

Olympic Region Pavement Markings Policy

DRAFT 8/20/15 Revision

PURPOSE:

The purpose of this document is to formalize the Olympic Region's policy and practices regarding pavement markings. It is not intended to be a substitute for any official WSDOT or federal manual but rather to supplement and clarify them and to answer commonly asked questions. Questions or comments can be directed to Lowell McBee (360) 704-3226

REFERENCES:

- Standard Specifications Sections 8-22 and 9-34 and Amendments
- MUTCD Part 3
- Standard Plans M section
- Olympic Region Special Provisions
- WSDOT Design Manual 1030.04 Pavement Markings

DEFINITIONS:

- **BLOCKED CROSSWALK:** Also known as "High Visibility", "Piano Key", or "Bar" type crosswalk as shown in standard plan M-15.10-01.
- **ENTRAPMENT or DROP LANE:** A thru lane that becomes a mandatory turn lane. A turn pocket is not a drop or entrapment lane.
- **NARROW PATTERN CENTERLINE:** A centerline pattern that is 12" wide when a double or single no-pass line is used. The narrow pattern is striped with two paint guns. Each gun alternates between a skip pattern and a solid (no-pass) line as no-pass zones change from one side to the other.
- **PROFILED PLASTIC LINE:** Plastic lines with bumps. Profiled lines are described in the Standard Specs. Section 8-22.3(3) and shown in Standard Plan M-20.20-01.
- **PMMA:** Profiled Methyl Methacrylate
- **RPM:** Raised Pavement Marker
- **RRPM:** Recessed Raised Pavement Marker
- **STENCIL WORK:** Crosswalks, stop lines, arrows, letters, and symbols.
- **TYPE D PLASTIC:** Methyl methacrylate (commonly referred to as durable plastic or MMA).
- **WIDE PATTERN CENTERLINE:** A centerline pattern that is 20" wide when double no-pass lines are used. The skip line (when present) is on the center of the roadway on two lane roads. The wide pattern is striped with three paint guns. Each gun paints only one type of line (skip centerline or solid no-pass line). The skip centerline is omitted in double no-pass areas.
- **WIDE-WIDE PATTERN CENTERLINE & WIDE EDGE LINES:** A centerline pattern that is 28" wide when double no-pass lines are used. The skip line (when Present) is on the center of the roadway on two lane roads and remains 4" wide. The wide-wide pattern is striped at present time using two guns and having to paint each line individually. If equipment is capable of painting with 5 guns, it would be the preferred method. The wide edge lines are striped using a two gun package either YELLOW or WHITE. At present time we have three test locations we are using these wide patterns on. They are: SR-8, SR-106 and SR-302.

DISCUSSION:

MATERIALS:

- **Definitions of plastic types** are found in Section 9-34 of the Standard Specifications.
- **Stencil Work:** Type D Plastic shall be used for all Stencil Work on all contracts except for temporary applications. Maintenance of Stencil Work will be either Type A Plastic or Type D Plastic material depending on location needs to be determined by the Region Traffic Office.
- **Drop Lanes:** All freeway drop lane arrows and traffic letters should be Type D Plastic.
- **Wide Lines:** Freeway exit gores should be Type D Profiled Plastic. See Standard Plan M-2.20-03 and M-20.20-02.
- **Wide Lines:** These are commonly used for channelization and used to separate HOV lanes. Shall be Type D plastic. Exception is test locations for wide lines.
- **Edge lines and Centerlines:** These are paint except for locations the region is testing new material or high-ware locations such as ramps. On ramps with meters existing or not expected, recesses durable (Extruded Type A Plastic) is preferred for both yellow and white edge lines. Contact Region Traffic Operations to confirm material type before installation.
- **Lane Lines:** All Multi lane freeway lane lines shall be profiled Type D Plastic supplemented with Recessed Type 2 RPM's or recessed durable (Extruded Type A Plastic). Contact Region Traffic Operations to confirm material type before installation.
- **EXCEPTION: If a project is only temporary in anticipation of another project planned to reconfigure the lanes in 3 years or less, paint should be used. The last project to complete a road section to its ultimate configuration shall install all new durable pavement marks and recessed markers.**

CENTERLINES:

- **Wide Pattern:** It is the Olympic Region policy to use the Wide Pattern Centerline also known as the three-gun pattern on all applicable highways. Use Olympic Region's GSP-CTRSTRPE.DT3 on all projects with centerline striping.
- **Narrow Pattern:** Narrow Pattern Centerline also known as the two gun package shall be used for all painted channelization. May also be used on some narrow roadway sections with Region Traffic Office approval.
- **Connecting No-Pass Zones:** if the gap between two consecutive no-pass zones in the same direction is less than 1/10 of a mile (528 feet), no-pass striping should connect the two zones. The statutory no-pass zone 100 feet in advance of intersections is typically not striped but is considered in these measurements. If a no-pass zone ends less than 620 feet before an intersection, the no-pass stripe should be extended to the intersection. A list of all No Passing Zones is maintained by Olympic Region Traffic Operations. Traffic Operations should be contacted at the end of each paving project on 2 lane highways so they can re-establish the No-passing zone in proper locations.
- **18" Yellow Barrier Lines and crosshatched channelization/median** these are illegal to cross. They should only be used if approved by the Traffic Engineer. When needed, the 18" Barrier Line (Typically 20", 5 paint guns are on simultaneously) is usually preferred over the crosshatching for maintenance reasons. An exception to this rule is that an island that is crosshatched should terminate Two Way Left Turn Lanes that lead into a double left turn pocket.
- **Centerline and Shoulder rumble strips:** Where used, centerline rumble strips should be continuous except there should be breaks for intersections and through towns. Olympic Region omits the centerline rumble strips where a RRPM would be positioned. See Standard Plan M-60.10-01 thru M-65.10-02, pages 1 & 2 and Design Manual Chapter 1600.

RPM'S USED AS POSITIONING GUIDES:

- **Type 2 RPM's:** These are used as positioning guides in addition to paint striping (see MUTCD section 3B.12) and recessed everywhere in Olympic Region except as noted below or where RPM's are used to substitute for striping (see MUTCD section 3B.14 Standard Plans M-20.50-02 and Figure 2).

The base of the markers shall have a minimum bonding surface of 14 square inches and be substantially free from gloss or substances that may reduce its bond to adhesive.

- **Where Type D Profiled Plastic Lane Lines** are used; Recessed Type 2 RPM's are used as positioning guides in all areas.
- **Spacing:** Generally shall be 80 feet for centerlines, lane lines, wide lines, and left edge lines except:
 - In lane reduction (merge) transitions and curves with radii less than 5,000' (engineering method) or requiring warning signs (maintenance method) spacing shall be 40 feet.
 - On drop lane lines, spacing should be 36'. See Figure 2
 - Wide lines spacing shall be 20'. See Standard Plan M-20.40-03.
 - Spacing in channelization shall be as shown in Standard Plan M-20.40-03.
- **Placement:** Install in line with and midway between line segments for broken types of lines, and 4 inches from the line on the "away from traffic" side for continuous types of lines. See Figure 2 and Standard Plans M-20.30-02 and M-20.40-02.
- **Recessed:** RPM's should be recessed on all highways. Exceptions are SR-102, SR-119 & SR-706.
- **Ramps:** Recessed Type 2 RPM's should be used on the left edge line of ramps.
- **Right Edge Lines:** RPM's are not normally used on right edge lines. They can be used in lane reductions or other areas approved by the Traffic Engineer.
- **Gore Areas:** Shall be recessed RPM's and wide lines shall be profiled MMA as shown in Standard Plan M-2.20-03. The wide lines around the perimeter should be PMMA and the interior chevron wide lines should be flat MMA

CROSSWALKS:

- **Replacing:** Existing crosswalks across side roads at non-signalized intersections are being evaluated for removal. Before replacing these, please check with the Traffic Operations Office.
- **Adding:** It is our policy to use crosswalks at all signalized intersections. They may be added following the Design Manual guidelines (See Chapter 1510) after consulting with the Traffic Engineer. Crosswalks across non-signalized side roads are not typically maintained unless marked for official school crossings that are signed. There is usually little value to installing crosswalks across non-signalized side roads.
- **Type:** All crosswalks should be the "Blocked" type as shown in Standard Plan M-15.10-01. Except that temporary crosswalks can be two transverse 12" lines.
- **Positioning:** When positioning crosswalks, it is critical that the pedestrians are as visible as possible to drivers who might cross the crosswalk especially right turning traffic in the nearest lane parallel to the crosswalk. This usually means placing the crosswalk as close as practical to the intersection.
- **Skewing:** Crosswalk bars within the crosswalk can be skewed to better match the roadway alignment or traffic pattern. The idea is to keep the bars out of the wheel tracks as much as possible.
- **Mid Block & Ped Islands:** Follow Design Manual guidelines (See Chapter 1510) and consult with Region Traffic Engineer.

STOP LINES:

- **Positioning:** Stop lines mark the desired stopping point. Stop lines must be a minimum of 4 feet back from the nearest edge of the intersecting traveled way or marked crosswalk (if existing). Where pedestrians are present and no crosswalk is used, the stop line should be moved 8 to 12 feet back from the intersecting roadway. At non-signalized intersections, the main consideration for stop line placement is sight distance (Sight Triangle) for the driver sitting at the stop line. The goal should be to optimize sight distance rather than go for the minimum. If sight distance would not be affected, the stop line can be moved back to allow a greater turning radius for trucks turning left in front of the stop line. Stop lines shall not be more than 30 feet from the nearest edge of the intersecting traveled way.
- **All intersecting Roads:** It is WSDOT policy to use stop lines on all intersecting publicly owned, stop sign controlled roads and all signal controlled roads.
- **Turn Pockets:** Unless a need is shown by an engineering study, stop lines should not be used in turn pockets at noncontrolled approaches to intersections.
- **Dog Legs:** For maintenance reasons stop lines should be straight and parallel to the intersecting roadway whenever possible. The practice of placing the right lane at an angle to the rest does not save enough material to justify the increased time to install and maintain it. If the throat of the intersection is extremely wide it may be advised to consider installing a marked island to separate the movements and reduce maintenance.
- **Median Crossovers:** Our standard at grade median crossover markings does not include stop lines in the medians. See Figure 1.
- **Yield Lines:** Stop line or Multi – triangle (Shark Teeth) per MUTCD 12”x18” under 45mph & 24”x36” over 45mph operation speed

LANE CONTROL ARROWS AND TRAFFIC LETTERS:

Entrapment (Drop) Lanes: Type 2 arrows and “ONLY” traffic letters are required in Entrapment Lanes (see definitions). When “ONLY” is used it shall be 8’ letter size. (See Std. Plans M-5.10-02 and M80.10-01).

- **Two way highways under 45 mph:** Drop Lane Line should extend the Wide Line upstream up to ½ mile minimum but no farther back than the previous intersection. “ONLY” traffic letters and Type 2 Arrows should be placed at the beginning of the Drop Lane Lines and 50’ before the end of the lane. In long drop lanes, additional sets of arrows and the traffic letters “ONLY” can be placed at 200’ to 300’ +/- spacing.
- **Two way highways and divided highways Over 45 mph:** Place sets of arrows and traffic letters “ONLY” spaced about 500’ to 1,000’ apart starting near the beginning of the drop lane line. The last set should be no closer than 500’ from the painted gore. On multiple lane exits where one lane has the option to exit or not, the option lane should receive a type 3 (combination) arrows in line with each type 2 (turn) arrow in the other lane(s).
- **Freeway off-ramp terminal turn lanes:** These are not considered entrapment lanes. Drivers using off-ramps should not have the expectation of their lane being a thru lane. Therefore they should receive type 2s arrows as a turn pocket. Traffic letters “ONLY” are not needed and the lane having the option of going straight or turning should receive type 3 combination arrows. However, if at the ramp terminal has multiple lanes turn right or left, “ONLY” should be used to designate the lanes on the inside of those turns which must turn.
- **Turn Pockets:** Type 2 arrows should be used in turn pockets. One arrow should be 50 feet from the end of the pocket; another should be at the beginning of the turn pocket white wide line (formerly known as gore line). In long turn pockets, additional arrows can be added at 200’ to 300’± spacing. Traffic letters “ONLY” should not be used in turn pockets
- **Straight “Pull thru” (type 1) arrows** are normally not needed. Use only when additional clarification is helpful to drivers.

- **Wrong Way Arrows:** Two wrong way arrows (Type 5) should be used in each lane on all freeway off ramps and prior to at grade intersections on divided highways. One should be 50 feet from the intersection or stop line, the other approx. 200 feet further upstream. When used, lane use (Type 2 – 4 arrows) substitute for wrong way arrows.

LANE REDUCTION (MERGE) ARROWS:

- **New Arrow Design:** See Standard Plan M-24.20-02 and M-24.40-02 for new lane reduction (merge) arrows. M-24.20-02 is for use prior to lane reduction transitions on mainlines (high-speed roadways). M-24.40-02 is for use in acceleration lanes, lane reductions on ramps, and other slower-speed locations. Type 1 or Type 5 arrows shall not be used for “merge” arrows. Please specify Type 6 arrows in contract plans.
- **Where to use:** Lane Reduction Arrows are not required at every lane reduction. They are warranted in the following cases:
 - Multiple consecutive lane reductions.
 - Consider use where the shoulder past the transition is less than 10 foot.
 - Where geometrics limit sight distance to the transition.
 - Where other distractions are likely to cause drivers to miss the lane reduction signs.
- **Acceleration Lanes:** These should not automatically receive arrows. The only situation requiring arrows would be long acceleration lanes a driver may mistake as a thru lane. Most acceleration lanes are generally short and do not require merger arrows or lane reduction signs. The expectation would be drivers should use this as a refuge area to merge when it is safe to do so.

DOTTED EXTENSIONS LINES:

- **Where to use:** Any line can be extended through an intersection with a dotted extension line if needed.
 - Edge line extensions can be used where needed to clarify situations such as an extra wide intersection on the outside of a curve or an intersecting roadway at the beginning of a curve that is tangent to the highway so as to give the appearance that the highway goes straight. Illumination usually solves these problems without the need for line extensions. See figure 3 or contact Lowell McBee (360) 704-3226 for the current list of intersections that have been approved for edge line extensions.
 - Edge line extensions are required across at-grade median crossings (see figure 1) and entrances to roundabouts.
 - Centerline or lane line dotted extensions can be used through offset intersections.
 - The line between multiple turn lanes shall be extended through the intersection.
- **Materials:** Where used, edge line extensions shall be Type D Plastic.
- **Intervals** shall be a 2-foot line with a 6-foot gap except for roundabouts and at-grade median crossings, where the interval shall be a 2-foot line with a 3-foot gap.
- **Width and color:** Shall match the line being extended. Exception: For at-grade median crossings the line being extended is the yellow edge line rather than the white wide line.

MILE AND HALF-MILE SHOULDER MARKS:

- **Where to use and Accuracy:** Some existing marks are no longer needed.
- Tolerance between marks is $\pm 10'$. Courses should be re-measured after paving. Call Keith Kirkendall at (360) 704-3235 for assistance or with questions.

ADDITIONAL ITEMS:

- **Multiple Turn Lanes:** The line between the turning lanes should be a Lane Line. The line separating mandatory turn lanes from thru or option lanes should be an 8-inch solid line (Wide Line). See Standard Plans M-3.50-02 and M-5.10-02.

- **Right Turn Channelization:** The wide line for right turn pockets should not exceed 300 feet. If a longer line is needed, the 300' wide line should be extended back with a drop lane line. See Standard Plan M-5.10-02.

This policy is approved:

Steve Kim, Date
Region Traffic Engineer

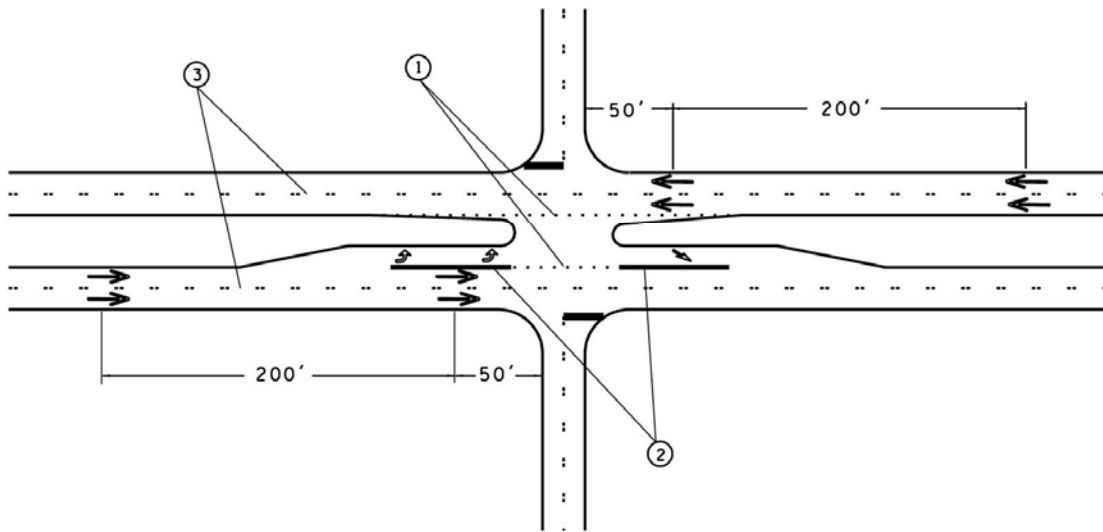
Troy Cowan, Date
Asst. Region Administrator for Maintenance & Operations

John Wynands, Date
Asst. Region Administrator for Project Development

STANDARD MEDIAN CROSS-OVER PAVEMENT MARKING

NOT TO SCALE

- ① Yellow plastic dotted extension line (4" line x 2' w/3' gap)
This dotted extension line is needed for all applications.
- ② White plastic wide line. (8" line)
- ③ Skip lane line



NOTE:

- ☞ Turn pockets <100' require only one arrow.
- ☞ Turn pockets >600' can have 3 or more arrows. (Spacing at 200'-300')
- ☞ Lane reduction arrow(s) only required if transition is obscured or to solve operational problems.

FIGURE 1

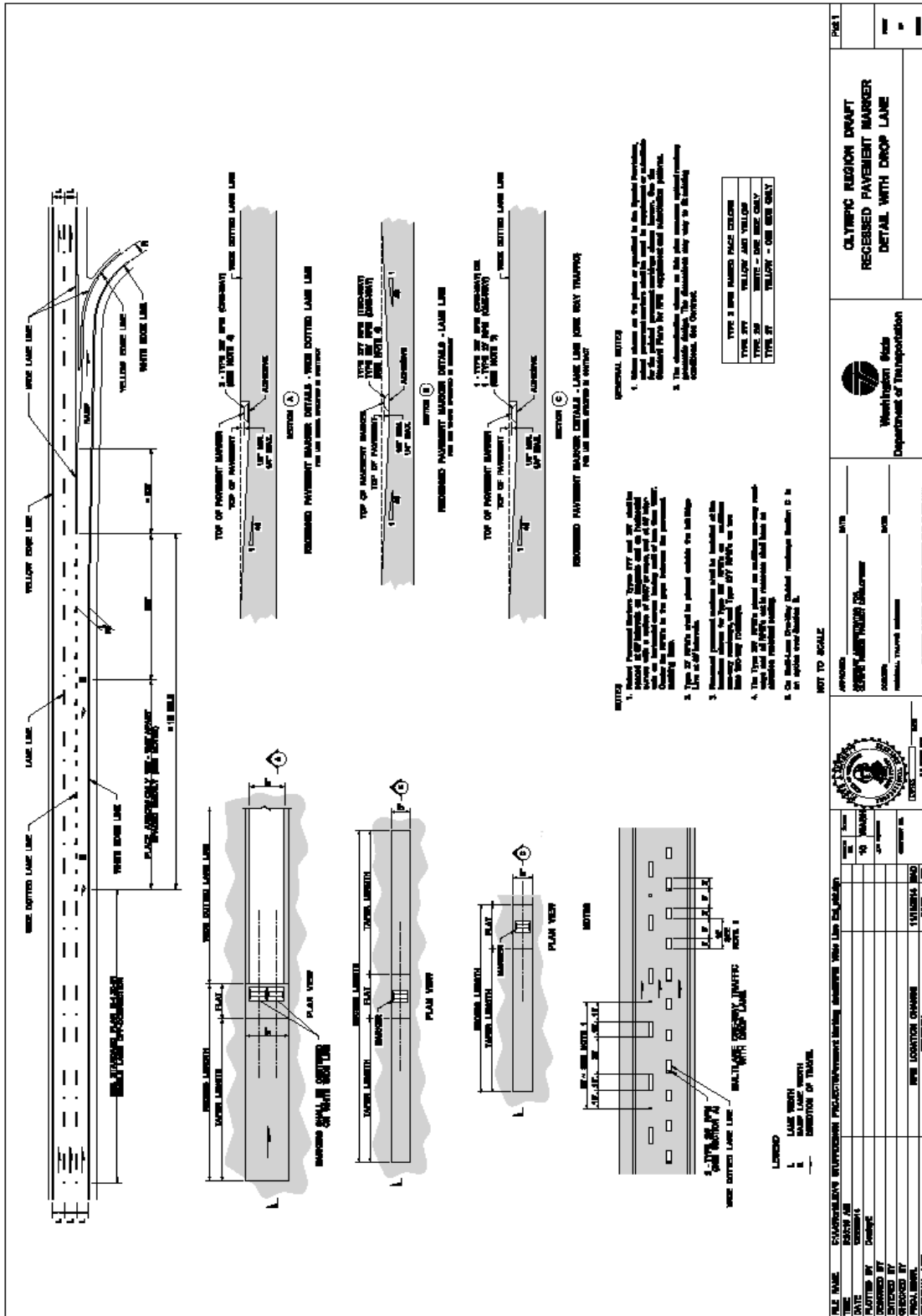


FIGURE 2

Figure #3 – Edge Line Extensions

SR	MP	INTERSECTION	SR	MP	INTERSECTION
3	21.23	North Bay Rd.	101	193.38	WEIGH STA
3	45.30	NB OFF RAMP TO KITSAP MALL BLVD	101	193.96	WHITCOMB DIMMEL RD
3	52.41	NB OFF RAMP TO SR305	101	198.71	BEDROCK RD
3	53.21	R1 SB OFF RAMP TO SR 305	101	203.86	BURNT MTN RD (DNM)
			101	213.01	SNIDER RD
5	88.61	SB OFF TO SR12/GRANDMOUND	101	218.53	EXTENSIONS FOR TRK CLIMB LN
5	88.17	NB OFF TO SR12/GRANDMOUND	101	221.07	EXTENSIONS FOR TRK CLIMB LN
5	111.00	NB OFF RAMP @ GALAXY DR R/A BYPASS	101	224.41	EXTENSIONS FOR TRK CLIMB LN
			101	239.75	EXTENSIONS FOR TRK CLIMB LN
8	0.89	S. UNION RD. / FAIRGROUNDS RD.	101	267.43	PALO ALTO RD
8	2.42	HEISE RD	101	272.50	EXISTING EXTENSIONS " FTCLN"
8	4.46	MCKNIGHT RD	101	274.66	EXISTING EXTENSIONS " FTCLN"
8	6.03	SR 108 / CO RD.	101	275.75	OLD GARDINER HWY
8	9.00	MOX CHEHALIS RD E	101	292.75	LORDS LAKE LOOP RD
8	10.08	COOPER RD	101	296.10	PENNY CREEK RD
8	13.41	SUMMIT LAKE RD	101	309.99	DUCKABUSH RD
8	15.41	KENNEDY CREEK RD SW	101	351.6	FREDSON RD/RYAN RD
8	16.12	SUMMIT LAKE RD/ROCK CANDY MT RD	101	355.31	HURLEY WALDRIP RD
8	17.56	WINSLOW DRIVE NW / WILSON RD NW	101	356.00	OLD OLYMPIC HWY
8	19.91	OLD OLYMPIC HWY SW	101	357.07	OLD OLYMPIC HWY
			101	358.10	HOLIDAY VALLEY DR
12	2.95	LAKE ABERDEEN RD			
12	7.76	CLEMONS RD	104	16.82	RAINIER AVENUE
12	7.81	CLEMONS RD			
12	7.86	CLEMONS RD	109	3.67	BROADWAY HILL RD
12	8.16	ALDER GROVE DR / W WYNOOCHEE	109	13.34	BURROWS RD
12	12.51	MONTE BRADY RD. / MEDIAN X RD	109	18.04	PACIFIC BLVD/SECOND AVE
12	14.76	MONTE BRADY RD. / MEDIAN X RD	109	21.09	BENNER RD
12	16.38	4TH ST / KEYS RD. / MEDIAN X RD	109	21.29	COPALIS BEACH RD
12	18.11	SCHOUWEILER RD / MEDIAN X RD	109	31.59	SECOND ST
12	20.46	W.B. OFF TO 3RD ST			
12	27.22	PORTER CRK RD. / PORTER CRK RD W	115	0.37	DAMON RD
12	46.37	OLD HWY 99 SW / SARGENT RD SW			
			116	2.92	NAVAL STATION
101	83.17	W. CURTIS ST / SCOTT ST.	116	4.79	ROBBINS RD
101	83.78	G ST. / WISHKAH ST.			
101	84.30	ALDER ST. / W. WISHKAH	303	5.43	BROWNSVILLE HWY WYE CONN
101	88.40	22ND ST	303	5.86	GLUD RD WYE CONN
101	90.31	OLD STATE 9			
101	90.60	WEIGH STA	305	12.82	BOND RD/307
101	90.72	WEIGH STA			
101	102.10	POLSON CAMP RD (DNM)	507	6.62	FLUMERFELT RD
101	106.50	BOWES RD (DNM)	507	6.87	CONNER RD
101	108.40	E HUMPTULIPSRD (DNM)	507	16.77	OLD MILITARY RD SE
101	110.00	MCNUTT RD (DNM)	507	35.98	WATER & MCNAUGHT
101	176.82	EXTENSIONS FOR TRK CLIMB LN			
101	177.30	OIL CITY RD (DNM)	510	12.90	SOUTHWORTH ELEM. SCHOOL
101	178.50	UPPER HOH RD (DNM)	510	13.50	MUD RUN RD