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~~From the Director~~FROM THE DIRECTOR

The *Clackamas County Roadway* ~~*Standards*~~*Standards* (hereafter referred to as the "~~*Standards*~~*Standards*") provides a handbook for both roadway design and construction of public and private roadway improvements, alteration of drainage on private property in the unincorporated areas and outside of a storm water district and site design standards for required site improvements ~~through approval of a land use application in Clackamas County~~ related to land use approvals~~development~~. The purpose of these ~~Standards~~*Standards* is:

~~—~~To provide specific, consistent and acceptable road design and construction elements for applicants, developers and other private parties constructing or modifying road right-of-way facilities or on-site improvements which require County permits.

~~2)~~1)

~~—~~To establish uniform criteria that still provide~~s~~ context sensitive flexibility in guiding the County's design and construction of ~~our own~~ County facilities.

~~4)~~

~~— To implement the Clackamas County Zoning and Development Ordinance (ZDO), the *Clackamas County* Comprehensive Plan (Comprehensive Plan), and the .~~

~~6)~~2)

3) To allow for practical approaches to road design and construction challenges that provide the best fit solution given the realities of financial constraints and community context.

~~7)~~

Roadway designs in Clackamas County ~~shall~~ strive to achieve sustainable outcomes when safety, convenience, aesthetics, resource protection, ease of maintenance, and community livability are considered.

These ~~*Standards*~~*Standards* provide the minimum criteria for design and construction of roadways, accesses, site development, and integrated drainage facilities under the jurisdiction of Clackamas County.

~~Presented as a working document, these *Standards* are intended to lead to a common understanding of design guidelines among applicants, County staff and other users of the *Standards*.~~

It is not the objective of this handbook to limit the creative efforts of Engineers in providing alternate solutions to specific problem areas or relieve the responsibility for professional engineering judgment. Practical designs that preserve the function and safety of the roadway system and promote sustainability by offering benefits to aesthetics, resource protection, ease of maintenance, and livability are encouraged.

~~These *Standards* will be periodically revised and updated.~~

~~It is with great pride that we present the revised *Clackamas County Roadway Standards*. These *Standards* are the culmination of a collaborative effort among County Engineering, Transportation Maintenance and Development Services staff, service providers, Engineers and the public at large.~~

Dan Johnson, Director
Clackamas County Department of Transportation and Development
~~April 19, 2018~~February xx~~October 11~~~~January 1~~, 2020

DEFINITIONS

~~**Access Drive:** See *ZDO* Section 202.~~

ADA: Americans with Disabilities Act of 1990.

ADA s~~S~~tandards: Requirements and standards resulting from the Americans with Disabilities Act of 1990 and adopted by Clackamas County as standards for accessible design within Clackamas County rights-of-way.

Alteration: A change to a facility ~~in the public right-of-way~~ that affects or could affect pedestrian access, circulation, or use. Alterations include, but are not limited to, resurfacing, rehabilitation, reconstruction, historic restoration, or changes or rearrangement of structural parts or elements of a facility.

Applicant: Property owner or person designated by the property owner to be the representative for an application for a development proposal, permit or approval, or their successors or assigns. As this pertains to utilities, see *County Code* Section 7.03.020.

Average d~~D~~aily t~~T~~raffic ("ADT"): The number of vehicles traveling in both directions over a given time period greater than one day but less than one year, divided by the number of days in that time period. Commonly, traffic counts completed at various times of year are adjusted for time of year to account for seasonal and day of week variations. For the purposes of determining whether a roadway is "very low volume", ADT's shall be based upon a 20 year projected ADT.

Backfill: Replacement of excavated material with suitable material compacted as specified.

Blended t~~T~~ransition: A connection between the pedestrian access route at the level of the sidewalk or pedestrian path and the level of the pedestrian street crossing that has grade in the direction of pedestrian travel of 5 percent or less.

Breakaway: A structure that is designed to yield when impacted by a vehicle and has been tested and found acceptable in accordance with ~~NCHRP Report 350~~NCHRP Report 350.

Clear z~~Z~~one: See ~~*County Code*~~*County Code* ~~Section 7.03.020~~ ~~Section 7.03.020~~ Section 7.03.020.

Clackamas County ("County"): The political subdivision of the State of Oregon providing statutory authority administered through its Board of County Commissioners ("BCC").

Commercial: Shall include industrial, multi-family and institutional development.
Compaction: The densification of a fill by mechanical means.

County: See "Clackamas County".

County Road Official: See ~~*County Code*~~*County Code* ~~Section 7.03.020~~ Section 7.03.020.

~~**County Roadway:** See "Road, county".~~

County Surveyor: See ~~ORS 209.005 (2)~~ORS 209.005 (2).

Cross s~~S~~lope: The slope perpendicular to travel of a road or pedestrian facility.

Crosswalk: Under ~~Oregon Revised Statutes~~ORS 810.220 a crosswalk is a legally defined area for pedestrian crossing of the surface of a roadway and may be marked or unmarked.

Cul-de-sac: A short street having one end open to traffic and the other temporarily or permanently terminated by a vehicle turnaround at or near the terminus.

Curb rRamp: A ramp that cut through or is built up to the curb. Curb ramps can be perpendicular or parallel to the curb or a combination of parallel and perpendicular ramps.

Dead cEnd: A road without an exit.

Dedication: The designation and gift of land by its owner. In the context of this document, it is the perpetual easement for right-of-way purposes to the public.

~~**Department of Transportation and Development ("DTD"):** Those County offices formed by the Board of Commissioners ("BCC") and administrating the Transportation and Development Ordinances and related issues within unincorporated Clackamas County.~~

Design sSpeed: The speed approved for the geometric and roadside design of the physical features of a road.

Developer: See "Applicant.""~~.~~

Development Permit: A permit issued to address major work or activities in a right-of-way under the jurisdiction of Clackamas County and/or to address improvements on private property that are required as part of land use.

Ditch: An excavation dug in the earth used to convey water.

Drainage facilities: The physical elements used to convey, absorb, or store runoff such as pipes or channels, and detention or retention ponds or bio-swales.

Driveway ("entry", "entrance", or "access"): A private road ~~which is~~ on private property ~~and which~~that is maintained with private funds.

Driveway, sshared aaccess: A road which is on private property in an easement and which is maintained with private funds, generally considered to provide practical and legal access to ~~two or three~~multiple properties.

Easement: See ~~*ZDO*~~*ZDO* ~~Section 202.~~.

Engineer: A Professional Engineer with Civil Engineering expertise holding a valid license from the State of Oregon.

Engineering: The County Department of Transportation and Development ("DTD") office of Engineering formed by the Board of Commissioners and administrating the DTD ordinances and related issues within unincorporated Clackamas County.

Engineering Geologist: A registered Professional Geologist holding a valid license from the State of Oregon.

Entrance Permit (aka "Entry Permit", "Driveway Permit"): See "Entry Permit" of *County Code* Section 7.03.020.

Fixed oObject: See ~~*County Code*~~*County Code* ~~Section 7.03.020~~ Section 7.03.020.

Frontage iImprovements: ~~See *County Code* Section 7.03.020.~~Required improvements along an applicant's property frontage.

Functional cClassification: The hierarchy of roadways in descending order of mobility, traffic volume and design speed, and ascending order of access: Freeway/Expressway, Major Arterial, Minor Arterial, Collector, Connector, and Local. Functional classifications of individual roadways can be found on Maps ~~V-2a~~V-2a and ~~V2-b~~V2-b of the *Clackamas County Comprehensive Plan*. Descriptions of each functional classification can be found on ~~Table V-2~~Table V-2 and Table V-3 of the *Comprehensive Plan*.

Grade: See ~~*ZDO*~~*ZDO* ~~Section 202.~~.

Grade bBreak: The line where two surface planes with different grades meet.

~~**Interim section:** That roadway cross-section affording full standard improvement adjoining the supporting property frontage and including the improvement across the roadway centerline to effect the improvement bringing the roadway to sufficient width to meet traffic demands.~~

Intersection: The point where a public roadway or private roadway intersects with a public roadway, private roadway or driveway.

Intersection sSight dDistance ("ISD"): The distance that a motorist can see approaching traffic when entering or exiting a roadway at an intersection.

Landing: A generally flat road or driveway approach to any public or private road. Also, the generally flat area at the back of the sidewalk ramp, typically four feet wide for sidewalk ramps.

Landscape screening: Plantings, shrubbery, bushes or other foliage intended to screen the base of a wireless telecommunication facility from public view.

Land Surveyor: A Professional Land Surveyor holding a valid license from the State of Oregon.

Low iImpact dDevelopment (LID): An innovative ecosystem based approach to ~~land development and~~ storm water management that results in fewer environmental impacts.

~~**New Development:** Development that requires land use approval. It also includes single family residences being constructed on lots which were previously unimproved.~~

Pedestrian aAccess rRoute: A prepared surface provided for pedestrian travel within the public right-of-way, including sidewalks and multiuse paths.

~~**Predevelopment:** Existing conditions on site prior to a specific new development.~~

~~**PROWAG*PROWAG***~~: *Public ~~Right of Way~~Right-of-Way Accessibility Guidance* as set forth under ~~Section 1~~Section 1190.1 of the Americans with Disabilities Act of 1990 and adopted by federal agencies for implementing the Americans with Disabilities Act of 1990, ~~Section 5~~Section 504 of the Rehabilitation Act and the Architectural Barriers Act.

Public utility: See ~~*ZDO*~~*ZDO* ~~Section 202.~~.

Public utility easement ("PUE"): An easement for the use of a Public Utility ~~as defined in this section~~. The use of the PUE shall include telecommunications as per ~~ORS 758.035~~ORS 758.035.

~~**"Commission's power to enforce joint use of facilities.** (1) Every public utility, telecommunications utility, person, association or corporation having conduits, subways, street railway tracks, poles or other equipment on, over or under any street or highway shall for a reasonable compensation permit the use of the same by any public utility or telecommunications utility whenever public convenience or necessity requires such use and such use will not result in~~

~~irreparable injury to the owner or other users of such equipment nor in any substantial detriment to the service to be rendered by such owners or other users."~~

Ramp ~~s~~Slope: The grade of a curb ramp parallel to the direction of pedestrian travel.

Recoverable ~~(~~s~~S~~lope~~):~~ A slope on which the driver of an errant vehicle can regain control of the vehicle. Slopes of 4H:1V or flatter in the foreslope and 3:1 in the backslope are considered recoverable.

Right-of-way ("ROW"): See ~~ZDO Section 202~~*ZDO*.
Right-of-Way Permit: A permit issued to address minor work or activities in a right-of-way under the jurisdiction of Clackamas County.

~~:~~

Road: See ~~ZDO~~*ZDO* ~~Section 202~~.

Road, ~~c~~County: See ~~ZDO Section 202~~*ZDO*.

Road, ~~p~~Private: See ~~ZDO Section 202~~*ZDO*.

Road, ~~p~~Public: See ~~ZDO Section 202~~*ZDO*.

Roadway: See ~~ZDO Section 202~~*ZDO*.
Road Official: See County Road Official

Running ~~s~~Slope: The grade of a Pedestrian Access Route that is parallel to the direction of pedestrian travel. In reference to a curb ramp the term Ramp Slope is also used.

Rural: Those unincorporated County areas outside the current designated ~~Urban Growth Boundary~~Urban Growth Boundary (UGB).

Shoulder: The paved or compacted graveled portion of the roadway outside the traveled portion of the roadway ~~way~~ that is available for emergency parking or non-motorized use.

Sidewalk: See ~~ZDO Section 202~~*ZDO*.

~~**Small Cell wireless telecommunication antenna:** An antenna that is part of a private wireless telecommunications facility.~~

~~**Small Cell wireless telecommunication equipment:** Equipment, exclusive of an antenna, that is part of a private wireless telecommunications facility.~~

~~**Small Cell wireless telecommunication facility:** A Small Cell wireless telecommunications facility consisting of an antenna and related equipment, either installed individually or as part of a network, to provide coverage or enhance capacity in a limited defined area. Generally, it is a single service provider installation.~~

Stopping sight distance ("SSD"): The minimum sight distance available on a roadway to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path.

Storm drainage system: A means to control storm water through natural or constructed elements by conveyance, absorption, or storage.

Street: See ~~ZDO Section 202~~*ZDO*.

Temporary: Lasting for a limited time.

Traffic Engineer: A Professional Engineer with traffic engineering expertise or a Professional Traffic Engineer holding a valid license from the State of Oregon.

~~**Traveled Way:** See "Traveled portion of the roadway".~~

Traveled portion of the roadway: See ~~*County Code*~~*County Code* ~~Section 7.03.020~~ Section 7.03.020.

Trip generation: The number of vehicle trips generated by a particular land use.

Urban: Those areas within the current designated ~~Urban Growth Boundary~~Urban Growth Boundary ("UGB") as designated by Metro.

Utilities: Any water, gas, sanitary or storm sewer, electrical, telephone, drainage way, wire, or television communication service and all persons, companies, districts or governmental agencies supplying the same.

Utility Permit: See *County Code* Section 7.03.020

Very low volume: A roadway with a 20 year projected volume of 400 ADT or less or an intersection with a 20 year projected entering volume of 400 ADT or less.

ABBREVIATIONS

AASHTO: ~~American Association of State Highway and Transportation Officials~~American Association of State Highway and Transportation Officials

ADA: ~~Americans with Disabilities Act~~Americans with Disabilities Act

ADT: Average daily traffic

APWA: ~~American Public Works Association~~American Public Works Association

ASTM: ~~American Society for Testing and Materials~~American Society for Testing and Materials

BCC: ~~Clackamas County Board of County Commissioners~~Clackamas County Board of County Commissioners

CRC: Clackamas Regional Center

DTD: ~~Clackamas County Department of Transportation and Development~~Clackamas County Department of Transportation and Development

EOR: Engineer of Record

FHWA: ~~Federal Highway Administration~~Federal Highway Administration

ISD: Intersection sight distance

ITE: ~~Institute of Transportation Engineers~~Institute of Transportation Engineers

MPH: Miles per hour

MUTCD: ~~Manual on Uniform Traffic Control Devices~~Manual on Uniform Traffic Control Devices

ODOT: ~~Oregon Department of Transportation~~Oregon Department of Transportation

PI: Point of intersection

PC: Point of curvature

PT: Point of tangency

SSD: Stopping sight distance

~~**TIS:** Traffic impact study~~

UGB: ~~Urban Growth Boundary~~Urban Growth Boundary

~~USPS: United States Postal Service~~

STANDARD DRAWINGS

The Standard Drawings are available in two formats, ~~electronic portable document format (~~pdf~~)~~ and as dwg, online at http://www.clackamas.us/engineering/roadway.html.

~~and as dwg AutoCAD drawings by requesting online at the same address.~~

CHAPTER 1 - GENERAL CONSIDERATIONS

Chapter 1 establishes general requirements, applicability and process and procedures for plan review, permitting and inspection, sureties, and project close-out.

The remainder of the chapters address technical requirements.

~~SECTION 1~~SECTION 110 - GENERAL PROVISIONS

~~a)~~ These *Clackamas County Roadway ~~Standards~~Standards* will commonly be referred to as the "*~~Standards~~Standards*".

a)

~~b)~~ The *~~Standards~~Standards* are available online at http://www.clackamas.us/engineering/roadway.html. This website will contain the most recently adopted *Standards*~~text~~, the Standard Drawings in both pdf and ~~Autocad dwg~~dwg formats, ~~and any periodic updates to the *Standards*. Please consider the environment before printing.~~ADA design and inspection checklists, general inspection checklists, Design Modification Request form and other materials.

b)

c) The *~~Standards~~Standards* apply to all improvements in right-of-ways easements under the jurisdiction of Clackamas County (including public utility easements and some trails), public and private storm drainage & erosion control as well as some onsite improvements related to development through a land use approval ~~and proposed road and right-of-way facilities, both public and private under the jurisdiction of Clackamas County~~., ~~except as otherwise required by federal design standards or as necessary due to a shortfall of available public funds.~~ Additionally, these *Standards* apply to certain structures on private property and private improvements related to the adequacy of fire access, and grading required in conjunction with private and public roadway development. Grading associated with structures shall be addressed per Title 9.03 of the *County Code* and are administered by the Building Codes Division.

d) ~~–~~In the unincorporated area, w~~W~~hen there is no ~~special~~identified district for stormwater management and erosion control, DTD has jurisdiction.

~~e)~~e) ~~–~~Additional requirements are also imposed upon federally funded projects and supersede the requirements of these ~~Standards~~*Standards*~~nards, which may not coincide with the requirements of these *Standards*.~~

~~d)~~f) These *~~Standards~~Standards* shall be used ~~to implement and be used~~ in conjunction with the *Clackamas County Comprehensive Plan* ("*Comprehensive Plan*") and ~~and~~ the *Clackamas County Zoning and Development Ordinance* ("*~~ZDO~~ZDO*"). ~~Specific sections include:~~

~~e)~~g) These *~~Standards~~Standards* shall be used to implement and be used in conjunction with the policies and standards adopted by the Board of County Commissioners ("BCC").

~~f)~~

~~SECTION 1~~SECTION 115 ~~— OTHERAPPLICABLE~~ STANDARDS, GUIDELINES & REFERENCES

~~(REFERENCES 1, 2)~~

~~115.1 General References~~

These *~~Standards~~Standards* are intended to be consistent with the most recent versions of the following references. It is the Engineer's and/or applicant's responsibility to comply with ~~other~~ federal, state, and local regulations, particularly with respect to wetland and environmental regulations and other development requirements.
If conflicts arise, the most restrictive regulation shall apply.

a) *Clackamas County ~~Comprehensive Plan~~Comprehensive Plan*
b) *Clackamas County ITS (Intelligent Transportation System) Action Plan*
c) *Clackamas County Active Transportation Plan ("ATP")*
~~1)~~d) *Clackamas County Transportation Safety Action Plan ("TSAP")*
~~2)~~e) *Clackamas County Zoning and Development Ordinance ("~~ZDO~~ZDO")*
~~a)~~f) *Clackamas County Capital Improvement Plan ("CIP")*
~~b)~~g) *Clackamas County Code ("County Code")~~ ~~– Title 7.03 Road Use 3)~~
~~c)~~
~~d)~~h) ~~WES~~Clackamas County Service District#1 *Stormwater Standards*
i) Water Environment Services *Erosion Prevention and Sediment Control Planning and Design Manual*

~~e) Local Drainage District or Clackamas County Stormwater Quality and Erosion and Sedimentation Control policies~~
~~f)~~ *Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way* ("~~*PROWAG*~~*PROWAG*")
~~g)~~
~~j)~~
k) Technical requirements of *Oregon Standard Specifications for Construction*
l) Other state and federal laws
~~h) PROWAG – The Public Right of Way Accessibility Guidance prepared and published by the Department of Justice U.S. Access BoardOther state and federal laws~~

~~115.2 Other Adopted References, Design Standards and Guidelines~~

If these ~~*Standards*~~*Standards* do not address a specific design issue, ~~reference~~ the most recent version of the following documents should be referenced. ~~The most recent editions of the following documents are adopted by the County by reference.~~ In all situations, ~~Where conflicts exist,~~ Engineering shall determine the appropriate design reference and its applicabiltiy.

a) American Association of State Highway and Transportation Officials ("AASHTO") - *A Guide for Achieving Flexibility in Highway Design*
b) AASHTO - *Guide for the Development of Bicycle Facilities*
c) AASHTO - *Guide for the Planning, Design, and Operation of Pedestrian Facilities*
d) AASHTO - *Guidelines for Geometric Design of Very Low-Volume Local Roads*
e) ~~AASHTO - Highway Safety Manual~~AASHTO - *LRFD Bridge Design Specifications*
f) AASHTO - *A Policy on Geometric Design of Highways and Streets* ~~(aka "Green Book")~~
g) AASHTO - *Roadside Design Guide*
h) AASHTO - *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*
i) ~~*American Society for Testing and Materials (ASTM)*~~*American Society for Testing and Materials* (ASTM)
j) The Asphalt Institute - *The Asphalt Handbook*
k) The Asphalt Institute - *Thickness Design - Highways and Streets*~~.~~
l) Federal Highway Administration (FHWA) - ~~*Manual on Uniform Traffic Control Devices (MUTCD)*~~*Manual on Uniform Traffic Control Devices (MUTCD)*
m) FHWA - ~~*Standard Highway Signs*~~*Standard Highway Signs*
n) FHWA - ~~*Roundabouts: An Informational Guide*~~*Roundabouts: An Informational Guide*
o) ~~FHWA - *Traffic Analysis Toolbox Volume III: Guidelines for Applying Microsimulation Modeling Software*~~Institute of Transportation Engineers ~~(ITE) - *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practice*~~ITE - ~~*Neighborhood Street Design Guidelines: An ITE Recommended Practice*~~ITE - *Traffic Control Devices Handbook*
p) ITE - *Traffic Engineering Handbook*
q) ITE - *Trip Generation Manual*
r) ITE - *Trip Generation Handbook*
s) ~~*ITE - Urban Street Geometric Design Handbook*~~*International Building Code* ("*IBC*")
t) *International Plumbing Code* ("*IPC*")
u) National Association of City Transportation Officials - *Urban* ~~*Bikeway*~~*Bikeway Design Guide*
v) National Association of City Transportation Officials - *Urban Street Design Guide*
w) ~~Oregon Department of Transportation ("ODOT") - *Oregon Bicycle and Pedestrian Design Guide*~~ODOT~~-~~ - ~~*Highway Design Manual*~~*Highway Design Manual*
x) ODOT - ~~*Hydraulics Manual*~~*Hydraulics Design Manual*
~~y) ODOT - *Oregon Supplement to the MUTCD*~~*Oregon Supplement to the MUTCD*
~~z)~~y) ODOT - ~~*Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*~~*Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*
~~aa)~~z) ODOT - ~~*Traffic Control Plans Design Manual*~~*Traffic Control Plans Design Manual*
~~bb)~~aa) ODOT - ~~*Traffic Line Manual*~~*Traffic Line Manual*
~~cc)~~bb) ODOT - ~~*Traffic Manual*~~*Traffic Manual*
~~dd)~~cc) ODOT - ~~*Traffic Signal Policy and Guidelines*~~*Traffic Signal Policy and Guidelines*

~~ee)~~dd) ODOT - ~~*Sign Policy and Guidelines*~~*Sign Policy and Guidelines*
~~ff)~~ee) ODOT - ~~*Oregon Standard Drawings*~~*Oregon Standard Drawings*
~~gg)~~ff) ODOT and American Public Works Association ("APWA") - ~~*Standard Specifications for Construction*~~*Standard Specifications for Construction*
~~hh)~~gg) ~~*Oregon Fire Code*~~*Oregon Fire Code* Appendices B and D
hh) Oregon Fire Code Metro Code Committee ~~*Fire Code Applications Guide*~~*Fire Code Applications Guide*
ii) *Oregon Supplement to the MUTCD*
~~ii)~~jj) Other local fire codes
~~jj)~~kk) ~~Transportation Research Board (TRB) - *Access Management Manual*~~Transportation Research Board (TRB) - *Highway Capacity Manual*
~~kk)~~ll) Tri-Met ~~design guidelines for transit related facilities~~*Bus Stops Guidelines*

~~a) It is the Engineer's and/or applicant's responsibility to comply with other federal, state, and local regulations, particularly with respect to wetland and environmental regulations and other development requirements.~~

~~1)~~

~~SECTION 1~~SECTION 120 - DEVELOPMENT RELATED~~RESPONSIBILITY TO PROVIDE~~ IMPROVEMENTS

In certain instances, the provisions of the *ZDO* may require a developer to make improvements and/or dedicate right-of-way for the improvement of roadways in connection with a development that has received land use approval. The *ZDO* and subsequent land use conditions of approval shall dictate the nature and extent of those improvements. When improvements are made, they shall be compliant with these *Standards* and the roadway cross sectional elements of the *Comprehensive Plan* and the *ZDO*.

~~Any development, which increases trips or will otherwise impact the capacityservice level, safety, or operational efficiency of roads serving such land development and is required by the ZDOother County code or ordinance to improve such roads, shall improve and/or dedicate the right-of-way to improve those roads in accordance with these *Standards*, the *ZDO*, the *Comprehensive Plan* and the *CIP*. These improvements are predicated on the assumptioning that these improvements can be required constitutionally. re is a nexus for those improvements and the proposed improvements are roughly proportional to the impacts of the proposed development. .~~

~~Public and private improvements, dedication of right-of-way, and granting of easements are conditioned through the land use review process, described and administered under the ZDO or by Federal, State, or other local government regulations and are subject to the requirements of these Standards.~~

~~GMass grading required in conjunction with roadway development is subject to these Standards.Title 9.03 of County Code.~~

~~SECTION 1~~SECTION 130 - PERMIT REQUIREMENTS~~GENERAL REQUIREMENTS FOR IMPROVEMENTS~~

130.1 General Requirements

Improvements, ~~Construction~~activities or the placement of permanent objects ~~work~~ in ~~the~~ the right-of-way ~~-~~under County jurisdiction require~~s~~ a permit prior to the start of work ~~prior to the start of work~~. The County will issue a permit when it is established that the proposed activity is compliant with requirements. The County is not liable for errors or omissions of an applicant submittal. ~~Unpermitted work, work that is not compliant with the approved plans, specifications, the permit conditions, and/or land use approval conditions are subject to work suspension and code enforcement per the County Code.~~

Per *County Code* 7.03.030, the Road Official "may take any action deemed to safeguard the best interests of the traveling public." This includes objects within the right-of-way, permitted or otherwise, are subject to relocation or removal at the adjacent property owner's expense at such time that the Road Official deems it necessary to relocate or remove such things due to public need, safety, or violation of standards.

The privileges granted and obligations created by virtue of a~~the~~ permit issued shall be binding not only upon the applicant, but also upon the successors and assigns of the applicant~~.~~. The applicant shall give E~~e~~ngineering written notice of any such assignment or transfer within a reasonable time not to exceed 90 days after assignment.

~~**Construction noise shall be within the hours and decibel level limits established in the County Noise Control Ordinance located in Title 6.05 of the County Code or other applicable local noise control ordinances.**~~

~~Depending on the classification of the road, type of installation, the duration of the installation or other road and traffic impact considerations, the county may require the work be completed during hours with the least volume of traffic.~~

~~The County issues various types of permits for various types of work.~~

130.2~~1~~ Exceptions to Requirements for Permit

The following work/placements within the right-of-way under the jurisdiction of Clackamas County ~~-~~do~~es~~ not require a permit:

a) Work performed by the County Department of Transportation and Development or ~~their~~ its contractors. However, a Right-of-way Permit is required for road closures when work is performed by DTD contractors.~~-~~

~~a)~~b) Unless traffic control is ~~necessary~~required per Section 290, certain ~~maintenance~~ activities including~~performed by private parties. Maintenance activities include~~:

1) Vegetation installation, maintenance, and removal not related to street trees that is compliant with the *County Code*.
2) Street tree removal and installation not related to development. Land use requirements dictate the replacement when street trees are removed. See Section 255 regarding street tree installation not related to development.

~~b) Landscaping except street tree installation or removal~~

3) ~~Cleaning of a sidewal~~Roadway and sidewalk cleaning.
4) Driveway culvert maintenance.
5) Driveway maintenance including the spreading of gravel, repair of asphalt deterioration if the pavement edge of the roadway is not impacted, and sealing pavement.

~~c) k~~

~~d) Culvert maintenance~~

~~Light driveway maintenance including the spreading of gravel, repair of asphalt deterioration if the pavement edge of the roadway is not impacted and sealing pavement~~

6) Minor grading and placement of gravel on graveled roadways that does not significantly impact the existing drainage in the judgment of the Road Official.

7) Some utility work per *County Code* Section 7.03.099.

c) ~~Until such time as the occupied portion of the right-of-way needs to be utilized~~C~~, c~~ertain right-of-way ~~public right-of-way and easement~~ encroachments may be installed ~~a~~ without a permit~~nd exist~~ ~~per~~ if maintained by the adjacent property owner or by agreement and are compliant with ~~County Code~~*County Code* ~~Section 7~~Section 7.03.090~~,~~ sight distance standards of ~~without a permit and include~~Section 240, clear zone standards of Section 245, do not hinder access or maintenance of the constructed roadway or to utilities within an easement, do not constitute a road hazard and do not necessitate traffic control upon installation or maintenance per Section 290. These encroachments include:

1) Private irrigation systems not installed within a roadway median or island.
2) Mailboxes installed per the Standards for Installing Mailboxes on County Roads.
3) Landscaping except within a roadway median or island.
4) Fences.
5) Other objects compliant with *County Code* Section 7.03.

d) Under any other conditions determined by the Road Official.

~~:~~

~~Private irrigation systems~~
~~Mailboxes installed per the County's Mailbox Policy~~
~~Landscaping within a landscape strip except street tree removal and placement~~
~~Landscaping outside of the landscape strip and median~~
~~Fences that:~~
~~Are located outside of the clear zone or located in the clear zone but are not a fixed object;~~
~~Meet the sight distance requirements of Section 240~~
~~Do not obstruct existing or proposed utilities and~~
~~Do not obstruct the constructed road including drainage facilities and roadway shoulder.~~
~~Do not obstruct intersection sight distance for an intersection or a driveway.~~
~~When the need for a permit is waived by the Road Official.~~
~~The following objects are prohibited in the Right of way:~~
~~Permanent buildings and walls retaining private property~~
~~Water wells~~
~~Septic tanks or drainfields~~~~drain fields~~
~~Basketball hoops, skate board ramps, cycle ramps or other recreations…?~~
~~Code Enforcement, Work shutdowns, access to the site~~ ~~Public and private improvements, dedication of right-of-way, and granting of easements are conditioned through the development review and land use review process, described and administered under the *ZDO* or by Federal, State, or other local government regulations and are subject to the requirements of these *Standards*.~~

~~**130.1 Public Improvements**~~

~~**Fully developed**~~~~**Complete engineering plans for all proposed improvement work within public right-of-way or on private property that impacts public facilities or easements under the jurisdiction of the County shall be submitted to the Department of Transportation and Development Engineering Division ("Engineering") for approval. Such plans shall be prepared by**~~**under the supervision of, and display the stamp of, an Engineer unless the engineered planthat requirement is waived by Engineering. A development permit is required for this work.**

~~**130.2 Private Improvements**~~

~~**When improvements to private property are required through land use approvals or proposed by the owner that affects shared access, emergency access, surface water runoff, erosion, neighboring property, or a water course, the work shall be subject to plan submittal and approval, and will require a permitin the form of either a Development or Entrance Permit. Such plans shall be prepared by**~~**under the supervision of, and display the stamp of, an Engineer licensed in the State of Oregon unless that requirement is waived by Engineering. A permit is required for this work**

~~130.3 Permits Required Prior to Construction~~

~~A permit is required for mostany work within the right of way unless waived by Engineering and may be required for drainge, access, parking, circulation and other site improvements. Construction of proposed improvements shall not precede plan approval and issuance of a permit. Work that commences prior to plan approval or issuance of a permit may not be accepted and may be subject to the code enforcement procedures of the County Code TitleSection 7.03xxx.~~

130.3~~23.1~~ ~~Issuance Approval of Permits~~General Permit Requirements

The following provisions apply to Development Permits, Entrance (Entry) Permits, Utility Permits, and Right-of-Way Permits. ~~Public Utility connections and extensions within County right-of-way shall be permitted under the Development Permit. When a Development Permit is not required, all utilities shall be required to obtain a Utility Permit. Franchise Utility connections and extensions within County right-of-way shall be required to obtain a Utility Permit.~~

130.3.1 Responsibility

~~Approval of plans and I~~Issuance of permits by the County does not in any way relieve an~~the~~ applicant~~property owner or Engineer~~ of their ~~his/her~~ responsibility to meet all requirements of the County or other affected jurisdictions, or the obligation to protect ~~the~~ life, health and/or property ~~of the public~~. The issued permit ~~design~~ for any project may~~ust~~ be revised, ~~or~~ supplemented, or revoked at any time if it is determined by the ~~County~~ Road Official that the ~~full~~ requirements of the County may not have been met or life, health and/or property are jeopardized. An applicant is responsible for the safety and maintenance of the roadway within their work area.

130.3.2 Application Submission

a) Utility- Permit applications shall be submitted online at https://accela.clackamas.us/citizenaccess/ where permit instructions and submittal requirements can be found.
b) Development Permit applications may be submitted via any of the following:
   1) Online at https://accela.clackamas.us/citizenaccess/.
   2) Via mail, email or at the Engineering office. The permit instructions, submittal requirements and application can be found at https://www.clackamas.us/engineering/forms.html. Electronic submittals are preferred.
c) Entrance Permit applications may be submitted via mail, email or at the Engineering office. The permit instructions, submittal requirements and application can be found at https://www.clackamas.us/engineering/forms.html. Electronic submittals are preferred.
d) Right-of-Way Permit applications, including special requirements for revocable encroachments, may be submitted via mail, email or at the Engineering office. The permit instructions, submittal requirements and application can be found at https://www.clackamas.us/engineering/forms.html. Electronic submittals are preferred.

130.3.3 Fees

a) Fees will be charged per the Clackamas County fee schedule found at https://www.clackamas.us/transportation/engineeringfees.html. Fees not paid online may be paid via cash, check or credit card. Credit card payment requires an additional fee. Engineering staff will contact applicants for applications that are not accompanied by the appropriate fee for payment prior to permit processing.
b) Development Permit fees are typically based upon a percentage of the Engineer's estimate or a Contractor's estimate or bid and subject to Engineering approval. Sureties will be based upon an Engineer's estimate per Section 190.
   1) All work in the public right-of-way under the jurisdiction of Clackamas County shall be included in the estimate.
   2) All work on private property included on the Development Permit related inspection checklist as applicable, shall be included in the estimate.

130.3.4 Contractor Requirements for Licensing, Bonding, & Insurance

Contractors performing within the right-of-way under the jurisdiction of Clackamas County shall:

a) Maintain a valid license with the Oregon Construction Contractors Board.
b) Comply with the insurance requirements of Clackamas County's "Insurance for Permitted Work" policy.

Contractors performing work without compliance with these requirements are subject to Code Enforcement per the *County Code*.

130.3.5 Property Owner Requirements for Insurance

a) Property owners may perform limited work in the right-of-way per Clackamas County's "Insurance for Permitted Work" policy.
b) Property owners performing work without compliance with these requirements are subject to Code Enforcement per the *County Code*.

130.3.6 Permit Approval

~~I~~W~~When~~ork subject to a permit may not proceed until Engineering issues the permit. Work without a permit is subject to Code Enforcement. When a permit is issued, a copy of the issued permit will be provided to the applicant ~~and should be kept with the County approved plans~~. Permit numbers are assigned at the time of your application and are displayed on the permit. Applicants should refer to these numbers when communicating with staff about their project.

130.3.7 Application Period, Approval Period & Extensions

Permits that are not issued within a certain timeframe will expire. Issued permits will display a permit expiration date. Work may not occur after the expiration date. Permits not completed by the expiration date or work that takes place after the expiration date is subject to Code Enforcement. Paid fees will not be refunded. Any surety that is in place may be utilized by the County to complete the work at the date of expiration. Expiration dates are determined as follows:

a) **Development Permits**
   1) Two years from the application date if not issued.
   2) Whichever is longer, two years from the date of issuance; or
   3) The date of the expiration of the land use permit.
   4) Extensions may be granted if such an extension complies with land use requirements, any required surety is in place, and any extension fee is paid.
b) **Entrance Permits**
   1) Two years from the application date if not issued.
   2) Whichever is longer, two years from the date of issuance; or
   3) The date of the expiration of the land use permit.
   4) When associated with a residential Building Permit, the Entrance Permit expires at Certificate of Occupancy unless the applicant provides a Cash Acknowledgement of $2,500 per Section 190, any required extension fee is paid and fire, life, and safety requirements are met. In that case, the permit expiration may be extended for up to one~~an~~ additional year. At the completion of the permit, the Cash Acknowledgement will be released to the applicant.
   5) When not associated with a residential Building Permit, the permit expiration may be extended for up to one~~an~~ additional year when any required extension fee is paid.
c) **Utility Permits**
   1) One year from the application date if not issued.
   2) One year from the date of issuance except:
      i. Minor work such as potholing, which shall expire at conclusion of the proposed activity.
      ii. The ongoing occupation of the right-of-way is not subject to expiration.

iii. The permit expiration may be extended for up to an additional three months if approved by the Road Official.

d) ~~Utility work performed as part of a Development Permit. The expiration date shall match that of the Development Permit.~~**Right-of-Way Permits** –

1) One year from the application date if not issued.

2) A maximum of one year from the date of issuance except:

i. Revocable encroachments may expire per the revocable encroachment agreement.

ii. Permits addressing filming, bike races, running races, block parties, road closures, or traffic control only will expire at the conclusion of the proposed activity.

iii. When not associated with a residential Building Permit, the permit expiration may be extended for up to an additional year when any required extension fee is paid.

Timelines for work that is subject to Code Enforcement action per Section 7.03 of the *County Code* will vary depending upon the timeline of the Code Enforcement action and is subject to an extension fee or a new or revised permit. No work subject to a permit per Section 130.4 may occur without a valid permit per these *Standards*.

130.3.8 Revocation or Modification of Permits

Per County Code Section 7.03.030, "The Road Official or the Board may take any action deemed to safeguard the best interests of the traveling public." The Road Official may stop work, revoke, suspend, modify or reissue a permit at any time if the permitted activities:

a) Violate these *Standards*;
b) Violate the permit conditions;
c) Violate the approved plans;
d) Violate and use requirements including the conditions of approval;
e) Require the consideration of new information not considered in the original permit approval; or
f) Do not protect health, safety, property or environment.
g) Any other situation as determined by the Road Official.

130.3.9 Notification

The applicant shall coordinate construction activities with the adjacent property owner (if not the applicant), tenants, local public agencies, utilities and service providers during construction to avoid damage to property or utilities and to prevent the interruption of services. Applicants shall be responsible to notify adjacent property owners of work occurring along that property owner's roadway frontage to protect their property and access. Work within the right-of-way that affects another property owner's private property will require additional notice and accommodation. The adjacent property owner is entitled to the delivery of private property removed from the right-of-way.

130.3.10 Construction Noise

Construction noise shall be within the hours and decibel level limits established in the County Noise Control Ordinance located in Title 6.05 of the *County Code* or other applicable local noise control ordinances.

130.3.11 Inspection

Comply with requirements of Section 180.

130.3.12 Final Inspection/Project Close-out

Comply with requirements of Section 190.

130.~~43~~ Permit ~~Types~~Types & Requirements; Stormwater & Erosion Control Reviews

130.~~43~~.~~12~~ Development Permit

A Development Permit will be required for:

a) Work in the public right-of-way under the jurisdiction of Clackamas County that creates, modifies, widens or extends a roadway or trail, involves a structure per Chapter 5, or significantly modifies drainage in the judgment of the Road Official.
b) Work in a right-of-way under county jurisdiction that exceeds the parameters of an Entrance or Right-of-Way Permit.
c) Dedication of public right-of-way or easements as part of a development.
d) Work on private property that involves:
    1) Land use requirements.
    2) The construction of private roadways.
    3) Structures per Chapter 5 when not subject to a Building Permit.
    4) A culvert greater than 12 inches in diameter.
    5) An environmental resource involving land use or environmental permitting.
    6) A structural fill or fills greater than one foot in depth.

7) Access and other site improvements on existing slopes greater than 10%.
8) Improvements to a driveway or private roadway in a shared access easement.

d) Public utility placements related to a development shall be issued via a Development Permit. Franchise utility placements not related to a development shall be issued via a Utility Permit.
e) Any other situation as determined by the Road Official.

On a case-by-case basis, the County may reduce the requirement for a Development Permit to an Entrance and/or Right-of-Way Permit (i.e. providing access to four of less residential properties where the required improvements could be acceptably constructed to meet residential, agricultural, or logging driveway requirements, an entrance permit may suffice).

~~A Development Permit will be required under the following conditions:shall be issued for construction per Section 130.1 and 130.2. See Section 140 for submittal requirements.~~
~~a)~~
~~Work in the right of way that creates, widens or extends a roadway, involves a bridge, wall, stairs or other structure or modifies drainage within a right-of-way.Work in the right of way that is subject to land use approvalit falls within the requirements of an Entrance Permit, Utility Permit or Right-of-way Permit.~~
~~Work on private property that constructs, widens, extends, modifies or otherwise involves:~~
~~a) A bridge, wall, stairs or other structure not related to a Building Permit~~
~~b) A culvert greater than 12 inches in diameter~~
~~c) An environmental resource requiring land use or environmental permitting.~~
~~A structural fill or fills greater than one foot in depth.~~
~~Access and other site improvements on eExisting slopes greater than 10%~~
~~Improvements in a A required offsite access easement is not recorded or is found to be insufficient~~
~~Parking and circulation improvements subject to land use approval~~
~~Surface water management facilities when more than 5,000 square feet of new or reconstructed impervious surface is proposed within the UGB and outside one of the surface water districts and for 10,000 square feet of new or reconstructed impervious surface is proposed outside the UGB or the disturbance is within 50 feet of a stream or within 10 feet of a property line.~~
~~Work in the right of way that exceedsdoes not fall within the parameters of a Right-of-Way Permit including major work on non-maintained local access roads~~
~~See Section 140 for submittal requirements.~~
~~A Development Permit shall be required in lieu of a Driveway Entrance Permit when the following conditions exist:~~

130.43.23 ~~Driveway~~ Entrance (~~Road~~ Entry) Permit

An Entrance Permit will be required under the following conditions:
a) New driveways to a right-of-way under County jurisdiction except in the case of industrial, commercial and multi-family developments where a Development Permit has sufficiently addressed the entrance requirements.
b) Modification to portions of existing driveways located in the right-of-way not meeting the exemption requirements of *County Code* Sections 7.03.240-7.03.290.
c) As part of a residential subdivision or partition to address access to each lot of record.
d) When required per the "Entrance Permit Matrix."
e) Any other situation as determined by the Road Official.

~~Unless a Development Permit is required, a~~A ~~Driveway~~ Entrance Permit ~~will be~~ is required ~~under the following conditions:~~
~~unless the requirements for a Development Permit are for:~~
~~nNew driveways, ly proposed~~
~~EEdriveways that require turnarounds, turnouts per fire access requirements.~~
~~or mModification to portions of existinged driveways located in the right-of-wayr located within the right-of-wayesidential, agriculture and logging access not subject to a Development Permit.onbetween individual lots of record and County and~~

pPublic and private access improvements rights of waythat are under 10% grades, and do not involve a waterway or structures.
All other types of entrances require a Development Permit per Section 130.3.2. County Code Sections 7.03.240-7.03.290 provides additional Entrance Ppermit requirements. In addition to approach requirements, driveway permits can be utilized for simple on-site improvements such as turnarounds and turnouts. If the requirements of xxx are met, then a Development Permit shall be required.
See Section xxx for submittal requirements.

130.43.34 Utility Placement Permit

A Utility Placement Permit will beis required for work in the public right-of-way under the jurisdiction of Clackamas County under the following conditions:

a) Franchise utility placements not related to a development shall be issued via a Utility Permit. Public utility placements related to a development shall be issued via a Development Permit.
b) for the placement of utility pipes, conduits, lines, poles, or other appurtenances in the right-of-way or public easements. Potholing for utility location.
c) Other work not addressed by the exemption of *County Code* Section 7.03.099.
d) Any other situation as determined by the Road Official.

When a Development Permit is required, all Public Utility connections and extensionsutility placements shall be permitted though the Development Permit.
County Code Sections 7.03.100-7.03.240 and Chapter 7 of the Standards provides additional permit requirements.
See Section xxx for submittal requirements. See Section xxs for small cell wireless facilities submittal requirements.
At the discretion of the Road Official, a utility Placement Permit may require the franchise utility to provide, at the expense of the utility, an independent Primary Inspector, not associated with the contractor.

Clackamas County shall not be responsible for any expensesexpense related to the Primary Inspector or an inspection required by the County.

The franchise utility shall ensure the primary inspector has passed the ODOT General Inspector Certification and is certified by ODOT in the inspection requirements being performed. Required certifications shall be provided to the County upon formal request.

The franchise utility may be required to provide primary inspection for work within the County right-of-way where:
More than 1,000 longitudinal feet of disturbance within the Urban Growth Boundary
More than 2,500 longitudinal feet of disturbance outside the Urban Growth Boundary
Governmental agency upgrades, maintenance, or service work
Work on County roads classified as Arterials or Collectors that disturbs more than 250 square feet of hard surface.
Night or weekend work is required or performed
Disturbance, alteration or replacement of any ADA facility/component
trench plowing is performed
Suspension of utility from publicCounty bridge is proposed

Franchise utility work that may be exempt from providing a primary inspector:
Aerial work or work that does not break the surface within the County right-of-way
Lateral work within the County right-of-way
Pushing or pulling utilities though existing conduits

The Primary Inspector will submit daily reports on a weekly basis to the County inspector throughout the duration of the project. Daily reports shall include at a minimum:
Inspector's name and contact information
Utility Permit number
Date and time of inspection
Nature of work being performed
Approximate address/station/cross street/mile post of daily work
Structural section of the roadway (rock and hard surface)
Effectiveness of the implemented Traffic Control Plan
Compaction testing results (if applicable)
Relative pictures with references showing work performed
Hazards found during construction
Changes to approved plans
Hard surface cuts and locations

The Primary Inspector shall contact the County inspector at a minimum 48 business hours prior to starting work and when:
48 business hours prior starting work and when Wwork has been completed.
The scope of the project/work within the right-of-way has changed
An adjacent utility has been compromised
The continuation of work has stalled or been postponed for longer than 72 hours (not including weekends and holidays).
The integrity of the County Road has been compromised
Any unforeseen safety issues arise
Any public conflicts or concerns arise

130.4.45 Right-of-Way Permit

a) A Right-of-Way Permit is required when the work in the right of way is minor, miscellaneous and and does not rise to the level of a Development Permit. Additionally, a Right of Way Permit may be issuedrequired for work in the public right-of-way under the jurisdiction of Clackamas County under the following conditionsthe following:
Sidewalk work not affecting drainage

~~The removal and replacement of street trees~~

a) Sidewalk grinding or panel replacement.

b) ~~Minor work on non-maintained local access roads,~~ Improvements to roadways that do not require a Development Permit.

c) Encroachments not exempt per Section 130.1. Special requirements to address revocable encroachments are found at https://www.clackamas.us/engineering/forms.html. Other than public utilities and other facilities, privately owned installations require a Revocable Encroachment Permit.

d) Any activities that require traffic control not related to other permits. These activities commonly include races, filming and block parties.

e) Temporary road closures.

f) Dust control application.

~~for~~

~~rR regulated per xxx.~~

~~B~~

~~F.~~

~~Traffic control not related to other permits races,~~

~~Ttemporary road closures,~~

~~Races and other events~~

g) ~~Dust control application~~Gates or other obstructions that restrict access to a right-of-way.

h) Minor paving or grading work that does not involve significant drainage changes.

~~b)~~i) Any other situation as~~minor work not rising to the level of a Development Permit and xxx.~~ determined by the Road Official.

~~See Section xxx for submittal requirements..~~

~~A Development permit is required for surface water management facilities when more than 5,000 square feet of new or reconstructed impervious surface is proposed within the UGB and outside one of the surface water districts and for 10,000 square feet of new or reconstructed impervious surface is proposed outside the UGB or the disturbance is within 50 feet of a stream or within 10 feet of a property line. Permit requirements are covered in Chapter 4.~~

~~130.3.6~~

~~AOutside of xxx, aAnWhen there is 800 square feet or greater of soil disturbance outside a stormwater district an erosion control permit is required from DTD Engineering, whether the disturbance occurs in the right of way or on private property. The erosion control permit will be included in either a Development Permit, Entrance Permit or a Right of way Permit. The permit requirements are covered in Chapter 4. In addition to the erosion control permit from DTD, disturbances of one acre or more also requires a 1200-C permit from DEQ. When applicable, DTD requires a copy of the 1200-C permit prior to issuance of a permit.~~

~~Permit durations, expirations, extensionsand extensions.~~

~~Submittal options, fee schedule links, website to permit applications, ACA.~~

~~Expectations for the condition of the work site and remedies.~~

130.4.5 Stormwater Review

The Engineering Division of DTD is responsible for ensuring the adequate drainage of public roadways and developed properties in unincorporated areas outside of established stormwater districts within the County. Engineering regulates the construction of public and private roads and other site improvements to ensure adequate drainage of storm/surface water to an appropriate discharge point.

Stormwater management review and requirements for work in a public right-of-way or on private property may be added to an Engineering permit for work proposed outside a stormwater district under the following conditions:

a) When 5,000 square feet or more of new or reconstructed impervious surface is proposed within the UGB.
b) When 10,000 square feet or more of new or reconstructed impervious surface is proposed outside the UGB.
c) When grading or any new or reconstructed impervious surface is proposed or replaced within 50 feet of a perennial creek or stream or within 10 feet of a property line.

See Chapter 4 for stormwater management standards when required by this section.

130.4.6 Erosion Control Review

An erosion control review and inspections may be added to an Engineering permit when 800 square feet or greater of soil disturbance is proposed outside a stormwater district whether the disturbance occurs in the right-of-way or on private property. In addition to the erosion control review from DTD, disturbances of one acre or more ~~also~~ requires a 1200-C permit from DEQ. When applicable, DTD requires a copy of the 1200-C permit prior to issuance of a permit. See Section 470 for requirements.

~~SECTION 135 – NOTIFICATION~~

~~The contractor shall coordinate the proposed construction activities with the owner and the local public agencies, utilities and companies during construction to avoid damage to utilities and to prevent the interruption of services to residences and businesses.Applicants shall be responsible to notify adjacent property owners of work occurring along that property owner's roadway frontage or as required by Engineering. Work within the right-of-way that affects another property owner's private property will require additional notice and accommodation.~~
~~Refer to the local utility district for erosion control, sanitary sewer, storm water and waterline requirements.~~
~~(REFERENCES 2, 3, 10)~~

~~SECTION 1~~SECTION 140 – PERMIT AND PLAN SUBMITTAL~~PERMIT SUBMITTAL REQUIREMENTS~~~~B~~SUBMITTAL REQUIREMENTS FOR PERMITS

140.1 Development Permit Submittal

Permit applications shall contain documents submitted in support of a Development Permit application and shall be prepared in accordance with the following requirements:

a) Submitted via one of the methods described in Section 130.3.2.
b) Electronic plans are preferred to paper plans and shall follow the same requirements as paper plans.
c) Plans submitted on paper shall be submitted on 22" x 34", 24" x 36" or 11"x17" sheets. Traffic signal plans shall be submitted on 11" x 17" sheets. Acceptable scales are 1" = 10', 20', 30', 40' or 50' horizontal (1:10 ratio) and 1" = 1', 2', 3', 4', or 5' vertical. The scale shall be shown for each plan. Engineer scale shall be required. Depending on the plan, engineering may allow other scales upon request.
d) Plans shall include the following:
    1) The land use case file number on the cover sheet (if applicable)
    2) Project contacts on the cover sheet
    3) A north arrow shall be included on each sheet and point to the top or right side of the plan.

4) The location and elevation of a temporary benchmark shall be shown on the plans, or if the benchmark is not within the proposed area of work it shall be referenced by number and location and the plans shall also provide a local benchmark. When practicable, elevations shall be based on the NAVD88 datum. Alternatively, another datum may be acceptable as the basis of elevations for engineering drawings.
5) Whenever practicable, utilize the Oregon Coordinate Reference System – PDX zone (OCRS-PDX) international feet as the coordinate base for projects. Alternatively, another geodetic plane system may be acceptable as the basis for engineering drawings.
6) Plans shall have a vicinity map showing the location of the project, surrounding roadways, nearby driveways, and major intersections. The stamp and signature of the Engineer responsible for preparation of the plans shall be on all sheets.
7) The stamp and signature of the Surveyor responsible for preparation of the existing topographic conditions shall appear on the existing conditions plan. The Engineer's stamp is not required on the existing conditions plan.
8) Detail sheets shall show all Standard Drawings and special drawings needed for the project. *Oregon Standard Drawings*, as applicable, should be incorporated into the plans.
9) Detail sheets shall be submitted for all ADA accessibility features including blended transitions, curb ramps, crosswalks, medians/traffic islands, sidewalks/paths, pedestrian push buttons and clear spaces. The detail sheets shall contain the level of detail similar to that found in *ODOT Standard Detail* DET1720.
10) Plans shall include existing and proposed locations of utility poles, pedestals, vaults, fire hydrants, signs, mailboxes, fencing, and any other structures within the right-of-way.
11) General notes shall be shown together on one page, preferably the first sheet in the set. The County's standard general notes are provided in Standard Drawings N100-N300.
12) Plans shall include any additional information the County deems necessary.

140.1.1 Plan View Sheets

Plan views shall contain the following items (as applicable). Plan and profile views shall include the items below, extending 200 feet from project boundaries adjacent to and beyond the proposed improvement:

a) Plan and profile views may be stacked one above the other if desired. Plan horizontal scale shall match the profile horizontal scale.
b) Right-of-way, property lines, right-of-way centerline, and existing and proposed easements. The plans shall identify any offset crowns from centerline of the right-of-way.
c) Construction shall not occur within two feet of adjacent property lines unless approved by the County.
d) Right-of-way centerline stationing of existing and proposed roadways. Stations shall be based on existing stationing if available. Show stationing for centerline-centerline of intersections.
e) Subdivision name, approved roadway names, subject property tax lot numbers and adjacent property tax lot numbers.
f) Existing utilities and structures, including hydrants, pedestals, signs (public and private), mailboxes, light poles, structures, manholes, drainage structures, valves, meter boxes, power poles, fences, curb ramps, pavement markings, trees, etc.
g) On both sides of the street across the property frontage and within 200 feet of each property line include the edge of pavement, shoulders, curb, sidewalk, ditch line, culverts and existing driveways.
h) Horizontal alignment and curve data for roadway centerline and non-parallel curb lines. Curve data shall include radius, length, and delta.
i) Curve data (radius, length, and delta angle) for all curb returns, with gutter elevations at the P.T., P.C., and quarter deltas. Top of curb elevations may be shown. Show the location of existing and proposed survey monument boxes per Section 150.3.
j) Minimum stationing callouts at 100 foot increments, with tick marks at 50 foot increments.
k) Location, station, and size of all existing and proposed storm drains, sanitary sewers and water systems. Stationing shall be based on roadway stationing, except where specifically required otherwise by sewer or water district.
l) Grading plans shall show existing and proposed contours, and high and low points. Contours shall be at a maximum two (2) foot interval.
m) Placement, elevations, dimensions and slopes shall be shown for ADA accessibility features in accordance with *Oregon Standard Drawings* and *ODOT Standard Detail* DET1720.

n) Location and description of existing and proposed survey monuments.
o) Typical sections of all roadway sections and drainage channel sections.
p) Pavement restoration considering the impacts of each utility associated with the development. The location of the saw cut line. Pavement restoration and saw cut line location shall be based upon Standard Drawings U270 through U290.
q) Pavement tapers as defined in Section 250.6.4.
r) Signing and pavement marking plan as necessary per Sections 270 and 280.

140.1.2 Profile View

Profile views shall contain the following items (as applicable):
a) Stationing, elevations, vertical curve data and slopes for proposed roadway centerline. Existing centerline elevations shall be shown. Estimate and label existing vertical curve data.
b) Gutter elevations shall be shown when gutter slope does not parallel the centerline profile.
c) Where super elevation is employed, both curbs shall be profiled. As an alternative, a super elevation diagram or table may be acceptable.
d) Existing ground line at proposed roadway centerline. Existing ground line shall extend a minimum of 200 feet beyond the proposed improvement.
e) All existing and proposed storm drains, sanitary sewers, and water systems. Include pipe size, material, length, slope, manholes, inlets, invert and rim elevations, and outfalls.
f) All existing and proposed storm, sanitary, and water lines, and utility crossings.
g) Existing and proposed flowlines of ditches and drainage ways. Flowlines shall extend a minimum of 200 feet beyond the proposed improvement or to the nearest acceptable outfall.

140.1.3 Half Street/Cross Section Views

Half street/cross section views shall contain the following items (as applicable):
a) Half street design shall include the information required in Sections 140.1.1, 140.1.2 and 225.6.
b) Half street designs require full street cross sections at 25 feet on center extending 200' beyond the property lines and across the frontage. The cross slopes shall be labeled with the stationing, and indicate the existing cross slope beyond the centerline to the opposite edge of pavement, the pavement width, elevations at centerline, crown, saw cut line, and gutter line or existing edge of pavement. The maximum allowed grade break within the transition between existing and proposed cross slopes is 2%.
c) Additional cross sections may be required by the County when warranted by the complexity of the road design.

140.1.4 Stormwater Report & Drainage Calculations

a) All stormwater reports and drainage calculations shall be stamped and signed by an Engineer. Complete calculations shall contain, at a minimum, the following:
    1) Map of the drainage basin showing areas contributing to each inlet.
    2) Design assumptions and parameters.
    3) Nomographs and charts used to determine time of concentration and rainfall intensity.
    4) Calculations for conveyance systems, water quality facilities and detention facilities as applicable.
    5) Downstream analysis as applicable.
    6) Provide an executive summary that references the design elements included in the report.
b) For full criteria and requirements for drainage, see Chapter 4 of these *Standards*.

140.1.5 Other Requirements

Design elements and assumptions used for roadway design shall be included on the plans or submitted in memorandum form to the County. The following information shall be provided, as required:
a) Geotechnical or Soils report (see Section 252 for requirements).
b) Pavement design.
c) Structural plans and calculations shall be submitted for all proposed structures that are not under the purview of

the Building Codes Division. Comply with the requirements of Chapter 5 of these *Standards*.

d) Other required technical data and reports including traffic engineering analysis, etc.

e) Environmental reports and permits as required by law.

140.1.6 Other Reviewing Agencies

The design and construction of public and private improvements within the County may involve numerous federal, state and local agencies, utility districts, and private utilities. It shall be the applicant's responsibility to coordinate the design, permit process, and construction with the applicable agencies, districts, and private utilities.

140.1.7 As-Built Plans

The applicant shall be responsible for providing as constructed drawings for all improvements including all construction changes, added and deleted items, location of utilities, etc. The as-built plans shall be submitted to the County at the time of initial paving or prior to building occupancy, and shall include at a minimum, the following.

a) As-built plans shall include and address the requirements of Section 140.

b) As-built plans shall include field survey data by a Land Surveyor that provides the actual invert and rim elevations of all sanitary and storm sewer systems within the project.

c) As-built elevations that vary from plan elevations shall be shown on the plan by striking a line through the plan elevation and listing the field verified elevation adjacent to the plan elevation. Elevations shall be as-built at a tolerance of 0.05± feet.

d) Applicant shall submit one set of as-built plans stamped and signed by an Engineer. The as-built plans shall include the entire approved plan set. As-built plans shall be submitted as dwg and pdf format via one of the methods of Section 130.3.2.

140.2 Entrance, Utility and Right-of-Way Permit Submittals

Comply with requirements found at https://www.clackamas.us/engineering.

~~140.1 Development Permits~~

~~Permit applications shall contain documents submitted in support of a Development Permit Construction plans application and shall be prepared in accordance with the following requirements:~~

~~Initial submission should be via the County's online permitting system found at https://accela.clackamas.us/citizenaccess/Welcome.aspx.~~

~~Subsequent submissions should be via email toby to Engineering@clackamas.us,, via a thumb drive or equivalent submitted in person or mailed to Engineering, or via applicant provided ftp site or equivalent.~~

~~A Development permit number will be assigned to your project after application submission.~~

~~Payment can be made online, in person via cash, check or credit card, or by phone by credit card.~~

~~The initial fee is due upon submission of the application package.~~

~~All documents may at the time the application is submitted.ivia electronicin pdf format.~~

~~If the applicant is not capable of an electronic submissions, paper plans will be accepted and scanned.., paper Plans shall be submitted~~

~~Plans shall be submitted on sheets 22" x 34",24" x 36" or 11"x17" sheets. Traffic signal plans shall be submitted on 11" x 17" sheets. Acceptable scales are 1" = 10', 20', or 30' horizontal (1:10 ratio) and 1" = 1', 2', 3', 4', or 5' vertical. The scale shall be shown for each plan. Engineer scale shall be required. Depending on the plan, engineering may allow other scales upon request.~~

~~Plans shall include the following:~~

~~The land use case file number or Development Permit number on the cover sheet~~

~~b) Project contacts on the cover sheet~~

~~b) Illegible plans will be returned for revision without review. This includes plans that do not clearly identify existing versus proposed.A north arrow shall be included on each sheet and generally point to the top or right side of the plan.~~

~~a) For truck turning movements provide an exhibit at 1" = 20', 40', or 50' scale. When truck turning analysis is required, only CAD based truck turning software is acceptable. Truck turning exhibits need not be part of~~

the construction plans, but may be submitted separately for review and approval. The location and elevation of a temporary benchmark shall be shown on the plans, or if the benchmark is not within the proposed area of work it, shall be referenced by number and location and the plans shall also provide a local benchmark. When practicable, elevations shall be based on the NAVD88 datum. Alternatively, another datum may be acceptable as the basis of elevations for engineering drawings.

Whenever practicable, utilize the Oregon Coordinate Reference System – PDX zone (OCRS PDX) as the coordinate base for projects. Alternatively, another geodetic plane system may be acceptable as the basis for engineering drawings.

a) Plans shall have a vicinity map showing the location of the project, surrounding roadways, nearby driveways, and major intersections. The stamp and signature of the Engineer responsible for preparation of the plans shall be on all sheets. If not final plans intended for approval, the stamp shall be marked "Preliminary" or similar per . The Engineer shall date the stamp on each sheet on the day it was signed.

a) The stamp and signature of the Surveyor responsible for preparation of the existing topographic conditions shall appear on the existing conditions plan. The Engineer's stamp is not required on the existing conditions plan. The surveyor shall date the stamp on the day it was signed.

Plans that include any ADA facility within the public right-of-way shall include the stamp and signature of an Engineer. In the future it is the department's intent to require that Engineers who stamp/sign plans including ADA facilities shouldwill be required to be on the Oregon Department of Transportation list of Engineers certified for design of ADA facilities by July 1, 2020. Any engineer that is not ODOT certified will be required to fill out the ADA checklistcheck likts for each ADA facility they design.

a) Detail sheets shall show all Standard Drawings and special drawings needed for the project. Oregon Standard Drawings should be incorporated into the plans.

a) Detail sheets shall be submitted for all ADA accessibility features including blended transitions, curb ramps, crosswalks, medians/traffic islands, sidewalks/paths, pedestrian push buttons and clear spaces. The standard detail sheet for curb ramps shall be .

a) Plans shall include existing and proposed locations of utility poles, pedestals, vaults, fire hydrants, signs, mailboxes, fencing, and any other structures within the right-of-way.Other than public utilities and other facilities , privately owned installations

a) General notes shall be shown together on one page, preferably the first sheet in the set. The County's standard general notes are provided in Standard Drawings N100-N300.

a) Plans shall include any additional information the County deems necessary.

b)

140.1.1 Plan View sheets

Plan views shall contain the following items (as applicable):

Plan and profile views may be stacked one above the other if desired. Plan horizontal scale shall match the profile horizontal scale.

d) Right-of-way, property lines, right-of-way centerline, and easement lines. The plans shall identify any offset crowns from centerline of the right of way.

d) Construction shall not occur within two feet of adjacent property lines unless approved by the County, and adjacent property owner.

d) Right-of-way centerline stationing of existing and proposed roadways. Stations shall be based on existing stationing if available. Show existing stationing for s and centerline-centerline of intersections stations.

d) Subdivision name, approved roadway names, subject property tax lot numbers and adjacent property tax lot numbers.

d) Existing utilities and structures, including hydrants, pedestals, signs (public and private), mailboxes, light poles, structures, manholes, inlets, valves, meter boxes, power poles, fences, curb ramps, pavement striping, trees, etc.

d) On both sides of the street across the property frontage and within 200' of each property line include the

a) Eedge s of pavement on both sides of the street, including shoulders, curb, sidewalk, ditch line, culverts and existing driveways.

a) Plan and profile views shall include the above items extending **200 feet from project boundaries adjacent to and beyond the proposed improvement**.Horizontal alignment and curve data for roadway centerline and non-parallel curb lines. Curve data shall include radius, length, and delta.

b) Curve data (radius, length, and delta angle) for all curb returns, with gutter elevations at the P.T., P.C., and quarter deltas. Top of curb elevations may be shown. Show the location of existing and proposed survey monument boxes per 150.3.

Minimum stationing callouts at 100 foot increments, with tick marks at 50 foot increments.

Location, station, and size of all existing and proposed storm drains, sanitary sewers and water systems. Stationing shall be based on roadway stationing, except where specifically required otherwise by sewer or water district.

c) Grading plans shall show existing and proposed contours, and high and low points. Contours shall be at a maximum two (2) foot interval.

c) Placement, elevations, dimensions and slopes shall be shown for ADA accessibility features in accordance with ODOT standard drawings and ODOT standard detail DET1720.

c) Location and description of existing and proposed survey monuments.

c) Typical sections of all roadway sections and drainage channel sections.

c) Pavement restoration considering the impacts of each utility associated with the development. The location of the saw cut line. Pavement restoration and saw cut line location shall be based upon Standard Drawings xx. Add this note: "Saw cut to be approved by Clackamas County prior to commencing this work. Provide approved hot liquid asphalt or emulsion oil and sand seal."

d) Pavement tapers as defined in Section 250.6.4.

d) Sight distance triangles.Signing and pavement marking plan as necessary per Sections 270 and 280.

e)

140.1.2 Profile View

Profile views shall contain the following items (as required):

Stationing, elevations, vertical curve data and slopes for proposed roadway centerline. Existing center line elevations shall be shown. Estimate and label existing vertical curve data.

a) Gutter elevations shall be shown when gutter slope does not parallel the centerline profile.

a) Where super elevation is employed, both curbs shall be profiled. As an alternative, a superelevationsuper elevation diagram may be acceptable.

a) Existing ground line at proposed roadway centerline. Existing ground line shall extend a minimum of 200 feet beyond the proposed improvement.

a) All existing and proposed storm drains, sanitary sewers, and water systems. Include pipe size, material, length, slope, manholes, inlets, invert and rim elevations, and outfalls.

a) All existing and proposed storm, sanitary, and water lines, and utility crossings.

a) Existing and proposed flowlines of ditches and drainage ways. Flowlines shall extend a minimum of 200 feet beyond the proposed improvement or to the nearest acceptable outfall.

a)

140.1.3 Half Street/Cross Section Views

Half street/cross section views shall contain the following items (as required):

Half street design shall include the information required in Sections 140.1.1, and 140.1.2 and 225.6.

) Half street designs require full street cross sections at 25 feet on center extending 200' beyond the property lines and across the frontage. The cross slopes shall be labeled with the stationing, and indicate the existing cross slope beyond the centerline to the opposite edge of pavement, the pavement width, elevations at centerline, crown, saw cut line, and gutter line or existing edge of pavement. The maximum allowed grade break within the transition between existing and proposed cross slopes is 2%.

) Additional cross sections may be required by the County when warranted by the complexity of the road design.

)

140.1.4 Drainage Calculations

All drainage calculations shall be stamped and signed by an Engineer. Complete calculations shall be shown in a clear, concise manner and contain, at a minimum, the following:

a) Map of the drainage basin showing areas contributing to each inlet.

2) Design assumptions and parameters.

2) Nomo graphs and charts used to determine time of concentration and rainfall intensity.

1) Calculations for conveyance systems, water quality facilities and detention facilities, as required.
Downstream analysis as required.
2) Provide an executive summary that references the design elements included in the report.
3) For full criteria and requirements for drainage, see Chapter 4 of these Standards.
a)

140.1.5 Other Requirements

Design elements and assumptions used for roadway design shall be included on the plans or submitted in memorandum form to the County. The following information shall be provided, as required:

a) Functional classification of roadway.

Design speed and posted speed.

Superelevation.

Cross sections.

Geotechnical or Soils report (see Section 252 for requirements).

a) Pavement section design.
Structural plans and calculations shall be submitted for all proposed structures (i.e., retaining walls, box culverts, bridges, setc.) and may require a building permit under the purview of. Comply with the requirementsrequirements of Chapter 5 of the Standards. All structures, excluding bridges, on private property shall meet the requirements of the International Building Code (IBC). All bridges (public and private) and all structures in the public right-of-way will be reviewed per AASHTO requirements as determined by Engineering.
a)
Other required technical data and reports analysis.

a) Environmental reports and permits as required by law.

140.1.6 Other Reviewing Agencies

The design and construction of public and private improvements within the County may involve numerous federal, state and local agencies, utility districts, and private utilities. It shall be the applicantEngineer's responsibility to coordinate the design, permit process, and construction with the applicable agencies, districts, and private utilities.

140.1.7 As-Built Plans

The applicant shall be responsible for providing a reproducible set of as-constructed drawings for all improvements including all construction changes, added and deleted items, location of utilities, etc. The as-built plans shall be submitted to the County at the time of initial paving or prior to building occupancy, and shall include at a minimum, the following.

As-built plans, both electronic and paper, shall include and address the requirements of Section 140.
) As-built plans shall include field survey data by a Land Surveyor that provides the actual invert and rim elevations of all sanitary and storm sewer systems within the project.
) As-built elevations that vary from plan elevations shall be shown on the plan by striking a line through the plan elevation and listing the field verified elevation adjacent to the plan elevation. Elevations shall be as-built at a tolerance of 0.05± feet.

Applicant shall submit one set of as-built plans stamped and signed by an Engineer. The as-built plans shall include the entire approved plan set. The applicant shall check with other departments, including Planning and the Utility districts, for their as-built plan requirements. Traffic signal plans and signing and striping plans shall be submitted as pdf in addition to paper and AutoCAD formats.

~~One set of AutoCAD files for the as-built civil drawings and also in .pdf format via one of the methods of Section 140.1.b. If AutoCAD files are not available, provide a drawing file in DXF format for translation into AutoCAD. Combination files are acceptable with numerous civil sheets included in the drawing file. If multiple files are provided a list shall be included of the filenames linking the drawing files to the civil sheet number. A hard copy description of the drawing configuration including paper space layout, layer assignments, pen assignments, XREFs and special plotting instructions is requested. A printed description included in the actual drawing file is recommended. . Utilities shall not be located in areas of restricted sight distance, i.e., on sharp curves and steep grades. They shall not interfere with the proper function of traffic control signs, signals, lighting or other devices that affect traffic operation. Engineering shall approve any revisions to historic utility locations.~~

~~:~~

~~guardrails or bollards, for review by Engineering to ensure compliance with the clear zone criteria of~~

~~SECTION 1~~SECTION 150 - SURVEYING

150.1 General

These ~~*Standards*~~*Standards*, the *Oregon* ~~*, Section 170Section 170 of the ODOT Standard Specifications for Construction*~~*Standard Specifications for Construction*, and ~~ORS 209.140155~~ORS 209.140155, define the requirements for protection of existing survey monuments during any construction and setting new survey monuments following construction of new roadways.7,

~~10)~~

150.2 Existing Survey Monuments

a) Anyone who notices or causes an existing section corner, quarter corner or donation land claim corner monument or accessory, to be in danger of damage or destruction by any construction, shall notify the County Surveyor in writing, not less than ten (10) working days prior to construction. The County Surveyor shall reference the monument prior to construction and replace it following construction. The County Surveyor shall be reimbursed by the applicant for all expenses from said replacement.

~~a)~~b) In accordance with ORS 209.150, ~~(or as subsequently amended),~~ any person or public agency removing, disturbing or destroying any survey monument of record in the office of the C~~c~~ounty S~~s~~urveyor or C~~c~~ounty C~~c~~lerk shall cause a registered professional L~~l~~and S~~s~~urveyor to reference and replace the monument within 90 days of the removal, disturbance or destruction. The registered professional L~~l~~and S~~s~~urveyor referencing and replacing the monument shall do so in the same manner that is provided for public land survey corners according to ORS 209.140 and shall notify the C~~c~~ounty S~~s~~urveyor of that action within two business days. The costs of referencing and replacing the survey monument shall be paid by the person or public agency causing the removal, disturbance or destruction.

c) Any project that involves the reconstruction or realignment of all or a portion of a public road shall be required to comply with ORS 209.155.

~~b)~~

~~a)~~

150.3 New Survey Monuments

a) New roadways and where new roadways connect to existing roadways shall provide monumentation as follows:

~~a)~~1) Centerline monuments shall be installed at all centerline intersections of roadways (including intersections with existing roadways), P.C.'s and P.T.'s of each curve, and at all centers of cul-de-sacs, turnarounds or as required by the County Surveyor to sufficiently monument the right-of-way or a required easement.

~~1)~~2) Monuments shall be set by a Land Surveyor.

~~2)~~3) When monuments are set by a Land Surveyor, they shall file a record of survey complying with ~~ORS 209.250~~ORS 209.250 and any additional requirements set forth by the County Surveyor.

4) The County requires centerline monument boxes to be used meeting the requirements of the County Surveyor. Requirements can be found at the Surveyor's ~~website~~website. Any monument box used that has not been approved by the County Surveyor will be required to be removed and replaced at the expense of the applicant.

3)b) Monument boxes shall c~~C~~omply with Standard Drawings M100 or M200. ~~xxx.~~
~~4)~~

~~SECTION 1~~SECTION 160 - DEDICATION OF PUBLIC RIGHT-OF-WAY AND EASEMENTS

160.1 Requirement for Public Easement

As a condition of approval for a development, the County may require that additional road ~~right of way~~right-of-way or other public easements be dedicated in support of the proposed development to meet standard cross sectional elements. The determination of the right-of-way and easement widths and types will be made upon review of the development with the requirements for dedications identified via land use requirements~~in the Conditions of Approval~~ or as identified in the dedication review ~~plat review~~ processes. ~~The requirement to improve road widths and public use configurations reflect the County's long term transportation plan goals.~~

160.2 County Approval Required

State law and County policy require evidence of County approval before a dedication instrument of a public easement can be recorded per ~~.~~ ORS 92.014. ~~provides that:~~

~~160.3 County Road Official Review~~

~~County approval of these dedications and resultant roadways will ensure the establishment of legal access and minimize future problems as expansion of the roadway system occurs. The County Road Official has a key role in reviewing proposals to ensure adequate width and suitable alignment of roadway right-of-way are provided and in monitoring roadway improvement work for compliance with these *Standards*.~~

160.~~3~~4 Development Permit Required

A Development Permit is required to ensure County acceptance of any required improvements with a dedication.

~~**The privileges granted and obligations created by virtue of the permit issued shall be binding not only upon the applicant, but also upon the successors and assigns of the applicant. The applicant shall give engineering written notice of any such assignment or transfer within a reasonable time not to exceed 90 days after assignment.**~~

160.~~4~~5 Minimum Width Requirements for Rights-of-Way and Easements

~~Before improvement of a public right-of-way will be permitted and initiated, the width of the existing road right-of-way shall be determined to be adequate to contain the proposed improvements.~~Definition of standard road right-of-way widths by roadway functional classification are provided in ~~Standard Drawings C110 to C140~~Standard Drawings C110 to C140. However, ~~our development community is aware that within the County road system,~~ there are special districts and projects that require road designs specific to those areas. Details specific to these ~~development~~ areas can be found in the ~~County's Comprehensive Plan~~*Comprehensive Plan*.

a) In the case of the requirement to dedicate a Permanent Public Utility Easement (PUE) or combination of another easement that includes a PUE, an eight (8) foot wide easement along the entire abutting right-of-way of all front lot lines. ~~, as shown on Standard Drawings C110 to C140, shall be provided for County approved public utilities as defined in ORS 757.~~ It should be ~~N~~noted that storm and sanitary lines are not permitted within a PUE.

b) Additional easements for signing, slopes, and pedestrian facilities may be required ~~by the County under the conditions of approval~~via land use requirements or during construction plan review.

~~a)~~
~~a)~~

160.~~6~~5 Public Easement Dedication Process

a) Typical easements that may be required for dedication by plat or by a separate instrument (standard easement form) may include, but are not limited to:
~~a)~~1) Permanent ~~Right-of-Way~~Right-of-way Easement for Road Purposes
~~b)~~2) Permanent Public Utility Easement
~~c)~~3) Permanent Sign, Slope, Public Utility and Sidewalk Easement
~~d)~~4) Permanent Storm Drainage Easement

~~e)~~b) Depending upon the ~~conditions of approval~~requirements of the project, one or more of the above easement dedications may be required.

~~f)~~c) In addition to the aforementioned easements, an applicant~~the development~~ may be required to provide proof of recorded access from a public road through the proposed development to an abutting~~er~~ parcel as noted in ~~Section 2~~Section 220.2.

~~g)~~ If proof of said ~~reciprocal pass through~~ access easement cannot be proved or has not previously been created, then ~~the development parcel~~an applicant will be required to dedicate a p~~P~~ermanent ~~reciprocal access easementt~~~~Easement for Ingress and Egress~~ for the benefit of the abutting~~er~~ parcel on the face of the plat. If created by separate document, this form may be obtained ~~from the Right of Way Section of the Department of Transportation and Development (DTD~~from Engineering~~)~~ and reference the process below in ~~Section 1~~Section 160.8.

~~h)~~

160.6~~7~~ Dedication of Public Right-of-Way and Easements O~~o~~n the Plat

a) Dedications of right-of-way and easements on a plat shall meet all requirements of Sections 160.1 through 160.5.
~~a) Dedications of right-of-way and easements on a plat shall meet all requirements of Section 160.4.~~
b) Dedications of easements shall be shown on the plat and meet the requirements of the ~~ZDO~~*ZDO* ~~Section 1007~~Section 1007.

~~c)~~

160.7~~8~~ Dedication of Public Right-of-Way and Easements Outside of the Plat

a) Dedication of right-of-way and easements created by separate document outside of the plat shall follow Sections 160.1 through 160.5.
~~a) Dedication of right-of-way and easements created by separate document outside of the plat shall follow Section 160.6.~~
b) Easement dedications ~~outside of the plat~~ that are required to allow for development s~~h~~ould~~hall~~ be acquired and recorded prior to issuance of a Development Permit.
c) Prior to acceptance of right-of-way or~~and~~ public easements, ~~created by a separate document (easement form),~~ plans ~~shall be submitted to the~~may be reviewed by the DTD Planning and Zoning Division to determine if a land use app~~roval~~~~lication~~ is required. The design and construction of the resultant roadway may proceed pursuant to the requirements of these ~~Standards~~*Standards* and in conformance with all applicable land use conditions.
d) The easement forms are available for use from ~~the Right of Way Section~~Engineering ~~of DTD~~.
e) When requested by DTD, each easement shall be accompanied by an appropriate Exhibit "A" and "B." Exhibit "A" is the written legal description of the easement area, and Exhibit "B" is the map depicting the area of the legal description. Both exhibits shall be stamped and signed by a Land Surveyor.
f) If the applicant's representative ~~developer or owner's surveyor or engineering firm~~ has not previously provided Exhibits "A" and "B" to the County, ~~the Right of Way Section~~Engineering ~~of DTD~~ can provide copies of previously recorded exhibits that were acceptable to the County.
g) The ~~developer (or owner)~~applicant will be asked to provide documentation supporting the easement signer's authority to execute land rights documents on behalf of the corporation or other representative organization. The ~~developer~~ applicant may also be required to provide a copy of the owner's current vesting deed.
h) Easement forms, with exhibits, shall be submitted to ~~the County Right of Way Section~~Engineering for review and approval, prior to obtaining signatures on the easement ~~(s)~~ form~~s~~.
i) Acceptance and recording of ~~the easement dedication(s)~~documents will be provided free of charge by the County.

~~j)~~

~~SECTION 1~~SECTION 170 - DESIGN MODIFICATIONS & ADA EXCEPTIONS

170.1 Design Modifications

a) It is not the objective of these standards to limit the creative efforts of ~~c~~Engineers in providing alternate solutions to specific problem areas or to relieve the responsibility for professional engineering judgment.

~~a)~~b) Practical design modifications that preserve ~~community,~~ the function and safety of the roadway system and ~~promote sustainability by~~ offer~~ing~~ benefits to aesthetics, resource protection, ease of maintenance, and livability are encouraged.

~~b) The modification process provides flexibility in guiding the design and construction of our roadway facilities with practical approaches to roadway design and construction challenges that provide the best fit solution given the realities of improvement costs versus their benefits versus the impact of a development, financial constraints, constructability and community context.~~

c) Approval of non-compliant or alternate specifications and standards under the purview of the ~~Roadway~~se ~~Standards~~*Standards* may be requested utilizing the following process. This process does not apply to land use requirements or ~~"~~Conditions of Approval~~"~~ generated through ~~any standards in~~ the ~~*Zoning and Development Ordinance*~~*ZDO* or the *Comprehensive Plan* ~~which have a separate modification process outlined in the *ZDO*~~. The ADA exception process follows the ~~different~~ procedures ~~and are~~ detailed below in ~~Section 1~~Section 170.2.

~~d) Consequently, the County will consider the aggregate number of minimum criteria used in a design. If a design modification is granted, the County may require that the overall design of the project be mitigated with an increase above the minimum requirements in other areas of the project to improve safety and/or reduce maintenance and to comply with AASHTO's overall design objectives.~~

170.1.1 Modification Request Submittal

a) Requests to modify design standards shall utilize the ~~"~~"Clackamas County Design Modification Request~~"~~" form ~~related to development or capital projects, as applicable~~. D~~hould be submitted in writing to Engineering,~~ ~~generally D~~esign Modifications are typically submitted prior to land use application approval or early on in the design process when related to capital construction.~~.~~

~~a)~~b) Land use conditions of approval are commonly written so that there is little, if any, flexibility after land use approval. For this reason, it is imperative that ~~standards that cannot be complied with be identified and~~design modification requests be addressed prior to land use approval. If a design modification is requested after the land use conditions of approval are issued, additional application for a modification of the conditions of approval or a new land use application through the Planning ~~Department~~ and Zoning Division may be required. ~~This written request should include the following:~~

~~The desired modification(s);References to regionally or nationally accepted specifications and standards, record of successful use by other agencies, or other supportive information.~~

170.1.2 Criteria for Modification of ~~Standards~~*Standards*

The County may grant a modification when the use thereof does not compromise public safety or the intent of the County's standards and any one of the following conditions are met:

a) The subject standard is deemed not applicable in the particular circumstance.

b) Topography, right-of-way or other geographic conditions impose an environmental concern or provides a constraint for constructability and an equivalent alternative, which can accomplish the same design intent, is available.

c) A minor change to the standard and the modification is required to address a specific design or construction constraint which, if not enacted, will result in an undue hardship.

d) The proposed modification does not compromise safety, function, appearance and maintainability based upon sound engineering and technical judgment.

e) The modification is not in conflict with land use requirements.

170.1.3 Review

a) Type I modifications shall include, but not be limited to, geometric design and the modification or omission of standard roadway cross section elements. A Type 1 modification requires a higher level of scrutiny than a Type II

modification.

b) Type II modifications shall include, but not be limited to, sight distance, access spacing, number of accesses, intersection angle, etc.

c) The request to modify design standards shall be reviewed first by Engineering technical staff who shall make one of the following decisions:
   1) Approve as proposed,
   2) Approve with changes, or
   3) Deny with an explanation.

d) Design Modification approval shall not constitute a precedent for use at other locations.

170.1.4 Appeal

Applicants may appeal the Engineering technical staff's decision to the Transportation Engineering Manager. The Transportation Engineering Manager's decision may be appealed to the Road Official, whose decision shall be final.

~~The County may grant a modification to eliminate or alter from to the adopted standards or specifications when the use thereof does not compromise public safety or the intent of the County's standards and any one of the following conditions are met:~~

~~a) The standard or specification is deemed not applicable in the particular situationcircumstancesapplication.~~

~~a) Topography, right-of-way or other geographic conditions impose an environmental concern or provides a constraint for constructability and an equivalent alternative, which can accomplish the same design intent, is available.~~

~~a) A minor change to a standard or specification is required to address a specific design or construction problem constraint which, if not enacted, will result in an undue hardship.~~

~~a) The proposed modification fully meets the requirements for safety, function, appearance and maintainability based upon sound engineering and technical judgment.~~

~~a) Any necessary modification of land use conditions of approval has been obtained.~~

~~a)~~

~~**170.1.3 Review**~~

~~Type I shall include the highest level of Design Modifications mainly including *Comprehensive Plan* amendments, geometric design change and Omission of roadway cross section element. Type II shall include less restrictive elements of the Roadway Standards including but not limited to: Sight distance, access spacing, roadway design, etc.c… The request to modify design standards shall be reviewed first by Engineering technical staff who shall make one of the following decisions:~~

~~The request to modify design standards shall be reviewed first by Engineering technical staff who shall make one of the following decisions:~~

~~Approve as proposed,~~

~~1) Approve with changes, or~~

~~1) Deny with an explanation.~~

~~)~~

~~) Design Modification approval of a site-specific request shall not constitute a precedent for use at other locations.~~

~~**170.1.4 Appeal**~~

~~Applicants may appeal the Engineering County technical staff's decision to the Engineering Division Manager. The Engineering Division Manager's decision may be appealed to the County Road Official, whose decision shall be final.~~

170.2 ADA Exceptions~~XCEPTIONS PROCESS~~

The County has adopted the ~~PROWAG~~*PROWAG* standards for ADA accessibility within the ~~county~~ public rights-of-way and easements under the jurisdiction of Clackamas County. ~~PROWAG~~*PROWAG* provides justifications for

exceptions to the standards for new construction and for alterations to existing ADA accessibility features. Exceptions are required for any accessibility feature ~~being proposed by either a private party or in a County sponsored improvement~~ that cannot meet the requirements due to a physical constraint identified in the following sections. Crosswalk closures are also reviewed under the ADA exceptions process.

170.2.1 Exceptions for New ADA Accessibility Features

Exceptions to full compliance with ~~county adopted PROWAG~~*PROWAG* standards can only be granted for a limited number of physical constraints preventing full compliance. If an exception is required for a particular feature, efforts must be made to ensure that other elements are accessible ~~to the extent practicable~~. Exceptions for non-compliance with the ~~PROWAG~~*PROWAG* standards for new ADA accessibility features can only be approved when full compliance cannot be achieved due to terrain or historic features. Where the State Historic Preservation Officer or Advisory Council on Historic Preservation determines that compliance with a requirement would threaten or destroy historically significant features of a qualified historic facility, compliance shall be required to the extent that it does not threaten or destroy historically significant features of the facility (~~PROWAG~~*PROWAG* R202.3.4).

170.2.2 Exceptions for Alterations to Existing ADA Accessibility Features

Where existing physical constraints make it impracticable for altered facilities to fully comply with the ADA ~~requirements, compliance~~requirements, compliance is required ~~to the extent practicable~~ within the scope of the project. Existing physical constraints include, but are not limited to, underlying terrain, right-of-way availability, underground structures, adjacent developed facilities, drainage, or the presence of a notable natural or historic feature (~~PROWAG~~*PROWAG* R202.3.1).

170.2.3 ADA Exception Request Submittal

a) Exception requests shall be submitted on the "ADA Exception Request" form. Exception requests shall only be submitted at the following points in the process:
   1) Requests for exceptions to waive the requirement for a new ADA accessibility feature as part of a development shall be submitted and acted upon prior to land use approval since land use conditions are typically written with little or no flexibility.
   2) Requests for exceptions to requirements for a particular element should be submitted during plan review and must be acted upon prior to permit issuance.
   3) Requests for exceptions to requirements can be submitted during construction if physical constraints are identified that were not included in the design. In such situations, the project Engineer shall prepare a revised design that maintains accessibility to the greatest extent practicable, and that exception must be acted upon prior to construction of the accessibility feature.
   4) Exceptions shall not be provided for noncompliant features after construction.
b) Exception requests that are submitted shall be reviewed by Engineering. The Transportation Engineering Manager will make the decision to approve or deny the requested exception. The Transportation Engineering Manager's decision may be appealed to the Road Official, whose decision shall be final.

~~a) Exception requests shall only be submitted at the following points in the process:~~
~~b) Requests for exceptions to waive the requirement for a new ADA accessibility feature as part of a development shall be submitted and acted upon prior to a land use approval since land use conditions are typically written with little or no flexibility.~~
~~) Requests for exceptions to requirements for a particular element should be submitted during plan review and must be acted upon prior to permit issuance.~~
~~) Requests for exceptions to requirements can be submitted during construction if physical constraints are identified that were not included in the design. In such situations the project Engineer shall prepare a revised design that maintains accessibility to the greatest extent practicable, and that exception must be acted upon prior to construction of the accessibility feature.~~
~~) Exceptions shall not be provided for noncompliant features after construction.~~
~~) Exception requests that are submitted shall be reviewed by the County project manager, a DTD engineer, and the DTD ADA Coordinator and each shall make a recommendation to approve or deny the requested exception. The DTD Assistant Director will make the decision to approve or deny the requested exception. The DTD Assistant Director's decision may be appealed to the County Road Official, whose decision shall be final.~~

~~c)~~

~~SECTION 1~~SECTION 180 - CONSTRUCTION INSPECTION

180.1 General

The applicant shall provide the County ~~The county with~~~~shall be provided~~ access and be furnished with every reasonable facility for inspection of the work, is in accordance with the requirements and intent of the plans, specifications, permit conditions and land use requirements (collectively known as "the permit").
~~to inspect all improvements required under a permit or land use decision including access to private property . The costs for roadway inspection, plan review, and project coordination are assessed and included in the issuance of the Development Permit, Entrance Permit, Right-of-Way Permit, Erosion Control Permit, or Utility Placement Permit. except when a Third Party Inspector is required.~~

180.2 County Inspection Authority and Duties

A County inspector will be assigned to each project to inspect materials and work performed. Such inspection may extend to any or all parts of the work and to the preparation and/or manufacture of the materials to be used.

The County inspector is not authorized to:
a) Revise, alter, or relax requirements of the permit.
b) Direct how the work is to be performed.

The County inspector has the authority to:

a) Inspect work performed and materials furnished, including without limitation, the preparation, fabrication, or manufacture of materials to be used.
b) Reject deficient materials or work. The inspector may advise the applicant or contractor of any faulty work or materials; however, failure of the inspector to advise the applicant or contractor does not constitute acceptance or approval.
c) Temporarily suspend the work for safety deficiencies for safety issues, lack of compliance with the permit, or if the requirements of a private primary inspector are not being fulfilled per Section 180.3.
d) Recommend revisions or revocation of the permit per Section 130.3.8.
e) Allow work to proceed after deficiencies have been corrected.
f) Exercise additional delegated authority.

~~A County inspector will be assigned to each project to inspect materials and work performed. Such inspection may extend to any or all parts of the work and to the preparation and/or manufacture of the materials to be used.~~At the ~~completion of the Development, The Engineer of Record, when required, shall complete, stamp and sign the Certification of Compliance. By stamping and signing the Certification of Compliance, the Engineer of Record is certifying all improvements are complete as per approved plans and/or Clackamas County Roadway Standard~~

180.3 Private Primary Inspection

180.3.1 Developer Engineer Agreement

In some cases, privately funded inspection services are required. These inspection services are more comprehensive and intensive than County inspection services and are the responsibility of the applicant and Engineer of Record ("EOR").

When a private primary inspector (PI) is required, the applicant shall enter into a "Developer Engineer Agreement" prior to Development Permit issuance to have the EOR responsible for primary inspection services. This may be through a representative of the engineering firm or other qualified third party inspection company. Utility Permit work proposed by a public utility may provide public utility engineering staff to satisfy this requirement. The applicant shall be responsible for primary inspection services of all improvements permitted by Engineering at no cost to the County. A private PI shall not have a corporate ownership or have real property interest in the development for which the improvements are required. At the close of the project, the EOR shall certify that the project was constructed in accordance with the permitted work.

180.3.2 When a Private Party Inspector is Required

A private PI is required in the following cases:

a) Development Permit: all commercial, industrial, institutional, multi-family development and residential development of more than three parcels
b) Utility Permit:
    1) More than 1,000 longitudinal feet of disturbance within the UGB.
    2) More than 2,500 longitudinal feet of disturbance outside the UGB.
    3) Night or weekend work is involved.
    4) Disturbance, alteration or replacement of any ADA facility/component.
    5) Trench plowing.
    6) Installation of a utility suspended from a bridge under County jurisdiction.
c) When a Development Permit requires a private PI and an Entrance Permit is required, the private PI shall assume inspection for the Entrance Permit if the Development Permit has not been finalized.
d) Even when a private PI is involved, the inspection checklist still requires certain County inspections.

180.3.3 Private Primary Inspector Authority and Duties

~~a.~~

The private PI shall perform the following duties:

a) Monitor construction activity and inspect work and materials furnished to ensure construction per the permit, and to reject defective materials or workmanship.
b) Provide a "Daily Inspection Report" to be submitted to the County on a weekly basis during periods of active construction. If the reports become more than four weeks in arrears, or are significantly lacking information, the County inspector may temporarily stop work. The permit will not be closed out without receipt of all inspection reports. The inspection report shall include at a minimum:
    1) Permit number
    2) Name of inspector
    3) Date and time of arrival and departure
    4) Weather conditions, including temperature
    5) Description of construction activities
    6) Statements of direction to stop work, reject materials, or other work quality actions
    7) Perceived problems and plan of action taken
    8) Final and staged inspection results
    9) Record of all material and soil types and conditions
    10) Record of locations of cement amended base and cement amended soils within the project (these locations shall be shown on the as-built construction plans).
    11) Record of review of test results
    12) Record of review of ADA inspections
    13) Record of pavement grade and depth measurement by street stationing
    14) General remarks including citizen contact or complaints received
    15) Record of review of inspection requirements of the inspection checklists and other inspections required by the work
c) Notify the County inspector two business days before the start of construction or resumption of work after shutdowns.
d) Temporarily suspend the work for lack of compliance with these Standards, land use requirements, permit conditions, plans, specifications and/or safety deficiencies.
e) Communicate critical issues to the County inspector including proposed changes, significant construction problems, property owner disputes or complaints, need for County inspections, etc.
f) Ensure County approval prior to the commencement of work affected by any revisions.

A private PI is not authorized to:

a) Revise, alter, or relax the requirements of the permit.
b) Direct how the work is to be performed.

~~or applicant's representative. It shall be the policy of the County no to provide full inspection services for commercial development and residential development with less more than three3 parcels.~~

~~**Add to this and define County's role in 3rd party inspector situations**~~

~~180.3 Third Party Inspector~~

~~All non-publicly funded commercial, industrial, institutional, multi-family development and residential development ofwith more than three3 parcels shall enter into a Development Engineer Agreement prior to Development Permit issuance to provide a Third Party Primary Inspector. The Engineer of Rrecord shall be responsible for provide primary inspection services of all improvements permitted by Clackamas County DTD at no cost to Clackamas County. The Third Party Primaryprivate engineering Iinspector shall not have a corporate ownership or be a member of the engineering firm or have real property interest in the development for which the improvements are required. At the close of the project, the Engineer of Record shall certify that the project was constructed in accordance with the permitted work./maintenance for restoration of County infrastructureInstallation of that is suspended. The inspecting engineer's relationship shall be strictly professional nature.~~

~~) When a Ddevelopment Permit is requiresrequiresd to provide a Third Party primary engineering Iinspector, as outlined in Section 180.2, and a Utility Placement Permit is obtained and/or required (as required in Section~~

130.3.4), the Third Party Inspectorprimary engineering inspector shall assume inspection for the restoration requirements and work within the County right-of-way, as permitted under the Utility Placement Permit.

)

a) The CountyCounty inspector and Third Party/primary Primary Iinspector isareis not authorized to:

a) Revise, alter, or relax the provisions of the permit, land use conditions, specifications, the approved plans, or these *Standards.*

Direct how the work is to be performed.

The or Third Primaryarty /primary IiInspector duties include:

a) Visit the jobsite daily and document tasks when permitted work is being performed. illustrated on the plans and subject

Document and inspect work performed and materials furnished, including without limitation, the preparation, fabrication, or manufacture of materials to be used.

a) Reject defective materials, means or methods.

a) Suspend the work for lack of compliance with the permit conditions, plans and/or safety deficiencies.

a) Allow work to proceed after the deficiencies have been corrected.

County inspector duties include:

Accept the work at the completion of the project. No interim acceptances will be granted

Require revisions to approved engineering plans when necessary due to conflicting field conditions. Any changes to approved plans shall be submitted by the Engineer of Record to the County Plans Examiner in writing.

Exercise additional delegated authority.

Advise the applicant or contractor of any faulty work or materials; however, failure of the engineering inspector to advise the applicant or contractor does not constitute acceptance or approval.Exercise additional delegated authority.

180.3 Inspection Requirements

When the County is not the primary inspector, the Engineer of Record, or designee, shall provide field surveying, engineering, design and drafting to prepare the necessary construction plans for the proposed development with respect to public and private improvements and all other requirements mandated by the Developer-Engineer Agreement.

The primary inspector, when required, will be required for daily inspection reports and to ensure the approved plans are constructed and all standards are met. Daily inspection reports shall be submitted to the County inspector prior to Final Inspection .

The Primary Inspector shall adhere, at minimally, to the inspection requirements on the Development Engineering Inspection Checklist and the approved plans.

At the completion of the Development, The Engineer of Record, when required, shall complete, stamp and sign the Certification of Compliance. By stamping and signing the Certification of Compliance, the Engineer of Record is certifying all improvements are complete as per approved plans and/or Clackamas County Roadway Standards.

180.3.1 Inspection Access

The County and primary inspector shall be allowed access to all parts of the work; and shall be furnished with every reasonable facility for ascertaining whether or not the work, as performed, is in accordance with the requirements and intent of the plans and specifications.

180.4~~3.2~~ Testing

b) All testing required by the County shall be at the applicant's expense. Inspection requirements shall include but not limited to the Inspection Checklist and other inspections required by the approved plans.

Special testing and inspection shall be carried out by Developer's contractor and approved by an independent special inspector and primary inspector. Developer's contractor shall give County inspector not less than wo3-day notice prior to special inspection.

a) All testing required by the County shall be at the applicant's expense.

b) Testing shall be in accordance with the most recent edition of the *ODOT Manual of Field Test Procedures*.
c) Special testing shall be at the expense of the applicant and performed by a qualified testing firm. The applicant shall give County inspector not less than two business days' notice prior to special testing.
~~c) All costs incurred from special inspections shall be at Developer's expense.~~
~~d)~~

~~180.3.3 Inspection Notification~~

~~The County does not furnish Primary Inspection of new development roadway construction. For this reason, the Engineer of Record shall provide prompt and complete inspections. The primary inspector shall document all work within daily reports and notifynotification to the County as to the progress of the construction of roadway and drainage improvements. A minimum of 48 hour notice shall be provided for inspection requests.~~
~~Notification shall be given to the County when the following work is to be scheduled:~~

- ~~0) Placement of erosion and sedimentation controls.~~
- ~~0) Stripping of vegetation and topsoil in fill areas.~~
- ~~0) Underground utility placement.~~
- ~~0) Compaction testing and proof roll of trench backfill and fill areas.~~
- ~~0) Engineered fill placement and rough grading of roadways.~~
- ~~0) Construction of concrete structures (curbs, inlets, manholes, sidewalks, driveways, etc.).~~
- ~~0) Fine grading/compaction testing/proof roll of subgrade related to roadways/driveways.~~
- ~~0) Fine grading/compaction testing/proof roll of base rock related to roadways/driveways.~~
- ~~0) Placement and compaction of pavement.~~
- ~~0) Finishing roadbed and slopes (backfilling curb or gutter, trimming out banks and drainage channels, etc.).~~
- ~~0) All work related to bridges, culverts and walls.~~
- ~~0) Striping layout.~~
- ~~0) ADA features both for a concrete forms inspection as well as a post fabrication inspection (see Section 180.3.6).~~

~~Placement of traffic signal related items (junction box, service cabinet, traffic signal/ITS cabinet, pedestrian signal poles, flasher poles, and traffic signal poles).~~

~~180.3.4 Inspection Requests~~

~~Failure to request inspection 48 hours in advance of the work schedule may result in the rejection of the work. If the County/primary inspector is not able to inspect the work after proper notice, the applicant shall take measures to either reschedule the work or provide sufficient evidence of the work so that the County/primary inspector can determine compliance with the requirements.~~

~~180.3.5 Additional Fees~~

~~When increased inspection is deemed necessary by Engineering, additional costs shall be paid by the applicant per the fee schedule. Examples of special circumstances that may trigger additional inspection fees shall include:~~
~~Extended hours of work/operation; or~~
~~Failure to comply with permit requirements; or~~
~~Special access requirements for the work/operation; or~~
~~Repeated inspection fee will be assessed on third inspection of the same improvement when two inspections have failed~~

180.5 Required Inspections of ADA Accessibility Features

a) All ADA accessibility features, including but not limited to sidewalks, paths, crosswalks, curb ramps, medians, traffic islands, signs, and pedestrian traffic signal accessibility features including clear spaces shall be inspected for compliance with ADA requirements. No project shall be accepted as complete without documentation prepared by the County inspector showing that all ADA accessibility features meet requirements or have a previously approved exception per ~~Section 1~~Section 170.2.

~~**Any ADA accessibility feature shall be subject to two inspections: forms inspection and post fabrication inspections.**~~

b) **Forms Inspection** - The forms inspection shall determine if the forms and survey marks for an accessibility feature are placed in such a manner to meet requirements. The contractor shall provide a signed written record of the dimensions and relative elevations of the forms for an ADA accessibility feature prior to placement of pavement using an inspection report form supplied by the County. A diagram of the ADA accessibility feature shall be provided and at least one photo of the forms prior to fabrication. Dimensions of all sides of the accessibility feature shall be measured with a steel tape and compared with the approved design. The height of the curbs and any corners shall be determined in relation to the lowest point on the accessibility feature using a level. The completed forms inspection report provided by the contractor including diagram and photos shall be included in the project file.

c) ~~**Po**~~**Post fabrication inspection** - The post fabrication inspection shall determine compliance of the accessibility feature with all ADA requirements. The inspection shall be conducted using the standard county inspection checklists and required measurement tools and techniques. Dimensions and curb heights shall be determined using standard methods. Slopes shall be determined using the ODOT specified 6 inch and 2 foot smart levels with multiple slope measurements taken for each feature and the highest slope used to determine compliance. Any element that fails to meet required ~~PROWAG~~*PROWAG* standards shall be replaced by the applicant and re-inspected for compliance. If it is determined that an ADA feature does not comply with ~~PROWAG~~*PROWAG* standards, the applicant shall have the option of appealing that determination. For the appeal the builder shall retain ~~an independent Oregon licensed~~a Land S~~s~~urveyor to conduct a survey of the ADA accessibility feature and prepare a plan showing actual elevations and slopes for the accessibility feature. If the survey plan demonstrates that the accessibility feature meets ~~PROWAG~~*PROWAG* standards the applicant will not be required to replace that accessibility feature. If the survey plan demonstrates that the accessibility feature fails to meet ~~PROWAG~~*PROWAG* standards, then the accessibility feature shall be replaced at the applicant's expense and re-inspected for compliance.

180.6 Inspection Requests

A minimum of two business days' notice shall be provided for inspection requests via the method described on the permit, which also lists the required inspections. The required inspections are based upon the inspection checklists.

Even when a private PI is involved, the inspection checklist still requires certain County inspections.

180.7 Failure to Obtain Inspection

If the County inspector is not able to inspect the work after proper notice, the applicant shall take measures to reschedule the work. Work that is completed without the required inspections per the inspection checklist, as dictated by the permit or as required by Section 180.4 is subject to rejection and/or Code Enforcement procedures of the *County Code.*

~~SECTION 180 – CONSTRUCTION INSPECTION~~

~~180.1 General~~

~~The cCounty shall be provided access to inspect all improvements required under a permit or land use decision including access to private property. The costs for roadway inspection, plan review, and project coordination are assessed and included in the issuance of the Development Permit, Entrance Permit, Right of Way Permit, or or Utility Permit fee.~~

~~180.2 Inspector's Authority and Duties~~

~~An inspector will be assigned to each project to inspect materials and work performed. Such inspection may extend to any or all parts of the work and to the preparation and/or manufacture of the materials to be used.~~

The inspector is not authorized to:

Revise, alter, or relax the provisions of the specifications, the approved plans, or these Standards.

Direct how the work is to be performed.

The inspector has the authority to:

Enter the work area illustrated on the plans and subject to the permit.

Inspect work performed and materials furnished, including without limitation, the preparation, fabrication, or manufacture of materials to be used.

ROrally reject defective materials, means or methods and to confirm such rejection in writing. The inspector may advise the applicant or contractor of any faulty work or materials; however, failure of the inspector to advise the applicant or contractor does not constitute acceptance or approval.

Require revisions to approved engineering plans when necessary due to conflicting field conditions.

Temporarily sSuspend the work for lack of compliance with the permit conditions, plans and/or safety deficiencies.

and Aallow work to proceed after safety the deficiencies have been corrected.

Accept the work at the completion of the project. No interim acceptances will be granted.

Exercise additional delegated authority.

180.3 Inspection Requirements

180.3.1 Inspection Access

The County shall be allowed access to all parts of the work, including the manufacturing facilities of producers and fabricators at all times; and shall be furnished with every reasonable facility for ascertaining whether or not the work, as performed, is in accordance with the requirements and intent of the plans and specifications.

180.3.2 Testing

All testing required by the County shall be at the applicant's expense.

180.3.3 Inspection Notification

The County does not furnish full-time inspection of new development roadway construction. For this reason, it is imperative that the applicant and/or the applicant's contractors provide prompt and complete notification to the County as to the progress of the construction of roadway and drainage improvements. A minimum of 48 hours notice shall be provided for inspection requests.

Notification shall be given to the County when the following work is to be scheduled:

Placement of erosion and sedimentation controls.

Stripping of vegetation and topsoil in fill areas.

Underground utility placement.

Compaction testing and proof roll of trench backfill and fill areas.

Engineered fill placement and rough grading of roadways.

Construction of concrete structures (curbs, inlets, manholes, sidewalks, driveways, etc.).

Fine grading and compaction testing/proof roll of subgrade related to roadways/driveways.

Fine grading/compaction testing/proof roll of base rock related to roadways/driveways.

Placement and compaction of pavement.

Finishing roadbed and slopes (backfilling curb or gutter, trimming out banks and drainage channels, etc.).

All work related to bBridges, culverts and walls.

Striping layout.

Inspection of ADA features both for a concrete forms inspection as well as a post fabrication inspection features following concrete placement(see Section 180.3.6).

Placement of traffic signal related items (junction box, service cabinet, traffic signal/ITS cabinet, pedestrian signal poles, flasher poles, and traffic signal poles).

180.3.4 Inspection RequestsFailure to Notify
Failure to request inspection 48 hours in advance of the work schedule may invalidate the work performedmay result in the rejection of the work.. If the County is not able to inspect the work after proper notice, the applicant shall take measures to either reschedule the work or provide sufficient evidence of the work so that the County can determine compliance with the requirements. and therefore require tests and inspection reports from a certified independent testing laboratory in order to determine whether or not compliance with the roadway construction specifications exists. Test results shall be furnished at no expense to the County. Work that is deemed noncompliant may be required to be removed and replaced.
Failure to comply with permit requirements; orSpecial access requirements for the work/operation; or

Inspection of ADA facilities for compliance with requirements

Repeated re-inspection of the same improvement.

Required Inspections of ADA Accessibility Features

All ADA accessibility features, including but not limited to sidewalks, paths, crosswalks, curb ramps, medians, traffic islands, signs, and pedestrian traffic signal accessibility features including clear spaces shall be inspected for compliance with ADA requirements. No project shall be accepted as complete without documentation prepared by the County inspector showing that all ADA accessibility features meet requirements or have a previously approved exception per Section 170.2. Any ADA accessibility feature constructed using either concrete or asphalt paving, shall be subject to two inspections: forms inspection and post fabrication inspections.

Forms Inspection - The forms inspection shall determine if the forms and survey marks for an accessibility feature are placed in such a manner to meet requirements. The contractor shall provide a signed written record of the dimensions and relative elevations of the forms for an ADA accessibility feature prior to placement of pavement using an inspection report form supplied by the County. A diagram of the ADA accessibility feature shall be provided and at least one photo of the forms prior to fabrication. Dimensions of all sides of the accessibility feature shall be measured with a steel tape and compared with the approved design. The height of the curbs and any corners shall be determined in relation to the

~~lowest point on the accessibility feature using a level. The completed forms inspection report provided by the contractor including diagram and photos shall be included in the project file.~~

~~Post fabrication inspection. The post fabrication inspection shall determine compliance of the accessibility feature with all ADA requirements. The inspection shall be conducted using the standard Oregon Department of Transportationcounty inspection checklists and required measurement tools and techniques. Copies of the inspection checklists and a list of required measurement tools is available from the Department. Dimensions and curb heights shall be determined using standard methods. Slopes shall be determined using the ODOT specified 6 inch and 2 foot smart levels with multiple slope measurements taken for each feature and the highest slope used to determine compliance. Any element that fails to meet required PROWAG standards shall be replaced at the builder's expenseby the applicant and re-inspected for compliance. If it is determined that an ADA feature does not comply with PROWAG standards, the builder applicant shall have the option of appealing that determination. For the appeal the builder shall retain an independent Oregon licensed surveyor to conduct a survey of the ADA accessibility feature and prepare a plan showing actual elevations and slopes for the accessibility feature. If the survey plan demonstrates that the accessibility feature meets PROWAG standards the builder applicant will not be required to replace that accessibility feature. If the survey plan demonstrates that the accessibility feature fails to meet PROWAG standards then the accessibility feature shall be replaced at the builder's applicant's expense and re-inspected for compliance.~~

~~SECTION 1~~SECTION 190 - PERFORMANCE SURETY, WARRANTY AND ACCEPTANCE OF WORK

190.1 ~~190.1~~ General

To ensure the acceptable completion of permitted ~~roadway, access, drainage,~~ private~~,~~ or public improvements, a Performance Surety and/or Warranty ~~Bond~~Surety ~~shall~~ may be required and integrated into ~~the respective~~a ~~Development Permit~~ ~~Permit or Utility Permit~~the Engineering Sections Permits.

~~A date of completion of the construction improvements shall be established and stated in this permit.~~

~~A performance surety is required Pprior to a permit issuance for:~~

~~b) Main line utilities;~~

~~All utilities not completed by the completion date established in the permit.~~

~~Public improvements when they affect the traveling public.permit issuance~~

~~All required improvements that are not completed and/or accepted when a request for issuance of an occupancy permit or plat recording is made.~~

a) A P~~p~~erformance S~~s~~urety shall be required prior to:

1) Issuance of a Utility Permit for mainline utilities or other utility work that significantly impacts the existing roadway except when performed by a "public utility company or municipal authority" per *County Code* 7.03.130.E. If at any time, an existing roadway is left in disrepair and is a hazard to the traveling public, the County reserves the right to repair the road and call the ~~bond or use a cash acknowledgement~~surety to cover the cost of repairing the road. If the P~~p~~erformance S~~s~~urety is redeemed to repair a road during the course of a project, an additional surety may be required by the County~~;~~.
2) Issuance of a Development Permit impacting an existing roadway under the jurisdiction of the County. If at any time, an existing roadway is left in disrepair and is a hazard to the traveling public, the County reserves the right to repair the road and call the ~~bond or use a cash acknowledgement~~surety to cover the cost of repairing the road. If the P~~p~~erformance S~~s~~urety is redeemed to repair a road during the course of a project, an additional surety may be required by the County;
3) Issuance of a Certificate of Occupancy when all improvements required by the Development Permit and the land use requirements are not completed and accepted; or

Recordation of a plat when all improvements required by the Development Permit and the land use ~~requirements~~conditions are not completed and/or accepted.

4)

~~1) Issuance of a Right of Way Permit for events that have a strong potential of damage occurring to the road or right of way during the event.~~

A Performance Surety may be required prior to i~~I~~ssuance of a Right of Way Permit for events that have a strong potential of damage occurring to the ~~road or~~ right-of-way ~~during the event~~.

5)

b) ~~If at any time, an existing roadway is left in disrepair and is a hazard to the traveling public, the County reserves the right to repair the road and call the bond or use a cash acknowledgement to cover the cost of repairing the road. If the performance surety is redeemed to repair a road during the course of a project, an additional surety may be required by the County.~~Substantial Completion of residential partitions and subdivisions shall be achieved prior to acceptance of any surety for guarantee of work to record a plat. Requests for acceptances of a surety for guarantee of work without achieving Substantial Completion will be evaluated by Engineering using the criteria in Section 190.2~~1.1~~ if minimum fire, life and safety issues are met.

~~) A date of completion of for the construction improvements shall be established and stated in thisthe permits and applicable development agreements. Performance Sureties for:~~

~~c) A performance surety shall be required If the work required by the Development Permit or Utility Permit is not completed and accepted by the County at the time the applicant requests the release of the plat or a certificate of occupancy., or by the completion date of the Utility Permit a performance surety shall be required.~~

~~f) Substantial Completion of a subdivision shall be achieved prior to acceptance of any surety for guarantee of work to record a plat. Requests for acceptances of a surety for guarantee of work without achieving Substantial Completion will be evaluated by Engineering using the criteria in Section 190.1.1 on a case by case basis if minimum fire, life and safety issues are met.~~

c) A W~~w~~arranty ~~bond~~Surety shall be required for ~~for any~~all ~~public or private~~ improvements located in the right-of-way under County jurisdiction ~~that are at risk of failure~~ after the ~~project completion and~~ acceptance of improvements.

~~When LIDA is not required Final asphalt wear course shall be installed prior to permit expiration.~~

No Performance Surety or Warranty ~~Bond~~Surety will be required for Entrance Permits or Right-of-Way Permits except as noted above. A Cash Acknowledgement surety~~s~~ may be required as part of an approval period extension for Entrance Permits per Section 130.3.7.

~~g) date.affect the public or property occupants/users.~~

~~h)~~

190.2~~1.1~~ Substantial Completion for Development Permits~~Subdivision of Land~~

Substantial c~~C~~ompletion is achieved ~~at th~~when:~~e conclusion of the initial roadway improvement and shall meet each of the following applicable conditions:~~

~~1) Off site right-of-way and easements have been accepted.~~

~~1) The sanitary sewer under the road is constructed and accepted.~~

~~1) The roadway drainage system draining the road is constructed and inspected~~

~~1) .The water line is constructed and inspected and water is available for fire suppression~~

~~1) installed.~~

~~1) The final lift of pavement is constructed or, if pavement is not required, the full gravel section has been placed and properly compacted when located outside of the UGB. and if no pavement is required on pand/or private .The finalfirst lift of pavementasphalt concrete has beenis constructed or the full gravel section has been placed and properly compacted when located outside of the UGB and if no pavementasphalt is required~~

~~All on and off-site public right-of-way improvement are completed and accepted.~~

a) All required right-of-way dedications and easements have been accepted or are shown on the final plat.

b) The sanitary sewer mainline and service laterals under subject roadways are constructed and accepted.

c) The roadway drainage system is constructed and accepted, including ~~water quality/quantity~~LIDA ~~facility~~ when required.~~d.~~

d) The water main line and service laterals are constructed and accepted and water is available for fire suppression.

e) The ~~gas, electric, and communication~~franchise utilities and/or conduits are installed and accepted.

f) ~~When LIDA is required, t~~The pavement wear course is installed ~~or Tthe first lift of pavement is constructed or, when no LIDA is required~~. ~~I~~If pavement is not required, the full gravel structural section has been placed and properly compacted.

g) All~~ny~~ other land use or Development ~~p~~Permit conditions required to be met prior to plat or occupancy approval are completed.

h) The EOR shall complete, stamp and sign a Certification of Compliance and Completion. By stamping and signing the Certification of Compliance, the EOR is certifying the items required for Substantial Completion are complete and installed as per the ~~the requirements~~approved plans. A Certification of Compliance and Completion will be required for all structures per Chapter 5.

~~Street lights, if required, are installed and ready to be energized.~~

~~or occupancy~~

~~1) Sign fees have been paid.~~

~~190.1.2 Substantial Completion for Certificate of Occupancy for Lots of Record including Commercial, Industrial and Multifamily~~

~~All right-of-way and easements have been accepted or provided.~~

~~The sanitary sewer is constructed and accepted.~~

~~The drainage system is constructed and inspected.~~

~~The water line is constructed and inspected and water is available for fire suppression.~~

~~All asphalt pavement is constructed or the full gravel section has been placed and properly compacted if no asphalt is required.~~

190.~~31.~~3 Performance Surety

Acceptable P~~p~~erformance S~~s~~ureties include a Performance Bond or Cash Acknowledgement.

a) Performance Bonds shall be provided only through State regulated surety companies while assignment or commitment of savings or loan proceeds shall be through State regulated financial institutions.

~~a)~~b) A Cash Acknowledgment is a C~~c~~ash S~~s~~urety held directly by the County.

~~b)~~c) A Developmen~~t~~~~er's~~ Agreement shall accompany ~~the~~ all types of sureties and be recorded~~y~~.

~~c)~~

190.3.1~~1.~~ ~~Surety~~ Forms

All sureties and Developmen~~t~~~~er's~~ Agreements shall be submitted on forms provided by the County and are subject to review and approval by County Counsel.

190.3.2~~1.4~~ Timeframe~~Surety in Effect~~

Sureties shall be in ~~full force and~~ effect at the time of plat approval or issuance of a C~~c~~ertificate of O~~o~~ccupancy and ~~through~~ until County acceptance of the improvements resulting in release of the surety.

190.3.3~~1.5~~ ~~Surety~~ Amount

a) The financial amount established for the Performance ~~s~~Surety shall be equal to 125~~25~~% of the estimated value of the improvement.

~~a)~~b) An Engineer's ~~quantity~~ estimate is required and shall be ~~based upon Engineering's~~approved by Engineering ~~surety template~~~~current unit costs~~. A contractor's bid or estimate is not acceptable. The surety shall cover the County's cost for completing the work on behalf of the applicant including project management. ~~.~~

c) The minimum amount for P~~p~~erformance ~~bond s~~Sureties shall be $10,000. The minimum amount for all other sureties including the Cash Acknowledgment shall be $2,54,0~~0~~00.~~00~~.

d) Any work that is financially guaranteed ~~that~~ and is located on private property shall provide a temporary construction easement to the county that may be terminated ~~expires~~ upon completion and acceptance of the improvements.

e) Engineering will not approve more than one surety reduction throughout the life of the project, not including the reduction of Pperformance Ssurety to the Wwarranty Ssurety.

~~a)~~

~~b)~~

~~Sureties shall be accompanied with a 25% contingency for the first two years and an additional 10% contingency per year for up to two additional years.~~

~~**190.3.41. Cash Sureties Required for Work in Existing Roadways for Development Permits**~~

~~a) As determined by Engineering, a Cash Acknowledgment is required for work permitted in existing roadways prior to issuance of the Development Permit. This is to ensure that the road remains in serviceable condition at all times. The guarantee shall be in the amount of 12525% of the required improvements required to keep the road in such condition.s. This is to ensure that the road remains in serviceable condition at all times.~~

~~This section is intended to protect primarily arterials and collectors. However, if the extent of the proposed work on a local street is significant enough to warrant concern, the county may require a Cash Acknowledgment for the local street as detailed in this section.~~

~~a) If an existing roadway is left in disrepair and is a hazard to the traveling public, the County reserves the right to repair the road by redeeming the Cash Acknowledgment without executing the remaining sureties that may be in place for the development.~~

~~If the Cash Acknowledgment is redeemed to repair a road during the course of a project, an additional surety may be required by the County.~~

~~If the Cash Acknowledgment is redeemed to repair a road during the course of a project, an additional surety may be required by the County.~~

~~Local, local access and private roads used for construction entrances or haul routes shall be required to comply with Section …….~~

~~a)~~

190.~~4~~2 Maintenance and Warranty Period for Development Permits

a) The warranty period will begin when all improvements, with the exception of street trees, are accepted by the County.

b) The applicant shall provide a Wwarranty Ssurety as part of a Development Permit for work located in a public right-of-way under County jurisdiction. The Wwarranty sSurety/maintenance requirements shall be held for a minimum of two years~~at minimum:~~.

~~One year period for the guarantee of street trees and any landscape improvements.~~

~~Two year period for the guarantee of all other improvements.~~

c) The required wWarranty Ssurety, as detailed above, shall be valued at 25% of the Engineer's estimate and approved by Engineering.

d) If there are remaining improvements to be constructed, the Wwarranty Ssurety will also include a Pperformance Ssurety. All outstanding performance items shall be guaranteed at 125%. This combined surety may require the minimum warranty period to be extended to~~for~~ two years from~~beyond~~ the date all performance improvements have been completed.

e) The County may require an extension~~s~~ of the Wwarranty sSurety/maintenance period for more than the minimum required if the required improvements show signs of failure during a final inspection and the surety is sufficient to cover the costs.

f) The Wwarranty Ssurety does not expire and may only be released after a final inspection has been completed and the minimum warranty period has elapsed. At the time of final warranty inspection, any items not completed or maintained to County standards will be included in a punch list provided to the applicant and/or guarantor. These items shall be addressed prior to the release of the Wwarranty sSurety.

190.5 Maintenance and Warranty Period for Utility Permits

a) Public utilities who serve as the applicant for Utility Permits ~~obtained by Franchise Utility Owners~~ will not have warranty periods as their trenches are guaranteed for life per County Code Section xxx. Upon final inspection and acceptance of the work, the permit can be closed at that time. In order to qualify for this warranty

exemption, ~~Restoration of damaged roadway surfaces or abutting property must be completed before the permit is closed out.~~ Contractors applying on behalf of the public utilities ~~Franchise Owners~~ must be on an authorized list provided to Engineering from the ~~Franchise Owner~~public utility. These trenches are still guaranteed for life by the public utility per County Code Section xxx

b) Utility Permits obtained by ~~general~~ contractors or ~~home owners~~ private parties will have the warranties specified in County Code Section 7.03.110 and 7.03.120.

c) The warranty period will begin when the all improvements are accepted by the County.

d) When related to a ~~Utility~~Development Permit, the W~~w~~arranty ~~s~~Surety/maintenance requirements will extend for a minimum of ~~three~~two years for work located in a public right-of-way under the jurisdiction of the County ~~per County Code Section 7.03.110 and 7.03.120~~.

~~When Substantial Completion is achieved and the owner or developer wants to record the plat or obtain occupancy,, the owner's or developer's maintenance and warranty period begins. Otherwise the warranty period will begin when the improvements are finaledaccepted by the county inspector.~~

~~All subdivisions, partitions and commercial developments with public improvements shall provide a warranty surety. The warranty/maintenance period will extend for a minimum of one year or longer as determined warranted by the county after the final inspection that does not result in a punchlist. with a period of at least one year or at least 90% of subdivision build-out of the homes.~~

~~At this time, the required warranty/maintenance surety, as detailed above, shall be valued at 1502525% of engineer's estimate of quantities of the improvements completed to date and the unit cost values from engineering.~~

~~If there are improvements of the remaining to be constructed the warranty/maintenance surety will also include a performance surety. All remaining performance shall be guaranteed for 125% to 150% depending on the completion date of the development agreement. ion, Guarantees shall includeing sidewalks, street trees, ground cover, planter strips and other site and public improvements. andimprovements and estimated remaining lift of asphalt, and 25% of all public improvements items previously constructed and approved by the County.~~

~~a) The county may extend the warranty period more than the minimum one year may be extended if the required improvements show signs of failure during a final inspection and the surety is sufficient to cover the costs.~~

~~b)~~

190.~~6~~3 Acceptance of Work

~~a)~~ Prior to County acceptance of the improvements and release of the ~~all sureties~~P~~p~~erformance S~~s~~urety and/or W~~w~~arranty Surety~~bond~~/maintenance period, the following shall occur:

~~b) The County shall conduct a final inspection of the roadway, accesses, drainage, ADA accessibility features and other private or public improvements.~~

~~c) The County shall make a determination of final completion in conformance with plans, specifications, and County standards.~~

~~d) The owner or developer shall perform a thorough cleaning of the roadway surface and storm drain system.~~

~~e)~~ by the construction of the work any roadways or/or ~~that is~~were not part of the project~~work~~

~~f) All improvements shown on the permitted plans and required by land use conditions of approval shall be completed.~~The final lift of pavement~~asphalt or concrete roadway surface and all sidewalks shall be completed.~~

a) The applicant shall perform a thorough cleaning of the roadway surface and storm drain system.

b) If a private PI is required, the PI shall conduct an inspection of the improvements.

c) If the private PI indicates that the work is complete, the EOR shall ~~shall~~ complete, stamp and sign a "Certification of Compliance and Completion." By stamping and signing the Certification of Compliance and Completion, the EOR is certifying the items are complete as per the requirements.

d) The County shall conduct an inspection of the improvements.

e) The County shall make a determination of completion in conformance with the permit.

f) The applicant shall repair any damage caused by the construction of the work to any public roads, private roads and/or property that is not part of the project as well as any identified haul routes per Section 225.6.

g) Any deficiencies resulting in non-acceptance of the work permitted in the Development Permit shall be identified in writing on a ~~final~~ punch list and presented to the ~~owner or developer~~permit holder~~r~~applicant with a date named for correction and completion.

h) Upon correction of the noted deficiencies and the determination that all work is in conformance with ~~County Standards~~the requirements, repeat steps a) through c).

i) The County shall conduct an inspection of the improvements.

j) ~~the owner or developer shall schedule another final inspection~~When~~;~~ ~~If~~if the improvements are found complete and the work ~~will~~ is ~~be~~ accepted, the P~~p~~erformance S~~s~~urety will be released and the period for warranty will begin.

k) Once the warranty period has passed, and there are no defects in workmanship found by County inspection, the W~~w~~arranty S~~s~~urety will be released.

~~f) Once the warranty period has passed, and there are no defects in workmanship found by County inspection, the warranty surety will be released. and the warranty period has passed,, and all sureties shall be released.~~

190.74 Acceptance of Roads ~~for County Maintenance~~

When the permit requirements are met~~is~~ and the warranty period is over and all sureties have been released, the County will then accept the road right-of-way as dictated by the road's classification.

~~When a public road built to County standards is accepted, the final punch list is deemed complete, and the warranty period is over and, all sureties haveshall been released, . Tthe County will then accept the road for maintenance as indicated by the road's classification.~~

~~b)~~

~~c)~~

190.85 Nonperformance of ~~Development~~ Permit

Failure to complete the project ~~within the times outlined in the~~prior to expiration of the Development Permit and Utility Permit shall be construed as nonperformance and may be considered a ~~a~~ violation of the ~~project's Conditions of Approval~~permit. The surety may~~shall~~ be demanded in order to bring the project to completion. If compliance is not achieved, the ~~file shall~~permit will be forwarded to the ~~Code Enforcement Division~~Code Enforcement Division for enforcement. Development Agreements should~~all~~ not be extended unless there is adequate surety to guarantee the improvements through the extended period.

~~190.6 Utility Permits~~

~~For requirements related to Utility Permits, see *County Code* Section 7.03.130 and Chapter 7 of these Standards.~~

~~SECTION 195 PROHIBITED ACTIVITIES DURING CONSTRUCTION IN RIGHT-OF-WAY~~

~~The use of public rights-of-way for construction vehicles and materials staging is not authorized by the *Standards* and poses a potentially deleterious effect of the proposed use, because it contributes to congestion, reduces sight distance, and occupies shoulders intended for emergencies and other purposes. To protect the public from such effects, the applicant shall be required to submit a construction vehicle management and materials staging plan for review and approval by Engineering, before the issuance of a Development Permit. The plan shall show that the construction vehicles and materials will not be staged or queued up on improved public streets and shoulders without specific authority from Engineering for that purpose.~~

CHAPTER 2 - ROADWAY DESIGN & CONSTRUCTION

~~(REFERENCES 2, 6)~~

~~SECTION 2~~SECTION 210 ~~–~~ GENERAL

Chapter 2 establishes the technical requirements associated with roadway design and construction.

Roadways in Clackamas County should~~all~~ be designed as follows:

~~a) For the safe and efficient travel of all users of the transportation system.~~

~~b) To meet or exceed the minimum design guidelines referenced~~contained herein and/or the most recent versions of the manuals and standards of Section 115 except as allowed by Section 170.. ~~Considerations will be made to best accommodate interrelationships of existing and proposed roadways, topographic conditions and the land use to be served by the roadway.~~

~~c) To flexibly consider roadway context with regard to the mix of users, adjacent land use, type of traffic, traffic volume, and speed of traffic to be carried.~~

a) For the safe and efficient travel of all users of the transportation system.

b) To meet or exceed the minimum design guidelines referenced herein. Considerations will be made to best accommodate interrelationships of existing and proposed roadways, topographic conditions and the land use to be served by the roadway.

c) To flexibly consider roadway context with regard to the mix of users, adjacent land use, type of traffic, traffic volume, and speed of traffic to be carried.

d) To ~~implement the~~comply with the cross section elements illustrated in the ~~ZDO~~*ZDO*, ~~Comprehensive Plan~~*Comprehensive Plan* and the *CIP*. ~~Planned improvements should comply with these documents.~~.

~~e) Proposed development shall be provided access through safe and efficient transportation improvements. Determinations of minimally adequate traffic safety may include consideration of the safety and adequacy of off-site public roadways through which traffic to and from development flows.~~

~~f)~~

~~Considerations will be made to best accommodate interrelationships of existing and proposed roadways, topographic conditions and the land use to be served by the roadway.~~

~~Community Planning Areas exist that have exceptions to these Standards. These areas include unincorporated communities, Sunnyside Village, Clackamas Regional Center, Mt. Hood Community Plan and Urban Growth Management Areas, as examples.~~

~~These Standards, except as noted, may be~~ modified ~~altered on a case by case basis through the modification process of Section 170.~~

~~SECTION 2~~SECTION 215 - FUNCTIONAL CLASSIFICATION & REGIONAL STREET DESIGN GUIDELINES

a) The functional classification of existing and planned roadways has been established by the ~~*Comprehensive Plan*, Chapter 5 - Transportation~~*Comprehensive Plan*, Chapter 5 - Transportation. Design standards for new roadway construction and existing roadway improvements are based on these functional classifications. The functional classification of a roadway determines how the roadway will be designed ~~by defining roadway cross section, design speed and access control.~~.

~~a)~~b) Functional classifications of individual roadways can be found on Maps ~~V-2a~~V-2a 5-4a and ~~V-2b~~V-2b 5-4b of the *Comprehensive Plan*. Descriptions of each functional classification can be found ~~on Table V-2Table V-2~~Chapter 5 of the *Comprehensive Plan*.

~~.~~ Roadway design shall consider the Regional Street Design Type Guidelines as described per *Comprehensive Plan* policy ~~12.0~~ 5.O.5 as illustrated in ~~Table V-4Table V-4 and Map V-3Map V-3~~ Map 5-5.

~~c)~~

d) ~~Community Planning Areas~~Community Planning Areas, ~~-~~as referenced in the *Comprehensive Plan*, ~~exist that~~ have exceptions to these ~~*Standards*~~*Standards*. Otherwise, Standard Drawings C110 through C140 shall be used for design of roads under the jurisdiction of Clackamas County.

e) Use of Urban Alternate 1 and 2 sections per Standard Drawing C110 may be considered on very low volume roads or roads that cannot be extended, and where the alternate street section would better accommodate:

1) Sustainable surface water management solutions such as low infiltration planters and basins, swales, ponds, rain gardens, trees, and minimal disruption to natural drainage systems;
2) Preservation of existing significant trees and native vegetation;
3) Preservation of natural terrain and other natural landscape features; and
~~c)~~4) Existing development.

f) All other roadway design shall comply with these ~~*Standards*~~*Standards*.

~~Roadway Sections~~

~~Standard Drawings C110, C130 and C140 shall be used for design of roads under the jurisdiction of Clackamas County, except where Community Planning Area cross sections have been adopted.~~

~~Use of Urban Alternate 1 and 2 Local/Connector Road Sections may be considered on very low volume roads or roads that cannot be extended, and where the alternate street section would better accommodate:~~

~~Sustainable surface water management solutions such as low infiltration planters and basins, swales, ponds, rain gardens, trees, and minimal disruption to natural drainage systems;~~

~~Preservation of existing significant trees and native vegetation;~~

~~Preservation of natural terrain and other natural landscape features; and~~

~~d) Existing development;~~

~~e)~~

~~SECTION 2~~SECTION 2~~20~~ - ACCESS MANAGEMENT

220.1 General

a) Access management ~~-~~for private accesses or public intersections is required to improve~~ensure~~ safety and efficiency of traffic flow for users of the transportation network and to balance those needs with livability, economy and community values. ~~Overall, access management should balance the needs of local business, residents, through traffic, local traffic, pedestrians and bicyclists on a particular roadway.~~

b) The location and number of roadway intersections and other access points shall be planned, coordinated and controlled by Engineering.

~~a)~~ By the nature of the roadway functional classification system, higher speed arterial streets require the highest access management restriction tending toward less access. Lower speed collector streets and connector streets require less restrictive access management. Local streets require very few access management restrictions and tend towards more frequent access.

~~a) The location and number of roadway intersections and other access points shall be planned, coordinated and controlled by Engineering. Roadway and driveway entrances to existing and planned roadways shall conform to the access requirements of these *Standards*.~~

~~By the nature of the roadway functional classification system, higher speed arterial streets require the highest access management restriction tending toward less access. Lower speed collector streets and connector streets require less restrictive access management. Local streets require very few access management restrictions and tend towards very frequent access.~~

c)

d) ~~T~~Chapter 10 of the *Comprehensive Plan* provides various standards for access within certain Community Planning Areas~~, Chapter 10~~. Within those plan areas, access shall be determined according to the ~~Comprehensive Plan~~*Comprehensive Plan*.

~~a)~~

~~Consolidating access points onto arterials, and improving traffic flow and safety in the UGBurban area and improving safety in the rural area are~~will be the primary considerations when reviewing access proposals for approval.~~All access that is allowed or allowed by modification per Section 170 is subject to access movement restrictions in order to~~

~~preserve the safety and/or mobility of the subject roadway. Access movement restrictions may necessitate the installation of roadway medians.~~, ~~which may result in substantial cost including off-site roadway widening. These improvement costs shall be borne entirely by the applicant proposing such access.~~
~~With development, requested access may be denied and/or reduced from existing conditions if adequate safety, spacing, classification and mobility requirements cannot be met. unless there is a reasonable alternate such as a shared access or access to an equal or lower classification street is available.~~
~~Conflicting access movements within the 95th percentile queue of any traffic movement at an existing intersection or major driveway may be reason to deny or restrict access . A traffic study complying with Section 295 will be required if this is a likely issue.~~

220.2 ~~Driveway~~ Access ~~Spacing Standards~~Standards

Accesses are subject to the sight distance standards of Section 240, the design requirements of Sections 230 and 330, and this section. Accesses that are not compliant with these requirements may not be approved. Existing accesses may be required to be removed or modified in order to comply with these requirements.

220.3 Access Spacing Standards

~~Driveway access~~ Accesses subject to a land use approval and those subject to spacing standards per the Entrance Permit Matrix shall adhere to the minimum spacing ~~shall adhere to~~requirements of Tables 2-1 or Table 2-2 ~~xx except when any of the conditions of~~and requirements of ~~Section 2~~Section 220.4.3 ~~are met. For proposed driveways and private roads, intersection~~ Considering access along both sides of the roadway (i.e. consider spacing from existing accesses on the south side of a road when an access on the north side of a road is proposed), access spacing shall be measured from the proposed centerline to the centerline of an existing ~~driveway~~access or ~~or~~ roadway or planned roadway. Planned roadways are those illustrated in the ~~Comprehensive Plan~~*Comprehensive Plan*, other local transportation system plans, or those approved as part of an approved development not yet constructed.
~~The following access scenarios are prohibited unless it is demonstrated that no other alternative is feasible:~~

Table 2-1. Minimum Access Spacing Inside the UGB

Functional Classification	Full access spacing	Restricted access spacing*
Major Arterial	500	250
Minor Arterial	250	150
Collector	150	100
Connector	25**	N/A
Local	25**	N/A

Table 2-2. Minimum Access Spacing Outside the UGB

Functional Classification	Full access spacing
Major Arterial	500
Minor Arterial	400
Collector	300
Connector	200
Local (Non-Residence District)	100
Local (Residence District)	25**

*If approved, restricted access spacing implemented typically by raised median only
N/A = Restricted access not considered on these roadways
**Access shall be placed a minimum of 100 feet from any intersection with an arterial roadway.

220.~~43 Exceptions~~Additional Access Requirements ~~to Table xx~~

The following ~~exceptions~~conditions apply in addition to the requirements of ~~supercedes~~supersede ~~the requirements of~~ Tables 2-1 and 2-2~~xx~~: ~~and access is not permitted unless there are no other feasible alternatives~~:

a) Existing or proposed accesses subject to land use approval shall first take access to the lower functional classified roadway unless evidence or an engineering study establishes that access(es) to the higher functional classified roadway are needed for safety, circulation, to address topography or environmental constraints, or are otherwise a benefit to the public. Existing accesses where ADT is increased by ten or ~~less~~fewer trips are not subject to this standard if the sight distance standards of Section 240 are met.

b) Parcels or contiguous parcels under the same ownership shall be limited to one access except on local or connector roads where the number of accesses is not limited if sight distance and access spacing standards are met.

c) Accesses subject to the Entrance Permit Matrix that provide the only access to a parcel or contiguous parcels under the same ownership shall comply requirements of Table 2-1 or 2-2 to the extent feasible. First priority will be given to achieving adequate sight distance per Section 240, second to access by functional classification per 220.4(a) and (b) and third to access spacing requirements. Based on the judgment of the Road Official, the access will be placed in the safest location.

d) Commercial, multifamily and industrial developments that can comply with spacing standards to collectors and arterials may request additional access but shall establish that the proposed access is/are needed for safety, circulation, to address topography or environmental constraints, or are otherwise a benefit to the public.

e) Reciprocal access easements may be required even if these standards are met in order to promote connectivity and to reduce conflicts on the public street system.

f) On roadways with an ADT greater than 1000 and outside the UGB, additional access(es) may be permitted on collectors, minor arterials and major arterials for logging, agricultural, and accessory structure use when sight distance, functional classification, and spacing standards are met, and for all uses when needed to address safety, circulation, to address topography or environmental constraints, or are otherwise a benefit to the public.

g) On roadways with an ADT less than or equal to 1000 and outside the UGB, additional access(es) may be permitted on collectors, minor arterials and major arterials for all land uses when sight distance, functional classification and spacing standards are met.

h) Conflicting access movements within the 95th percentile queue of any traffic movement of an intersection may be reason to deny, relocate or restrict access. A traffic study complying with Section 295 will be required if this is a likely issue.

i) Accesses that serve only emergency vehicles are exempt from these requirements. However, these accesses shall be gated.

j) Accesses, other than those to a local or connector roadway, that require any vehicle to back onto a public roadway are prohibited.

Access within 600 feet of an existing or planned signalized or roundabout ~~controlled intersection.~~
~~Driveway a~~**ccess within 400 feet of an existing or planned signalized intersection along a major arterial.**
Driveway access within 300 feet of an existing or planned signalized intersection along a minor arterial.
Access within 300 feet of a signalized intersection along a collector.
Access within 150 feet of an existing or planned public roadway intersection.
~~Conflicting access movements within the 95th percentile queue of any traffic movement~~ **at an existing intersection or major driveway may be reason to deny or restrict access .access. A traffic study complying with Section 295** ~~will be required if this is a likely issue. Access within the 20 year 95th percentile queue~~
~~Access is restiricted~~ within 400 feet of all other existing or planned public roadway intersections.~~Driveways, other than those to~~on a local ~~or connector~~ **roadway, that require anythe design vehicle to back onto a public roadway. the principal arterial from the driveway or to back from the arterial into the driveway.**
~~If a development can access multiple streets, access shall first be taken to the lower functional classification street.~~
~~If a safety or mobility issue would result, new intersections shall not be created within the influence area of~~ **an existing or planned intersections**.

~~**220.2 Crossover Access Easements**~~

~~**Along collector and arterial roadways, reciprocalcrossover access easements providing shared access shall generally be required within the UGB. These easements shall provide for shared access between adjacent compatible commercial, multifamily and industrial developmentsparcels, to reduce access points, traffic volumes, and impacts to environmentally sensitive areas and improve safety, mobility, and convenience to on-site users, and .**~~
~~**If reciprocal access easements are in place on adjacent properties, the easements shall be reciprocated and these accesses shall be constructed.**~~
~~In evaluating a development, existing and future access via shared access shall be considered.~~
~~1) These easements shall generally be required even if adjacent uses are allowed direct individual access to an adjacent roadway.~~

220.5~~3~~ Roadway Intersection Management

~~The *Comprehensive Plan* requires "…n~~New developments that will require construction of new streets ~~to~~shall provide full street connections at intervals of no more than 530 feet, where feasible. If full street connections are not feasible at such intervals, ~~require~~ accessways for pedestrians, bicyclists or emergency vehicles at intervals of no more than 330 feet shall be provided. Exceptions may be made where there are barriers, including topography, railroads, freeways, pre-existing development, existing easements, or environmental constraints such as streams and wetlands."

No public roadway/public roadway intersection may be offset by less than 100 feet unless approved per Section 250.8.3.

Comply with requirements of Section 225.1.
~~Development shall comply with these requirements.~~ ~~Proposed new subordinate public and private roadways shall comply with the following requirements at their intersections with existing or proposed primary roadways. Roadways of a given functional classification may access roadways of another classification as indicated in Table 2-1.~~

Table 2-1. Urban Public Intersection Access

Mulder, Deana - DTD:
I added Urban

Functional Classification of Existing Primary Roadway	Functional Classification of Proposed Subordinate Roadway				
	Major Arterial	Minor Arterial	Collector	Connector	Local/Private Roadways
~~Major Arterial~~	Yes	Yes	Yes	No*	No*
Minor Arterial		Yes	Yes	Yes	No*
Collector			Yes	Yes	Yes
Connector				Yes	Yes
Local					Yes

*May be allowed as a modification ~~per Section 170.~~

~~Proposed new subordinate public and private roadways shall only access an existing or proposed roadway at the minimum centerline spacing illustrated in Table 2-2.~~
~~No access to principal interstate or principal expressway.~~
~~Driveway access to principal urban arterial roadways and those rural roadways with more than 5,500 ADT is very restricted. If available and reasonable, access shall be provided from streets with a lower functional classification except where Engineering determines that safety dictates an alternative access scenario. If access is approved, it is very likely to be restricted to a right in/right out configuration or similar restrictions in the UGB or similar restrictions. Full access is not guaranteed to principal arterial roadways.~~
~~For proposed private driveways, intersection spacing shall be measured along the existing primary roadway from the proposed driveway centerline to the centerline of an existing or planned roadway and/or any existing driveway.4~~
~~Serving Urban Commercial, Multi-Family or Industrial areas~~
~~220.4 Driveway Access to Urban Principal, Major and Minor Arterial Roadways~~

~~Driveway access to arterial roadways within the UGB is very restricted. If available, access shall generally be provided from streets with a lower functional classification except where Engineering determines that safety dictates an alternative access scenario. Access to major arterials is more restricted than access to minor arterials. If access is approved, it is very likely to be restricted to a right-in/right-out configuration or similar restrictions. Full access is not guaranteed to arterial roadways. The following access scenarios are prohibited unless it is demonstrated that no other alternative is feasible:~~

~~Driveway Aaccess within 400 feet of an existing or planned signalized intersection along a major arterial.~~

~~Driveway aAccess within 300 feet of an existing or planned signalized intersection along a minor arterial.~~

~~Access within 400 feet of an existing or planned public roadway intersection along a major arterial.~~

~~Access within 300 feet of an existing or planned public roadway intersection along a minor arterial.~~

~~Conflicting access movements within the 95th percentile queue of any traffic movement at an existing intersection or major driveway. A traffic study complying with Section 295 will be required if this is a likely issue.~~

~~Proposed single family residential driveways.~~

~~Driveways that require the design vehicle to back onto the arterial from the driveway, or to back from the arterial into the driveway.~~

~~**Principal, Major and Minor**~~

~~rural with less than 5,500 ADT are required to meet safety standards. Safety considerations are conflicting movements, queues at intersections, stopping sight distance and maneuvering area.When reasonable shall~~

provide intersection sight distance and in all cases stopping sight distance shall be provided. Driveway spacing shall comply with Table 2-?????

Modifications may be granted per Section 220.8.

220.5 **Urban Driveway Access to Collector Roadways**

Access to local roadways is the least restricted and collector roadways is less restricted than to arterial roadways. If available, access should be provided from streets with a lower functional classification except where Engineering determines that safety dictates an alternative access scenario. The following access scenarios are strictly prohibited unless it is demonstrated that no other alternative is feasible:

Access within 300 feet of a signalized intersection along a collector.

Access within 150 feet of an existing or planned public roadway intersection.

Conflicting access movements within the 95th percentile queue of any traffic movement at an existing intersection or major driveway. A traffic study complying with Section 295 will be required if this is a likely issue.

Proposed single family residential driveways to arterial roadways if an alternate access to a lower classification exists or can be provided.

Driveways that require the design vehicle to back onto the collector from the driveway or, to back from the collector into the driveway.

Commercial, industrial, multifamily and institutional uses may have exclusive driveway access to a collector with a minimum intersection spacing of 150 feet.

Modifications may be granted per Section 220.8.

220.5 Rural Driveway Access to Collector Roadways

220.6 Driveway Access to Connector Roadways

If available, access should be provided from streets with a lower functional classification except where Engineering determines that safety dictates an alternative access scenario. Access for proposed single family residential driveways is allowed. No driveway shall be allowed within 25 feet of the right-of-way lines at an intersection.

Commercial, industrial and institutional developments proposing access to roadways with a local road functional classification that serve existing residential neighborhoods located within the UGB are discouraged and any

~~anticipated adverse impact upon the livability of these neighborhoods shall be quantified and mitigated proportionately to their impacts.~~

~~Modifications may be granted per Section 220.8.~~

~~220.7 Driveway Access to Local Roadways~~

~~Access for proposed single family residential driveways is allowed. No driveway shall be allowed within 25 feet of the right-of-way lines at an intersection~~

~~Commercial, industrial and institutional developments proposing access to roadways with a local road functional classification that serve existing urban residential neighborhoods shall evaluate and quantify any anticipated adverse impact upon the livability of these neighborhoods and mitigate those impacts proportionately.~~

~~Modifications may be granted per Section 220.8.~~

220.~~6~~8 Modification Considerations

~~a)~~ All access requests not meeting these standards for access shall include a scaled site plan and a traffic report if required by Engineering. The scope of the development will determine the information required and shall comply with ~~Sections 170~~Sections 170 and ~~295~~295. The evaluation of the access request will consider the impacts that traffic generated by the proposed development will have on through traffic, traffic patterns, traffic queuing, and safety ~~in the area~~.

a)

~~b)~~ If approved, access may be restricted to right-in/right-out movements or other movement restrictions., ~~and then only if meeting the maximum access standards of Table 2-3 and spacing standards of Table 2-4.~~

~~c)~~b)

~~220.9 Maximum Access by Modification~~

~~If access is approved to a roadway under the procedures of Section 220.8, Table 2-3 illustrates the maximum number of driveways that may be approved with the associated weekday ADT generated by the development and functional classification of the existing roadway. The allowed number of access points will be based upon a traffic study complying with Section 295. Depending upon the individual situation, turning movements may be restricted to right-in/right-out or similar at the discretion of Engineering.~~

Table 2-3. Commercial, Industrial, Multifamily Maximum Number of Private Driveway Access

Functional Classification of Existing Roadways	Estimated Development ADT		
	ADT < 2500	2500 > ADT > 5000	5000 > ADT
Principal Arterial*			
Major Arterial*	0	1	2
Minor Arterial*	1	2	2
Collector	Access Determined by Table 2-4		
Connector			
Local			

Notes: All proposed driveways must meet access spacing of Table 2-4.

*No access allowed unless no alternate access is available.

Table 2-4. Commercial, Industrial, Multifamily Minimum Private Access Spacing*

Functional Classification	Full Access Spacing (feet)	Restricted Access Spacing (feet)
Principal Arterial		
Major Arterial	500	500
Minor Arterial	500	300
Collector	150	150
Connector	100	N/A
Local	100	N/A

*If access is approved by Engineering per Section 170, access movements may be restricted as necessary.
N/A = Access restrictions not commonly employed.

~~Access Spacing Standards~~

~~Item~~	~~Posted Speed~~	~~Major Arterials~~	~~Minor Arterials~~	~~Collector Roads~~	~~Local Streets~~
~~Driveway Spacing~~ ~~Urban~~ ~~Rural~~	~~50MPH - 55MPH~~	~~360'/475'/660'~~	~~360'/475'/660'~~ ~~150'~~	~~325'/250'/125'~~ ~~125'~~	~~n/a~~ ~~n/a~~
~~Corner Clearance~~		~~360'~~	~~360'~~	~~250'~~	~~70'~~
~~Driveway Spacing~~ ~~Urban~~ ~~Rural~~	~~40MPH - 45MPH~~	~~660'~~ ~~1,320'~~	~~330'~~ ~~660'~~	~~150'~~ ~~660'~~	~~100'~~ ~~330'~~

~~Driveway Spacing Urban Rural~~	~~30MPH-35MPH~~	~~1,320' 660'~~	~~660' 330'~~	~~220' n/a~~	~~n/a n/a~~
~~Driveway Spacing Urban Rural~~	~~25MPH OR LESS~~	~~200'~~		~~150'~~	

~~220.10 Minimum Vehicular, Pedestrian, Bicycle and Emergency Access~~

~~Minimum access should be considered per the Comprehensive Plan Chapter 5 Policies 20.0 and 21.0.~~

~~SECTION 2~~SECTION 225 - ROADWAY DEVELOPMENT

225.1 Future Extension of Roadways Related to Development

a) When required ~~by the *ZDO* or and or the Comprehensive Plan,~~by land use approval, a proposed development shall construct a public~~County standard~~ roadway, or private roadway acceptable to the County, to the boundaries of the development to permit future development or division of adjoining land, in order to promote connectivity.

b) A roadway master plan may be required prior to approval of the location of a roadway stubbed to the current development boundary to ensure connectivity of the future roadway system and to retain the development potential of adjacent land. This master plan shall consider topographical and geographical information and assume maximum development consistent with existing zoned densities.~~. This plan shall consider Comprehensive Plan Chapter 5 PolicicPolicies 17.0, 18.0 and 19.0s 17.0, 18.0 and 19.0~~.

c) New public roadways~~streets~~ that are stubbed to adjacent property with future potential extension may require the construction of a temporary turnaround, depending on the length of the dead end street and/or the~~ the dedication~~dedication of ~~right of way~~right-of-way for the ~~temproary~~temporary ~~tunaround~~turnaround or future turnaround.

d) P~~New p~~ublic streets that cannot be extended shall end in a County approved cul-de-sac or turnaround.

~~d)~~

~~d)~~

225.2 Termination of Roadways/Dead End Streets (Cul-De-Sacs, Turnarounds & Hammerheads)

Dead end streets may be allowed when deemed appropriate by Engineering and shall meet the following minimum criteria:

a) Dead end roads are allowed on local and private roads only.

b) Dead end public roads should terminate in a cul-de-sac. Alternate designs may be considered on a case by case basis depending on topography, length, ADT, or other design constraints.

c) Dead end streets are allowed only where topography or pre-existing development precludes roadway connections.

d) A roadway ending in a dead end shall be as short as possible, having a maximum length of 400 feet, serving not more than 18 dwelling units.

e) The length of the roadway ending in dead end shall be measured along the centerline of the roadway from the near side right-of-way of the nearest cross street to the farthest point of the dead end right-of-way.

f) Dead end streets longer than 400 feet may be approved if no other means are available for development of the property and special provisions are made for: public facilities, pedestrian and bicycle circulation and emergency service access and vehicle turnaround.

g) For dead end streets less than one hundred fifty (150) feet in length, sidewalk is required on one side only, but shall include the entire turnaround area.
h) Cul-de-sacs shall conform to Standard Drawing C300.
i) For alternate termination designs see Standard Drawing C350.
~~1) Dead end roads are allowed on local and private roads only.~~
~~2) Dead end public roads shall terminate in a cul-de-sac. Alternate designs may be considered on a case by case basis depending on topography, length, ADT, or other design constraints.~~
~~3) Dead end streets are allowed only where topography or pre-existing development precludes roadway connections, and should be avoided wherever possible.~~
~~4) A roadway ending in a dead end shall be as short as possible, having a maximum length of 400 feet, serving not more than 18 dwelling units.~~
~~5) The length of the roadway ending in dead end shall be measured along the centerline of the roadway from the near side right-of-way of the nearest cross street to the farthest point of the dead end right-of-way.~~
~~6) Dead end streets longer than 400 feet may be approved if no other means are available for development of the property and special provisions are made for: public facilities, pedestrian and bicycle circulation and emergency service access and vehicle turnaround.~~
~~7) For dead end streets less than one hundred fifty (150) feet in length, sidewalk is required on one side only, but shall include the entire turnaround area.~~
~~8) Cul-de-sacs shall conform to Standard Drawing C300.~~
~~9) For alternate termination designs see Standard Drawing C350.~~
~~9)~~

225.3 Opening or Upgrade of Unimproved or Substandard Public Right-Of-Way to Benefit Private Access

An existing unimproved or substandard public right-of-way may be opened, upgraded, or improved for vehicular access ~~under the provisions and issuance of a Development Permit~~subject to a permit. Requirements include:~~.~~

a) Applicants for the improvement shall bear all costs inclusive of survey, engineering, construction and maintenance.
b) Subsequent to this investment, no proprietary rights or exclusive use to the funded improvement will or could be granted within the public right-of-way.
~~c)~~ Case-by-case ~~County~~ interpretation of construction standards based on the proposed use is necessary to define the extent of construction ~~within the fixed alignment~~, location and width of available existing right-of-way consistent with the proposed use or impact.
~~c)~~
d) The applicant may be required to dedicate additional right-of-way or easements along the property frontage and at the terminus as deemed necessary by engineering to comply with County standards.
e) If satisfactory access cannot be constructed within the available public right-of-way, the applicant has the option of acquiring additional right-of-way as required or may seek an alternative private access.
~~e)~~

~~225.4 Access to Existing Lots of Record (Single Family Dwelling)~~

~~On a case-by-case basis, the County may consider permitting construction of improvements within the existing public right-of-way to provide access to existing lots of record or for temporary or restricted access.~~
~~5)~~

~~6) The improvement must have an unobstructed width of 20 feet to meet emergency vehicle access requirements.~~
~~7) The minimum constructed width for a travel surface shall be 12 feet~~
~~Turnouts for emergency/passenger vehicles shall be provided every 400 feet.~~
~~The access design shall be approved by the local fire district.~~
~~The minimal structural standard shall be per .The applicant shall dedicate additional right-of-way or easements along the property frontage and at the terminus as deemed necessary by Engineeringengineering to comply with County standards.~~
~~If satisfactory access cannot be constructed within the available public right-of-way, the applicant has the option of acquiring additional right-of-way as required or may seek an alternative private access.~~

~~12)~~

225.~~45~~ Off-Site Access ~~Standards~~*Standards*

On a case by case basis, the County may require construction of improvements within existing off-site (beyond a development site's frontage) public rights-of-way in order to provide adequate safe access to newly created lots or parcels or for other development. ~~resulting from a land use decision.~~ If Engineering determines that off-site roadway improvements are necessary to achieve minimally adequate and safe traffic flow, such improvements may be required before Engineering can recommend approval of a proposed development.

~~**A determination of adequacy may include, but is not limited to, one or more of the following considerations:**~~

~~Right-of-way width(s)~~

~~Roadway configuration and geometry~~

~~Sight distance (refer to)~~

~~Emergency service access~~

~~Traffic volume~~

~~Functional classification~~

~~Crash history~~

~~Off-site roadway capacity issues that create or exacerbate safety issues~~

~~Presence of ADA accessibility facilities on the street frontage of the opposite side from the proposed development. In such a case the County will determine how ADA accessibility requirements will be meet, and could require off-site improvements or fee in lieu of improvements.~~

~~The County will determine the required width for any off-site improvements to provide adequate access to the proposed development. Sufficient right-of-way shall be provided for the required improvements.~~

~~Minimum travel width for new development for simultaneous two-way traffic is 20 feet to meet vehicle access requirements.~~

~~Positive drainage shall be provided to an acceptable outfall having the capacity to accommodate the contribution.~~

~~225.6 Existing Roadway Deficiencies and Improvements~~~~Street Improvements, Haul Routes and Access for Development~~

225.~~56.1~~ ~~Street~~ Structural and Surface Road Improvements Related to Development

a) The County cross section standards of Standard Drawings C110 to C140, community plans in the ~~rehensive~~*Comprehensive Plan* or design equivalents, shall be applied to the roadway design and constructed in the course of the development or redevelopment along the site frontage and extended to an off-site roadway as established in site specific land use requirements.
b) Road right-of-way or easement width dedications for roadway or public utility purposes along the site frontage (see Section 160.5) is required to meet the adopted cross section width and any additional width identified in a traffic impact analysis.
c) Frontage improvements shall typically be designed and constructed to the standard~~s~~ cross section.

d) Staff may rely upon Table 2-3 as a guideline or other alternatives when the full standards cannot be required. ~~proportional under a Nollan/Dollan determination~~

e) The extent of frontage improvements typically are based on providing a half street improvement. Occasionally, a situation may call for more than a half street improvement and will be determined based on:

~~Consistent with *ZDO* Sections 1007 and & 1014,, Title 7 of the *Clackamas County Code*, Roadway Standards and respective conditions of approval, the following improvements shallmay be required via the Development Permit or Driveway Entrance Permit processes.~~

~~All roadway design plans shall be in conformance with Chapter 2 of the Roadway Standards and applicable Standard Drawings, Notes and Details.~~

~~When the existing rRoad right-of-way or easement width dedications for roadway or public utility purposes along the site frontage (see Section 160.4) isis less than the required to minimally meet the adopted cross section width and any additional width identified in a traffic impact analysis. in the Comp Plan or Roadway Standards, sufficient additional right-of-way or easements shall be dedicated for roadway purposes along the site frontage of the adjoining land (see Section 160.4).~~

~~The County cross-section standards, as provided in Standard Drawings C110 to C140, community plans in the Comp Plan or design equivalents, shall be applied to the roadway design and constructed in the course of the development or redevelopment along the site frontage of the adjoining land orand extended to an off-site roadway as established in site specific land use conditionss of approval.~~

~~Frontage improvements shall be designed and constructed to the standards or as allowed required in Table??? Or as modified per Section 170. "interim section" definition of these Standards.~~

~~The extent of frontage improvements may include more than a half street and will be determined based on the requirement of the Comp Plan, ZDO, and Roadway Standards, and existing:~~

1) Location of the existing pavement in relation to the ~~right of way~~right-of-way;
~~1)~~2) Pavement width;
~~2)~~3) Pavement condition;
~~3)~~4) Centered crown, offset crown, shed or other;
~~4)~~5) Cross slope;
~~5)~~6) Road grade;
~~6)~~7) Elevation of existing curbs within 300' of the property lines, including ~~across the street~~opposite the development.

~~a)~~ The extent of offsite tapers will be determined per ~~Section~~ Section 250.6.4 ~~XXX~~ and by the need to:

~~a) The width of pavement widening or narrowing;~~

~~0) Matching an offset crown;~~

f)

1) Match an offset crown;
2) Match~~ing~~ to existing grades and cross slopes

~~b)~~ When a ~~If a~~ fee in lieu of ~~frontage~~ improvements ("FILO") is ~~allowed and is chosen~~paid, ~~then~~ a development's site frontage~~the road will need to~~should ~~all~~ meet minimum widths l~~L~~isted in Table 2-3????.

g) When FILO is paid and the minimum frontage improvements are ~~not required~~existing, the applicant shall still provide roadway improvements compliant with utility restoration standards of Chapter 7 and Standard Drawings U275 to U290.

Table 2-3. ~~Proportional~~ Frontage Improvement Guidelines

	Required Frontage Improvements	
Type of Development	Inside UGB	Outside UGB
Cell Towers, Solar Facilities	None	None
Partitions, Marijuana subject to land use, Duplexes, Triplexes	Std or When FILO is paid: Std ~~Full std.~~ R/W with Min 16' paved & Min 20' clear roadway	~~Full std.~~ R/W, Min 20' clear roadway
Short Subdivisions (4-10 lots)	Std	Adjacent to local/connector: Std ~~Full std.~~ R/W, Min. 20' clear roadway~~& obtain ISD or (SSD when allowed)~~
	Std	Adjacent to collector/arterial: Std
Long Subdivisions (11+)	Std	Std
Commercial/Industrial/Institutional/ Multi-Family	Std	Std

Std = Dedicate half street right-of-way and construct standard half street cross sections per Section 225.5.a and 225.5.b
Std R/W = Dedicate half street right-of-way per Section 225.5.a and 225.5.b

~~c) developer will, at a minimum, ensure that the utility installations are grouped together sufficiently to allow for one top pavement patch via a 2" grind and inlay and insure the ride characteristic standards are provided.~~

h) The applicant~~developer~~ may ~~will~~ be required to provide an analysis of the pavement and base structural sections to determine the structural section and the current condition of the road. When required, t~~T~~he analysis shall include:

1) Surface Defects
   - ~~.~~ Raveling & Loss of Surface Aggregate
   - i. ~~___~~
   - ii. Flushing
2) Surface Deformations (due to a weak sub-base or instability in the pavement)
   - i. Rippling and Shoving
   - ii. Wheel Track Rutting
   - iii. Distortion
3) Cracking (caused by either thermal stresses or weak base)
   - i. Longitudinal Wheel Track Single and Multiple, Alligator
   - ii. Centerline Single and Multiple, Alligator
   - iii. Pavement Edge Single and Multiple, Alligator
   - iv. Transverse Single and Multiple, Alligator
   - v. Longitudinal - Meander or Mid-lane

i) The County will review the analysis to determine if an overlay, grind and inlay or full depth reconstruction is warranted based on the existing conditions of the road, the proposed construction impacts and the ADT with the added deevelopment. Different causes of the pavement condition will warrant different remedies.
j) If an existing County or public road terminates along a development's frontage without the benefit of a cul-de-sac or turnaround and the roadway cannot be extended, the development shall construct a full County cul-de-sac per Standard Drawing C300 or approved turnaround per Standard Drawing C350.
k) Newly created public roads or improvements to existing public roads may be required to be accompanied by a maintenance agreement with a HOA or equivalent unless annexed into a city or will become part of a special road district per ORS 371.305. If required, the HOA or equivalent shall establish fees that are adequate to maintain all improvements located within the right-of-way. The stormwater facilities shall be included in the maintenance unless the stormwater regulatory authority agrees to maintain them.

225.6 Construction Haul Routes

Construction activities for some developments should not deteriorate roadways classified as local roads, which are more susceptible to damage due to reduced maintenance and/or structural section. Clackamas County Transportation Maintenance performs annual pavement condition reviews on county maintained roads and may be able to provide a Pavement Condition Index (PCI) rating for the road but not necessarily at the project site frontage. Temporary construction access via an Entrance Permit may be granted to avoid impacts to local roads.

Residential subdivisions, commercial, industrial and multifamily developments that utilize a local road as a haul route for construction or will otherwise impact a local road may be required to improve those roads. If during the work or at the conclusion of work, there is any visible deterioration or drop in PCI of 8 or more the applicant may be required to provide an overlay, grind and inlay or other sufficient improvement to restore the roadway to as good as or better than before the work was initiated.

Should this be required, the applicant shall provide the following:

a) An exhibit depicting haul routes and the location of the construction entrance(s) for all construction equipment and materials if an existing local road will be utilized prior to intersection with a collector or arterial;
b) Such routes may be subject to possible restrictions or conditions to protect existing infrastructure and address traffic impacts;
c) An existing conditions PCI from County Transportation Maintenance, if available;
d) Photographic/video evidence of the conditions before and after construction;
e) Core samples, as requested, of the pavement and base section, before and after construction;
f) A financial surety of not less than $10,000 or 125% of the cost estimate for addressing anticipated infrastructure improvements along the haul route, whichever is greater, prior to Development Permit issuance;
g) Temporary measures to limit further deterioration of the roadways that are currently in poor or very poor condition prior to Development Permit issuance; and/or
h) The applicant shall maintain affected roads at an acceptable and safe level throughout the work.

225.7 Creation of a Private Roadway

In certain circumstances, creation of a private roadway may be the only reasonable method and alternative to provide access to the proposed lots or parcels. If connectivity and access to adjacent properties is not an issue, private roadways, as addressed in the *ZDO*, may be permitted. The following shall apply:
a) Design and construction of a private roadway shall be consistent with the design standards for public roads, except as noted in these *Standards* regarding widths, cross section and design speed, and in no case shall improvements be less than minimums set out in Standard Drawing R100.
b) Provisions should be made through a formal maintenance agreement or equivalent to ensure private responsibility for future maintenance.
c) Private roadways and their respective easements shall be distinguished from public roadways and any reservations, restrictions, and maintenance agreements related to the created private roadways shall be described in the land division plat or deed records.

d) The need for utilities and roadway drainage shall be considered.

SECTION 230 – RESIDENTIAL, AGRICULTURAL & LOGGING DRIVEWAY DESIGN

230.1 General

The following standards shall apply to the design of residential, agricultural and logging driveways approaching public or private roadways. County Code Section 7.030.240 provides some exceptions to the requirements below. The Entrance Permit Matrix provides additional requirements.

230.2 Standard Drawings

Driveways that intersect with a proposed or existing sidewalk or other pedestrian facility shall meet ADA accessibility requirements and should be constructed in conformance with the applicable standards depicted in the most recent versions of *Oregon Standard Drawings* RD725, RD730, RD735, RD740, RD745, or RD750. Residential, agricultural and logging driveways shall be constructed in conformance with the applicable standards depicted in Standard Drawings D250 through D700. The County shall determine the specific driveway detail, based upon the existing and planned improvements.

230.3 Provisions for ADA Accessibility of Driveways

a) All new or altered driveways required to meet ADA accessibility standards shall meet the *PROWAG* standards for a Pedestrian Access Route whether or not the driveway is connected to sidewalk or path.
b) The driveway shall provide a connection on both sides to existing or planned sidewalk or path, at a location identified by DTD.
c) The pedestrian access route across the driveway shall be at least 5 feet wide perpendicular to the direction of pedestrian travel with a cross slope of no more than 2% and a grade in the direction of pedestrian travel that does not exceed the grade of the adjacent street.
d) The edge of the pedestrian access route on the driveway shall be flush with the adjacent sidewalk or path with a vertical surface discontinuity of no more than ¼ inch.
e) If it is necessary to provide ramp(s) connecting the driveway pedestrian access route to the adjacent sidewalk or path, the ramp shall have a running slope in the direction of pedestrian travel no more than 8.33%, ramp length not to exceed 15 feet, and cross slope no more than 2%.
f) If the driveway serves commercial uses and is 50 feet or more wide, or stop controlled, or both, truncated dome texture contrast shall be provided perpendicular to the direction of pedestrian travel on the sidewalk on the transition from the adjacent sidewalk or path to the driveway on both sides. The truncated dome texture contrast shall extend 2 feet in the direction of pedestrian travel and completely across the sidewalk.

~~**TABLE ?????**~~

~~Type of Development~~	~~Inside UGB~~	~~Outside UGB~~	~~Existing Structural Section (HMAC & BASE AGGREGATE)**~~
~~Cell Towers, Solar Facilities, FTT, Hosting Events~~	~~None~~	~~None~~	~~No cores needed~~
~~Partitions, Marijuana, 2-3 Plexes~~	~~Full Std. or FILO*; W/ FILO: Std. R/W with Min 16' paved & Min 20' clear~~	~~Standard R/W, Min 20' clear~~	~~One core in outside wheel track every 300'~~

Short Subdivisions (4-10 lots)	Full Std. or FILO (if allowed);	Adjacent to local/connector: Std. R/W, Min. 20' clear & obtain ISD or (SSD when allowed)	One core in outside wheel track every 200'
	Full Std. W/ FILO: Min 18' paved & Min 20' clear	Adjacent to collector/arterial: Full Std. unless modified per Section 170	
Long Subdivisions (11+)	Full Std. or FILO; W/ FILO (if allowed): Min 28' paved	Full Std. unless modified per Section 170	One core in outside wheel track every 200' & inside wheel track every 400'
Commercial/Industrial/Institutional/ Multi-Family	Full Std. or FILO; W/ FILO (if allowed): Min 28' paved	Full Std. unless modified per Section 170	One core in outside wheel track every 200' & inside wheel track every 400'

* See 8) and 9) this Section for FILO description

** As established per 10) and 11) this Section

If an existing County or public road terminates along a development's frontage without the benefit of a cul-de-sac or turnaround and the roadway cannot be extended, the development shall construct a full County cul-de-sac per Standard Drawing C300 or approved turnaround per Standard Drawing C350.

Newly created local access roads shall be maintained by the HOA or equivalent unless annexed into a city or becomes part of a special road district per ORSors 371.305. The HOA or equivalent shall establish fees that are adequate to maintain all improvements located within the local access road right of ways including road structural section, curbs, planters, trees, signage, street furniture, and surface water management facilities, etc. The stormwater facilities shall be included in the maintenance unlessmaintenance unless the stormwater regulatory authority agrees to maintain them. If an existing County or public road terminates along a development's frontage without the benefit of a cul-de-sac or turnaround and the roadway cannot be extended, the development shall construct a full County cul-de-sac or approved turnaround.

d)

225.6.2 Construction Entrances and Haul Routes

a) Clackamas County Transportation Maintenance does annual pavement condition reviews on county maintained roads and may be able to provide a Pavement Condition Index (PCI) rating for the road but not necessarily at the project site frontage. All local, local access and private roads used for construction entrances and/or as haul routes for development requires the developer to provide photographic evidence, and core samples as requested of the pavement and base section, before and after construction activities begin and end.

All other road classifications used for haul routes and/or construction entrances shall be evaluated for their PCI rating before the initiation of the related construction and at the completion of the construction related to the permitted development.

) If during the construction there is any visible deterioration or drop in PCI of 8 or more the developer will be required to provide an overlay, grind and inlay or other sufficient improvement to restore the roadway to as good as or better than before the construction activity was initiated.

There are five categories of road conditions in the pavement condition index (PCI):

Very good (PCI of 70-100);

Good, non-load related stresses (PCI of 50-69);

Good, load related stresses (PCI of 50-69);

Poor (PCI below 50);

Very poor

Local and local access roads as well as private roads are not constructed to withstand heavy construction traffic and equipment. Construction of improvementsactivities for new development shall not be allowed to deteriorate existing infrastructure. Local and local access roads as well as private roads are not constructed to withstand heavy construction traffic and equipment.

All subdivisions and larger commercial developments shall provide:

An exhibit depicting The haul routes and the location of the construction entrance(s) for all construction equipment and materials.

Such routes may be subject to possible restrictions or conditions to protect existing infrastructure and address traffic impacts;

Obtain aA base line PCI from County Transportation Maintenance;

If a base line PCI is not available then the developer is required to provide photographic evidence of the existing condition before and after construction;

Haul routes along roads susceptible to deterioration due to heavy construction traffic, including local, local access or roads in poor condition, will require a financial surety of not less than $10,000 or 125% of the cost estimate for addressing anticipated infrastructure improvements along the haul route, whichever is greater, prior to Development Permit issuance.

Temporary measures to limit further deterioration of the roadways that are currently in poor or very poor condition prior to initiation of the project construction. The developer shall maintain the roads at an acceptable level for local traffic.

Post construction, prior to development closeout, the developer shall restore haul routes to the previous condition or better when there is visible deterioration noted through the construction phase of development or a drop in PCI of over 8 points on with existing PCI ratings. (Roads with existing PCI ratings may be re-evaluated by Transportation Maintenance post-construction.)

Notify Transportation Maintenance when the construction for the development is completed and request that they measure the current PCI;

Prior to issuance of a permit and initiation of construction, provide a financial surety of not less than $10,000 or in the amount of 125% of the cost estimate for addressing anticipated infrastructure improvements along the haul route whichever is greater.

Restore the roadways to the previous conditions or better when there is any drop in PCI over 8 points or any visible deterioration noted through the construction phase of the development.

Provide temporary measures to limit further deterioration of the roadways that are currently in poor or very poor condition prior to initiation of the project construction. The developer shall maintain the roads at an acceptable level for local traffic.

All local, local access and private roads used for construction entrances and/or as haul routes for development requires the developer to provide photographic evidence, and core samples as requested of the pavement and base section, before and after construction activities begin and end.

All other road classifications used for haul routes and/or construction entrances shall be evaluated for their PCI rating before the initiation of the related construction and at the completion of the construction related to the permitted development.

If during the construction there is any visible deterioration or drop in PCI of 8 or more the developer will be required to provide an overlay, grind and inlay or other sufficient improvement to restore the roadway to as good as or better than before the construction activity was initiated.

225.6.3

Access

New access shall meet standards or be approved through a modification request per Section 170.

Existing accesses will be closed or relocated or closed when they do not meet intersection sight distance, (or stopping sight distance if allowed in the rural area), or be approved through a modification request per Section 170.

New accesses shall meet intersection sight distance (or stopping sight distances when allowed) or be approved through a modification request per Section 170.

225.7 Creation of a Private Roadway

Site topography or other constraints may preclude development of a public roadway to standards allowing for County acceptance of a local access road and maintenance. In certain circumstances, creation of a private roadway may be the only reasonable method and alternative to provide access to the proposedto proposed lots or parcels. If connectivity and access to adjacent properties is not an issue, private roadways, as addressed in Section 1007 of the ZDO, may be permitted.

Design and construction of a private roadway shall be consistent with the design standards for County roads, except as noted in these Standards regarding widths, cross-section and design speed, and in no case shall improvements be less than minimums set out in Standard Drawing R100.

a) Plan approval and Iissuance of a Development Permit shall be required for, and plan approval shall precede, further site development.

Provisions shall be made through a formal maintenance agreement or equivalent to ensure private responsibility for future maintenance of these private roadways.

Private roadways and their respective easements shall be distinguished from public roadways and any reservations, restrictions, and maintenance agreements related to the created private roadways shall be described in the land division plat or deed records.

b)

SECTION 230 – RESIDENTIAL, AGRICULTURAL & LOGGING DRIVEWAY DESIGN

230.1 General

The following standards shall apply to the design of residential, agricultural and logging driveways approaching public or private roadways. These standards do not apply to remodels or additions to existing structures, unless the driveway entry must be rebuilt or relocated or an entry permit is required by Engineering.

230.2 Standard Drawings

Driveways that intersect with a planned or existing sidewalk or other pedestrian facility shall meet ADA accessibility requirements and shall be constructed in conformance with the applicable standards depicted in the most recent versions of ODOT Standard Drawings RD725, RD730, RD735, RD740, RD745, or RD750. Residential, agricultural and logging driveways not required to meet ADA accessibility requirements shall be constructed in conformance with the applicable standards depicted in Standard Drawings D250 through D700. The County shall determine the specific driveway detail, based upon the existing and planned improvements.

230.3 Provisions for ADA Accessibility of Driveways

All new or altered driveways required to meet ADA accessibility standards shall meet the PROWAG standards for a Pedestrian Access Route whether or not the driveway is connected to sidewalk or path:

1) The driveway shall provide a connection on both sides to existing or planned sidewalk or path, at a location identified by DTD.

1)

The pedestrian access route across the driveway shall be at least 5 feet wide perpendicular to the direction of pedestrian travel with a cross slope of no more than 2% and a grade in the direction of pedestrian travel that does not exceed the grade of the adjacent street.

The edge of the pedestrian access route on the driveway shall be flush with the adjacent sidewalk or path with a vertical surface discontinuity of no more than ¼ inch.

If it is necessary to provide ramp(s) connecting the driveway pedestrian access route to the adjacent sidewalk or path, the ramp shall have a running slope in the direction of pedestrian travel no more than 8.33%, ramp length not to exceed 15 feet, and cross slope no more than 2%.

The driveway shall provide a connection on both sides to existing or planned sidewalk or path, at a location identified by DTD.

~~The pedestrian access route across the driveway shall be at least 5 feet wide perpendicular to the direction of pedestrian travel with a cross slope of no more than 2% and a grade in the direction of pedestrian travel that does not exceed the grade of the adjacent street.~~

~~The edge of the pedestrian access route on the driveway shall be flush with the adjacent sidewalk or path with a vertical surface discontinuity of no more than ¼ inch.~~

~~If it is necessary to provide ramp(s) connecting the driveway pedestrian access route to the adjacent sidewalk or path, the ramp shall have a running slope in the direction of pedestrian travel no more than 8.33%, ramp length not to exceed 15 feet, and cross slope no more than 2%.~~

~~If the driveway serves commercial uses and is 50 feet or more wide, or stop controlled, or both, truncated dome texture contrast shall be provided perpendicular to the direction of pedestrian travel on the sidewalk on the transition from the adjacent sidewalk or path to the driveway on both sides. The truncated dome texture contrast shall extend 2 feet in the direction of pedestrian travel and completely across the sidewalk.~~

~~2)~~

230.4 Driveway Vertical **Geometry**

a) For residential driveways, the average driveway grade shall not exceed 12%, and no grade shall exceed 15% for gravel driveways or 20% for paved driveways.

~~a)~~b) All grades in excess of 12% shall be approved by the ~~emergency service providers~~fire district.

~~b)~~c) The grade break for all driveways shall be a maximum of 9%. Grade breaks in excess of 9% shall require vertical curves with a minimum K value of one (1).

~~c)~~d) Vertical transitions shall be designed for the design vehicle to not "bottom out" at minimum. The functionality of the intersecting roadways shall be considered to ensure that vehicles on major roadways are not excessively slowed or endangered by driveway operations.

~~d)~~e) For residential driveways, vertical clearance shall not be less than ~~14 feet.~~13.5 feet.

~~e)~~f) Steep uphill driveways having greater than a ten percent grade shall be constructed with diagonal water bars (berms) to assure that water from uphill properties is directed into the ditch line. In drainage situations which will not be remedied by valley gutters or water bars, it is the responsibility of the owner to construct ditches, etc., to prevent damage to the roadway or danger to the traveling public.

~~f)~~

230.5 ~~230.5~~ Driveway Horizontal Geometry

~~2) Standard driveway throat widths vary from a minimum of 12 feet to a maximum of 35 feet at their intersections with public or private roadways.~~

~~3) Horizontal clearance shall not be less than 20 feet for residential driveways~~

~~4) Minimum improved surface shall be 12 feet wide. For residential driveways, minimum centerline curve radius shall be 50 feet.~~

a) Standard driveway throat widths for agricultural and logging driveways and residential driveways vary from a minimum of 12 feet to a maximum of 35 feet at their intersections with public roadways. Driveway widths should be minimized. A truck turning analysis should accompany any design modification requests.

b) Horizontal clearance shall not be less than 20 feet for driveways subject to fire access requirements.

c) Minimum centerline curve radius shall be 50 feet for driveways subject to fire access requirements.

~~5)~~d) Turnaround geometrics shall conform to ~~Standard Drawing C350~~Standard Drawing C350 or ~~C30~~C300, as applicable.

~~6)~~

230.6 Driveway Structural Capacity

For driveways subject to fire access requirements, r~~R~~oadway base, bridges, and culverts shall be capable of supporting a 75,000 pound fire truck. ~~Bridges and some culverts require a building permit.~~See Chapter 5 regarding requirements associated with structures such as walls, bridges and other structures.

230.7 Emergency Services

~~a) All driveways shall be designed to provide for emergency service access.~~
~~1) Residential driveways in excess of 150 feet in length shall be provided with an emergency vehicle turnaround area at or near the driveway termination.~~

a) All residential and agricultural driveways longer than 150 feet in length shall be designed to provide for fire access and shall be provided with an emergency vehicle turnaround area at or near the driveway termination.
b) Residential and agricultural driveways with a travel surface less than 20 feet wide and in excess of 400 feet in length shall have a turnout every 400 feet per ~~Standard Drawing C~~Standard Drawing C350 at locations approved by the ~~local emergency service provider~~fire district.
c) Gates shall be placed a minimum of 30 feet from back of sidewalk or edge of pavement. If queues are likely to extend into the travel lane of the nearest roadway, then a queuing analysis shall be provided per Section 295. Gates may require the approval of the fire district.
~~2)~~d) Exceptions to these standards are illustrated in the Entrance Permit Matrix.
~~3)~~

230.8 Driveway ~~Drainage~~Surface Water

a) Surface water runoff shall not be allowed to flow along or across an access or entrance from private property onto the travel surface of the roadway.
b) Driveways and buildings that increase impervious surface by the thresholds described in Chapter 4 are subject to stormwater management requirements.
c) Requirements for erosion control shall be addressed per Chapter 4.

230.9 Driveway Culverts

a) All driveways on non-curbed roadways shall have culverts for proper road drainage unless Engineering determines that they are not required.
~~a)~~b) Culvert installations are ~~generally~~ typically not required on paved and curbed roads. The installation of driveway culverts to control surface runoff shall be required as deemed necessary by Engineering.
~~b)~~c) Driveway c~~C~~ulverts shall provide a minimum 12 inch inside diameter. Larger culverts are required based upon the design calculations and under the following conditions:
~~c)~~1) Culverts shall be designed to convey storm water from the contributing basin for the 25 year storm at full build-out of the basin.
~~1)~~2) When the existing storm sewer culverts above and below the proposed driveway entry are a larger diameter than 12-inches;
~~2)~~3) When there is evidence that ~~severe~~ erosion has occurred in the roadside ditch;
~~3)~~4) When there is other evidence to show that a larger diameter would be appropriate.
~~4)~~5) Bedding requirements for concrete and metal culvert pipe shall never be below the Class C b~~B~~edding s~~S~~pecification contained in the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction*.
~~5)~~6) Storm sewer culvert shall have enough aggregate and/or pavement cover to support HS-20 loading per ~~Standard Drawing D~~Standard Drawing D250.
~~6)~~7) Notwithstanding the requirements of this subsection, ORS 368.251 to 368.281 shall govern storm sewer culverts and the accompanying entry structure.
8) Culverts shall be maintained in good condition so the flow of storm water is not impeded.
~~7)~~
~~7)~~

230.10 Intersection Angle

~~The intersection angle at intersecting roadways shall be kept as near to 90 degrees as possible, and in no case shall it be less than 80 degrees or more than 100 degrees unless otherwise approved by Engineering.~~
Comply with requirements of Section 250.8.2.

230.11 Permit Requirements

An ~~Driveway~~ Entrance Permit or Development Permit, whichever is applicable, shall be obtained from Engineering. ~~A permit fee will be charged at the time of application.~~

230.12 Inspection Requirements

Comply with requirements of Section 180.

~~All new residential driveways subject to a Driveway Entrance Permit will be afforded a County pre-approval site inspection.~~
~~The applicant will be provided an inspection marker and will be asked to mark the precise location of the proposed driveway.~~
~~Upon approval, a Driveway Entrance Permit with construction details will be issued.~~
~~If ADA accessibility is required, the county inspector shall measure all elements of the driveway required to provide pedestrian accessibility to determine if the driveway as constructed is compliant with PROWAG standards as described in Section 230.3. If the driveway fails to comply with any of the required standards that element of the driveway will be repaired or replaced by the permittee.~~
~~Modifications to the access after final inspection require additional permitting and inspection and is subject to additional fees.~~

230.13 Intersection Sight Distance Requirements

~~Intersection sight distance requirements of~~Comply with requirements of ~~Section 240~~Section 240. ~~shall be met.~~

230.14 Maintenance Requirements

The maintenance of existing driveway entries within the right-of-way, including culverts, aggregate, and driving surface, shall be the responsibility of the owner of the ~~propert~~property~~y~~ being served by the driveway. Maintenance must be performed so that the entry does~~n~~ not become a hazard~~.~~ including the responsibility of ongoing management of private property and the right-of-way to maintain sight distance per Section 240. Additional requirements are provided in *County Code* Section 7.03.

~~SECTION 2~~SECTION 240 - SIGHT DISTANCE

240.1 General

Sight distance shall be determined and approved ~~generally~~ in accordance with the procedures as stated in the current AASHTO "*A Policy on Geometric Design of Highways and Streets*" or AASHTO's "*Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400)*". ~~Adequate sight distance requirements shall apply at all intersections except as modified below.~~

240.2 ~~240.2~~ Sight Distance ~~–~~ Standard

a) Comply with the requirements of *County Code* Section 7.03 which requires that no person shall place objects in the right-of-way or private property in such a way that they limit ISD or SSD per Table 2-6 to 2-10.
b) Adequate intersection sight distance ("ISD") and adequate stopping sight distance ("SSD"), per Tables 2-6, 2-7, and 2-8, should be provided at all existing intersections and shall be provided at all new intersections.
c) Adequate intersection sight distance ("ISD") and adequate stopping sight distance ("SSD"), per Tables 2-6, 2-7, and 2-8, should be provided at all proposed accesses and existing accesses that are subject to land use approval that increase in ADT by 21 or more.
d) Sight distance at intersections and accesses to very low volume local, connector and collector roadways with a 20 year entering volume of less than or equal to 400 ADT and meeting the eligibility requirements of Table 2-9 may be based upon Table 2-9.

e) Existing access subject to land use approval where ADT is increased by 20 or fewer trips shall provide adequate SSD per Table 2-10.
f) Existing access not subject to land use approval but subject to a permit shall maximize ISD and SSD by removing visual obstructions located on the applicant's property or located in the road right-of-way.
g) Proposed access to parcels or contiguous parcels with no other access and not subject to land use approval but subject to a permit shall maximize ISD and SSD by removing visual obstructions located on the applicant's property or located in the road right-of-way.
h) Adequate SSD should be provided along all roadways per Table 2-10 except very low volume local roads, which may be based upon Table 2-9.
i) Adjustments to the sight distance tables of these *Standards* for street grade, design vehicle, or other factors, with regard to ISD and SSD requirements, shall be made per AASHTO guidelines.
j) If required ISD or SSD cannot feasibly be achieved, lesser sight distance may be acceptable per Section 170.

An applicant may be required to provide evidence that proposed improvements will not create situations where sight distance is made inadequate for other driveways, intersections, or other sections of roadway. If sight distance for existing driveways, intersections or sections of roadway is already inadequate, the applicant shall provide evidence that sight distance is not worsened by the applicant's improvements.

Access that doesn't comply with the above criteria are subject to denial, removal or modification.

~~Adequate intersection sight distance ("ISD") shall be provided at all intersections per Tables 2-6, 2-7, and 2-8 except as modified below:~~
~~Very low volume local, connector and collector roadways with a 20 year entering volume of less than or equal to 400 ADT and meeting the eligibility requirements of Table 2-9 shall comply with Table 2-9, as applicable.~~
~~Existing lots of record, not subject to land use approvalpermit conditions, shall maximize ISD and safety by locating access to maximize ISD and removing visual obstructions located on the applicant's property or located in the road right-of-way when establishing driveway location..~~
~~If adequate ISD cannot feasibly be achieved, lesser sight distance may be acceptable per Section 240.7 and Section 170.~~
~~Adequate stopping sight distance ("SSD") shall be provided along all roadways and at intersections per Table 2-10 except very low volume local roads, which shall comply with Table 2-9.~~
~~Adjustments to the sight distance tables of these *Standards* for street grade, design vehicle, or other factors, with regard to ISD and SSD requirements, shall be made per AASHTO guidelines.~~
~~When designing or completing roadway improvements, the applicant shall provide evidence that the proposed improvements will not create situations where sight distance is made inadequate for other off-site driveways, intersections, or other sections of roadway. If sight distance for existing off-site driveways, intersections or sections of roadway is already inadequate, the applicant shall provide evidence that sight distance is not worsened by the applicant's improvements.~~

240.3 Existing Off~~s~~ ~~s~~ite Public Roadway Intersections

Proposed developments subject to adequate safety ~~requirements~~requirements of~~per~~ the ~~ZDO~~*ZDO* ~~land use approval~~ that impact off-site public roadway intersections (public road intersecting another public road) may be~~are~~~~may be~~ subject to ISD and SSD adequacy requirements at those off-site intersections if safety issues may ~~might~~~~would~~ result from the proposed development in the judgment of the Road Official. A development may be found to impact off-site intersection(s) if the development's only access or all directions of access to the nearest collector or arterial road is/are via intersection(s) turning movement(s) with inadequate ISD ~~or approach movements with inadequate~~or SSD per ~~Section 240.~~Section 240.~~7~~2. The applicant may be responsible for submitting data that substantiates trip movements. The following criteria ~~may~~ apply:

a) Developments that add a minimum of 15 daily trips to the inadequate movement(s) at the off-site intersection(s) may be required to mitigate that/those intersection(s) along at least one route from the site access to the nearest collector or arterial roadway per the standards of ~~Section 240.7~~Section 240.2 or be denied access; or

b) Developments that add between five and 14 daily trips to the inadequate movement(s) at the off-site intersection(s) may be required to mitigate that/those intersection(s) along at least one route from the site access to the nearest collector or arterial roadway per the standards of Table 2-10 and measured per ~~Section 240.4~~Section 240.4 or be denied access; or

c) Developments that add less than five daily trips to the inadequate movement(s) at the off-site intersection(s) will only be required to mitigate that/those intersection(s) along at least one route from the site access to the nearest collector or arterial roadway per the standards of Table 2-10 and measured per ~~Section 240.4~~Section 240.4 if any of the off-site intersections are experiencing a crash history related to the inadequate ISD, inadequate SSD or if the development is anticipated to create a significant safety issue.

~~c) Intersections that can be mitigated via the provisions of County Code Section 7.03.090 will be considered to be adequate.~~

~~d)~~

240.4 Intersection Sight Distance Measurement

ISD shall ~~typically~~ be measured from a driver's eye height of 3.5 feet and 14.5 feet from the edge of the nearest travel lane (edge line, bike lane line or if neither exits, edge of pavement) to an object height of 3.5 feet above the roadway surface and measured along the center of a travel lane. ~~Standard Drawing T300 illustrates several standard sight distance measurements.~~ Sight distance measurements shall be modified under the following conditions:

a) Where a significant percentage of trucks will intersect a roadway, sight distance measurements may also dictate compliance with the truck sight distance measurements of AASHTO.

b) At the intersection of a local roadway and a private driveway serving up to two single family residential homes, sight distance may be measured 10 feet from the edge of the nearest travel lane except where backing maneuvers are likely to occur.

~~a)~~

~~a) Sight lines shall be measured with a clearance of a minimum of six inches from any vertical or horizontal obstructions.~~

240.5 Stopping Sight Distance Measurement

SSD shall be measured from a driver's eye height of 3.5 feet to an object height of 2.0 feet above the roadway surface and measured along the center of a travel lane.

240.6 Sight Distance Design Speed

Design speed, for the purpose of determining sight distance, shall ~~generally~~ be based upon the guidance of ~~Section 250.1.2~~Section 250.1.2. ~~Engineering may, at its own discretion, base the appropriate design speed in the vicinity of a horizontal curve on the advisory speed posting plus 10 MPH.~~ If desired or required, a speed study shall be completed by the applicant in conjunction with County staff direction.

~~240.7 Intersection Sight Distance – Modification Criteria~~

~~If the standards of Section 240.2.a cannot reasonably be met, then a modification may be sought pursuant to Section 170. If the modification cannot be approved, access will be denied.~~
~~The standards of Table 2-5 may be applied under the following cases:~~
~~Intersections cannot meet the standards of Section 240.2 or~~
~~Section 240.3 dictates compliance with Section 240.7.~~
~~ISD requirements shall be measured per Section 240.4.~~

Table 2-5 Modified ISD Requirements

Functional Class of Major Roadway	Major Roadway ADT	Intersecting Side Street/Driveway ADT	VLV[1]	SSD90[2]
Local, Connector	Total Entering Volume < 400		Applies	N/A
Local, Connector, Collector, Arterial	< 400	< 20	N/A	Applies
Local, Connector, Collector, Arterial	< 400	> 20	N/A	Applies
Local, Connector, Collector, Arterial	400 to 1000	< 20	N/A	Applies
~~Local, Connector, Collector, Arterial~~	~~> 1000~~	~~< 20~~	~~ISD per Section~~	
Local, Connector, Collector, Arterial	> 400	> 20	240.2	

[1] Very Low Volume - ISD distance requirements based on Table 2-9 (Very Low Volume Intersection)

[2] Stopping Sight Distance (90th Percentile Speed) - ISD distance requirements based on Table 2-10 (Stopping Sight Distance) and AASHTO equations associated with 90th percentile speed, curve speed + 20, or design speed + 5 mph

N/A = Not applicable

All ISD measurements shall be made per Section 240.4

Table 2-6 Intersection Sight Distance (ISD) - Left Turn from Stop

Design Speed (MPH) of Major Roadway	Intersection Sight Distance (feet)
15	170
20	225
25	280
30	335
35	390
40	445
45	500
50	555
55	610
60	665
65	720
70	775
75	830
80	885

Note: ISD shown is for a stopped passenger car to turn left onto a two-lane roadway with no median and minor street/driveway approach grades of 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated per AASHTO.

Table 2-7 Intersection Sight Distance (ISD) - Right Turn from Stop and Crossing Manuever

Design Speed (MPH) of Major Roadway	Intersection Sight Distance (feet)
15	145
20	195
25	240
30	290
35	335
40	385
45	430
50	480
55	530
60	575
65	625
70	670
75	720
80	765

Note: ISD shown is for a stopped passenger car to turn right onto or cross a two-lane roadway with no median and minor street/driveway approach grades of 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated per AASHTO.

Table 2-8 Intersection Sight Distance (ISD) - Left Turn from Major Road

Design Speed (MPH) of Major Roadway	Intersection Sight Distance (feet)
15	125
20	165
25	205
30	245
35	285
40	325
45	365
50	405
55	445
60	490
65	530
70	570
75	610
80	650

Note: ISD shown is for a passenger car making a left turn from an undivided highway.
For other conditions, the time gap must be adjusted and required sight distance recalculated per AASHTO.

Table 2-9 Intersection Sight Distance for Very Low-Volume Local and Connector Roads

Design Speed (MPH) of Major Roadway	Intersection Sight Distance (feet)		
	0-100 ADT	100-250 ADT	250-400 ADT
15	65	65	65
20	90	95	95
25	115	125	125
30	135	165	165
35	170	205	205
40	215	250	250
45	260	300	300
50	310	350	350
55	365	405	405
60	435	470	470

Note: ADT is based upon 20 year projected entering volume.
Applies to local/local, connector/connector, connector/local, collector/connector, collector/local road intersections only with a 20 year projected ADT of 400 or less.
Intersections with a collector must be found to be functioning as local roadways by Engineering.

Table 2-10 Stopping Sight Distance

Design Speed (MPH)	Stopping Sight Distance (feet)
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

SECTION 2SECTION 245 - ROADSIDE & CLEAR ZONE

245.1 General

Roadside and clear zone standards strive to ensure that the roadside remains free of fixed objects and is sufficiently flat in the event that a vehicle runs off the roadway, enabling the vehicle to recover under ideal conditions. For additional information, refer to the ~~Clear zones shall be determined and approved generally in accordance with the procedures as stated in the current~~ AASHTO *Roadside Design Guide*, ~~except as modified below.~~

245.2 Clear Zone Measurement

The clear zone width is measured from the edge of the travel lane of the roadway, ~~or or~~ the fog line or bike lane line.~~, if present. If a bike lane is present, the clear zone is measured from the bike lane line.~~

245.3 Clear Zone ~~Standards~~*Standards*

Minimum clear zone widths are defined by Table 2-11 and are ~~made~~ enforce~~d~~dable by ~~Section 7.03.090~~~~Section 7~~Section 7.03.090(C) of the ~~County Code~~*County Code*.

Table 2-11. Roadway Clear Zone

Functional Classification	INSIDE THE UGB					OUTSIDE THE UGB				
	Posted Speed or Design Speed (MPH)					Posted Speed or Design Speed (MPH)				
	55	45-50	35-40	30	25 and under	55 or Basic Rule	45-50	35-40	30	25 and under
Major Arterial	15'	15'	10'	10'	10'	15'	15'	10'	10'	10'
~~Minor Arterial~~	~~N/A~~	~~15'~~	~~10'~~	~~10'~~	~~7'~~	~~15'~~	~~15'~~	~~10'~~	~~10'~~	~~10'~~
Collector	N/A	N/A	10'	7'	7'	15'	10'	10'	7'	7'
Connector	N/A	N/A	10'	7'	*	10'	10'	10'	7'	7'
Local	N/A	N/A	N/A	N/A	*	10'	10'	7'	7'	7'

Notes:

Clear zone is measured from edge of travel lane or fog line.

N/A = Not applicable

~~* = See AASHTO Green Book discussion on lateral offset for requirements~~

Table 2-11. Roadway Clear Zone

Functional Classification	INSIDE THE UGB					OUTSIDE THE UGB				
	Posted Speed or Design Speed (MPH)					Posted Speed or Design Speed (MPH)				
	55	45-50	35-40	30	25 and under	55 or Basic Rule	45-50	35-40	30	25 and under
Major Arterial	15'	15'	10'	10'	10'	15'	15'	10'	10'	10'
Minor Arterial	N/A	15'	10'	10'	7'	15'	15'	10'	10'	10'
Collector	N/A	N/A	10'	7'	7'	15'	10'	10'	7'	7'
Connector	N/A	N/A	10'	7'	7'	10'	10'	10'	7'	7'
Local	N/A	N/A	N/A	7'	18"	10'	10'	7'	7'	18"

Notes:

N/A = Not applicable

245.4 Clear Zone Requirements

a) Fixed objects located along the edge of the traveled portion of the ~~right-of-way~~roadway should be located outside the clear zone.
b) Fixed objects are defined by AASHTO's *Roadside Design Guide* and the *County Code*.~~.~~
~~a) If fixed objects are not feasible to remove, fixed objects should be xxx.~~

245.4.1 Fixed Objects Allowed in Clear Zone

The following permanent objects are permitted within the clear zone under the following conditions:
~~1) Trees with a diameter less than or equal to six inches~~Approved street trees.
~~a)~~
~~a)~~b) Mailboxes erected ~~pursuant to~~ per the Standards for Installing Mailboxes on County Roads.~~AASHTO's *Roadside Design Guide* and USPS requirements. Mailboxes shall be placed on breakaway posts.~~
~~b)~~c) Fences and walls approved by Engineering or meeting the requirements of Section 130.2.~~.~~
d) ~~Existing fences and walls determined not to be a hazard by Engineering. Breakaway illumination poles.~~Illumination poles.
e) Approved street furniture.
f) Objects permitted by the *County Code*.
~~e)~~
~~d) Parked vehicles where parking is legally allowed.~~
~~e)~~g) Other objects approved or installed by the County.

245.4.2 Embankments and Ditches

New construction of foreslopes and backslopes should~~all~~ be based upon ~~Standard Drawings C110 to C140~~Standard Drawings C110 to C140. Proposed slopes within~~Foreslopes~~ the clear zone should be "recoverable.""~~.~~ Slopes that are "critical" per the AASHTO *Roadside Design Guide* ~~are not permitted~~should be avoided with new construction.

245.4.3 Vegetation

Vegetation should~~all~~ not be allowed over a height of 30 inches in locations where it would limit sight distance per Section 240. O~~and o~~verhanging tree limbs should ~~all~~ have a minimum vertical clearance of 10 feet within the clear zone~~s as defined by Table 2-11~~. ~~Measurement shall be taken from pavement surface.~~ Overhanging tree limbs should~~all~~ have at least 14 feet of vertical clearance above the pavement surface over the traveled portion of the roadway. Measurement shall be taken from pavement surface.

245.4.4 Above Ground Appurtenances

Above ground appurtenances constructed as component parts of any underground utility line should be~~shall normally be~~ located outside the clear zone ~~and/or within one foot of the right-of-way line~~ as practicable.~~. Engineering will require that the utility obtain easements in situations where Engineering finds that the placement of an appurtenance would constitute a safety hazard.~~

~~Above ground appurtenances, when permitted within County road rights-of-way, shall be provided with a vegetation-free area extending one foot beyond the appurtenance in all directions.~~

245.5 Clear Zone Exceptions

If fixed objects cannot be moved from~~are proposed to remain in~~ the clear zone and cannot meet the standards of the *County Code*, Sections~~subsections~~ ~~245.1~~245.1 through ~~245.4.3~~245.4.3 and Table 2-11, the County may allow the

obstructions to remain ~~if they can be~~with consideration given to ~~adequately~~ delineat~~ed~~ing or protecting the objects.~~ed and approved.~~

~~SECTION 2~~SECTION 250 - GEOMETRIC DESIGN

The design of public and private roadways shall be largely based upon these ~~*Standards*~~*Standards*, the manuals and standards of ~~Section 115~~Section 115 and the ~~Standard Drawings~~Standard Drawings.

The County reserves the right to restrict specific combinations of horizontal and\or vertical alignments which contain steep grades, minimum K values, minimum centerline radii, and broken back curves.

250.1 General

250.1.1 Roadway Cross Section

a) Standard Drawings C110 to C140 are to ~~generally~~ be used for the design of roadways under the jurisdiction of the County. These figures illustrate the required right-of-way width, paved widths, shoulder widths, lane configurations, easement widths, ~~sidewalk~~ pedestrian facility widths, planter strips widths, curbs, bike ~~lane~~ facility widths, and design speeds for each functional classification.

~~a)~~b) Roadway cross sections shall consider the Regional Street Design Type Guidelines as described per *Comprehensive Plan* Chapter 5 ~~Policy 12.0~~ as illustrated ~~in Table V-4 and~~ Map V-~~53~~.

c) Community and Design Plans~~ning Areas~~ ~~exist~~ are provided in the *Comprehensive Plan* that have exceptions to these ~~*Standards*~~*Standards*.

~~b)~~d) The *Active Transportation Plan*, projects adopted in the *Comprehensive Plan* and *CIP* should be referenced in determining the appropriate bicycle facility.

~~c)~~c) An urban street section shall ~~generally~~ be used on all roadways within the Urban Growth Boundary (UGB) and within unincorporated communities except as allowed by Engineering.

~~d)~~f) A rural road section shall be used on all roadways outside the UGB, unless located within an unincorporated community.

~~e)~~

250.1.2 Design Speed

a) The design speed for all roads shall be determined by Engineering.

~~a)~~b) The minimum design speed for all public roads shall be 25 MPH.

~~b)~~c) Design speed shall ~~generally~~ be determined or assumed as one of the following:

~~c)~~1) Intended posted regulatory speed ~~plus 5 MPH~~.

~~1)~~2) Existing posted regulatory speed ~~plus 5 MPH~~.

~~2)~~3) 85th percentile speed.

~~3)~~4) In the vicinity of a horizontal curve, the advisory speed posting plus 10 MPH.

~~3) Design speeds on private roads lower than 25 MPH shall be granted by the conditions of approval for land use or shall require approval by Engineering and shall be posted for the associated speed.~~

~~e)~~

250.1.3 Design & Control Vehicle

a) Engineering shall determine the appropriate design and control vehicle for a facility.

~~a)~~b) A "design vehicle" frequently uses a facility and must be accommodated without encroaching into opposing traffic lanes.

~~b)~~c) A "control vehicle" infrequently uses a facility but encroachment into opposing traffic lanes, multiple-point turns or minor encroachment into the roadside is acceptable.

d) The Engineer ~~shall~~ may be required to provide evidence that the design vehicle and control vehicle are accommodated in their designs.

e) Functional classification, safety and roadway use all play a role in determining the acceptability of lane encroachment by control vehicles. For example, on a local road, full lane encroachment by a control vehicle may be acceptable if sight distance was adequate while on a major arterial, such encroachment may not be permitted.

~~e)~~ ~~.~~

~~e)~~

250.2 Curbs

a) When ~~curbing is a requirement of new development~~needed, curbs~~it~~ shall ~~be developed according to the criteria stated in the ZDO. Curbs shall~~ conform to Standard Drawings S100 to S180, as specified by Engineering.

b) ~~A modification may be approved in the case of approved shared use paths. In such cases, it shall be~~Curbs may be omitted when it is demonstrated that surface water quality and storm water discharge considerations can be better achieved by collection in shallow, grass-lined swales paralleling the roadway and provisions for maintenance

can be arranged. Additional pavement width along shoulders or on separated facilities shall be shown to demonstrate sufficient accommodations for pedestrian and bicycle traffic.

~~a)~~

~~a)~~

250.3 Pedestrian Improvements - General

a) All pedestrian improvements ~~including sidewalks per Section 250.3.1, separated asphalt paths per Section 250.3.2, and shared use paths per Section 250.3.3~~ shall comply with the ~~PROWAG~~*PROWAG* standards for a pedestrian access route. The specific provisions of the ~~PROWAG~~*PROWAG* standards for pedestrian access routes can be found in the "Sidewalk/Multiuse Path – ADA Design Review Checklist."~~".~~

b) ~~Sidewalk~~ Pedestrian facilities are~~is~~ required within the UGB and unincorporated communities. ~~Sidewalk is~~P edestrian facilities are not required outside the UGB except within unincorporated communities.

c) If right-of-way or public easement is adequate and a development is required to construct a pedestrian facility, the development is required to connect to an existing pedestrian facility that is terminated mid-block and within 15 feet of the proposed pedestrian facility, the development shall connect to that pedestrian facility. The development shall be required to construct the connecting pedestrian facility and associated improvements including curb, drainage and landscaping and comply with Section 250.3.9.

d) On roadways with an anticipated ADT of less than 400 where pedestrian facilities would otherwise be required, pedestrian facilities may be provided on only one side.

e) Minimum pedestrian facility widths are found in *ZDO* Section 1007. However, compliance with Section 250.1.1 is required.

f) Pedestrian facilities within the public right-of-way may have a running slope in the direction of pedestrian travel equal to the grade of the adjacent roadway. Pedestrian facilities outside the public right-of-way may not have a running slope in the direction of pedestrian travel in excess of 5%.

250.3.1 Sidewalks

Sidewalks should be designed to comply with Standard Drawing S960.

~~The need for sidewalks is determined by ZDO Section 1007.~~

~~1) Sidewalk is required within the UGB and unincorporated communities. Sidewalk is not required outside the UGB except within unincorporated communities.~~

~~Sidewalks required as part of a development shall generally only be required upon the development's site frontage and internal roadways.~~

~~2) A minimum sidewalk width is required. These minimums are found in ZDO Section 1007 and based upon the roadway classification and zoning adjacent to the property.~~

~~2) On roadways with an anticipated ADT of less than 400 where sidewalks would otherwise be required, sidewalks may be provided on only one side.~~

~~3) Sidewalk design shall comply with ADA requirements as identified in the "Sidewalk/Multiuse Path – ADA Design Review Checklist" as shown on ODOT Standard Drawing RD720.~~

~~3) Sidewalks within the public right-of-way may have a running slope in the direction of pedestrian travel equal to the grade of the adjacent roadway. Sidewalks outside the public right-of-way may not have a running slope in the direction of pedestrian travel in excess of 5%.~~

~~3) Other modifications may be made in specified districts only.~~

~~4) 250.3.2 Separated Asphalt Paths – As an alternative to sidewalk, asphalt paths may be allowed in appropriate circumstances according to the criteria of the *ZDO* and as part of conditions of approval of a land use action, typically as a temporary measure. These circumstances will consider relative anticipated use of the facility, topography, preservation of significant trees, safety, right-of-way, and schedule of upcoming capital projects.Separated asphalt paths shall comply with ADA requirements as identified in the "~~

~~Required accessibility features such as curb ramps that are part of separated asphalt paths shall not be constructed of asphalt due to the possibility of deformation which could render the feature non-compliant. Required accessibility features shall be constructed of concrete. Separated asphalt paths within the public right-of-way may have a running~~

~~slope in the direction of pedestrian travel equal to the grade of the adjacent roadway. Separated asphalt paths outside the public right-of-way may not have a running slope in the direction of pedestrian travel in excess of 5%.Separated asphalt paths shall generally be designed per the and AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities* or as established by conditions of approval of a land use action.~~

250.3.2~~3~~ Shared~~ -~~Use (Multi-Use) Paths

a) As an alternative or in addition to sidewalk and separated bike facilities, shared use paths may be allowed ~~in appropriate circumstances~~ according to the criteria of the ~~*ZDO*~~*ZDO* and as part of conditions of approval of development or allowed as part of a County initiated project.
b) The location of planned shared use paths is provided by Map 5-3 ~~and~~ of the *Comprehensive Plan*.
~~c)~~ The required shared use path width varies from an unobstructed minimum width of ~~eight to twelve~~ten feet depending upon anticipated use.
~~d)~~c) These circumstances will consider relative anticipated use of the facility, topography, preservation of significant trees, safety, and right-of-way.
~~e) Shared use paths shall generally be designed per the *Oregon Bicycle and Pedestrian Design Guide*, AASHTO Guide for the Development of Bicycle Facilities and AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities or established by conditions of approval of a land use action.~~
~~f) Design of shared use paths shall comply with ADA requirements as identified in the "Sidewalk/Multiuse Path – ADA Design Review Checklist".~~
~~g) Shared use paths within the public right-of-way may have a running slope in the direction of pedestrian travel equal to the grade of the adjacent roadway. Shared use paths outside the public right-of-way may not have a running slope in the direction of pedestrian travel in excess of 5%.~~
~~h)~~d) Shared use paths under County jurisdiction shall be constructed of concrete.
~~i)~~

250.3.3~~4~~ Cycle Tracks

Separated pedestrian facilities constructed at the same grade as a cycle track shall be physically or visually separated from the cycle track. The design of these facilities should be based upon Standard Drawing S960.

250.3.4~~5~~ Landscape Strips

a) All ~~sidewalks, separated asphalt paths and shared use paths~~pedestrian facilities should~~all~~ be located adjacent to a landscape strip or other physical buffer from vehicular traffic unless otherwise approved.
~~a)~~b) ~~The landscape strip shall contain the elements as recommended in the .~~Landscape strip width shall be determined per ~~Standard Drawings C110-140~~Standard Drawings C110-140 or by the *Comprehensive Plan*.
~~b)~~c) Landscape strips shall include landscaping elements of ~~Section 255~~Section 255.
~~c)~~

250.3.5~~5~~ Right-of-way and Easements

All roadway improvements including sidewalks, ~~asphalt paths,~~cycle tracks, and shared use paths should~~hall~~ be constructed~~exist~~ within the public right-of-way. These improvements may be located within a public easement if approved. ~~or a dedicated easement.~~

250.3.6~~6~~ Horizontal and Vertical Clearance

A minimum horizontal clearance around any obstacles shall be ~~around obstacles of at least 5 feet~~ compliant with PROWAG and ~~shall~~ be provided on all ~~sidewalks, separated asphalt paths and shared use paths~~pedestrian facilities ~~around any obstacles~~.

The minimum vertical clearance above a sidewalk ~~, asphalt path,~~ or shared use path is eight feet.

250.3.77 Pedestrian Facilities Cross Slope

The cross slopes of pedestrian facilities perpendicular to the direction of travel shall be designed for 1.5% but not exceed 2% per ADA requirements as identified in the "Sidewalk/Multiuse Path – ADA Design Review Checklist.""

250.3.8 Curb Ramps

At any location where the route of pedestrian travel requires crossing a curb, a curb ramp shall be provided. Two curb ramps are typically required at each intersection corner, with one curb ramp to serve each direction of pedestrian travel.

Curb ramps are to be placed as near as possible to continue the natural path of pedestrians using the adjacent sidewalk.

A crosswalk location may be closed and a curb ramp not required if any of the following are true: 1) There is no sidewalk or shoulder at least 5 feet wide on the opposite side of the street on the natural path of pedestrian travel; or 2) Per the provisions of ORS 801.220 there is a marked crosswalk at the intersection serving the same direction of pedestrian travel, or 3) The requirements for a crosswalk closure as determined by the county traffic engineer are satisfied. In the event that a crosswalk is closed appropriate signs/barriers should be provided.

A curb ramp may be required but signed as "crosswalk closed" if an accessible pedestrian path is not available on the opposite side of the street in the natural path of pedestrian travel but is reasonably expected to be built within five years.

Design of curb ramps shall comply with ADA requirements as identified in the "Curb Ramp – ADA Design Review Checklist". Typical curb ramp designs are shown on ODOT Standard Drawings RD755, RD756 and RD757. Typical designs for a ramp to allow pedestrians to transition from the end of a sidewalk, separated asphalt path or shared use path to the road surface are shown on ODOT Standard Drawing RD754.

Exceptions to the ADA requirements for curb ramps may be requested using the process identified in Section 170.2 in cases of physical barriers that make full compliance infeasible.

250.3.8 Curb Ramps

At any location where the route of pedestrian travel requires crossing a curb, a curb ramp shall be provided. Two curb ramps are typically required at each intersection corner, with one curb ramp to serve each direction of pedestrian travel. Curb ramp considerations include:

a) Curb ramps are to be placed as near as possible to continue the natural path of pedestrians using the adjacent sidewalk.

b)

0)
0)
0)
0)
0)
0)
0)

i)

b) Design of curb ramps shall comply with ADA requirements as identified in the "Curb Ramp – ADA Design Review Checklist." Typical curb ramp designs are shown on *Oregon Standard Drawings* RD755, RD756 and RD757. Typical designs for a ramp to allow pedestrians to transition from the end of a sidewalk, separated path or shared use path to the road surface are shown on *Oregon Standard Drawing* RD754.

c) For pedestrian facilities proposed to end mid-block that do not connect to an existing pedestrian facility, curb ramps shall be provided as such:
   1) At both ends of the new pedestrian facility when the proposed construction length exceeds 100 feet.
   2) At one end of the new pedestrian facility when the proposed construction length is between 50 feet and 100 feet.
   3) No curb ramps if not required by 1) or 2).

d) For pedestrian facilities proposed to end mid-block that connect to an existing pedestrian facility, curb ramps shall be provided as such:
   1) At the end of the new pedestrian facility when a curb ramp already exists. The existing curb ramp, even if located off-site from a development, shall be removed and replaced with appropriate curb and landscaping.
   2) At the end of a new pedestrian facility when the proposed construction length exceeds 50 feet.
   3) No curb ramps if not required by 1) or 2).

~~k)~~

e) Exceptions to the ADA requirements for curb ramps may be requested using the process identified in Section 170 in cases of physical barriers that make full compliance infeasible.

250.3.9 Curb Ramp Closures

a) A crosswalk may be considered for closure and a curb ramp not required under any of the following criteria:
   1) There is no sidewalk or shoulder at least five feet wide on the opposite side of the street on the natural path of pedestrian travel and the construction of the curb ramp would result in a safety issue;
   2) Per the provisions of ORS 801.220 there is a marked crosswalk at the intersection serving the same direction of pedestrian travel and the construction of the curb ramp may result in a safety issue.
   3) There are closely spaced crossings of offset T-intersections;
   4) The crosswalk is within a maneuvering area or storage length of an intersection and crossing at that location would result in a safety issue;
   5) An ADA compliant curb ramp cannot be designed, and a non-compliant curb ramp approved through an exception would be a safety hazard for users due to excessive slope, cross slope or other existing physical constraints;
   6) The crosswalk would not have adequate stopping sight distance based on the design speed, or
   7) A physical barrier exists that prevents roadway crossing.

b) In the event that a crosswalk is closed, appropriate signs/barriers should be provided.

c) A curb ramp should be constructed but signed as "crosswalk closed" if an accessible pedestrian path is not available on the opposite side of the street in the natural path of pedestrian travel but is reasonably expected to be built within five years.

~~l)~~

~~l)~~

250.3.109 Bulb Outs (Curb Extensions)

1) Bulb outs are typically used to span parking areas on arterials and collectors to make pedestrians more visible, reduce pedestrian crossing length and should all be considered provided in the following instances:

2) At intersections with adjacent established on-street parking along arterial and collector roadways.
3) In areas of moderate to high pedestrian volumes.At midblock crossing locations with adjacent established on-street parking along arterial and collector roadways.
4) As required by the Sunnyside Village Community Plan or similar community or design plan area standards in the *Comprehensive Plan.*

a) At midblock crossing locations and intersections within the UGB with adjacent established on-street parking along arterial and collector roadways.
b) As required by the Sunnyside Village Community Plan or similar community or design plan area standards in the *Comprehensive Plan.*
c) At In other locations determined by Engineering.
5)

250.3.110 Midblock Crosswalksings

a) Marked mMidblock crosswalksings should may be considered in the UGB in the following cases and may be provided if warrantedbased upon an engineering study: and considered in the following cases per the *MUTCD*:
   a) On arterial or collector roadways within the with a posted speed of 35 MPH or less.
   2)1) On arterial or collector roadways within the at locations where existing intersections, proposed intersections, or existing crossing opportunities are at least 600more than 330 feet apart.
   3)2) In locations of existing or anticipated moderate to high pedestrian volumes..
4)b) Midblock crossings crosswalks should be designed and constructed with the following features:
   1) Generally pursuant to the recommendations of Table 9.5 of ITE's *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practice*.
   1)
   2) With a raised concrete median per Section 2Section 250.10 when crossing three or more lanes of traffic.
   2)
   3) Curb ramps meeting ADA requirements as identified in the "ADA Assessment Checklist – Curb Ramps" should be provided on both sides of the street per these *Standards.*
3) Curb ramps meeting ADA requirements as identified in the "Curb Ramp – ADA Design Review Checklist" shall be provided on both sides of the street at midblock crossings.

250.3.12 Pedestrian Facility Condition & Repair

a) For pedestrian facilities under the jurisdiction of Clackamas County, comply with the requirements of the *County Code* Section 7.03 with regard to vertical displacements, cracks and disrepair.
b) Concrete pedestrian facilities may be ground up to ½" in depth from the original pedestrian facility depth. When more than ½" depth is proposed or required for removal, the full panel of the pedestrian facility shall be replaced.
4)

250.4 Bicycle Improvements

a) Bicycle facilities should be designed and constructed per the *Oregon Bicycle and Pedestrian Design Guide*Oregon Bicycle and Pedestrian Design Guide, the AASHTO *Guide for the Development of Bicycle Facilities* and with consideration given to NACTO's *Urban Bikeway*Bikeway *Design Guide.*
b) Separated bicycle facilities shall be provided on all collector and arterial roadways.
c) The location of planned bicycle facilities is established by *Comprehensive Plan* Map V-7aMap V-7a in the urban area and V-7bV-7b in the rural area.
d) The *Comprehensive Plan* and *Active Transportation Plan* provide guidance on bicycle facility selection.
e)c) Bicycle facilities shall be provide travel in both directions along a roadway, where planned.

~~d)~~

~~250.4.1 Bicycle **Lanes**~~

~~Bicycle lanes shall conform to **Standard Drawings C110 to C140**.~~
~~Bicycle lanes shall be installed on both sides of collector and arterial roadways, where planned.~~
~~Roadway improvements to accommodate bicycle lanes, required as part of a development, shall generally only be required upon the development's adjacent frontage.~~

250.4.1~~2~~ Shared Use Paths

See ~~Section 250.3.3~~Section 250.3.3.

250.4.2~~3~~ Other Bicycle ~~Facilties~~Facilities

See the ~~Oregon Bicycle and Pedestrian Design Guide~~Oregon *Bicycle and Pedestrian Design Guide*, the AASHTO *Guide for the Development of Bicycle Facilities*, and NACTO~~'s *Urban Bikeway Design Guide*~~*Urban Bikeway Design Guide* for design guidance.~~.~~

250.5 Transit Improvements

The applicant ~~designer~~ shall evaluate existing transit amenities and work with transit providers to determine if transit feature improvements are necessary based upon established transit agency guidelines. Each project shall provide reasonable accommodations for the incorporation of public transit per transit design guidelines.

250.6 Horizontal Alignment

250.6.1 Horizontal Curves

a) The horizontal alignment of County, public and private roadways shall conform to the following requirements:
   ~~a)~~1) ~~—~~The centerline alignment of roadway improvements shall be common to the centerline of the right-of-way or access easement unless otherwise approved by Engineering.
   ~~1)~~2) The centerline of a proposed roadway extension shall be aligned with the existing centerline.
   ~~2)~~3) ~~—~~Horizontal curves shall meet the minimum radii requirements shown in Table 2-13. The minimum horizontal curve radii are determined by the following formula:

~~3)~~

$$R = \frac{V^2}{15\,(e+f)}$$

where R = minimum centerline radius (ft)
V = design speed (MPH)
e = rate of roadway superelevation (ft/ft)
f = side friction factor

Table 2-13. Minimum Centerline Horizontal Curve
Low Speed Urban Roadways

Design Speed (MPH)	Minimum Horizontal Curve (feet) *
15	50
20	107
25	198
30	333
35	510
40	762
45	1039

Notes:
*Assumes standard crown section of -0.025. For other sections, consult AASH
Urban conditions emax = 0.04, see AASHTO Exhibit 3.15

b) Very low volume local roads with ADT less than or equal to ~~under~~ 400 may use a centerline radius of 178 ft per AASHTO's *Guidelines for Geometric Design of Very Low-Volume Local Roads*. Exceptions for very low-volume local roads can be found in ~~Section 2~~Section 250.6.3.

~~b)~~c) Residential driveways that serve no more than three~~3~~ lots, and are less than 400 feet in length or have topographic constraints may use a 50 foot centerline radius for a 12 foot width or 40 foot centerline radius for a 20 foot width. Engineering and emergency service provider approval is required.

~~c)~~

250.6.2 Design Intent for Horizontal Curves

Minimum radii may be used only as approved by Engineering. The following excerpts from AASHTO's *A Policy on Geometric Design of Highways and Streets* and ITE's *Urban Street Geometric Design Handbook* clarify the use of minimum radii and are adopted by Engineering as general design controls:

~~1)~~

~~2)~~ Per AASHTO Chapter 3 - Elements of Design, "General Controls for Horizontal Alignment"~~, Pages 3-111 to 3-112~~:

a) "Winding alignment composed of short curves should be avoided because it usually leads to erratic operation."

~~1)~~b) "In an alignment developed for a given design speed, the minimum radius of curvature for that speed should be avoided wherever practical."

~~2)~~c) "Abrupt reversals in alignment should be avoided. Such changes in alignment make it difficult for drivers to keep within their own lane."

~~3)~~d) "The broken-back or flat-back arrangement of curves (with a short tangent between two curves in the same direction) should be avoided… "

~~4)~~ Per AASHTO Chapter 3 - Elements of Design, "General Design Controls"~~, Page 3-165~~:

~~3)~~a) "Sharp horizontal curvature should not be introduced at or near the top of a pronounced crest vertical curve. This condition is undesirable because the driver may not perceive the horizontal change in alignment, especially at night."

~~a)~~b) "…sharp horizontal curvature should not be introduced near the bottom of a steep grade approaching or near the low point of a pronounced sag vertical curve."

~~b)~~c) AASHTO Chapter 5 - Local Roads and Streets, "Local Urban Streets", Page 5-12:

~~c)~~d) "[Local urban] street curves should be designed with as large a radius curve as practical, with a minimum radius of 100 feet."

~~d)~~ Per ITE, Chapter One 1.6.3:

~~4)~~ "Although local streets may be planned, constructed and operated with the primary purpose of providing access to adjacent property, some local streets also may serve a limited amount of through traffic due to street network deficiencies. In these situations, the designer should utilize geometric design and traffic control features more typical of collector streets to encourage the safe and efficient movement of all street users."

250.6.3 Exceptions for Very Low Volume (≤400 ADT) Local Streets with a Speed of 25 MPH or less

The following are allowed under the listed circumstances on a limited basis:

a) Horizontal curves on local roadways within residential areas may have a minimum centerline radius of one hundred (100) feet as limited in this section.

b) ~~Horizontal curves on local roadways within residential areas may conform to the geometry of and notes of as limited in this section.~~A single 15~~20~~ MPH maneuver is allowed on a ~~County~~ local road on a limited basis when physical constraints or property boundary limitations exist.

~~a)~~c) A 100 foot tangent length shall be provided between low speed maneuvers. The tangent length provides the driver adequate time to recognize the maneuver and slow down to accomplish the turn.

~~b)~~

250.6.4 Roadway and Marking Transitions

~~For traffic safety,~~ Sshifts in roadway alignment, widening, or narrowing within motor vehicle travel lanes shall be accomplished through roadway transitions as described below.

a) Roadway transitions within through lanes or left turn lanes:~~shall be based upon the following:~~

$$L = S \times W \quad (S \geq 45 \text{ MPH})$$

$$L = \frac{WS^2}{60} \quad (S < 45 \text{ MPH})$$

where L = minimum taper length (ft)
S = design speed (MPH)

~~W = offset (shift) width (ft)~~

~~Exclusive right turn lanes shall have a minimum 8 (length) to 1 (offset) widening taper for design speeds 35 MPH and below and 15:1 for design speed of 40 and above.~~

~~b)~~

~~$L = S \times W$ (S ≥ 45 MPH)~~

~~$L = \frac{WS^2}{60}$ (S < 45 MPH)~~

~~where L = minimum taper length (ft)~~
~~S = design speed (MPH)~~
~~W = offset (shift) width (ft)~~

~~2) Exclusive right turn lanes shall have a minimum 10 (length) to 1 (offset) widening taper.~~

~~250.6.5 Shoulder and Bike Lane Transitions~~

c) ~~Within~~ On all bike facilities~~lanes~~ and all paved ~~or~~ shoulders, roadway width transitions shall have a minimum 8 (length) to 1 (offset) pavement taper for design speeds 35 MPH and below and 10:1 for design speed of 40 and above.

d) Along local and connector roads within the UGB, roadway width transitions are not required if traffic is not expected to utilize the shifting roadway.~~minimum 10 (length) to 1 (offset) taper.~~

250.6.5 Lane Widths

The *Comprehensive Plan* and these *Standards* present a range of lane widths. Engineering will utilize will consider the following when making decisions about lane widths:

a) Lane widths should be kept as narrow as possible.
b) Wider lane widths should be considered when the mix of heavy vehicles is greater.
c) When no bicycle facility or shoulder is present, a shy distance from a vertical curb should be considered.
d) If the purpose of the design is a lower speed environment, narrower travel lanes should be selected.
e) The *Active Transportation Plan* for guidance on the type and width of bicycle facilities.

250.7 Vertical Alignment

The vertical alignment of the County's public and private roadways shall conform to the following requirements:

250.7.1 Minimum Roadway Gradient

a) The minimum tangent roadway gradient shall be 1% along the crown and vertical curb line.
b) A minimum of 0.5% may be designed with concrete curb and gutter with ~~Engineering~~Engineering approval.
~~a)~~c) Through curb ramps, the minimum gradient shall be designed to 1.0% to 1.5%
~~b)~~

250.7.2 Maximum Roadway Gradient

The maximum roadway gradient shall be based on Standard Drawings C110-C140.~~:~~
~~Major and minor arterial roadways, see Standard Drawing C140.~~
~~Collector roadways, see Standard Drawing C130.~~
~~Connector roadways, see Standard Drawing C120.~~
~~Local roadways, see Standard Drawing C110.~~

Grades in excess of these maximums may be approved by Engineering on a case-by-case basis per ~~Section 170~~Section 170.

250.7.3 Intersection Landing

a) At intersections, a landing shall be provided on the secondary or subordinate approach or on a stop-controlled approach.

~~a)~~b) Landings should be 20 feet in length for private driveways, 50 feet in length for local roadways and one hundred 100 feet in length for all other roadways.

~~b)~~c) Landings should be measured from the edge of pavement of the intersected roadway at full development and shall have an average grade of not greater than 5%.

~~c)~~

250.7.4 Vertical Curves

a) Vertical curves shall be used when design grade breaks of more than 1% are necessary.

~~a)~~b) Vertical curves shall conform to the values in Table 2-14 and calculated as below.

~~b)~~

$$K = \frac{L}{A}$$

where A = algebraic difference in grades (percent)
L = length of vertical curve (feet)

Table 2-14. Design Controls for Stopping Sight Distance for Crest and Sag Vertical Curves

Design Speed (MPH)	K-Crest	K-Sag
15	3	10
20	7	17
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79
50	84	96
55	114	115
60	151	136
65	193	157

c) The minimum vertical curve length shall be fifty (50) feet.

~~c)~~d) K-Sag values may be reduced to K-Crest values if adequate street lighting is present along the entire sag vertical curve.

~~d)~~

250.7.5 ~~Half Street~~ Roadway Widening

a) Required road widening for land use approvals generally require a half street improvement; however, when one or more of the following apply up to a full street widening may apply:

~~a)~~1) Setting new curbs;

~~1)~~2) Centering up road improvements in the ~~right of way~~right-of-way;

~~2)~~3) Existing cross slopes are below the minimum or above the maximum standards;

~~3)~~4) Cross slopes vary from one side to the other; or

~~4)~~5) Offset crowns exist.

~~5)~~b) Road widening shall not reduce existing road structural sections beyond the minimum standard structural section unless the road structural section is reconstructed to standards.

~~b)~~c) ~~Half street~~Road widening designs require designed cross sections at 25' on center~~cross section data~~ that illustrate the elevations at:

~~c)~~1) ~~c~~Centerline of ~~right of way~~right-of-way,

~~1)~~2) Crown of road,

~~2)~~3) ~~s~~Saw cut line, and

4) ~~g~~Gutter line

i) Show the existing and new cross slopes between elevation points;

ii) Provide the station for each cross slope;

iii) These cross slopes are usually for plan review to insure that the cross slopes and crown are designed within the acceptable standards and can be provided as a separate exhibit to the plans unless they are also needed to provide information to the contractor.

5) The maximum grade break between existing and proposed cross slopes shall be 2%.

Cross sections through existing driveways and intersections shall be provided.

~~3)~~6)

~~4) Show the existing and new cross slopes between elevation points;~~

~~) Provide the station for each cross slope;~~

~~) at 25 feet on center. These cross slopes are usually for plan review to insure that the cross slopes and crown are designed within the acceptable standards and can be provided as a separate exhibit to the plans unless they are also needed to provide information to the contractor.~~

~~i)~~

~~i) Stations, offsets, and cross slopes shall be shown on the plans. Cross slope grade breaks created by the new gutter line shall be provided.~~

~~The maximum grade break between existing and proposed cross slopes shall be 2%.~~

~~i) Cross sections through existing driveways and intersections shall be provided.~~

250.7.6 Superelevation

a) Design elements for superelevation should~~all~~ be based on AASHTO guidelines~~standards~~.

~~a)~~b) Super-elevation is not allowed on roadways with a design speed of 35 MPH or less.

~~b)~~c) The maximum rate of roadway superelevation for urban conditions should~~all~~ be 4% (e_{max} = 0.04).

~~c)~~d) The use of superelevation in the urban area is discouraged and shall be approved by Engineering before used.

~~d)~~

250.8 Intersections

250.8.1 Minimum Curb Radii

a) Minimum curb radii at intersections within the UGB are shown in Table 2-15.
b) Minimum curb radii at intersections outside the UGB ~~are based upon an engineering assessment and approved~~are determined by Engineering.
c) The minimum right-of-way radii shall be sufficient to maintain at least the same distance from right-of-way to edge of pavement or curb as the lower classified roadway.
d) Curb radii shall be designed to accommodate the design and control vehicle per ~~Section 2~~Section 250.1.3.
e) Curb radii shall be approved by Engineering based upon an assessment of design and control vehicle considerations as well as pedestrian and design speed considerations.
~~f)~~

Table 2-15. Minimum Urban Area Turning Radii - Edge of Pavement or Curb Radius

Functional Classification	Major Arterial	Minor Arterial	Collector	Connector	Local
Major Arterial	35	35	30	25	25
Minor Arterial		35	30	25	25
Collector			25	20	20
Connector				20	20
Local					20

Notes:
If a bike lane or on-street parking exist on both roadways, then the above radii may be reduced by five (5) feet
Larger radii may be needed to accommodate the design and control vehicle, designers shall identify each
for the roadway and ensure that movements can be made with the associated minimum turning radii.

250.8.2 Intersection Angle

The intersection angle at intersecting roadways shall be kept as near to 90 degrees as possible. Intersection angles from 80 to 85 degrees and 95 to 100 may be considered per Section 170.
~~The intersection angle at intersecting roadways shall be kept as near to 90 degrees as possible, and in no case shall it be less than 80 degrees or more than 100 degrees unless otherwise approved by Engineering.~~

250.8.3 Roadway/Lane Offset

New lanes, roadways or driveways intersecting an existing intersection should not be significantly offset from the existing alignment. Minor offsets may be approved where low speed maneuvers are predominant or where otherwise acceptably safe operations would occur.

250.8.4 Tangent Section

In order to improve the safety at intersections, new intersections should conform to the following tangent requirements unless otherwise approved by Engineering. The following tangent sections should be provided per Table 2-16.

Table 2-16. Minimum Tangent of Intersecting Roadway
(Measured in feet from nearest intersecting curbline or edge of pavement)

Major Roadway	Intersecting Roadway					
	Major Arterial	Minor Arterial	Collector	Connector	Local	Private Access
Major Arterial	100	100	75	50	50	20*
Minor Arterial		100	75	50	50	20*
Collector			50	20	20	20*
Connector				20	20	20*
Local					20	20*

Notes:
*Private Access tangents shall be based upon relative ADT of the planned driveway and will be determined on a case by case basis as part of the land use review process.

Table 2-16. Minimum Tangent of Intersecting Roadway
(Measured in feet from nearest intersecting curbline or edge of pavement)

Major Roadway	Intersecting Roadway					
	Major Arterial	Minor Arterial	Collector	Connector	Local	Private Access
Major Arterial	100	100	75	50	50	20*
Minor Arterial		100	75	50	50	20*
Collector			50	20	20	20*
Connector				20	20	20*
Local					20	20*

Notes:
*Private Access tangents shall be based upon relative ADT of the planned driveway and will be determined on a case by case basis as part of the land use review process.

250.8.5 Residential Intersection Design

Four-legged intersections should be considered for neighborhood traffic circles per ~~Section 265~~Section 265.

250.8.6 Roundabouts

a) Roundabout intersections shall ~~generally~~ be designed in accordance with FHWA's *Roundabouts: An Informational Guide.*

~~a)~~b) ~~Roundabouts are strongly encouraged over the use of signalized intersections or other high capacity intersections, where appropriate.~~ Roundabouts shall be considered per ~~Section 260.1.2~~~~Section 2~~Section 260.1.1 ~~at all arterial/arterial or arterial/collector intersections~~ prior to the approval of a traffic signal.~~.~~

~~b)~~c) ~~Roundabouts shall be designed to allow a fire truck and school bus to circulate through the roundabout without using the truck apron.~~Roundabouts with pedestrian ~~crossing present~~facilities shall be designed to comply with ADA requirements as identified in ~~PROWAG~~*PROWAG* Section R306.3.

~~c)~~

250.8.7 Intersection Sight Distance

Comply with i~~I~~ntersection sight distance ~~shall be evaluated and designed~~requirements of ~~per~~ ~~Section 240~~Section 240.

250.8.8 Turn Lane Design

a) The need for left or right turn lanes shall be based upon a traffic study per ~~Section 295.19.1~~Section 295.18.1 and/or as dictated by the *Comprehensive Plan* or *CIP*.~~.~~

b) QRequired queue storage estimates shall be based upon a traffic study per Section 295.17Section 295.16.
c) Left turn lanes, when provided, shall have a storage queue of at least 50 feet.
d) Tapers shall be designed per . Design of left or right turn lanes should be based upon ODOT's *Highway Design Manual*,.

250.9 Roadway Grading

a) Roadway grading should conform to clear zone requirements of Section 245 and cross section requirements of Standard Drawings C110 to C140.
b) Slopes along and adjacent to the roadway should be as specified in Standard Drawings C110 to C140. The maximum slopes outside the clear zone as detailed in Section 245 are as follows:
   1) Cut Slope - 2 to 1
   2) Fill Slope - 2 to 1
c) Roadway embankment should be constructed with crushed aggregate no larger than 6"-0 and no larger than 1½"-0 to 3"-0 can be used within one-foot of the structural section of the roadway.
d) Flatter slopes are preferred and may be required by the County if soils are unstable as determined by a geotechnical analysis.
e) Side slopes exceeding four feet in height shall be constructed in conformance with design and specifications prepared by an Engineering Geologist or Geotechnical Engineer. All side slopes shall be stabilized by grass sod, seeding, riprap, or other acceptable ground stabilizing materials as recommended by a geotechnical engineer.
f) Side slopes necessary for roadway stability extending outside the public right-of-way will require slope easements.

250.10 Non-traversable Medians and Accessible Route Islands

a) Non-traversable medians should be required in the following cases:
   1) On arterial roadways within the UGB with five or more travel lanes.
   2) When described as an element of a project listed an adopted plan.
   3) On roadways where right-in/right-out driveway access maneuvers are required.
b) Non-traversable medians should be considered in the following cases:
   1) On arterial or collector roadways within the UGB with three or more travel lanes.
   2) On roadways where improved access management is desirable.
c) Medians should be designed and constructed with the following features:
   1) Landscaping per Section 255.
   2) Landscaping with a mature height of 2.5 feet should not be planted within 50 feet of an intersection.
   3) With a minimum width of eight feet when designed to serve as a pedestrian refuge.
   4) With a minimum width of one foot when not designed to serve as a pedestrian refuge.
   5) To contain a "shy" distance from adjacent traffic of varying width depending upon the design speed of the roadway.
   6) Medians that are crossed by a pedestrian access route and accessible route islands shall comply with ADA requirements as identified in "ADA Design Review Checklist – Medians/Traffic Islands" and depicted in Oregon Standard Drawing RD710.

d)

~~250.9 Roadway Grading~~

~~a) Roadway grading shall conform to clear zone requirements of Section 245 and cross section requirements of Standard Drawings C110 to C140.~~
~~b) Slopes along and adjacent to the roadway shall be as specified in Standard Drawings C110 to C140. The maximum slopes outside the clear zone as detailed in Section 245 are as follows:~~
   ~~c) Cut Slope - 2 to 1~~
   ~~Fill Slope - 2 to 1~~
~~1) Roadway embankment shall be done with crushed aggregate no larger than 6"-0 and no larger than 1½"-0 to 3"-0 can be used within one-foot of the structural section of the roadway.~~

d) Flatter slopes are preferred and may be required by the County if soils are unstable as determined by a geotechnical analysis.
e) Side slopes exceeding four feet in height shall be constructed in conformance with design and specifications prepared by an eEngineering gGeologist or gGeotechnical eEngineer. All side slopes shall be stabilized by grass sod, seeding, riprap, or other acceptable ground cover vegetationstabilizing materials as recommended by a geotechnical engineer.
f) Side slopes necessary for roadway stability extending outside the public right-of-way will require slope easements.
g)

250.10 Raised Concrete Medians and Accessible Route Islands

Raised medians shall generally be required in the following cases:
On arterial roadways within the UGB with five or more travel lanes.
1) When described as an element of a project listed in the Transportation System Plan.
2) On roadways where right-in/right-out driveway access maneuvers are required.
3) Raised medians should be considered in the following cases:
a) On arterial or collector roadways within the UGB with three or more travel lanes.
1) On roadways where improved access management is desirable.
2) On roadways where right-in/right-out driveway access maneuvers are desired.Medians should be designed and constructed with the following features:
b) Landscaping per Section 255 if required.
1) With a minimum width of eight feet when designed to serve as a pedestrian refuge.
2) With a minimum width of 1.5 feet when not designed to serve as a pedestrian refuge.
3) Landscaping with a mature height of 2.5 feet should not be planted within 50 feet of an intersection.
4) To contain a "shy" distance from adjacent traffic of varying width depending upon the design speed of the roadway.
5) Medians that are crossed by a pedestrian access route and Accessible Route Islands shall comply with ADA requirements as identified in "ADA Design Review Checklist – Medians/Traffic Islands" and depicted in ODOT Standard Drawing RD710.
6)

SECTION 2SECTION 252 - STRUCTURAL SECTION

Roadways shall be constructed, reconstructed and repaired with asphaltic concrete over a crushed rock base or Portland Cement Concrete over a crushed rock base. All construction work and material shall be in accordance with Section 110Section 1Chapter 1 of these *Standards.Standards*.

In weak soil conditions, where the strength of the standard base rock section is inadequate, Cement Treated Base (CTB) may be used as an alternative as approved by Engineering.
the County Engineering Division
In conditions where the road surface is not structurally sound or, is damaged by construction activities, or is damaged by construction traffic, or traffic, Full Depth Reconstruction Reclamation (FDR) may be used as an alternative as approved by Engineeringthe County Engineering Division.

252.1 Subgrade Evaluation

a) Soil testing may be required by Engineering on a case by case basis to determine soil strength and design of the roadway structural section.
a)b) Soil tests are needed on undisturbed samples of the subgrade materials that are expected to be within three (3) feet of the planned subgrade elevation.
b)c) Samples are needed for each 500 feet of roadway and for each visually observed soil type.
c)d) Soil tests are required from a minimum of two locations.
d)e) The results of the soil testing shall be included in a soils report prepared and stamped by an Engineering Geologist or Geotechnical Engineer licensed to practice in the State of Oregon.

e)f) This soils report shall also address subgrade drainage and ground water considerations for year-round conditions, percolation data in areas of proposed drywells or french drains, and recommendations for both summer and winter construction.

f)

252.2 Asphaltic Concrete

a) The standard asphaltic concrete structural section shall be in accordance with Standard Drawing CStandard Drawing C100.

a)

b) Asphalt concrete is to be ½ inch or ¾ inch dense HMAC. Material and installation shall conform to Oregon Standard Specifications for Construction*Oregon Standard Specifications for Construction*.

c) No single lift shall be less than 2 inches or greater than 2 ½ i3 inches in thickness.

d) Smoothness of ride characteristics shall meet the *Oregon Standard Specifications for Construction* Section 00744.70.

e) When unusually weak soil conditions exist, or in higher elevations with frequent freeze/thaw cycles, or high volumes of truck traffic exist, the pavement and aggregate thickness may be determined by the Asphalt Institute Method. If it is determined that the street section identified in Standard Drawing C100 is inadequate, the EOR shall provide a pavement design.

b)

c) The final lift of asphaltic concrete shall not be placed on local streets until 90% of the lots associated with a development are complete or two years have elapsed after the installation of the first lift of asphalt, whichever occurs first. Any and all defects in the base lifte shall be repaired and approved by the County prior to placing the final lift.

d) At the option of the Engineer or where Engineering determines that unusual weak soil conditions exist, or in higher elevations with frequent freeze/thaw cycles, or high volumes of truck traffic exist, the pavement and aggregate thickness shall be determined by the Asphalt Institute Method. If it is determined that the street section identified in Standard Drawing C100 is inadequate, the Engineer of Record shall provide a pavement design.

e)f) Design values used in the asphaltic concrete design shall be supplied by an Engineer. Traffic data shall be obtained and include the following: Design period, traffic volumes, rate of growth, and percent of trucks, and relationship to land use.

f)g) Design of asphalt concrete pavement structures shall conform to the guidelines determined by Engineering of the Asphalt Institute publication, *Thickness Design - Highways and Streets*.

g)h) The Equivalent Axle Load (EAL) for design of roadways shall be determined by a traffic analysis considering traffic growth, truck distribution determined on the basis of local traffic data and load equivalency factors as set forth in the above-referenced manual, MS-1. For collectors and local roadways, the EAL may be determined using simplified procedures which relate the EAL to the average daily number of 18,000 lb. single axle loads estimated for the design lane during the design period. Pavement shall be designed as established by Engineering.

h)i) Testing and evaluation of the subgrade soil strength shall be required for all pavement designs. Testing methods shall include but not be limited to:

i)1) The Asphalt Institute Publication, Method of Test for Resilient Modulus of Soil, Manual Series No. 10 or

1)2) AASHTO T-193 (CBR Method), or

2)3) AASHTO T-190 (R-Value Method)

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

k) Test methods and results shall be incorporated in a soils report in accordance with the requirements of Section 2Section 250.10 of these Standards*Standards*.

j)

k)

252.3 Portland Cement Concrete ("PCC")

The PCC structural section shall be determined using the guidelines and requirements of the Portland Cement Association ("PCA"). The following design parameters shall be used:

The design shall be determined by Engineering.

a) Design shall be determined by projected estimated axle loading (EAL) of the road.

b) Minimum thickness of PCC shall be seven inches.
c) Jointing plans will be required one week prior to start of construction, delineating intersection and utility structure jointing for final review and approval by Engineering.
d) Design values used in the PCC design shall be prepared by an Engineer. Traffic data shall be obtained and shall relate to a 20 year projection.
~~1) Design shall be determined by projected estimated axle loading (EAL) of the road.~~
~~2) Minimum thickness of PCC shall be seven inches.~~
~~3) Jointing plans will be required one week prior to start of construction, delineating intersection and utility structure jointing for final review and approval by Engineering.~~
~~a) Design values used in the PCC design shall be prepared by an Engineer. Traffic data shall be obtained and shall relate to a 20 year projection.~~

252.4 Cement Stabilized Roadway (CSR) by Full Depth Reclamation (FDR) or Cement Treated Base (CTB)

252.4.1 General

This work consists of in-place construction of cement stabilized roadway utilizing pulverized existing pavement and base materials mixed with Portland cement as per design specifications, and shaping the roadway to design/plan grades and cross slopes, including cure sealing or paving and the relocation of excess sub-grade material where required. The first till pulverizes for shaping to compacted design base grades (minus cement volume) and the second till incorporates (mixes) the cement into the prepared compacted roadway to final design base grades and seals the CSR for curing via fog seal, chip seal or an asphalt base lift per design/plan specifications.

This section details the requirements for full depth reclamation (FDR). Cement treated base (CTB) will follow the same standards with the exception that there is no existing road surface to pulverize. The CTB requirements cover the remediation of both base rock and sub-grade. If the CTB shall be overlain with a full depth of base rock as per these standards, a chip seal or vapor barrier is not required.

252.4.2 Materials, Preparation & Equipment

a) The aggregate shall conform to the requirements of the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction* Section 02630.10.
b) The Portland cement shall conform to the requirements of the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction* Section 02010.
c) The water shall conform to the requirements of ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction* Section 00340.
d) Portland cement shall be applied at the rate determined by an engineered design in percent of the dry weight of the material within a depth to be treated to achieve a seven day strength between 300 psi and 400 psi. The design shall indicate the optimum moisture content.
e) The Engineer shall obtain samples of the material to be pulverized to determine the design. Cores will be taken at 7 days and tested as per ASTM C39/C39M-12a and ASTM C42/C42M-12 to confirm that the strength of the CTB is within the correct range.
f) The asphalt used in the curing seal shall be either CRS-1 or CRS-2 emulsified asphalt as designated. The emulsified asphalt shall conform to the requirements of the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction* Section 00710. Cover aggregate for the cure seal shall conform to the requirements of Section 00710 and shall be ¼ - #10 size.
g) A traveling single or multiple transverse shaft mixer shall be capable of mixing to a depth of 12-inches in one pass. The cutting and mixing rotor shall be capable of adjustment to conform to the slope of the pavement. The mixer must have a working water system to bring the CSR to optimum moisture content.
h) Cement shall be spread using a mechanical spreader capable of uniformly distributing the cement across the width of the spread. The cement spreading equipment shall be in good working condition and shall be equipped with a metering device and travel speed indicator capable of accurately metering and uniformly spreading the required amount of Portland cement on the grade.

i) Equipment used to compact CSR shall be self-propelled 12 ton minimum, vibratory steel wheel, tamping foot, and/or pneumatic tire rollers. Rollers shall be capable of compacting the material to a firm, even surface. The tamping foot roller shall be placed immediately behind the tilling operation and before the initial grader operation.

252.4.3 Construction

a) The CSR shall be constructed so that the work will result in a finished sealed or continuously watered, curing CSR section conforming to specifications regardless of the daily or seasonal variations in weather, temperature and humidity under which the work is permitted to proceed. CSR shall not be constructed during periods of rain. CSR shall not be constructed out of frozen bases. Construction shall not occur when descending air temperatures fall below 40° F. Cement shall not be applied during windy conditions.
b) On the first till the existing road base and pavement materials shall be pulverized to a depth, as specified in the engineered design/plans to a condition such that all material will pass a 2-inch sieve.
c) Roads Without Curbs: The surface of the pulverized material shall then be brought to the uniform grades and cross sections, as shown in the plans for the final CSR grades (minus the cement volume) and compacted to specifications.
d) Roads With Curbs: The plans will show the first till depth noted above,- as the depth of the existing asphalt and rock sections combined or 12" maximum-. This material is to be stock piled and the subgrade (not tilled) is dug out and removed (to accommodated the depth of the new asphalt section, the cement and -redistributed stockpiled material; s-so that the final finished asphalt grade matches the designed/plan curb exposure). The stockpiled material is then evenly redistributed, and brought to uniform grades and cross sections, as shown in the plans for the final CSR grades and compacted to specifications. Any material to be hauled off must go to an approved dump site.
e) The County makes no representation as to the type and size of the material that may be encountered in the existing roadway. The contractor shall notify the County immediately if the type and size of material -(solid objects 3" > dia.) exceeds that which can be cement treated without excessive damage to the tiller.
f) In those areas which show excessive deflection or exhibit pumping under the wheel loads of the construction equipment, the pulverized material shall be removed and the sub-grade shall be over excavated to a firm depth as directed by the Engineer. Backfill the over excavation to the top of the existing sub-grade with 2"-0 size aggregate compacted in 9-inch maximum, loose depth, thickness lifts. Each lift shall be compacted to at least 95 percent of the maximum dry density determined by inspection. After backfilling of the over excavation, the remainder of the depth shall be backfilled with stockpiled pulverized material and brought to a uniform grade and cross section.
g) Cement shall be uniformly applied at the designated rate. The equipment and method used shall ensure the uniformity of cement distribution throughout the material to be treated. Water shall be added at the tiller during mixing operations to bring the mix to within – 0 to +1 ½ percent of the optimum moisture/density point. This moisture content shall be maintained until the mixing is completed.
h) The second tilling/mixing of the cement, water, and aggregate materials shall be started immediately but no later than two hours after the application of the cement. Mixing shall continue until a homogeneous mixture is obtained.
i) The CSR mixture shall integrate the pulverized material to a depth of 12 inches or design/plan depth.. This CSR mixture shall then be brought to a uniform profile and cross section as noted in the plans. Shaping and compaction of the CSR mixture shall be completed within two hours after mixing has been completed.
j) Special attention shall be taken around utility structures, survey monument boxes and next to curbs to ensure that the material is thoroughly pulverized, mixed with cement, moistened and compacted to the specified depth. Material that is inaccessible to the mixer shall be bladed or shoveled into the pulverizing and mixing process after which it shall be returned to its original position. Vibratory plate compactors shall be used to achieve compaction of the mixture in areas which are inaccessible to the rollers.
k) Special attention shall be given to ensure that the material next to all joints is thoroughly pulverized, mixed with cement, moistened and compacted to the specified depth.
l) Longitudinal and transverse joints adjacent to partially hardened CSR shall be constructed by cutting back with the mixer into the previously constructed work. The amount of the overlap shall be sufficient to cut back into solid materials.

m) Longitudinal and transverse joints adjacent to existing asphalt, concrete or hardened CSR shall be formed by saw cutting back into the work to form a straight vertical face. When completed, the face of the joint must be free of loose and shattered material.

252.4.4 Curing

Immediately after the grading, compaction and finishing of the cement treated base has been completed and during the same day while it is still moist, the surface shall be sealed with a fog or chip seal. The fog or chip seal shall be applied in accordance with applicable portions of Section 00710 of the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction* at the rates of 0.26 gallons per square yards of emulsified asphalt and 0.006 cubic yards (truck measure) per square yard for the cover aggregate. An asphalt surface course may be chosen as a sealing course on high volume roads that must remain in constant service when the County determines that the chip seal does not have sufficient strength to carry the anticipated traffic. If an asphalt surface course is chosen to seal the CSR, it may be installed no sooner than Day 2. If the fog/chip seal or asphalt concrete surface sealing course is not placed within forty eight hours (Day 2) following start of the mixing operation, then the CSR shall be allowed to cure, while maintaining moisture, for a period of 7 days (Day 7) before placing any asphalt concrete surface course.

252.4.5 Micro-Cracking

a) If specified by the Engineer and approved by Engineering, micro-cracking may be used as part of the design. Micro-cracking shall occur between Day 2 and Day 3.
b) Micro-cracking consists of 3 full passes, up and back, of a 12 ton vibratory roller with maximum vibrations for the full extent~~d~~ of the CSR.

252.4.6 Performance

a) The cement treated mixture shall be compacted to 98 percent of the maximum dry density as established by AASHTO T 134. Final finishing shall be accomplished by rolling accompanied by light watering and reshaping to provide a finished surface free of hairline cracking and free of ridges exceeding 0.04 foot in height.
b) If the specified compaction is not obtained, the contractor shall notify the County and Engineer. The contractor may be required to use a modified compaction procedure or apply additional compactive effort.
c) If approved materials meeting the specifications cannot be compacted to the required density regardless of compactive effort or method, the Engineer may reduce the required density or direct that alternate materials be used. In no case shall CSR construction proceed until the contractor is able to compact the material to the satisfaction of the Engineer.
d) When directed by the Engineer, the surface of the CSR shall be tested with a 12-foot straight edge provided by the contractor. No point shall vary by more than 0.04 foot from the testing edge when applied in any direction to the pavement surface. The completed surface of the CSR shall be within plus or minus .04 foot of the grade required to allow for placement of the specified thickness of asphalt concrete to the designated finished grade height.

252.4.~~7~~6 Traffic Control Considerations

The CSR construction shall be scheduled so that at the completion of the day the work may be opened to local traffic. The surface of the CSR shall be protected by placement of the asphalt concrete surface course or by placement of the cure seal. If a cure seal is placed, it shall be placed a minimum of two hours in advance of opening the road to traffic. The asphalt surface shall be below 140 degrees before opening the road to traffic. When approved by Engineering, the road should be closed to through traffic, especially to through truck traffic, for 7 day cure period per Section 290.
~~Section 290.4 of these Standards.~~

~~SECTION 2~~SECTION 255 - LANDSCAPING

~~as required by . Street trees~~Landscaping and irrigation shall be maintained by adjacent the property owner unless an agreement exists that requires maintenance by others ~~or an HOA until they are replaced~~. Street trees located within landscape strips are required by the *ZDO* as part of development. The number of street trees along a property frontage shall be maintained by the property owner unless otherwise approved by the County. ~~The Removal and installation of street trees is subject to a permit.~~Approved ground cover including shrubs, plants, or grasses ~~or other approved groundcover and~~ should be installed at the time of development within landscape strips and landscaped medians.

If installed as part of development, landscaping and irrigation are subject to a Development Permit. Otherwise, landscaping installation compliant with Section 130.2 is not subject to a permit. Street trees that are removed are required to be replaced if required as part of land use approval.

The County presents guidelines for street tree installation and landscaping not subject to a Development Permit. It should be noted that regardless of compliance with County standards and guidelines for street tree planting, the adjacent property owner is responsible for the landscaping, and per ORS 368.910 and *County Code* Section 7.03, is responsible for the maintenance of adjacent sidewalk and curb and any damage that may be caused by landscaping or other activities.

255.1 ~~Soil, etc??~~Topsoil

The top 6" of topsoil in the planter strips shall be a soil blend consisting of min. 30% and maximum 50% compost, 10% sand and between 30% to 40% sandy loam or clay ~~or shall be sourced from a source previously approved by ODOT~~from a source on the ODOT Qualified Products List.

255.2~~1~~ Shrubs, Plants and Grasses

a) Shrubs, plants and grasses species should ~~all~~ comply with ~~the requirements of~~ the County's Shrub, Groundcover, Riparian Plant List.
b) Landscaping should~~all~~ be designed to minimize water consumption and ~~generally~~ utilize Oregon native plants.
c) In addition to street trees, ~~l~~Landscape strips should~~all~~ be planted with a sufficient quantity and density of shrubs, plants and grasses to minimize weed growth.
d) ~~In some instances under proper design, Engineering may approve installations without irrigation.~~Irrigation should be provided unless the applicant presents a planting plan that is likely to succeed as recommended by a Landscape Architect and/or Arborist.
~~d)~~
~~e)~~

255.32 Street Trees

These standards are intended to ensure that new trees planted within the ~~right of way~~right-of-way are of the highest quality, require low maintenance, and will not compromise public safety. Comply with the requirements of Standard Drawings L100 and L200.

255.32.1 Street Tree Selection

Street t~~T~~rees ~~species~~ shall ~~be~~ comply with the Clackamas County Street Tree List.~~approved by Engineering.~~

255.32.2 Street Tree Quality at Time of Planting

a) The trees shall have a straight trunk perpendicular to the ground with a minimum branching height of four feet above the ground for trees 1 ½" caliper to a minimum of six feet above the ground for trees with 2" caliper. No trees may be planted with a caliper less than 1 ½" except as noted below.

~~a)~~b) Plant material shall be grown to the current standards and specifications of the American Association of Nurserymen and American Standard for Nursery Stock. Plant material shall be of standard quality or better, true to name and type of their species or cultivar.

~~b)~~c) Trees shall be provided reasonably free, as defined by nursery industry standards for street trees, from insects, decay, major structural defects and damage to the trunk, branches, and root system.

~~c) Engineering shall be notified and will have the right to inspect all trees and shrubs before they are planted. Engineering reserves the right to reject any plant material at any time.~~

255.32.3 Street Tree Condition at Time of Planting

a) If b~~B~~alled and bur~~-Bur-~~lapped ~~and~~ in wire baskets:

~~a)~~1) Trees shall have a sound root ball with a firm attachment of the trunk with the root ball. The trunk shall not be loose, but firmly held within the root ball.

~~1)~~2) The size and condition of root balls shall conform to the current standards and specifications of ~~—~~American Association of Nurserymen and the American Standard for Nursery Stock.

~~2)~~3) Root balls of trees shall not be allowed to dry out at any time from the nursery to the final planting.

~~3)~~4) Trees shall have a ~~well developed~~well-developed root system and not be root bound or have circling/girdling roots.

~~4)~~b) If i~~I~~n a c~~C~~ontainer:

~~b)~~1) Trees shall be free of circling/~~-and-~~girdling roots.

~~1)~~2) The trees shall have been grown in the container for a maximum period of one year.

~~2)~~c) If b~~B~~are r~~R~~oot:

~~c)~~1) ~~Trees in bare root condition S~~shall not exceed 1 ½"~~ inch~~ caliper, measured six feet above mean ground level.

~~1)~~2) The roots shall not be allowed to dry out and shall be kept moist at all times from the nursery to final planting.

~~2)~~3) The roots shall be well established and full of live and vigorous fibrous roots along with the larger structural roots.

~~3)~~

255.32.4 Preparation of Tree Planting Holes

a) If b~~B~~alled and b~~B~~ur-lapped and in wire baskets:

1) A shallow, broad tree planting hole at least 1 ½ times the diameter of the root ball shall be excavated to a depth that will position the trunk flare level with finish grade.

The inner surfaces of the excavation shall be scored or roughened to the extent necessary to encourage rooting in the native soil.

2)

b) If bare root:

1) Tree planting holes shall be one inch wider than the spread of the roots.
2) Holes shall have sufficient depth to position the trunk flare level with finish grade.

~~a) A shallow, broad tree planting hole at least 1 ½ times the diameter of the root ball shall be excavated to a depth that will position the trunk flare level with finish grade.~~

~~a) The inner surfaces of the excavation shall be scored or roughened to the extent necessary to encourage rooting in the native soil.~~

~~b)~~

~~2) Bare Root~~

~~Tree planting holes shall be one inch wider than the spread of the roots.~~

~~c) Holes shall have sufficient depth to position the trunk flare level with finish grade.~~

c) A mound of native soil shall be left in the center of the hole to support the roots. The roots shall be draped and spread in their natural position over the mound.

~~d)~~

~~e)~~

255.32.5 Seating of Trees

a) Trees shall be set plumb, upright, and faced for best appearance. Broken branches should~~all~~ be pruned after planting.

~~a)~~b) The hole shall be backfilled one-half with original soil and the hole flooded with water to remove any air pockets. After backfilling is complete, the entire planting area shall be thoroughly saturated with water to remove any remaining air pockets.

~~b)~~c) Mulch shall be applied to a depth of two to four inches around the tree. Mulch shall be kept free of an area within two inches of the trunk.

~~c)~~d) A continuous three inches high raised berm shall be constructed around the planting hole to direct water to the roots. The berm should~~all~~ be removed after one year.

~~d)~~

255.32.6 Staking

If an anchor system is not provided per Standard Drawing L200, staking is required:

a) Hardwood stakes shall be driven firmly into the ground outside of the hole. Care shall be taken to avoid driving the stakes through the root structure.

~~a)~~b) Trees shall be attached to the stakes at a height of two feet using ~~non binding~~non-binding tree ties or tree ties that are at least one inch wide to prevent damage to the tree trunk. Ties shall be attached in a manner that will allow the tree to move but still be held firmly in place.

~~b)~~

255.32.7 Establishment Period

If installed as part of development, t~~T~~he establishment period for an original tree or replacement tree shall be ~~a minimum of three summers.~~determined by Section 190.4.

~~255.2.8 Street Trees Installation~~

~~Street tree design and installation shall comply with Standard Drawings L100 and L200.~~

~~Trees shall not block street signs.~~

~~Trees shall be centered in the landscape strip.~~

~~The minimum distance between street trees shall be as follows:~~

~~Spread crown trees (with a 30' or more foot mature crown) - 30' apart.~~

~~Global, Pyramidal trees (with a 20'-30' or more foot mature crown) - 30' apart.~~

~~Fastigate, Columnar trees (with a 10'-20' or more foot mature crown) - 20' apart.~~

~~The minimum distance between the trunk of a tree from objects shall be as follows (for linear landscapes):~~

Table 2-18. Tree Trunk to Object

Object	Distance (feet)
Sidewalks	2
Sidewalks not parallel to road	5
Face of curb	2
Manholes and catch basins	10
Fire hydrants	10
Water meters and other utility boxes	5
Stop signs	3.5
Utility poles	10
8" to 10" water lines	10
12" to 16" sewer lines	15
18"+ water and sewer lines	20
Driveways	10

~~The minimum distances between trunks and street lights shall be as follows:~~

Table 2-19. Tree Trunk to Streetlights

Type of Tree	Distance (feet)
Spread Crown	30
Global, Pyramidal	20
Fastigate, Columnar	10
Ornamental	10

~~No tree with potential of reaching a mature height of more than 35 feet shall be planted in the right-of-way under primary overhead wires.~~

255.3.8 Root Barrier

~~Root barriers, as shown in Standard Drawing L100 may be required for use in the installation of street trees.~~ Any tree planted ten feet or closer to a structure, such as curb or sidewalk, shall have an engineered impenetrable root barrier installed near the structure. The root barrier shall run the length of the planting area or the structure and reach a depth of at least 18 inches.

255.4 Sight Distance

Proposed landscaping shall ~~strictly~~ comply with the sight distance standards of ~~Section 240~~Section 240. If in question due to marginally adequate vertical or horizontal curvature, landscaping designers shall be required to provide evidence that proposed landscaping will not grow to become sight hazards.

~~SECTION 2~~SECTION 260 - TRAFFIC SIGNALS, FLASHERS & COMMUNICATION

260.1 Traffic Signal Approval

A traffic signal may be approved ~~by Engineering~~ if the criteria of this section are met.

260.1.1 Traffic Analysis

A traffic analysis is required prior to the approval of a traffic signal. Analysis requirements shall be based upon ~~Section 295~~Section 295 and should include the following:

a) An analysis of other alternatives is required prior to the approval of a traffic signal. Possible alternatives to traffic signal installation include right and left turn lane additions, other lane additions, alternative routes via planned or existing roadways, roundabout installation as well as modifications to traffic control.
b) An analysis of capacity, queuing and safety both with and without the proposed traffic signal. Additional roadway improvements may be required based upon this analysis to ensure safety is maintained with the installation of a traffic signal, notably left turn lanes.
~~a)~~
~~b)~~ Unless the *Comprehensive Plan* specifically calls for a traffic signal, a~~A~~n analysis of alternatives shall establish that a roundabout is impractical or unreasonable before a traffic signal will be approved.
    ~~c)~~ The analysis shall include preliminary geometry~~ics~~, a comparative estimate of right-of-way impacts of a traffic signal versus a roundabout, ~~comparative~~ benefit/cost ratio, and a ~~comparative~~ capacity analysis.
c) ~~In some instances, on a case by case basis, the County may assist in the acquisition of right-of-way in order to facilitate the installation of a roundabout.~~
d) Evidence that the criteria of ~~Section 2~~Section 260.1.2 can be met.
e) In locations with other traffic signals nearby, the proposed traffic signal shall~~will~~ not unacceptably decrease the corridor bandwidth.
~~d)~~f) A consideration of bicycle and pedestrian safety and mobility.
~~e)~~g) ~~Microsimulation modeling may be required per Section .~~An analysis of traffic signal phasing including:
    ~~f)~~1) Phasing analysis for different peak periods.
    ~~1)~~2) Evaluation of warrants for left turn protected, protected/permissive, and permissive/protected signal phasing, and protected right turn signal phasing based upon ODOT's *Traffic Signal Policy and Guidelines*.
~~2)~~

260.1.2 Traffic Signal Warrants

a) New traffic signals at intersections on County roadways shall meet at least one, preferably several, of the traffic signal warrants of the current version of the ~~*MUTCD*~~*MUTCD* prior to the approval of a traffic signal. ~~A proposed traffic signal may not be approved unless the intersection meets several warrants and the proposed signal offers a clear benefit to the traveling public.~~
b) Traffic signals meeting only peak hour volume warrants should~~all~~ only be approved if the intersection serves a special trip generator with unique peak traffic characteristics and evidence is provided ~~that results in a finding by Engineering~~ that the traffic signal ~~offers a special benefit to the transportation system~~is a benefit to the public.
~~c)~~

260.1.3 Traffic Signal Spacing

Traffic signals should ~~generally~~ be ~~spaced~~ separated from existing or planned traffic signals a minimum of ~~1000~~ ¼ mile~~feet~~ apart. ~~No traffic signals should be approved within 1000 feet of an existing or planned future traffic signal or roundabout~~ unless evidence supports ~~the~~ adequate long term operations at a lesser spacing ~~of such a proposal~~. If an existing comprehensive plan illustrates spacing closer than this spacing, additional long term analysis is not required.

260.2 Traffic Signal Design

a) Traffic signal design should be~~shall be generally~~ based upon the ODOT ~~*Traffic Signal Design Manual*~~*Traffic Signal Design Manual*, ~~Oregon Standard Drawings~~*Oregon Standard Drawings* ~~TM 400 and TM 600 Series~~ TM 400 and TM 600 Series, Clackamas County ~~t~~Traffic ~~s~~Signal ~~d~~Drawings and ~~d~~Details and the ~~*MUTCD*~~*MUTCD*.
b) ~~Prior to the design of traffic signals, designers shall consult with Engineering to determine design requirements.~~Plans shall be consistent with the results of the traffic analysis performed under ~~Section 260.1.1~~Section 260.1.1.
c) Signalized intersections should~~shall generally~~ be accompanied by channelized left turn lanes on the major street, ~~t and~~ on minor street arterials and collectors, and designed per ~~Section 250.8.8~~Section 250.8.8.

d) Signalized intersections may be accompanied by channelized right turn lanes on the major street and minor street arterials and collectors as warranted by ~~Section 295.19.1~~Section 295.19.1 and designed per ~~Section 250.8.8~~Section 250.8.8.

e) Signalized intersections with pedestrian access routes shall comply with ADA requirements as described in ~~Chapter 5 of~~ the most recent version of ODOT's *Traffic Signal Policy and Guidelines* including accessible pedestrian signals and push buttons complying with ~~Section 4E of~~ the *MUTCD*, and meeting the provisions of ~~PROWAG~~*PROWAG.* ~~R403 Operable Parts, and R404 Clear Spaces.~~

f) All plans shall be prepared under the direction of and stamped by an Engineer with expertise in traffic engineering ~~or by a Traffic Engineer~~.

~~g)~~

260.3 Traffic Signal Materials

Materials used in the construction of traffic signals shall be approved by Engineering and comply with the ~~Oregon Standard Specifications for Construction~~*Oregon Standard Specifications for Construction* and the Clackamas County t~~T~~raffic s~~S~~ignal d~~D~~rawings and d~~D~~etails.

260.4 Material Submittals

Prior to signal construction, the materials to be used on the project shall be submitted to Engineering for review and approval in the form of standard ~~ODOT~~ Oregon traffic signal ~~blue sheets~~blue sheets, ~~green sheets~~green sheets, ~~red sheets~~red sheets and applicable cut sheets.

260.5 Traffic Signal Funding and Agreements

If approved in conjunction with a development, the following shall apply:

a) The applicant shall be required to enter into necessary agreements to fulfill the obligations of this section.

~~a) The applicant shall be required to enter into necessary agreements to fulfill the obligations of this section.~~

~~The applicant shall provide funds for the staff review of all proposed traffic signal designs and construction inspection and coordination, in addition to the customary Development Permit review fees.~~

b) The applicant shall provide funds for necessary signal timing synchronization with existing traffic signals systems.

~~b)~~c) If approved at the intersection of a private driveway with a public roadway, the applicant shall be required to provide funds~~a cash advance~~ equal to 2015 years of the maintenance and power of the traffic signal.

d) The applicant shall provide ~~or obtain~~ the necessary right-of-way and/or easements for County ~~to maintain~~maintenance of the traffic signal appurtenances constructed at a development's private driveway or along a development's frontage.

~~c)~~e) The applicant shall maintain on-site pavement markings and signage in such a way that is consistent with the approved design. Markings and signage shall be maintained in a way that is compliant with the *MUTCD*.

~~d)~~

~~**260.6 Flashers in School Zones**~~

~~New schools or existing schools with an expansion of 20% floor area or greater shall be required to install school zone flashers on roadways that are classified as arterial or collector roadways if the proposed or existing school speed zone signing would result in a school speed 20 MPH zone and the County supports the installation.~~

260.6 Underground Communication Conduit

As required by Engineering, developments within the UGB shall be required to install fiber optic ready conduit under any of the following conditions:

a) When the development is required to install landscape strip and/or sidewalk along a collector or arterial roadway, the length of the work exceeds 200 feet, and is along a planned fiber optic network.

b) When the development abuts existing fiber optic conduit and extending the fiber optic conduit would extend a planned fiber optic network.

c) When the conditions of Section 260.7 apply.

260.7 Fiber Optic Communication

As required by Engineering, the installation of new traffic signals shall be accompanied by the installation of fiber optic conduit and fiber optic cable, unless existing, between the proposed traffic signal and adjacent traffic signals.

260.8 Flashers in School Zones

New schools or existing schools with an expansion of 20% floor area or greater shall be required to install school zone flashers on roadways that are classified as arterial or collector roadways if the proposed or existing school speed zone signing supports a school speed 20 MPH zone and the County supports a school speed zone installation. In addition to school zone flashers, radar speed signs may be required along arterial roadways.

The applicant shall be required to provide funds equal to 20 years of the maintenance and power of the school zone flasher and/or radar speed sign.

~~Schools seeking approval proposing a for a school speed zone shall be required to install school zone flashers on roadways that are classified as arterial or collector roadways if the proposed school speed zone signing would result in a school speed 20 MPH zone and County supports the proposed installation.~~

~~SECTION 2~~SECTION 265 - TRAFFIC CALMING

a) The County has adopted a *Clackamas County Local Streets Traffic Calming and Skinny Streets Program*.

~~a)~~b) The use of traffic calming measures shall be considered in cases where a ~~proposed~~ development will have a detrimental effect upon existing residential local streets~~neighborhoods~~. See ~~Section 295~~Section 295 for additional information.

~~b)~~c) Traffic calming devices will only be considered if meeting the criteria of the *Clackamas County Local Streets Traffic Calming and Skinny Streets Program* or as recommended by Engineering to mitigate the impacts of a proposed development or project.

~~c)~~

~~SECTION 2~~SECTION 270 - TRAFFIC SIGNING

270.1 Design and Construction Requirements

a) All proposed signing and pavement markings shall comply with the requirements of the ~~*MUTCD*~~*MUTCD*, ~~Oregon MUTCD supplement~~Oregon MUTCD supplement, the ODOT ~~*Sign Policy and Guidelines*~~*Sign Policy and Guidelines*, ~~the Federal Highway Administration's *Standard Highway Signs*~~*Standard Highway Signs*, the ODOT QPL, *Oregon Standard Drawings*, *Oregon Standard Details*, the ODOT *Traffic Line Manual*, ODOT *Pavement Marking Design Guidelines*, and ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction*.

b) All plans shall be prepared under the direction of and stamped by an Engineer with expertise in traffic engineering ~~or by a Traffic Engineer~~.

~~c)~~

270.2 Street Name Signs

The design and construction of permanent street name signs shall conform to ~~Standard Drawing T100~~~~Standard Drawing T~~Standard Drawing T100 ~~except as required by Section 270.3~~.

270.3 ~~County Logo Street Name Signs~~End of Street

The end of streets shall be signed with:

a) ~~The design and construction of permanent street name signs on arterials and collectors shall generally conform to Standard Drawing T110 and as follows:Engineering shall approve all locations prior to design and installation.~~Type OM4-2 object markers with a maximum spacing of ~~eight~~six feet; or

b) Type III barricades per Standard Drawing T350.

270.4 End of Sidewalk

~~a)~~

The end of sidewalks shall be signed with at least one OM4-2 object marker. For sidewalks wider than 8 feet, two OM4-2 object markers are required. Signs shall be mounted at approximate eye level (60").

270.5~~4~~ Sign Mounting

The design and construction of permanent sign mounting shall conform to ~~Standard Drawings T150 to T250~~Standard Drawings T150 to T250.

SECTION 280 - PAVEMENT MARKINGS

~~**270.5 Sign Materials**~~

~~Sign materials shall conform to the **Oregon Standard Specifications for Construction.**~~

~~SECTION 280 - PAVEMENT MARKINGS~~

~~280.1 Design and Construction Requirements~~

~~All proposed pavement markings shall comply with the requirements of the **MUTCD, Oregon MUTCD supplement**, ODOT **Traffic Line Manual**, generally with **Oregon Standard Drawings TM500 series**, generally~~

~~with the ODOT **Pavement Marking Design Guidelines** and the **Oregon Standard Specifications for Construction** except as modified below.~~

~~All plans shall be prepared under the direction of and stamped by an Engineer with expertise in traffic engineering or by a Traffic Engineer. Plans submitted that exhibit a lack of expertise may be returned without comment.~~

~~Materials shall conform to the ODOT Qualified Products List, or as otherwise approved by Engineering.~~

280.1 Crosswalk Markings

a) Crosswalk markings shall be "continental" style (CW-SC per *Oregon Standard Drawings* TM 500 series) with two-foot wide bars and approximately three-foot wide gaps and be oriented in travel lanes to avoid vehicle wheel tracks.
b) Crosswalks markings shall extend ten feet longitudinally. Curb ramps, when required, shall always be located within the longitudinal borders of the marked crosswalk.
c) Marked crosswalks shall be used at all signalized intersections. Marked crosswalks should be provided across all legs of a signalized intersection unless an engineering study establishes that a crosswalk would create a safety issue or significant operational issue at the intersection.
d) Marked crosswalks may be used in other locations as required by Engineering.
e) Marked crosswalks shall not be provided if there is not a curb ramp provided at ends of the marked crosswalk where it is necessary for pedestrians to cross a curb.

280.2 Left Turn and Right Turn Lanes Markings

a) Turn arrows shall be elongated per *Oregon Standard Drawings* TM500 series.
b) A minimum of two turn arrows shall be provided within each turn lane at both signalized and unsignalized turn lanes.
c) At signalized intersections, the first set of arrows should be placed a minimum of 40 feet from the crosswalk.
d) Dual turn lanes shall include dotted lane extension lines (WD per *Oregon Standard Drawings* TM500 series) through the intersection.

280.3 Stop Bars

a) Stop bars, if required, shall be placed behind the location of pedestrian crossings.
b) Stop bars should be used at all intersections with arterial, collector and connector roadways.
c) Stop bars are not required if crosswalk markings are present except to address unique geometry or as directed by Engineering.

280.4 Transverse Marking Materials

Durable markings (Type B-HS) shall be used for all crosswalks, bike lane symbols, turn lane arrows, stop bars and other pavement legends unless installed for construction activities.

280.5 Longitudinal Markings

a) Durable markings should be used for all major and minor arterials within the urban area.
b) Durable markings should be used for all lane extension lines and transition areas.
c) Durable markings should be used on all approaches within the queuing and transition areas approaching a signalized intersection or other areas where traffic would be expected to transition or frequently traverse over markings.
d) High performance markings should be used for all other longitudinal markings.
e) Arterials and collectors should be marked with centerlines unless the requirements of the *MUTCD* don't call for centerlines.
f) Arterials and collectors should be marked with edge lines except where the overall road width is less than 20 feet.
g) Paint, as defined by the *Oregon Standard Specifications for Construction*, may not be used on non-maintained local access roads unless temporary or as part of maintenance activities.

280.6 Reflective Pavement Markers (RPMs)

Centerline recessed reflective pavement markers (RPMs) should be used on the following roadways:
a) Arterial roadways.
b) Collector roadways outside the UGB.
c) Roadways where reflective pavement centerline markers already exist.

280.7 Temporary Markings

a) Foil-back tape of similar width to the permanent line may be used for temporary marking for a period not to exceed one month. For periods exceeding one month, paint should be utilized.
b) Temporary reflective pavement markers (also known as "stick and stomps") may be used for a period not to exceed two weeks and should be checked frequently to ensure adequate delineation is present.

280.8 Marking Materials

The materials to be used on the project shall be submitted to Engineering for review and approval prior to marking layout.

280.9 Marking Layout

The applicant should contact the County at least two business days in advance of striping for inspection of an applicant or contractor supplied striping field layout.

~~280.2 Crosswalk Markings~~

~~Crosswalk markings shall be "continental" style generally with two foot wide bars and three foot wide gaps and be oriented in travel lanes to avoid vehicle wheel tracks.~~
~~a) Crosswalks markings shall extend ten feet longitudinally. Curb ramps shall always be located within the longitudinal borders of the marked crosswalk.~~
~~b) Marked crosswalks shall be used at all signalized intersections. Marked crosswalks should normally be provided across all legs of a signalized intersection unless otherwise approved.~~
~~c) Marked crosswalks may be used in other locations only as approved by Engineering.~~
~~d) Marked crosswalks shall not be provided if there is not a curb ramp provided at ends of the marked crosswalk where it is necessary for pedestrians to cross a curb.~~
~~e)~~

~~280.3 Left Turn and Right Turn Lanes Markings~~

~~a) Turn arrows shall be elongated per *Oregon Standard Drawings* TM 500 series.~~
~~b) A minimum of two turn arrows shall be provided within each turn lane at both signalized and unsignalized turn lanes.~~
~~c) At signalized intersections, the first set of arrows shall be placed a minimum of 40 feet from the crosswalk.~~
~~d) Dual left or right turn lanes shall include dotted lane extension lines through the intersection. Survey marks shall be provided by the applicant or contractor during field layout to ensure accuracy.~~
~~e)~~

~~280.4 Stop Bars~~

~~Stop bars shall typically be placed behind the location of pedestrian crossings.~~
~~a) Stop bars~~ are~~shall not typically~~ ~~not required if~~be used with crosswalk markings ~~are present except to address unique geometry~~.
~~Stop bars should typically be used at~~ all ~~intersections with arterial, collector and connector roadways.~~
~~b)~~

~~280.5 Transverse Marking Materials~~

Durable markings shall be used for all crosswalks, bike lane symbols, turn lane arrows, stop bars and other pavement legends unless temporary..

280.6 Longitudinal Markings

Durable markings shouldall be used for all major and minor arterials within the urban area.

a) Durable markings shouldall be used for all lane extension lines and transition areas.

b) Durable markings shouldall be used on all approaches within the queuing and transition areas approaching a signalized intersection or other areas where traffic would be expected to transition or frequently traverse over striping.

c) High performance markings shouldall be used for all other longitudinal markings.

d) Arterials outside the UGB shouldall be marked with centerlines. These arterials shouldall be marked with bike lanes or edge lines except where the overall road width is less than 20 feet.

e) Collectors outside the UGB shouldall be marked with centerlines. These collectors may be marked with a narrow double or edge lines except where the overall road width is less than 20 feet.

Paint, as defined by the Oregon Standard Specifications for Construction, may not be used on publicCounty roads unless temporary. in natureds unless .

280.7 Reflective Pavement Markers

Reflective pavement centerline markers shouldall be generally used on the following roadways:

a) Arterials within the UGB.

b) Arterials and collectors outside the UGB.

c) Roadways where raised pavement centerline markers already exist.

d)

280.8 Temporary Markings

Foil back tape of similar width to the permanent line may be used for temporary marking for a period not to exceed one month. For periods exceeding one month, paint shall be utilized.

a) Temporary reflective pavement markers (also known as "stick and stomps") may be used for a period not to exceed two weeks and should be checked frequently to ensure adequate delineation is present. Use shall be based upon *Oregon Standard Drawing* TM810.

b)

280.9 Marking Materials

Prior to marking layout, the materials to be used on the project shall be submitted to Engineering for review and approval.

280.10 Marking Layout

The applicant shouldall contact the County at least two working days in advance of striping for inspection of an applicant or contractor supplied striping field layout.

~~SECTION 2~~SECTION 290 - TEMPORARY TRAFFIC CONTROL

290.1 General

a) Traffic control in the public right-of-way ~~requires a permit issued~~is subject to a permit.~~ by Engineering.~~

b) ~~Traffic control shall be considered for all work located in the public right-of-way.~~ All traffic control shall comply with the requirements of the *MUTCD*, Oregon MUTCD supplement, the ODOT *Sign Policy and Guidelines*, FHWA's *Standard Highway Signs*, ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction*, *Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*, and *Oregon Traffic Control Plans Design Manual. Oregon Standard Drawings* TM800 series ~~standard drawings~~ should be used with particular reference to TM844 for temporary pedestrian access routes.

~~a)~~

~~b)~~

c) Traffic control plans need not generally bear the stamp of an Engineer, except as required by Engineering~~the County~~. If required due to complexity, plans shall be prepared under the direction of and stamped by an Engineer with expertise in traffic engineering~~ or by a Traffic Engineer~~.

290.2 Control of Site

a) At no time shall flagging operations delay traffic for a period greater than twenty (20) minutes.

b) Work and activity zones (construction, restoration, erosion control) shall extend no more than 2500 lineal feet at any one time unless otherwise approved.

c) Open trenches shall extend no more than 250 lineal feet at any one time, unless otherwise approved.

d) No trenches are to be left unprotected between dusk and dawn.

e) Trenches shall conform to the technical requirements of Section 00405 of the *Oregon Standard Specifications for Construction.*

f) Trench plating shall be positively secured from movement and shall be ramped with anti-slip coated plate ramps.

290.3 Temporary Pedestrian Accessible Route

~~c) Plans submitted that exhibit a lack of expertise may be returned without comment.~~

If existing pedestrian access will be obstructed by construction, alteration, maintenance or other temporary conditions, a continuous temporary pedestrian accessible route (TPAR) shall be provided consistent with the requirements of this section. Temporary pedestrian accessible routes shall conform to the requirements of Part 6 of the *MUTCD*, and the most recent update of the ~~*Oregon Standard Specifications for Construction*~~*Oregon Standard Specifications for Construction*, Section 00220.02(b). The temporary pedestrian accessible route plan shall be included in the traffic control plans. County inspectors will inspect the TPAR. If deficiencies are identified the inspector will stop work until such deficiencies are corrected. TPAR requirements include:

In work zones pedestrian access shall not be blocked by parking of vehicles or equipment, materials storage or for any other reason except for construction.

~~a) In work zones pedestrian access shall not be blocked by parking of vehicles or equipment, materials storage or for any other reason except for construction.~~

a)

~~1)~~ The TPAR shall parallel the disrupted pedestrian access route, on the same side of the street where possible.

b)

~~2) Pedestrians and Bb~~Bicyclists should not routed into~~use the same~~ the TPAR~~temporary pedestrian accessible route~~. If it is necessary to divert bicyclists around the work, provision should be made for a separate route for ~~the~~ bicyclists.~~ that is consistent with the most recent update of the Oregon Standard Specifications for Construction, Section 00220.02(c).~~

c)

~~3)~~ If the work impacts the accessibility of pedestrian routes through or around the work zone, limit impacts to one corner of an intersection at a time.

d)

~~4)~~ Close sidewalk at a point where there is an alternate way to proceed~~,~~ and provide signing and other traffic control devices directing pedestrians to an alternate pedestrian route. ~~Work with traffic engineering to develop a plan.~~

e)

~~5)~~ The TPAR shall be inspected by the applicant on a regular basis to ensure that it is safe and does not have gaps or surface displacements creating a hazard.

f)

~~6)~~g) The TPAR shall meet the standards of a pedestrian access route as defined in ~~PROWAG~~*PROWAG*:

~~7)~~1) Minimum width shall be 48 inches. Provide a 60 by-60 inch passing space every 200 feet along the route.

~~a)~~ Surface shall be smooth and nonslip.

2)

~~b)~~3) Vertical clearance shall be at least 8 feet.

~~c)~~4) Cross slope shall be no more than 2.0% perpendicular to the direction of pedestrian travel.

~~d)~~5) Grade shall be less than or equal to the grade of the adjacent road.

~~e)~~6) Minimum turning space of 4 feet by 4 feet shall be provided wherever it is necessary for pedestrians to turn.

~~f)~~7) If it is necessary to cross a curb, the TPAR shall include a temporary ramp meeting standards for a curb ramp.

~~g)~~8) If it is necessary for the TPAR to cross a driveway or construction access truncated dome warning shall be provided. If it is not possible to provide truncated dome warning construction staff shall be provided at all times when construction vehicles are crossing the pedestrian access route.

~~h)~~9) Night time lighting shall be provided.

~~i)~~g) Provide and maintain Pedestrian Channelizing Devices (PCD) through the period in which the permanent pedestrian access route is disrupted. Pedestrian channelizing devices are intended to prevent those with disabilities from straying into the vehicular way or an active construction area. Caution tape is not sufficient to guide those who are blind or low vision. Use only PCDs that are on the approved ODOT Qualified Products List, that are designed to be ADA compliant. Provide pedestrian channelizing devices ~~at the following locations~~:

~~a)~~ Between the TPAR and any adjacent construction site.

1)

~~b)~~ Between the TPAR and the vehicular way, if the temporary pedestrian access route is diverted into the street.

2)

~~c)~~ Between the TPAR and any protruding objects, drop-offs, or other hazards to pedestrians.

3)

~~d)~~4) At a curb ramp if the opposite curb ramp is temporarily and completely blocked, and no adjacent alternate circulation path is provided.

h) When work briefly or intermittently blocks or restricts the use of a pedestrian route, and a temporary detour route is not practicable due to the short duration of the restriction, provide a temporary means of allowing pedestrian access through or around the work area. Means of providing temporary pedestrian accessibility may include, but are not limited to temporarily suspending the work and making the pathway passable, or use of construction staff to guide pedestrians through or around the area. When a TPAR is created in the public right-of-way, both visual and audible warning shall be provided at both ends of the temporary pedestrian access.

~~4)~~ When direction signage or warnings are provided they should be located to minimize backtracking. Audible warnings shall be provided for those who are blind or low vision and should include specific directions allowing them to find the desired path.

i)

~~8)~~a) ~~At no time shall flagging operations delay traffic for a period greater than twenty (20) minutes.~~

~~Work and activity zones (construction, restoration, erosion control) shall extend no more than 2500 lineal feet at any one time unless otherwise approved.~~

~~Open trenches shall extend no more than 250 lineal feet at any one time, unless otherwise approved.~~

~~At no time shall flagging operations delay traffic for a period greater than twenty (20) minutes.~~

~~Work and activity zones (construction, restoration, erosion control) shall extend no more than 2500 lineal feet at any one time unless otherwise approved.~~

~~5) Open trenches shall extend no more than 250 lineal feet at any one time, unless otherwise approved. No trenches are to be left unprotected between dusk and dawn.~~

~~6) 290.2 Plans Required~~

If a traffic control plan is required required, a traffic control plan shall be submitted to Engineering for approval for all work in the right-of-way prior to the commencement of work.

290.43 Impacts to Traffic Signals

a) In no case may flagging operations take place in conflict with the indications of an operating traffic signal.
b) No flagging operations may take place within 200 feet of an operating traffic signal without the approval of a custom traffic control plan subject to a permit.
a) .
b) Should traffic control requirements dictate the "turn-off" and/or "turn-on" of a traffic signal, the following shall take place:
c) The applicantrequestor shall coordinate with the County Traffic Signal Shop at least 48two business days hours prior to turn-off and/or turn-on.
The requestor shall provide funds to the County Traffic Signal Shop equal to time and expenses required to complete the turn-off and turn-on, including overtime expenses.

290.54 Temporary Road Closures

290.4.1 General

Temporary Temporary road closures will be approved on a case-by-case basis and are generally discouraged. rRoad closures are not for the purpose of convenience or cost reduction for an applicant. Proposed closures shall establish that a clear public safety and convenience benefit would result from a closure.

a) The detour route shall be capable of safely and legally accommodating the detoured traffic.
a)b) With increasing ADT, functional classification and closure duration, the applicant's burden becomes greater in establishing the benefit of a proposed closure.
b)c) Proposed closures shall be accompanied by a traffic control plan. More complex closures may be required to be designed by an Engineer.If a road closure is proposedapproved, the following may be required:
1) Evidence that other methods of traffic control and/or that temporary improvements are not feasible in order to keep the road open.
2) Time of day restrictions or extension of normal working hours and days.
3) Contract requirements of incentives/disincentives for completing/not completing closure on time.
4) A public engagement plan.
5) Off-site improvements to meet minimum safety of the detour route and/or to return the detour route to its original condition prior to the detour per Section 225.6.

1) Time of day restrictions or extension of normal working hours and days.
2) Time of day restrictions or extension of normal working hours and days.
3) Contract requirements of incentives/disincentives for completing/not completing closure on time.
4) Public engagement plan.which may includeWritten notification of nearby property owners and service providers as defined by the County.
c) Public egagement planmeeting to address neighborhood concerns.Off-site improvements to meet minimum safety of the detour route and/or return the detour route to its original condition.
d) Portable variable message signs.

290.4.2 Arterial Road Closures

Temporary road closures proposed on arterial roadways will generally not be approved.
Prior to the approval of a temporary road closure on an arterial roadway, the applicant shall establish that the following conditions exist:
There is no other feasible alternative to closure.The proposed closure offers a clear benefit to the safety of the roadway system.
Temporary improvements to the roadway are infeasible.

~~The proposed detour route can safely and legally accommodate the detoured traffic.~~

~~290.4.3 Submission and Approval~~

~~General road closure requests and the associated traffic control plans shouldall be submitted at least four (4) weeks in advance of the proposed closure.~~
~~Road closures exceeding six (6) months in duration or closures proposed on collectors or arterials shaouldll be submitted at least six (6) weeks in advance of the proposed closure.~~
~~Plans submitted with inadequate traffic control plans may extend this timeline, possibly significantly. Road closures of duration greater than six months may require BCC approval, while closures of shorter duration require Road Official approval.~~

~~SECTION 2~~SECTION 295 - TRANSPORTATION IMPACT STUDY (TIS) REQUIREMENTS

295.1 General

The objective of a transportation impact study (TIS) is to assess the impacts of a proposed project or land use action on the transportation system and identify mitigation for any capacity or safety deficiencies. ~~A development should only be approved if criteria are met from both a capacity and safety perspective.~~ These requirements are intended to provide standards for generation of a TIS for land development applications that are consistent with ~~existing~~ land use regulations and guidelines for traffic analysis that is prepared for County capital projects. ~~.~~

295.2 Requirement for a Traffic Impact Study ~~Required~~

a) A TIS shall be required based upon an assessment of Engineering regarding the anticipated relative impact of a proposed development on the existing or planned transportation system.

~~a)~~b) A TIS to address traffic capacity is not~~should not typically be~~ required where the proposed development will generate less than twenty vehicles trips in any peak hour unless to ~~. However, a TIS may be required to~~ address specific safety issues identified by the County. The need for a TIS is at the discretion of the ~~County~~ Road Official.

~~b)~~

295.3 Traffic Study Scope and Coordination

a) Engineering and the applicant should coordinate to develop a written TIS scope that will guide the work of the TIS and define the study requirements based upon the anticipated influence area of the proposed development.

~~a)~~b) The influence area of a proposed development establishes the requirements of analysis for the TIS and is defined on a case by case basis, but is typically~~generally~~ based upon the trip generation of the proposed development in relation to the proximity of congested roadways and intersections or the proposed development's potential impact on safety issues.

~~b)~~

295.4 Traffic Engineering Expertise

All traffic impact studies shall be conducted under the direction of and stamped by an Engineer with expertise in traffic engineering ~~or by a Traffic Engineer~~.

295.5 Coordination with Other Agencies

As applicable, ~~T~~the applicant is expected to ~~shall~~ coordinate with ODOT and affected local jurisdictions in the scoping, development, and review of a TIS regarding intersections or roadways that are not under the County's jurisdiction. In some cases, the County has adopted adjacent agency standards as part of the *ZDO*~~., so coordination is advised~~.

295.6 ~~Long Term Analysis~~ Zone Changes and Comprehensive Plan Amendments

Zone changes and *Comprehensive Plan* amendments require ~~long range year~~ analysis compliant with ~~the~~ OAR 660-012-0060, ~~the~~ Transportation Planning Rule. ~~The applicant shall obtain horizon year link volume estimates from Engineering or Metrodevelop appropriate horizon year volumes from the regional travel demand forecast model for use in their analysis. Link volumes shall be post processed and not used directly in the analysis. This analysis should be compliant with the procedures of ODOT's Analysis Procedures Manual~~

295.7 Clackamas Regional Center (CRC) Area Analysis Period

a) The *~~ZDO~~ZDO* ~~Section 1007~~ and *Comprehensive Plan* ~~Chapter 10~~Chapter 10 require special analysis periods within the Clackamas Regional Center Area.

b) Within the CRC area, a weekday PM peak two hour analysis is required. The first hour of analysis shall be based upon the peak hour of the subject intersections. If the mobility standard is met for the first hour, no further

analysis is required. If the mobility standard is not met in the first hour, a second hour of analysis is required. The second hour of analysis shall be based upon the "shoulder" ½ hours before and after the peak hour, which may require additional traffic counts.

c) Within the CRC area, a weekday midday hour analysis is required.

d)

295.8 Analysis Methodology

a) All analyses shall be conducted in compliance with the most recent versions of the following:

1) *Highway Capacity Manual* (*HCM*) with the exception of signalized intersections, which shall be based upon the HCM 2000.
2) ITE *Trip Generation Manual*
3) ITE *Trip Generation Handbook*
4) *MUTCD*
5) AASHTO - *"A Policy on the Geometric Design of Highways and Streets"*
6) AASHTO - *"Guidelines for Geometric Design of Very Low-Volume Local Roads"*
7) AASHTO - *Highway Safety Manual*

8)b) It is recognized that in many instances, the HCM's methodology is limited especially in highly congested conditions. In instances where the HCM is incapable of providing accurate analysis, the County and applicant shall coordinate on an appropriate analysis method.

a)c) The HCM provides methodology for reporting intersection level of service (LOS) in a variety of ways, including by movement, by approach, or by the intersection as a whole. The following establish the County's LOS and v/c determination method and other analysis parameters required to evaluate the requirements of the Comprehensive Plan *Comprehensive Plan* and ZDO *ZDO*.

b)

295.8.1 Two-Way Stop Controlled (TWSC) Intersections

At two-way stop controlled intersections, including driveways, the weighted average methodology of the critical approach of the *HCM* shall determine the LOS and v/c of the intersection.

295.8.2 All-Way Stop Controlled (AWSC) Intersections

At all-way stop controlled intersections, the intersection average methodology of the *HCM* shall determine the LOS and v/c of the intersection.

295.8.3 Signalized Intersections

At signalized intersections, the intersection average methodology of the *HCM* shall determine the LOS and v/c of the intersection.

295.8.4 Roundabout Intersections

At roundabouts, the critical approach shall determine the LOS and v/c of the intersection.a volume to capacity ratio of 0.95 or less shall be provided on each approach based upon HCM methodology or as approved by Engineering.

295.9 Signalized Intersection Analysis Parameters

a) The TIS shall analyze traffic signals in the following manner with regard to traffic signal timing:

1) The existing, background and total traffic analysis shall be consistent with the existing signal timing.

a) The existing, background and total traffic analysis shall generally be consistent with the existing signal timing.

1) Signals operating asAnalysis of isolated intersections shall optimize the existing timing, with green times not to exceed the maximum existing green times. splits within the maximum cycle length.

2)

b) Signals that operate in a coordinated timing plan shall be analyzed without adjustments.as such, with consistent cycle lengths, forceoffs, green time, yellow time, red time and offsets.

3)

~~a) Pedestrian volume and timing shall be considered.~~The total traffic analysis ~~may vary from the existing signal timing under the following conditions:~~

4) If modifications to the signal timing are proposed or shown in the analysis, the total traffic analysis shall contain two scenarios: total traffic with existing signal timing and total traffic with proposed signal timing. ~~Generally~~However, signal timing modifications are typically not acceptable as mitigation to a project's impacts.

b) Additional analysis requirements may apply in the case of coordinated signal systems as changes at one intersection may affect other intersections not included in the study area of the project.

~~b)~~c) The Engineer shall request County, ODOT and local jurisdiction signal timing for use in their analysis. The Engineer is responsible for ensuring that the ~~existing~~ appropriate signal timing is used in the analysis ~~as appropriate~~.

d) If signal timing changes are recommended by the applicant and approved by Engineering as acceptable mitigation to a project's impacts, funds will be required to design and implement new signal timing plans suggested as mitigation by the applicant.

~~c)~~c) Where adaptive signal timing exists, the ~~County will provide signal timing parameters to the applicant.~~applicant and County will work together to determine the appropriate signal timing parameters.

~~d)~~

295.10 Peak Hour Factor ("PHF")

a) The peak 15 minutes of the peak hour shall be the basis for determining ~~level-of-service~~intersection operations except as noted in the ~~*ZDO*~~*ZDO* and *Comprehensive Plan*, which allows a one hour peak period in some situations. In those instances, the peak hour factor shall be set to 1.0 and the entire peak hour traffic volume shall be evaluated.~~.~~

~~a)~~b) The PHF shall be derived from the existing raw manual turning movement counts and be applied uniformly over each scenario except ~~in the case of long term analysis~~as provided below in 3).

~~b)~~c) In the case of ~~long term~~zone change or comprehensive plan amendment analysis, the peak hour factors presented in ~~the default PHF of the *HCM* or the existing PHF, whichever is greater,~~ODOT's Development Review Guidelines ~~shall~~or existing PHF shall be used in analysis.

~~c) The intersection peak hour factor may be utilized rather than individual movement peak hour.~~

295.11 Microsimulation Models

a) C~~Highly c~~ongested conditions will require the use of microsimulation models.

~~a)~~b) The use of microsimulation ~~models shall require general adherence to the procedures of FHWA's~~ shall require compliance with the ODOT *Analysis Procedures Manual (APM)*~~.~~

~~b)~~

295.12 Growth Rates and In Process Traffic

a) For short term analysis of five years or less, linear growth rates shall not ~~typically~~ be less than 2% per year unless verifiable evidence is submitted or known which indicates that the local growth rate is less than 2% per year.

~~a)~~b) For long term analysis of six years or more, linear ~~simple~~ growth rates ~~shall~~ should not be used if ~~. The applicant shall comply with the ODOT Analysis Procedures Manual in developing future year volumes~~regional travel demand volumes are available. In that case, the analysis should rely upon regional travel demand volumes and post process those volumes per the *APM*.~~.~~ If no regional travel demand volumes are available, the historical trends methodology of the *APM* or other approved methodology may be acceptable.~~obtain data per for use in their analysis.~~

~~b)~~c) In process traffic, or developments that have been approved and have current land use approval ~~yet~~ are not ~~yet~~ occupied or fully built-out, shall be included in addition to growth projections. T~~except~~hat information may be omitted for ~~for~~ zone changes and comprehensive plan amendments.~~only when modeling data per is not utilized.~~

~~c)~~

295.13 Turning Movement Counts

Turning movement counts shall be conducted as follows:

295.13.1 Count Hours

The count hours stated in Table 2-19 shall be collected in analysis unless the TIS scope specifies otherwise.

Table 2-19. Traffic Count Hours by Area

Outside Clackamas Regional Center Area	
Weekday AM Peak Hour	6:30 AM to 8:30 AM
Weekday PM Peak Hour	4 PM to 6 PM
Within Clackamas Regional Center Area	
Weekday Midday Peak Hour	11 AM to 2 PM
Weekday PM Peak Hour	3:30 PM to 6:30 PM

Table 2-19. Traffic Count Hours by Area

Outside UGB	
Weekday AM Peak Hour	6:30 AM to 8:30 AM
Weekday PM Peak Hour	4 PM to 6 PM
Inside UGB	
Weekday Midday Peak Hour	11 AM to 1 PM
Weekday PM Peak Hour	3:30 PM to 6:30 PM

295.13.2 Day of Week

Turning movement counts shall be conducted on Tuesdays, Wednesdays and Thursdays unless otherwise directed.

295.13.3 Holidays

Turning movement counts shall not be conducted within one week of a ~~federal holiday~~federal holiday.

295.13.4 Current Counts

Traffic counts should be based upon counts collected within 24~~12~~ months of the completed land use application. Counts older than 24~~12~~ months may not be accepted or may require adjustment to current traffic conditions.

295.13.5~~6~~ ~~Turning Movement Count Required Data~~Vehicle Classification, Bicycles and Pedestrian Data

Turning movement counts shall separately include vehicular (truck vs. non-truck), bicycle and pedestrian traffic volumes.

~~295.13.5 Traffic Count Submission~~

~~Raw traffic counts files shall be submitted electronically with each TIS submission.~~

295.14 Trip Generation

a) Trip generation shall be based upon the latest edition of ITE's *Trip Generation Manual* and *Trip Generation Handbook*.
b) The traffic impact study shall include an estimate of site generated trips, pass-by trips, diverted linked trips, and internal capture trips during each study period.
c) If a trip generation rate similar to the proposed use is not available within *Trip Generation Manual*, then the procedures of the *Trip Generation Handbook* regarding obtaining local trip rates shall ~~generally~~ be required unless otherwise~~local trip data is unavailable for the proposed use or as~~ approved by Engineering.
d) Trip generation shall be based upon an average weekday unless otherwise specified by Engineering.
~~e)~~

295.15 Trip Distribution

Trip distribution shall be approved by Engineering.~~be mutual~~~~For smaller projects, trip distribution may be based upon existing traffic conditions~~ and ~~, engineering judgment, and previous traffic studies.~~
~~For larger projects, the transportation modeling methodologies of NCHRP 255 should be used as a general guideline. In both cases, prior to trip distribution, it is strongly recommended that the method of trip distribution be confirmed with Engineering.~~

295.16 Queuing Analysis

~~1) Development that proposes a drive-thru serivce shall provide a queuing analysis that evaluates the impact of drive-thru queues onto public roadways. Drive-thrus that are anticipated to back traffic onto public roadways are considered to be a safety issue.~~

~~All development may be required toprovide a queuing analysis that evaluates the impact of drive-thru queues onto public roadways. Drive-thrus that are anticipated to back traffic onto public roadways are considered to be a safety issue.~~

~~As required by Engineering, the TIS shall provide 95th percentile queue estimates for each movement at each study intersection.~~

~~In tabular format, T~~the ~~TIS~~traffic study shall identify the existing available queue storage, anticipated 95th percentile queue and indicate if that storage is or will be exceeded.

~~2) In cases where the anticipated 95th percentile queue exceeds the available storage and the queuing is considered to be a safety issue:~~

~~A the development willmay be required to mitigate a queue back to the background condition, if a safety issue maywould result without mitigation.~~

a) All development may be required to provide a queuing analysis that evaluates the impact of queues onto public roadways. Developments that are anticipated to back traffic onto public roadways are considered to be a safety issue.

b) Development that proposes a drive-thru service shall provide a queuing analysis that evaluates the impact of drive-thru queues onto public roadways.

c) As required by Engineering, the TIS shall provide 95th percentile queue estimates for each movement at each study intersection. The TIS shall identify the existing available queue storage, anticipated 95th percentile queue and indicate if that storage is or will be exceeded.

d) In cases where the anticipated 95th percentile queue exceeds the available storage and the queuing is considered to be a safety issue, the development will be required to mitigate a queue back to the background traffic condition.

~~3)~~c) Microsimulation utilized to substantiate queuing shall comply with ~~Section 295.11~~Section 295.11.

~~4)~~

295.17 Traffic Safety

If required, t~~T~~he TIS shall analyze the ~~existing and future~~ safety of the transportation network by addressing the following. If any of these conditions cannot be met and mitigation does not sufficiently address the deficiencies, ~~the development does not~~Engineering may find that a proposed development does not meet safety standards:

~~:**Adequate intersection sight distance at existing or proposed driveways unless one of the following have occurred:**~~

~~The County has approved the use of stopping sight distance.~~

~~**Section xxx** allows an existing driveway to remain.~~

~~**295.17.1 Sight Distance**~~

a) Sight distance is~~shall~~ adequate ~~be determined at each proposed site driveway and at affected off-site intersections~~ subject ~~to the per the~~ standards of ~~Section 240~~Section 2Section 240.

~~a)~~b) Crash history is adequate per ~~2~~Section 295.17.1~~2~~.

~~b)~~c) Queuing is adequate per Section 295.16~~xxx~~.

d) Access requirements are adequate per ~~Section 2~~Section 220.

~~e)~~

~~d) Access by functional classification is adequate per xxx.~~

e) A turn lane, if warranted and recommended by Engineering per ~~Section 2~~Section 295.18.1, ~~will be~~is provided.

f) Truck circulation is adequate per Section 295.17.2.

g) Off-site access is adequate per Sections 225.4 and 225.5.

295.17.1 Crash History
~~**295.17.2 Crash History**~~

Crash history shall be analyzed ~~provided~~ for all study intersections and ~~as well as nd along all~~ sections of roadway to which access is proposed ~~if required~~.

a) Crash rates, frequency and severity shall be evaluated~~reported.~~ ~~at all study intersections.~~

b) The applicant~~consultant~~ shall evaluate the existing crash history to determine crash patterns, severity and frequency and make recommendations for safety improvements.

c) Intersection crash rates in excess of typical crash rates require ~~an in depth~~ further safety analysis based upon the *Highway Safety Manual* the *APM* to determine the development's impact on safety and may require proportional mitigation.

d) As required, s~~S~~egment crash rates in excess of typical crash rates require further ~~an in depth~~ safety analysis based upon the *Highway Safety Manual* and the *APM* to determine the development's impact on safety and may require proportional mitigation.

~~e) A discussion of (SPIS) rankings, if required. SPIS data will be provided to the applicant, if required.~~

~~295.17.3 Analysis of Access Standards~~

~~The TIS shall provide an analysis of access standards per Section 220.~~

295.17.24 Truck Circulation

~~For~~An analysis of the ability of the onsite design and control vehicle to circulate on site and at access locations.

~~The minimum onsite design vehicle is a fire truck.~~

a) ~~As required, f~~For developments that will ~~be frequently served by~~generate greater than 50 daily vehicles ~~in size greater or equal to~~of a size greater than or equal to WB-50, an analysis of truck turning movements at~~to~~ the intersection of the following will be required:
   1) The nearest collector or arterial roadway (whichever is closer) if within the UGB.
   2) With the nearest arterial roadway if outside the UGB.

b) Mitigation will be required if a safety issue would result.

~~a) With tThe nearest collector or arterial roadway (whichever is closer) if within the urban area.~~
~~a) With the nearest arterial roadway if within the rural area.~~
~~b) Mitigation may be required if a safety issue would result.~~
~~c)~~

~~295.17.5 Roadside Characteristics~~

~~As required by Engineering, address any existing roadside deficiencies such as lack of sidewalk, shoulders and bikeways and discuss proportional roadside improvements along the project frontage and impacted roadways and intersections.~~

295.18 Mitigation

a) The traffic study shall include suggested mitigation to comply with ~~*ZDO*~~*ZDO* and *Comprehensive Plan* ~~level of service~~mobility requirements, to provide a minimum level of safety to support the proposed development ~~per Sections 225, 240.3 and this section, to determine a development's proportional share of needed improvements,~~ and to address ~~neighborhood livability issues, and~~ other requirements of these ~~*Standards*~~*Standards* as required.

~~a)~~b) Proposed mitigation may require a safety analysis based upon the *Highway Safety Manual* and *APM*.~~.~~

~~b)~~c) Mitigation that shall be considered in the analysis is described below, as applicable:

~~c)~~

~~295.18.1~~ **295.18.1** ~~295.18.1~~ **Turn Lane Warrants**

~~295.18.2~~

~~a) The consultant shall analyze the need for right and left turn lane warrants as required by Engineering.~~

~~The County utilizes the current ODOT left turn and right turn siting criteria of the Highway Design Manual when establishing the possible need for left and right turn lanes.~~

~~b) The affirmation of a warrant being met for a turn lane does not dictate its installation. County staff will make a determination regarding the need for turn lanes based upon the following factors:~~

~~ODOT turn lane siting criteria.~~

~~a)~~

~~Relative turn volume to through volume.~~

~~Bicycle and pedestrian activity.~~

~~Proportional impact of the development upon the movement.~~

~~Right-of-way availability.~~

~~Crash history or anticipated crashes.~~

~~The presence of other turn lanes along the roadway.~~

~~Functional classification of the roadway.~~

~~b) Planned cross section of the roadway within the *Comprehensive Plan* or *CIP*.~~

a) The applicant shall analyze the need for right and left turn lane warrants as required by Engineering.
b) The County utilizes the current ODOT left turn and right turn siting criteria of the *Highway Design Manual* when establishing the possible need for left and right turn lanes.
c) The affirmation of a warrant being met for a turn lane does not dictate its installation. County staff will make a determination regarding the need for turn lanes.
~~c)~~ Signalized intersections shall ~~generally~~ be accompanied by channelized left turn lanes on the major street and minor street and designed per ~~Section 250.8.8~~Section 250.8.8 except as approved ~~by Design Modification~~per Section 170.~~otherwise approved.~~.
d)
e) Signalized intersections may require ~~be accompanied by~~ channelized right turn lanes ~~on the major street and minor street~~ as warranted above and designed per ~~Section 250.8.8~~Section 250.8.8.

~~f)~~

295.18.2 ~~18.2~~ **Traffic Signal Approval**

A traffic signal proposed to address safety or capacity issues shall meet the requirements of ~~Section 260~~Section 260 including evidence to indicate that other alternatives have been considered.

~~The approval of traffic signals shall be based upon Section 260.~~

295.18.3~~18.3~~ **Analysis of** ~~Neighborhood~~ **Impacts on Local, Residential Streets**

Some developments may have a detrimental effect upon existing residential uses~~neighborhoods~~. As applicable, the TIS shall evaluate impacts such as traffic volume increases, potential speed increases, safety impacts and other livability issues on local, residential streets.

a)

~~a)~~ Based upon the relative impact of the development upon local, residential streets, ~~the neighborhood, the County may recommend~~ improvements to mitigate a development's impact may be required ~~upon an existing neighborhood~~.

b)

c) Elements to be considered as potential mitigation include the traffic calming measures of ~~Section 265~~Section 265.

~~d)~~

295.18.4 Other Mitigation

Other mitigation, such as the installation of stop signs, warning signs, signal timing modifications, additional ~~through travel~~ lanes, roundabouts, traffic circles, pedestrian and bicycle improvements and other potential improvements, will be evaluated on a case by case basis ~~on their own merits~~. Suggested mitigation shall be accompanied by appropriate engineering analysis to allow for the review of such proposals including a review of the mobility and safety impacts of the proposed mitigation. ~~s.~~

295.19 Traffic Study Components

The following elements typically make up a ~~are generally required for a~~ TIS.~~:~~

295.19.1 Executive Summary

An executive summary that ~~shall be prepared generally~~ discusses ~~sing~~ the proposal and the results of the study and any necessary traffic related mitigation to meet the requirements of the land use application.

295.19.2 Project and Study Area Description

A description of the existing and proposed land uses, site characteristics, surrounding land uses, roadway system characteristics, transit service, pedestrian and bicycle facilities, and any pending transportation system improvements as identified in the *Clackamas County Capital Improvement Program*, *Comprehensive Plan*, and ODOT or local jurisdiction plans.

295.19.3 Analysis Periods and Scope

~~a)~~ Analysis of intersection capacity and/or roadway segment capacity, as required by the Scope, meeting the requirements of these ~~*Standards*~~*Standards*, ~~*ZDO*~~*ZDO* and *Comprehensive Plan*.

~~b)~~a)

The analysis shall include the following study scenarios at a minimum or as directed by staff:

~~c)~~

~~a) Existing Traffic (Analysis based upon "current" traffic counts)~~

~~Background Traffic at a reasonable full build-out year (Existing Traffic + Growth + In Process Traffic)~~

~~b)~~

1) Existing Traffic (Analysis based upon "current" traffic counts) ~~Total Traffic at a reasonable full build-out year (Background Traffic + Site Generated Traffic)~~
2) Background Traffic at a reasonable full build-out year (Existing Traffic + Growth + In Process Traffic)
~~b)~~3) Total Traffic at a reasonable full build-out year (Background Traffic + Site Generated Traffic)

295.20 Submittal Requirements

~~Traffic studies, revisions, and all communications intended for the land use written record shall be submitted to the Planning staff responsible for the land use action. Unless prior to a land use application, a TIS should not be submitted directly to Engineering.~~

a) Completed traffic studies and revisions shall be submitted as a pdf document.
b) All electronic files used in support of a traffic analysis shall be submitted upon request.

~~1) Completed traffic studies and revisions shall be submitted, in their entirety, as a pdf document.~~

~~2) All electronic files used in support of a traffic analysis shall be submitted upon request.~~

~~Traffic counts shall be submitted electronically.~~

~~Printed traffic impact studies shall be submitted to Planning in the number and form required by Planning.~~

CHAPTER 3 - ON SITE DESIGN OF COMMERCIAL, INDUSTRIAL AND MULTIFAMILY DEVELOPMENTS

SECTION 310 - GENERAL

Chapter 3 establishes the technical requirements associated with on site design of commercial, industrial and multifamily developments

Site improvements for commercial, industrial, and multifamily developments are reviewed~~generally conditioned~~ through ~~the development review and~~ the land use approval process, described and administered pursuant to the ~~*ZDO*~~*ZDO*. ~~or by Federal, State or other local agency regulation. The goal of site design in Clackamas County is to provide safe, efficient, convenient, and economical movement of all vehicles, pedestrians, bicycles and service providers.~~

This chapter supplements the requirements of the ~~*ZDO*~~*ZDO* ~~Section 1007~~, which contain~~s~~ greater detail in relation to onsite design of commercial, industrial and multifamily developments.

~~SECTION 320 – PARKING AREAS~~

~~SECTION 320 PARKING AREAS~~

~~320.1 General~~

~~**All parking areas shall conform to the following minimum requirements:**~~

~~320.1.1 Maximum Slopes and Grades~~

320.1 Maximum Slopes and Grades

The plan review, permit and inspections for ADA improvements will be covered under a Development Permit when~~-~~ they are not related to a ~~current~~ building permit under review. ~~ADA accessible parking shall be provided as required by Building Code and the designated loading areas for accessible parking stalls shall not have slopes in any direction that exceed 2%. All ADA ramps shall not exceed 8.33% slopes.~~

a)

The ADA facilities should~~need to~~ be designed with a 0.5% tolerance from maximum slopes and grades.

b)

General parking areas and adjacent drive aisle slopes should~~all~~ not exceed +/-5%.

c)

d) Drive aisles not adjacent to parking spaces should~~all~~ not exceed a longitudinal slope of 10~~12~~%. Cross slopes shall not exceed 5%.

~~d)~~

320.2~~1.2~~ Pedestrian Walkways

Walkway connections to the public sidewalk shall meet ADA landing area requirements per ~~PROWAG~~*PROWAG* and be reviewed and permitted by Engineering.

~~For developments with more than 150 parking spaces, no parking space shall be more than 150 feet from an minimum 5' unobstructed pedestrian walkway which connects to a public building entrance.~~

320.3~~1.3~~ Vehicular Circulation and Maneuvering

All ~~service~~ vehicle maneuvering shall be provided on site and should limit backing maneuvers in locations where pedestrians are expected. ~~unless the facilities are approved to be serviced at curb or roadside.~~

~~a) For 90 degree parking spaces, a minimum of 24 feet of back up maneuvering room is required.~~

~~b)~~ For dimensions of parking spaces and drive aisles refer to Standard Drawings P100 and P200 ~~for maneuvering requirements~~.

~~c)~~a) All garbage and recycling facilities shall have adequate access, with onsite maneuvering and circulation for the service provider's vehicle. ~~Loading spaces shall provide adequate maneuvering for backing and turning movements~~room for the required loading space dimensions. ~~for anticipated delivery or service vehicles.~~

~~d)~~b) All movements for non-passenger design vehicles should~~all~~ be shown on an~~the plans or~~ exhibit~~s~~, showing paths traced by the extremities of the vehicles, including off-tracking. Adequate turning radii shall be provided for all loading spaces and the largest anticipated vehicles maneuvering on site and at driveway approaches. At a minimum, the circulation of a fire truck and garbage truck shall be illustrated.

~~e)~~

320.~~41.~~4 Parking and Maneuvering Area Surface & Structural Section

~~1) Shall comply with ZDO Section 1015.01~~Inside the ~~UGB, all parking and maneuvering areas shall be hard surfaced with HMAC, concrete or an acceptable alternative.~~

~~2)~~

~~3) Outside the UGB, all parking and maneuvering areas shall be constructed with compacted screened gravel or better or hard surfaced with HMAC, concrete or an acceptable alternative or surfaced with compacted screened gravel or better. All required ADA accessible parking areas and adjacent accessible areas shall meet current ADA requirements, requiring a hard surface parking space, access aisle and access way to the building entrance.~~

a) ~~The structural section of parking and drive aisles lots shall meet or exceed Standard Drawing R100.~~The parking and maneuvering surface (gravel or paving) shall comply with *ZDO* Section 1015 or with Standard Drawing R100 if not related to development.

The structural section of parking and drive aisle areas shall meet or exceed Standard Drawing R100.

b)

320.5 Parking Stalls

~~The structural section for any on-street parking shall be the same as the street structural section.~~

~~**320.1.5 Number & Dimensions**~~

~~a) All automobile off-street parking quantity and dimensions shall meet minimum and maximum *ZDO* Section 1007.07 1015.02 and Roadway Standard Drawing P100.requirements (see Standard Drawing P100).~~

~~b)~~

~~All off-street loading parking numbers and dimensions shall meet minimum and maximum *ZDO* Section 1007.08 Section 1015.04 and Table 1015-3 requirements.~~

~~All off-street bicycle parking numbers and dimensions shall meet minimum and maximum *ZDO* Section 1007.07.E Section 1015.03 and Table 1015-2 requirements.~~

~~All plans shall list the minimum number of parking and loading spaces required and the number of parking and loading spaces provided.~~

a) All automobile off-street parking quantity and dimensions shall meet the *ZDO* and Roadway Standard Drawing P100 or P200

Dimensions for on-street parking spaces shall ~~comply with~~ meet or exceed the requirements of Roadway ~~Standard Drawing P~~Standard Drawing P100 or P200. The on-street parking shall utilize the street for the drive aisle. The parking spaces shall not diminish or obstruct the required travel lanes or bike lanes.

~~c)~~

~~Plans shall show parking and loading space and drive aisle dimensions.~~

b)

c) ~~The applicant shall label all~~All compact, carpool, disabled, and loading berth spaces~~, and drive aisles~~ shall be labeled on the plans.

~~On-street parking dimensions here, 22 feet parallel, others as well, Fuller station dimensions, does this belong in this section? On-street public parking should be addressed somewhere.~~

320.~~1.~~6 Curbs and Wheel Stops

~~~~If parking lot curbs carry, direct or channel surface water, the curb s~~houldhall typically~~ be ~~type "C" or curb and gutter~~structural curb. ~~C~~urb and gutter~~. Curb and gutter shall be used if curb line slope is less than 1%.adjacent to all ADA facilities in the urban area and all curb returns.~~

a)

~~~~Alternative curbs will be considered when it is determined by Engineering that ~~type "C" curbs or curb and gutter~~structural curb ~~are~~ is not the most appropriate.

b)

~~b)~~

Extruded curbs shall not be used for carrying, directing or channeling surface water, or as a vehicle wheel stop.

~~c)~~

c) ~~Sturdy curbs and/or wheel stops shall be used in parking spaces adjacent to landscaped areas and along property lines to prevent any portion of a vehicle within the lot from extending over the landscaping or a property line. Locate the wheel stop two feet within the parking space. The wheel stop shall be at least 4" in height and secured in place.~~

320.~~1.~~7 Signage and Pavement Markings

a) All traffic control devices on private property~~, and those located where private driveways intersect County facilities,~~ shall be installed and maintained by the property owner. Traffic control devices that are located where private driveways intersect a road right-of-way shall be kept in good condition.

b) The applicant shall provide a signing and pavement marking plan to Engineering for onsite parking and circulation. This plan shall be reviewed and approved by Engineering and the local fire service provider prior to the applicant being issued a Development Permit.

c) All compact, carpool, disabled parking spaces shall be clearly marked on the site.

~~~~, and shall ~~meet the standards~~meet standards set forth in the *MUTCD* and Oregon MUTCD supplement~~.~~

~~The applicant shall provide a signing and pavement marking plan to Engineering for on site~~onsite~~ parking and circulation. This plan shall be reviewed and approved by Engineering and the local fire service provider prior to the applicant being issued a Development Permit.~~

~~a)~~

~~Stop signs shall meet the following minimum requirements:~~

~~Applicant shall install a 30-inch "STOP" sign, behind the sidewalk, at the driveway exit.~~

~~Within the urban area, the bottom of the "STOP" sign shall be positioned a minimum of 7 feet above the surface of the new sidewalk or pavement.~~

~~Outside the urban area, the bottom of the "STOP" sign shall be positioned a minimum of 5 feet above the surface of the new sidewalk or pavement.~~
~~~~

320.~~.1.~~8 Reciprocal ~~Crossover~~ Access Easements

Comply with Section 220.~~See Section 220.2 for requirements.~~

~~Confirm with planning that they review/inspect landscaping, landscaping warranty, lighting, walkways, bike parking, garbage for review and inspection and have planning, engineering, building and sustainability all agree. Emily from sustainability will do everything from garbage facility. We are no longer doing any review/inspection except for adequacy of circulation during plan review.~~

~~Garbage and recycling facilities shall comply with ZDO Section 1021.~~
~~All garbage and recycling facilities shall have adequate access, with onsite maneuvering and circulation for the service provider's vehicle. The site plans shall show all access, maneuvering and circulation for the garbage and recycling vehicles using a bus 40 auto turn template.~~
~~All service maneuvering shall be provided on site unless the facilities are approved to be serviced at curb or roadside.~~

SECTION 330 - COMMERCIAL, INDUSTRIAL AND MULTIFAMILY DRIVEWAYS

~~330.1 Minimum Driveway Design Requirements~~

a) All driveways shall meet ADA accessibility requirements if the driveway intersects with a planned or existing sidewalk or other pedestrian facility.

b) Driveways should~~hall~~ be designed with a minimum 28-foot wide approach except where the *Comprehensive Plan* requires narrower driveways.~~.~~

c) If the design vehicle for the site requires it per Section 250.1.3 or if traffic operations necessitate additional travel lanes, driveways wider than 28 feet may be required to reduce the pedestrian crossing length or implement additional measures to reduce conflicts with pedestrians.

d) Driveways on streets with curb tight sidewalk should be constructed per Standard Drawing D600.

e) Driveways on streets with curb and sidewalk with a landscape strip should be constructed per Standard Drawing D650.

f) In rare cases where a development's trip generation is such that higher speed egress maneuvers from the adjacent roadway are desired or is used for a large number of truck deliveries, the County may allow or require driveways to be constructed per Standard Drawing D675.

g) Driveways constructed without curbs should be constructed per Standard Drawing D500.

h) Driveway throats (measured from the back of the public sidewalk in the UGB and from the edge of pavement outside the UGB to the nearest perpendicular drive aisle) shall have a minimum length of 20 feet but should be designed to accommodate the 95th percentile queue. Driveway throat depths may be required to be based upon a traffic study per Section 295.

i) Driveways accessed by trucks with trailers, should~~all~~ require a minimum throat length of 50 feet.

j) Parking, intersecting drive aisles and designated pedestrian crossings are prohibited within the minimum throat depth.

k) If a gate is proposed on a driveway serving the public, the gate shall be placed a minimum of 20 feet from back of sidewalk or edge of pavement, whichever is greater. If queues are likely to extend into the travel lane of the nearest roadway, then a queuing analysis shall be provided per Section 295. Gates may require the approval of the fire district.

l) Gates are required to have a minimum of a 20' wide unobstructed opening. The opening width will be required to increase when the length of the anticipated vehicle increases unless the gate is set back far enough for the vehicle to be perpendicular to the gate.

~~Larger driveways within the UGB will be required to reduce the pedestrian crossings or implement additional safety measures to reduce conflicts with pedestrians.~~

~~b) Driveways on streets with curbs and driveways within the UGB shall typically be constructed per Standard Drawing D600. In cases where a development's trip generation is such that higher speed egress maneuvers from the adjacent roadway are desired, or is used for a large number of truck deliveries, the County may require driveways to be constructed per Standard Drawing D675.~~

~~Driveways constructed without curbs shall be constructed per Standard Drawing D500 with appropriate radii for turning movements. In the UGBurban area the driveway shall be graded to allow for max 2% cross slope of a sidewalk.~~

~~c)~~

~~d) Driveway throats (measured from the back of the public sidewalk in the UGBurban area and from the edge of pavement outside the UGB in the rural area to the nearest perpendicular drive aisle) shall have a minimum length of 20 feet but should be designed to accommodate the 95th percentile queue. Driveway throat depths may be required to be based upon a traffic study per Section 295.~~

~~Driveways accessed by trucks with trailers, shall require a minimum throat length of 50 feet.~~

e) Parking and intersections are prohibited within the minimum throat depth.

f) Driveways accessed by trucks with trailers, shall require a minimum throat length of 50 feet.

Gates are required to have a minimum of 20' wide unobstructed opening. The opening width will be required to increase when the length of the anticipated vehicle increases unless the gate is set back far enough for the vehicle to be perpendicular to the gate.

g)

SECTION 340 - REFUSE AND RECYCLING ENCLOSURE STANDARDS FOR COMMERCIAL, INDUSTRIAL AND MULTIFAMILY DEVELOPMENTS

Access and Maneuvering

AutoTurn exhibits are required to demonstrate adequate service access and maneuvering for a bus 40 and that the Ggrades may do not exceed +/- 3% in the service area.

and servi340.1 Location

All garbage and recycling enclosures located within 15 feet of any structure shall be designed to protect other structures from fire hazard.

340.2 Slope and Structural Section of Pad

The enclosure pad shall be constructed of Portland Cement Concrete, a minimum of four inches in thickness.

The grade of the pad for the enclosure shall be between 1.5% and 2%, to allow the pad to discharge surface water runoff. The grade for access to the pad shall not exceed 3% (*ZDO* subsections 1021.04.A and 1021.07.E)

340.3 Other Design Requirements

All other design elements shall conform to *ZDO* Section 1021 and Strategic Planning and Sustainability Division design guidelines. Prior to the issuance of a Development Permit, the applicant shall obtain written approval from the Strategic Planning and Sustainability Division of the proposed design and location of the enclosure.

CHAPTER 4 - STORM WATER MANAGEMENT

~~SECTION 4~~SECTION 410 - GENERAL

Chapter 4 establishes the technical requirements associated with storm water management.

410.1 Regulatory Authority

The Engineering Division of DTD is responsible for ensuring the adequate drainage of public roadways~~s~~ and developed properties in unincorporated areas outside of established stormwater districts within the County. Engineering regulates the construction of public and private roads and other site improvements to ensure adequate drainage of storm/surface water to an appropriate discharge point.

Clackamas County has ~~four~~multiple surface water districts: Water Environment Services (WES) encompasses the Clackamas County Service District #1 (CCSD#1) and ~~,~~the Surface Water Management Agency of Clackamas County (SWMACC) and Hoodland Service ~~Distrct~~District.~~;~~ The other districts are Clean Water Services (CWS) and the Oak Lodge Sanitary District (OLSD). ~~CCSD#1 and SWMACC are regulated by Clackamas County Water Enviroment Services (WES)~~

Engineering manages storm water drainage and surface water regulations for all development outside of the County's ~~four~~ established storm water districts or outside ~~a~~ city limits located within the County's boundary. For the regulations in these other areas, please refer to the respective jurisdiction.

410.2 Engineering Regulations ~~Outside the Tualatin River Basin~~

Engineering has adopted WES stormwater standards, ~~for CCSD#1, Chapters 1-5 & 8-10 outside the Tualatin River basin. Chapters 6 and 7 do not apply~~with the exceptions noted within this chapter.

~~410.3 Engineering Regulations Within the Tualatin River Basin~~

~~Engineering has adopted WES standards for SWMACC, Chapters 1-6 & 9-11 within the Tualatin River basin. Chapters 7 and 8 do not apply.~~

410.~~4~~3 Erosion Control Contractor Certification Not Required

~~CCSD#1 & SWMACC Section 4.2.8~~WES Erosion Control Certification shall not apply to Engineering regulations.

410.~~5~~4 Fees

~~Engineering does not have a surface water management district.~~ Fees listed in the WES rules and regulations, or their Stormwater ~~Standards~~*Standards*, only apply to areas within their surface water management districts. ~~Any reference to fees in WES standards apply to WES districts only. There are no surface water management fees outside of CCSD#1 and SWMACC required by the County.~~ For information on Engineering stormwater and erosion control fees outside of existing surface water management districts, ~~the WES district are as listed in the~~see ~~County Code~~*County Code*, Appendix A: Fees. For surface water management fees, within another district or municipality, contact the district or municipality directly.

~~SECTION 4~~SECTION 420 - ~~DTD DESIGN~~ EXCEPTIONS TO WES STANDARDS

The following standards are exceptions to WES ~~surface water regulations~~stormwater standards. These standards are directed towards the design and construction of public storm drainage facilities and for the coordination of stormwater runoff from private drainage systems into public systems. The intent is to ensure a comprehensive engineering review and sufficient design to identify and mitigate existing deficiencies, protect the environmental health of our watersheds, as well as to identify the capacity requirement of new system improvements resulting in an overall benefit of reduced flooding.

If any conflicts arise between these standards and WES ~~regulations~~standards, the following shall govern.

420.1 Best Management Practices (BMP) & Low Impact Development Approaches (LIDA)

Engineering acknowledges the need for Best Management Practices (BMP~~s~~) or Low Impact Development Approaches (~~/~~LIDA~~s~~) ~~in new~~ with development. ~~Currently, Engineering does not have a list of accepted LIDAs. However,~~ In addition to any LIDA standards adopted by WES, Engineering encourages designers to submit LIDA designs for review to meet the water quality and infiltration requirements outlined in WES ~~rules and regulations~~stormwater standards. Calculations will be required to illustrate to Engineering how a given LIDA provides water quality benefit. Private improvements in rural areas may work with DTD to provide a simplified approach to stormwater management that utilizes vegetation and infiltration if the site conditions warrant it. City of Portland's Simplified Approach for infiltration testing and typical details for stormwater management may be used in the rural area.

420.2 Acreage as a BMP

Development outside WES service districts is predominated by larger lot sizes. A reasonable BMP outside the UGB may be the utilization of undeveloped acreage. The applicant shall demonstrate to Engineering that water quality, detention, and/or infiltration requirements are met using the acreage BMP.

420.3 ~~Rural Area~~ Surface Water Management Applicability

S~~In areas outside the Urban Growth Boundary, s~~urface water management plans in conformance with this chapter will be required for any of following:

a) When 5,000 square feet or more of new or reconstructed impervious surface is proposed within the UGB.
b) When 10,000 square feet or more of new or reconstructed impervious surface is proposed outside the UGB.
c) When grading or any new or reconstructed impervious surface is proposed or replaced within 50 feet of a perennial creek or stream or within 10 feet of a property line.

~~Adding or replacing 10,000 sf or more of impervious surface~~
~~Adding or replacing impervious surface within 50-ft of a perennial creek.~~
~~a) Adding or replacing impervious surface within 10-ft of a property line.~~
~~b)~~

420.~~4.3~~4 Underground Injection Control (UIC) Devices ~~not Permitted in Right-of-Way~~

~~-~~UICs are ~~not~~only permitted in Clackamas County right-of-way when registered with DEQ and maintained by an established stormwater district, unless otherwise approved by ~~County~~DTD ~~Roadway~~ Transportation Maintenance. When UIC are proposed in County right-of-way, an approved IGA and maintenance agreement with an established stormwater district shall be in place prior to Development Permit issuance.

~~SECTION 4~~SECTION 430 - HYDROLOGY

430.1 Acceptable Hydrology Methods (Detention Hydraulics)

Engineering accepts the Rational Method, and TR-55, ~~and continuous runoff models~~in addition to WES approved methodology. Other methods will require prior approval from Engineering.~~.~~

Detention pond routing shall be by the Storage Indication (Modified Pulse) method:

$\{2S_2/\Delta t + O_2 = I_2 + I_1 + 2S_1/\Delta t + O_1\}$ or approved equal.

430.2 Rational Method

The Rational Method (Q=ciA) may be used to estimate peak discharge from drainage basins of less than 300 acres.

The Soil Conservation Service ("SCS") TR55 method may be used for drainage areas less than 25 square miles.

Refer to the ODOT ~~*Hydraulics Manual*~~*Hydraulics Manual* for additional information. Some of the figures contained herein have been reproduced from the above manual.

430.2.1 Rational Method Basic Methodology

The Rational Method is a simplified model for estimating the discharge of a drainage basin based on the area of the basin, type of ground cover, and intensity of rainfall.

Q	=	ciA
Q	=	peak discharge (cfs)
c	=	runoff coefficient
i	=	rainfall intensity (in/hr)
A	=	drainage area (acres)

The Rational Method can result in a wide range of discharge values based on assumptions made by the Engineer. The following sections establish parameters for the variables in the Rational Method and should be used in the design of drainage systems within Clackamas County.

430.2.2 Runoff Coefficient ~~– C~~

~~———~~The runoff coefficient (C) is a dimensionless parameter based on the type of ground cover and slope of the terrain. Table 4-1 lists runoff coefficients for various conditions of ground cover and slope.

Where ground conditions vary throughout a drainage basin, a composite runoff coefficient can be calculated as follows:

$$C_{avg} = \frac{(C_1A_1 + C_2A_2 + C_3A_3 + \ldots C_nA_n)}{(A_1 + A_2 + A_3 + \ldots A_n)}$$

Table 4-1 Runoff Coefficients (C) for Storm Drainage

Ground Cover	Terrain		
	Flat	Rolling 2-10%	Hilly Over 10%
Pavement and Roofs	0.9	0.9	0.9
Earth Shoulders	0.5	0.5	0.5
Drives and Walks	0.75	0.8	0.85
Gravel Pavement	0.5	0.55	0.6
City Business Areas	0.8	0.85	0.85
Apartment Dwelling Areas	0.5	0.6	0.7
Suburban, Normal Residential	0.45	0.5	0.55
Dense Residential Sections	0.6	0.65	0.7
Lawns, Sandy Soil	0.1	0.15	0.2
Lawns, Heavy Soil	0.17	0.22	0.35
Grass Shoulders	0.25	0.25	0.25
Side Slopes, Earth	0.6	0.6	0.6
Side Slopes, Turf	0.3	0.3	0.3
Median Areas, Turf	0.25	0.3	0.3
Cultivated Land, Clay and Loam	0.5	0.55	0.6
Cultivated Land, Sand and Gravel	0.25	0.3	0.35
Industrial Areas, Light	0.5	0.7	0.8
Industrial Areas, Heavy	0.6	0.8	0.9
Parks and Cemeteries	0.1	0.15	0.25
Playgrounds	0.2	0.25	0.3
Woodland and Forests	0.1	0.15	0.2
Meadows and Pasture Land	0.25	0.3	0.35
Unimproved Areas	0.1	0.2	0.3

430.2.3 Rainfall Intensity

~~———~~The rainfall intensity indicates the "quantity" of rainfall and is related to the rainfall duration and the design storm. Rainfall intensity is usually represented by an Intensity-Duration-Frequency (I-D-F) curve. The IDF curves for drainage design in Clackamas County are taken from the ~~*Hydraulics Manual*~~*Hydraulics Manual* (see Figures 4-1 to 4-5).

430.2.4 Time of Concentration

~~a)~~ The duration of rainfall is equal to the time of concentration (T_c), in minutes, where the time of concentration is defined as "that amount of time from beginning of a storm event, that it takes water from the most remote time location in the basin to reach the point being considered."

~~b)~~a)

~~c)~~ Determination of the time of concentration, T_c, shall be in accordance with the ~~*Hydraulics Manual*~~*Hydraulics Manual* as follows: Most drainage basins will consist of overland flow segments as well as channel flow segments. Overland flow can be further divided into a sheet flow component and a shallow concentrated flow component. Urban drainage basins may be further complicated by having significant pipe flow segments. The travel time is computed for each flow segment and the time of concentration is equal to the sum of the segment travel times.

~~d)~~b)

c) The best method of determining overland sheet flow time is the kinematic wave equation. The equation is only applicable for travel distances less than 300 feet.

~~e)~~

$$T_c = KL^{0.6}n^{0.6} / I^{0.4}S^{0.3}$$

Where: T_c = overland flow time in minutes
L = overland flow length in feet
n = Manning's roughness coefficient (see Table 4-2)
I = rainfall intensity, in/hr
S = the average slope of the overland area
K = 0.93

d) Figure 4-6 is a nomograph for the solution of the kinematic wave equation for overland sheet flow. In using the nomograph, the time of concentration and rainfall intensity are unknown. The solution is one of iteration or trial and error.

~~f)~~

Table 4-2 Mannings Surface Roughness Coefficients (n) for Overland Sheet Flow

Surface Type	n Value
Pavement and Roofs	0.014
City Business Areas	0.014
Graveled Surfaces	0.02
Apartment Dwelling Areas	0.05
Industrial Areas	0.05
Urban Residential Areas (> than 6 units/acre)	0.08
Meadows, Pastures and Range Land	0.15
Rural Residential Areas (< than 6 units/acre)	0.24
Playgrounds, Light Turf	0.24
Parks and Cemeteries, Heavy Turf	0.4
Woodland and Forests	0.4

e) After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from Figure 4-7 in which average velocity is a function of watercourse slope and type of channel. This figure was reprinted from the 1972 SCS Handbook.

~~g)~~

f) For open channels, Manning's equation can be used to estimate average flow velocity, which is usually determined for bank-full flow.

~~h)~~

~~i) REFERENCE 19~~

430.2.5 Design Storm

A design storm defines the statistical recurrence interval of a storm event. The probability of a 25-year storm occurring in a given year is 4%. Conversely, a 25-year storm will statistically occur once every 25 years. The selection of a design storm is dependent on the balance between the cost of the drainage facility and the flood risks associated with the storm event. The design storm required for public drainage facilities within the County, but outside an existing stormwater district, shall be based on a 25-year storm event. Design storms within

existing surface water management districts, shall be based on the districts requirements, but in no case shall public drainage facilities within the County's ~~right of way~~right-of-way be designed for less than the 25-year storm at basin buildout with 85% impervious.

a) ~~—~~The effects of the 100 year storm event on storm drainage structures and bridges shall be evaluated as required.

b) ~~—~~The effects of the 100 year storm event on developments within a flood plain shall be evaluated as required.

c)

d) The effect of the 100 year storm shall be evaluated when the path of the drainage could place persons or property in jeopardy.

~~d)~~

430.2.6 Drainage Area

The discharge of a storm system is dependent on the size of the basin contributing to the flow. The design of a drainage facility should account for the entire drainage basin surrounding the affected area. The Engineer shall submit a topographic map of the entire drainage basin with the drainage calculations. This map should identify the existing and proposed drainage facilities and sub-basins considered in the design. This overall design shall anticipate and accommodate the acceptance and conveyance of surface water on or crossing the roadway or roadway system considered in the design area.

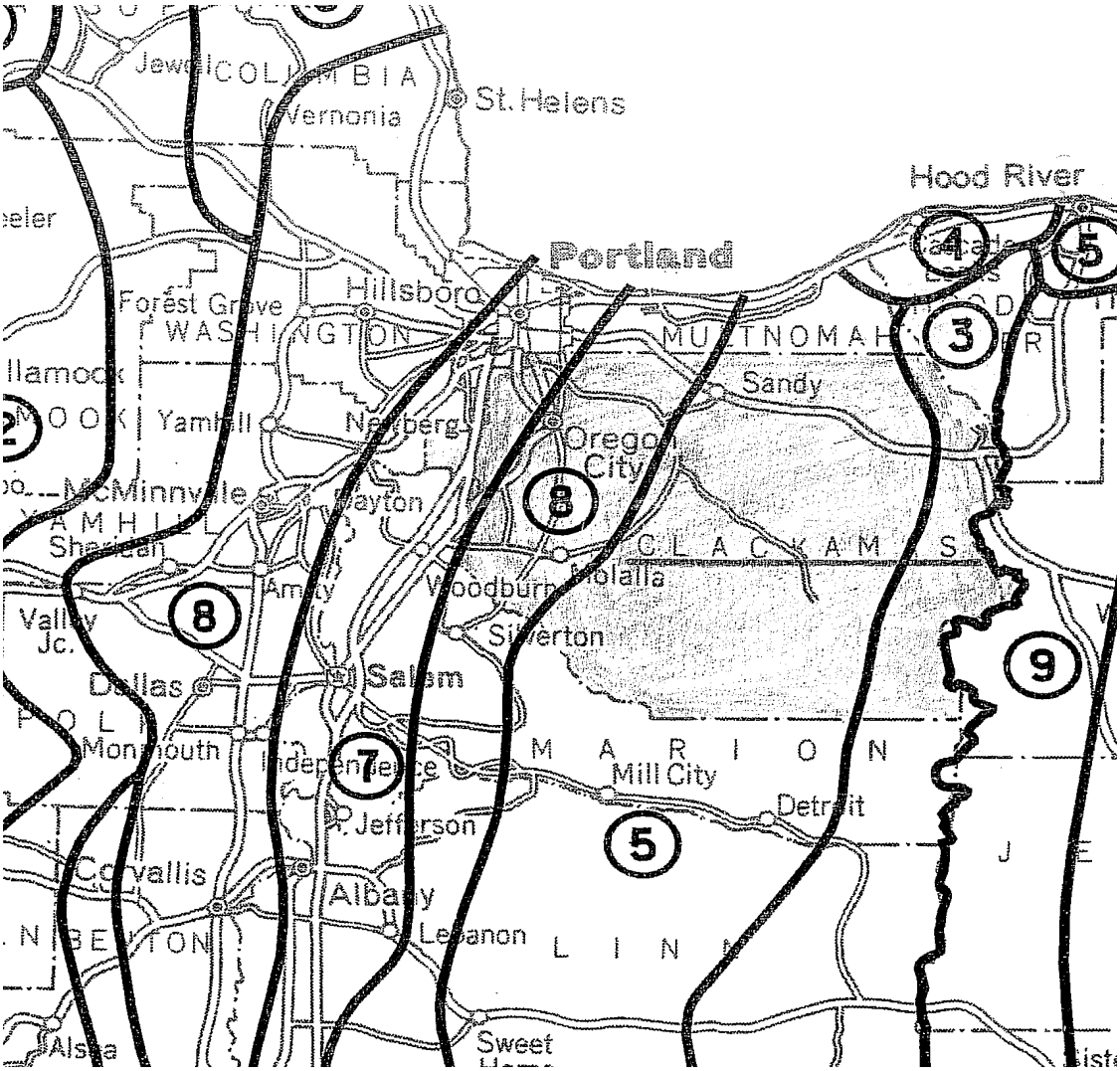

Figure 4-1. Clackamas County Rainfall Zones
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

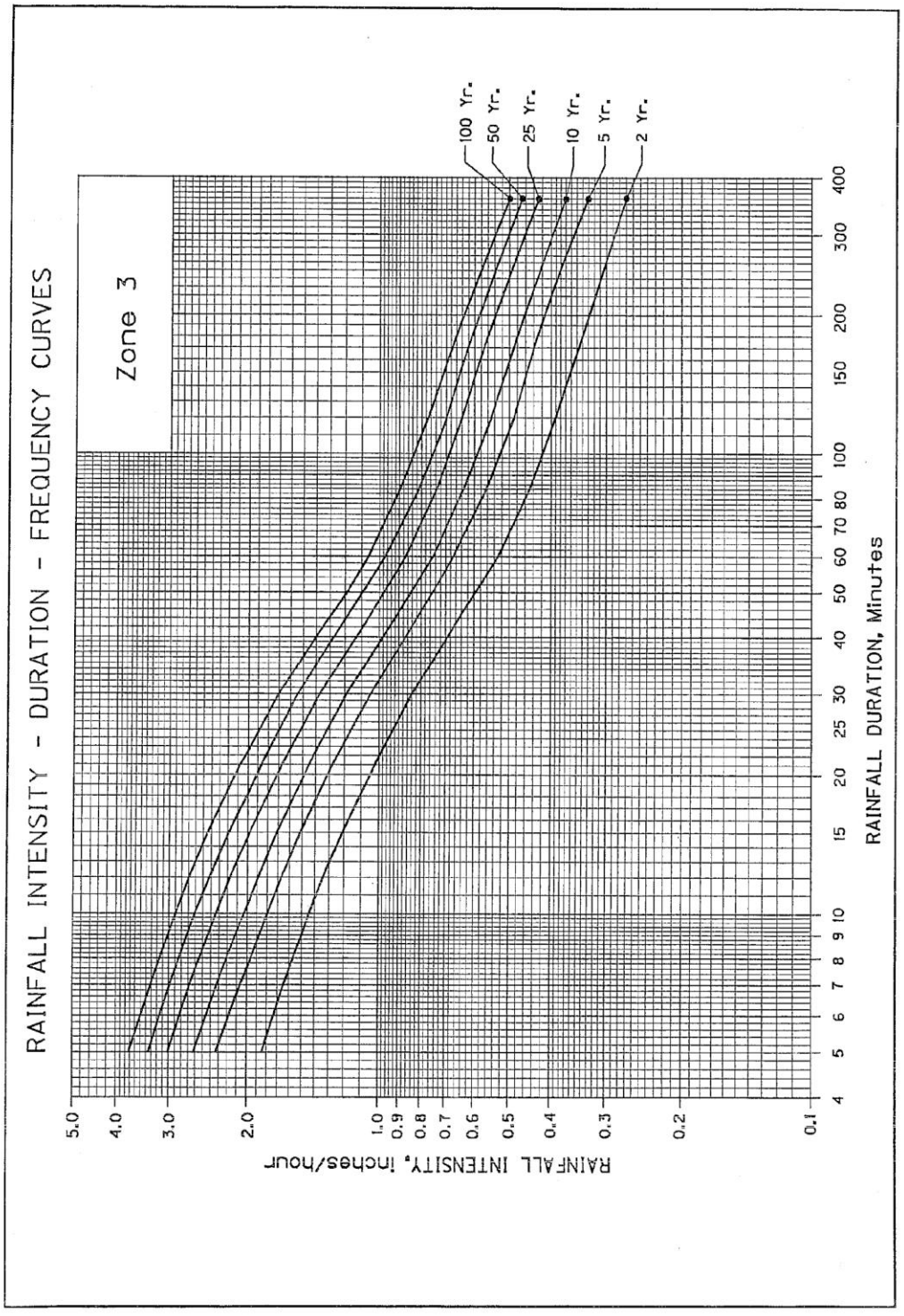

Figure 4-2. ZONE 3 Rainfall Intensity, Duration, Frequency Curves
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

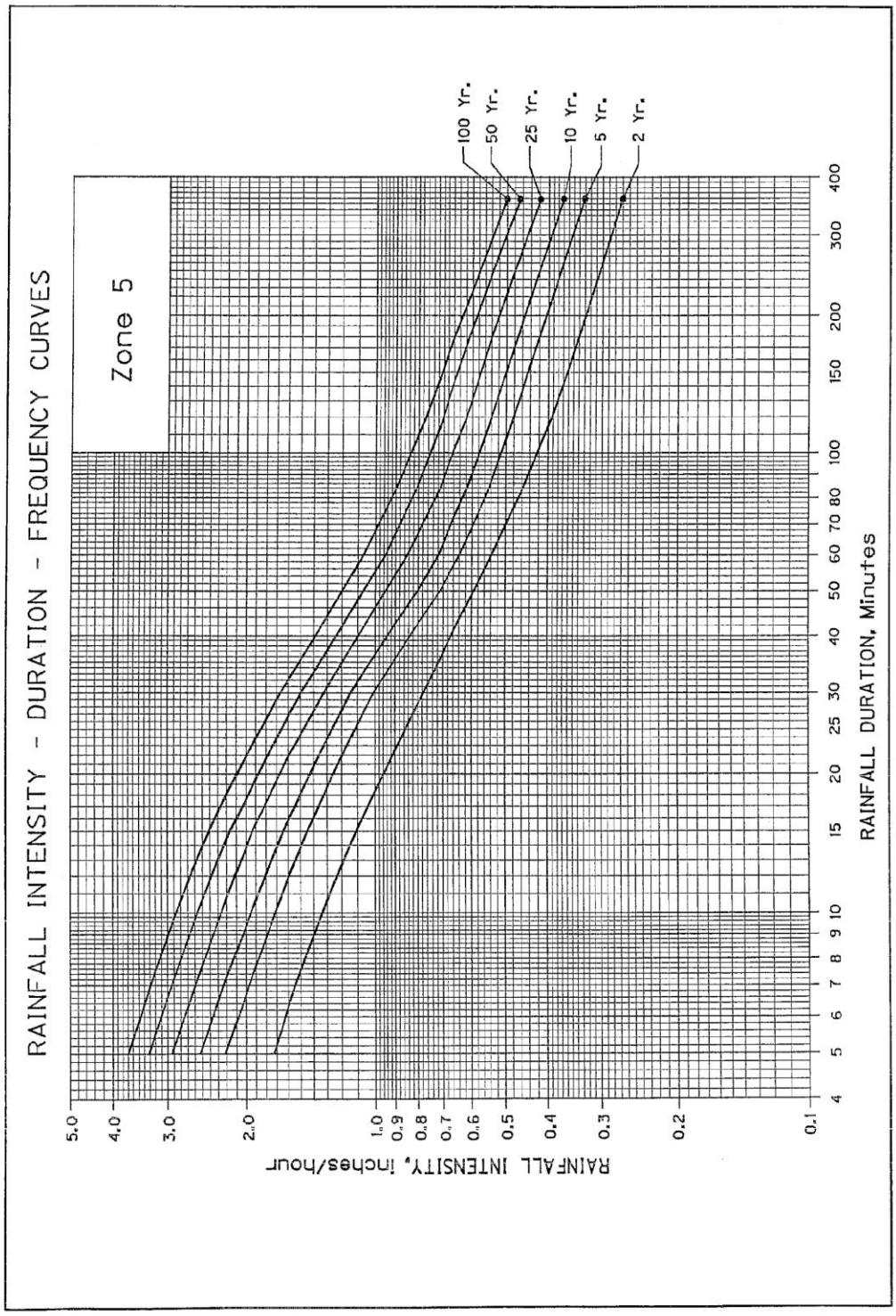

Figure 4-3. ZONE 5 Rainfall Intensity, Duration, Frequency Curves
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

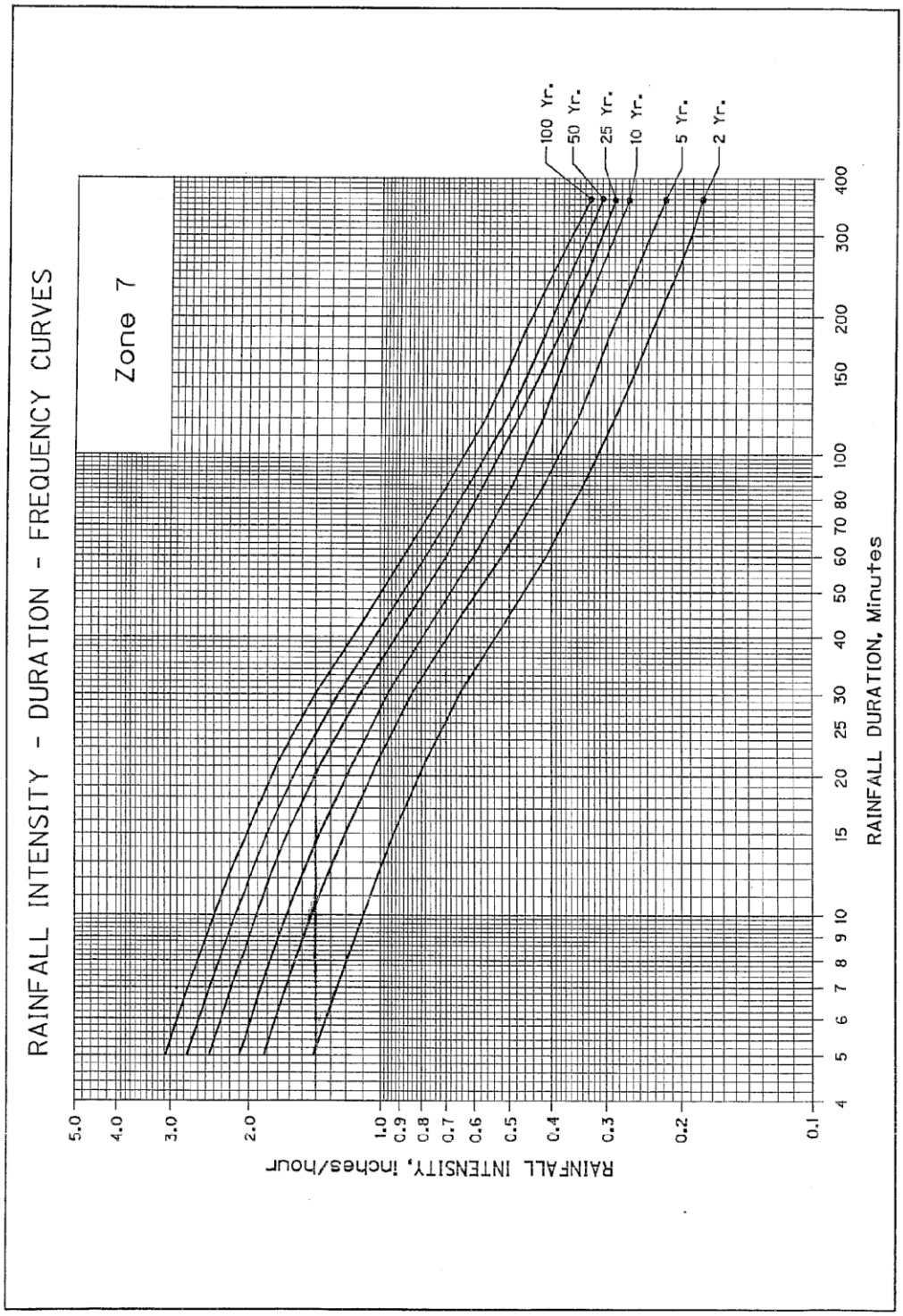

Figure 4-4. ZONE 7 Rainfall Intensity, Duration, Frequency Curves
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

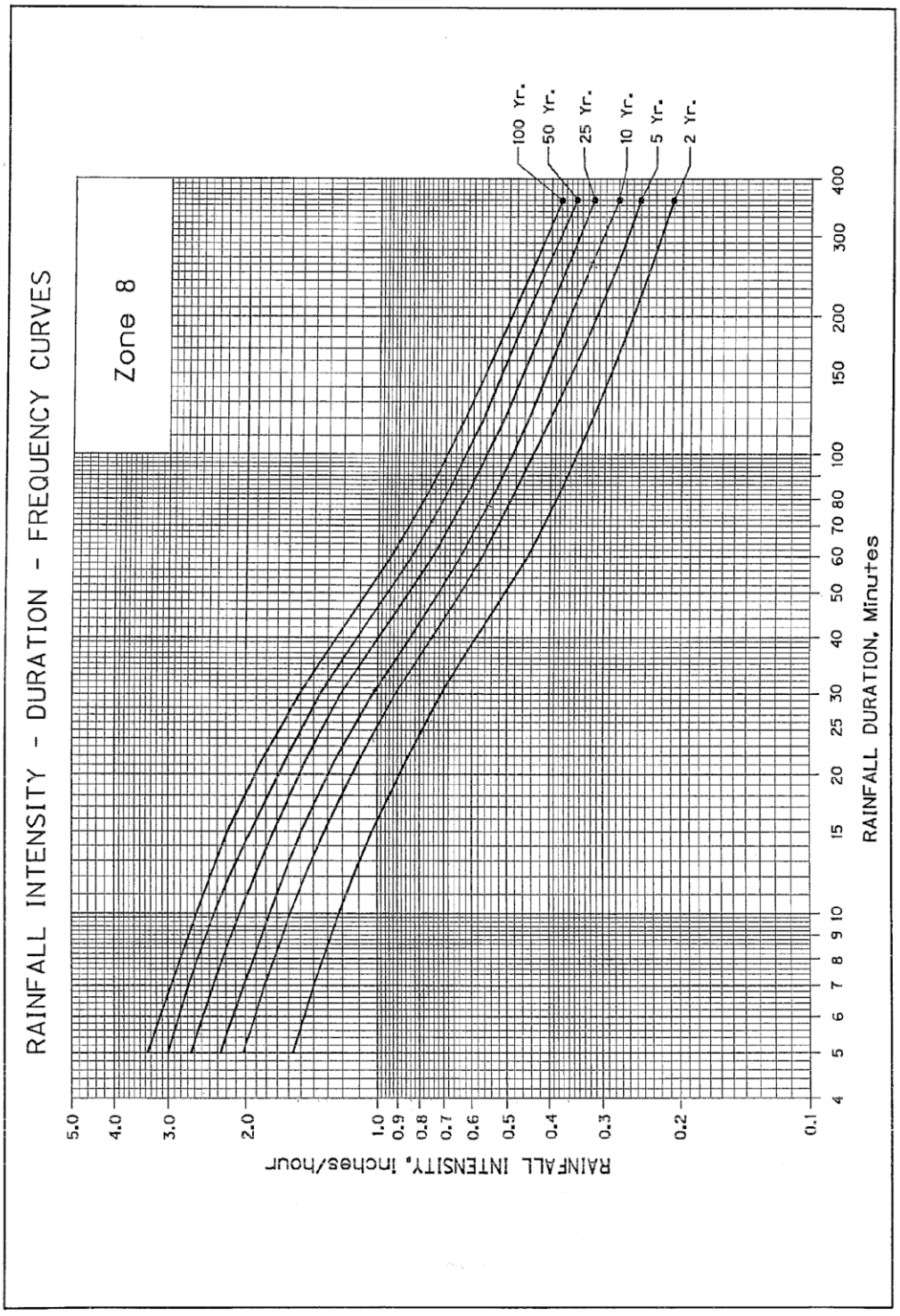

Figure 4-5. ZONE 8 Rainfall Intensity, Duration, Frequency Curves
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

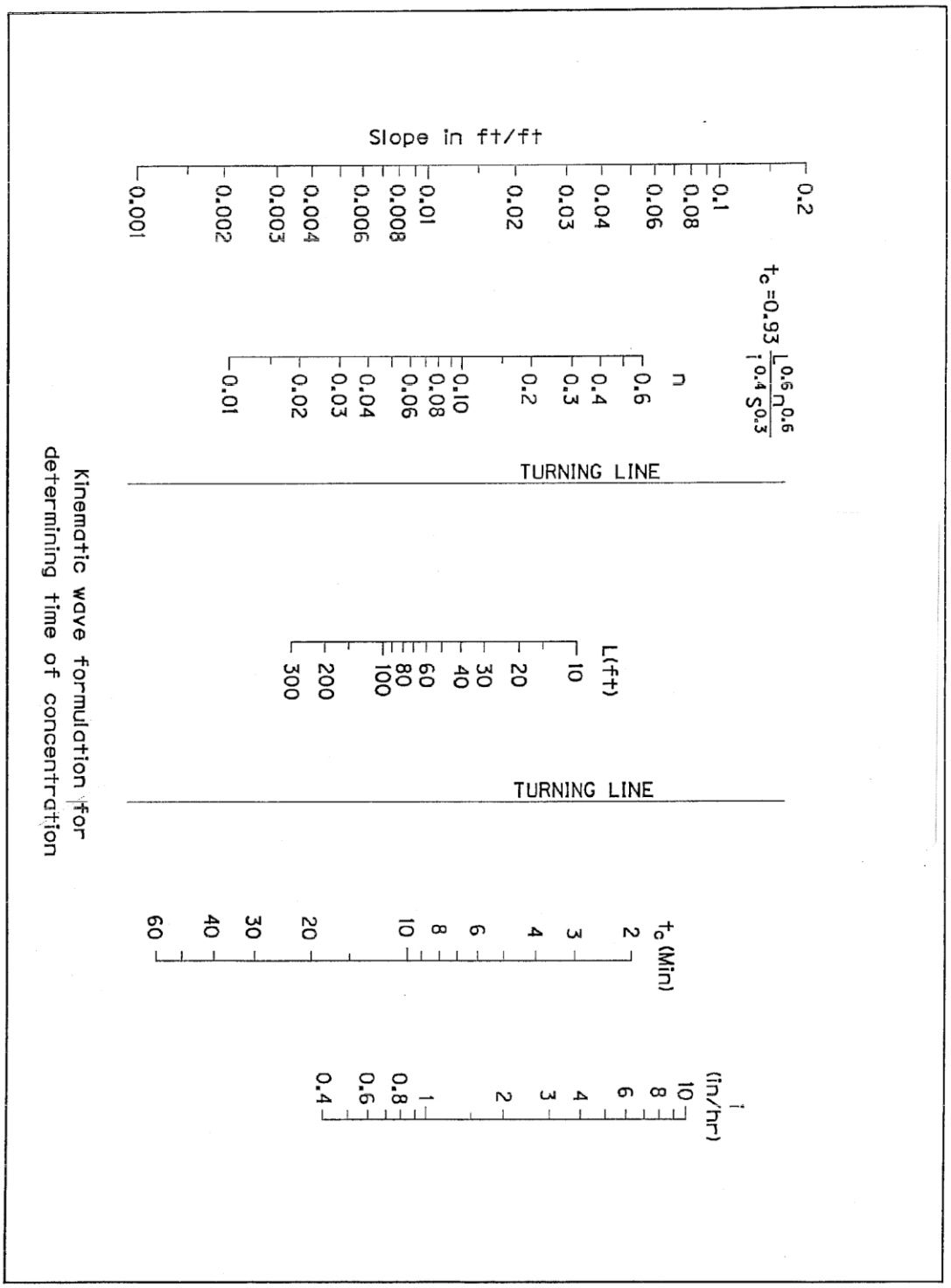

Figure 4-6. Time of Concentration
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

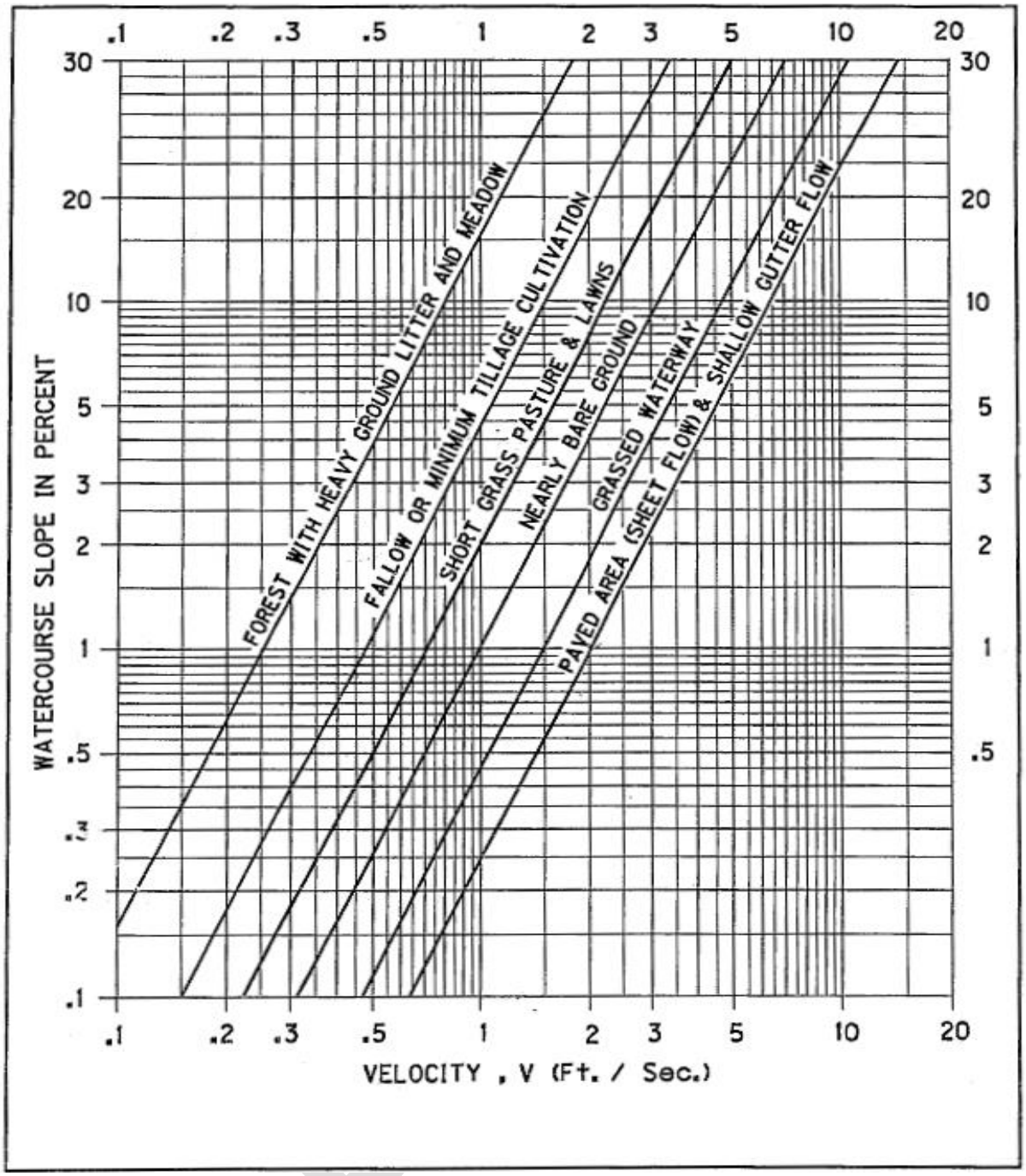

Figure 4-7 – Shallow Concentrated Flow Velocity
Reference: ODOT ~~Hydraulics Manual~~Hydraulics Manual

~~SECTION 4~~SECTION 440 - STORM DRAINAGE COMPONENTS

440.1 Pipes and Culverts

440.1.1 Pipe Material

~~—~~The pipe material permitted for use within the public right-of-way is as follows:

a)
~~—~~Concrete, non-reinforced, ASTM C-14, Class 3 (maximum size: 18" inside diameter).

1)
~~—~~Concrete, reinforced, ASTM C-76, Class III (minimum).

2)
~~—~~Ductile Iron, cement lined, class 52.

3)
~~—~~High Density Polyethylene Pipe (HDPE) smooth interior, corrugated exterior HDPE sewer pipe and associated HDPE fittings shall conform to AASHTO M294, AASHTO 252, ASTM 405 or ASTM 667.

4)
~~—~~~~The following may be used as an alternate as approved by Engineering:~~ High Performance Polypropylene (HP3) smooth interior, corrugated exterior HP3 sewer pipe (12" to 30") as per ASTM F2736 and smooth interior and smooth exterior HP3 sewer pipe encasing a corrugated layer (30" to 60") as per ASTM 2764. Associated HP3 fittings shall conform to ASTM D3212.

5)
~~—~~PVC C900 or PVC 3034 with a minimum 3' of cover can be used for storm runs between manholes or between catch basins. No PVC pipe is allowed as culvert pipe.

~~5)~~6)
~~—~~~~Pipe used as culverts shall have the ends protected with headwall concrete ls unless concrete or ductile iron pipe is used.~~ The minimum life span of pipe used within the right-of-way shall be 70 years.

b)
~~—~~The Engineer shall provide to the County certification with respect to alternative pipe materials, if allowed by the County. Certification shall state that upon inspection the installation, cover, and backfill compaction are in conformance with the manufacturer's recommendations for installation and the product and installation procedures are sufficient for HS 20 loading.

c)

d) The specific strength and depth of cover for pipe shall be based on the manufacturer's recommendations for the loading requirements. Private storm drainage materials shall conform to the Oregon State Plumbing Specialty Code and requirements of the local plumbing official. If private storm drainage materials and applications are not listed in the plumbing code, Engineering will determine the requirements.

~~e)~~

440.1.2 Pipe Size

~~—~~Publicly maintained storm drains shall be a minimum of 12-inch inside diameter.

a)
~~—~~Pipes shall be sized to convey the 25 year design storm flow within the County ~~right of way~~right-of-way to accommodate the existing and subject development at a minimum velocity of 3 ft/sec when flowing full.

b)

c) The method of analysis shall be based on Manning's equation as follows:

~~e)~~

$$Q = \frac{1.49}{n} \times A \times R^{0.67} \times S^{0.5}$$

Where: Q = discharge (cfs)
n = Manning's roughness coefficient (see Table 4-2)
A = pipe area (ft^2)
R = hydraulic radius (ft)
S = slope of the energy grade line (ft/ft)

Table 4-2 Mannings Surface Roughness Coefficients (n) for Pipes

Pipe Material	n Value
Concrete	0.013
Concrete Lined Ductile Iron	0.013
High-Density Polyethylene	0.012
Polyvinyl Chloride	0.011

440.1.3 Pipe Slope

All pipes and culverts shall be designed to operate under gravity flow and be sloped to provide a minimum velocity of 3 ft/sec when flowing full. This may be reduced to 2.5 ft/sec with approval of Engineering.

440.1.4 Pipe Cover

~~a)~~ Pipe trenching, bedding, and backfill shall conform to ~~Standard Drawing U200~~Standard Drawings U200 through U270B.~~.~~

~~b)~~a)

The required minimum cover for pipe for all public storm drains shall be 36 inches or shall be as specified by the manufacturer, whichever is greater, as measured from the top of pipe to the finished roadway or ground grade.

~~c)~~b)

Reduced depth of cover may be considered by the County due to topographical constraints. Appropriate pipe material shall be used to ensure the pipe's capacity to withstand HS 20 loading.

~~d)~~c)

d) Fill heights over pipes shall meet manufacturer's recommendations and are subject to the approval of Engineering.

~~e)~~

440.1.5 Pipe Alignment and Connections

Pipes shall be laid to a straight line and grade with no curves, bends, or deflections in any direction.

a)

All changes in pipe slope, material or alignment shall require a manhole or catch basin.

b)

Catch basin locations shall have a maximum spacing of 500 feet from the high point in the road provided that the catch basins drain in opposite directions and there is not a pipe connected for that distance. Typical in line spacing shall be 250 feet.

c)

d) Extensions of pipes and culverts shall be in the same line, grade, and inside diameter as the existing pipe. Extensions shall be of like material and with a connection approved by Engineering.

~~d)~~

440.1.6 Pipe Inspection Including Televiewing

All pipes shall be lamped, mandreled and video recorded.

a)

Upon completion of all storm drain construction, the storm line shall be inspected by televiewing. The applicant shall coordinate the video recording inspection with Engineering.

b)

c) If deficiencies are revealed by the inspection, the corrections shall be made and the televiewing shall be repeated until all work is accepted. The cost of the televiewing shall be borne by the Applicant.

~~e)~~

440.2 Catch Basins and Inlets

440.2.1 Catch Basin Type

Standard GB-2 catch basins shall be used in locations where vertical curb is used. Standard catch basins shall conform to ~~Standard Drawing S200~~~~Standard Drawing S200~~WES Standard Drawings. Substandard catch basins shall be upgraded when connections are proposed.

440.2.2 Catch Basin and Inlet Spacing and Location

The spacing of catch basins or curb inlets shall be as required to limit gutter flow to less than 4 inches depth and limit water depth in a travel lane to less than 1 inch during the 10 year storm event. The maximum length of pipe between catch basins and inlets shall be 250 feet.

a)

b) Catch basins or inlets shall be provided just prior to curb returns where the centerline gradient is greater than 5% or where the next upstream inlet is 100 feet away or farther. Catch basins also are required within 500 feet of the high point of the roadway profile.

~~b)~~

440.2.3 Catch Basin and Inlet Connections

All catch basin laterals shall be a minimum 12 inches inside diameter. Catch basin laterals shall connect to the receiving main with a manhole or another catch basin or curb inlet. Blind tee connections are not allowed.

440.2.4 Lateral Connections

Lateral Connections to newly installed mainlines shall be factory fittings. "Inserta-Tee" fittings are only allowed ~~Lateral connections from roof and foundation drains from individual properties are allowed~~ on existing pipe when the lateral diameter ~~is less than half of the mainline diameter~~ is at least two nominal sizes smaller than the mainline pipe or the mainline is at least 12". The lateral shall be installed above the spring line of the mainline. The lateral shall have a clean out at the property line. Connections will not be allowed if the lateral is connected to an inlet or area drain.

440.3 Manhole Sizing and Alignment

~~a)~~

a) The diameter of manhole required shall ensure a minimum dimension, of solid concrete manhole wall, between pipe openings of 12 inches. The standard and minimum manhole size shall be 48 inches in diameter. Maximum spacing of manholes shall be 250 feet.

b) Access locations shall be required at a change in vertical or horizontal alignment or a change in pipe size or material.

c) Manhole rims shall be flush with top of asphalt. If only one lift is placed, or a portion of the overall depth of asphalt, the rim shall still be flush with the top of the asphalt constructed. As additional asphalt thickness is added later, the rim shall be adjusted to be level with the new top of asphalt.

~~440.3 Manholes~~

~~440.3.1 Manhole Size and Alignment~~

~~The diameter of manhole required shall ensure a minimum dimension, of solid concrete manhole wall, between pipe openings of 12 inches. The standard and minimum manhole size shall be 48 inches in diameter. Maximum spacing of manholes shall be 250 feet.~~

~~b)~~

~~Access locations shall be required at a change in vertical or horizontal alignment or a change in pipe size or material.~~

~~c)~~

~~Manhole rims shall be flush with top of asphalt. If only one lift is placed, or a portion of the overall depth of asphalt, the rim shall still be flush with the top of the asphalt constructed. As additional asphalt thickness is added later, the rim shall be adjusted to be level with the new top of asphalt.~~

~~d)~~

440.4 Open Channels and Ditches

440.4.1 Natural Channels

——Natural channels are those which occur naturally due to the flow of water or, following construction, those manmade channels that have become vegetated and stable.

a)

b) Natural channels shall remain in their existing, or natural, condition wherever feasible. The preservation of natural drainage-ways shall conform to the requirements of the ~~*ZDO*~~*ZDO*. Alteration of natural drainage-ways shall not occur without approval of all agencies having jurisdiction.

~~c)~~

440.4.2 Constructed Channels & Ditches

——Constructed channels include those constructed and maintained by human activity and include bank stabilization at existing channels.

a)

——Roadside ditches shall conform to the requirements and sections for County rural roadways. Roadside ditches shall not be constructed within the urban growth boundary.

b)

c) The County may consider a constructed channel along the roadside when pedestrian and vehicle safety are not compromised and sufficient road right-of-way is available.

~~c)~~

440.4.3 Design Criteria

~~a)~~ ——Roadway grading shall conform to clear zone requirements of ~~Section 245~~Section 245 and cross section requirements of ~~Standard Drawings C110 to C140~~Standard Drawings C110 to C140.

~~b)~~a)

——Constructed channels and ditches shall be trapezoidal or parabolic in cross section with side slopes no steeper than 3H:1V, or 4H:1V within the clear zone, for vegetation-lined channels and 2H:1V for rock-lined channels. Constructed channels and ditches shall be designed for a 25 year storm event. Constructed channels and ditches within the required recoverable slopes shall meet recoverable slope requirements: 4H:1V on the fore slope (down slope) and 3H:1V on the back slope (up slope).

~~c)~~b)

——Vegetation-lined channels shall maintain a maximum velocity of 5.0 ft/sec at the 25 year event. Rock-lined channels or bank stabilization shall be required when design velocities exceed 5.0 ft/sec.

~~d)~~c)

d) Access and utility easements shall be provided for all publicly maintained open channels and ditches as required by the County.

~~e)~~

~~SECTION 4~~SECTION 450 - DETENTION AND DOWN-STREAM IMPACTS

~~Detention requirements and downstream analysis shall conform to WES standards.~~

~~The requirements for downstream analysis shall conform to WES standards.~~

——Bridges and other major conveyances identified as deficient in a downstream analysis shall be designed to accommodate the 100 year storm.

a)

——The outfall of detention facilities may be required to accommodate the 100 year storm depending on the downstream impacts.

b)

——Detention structures shall not be constructed in the public right-of-way without prior approval from Engineering.

c)

~~c)~~ ——Conveyance facilities shall be designed to carry a 25 year storm event with the basin built with 85% impervious.

d)
Infiltration testing is required for all detention ponds and other surface water management facilities proposed that utilize infiltration. In rural areas, the simplified method for infiltration testing may be used if coordinated with County staff.

e)

~~Infiltration testing is required for all detention ponds and other surface water management facilities proposed that utilize infiltration. In rural areas, the simplified method for infiltration testing may be used if coordinated with County staff.~~

~~FERENCE 2)~~

~~SECTION 4~~SECTION 460 - WATER QUALITY

a) The installation of water quality facilities shall conform to WES standards.

b) Water quality structures shall not be constructed in the public right-of-way without prior approval from Engineering.

~~a)~~

~~b)~~a) ~~Water quality structures shall not be constructed in the public right-of-way without prior approval from Engineering.~~

~~c) FERENCES 2, 5)~~

~~SECTION 4~~SECTION 470 - EROSION AND SEDIMENTATION CONTROL

Erosion and sedimentation control measures are required for construction areas where the ground surface will be disturbed by clearing, grading, fills, excavations, and other construction activities. Erosion and sediment controls shall conform to ~~WES standards. Design guidelines with respect to plans and implementation of soil loss protection measures can be found in~~ WES standards and their~~the~~ *Erosion/Sedimentation* Prevention and Sediment *Control Plans*~~ning~~ and Design Manual~~, *Technical Guidance Handbook*~~. Engineering will require an erosion and sediment control plan ~~and issue an Eerosion Ccontrol p~~Permit ~~for projects associated with development~~ that disturb between 800 square feet and one acre when located in the unincorporated area and outside a stormwater district. A permit is required for this work.

~~a.~~

For areas outside a surface water management district,

~~b.~~ NPDES 1200-C permits are required for projects that disturb ~~more than~~ an acre or more and are issued by the Department of Environmental Quality (DEQ) ~~for areas outside a surface water management district.~~ ~~issued by WES for all of Clackamas County~~ An applicant will be required to provide evidence of an approved 1200-C permit upon request.~~.~~

CHAPTER 5 - STRUCTURES

Chapter 5 establishes the technical requirements associated with structures.

~~Structures not under the review of the Clackamas County Building Codes Division shall be reviewed by Engineering and subject to a permit.~~

~~Engineering will review:~~

Structures not under the review of Clackamas County Building Codes will be reviewed by Engineering and are subject to a Development Permit. Engineering will review all structures in the public right-of-way including ~~Walls over four feet in height that provide structural support to a private drive.~~

w~~W~~alls, bridges, box culverts and stairs ~~in public right -of-way.~~

~~Bridges on private drives that must support a fire truck.~~

~~Bridges along trails that are under the jurisdiction of Clackamas County.~~

Structures under the review of Engineering shall meet the following requirements:

~~Cut walls shall be located on private property.~~

~~Fill walls may be located in the public right of way if they support a public road.~~

~~a) All structures not detailed in the Standard Drawings of this document or the *Oregon Standard Drawings* shall be designed by an the applicant's Engineer and approved by Engineering.~~

a) All structures described herein shall be designed by an Engineer.
b) Walls installed by the County are allowed within the public right-of-way.
c) As feasible, retaining walls should be located on private property. Easements shall be provided as necessary.
d) Stairs located in the public right-of-way shall meet IBC requirements.
e) Other structures in the public right-of-way will be reviewed per AASHTO requirements or as otherwise determined by Engineering.

~~The project special provisions shall specify the APWA/ODOT requirements for bridges and other structures that apply to the specific project.~~

~~All structures, excluding bridges, on private property shall meet the requirements of the International Building Code ("IBC").~~

~~b) The project special provisions shall specify the APWA/ODOT requirements for bridges and other structures that apply to the specific project.~~

~~c)~~

~~d) All structures, excluding bridges, on private property shall meet the requirements of the International Building Code ("IBC"). All bridges (public and private) and all structures in the public right-of-way will be reviewed per AASHTO requirements as determined by Engineering.~~

~~e)~~ CHAPTER 6 - STREET ILLUMINATION

~~SECTION 6~~SECTION 610 - GENERAL

Chapter 6 addresses the technical requirements associated with street illumination.

Street illumination is typically installed as part of a Development Permit.

610.1 Street Illumination~~lights~~ Required Within UGB

Street illumination installation ~~lights~~ is~~are~~ required of all ~~development (~~partitions, subdivisions, commercial, industrial, and multifamily residential development~~)~~ within the ~~UGB~~UGB in Clackamas County by the ~~ZDO-1006.02.C~~*ZDO* ~~-~~if adequate street lighting does not already exist.

610.2 Street Illumination~~light~~ Design by PGE

Street illumination~~light~~ design and installation is ~~are~~ subject to the approval of Clackamas County Service District No. 5 ("Service District"), working through Engineering, and the utility serving the development, Portland General Electric ("PGE").

610.3 Street Illumination~~lights~~ are Option A

Street illumination ~~lights~~ is~~are~~ owned, operated, and maintained by PGE, as Option A and ~~PGE~~ the applicant is responsible for the ~~streetlight~~ design. PGE and the District are responsible for the design approval.

610.4 Illuminating Engineering Society (IES)

~~Lighting~~ Street illumination is generally designed to IES guidelines for the road classification utilizing existing infrastructure (poles, transformers, and circuitry) where available.

610.5 Fixture Approval

The Service District has final approval for all street illumination~~light~~ fixtures for each development.

~~SECTION 6~~SECTION 615 - PROCESS FOR OBTAINING APPROVAL FOR ~~STREETLIGHTING~~STREET ILLUMINATION

The following process is required in order to obtain Service District approval for street ~~lighting~~ illumination for all ~~new~~ development as required above:

615.1 Approval Process

~~—~~The applicant shall contact the Service District and have the property owner sign a "Request for Street Lighting."

a)

~~—~~The applicant shall also contact PGE and ~~request~~ provide PGE with a street illumination~~light~~ design.

b)

~~—~~The Service District, in turn, places an annual assessment determined by the district rate schedule on the property tax statement of the affected properties for the operation of the street illumination~~lights~~.

c)

~~—~~The tax lots in the development will be required to form an assessment area within Clackamas County Service District No. 5 for the purpose of paying for the operation and maintenance of street illumination~~lights~~.

d)

After a formal hearing process, a special assessment is placed on the tax roll at the District rate determined by the classification of the property and the type of ~~lighting~~ illumination installed.

e)

f) Contact Engineering at 503-742-4400 with any questions or to initiate the street ~~lighting~~ illumination process for a development.

~~f)~~

615.2 Construction & Installation

In areas where new underground or overhead electricity supply circuitry is required, PGE will coordinate the street ~~light~~ illumination circuitry design with the primary power supply. However, the applicant cannot assume that this will happen automatically, a separate request for street ~~lighting~~ illumination shall still be made.

a)

Depending on the circumstances of the installation, the applicant may be required to provide and install at their expense and according to the design approved by the District and PGE:

b)

Pad-vaults for transformers or overhead transformers for street illumination~~lights~~,

1)

Splice boxes, and/or

2)

Circuitry conduit with pull line.

3)

PGE will provide the transformers and circuitry for street ~~lights~~ illumination but will bill the applicant directly for any costs that may be incurred to install these; these charges may be offset to some extent by PGE line extension allowances.

c)

d) PGE will provide and install the street illumination~~light~~ poles and luminaries at no charge to the applicant.

~~d)~~

615.3 Rates

Rates are subject to change annually. The first assessment is usually in November following the date of installation and the assessment is pro-rated to the date of installation.

CHAPTER 7 - UTILITIES

SECTION 7SECTION 710 – GENERAL

Clackamas County regulates the placement and ongoing requirements of utilities that are located in the public right-of-way and easements under the jurisdiction of the County. This chapter addresses the technical requirements associated with utility installation.

See County Code*County Code* Title 7.03.099 for Utilities' Use of County Right of Wayshould be referenced for additional important information. Additionally, some utilities have separate agreements with Clackamas County that may modify the requirements included herein.

All material installed within the right-of-way shall be durable, designed for long service life expectancy, and relatively free of routine servicing and maintenance requirements.

Applicants shall conform to the requirements of Chapter 4 regarding soil loss and erosion control measures.

710.1 Potholing Requirements General Construction and Location Details for Utilities

Locating Existing Utilities – All existing utilities shall be located sufficiently ahead of trench excavation to allow for their protection or relocation.

On arterial and collector roadways, the county will require utility design plans associated with a Development Permit to pothole for existing utility locations to verify that the design has no conflicts with existing utilities. The county may require potholing in other situations and on other roadways depending on the type of facility and scope of the work. Any conflicts with existing utilities including storm or sanitary will be resolved prior to excavation for installation of the utility.

Potholing requires a Utility Permit.

710.2 Location RequirementsPotholing may be necessary to confirm their actual location.

a) Practices and procedures for locating existing utilities shall adhere to all requirements of ORS 757.New and relocated utility installations within new or existing streets shall follow Standard Drawing U100 for placementthe applicable Utility Placement Zones detail U100. unless otherwise approved by the engineering plan reviewer through a formal written request from the utility provider.

a)

b) The utility shall be placed as far as possible from the edge of the roadway including within public utility easements as feasible.

b)

c) Any placement shall not impede, obstruct, or hinder operation of any emergency service, maintenance operations, pedestrian or vehicular access or travel including to or from private properties and of legally parked vehicles or permitted items within a public right-of-way.

Above ground utility facilities shall comply with the clear zone for the street. See Section 245.follow the clear zone standards of Section 245 and pedestrian facility requirements of Section 710.3.

e)d)

e) All new or relocated Uutilities shall be installed underground per the *ZDO* or as required by land use requirements.except where otherwise prohibited by the utility district or company

f) Any manhole lids, junction boxes, vault lids, water meters, etc. that are located in vehicular travel lanes are to be out of any wheel tracks.

or allowed to be overhead through a modification request per Section 170.

d)

~~On arterial and collector roadways the county will require utility design plans to pothole for existing utility locations to verify that the design has no conflicts with existing utilities. The county may require potholing on other roadways depending on the type of facility and scope of the work. Any conflicts with existing utilities including storm or sanitary will be resolved prior to excavation for installation of the utility.~~

~~Any manhole lids, junction boxes, vault lids, water meters, etc. that are not located in the street need to be located in the planter strip or in the PUE behind the sidewalk when possible.~~

~~7) Any manhole lids, junction boxes, vault lids, water meters, etc. that are in the street are to be out of any wheel tracks.~~

710.3 Pedestrian Considerations

When considering pedestrian facilities, utilities:

a) Shall not obstruct the pedestrian facility width.

b) Any surface access to utilities (including manhole lids, junction boxes, vault lids, water meters, etc.) shall not be installed in a pedestrian facility unless no reasonable alternative exists. If no reasonable alternative exists, the surface access shall be flush with the pedestrian facility grade. The surface access located in a pedestrian facility shall be slip resistant and not have holes or depressions that can cause a tripping hazard per *County Code* Section 7.03.

c) Surface access for new utilities shall not be constructed within any ADA ramps or landing.

d) If existing utilities are located where an ADA facility needs to be constructed and the utility cannot be relocated, the surface access shall be made flush with the ADA ramp or landing and an ADA exception shall~~needs to~~ be formally requested and approved.

~~Required sidewalk widths cannot be obstructed~~~~The surface of all facilities located in a pedestrian facility shall be slip resistant and not have holes or depressions that can cause a tripping hazard.~~

~~:~~

~~When it is necessary that a facility be located within the sidewalk they shall not be constructed within an ADA ramp or landing and they shall be flush with the sidewalk.~~

~~If existing facilities are located where an ADA facility needs to be constructed and cannot be relocated, the facility shall be made flush with the constructed surface and an ADA exception needs to be formally requested and approved.~~

~~The surface of all facilities located in a pedestrian facility shall be slip resistant and not have holes or depressions that can cause a tripping hazard.~~

710.4 Structures

When attachment to a ~~road~~ structure (i.e. a bridge or a box culvert) located in a public right-of-way is involved: ~~, (i.e. a bridge or a box culvert), provide:~~

~~A current engineer's assessment of the existing structure to add the facility including;~~

~~The ability of the structure to carry the weight of the facility;~~
~~Quantify and design of:~~

~~Size of facility;~~

~~Dead load of the facility,~~

~~Supports to attach to the structure~~

~~Attachment method;~~

~~Spacing of the supports~~

~~The attachment shall be designed to be structurally sufficient and compatible with the affected road structure. The design of the attachment shall be approved by Engineering.~~

a) The applicant shall provide an engineering assessment of the existing structure to add the facility including a structural analysis that illustrates the ability of the structure to carry the weight of the facility and also considering:
   1) Dead load of the facility
   2) Supports to attach to the structure
   3) Attachment method
   4) Spacing of the supports
b) ~~Unless authorized by the Planning and Zoning Division, no~~No utility shall be attached to a bridge or other structure crossing a body of water prior to County Planning and Zoning ~~being reviewed through a~~review for a possible F~~f~~loodplain D~~d~~evelopment P~~p~~ermit ~~in Planning~~ and shall obtain the concurrence of County Transportation Maintenance. ~~Contact the Planning and Zoning Division to find out how to file a floodplain development permit: (503)742-4500~~

~~a)~~

~~No utility attachment to a structure shall inhibit the future installation of bicycle and/or pedestrian facilities on the structure nor shall they be within a floodway without land use approval. The utility may first be required to construct such bicycle and/or pedestrian facilities on the structure in order to gain approval for the attachment if otherwise the utility installation would inhibit the installation of such facilities. All design costs shall be borne by the utility at no cost to the County.~~

710.5 Pressurized Pipes

When the proposed utility involves pressure pipe line, the applicant shall ~~the following additional details are required~~provide the:

~~Design pressure of pipe;~~

~~Normal operating pressure;~~

a) Design pressure of pipe;
b) Normal operating pressure;
~~Design pressure of pipe;~~
~~a)~~c) ~~Normal operating pressure;~~Maximum operating pressure.
~~b)~~

~~Engineering shall have any proposal for attachment to a bridge or other structure reviewed by the County Bridge Maintenance Division and/or a structural engineer.~~

~~After any street has been constructed, reconstructed, or paved by County forces, under County contract, or under permit, the pavement surface shall not thereafter be cut or opened for a period of 5 years.~~

~~The Director of the Department of Transportation may~~ **~~grant exemptions to this moratorium in order to facilitate development on adjacent properties, provide for emergency repairs to subsurface facilities, provide for underground service connections to adjacent properties or allow the upgrading of underground utility facilities.~~**

~~a) When granting exceptions to this regulation, the Director of the Department of Transportation may impose conditions determined appropriate to insure the rapid and complete restoration of the street and the surface paving. Repaving will include surface grinding, and may include additional base and sub-base repairs, or other related work as needed for full-width road or full lane surface paving of the roadway.~~**710.6 Vertical Clearance**

When allowed, aerial utilities crossing the roadway shall have a minimum vertical clearance of eighteen (18) feet from the lowest elevation above the nearest roadway surface.

710.7 Burial Requirements

710.7.1 Depth

All underground installations shall be buried a minimum of thirty (30) inches below the nearest vertical roadway surface, (i.e., from the bottom of ditch line). Plans must show the distance from the nearest vertical roadway surface to the top of the proposed buried cable, pipe line, or facility.

710.7.2 Warning Signage

~~When allowed, aerial utilities crossing the roadway shall have a minimum vertical clearance of eighteen (18) feet from the lowest elevation above the nearest roadway surface.~~

Warning signs for buried power or communications cable, and for pipe lines carrying gas or flammable liquids, shall be placed at each crossing under the roadway, and at intervals along longitudinal installations as required by the current Public Utility Commissioner's Order and as specified by the Road Official as follows:

~~a)~~ Signs shall be placed as near the right-of-way line as is practical.

b) Notwithstanding ~~subsection~~ (1) above, signs for an installation within the roadway shall be placed behind any existing guardrail.

Placement of any utility within a nonconductive chase or casing shall be accompanied with excavation warning tapes and a location tracer wire placed immediately above the utility.

710.7.3 Pedestal Placement

Pedestals installed as part of a buried cable installation are to be located as far from the traveled portion of the roadway as is practical, and preferably one foot from the right-of-way line. The locations shall not impact driveways or ADA ramps. All pedestals located within the right-of-way where maintenance operations occur, including routine mowing operations, shall be routinely maintained by the applicant for vegetation control.

~~**All material installed within the right-of-way shall be durable, designed for long service life expectancy, and relatively free of routine servicing and maintenance requirements.**~~

~~Soil loss and erosion control measures shall conform to the Clackamas County Department of Water Environment Services "Erosion Prevention and Sediment Control Plans," Technical Guidance Handbook.~~

~~Placement of any utility within a nonconductive chase or casing shall be accompanied with excavation warning tapes and a location tracer wire placed immediately above the utility.~~

Any utility facilities occupying the right of way free of charge shall relocate at the utility's own expense when they obstruct or inhibit the construction of the county's road cross section. This applies to both capital projects and development that is conditioned to construct the adopted roadway cross section.

710.2 Permitting

See County Code Title 7.03.099 for Utilities' Use of County Right of Way.

No utility shall be placed, built or constructed in the right of way of any roadway under the jurisdiction of Clackamas County without first obtaining written permission from the Department of Transportation. ORS 374.305

710.2.1 Utility Placement Permits

Application for a permit to establish, place and operate utilities within the right of way shall be made on the official permit application, available from Engineering.

710.2.2 General Requirements

Construction noise shall be within the hours and decibel level limits established in the County Noise Control Ordinance located in Title 6.05 of the County Code or other applicable local noise control ordinances.

Depending on the classification of the road, type of installation, the duration of the installation or other road and traffic impact considerations, the county may require the work be completed during hours with the least volume of traffic.

1) Effective Period of Utility Placement Permits – Title 7.03.110 of the County Code;

The privileges granted and obligations created by virtue of the permit issued shall be binding not only upon the applicant, but also upon the successors and assigns of the applicant. The applicant shall give Engineering written notice of any such assignment or transfer within a reasonable time not to exceed 90 days after assignment.

2)

710.2.3 Submittal Requirements

The following items must be submitted along with Utility Permit applications:

1) Utility Placement Permit Application – online: https://accela.clackamas.us/citizenaccess/ or https://dochub.clackamas.us/documents/drupal/3ee69df1-3de1-465d-8d27-3504f8a412e2

2)

Cost estimate;

3) Plans, See Utility Notes and Details in Standard Drawing U100–U????;

4) Any additional drawings requested to illustrate the work described in the permit application.

5)

6) Traffic Control Plan in compliance with Section 290 unless waived by the County;

7) Erosion and Sediment Control plans per Section 470

8) If an installation contractor is to be used, both the applicant/utility and the selected contractor must sign the permit.

9)

10) Liability Insurance – County Code Title 7.03.130;

11) Performance Bond – County Code Title 7.03.130;

Development Agreement -

12)

When attachment to a road structure is involved, (i.e. a bridge or a box culvert), details of the attachment method and specifics of the dead load, support, spacing, size of pipe and attachment method shall be quantified and designed by an Engineer. The attachment shall be designed to be structurally sufficient and compatible with the affected road structure. The design of the attachment shall be approved by Engineering.

When the proposed utility involves pressure pipe line, the following additional details are required:

Design pressure of pipe;

Normal operating pressure;

Maximum operating pressure.

Construction related noise should be kept to the lowest possible level. Such noise shall be within the hours and decibel level limits established in the County or other applicable local noise control ordinances.

710.3 Specific Construction Details for Utility Facilities

Engineering may require provisions to prevent damage to public property, or to prevent construction from being conducted in a manner hazardous to life or property, or likely to create a nuisance. Such conditions may include, but shall not be limited to:

Limitations on the season or time of the year in which the work may be performed;

Restrictions as to the size and type of equipment;

Designation of routes upon which materials may be transported;

The place and manner of disposal of excavated materials;

Requirements as to the abatement of dust, the cleaning of streets, the prevention of noise, and other results which are offensive or injurious to the neighborhood, the general public, or any portion thereof;

Regulations as to the use of roadways as alternate routes to bypass construction delays in the course of the work;

Limitations on the operation to protect the roadway from temperature related damage, i.e., delamination of oil Macadam surfaces or through freeze/thaw cycles;

Mitigation of potential subsurface hydrologic flow along the utility or appurtenant trench;

Additional asphalt area removal and replacement to ensure the smoothness or ride characteristic present in the former undisturbed asphalt surface. This provision would apply on arterial and collector classified roadways or where the affected roadway surface is newer than five years from the time of the last overlay, without regard to roadway classification.

All underground installations shall be buried a minimum of thirty (30) inches below the nearest vertical roadway surface, (i.e., from the bottom of ditch line). Plans must show the distance from the nearest vertical roadway surface to the top of the proposed buried cable, pipe line, or facility.

Aerial utilities crossing the roadway shall have a minimum vertical clearance of eighteen (18) feet from the lowest elevation above the nearest roadway surface.

All debris which accumulates upon the right-of-way in association with a permitted activity shall be removed immediately upon completion of the activity, and the right-of-way must be restored to its previous condition or better.

Direct burial of cable placed by the plowing method shall be limited to areas behind the ditch line. Approval of alternate means is subject to time and schedule restraints to allow for preferable soil moisture conditions, oil Macadam road surface temperatures, and other roadway characteristics. In all cases mechanical comparative efforts shall be applied to the entire disturbed portion of the right-of-way. Restoration of gravel shoulders and drainage ditches and the verification of the function of all drainage structures must be achieved prior to completion.

Warning signs for buried power or communications cable, and for pipe lines carrying gas or flammable liquids, shall be placed at each crossing under the roadway, and at intervals along longitudinal installations as required by the current Public Utility Commissioner's Order and as specified by the Road Official as follows:

Signs shall be placed as near the right-of-way line as is practical.

Notwithstanding subsection (1) above, signs for an installation within the roadway shall be placed behind the existing guardrail.

Pedestals installed as part of a buried cable installation are to be located as far from the traveled portion of the roadway as is practical, and preferably one foot from the right-of-way line. All pedestals located within the right-of-way where maintenance operations occur, including routine mowing operations, shall be routinely maintained by the applicant for vegetation control.

All material installed within the right-of-way shall be durable, designed for long service life expectancy, and relatively free of routine servicing and maintenance requirements.

Soil loss and erosion control measures shall conform to the Clackamas County Department of Water Environment Services "Erosion Prevention and Sediment Control Plans," Technical Guidance Handbook.

Placement of any utility within a nonconductive chase or casing shall be accompanied with excavation warning tapes and a location tracer wire placed immediately above the utility.

710.2.4 Third Party Inspection

A Utility Placement Permit will require the applicant to provide, at the expense of the applicant, an independent third party "Primary Inspector," not associated with the ContractorThird party primary inspection will be required for work within the County right-of-way when the work includes:

More than 1,000 longitudinal feet of disturbance within the UGB.

More than 2,500 longitudinal feet of disturbance outside the UGB.

Governmental agency upgrades, maintenance, or service work

Work on arterials or collectors that disturbs more than 250 square feet of hard surface.

Night or weekend work is required or performed

Disturbance, alteration or replacement of any ADA facility/component

Trench plowing

Suspension of a utility from a bridge under County jurisdiction

.

The applicant shall ensure that any Primary Inspector has a current ODOT General Inspector Certification and is certified by ODOT in the inspection requirements being performed. Required certifications shall be provided to the County upon request.

Third party primary inspection will be required for work within the County right-of-way when the work includes:

More than 1,000 longitudinal feet of disturbance within the UGB.

More than 2,500 longitudinal feet of disturbance outside the UGB.

Governmental agency upgrades, maintenance, or service work

Work on arterials or collectors that disturbs more than 250 square feet of hard surface.

~~Night or weekend work is required or performed~~
~~Disturbance, alteration or replacement of any ADA facility/component~~
~~Trench plowing~~
~~Suspension of a utility from a bridge under County jurisdiction~~

~~Franchise utility work that may be exempt from providing a primary inspector:~~
~~1) Aerial work or work that does not break the surface within the County right-of-way~~
~~2) Lateral work within the County right-of-way~~
~~3) Pushing or pulling utilities though existing conduits~~

~~The Primary Inspector will submit daily reports on a weekly basis to the County inspector throughout the duration of the project. Daily reports shall include at a minimum:~~
- ~~Inspector's name and contact information~~
- ~~Utility Permit number~~
- ~~Date and time of inspection~~
- ~~Nature of work being performed~~
- ~~Approximate address/station/cross street/mile post of daily work~~
- ~~Structural section of the roadway (rock and hard surface)~~
- ~~Effectiveness of the implemented Traffic Control Plan~~
- ~~Compaction testing results (if applicable)~~
- ~~Relative pictures with references showing work performed~~
- ~~Hazards found during construction~~
- ~~Changes to approved plans~~
- ~~Hard surface cuts and locations~~

~~The Primary Inspector shall contact the County inspector at a minimum 48 business hours prior to starting work and when:~~
- ~~48 business hours prior starting work and when Wwork has been completed.~~
- ~~The scope of the project/work within the right-of-way has changed~~
- ~~An adjacent utility has been compromised~~
- ~~The continuation of work has stalled or been postponed for longer than 72 hours (not including weekends and holidays).~~
- ~~The integrity of the County Road has been compromised~~
- ~~Any unforeseen safety issues arise~~
- ~~Any public conflicts or concerns arise~~

710.8~~4~~3 ~~-~~Requirements and Specifications for ~~Controlled Density Fill~~Trench Backfill

a) Backfill materials meeting the *Oregon Standard Specifications for Construction* (aka "standard trench backfill") shall be required for use when trenches exceed one of the following dimensions:
   1) 100 feet in length or longer; or
   2) Greater than 10 feet in depth.

Standard trench backfill may be used per Standard Drawing U200 except when the following conditions exist and then ~~All utility trenches shall be backfilled with~~ CDF shall be utilized per U250 through U275B~~when~~:

~~a)~~b)
   1) Utility trenches are within the roadway of arterial and collector classified roadways;
   2) The affected roadway surface is newer than 5 years from the time of the last overlay, without regard to roadway classification; or
   3) Engineering deems it necessary.

~~Engineering deems it necessary.~~~~Utility trenches are within the roadway of Arterial and Collector classified roadways;~~ ~~or~~

~~1)~~
~~The affected roadway surface is newer than 5 years from the time of the last overlay, without regard to roadway classification; or~~
~~2)~~
~~Engineering deems it necessary.~~
~~3)~~
~~Backfill materials meeting the Oregon Standard Specifications for Construction may be proposed, reviewed and approved for use when trenches exceed one of the following dimensions:~~

~~Wider than four feet (trench edge to trench edge); or~~

~~100 feet in length or longer; or~~

~~Greater than 10 feet in depth.~~

~~Exemption from CDF may be considered if all of the following construction requirements are otherwise met:~~

~~Backfill materials meeting Class "B" backfill specifications from the Oregon Standard Specifications for Construction or its approved equal are used;~~

~~Not less than 97% relative maximum density (using AASHTO T-99) is achieved;~~

~~Compaction results are provided by a certified testing lab;~~

~~Perimeter excavation for manholes is 10'X10' or greater to allow for sufficient mechanical compaction of the backfill;~~

~~The surety repair time duration is extended an additional two years beyond the three years as specified in the subsequent section "Open Cut of Paved Roadway Surfaces".~~

~~b)~~ CDF shall conform to the following specifications:
c)
~~c)~~

~~Be excavatable~~Be able to excavate and produce unconfined, compressive, 28-day strengths ~~from 50 psi~~ to a maximum of 200~~150~~ psi.

1)
Contain aggregate no larger than 3/4 inch, and for trenches less than 12 inches in width, the aggregate shall be no larger than 3/8 inch.

2)
Slump shall be 6 to 8 inches to insure flowa~~i~~bility and will fill all voids without requiring compaction efforts.

3)
~~4)~~ The surface of fill shall reach a strength to withstand the process of paving without displacement or disruption within 48 hours, regardless of weather conditions, temperature or moisture content of the soil where placed. Additives such as calcium (1% or 2%), hot water and/or a pozzilith (water reducer) are acceptable means to achieve this set.

4)
5) Copies of the CDF batch weights must be submitted to Engineering.

Alternative backfill may utilized per Standard Drawings U270A and U270B.

~~5)~~
~~6) Copies of the CDF batch weights must be submitted to Engineering.~~

~~7)~~ Exemption from CDF may be considered if all of the following construction requirements are otherwise met:
~~Trenches backfilled with CDF shall be protected in the following manner:~~

~~Sufficient weight and size steel plating or approved equal materials, capable of carrying a minimum of H-20 loading, shall be present at the work site prior to excavation and placed over the trench to protect the public. Plating shall be positively secured (steel pins or welded lugs) from movement and shall be ramped with cold mix asphalt to provide for all traffic.~~

~~Plates must extend beyond the trench wall a minimum of one foot on all sides.~~

~~Lighted barricades with appropriate signage shall be placed sufficiently ahead of, and adjacent to, plating to warn all traffic.~~

~~All plating and signs are to remain in place until permanent surface repair paving operations are underway.~~

~~d)~~

~~e) A 24 hour phone number will be provided while plates are in the roadway.~~

~~Exemption from CDF may be considered if all of the following construction requirements are otherwise met:~~

d)

~~1)~~ Backfill materials meeting Class "B" backfill specifications from the ~~Oregon Standard Specifications for Construction~~*Oregon Standard Specifications for Construction* or its approved equal are used;

~~2)~~1)

Not less than 95% relative maximum density (using AASHTO T-99) is achieved;

~~3)~~2)

Compaction results are provided by a certified testing lab;

~~4)~~3)

Perimeter excavation for manholes is 10'X10' or greater to allow for sufficient mechanical compaction of the backfill;

~~5)~~4)

5) The surety repair time duration is extended an additional two years beyond the three years as specified in ~~the subsequent section "Open Cut of Paved Roadway Surfaces~~Section 710.9.

e) Trenches shall be protected in the following manner:

1) Sufficient weight and size steel plating or approved equal materials, capable of carrying a minimum of H-20 loading, shall be present at the work site prior to excavation and placed over the trench to protect the public.
2) Plating shall be positively secured from movement and shall be ramped with anti-slip coated plate ramps.
3) Plates must extend beyond the trench wall a minimum of one foot on all sides.
4) Lighted barricades with appropriate signage shall be placed sufficiently ahead of, and adjacent to, plating to warn all traffic.
5) All plating and signs are to remain in place until permanent surface repair paving operations are underway.
6) Additionally as required by Section 290.~~"~~.

~~6)~~

710.~~95~~4 ~~–~~Open Cuts of Paved Roadway Surfaces

Unless there are extenuating circumstances that require open cutting the road to install utilities or special permission is granted by the ~~County~~ Road Official to open cut the road, a cable, pipeline, or conduit, which crosses under the roadway, other roadway connections e.g. road approaches or driveways, shall be placed in a casing bored under the surface for that purpose in accordance with the following provisions:

a)

All utility companies serving the work site vicinity shall be contacted to request line locate services.

1)

Any utility conflicts shall be resolved before initiation of construction.

2)

~~3)~~ The applicant will ~~again~~ be required to comply with ORS 757.

~~4)~~3)

Installations by plowing of cable or conduits within the UGB ~~urban area~~ shall not be allowed.

b)

c) Burial of cable outside the UGB placed by the plowing method shall be limited to areas behind the ditch line or as close the right-of-way line as practical when no ditch exists. Approval of alternate means of installation is subject to time and schedule restraints to allow for preferable soil moisture conditions, pavement surface temperatures, and other roadway characteristics.

1) In all cases mechanical compaction efforts shall be applied to the entire disturbed portion of the right-of-way.

~~b)~~2) Restoration of gravel shoulders and drainage ditches and the verification of the function of all drainage structures must be achieved prior to completion.

~~Burial of cable in the rural area placed by the plowing method shall be limited to areas behind the ditch line or as close the right of way line as practical when no ditch exists. Approval of alternate means of installation is subject to time and schedule restraints to allow for preferable soil moisture conditions, pavement surface temperatures, and other roadway characteristics.~~

~~c)~~

~~1) In all cases mechanical compaction efforts shall be applied to the entire disturbed portion of the right-of-way.~~

~~Restoration of gravel shoulders and drainage ditches and the verification of the function of all drainage structures must be achieved prior to completion.~~

~~2)~~

~~1) Restoration of gravel shoulders and drainage ditches and the verification of the function of all drainage structures must be achieved prior to completion.~~

~~3)1)~~

~~d)~~ Open cut ~~main line~~ utility installations in paved streets shall restore those streets ~~the road structural section per these standards and Standard Drawing C100 or be equal to the thickness that was removed, whichever is greater and surface pavement restoration standards in~~per Standard Drawings ~~details~~ U275~~400~~ through U4~~??????~~290.

d)

~~e)~~

e) Open cut service laterals, ~~,~~ when allowed, shall be grouped together per Standard Drawing U290.

f) In addition to the requirements of Standard Drawings U275 to U295, utility cut requirements may include, but not be limited to the following conditions:

1) Repaving may include surface grinding, base and sub-base repairs, or other related work as needed to restore the road to the minimum standards and to reduce the number of seams or eliminate pavement seams in a wheel path.
2) Additional asphalt area removal and replacement may be required to ensure the smoothness of ride characteristics to meet the *Oregon Standard Specifications for Construction* Section 00744.70.
3) As required by these Roadway *Standards* and/or as determined by the Road Official the requirements may include up to full-width surface paving of the roadway depending on the limits of disturbance and the condition of the existing pavement;
4) Limitations on the operation to protect the roadway from temperature related damage, i.e. delamination of pavement surfaces and subgrade;
5) If the County determines that the final repaving of the street is not appropriate at that particular time for reasons relating to weather or other short term concerns, the County may grant a delay until proper conditions allow for repaving.
6) Apply restrictions as to the size and type of equipment during freeze/thaw conditions or for saturated subgrade with a poor or very poor PCI rating; it could also be due to the existing width of the road and traffic flow or other conditions that warrant limitations on equipment;
7) Designation of routes upon which materials may be transported;
8) Mitigation of potential subsurface hydrologic flow along the utility or appurtenant trench; e.g. bentonite check dams;

~~as much as practical to:~~

~~Maximize the placement of required street trees and street lighting on the property frontage.~~Minimize the ~~number of pavement cuts and consolidate pavement restorations. See Standard Drawing L200 to coordinate the placement of utilities with required street trees.~~

~~a)~~

b) Minimize the number of pavement cuts and consolidate pavement restorations. See Standard Drawing L200 to coordinate the placement of utilities with required street trees.

c) When trenches are less than 50' apart they shall be combined into one minimum 2" grind and inlay top lift pavement restoration to the nearest edge of pavement or lane line.

d) Trench repair seems shall not lie in a wheel path.

A cable, pipeline, or conduit which crosses under the roadway, other roadway connections, or road approaches or driveways, shall either be tunneled, jacked, driven, or placed in a casing bored under the surface for that purpose in accordance with the following provisions:

All utility companies serving the work site vicinity shall be contacted to request line locate services.

Any utility conflicts shall be resolved before initiation of construction.

The applicant will again be required to comply with ORS 757.

Open cut main line utility installations in paved streets shall restore the road structural section per pavement restoration standards, Standard Drawing details U400 through U4?????
If the trench edge of pavement is less than 5 feet from another patch, curb or existing edge of street, the pavement in between shall be removed and replaced with the trench repairs.
The width of the T cut shall be widened where necessary to move the edge line out of the wheel path so that both conditions below are satisfied:
New edge of pavement is at least 12" from the wheel path and
New edge of pavement complies with Note 3.

Utility cut requirements may include, but shall not be limited to the following conditions:

f)

a)

Repaving that may include surface grinding, base and sub-base repairs, or other related work as needed to restore the road to the minimum standards or to the pre-existing condition whichever is greater and to reduce the number of seams or eliminate pavement seams in a wheel path.

Additional asphalt area removal and replacement may be required to ensure the smoothness of ride characteristic meets the ODOT standard specifications.

b)

As required by these Standards and/or as determined by the County Road Official the requirements may include up to full width surface paving of the roadway;

c)

If the County determines that the final repaving of the street is not appropriate at that particular time for reasons relating to weather or other short term problems, the County may grant a delay until proper conditions allow for repaving.

Limitations on the operation to protect the roadway from temperature related damage, i.e., delamination of pavement surfaces and subgrade;

d)

If the County determines that the final repaving of the street is not appropriate at that particular time for reasons relating to weather or other short term concerns, the County may grant a delay until proper conditions allow for repaving.

e)

If the County determines that the final repaving of the street is not appropriate at that particular time for reasons relating to weather or other short term concerns, the County may grant a delay until proper conditions allow for repaving.

Apply restrictions as to the size and type of equipment during freeze/thaw conditions or for saturated subgrade with a poor or very poor PCI rating; it could also be due to the existing width of the road and traffic flow or other conditions that warrant limitations on equipment;

f) Designation of routes upon which materials may be transported;

g) The place and manner of disposal of excavated materials;

h) Depending on the project scope and location an erosion and sediment control permit may be requiredChapter 4;

i) to ensure the abatement of dust, the cleaning of streets, the prevention of noise, and other results which are offensive or injurious to the neighborhood, the general public, or any portion thereof;

Regulations as to the use of roadways as alternate routes to bypass construction delays in the course of the work;

Mitigation of potential subsurface hydrologic flow along the utility or appurtenant trench; e.g. bentonite check dams;

j) Additional asphalt area removal and replacement may be required to ensure the smoothness or ride characteristic meets the standards. This provision applies on all roadways.

Pot holing is required before any boring is performed per OAR 952-001-0090(3) (c) and anytime Should the Applicant/Owner and or the owners of the existing utilities determine that exploration and pot holing is necessary. , t The disturbed portions of the disturbed roadway must be restored to County specification in Standard Drawing U280 after any pot holing excavations.must be restored to County specifications.

7) When requested, special permission may be granted and acknowledged on the permit to open cut the roadway. The following provisions shall be adhered to:

Immediately after the utility has been placed upon its prepared bedding in the trench and covered to meet the pipe zone specifications, the remaining trench section shall be backfilled with materials approved or specified by Engineering. The backfill material shall be placed and compacted to an elevation compatible with subsequent surface repair. When approved and exempt from use of CDF, the roadway trench shall be backfilled using granular materials conforming to the following:

Granular backfill materials in CDF exempt trenches shall meet *Oregon Standard Specifications for Construction*, or its approved equal, from the pipe zone to the bottom of the asphalt concrete surface repair;the Clackamas County Roadway Standards.

Separate, sequential, mechanical compaction efforts on all bedding, pipe zone, and backfill materials shall produce a density in place of not less than 95% relative maximum density (using AASHTO T-99);

Trench backfill materials outside of the ditch line or the curb and sidewalk zone, but in the right-of-way, shall may meet the *Oregon Standard Specifications for Construction* unless otherwise noted in this section or in the permit's special provisions.

When trenching across more than one-travel lane of the roadway, no more than one-half (1/2) of the traveled portion is to be opened at any one time. The relevant installation shall be made, then the opened half shall be

~~covered and secured with steel running plates or be completely back-filled and compacted before opening the remaining half.~~

~~No closure of intersecting streets, roadways, driveway approaches or other access points will be permitted without review and approval by the Road Official. Upon trenching, steel running plates or other satisfactory methods shall be used to maintain traffic.~~

~~No more than two hundred and fifty (250) feet of longitudinal trench along the roadway shall be open at one time and no trench shall be left open overnight.~~

~~All undermined pavements caused by trench excavation and cave-in, shall be removed immediately during construction.~~

~~Asphalt roadway surface repairs shall conform to the following specifications:~~

~~Trenches in paved areas shall provide the typical "T" cut trench repair, not necessarily being centered over the utility;~~

~~Asphalt shall be saw cut with neat lines. The cut lines are to be a minimum 1 foot (12") beyond the trench edges to the depth of the first pavement lamination or at a depth sufficient to permit removal of pavement without damage to pavement that is to be left in place;~~

~~Removal of the pavement to the neat lines shall be by methods satisfactory to the Road Official; use of a pavement mill (cold plane) and depth of asphalt removal may be prescribed in permit special provisions;~~

~~Pavement within the cutting limits, together with all other excavated material, shall be removed and disposed of outside the road right-of-way in proper dump sites;~~

~~If work results in an irregular trench width, or if incidental damage to the adjacent roadway surface occurs, another sawing and removal of the pavement shall be performed along a line approved by Engineering prior to the placement of the permanent surface repair;~~

~~Surface repairs to asphalt pavements shall conform to the Oregon Standard Specifications for Construction;~~

~~Asphalt joints (seams) shall be sealed with hot liquid asphalt, (i.e. CRS-2 AR 4000 or its approved equal), and choked with sand.~~

~~Compacted asphalt concrete shall be a minimum of 4", or be equal to the thickness that was removed or four (4) inches, whichever is greater;~~

~~For a period of three (3) years following the initial completion of the installation and the surface repair, the applicant's bond shall remain in full force and effect, ensuring the condition of the roadway surface repairs. If earlier repairs become settled, cracked, broken or otherwise faulty, during this surety repair time duration, Engineering may request that the applicant make subsequent repairs in order to comply with specifications. The applicant shall comply with any such request.~~

~~The applicant of the permitted utility shall be responsible indefinitely for settlement over the utility and structural failures in the right-of-way that Engineering deems attributable to the installation or occupancy of the~~

710.106 Concrete Street Surface repairs

Concrete roadway surface repairs shall conform to the following specifications:

~~1)~~

The entire Portland ~~Cement~~cCement ~~concrete~~ Concrete (PCC) panel must be removed between the nearest ~~construction~~ expansion joint. If the trench excavation is within two feet of the nearest joint the abutting panel must be removed.

a)

Placement of the bedding material and approved granular backfill must be placed and compacted to 95% compaction.

b)

Replacement of the Portland ~~Cement~~cCement ~~concrete~~ Concrete panel must equal the thickness and design strength of the concrete material removed, or be of a minimum 4,000 pound, 28 day strength design mix, whichever is stronger. The concrete must be placed in conformance with industry standards and protected against freezing. The texture of the concrete surface must be like the adjoining surfaces.

c)

Perpendicular PCC joints - 18" long, 1 ¼" smooth dowels with epoxy coating, embedded 9" into both the new PCC panel and the existing, abutting panel, spaced at 12" on center

d)

Longitudinal PCC joints - 16" long, #4 rebar smooth dowels with epoxy coating, embedded 8" into abutting panels (new and existing), spaced at 18" on center

e)

Longitudinal joint with curb and gutter - 8" long, #4 rebar smooth dowels with epoxy coating, embedded 4" into both the ~~pcc~~PCC gutter and ~~PCC~~ panel, spaced at 18' on center.

~~f)~~

~~f)~~

The work area must be signed and protected to detour traffic away from the repair for seven (7) days following the placement of the concrete repair unless the use of a high early additive is requested and approved in the permit.

~~g)~~

~~Additional requirements in County Code – Title 7.03 Road Use Ordinance~~

~~Allocation of Costs Connected to Utility Placement – 7.03.200;~~

~~Protection of Survey Monuments in the Vicinity of Utilities – 7.03.210;~~

~~Maintenance and Operation of Utilities – 7.03.220;~~

~~Removal, Relocation or Repair of Utilities – 7.03.230~~

g)

715 SMALL CELL WIRELESS FACILITIES~~Small Cell Wireless Facilities~~

The following governs the installation of small cell wireless facilities within right-of-way or easements under Clackamas County jurisdiction. The installation of small cell wireless facilities requires a Utility Permit. In some cases, the installation of small cell wireless facilities is further governed by the *ZDO*. In those cases, land use approval is required before the application for a Utility Permit. *County Code* Section 7.03 provides additional requirements.

715.1 Application

An application for a small cell wireless facility shall not be complete until the following elements have been provided to the County:

a) Land use approval, if required.
b) Utility Permit application which requires:
   1) Evidence of land use approval, if required.
   2) For location on existing traffic signal appurtenances or illumination poles, written authorization or agreement from the owner of those structures.
   3) Plans illustrating the proposed installation that is compliant with the standards of Section 715. Plans for new structures shall include the right-of-way, public utility easements, location of edge of pavement, curbs,

sidewalks, landscape strips, curb ramps, driveways, and other structures within the vicinity of the proposed installation.

4) An evaluation of the ability to install proposed equipment underground. Provide dimensions of all above ground structures.
5) Structural engineering calculations and plans for any new support structures or modifications to County owned infrastructure.
6) As necessary, an evaluation of the preferred alternative locations of Section 715.3.
7) As necessary, an evaluation of the preferred alternative locations of Section 715.4.
8) Photographs illustrating the existing site conditions that will be impacted.
9) An RF certification report per Section 715.9.

715.2 Review and Approval Period

Installations proposed on structures shall comply with regulation and documentations/permissions as set forth by federal, state, and these Standards. The review period for applications will be a maximum of 60 days on existing structures and will be a maximum of 90 days on new structures following receipt of a completed application per Section 715.1.

715.3 Location Requirement

Small cell wireless facilities shall be placed on existing wood utility poles unless it can be established that such placement is not feasible. In such cases, the applicant shall site the small cell facility in the following order of preference and if applicable, establish that a preferred alternative is not feasible.

a) On existing street illumination poles not owned by the County.
b) On County owned street illumination poles.
c) On new support structures to be maintained by the utility provider.
d) On County owned signal infrastructure.

715.4 Roadway Preference

Small cell wireless facilities shall be located in the following order of preference and if applicable, establish that the preferred alternative is not feasible by an evaluation that the preferred alternative does not provide sufficient coverage that the proposed small cell wireless facility is designed for.

Within the UGB:
a) Along an arterial roadway
b) Along a collector roadway adjacent to non-residential zoning
c) Along a connector or local roadway adjacent to non-residential zoning
d) Along a collector roadway adjacent to residential zoning
e) Along a connector or local roadway adjacent to residential zoning

Outside of the UGB:
a) Along an arterial roadway
b) Along a collector roadway
c) Along a connector or local roadway

715.5 Other Siting Requirements

a) New small cell wireless poles shall not be sited within 50 feet longitudinally of an existing or approved utility pole, illumination pole or small cell wireless pole.
b) Small cell wireless telecommunication antennae shall be placed a minimum horizontal distance of the total above ground height of the pole or structure that the antenna is attached to from an existing or approved residential structure.

c) Small cell wireless telecommunication antennae installed and maintained by the same provider shall be a minimum of 200 horizontal feet apart.
d) Locations for new poles shall be as near as possible to property lines to avoid interference with building faces, views and business signage.
e) Any placement shall not impede, obstruct, or hinder operation of any emergency service, maintenance operations, pedestrian or vehicular access or travel including to or from private properties and of legally parked vehicles or permitted items within a public right-of-way.
f) The utility shall be placed as far as possible from the edge of the roadway including within public utility easements as feasible.
g) Above ground utility facilities shall follow the clear zone standards of Section 245 and pedestrian facility requirements of Section 710.3. Installations shall comply with clear zone requirements of the *County Code* and Roadway *Standards* Section 245, sight distance standards of Section 240, the National Electric Safety Code ("*NESC*"), and *PROWAG*.
h) All electrical, fiber optic or other related infrastructure shall be located within its own conduits.
i) Any placement shall not impact any existing or planned bridges, retaining walls or guardrail.
j) There shall be no physical, electrical, or radio interference by the small cell with the traffic signal appurtenances or emergency control devices.
k) If a small cell device is proposed to be installed on a County-owned traffic signal pole, the following requirements apply:
    1) A small cell device can only be installed on a traffic signal pole without a luminaire.
    2) All provider equipment, other than antennae, shall be housed inside a ground-mounted utility box or hidden within the small cell antenna.
    3) Antennae may only be attached to the top of the upright pole and provider equipment shall not be strapped to the outside of the signal pole or on a side arm extension.

715.6 Access Requirements

Portions of any transmitter site may have high power densities that could cause exposures in excess of the FCC Occupational or General Population guidelines. The companies that operate the antennae are required by law to implement the following:

a) Access restrictions to protect public safety.
b) Post notification signs on every access point to increase awareness of the potential for exposure before one enters an area with antennae.
c) Place additional notification signs and visual indicators in an area with antennae (beyond an access point) where RF exposure levels may start to exceed the FCC limits.
d) County and/or other qualified workers and contractors shall have the ability to easily shut off radio signals and power while working on the pole where a device is installed or in the vicinity of a RF emitting device. Provide a small cell device shut-off switch and shut-off/turn-on instructions.

715.7 Aesthetics

a) A small cell wireless telecommunication facility, including all related equipment and appurtenances, shall be a color that matches the support structure, blends with the surroundings of the support and uses non-reflective materials.
b) The highest point of the antenna shall extend no more than seven feet above the highest point of the support structure.
c) The size of above ground infrastructure shall be minimized. If feasible, small cell infrastructure shall be placed underground.
d) Lighting should be shrouded to the extent possible from nearby properties.

715.8 Abandonment and Removal

A small cell wireless telecommunication facility that is not operated for a continuous period of 12 months, shall be considered abandoned and the owner of the facility shall be responsible for the removal of the facility, including its

antenna and equipment, within 30 days of receipt of written notice from the County notifying the owner of such facility abandonment.

715.9 Special Requirements

Within the Clackamas Regional Center Design Plan Area, new support structures and proposed attachments to existing support structures shall be designed to match the character of the area and are required to internalize small cell equipment placed on support structure.

715.10 Inspection

Comply with the requirements of Section 180.

715.11 Expiration

Comply with the Utility Permit requirements of Section 130.3.7.

715.12 Radio Frequency (RF) Certification Report

All new small cell infrastructure proposed in County rights-of-way shall be accompanied by a Radio Frequency Certification Report.

RF Certification reports shall be prepared by a qualified professional and include the following elements:

a) Description of the proposed equipment, type of deployment, including heights, drawings geo-coded location of each device(s).
b) All frequencies at which the proposed equipment will operate.
c) The number of channels that will be used on each frequency.
d) A graphic and scaled elevation of the maximum power densities levels proposed by the equipment illustrating FCC exposure thresholds.
e) Tables and/or graphics outlining RF exposure, FCC limits and minimum approach distances for the general public as well as electrical and communications workings that are not trained for working in an RF environment (uncontrolled) when accessing a pole with equipment or working on or off the ground.
f) Protocols for small cell device shut-off and turn-on.

~~The following governs the installation of small cell wireless facilities within the right-of-way under Clackamas County jurisdiction. The installations of small cell wireless facilities in the right-of-way or utility easement requires a Utility Permit. In some cases, the installation of small cell wireless facilities is governed by the ZDO. In those cases, land use approval is required before the application for a Utility Permit. The County Code provides additional requirements.~~

~~Installations shall comply with clear zone requirements of County Code xx and Roadway Standards Section xxxx.~~
~~Installations shall comply with sight distance standards of xxx.~~
~~National Electric Safety Code, PROWAG~~

~~**715.1 Complete Application**~~

~~The submission of a Utility Permit application for a small cell wireless facility is complete only when it contains the following applicable elements:~~

- ~~For location on an existing structure, written authorization or agreement from the owner of that structure.~~
- ~~For location on a new structure that is not being located on a structure owned by another utility provider, a maintenance agreement between the County and the applicant.~~
- ~~Submit pComplete pllans illustrating the proposed installation that is compliant with the siting standards and aesthetic standards included herein.~~right-of-way, public utility easements,

- ~~Complete structural engineering calculations and plans for any new poles or modifications to County owned infrastructure.~~
- ~~If not feasible to be sited on existing wood utility poles, an evaluation of the preferred alternative locations of Section 7.15.2.~~
- ~~If not feasible to be sited along an arterial roadway, an evaluation of the preferred alternative locations of Section 715.3.~~

1. Aerial vicinity map showing the location of the existing and/or proposed wireless support structure to which the Small Cell facility will be attached.

2. Street view image or photographs showing existing and proposed site conditions including all proposed Small Cell facility infrastructure.

3. Scaled engineered plans or drawings, prepared by a professional engineer licensed in the State of Oregon, showing at a minimum:
   a. The height of a wireless support: Small Cell Facilities height as defined by the FCC
      i. The overall height of the wireless support structure and Small Cell facility, including shrouding and concealment.
      ii. Existing wireless support structure: the increase in height due to the collocated antenna, including shrouding and concealment, height at which all Small Cell wireless telecommunication facility equipment is placed, clearance requirements to other attached utilities denoting each clearance regulated by OJUA and NESC.
   b. The height from the base of the wireless support structure to the lowest point proposed Small Cell facility equipment to be installed on the structure.

c. The distance from the outer edge of the wireless support structure parallel to the outer edge of all equipment associated with the Small Cell facility to be installed on the structure.

4. Structural analysis, prepared and stamped by a professional engineer licensed in the State of Oregon, shall include evaluation of the existing and/or proposed wireless support structure and foundation structurally adequate to safely support the proposed Small Cell wireless facilities and comply with NESC for structural stability to determine whether the structure can carry the proposed Small Cell wireless facility and comply with applicable NESC and structural safety code.

5. Engineered plans shall show the right-of-way lines, property lines, proposed utilities (above and below grade), and existing curbs, driveways, sidewalks, streets, paths, buildings, and structures. Any conflicts with existing infrastructure shall be noted, along with a description of how the conflicts will be resolved.

6. Engineered details of proposed Small Cell facilities, including elevations/profiles, plans and sections, clearly indicating the following:
   a. Height, width, depth, and volume (in cubic feet) of all proposed antenna and exposed elements and/or proposed antenna enclosures.
   b. Height, width, depth, and volume (in cubic feet) of proposed wireless equipment associated with the facility Including electric meters, concealment elements, telecommunications demarcation boxes, grounding equipment, power transfer switches, cut-off switches, and vertical cable runs for the connection of power and other services as applicable.
   c. Method of installation/connection.
   d. Color specifications for proposed wireless support structures and associated exposed equipment, cabinets, and concealment elements.
   e. Electrical plans and wiring diagrams.
   f. Footing and foundation drawings and structural analysis, sealed and signed by a professional engineer licensed in the State of Oregon.

7. Permission to use utility pole or alternative antenna structure: The operator of a Small Cell wireless telecommunication facility shall submit to the City a copy of the written approval from the owner of an existing utility pole, monopole, or an alternative antenna structure, to mount the Small Cell wireless telecommunication facility on that specific pole, tower, or structure, prior to issuance of the City permit.

8. Manufacturer's specification sheets for proposed Small Cell facility equipment, including wireless support structures, equipment cabinets, shrouds or concealment devices, antennas, meters, radios, switches, telecommunications demarcation boxes, and grounding equipment.

9. For removal of wireless support structures or ground-mounted equipment, an engineered drawing that shows the item(s) being removed and the details of restoration to be completed. Restoration shall be completed in accordance with the applicable City of Oregon City Municipal Code and shall restore the site to pre-construction conditions.

10. Letter stating the Applicant has performed an analysis to verify that the Small Cell facility will not cause any interference with City public safety radios, traffic signal light system, or other communications equipment. It shall be the responsibility of the Operator to evaluate the

compatibility between the existing City infrastructure and the Operator's proposed infrastructure.

11. A traffic control plan, in accordance with the requirements of the *Manual of Uniform Traffic Control Devices*.

~~**715.2 Approval and Review Period**~~

~~Installations proposed on existing third-party infrastructure shall comply with regulation and documentations/permissions as set forth by federal, state, and County standards. The review period for applications will be a maximum of 60 days following reception of a completed Utility Placement Permit application.~~

~~Installations on existing County-owned infrastructure or proposed new infrastructure shall comply with regulation and documentations/permissions as set forth by federal, state, and County standards. The review period for applications will be 90 days following reception of completed Utility Placement Permit application.~~

~~**715.2 Location Requirements**~~

~~Small cell wireless facilities shall be placed on existing wood utility poles unless it can be established that such placement is not feasible. In such cases, the applicant shall site the small cell facility in the following order of preference and if applicable, establish that a preferred alternative is not feasible.~~

- ~~On existing street illumination poles not owned by the County.~~
- ~~On County owned street illumination poles.~~
- ~~On new poles to be maintained by the utility provider.~~
- ~~On County owned signal infrastructure.~~

~~**715.3 Roadway preference**~~

~~Small cell wireless facilities shall be located in the following order of preference and if applicable, establish that the preferred alternative is not feasible by an evaluation that the preferred alternative does not provide sufficient coverage that the proposed small cell wireless facility is designed for.~~

~~Within the UGB:~~

- ~~Along an arterial roadway~~
- ~~Along a collector roadway adjacent to non-residential zoning~~
- ~~Along a connector or local roadway adjacent to non-residential zoning~~
- ~~Along a collector roadway adjacent to residential zoning~~
- ~~Along a connector or local roadway adjacent to residential zoning~~

~~Outside of the UGB:~~

- ~~Along an arterial roadway~~
- ~~Along a collector roadway~~
- ~~Along a connector or local roadway~~

715.4 Other Siting Requirements

- New small cell wireless poles shall not be sited within 50 feet longitudinally of an existing utility, illumination or small cell wireless pole.

a) An existing residential structure by a minimum horizontal distance of the total above ground height of the pole or structure that the antenna is attached to, and

- Small Cell wireless telecommunication antenna installed and maintained by the same provider shall be a minimum of 300 horizontal feet apart.

715.5 Signage Requirements

Small Cell wireless telecommunication equipment shall not have any signage other than required federal law identification markings.

715.6 Lighting Requirements

All lights shall be shrouded.

715.7 Aesthetics

- A Small Cell wireless telecommunication facility, including all related equipment and appurtenances, shall be a color that matches the pole, blends with the surroundings of the pole, structure tower, or infrastructure on which it is mounted, and uses nonreflective materials.

The highest point of the antenna shall extend no more than seven feet above the
- highest point of the utility pole, alternative antenna support structure, tower or Cityowned
- infrastructure. A replacement or new utility pole, alternative support structure,
- third party utility pole, or City owned infrastructure shall be no more than ten percent
- higher than an existing adjacent pole or a maximum of the zoning designated height
- allowance, in height above the ground surface, whichever height is the lesser of the two.

715.7 Abandonment and Removal

A Small Cell wireless telecommunication facility that is not operated for a continuous period of 12 months, shall be considered abandoned and the owner of the facility shall be responsible for the removal of the facility, including its antenna and equipment, within 30 days of receipt of written notice from the City notifying the owner of such facility abandonment.

715.6 Special Requirements

Within the Clackamas Regional Center Design Plan Area, new poles shall be designed to match the character of the area and internalize small cell equipment to the extent feasible.

- Within the Clackamas Regional Center Design Plan Area, proposed installations on existing ornamental poles shall internalize antennae. If not feasible to internalize, the pole shall be replaced by the applicant.