



**Avon I-90 Access Study
Addendum #1 to Planning Study Report
January 23, 2007**

Introduction

In 2001, studies conducted for the *City of Avon Master Plan* recommended construction of a new interchange just east of the Nagel Road overpass. In 2004, the City of Avon hired TranSystems to begin a planning study for the proposed project. The planning study was designed to involve a large group of stakeholders and consider whether a new access point to I-90 was needed and, if so, where it should be located. The results, including public and stakeholder input, were documented in the *Avon I-90 Access Study Planning Study Report, April 14, 2006*. This report is on file at the City of Avon and NOACA offices.

Technical analyses and community input during the Planning Study resulted in two basic needs for the proposed project:

- Provide adequate access to I-90
- Support growth consistent with existing land use plans

As documented in the *Planning Study Report*, these needs arise from the current growth of traffic in the City of Avon and existing congestion at existing I-90 access points at SR 83 and Crocker Road. Between these existing interchanges, north of I-90, is the primary industrial area for the City of Avon that is zoned office and manufacturing in Avon's Master Plan. This area includes many existing and expanding businesses, along with a large area of currently developing land.

Several alternatives were evaluated to address these needs. The planning study evaluated the No Build Alternative, the Upgrade Existing Interchanges Alternative, and four possible new interchange alternatives between the existing interchanges at SR 83 and Crocker Road. Based upon technical results, a comparison of impacts (based upon literature review level environmental information along with property impacts), and public comments, the planning study recommended that a new interchange be pursued and that the Nagel Road location was preferable. The Nagel Road location was chosen because it met the traffic and access needs while having the least property impacts, including having the fewest number of residences in close proximity to the interchange and associated roadways. (Please refer to *Planning Study Report* for more information.)

As documented in the *Planning Study Report*, benefits of the project include improved Levels of Service for traffic accessing the study area, reductions in traffic volumes at currently congested intersections on SR 83 and Crocker Road, and shorter travel routes for the manufacturing area.

Completion of the planning study only answered the questions of whether the community consider pursuing a new interchange and the approximate location to evaluate for this new interchange. Additional studies are required to fulfill NOACA, ODOT, and FHWA requirements for new access points on the interstate system, regardless of funding source.

In the “Next Steps” chapter of the *Avon I-90 Access Study Planning Study Report, April 14, 2006*, it was noted that additional preliminary engineering and traffic studies are required to resolve the limits and configuration of the proposed design. The purpose of this memo is to provide the results of the updated traffic analyses performed since completion of the Planning Study Report.

Updated Traffic Volumes

During the Planning Study, the project team, City of Avon and NOACA agreed to utilize traffic volumes developed from NOACA’s most recent Travel Demand Model (TDM) for the purpose of assessing needs and for evaluating conceptual alternative solutions. Because NOACA’s travel demand model volumes do not allow for any substantial growth in Avon’s industrial and office zones north of I-90, it was noted publicly that the traffic volumes were useful for comparing options and the changes in travel patterns, but that the absolute volumes were expected to be higher.

With the proposed expansions of Henkel Industries and developments under consideration by major land owners in the area that are not accounted for in the NOACA model, ODOT and FHWA approvals of a new access point require that these higher volumes are accounted for in the Interchange Justification Study (IJS) and also reflected in the proposed design.

Since completion of the Planning Study, the project team has worked with NOACA and ODOT’s Offices of Technical Services and Roadway Engineering Services to resolve the opening day and design year traffic volumes used for the IJS and for the analyses of potential design configurations.

Process. TranSystems collected turning movement counts for most of the intersections in the study area in April 2004, August 2005 and May 2006. Traffic counts were collected on Tuesdays, Wednesdays, and Thursdays to get an accurate representation of normal morning and afternoon peak hour traffic. Traffic for intersections was collected using manual turning movement counts as well as tube counts with portable machine counters. Manual turning movement counts at selected intersections were collected between the hours of 7:00-9:00 a.m. and 4:00-6:00 p.m. Tube counts were collected over a 24-hour period on selected roadway sections.

Due to the number of intersections in the study area and the availability of recent traffic studies, TranSystems utilized traffic counts and projections from previously accepted traffic studies for the Jaycox & Detroit, Jaycox & Chester and Nagel & Avon intersections. The traffic counts or projections were then adjusted to year 2006 counts by multiplying by 2% per year to account for traffic growth. These traffic projections, combined with the 2004-2006 traffic counts collected by TranSystems, served as the base-year or “Current Year” traffic data for analyses.

NOACA provided their Travel Demand Model (TDM) with a base year run for 2006 plus No Build and Build runs for 2030. The 2030 model runs included new trip tables for proposed developments in the study area. The No Build run included proposed development on SR 83 north of Chester Road and on Nagel Road north of Chester Road. The Build run included the same developments plus a small area of commercial development surrounding the proposed interchange. Using NOACA’s TDM, ODOT’s Office of Technical Services prepared certified traffic for 2010 (Opening Year) and 2030 (Design Year) in both No Build and Build conditions. 2010 traffic was developed with a straight-line interpolation between 2006 and 2030 volumes, so only some of the proposed development is included in Opening Year traffic.

Results. The resulting traffic volumes for Build and No Build conditions are included as Attachment A and summarized in the Table 1 below. These traffic results indicate that the proposed project will have the following impacts on Average Daily Traffic Volumes on key routes in the area:

- Reduce traffic volumes on Crocker Road and SR 83 north of I-90
- Reduce traffic on the highest volumes sections of Detroit Road
- Increase volumes on Detroit Road between Jaycox and Nagel Roads
- Increase traffic on Jaycox Road, while reducing traffic on Nagel Road south of Detroit

Traffic Analyses

TranSystems utilized the updated traffic volumes and Highway Capacity Software (HCS+) to revisit the Level of Service (LOS) calculations performed during the Planning Study. Level of Service is a measure of congestion, with LOS A being the best and LOS F being the worst. For the NOACA planning area, LOS D is considered acceptable for peak-hour Level of Service. Therefore, any locations that function at LOS E or LOS F are considered to have unacceptable levels of congestion.

Process. Using the 2030 certified traffic volumes provided by ODOT, TranSystems performed Highway Capacity Analyses using Highway Capacity Software (HCS+) for signalized intersections, unsignalized intersections, freeway ramps and freeway segments within the study area. At the ramp terminal intersections, the signalized HCS+ analyses identified traffic movements that have a volume to capacity (v/c) ratio of greater than 1.00, indicating a situation that constrains traffic flow onto the freeway ramps and segments. TranSystems determined the constrained volume on the entrance ramps and performed HCS+ ramp and freeway analyses using those constrained volumes.

No Build. No Build analyses were performed using existing lane configurations, interchange layout and number of freeway lanes with the 2030 certified traffic volumes. The results are shown on Table 1 on the following page. The No Build analyses indicate substantial congestion at:

- Eastern SR 83 intersection with Chester Road
- SR 83 intersection with I-90 westbound ramps
- SR 83 intersection with I-90 eastbound ramps
- Nagel Road intersection with Chester Road
- Nagel Road intersection with Avon Road

In the adjacent community of Westlake, substantial congestion is indicated at:

- Crocker Road intersection with Clemens Road
- Crocker Road intersection with I-90 westbound
- Exit from I-90 westbound to Crocker Road ramp

Build. Build analyses in the proposed interchange area incorporate lane configurations and ramp configurations that provide a minimum of LOS D. This also includes proposed improvements at the intersections of Nagel & Chester Roads and Nagel & Detroit Roads. A conceptual layout of the project is included as Attachment B. In addition, the analyses of ramp intersections at SR 83 include improvements to reach LOS D. The results are shown on Table 1 below.

Table 1: 2030 Capacity Analyses

Location	2030 No Build		2030 Build		Location
	AM	PM	AM	PM	
Signalized Intersections					Signalized Intersections
SR 83 & Chester (east)	27.8 C	58.0 E	24.1 C	36.3 D	SR 83 & Chester (east)
SR 83 & Chester (west)	36.0 D	40.5 D	33.4 C	37.6 D	SR 83 & Chester (west)
SR 83 & I-90 WB	52.0 D	124.6 F	27.9 C*	37.6 D*	SR 83 & I-90 WB
SR 83 & I-90 EB	153.8 F	66.8 E	40.6 D*	30.5 C*	SR 83 & I-90 EB
SR 83 & Detroit	40.3 D	42.4 D	37.2 D	39.5 D	SR 83 & Detroit
Jaycox & Chester	17.7 B	24.0 C	19.1 B	32.9 C	Jaycox & Chester
Jaycox & Detroit	12.2 B	14.9 B	12.8 B	21.6 C	Jaycox & Detroit
Nagel & Chester	296.2 F	432.8 F	33.5 C*	37.7 D*	Nagel & Chester
Nagel & I-90 WB			24.4 B	40.8 D	Nagel & I-90 WB
Nagel & Avon/I-90 EB			32.1 C	30.2 C	Nagel & Avon/I-90 EB
Nagel & Detroit	18.9 B	40.3 D	13.0 B*	44.8 D*	Nagel & Detroit
Crocker & Clemens	137.3 F	156.8 F	72.3 E	67.3 E	Crocker & Clemens
Crocker & I-90 WB	48.4 D	141.2 F	36.3 D	118.0 F	Crocker & I-90 WB
Crocker & I-90 EB	54.7 D	36.5 D	32.9 C	25.4 C	Crocker & I-90 EB
Crocker & Detroit	40.3 D	52.3 D	35.8 D	45.5 D	Crocker & Detroit
Unsignalized Intersections					Unsignalized Intersections
Nagel & Chester	339.37 F	614.77 F			Nagel & Chester
Nagel & I-90 WB					Nagel & I-90 WB
Nagel & Avon	WB=112.6 F	WB=389.5 F			Nagel & Avon
Freeway Segments					Freeway Segments
EB I-90 SR 611 to SR 83	19.4 C	14.7 B	19.7 C	14.6 B	EB I-90 SR 611 to SR 83
EB I-90 SR 83 to Crocker	21.4 C	14.9 B	24.9 C	16.5 B	EB I-90 SR 83 to Nagel
			22.4 C	15.2 B	EB I-90 Nagel to Crocker
EB I-90 Crocker to SR 252	26.7 D	17.0 B	29.3 D	18.0 B	EB I-90 Crocker to SR 252
WB I-90 SR 252 to Crocker	14.4 B	31.6 D	15.0 B	30.9 D	WB I-90 SR 252 to Crocker
WB I-90 Crocker to SR 83	11.5 B	23.0 C	11.9 B	22.5 C	WB I-90 Crocker to Nagel
			12.8 B	24.9 C	WB I-90 Nagel to SR 83
WB I-90 SR 83 to SR 611	11.5 B	19.6 C	12.0 B	21.2 C	WB I-90 SR 83 to SR 611
Ramp Merges					Ramps
SR 83 EB entrance	25.6 C	18.5 B	29.9 D	20.6 C	SR 83 EB entrance
SR 83 EB exit	24.1 C	19.4 B	24.2 C	18.9 B	SR 83 EB exit
SR 83 WB entrance	14.5 B	22.1 C	14.8 B	23.8 C	SR 83 WB entrance
SR 83 WB exit	15.7 B	28.4 D	17.3 B	30.0 D	SR 83 WB exit
Nagel EB entrance			24.0 C	17.4 B	Nagel EB entrance
Nagel EB exit			26.1 C	18.4 B	Nagel EB exit
Nagel WB entrance			15.5 B	27.9 C	Nagel WB entrance
Nagel WB exit			13.0 B	24.0 C	Nagel WB exit
Crocker EB entrance	30.2 D	20.0 B	32.1 D	20.9 C	Crocker EB entrance
Crocker EB exit	26.0 C	19.4 B	26.6 C	19.5 B	Crocker EB exit
Crocker WB entrance	14.9 B	26.0 C	15.1 B	25.5 C	Crocker WB entrance
Crocker WB exit	20.1 C	35.1 E	20.7 C	34.9 D	Crocker WB exit

* Locations with intersection improvements.

Acceptable Levels of Service may be obtained with construction of the new interchange combined with the following intersection improvements:

Table 2: 2030 Build Improvements Required to meet LOS D

Intersection		Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
SR 83 & I-90 WB	Existing	1 Lt, 2 Th	1 Th, 1 Th/Rt	--	1 Lt/Th, 1 Rt
	Proposed	no change	2 Th, 1 Rt	--	1 Lt, 1 Lt/Th/Rt, 1 Rt
SR 83 & I-90 EB	Existing	1 Th, 1 Th/Rt	1 Lt, 2 Th	1 Lt, 1 Rt	--
	Proposed	2 Th, 1 Rt	no change	2 Lt, 2 Rt	--
Nagel & Chester	Existing	1 Lt/Th/Rt	1 Lt/Th/Rt	1 Lt/Th/Rt	1 Lt/Th/Rt
	Proposed	1 Lt, 1 Th, 1 Th/Rt	1 Lt, 1 Th, 1 Th/Rt	1 Lt, 1 Th/Rt	1 Lt, 1Th/Rt
Nagel & Detroit	Existing	1 Lt, 1 Th/Rt	1 Lt, 1 Th/Rt	1 Lt, 1 Th/Rt	1 Lt, 1 Th/Rt
	Proposed	no change	no change	1 Lt, 1 Th, 1 Rt	1 Lt, 1 Th, 1 Rt

It should be noted that the final design configuration for the Nagel corridor in the vicinity of the interchange, as well as the associated intersection improvements, will be coordinated with ODOT's Office of Roadway Engineering Services, adjacent communities, and the public before it is finalized.

The City of Westlake previously identified the need to reconstruct the Crocker Road interchange, however they have not yet funded this improvement due to competing priorities. Although no improvements to the Crocker Road interchange are proposed as a part of this project, some improvement in the Level of Service and/or delay at the Crocker Road interchange will result from the reduction in traffic volumes using this access point.

Next Steps

During project development, an Interchange Justification Study will be required. The project team will document the No Build, Upgrade Existing, and the Nagel Interchange options utilizing the updated traffic information. The conceptual design will be refined based upon the updated traffic volumes, to avoid and/or minimize impacts, to better establish work limits for the purpose of estimating impacts, and to update the preliminary construction cost estimate.

An updated Purpose and Need document based upon these goals has been drafted and is currently in review. A copy of this draft is included as Attachment C. As project development continues, revisions to the Purpose and Need document are anticipated based upon feedback from NOACA, ODOT, FHWA and members of the public.

Environmental studies and preliminary engineering are currently underway to develop and evaluate potential interchange layouts, along with local roadway improvements required as a part of the interchange. A public meeting is tentatively scheduled for March 22, 2007 to obtain feedback on the project design and environmental impacts.