THURSTON COUNTY
WASHINGTON
SINCE 1852

ROAD STANDARDS

JANUARY 1999
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1.00 INTRODUCTION

The Thurston County Road Standards shall be referred to as the "Standards."

These Standards include safety, convenience, drainage, aesthetic values, and economical maintenance.

These Standards are not intended to provide for all situations but to be flexible in form and content. They are intended to assist but not substitute for competent work by design professionals. It is expected that land surveyors, engineers, architects, and contractors will bring to each project the best of their skills.

These Standards are also not intended to unreasonably limit any innovative or creative effort. However, any variance from these Standards are subject to the approval of the Engineer based on satisfactory evidence that the proposed variance will produce an equivalent facility.

1.01 Current Edition of the Standards

The most current edition of these Standards will be available at the Permit Assistance Center of the County Development Services Department. In order to remain current with technology and public needs, these Standards are subject to revisions. It is essential for the holder to keep the manual current with revisions as they occur.

1.02 Application of Standards

A. Mandatory Standards

Mandatory Standards are those considered most essential to the achievement of overall design objectives. Mandatory Standards use the word “shall”.

B. Advisory Standards

Advisory Standards allow some flexibility in application to accommodate design constraints or to be compatible with local conditions. Advisory Standards use the word “should”.

C. Permissive Standards

All Standards other than the mandatory and advisory, indicated with the word “may”, are permissive with no requirement intended.
## 2.00 GENERAL CONSIDERATIONS

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2.00 GENERAL CONSIDERATIONS

2.01 Applicability

Except as noted in Section 2.04 these Standards and guidelines shall govern all new construction and upgrade construction. Standards shall be considered reasonable minimum regulations, and shall not be relaxed except upon approval of a variance.

Any land development which will adversely impact the level of service, safety, or operational efficiency of abutting or serving roadways or is required by other County code, permit or ordinance to improve such roadways, shall improve those roadways in accordance with these Standards or the applicable urban growth area Standards.

These Standards are pursuant to Thurston County Code Title 18, "Platting and Subdivision" and Title 20, "Thurston County Zoning Ordinance" and the Uniform Building Code. Where these Standards may be inconsistent with the provisions of Title 18 and Title 20, these Standards shall control.

2.02 Definitions

AASHTO - American Association of Highway and Transportation Officials.

Acceleration Lane - A speed change lane, including tapered areas, for the purpose of enabling a vehicle entering a roadway to increase its speed to a rate at which it can more safely merge with through traffic.

Access - A trail, driveway or private road that connects to the general public road system.

ACP - Asphalt Concrete Pavement.

ADT - Average Daily Traffic. The total two-directional volume of traffic passing through a given point during a given time period, divided by the number of days in that time period. When used as a threshold to determine classification (size) of the access point or road, ADT shall be based on the ultimate build out of all land, considering current zoning, that will potentially be served by the access point or road.

Applicant - Any person, firm, partnership, association, joint venture, corporation or any other entity responsible for a given project seeking approval from the County for any land use or other related permit or approval referenced in Thurston County Code and which requires utilization of these Standards.

Approved/Accepted Plans - Project plans that have been accepted for construction by the County Engineer or designee.
ATB - Asphalt Treated Base.

Auxiliary Lane - The portion of the roadway adjoining the traveled way for parking, speed change, turning, storage for turning, weaving, truck climbing, and other purposes supplementary to through-traffic movement.

Breakaway Structure or Breakaway Design - A structure or installation that has been crash tested in accordance with National Cooperative Highway Research Program procedures.

Capacity - The maximum number of vehicles that have a reasonable expectation of passing over a given roadway or section of roadway in one direction during a given time period under prevailing roadway and traffic conditions.

CF - Cubic Feet.

Channelization - The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands or other suitable means to facilitate the safe and orderly movement of both vehicles and pedestrians.

Clear Zone - The total roadside border area, starting at the edge of traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a nonrecoverable slope, and/or a clear run-out area. The desired width is dependent upon the traffic volumes, speeds, and the roadside geometry.

CMP - Corrugated Metal Pipe.

Control Zone - That roadside area defined by the “Control Zone Distance Table”, found in the WSDOT Utilities Manual, within the road right-of-way in which placement of utility objects are controlled.

County - Thurston County

CSTC - Crushed Surfacing Top Course.

Cul-de-sac - Short road having one end open to traffic and the other temporarily or permanently terminated by a vehicle turnaround.

CY - Cubic Yard.

Deceleration Lane - A speed change lane, including tapered areas, for the purpose of enabling a vehicle that is to make an exit turn from the roadway to slow to a safe turning speed after it has left the main stream of faster moving traffic.
**DHV - Design Hour Volume.** Hourly peak traffic volume, in a typical 24 hour period, used for road design and capacity analysis.

**Design Speed** - A speed determined for design and correlation of the physical features of a highway that influence vehicle operation: the maximum safe speed maintainable over a specified section of road when conditions permit design features to govern.

**Director** - The Director of Thurston County Roads and Transportation Services or authorized representative.

**Driveway** - Access to individual lot.

**Easement** - A right to use or control the property of another for designated purposes.

**Edge of Traveled Way** - The face of curb or roadside edge of bike path for roads that are, or will be constructed to urban Standards, or the edge of driving lane (not shoulder) for roads that are, or will be constructed to rural Standards.

**Encroachment** - Occupancy of County right-of-way by non-roadway structures or other objects of any kind. This includes any work within the County right-of-way.

**Engineer** - Shortened designation for County Engineer or authorized representative. This definition shall also be applied to the terms “Director” or “Engineer” as they may appear in the Standard Specifications or the Standard Plans.

**Geometrics** - The arrangement of the visible elements of a road such as alignment, grade, sight distance, widths, and slopes.

**Grade** - Rate or percent of change in slope, either ascending or descending from or along the roadway. It is measured along the centerline of the roadway or access point.

**Half Road** - A road constructed along the property line of development utilizing half the regular width of the right-of-way and permitted as an interim facility pending construction of the other half of the road by the adjacent owner.

**Hazard** - A side slope, an object, water, or a drainage device which, if impacted, would apply unacceptable impact forces on the vehicle occupants or place occupants in a hazardous position. It may be either natural or manmade.

**Horizon Year(s)** - Estimated year or years in which a project or phases of a project will be complete.
**Intersection** - The general area where two or more roadways join or cross. Minor approaches to roadways such as private driveways are also defined as an intersection.

**Island** - A defined area between traffic lanes for control of vehicle movements and/or for pedestrian refuge.

**Joint Access** - An access onto County right of way which provides access to two driveways.

**Land Surveyor** - A professional land surveyor currently licensed by the State of Washington.

**LF** - Linear Feet.

**Median** - That portion of a divided roadway separating the traveled ways for traffic in opposite directions.

**MPH** - Miles Per Hour.

**NGVD** - National Geodetic Vertical Datum

**Operating Speed** - Used for determination of sight distance. Operating speed should be equal to the P85 speed for existing facilities and be equal to the design speed for new facilities.

**Passing Sight Distance** - The minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably.

**Pavement Width** - The distance measured from face of curb to face of curb for curbed sections of roadway or the distance measured from outside edge of pavement to outside edge of pavement sections of roadway.

**PC** - Point of Curvature.

**PCC** - Portland Cement Concrete.

**PI** - Point of Intersection.

**Plan/Construction Drawings** - The plans, profiles, cross sections, elevations, details, and supplementary specifications, signed by a licensed professional engineer and accepted by the County Engineer, which show the location, character, dimensions, and details of the work to be performed.

**Posted Speed** - Is the speed actually signed along the roadway.
Private Road - Private vehicular access provided for by an access tract, easement, or other legal means, serving two or more potential dwelling units; privately owned and maintained.

Project Engineer - A professional engineer currently licensed by the State of Washington, retained by the applicant, and acting on the applicant’s behalf as a project designer.

PT - Point of Tangency.

Public Road - Publicly owned and maintained road.

P85 Speed or 85th Percentile (85%) Speed - Based on speed studies, P85 Speed is that speed at which 85% of the vehicles travel at or below.

Radius Return Access Point - The intersection of an access point with a County road delineated by either pavement edges or curbs laid out at each edge in curvilinear fashion between tangents formed by the edge of roadway (or curb face) and the edge of access point (driveway) pavement or curb face.

R/W/Right-of-Way - All property in which the County has any form of ownership or title and which is held for public road purposes, regardless of whether or not any road exists thereon or whether or not it is used, improved, or maintained for public travel.

Road/Roadway - An open public way for the passage of vehicles, person and animals. Limits include the outside edge of sidewalks, or curbs and gutters, or side ditches, including the appertaining shoulder and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection within the right-of-way or easement.

Rural Areas - Areas so designated in Thurston County Comprehensive Plan, and as implemented through community plans and area zoning which are characterized by long-term low density development.

Separate Turn Lane - An auxiliary lane for turning traffic in one direction which has been physically separated from the intersection area by a traffic island or stripe. Separate turn lanes may be included within intersections or separated from intersection areas by traffic islands.

SF - Square Feet.

Shoulder - That portion of the roadway contiguous with the traveled way for accommodating stopped vehicles, for emergency use, and for lateral support of base and surface courses.
Sight Distance, Stopping - As defined by AASHTO, the minimum distance along a roadway sufficiently long enough to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. The Stopping Sight Distance is the sum of the distance a driver travels to perceive and comprehend the object, decide on an appropriate response, react and complete the braking maneuver without hitting the object in its path.

Speed Change Lane - A separate lane for the purpose of enabling a vehicle entering or leaving a roadway to increase (acceleration lane), or decrease (deceleration lane) its speed to a rate at which it can more safely merge with or diverge from through traffic.

Traveled Way - The part of the road made for vehicle travel excluding shoulders and auxiliary lanes.

Trip - A one-direction movement which begins at the origin and ends at the destination.

Trip Distribution - The process by which the movement of trips between zones is estimated. The data for each distribution may be measured or estimated by a growth factor process or by a synthetic model.

Trip End - A single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside the study area. For trip generation purposes, the total trip ends for a land use over a given period of time are the total of all trips entering plus all the trips exiting a site during a designated time period.

An example of a trip end would be: A site which has over some period of time, 2,000 trips entering and 1,800 trips leaving, has 3,800 trip ends associated with it. The 3,800 total trips to and from the site represent a total of 7,600 trip ends. Of these, 3,800 occur at locations other than the site in question.

Trip Generation - A general term describing the analysis and application of the relationships that exist between the trip makers, the traffic study area, and the trip making. It relates to the number of trip ends in any part of the traffic study area.

Unopened Right-of-Way - A County right-of-way that exists by dedication or deed, but for which no vehicular roadway has been constructed by the County or other parties.

Urban Areas - Areas so designated in the Thurston County Comprehensive Plan, and as implemented through community plans and area zoning which are characterized by denser commercial/industrial and residential development.
Utility - A business providing public service such as gas, electric power, telephone, telegraph, water, sewer, or cable television, whether or not such business is privately owned or owned by a governmental entity.

2.03 Adopted Thurston County Specifications

Except where these Standards provide otherwise, or by contract with the County, all design and construction, including materials, shall be in accordance with the relevant sections of the following publications:


2.04 Exemptions

These Standards shall not govern the following:

A. Maintenance work within public rights-of-way by County forces.

B. Temporary repairs made on an emergency basis.

C. 3R Standards - Restoration, Rehabilitation, and Resurfacing as defined in the LAG Manual.

D. Rural private road, if:

1. The road complies with requirements of the 16-foot private roadway section, Appendix 6-A. To determine whether the road complies, pot-holing and material testing may be required; and

2. Engineered drainage plans are not required; and

3. Existing grade or slope in the road profile does not exceed 12%; and

4. The work will not intercept a drainage swale or otherwise impact natural surface drainage; and

5. Roadway runoff will not affect neighboring property.

E. Upgrading of existing private road, if:

1. Existing road meets the requirements of the 16-foot private roadway section, Appendix 6-A; and

2. Road is to remain private; and

3. No safety improvements are required by Engineer or designee.
4. Roads between 12 and 16-feet in width and serving 4 or fewer lots may be allowed with pullouts every 300 feet. The pullouts shall be a minimum of 8 feet in width and 50 feet in length plus 25 foot tapers at each end. “No Parking-Fire Lane” signs shall also be placed at each end of the pullout.

2.05 Interpretation and Enforcement

Interpretation and enforcement of these Standards shall be the responsibility of the Engineer.

Failure to comply with these Standards will be cause for withholding or withdrawing acceptance of plans or drawings, withholding of bond, final inspection approval or occupancy certificates and/or other penalties as provided by code, ordinance or law.

2.06 Project Acceptance

The Engineer shall rely upon the certification and approval of the road and drainage plans and calculations by the applicant’s Project Engineer for approval of the project. The Engineer’s acceptance of the plans shall not relieve the applicant or the applicant’s Project Engineer from any liability related to portions of the design which are not in conformance with these Standards or do not follow good engineering practice.

Upon receipt of the project plans and calculations, the Engineer will review the work of the applicant’s Project Engineer for accuracy and completeness. The plans and calculations will either be accepted by the County or returned for revisions. All revisions are subject to hourly review fees as set forth in the current Thurston County Fee Schedule. Project acceptance occurs when the Engineer signs the plans.

The plans, reports, basin maps and calculations shall be signed, sealed and dated by the applicant’s Project Engineer. The cover sheet of the plan set and the cover sheet of all calculations shall bear the certification which reads:

“The design improvements shown in this set of plans and calculations conform to the current edition of the Thurston County Road Standards and the Drainage Design and Erosion Control Manual for Thurston County. All design variances have been approved by the Thurston County Engineer. I approve these plans for construction.”

2.07 Time Limitation of Acceptance

The acceptance of plans shall be valid for a time period of 2 years from the date of acceptance by the Engineer. Construction in accordance with the approved plans must be completed within this time period. If not completed within this time
period, then the plans shall be resubmitted to the County for review and any revisions or modifications necessary to meet the current Standards shall be made. Re-submittal fees equal to new application fees shall be paid before the plans are approved by the County.

A Traffic Impact Analysis shall only be valid for a time period of 2 years from the date of submittal. If the project is not completed within 2 years from submittal date, the Traffic Impact Analysis shall be updated and resubmitted to the County for review and concurrence prior to project acceptance. Re-submittal fees equal to new application fees shall be paid before the plans are approved by the County.

2.08 Variance from the Standards

A. These Standards represent reasonable approaches based on past experience in Thurston County and other jurisdictions. These Standards indicate the appropriate practice under most conditions.

B. Engineering design is an endeavor that examines alternative solutions in real world situations and accordingly, these Standards are not provided to hamper the introduction of new ideas. It is fully expected that creative engineering will continue to take place. Situations will present themselves where alternatives may be preferred to allow conformance with existing conditions, to overcome adverse topography or to allow for more affordable solutions without adversely affecting safety, maintainability or aesthetics. These Standards are intended to provide predictability yet still allow for the flexibility necessary for innovation.

C. A variance request shall not be evaluated until an application for the required permit/approval has been applied for.

D. The variance request shall be in writing, submitted to the Development Review Division and address the following points:

1. Specifically outline the reason for the variance request with alternatives if appropriate.

2. Specify the chapter and section the variance request is for.

3. Provide supporting evidence demonstrating that a variance from these Standards is in the public interest, based on sound engineering judgment and that the requirements for safety, function, appearance, fire protection and maintainability are fully met.
E. The above information shall be used by the Engineer in evaluating requests for variances from these Standards. The Engineer will endeavor to evaluate and respond in writing to the variance request within 15 working days of receipt of the request. Variance requests that do not meet the Uniform Fire Code also require concurrence from the County Fire Marshall.

F. Variances made during the construction of a project shall be approved prior to any changes being made in the field.

2.09 Environmental Considerations

Unless exempt, land development projects, including clearing and grading activities, must have an Environmental Checklist completed by the applicant and submitted along with plans and other information when approval or permits are being requested for a project. In all cases, the applicant is required to adhere to the requirements in the Critical Areas Ordinance. Permits, project acceptances and/or approvals shall not be issued until an Environmental Determination has been issued and the appeal period has passed.

2.10 Violations and Penalties

A. Failure to comply with these Standards shall be cause for withholding or withdrawing approval of plans, forfeiture of financial security or non-acceptance of the work by the County.

B. Any person, firm or corporation violating any provisions of these Standards shall be deemed guilty of a misdemeanor, and, upon conviction thereof shall be punished by a fine not exceeding $1,000 or by imprisonment for not more than 90 days, or by both such fine and imprisonment. Each person, firm or corporation found guilty of a violation shall be deemed guilty of a separate offense for every day during any portion of which any violation of any provision of these Standards is committed, continued or permitted by such person, firm or corporation and shall be punishable therefore as provided for in these Standards.

C. Notwithstanding the existence or use of any other remedy, the Director or Engineer may seek legal or equitable relief to enjoin any acts or practices and abate any conditions which constitute or will constitute a violation of these Standards or other regulations herein adopted.

2.11 Severability

If any part of these Standards or its application to any person is, for any reason, declared invalid, illegal, or unconstitutional, in whole or in part by any court or agency of competent jurisdiction, said decision shall not affect the validity of the remaining portions hereof.
2.12 Fees

Fees shall be assessed in accordance with current Development Services fee schedule as approved by the Thurston County Board of Commissioners.

The applicant shall be responsible for costs incurred by the County for plan review, inspection and quality control.

All plan review and inspection fees shall be paid prior to the applicant receiving signed road construction mylars.

2.13 Transportation Improvements

Transportation and frontage improvements, SEPA impacts, fees, etc. or the proportionate cost share of the improvements based on peak hour trips and necessary to mitigate impacts of each phase of development shall be in place or paid no later than time of final plat approval or certificate of occupancy, whichever occurs first, for that phase. If the improvements are not listed on the County Transportation Improvement Plan, they shall be installed prior to final plat approval.

2.14 Grading Permits

Grading Permits are required for all grading activities outlined in the currently adopted version of the UBC.

2.15 Grading Plan

All grading activities meeting the requirements outlined in the UBC, shall submit a Grading Plan. The Grading Plan may be a part of the project plans for associated land development and other projects.

2.16 Securities

Under certain circumstances or as required by County code, securities may be required by the County to guarantee the performance of, or to correct permitted work. The amount of security shall cover the County's cost to correct deficiencies. The type and amount of security shall be per ordinance or, if not specified, be at 150% of the estimated cost of the work. The County may request a Project Engineer's Estimate or contractors bid document of the project costs to use in establishing the amount of security.

Types of securities include but are not limited to cash deposits, assignment of savings account, irrevocable standby letter of credit and bonds. Securities shall be released by the County upon satisfactory completion of the required work and satisfaction of any previously specified stipulations relating to the work being performed. The Project Engineer shall provide written certification to the County
that the stormwater facilities are functioning and being maintained as intended by the design prior to the release of all securities for the operation and maintenance of the stormwater facilities. The applicant shall remain financially responsible for any and all costs exceeding the amount of the original financial guarantee.

2.17 Withdrawal of Approval/Acceptance

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

2.18 Site Maintenance

A. The applicant shall schedule and control the work so as to comply with all applicable provisions of County land use codes and applicable state and federal laws and regulations to prevent any hazards to public safety, health and welfare.

B. On existing roads, two way and all existing lanes of traffic shall be maintained at all times unless detour plans have been approved in advance by the Engineer and the Board of County Commissioners where applicable.

C. Roads shall be kept free of dirt and debris.

D. Pedestrian and bicycle facilities shall be kept free of obstructions.

E. Pedestrian and vehicular access to occupied buildings shall be maintained except where written approval from the building owner has been obtained.

F. Drainage facilities shall be maintained and fully functionable.

2.19 Correspondence

All correspondence, including letters, reports, and plans, shall be clearly labeled with the County project number. Submittal or correspondence without this identification will not be accepted and will not be reviewed.
### CHAPTER 3
### PLAN FORMAT

#### 3.00 PLAN FORMAT

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**Appendix 3 - A** Standard Notes
3.00 PLAN FORMAT

When construction is required by conditions of a plat, subdivision, Special Use Permit, commercial and other projects or by these Standards, plans for the proposed improvements shall be prepared, meeting all of the requirements in these Standards. Failure to provide the requirements set out in this chapter shall constitute an incomplete application and shall not be accepted for review. The plans shall be signed, sealed, and submitted by the applicant’s Project Engineer to the County for review. Final plans and profile drawings must be accepted by the Engineer prior to the start of construction and recording of the development. The applicant’s Project Engineer shall be a registered engineer, licensed in the State of Washington.

3.01 Submittal Procedure

Plans, profiles, and details shall be submitted on sheets 24" by 36".

A. All plan submittal prior to approval shall include the following:

1. Three complete sets of plans, profiles, and details. (Refer to Sections 3.02 through 3.08 for plan content requirements.)
2. Two sets of drainage calculations.

B. Upon final design acceptance by the Engineer the following shall be submitted:

1. One reproducible set of plans, profiles, and details (mylar or vellum) for the Engineer’s signature.

   Followed by:

2. Seven complete sets of signed plans, profiles, and details.

C. Changes to signed plans, profiles, and details shall be submitted for review and acceptance prior to construction. The following shall be submitted:

1. Three revised sets of plans, profiles, and details.

   Followed by:

1. Seven copies of the signed revised plans, profiles, and details.

D. Final submittal shall be a complete set of "as-built" drawings on good quality reproducible mylar. All changes to the original drawings shall be shown with a single line or XXXX on the as-built drawings. As-built drawings shall be submitted prior to final acceptance of any road,
structure, drainage or facility for final acceptance by the County. Such drawings shall describe any and all revisions or additions to the approved plans.

3.02 General Formatting

Roadway plan alignments shall be stationed at 100’ intervals with “tick marks” between stationing at a minimum of 50’ intervals. Road widening projects shall be stationed at 25’ intervals. Stationing shall be shown on all points of curvature, tangents and intersections and shall be tied to existing road surveys, stationing, section corners, quarter corners and the horizontal control net established by the Engineer. Stations should increase from west to east and from south to north and be north arrow consistent, ie. north arrow pointing to the top of the drawing or to the right of the drawing.
3.03 Plan Elements

NOTE: □P - Minimum project requirements for preliminary approval prior to public hearing.

□P Title Block to include:
  1. Project name
  2. County assigned
  3. Sheet number
  4. Road Name
  5. Designed By:
  6. Drawn By:
  7. Checked By:

□P Legend (APWA Standard Symbols).

□P Signature block for acceptance.

□P Project Engineer’s stamp (signed and dated).

□P Section, township, range and vicinity map.

□P Horizontal Scale Bar: 1" = 50’ or less, However, 1" = 100’ may be optional for larger developments. Details for clarification shall be shown on a convenient scale.

□P North arrow.

□P Section and lot lines.

□P All topographic features within right-of-way limits or future right-of-way limits, and sufficient area beyond to resolve questions of setback, slope, drainage, access onto abutting property, and road continuations.

□P Cross sections for all proposed new roads and widening of existing roads.

□P Road alignments and centerline stationing.

□P Curve data including radius, delta, arc length, and semi-tangent on all horizontal lines. Curve radius only for Preliminary.

□P Project beginning and ending designation with stations.

□P Indication of whether the roads are public or private.

□P Identification of all roads and adjoining subdivisions.

□P Edge of pavement and width.

□P Sidewalks and width.
Easement type, width and ownership.

Right-of-way lines and width for proposed road and intersecting roads, together with existing road improvements with dimensions.

Cut and fill quantities.

Existing and proposed drainage features, indicating direction of flow, type of each drainage channel, pipe, and structure.

NOTE: Drainage facility sizing required on sites with critical areas and high ground water table.

Identify roof run-off and storage.

Soil test pit locations.

All proposed utilities that will be designed and constructed.

Existing and proposed transit stops and shelters, and bus pullouts.

Environmentally sensitive and critical area.

Existing and proposed wells within 200 feet of property lines.

Existing drain fields.

Bearings on road centerline, keyed to an associated plat map.

Stationing of PC, PT, PI, Equations and Intersections.

Datum - Bench mark elevation and location (on all sheets where elevations are referenced).

Finished grade elevations shall be shown on:

1. All radius returns at beginning, quarter points and end.

2. All cul-de-sacs at beginning, quarter points and end.

Existing center line and gutter line grades for all frontage improvements.

All existing utilities.

Traffic control signing and signal layout.

Pavement marking details with station and offsets.
- Size, invert in, invert out, rim elevations, station of structures and offsets for all drainage facilities and other requirements as specified in the Drainage Manual.

- As a minimum, one new control monument shall be set at each end of a new road and intermediate monuments as required. Road monuments shall not be placed in landscape medians. Witness monuments shall be offset in the roadway and so described.

- Beginning, quarter points, and ending elevations of curb returns.

- Temporary and permanent erosion control.

- Grading plans (see UBC for requirements).

- Proposed roadway names.

- Other data necessary for the specific project.
3.04 Profile Elements

Profile elements shall include the following:

- Original ground line along center line, edge of pavement, ditch flow line or arrows, 25-foot stations through superelevation, and at significant ground breaks and topographic features with accuracy to within 0.1 feet on unpaved surfaces and 0.02 feet on paved surfaces. When a road extends to the perimeter of the project, ground lines shall be extended at least 300 feet to show any changes in contour which might affect the profile of the proposed road.

- Existing and proposed road, sewer, water and storm drainage profile with stationing to show stationing of points of curve, tangent, and inner section of vertical curves, with elevations to 0.01 feet.

- Values for grade and length of vertical curve shall be shown with the profiles on a numbered grid.

- Superelevation data, if required, to include diagrams and calculations, shall be required and included for roadways of 30 miles per hour design speed or more.

- Vertical datum used on all benchmarks will refer to NGVD 1929 control i.e. mean sea level.

- Vertical scale of one inch equals two to five feet. Vertical scale shall be one inch equals ten feet if the optional one inch equals 100 foot horizontal scale is used.

3.05 Typical Cross Section

- P Widths of pavement, shoulders, walks, ditch and right-of-way.

- P Type of road.

- P Depth of gravel base, crushed surfacing and hard surfacing.

- P Type of sub-grade soil.

- P Slope of crown, shoulder and ditch design.

- P Total width from centerline to back of ditch, including width of new pavement on widening of existing roads.
A separate, full-width roadway typical section for each road or portion of road having a different section, labeled with appropriate stationing (i.e. Sta. 10+00 to Sta. 12+36).

R-value table, if applicable, or other relevant information from Chapter 6.

Location of existing and proposed utilities.

All other data necessary for a specific project.

### 3.06 Intersection Plan Details

When either of the road centerline profile grades within 35 feet of an intersection have a gradient less than or equal to 1% or greater than or equal to 8%, an intersection detail drawn to a scale of 1" = 20' must be included as a detail on the plans. The detail will show spot elevations every 25 feet on the road centerline, around the radius return and grate elevations for drainage structures in the intersection. The intersection plan must be clearly detailed to show flow line grades and how surface drainage will be controlled at the intersection. Radius return data for lesser gradients shall be shown on the road drawings.

Details meeting the Americans with Disabilities Act (ADA) requirements.

Profile grades for all roads (public and private) intersecting onto a County road (existing or proposed) shall be designed and constructed so that intersection sight distance is available at the intersection. Refer to Section 4.04.
3.07 **Drainage and Erosion Control Plan**

Submittal shall be in accordance with the Drainage Design and Erosion Control Manual for Thurston County.

3.08 **As-Built Drawings**

Engineering as-built or record drawings for roads and drainage facilities will be required prior to final inspection approval. In some cases, these drawings will be required during the inspection process to approve facilities before the next phase of construction can proceed.

3.09 **Standard Notes**

All plans shall contain, as applicable, the Standard Notes listed in Appendix 3-A. Other notes should be added as appropriate and necessary.

3.10 **Construction Staking**

So as to ensure that design is carried through to the final product, construction staking of the Project Engineer’s design by a registered surveyor or the design engineer, is required. Construction staking will consist of, but not limited to, the following:

A. Easement/Right-of-Way lines  
B. Slope Stake Sub-Grade  
C. Catch basins prior to Sub-Grade sign off  
D. Gutter line  
E. Top of Sub-Grade  
F. Top of Gravel Base  
G. Top of Crushed Surfacing, if required  
H. Drainage  
I. 50 foot center line stations minimum  
J. Quarter Points on Cul-de-Sacs.

Staking location shall be determined by the County at the pre-construction conference.
APPENDIX 3-A
STANDARD NOTES

A. All materials and workmanship shall be in accordance with the requirements of the most current edition of the State of Washington, Department of Transportation Standard Specifications for Road and Bridge Construction and Thurston County Road Standards.

B. Inspection of the storm drain system must be called for before any backfill is placed for the drain system.

C. Catch basins shall be Type 1 with B-2a, WSDOT Standard Plans, frame and grate unless otherwise noted. The outside edge of the catch basin shall be placed at the intersection of the curb and gutter and 0.010' to 0.015' below finished grade, or in the gutter line of the rolled edge section.

D. If adequate inspection is not called for before completion of the roadway construction, it may be necessary for core drilling and testing to be performed to assure an acceptable quality of roadway. When core drilling is found to be necessary, the applicant will be held responsible for all costs incurred.

E. It will be the applicant’s responsibility to contact all utility companies in order to assure that all lines, pipes, poles and other appurtenances are properly located and their installation is coordinated with the road construction. All utility relocation work shall be at the expense of the applicant and must be in accordance with Thurston County Road Standards prior to road acceptance.

F. Culvert pipe shall be concrete, aluminum or plastic 12-inch diameter minimum pipe with beveled ends unless otherwise noted. Beveled ends shall be a minimum of 3:1 in the ditch line or match the slope in a cut or fill section.

G. Buried utilities are shown in their approximate location. The applicant shall have the utilities verified on the ground prior to any construction.

H. Onsite erosion control measures shall be the responsibility of the applicant and be in place prior to construction. Any problems occurring before final acceptance by Thurston County and within 24 months thereafter shall be corrected by the applicant.

I. Any revisions to plans must be made by the Project Engineer and approved by the County prior to any implementation in the field.

J. All pavement markings shall conform to the requirements of the MUTCD and the Thurston County Standard Pavement Marking Details.

K. Before striping takes place the applicant shall contact the Thurston County traffic division for coordination of the striping.
L. A copy of the approved plans must be on the job site whenever construction is in progress.

M. Thurston County shall be notified 72 hours before construction is started. The applicant shall be responsible for scheduling a pre-construction conference with the County. Other jurisdictions, Project Engineer, utility companies, subcontractors and other necessary parties to the project shall be present at the pre-construction conference.

N. Slopes shall be stabilized to prevent erosion. In case erosion occurs in ditches, ditch lining is to be provided as requested and specified by the County.

O. All Type 2 catch basins over 4 feet in height shall have standard steps.

P. Where newly constructed paving meets existing paving, the applicant shall overlay and feather new pavement to provide a smooth transition from existing to proposed paving. Application of a thin paint coat of emulsified asphalt shall be applied to insure proper bonding.

Q. The completed surface of all courses shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds. The completed surface of the wearing course shall not vary more than 1/8 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline. The traverse slope of the completed surface of the wearing course shall vary not more than 1/4 inch in 10-feet from the rate of traverse slope shown on the plans.

R. Materials sampling and testing shall be at a frequency and magnitude as specified in the Standard Specifications or determined by the County Engineer. In the case of plat roads, testing and sampling shall be performed by a private testing laboratory. Certified test reports shall be furnished for all tests performed by private testing laboratories.

S. All utility work within existing pavement requires a minimum roadway reconstruction from the centerline, to include grinding the existing pavement and replacing it with a minimum 0.17' pavement.
CHAPTER 4
ROAD TYPES AND GEOMETRICS

4.00 ROAD TYPES AND GEOMETRICS

4.01 Functional Classifications in Rural Areas
4.02 Functional Classifications in Urban Areas
4.03 Maximum and Minimum Grades
4.04 Sight Distances
4.05 Private Roads
4.06 Half Roads
4.07 New Driveways
4.08 Emergency Turnarounds
4.09 Intersections
4.10 Medians and Planters
4.11 One-way Roads
4.12 Dedications
4.13 Railroad Grade Crossings
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4.15 Exception to Paving on Rural Local Roads
4.16 Slope, Wall, and Drainage Easements
4.17 Road Network Circulation
4.18 On-Site Principles
4.19 Dead End Roads
4.20 Roadside Obstacles

Appendix 4 - A Vision Clearance Triangle
4.00 ROAD TYPES AND GEOMETRICS

Each lot shall be served by a road built to applicable County Standards set forth herein, as now or hereafter amended, for public or private roads.

For the purpose of determining the applicable standard for development, the density and type of land use shall be that designated on the application by the applicant or, if the applicant fails to designate densities, they shall be deemed to be the maximum density allowed by the applicable zoning classification or the Comprehensive Plan. The applicable Standards shall be determined by the number of vehicle trips per day identified as being reasonably anticipated for the proposed use.

In the event an applicant seeks a building permit after the final plat approval which results in a greater density or different use than the original approval, the applicant shall not be granted the building permit until the road serving the lot is built to the higher standard or an agreement guaranteeing such construction is accepted by the County.

4.01 Functional Classifications in Rural Areas

All development in the rural areas shall be constructed as set forth in these Standards.

4.02 Functional Classifications in Urban Areas

A. Olympia

All roadway construction and improvements within the Olympia Urban Growth Boundary shall comply with Chapter 15.04.086 Thurston County Code.

B. Lacey and Tumwater

All roadway construction and improvement within the Lacey and Tumwater Urban Growth Boundaries shall comply with the more stringent of the Standards of the city and the County.

C. Grand Mound, Tenino, Yelm, Rainier, and Bucoda

All roadway construction and improvements within the Grand Mound, Tenino, Yelm, Rainier and Bucoda’s Urban Growth Boundaries shall comply with urban requirements as set forth in these Standards or as modified by the Thurston County Comprehensive Plan and the 1997 amended Grand Mound Sub Area Plan.
4.03 Maximum and Minimum Grades

Grades exceeding the maximum grades specified in Appendices 6-A through 6-G shall require approval by the Engineer, the County Fire Marshal and the Fire Chief of the local district upon a showing that no practical alternative exists.

Gutter, ditch and swale flow line grades shall not be less than 0.5%.

Refer to Chapter 7 for access grade requirements.

4.04 Sight Distance

A. Stopping Sight Distance

All stopping sight distance calculations shall be based on AASHTO wet pavements criteria with adjustments for downgrades.

B. Intersection Sight Distance

Refer to AASHTO Chapter IX, Sight Distance, Intersection Control.

C. Preserving Sight Distance

Notes outlining the requirements shown in Appendix 4 - A may be required on final plat restricting the uses of the sight distance triangle with regards to structures, landscaping, fencing, signs, and other visual obstructions.

4.05 Private Roads

A. While community road requirements are usually best served by public roads, owned and maintained by the County, private roads may be appropriate for some local access roads for either residential or commercial properties.

B. Private roads are approved only when they are:

1. Permanently established by tract or easement providing legal access to each affected lot, dwelling unit, or business and sufficient to accommodate required improvements, to include provision for future use by adjacent property owners when applicable; and

2. Built to County Standards, as set forth herein; and

3. Accessible at all times for emergency and public service vehicle use; and
4. Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the Thurston County Comprehensive Plan, applicable community plan, or Capital Improvement Program; and

5. Not needed as public roads to meet the minimum road requirements of these Standards; and

6. Designed to serve a maximum potential of 16 legal lots when the entire length of the private road system to the nearest public road is considered. The maximum potential is the number of dwelling units that can possibly be served by the road when physical barriers, zoning or other legal constraints are considered; and

7. Maintained in accordance with these Standards by a capable and legally responsible owner or homeowner’s association or other legal entity made up of all benefitted property owners; and

8. Clearly described as a private road on the face of the plat; and

9. Clearly signed at road location as a private road the maintenance of which the County is not responsible for.

C. The County shall not accept private roads into the County road system until the private road meets all of the requirements of these Standards. This includes, but not limited to, plan and profile drawings, survey monumentation, dedication of right-of-way and drainage easements. For more specific information regarding the dedication process, contact the County Right-of-Way Section.

4.06 Half Roads

A half road may be permitted subject to approval by the Engineer when:

1. There is reasonable assurance of obtaining the prescribed additional right-of-way from the adjoining property suitable for completion of a full-roadway; and

2. Such alignment is consistent with or will establish a reasonable circulation pattern; and

3. The right-of-way width of the half road shall equal at least 30 feet, or 50 percent of the required right-of-way, whichever is greater; and

4. The traveled way shall be surfaced the same as the designated road classification to a width not less than 20 feet; and
5. The half road shall be graded consistent with the centerline of the ultimate roadway section.

4.07 New Driveways

A. An emergency vehicle access road with a minimum width of 10 feet with 1 foot of clearance on each side shall be provided to Group R Division 3 occupancies, as defined by the UBC, that have an exterior wall of the first story of the dwelling located more than 150 feet from fire apparatus access as measured by an approved route around the exterior of the building.

B. The emergency vehicle access road shall be constructed with an all weather surface to adequately support the proposed loads of emergency vehicles.

C. The maximum grade for a driveway shall be 15%.

D. Turnarounds shall be required for any required emergency vehicle access road exceeding 300 feet in length. Turnarounds shall meet one of the following:

1. A looped turnaround providing the required width and turning radius, or

2. A cul-de-sac or hammerhead meeting the requirements of Appendix 6-G.

E. All turns shall have a minimum inside turning radius of 25 feet.

F. An unobstructed vertical clearance of not less than 13 feet 6 inches in height shall be maintained for the required width of the emergency vehicle access road including required clearance.

G. Bridges shall follow the criteria in Chapter 10 with one exception: A bridge serving only one single-family dwelling may have a driving width of 8 feet 6 inches with hub rails or guard rails.

H. The emergency vehicle access road shall be shown on the site plan.

I. The emergency vehicle access road shall be maintained in accordance with these Standards by the property owner.

J. The Director of Development Services is authorized to approve alternative materials or methods, or to modify these driveway Standards pursuant to the provisions of sections 103.1.2 and 103.1.3 of the Uniform Fire Code.
K. 1. Where practical difficulties prevent compliance with these Standards and where alternative materials or methods do not provide equivalent protection, the Director of Development Services shall provide written notice to the fire district in which the affected property is located.

2. A property owner may elect to not comply with Section 4.07. In such cases, the property owner shall sign a statement acknowledging that lack of compliance may impede access of emergency services to the affected property. Said statement shall be recorded by the Development Services Department with the County Auditor against the parcel number. A copy of such recorded statement shall be mailed to the fire district in which the affected property is located.

4.08 Emergency Turnarounds

A. A cul-de-sac shall be required on any dead end access road over 150 feet in length serving two or more parcels. A hammerhead may be used as a temporary emergency turnaround. Refer to Appendix 6 - G for specific details.

B. An emergency turnaround shall be provided within three hundred (300) feet of the end of an existing, private or public, dead end road.

4.09 Intersections

A. Angle of Intersection Minimum 75° to Maximum 105°

B. Minimum Centerline Radius (2-Lane) 55 Feet*

C. Minimum Curb Radius 35 Feet*

D. Minimum Property Line Radius 25 Feet*

★ Values shown are for local roads only. All others shall be designed for the specific roadway section.

E. Minimum centerline offsets between adjacent intersections shall be as follows:

   1. Principle Arterial 1,000 Feet
   2. Minor Arterial 500 Feet
   3. Collector 300 Feet
   4. Local Road 150 Feet
F. On sloping approaches at an intersection, landings/apron lengths shall be provided with grades as specified in Appendix 7-B.

G. Sight Distance

Refer to AASHTO Chapter IX, Sight Distance, Intersection Control.

4.10 Medians and Planters

Optional design feature. Median width shall be additional to, not part of, the specified width of traveled way. Edges shall be similar to outer road edges: either rolled edge or formed vertical curb; or shoulder and ditch; except that median shoulders shall be minimum four feet in width. Medians shall be designed to accommodate pedestrian crossings at intersections, at mid-block crosswalks and bus stops. Median and planters may be grassed, landscaped, or surfaced with aggregate or pavement. They shall be designed so as not to limit turning radii or sight distance at intersections. Maintenance of the medians, planters and planter strips within County right-of-way shall be the responsibility of the home owners.

On five lane arterial roads, refuge islands for pedestrians shall be incorporated as part of the road improvement as determined by the County.

4.11 One-Way Roads

Local roads, including loops, may be designated one-way upon a finding by the Engineer that topography or other site features make two-way traffic impractical. One-way roads shall meet the minimum fire access requirements.

4.12 Dedications

A. Right-of-Way dedication at a minimum shall be in accordance with the applicable standard roadway section as set out in Appendices 6-A through 6-G to accommodate motorized and non-motorized transportation, parking, utility and buffer requirements.

B. Easements shall be provided for all public systems as required.

C. The Engineer may require the dedication of additional right-of-way as a condition of project approval to provide the necessary right-of-way for the extension of existing and future roads for compatibility with the area’s circulation system.

D. Fees shall be assessed for roadway dedications based on the Public Roads Inspection and Plan Review fee schedule.
4.13 Railroad Grade Crossings

All proposed railroad crossings shall be submitted and approved by the railroad and the Utilities and Transportation Commission prior to construction drawing approval. Additional railroad crossings, especially across main line track, shall not be considered if alternate access is available.

4.14 Traffic Control

A. Any construction proposed within the traveled way shall provide a Traffic Control Plan. All traffic control and traffic control devices shall be as specified in the latest edition of the MUTCD. The applicant shall implement the approved plan, when necessary, until the project is given final acceptance by the County. If conditions change, the traffic control plan shall also reflect the changes.

B. During any construction, barriers and warning signs shall be erected, lighted and maintained as necessary or as directed by the County for the protection of the traveling public. The County may hire or use County forces to bring traffic control up to the safety Standards set out in the MUTCD, WSDOT Design Manual and other applicable documents at the applicant's expense when the safety of the traveling public is at risk.

C. When road closures and detours cannot be avoided, the applicant shall notify the County at least 7 days prior to the road closure. Road closures requiring action by the Board of County Commissioners shall require a minimum of 21 days advance notice. The County requires a detour plan to be prepared, submitted and approved prior to closing any portion of a County roadway.

The road closure plan, as a minimum, shall include a detour route with the location and type of signs to be used, as per the MUTCD. A written statement describing the detour route, length of detour and proposed dates and times of road closure shall also be submitted.

All road closures shall be consistent with Chapter 47.48 RCW. Special consideration needs to be given by the applicant concerning the timing requirements of road closures as specified in the RCW and the timing requirements for the Board of County Commissioners to review and approve the closure.

4.15 Exception to Paving on Rural Local Roads

Refer to Section 6.01, Surfacing Requirements
4.16 **Slope, Wall, and Drainage Easements**

Either the functional classification or particular design features of a road may necessitate slope, wall, or drainage easements beyond the right-of-way line. Such easements may be required of the developer by the Engineer in conjunction with dedication or acquisition of right-of-way.

4.17 **Road Network Circulation**

The importance of good road network circulation for the health, welfare and safety of the public cannot be overemphasized. Poor circulation adds unnecessary miles to pedestrian and trail systems, school bus routes, mail delivery and other service deliveries, utility services and most importantly, emergency services such as police and fire. Through good road network circulation, the public will have better emergency access and police and fire safety will be enhanced. See also [Section 4.19](#) Dead End Roads.

A. Plans will be reviewed for the provision of the best possible road network circulation. The road alignment may necessitate re-alignment in order to foster the long range transportation objectives of the County. This includes greater scrutiny to provide continuity of pedestrian and other trail systems related to the proposed road network.

B. To facilitate the best possible road network circulation, if it is determined by the Engineer, after making an individualized determination, that the layout of roads are to provide for the continuation of existing roads in adjoining subdivisions, then the roads shall be constructed prior to final plat approval. When adjoining property is not subdivided, the Engineer shall determine whether roads in the proposed plat are to provide access to such unplatted property. The location for access to unplatted property shall be placed such that the objectives in these Standards can be achieved.

C. If the roads are to remain private, the above still applies except an easement will be shown on the final plat map and they will not be dedicated to the public. Specific information in the recorded covenants regarding the use of this easement will be required.

4.18 **On-Site Principles**

An integral part of an overall traffic study relates to basic site planning principles. An integrated on-site roadway system should deliver vehicles from the external roadway system in a manner easily understood by typical drivers and that maximizes efficiency, accommodates anticipated traffic patterns and ensures public safety.
A. Internal Vehicular Circulation

1. Internal circulation is the means by which vehicular traffic is delivered between entry points and parking areas, pick-up/drop-off points, and service areas, and should be planned to accommodate appropriate future traffic volumes.

B. Access points

Refer to Appendix 7-A.

C. Parking

Parking shall be provided to meet site-generated demands and be consistent with Title 20 of the Thurston County Code and other planning department policies.

D. Vehicular Queuing and Storage

1. Access drives should provide adequate vehicular exit queuing.

2. Parking areas and access points of small developments should be designed so vehicles waiting to exit are aligned perpendicular to the off-site roadway system.

3. Queuing areas of large developments should be sufficient so vehicles queued at exits do not block internal circulation. Exits shall be signalized if warranted by the MUTCD at build out.

4. Documentation shall be provided to verify queue lengths for signalized intersections, on-site queuing reservoirs, and off-site left and right-turn lanes.

E. Building Service Drives

Building service drives are roadways adjacent to a building and its entrances, and should be designed with sufficient width to serve as one or all of the following:

1. Fire and/or emergency vehicle access

2. Pedestrian pick-up/drop-off points

Pedestrian crossings and pick-up/drop-off points should be signed and striped to identify the vehicular/pedestrian conflict.

3. Internal circulation
4. Recirculation in parking areas

Recirculation aisles shall have sufficient turning radii, clearances, sight distances and signing.

5. Bus passenger pick-up/drop off areas.

F. Pedestrian, Bus, Bicycle, and Handicapped Access Facilities

The overall site plans must consider pedestrians, bus, bicyclists, and handicapped access facilities.

1. Pedestrian Facilities

Pedestrian connections between public transportation facilities and site buildings should be integrated into the overall project design. Pedestrian facilities should be designed to reduce the motor vehicle use for trips within the development and between nearby developments.

2. Bus Facilities

Appropriate public transportation facilities, such as passenger shelters, ride sharing areas and bus staging areas shall be accommodated adjacent to service drive and entrance areas; at key locations along circulation drives; and at major pedestrian focal points along the external roadway system as determined the County and Intercity Transit.

3. Bicycle Facilities

Facilities for parking bicycles should be provided where bicycle use is expected.

4. Handicapped Access Facilities

Handicapped access shall be provided in accordance with federal, state and County requirements.

G. Service and Delivery Vehicles

Service and delivery vehicles require separate criteria for movement to and from the site:

1. Vehicle turning paths shall be sufficient to accommodate the largest vehicles anticipated, a minimum single unit truck (SU).
2. Service vehicle access points shall have turning paths sufficient to allow service vehicles to enter and exit the site without encroaching upon opposing lanes or curbed areas.

3. External and internal roads shall have sufficient separation for large vehicles to be queued on entry or exit without blocking access to parking spaces or internal roadways.

4.19 Dead End Roads

A. Permanent road ends of 150 feet or less in length (measured from the edge of traveled way of the intersecting road to the end of the road) shall have a minimum roadway section as specified in the Appendixes 6-A through 6-E and do not require a cul-de-sac.

Permanent road ends between 150 and 600 feet (measured from the edge of traveled way of the intersecting road to the beginning of cul-de-sac) shall have a minimum roadway section as specified in Appendixes 6-A through 6-E and be provided with a cul-de-sac as shown in Appendix 6-G.

Permanent road ends in excess of 600 feet are discouraged but will be considered for cases where lots are large and/or difficult terrain exists, provided, the number of single family lots served by the road does not exceed 25 or the ADT generated from the properties served by the road does not exceed 250. The roadway shall have a minimum roadway section as specified in Appendixes 6-A through 6-E and be provided with a cul-de-sac as shown in Appendix 6-G.

B. The maximum grade within the cul-de-sac bulb or turnaround shall be 6 percent in any direction.

C. The Engineer may require off-road walkways to connect a road end at its terminus with other roads, parks, schools, bus stops, or other pedestrian traffic generators, if a demonstrated need exists. The Engineer may also require road ends be designed for increased circulation and future vehicle access where connection to an existing road or future road is feasible. A public access easement or tract may be required to the property line.

4.20 Roadside Obstacles

A. WSDOT Clear Zone distances shall be used for evaluation, placement and relocation of roadside features within the County right-of-way. Such distances are shown in Appendix 6-F for roads with posted speed of 35 mph or less.
For posted speeds of greater than 35 mph, clear distances are contained within the WSDOT Design Manual.

B. Existing or new roadside features which could present a hazard to the public shall be placed outside of clear zone areas unless justified to the Engineer's satisfaction by suitable engineering studies considering traffic safety, or where shielded by a barrier, placed in an area normally inaccessible to vehicles or utilize a breakaway design. If barriers are required, they shall be designed to AASHTO and WSDOT Standards.

C. Locations of poles shall be compatible with driveways, intersections, and other roadside features (i.e., they shall not interfere with sight distance, roadway signing, traffic signals, culverts, etc.). Where possible, utility poles and other above ground appurtenances shall be located outside of the sidewalks or walkways.

D. Costs of relocating poles or obstacles to achieve these Standards are the responsibility of the applicant/developer whose project necessitates compliance with these Standards. This is not intended to prevent the applicant/developer from making financial arrangements with an appropriate utility or other owner of the obstacle to accomplish removal of the pole or obstacle.
CHAPTER 5
TRAFFIC ANALYSIS GUIDELINES

5.00 TRAFFIC ANALYSIS GUIDELINES

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5.00 TRAFFIC ANALYSIS GUIDELINES

Applications for land division and changes of land use shall include sufficient data to determine the amount of additional traffic generated by the development. Such data shall also be used as a guideline for access road and/or driveway requirements.

5.01 Purpose

The purpose of a Traffic Impact Analysis (TIA) is to:

A. Determine the safety impacts a particular development will have on the regional road network;

B. Establish whether the development will meet the County's level of service Standards adopted within the County Comprehensive Plan; and

C. Determine mitigating measures necessary to alleviate safety issues and to meet the adopted level of service Standards.

D. Developments that are small and generate less than 25 AM or PM peak hour trips may be reviewed for concurrency without an in-depth TIA by identifying influence zones for roads that are approaching or have exceed their capacity.

5.02 Level of Analysis

There are two level of traffic analysis, as follows:

A. Level I TIA

Trip Generation and Distribution Study. (Refer to Appendix 5-A for study requirements.)

B. Level I TIA - Grand Mound

Trip Generation and Distribution Study. (Refer to Appendix 5-B for study requirements.)

C. Level II TIA

Traffic Impact Analysis. (Refer to Appendix 5-C for study requirements.)

5.03 Warrants for a Level I TIA

A complete Level I TIA shall be required if any one of the following warrants is met:
A. The project generates 25 or more PM peak hour trips; or

B. The project requires a SEPA review.

A Level I TIA may be required by the County to determine the need and scope of Level II TIA.

A Level I TIA shall be expanded to a Level II TIA if any of the warrants in Section 5.04 are met.

5.04 Warrants for Level II TIA

A complete Level II TIA shall be required if the project generates more than 50 peak hour trips, and any one of the following warrants is met:

A. The development is within the urban area as defined by the Urban Growth Management Boundary and is required by the city.

B. The development will generate 100 or more AM or PM peak hour trips within the rural areas as defined by the Urban Growth Management Boundary.

C. The County has required that an Environmental Assessment or Impact Statement be prepared.

D. A rezone of the subject property is being proposed.

E. If there exists any current traffic problems in the local area as identified by the County or a previous traffic study, such as a high-accident location, poor roadway alignment, or capacity deficiency.

F. The current or projected level of service of the roadway system in the vicinity of the development is perceived to be significantly affected, or is expected to exceed County adopted level of service Standards.

G. Adjacent neighborhoods or other areas are perceived to be impacted.

5.05 Traffic Generation Guidelines

The Institute of Transportation Engineers (ITE), Trip Generation “Manual”, is a tool for planners, transportation engineers and others to estimate the number of vehicle trip or trip ends generated by a proposed development. Unless otherwise stated, trip generation rates for proposed developments shall be estimated using the most current version of the Institute of Transportation Engineers, Trip Generation “Manual”. The following are guides to determine trip rates for new developments.
1. The Trip Generation “Manual” provides graphical plots and trip generation rates consisting of average rates or fitted curve equations. To forecast trip generation for proposed developments, the user should pick the method (average rate or fitted curve equation) that most closely represents the data points within the range of the independent variable being used. Guidelines for using the trip generation rates or equations can be found within the ITE, Trip Generation “Manual” and should be consulted if questions persist.

2. Some ITE Land Use Codes contain a limited number of data points or data points are scattered. Also, not all proposed developments fit the ITE Land Use Code descriptions. Therefore average rates, fitted curve equations and plots may not be truly representative of proposed development. In general, if there are less than 20 data points representing the ITE Land Use Code and/or the proposed development does not match current ITE Land Use Code descriptions then an independent trip generation study(s) of a site similar to the proposed development shall be submitted.

Trip generation estimates for proposed developments shall require approval of the County.

3. Estimation of Pass-By or other trip generation discounts.

Primary Trips are trips made for a specific purpose of visiting a generator.

Pass-by Trips are those made as intermediate stops on a trip from origin to primary destination.

Trip Generation reductions submitted to the County shall be substantiated by surveys or studies conducted on similar sites. Without, supporting documentation the County reserves the right to deny the use of trip generation discounts and all proposed trip generation discounts shall require approval of the County.

5.06 Peak Traffic Hours

For traffic analysis, the PM peak hour conditions shall be used.

Reversed flow at intersections from morning to afternoon, and other unusual conditions, shall require analysis for both AM and PM peak hour conditions, as required by the County.

5.07 Level of Service

A. Minimum Levels of Service
Minimum required levels of service for road links and intersections within Thurston County are as follows:

1. Within the Urban Growth Management Boundary (UGMB):
   - High density corridors, as identified in the Regional Plan: LOS E
   - Other urban roads: LOS D

2. Outside the Urban Growth Management Boundary:
   - Mud Bay Road from UGMB to SR-101: LOS D
   - Yelm Highway from UGMB to Fairoaks Road: LOS D
   - Grand Mound Urban area: LOS D
   - Other rural roads: LOS C

These levels of service may change in the future and the changes will apply when adopted by the Board of County Commissioners.

B. Calculation of Level of Service

Level of service calculations shall be in accordance with the most current version of the Transportation Research Board “Highway Capacity Manual” or Highway Capacity Software. The manual and software contain separate calculations for two-lane and multi-lane free-flow roadways, signalized arterial and signalized and unsignalized intersections.

C. Required Level of Service Evaluations

Critical segment links and intersections within an influence area shall be evaluated using two-lane rural highway methods.

As required by the County, signalized intersections shall be evaluated using the most current version of the Strong Concepts Signalized Intersection Analysis and Design Software.

5.08 Concurrency

Per the requirements of the State Growth Management Act and Chapter 17.10 of the Thurston County Code, a proposed development must undergo a concurrency review and determination.

To satisfy concurrency:

1. The existing transportation system, functioning at the County adopted minimum level of service, must have adequate available capacity for the
additional trips generated by the project at the time of preliminary plat or project approval, or

2. The development must have, at the time of final project approval, a financial guarantee for transportation improvements required to achieve County adopted minimum levels of service with the additional trips generated by the project to be in place within six years of final project approval, or

3. The applicant shall construct the transportation improvements required to achieve County adopted minimum levels of service with the additional trips generated by the project to be in place at the time of final project approval.

5.09 Report Certification

All traffic studies shall be prepared by or under the direct supervision of a Professional Civil Engineer currently licensed to practice within the State of Washington.

The Project Engineer shall certify the traffic study document by providing a signature and seal of approval.

5.10 Scoping

A. Scoping Meeting

If a Level II TIA is required, the study preparer shall establish a scoping meeting with all necessary agencies and impacted jurisdictions to address relevant issues. The method of traffic analysis shall be as directed by the County.

B. Extent of Study Area

The study shall include all site access drives, adjacent roadways, and major roadways and intersections in all directions from the site that are impacted by 25 or more inbound and outbound PM peak hour trips, or less as required by the County. Major roadways and intersections are typically those classified as arterial and/or collectors.

The influence area should be no more than a 5 mile radius from the development center, but may be slightly lower or higher depending on whether the project is within the urban or rural areas. The County shall approve the defined influence area prior to commencement with the traffic study.

C. Selection of Horizon Years
Development with several stages of construction activity should select a number of horizon years corresponding with the opening of each phase.

5.11 Background Study Area Data

The study preparer shall research and gather the following information. If this information is not available from the County or other jurisdictions, it shall be obtained in the field as required.

A. Land Use

1. Current zoning, land use, densities, and occupancy in vicinity of site;

2. Approved development projects and planned completion dates within study area, including densities and land use types;

3. Other anticipated developments within study area.

B. Traffic Volumes

1. Current and historic daily and hourly traffic counts to verify traffic growth and peak hour times;

2. Recent intersection turning movement counts;

3. Percent of heavy vehicles, including trucks, buses, and recreational vehicles;

4. Pedestrian and bicyclist counts when required.

C. Demographics

1. Current and future population and employment within study area by traffic zone (as needed for use in site traffic distribution and assignment).

D. Transportation System: Existing and Future Conditions, and On and Off Site Conditions

1. Current road system characteristics, including number of lanes, lane and shoulder widths, including differences between existing geometrics and current Standards, access control, and traffic control devices;

2. A description of roadway geometrics, including horizontal and vertical curvature;
3. Roadway functional classifications;
4. Posted speed limits and/or free-flow speeds;
5. Traffic signal locations, phasing, coordination and timing;
6. Existing congested locations within study area as identified by the County or previous traffic studies;
7. Accident history for 3 years adjacent to site, and on major roadway links and intersections within study area;
8. Adopted local and regional transportation plans, including any future bicycle, pedestrian and transit plans;
9. Planned future roadways within study area;
10. Planned future roadway improvements within study area, identifying those with secured funding and those in planning stages;
11. Location of bus stops, service and usage;
12. Pedestrian and bicycle linkages and usage;
13. Available curb and off-site parking facilities;
14. Any temporary anomalies in the current road system that would influence the data or outcome of the analysis, e.g. road construction;
15. Private and public schools in the area;
16. Hospitals, police and fire stations in the area.

E. Other Data

1. Applicable County codes and policies, including but not limited to development regulations, Standards, and parking space requirements.
2. Origin-destination or trip distribution data as required;
3. Any neighborhood sensitivities.
5.12 Safety Analysis

Intersections and roadway segments within the influence area shall be evaluated to determine if the probability of accidents will increase with the addition of project traffic. Two methods shall be used: Accident Record Research and Conflict Analysis.

A. Accident records are to be analyzed to determine whether patterns of accidents are forming within the influence zone and what alternative treatments should be considered to correct the problem. Examples of reoccurring accidents include:

1. Right-angle collisions at an intersection
2. Rear-end collisions at an intersection
3. High frequency of vehicles leaving the roadway

B. Conflict Analysis is applicable to locations where accident data is not available or insufficient for analysis. This analysis is used to predict or measure accident potential at a location. A Conflict Analysis should determine the number of conflict points, frequency of conflicts and severity of conflicts based on expected traffic volumes and mix of traffic. Similar to the manner in which accidents are grouped by type of collision, traffic conflicts are arranged by type of maneuver. Examples of intersection conflicts are:

1. Cross traffic
2. Opposing left-turn cross traffic
3. Pedestrian

A field study shall be completed and the results evaluated to identify the types of conflicts, roadway/intersection characteristics that contribute to the conflicts, and what alternative treatment should be considered to correct the problem.

Impacts to substandard roadway segments shall be evaluated as required by the County.
TRIP GENERATION AND DISTRIBUTION STUDY REPORT FORMAT
LEVEL I ANALYSIS

I Introduction and Summary
1. Report Certification
2. Purpose of Report and Study Objectives

II Proposed Development
1. Description
2. Location and Vicinity Map
3. Site Plan
4. Proposed Zoning
5. Proposed Land Use and Intensity
6. Phasing and Timing of Project

III Existing Conditions
1. Study Area
   a. Limits of traffic study
   b. Existing zoning
   c. Existing land uses
2. Site Accessibility
   a. Area roadway system
   b. Transit service
   c. Pedestrian and Bicycle Facilities

IV Trip Generation and Distribution
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V Appendices
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2. Trip Generation Sources
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3. Executive Summary
   a. Site location and study area
   b. Proposed development description
   c. Findings
   d. Recommendations

II Proposed Development
1. Description
2. Location and Vicinity Map
3. Site Plan
4. Proposed Zoning
5. Proposed Land Use and Intensity
6. Phasing and Timing of Project

III Existing Conditions
1. Study Area
   a. Limits of traffic study
   b. Existing zoning
   c. Existing land uses
2. Site Accessibility
   a. Area roadway system
   b. Transit service
   c. Pedestrian and Bicycle Facilities

IV Trip Generation and Distribution
1. Trip Generation
2. Trip Distribution

V Traffic Analysis
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   a. Capacity
   b. Level of Service
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   a. Vehicular Queuing and Storage
   b. Internal Vehicular Circulation
   c. Service and Delivery Vehicle Movement
   d. Building Service Drives
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VI Improvement Analysis
1. Improvements to accommodate site traffic and circulation patterns

VII Findings
1. Site accessibility
2. Traffic impacts
3. Access Locations
VIII Recommendations
   1. Site access and circulation plan

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   2. Purpose of Report and Study Objectives
   3. Executive Summary
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      b. Proposed development description
      c. Findings
      d. Recommendations and mitigation

II Proposed Development
   1. Description
   2. Location and Vicinity Map
   3. Site Plan
   4. Proposed Zoning
   5. Proposed Land Use and Intensity
   6. Phasing and Timing of Project

III Existing Conditions
   1. Study Area
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      c. Existing land uses
      d. Anticipated future development in area
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4. Status of improvements already funded, programmed, or planned

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1. Definitions
2. Trip Generation Sources
3. Passer-by and Origin-Destination Studies
4. Volume and Turning Movement Count Sheets
5. Level of Service Calculations
6. Signal Warrant, Timing and/or Progression Calculations
7. Access Configuration Drawings
8. References
CHAPTER 6
ROADWAY BASES, SURFACING AND RESTORATION

6.00 ROADWAY BASES, SURFACING AND RESTORATION

6.01 Surfacing Requirements
6.02 Restoration

Appendix 6 - A Private Roadway Section
Appendix 6 - B Minor Local Roadway Section
Appendix 6 - C Local Roadway Section
Appendix 6 - D Collector Roadway Section
Appendix 6 - E Arterial Roadway Section
Appendix 6 - F Clear Zone/Recovery Area
Appendix 6 - G Cul-de-Sac, Hammerhead Detail
Appendix 6 - H Utility Trench Detail
6.00 ROADWAY BASES, SURFACING AND RESTORATION

6.01 Surfacing Requirements

A. Design

A pavement surfacing design procedure shall be performed for all County roads. The design life for all roads shall be 20 years with a growth factor of 5%. The design procedure used shall be approved by the Engineer and consider the following:

1. Traffic Loading - An estimate of the number and types of loadings the roadway will carry for the design life. This estimate of loading shall be established by a procedure accepted by the Engineer and be expressed in 18-Kip Equivalent Single Axle Loads (ESALs).

2. Subgrade Support - A representative value for the stiffness of the native material on which the road will be built. This value shall be established by a procedure accepted by the Engineer and be expressed as resilient modulus.

3. Analysis - a procedure for establishing the surfacing depth requirements for a given traffic loading and subgrade resilient modulus. This procedure shall be approved by the Engineer. The following procedure is pre-approved:


B. Minimum Thickness:

Regardless of the thickness computed by the design procedure, the minimum thickness of in-place compacted surfacing on a road shall be as follows:

Local:
- 0.20' Asphalt Concrete Pavement (when required)
- 0.17' Crushed Surfacing Top Course
- 0.75' Gravel Base

Collector & Arterial:
- 0.25' Asphalt Concrete Pavement
- 0.17' Crushed Surfacing Top Course
- 0.75' Gravel Base
C. All plan submittals shall be accompanied by the soils and traffic analysis on which the design was based. All minimum surfacing requirements assume an acceptable, well drained, stable, compacted subgrade. Additional measures may be required at the Engineer’s discretion if evidence exists of unstable subgrade.

D. Rural roads with a traffic volume less than 200 ADT may be paved by means of a light bituminous surface treatment (LBST). The LBST shall consist of no less than two applications of oil. The gravel thickness shall be designed according to good engineering practices considering the quality of the underlying soil. The design method shall be subject to approval by the Engineer. In no case shall the gravel thickness be less than eleven inches, two inches of crushed surfacing top course and nine inches of gravel base. The developer shall provide funding for an additional application of oil to be placed as a seal coat approximately one year after initial construction.

6.02 Restoration

The intent of this section is to insure the life expectancy, structural integrity and overall safety of the public right-of-way as related to any encroachment into the road right-of-way. This section pertains to existing public roads and those roads proposed to be dedicated to the County as public roads.

A. All roadway crossings shall be done by means of boring or pushing (untrenched installation). Opening of the roadway surface shall not be permitted unless it has been determined by the Engineer, or his designated representative, that boring or pushing can not be done.

B. When a trenched crossing is approved, restoration shall be in accordance with one of the following guidelines:

1. Controlled density backfill, CDF shall be required as a backfill material; or

2. Select backfill, meeting the requirements of the Standard Specifications may be used. Backfill shall be compacted to at least 95 percent density and placed in a maximum of 12-inch lifts, as specified in the Standard Specifications. Written verification of compaction, based upon acceptable testing methods, and placement of the backfill shall be required.

C. Native material may be used as backfill material when standard acceptable tests show the material meets the requirements for backfill material as specified in the Standard Specifications. The requirements for compaction and placement in item B above also apply when native material is used.
D. All utilities placed parallel to and within the pavement structure shall be required to rebuild a minimum of half the road, from centerline for utilities in one driving lane, to include grinding and the replacement of a minimum 0.20' of asphalt.

E. When conditions are warranted, the Engineer may require all or a portion of the trench be backfilled with a combination of select backfill or CDF. Conditions that may warrant a combination use may be, but not limited to, the depth of trench required, the type of material that is being excavated and crossings on arterial and collector roadways.

F. When conditions are warranted, the Engineer may require financial security for a minimum of 10-years in the form of a bond, irrevocable letter of credit or irrevocable assignment of interest in a bank account for all or a portion of restoration. Conditions that may warrant this may be, but not limited to, the placement of utilities in or near sensitive areas and areas of continuous settlement.
RURAL AREA ROADWAY
DESIGN STANDARDS

ROADWAY CLASSIFICATION: PRIVATE ROAD
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): LESS THAN 160
(16 DETACHED SINGLE FAMILY HOMES)

DESIGN CRITERIA

DESIGN SPEED ___________________ 20 M.P.H.
MAXIMUM ROAD GRADE ______________ 12%
MINIMUM ROAD GRADE ____________ 0.5%
MINIMUM SURFACING WIDTH ________ 16'
MINIMUM ROADWAY WIDTH __________ 20'
MINIMUM DESIGN LOAD ____________ HS 20–44
EASEMENT WIDTH _________________ 40' MIN.
ROADWAY GEOMETRICS ____________ PER AASHTO AND WSDOT STD..
MINIMUM REQUIRED:
  CRUSHED SURFACING, TOP COURSE — 0.17’ COMPACTED DEPTH
  GRAVEL BASE ___________________ 0.75’ COMPACTED DEPTH
  VERTICAL CLEARANCE ____________ 16.5’

NOTES:
CLEAR ZONE DISTANCE SHOWN APPLIES TO ROADS WITH A POSTED SPEED
OF 35 MPH OR LESS.

EASEMENT WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED
THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE
OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.

IN FILL SECTIONS, THE COUNTY ENGINEER MAY REQUIRE A
THICKENED EDGE TO CONTROL EROSION.

THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIO–FILTRATION, MAY REQUIRE
ADDITIONAL EASEMENT WIDTH.
RURAL AREA ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: MINOR LOCAL ROAD
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): 161 – 250
(17 – 25 DETACHED SINGLE FAMILY HOMES)

DESIGN CRITERIA

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<tr>
<th>DESIGN SPEED</th>
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<tr>
<td>MAXIMUM ROAD GRADE</td>
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<td>MINIMUM ROAD GRADE</td>
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<td>MINIMUM SURFACING WIDTH</td>
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<td>MINIMUM ROADWAY WIDTH</td>
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<tr>
<td>MINIMUM DESIGN LOAD</td>
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<tr>
<td>RIGHT-OF-WAY WIDTH</td>
<td>60' MIN.</td>
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<tr>
<td>ROADWAY GEOMETRICS</td>
<td>PER AASHTO AND WSDOT STDS.</td>
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</tbody>
</table>

MINIMUM REQUIRED:
- ASPHALT CONCRETE PAVEMENT 0.20' COMPACTED DEPTH
- CRUSHED SURFACING, TOP COURSE 0.17' COMPACTED DEPTH
- GRAVEL BASE 0.75' COMPACTED DEPTH
- VERTICAL CLEARANCE 16.5'

NOTES:

CLEAR ZONE DISTANCE SHOWN APPLIES TO ROADS WITH A POSTED SPEED OF 35 MPH OR LESS.

FULL DEPTH PAVED SHOULDERS MAY BE REQUIRED ON CURVES AND WHERE ADDITIONAL Lanes ARE, OR WILL BE, REQUIRED. ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.

R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.

IN FILL SECTIONS, THE COUNTY ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION.

STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.

THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIO-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.

FILE: ROAD2

APPENDIX 6 – B
RURAL AREA ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: LOCAL ROAD
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): 251 – 400

DESIGN CRITERIA

DESIGN SPEED
MAXIMUM ROAD GRADE
MINIMUM ROAD GRADE
MINIMUM SURFACING WIDTH
MINIMUM ROADWAY WIDTH
MINIMUM DESIGN LOAD
RIGHT-OF-WAY WIDTH
ROADWAY GEOMETRICS
MINIMUM REQUIRED:
- ASPHALT CONCRETE PAVEMENT
- CRUSHED SURFACING, TOP COURSE
- GRAVEL BASE
VERTICAL CLEARANCE

35 M.P.H.
10%
0.5%
20’
26’
HS 20-44
60’ MIN.
PER AASHTO AND WSDOT STDS.
0.20’ COMPACTED DEPTH
0.17’ COMPACTED DEPTH
0.75’ COMPACTED DEPTH
16.5’

NOTES:
CLEAR ZONE DISTANCE SHOWN APPLIES TO ROADS WITH A POSTED SPEED OF 35 MPH OR LESS.

WHERE BICYCLE Lanes ARE REQUIRED, PAVEMENT WIDTHS AND R/W WIDTHS SHALL BE INCREASED TO ACCOMMODATE THE BICYCLE LANE.

R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWARES.

FULL DEPTH PAVED SHOULDERS MAY BE REQUIRED ON CURVES AND WHERE ADDITIONAL LANES ARE, OR WILL BE, REQUIRED. ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.

IN FILL SECTIONS, THE COUNTY ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION.

STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.

THE USE OF ROADSIDE SWARES FOR STORMWATER TREATMENT, BIO-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.
RURAL AREA ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: COLLECTOR
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): 401 - 2000

30' R/W

1-1/2:1 MIN.

11'

6'

1-1/2:1 MIN.

ASPHALT CONCRETE PAVEMENT
CRUSHED SURFACING
GRAVEL BASE

DESIGN CRITERIA

DESIGN SPEED 40 M.P.H.
MAXIMUM ROAD GRADE 10%
MINIMUM ROAD GRADE 0.5%
MINIMUM SURFACING WIDTH 22' PLUS TWO 6' SHOULDERS
MINIMUM ROADWAY WIDTH 34'
MINIMUM DESIGN LOAD HS 20-44
RIGHT-OF-WAY WIDTH 60' MIN.
ROADWAY GEOMETRICS PER AASHTO AND WSDOT STD.
MINIMUM REQUIRED:
ASPHALT CONCRETE PAVEMENT 0.25' COMPACTED DEPTH
CRUSHED SURFACING, TOP COURSE 0.17' COMPACTED DEPTH
GRAVEL BASE 0.75' COMPACTED DEPTH
VERTICAL CLEARANCE 16.5'

NOTES:

WHERE BICYCLE LANES ARE REQUIRED, PAVEMENT WIDTHS AND R/W WIDTHS SHALL BE INCREASED TO ACCOMMODATE THE BICYCLE LANE.

R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.

IN FILL SECTIONS, THE COUNTY ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION.

FULL DEPTH PAVED SHOULDERS MAY BE REQUIRED ON CURVES AND WHERE ADDITIONAL LANES ARE, OR WILL BE, REQUIRED. ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.

CLEAR ZONE REQUIREMENTS OUTLINED IN THE LOCAL AGENCY GUIDELINE AND APPENDIX 6-F SHALL BE COMPLIED WITH.

STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.

THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIO-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.

FILE: ROAD4
RURAL AREA ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: ARTERIAL
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): ABOVE 2000

30' R/W 1-1/2:1 MIN
1-1/2:1 MAX
8' 12' 2% SWALE 2' MIN
12' 2% SWALE 2' MIN
8' 12' 2% SWALE 2' MIN
30' R/W

DESIGN CRITERIA

ASPHALT CONCRETE PAVEMENT
CRUSHED SURFACING
GRAVEL BASE

DESIGN SPEED 50 M.P.H.
MAXIMUM ROAD GRADE 10%
MINIMUM ROAD GRADE 0.5%
MINIMUM SURFACING WIDTH 24' PLUS TWO 8' SHOULDERS
MINIMUM ROADWAY WIDTH 40'
MINIMUM DESIGN LOAD HS 20-44
RIGHT-OF-WAY WIDTH 60' MIN.
ROADWAY GEOMETRICS PER AASHTO AND WSDOT STDS.

MINIMUM REQUIRED:
ASPHALT CONCRETE PAVEMENT 0.33' COMPACTED DEPTH
CRUSHED SURFACING, TOP COURSE 0.17' COMPACTED DEPTH
GRAVEL BASE 0.75' COMPACTED DEPTH
VERTICAL CLEARANCE 16.5'

NOTES:
WHERE BICYCLE LANES ARE REQUIRED, PAVEMENT WIDTHS AND R/W WIDTHS SHALL BE INCREASED TO ACCOMMODATE THE BICYCLE LANE.
R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.
IN FILL SECTIONS, THE COUNTY ENGINEER MAY REQUIRE A THICKENED EDGE TO CONTROL EROSION.
FULL DEPTH PAVED SHOULDERS MAY BE REQUIRED ON CURVES AND WHERE ADDITIONAL LANES ARE, OR WILL BE, REQUIRED.
ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.
CLEAR ZONE REQUIREMENTS AS OUTLINED IN THE LOCAL AGENCY GUIDELINES AND APPENDIX 6-7 SHALL BE COMPLIED WITH.
STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.
The use of roadside swales for stormwater treatment, bio-filtration, may require additional R/W width.

FILE: ROADS

APPENDIX 6 - E
## Clear Zone Distances

**Design Speed**  | **Design ADT** | **Fill Slopes** | **Cut Slopes**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6:1 or flatter</td>
<td>5:1 to 4:1</td>
</tr>
<tr>
<td>40 mph or less</td>
<td>Under 750</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>750–1500</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>1500–6000</td>
<td>14</td>
<td>16</td>
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<tr>
<td></td>
<td>Over 6000</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>45–50 mph</td>
<td>Under 750</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>750–1500</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>1500–6000</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Over 6000</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>55 mph</td>
<td>Under 750</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>750–1500</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>1500–6000</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Over 6000</td>
<td>24</td>
<td>32*</td>
</tr>
<tr>
<td>60 mph</td>
<td>Under 750</td>
<td>18</td>
<td>24*</td>
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<tr>
<td></td>
<td>750–1500</td>
<td>24</td>
<td>32*</td>
</tr>
<tr>
<td></td>
<td>1500–6000</td>
<td>30</td>
<td>40*</td>
</tr>
<tr>
<td></td>
<td>Over 6000</td>
<td>32*</td>
<td>44*</td>
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<tr>
<td>65–70 mph</td>
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<td>750–1500</td>
<td>26</td>
<td>36*</td>
</tr>
<tr>
<td></td>
<td>1500–6000</td>
<td>31*</td>
<td>42*</td>
</tr>
<tr>
<td></td>
<td>Over 6000</td>
<td>34*</td>
<td>46*</td>
</tr>
</tbody>
</table>

* May be limited to 30 feet for practicality unless a site investigation indicates a probability of accidents. This will be determined by the County Engineer.

**Clear Zone Distances in Feet from Edge of Driving Lane**

### Recovery Area Formula

\[
RA = (SHLD + (Horiz. Dist.) + (CZD–SHLD))
\]

**CZD** = Clear Zone Distance

**RA** = Recovery Zone

For slopes steeper than 3:1, the embankment height must be 10 feet or less.

### Degree of Curve 

<table>
<thead>
<tr>
<th>Degree of Curve</th>
<th>Design Speed</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
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<tr>
<td>2.0</td>
<td>1.08</td>
<td>1.10</td>
<td>1.12</td>
<td>1.15</td>
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<tr>
<td>2.5</td>
<td>1.10</td>
<td>1.12</td>
<td>1.15</td>
<td>1.19</td>
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<td>3.0</td>
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<td>1.18</td>
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<td>3.5</td>
<td>1.13</td>
<td>1.17</td>
<td>1.22</td>
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<tr>
<td>4.0</td>
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<tr>
<td>4.5</td>
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<td>1.22</td>
<td>1.31</td>
<td>1.34</td>
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<tr>
<td>5.0</td>
<td>1.19</td>
<td>1.24</td>
<td>1.31</td>
<td>1.37</td>
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<tr>
<td>6.0</td>
<td>1.23</td>
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<td>1.36</td>
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<td>1.42</td>
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<td>1.48</td>
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<tr>
<td>9.0</td>
<td>1.34</td>
<td>1.43</td>
<td>1.53</td>
<td>1.59</td>
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<tr>
<td>10.0</td>
<td>1.37</td>
<td>1.47</td>
<td>1.56</td>
<td>1.62</td>
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</tr>
<tr>
<td>15.0</td>
<td>1.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**K** (Curve Correction Factor)

\[
CZD = L \times K, \text{ where } CZD = \text{clear zone outside of curvature, ft.}
\]

\[
L = \text{clear zone distance, ft.}
\]
### NOTES:

1. LENGTHS ABOVE 600 FT. SHOULD BE AVOIDED. THEY WILL BE CONSIDERED FOR CASES WHERE LOTS ARE LARGE AND/OR DIFFICULT TERRAIN EXISTS, PROVIDED, THE LIMITS SPECIFIED IN 2 ARE MET.

2. 25 MAXIMUM SINGLE FAMILY LOTS OR A MAXIMUM OF 250 ADT.

3. SHOULDER WIDTHS SHALL BE CONSISTENT WITH THE ADJOINING ROADWAY SHOULD WIDTH.

4. PLANTER MAINTENANCE SHALL BE THE RESPONSIBILITY OF THE HOME OWNER'S. REFER TO SECTION 4.09.

### CUL-DE-SAC

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th># Lots Served or Street ADT</th>
<th>Road Section</th>
<th>Street End Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent</td>
<td>&lt; 150 Ft.</td>
<td>N.A.</td>
<td>Private/Local</td>
<td>None Required</td>
</tr>
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<td></td>
<td>151 – 600 Ft.</td>
<td>②</td>
<td>Private/Local</td>
<td>Cul-de-Sac</td>
</tr>
<tr>
<td>Temporary</td>
<td>&lt; 150 Ft.</td>
<td>N.A.</td>
<td>Private/Local</td>
<td>None Required</td>
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<tr>
<td></td>
<td>151 – 600 Ft.</td>
<td>②</td>
<td>Private/Local</td>
<td>Hammerhead</td>
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</tbody>
</table>

See Standard Drawings Appendix 6-A through Appendix 6-C for Road Section Requirements

### HAMMERHEAD

<table>
<thead>
<tr>
<th>W</th>
<th>L1</th>
<th>L2</th>
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<tbody>
<tr>
<td>12'-16'</td>
<td>38'</td>
<td>38'</td>
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<tr>
<td>16'-20'</td>
<td>34'</td>
<td>34'</td>
</tr>
<tr>
<td>20'+</td>
<td>30'</td>
<td>30'</td>
</tr>
</tbody>
</table>
TRENCH RESTORATION NOTES:

1. ALL REFERENCES TO STD. SPECS. SHALL BE IN ACCORDANCE W/ W.S.D.O.T. STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION 1994 EDITION.

2. ALL ROADWAY CROSSINGS SHALL BE PUSHED UNLESS DETERMINED BY THE COUNTY ENGINEER THAT PUSHING CANNOT BE ACHIEVED.

3. RESTORATION SHALL BE IN ACCORDANCE WITH ONE OF THE FOLLOWING:
   A. CONTROLLED DENSITY BACKFILL, CDF, WILL BE REQUIRED AS A BACKFILL MATERIAL; OR
   B. SELECT BACKFILL MEETING THE REQUIREMENTS OF THE STD. SPEC. 9–03.12(1)B COMPACTED TO 95% DENSITY AND PLACED IN A MAXIMUM 12" LIFTS. WRITTEN VERIFICATION OF COMP ACTION, BASED UPON ACCEPTABLE TESTING METHODS, AND PLACEMENT OF THE BACKFILL WILL BE REQUIRED; OR
   C. NATIVE MATERIAL MAY BE USED AS BACKFILL MATERIAL WHEN STANDARD ACCEPTABLE TESTS SHOW THE MATERIAL MEETS THE REQUIREMENTS AS SPECIFIED ABOVE.

4. ALL PATCHES SHALL BE ROLLER COMPACTED. STEEL WHEEL ROLLERS SHALL BE NO WIDER THAN TRENCH PATCH WIDTH.

5. ALL LONGITUDINAL CUTS WITHIN THE PAVEMENT SHALL REQUIRE A FULL LANE OVERLAY AND MAY REQUIRE GRINDING AT THE COUNTY INSPECTOR'S DISCRETION.
CHAPTER 7
ACCESS

7.00 ACCESS

7.01 General
7.02 Sight Distance
7.03 Location of Access Points
7.04 Construction of Access Points
7.05 Horizontal Alignment of Access Points
7.06 Vertical Alignment of Access Points
7.07 Left Turn, Acceleration and Deceleration Lanes
7.08 Intersections

Appendix 7 - A County Road Accesses
Appendix 7 - B Access Point Grades
7.00 **ACCESS**

7.01 **General**

A. Access to State Highways is regulated by the Washington State Department of Transportation. The property owner desiring access to a State Highway is responsible to coordinate with WSDOT for satisfactory completion of any requirements prior to construction.

B. An Encroachment Permit shall be obtained through the Development Services Department prior to accessing County roads. Construction of access points or related improvements shall not be allowed without a valid Encroachment Permit. Application for Encroachment Permits shall be evaluated and Encroachment Permits issued based on the ability of the proposed access or use to meet these Standards.

Access widths and locations for driveways are determined at the time of acquisition of the Encroachment Permit. As a rule, access widths are:

1. Residential minimum width 20 feet plus beveled ends.
2. Commercial minimum width 35 feet plus beveled ends.

C. Access points for parking and loading areas shall be designed so that backing maneuvers from or onto a public road right-of-way will not occur. All vehicles shall exit the property in a forward motion. This does not apply to single family or duplex residential uses on non-collector or non-arterial roads.

D. Where necessary for the safe and efficient movement of traffic, the Engineer may require an investigation by the applicant to determine whether access points should be designed to limit turning movements. The Engineer may also require joint access and circulation agreements between neighboring properties to further provide safe and efficient movement of traffic.

E. Temporary access may be granted to undeveloped property prior to completion of a final development plan if access is needed for construction of preliminary site access. Temporary access points shall meet the requirements of these Standards. They are subject to removal, relocation, or redesign after development plan approval.

F. Secondary access for emergency vehicles may be required for certain high volume or public safety sensitive developments. They
shall be designed to the satisfaction of the Engineer based on review by the Thurston County Fire Marshal.

G. No relocation, alteration or reconstruction of existing access points shall be permitted without prior written approval from the Engineer.

H. All abandoned driveway areas on the same frontage shall be removed and the curbing and sidewalk, or shoulders and ditch section, shall be properly restored in accordance with these Standards.

7.02 Sight Distance

All access points shall conform with the minimum requirements in Section 4.04.

7.03 Location of Access Points

A. The spacing of access points and their separation from intersections is critical to maintaining access point and roadway traffic flow. Thoughtful spacing of access points can reduce vehicular and pedestrian conflicts while helping to avoid traffic accidents. As a general rule, access points shall be a minimum of 130 feet from an intersection, measured from the property corner nearest the intersection.

The following guidelines shall be followed for accessing a County road:

1. Arterial Roads

   Internal collection of traffic shall be required. Access points shall be limited to one access point per 500 feet of frontage, taking into account accesses on both sides of the road and adjoining property. Lots within a subdivision shall be designed so that lots adjacent to an arterial road are not allowed direct access.

2. Collector Roads

   Internal collection of traffic shall be required. Access points shall be limited to one access point per 300 feet of frontage, taking into account accesses on both sides of the road and adjoining property. Lots within a subdivision shall be designed so that lots adjacent to an arterial road are not allowed direct access.

3. Local Roads

   Internal collection of traffic is desirable. Access points are not limited for local roadways.
B. Where a property has frontage on more than one roadway, access shall be limited to the lowest volume roadway where the impacts of the new access are minimized. Access onto other higher volume roads shall be denied in the interest of traffic safety or in order to lessen congestion on the higher volume road.

C. Access points for commercial or industrial property uses shall be placed directly opposite each other wherever possible. If this is not possible, a separation between the nearest edges of such opposite access points shall be as close to the spacings as listed in Section 7.04 A. When such spacing cannot be attained, the Engineer may require investigation to substantiate whether or not left turns should be prohibited into or out of the access points.

D. Access to commercial or industrial use corner lots shall be located on the lower volume roadway and as close as practicable to the property line most distant from the intersection. Right in and right out conditions may also be required by the County.

E. No portion of an access shall be permitted within curb returns.

F. The nearest edge of any access point flare or radius shall be at least 3 feet from the nearest point of a fire hydrant, no parking zone, utility pole, traffic signal installation or light standard, mailbox cluster or other similar appurtenance.

7.04 Construction of Access Points

A. All access points on arterial and collector roadways shall be installed prior to final project/plat approval. Access points on arterial and collector roadways serving two or more parcels shall be required to construct a paved apron as shown in Appendix 7-A.

B. The construction of all access points involving removal of existing vertical curb or vertical curb and gutter shall conform to this section.

C. When cutting through or crossing vertical curbs, gutters and sidewalks, access approaches shall extend from the curb to back of sidewalk and shall be portland cement concrete. The cross slope shall not exceed 2%.

D. When an opening for an access or for any other purpose is to be constructed through an existing portland cement concrete vertical curb, the existing curb, or curb and gutter shall be saw cut at the limits of work or removed to the nearest construction joint and the opening replaced with standard curb and driveway. The cross slope shall not exceed 2%.
E. Existing road trees, road lights, traffic signal facilities, utility poles, and fire hydrants shall be shown on any plan for access point construction in an area of existing vertical curb.

F. Prior to commencing any necessary removal or relocation of any public utilities, structures, trees, or plantings due to construction of an access point, the applicant/developer shall secure approval from the person or persons having ownership or control of such facilities or features.

G. All constructed access points to a County road shall be inspected by the County. If said access point, including culvert, is not installed in accordance with these Standards, it shall be removed and reinstalled by the applicant to the satisfaction of the County. A fee shall be charged for each additional inspection. If the applicant does not remove and reinstall the access and culvert within thirty days from the date of notice, the County has the right to remove said access and culvert at applicant’s expense. Upon removal by the County, the Encroachment Permit shall be void and the applicant shall resubmit an application for a new access.

7.05 Horizontal Alignment of Access Points

All access points shall be angled a minimum of 75 degrees to the road, 90 degrees preferred, unless designated right turn only, in which case the angle shall be at least 45 degrees and then only with the Engineer’s approval. Refer to Appendix 7-A, County Road Accesses.

EXCEPTION: Access points designed for large vehicles, WB-40 and greater, shall be angled a minimum of 85 degrees to the road.

7.06 Vertical Alignment of Access Points

A. Approach grades and configuration shall accommodate future road widening to prevent major access point reconstruction.

B. For maximum access grades, refer to Appendix 7-B, Access Point Grades.

7.07 Left Turn, Acceleration and Deceleration Lanes

The need for left turn, acceleration and deceleration lanes in conjunction with development proposals shall be determined based on the criteria in AASHTO and the WSDOT Design Manual. Evaluation by the Engineer may require submittal of traffic data by the Applicant/Developer.

7.08 Intersections

Refer to Section 4.09
GENERAL NOTES
1. ALL APPROACHES ARE SYMMETRIC ABOUT CENTERLINE UNLESS OTHERWISE NOTED.

2. WHERE LARGER TRUCK TURNING MOVEMENTS ARE ENCOUNTERED, LARGER RETURN RADIUS AND RIGHT TURN TAPERS MAY BE REQUIRED. RADIUS AND TAPERS SHALL BE DETERMINED BY THE COUNTY ENGINEER.

3. WHERE REQUIRED, CULVERTS SHALL BE PLACED AT INTERSECTIONS TO MAINTAIN DRAINAGE FLOW. ALL CULVERTS AND STORMWATER PIPES SHALL BE A MINIMUM 12" DIAM. AND BE OF AN APPROVED MATERIAL. COVER REQUIREMENTS SHALL MEET WSDOT AND MANUFACTURES SPECS.
### DESIGN VALUES

<table>
<thead>
<tr>
<th>ROADWAY CLASSIFICATION</th>
<th>APRON LENGTH (A)</th>
<th>GRADE CHANGE (D)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DESIRABLE</td>
</tr>
<tr>
<td>ARTERIAL</td>
<td>≥20 FEET</td>
<td>≤4%</td>
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<tr>
<td>COLLECTOR</td>
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<td>≤5%</td>
</tr>
<tr>
<td>LOCAL</td>
<td>≥10 FEET</td>
<td>≤6%</td>
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</table>

**ACCESS POINT GRADES AND APRON LENGTHS FOR ROADWAYS AND DRIVEWAYS**

**NOTES:**

1. PINVOT POINT SHALL BE AT THE EDGE OF THE SHOULDER
2. DESIRABLE WIDTHS SHOWN WILL BE THE REQUIREMENT, UNLESS THE APPLICANT DEMONSTRATES TO THE COUNTY ENGINEER’S SATISFACTION THAT THEY CANNOT BE OBTAINED.
3. VERTICAL CURVES ARE NOT TO EXCEED A 3–1/4 INCH HUMP OR A 2 INCH DEPRESSION IN A 10 FOOT CORD.
4. IN CASES OF FUTURE LANE WIDENING AND ADDITIONAL LANES, THE APRON LENGTH SHALL BE INCREASED TO ACCOMODATE FUTURE WIDENING.
CHAPTER 8
ROADSIDE FEATURES

8.00 ROADSIDE FEATURES

8.01 Side Slopes
8.02 Survey Monuments
8.03 Mailboxes
8.04 Landscaping
8.05 Road Illumination
8.06 Roadway Barricades
8.07 Bollards
8.08 Guardrail
8.09 Off-Road Parking Spaces
8.10 Road Name Signs
8.11 Stop Signs
8.12 Roadway Striping, Buttoning, and Delineation

Appendix 8 - A Survey Monument Standard
Appendix 8 - B Community Mail Box
8.00 ROADSIDE FEATURES

8.01 Side Slopes

Side slopes shall be stabilized by grass sod or seeding, or by other planting or surfacing material acceptable to the Engineer.

8.02 Survey Monuments

Refer to Appendix 8-A for Survey Monument Standard

A. Reference

All surveyed monuments horizontal or vertical tied, placed, replaced or calculated shall be coordinated (X,Y,Z) to the Thurston County High Precision Network (TCHPN).

B. Placement

Survey control monuments, including existing monuments disturbed, destroyed or removed during construction, shall be placed or replaced by a registered surveyor at the expense of the applicant in accordance with recognized good practice of land surveying, and in conformance with all applicable state law, rules and local regulations.

C. Records

A legal survey conforming to Chapter 58.09 RCW shall be filed with the County Auditor and the Engineer showing methods used to establish the monument's position with references tying the monument's location. Formal recorded documents, containing the registered surveyor's certification, monumentation, and staking, shall be placed by the registered surveyor in accordance with Chapter 58.09 RCW.

D. Plat Surveys

Survey monuments shall be placed at all exterior boundary corners of plats. A signed and sealed statement from a registered surveyor that all monuments and corners indicated on the subdivision plat have been set and are in good condition shall be required prior to final plat approval.

E. Road Surveys

Survey monuments, Appendix 8-A shall be placed in County roads at:

1. Points of curvature
2. Points of tangent
3. Intersections
4. Centers of cul-de-sacs
5. As needed for intervisibility
6. As required by the County

If a PI falls within the paved roadway surface, a PI monument may replace the corresponding PC and PT monuments. Monuments shall not be placed in landscape medians. Witness monuments shall be offset in the roadway and so described.

8.03 Mailboxes

Mailboxes shall be set in accordance with the LAG manual, and as follows:

A. U.S. Postal Service approval shall be required.

B. Mailbox supports shall be of breakaway design.

C. Mailbox clusters shall conform to WSDOT Standard Plan H-12.

D. Community mailboxes shall not be allowed within the County right-of-way with the exception of the Grand Mound Urban Growth Area. Within the Grand Mound Urban Growth Area, community mailboxes as shown in Appendix 8-B may be used with approval from the County. When used, they shall be clearly shown on the plan sheets.

8.04 Landscaping

A. All landscaping within County right-of-way shall require approval of the Engineer.

B. Landscaping shall be of the type and placement to achieve and maintain the sight distance requirements in Section 4.04.

C. No landscaping shall be allowed within a drainage ditch or drainage swales.

D. Installation and maintenance of all landscaping shall be the responsibility of the applicant or the homeowner’s association.

8.05 Road Illumination

A. Road illumination may be required at school bus stops as identified by the local school district.

B. Road illumination shall be installed at critical intersections as required by the County.
C. Installation, maintenance, and operation billing shall be the responsibility of the applicant or the homeowner’s association.

8.06 Roadway Barricades

Refer to WSDOT Standard Plans.

8.07 Bollards

A. Acceptable Uses

When necessary to deny motor vehicle access to an easement, tract, or trail, except for maintenance or emergency vehicles, the point of access shall be closed by a line of bollards.

B. Placement

One or more fixed bollards shall be placed on each side of the traveled way and removable, locking bollards shall be placed across the traveled way and outside of the roadway clear zone. Spacing shall provide one bollard on centerline of trail and other bollards spaced at intervals not exceed 50 inches on centers.

C. Fire Access

No fire apparatus access roads shall be blocked in this manner without the approval of the County Fire Marshal and local Fire District Chief.

8.08 Guardrail

All roads that do not meet the minimum roadway clear zone and recovery area criteria, to include slopes, shall be required to install guardrail. An exception to this is when the installation of guardrail creates a greater hazard with the potential of redirecting errant vehicles into oncoming traffic.


8.09 Off-Road Parking Spaces

Off-road parking shall not be allowed in County right-of-way, unless approved by the Engineer.

When off-road parking is approved, the design shall take into account the minimum required Standards and the requirements of Title 12 and Title 20 of the Thurston County Code.
8.10 Road Name Signs

A. Required for all public and private roads providing access to 5 or more legal lots.

B. Road name signs shall be installed in accordance with WSDOT Standards.

C. Placement of private road name signs in County right-of-way shall require a County encroachment permit and be installed by County forces at applicant’s expense.

D. Any sign constructed in County right-of-way in non-conformance to these Standards may be removed by County forces and any liability incurred by the County due to non-conformance by the applicant shall be transferred to the applicant.

E. Road naming shall comply with Chapter 13.44 of the Thurston County Code. Contact Development Services to coordinate road names.

8.11 Stop Signs

Stop signs shall be installed in accordance with the MUTCD.

8.12 Roadway Striping, Buttoning, and Delineation

A. When required by the County, roadway striping, buttoning or other traffic delineators shall be installed in accordance with the approved plans, the MUTCD and the County traffic division.

B. Before any pavement marking work takes place, the applicant shall contact the County traffic division. An on-site meeting may be required to review the work and method of construction.
BRASS DISC 2" MIN. DIA.

NOTE: BRASS DISC TO BE SLIGHTLY RECESSED BELOW BLACKTOP AS TO PREVENT DESTRUCTION BY SNOW FLOW AND OR ROAD MAINTENANCE.

FINISHED GRADE

MAGNETIC MATERIAL

(#5 REBAR, 12" LONG) PLACED VERTICALLY UNDER BRASS CAP A MINIMUM OF 2".

NOTE: REBAR IS TO BE SET, CENTERED BY STRADDLES (PK NAILS), SO BRASS DISC, IF COVERED BY BLACKTOP, CAN BE EASILY RECOVERED BY METAL DETECTOR.

CONCRETE SHALL BE CLASS 3000 MIX. THE HOLE SHALL BE 18" MIN. DEPTH BELOW FINISHED GRADE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE BOTTOM OF THE HOLE. THE CONCRETE SHALL BE PLACED ON FIRM UNDISTURBED EARTH. THE TOP OF THE CONCRETE SHALL BE TRAWLED SMOOTH. THE BRASS DISC SHALL BE SET IN THE CENTER WITH THE TOP SLIGHTLY RECESSED AS NOTED ABOVE. REBAR SHALL BE CENTERED OVER STRADDLES, POSITIONED BY PK NAILS.
GENERAL NOTES:
1. SEE SECTION 8.03 FOR ADDITIONAL REQUIREMENTS.
2. LOCATE OUTSIDE INTERSECTION SIGHT–DISTANCE OBSTRUCTION AREAS.
CHAPTER 9
RETAINING WALLS

9.00 RETAINING WALLS

9.01 Design Criteria
9.02 Rock Retaining Walls

Appendix 9 - A Rock Retaining Wall
9.00 RETAINING WALLS

9.01 Design Criteria

A. Retaining walls on public or private roads shall be designed and constructed to meet the minimum requirements of the AASHTO Bridge Specifications.

B. Retaining walls with a height of four feet or greater shall be designed, signed, and stamped by a registered engineer licensed in the State of Washington, and shall be submitted by the applicant for approval by the Engineer.

C. Refer to Appendix 9-A.

9.02 Rock Retaining Walls

A. Rock retaining walls, not exceeding the maximum height specified in Appendix 9-A, may be used for the containment of cut slopes or fill embankments in stable soil conditions which will result in no significant foundation settlement or outward thrust upon the walls.

For heights over 4 feet or when soil is unstable, a structural wall of acceptable design shall be used and calculations shall be submitted to the County for approval. A soils investigation and report by a geotechnical Engineer may be required by the County if soils conditions are questionable.

B. Materials:

1. Rock sizes shall be as shown in Appendix 9-A.

2. The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The rock material shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. The rock density shall be a minimum of 160 pounds per cubic foot.

C. The retaining wall shall be started by excavating a trench, not less than 12 inches in depth below subgrade in excavation sections or below the existing ground level in embankment sections.

D. Rock selection and placement shall be such that there will be minimum voids and, in the exposed face of the wall, no open voids over 6 inches across in any direction. The final course shall have a continuous appearance and be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the rockery so that the wall
will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the rockery face. The rocks shall have all inclining faces sloping to the back of the rockery. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath.

E. The wall backfill shall consist of gravel backfill for walls as per the Standard Specifications. This material shall be placed to a 12-inch minimum thickness between the entire wall and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately 6 inches below the top of each course of rocks as they are placed, until the uppermost course is placed. Any backfill material on the bearing surface of a rock course shall be removed before setting the next course.

F. A 6-inch, minimum inside diameter, perforated drain pipe shall be installed behind the first course of rock and laid on original ground. The perforated drain pipe shall be surrounded by gravel backfill for drains as shown in Appendix 9-A. Positive drainage for the perforated drain pipe shall be provided and shown on the construction plan.

G. The face of the rockery shall be sloped at 1/4 to 1 or flatter.

H. For rock walls in fill sections all fill material placed beyond the backfill shall be placed and compacted in a maximum of 6-inch compacted lifts.
GENERAL NOTES:

1. Rockeries higher than 5' shall be constructed of rocks of graduated sizes from 5-man to 2-man from bottom to top. Rockeries of 5' or lower shall be constructed of 3-man to 2-man from bottom to top. Rock size categories shall include:

   - Two-man rocks (300 to 600 pounds), 13 inches in least dimension;
   - Three-man rocks (800 to 1200 pounds), 16 inches in least dimension;
   - Four-man rocks (1500 to 2200 pounds), 18 inches in least dimension;
   - Five-man rocks (2400 to 3400 pounds), 24 inches in least dimension.

2. The rockery shall be installed with a smooth face.
3. The long dimension of the rocks shall be oriented towards the bank to provide maximum stability.
4. The rock shall be placed so as to lock into two rocks in the lower tier.
5. Call for inspection prior to base course being placed (for verification of rockery height, foundation material and rock size).
6. Design varying from those indicated shall carry the seal of a civil engineer experienced in soil mechanics.
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10.00 BRIDGES

10.01 Principal References

Except as specified below, Thurston County bridges, whether on public roads or on private roads serving subdivided land, shall be designed and constructed to meet the minimum requirements set forth in the latest edition, including all interim addenda, of the AASHTO Bridge Specifications. Bridge and approach railings shall be provided in accordance with that reference or with AASHTO “Guide for Selecting, Locating, and Designing Traffic Barriers.” All new bridges shall be designed to carry an AASHTO HS 20-44 live load or greater.

10.02 Bridge Geometrics

A. In the general case, the bridge roadway shall comprise the full width and configuration of the road being served -- traveled way plus curb, sidewalks, walkway, bike lane, equestrian lane, and/or shoulder on both sides. Requirements of utilities shall be duly considered. Bridge roadway width shall be measured between curbs or between faces of rails, whichever is less, but in no case shall be less than 28 feet. Bridges to be dedicated to the County for public use shall be constructed of concrete unless approved otherwise by the Engineer.

B. Where typical speed is 35 MPH or higher and significant pedestrian, bike and/or horseback traffic can be expected, the Engineer may require that the lanes for these other modes of traffic be separated from motor vehicle traffic by use of a bridge traffic trail and further protected by a rail at outer edge. See WSDOT Design Manual.

C. Approach railings shall be made structurally continuous with bridge railings and shall meet AASHTO specifications as cited in Section 10.01 above.

D. Overhead vertical clearances for motor traffic on the traveled roadway or under overpasses shall be 16.5 feet minimum. Vertical clearance of structures above a walkway or sidewalk shall be eight feet minimum.

10.03 Bridge Design Criteria

A. Approach slabs shall be required for all bridges. New bridge plans shall provide pavement seats for approach slabs unless otherwise approved by the Engineer. Waiver of the requirement for approach slabs may be considered only on the basis of adequate geotechnical analysis. Approach slabs shall be constructed in accordance with the Standard Plans A-2.
B. New bridge decks and approach slabs shall be designed with a protective system to prevent corrosion of the reinforcing steel.

C. Criteria under other recognized road bridge project classifications, such as those of 3-R projects, set forth in the LAG Manual, may be applied under conditions deemed appropriate by the Engineer.

10.04 Special Permits

Permit requirements for construction or reconstruction of bridges include but are not limited to the following:

A. Bridges over navigable waters require U.S. Coast Guard permits.

B. Bridges involving deposition of material in waters of the United States or their adjacent wetlands require a U.S. Army Corps of Engineers Permit.

C. Any work involving alteration of flow or bed materials below the ordinary high water line of any water body or water course requires a Hydraulic Project approval from the State Department of Fish and Wildlife.

D. Any project requiring a U.S. Army Corps of Engineers Permit also requires a Water Quality Certification from the State Department of Ecology.

E. Bridges across streams in State Flood Control Zones require a permit from the State Department of Ecology.

F. Where Bridge structures lie on or over submerged lands, a lease from the Washington State Department of Natural Resources may be necessary.

G. Structures located on shoreline zones as defined in the Thurston County Shoreline Master Program require a substantial development permit from the Thurston County Development Services Department, subject to concurrence of the State Department of Ecology.

H. Bridges over waterways shall be submitted, stamped and sealed by a licensed civil engineer. Bridges require the Engineer’s approval of the size and shape of the hydraulic opening, the height of the superstructure over high water, the location of piers, channel improvement, and other hydraulic considerations.

10.05 Existing Bridges
Existing bridges shall meet all of the specific requirements in these Standards. Written certification by a Structural Engineer licensed in the State of Washington specifically outlining compliance with each of the requirements in these Standards shall be required prior to acceptance by the County.
CHAPTER 11
DRAINAGE

11.00 DRAINAGE

11.01 Catch Basins, Manholes and Inlets
11.00 DRAINAGE

All project submittals shall be in compliance with the Drainage and Erosion Control Manual for Thurston County. In addition, drainage facilities within current or future County Right-of-Way must be of the type and nature that can be easily maintained by County forces. This typically includes as a minimum, 10 inch diameter storm sewer pipe, standard catch basins and manholes and roadside ditches and swales of a minimum depth of 18 inches. All other facilities, such as french drains, curtain drains, drywells and stormwater ponds shall be installed outside County Right-of-Way and be maintained by the applicant or homeowner’s association.

Stormwater facilities shall also be designed to accommodate the stormwater from the addition of frontage improvements, including tributary area.

Projects requiring an agreement for the operation and maintenance of the stormwater facilities shall be required to provide the County with a Project Engineer's Certification of the facilities prior to release of the financial security. The financial security shall not be released until all facilities are completed and repaired as per the approved plans.

11.01 Catch Basins, Manholes and Inlets

A. Maximum spacing on surface drainage courses between inlets or catch basins shall be 150 feet on road grades less than 1.0% and 200 feet on grades from 1.0% to 3.0%. When the road grade is 3.0% or greater, the maximum spacing shall be 300 feet. Additional catch basins shall be installed as needed to confine drainage to the gutter and prevent road drainage from sheet flowing across roadways or intersections.

B. Maximum spacing on main storm sewers between access structures, whether catch basins or manholes, shall be 300 feet.

C. On storm sewers with depths less than five feet to invert of lowest pipe, catch basins may be either Catch Basin Type 1, Catch Basin Type 1-L or Catch Basin Type 2.
CHAPTER 12
UTILITIES

12.00 UTILITIES

Refer to Accommodation of Utilities on Thurston County Rights-of-Way, Chapter 13.56 Thurston County Code.
CHAPTER 13
CONSTRUCTION CONTROL AND INSPECTION

13.00 CONSTRUCTION CONTROL AND INSPECTION

13.01 Basis for Control of Work
13.02 Engineer Certification
13.03 Inspection Criteria
13.04 Notification Requirements
13.05 Revisions to Inspection Sequence
13.06 Required Inspections to be Performed by the Applicant
13.07 Materials Sampling and Testing
13.00 CONSTRUCTION CONTROL AND INSPECTION

13.01 Basis For Control of Work

A. Work performed within the County rights-of-way, or as described in these Standards, whether by or for a private applicant, or by a County contractor, shall be done to the satisfaction of the County and in accordance with the approved plans and specifications and these Standards. Unless otherwise approved, any revision to plans shall be approved by the County before being implemented.

B. The County shall have the authority to enforce these Standards as well as other referenced or pertinent specifications. The County may appoint project assistants and inspectors as necessary to inspect the work on public and private roadways. They shall exercise such authority as the Engineer may delegate. On all other projects, the Project Engineer shall be responsible for all inspections as outlined in this chapter.

C. It is the responsibility of the applicant, contractor and their agents to have an approved set of plans and permits on the job site wherever work is being accomplished. If requested by the County, the applicant shall be required to provide tests to substantiate the adequacy and/or placement of construction materials.

D. It is the responsibility of the applicant, contractor, or their agents to notify the County in advance of the commencement of any work on significant projects.

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

F. Prior to commencing work on the project, the sponsor shall prepare and submit a signing plan to the Engineer for review and approval. From time to time, as progress of the work indicates, as conditions change, or as required by the Engineer, the sponsor shall revise the signing plan to conform with the existing conditions.

The applicant shall provide, place, and maintain all Washington certified flagger, flagger protective apparel, barricades, lights, standard signs, cones and other devices, equipment, and personnel necessary for the protection of the public and maintenance of traffic through the limits of the project at the applicant’s expense.

If the County finds an unsafe condition, the applicant, contractor, and Project Engineer, if warranted, shall be notified and shall be required to
correct the condition immediately. In some circumstances, the County may be required to make the appropriate corrections. The applicant shall be responsible for all costs incurred by the County.

In addition to the requirements contained in the Standard Specifications, the following will be required:

1. The applicant shall maintain at least one-way traffic through the limits of construction at all times and shall open the roadway to two-way traffic during periods when actual work is not in progress.

2. Unless otherwise directed by the Engineer, the roadway shall be open to two-way traffic at all times except between the hours of 8:00 a.m. to 4:00 p.m. weekdays.

3. Access to side roads and private approaches shall be maintained at all times unless otherwise authorized by the Engineer.

4. When it becomes necessary to restrict access to private driveways for construction purposes, as approved by the Engineer, the applicant shall advise affected residents at least 24 hours in advance and cooperate to the fullest extent to minimize inconvenience to residents of the area.

G. Road Closures

Refer to Section 4.14 C.

13.02 Engineer Certification

County may require the applicant to obtain certification from the Project Engineer to document and certify an inspection at any time during the construction process.

13.03 Inspection Criteria

A. On all road construction required by Thurston County Code and work performed within the County right-of-way, inspections shall be done under the control of the Engineer.

B. Unless otherwise instructed by the Engineer, non-platting projects with engineered plans shall be required to submit inspection certifications completed by the Project Engineer for each of the following:

1. Temporary sedimentation and erosion control in accordance with approved plans.
2. Underground drainage, at the stage that trenching and placing of pipe are completed but prior to cover.

3. Survey staking of invert elevations and catch basins prior to subgrade sign off.

4. Underground utilities, including storm, sewer and water, shall be inspected during backfilling for compliance with APWA Standard Specifications. General Roadway inspection at the stage that drainage system, underground utilities, roadway grading, subgrade and including gravel ballast and compaction is completed, as well as curbing, if required.

5. General roadway at the stage that crushed surfacing top course has been placed and compacted.

6. General roadway, while paving is in progress.

7. Overall roadway, final, after paving, monument inspection, cleaning of drainage systems, and all necessary clean up.

8. Structural inspections shall be at critical stages of foundation, placement and at assembly of components and final completion and tests, as directed by the Engineer.

9. Drainage shall be inspected periodically during construction and after any storm event with a precipitation of 2 inches in a 24 hour period.

C. Unless otherwise instructed by the Engineer, platting projects with engineered plans shall be required to submit inspection certifications completed by the Project Engineer for each of the following:

1. Temporary sedimentation and erosion control in accordance with approved plans.

2. Survey staking of invert elevations and catch basins prior to subgrade sign off.

3. Overall roadway, final, after paving, monument inspection, cleaning of drainage systems, and all necessary clean up.

4. Structural inspections shall be at critical stages of foundation, placement and at assembly of components and final completion and tests, as directed by the Engineer.
5. Drainage shall be inspected periodically during construction and after any storm event with a precipitation of 2 inches in a 24 hour period.

13.04 Notification Requirements

A. The County shall be notified 72 hours before construction is started. The applicant shall be responsible for scheduling a pre-construction conference with the County. Other jurisdictions, Project Engineer, utility companies, subcontractors and other necessary parties to the project shall be present at the pre-construction conference.

B. The applicant shall notify the County’s Development Review Division at least 24 hours in advance of each required inspection. Failure to comply with inspection requirements shall necessitate appropriate testing and certification as directed by the Engineer. Costs of such testing and certification shall be borne by the contractor, and for subdivision roads, it shall be the applicant. At the time that such action is directed by the Engineer, no further work shall be permitted on the road or subdivision until all tests have been completed and all corrections have been made to the satisfaction of the Engineer.

13.05 Revisions to Inspection Sequence

If the contractor believes that the inspection sequence indicated above does not fit the requirements of a particular project, the contractor should make a request to the Engineer in sufficient time to permit revision to the inspection schedule.

13.06 Required Inspections to be Performed by the Applicant

When it is determined by the Engineer that work being performed requires quality control inspection, the applicant performing the work shall be required to furnish a qualified inspector(s). All inspection work performed shall be coordinated with the Engineer.

13.07 Materials Sampling and Testing

Materials sampling and testing shall be by the applicant at a frequency and magnitude to be determined by the Engineer. In the case of plat roads, testing and sampling shall be performed by a private testing laboratory. Certified test reports shall be furnished for all tests performed by private testing laboratories.
CHAPTER 14
FRONTAGE IMPROVEMENTS

14.00 FRONTAGE IMPROVEMENTS

- 14.01 Exceptions
- 14.02 Alternatives
14.00 FRONTAGE IMPROVEMENTS

Frontage Improvements shall be required for all improvement and development projects which have frontage on a public road. Frontage improvements shall consist of, but not limited to, dedication of right-of-way, road widening, bus stop pads, bus shelter pads, passenger shelters, bus pullouts, urban features as specified in Chapter 16, bike paths where designated in the current County Comprehensive Plan and safety and drainage improvements, including all tributary runoff.

Frontage improvements, including the dedication of right-of-way, shall be installed at the time of development, including the purchase of passenger shelters using specifications and suppliers approved by Intercity Transit, if required.

The developer shall coordinate the design and construction with County and Intercity Transit when frontage improvements include bus stop pads, shelter pads and bus shelters. Where a bus passenger shelter is identified by County as a mitigation measure, the measure shall also include payment to Intercity Transit for its assembly and installation. Prescription of a passenger shelter shall also incorporate the condition that the shelter meet Intercity Transit’s standard passenger shelter specifications.

14.01 Exceptions

The Engineer may approve an alternative as set out in Section 14.02 to the installation of frontage improvements, not including dedication of right-of-way, if one or more of the following conditions apply:

A. The design grade and alignment of the abutting roads cannot be determined at the time of construction of the development.

B. The installation of frontage improvements required for the development would create or intensify a hazard to public safety.

C. The installation of frontage improvements required for the development could be more safely, efficiently, and effectively implemented if done concurrently with the installation of improvements required for other developments along the same road frontage.

14.02 Alternatives

A. Deferral of Frontage Improvements

Any deferred frontage improvement shall be secured for installation at a later date by an agreement and covenant between the County and the property owner whereby the
property owner agrees to two methods of installation of the deferred frontage improvements. This agreement and covenant shall be executed before the issuance of any improvement and development permits. The Engineer shall select which method to enforce against the property owner at the time when the deferred frontage improvements are required to be installed. Two methods the property owner shall agree to are:

1. Commitment to Participate in an Improvement District

   The property owner shall execute and record an agreement and covenant running with the land that ensures the participation of the subject property owner in any local improvement district, road improvement district, transportation benefit district or other similar type of district formed for the construction of such frontage improvements. Said document shall be in a form acceptable to the County Prosecuting Attorney’s Office and shall be effective for a period of thirty years from the date of recording. This document shall bind the owner and its designees, heirs, transferees, donees, and/or successors in interest.

2. Agreement to Participate in Improvement Project

   The property owner shall execute and record an agreement and covenant running with the land that ensures the participation of the subject property owner in an improvement project not supported by an improvement district which encompasses the said deferred frontage improvements by paying their share thereof. Such share shall be equal to the County’s costs for installing the deferred frontage improvements. A contract shall be developed at the time the improvement project is developed outlining the level of participation by the subject property owner in said project and the manner in which payment is to be made; provided that the financial responsibility of the subject property owner shall not exceed the cost of said deferred frontage improvements at the time of the improvement project. Such an agreement and covenant shall bind the owner and its assignees, heirs, transferees, donees, and/or successors in interest. The agreement and covenant document shall be effective for a period of thirty years from the date of recording.

B. Voluntary Payments

   See RCW 82.02.020 as hereinafter amended.
CHAPTER 15
UNOPENED County RIGHT-OF-WAY

15.00 UNOPENED County RIGHT-OF-WAY

Appendix 15 - A Unopened County Right-of-Way Standard
15.00 UNOPENED COUNTY RIGHT-OF-WAY

In order to obtain a land use permit, to include building permits, the applicant desiring access via an unopened County right-of-way shall provide or improve access to a minimum County standard. To accomplish this process, the applicant shall:

A. Obtain an Access Permit from the County right-of-way division, and

B. Provide access over or improve access to the unopened County right-of-way in accordance with Appendix 15-A.

For 17 lots or more, the Engineer will evaluate each request for access on a case by case basis. Evaluation by the Engineer may require submittal by the applicant of traffic data and other information.
# LOTS | R/W | SECTION | W1 | W2 | S1 | S2 | S3 | D
---|---|---|---|---|---|---|---|---
2 - 4 | LESS THAN 20' | SECTION A | -- | -- | -- | -- | -- | INADEQUATE R/W WIDTH
    | 20' - 30' | SECTION A | 7' | 9' | 1 1/2 : 1 | 3 : 1 | -- | 6" GRAVEL BORROW OR PIT-BRUN GRAVEL
    | 30' TO 60' | SECTION B | 10' | 10' | 1 1/2 : 1 | 3 : 1 | 3 : 1 | 6" GRAVEL BORROW OR PIT-BRUN GRAVEL
5 - 8 | LESS THAN 30' | SECTION B | -- | -- | -- | -- | -- | INADEQUATE R/W WIDTH
    | 30' TO 60' | SECTION B | 10' | 10' | 1 1/2 : 1 | 3 : 1 | 3 : 1 | 6" GRAVEL BORROW OR PIT-BRUN GRAVEL PLUS 1 1/2" CSBC GRAVEL AND PAVED APRON
6 - 12 | LESS THAN 30' | SECTION B | -- | -- | -- | -- | -- | INADEQUATE R/W WIDTH
    | 30' TO 60' | SECTION B | 10' | 10' | 1 1/2 : 1 | 4 : 1 | 4 : 1 | 6" GRAVEL BORROW OR PIT-BRUN GRAVEL PLUS 1 1/2" CSBC GRAVEL AND PAVED APRON
13 - 16 | LESS THAN 30' | SECTION B | -- | -- | -- | -- | -- | INADEQUATE R/W WIDTH
    | 30' TO 60' | SECTION B | 10' | 10' | 1 1/2 : 1 | 4 : 1 | 4 : 1 | 6" GRAVEL BORROW OR PIT-BRUN GRAVEL PLUS 2 1/2" CSBC GRAVEL PLUS 1 1/2" CSTC GRAVEL AND PAVED APRON

NOTES:

All unopened county right-of-way shall be maintained by the adjoining property owners. The county will not maintain nor be liable for unopened county right-of-way until a public roadway is constructed and dedicated to Thurston County.

It is in the best interest of the users of unopened county right-of-way to have a maintenance agreement between all users of the access roadway.

Curve radius, grades, and sight distance shall meet the standards for a rural minor local road as a minimum.

* Section A - Turnouts are required on all blind curves. At 300 foot spacing and must be intervisible. Turnouts shall be a minimum of 10 feet in width, 50 feet in length and have 25 foot tapers on each end.

Section 4.07 shall be used for single lots.

FILE: UCROW
CHAPTER 16
URBAN FEATURES

16.00 URBAN FEATURES

16.01 General
16.02 Design Standards
16.03 Sidewalks, Curb and Gutter
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Appendix 16 - N Typical Cross-Walk Dimensions
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Appendix 16 - Q Entry/Exit Detail
Appendix 16 - R Minor Local & Local Roadway Section
Appendix 16 - S Collector Roadway Section
Appendix 16 - T Arterial Roadway Section
Appendix 16 - U Elderberry Access Detail
16.00 URBAN FEATURES

16.01 General

All properties within the Grand Mound Urban Growth Area shall have cement concrete curb, gutter and sidewalks constructed along the abutting private and public roads as shown on the typical roadway cross sections. Bikeways shall also be constructed in locations shown on the Comprehensive Bike Plan. New construction, alterations and improvements which constitute 25 percent or more of the value of the existing real property improvements shall also have cement concrete curb, gutter, sidewalks and bikeway (if applicable) constructed along the abutting private and public roads. All existing and proposed accesses onto the roadways within the Grand Mound Urban Growth Area shall be evaluated for conformance with these Standards.

16.02 Design Standards

Plans for the construction of sidewalks, curb and gutters shall be submitted as part of the plans when applicable.

The County has set forth minimum Standards for the Grand Mound Urban Growth Area as outlined in Appendices 16-A through 16-U which shall be met in the design and construction of sidewalks, cross-walks, bus pullouts, bikeways, cement concrete curb and gutter. Because these are minimum Standards, they may be modified by the Engineer when it is felt that circumstances require increased or decreased widths.

16.03 Sidewalks, Curb and Gutters

Sidewalks shall be constructed of air entrained Type II Portland Cement Class 3000 in accordance with the requirements of Section 6-02 of the Standard Specifications. The thickness of the sidewalk shall be 6 inches in driveway locations and 4 inches in all other areas. The width of the sidewalk shall be measured from the back of the curb and gutter to the back of the sidewalk.

A. Arterial, Collector and Local Roads. Sidewalks, curb and gutters shall be required on both sides of all roads interior to the development, including cul-de-sacs. Sidewalks, curb and gutters shall also be required on all roads abutting the development.

B. The design and construction of all sidewalks, curb and gutters shall meet the Standards set forth in Appendices 16-A through 16-U.

The width of the sidewalks shall be shown in the road design drawings. The Engineer shall require that the design of all sidewalks provides for a gradual rather than abrupt transition between sidewalks of different widths or alignments.
C. Form and subgrade inspection by the County is required before the sidewalk is poured.

D. Monolithic pour of curb and sidewalk will not be allowed.

16.04 Cement Concrete Curb and Gutter

Cement concrete curb and gutter shall be used for all road edges unless otherwise approved by the Engineer. All curb and gutters shall be constructed of Type II Portland Cement Class 3000 as shown in Appendix 16-M.

Extruded curb and gutter per Standard Specifications is allowed.

Form and subgrade inspection by the County is required before the curb and gutter is poured.

16.05 Curb Access Ramps

All sidewalks must be constructed to provide for access ramps in accordance with the Standards of State law.

Curb access ramps shall be constructed of Type II Portland Cement Class 3000. Form and subgrade inspection by the County is required before the handicap ramp is poured.

16.06 Staking

All surveying and staking shall be performed by an engineer or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington.

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

The minimum staking of curb, gutter and sidewalk shall be as follows:

Stake top back of sidewalk or top back of curb at a consistent offset for vertical and horizontal alignment every 25 feet or 50 feet in tangent sections.

Staking shall be maintained throughout construction.

16.07 Testing

Testing shall be required at the applicant’s or contractor’s expense on all materials and construction as specified in the Standard Specifications.
At a minimum, one slump test and 2 test cylinders shall be taken once per day.

In addition, the County shall be notified before each phase of sidewalk and curb construction commences.

16.08 Bikeways

The minimum design Standards for bikeways shall be as defined in the “WSDOT Design Manual,” Section 1020, Facilities for Non-motorized Transportation.

Class II Bike Paths are required within the Grand Mound Urban Growth Area as shown on the Comprehensive Bike Plan. Class II Bike Paths are those in which a portion of the motor vehicle roadway is designated by signs and pavement markings for bicycle use. These facilities are adjacent to the motor vehicle roadway.

Bikeways may also be required when the traffic analysis or traffic planning indicates substantial bicycle usage which would benefit from a designated bicycle facility as determined by the Engineer except where noted herein.
NOTES:
1. WHERE D/W EXCEEDS 16' WIDTH
   AN EXPANSION JOINT SHALL BE PLACED
   TRANSVERSALLY, CENTERED IN DRIVEWAY.
2. EXPANSION JOINT MATERIAL TO BE 3/8" THICK
   PRE-MOLDED JOINT FILLER FULL THICKNESS.
3. FORM AND SUBGRADE INSPECTION ARE
   REQUIRED BEFORE PLACING CONCRETE.
4. TRANSITION WIDTH WILL VARY DEPENDING ON
   DRIVEWAY SLOPE. MAINTAIN 12:1 TRANSITION SLOPE.
5. 6" MIN. SPACING REQUIRED TO NEXT DRIVEWAY.
6. DRIVEWAY WIDTH AT THE THROAT SHALL
   NOT EXCEED 11' WIDE IN CUL-DE-SACS.
7. WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE,
   GRADE SHALL NOT DEVIATE MORE THAN 1/8 INCH;
   AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4 INCH.
8. BROOM FINISH LONGITUDINALLY WITH LIGHT BROOM
    FINISH INCLUDING CURB FACE.
9. MINIMUM GUTTER LINE GRADE SHALL BE 0.50%.
GENERAL NOTES:
1. FOR JOINTS AND SCORING, SEE STANDARD FOR SIDEWALK SPACING, EXPANSION JOINTS, AND SCORE MARKS.
2. AT CONCRETE DRIVEWAYS, SIDEWALKS SHALL BE A MINIMUM DEPTH OF 6".
3. WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE, GRADE SHALL NOT DEVIATE MORE THAN 1/8 INCH, AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4 INCH.
3/8" EXPANSION MATERIAL THRU JOINTS SHALL BE PLACED AT 90° TO FACE OF CURB AND NO MORE THAN 15 FT. APART. REFER TO APPENDIX 16-D FOR EXPANSION JOINT AND SCORE MARK DETAILS.

ROADWAY

WIDTH VARIES SLOPE 0.02'/FT.

90'

BROOM FINISH

SCORE MARKS

1/2" RADIUS (TYP)

1/2" EXPANSION MATERIAL WHERE ABUTTING EXIST. STRUCTURES (TYP)

3/8" EXPANSION JOINT–1/2" RADIUS

4" MIN

CEMENT CONCRETE CURB & GUTTER

2" CRUSHED SURFACING TOP COURSE

1/4" RADIUS (TYP)

NOTES:

1. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE POURING.
2. CONCRETE SHALL BE AIR ENTRAINED TYPE II PORTLAND CEMENT CLASS 3000.
3. BROOM FINISH SHALL BE PERPENDICULAR TO FACE OF CURB.
4. JOINTS SHALL BE TROWEL FINISHED, AFTER BROOMING.
5. ALL EDGES AND JOINTS SHALL BE FINISHED.
6. WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE, GRADE SHALL NOT DEVIATE MORE THAN 1/8 INCH, AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4 INCH.

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GENERAL NOTES:

1. Expansion joint material to be 3/8" thick premolded joint filler full thickness of concrete.

2. Form and subgrade inspection required before pouring concrete.

3. Score marks shall be ±1/8" wide by ±1/4" deep. For sidewalks over 8' in width, a longitudinal score mark shall be made along center of walk.

4. Expansion joints shall be installed in curb and gutter and in sidewalk at PC and PT at all curb returns. Expansion joints shall be placed in sidewalk at same locations as those in curb and gutter when sidewalk is adjacent to curb and gutter, unless otherwise directed by the county engineer.

5. Planter strip to be maintained by adjacent property owner.
LEGEND

S/W = SIDEWALK
L/S = OPTIONAL LANDSCAPE
TYPE "A"

Curb & Gutter

1/4" Deep Pattern Made with Expanded Metal Grate (Typ)

3/8" Expansion Joint (Typ)

1/4" Max. Lip (Typ)

25'R (Min)

Curb & Gutter

Landscaping (LS) Varies

Advance Warning Strip (Typ)

1/4" Deep Pattern Made with Expanded Metal Grate (Typ)

Back of Walk Varies to Match Adjacent Curb Ramp and Sidewalk

Radius Varies to Maintain Sidewalk Width

TYPE "B"

Cement Concrete Curb & Gutter

Landscaping

1/4" Deep Pattern Made with Expanded Metal Grate (Typ)

1/4" Max. Lip (Typ)

25'R (Min)

Curb & Gutter

Adjust to Match Adjacent Curb Ramp and Sidewalk

3/8" Expansion Joint (Typ)

Advance Warning Strip (Typ)

5/8" Lip (Typ)

5/8" Min.

NOTES:

1. See Sidewalk Detail for Thickness, Expansion Joints and Score Marks.
2. Cross walks shall be centered on curb access ramps.
NOTE: AREA MAY BE GRADED TO MATCH EXISTING GRADE

3/8" EXPANSION JOINT (TYP)

LANDING (6' MIN). SEE NOTE (1)

1/4" MAX LIP (TYP)

1/4" DEEP PATTERN MADE WITH EXPANDED METAL GRATE (TYP.)

10' MIN RAD

3' MIN BETWEEN CURB RAMPS

5' MIN SEE NOTE (1)

10' MIN

NOTE:
1. WHEN MATCHING EXISTING 10' SIDEWALK, LANDING CAN BE DECREASED TO 4' MINIMUM.
2. SEE SIDEWALK DETAIL FOR THICKNESS, EXPANSION JOINTS AND SCORING MARKS.
3. CROSS WALKS SHALL BE CENTERED ON CURB RAMPS.
NOTE: AREA MAY BE GRADED TO MATCH EXISTING GRADE

3/8" EXPANSION JOINT (TYP)

1/4" MAX LIP (TYP)

10' MAX

12'

5' MIN

NOTE: TWO CROSS WALKS SHOWN. MAY ALSO BE USED WITH SINGLE CROSS WALK TO TRAFFIC ISLAND.

2' MIN. TO EDGE OF LANE

DEPRESSED CURB & GUTTER

LIMITS OF CONSTRUCTION

Cement concrete curb to match sidewalk grade when needed for drainage control or safety concerns.

1/4" Deep pattern made with expanded metal grate (TYP)

5' MIN & 10' MAX

1/4" MIN.

5' MIN, 10' MAX.

ADVANCE WARNING STRIP (TYP)

1/4" Deep pattern made with expanded metal grate (TYP)

FOR USE WITH LARGE RADIUS (35' MIN.) INTERSECTIONS.

NOTE:
1. SEE SIDEWALK DETAIL FOR THICKNESS, EXPANSION JOINTS AND SCORE MARKS.
2. THIS RAMP TO BE USED WITH RADIUS 35 FEET OR GREATER AND OTHER CURB RAMPS ARE NOT FEASIBLE. FINAL DECISION TO BE MADE BY THE COUNTY ENGINEER.
3. CROSS WALKS SHALL BE CENTERED ON CURB RAMPS.
TYPICAL CURB RAMP

CEMENT CONCRETE CURB & GUTTER

4' MIN. FACE OF CURB TO CROSS-WALK

1/4" DEEP PATTERN MADE WITH EXPANDED METAL GRATE

RADIUS 35 FEET OR GREATER

ADVANCE WARNING STRIP

POSSIBLE PLANTING STRIP. LESS THAN 6'.

SECTION A-A

SECTION B-B

NOTE: SEE SIDEWALK SPACING, EXPANSION JOINTS & SCORE MARK DETAIL FOR ADDITIONAL NOTES.
NOTE:
1. SEE SIDEWALK DETAIL FOR THICKNESS, EXPANSION JOINTS AND SCORE MARKS
2. THIS RAMP TO BE USED AS DESIGNATED ON THE PLANS AND WHEN OTHER TYPES ARE NOT FEASIBLE. FINAL DETERMINATION TO BE MADE BY THE COUNTY ENGINEER.
NOTE:
THIS RAMP MAY BE USED AS DESIGNATED ON THE PLANS AND IN AREAS WHERE OTHER RAMP DESIGNS ARE NOT FEASIBLE. FINAL DETERMINATION SHALL BE MADE BY THE COUNTY ENGINEER.
NOTE: SEE SIDEWALK SPACING EXPANSION JOINTS & SCORE MARK DETAIL FOR ADDITIONAL NOTES.

ADVANCE WARNING STRIP

"DUMMY JOINTS"

NOTE: NATIONAL MANUFACTURER 1/4" DEEP PATTERN MADE WITH EXPANDED METAL GRATE

STANDARD CURB AND GUTTER

OPTIONAL PLANTER WIDTH VARIES

6" 3'-0" MIN.

6'

SECTION A-A

RAMP 1:12 SLOPE

6'-0" 6'-0"

PLANTER WIDTH VARIES

6" TYP. CURB & GUTTER

BACK OF WALK SEE LIP DETAIL

1:6 MAX.

SECTION B-B

BOTTOM OF RAMP SHALL HAVE MAX. 1/4" LIP AT 45°

LIP DETAIL

NOTE:
THIS RAMP MAY BE USED AS DESIGNATED ON THE PLANS AND IN AREAS WHERE OTHER RAMP DESIGNS ARE NOT FEASIBLE. FINAL DETERMINATION IS TO BE MADE BY THE COUNTY ENGINEER.
NOTES:

- EXPANSION JOINT MATERIAL TO BE 3/8" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE SPACING.
- FORM AND SUBGRADE INSPECTION REQUIRED BEFORE POURING CONCRETE.
NOTE:
- CEMENT CONCRETE CURB & GUTTER SHALL BE USED WHEN TRAFFIC ISLAND IS LANDSCAPED
- THIS IS ONE EXAMPLE OF A LIMITED MOVEMENT DRIVEWAY ACCESS. THERE ARE SEVERAL OTHER TYPES AND DECISIONS TO LIMIT MOVEMENTS FROM A DRIVEWAY ACCESS. EACH SITE PLAN DESIGN WILL NEED TO MEET THE REQUIREMENTS OF THE SPECIFIC SITE WHILE MEETING THE LIMITED MOVEMENT REQUIREMENTS.
GRAND MOUND ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: MINOR COLLECTOR & LOCAL
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): LESS THAN 2,000

DESIGN CRITERIA

- ASPHALT CONCRETE PAVEMENT
- CRUSHED SURFACING
- GRAVEL BASE

DESIGN SPEED 20 TO 25 M.P.H.
MAXIMUM ROAD GRADE 12%
MINIMUM ROAD GRADE 0.5%
MINIMUM SURFACING WIDTH 22'
MINIMUM ROADWAY WIDTH 22'
MINIMUM DESIGN LOAD HS 20-44
RIGHT-OF-WAY WIDTH 50' MIN.
ROADWAY GEOMETRICS PER AASHTO AND WSDOT STDs.
MINIMUM REQUIRED:
- ASPHALT CONCRETE PAVEMENT 0.20' COMPACTED DEPTH
- CRUSHED SURFACING, TOP COURSE 0.17' COMPACTED DEPTH
- GRAVEL BASE 0.75' COMPACTED DEPTH
- VERTICAL CLEARANCE 16.5'

NOTES:
R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.
THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIO-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.

ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.
CLEAR ZONE REQUIREMENTS AS OUTLINED IN THE LOCAL AGENCY GUIDELINES AND APPENDIX 6–7 SHALL BE COMPLIED WITH.
STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.
GRAND MOUND ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: COLLECTOR
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): 2,000 TO 15,000

DESIGN CRITERIA

DESIGN SPEED: 25 TO 35 M.P.H.
MAXIMUM ROAD GRADE: 10%
MINIMUM ROAD GRADE: 0.5%
MINIMUM SURFACING WIDTH: 24'
MINIMUM ROADWAY WIDTH: 24'
MINIMUM DESIGN LOAD: HS 20-44
RIGHT-OF-WAY WIDTH: 60’ MIN.
ROADWAY GEOMETRICS: PER AASHTO AND WSDOT STDs.
MINIMUM REQUIRED:
- ASPHALT CONCRETE PAVEMENT: 0.25’ COMPACTED DEPTH
- CRUSHED SURFACING, TOP COURSE: 0.17’ COMPACTED DEPTH
- GRAVEL BASE: 0.75’ COMPACTED DEPTH
- VERTICAL CLEARANCE: 16.5’

NOTES:
CENTER MEDIAN MAY TAKE THE FORM OF A TWO-WAY LEFT TURN LANE, LEFT TURN POCKET AT MAJOR INTERSECTION/DRIVEWAYS, OR RAISED MEDIAN.

R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.

ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.
CLEAR ZONE REQUIREMENTS AS OUTLINED IN THE LOCAL AGENCY GUIDELINES AND APPENDIX 6-7 SHALL BE COMPLIED WITH.

STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON.

THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIO-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.

COLLECTOR ROADWAY SECTION

APPENDIX 16 – S
GRAND MOUND ROADWAY DESIGN STANDARDS

ROADWAY CLASSIFICATION: ARTERIAL
20-YR. PROJECTED AVERAGE DAILY TRAFFIC (ADT): ABOVE 15,000

DESIGN CRITERIA

ASPHALT CONCRETE PAVEMENT
CRUSHED SURFACING
GRAVEL BASE

DESIGN SPEED ____________________________ 30 TO 45 M.P.H.
MAXIMUM ROAD GRADE ____________________ 8%
MINIMUM ROAD GRADE ____________________ 0.5%
MINIMUM SURFACING WIDTH __________________ 44' PLUS TWO 5' CLASS II BIKE LINES
MINIMUM ROADWAY WIDTH _________________ 54'
MINIMUM DESIGN LOAD ____________________ HS 20-44
RIGHT-OFF-WAY WIDTH ____________________ 90' MIN.
ROADWAY GEOMETRICS ____________________ PER AASHTO AND WSDOT STDS.
MINIMUM REQUIRED:
ASPHALT CONCRETE PAVEMENT ______ 0.33' COMPACTED DEPTH
CRUSHED SURFACING, TOP COURSE____ 0.17' COMPACTED DEPTH
GRAVEL BASE ________________________ 0.75' COMPACTED DEPTH
VERTICAL CLEARANCE ____________________ 16.5'

NOTES:
CENTER MEDIAN MAY TAKE THE FORM OF A TWO-WAY LEFT TURN LANE, LEFT TURN POCKET AT MAJOR INTERSECTION/DRIVEWAYS, OR RAISED MEDIAN

R/W WIDTHS MAY BE REDUCED WHERE THE COUNTY ENGINEER HAS DETERMINED THAT ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE PRIVATE MAINTENANCE OF WALKWAYS, TRAILS, BIKEWAYS AND SWALES.

ADDITIONAL R/W MAY BE REQUIRED TO ACCOMMODATE ADDITIONAL LANES.
CLEAR ZONE REQUIREMENTS AS OUTLINED IN THE LOCAL AGENCY GUIDELINES AND APPENDIX 6-7 SHALL BE COMPLIED WITH.
STRUCTURAL ROADWAY SECTION TO BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN WASHINGTON
THE USE OF ROADSIDE SWALES FOR STORMWATER TREATMENT, BIOL-FILTRATION, MAY REQUIRE ADDITIONAL R/W WIDTH.
GRAND MOUND ROADWAY DESIGN STANDARDS

ELDERBERRY STREET ACCESS CONFIGURATION
AFTER INITIAL IMPROVEMENTS ARE COMPLETED

NOTES

INITIAL IMPROVEMENTS ARE DESCRIBED IN THE 1997 AMENDED GRAND MOUND SUBAREA PLAN

THIS DRAWING DOES NOT DEPICT FULL ARTERIAL ROADWAY SECTION FOR ELDERBERRY ST. REFER TO CHAPTER 16, APPENDIX 16 – , FOR THE ARTERIAL ROADWAY SECTION