A Sketch Level Technical Analysis of Traffic Flow Alternatives to the Three Cities River Crossing

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Background – If the Three Cities River Crossing (3CRX) is removed from the proposed street network, the traffic forecast for 2035 shows about 16,000 greater average daily traffic (ADT) on both the Eagle Road River Crossing and the Glenwood Street River Crossing. The major traffic congestion impacts would be experienced primarily at the four adjacent state highway/state highway intersections due to the heavier traffic volumes and turning movements at those locations. The four critical intersections are Glenwood/State, Chinden/Glenwood, Chinden/ Eagle, and Eagle/Eagle Alternate Route. Special high volume intersections or grade separations have been considered for these four intersections in the past but only the Chinden/Eagle intersection is currently in the approved Long Range Transportation Plan.

Drawing extensively from past efforts, especially the COMPASS High Volume Intersection Study, ACHD staff has put together a sketch level technical evaluation of the most feasible options and rough cost estimates for the four intersections. Very little, if any, public involvement has been done on any of these options beyond the general plan level and the purpose of bringing them forward now is only to give decision makers an idea of the kind of options that are technically possible. There has been no assessment up to this time as to whether the ACHD Commissioners, the cities, or ITD support the consideration of these options. This is <u>not</u> meant to imply the ability of agencies to consider these improvements given current funding sources and levels. Table 1 shows the 2035 daily traffic forecasts of the river crossings and the critical intersection total entering volumes with and without the 3CRX in the roadway network.

Table 1 – Forecast Weekday Traffic Demand

Traffic Forecast[1]	Location	With 3CRX[2]	Without 3CRX		Net Change
			Funded Only[2]	SH 16 to I-84[3]	
Average Daily Traffic (ADT)	Eagle Road River Crossing	52,500	68,500	66,000	+13,500 to +16,000 *+26% to +30%*
	Glenwood Street River Crossing	44,500	61,000	59,000	+14,500 to +16,500 *+33% to +37%*
Average Daily Total Entering Volume (TEV)	Glenwood & State	89,500	103,000	101,000	+11,500 to +13,500 *+13% to +15%*
	Glenwood & Chinden	83,000	88,500	86,500	+3,500 to +5,500 *+4% to +7%*
	Eagle & SH 44	88,500	94,500	93,000	+4,500 to +6,000 *+5% to +7%*
	Eagle & Chinden	94,500	101,500	100,000	+5.500 to +7,000 *+6% to +7%*

1 - Forecast traffic demand per year 2035 travel demand models. The 2035 models are not yet adopted but are expected to be adopted this summer. Unlike the 2030 model and 2006 CIM, the 2035 model does not assume roadway widening projects on SH 44 west of Ballantyne, Chinden west of Eagle, and Five Mile and Maple Grove north of Fairview.

2 - Model assumes only funded transportation projects which includes the SH 16 river crossing from SH 44 to Chinden.

3 - Model assumes funded transportation projects plus SH 16 extension to I-84.

Table 2 shows the approximate existing volumes and capacities of the four intersections and the additional capacity to be gained by the alternative intersection treatments summarized below.

Table 2 – Approximate Peak Hour Intersection Capacity

Intersection	Existing Volume	Existing Capacity	Alternative Intersection Treatment Capacity	Net Capacity Gain
Glenwood & State	5,300	5,900	7,800	+1,900 *+32%*
Glenwood & Chinden	5,600	5,600	8,200	+2,600 *+46%*
Eagle & SH 44	4,600	5,300	6,700	+1,400 *+26%*
Eagle & Chinden	5,700	5,700	8,000 to 11,300[1]	+2,300 to +5,600[1] *+40% to +98%*

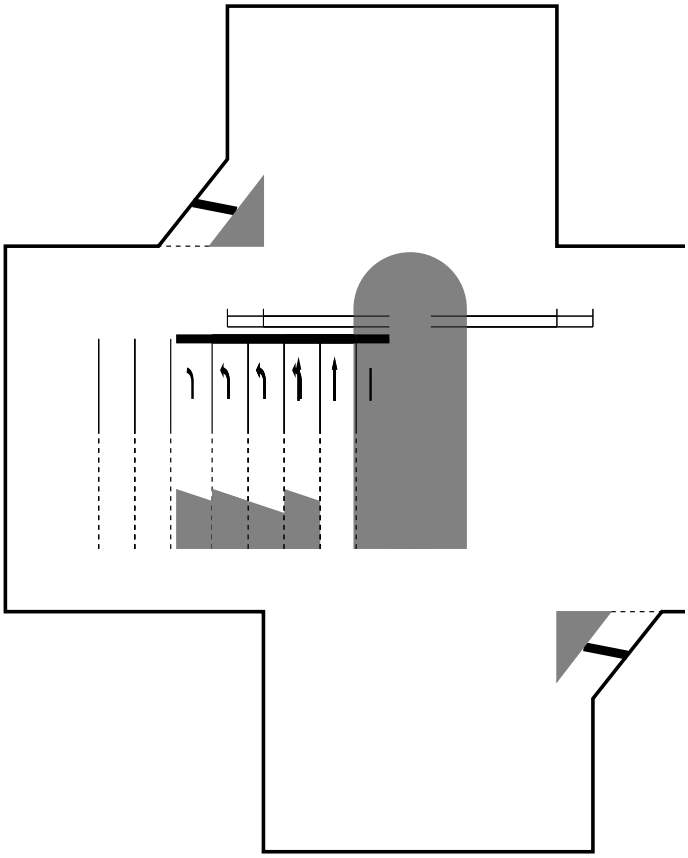
1 – Upper capacity level is based on increased growth to Eagle Road through traffic (uninterrupted flow movements.)

Glenwood and State - The west and south legs are State Highway 44 under ITD's jurisdiction and the east and the north legs are ACHD streets. The 2015 Plan and subsequent plans identified this location as a future urban interchange until the 2030 Plan was approved in 2006. The State Street Corridor Study put forward the possibility of left turn overpasses which would be out of scale with the character of the area. In addition, the COMPASS High Volume Study considered quadrant roadways around all four corners but identified the Median U-turn application (also known as the Michigan U-turn) as the preferred option. In our analysis we did not find the Median U-turn application to be feasible due to the extremely high left-turn demand without the 3CRX. The only option found to have possible merit was conventional widening:

- The State Street eastbound and westbound approaches to six through lanes
    - A third eastbound "through departure lane" on State from Glenwood to Pierce Park and a third westbound "through departure lane" from Glenwood to Bogart.
- A third left-turn lane for the westbound to southbound movement,
- A third northbound left-turn lane for the northbound to westbound movement, and
- A third receiving southbound lane on Glenwood from State to Riverside.

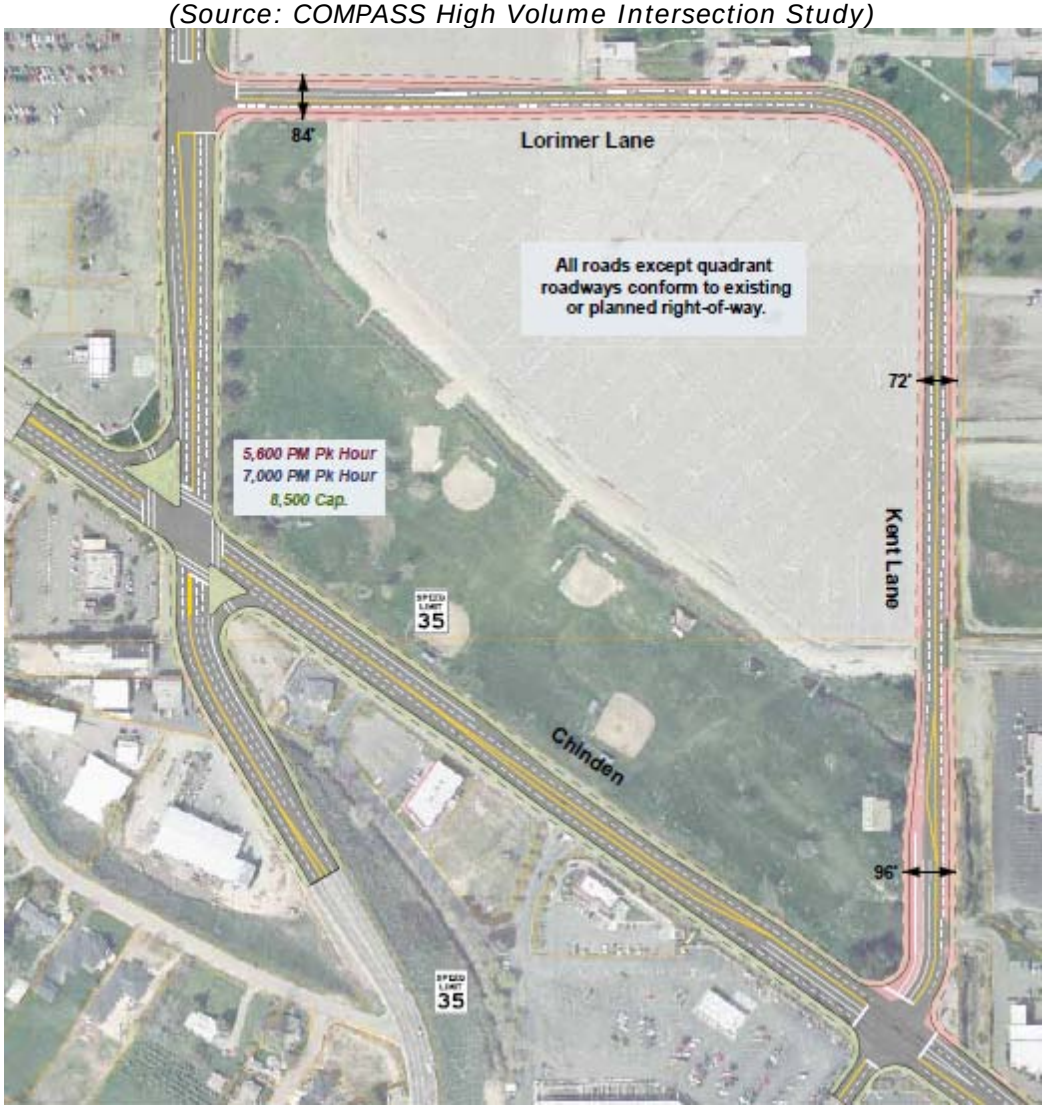
The 2009 ACHD CIP identifies a road widening project on State Street east of Glenwood (widening to 7 lanes) and right-of-way preservation for widening of the State Street and Glenwood intersection. The travel demand model provides capacity for three lanes of multiuse vehicles (passenger cars, HOV, and transit) in each direction on State Street east of Glenwood. The alternative intersection treatment (conventional widening) identified fits within this context. The road widening east of Glenwood may be reserved as a transit and HOV lane assuming heavy usage. Improvements in the vicinity of this intersection should be coordinated with the State Street Study and any ongoing/future corridor studies. Figure 1 illustrates a conceptual layout of the alternative intersection treatment at the intersection of Glenwood and State.

Figure 1 - State & Glenwood Alternative Treatment



Chinden and Glenwood (US-20/26, SH-44) - The north leg is SH-44, the east and west legs are US-20/26. The south leg is an ACHD arterial. This intersection was identified in 1996 as an urban interchange in the 2015 Plan and two subsequent updates (2020 and 2025) but was dropped from the plan in 2006 when the 2030 Plan was approved. A Chinden Corridor Access Management Study was done by ACHD in 1999 that confirmed the need for an interchange for this intersection. The COMPASS High Volume Intersection Study evaluated several alternatives for the intersection but concluded the most appropriate was a single quadrant intersection application. The quadrant roadway would be around the park and the state fair parking lot in the northeast quadrant of the intersection. Our analysis found the need for three through travel lanes on Chinden between approximately Coffey and 52nd Street. The design would require all of the left turns to use this roadway in lieu of turning left at the intersection. The intersection of Glenwood and Chinden would then be reduced to a two-phase signal with no left turns and would move traffic much more efficiently than the existing 8-phase signal. Figure 2 illustrates the quadrant roadway intersection configuration developed as a part of the COMPASS High Volume Intersection Study.

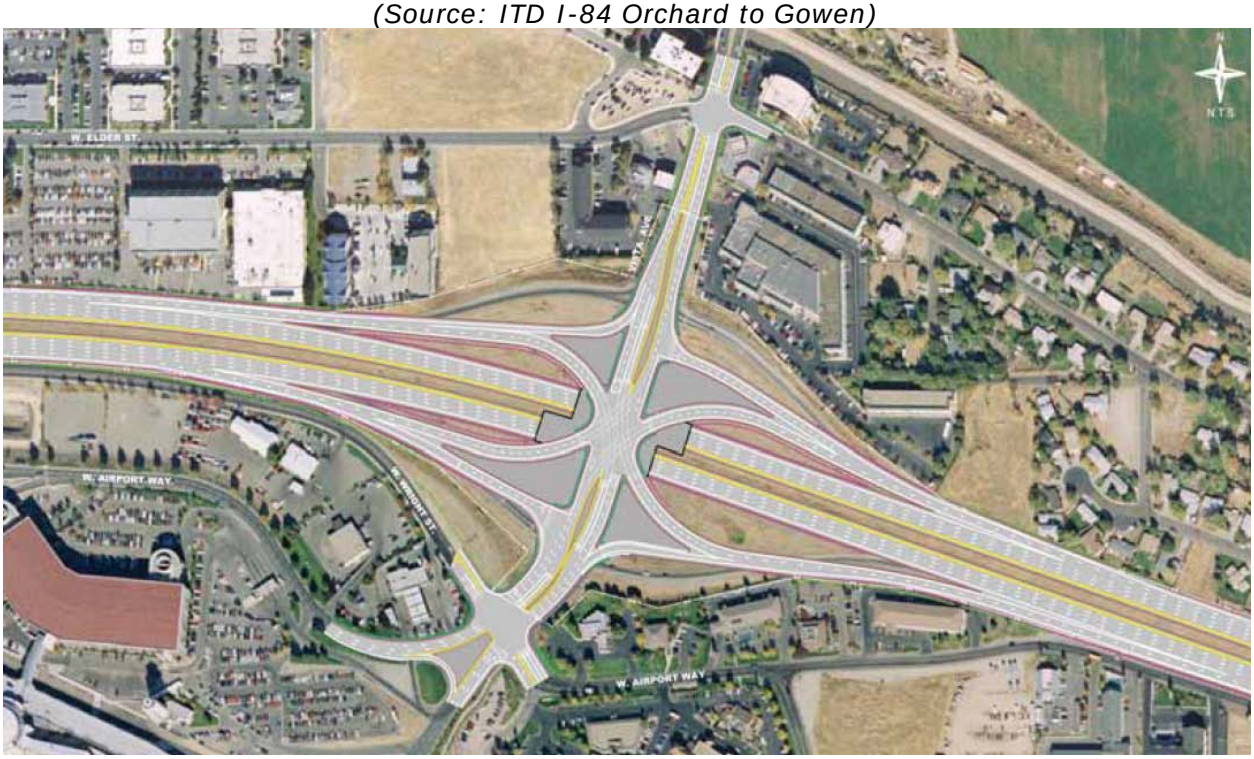
Figure 2 – Chinden & Glenwood Alternative Treatment
(Source: COMPASS High Volume Intersection Study)



Chinden and Eagle Road (US-20/26, SH-55) - All legs of this intersection are under ITD's jurisdiction. This has the potential to be the most strategic arterial intersection in the Valley given the importance and continuity of the two routes. This intersection was identified for an urban interchange in the 2015 Plan and subsequent plans and shows up as an interchange in the current 2035 Plan. A Single Point Urban Interchange (SPUI) was proposed in an Eagle Road study done by ACHD in 1996 along with all of the major intersections along Eagle Road between I-84 and SH-44. This intersection was not used as a prototype in the High Volume Intersection Study and the development and access around it make any of the innovative at-grade applications infeasible. The SPUI still appears to be the most feasible application but it is unclear which street should stay at grade or whether the grade change could be distributed to both streets. A SPUI was considered at another intersection with fully developed corners, State and Veterans Memorial Parkway, during the State Street Study but no follow-up was done on that proposal. The only SPUI's that have gone through the full project development process here in the Treasure Valley are under construction currently on I-84 at Ten Mile Road and at Vista Avenue. Costs for those interchanges were used as a basis in this analysis. Figure 3 illustrates the proposed SPUI at I-84 and Vista as an example SPUI configuration.

Figure 3 – Example SPUI Design at I-84 and Vista

(Source: ITD I-84 Orchard to Gowen)



Eagle Rd and Eagle Alternate Route (SH-55, SH-44) - This intersection was identified for an urban interchange in the 2015 and 2020 Plan but was not included in the 2025 Plan or subsequent Plans due to the concerns of Eagle City. The COMPASS High Occupancy Study did not use this intersection as a prototype but did evaluate a continuous flow intersection (CFI) at the Linder/SH-44 and at Eagle/Fairview intersections. While an interchange would call for a grade separation, the CFI is an innovative "at grade" application that separates the left-turns in separate movements in advance of the intersection and does not have the aesthetic or noise concerns of an overpass. A partial CFI may be feasible with advance signals and advance left-turn movements on the SH-44 approaches only. The good access control on SH-44 would allow this treatment while the driveways and intersecting streets on Eagle Road approaching this intersection would not be compatible with such a treatment. Figure 4 illustrates a concept model developed for a similar location in the Salt Lake City area.

Figure 4 - Example Partial CFI at 3500 South & Bangerter Highway
(Source: UDOT)

Summary – Table 3 summarizes the alternative intersection treatments addressed in this analysis of the scenario in which Three Cities River Crossing does not happen and provides a rough cost estimate for their implementation. With or without the construction of the Three Cities River Crossing, it is anticipated that traffic enhancements above what exists will be required to accommodate the forecast traffic demand in the area. While a benefit to cost analysis was not completed in this effort, the COMPASS High Volume Study, which analyzed most of these same treatments, generally showed benefit to cost ratios ranging from 6:1 to 18:1.

Table 3 – Alternative Intersection Treatment Summary

Intersection	Alternative Treatment	Treatment Highlight Summary	Cost Estimate
Glenwood & State	Intersection Widening	- 3 EB & WB through lanes - 3 WB and NB left-turn lanes - 3 SB receiving through lanes	$13.3 to $16.2 Million
Glenwood & Chinden	Quadrant Roadway	- New roadway on park/state fair parking lot property - 3 EB & WB through lanes	$10.4 to $12.7 Million
Eagle & SH 44	Partial Continuous Flow Intersection (CFI)	- Advance left-turn movements on SH 44 - At grade alternative with only 2 EB, WB, SB, and NB through travel lanes	$10.4 to $12.8 Million
Eagle & Chinden	Single Point Urban Interchange (SPUI)	-Compact grade separated intersection -Only 2 EB, WB, SB, and NB through travel lanes	$23.7 to $28.9 Million
Total			$57.8 to $70.6 Million