Section 8
Streets

8.0 STREETS

This section presents the minimum design standards for public and private streets. These Standards encourage the uniform development of an integrated, fully accessible public transportation system that will facilitate present and future travel demands with minimal environmental impact to the community as a whole. The design shall consider the location of facilities in relation to land use, pedestrian safety, right of way width, traffic standards and safety, landscaping, drainage facilities, ease of maintenance, and the ability to provide efficient public services.

8.1 Definitions

A. ***AASHTO*** : The American Association of State Highway Transportation Officials. The abbreviation may also be used throughout these Standards to reference AASHTO's publication, "A Policy on Geometric Design of Highways and Streets."

B. ***ADA:*** Americans with Disabilities Act.

C. ***ADAAG:*** Americans with Disabilities Act Accessibility Guidelines.

D. ***Clear Sight Area:*** The corner area at an intersection or driveway which must be free of sight obstructions over 36 inches in height to provide adequate sight distance.

E. ***Clear Zone:*** The unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles.

F. ***Cross Slope:*** A slope that is perpendicular to the direction of travel.

G. ***Cul-de-Sac:*** Short street having one end open to traffic and the other temporarily or permanently terminated by the vehicle turnaround.

H. ***Downtown Core:*** The area described in FHMC 17.08.125.

I. ***Driveway***: A privately maintained access to any property.

J. ***Half Street***: Street construction along edge of a development, utilizing a portion of the regular width of right-of-way and permitted as an interim facility pending construction of the other half of the street by the adjacent owner.

K. ***Monument***: A physical survey monument.

L. ***Pavement Width***: The width of a street from face of curb to face of curb.

M. ***Traveled Way***: The area of street which is intended to carry vehicular traffic.

8.2 Street Frontage Improvements

A. Requirements

All non-single family development shall install street frontage improvements prior to the issuance of a building permit for the proposed development. Land divisions of two or more lots shall install street frontage improvements prior to the issuance of final plat approval. Such improvements shall include curb and gutter, sidewalk, street storm drainage, street lighting system, utilities, landscaping, irrigation, and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington. All frontage improvements shall be made along full frontage of property from centerline of right-of-way to the property line.

B. Exceptions

When the Town deems that the above such improvements cannot be accomplished due to unique circumstances of the topography of those adjacent areas required to be improved, then the provisions of FHMC Chapter 12.02 shall apply.

8.3 Streets – Private

A. All private streets within the Town limits shall be constructed in accordance with the Town Engineering Design Standards.

B. The Town of Friday Harbor will not accept private streets as public streets until such streets are bought into conformance with these Engineering Design Standards.

8.4 Right of Way

A. Street Classification shall govern right of way width and street section. Town streets are divided into four classifications: major arterial, minor arterials, local access streets, and RES (40’ RW and 50’ RW). Street classification and shall govern right-of-way, road width, and road geometrics. Below is a list of existing street classifications and minimum right of way requirements. Streets not listed are classified as Local Access Streets. New streets will be classified by the Town.

1. Major Arterials

Street Name	From	To	RW Width
Court Street	First Street	Second Street	80’
East Street	Front Street	Harrison Street	80’
First Street	East Street	Northwest Terminus	80’
Front Street	East Street	Northwest Terminus	80’
Spring Street	Waterfront	Argyle Avenue	80’
West Street	Front Street	Second Street	80’

2. Minor Arterials

Street Name	From	To	RW Width
A Street	Harrison Street	Nichols Street	60’
B Street	Harrison Street	Nichols Street	60’
Argyle Avenue	Spring Street	Town limits	40’ to 50’
Blair Avenue	Spring Street	Guard Street	45’ to 50’
Grover Street	Argyle Avenue	East terminus	60’
Guard Street	Blair Avenue	Town limits	50’ to 60’
Harrison Street	A Street	300' west of Geneste Street	60'
Market Street	Mullis Street	Nash Street	50'
Mullis Street	Spring Street	Town limits	60'
Nash Street	Caines Street	Spruce Street	50'
Nichols Street	Argyle Avenue	C Street	50' to 40'
Park Street	Blair Avenue	Guard Street	60'
Second Street	Blair Avenue	Spring Street	60'
Spring Street	Argyle Avenue	Town limits	60'
Tucker Avenue	Guard Street	Town limits	45' to 60'

3. Local Access Streets

Street Name	From	To	RW Width
A Street	Nichols Street	Web Street	40’
Caines Street	Spring Street	Argyle Avenue	40’
Culver Avenue	Guard Street	Martin Street	60’
Malcom Street	Argyle Avenue	East terminus	50'
Marguerite Street	Spring Street	Guard Street	40' to 50'
Price Street	Spring Street	Park Street	40’ to 50’
Reed Street	Blair Avenue	Second Street	40'
Rhone Street	Reed Street	East terminus	40'
Web Street	Argyle Avenue	A Street	40' to 50'

4. RES – 50' RW or More

This classification is for streets which are located within residentially zoned areas with 50' or more dedicated right of way.

Street Name	From	To	RW Width
Carter Avenue	Guard Street	Harbor Street	50’
Chinook Way	Coho Drive	South terminus	50’
Coho Drive	Chinook Way	North terminus	50’
Friday Avenue	McDonald Street	North terminus	60'
Harbor Street	Carter Avenue	Tucker Avenue	50'
John Street	Argyle Avenue	East terminus	60’
Kelsando Circle	Larson Street	Larson Street	50'
Larson Street	Guard Street	Carter Avenue	60'
Martin Street	Tucker Avenue	Culver Avenue	60'
Mason Court	Kelsando Circle	East terminus	50'
McDonald Street	Tucker Avenue	Friday Avenue	50'
Rose Lane	Argyle Avenue	West terminus	50'
Spruce Street	Argyle Avenue	Rose Lane	50'
Terra Bella Lane	Carter Avenue	West terminus	50'

5. RES – 40' RW or Less

This classification is for streets which are located within residentially zoned areas with 40' or less dedicated right of way.

Street Name	From	To	RW Width
Alder Court	West terminus	Spruce Street	40’
Beach Court	McDonald Street	Martin Street	30’
Beck Street	Geneste Street	East terminus	20’
Beck Street	Gould Street	East terminus	20'
C Street	Harrison Street	Franck Street	40'
Carter Avenue	Harbor Street	North terminus	40’
Charles Place	Hillcrest Place	Northeast terminus	24'
Franck Street	C Street	East terminus	40'
Geneste Street	Harrison Street	Beck Street	40'
Gould Street	Franck Street	South terminus	40'
Green Way	Spruce Street	East terminus	40'

Street Name	From	To	RW Width
Harrison Street	300' West of Geneste Street	Warbass Way	30'
Hemlock Court	West terminus	Spruce Street	40'
Hillcrest Place	North terminus	Lampard Road	40' to 30'
Hunt Street	Franck Street	Grover Street	40'
Jennifer Place	North terminus	Hillcrest Place	24'
Lampard Road	Town limits	Spring Street	30'
Larson Street	Carter Avenue	Tucker Avenue	40'
Linder Street	North terminus	South terminus	40'
Maple Street	Franck Street	South terminus	40'
Marble Street	Tucker Avenue	East terminus	30'
Nelson Street	Linder Avenue	East terminus	20'
Perry Place	Tucker Avenue	East terminus	35'
Scenic Place	North terminus	South terminus	40'
Tree House Place	North terminus	Hillcrest Place	24'
Vine Street	Franck Street	South terminus	40'
Warbass Way	B Street	Harrison Street	40'

B. Right-of-way requirements may be increased if additional lanes, turning lanes, bus loading zones, posted speed, bike lanes, utilities, schools or other factors are required as determined by the Town.

C. Right-of-way shall be conveyed to the Town on a recorded plat and/or by a right-of-way dedication deed.

8.5 Streets – Public

A. General

The layout of streets shall provide for the continuation of existing streets in adjoining subdivisions or of their future projection when adjoining property is not subdivided. Streets, which serve primarily to provide access to residential subdivisions, shall be designed to discourage through traffic.

B. Street Width

1. Street classification and shall govern road geometrics. Table 8-1 Minimum Street Design Standards lists the minimum pavement width for each street classification.

2. Half-Street improvements are permitted as an interim facility. Half-Streets may be used pending construction of the entire street by the property owner on the opposite side of the road. When a project has frontage on an undeveloped or gravel roadway a half street improvement will be required. This will require the full improvement of the side adjacent to the project and the addition of 12 feet of the approved road cross-section and a 2-foot gravel shoulder on the side away from the development. Half-streets must be suitable for two-way traffic.

Table 8-1

Minimum Street Design Standards

Design Standards	Major Arterial	Minor Arterial	Local Access	RES – 50' RW	RES – 40' RW
Minimum Right of Way	80'	50' to 60'	40' to 50'	50'	40'
Minimum Pavement Width	63'	38'	28'	24'	22'
Parking Lane	Both Sides	Both Sides	One Side	No	NO
Minimum/Maximum Grade	0.5% to 10%	0.5% to 10%	0.5% to 15%	0.5% to 15%	0.5% to 15%
Curb	Cement Concrete Traffic Curb and Gutter	Cement Concrete Traffic Curb and Gutter	Cement Concrete Traffic Curb and Gutter	Cement Concrete Traffic Curb and Gutter	Cement Concrete Traffic Curb and Gutter
Sidewalks	Both Sides: 8' Wide	Both Sides: 6' to 8'	40' RW - 5' One Side 50' RW - 5' Both Sides	Both Sides: 5' Wide	Both Sides: 5' Wide
Planter Strip	N/A	0 - 4'-6" as determined by Town	5'	5'-6"	5'
Cul-De-Sac Radius (pavement width)	N/A	N/A	45' turnaround radius (55' right-of-way radius)	45' turnaround radius (55' right-of-way radius)	45' turnaround radius (55' right-of-way radius)
Intersection Curb Radius	30'	30'	25'	25'	25'
Design Speed (mph)	30	30	25	25	25
Minimum Centerline Radius for Normal Grown	335'	335'	200'	200'	200'
Stopping Site Distance	AASHTO Manual Criteria	AASHTO Manual Criteria	AASHTO Manual Criteria	AASHTO Manual Criteria	AASHTO Manual Criteria
Street Section	Dwg. No. ST-1	Dwg. No. ST-2 Dwg. No. ST-3	Dwg. No. ST-4	Dwg. No. ST-5	Dwg. No. ST-6

Note: Existing land locked parcels may be accessed by a private easement with a minimum width of 20 feet.

C. Turnarounds

1. Cul-de-sac: Streets designed to have one end permanently closed shall be no longer than 400 feet. At the closed end, there shall be a widened “bulb” having a minimum paved radius of 45 feet. The minimum right of way radius for the bulb section shall be 55 feet. The Town may require an off street walk or emergency vehicle access to connect a cul-de-sac at its terminus with other streets, parks, schools, or other pedestrian generators.
   a. Unless otherwise approved by the Director, cul-de-sacs shall be designed to drain out to the adjacent street.
   b. Cul-de-sac profiles shall be established to provide minimum one percent grades at all places along the gutter lines.

2. Temporary Dead Ends: Where a street is temporarily terminated, turn around provisions must be provided where the road serves more than six lots or is longer than 150 feet. The turnaround may be a cul-de-sac or a hammerhead with a minimum distance on both sides at the centerline intersection of 60 feet to facilitate emergency vehicle turn-around. Curbing is not installed in the temporary cul-de-sac. All temporary turnarounds shall be surfaced with an all-weather surface. Removal of the temporary cul-de-sac bulb or hammerhead shall be the responsibility of the developer who extends the road.

D. Intersections

1. Traffic Control: Traffic control will be as specified in the MUTCD or as modified by the Town as a result of traffic engineering studies.

2. Intersection Design: Street intersections shall be laid out so as to intersect, as nearly as possible, at right angles. Angle of intersection shall be between 85 and 95 degrees (measured 10 feet beyond the street classification right of way). For safe design, the following types of intersection features should be avoided:

   Intersections with more than four intersecting streets;

   Intersections adjacent to sign obstructions.

3. Intersection Spacing: Spacing between adjacent intersecting streets, whether crossing or "T" should be as follows:

Highest Classification Minimum Centerline Involved Is	Offset Should Be
Major Arterial	300 feet
Minor Arterial	300 feet
Local Access	150 feet
RES	150 feet

4. Curb: Curb radius for each street classification is indicated in Table 8-1 "Minimum Street Design Standards." When streets with different classifications intersect, the higher street classification standard shall apply. Deviations to this may be allowed at the direction of the Director as a result of a traffic engineering study.

5. Approaches: On sloping approaches at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching any street measured from nearest right-of-way line (extended) of intersecting street.

E. Sight Distance for Intersections

1. Sight Distance Triangle: The sight distance triangle is a clear sight area formed by extending two lines of specified length as shown on the Sight Distance Standard Plans. The area within the triangle shall be subject to restrictions to maintain a clear view on the intersection approaches.

2. Vertical Clearance Area: The vertical clearance area within the sight distance triangle shall be free from obstructions to a motor vehicle operator's view between a height of 3 feet and 10 feet above the existing surface of the street.

3. Exclusions: Sight obstructions that may be excluded from these requirements include: utility poles, regulatory signs, trees trimmed from the base to a height of 10 feet above the street, places where the contour of the ground is such that there can be no cross visibility at the intersection, saplings or plant species of open growth habits and not in the form of a hedge which are so planted and trimmed as to leave at all seasons a clear and unobstructed cross view, buildings constructed in conformance with the provisions of appropriate zoning regulations and preexisting buildings at the time of enactment of these Engineering Design Standards.

F. On-Street Parking

1. On-street parking shall be provided as required on Table 8-1 “Minimum Street Design Standards.”

G. Bulbs

1. Bulbs as shown in the Standard Plans shall be installed on all Major Arterials, Minor Arterials, and Local Access Streets unless waived by the Town.

H. Horizontal Curves

1. Horizontal curves are to be determined in accordance with normal civil engineering procedures, considering design speeds, sight distances, roadway crown, building proximity, and vertical grades. The centerline radius shall not be less than shown on Table 8-1.

2. The maximum superelevation on horizontal curves shall be four (4) percent. The minimum horizontal curve radii shall be determined per AASHTO Design for Low Speed Urban Streets.

3. Pavement widening on horizontal curves to accommodate large vehicles shall be considered per AASHTO Chapter III - Elements of Design, Table III-23.

I. Tapers

1. The standard taper length for narrowing or offsetting of a lane shall be based on the design speed, per the MUTCD.

J. Vertical Curves

1. Vertical curves shall comply with AASHTO.

K. Vertical Clearance

1. All streets, cul-de-sacs, and turnarounds must have a minimum clearance of 16.5 feet.

L. Pavement Markings

1. Design plans for pavement markings shall be submitted to the CDP for review and acceptance prior to construction. Plans shall include all existing and proposed striping, show the full width of the street, and show existing conditions beyond the proposed development. Any existing markings that are to be removed shall be clearly designated.

2. All crosswalks and stop bars shall be thermoplastic. All other pavement markings shall be painted.

3. All pavement markings shall conform to the MUTCD specifications.

M. Monuments

1. Prior to any construction within Town rights-of-way, the Applicant shall employ a Washington State Licensed Surveyor to conduct a thorough search for all survey monuments. Any found monuments shall be referenced in accordance with current applicable state laws. A copy of the references shall be submitted to CDP.

2. If placing new or replacing existing monuments is required the Applicant shall do so in accordance with current applicable state laws.

3. At a minimum, monuments shall be installed at the following locations:
   a. At center of each cul-de-sac;
   b. At point of intersection of all streets;
   c. On the roadway centerline at the end of every plat.

4. The location of the monuments shall be clearly marked on the construction plans and final plat.

N. Pavement Design

1. All streets in the Town shall be paved with HMA or cement concrete. A pavement design must be performed for all streets.

2. The pavement design shall meet the requirements in the latest publication of the AASHTO Guide for Design of Pavement Structures. A soils report, signed and stamped by a soils engineer licensed by the State of Washington, shall be based on actual soils tests and submitted with the plans. One soil sample per each 500 LF of centerline with three minimum per project representative of the roadway subgrade shall be taken to determine a statistical representation. Soil tests shall be performed by an accredited materials laboratory.

3. The structural pavement calculations, soil sample locations, lab results, design criteria and recommendations are to be included in a report prepared by Washington State Licensed Engineer. All design factors used are to be listed in the report, including traffic loads projected to occur over the life of the pavement.

O. Hot Mix Asphalt (HMA)

All HMA shall meet the Town's HMA Specification. See Attachment 8-1.

8.6 Curbs and Gutters and Sidewalks

A. General

1. Sidewalks and curbs and gutters and planting strips shall be required as shown on Table 8-1 "Minimum Street Design Standards" and the Standard Plans. Since these are minimum standards, they may be modified by the Town should the Town determine circumstances require increased widths.

B. Curbs and Gutters

1. Integral cement concrete traffic curb and gutter shall be constructed per the Standards Plans on all new construction. Curbs shall be constructed on 4 inches of crushed surfacing top course compacted to 95 percent of the maximum dry density. Special drainage issues may require the use of other curbing with gutter grading, upon approval of the Director. When repairing or replacing existing sections of curb, the type of curb constructed may match the adjacent curb.

C. Sidewalks

1. Curbs and sidewalks shall be constructed within the Town right-of-way on all streets and within private road easements. The required sidewalk construction or repair shall be on all sides of private property parcels adjacent to Town streets whenever any permit is issued for new construction or for substantial improvements to a parcel, or any improvements resulting in a change of occupancy classification. The Director will determine if existing sidewalks are in need of repair. Locations of sidewalk placement or repair shall be included on plans submitted to the Town for review.

2. Sidewalks shall be constructed with in accordance with the Standard Plans. Sidewalks shall be constructed on 4 inches of Crushed Surfacing Top Course compacted to 95 percent of the maximum dry density.

3. All utility vaults placed within the sidewalk shall be approved by the Town. All lids placed within the sidewalk shall be non-slip.

4. In the event the Town has raised or lowered an existing street so that the sidewalk does not match the new proposed sidewalk level, the Town shall be responsible for the costs associated with reconstruction of the new sidewalk.

D. Curb Ramps

1. Curb ramps shall be designed in accordance with the requirements of ADAAG, and the Standard Plans.

8.7 Planting Strips and Street Trees

A. Planting Strips

1. Planting strips shall be the width shown on Table 8-1 and on the Standard Plans unless otherwise directed by the Town. The planting strip shall be a minimum of 4.5 feet wide.

2. When development occurs on sites with existing street trees, the following items shall be addressed as part of the project:
   a. All dead or diseased trees must be removed and replaced at the discretion of the Director.
   b. Trees that are missing shall be replaced at the discretion of the Director.
   c. Broken or missing irrigation systems shall be repaired or replaced.
   d. Tree grates that are not flush with the surrounding sidewalk shall be raised or lowered as necessary to prevent a tripping hazard.
   e. No new utility pole location shall be established closer than 10 feet to an existing tree.

B. New Street Trees

1. Tree selection shall be species listed in Table 8-2 and coordinated with the Town. Trees shall be a minimum of 2" caliber measured 6-inches above the root crown. Approval shall be obtained from the Director prior to planting tree(s) in the Town right of way.

Table 8-2

Tree Species Permitted within Right of Way

Botanical Name	Common Name
Cercis canadensis	Eastern Redbud
Styrax japonica	Japanese Snowbell
Acer truncatum x platinoides	warrened"/Pacific Sunset Maple
Parrodia persica	Persian Ironwood
Acer griseum	Paperbark Maple
Magnolia stellata	Star Magnolia
Ginkgo biloba	Princeton Sentry
Ginkgo biloba Magyar	Magyar ginkgo
Stewartia psuedocamellia	Japanese stewartia
Cercis siliquastrum	Judas tree

2. When locating street trees, the following specific criteria shall apply:
   a. Street Trees shall be planted in the center of the planting strip.
   b. Street trees installed in planting strips or sidewalk cutouts shall be located so as to not interfere with street signs, lighting poles, and utilities, and shall accommodate ADA pedestrian requirements.
   c. Minimum horizontal distances from the centerline of a tree to other structures or improvements in the planting strip shall be as follows:
      1) 10 feet to edge of driveway;
      2) 20 feet to street light luminaire;
      3) As required to provide an adequate clear sight triangle;
      4) 5 feet to underground duct or pipe;
      5) 10 feet to hydrants and utility poles.
   d. Spacing of street trees will be 30 feet unless approved otherwise by the Director.
   e. If trees are to be planted in an area with no planting strip, the following criteria shall apply:
      1) A permanent, hard walking surface at least 5-feet wide shall be provided between the tree well and any structure or obstruction.
      2) Sidewalk cuts in concrete for tree planting shall be at least 48" x 48" to allow air and water to the root area.
      3) In cases where the existing walk cannot meet the four foot width requirement after tree planting, additional sidewalk width must be added within street right of way or easement, or the tree position must be modified.
   f. Trees shall be planted in accordance the Tree Planting Standard Plan.

8.8 Driveways

A. General

1. Driveways shall be construct in accordance with the Standard Plans.
   a. Joint-use driveways serving two adjacent parcels may be built on their common boundary upon formal written agreement by both property owners and approval of the Town. The agreement shall be a recorded easement for both parcels of land specifying joint usage.
   b. Driveways serving non-residential uses shall not be approved where backing onto the sidewalk or street will occur. Driveways serving residential uses where backing onto the sidewalk or street will occur, shall be approved by the Public Works Director.
   c. Driveway aprons shall not extend into the street further than the face of the curb.
   d. The angle between any driveway and the street shall be not less than 45°.
   e. Driveway edges shall be parallel.
   f. Grade breaks, including the tie to the roadway, shall be constructed as smooth vertical curves. The maximum change in driveway grade shall be 8 percent within any 10 feet of distance on a crest and 12 percent within any 10 feet of distance in a sag vertical curve. The grades of all driveway approaches are to be approved by the Town.
   g. All standard driveways shall be constructed of Concrete Cement, and shall be at least 6-inches thick, over a 4-inch crushed surfacing top course, unless alternative materials are approved by the Public Works Director. Driveways shall be subject to the same testing and inspection requirements as curb, gutter, and sidewalk construction.
   h. Maintenance of driveway approaches shall be the responsibility of the owners whose property they serve.
   i. Driveways giving direct access onto arterials may be denied if alternate access is available.
   j. Driveways should be situated as far away from intersections as practicable.
   k. Driveways shall not be located within 20 feet of a crosswalk.
   l. Driveway shall not be located so as to conflict with power poles, street lights, fire hydrants, traffic regulating devises or other above-ground facilities, and shall not create a hazard to pedestrians or motorists as determined by the Town.
   m. All abandoned driveway areas on the same frontage shall be removed and the curbing and sidewalk or shoulder and ditch section shall be properly restored, at the Applicant's expense.
   n. Right turn tapers, left turn pockets and acceleration lanes may be required in light industrial and commercial zoned areas as directed by the Town as a result of a traffic engineering study.
   o. Deviations of these standards may be permitted by the Town as a result of a traffic engineering study.

B. Private Intersection

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

1. Projected driveway usage is greater than 2,000 vehicles per day; and

2. Where traffic signalization is required by a traffic study; and

3. A minimum 100-foot long travel lane is provided between the street and any turning

or parking maneuvers within the development; and

4. The opening is at least 150 feet from any other intersection opening; and

5. The opening is at least 150 feet away from any other driveway on the property frontage under control of the applicant; and

6. Easement dedication for traffic control devices.

C. Width and Number of Access Points for All Driveways

1. Driveway width shall not exceed the maximum widths indicated in Table 8-3.

2. A wider driveway width may be approved by the Town as a result of a traffic engineering study.

Table 8-3

Driveway Widths

Property Frontage	Number of Driveways	Maximum Driveway Width
Residential Use		
Less than 120 feet	1	12'
Equal or Greater than 120 feet	2	12'
Non-Residential Use		
Less than 60 feet	1	24'
Equal or Greater than 60 feet and Less than 120 feet	1	30'
Equal or Greater than 120 feet	2	24'

8.9 Signing

A. General

The Applicant is responsible for providing all traffic control and street name signs. Traffic control signing shall comply with the provisions of the MUTCD. All signs (regulatory, warning, street name, etc.), including poles and hardware, shall be installed and paid for by the Applicant.

B. Street Signs

1. All existing and proposed street signs required as part of street design shall be shown on the plans submitted and approved by the Town. The plans shall include all existing and proposed signs, show the full width of the street, include any signs on the opposite side of the street, and show existing conditions beyond the proposed development.

2. All traffic control devices, including, but not limited to regulatory signs, warning signs, and guide signs shall adhere to the MUTCD.

C. Sign Posts

1. Refer to the Standard Plans for street sign post construction requirements.

D. Street Names and Address Number

1. Street Names

The Applicant shall submit proposed new street names to the Town during the preliminary plat process. The Town will insure that the name assigned to a new street is consistent with policies of the Town.

2. Address Number

An address number will be assigned to all new buildings at the time the building permit is issued. It is then the Applicant's responsibility to see that the building numbers are placed clearly and visibly at the main entrance to the property or at the principal place of ingress.

8.10 Mailboxes

A. During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the U.S. Postal Service. The mailboxes shall be reinstalled at the original location or, if construction has made it impossible, to a location as outlined below and approved by the U.S. Postal Service.

B. The responsibilities for location and installation of mailboxes in connection with the construction or reconstruction of Town streets are as follows:

The Town will require:

1. Street improvement drawings to show clearly the designated location or relocation of mailboxes, whether single or in clusters.

2. Any necessary widening or reconfiguration of sidewalks with suitable knock-outs or open strips for mailbox posts or pedestals.

3. Drawings to bear a statement on the first sheet that the Collection Box Unit (C.B.U.) mailbox locations as shown on these drawings have been coordinated with the serving post office at Friday Harbor, Washington as a prerequisite to plan approval.

4. Locations of mailboxes in accordance with the Standard Plans.

C. Mailboxes and Collection Box Units shall be installed by the Applicant in accordance with the Standard Plans.

8.11 Walls

A. Wall installations in the public right-of-way will be discouraged, and every effort should be made by the Design Engineer to grade the property in such a way as to avoid the installation of walls. If a wall is determined to be necessary, consideration shall be given to the design and placement of the wall to maximize the clear area, including placement of the wall outside of the right-of-way on private property. Any wall constructed within the roadway clear area shall have the appropriate barrier protection provided as approved by the Director. A chain link fence or aluminum hand railing shall be required at the top of a new or reconstructed wall if the height of the exposed face of the wall exceeds 30 inches. For walls less than 30 inches, the Director may require a fence or other protection.

B. Retaining Walls

1. For all retaining walls, a structural wall of acceptable design shall be used. Geotechnical design criteria shall be provided by a geotechnical engineer. Plans and specifications for each retaining wall to be located within the Town road right-of-way shall be designed, stamped, and signed by an engineer.

   Any retaining wall constructed for a roadway fill section shall provide a minimum 1-foot setback from any portion of the wall to the right-of-way to allow for wall maintenance and inspection activities.

2. Rock Walls

   Rock Walls may be used for the containment of cut slopes or fill embankments up to a maximum wall height of 4 feet (including one foot of embedment) if stable and appropriate soil conditions exist.

3. Modular Block Walls

   Modular Block Walls may be installed as shown in the Standard Plans for exposed wall heights of less than 4 feet.

8.12 Illumination

A. General

1. All new streets and street improvements shall provide street lighting in accordance with these Standards.

2. All public street light designs shall be prepared by an engineering firm capable of performing such work. The engineer shall be licensed by the State of Washington.

3. The Applicant shall submit a street lighting plan and illumination calculations to Town for review and approval.

B. Design Criteria

1. Design shall be completed in accordance with the Illuminating Engineering Society Roadway Lighting Manual ANSI/IES RP-8-14.

2. The lighting criteria for streets is provided Table 8-4 “Lighting Design Criteria.” The Applicant shall complete illumination uniformity and light level calculations using AGI32 software.

3. All new lighting systems shall be connected to a metered service. The Applicant shall coordinate the service location with Orcas Power and Light Cooperative (OPALCO). The stainless steel service cabinet shall be Milbank CP 3B11115A22.

4. The light standard shall be HAPCO Model RTA25D7B4M16-01 unless the Town directs otherwise. The mounting height of the luminaire is 25 feet.

5. The luminaire shall be CREE Model BXSP_B_HT_3ME_A_40K_UL_SV_N-Q9.

6. A photocell shall be placed on one luminaire to control the lighting system.

7. All conduits shall be schedule 80 PVC.

8. Street light junction boxes shall conform to WSDOT Standard Plan J-40.10, Type 1.

Table 8-4

Lighting Design Criteria

	Min. Avg. Light Level	Maximum Uniformity Ratio
Non-Residential Streets	0.6	6:1
Residential	0.3	10:1

Attachment 8-1 Hot Mix Asphalt Specification

5-04.1 Description

This Work shall consist of providing and placing one or more layers of plant-mixed hot mix asphalt (HMA) on a prepared foundation or base in accordance with these Specifications and the lines, grades, thicknesses, and typical cross-sections shown in the Plans.

This work also consists of adjusting castings to grade per the details in the Contract Plans.

HMA shall be composed of asphalt binder and mineral materials as may be required, mixed in the proportions specified to provide a homogeneous, stable, and workable mixture.

5-04.2 Materials

Materials shall meet the requirements of the following WSDOT Standard sections:

Asphalt Binder	9-02.1(4)
Cationic Emulsified Asphalt	9-02.1(6)
Anti-Stripping Additive	9-02.4
HMA Additive	9-02.5
Aggregates	9-03.8
Recycled Asphalt Pavement	9-03.8(3)B
Mineral Filler	9-03.8(5)
Recycled Material	9-03.21
Portland Cement	9-01
Sand	9-03.1(2).
(As noted in 5-04.3(5)C for crack sealing)	
Joint Sealant	9-04.2
Foam Backer Rod	9-04.2(3)A

The following local materials shall be considered acceptable for use as aggregate:

1. Crushed surfacing top course per Section 9-03.9(3).
2. Black sand per Section 9-03.1(2)B Class 1.

The Contractor shall be required to furnish mineral materials in the amounts required for the designated mix. Mineral materials include coarse and fine aggregates, and mineral filler.

5-04.2(2) Mix Design – Obtaining Project Approval

No paving shall begin prior to the approval of the mix by the Public Works Director.

- The mix provided for this work shall be a 1/2" dense mix with stripping agent using PG 64-22 asphalt binder at a proportion between 5.8 and 6.2 percent. Mix designs that have been successfully used on Town Projects for new construction within the past 2 years will be accepted.

5-04.3 Construction Requirements

5-04.3(1) Weather Limitations

Do not place HMA for wearing course on any traveled way beginning October 1st through March 31st of the following year without written concurrence from the Engineer.

Do not place HMA on any wet surface, or when the average surface temperatures are less than those specified below, or when weather conditions otherwise prevent the proper handling or finishing of the HMA.

Minimum Surface Temperature for Paving

Compacted Thickness (Feet)	Wearing Course	Other Courses
Less than 0.10	55 degrees F	45 degrees F
0.10 to .20	45 degrees F	35 degrees F
More than 0.20	35 degrees F	35 degrees F

5-04.3(2) Paving Under Traffic

When the Roadway being paved is open to traffic, the requirements of this Section shall apply.

The Contractor shall keep intersections open to traffic at all times except when paving the intersection or paving across the intersection. During such time, and provided that there has been an advance warning to the public, the intersection may be closed for the minimum time required to place and compact the mixture. In hot weather, the Engineer may require the application of water to the pavement to accelerate the finish rolling of the pavement and to shorten the time required before reopening to traffic.

Before closing an intersection, advance warning signs shall be placed and signs shall also be placed marking the detour or alternate route.

During paving operations, temporary pavement markings shall be maintained throughout the project. Temporary pavement markings shall be installed on the Roadway prior to opening to traffic. Temporary pavement markings shall be in accordance with Section 8-23.

All costs in connection with performing the Work in accordance with these requirements, except the cost of temporary pavement markings, shall be included in the unit Contract prices for the various Bid items involved in the Contract.

5-04.3(3) Equipment

5-04.3(3)A Mixing Plant

Plants used for the preparation of HMA shall conform to the following requirements:

1. **Equipment for Preparation of Asphalt Binder** – Tanks for the storage of asphalt binder shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by steam coils, electricity, or other approved means so that no flame shall be in contact with the storage tank. The circulating system for the asphalt binder shall be designed to ensure proper and continuous circulation during the operating period. A valve for the purpose of sampling the asphalt binder shall be placed in either the storage tank or in the supply line to the mixer.

2. **Thermometric Equipment** – An armored thermometer, capable of detecting temperature ranges expected in the HMA mix, shall be fixed in the asphalt binder feed line at a location near the charging valve at the mixer unit. The thermometer location shall be convenient and safe for access by Inspectors. The plant shall also be equipped with an approved dial-scale thermometer, a mercury actuated thermometer, an electric pyrometer, or another approved thermometric instrument placed at the discharge chute of the drier to automatically register or indicate the temperature of the heated aggregates. This device shall be in full view of the plant operator.

3. **Heating of Asphalt Binder** – The temperature of the asphalt binder shall not exceed the maximum recommended by the asphalt binder manufacturer nor shall it be below the minimum temperature required to maintain the asphalt binder in a homogeneous state. The asphalt binder shall be heated in a manner that will avoid local variations in heating. The heating method shall provide a continuous supply of asphalt binder to the mixer at a uniform average temperature with no individual variations exceeding 25 degrees F.

Also, when a WMA additive is included in the asphalt binder, the temperature of the asphalt binder shall not exceed the maximum recommended by the manufacturer of the WMA additive.

4. **Sampling and Testing of Mineral Materials** – The HMA plant shall be equipped with a mechanical sampler for the sampling of the mineral materials. The mechanical sampler shall meet the requirements of Section 1-05.6 for the crushing and screening operation. The Contractor shall provide for the setup and operation of the field testing facilities of the Contracting Agency as provided for in Section 3-01.2(2).

5. **Sampling HMA** – The HMA plant shall provide for sampling HMA by one of the following methods:

   a. A mechanical sampling device attached to the HMA plant.

   b. Platforms or devices to enable sampling from the hauling vehicle without entering the hauling vehicle.

5-04.3(3)B Hauling Equipment

Trucks used for hauling HMA shall have tight, clean, smooth metal beds and shall have a cover of canvas or other suitable material of sufficient size to protect the mixture from adverse weather. Whenever the weather conditions during the work shift include, or are forecast to include, precipitation or an air temperature less than 45 degrees F or when time from loading to unloading exceeds 30 minutes, the cover shall be securely attached to protect the HMA.

The Contractor shall provide an environmentally benign means to prevent the HMA mixture from adhering to the hauling equipment. Excess release agent shall be drained prior to filling hauling equipment with HMA. Petroleum derivatives or other coating material that contaminate or alter the characteristics of the HMA shall not be used. For live bed trucks, the conveyer shall be in operation during the process of applying the release agent.

5-04.3(3)C Pavers

Asphalt pavers shall be self-propelled mechanical spreading and finishing equipment, provided with a screed or strike-off assembly capable of distributing the material to not less than the full width of a traffic lane. Screed action shall include any cutting, crowding or other practical action which is effective on the mixture without tearing, shoving or gouging, and which produces a surface texture of uniform appearance. The screed shall be adjustable to the required section and thickness. The paver shall be provided with a suitable full width compacting

device. Pavers that leave ridges, indentations or other marks in the surface shall not be used unless the ridges, indentations or other marks are eliminated by rolling or prevented by adjustment in operation.

The asphalt paver shall operate independently of the vehicle being unloaded or shall be capable of propelling the vehicle being unloaded in a satisfactory manner. The load of the haul vehicle shall be limited to that which will ensure satisfactory spreading. While being unloaded the haul vehicle shall be in contact with the machine at all times and the brakes on the haul vehicle shall not be depended upon to maintain contact between the vehicle and the machine.

No portion of the weight of hauling or loading equipment, other than the connection, shall be supported by the asphalt paver, and no vibrations or other motions of the loader, which could have a detrimental effect on the riding quality of the completed pavement, shall be transmitted to the paver.

Sufficient personnel shall be provided to properly operate the paver. Unless fully automatic a person shall be provided to operate each wing as well as an operator to drive the unit. The paver operator shall not also operate any of the rollers.

If the paving machine in use is not providing the required finish, the Engineer may suspend Work as allowed by Section 1-08.6. Any cleaning or solvent type liquids spilled on the pavement shall be thoroughly removed before paving proceeds.

5-04.3(3)D Rollers

At a minimum three rollers consisting of the following shall be used for each asphalt paver to compact all asphalt concrete and asphalt concrete base:

One steel-tired 2 axle tandem breakdown roller weighing not less than 8 tons;

One steel-tired, 2 axle vibratory roller weighing not less than 4 tons and;

One steel tired tandem finish roller.

The 2 axle tandem breakdown roller shall have rolling wheels with a diameter of 40 inches or more.

Each roller shall have a separate operator. Rolling equipment shall be self-propelled and reversible. The minimum number, weight and type of rollers required may be reduced or modified for low rates of production when alternative equipment is approved by the engineer.

Rollers shall be equipped with pads and water systems which prevent sticking of asphalt mixtures to the pneumatic-tired or steel-tired wheels. A parting agent, which will not damage the asphalt mixture, as determined by the Engineer, may be used to aid in preventing the sticking of the mixture to the wheels.

Pneumatic-tired rollers when used, shall be the oscillating type having a width of not less than 4 feet with pneumatic-tires of equal size, diameter and having treads satisfactory to the Engineer. Wobble-wheel rollers will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by the following tires.

The tires shall be inflated to 90 psi, or a lower pressure as designated by the Engineer, and maintained so that the air pressure will not vary more than 5 psi from the designated pressure. Pneumatic-tired rollers shall be constructed so that the total weight of the roller can be varied to produce an operating weight per tire of not less than 2,000 pounds. The total operating weight of the roller shall be varied as directed by the Engineer.

5-04.3(4) Preparation of Existing Paved Surfaces

When the surface of the existing pavement or old base is irregular, the Contractor shall bring it to a uniform grade and cross-section as shown on the Plans or approved by the Engineer.

Preleveling of uneven or broken surfaces over which HMA is to be placed may be accomplished by using an asphalt paver, a motor patrol grader, or by hand raking, as approved by the Engineer.

Compaction of preleveling HMA shall be to the satisfaction of the Engineer and may require the use of small steel wheel rollers, plate compactors, or pneumatic rollers to avoid bridging across preleveled areas by the compaction equipment. Equipment used for the compaction of preleveling HMA shall be approved by the Engineer.

Before construction of HMA on an existing paved surface, the entire surface of the pavement shall be clean. All fatty asphalt patches, grease drippings, and other objectionable matter shall be entirely removed from the existing pavement. All pavements or bituminous surfaces shall be thoroughly cleaned of dust, soil, pavement grindings, and other foreign matter. All holes and small depressions shall be filled with an appropriate class of HMA. The surface of the patched area shall be leveled and compacted thoroughly. Prior to the application of tack coat, or paving, the condition of the surface shall be approved by the Engineer.

A tack coat of asphalt shall be applied to all paved surfaces on which any course of HMA is to be placed or abutted. Tack coat shall be uniformly applied to cover

the existing pavement with a thin film of residual asphalt free of streaks and bare spots at a rate between 0.02 and 0.10 gallons per square yard of retained asphalt. The rate of application shall be approved by the Engineer. A heavy application of tack coat shall be applied to all joints. For Roadways open to traffic, the application of tack coat shall be limited to surfaces that will be paved during the same working shift. The spreading equipment shall be equipped with a thermometer to indicate the temperature of the tack coat material.

Equipment shall not operate on tacked surfaces until the tack has broken and cured. If the Contractor's operation damages the tack coat it shall be repaired prior to placement of the HMA.

The tack coat shall be CSS-1, or CSS-1h emulsified asphalt. The CSS-1 and CSS-1h emulsified asphalt may be diluted once with water at a rate not to exceed one part water to one part emulsified asphalt. The tack coat shall have sufficient temperature such that it may be applied uniformly at the specified rate of application and shall not exceed the maximum temperature recommended by the emulsified asphalt manufacturer.

5-04.3(4)A Crack Sealing

5-04.3(4)A1 General

When the Proposal includes a pay item for crack sealing, seal all cracks 1/4 inch in width and greater.

Cleaning: Ensure that cracks are thoroughly clean, dry and free of all loose and foreign material when filling with crack sealant material. Use a hot compressed air lance to dry and warm the pavement surfaces within the crack immediately prior to filling a crack with the sealant material. Do not overheat pavement. Do not use direct flame dryers. Routing cracks is not required.

Sand Slurry: For cracks that are to be filled with sand slurry, thoroughly mix the components and pour the mixture into the cracks until full. Add additional CSS-1 cationic emulsified asphalt to the sand slurry as needed for workability to ensure the mixture will completely fill the cracks. Strike off the sand slurry flush with the existing pavement surface and allow the mixture to cure. Top off cracks that were not completely filled with additional sand slurry. Do not place the HMA overlay until the slurry has fully cured.

The sand slurry shall consist of approximately 20 percent CSS-1 emulsified asphalt, approximately 2 percent portland cement, water (if required), and the remainder clean Class 1 or 2 fine aggregate per section 9-03.1(2). The components shall be thoroughly mixed and then poured into the cracks and joints until full. The following day, any cracks or joints that are not completely filled shall

be topped off with additional sand slurry. After the sand slurry is placed, the filler shall be struck off flush with the existing pavement surface and allowed to cure. The HMA overlay shall not be placed until the slurry has fully cured. The requirements of Section 1-06 will not apply to the portland cement and sand used in the sand slurry.

In areas where HMA will be placed, use sand slurry to fill the cracks.

In areas where HMA will not be placed, fill the cracks as follows:

1. Cracks 1/4 inch to 1 inch in width – fill with hot pressure fed sealant.

2. Cracks greater than 1 inch in width – fill with sand slurry.

Hot Pressure Fed Sealant: For cracks that are to be filled with hot poured sealant, apply the material in accordance with these requirements and the manufacturer's recommendations. Furnish a Type 1 Working Drawing of the manufacturer's product information and recommendations to the Engineer prior to the start of work, including the manufacturer's recommended heating time and temperatures, allowable storage time and temperatures after initial heating, allowable reheating criteria, and application temperature range. Confine hot poured sealant material within the crack. Clean any overflow of sealant from the pavement surface. If, in the opinion of the Engineer, the Contractor's method of sealing the cracks with hot pressure fed sealant results in an excessive amount of material on the pavement surface, stop and correct the operation to eliminate the excess material. Pouring sealant is not an acceptable method.

5-04.3(4)A2 Crack Sealing Areas Prior to Paving

In areas where HMA will be placed, use sand slurry to fill the cracks.

5-04.3(4)A3 Crack Sealing Areas Not to be Paved

In areas where HMA will not be placed, fill the cracks as follows:

a. Cracks 1/4 inch to 1 inch in width - fill with hot pressure fed sealant.

b. Cracks greater than 1 inch in width – fill with sand slurry.

5-04.3(4)B Vacant

5-04.3(4)C Pavement Repair

The Contractor shall excavate pavement repair areas and shall backfill these with crushed surfacing top course and HMA in accordance with the details shown in the Plans and as marked in the field. The Contractor shall conduct the excavation operations in a manner that will protect the pavement that is to remain. Pavement not designated to be removed that is damaged as a result of the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer at no cost to the Contracting Agency. The Contractor shall excavate only within one lane at a time unless approved otherwise by the Engineer. The Contractor shall not excavate more area than can be completely finished during the same shift, unless approved by the Engineer.

The Contractor shall excavate to the depth noted on the Plans. Should additional depth be required to expose a firm and unyielding subgrade it will be paid for under "Unsuitable Foundation Excavation, Incl. Haul". The Engineer will make the final determination of the excavation depth required. The minimum width of any pavement repair area shall be 40 inches unless shown otherwise in the Plans. Before any excavation, the existing pavement shall be sawcut or shall be removed by a pavement grinder. Excavated materials will become the property of the Contractor and shall be disposed of in a Contractor-provided site off the Right of Way or used in accordance with Sections 2-02.3(3) or 9-03.21.

Asphalt for tack coat shall be required as specified in Section 5-04.3(4). A heavy application of tack coat shall be applied to all surfaces of existing pavement in the pavement repair area.

Placement of the crushed surfacing top course backfill shall be as specified in Section 4.04.

Placement of the HMA backfill shall be accomplished in lifts not to exceed 0.35-foot compacted depth. Lifts that exceed 0.35 foot of compacted depth may be accomplished with the approval of the Engineer. Each lift shall be thoroughly compacted by a mechanical tamper or a roller.

5-04.3(4)D Temporary HMA and Temporary Cold Mix

During the course of construction, it may be necessary to provide improved temporary vehicle and/or pedestrian access within the project limits. Such temporary access shall be provided by temporarily patching trench crossings or other areas with temporary HMA and temporary cold mix (EZ Street or Contracting Agency approved equal), until such time as the permanent surface restoration is installed. Locations shall include those areas specifically indicated on the Plans, directed by the Engineer or as further specified herein. This material will be furnished, placed, compacted, and removed and wastehauled at various locations

throughout the project. The trenches and/or subgrade shall be thoroughly compacted and brought to a smooth grade prior to placing the material. It shall be placed, maintained (daily), and removed and wastehauled by the Contractor. Typical compacted depth will be 4 inches. Temporary HMA and temporary cold mix shall also be used around castings, after grinding, to provide a transition until final lift of HMA paving is installed.

5-04.3(5) Producing/Stockpiling Aggregates and RAP

Aggregates and RAP shall be stockpiled according to the requirements of WSDOT Standard Specification Section 3-02. Sufficient storage space shall be provided for each size of aggregate and RAP. Materials shall be removed from stockpile(s) in a manner to ensure minimal segregation when being moved to the HMA plant for processing into the final mixture. Different aggregate sizes shall be kept separated until they have been delivered to the HMA plant.

5-04.3(5)A Vacant

5-04.3(6) Mixing

After the required amount of mineral materials, asphalt binder, recycling agent and anti-stripping additives have been introduced into the mixer the HMA shall be mixed until complete and uniform coating of the particles and thorough distribution of the asphalt binder throughout the mineral materials is ensured.

When discharged, the temperature of the HMA shall not exceed the optimum mixing temperature by more than 25 degrees F as shown on the reference mix design report or as approved by the Engineer. Also, when a WMA additive is included in the manufacture of HMA, the discharge temperature of the HMA shall not exceed the maximum recommended by the manufacturer of the WMA additive. A maximum water content of 2 percent in the mix, at discharge, will be allowed providing the water causes no problems with handling, stripping, or flushing. If the water in the HMA causes any of these problems, the moisture content shall be reduced as directed by the Engineer.

Storing or holding of the HMA in approved storage facilities will be permitted with approval of the Engineer, but in no event shall the HMA be held for more than 24 hours. HMA held for more than 24 hours after mixing shall be rejected. Rejected HMA shall be disposed of by the Contractor at no expense to the Contracting Agency. The storage facility shall have an accessible device located at the top of the cone or about the third point. The device shall indicate the amount of material in storage. No HMA shall be accepted from the storage facility when the HMA in storage is below the top of the cone of the storage facility, except as the storage facility is being emptied at the end of the working shift.

Recycled asphalt pavement (RAP) utilized in the production of HMA shall be sized prior to entering the mixer so that a uniform and thoroughly mixed HMA is produced. If there is evidence of the recycled asphalt pavement not breaking down during the heating and mixing of the HMA, the Contractor shall immediately suspend the use of the RAP until changes have been approved by the Engineer. After the required amount of mineral materials, RAP, new asphalt binder and asphalt rejuvenator have been introduced into the mixer the HMA shall be mixed until complete and uniform coating of the particles and thorough distribution of the asphalt binder throughout the mineral materials, and RAP is ensured.

5-04.3(7) Spreading and Finishing

The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. HMA pavers complying with Section 5-04.3(3) shall be used to distribute the mixture. Unless otherwise directed by the Engineer, the nominal compacted depth of any layer of any course shall not exceed the following:

HMA Class 1"	0.35 feet
HMA Class 3/4" and HMA Class 1/2" wearing course	0.30 feet
other courses	0.35 feet
HMA Class 3/8"	0.15 feet

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the paving may be done with other equipment or by hand.

When more than one job mix formula (JMF) is being utilized to produce HMA, the material produced for each JMF shall be placed by separate spreading and compacting equipment. The intermingling of HMA produced from more than one JMF is prohibited. Each strip of HMA placed during a work shift shall conform to a single JMF established for the class of HMA specified unless there is a need to make an adjustment in the JMF.

5-04.3(8) Vacant

5-04.3(9) Vacant

5-04.3(10) HMA Acceptance

5-04.3(10)A HMA Compaction

A pass shall be one movement of a roller in either direction. A coverage shall be as many passes as are necessary to cover the entire width being paved. Overlap between passes during any coverage, made to ensure a compaction without

displacement of material in accordance with good rolling practice, shall be considered to be part of the coverage being made and not part of subsequent coverages started.

Rolling shall commence at the lower edge and shall progress toward the highest portion, except that when compacting layers which exceed 0.25 foot in compacted thickness, and if directed by the Engineer, rolling shall commence at the center and shall progress outwards.

Asphalt concrete and asphalt concrete base shall be compacted as follows:

Initial or breakdown compaction shall consist of a minimum of 3 coverages of a layer of asphalt mixture and shall be performed with a 2 axle or 3 axle tandem roller weighing not less than 8 tons. Where the thickness of the layer of asphalt mixture is less than 0.15-foot, fewer coverages than specified above may be ordered by the Engineer if necessary to prevent damage to the layer being compacted.

The initial or breakdown compaction shall be followed immediately by additional rolling consisting of 3 coverages with a 2 axle vibratory roller weighing at least 4 tons. Coverages with the second roller shall start when the temperature of the mixture is as high as practicable, preferably above 180 F, and shall be completed while the temperature of the mixture is at or above 150 F.

Each layer of asphalt concrete and asphalt concrete base shall be compacted additionally without delay by a final rolling consisting of not less than one coverage with a steel tired finish roller. Except as otherwise provided for low rates of production, a separate finish roller will be required. A vibratory roller may be used as the finish roller provided that the vibratory roller meets the requirements for a finish roller and is operated with the vibratory unit turned off.

Rolling shall be performed so that cracking, shoving or displacement will be avoided.

Rolling, where 3 axle tandem rollers may be used as specified in this Section shall be under the control of the Engineer, but in general no 3 axle tandem roller shall be used in rolling over a crown or on warped sections when the center axle is in the locked position.

The completed surfacing shall be thoroughly compacted, smooth and free from ruts, humps, depressions or irregularities. Any ridges, indentations or other objectionable marks left in the surface of the asphalt concrete by blading or other equipment shall be eliminated by rolling or other means. The use of any equipment that leaves ridges, indentations or other objectionable marks in the asphalt

concrete shall be discontinued, and acceptable equipment shall be furnished by the Contractor.

When a straightedge 12 feet long is laid on the finished surface and parallel with the center line, the surface shall not vary more than 0.01 foot from the lower edge of the straightedge. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.02 foot are present when tested with a straightedge 12 feet long laid in a direction transverse to the center line and extending from edge to edge of a 12-foot traffic lane.

Pavement within 50 feet of a structure or approach slab may deviate from a 12-foot straightedge by 0.02 in the center line direction.

5-04.3(10)B Quality Control

As near to the commencement of paving as practical the Contractor shall submit to the Town's material laboratory a representative sample of HMA for determination of theoretical maximum density (TMD) via the Rice method. This TMD will be used for initial calibration of nuclear test gages to be used during paving.

The Town will provide on-site inspection of HMA placement and compaction.

The HMA used on the job will be sampled at three locations and additional Rice densities taken and averaged as verification of the initial nuclear gage calibration. The lower acceptable limit of compaction shall be 91 percent based on the average theoretical maximum density obtained from the three samples taken from the mix used on the job.

The completed work shall be a smooth, tight, uniform texture without voids, rock pockets or being subject to excessive tracking under traffic when cooled.

5-04.3(11) Reject Work

5-04.3(11)A Reject Work General

Work that is defective or does not conform to Contract requirements shall be rejected. The Contractor may propose, in writing, alternatives to removal and replacement of rejected material. Acceptability of such alternative proposals will be determined at the sole discretion of the Engineer.

5-04.3(11)B Rejection by Contractor

The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material. Any such new material will be sampled, tested, and evaluated for acceptance.

5-04.3(12) Joints

5-04.3(12)A HMA Joints

5-04.3(12)A1 Transverse Joints

The Contractor shall conduct operations such that the placing of the top or wearing course is a continuous operation or as close to continuous as possible. Unscheduled transverse joints will be allowed and the roller may pass over the unprotected end of the freshly laid mixture only when the placement of the course must be discontinued for such a length of time that the mixture will cool below compaction temperature. When the Work is resumed, the previously compacted mixture shall be cut back to produce a slightly beveled edge for the full thickness of the course.

A temporary wedge of HMA constructed on a 20H:1V shall be constructed where a transverse joint as a result of paving or planing is open to traffic. The HMA in the temporary wedge shall be separated from the permanent HMA by strips of heavy wrapping paper or other methods approved by the Engineer. The wrapping paper shall be removed and the joint trimmed to a slightly beveled edge for the full thickness of the course prior to resumption of paving.

The material that is cut away shall be wasted and new mix shall be laid against the cut. Rollers or tamping irons shall be used to seal the joint.

5-04.3(12)A2 Longitudinal Joints

The longitudinal joint in any one course shall be offset from the course immediately below by not more than 6 inches nor less than 2 inches. All longitudinal joints constructed in the wearing course shall be located at a lane line or an edge line of the Traveled Way. A notched wedge joint shall be constructed along all longitudinal joints in the wearing surface of new HMA unless otherwise approved by the Engineer. The notched wedge joint shall have a vertical edge of not less than the maximum aggregate size or more than ½ of the compacted lift thickness and then taper down on a slope not steeper than 4H:1V. The sloped portion of the HMA notched wedge joint shall be uniformly compacted.

5-04.3(13) Surface Smoothness

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 of the following sections of Roadway shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline:

1. roads less than 45 mph

The completed surface of the wearing course of all other sections of Roadway shall not vary more than 1/8 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline.

The transverse slope of the completed surface of the wearing course shall vary not more than 1/4 inch in 10 feet from the rate of transverse slope shown in the Plans.

When deviations in excess of the above tolerances are found that result from a high place in the HMA, the pavement surface shall be corrected by one of the following methods:

1. Removal of material from high places by grinding with an approved grinding machine; or

2. Removal and replacement of the wearing course of HMA; or

3. By other method approved by the Engineer.

Correction of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances.

Deviations in excess of the above tolerances that result from a low place in the HMA and deviations resulting from a high place where corrective action, in the opinion of the Engineer, will not produce satisfactory results will be accepted with a price adjustment. The Engineer shall deduct from monies due or that may become due to the Contractor the sum of $500.00 for each and every section of single traffic lane 100 feet in length in which any excessive deviations described above are found.

All utility castings and monuments within the existing and/or new pavement area shall be referenced by the Contractor prior to any pavement removal or planing. The Contractor shall keep a record of such references, and submit a copy to the Contracting Agency.

Existing structures and new structures shall be adjusted to the finished grade as shown on the Plans and as further specified herein. Existing boxes, rings, grates, covers, and lids shall be reset in a careful and workmanlike manner to conform to the required grades.

The new and existing utility castings and monuments shall be adjusted to grade in the following manner:

As soon as the street has been paved past each structure or casting, the asphalt concrete mat shall be scored around the location of the structure or casting. After rolling has been completed and the mat has cooled, it shall be cut along the scored lines. The structure or casting shall then be raised to finished pavement grade and the annular spaces filled as indicated on the Plans. The Contractor shall install the pavement to give a smooth finished appearance. All covers, lids, frames, and grates shall be thoroughly cleaned.

After pavement is in place, all new pavement joints shall be sealed with a 6-inch-wide strip of hot asphalt sealer. A sand blanket shall be applied to the surface of the hot asphalt sealer immediately after the placement of the sealer to help alleviate the tracking of the asphalt. The sealer shall meet the requirements of Section 9-04.2(1) of the Standard Specifications.

5-04.3(14) Planing (Milling) Bituminous Pavement

The planing plan must be approved by the Engineer and a pre-planing meeting must be held prior to the start of any planing. See Section 5-04.3(14)B2 for information on planning submittals.

Locations of existing surfacing to be planed are as shown in the Drawings.

Where planing an existing pavement is specified in the Contract, the Contractor must remove existing surfacing material and to reshape the surface to remove irregularities. The finished product must be a prepared surface acceptable for receiving an HMA overlay.

Use the cold milling method for planing unless otherwise specified in the Contract. Do not use the planer on the final wearing course of new HMA.
Conduct planing operations in a manner that does not tear, break, burn, or otherwise damage the surface which is to remain. The finished planed surface must be slightly grooved or roughened and must be free from gouges, deep grooves, ridges, or other imperfections. The Contractor must repair any damage to the surface by the Contractor’s planing equipment, using an Engineer approved method.

Repair or replace any metal castings and other surface improvements damaged by planing, as determined by the Engineer.

A tapered wedge cut must be planed longitudinally along curb lines sufficient to provide a minimum of 4 inches of curb reveal after placement and compaction of

the final wearing course. The dimensions of the wedge must be as shown on the Drawings or as specified by the Engineer.

A tapered wedge cut must also be made at transitions to adjoining pavement surfaces (meet lines) where butt joints are shown on the Drawings. Cut butt joints in a straight line with vertical faces 2 inches or more in height, producing a smooth transition to the existing adjoining pavement.

After planing is complete, planed surfaces must be swept, cleaned, and if required by the Contract, patched and preleveled.

The Engineer may direct additional depth planing. Before performing this additional depth planing, the Contractor must conduct a hidden metal in pavement detection survey as specified in Section 5-04.3(14)A.

Gutter panels, curbs, or utility structures damaged as a result of planing operations shall be replaced by the Contractor at their own expense. No additional monies will be due the Contractor for damage to curbs, gutters, or utility structures, all costs of which shall be borne by the Contractor.

5-04.3(14)A Pre-Planing Metal Detection Check

Before starting planing of pavements, and before any additional depth planing required by the Engineer, the Contractor must conduct a physical survey of existing pavement to be planed with equipment that can identify hidden metal objects.

Should such metal be identified, promptly notify the Engineer.

See WSDOT Standard Specification Section 1-07.16(1) regarding the protection of survey monumentation that may be hidden in pavement.

The Contractor is solely responsible for any damage to equipment resulting from the Contractor's failure to conduct a pre-planing metal detection survey, or from the Contractor's failure to notify the Engineer of any hidden metal that is detected.

5-04.3(14)B Paving and Planing Under Traffic

5-04.3(14)B1 General

In addition, the requirements of WSDOT Standard Specification Section 1-07.23 and the traffic controls required in Section 1-10, and unless the Contract specifies otherwise or the Engineer approves, the Contractor must comply with the following:

1. Intersections

a. Keep intersections open to traffic at all times, except when paving or planing operations through an intersection requires closure. Such closure must be kept to the minimum time required to place and compact the HMA mixture, or plane as appropriate. For paving, schedule such closure to individual lanes or portions thereof that allows the traffic volumes and schedule of traffic volumes required in the approved traffic control plan. Schedule work so that adjacent intersections are not impacted at the same time and comply with the traffic control restrictions required by the Traffic Engineer. Each individual intersection closure or partial closure, must be addressed in the traffic control plan, which must be submitted to and accepted by the Engineer, see Section 1-10.2(2).

b. When planing or paving and related construction must occur in an intersection, consider scheduling and sequencing such work into quarters of the intersection, or half or more of an intersection with side street detours. Be prepared to sequence the work to individual lanes or portions thereof.

c. Should closure of the intersection in its entirety be necessary, and no trolley service is impacted, keep such closure to the minimum time required to place and compact the HMA mixture, plane, remove asphalt, tack coat, and as needed.

d. Any work in an intersection requires advance warning in both signage and a number of Working Days advance notice as determined by the Engineer, to alert traffic and emergency services of the intersection closure or partial closure.

e. Allow new compacted HMA asphalt to cool to ambient temperature before any traffic is allowed on it. Traffic is not allowed on newly placed asphalt until approval has been obtained from the Engineer.

2. Temporary centerline marking, post-paving temporary marking, temporary stop bars, and maintaining temporary pavement marking must comply with Section 8-23.

3. Permanent pavement marking must comply with WSDOT Standard Specification Section 8-22.

4. Roadways Open to Traffic

When the roadway being paved is open to traffic, the following requirements shall apply:

The Contractor shall keep roadways open to traffic at all times except where paving is in progress. During such time, and provided that there has been an advance warning to the public, only that specified section of road being paved may be closed for the minimum time required to place and compact the HMA. Adjacent travel lanes and shoulder shall be left open for traffic during these times. In hot weather, the Engineer may require the application of water to the pavement to accelerate the finish rolling of the pavement and to shorten the time required before reopening to traffic.

Before temporarily closing a portion of the road, advance-warning signs shall be placed and signs shall also be placed clearly alerting the driver of temporary lane closures.

During paving operations, temporary pavement markings shall be maintained throughout the project. Temporary pavement markings shall be installed on the roadway prior to opening to traffic and shall be in accordance with WSDOT Standard Specification Section 8-23.

All costs in connection with performing the Work in accordance with these requirements shall be included in the unit contract prices for the various bid items involved in the Contract.

5-04.3(14)B2 Pre-Paving and Pre-Planing Briefing
(March 21, 2018 G&O GSP)

At least 2 Working Days before the first paving operation and the first planing operation, or as scheduled by the Engineer for future paving and planing operations to ensure the Contractor has adequately prepared for notifying and coordinating as required in the Contract, the Contractor must be prepared to discuss that day's operations as they relate to other entities and to public safety and convenience, including driveway and business access, garbage truck operations, transit operations and working around energized overhead wires, school and nursing home and hospital and other accesses, other contractors who may be operating in the area, pedestrian and bicycle traffic, and emergency services. The Contractor, and Subcontractors that may be part of that day's operations, must meet with the Engineer and discuss the proposed operation as it relates to the submitted planing plan and paving plan, approved traffic control plan, and public convenience and safety. Such discussion includes, but is not limited to:

1. General for both Paving Plan and for Planing Plan:

   a. The actual times of starting and ending daily operations.

   b. In intersections, how to break up the intersection, and address traffic control and signalization for that operation, including use of peace officers.

   c. The sequencing and scheduling of paving operations and of planing operations, as applicable, as it relates to traffic control, to public convenience and safety, and to other contractors who may operate in the Project Site.

   d. Notifications required of Contractor activities, and coordinating with other entities and the public as necessary.

   e. Description of the sequencing of installation and types of temporary pavement markings as it relates to planning and to paving.

   f. Description of the sequencing of installation of, and the removal of, temporary pavement patch material around exposed castings and as may be needed.

   g. Description of procedures and equipment to identify hidden metal in the pavement, such as survey monumentation, monitoring wells, street car rail, and castings, before planning, see Section 5-04.3(14)B2.

   h. Description of how flaggers will be coordinated with the planing, paving, and related operations.

   i. Description of sequencing of traffic controls for the process of rigid pavement base repairs.

   j. Other items the Engineer deems necessary to address.

2. Paving – additional topics:

   a. When to start applying tack and coordinating with paving.

   b. Types of equipment and numbers of each type equipment to be used. If more pieces of equipment than personnel are proposed, describe the sequencing of the personnel operating the types of

equipment. Discuss the continuance of operator personnel for each type equipment as it relates to meeting Specification requirements.

c. Number of JMFs to be placed, and if more than one JMF how the Contractor will ensure different JMFs are distinguished, how pavers and MTVs are distinguished if more than one JMF is being placed at the time, and how pavers and MTVs are cleaned so that one JMF does not adversely influence the other JMF.

d. Description of contingency plans for that day's operations such as equipment breakdown, rain out, and Supplier shutdown of operations.

e. Number of sublots to be placed, sequencing of density testing, and other sampling and testing.