

**RESOLUTION No. 19/20-19
CITY OF DAYTON, OREGON**

A Resolution Adopting Public Works Design Standards Update No. 10

WHEREAS, on October 6, 2006, the Dayton City Council adopted Resolution #06/07-11, A Resolution Adopting City of Dayton Public Works Design Standards (hereafter called "Standards"), and amended on February 5, 2007, by Resolution #06/07-27, A Resolution Adopting Public Works Design Standards Update No. 1; and on January 7, 2008, by Resolution #07/08-17, A Resolution Adopting Public Works Design Standards Update #2; and Resolution 07/08-31, A Resolution Adopting Public Works Design Standards Update #3; and Resolution 09/10-31, A Resolution Adopting Public Works Design Standards Update #4; and Resolution 12/13-35, A Resolution Adopting Public Works Design Standards Update #5; and Resolution 13/14-5, A Resolution Adopting Public Works Design Standards Update #6; and Resolution No. 15/16-10 A Resolution Adopting Public Works Design Standards Update #7; and Resolution No. 17/18-9 A Resolution Adopting Public Work Design Standards Update #8; and Resolution No. 19/20-2 A Resolution Adopting Public Work Design Standards Update #9; and

WHEREAS, the Standards are subject to change as both the City's needs change and the industry standards change, or if errors are discovered in the document; and

WHEREAS, certain information in the Standards needs to be updated or changed.

The City of Dayton resolves as follows:

- 1) **THAT** Update No. 10 to the City of Dayton Public Works Design Standards, (attached hereto as Exhibit A and by this reference incorporated herein) is hereby adopted; and
- 2) **THAT** this resolution shall become effective immediately upon adoption.

ADOPTED this 4th day of May 2020.

In Favor: Collins, Holbrook, Mackin, Marquez, Price, Sandoval-Perez & Wytoski

Opposed: None

Absent: None

Abstained: None



Elizabeth Wytoski, Mayor



Date of Signing

ATTESTED BY:


Patty Ringnald, City Recorder



Date of Enactment

Attachment - Exhibit A

Exhibit A

City of Dayton

PUBLIC WORKS DESIGN STANDARDS

September 2006

Last Updated ~~August~~ City review set 3/4/2020 2020

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PREFACE

These design standards have been developed by the City of Dayton to provide a uniform set of standards for public improvements. The intent of these standards is to provide guidelines for the construction of public facilities that will provide an adequate service level for the present as well as for future development. The format has been kept brief and no attempt has been made to cover all possible situations or to provide lengthy explanations.

These design standards are intended to be used in conjunction with the City's PWCS - Public Works Construction Standards (*ie. the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), most recent edition except as otherwise noted herein*). The PWCS are subject to the material, equipment and provisions specified in these PWDS. In the event of discrepancies between the requirements in these PWDS and the Public Works Construction Standards (PWCS) or between the text of these PWDS and the standard details, the more stringent requirements as determined by the City Engineer and Public Works Director shall apply.

Copies of these design standards can be obtained from City of Dayton, Oregon , PO Box 339 , Dayton, OR 97114 .

It is anticipated that revisions to the design standards will be made from time to time. The date appearing on the title page is the date of latest revision of the text portion of the standards. The date appearing on the details is the date of latest revision of that particular detail.

CITY OF DAYTON
Public Works Design Standards

Division 1

General Requirements

DIVISION 1 GENERAL REQUIREMENTS

1.1 GENERAL

- a. These Public Works Design Standards will be cited routinely in the text as the "Standards" or "PWDS".
- b. Wherever specific supplementary standards are indicated (ie. ASTM C-150), it shall be understood to mean the latest revision thereof.
- c. In interpreting these Standards, it is understood that: (1) if the context so requires: (a) the singular pronoun shall be taken to mean and include the plural pronoun; (b) the masculine pronoun shall be taken to mean the feminine and the neuter pronoun; and (2) all captions used therein are intended solely for the convenience of reference and shall in no way limit any of the provisions of these Standards.
- d. These Standards shall apply to all improvements within existing and proposed public right-of-way and public utility easements, to all improvements to be maintained by the City, and to all improvements for which the Development Code requires approval by the City. These Standards are to be guidelines for designers and developers in preparing their drawings and for City staff in reviewing drawings. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.
- e. Requests submitted for variances to these Standards shall be based on topography, right-of-way, geography or existing physical conditions which impose an economic hardship on the applicant. Requests for variances must demonstrate *(to the satisfaction of the City)* that the proposed variance meets the intent of the standards and will not compromise safety, will not disproportionately impact other properties *(as determined by the City)* or cause an increase in maintenance by the City.
- f. PWCS. The City currently has physical standards for the construction of streets and related work, sanitary sewers, storm drains and structures and waterlines which cover the standard construction requirements for these facilities within the City of Dayton *(Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), subject to the material, equipment and provisions specified in these PWDS)*. Standard Specifications are hereinafter referred to as Public Works Construction Standards (PWCS) and can be viewed at Dayton City Hall or the Public Works Department, and can be purchased on-line through the link at:
<https://5207--62.myuplinxstore.com/franchise/index.htm>.
- g. In the case of conflicts between the text of these design standards and the standard details, or between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply.

Acceptable materials shall be as outlined in these Design Standards.

- h. All other utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as City standards.
- i. Traffic Control Devices shall meet the standards of the current Manual on Uniform Traffic Control Devices, including Oregon amendments.
- j. All other work not covered by the above standards shall conform to the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), most recent edition.
- k. All applicant/developers are hereby notified that the requirements of the PWDS must be addressed during the design & construction of any improvements which are required due to land use decisions. This applies whether or not specific PWDS requirements are referenced during the land use approval process, noted in the land use findings or included in the land use approval conditions.

1.2 PURPOSE

- a. The purpose of these Standards is to provide a consistent policy under which certain physical aspects of public utility design will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to the development or platting process. However, it is intended that they apply to both public and private work designated herein.
- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.
- c. The objective is to develop Standards which will:
 - 1) be consistent with current City Ordinances.
 - 2) provide design guidance criteria to the private sector for the design of public improvements within the City of Dayton.
 - 3) provide public utility improvements designed in a manner to allow economical future maintenance.
 - 4) Develop minimal franchise and/or private utility standards for systems which will impact or potentially impact public streets and/or public utility systems.

1.3 ENGINEERING POLICY

- a. The engineering policy of the City of Dayton requires strict compliance with Oregon Revised Statute 672 for professional engineers. The following requirements shall be applicable to the design of streets, grading plans, sanitary sewers, storm drain systems (*including detention systems*), and water distribution and storage facilities.
- 1) All engineering drawings, reports, or documents designated herein shall be prepared by a professional Civil Engineer registered in the State of Oregon, or by a subordinate employee under his direction, and shall be signed by him and stamped with his seal to indicate responsibility for them. Per interpretations issued by the OSBEELS Professional Practices Committee (*December 2016*), the design engineer shall seal and sign drawing sheets containing standard details (*whether prepared by the City or other agencies*), since the details are incorporated into the larger design which is under the responsible charge of the design engineer.
 - 2) It shall be the Design Engineer's responsibility to review any proposed extension, modification or improvement of a public utility system with the City prior to final engineering and design work to determine any special requirements or whether the proposal is permissible. A preliminary review and/or approval of the drawings for construction for any project does not in any way relieve the Design Engineer of his responsibility to meet all requirements of the City or the obligation to protect life, health and property of the public. The drawings for any project shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met. Furthermore, it shall be the Design Engineer's responsibility to review any and all standard details incorporated into the design (*whether prepared by the City or other agencies*), and verify that they are applicable to and appropriate for the proposed design.
 - 3) Any engineer having submitted to the City false or inaccurate information of a material nature will be warned of their conduct, and the Oregon State Board of Engineering Examiners will also be advised.

1.4 DEFINITIONS AND TERMS

- a. Unless otherwise defined in these Standards, the following definitions, terms and abbreviations shall apply whenever used.
- 1) ADA: Americans with Disabilities Act, including any amendments thereto, and all applicable federal rules and regulations implementing the ADA, including but not limited to the current version of the Public Right-of-Way Accessibility Guidelines (PROWAG).
 - 2) As-built Drawings: Drawings prepared by the Design Engineer, signed and dated by the city representative indicating the drawings have been reviewed and

revised, if necessary, to accurately show all as-built conditions and construction details.

- 3) City: The City of Dayton, Oregon.
- 4) Construction drawings: Drawings prepared by a registered professional engineer, including site plans, plan and profile views of utilities, cross sections, detailed drawings, etc., or reproductions thereof, approved by the City Engineer, which show the location, character, dimensions and details for the work to be done.
- 5) Definition of Words: Wherever, in these Standards, the words directed, required, permitted, ordered, designated or words of like importance are used, they shall be understood to mean the direction, requirement, permission, order or designation of the City Engineer and Public Works Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or satisfaction to the Director.
- 6) Design Engineer: The engineer licensed by the State of Oregon as a Civil Engineer under whose direction plans, profiles and details for work are prepared and submitted to the City for review and approval.
- 7) Director: The Director of Public Works of the City of Dayton or his/her authorized representative.
- 7)8) Dwelling Unit: A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, eating and sanitation.
- 8)9) Easement: Areas along the alignment of streets, sidewalks or utilities which are outside of a dedicated street right-of-way. Easements to the City shall be prepared on standard City easement forms granting (*to the City*) access & easement rights along the utility line or facility, and formalizing the terms and conditions of the easement.
- 9)10) Multiple Family Dwelling: A building or portion designed thereof for occupancy by two or more families, living independently of each other.
- 10)11) Manufacturer's Name: Any manufacturer's name, specification, catalog number, or type used herein is specified by make in order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are comparable with this established standard.
- 11)12) Owner: Any individual, partnership, firm or corporation by whom the Design Engineer has been retained or who, as a property owner, is making arrangements with the City.
- 12)13) Person: Individual, firm, corporation, association, agency or other entity.

- ~~13)~~14) Plans: See Construction Drawings.
- ~~14)~~15) Preliminary Review: Review of the construction drawings by the City as outlined in these standards. All City comments and provisions of these design standards must be addressed prior to final review and approval for construction.
- ~~15)~~16) PROWAG: Public Right-of-Way Accessibility Guidelines, see ADA.
- ~~16)~~17) PWCS: Public Works Construction Standards, consisting of Oregon Standard Specifications for Construction (OSSC (ODOT/APWA)), subject to the material and equipment specified in these PWDS. See also PWDS 1.1.f.
- ~~17)~~18) PWDS: Dayton Public Works Design Standards, consisting of this manual.
- ~~18)~~19) Residential User: The owner, lessee, or occupant of a single dwelling unit in one structure.
- ~~19)~~20) Right-of-Way: All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public free of all encumbrances, within which the City shall have the exclusive right to install and maintain streets and public utilities.
- ~~20)~~21) Roadway: All of that portion of the right-of-way used, for vehicle movement, which exists between the curbs or proposed curbs or proposed curb lines.
- ~~21)~~22) Single Family Dwelling: Any residential building designed to house one family.
- ~~22)~~23) Standard Details: The drawings of structures or devices commonly used on City work and referred to on the construction drawings. Also called Standard Plans.
- ~~23)~~24) Street or Road: Any public highway, road, street, avenue, alley, way, easement or right-of-way to be used for vehicle movement.
- ~~24)~~25) Substantial Completion (*Public Works*): Substantial Completion is that degree of completion of the project's facilities and operating systems sufficient to provide the City and the public the full time, uninterrupted, and continuous beneficial use and operation of the work, and after (i) all required functional and acceptance testing has been successfully completed; (ii) all final Public Works, building, plumbing, mechanical and electrical inspections required have been completed and any identified critical defective or incomplete work replaced or corrected; and (iii) all required record drawings and maintenance bonds have been submitted and accepted by the City. The terms "substantially complete" and "substantially completed" as applied to all or part of the work refer to Substantial Completion thereof.
- ~~25)~~ Director: ~~The Director of Public Works of the City of Dayton or his/her authorized representative.~~

26) Substantial Completion (for building permits in residential subdivisions, under HB 2306): Effective 1/1/2020, HB 2306 prevents a city from denying a building permit on the basis that the supporting infrastructure is not entirely completed in a subdivision. If a residential subdivision is built, the city must have a process to allow the builder to seek building permits upon "substantial completion" of the infrastructure required as a condition of development.

As defined in HB 2306, "Substantial completion" means the city, county or other appropriate public body has inspected, tested and found acceptable under applicable code requirements, unless the parties agree to a lower standard: (A) The water supply system; (B) The fire hydrant system; (C) The sewage disposal system; (D) The storm water drainage system, excepting any landscaping requirements that are part of the system; (E) The curbs; (F) The demarcating of street signs acceptable for emergency responders; and (G) The roads necessary for access by emergency vehicles."

Per HB 2306 also allows the City to require that if all improvements are not complete, "The developer, declarant or owner, to secure the completion of the remaining public improvements included as conditions of development for the residential subdivision: (A) Obtains and maintains a bond; or (B) Undertakes an alternative form of financial guarantee, if any, that is acceptable to, but may not be required by, the city or county."

Also per HB 2306, a city may decline to issue the certificate of occupancy "for any residential dwellings if all conditions of development are not fully completed or the conditions for the release of the bond are not fulfilled."

27) Substitute: If in the sole discretion of the Public Works Director or his designee, an item of material or equipment proposed by the Contractor does not qualify as an "or equal" item as defined above, or requires a change to the design or to the configuration of the project in order to be utilized, it will be considered as a proposed "substitute". The decision relative to acceptability of substitute items will be by the Public Works Director or his designee, and shall be final. In addition to the review criteria for "equal" items, the written request for review of a substitute item shall document whether use of the proposed substitute item will require any changes to adapt the design to the proposed substitute item (and to what extent), and shall identify the timeframe required to complete such design changes, and that there will not be any cost or other impact to the City due to any such required design changes.

26)28) Survey Cut Sheets: Sheets of tabulated survey data, indicating stationing, structures, fittings, angle points, beginning of curve, points on curve, end of curves, staking offset, various elevations and offset utility cuts.

27)29) Traveled Way: That portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.

~~28~~30) UGB: Urban Growth Boundary.

1.5 LOCATION OF UTILITIES WITHIN RIGHT-OF-WAY OR EASEMENT

- a. The standard details indicate the general required location for each utility within the public right-of-way.
- b. Installation of franchise or private utilities in a common trench with public water, sanitary sewer or storm drain mainlines is prohibited. Unless otherwise approved by the Public Works Director and the City Engineer, a minimum of 5 feet of horizontal separation must be maintained between public and private or franchise utilities except at crossings, as well as between water or fire service lines and private or franchise utilities. Franchise utilities or private utilities shall not be placed in City utility (*ie. water, sewer or storm*) easements, unless specifically directed in writing to do so by the Public Works Director, subject to separation requirements in excess of minimums as dictated by Public Works.
- c. Utility service companies proposing to install major utility systems larger than typically required to serve local users and which cannot conveniently be relocated in the future will be required to prepare detailed drawings showing how the proposed system can be installed within the right-of-way without conflicting with existing or proposed City utilities. Drawing requirements may include but not be limited to plan and profile of proposed systems based on a detailed topographic survey.
- d. Utility/Infrastructure Modifications Required Due to Changes on Private Property.
 - 1) If changes are made to private property which requires modifications to and/or relocation of City utilities/infrastructure which is installed on private property (*ie. changes including but not limited to changes in finish grade, changes in surface type, change in use of the property, construction of structures, etc.*), such modifications and/or relocation shall be completed by the property owner or Developer at their sole expense, as directed by the City.
 - 2) When modifications to and/or relocation of City utilities/infrastructure are required due to changes on private property, such modifications and/or relocation shall comply with current City standards, and shall be reviewed and approved in accordance with these PWDS.

1.6 PROVIDING FOR NEW & FUTURE DEVELOPMENT

- a. All public improvements shall be designed as a logical part of the development of the surrounding area, as required or approved by the City Engineer and Public Works Director.
- b. Storm drain systems and sanitary sewers shall be sized to accommodate the entire drainage basin which they will ultimately serve.
- c. Utilities and street improvements shall be extended to the boundaries of the development (*ie. to and through*) so as to provide for future extensions to the adjoining areas and prevent adjoining properties from becoming landlocked. In the case of utilities, this shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future.
- d. The City may require over-sizing of utility lines to accommodate future growth of the City. Water, sewer and storm drain mainlines shall be sized to comply with recommendations in the applicable master plan documents or maps.
- e. Where existing City utility lines do not adjoin the proposed development or the capacity of existing lines is inadequate, or are smaller than the minimum size allowed under the PWDS, or where the size does not match the applicable utility master plan documents or maps, the developer will be required to extend new utility lines to the development as necessary, and extend them through the property or to the end of the property frontage as required to provide for service to adjacent properties, at the developer's expense.
- f. Connection of Existing Utilities. Existing City utilities crossed, intercepted by or in the vicinity of new utility lines or facilities shall be connected to the new City utility system at locations as required by the City Engineer and Public Works Director. Existing City utility lines which are parallel with, or which are replaced or superseded by the new utility lines (*as determined by the City*), shall be abandoned or removed as part of the project (*and existing facilities or structures served by the abandoned lines shall be connected to the new system as applicable*), as required by the City Engineer and Public Works Director.
- g. Where existing roadway improvements do not extend to the proposed development or the existing roadways to the proposed development are not adequate to serve the development, the developer may be required to improve the roadways to the development, at the developer's expense.
- h. SDC Credits & Oversizing Reimbursement. The requirement by City standards that offsite or oversized street and/or offsite or oversized utility improvements must be completed "at the developer's expense" does not preclude the developer from applying under any SDC credit, oversizing reimbursement or reimbursement district procedures which may be authorized by the City Council or provided for by City code.

1.7 TIME LIMITS FROM DRAWING APPROVAL TO CONSTRUCTION

- a. The Developer shall obtain a construction permit and begin construction within six (6) months from the time the construction drawings are approved by the City Engineer. If construction does not begin within this period, the approvals of the construction drawings shall be null and void. Renewal of the approval for the construction drawings may result in additional conditions to update standard details, meet new standards, changed conditions or new information discovered since the original approval.

1.8 PHASED DEVELOPMENT

- a. In the case of a development approved to be constructed in phases, the construction drawings and infrastructure constructed for each phase shall be capable of standing alone.
- b. Approval by the City of construction drawings for each phase of a phased development shall be independent of the approval for all other phases.
- c. The intent of these requirements is that the time limits between approval of the construction drawings by the City and the time by which construction must begin shall apply to each phase independently.

1.9 REVIEW PROCEDURE

- a. Detailed provisions covering the review procedures and permitting requirements for street, site and utility construction are contained in Appendix G of these standards. The following is an overview of these requirements.
- b. Pre-design Conference: The developer and developer's engineer are required to schedule a meeting with the Public Works Director and the City Engineer after land use approval and prior to preparing final design drawings of the proposed improvements.
 - 1) A minimum of 5 working days prior to the predesign meeting, it shall be the responsibility of the developer or the developer's engineer to provide the City Engineer with copies of the following:
 - a) Base maps and topographic surveys showing existing streets and utilities within and adjacent to the property, and along and/or required proposed utility & infrastructure alignments (*on-site and offsite, limits as required by the PWDS*), and;
 - b) A plan or narrative summary detailing how each of the planning conditions of approval (*ie. land use conditions*) will be satisfied (*as applicable*), and;
 - c) Scaled plan view drawings showing existing and proposed lot layouts

(sizes and dimensions), proposed and/or required street, sidewalk and/or utility *(water/sewer/storm)* alignments and improvement limits and conceptual layouts, existing grade contours and designation of where significant cuts or fills will be required, general alignment of any proposed retaining walls, limits of proposed or required right-of-way dedications and easements *(on-site and offsite, addressing the requirements of PWDS, the development code, planning conditions of approval, and known agency requirements)*, and;

- d) Preliminary profiles or invert/slope information along gravity sewer and storm alignments *(including proposed rim elevations for all manholes, catch basins, & other structures)*, demonstrating the ability to meet the depth and slope requirements of the PWDS, and;
 - e) Verification that the elevations shown are based on the vertical datum specified in the PWDS, as well as information on the drawings showing the location and limits of any flood plain or wetlands within the development or along offsite street/utility alignments *(as wells as information on the status of any required wetland permits)*, and;
 - f) List of *(and justification for)* any known variances to the PWDS requirements which will be necessary based on the preliminary layout, street and utility drawings required above, and;
 - g) A current title report(s) covering all property where utility construction will occur *(which includes a list of all existing easements, restrictions, and other encumbrances, including copies of deeds, easements or other restrictive documents referenced in that report)* [a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy], and;
 - h) A geotechnical report is typically required for sites with existing fills,
 - i) Other information requested by the Public Works Director or the City Engineer.
- c. Construction Drawings for Review: After the pre-design meeting, for single family residential developments, three (3) sets of complete full size construction drawings *(addressing all issues noted in the pre-design meeting)* shall be submitted to the City for preliminary review. For commercial, industrial and multifamily residential developments, four (4) sets of complete full size construction drawings *(addressing all issues noted in the pre-design meeting)* shall be submitted to the City for preliminary review. Submittal requirements are as outlined herein, and shall include a unit price engineer's estimate acceptable to the City Engineer and any required review fees *(see also PWDS G.7)*. Incomplete submittals will be returned without review.

- d. Review Comments, Resubmittals:
- 1) Upon completion of the preliminary review, the City will return one (1) set of drawings outlining the required revisions (*with redline drawings, a review letter or memo, or email as applicable*).
 - 2) In order to be entitled to further review, the applicant's engineer must address each comment of the prior review(s), and make all required corrections. All resubmittals and responses to comments must appear throughout to be a bona fide attempt to result in complete drawings fully conforming to City standards.
 - 3) Return without Review. The City reserves the right to return, without review, revised drawings and/or submittals which have not addressed all previous review comments.
 - 4) Resubmittals shall consist of a minimum of three (3) sets of full size drawings for single family residential developments, and a minimum of four (4) sets of full size drawings for commercial, industrial and multifamily residential developments, unless the City and the City Engineer allows pdf submittals of the revised drawings.
- e. Franchise Utility Coordination by Developer's Engineer. Once the preliminary review has been completed by the City and required revisions made, the Developer's engineer shall circulate the drawings to all utility service companies within the City, and bring any conflicts to the attention of the City Engineer and Public Works Director. Prior to installation of any franchise utilities, all proposed drawings from utility service companies must be provided to the City for review.
- f. Coordination of Other Agency Approvals by Developer's Engineer. The Developer's engineer shall submit the drawings to all other agencies with jurisdiction as applicable, and bring any conflicts to the attention of the City Engineer and Public Works Director. Prior to final City approval of the construction drawings, approvals from other agencies with jurisdiction must also be received where applicable, including but not limited to the Oregon Health Authority – Drinking Water Services (OHA-DWS), Department of Environmental Quality (DEQ), Department of Transportation (ODOT), Yamhill County and railroads wherein each has jurisdiction.
- g. The applicant is responsible for the coordination with the various utilities and agencies during design and construction. The utilities and agencies may include those shown in the Appendix.
- h. Upon final approval of the drawings for a Type B permit, submit a minimum of ten (10) copies of the revised drawings to the City Engineer to be stamped as approved for construction (*see also Appendix G for Type A permit requirements*). Additional sets may be submitted for stamping at the developer's option. No changes shall be made between the final verification set of drawings approved by the City and the drawing sets submitted to the City to be stamped, without the express written approval from the City.

Any unauthorized changes introduced into the final drawings submitted for stamping will invalidate the final drawing approval.

- i. Prior to issuance of the Public Works street or public-utility construction permits, the Developer shall provide the City with the following:
 - 1) Copy of an approved (*by City Attorney*) Developer/City Construction Agreement signed and notarized by the Developer, the Developer's engineer and the Developer's prime contractor.
 - 2) Any required permit fees.
 - 3) Recorded copies of all required off-site easements (*with exhibit maps*) and off-site right-of-way dedications, and as well as on-site easements and on-site right-of-way dedications, and any as well as recorded maintenance agreements required by City standards, shall be submitted before construction permits are issued, with the following exception.
 - a) For subdivisions or partitions where all public utilities will be constructed prior to the recording of a final plat, the execution and recording of the on-site easement documents and on-site right-of-way dedications, as well as recorded agreements relating to on-site or off-site improvements, can be done in conjunction with the final plat.
 - a)b) If the Public Works Director, at his sole discretion, approves a request by the development team to split the City Public Works construction permits into segments, so that the certain work can be commenced while the detailed civil/site/utility construction drawings for the remainder of the improvements (*offsite or onsite*) are completed and reviewed, such split permits shall not be issued until after any identified offsite easements have been acquired by the development team, and recorded copies of the easements have been provided to the City.
 - 4) All easements documents (*as well as ROW dedications, easement quit-claim deeds, or similar documents*) shall include a legal description and a to-scale exhibit map (containing the information required under PWDS 1.11), and easements to the City shall use the City's standard form. Legal descriptions and exhibit maps shall be submitted for City review and approval prior to recording.
 - 5) Proposed Construction Schedule.
 - 6) Certificates of insurance, minimum limits as outlined in the Appendix. City of Dayton and City Engineer shall be covered as additional insured.
 - 7) Evidence of Workman's Compensation coverage from contractor performing the work.
 - 8) Any required Waiver of Remonstrance agreements.

- 9) Any required performance bonds.
 - 10) Other submittals specific to this project, including any required approvals from applicable state agencies, such as DEQ (sewer & erosion control), OHA-DWS (water), DSL, ODOT, etc.
- j. Approval of plans by the City Engineer or Public Works for issuance of a City Public Works street/site/utility construction permit does not relieve the developer, contractor or engineer from obtaining any and all reviews and permits required under the building, plumbing or electrical codes that any portions of the work may be subject to, or from any requirements under County, ODOT or other agency permits or approvals required for the project.

1.10 CONSTRUCTION DRAWING SUBMITTAL REQUIREMENTS

- a. Survey: *All topographic surveys shall be based from an official benchmark acceptable to the City, and be based on the NAVD 1988 datum to match the FEMA flood map elevations. Existing elevation benchmarks that are based on the NGVD 1929 datum shall utilize the appropriate conversion factor to convert to the NAVD 1988 datum. All temporary benchmarks for construction purposes are to be based off accepted City benchmarks.*

Based on the NOAA VertCon website, the current conversion (*for this area*) from 1988 to 1929 datum is about 3.356 feet – see http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl for specific conversions by location.

****All designs subject to a Type B Public Works Permit shall be based off of a complete topographic survey of the entire project site, adjacent right-of-ways, areas adjacent to the project site and outside of adjacent to right-of-ways as necessary to provide all design elements required by these PWDS, and all offsite areas where improvements are proposed or required, including but not limited to the following.**

- 1) ****Surface features, including complete & accurate topographic information, extended to the full limits required by these PWDS.**
 - 2) ****Subsurface features.**
 - 3) ****Existing utilities (*public and private*) within and adjacent to the project site and/or limits of improvements.**
 - 4) ****Property lines & all survey monuments within or adjacent to the limits of the required topographic survey.**
 - 5) ****Right-of-way lines & centerline monuments.**
- b. Drawing Submittal: The drawing submittal shall include the following as applicable unless otherwise approved by the City Engineer. The following is a general overview of drawing requirements, but is not intended to be exclusive. All requirements of the

individual divisions of the standards shall be satisfied.

Since projects subject to a Type B Public Works Construction Permit vary greatly in size and complexity, not all provisions in this section will apply to all projects. For instance, small projects in improved areas which do not involve any street improvements or extensions of water, sewer or storm drain mainlines will not need to provide profiles for these facilities. To assist the design engineer, the minimum elements required of all designs subject to a Type B Public Works construction permit are designated as summarized in the sentence below.

****The elements in this section 1.10 which are marked by an (**) are required to be included on the drawings for all projects subject to a Type B Public Works construction permit (see PWDS G.5).** All other elements not so designated are only required if the project involves improvements or infrastructure referenced in the non-designated paragraphs or sentences. If there are questions due to the unusual nature of a project, these should be discussed with the Public Works Director at the predesign conference (PWDS 1.9.b)

- 1) ****Construction drawings shall be submitted on 22" x 34" blackline sheets unless otherwise approved by the City Engineer. All drawings submitted for review and/or approval shall be stapled and bound into sets.**
- 2) ****City plan review fees as required.**
- 3) ****Cover Sheet (*with all information required under PWDS 1.10.d*)**
- 4) ****Overall drainage, utility and street/site lighting plan.**
- 5) ****Site grading plan where applicable.**
- 6) Plan and profile for the following public utilities:
 - a) Streets
 - b) Water as specified
 - c) Sanitary sewers
 - d) Storm drains
- 7) ****Erosion control plan.**
- 8) ****Standard details shall be included on the construction drawings.**
- 9) ****Stamped storm drainage calculations, including storm drainage basin maps.**
- 10) A geotechnical report for the development site and other impacted properties is required for sites with (a) any existing or proposed fills, (b) existing slopes steeper than 3H:1V, (c) existing or proposed retaining walls on the

development property or on contiguous properties, (d) if stormwater infiltration is proposed, or (e) where there are other geotechnical concerns identified by the City Engineer or the Public Works Director.

- 11) **A current title report which includes a list of all existing easements, restrictions, and other encumbrances on all property where construction will occur, including full copies of deeds, easements or other restrictive documents referenced in the title report (*a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy*).
- 12) **Recorded copies of all easements and right-of-way dedications required in conjunction with the project, with the exception noted under PWDS 1.9.i.3 for subdivisions or partitions where all public utilities will be constructed prior to the recording of a final plat. Easements shall be worded such that no trees, permanent structures or improvements including parallel fences shall be placed or constructed on the easement. Easements shall be a constant width between manholes, valves or other in-line structures. Easement width shall be based on the deepest portion of the line between such structures. See the Appendix for standard easement forms.
- 13) **Proposed utility plans from all franchise utilities (*final review*).
- 14) **Engineer's unit price construction cost estimate acceptable to the City Engineer or unit price bid results (*estimate to be submitted with initial review drawings and shall be updated as applicable when final review drawings are provided*). Cost estimates shall include all work covered under the PWDS (*excluding work covered by buildings permits for structures*). In addition to all grading, streets, water/sanitary sewer/storm drainage, driveways, parking, etc. to be constructed with the project, estimates shall include line items for street lighting and franchise utility trenching & conduit, as well as trenching & installation of street lighting conduits, junction boxes and pole bases as applicable.
- 15) Design Vehicle Turning Radius. For all developments (*other than single family subdivisions and/or partitions conforming with OFC requirements*), provide a summary of the largest design vehicle (*including emergency/fire vehicles*) which will need to access the development (*including vehicle size & dimensions*), as well an exhibit showing turning-radius wheel-path templates for the design vehicle (*auto-turn or equivalent*). The development team shall be responsible to coordinate with the Fire Chief regarding the size and turning radius of the largest emergency/fire vehicle which will need to access the site.
- 16) The submittal may also be required to include a traffic study and a traffic control plan.
- 17) **A written summary of all deviations from the PWDS requirements, and

written justification for any variance requests (*see section 1.11*). It is the responsibility of the design engineer to submit a written request for any proposed deviations or variances from City standards.

c. General

- 1) **A title block shall appear on each sheet of the drawing 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 name of the project, the sheet title and number, the name of the engineering firm, engineer's stamp, date and revision blocks. Revision blocks shall be filled in on each drawing sheet containing revisions from previously submitted or reviewed drawings.
- 2) ***By City convention and to minimize confusion regarding directions, for areas northerly of Palmer Creek, "plan" north (for purposes of design drawings) is considered to be parallel with the numbered streets (1st Street through 9th Street). North arrows (true north and plan north where applicable) shall be shown on each sheet containing plan views and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.*
- 3) **The scale shall be 1"=10', 20', 40' or 50' horizontal and 1"=2', 4' or 5' vertical for all drawings except structural or mechanical drawings. The scale of corresponding plan views and profiles shall be the same.
- 4) **In cases where streets or public utilities exist or will be reconstructed, plan view scales shall not exceed 1" = 20'.**
- 5) **Each plan, profile and detail shall be labeled under the drawing. The scale for the plan, profile, or detail shall be noted under the title. Details not drawn to scale shall be so noted.
- 6) **All detail drawings, including standard detail drawings, shall be included on the drawing sheets.
- 7) **A complete legend of all symbols used shall be provided at the front of each drawing set or on the appropriate pages. In general, existing utilities shall be shown with a lighter line weight than proposed utilities.
- 8) **Letter size shall not be smaller than 0.10-inch high.

d. Cover Sheet

- 1) The first sheet (*Cover Sheet*) of all drawing sets shall include the following as a minimum:
 - a) ****Project name.**
 - b) ****Design Engineer's name, address, telephone and fax number, and email address/website.**
 - c) ****Developer's name, address and telephone number, and email address.**
 - d) ****Vicinity Maps showing the location of the project in respect to the nearest major street intersection and a minimum of 500 feet around the site.**
 - e) ****Legend including all symbols and line types used on the construction drawings.**
 - f) ****General construction notes matching format and content of notes in the Appendix. Where there is insufficient room on the cover sheet, the notes can be included on a subsequent sheet.**
 - g) ****Sheet index located near lower right corner.**
 - h) **Include a summary table listing the number of lineal feet of new public streets and public mainline utilities to be constructed. Identify the length of new streets and/or utilities under County or ODOT jurisdiction separately from those under City jurisdiction. Do not include existing streets or utilities that are being replaced as part of the project with the same length, or private streets or utilities. List the size and type (*domestic, irrigation, etc.*) of all water meters proposed. Do not include length of sewer or storm service laterals.**
 - i) ****The City Planning Department file or docket number shall be listed for projects which required land use approval.**

e. ****Overall Drainage, Utility and Street/Site Lighting Plan.**

- 1) The overall drainage and utility plan shall show the following as a minimum:
 - a) ****The location and elevation of a National Geodetic Survey, United States Geological Survey, State Highway, Yamhill County or City of Dayton bench mark which the elevations shown are based shall be shown or noted. Temporary bench marks on or near the project site shall also be shown.**
 - b) ****Right-of-way lines, property lines, easement lines (*including those***

outside the project but intersecting or within 150 feet of the project boundaries).

- (1) *This distance can be reduced with written approval from the Public Works Director, but in all cases shall extend to the far side of right-of-ways and show property lines and improvements on the far side of the street along the entire property frontage, as well as showing enough of the adjacent properties to clearly illustrate drainage patterns, setbacks and utility issues.*
- c) ***Show (& list the recording reference numbers of) all existing easements affecting the property (on-site & off-site), and provide callouts with blanks for the proposed new easements (the recording references for proposed easements are to be inserted at the as-built stage).*
- d) ***Existing and proposed streets, curbs, sidewalks, handicap ramps and driveways within the project and within 150 feet of the project boundaries (see exception allowed under 1.10.e.1.b.1 above).*
- e) ***Existing and proposed sanitary sewers, storm drains, waterlines and appurtenances within the project and within 150 feet of the project boundaries (see exception allowed under 1.10.e.1.b.1 above).*
- f) ***Existing franchise and private utilities within the project and within 150 feet of the project boundaries (see exception allowed under 1.10.e.1.b.1 above).*
- g) ***Lot or parcel numbers, street names and other identifying labels (including tax lot and address numbers for all existing properties shown). New street names are subject to the approval of the City.*
- h) ***Location and description of existing survey monuments, including but not limited to street monuments, property monuments, section corners, quarter corners and donation land claim corners within or adjacent to the limits of the work area.*
- i) ***Public and franchise/private utilities and other facilities to be relocated.*
- j) *Street light and site/parking light locations based on a City spacing standards or a photometric design acceptable to the City, subject to City approval for location and maximum spacing (see PWDS 2.28.h & 2.32).*

- k) Methodology proposed for individual lot drainage. Direction of drainage arrows and the following letter legend shall be used:

Symbol	Lot drains to:
C	Curb
P	Piped Storm Drain
DB	Detention Basin
S	Subsurface Disposal
→	Flow Direction

- l) The location of all curb weepholes shall be shown unless otherwise clearly defined or noted on the drawings.
- m) ****Existing drainage patterns within the project and within 150 feet of the project boundaries (see exception allowed under 1.10.e.1.b.1 above).**
- n) Floodplain, floodway and wetland boundaries, including floodplain elevation with FEMA map reference.

f. Site Grading Plan

- 1) A site grading plan is required for subdivisions, multi-family, commercial or industrial developments, and for partitions involving street improvements or cuts/fills.
- 2) A site grading plan is required for projects subject to site design review, including all commercial, industrial, or multi-family developments.
- 3) The site grading plan shall show proposed finished grade and parcel corner elevations, with the existing and proposed contours shown at maximum one (1) foot intervals and extended a minimum of 100 feet beyond the improvements. Extremely flat sites will require contour intervals closer than 1 foot as necessary to clearly illustrate proposed grading and drainage slopes and limits.
- 4) The site grading plan shall show all drainage systems and proposed erosion control facilities, including swales along property lines as required to intercept uphill surface runoff and convey it to an approved point of disposal.

g. Drainage Calculations

- 1) **A summary of drainage and detention calculations, including basin maps, shall be presented in a clear, concise and complete manner on the site grading or drainage plan sheets, or a separate sheet. These calculations shall address all runoff into the drainage system and downstream capacity. Where applicable, list information such as the design flow and pipe capacity at key points along the storm system improvements including where flow from upstream property enters the site, downstream capacity at the connection to existing system, etc., as well as key information relating to any required detention, such as detention volume required, detention volume provided, predesign in-flow rate & design storm, design out-flow rate & design storm, overflow elevation, orifice size, head above orifice at design flow, overflow route capacity, etc. If required by the City, 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.

h. Plan Views

- 1) General: **Information required on the overall utility plan shall be shown on the plan views as applicable, including tax lot & address numbers of all existing lots or existing parcels shown. In addition, the following shall be shown:
 - a) **Utilities and vegetation in conflict with the construction or operation of the street and public utilities. Vegetation to include trees greater than 6 inches in diameter and landscape plantings within the right-of-way and easement areas.
 - b) Public and franchise or private utilities to be relocated.
 - c) Match lines with sheet number references.
 - d) **All existing survey monuments within or adjacent to work areas.
 - e) Additional information as outlined below or as required by the City based on unique or unusual features of the project.
 - f) Show Future Curblines where Applicable. Where existing streets are not fully improved, or where less than full street improvements are being constructed, show the location & alignment of future curblines and intersection curb radii, so that the location of utilities being installed are clearly defined in relation to the future street improvements (*this requirement also applies to water/sewer/storm mainline improvements which are constructed without streets improvements, unless specifically waived by the City*).

2) Streets (plan view)

- a) Street stationing shall be tied to existing property corners, centerline of intersections, and/or existing street monuments.
- b) ****Location, alignment and stationing of **existing streets and proposed street centerline and curb faces. **Location of all curbs, driveways, edge of pavement, sidewalks, etc. shall be dimensioned from right-of-way centerline, easement boundary or other means so that its location is clearly defined.**
- c) Bearing of all street centerlines.
- d) Horizontal curve data of street centerline and curb returns, including stationing of point of tangency and point of curvature, length of tangent, length of centerline curve, delta angle, radius point, and centerline radius.
- e) Location of existing and proposed street centerline monuments.
- f) Centerline stationing of all intersecting streets.
- g) **Curb return plan view details (*scale not to exceed 1" = 10', with all running slopes & cross slopes of sidewalks, pedestrian ramps & landings labeled*) and separate curb return profiles (showing gutter grades at face of curb) for all curb returns with pedestrian ramps, to demonstrate compliance with PROWAG requirements. Where centerline street grades and cross slope street grades of both intersecting streets is less than 1% (*including through the entire intersection*), the City Engineer may allow plans to show only top of curb elevations along curb returns at quarter-points on the curb return detail views.**
- h) Location of the low points of street grades and curb returns.
- i) Crown lines along portions of streets transitioning from one typical section to another.
- j) Location, alignment & dimensions of all street frontage sidewalks, including sidewalks to be constructed with the project and sidewalks which are deferred to a future date. Sidewalks to be constructed with the project and those deferred to the future shall be clearly designated, and all required sidewalk easements shown & labeled.
- k) For residential projects or multi-tenant commercial projects, the location of CBU mailboxes shall be shown (*location must be acceptable to the local postmaster*), and the ADA access path to the CBU mailboxes must be designated per OSSC 1111, with a note designating that the CBU and the required ADA access path to the

CBU must be constructed prior to City acceptance of the street improvements.

- l) Partial street improvements must be based on a full street design for a full urban improvement (*ie. provide full design as if the entire street were being constructed as part of project, including design of sidewalks & driveway approaches, reconnection to existing driveways, etc. on both sides, as well as storm drainage design for both sides of the street and associated intersections, etc.*), with the portion actually to be constructed as part of the project being clearly designated on the plans.

Where partial street improvements cross or intersect with other public or private streets, the partial (*interim*) intersection design must be based on a full intersection design, including but not limited to showing proposed and future ADA compliant pedestrian ramps on all corners, storm drainage for the entire intersection, etc.

- m) For streets which are anticipated to experience significant truck traffic (*as determined by the City Engineer or Public Works*), and for driveways or access points which will accommodate truck traffic and/or emergency/fire vehicles, turning-radius wheel-path templates shall be included with the drawings to demonstrate that the proposed improvements allow vehicular turning movements without encroaching onto sidewalks or crossing curbs outside of the defined driveway or vehicular access path.

3) Storm Drains (*plan view*)

- a) ****Location, stationing and **size of **existing and proposed storm drains and appurtenances. Show drainage facilities upstream and downstream of the project as required to illustrate conditions affecting the design.**
- b) ****Drainage facilities located outside of public right-of-ways shall be stationed from the downstream end. For all manholes, catch basins, etc, located in or adjacent to streets, drainage facility stationing shall correspond to the street stationing.**
- c) Mainline stationing of all service tees.
- d) ****Location of all manholes, cleanouts (*including storm lateral cleanouts*), junction boxes, pipelines, ditches, etc. shall be dimensioned from right-of-way centerline, easement boundary, property line or other means so that its location is clearly defined.**
- e) All manholes and other structures shall be numbered (*or lettered*) with a designation unique to the project and stationed to facilitate checking the

plan views with the profile.

- f) ****Alignment, size and depth at property line or easement line of proposed storm drain laterals, as well as distance tie from property line cleanout to nearest property corner.**

4) Sanitary Sewer (plan view)

- a) ****Location, stationing and **size of **existing and proposed sanitary sewers and appurtenances.**
- b) All sanitary sewers shall be stationed from downstream manholes to upstream manholes.
- c) ****Location of all manholes, cleanouts, pipelines, ditches, etc. shall be dimensioned from right-of-way centerline, easement boundary or other means so that its location is clearly defined.**
- d) Mainline stationing of all service tees.
- e) All manholes, cleanouts and other structures shall be numbered (*or lettered*) with a designation unique to the project and stationed to facilitate checking the plan views with the profile.
- f) ****Existing City manholes numbers shall be used for all existing manholes or mainline cleanouts shown. Following acceptance by the City, each new sanitary sewer manhole and new mainline cleanout shall be identified on the as-builts with a number provided by the City.**
- g) ****The following information shall be provided for all sanitary sewer service laterals.**
 - (1) Mainline stationing
 - (2) Alignment
 - (3) Size
 - (4) Length of service lateral
 - (5) Depth at property line or easement line
 - (6) Distance ties from property line cleanout to nearest property corner
 - (7) Location of property line cleanout.

5) Water Distribution (plan view)

- a) ****Location, callouts, stationing (*where applicable*) and **size of **existing and proposed water mains and appurtenances, fittings, bends, thrust blocks, straddle blocks, retainer glands or other restraint devices, couplings, domestic water or fire service lines, meter boxes, backflow**

devices or vaults, etc.

- b) Each valve and fire hydrant shall be identified and stationed to facilitate checking the plan views with the profile.
- c) **Location of all waterlines, hydrants, water meters, backflow devices, etc. shall be dimensioned from right-of-way centerline, easement boundary, adjacent property corner or other means so that its location is clearly defined.
- d) Waterline stationing shall be independent of the street stationing, unless otherwise approved by the City Engineer on a case-by-case basis where waterline profiles are not required.
- e) Size, depth, pipe material and class, length of water pipe and class of backfill shall be clearly shown or called out on the plan view, unless this information is shown on a profile view.

i. Profile Views

- 1) General: Profile views shall conform to the requirements and show the information outlined under this section as applicable:
 - a) Profile views shall be to the same horizontal scale and on the same sheet as the corresponding plan view.
 - b) Match lines with sheet number references.
- 2) Streets (profile view)
 - a) Original ground & finish grade profile along the centerline and curbs as appropriate. For off-set or super-elevation cross-sections, both curbs shall be profiled. Ditch invert profiles shall be shown where curbs are not to be constructed. Profiles at intersections or cul-de-sacs shall be extended to the back of the far side PUE as a minimum, and to the top/bottom of cut or fill slopes where applicable.
 - b) Stationing, elevations and percent slopes for centerline or top of curb profiles.
 - c) Beginning point of all vertical curves, points of vertical intersection, end of vertical curve, length of vertical curve, K-value and design speed, and low point of vertical curve if a sag curve.
 - d) Projection of the profile of streets that may be extended or reconstructed in the future. The projected profile shall extend a minimum of 200 feet beyond the proposed work limits. The City may require profiles to be extended further where necessary due to topography or to demonstrate

ability to tie to existing streets. Projected profiles shall be designed to be compatible with the restraints of the terrain.

- e) The top of curb profiles for all cul-de-sacs, including vertical curves for any grade changes exceeding 1%, with a K-value not less than 3.
 - f) Separate curb return profiles (*showing gutter grades at face of curb*) for intersection curb returns in accordance with requirements under PWDS 1.10.g.2.g. The location of all pedestrian ramps shall be indicated and labeled on the curb return profiles to demonstrate that the design grade along the gutter pan is less than 2% at the pedestrian ramp throat.
 - g) Unless otherwise approved or required by the City, cross sections showing existing and proposed finish grade shall be shown at 50 foot intervals to demonstrate that the proposed street grades match the surrounding grades and address drainage concerns, as well as to determine the need for slope easements, as well as at existing driveways or other access ways. Unless otherwise approved by the City in existing developed areas, the cross sections shall extend a minimum of 50 feet beyond the right-of-way line where existing cross slopes are less than five percent (<5%) and a minimum of 25 feet beyond the right-of-way line where existing cross slopes are greater than five percent (>5%).
 - h) Profiles for partial street improvements shall include information for both the turnpike construction (*including ditch profiles as applicable*), as well as future street profiles, including cross section profiles.
- 3) Storm Drain (profile view)
- a) Profile of existing and proposed ground surface along centerline of pipe, with rim and pipe inverts at each manhole, catch basin, etc.
 - b) Manholes and other appurtenances shall be numbered (*or lettered*) with a designation unique to the project and stationed to match the corresponding plan view.
 - c) Size, slope, pipe material and class, length of storm pipe and class of backfill between consecutive manholes, catch basins, junction boxes or cleanouts.
 - d) All existing or proposed public and franchise or private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.
 - e) Existing drainage facilities, including offsite facilities upstream and downstream which affect the design (*ie. size, capacity and/or slope of upstream and downstream system*).

- f) Profiles for ditch and creek flow lines shall be extended as appropriate to illustrate conditions affecting the design beyond the project, both upstream and downstream. Typical cross sections shall also be shown.
 - g) Where mainline storm cleanouts are approved for storm lines which will be extended in the future, plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole or catch basin shall be included (*without mainline grade breaks between structures*).
- 4) Sanitary Sewer (profile view)
- a) Profile of existing and proposed ground surface along centerline of pipe, with rim and pipe inverts at each manhole.
 - b) Manholes and other appurtenances shall be numbered (*or lettered*) with a designation unique to the project and stationed to match the corresponding plan view.
 - c) Size, slope, pipe material and class, length of sewer and class of backfill between consecutive manholes.
 - d) All existing or proposed public and franchise or private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.
 - e) Where mainline sewer cleanouts are approved (PWDS 4.16.b.1), plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole shall be included (*without mainline grade breaks between manholes*).
- 5) Water Distribution (profile view)
- a) Waterline profiles shall be provided for all waterlines within existing right-of-ways or along alignments paralleled (*within 15 feet*) or crossed by existing public utilities. Waterline profiles will not be required for new waterlines within new right-of-ways unless required to prevent conflicts with proposed utilities.
 - b) Profile of existing and proposed ground surface along centerline of pipe, as well as existing and proposed pavement surface of adjacent streets (*where applicable*).
 - c) Show the location of valves, fittings, fire hydrants and other appurtenances, with all valves and fire hydrants numbered and stationed to match the corresponding plan view.
 - d) Size, pipe material and class, depth of cover and class of backfill and

surface restoration.

- e) All existing public and private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.

1.11 EASEMENTS, ETC.

- a. ****Utility easements to the City** (*in a form acceptable to the City and conforming to the PWDS requirements*) shall be provided and recorded for any City utilities outside of public street right-of-ways. The minimum utility easement widths and property line offset requirements are referenced in subsequent PWDS sections for Storm Drain, Sanitary Sewer and Water. Other recorded easements/instruments affecting City access and/or interests (*ie. fire lane easements, detention easements & maintenance agreements, grease interceptor maintenance agreements, common driveway maintenance agreements, etc.*) shall also be in a form acceptable to the City and conforming to the PWDS requirements.
- b. ****Legal Description & Exhibit Map.** All recorded easement or right-of-way dedication documents shall include a legal description of the easement or ROW area and a to-scale exhibit map (*with the easement or ROW area clearly shown and labeled, and including all information/callouts required to illustrate the information contained in the legal description, including point of beginning, bearings and distances if applicable*), except for easements created by a plat, in which case the recorded easement documents may reference the easement as shown on the plat. Exhibit maps not drawn and plotted to scale, or not containing the information required above, will be returned for revision.
- c. Prohibited within Easements Granted to the City. Property owners shall not plant, build, construct, or create (nor permit others to plant, build, construct, or create) any fills, trees, buildings or other structures, including fences or parallel utilities, on or within an easement granted to the City which might interfere with the use by the City of the easement for the defined purposes, or which might interfere with the normal operation, inspection, access to or maintenance of the utilities within the easement, including excavation for repairs or replacement if necessary. In addition to permanent structures, prohibited structures shall include sheds, decks, footings or overhanging portions of structures which are located outside of the easement.
 - 1) Access gates acceptable to the Public Works Director shall be installed in fences which the City allows to be constructed across the easement granted to the City.
 - 2) The property owner shall not construct cuts or fills within or on the easement area without express written approval by the City, since this will interfere with the use of the easement for the purposes for which it was granted. Fills will make the utilities less accessible for inspection and/or maintenance, and cuts may result in inadequate cover over said utilities, and either will result in

access points (manholes, inlets, valves, cleanout or meter boxes, etc.) no longer being at the proper grade. Any such approval by the City (which approval may be granted or withheld at the City's sole discretion), shall be contingent on the property owner performing all work required by the City in order to mitigate impacts due to such cuts or fills, including reconstructing or resetting the utilities and appurtenances as directed by the City at the property owner's expense. It is understood and agreed that the City may remove (or require removal by the Grantor) any physical obstructions including buildings, overhangs, fences, trees, shrubbery or fill material, and abate any use of the easement if the City finds that the physical obstruction or use will interfere with the City utility or the City's ability to access, maintain or repair the City utility, and that such removal or abatement may be completed (including if removal by property owner is required) without recompense to the property owner(s) (excerpt to the extent that such recompense or reimbursement may be specifically included in the recorded easement documents).

- 3) The City acknowledges that the property owner may generally use the easement area for permitted parking and/or access driveways, or similar uses which are allowed by the City.

e.d. **Street Frontage PUE. Easements shall include minimum eight (8) foot public utility easements (PUE) for franchise utilities along all lot lines fronting public or private streets, as well as easements for fire hydrants, sewer & storm drainage property line cleanouts & water meters where set behind the sidewalk, cluster mail box pads, and sidewalks at driveway crossings (when they must be widened or jogged back to meet ADA standards), pedestrian ramps as intersections, city street light poles, etc. which may be located behind sidewalks and just outside of the public right-of-way sidewalks, utility vaults, light poles, mail boxes, meter boxes, fire hydrants, lateral cleanouts, etc. that are not within the public right-of-way.

- 1) PUEs created by a plat should include wording similar to the following (plat wording to be acceptable to the both Public Works and the County Surveyor). "We hereby create a utility easement as shown along the public right-of-ways for franchise utilities and also dedicate to the City of Dayton along said utility easement a waterline, sanitary sewer, storm drain and public sidewalk easement."
- 1) Since new right-of-ways typically result in the back of sidewalk being close to the right-of-way line, PUEs along public streets shall include wording that they are a "utility easement", and also a "public sidewalk easement", as well as a "waterline, sanitary sewer and storm drain easement to the City of Dayton."
- 2) Construction of a building or a structure within the PUE is prohibited, including footings or overhanging portions of structures located outside the easement. If the City allows a retaining wall or a fence to be constructed within or across a PUE, an encroachment license agreement shall be executed

and recorded against the property stipulating that the property owner will be responsible for any restoration costs associated with removal and reconstruction of said retaining wall or fence if such removal is required to service, maintain or repair utilities installed within the PUE, whether by the City or by any franchise utility company.

- 3) Where easements for City water, sewer or storm drain mainlines are proposed or exist along street frontages, new PUEs shall be located outside of City utility easements (*except at crossings*), to prevent future installation of franchise or private utilities within the City easements parallel with City pipelines.

d.e. **Private Easements. Private utility easements a minimum of ten (10) feet wide (*centered on the utility pipe and offset from common property lines*) shall be provided for all private water, sanitary sewer and storm drains, ditches or channels outside of public right-of-ways and outside the boundaries of the property being served, or which is extended across the development property in order to provide service to other properties. While the City does not dictate the specific form required for use on the private easements noted above, the easement forms used shall define which properties the private easement is to the benefit of, shall include provisions that the easement cannot be extinguished without explicit written authorization from the City, and include language that the easement will not be extinguished by the doctrine of merger (*unless the properties are consolidated into a single legal lot of record*).

e.f. **Recorded copies of all required easements, dedications and/or agreements shall be submitted prior to start of construction, with the exception noted under PWDS 1.9.i.3 for subdivisions or partitions where all public utilities will be constructed prior to the recording of a final plat. All recording costs shall be borne by the Developer.

1.12 VARIANCES TO DESIGN STANDARDS

a. Request for Variance to Specifications/Standards

- 1) Variances to specifications or standards may be requested as outlined below.
- 2) In considering variance requests, the City, at its sole discretion, will seek input from individuals and/or agencies which may have information that would be relevant to the decision making process.
- 3) It is to be noted that if the requested variance involves public safety, the City will rule in favor of safety.
- 4) It is the responsibility of the design engineer to submit a written request for any proposed deviations or variances from City standards. Failure by the City to detect a deviation from (*or the need for a required variance of*) the PWDS requirements during drawing review does not constitute an default approval of said variance, unless the variance was requested in writing as outlined below and

approved by the City.

b. Variance Process

1) Submittal

- a) Requests for variance shall be submitted in writing to the City Engineer. This written request shall state the desired variance, the reason for the request and a comparison between the specification/standard and the variance as far as performance, etc.
- b) Any variance of these Standards should be documented and referenced to a nationally accepted specification/standard. The use thereof shall not compromise public safety or intent of the City's Standards.

2) City's Review

- a) The variance request shall be reviewed by the City Engineer who shall make one of the following decisions:
 - (1) Approve as is,
 - (2) Approve with changes, or
 - (3) Deny with an explanation.
- b) Approval of a request shall not constitute a precedent.
- c) For variances which will result in increased maintenance or increased future costs by the developer (*or the future property owners*), the variance request must be concurred with in writing by the developer/property owner prior to final approval by the City.

3) Appeal

- a) Applicant may appeal the City Engineer's decision to the City Manager. Applicant may appeal the City Manager's decision to the City Council.

c. Criteria for Variance of Specification Standards

- 1) The City Engineer may grant a variance to the adopted specifications or Standards when all of the following conditions are met:
 - a) Topography, right-of-way or other geographic conditions impose an economic hardship on the applicant and an equivalent alternative is proposed which can accomplish the same intent. Variances to self-imposed hardships shall not be allowed. The variance requested shall be the minimum variance which alleviates the hardship.

- b) Variance is a minor change to a specification or standard required to address a specific design or construction problem which, if not enacted, will result in an undue hardship.
- c) An alternative design is proposed which will provide a plan equal or superior to these Standards. In considering the alternative, the City Engineer and/or Public Works Director shall consider appearance, durability, cost of maintenance by the City, public safety and other appropriate factors.

1.13 PRECONSTRUCTION CONFERENCE

- a. Following approval of the civil/site/street/utility drawing package by applicable agencies with jurisdiction, a preconstruction conference shall be scheduled with the City before issuance of the public works construction permits, at a location in Dayton approved by the City. The purpose of the conference is to discuss the construction schedule and times of the civil/site/street/utility work which require coordination, as well as to provide the opportunity for parties from the construction team and various agencies/entities involved to meet and coordinate as may be necessary, and answer contractor questions regarding the work shown on the approved drawings.
- b. In addition to a City representative, the meeting is to include the following from the development team:
 - Developer's representative.
 - Developer's engineer of record during construction.
 - Prime contractor.
 - Street/site/utility subcontractor (*if different than the prime contractor*).
- c. Agency & Utility Company Notification. The development team shall be responsible for notifying the franchise and private utility companies (*as well as the County Public Works and ODOT if applicable*) of the time and location of the preconstruction conference, and requesting that a representative of each agency and utility be present. The Developer may be required to submit proof of notification to the City prior to the preconstruction conference. Copies of notification letters or emails sent to the utility companies are acceptable.
- d. The developer, prime contractor and/or the street/site/utility subcontractor shall provide the following prior to or at the preconstruction conference.
 - Overall bar-chart project schedule (*for the street/site/utility work*)
 - Listing of supervisory personnel and two emergency contact persons.
 - Materials testing lab (*and outside inspection entity if applicable*).
 - List of subcontractors & major materials suppliers to be utilized by the prime contractor and the street/site/utility subcontractor for work under the Public Works Permit.
 - Certificates of insurance from the contractor performing the site/street/utility work, minimum limits and format as outlined in PWDS Appendix E. The

City and Westech Engineering (*as City Engineer*) shall be covered as additional insured. The City is to be named as the certificate holder.

- e. Evidence of Workman's Compensation coverage from the contractor performing the site/street/utility work.

1.14 **CONSTRUCTION OBSERVATION, INSPECTION & TESTING**

a. General

- 1) All public construction associated with development shall be inspected or periodically observed by a professional engineer licensed in the State of Oregon (*or a qualified individual under his supervision*) as required in the Developer-City Construction Agreement. City projects may be inspected by Public Works or the City Engineer as applicable and as determined by the City.
- 2) An engineer whose firm, or any member of the firm, has a corporate, partnership or any form of real property interest in the development for which the improvements are required cannot be designated engineer-of-record. The engineer-of-record's relationship to the project must be solely that of a professional nature.
- 3) It shall be the policy of the City not to provide full inspection services for non-public funded public improvements, including public access parking lots and fire lanes.
- 4) It shall be the Developer's responsibility to provide an engineer to perform periodic inspection and/or construction observation services for improvements which are designed and permitted under these PWDS, at the developer's expense.
- 5) These inspection and construction observation requirements are not applicable to individual sidewalk, driveway or service lateral permits for single residences. If the project scale is such that the retention of an independent engineer-of-record is not warranted, the Developer may request that the City provide these services. If the City agrees to provide these services, the Developer shall be responsible to reimburse the City for any costs incurred for these inspection and/or construction observation services.

b. City Activities

- 1) Services provided by the City shall include:
 - a) Liaison between the engineer-of-record and the City;
 - b) Monitoring of work progress and performance testing as deemed desirable;

- c) The performance of administrative and coordination activities as required to support the processing and completion of the project;
 - d) The issuance of stop work orders upon notifying the engineer-of-record and/or the Contractor of the City's intention to do so.
 - e) Operate all valves, including fire hydrants, on existing waterlines.
- 2) In addition, the City shall be notified a minimum of 48 business hours (2 *business days*) prior to the following tests and inspections so that a City representative may be present to witness the inspections or tests. Testing shall be started and completed during normal City business hours.

a) Streets (*public streets, private streets/fire lanes*)

- (1) Curb inspection;
- (2) Subgrade testing or proof rolls;
- (3) Base rock testing;
- (4) AC pavement placement and testing;

b) Sanitary Sewers

- (1) Mandrel testing of mainlines;
- (2) Air testing of mainlines;
- (3) Vacuum testing of manholes;
- (4) Video inspection of mainlines;

c) Storm Drains

- (1) Mandrel testing of flexible pipe storm drains;

d) Water Distribution System

- (1) Pressure tests;
- (2) Disinfection (*see App. B notes for procedures*).
- (3) Bacteriological Testing (*see App. B notes for procedures*).

c. Developer's Engineer-of-Record's Activities

- 1) The engineer-of-record must be registered to practice engineering in the State of Oregon. Material testing which is not performed by the engineer-of-record must

be accomplished by a recognized testing firm or another registered engineer.

- 2) ***The engineer-of-record must personally perform all activities marked by an (*) and must supervise all individuals performing other delegated activities.**
- 3) The following minimum activities are required of the developer's engineer-of-record:
 - a) *Execute a form accepting responsibility and verifying that he/she has been retained as engineer-of-record during the construction of the project (*ie. the Developer-City Construction Agreement*):
 - b) *Attend preconstruction conference and ensure that approved construction drawings are distributed to contractor, subcontractors and franchise utility companies.
 - c) Obtain and use a copy of City-approved construction drawings and specifications during construction;
 - d) Coordinate to ensure that the City is notified 48 business hours (*2 business days*) before the start of construction or resumption of work after shutdowns, except for normal resumption of work following Sundays or holidays.
 - e) Call to the City's attention within two (2) working days all drawing changes, material changes, stop work orders or errors or omissions in the approved drawings or specifications.
 - f) Maintain records which contain at least the following information and submit copies to the City on a weekly basis:
 - (1) Any Site Visits during the previous week
 - (a) Date and time of site visits
 - (b) Weather conditions, including temperature
 - (c) A description of construction activities
 - (2) Statement of directions to change drawings, specifications, stop work, reject materials or other work quality actions;
 - (3) Public agency contacts which result in drawing changes or other significant actions;
 - (4) Perceived problems and action taken;
 - (5) Final and staged inspections (*notify & coordinate with City to allow City representative to attend during regular business hours*);

- (6) Records of all material, soil and compaction tests.
- g) The engineer of record shall either (1) provide all surveying services necessary to stake the project prior to and during construction and as necessary to prepare as-built drawings when the project is complete, or (2) confirm that these surveying services are being provided separately (*by the developer or by the contractor*), all in conformance with City Standards.
- h) Review and approve all pipe, aggregate, concrete, A.C. and other materials submittals to ensure their compliance with City Standards, and provide any submittal review comments to the City Engineer and/or Public Works;
- i) *Approve all drawing or specification changes in writing and obtain City approval prior to the performance of the work;
- j) Provide periodic construction observations of construction activities as required to ensure end products meet City specifications;
- k) *Perform (*or verify that they are performed*) material, compaction and other tests required to ensure City specifications are met;
- l) Periodically check that curb, storm drain work and pavement grades are in substantial conformance with approved drawings;
- m) For pavement construction, perform the following stage construction observations and record the date that each is verified:
- (1) Curbs are built to line and grade;
 - (2) Subgrade meets grade and compaction specifications;
 - (3) Base rock meets grade and compaction specifications;
 - (4) Leveling course meets grade and compaction specifications;
 - (5) Wearing course meets grade and compaction specifications.
- n) For sanitary and storm drain construction, perform the following stage construction observations and record the date that each is verified:
- (1) Sewers are installed to proper line and grade;
 - (2) Trenches are properly backfilled and compacted;
 - (3) Construction staking is adequate to ensure that the sewer is properly installed with respect to easement, right-of-way and property lines;

- (4) Air testing and video inspections are performed according to standard procedures.
- o) For grading, verify that the grading plan, as staked, will result in acceptable slopes along exterior property lines, proper onsite and offsite drainage, and erosion control.
- p) When the engineer-of-record believes that the project is complete (*based on his/her inspections with the Contractor*), the engineer-of-record shall notify the City that the project is ready for final inspection.
 - (1) In conjunction with this notification, the engineer-of-record shall also provide the City with a complete and detailed summary of any items which remain to be completed.
 - (2) Prior to requesting followup inspections, the engineer-of-record and contractor shall provide the City with verification that all items on any previous checklists/punchlists have been completed (*submittal of a hand annotated copy of the previous checklist/punchlist is acceptable*).
- q) File a completion report which contains:
 - (1) The original of the project completion certification verifying that the work under the Public Works permit was completed in substantial conformance with the approved construction drawings;
 - (2) A complete set of black-line as-built drawings for review by Public Works and/or the City Engineer;
 - (3) The results of storm, sewer and manhole tests, video inspections, waterline tests, material tests, compaction tests and soil analysis as applicable.
 - (4) Written verification that all installed ADA ramps, sidewalks and exterior pedestrian access routes (*those covered under the Public Works permit*) comply with current ADA and City standards.
- r) Submit final reproducible as-built drawings conforming to the requirements outlined herein.
- s) Provide information summarizing the cost of the improvements which must be covered under any required maintenance bonds (*see PWDS G.15 for bond amounts & bond periods*).

1.15 AS-BUILT DRAWINGS

- a. As-built drawings prepared by the design engineer (*or engineer-of-record*) are required whenever the work results in new or modified public improvements (*or improvements designed under the provisions of the PWDS*) and shall describe all revisions to the previously approved construction drawings.
- b. The engineer-of-record shall utilize information from the Contractor's field record drawings, the engineer's field inspections, and the as-built survey as applicable to ensure that the as-builts accurately reflect as-built conditions.
- c. Unless otherwise approved by the City Engineer, as-built drawings for sanitary sewer and storm drains shall be based off of an as-built survey conducted by a land surveyor registered to practice surveying in the State of Oregon.
- d. Show all below grade franchise or private utility vaults and street crossing, as well as all above grade transformers, pedestals, etc.
- e. Distance Ties to Sewer & Storm Cleanouts. The location of all cleanouts on service lines shall be shown on the as-builts (*sanitary sewer and storm drain*) based on distance ties from two permanent points. The tie points shall be immovable structures, such as property pins, street monuments or the center of manholes.
- f. City Numbers for Sewer Manholes, Cleanouts, etc.
 - 1) The new sanitary sewer manholes and/or mainline cleanouts will be assigned City numbers by the City at the as-built stage. City sewer manhole numbers shall be shown on the as-built drawings in parenthesis next to the design manhole designation.
 - 2) Street Names & MH numbers. If street names are changed, the new street name shall be shown on the as-built drawings in parenthesis next to the original design street names. Since the inspection reports, TV inspection reports, etc, will reference the design street names and design sewer manhole numbers, the as-builts need to retain the design information (*in addition to showing the new City sewer manhole numbers and as-built street names*) to allow reference to the construction report documents.
- g. The recording references for the easement documents for all existing or required public and private easements shall be included on the as-built drawings (*as well as listing the beneficiary of each easement*), as well as recording references for construction deferral agreements, maintenance agreements, etc.
- h. Legible black-line copies of the as-built drawings shall be submitted to the City prior to the final walkthrough inspection and for review prior to submittal of the final as-builts.
- i. Final As-Builts. Following the final walkthrough and review of preliminary as-builts by the City, submit approved full size as-built drawings on mylar or vellum to the City

Engineer, as well as full-size as-builts in electronic format (pdf). Additionally, two paper sets of final as-builts shall be submitted to Public Works and one set to the City Engineer.

j. Digital Parcel/Lot/ROW Map.

- 1) In addition to the mylar or vellum as-builts, a digital map shall be submitted to the City showing the final configuration of lot lines and right-of-way lines within or fronting the development, as well as easement boundary lines.
- 2) The drawing shall be in Autocad format, with lot lines, right-of-way lines and easement lines each on separate layers.
- 3) Other than lot lines and right-of-way lines, the only other information shown shall be limited to street names and the name of the development.

**CITY OF DAYTON
Public Works Design Standards**

**Division 2
Streets**

DIVISION 2 STREETS

2.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to:
- 1) provide design guidance criteria to the private sector for the design of public and private streets within the City;
 - 2) establish standard right-of-way widths and improvement requirements for the appropriate street classifications;
 - 3) require the use of design and materials to provide streets with a minimum practical design life of not less than 30 years.
 - 4) ensure the development of a street system which will:
 - a) be of adequate design to handle the traffic needs for the City of Dayton;
 - b) be designed in a manner to allow economical future maintenance;
- Alternate materials and methods will be considered for approval on the basis of these objectives.
- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

2.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public and private streets in the City of Dayton and applicable work within its service areas.
- b. All properties shall be provided with access to a public or private street prior to or concurrently with the development of the property. This shall generally be interpreted to mean that permanent streets and associated improvements (*including but not limited to paving, curbs, non-deferred sidewalks, street lights, storm drains to drain the street improvements, etc.*) shall be provided for existing lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
- c. ADA & PROWAG Applicability.
- 1) New Construction: Newly constructed facilities within the project limits shall be made to comply with ADA and PROWAG standards as applicable.

Designers are encouraged to reference the complete PROWAG document for additional information (www.access-board.gov).

- 2) Alterations: When alterations are made to the pedestrian circulation path (*including pedestrian crossings*), the pedestrian access route shall be made to comply with ADA and PROWAG standards as applicable, to the maximum extent feasible within the scope of the project. Alterations shall not be allowed to gap pedestrian circulation paths in order to avoid compliance with ADA and PROWAG standards.
- a) When elements are altered or added to existing facilities in a manner that does not alter or impact the pedestrian circulation path, the pedestrian circulation path is not required to be modified. However, elements that are added shall be made accessible to the extent required by ADA or PROWAG standards.
 - b) Sidewalk improvements or replacement which includes or impacts curb ramps, landings or turning spaces will trigger a requirement to upgrade the affected ramp, landing or turning space.
 - c) Street resurfacing (*including overlays*) is an alteration which triggers the requirement to upgrade curb ramps if it involves work on a street or roadway spanning from one intersection to another, or spanning a mid-block pedestrian crossing.
 - d) Accessibility improvements are not required for work that is considered as maintenance. Examples of work considered to be maintenance include, but are not limited to, the following.
 - Painting and/or other traffic control surface markings, excluding delineations of new accessible parking spaces.
 - Crack filling & sealing
 - Slurry seals or chip seals
 - Localized high friction treatments
 - Minor street patching (*less than 50% of the pedestrian street crossing area*)
 - Minor sidewalk repair which does not include or impact curb ramps, landings or turning spaces.
 - Filling potholes
 - e) If a project includes work which is not included in the lists above, or which consists of a combination of several maintenance items occurring at or near the same time, the City will determine whether the project should be considered maintenance or an alteration.

2.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
 - 1) Intersections with State highways
 - 2) Intersections with railroads
 - 3) Commercial/Industrial entrances
 - 4) Signalized Intersections
 - 5) Bridges or Culverted Stream Crossings
- b. Review and approval of the above special items by the City Engineer and Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

2.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 2.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards.
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer. When requested by the City, full design calculations shall be submitted for review with the request for approval.

2.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all street system components including typical sections, curbs, sidewalks, handicap ramps, drainage facilities, etc.

2.6 STANDARD DETAILS

- a. Standard details included in the Appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable standard details shall be included on the construction drawings.

2.7 EXISTING STREET CLASSIFICATIONS

- a. The classification of arterials and collectors is established by the Dayton Comprehensive Plan and other documents, while industrial and commercial streets are established by the surrounding land use designation. Streets currently designated as arterial and collector streets are as outlined below.

- 1) Arterial:

- Ferry Street (Hwy 233)
- 3rd Street (Hwy 221)
- Dayton Bypass (Hwy 18)

- 2) Collector:

- Church Street
- Ash Street
- Flower Street
- 8th Street
- Fletcher Road

- 3) Commercial/Industrial Streets include those streets within or fronting commercial or industrial zones.

2.8 OTHER JURISDICTIONS

- a. Other than the City, there are two other agencies with jurisdiction over streets or roads within the City Limits. These agencies are the Oregon Department of Transportation (ODOT) and Yamhill County.
- b. In all cases, the City design standards shall be considered to be the minimum allowable standards for any streets within the City Limits. ODOT and Yamhill County may have additional or more stringent requirements. Approval from ODOT and Yamhill County will be required prior to construction activities on any street or road under their

jurisdiction.

2.9 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to street systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA) shall also apply.
- 1) Abbreviations: Acceptable abbreviations for pavement materials are as follows:
 - a) AC - Asphalt Cement
 - b) PCC - Portland Cement Concrete
 - 2) Alley: A public right-of-way not more than 20 feet and not less than 10 feet in width, which intersects with a public street.
 - 3) Arterial Street: A street of considerable continuity which is used for moving large volumes of traffic to and from the highway and for interconnection between major areas of the City.
 - 4) Bike Lanes: A designated travel-way for bicyclists which is established within the roadway directly adjacent to the outside vehicular lane or on the shoulder.
 - 5) Bike Path: A designated travel way for bicyclist which is completely separated from the vehicular travel lanes and is within independent right-of-ways.
 - 6) Bike Route: A designated travel-way for bicyclists which can be shared with vehicular traffic. The roadway is designated with signs for bicycling (*no pavement markings for the bike route or delineation of parking spaces is used*).
 - 7) Clear Vision Area: A triangular area on a lot at the intersection of two streets or a street and a railroad, the sides of which are lines measured from the corner intersection of the right-of-way lines. The third side of the triangle is a line across the corner of the lot joining the ends of the other two sides. Where the lines at the intersections have rounded corners, the right-of-way lines will be extended in a straight line to the point of intersection.
 - 8) Collector Street: A centrally located street for moving traffic from arterials to local streets.
 - 9) Cross Slope (Pedestrian Path): The grade that is perpendicular to the direction of pedestrian travel.
 - 10) Cross Slope (Vehicle Path): The grade that is perpendicular to the direction of vehicular travel.

- 11) Crosswalk: See Pedestrian Street Crossing.
- 12) Curb Ramp: A ramp that cuts through or is built up to the curb. Curb ramps can be perpendicular, parallel, or a combination of parallel and perpendicular.
- 13) Detectable Warning: Detectable warnings consist of small, truncated domes built in or applied to a walking surface that are detectable by cane or underfoot. On pedestrian access routes, detectable warning surfaces indicate the boundary between a pedestrian route and a vehicular route for pedestrians who are blind or have low vision. Detectable warnings shall contrast visually with the surrounding sidewalk surface.
- 14) Downstream Intersection: The nearest intersection from a driveway located in the direction of traffic flow of the nearest lane of the abutting street.
- 15) Expansion Joint: A joint to control cracking in the pavement structure and filled with preformed expansion joint filler.
- 16) Grade: The degree of inclination of a road, sidewalk or slope, in the direction of travel.
- 17) Half Street Improvement: Where allowed by the development code, half street improvements shall fully comply with the fire lane requirements of the Oregon Fire Code, including provision of additional width if on-street parking is allowed. Generally half-street improvements are allowed only if the other side of the street was previously improved and the current development is required to complete the street improvement to full urban width (*three-quarter street improvements are the minimum typically required if there are no frontage improvements, and where the far side of the street will be improved in the future in conjunction with other developments*).
- 18) Intersection: The meeting point of two streets having at least three legs.
- 19) Local or Residential Street: A facility not designed as an arterial or collector. It serves primarily to provide direct access to abutting land and offers the lowest level of traffic mobility. Through traffic movement is deliberately discouraged.
- 20) Longitudinal Joint: A joint which follows a course approximately parallel to the centerline of the roadway.
- 21) Natural Grade: The grade with the land in an undisturbed state.
- 22) One-Way Driveway: A driveway of either ingress or egress, but not both.
- 23) Parking Space: A designated space in a parking area for the parking of one motor vehicle. An off-street parking space is a designated space for the parking of one motor vehicle, which is located on private property rather than on a public street.

- 24) Pedestrian Access Route: A continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path.
- 25) Pedestrian Circulation Path: A prepared exterior or interior surface provided for pedestrian travel in a public right-of-way.
- 26) Pedestrian Street Crossing: A marked or unmarked route, providing and accessible path to travel from one side of the street to the other. Pedestrian street crossings are a component of the pedestrian access route and/or the pedestrian circulation path.
- 27) PROWAG: See definition in Division 1.
- 28) Running Slope: The grade that is parallel with the direction of pedestrian travel.
- 29) Sidewalk: A right-of-way deeded, dedicated, and designated for the use of non-motorized vehicles and pedestrians.
- 30) Streets or Roads: Any public highway, road, street, avenue, alley, easement or right-of-way used or to be used for vehicle movement. Full street improvements include curb and sidewalk on both sides, storm drainage and fully improved in accordance with these standards.
- 31) Structures: Those structures designated on the standard plans as catch basins, manholes, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these standards are included in the standard construction specifications.
- 32) Superelevation: The vertical distance between the heights of the inner and outer edges of pavement on horizontal curves.
- 33) Three-Quarter (3/4) Street: A ± 75 percent portion of the ultimate width of a street, but not less than $25\frac{1}{2}$ feet from face of curb to edge of pavement, usually along the edge of a development, where the remaining portion of the street shall be provided when adjacent property is developed. $3/4$ street improvements include curb, piped storm drainage and sidewalk on one side, storm drainage improvements stubbed across the street for future catch basins on the unimproved side, and a full depth gravel shoulder per PWDS 2.19.c & drainage facilities on the non-curbed side of the street.
- 34) Transition: The taper between portions of a street with different pavement widths.
- 35) Transverse Joint: A joint which follows a course approximately perpendicular to the centerline of the roadway.

- 36) Travelled Way: That portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.
- 37) Turnaround Area: A paved area of sufficient size and configuration that emergency vehicles may maneuver around to head in the opposite direction without having to move in reverse more than once.
- 38) Turning Space: An area at the top or bottom of a curb ramp, providing a space for pedestrians to stop, rest, or change directions.
- 39) Turnpike Street: Any public street, road or right-of-way which has been paved for vehicular movement and does not have curbs on either side of the street.
- 40) Two Way Driveway: A driveway functioning as both an exit and entrance.
- 41) Upstream Intersection: The nearest intersection from a driveway located in the direction opposite the traffic flow of the nearest lane of the abutting street.

2.10 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply. Acceptable materials shall be as outlined in these Design Standards.
- 3) It is not intended that materials listed herein are to be considered acceptable for all applications. The design engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.

b. AC Pavement

- 1) Bituminous Material: The asphalt cement shall be PG 64-22 and shall meet the requirements of OSSC (ODOT/APWA) 00744.11, Asphalt Cement & Additives.

2) AC Design Mix:

- a) AC pavement shall meet the requirements of OSSC (ODOT/APWA) 00744, hot mixed Asphalt Concrete Pavements (ACP), 3/4" dense graded mix (*base course*) or 1/2" dense graded mix (*leveling or wearing course*) as summarized below.
 - (1) Where noted on the drawings, Class B pavement refers to the 3/4" dense graded mix, and Class C refers to 1/2" dense graded mix.
- b) AC pavement for public streets shall be Level 2 Job Mix Formula (JMF).
- c) Unless otherwise specified or shown on the drawings, AC pavement for private streets and parking lots shall be Level 2 Job Mix Formula (JMF).
- d) Where identified on the drawings, AC pavement for collector or arterial streets shall be Level 3 Job Mix Formula (JMF).

3) AC mix design shall be submitted to the City for review and approval prior to use.

c. Granular Baserock

- 1) Granular baserock shall conform to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve. Gradation shall be as follows:
 - a) Base Rock: 1½"-0
 - b) Leveling Rock: ¾"-0
 - c) Alternate single size 1"-0 aggregate as approved by the Engineer.

d. Concrete (Cast-in-Place)

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi air entrained (*5" slump or stiffer*).
- 2) Concrete mix design shall be submitted to the City for review and approval prior to use.

e. Street Lights

- 1) Unless otherwise approved by the City Engineer and Public Works Director, street light poles shall be fiberglass poles designed to produce a 25-foot

mounting height, with a mounting arm per the standard details. Poles shall be grey or brown in color, have a natural finish, and be provided with a direct bury base sleeve for landscape areas, and a precast concrete pole foundation for sidewalk areas.

- 2) Unless otherwise approved by the City Engineer and Public Works Director, all luminaries shall be Cobrahead flat lens type using a 49 watt LED cobrahead fixture (*ie. equivalent to 100 watt high pressure sodium*) and photoelectric control relay.
- 3) All street lighting materials, including wire, and installation procedures shall meet current requirements for maintenance by the local electric utility company. Any line extension fees shall be the responsibility of the developer.

f. **Geotextile Fabric.**

- 1) Unless otherwise required by City Engineer, geotextile fabric shall conform with OSSC (ODOT/APWA) 02320, Geosynthetics, with minimum property values conforming to Table 02320-1 as noted below.
- 2) **Reinforcement Fabric.** Unless heavier is specified or noted on the drawings, reinforcement fabric (*for over-excavation or under embankments*) shall be non-woven fabric (*Propex Geotex 1001, Mirafi 1000N, Linq 250EX or approved equivalent*), or woven fabric (*Propex Geotex 250ST, Mirafi 550X, Linq GTF250, or approved equivalent*). Slit film fabrics are not allowed.
- 3) **Separation Fabric.** Unless heavier is specified or noted on the drawings, separation fabric (*where successful proofroll allows compaction testing of subgrade to be waived*) shall be non-woven fabric (*Propex Geotex 601, Mirafi 160N, Linq 150EX or approved equivalent*), or woven fabric (*Propex Geotex 200ST, Mirafi 500X, Linq GTF200, or approved equivalent*). Slit film fabrics are not allowed.
- 4) **Drainage Fabric.** Unless heavier fabric is specified or noted on the drawings, drainage fabric shall be conform with Type 2 Drainage Geotextile (OSSC/ODOT/APWA 02320), non-woven fabric (*Propex Geotex 601, Mirafi 160N, Linq 150EX or approved equivalent*). Slit film or woven fabrics are not allowed.
- 5) **Riprap Fabric.** Unless heavier is specified or noted on the drawings, fabric under riprap shall be conform with Type 2 Riprap Geotextile (OSSC/ODOT/APWA 02320), non-woven fabric (*Propex Geotex 1071, Mirafi 1120N, Linq 275EX or approved equivalent*). Slit film or woven fabrics are not allowed.

2.11 IMPROVEMENT STANDARDS BY STREET CLASSIFICATION

a. The table below summarizes the improvement standards for each road classification.

IMPROVEMENT REQUIREMENTS		
Street Classification	Min. Right-of-Way Width	Curb to Curb Width
Arterial Ferry Street, 3 rd Street/Wallace Road	case-by case	case-by case
Collector ¹	60'	36'
Commercial/Industrial	60'	36'
Local III ^{2,3} (<i>provides access to ≥80 dwelling units or serving ≥800 ADT or ≥320,000 ft²</i>)	50'	34'
Local II ^{2,3} (<i>provides access to 20-79 dwelling units or serving 200-799 ADT or ≥80,000 ft²</i>)	48'	32'
Local I ^{2,3} (<i>provides access to ≤19 dwelling units or serving ≤190 ADT or <80,000 ft²</i>)	46'	30'
Residential Cul-de-sac ^{2,3}	Width per local street criteria above	Width per local street criteria above
Cul-de-sac Bulb (Residential)	45' radius	38' radius
Alleys	20	18' ⁵
Parking both sides typical all streets except as noted. ¹ Collector street widths determined on a case by case basis (LUDC 7.2.302.04), with widths noted above as typical minimums. ² See LUDC 7.2.302.04 for additional information. ³ Parking both sides for all local streets and cul-de-sacs (LUDC 7.2.302.04). <u>OFC Notes:</u> <ul style="list-style-type: none"> • For reference, the minimum clear widths required for fire apparatus access roads (<i>fire lanes</i>) under the Oregon Fire Code (OFC) may take precedence in some situations (<i>20' fire lane width required where there are no fire hydrants, 26' fire lane width required for streets with fire hydrants, OFC 503 & OFC App. D</i>). • Fire lanes up to 26 feet wide shall have fire-lane/no-parking signs posted on both sides, while fire lanes wider than 26 feet (<i>but less than 32 feet</i>) shall be posted on one side (OFC D103.6.1&2). • The OFC requirements cannot be modified solely by a land use approval. ⁵ Width listed refers to driveable paved width, whether or not curbs are provided or required. Where curbs are not provided, gravel shoulders shall be provided on each side of paving to the extent possible. <u>Notes:</u> <ul style="list-style-type: none"> -If a land use variance is granted for no parking on one or both sides of the street, curb(s) along the no parking side(s) shall be painted and signed for no parking at time of street construction. -Right-of-way widths must be adequate to accommodate the specified street, curb, and sidewalk widths (<i>including planter strips if required</i>), while allowing a <u>minimum</u> of 0.5 feet from the back of sidewalk to the right-of-way line to ensure that survey monuments are not disturbed during construction or reconstruction of sidewalks (<i>see also ORS 209.140-155 & 92.044.7</i>). 		

b. The number of travel lanes for arterial and major collector roads shall be determined by the volume of traffic. The City may require additional turning lanes where required by

Public Works Director or a traffic engineer's report evaluating the need for additional turning lanes.

- c. Additional pavement and right-of-way width may be required to accommodate turning lanes, parking and bike lanes.

2.12 STREET DESIGN MINIMUM SECTIONS

- a. The street design shall result in streets which:
 - 1) are of adequate design to handle the traffic needs of the City,
 - 2) are designed in a manner to allow economical future maintenance, and,
 - 3) provide a minimum practical pavement design life of 30 years for all streets.
- b. The minimum pavement section for public streets shall conform to the following table. These pavement sections are based on subgrade compacted to 95% of AASHTO T-180 (Modified Proctor). Where subgrades cannot be compacted and tested to this standard (or if subgrades are not compacted by choice), a thicker baserock section will be required.

MINIMUM PAVEMENT SECTIONS		
Street Classification	AC Pavement Thickness (inch)	Baserock Thickness ³ (inch)
Arterial ¹	4	15
Collector	4	12
Commercial	4	12
Industrial	4	15
Local Residential (III) ²	3½	12
Local Residential (I, II) ²	3½	10
Cul-de-sac (Residential)	3½	10
Private Street (3 or more dwelling units)	3	9
Alley in Residential Zone ³	2½	9
Alley in Commercial Zone ³	3	10
¹ – Thicker baserock & AC sections may be required by ODOT or Yamhill County wherein each has jurisdiction. ² – See LUDC 7.2.302.04 for additional information on Class I, II & III streets. ³ – Assumes alleys are not used as primary vehicular access route, in which case public street rock & AC sections will be required. ³ – Minimum baserock thickness assuming subgrade compacted to 95% of		

Modified Proctor and passes a proofroll. Thicker baserock sections over fabric are required otherwise.

Thicker rock & AC sections may be required by the Public Works Director where heavier location traffic exists or is anticipated.

- c. The City reserves the right to require an engineer designed pavement section in lieu of the standard section. This will typically be required for streets for which the City Engineer has reason to suspect unsuitable soil conditions, high percentage of trucks, where overlays are proposed, or any other conditions that may significantly affect the pavement structure design.
- d. Where required by the City, the design of overlays shall include non-destructive falling weight deflectometer tests or other tests approved by the City Engineer and the preparation of an engineering analysis of street improvements required for the design life required with all anticipated traffic, including truck traffic.
- e. Unless otherwise approved by the City Engineer, pavement designs shall be based on AC pavement conforming to OSSC (ODOT/APWA) 00744, hot mixed Asphalt Concrete Pavements (ACP), for standard duty mix and compacted to a minimum of 91% of maximum density (*at all locations*) as determined by the Rice Standard Method.

2.13 OVERLAYS

- a. All AC pavement overlays shall include non-woven fabric specifically designed for use with AC pavement.
- b. The standard minimum overlay thickness shall be 2-inches. In no case shall the overlay thickness be less than 1½-inches. This minimum thickness shall be increased as necessary to provide the required cross slopes, with smooth transitions between all variations in cross slope.
- c. Design of overlays shall be based on an analysis of the existing pavement condition by a registered professional engineer experienced in the design of pavements, and shall result in the minimum practical design life as specified. Unless otherwise approved by the City Engineer, testing of the existing pavement shall include the following as a minimum.
 - 1) Coring of the street at maximum 50 foot intervals to establish the thickness and condition of existing pavement and aggregate base.
 - 2) Non-destructive falling weight deflectometer tests on the existing pavement proposed for overlay.
 - 3) Preparation of an engineering analysis of overlay thickness required to provide the specified design life with all anticipated truck traffic.
- d. Areas of existing pavement and baserock which exhibit deflection or alligator cracking

or have otherwise failed shall be excavated and replaced with new compacted baserock and AC pavement prior to the overlay. Baserock and AC pavement repair thicknesses shall match standard section thicknesses. All cracks greater than 1/8-inch in width shall be cleaned out and filled with an asphalt emulsion slurry and sand, or other method approved by the City Engineer. All crack sealing, skin patching and plugging of digout areas must be approved by the City Engineer prior to the placement of the final fabric and overlay.

- e. Overlay fabric shall be Petromat as manufactured by Amoco Fabrics & Fiber Company, or approved equivalent. Hot oil tack coat (*PBA-5 or approved equivalent*) shall be used prior to placement of the overlay fabric. Use of emulsion tack coats shall be prohibited.
- f. Asphalt overlays shall include grinding as required to allow the minimum overlay thickness at existing paving, catch basins, gutter pans and other structures which cannot be raised to grade. Unless otherwise approved by the City Engineer, all existing manholes, valve boxes and other structures shall be raised to grade before the overlay. Structures raised to grade following placement of the overlay shall have the pavement sawcut around the structure as required by the City Engineer and a reinforced PCC concrete patch placed around the structure.
- g. Any existing survey monuments within AC pavement overlay areas shall be provided with a monument box to City and County Surveyor standards, installed prior to overlay paving, unless the Public Works Director allows the survey monuments to be reset by a licensed surveyor to finish pavement grade with aluminum caps (*case-by-case basis*).

2.14 HORIZONTAL ALIGNMENT

- a. Horizontal centerline alignments of improvements shall be parallel with the centerline of the right-of-way. Centerline of the proposed street extensions shall be aligned with the centerline of corresponding existing streets.

- b. Unless required to match curvature of existing right-of-ways, horizontal curves shall be to an even 5 feet, and shall meet the minimum requirements listed below:

MINIMUM HORIZONTAL CURVE RADIUS	
Street Classification	Minimum Horizontal Curve Centerline Radius
Arterials	300 feet
Collectors and Continuing Residential Streets	200 feet
Commercial/Industrial	250 feet
Cul-de-sac	160 feet
Alleys and Private Streets	100 feet
<p>NOTE: Horizontal curve lengths shall conform to the minimums outlined herein, or the length required by AASHTO for the posted speed, whichever is greater.</p>	

- c. Staggering or T intersections at collectors and arterials shall be avoided within 300 feet of an opposing intersection. Intersections of local streets shall not be offset staggered less than 200 feet from an opposing intersection.
- d. Streets intersecting an arterial or collector street but not continuing through the arterial or collector street along the same horizontal alignment (*ie. a staggered or tee intersection*) shall not be located within 300 feet of another street intersecting the opposite side of the arterial or collector street. Similarly, opposing-intersections of local streets shall be separated by not less than 200 feet.

2.15 MONUMENTATION

- a. In accordance with ORS 92.060 Subsection (2) and/or 209.15 Section 2, the centerline of all street right-of-way shall be monumented before the City shall accept a street improvement. Monuments shall be set under the direction of a registered Professional Land Surveyor. A record of survey must then be filed in compliance with ORS 209.250 and any additional requirements set forth by the City.
- b. Any existing or new street or property survey monuments within the paved street improvement areas, driveways, sidewalks or other hard surface areas or areas subject to vehicular traffic shall be set flush with the finish pavement surface with 2-inch aluminum caps. The City reserves the right to require monument boxes per standard details where directed by the Public Works Director.

- c. The following centerline monuments shall be set as a minimum:
 - 1) All centerline - centerline intersections.
 - 2) The centers of all cul-de-sacs.
 - 3) Curve points in accordance with ORS 92.06 and 209.15.
- d. All public utilities within the right-of-way shall be placed in positions that do not interfere with centerline monumentation.

2.16 INTERSECTIONS & PEDESTRIAN CROSSINGS

- a. Intersection Angle. The interior angle at intersecting streets shall be kept as near to ninety degrees (90°) as possible and in no case shall it be less than seventy-five degrees (75°).
- b. Centerline Horizontal Tangents.
 - 1) There shall be a straight horizontal tangent section on each leg of an intersection having a length not less than shown in the table below.
 - 2) The length of the horizontal tangent on each leg shall be measured from the extension of the curblines of the intersected street.
 - 3) Where streets are not fully improved, horizontal tangent length shall be measured from the future curb location.

Street Classification	Minimum Horizontal Tangent Length (ft)
Arterial	100
Collector	75
Commercial/Industrial	75
Residential	50

- c. Primary & Secondary Street Designation.
 - 1) The designation of primary streets versus secondary streets for intersection design shall be made by the City Engineer.

d. Intersection Street Grades.

- 1) The maximum street grade through intersections and within the landing area (*vertical intersection approach as defined below*) shall be 5% for the primary street and 2% for the secondary street, or as required to meet ADA and PROWAG standards where applicable.

e. Vertical Intersection Approach.

- 1) The beginning of secondary street vertical curve at intersections (*from the cross-slope of the primary street to the centerline/curb street grade of the secondary street*) shall not begin prior to the end of curb radius unless otherwise approved or required by the City Engineer based on detailed drawings showing compliance with all ADA and PROWAG standards.
- 2) Vertical intersection approaches shall have straight street grades within the limits specified, with no more than a 1% grade break from the adjacent intersection cross slope (*street grade break at the curbline extension*).

f. Intersection Pedestrian Street Crossing.

- 1) A pedestrian street crossing (*marked or unmarked as approved by the City*) shall be provided for all legal crossing location as required by state law, unless the City Engineer determines that a crossing should not be provided based on consideration of safety and traffic issues. Pedestrian street crossings shall comply with requirements for pedestrian access routes herein and PROWAG standards.
- 2) Sidewalk access ramps meeting current ADA and PROWAG standards shall be provided at all corners of intersections where crossing is permitted, regardless of curb type (*or absence of curb*).
- 3) Street Grades at Pedestrian Crossings. The street cross slope for pedestrian street crossings at intersections shall not exceed 2% maximum at crossings of secondary streets, nor 5% maximum at crossings of primary streets.
- 4) The pedestrian grade of the pedestrian street crossing (*along the pedestrian access route*) shall not exceed 5% maximum at any point in the crossing, including at gutter pans.

g. Midblock Pedestrian Street Crossing.

- 1) Unless specifically approved in writing by the City Engineer, mid-block pedestrian street crossings are not permitted.
- 2) Street Grades at Pedestrian Crossings. Where pedestrian access routes are contained within midblock street crossings, the pedestrian cross slope (*cross slope of the pedestrian street crossing*) shall be permitted to equal the street

grade, unless otherwise required by PROWAG.

- 3) The pedestrian grade of the midblock pedestrian street crossing (*along the pedestrian access route*) shall not exceed 5% maximum at any point in the crossing, including at gutter pans.

- h. **Curb Radius.** Curb radii at intersections shall be as shown below for the various functional classifications. The right-of-way radius at intersections shall be sufficient to maintain the same right-of-way to curb spacing as the lower classified street.

MINIMUM INTERSECTION CURB RADIUS¹				
Street Classification	Arterial Street	Collector Street	Commercial/Industrial Strt	Local Street
Arterial Street	35 feet	-	-	-
Collector Street	30 feet	30 feet	-	-
Commercial or Industrial Str.	35 feet	35 feet	35 feet	-
Local Street	25 feet	25 feet	30 feet	20 feet

¹ Smaller or alternate curb radius may be required or approved by Public Works on a case-by-case basis, including the use of pedestrian bulbouts on wider streets where deemed applicable by Public Works or the City Engineer. Larger radius may be required by Public Works to accommodate truck turning movements.

- i. **Street Signs.** All newly platted or newly improved streets shall be posted with a name sign approved by the City. In the case of development, installation of any required street signs or traffic control signs shall be the responsibility of the developer.

2.17 VERTICAL ALIGNMENT AND STREET GRADES

- a. Street grades shall be designed to allow drainage to the curb of areas within the public right-of-way, as well as lot drainage. In general, this requires the curbs of new streets be set a minimum of 6-inches below existing grade.
- b. Unless otherwise approved in writing by the City Engineer and Public Works Director and applicable City planning authorities, street grades shall not exceed the following:
 - 1) Collectors - 6%
 - 2) All others -6% except as noted below
12% maximum, with 12% grades not exceeding 100 feet in length and not at intersections.
 - 3) Notwithstanding these maximum street grades, street grades through

intersections and intersection approaches must allow for the installation of pedestrian ramps & pedestrian crossings conforming to PROWAG standards.

- c. Minimum tangent street gradients shall be 0.4% along the crown and curb for all streets (*Type A curb & gutter required*).
- d. Streets intersecting with streets not constructed to full City standards shall be designed to match both present and future vertical alignments of the intersected street. The requirements of these standards shall be met for both present and future conditions.
- e. Street grade changes of more than one percent (1%) shall be accomplished with vertical curves. Vertical curve K-values shall conform to the values listed below. The vertical curve K-value shall be defined as the length of the vertical curve divided by the algebraic difference between the tangent street grades ($K = L/A$).

Vertical curve length shall not be less than the length computed from the formula $L = K * A$ (*ie. K value shall not be less than the values listed below*), where:

L = length of vertical curve in feet

K = vertical curve design constant (K-value)

A = algebraic difference between the tangent street grades each way.

DESIGN CONTROL FOR VERTICAL CURVES BASED ON STOPPING SIGHT DISTANCE		
Design Speed MPH	Crest Vertical Curve, Minimum K-value	Sag Vertical Curve, Minimum K-value
15 ¹	3	10 (8 ²)
20	7	17
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79
50	84	96
55	114	115
¹ Applies only to vertical curves in alleys or at the intersection of a secondary street (<i>side street</i>) to a primary (<i>thru</i>) street (<i>ie. transition from primary street cross slope to street grade of secondary street</i>). ² Reduction in K-Value (<i>for sag curves on secondary street intersections</i>) which is allowed provided the intersection is fully illuminated with a		

street light (*per these standards*) adjacent to the sag vertical curve.

- f. Street grades, intersections and super-elevation transitions shall be designed to not allow concentrations of stormwater to flow across travel lanes.
- g. Slope easements shall be dedicated or obtained for the purposes of grading outside of the right-of-way or to ensure that roadway fill slopes are not disturbed.

2.18 STREET CROSS SECTIONS AND STREET CROSS SLOPES

a. General

- 1) Cross-slope of the street section shall be two percent (2%) unless otherwise approved by the City Engineer, based on a demonstration by the design engineer that PROWAG standards are met..
- 2) Symmetrical street cross sections with opposite curbs at the same level are preferred.
- 3) Off-set crown cross-sections are acceptable only where required due to sidehill lies and to match existing facilities. Off-set crowns shall not exceed 12 inches between the high curb and the low curb, and the crown location shall not be less than 12 feet from the face of curb.
- 4) Inverted crown sections are not acceptable for public streets.
- 5) Shed roof cross sections are not acceptable for public streets, except within and immediately adjacent to street intersections. The design of shed cross sections shall include provisions to avoid concentrated drainage sources from flowing across the pavement surface.

b. Superelevation

- 1) Use of superelevations shall be prohibited unless specifically authorized by the City Engineer. Criteria for approval of the use of superelevations shall generally conform to the requirements for variances as outlined under Division 1.
- 2) Off-set crown sections are not acceptable as super elevation sections.
- 3) Maximum superelevation allowed for City streets shall be five percent (5%) (*except at intersections or pedestrian crossings where lesser slopes are required by PROWAG*).
- 4) Super elevation transitions shall be designed to not allow concentrations of storm water to flow over the travel lanes.

2.19 GRADING WITHIN PUBLIC RIGHT-OF-WAY

- a. Grading for local street and commercial/industrial classifications shall not exceed the following cross slopes:
 - 1) From curb to 1 foot behind the sidewalk: Two percent (2%) upward.
 - 2) From 1 foot behind sidewalk to property line: 5H:1V upward or downward.
 - 3) Within the street frontage public utility easement (PUE): 5H:1V upward or downward.
 - 4) Outside of right-of-way and public utility easement (PUE): 2H:1V up or down outside the public utility easement.
 - 5) Along the edge of turnpike streets (*from the back of the gravel shoulder*): 3H:1V downward, unless otherwise approved on a case-by-case basis by the Public Works Director and City Engineer.
- b. Side slopes may be increased to 2H:1V up or down within 2 feet from the back of the sidewalk with approval from the City Engineer and affected utilities.
- c. Where street improvements do not include curbs along both sides of a street, the design shall include a full depth gravel shoulder on the non-curbed side (*1' minimum width, wider shoulder may be required by Public Works to address site specific circumstances*), and shall address collection of storm water drainage on the non-curbed side of street improvements. Where ditches are necessary along the non-curbed side (*ie. where ground does not slope away from the street*), ditches shall conform with PWDS requirements and standard details (*including driveway culverts which meet City standards*), and shall drain to an approved point of disposal.

2.20 CURBS AND GUTTERS

- a. All streets shall include curbs on both sides except in the situations of interim width improvements. The minimum tangent curb gradients shall be as outlined under Section 2.16, 'Vertical Alignment'.
- b. The standard curb for City Streets shall be Type A curb and gutter for all road classifications.
 - 1) Use of Type C curbs requires written approval by the City Engineer for each location proposed, and is typically limited to replacement of short lengths of existing Type C curbs (*other than at new driveway approaches*), use at raised pedestrian crossing islands, or where required by County or ODOT standards.
 - 2) Where Type A curb and gutter is installed along the edge of existing paved streets (*where pavement widening is not required, and where changes to the*

vertical alignment or cross slope is not required), the pavement shall generally be sawcut at the edge of the gutter pan and the new curb & gutter placed against the sawcut, in order to minimize the need for street patching and repaving.

- c. The ends of all curbs shall be tapered downward to prevent damage to vehicle tires.
- d. A six (6) inch curb exposure is normally required on residential streets and streets with curb and gutter. A seven (7) inch exposure may be required by the Public Works Director on streets where Type C curbs are allowed. Greater curb exposure shall also be provided where required by ODOT standards.
- e. Three (3) inch diameter curb weep holes shall be provided through curbs with inverts 1-inch above the gutter line, at the locations outlined below. Drain pipe shall be provided under all sidewalks to connect to all curb weep holes. The location of all weep holes shall be shown on the drawings as outlined in Division 1.
 - 1) Opposite existing or anticipated roof drain downspouts (*minimum 2 per lot*).
 - 2) At 16 foot on center along low areas where curb top is above adjacent ground.
 - 3) At 16 foot on center adjacent to bank areas to receive groundwater.
- f. When new curbing is being placed, a stamp shall be placed to mark where each water, sanitary sewer or storm drain service lateral crosses the curblines. The curbs shall be marked on the top of the curbs with an imprinting stamp a minimum of 2-inches high. The impression for a water service shall be the letter "W". The impression for a sanitary sewer service shall be the letter "S". The impression for a storm drain service shall be the letter "D".

2.21 SIDEWALKS & PEDESTRIAN ACCESS ROUTES

- a. Unless otherwise allowed by the Development Code and/or approved through the Planning Department, sidewalks shall be provided on both sides of curbed streets for all road classifications, as well as for private streets.
- b. Monolithic curb & public sidewalk placement is not permitted (*ie. curb concrete & public sidewalk concrete shall be placed separately, except where approved by the City at pedestrian ramps*).
- c. Drain pipe shall be installed under sidewalks as required to connect to all curb weep holes or other storm drain facilities. Surface discharge of roof drains or other drain pipes across sidewalks is not allowed, nor is the sheet flow from parking lots, commercial/industrial driveways, common residential driveways, or concentrated flow from long flaglot driveways allowed to flow across sidewalks.
- d. All sidewalks shall fully comply with all ADA and/or PROWAG standards as applicable. Handicap access ramps meeting current ADA and PROWAG standards

shall be provided at all corners of intersections where crossing is permitted, regardless of curb type (*or absence of curb*), and at the ends of all sidewalks.

- e. Handicap access ramps shall be located so as to avoid conflict with storm drain catch basins.
- f. Sidewalks shall be constructed of concrete, and shall be a minimum of 4-inches thick except at driveway crossings and pedestrian ramps, which shall be a minimum of 6-inches thick (*8-inch thickness required for commercial type driveways*).
- g. Sidewalks shall meet the minimum widths outlined below. The location of sidewalks within the public right-of-way shall be as approved by the City during the design process.

MINIMUM SIDEWALK WIDTHS		
Street Classification	Min. Sidewalk Width from back of curb	Location unless otherwise approved
Ferry Street & 3 rd Street <i>(ODOT R.O.W. outside of CBO overlay zone)</i>	6 ft or current ODOT standard	Curblines
Within CBO overlay zone ^{1,2}	8 ft from property side, plus ±4' concrete planter strip to curblines ³	Property Side ⁴ to Curblines
Collector Street	5 ft	Curblines
Commercial or Industrial Str.	5 ft	Curblines
Local Street	5 ft	Curblines
¹ This sidewalk standard applies to all properties within the CBO (Central Business Overlay) zone (<i>except for properties along 3rd Street where existing curbs do not exist, or for properties fronting non-curbed streets where new curbs are not required as a condition of development</i>). This does not apply to the frontage of Courthouse Square Park, as this property is outside of the CBO zone. ² Sidewalks meeting the CBO zone standard are not required for properties within the CBO zone which contain only single-family residential structures (<i>until such time as the use of those properties changes to commercial, or such time as those properties are redeveloped to a commercial use</i>). ³ Sidewalk improvements in the CBO zone shall also include tree wells and street trees at ±30-40 foot spacing (<i>actual spacing to be as directed by Public Works, based on property & building/door layouts, driveway locations, etc.</i>). ⁴ Property line sidewalks are typically offset 6" to 1' from the rights-of-way line in order to avoid conflicts with right-of-way and property monuments.		

- h. Water meters, utility poles, etc. are not permitted within sidewalks unless authorized in writing by the City Department of Public Works.

- i. Where single or clustered mailboxes or other objects are within a sidewalk, the sidewalk shall be widened to provide clearance equal to the required sidewalk width. For retrofit installations only where specifically approved in writing by Public Works, the sidewalk clear space may be reduced to 48 inches minimum, provided that all other PROWAG requirements are satisfied. All existing mailboxes shall be set on new posts at the time of sidewalk construction.
- j. Sidewalks to be constructed in conjunction with street improvements or to be provided as part of a development may be deferred at the City's option until building construction except for the following situations:
 - 1) Arterial or collector streets fronting corner lots.
 - 2) Sidewalks along streets from which vehicular access to the fronting lot is restricted.
 - 3) Sidewalks fronting existing structures.
 - 4) Offsite sidewalks not abutting the property within the development.
 - 5) Pedestrian walkways not along public streets.
 - 6) Sidewalks fronting non-buildable tracts or parcels.
 - 7) All required ADA pedestrian curb ramps within or adjacent to public or private streets, as well as sidewalks required for ADA compliant pedestrian access to CBU mailboxes.
 - a) CBU mailbox location must be acceptable to the local postmaster, and provide for ADA compliant access.
 - b) ~~An~~ ADA pedestrian curb ramp must be located within 50 feet of the CBU (Oregon Structural Specialty Code 1111.4.1).
 - c) Installation of CBU mailboxes within the curb radius at street intersections is prohibited.
 - 8) Existing sidewalks which do not meet City or ADA standards which must be replaced in conjunction with a development.
- k. In all cases where the construction of a sidewalk is deferred, all grading work required for future construction of the deferred sidewalks shall be completed by the developer at the time of street and utility construction, including weepholes through the curb for future rain drain pipes.
- l. Sidewalk Grades & Vertical Alignment.
 - 1) Except for pedestrian street crossings (see Section 2.16, Intersections &

Pedestrian Crossings), the sidewalk grade for pedestrian access routes contained within the public right-of-way shall not exceed the general grade of the adjacent street.

- m. Temporary transitions acceptable to the City shall be provided at points where sidewalks terminate, except where otherwise approved by Public Works and the City Engineer *(typically limited to cases where the pedestrian access route does not continue beyond the end of the sidewalk, and subject to a "sidewalk ends" sign being installed on a post conforming with ODOT detail TM240, which post is also shown on Detail 212)*.

2.22 CLEAR VISION AREA

- a. Clear vision areas shall be maintained at each driveway access to a public street and on each corner of property at the intersection of two streets, a street and an alley, or a street and a railroad.
- b. No fence, wall, sign or structure that would impede visibility between three (3) feet and eight (8) feet shall be established in the clear vision area, nor any planting or hedge taller than three (3) feet in height *(except for tree trunks with all branches and foliage removed to a height of eight (8) feet above grade)*. Measurement shall be made from the top of curb or, where no curb exists, from the street centerline grade.
- c. The clear vision area shall consist of a triangular area, two sides of which are right-of-way lines or a right-of-way line and access easement line. Where right-of-way lines have rounded corners, the right-of-way lines shall be extended in a straight line to the point of intersection and so measured. The third side of the triangle shall be a line connecting the non-intersecting ends of the other two lines.
- d. For single use residential driveways, the clear vision area shall consist of a triangular area, two sides of which are the curb line and the edge of the driveway. Where no curbs exist, the future location of the curb based on full street improvements shall be used.

- e. The following measurements shall establish the clear vision areas:

CLEAR VISION AREA MEASUREMENTS	
Type of Intersection	Measurement Along Each Lot Line or Drive Edge ¹
Controlled Intersection (Stop sign/signal)	20 feet
Uncontrolled Intersection ($\geq 60'$ r/w)	30 feet
Uncontrolled Intersection ($< 60'$ r/w)	40 feet
Commercial/Industrial Driveways	20 feet
Common Use Residential Driveways & Alleys	20 feet
Single Residential Driveways	10 feet
¹ At the intersection of different classification streets, the measurement shall apply to the measurement along the right-of-way line as specified for each street classification.	

- f. The preceding provisions shall not apply to the following:
- 1) A public utility pole.
 - 2) A tree trimmed (*to the trunk*) to a line at least eight (8) feet above the level of the intersection.
 - 3) An official warning sign or signal.
 - 4) A place where the natural contour of the ground is such that there can be no cross visibility at the intersection.

2.23 CUL-DE-SACS, TURNAROUNDS

- a. Cul-de-sacs shall be as short as possible and shall have a maximum length of 400 feet long and serve no more than 18 dwelling units unless otherwise approved by the Planning Commission.
- b. The standard details show the minimum requirements for cul-de-sac turnaround areas. Other turnaround geometries may be used when conditions warrant and the City Engineer approves the design and application of its use. Cul-de-sacs in commercial or industrial developments shall provide adequate turnarounds for the type of vehicle serviced by the street, as approved by the City Engineer.

- c. The minimum curb radius for transitions into cul-de-sacs 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 street.
- d. The finished pavement grade from the center point of cul-de-sac turnarounds to the curb shall not be less than two and one-half percent negative (-2.5%).
- e. Cul-de-sac curb profiles shall be provided with a smooth vertical alignment. Curblineline grade changes in excess of 1% shall use a vertical curve, with a K-value not less than 3.

2.24 STUB STREETS, VEHICULAR NON-ACCESS PROVISIONS

- a. Stub streets which allow for future extensions shall include a reserve strip at the terminus of the right-of-way provided by deed or plat conveyance to the City. The reserve strip shall be at least one foot in width and extend the full width of the right-of-way.
- a-b. Reserve strips may also be required along new street right-of-ways which front on undeveloped property. Where reserve strips are required, they may be counted as part of the required right-of-way width.
- c. A vehicular non-access easement to the City (or a reserve strip tract) is also required along street frontages where vehicular access is not allowed (such as the non-access frontage of corner lots, one end of double frontage lots, etc.).
- b.d. A paved turn around shall be provided for stub streets with lengths greater than 300 feet, or as required by the Oregon Fire Code (150 foot maximum length without turnaround per OFC D103.4, unless otherwise approved by the Fire Chief).
- e.e. Permanent barricades shall be placed at the end of all stubbed roads without a cul-de-sac turnaround. Vehicular access from the end of stub streets is prohibited unless explicitly authorized in writing by the City (*specific City Council approval typically required for any such permanent vehicular access from the end of stub streets*).

2.25 TRANSITIONS

- a. Street width transitions from a narrower width to a wider width (*based on the direction of traffic flow in the travel lane adjacent to the taper*) shall be designed with a 10:1 taper. Delineators, as approved by the City, shall be installed to mark the edges of the transition.
- b. Street width transitions from one width to a narrower width (*based on the direction of traffic flow in the travel lane adjacent to the taper*), or lane alignment transitions shall be designed with the length of transition taper as follows:

$$L = S \times W$$

Where:

L = minimum length of taper (feet)

S = Designated Speed (MPH)

W = EP to EP offset width (EP – Edge of Pavement)

- c. Delineators, as approved by the City, may be installed to define the configuration. Maximum spacing of delineators shall be the numerical value of the design speed, in feet (*ie. thirty-five (35) foot spacing for thirty five (35) MPH*).
- d. 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 City. The barricade shall conform to MUTCD Standards.

2.26 SUBSURFACE DRAINAGE

- a. Subsurface street drainage must be considered in the design of each street. Subsurface drains shall be designed and constructed per the standard drawing details or the recommendations of the soils report.
- b. Subsurface drains shall connect and drain into the storm drainage system at catch basins, curb inlets, gutter inlets, manholes or road side ditches. Surcharge from the storm drainage system shall not be allowed to back up into the subsurface drains. Alternative subsurface drainage measures may be used if approved by the City.

2.27 ACCESSIBLE ON-STREET PARKING

- a. Accessible on-street parking shall be provided as required by PROWAG, or as required by any planning approval for development projects, whichever is more stringent.
- b. Where on-street parking is provided on the block perimeter (*block perimeter is defined as both sides of a street between two adjacent cross street intersections*) and the parking is marked or metered, ADA accessible parking spaces shall be provided in accordance with PROWAG Table R214. Where marked or metered parking on part of the block perimeter is altered, the minimum number of accessible parking spaces required is based on the total number of marked or metered parking spaces in the block perimeter.
 - 1) Accessible on-street parking spaces shall conform with the requirements of PROWAG, and shall conform with City parking space or ADA dimensions, whichever is more stringent.
 - 2) Accessible on-street parking spaces shall be located as close to an accessible curb ramp as possible. Unless the accessible on-street parking spaces are provided adjacent to the intersection (*ie. at the block end*), an accessible curb ramp shall be installed at the accessible parking location.
 - 3) Access aisles adjacent to head-in or angled on-street parking shall be a minimum of 8 feet in width. Parallel accessible on-street parking will require

a 5 feet wide access aisle between the parking space and the curb.

- 4) Access aisles shall extend the full length of the parking spaces they serve, where access aisles are required by PROWAG standards. Access aisles (*a minimum of 8 feet in width*) shall extend from the accessible on-street parking space to the accessible curb ramp.
- 5) Slopes within the accessible on-street parking space and access aisle shall not exceed 2% in any direction.

2.28 PARKING LOTS

- a. Minimum pavement sections for parking lots over compacted subgrade shall conform to the following:

PARKING LOT MINIMUM PAVEMENT SECTIONS		
Classification	Pavement Thickness (inch)	Baseroack Thickness (inch)
Parking Lot Access Route	3 (AC)	10
Parking Lot	2½ (AC)	7
The minimum pavement sections shown assume competent compacted subgrade and normal light traffic loading, and may not be adequate for all locations, soil conditions or types of development. The developer and/or design engineer shall be responsible to verify adequacy of proposed sections for the use intended. See PWDS 2.30.f for requirements where use of durable non-paved surfaces is proposed.		

- b. Access routes through parking lots which are to be used (1) by delivery trucks, service vehicles or fire trucks, or (2) by automobiles in excess of 500 vehicles per day, shall conform to the minimum access route section outlined above.
- c. The dimensions for the design and layout of parking facilities shall conform to the minimum requirements shown on the Standard Details. In the event of discrepancies between the minimums in the PWDS standard details and the minimums in the development code, the larger minimums will typically apply as determined by the City (*ie. for instance, if minimum parking space dimensions in the PWDS are greater than minimums listed in the development code, the larger space requirements will control since the greater size will still comply with the minimum under the development code. The same applies to minimum drive aisle widths required in the development code, the PWDS or the Oregon Fire Code*).
- d. Parking lots and associated driveways shall maintain adequate drainage facilities to prevent water ponding or ice formation, and to prevent stormwater from sheet flowing

across sidewalks. In general, this requires a minimum cross slope of two percent (2%) perpendicular with contour lines. In no case shall cross slopes less than one percent (1%) be allowed at any point. All drainage facilities shall conform to the requirements of Division 3 of these Design Standards.

- e. Curves and corners within the parking facilities shall have a minimum curb radius of 15 feet except for emergency access lanes, where a minimum curb radius of 28 feet shall be required, unless a smaller radius is approved by the Fire Chief (*OFC 503.2.4 & OFC Fig D103.1*).
- f. Bumper guards or wheel barriers shall be installed so that no portion of a vehicle projects into the right-of-way or over the adjoining property.
- g. Sidewalks abutting head-in parking stalls shall be a minimum of 6 feet wide, unless wheel stops are provided (*front of wheel stop set 2 feet from the curblin e or edge of the sidewalk*). For purposes of sizing single loaded parking stalls (*without wheel stops*) which abut 6-inch curbs and 6 foot wide sidewalks, a maximum 1 foot bumper overhang may be assumed for standard size parking stalls (*ie. standard parking stall length may be reduced by a maximum of 1 foot from the length listed on the Standard Details*). Length of compact parking stalls are not to be reduced.
- h. Parking lots and associated access driveways shall be provided with security lighting configured to minimize glare onto adjacent property (*see PWDS 1.10.e.1 j*). Wall pack and/or bollard lights may be utilized as the sole source of driveway & parking lot lighting only in locations where they will not need to shine over vehicles to light the parking lot, and it is demonstrated that wall pack lights will not shine onto adjacent property.

2.29 DRIVEWAY SPACING & LOCATION

- a. No more than one driveway per property shall be permitted in residential zones except for duplexes (*which can have two driveways*).
- b. Where possible, driveways for corner properties (*corner lot*) shall be located on the lowest classification street and as far from the intersection as possible.
- c. Driveways on through lots shall be located on the lowest classification street.
- d. Residential driveways of adjoining properties shall have a minimum of 15 feet clear between the edges of the driveways.
- e. Location of all driveways serving commercial, industrial or multifamily facilities shall be approved by the City.
- f. Driveways shall be separated from an intersection by a minimum of 30 feet or one-half the lot frontage, whichever is greater.

2.30 DRIVEWAYS, DRIVEWAY APPROACHES, ALLEYS

- a. Driveways shall conform to the City of Dayton Standard Details. Curb removal for driveways shall be by saw cutting.
- b. Sidewalks crossing driveway approaches shall be concrete per City standards.
- c. Driveway approaches shall be constructed to meet current ADA and PROWAG standards at all locations where sidewalks cross or will cross the driveway.
- d. Driveway approaches on curbed streets shall be constructed of concrete, and shall be a minimum of 6-inches thick (*8-inch minimum for commercial type driveways*). Driveway approaches on turnpike (*non-curbed*) segments may be either concrete or asphalt, and shall be constructed so that they do not block drainage along the street.
- e. Driveways, etc. to be paved. All driveways, parking areas and vehicle maneuvering areas shall be paved with asphalt, concrete or comparable surfacing, except where the use of durable non-paving material is approved by the City on a case-by-case basis, where required to reduce surface water runoff and protect water quality.
 - 1) Durable non-paved surfaces shall be subject to review and approval by the Public Works Director, and will require a maintenance agreement acceptable to the City be recorded against the property.
 - 2) The type of durable non-paved surface proposed shall allow for the installation of permanent marking of parking spaces, driving lanes, fire lanes & turnarounds, etc. (*ie. where permanent surface painting is not feasible, permanent colored surface delineators specifically designed for use with the durable non-paved surface proposed shall be provided and installed*).
- f. New alleys shall be paved.
- g. Alleys Used as Driveways. Existing alleys used as driveways for new structures (*whether or not land use approval is required*) shall be paved to City standards from the public street along the entire portion of the alley used as a driveway (*including turning/backing areas as applicable*).
- h. In cases where non-paved surfaces are allowed, driveways and alleys shall be provided with a minimum 10 foot paved or concrete extension of the approach beyond the back of sidewalk location in all cases (*from back of future sidewalk location for turnpike streets*). Per LUDC 7.2.303.09.A, new driveways shall be paved completely with asphalt or concrete.
- i. Multiple use, commercial or industrial type driveways (*and any driveway exceeding 10% slope*) shall be paved completely.
- j. Single family residential driveways: Driveway shall be a minimum of 12 feet wide and a maximum of 24 feet wide at the property line (LUDC 7.2.303.09.C). See PWDS

2.30.d, g & m for residential driveway apron requirements on turnpike streets.

- k. Common driveways serving multiple lots and flag lot driveways over 150 feet in length shall be provided with an emergency turnaround meeting the requirements of Public Works, or as required by the Oregon Fire Code.
- l. Maximum slope of driveways shall not exceed 15%.
- m. The angle between a driveway centerline and the parallel vehicle travel lane shall be between 75 degrees and 105 degrees.
- n. For driveways connecting to a street that has not been improved to its ultimate width, the driveway profile (*ie. vertical profile*) shall be designed to allow for future street widening without reconstruction of the driveway. Driveways on turnpike or streets narrower than standard shall be constructed such that the surface of the driveway matches the future back of sidewalk elevation (*ie. future back of sidewalk elevation to be based on design street width and cross slope per current City standards, assuming the future street will be centered in the future right-of-way unless otherwise directed by the City*). This requirement applies both to new driveways and to existing driveways reconstructed in conjunction with street improvements.

2.31 PRIVATE STREETS, COMMON DRIVEWAYS AND FLAGLOTS

- a. Private streets serving 3 or more single family lots or parcels shall be constructed to the same cross sectional specifications (*AC & rock sections*) as public streets.
 - 1) Private streets or common driveways shall be provided with sidewalks or pedestrian walkways (*servicing all structures*) as required by City code and/or planning approval.
 - 2) Unless otherwise approved by the City Engineer and the Fire Chief, cross slope for common driveways, private streets and fire lanes shall not exceed limits for public streets (*typically 5% maximum*).
- b. A turn-around shall be required for any private residential street, common driveway, fire lane or flagstem driveway which has only one outlet and which is in excess of 150 feet long, or which serves more than two residences, or as required by the Oregon Fire Code. Non-residential private streets serving more than one ownership shall provide a turn-around if in excess of 200 feet long and having only one outlet, or as required by the Oregon Fire Code. Turn-arounds for private streets shall be either a circular turn-around with a minimum paved radius of 35 feet, or a tee or hammerhead turnaround conforming to the standard details, or as required by the Oregon Fire Code.
- c. Pavement sections and widths for private streets, common driveways, flaglot drives or partition access easements serving single family lots or parcels shall conform to the following (*driveways for commercial, industrial or multi-family developments shall conform with commercial driveway & parking lot access requirements – see details*):

MINIMUM PAVEMENT WIDTH AND SECTIONS (SF homes or duplexes)			
Classification ^{5,6}	Minimum ¹ Paved Width ²	Pavement Thickness (inch)	Baserock Thickness ⁸ (inch)
Private Streets serving 3 to 6 lots or parcels ^{3,4} Fire Lane minimum (<i>match street section where more than 6 residences, or match parking lot access route where applicable</i>)	20 ft*	3 (AC)	9
		8 (PCC)	2
Common Drives serving 2 lots or parcels ^{1,3}	20 ft	2½ (AC)	8
		6 (PCC)	2
Flag Lot Driveway serving one single family lot or parcel ¹	12 ft	2½ (AC)	6
		6 (PCC)	2
Partition Access Easement (1 dwelling unit on a single lot or parcel) with a sole use driveway ⁷	12 ft	2½ (AC)	6
		6 (PCC)	2
Partition Access Easement (2 dwelling units on a single lot or parcel) with a sole use driveway ⁷	16 ft	2½ (AC)	6
		6 (PCC)	2
Residential driveway aprons on a turnpike street (no curbs), for portion within ROW	D/W width 24 ft max	2½ (AC)	6
		6 (PCC)	2
<p>¹ – Wider pavement widths may be required by the local fire chief or where necessary to meet Oregon Fire Code (OFC) requirements or where necessary to meet Oregon Fire Code (OFC) requirements (<i>20' minimum typical</i>). Fire Lanes shall be designed to support 60,000 lb fire apparatus per OFC D102.1. OFC 503.1.1 requires that a fire lane (<i>ie. fire apparatus access road</i>) extend to within 150 feet of the furthest point on any building exterior 1st story wall.</p> <p>² – Paved width shall be measured from the face of curb where curbs exist.</p> <p>³ – See LUDC 7.2.302.07. Also, a recorded maintenance agreement is required for common driveways serving two or more lots or parcels, or for private streets.</p> <p>⁴ – Sidewalk to City standards required along one side of private street for entire length (LUDC 7.2.302.07.B.4). Provide PUE along one side of street easement for franchise utilities.</p> <p>⁵ – All common residential driveways & private streets shall be designated as fire lanes and signed for no parking, and shall meet the fire apparatus access road requirements of the Oregon Fire Code where applicable.</p> <p>⁶ – See PWDS 2.29.d for hard surfacing requirements adjacent to sidewalks.</p> <p>⁷ – See LUDC 7.2.302.08. Recorded maintenance agreement is required.</p> <p>⁸ – Minimum baserock thickness assuming subgrade compacted to 95% of Modified Proctor and passes a proofroll. Thicker baserock sections over fabric are required otherwise.</p> <p>Note: Easement widths for fire lanes or driveways across other property are to be a minimum of 5 feet wider than the paved or improved width (see also Detail 220).</p>			

- d. Flaglot Drive Earthwork & Grading. As a minimum, all grading for single flag lot drives shall be completed by the developer at the time of street and utility construction, whether or not paving is required at the time of street construction.
- e. Common Use Driveway & Fire Lane Paving. Common use driveways and fire lanes shall be paved by the developer at the time of street and utility construction to ensure that they are serviceable prior to building permit issuance per Oregon Fire Code requirements (OFC 501.4), unless an exemption is granted by the Fire Chief and the Public Works Director to allow paving to occur prior to occupancy.
 - 1) If such an exception is granted to defer paving, the common driveway and/or fire lane shall be improved with granular baserock to a sufficient depth to accommodate all truck and construction loads during building construction, typically corresponding to the City's standard over-excavation baserock section as a minimum.

2.32 STREET LIGHTING

- a. Street lighting design shall be provided as part of the street design and/or development process at the developer's cost. Street lights shall be located as near as possible to lot line extensions and not in the middle of lots.
- b. Spacing and location of street lighting shall be approved by the City based on City spacing standards or a photometric design, subject also to the location and spacing standards summarized herein. The design and installation of street lights shall be paid for by the developer, including any redesign costs required to comply with City spacing or location standards. Any line extension fees shall be the responsibility of the developer.
- c. Any street light relocation, if requested by a resident or developer, must be approved by the Public Works Director, and the resident or developer will be responsible for the cost of such relocation.
- d. Unless otherwise approved by Public Works and the utility company, street lights shall be installed a minimum of 1 foot behind curblin sidewalks.
- e. Street lights may be installed between the curb and property line sidewalks provided the street light is a minimum of 3-feet behind the face of curb and 1 foot from the sidewalk.
- f. Street lights shall be placed at all street intersections and at cul-de-sac bulbs. Unless otherwise approved by the City, street light spacing shall not exceed 200 feet or 3 lot widths, whichever is less. As noted above in paragraph 1.1(d) of these standards, lesser spacing must be used whenever required in writing by the City, based on public safety concerns or by a photometric design.
- g. Where pedestrian paths or offsite sidewalks are required in conjunction with a development project, street lights or pedestrian lighting (*acceptable to the Public*

Works Director) shall be provided along the sidewalks or paths where adequate lighting does not already exist.

2.33 BARRICADES AND GUARDRAILS

- a. Guardrails shall be provided on all streets with downhill slopes which drop 6 feet or more at greater than 3H:1V slopes.
- b. Guardrail installation shall be based on information found in AASHTO publication "Guide for Selecting, Locating and Designing Traffic Barriers."
- c. Guardrails shall be designed and constructed per ODOT's "Standard Drawings for Design and Construction."
- d. ~~B~~Permanent barricade installation shall be based on the "Manual of Uniform Traffic Control Devices." Basically red and white reflectorized Type III barricades shall be used at the end of a street, conforming with Detail 225. White and black reflectorized Type III barricades shall be used at the end of a street widening which does not taper back to the existing pavement width. White and black reflectorized ~~Type II barricades~~ signs shall be used at the end of the sidewalk or pedestrian/bike path, mounted on a post conforming with ODOT detail TM240, which post is also shown on Detail 212.

2.34 BIKEWAYS

- a. Bikeway locations shall be determined by the City. Bikeway facilities shall meet the requirements of this document and the American Association of State Highway and Transportation Officials publication, Guide for Development of New Bicycle Facilities, as amended and adopted by the Oregon Department of Transportation.
- b. A bikeway may be constructed adjacent to the curb within the pavement area.
- c. Structural sections of bikeway facilities on streets shall conform to that of the street or be integral with the curb. Bikeways not within a street shall be constructed upon compacted subgrade that has been sterilized if an asphaltic concrete bikeway, to one of the following pavement section designs:
 - 1) 4-inches of asphalt concrete over 2-inches of compacted baserock, or
 - 2) 2½-inches of asphalt concrete over 4-inches of compacted baserock, or
 - 3) 4-inches of Portland cement concrete over 2-inches of compacted baserock.
- d. Design Standards regarding horizontal alignment, grade, sight distance, intersections, signing, marking, structures, drainage and lighting shall conform to the AASHTO Standards. When bikeways are integrated with a curb, all inlet grates shall be designed to protect the bicyclist from the grate or opening.

2.35 STREET SIGNS

- a. Street signs shall be installed on all new or reconstructed public and private streets. Street names for all newly platted streets shall be approved by the City.
- b. All street signs (*material, color, wording, etc.*) shall conform to OSSC (ODOT/APWA) Specifications, City Standards, and the Manual of Uniform Traffic Control Devices (MUTCD). Location and type of signs shall conform with MUTCD and City Standards.
- c. Signs along County or State right-of-ways shall be approved by the County or ODOT as appropriate.
- d. All signs shall be ordered, installed and paid for by the developer. Street names and sign types shall be approved by the City prior to placement of the sign order.

2.36 CUTTING EXISTING STREETS & RESTORATION REQUIREMENTS

- a. Any street pavement cuts shall be repaired to PWDS standards and details, including any work by or for franchise utility companies. Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces, pavement which does not drain, or pavement with cracks or discontinuities along edges between new pavement and existing pavement or curbs shall be repaired to the satisfaction of the City, prior to final acceptance of the work.
- b. Unless otherwise approved in writing by Public Works, sawcuts or trenches within arterial or collector streets shall meet same requirements (*below*) as for cutting new streets (*ie. pavement less than 5 years old*).
- c. Street cuts in PCC concrete streets or concrete driveway aprons shall be restored as required by the City Engineer.
- d. Pavement more than 5 years old. All trench cuts or widening of existing paved streets (*those which do not meet the overlay/inlay requirements below*) shall include a bench grind along the joint between the new AC and existing AC per City standard details (*to avoid a full depth joints*), unless otherwise specifically approved by the City Engineer and Public Works for driveway cuts, private street cuts or public streets where existing asphalt is inadequate to support the bench grind.
- e. Pavement less than 5 years old. **No street in the City shall be cut by a contractor, developer or utility company within 5 years of construction, reconstruction or overlay unless approved by the City Engineer and authorized in writing by the City Council.** This time period may be extended in one (1) year increments by resolution by the City Council on a case-by-case basis. In the event that the City

allows a street to be cut within the time limit outlined herein, the trench in AC pavement streets shall be restored as follows:

- 1) Unless otherwise approved in writing, the trench shall be backfilled above the pipe zone with a Controlled Low Strength Material (CLSM) backfill (*with an unconfined compressive strength less than 200 psi*) as approved by the City Engineer and Public Works Director. The mix design shall be submitted to the City and approved prior to cutting the street.
- 2) The trench edges shall be over-cut square and straight to a minimum width of 6-inches from each edge of the trench following completion of the backfill and prior to the final patch work.
- 3) An asphalt wearing course of Class C mix shall be placed in two lifts to a minimum compacted depth of 4-inches or the depth of the existing pavement, whichever is greater.
- 4) After the trench cut is plugged as noted above, the street shall be repaved with an overlay or an inlay based on the minimum requirements summarized below, and as approved by the City Engineer and the Public Works Director.
 - a) The overlay shall cover the cut area to a minimum compacted depth of 2-inches and extend a minimum of 50 feet beyond the cut area in each direction along the street. Unless otherwise approved by the City Engineer and the Public Works Director, the overlay shall encompass the entire paved width of the street. A 2-inch deep edge grind shall be provided along all gutter or curblines to allow the new pavement to match gutter or curb grades and at each end to allow the new pavement to match existing pavement grade. Edge grinds shall be tapered to allow the full overlay depth at all locations. Butt grinds at the end of overlays shall be a minimum of 25 feet in length.
 - b) As an alternate to a full width overlay, a grind and inlay may be provided as follows. The grind & inlay shall be 2-inch minimum, or half the pavement depth, whichever is greater (*3" maximum*). Unless otherwise approved by the City Engineer and the Public Works Director, the grind & inlay shall extend a minimum of 15 feet in each direction (*parallel with curbline*) beyond any trench cut, and all inlays shall extend a minimum of 5 feet (*perpendicular to curb*) beyond any trench cut limits, with pavement limits extended as required to ensure that pavement joints do not fall in a wheel track. If the minimum inlay limits extend beyond the street centerline, it is to encompass the entire street width.
- 5) The overlay *or inlay* shall meet all requirements as outlined in PWDS 2.13, Overlays. A strip of Petrotac fabric shall be installed over all trench patch joints.

If this work is performed by a private party, a maintenance bond for the cost of the original construction and repair shall be posted with the City stating that the party shall be responsible for the condition of said pavement patches for a period of two (2) years, and during that time shall repair to the City's satisfaction any of the patches which become settled, cracked, broken or otherwise faulty."

CITY OF DAYTON
Public Works Design Standards

Division 3

Stormwater Management

DIVISION 3 STORMWATER MANAGEMENT

3.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a stormwater management system which will:
- 1) be of adequate design to safely manage all volumes of water generated upstream and on the site to an approved point of disposal;
 - 2) provide points of disposal for stormwater generated by existing upstream properties and future upstream developments;
 - 3) prevent the uncontrolled or irresponsible discharge of stormwater onto adjoining public or private property;
 - 4) prevent the capacity of downstream channels and storm drainage facilities from being exceeded, unless downstream improvements to increase capacity are provided as part of the project;
 - 5) have sufficient structural strength to resist erosion and all external loads which may be imposed;
 - 6) maximize the use of the City's natural drainage system;
 - 7) be designed in a manner to allow economical future maintenance;
 - 8) require the use of design and materials to provide a system with a minimum practical design life of not less than 50 years.

Alternate materials and methods will be considered for approval on the basis of these objectives.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

3.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public and private drainage facilities in the City of Dayton and applicable work within its service areas. This standard shall apply to all drainage facilities which impact any public storm drain system, public right-of-way or easement dedicated to or located within the City of Dayton and within all off-street parking and loading areas.
- b. All storm water runoff shall be conveyed to a public storm drain or natural drainage

channel having adequate capacity to carry the flow without overflowing or otherwise causing damage to public and private property. In the case of private development, the developer shall pay all costs associated with designing and constructing the facilities necessary to meet this requirement.

- c. Permanent storm drain facilities shall be provided to all properties within the City of Dayton in accordance with these Standards. This shall generally be interpreted to mean that permanent storm drainage facilities shall be provided for the following types of development:
- 1) Existing legal lots of record at the time development occurs;
 - 2) All partitions and subdivisions;
 - 3) Developments entailing construction which will change the point of discharge of surface waters, the quantity of discharge, or will discharge water at a higher velocity than that of the preconstruction discharge rate.
 - 4) Construction or reconstruction of public or private streets and temporary detours;
 - 5) Developments entailing construction in or adjacent to any existing stream or watercourse including intermittent streams.

3.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
- 1) Stormwater Pump Stations and Force Mains
 - 2) Siphons
 - 3) Water Quality Facilities
 - 4) Energy Dissipators
 - 5) Flow Measurement Devices
 - 6) Bore Crossings
 - 7) Concrete Box Culverts (*where standard culverts are not feasible*)
- b. Review and approval of the above special items by the City Engineer and the Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

3.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 2.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards.
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and the Public Works Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

3.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all storm drain appurtenances including manholes, catch basins, junction boxes, ditch inlets, service lateral connections, outlet structures, riprap outlets, etc.

3.6 STANDARD DETAILS

- a. Standard details included in the Appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable standard details shall be included on the construction drawings.

3.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to stormwater systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.
- 1) Abbreviations: Acceptable abbreviations for showing types of new and existing pipe materials and facilities on the plans are as follows:
 - a) AC - Asbestos Cement
 - b) CAP - Corrugated Aluminum Pipe
 - c) CI - Cast Iron
 - d) CHDPE - Corrugated High Density Polyethylene
 - e) CMP - Corrugated Metal Pipe (*Aluminum*)
 - f) CP - Non-reinforced Concrete Pipe
 - g) DI - Ductile Iron
 - h) HDPE - High Density Polyethylene
 - i) PVC - Polyvinyl Chloride
 - j) RCP - Reinforced Concrete Pipe
 - 2) Building Drain: The building drain is that part of the lowest piping of the drainage system which receives the discharge from stormwater drainage pipes inside or within 5 feet of the outside walls of the building and conveys it to the building sewer, which begins five (5) feet outside the building wall or building foundation.
 - 3) Building Storm Drain: That part of the piping of a stormwater drainage system which begins at the connection to the building drain and conveys stormwater to an approved point of disposal.
 - 4) Catch Basin: An approved receptacle designed to receive surface drainage and direct it to a stormwater collection system.
 - 5) Creek: Any and all surface water generally consisting of a channel having a bed, banks, and/or sides in which surface waters flow to drain higher land to lower land, both perennial and intermittent, excluding flows which do not persist for more than 24-hours after the cessation of $\frac{1}{2}$ -inch of rainfall in a 24-

hour period from October through March.

- 6) Detention: The holding of runoff for a short period of time while releasing it to the downstream drainage system at a controlled rate.
- 7) Drainage Facilities/System: Pipes, ditches, detention basins, creeks, culverts, etc. used singularly or in combination with each other for the purpose of conveying or storing stormwater runoff.
- 8) Impervious Areas/Surfaces: Those hard surface areas located upon real property which either prevent percolation of water into the land surface or reduce the percolation rate which existed under natural conditions prior to development. Also surfaces which cause water to run off the land surface in greater quantities or at increased flow rates than under natural conditions which existed prior to development. Common impervious surfaces include but are not limited to rooftops, driveways, parking lots or storage areas, sidewalks, patios, etc.
- 9) Natural Location: The location of those channels, swales, and other non-man-made drainage conveyance systems as defined by the first documented topographic contours existing for the subject property either from maps or photographs.
- 10) On-site Detention: The storage of excess runoff on the development site and gradual release of the stored runoff into a public storm drain system after the peak of the runoff has passed.
- 11) Peak Discharge: The maximum water runoff rate determined for the design storm.
- 12) Private Storm Drain: A storm drain located on private property serving parking lot catch basins or more than one structure on the same premises, and not operated or maintained by the City.
- 13) Public Storm Drain: Any storm drain in a public right-of-way or easement operated or maintained by the City.
- 14) Receiving Body of Water: Creeks, streams, lakes, and other bodies of water into which runoff is naturally or artificially directed.
- 15) Release Rate: The controlled rate of release of drainage and runoff water from property, storage ponds, detention basins, or other facility during and following a storm event.
- 16) Retention Facility: Facilities which hold water for a considerable length of time and then consume it by evaporation, plant transpiration, or infiltration into the soil.

- 17) Sedimentation: Deposition of erosional debris and soil sediment displaced by erosion and transported by water from a higher elevation to an area of lower gradient where sediments are deposited as a result of slack water.
- 18) Terrace: A relatively level step constructed in the face of a slope for drainage, erosion control and maintenance purposes.
- 19) Trunk Drainage System: That portion of the drainage system which receives waters from upstream land areas in excess of 20 acres. The drainage system may consist of watercourses or manmade facilities such as pipes, ditches, and culverts.
- 20) Wetlands: As defined by the Division of State Lands and the US Army Corps of Engineers.

3.8 MATERIALS

a. **General**

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply. Acceptable materials shall be as outlined in these Design Standards.
- 3) It is not intended that materials listed herein are to be considered acceptable for all applications. The design engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.
- 4) Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

- #### b. **Pipe Type By Cover Depth**: Unless otherwise approved by the City Engineer, storm drain pipe materials shall conform to the table below. Uniform pipe material shall be used on each pipe run between structures. Special requirements for use of jointed HDPE pipe for slopes exceeding 6% for or cover depths greater than 10 feet are listed in the following table.

ALLOWABLE STORM DRAINAGE PIPE BASED ON COVER DEPTH	
↓ COVER DEPTH ↓ <i>(from finish grade)</i>	10" – 18" DIAMETER
Less than 1½' Cover	Class 50 Ductile iron pipe with bell & spigot joints and rubber gaskets.
1½' to 2½' Cover	Pipe specified for lesser depths -OR- Class 3, ASTM C-14 non-reinforced concrete pipe with bell & spigot joints and rubber gaskets. -OR- PVC pipe conforming to AWWA C900 DR 18 with bell and spigot joints and rubber gasket.
2½' to 10' Cover	Pipe specified for lesser depths -OR- PVC pipe conforming to ASTM D-3034 solid wall PVC SDR 35 (6"-15") or ASTM F-679 PVC solid wall SDR 35 (18") with bell and spigot joints and rubber gasket -OR- HDPE (High Density Polyethylene) pipe conforming to AASHTO M-252 (8"-10") or AASHTO M-294 (12"-18"). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.
More than 10' Cover	Case by case basis.
↓ COVER DEPTH ↓ <i>(from finish grade)</i>	21" – 30" DIAMETER
Less than 1½' Cover	Class 50 Ductile iron pipe with bell & spigot joints and rubber gaskets.
1½' to 2½' Cover	Pipe specified for lesser depths -OR- Class IV (minimum), ASTM C-76 reinforced concrete pipe with bell & spigot joints and rubber gaskets -OR- PVC pipe conforming to AWWA C900 DR 18 with bell and spigot joints and rubber gasket.
2½' to 10' Cover	Pipe specified for lesser depths -OR- ASTM F-679 PVC solid wall SDR 35 pipe with bell and spigot joints and rubber gasket -OR- HDPE (High Density Polyethylene) pipe conforming to AASHTO M-294. For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.
More than 10' Cover	Case by case basis.
GREATER THAN 30" DIAMETER, OTHER PIPE MATERIALS - Case by case basis.	
Driveway Culverts or Open Storm Inlets: Pipe type based on cover depth, minimum size 12-inch diameter <i>(or size based on flow capacity, adjacent existing street crossing or storm drain size, whichever is greater)</i> .	
Pipe End Protection: PVC or HDPE pipe is not allowed for culverts or for exposed inlets/outfalls without structures unless concrete end caps are provided <i>(6" min thickness, typically 12" larger than pipe OD unless larger size required by Public Works)</i> .	
Detention Systems. Piping associated with detention systems <i>(ie. including detention pipe where applicable, piping between the detention basin & the flow control manhole, overflow piping, etc.)</i> shall conform with the minimum requirements of this table. This pipe material table also does not apply to other <u>private</u> storm piping which fully complies with the material <u>and</u> slope requirements of the Oregon Plumbing Specialty Code (OPSC).	

c. **Storm Drain Pipe**

1) **Ductile Iron**

- a) Ductile iron storm pipe shall be Class 50 pipe conforming to AWWA C-151, and cement-mortar lined and seal coated in accordance with AWWA C-104.

2) **Non-Reinforced Concrete Pipe (CP)**

- a) Non-reinforced concrete pipe and specials shall conform to AASHTO M86 (ASTM C-14), Class 3 minimum.
- b) Joints shall be bell and spigot with an O-ring as specified or shown on the drawings and conforming to the following:
- (1) Bell and Spigot joints shall be sealed with flexible watertight gaskets meeting or exceeding all requirements of Federal Specifications SS-S-06210 (GSA, FSS Washington, DC) "Sealing Compounds, Preformed Plastic for Pipe Joints," type 1 Ropeform. Such gaskets may be RAMNEK as manufactured by K.T. Snyder Co., Inc., of Houston, Texas; KENTSEAL No. 2 Joint Sealant as manufactured by Hamilton Kent Mfg., Co., of Kent, Ohio, or approved equal.
- (2) O-Ring joints shall conform to ASTM C-443. The gaskets shall conform to material requirements of ASTM C-361.

3) **Reinforced Concrete Pipe (RCP)**

- a) Reinforced concrete pipe shall meet the requirements of AASHTO M170 (ASTM C-76) Class IV minimum.
- b) Joints shall be O-ring type in conformance with non-reinforced concrete pipe joint and gasket specifications above.

4) **PVC Pipe**

- a) Pipe and fittings shall conform to ASTM D-3034, SDR 35 or ASTM F 679, SDR 35 as outlined above.
- b) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.
- c) The joints shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

5) **High Density Polyethylene Pipe (HDPE)**

- a) Pipe and fittings shall have integrally formed smooth interior pipe surface.
- b) Pipe and fittings shall conform to the requirements as listed in the table above.
- c) HDPE (High Density Polyethylene) pipe conforming to AASHTO M-252 (8"-10") or AASHTO M-294 (≥ 12 ""). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.

d. **Joints**

- 1) Except as otherwise specified, joints for pipe shall be watertight joints using elastomeric ring gaskets. The gaskets shall be securely fixed into place so that they cannot be dislodged during joint assembly.
- 2) The gaskets shall be of a composition and texture which is resistant to common ingredients of drainage, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.

e. **Pipe Accessories**

- 1) Fittings shall be of the same material as the pipe, molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations as required.
- 2) Manufactured fittings shall be used for all connections to existing or new storm drains.

f. **Catch Basins**

- 1) Catch basin construction and dimensions shall conform to the Standard Details. Side inlet grated catch basins shall be required.
- 2) Catch basin frame and grate shall conform to standard details, and shall be fabricated of structural steel, ASTM A-7, A-36 or A-273.
- 3) Solid lids on junction boxes shall be minimum 3/4-inch steel plate, and shall be provided with at least one lifting hole. Junction boxes located in a travel lane shall have a manhole frame and cover.

g. **Manholes**

- 1) Except as modified herein, precast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to the requirements outlined under Division 4, Sanitary Sewers and as shown in the standard details.
- 2) Steps shall not be required for manholes 4 feet or less in depth (*rim to invert*).
- 3) Manhole castings for storm manholes shall have 16-hole lids.
- 4) **Pollution/Flow Control Manholes**
 - a) Unless otherwise required by the Public Works Director, pollution/flow control manholes shall be provided with a 24-inch diameter casting and lid, with a separate access hole over the orifice.

h. **Mainline Storm Cleanouts**

- 1) Except as modified herein, mainline storm cleanouts (*where approved by the City*) shall conform to the requirements outlined under Division 4, Sanitary Sewers and as shown in the standard details.
- 2) A 3,300 psi concrete collar is required for cleanouts located outside of paved areas. The shaft or chimney of the cleanout shall be a minimum of 8-inches in diameter.

i. **Concrete (Cast-in-Place)**

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi (*5" slump or stiffer*).

j. **Underground Warning Tape**

- 1) Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
- 2) The tape shall be safety green and shall be provided with the legend "CAUTION BURIED STORM DRAIN LINE BELOW" or approved equivalent printed continuously down the length of the tape.

k. **Toning Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be green in color for storm piping.
- 2) Wire shall penetrate into manholes and catch basins within 18 inches of the rim elevation.

l. **Bore Casings and Accessories**

- 1) Carrier pipe used in bore casings shall be Ductile Iron or PVC as specified herein.
- 2) Bore casing and carrier pipe design and installation shall conform to the requirements outlined under Division 5, Water Distribution.

3.9 GENERAL DESIGN CONSIDERATIONS

a. **General Requirements**

- 1) The design of storm drainage systems shall include provisions to adequately control runoff from all public and private streets and the roof, footing, and area drains of residential, multifamily, commercial and industrial developments, and to provide for the future extension of the storm drainage system to serve the entire drainage basin.
- 2) All storm water runoff shall be conveyed to an approved point of disposal. In the case of private development, the developer shall pay all costs associated with designing and constructing the facilities necessary to meet this requirement.
- 3) The design storm peak discharge from the subject property may not be increased from conditions existing prior to the proposed development except where it can be satisfactorily demonstrated by the applicant that there is no adverse impact to downstream properties, and that the "remaining available downstream capacity for the site being developed" (per PWDS 3.18.g) is not exceeded.
- 4) Public storm drains within easements will be permitted only upon a showing that drainage cannot be provided from within a right-of-way. Minimum easement widths shall be as outlined herein.
- 5) Gravity Flow: Where possible, all public storm drains shall be designed to flow by gravity to an existing or new storm drain system without lift stations.
- 6) **Self-Cleaning**. Except for pollution control or water quality structures, all

storm drain system components shall be designed to be self-cleaning to the extent possible.

b. **Approved Point of Disposal**

- 1) Surface or subsurface drainage, caused or affected by changing of the natural grade of the existing ground or removal of natural ground cover or placement of impervious surfaces, shall not be allowed to flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred, and shall be collected and conveyed in an approved manner to an approved point of disposal.
- 2) The approved point of disposal for all stormwater may be a storm drain, existing well defined open channel or creek as approved by the City Engineer and the Public Works Director. Acceptance of proposed point of disposal will depend upon the prevailing site conditions, condition and capacity of existing downstream facilities, and feasibility of alternate design.
- 3) When private property must be crossed in order to reach an approved point of disposal (*or if downstream improvements are required across private property in order to provide required capacity or depth*), it shall be the developer's responsibility to acquire a recorded drainage easement from the private property owner meeting the approval of the City Engineer and the Public Works Director. The drainage facility installed must be a closed conduit system. Temporary drainage ditch facilities, when approved, must be engineered to contain the stormwater without causing erosion or other adverse effects to the private property.

c. **Providing for Future Development & Collection of Upstream Drainage**

- 1) As a condition of development, all developments will be required to provide public storm drainage systems (*or private storm drainage systems where approved by the City*) to serve adjacent upstream parcels in order to provide for the orderly development of the drainage area, as well as connection (*to the new system*) of existing storm lines or laterals crossed or intercepted by the new storm lines (*including manholes or catch basins which can be served by the new storm lines*), at locations as required by the City Engineer and Public Works Director (*see also PWDS 1.6.e*).
- 2) The requirement above shall include the extension of storm drain lines in easements across the property as required to collect drainage from adjoining upstream/uphill properties and across street frontages of the property to adjoining properties when the storm drain system is located in the street right-of-way. This shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future.
- 3) The requirements above shall include storm drains which are oversized to

provide capacity for future upstream development, or as required to meet the minimum sizes shown in the applicable storm master plan (*see also PWDS 1.6.h*).

- 4) Where swales along property lines are required to intercept uphill surface runoff, inlets shall be provided at spacing & location acceptable to the City Engineer.

d. **Design Factors**

- 1) The following factors as a minimum shall be addressed in the design of storm drain systems and determination of design flows.
 - a) Drainage basin to be served.
 - b) Topography of the area
 - c) Depth of excavation
 - d) Soils conditions
 - e) Land use within the area to be served.
 - f) Projected population within the area to be served at build-out.
 - g) Flows from commercial, industrial or institutional users.
 - h) Condition and size of existing storm drains
 - i) Location of approved disposal point
 - j) Maintenance, including accessibility for cleaning and inspection personnel and equipment.

3.10 **DESIGN CALCULATIONS AND CAPACITY**

a. **Design Calculations**

- 1) Design calculations shall be submitted for all drainage facilities and shall be stamped by a professional engineer licensed in the State of Oregon. Peak flows shall be calculated using either the Rational Method or the Santa Barbara Urban Hydrograph (SBUH) method, subject to requirements herein and direction from the City Engineer and/or other agencies with jurisdiction.
 - a) A summary of these drainage calculations, including basin maps, shall be included on the site plan drawings (*see PWDS 1.10.g*).

- 2) Rational Method: One method used for calculating peak flows from small drainages less than 200 acres is the Rational Method.
 - a) Peak design discharges shall be computed using the rational method formula, $Q=CiA$, where Q = flow in cfs, C = runoff coefficient, i = rainfall intensity, and A = area in acres.
- 3) SBUH: Another method of involves the use of the Santa Barbara Urban Hydrograph (SBUH) method to develop runoff hydrographs using 24 hour storm data for the local area, based on current NOAA Atlas 24 hour isopluvials for Oregon.
 - a) The City Engineer reserves the right to verify all calculations using the Rational Method, and require larger pipe sizes if the Rational Method calculations result in higher flows than the SBUH methodology.

b. **Design Storm**

- 1) Rational Method Rainfall Intensity-Duration Curve - The rainfall intensity-duration-frequency (IDF) curve for use under the Rational Method in the City of Dayton is the ODOT Zone 7 IDF curve (*enclosed herein*).
- 2) Rational Method Design Frequency - The intensity-duration design frequency for use under the Rational Method is based on the time of concentration for the area and the size of the drainage facility. The adopted criteria are listed in the following table.
- 3) ~~SBUH Design Storm: Where use of a Santa Barbara Urban Hydrograph (SBUH) based computer program is proposed for use in sizing storm drain pipes for peak discharge, a 50 year 24 hour SBUH storm event must be used in lieu of the 10 year or 25 year rational storm frequency to provide equivalent capacity.~~

Rational Method - DESIGN STORM FREQUENCY¹	
AREA	FREQUENCY
Residential areas	10-year storm
Commercial and high value districts	10-year storm
Trunk lines (<i>18" pipe and larger</i>)	25-year storm
Minor creeks and drainage ways (<i>not shown as a flood plain on the Flood Insurance Rate Map (FIRM)</i>)	50-year storm
Major creeks (<i>shown as a flood plain on the FIRM</i>)	100-year storm

¹ See PWDS 3.10.a.3 regarding design storm when SBUH methodology used for pipe sizing.

- 3) SBUH Design Storm: Where use of a Santa Barbara Urban Hydrograph (SBUH) based computer program is proposed for use in sizing storm drain pipes for peak discharge, a 50 year 24 hour SBUH storm event must be used in lieu of the 10 year or 25 year rational storm frequency to provide equivalent capacity.

ODOT IDF Curve Tabular Data

ODOT IDF curve plot

c. **Runoff Coefficients**

- 1) The Rational Method coefficients of runoff "C" are listed below (*ie. for use with rational method calculations*). Use of coefficients other than those listed must be based on field investigations which demonstrate conclusively that the proposed coefficients are justified. See requirements above for CN runoff curve numbers required for use with Santa Barbara Urban Hydrograph (SBUH) calculations.

Rational Method - RUNOFF COEFFICIENTS			
SOIL COVER	FLAT TERRAIN S<2%	ROLLING TERRAIN 2%<S≤10%	STEEP TERRAIN S>10%
Cultivated Land	0.30	0.35	0.40
Parks & Cemeteries	0.15	0.20	0.30
Woodlands & Forests	0.10	0.15	0.20
Meadows & Pasture Land	0.25	0.30	0.35
1) Single-family residential in urban areas, except corner lots with duplex potential	0.40	0.45	0.50
2) Gravel parking lots	0.50	0.55	0.60
3) Mobile home parks	0.60	0.65	0.70
4) Multi-family residential, zero-lot-line single-family residential and potential duplex lots in single-family residential	0.70	0.75	0.80
Highly impermeable (<i>roofs and paved areas</i>)	0.90	0.90	0.90

- 2) All CN parameters (*runoff curve number*) used for SBUH calculations shall be as conservative or more conservative than the equivalent Rational Method runoff coefficients listed in these standards.

d. **Time of Concentration**

- 1) For land in a pre-development condition, the minimum time of concentration from the most remote point in the basin to the first defined channel (*ie. gutter, ditch or pipe*) shall be 10 minutes. Pre-development shall be defined as a site with natural vegetation on native soil.
- 2) For developed residential and commercial/industrial property, the maximum post-development time of concentration from the most remote point in the

development to the closest inlet shall be 10 minutes, unless calculations by an acceptable method show the time to be longer for very large developments.

3.11 OPEN CHANNELS

- a. Within the UGB, creation of new open channels will not generally be allowed. Where allowed by the City, ditches or open channels shall be offset from lot lines, such that maintenance access can be provided and survey monuments are not required to be set within the open channel.
- b. For reasons of maintenance and safety, bank slopes generally shall be 3H:1V or flatter unless otherwise required by the Public Works Director or the City Engineer. Unless otherwise required by Public Works Director or the City Engineer, open channels shall generally be provided with a minimum of 1 foot freeboard above the design high water level, where required to ensure that the channel does not overflow onto private property between periods when the ditch is mowed or cleaned by the agency with jurisdiction.
- c. The maximum allowable design velocity shall be 7 fps.
- d. The minimum allowable design velocity shall be 2 fps. The installation of a concrete lined low-flow channel may be required to achieve minimum velocity necessary to ensure that the channel is self-cleaning to the extent feasible.
- e. Unless otherwise approved by the City Engineer, all piped discharges to open channels (*existing or new*) shall be mitered to match the channel side slope and include a reinforced concrete collar (*6" minimum thickness*) to prevent settlement or erosion of the pipe trench at the discharge location, and to protect the end of the pipe. Unless otherwise approved by Public Works and the City Engineer, the concrete collar shall extend from the channel bottom to the top of bank. Grates shall be provided on all inlets or outlets 18" or larger unless otherwise specifically approved by Public Works and the City Engineer, as well as at any locations required by Public Works to accommodate maintenance or mowing requirements.

3.12 STORM DRAIN ALIGNMENT AND LOCATION

a. General

- 1) Generally, storm drains shall be laid on a straight alignment between catch basins and between manholes. Lines 15-inch in diameter and smaller may be laid on horizontal curves conforming to the street curvature provided the radius of the horizontal curve is not less than 200 feet.
- 2) Variance for horizontal curves on larger size pipes shall be reviewed by the City Engineer on a case by case basis.
- 3) Where storm drains are being designed for installation parallel to other utility

pipe or conduit lines, the vertical location shall be in such a manner that will permit future side connections of main or lateral storm drains and avoid conflicts with parallel utilities without abrupt changes in vertical grade of main or lateral storm drains.

b. **Storm Drain Location in Relation to Water and Sewer Lines and Other Utilities**

- 1) Public storm drainage lines shall be separated from all other parallel public utilities by a minimum of 5 feet between utility centerlines, but in all cases a minimum of 3 foot clear separation shall be provided.
- 2) Installation of franchise or private utilities in a common trench with storm drain lines shall be prohibited.

c. **Storm Drain Location in Street Right-of-Ways**

- 1) Unless otherwise approved by the City Engineer and the Public Works Director, storm drain lines shall generally be located in the street right-of-way within six (6) feet of the face of curb.
- 2) Variance for horizontal curves on larger size pipes shall be reviewed on a case by case basis for approval by the City Engineer.

d. **Storm Drain Location in Easements, & Easement Widths, Maintenance Access Requirements**

- 1) Minimum Easement Widths: Unless otherwise specified or authorized by the City, minimum easements widths for storm drains shall be as follows:

MINIMUM STORM DRAIN EASEMENT WIDTHS		
Storm Drain Diameter	Depth to Invert	
	≤ 6 feet	> 6 feet
10 - 15 inches	12 feet	12 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
18 - 24 inches	16 feet	16 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
> 24 inches	20 feet	20 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
<p>Note: Easements shall be a constant width between manholes or other in-line structures. Easement width shall be based on the deepest portion of the line between such structures.</p>		

- 2) Open channels located outside of public right-of-ways shall be provided with

an easement widths as follows:

- a) Channel width less than 14 feet at top of banks: Channel width plus 12 feet on one side and 2 feet on the other.
- b) Channel width greater than 14 feet at top of banks: Channel width plus 12 feet on both sides.
- 3) Public storm drains in easements will be allowed only after all reasonable attempts to place the mains in a right-of-way have been exhausted. All easement installations must be approved in writing by the City Engineer and the Public Works Director on a case-by-case basis.
- 4) Offset. When storm drains in easements are approved by the City, the storm line shall be offset a minimum of 6 feet from any property line or easement boundary, or 1/3 the required easement width (*rounded up to the nearest foot*), whichever is greater.
- 5) Easement locations for public storm drain lines serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.
- 6) Maintenance Access Requirements. Where required by the Public Works Director, public storm drain lines located outside of developed street right-of-ways will require maintenance access similar to that required for sewers under PWDS 4.15.d (*ie. all-weather access lanes along mainlines and/or for access to manholes including flow control manholes, inlets, valves or other structures, maintenance agreement, etc.*).
- 7) City standards require that ~~The conditions of the easements granted to the City shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for storm drain purposes.~~ Under no circumstances shall a building or structure or tree be placed over a storm drain pipe or easement, nor shall any parallel fences be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.
- 8) Common placement in the easement of a sanitary sewer and storm drain line may be allowed under certain conditions subject to approval by the City Engineer and the Public Works Director. Easements wider than the minimum may be required.
- 9) Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet Oregon State Department of Environmental Quality (DEQ) requirements.

- 10) All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the Developer.

3.13 STORM DRAIN MINIMUM PIPE SIZE

- a. Public mainline, lateral or connector pipe storm drains shall not be less than 10-inches inside diameter, and shall begin at a structure and terminate at an approved point of disposal.
- b. Per 3.8.b (table), driveway culverts (*or any other pipe specifically approved with an open inlet end*) shall be a minimum of 12-inches diameter. Larger diameters shall be provided where required for flow capacity or where required to match the size of adjacent existing street crossings or storm drain pipes.
- c. When two parallel pipes are installed in lieu of a box culvert, the minimum separation between the pipes shall be one foot or 1/3 the diameter, whichever is greater. This requirement may be waived if the void between the pipes below the springline is filled by grouting or other approved method.

3.14 STORM DRAIN MINIMUM COVER

- a. All storm drains shall be laid at a depth sufficient to protect against damage by traffic and to drain building footings where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the storm drain alignment.
- b. Under normal conditions minimum cover shall be 24-inches above the top of the pipe in paved areas and 30-inches at all other locations.
- c. In areas of relatively flat terrain, the design engineer must demonstrate that sufficient depth is provided at the boundary of the development to properly drain the remainder of the upstream basin area tributary to the site.

3.15 STORM DRAIN MINIMUM SLOPE & ROUGHNESS COEFFICIENT

- a. All storm drains shall be laid on a grade which will produce a mean velocity (*when flowing full*) of at least 2½ feet per second, based upon Manning's pipe friction formula using a roughness coefficient as noted below.
 - 1) Roughness Coefficient:
 - a) A minimum “n” value of 0.013 shall be used in Manning’s formula for the design of all smooth wall pipe and 0.024 for corrugated wall pipe, or per the pipe manufacturer’s recommendations, whichever is greater. The use of higher “n” values for existing pipe may be required by the City Engineer as deemed necessary by the City.
 - b) In theory, new PVC and HDPE pipes have manufacturer’s “n” value of

0.009 to 0.012. However, sand, dirt and rock and other deposits tend to build up in pipes over time. Hence, an “n” value of less than 0.013 will not be considered for approval.

- b. The minimum acceptable slopes for various pipe sizes and types are listed below:

MINIMUM STORM DRAIN PIPE SLOPES <i>(for 2½ fps velocity)</i>	
Inside Pipe Diameter (inches)	Smooth Wall (n=0.013) % Slope (ft/100 ft)
10	0.39
12	0.30
15	0.23
18	0.18
21	0.14
24	0.12
27 & larger	0.10

- c. In general, gradients greater than those shown above are desirable and are particularly recommended on connector pipes and the upper ends of laterals.
- d. The minimum grade may be reduced from the above table to produce an absolute minimum velocity of 2.0 fps upon approval of the City Engineer. Cases requiring a flatter grade than permitted above shall also be reviewed on a case by case basis for approval by the City Engineer.
- e. Engineers are cautioned not to specify sewers of sizes which are obviously larger than necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements (*ie. a 15-inch pipe for an 12-inch pipe to acquire a decrease in slope*).
- f. Storm drains shall be laid with uniform slope between structures.
- g. Grades (*slopes*) shall be determined to the pipe invert at the edge of the catch basin or manhole and lengths to the center of the catch basin or manhole.
- h. The difference between the inlet pipe slope (Si) and outlet pipe slope (So) at any catch basin or manhole shall not exceed 25 percent.
- i. Storm drains on slopes of 20 percent or more shall be anchored with concrete anchor walls or other restraining methods approved or specified by the City.

- j. Where velocities greater than fifteen (15) feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes against erosion and displacement by shock. This may be accomplished by installing one additional manhole to decrease the slope or to split a 90° horizontal direction change into two 45° incremental changes.

3.16 UNDERGROUND WARNING TAPE & TRACER WIRE

- a. Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all service laterals and all mainlines not located under sidewalks or paved portions of public streets.
- b. Underground warning tape shall be placed a minimum of 12-inches and a maximum of 18-inches below the finish ground surface, and shall be continuous the entire length of the service laterals installed from the mainline to the back of the PUE. Where required for mainlines not located under sidewalks or paved portions of public streets, the warning tape shall be continuous between manholes or cleanouts.
- c. All storm piping (*both public lines and private lines serving parking lots, detention basins, etc.*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with green sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe with each end accessible from the surface through a manhole, cleanout or catch basin.

3.17 MANHOLES AND CATCH BASINS

a. General

- 1) All junctions between storm drains shall be made at manholes, catch basins or detention basins.
- 2) Manholes or junction boxes shall be required at the following locations or as determined by the City Engineer:
 - a) All changes in horizontal or vertical alignment. Minor horizontal curvature in pipe less than 15 degrees may be allowed, (*without manholes or cleanouts*), depending on pipe size, street alignment, degree of curvature and reason. Maximum joint deflection shall be per manufacturer's recommendation.
 - b) All connections unless otherwise noted herein.
 - c) All changes in pipe size.
 - d) At a spacing no greater than five hundred (500) feet.

- 3) For new storm mainline and/or new catch basin construction, catch basin laterals of 10 feet or less in length and 10 inches in diameter or less may connect to the main line with a shop fabricated 90 degree "T", provided the connections is located not more than one hundred (100) feet from a manhole or cleanout on the main line and the main line is a minimum of 15-inches or larger in diameter.
- 4) In lieu of connecting to manholes, catch basins or junction boxes, storm drain laterals draining private property may be connected directly to the public main line, provided the storm lateral diameter is 8-inches or less and is no more than half the diameter of the main line. Unless otherwise approved by Public Works, the connection to the mainlines shall be with an Inserta-Tee connection so as to provide a strong, leak-proof joint. The lateral shall not project inside the main line.

b. **Catch Basins**

1) **General**

- a) Side inlet grated catch basins shall be used at all locations. Exceptions will be considered on a case by case basis.
- b) Catch basins may be used for the junction of pipes 15-inches in diameter or less where the depth from rim to invert is less than 4 feet.
- c) Catch basins shall be designed to completely intercept the 5 year design storm gutter flow.

2) **Location**

- a) The maximum length of curb and gutter which may be drained by a catch basin is 500 feet.
- b) The maximum impervious area which may be drained by a catch basin is 20,000 square feet.
- c) Catch basins shall be installed where the improvement ends on all streets terminating on a descending grade, and piped to an approved point of disposal.
- d) Catch basins on corners shall not be located in front of handicap access ramps.
- e) Catch basins in the middle of blocks shall be located within 5 feet of the extension of a common property line.
- f) Catch basins shall be installed at all low spots, whether on private or public property, and shall be connected to a storm drainage facility.

- g) Catch basins shall be set to minimize gutter flows across new pedestrian access ramps to the extent practicable, as determined by the Public Works Director and City Engineer. A catch basin shall be set on the uphill side of pedestrian ramps, unless otherwise approved on a case-by-case basis.
- h) Maintenance of Private Catch Basins. In order to ensure compliance with City requirements regarding stormwater discharge, all catch basins on private property (*parking lots, etc.*) which drain to a public storm system shall be provided with a recorded agreement allowing for inspection entry by Public Works, unless catch basins are located within a City easement, or otherwise covered by a detention system maintenance agreement. Maintenance of private catch basins and private stormwater systems shall be an ongoing responsibility of the property owner, whether or not a maintenance agreement is recorded.

3) Drop Across Catch Basin Structure

- a) The vertical drop across flow-through storm drain catch basins shall not be less than 0.1 feet.

c. Manholes

1) Manhole Size

- a) Manhole size shall conform to the requirements outlined under Division 4, Sanitary Sewers and the standard details.

2) Manhole Location

- a) Manholes shall be installed at all pipe junctions where the depth from rim to invert exceeds 4 feet or where the pipe is 18-inches in diameter or greater. Exceptions will be reviewed on a case by case basis.

3) Drop Across Manhole Structure

- a) The vertical drop across storm drain manholes shall conform to the requirements outlined under Division 4, Sanitary Sewers.
- b) Where pipes of different sizes enter the same manhole, the design shall generally provide that the crowns of the pipes are set at the same elevation. Deviation requires approval by the City Engineer.
- c) In cases where two pipes discharge into a manhole from opposite directions and one pipe has a slope more than 4% steeper than the pipe opposite, the invert of the pipe with the lower slope shall be set a minimum of 0.35 feet or $\frac{1}{2}$ the pipe diameter, whichever is greater, above invert of the steeper pipe.

- 4) **Rim Elevation**
 - a) The rims of all manholes located within paved or other hard surfaced areas shall be set to finished grade.
 - b) Concrete riser rings shall be used to bring casting to grade. The height from the top of the cone or flattop section to the rim shall not exceed 18 inches.

d. **Mainline Storm Cleanouts**

- 1) Mainline storm cleanouts will not be approved as substitutes for manholes or terminal catch basins. Cleanouts shall only be allowed at the upper end of main storm lines less than 150 feet long which will be extended on the same grade and alignment during the next construction phase of a multiphase development, and which do not have any laterals.
- 2) All mainline cleanouts will be considered on a case-by-case basis and approved by the City Engineer and the Public Works Director. In all cases, plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole shall be submitted prior to approval of cleanouts.

3.18 DETENTION FACILITIES

a. **Where Required**

- 1) Peak storm water runoff shall be controlled by detention facilities for the following:
 - a) All commercial, industrial and multi-family developments
 - b) Parking lots with 10,000 square feet or more of impervious area
 - c) All other developments where such control is needed to prevent the capacity of the downstream system from being exceeded.
- 2) Developers shall be responsible for demonstrating to the satisfaction of the City Engineer that the downstream system has capacity for the proposed flows.
- 3) Developers proposing to not provide detention or control shall be responsible for demonstrating to the satisfaction of the Engineer that such control is not necessary.

b. **Allowable Runoff Rate (Outflow)**

- 1) Peak runoff rate shall be limited to that which would occur in a 5-year frequency

storm with pre-development conditions as defined above, or the *remaining available downstream capacity for the site being developed*, whichever is more stringent.

- 2) Remaining available downstream capacity is defined as the downstream capacity unused during the design storm event. The *remaining available downstream capacity for the site being developed* is that portion of the remaining available downstream capacity equivalent to the ratio of the site being developed to the total undeveloped land in the basin.

c. **Detention Facility Siting & Maintenance**

- 1) Unless otherwise approved by the City Engineer and Public Works Director, all detention facilities shall be located on private property. Detention facilities located within a public right-of-way shall be configured as piped detention facilities (*ie. surface detention within right-of-way is not allowed*).
- 2) **Detention Easement & Maintenance Responsibility**. All detention facilities shall be maintained by the property owner or Home Owner's Association (*or similar entity acceptable to the City*), including but not limited to cleaning and maintenance of outlet/flow control structures, irrigation (*via a permanent irrigation system*), mowing, etc.
 - a) Maintenance shall be assured through a recorded maintenance agreement acceptable to the City (see Appendix D).
 - b) All detention basins, with the exception of parking lot detention basins, shall be within a storm/detention and access easement to the City.
- 3) **Flow Control Structure Maintenance Access Requirements**. Unless otherwise approved in writing by the Public Works Director, provisions for all weather maintenance vehicle access to detention flow control structure shall be installed by the developer.
- 4) Grass and a permanent irrigation system shall be provided and installed by the developer for open detention basins outside of parking lots.

d. **Detention Facility Design**

- 1) **General**
 - a) All detention facilities and drainage calculations shall be designed and stamped by a Professional Engineer registered in the State of Oregon. Detention facilities shall be designed to protect public and private property.
 - b) Unless otherwise approved by the City Engineer, all open detention

basins (*including detention chambers with open bottoms*) shall be designed as off-stream storage basins, sloped to drain completely between design storms.

- c) The water level in the receiving stream during the design storm event must be lower than the bottom of the detention basin, unless otherwise approved by the City Engineer and the Public Works Director on a case-by-case basis. Any portion of the detention basin below the design water level in the receiving stream or storm system, or below the highest seasonal groundwater level (*for open basins or detention systems with open bottoms*), may not be utilized for storage volume in detention calculations.

2) Detention Basin Storage Capacity

- a) Detention facilities shall have storage capacities to detain the greater of the following:
 - (1) The difference between a 5-year frequency storm with pre-development conditions and a 25-year frequency storm under developed conditions.
 - (2) The difference between the *remaining available downstream capacity for the site being developed* (as defined above) under design storm conditions and a 25 year frequency storm under developed conditions.

3) Orifice

- a) The orifice size and the hydraulic head shall be adjusted to produce the allowable outflow based on the following formula:

$$D = 6.166 \left(\frac{Q}{H^{1/2}} \right)^{1/2}$$

Where:

D = Orifice diameter in inches.

Q = Discharge in cubic feet per second.

H = Hydraulic head above the orifice in feet.

- b) To prevent excessive plugging, the minimum orifice diameter shall be 1½-inches. The orifice shall be located in a pollution control manhole in an accessible location outside of the detention basin.
- c) The outlets of all detention basins shall be provided with suitable debris barriers designed to protect the outlet from blockage or plugging.

- d) Flow control orifice assemblies shall substantially conform with the general configuration shown on the City standard details, as approved by the Public Works Director and the City Engineer (*even if installed in a structure other than a manhole as shown on the details*).
- (1) Details for alternate structures to house the flow control assembly shall be drawn to scale, and to demonstrate that the assembly fits in the proposed structure while allowing for equivalent maintenance & cleaning access.
 - (2) If an alternate flow control outlet assembly is proposed which does not allow for continuous outflow from the detention system equivalent to the predevelopment flowrate, the detention storage volume shall be increased to compensate for antecedent rainfall which reduces the available detention storage prior to the start of the design storm event.

4) Overflow System

- a) The detention facility shall have an primary overflow system with the capacity to pass a 50-year frequency storm. Detention basin-The overflows shall discharge into a public storm drain facility or the natural drainage course for the drainage basin where the development is located (*without flowing across adjacent property where a recorded easement or an established natural drainage channel does not exist*), and shall be designed to minimize the impact to downstream systems (*the design engineer shall identify the flow path that overflow water will follow to demonstrate that this requirement is satisfied*).
- b) The primary overflow elevation shall be a minimum of 1 foot below the top of the top of the structure designed to contain the water.
- c) The design engineer shall also demonstrate how emergency overflow (*for flows which exceed the primary overflow capacity*) will get from the detention basin to an approved downstream storm system without causing damage to the detention system or adjacent properties.
- e)d) The design of detention facilities shall ensure that primary or secondary overflow or system failure will not cause flooding in any habitable building area.

5) Open Basins

- a) Depth - At maximum storage, the maximum allowable water depth shall not exceed 5 feet.
- b) Freeboard - The maximum water surface elevation at overflow shall be a minimum of 1.0 feet below the top of the structure (*curb, bank, berm,*

etc.) designed to contain the water.

c) Side Slopes & Top Width –

(1) The interior side slopes for detention basins shall be no steeper than 4H:1V. Exterior side slopes shall be no steeper than 3H:1V for maintenance. Steeper slopes or retaining walls may be used where approved by the Public Works Director and if access to the detention facility is restricted by chain link or other approved fencing a minimum of six (6) feet high. Chain link fences, posts & hardware along public right-of-ways shall be vinyl coated.

(2) Unless greater width is required based on site specific geotechnical or maintenance access considerations, dikes surrounding open basin detention systems shall generally have a minimum top width of 4 feet.

d) Bottom Slope - The bottom of all constructed and graded detention basins shall be sloped a minimum of 1% towards the outlets for drainage. Flatter slopes will require the use of a concrete valley gutter or similar method as approved by the City Engineer.

e) Maintenance & Mowing Access – Provisions for maintenance and mowing access shall be provided for interior and exterior slopes, and for the bottom of open basins.

6) Parking Lot Detention Basins

a) Depth - The maximum water depth for parking lot detention basins shall be 1 foot.

b) Freeboard - The maximum water surface elevation at overflow shall be a minimum of 0.25 feet below the top of any and all structures designed to contain the water. Landscape berming is typically not allowed for containing water on parking lot detention basins.

c) The maximum water level (*overflow*) in parking lot detention basins shall be a minimum of 1 foot below the lowest habitable floor elevation of buildings within the proximity of the basin.

d) No parking lot detention basins shall be located within the primary ingress/egress portions of the site. Parking lot detention basins shall be designed to provide a minimum 11 foot wide unflooded emergency access route at maximum water level conditions (*ie. overflow conditions*), and shall not encroach into designated fire lanes.

7) Piped Detention System

- a) Unless otherwise approved, piped detention systems shall be designed as a watertight subsurface pipeline, and shall be sloped a minimum of 0.1% towards the outlet to drain. Where open-bottom subsurface stormwater detention chambers are proposed, they shall be designed as off-stream storage basins (PWDS 3.18.d.c), and licensed as infiltration systems by DEQ as applicable.
- b) Maintenance Access Points - A pollution control manhole with an orifice shall be provided at the downstream end of the piped detention system, and a standard manhole shall be provided at the upper end of the upstream end.
- c) Pipe type shall be based upon the depth of cover and loading conditions as specified herein.
- d) Easement widths shall conform to the minimum requirements outlined herein.

3.19 PRIVATE STORM DRAINAGE COLLECTION SYSTEMS

- a. Private storm drainage collection systems shall be designed in conformance with main line standards specified herein when plumbing code grade requirements of Oregon Plumbing Specialty Code cannot be met. The private storm drainage collection systems shall conform to the detention requirements contained herein as applicable.
- b. These provisions of the PWDS do not, nor are they intended to supersede the Oregon Plumbing Specialty Code (OPSC), but are intended to allow the design engineer flexibility in the design of private storm drainage systems where the OPSC minimum slope requirements cannot be satisfied.

3.20 INFILTRATION SYSTEMS, DRYWELLS AND FRENCH DRAINS

- a. Infiltration systems, drywells and french drains are not allowed as the exclusive method for draining public right-of-ways but may be used for developments on private property for buildings, paved driveways, parking and loading spaces, subject to the all of the following conditions:
 - 1) There are no public storm drain facilities, available within a reasonable distance of the development as determined by the City Engineer. The need to acquire easements across private property to access a public storm drain facility that is within a reasonable distance shall not be grounds for allowing an infiltration system unless all other criteria are met.
 - 2) If a design based on stormwater infiltration are proposed, soils infiltration

tests shall be performed by a registered Professional Geotechnical Engineer licensed in the State of Oregon to document the permeability and infiltration capacity. The Geotechnical Engineer shall develop a recommended infiltration testing methodology using test methods and sound engineering principles appropriate to the specific site being tested (*test methods proposed must demonstrate infiltration capacity of the site soils, as opposed to percolation capacity*). A detailed summary of the proposed methodology and test procedures shall be submitted to the City Engineer a minimum of 7 business days in advance of the proposed testing, for review and comment by the City Engineer.

Infiltration tests shall be conducted at the location and depth of the proposed infiltration facility. The Geotechnical Engineer shall perform a field evaluation of the soils to demonstrate that the highest seasonal water table is not within 5 feet of the ground surface, or within 2 feet of the bottom of the proposed infiltration facility. A final infiltration report stamped by the Geotechnical Engineer shall be provided with the design drawings submitted for review by the City..

- 3) The system shall be engineered to ensure that adequate reserve capacity is available. Adequate reserve capacity shall include all runoff assuming the maximum amount of impervious area allowed by City Code based on zoning, and shall include an instrument recorded against the property reserving an area adequate for a replacement infiltration system equal in size to the primary system.
 - 4) Provisions shall be made for grease and fines removal, including recording of a maintenance agreement (*acceptable to the City Engineer & City Attorney*) against the property.
 - 5) The site shall be graded so that it does not drain onto a public right-of-way without a storm drain system or neighboring property in the event that the drywell or french drain fails. The site and adjacent down gradient areas shall have no history of groundwater surfacing or being within 12-inches of the ground surface during the wet winter months, and shall not have field tile systems which may convey the infiltration water onto neighboring property.
 - 6) The design shall include pretreatment conforming with Oregon DEQ standards for groundwater injection wells, shall be acceptable to the City Engineer, and shall be approved by and registered with DEQ prior to final plan approval by the City.
- b. DEQ Registration Required. Where drywells, french drains or other infiltration systems are authorized & allowed, they shall be registered with the Oregon DEQ as required by OAR 340-044-005 through 340-044-055 prior to final approval by the City and construction (*in addition to the standards above*). Only DEQ “rule authorized” infiltration systems are acceptable, unless otherwise approved by DEQ

and the City Engineer. Under these regulations, stormwater dry wells are “rule authorized” if they meet certain highly restrictive standards (*conformance with current DEQ/EPA standards must be confirmed prior to submittal for review by the City*). These standards restrict the use of dry wells under the rule authorized provisions to the following.

- 1) No other method of storm water disposal, including construction or use of surface discharging storm sewers or surface infiltration systems, is appropriate. An appropriate method shall protect groundwater quality and may consider management of surface water quality and watershed health issues.
 - 2) No domestic drinking water wells are present within 500 feet of the injection system.
 - 3) The injection system does not exceed a depth of 100 feet and the bottom of the infiltration structure is a minimum of 10 feet above the highest seasonal groundwater level.
- c. It should be noted that DEQ standards consider water draining from building roof areas (*that has not been mixed with any other stormwater*) differently, in that it can be discharged in a dry well without the same level of treatment required for other types of runoff, although it must still comply with the City and DEQ criteria above and receive DEQ approval prior to final City approval or construction.

3.21 STORM DRAIN SERVICE LATERALS

- a. As a minimum criterion, construction of the storm service laterals shall be of the same quality and meet the same requirements as the public storm drain with regard to materials, watertightness, and location. In addition, these storm drains shall conform to the State and local plumbing codes and restrictions.
- b. Storm drain laterals shall be installed for any residential lots which do not have finish grades that slope 2% minimum from the back of the building envelope to the top of the fronting curb, so as to allow both the roof and footing drains to flow to the fronting curb weep holes. In all cases, storm drain lines shall be provided as required to prevent roof and surface drainage from flowing across pedestrian access routes.
- c. A cleanout shall be installed at the right-of-way or easement line for all storm drain service laterals. The storm drain service lateral shall extend beyond the cleanout to the back of any private utility easement (PUE) fronting the right-of-way or easement.
 - 1) Where storm laterals are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot being served (*whichever is farther*) in conjunction with the development infrastructure construction.

- d. For long storm laterals, a cleanout to City standards shall be installed on the upstream side of any intermediate property lines crossed (*including on the upstream side of the property line where the lateral crosses onto the property being served*), as well as at maximum 100-foot intervals beyond the right-of-way or easement cleanout, and at bends as required by the Oregon Plumbing Specialty Code.
- e. The minimum inside diameter of a storm drain lateral shall be four (4) inches and shall be equal to or greater than the building drain diameter.
- f. Additional storm laterals must be stubbed into the property lines sufficient to serve all residential parcels (*including those which can be further partitioned in the future*) where such service or future partition would require that new streets be cut to install such services, or where the service line must cross intervening property to provide such future service.
- g. Where storm drain laterals tied to storm mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the standard details and standard notes.
- h. Unless otherwise approved by Public Works on a case-by-case basis, where storm drain laterals are necessary to serve/drain parcels which are located to the rear of and above (*in elevation*) another parcel which fronts a right-of-way that contains a storm drain mainline, the storm drain lateral serving the upper parcel must be directly connected to such storm mainline, and not daylight through a curb weephole.
 - 1) The storm lateral from the rear parcel shall be located within a private utility easement granted by the lower property owner, where it crosses the lower property.
 - 2) In addition to any cleanouts required by the Oregon Plumbing Specialty Code, there must also be a cleanout installed at the right-of-way boundary where the lateral serving the upper property exits the lower property into the right-of-way (*ie. property line cleanout at the ROW line*).
- i. Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, storm drain laterals shall be installed from the mainline to the property line perpendicular to the street centerline. Permanent installation of storm service laterals parallel with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.

CITY OF DAYTON
Public Works Design Standards

Division 4

Sanitary Sewer

DIVISION 4 SANITARY SEWER

4.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a sanitary sewer system which will:
- 1) be of adequate design to carry the expected flow, within the design life, and at sufficient depth to serve all adjacent properties;
 - 2) have sufficient grade to maintain a minimum velocity of two (2) feet per second when flowing full;
 - 3) have sufficient structural strength to withstand all external loads which may be imposed;
 - 4) be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
 - 5) be economical and safe to build and maintain;
 - 6) prevent infiltration and inflow of ground and surface waters.
 - 7) meet all design requirements of the Oregon Department of Environmental Quality (DEQ).

Alternate materials and methods will be considered for approval on the basis of these objectives.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

4.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public sanitary sewer facilities in the City of Dayton and applicable work within its service areas.
- b. Permanent sanitary sewer facilities shall be provided to all properties within the City of Dayton in accordance with these Standards. This shall generally be interpreted to mean that permanent sanitary sewer distribution facilities shall be provided for existing legal lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
- c. These design requirements may be used for private systems when plumbing code

requirements cannot be met, provided the system is designed and appropriately certified by a professional civil engineer licensed in the State of Oregon, and provided design of private improvements to these public standards is not prohibited by the plumbing code or building official.

4.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
- 1) Sewerage Pump Stations
 - 2) Force Mains
 - 3) Siphons
 - 4) Relining or Insitu Reconstruction of Existing Sewers
 - 5) Internal Sealing of Existing Sewers
 - 6) Treatment Plants
 - 7) Pretreatment Facilities
 - 8) Energy Dissipators
 - 9) Regulating Devices
 - 10) Flow Measurement Devices
-
- 11) Hydrogen Sulfide and/or Hazardous Gases
- b. Review and approval of the above special items by the City Engineer and Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

4.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 4.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards.

- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and Public Works Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

4.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all sanitary sewer appurtenances including manholes, cleanouts, metering manholes, lateral connections, etc.

4.6 STANDARD DETAILS

- a. Standard details included in the appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable standard details shall be included on the construction drawings.

4.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to sanitary sewer systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.

1) **Abbreviations:** Acceptable abbreviations for showing types of new and existing pipe materials on the plans are as follows:

- a) AC - Asbestos Cement
- b) CI - Cast Iron
- c) CP - Non-reinforced Concrete Pipe

- d) DI - Ductile Iron
 - e) HDPE - High Density Polyethylene
 - f) PVC - Polyvinyl Chloride
 - g) RCP - Reinforced Concrete Pipe
- 2) Building Drain: The building drain is that part of the lowest piping of the drainage system which receives the discharge from waste and other drainage pipes inside the walls of the building and conveys it to the building sewer, which begins five feet outside the building wall (*building foundation*).
 - 3) Building Sewer: That part of the horizontal piping of the drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sanitary sewer system, private sanitary sewer system, individual sewage disposal system, or other approved point of disposal.
 - 4) Collection Sewer: Lateral and mainline sanitary sewers.
 - 5) Collection System: Facilities maintained by the City for the collecting, conveying, pumping and controlling of wastewater.
 - 6) Contact Cooling Water: Water which is used as a medium for carrying away excess heat from apparatus, appliance, mechanism or device in which, in the course of cooling process, comes in direct contact with the product, is mixed or co-mingled with any other substance or used as a means of carrying off any other substance, in suspension or in solution. Contact cooling water is considered to be a process wastewater and may require pretreatment prior to discharge into the City's sewer system.
 - 7) Domestic Sewage: The liquid and water borne waste derived from the ordinary living processes, free from industrial wastes, and of such character to permit satisfactory disposal, without special treatment into the public sanitary sewer or by means of private sanitary sewage disposal system.
 - 8) Drainage Waste: Stormwater, groundwater, surface drainage, subsurface drainage, spring water, well overflow, roof drainage, or other like drainage other than sewage or industrial waste.
 - 9) Fixture Unit Equivalents: The unit equivalent of plumbing fixtures as tabulated in the Oregon Plumbing Specialty Code (OPSC).
 - 10) Flow: The wastewater flow from an industry, institution or house connection (*daily average*).
 - 11) Industrial Waste: A water borne waste and wastewater from an industrial

user.

- 12) Lateral Sewer: Any public sanitary sewer which has no other common sanitary sewers discharging into it.
- 13) Mainline Sewer: Any public sanitary sewer which receives flow from one or more lateral sewers.
- 14) Noncontact Cooling Water: Water other than sewage or industrial waste which is used as a medium for carrying away excess heat from apparatus, appliance, mechanism or device in which, in the course of cooling process, is not mixed or co-mingled with any other substance or used as a means of carrying off any other substance, in suspension or in solution, thereby exiting such cooling process in substantially the same condition, save for temperature, as when it entered.
- 15) Plumbing System: All plumbing fixtures and traps, or soil, waste, special waste and vent pipes within a building and to a point five feet outside the building foundation thereof.
- 16) Private Collection System/Private Sewer: A privately owned and maintained sanitary sewer system installed to serve multi-unit structures on single ownership properties, which cannot legally be further divided, such as apartments, mobile home parks and schools or installed in commercial or industrial developments.
- 17) Property Line Cleanout: A cleanout (*to City standards*) is installed on a sanitary sewer service lateral and which is located at or near the point where the sewer service lateral leaves the public right-of-way (*at or near the point where it leaves the public sewer easement for sewer mainlines not constructed in public right-of-ways*). This general term applies even if said cleanouts are not installed directly on the property line or easement boundary. Other cleanouts between the Property Line Cleanout and the building (*whether or not installed on other property lines crossed*) are private cleanouts which must conform with the Oregon Plumbing Specialty Code standards.
- 18) Public Sewer: Any sanitary sewer in the public right-of-way or easement operated and maintained by the City.
- 19) Sewer Service Lateral: That portion of the building sewer from the right-of-way line (*or easement boundary*) to a public sanitary sewer, private sanitary sewer, individual sanitary sewage disposal system, or other point of disposal. Lateral maintenance responsibility. The entire portion of the sanitary sewer lateral and building sewer from the building to the public mainline shall be the sole responsibility of the property owner for maintenance and/or repair, whether or not a property line cleanout exists (DMC 8.1.5). The required property line cleanout for new services or rehabilitated existing services is required to allow the service lateral to be located, as well as to facilitate

cleaning and maintenance of the portion of the sewer lateral under City streets, and decrease the likelihood of having to cut or excavate City streets.

- 20) Sewage: The wastewater derived from human habitation and use of buildings for residential, institutional or commercial purposes, excluding storm waters and industrial waste.
- 21) Structures: Those structures designated on the plans as manholes, siphons, junctions or diversion facilities, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these Standards are included in the standard construction specifications.
- 22) Trunk Sewer: A public sanitary sewer ten inches or larger which has been or is being constructed to receive the flow of more than one mainline sewer.

4.8 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply. Acceptable materials shall be as outlined in these Design Standards.
- 3) It is not intended that materials listed herein are to be considered acceptable for all applications. The design engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.
- 4) Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

b. Non-Pressure PVC Sewer Pipe

- 1) Pipe and fittings fifteen (15)-inches in diameter or less shall conform to ASTM D-3034, SDR 35.
- 2) Pipe and fittings eighteen (18) through twenty-seven (27)-inches in diameter shall conform to ASTM F-679.
- 3) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.

- 4) The joints shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

c. **Pressure PVC Sewer Pipe**

- 1) Where approved by the Public Works Director, PVC pressure pipe shall conform to the requirements of AWWA C-900 (*design stress of 4000 psi*), NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions. Pipe shall be PVC pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 18.
- 2) Restrained joint PVC pipe shall be used in locations and configurations as required by the City Engineer (*Diamond Lok-21, Eagle Loc 900, TerraBrute CR, CertaLok C900 or approved equal, as approved by the City Engineer and Public Works Director for the specific application*).

d. **Ductile Iron Pipe**

- 1) Ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151.
- 2) Ductile iron sewer pipe shall be minimum Class 50 thickness for non-pressure applications, Class 52 for pressure applications.
- 3) All ductile iron pipe and fittings shall be cement-mortar lined and seal coated in accordance with AWWA C-104.
- 4) All ductile iron pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of 1 mil thick unless otherwise specified.

e. **Joints**

- 1) Joints for pipe shall be push-on joints using factory installed elastomeric ring gaskets. The gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.
- 2) The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.

f. **Pipe Accessories**

- 1) Fittings shall be of the same material as the pipe, molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations as required.
- 2) **Flexible, Mechanical Couplings and Adapters (*gravity applications*)**
 - a) Flexible, mechanical couplers and adapters shall be used for connecting plain ends of non-compatible types or sizes of pipe and for

the installation of cut-in tee connections and other fittings into existing lines.

- b) Couplers and adapters shall be supplied with stainless steel bands.
- c) Flexible mechanical couplers and adapters shall be as manufactured by MaxAdaptor Coupling (*by Gripper Gasket LLC*) or approved equal, consisting of an EPDM rubber gasket, high impact polyamide (nylon) securing cage & stainless steel securing clamp assembly & hardware.

g. **Manholes**

1) **General**

- a) Precast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to the requirements of ASTM C-478 except as modified herein. Reinforcing in transition sections shall be equal to the requirements of that specified for wall sections of the larger diameter.
- b) Unless otherwise approved, all joints between manhole sections shall be keylock or O-ring type conforming to ASTM C-443.
- c) Precast base sections shall be of monolithic construction and shall be manufactured such that the base riser section is integral with the base slab.
- d) The bottom of the precast base section shall be a minimum of six (6) inches thick, and contain a minimum of 0.32 sq. inches of reinforcing steel each way in the top of the slab.
- e) Sanitary sewer manhole bases shall be provided with core-drilled openings and flexible manhole-to-pipe connectors for the connection of stubouts.

2) **Manhole Steps**

- a) All manholes shall be equipped with permanent factory installed steps to provide a continuous ladder of 12-inch center-to-center rung spacing.
- b) Manhole steps shall be of polypropylene plastic reinforced with a 1/2-inch grade 60 reinforcing rod.
- c) There shall be no more than 30 inches from the manhole rim and the rung of the top step.

3) Manhole Grade Rings

- a) Concrete grade rings shall have precast keyway grooves, and the height from the top of the cone or the bottom of the flattop section shall not exceed eighteen (18) inches in height.

4) Manhole Frame and Cover Assemblies

- a) Castings shall be cast iron conforming to the requirements of ASTM A-48, Class 30, and shall match the dimensional requirements of the standard details.
- b) Standard frames and covers shall be used for all paved areas. Sanitary sewer manhole lids shall have 2 holes (*as opposed to storm manhole lids, which have 16 holes*).
- c) Where pressure tight manhole covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer. Threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for the manhole casting.

5) Manhole Inflow Protector Lid Inserts

- a) All sanitary sewer manholes in low areas which are subject to flooding or water ponding (*including all lawn, landscape or gravel areas, or low areas of parking lots, or manholes closer than 4 feet clear of parking lot curblines or existing/future street curbs, adjacent to ditches, etc.*) shall be provided with inflow protector lid inserts.
- b) Manhole lid inserts shall be made of ABS or HDPE plastic, and shall include integral lifting lugs on each side of the insert allowing removal with a manhole hook (*lift straps are not an acceptable alternate*). The insert body shall be manufactured to match the dimensions and style of each specific manhole frame & cover. Each insert shall be provided with a factory installed closed cell neoprene gasket bonded to the underside of the insert rim, designed for wet or dry conditions. Manhole lid inserts shall be ManPan manhole inserts, or approved equal.
- c) Where required by the Public Works Director for specific manholes, manhole inserts shall be provided with an integral clog free vent rubber check valve by Tideflex.

6) External Mastic Wrap on: Manhole Joints & Pickholes.

- a) External mastic wrap joint seal (*9-inch minimum width*) shall be installed on all manhole barrel joints after assembly, prior to

backfilling (*Bidco External Joint Wrap BW-9T by Telleborg, or equal*).

- b) External mastic wrap joint seal (*9-inch minimum square*) shall be installed over all pickholes after grouting and prior to backfilling (*Bidco External Joint Wrap BW-9T by Telleborg, or equal*).
- c) Clean MH Exterior Prior to Mastic Wrap Installation. The exterior of the manhole barrels adjacent to each joint shall be clean (*under the mastic wrap*) to ensure a good seal. A wire brush shall be used to clean the exterior surface under the mastic wrap as required to remove all dirt, loose particles or deleterious material.
- d) Plastic Pallet Wrap for Use Over Joint Wrap Mastic. The mastic wrap over manhole joints shall be held in place with plastic stretch wrap (*ie. pallet wrap plastic*) to hold the mastic tape in place during backfilling (*ie. to protect the external mastic wrap from displacement during backfill installation &/or compaction*). Plastic wrap shall be installed immediately after the mastic wrap is placed.

h. **Mainline Cleanouts**

- 1) Mainline cleanouts shall consist of a lid and frame of heavy duty cast iron construction with closed lid design. A 3,300 psi concrete collar is required for cleanouts located outside of paved areas.
- 2) A 3,300 psi concrete collar is required for cleanouts located outside of paved areas.
- 3) The shaft or chimney of the cleanout shall be a minimum of 8-inches in diameter, except for 6-inch lines, which shall have a chimney diameter of 6-inches.

i. **Underground Warning Tape**

- 1) Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
- 2) The tape shall be safety green and shall be provided with the legend "CAUTION BURIED SANITARY SEWER LINE BELOW" or approved equivalent printed continuously down the length of the tape.

j. **Toning Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be green in color for sewer piping.
- 2) Wire shall penetrate into manholes within 18 inches of the rim elevation.

k. **Bore Casings and Accessories**

- 1) Carrier pipe used in bore casings shall be Ductile Iron or PVC as specified herein.
- 2) Bore casing and carrier pipe design and installation shall conform to the requirements outlined under Division 5, Water Distribution.

4.9 GENERAL DESIGN CONSIDERATIONS

a. **General Requirements**

- 1) Sanitary sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow.
- 2) Sewers shall be designed to convey the peak instantaneous wet weather flows anticipated over the design period without surcharging.
- 3) Gravity Flow: Where possible, all sanitary sewers shall be designed to flow by gravity to an existing or new sewer without sewage lift stations.
- 4) As a condition of sewer service, all developments will be required to provide public sewers to serve adjacent upstream parcels in order to provide for the orderly development of the drainage area, as well as connection (*to the new system*) of existing sewer lines or laterals crossed or intercepted by the new sewer lines, at locations as required by the City Engineer and Public Works Director (*see also PWDS 1.6.e*). This shall include the extension of sewer mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way. This shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future. This shall include trunk sewers which are oversized to provide capacity for upstream development, or as required to meet the minimum sizes shown in the applicable sewer master plan (*see also PWDS 1.6.h*).
- 5) Storm water, including street, roof or footing drainage, shall not be discharged into the sanitary sewer system but shall be removed by a storm drainage

system separate from the sanitary sewer system.

- 6) Unpolluted (*noncontact*) cooling waters shall not be discharged into sanitary sewers.
- 7) Public sewers within easements will be permitted only upon a showing that services cannot be provided from a line within a right-of-way. Minimum easement widths shall be as outlined herein, but in no cases shall easements narrower than 15 feet be considered.
- 8) **Prohibited Discharges to Sewer System:**
 - a) State and Federal laws and regulations and the sewer use ordinance restrict the disposal of certain chemicals and/or constituents into the sewer system and/or a Publicly Owned Treatment Works (POTW).
 - b) Only water or waste that will have no harmful affects on the sewage collection system or treatment system, and that will not endanger persons exposed to the wastes will be considered for discharge into the sewerage system. Prohibited discharges are not listed in their entirety herein (*see sewer use ordinance and/or DEQ regulations for more complete list*), but generally include rainwater, stormwater or groundwater of any type, waters or wastes with a pH lower than 5.5 or higher than 9.5, radioactive isotopes, high concentrations of suspended solids or BOD, fats/oils/greases, septic tank or sewer holding tank effluent, other potentially corrosive or explosive liquid, etc.

b. **Design Factors**

- 1) The following factors as a minimum shall be addressed in the design of sanitary sewers and determination of design flows.
 - a) Drainage basin to be served.
 - b) Topography of the area
 - c) Depth of excavation
 - d) Service lateral elevations
 - e) Soils conditions
 - f) Land use within the area to be served.
 - g) Projected population within the area to be served at build-out.
 - h) Per capita sewage flow.
 - i) Flows from commercial, industrial or institutional users.

- j) Infiltration and Inflow
 - (1) Infiltration allowance for new facilities.
 - (2) Infiltration and inflow from existing facilities.
- k) Maximum hourly and peak instantaneous flows
- l) Condition and size of existing sewers
- m) Location of WWTP
- n) Pumping requirements
- o) Maintenance, including accessibility for cleaning and inspection personnel and equipment.

4.10 DESIGN PERIOD

a. Mainline and Lateral Sewers

- 1) Mainline and lateral sewers shall be designed for the ultimate development of the tributary area. Consideration shall be given to the maximum anticipated capacity of institutions, industrial parks, commercial establishments, etc.

b. Trunk Sewers

- 1) Selection of the design period for trunk sewers shall be based on evaluation of functional and other considerations. Some of the factors that should be addressed in the design of trunk sewers are:
 - a) Solids deposition, odor, and pipe corrosion at initial flows.
 - b) Effect of sewer sizing on land use and development.
 - c) Population and economic growth projections and the anticipated accuracy of these projections, coupled with the comparative costs of staged construction and the anticipated manner in which the future improvements will be funded.

4.11 SEWER DESIGN BASIS & CAPACITY

a. Design Basis

- 1) Generally, sewers shall be designed to carry the peak domestic, commercial and industrial contributions, plus infiltration/inflow from the individual gravity service laterals, sewer mains and manholes. Where more detailed information is not available, new sewer systems within the City may be

designed on the basis of the following flows.

- a) Residential domestic flows: 100 gal/capita/day (gpcd)
- b) Schools, non-residential students & staff: 25 gpcd
- c) Commercial, non-residential customers
 - (1) Restaurant/Cafe: 40 gal/day/seat
 - (2) Tavern/Bar: 50 gal/day/seat
- d) Laundries, self-service: 500 gal/day/machine
- e) Infiltration/Inflow
 - (1) New facilities: 1,600 gal/acre/day
 - (2) Existing facilities: As measured.

2) Assumed flows from types of establishments not listed above shall be as approved by the City Engineer.

b. **Sewer Capacity:** Generally, sewers should be designed to carry, when flowing full but not surcharged, not less than the following plus existing or planned flows from upstream properties:

1) Lateral and Mainline Sewers:

- a) For new installations serving new areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus I/I allowance.
- b) For new installations serving existing sewered areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus an additional I/I allowance based on existing conditions.

2) Trunk Sewers:

- a) For new installations serving new areas, minimum peak design flow shall not be less than 3 times the design sanitary flow plus I/I allowance.
- b) For new installations serving existing sewered areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus an additional I/I allowance based on existing conditions.

3) Roughness Coefficient:

- a) A minimum "n" value of 0.013 shall be used in Manning's formula for the design of all sewer facilities regardless of pipe material. The use of higher "n" values for existing pipe may be required by the City Engineer.
- b) In theory, new PVC sewers have manufacturer's "n" value of 0.009. However, sand and grit as well as slime build up on the pipe walls over time tend to render a true "n" value of 0.013. Hence, an "n" value of less than 0.013 will not be considered for approval.

- 4) It is recommended that design calculations include estimates of average, maximum and minimum daily flows. The submission of design calculations will not ordinarily be required, but engineers should be prepared to substantiate pipe sizes, layout, population estimates, land uses or other design assumptions as may be requested.

4.12 SEWER MINIMUM SIZE

- a. Public lateral or mainline sewers shall not be less than eight (8) inches in diameter, or as required to meet the minimum sizes shown in the applicable sewer master plan (see also PWDS 1.6.h), unless approved in writing by DEQ and the City Engineer.

4.13 SEWER MINIMUM DEPTH

- a. All sanitary sewers shall be laid at a depth sufficient to drain building sewers, to protect against damage by frost or traffic and to drain basement sewers where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the sewer alignment.
- b. Under normal conditions (*where it can be demonstrated that the required 18" clearance can be maintained between sewer laterals and water mainlines*), sanitary sewers in residential areas shall be placed in the street with the following minimum cover (*ie. cover over the pipe*):
 - 1) Lateral and Mainline Sewers - Seven (7) Feet
 - 2) Trunk Sewers:
 - a) In the roadway - Seven (7) feet
 - b) In easements - Eight (8) feet
 - 3) Where the topography is relatively flat and existing sewers are shallow (*five feet or less*) and cannot practically be lowered, the minimum cover may be reduced to four (4) three (3) feet. Cover depths less than four (4) three (3) feet

will require the approval of the City Engineer, and will require the installation of Class 50 ductile iron pipe (*corrosion resistant mortar lined*) or C900 PVC, DR 18.

- c. Mainline and lateral sewers shall be placed in the street at a depth sufficient to drain building sewers on the low side of the street, including for new residential subdivisions. Deviation from these standards will be considered on a case-by-case basis when the following circumstances exist and the required documentation is submitted.
 - 1) Underlying rock strata: A request in writing must be submitted to the City Engineer together with a soils report including a plan and profile certifying bed rock exists below the undisturbed ground surface at all investigated alignments.

4.14 SEWER MINIMUM SLOPE & ROUGHNESS COEFFICIENT

- a. All sanitary sewers shall be laid on a slope which will produce a mean velocity when flowing full of at least two (2) feet per second based on Manning's formula using minimum roughness coefficient of 0.013 or the pipe manufacturer's recommendations, whichever is greater.
- b. The minimum acceptable slopes for various pipe sizes are listed below:

MINIMUM MAINLINE PIPE SLOPES	
Inside Pipe Diameter (inches)	% Slope (feet per 100 feet)
(private sewers only)	
6	0.60
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12
21	0.10
24 & larger	Case-by-Case

- c. In general, gradients greater than those shown above are desirable and are particularly recommended on the upper ends of lateral sewers.

- d. Sewers shall be laid with uniform slope and alignment between manholes.
- e. Engineers are cautioned not to specify sewers of sizes which are obviously larger than necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements (*ie. a 10-inch pipe for an 8-inch pipe to acquire a decrease in slope*).
- f. Grades (*slopes*) shall be determined to the pipe invert at the edge of the manhole and lengths to the center of the manhole.
- g. The difference between the inlet pipe slope (Si) and outlet pipe slope (So) at any manhole shall not exceed 25 percent.
- h. Sewers on slopes of 20 percent or more shall be anchored with concrete anchor walls or other restraining methods approved or specified by the City.
- i. Where velocities greater than fifteen (15) feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes against erosion and displacement by shock. This may be accomplished by installing one additional manhole to decrease the slope or to split a 90° horizontal direction change into two 45° incremental changes.

4.15 **SEWER ALIGNMENT AND LOCATION**

a. **General**

- 1) Sewer lines shall be laid on a straight alignment and uniform slope between consecutive manholes.
- 2) Horizontal and vertical curves in sanitary sewers are not permitted.

b. **Sewer Location in Relation to Water Lines and Other Utilities**

- 1) Sewer mainlines and lateral mainlines shall be separated from all other utilities by a minimum of 5 feet clear for normal depth pipelines. Greater separation may be required for deeper pipelines as directed by the Public Works Director.
- 2) Sewer mainlines and lateral mainlines shall generally be separated from water mainlines by a minimum of 10 feet. In no case shall the separation be less than 5 feet or as required by OAR 333-061.

3) **Water Main Crossings**

- a) Where new sanitary sewer lines cross above or within 18-inches vertical separation below a waterline, such sewer mains and/or laterals shall have one full length of approved PVC (*or approved equal*) sewer pipe centered at the point of crossing per OAR 333-061-0050(9).

c. **Sewer Location in Streets**

- 1) Unless otherwise approved by the City Engineer and Public Works Director, sanitary sewers shall generally be located in the street right-of-way five (5) feet from the street centerline on the low side of the street. Unless otherwise approved by the City Engineer and Public Works Director, horizontal alignment of new sewer mainlines shall be parallel with the centerline of the right-of-way. In general, manholes or cleanouts shall be located outside of gutter areas or other locations where surface water inflow is likely to occur during storm events.
- 2) Where sewer alignments cross the street centerline, the design shall demonstrate that the requirements of ORS 92.044(7) are satisfied with relation to street centerline monuments (*ie. utility infrastructure is not to be placed within 1 foot of a survey monument location shown on a plat*).
- 3) If streets have curved alignments, the minimum distance between manholes or sewer lines and the curb face shall be as listed below. For streets improved to less than full width, the location shall be measured from the future curb location. The intent is to prevent a conflict with new storm drain lines while still providing for the least number of manholes required to transverse the curve.
 - a) Center of manhole to curb face: 6-feet minimum.
 - b) Sewer centerline to curb face: 6-feet minimum.

d. **Sewer Location in Easements, & Easement Widths, Maintenance Access Requirements**

- 1) Offset: When sewers in easements are approved by the City, the sewer line shall be offset a minimum of 6 feet from any property line or easement boundary, or 1/3 the required easement width (*rounded up to the nearest foot*), whichever is greater.
- 2) Sewers in easements will be allowed only after all reasonable attempts to place the mains in a right-of-way have been exhausted. All easement installations must be approved in writing by the City Engineer and Public Works Director on a case-by-case basis.
- 3) Easement locations for public sewer mains serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.
- 4) Maintenance Access Requirements. All sewer mainlines shall be located within developed street right-of-ways, or installed along all-weather access lanes along

alignments approved by the Public Works Director. Except where precluded by steep slopes, all-weather maintenance access lanes (*minimum 12' width, minimum section as defined below*) shall extend along the entire length of off-street sewers unless otherwise specifically authorized in writing by the Public Works Director.

Where there are steep slopes along the sewer alignments which preclude all-weather access along the entire sewer alignment (*as determined by the City*), the access lanes shall extend to encompass all manholes or lateral connections located outside of the improved right-of-way.

If installation of a sewer main along alignments without a maintenance access road is approved by the City Engineer and Public Works Director, the minimum easement width may be increased as determined by the Public Works Director at his sole discretion (*typically by 5 feet minimum in flatter areas, and by 10 feet minimum for steep hillside areas*).

Where all-weather access lanes are located outside of parking lots, private streets, fire lanes or private driveways, the easement along the access lane alignment shall include provisions that maintenance of the all-weather access lanes shall be the responsibility of the owner of the property on which the access lane is located.

Show all maintenance access lanes on the drawings, including dimensions and standard details for rock, AC and/or other surface sections (*minimum 2½" AC (Class C) over 10" compacted baserock typical (1.5% design cross slope typ), unless alternate surfacing is approved by the Public Works Director*).

- 5) ~~City standards require that The conditions of the easements granted to the City shall be such that the easement shall not be used for any purpose which would~~ interfere with the unrestricted use for sewer main purposes. Under no circumstances shall a building or structure or tree be placed over a sanitary sewer main or sewer easement, nor shall any parallel fences be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.
- 6) All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the Developer.

- 7) Minimum Easement Widths: Unless otherwise specified or authorized by the City, minimum easements widths for sanitary sewers shall be as follows:

MINIMUM SANITARY SEWER EASEMENT WIDTHS		
Sewer Diameter	Depth to Invert	
	≤ 6 feet	> 6 feet
8 - 10 inches	15 feet	15 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
12 - 15 inches	20 feet	20 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
> 15 inches	25 feet	25 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.

Note: Easements shall be a constant width between manholes or other in-line structures. Easement width shall be based on the deepest portion of the line between such structures.

- 8) Easement widths shall vary from the minimum by even foot increments. Sewers with a nominal inside diameter of 24 inches or larger will require wider easements than outlined above.
- 9) Common placement in the easement of a sanitary sewer and storm drain line may be allowed under certain conditions subject to approval by the City Engineer and Public Works Director. Easements wider than the minimum may be required.
- 10) Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet Oregon State Department of Environmental Quality (DEQ) and OHA-DWS requirements.

e. **Sewer Location in Relation to Streams and Drainage Channels**

- 1) Generally, the top of all sanitary sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line. In general, as much cover as possible shall be provided. If less than 3 foot of cover is provided, the sewer shall be encased in concrete, CDF or CLSM backfill (*with an unconfined compressive strength less than 200 psi*) as approved by the Public Works Director. Design shall include provisions to prevent floatation of the pipe during concrete, CDF or CLSM backfill placement.
- 2) Sewers crossing streams or drainage channels shall be designed to cross the stream as nearly perpendicular to the stream channel as possible and shall be free from change of grade at the crossing.

- 3) Sewers located along streams shall be located outside of the stream bed and sufficiently removed therefrom to provide for future possible stream channel widening. All manhole covers at or below the 100 year flood elevation shall be provided with leakproof manhole inflow protector lid inserts as specified.
- 4) Pipe material at crossings shall be Class 50 ductile iron with an 18 foot length of pipe centered on the stream or drainage channel centerline. The ductile iron pipe shall extend to a point where a 1H:1V slope from the top of the bank and sloping away from the channel centerline intersects the top of the pipe.
- 5) Concrete encasement will be required when the above cover requirements can not be met. Concrete caps in lieu of concrete encasement are not acceptable. Each deviation from the above requirements will be reviewed on a case-by-case basis.

4.16 MANHOLES AND MAINLINE CLEANOUTS

a. General

- 1) Sewer service laterals shall not be connected into manholes unless approved in writing by the City Engineer and the Public Works Director on a case-by-case basis. Where lateral connections to manholes are allowed, the crown of the lateral pipe shall be installed at or above the crown of the manhole outlet pipe, or as required to provide a minimum of 0.35' fall across a 48-inch manhole, whichever is greater.

b. Mainline Sewer Cleanouts

- 1) ~~Mainline cleanouts will not be approved as substitutes for manholes.~~
Cleanouts shall only be allowed at the upper end of lateral or main sewers less than 150 feet long which will be extended on the same grade and alignment during the next construction phase of a multiphase development, and which does not have any laterals.
- 2) All mainline cleanouts will be considered on a case-by-case basis and approved by the City Engineer and the Public Works Director. In all cases, plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole shall be submitted prior to approval of cleanouts.

c. Manhole Size

- 1) For pipe 21-inches in diameter and smaller, the minimum diameter of manholes shall be 48 inches.
- 2) For pipe 21-inches or 27-inches in diameter, the minimum diameter of manholes shall be 60 inches.

- 3) For pipe larger than 27-inches in diameter, the minimum diameter of manholes shall be 72 inches unless otherwise approved by the City Engineer.
- 4) Larger manholes may be required for multiple pipe connections.
- 5) Manholes sizes for drop structures or metering manholes will be reviewed on a case-by-case basis.

d. **Manhole Location:**

- 1) Manholes shall be placed at the following locations:
 - a) Upper end of all lateral sewers, except as provided above.
 - b) Every change in grade or alignment of a sewer.
 - c) Every change in size of a sewer.
 - d) Each intersection or junction of sewers, excluding service laterals 6-inches or less in diameter.
 - e) Adjacent to the center radius point of a cul-de-sac.
 - f) In front of the last property or lot being served, a minimum of 10 feet past the common lot line of the adjoining parcel served.
 - g) At intervals of 450 feet or less.
- 2) Where practical, manholes shall be located at street intersections. All manholes from which future sewer line extensions are anticipated, shall have a pipe stub designed and installed at the grade and direction of the anticipated sewer main extension. Pipe stubs shall be a minimum of eight inches in size and shall protrude at least 2 feet outside the manhole base, and end with a watertight gasketed cap acceptable to Public Works.
- 3) Manholes shall not be located in the curb or in the gutter. Placement of manholes behind the curb shall be reviewed on a case-by-case basis for approval. Consideration shall be given to those sewer or public utility lines which already exist behind the curb.
- 4) Two manholes shall be installed when the horizontal deflection angle between two sewers is an acute angle less than or equal to 80°. Spacing of such manholes shall be a minimum of ten feet outside to outside. The intent is to prevent lateral sewer connections from discharging into sewers against the direction of flow.

e. **Manhole Rim Elevation**

- 1) The rims of all manholes located within paved or other hard surfaced areas shall be set to finished grade.
- 2) Concrete riser rings shall be used to bring casting to grade. The height from the top of the cone or flattop section to the rim shall not exceed 18-inches.
- 3) The rims of all manholes located outside of paved or other hard surfaced areas shall be set 6-inches above surrounding finish grade. Finish grade shall be defined as the final ground surface after grading and landscaping, as shown on the standard manhole rim adjustment details.
- 4) Manholes within easements shall have lockdown lids only where specifically required by Public Works.

f. **Drop Across Manhole Structure**

- 1) Generally, the minimum vertical drop across a 4-foot diameter manhole is required as shown below.
 - a) Straight through runs: 0.1' minimum drop
 - b) Bends greater than 45°: 0.2' minimum drop
- 2) Maximum vertical drop across a 4-foot diameter manhole shall not exceed 18-inches with a beaver slide channel (*drops of more than 18-inches invert to invert require an inside drop assembly*).
- 3) Where pipes of different sizes enter the same manhole, the design shall generally provide that the crowns of the pipes are set at the same elevation.
- 4) In cases where two pipes discharge into a manhole from opposite directions and one pipe has a slope more than 4% steeper than the pipe opposite, the invert of the pipe with the lower slope shall be set a minimum of 0.35 feet or ½ the pipe diameter, whichever is greater, above invert of the steeper pipe.
- 5) **Manhole Flow Channels**
 - a) Flow channels in manholes shall be of such shape (*semi-circular bottoms*) and slope to provide smooth transition between inlet and outlet sewer size/ invert to minimize turbulence and to ensure that the manhole channels are self-cleaning.
 - b) Flow channel height shall be to the crowns of the sewers. Benches beside flow channels shall be sloped from the manhole wall toward the channel to prevent accumulation of solids.

- c) Beaver slide channels shall be shaped to allow the insertion of a 6-inch diameter by 3-foot long TV camera into the downstream sewer.

g. **Drop Manholes**

- 1) Drop manholes shall only be used in extreme cases of slope difference between existing and proposed sewer lines or when very special conditions exist such as a conflict with existing facilities which cannot be relocated. All drop manhole installations must be approved in writing by the Public Works Director on a case-by-case basis.
- 2) Drop assemblies shall be provided for pipe lines 12 inches in diameter and smaller when entering a manhole with an invert more than 18 inches above the invert of the outlet line. The vertical displacement shall be measured at the inside manhole walls and not the manhole centerline. Pipe lines larger than 12-inches shall be introduced into the manhole at the manhole invert, unless otherwise approved by the Public Works Director on a case-by-case basis.
- 3) When allowed, inside drop manholes shall be a minimum of 60 inches in diameter. All inside drops shall be constructed with pipe per the standard details, with stainless steel support structures. No partitions will be allowed.

h. **Manhole Taps**

- 1) When an existing manhole is tapped to install a new sewer which will drain into the manhole, the crown of the new sewer shall generally match the crown of the existing pipes.
- 2) When the size of the new pipe being tapped into the existing manhole is the same size as the existing pipe exiting the manhole, the invert of the new pipe should be a minimum of 0.35 feet above the invert of the existing pipe, or higher as required to be above the normal sewage flow level.
- 3) A detail drawing showing the steps, bench and proposed connection is required for connections to existing manholes.
- 4) The drawing shall include notes to the effect that openings for connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels. Use of large pneumatic jackhammers shall be prohibited.
- 5) Unless otherwise approved by the City Engineer, manhole steps shall be installed in any manhole tapped which does not have existing steps.

i. **Metering & Sampling Manhole**

- 1) A metering and sampling manhole shall be installed on all systems meeting one of the following criteria:
 - a) A private sewer which contributes more than 5,000 gallons per day to the public sewer.
 - b) A private sewer which serves more than one structure on the same premises (*private collection system*).
 - c) Industry or business which discharges high strength wastewater or wastewater with characteristics not commonly found in domestic sewage.
- 2) Metering and sampling manholes shall include provisions for continuous and composite sampling, continuous flow monitoring and recording, and flow paced sampling.
- 3) Sampling and flow monitoring may be required at the discretion of the City Engineer and Public Works Director. All machinery, equipment, supplies and labor required to carry out the sampling and flow monitoring program shall be provided by the Developer, and shall meet the City's prior approval.
- 4) The minimum size sewer line upstream of the metering/sampling manhole structure shall be six (6) inches.

4.17 WORK ON EXISTING SEWERS

a. **General**

- 1) Connections of new service laterals to existing sewers shall be made watertight. Connection shall be made where possible to existing tees or wyes previously installed and capped. In all cases, the integrity of the existing tee or wye shall be verified by Public Works prior to connection (*see also PWDS 4.18.d for requirements relating to reuse of existing service laterals*).
- 2) Where tees or wyes for connection are absent or unusable, connection of service laterals into existing sewer lines shall be made with approved couplings or service saddles. Taps shall be installed without protrusion into or damage to the existing sewer, and shall result in a watertight connection.
- 3) Service lateral connections to existing AC pipe shall be with approved service saddles. Connections to all other types of existing pipes shall use Insert-a-Tee type couplings. A note shall be added to the drawings stating that the coring machine for Insert-a-Tee couplings shall be anchored in accordance with the manufacturer's recommendations.

- 4) Existing Sewer Slope & Condition Verification.
- a) As a condition of connecting to and/or extending sewer mainlines, the design shall include verification that the existing sewer is in adequate condition and with adequate capacity to handle the new flows.
 - b) This shall include verification of existing sewer slopes downstream of the connection point (*as part of the design topographic survey*), AND cleaning/TV inspection of existing mainlines which meet any of the following conditions: (a) existing or design slopes less than 1.0% or (b) have had a history of flow or maintenance problems, or (c) end with mainline cleanouts, or (d) existing mainline will be replaced as part of the project. **Costs for cleaning and TV inspection are the responsibility of the development team.**
 - c) The TV inspection shall be conducted by an approved technical service, using a track or wheel propelled self-leveling auto-focus pan-head camera which is equipped to make audio-visual recordings of the TV inspections on DVD.
 - (1) A standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water (*with the ball in contact with the pipe invert*). The pipe shall contain sufficient water to reveal low areas or reverse grades during the TV inspection.
 - (2) The DVD and written report (*or download link and pdf report*) shall be delivered to the City Engineer and the Public Works Director.
 - d) Unless otherwise approved in writing by the City Engineer, this survey verification and TV inspection shall be done as part of the design process (*approval by the City to defer this pre-design TV inspection work shall not relieve the Developer and/or his contractor of the responsibility to correct problems subsequently discovered*). If the development team uses sewer TV inspections previously performed by the City or others, any discrepancies discovered during construction shall remain the developer's entire responsibility.
 - e) The design shall include provisions to correct any adverse grade conditions, broken/obstructed pipe or other conditions found in the existing sewer which, in the opinion of the City Engineer, may cause sewer backups or significant maintenance issues upon extension of the mainline and connection of additional services. Any corrections of adverse grade conditions shall occur prior to extending the mainline or setting new manholes.

b. Manholes over Existing Sewers

- 1) In general, existing sewers shall be cut out to allow installation of new precast manholes (*with pipe coupling to existing pipe each way*), unless otherwise approved by the Public Works Director and the City Engineer on a case-by-case basis.
- 2) Where cast-in-place manholes are approved to be Manholes constructed over existing sanitary sewers shall conform to the requirements of OSSC (ODOT/APWA) 490.41, Manholes Over Existing Sewers.
 - a) Waterstop Grouting Rings by Trelleborg (or approved equal) shall be installed on each pipe (centered on the manhole wall thickness) prior to concrete placement for the manhole base.
 - b) The existing pipe shall not be broken out until after the completion of the manhole vacuum test.
 - a)c) Notes to this effect shall be placed on the construction drawings.

c. Maintaining Sanitary Sewer Flows. The construction of sewer improvements that impact existing sewers shall address the following, including notes on the drawings.

- 1) All existing sanitary sewer system components shall remain in service through the construction operations unless specific exceptions are approved in writing by Public Works and the City Engineer, and written approval from each affected property owner.
- 2) Sewer service from upstream and affected properties must be maintained unless such written approval is granted. The methods used to maintain sewer flows shall be the Contractor's design, subject to approval by the City. Required methods of conveying sewer flows may include, but are not limited to, bypass pumping, use of flow through plugs with periodic release of sewage flows, etc. The bypass system shall be capable of conveying flows when the sewers are flowing full. Normal unrestricted flows shall be restored at the end of each work day. Bypass systems left in place or operated outside normal working hours shall be monitored continuously by the Contractor personnel unless alternate arrangements proposed by the Contractor are acceptable to the City (*ie. high level & pump fail alarm callouts, etc.*). The Contractor shall provide for City review all submittal information required to demonstrate (*to the satisfaction of the City*) compliance with these requirements.
- 3) Contractor shall be responsible for all costs related to cleanup, damages and fines resulting from any sewerage spill or overflow associated with any methods used to convey sewage flows during construction.

4.18 SEWER SERVICE LATERALS

a. General

- 1) Sewer service laterals are building sewers as defined above.
- 2) Sewer service laterals shall not tie into manholes unless approved by City Engineer and Public Works Director on a case-by-case basis. Where allowed, lateral inverts shall provide a minimum of 0.5 feet fall across the manhole, or the lateral shall match crowns with the outlet pipe, whichever is higher.
- 3) As a minimum criterion, construction of the sewer service lateral shall be of the same quality and meet the same requirements as the public sewer with regard to materials, watertightness, and location. In addition, these sewers shall conform to the State and local plumbing codes and restrictions. No roof, surface, foundation, or stormwater drain lines shall be connected to the public sewers or service laterals.
- 4) Each legal lot of record shall be provided with a separate sewer service lateral connected to the public sewer main or approved private sewer main. Combined sewer service laterals will be permitted only when the property cannot legally be further divided. An example of this is a residential lot with a house and detached garage or shop with plumbing fixtures.
- 5) Separate sewer service laterals shall be installed to serve each side of duplex lots. Separate sewer service laterals shall be installed to serve each unit of condominiums, or to serve each unit of developments with separate detached dwelling units or single family lots with separate detached accessory dwelling units (*except where otherwise approved by City for parks, etc.*).
- 6) Additional sanitary sewer laterals must be stubbed into the property lines sufficient to serve all residential parcels (*including those which can be further partitioned in the future*) where such service or future partition would require that new streets be cut to install such services, or where the service line must cross intervening property to provide such future service.
- 7) Where sanitary sewer laterals connect to sewer mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the standard details and standard notes.
- 8) Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, sewer service laterals shall be installed from the mainline to the property line perpendicular to the street centerline. Permanent installation of sewer service laterals parallel with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.

- 9) For reference only, OPSC 710.1 requires that a private backwater check valve be installed on the private building sewer when a drainage fixture is installed on a floor level that is lower than the top of the nearest upstream manhole or cleanout structure. In all cases, this backwater valve shall be installed on the private side of the property line cleanout (*backwater valve is typically installed between the cleanout just outside the building and the building wall*).

While this backwater valve is a private item covered under the OPSC (*ie. not under Public Works jurisdiction for inspection or maintenance*), property owners and homebuilders may wish to consider using a backwater valve designed to allow inspection, cleaning and maintenance to be performed from the surface (*such as the Clean Check by Rectorseal*). Failure to install a backwater valve per OPSC requirements will not result in any liability by the City (*for either cleanup or repairs*) in the event there is a sewage backup into a building which would have been prevented by a operable backwater valve installed as required by the OPSC.

10) Grease Removal.

- a) Provisions acceptable to Public Works shall be made for grease removal for any installations with commercial or similar kitchens, or other applications as required by Public Works.
- b) Unless otherwise approved by Public Works, a minimum two compartment exterior gravity grease interceptor vault (*1000 gallon minimum*) shall be provided, particularly in any application where hot water or steam cleaning of commercial type kitchens is utilized. Larger sizes shall be provided as required by 2017 Oregon Plumbing Specialty Code table 1014.3.6 (*gravity grease interceptor sizing*).
- c) Outlet Sampling. Provisions shall be included to allow for sampling of the vault effluent (*ie. details for outlet junction box, vertical drop cleanout or equivalent shall be included on the drawings*).
- d) Any proposal for a gravity grease interceptor vault smaller than 1,000 gallon capacity shall include documentation that the unit is sized per the requirements of the 2017 OPSC table 1014.3.6 (*or current edition*).
- e) A maintenance agreement (*acceptable to the Public Works Director and City Attorney where applicable*) shall be recorded against the property.
- f) Property owner shall provide the City with a copy of a maintenance contract with a certified grease removal company, and copies of cleaning and/or maintenance work orders.

11) Private Sewer Pump Stations.

- a) As noted under PWDS 4.9.a.3, gravity sewer service is required where possible. Installation of private sewer pump stations is not allowed except with express prior written approval by Public Works and the City Engineer (*during land use approval where applicable, and prior to submittal of project design drawings for review otherwise*).
- b) Any private sewer pump stations approved by the City shall meet standards established by the Public Works Director and the City Engineer (*see PWDS 4.3*), the Oregon Plumbing Specialty Code and other applicable codes or standards (*whichever is more stringent*).
- c) An operation & maintenance agreement acceptable to the City shall be recorded against the property.

b. Service Lateral Cleanouts

- 1) A cleanout (*set in a cleanout box conforming with City standard details*) shall be installed at or near the right-of-way line or sewer easement boundary line for all sanitary sewer service laterals, at a location acceptable to Public Works. The sanitary sewer service lateral shall extend beyond the property line/sewer easement boundary cleanout to the back of any PUE fronting the right-of-way or easement, or to the far side of easements for public utilities, whichever is further.
 - a) Where sewer laterals are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot being served (*whichever is farther*) in conjunction with the development infrastructure construction.
- 2) For long sewer service laterals, a cleanout to City standards shall be installed on the upstream side of any intermediate property lines crossed (*including on the upstream side of the property line where the lateral crosses onto the property being served*), as well as at maximum 100-foot intervals beyond the right-of-way or easement cleanout, and at bends as required by the Oregon Plumbing Specialty Code.
- 3) Unless otherwise approved by the City Engineer, sewer service laterals shall have at least four (4) feet of cover from finish grade (*typically sidewalk grade*) at the right-of-way or easement line. Generally, the topography of the property will dictate how deep the service line must be.

c. Minimum Diameter and Slope

- 1) The minimum inside diameter of a sewer service lateral shall be four (4)

inches and shall be equal to or greater than the building plumbing stub (*building drain*) diameter.

- 2) The minimum inside diameter of sewer service laterals to serve multifamily dwellings or commercial buildings shall be six (6) inches. Fixture unit equivalents shall be determined in accordance with the Oregon Plumbing Specialty Code.
- 3) Minimum sizes and slopes for sewer service laterals, based on the fixture unit equivalents, shall be in accordance with the Oregon Plumbing Specialty Code.
- 4) Sewer service laterals for townhouses and similar cluster housing developments shall be installed on a uniform slope from the main line sewer connection to a point five (5) feet from the end of the building drain conforming to the above requirements.

d. Existing Sewer Service Laterals

- 1) The City is under mandate from the Oregon Department of Environmental Quality (DEQ) to reduce infiltration and inflow (I/I) of storm runoff and groundwater into the City's sanitary sewer system. A significant portion of the (I/I) problems in the City's sewage collection system are attributable to leaking sewer service laterals or drains connected to service laterals. DEQ and City standards require that "No person shall discharge or cause to be discharged any storm water, surface water, groundwater, roof runoff, subsurface drainage to any sanitary sewer." The City requires applicants to demonstrate compliance with this ordinance by testing existing sanitary sewer service laterals (*at the expense of the applicant*) which are proposed for continuing use (see Dayton Municipal Code 8.1.3.5 & 8.1.1.6).
- 2) Unless waived in writing by Public Works (*for newer PVC laterals*), all existing sewer service laterals shall be air tested from the mainline to the building to verify that it is free of leaks or defects. The service laterals shall be tested at 4 to 5 psi, and a loss of 0.5 psi in 15 seconds constitutes a test failure. The service lateral shall be replaced if defective. Cleanouts per PWDS (& *plumbing code*) requirements shall be installed on existing sanitary sewer service laterals which are proposed for continuing use (*ie. those which do not already have cleanouts*).
- 3) If existing sewer service laterals are abandoned or not used, the sewer lateral shall be plugged watertight at the mainline in a manner acceptable to Public Works. All such plugged mainlines shall be inspected by Public Works prior to being covered, and may be TV inspected during the winter following the end of the first year of service to verify that the plug remains watertight. Any excavation, repairs or surface restoration required to correct leaking plugged laterals will be the responsibility of the party performing the original work.

4.19 PRIVATE COLLECTION SYSTEMS

- a. Private collection system sewers shall be designed in conformance with main line standards specified herein when plumbing code grade requirements of Oregon Plumbing Specialty Code Section 1106 cannot be met.
 - 1) A manhole is required at the connection to the City system.
 - 2) A monitoring/metering manhole may be required at the property line upstream from the manhole connection at the City main (*see PWDS 4.16.i*).
- b. PWDS 4.18, Sewer Service Laterals, must be used for sewer service lines in the system with the following exceptions:
 - 1) The minimum size sewer line upstream of the monitoring manhole structure shall be six (6) inches.
- c. See requirements and criteria under PWDS 4.18.a.9 relating to private sewer pump stations.

4.20 UNDERGROUND WARNING TAPE & TRACER WIRE

- a. Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all service laterals and all mainlines not located under sidewalks or paved portions of public streets.
- b. Underground warning tape shall be placed a minimum of 12-inches and a maximum of 18-inches below the finish ground surface, and shall be continuous the entire length of the service laterals installed from the mainline to the back of the PUE. Where required for mainlines not located under sidewalks or paved portions of public streets, the warning tape shall be continuous between manholes or cleanouts.
- c. All sanitary piping (*both public lines and private lines within right-of-way or easements*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with green sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe, with each end accessible from the surface through a manhole or cleanout.

CITY OF DAYTON
Public Works Design Standards

Division 5

Water Distribution

DIVISION 5 WATER DISTRIBUTION

5.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a water distribution system which will:
- 1) be of adequate design to meet all expected domestic, commercial and industrial demands including fire flows within the design life;
 - 2) have sufficient structural strength to withstand all external loads which may be imposed;
 - 3) be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
 - 4) be economical and safe to build and maintain;
 - 5) meet all design requirements of the Oregon Health Authority – Drinking Water Services (OHA-DWS).

Alternate materials and methods will be considered for approval on the basis of these objectives.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

5.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public water distribution facilities in the City of Dayton and applicable work within its service areas.
- b. Permanent water distribution facilities shall be provided to all properties within the City of Dayton in accordance with these Standards. This shall generally be interpreted to mean that permanent water distribution facilities shall be provided for existing legal lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.

5.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
 - 1) Water Distribution Pump Stations
 - 2) Reservoirs
 - 3) Wells
 - 4) Treatment Plants
 - 5) Pressure Regulating Devices
 - 6) Flow Measurement Devices
 - 7) Relining of the Existing Water Mains
 - 8) Chemical Addition or pH Adjustment
 - 9) Bridge Crossings
 - 10) Creek or Stream Crossings
 - b. Review and approval of the above special items by the City Engineer and Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval. Special items may also require review and approval by the OHA-DWS as applicable.
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5.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 5.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards.
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and Public Works Director. When requested by the City,

full design calculations shall be submitted for review with the request for approval.

5.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all water system appurtenances including valves, blowoffs, hydrants, service connections, couplings, etc.

5.6 STANDARD DETAILS

- a. Standard details included in the appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable standard details shall be included on the construction drawings.

5.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to water distribution systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.
 - 1) **Abbreviations:** Acceptable abbreviations for showing types of new and existing pipe materials on the plans are as follows:
 - a) CI - Cast Iron
 - b) DI - Ductile Iron
 - c) PVC - Polyvinyl Chloride
 - d) STL - Steel
 - e) AC - Asbestos Cement
 - 2) **Air Gap Separation:** A physical vertical separation between the free-flowing discharge end of a potable water supply and the rim of any open, non-pressurized receiving vessel.

- 3) Approved Backflow Prevention Assembly: An assembly that has been investigated and approved by the OHA-DWS for preventing backflow.
- 4) Backflow: The flow of water or other fluids in a direction opposite to the normal flow. (See *Back-Siphonage*.)
- 5) Back-Siphonage: The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a negative or reduced pressure in such pipe.
- 6) Building Supply: The pipe carrying potable water from the water meter or other source of water supply to a building or other point of use or distribution on the lot. Building supply shall also mean customer line.
- 7) Cross Connection: Any connection or arrangement, physical or otherwise, between a potable water supply system and any plumbing fixture or any tank, receptacle, equipment or devise, through which it may be possible for non-potable, used, unclean, polluted and contaminated water, or other substances, to enter into any part of such potable water system under any condition.
- 8) Customer Water Supply System: The water supply system of a building, premises or private system consists of the all supply pipe from the customer side of the water meter, including water service pipes, and the necessary connecting fittings, control valves, pipe and all appurtenances carrying or supplying potable water in or adjacent to the building premises served.
- 9) Distribution Mains: All mains which are not designated as transmission mains, and which are used for supply the individual consumer. As a general rule these are the smaller mains in the water supply system.

- 10) Distribution System: Distribution main pipelines, pumping stations, valves and ancillary equipment used to transmit water from the supply source to the service line.
- 11) Double Check Valve Assembly: An assembly composed of two single, independently acting check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test ports.
- 12) Double Detector Check Valve Assembly: A line-sized approved double check valve assembly with a parallel meter and meter-sized approved double check valve assembly. The purpose of this assembly is to provide double check valve protection for the distribution system and at the same time provide partial metering of the fire system showing any system leakage or unauthorized use of water.
- 13) Fire Hydrant Assembly: Fire hydrant, hydrant lead, mainline hydrant valve, mainline tee, and thrust restraint at the hydrant and the mainline tee.

- 14) Fire Protection Services: A connection to the public water main intended only for the extinguishment of fires and flushing necessary for its proper maintenance. All fire services connected to building sprinkler systems shall have a double check detector assembly. The connection of the fire protection service to the public mainline shall be the service connection, and the entire portion of the fire protection service from the public mainline to the building shall be the sole responsibility of the property owner for maintenance and/or repair (*ie. a private service line*).
- 15) Fixture Unit Equivalents: The unit flow or demand equivalent of plumbing fixtures as tabulated in the Oregon Plumbing Specialty Code.
- 16) Hydrant Lead: The line connecting the fire hydrant to the City main or private fire line.
- 17) Irrigation Service: A metered connection intended for seasonal use and delivering water which is not discharged to the sanitary sewer.
- 18) ISO: Insurance Service Office.
- 19) Mainline Hydrant Valve: The isolation valve between the City water main or private fire line and the fire hydrant.
- 20) OHA-DWS: Oregon Health Authority, Drinking Water Services.
- 21) Oregon Plumbing Specialty Code: The Uniform Plumbing Code, current edition as revised by the State of Oregon, called the "Oregon Plumbing Specialty Code."
- 22) Potable Water: Water which satisfactory for drinking, culinary and domestic purposes and meets the requirements of the health authority having jurisdiction.
- 23) Private Distribution System: A privately owned and maintained water distribution system serving an industrial or commercial subdivision or a multi-building development on a single lot served through a master meter installed at the approved location. Private distribution systems must have a single entity responsible for the system. Resale of water without written approval of the City shall be prohibited.
- 24) Service Line: The waterline or pipe extending from the distribution main to the water meter, backflow prevention device, or private fire system double check valve.
- 25) Transmission Mains (Supply Lines): Mains which are used for transporting water from the source of supply and storage reservoirs to the centralized point of distribution and distribution reservoirs. Transmission mains may or may not supply individual consumers, but they are sized and located to transport water from centralized points of distribution to various points of interconnection with

the grid system and centralized points of consumption.

- 26) Uniform Plumbing Code: The Uniform Plumbing Code adopted by the International Association of Plumbing and Mechanical Officials, current edition as revised by the State of Oregon, called the "Oregon Plumbing Specialty Code."
- 27) Water Main: A water-supply pipe for public or community use.
- 28) Water Master Plan: The Water System Evaluation and Master Plan for the City of Dayton, Oregon, most recent revisions.

5.8 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply. Acceptable materials shall be as outlined in these Design Standards.
- 3) It is not intended that materials listed herein are to be considered acceptable for all applications. The design engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.
- 4) All materials or products which will come in contact with or which will be used on material or products which will come in contact with potable water shall conform to the requirements of OAR 333-61-087, Product Acceptability Criteria or the National Sanitation Foundation (NSF) Standard 61, Drinking Water System Components - Health Effects as approved by the OHA-DWS.
- 5) Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

b. Pipe

- 1) PVC (AWWA C-900)
 - a) PVC pressure pipe 4-inches through 24-inches in diameter shall conform to the requirements of AWWA C-900-16 (*design stress of 4000 psi*), NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions. Pipe shall be PVC pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 18.

- 2) Ductile Iron
 - a) Where ductile iron pipe is used for water distribution, pipe shall be Class 52 ductile iron pipe with push-on joints conforming to AWWA C-151, and cement-mortar lined and seal coated in accordance with AWWA C-104 (*ductile iron pipe threaded for flanges shall be Class 53*).
 - b) All ductile iron pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of 1 mil thick unless otherwise specified.
 - c) All ductile iron pipe within a single project shall be of the same manufacturer.
- 3) Rubber-ring gaskets for push-on joints shall be furnished by the pipe manufacturer to ensure compatibility with the gasket groove in the push-on bell end. Gaskets shall be suitable for the specified pipe sizes and pressure.
- 4) Restrained joint PVC pipe shall be used in locations and configurations as required by the City Engineer (*Diamond Lok-21, Eagle Loc 900, TerraBrute CR or approved equal, as approved by the City Engineer and Public Works Director for the specific application*).

c. **Bolts & Nuts for MJ Joints & Flanged Joints**

- 1) Mechanical Joints
 - a) MJ joints shall be provided with corten tee-head bolts and nuts (*ASTM A242, high strength, low alloy steel conforming with AWWA C-111*).
- 2) Flanged Joints
 - a) As a minimum, all nuts and bolts used for flanged joints shall conform to the requirements of ASME/ANSI B18.2.1 and shall be high strength, low carbon steel conforming to the requirements of ASTM A-307 Grade B, zinc plated steel conforming with AWWA C-111.
- 3) Areas with Corrosion Concerns
 - a) For any areas where required by Public Works, MJ and flanged joints shall be provided with bolts and nuts (*low alloy steel conforming with AWWA C-111*) coated with a zinc base coat and a Xylan fluoropolymer top coating (*or approved equal*) for corrosion control and to control thread friction torque during tightening (*Romac R-Blue, TriPac 2000 Blue or approved equal*).

d. **Fittings**

1) **Mechanical Joint Fittings**

- a) All MJ tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C-153.
- b) The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi.
- c) **Retainer Glands for MJ Joints**
 - (1) Retainer gland casting bodies shall have all surfaces fusion bond powder coated (*polyester or nylon based*) after pretreatment with a phosphate wash, rinse & sealer coating (*Mega-Bond or approved equal*).
 - (2) Retainer gland set wedge bolts and set wedge assemblies shall have all surfaces coated with a minimum of two coats of fluoropolymer coating or approved equal coating (*to control thread friction torque during tightening of set wedges*).
 - (3) Retainer glands for use on MJ joints shall be "Mega-Lug" as manufactured by EBAA Iron Inc. (*color coded based on the type of compatible pipe*), or approved equal.

2) **Flanged Fittings**

- a) All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48-inches in diameter shall be cast iron or ductile iron fittings in conformance with AWWA C-110.
- b) The minimum working pressure for all flanged cast iron or ductile iron fittings shall be 250 psi.

e. **Couplings**

- 1) Couplings shall be limited in their application to connection of new pipe work to existing waterlines, temporary installations, and where specifically approved by the City Engineer.
- 2) Mechanical joint couplings shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.

- 3) Unrestrained Couplings. Unrestrained mechanical joint sleeve couplings and adapters shall be long-style solid sleeve type couplings consisting of a fusion bond epoxy coated ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts (*zinc plated*). Unrestrained long sleeve couplings shall be Tyler Pipe, UFCO, Star, Sigma or approved equal. Hymax Wide Range Couplings are allowed as an alternative to unrestrained MJ sleeve couplings.
- 4) Restrained Couplings. Unless otherwise specifically specified or noted on the drawings, restrained sleeve couplings up to 12-inch diameter shall be Krausz Hymax Grip Coupling, or approved equal (*Romac Alpha Coupling*), consisting of a fusion bond epoxy coated two bolt coupling with all cast components (*end rings, center ring, bolt guides, gripper teeth*) of ductile iron, NBR gaskets, stainless steel hardware, stainless steel bolts & anti-gall e-coated nuts.
- 5) Dresser type couplings are not an approved option unless specifically approved by the Public Works Director. Applications shall be limited to transitions between pipe types for which mechanical joint couplings are not available.

f. Mainline Valves

1) General

- a) All mainline valves and appurtenances shall have the name, monogram, or initials of the manufacturer cast thereon. They shall be built and equipped for the type of operation as specified herein or as shown on the drawings.

2) Valve Operators

- a) All valve operators shall be totally enclosed traveling nut type manual operators, sealed and lubricated for underground service.
- b) All buried valves shall be supplied with a 2-inch square operating nut, and shall open to the left (*ie. counterclockwise*). Nuts shall have a flanged base on which shall be cast an arrow at least 2-inch long with the word "OPEN" cast on the nut to clearly indicate the direction of opening.
- c) Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Extension stem shall extend to within twelve (12) inches (*maximum*) of the finished ground surface and shall be provided with spacers which will center the stem in the valve box.

3) Valve Boxes (VB)

- a) All buried valves shall be provided with valve boxes as shown on the Standard Details. All valve boxes shall be provided with VC212 self centering valve box bases as manufactured by 3 Dimensional

Contracting, or approved equivalent.

4) Gate Valves (GV)

- a) For criteria regarding acceptable location for use of gate valves, see Section 5.16.
- b) All gate valves shall be resilient wedge gate valves conforming to the requirements of AWWA C-509, except as herein modified.
- c) Gate valves shall be epoxy coated iron-body, resilient wedge non-rising stem gate valves. The wedge shall be cast iron completely encapsulated in a elastomer covering with polymer guide bearing caps on each side. The valves shall have a full diameter waterway with no grooves or recesses at the valve seat location. Flanges, where required, shall be 125 pound, full faced, drilled per ANSI B16.1.
- d) Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and a minimum test pressure of 300 psi.
- e) Gate valves shall be Mueller A-2360, Waterous Series 500 or approved equivalent.

5) Butterfly Valves (BFV)

- a) For criteria regarding acceptable location for use of butterfly valves, see Section 5.16.
- b) All butterfly valves shall conform to AWWA C-504, except as herein modified.
- c) Butterfly valves shall be epoxy coated short body type AWWA Type-B valves. Flanges, where required, shall be 125 pound, full faced, drilled per ANSI B16.1.
- d) Valve operators shall be enclosed traveling nut type manual operators, sealed and lubricated for underground service, and shall be rated for submerged operation up to 10 psi (± 23 feet).
- e) Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 150 psi and a minimum test pressure of 300 psi.
- f) Butterfly valves shall be Pratt Groundhog series, or approved equivalent.

6) Valve Coating

- a) All valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C-550.

g. **Service Pipe and Fittings**

- 1) For criteria regarding tapping requirements, see Section 5.19.
- 2) All services that are saddle tapped shall use ductile iron service saddles with stainless steel bolts and double strap clamps. All ductile iron service saddles shall be furnished with a fusion bonded epoxy or nylon coating conforming to the requirements of AWWA C-550, Romac 202NS, Ford FC202 or approved equal.
- 3) Unless otherwise required by the City Engineer or the Public Works Director, single residential service pipe shall be a minimum of 1-inch in diameter.
- 4) Unless otherwise approved by the City Engineer or the Public Works Director, commercial or industrial service pipe shall be a minimum of 1½-inches in diameter (*reducers to be installed at meter location as applicable*).
- 5) **Compression Inserts**. All service connections to HDPE service pipe shall be compression fittings, with 2-3/8” long inserts provided for all HDPE connections per manufacturer’s recommendations (*AY McDonald 6133T CTS insert stiffener or equal*). All service connections to copper pipe shall be compression fittings.
- 6) **No-Lead Service Brass**. All service brass shall be manufactured from no-lead alloy conforming with UNS/CDA C89833, and shall have the letters “NL” cast into the body for proper identification.
- 7) **Tracer Wire**. A continuous 12 gauge solid core copper toning wire shall be installed along all non-copper water service lines from the mainline to the meter box.
- 8) **1-inch Services**
 - a) Unless otherwise specified herein, water service lines shall be blue HDPE tubing (*CTS, SDR 9, 200 psi rated*) conforming to AWWA C901 (ASTM D2239 & D2737), with long style compression inserts as specified above and Q style compression fittings (*Cencore or approved equal*). All water services shall be continuous HDPE without splices.
 - b) All corporation stops shall be brass ball valve corporation stops rated to 300 psi with iron pipe thread inlet and compression outlet to adapt to HDPE copper tube size (CTS) pipe. Corporation stops shall be Ford FB-1100-4Q or approved equivalent.
 - c) Each individual water service line shall be equipped with a full size locking ball valve meter stop assembly at the inlet to the meter. All meter stop assemblies shall be brass with copper pipe connector as

appropriate and outlet for meter coupling.

- d) Meter stops for 3/4-inch and 1-inch meters shall be 1-inch locking angle ball valves with compression inlet. 1-inch meter stops shall be Ford BA43-444WQ, or approved equivalent. Provide all services with a 1" x 3/4" adapter on the meter stop for each 1" service.
- e) Where permitted, service line couplings shall be compression style couplings. Couplings (*where approved by Public Works*) shall be Ford C44-44Q coupling or approved equivalent, with long style compression inserts as specified above.

9) **1½-inch and 2-inch Services**

- a) 1½-inch water service lines shall be either blue HDPE tubing (*CTS, SDR 9, 200 psi rated*) conforming to AWWA C901 (ASTM D2239 & D2737), with long style compression inserts as specified above and Q style compression fittings (*Cencore or approved equal*), or Schedule 80 PVC pipe. All fittings on PVC pipe shall be Schedule 80 PVC. Use IPS Weld-On purple primer P70 with 711 glue or approved equivalent.
- b) 2-inch water service lines shall be Schedule 80 PVC pipe. All fittings shall be Schedule 80 PVC. Use IPS Weld-On purple primer P70 with 711 glue or approved equivalent.
- c) 1½-inch and 2-inch water services shall be provided with high bypass copper-setters for flanged meters, Ford VBB76-12HB-11-66 (1½") or VBB77-12HB-11-77 (2") high locking bypass or approved equivalent conforming to standard details.

(1) The copper-setter shall be provided with ball valves on the inlet and outlet, with inlet valve provided with a lockwing and the outlet valve provided with a handle.

(2) The bypass line shall be 1-inch diameter minimum, and shall be provided with a lockwing ball valve.

- d) 2-inch and larger services shall have a mainline tee with flanged side outlet and flange x MJ resilient wedge gate valve conforming the requirements specified herein.

10) **3-inch and Larger Services**

- a) 3-inch and larger water service lines shall be reviewed on a case-by-case basis. Pipe and fittings shall be as required by the City Engineer and the Public Works Director.
- b) All services 3-inch and larger shall be Class 52 ductile iron pipe, with

ductile iron fittings. Provide retainer glands on all MJ joints, and field-lock type gaskets on all push-on joints. See PWDS 5.7 for ownership and responsibility for fire protection service from mainline connection to building.

- c) 3-inch and larger services shall have a mainline tee with flanged side outlet and a flange x MJ resilient wedge gate valve conforming to the requirements specified herein.
- d) The meter assembly shall include a lockable bypass and may require a backflow preventer if required by Public Works.

11) **Fire Services**

- a) All fire service lines shall be reviewed on a case-by-case basis. Pipe and fittings shall be as required by the City Engineer and the Public Works Director.
- b) The portion of all fire services within the public right-of-way or within utility easements to the City shall be Class 52 ductile iron pipe, with ductile iron fittings. Provide retainer glands on all MJ joints, and field-lock type gaskets on all push-on joints.
- c) All fire service connections shall have a minimum 4-inch mainline tee with flanged side outlet and a flange x MJ resilient wedge gate valve conforming to the requirements specified herein.
- d) Each fire service connection shall be provided with a double check detector assembly with a City approved meter on the detector loop.

h. **Water Meter Boxes**

- 1) Unless otherwise approved by the Public Works Director, all meter boxes must be as shown below:

WATER METER BOXES			
Service Line Size	Non-Traffic Area	Traffic Area	Inside Dimensions
3/4-inch & 1-inch	Box – DFW1324C4-12-BODY Lid – DFW132C-4T-LID ¹	Same	13” x 24”
1½-inch & 2-inch	Box – DFW2436C4-18-BODY Lid – DFW2436C-4T-LID ¹	Same	24” x 36”
3-Inch and larger	Vault built to Public Works requirements, w/ aluminum hatch, OSHA ladder, sump pump & lockable bypass.		
¹ -or approved equivalent.			

- 2) Meter boxes shall be H20 rated polymer boxes with covers configured for top-mount touch -read AMR sensors and containing an embedded locator magnet.

i. **Fire Hydrants**

- 1) Unless otherwise required by the Dayton Fire District, all fire hydrants shall conform to the following:
 - a) All fire hydrants shall be improved, dry barrel, 5¼-inch compression type valve, traffic model.
 - b) Fire hydrants shall be equipped with two 2½-inch hose ports (NST), one 4½-inch pumper port (NST) with Storz adapter as specified, 1½-inch pentagon nut, and barrel drains.
 - c) Fire hydrants shall be oriented so as to optimize access to ports, or as directed by the City Engineer or Fire Chief.
 - d) Fire hydrants shall be Kennedy Guardian K81D, and shall be factory coated yellow with powder coat epoxy.

j. **Mainline Blowoffs**

- 1) Minimum allowable blowoff size shall be as outlined under Section 5.12. Blowoffs shall be sized to provide adequate flushing velocities as approved by the City Engineer.
- 2) Unless otherwise shown or authorized by the City Engineer, all blowoffs shall be provided with valve boxes and/or meter boxes as shown in the Standard Details.

k. **Mainline Tapping Tees**

- 1) Tapping tees used for making connections to existing, in-service lines shall be all stainless steel construction (*including stainless steel flange*) with full perimeter gasket, and shall have Class 125 outlet flanges. In all cases, the tapping tee shall be designed for use with the existing pipe materials and O.D. equivalent.
- 2) All tapping valves shall be resilient wedge gate valves furnished with a fusion bonded epoxy coating inside & outside conforming to the requirements of AWWA C-550.
- 3) Any company performing mainline taps shall be prequalified with the City prior to performing any work on a project.
- 4) Contractors shall coordinate all taps with City Public Works and perform work with Public Works staff present.

l. **Underground Warning Tape**

- 1) Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
- 2) The tape shall be safety blue and shall be provided with the legend "CAUTION BURIED WATER LINE BELOW" or approved equivalent printed continuously down the length of the tape.

m. **Toning Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be blue in color for potable water piping.
- 2) Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all valve boxes on all lines.

n. **Concrete (Cast-in-Place) Thrust Restraint.**

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi (*5" slump or stiffer*). Concrete mix design shall be submitted to the City for review and approval prior to use.
- 2) If hand mixed sack-crete type concrete is proposed by the Contractor and approved by the Public Works Director, it shall be a 4000 psi minimum mix (*approved by the City prior to use*), mixed with the minimum amount of water necessary for workability (*5" slump or stiffer*).
- 3) In no case will dry sack-crete (*either in bags or as loose mix*) be considered as an acceptable substitute for an approved concrete mix, placed as specified herein or on the drawing details.

o. **Bore Casings and Accessories**

- 1) Carrier pipe used in bore casings shall meet the minimum specifications contained herein. Casing pipe shall be of a size to permit proper construction of the carrier pipe to the required lines and grades.
- 2) Casing shall be welded smooth steel pipe conforming to the requirements of ASTM A-53 or approved equal, with a minimum yield strength of 35,000 psi.
- 3) Minimum casing size and wall thickness shall as outlined below. Casing wall thickness shall conform to these requirements or the requirements of the agency

having jurisdiction, whichever is more stringent. Contractor shall be responsible for verifying the bell OD or casing spacer diameter required of actual carrier pipe provided or bore grades specified, as bell diameters or casing spacer requirements may vary between manufacturers. Casing diameter shall be increased as required to allow trimming of casing spacers on grade critical bores, or where required to provide additional clearance between bells and casing. The fact that certain carrier pipe types are listed in this table does not indicate that such pipe type is approved for any particular application (*ie. to avoid repetition, this table applies to water, sewer and storm drainage as applicable*).

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
<6"	10 OD / 9.5" ID	0.250 (1/4)
6" DI (CL 52, push-in joint) (Bell OD = ±8.9")	12" OD / ±11.5" ID	0.25 (1/4)
6" PVC C900 (DR 18) (Bell OD = ±8.43")	12" OD / ±11.5" ID	0.25 (1/4)
6" PVC D3034 (DR 35) (Bell OD = ±7.0")	12" OD / ±11.5" ID (18" min. if slope ≤ 2%)	0.25 (1/4) 0.375 (3/8)
8" DI (CL 52, push-in joint) (Bell OD = ±11.2")	14" OD / ±13.37" ID	0.312 (5/16)
8" PVC C900 (DR 18) (Bell OD = ±11.06")	14" OD / ±13.37" ID	0.312 (5/16)
8" PVC D3034 (DR 35) (Bell OD = ±9.36")	14" OD / ±13.37" ID (20" min. if slope ≤ 2%)	0.312 (5/16) 0.375 (3/8)
10" DI (CL 52, push-in joint) (Bell OD = ±13.25")	16" OD / ±15.37" ID	0.312 (5/16)
10" PVC C900 (DR 18) (Bell OD = ±13.57")	16" OD / ±15.37" ID	0.312 (5/16)
10" PVC D3034 (DR 35) (Bell OD = ±11.7")	16" OD / ±15.37" ID (24" min. if slope ≤ 2%)	0.312 (5/16) 0.50 (1/2)
12" DI (CL 52, push-in joint) (Bell OD = ±15.37")	18" OD / ±17.25" ID	0.375 (3/8)
12" PVC C900 (DR 18) (Bell OD = ±16.13")	18" OD / ±17.25" ID	0.375 (3/8)
12" PVC D3034 (DR 35) (Bell OD = ±13.94")	18" OD / ±17.25" ID (24" min. if slope ≤ 2%)	0.375 (3/8) 0.50 (1/2)
14" DI (CL 52, push-in joint) (Bell OD = ±17.85")	22" OD / ±21" ID	0.50 (1/2)
14" PVC C900 (DR 25) (Bell OD = ±17.94")	22" OD / ±21" ID	0.50 (1/2)
15" PVC D3034 (DR 35)	22" OD / ±21.2" ID	0.50 (1/2)

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
(Bell OD = ±17.05")	(24" min. if slope ≤ 2%)	0.50 (1/2)
16" DI (CL 52, push-in joint) (Bell OD = ±20")	24" OD / ±23" ID	0.50 (1/2)
16" PVC C905 (DR 25) (Bell OD = ±20.41")	24" OD / ±23" ID	0.50 (1/2)
18" DI (CL 52, push-in joint) (Bell OD = ±22.2")	26" OD / ±25" ID	0.50 (1/2) 0.50 (1/2)
18" PVC C905 (DR 25) (Bell OD = ±22.87")	26" OD / ±25" ID	0.50 (1/2) 0.50 (1/2)
18" PVC F679 (PS46) (Bell OD = ±20.85")	24" OD / ±23" ID (28" min. if slope ≤ 2%)	0.50 (1/2)
20" DI (CL 52, push-in joint) (Bell OD = ±24.3")	28" OD / 27" ID	0.50 (1/2)
20" PVC C905 (DR 25) (Bell OD = ±25.34")	28" OD / 27" ID	0.50 (1/2)
21" PVC F679 (PS46) (Bell OD = ±24.58")	28" OD / 27" ID (30" min. if slope ≤ 2%)	0.50 (1/2)
24" DI (CL 52, push-in joint) (Bell OD = ±28.5")	32" OD / ±31" ID	0.50 (1/2)
24" PVC C905 (DR 25) (Bell OD = ±30.27")	34" OD / 33" ID	0.50 (1/2)
24" PVC F679 (PS46) (Bell OD = ±27.65")	32" OD / 31" ID (34" min. if slope ≤ 2%)	0.50 (1/2)
27" PVC F679 (PS46) (Bell OD = ±31.16")	36" OD / ±34.75 ID	0.625 (5/8)
30" DI (CL 52, push-in joint) (Bell OD = ±34.95")	38" OD / ±36.75" ID	0.625 (5/8)
30" PVC C905 (DR 25) (Bell OD = ±37.12")	42" OD / ±40.75" ID	0.625 (5/8)
30" PVC F679 (PS46) (Bell OD = ±35.61")	42" OD / ±40.75" ID (44" min. if slope ≤ 2%)	0.625 (5/8)
36" DI (CL 52, push-in joint) (Bell OD = ±41.4")	46" OD / ±44.75" ID	0.625 (5/8)
36" PVC C905 (DR 25) (Bell OD = ±44.43")	48" OD / ±46.75" ID	0.625 (5/8)
36" PVC F679 (PS46) (Bell OD = ±42.82")	48" OD / ±46.75" ID (50" min. if slope ≤ 2%)	0.625 (5/8)
42" PVC F679 (PS46) (Bell OD = ±49.61")	54" OD / ±52.75" ID (56" min. if slope ≤ 2%)	0.75 (3/4)

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
48" DI (CL 52, push-in joint) (Bell OD = ±54.71")	60" OD / ±58.5" ID	0.75 (3/4)
48" PVC F679 (PS46) (Bell OD = ±56.62")	60" OD / ±58.5" ID (64" min. if slope ≤ 2%)	0.75 (3/4)
¹ Casing diameter shall be increased as required to allow trimming of casing spacers on grade critical bores.		

- 4) The class of casing specified is based upon assumed superimposed loads and not upon the stresses resulting from jacking or boring operations. Any increase in casing strength to withstand jacking or boring operations shall be the responsibility of the Contractor.
- 5) Casing Spacers (Skids)
- a) Casing spacers shall be Model SSI-8 for carrier pipes up to 18 inch diameter and Model SSI-12-2 for larger pipe sizes as manufactured by APS (*Advanced Products and Systems, Inc.*), or approved equivalent.
 - b) Casing spacers shall be bolt-on style with a shell made of at least two halves. The band material shall be manufactured of a minimum 14 gauge T-304 stainless steel. The runners shall be at least 7 inches long for SSI-8 models and 11 inches long for SSI-12 models, and manufactured of high abrasion resistant and low co-efficient of friction, glass filled polymer.
 - c) The spacer shall have a flexible EPDM liner having a minimum thickness of 0.090 inches, with a hardness of durometer "A" 85-90. The liner shall have a rating of no less than 60,000 VPM and water absorption of 1% maximum. All welds are to be chemically passivated and all hardware to be stainless steel.
 - d) All spacers used for grade critical gravity sewer and storm lines shall have field replaceable runners to allow for grade and elevation adjustment.
 - e) A minimum of three (3) casing spacers per length of pipe shall be required, or 6-foot on center maximum spacing, whichever is greater.
- 6) End Seals.
- a) Where casings are filled with sand (*gravity or non-pressure pipelines*), end seals shall be grout/masonry end caps with 4" minimum diameter sand feed and vent tubes at each end. The vent tubes shall be plugged

with grout after the casing is filled with sand.

- b) Where casings are not filled with sand (*pressure pipelines*), end seals shall be Model AC (*pull-on*) or Model AW (*wrap-around with pressure sensitive butyl mastic strips*) end seals as manufactured by APS, or approved equivalent, fastened to the casing and carrier pipe with stainless steel bands.

5.9 GENERAL DESIGN CONSIDERATIONS

- a. Unless otherwise approved or required by the Public Works Director and the City Engineer, the water distribution system shall have sufficient capacity to maintain 40 psi at the building side of the meter for one and two family dwellings. For other development, the distribution system shall have sufficient capacity to provide minimum pressure of 35 psi at the building side of the meter during periods of maximum use, and to provide sufficient volumes of water at adequate pressures to satisfy the maximum expected daily consumption plus fire flows.
- b. Normal working pressure in the distribution system should be approximately 70 psi with a range of 40 psi to 100 psi.
- c. Head loss shall be determined by the Hazen-Williams equation based on the following coefficients.

Hazen-Williams Coefficients	
Pipe Diameter	C Value
8 Inches and Less	100
10 to 12 Inches	110
Greater than 12 Inches	120

- d. Velocities in mains shall normally range from three (3) to six (6) feet per second for average demand to a maximum velocity of ten (10) feet per second for maximum day demand plus fire flow, where pressure headloss is not a concern. In general, maximum headloss for transmission and distribution mains should be limited to 3 feet per 1000 feet and 10 feet per 1000 feet respectively, provided that acceptable pressure can be maintained under maximum design flow conditions.
- e. A 20 psi residual pressure under fire flow conditions shall be maintained at all meter service connections in the distribution system (*OAR 333-061-0025.7 & OAR 333-061-0050.8.e*), and positive pressure at all other locations. Generally, a maximum velocity of ten (10) feet per second under fire flow conditions will govern for sizing mains at all other locations of the service level where this criteria does not govern.

- f. For purposes of calculating projected headloss through a fire hydrant assembly, the maximum headloss values provided in AWWA C502, Table 5 shall be used (*13 psi headloss @ 1500 gpm through large steamer port*). Use of lower headloss values shall be based on a certified headloss curve from the hydrant manufacturer (*ie. based on City approved hydrant*), and the headloss through the 6-inch hydrant lead shall also be accounted for.
- g. Private systems shall limit velocities as required by the Oregon Plumbing Specialty Code, Installation Standards.

h. **Providing for Future Development**

- 1) As a condition of water service, all developments will be required to provide public water mains of sufficient size for fire protection to adjacent parcels, as well as connection (*to the new system*) of existing water lines, hydrants or services crossed or intercepted by or adjacent to the new waterlines, at locations as required by the City Engineer and Public Works Director (*see PWDS also 1.6.e*).
- 2) This shall include the extension of water mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way. This shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future.
- 1)3) This shall include waterlines that are oversized to provide capacity for required fire flows, or as required to meet the minimum sizes required by the PWDS, or by shown in the applicable water master plan, whichever is larger (*see also PWDS 1.6.h*).
- 2)4) In general, water distribution systems should be designed for maximum development of the service area with recognition of possible urban renewal, industrial expansion, etc.

5.10 WATER SYSTEM CAPACITY

a. **General:**

- 1) Waterlines shall be provided as required to meet the minimum sizes required by the PWDS or by the applicable water master plan, or as required to provide the required fire flows, whichever is larger (*see also PWDS 1.6.h*). In areas not addressed in the Water Master Plan, design capacities shall be determined by consideration of the following factors and assumptions:
 - a) Area to be serviced, both immediate and adjacent.
 - b) Current and projected population within the areas to be served.

- c) Current and projected land use within the areas to be served.
 - d) Commercial, industrial, or institutional users to be served.
 - e) Changes in any of the above factors which are likely to occur within a foreseeable time period.
- 2) In the absence of consumption data or other reliable information, the following factors may be assumed:
- a) Peak hour demands as follows:
 - (1) 5 gpm per single family residential
 - (2) 2.5 gpm per dwelling unit for multiple family residential
 - (3) 5,000 gal/ac/day for commercial development
 - (4) 10,000 gal/ac/day for industrial development
 - b) Demand for unique commercial installations, industrial users, PUD's, multiple and institutional developments shall be calculated on an individual basis.

b. Fire Flow Requirements

- 1) Unless otherwise approved or required by the City Engineer and the local Fire Marshall, the water system shall be designed to convey minimum fire flows as follows:

MINIMUM FIRE FLOW REQUIREMENTS**			
Location		Recommended Fire Flow (gpm)	Duration (hours)
Residential	R-1	1,000	2
	R-2	1,500	2
	R-3	2,000	2
Commercial Residential CR		2,500	3
Public (Schools & Institutions)		4,000	4
Commercial/Industrial (C, I)	New Facilities	3,250	3
	Existing Facilities	up to 4,000	4

** These values are general planning values only, and do not supersede or take the place of Oregon Fire Code (OFC) (summarized in OFC Appendix B) or OBC fire flow requirements. Reductions may be allowed by the Fire Chief for buildings with fire sprinkler systems. Higher values may be

necessary based on the OFC, Fire Marshall or ISO requirements.

- 2) In all cases, all new fire hydrants shall be capable of delivering a minimum of 1,000 gpm at 20 psi residual system pressure. This requirement will apply independently to each phase of multi-phase projects.

5.11 LOOPING

- a. The distribution system mains shall be looped at all possible locations.
- b. All water lines shall be looped and valved such that the removal of any single line segment from service will not result in more than one fire hydrant being taken out of service.
- c. The installation of permanent dead-end mains upon which fire protection depends and areas of large demands on single mains will not be permitted.

5.12 BLOWOFFS

- a. All dead-end mains shall terminate with a blowoff assembly or a fire hydrant.
- b. Permanent dead-ends shall have a permanent blow-off assembly and a permanent thrust restraint system. Permanent blowoffs in cul-de-sacs shall be located in front of the curb within five (5) feet from the curb face.
- c. Mains which can conceivably be extended at some later date shall have a mainline valve (*same size as mainline*) in front of the blowoff assembly, and a thrust restraint system which allows the mainline valve to be connected to without taking the line out of service.
- d. Blowoffs shall be sized to ensure that the water mains can be flushed at a minimum velocity of 2½ feet per second in accordance with AWWA C-650. The following table may be used as a minimum guideline assuming 40 psi minimum residual system pressure under flushing conditions.

MAINLINE BLOWOFF SIZES	
Water Main Diameter	Minimum Blowoff Diameter
6 and 8-inch	2-inch
10 and 12-inch	4-inch
>12	As required

- e. The design engineer shall submit calculations showing that these flushing velocities can

be satisfied.

- f. Temporary blowoffs larger than 2-inches in diameter shall have a valve conforming to the requirements contained herein for mainline valves.
- g. Temporary blowoffs, where required for cleaning new water mains, shall be located at the lower end of the line to be flushed whenever possible.

5.13 MINIMUM DEPTH

- a. The standard minimum cover over buried water mains within the street right-of-way or easements shall be thirty six (36) inches from the finished grade, except that a minimum of 40 inches cover shall be required for waterlines in fill slopes.
- b. Finish grade shall normally be determined as follows:

FINISH GRADE	
Mainline Location	Reference Finish Grade
Waterline under sidewalk in right-of-way	Top of curb
Waterline in front of curb	Gutter
Waterline in cut slope (<i>ie. waterline located behind and parallel with curb/sidewalk</i>)	Top of curb (<i>ie. cover depth measured from top of curb grade</i>)
Waterline in cut slope other than parallel with curbline	Perpendicular from pipe to surface
Fill slopes	Perpendicular from pipe to surface
Easement	Finish grade at pipe centerline

- c. Where the waterline is located in the cut side slope, in an undeveloped right-of-way, or along a roadway developed at less than ultimate width (*including sidewalks*), the waterline shall be placed at a depth sufficient to ensure that 36-inches of cover is maintained at the time of final construction of the roadway.

5.14 MINIMUM MAINLINE SIZE

- a. Minimum sizes for water mains shall be as follows, or as required to meet the minimum sizes shown in the applicable water master plan, or as required to provide the required fire flows, whichever is larger (see also PWDS 1.6.h):

MAINLINE SIZE REQUIREMENTS	
Minimum Diameter	Type of Mainline
6-inch	Public lines in cul-de-sacs which cannot be looped in the future and which are beyond the fire hydrant envelope of 250 feet to the furthest point on any existing or future structure. Private fire line supplying either a single fire hydrant or a building fire suppression system. Looping of private fire lines which supply hydrants will be required.
8-inch	Minimum size water main for the public water system. Looping back into the distribution grid shall be at intervals as required by the City, but shall generally not exceed ±600 feet.
8-inch	Public water distribution mains, and permanently dead-end mains supplying fire hydrants with a required fire flow of 1,500 gpm or less.
10-inch & Larger	As required for transmission mains, distribution mains in industrial subdivisions, and fire lines supplying more than 1,500 gpm.

5.15 WATERLINE ALIGNMENT AND LOCATION

a. **General**

- 1) Water lines shall generally be parallel to the right-of-way or easement wherein they lie.
- 2) Unless otherwise required by the City Engineer, water lines shall generally be located on the south and west sides of the right-of-way wherein they lie, or on the high side of the right-of-way for hill side streets.

b. **Waterline Location in Relation to Sanitary Sewer Lines and Other Utilities**

- 1) Water mainlines shall be separated from all other utilities by a minimum of 5 feet between utility centerlines, but in all cases a minimum of 3 foot clear separation shall be provided.
- 2) Water mainlines shall generally be separated from sewer mainlines by a minimum of 10 feet. In no case shall the separation be less than 5 feet or as required by OAR 333-061.

- 3) Sanitary Sewer Main Crossings
 - a) Where a water mainline crosses below or within 18-inches vertical separation above a sanitary sewer main or lateral, one full length of AWWA C-900 PVC pipe (DR 18) shall be centered at point of crossing.

c. Waterline Location in Right-of-Ways

- 1) Unless otherwise approved by the City Engineer and Public Works Director, water mainlines shall generally be located in the street right-of-way along general alignments shown in the standard details.
- 2) The distance between the mainline and the curb shall vary as little as possible. On curved streets, mains may be laid on a curve concentric with the street centerline with deflections no greater than the manufacturer's specifications, or mains may be laid in straight lines along the tangent between selected angle points to avoid conflicts with other utilities. The angle point and tangent section shall not be closer than 5 feet from the right-of-way line, nor more than 3 feet in front of the curb face.

d. Waterline Location in Easements, & Easement Widths, Maintenance Access Requirements

- 1) Unless otherwise specified or authorized by the City, minimum easements widths for water mainlines (*as well as water service lines or meters located on private property*) shall be fifteen (15) feet for normal depth lines (*centered on the waterline*). Wider easements may be required for waterlines with cover depths greater than 5 feet, on steep hillsides or where maintenance access concerns exist (*see d.6 below*), as determined by the City Engineer and/or Public Works Director.
- 2) Water mainlines with inside diameters larger than 12-inches will require wider easements (*20' minimum*).
- 3) Mainlines in easements will be allowed only in cases where it is required in order to loop a mainline to avoid a permanent dead end condition, and only after all reasonable attempts to loop the mainlines in a right-of-way have been exhausted.
- 4) Offset: When waterline in easements are approved by the City, the waterline shall be offset a minimum of 7½ feet from any property line or easement boundary, or 1/3 the required easement width where wider easements are required (*rounded up to the nearest foot*). The easement shall be sized to provide a minimum of five (5) foot clear on all sides around any meter box/vault, hydrant, ARV or similar structure located on private property.
- 5) Easement locations for public water mainlines serving a PUD, apartment

complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.

- 6) Maintenance Access Requirements. Where required by the Public Works Director, public waterline located outside of developed street right-of-ways will require all-weather maintenance access similar to that required for sewers under PWDS 4.15.d (*ie. all-weather access lanes along mainlines and/or for access to valves, meters, hydrants or other structures; maintenance agreement, etc.*).
- 7) City standards require that ~~The conditions of the easements granted to the City shall be such that the easement~~ shall not be used for any purpose which would interfere with the unrestricted use for water mainline purposes. Under no circumstances shall a building or structure, trees or ornamental landscaping be placed over a water mainline or easement, nor shall any parallel fences be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.
- 8) Common placement in the easement of water and sewer or storm drain line may be allowed under certain conditions subject to approval by the City Engineer and Public Works Director. Easements wider than the minimum will be required. Franchise utilities shall not be placed in City utility easements.
- 9) Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet OHA-DWS requirements.
- 10) All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the Developer.

e. **Waterline Phased Construction**

- 1) Water mains installed by phased construction, which will be extended in the future, shall terminate with a mainline valve, blow off and permanent thrust restraint system which allows the mainline valve to be connected to without taking the line out of service.
- 2) All developments will be required to extend mains across existing or proposed streets for future extensions by the City or other developments. All terminations shall be planned and located such that new or existing pavement will not have to be cut in the future when the main is extended.
- 3) The construction plans for each phase shall be capable of standing alone, including provisions for looping and minimum fire flows.

f. **Waterline Location in Relation to Ditches and Drainage Channels**

- 1) Surface water crossings of mains shall be in accordance with OAR 333-061 and the requirements outlined herein.
- 2) Mains crossing ditches or drainage channels shall be designed to cross as nearly perpendicular to the channel as possible.
- 3) The following surface water crossings will be treated on a case-by-case basis:
 - a) Ditch or drainage channel crossing for pipes of 12-inch diameter and greater.
 - b) River or creek crossings requiring special approval from the Division of State Lands.
- 4) The minimum cover from the bottom of the ditch or drainage channel to the top of pipe shall be a minimum of thirty-six (36) inches unless otherwise approved by the City Engineer, Public Works Director and the OHA-DWS.
- 5) A scour pad centered on the water line will be required for mains where the potential for erosion exists as determined by the City Engineer and Public Works Director. The size and design of scour pads will be reviewed on a case-by-case basis by the City Engineer.

5.16 VALVES

a. **Valve Sizes**

- 1) In general, valves shall be the same size as the mains in which they are installed. Reducers for reconnection into existing water mains less than 8-inches in diameter (*or existing mains smaller than the new mainline*) shall be placed between the new valve and the existing line (*ie. the new valves shall be the same size as the larger mainline*).
- 2) Unless otherwise approved or required by the City Engineer, valves shall conform to the following table.

Required Valves by Size and Operating Conditions		
Valve Size	Static Pressure	Valve Style
10-inch and smaller	< 120 psi	Gate Valve
8-inch & 10-inch	≥ 120 psi	Butterfly Valve
12-inch & larger	All pressures	Butterfly Valve

- 3) Valve types and materials shall conform to the requirements of these Design Standards and the Standard Construction Specifications.

b. Valve Location

- 1) Distribution system valves shall be located at the tee or cross fitting as nearly as possible.
- 2) There shall be a sufficient number of valves so located that not more than four (4) and preferable three (3) valves must be operated to effect any one particular shutdown. The spacing of valves shall be such that the length of any one shutdown in high value areas shall not exceed 500 feet nor 800 feet in other areas.
- 3) A water mainline tee-intersection shall be valved on all three branches and a water mainline cross-intersection shall be valved on all four branches (*this requirement does not apply to fire hydrant tees or service connection tees*).
- 4) Hazardous crossings (*ie. creek, railroad, freeway crossings, etc.*) shall be valved on each side of the crossing.
- 5) Distribution branches on transmission mains shall be spaced not more than 800 feet apart where practical and shall be valved and plugged.
- 6) Transmission water mains shall have valves at spacings as required by the City Engineer.

c. Mainline Tapping Tee & Valve

- 1) A tapping tee & valve to make connection to an existing, in-service line is only allowed in cases where the City determines that water service cannot be interrupted to cut in a tee or cross, and where the additional in-line valve is not needed for system isolation as outlined above.

d. Water Valve Operation

- 1) City forces shall operate all valves, including fire hydrants, on existing public water mains, on the public side of water meters, or at the connection of fire service lines to public water mains.

5.17 FIRE HYDRANTS

a. Hydrant Coverage

- 1) Preferred coverage shall result in maximum hydrant spacing of 500 feet in residential areas, 300 feet in high-value districts including industrial subdivisions and no further than 250 feet from the furthest point of any dwelling, business, garage or building. Hydrant stubs with mainline valves will be required as a minimum in undeveloped areas.

b. Hydrant Location & Availability

- 1) No fire hydrant shall be installed on a main of less than 8-inch diameter unless it is in a looped system of 6-inch mains. The hydrant lead shall be a minimum of 6-inches in diameter.
- 2) Hydrants shall be placed in locations approved by the City Engineer and the Fire Chief.
- 3) In general, hydrants shall be located at corner of each public & private street intersection where possible (*unless otherwise approved by the City Engineer and the Fire Chief*). Hydrants located at points other than intersections shall be located at the extension of property lines (*offset as required only to avoid conflict with survey monuments per ORS 92.044.7*).
- 4) Unless otherwise approved by the City, hydrants shall be placed between the sidewalk and the property line.
- 5) No hydrant shall be installed within five (5) feet of an existing utility pole or guy wire nor shall a utility or guy wire be placed within five (5) feet of an existing hydrant.
- 6) Existing or new hydrant availability for a particular property will be determined by the City and Fire Chief based on both distance and accessibility (*see also OFC C103.1 & C104*).
 - a) Existing hydrants on City streets are generally considered as available to properties on both sides of the street.
 - b) For purposes of new development, hydrants on the opposite side of an ODOT highway right-of-way are generally NOT considered to be available, unless specific prior written approval is granted by ODOT (*ie. since the Fire Department may need to lay hose across the highway and restrict traffic during emergencies*).
 - c) Hydrants on the opposite side of railroad tracks are NOT considered to be available.

- d) Hydrants on or across adjacent properties are not considered available unless fire apparatus access roads (*fire lanes*) extend between properties, and easements are recorded to prevent obstruction of such roads (OFC C104.1).

c. Hydrant Valves

- 1) Each fire hydrant shall have a hydrant valve and valve box at the mainline hydrant tee which will permit removal and repair of the hydrant without shutting down the water main supplying the hydrant.
- 2) Hydrant valves shall be resilient wedge gate valves.
- 3) The hydrant valve shall be connected directly to the mainline tee using a flange joint.
- 4) If the length of the hydrant lead is greater than 30 feet, an additional gate valve shall be provided within 3 feet of the hydrant, but under no circumstances shall the valve be attached to the hydrant.

d. Hydrant Leads.

- 1) All hydrant leads shall be Class 52 ductile iron, 6" minimum diameter, with retainer glands at both ends.
- 2) Unless specifically approved in writing by Public Works for long hydrant leads, all hydrant leads shall consist of a single piece of pipe without joints. Any joints allowed on hydrant leads shall be provided with fully restrained gaskets (*Field-Lok or equivalent*).
- 3) Service taps on hydrant leads are prohibited.

e. Hydrant Bury & Exposure

- 1) Hydrant bury shall be sufficient to provide a minimum of 36-inches of cover over the hydrant lead. In no case shall the bury be less than the depth of the waterline from which the hydrant is served.
- 2) The hydrant shall be set such that the base of bottom flange bolts are a minimum of 2-inches and a maximum of 6-inches above finish grade following all landscaping and surface restoration.

f. Hydrant Operation & Use

- 1) No person other than Public Works staff shall operate or flow test fire hydrants without first obtaining written authorization from the Public Works Director. This hydrant use restriction shall not apply to fire department/fire district staff in the performance of their regular duties.

- 2) All hydrant flow tests shall be performed with Public Works staff present unless otherwise approved by the Public Works Director.
- 3) Opening or operating fire hydrants with any tool other than a standard hydrant wrench designed for that purpose is prohibited.

5.18 AIR RELEASE VALVES

a. General

- 1) Provisions for air relief shall be provided at all high points of waterlines. Where possible, location of service taps at high points in the line is preferable to the installation of an air relief valve.
- 2) Where service taps cannot be used, an air release valve shall be permanently installed at high points on all water mains at all location where air can accumulate. An automatic air release valve shall be installed in a meter box or vault outside of the street at a location where flooding of the manhole or chamber will not occur.

b. Air Release Valve Piping

- 1) The open end of an air release pipe from automatic valves shall extend to the top of the manhole at least twelve inches above grade and provided with a screened, downward facing tee vent. Grade shall mean the existing ground elevation adjoining the meter box or vault.

5.19 WATER SERVICE LINES

a. General

- 1) The use of pumps on a water service line (*between the mainline and the meter*) to provide adequate pressure to a subdivision lot or property located above the pressure level of the supply main shall be prohibited.

Booster pumps installed on private property shall require the installation of a backflow device meeting City and state standards.
- 2) Each legal lot of record shall be provided with a separate water service line connected to the public or approved private water main. Combined water service lines will be permitted only when the property cannot legally be further divided. An example of this is a residential lot with a house and detached garage or shop with plumbing fixtures.
- 3) Separate water services and separate meters shall be installed to serve each side of duplex lots, and each unit of triplex residential buildings unless otherwise approved by Public Works. Separate water services and separate

meters shall be installed to serve each unit of condominiums or to serve each unit of developments with separate detached dwelling units or single family lots with separate detached accessory dwelling units (*except where otherwise approved by City for RV parks – DMC 8.2.16.5*).

- a) Where water service lines beyond the meter are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot being served (*whichever is farther*) in conjunction with the development infrastructure construction. The end of the service line shall be marked with a 2x4 post wired to the pipe stub, extending 18” above grade, with the toning wire stapled to the top of the marker post.
- 4) Additional water service lines must be stubbed into the property lines sufficient to serve all residential parcels which can be further partitioned in the future where such future partition would require that the streets be cut to install such services, or where the service line must cross intervening property to provide such future service.
- 5) Where water service lines are connected to water mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the standard details and standard notes.
- 6) Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, water service lines shall be installed from the mainline to the property line perpendicular to the street centerline. Permanent installation of water service lines with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.
- 7) Private pressure reducing valves (PRV) may be required by Public Works in certain areas. The installation, maintenance and repairs of such devices shall be entirely the responsibility of the property owner.

b. **Water Service Sizes**

- 1) Standard service line sizes are 1-inch, 1½-inch, 2-inch, 3-inch, 4-inch, 6-inch and 8-inch (*4" service line required for 3" meters*). Service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

MINIMUM SERVICE SIZE	
Type of Service	Minimum Service Size
Single residential service ¹	1-inch
Triple residential service (triplexes only)	1½-inch
Commercial Service ²	1½" minimum
Notes: ¹ . The next larger service size may be required for residential lots large enough to be partitioned into additional lots without a water main extension. ² . Commercial service pipe smaller than 1½" require prior approval by the City Engineer & Public Works Director (<i>with approval from Public Works, reducers can be installed at meter location as applicable if smaller meters are desired, and where maximum demand flows are demonstrated to be within operating limits of the smaller meter</i>).	

- 2) The water service line on the private side of the meter may not be larger than one nominal pipe size larger than the service line size.
- 3) Commercial services shall not be smaller than 1½-inch (*reducers may be installed at the meter location to accommodate a smaller meter*). For new streets or streets being cut for service installation, far side commercial services shall be installed in a 4-inch minimum size PVC sleeve.
- 4) Service piping shall be equal to or greater than the meter size.
- 5) For 1½-inch and larger meters, calculations, documentation and drawings as applicable must be submitted with the expected flow requirements and proposed usage.

c. **Tapping requirements**

- 1) Tapping requirements for water service lines shall be as outlined below.

WATER SERVICE TAPPING REQUIREMENTS		
Service Size	Mainline Type	Tapping Requirements
1"	All pipe types	Service Saddle
1½"	All pipe types	Service Saddle
2" & larger	All pipe types	Mainline tee (<i>or tapping saddle</i>) with

	flanged valve
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d. **Water Service Location**

1) **Domestic & Irrigation Services**

- a) The service lines shall extend from the main to the meter location shown on the standard details. An angle meter stop and meter box shall be located at the termination of the service line.
- b) The meter stop shall be located such that the front of the meter box is the distance behind the curb or sidewalk as shown on the standard details.
- c) In general, individual service connections shall terminate in front of the property to be served. Double services shall be located on each side of a common side property line.
- d) Domestic or irrigation service lines shall not be connected to fire protection services, including hydrant leads.

2) **Fire Service**

- a) A backflow prevention assembly (*with detector loop & detector meter*) shall be placed on fire service lines as required by the City. See PWDS 5.7 for ownership and responsibility for fire protection service from mainline connection to building.
- b) Plans for fire service lines shall meet the requirements outlined in PWDS Division 1, and shall be stamped by a licensed Civil Engineer. The portion of the fire service within the right-of-way shall conform with PWDS 5.8.f.9 (*ie. Cl 52 DI pipe*), and the remainder (*on private property*) shall conform with the Oregon Fire Code and referenced standards, and shall be acceptable to the Fire Chief.
- c) Drawings for fire services shall include vicinity map, adjoining street name, width, curb and property line, location of existing water line referenced to the property line, existing hydrant locations and the distance to property pins where the service crosses the property line (*offset as required to avoid conflict with survey monuments per ORS 92.044.7*).
- d) Service taps on fire service lines are prohibited.

5.20 WATER METERS

a. General

- 1) Except as otherwise required, all water meters within the service area of the City of Dayton will be furnished and installed by City forces at the request and expense of the customer. The service line, meter box and all piping & fittings within the meter box must be installed by the developer.
- 2) All meters 1½-inches and larger shall be installed by a contractor retained by the developer, under the on-site inspection and subject to the approval of Public Works.
- 3) All meters 3-inch and larger shall be calibration tested after installation and prior to being placed in service. Testing shall be done by a qualified and trained water meter tester at the developer's expense. All test results shall be submitted to Public Works for review and approval.
- 4) A backflow preventer shall be provided if required by Public Works.

5) Meter Sizing.

- a) Fixture unit equivalents and demand curves (*used in determining the size of larger water meters*) shall be established in accordance with the Oregon Plumbing Specialty Code. The size of water meter required shall be based on standards determined by the Public Works Director (*based on fixture units or demand flow as directed*), and will be based on use of the City's standard compound water meter for maximum accuracy. City meter sizing criteria will include factors to minimize excessive velocities in the water system, including velocities through meters and water service lines (*in order to reduce the risk of water hammer induced pipe breakages on the public and/or private side of the meter, and to maximize the useful lifespan of the water meters installed*). Unless otherwise determined by the Public Works Director, default meter sizing (*and associated SDC charges*) will be based on the "High-Normal Flow Rate" (*for Compound Class II meters*) in Table 6-1 of AWWA M22 3rd Edition (*Sizing Water Service Lines and Meters*) published by the American Water Works Association (*AWWA*).
- b) Turbine style water meters will only be allowed where approved by the Public Works Director on a case-by-case basis (*at his sole discretion*), where projected flow patterns support the use of a turbine meter. In cases where the Public Works Director allows the use of a turbine meter in place of a standard compound meter, any reduction in meter size (*due to the use of such turbine meter*) will not result in a reduction of applicable SDC fees. If turbine meters are allowed, and

changes in future flow patterns result in reduced meter accuracy, the Public Works Director may require that the turbine meter be changed to a standard compound meter, at the customer's expense.

b. **Water Meter Location**

1) **General**

- a) Meters shall be located at the termination of the City service line. Unless otherwise approved by the Public Works Director, meters shall be located within or immediately adjacent to the right-of-way or easement containing the water mainline.
- b) Unless otherwise approved by the Public Works Director on a case-by-case basis, meter boxes shall be located outside of driveways or other areas subject to vehicular traffic. Approval by the City for meters and meters boxes set in driveways or areas subject to vehicular traffic shall be contingent upon the Developer, builder or property owner providing a traffic rated meter box, including installation of a concrete collar around the box per City standards in traffic or gravel areas (*concrete is required both to provide lateral support for the meter box and the prevent gravel from covering the box lid*). After initial installation, the property owner shall be responsible to protect the meter box and meter from damage. Damaged meter boxes (*or concrete collars where required*) shall be repaired and/or replaced as directed by the City, at the property owner's expense.
- c) Water meters shall be located outside of buildings being served (*including meters on fire service detector loops*), at a location approved by the Public Works Director.
- d) **Easement around Meter Box/Vault.** A public utility and access easement to the City shall be provided to and around any meter boxes or meter vaults set on private property. The easement shall be sized to provide a minimum of five (5) foot clear around the meter box or vault on all sides.

2) **3/4-inch through 2-inch Meters**

- a) In the right-of-way in a location that allows for easy reading and maintenance, at the location specified herein or shown on the standard details.

3) **3 Inch and Larger Meter:**

- a) On private property adjacent to the public right-of-way to allow reading and maintenance. It must be accessible with a crane truck to within ten feet of the installation with a ten foot vertical clearance.

- b) The meter, vault and piping are to be protected from freezing, vandals and vehicles. The area around the vault must be sloped in such a manner to prevent storm water from ponding over or running into the vault.
 - c) A minimum three foot clear space must be provided around the vault to provide ample working space for maintenance.
 - d) All 3-inch and larger meters shall be provided with a remote readout head approved by Public Works which is located such that it can be read without entering the meter vault.
 - e) A sump pump shall be installed and maintained in the meter vault (*of all meters larger than 2-inch*) by the property owner, discharging to a storm drain or other location approved by Public Works. Owner of the property being served shall be responsible for all permits & installation costs associated with providing, installing and connecting conduit(s) and power to the meter vault for the sump pump and/or freeze protection, and for the ongoing power costs.
 - (1) Where conduit(s) connect to building basements, and where conduits are installed flat or slope toward the building, the conduits shall be swept up to an above grade junction box mounted on the exterior wall of the building, to avoid the potential for groundwater drainage into the basement if the buried conduit is cracked or broken in the future.
 - f) The configuration of the lockable bypass shall be acceptable to Public Works.
- 4) The meter, with approval by the City, may be located in the same vault with a backflow prevention device, provided a completed dimensioned design is submitted with a request for variance.

c. **Meter Boxes**

- 1) Meter boxes shall be provided by the Developer for each water service and meter location. Double set meters (*2 meters in 1 box*) are not allowed.
- 2) Meter boxes for water meters 2" & smaller shall be set level to finish grade (*vaults for larger meters shall be set to grades as shown by City standard details*). The Developer, builder or property owner shall be responsible for setting meter boxes and services to finish grade prior to initial installation and approval of water meters by the City.
- 3) Meter boxes that do not provide all required clearances and spacing so as to allow the City to install a standard meter without removing the box, will be required to be reset or replaced by the developer or builder (*at their sole expense*), prior to installation of the meter by the City.

5.21 PRIVATE WATER SYSTEMS

- a. General design considerations for private water systems shall conform to requirements set forth by the OHA-DWS, by the Oregon Plumbing Specialty Code (*Chapter 10*), and these Design Standards.
- b. All public water mains within private developments shall be in public right-of-way or exclusive easements to the City of Dayton and shall conform to these design standards. Each connection of the private water system to the City system shall be through an approved backflow prevention assembly and meter.
- c. Requirements for capacity, materials, looping, valves, fire protection, service lines and meters shall also be applicable to design within PUD areas.
- d. The resale of water without written approval of the City shall be prohibited. Written authorization from the City shall be required for each service connection and for any sale of water.

5.22 BACKFLOW PREVENTION

a. General

- 1) All backflow assemblies shall be testable and include provisions for testing by a certified backflow testing person or organization.
- 2) An approved backflow prevention assembly with an approved metering system shall be required for each use in the following instances:
 - a) As determined by the City Cross Connection Specialist and OHA-DWS requirements.
 - b) When a private line must be extended from or looped between two (2) or more City mains in order to obtain the required flow and the resultant loop is no benefit to the City grid system.
 - c) On all fire services, which shall also include a detector loop & detector meter configuration as approved by Public Works.
 - d) On all private water lines or private distribution system attached to the City's distribution system, with or without a master meter.
 - e) When an auxiliary water supply exists on the property being served, including but not limited to a domestic or irrigation well, or an irrigation system supplied from a surface water source (*see OAR 333-061 Table 42*).
- 3) An approved reduced pressure backflow prevention assembly with an approved metering system shall be required for service connections in high hazard areas as

determined by the City Engineer and Public Works Director.

- 4) The backflow assemblies must meet the City approved assembly standards, which standards are taken from the current approved list of assemblies maintained by the OHA-DWS.
- 5) RP backflow devices shall be provided with drains per OHA-DWS standards. Unless installed indoors or in weather proof above grade enclosures, all backflow assemblies shall be installed in a box or vault approved by Public Works. Sump pumps per standard details shall be provided for all double check assemblies installed in vaults (3" & larger size). Owner of the property being served shall be responsible for all permits & installation costs associated with providing, installing and connecting conduit(s) and power for required sump pumps and/or freeze protection, and for the ongoing power costs. ~~RP backflow devices installed below grade shall be provided with drains per OHA-DWS standards.~~ Conduits required for connecting OS&Y valve tamper switches to fire alarm control unit shall also be the responsibility of the owner of the property being served.

- a) Where conduits connect to building basements, and where conduits are installed flat or slope toward the building, the conduits shall be swept up to an above grade junction box mounted on the exterior wall of the building, to avoid the potential for groundwater drainage into the basement if the buried conduit is cracked or broken in the future.

b. Backflow Location

- 1) The approved backflow prevention assembly shall be installed on the property being served in place accessible for City inspector and testing and located as follows:
 - a) Before any branch, immediately downstream of the meter; or
 - b) If not metered, at the property line; or
 - c) If in the building, before the first branch or hazard being controlled or as determined by the City Cross Connection Specialist.
- 2) If installed outside the building being served, it shall be placed at or adjacent to the property line or easement line in a vault or structure in accordance with the manufacturer's recommendations and as approved by the Public Works Director. Vaults must have a sump and be watertight.
 - a) Easement around Box/Vault. A public utility and access easement to the City shall be provided to and around any backflow assembly set on private property (*ie. when installed outside of the building being served*). The easement shall be sized to provide a minimum of five (5) foot clear around the box or vault on all sides.

c. Backflow Thermal Expansion Issues.

- 1) As noted under OAR 333-061-0070(2.b), “‘Thermal Expansion’ means the pressure increase due to a rise in water temperature that occurs in water piping systems when such systems become "closed" by the installation of a backflow prevention assembly or other means, and will not allow for expansion beyond that point of installation.”
- 2) It is the responsibility of the property owner and/or water user to provide a thermal expansion tank or other means approved by the Oregon Plumbing Specialty Code to address thermal expansion concerns in the private water system piping downstream of any backflow device or pressure regulator where applicable (*see OPSC 608.2&3 for expansion tank requirements*).
- 3) This section shall be considered to be written notice to the premise owner and water user of these thermal expansion concerns, and notice of the responsibility of the premise owner and/or water user to address these concerns (*see OAR 333-061-0070(9.b.A.iii)*).

d. Fire Department Connections (FDC)

- 1) The distance from a fire hydrant to the fire department connection (FDC) shall not exceed 40 feet unless otherwise approved in writing by the Fire Chief, but in no case shall a distance of greater than 60 feet be allowed.
- 2) FDCs connections/risers and FDC supply lines shall be installed in conformance with provisions of the Oregon Fire Code and applicable NFPA standards (*including but not limited to installation of accessible ball drip valves, cover depths for freeze protection, etc.*), with specific location and configuration subject to approval by the Fire Chief.

5.23 UNDERGROUND WARNING TAPE & TRACER WIRE

- a. Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along all mainlines not located under sidewalks or paved portions of public streets.
- b. Underground warning tape shall be placed a minimum of 12-inches and a maximum of 18-inches below the finish ground surface, and shall be continuous the entire length of the mainline as specified.
- c. All water pipe (*both public lines and private lines within right-of-way or easements*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with blue sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe, with each end extended to within 12-inches of the surface through a valve box or meter box.

5.24 MAINLINE BORED CROSSINGS

- a. Casing size shall be adequate to permit proper construction of the carrier pipe to the required lines and grades. Carrier pipe used in bore casings shall be as specified herein.
- b. All bore crossings shall be provided with casing spacers and end seals. Casing spacer configuration shall conform to the manufacturer's recommendations, but in no case shall less than 3 spacers per length of pipe be used.
- c. In order to prevent over-belling of PVC or other flexible pipe while installing it through the casing, provide a method for restricting movement between the assembled bell and spigot conforming with the manufacturer's recommendations.
- d. The design of the bore crossing shall include the following as a minimum:
 - 1) Casing and carrier pipe materials and dimensions, including outside bell diameters of the carrier pipe.
 - 2) Details for any part of the system which must be changed as a result of the boring operation (*manhole, headwall, etc.*).
 - 3) Bore and receiving pit backfill material and compaction requirements.

CITY OF DAYTON
Public Works Design Standards

Standard Detail Drawings & Sample Test Report Forms

Appendix A

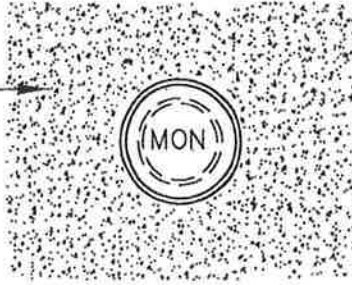
Note:

1) Per PWDS 1.10.b.9, the applicable City standard details shall be included on construction drawings submitted for City review and approval. See also PWDS 1.3.b for detail sheet stamping requirements where engineered drawings are required.

2) Per PWDS 1.2.b, the standard details are intended to assist but not to substitute for competent work by design professionals where applicable. As noted in the PWDS, the standard details illustrate the minimum requirements and materials required by the Public Works Department for the construction of certain standard system components, and are thus not considered to be final documents until incorporated into a design approved by the City,

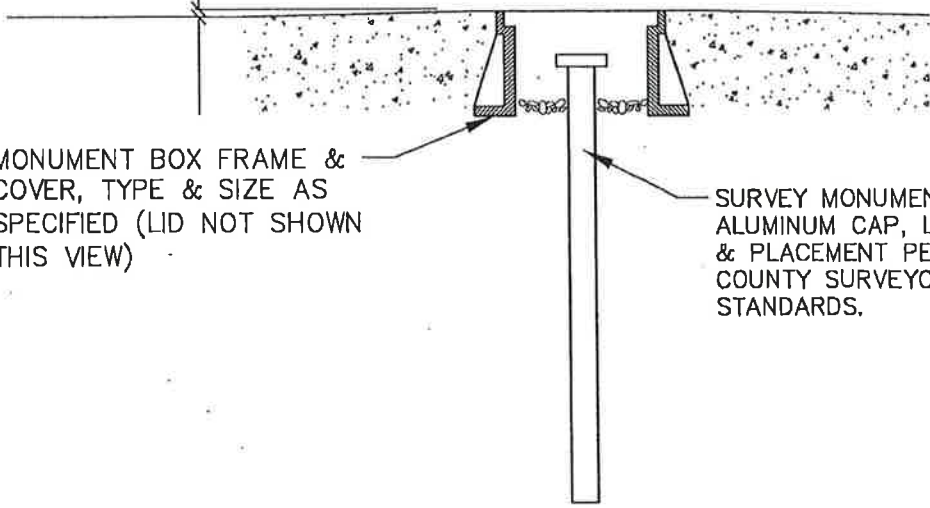
NOTE: PER ORS 92.044(7), "UTILITY INFRASTRUCTURE (INCLUDING PIPELINES) MAY NOT BE PLACED WITHIN ONE FOOT OF A SURVEY MONUMENT LOCATION NOTED ON A SUBDIVISION OR PARTITION PLAT."

SLOPE PAVEMENT AWAY FROM MONUMENT BOX EACH WAY WHERE POSSIBLE WITHOUT AFFECTING STREET PAVEMENT GRADES.



MONUMENT BOX FRAME & COVER, TYPE & SIZE AS SPECIFIED (LID NOT SHOWN THIS VIEW)

SURVEY MONUMENT WITH ALUMINUM CAP, LENGTH & PLACEMENT PER COUNTY SURVEYOR STANDARDS.

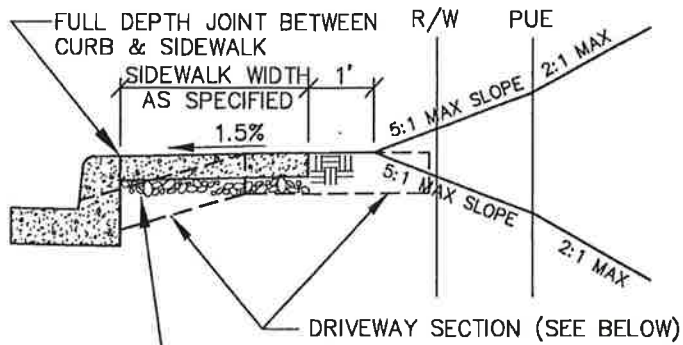


NOTES:

1. VERIFY MONUMENT BOX SIZE WITH COUNTY SURVEYOR PRIOR TO PLACEMENT. UNLESS OTHERWISE REQUIRED BY THE COUNTY SURVEYOR (BASED ON TYPE OF SURVEY MONUMENT), PROVIDE THE FOLLOWING.
 - a) USE 8" DIAMETER (MINIMUM) MONUMENT BOX FOR POSTED SPEEDS LESS THAN 35 MPH. (EJ 3614Z BOX W/3614A LID).
 - b) USE 12" DIAMETER MONUMENT BOX FOR POSTED SPEEDS EQUAL TO OR GREATER THAN 35 MPH. (EJ 3673Z BOX W/3673A LID).
2. FOR REPAVING PROJECTS, PROVIDE OVERLAY RISER RINGS FROM SAME MANUFACTURER, HEIGHT AS REQUIRED TO ACCOMODATE OVERLAY THICKNESS.

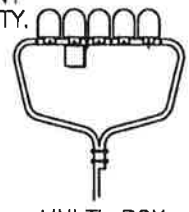
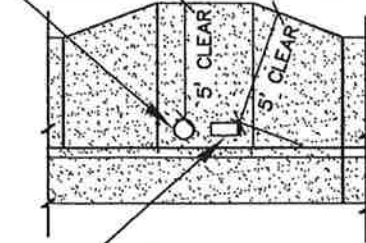
LAST REVISION DATE: OCT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
SURVEY MONUMENT BOX (IN STREETS OR PUBLIC SIDEWALKS) (NTS)	
DAYTON, OR	DETAIL NO. 115

TOOLED CONTRACTION JOINTS TYPICAL AT 5' INTERVALS (**BROOM FINISH, NO SLICKS**)



TYP. CROSS SECTION

UTILITY POLE OR FIRE HYDRANT WHERE PRE-APPROVED BY CITY.



MULTI-BOX



SINGLE-BOX

NON-CBU MAILBOXES (PRE-EXISTING MAILBOXES ONLY W/POST OFFICE APPROVAL, ON GALV. POSTS)

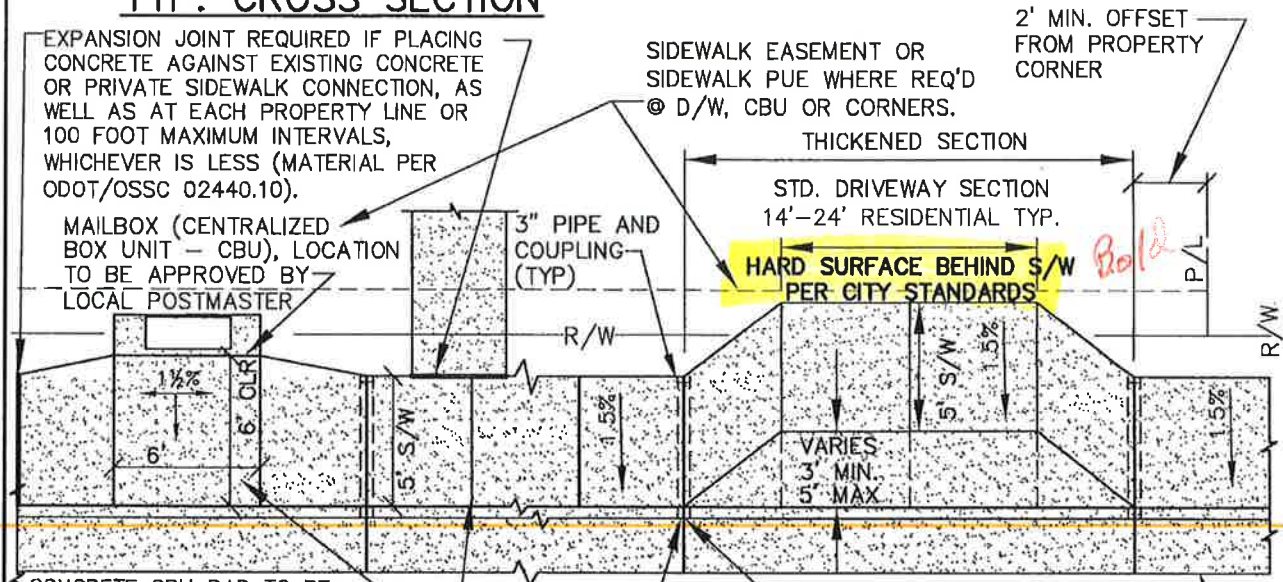
S/W AT OBSTRUCTION

EXPANSION JOINT REQUIRED IF PLACING CONCRETE AGAINST EXISTING CONCRETE OR PRIVATE SIDEWALK CONNECTION, AS WELL AS AT EACH PROPERTY LINE OR 100 FOOT MAXIMUM INTERVALS, WHICHEVER IS LESS (MATERIAL PER ODOT/OSSC 02440.10).

MAILBOX (CENTRALIZED BOX UNIT - CBU), LOCATION TO BE APPROVED BY LOCAL POSTMASTER

SIDEWALK EASEMENT OR SIDEWALK PUE WHERE REQ'D @ D/W, CBU OR CORNERS.

2' MIN. OFFSET FROM PROPERTY CORNER



CONCRETE CBU PAD TO BE MONOLITHIC WITH SIDEWALK, 6' WIDE & 8" THICK OR AS REQUIRED PER USPS REGULATIONS. SEE NOTE 8. **FOR GUTTER SLOPES STEEPER THAN 2%, USE DETAIL 214C FOR CBU.**

WEEP HOLES TYPICAL @:
 -BOTH SIDES OF D/W
 -2 PER LOT MINIMUM
 -LOW POINTS IN CURB

TYP. PLAN VIEW

NOTES:

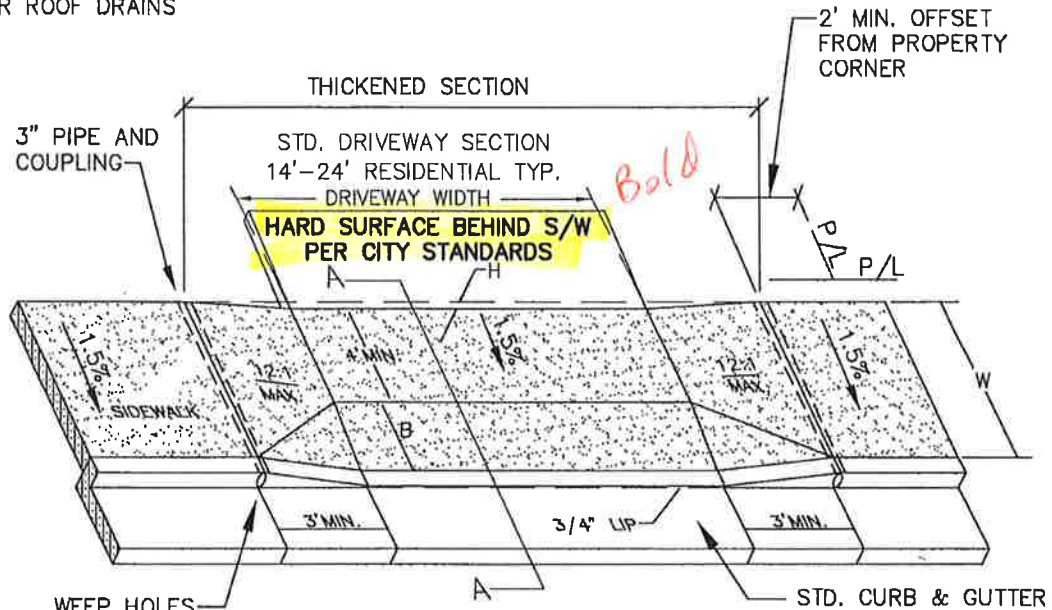
1. MONOLITHIC PLACEMENT OF CONCRETE FOR STREET CURB & PARALLEL PUBLIC SIDEWALK IS PROHIBITED.
2. CONCRETE THICKNESS. STANDARD SIDEWALKS SHALL BE 4" MIN. THICK. SIDEWALKS THROUGH RESIDENTIAL DRIVEWAYS (INCLUDING WINGS) SHALL BE 6" MIN. THICK. COMMERCIAL DRIVEWAYS & ALLEY APPROACHES SHALL BE 8" MIN. THICK.
3. SIDEWALKS 8' & WIDER SHALL HAVE A LONGITUDINAL CONTRACTION JOINT AT MIDPOINT.
4. CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
5. PCC APRONS JOINTED TO MATCH SIDEWALK PATTERN.
6. SIDEWALKS SHALL BE LOCATED ENTIRELY WITHIN PUBLIC RIGHT-OF-WAY OR SIDEWALK EASEMENTS, INCLUDING AT DRIVEWAYS & INTERSECTIONS.
7. ADA ACCESS TO CBU MAILBOXES SHALL CONFORM WITH SECTION 1111 OF OSSC (OREGON STRUCTURAL SPECIALTY CODE), INCLUDING AN ADA PEDESTRIAN CURB RAMP LOCATED WITHIN 50 FEET OF THE CBU. PROWAG REQUIRED 6'x6' TURNING SPACE IN FRONT OF CBU SHALL NOT EXCEED 2% IN ANY DIRECTION. **CBU LAYOUT ABOVE ASSUMES STREET & CURB GRADE DOES NOT EXCEED 2%.**

LAST REVISION DATE: NOV 2019	COPYRIGHT 1998 WESTECH ENGINEERING, INC.
CURBLINE SIDEWALKS AND DRIVEWAY APRONS	
(NTS)	
DAYTON, OR	DETAIL NO. 212

SEE DETAIL 212 FOR STANDARD MAILBOX LOCATION & MOUNTING DETAILS & INFORMATION.

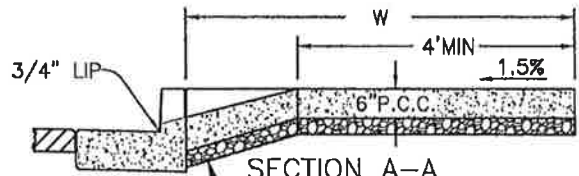
TOOLED CONTRACTION JOINTS TYPICAL AT 5' INTERVALS (BROOM FINISH, NO SLICKS)

NOTE:
CONTRACTION JOINT REQUIRED AT BOTH SIDES OF DRIVEWAY AND OVER ROOF DRAINS



WEEP HOLES TYPICAL @:
-BOTH SIDES OF D/W

W	B	H	
5'	1'	0.27'	(3-1/4")
6'	2'	0.23'	(2-3/4")
7'	3'	0.19'	(2-1/4")



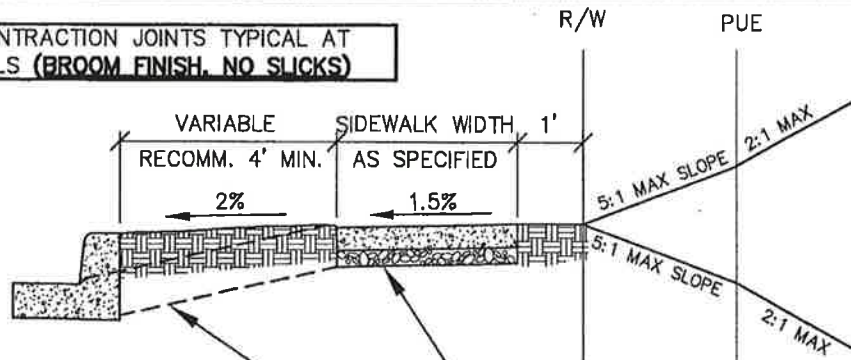
MIN. 4" OF 3/4"-0" COMPACTED GRANULAR BASEROCK (TYPICAL UNDER ALL SIDEWALKS AND DRIVEWAYS)

NOTES:

- SEE DETAIL 212 FOR STANDARD APRON & SIDEWALK DETAILS. USE OF THIS DETAIL REQUIRES SPECIFIC APPROVAL BY PUBLIC WORKS PRIOR TO FORMING.
- CONCRETE THICKNESS.** CONCRETE DEPTH FOR STANDARD SIDEWALKS SHALL BE 4" MIN. SF & DUPLEX RESIDENTIAL DRIVEWAY SECTIONS INCLUDING SIDEWALKS THROUGH DRIVEWAYS SHALL BE 6" MIN. THICKNESS.
- MONOLITHIC PLACEMENT OF CONCRETE FOR STREET CURB & PARALLEL PUBLIC SIDEWALK IS PROHIBITED.
- CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
- PCC APRONS SHALL BE JOINTED TO MATCH SIDEWALK PATTERN.
- PUBLIC SIDEWALKS SHALL BE LOCATED ENTIRELY WITHIN RIGHT-OF-WAY OR SIDEWALK EASEMENTS, INCLUDING SIDEWALKS THROUGH DRIVEWAY APRONS & AT CORNERS.
- CROSS SLOPE IS MEASURED FROM HORIZONTAL.
- RUNNING SLOPE OF SIDEWALK APPROACH TO LANDINGS SHALL TYPICALLY NOT EXCEED 1V:12H (8.33%), BUT SHALL NOT REQUIRE THE LENGTH TO EXCEED 15 FEET.

LAST REVISION DATE: NOV 2019	
RESIDENTIAL DW APRON CURBLINE SIDEWALK UPHILL LOTS ONLY	
(NTS)	
DAYTON, OR	DETAIL NO. 212A

TOOLED CONTRACTION JOINTS TYPICAL AT 5' INTERVALS (BROOM FINISH, NO SLICKS)



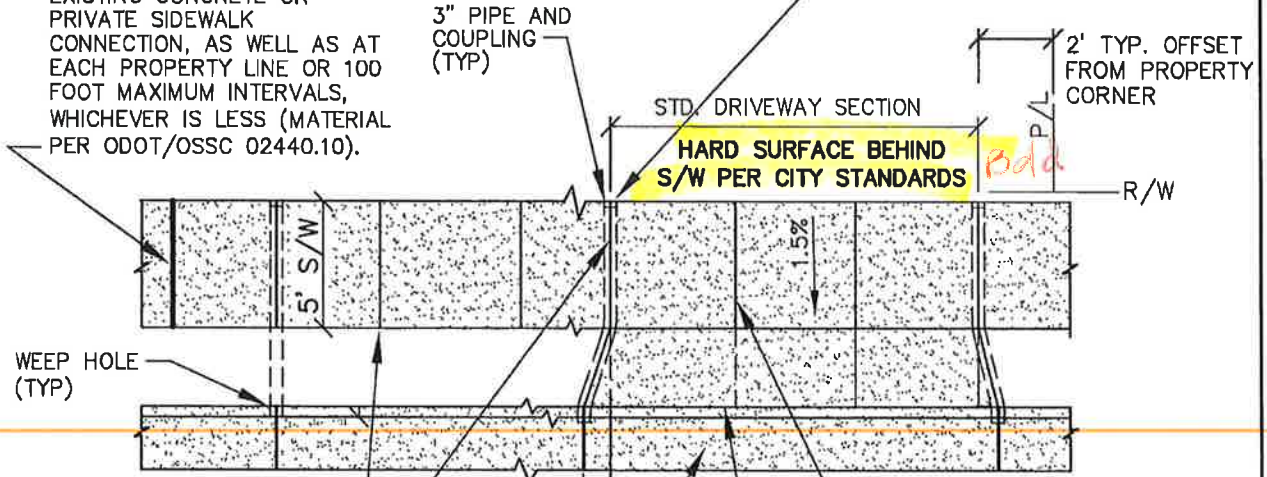
NOTE:
CONTRACTION JOINT REQUIRED AT BOTH SIDES OF DRIVEWAY AND OVER ROOF DRAINS

MIN. 4" OF 3/4"-0" COMPACTED GRANULAR BASEROCK (TYPICAL UNDER ALL SIDEWALKS AND DRIVEWAYS)

TYP. CROSS SECTION

EXPANSION JOINT REQUIRED IF PLACING CONCRETE AGAINST EXISTING CONCRETE OR PRIVATE SIDEWALK CONNECTION, AS WELL AS AT EACH PROPERTY LINE OR 100 FOOT MAXIMUM INTERVALS, WHICHEVER IS LESS (MATERIAL PER ODOT/OSSC 02440.10).

WEEP HOLES TYPICAL @:
-BOTH SIDES OF D/W
-2 PER LOT MINIMUM
-LOW POINTS IN CURB
-LOW END OF LOT FRONTAGE



TOOLED CONTRACTION JOINTS, SEE NOTE ABOVE

STD. CURB & GUTTER

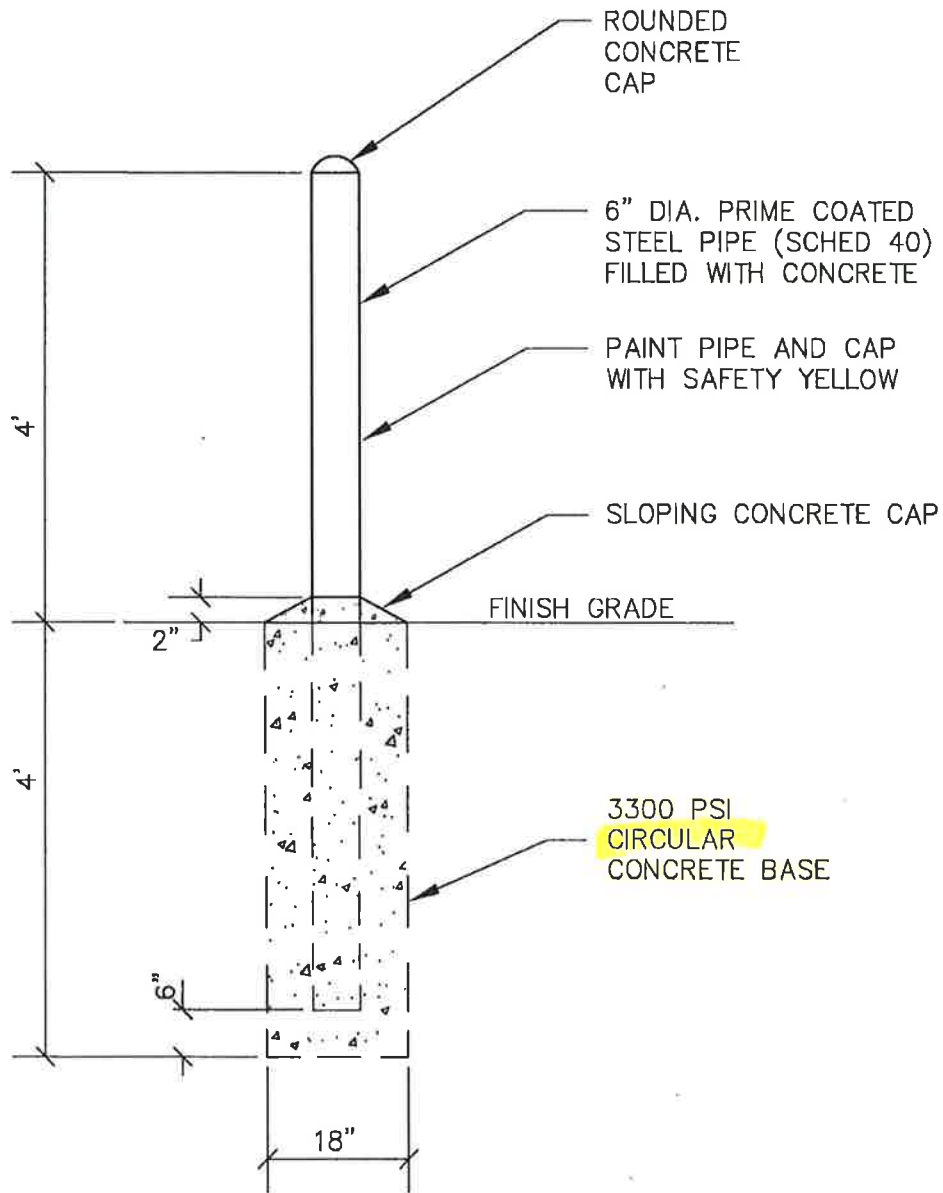
TYP. PLAN VIEW

PLACE BOND BREAKER BETWEEN CURB AND DRIVEWAY (TYP).

NOTES:

1. MONOLITHIC PLACEMENT OF CONCRETE FOR STREET CURB & PARALLEL PUBLIC SIDEWALK IS PROHIBITED.
2. CONCRETE THICKNESS, STANDARD SIDEWALKS SHALL BE 4" MIN. THICK. SIDEWALKS THROUGH RESIDENTIAL DRIVEWAYS (INCLUDING WINGS) SHALL BE 6" MIN. THICK. COMMERCIAL DRIVEWAYS & ALLEY APPROACHES SHALL BE 8" MIN. THICK.
3. SIDEWALKS 10' & WIDER SHALL HAVE A LONGITUDINAL CONTRACTION JOINT 5' MAX. ON CENTER.
4. JOINT PCC APRONS TO MATCH SIDEWALK PATTERN.
5. CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
6. CBU MAILBOXES ON PROPERTY LINE SIDEWALKS SHALL MEET PROWAG STANDARDS, INCLUDING TURNING SPACE/ LANDING FRONTING CBU (6'x6' MIN, 1½% SLOPE), LANDING APPROACH WIDTHS/SLOPES/LENGTHS, AND CONCRETE THICKNESS AS SHOWN ON DETAILS 212 & 214C, AND PEDESTRIAN CURB RAMP LOCATED WITHIN 50 FEET OF THE CBU.

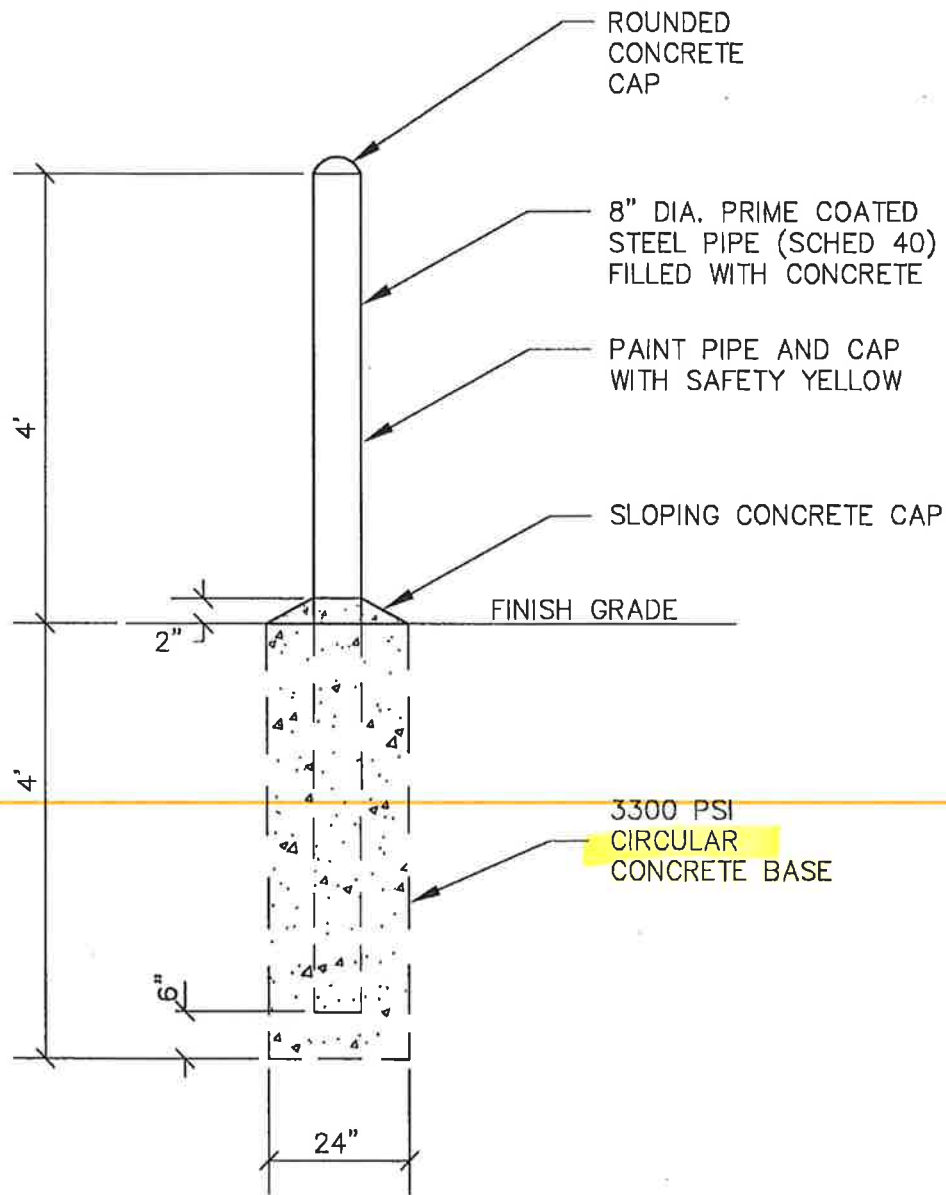
LAST REVISION DATE: NOV 2019	COPYRIGHT 1998 WESTECH ENGINEERING, INC.
PROPERTY LINE SIDEWALKS AND DRIVEWAY APRONS	
(NTS)	
DAYTON, OR	DETAIL NO. 213



NOTES:

1. IF BOLLARDS ARE PLACED IN AC PAVEMENT OR CONCRETE AREAS, HOLES FOR THE CONCRETE ANCHOR BASE SHALL BE CORE DRILLED TO DIMENSIONS SHOWN.

LAST REVISION DATE: OCT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
6-INCH BOLLARD (GUARD POST)	
(NTS)	
DAYTON, OR	DETAIL NO. 226



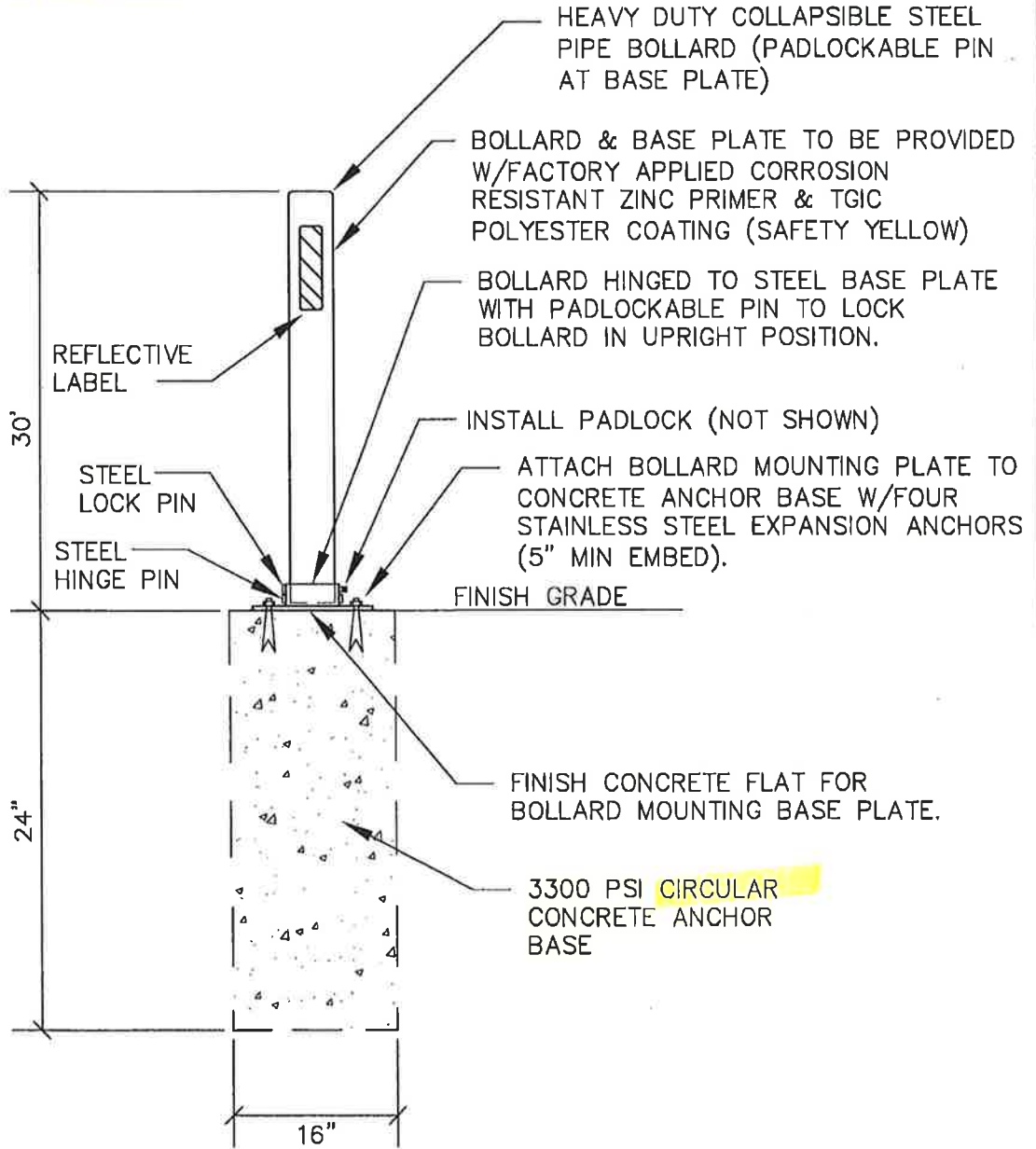
NOTES:

1. IF BOLLARDS ARE PLACED IN AC PAVEMENT OR CONCRETE AREAS, HOLES FOR THE CONCRETE ANCHOR BASE SHALL BE CORE DRILLED TO DIMENSIONS SHOWN.
2. 8" BOLLARD TYPICALLY ONLY REQUIRED FOR LARGE COMMERCIAL/INDUSTRIAL TRUCK TRAFFIC.

LAST REVISION DATE: OCT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
8-INCH BOLLARD (GUARD POST)	
(NTS)	
DAYTON, OR	DETAIL NO. 227

NOTE:

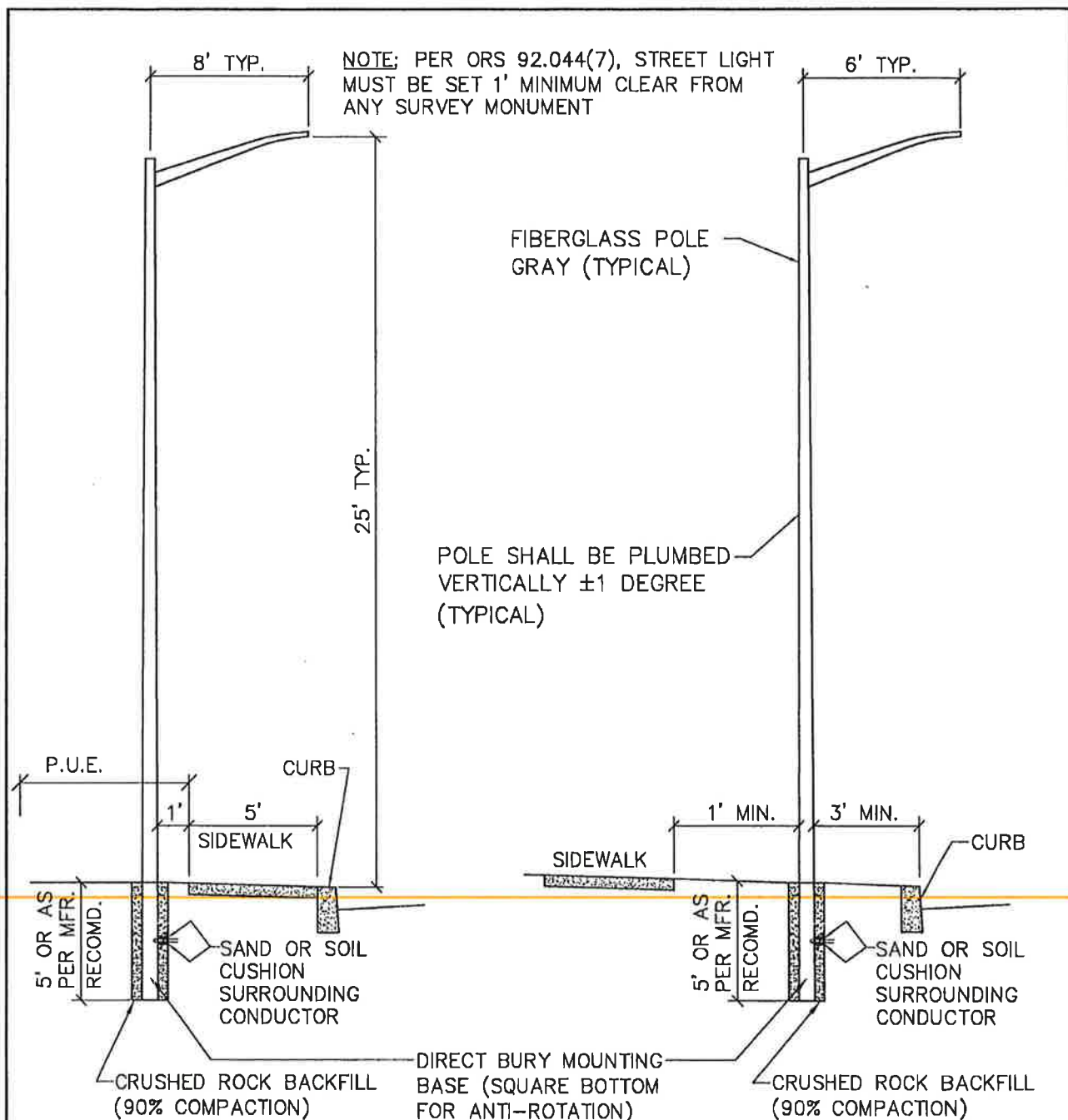
1. IF BOLLARDS ARE PLACED IN AC PAVEMENT OR CONCRETE AREAS, HOLES FOR THE CONCRETE ANCHOR BASE SHALL BE CORE DRILLED TO DIMENSIONS SHOWN.



NOTES:

1. BOLLARD BASE MOUNTING PLATE AND BOLLARD SHALL BE 4-INCH MAXIMUM HEIGHT WHEN IN COLLAPSED/DOWN POSITION.
2. UNLESS OTHERWISE SPECIFIED, PROVIDE WEATHER RESISTANT PADLOCK KEYED TO SPECIFIED PATTERN.
3. COLLAPSIBLE BOLLARD ASSEMBLY SHALL BE TRAFFICGUARD MODEL LPHDHB OR APPROVED EQUAL.
4. VERIFY BOLLARD HINGE LOCATION (IE. COLLAPSE DIRECTION) WITH OWNER PRIOR TO INSTALLATION.

LAST REVISION DATE:	
OCT 2019	
30" TALL COLLAPSIBLE PADLOCKABLE BOLLARD	
(NTS)	
DAYTON, OR	DETAIL NO. 228



TYPICAL LAMP POST
CROSS SECTION TYPE ONE

TYPICAL LAMP POST
CROSS SECTION TYPE TWO

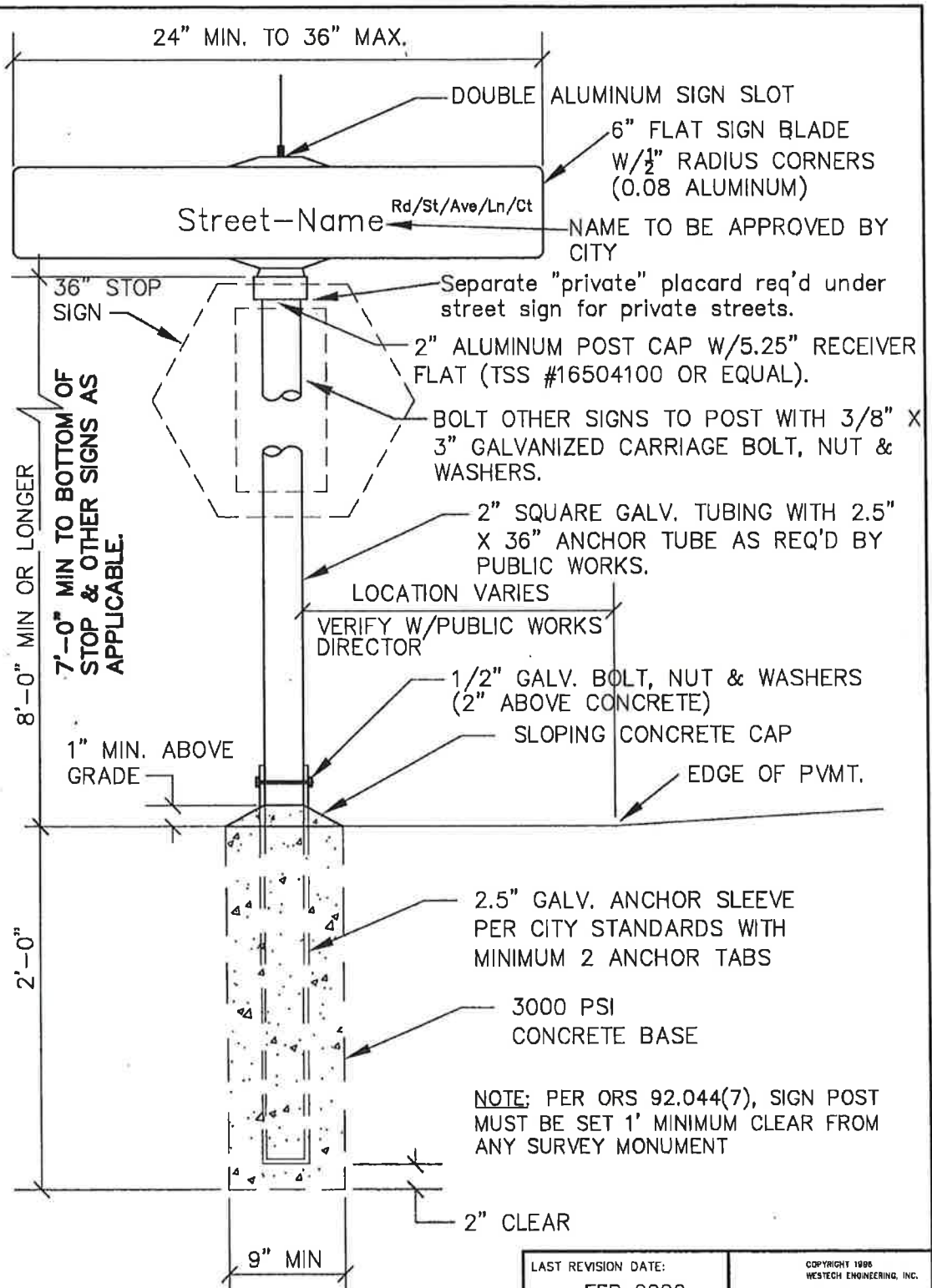
NOTES:

1. CONTRACTOR TO COORDINATE W/LOCAL POWER COMPANY FOR MATERIALS AND WORKMANSHIP REQUIREMENTS.
2. UNLESS OTHERWISE SHOWN ON DRAWINGS OR REQUIRED BY CITY, PROVIDE CITY APPROVED COBRAHEAD LED FIXTURE EQUIVALENT TO 100 WATT HPS (45 WATT LED LEOTECH 3K GRAY COBRAHEAD).
3. PUBLIC STREET LIGHTS TO BE INSTALLED UNDER PGE TARIFF OPTION A (OWNED & MAINTAINED BY PGE).

LAST REVISION DATE: OCT 2019	
TYPICAL STREET LAMP POST	
(NTS)	
DAYTON, OR	DETAIL NO. 230

SIGN TEXT STANDARDS: PROVIDE SIGN TEXT AS FOLLOWS:

- 4" HIGH CHARACTERS FOR UPPER CASE,
- 3" HIGH CHARACTERS FOR LOWER CASE,
- 3" HIGH 1ST LETTER FOR TITLE (Rd/St/Ave/Ln/Ct/Blvd/etc).



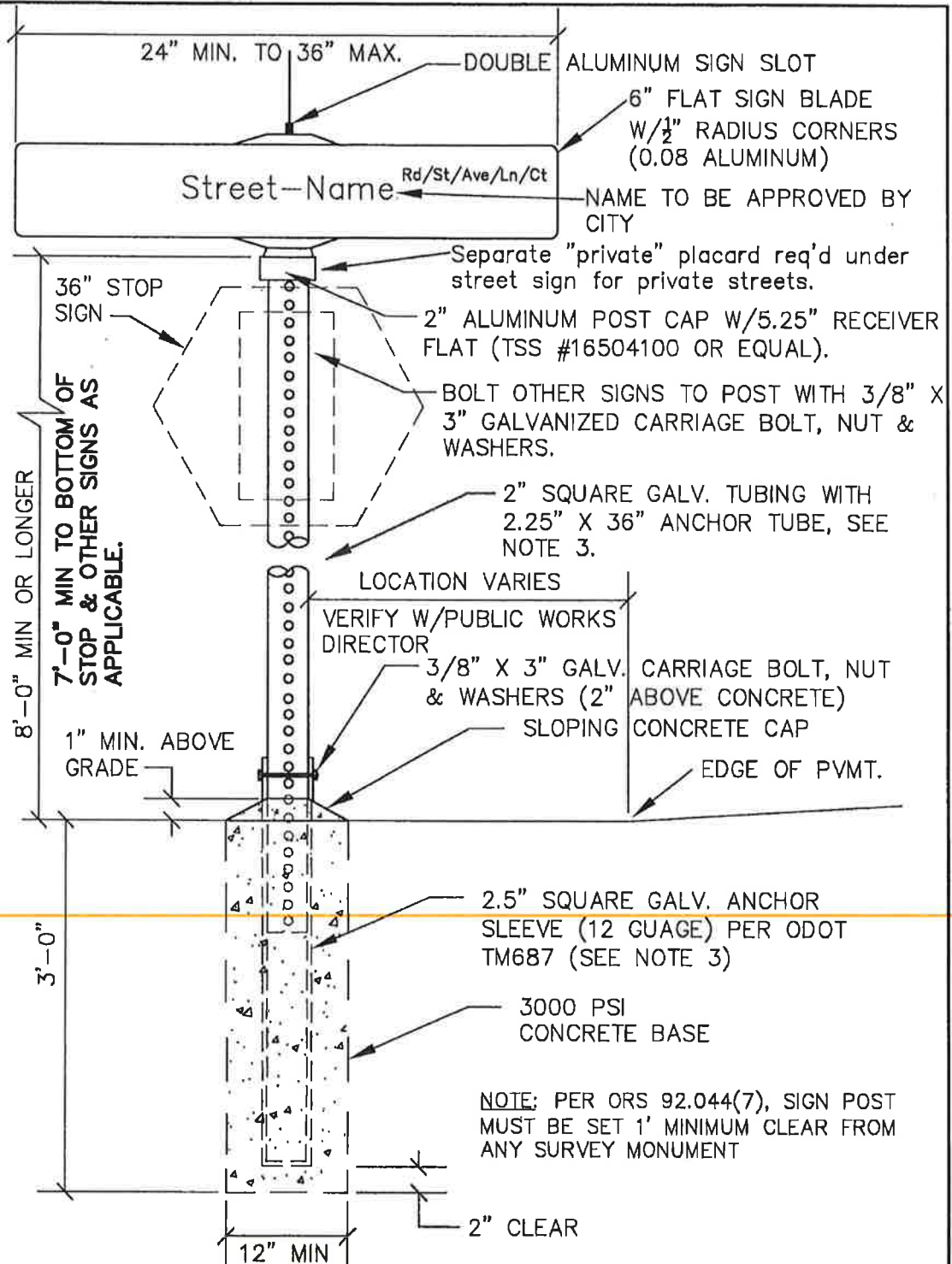
NOTES:

1. ALL RECONSTRUCTED & NEWLY PLATTED STREETS TO BE SIGNED IN ACCORDANCE WITH CITY STANDARDS.
2. SIGN PANEL MATERIALS TO BE ALUMINUM PER OSSC 02910, AND ALL SIGNS SHALL CONFORM WITH OREGON MUTCD.
3. PROVIDE STOP BARS AT ALL STOP SIGNS, BEHIND PEDESTRIAN CROSSING AT LOCATION ACCEPTABLE TO PUBLIC WORKS (SEE NOTES FOR TYPE OF MARKING).

LAST REVISION DATE: FEB 2020	COPYRIGHT 1998 WESTECH ENGINEERING, INC.
SIGN POST FOR STREET SIGNS, STOP SIGNS & TRAFFIC CONTROL SIGNS (NTS)	
DAYTON, OR	DETAIL NO. 231

SIGN TEXT STANDARDS: PROVIDE SIGN TEXT AS FOLLOWS:

- 4" HIGH CHARACTERS FOR UPPER CASE,
- 3" HIGH CHARACTERS FOR LOWER CASE,
- 3" HIGH 1ST LETTER FOR TITLE (Rd/St/Ave/Ln/Ct/Blvd/etc).

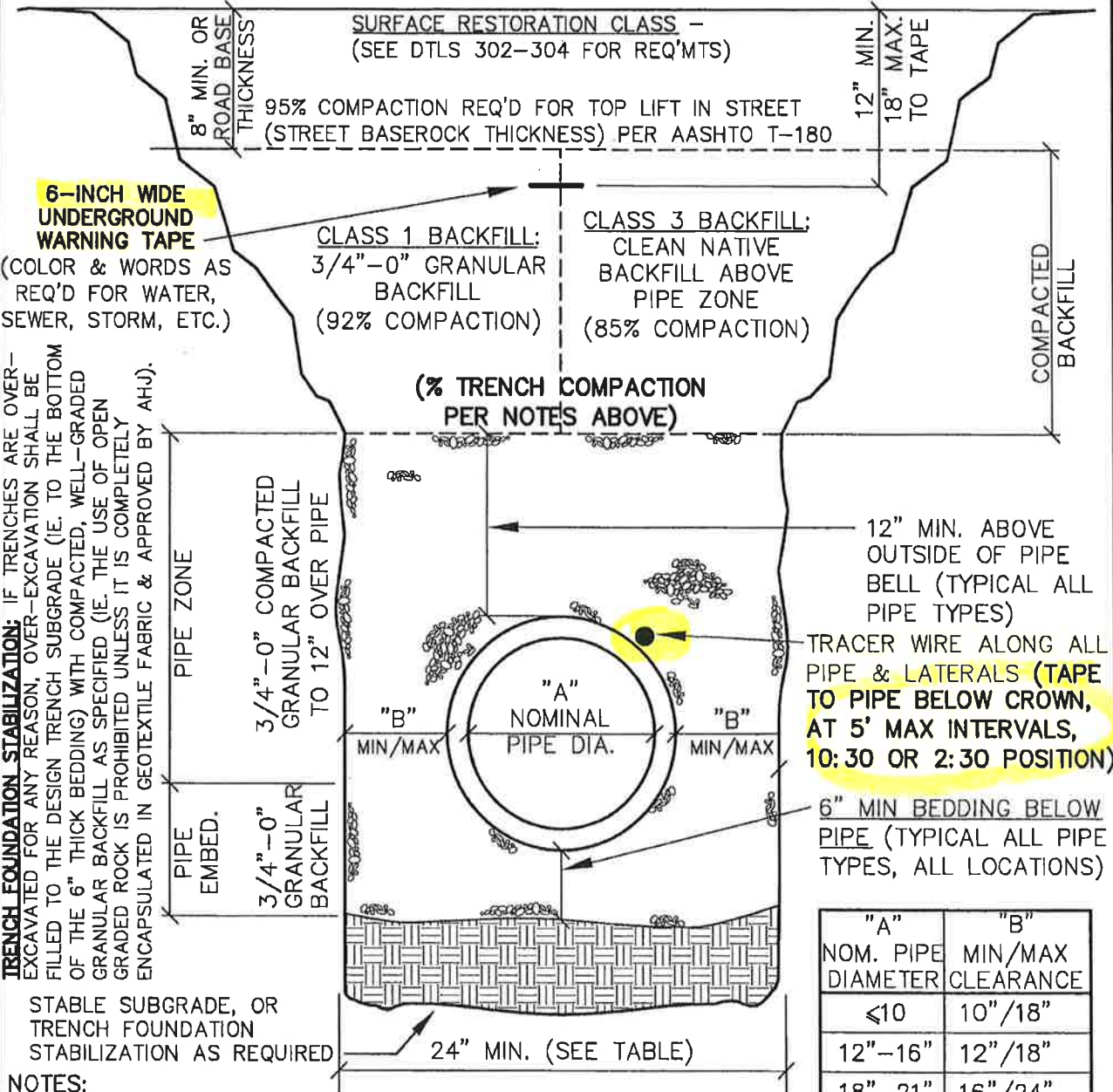


NOTES:

1. ALL RECONSTRUCTED & NEWLY PLATTED STREETS TO BE SIGNED IN ACCORDANCE WITH ODOT STANDARDS.
2. SIGN PANEL MATERIALS TO BE ALUMINUM PER OSSC 02910, AND ALL SIGNS SHALL CONFORM WITH OREGON MUTCD.
3. SIGN POSTS & SLEEVES TO HAVE 7/16" DIAMETER HOLES ON 1" HOLE CENTERS.
4. PROVIDE STOP BARS AT ALL STOP SIGNS, BEHIND PEDESTRIAN CROSSING AT LOCATION ACCEPTABLE TO PUBLIC WORKS (SEE NOTES FOR TYPE OF MARKING).

LAST REVISION DATE:	
FEB 2020	
SIGN POST WITH TELESPAR BASE & ANCHOR (REQUIRED IN ODOT R.O.W) (NTS)	
DAYTON, OR	DETAIL NO. 232

TRENCH COMPACTION: CLASS 1 GRANULAR BACKFILL - 92% OPTIMUM PER AASHTO T-180 (MODIFIED PROCTOR)
 CLASS 3 NATIVE BACKFILL - 85% OPTIMUM PER AASHTO T-180



TRENCH FOUNDATION STABILIZATION: IF TRENCHES ARE OVER-EXCAVATED FOR ANY REASON, OVER-EXCAVATION SHALL BE FILLED TO THE DESIGN TRENCH SUBGRADE (I.E. TO THE BOTTOM OF THE 6" THICK BEDDING) WITH COMPACTED, WELL-GRADED GRANULAR BACKFILL AS SPECIFIED (I.E. THE USE OF OPEN GRADED ROCK IS PROHIBITED UNLESS IT IS COMPLETELY ENCAPSULATED IN GEOTEXTILE FABRIC & APPROVED BY AHJ).

STABLE SUBGRADE, OR TRENCH FOUNDATION STABILIZATION AS REQUIRED

- NOTES:**
1. CLASS 1 REQ'D. UNDER ALL EXIST. OR FUTURE IMPROVED AREAS INCLUDING SIDEWALKS.
 2. WHERE NEW PIPING IS IN SAME ALIGNMENT AS EXISTING PIPING, THE PIPE EMBEDMENT SHALL EXTEND TO A MIN. OF 6" BELOW THE NEW PIPING OR 6" BELOW EXISTING PIPING, WHICHEVER IS DEEPER.
 3. FOR FLEXIBLE PIPE, BOTTOM OF TRENCH SHORING SHALL BE ABOVE PIPE SPRINGLINE PRIOR TO COMPACTING BACKFILL BELOW THE PIPE SPRINGLINE AND UNDER THE PIPE HAUNCHES.
 4. MINIMUM CLEARANCES SHOWN ("B") ASSUMES STANDARD 6" WALL TRENCH BOXES SET ON TRENCH BOTTOM, AND REPRESENTS WIDTH REQUIRED TO CONSOLIDATE GRANULAR MATERIAL UNDER PIPE HAUNCHES (TO AVOID LOSS OF SIDE SUPPORT WHEN TRENCH BOX IS MOVED OR PULLED FORWARD). TRENCH WIDTH REDUCTION REQUIRES PRIOR APPROVAL BASED ON ACTUAL TRENCH SHORING PROPOSED.

12" MIN. ABOVE OUTSIDE OF PIPE BELL (TYPICAL ALL PIPE TYPES)

TRACER WIRE ALONG ALL PIPE & LATERALS (TAPE TO PIPE BELOW CROWN, AT 5' MAX INTERVALS, 10:30 OR 2:30 POSITION)

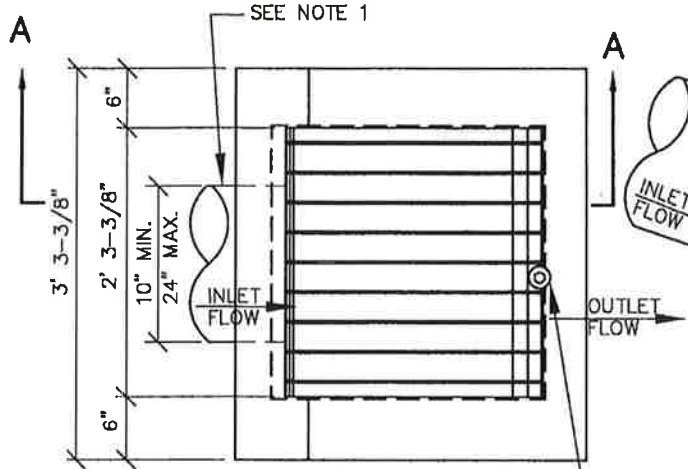
6" MIN BEDDING BELOW PIPE (TYPICAL ALL PIPE TYPES, ALL LOCATIONS)

"A" NOM. PIPE DIAMETER	"B" MIN/MAX CLEARANCE
≤10	10"/18"
12"-16"	12"/18"
18"-21"	16"/24"
24"-30"	18"/30"
>30"	24"/36"

(SEE NOTE 4)

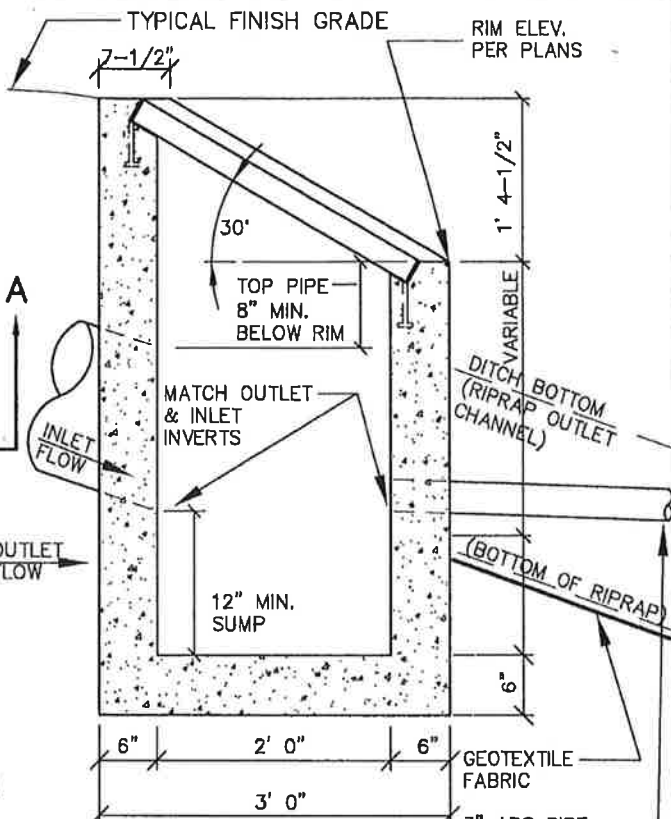
LAST REVISION DATE: FEB 2020	
TRENCH BACKFILL, BEDDING, AND PIPE ZONE (NTS)	
DAYTON, OR	DETAIL NO. 301

NOTE: CONTRACTOR TO VERIFY FINISH GRADE ELEV'S PRIOR TO INSTALLATION TO ENSURE THAT TOP OF OUTLET STRUCTURE DOES NOT EXTEND ABOVE SURROUNDING GRADE UNLESS OTHERWISE NOTED ON DWGS OR APPROVED BY CITY. PROVIDE OUTLET PIPE & OUTLET CHANNEL (LENGTH & CONFIGURATION PER NOTE 4) AS NOTED UNLESS OTHERWISE SHOWN ON APPROVED DWGS OR REQUIRED BY CITY.



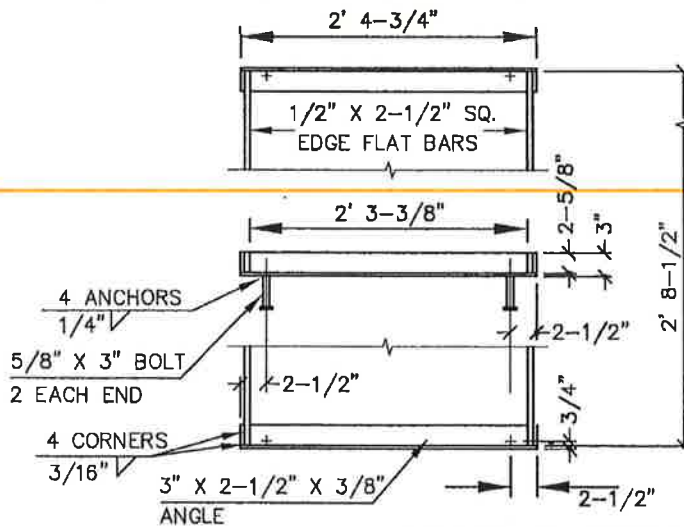
PLAN

INSTALL SINGLE 1/2" ST. STEEL EXPANSION ANCHOR BOLT & 2" SS PLATE WASHER UNLESS OTHERWISE APPROVED OR REQUIRED BY CITY

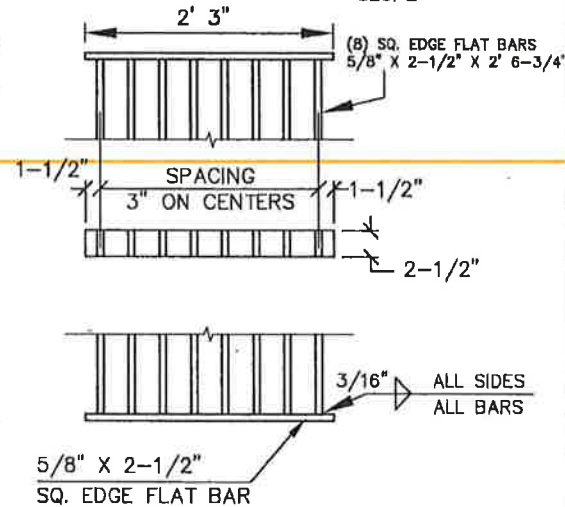


SECTION A - A

3" ABS PIPE TYP, EXTEND TO DAYLIGHT, 0.5% MIN SLOPE



FRAME & GRATE



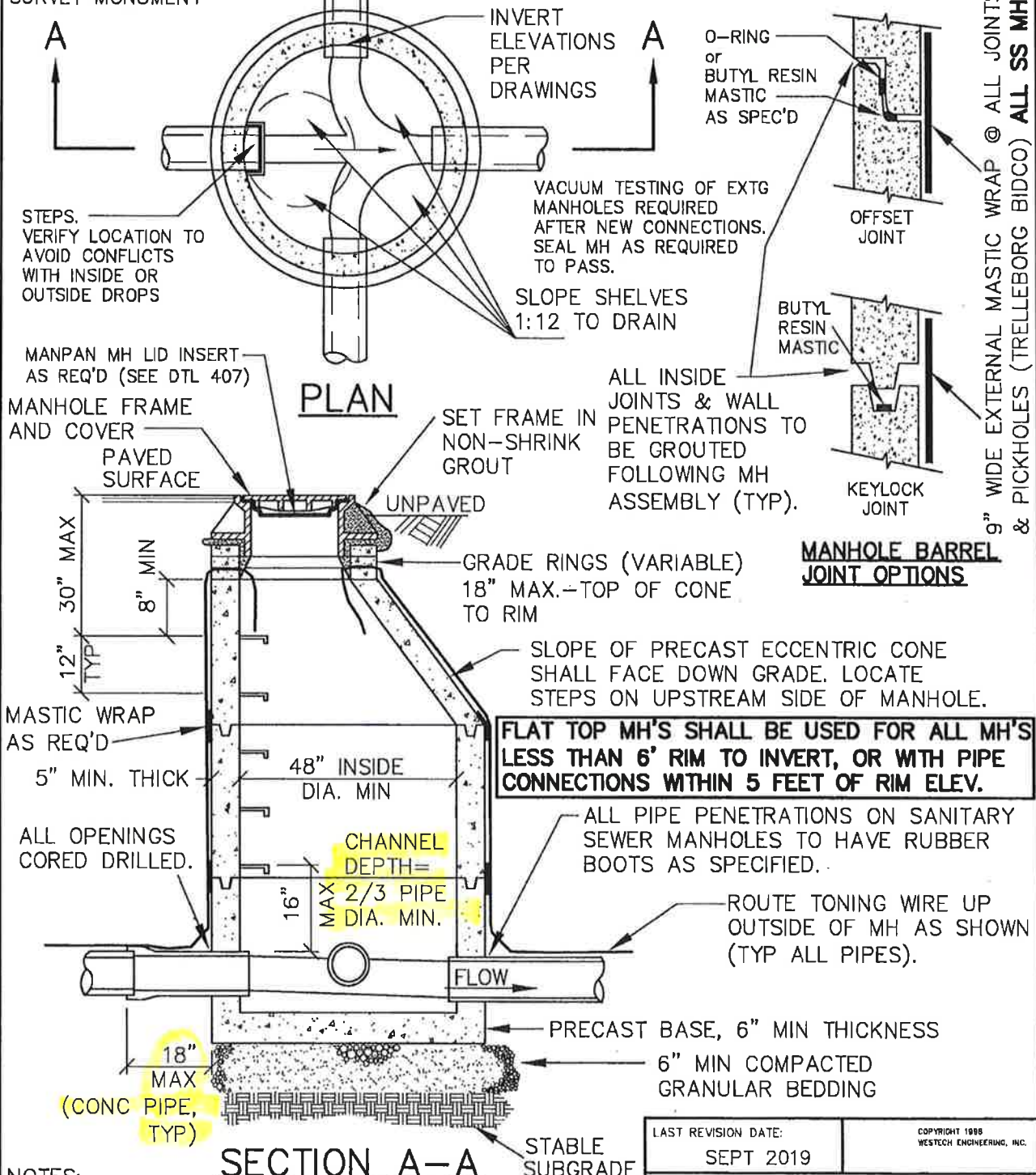
NOTES:

1. SEE CONSTRUCTION DRAWINGS FOR PIPE SIZE, LOCATION AND INVERT ELEVATION.
2. FRAME & GRATE SHALL BE ASTM A-36 STEEL, HOT-DIP GALV AFTER CONSTRUCTION.
3. ALL CONCRETE TO BE 3300 PSI MIN AT 28 DAYS.
4. PROVIDE RIPRAP OUTLET CHANNEL (TYP 18" MIN THICK) W/2H:1V SIDE SLOPES, 12" MIN CHANNEL DEPTH & LENGTH AS NOTED ON DRAWINGS (10' MIN). PROVIDE GEOTEXTILE UNDER RIPRAP TO TOP OF BANK (NO LAPS). USE 5"-12" GRADED ANGULAR RIPRAP (TYP), FILL VOIDS BETWEEN STONE WITH 3/4"-0 BASEROCK.

LAST REVISION DATE: OCT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
STORM OUTLET ENERGY DISSIPATOR BASIN	
(NTS)	
DAYTON, OR	DETAIL NO. 313A

NOTE: PER ORS 92.044(7), MANHOLE MUST BE SET 1' MINIMUM CLEAR FROM ANY SURVEY MONUMENT

PROVIDE GASKETED PVC CAP ON ALL STUBS FOR FUTURE CONNECTION SHOWN ON DWGS (EXTEND PIPE 2' MIN BEYOND MH WALL), SLOPE PER DWGS.



FLAT TOP MH'S SHALL BE USED FOR ALL MH'S LESS THAN 6' RIM TO INVERT, OR WITH PIPE CONNECTIONS WITHIN 5 FEET OF RIM ELEV.

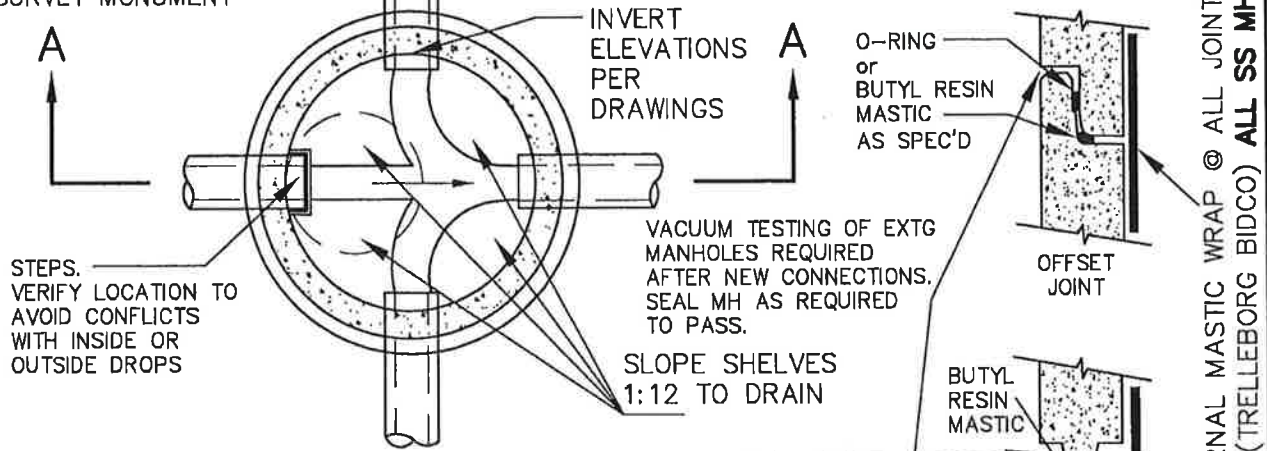
NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC JOINTS REQUIRED, W/EXTERNAL SEAL AT BARREL JOINTS & PICKHOLES.
3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

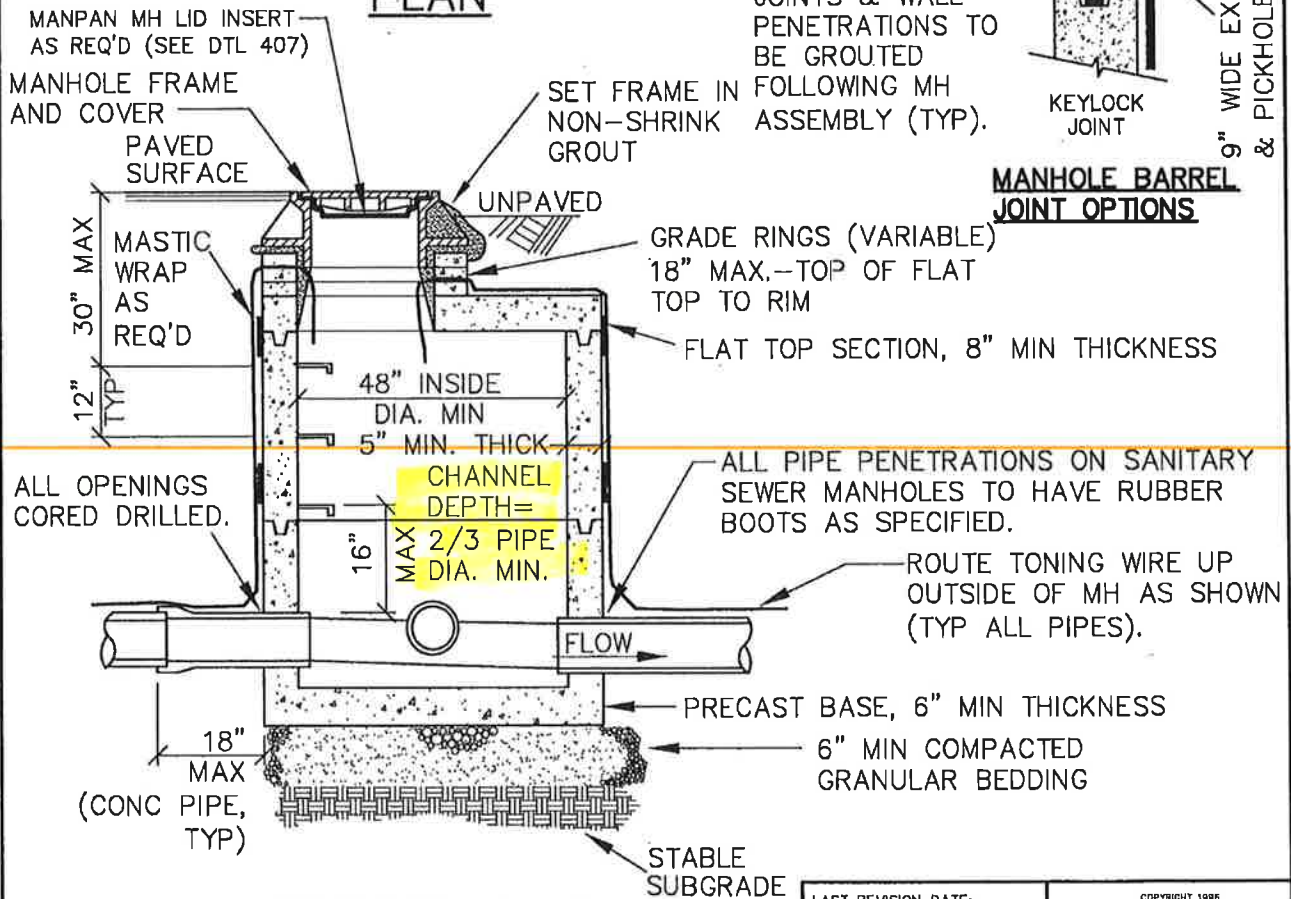
LAST REVISION DATE: SEPT 2019	COPYRIGHT 1988 WESTTECH ENGINEERING, INC.
STANDARD MANHOLE FOR 21" PIPE AND SMALLER (SEWER & STORM)	
(NTS)	
DAYTON, OR	DETAIL NO. 401

NOTE: PER ORS 92.044(7), MANHOLE MUST BE SET 1' MINIMUM CLEAR FROM ANY SURVEY MONUMENT

PROVIDE GASKETED PVC CAP ON ALL STUBS FOR FUTURE CONNECTION SHOWN ON DWGS (EXTEND PIPE 2' MIN BEYOND MH WALL), SLOPE PER DWGS.



PLAN



SECTION A-A

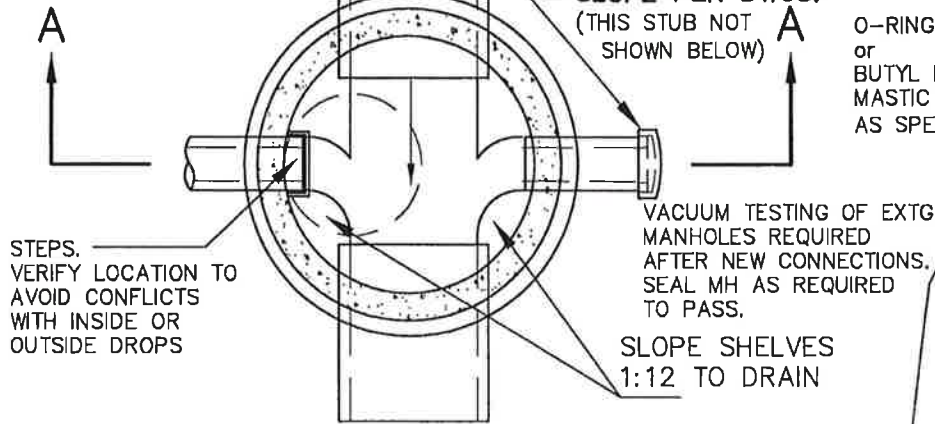
NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC JOINTS REQUIRED, W/EXTERNAL SEAL AT BARREL JOINTS & PICKHOLES.
3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

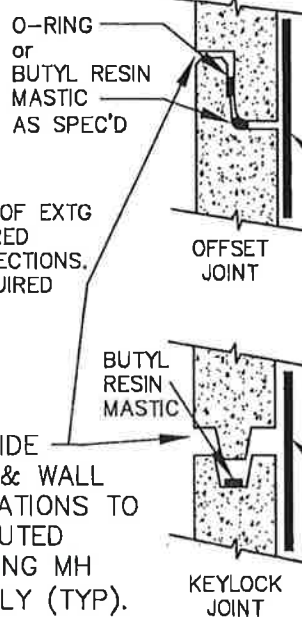
LAST REVISION DATE: SEPT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
FLAT TOP MANHOLE FOR 21" PIPE AND SMALLER (SEWER & STORM) (NTS)	
DAYTON, OR	DETAIL NO. 402

NOTE: PER ORS 92.044(7),
MANHOLE MUST BE SET 1'
MINIMUM CLEAR FROM ANY
SURVEY MONUMENT

PROVIDE GASKETED PVC CAP ON ALL STUBS
FOR FUTURE CONNECTION SHOWN ON DWGS
(EXTEND PIPE 2' MIN BEYOND MH WALL),
SLOPE PER DWGS.
(THIS STUB NOT
SHOWN BELOW)

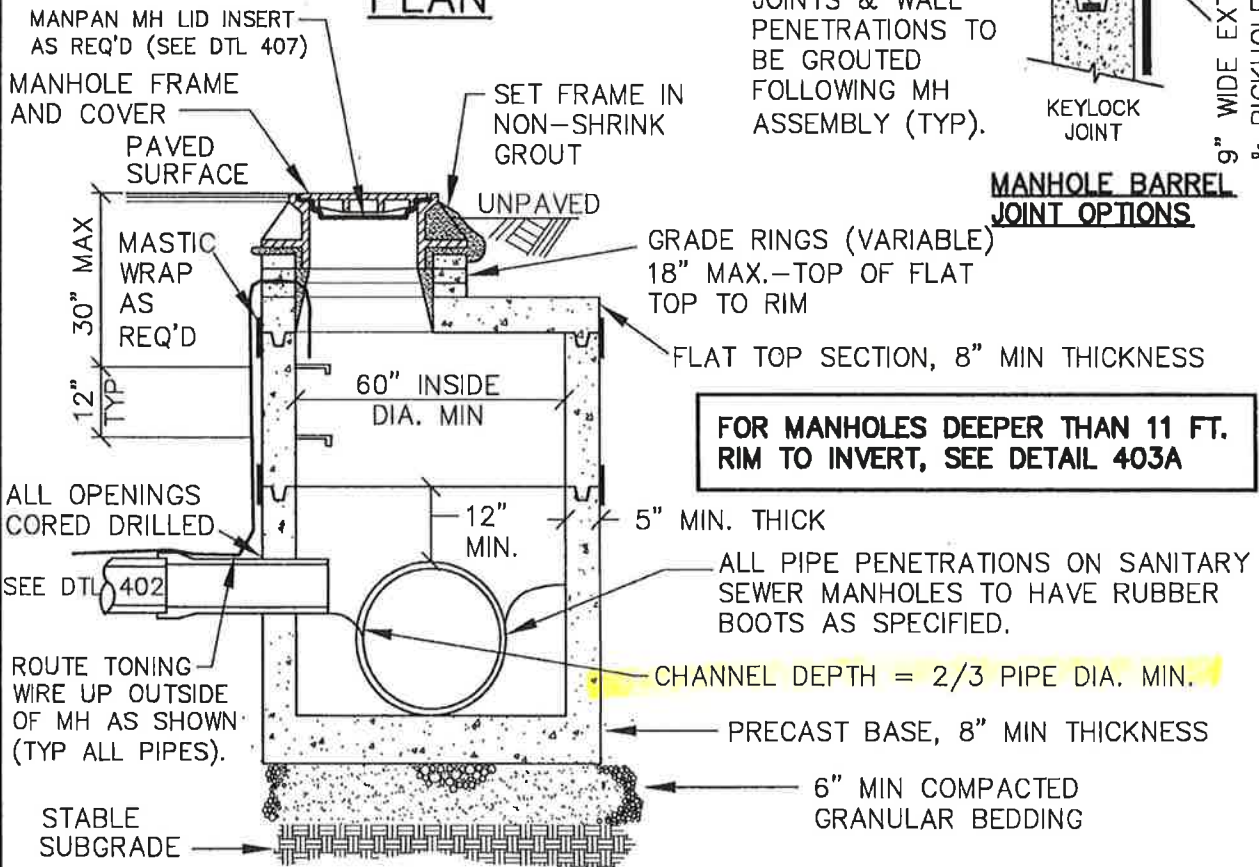


PLAN



**MANHOLE BARREL
JOINT OPTIONS**

9" WIDE EXTERNAL MASTIC WRAP @ ALL JOINTS
& PICKHOLES (TRELLEBORG BIDCO) ALL SS MHS

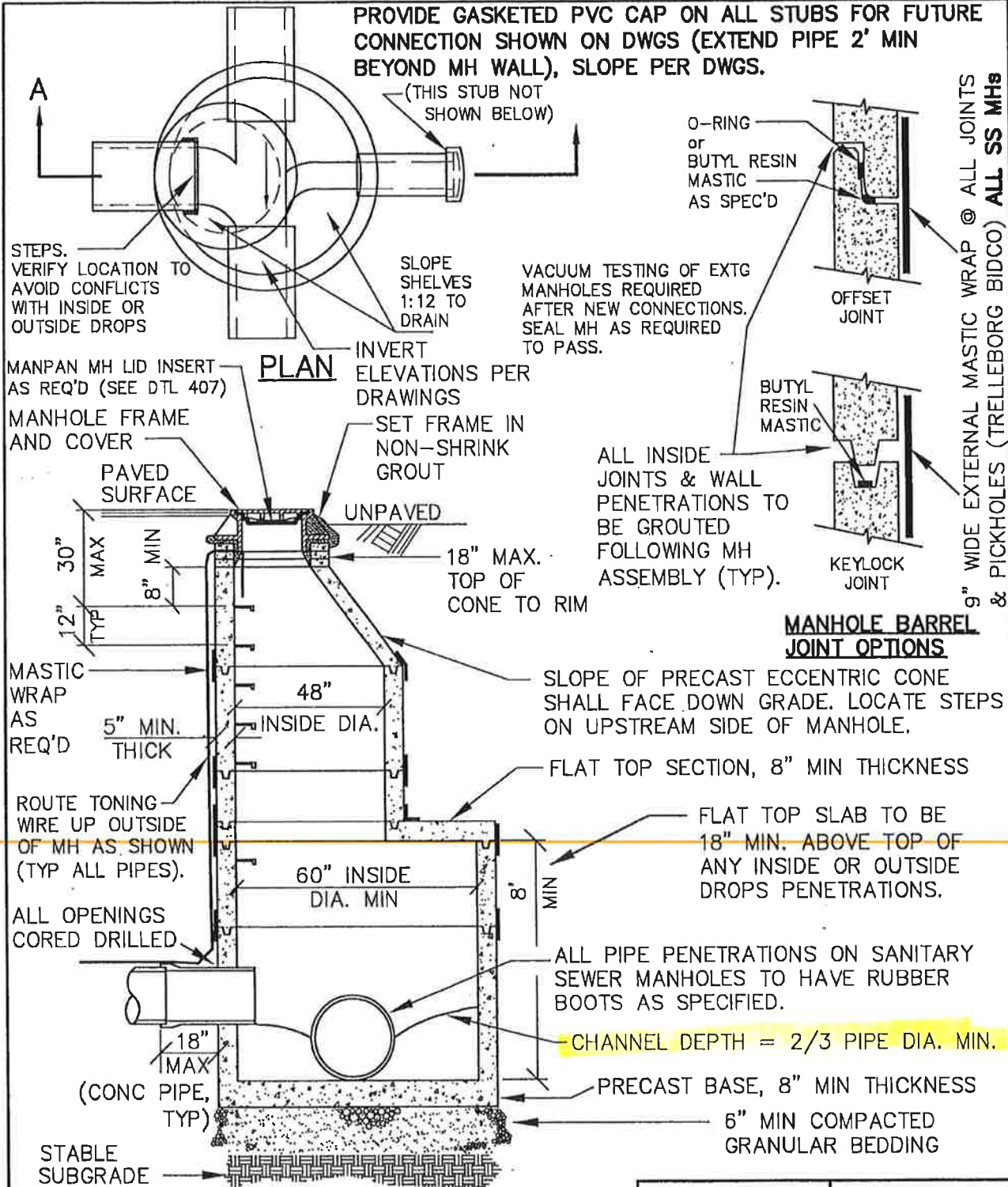


SECTION A-A

NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC JOINTS REQUIRED, W/EXTERNAL SEAL AT BARREL JOINTS & PICKHOLES.
3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

LAST REVISION DATE: SEPT 2019	COPYRIGHT 1995 WESTECH ENGINEERING, INC.
MANHOLE FOR 24" AND 27" PIPE (SEWER & STORM) (NTS)	
DAYTON, OR	DETAIL NO. 403



NOTES:

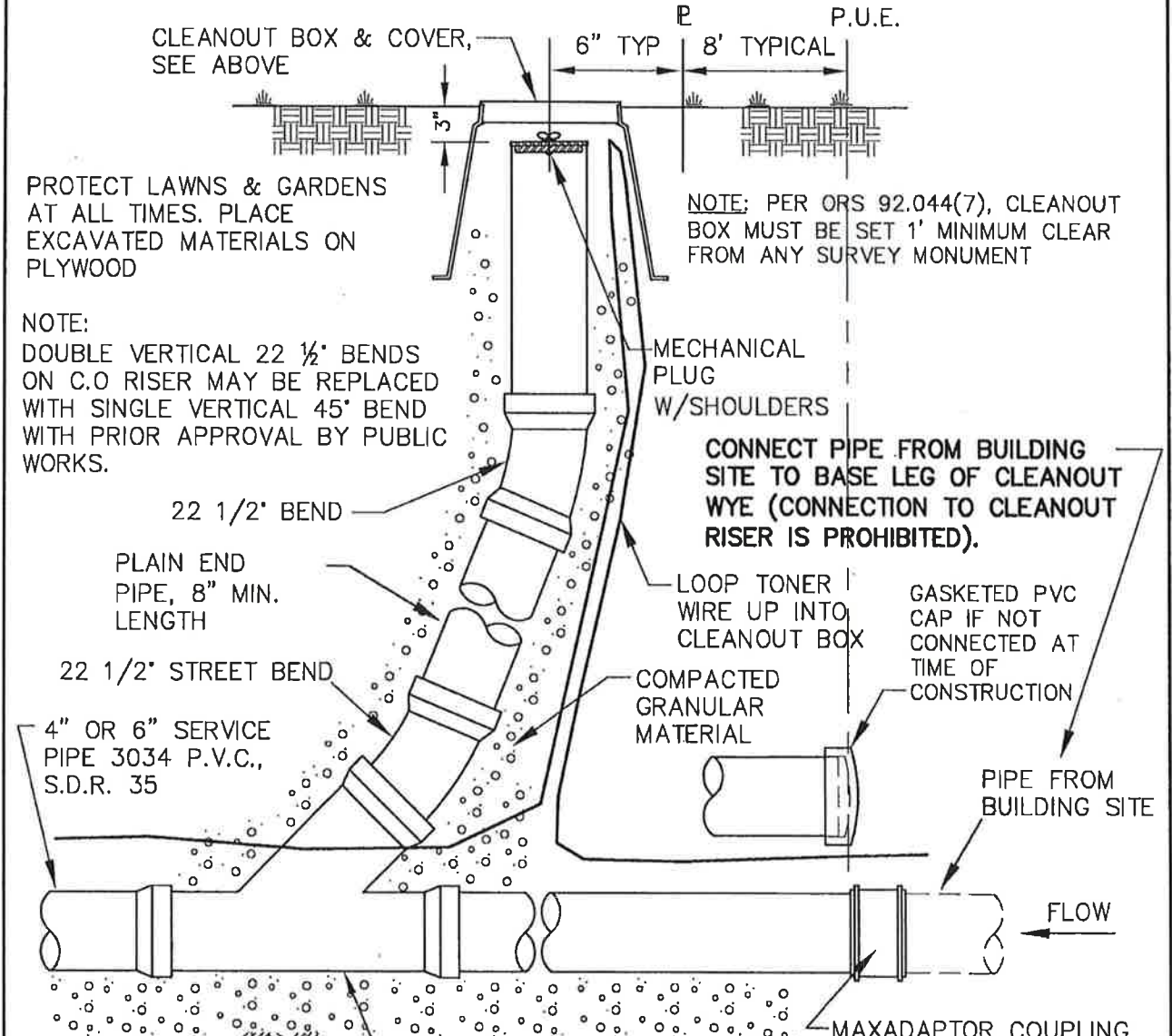
1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC JOINTS REQUIRED, W/EXTERNAL SEAL AT BARREL JOINTS & PICKHOLES.
3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

SECTION A-A

LAST REVISION DATE: SEPT 2019	COPYRIGHT 1998 WESTECH ENGINEERING, INC.
DEEP MANHOLE FOR 24" AND 27" PIPE (SEWER & STORM) (NTS)	
DAYTON, OR	DETAIL NO. 403A

CLEANOUT COVERS: ALL SEWER CLEANOUT LIDS TO READ "SEWER"
 ALL STORM CLEANOUT LIDS TO READ "STORM" OR "C/O".

1. NON-TRAFFIC AREAS:
 CARSON MODEL 910 T-COVER OR EQUAL (GREEN FOR SEWER, GREY FOR STORM).
2. TRAFFIC AREAS, INCLUDING DRIVEWAYS:
 8" X 4" CAST IRON FRAME & COVER, OLYMPIC M1007 OR EQUAL.
 8" X 6" CAST IRON FRAME & COVER, OLYMPIC M1018 OR EQUAL.
 (FOR CI CLEANOUTS IN UNPAVED AREAS, SET IN 6" THICK CONCRETE PAD)



PROTECT LAWNS & GARDENS AT ALL TIMES. PLACE EXCAVATED MATERIALS ON PLYWOOD

NOTE: PER ORS 92.044(7), CLEANOUT BOX MUST BE SET 1' MINIMUM CLEAR FROM ANY SURVEY MONUMENT

NOTE:
 DOUBLE VERTICAL 22 1/2° BENDS ON C.O RISER MAY BE REPLACED WITH SINGLE VERTICAL 45° BEND WITH PRIOR APPROVAL BY PUBLIC WORKS.

CONNECT PIPE FROM BUILDING SITE TO BASE LEG OF CLEANOUT WYE (CONNECTION TO CLEANOUT RISER IS PROHIBITED).

- NOTES:
1. CLEANOUT RISER SHALL BE SAME SIZE AND MATERIAL AS LATERAL PIPE.
 2. PROVIDE CONCRETE PAD FOR CLEANOUTS LOCATED IN UNPAVED DRIVEWAYS OR TRAFFIC AREAS (6" THICK PAD TO BE 6" LARGER THAN CLEANOUT BOX FRAME).
 3. CLEANOUT PIPE SHALL BE LEFT A MINIMUM OF 18" ABOVE EXISTING GRADE UNTIL ALL CURBING IS INSTALLED AND ALL PRIVATE UTILITY TRENCHES ARE BACKFILLED. CLEANOUTS SHALL THEN BE SET NO MORE THAN 6" BELOW FINISH GRADE, AND CLEANOUT BOXES SET FLUSH WITH FINISH GRADE.

Review

LAST REVISION DATE: OCT 2019	COPYRIGHT 1986 WESTECH ENGINEERING, INC.
STANDARD SERVICE LATERAL CLEANOUT (SEWER & STORM) (NTS)	
DAYTON, OR	DETAIL NO. 416

1" ALUMINUM SCREENED TEE VENT
(DOWN ORIENTED DOUBLE OUTLET)
(MORRISON MR 155 OR EQUAL),
MOUNT WITH SCREEN 12" MINIMUM
ABOVE GRADE.

17"X30" ARMORCAST
METER BOX W/LID

1"x3" BRASS NIPPLE

1/2"x1" 90° BEND.

1" A.R.I D-040-C
COMB. AIR/VAC
VALVE (DUCTILE IRON
BODY) OR EQUAL

17"X30" ARMORCAST
METER BOX W/OUT LID

1" HDPE PIPE W/OUT
JOINTS, SEE NOTE BELOW

90° ELL,
BRASS OR
BRONZE

5% MIN.
SLOPE

1" BALL STYLE
CORPORATION STOP
FORD FB-1100 OR
APPROVED EQUAL (ORIENT
NUT ON HORIZONTAL CORP
STOP TO FACE UPWARD)

PIPE NOTE. CENCORE BLUE HDPE (CTS OD, SDR 9, 200
PSI) CONFORMING TO AWWA C901, USE 2-3/8" LONG
INSERTS ON COMPRESSION FITTINGS (McDONALD 6133T).

NOTES:

1. RISER SHALL BE PROTECTED FROM VEHICULAR OR PEDESTRIAN TRAFFIC AS APPROVED BY THE CITY ENGINEER & PUBLIC WORKS.
2. PAINT BOLLARD & TOP SAFETY BLUE FOR POTABLE WATER APPLICATIONS.
3. WHERE ARV ASSEMBLIES ARE INSTALLED ADJACENT TO FENCES, BOLLARDS SHALL BE SET 3" MIN CLEAR FROM FENCE UNLESS OTHERWISE APPROVED BY PROPERTY OWNER.
4. EXACT LOCATION OF RISER PENTRATION THROUGH BOX & BOLLARDS TO BE VERIFIED IN FIELD WITH CITY ENGINEER & PUBLIC WORKS PRIOR TO RISER & BOLLARD INSTALLATION.

4" or 6" φ PIPE BOLLARD
PER DTIL 226. LOCATION PER
PLANS (2 WHERE REQ'D TO
PROTECT METER BOX,
PAINT BLUE FOR POTABLE
WATER, SEE NOTE 2).

SECURE TO BOLLARD
WITH 1"x1/8" STAINLESS
STEEL CLAMP & BOLT
PER DETAIL @ LEFT.

PYLWOOD FORM &
PLASTIC AS REQUIRED
TO AVOID CONCRETE
ENCASEMENT OF RISER
PIPE.

ORIENTATION OF VENT PIPE
THROUGH BOX WALL AS
SHOWN ON PLANS OR AS
DIRECTED (ORIENTATION ON
DETAIL IS FOR CLARITY).

1" BRASS
90° ELL

1" BRASS OR
COPPER PIPE

1" BRASS NIPPLE &
COUPLING

1" BRASS 90° ELL

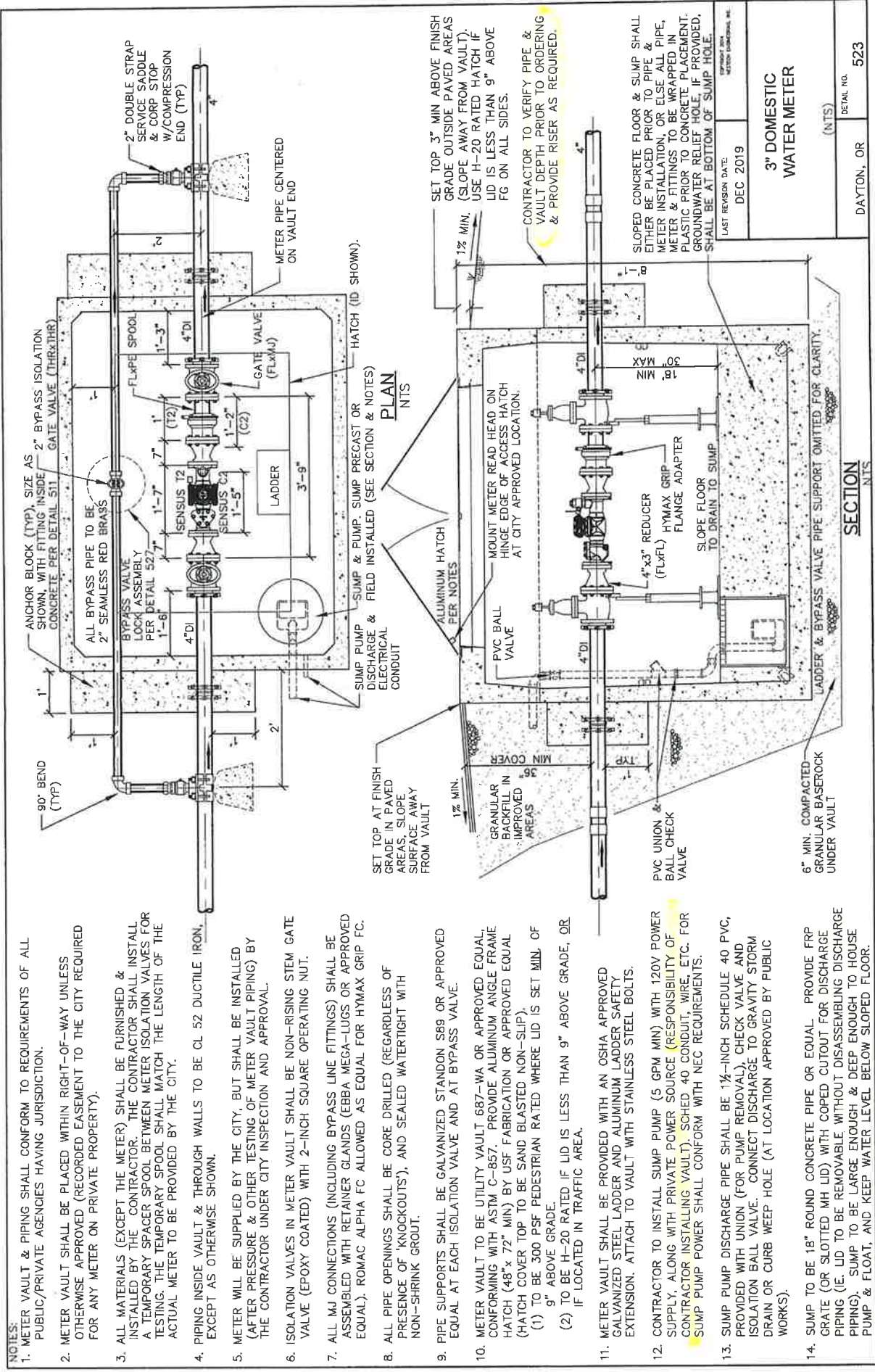
1"x3" BRASS NIPPLE

1" BRASS COUPLING

CONCRETE SUPPORT BLOCK

COMPACTED 3/4"-0
GRAVEL, 12" THICK (MIN)

LAST REVISION DATE: JAN 2020	JO #
1" COMBINATION AIR RELEASE VALVE (CARV) (NTS)	
DAYTON, OR	DETAIL NO. 518



NOTES:

1. METER VAULT & PIPING SHALL CONFORM TO REQUIREMENTS OF ALL PUBLIC/Private AGENCIES HAVING JURISDICTION.
2. METER VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY UNLESS OTHERWISE APPROVED (RECORDED EASEMENT TO THE CITY REQUIRED FOR ANY METER ON PRIVATE PROPERTY).
3. ALL MATERIALS (EXCEPT THE METER) SHALL BE FURNISHED & INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL INSTALL A TEMPORARY SPACER SPOOL BETWEEN METER ISOLATION VALVES FOR TESTING. THE TEMPORARY SPOOL SHALL MATCH THE LENGTH OF THE ACTUAL METER TO BE PROVIDED BY THE CITY.
4. PIPING INSIDE VAULT & THROUGH WALLS TO BE CL 52 DUCTILE IRON, EXCEPT AS OTHERWISE SHOWN.
5. METER WILL BE SUPPLIED BY THE CITY, BUT SHALL BE INSTALLED (AFTER PRESSURE & OTHER TESTING OF METER VAULT PIPING) BY THE CONTRACTOR UNDER CITY INSPECTION AND APPROVAL.
6. ISOLATION VALVES IN METER VAULT SHALL BE NON-RISING STEM GATE VALVE (EPOXY COATED) WITH 2-INCH SQUARE OPERATING NUT.
7. ALL MJ CONNECTIONS (INCLUDING BYPASS LINE FITTINGS) SHALL BE ASSEMBLED WITH RETAINER GLANDS (EBBA MEGA-LUGS OR APPROVED EQUAL). ROMAC ALPHA FC ALLOWED AS EQUAL FOR HYMAX GRIP FC.
8. ALL PIPE OPENINGS SHALL BE CORE DRILLED (REGARDLESS OF PRESENCE OF "KNOCKOUTS"), AND SEALED WATERTIGHT WITH NON-SHRINK GROUT.
9. PIPE SUPPORTS SHALL BE GALVANIZED STANDON S89 OR APPROVED EQUAL AT EACH ISOLATION VALVE AND AT BYPASS VALVE.
10. METER VAULT TO BE UTILITY VAULT 687-WA OR APPROVED EQUAL, CONFORMING WITH ASTM C-857. PROVIDE ALUMINUM ANGLE FRAME HATCH (48"x 72" MIN) BY USF FABRICATION OR APPROVED EQUAL (HATCH COVER TOP TO BE SAND BLASTED NON-SLIP).
 - (1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
 - (2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
11. METER VAULT SHALL BE PROVIDED WITH AN OSHA APPROVED GALVANIZED STEEL LADDER AND ALUMINUM LADDER SAFETY EXTENSION. ATTACH TO VAULT WITH STAINLESS STEEL BOLTS.
12. CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
13. SUMP PUMP DISCHARGE PIPE SHALL BE 1/2-INCH SCHEDULE 40 PVC, PROVIDED WITH UNION (FOR PUMP REMOVAL), CHECK VALVE AND ISOLATION BALL VALVE. CONNECT DISCHARGE TO GRAVITY STORM DRAIN OR CURB WEEP HOLE (AT LOCATION APPROVED BY PUBLIC WORKS).
14. SUMP TO BE 18" ROUND CONCRETE PIPE OR EQUAL. PROVIDE FRP GRATE (OR SLOTTED MH LID) WITH COPED CUTOUT FOR DISCHARGE PIPING (IE. LID TO BE REMOVABLE WITHOUT DISASSEMBLING DISCHARGE PIPING). SUMP TO BE LARGE ENOUGH & DEEP ENOUGH TO HOUSE PUMP & FLOAT, AND KEEP WATER LEVEL BELOW SLOPED FLOOR.

PLAN
NTS

SECTION
NTS

3" DOMESTIC WATER METER

DETAIL NO. 523

DAYTON, OR

LAST REVISION DATE: DEC 2019

SLOPED CONCRETE FLOOR & SUMP SHALL EITHER BE PLACED PRIOR TO PIPE & METER INSTALLATION, OR ELSE ALL PIPE, METER & FITTINGS TO BE WRAPPED IN PLASTIC PRIOR TO CONCRETE PLACEMENT. GROUNDWATER RELIEF HOLE, IF PROVIDED, SHALL BE AT BOTTOM OF SUMP HOLE.

CONTRACTOR TO VERIFY PIPE & VAULT DEPTH PRIOR TO ORDERING & PROVIDE RISER AS REQUIRED.

SET TOP 3" MIN ABOVE FINISH GRADE OUTSIDE PAVED AREAS (SLOPE AWAY FROM VAULT). USE H-20 RATED HATCH IF LID IS LESS THAN 9" ABOVE FG ON ALL SIDES.

6" MIN. COMPACTED GRANULAR BASEROCK UNDER VAULT

SET TOP AT FINISH GRADE IN PAVED AREAS. SLOPE SURFACE AWAY FROM VAULT

SUMP PUMP & FIELD INSTALLED (SEE SECTION & NOTES)

METER PIPE CENTERED ON VAULT END

ANCHOR BLOCK (TYP), SIZE AS SHOWN, WITH FITTING INSIDE CONCRETE PER DETAIL 511

ALL BYPASS PIPE TO BE 2" SEAMLESS RED BRASS

90° BEND (TYP)

1" (TYP)

1'-6"

1'-7"

1'-3"

1'-2"

3'-9"

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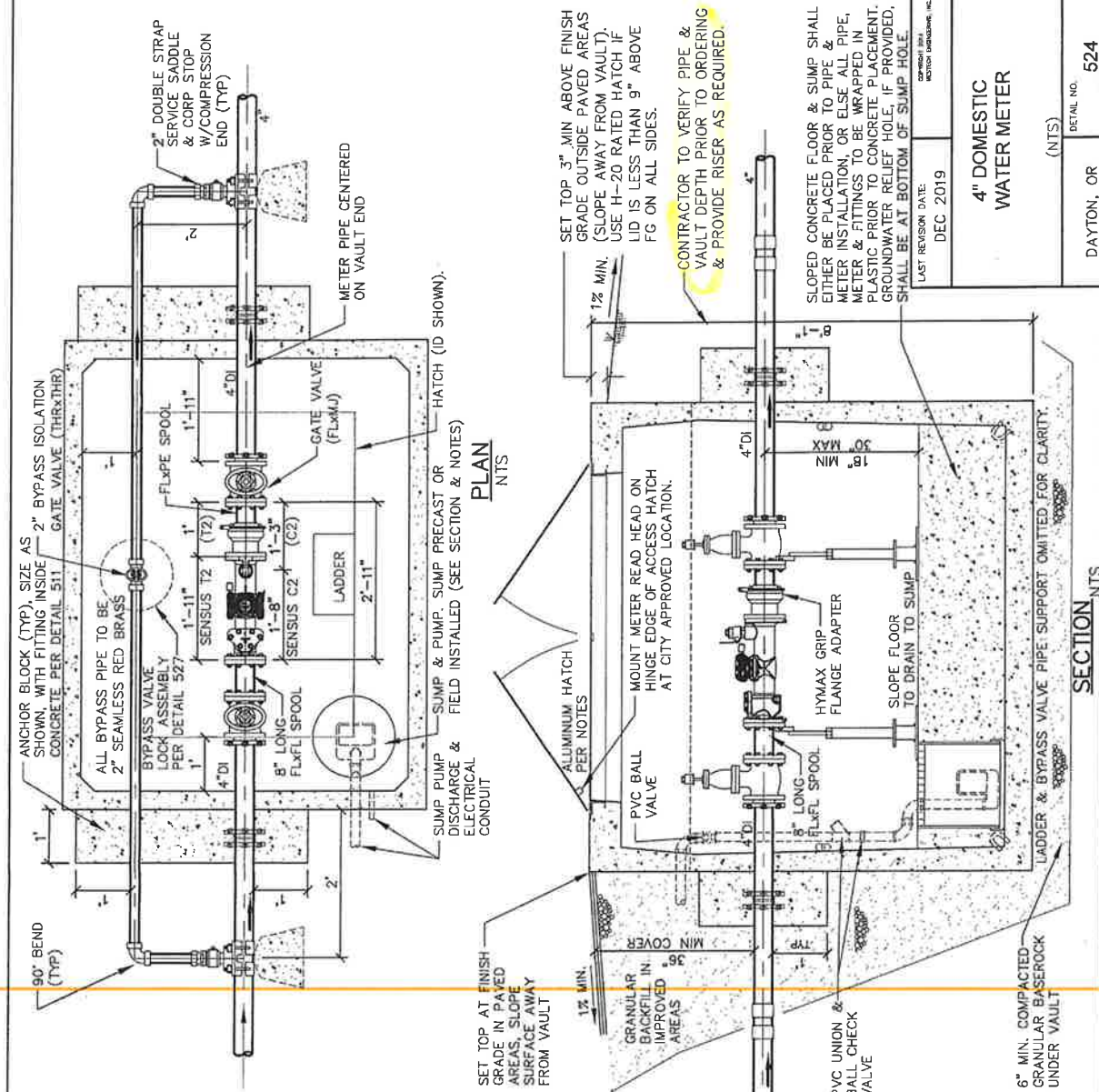
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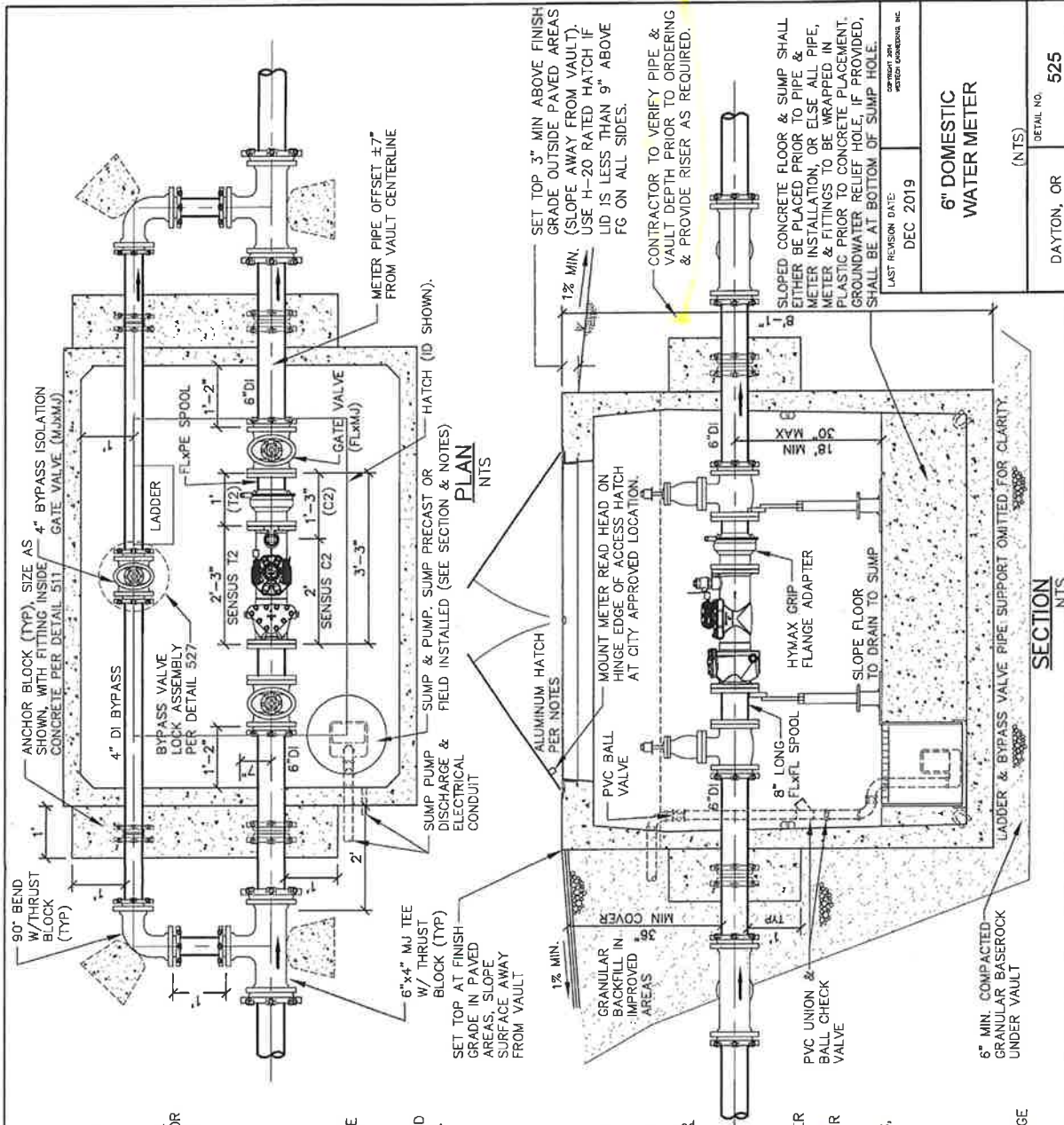


- NOTES:**
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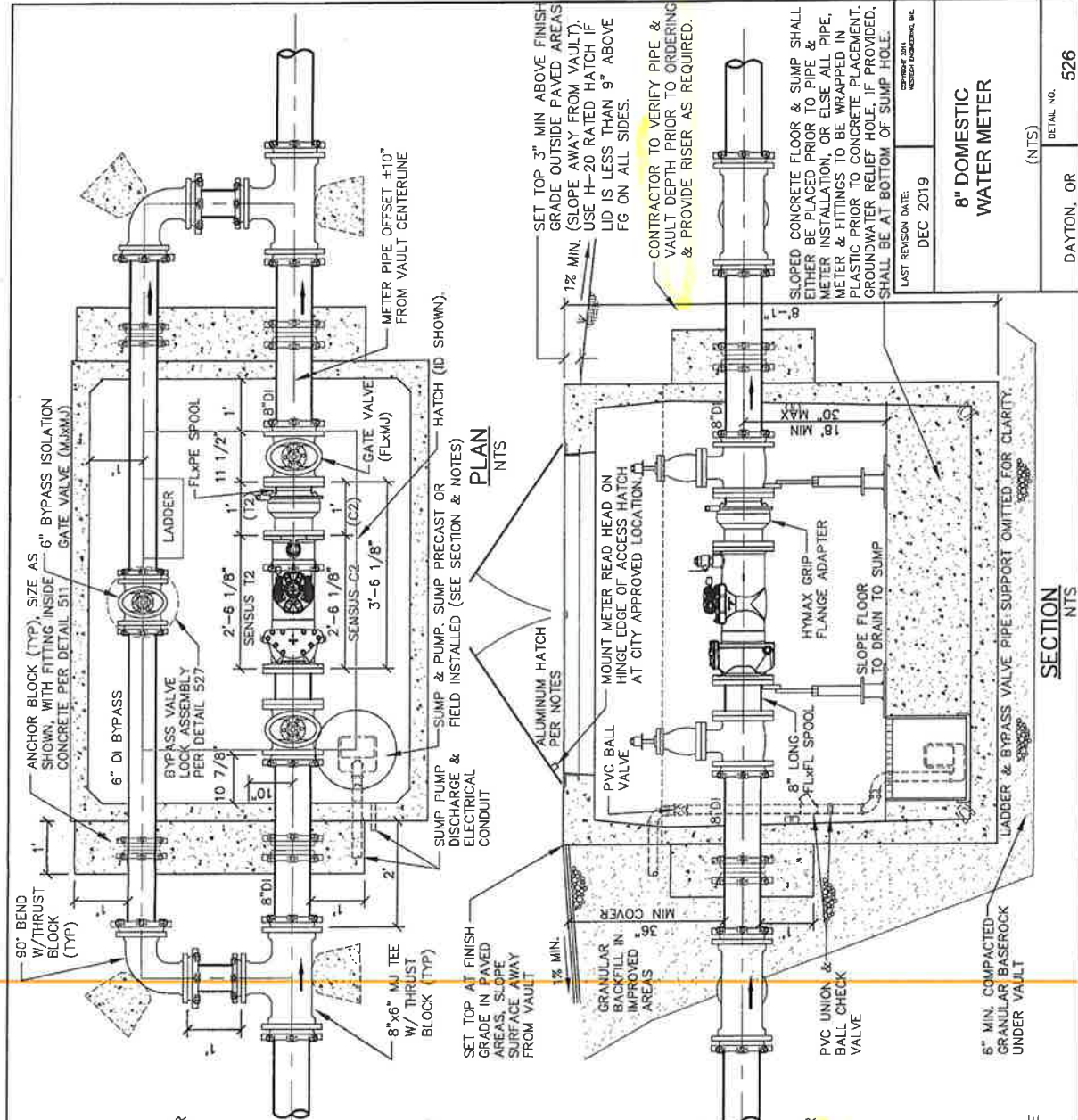
LAST REVISION DATE: DEC 2019	
4" DOMESTIC WATER METER	
(NTS)	
DAYTON, OR	524

SECTION
NTS

PLAN
NTS



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LAST REVISION DATE:
DEC. 2019

8" DOMESTIC WATER METER

(NTS)

DAYTON, OH

DETAIL NO. 526

PAD MOUNTED FIBERGLASS INSULATED ENCLOSURE W/HEATER, HOT BOX MODEL AS SHOWN ON TABLE (OR APPROVED EQUIVALENT). ANCHOR ENCLOSURE TO CONCRETE PAD PER MANUFACTURER'S REQUIREMENTS.

RPBA DIAMETER	HOT BOX MODEL
1"	HB1
1½"	HB1
2"	HB1.5

NOTE: VERIFY HB SIZE FOR OTHER MODEL RPBA DEVICES.

ELECTRICAL RECEPTICAL FOR HEAT TAPE (GFI). PROVIDE HEAT TAPE OR ENCLOSURE HEATER FOR ALL ABOVE GRADE PIPING. MOUNT RECEPTACLE 18" ABOVE SLAB ON TOP OF RIGID CONDUIT OR ON UNI-STRUT.

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) MFR'D BY FEBCO, MODEL 825YA (OR APPROVED EQUAL)

DO NOT OBSTRUCT ENCLOSURE OPENINGS (TYP)

SCH 80 PVC PIPE, TYPICAL BOTH VERTICAL RISERS

12" MIN. TYP (ALL WAYS)

12" MIN

4" CONCRETE PAD

SURFACE PER PLAN SLOPE TO DRAIN

3" PIPE SLEEVE FIELD LOCATE (TYP 2)

ELECTRICAL CONDUIT & WIRE TO POWER SOURCE. COORDINATE AS REQ'D TO PROVIDE 120V POWER.

MIN. 2" COMPACTED GRANULAR BASEROCK

COMPACTED SUBGRADE

SCHEDULE 40 PVC FROM WATER SERVICE, SIZE AS SHOWN ON PLANS

30" TYP

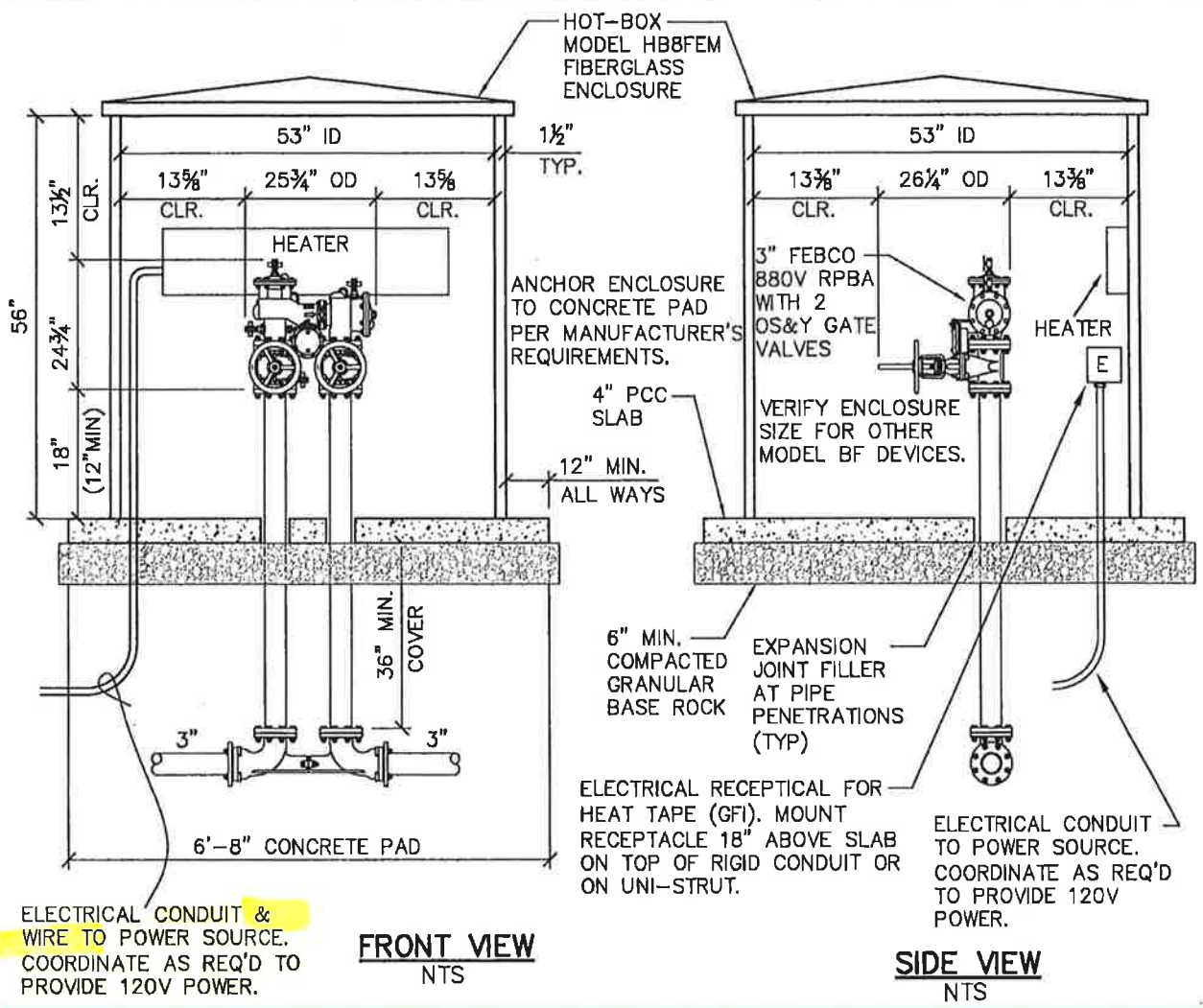
SCHEDULE 40 PVC TO BUILDING, SIZE AS SHOWN ON PLANS

NOTES:

1. RPBA— REDUCED PRESSURE BACKFLOW ASSEMBLY.
2. INSTALLATION OF RPBA & ENCLOSURE SHALL MEET OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPBA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPBA & ENCLOSURE SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. ENCLOSURES SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON HEIGHT OF REDUCED PRESSURE ASSEMBLY.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE BACKFLOW ASSEMBLY.
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
10. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
11. RPBA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.

12. FINISH GRADE TO SLOPE AWAY FROM ENCLOSURE SLAB AT 2% MIN. SLOPE.

LAST REVISION DATE: OCT 2019	JO # STANDARD
2" AND SMALLER REDUCED PRESSURE BACKFLOW ASSEMBLY (NTS)	
DAYTON, OR	DETAIL NO. 541

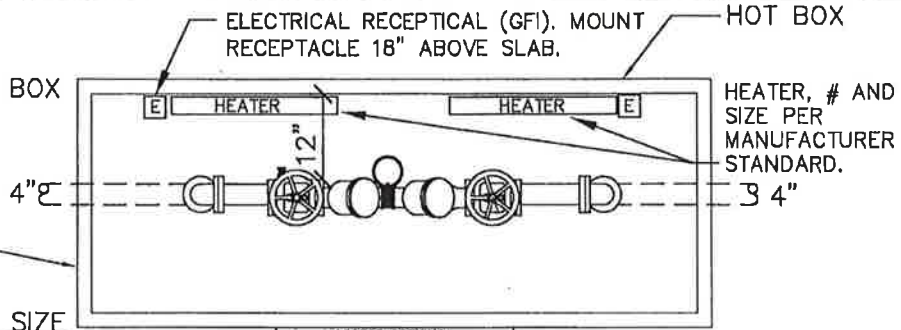


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12. FINISH GRADE TO SLOPE AWAY FROM ENCLOSURE SLAB AT 2% MIN. SLOPE.
13. RISER PIPES & ABOVE GRADE PIPING SHALL BE DUCTILE IRON (CL 52 MIN).

LAST REVISION DATE: OCT 2019	JO #
3" REDUCED PRESSURE ASSEMBLY	
(NTS)	
DAYTON, OR	DETAIL NO. 543

MODEL NO. HB4E AS MANUFACTURED BY HOT BOX (1-800-736-0238) ANCHOR ENCLOSURE TO CONCRETE PAD PER MANUFACTURER'S REQUIREMENTS.



NOTE: VERIFY ENCLOSURE SIZE FOR ACTUAL PROVIDED BF DEVICE.

4" FEBCO 860 REDUCED PRESSURE ASSEMBLY (OR APPROVED EQUAL) WITH 2 OS&Y GATE VALVES (TYP)

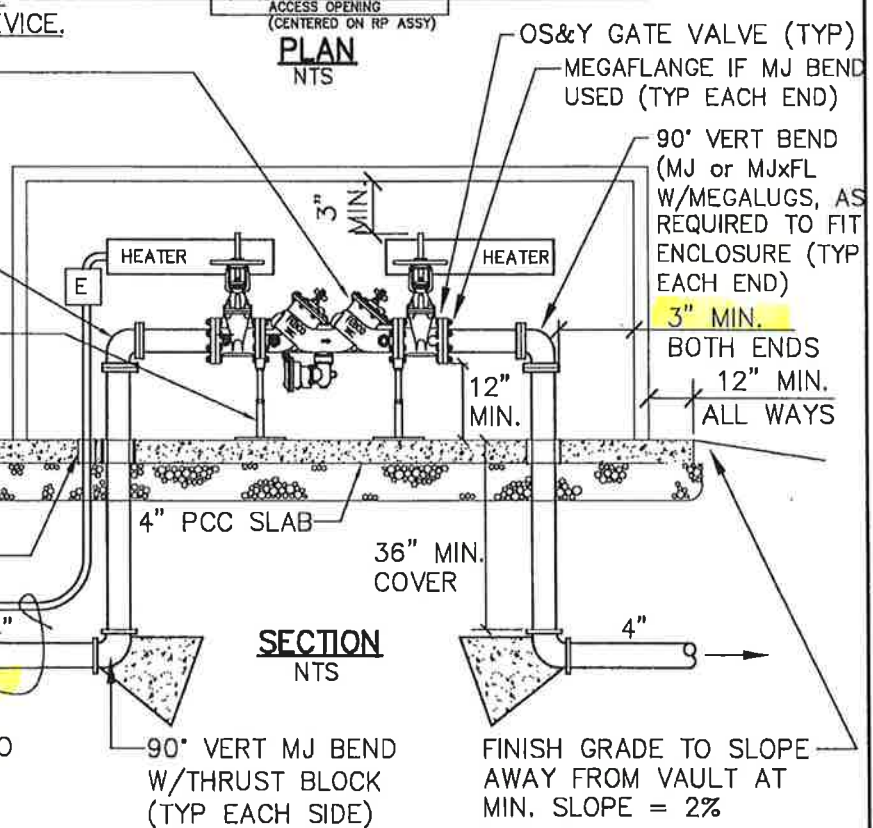
90° VERT MJ BEND W/MEGALUGS (TYP EACH SIDE)

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

6" MIN. COMPACTED GRANULAR BASEROCK

PROVIDE EXPANSION JOINT FILLER AT PIPE PENETRATIONS (TYP)

ELECTRICAL CONDUIT & WIRE TO POWER SOURCE. COORDINATE AS REQ'D TO PROVIDE 120V POWER.



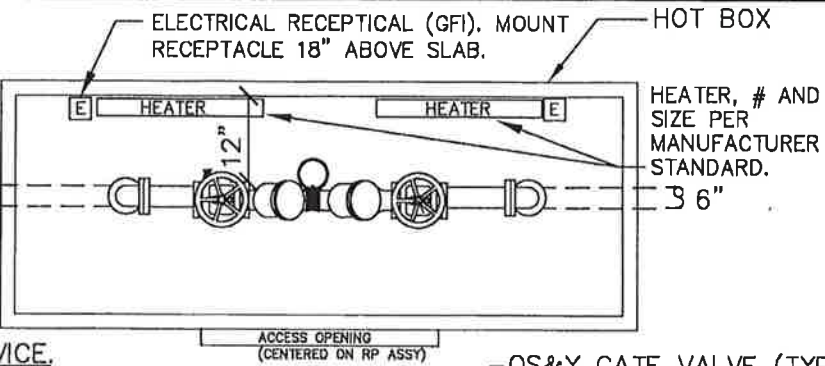
SECTION NTS

NOTES:

1. RPA- REDUCED PRESSURE ASSEMBLY
2. INSTALLATION OF RPA & ENCLOSURE SHALL MEET OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPA & ENCLOSURE SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. ENCLOSURE SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON DIMENSIONS OF REDUCED PRESSURE ASSEMBLY PROVIDED.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE ASSEMBLY (LENGTH-WISE).
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. 'E' INDICATES THE ELECTRICAL RECEPTACLE. IT SHALL BE MOUNTED A MIN. OF 18" ABOVE THE SLAB.
10. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
11. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
12. RPA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.
13. RISER PIPES & ABOVE GRADE PIPING SHALL BE DUCTILE IRON (CL 52 MIN).

LAST REVISION DATE: OCT 2019	JO # STANDARD
4" REDUCED PRESSURE ASSEMBLY	
(NTS)	
DAYTON, OR	DETAIL NO. 544

MODEL NO. HB4E AS MANUFACTURED BY HOT BOX (1-800-736-0238) ANCHOR ENCLOSURE TO CONCRETE PAD PER MANUFACTURER'S REQUIREMENTS.



NOTE: VERIFY ENCLOSURE SIZE FOR ACTUAL PROVIDED BF DEVICE.

6" FEBCO 860 REDUCED PRESSURE ASSEMBLY WITH 2 OS&Y GATE VALVES (TYP)

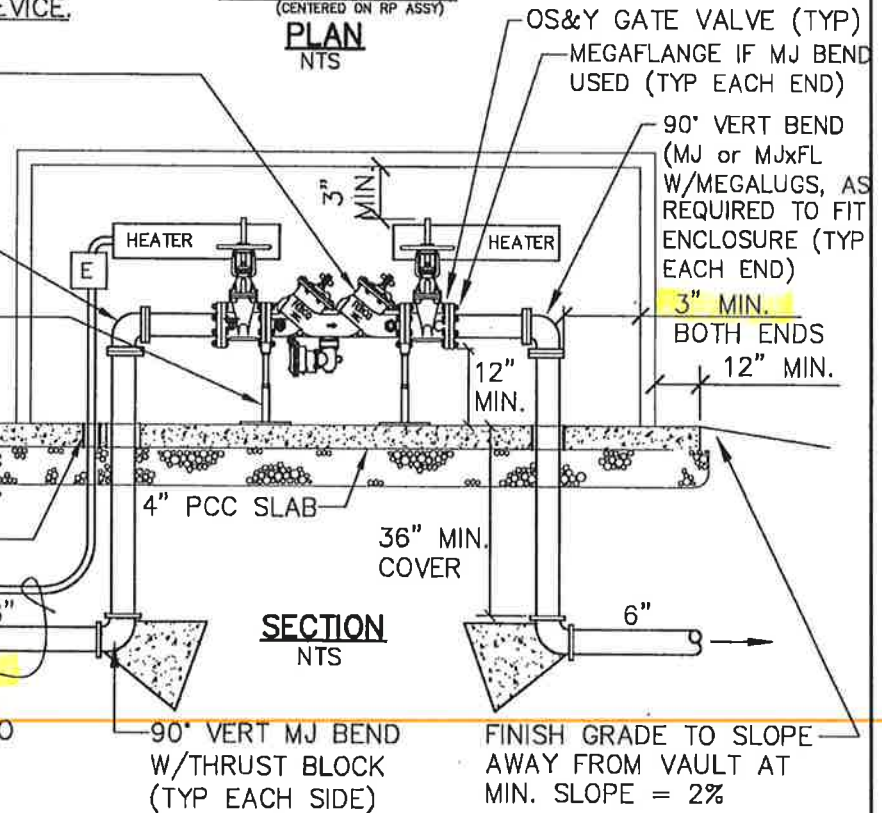
90° VERT MJ BEND W/MEGALUGS (TYP EACH SIDE)

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

6" MIN. COMPACTED GRANULAR BASEROCK

PROVIDE EXPANSION JOINT FILLER AT PIPE PENETRATIONS (TYP)

ELECTRICAL CONDUIT & WIRE TO POWER SOURCE. COORDINATE AS REQ'D TO PROVIDE 120V POWER.

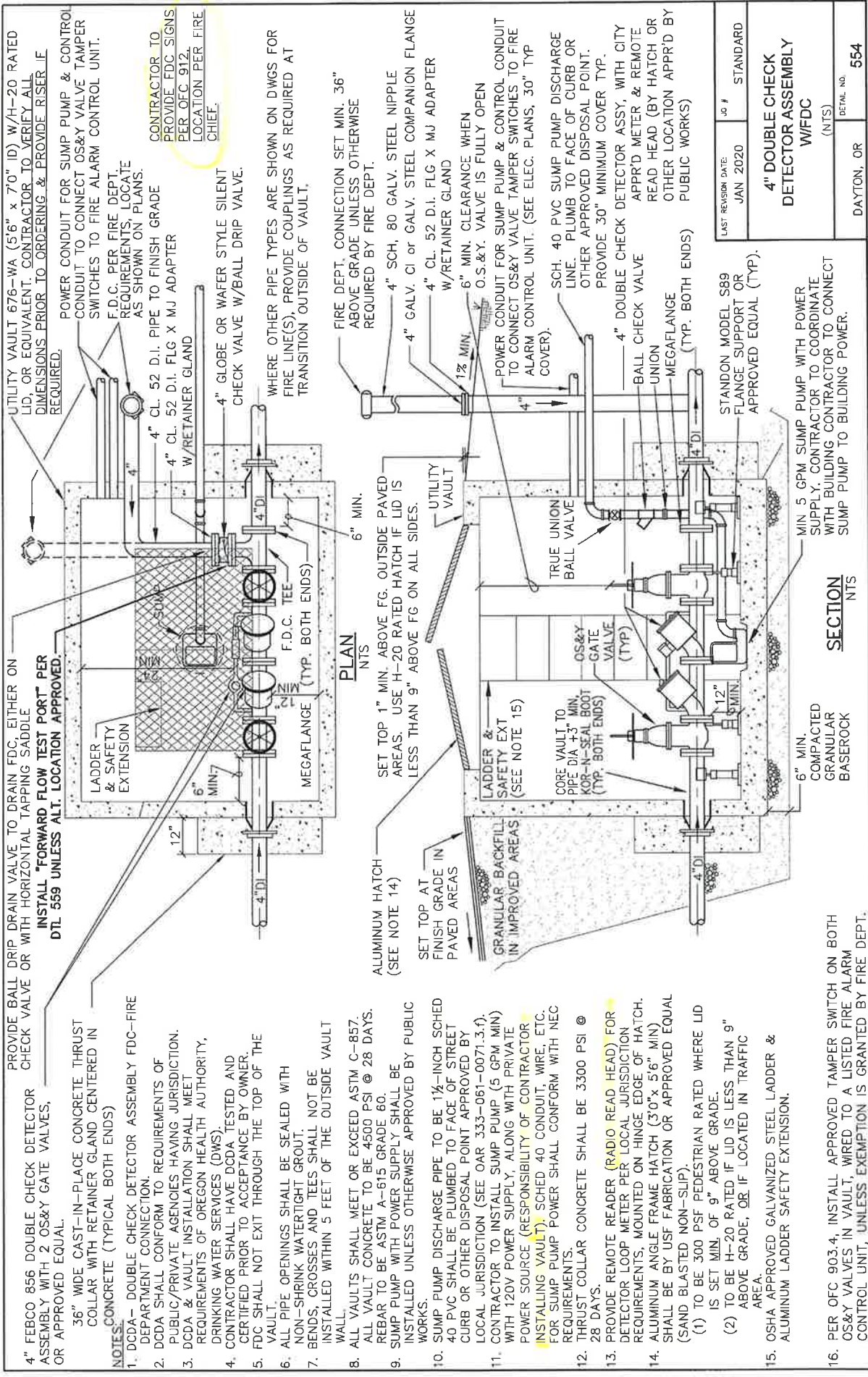


SECTION NTS

NOTES:

1. RPA- REDUCED PRESSURE ASSEMBLY
2. INSTALLATION OF RPA & ENCLOSURE SHALL MEET OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPA & ENCLOSURE SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. ENCLOSURE SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON DIMENSIONS OF REDUCED PRESSURE ASSEMBLY PROVIDED.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE ASSEMBLY (LENGTH-WISE).
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. 'E' INDICATES THE ELECTRICAL RECEPTACLE. IT SHALL BE MOUNTED A MIN. OF 18" ABOVE THE SLAB.
10. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
11. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
12. RPA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.
13. RISER PIPES & ABOVE GRADE PIPING SHALL BE DUCTILE IRON (CL 52 MIN).

LAST REVISION DATE: OCT 2019	JD # STANDARD
6" REDUCED PRESSURE ASSEMBLY	
(NTS)	
DAYTON, OR	DETAIL NO. 545



PROVIDE BALL DRIP DRAIN VALVE TO DRAIN FDC, EITHER ON CHECK VALVE OR WITH HORIZONTAL TAPPING SADDLE. INSTALL "FORWARD FLOW TEST PORT" PER DTL 559 UNLESS ALT. LOCATION APPROVED.

UTILITY VAULT 676-WA (5'6" x 7'0" ID) W/H-20 RATED LID, OR EQUIVALENT. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING & PROVIDE RISER IF REQUIRED.

POWER CONDUIT FOR SUMP PUMP & CONTROL SWITCHES TO FIRE ALARM CONTROL UNIT. CONDUIT TO CONNECT OS&Y VALVE TAMPER F.D.C. PER FIRE DEPT. REQUIREMENTS, LOCATE AS SHOWN ON PLANS.

4" CL. 52 D.I. PIPE TO FINISH GRADE

4" CL. 52 D.I. FLG X MJ ADAPTER

4" GLOBE OR WAFER STYLE SILENT CHECK VALVE W/BALL DRIP VALVE.

WHERE OTHER PIPE TYPES ARE SHOWN ON DWGS FOR FIRE LINE(S), PROVIDE COUPLINGS AS REQUIRED AT TRANSITION OUTSIDE OF VAULT.

FIRE DEPT. CONNECTION SET MIN. 36" ABOVE GRADE UNLESS OTHERWISE REQUIRED BY FIRE DEPT.

4" GALV. CI OR GALV. STEEL COMPANION FLANGE

4" CL. 52 D.I. FLG X MJ ADAPTER W/RETAINER GLAND

6" MIN. CLEARANCE WHEN O.S.&Y. VALVE IS FULLY OPEN

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT. (SEE ELEC. PLANS, 30" TYP COVER).

SCH. 40 PVC SUMP PUMP DISCHARGE LINE. PLUMB TO FACE OF CURB OR OTHER APPROVED DISPOSAL POINT. PROVIDE 30" MINIMUM COVER TYP.

4" DOUBLE CHECK DETECTOR ASSY, WITH CITY APPR'D METER & REMOTE READ HEAD (BY HATCH OR OTHER LOCATION APPR'D BY PUBLIC WORKS)

4" CHECK VALVE

BALL UNION

MEGAFLANGE (TYP. BOTH ENDS)

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

MIN. 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912. LOCATION PER FIRE CHIEF.

36" WIDE CAST-IN-PLACE CONCRETE THRUST COLLAR WITH RETAINER GLAND CENTERED IN CONCRETE (TYPICAL BOTH ENDS)

DCDA - DOUBLE CHECK DETECTOR ASSEMBLY FDC-FIRE DEPARTMENT CONNECTION.

DCDA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.

DCDA & VAULT INSTALLATION SHALL MEET REQUIREMENTS OF OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES (DWS).

CONTRACTOR SHALL HAVE DCDA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.

FDC SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.

ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.

BENDS, CROSSES AND TEES SHALL NOT BE INSTALLED WITHIN 5 FEET OF THE OUTSIDE VAULT WALL.

ALL VAULTS SHALL MEET OR EXCEED ASTM C-857. ALL VAULT CONCRETE TO BE 4500 PSI @ 28 DAYS. REBAR TO BE ASTM A-615 GRADE 60.

SUMP PUMP WITH POWER SUPPLY SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS.

SUMP PUMP DISCHARGE PIPE TO BE 1 1/2-INCH SCHED 40 PVC SHALL BE PLUMBED TO FACE OF STREET CURB OR OTHER DISPOSAL POINT APPROVED BY LOCAL JURISDICTION (SEE OAR 333-061-0071.3.1).

CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.

THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.

PROVIDE REMOTE READER (RADIO READ HEAD) FOR DETECTOR LOOP METER PER LOCAL JURISDICTION REQUIREMENTS, MOUNTED ON HINGE EDGE OF HATCH.

ALUMINUM ANGLE FRAME HATCH (3'0" x 5'6" MIN) SHALL BE BY USF FABRICATION OR APPROVED EQUAL (SAND BLASTED NON-SLIP).

(1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.

(2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.

OSHA APPROVED GALVANIZED STEEL LADDER & ALUMINUM LADDER SAFETY EXTENSION.

PER OFC 903.4, INSTALL APPROVED TAMPER SWITCH ON BOTH OS&Y VALVES IN VAULT, WIRED TO A LISTED FIRE ALARM CONTROL UNIT, UNLESS EXEMPTION IS GRANTED BY FIRE DEPT.

4" FEBCO 856 DOUBLE CHECK DETECTOR ASSEMBLY WITH 2 OS&Y GATE VALVES, OR APPROVED EQUAL.

LADDER & SAFETY EXTENSION

6" MIN.

MEGAFLANGE (TYP. BOTH ENDS)

F.D.C. TEE

6" MIN.

UTILITY VAULT

ALUMINUM HATCH (SEE NOTE 14)

SET TOP AT FINISH GRADE IN PAVED AREAS

GRANULAR BACKFILL IN IMPROVED AREAS

LADDER & SAFETY EXT (SEE NOTE 15)

CORE VAULT TO PIPE DIA +3" MIN. KOR-N-SEAL BOOT (TYP. BOTH ENDS)

OS&Y GATE VALVE (TYP)

TRUE UNION

BALL VALVE

4" DI

6" MIN. COMPACTED GRANULAR BASEROCK

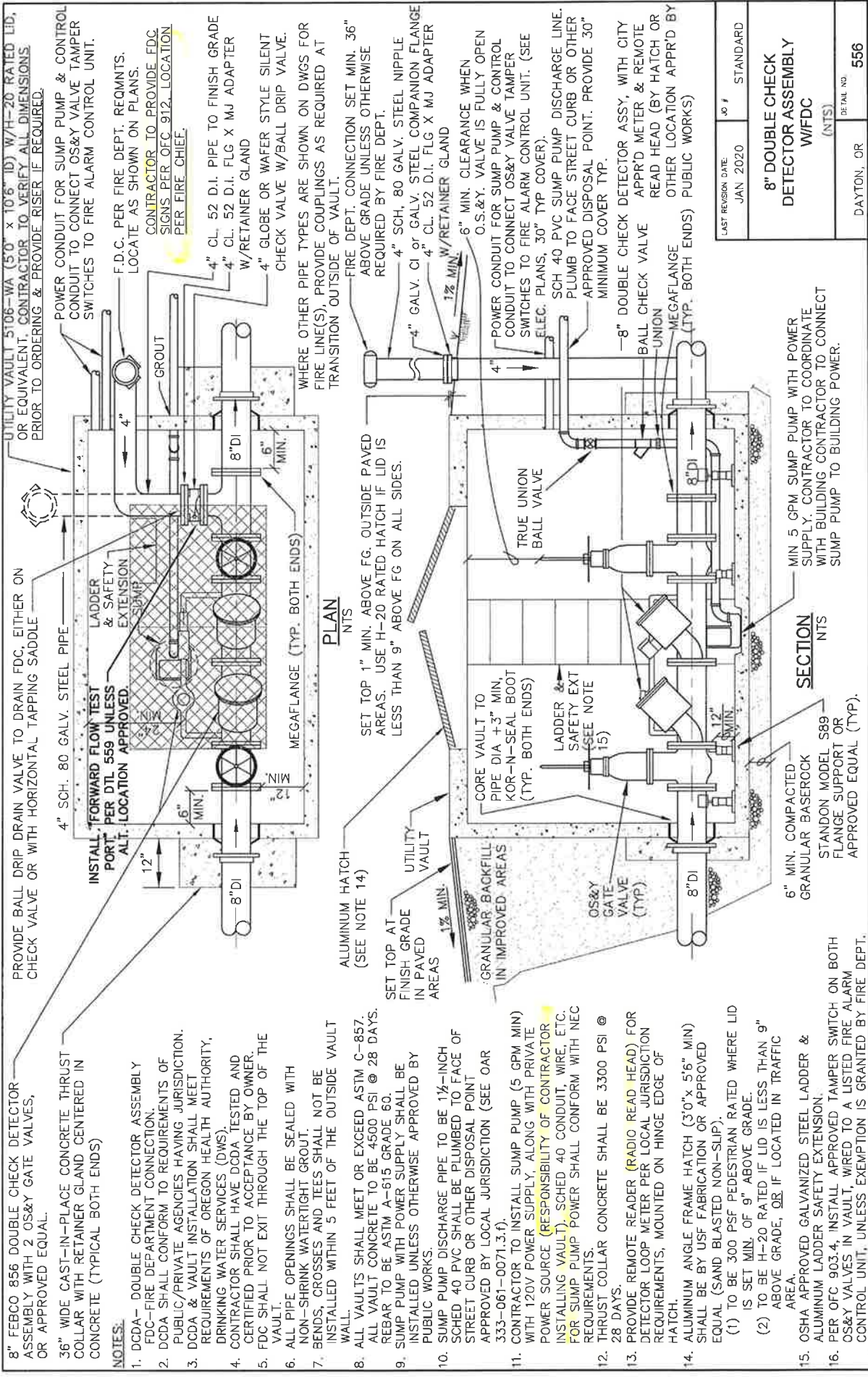
PLAN

SECTION

NTS

NTS

LAST REVISION DATE:	LO #	STANDARD
JAN 2020		
4" DOUBLE CHECK DETECTOR ASSEMBLY		
WFDC		
(NTS)		
DAYTON, OR	DETAIL NO.	554



8" FEBCO 856 DOUBLE CHECK DETECTOR ASSEMBLY WITH 2 OS&Y GATE VALVES, OR APPROVED EQUAL.

36" WIDE CAST-IN-PLACE CONCRETE THRUST COLLAR WITH RETAINER GLAND CENTERED IN CONCRETE (TYPICAL BOTH ENDS)

PROVIDE BALL DRIP DRAIN VALVE TO DRAIN FDC, EITHER ON CHECK VALVE OR WITH HORIZONTAL TAPPING SADDLE

UTILITY VAULT 5106-WA (50" x 10.6" ID) W/H-20 RATED LID, OR EQUIVALENT. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING & PROVIDE RISER IF REQUIRED.

INSTALL FORWARD FLOW TEST PORT PER DTL 559 UNLESS ALT. LOCATION APPROVED.

4" SCH. 80 GALV. STEEL PIPE

LADDER & SAFETY EXTENSION SURVEY

8" DI

6" MIN.

6" MIN.

6" MIN.

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT.

F.D.C. PER FIRE DEPT. REQMENTS. LOCATE AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912, LOCATION PER FIRE CHIEF.

4" CL. 52 D.I. PIPE TO FINISH GRADE

4" CL. 52 D.I. FLG X MJ ADAPTER W/RETAINER GLAND

4" GLOBE OR WAFER STYLE SILENT CHECK VALVE W/BALL DRIP VALVE.

WHERE OTHER PIPE TYPES ARE SHOWN ON DWGS FOR FIRE LINE(S), PROVIDE COUPLINGS AS REQUIRED AT TRANSITION OUTSIDE OF VAULT.

FIRE DEPT. CONNECTION SET MIN. 36" ABOVE GRADE UNLESS OTHERWISE REQUIRED BY FIRE DEPT.

4" GALV. CI or GALV. STEEL COMPANION FLANGE

4" CL. 52 D.I. FLG X MJ ADAPTER W/RETAINER GLAND

6" MIN. CLEARANCE WHEN OS&Y VALVE IS FULLY OPEN

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT. (SEE ELEC. PLANS, 30" TYP COVER).

SCH 40 PVC SUMP PUMP DISCHARGE LINE. PLUMB TO FACE STREET CURB OR OTHER APPROVED DISPOSAL POINT. PROVIDE 30" MINIMUM COVER TYP.

8" DOUBLE CHECK DETECTOR ASSY, WITH CITY APPR'D METER & REMOTE READ HEAD (BY HATCH OR OTHER LOCATION APPR'D BY PUBLIC WORKS)

MEGAFLANGE (TYP. BOTH ENDS)

MIN 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

SET TOP 1" MIN. ABOVE FG. OUTSIDE PAVED AREAS. USE H-20 RATED HATCH IF LID IS LESS THAN 9" ABOVE FG ON ALL SIDES.

ALUMINUM HATCH (SEE NOTE 14)

UTILITY VAULT

1% MIN.

GRANULAR BACKFILL IN IMPROVED AREAS

CORE VAULT TO PIPE DIA + 3" MIN. KOR-N-SEAL BOOT (TYP. BOTH ENDS)

LADDER & SAFETY EXT (SEE NOTE 15)

OS&Y GATE VALVE (TYP)

8" DI

12" MIN.

6" MIN. COMPACTED GRANULAR BASEROCK

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

MIN 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

SECTION

NTS

PLAN

NTS

SECTION

NTS

LAST REVISION DATE: JAN. 2020

NO # STANDARD

8" DOUBLE CHECK DETECTOR ASSEMBLY W/FDC (NTS)

DAYTON, OR

556

DETAIL NO

OSHA APPROVED GALVANIZED STEEL LADDER & ALUMINUM LADDER SAFETY EXTENSION.

PER OFC 903.4, INSTALL APPROVED TAMPER SWITCH ON BOTH OS&Y VALVES IN VAULT. WIRED TO A LISTED FIRE ALARM CONTROL UNIT. UNLESS EXEMPTION IS GRANTED BY FIRE DEPT.

CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.

THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.

PROVIDE REMOTE READER (RADIO READ HEAD) FOR DETECTOR LOOP METER PER LOCAL JURISDICTION REQUIREMENTS, MOUNTED ON HINGE EDGE OF HATCH.

ALUMINUM ANGLE FRAME HATCH (30" x 56" MIN) SHALL BE BY USF FABRICATION OR APPROVED EQUAL (SAND BLASTED NON-SLIP).

(1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.

(2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.

CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

MIN 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

6" MIN. COMPACTED GRANULAR BASEROCK

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

LADDER & SAFETY EXT (SEE NOTE 15)

OS&Y GATE VALVE (TYP)

8" DI

12" MIN.

6" MIN. COMPACTED GRANULAR BASEROCK

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

MIN 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

SECTION

NTS

8" DOUBLE CHECK DETECTOR ASSEMBLY W/FDC (NTS)

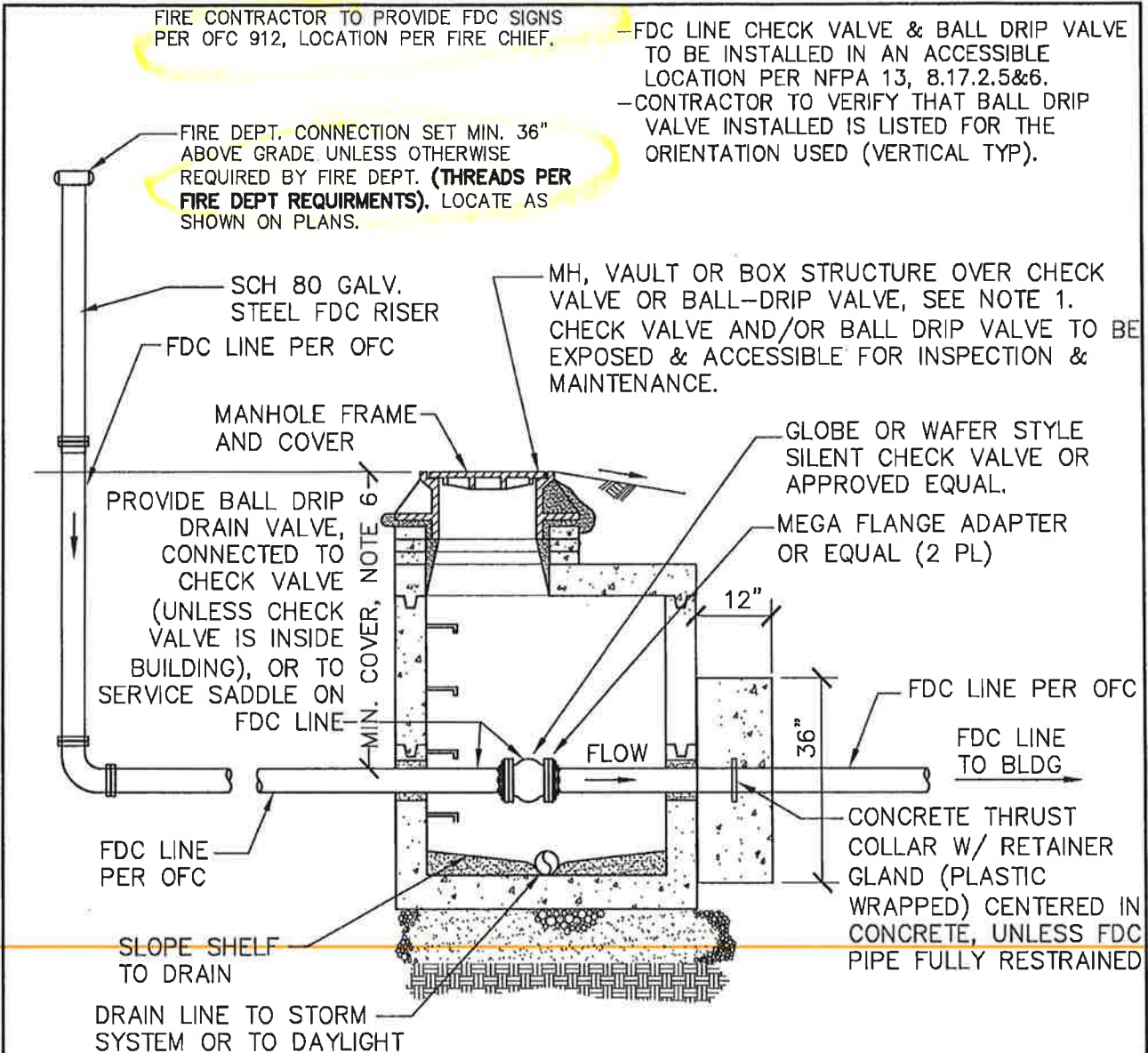
DAYTON, OR

556

DETAIL NO

LAST REVISION DATE: JAN. 2020

NO # STANDARD



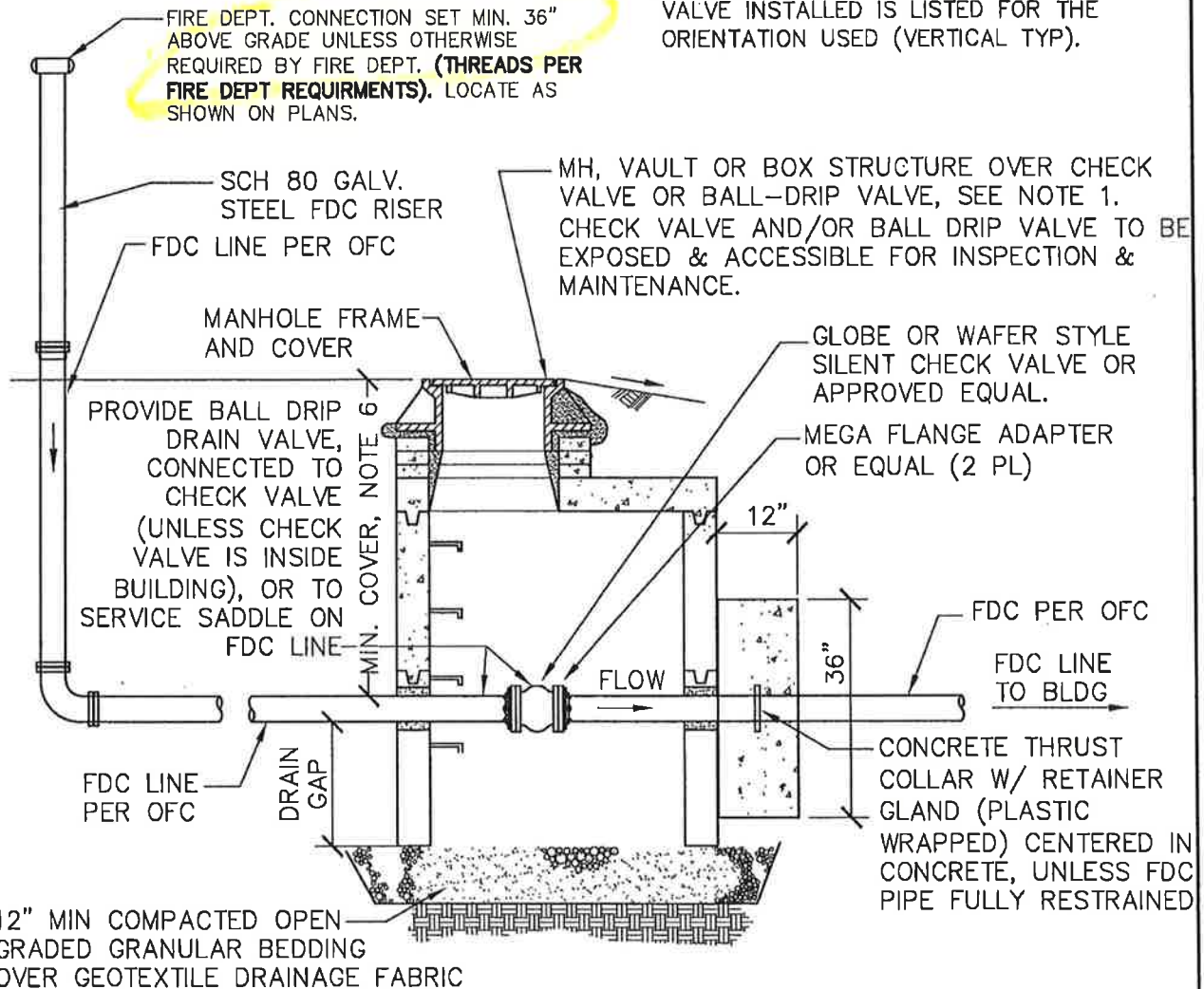
NOTES:

1. INSTALL 48" PRECAST MANHOLE PER DETAIL 402, UNLESS OTHER APPROVED VAULT OR BOX IS SHOWN OR NOTED ON DWGS.
2. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
3. WHERE REQUIRED, THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
4. IF AN FDC LINE CHECK VALVE IS PROVIDED INSIDE BUILDING, AN EXTERIOR FDC LINE CHECK VALVE IS NOT REQUIRED UNLESS OTHERWISE DIRECTED IN WRITING BY FIRE CODE OFFICIAL. BALL DRIP DRAIN VALVE SHALL BE INSTALLED ON CHECK VALVE OR AT LOW POINT ON FDC LINE (DETAIL 562) TO DRAIN FDC LINE BETWEEN CHECK VALVE & FDC RISER.
5. PER NFPA 13, A10.4.1, 36" MIN COVER REQUIRED FOR "WET" FDC LINES (ANY PORTION OF FDC LINE WHICH REMAINS FILLED WHEN NOT IN USE). COVER MAY BE REDUCED TO 12" MIN ON "DRY" FDC LINE WHICH IS DRAINED COMPLETELY WHEN NOT IN USE.
6. THIS DETAIL DOES NOT SUPERCEDE REQUIREMENTS UNDER THE OREGON FIRE CODE, NFPA STANDARDS OR DIRECTION FROM FIRE CHIEF.

LAST REVISION DATE: FEB 2020	JO # STANDARD
BELOW GRADE CHECK VALVE & BALL DRIP VALVE, IN CLOSE BOTTOM DRAIN STRUCT (NTS)	
DAYTON, OR	DETAIL NO. 560

FIRE CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912, LOCATION PER FIRE CHIEF.

-FDC LINE CHECK VALVE & BALL DRIP VALVE TO BE INSTALLED IN AN ACCESSIBLE LOCATION PER NFPA 13, 8.17.2.5&6.
 -CONTRACTOR TO VERIFY THAT BALL DRIP VALVE INSTALLED IS LISTED FOR THE ORIENTATION USED (VERTICAL TYP).



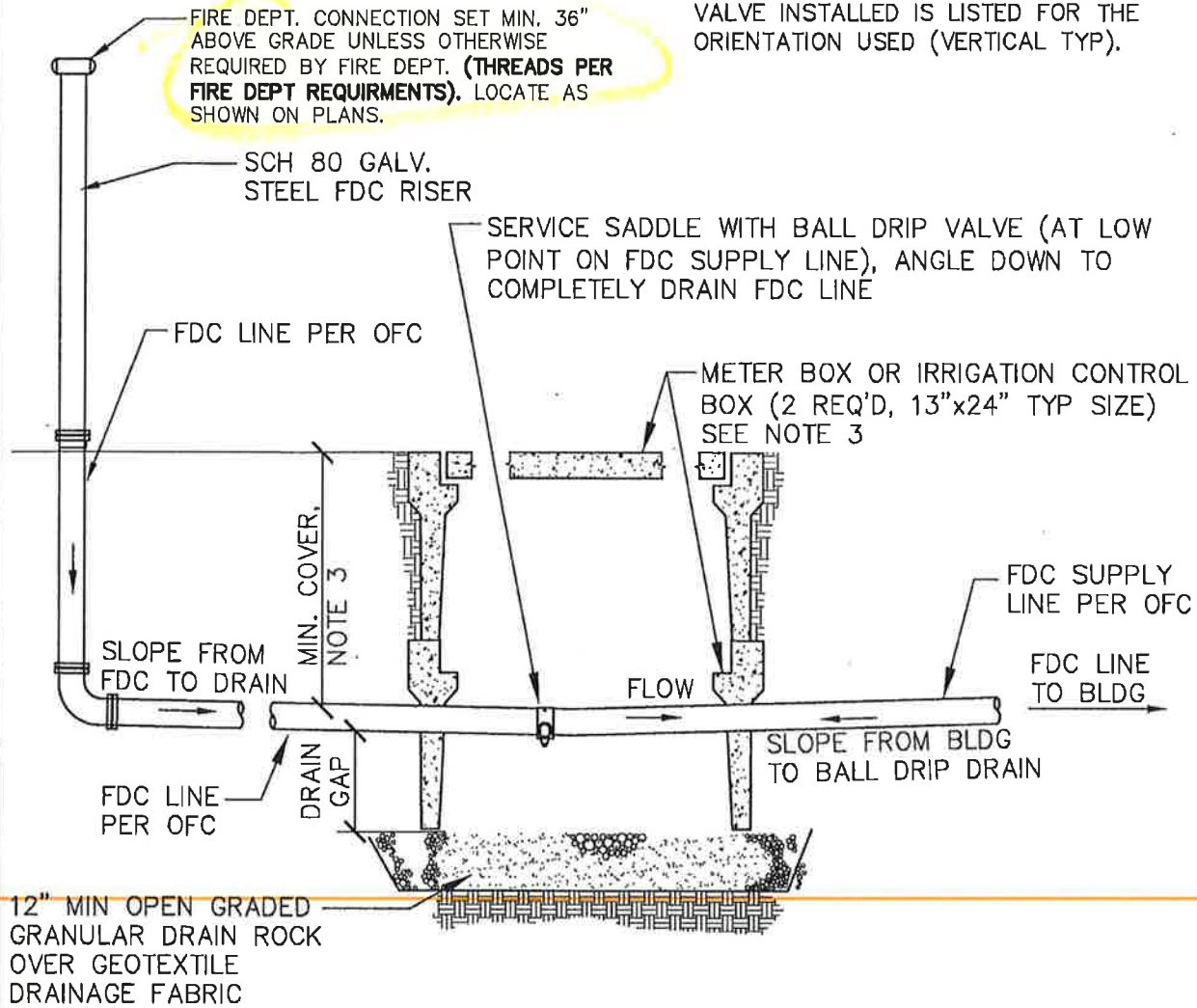
NOTES:

1. INSTALL 48" PRECAST MANHOLE PER DETAIL 402, UNLESS OTHER APPROVED VAULT OR BOX IS SHOWN OR NOTED ON DWGS.
2. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
3. WHERE REQUIRED, THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
4. IF AN FDC LINE CHECK VALVE IS PROVIDED INSIDE BUILDING, AN EXTERIOR FDC LINE CHECK VALVE IS NOT REQUIRED UNLESS OTHERWISE DIRECTED IN WRITING BY FIRE CODE OFFICIAL. BALL DRIP DRAIN VALVE SHALL BE INSTALLED ON CHECK VALVE OR AT LOW POINT ON FDC LINE (DETAIL 562) TO DRAIN FDC LINE BETWEEN CHECK VALVE & FDC RISER.
5. PER NFPA 13, A10.4.1, 36" MIN COVER REQUIRED FOR "WET" FDC LINES (ANY PORTION OF FDC LINE WHICH REMAINS FILLED WHEN NOT IN USE). COVER MAY BE REDUCED TO 12" MIN ON "DRY" FDC LINE WHICH IS DRAINED COMPLETELY WHEN NOT IN USE.
6. THIS DETAIL DOES NOT SUPERCEDE REQUIREMENTS UNDER THE OREGON FIRE CODE, NFPA STANDARDS OR DIRECTION FROM FIRE CHIEF.

LAST REVISION DATE:	JD #
FEB 2020	STANDARD
BELOW GRADE CHECK VALVE & BALL DRIP VALVE, IN OPEN BOTTOM DRAIN STRUCTURE	
(NTS)	
DAYTON, OR	DETAIL NO. 561

FIRE CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912, LOCATION PER FIRE CHIEF.

-FDC LINE CHECK VALVE & BALL DRIP VALVE TO BE INSTALLED IN AN ACCESSIBLE LOCATION PER NFPA 13, 8.17.2.5&6.
 -CONTRACTOR TO VERIFY THAT BALL DRIP VALVE INSTALLED IS LISTED FOR THE ORIENTATION USED (VERTICAL TYP).



NOTES:

1. INSTALL BALL-DRIP DRAIN VALVE & BOX AT LOW POINT IN FDC LINE PROFILE (IE. BALL DRIP VALVE SHALL BE CONFIGURED TO DRAIN ENTIRE FDC PIPE BETWEEN FDC RISER & BUILDING WHEN FDC IS NOT IN USE).
2. CONFIGURATION SHOWN IS BASED ON FDC LINE CHECK VALVE INSIDE BUILDING (IE. FDC LINE "DRY" WHEN NOT IN USE).
3. UNLESS OTHERWISE REQUIRED TO ADDRESS UTILITY CONFLICTS OR OTHER ISSUES, COVER DEPTH FOR "DRY" FDC LINE SHALL BE 12" MIN AT ALL LOCATIONS.
4. BALL DRIP VALVE SHALL BE ACCESSIBLE IN BOX FOR INSPECTION & MAINTENANCE AS SHOWN (PROVIDE LARGER BOXES AS NECESSARY TO ACCOMPLISH THIS).
5. THIS DETAIL DOES NOT SUPERCEDE REQUIREMENTS UNDER THE OREGON FIRE CODE, NFPA STANDARDS OR DIRECTION FROM FIRE CHIEF.

LAST REVISION DATE: FEB 2020	JO # STANDARD
FDC LINE BALL DRIP DRAIN VALVE (CHECK VALVE IN BLDG) OPEN BOTTOM DRAIN STRUCT (NTS)	
DAYTON, OR	DETAIL NO. 562

CITY OF DAYTON
Public Works Design Standards

Standard Construction Notes

Appendix B

Notes:

- 1) The developer's engineers can request the standard construction notes in digital format from the City Engineer.
- 2) Per PWDS 1.10.d.1.f, all applicable City standard notes are to be included on construction drawings submitted for City review and approval. Supplemental notes may be added at the discretion of the design engineer.

GENERAL NOTES:

1. Contractor shall procure and conform to all construction permits required by the City of Dayton and Yamhill County, and conform to all conditions and requirements of said permits. Issuance of a City Public Works street/site/utility construction permit does not relieve the contractor from obtaining any and all reviews and permits required under building, plumbing or electrical codes that any portions of the work may be subject to (including a site plumbing permit if required), or from any requirements under permits which may be required for the project by other agencies with jurisdiction.
2. Contractor shall procure a right-of-entry permit from ODOT State Highway Division for all work within the State right-of-way and conform to all conditions of the permit.
3. Contractor shall procure a right-of-entry permit from affected railroads for all work within the railroad right-of-way and conform to all conditions of the permit.
4. A copy of final approved construction drawings and any required permits shall be kept on-site at all times, for review by inspectors upon request.
5. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction.
6. All grading, rocking, paving, utility and related work shall conform to Oregon Standard Specifications for Construction - OSSC (ODOT/APWA), 2018 edition, or local jurisdiction standards, whichever is more stringent.
7. All materials and workmanship for facilities in street right-of-way or easements shall conform to approving agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, County, Oregon Health Authority – Drinking Water Services (OHA-DWS) and the Oregon Department of Environmental Quality (DEQ).
8. Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. Saturday.
9. The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet applicable agency requirements and provide a completed project.
10. Contractor to notify City, County, ODOT and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other requirements of ORS 757.541 to 757.571.
11. Any inspection by the City, County or other agencies shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the applicable codes and agency requirements.

12. All traffic control plans & measures shall be approved by the agency with jurisdiction and in place prior to any construction activity. Contractor shall erect and maintain barricades, warning signs, traffic cones (and all other traffic control devices required) per City, County and ODOT requirements in accordance with the current MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times.
13. Unless authorized in writing by the City prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days (timeframe applies independently and separately to each block or intersection where traffic control work is required).
14. **Record Drawings.** The Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record any approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered (whether or not existing utilities are shown on the construction drawings). These field record drawings shall be kept up to date at all times and shall be available for inspection by the City upon request. Information on the field record drawings shall include reference measurements and materials type.
15. Upon completion of construction of public facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Design Engineer for use in the preparation of As-Built drawings for submittal to the City.
16. The Contractor shall submit a suitable maintenance bond prior to final payment or final approval where required by public and/or private agencies having jurisdiction.
17. Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.
18. Elevations shown on the drawings are based from _____ (City; OSHD, etc) Bench Mark _____, Elevation _____ (adjusted 19 _____), consisting of a _____ (brass cap; monument, etc.) Located at _____, which is based on the NAVD 1988 datum corresponding to the FEMA flood map elevations.
19. **Address Numbers.** Per OFC 505.1, all new and existing buildings shall have approved address numbers (4" minimum number height, color to contrast with background) placed in a position that is plainly legible and visible from the fronting street. For flaglots or other situations where the structure is not visible from the public street, an address sign shall be installed near the entrance to the driveway or private road. Temporary address signs shall be mounted in a visible location prior to and during any construction, and the permanent numbers mounted prior to occupancy, in a position that is plainly legible and visible from the street fronting the property.
20. Contractor is solely responsible for assuring that any site, street or utility work within the jurisdiction of the City, meets or exceeds any and all legal requirements and any and all

industry best practices in the design, construction and/or performance of such site, street or utility work. Contractor is solely responsible for payment of any assessment, fine, penalty, claim, damages or costs that result from Contractor's (1) performing site, street or utility work or (2) failing to perform site, street or utility work that meets or exceeds any and all legal requirements and industry best practices. The City may require and Contractor shall provide the City with confined space entry plans conforming with the requirements of OR-OSHA, traffic control plans, or other plans or performance descriptions necessary or desirable for the Public Works Director to assure that these requirements can be met in performing the work. The City's acceptance, review, or comments on or about the adequacy of any such plan shall not remove or reduce Contractor's sole responsibility to meet any and all legal requirements, administrative requirements, or industry best practices, and Contractor specially assumes, will defend, and will indemnify the City against any claims, liability, damages, fines, fees or assessments related in any manner to Contractor's site, street or utility work.

21. All construction water must be obtained through an approved hydrant meter or bulk water meter, at a location approved by Public Works.
22. The Contractor shall provide the City and the project engineer with the names and 24 hour telephone numbers of at least two persons associated with the project who can be contacted outside of regular work hours in case of emergencies.
23. Notice to Property Owners, Contractor Responsibility. When work performed by Contractor will impact or interrupt water/sewer/storm drainage utility service or interrupt vehicular or pedestrian access to any public or private property, Contractor shall notify all the affected parties prior to the anticipated impact a minimum of 48 hours in advance. In addition, Contractor shall provide door hangers or equivalent a minimum of 24 hours (and a maximum of 48 hours) before such interruption of utility service (or vehicular/pedestrian access) to all residences, structures or businesses impacted by the work (Contractor is responsible to coordinate with the City staff a minimum of 1 week prior in order to verify area of impact or interruption). In addition to the written notice, a representative of the Contractor shall knock on the front door of all affected residences or businesses on the morning that the work will commence, and attempt to notify the residents or businesses regarding the start of the work.

EXISTING UTILITIES & FACILITIES:

24. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232-1987).
25. The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify sizes and locations of all existing utilities prior to construction.
26. The Contractor or developer shall retain a surveyor to research, locate and mark all existing

property and street monuments within or adjacent to the work areas prior to construction. Any survey monuments that will be disturbed during construction of the project shall be referenced (prior to construction) and replaced (following construction) by a Registered Land Surveyor at the Contractor's expense. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing and/or a survey document recorded as required by ORS 209 140, ORS 209.150 and/or ORS 209.155 as applicable.

27. Contractor shall field verify location and depth of all existing utilities where new facilities cross or are closely parallel to the existing facilities. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility and other conflicts far enough ahead of construction to determine necessary grade, alignment or depth modifications without delaying the work or requiring otherwise unnecessary materials, fittings or structures. If grade, alignment or depth modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer shall obtain approval from the City Engineer prior to construction. .
28. All existing facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the City Engineer.
29. Except where otherwise shown on the drawings and explicitly approved in writing by the City, existing City utilities crossed, intercepted by or in the vicinity of new utility lines or facilities (of the same system) shall be connected to the new City utility system at locations as required by the City Engineer and Public Works Director. Existing City utility lines which are parallel with, or which are replaced or superseded by the new utility lines (as determined by the City), shall be abandoned or removed as part of the project (and existing facilities or structures served by the abandoned lines shall be connected to the new system as applicable), as required by the City Engineer and Public Works Director.
30. Utilities that are abandoned in place, or interfering portions of utilities, shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities (grout or concrete plugs, if used, shall be installed to fill the full pipe diameter for a distance of two times the pipe diameter back from the pipe end).
31. Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.
32. Unless otherwise approved by the City, all springs, field tiles or drain lines intercepted or exposed during construction shall be connected to catch basins or new storm lines, except for field tiles or drain lines which are removed completely during construction, or are located and plugged at 50 foot maximum intervals uphill of the location intercepted (grout plugs, if used, shall have a length of two times the pipe diameter). Any abandoned drain tiles downstream of

the intercepting trenches shall be plugged with grout for a distance of two times the pipe diameter back from the pipe end.

33. Any septic tanks encountered during construction shall be pumped out. Contractor shall break bottom of tank out and backfill with pea gravel unless otherwise required by public agencies having jurisdiction. Septic tank removal to be in accordance with County Sanitarian requirements.
34. Any wells encountered shall be abandoned per state of Oregon water resources department requirements.
35. Any fuel tanks encountered shall be removed and disposed of per State of Oregon DEQ requirements. Backfill with compacted granular material.

GRADING, PAVING & DRAINAGE:

36. Contractor to review soils/geotechnical report prepared by _____ (dated __/20__), and conform to all recommendations listed in the report or requirements shown on these plans, whichever is more stringent.
37. The Contractor shall be responsible for managing construction activities to insure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.
38. Unless otherwise noted, all grading, rocking and paving to conform to OSSC (ODOT/APWA) Specifications, 2018 edition.
39. Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the engineer or as shown on the drawings. Protect all roots two inches in diameter or larger on trees which are not scheduled for removal.
40. Strip work limits, removing all organic matter which cannot be compacted into a stable mass. All trees, brush and debris associated with clearing, stripping or grading shall be removed and disposed of off-site. Fills are not to be placed prior to approval of stripping limits and depths and concurrence of such approval by the City.
41. Immediately following fine grading operations, compact subgrade to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the City prior to placing embankments or base rock.
42. Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills within public right-of-ways and easements shall be engineered, with each lift compacted to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
43. All fills outside of public right-of-ways which are within potential building envelopes shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to

90% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Fills outside of building envelopes which are over 12-inches in depth shall also be engineered and compacted.

44. Unless otherwise shown on the drawings, straight grades shall be run between all finish grade elevations and/or finish contour lines shown. Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.
45. Contractor is responsible for coordinating with the City for the following proof-rolls (witnessed by the City, with a fully loaded rock truck). Performance of proof-rolls summarized below are required for all public street, fire lane or common use driveway improvements. Performance of a proof-roll does not replace the requirement for density testing where specified or where required by City standards.
 - Subgrade proof-roll: prior to fabric or baserock placement.
 - Curbline proof-roll: prior to placement of curb & gutter.
 - Finished rock proof-roll: prior to paving.If the subgrade is disturbed after the subgrade proofroll, or if inclement weather (ie. significant rain) occurs between the time any proof roll is performed and baserock placement, curb placement or paving, another proof roll may be required by the City.
46. Crushed granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve, and shall be approved by the City prior to placement.
47. Compact granular baserock to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Prior to placing AC pavement, written compaction test results for baserock and trench backfill must be received by the City, and a finished rock grade proof-roll (witnessed by the City) must be performed.
48. Paving of streets shall not be allowed until after completion of all of the following as a minimum, including submittal of acceptable written test results to the City where applicable:
 - all required testing, inspection and proofroll of baserock;
 - installation and testing of new water, sewer and storm drain lines under paved areas (including trench compaction testing and submittal of test results to the City);
 - review and approval of the franchise and/or private utility plans by the City Engineer; and
 - installation of all franchise utilities or sleeves located under or crossing paved areas, curbs or sidewalks.
49. A.C. Pavement shall conform to OSSC (ODOT/APWA) 00744 (hot mixed Asphalt Concrete Pavements (ACP)) for standard duty mix, and shall be approved by the City prior to placement. Unless otherwise approved in writing by the City (prior to paving), base course paving shall be 3/4 inch dense graded mix and wearing/leveling course paving shall be 1/2 inch dense graded mix (Level 2 JMF for local streets/parking lots/fires lanes, and Level 3 JMF for collector/arterial streets). AC Pavement shall be compacted to a minimum of 91% of

maximum density (at all locations) as determined by the Rice standard method, based on nuclear density testing.

50. Pavement Joint Locations. Per OSSC 744.44, place ACP in panel widths to minimize the number of longitudinal joints to a minimum. For multi-lift paving, offset the longitudinal and/or transverse joints in one panel by at least 6-inches from the joints in the panel immediately below (OSSC 744.44.a). Longitudinal pavement panel joints/seams shall be at or within 6 inches of the centerline of the street unless otherwise approved by Public Works Director and agency with jurisdiction. Where approved, joints offset from centerline shall be installed at or within 6 inches of lane lines or fog lines. In no case shall longitudinal pavement joints be allowed in travel lanes or adjacent to travel lane wheel paths.
51. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the City, prior to final acceptance of the work.
52. ACP mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall ACP mixtures be placed when the surface temperature is below the minimum established under 2018 OSSC (ODOT/APWA) 00744.40 (Season and Temperature Limitations) or the project specifications, whichever is more stringent.
53. Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.
54. All existing or constructed manholes, cleanouts, monuments, gas valves, water valves and similar structures shall be adjusted by the Contractor to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie.
55. Street pavement widening cross slope shall be a minimum of 2% and a maximum of 5% except at intersections, where the street cross slopes shall not exceed 2% maximum (intersection defined from end of curb radius both directions) to comply with ADA and PROWAG standards. Prior to placing curbs, Contractor shall field verify pavement widening cross slope and contact City if the design pavement widening cross slope is not within the limits stated above.
56. All street signs, traffic control signs, curb & pavement painting or striping, and/or reflectors shall be installed (in conformance with City and MUTCD standards) prior to requesting final inspection by the City. Signs or barricades at the end of streets, sidewalks or bike lanes shall conform with City standards and be acceptable to the Public Works Director.
57. Pavement Markings. Stop bars shall be provided at all stop signs, located behind the pedestrian crossing at a location acceptable to Public Works. All stop bars, crosswalk striping and other roadway marking and emblems shall be pre-formed thermoplastic (Premark BD by Ennis-Flint). Installation shall be by methods and by a contractor approved by Public Works.

58. Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V maximum.
59. All planter areas shall be backfilled with approved top soil minimum 8" thick. Stripping materials shall **not** be used for planter backfill.
60. Contractor shall hydroseed all exposed slopes and disturbed areas which are not scheduled to be landscaped.
61. Grading shown on the drawings is critical to functioning of detention system and shall be strictly followed.
62. Contractor shall coordinate and ensure that detention volumes are inspected and approved by public agencies having jurisdiction prior to paving and landscaping.

• **Curbs & Sidewalks**

63. Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.
64. Unless otherwise approved in writing by the City and any other agency with jurisdiction, monolithic curb & sidewalk shall not be placed in the public right-of-way (ie. curb concrete & sidewalk concrete shall be placed separately). Joint material shall be placed at spacing and locations as noted on the standard details.
65. Construction of all curbs & sidewalks shall conform to the applicable requirements of OSSC (ODOT/APWA) Section 00759, Miscellaneous Portland Cement Concrete Structures, including placement, curing, finishing and the repairing of minor defects. Major defects (as determined by the City) will require removal and replacement of the defective portions as directed.
66. Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter, as well as through any transitions or connections between old & new curbs. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to curb placement. Curbs that are placed too high or too low shall be removed and replaced as directed by the City
67. Finish sidewalk grades at transition to existing sidewalks shall match existing sidewalk grades as required to form a continuous, smooth, free draining surface. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to sidewalk placement.
68. Each lot shall be provided with a minimum two 3-inch diameter weep holes per lot in curbs on each frontage to provide for lot drainage. As a minimum, one weep hole shall be located 5 feet from the property line on the low point in the lot frontage at the time of curb construction.

Weep holes shall also be provided as required for existing drainpipes whether or not shown on the drawings, for additional drainpipes shown on the drawings, as well as on both sides of driveway aprons. Contractor shall install drainpipe (smooth wall PVC or ABS) from each weep hole to the back of sidewalk location prior to acceptance of the curbing by the City, and shall connect to existing drain piping where such piping exists within or adjacent to the right-of-way or easement. Where storm drain laterals for lots are constructed to curb weepholes in conjunction with subdivision or development improvements (ie. where storm drain laterals from storm mainline is not provided), the Contractor shall install 3" x 4" eccentric reducers just past the back of sidewalk to transition to 4-inch PVC rain drain lines as applicable.

69. Weep holes installed in existing curbs shall be core drilled and sealed as required by Public Works.
70. New or replacement curbs shall be stamped with an 'S', 'D' or a 'W' at the point where each sanitary sewer, storm drain or water service lateral crosses the curb, respectively. Letters shall be a minimum of 2-inches high. Existing curbs crossed by new services shall have letters routed or cut into the concrete, unless otherwise approved in writing by the City.
71. Contractor shall construct handicap access ramps at all intersections in accordance with current ADA and PROWAG requirements.
72. All curbs, sidewalks and driveway approaches shall be constructed using batch plant 3300-psi concrete, air entrained (5" slump or stiffer), and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall fully comply with all ADA and PROWAG standards.
 - Standard sidewalks shall be a minimum of 4-inches thick.
 - All pedestrian ramps and standard residential driveways shall be a minimum of 6-inches thick.
 - Commercial or industrial use driveways and alley approaches shall be minimum 8-inches thick.
73. Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (protect unhardened concrete from precipitation). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35°F and rising, and stop placement if air temperature falls below 35°F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 0000440.40.d & 00756.40 or the project specifications, whichever is more stringent.
74. Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (at locations other than contraction joints) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by Public Works.
75. Contractor shall conduct a flood test of all new or replacement pedestrian ramps after concrete is cured to demonstrate that the ramp does not hold water. After water is poured into the ramp area, the inspector shall check the ramp 15 minutes later to determine if water is ponding in the ramp or gutter area. If water is ponding in the ramp or gutter area and the pond is more than 1-

foot in length or ¼-inch in depth, the Contractor shall be required to make repairs in an approved manner at his sole expense.

76. Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the City. The sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.
77. Unless otherwise approved in writing by Public Works, areas along curbs and public sidewalks shall be backfilled with approved topsoil, as well as being seeded and mulched (or hydroseeded).

PIPED UTILITIES:

78. Contractor shall coordinate and pay all costs associated with connecting to existing water, sanitary sewer and storm sewer facilities.
79. Unless otherwise noted, materials and workmanship for water, sanitary sewer and storm sewer shall conform to OSSC (ODOT/APWA) Specifications, 2018 edition.
80. The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.
81. **Pipe Bedding and Trench Backfill.** All pipes shall be bedded with minimum 6-inches of ¾" minus crushed rock bedding and backfilled with compacted ¾" minus crushed rock in the pipe zone (crushed rock shall extend a minimum of 12-inches over the top of the pipe in all cases). Crushed rock trench backfill shall be used under all improved areas, including sidewalks. Granular trench backfill shall be compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
82. Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.
- 82.83. **Trench Foundation Stabilization.** If trenches are over-excavated for any reason, over-excavation shall be filled to the design trench subgrade (ie. to the bottom of the 6" thick pipe bedding layer) with compacted, well-graded granular backfill as specified (the use of open graded rock for trench foundation stabilization is prohibited unless it is completely encapsulated in geotextile fabric & approved in writing by the City).
- 83.84. Temporary thrust restraint on pressure pipelines shall be provided at all locations where necessary due to construction sequencing shown on the drawings, required by City standards or chosen by the Contractor. The adequacy of the temporary thrust restraint shall be the Contractor's sole responsibility, but shall be acceptable to the City and any other

agency with jurisdiction. Any movement of the pipe or fittings during pressurization of the pipeline or connection shall be considered evidence that the temporary thrust restraint is not adequate, and the pipeline or connection shall be depressurized and the thrust restraint increased as necessary. Re-pressure testing or re-chlorination, if deemed necessary at the sole discretion of the City, shall be completed at the Contractor's expense.

84.85. Contractor shall arrange for and pay all costs to abandon existing sewer and water services not scheduled to remain in service.

85.86. All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.

86.87. The end of all utility stubs shall be marked with a painted 2-x-4, extending 2 feet minimum above finish grade (painted white for sanitary sewer, green for storm), and wired to pipe stub. Tracer wire shall be extended (and attached) to the top of the 2-x-4 post. Type of utility (ie. sewer, storm, etc) and depth below grade to pipe invert shall be clearly & permanently labeled on the marker post.

87.88. Contractor shall provide all materials, equipment and facilities required for testing all utility piping in accordance with City construction specifications.

88.89. **Tracer (Toning) Wire.** All water, sanitary and storm sewer piping shall have an electrically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green for storm and sanitary piping.

--Tracer wire shall be taped to the top of the pipe at 10 foot maximum intervals and shall be extended up into all valve boxes, and manholes and catch basins and accessible from the surface.

-- All tracer wire splices shall be made with corrosion resistant waterproof wire nuts (DBR direct bury splice kit by 3M Company, or equal).

--Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole or catch basin.

89.90. **Warning Tape.** Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all water, sanitary sewer and storm drain service laterals and along the full length of all water, sanitary sewer and storm drain mainline segments not located under sidewalks or paved portions of public streets. Underground warning tape shall be continuous the entire length of service laterals installed from the mainline to the back of the PUE.

91. **Warning Tape.** All underground water, sanitary and storm sewer piping shall have a 6-inch wide warning tape installed in the upper reaches of the trench as shown on Detail 301 (*color & "Caution: Buried Below" wording as required for water, sewer, storm drain, etc.*).

90.92. No trenches in roads or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each work day and normal traffic flows restored.

91.93. Before mandrel testing, TV inspection or final acceptance of gravity sewer or storm pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.

92.94. Where future extensions are shown upstream of new manholes (sewer or storm), catch basins or junction boxes, pipe stubs (with gasketed caps) shall be installed at design grades to a point 2' minimum outside of the structure.

93.95. Timing for Trench Work on Existing Public Streets. Unless authorized in writing by the City prior to the start of the work: trenching within existing paved streets shall be backfilled and repaved within 14 days of the start of excavation unless the trenches are completely plated or repaired with cold patch; trenches within each block or intersection shall be permanently repaved within 21 days of the start of excavation (including completion of all inspections, testing & corrective work required by City standards prior to paving). These timeframes apply independently and separately to each block or intersection where trenching work occurs.

- **Water**

94.96. City forces to operate all valves on existing public water mains, on the public side of water meters, or at the connection of fire service lines to public water mains.

95.97. No person other than Public Works staff shall operate or flow test fire hydrants without first obtaining written authorization from the Public Works Director. This hydrant use restriction shall not apply to fire department/fire district staff in the performance of their regular duties. All hydrant flow tests shall be performed with Public Works staff present unless otherwise approved by the Public Works Director. Opening or operating fire hydrants with any tool other than a standard hydrant wrench designed for that purpose is prohibited.

96.98. All water mains shall be C-900 PVC (DR 18) or Class 52 ductile iron. All fittings 4-inches through 24-inches in diameter shall be ductile iron fittings in conformance with AWWA C-153 or AWWA C-110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.

97.99. All water mains to be installed with a minimum 36 inch cover to finish grade unless otherwise noted or directed. Service lines to be installed with a minimum 30 inches cover within the right-of-way. Deeper depths may be required as shown on the drawings or to avoid obstructions.

98.100. Unless otherwise approved by the City Engineer, all valves shall be flange connected to adjacent tees or crosses (where such fittings are installed adjacent to valves). In-line valves shall be MJ x MJ.

99.101. Permanent thrust restraint (concrete thrust blocks) shall be provided on all bends, tees and other direction changes per local jurisdiction requirements and as specified or shown on the

drawings. All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi (5" slump or stiffer). Concrete mix design shall be submitted to the City for review and approval prior to use. If hand mixed sack-crete type concrete is proposed by the Contractor and approved by the Public Works Director, it shall be a 4000 psi minimum mix (approved by the City prior to use), mixed with the minimum amount of water necessary for workability (5" slump or stiffer). In no case will dry sack-crete mix (either in bags or as loose mix) be considered as an acceptable substitute for an approved mixed concrete.

102. It shall be the Contractor's responsibility to coordinate with the City for visual inspection and verification of all thrust restraint and thrust blocking prior to covering or backfilling.

~~100.103.~~ Where approved by the City prior to construction, temporary thrust restraint may be used at mainline connections where it is not possible (prior to pressurization of the connection and placing the waterline in service) to install permanent concrete thrust blocks, straddle blocks or other permanent thrust restraint as required or shown/noted on the drawings. Trenches at the temporary thrust restraint location shall be left open and not backfilled (but plated as necessary or required) until the permanent thrust restraint is installed and approved by the City. Unless otherwise approved in writing by the City, permanent thrust restraint shall be installed by the end of the next working day after installation of the temporary thrust restraint, but in no case later than the third calendar day following installation of the temporary thrust restraint.

~~101.104.~~ Unless otherwise approved by the City, water service pipe on the public side of the meter shall be CenCore blue HDPE tubing (CTS, SDR 9, 200 psi) conforming to AWWA C901 (ASTM D2239 & D2737) with 2-3/8" long style compression inserts (AY McDonald 6133T CTS insert stiffener or equal) and Q style compression fittings.

~~102.105.~~ Unless otherwise noted, water service pipe on the private side of the meter shall be Schedule 40 PVC or as approved by the OPSC.

~~103.106.~~ Domestic, irrigation and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction. It is the responsibility of the premise owner and/or water user to provide a thermal expansion tank or other means approved by the Oregon Plumbing Specialty Code to address thermal expansion concerns in the private water system piping downstream of any backflow device or pressure regulator where applicable (see PWDS 3.22.c & OPSC 608.2&3). The premise owner and water user is hereby notified of these thermal expansion concerns, and that it is the responsibility of the premise owner and/or water user to address these concerns.

107. The Contractor shall be responsible for having backflow devices tested and certified prior to final acceptance of the work.

108. The Contractor shall coordinate with the owner(s) of property being served for permits and installation of conduit(s) and wire as necessary to power required sump pumps in meter vaults and/or in backflow vaults, and any required freeze protection, or as necessary to monitor any tamper switches required in backflow vaults or enclosures. Installation and

activation of any such power and/or signal wires is required prior to acceptance by the City.

109. The Contractor installing each vault or enclosure shall be responsible to install (or coordinate the installation of) the conduit and wires required to serve each such vault or enclosure.
- ~~104.~~110. _____ The work shall be performed in a manner designated to maintain water service to buildings supplied from the existing waterlines. In no case shall service to any main line or building be interrupted form more than four (4) hours in any one day. Contractor shall notify the City and all affected residents and businesses a minimum of 24 business hours (1 business day) prior to any interruption of service.
- ~~105.~~111. _____ Water Mainline Couplings. Where shown on the drawings or required by the City, restrained sleeve couplings shall be Krauz Hymax Grip Couplings or approved equal (Romac Alpha Coupling). Unrestrained mainline couplings shall be long-style epoxy coated DI sleeve couplings, or Hymax Wide Range Coupling (short body couplings not allowed).
- ~~106.~~112. _____ Sanitary Sewer & Waterline Crossings. Where new waterlines cross below or within 18-inches vertical separation above a sewer main or sewer service lateral, center one full length of waterline pipe at point of crossing the sewer line or sewer lateral. Unless otherwise approved in writing by the Public Works Director, existing sewer mains and/or service laterals within this zone shall be replaced with a full 12 foot length of new pipe (D2241 PVC-DR 32.5, C-900 PVC-DR 18 or CL 50 ductile iron), centered at the crossing in accordance with OAR 333-061 and local jurisdiction requirements. Connect to existing sewer lines with approved flexible reinforced couplings (MaxAdaptor Coupling by Gripper Gasket LLC or approved equal). Example: For an 8-inch waterline with 36-inches cover, 4-inch service lateral inverts within 5.67-feet (68-inches) of finish grade must have this pipe centered at the crossing.
- ~~107.~~113. _____ Contractor shall install temporary chlorination & sample taps, restrained caps/plugs and blowoffs as required on new waterlines for flushing, pressure testing, chlorination and bacteriological testing (configuration to be acceptable to the City or other agency with jurisdiction). Chlorination and sample taps shall be located within 18-inches of the end of each mainline segment to be chlorinated & tested, and configured to ensure that all portions of the pipelines are adequately disinfected.
- ~~108.~~114. _____ Pressure Testing. All waterlines, services and appurtenances shall be pressure tested for leakage. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed, and with all hydrant line valves open. Prior to the start of each pressure test, the position of all mainline valves, hydrant line valves and service line corporation stops in the test segment shall verified.
- ~~109.~~115. _____ Cleaning & Flushing. After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other approved means.

~~110~~.116. Disinfection & Bacteriological Testing. All water mains and service lines shall be chlorine disinfected per local jurisdiction requirements, AWWA C-651 or OAR 333-061 (25 mg/L minimum chlorine solution, 24 hours contact time), whichever is more stringent. Unless otherwise approved by the Public Works Director, a City representative shall witness the application of the chlorine solution and the chlorine testing at the end of the 24 hour contact period. After the 24 hour chlorine contact period, the free chlorine concentration shall be checked, and if it is found to be 10 mg/L or more, the chlorine solution shall be drained (otherwise the line shall be rechlorinated), the waterline flushed with potable water, and a minimum of two consecutive samples taken at least 24 hours apart shall be collected from the waterline for microbiological analysis (ie. one sample immediately after flushing, and another sample a minimum of 16 hours later). Contractor to pay for laboratory analysis of water samples taken under the supervision of the City. If the results of both analyses indicate that the water is free of coliform organisms, the waterline may be placed in service. Should the initial treatment prove ineffective, the flushing & chlorination shall be repeated until confirmed tests show acceptable results. Contractor shall coordinate with Public Works to ensure that both a high level chlorine test kit and a chlorine residual test kit is available at the site during testing.

~~111~~.117. Disinfection of Connections. For connections which cannot be disinfected with the waterline mainlines as noted above, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution (10,000 mg/L) in accordance with the requirements of AWWA C-651 and OAR 333-061.

~~112~~.118. Disposal of Chlorinated Water. The chlorine residual in water from testing, disinfection or flushing activities shall be neutralized in accordance with DEQ standards prior to discharge to the storm system or ditch discharging to surface waters. Care should be exercised to balance the amount of dechlorinating chemical against the chlorine present. Where required by Public Works, the Contractor shall provide a field chlorine residual test kit to verify adequate dechlorination of water being discharged.

~~113~~.119. Capping of Chlorination Taps, Pressure Test Taps, Temporary Sample Taps, etc. Unless otherwise approved or required by the City, all extra pipe and fittings attached to chlorination, pressure test or temporary sampling taps shall be removed and the corporation stop capped at the mainline tap or saddle after the new waterline is placed in service (to avoid depressurizing the mainline after disinfection). Wrap each capped corporation stop in plastic prior to backfilling. The location of all such capped corporation stops shall be shown on the Contractor's record drawings.

~~114~~.120. Unless otherwise shown on the drawings AND explicitly approved in writing by the City, any existing waterlines abandoned in place shall be physically disconnected from valves and other connection points to the existing water system. A blind flange or restrained MJ plug (as applicable) shall be installed on the back side of all valves from which abandoned waterlines are disconnected. Remove valve boxes from abandoned valves prior to repaving or surface restoration.

- **Sewer & Storm Manholes**

- ~~115~~.121. All precast sanitary sewer manholes shall be provide with integral rubber boots. Lockdown lids shall be used on manholes outside of public right-of-way only where specifically required by Public Works.
- ~~116~~.122. All connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. Connections to manholes shall be watertight and shall provide a smooth flow into and through the manhole. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels. Use of large pneumatic jackhammers shall be prohibited.
- ~~117~~.123. Unless otherwise approved in writing by the City Engineer, manhole steps shall be installed in any manhole tapped which does not have existing steps.
- ~~118~~.124. Manhole channel depths (sewer & storm) shall be to the heights shown on the drawings, but in no case shall be the channel depth be less than 2/3 of the pipe diameter. Flow channels in manholes shall be of such shape (semi-circular bottoms) and slope to provide smooth transition between inlet and outlet sewer size/ invert to minimize turbulence and to ensure that the manhole channels are self-cleaning. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.
- ~~119~~.125. All sanitary sewer manholes in low areas which are subject to flooding or water ponding (including all lawn, landscape or gravel areas, or low areas of parking lots, or manholes closer than 4 feet clear of parking lot curblines or existing/future street curbs, adjacent to ditches, etc.) shall be provided with inflow protector lid inserts (whether or not such MH inserts are specifically noted on each applicable drawings sheet). Manhole inflow inserts shall be of ABS or HDPE plastic, and shall include integral lifting lugs on each side of the insert allowing removal with a manhole hook (lift straps are not an acceptable alternate), a factory installed closed cell neoprene rubber gasket bonded to the underside of the insert rim. Unless waived in writing by Public Works (case by case basis), a clog-free vent-valve valve (rubber check by Tideflex) shall be provided on each unit. Inserts shall be ManPan manhole inserts or approved equal.
- ~~120~~.126. Vacuum Testing (New MHs). All sanitary sewer manholes shall be vacuum tested following completion of paving or final surface restoration. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Visible groundwater infiltration or leakage constitutes a failed manhole test, whether or not the vacuum test is successful.
- ~~121~~.127. Vacuum Testing (Existing MHs). Existing sanitary sewer manholes to which new pipes are connected (or where existing pipe connections are modified) shall be sealed as required and pass a vacuum test prior to final approval. Visible groundwater infiltration or leakage constitutes a failed manhole test, whether or not the vacuum test is successful.
- ~~122~~.128. Manhole Cleaning. All manholes shall be thoroughly cleaned prior to being placed in

service and/or accepted by the City, including removal of any debris, excess grout in manhole channels or on manhole steps, etc.

- **Sewer & Storm Warranty Inspections**

~~123.129.~~ Re-inspection of the sanitary sewer systems by cleaning & TV inspection shall be performed during the last month of the warranty period, as well as visual inspection of all sanitary sewer manholes during the wet weather season (any visible groundwater infiltration or leakage constitutes a failed manhole test, and will require warranty correction). Based on the results of the TV inspections and/or the City's warranty inspections, additional warranty tests may include mandrel testing or low pressure air testing. The results of these test(s) will be used by Public Works to determine if final acceptance of the system is warranted and what corrective work is required prior to final acceptance. The cost of these re-inspections and any corrective work shall be the responsibility of the Developer. The warranty period will not be considered to be complete, and maintenance bonds will not be released until after all warranty inspections are finished and any resulting corrective work is completed.

- **Sanitary Sewer**

~~124.130.~~ Unless otherwise shown, sanitary sewer pipe shall be PVC in conformance with ASTM D3034, SDR 35. All other appurtenances and installation to conform to the City specifications.

~~125.131.~~ Sanitary sewer laterals for single family residential & each side of duplexes shall be a minimum of 4-inches in diameter (6-inch minimum for other laterals), and shall include toning wire and warning tape per standard details.

~~126.132.~~ **Gravity Sewer Couplings.** Couplings for new PVC sewer pipe connecting to other PVC or solid wall HDPE pipe shall be gasketed solid sleeve PVC slip couplings. Couplings for connection of PVC to concrete pipe shall be MaxAdaptor Coupling (by Gripper Gasket LLC) for sizes up to and including 12-inch diameter.

~~127.133.~~ **Sewer Cleaning.** After manhole channeling and prior to leakage testing, mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from mainlines and manholes. Failure to clean all dirt, rock and debris from pipelines prior to TV inspection will result in the need to re-clean and re-TV the sewer lines.

~~128.134.~~ **Sewer Leakage Testing.** Sanitary sewer pipe and appurtenances shall be tested for leakage. Leakage tests shall include an air test of all sewer mains and laterals prior to paving, and a separate air test of all sewer mains and laterals following excavation and backfilling of any franchise utility trenches or other utility work that crosses sanitary sewer laterals. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS.

~~129.135.~~ **Sewer Mandrel Testing.** Contractor shall conduct deflection test of flexible sanitary sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted ~~not more than 30 days~~ after the trench backfilling and compaction is completed

and tested.

~~130.~~136. **Sewer TV Inspection.** Upon completion of all sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b (no deviation greater than 1/32-inch per inch of pipe diameter [1/2-inch max for pipes >16-inch diameter], & no reverse sloping pipe inverts) and to verify pipelines are adequately cleaned. The TV inspection shall be conducted by an approved technical service, using a track or wheel propelled self-leveling auto-focus pan-head camera which is equipped to make audio-visual recordings of the TV inspections on DVD. Unless otherwise required by the agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection (with the ball in contact with the pipe invert) to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report (or download link and pdf report) shall be delivered to the City Engineer.

~~134.~~137. Prior to or concurrent with connection to a sanitary sewer lateral, it shall be demonstrated to the City that the sewer lateral is not obstructed. This shall be accomplished by “snaking” the service lateral downstream of the connection point to the mainline, or similar method acceptable to the City. City personnel or authorized agent shall be present during the “snaking” or other demonstration method.

~~132.~~138. Sewer service from upstream and affected properties shall be maintained during construction unless prior written City approval is granted. Bypass pumping or other methods used to maintain sewer flows shall be the Contractor’s design, subject to approval by the City. The bypass system shall be capable of conveying flows when the sewers are flowing full. Normal unrestricted flows shall be restored at the end of each work day. Bypass systems left in place or operated outside normal working hours shall be monitored continuously by the Contractor personnel unless alternate arrangements proposed by the Contractor are acceptable to the City (ie. high level & pump fail alarm callouts, etc.). The Contractor shall provide for City review all submittal information required to demonstrate (to the satisfaction of the City) compliance with these requirements. Contractor shall be responsible for all costs related to cleanup, damages and fines resulting from any sewerage spill or overflow associated with any methods used to convey sewage flows during construction.

139. Thrust restraint shall be provided on all pressure pipelines meeting the same standards and requirements as for water mainlines.

- **Storm Drain**

~~133.~~140. Storm drain pipe materials shall conform to the construction drawings and City requirements. Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%).

~~134.141.~~ Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.

~~135.142.~~ Unless otherwise approved by the City Engineer, all storm drain connections shall be by manufactured tee or wye fittings.

~~136.143.~~ Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.

~~137.144.~~ Sweep (deflect) storm drain pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.

~~138.145.~~ Unless otherwise specified or directed, install storm drain pipe in accordance with manufacturer's installation guidelines.

~~139.146.~~ **Gravity Storm Couplings.** Couplings for connection of PVC to concrete or other non-compatible pipe shall be MaxAdaptor Coupling (by Gripper Gasket LLC) for sizes up to and including 12-inch diameter.

~~140.147.~~ **Storm Cleaning.** After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.

~~141.148.~~ **Storm Mandrel Testing.** Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.

~~142.149.~~ Prior to acceptance, the City will typically lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the City.

STREET LIGHTS

~~143.150.~~ Street lights shall be installed after all other earthwork and public utility installations are completed and after rough grading of the property is accomplished to prevent damage to the poles.

~~144.151.~~ Public street light poles, conduit and junction boxes shall conform with the requirements of the City and the power company providing service. Junction boxes shall be H-20 rated and set to finish grade. Direct bury street light poles shall be set to a depth as

specified by the manufacturer, but not less than 5 feet.

~~145.152.~~ Street light poles shall be installed within one degree (1°) of plumb.

~~146.153.~~ All public street lights shall be energized and fully operational prior to requesting final inspection by the City.

FRANCHISE & PRIVATE UTILITIES

~~147.154.~~ Unless otherwise shown on the drawings and approved in writing by all jurisdictions having authority, new and relocated franchise utilities (power, cable TV, telephone & gas) shall be installed underground in conjunction with the development.

~~148.155.~~ Franchise utility plans shall be submitted to Public Works and the City Engineer for review prior to installation. All franchise utility street crossings shall be installed at right angles to the street centerline, and all crossings of water, sewer or storm mainlines or laterals shall be as close to perpendicular as feasible.

~~149.156.~~ Where franchise utilities are installed along new public or private streets, franchise utilities shall either be extended across the entire frontage of the property or to the end of the street improvements (whichever is further) or conduit shall be provided for extension of franchise utilities in the future without additional excavation along the new street frontage.

~~150.157.~~ Developer and/or Contractor shall coordinate with gas, power, telephone, and cable TV company for installation/location of utilities and/or conduits in common trenches, as well as location of vaults, pedestals, etc., as required to serve all existing homes and new lots within the development. The Contractor shall be responsible for providing franchise utility companies adequate written notice of availability of the open trench (typically 10 days minimum), and reasonable access to the open trench for installation of franchise utilities as required to serve each lot within the development or along offsite improvements (even though how or whether the homes will connect to such franchise utility service lines will be up to the homebuilder or homeowner).

~~151.158.~~ Unless otherwise approved in writing by the City, all above-grade facilities shall be located in PUEs (where PUEs exist or will be granted by the development), and otherwise shall be placed in a location outside the proposed sidewalk location. Contractor shall grade street frontage PUEs so that all franchise utility pedestals and vaults can be set to finished grade as measured from the back of the public sidewalk (whether the sidewalk is installed with street construction or deferred to a later time).

~~152.159.~~ Installation of private utilities (including either franchise utilities or private water, sewer or storm services) in a common trench with public water, sanitary sewer or storm drains, or within 5 feet horizontally of (ie. clear separation) and paralleling public water, sanitary sewer or storm drains is prohibited.

~~153.160.~~ Power, telephone and TV trenching and conduits shall be installed per utility company

requirements with pull wire. Contractor shall verify with utility company for size, location and type of conduit prior to construction, and shall ensure that trenches are adequately prepared for installation per utility company requirements. All changes in direction of utility conduit runs shall have long radius steel bends.

~~154.161.~~ Contractor shall notify and coordinate with franchise utilities for relocation of power poles, vaults, etc. to avoid conflict with City utility structures, fire hydrants, meters, sewer or storm laterals, etc.

STREET TREES, LANDSCAPING & IRRIGATION:

~~155.162.~~ Street trees and landscaping shall not conflict with sight distance standards.

~~156.163.~~ Landscape plantings shall maintain a minimum of three (3) feet clear from all fire hydrants. Maintenance of this clearance is an ongoing obligation of the property owner.

~~157.164.~~ All irrigation systems shall be provided with backflow protection conforming to state and City standards. Backflow testing results shall be submitted to Public Works prior to requesting final inspection by the City.

TESTING AND INSPECTION:

~~158.165.~~ The Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.

~~159.166.~~ Unless otherwise specified, the attached "Minimum Required Testing and Frequency" table outlines the minimum testing schedule for the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor. Copies of all test reports shall be submitted to the designated City representative.

Minimum Required Testing and Frequency”, page 1

Minimum Required Testing and Frequency”, page 2

EROSION CONTROL NOTES

The erosion control notes and details contained in these PWDS also apply to work under separate building permits issued without the need for a Public Works Construction Permit. City Code requires that erosion control measures be provided for work under such building permits, to minimize runoff, siltation and pollution both during and after construction (DMC 7.2.304.03 & 7.2.301.02).

General

1. Approval of an erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.)
2. The implementation of ESC plans and the construction, maintenance, replacement and upgrading of ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established as provided for on the construction drawings, or until 75% coverage without bare spots (ie. vegetation well established and not just showing).
3. The erosion control measures shown on the ESC plan are considered the minimum required for anticipated site conditions, and shall be supplemented and/or upgraded by the applicant/contractor as required to control erosion or sediment within the project boundaries and avoid impacts to adjacent property. Additional measures shall be installed as required to ensure that all paved areas are kept clean for the duration of the project.
4. The boundaries of the clearing limits shown on the plans shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the applicant/contractor for the duration of construction. Sediment fence may be used as the flagging for the clearing limits at the discretion of the Contractor.
5. The ESC facilities must be installed and maintained in conjunction with all clearing, grading and construction activities, and in such a manner as to insure that sediment and sediment laden water do not enter the drainage system, roadways, or violate applicable water standards. The Contractor shall be financially responsible for all costs, violations, fines and/or penalties resulting from failure to adequately control erosion or sediment.
6. Erosion control facilities and sediment fences on active sites shall be inspected by the Contractor at least daily during any period with measurable precipitation. Any required repairs or maintenance shall be completed immediately. The erosion control facilities on inactive sites shall be inspected and maintained by the Contractor a minimum of once a month or within 24 hours following the start of a storm event, or within 24 hours of notification for failure of erosion control devices.
7. Sediment protection (silt sack inserts with biobags) for storm drain inlets, catch basin and area drains shall be installed and maintained for the duration of the project, and until permanent

vegetation/landscaping is established.

8. At no time shall sediment accumulation within a trapped catch basin exceed 50% of the sediment capacity. All catch basins and conveyance lines shall be cleaned prior to paving, by the Contractor as their cost. The cleaning operation shall not flush sediment laden water into the downstream system. Contractor shall also verify that all catch basins and conveyance lines are clean, and all trash or sediment deposits are removed, prior to requesting final inspection of the project by the City.
9. In addition to hydroseeding, for slopes 2H:1V or steeper (or where slope protection matting is indicated on the drawings or required by Public Works), the erosion matting shall be a type that has a extended term functional longevity (ie. minimum 24 months degradability) and specifically designed for use of 2:1 or steeper slopes to ensure that the steep slopes are protected until they have adequate vegetation cover established before the matting biodegrades away. Erosion control matting shall be SC150 matting by North American Green, or approved equal (consisting of a full layer of 70% straw and 30% coconut fiber stitched with degradable thread between a heavyweight UV stabilized polypropylene top net and a lightweight photodegradable polypropylene bottom net).
10. The Contractor shall provide (at Contractor's expense) site watering as necessary to prevent wind erosion of fine-grained soils, and to support vegetation until it is established as specified herein, or as required by an erosion control permit or to comply with City/state/federal erosion control standards.
11. Soil or native fill stockpiles placed or left in place during wet weather periods shall be covered with UV resistant plastic or tarps anchored and weighted in place. Stockpile covering shall also include installation of sediment fences or other sediment barrier around the stockpile on all sides. Inactive stockpiles shall not be left uncovered for more than 7 days during dry weather periods.

Sediment Fences

12. Sediment fences shall consist of standard strength filter fabric fastened securely to stitched post loops, and shall be installed on the upslope side of the posts, with 6 inches of the fabric extended into a trench along the sediment fence alignment. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
13. The sediment fence (filter fabric barrier) shall be purchased in a continuous roll cut to the length of the barrier to minimize joints. When joints are necessary, the sediment fence shall be spliced together only at a support post. The support post ends of each sediment fence section shall be twisted together by at least 2 turns and both stakes installed into the ground together.
14. The filter fabric fence shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground, and shall be provided with additional support as required to contain all silt and sediment capture. Filter fabric shall not be stapled to the existing trees.

15. Sediment fences shall be inspected by applicant/contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
16. Sediment fences shall be removed by the Contractor when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Gravel Construction Entrances

17. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as wheel wash basins, may be required to insure that all paved areas are kept clean for the duration of the project. Where provided or required by the City, wheel wash basins shall be periodically (or as directed by City inspector) drained, cleaned of sediment and refilled with clean water.
18. The area of the entrance shall be cleared of all vegetation, roots, and other objectionable material. The gravel shall be placed to the specified dimensions.
19. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public right-of-way.
20. The entrance may require periodic top dressing with additional stone as conditions demand, and repair and/or cleanout of any structures used to trap sediment.
21. The Contractor shall verify that all trucks are well sealed when transporting saturated soils from the site. Water drippage from trucks transporting saturated soils must be reduced to less than 1 gallon per hour prior to leaving the site.
22. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately by the Contractor at their expense and to the satisfaction of the Public Works Director or his designee.

CITY OF DAYTON
Public Works Design Standards

Utility Companies & Agencies
Appendix C

UTILITY COMPANIES AND AGENCIES

The following is a summary list of utility companies with utilities within the City, as well as public agencies with jurisdiction within the City. This summary is not necessarily complete or up to date, and is included solely for benefit of the developer, and is not intended to indicate all utilities or agencies which must be contacted or from which approvals must be obtained. As noted in the various sections of the PWDS, design and construction of improvements within the City must fully comply with the applicable rules and regulations of all applicable agencies, including but not limited to those listed below. In the event of discrepancies between these PWDS and applicable agency requirements, the more stringent requirements (*as determined by the Public Works Director*) shall apply.

Category	Utility/Agency	Phone #
City Hall	Dayton City Hall	(503) 864-2221
City Utilities	Dayton Public Works	(503) 864-2221
City Engineer	Westech Engineering	(503) 585-2474
Fire Chief	Dayton Fire District	(503) 864-2221
Gas	NW Natural Gas (currently no gas service in Dayton)	(503) 585-6611 x8142
Power	PGE	(503) 463-6184
Telephone	Verizon	(503) 644-9848
Fiber Optic	Verizon	(503) 644-9848
TV	Comcast	(541) 230-0219
State Highway	ODOT District 3	(503) 986-2874
County Roads	Yamhill County Public Works	(503) 434-7515
Sanitary Sewer	Dept. of Environmental Quality (DEQ) Western Region	(503) 378-8240
Water System	Oregon Health Authority (OHA) Drinking Water Services (DWS)	(971) 673-0405
Schools	Dayton School District, Facilities	971-237-2044

CITY OF DAYTON
Public Works Design Standards

Standard Easement Forms, Etc.

Appendix D

Note: Forms in this appendix are sample model documents only, included for convenience of reference by developers. These sample documents are for reference only, and may not have the proper margins and spacing required by the County Clerk for recording.

The documents are subject to modification by the City to address project specific conditions (*as required by the Public Works Director, the City Engineer or the City Attorney*).

Easement Procedure Summary (*similar procedure for ROW dedications*).

- For easements from a developer or property owner to the City, the easement legal description and to-scale exhibit map for the proposed easement shall be submitted to the City for review and approval (unless the easement is created by the final plat, in which case the City easement form will simply reference the easement as noted on the plat). Exhibit maps not drawn and plotted to scale, or not containing the information required under PWDS 1.11.b, will be returned for revision.
- Once approved, the City will attach the legal description and exhibit map to the appropriate City easement form (*modified by the City as applicable based on specific project conditions*), and it will be returned to the developer for execution and recording at the County.
- A photocopy of recorded easements documents must be returned (*hard copy or email*) to the City after recording (*ie. to the City Planner, Public Works Director & City Engineer*).
- All recording costs shall be borne by the Developer.

After recording, return to:

Dayton City Recorder
PO Box 339
Dayton, OR 97114-0339

PUBLIC UTILITY EASEMENT

_____ and _____ (collectively "Grantor"), for good and fair consideration the receipt of which is hereby acknowledged, does hereby grant unto the City of Dayton, ("Grantee" & "City"), a permanent exclusive public utility easement and non-exclusive inspection & maintenance access easement ("Easement") over, across, and through the real property described in EXHIBIT A and depicted in EXHIBIT B (the "Easement Area") for constructing, reconstructing, installing, and maintaining water, sanitary sewer, storm drainage and other associated utilities not deemed incompatible by the Grantee, including the right to utilize routes on and across the Grantor's property as required to access said easement. The easement is in gross for the benefit of the Grantee/City in perpetuity, and subject to the conditions relating to merger and/or vacation/extinguishment as summarized herein.

The Easement Area referenced above is located within the following described properties:

- Lot __, Block __, _____ subdivision plat, Yamhill County Deed Records
- Tract described in Deed Reference Number _____, Yamhill County Deed Records.
(collectively the Grantor's Property)

The parties further agree as follows:

1. The true and actual consideration paid for this easement is \$ _____.

The true and actual consideration for this easement consists wholly of value other than money, including the mutual promises and conditions contained herein.

2. Grantor Rights & Obligations. The Grantor agrees not to plant, build, construct or create (or permit others to plant, build, construct, or create) any cuts, fills, flora, buildings or other structures including fences or parallel utilities in the Easement Area that may interfere with Grantee's use of the Easement Area as set forth herein. Prohibited structures in the Easement Area include but are not limited to decks, footings, or overhanging portions of structures which are located outside of the Easement Area. Grantor may use the Easement Area for permitted parking and/or access so long as that use does not interfere with Grantee's use of the Easement Area.

The Grantor agrees not to construct cuts or fills within or on the easement area without express written approval by the Grantee, since this will interfere with the use of the easement for the purposes set forth herein. Any such approval by the Grantee shall be contingent on the Grantor performing all work required to mitigate impacts due to such cuts or fills, including reconstructing or resetting the utilities and appurtenances as directed by the Grantee, at the Grantor's sole expense.

3. Construction, Repair, Inspection and Maintenance. Grantee shall be responsible for the construction, installation, maintenance, and repair of any Grantee utilities in the Easement Area, except to the extent the need for such maintenance and repair is caused by the gross negligence or willful misconduct of Grantor. The Grantee may remove any obstructions in the Easement Area that interfere with Grantee's use of the Easement Area without any payment to the Grantor including but not limited to trees, undergrowth, buildings, overhangs, fences, shrubbery, cut areas or fill material. Grantee agrees that with the exception of appurtenances which must be at or above grade, all of the utilities will be placed underground. The Grantee shall return the Easement Area to a good condition (i.e. repair/replace soil disturbance; removal of construction debris, rocks/gravel and other materials; etc.) with all damage resulting from or arising out of said use to be repaired by Grantee. The Easement shall include the right of the Grantee, its employees, agents, contractors, consultants and assigns to have ingress and egress to and along the Easement Area for the purposes summarized herein, as well as the right to utilize routes on or across the Grantor's Property as required for inspection or maintenance access, including ingress and egress along any all-weather access lanes required by City standards. In the event Grantor installs cross fences in the Easement Area, Grantor agrees to construct gates allowing Grantee to access the Easement Area.

Grantor shall be responsible for maintenance and repair of any all-weather access lanes which are provided along (or to provide access to) City utilities, in a manner and condition to allow the City, its employees, agents, contractors, consultants and assigns to have vehicular access along said access lane at all times and during all seasons for the purpose of inspecting, maintaining or repairing City utilities.

4. Compliance with Laws. In utilizing the Easement Area, both parties agree to comply with any applicable State, local or Federal laws or regulations for public health or safety, construction or environmental protection.
5. Title Warranty. Grantor represents and warrants that to the best of its knowledge, Grantor owns the entire fee simple interest in the Property, which is free to the best of Grantor's knowledge from all encumbrances (except for easements, conditions and restrictions of record), and has the full power and lawful authority to grant this Easement.
6. Entire Agreement. This Easement is the final and complete agreement between the parties concerning the rights granted herein, and supersedes all prior understandings with respect to it. Except as otherwise set forth in this Easement, this Easement may not be modified or terminated, nor may any obligations under it be waived, except by written instrument signed by all parties to the Easement. The Grantee may vacate or terminate this easement in accordance with state law and local ordinance, subject to the condition that the easement will not be considered abandoned until City Council has declared (in writing) the easement abandoned and no longer in use by (or of benefit to) the City.
7. Further Cooperation. Each of the parties agree to execute such other documents and to perform such other acts as may be reasonably necessary or desirable to further the expressed and intent purpose of this Easement.

8. Covenants Running With the Land. The Easement shall run with the land as to all property benefited and burdened thereby, including any partition or division of such property. The rights, covenants, and obligations contained in this Easement shall bind, burden, and benefit Grantor and Grantee, and their respective successors, assigns, lessees, mortgagees, and beneficiaries under any deeds of trust.
9. Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a “Covenant Creating an Springing Easement Effective upon Date of Sale”, which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

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IN WITNESS WHEREOF, the parties have executed this easement, effective this ____ day of _____, 20__.

GRANTOR:

GRANTEE:

(Signature)

(Signature)

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

STATE OF OREGON
County of Yamhill

This instrument was acknowledged before me on _____ 20__, by _____ as _____ of the City of Dayton, an Oregon municipal corporation (Grantee).

Notary Public for Oregon

STATE OF OREGON
County of Yamhill

This instrument was acknowledged before me on _____ 20__, by _____ as _____ of _____, a(n) _____.

Notary Public for Oregon

ACCEPTED on behalf of City of Dayton, Oregon
this ____ day of _____, 20__.

City Engineer (Initial) _____ (if modified)

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

COVENANT FOR PERMANENT ACCESS EASEMENT AND FIRE LANE EASEMENT

WHEREAS, the owner of record of the Property referenced below is _____, hereinafter called "Owner" and "Grantor", and said Owner (or subsequent owner of the lot or property as noted below) shall be subject to a covenant that creates an easement in perpetuity as outlined herein, which is recorded against the Property referenced below.

The undersigned Owner and Grantor does hereby reserve, create and grant to City of Dayton, Yamhill County, Oregon, a municipal corporation, referred to herein as City, a permanent access easement and fire lane easement for the construction, reconstruction, operation and maintenance of an fire lane (and such other uses not deemed by the City to be incompatible therewith), and all necessary related facilities above, upon and under the following described premises, and subject to the conditions relating to merger as summarized herein:

Sample wording

All that portion of the tract of land described in the attached Legal Description labeled "Exhibit A" and map labeled "Exhibit B" (incorporated herein by reference), which is located within the following described parcels:

• Lot __, Block __, _____ subdivision plat

-or- • Tract described in Volume __, page __, Yamhill County Deed Records.

-or-

A portion of Parcel __/Lot __ of Partition Plat 2004-____/____ (subdivision), Deed Records of Yamhill County, incorporated herein by reference, said easement shown as "Easement __" on said _____ plat.

-or-

Easement __ as shown on plat for _____, Yamhill County deed records, incorporated herein by reference.

- () Consideration for this covenant and grant consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.
- () Consideration for this covenant and grant consists of _____ dollars and other valuable consideration to Grantor paid by _____, as well as the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

This covenant and easements are in gross, for the benefit of the City and afford the City all rights to utilize said easements in perpetuity.

The covenant and permanent access easement and fire lane easement shall include the right of City, its

employees, agents, contractors, consultants and assigns (including the Fire Department or Fire District with jurisdiction) to have ingress and egress above, upon and under the easement at all times for the purpose of installing, inspecting, repairing, maintaining an emergency access and fire lane. The City, its employees, agents, contractors, consultants and assigns, shall have the right to clear and keep clear all obstructions, trees, undergrowth, and other obstructions that may interfere with access, normal operation or maintenance of said emergency access and fire lane, out of and away from the easement.

Notwithstanding these rights, the City and assigns shall be under no obligation to perform maintenance or repairs on said easement.

The access easement and fire lane easement shall be designated and signed for no parking, and the fire lane shall include the right, privilege, and authority of City and/or the Fire Department/Fire District to remove or cause to have removed any and all obstructions, including vehicles, from the above described premises which may interfere with the full use of the fire lane. Except for the uses specifically stated herein, this easement does not grant any rights to the public for access across the referenced property.

No trees, permanent structures or improvements (including overhanging portions of structures which are located outside of the easement), including parallel fences shall be placed or constructed on the easement by the Grantor or the Grantor's heirs, assigns or successors in interest. Access gates acceptable to the City shall be installed in fences which the City allows to be constructed across the easement.

Legal Effect. This covenant and easement is binding upon and inures to the benefit of all heirs, successors and assigns of Grantor and City and runs with the land.

Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a "Covenant Creating an Springing Easement Effective upon Date of Sale", which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

Provision Applicable Law. This covenant and easement shall be governed by, and construed in accordance with the laws of the State of Oregon.

Waiver. Failure of either party at any time to require performance of any provision of this covenant and easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this covenant and easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.

Severability. The determination that one or more provisions of this covenant and easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this covenant and easement.

Amendment or Modification. No amendment or modification of this covenant and easement shall be valid unless in writing and signed by all parties hereto. City may vacate this easement in accordance with state law and local ordinance. This easement will not be considered abandoned until City Council (upon consultation with the Fire Department/Fire District) has declared (in writing) the easement abandoned and no longer in use and will not be needed in the future.

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The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this ____ day of _____, 20__.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20__, by _____, as _____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20__, by _____ as City Manager of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

COVENANT FOR PERMANENT SIDEWALK EASEMENT

WHEREAS, the owner of record of the Property referenced below is _____, hereinafter called "Owner" and "Grantor", and said Owner (or subsequent owner of the lot or property as noted below) shall be subject to a covenant that creates an easement in perpetuity as outlined herein, which is recorded against the Property referenced below.

The undersigned Owner and Grantor does hereby reserve, create and grant to City of Dayton, Yamhill County, Oregon, a municipal corporation, referred to herein as City, a permanent sidewalk easement for the construction, reconstruction, operation and maintenance of sidewalks and all necessary related facilities (and such other uses not deemed by the City to be incompatible therewith) above, upon or under the following described premises, and subject to the conditions relating to merger as summarized herein:

Sample wording

'The southerly __ feet (adjacent to the __ Street right-of-way) of the following described parcels:

- Lot __, Block __, _____ subdivision plat
- or- • Tract described in Volume __, page __, Yamhill County Deed Records.

- () Consideration for this covenant and grant consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.
- () Consideration for this covenant and grant consists of _____ dollars and other valuable consideration to Grantor paid by _____, as well as the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

The covenant and easements are in gross, for the benefit of the general public and afford the public, by and through the City, all rights to utilize said easements in perpetuity. Grantor shall retain no special rights of use of the easement property beyond those held as member(s) of the general public.

The covenant and sidewalk easement shall include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress above, upon and under the easement at all times for the purpose of excavating, constructing, installing, operating, repairing, maintaining and removing the sidewalk and associated improvements.

The City or its utility franchisees, its employees, agents, contractors, consultants and assigns, shall have the right to clear and keep clear all trees, undergrowth, and other obstructions that may interfere with access, normal operation or maintenance of said sidewalk, out of and away from the easement. The Grantor agrees not to plant, build, construct, or create, nor permit others to plant, build, construct, or create any flora, buildings or other structures, including fences, on the easement that may interfere with the use of the easement for the purposes set forth herein or with the normal operation or maintenance of the sidewalk and associated improvements.

Except as expressly set forth herein, the Grantor reserves the right to utilize the Easement Property for any purpose which does not interfere with the use of the easement by City for the purposes set forth herein.

Grantor agrees that he shall comply with all obligations in regard to construction, maintenance, repair and other responsibilities in regard to the sidewalk as if the sidewalk were constructed and existing in the public right-of-way adjacent to the property and in accordance with City ordinances.

Legal Effect. This covenant and easement is binding upon and inures to the benefit of all heirs, successors and assigns of Grantor and City and runs with the land.

Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a “Covenant Creating an Springing Easement Effective upon Date of Sale”, which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

Provision Applicable Law. This covenant and easement shall be governed by, and construed in accordance with the laws of the State of Oregon.

Waiver. Failure of either party at any time to require performance of any provision of this covenant and easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this covenant and easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.

Severability. The determination that one or more provisions of this covenant and easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this covenant and easement.

Amendment or Modification. No amendment or modification of this covenant and easement shall be valid unless in writing and signed by all parties hereto. City may vacate this easement in accordance with state law and local ordinance. This easement will not be considered abandoned until City Council has declared (in writing) the easement abandoned and no longer in use by City.

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The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this ____ day of _____, 20__.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20__, by _____, as _____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20__, by _____ as City Manager of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

PERMANENT ACCESS EASEMENT & STORMWATER DETENTION SYSTEM EASEMENT & DETENTION SYSTEM MAINTENANCE AGREEMENT

WHEREAS, the owner of record of the Property is _____, hereinafter called "Owner", and said Owner shall be subject to the maintenance provisions of this agreement;

WHEREAS, _____, hereinafter called "Developer", applied for (with concurrence from the Owner) and was granted approval to develop land in accordance with the City of Dayton Development Code under Dayton Planning File No. _____, hereinafter called "Planning Action," by the City of Dayton, Yamhill County, Oregon, a municipal corporation, hereinafter called "City," for property located as follows, hereinafter called "Property,":

Street Address: _____

Tax Lot: _____

Legal Description: Tract described in Deed Reference Number _____, Yamhill County Deed Records.

WHEREAS, the development & design standards require the Developer to construct a private storm drainage detention system, including detention storage basin, manholes & control structures, storm drain lines, control structures, (also including catch basins and storm inlet structures tributary to the detention basin which collect or otherwise minimize debris or pollutants reaching the detention basin and associated control structures), etc. (and such other uses not deemed by the City to be incompatible therewith), hereinafter called "Detention System";

WHEREAS, the City development & design standards require that the Detention System be located on private property, and be within a public utility and access easement to the City;

WHEREAS, the City development & design standards require that the maintenance of the private Detention System shall be the responsibility of the property Owner, and shall be assured through a recorded maintenance agreement;

NOW, THEREFORE, Owner and the City agree as follows:

SECTION 1. Ownership of Detention System. The Detention System is a private facility owned and maintained by the property Owner noted above. Where there are multiple parties with ownership interest the property on which the Detention System is sited, the provisions of this agreement shall apply to all owner's jointly and severally.

SECTION 2. Description of Easement Area.

2.1 All that portion of the tract of land described under "Easement ___" in the attached Legal Description labeled "Exhibit A" and map labeled "Exhibit B" (incorporated herein by reference), which is located on the property noted above.

SECTION 3. Grant of Easement. The undersigned Owner does hereby grant to City of Dayton, in gross, a permanent and exclusive access & stormwater detention system easement for the access to the Detention System and all necessary related facilities above, upon and under the premises described under Section 2. The easement

shall include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress above, upon and under the easement at all times for the purpose of inspecting said Detention System and related facilities, or for performing any maintenance or repair work determined to be necessary by the City in order to protect public or private property, as outlined under Section 5 below. However, such right to inspect and perform maintenance or repairs does not obligate the City to perform such inspections, maintenance or repairs. Consideration for this grant of easement consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

SECTION 4. Maintenance Responsibilities. The Owner shall be responsible for the maintenance, repair, replacement and upkeep of the Detention System, including the irrigation system serving the Detention System, at the Owner's sole expense. It shall be the Owner's responsibility to demonstrate to the City upon request that the Detention System and related facilities are operating properly. Maintenance responsibilities shall include, but are not limited to, the following:

- 4.1 Inspection. All Detention System components, irrigation system, vegetation, and control structures (outlet structures, control manholes, orifices, as well as catch basins and storm inlet structures tributary to the detention basin, etc.) shall be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event.
- 4.2 Cleaning of Outlet Structures, Outlet Manhole and/or Control Structures. All sediment and/or debris shall be cleaned from the sump of any inlet or outlet structure, outlet manhole and/or flow control structures (as well as catch basins and storm inlet structures tributary to the detention basin) as required to maintain the design function and capacity of the system (water shall be pumped from said sumps as required to accomplish this cleaning). The initial cleaning & maintenance interval shall not exceed 6 months, unless the inspections above reveal a need for more frequent cleaning. After the end of the first year, if approved by Public Works based on the sumps in these structures having adequate capacity, the cleaning & maintenance interval can be increased as appropriate, but shall not be cleaned and maintained less frequently than once a year.
- 4.3 Maintenance & Repair. Owner shall be responsible for maintenance, repair or replacement of any component that has been broken, damaged, altered, removed or other is not functioning as designed, including but not limited to inlet & outlet structures, manholes & control structures, storm drain lines, catch basins & storm inlets tributary to the Detention System, etc.
- 4.4 Irrigation, Mowing, Basin Planting & Maintenance Owner shall be responsible for: (a) installation and operation of a permanent underground automatic sprinkler system to maintain the grass and landscaping in a healthy state to maintain the stability of the detention basin slopes; (b) planting of grass to cover the entire interior slopes & base of the detention basin (use of bark dust or similar material on the top of slopes or on interior slopes of the basin is prohibited), (c) planting of grass or other approved landscaping on the exterior slopes of the detention basin. No trees or shrubs which will impair the structural integrity of the detention basin shall be planted or allowed to grow on the detention basin exterior; (d) any work required on the interior or exterior slopes to stabilize and/or replant (including appropriate erosion control measures) when soil is exposed or if erosion is observed; (e) periodic mowing of grass areas not less than once a month during the growing season, or more frequently if required to keep the maximum height less than 5-inches; (f) periodic inspection of the Detention System to ensure that outlet and control pipes are not clogged and remain clear; (g) removal of all debris from catchment and detention basin areas, including litter, leaves, branches and other objects which are unsightly or which may clog storm pipe lines; (h) removal of all non-grass vegetation from the top and interior slopes of the detention basin, and removal of nuisance and invasive vegetation (such as blackberries, ivy, etc) from the exterior slopes when discovered.
- 4.4 Spill Prevention. Measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.
- 4.5 Pest Control. Insects & rodents shall not be harbored in the Detention System. Pest control measures shall be taken when insects/rodents are found to be present. If mosquito larvicide is used,

it shall be applied in strict conformance with manufacturer's recommendation and any applicable State regulations. Rodent holes in the ground located in and around the detention basin shall be filled by the Owner.

SECTION 5. Failure to Maintain.

- 5.1 If at any time the City determines, in the sole exercise of its discretion, that the Detention System and related facilities are not properly cleaned, maintained and/or otherwise kept in good repair, the City shall give reasonable notice to the Owner that the Detention System needs to be cleaned, maintained and/or otherwise repaired (in the case of an emergency, the City may enter upon the property without notice to perform emergency maintenance or repairs in cases where the City, at its sole discretion, determines that it is necessary to protect public or private property). The notice shall provide a reasonable description of the problem with the Detention System, and the notice shall provide a reasonable time to correct the problem. Should the responsible parties fail to correct the specified problem, the City may enter upon the property to so correct the specified problem. Notice shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid. However, this agreement does not expressly impose on the City a duty to so inspect, clean, repair or maintain the Detention System. Any surface restoration required due to access, inspection, maintenance or repairs thus performed by the City shall remain the responsibility of the Owner, whether or not the City chooses to complete such restoration in conjunction with the City's access, inspection, maintenance or repairs.
- 5.2 The Owner agrees and covenants (for themselves and their respective successors and assigns) that they will reimburse the City for its costs and expenses incurred in the process of cleaning, maintaining, and/or repairing the Detention System within 30 days of written request by the City. Such written request for payment shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid. The terms actual costs and expenses shall be liberally construed in favor of the City and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless whether the City uses its own personnel, tools, equipment and supplies, etc. to correct the matter. If the City initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the City shall be entitled to its damages and costs, including reasonable attorney's fees, regardless whether the City contracts with outside legal counsel or utilizes in-house legal counsel for the same. In the event that the costs and expenses are not timely paid, such costs and expenses shall be charged against the Property consistent with State and local regulations, and shall constitute a lien upon the Property until paid.

SECTION 6. Indemnification. The Owner agrees to indemnify and defend the City, its officers, agents and employees and hold them harmless against any and all liability, claims, damages or other costs or expenses related to failure of the private Detention System, including any damage or injury incurred during inspection or maintenance of the Detention System, or due to the Owner's failure to maintain the Detention System, or failure to follow proper safety procedures during such inspection or maintenance, or failure to adequately control access to the private Detention System by the public.

SECTION 7. Recording of this agreement by Developer. Developer shall cause this agreement to be recorded in the deed records of Yamhill County, and a photocopy of the recorded document returned to the City.

SECTION 8. Other Provisions.

- 8.1 Legal Effect, Successors and Assigns. This Agreement shall run with the land and be binding on all parties having or acquiring from the Owner, or the Owner's successors, any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of the City.

- 8.2 Provision Applicable Law. This easement shall be governed by, and construed in accordance with the laws of the State of Oregon.
- 8.3 Nonexclusivity of Rights & Remedies. The rights and remedies authorized to the City under this agreement are cumulative and are in addition to such other remedies as may be provided by law, equity, statute, ordinance or other source.
- 8.4 Waiver. Failure of either party at any time to require performance of any provision of this easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.
- 8.5 Severability. The determination that one or more provisions of this easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this easement.
- 8.6 Modification. No amendment or modification of this easement shall be valid unless in writing and signed by all parties hereto. City may, at their sole discretion, vacate this easement in accordance with state law and local ordinance.

The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this _____ day of _____, 20__.

 (Printed Name of Grantors)

 (Signature of Grantors)

STATE OF OREGON)
) ss.
 County of _____)

This instrument was acknowledged before me on _____, 20__, by _____, as _____ of _____.

 (Notary Signature)
 Notary Public for Oregon
 My Commission Expires: _____

APPROVED:

 Dayton City Manager Date

This instrument was acknowledged before me on _____, 20__, by _____ as City Manager of the City of Dayton, Oregon.

 (Notary Signature)
 Notary Public for Oregon
 My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

PERMANENT ACCESS EASEMENT & GREASE INTERCEPTOR VAULT MAINTENANCE AGREEMENT

WHEREAS, the owner of record of the Property is _____, hereinafter called "Owner", and said Owner shall be subject to the maintenance provisions of this agreement;

WHEREAS, _____, hereinafter called "Developer", applied for (with concurrence from the Owner) and was granted approval to develop land in accordance with the City of Dayton Development Code under Dayton Planning File No. _____, hereinafter called "Planning Action," by the City of Dayton, Yamhill County, Oregon, a municipal corporation, hereinafter called "City," for property located as follows, hereinafter called "Property,":

Street Address: _____

Tax Lot: _____

Legal Description: Tract described in Deed Reference Number _____, Yamhill County Deed Records.

WHEREAS, the development & design standards require the Developer to construct a private exterior two-compartment grease interceptor vault, hereinafter called "Grease Interceptor";

WHEREAS, the City design standards require that the maintenance of the Grease Interceptor shall be the responsibility of the property Owner, and shall be assured through a recorded maintenance agreement;

WHEREAS, the City design standards require that the Grease Interceptor be located on private property, and as such needs to be provided with a general access easement to the City;

NOW, THEREFORE, Owner and the City agree as follows:

SECTION 1. Ownership of Grease Interceptor. The Grease Interceptor is a private facility owned and maintained by the property Owner noted above. Where there are multiple parties with ownership interest the property on which the Grease Interceptor is sited, the provisions of this agreement shall apply to all owner's jointly and severally.

SECTION 2. Grant of Access Easement. The undersigned Owner does hereby grant to City of Dayton, in gross, a permanent and non-exclusive right to access the Grease Interceptor location and all necessary related facilities above, upon and under the premises, along driveways, walkways or other areas that must be crossed between the public right-of-way and the Grease Interceptor location. The access rights shall include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress on the property at all times for the purpose of inspecting said Grease Interceptor, or for performing any maintenance or repair work determined to be necessary by the City in order to protect public or private property, as outlined under Section 4 below. However, such right to inspect and perform maintenance or repairs does not obligate the City to perform such inspections, maintenance or repairs. Consideration for this grant of easement consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

SECTION 3. Cleaning & Maintenance Responsibilities. The Owner shall be responsible for the cleaning, maintenance, repair, replacement and upkeep of the Grease Interceptor, at the Owner's sole expense. It shall be the Owner's responsibility to demonstrate to the City upon request that the system is operating properly. Maintenance responsibilities shall include, but are not limited to, the following:

- 3.1 Inspection. All Grease Interceptor components (vault segments, inlets, outlets, control orifices, etc.) shall be inspected for proper operations and structural stability, at a minimum, annually.
- 3.2 Cleaning of Grease Interceptor. All grease and/or debris shall be removed from both compartments of the Grease Interceptor vault, as well as cleaned from inlet or outlet piping as required, to maintain the design function and capacity of the system (water shall be pumped from vault as required to accomplish this cleaning). The initial cleaning & maintenance interval shall not exceed every 3 months while the building is in use (including at the end of each school year), unless the inspections above reveal a need for more frequent cleaning. After the end of the first year, if approved by Public Works based on the vault having adequate capacity, the cleaning & maintenance interval can be increased as appropriate, but shall not be cleaned and maintained less frequently than twice a year (including at the end of each school year). If subsequent inspections reveal capacity problems, the Owner shall revert to the more frequent cleaning intervals.
- 3.3 Maintenance & Repair. Owner shall be responsible for maintenance, repair or replacement of any component that has been broken, damaged, altered, removed or other is not functioning as designed, including but limited to the vault, divider walls, inlet & outlet structures, access lids, etc. All access lids and risers shall be extended to finish grade and maintained in a watertight condition, and exclude any infiltration of groundwater or inflow of surface water.
- 3.4 Spill Prevention. Measures shall be exercised when cleaning the Grease Interceptor to avoid spillage of pumped grease, solids or liquids. Any spillage shall be completely cleaned up prior to the cleaning or maintenance crew leaving the site.
- 3.5 Prohibited Substances. No chemical, enzyme or bacterial agent shall be added to the Grease Interceptor which will cause the release of grease into the sewer system. Unless otherwise specifically required in writing by the Plumbing Official, no garbage grinders, food pulpers or toilets shall discharge to the Grease Interceptor.
- 3.4 Records and Reporting. The Owner shall maintain a record (in the form of a log book) of steps taken to abide by the obligation under this section. The log book shall be available for inspection by the City upon request. The log book shall catalog the action taken (cleaning, inspection and/or maintenance), who took it, date and time it was done, how it was done, and any problems encountered or follow-up action recommended. Copies of all receipts for cleaning and pumping of the Grease Interceptor must be retained by the Owner with the log book. The Owner shall send a letter to the City prior to December 15 of each year that provides proof of cleaning, inspection and maintenance, including copies of pumping contracts and/or receipts of work conducted by a hired service.

SECTION 4. Failure to Maintain.

- 4.1 If at any time the City determines, in the sole exercise of its discretion, that the Grease Interceptor is not properly cleaned, maintained and/or otherwise kept in good repair, the City shall give reasonable notice to the Owner that the Grease Interceptor needs to be cleaned, maintained and/or otherwise repaired (in the case of an emergency, the City may enter upon the property without notice to perform emergency maintenance or repairs in cases where the City, at its sole discretion, determines that it is necessary to protect public or private property). The notice shall provide a reasonable description of the problem with the Grease Interceptor, and the notice shall provide a reasonable time to correct the problem. Should the responsible parties fail to correct the specified problem, the City may enter upon the property to so correct the specified problem. Notice shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid, or delivery to the Owner's local place of business. However, this agreement does not expressly impose on the City a duty to so inspect, clean,

repair or maintain the Grease Interceptor. Any surface restoration required due to access, inspection, maintenance or repairs thus performed by the City shall remain the responsibility of the Owner, whether or not the City chooses to complete such restoration in conjunction with the City's access, inspection, maintenance or repairs.

- 4.2 The Owner agrees and covenants (for themselves and their respective successors and assigns) that they will reimburse the City for its costs and expenses incurred in the process of cleaning, maintaining, and/or repairing the Grease Interceptor (including cleaning of downstream sewer system resulting from failure of the Grease Interceptor) within 30 days of written request by the City. Such written request for payment shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid, or delivery to the Owner's local place of business. The terms actual costs and expenses shall be liberally construed in favor of the City and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless whether the City uses its own personnel, tools, equipment and supplies, etc. to correct the matter. If the City initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the City shall be entitled to its damages and costs, including reasonable attorney's fees, regardless whether the City contracts with outside legal counsel or utilizes in-house legal counsel for the same. In the event that the costs and expenses are not timely paid, such costs and expenses shall be charged against the Property consistent with State and local regulations, and shall constitute a lien upon the Property until paid.

SECTION 5. Indemnification. The Owner agrees to indemnify and defend the City, its officers, agents and employees and hold them harmless against any and all liability, claims, damages or other costs or expenses related to failure of the Grease Interceptor, including any damage or injury incurred during inspection or maintenance of the Grease Interceptor, or due to the Owner's failure to maintain the Grease Interceptor, or failure to follow proper safety procedures during such inspection or maintenance.

SECTION 6. Recording of this agreement by Developer. Developer shall cause this agreement to be recorded in the deed records of Yamhill County, and a photocopy of the recorded document returned to the City.

SECTION 7. Other Provisions.

- 7.1 Legal Effect, Successors and Assigns. This Agreement shall run with the land and be binding on all parties having or acquiring from the Owner, or the Owner's successors, any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of the City.
- 7.2 Provision Applicable Law. This easement shall be governed by, and construed in accordance with the laws of the State of Oregon.
- 7.3 Nonexclusivity of Rights & Remedies. The rights and remedies authorized to the City under this agreement are cumulative and are in addition to such other remedies as may be provided by law, equity, statute, ordinance or other source.
- 7.4 Waiver. Failure of either party at any time to require performance of any provision of this easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.
- 7.5 Severability. The determination that one or more provisions of this easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this easement.
- 7.6 Modification. No amendment or modification of this easement shall be valid unless in writing and signed by all parties hereto. City may, at their sole discretion, vacate this easement in accordance with state law and local ordinance.

The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this _____ day of _____, 20__.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20__, by _____, as
_____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager Date

This instrument was acknowledged before me on _____, 20__, by _____ as City
Manager of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

This memo is considered to be sent to all land developers within the City of Dayton, at or near completion of their project.

Memo

Date:

To:

_____ address

cc:

Dayton land use file (_____)

Dayton Building Official

Dayton Public Works

From: **Dayton City Engineer**

Subject: Lot Grading & Drainage During and After Construction of Structures

This memo is to reiterate grading requirements relative to the layout and building of homes and structures on this property, and the need to take extra care in the grading during and after building to facilitate good drainage on the lots and the surrounding area.

As you are no doubt aware, good grading around a house and on a lot can make all of the difference in how homes are effected by the rain (and resultant drainage concerns) in Oregon. It is important to ensure that the houses and structures are not set too low on the lots. To avoid drainage problems, it is important that the homes are kept high enough so that you can grade around the structures and the lots in a manner that will direct the surface runoff away from the homes and off the lots into the streets and drainage systems without ponding. This is particularly critical where there is drainage coming onto any lot from adjacent property, either within or outside the development. In addition, it is critical that existing drainage patterns from adjacent properties must be maintained when grading on lots, around houses or other structures so as to not pond water or block drainage.

The City design standards for new developments include provisions intended to ensure that the streets are low enough so that the lots can drain to the streets, or that drainage stubs are provided at an elevation that will provide a good positive outlet. However, in spite of this, poor grading around homes during house construction and landscaping is a common cause of problems. Depending on building location, landscaping and lot grading, in some cases it may be necessary to construct perimeter drains to collect water and direct it to another point. It may also be necessary to install area drains to prevent water from collecting and being trapped in areas around homes, particularly in the rear of the homes or on the high side of the lots. It is a good idea to ensure that the landscape contractor considers these elements when the lots are finished following house construction.

In the event that you sell all or any portion of this property to another builder or developer, please make sure that they are aware of the need for proper grading and drainage on the lots. Please be aware that under City standards, the builder is responsible for ensuring that these drainage issues are addressed, and the builder is also responsible for installing and maintaining erosion control measures during and after building construction (*LUDC 7.2.304.03.A & 7.2.306.01.C*).

CITY OF DAYTON
Public Works Design Standards

Sample Insurance Certificates
Appendix E

Note: Sample form in this appendix is provided for convenience of reference by developers and contractors.

Insurance Certificate Requirements.

- Certificates of insurance required from the contractor contracted to complete the site/street/utility work. Insurance certificates shall include notations or language noting the coverage limits listed on the sample certificate included herein.
- Evidence of insurance coverage submitted on current “ACORD” forms (*or other insurance certificate containing the same information*) shall EITHER include a statement that “30 days cancellation notice will be provided”; OR the Contractor’s insurance agent shall provide a written letter (*to be submitted with the insurance certificates*) stating that copies of insurance certificates will be sent to the City a minimum of every 30 days, throughout the term of the required insurance under the contract.
- The City and Westech Engineering (*as City Engineer*) shall be covered as additional insured.
 - The insurance certificate and/or separate Accord schedule(s) may include language certifying that “any and all entities required by written contract or by required permits are additional insureds”, OR all of the required “additional insured” entities may be listed individually on the insurance certificate.
- The City is to be named as a certificate holder.
- Where work is to be performed in an ODOT or County right-of-way, these agencies shall be covered as additional insured and certificate holders per agency permit requirements.
- Insurance certificates shall include notations, language or additional schedule(s) specifically noting job site pollution coverage, and specifically noting that there are no XCU exclusions.
- Coverage shall be primary and non-contributory with any other insurance and self-insurance. Policies shall be written on an occurrence basis, and include coverage for respective officers, directors, members, partners, employees, agents, consultants and subconsultants of each additional insured.

- Evidence of Workman’s Compensation coverage from the contractor performing the site/street/utility work.

**City of Dayton, Oregon
PO Box 339
Dayton, OR 97114-0339**

**City of Dayton, Oregon
PO Box 339
Dayton, OR 97114-0339**

**Westech Engineering, Inc.
Dayton City Engineer
3841 Fairview Industrial Drive SE, Suite 100
Salem, OR 97302**

CITY OF DAYTON
Public Works Design Standards

Adopting Ordinance & Resolutions

Appendix F

CITY OF DAYTON
Public Works Design Standards

Dayton Small Wireless Facilities Design & Construction Standards

Appendix H

CITY OF DAYTON
Construction Drawing Review, Public Works Permit, Construction Requirements & Procedures

PWDS Appendix G
Construction Drawing Review, Public Works Permit,
Construction Requirements & Procedures

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PWDS APPENDIX G
CONSTRUCTION DRAWING REVIEW, PUBLIC WORKS
PERMIT, CONSTRUCTION REQUIREMENTS & PROCEDURES

G.1 GENERAL

- a. These Public Works Construction Requirements and Procedures will be cited routinely in the text as the “Standards.”
- b. Wherever specific supplementary standards are indicated (ie. AWWA C-150, ASTM C-857), it shall be understood to mean the latest revision thereof.
- c. In interpreting these Standards, it is understood that: (1) if the context so requires: (a) the singular pronoun shall be taken to mean and include the plural pronoun; (b) the masculine pronoun shall be taken to mean the feminine and the neuter pronoun; and (2) all captions used therein are intended solely for the convenience of reference and shall in no way limit any of the provisions of these Standards.
- d. These Standards shall apply to all improvements within existing and proposed public right-of-way and public utility easements, to all improvements to be maintained by the City, and to all improvements for which the Development Code requires approval by the City, or which must be designed to meet the provisions of the Public Works Design Standards (PWDS). The provisions of these Standards are binding on contractors and developers in the performance of any work covered under the categories outlined above. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.
- e. Requests for variances to these Standards shall be based on the criteria and procedures outlined in Section ~~1.121.11~~ of the Public Works Design Standards (PWDS).
- f. In the case of conflicts between the text of these construction standards and the standard details in the PWDS, or between the provisions of these construction standards and the PWDS, the more stringent as determined by the Public Works Director shall apply.
- g. All other utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as City standards.
- h. Traffic Control Devices shall meet the standards of the current Manual on Uniform Traffic Control Devices, including Oregon amendments.
- i. All other work not covered by the above standards shall conform to the Oregon Standard Specifications for Construction (OSSC/ODOT/APWA), most recent edition.

G.2 PURPOSE

- a. The purpose of these Standards is to provide a consistent policy under which certain physical aspects of public utility construction will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to the development or platting process. However, it is intended that they apply to both public and private work designated herein.
- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by experienced contractors. The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.
- c. The objective is to develop Standards which will:
 - 1) be consistent with current City Ordinances and the PWDS.
 - 2) set forth uniform material and workmanship standards under which all public works facilities shall be constructed within the City.
 - 3) supplement and complete the requirements of the City's development ordinances, PWDS, and other prevailing ordinances as they relate to the physical construction of public works facilities within the City.
 - 4) clarify and streamline the administration and construction of public works facilities within the City.
 - 5) provide public and private utility improvements constructed in a manner to allow economical future maintenance.
- d. These Standards shall relate only to public works construction in the City and are not to be intended to replace building codes, development or zoning ordinances and other regulations for which procedures and standards have been established. Planning, zoning and related matters shall be satisfied prior to submitting an application for a public works construction permit.

G.3 CONTRACTING POLICY

- 1) The policy of the City for construction of public improvements covered under these standards requires that the contractor be registered with the Oregon Construction Contractors Board.

G.4 DEFINITIONS AND TERMS

- a. Unless otherwise defined in these Standards, the following definitions, terms and abbreviations shall apply whenever used.
- 1) City: The City of Dayton, Oregon.
 - 2) Construction drawings: Drawings prepared by a registered professional engineer, including site plans, plan and profile views of utilities, cross sections, detailed drawings, etc., or reproductions thereof, approved by the City Engineer, which show the location, character, dimensions and details for the work to be done.
 - 3) Contractor: Any individual, firm, co-partnership, corporation or any combination thereof who has or have been named on a public works construction permit as the person responsible for the construction of the subject work, or who have entered into a Contract with the City for a particular project.
 - 4) Cut Sheets: Construction submittals as required by Section G-01300 of these standards.
 - 5) Definition of Words: Wherever, in these Standards, the words directed, required, permitted, ordered, designated or words of like importance are used, they shall be understood to mean the direction, requirement, permission, order or designation of the Public Works Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or satisfaction to the Public Works Director.
 - 6) Design Engineer: The engineer licensed by the State of Oregon as a Civil Engineer under whose direction plans (*construction drawing*), profiles and details for work are prepared and submitted to the City for review and approval.
 - 7) Developer. The individual, organization, business, partnership or joint venture who is responsible for submitting construction drawings for review and obtaining a Type A or Type B site/street/utility construction permit as required by these standards, or the applicant for such construction drawing review and construction permits.
 - 8) Easement: Areas along the line of public utilities that are outside of dedicated right-of-way. Easements shall be prepared on City forms granting rights along the public utility line to the City.
 - 9) Improvement: General term encompassing all phases of the work to be performed under the construction permit and is synonymous to the term project.
 - 10) Inspector: The authorized representative of the City whose instructions and

decisions shall be limited to the particular duties and responsibilities entrusted to him/her in making detailed inspections of any or all portions of the work or materials therefor.

- 11) Owner: The City of Dayton for projects initiated and contracted by, and paid for by the City. For any other project, the owner is the individual, firm, co-partnership, corporation or any combination thereof who has hired a Contractor to complete any public works project subject to these standards.
- 12) Plans: See Construction Drawings.
- 13) PWDS: Dayton Public Works Design Standards.
- 14) Right-of-Way: All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public free of all encumbrances, within which the City shall have the exclusive right to install and maintain streets and public utilities.
- 15) Standard Details: The drawings of structures or devices commonly used on City work and referred to on the construction drawings. Also called Standard Plans. The Standard Details in these standards and in the PWDS shall apply to all public works construction within the City.
- 16) Director: The Director /supervisor of the Public Works Department of the City of Dayton or his/her authorized representative (*Public Works Director*).
- 17) Survey Cut Sheets: Sheets of tabulated survey data, indicating stationing, structures, fittings, angel points, beginning of curve, points on curve, end of curves, staking offset, various elevations and offset utility cuts.
- 18) Work: All material, labor, tools, equipment, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure.

G.5 PERMITS REQUIRED, TYPES OF PERMITS

- a. The following requirements and procedures apply to City Public Works construction permits. Any reviews and/or permits required by the County, ODOT or railroads (*where applicable*) are the sole responsibility of the design engineer and/or the development team, including payment for any associated permit fees, bonds or insurance. The City does not coordinate with (*or submit construction drawings to*) the County, ODOT or the railroads on the developer's behalf (*for public works related permits*). The development team is responsible to comply with any

requirements imposed by the County, ODOT or the railroads. Where County, ODOT or railroad requirements conflict with City requirements, the more stringent shall apply.

- b. No developer, person or organization (*other than the City of Dayton*) shall begin to construct, reconstruct, cut, excavate, repair, modify, alter, or grade any sidewalks, curb, curb-cut, driveway, street, or begin to lay and install any sanitary sewer, water mainline, storm sewer, including appurtenances or service laterals, or other private or franchise utility within any public right-of-way or public utility easement within the jurisdiction of the City without first obtaining approvals from the Public Works Director and the City Engineer as required by these standards, paying any required plan review and construction permit fees, depositing any required performance security, and obtaining a street/utility construction permit therefor as provided herein.
- c. Work for which a street/utility construction permit is required shall include, but not be limited to, the following. This list is not all inclusive. The intent is that any work covered under the Public Works Design Standards (PWDS) will require either a Type A or Type B Site/Utility/Street Construction Permit prior to construction.
 - 1) Streets. A permit shall be required for any work on a public street, dedicated fire lane, sidewalk, curb, curb-cut, driveways and driveway approaches within a public right-of-way, or within an existing or proposed public easement or fire lane, including signs, traffic markings and traffic control devices.
 - 2) Storm Sewer. A permit shall be required for any work to lay and install any storm sewer and storm sewer appurtenances, detention systems, storm drainage improvements involving drywells or stormwater infiltration systems which require approval or permitting by DEQ, or storm drainage service lateral(s), or within any existing or proposed public utility easement.
 - 3) Sanitary Sewer. A permit shall be required for any work to lay and install any sanitary sewer pipeline and appurtenances, including sanitary sewer service lateral(s), within any public right-of-way or within any existing or proposed public utility easement.
 - 4) Water. A permit shall be required for any work to lay and install any water main and appurtenances, including water service lines and meter boxes, fire service lines or appurtenances, within any public right-of-way or within any existing or proposed public utility easement, or any other improvements attached to the City water system.
 - 5) Parking Lots, Private Streets, Common Use Driveways, Fire Lanes: A permit shall be required for any work on a parking lot, private street or common use driveway that takes access from a public City street, that discharges storm drainage to a public storm drain system, or that overlies a public sanitary sewer or water line, or for fire lanes required by the Fire District. A City utility/street construction permit is not required for the portion of single

family residential driveways (*servicing a single residence or duplex*) that is outside the public right-of-way or public utility easements.

- 6) Site Grading and Filling. A permit shall be required for any site grading, filling or fill stockpiling operations as follows.
 - a) Projects that require site grading, filling or fill stockpiling operations associated with development of the property other than those operations directly associated with the construction of a structure for which a valid building permit has been issued by the City.
 - b) Site grading, filling or fill stockpiling operations over existing public sanitary sewer, storm drain or water distribution lines, or such operations within existing or proposed public utility easements.
- 7) Street Closure. In the event any of the above activities, or any activities related to the construction of a building, structure, or parking lot, which requires the temporary closure of a street, alley, lane of traffic, or sidewalk to vehicle or pedestrian flow, a permit shall be obtained from the City for said closure.
- 8) Franchise Utilities. A permit covering any work on underground franchise utilities within any improved area of any public street, including sidewalks, or within any existing or proposed public utility easements. Permits will not be required for work on overhead or above grade franchise utilities which do not involve excavation within the areas specified herein.

d. Type A Public Works Permit.

- 1) ~~Work for which a Type A Street/Utility Construction Permit is required shall include the following.~~
 - a) Any sidewalk, driveway approach or utility service improvements to serve a single residence, duplex or business for which public street or mainline utility improvements are not required, and that do not include construction or reconstruction of parking lots, private streets, fire lanes or common use driveways other than for duplexes.
 - b) Utility work by franchise utility companies that does not require pavement cuts longitudinally along a street shall require a Type A permit (*including installation by boring along or across a public right-of-way or City utility easement, unless the Public Works Director determines that the scope of the proposed installation requires review by the City Engineer, in which case a Type B permit will be required*). Such work shall be exempt from permit fees to the extent provided by Section G.9(e) herein.
- 2) An improvements agreement and performance security shall be executed as

specified in Section G.10 herein.

e. Type B Public Works Permit.

- 1) Work for which a Type B Site/Street/Utility Construction Permit is required shall include the following.
 - a) Any street, sidewalk or utility improvement to serve more than a single residence, duplex or business, or for which public street or mainline utility improvements are required (*including fire hydrants or dedicated fire sprinkler services*), or that include parking lots, private streets, fire lanes or common use driveways other than for duplexes, or which includes storm drainage improvements involving drywells or stormwater infiltration systems which require approval or permitting by DEQ, or which serve more than a single residence, or which serve commercial / industrial / public developments.
 - b) Installation of service laterals for multiple properties within a common trench, or installation of service lateral(s) across property other than that being served.
 - c) Site Grading & Fills.
 - (1) Projects that require site grading, filling or fill stockpiling operations associated with development of the property other than those operations directly associated with the construction of a structure for which a valid building permit has been issued by the City.
 - (2) Site grading, filling or fill stockpiling operations over existing public sanitary sewer, storm drain or water distribution lines, or such operations within existing or proposed public utility easements.
 - d) Utility work by franchise utility companies that requires pavement cuts longitudinally along a street shall require a Type B permit (*for subdivisions or other development which obtains a Type B permit for the overall project, a separate permit will not be required for franchise utility work directly associated with the issued Type B permit for the development*). ~~Such work~~ Work by franchise utility companies which is not associated with such a development project shall be exempt from permit fees to the extent provided by Section G.9(e) herein.

- f. If there are classes of work not specifically covered herein but that are included under the scope of the Public Works Design Standards, the determination of the type of permit required shall be made by the City Manager after consultation with the Public Works Director and the City Engineer.

- g. Approval of Construction Drawings is required prior to obtaining a permit or beginning construction.
- h. Approval of construction drawing (*plans*) by the City Engineer or City Public Works for issuance of a City Public Works street/site/utility construction permit does not relieve the developer, contractor or engineer from obtaining any and all reviews and permits required under the building, plumbing or electrical codes that any portions of the work may be subject to, or from any requirements under County, ODOT or other agency permits or approvals required for the project.
- i. Any permit issued by the City is considered to be a “written contract” for purposes of triggering “additional insured” coverage of the City under the Contractor’s required insurance policy(s).

G.6 APPROVAL OF CONSTRUCTION DRAWINGS REQUIRED

- a. Construction drawings (*plans*) shall be submitted for review and approval prior to issuance of permits required by these Standards. Type A Permits shall have the written approval of the Public Works Director or his designated representative prior to issuance of the permit. In addition to written approval by the Public Works Director, Type B Permits shall have the written approval of the City Engineer. For subdivisions and other developments requiring improvements to public streets and/or multiple public utility systems, construction drawings for sewer, water, streets, and storm drains shall be submitted simultaneously to facilitate checking for conflicts.
- b. Construction drawings submitted for approval shall be subject to the standards, specifications, policies and procedures, construction drawing review and permit fees of the Public Works Department in effect at the time of application or reapplication for construction drawing review.
- c. Except as provided in Subsection (d) of this section, such construction drawing approval shall be void upon expiration of six months from the date of said written approval in Subsection (a) of this section if a Type A or Type B permit is not obtained and work commenced on the project. Resubmittal of construction drawings will require that they be updated to reflect current City standards.
- d. Upon a written verification that the facts upon which the plan approval was based have not changed to an extent sufficient to warrant a new review of construction drawings, the plan approval may be extended for a period not to exceed 6 additional months. Written verification for Type A permits shall be provided by the Public Works Director t, while verification for Type B permits shall be by both the Public Works Director and the City Engineer. No more than two such six month extensions shall be granted for any one development or project, resulting in a maximum time extension of one year. Reapplication for construction drawing review must be made with the Public Works Director or his designated representative upon expiration of said six month period in Subsection (c) of this section, or extension periods provided herein, if the permit is not issued within said approval or extension period.

- e. All plans, reports, or documents for public utility improvements required by these standards or the City development ordinances or other City ordinances shall be prepared by and certified by a registered professional civil engineer licensed by the State of Oregon.

G.7 CONSTRUCTION DRAWING REVIEW PROCESS AND REVIEW FEES

- a. All construction drawings (*plans*) for Type A or Type B permits shall be reviewed in general conformance with the procedures outlined in PWDS Section 1.9, including providing preliminary drawings and scheduling a pre-design meeting (*per PWDS 1.9.a*) between the developer's engineer and Public Works (& City Engineer as applicable) to receive input regarding design issues related to required improvements.

The submittal for construction drawing review shall be filed by the responsible party (*ie. the design engineer for public improvements*) with the Public Works Director for any permit or permits required by these standards.

In addition to requirements, documents and information listed under PWDS 1.10.b (*full list is not reproduced here*), such submittal for construction drawing review shall include the following as applicable.

- 1) Name and address of the owner or owners of the property;
- 2) Name and address of the developer of the property;
- 3) Name, address, and phone number of the designer (*design engineer for public improvements*);
- 4) Description of the work area location, including addresses as applicable;
- 5) Preliminary plans (*3 sets for single family residential developments, and 4 sets for commercial, industrial and multifamily developments*) showing a vicinity map and details of the proposed project, including street widths and property lines, existing and proposed utility locations. In the case of public improvements, preliminary plans shall include all applicable information outlined under PWDS 1.10.
- 6) Estimated construction cost of the proposed project, or estimates based on the construction cost estimate schedule established by the Public Works Director or the City Engineer.
- 7) Plan review fees as prescribed by resolution of the City Council (*for franchise utilities, see Section G.9e*).
- 8) Review fees required in Subsection (7) of this section are nonrefundable, and are required to support permit plan review.

- a) A plan review fee payment based on a percentage (*to be set by resolution of the City Council*) of the initial engineer's estimate of all construction work related to the project (*ie. all work covered under the PWDS*) is due at submission of the engineered construction drawings for review (*see also PWDS 1.10.b.13 for costs to be included in the estimate*).
 - b) Monthly billings of any City costs exceeding the plan review fee payment, payable within 30 days.
 - c) Final reconciliation of project review and inspection costs, including City Engineer review & inspection costs and Public Works staff expenses, will be determined at project completion. Any final balance due the City must be paid before City approval and/or acceptance of the project.
- 9) Evidence that all federal and state laws and regulations have been complied with, including a copy of any permits required by federal, state, or county agencies.
 - 10) A current title report(s) covering all property where utility construction will occur (*which includes a list of all existing easements, restrictions, and other encumbrances, including copies of deeds, easements or other restrictive documents referenced in that report*) [a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy].
 - 11) Such other information as the Public Works Director shall find reasonably necessary for the determination of whether plans should be approved for permit.

G.8 CONSTRUCTION PERMIT APPLICATION

- a. Application Form. Following review and approval of the plans by the City, an application for a construction permit as required by these standards shall be filed with the Public Works Director. Such applications shall be in the form prescribed by the City and shall include the following information as a minimum:
 - 1) Name and address of the owner or owners of the property.
 - 2) Name and address of the developer of the property.
 - 3) Name and address of the designer (*design engineer for public improvements*).
 - 4) Name and address of the party doing the work, including subcontractors.
 - 5) Location of the work area, including addresses as applicable.

b. Supplemental Information Required. Prior to issuance of the public utility construction permits, the Developer shall provide the City with the following (*see also PWDS 1.9(h)*):

1) Copies of the final revised (*approved*) plans for stamping by the City as follows:

- Type B permit, 10 sets
- Type A permit or franchise utility improvements, 4 sets

For Type B permits, the City will keep four (4) sets of approved construction drawings and return the remainder to the development team. Additional sets may be submitted for stamping at the Developer's request.

2) Other information & documentation as summarized under PWDS 1.9.i.

3) Such other information specific to the project as the Public Works Director or the City Engineer shall find necessary for the determination of whether a permit should be issued therefor, including evidence that all applicable City, County, state and/or federal laws and regulations have been or will be complied with.

G.9 CONSTRUCTION PERMIT FEES

- a. Accompanying the application required by these standards shall be a construction permit fee as prescribed by resolution of the City Council.
- b. Permit fees required by these standards are nonrefundable, and are required to support permit issuance, testing, and inspection.
- c. In computing the construction permit fees, the estimated value of proposed construction shall be comparable with current bid prices for City contract projects, and shall approved by the City prior to issuing the permit.
- d. Work being done under contract with the City shall be exempt from permit fees.
- e. Work being done by franchise utilities shall be exempt from permit fees to the extent provided by the franchise agreements with the City.
- f. Work without Permits. Where work for which a permit is required by these standards is commenced or proceeded with prior to obtaining said permit (*or after said permit has expired or been suspended*), the construction permit fees specified in Subsection (a) of this section shall be doubled, but the payment of such double fee shall not relieve any person from fully complying with the requirements of these standards and other applicable City codes, standards and ordinances in the execution of the work nor from any other penalties prescribed herein, nor shall it obligate the City to accept any work so performed without a valid permit.

- g. Permits required by these standards shall be non-transferable. Any change in applicant, such as a subdivision sale, will require re-application for permit. If six months has elapsed since plan approval, reapplication for plan review shall be made. If previous plan review payment provided by the applicant is insufficient to cover the costs of the new review, the City may assess an additional review fee which will, in the opinion of the City Manager, cover the estimated cost for the new review.

G.10 CONSTRUCTION AGREEMENT & PERFORMANCE GUARANTEE

- a. Except as otherwise provided below, a performance guarantee shall be provided for all work for which a Type A or Type B permit is required. Depending on the type of project, the performance guarantee may consist of a restriction on the issuance of a building permit(s), a restriction on the recording of a plat, or a financial security. Acceptable performance guarantees shall be as outlined below for the different classes of project listed.
- b. Work being done by franchise utilities shall be exempt from performance guarantee requirements only to the extent provided by the franchise agreements with the City.
- c. Type A permit. The performance guarantee may consist of one of the following, and shall be in a form as required by the City.
 - 1) An agreement with the City whereby building permits will not be issued until all improvements within the public right-of-way or utility easements are completed and approved by the City.
 - 2) If a building permit is requested before all improvements within the public right-of-way or utility easements are completed and approved by the City, the developer shall provide a financial security acceptable to the City to guarantee the completion of all work covered under the permit. The financial security shall be 110% of the estimated construction cost, or \$500, whichever is greater, and may consist of cash, or it may be a bond or irrevocable letter of credit as outlined in Subsection d(4) below. Occupancy of structures and permanent connection to City water and sewer service will not be allowed until all permitted improvements have been completed and approved by the City.
- d. Type B permit. Before the issuance of a Type B construction permit, the applicant shall execute the City's standard Developer-City Construction Agreement that certifies that all improvements will be constructed in conformance with all City standards and ordinances and all conditions of construction permit approval will be satisfied (*ie. plan approval required prior to execution of the construction agreement*). In addition to the construction agreement, the developer shall provide a performance guarantee consisting of one of the following in a form as required by the City.

- 1) Work Within Existing Improved Rights-of-Way, or Work on Existing Public Utilities. Except for work being performed under public contract for the City of Dayton or Yamhill County, a financial security shall be provided to the City as outlined under Subsection d(4) below for all work within existing developed rights-of-way, unless otherwise approved by the City. The financial security shall specify a timeframe, acceptable to the City, by which the work shall be completed and the existing streets, facilities and improvements are restored to pre-existing or better conditions.
- 2) Work Outside Existing Improved Rights-of-Way (except Work on Existing Public Utilities).
 - a) Subdivisions. An agreement with the City that the final plat for the subdivision will not be approved nor recorded until all improvements have been completed and accepted by the City, or all improvements have been substantially completed and a financial security has been provided as outlined in Subsection d(4) below.
 - b) Partitions. An agreement with the City that no building permits for any structures within the partition will be issued until all improvements have been completed and accepted by the City, or all improvements have been substantially completed and a financial security has been provided as outlined in Subsection d(4) below.
 - c) Other than Subdivisions and Partitions. An agreement with the City whereby occupancy of structures and permanent connection to City water and sewer service will not be allowed until all permitted improvements are completed and approved by the City.
- 3) Upon provision of a performance guarantee as outlined herein, building permits for on-site private work can be obtained for commercial, industrial & multi-family projects. Permanent connection to City water and sewer service will not be allowed until all public improvements are completed, and all on-site improvements are completed or bonded to guarantee all improvements will be completed in accordance with the approved drawings, City Standards and specifications.
- 4) Financial Security. The financial guarantee for a Type B permit may consist of one of the following, and shall be in a form as required by the City. The amount of the security guarantee shall not be less than \$500 or the amounts specified below, whichever is greater.
 - a) A surety bond executed by a surety company authorized to transact business in the State of Oregon, in a form approved by the City Attorney. The amount of the performance surety bond shall be as established by the Public Works Director, but shall not be less than 125% of the estimated construction cost of required improvements, as

verified by the City. The performance surety bond shall insure the full and faithful performance of all proposed work and shall guarantee that the applicant will conform to all provisions of the construction agreement, if any, and immediately upon the completion of work, remove all surplus earth, rubbish or other material, replace or restore all existing streets, utilities and landscaping to a condition as good as or better than existed prior to the work.

- b) An irrevocable letter of credit assigned to the City of Dayton in an amount equal to 125% the estimated construction cost of required improvements, as verified by the City. The letter of credit shall be subject to the same conditions as set forth above in the case of surety bonds.
- 5) If the applicant fails to complete all improvements for which a performance surety bond or letter of credit were provided, the City shall estimate the cost of completing any required improvement, call on the bond or letter of credit for the funds necessary to complete the improvement, and complete the improvement to the extent of the funds obtained upon call of the bond or letter of credit. If the amount obtained is insufficient to complete the improvement, the City may either hold the collected funds until additional funds are authorized for the improvement or expend the collected funds on a revised improvement or on a portion of the improvement as determined reasonable by the Public Works Director.

G.11 CONDUCT AND PROGRESS OF THE WORK

- a. All work under said permits shall be completed in conformity with the provisions of these standards, the terms of the applications and construction permits, and under the supervision and subject to the approval of the Public Works Director. Immediately upon completion of work, all surplus earth, debris, rubbish or other materials shall be removed immediately and the street and utilities restored to a condition as good as or better than existed prior to the work.
- b. Timeframe for Restoration of Existing Street Surfaces.
 - 1) Unless authorized in writing by the City Manager prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days.
 - 2) Unless authorized in writing by the City Manager prior to the start of the work, trenching within existing paved streets shall be backfilled and repaved within 14 days of the start of excavation unless the trenches are plated or repaired with cold patch. In addition, trenching within existing major streets (*arterial, collector or commercial-industrial streets*) shall be plated or repaired with cold patch at the end of each work day. This requirement shall apply to work within existing paved streets that are will later be reconstructed

as part of the project. Failure to maintain any temporary cold mix trench patching in a smooth condition will result in the City requiring the cold mix to be removed and replaced with hot mix AC for temporary patching. Such replacement shall occur within 4 working days of written notice by the City.

- 3) Unless authorized in writing by the City Manager prior to the start of the work, the timeframes specified herein shall apply independently and separately to each block or intersection where trenching work occurs. In all cases, trenches within each block or intersection shall be permanently repaved within 21 days of the start of excavation, except where the street will be reconstructed as part of the project.
- c. The contractor is responsible for the coordination with the various utilities and agencies during construction.

G.12 ADHERENCE TO AND EXHIBITION OF PERMITS

- a. No work shall be undertaken other than that specified in the application and permit for the particular cut or excavation. Upon demand of the Public Works Director or his designate or any city police officer, the permits shall be produced at the place where the work is in progress, or such work will be stopped until the permit is produced.

G.13 EXPIRATION OR SUSPENSION OF PERMIT; STOP WORK ORDER; APPEAL

- a. Expiration of Permit
 - 1) A Type A or Type B site/street/utility construction permit shall lapse if construction for which the permit was issued has not commenced within ninety (90) days of the date of issuance. All construction under a Type A or Type B site/street/utility construction permit shall be completed within 12 (twelve) months of issuance of the permit or execution of the Developer-City Construction Permit, whichever is earlier.
 - 2) To reinstate the permit, the applicant shall submit a written request for reinstatement to the Public Works Director giving the reasons for failure to begin construction, pay a reinstatement fee and provide a date when construction will be commenced.
 - 3) In reinstating the permit, the Public Works Director and/or the City Engineer may impose additional requirements or conditions deemed necessary for the project to conform to current City standards.

b. Suspension of Permit

- 1) At any time after the issuance of a construction permit required by these standards, the Public Works Director may suspend the same upon a finding that any of the following grounds exist:
 - a) False, misleading, or erroneous data or information submitted by the applicant in connection with securing the permit.
 - b) Materials or workmanship do not meet specification for the construction or installation of the permitted improvement; or construction or installation varies from the approved plan or design of the improvements.
 - c) Violation of any of the provisions of the City development ordinances governing the work being done under the permit.
- 2) Upon suspension of a construction permit as provided in Subsection (a) of this section, the Director shall cause to be issued a written "stop work order," one copy of which shall be sent by regular mail to the permittee at the address shown on the permit application, one copy of which shall be sent by regular mail to the permittee's engineer overseeing the work, if known, and one copy of which shall be personally delivered to the person in charge of any work in progress.
- 3) It shall be unlawful for any person to cause, suffer, or permit any work to be done for which a permit is required by these standards when a "stop work order" has been issued as provided in Subsection (b) of this section. The City will not accept any work performed after delivery of the "stop work order" to the person in charge of work in progress at the project site.
- 4) An applicant whose permit has been suspended may appeal such action to the City Manager through the City's established appeal process. Notwithstanding the provisions for appeal to the City Manager, the filing of an appeal shall not stay the effect of a "stop work order" issued under Subsection (b) of this section.

G.14 NOTICE OF COMPLETION OF WORK, FINAL INSPECTIONS

- a. Within 3 business days of completion of the work for which a permit was required under these standards, all in accordance with the approved construction drawings and City standards, the person or organization to whom the permit to do such work was issued shall submit written notice to the Public Works Director (*Type A permits*) or the City Engineer (*Type B permits*) stating that the work has been completed and give such other information as may be required by the City, and request a preliminary final inspection of the work.

- b. As a minimum, the following must be submitted to the Public Works Director or the City Engineer as applicable prior to the preliminary final inspection.
- 1) All exterior property pins and street monumentation set (*partitions & subdivisions*).
 - 2) All set property pins exposed and all property corners marked with lath (*partitions & subdivisions*).
 - 3) All easement limits (*except PUEs parallel with r/w*) marked with labeled lath.
 - 4) Paper copy of as-built drawings submitted to City Engineer a minimum of 48 hours prior to final inspection, including distance ties to all utility stub ends.
 - 5) Written copies of all required utility test reports (*compaction, mandrel, pressure, vacuum, etc*), as well as video tapes of any required pipeline TV inspections.
 - 6) Completion report from design engineer including written copies of all utility test reports (*compaction, mandrel, pressure, vacuum, etc*), as well as inspection reports of any required TV inspections. Submitted compaction tests shall include certification of engineered fills, baserock and AC pavement tests for streets and trench patching, as well as soil compaction results for all lots with fills.
 - 7) Certification that the areas within the building envelopes of all lots conform to compaction requirements of the applicable Oregon Building Code.
- c. Any corrective work items identified during the preliminary final inspection (*ie. punchlist items*) shall be completed prior to the City's conditional acceptance of any of the public streets or utilities. Failure by the City to include items on the preliminary punchlist shall not, in any way, relieve the contractor from any obligation to perform the work in strict compliance with the approved plans and City standards. Additional items discovered during subsequent inspections must be corrected prior to provisional acceptance of the improvements by the City.
- d. Upon completion of all corrective work to the satisfaction of the Public Works Director and the City Engineer, including a final inspection by the City, the developer shall provide the following prior to provisional acceptance of the public improvements by the City.
- 1) Full-size mylar or vellum as-built drawings (*based from an as-built survey as applicable*) for Type B permitted improvements, full-size blackline paper as-built drawings for Type A permitted improvements.
 - 2) Acceptable Maintenance Bond (*or other security acceptable to the City*) valued at a minimum of 40 percent of the estimated construction costs for the public portion of the improvements completed under the Public Works permit,

as well as portions of the private improvements as noted under G.15.

- a) Bond periods shall conform with the minimums noted under G.15.d, unless longer periods are required by the City as noted under G.15.d.5.
 - b) The warranty period shall not commence prior to provisional acceptance of the public improvements by the City.
 - 3) Photocopies of any recorded easements required in conjunction with the improvements, except for on-site easements that will be recorded after the plat is recorded.
 - 4) Other items required as conditions of the land use planning approval, where applicable.
- e. In no case shall the City issue written provisional acceptance of the work until as-built drawings (*for public improvements*) and maintenance bonds (*if required*) are submitted to and accepted by the City. Final acceptance by the City shall not occur until the end of the warranty period.

G.15 CITY POLICY FOR ACCEPTING NEW OR RECONSTRUCTED STREETS AND PUBLIC UTILITIES

- a. The City will accept developer-built public street, sanitary sewer, storm sewer and water distribution improvements constructed in conformance with the City Public Works Construction Standards subject to the following procedures.
- b. After construction of the total project has been completed, all final inspections have been completed, and all required maintenance bonds and as-builts have been submitted and accepted by the City and any outstanding plan review or permit fees have been paid (*and after other items under G.14 have been provided*), the Public Works Director or the City Engineer will provide a memo to the City Manager recommending that the City provisionally accept the public street, sanitary sewer, storm drainage and/or water system improvements, with final acceptance to occur at the end of the warranty period.
- c. 40% Maintenance/Warranty Bonds.
 - 1) Maintenance Bonds (*or other security acceptable to the City*) shall be provided by the Contractor or the Developer for the public portion of the improvements constructed under the Public Works permit, as well as portions of the private improvements as noted below, valued at a minimum of forty percent (40%) of the applicable construction costs.
- d. Warranty & Bond Periods/Coverage.
 - 1) Warranty and Maintenance Bond periods shall commence upon the date of the notice of provisional acceptance by the City, with final acceptance to occur at

the end of the warranty period. The warranty and maintenance bond periods shall be as summarized below.

- 2) One (1) year from provisional acceptance by the City of the applicable public sanitary sewer, storm drainage and/or water improvements (*as well as detention systems, water quality facilities & structures, portion of fire service lines located within the public right-of-way or City utility easements, etc.*), but excluding any other improvements which are listed by the PWDS as “special items” for design (*see PWDS 2.3, 3.3, 4.3 & 5.3*).
 - 3) Two (2) years from provisional acceptance by the City of the applicable public street/public sidewalk/street light improvements (*as well as box culverts, trench paving, driveway approaches, designated fire lanes, common use driveways, common use private streets, private sewer pump stations, metering/monitoring manholes, etc.*), and also including other improvements which are listed by the PWDS as “special items” for design (*see PWDS 2.3, 3.3, 4.3 & 5.3*).
 - 4) Any damage to the covered improvements during the warranty period shall be corrected prior to final acceptance by the City and release of the warranty and/or bonds, regardless of the cause of the damage.
 - 5) The required warranty and bond period may be extended at the discretion of the City Manager if the Public Works Director or the City Engineer identify construction materials or methods that differ from City standards, but which the City does not require to be removed and replaced.
 - a) This authority granted to the City Manager shall in no way obligate the City to accept any work that is not constructed in full conformance with the approved plans and these standards, nor shall it be construed as establishing a precedent.
- e. Prior to the end of the warranty and bond period, Public Works and/or the City Engineer will make warranty inspection(s) and investigations as deemed necessary by the City to identify any defective work that must be corrected prior to final acceptance of the improvements by the City. The developer will be notified in writing of any required corrective work.
- 1) All required corrective work shall be completed by no later than 21 days from the date of such written notification.
 - 2) Any delay in correcting the identified deficiencies will result in a delay in final acceptance by the City, and release of any warranty or bonds.

G.16 PENALTY; CONTINUING VIOLATIONS

- a. Failure to comply with any provision of these standards, or with any restrictions or conditions imposed hereunder, or failure to comply with the conditions of a construction permit issued by the City, shall subject the person, firm or corporation who violates, disobeys, omits, neglects, or refuses to comply with any of the provisions of these standards to civil penalties as prescribed herein.
- b. Offenses defined in these standards shall be punishable by a fine not to exceed \$250 per violation. Each and every day a violation is permitted to exist shall constitute a separate offense.
- c. A violation of the provisions of these standards is declared to be an offense, but not a crime. It is intended to be an offense which can be disposed of in all respects as a civil proceeding and not governed by procedural, evidentiary, substantive, and constitutional rules applicable to criminal charges and proceedings. A person adjudged responsible for an infraction shall not be deemed "guilty" of the infraction and a judgment of responsibility shall not be deemed a "conviction" for any purpose.
- d. Notwithstanding anything in this section or any other ordinance to the contrary, no greater penalty shall be imposed for any violation of city ordinance than the maximum penalty prescribed under Oregon statute for the same act or omission.

G.17 PRECONSTRUCTION CONFERENCE

Requirements relating to the Preconstruction Conference are outlined in Section 1.13 of the Public Works Design Standards (PWDS).

G.18 VARIANCES TO CONSTRUCTION STANDARDS

Requests for variances to these Standards shall be based on the criteria and procedures outlined in Section ~~1.121.11~~ of the Public Works Design Standards (PWDS).

G.19 CONSTRUCTION INSPECTION

Construction inspection shall generally conform to the procedures outlined in Section 1.14 of the Public Works Design Standards (PWDS).

G.20 CONSTRUCTION SUBMITTALS

Construction submittals for materials & equipment incorporated into the work shall generally conform to the requirements outlined in Section G-01300 attached hereto.

