

SECTION - 300

STREET CONSTRUCTION

300 – STREET CONSTRUCTION

300.00.00 – Scope

This section shall include but not be limited to the items of work necessary for the survey, design, and construction of streets or other public ways within City Rights of Ways and Easements or to be dedicated as such. Such work shall include but not be limited to excavation and embankments; disposal of excess excavated materials, providing and placing sub-base and base materials; construction of curbs, curb and gutter sections; construction of asphaltic or Portland Cement concrete pavements, constructing concrete sidewalks; driveway aprons and wheelchair ramps; concrete bases for street lights or traffic signals and other street related facilities and other miscellaneous street appurtenances.

310.00.00 – General

310.10.01 – References

Except as further defined, supplemented or contained in these standards, all designs, construction, inspection and testing shall be in conformance with standards, specifications and methods referenced in the following publications:

American Association of State Highway Transportation Officials (AASHTO). "A Policy For Geometric Design of Highways and Streets" 2001; "AASHTO Guide for Design of Pavement Structures", 1993; Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 29th Edition.

Oregon Department of Transportation (ODOT), Oregon Standard Specifications for Construction, latest edition, and associated Oregon Standard Drawings

Institute of Transportation Engineers (ITE), Trip Generation Manual

Oregon Department of Transportation (ODOT), Oregon Bicycle and Pedestrian Plan current requirements.

State of Oregon, Manual of Uniform Traffic Control Devices (OMUTCD) current requirements, including, Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less, latest edition.

Asphalt Institute. MS-1, Thickness Design of Asphalt Pavements for Highways and Streets and other publications and handbooks, which may pertain or supplement the design and construction of pavement structures as may apply

AASHTO Guide for Design of Pavement Structures as it may apply

Oregon Structural Specialty Code, latest edition

310.10.02 – Definitions

Alternate Street Section	Refer to sub sections of Section 320.10.10, labeled as “Alternate” descriptions and Table 300-1A for Alternate Street and Right-of-Way widths.
Standard Street Section	Refer to sub sections of Section 320.10.10 labeled as “Standard” descriptions and Table 300-1 for Standard Street and Right-of-Way widths.
APWA	American Public Works Association
Functional Street Classification	General definitions based on AASHTO, ODOT, RVCOG and other institutions engaged in transportation planning to describe the function and hierarchy of streets or roads based on their ability to handle different traffic volumes and speeds from local (the lowest) category to arterial and interstate highways the (highest).
ODOT	Oregon Department of Transportation
MUTCD, OMUTCD	Manual of Uniform Traffic Devices and Oregon Manual of Uniform Traffic Devices
OSHA, OROSHA	Occupational Safety and Health Administration, US Department of Labor, Oregon Occupational Safety and Health Division, Department of Insurance and Finance.
Street Classifications and Descriptions	Refer to Section 320.10.10 through 320.10.20 for detailed descriptions and requirements.
PUE	<u>Public Utility Easement</u> . A dedicated strip of land on private property for the construction, maintenance and access of utilities by companies franchised or licensed by the City of Cave Junction to install and operate a

utility within the city limits and are further registered as a public utility in the State of Oregon. These companies include but are not limited to companies that provide underground and overhead electric power, natural gas, communications, and television services and shall hereinafter be referred to as the "Utility". These do not normally include City utilities such as water, sewer and traffic appurtenances except by crossing.

Private Easement	A strip of private land whereby certain rights have been given to another party or parties, to construct, maintain or provide access across said land, or to limit certain activities such as visual obstructions or noise. Easements can be either exclusive (limited) or non-exclusive.
Sub-grade	The top surface of the completed earthwork on which sub-base, base and surfacing, pavement or final course of other material is to be placed.
Sub-base Section	The layer or layers of specified course aggregate placed on the sub-grade. Typically a Geo-textile fabric layer separates the sub-base section from the sub-grade.
Base Section	The layer or layers of specified finer aggregate placed on the sub-base below the pavement layer. The top layer immediately below any paving is generally referred to as a leveling course.
Aggregate	Sound, tough, durable, gravel or fragments of rock of uniform quality that has been crushed to a specified gradation.
Sub-grade Reinforcement Rock	The specified material placed in the sub-grade to reinforce weak areas and or bridge such areas of sub-grade that do not or may not meet the required stability and compaction requirements. This rock may be crushed or Pit-Run as specified in Section 915.00.00, Sub-grade and Trench Reinforcement Rock.
Sub-base Aggregate	Crushed rock meeting the requirements described in Section 910.10.03, Sub-Base Aggregate.
Base Aggregate	Crushed rock meeting the requirements described in Section 910.10.02, Base Aggregate.
HMAC	Asphalt paving meeting the requirements described in Section 925.00.00, Hot Mix Asphalt Concrete Paving.
PCC	Concrete meeting the requirements described in Section 930.00.00, Portland Cement Concrete.

Topsoil	Fertile soil meeting the requirements described in Section 935.00.00, Topsoil.
Riprap	Large fractured rock meeting the requirements described in Section 920.00.00, Riprap.

Refer to other sections of these specifications and standards or OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, latest edition, Section 110, for other applicable definitions.

310.10.03 – Tables

Table 300-1A Arterial Street Widths and Rights-of-Way Widths

Table 300-1B Collector Street Widths and Rights-of-Way Widths

Table 300-1C Standard Local Street Widths and Rights-of-Way Widths

Table 300-1D Minor Local Street Widths and Rights-of-Way Widths

Table 300-1E Miscellaneous Transportation Features

Table 300-2 Minimum Street Alignment and Grade Requirements

Table 300-3 Minimum Street Section Requirements

Table 300-4 Street Intersection and Access Separation

Table 300-5 Minimum Sight Distance and Clear Vision Requirements

Table 300-6 Driveway and Property Access Dimensions and Spacing

Table 300-7 Clear Vision Areas

320.00.00 – Design

320.10.01 – Design Standards

The purpose of these standards is to provide a consistent policy under which certain physical aspects of street and related design and plan preparation will be observed by the engineer.

This section contains design standards to ensure the safe and efficient operation of each facility type for all users and the best use of public space. The requirements in this section are established as minimum standards to follow and apply to both new construction and reconstruction, except as otherwise specified.

Designs shall consider the needs of people with disabilities and the aged, such as visually impaired pedestrians and mobility impaired pedestrians. Every effort should be made to locate street hardware away from pedestrian locations and provide a surface free of bumps and cracks, which create safety and mobility problems. Smooth access ramps shall be provided where required. All designs shall conform to the current American Disabilities Act (ADA) or as adopted by the Oregon Department of Transportation (ODOT), Oregon Bicycle and Pedestrian Plan.

The determination of the pavement width and total right-of-way shall be based on the operational needs for each street as determined by a technical analysis. The technical analysis shall use demand volumes that reflect the maximum number of pedestrians, bicyclists, parked vehicles and motorized vehicle traffic expected when the area using the street is fully developed. Technical analysis shall take into consideration, transportation elements of the Comprehensive Plan, neighborhood plans, approved tentative plans as well as existing commercial and residential developments. All street designs shall be coordinated with the design of other new or existing infrastructure.

These standards set forth the minimum requirements for materials and street design. The Public Works Department shall have discretion to require a higher or different standard for materials or design when in his judgment it is in the best interest of the public's health, safety and welfare when considering all aspects and circumstances of the project.

The minimum requirements for all street classifications are defined in Tables 300 – 1 through 300 – 7.

320.10.02 – Traffic Impact Analysis

The purpose of this section is to assist in the determination of which road authorities participate in land use decisions, and to implement Section 660-012-0045(2)(e) of the State Transportation

Planning Rule that requires the city to adopt a process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities.

This chapter establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a traffic impact analysis must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a traffic impact analysis; and who is qualified to prepare the study.

A traffic impact analysis shall be prepared by a traffic engineer or civil engineer licensed to practice in the state of Oregon with special training and experience in traffic engineering. If the road authority is the Oregon Department of Transportation (ODOT), consult ODOT's regional development review planner and OAR 734-051-180. If the road is the authority of Josephine County, consult Josephine County's road design requirements.

The Public Works Department may, at his/her discretion, waive the study of certain intersections when it is concluded that the impacts are not substantial.

320.10.03 – Traffic Impact Analysis Applicability

(1) The level of detail and scope of a traffic impact analysis (TIA) will vary with the size, complexity, and location of the proposed application. Prior to any TIA, the applicant shall submit sufficient information to the City for the Public Works Department to issue a scoping letter. If stipulations to reduce traffic are requested by an applicant, it must first be shown by means of an analysis that an unconditional approval is not possible without some form of mitigation to maintain an adequate LOS. This will determine whether a stipulation is necessary.

(2) Extent of Study Area:

The study area shall be defined by the Public Works Department in the scoping letter and shall address at least the following areas:

- a) All proposed site access points;
- b) Any intersection where the proposed development can be expected to contribute 25 or more trips during the analysis peak period. Impacts of less than 25 peak period trips are not substantial and will not be included in the study area. This volume may be adjusted, at the discretion of the Public Works Department, for safety or unusual situations; and
- c) Any intersections directly adjacent to the subject property.

(3) When required: TIA shall be required when a land use application involves one or more of the following actions:

- a) A change in zoning or a plan amendment designation that generates 300 average daily trips (ADT) more than the current zoning;
- b) Any proposed development or land use action that a road authority, including the city, Josephine County or ODOT, states may have operational or safety concerns along its facilities;
- c) An increase in site traffic volume generation by 250 average daily trips (ADT) or more, or 25 Peak Hour Trips (PHT);

- d) An increase in peak hour volume of a particular movement to and from the State highway by 20 percent or more;
- e) An increase in use of adjacent streets by vehicles exceeding twenty thousand pounds gross vehicle weight by 10 vehicles or more per day;
- f) The location of the access driveway does not meet minimum sight distance requirements, as determined by the city engineer, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate on the state highway, creating a safety hazard at the discretion of the Public Works Department or
- g) A change in internal traffic patterns that, at the discretion of the Public Works Department, may cause safety problems, such as back-up onto a street or greater potential for traffic accidents.

(4) Submittals:

Provide two copies of the TIA for Public Works Department to review.

(5) Elements of Analysis:

A TIA shall be prepared by a Traffic Engineer or Civil Engineer licensed to practice in the State of Oregon with special training and experience in traffic engineering. The TIA shall be a thorough review of the effects a proposed use will have on the transportation system. The study area shall include all streets and intersections in the analysis, as defined in subsection (2) above. Traffic generated from a proposed site will be distributed throughout the transportation system using existing count data or the current transportation model used by the City. Any alternate distribution method must be based on data acceptable to the Public Works Department. The following checklist outlines what a TIA shall contain. Incomplete reports shall be returned to the applicant for completion without review:

- a) The scoping letter as provided by the Public Works Department;
 - b) The Final TIA shall be signed and stamped by a Professional Civil or Traffic Engineer registered in the State of Oregon;
 - c) An executive summary, discussing the development, the major findings of the analysis, and the mitigation measures proposed;
 - d) A vicinity map of the proposed site and study area;
 - e) Project characteristics such as zoning, potential trip generations (unless stipulated to less than potential), proposed access(s), and other pertinent factors;
 - f) Street characteristics within the study area including functional classification, number of travel lanes, lane width, shoulder treatment, bicycle path corridors, and traffic control at intersections;
 - g) Description of existing transportation conditions including transit accessibility, accident history, pedestrian facilities, bicycle facilities, traffic signals, and overall traffic operations and circulation;
 - h) Peak period turning movement counts of at least two-hour minimums at study area intersections, less than 2 years old. These counts shall be adjusted to the design year of the project and consider seasonal traffic adjustments when required by the scoping letter;
 - i) A "Figure" showing existing peak period (AM, noon, or PM, whichever is largest) turning movement volumes at study area intersections, as shown in Example 1.
- Approved applications obtained from the City that have not built out but will impact study

area intersections shall be included as pipeline traffic. An appropriate adjustment factor shall be applied to existing count data if counts were taken during the off-peak season;

j) Potential "Project" trip generation using the most current edition of the ITE Trip Generation, as required by the Public Works Department at the time of scoping. Variations of trip rates will require the approval of the Public Works Department. Such approval will require submission of adequate supporting data prior to first submittal of the TIA;

k) A "Figure" illustrating project turning movement volumes at study area intersections for peak periods, as shown in Example 2. Adjustments made for pass-by traffic volumes shall follow the methodology outlined in the latest edition of the ITE Trip Generation, and shall not exceed 25% unless approved by the Public Works Department;

l) A "Figure" illustrating the combined traffic of existing, background, and project turning movement volumes at study area intersections for peak periods, as shown in Example 3;

m) Level of Service (LOS) analysis at study area intersections under the following conditions:

- (A) Existing plus pipeline traffic
- (B) Existing plus pipeline traffic and project traffic.

A table shall be prepared which illustrates all LOS results. The table shall show LOS conditions with corresponding vehicle delays for signalized intersections and the critical movement at unsignalized intersections. If the proposed use is scheduled to be completed in phases, a LOS analysis shall be prepared for each phase;

n) A mitigation plan if impacts to the study area reduce level of service (LOS) below minimums. Mitigation measures may include stipulations and/or construction of necessary transportation improvements. Mitigation measures shall be required to the extent that the transportation facilities, under City jurisdiction, operate at an acceptable level of service (LOS) with the addition of project traffic; and

o) Intersections under jurisdiction of another agency, but still within the City limits, shall be evaluated by either the City's criteria or the other jurisdiction's criteria, or both, whichever is considered applicable by the Public Works Department.

If the TIA is not consistent with the scoping letter (including any amendments) then the TIA will be returned to the applicant without review.

(6) Analysis criteria:

a) All trip distributions into and out of the transportation system must reflect existing traffic count data for consistency or follow the current transportation model used by the City. If alternate splits are used to distribute traffic then justification must be provided and approved by the Public Works Department prior to first submittal of the TIA.

b) If progression analysis is being evaluated or queuing between intersections is a concern, the peak period used in the analysis must be the same for every intersection along the street and reflect that of the most critical intersection being evaluated. If a common peak period is not requested by the Public Works Department, then the actual peak period of every intersection shall be used.

c) Counts performed must be a minimum of two hours and include the peak period for analysis purposes. All documentation shall be included in the TIA.

d) All supporting count data, LOS analyses, pass-by deductions, growth rates, traffic

distributions, or other engineering assumptions must be clearly defined and attached to the TIA when submitted in report form to the City for review.

e) All LOS analyses shall follow operational procedures per the current Highway Capacity Manual. Ideal saturation flow rates greater than 1800 vehicles per hour per lane should not be used unless otherwise measured in the project vicinity. Queue lengths shall be calculated at the 95th percentile where feasible. Actual peak hour factors should be used for each movement or lane grouping in the analysis. Peak hour factors over 0.90 shall not be used unless justified by specific counts at that location.

f) Signal timing used in capacity or progression analysis shall follow City timing plans and account for pedestrian crossing times, unless otherwise noted in the scoping letter.

g) Arrival Type 3 (random arrivals) shall be used unless a coordinated plan is in place during the peak period.

320.10.04 – Maintenance of level of Service D

Whenever level of service is determined to be below level D for arterials or collectors, development is not permitted unless the developer makes the roadway or other improvements necessary to maintain level of service D respectively.

SERVICE LEVELS FOR ARTERIAL AND COLLECTOR STREETS

Typical Traffic Flow Conditions

Service Level A	Relatively free flow of traffic with some stops at signalized or stop sign controlled intersections. Average speeds would be at least 30 miles per hour. The volume to capacity ratio would be equal or less than 0.60.
Service Level B	Stable traffic flow with slight delays at signalized or stop sign controlled intersections. Average speed would vary between 25 and 30 miles per hour. The volume to capacity ratio would be equal or less than 0.70.
Service Level C	Stable traffic flow but with delays at signalized or stop sign controlled intersections to be greater than at Level B but yet acceptable to the motorist. The average speeds would vary between 20 and 25 miles per hour. The volume to capacity ratio would be equal to or less than 0.80.
Service Level D	Traffic flow would approach unstable operating conditions. Delays at signalized or stop sign controlled intersections would be tolerable and could include waiting through several signal cycles for some motorists. The average speeds would vary between 15 and 20 miles per hour. The volume to capacity ratio would equal or be less than 0.90.
Service Level E	Traffic flow would be unstable with congestion and intolerable delays to motorists. The average speed would be approximately 15 miles per hour. The volume to capacity ratio would be 1.00.
Service Level F	Traffic flow would be forced and jammed with stop and go operating conditions and intolerable delays. The average speed would be less than 15 miles per hour.
NOTE:	The average speeds are approximations observed at the various levels of service but could differ depending on actual conditions.

320.10.05 – Street Section Design

The Public Works Department or a designated engineer consultant shall provide the street Section design based on the Asphalt Institute "Thickness Design" Manual, M – 1 and AASHTO Guide for Design of Pavement Structures as they may apply to the functional classification of street, traffic levels and vehicle types. The street section design shall include all testing necessary to determine the strength and density of materials as it relates to the design and subsequent field-testing for quality assurance. Minimum design thickness for functional classifications of streets are shown on Standard Detail Sheet(s) ST-10 through ST-53 and Table 300-3

320.10.10 – General Design Requirements

The Public Works Department general requirements for Standard public street design are shown below. Refer to Tables 300-1 through 300-6 for more geometric details. Street thickness design and other requirements herein are applicable to both Standard and Alternate public streets.

Lane widths are as required in Tables 300-1A through 300-1E and are measured from top face of curb (TFC) or from the edge of pavement if no curb is required. Also see Section 320.10.35, Striping and Delineation.

320.10.11 – Standard Residential Street

Standard residential streets are functionally classified as local streets and provide access to immediately adjacent residential land. Streets in this category typically provide connections between collector streets and residential areas. Design requirements include 2 travel lanes, on-street parking, landscape rows and sidewalks. Additional turn lane(s) may be required where entering a higher order street or where safety and traffic control needs are apparent. Standard residential streets are planned to have an optimum 250 Peak Hour Trips (PHT). Right-of-way width shall be a minimum of 60'. (Drawing ST-15)

320.10.12 – Minor Residential Street

A minor residential street is a facility having the sole function of providing access to immediately adjacent land upon which a maximum of 50 units front and take access. Design requirements include 2 travel lanes, on-street parking on 1 side and landscape rows and sidewalks. Right-of-way width shall be a minimum of 52'. (Drawing ST-10)

320.10.13 – Residential Lanes

A residential lane also falls into the local street functional classification and is limited to serving not more than 8 dwelling units that front and take access. The residential lane is a short street of not more than 200' in length with no on street parking. Design requirements include 2 travel lanes and no on-street parking. Typically these right-of-ways are narrow and sidewalks are constructed in an easement on the property if required, or on one side only. A hammerhead, or bulb type turnaround, meeting Fire District No #3 specifications, is required. Such turnarounds may not be combined with residential driveways. (Drawing ST-05)

320.10.14 – Standard Collector Streets

A collector street services lower order streets and conducts traffic between arterials. Standard design requirements for a collector shall include two 12' travel lanes and may include short center and right turn lanes when necessary to meet safety and traffic control requirements. Designs shall include facilities for bicycle lanes, sidewalks and landscape rows. Collectors with parking and bike lanes shall include two 10-11' travel lanes.

The design of collectors may be subject to regulation and control of on street parking,

turning movements and access. Additionally, if the project is retrofitting an older street landscape rows may be eliminated. Landscaping will be required where the right-of-way is acceptable. Individual residential driveway access for new development shall not be permitted on a collector street if other reasonable means of access are available. Streets in this category are designed for traffic volumes of 2500 – 5000 AVDT.

320.10.15 – Arterial Streets

Arterial streets are intended to provide for high volume travel between or within communities, or to and from collector streets. Minimum standard design requirements for new two-way arterials shall include two to four 11'-12' travel lanes and one 14' center turn lane at all intersections where left turns are allowed.

Additional right turn bays or lanes may also be required where traffic and safety needs are apparent. Facilities for bicycle and pedestrian traffic shall be included in the design of arterial streets. Secondary arterial streets are designed for volumes of 5000 – 10,000 AVDT while Major arterial streets are designed to volumes of 10,000 – 40,000 AVDT.

The design of arterial streets may also be subject to regulation and control of on-street parking, turning movements and access. Individual residential driveway access for new development shall not be permitted on arterial streets if other reasonable means of access are available.

320.10.17 – Commercial / Industrial Streets

These streets are designed and located for primary access to commercial and industrial properties and connection to the major street network. Streets in these categories are designed to accommodate higher traffic volumes and heavier loads. Limited access points and onsite parking are emphasized in industrial areas to reduce congestion and traffic interruption.

Standard design requirements for commercial / industrial streets shall conform to the functional classifications for local, collector and arterial.

320.10.18 – Private Minimum Access Drives

A private minimum access drive is a private residential street upon which a maximum of 3 dwelling units front and take access and does not exceed 150' in length.

320.10.19 – Alleys

Alleys are only allowed for new residential or commercial construction if they are integrated as part of a master planned community. The City may require existing alleys to be re-constructed or surfaced to prevent erosion; enhance bicycle and pedestrian movement; and improve air quality. Adjacent property owners to the alley may also request improvements. Improvements and re-construction of alleys shall be designed in accordance with methods and requirements for streets.

320.10.20 – Sidewalks

All sidewalks shall be constructed of concrete as further specified herein. Sidewalks are required for all new local, collector and arterial streets. The width shall vary according to the functional classification of the street and the intended purpose of the street taking into consideration pedestrian volumes and safety. In commercial / Industrial areas, the sidewalk width requirement may be increased to accommodate additional pedestrian loading and safety. Setback sidewalks may also be considered on streets with high traffic volumes or as private sidewalks outside the City rights-of-way, such as a residential lane. Setback design and planter strip design shall be evaluated on the basis of pedestrian safety, traffic volume and aesthetic appearance.

Clustered mailboxes placed in or adjacent to sidewalks must be provided with accessibility according to the latest edition of Oregon Structural Specialty Code, Chapter 11 Accessibility, section 1111, and ANSI A117.1, section 304.

Sidewalks are generally required on both sides of the street in both residential and commercial / industrial areas. This requirement may be waived in the case of Residential Lanes and in special circumstances in order to reduce excessive impacts to topography, wetlands, drainage ways and other natural features; infill situations to match existing configuration; or in existing unimproved streets. In these situations the sidewalk may be placed adjacent to the street to reduce overall right-of-way.

320.10.21 – Differing Sidewalk Widths

In developments where the sidewalk width has been previously approved for a previous phase under the then existing standard, the same width shall be continued to the nearest street corner of the intersecting new development and blended at the radius with the current standard width. In cases of long sidewalk sections where it is not feasible to continue to the corner, a minimum 10' transition length shall be made between the differing widths for subsequent phases. Where a new development is planned the sidewalk widths shall conform to current standards as measured behind the curb.

320.10.22 – Parking Lanes

Parking lanes are a minimum of 8' wide on all streets unless otherwise approved by the PWD. The non-delineated parking lane is generally combined with the 10' vehicle lane for a total width of 18' in residential areas.

320.10.23 – Bicycle Lanes

Because of the low projected traffic volume and speed, striped bicycle lanes are not required on local streets. However, the design shall comfortably accommodate the shared use of roadway by bicyclists and motorized traffic. Typical bike lane width is 5' to 6' on arterial streets and 5' to 6' on collector streets depending on traffic volume. Bicycle lanes are measured

from the face of curb (FOC) and include the gutter. Bike lanes on Arterial and Collector streets shall be delineated with white striping in accordance with MUTCD requirements.

320.10.24 – Bicycle and Pedestrian Paths

Bicycle and Pedestrian Paths shall be designed in accordance with the ODOT, Oregon Bicycle and Pedestrian Guidelines where required in the approved site plan. These paths range in width from 5' for minor pathways to 8' and 12' for major pathways. Landscaped shoulders are typically required. Table 300-1E Miscellaneous Transportation Features, shows the widths for major and minor pathways. The pathway sectional depths shall be determined by the PWD based on type of use and the Engineers recommendations.

320.10.25 – Vehicle Lanes

Two vehicle traffic lanes are required on local residential streets. The vehicle lane width is combined with a shared parking lane (non-delineated). In special circumstances, such as where a local street intersects with a collector or arterial street, additional width may be required for safe turning movements. Multiple, delineated lanes are required on collector and arterial streets. Typically lane widths are 12' wide, however, they may vary if approved by the City Public Works Department.

In cases of alleys and private flag lot drives a minimum single vehicle lane width of 20' is required.

320.10.26 – Planting Strips, Medians and Shoulder Landscaping

Planting strips where required and approved on the plans, are typically 6' wide on Standard Residential, 6' wide on Collector and 6' to 7.5' wide on Arterial Streets. Refer to Street Tree Planting Detail Drawing A-12 for tree planting requirements in the public right-of-way. Residential Lanes require a 2' meter strip between the curb and sidewalk. Alternate widths may be required in special districts or corridors. Refer to tables 300-1A thru 300-1E. Refer to Section 350.10.01 for ODOT referenced construction requirements.

320.10.27 – Drainage and Curbs

Drainage inlets shall be bicycle safe as required by ORS 810.150. Curb inlets as shown on the Standard Detail sheet(s) SD-3, SD-4 and SD-5 shall be used unless otherwise approved by the Public Works Department.

Inlets for stormwater facilities shall be as shown on Standard Detail sheets SD-8, SD-9, SD-10, SD-11 and SD-12.

Combined vertical curb and gutter shall be used on all streets with an enclosed storm drainage system or curbed stormwater facility. Minimum curb and gutter dimensions are shown on the Standard Detail Sheet(s) A-6B. A modified rolled curb and gutter section as shown on the

Standard Detail Sheet A-6B may also be used in residential areas for which they have been approved.

Where standard curb and gutter sections join rolled curb and gutter sections, there shall be a transition of 50' minimum.

320.10.28 – Street widths and Rights-of-Way widths

The basic width requirements for Street and Rights-of-Ways are found in Tables 300 – 1A through 1E.

320.10.29 – Cul-de-sacs and turnarounds

The use of Cul-de-Sacs is discouraged as a transportation planning tool and should be avoided. Where utilized, the maximum length for a cul-de-sac street is 400' as measured from the centerline of the nearest intersecting through street to the center radius point of the cul-de-sac. Cul-de-sacs and/or turnarounds are required at the ends of all non-connecting standard residential streets.

Turnarounds meeting Fire District #3 requirements such as a bulb or hammerhead type may be established as a temporary means to accommodate streets that are to be extended as part of an approved tentative plan. Turnarounds may also be designed at the ends of private drives. Where temporary turnarounds cannot be accommodated within a right-of-way, a public easement shall be required.

The basic requirements for cul-de-sac widths are found in Table 300 – 1E

320.10.30 – Driveways and Property Access

Property access shall be accomplished by the use of driveways. Driveway spacing shall be established based on the classification of the street the driveway will access. For driveway widths and property access dimensions, see Table 300 – 6, and Standard Detail Sheets A-6A and A-10.

All driveways shall be constructed of AC or concrete, unless otherwise specified by PWD.

Widths – Driveway width depends on whether a driveway will provide for one-way or two-way traffic and the functional street classification. The minimum residential and commercial driveway throat width on all streets where access is allowed shall be 12'. The maximum residential driveway throat width shall be 30'. See Table 300-6 for other requirements for residential and commercial streets on arterial and collector streets.

The Public Works Department may require wider driveways when traffic volumes cause ingress / egress difficulties. The PWD may require the Applicant to provide a Traffic Engineering Study to provide recommendations for maximum driveway width.

The Public Works Department may allow wider driveways in residential areas where multi-family dwellings or pad lot construction occur and would be overall less disruptive to pedestrian and wheel chair access.

Connection Type at Street – The type of driveway connection at the street shall be accomplished by a taper connection (typical) or a curb radius connection.

Taper Connection – A taper connection is shown in Standard Detail Sheet(s) A-5A and A-6A.

Curb Radius Connection – This type of connection is typically used when large trucks will be entering the property and unloading or when higher traffic speeds are anticipated. The curb from the driveway will match the existing curb at the street with the proper radius from the driveway to the street. Curb radii shall be designed to accommodate the maximum length vehicle in accordance with current AASHTO requirements and City of Cave Junction standards.

The PWD will determine the type of connection for each commercial driveway or property access.

Spacing – To provide the traveling public with adequate area for maneuvering for ingress / egress to the property, the safety of the traveling public is a key factor in the spacing of driveways. See table 300 - 6 and Standard Detail Sheet A-10.

The spacing of driveways from property lines, away from street intersections shall be determined by the Public Works Department by considering classification of street. Joint access driveways for two or more adjoining properties shall be constructed where possible. Typical situations would include pad lots, duplexes, or Cul-de-Sacs.

No driveway or property access shall be installed, reconstructed, or constructed without first obtaining the required approvals and permit from the Public Works Department.

320.10.31 – Utilities

The primary location for franchised commercial utilities is in a Public Utility Easement (PUE) adjacent to the street right-of-way on private property. City utilities such as manholes, hydrants, water meters, blow-off valves and air-vacuum valves are to be located within the street or street right-of-way.

All utility facilities such as electric transformers, junction boxes, hydrants, water meters, etc., and streetlights shall be located and designed in a manner so as not to conflict with driveways, sidewalks, loading and unloading areas, and pedestrian or vehicular traffic. Commercial utilities shall be located so as not to conflict with City water, sewer or storm drainage facilities. Refer to section entitled "Underground Utilities" Section 700.

320.10.32 – Street Lighting

Street lighting shall be installed, as further defined under “Underground Utilities” Section 700, at the following locations and intensities:

(a) Local Streets	5800 lumen HPS	200’ maximum spacing
(b) Collector Streets	9500 lumen HPS	200’ maximum spacing
(c) Arterial Streets	22500 lumen HPS	200’ maximum spacing

Cul-de-sac lighting shall be as follows:

(a) 0’ – 100’	One light at intersection
(b) 101’ – 200’	One light at the intersection, one light at end of Cul-de-sac.
(c) 201’ – 400’	One light at the intersection, one light at mid-point and one light at end of Cul-de-sac.

When a street of higher classification intersects a street of lower classification the Standard for the street light installation shall be that of the higher standard.

Streetlights installed at intersections shall face the street with the higher street classification. If both streets are of the same classification, the streetlight shall be positioned so that the light equally illuminates both streets. Street light pole arms shall normally be oriented at right angles to the street centerline. All streetlight placements shall be approved by the Public Works Department prior to installation or during construction plan approval, whichever is first.

City Decorative street lighting will only be allowed in the historic areas. When decorative lighting is used, electrical as-builts will be submitted before any electrical power request is generated for PPL. Decorative street lighting for private development is allowed using Pacific Power ornamental lighting standards and equipment. Drawings specific to decorative street lighting are available in the City Uniform Standard Drawings – Street Lights, section. lighting specifications can be found in section 700 – Underground Utilities.

320.10.33 – Traffic Calming

Occasionally it is necessary to employ various techniques to reduce vehicle speeds, congestion or to shift traffic to a more appropriate route. Traffic calming measures can also be incorporated in the construction of new streets to prevent problems from developing in newly constructed or future residential areas. Traffic calming devices are intended mainly for use on local residential streets or lanes.

The application of these techniques is on a case-by-case basis, applying sound engineering judgment. Planning and design should be coordinated with nearby residents as well as emergency and other service providers who will be affected by their use. The following techniques are suitable for existing and new streets. All traffic calming devices or measures shall be approved by the Public Works Department in writing.

Traffic Calming Techniques and Devices

Traffic Calming Device	Existing Street	New Streets
Traffic Circles	Yes	Yes
Speed Humps	Yes	Yes
Raised Crosswalks	Yes	Yes
Curb bulb extensions	Yes	Yes
Chicanes (alignment offset)	Yes	Yes
Traffic Diverters	Yes	Yes
Full (Street Closure)		
Half (One Way)		
Diagonal		
Median Barriers	Yes	Yes
Forced Turn Channeling	Yes	Yes
Parking Bays	Yes	Yes
Pavement Surface Modification	Yes	Yes
Speed Actuation Signing	Yes	

320.10.34 – Exceptions to address Topography and Natural Features

Occasionally, streets are constructed in locations that require special consideration such as in steep areas, or near wetlands, canals, creeks, or retention of desirable vegetation or sensitive plants and animals. In these cases, the design should mitigate negative impacts.

Generally, the range of local street types and configurations makes it possible to construct or improve a local street in these areas as well as remain in accordance with Public Works design standards for the required functional street classification.

Standard Detail Sheet(s) ST-10 through ST-53 illustrates the minimum street section design requirements and materials.

320.10.35 – Striping and Delineation

The Engineer shall provide a striping and delineation plan for all arterial and collector streets to the Public Works Department for approval.

Where striping and delineation is required it shall normally be centered over the separate required lane widths and centerline. All delineation and striping shall meet the MUTCD requirements as administered by the State of Oregon, latest edition of Oregon Standard Specifications for Construction, Section 00865 and be presented in conformance with applicable Oregon Standard Drawings.

320.20.00 – Quality Assurance

320.20.01 – Construction Staking

The Engineer will establish marked centerline stakes, and stakes 7' behind curb faces at minimum 50' intervals along tangents (25' on curves) for sub-grade excavation and embankments. After sub-grade excavation the Engineer will establish stakes 3' behind the face of curbs at 25' intervals for construction of sewer lines and water lines and for construction of curbs. In addition the points of curve radius (pcr), vertical curve points shall be staked. "Blue-top" grade hubs will be set at the centerline of the street at minimum of 25' intervals for placing the base course and leveling course for the street. Paving grade hubs or "red tops" may be established in addition to control at the top elevation of the concrete lip of gutter. After stakes or hubs are set, protection of the all staking shall be the Contractor's responsibility. If stakes are disturbed or removed in any way, either during construction operations or after working hours, they shall be reset by the Engineer, as he deems necessary, at the Contractor's expense.

320.20.02 – Inspections

The Public Works Department inspector is the authorized representative of the Public Works Department whose instructions and decisions shall be limited to the particular duties and responsibilities delegated to him. These delegated responsibilities include performing all necessary inspections to assure that project construction is in conformance with the approved plans, specifications and materials for any Public Works project or work that will be accepted into the City system. All work shall be inspected in accordance with the City of Cave Junction , Public Works Standards and Specifications, including the requirements of other referenced organizations noted herein or as may otherwise be directed by the Public Works Department.

In addition to periodic informal inspections the Public Works Department requires a minimum of formally requested or coordinated inspections at the following phases in order to assure that the approved plan requirements and specifications are met before installation or construction of a subsequent phase:

1. Clearing and Grubbing.
2. Sub-grade alignment, grade and density testing including roll testing if required.
3. Sub-base course alignment, grade and roll testing if required.
4. Base course alignment, grade and density testing including beneath the curb section.
5. Check curb and gutter grade and alignment.
6. Check final base course alignment and grades including transverse grades. Perform any remaining density testing. Check base course smoothness.
7. Pavement lay-down, grading, rolling, transverse grades and density. Check final smoothness and surface quality.

Inspections should be coordinated with the inspector and requested by the Contractor at least 24 hours in advance of the required inspection. Arrangements for inspections during weekends and holidays must be made at least 48 hours in advance.

Requests for Public Works inspection may also be made through the PWD secretary at (541) 664-7602 ext.241.

320.20.03 – Sampling and Testing

All testing of materials to be placed or installed in public works construction by the applicant, contractor, or franchisee shall be conducted by a testing laboratory approved by the Public Works Department, and currently certified by the State of Oregon or other government authority conduct the required tests.

Unless otherwise directed, tests shall be sampled and conducted in accordance with the agency or institutes standards and specifications for each type of test noted herein. The required tests shall normally be as stated in the City of Cave Junction Standard Specifications and Details, or as described in the approved plans or contract specifications for a specified material.

The Public Works Department has sole discretion to require additional sampling and tests to confirm or supplement previous tests, identify faulty material or methods of installation.

All costs of testing and re-testing shall be borne by the applicant, contractor or franchisee unless previously approved in writing by the Public Works Department or his designee.

All field-testing and sampling of materials shall be conducted in the presence of the inspector unless otherwise authorized by the Public Works Department. It shall be the responsibility of the applicant, contractor, or franchisee to schedule the type of test and times the tests will be conducted. The inspector or Public Works Department shall be notified 24 hours in advance of field-testing.

320.20.04 – Design Changes

Minor field adjustments in the location or grades of certain construction, or materials, may be authorized by the inspector on site within the limits of his delegated authority.

Design changes that could materially impact the engineering design, design life, cost, safety, or future development, etc. shall be submitted in writing to the Public Works Department for approval. Submission of materials for review shall include all revised drawings, proposed materials and any proposed specifications that clearly illustrate the design change.

Preliminary approval of design change may be made at the discretion of the Public Works Department in cases of emergency or safety. It is understood however, that the applicant, contractor or franchisee is solely responsible for any increased work or cost incurred pending final approval of the design change.

330.00.00 – Materials

This section is described in two parts: On-site materials which reflect the existing materials at the project site, which if approved, may be used in construction, and, materials which shall be disposed of by the Contractor. Descriptions of on-site materials are set forth below in Section 330.10.01.

Supplied materials are those to be imported to the project site from commercial plants or facilities. Includes manufacturing facilities brought on-site to produce such materials.

The descriptions and requirements of commonly supplied materials to be used in public works construction are defined in Section 900, Construction Materials.

330.10.01 – On site materials

a) Unclassified Material

All native soils to be excavated shall be considered "unclassified", unless otherwise set forth in the Plans or Special Specifications. The Contractor shall make his own estimates of existing conditions and shall base his methods and costs on his own investigation of the actual types, and hardness of materials to be removed and the equipment that will be required.

b) Rock Excavation

When the Plans or the Special Specifications set forth to classify materials to be excavated, the term "rock" shall be understood to mean solid sandstone, limestone, granite, basalt, or other solid rock of equal hardness in ledges, bedded deposits, or unstratified masses, boulders larger than one-half cubic yard in volume, cemented gravels (conglomerates) or shale, that in the Engineer's opinion will require the use of systematic drilling and blasting for removal, and that in fact did require systematic drilling and blasting for removal.

Materials may be classified as "rock" when mutually, agreed by the Engineer and the Contractor that the "rock" may be removed by power-operated hand tools such as pneumatic pavement breakers.

It shall be the Contractor's responsibility, when directed by the Engineer, to remove all over-burden, soil, or other such material and expose the rock surface in a satisfactory manner so that the Engineer may examine the surface and obtain any measurements he requires. Where specified in a Public Works funded project only the actual volume of the rock will be measured for payment for "rock excavation".

c) Common Excavation

When materials to be excavated are "classified", any material that cannot be classified as "rock" will be classified as "Common" excavation.

330.10.02 – Disposal of Excess Excavated Soils

All approved, excavated soils not required for sub-grade beneath streets or sidewalks, for backfill behind curbs, or for finish grading in the rights-of-way may be used for fills on the site as shown on the Grading Plan. All materials not utilized or suitable for site grading shall be removed from the site. No stockpiling of excavated materials, for later removal, will be allowed. All excavated material, not to be immediately used on site must be hauled from site as it is excavated.

330.10.03 – Storage of Excess Excavated Soils

The PWD may approve the temporary storage of excess excavated soils, at their sole discretion, for future use provided they meet the requirements of Section 800, Erosion and Sedimentation Control.

330.12.00 – Supplied Materials

See Section 900 – Construction Materials for testing requirements and specifications of supplied materials generic to most phases of construction.

330.12.01 – Sub-grade Reinforcement

Materials that conform to the requirements set forth in Section 915.00.00, Sub-grade and Trench Reinforcement Rock may be substituted where an increased section is needed to stabilize poor sub-grade conditions or bridge sub-standard areas; where imported structural fill materials are to be imported to raise sub-grades; or where “equivalent base courses” are to be used in addition to the required minimum base course thickness.

330.12.02 – Sub-base Aggregate

Materials that conform to the requirements set forth in Section 910.10.03, Sub-base Aggregate shall be used in the “street sub-base section” where specified on the approved plans.

330.12.04 – Base Aggregate

Materials that conform to the requirements set forth in Section 910.10.02, Base Aggregate shall be used in the “street base section” and as a “leveling course” where specified on the approved plans.

330.12.05 – Concrete

Concrete materials that conform to the requirements set forth in Section 930.00.00, Portland Cement Concrete (PCC) shall be used in the construction of all concrete drainage structures where specified on the approved plans. Included but not limited to are, sewerage structures such as manholes and catch basins, thrust blocking for the water system, for curbs; curb and gutter sections including curb inlets; for sidewalks, driveway aprons, wheelchair ramps; and for streetlight bases. Unless otherwise specified, all concrete shall meet the requirements of section 930.00.00. All concrete supplied shall be plant mixed. Bags mixed onsite in a mixer or wheelbarrow are not allowed.

A concrete slump requirement for various structures is listed in Section 930.10.02, Requirements.

330.12.06 – Hot Mix Asphaltic Concrete (HMAC)

Asphalt paving materials that conform to the requirements set forth in Section 925.00.00, Hot Mix Asphalt Concrete Paving (HMAC) shall be used in the paving of all streets, paths and street curb returns where specified on the approved plans.

330.12.07 – General Uses

- a) Level II mix shall generally be used for all initial paving lifts and leveling courses where the finished thickness is 2" or greater in depth at the shallowest point.
- b) Level III mix shall generally be used for patching removed or damaged pavement; Overlays less than 1" but greater than $\frac{3}{4}$ " in thickness and other minor areas such as shoulders, berms and asphalt curbs. Light duty mix in this category may be substituted for use on pedestrian or bicycle pathways.
- c) Level IV mix shall be considered for overlays where the finished lift thickness is less than $\frac{3}{4}$ ".
- d) Mixing temperatures, hauling and placing temperatures, rolling, equipment and compaction shall conform to Section 00745 of the Oregon Standard Specifications for Construction, latest edition.

330.30.00 – Geo-textile Construction Fabric

Where specified on the plans, all woven and non-woven geo-textile fabric shall conform to the requirements set forth in Section 940.00.00 Geo-textile Construction Fabric.

340.00.00 – Construction Requirements and Workmanship

340.10.00 – Sub-grade Excavation, General

- a) Prior to starting any work the Contractor shall provide a Traffic Control Plan to the PWD. Notify the Emergency Dispatch Center (Cave Junction Police Department) if there will be substantial interruption of traffic as determined by PWD.
- b) The Contractor shall excavate to sub-grade any and all materials to the lines and dimensions shown on the Plans, and Standard Details as staked by the Engineer.
- c) Excavated soils may be used for engineered embankments as described in Section 340.12.00 below unless otherwise set forth in the Special Specifications.
- d) Excess excavated soils not incorporated into engineered embankments shall be disposed of as specified in 330.10.02.

e) The locations of existing underground utilities are shown on the Plan with as much accuracy as possible, based on existing records, but are not guaranteed. In accordance with OAR 952-001-0010 through 952-001-0100, the Contractor shall call the Oregon Utility Notification Center at 1-800-332-2344, or dial 811, at least 48 hours before beginning any excavation for accurate location of utilities, and shall be responsible for all damage to existing underground facilities.

f) The Contractor shall be required to provide the necessary personnel and signing to control traffic for the duration of the project in accordance with MUTCD and ODOT "Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less, latest edition.

340.10.01 – Grading

All excavated areas shall be smoothly graded to conform to the lines, dimensions and elevations shown on the plans, Standard Details and as staked by the Engineer. Unless otherwise directed by the PWD, all excavated sub-grade areas shall be graded to a tolerance range of 0.05' above and 0.10' below the specified grade elevation when measured from established control hubs. Finished sub-grade alignments shall be within 0.20' of the specified location.

340.10.02 – Sub-grade Reinforcement

When unstable, wet, frozen or boggy areas of the excavated sub-grade are encountered they shall be allowed to drain and be reinforced with materials meeting the requirements set forth in Section 910.10.03, Sub-base Aggregate or Section 915.00.00, Sub-grade and Trench Reinforcement (ballast). Grading requirements shall be as described above in Section 340.10.01.

340.10.03 – Compaction

After excavation has been completed to the required sub-grade elevations and before any sub-base materials may be placed, the entire area of the sub-grade surface shall be compacted to a minimum of 95% of maximum density at optimum moisture as determined by AASHTO T-99 (A).

Test points selected for density testing of base course layers shall be selected at random by the inspector to adequately represent the full cross section and length of areas to be tested. The stationed centerline distance between test points shall not exceed 50'.

The PWD may also require proof rolling in addition to the field density tests described above when in the opinion of the inspector, the condition of the material appears unstable or moisture levels exceed the amount determined for the specified soil.

340.11.00 – Rock Excavation

Where materials classified as “rock” under Section 330.10.01, On-Site Materials, are encountered during excavation to sub-grade, the Engineer will establish a new sub-grade for the pavement section at a minimum of 12” below the finish grade elevation of paving to allow for a minimum of 8” of crushed aggregate base and 3” of HMAC paving. See Standard Detail sheets ST-10 through ST-53 of these Standard Specifications.

340.11.01 – Use of Explosives

Where blasting is anticipated or required for excavation, loosening and removal of any materials or objects, The Contractor, and if applicable, his employees shall be properly trained, certified and licensed in accordance with all applicable County, State and Federal laws, rules and requirements for the storage, use and handling of explosives, blasting caps and accessories.

The Contractor shall provide insurance in amounts provided for in the General Conditions of any Public Works Contract, or where applicable, the amounts required by state or federal statute against damage to surrounding properties, equipment and work, and shall name as an additional insured, the City, its employees and agents, the Engineer, his employees and agents, and the Owner, including his employees and agents. These “additional insured” shall be held harmless from damages occurring during the “rock excavations”. When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care so as not to endanger life or property, cause slides or disturb materials outside the neat lines of the trenches or excavations.

The Contractor shall be responsible for any and all damages to property or injury to persons resulting from blasting or accidental or premature explosions that may occur in connection with his use of explosives.

340.11.02 – Repair of Damage

In case injury from blasting occurs to any portion of the work or to the material surrounding or supporting the same, the Contractor, at his own expense, shall remove such injured work, repair the work, and replace the material surrounding or supporting the same, or shall furnish such material and perform such work or repair or replace as the Engineer shall order. Any damage whatever to any existing structures due to blasting shall be promptly, completely and satisfactorily repaired by the Contractor at his own expense.

340.11.03 – Grading in areas classified as rock

All excavated areas classified as rock shall be smoothly rolled and graded to conform to the lines, dimensions and elevations shown on the plan, Standard Details and as staked by the Engineer. Excavated rock sub-grade areas shall be graded to a tolerance range of 0.10’ above and 0.20’ below the specified grade elevation when measure from established control hubs. Finished sub-grade alignments shall be within 0.20’ of the specified location.

340.11.04 – Compaction in areas classified as rock

All excavated areas classified as rock shall be rolled with vibratory equipment capable of breaking down larger material and manipulating such material into adjacent voids. Compaction shall be determined adequate through visual observation by the inspector when a minimum of 3 successive passes over the same tread area by a loaded rock truck or similar equipment produce less than ½" of accumulated deflection.

340.12.00 – Unclassified Excavation and Embankments

340.12.01 – Grading

All un-classified excavated or embankment areas of sub-grade shall be smoothly graded to conform to the lines, dimensions and elevations shown on the approved plans, Standard Details and as staked by the Engineer. The sub-grade shall be graded to a tolerance range of 0.05' above and 0.10' below the specified grade elevation when measure from established control hubs. Finished sub-grade alignments shall be within 0.10' of the specified location.

Excavated materials approved for engineered embankments shall be free of muck, vegetation and other deleterious debris. Unless otherwise shown on the plans, or directed by the PWD, embankments shall be placed in uniformly compacted lifts of less than 6" in thickness. Each lift shall be spread, rolled and moistened or dried to achieve a consistently dense structure.

340.12.02 – Compaction

Excavated materials placed in engineered embankments and under sidewalks shall be compacted to a minimum of 95% of maximum density at optimum moisture when tested in accordance with AASHTO T-99 (A).

Test points selected for density testing of base course layers shall be selected at random by the inspector to adequately represent the full cross section and length of areas to be tested. The stationed centerline distance between test points shall not exceed 50'.

341.00.00 – Sub-base

341.10.01 – General Requirements

After the sub-grade has been inspected, tested and approved, install Geo-textile fabric as specified in section 940.00.00, Geo-textile Construction Fabric and 4" minus crushed rock as specified in Section 910.10.03, Sub-base Aggregate. Each layer shall be compacted to a minimum density as specified in Section 341.10.03 below.

Sub-base layers shall be extended a minimum of 2' behind the face of curb.

341.10.02 – Grading

The top surface of each layer shall be reasonably parallel to the finish grade of paving. Where the total compacted depth of the sub-base course exceeds 6" or more in depth it shall be constructed in 2 or more layers of nearly equal thickness. Unless otherwise shown on the plans or directed by the PWD, the maximum compacted thickness of any one layer shall not to exceed 75 percent of the total required course thickness or 8" of compacted layer thickness whichever is less. The sub-base material shall be smoothly rolled and graded to conform to the lines, dimensions and elevations shown on the plans, Standard Details, and as staked by the Engineer.

Sub-base material shall be graded and compacted within a tolerance range of 0.10' above and 0.20' below the specified grade elevation when measure from established control hubs. Finished sub-base alignments shall be within 0.10' of the specified location.

341.10.03 – Compaction

Sub-base materials shall be processed and compacted with rolling equipment capable of compacting and manipulating such material into adjacent voids creating a dense, uniformly graded mass. Compaction shall be determined adequate through visual observation by the PWD inspector when 3 successive passes within the same tread by a loaded rock truck or similar equipment produce less than ½" of deflection when measured from an undisturbed section or grade reference hub.

Where unstable areas are identified, they shall be allowed to dry out and the material removed and replaced. The area shall be re-compacted and graded as necessary to meet the requirements noted above for compaction and proof-rolling. When removing and replacing sub-base material or ballast material in the sub-grade, the contractor shall be required to replace the Geo-textile fabric with a minimum 1' overlap at all edges.

All areas of deficient grade and uniformity shall be re-graded, compacted to the specified standards, and inspected prior to placing any base course layers.

342.00.00 – Base Course

342.10.01 – Install Base or Leveling Course Materials

Before constructing curb and gutter sections, ¾"-0 crushed rock, as specified in Section 910.10.02, Base Aggregate shall be placed in a minimum 4" thick compacted layer as a leveling course under the curb and gutter section. See Standard Detail A-5A, Sidewalks of these Standard Specifications.

Base course layers shall be extended a minimum of 2' behind the curb. After curbs, or curb and gutter sections have been constructed and approved, the Contractor shall place crushed rock base course materials, as specified in Section 330.12.04 above, to the finished base layer grades as shown on the Plans, Standard Details, and as staked by the Engineer.

342.10.02 – Grading

The top surface of each layer shall be closely parallel to the finish grade of paving. Where the total compacted depth of the base course exceeds 6" or more in depth it shall be constructed in 2 or more layers of nearly equal thickness.

The maximum compacted thickness of any one layer shall not to exceed 75 percent of the total required course thickness or 8" of compacted layer thickness whichever is less. The base course material shall be processed, and smoothly rolled, and graded to conform to the lines, dimensions and elevation shown on the plans, Standard Details, and as staked by the Engineer. Base course material shall be graded to a uniformly compacted surface within a tolerance range of 0.02' above and 0.02' below the specified grade elevation when measure from established centerline control hubs and/or curb and gutter.

The final transverse slope of the base section shall be a minimum of 3% from the centerline of the street to the edge of gutter. Care shall be taken to assure grading will provide drainage of intersection corner radii.

The final surface shall not deviate at any point more than 0.02' from the bottom of a 12' straight edge laid in any direction on the surface on either side of the roadway crown. Finished base course alignments including curbs shall be within 0.05' of the specified location.

Base course materials shall be compacted to a minimum of 95% of maximum density at optimum moisture when tested in accordance with the AASHTO T-99 (A) for determining the maximum density for crushed rock base.

Test points selected for density testing of base course layers shall be selected at random by the inspector to adequately represent the full cross section and length of areas to be tested. The stationed centerline distance between test points shall not exceed 50'.

The PWD may also require proof of rolling in addition to the field density test described above when the opinion of the inspector the condition of the material appears unstable or moisture levels exceed the amount determined for the specified base course material. Stability shall be determined adequate through visual observation by the inspector, per ODOT TM 158.

Where unstable areas are identified, they shall be allowed to dry out and the material removed and replaced. The area shall be re-compacted and graded as necessary to meet the requirements noted above for compaction and proof-rolling.

343.00.00 – Hot Mix Asphalt Concrete Pavement (HMAC)

343.10.01 – Provide and Place Hot Mix Asphalt Concrete (HMAC)

After completion and approval of the finished base course of crushed rock, the Contractor shall install the required depth of HMAC pavement of the type shown on the plans and further specified in Section 925.00.00, Hot Mix Asphalt Concrete Paving, to the lines, grades and dimensions shown on the Plans, Standard Details and as staked in the field.

The following paving requirements for HMAC are referenced to sections of Oregon Standard Specifications for Construction, latest edition and are substituted where applicable.

343.10.02 – Hauling, Depositing, Weather Limitations and Placement

- a) Mixing, transporting, and placing shall conform to the requirements described in Section 00744, Oregon Standard Specifications for Construction, latest edition.
- b) Prior to any placing of HMAC the Contractor will be required to submit a Paving Operation Plan to the City for the Public Works Department's approval not less than 72 hours prior to beginning paving.
- c) The plan shall include a list of the minimum number, type, and size of the paving equipment used, or present at the job site, for hauling, placing, and compaction of HMAC pavement. The plan shall also include the anticipated hauling time from the supplier's plant; and the width, sequence, and direction of the panels to be paved.
- d) The finished elevation of pavement shall be held ¼" (0.021') above lip of gutter.
- e) The final transverse slope of the full half street panel shall be 3% as measured from the top lip of gutter to the crown. A slightly rounded crown where the street half panels join is acceptable provided drainage is maintained to the gutter or street edge.

343.10.03 – Compaction

Compaction shall be in accordance with applicable provisions of Oregon Standard Specifications for Construction, latest edition, Section 00744, and as follows:

- a) If the mix design submitted by the Contractor has been prepared using the Marshall method, the asphaltic concrete shall be compacted to a minimum of 95% of maximum density, based on test core densities measured by the paraffin method.
- b) If the mix design was prepared by the ODOT laboratory, the asphaltic concrete shall be compacted to a minimum of 92% of theoretical maximum density (Rice Density) as determined by ODOT TM 306.

343.10.04 – Additional Field Testing Requirements

Extraction and Gradation – In addition to required asphalt plant testing, a minimum of 2 representative field samples shall be taken daily at the approximate 1/3 and 2/3 points in the project (or sub-project) that will laid down during the shift for asphalt content extraction and aggregate gradation testing. The samples shall normally be taken immediately behind the paving screed a minimum of 1' from the inside edge of the panel. No sample will be taken in the first 25 tons.

343.10.05 – Maintenance

Correct any defects in materials and workmanship in accordance with Oregon Standard Specifications for Construction, latest edition, Section 00744.

343.10.06 – Joints

Joints in HMAC pavement shall be constructed in accordance with Oregon Standard Specifications for Construction, latest edition, Section 00744, Longitudinal Joints except as follows:

Saw cut joints shall be required where joining all new pavement sections with existing pavement sections. All saw cut joints shall receive a tack coat with emulsified asphalt CSS-1 or CSS-1h prior to placement of HMAC.

343.10.07 – Smoothness

The tolerances for smoothness shall be as defined in Standard Specifications for Construction, latest edition, Section 00744, except that if a 10' straight edge is used, the surface shall not vary more than 3/16" (0.0156').

344.00.00 – Portland Cement Concrete (PCC)

344.00.01 – General

All concrete placement, and protection of concrete, shall be subject to the weather limitations and requirements defined in Oregon Standard Specifications for Construction, latest edition, 00540.49, Weather Conditions for Concreting.

All concrete form work and base grading shall be inspected and approved by Public Works Department prior to placement of any concrete. Concrete placed without prior approval is subject to removal by the Contractor/Applicant at his own expense.

All PCC and joint materials shall conform to the requirements of Section 930.00.00, Portland Cement Concrete.

344.00.02 – Quality Assurance

a) Miscellaneous Concrete Structures

1. Finish – PCC shall be finished as specified in the following sub-sections unless otherwise shown on the plans.
2. Joints – Joints shall be constructed and finished in such a manner as to be flush or slightly below adjoining surfaces to avoid tripping hazards.
3. Cracking – Panels or sections that incur cracks greater than 1/16" whether caused by shrinkage, freezing, curing or other indeterminate means shall be removed and replaced with appropriate isolation joints.
All cracks occurring in panels or sections of PCC that are vertically displaced or caused by loading prior to full curing of concrete shall be removed and replaced with appropriate isolation joints.

4. Chipping or Spalling – Sections or panels that have chipped or spalled as result of freezing shall be removed and replaced. Panels with minor chipping or spalling greater than 2 square inches of area shall be repaired with an epoxy based cement grout.
Areas or sections that have received impact damage to such an extent the structure is weakened or cracked by such action shall be entirely removed and replaced between adjacent control or isolation joints.

The determination of repair, removal and replacement of any cracked, chipped or otherwise damaged miscellaneous PCC shall be made at the sole discretion of the PWD.

b) Major Concrete Structures

1. Finish – Finishing of major concrete structures shall be in accordance with Oregon Standard Specifications for Construction, latest edition, Section 540.53, Surface Finish Other Than Bridge Decks.
2. Cracking and Damage – A determination of the remedy, repair, replacement, or additional construction of or to all part(s) of any major concrete structure shall be made jointly by the Engineer and PWD. Upon examination of such damage the Engineer shall deliver a letter to the PWD describing the competency and required remedy, reconstruction or replacement of the structure.

344.10.01 – Miscellaneous Concrete Structures - Requirements

This work consists of furnishing, placing and finishing PCC (concrete) curbs, gutters, islands, sidewalks, driveways, formed or extruded curbs and gutters, ramps, catch basins, and other miscellaneous surfaces and stairs with metal handrail.

Unless otherwise specified, the above described work shall be constructed in accordance with the specifications detailed in Oregon Standard Specifications for Construction, latest edition, Section 00759, Miscellaneous Portland Cement Concrete Structures, all supplemental specifications, and in close conformity to the lines, grades and dimensions shown on the plans, standard details and as staked in field by the Engineer. Unless otherwise specified or shown on the plans, PCC shall attain 3000-psi compressive strength at 28 days, per section 930.00.00 – Portland Cement Concrete(PCC).

All curbs, gutters and sidewalks to be cut for the purpose of repair or relocation of driveways and ramps shall be cut at existing control or isolation joints. Where existing joints do not exist, the cut shall be made at the nearest incremental interval shown on the Standard Detail Sheet A-5A. See Section 350.20.02, Curb, Gutter and Sidewalk Cuts.

Isolation joints shall be constructed at least ½” wide with joint materials conforming to Section 930.10.03, Joint Materials. Concrete shall be allowed to cure free from contact, strain, and public traffic a minimum of 7 calendar days. The PWD may require a longer curing period at its discretion.

344.10.02 – Major Concrete Structures and PCC Pavement - Requirements

All other major concrete structures such as bridges, pavements, box culverts, wing walls, abutments, columns and other similar structures, unless otherwise specified, shall be constructed in accordance with applicable sections of Oregon Standard Specifications for Construction, latest edition, Section 00540, Structural Concrete, Section 00595, Reinforced Concrete Box Culverts, Section 00755, Continuously Reinforced Concrete Pavement.

All PCC materials shall conform to the requirements of Section 930.00.00, Portland Cement Concrete. Unless otherwise specified by City Engineer or shown on the plans, PCC for these types of miscellaneous structures shall meet the requirements of section 930.00.00. All concrete supplied shall be plant mixed. Bags mixed onsite in a mixer or wheelbarrow are not allowed.

344.20.00 – Curbs and Gutters, General

Construction of curb cuts for driveway aprons will not generally be allowed as part of the construction of extruded or formed curb and gutter sections along new or re-constructed streets except at existing driveway locations unless previously approved by the Public Works Department as a condition of the construction plans.

Pre-approved curb cut locations shall not be re-located or adjusted by the Developer / Applicant for a period of 2 years from the date of acceptance of the original curb and gutter.

Concrete shall be allowed to cure free from contact, strain, and public traffic for at least 7 calendar days or longer as directed.

344.20.02 – Curbs with Gutters

Concrete curb and gutter section including curb cuts if located, shall be constructed to the finish grades and alignments shown on the Plans and staked in the field, and to the shapes detailed on Sheet A-6B of the Standard Details, using concrete as specified in Section 344.00.00 above. The maximum allowable slump is 1" for extruded curbs and gutters and 3" for formed curbs and gutters.

The concrete surfaces shall be floated and lightly brushed as required to produce a smooth even finish, free from bubbles, pockets, or blemishes. The sections shall have control joints at intervals not exceeding 10', and isolation joints at intervals not exceeding 50'. All joints shall be neatly marked and finished using jointing or edging tools. To the extent possible isolation joints shall not be located at dropped curb sections.

344.20.03 – Straight Curbs (Non-gutter type)

Straight concrete curbs, where called for, including curb cuts, shall be formed and poured to the finish grades and alignments shown on the Plans, and staked in the field, and to the shapes detailed on Sheet A-6B of the Uniform Standards, using concrete material as specified in Section 344.00.00 above. The concrete surfaces shall be floated and lightly brushed as required to produce a smooth even finish free from bubbles, pockets or blemishes. Curbs shall

have control joints at maximum intervals of 10', and expansion joints at maximum 50' intervals and at the ends of all curb returns. All joints shall be neatly marked with edging tools or jointing tools.

344.20.04 – Rolled Curbs and Gutters

Rolled concrete curb and gutter sections including curb cuts if located, shall be constructed to the finish grades and alignments shown on the Plans and staked in the field, and to the shapes detailed on Sheet A-5B of the Standard Details, using concrete as specified in Section 344.00.00 above. The maximum allowable slump is 1" for extruded curbs and gutters and 3" for formed curbs and gutters. Transitions between rolled curb sections and straight curb sections will be constructed as shown on the plans.

The concrete surfaces shall be floated and lightly brushed as required to produce a smooth even finish, free from bubbles, pockets, or blemishes. The sections shall have control joints at intervals not exceeding 10', and isolation joints at intervals not exceeding 50'. All joints shall be neatly marked and finished using jointing or edging tools. To the extent possible isolation joints shall not be located at dropped curb sections.

344.30.00 – Concrete Sidewalks, Driveway Aprons, Wheelchair Ramps, General

All sidewalks, driveway aprons, wheel chair ramps and other similar street side structures shall be constructed of PCC as described in Section 930.00.00, Portland Cement Concrete.

Where required, sidewalks, driveway aprons and wheelchair ramps and other similar structures shall be constructed after the curb and gutter sections have been installed and cured. The location and widths of driveways shall conform to the requirements shown in Table 300 – 6 unless otherwise approved by the Public Works Department. Construction shall conform to the lines, grades and dimensions shown on the plans, standard detail sheets and as staked in the field by the Engineer. Commercial driveways including the sidewalk section in the driveway entrance shall be reinforced as required on the standard detail sheets.

344.30.01 – Sidewalk and Ramp Requirements

Sidewalks shall slope toward the curb at less than 2% and shall be a minimum of 4" thick in residential areas. A minimum of 6" thickness is required in commercial applications and for rolled curbs. Sidewalks shall conform to the Standard Detail sheet A-5A and A-5B of these Standard Specifications. A 4" plastic pipe shall be placed where sign posts will be included in the sidewalk pour to prevent signpost from being incorporated in the concrete of the sidewalk. Wheelchair ramps shall conform to the slopes and dimensions as detailed on Standard Detail sheets A-8 and A-9. The minimum concrete thickness shall be 4" except at the driveway entrances and rolled curbs where it shall be 6".

Sub-grades behind curbs shall be compacted to 95% of maximum density at optimum moisture when tested in accordance with AASHTO T-99 (A) and graded to a minimum depth of 8" below the tops of curbs at the locations to receive base rock and concrete sidewalks. An area to receive a wedge shaped, concrete thickened edge immediately behind the curb shall also be excavated and slope downward to the bottom of the curb and gutter section.

A 4" lift of ¾"-0" crushed rock as specified in Section 910.10.02, Base Aggregate shall be placed and graded the full width of the area to receive concrete including thickened edges and footings. The crushed rock shall be compacted to 95% of maximum density at optimum moisture when tested in accordance with AASHTO T-99 (A).

After receiving a Public Works inspection and approval of the formwork and grading, 4" of concrete as specified in Section 344.00.00 above and having a maximum slump of 4" shall be placed and finished as follows:

Sidewalks and wheelchair ramps shall be tamped, floated, troweled, and lightly broomed for a non-slip surface. Edges shall be tooled to a smooth neat finish and the surface shall be joint-marked at intervals not exceeding 5. All wheel chair ramps shall have truncated domes, in safety red, installed and/or tooled as shown on Standard Detail Sheet(s) A-8 and A-9 to provide a warning to the impaired user.

At intervals not exceeding 50', a ½" thick isolation joint shall be installed. Isolation joints shall also be installed at tops of all driveway aprons, at the outside edges of wheelchair ramps, and at the ends of all curved sections, such as curb returns, as detailed on Standard Detail Sheets A-5A, A-6A, A-6B and A-9. To the extent possible sidewalk joints shall line up with curb joints.

344.30.03 – Concrete Driveway Aprons

When Driveway Aprons are included in the project, they shall be installed at the locations shown on the Plans, and to the widths shown on the Plans. Residential and Commercial driveway aprons shall include a minimum 6" leveling course of compacted ¾"-0" crushed base aggregate as specified in Section 910.10.02 shall be placed and graded the full width of the area to receive concrete including thickened edges and footings. The sub-grade shall be compacted to a 95% of maximum density at optimum moisture when tested in accordance with AASHTO T-99-A before placing the base rock. The crushed rock base course shall be placed and compacted to 95% of maximum density at optimum moisture when tested in accordance with AASHTO T-99 (A).

Residential driveway aprons shall be formed with the lines and slopes detailed on Standard Detail Sheet A-5A and shall be a minimum of 6" thick PCC. Commercial driveways and alleys shall be a minimum of 6" thick PCC and reinforced with #4 reinforcing steel installed in a grid pattern @ 16" on center. Unless otherwise detailed and approved, all driveways shall be a minimum 12' wide.

After receiving an inspection and approval of the formwork and grading, the concrete as specified in Section 344.00.00 above and having a maximum slump of 4" shall be placed and finished as follows:

Driveway aprons shall be tamped, floated, troweled, and then broomed in the direction of the slope. The edges and joints shall be neatly tooled as shown on Standard Detail sheet A-6A. Isolation joints, control joints and the joint marking pattern shall be made at intervals as shown on the Standard Detail sheets A-5A and A-6A. As a minimum, isolation joints are required at the tops of all driveway flares where joining level sidewalk and at connection to existing concrete. Where curbs and gutter are cut to accommodate driveway aprons, the isolation joint shall be extended to the edge of pavement.

Isolation joints shall be constructed at least ½" wide with asphalt impregnated fiberboard joint materials conforming to Section 344.00.00 above.

Control joint marking along the base (front) of the apron shall be made as shown on Standard Details A-5A and A-6A and extended through the sidewalk section. To the extent possible, joints in the apron shall line up with joints in the curb and gutter section. In certain cases where a portion of an existing driveway apron is cut, the existing dropped curb width (approx. 7") shall be extended along the apron to the bottom of the new flare. A transition shall be made in the apron from the dropped curb at bottom of flare to the normal curb width at top of flare. Joint marking of the adjoining private driveway shall line up with the driveway apron and/or sidewalk joints to prevent cracking.

350.00.00 – Miscellaneous Construction Requirements and Workmanship

350.10.01 – Planter Strips, Medians and Shoulder Landscaping

These items shall be constructed as shown on the approved plans in accordance with applicable sub-sections of Part 01000, Right of Way Development and Control and Section 01120, Irrigation Systems, Oregon Standard Specifications for Construction, latest edition.

350.20.00 – Street Cutting including Curbs, Gutters and Sidewalks

General – Street cuts may only be made after obtaining a permit from the Public Works Department. Generally street cuts shall be made only on streets or overlays after a 5-year moratorium period has elapsed from the date of acceptance. All street cuts shall be made in conformance to Standard Detail Sheet(s) T-1. Also refer to Standard Detail Sheet U-1B, Utility Trench.

After backfill has been placed and compacted as required, contractor shall utilize a "T-Cut" method on the existing asphalt, in which the asphalt is cut again a minimum of 6" wider than the existing trench wall, on both sides, including any undermined areas. Exposed road bed will then be satisfactorily compacted, as determined by the Public Works Department, or their representative, prior to paving the trench.

On projects having numerous cross trenches or where there has been extensive damage to the surface, the City may require a 0-33 seal coat or an asphaltic concrete overlay of the entire paved surface, after the asphaltic concrete patching has been completed. On longitudinal trenches of 200' or greater in length, unless otherwise approved by the Engineer, the existing pavement shall be removed and replaced to full paving machine width (normally 10'). Drag boxes or other pull-type asphalt spreader will not be permitted for longitudinal trench pavement replacement.

Special approval on "moratorium streets" may be granted by the PWD where no other reasonable alternative is available for accessing underground utilities. The applicant, franchisee, and / or contractor shall be required to make certain deposits and warranties as follows:

350.20.01 – Requirements

The Applicant, Franchisee and/or Contractor is/are required to do the following:

- a) A permit from the City of Cave Junction and Public Works Department is required prior to any work being done within any city right-of-way (ROW).
- b) Deposit a non-refundable street cut fee in the amount of 7.52% of the construction cost associated with the project;
- c) Shall warrant the repaired street free of defect for a period of 5 years from the date of acceptance by the PWD.

And provide further, that in addition to repair of the street in accordance with all applicable specifications and standards of Section 300, Street Construction, the applicant, franchisee and/or contractor shall perform the following:

- d) Submits a Traffic Control Plan to the PWD prior to beginning any work. Provide traffic control in accordance with ODOT and MUTCD standards and ODOT "Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less", latest edition, during all phases of construction and repair.
- e) After work is complete, re-saw the pavement a minimum of 6" behind the original trench cut or undisturbed trench wall, whichever is greater.
- f) Backfill trench and any failed edges of trench with 1-sack cement / sand slurry mix. The PWD at its discretion may require 2-sack cement sand / slurry mix in areas of high traffic.
- g) Remove slurry including all loose material to existing asphalt depth but not less than a minimum 3" depth. In areas of high traffic, the PWD will require a minimum of 4" thickness ACP.
- h) Tack all pavement edges prior to patching.
- i) Repave with ACP of a class and depth, as determined by street classification, as follows. Local and Collector streets shall use a minimum of 3" of level II mix. Arterial and Industrial streets shall use a minimum of 4" of level III mix. Where the total thickness exceeds 3" the patch shall be placed in 2 lifts. Each lift shall be rolled a minimum of 4 passes with a vibratory roller to achieve compaction and smoothness.
- j) Seal all finished edges and saw cuts using a sand seal composed of emulsified asphalt and fine sand in the presence of the inspector.
- k) Provide and maintain any temporary measures needed to promote safe traffic movement with steel jump plates, warning signs or lights, etc. All jump plates shall be secured in place with plate locks on all edges.

l) The Contractor shall re-establish any delineation of cross walks, fog lines, bicycle lanes, and etc. to the standards and with materials required by the PWD including hot-tape application.

Where street cuts are required on non-moratorium streets the PWD may waive, modify certain requirements on a case-by-case basis.

350.20.02 – Curb, Gutter and Sidewalk Cuts

- a) Saw cuts in concrete curb, gutter, and sidewalk sections shall be made only at existing panel joint lines or isolation or control joints unless otherwise directed by the PWD.
- b) The entire panel shall be removed and replaced to the existing grades of the panel and/or any adjoining panels or, if applicable, to the newly required lines grades and dimensions shown on the plans, Standard Detail sheets, as staked in the field, or as directed by the PWD. All disturbed base material, base material lost as a result of removal or in the absence of such adequate material, shall be replaced with $\frac{3}{4}$ "-0 crushed rock material conforming to the requirements of Section 910.10.02.
- c) Isolation joints, control joints and joint marking shall be made at intervals as shown On the Standard Detail sheets A-5A, and A-6A. As a minimum isolation joints are required at the tops of all driveway flares where joining level sidewalk and at existing concrete.
- d) Where curbs and gutter are cut, removed and replaced the isolation joint shall be extended to the edge of pavement.

**Table 300-1A
Arterial Street Widths and Rights of Way Widths**

Lane Configuration	Lane Widths	Turn Lanes and Width	Parking Lanes and Width (4)	Bicycle Lanes and Width	Street Width at FOC (1)(4)	Sidewalk Width (2)	Landscape Row Width (3)	Minimum Rights of Way Widths (1)
3 Lane (minor)	2 @ 12'	1 @ 14'	Optional	2 @ 6'	50'	2 @ 6'	6' - 7.5'	79'
3 Lane (minor) Alternative	2 @ 11'	1 @ 12'	2 @ 8'	2 @ 5'	60'	2 @ 12'	Tree Wells	86'
4 Lane (minor)	4 @ 12'	(7)	Optional	2 @ 6'	60'	2 @ 6'	7.5'	89'
5 Lane	4 @ 12'	1 @ 14'	Optional	2 @ 6'	74'	2 @ 6'	7.5'	103'
5 Lane Alternative	4 @ 11'	None	2 @ 8'	2 @ 5'	2 @ 35'	2 @ 12'	12' center median and tree wells	108'

NOTES:

1. Minimum ROW and street widths may vary according to requirements for left turn lanes, right turn bays, parking lanes, sidewalks, and landscape rows. The individual lane widths are considered minimum unless otherwise approved by the Public Works Department.
2. The smaller sidewalk width shall be used only in conjunction with a curbside landscape rows.
3. Planter Strips are required except as approved by the Public Works Department.
4. Parking lanes are not normally permitted on Arterial streets. They may be permitted in existing commercial business districts or may partially substitute for right turn bays and transit pullouts. Widths are increased accordingly.
5. Lane widths include striping and gutter widths. Where striping and delineation is required it shall normally be centered over the separate required lane widths or centerline. All delineation and striping shall meet the MUTCD requirements as administered by the State of Oregon.
6. Public Utility Easements are required in addition to the Right-of-Way widths shown.
7. Right-of-Way may be increased at intersections to accommodate short refuge and left turn lane sections.

**Table 300-1B
Collector Street Widths and Rights of Way Widths**

Lane Configuration	Lane Widths	Turn Lanes and Width	Parking Lanes and Width	Bicycle Lanes and Width	Street Width (1)(4) at FOC	Sidewalk Width (2)	Landscape Row Width (3)	Minimum Rights of Way Widths (1)
2 Lane (Retrofit)	2 @ 12'	None	None	2 @ 6'	36'	2 @ 5'	6'	63'
2 Lane Business/ Residential	2 @ 10'	May or may not have a turn lane.	2 @ 8'	2 @ 5'	46'	2 @ 8' or 2 @ 12'	6'	72' or 76'
3 Lane	2 @ 12'	1 @ 14'	None	2 @ 6'	50'	2 @ 5/6'	6'	74' or 76'
3 Lane	2 @ 12'	1 @ 14'	2 @ 8'	2 @ 6'	66'	2 @ 5/6'	6'	90' or 92'

NOTES:

1. Minimum ROW and street widths may vary according to requirements for left turn lanes, right turn bays, parking lanes, sidewalks, and landscape rows. The individual lane widths are considered minimum unless otherwise approved by the Public Works Department.
2. The smaller sidewalk width shall be used only in conjunction with a curbside landscape row.
3. Landscape rows are required except as approved by the Public Works Department.
4. Parking lanes may normally be permitted on Collector Streets. They may also partially substitute for right turn bays and transit pullouts. Widths are increased accordingly.
5. Lane Widths include striping and gutter widths. Where striping and delineation is required it shall normally be centered over the separate required lane widths or centerline.
6. All delineation and striping shall meet the MUTCD requirements as administered by the State of Oregon.
7. Public Utility Easements are required in addition to the Right-of-Way widths shown.
8. Right-of-Way may be increased at intersections to accommodate short refuge and left turn lane sections.
8. Short center and right turn lanes may be required to meet safety and traffic control requirements.

Table 300-1C

Standard

Local Street Widths and Rights of Way Widths

Lane Configuration	Lane Widths	Turn Lanes and Width	Parking Lanes and Width (4)	Bicycle Lanes and Width	Street Width (1)(4) at FOC	Sidewalk Width (2)	Landscape Row Width (3)	Minimum Rights of Way Widths (1)
Residential								
2 Lane - new	2 @ 10'	N/A	2 @ 8'	N/A	36'	2 @ 5'	2 @ 6'	60'
2 Lane - retrofit	2 @ 10'	N/A	2 @ 8'	N/A	36'	2 @ 5'	n/a	52'

NOTES:

1. Minimum ROW and street widths may vary according to requirements for left turn lanes, right turn bays, parking lanes, sidewalks, and landscape rows. The individual lane widths are considered minimum unless otherwise approved by the Public Works Department.
2. The smaller sidewalk width shall be used only in conjunction with residential streets.
3. Landscape rows may be required as approved by the Public Works Department.
Residential parking lanes are combined with the travel lane (un-delineated). Commercial parking areas may be delineated in combination with loading areas, etc.
4. Lane Widths include striping and gutter widths. Where striping and delineation is required it shall normally be centered over the separate required lane widths or centerline. All delineation and striping shall meet the MUTCD requirements as administered by the State of Oregon.
5. Public Utility Easements are required in addition to the Right-of-Way widths shown.
6. Right-of-Way may be increased at intersections to accommodate short refuge and left turn lane sections.

Table 300-1D
Minor Local Street and Residential Lanes
Widths and Rights of Way Widths

Lane Configuration	Lane Widths	Turn Lanes and Width	Parking Lanes and Width (3)	Bicycle Lanes and Width	Street Width at FOC	Sidewalk Width	Landscape Row Width (1)	Minimum Rights of Way Widths (1)
Minor Local								
2 Lane - Retrofit	2 @ 10'	N/A	1 @ 8'	N/A	28'	2@ 5'	N/A	42'
2 Lane - New	2 @ 10'	N/A	1 @ 8'	N/A	28'	2@ 5'	2 @ 6'	52'
Residential Lane	2 @ 12'	N/A	N/A	N/A	25'	N/A	N/A	25'

NOTES:

1. Minimum ROW and street widths may vary according to requirements for left turn lanes, right turn bays, parking lanes, sidewalks, and landscape rows. The individual lane widths are considered minimum unless otherwise approved by the Public Works Department.
2. Landscape rows may be required as approved by the Public Works Department.
3. Residential parking lanes may be combined with a reduced travel lane (un-delineated). Lane Widths include gutter widths.
4. Public Utility Easements are required in addition to the Right-of-Way widths shown.
5. Hammerhead turnarounds, knuckles or bulbs meeting Fire District Number 3 requirements are required for all dead drives, residential lanes or alleys.
6. 18" mountable curbs may be required in lieu straight curbs where approved.

**Table 300-1E
Miscellaneous Transportation Features**

Functional Class and Type of Street	Minimum Travel Lanes and Width (3)	Turn Lanes and Width	Parking Lanes and Width	Bicycle Lanes and Width	Street Width or Radius at FOC (1), (2)	Sidewalk Width	Planting Strip (Optional except as noted)	Rights of Way Widths
Industrial	2 @ 17'	0	2 @ 8'	0	50'	2 @ 5'	2 @ 6'	79'
Alleys	Varies, see dwg ST-42	0	0	0	20'	0	0	21' to 29'
Private Drives	Varies, see dwg ST-42	0	0	0	21'	0	0	None
Cul de sac Radius(4)	Local Streets Res. Lanes				See note 4			See note 4
Bicycle Paths	5'			5' to 12'				Varies
Pedestrian Paths	5'			5' to 12'				None
Multi-Use Paths	8' to 12'			8' to 12'				None

Notes:

1. Cul de Sac's for Local Streets may be configured as end bulb or side bulb providing minimum Cul de Sac street width and radius are met. Minor local street Cul de Sac's may be designed with a reduced radius where approved providing they meet Fire District Number 3 requirements and meet minimum turning requirements (no backing) for utility vehicles
2. Hammerhead tumarounds, knuckles or bulbs meeting Fire District Number 3 requirements are required for all dead drives, residential lanes or alleys
3. Required for all private and minor land partitions of 3 or less. Width includes an 18" mountable curb section on each side. Water meters require drivable lids.
4. Contact Fire District #3 for the most up to date turning template information.

**Table 300-2
Minimum Street Alignment and Grade Requirements**

Functional Class & Type	Minimum Centerline Curve Radii	90 Degree Corner Radius at F.O.C.	Corner Radius at R.O.W.	Centerline Maximum Grade	Centerline Minimum Grade	Transverse Panel Grade (Crown)	Minimum Vertical Curve Length (g1 + g2)
Arterials						3.0%	
Major	300'	See AASHTO Table 11-2	Parallel to F.O.C. Radius	6%	0.5%	3.0%	See AASHTO Tables 111-39 through 41
Secondary	300'	"	"	6%	0.5%	3.0%	"
Collector	100'	"	"	8%	0.5%	3.0%	"
Local Streets							
Residential Street	100'	28'	"	12%	0.5%	3.0%	"
Residential Lane	100'	20'	"	12%	0.5%	3.0%	50'
Alleys	100'	20'	"	12%	0.5%	3.0%	50'
Private Drives	100'	20'	"	12%	0.5%	3.0%	N/A

Notes:

1. All street sections shall have a minimum transverse grade of 3% as measured from the crown to the top of the concrete lip of gutter

**Table 300-3
Minimum Street Section Requirements (1)**

Functional Class and Type	Paving Section	Base Section	Sub-base Section	Geo-textile Fabric (2)
Major Arterial	4" Class B	8" ¾"-0 crushed rock	12" 4" crushed rock	Woven
Minor Arterial	4" Class B	8" ¾"-0 crushed rock	12" 4" crushed rock	Woven
Collector	3" Class B	6" ¾"-0 crushed rock	10" 4" crushed rock	Woven
Local Residential Street	3" Class B	6" ¾"-0 crushed rock	8" 4" crushed rock	Woven
Residential Lane	3" Class B	6" ¾"-0 crushed rock	8" 4" crushed rock	Woven
Alley	3" Class B	6" ¾"-0 crushed rock	8" 4" crushed rock	Woven
Private Drive	3" Class B	6" ¾"-0 crushed rock	8" 4" crushed rock	Woven

Notes:

- 1 All required materials shall be in conformance with Section 900, Construction Materials and Section 320, Design
- 2 Woven Geo-textile fabric shall be Linq Industries GTR 200 or approved equal.

**Table 300-4
Street Intersections and Access Separation**

Street of Alignment	Major Arterial	Secondary Arterial	Collector	Local	New Driveway
Major Arterial	1000'(1)	1000'(1)	1000'	750'	See Note(2)
Secondary	1000'(1)	750'	500'	500'	See Note(2)
Collector	1000'	750'	500'	300'	Allowed
Local	750'	500'	300'	150'	Allowed

NOTES:

- 1 Major arterial streets, when aligned with other major arterial streets, shall be designed on a case-by-case basis and may require minimum spacing greater than 1000', but in no case shall spacing be less than 1000'.
- 2 Driveways are generally not allowed to access onto arterial streets unless no other reasonable access is available.
- 3 The Public Works Department, at the discretion of the Public Works Department, may allow a 300' distance between access driveways on major arterial streets.

Table 300-5

Minimum Sight Distance and Clear Vision Requirements

Sight Distance at Intersections (1)

20 MPH	30MPH	40MPH	50MPH	60MPH
200'	300'	400'	500'	600'

Notes:

1. Corner sight distance measured from a point of the minor road at least 10' from the edge of the major road pavement and measured from a height of eye of 3.5' on the minor road to a height of object of 4.25' as referenced on Standard Detail Sheet A-11, as distances d1 and d2.

**Table 300-6
Driveway and Property Access Dimensions**

	Driveway Throat Width	Curb Radius at Street	Minimum Spacing from Intersection	Spacing From Property Line	Minimum Spacing Between Driveways
	Min / Max	Min / Max		Min / Max	Minimum
Major Arterial					
Residential	N/A(1)	N/A(1)	(3)	N/A(1)	N/A(1)
Commercial	24' – 30'(1)	(2)	(4)	(6)	(7)
Secondary Arterial					
Residential	12' – 30'(1)	N/A(1)	(3)	N/A(1)	N/A(1)
Commercial	36' – 36'(1)	(2)	(4)	(4)(5)	(7)
Collector Street					
Residential	12' – 30'	20' – 35'	(3)	15'(5)	30'
Commercial	12' – 30'	(2)	(4)	20'(5)	40'
Local Street					
Residential Street	12' – 30'	20' – 20'	(3)	7'(5)	12'
Residential Lane	12' – 30'	20' – 20'	(3)	7'(5)	12'
Commercial / Ind.	12' – 30'	(2)	(4)	7'(5)	12'

Notes:

1. Property access to arterial streets is generally not allowed unless no other reasonable access is available. The Public Works Department shall determine maximum driveway or property access width. The PWD may require a traffic engineering study by the applicants engineer when determining width or access locations.
2. Minimum curb radius shall be designed for the maximum wheelbase intended in conformance with AASHTO and City of Cave Junction specifications.
3. The driveway throat shall be located the farthest distance away from a street intersection or 30', whichever is greater.
4. The driveway throat shall be located the farthest distance away from a street intersection or 200', whichever is greater.
5. Maximum spacing from non-intersection property lines shall be the farthest distance on the lot from the property line and still meet all other driveway spacing standards.
6. Spacing of driveway or property access from non-intersection property lines on an Arterial street shall be determined by the Public Works Department. The PWD may require a Traffic Engineering Study by the Applicants engineer, when determining spacing of driveways.
7. The Public Works Department shall determine minimum distances between driveway or property access. The PWD may require a Traffic Engineering Study by the Applicants Engineer when determining spacing between driveways.
8. The PWD may require joint access driveways for two or more adjoining properties to be constructed where possible. Typical situations would include pad-lots, duplexes, or Cul-de-Sac.

Table 300-7
Clear Vision Areas
Type of Street – Sight Triangle Distances

Type of Intersection	Local	Collector	Secondary Arterial	Major Arterial
Residential Access	15'	25'	55'(2)	(1), (2)
Commercial Access	25'	25'	55'	(1), (2)
Industrial Access	55'	55'	55'	(1), (2)
Alley and Private Drives	15'	25'	55'(2)	(1), (2)
Residential Lanes	25'	55'	55'	(1)
Residential Streets	25'	55'	55'	(1)
Collector Streets	55'	55'	55'	(1)
Secondary Arterial	55'	55'	55'	(1)
Major Arterial	(1)	(1)	(1)	(1)

Notes:

1. The Public Works Department may require the Applicant or Developer to provide a Traffic Engineering Study for clear vision, traffic and sight distance in the event a minimum 55' sight triangle appears to inadequate.
2. New residential, commercial and industrial access is generally not allowed unless no other reasonable access is available. This must be approved in writing by the Public Works Department.