Appendix H: Travel Demand Modeling

Jackson Teton County
COMPREHENSIVE PLAN

TRAVEL DEMAND MODELING

Purpose: The Jackson/Teton County Comprehensive Plan Update is revisiting land use and transportation planning policies to ensure they can be achieved as the community moves forward. In an effort to make informed decisions about policy adjustments, the project team modeled transportation scenarios using WYDOT's travel demand model. This model is currently the most accurate tool available to determine how potential land use and transportation network changes will affect future travel patterns.

WYDOT TRAVEL DEMAND MODEL

In the spring of 2007 the Wyoming Department of Transportation (WYDOT) prepared a travel demand model for Teton County. This travel demand model is based on existing land uses and is calibrated using actual traffic count data. It is important to note that the travel demand model is a general planning tool that forecasts how future changes to land use could modify travel behavior. It provides planning context to make decisions about general land use patterns, but is not an exhaustive tool for detailed roadway design. Using the model as a planning tool, alternative land use and roadway scenarios were evaluated. The scenarios help understand how the objectives identified by the community can be achieved.

MODELING ADJUSTMENTS

The current WYDOT travel model is not setup to evaluate the potential benefits of increased alternative travel mode usage (e.g., pedestrian, bicycle, and transit usage). It is also not equipped to adjust traffic flows in response to traffic congestion at intersections or along roads in the network. The model assigns motor vehicle trips to roads in the network using the shortest path possible.

To account for alternative modes, the team adjusted the model results to understand how increases in alternative mode use could affect travel. The adjustments examined how doubling the transit systems ridership and expanding pathways to increase alternative mode share 10% beyond current levels could affect traffic levels. The details of the modeling adjustments are available on the project website (www.jacksontetonplan.com) as a summary presentation. The results are also a key part of the conclusions in this document.

FUTURE LAND USE SCENARIO

In an effort to understand how future land uses may adjust travel behavior, a future land use scenario was prepared. The future land use scenario was based on the draft Countywide Future Land Use Plan and concepts presented at the May 2008 public workshops (available for review on the project website). The Future Land Use Plan will continue to be refined as the planning process moves forward, as will land uses in the Town of Jackson through the concurrent subarea plan process for the town. Once the Comprehensive Plan (Plan) update process is complete, more refined transportation planning work will be initiated to support the changes in the plan.

MODELING SCENARIOS

A series of transportation scenarios were prepared based on the current travel demand model. Each of the transportation scenarios includes a 2% annual traffic growth rate, which is lower than the recent growth rates but suggested by WYDOT. It is important to note that the actual annual growth rate based on traffic counts is higher than the rate WYDOT elected to use in the modeling.

A total of four modeling runs were prepared by WYDOT based on the scenarios prepared by the project team.

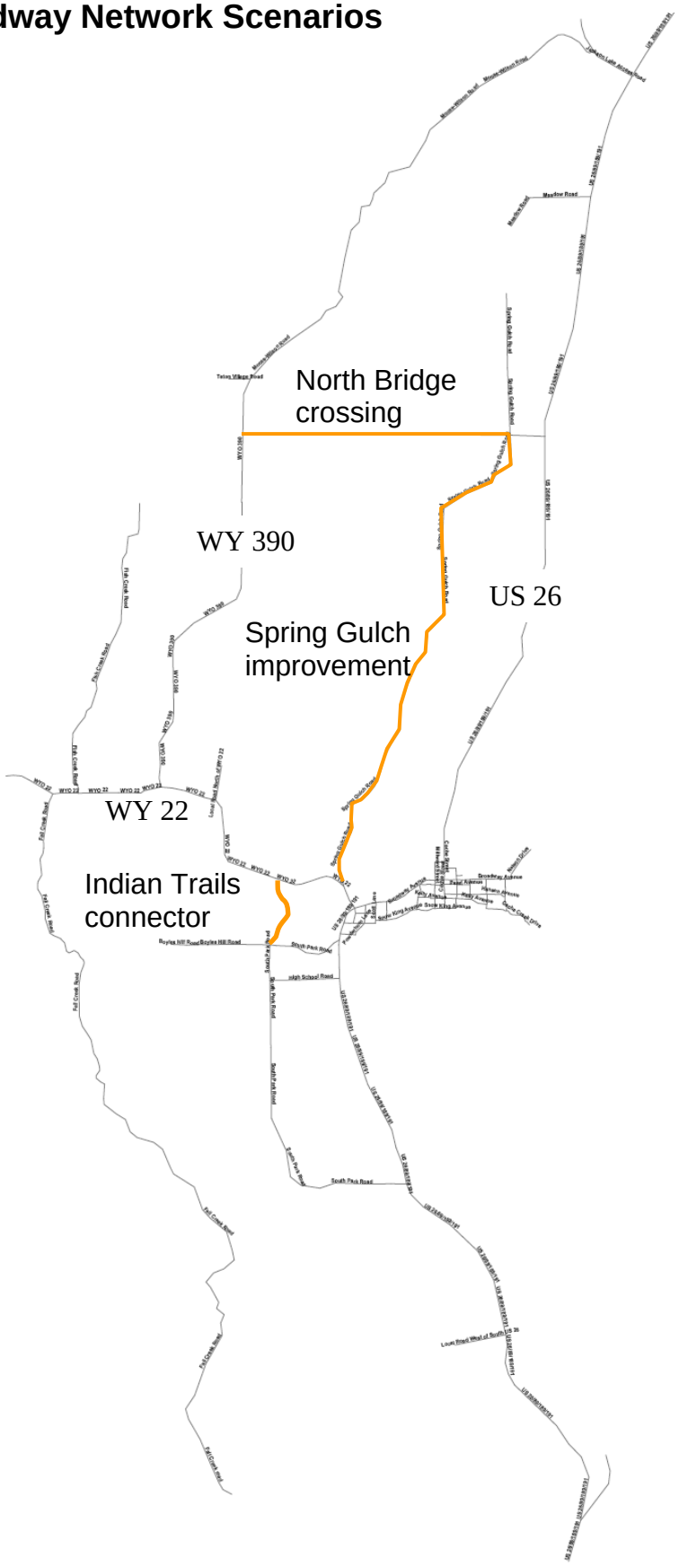
Future Scenario #1: No land use or roadway network changes
This scenario includes no changes to land use and no roadway network improvements.

Future Scenario #2: Existing network with Indian Trails Road connection
This scenario includes new land uses as presented in the May 2008 public workshop. A new roadway connection would be constructed between WY 22 and South Park Loop Road by reconfiguring Indian Trail Road.

Future Scenario #3: Existing network with Spring Gulch Road improvements
This scenario includes new land uses as presented in the May 2008 public workshop. Improvements to Spring Gulch Road would be made to increase the safety, travel speed, and functionality of the existing corridor to function as an alternative north-south connection.

Future Scenario #4: Existing network with North Bridge crossing
This scenario includes new land uses as presented in the May 2008 public workshop. A bridge would be constructed over the Snake River to connect Teton Village to US 26 using Sagebrush Drive

Roadway Network Scenarios



MODELING RESULTS

The results of the travel demand modeling are summarized below. This information is being used as one of the many planning tools for the Plan update. The modeling process provides a potential outcome of future travel conditions, but is considered a basic forecasting tool. The following results should be interpreted as possible outcomes and not absolutes. The results provide travel demand forecasts and are not intended to be a tool for determining specific roadway design. Questions regarding number of lanes on a roadway (3 lanes vs. 4 lanes) or intersection design (roundabout vs. traditional) cannot be determined from the modeling results. However, the traffic model does provide a useful evaluation of how the transportation network could be expanded to more efficiently distribute traffic. The results of each scenario are presented on the following pages.

Future Scenario #1: No land use or roadway network changes

The forecast prepared for this scenario suggests that traffic will exceed the thresholds established in the current transportation chapter of the Plan. The modeling results suggest that the WY 22 monitoring location will have 47% more traffic, the WY 390 location will have 22% more, and the Broadway Avenue location will have 12% more traffic than the thresholds established in the current transportation chapter of the Plan. This scenario also suggests that with no changes to current land use and a lower than average annual traffic growth rate (2% per year), the current Plan's objectives will be difficult to achieve. The model adjustments indicate transit and pathways improvements will be critical. They provide choices and serve an important part of the travel demand that is not served today, but the increased use of transit and pathways will not replace enough motor vehicle trips to meet the thresholds in the current transportation chapter of the Plan.

Future Scenario #2: Existing network with Indian Trails Road connection

The forecast prepared for this scenario suggests that traffic passing through the "Y" intersection will be approximately 28% less if this connection is made. This improvement could help meet the traffic thresholds established in the current Plan for Broadway south of the "Y" intersection. However, traffic traveling through other segments of the "Y" intersection could experience no improvement. Therefore, improvement to the "Y" intersections to facilitate motor vehicle, transit, bicycle, and pedestrian travel may still be warranted with the Indian Trails Road connection.

Future Scenario #3: Existing network with Spring Gulch Road improvements

The forecast prepared for this scenario suggests that improving this corridor could reduce approximately 20% of the traffic on Broadway Avenue near Flat Creek, allowing the thresholds in the current Plan to be met at this location. However, this connection results in approximately 6% more traffic through the "Y" intersection and WY 22 as north and southbound vehicles travel between Spring Gulch Road and South Broadway.

Future Scenario #4: Existing network with North Bridge crossing

The forecast prepared for this scenario suggests that building this connection could result in approximately 43% less traffic on WY 390 and 26% less traffic on WY 22. At both locations the thresholds established in the current plan could be achieved. However, this connection could result in approximately 24% more traffic on north Cache near Town Square.

MODELING CONCLUSIONS

The modeling results suggest improvements to the roadway network have system wide tradeoffs, even with alternative mode use adjustments. It appears the major traffic monitoring locations established in the transportation chapter of the current Plan are going to exceed the thresholds. This holds true under any land use scenario, even scenarios that assume no additional development or roadway network expansion.

The modeling also suggests that annual traffic growth needs to be monitored and evaluated more accurately. At this time it is unknown what factors are influencing annual traffic growth. It appears that the annual traffic growth rate is being influenced by new development, continued growth in tourist activities, increased trip making by residents, commute distance between jobs/housing, and resident's ability to access alternative modes. Given the high likelihood that the thresholds in the current Plan are going to be exceeded, the following course of actions could be taken.

- Implement a new set of multimodal mobility objectives, dedicated funding sources, and measures to reduce annual traffic growth as a concerted effort to achieve the current Plan's thresholds.

- Accept the current standards are not going to be achievable and establish new standards based on goals for all modes of travel (not just traffic volumes at major points in the transportation network).

- Establish a more accurate system for collecting, analyzing and forecasting traffic data (beyond the WYDOT modeling process) to evaluate the current Plan's thresholds.

The value of the WYDOT modeling process is to determine how travel demand is affected by network adjustments. There has been curiosity in the community about the validity of new roadway connections and their role in reducing traffic. The model provides an objective basis to help the community understand the potential outcomes of redistributing traffic via new roadway connections. Based on the modeling results the following conclusion can be drawn about new network connections.

- Leaving the existing roadway network in place and accepting high levels of motor vehicle congestion in the future will affect pedestrians, bicycles, and transit operations.

- The Indian Trails Road connection could improve the function of the "Y" intersection for all modes of travel while providing a more direct northbound connection for South Park residents. This improvement alone will not resolve all of the circulation issues at the "Y" intersection and should be considered with a redesign of the "Y" intersection.

- The Spring Gulch Road connection could improve traffic levels on Broadway Avenue, but would likely increase traffic at the "Y" intersection. This connection appears to offer very minimal system-wide benefit.

- The North Bridge connection is likely to shift traffic from WY 390 to US 26. This shift essentially moves traffic from a congested corridor to an equally congested corridor. This connection appears to offer very minimal system-wide benefit.

Finally, the results of the modeling suggest that new improvements and programs are necessary under any scenario. The following strategic action items are suggested, based on the draft policy updates that are available on the project website. Each strategic action item is preceded by potential outcomes.

1. Implement a "complete streets" program
   - Street projects accommodate all modes of transportation
   - 5% of all trips are walking and bicycling
   - Successful collaboration between WYDOT and local agencies

2. Expand START with new buses and service
   - 2,000 new daily START riders are riding by 2025
   - Major roadway corridors have 5-10% transit mode share
   - Regional transit service is expanded in Teton County, ID

3. Form a Regional Transportation Authority (RTA)
   - Communities in Teton County (WY&ID) & Star Valley in the RTA
   - Transportation funding is collected and shared within RTA
   - Roadway, bus, and trail projects are completed by RTA
   - RTA has members from each community collecting tax

4. Establish a transportation tax to fund roadways, transit & pathways
   - Tax proceeds supplement intersection reconstruction and corridor projects
   - Tax funds "complete street" projects
   - Tax proceeds fund START capital and operations costs
   - Tax proceeds supplement pathways program

APPENDIX DETAILS

This appendix summarizes land use assumptions for the March transportation analysis for the Town and County:

TOWN LAND USES IN FUTURE MODELING SCENARIOS

The town totals used in the March 2008 analysis included 3,900 new housing units and 1.31 million square feet of new non-residential uses. This total is slightly lower than what current zoning with options allows. The current zoning would allow 5,070 new housing units and 2.34 million square feet of new non-residential uses. Town future land uses have not been determined yet, so these numbers are subject to change.

COUNTY LAND USES IN FUTURE MODELING SCENARIOS

The town totals used in the March 2008 analysis included 4,150 new housing units and 1.47 million square feet of new non-residential uses. This total is slightly lower than what current zoning with options allows for residential development. The current zoning would allow 5,200 new housing units and 1.17 million square feet of new non-residential uses. The 4,150 new housing unit total assumed approximately 1,240 new units in all of South Park, with approximately 1,000 units within ½ mile of High School Road. The analysis also accounted for 400,000 square feet of commercial mixed-use at the intersection of High School Road and Hwy 89. However, the draft land uses do not include commercial in that location, and instead suggest a smaller amount of new light industry/business park uses just west of the school. County land uses will likely change as the draft plan is refined.

A. Traffic Count vs Goals

	So. HWY @ Rafter J	WY 22 @ S.R. bridge	WY 390 @ Nethercott	WY 390 North of Aspens	Broadway @ Maple Way	Broadway @ Flat Creek	Broadway @ Town Sq	Milward TRK Route	Pearl Ave
1996 Count	16,800	17,700	12,600	5,200	30,000	40,300	21,000	9,000	12,500
2002 Counts	20,300	22,600	15,400	8,100	35,100	39,500	19,400	7,800	9,900
2006 Counts	23,400	N/A	N/A	8,400	N/A	N/A	N/A	N/A	N/A
2020 Goal (Based on 2003 Plan)	29,000	31,000	20,000	9,000	43,000	56,000	24,000	13,000	14,000
	500	14,700	(2,100)	2,000	5,400	1,700	1,000	(6,300)	(6,000)

B. WYDOT Future Year Travel Demand Results

WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	29,500	45,700	17,900	11,000	48,400	57,700	25,000	6,700	8,000
w/Spring Gulch Connection	21,900	45,700	15,000	11,000	51,200	46,300	19,200	5,400	6,100
w/North Bridge Connection	21,900	33,700	10,600	5,900	51,000	62,000	31,000	7,400	14,400
w/Indian Trails Connection	21,700	45,700	18,000	11,000	34,700	64,400	24,200	6,700	8,200

C. 10% Transit Reduction (Very Aggressive - $$$$ - BRT - Scenario)

WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	2,950	4,570	1,790	1,100	4,840	5,770	2,500	670	800
w/Spring Gulch Connection	2,190	4,570	1,500	1,100	5,120	4,630	1,920	540	610
w/North Bridge Connection	2,190	3,370	1,060	590	5,100	6,200	3,100	740	1,440
w/Indian Trails Connection	2,170	4,570	1,800	1,100	3,470	6,440	2,420	670	820

D. WYDOT Future Year with 10% Transit Reduction

WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	26,550	41,130	16,110	9,900	43,560	51,930	22,500	6,030	7,200
w/Spring Gulch Connection	19,710	41,130	13,500	9,900	46,080	41,670	17,280	4,860	5,490
w/North Bridge Connection	19,710	30,330	9,540	5,310	45,900	55,800	27,900	6,660	12,960
w/Indian Trails Connection	19,530	41,130	16,200	9,900	31,230	57,960	21,780	6,030	7,380

E. Roadway Connections Analysis

WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	29,500	45,700	17,900	11,000	48,400	57,700	25,000	6,700	8,000
w/Spring Gulch Connection	21,900	45,700	15,000	11,000	51,200	46,300	19,200	5,400	6,100
w/North Bridge Connection	21,900	33,700	10,600	5,900	51,000	62,000	31,000	7,400	14,400
w/Indian Trails Connection	21,700	45,700	18,000	11,000	34,700	64,400	24,200	6,700	8,200
% change from Existing Roadway		-26%	-41%	-46%	-28%		24%		

The north bridge projects reduces traffic on WY390 & WY 22 but increase traffic on US89 into Town Square

The indian trails project would reduce trips from the "Y" intersection

F. Achieving Plan Goals (without increased transit)

	So. HWY @ Rafter J	WY 22 @ S.R. bridge	WY 390 @ Nethercott	WY 390 North of Aspens	Broadway @ Maple Way	Broadway @ Flat Creek	Broadway @ Town Sq	Milward TRK Route	Pearl Ave
WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	500	14,700	(2,100)	2,000	5,400	1,700	1,000	(6,300)	(6,000)
w/Spring Gulch Connection	(7,100)	14,700	(5,000)	2,000	8,200	(9,700)	(4,800)	(7,600)	(7,900)
w/North Bridge Connection	(7,100)	2,700	(9,400)	(3,100)	8,000	6,000	7,000	(5,600)	400
w/Indian Trails Connection	(7,300)	14,700	(2,000)	2,000	(8,300)	8,400	200	(6,300)	(5,800)

G. Achieving Plan Goals (10% Transit Reduction)

	So. HWY @ Rafter J	WY 22 @ S.R. bridge	WY 390 @ Nethercott	WY 390 North of Aspens	Broadway @ Maple Way	Broadway @ Flat Creek	Broadway @ Town Sq	Milward TRK Route	Pearl Ave
WYDOT MODELING RESULTS - ADJUSTED LAND USE									
Existing Roadway Network	(2,450)	10,130	(3,890)	900	560	(4,070)	(1,500)	(6,970)	(6,800)
w/Spring Gulch Connection	(9,290)	10,130	(6,500)	900	3,080	(14,330)	(6,720)	(8,140)	(8,510)