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March 21, 2012 LTR – 2320

Tim Dillon, Councilmember
Town of Yarrow Point
4090 95th Avenue Northeast
Yarrow Point, WA 98004

RE: 92nd Avenue Northeast Interchange

Dear Councilmember Dillon,

Thank you for your recent questions about the 92nd Avenue Northeast roundabout interchange. This letter responds to issues you raised on March 2 and 13 regarding bicycle safety and community design.

Bicycle safety and the 92nd Avenue Northeast Roundabout

WSDOT is familiar with the 2008 Belgium case study which you referenced as evidence suggesting that roundabouts raise the severity of injury crashes for bicycle users. This study looked at 90 roundabouts constructed between 1994 and 2000 in Flanders, Belgium. Similar information specific to bicycle safety was shared with US designers as part of the Federal Highway Administration (FHWA) publication titled: *Roundabout: An Informational Guide*, published in June 2000, which cautioned states not to adopt international designs as they related to roundabout bicycle facilities in many parts of Europe.

Our current design manual guidelines have been informed and developed by both national and international experiences, including the referenced 2008 report.

In your March 2, 2012 email to me, you referenced several statements from FHWA's June 2000 *Roundabout: An Informational Guide*. You indicated that these factors should result in WSDOT not building a roundabout at this location. The referenced statements are listed below in italics with your additions in bold; my responses follow.

1) *Heavy pedestrian or bicycle movements in conflict with high traffic volumes that might require supplemental traffic control (e.g., signals).* ***The 92nd interchange meets these criteria.***

   The 92nd Avenue Northeast interchange does not have high motor vehicle, pedestrian and bicycle volumes. On an average weekday in 2010, we saw about 5,500 users in the

intersection, including motor vehicles, pedestrians and bicycles; in 2030, we expect to see about 6,000 users in the intersection. Of these, pedestrians and bicycles are estimated to be 1 to 3 percent of all traffic. The total projected volume represents about 30 percent of the available capacity in the roundabout during the peak period.

The project will improve pedestrian access as part of the new roundabout. The western portion of the roundabout is expected to have the highest pedestrian volumes, with easiest access to the bus stop on the western portion of the new lid. Our analysis shows that pedestrians will have enough time to cross the roundabout legs safely.

2) *Intersections where an unacceptable delay to the major road could be created. Roundabouts introduce some delay to all traffic entering the intersection, including the major street.* ***The 92nd interchange meets this criteria.***

The 92nd Avenue Northeast roundabout will not introduce unacceptable delay to the intersection. It currently operates at a level of service (LOS) A – this is the best level at which an intersection can operate. Our forecasts show that with the roundabout in 2030, it will continue to operate at LOS A.

The existing interchange (as analyzed in 2008) operates with total intersection delays of 7.4 seconds during the AM peak and 6.6 seconds during PM peak. Based on our 2030 forecast, the roundabout will operate with delays of 6.8 seconds and 6.4 seconds for AM and PM peaks, respectively. The table below shows existing and 2030 level of service and intersection delay projections for the 92nd Avenue Northeast intersection. The table, included in the roundabout justification report performed as part of our design analysis, reports data for both stop-control and roundabout scenarios.

92nd Avenue Northeast Intersection Analysis (AM and PM peak hours)

Intersection type	Period	*Total*		Westbound off-ramp		92nd Ave NE northbound		NE 33rd St		92nd Ave NE southbound		NE Points Drive	
		LOS	*Delay (sec)*	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
2008 2-way stop *(off-ramp, NE 33rd St)*	**AM**	*A*	*7.4*	B	14.3	A	1.0	A	9.3	A	0.0	n/a	n/a
	PM	*A*	*6.6*	B	13.3	A	0.6	A	10.0	A	0.0	n/a	n/a
2030 2-way stop *(off-ramp, NE 33rd St)*	**AM**	*A*	*8.3*	C	15.2	A	1.0	A	9.3	A	0.0	n/a	n/a
	PM	*A*	*7.9*	C	15.9	A	0.6	B	10.3	A	0.0	n/a	n/a
2030 1-lane roundabout	**AM**	*A*	*6.8*	A	9.1	B	11.5	B	12.0	A	9.4	B	10.3
	PM	*A*	*6.4*	A	9.7	B	11.2	B	11.3	A	9.5	B	10.9

Note: LOS = level of service.

3) *Intersections with highly unbalanced traffic flows (that is, very high traffic volumes on the main street and very light traffic on the side street) and isolated intersections in a network of traffic signals often are not ideal candidates for roundabouts.* ***The 92nd interchange meets this criteria.***

   The volumes of individual legs at the 92nd Avenue Northeast roundabout will be too low to have an adverse impact on the overall intersection operations. As noted in response #1, the 92nd Avenue Northeast intersection traffic volumes are projected to be low as compared to the available capacity – projected 2030 volumes represent about 30 percent of the available capacity. Because the volumes on each of the legs are anticipated to be low and the number of available gaps for traffic to enter the roundabout will be high, the roundabout will operate well within the state operational guidelines. As noted in response #2, the overall intersection level of service will be LOS A.

4) *Intersection skew, grades or unfavorable topography, etc., that make it politically or economically infeasible to construct a roundabout.* ***The 92nd interchange meets this criteria.***

   The 92nd Avenue Northeast roundabout design incorporates recommendations set forth in the state design manual and federal design guidelines (American Association of State Highway and Transportation Officials Green Book). It does not have any geometric design exceptions or deviations for vertical grades, sight distance or horizontal alignment.

   In fact, the irregular intersection configuration present today – a two-way stop-control intersection with a fifth leg approach immediately adjacent – was one of the reasons for considering a roundabout in the first place. Building a roundabout in this location allows us to consolidate the five approaching legs and at the same time reduce the number of vehicle conflict points. The attached graphic illustrates vehicle conflict points in the existing interchange and the roundabout. The roundabout favorably eliminates all vehicle crossing locations and reduces the total number of conflict points.

The 2008 Belgium case study which you referenced, examines intersections and traffic conditions which are quite different from those at the 92nd Avenue Northeast interchange. Comparing the European bicycle roundabout data with that of the United States should be done with caution since bicycles represent a significantly higher mode share of traffic volumes in Europe. In the case of the 92nd Avenue Northeast roundabout, we have conditions where vehicle volumes are low and roundabout operating speeds are lower relative to European examples. In addition the 92nd Avenue Northeast roundabout incorporates many of the accepted policies to provide for safe pedestrian and bicycle usage such as:

- Avoiding bike lanes on the outer edge of circulatory roadway.

- Allowing bicyclists to mix with vehicle traffic without any separate facility in the circulatory roadway when traffic volumes are low.
- Allowing for separated paths that will provide the options for walking bicycles through the roundabout (local usage) as well as a grade-separated bicycle tunnel crossing under 92nd Avenue Northeast (regional usage).
- Limiting the speed for circulating vehicles to 15 to 20 miles per hour.

To summarize, the 92nd Avenue Northeast roundabout will have relatively low user volumes, will operate at a high level of service, and effectively limits the number of user conflict points. We are confident that it will be an effective design for the full range of users.

Community Design

As Dave Dye wrote in his September 21, 2011 letter to Mayor Cooper, WSDOT works very hard to meet community goals and objectives as we develop and implement our projects across the state. Context sensitive design is an ethic we have embraced and have worked hard to apply in this corridor.

WSDOT has partnered for many years with Yarrow Point and the three other Points communities – Clyde Hill, Hunts Point and Medina – as well as Bellevue and Kirkland. SR 520 community design processes date back to 2006 and include the following efforts:

- January to June 2006: Design Advisory Group
    - Six workshops with representatives from all SR 520 communities on the Eastside and the west side, including Yarrow Point representatives.
    - Identified thematic zones and aesthetic opportunities within the corridor.
    - Developed Corridor Aesthetics Handbook.

- April to August 2007: Jurisdiction Design Collaboration
    - Four workshops with mayors and staff from Eastside cities and towns, including Yarrow Point.
    - Developed consensus on Eastside interchange alignments and major community features.
    - Studied, vetted and adopted a roundabout at the 92nd Avenue Northeast interchange.

- September 2008 to March 2009: Eastside Community Design Collaboration
    - Six workshops with Eastside community members and jurisdictions, again including Yarrow Point.
    - Held additional technical and jurisdictional meetings.
    - Fulfilled three goals:
        - Built upon vision and themes identified in previous processes.
        - Identified preferences for aesthetic character of key design elements.

        - Selected preferred palettes for landscape character, architectural elements, and wall treatments.
    - Outcomes codified in Eastside Urban Design Criteria report, a contractual document included in the Eastside project request for proposals.

- March and April 2011: Eastside Corridor Constructors Urban Design Process
    - Three meetings with Eastside elected officials and residents to provide input on final lid designs.

The 92nd Avenue Northeast interchange was initially studied during the 2007 Eastside Jurisdictional Design Collaboration as a solution to two independent challenges in the interchange area:

1) How to replace and upgrade the existing drop-off function at 92nd Avenue Northeast; and
2) How to safely and efficiently move traffic, including bicyclists and pedestrians, through a five-point intersection and ensure safe access to the expanded lid-top kiss-and-ride?

During the 2007 Eastside Jurisdictional Design Collaboration process, WSDOT teamed with the local jurisdictions and their independent design consultant. Working together, we developed a roundabout design as an effective solution to those two challenges. The proposal was studied and accepted by the Jurisdictional Design Collaboration team, then vetted through public engagement and environmental analysis.

The roundabout design was subsequently included in public presentations about the interchange that we've provided since fall 2007. It was developed and supported through multiple community and jurisdictional design committees, included in preliminary design and environmental scoping, and incorporated into two key environmental documents: the Environmental Assessment, published in December 2009, and the Finding of No Significant Impacts, published in May 2010.

During those critical decision-making milestones, WSDOT consistently received support for the roundabout design, which was highlighted and discussed in project scoping meetings, open houses, Yarrow Point council meetings, other Eastside council meetings, as well as through mailings to the communities and materials published on the WSDOT website. In fact, we didn't hear of opposition to the plan until July 2011.

The Eastside project has benefitted from intensive community design workshops and regular public input at open houses, environmental hearings and briefings. Each major design milestone was accompanied by public meetings and briefings to city and town councils. Since 2006, we've presented project plans, including lid and interchange designs as noted below:

- 70 community events.
- Seven public open houses—including two environmental hearings.
- 29 Eastside city and town council briefings—including six to Yarrow Point.

As noted above, WSDOT has been working diligently with the Town of Yarrow Point for many years, including working in good faith with the Town since last summer to respond to your request to modify the configuration of the 92nd Avenue Northeast interchange. As a result of this latest coordination process, we offered the Town an opportunity to become a financial partner with WSDOT to alter the design of the interchange. I understand the Town recently voted against this option, resulting in WSDOT moving forward with the planned roundabout design.

Sincerely,

Julie Meredith

Julie Meredith, P.E.
Director, SR 520 Program
Washington State Department of Transportation

Encl: Comparison of intersection conflict points

Cc: Marty Loesch, Governor's Chief of Staff
Sen. Mary Margaret Haugen
Sen. Rodney Tom
Rep. Judy Clibborn
Rep. Ross Hunter
Rep. Larry Springer
George Martin, Mayor of Clyde Hill
Fred McConkey, Mayor of Hunts Point
Michael Luis, Mayor of Medina
Paula Hammond, WSDOT Secretary
Dave Dye, WSDOT Deputy Secretary
Jerry Lenzi, WSDOT Assistant Secretary
Mike Cotten, WSDOT, SR 520 Construction Director