08-28.09

Report of

# Project I.D. 1123-09-02

Interchange Study

For

CTH A at USH 41

Outagamie County, Wisconsin

September, 2004 OMNNI Project No. E1582A02

# ENGINEERING • ARCHITECTURE • ENVIRONMENTAL

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### INTRODUCTION

The purpose of this study is to investigate the interchange options at the CTH A and USH 41 interchange in the Town of Grand Chute, Outagamie County. The study will look at the feasibility, costs, and impacts of a grade separation (no interchange), partial interchange and full interchange. The partial interchange option would consist of constructing a southbound on-ramp and a northbound off-ramp on the west side of CTH A.

USH 41 in Outagamie County was constructed at its present location in 1960. At that time, right-of-way was purchased for a full diamond interchange at CTH A (Lynndale Avenue) and USH 41 intersection. However, at the time a two-lane structure on CTH A over USH 41 was built with no interchange.

The current freeway standards require 16.5 ft. of clearance above the freeway pavement. Since the clearance under the 1960 vintage bridges is only 15+/- ft., the existing bridges are being raised or replaced. The structure on CTH A at USH 41 is scheduled for reconstruction in year 2005.

There are positive impacts for building an interchange at CTH A for the general traveling public and for the local street system. There are also some negative impacts primarily to the USH 41 traffic. The alternatives have different impacts on the adjacent interchanges. There is strong local support for a partial interchange at CTH A and USH 41.

WisDOT has conducted traffic studies and projected traffic volumes for the three basic alternate designs. OMNNI Associates was retained to study the alternates and prepare this report.

#### **EXISTING CONDITIONS**

USH 41, STH 47 & CTH A. At the project location, CTH A is a rural two-lane minor arterial that runs north south. USH 41 is a four-lane freeway with a 60-foot median and is classified as a principal arterial. Even though USH 41 is generally a north-south route, it runs in an east west direction at CTH A. Just west of CTH A, USH 41 curves to the south and then parallels CTH A one mile to the west. Exhibits 1 and 2 show the general area of this study

There is an interchange on USH 41 with STH 15/CTH OO that is located one and one half miles southwesterly from CTH A. South of this interchange, USH 41 is a six-lane facility.

There is a full diamond interchange at the USH 41 intersection with STH 47 that is about one and one half miles east of CTH A. At USH 41, STH 47 runs in a true north-south direction. About six miles north of USH 41, STH 47 bears to the northwest and intersects with CTH A at about eight miles north of USH 41. This "T" intersection handles all of the traffic on STH 47 but only the northbound traffic from CTH A. The southbound traffic on CTH A has a separate roadway and avoids the "T" intersection. From the "T" intersection both routes head north concurrently for a short distance until CTH A turns west toward Shiocton. STH 47 continues north toward Black Creek. Exhibit 3 shows the roadway configuration at the merger point.

From the merger point of CTH A and STH 47, traffic destined for southbound USH 41 has two choices, either to take STH 47 to its interchange with USH 41 or take CTH A across USH 41 to CTH OO, turn right and enter USH 41 at the interchange one mile to the west of CTH A. The STH 47 route is 2.1 miles longer.

**Local Road System.** The local road system in this area of Grand Chute has many challenges. The location of USH 41, Canadian National Railroad, Gordon Bubolz Nature Preserve and other environmental sensitive areas impact the connectivity of the local road system. Exhibit 4 shows the roadway layouts, jurisdictions and classifications. Exhibit 5 shows the Community Facilities and Park and Recreations Facilities.

To the west of the CTH A/USH 41 intersection there is not another north-south route that crosses USH 41. Capitol Drive, an east-west minor collector, goes over USH 41 in the middle of the curve, which transitions USH 41 from an east west direction to a north south direction. There are no roads northwest of USH 41 that currently connect between Capitol Drive and CTH A. Rifle Range Road is a dead end roadway that intersects with Capitol Drive and goes northeasterly for approximately one half mile before it dead ends. It functions as a local road for the residents' along the north side of USH 41. The Town of Grand Chute plans to extend Rifle Range Road to the northeast and connect it to Grand Chute Blvd, which is a local street that intersects CTH A approximately 1600 feet north of USH 41. The location of a large tract of environmentally sensitive land and the Gordon Bubolz Nature Preserve have prevented other local roads to be connected to the west resulting in a gap in the local road system.

To the east of CTH A/USH 41 intersection, Gillette Street has an underpass of USH 41 approximately halfway between CTH A and STH 47. However there are no east west roadway connections for the first one and one quarter miles north of USH 41 due to the Canadian National Railroad which runs parallel to CTH A about one half mile to the east. CTH JJ, which is a major arterial, is the first east west connection across the railroad north of USH 41. CTH JJ from the east forms a "T" intersection with CTH A. The two roadways run concurrent to the north for about one mile where CTH JJ turns to the west forming another "T" intersection with CTH A. Both "T" intersections have stop control on CTH JJ.

The local road system south and east of USH 41 is more connected than the area north of USH 41. However USH 41 and Canadian National Railroad are barriers. Capitol Drive is an east west minor collector that is approximately a quarter of a mile south of USH 41 at CTH A. Capitol Drive provides access to numerous subdivisions in this area. CTH OO is an east west arterial located approximately one half mile south of Capitol Drive. It has an interchange with USH 41 approximately 1.5 miles southwesterly from the CTH A/USH 41 intersection. Bluemound Drive is a north south minor collector located one





















half mile west of CTH A and terminates with a cul-de-sac just south of USH 41. Gillette Street is a north south minor collector located three quarters of a mile east of CTH A and has an underpass with USH 41. Gillette Street forms a "T" intersection with Capitol Drive. Due to development it does not proceed south to CTH OO. Mason Street is another north south minor collector located a quarter of a mile east of Gillette Street. Due to development Mason Street forms a "T" intersection with Capitol Drive and does not extend any further north. STH 47 is a north south arterial that is located 1.5 miles east of CTH A. It has a full diamond interchange with USH 41. The area bordered by the STH 47, CTH OO and USH 41 is mostly residential with commercial development along CTH OO and STH 47.

Land Use. The Town of Grand Chute has adopted a comprehensive plan. Exhibit 6 shows the land use plan.

The area along CTH A south of USH 41 is mostly residential. Except for one large parcel in the northeast quadrant of CTH A & CTH OO, the area is fully developed. Lions Park is a small neighborhood park that is contiguous with Houdini Elementary School. Lions Park abuts a portion of CTH A and the school is just east of CTH A on Capitol Drive. There is also a daycare/preschool, formerly known as Twin Willow School, located in the southwest quadrant of the Capitol Drive/CTH A intersection. Exhibit 5 shows the location of the community facilities.

The development for the first mile and one half to the north of USH 41 is limited by large environmentally sensitive wetlands and flood plains. This area also contains the Gordon Bubolz Nature Preserve. The wetlands and flood plain locations are shown on Exhibit 7. The location of Mud Creek and some of its tributaries also impact the area as shown in Exhibit 8. Mud Creek parallels the east side of CTH A from Grand Chute Boulevard south. About 600 feet north of USH 41, Mud Creek pulls away from the east side of CTH A but swings back toward CTH A and USH 41 where it enters the existing twin cell box culvert under USH 41. The box culvert angles under USH 41 and outlets on the west side of CTH A. Mud Creek drains away from the intersection of CTH A and USH 41 in a southwesterly direction.

The area north of USH 41 is mostly agricultural or vacant with some residential. There has been some recent development in this area which includes a multi family development and the Grand Chute Town Hall to the east of CTH A and a large church and subdivision to the west of CTH A. The developments have access to CTH A via Grand Chute Boulevard.

The area further north along CTH A is mostly undeveloped or agricultural. However there are a several heavy truck generators in this area. These include at least 4 quarries and a large asphalt plant as shown on Exhibit 9. Badger Highways Co., Carew Concrete & Supply Co., Michels Materials, Murphy Concrete and Construction, and smaller contractors haul materials out of these quarries. Large quantities of sand are hauled into the asphalt plants. The majority of these trucks are using CTH A to CTH OO to access USH 41.

### **EXISTING TRAFFIC**

**USH 41.** Based on the 2000 counts the Average Daily Traffic (ADT) on the portion of USH 41 between STH 15/CTH OO and STH 47 is 55,400 vehicles of which 27,800 vehicles are southbound and 27,600 vehicles are northbound. Based on a peak hour factor of 11.1 and a directional split of 55/45, USH 41 functions at a level of service D during the peak hour. Exhibit 10 shows the 2000 annual ADT. The capacity analysis for the existing traffic can be found in Appendix D.

**CTH A.** Based on the 2000 counts the ADT on CTH A at the overpass of USH 41 is 6,100 vehicles. This number increases to 9,500 south of Capitol Drive. The CTH A and Capitol Drive intersection was signalized in 1992.

**STH 47.** Based on the 2000 counts the ADT on STH 47 just south of the USH 41 interchange is 19,400 vehicles. North of the interchange the ADT is 16,900 vehicles. STH 47 was reconstructed to 4 lanes from USH 41 north to CTH JJ in 2003. The STH 47 Bridge over USH 41 does not meet the current freeway standards clearance requirement of 16.5 feet. The STH 47/USH 41 interchange is being considered for upgrades.

STH 47/ CTH A Intersection. At the "T" intersection of STH 47/ CTH A the 2000 ADT for the STH 47 leg has 6,900 vehicles. The CTH A leg has a projected volume of 5,600 vehicles and the joint leg of STH 47/CTH A has a projected volume of 15,700 vehicles. The Outagamie County Highway Department has indicated that the intersection is already experiencing traffic congestions on weekends. STH 47 and CTH A are popular routes used by weekend recreational traffic. Four-hour traffic counts were taken on May 5, 2000, the Friday before the opening of fishing season, between 3:00 and 7:00 pm. These volumes are shown in Appendix B. Although these volumes would normally not be used to evaluate an intersection, these volumes represent the weekend recreational traffic and are over 70% higher than the weekday peak volumes. The WisDOT is in the process of studying the alternatives for the intersection under a separate project.

**Origin-Destination Study.** WisDOT conducted an extensive origin-destination (OD) study around the Appleton urbanized area in 1993 as one of the initial steps in developing a transportation plan for the area. The OD study can be found in Appendix C. Thirty-two interview stations recorded the vehicle travel patterns over a six-week period.

The study found that 83 percent of the vehicle travel patterns were local trips and 17 percent were through trips. A local trip is one in which either the origin and/or destination are within the study area. A through trip is a trip whose origin and destination are located outside of the study area. USH 41 accounted for 15,484 of the 27,900 (55%) through trips that were recorded. This is followed by USH 45 south, which has been renamed as STH 76, with 2,028 (7.3%) through trips, USH 45 north, which has been renamed as STH 15, with 1,559 (5.6%) through trips and CTH A north with 1,355 (4.9%) through trips. No other station recorded more than 1,000 through trips.



**EXHIBIT** 10

Slightly more than two thirds of all vehicles recorded in the survey were automobiles. The remaining one third was split between light trucks at 22.6% and heavy trucks at 10%. For the truck traffic, 66 percent were local trips and 34 percent were through trips. The largest concentrations of heavy trucks were on CTH A north (16.2%), STH 55 south (14.7%), STH 47 (14.3%), USH 41 north (14.1%) and USH 45 south (13.5%).

Two interview stations are of particular interest to this interchange study. Station # 73 which is located on CTH A, 1.2 miles north of Broadway Drive (CTH JJ) and Station #74 which is located on STH 47, 0.8 miles north of Broadway Drive. The interview station on CTH A provides information regarding travel patterns for vehicles on CTH A. The interview station on STH 47 can be used for comparisons purposes of vehicle travel patterns. These stations are shown on Exhibit 11 and Figure 1 of the OD Study, which can be found in Appendix C.

The total number of trips for the two locations is similar with 7,560 trips on CTH A and 7,237 trips on STH 47. However, the amount of thru traffic on CTH A, 1,355 trips (18%), was more than double that on STH 47, 586 (8%) trips.

The 7,560 total trips recorded on CTH A were made up of 1,224 heavy truck trips and 6,336 passenger and lightweight truck trips. There were 6205 local trips, which were made up of 843 heavy trucks and 5362 passenger and lightweight truck trips. There were 1355 through trips, which were made up of 381 heavy trucks and 974 passenger and lightweight vehicles.

The vast majority (289) of the through trucks were headed towards or coming from USH 41 at Neenah. 62 trucks were headed toward or coming from CTH A South (Winnebago County). 10 trucks were headed toward or coming from points west of USH 41. 10 trucks were headed toward or coming from points north west of USH 41 and 10 trucks were headed toward or coming from USH 41 north by the weigh station. 361of the 381 through heavy trucks traveled on CTH A south of USH 41 through the residential area to intersect CTH OO and access USH 41. This represents 95% (361/381) of the through truck traffic on CTH A and 30% (361/1,224) of all the trucks on CTH A.

Similarly 928 through passenger cars including lightweight trucks were headed toward or coming from USH 41at Neenah, CTH A South (Winnebago County) or west of USH 41. The 928 vehicles represent 95% (928/974) of the through passenger vehicles and 15% (928/6,336) of the total passenger vehicles on CTH A.

The 7,237 total trips recorded on STH 47 were made up of 1,034 heavy truck trips and 6,203 passenger and lightweight truck trips. There were 6,651 local trips, which were made up of 891 heavy trucks and 5,760 passenger and lightweight truck trips. There were 586 through trips, which were made up of 143 heavy trucks and 443 passenger and lightweight vehicles.



The data indicates that much of the through traffic uses CTH A instead of STH 47 to access USH 41. This is particularly true of truck traffic.

#### NO INTERCHANGE ALTERNATIVE

This option would not change current traffic patterns. Exhibits 12 and 13 show the projected traffic for the no interchange alternate. The capacity analysis for the existing traffic can be found in Appendix E.

**Impacts to CTH A.** The projected year 2020 traffic on CTH A is 17,000 vehicles north of Capitol Drive and 21,000 vehicles south of Capitol Drive. This traffic volume would warrant CTH A to be reconstructed to 4 lanes. The first three miles of CTH A north of USH 41 have been graded to accommodate a rural four lane section but only the center two lanes consisting of the existing roadway were resurfaced.

Exhibit 14 shows the traffic projections for CTH A, STH 47 and CTH JJ north of USH 41. The "T" intersection with CTH JJ to the east is stop control on CTH JJ and functions at a LOS C with year 2000 traffic. The intersection will function at a level of service F by the year 2020. Intersection improvements would need to be evaluated. These might include a roundabout, signalization, and/or additional lanes. With four lanes on CTH A and no separate left turn lane, a signalized intersection would function at a level of service "B" in the year 2020.

The six-mile segment of CTH A just south of CTH A/STH 47 intersection was reconstructed in 1996. The typical section consists of two twelve-foot driving lanes and ten-foot shoulders. No additional work is needed on this section for the no interchange alternate.

**Impacts to USH 41.** Since this alternative does not change traffic patterns, vehicles needing access to USH 41 are using the interchanges at STH 15/CTH OO or STH 47. The capacity of USH 41 can be used as a comparison for the other alternatives.

Traffic analysis indicates that the capacity of the existing four-lane facility on USH 41 is 66,000 vehicles per day. Using the year 2000 counts and year 2020 projections, this capacity will be reached in year 2019 for the segment of USH 41 from STH 15/CTH OO to STH 47.

Based on the 2000 counts the segment of USH 41 between STH 15/CTH OO and STH 47 functions at a LOS D. In the year 2020 this segment of USH 41 will function at a LOS of F if no changes are made to USH 41. If this segment is upgraded to 6 lanes it will function at LOS C in the year 2020. Exhibit 15 shows the traffic volumes and level of service along USH 41 for both year 2000 and year 2020.

Note that the existing year 2000 volume (7100 ADT) for the southbound on ramp to USH 41 at the STH 47 interchange is greater than the 2020 projected volume (7000 ADT). The projected volumes were completed before the 2000 counts were available and are



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EXHIBIT 12

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FE ALTERNATIVES STH 47   STH 47 *7000*   -7900- 11800	CTH A *2400-2700-2700-	7400 CEH A	-4900- 6200 6200 6200 -7000 -7000 -5900 -559000 -55900 -55900 -55900 -55900 -55900 -55900 -559000 -559000 -559000 -55900 -55000 -550000 -55000 -550000 -55000 -55000 -55000 -55000 -550000 -
USH 41-CTH A INTERCHANGE PROJECT ID: 1123-09-00 ROUTE: CTH A COUNTY: OUTAGAMIE DISTRICT: 3 ALTERNATIVE 1: NO BUILD	*000* = 1997 COUNT -000- = 2000 000 = 2020		

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consistent with the traffic model for the area. It is assumed that some unknown factor may have attributed to the 2000 volume being higher. This is based on the significant increase for this ramp from the 1997 count (4700 ADT) to the 2000 count (7100 ADT). Traffic volumes on the other ramps at the STH 47/USH 41 interchange did not change as significantly. The northbound off ramp remained the same at 4700 ADT while the northbound on ramp and southbound off ramp volumes decreased from 1997 to 2000. The northbound on ramp decreased from 7200 ADT to 6400 ADT and the southbound off ramp decreased from 6900 ADT to 6300 ADT.

Since the no interchange alternative does not change traffic patterns, the capacity of the STH 47 interchange with USH 41 can be used as a comparison for the other alternatives. Based on the 2000 counts both the southbound on-ramp and the northbound off-ramp functions at LOS D.

Based on the projected traffic for year 2020, the southbound on-ramp would function at a level of service D while the northbound off-ramp would function at a level of service E if no changes were made to USH 41. If USH 41 were upgraded to a six-lane facility by the year 2020, the southbound on-ramp would function at a level of service C and the northbound off-ramp would function at a level of service D.

**Impacts to STH 47.** With the no interchange option, the projected 2020 traffic on STH 47 would be 26,600 vehicles north of USH 41 and 28,400 vehicles south of USH 41. These volumes would put STH 47 in Urban Design Class 4, which calls for a 4-lane facility according to the Wisconsin Department of Transportation Facilities Development Manual (FDM). STH 47 was upgraded to 4 lanes from USH 41 north to CTH JJ in 2003.

**Impacts to STH 47/CTH A Intersection.** Currently all legs of the "T" intersection have one lane in each direction with a stop condition for northbound CTH A traffic. Southbound STH 47/CTH A to southbound CTH A traffic does not go through the intersection. Based on the turn movement traffic counts taken on Thursday March 3, 2000, the STH 47 legs of the intersection functions at LOS A while the northbound CTH A leg functions at LOS C. If the configuration of the intersection remains the same in 2020, the STH 47 leg would still have a LOS A while the CTH A leg would drop to a LOS F. The 2020 traffic projections are shown in Exhibit 14. The traffic turn movement counts are shown in Appendix B.

STH 47 and CTH A are popular routes used by weekend recreational traffic. The intersection experiences congestion not indicated by the week day counts or the traffic projections Based on counts taken on Friday May 5, 2000 between 3:00 and 7:00, the intersection receives over 70% higher volumes than the weekday peak volume. These counts are shown in Appendix B and should be taken into consideration when this intersection is analyzed. Options may include roundabout, interchange and signalization. WisDOT is analyzing this intersection under a separate project.

**Impacts to the Community.** Under this alternative the through traffic that was identified in the OD study would still be using CTH A and CTH OO to access USH 41.

This traffic volume is of particular concern to the local government because it is through traffic that passes through the residential area that includes Twin Willows School, which now operates as a daycare, Lions Park and Houdini Elementary School. According to the OD study this traffic contains the highest concentration of heavy trucks (16.2%) in the Appleton area. The projected 2020 traffic volume on CTH A south of USH 41 is 4000 higher for the no interchange option than the partial interchange option.

The south side of USH 41 on both sides of CTH A is a fully developed residential area. Noise predictions were made at five house locations utilizing the FHWA Traffic Noise Model. Both the year 2000 and year 2020 noise impacts are severe, with year 2000 noise levels ranging from 70.1dB to 70.9dB. The year 2020 noise levels are about 1.5 dB higher than the year 2000 levels. The severe noise impacts would have to be addressed when lanes are added to USH 41 but would not be required under the no interchange alternative.

Under this alternative there would be some impact to Mud Creek. The existing box culvert would need to be extended to accommodate a wider roadway on CTH A. North of USH 41 widening of CTH A would impact either Mud Creek on the eastside of CTH A or wetlands on west side of CTH A.

**Road User Costs.** Road user costs are based on the fact that with no interchange at CTH A, through traffic from the north needs to travel extra distance to reach USH 41 and travel southbound.

In the year 2020, the ADT from the north to the west (south via USH 41) at STH 47 interchange is 5,000 vehicles for the no interchange alternate and 2,400 vehicles for the partial interchange alternative (See Exhibits 13 and 17). This means that 2,600 vehicles would avoid the indirection of STH 47 and used the southbound on-ramp at CTH A. This also applies from the south to north movement. The road user costs associated with the indirection is \$7,000,000 over a 20-year period. Based on the state wide average crash rate, the reduction in overall length of travel could potentially eliminate 50 accidents and the associated costs over the same 20 years.

Exhibits 13 and 17 also show that the southbound ADT on CTH A in year 2020 south of USH 41 is 8,500 vehicles for the no interchange alternate and 5,500 vehicles for the partial interchange alternate. This means that a total of 3,000 vehicles are avoiding the inconvenience and indirection of getting to southbound USH 41 via CTH A and CTH OO. This also applies to the northbound movement. The reduction in traffic from the north to the west at STH 47 plus the reduction in traffic from the north to the south at CTH A (namely 5600 vehicles) should equal the movement from the north to the west for the interchange alternates at CTH A. This movement, as shown on exhibits 17 and 21, is 5,500 vehicles, which is close to the 5,600 vehicles used in computing the road user costs. The road user costs of this indirection and inconvenience are \$2,500,000 over a 20-year period. The statewide average crash rate is less for an urban interstate facility than non-interstate facilities. Based on the reduction in the average crash rate and less miles traveled, 20 accidents and the associated costs could potentially be eliminated.

The total cost of not providing the west ramps at CTH A is \$9,500,000 in road user costs. The parameters and assumptions used to compute the road user costs are contained in Appendix H.

**Construction Costs.** The recently completed Meade Street over USH 41 project is very similar to the no interchange alternate. Meade Street was widened to four lanes and the profile was raised to allow for appropriate clearance above USH 41. Adjusting the Meade Street project costs for inflation and box culvert extension at CTH A, the rough construction cost estimate of the no interchange alternate is \$1,500,000.

### PARTIAL INTERCHANGE ALTERNATIVE

This alternative would involve the addition of southbound on-ramp and northbound offramp at USH 41 and CTH A. The half diamond interchange would be constructed on the west side of CTH A. This would change the existing traffic patterns by allowing the through traffic that was destined for USH 41 a direct route via CTH A. Both the indirection of the USH 41/STH 47 interchange and the CTH OO to CTH A route thru the residential area would be eliminated. The capacity analysis for the existing traffic can be found in Appendix F.

**Impacts to CTH A.** Building the partial interchange at the CTH A and USH 41 intersection would increase the traffic on CTH A north of USH 41 and reduce the traffic on CTH A south of USH 41. Exhibits 16, 17 and 18 show the projected traffic volumes and movements for the partial interchange alternate. This alternative would eliminate much of the truck traffic from CTH A south of USH 41 that originates from the quarries located along CTH A north of USH 41. The origin destination study indicated that 25% of all heavy trucks on CTH A have an origin and destination beyond the Appleton Urbanized area west or south on USH 41.

Under this alternate, the capacity of two lanes on CTH A south of USH 41 would be reached in the year 2021. This would be approximately 20 years later then the no interchange alternate, which is already approaching the capacity of two lanes.

The added traffic on CTH A north of USH 41 would warrant a stronger pavement structure on the existing two lanes. The six-mile segment of CTH A north of USH 41 from Quarry Road to STH 47 was reconstructed in 1996. Since traffic under this alternate would increase 18 to 20 percent, an overlay would be warranted by the year 2020.

The intersection of CTH A with CTH JJ to the east would be over capacity as soon as the partial interchange opened. Due to the increase in traffic and the increase in left turns from CTH JJ to southbound CTH A the intersection would need to be reconstructed to a roundabout or signalized. A signalized intersection with the exiting geometrics would function at a LOS F in the year 2020. With four lanes on CTH A and no separate left turn lane, a signalized intersection would function at a LOS "C" in the year 2020.



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**Impacts to USH 41.** Under the partial interchange alternate, the year 2020 traffic on USH 41 west of CTH A would increase from 67,000 vehicles to 74,400 vehicles per day. The USH 41 traffic east of CTH A, however, would drop from 67,000 vehicles to 61,400 vehicles. This means that a six-lane facility west of CTH A would be warranted in year 2011 or eight years earlier when compared to the no interchange alternate. East of CTH A six lanes would be warranted in year 2026 or seven years later than for the no interchange alternate.

With a partial interchange at CTH A, the freeway segment on USH 41 between STH 15/CTH OO and CTH A would function at a level of service of F in the year 2020. If USH 41 were upgraded to 6 lanes, the segment would function at a level of service D. For the no interchange option the level of service was F and C respectively.

With a partial interchange at CTH A and 4 lanes on USH 41, the freeway segment between CTH A and STH 47 would function at a level of service of E in the year 2020. If USH 41 were upgraded to 6 lanes, the freeway segment would function at a level of service of C. For the no interchange option the level of service was F and C respectively.

The ramp terminals onto USH 41 at CTH A would have an adverse impact on USH 41 traffic. However, converting USH 41 to a six-lane facility at the time of ramp construction would reduce this adverse impact. Exhibit 19 shows the traffic volumes and level of service for year 2020. The ramp junctions for both the southbound on-ramp and northbound off ramp at USH 41/CTH A interchange would be a level of service F. If USH 41 were upgraded to 6 lanes the junction at the southbound on-ramp would be a level of service D.

The partial interchange has a positive impact on the USH 41 traffic at the ramp terminals for the USH 41 and STH 47 interchange. The ramp junction for the southbound on-ramp at USH 41/ STH 47 would be a level of service D in the year 2020 for a four-lane facility on USH 41. The level of service would be C for a six-lane facility. Although the level of services did not change from the no interchange alternative the numbers are slightly better for the partial interchange alternative. The ramp junction for the northbound off-ramp at USH 41/ STH 47 would be a level of service E in the year 2020 for a four-lane facility on USH 41. The level of service would be C for a six-lane facility. For the northbound off-ramp at USH 41/ STH 47 would be a level of service E in the year 2020 for a four-lane facility on USH 41. The level of service would be C for a six-lane facility. For the no interchange alternative the level of services are E and D respectively.

If USH 41 is not reconstructed to six-lanes at the time of the ramp construction the ramp lengths could be increased from the typical design lengths shown in the FDM. Increasing the on and off ramp tapers at CTH A and the northbound on-ramp and southbound off-ramp at STH 15/CTH OO would help improve the level of service at the ramp-freeway junction areas of influence until the volume of USH 41 through traffic has reached a level of service of F.

Because of the increased length of the ramps, the curved alignment of USH 41 and the uncertainty of the timing of the six lane upgrade, northbound and southbound auxiliary lanes from CTH A to STH 15/CTH OO will be required. Southbound and northbound

СТН "A" RAMP 6500 RAMP 4200 MERGE LOS MERGE LOS 4-LANES "F" 6-LANES "C" 4-LANES "D" 6-LANES "C" USH "41" 61400 RAMP 6500 RAMP 4200 DNERGE LOS 4-LANES "E" 6-LANES "C" FREEWAY LOS DNERGE LOS 74,400 4-LANES "E" 6-LANES "C" 4-LANES "F" 6-LANES "D" FREEWAY LOS 4-LANES "F" CAPITOL DRIVE 6-LANES "D" CTH "00" STH "15"

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auxiliary lanes would have a negative impact on the Capitol Drive Bridge over USH 41. This bridge has substandard clearance over USH 41 and is being evaluated for future needs. Auxiliary lanes on USH 41 would cause the span of the bridge to be longer. There would also be a negative impact on Rifle Range Road from the southbound auxiliary lane. The frontage road would need to be shifted to the north. However there is adequate right of way to rebuild Rifle Range Road with a 15-foot terrace from the property line and a 32' face of curb to face of curb roadway width. The Town of Grand Chute will be extending Grand Chute Boulevard to the west to tie into this ultimate location and typical section of Rifle Range Road.

Ramp spacing adversely affects the level of service if the merge or diverge influence areas overlap. According to the Highway Capacity Manual, diamond interchanges would have to be spaced less than one mile apart for this to be a concern. CTH A is a mile and a half northeasterly from the CTH OO/ STH 15 interchange as well as a mile and a half west of the STH 47 interchange.

Anyone exiting northbound USH 41 at CTH A could be redirected to northbound USH 41 via signing south on CTH A, east on CTH OO, north on STH 47 to the USH 41 northbound on-ramp. There is no gas; food or lodging in this area so the through traffic wishing to reenter USH 41 should be minimum.

**Impacts to STH 47.** The partial interchange at CTH A would have a positive affect on STH 47. Based on traffic projection, the partial interchange option would reduce the traffic on STH 47 and on the USH 41/ STH 47 interchange. The 2020 traffic on STH 47 north of USH 41 would decrease from 26600 ADT with the no interchange alternative to 21400 ADT for the partial interchange alternative. With a 19% reduction in traffic the partial interchange alternative would have a positive affect on the design of the STH 47/USH 41 interchange when it is upgraded. The reduced traffic could potentially reduce the length of turn lanes needed as well as the pavement depth.

**Impacts to STH 47/CTH A Intersection.** Just south of the STH47/CTH A intersection the CTH A traffic increases by 1,500 vehicles per day and STH 47 traffic decreases by 1500 vehicles per day in the year 2020 when comparing the partial interchange to the no interchange alternate. However, the amount of traffic at the "T" intersection of STH 47 and CTH A would be reduced by one half of the 1500 vehicles because the southbound traffic on CTH A by passes the "T" intersection as shown in Exhibit 3. Based on continuing with the stop control on CTH A at STH 47 and the 2020 traffic projections, the level of service is A for STH 47 and F for CTH A. The critical movement affecting the operations of the intersection is the left turn movement from CTH A to northbound STH 47. Under the partial interchange alternate.

The levels of services are based on weekday traffic counts/projections as shown in Exhibit 18. They do not take into account the large volumes of recreational/weekend traffic. These volumes are over 70% higher than the weekday traffic and should be taken

into account when the intersection is analyzed. WisDOT is analyzing this intersection under a separate project.

**Impacts to the Community.** The partial interchange alternative would have a positive impact for the community and the traveling public. According to the OD study, CTH A had 1,355 through trips, which was the fourth highest percentage for the Appleton Area. USH 41, USH 45 north and USH 45 South were the only locations that had higher percentages of through traffic. With the partial interchange the through traffic would be able to access USH 41 without using CTH OO and CTH A south of USH 41.

The noise impact on the residences on the south side of USH 41 is already severe. The construction of the northbound off-ramp in the southwest quadrant of USH 41 and CTH A would move some of the noise closer to the residents. The severe noise impacts would have to be addressed when lanes are added to USH 41. The estimated cost of a noise wall along the northbound off-ramp is \$500,000.00.

Under the partial interchange alternate traffic along the developed area on CTH A south of USH 41 would be reduced. The reduced traffic would improve the safety along CTH A and CTH OO, including the school zone area of Houdini School.

Under this alternative there would be some impacts to Mud Creek. The box culvert would need to be extended under the northbound-off ramp. North of USH 41 widening of CTH A would impact either Mud Creek on the eastside of CTH A or wetlands on west side of CTH A.

A small amount of right of way would be needed for the construction of the northbound off-ramp and southbound on-ramp.

**Road User Costs.** The partial interchange alternate eliminates the road user costs associated with the no interchange alternate because the indirection of using STH 47 to go west/south on USH 41 would be eliminated. Without the southbound on-ramp and northbound off-ramp at CTH A, motorists will travel on the average 5,500 extra miles per day over the next 20 years by traveling STH 47 to reach USH 41. The partial interchange would eliminate about \$7,000,000 in user cost associated with the extra travel to STH 47 over the next 20 years. Based on state wide crash rates the interchange alternates would potentially eliminate about 50 accidents associated with the extra 40 million miles traveled over the next 20 years.

The partial interchange would also eliminate the indirection and inconvenience of the CTH A to CTH OO route south of USH 41. Over the next 20 years an average of about 5,000 vehicles per day will use CTH A and CTH OO to reach USH 41 and points south and west if there is no partial interchange at CTH A and USH 41. This is a slower and longer route through a fully developed urban area as compared to the USH 41 route that would be available if there was a southbound on-ramp and northbound off-ramp to USH 41 at CTH A. Access to USH 41 at CTH A would save about \$2,500,000 in user costs over the next 20 years. The statewide average crash rate is less for an urban interstate

facility than non-interstate facilities. Based on the reduce travel length and the reduction in the average crash rate, 120 traffic crashes over the 20 year period could potentially be eliminated.

The partial interchange alternative would save about \$9,500,000 in road user costs and could potentially eliminate a total of 170 accidents over the next 20 years. The parameters and assumptions used to compute the road user costs are contained in Appendix H.

**Construction Costs.** Adjusting the actual costs of the completed USH 41 and Ballard Road interchange, the cost of the partial interchange alternate, including noise wall along the northbound off-ramp in the southwest quadrant would be about \$2,500,000.00. This does not include the cost of auxiliary lanes or impacts from the auxiliary lanes such as reconstructing Rifle Range Road or the increased length of the Capitol Drive Bridge over USH 41.

### **FULL INTERCHANGE ALTERNATIVE**

This alternative would involve adding a ramp in each of the quadrants for a complete diamond interchange. This would change the existing traffic patterns by allowing all movements between USH 41 and CTH A. The capacity analysis for the existing traffic can be found in Appendix G.

**Impacts to CTH A.** Building a full diamond interchange at CTH A would increase the traffic on CTH A north and south of USH 41 when compared to the no build or the partial interchange alternative. Exhibit 20, 21 and 22 show the current and projected traffic for this alternate.

Based on projected traffic volumes CTH A would warrant 4 lanes. Under this alternate, the capacity of two lanes on CTH A south of USH 41 would be exceeded as soon as the interchange was opened.

Traffic on CTH A north of USH 41 would increase about 10 % when compared to the partial interchange alternate and about 46% when compared to the no interchange alternative. CTH A between USH 41 and CTH JJ would warrant 4 lanes. The added traffic on CTH A north of CTH JJ would warrant a stronger pavement structure on the existing two lanes. An overlay would be warranted by the year 2020.

This alternate reduces the traffic on CTH JJ to the east of CTH A by about one third. As with the partial interchange alternate, the stop sign controlled intersection of CTH A and CTH JJ to the east would be over capacity when the full interchange opens. It would need to be analyzed and reconstructed to a roundabout or signalized. A signalized intersection with the exiting geometrics would function at a LOS F in the year 2020. With four lanes on CTH A and no separate left turn lane, a signalized intersection would function at a LOS "C" in the year 2020.





WisDOT TF&A Section RAP Corrected 14-Oct-98
TOWN OF BLACK CREEK		-5300- TOWN OF CENTER 7200 CTH S	STH 47 CTH 0 -7600- 11200	-11600- -19000 USH 41
USH 41-CTH A INTERCHANGE ALTERNATIVES PROJECT ID: 1123-09-00 ROUTE: CTH A COUNTY: OUTAGAMIE DISTRICT: 3 ALTERNATIVE 2: FULL INTERCHANGE ALTERNATIVE 2: FULL INTERCHANGE	CTH A -10600- *2400* -15700 -2700- 3900	*000* = 1997 COUNT -000- = 2000 000 = 2020 9700	-5300- 6800 -8600- 12300 - CTH JJ	-13400- 6000 18700 -15800 -15800- 700 24400 -15800- 6000

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EXHIBIT 22

**Impacts to USH 41.** Under the full interchange alternate, the traffic on USH 41 would increase on both sides of CTH A as compared to the no build alternate. The traffic would warrant upgrading USH 41 to six lanes in the year 2014 west of CTH A and in the year 2013 east of CTH A. Exhibit 23 shows the traffic volumes and levels of service for this alternate.

With a full interchange at CTH A, the freeway segment on USH 41 between STH 15/CTH OO and CTH A would function at a level of service of F in the year 2020. If USH 41 were upgraded to 6 lanes, the segment would function at a level of service D. For the no interchange option the level of service was F and C respectively.

With a full interchange at CTH A and 4 lanes on USH 41, the freeway segment between CTH A and STH 47 would function at a level of service of F in the year 2020. If USH 41 were upgraded to 6 lanes, the freeway segment would function at a level of service of D. For the no interchange option the level of service was F and C respectively.

The full interchange alternate would increase the ADT on USH 41 east of STH 47 by 4,000 vehicles when compared to the no interchange alternative. There would also be a decrease in the ADT on CTH OO east of CTH A of 4400 vehicle. This change in traffic suggests that some vehicles are choosing to use USH 41 instead of CTH OO. The freeway segment east of STH 47 would function at a level of service of F in the year 2020. If USH 41 were upgraded to 6 lanes, the freeway segment would function at a level of service was F and D respectively.

The addition of the ramps would have an adverse impact on USH 41 traffic. However converting USH 41 to a six-lane facility at the time of the interchange construction would reduce this adverse impact. Exhibit 23 shows the traffic volumes and levels of service for the ramp junctions and freeway segments for this alternate.

If USH 41 is not reconstructed to six-lanes at the time of the ramp construction, the ramp lengths could be increases from the typical design lengths shown in the FDM. Increasing the on and off ramp tapers would help improve the level of service at the ramp-freeway junction areas of influence until the volume of USH 41 through traffic has reached a level of service of F. If longer ramp tapers and/or auxiliary lanes are added, the impacts for the area between CTH A and STH 15/ CTH OO would be the same as the partial interchange option.

**Impacts to STH 47.** The full interchange alternative would have a positive affect on STH 47. Based on traffic projections, the full interchange would reduce the traffic on STH 47 and at the USH 41/STH 47 interchange. The 2020 traffic on STH 47 north of USH 41 would decrease from 26600 ADT with the no interchange alternative to 19000 ADT for the full interchange alternative. STH 47 south of USH 41 would decrease from 28400 ADT to 21000 ADT. With an approximate 26% reduction in traffic, the full interchange alternative would have a positive affect on the design of the STH 47/USH 41



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EXHIBIT 23

interchange when it is upgraded. The reduced traffic could potentially reduce the length of turn lanes needed as well as the pavement depth

**Impacts to STH 47/ CTH A Intersection.** Just south of the STH47/CTH A intersection, the CTH A traffic would increase by 2,300 vehicles per day in the year 2020 when comparing the full interchange to the no interchange alternate. However, the amount of traffic at the "T" intersection of STH 47 and CTH A would be reduced by one half of the 2,300 vehicles because the southbound traffic on CTH A by passes the "T" intersection as shown in Exhibit 3. Based on continuing with the stop control on CTH A at STH 47 and the 2020 traffic projections, the level of service is A for STH 47 and F for CTH A. The critical movement affecting the operations of the intersection is the left turn movement from CTH A to northbound STH 47. Under the full interchange alternative this movement is about 25 percent higher than the no interchange alternate.

The levels of services are based on weekday traffic counts/projections as shown in Exhibit 22. They do not take into account the large volumes of recreational/weekend traffic. These volumes are over 70% higher than the weekday traffic and should be taken into account when the intersection is analyzed. WisDOT is analyzing this intersection under a separate project.

**Impacts to the Community.** The full interchange alternative would have a negative impact on the community because this option would increase the traffic on CTH A between Capitol Drive and USH 41 when compared to the no interchange and partial interchange alternates. The traffic on Capitol Drive west of CTH A would also increase. The volume of traffic on CTH A between CTH OO and Capitol Drive would not be significantly different than that for the no interchange alternate. However the ADT is projected to be 7000 vehicles more than the partial interchange option. These increases would have an adverse effect on the primarily residential development in the area.

One positive impact for the community would be that the characteristics of traffic through the residential area would change because the through traffic consisting of a large percentage of heavy trucks would have access to USH 41 without using CTH OO and CTH A south of USH 41.

The noise impact on the residences on the south side of USH 41 is already severe. The construction of ramps at USH 41 and CTH A would move some of the noise closer to the residents. The severe noise impacts would have to be addressed when lanes are added to USH 41. The estimated cost of a noise wall along the northbound off-ramp and the northbound on-ramp is \$1,000,000.

Under this alternative there would be impacts to Mud Creek. The box culvert would need to be extended to accommodate a wider roadway on CTH A, the southbound off-ramp and northbound off-ramp. The southbound off ramp would also impact wetlands. North of USH 41 widening of CTH A would impact either Mud Creek on the east side of CTH A or wetlands on west side of CTH A.

Some right-of-way in each of the quadrants may be required for the construction of the ramps.

**Road User Costs.** The full interchange alternate would have the same impact to road user costs as the partial interchange alternative. It would eliminate the road user costs associated with the no interchange alternate because the indirection of using STH 47 to go west/south on USH 41 would be eliminated as well as eliminating the indirection and inconvenience of the CTH A to CTH OO route. Without the ramps at CTH A, motorists will travel on the average 5,500 extra miles per day over the next 20 years to reach USH 41 via STH 47. The full interchange would eliminate about \$7,000,000 in user cost associated with the extra travel to STH 47 over the next 20 years. Based on state wide crash rates the interchange alternates would potentially eliminate about 50 accidents associated with the extra 40 million miles traveled over the next 20 years.

The full interchange would also eliminate the indirection and inconvenience of the CTH A to CTH OO route south of USH 41. Over the next 20 years an average of about 5,000 vehicles per day will use CTH A and CTH OO to reach USH 41 and points south and west if there is no ramps at CTH A and USH 41. This is a slower and longer route through a fully developed urban area as compared to the USH 41 route that would be available if there was a southbound on-ramp and northbound off-ramp to USH 41 at CTH A. Access to USH 41 at CTH A would save about \$2,500,000 in user costs over the next 20 years. The statewide crash rate is less for an urban interstate facility than non-interstate facilities. Based on the reduced travel length and the reduction in the average crash rate, 120 traffic crashes over the 20-year period could potentially be eliminated.

The total savings for the full interchange alternative would be about \$9,500,000 in user costs and could potentially eliminate a total of 170 accidents over the next 20 years. The parameters and assumptions used to compute the road user costs are contained in Appendix H.

**Construction Costs.** By adjusting the actual costs of the completed USH 41 and Ballard Road interchange, the cost of a full diamond interchange with noise walls along the south side would be about \$3,500,000. This does not include the cost of auxiliary lanes or impacts from the auxiliary lanes such as reconstructing Rifle Range Road or the increased length of the Capitol Drive Bridge over USH 41.

#### RECOMMENDATION

It is our recommendation that a partial interchange be planned for and built at the USH 41 and CTH A intersection. The OD Study showed that CTH A had 1,355 through trips, which was the fourth highest percentage for the Appleton Area. This was only surpassed by the percentages on USH 41, USH 45 north and USH 45 south. The OD study also showed that the largest concentration of heavy trucks in the Appleton Area was on CTH A north of USH 41. 1,224 of the 7,560 trips (16.2%) were with heavy trucks. The OD study also indicated that 25% of all heavy trucks on CTH A have an origin and

destination beyond the Appleton area west or south on USH 41. The partial interchange alternative would allow the through traffic to access USH 41 at CTH A without using the local street system through the residential area to access USH 41 at CTH OO.

The partial interchange has some impacts to USH 41. Most of the impacts are a shift of the impact from the adjacent interchanges. Vehicles accessing USH 41 at the partial interchange would deduct from the number of vehicles accessing USH 41 at CTH OO/STH 15 and the STH 47 interchanges. Capacity concerns for the ramp junctions could be reduced by the construction of auxiliary lanes from CTH A to STH 15/CTH OO. The negative impacts of the interchange could be further reduce by building the partial interchange at the time that USH 41 is upgraded to 6 lanes.

**Interchange Project Evaluation Guidelines.** The partial interchange meets most of the Wisconsin Department of Transportation criteria for Interchange Project Evaluation Guidelines-Backbone Program Preliminary Draft-February 18, 2004. The first of the minimum criteria indicates that the interchange must be consistent with local land use and transportation plans and/or supported in writing by local officials. The existing East Central Wisconsin Regional Planning Commission's (ECWRPC) Long Range Transportation/Land Use Plan for the Fox Cities Urbanized Area does not include a partial interchange at CTH A and USH 41. However ECWRPC is in the process of updating the plan. ECWRPC supports a partial interchange at this location. See Appendix I. The Town of Grand Chute's Comprehensive Land Use Plan does include a partial interchange at CTH A. Outagamie County has approved a partial interchange at CTH A and USH 41 contingent upon the Wisconsin Department of Transportation addressing concerns at the intersection of CTH A and STH 47.

The second criterion is that the interchange must meet minimum spacing requirements of 2 miles for rural and 1 mile for urban. The partial interchange meets this requirement. The STH 15/CTH OO interchange to the southwest is located one and one half miles away. The STH 47 interchange to the east is also one and one half miles away from CTH A.

The third criterion is that the mainline LOS should be LOS C or better, or no worse than existing LOS. The existing LOS on USH 41between STH 15/CTH OO and STH 47 is D. In 2020 this USH 41 freeway segment will be at a LOS F for a 4-lane facility and C for a 6-lane facility. For the partial interchange option and 2020 traffic, the USH 41 segment between STH 15/CTH OO and CTH A would function at a LOS of F for a 4-lane facility and D for a 6-lane facility. The LOS for the USH 41 segment between CTH A and STH 47 would improve to E for the 4-lane facility and C for a 6-lane facility.

The ramp merge, ramp diverge and weaving movements should be LOS C or better. The CTH A southbound on-ramp, the STH 47 southbound on-ramp and the STH 47 northbound off-ramp meet this criteria with USH 41 as a 6 lane facility. The CTH A northbound off-ramp would meet this criterion if the taper length of the off ramp were lengthened to 500 feet. The LOS for the STH 47 northbound off-ramp improves under the partial interchange alternative for the 6-lane facility from D to C.

The next criterion indicates that the environmental issues need to be able to be addressed through the environmental process. This should not be a concern for the partial interchange alternative. The partial interchange option has a positive impact on the community and traveling public. Noise walls will mitigate the noise problems along USH 41. The impacts to Mud Creek and the associated wetlands will be mitigated adjacent to Mud Creek upstream on the Town of Grand Chute's property.

The next criterion deals with traffic volumes. The traffic on CTH A and USH 41 exceed the required traffic volumes for adding a new interchange to an existing freeway.

**FHWA Interchange Criteria.** The Wisconsin Department of Transportation is considering using the 8 FHWA Interchange Criteria for the backbone system as well as the interstate system. Each criterion is listed below followed by how the partial interchange alternative addresses that criterion.

1. The existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal.

The existing interchange at STH 47 is reaching capacity. For year 2000 ADT the southbound on ramp and northbound off ramp function at a LOS D. The addition of the partial interchange at CTH A will improve the conditions at the STH 47 interchange and the STH 15/CTH OO interchange, as well as reduce the through traffic from the local road system.

The OD study indicates that CTH A had 1,355 through trips, which was the fourth highest percentage for the Appleton Area. It also showed that the majority of those through trips are heading or coming from the south. This through traffic is entering USH 41 at the CTH OO/STH 15 interchange, which requires this through traffic to cross over USH 41 and continue on CTH A through a developed area before having access to USH 41.

### 2. All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included for accommodating such facilities if a future need is identified.

The partial interchange option is a reasonable design alternative. The no interchange option does not remove the through traffic from the local road system or improve the adjacent interchanges. The full interchange option provides for access to USH 41 for the though traffic. However it also has negative impacts to the community and additional negative environmental impacts. Because of the geometrics of USH 41 and the environmental constraints north of USH 41 there are no other reasonable design options.

3. The proposed access point does not have a significant adverse impact on the safety and operation of the Interstate facility based on an analysis of current and future traffic. The operational analysis for existing conditions shall, particularly in urbanized areas, include an analysis of sections of Interstate to and including at least the first adjacent existing or proposed interchange on either side. Crossroads and other roads and streets shall be included in the analysis to the extent necessary to assure their ability to collect and distribute traffic to and from the interchange with new or revised access points.

The partial interchange alternative does not have a significant impact to USH 41 if the interchange is constructed when USH 41 is upgraded to a 6-lane facility. The partial interchange option would have a small negative impact to the CTH A/USH 41 ramp junctions. However it would have a positive impact at the adjacent interchanges.

4. The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" for special purpose access for transit vehicles, for HOV's, or into park and ride lots may be considered on a case-by-case basis. The proposed access will be designed to meet or exceed current standards for Federal-aid projects on the Interstate System.

The partial interchange connects to a public road but does not provide for all traffic movements. The partial interchange addresses the need for through traffic heading south on CTH A and west to access USH 41 southbound. The through traffic that is heading south on CTH A and desires to head north or east on USH 41 is accommodated by the interchange at STH 47 and the local road system north of USH 41. Because of the geometry of USH 41 and the interchange at STH 47 there is not a need for a full interchange at CTH A. The full interchange increases traffic in the developed area south of USH 41. The full interchange has additional negative environmental impacts and does not have the support of Grand Chute and Outagamie County.

Northbound USH 41 through traffic could be redirected to northbound USH 41 via signing on CTH A, east on CTH OO, north on CTH 47 to the USH 41 northbound on-ramp.

5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to final approval, all requests for new or revised access must be consistent with the metropolitan and/or statewide transportation plan, as appropriate, the applicable provisions of 23 CFR part 450 and the transportation conformity requirements of 40 CFR parts 51 and 93.

Applicable provisions of 23 CFR part 450 indicate that the plan must conform to the regional plan. The partial interchange is included in Grand Chute's Comprehensive Land Use Plan. The existing East Central Wisconsin Regional Planning Commission's Long Range Transportation/Land Use Plan for the Fox Cities Urbanized Area does not include a partial interchange at CTH A and USH 41. However East Central is in the process of updating the plan. East Central supports a partial interchange at CTH A and USH 41.

Outagamie County has approved a partial interchange at CTH A and USH 41 contingent upon the Wisconsin Department of Transportation addressing concerns at the intersection of CTH A and STH 47.

Transportation conformity requirements of 40 CFR parts 51 and 93 deal with nonattainment areas. This does not apply in the Town of Grand Chute.

6. In areas where the potential exists for future multiple interchange additions, all requests for new or revised access are supported by a comprehensive Interstate network study with recommendations that address all proposed and desired access within the context of a long term plan.

This criterion does not apply to this location due to the adjacent interchange spacing.

7. The request for a new or revised access generated by new or expanded development demonstrates appropriate coordination between the development and related or otherwise required transportation system improvements.

The request for the partial interchange is based on the OD study showing that CTH A carries a high percentage of through traffic and that through traffic has a large percentage of heavy trucks. This traffic is currently crossing over USH 41 and traveling through a developed area before entering USH 41 at the CTH OO/STH 15 interchange.

There is some planned development on CTH A north of USH 41 that is consistent with Grand Chute's Comprehensive Land Use Plan. The amount of development is limited because of the environmentally sensitive area north and west of USH 41 and CTH A. All development would be consistent with a partial interchange.

8. The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.

Grand Chute has already included the partial interchange in their Comprehensive Land Use Plan. ECWRPC supports the partial interchange alternative and is in the process of updating the Fox Cities Long Range Transportation/Land Use Plan. Outagamie County has approved a partial interchange at CTH A and USH 41 contingent upon the Wisconsin Department of Transportation addressing concerns at the intersection of CTH A and STH 47. An environmental assessment is in the process of being finalized on the partial interchange.

# APPENDIX A

PROJECT ID: 1123-09-00 ROUTE: CTH A LOCATION: USH 41-CTH A INI 2000, & 2020 AADT FORECAST

Truck Classification/Design Parameters for USH 41 Between STH 47 and the Proposed CTH A Interchanges

· A1	LTERNATIV	VE 1: NO	BUILD	
Truck Classif			Design	Parameters
Truck Type	%AADT		Factor	%AADT
2D	3.7		P(K1)	13.6
3AXSU+	1.7		K30	11.1
2\$1+2\$2	0.7		K50	10.8
3S2+ '	6.7		K100	10.2
DBL BTM	0.2		T(DHV)	10.5
TOTAL	13.0		T(PHV)	7.9
			D	55/45

ALTER	NATIVE 2:	FULL INT	TERCHANGE	
Truck Classi		6	Design Pa	rameters
Truck Type	%AADT		Factor	%AADT
2D :	3.7		P(K1)	13,4
3AXSŲ+	1.7		K30	10.9
2\$1+2\$2	1.0		K50	10.6
3\$2+ ·	6.8		K100	10.0
DBL BTM	0.2		T(DHV)	10.7
TOTAL	13.4		T(PHV)	8.1

ALTERNA	TIVE 3: 1/2	HALF SOL	JTH INTERCI	HANGE
Truck Classi		영국왕주관품	Design Pa	rameters
: Truck Type	%AADT		Factor	%AADT
2D !	3.7		P(K1)	13.6
3AXSU+	1.7		K30	11.1
281+2\$2	0.7		K50	10.8
3S2+ :	6.7		K100	10.2
DBL BTM	0.2		T(DHV)	10.5
TOTAL	13.0		T(PHV)	7.9
	••		D	55/45

The following major assumptions are reflected in the USH 41 Truck Classification and Design Parameters for Project ID: 1123-09-00:

D

 Truck classification data is based on Vehicle Classification data collected in 1996 on USH 41 North of USH 10/Wisconsin Av; (Site ID: 440165/WIM Site 14C06). With the changes in access to USH 41 under Alternatives 2 & 3, the truck classification data is adjusted based on the site North of USH 10. This reflects the basic assumption that under the existing no access conditions at USH 41-CTH A, significant numbers of trucks on CTH A North of CTH JJ are using a CTH A to CTH JJ to STH 47 route to access USH 41. Alternatives 2 & 3 provide different levels of access at USH 41-CTH A.

55/45

2. Design parameters are based on ATR STA. 5-0001, 1.5 Mi. N. of Outagamie-Brown Co. line as well as Factor Group 1- Urban Interstate values.

WisDOT Traffic Forecasts & Analysis Section Robert Pike Feb 14, 1999

PROJECT ID: 11 ROUTE: CTH A LOCATION: USI 2000, & 2020 AADT FORECAST

Truck Classification/Design Parameters

<u>A</u>	LTERNATIV	E 1: NO BUILD	
Truck Classi	fication	the second s	Parameters
Truck Type 2D 3AXSU+ 2S1+2S2 3S2+ DBL BTM TOTAL	<u>%AADT</u> 3.2 3.5 1.9 0.8 0.2 9.6	Factor P(K1) K30 K50 K100 T(DHV) T(PHV) D	<u>%AADT</u> <u>13.1</u> 11.2 11.0 10.4 7.7 5.8 55/45

	ERCHANGE	2
Truck Classification	Design Pa	arameters
Truck Type%AADT2D3.2	Factor P(K1)	%AADT
3AXSU+ 3.5 281+282 4.2	K30	12.1 10.7
3S2+ 1.4	K50 K100	10.5 10.0
DBL BTM 0.2 TOTAL 12.5	T(DHV) T(PHV) D	10,0 7.5 55/45

ALTERN	ATIVE 3: 1/2	HALF SOUTH INTERC	HANGE
Truck Class	ification	Design Pa	
Truck Type 2D 3AXSU+ 2S1+2S2 3S2+ DBL BTM TOTAL	%AADT           3.2           3.5           3.1           1.1           0.2           11.1	Factor P(K1) K30 K50 K100 T(DHV) T(PHV) D	<u>%AADT</u> 12.4 10.9 10.6 10.1 8.9 6.7 55/45

The following major assumptions are reflected in the Truck Classification and Design Parameters for Project ID: 1123-09-00;

 Truck classification data is based on Vehicle Classification data collected in 1996 on CTH A North of Capitol Dr. (Site ID: 441216) and in 1993 on CTH A North of CTH JJ (Site ID: 440073). Alternative 1: No Build is based on the site North of Capitol Dr. With the changes in access to USH 41 under Alternatives 2 & 3, the truck classification data is adjusted based on the site North of CTH JJ. This reflects the basic assumption that under the existing no access conditions at USH 41-CTH A, significant numbers of trucks on CTH A North of CTH JJ are using a CTH A to CTH JJ to STH 47

route to access USH 41. Alternatives 2 & 3 provide different levels of access at USH 41-CTH A.
Design parameters are a composite of Factor Group 2, Urban Other and Factor Group 4, Rural Other values reflecting the existing rural character evolving to a more urban character over the forecast period.

WisDOT Traffic Forecasts & Analysis Section Robert Pike Dec 16,1998

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PROJECT ID: 62 ROUTE: STH 47 LOCATION: USI 2002, 2012 & 2022

### Truck Classification/Design Parameters

Truck Classif	ication	Design ]	Parameters
<u>Truck Type</u> 2D 3AXSU+ 2S1+2S2 3S2+ DBL BTM TOTAL	<u>%AADT</u> 2.6 1.9 1.3 1.2 0.2 7.2	Pactor P(K1): K30 <sup>-7</sup> K50 K100 T(DHV) T(PHV) D	*AADT 11.9 10.6 10.4 9.9 5.8 5.8 5.4 55/45

The following major assumptions are reflected in the 2002, 2012 & 2022 AADT Forecast for the USH 41-CTH OO segment of Project ID: 6240-05-00:

- 1. The forecast volumes are based on an analysis of historic raffic volumes and the 2020 ravel demand model for the Fox Cities area. Year 2020 Socio-Economic forecasts developed by the ECWRPC for the Fox Cities Area Long Range Transportation Plan adopted in July, 1997 are incorporated into the travel model. This land use plan reflects major residential development along the STH 47 corridor between CTH JJ and Evergreen Drive North of the project area. Continued moderate expansion of residential development is identified for the Richmond Street corridor South of USH 41 and the Capitol Drive corridor East and West of STH 47/Richmond Street.
- The estimated turning movements are based on a review of previous turning movement projections at the Richmond-Capitol intersection (1988) and the 1994 and 2020 turning movements generated in the Fox Cities travel model.
- 3. Truck classification data was obtained from site ID 441157 STH 47/Richmond North of CTH OO/Northland Av..
- 4. Design parameters are based on the functional classification of this segment of STH 47 as an urban principal arterial in Factor Group 2.

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WisDOT Traffic Forecasts & Analysis Section Robert Pike April 28,1998

APPENDIX B

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NAME OF STREETS	•	ст	H 47			STH	47						-	CTH	ł "A"								2		
SIREEIS		FROM		Н		FROM		H		FROM	EAST		. F		WEST	Г		TOTAL	S			PE	DESTR		
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9:15 - 9:30		40	21	61	0	26		26					28		0	28	87	28	115						
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		VOLU	UMMARY			
		-				
CTH "A" & STH 47	X	ALL VEHICLES				
3-30-00		-		SHOW STREET NAM	MES	

TRUCKS & BUSES ONLY

VEHICLE AND PEDESTRIAN

BY Brian Jacobs

LOCATION

DAY & DATE



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# VEHICLE AND PEDESTRIAN

	C	VOLU	IARY			
LOCATION	CTH "A" & STH "47"	X ALL VEHICLES			N	2
DAY & DATE	3-30-00	· .	SHOW STREET NAMES	w		E
WEATHER	BY Brian Jacobs	TRUCKS & BUSES ONLY			S	

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## VEHICLE AND PEDESTRIAN VOLUME SUMMARY

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WEATHER	BY Brian Jacobs TRUCKS & BUSES OF	

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PAGE 1 OF 2 ICLE AND PEDESTRIAN **VOLUM** --• . .-· · ..... . . . ... -5 **G** 

### ALTERNATE EVALUATION Table 1

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USH 41	Impacts and Costs	No Interchange	Partial Interchange	Full Interchange
West of A	Average Daily Traffic 2020	67,000	74,400	71,000
	% Traffic Increase 2020	-	11	6
ovrteo sie	LOS 2020 4-lane	F	F	F
	LOS 2020 6-lane	D	D	D
	Traffic Impacts		Negative	Negative
East of A	Average Daily Traffic 2020	67,000	61,400	72,000
	% Traffic Increase 2020	-	-8	7
TRUE OF A	LOS 2020 4-Lane	F	E	F
	LOS 2020 6-lane	С	C	D
	Traffic Impacts		Positive	Negative
East of 47	Average Daily Traffic 2020	74,000	74,000	78,000
	% Traffic Increase 2020	-	0	5
and the second	LOS 2020 4-Lane	F	F	F
	LOS 2020 6-lane	D	D	D
0	Traffic Impacts		None	Negligible
STH 15- STH 47	**Noise Impacts	Severe	Severe	Severe
	***Impact on Safety		Negative	Negative

\*\* Noise mitigation for the no interchange alternate would not have to be made at this time. It would take place at time of conversion to 6-lanes.

\*\*\* The addition of ramp terminals creates new points of friction for USH 41 traffic.

### ALTERNATE EVALUATION Table 2

CTH A	Impacts and Costs	No Interchange	Partial Interchange	Full Interchange
South of CTH OO	Average Daily Traffic 2020	29,000	29,000	33,800
	% Traffic Increase 2020	-	0	17
	Traffic Impacts	-	None	Negative
CTH OO to Capitol	Average Daily Traffic 2020	21,0000	14,0000	21,000
CTH OO to Capitor	% Traffic Increase 2020	-	-33	0
	Traffic Impact	-	Very Positive	Negligible
	D 11 TD 07 0000	17,0000	13,0000	23,000
Capitol to USH 41	Average Daily Traffic 2020	17,0000	-24	35
	% Traffic Increase 2020	-	Positive	Severe
	Traffic Impact	-	Positive	Severe
USH 41 - JJ East	Average Daily Traffic 2020	17,000	22,000	24,800
	% Traffic Increase 2020	-	29	46
	Traffic Impacts	-	Negative	Severe
JJ East - JJ West	Average Daily Traffic 2020	15,800	17,700	18,700
JJ East - JJ West	% Traffic Increase 2020	-	12	18
	Traffic Impacts	-	Negative	Negative
JJ West - CTH O	Average Daily Traffic 2020	10,000	11,500	12,300
JJ West-CIHO	% Traffic Increase 2020	-	15	23
	Traffic Impacts	-	Negative	Negative
		7.400		0 700
CTH O to STH 47	Average Daily Traffic 2020	7,400	8,900 20	9,700
	% Traffic Increase 2020 Traffic Impacts	-	Negative	Negative
			litegative	litegative
CTH OO – STH 47	* Road User Costs	2,500,000	0	0
	Pavement Structure Costs South of USH 41	-	-40,000	+60,000
	Pavement Structure Cost USH 41 to JJ West	-	+50,000	+90,000
	** Overlay Cost North 5 miles	-	+350,000	+350,000
	Construction Costs 41/A Intersection	1,500,000	2,500,000	3,500,000
	Accidents South of 41 20 years	-	-120	-120
<u></u>	*** Safety Impact South of USH 41	-	Positive	Negative
	Safety Impacts North of USH 41	-	Negative	Negative

CTH A	Impacts and Costs	No	Partial	Full
	<ul> <li>A 100 km</li> </ul>	Interchange	Interchange	Interchange

\* Road user costs are due to indirection and lower speed using CTH A and CTH OO to go south and west as compared to using USH 41.

\*\* Overlay cost to compensate for added traffic on new pavement. Actual overlay would take place when conditions warrant.

\*\*\* For the partial interchange alternate, safety not only improved by reduction of traffic, but also substantial reduction of trucks in a school zone.

#### ALTERNATE EVALUATION Table 3

STH 47	Impacts and Costs	No Interchange	Partial Interchange	Full Interchange
South of USH 41	Average Daily Traffic 2020	28,400	28,000	21,000
CONCE 19 7	% Traffic Increase 2020	01 - Clerif viteti -	-1	-26
	Traffic Impact	(-) company and all	Negligible	Very Positive
USH 41 to CTH JJ	Average Daily Traffic 2020	26,400	21,400	19,000
2월 4 5 1 2 2 2	% Traffic Increase 2020	- Cherringerein	-19	-28
	Traffic Impact	A 1-12 course al cal	Positive	Very Positive
CTH JJ to CTH O	Average Daily Traffic 2020	13,500	12,000	11,200
	% Traffic Increase 2020	-	-11	-17
	Traffic Impact	-	Positive	Positive
CTH O to CTH A	Average Daily Traffic 2020	9,500	8,000	7,200
	% Traffic Increase 2020	-	-16	-24
	Traffic Impact			
Capitol Dr to A	Traffic Impact	-	Positive	Positive
	*Road User Costs	7,000,000	0	0
7	** Pavement Structure Costs	-	-180,000	-340,000
	Accidents (20 years)	-	-50	-50
	Safety Impact	· -	Positive	Positive

\* Road user costs are due to the 2-mile indirection of traffic from the north wishing to travel west on USH 41.

\*\* Costs associated with the changes in design class are not included.

### ALTERNATE EVALUATION Table 4

Capitol Drive	Impacts and Costs	No	Partial	Full
		Interchange	Interchange	Interchange
West of CTH A	Average Daily Traffic 2020	4600	4600	5700
	% Traffic Increase 2020	-	0	24
	Traffic Impact	-	None	Negative
East of CTH A	Average Daily Traffic 2020	6000	6000	5600
	% Traffic Increase 2020	-	0	-7
	Traffic Impact	-	None	Positive

### ALTERNATE EVALUATION Table 5

CTH OO	Impacts and Costs	No	Partial	Full
	-	Interchange	Interchange	Interchange
West of CTH A	Average Daily Traffic 2020	36,800	31,400	31,200
	% Traffic Increase 2020	-	-15	-15
•	Traffic Impact	-	Positive	Positive
East of CTH A	Average Daily Traffic 2020	36,400	36,500	32,000
	% Traffic Increase 2020	-	1	-12
	Traffic Impact	-	Negligible	Positive

# APPENDIX C

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# 1993 ORIGIN-DESTINATION SURVEY

## FOR THE

# APPLETON AREA TRANSPORTATION STUDY

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### 1993 ORIGIN-DESTINATION SURVEY

## FOR THE

## APPLETON AREA TRANSPORTATION STUDY

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#### **KEY FINDINGS**

- An extensive origin-destination survey was conducted around the Appleton Urbanized Area during the latter half of May and all of June, 1993 to determine the vehicle travel patterns which currently exist.
- 2) Thirty-two interview stations recorded a factored total of 162,791 daily vehicle trips. The top three station locations and daily volumes are USH 41 south at 39,326; USH 41 north at 25,835; and USH 10W at 9,741. Station locations can be found on Figure 1 with detailed descriptions beginning on page 3.

- 3) The majority of trips surveyed were local trips (internal-external) with 82.9% (134,891 trips). Through trips accounted for the remaining 17.1% (27,900 trips). Graph #1 on the following page illustrates local and through trips by O-D station.
- 4) Of the 162,791 total trips recorded, 16,351 or 10% are considered medium and heavy duty trucks (page 67). The majority are local trips (65.9%) while the remaining 34.1% pass through the area.
- 5) Of the 27,900 through trips recorded, 15,484 or nearly 56% passed through the two USH 41 stations north and south of the Appleton urbanized area.
- 6) Winnebago County provided the greatest number of through trip ends or trips with either an origin or destination by county with 28.8%. Brown County followed with 19.2%.
- 7) The primary attraction zone was zone 206, a large tract of land representing the Fox River Mall along USH 41, with 6,233 or 4.6% of the total local trips. The entire study area was subdivided into 398 individual zones.
- 8) Autos accounted for 67.4% of the total trips while light trucks (pick-up, vans, etc.) accounted for 22.6%. The remaining 10% consisted of heavy trucks (delivery, semi-trailers, etc.). Graph #2 illustrates vehicle type by O-D station.
- 9) The largest destination trip purpose was the home trip with 50.8%. This was followed by the work trip with 24.7%. Time of the survey (10 AM - 6 PM) helps to explain the percentage split. Graph #3 illustrates trip purpose by O-D station.
- 10) Vehicle occupancy, the average number of people in each vehicle recorded throughout the entire survey, was tabulated at 1.41. Graph #4 illustrates vehicle occupancy by O-D station.

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### **BACKGROUND AND STUDY OBJECTIVES**

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An extensive origin-destination survey was conducted on the highway routes leading from Appleton as one of the initial steps in developing a long-range transportation plan for the Appleton Urban Area. The report examines the influence of externally generated vehicle trips which either originated in Appleton or pass completely through the area. Follow-up analyses will address the travel patterns within the urban zonal network. Previous work in the Appleton Urban Area included the Fox Valley Transportation Study which was initiated in 1969 as well as the Appleton Area Highway Network Plan report in 1977 and an update to the Fox Cities Highway Network Plan which was completed in 1986. Most of the recommendations in the plan are traffic operations modifications to the existing system. With the information collected in this latest survey as well as additional traffic counts and the demographic information contained in the 1990 census, a more comprehensive data base for development of the long-range transportation plan will be provided.

For analysis purposes the survey consisted of thirty-two data collection stations or one at nearly every roadway leading from Appleton as shown in Figure 1. These stations are located on the external fringe or away from the urban center of the city to better assess the complete pattern of highway travel from an areawide perspective. The survey was conducted starting in mid-May and lasting through the month of June, 1993 with operation taking place between the hours of 10 AM and 6 PM to ensure that the largest number of interviews possible were recorded with the motoring public. After compilation and tabulation of thousands of survey records, the data was then processed and factored upward to reflect a 24-hour traffic period at each of the 21 interview sites.

Nearly all interviews were conducted through a uniform procedure which incorporates stopping motorists as they approach the interview station and asking predetermined questions about their trip. At locations where average daily traffic volumes exceed approximately 12,000 such as the two sites on USH 41, motorists are given a survey card to be filled out and mailed back to the department at a later date. This process assists in speeding up the traffic flow and reduces the possibility for long vehicle delays. Essential questions asked included origin of the trip being made, destination of the trip, the type of vehicle used and primary purpose of the trip as well as the number of occupants in each vehicle.


One of the origin-destination survey's primary purposes was to answer questions concerning how much traffic passes through the study area without stopping (known as through trips). Also much of the traffic either enters from the outside and ends its trip in the study area (known as external to internal trips) or exits the study area and ends its trip elsewhere (known as internal to external trips).

#### INTERNAL ZONAL STRUCTURE

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On Figure 2 the internal traffic analysis zonal configuration for the Appleton Urban Area is shown. The area was divided into 398 separate geographic zones representing similar land use and/or commercial activity. The zones were referenced on the survey forms to determine where the motorist was traveling from and destined to.

An eight hour data collection sample of the origin-destination trips at each of the thirty-two survey stations provided the basis for the trip making behavior of all trips passing through each station. With the expansion of those trips to a 24-hour traffic count period, each interview station's daily number of trips was tabulated for analysis. External to internal and internal to external trips to and from the Appleton zonal network are considered local trips. The slash mark splits the total number of all vehicles from the number of larger or heavier type vehicles such as delivery trucks and semi-trailers with multiple axle configurations. Following are the 24-hour results for each interview station.

3	Station Location	Total Trips <u>All Veh/Hvy Trk</u>	Trip% <u>All Veh/Hvy Trk</u>
#30	STH 114, 1.4 MI S of USH 10 Local Trips Through Trips	6,072/379 608/114	91%/ 77% 9%/ 23%
•	TOTAL	6,680/493	100%/100%
#31	USH 10E, 1.0 MI E of CTH "N" Local Trips Through Trips	4,527/316 <u>952/205</u>	83%/ 61% 17%/ 39%
	TOTAL	5,479/521	100%/100%
#32	STH 55S, 0.3 MI N of Schmidt Rd. Local Trips Through Trips	2,568/331 429/110	86%/ 75% 14%/ 25%
	TOTAL	2,997/441	100%/100%



FIGURE 2

a Sector	nan di seconda di S	Total Trips	Trip%
5	Station Location	All Veh/Hvy Trk	All Veh/Hvy Trk
#33	CTH "KK", 0.1 MI E of CTH "GG"		
100	Local Trips	1,860/82	97%/94%
	Through Trips	63/ 5	3%/ 6%
	TOTAL	1,923/87	100%/100%
	Old Land Del O 1 MI W of USU 45	3.1 Fits for M 108, 0 2 11	rel Heu Mar
#34	Shady Lane Rd., 0.1 MI W of USH 45	248/14	92%/100%
	Local Trips	22/ 0	8%/ 0%
	Through Trips		· FATTER
	TOTAL	270/14	100%/100%
#35	STH 150, 2.0 MI W of USH 45	560 HTT 1. W HA 0.7	
#33	Local Trips	4,668/260	90%/ 63%
,	Through Trips	528/153	10%/ 37%
, a.c.	TOTAL	5,196/413	100%/100%
			171 STS 26
#36	Oakridge Rd., 0.8 MI W of USH 45		
	Local Trips	412/18	91%/72%
	Through Trips	40/ 7	9%/ 28%
	TOTAL	452/25	100%/100%
107		MIT TO BE R SAFE O , LA 1	V73 Mayfrones
#37	W Breezewood Ln., 0.6 MI W of USH 45	1,238/43	93%/84%
	Local Trips	95/ 8	7%/ 16%
	Through Trips	-	
	TOTAL	1,333/51	100%/100%
#38	CTH "G", 0.2 MI E of CTH "T"	THE BED TO MEMORY AND	N RIO EV.
1150	Local Trips	1,135/9	88%/27%
6.11	Through Trips	149/24	12%/ 73%
1.26		1,284/33	100%/100%
	TOTAL	1,204/35	100 /01 100 /0
#39	CTH "GG", 0.4 MI W of USH 45	(Ipollais, J. 10 PL 169 S. 1	
	Local Trips	959/19	64%/25%
	Through Trips	544/58	36%/75%
	TOTAL	1,503/77	100%/100%
		A stand to M M A.O.	is Merete St
#67	CTH "BB", 0.8 MI W of USH 45	1 404/20	0201060
	Local Trips	1,424/62	92%/86% 8%/14%
	Through Trips	127/10	in a second second
	TOTAL	1,551/72	100%/100%
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	Station Location	* 	Total Trips <u>All Veh/Hvy Trk</u>	Trip% <u>All Veh/Hvy Trk</u>
#68	USH 10W, 2.0 MI W of USH 45 Local Trips Through Trips		8,771/ 990 970/122	90%/ 89% _10%/ 11%
2	TOTAL		9,741/1,112	100%/100%
#69	USH 45N, 2.0 MI N of STH 76 Local Trips Through Trips		7,668/409 1,559/362	83%/ 53% 17%/ 47%
	TOTAL		9,227/771	100%/100%
#70	CTH "JJ", 1.0 MI W of STH 76 Local Trips Through Trips		2,134/103 	88%/ 72% _12%/ 28%
	TOTAL		2,414/144	100%/100%
#71	STH 76, 0.9 MI N of CTH "JJ" Local Trips Through Trips		1,680/ 91 421/ 74	80%/ 55% 20%/ 45%
	TOTAL		2,101/165	100%/100%
#72	Mayflower Rd., 0.3 MI N of CTH Local Trips Through Trips TOTAL	"]]"	464/33 <u>48/ 9</u> 512/42	91%/ 79% <u>9%/ 21%</u> 100%/100%
#73	CTH "A" N, 1.2 MI N of CTH "JJ	1		
	Local Trips Through Trips	*	6,205/ 843 <u>1,355/ 381</u>	82%/ 69% 18%/ 31%
	TOTAL	3 · •	7,560/1,224	100%/100%
#74	STH 47, 0.8 MI N of Broadway Local Trips Through Trips		6,651/ 891 586/ 143	92%/ 86% 
	TOTAL		7,237/1,034	100%/100%
#75	Meade St., 0.6 MI N of Broadway Local Trips Through Trips	a a a a a a a a a a a a a a a a a a a	1,398/33 14/_0	99%/100% _ <u>1%/_0%</u>
	TOTAL		1,412/33	100%/100%

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i.	Station Location	Total Trips All Veh/Hvy Trk	Trip% All Veh/Hvy Trk
	Station Location	All VCI/IIVY IIK	All VOITIVY TIK
#76	CTH "EE", 1.0 MI N of CTH "E"		- 10. J - 178
	Local Trips	2,081/116	97%/97%
	Through Trips	70/ 4	3%/ 3%
	TOTAL	2,151/120	100%/100%
#77	CTH "E", 0.2 MI W of French Rd.	ant dire under die eine	
	Local Trips	3,201/248	93%/ 89%
	Through Trips	247/ 32	7%/ 11%
	TOTAL	3,448/280	100%/100%
#78	French Rd., 0.3 MI N of Broadway		
<i>π</i> 70	Local Trips	446/36	97%/100%
	Through Trips	<u>_16/_0</u>	3%/ 0%
2022 	TOTAL	462/36	100%/100%
#70	CTH "N", 0.3 MI N of CTH "JJ"	2 Y	
#79	Local Trips	2,620/225	95%/82%
8200	Through Trips	137/ 50	5%/ 18%
	TOTAL	2,757/275	100%/100%
* 809	IOIAL	2,1311213	100/0/100/0
#80	STH 55N, 0.6 MI N of Coenen Rd.	The STREET And and a star	ALL REAL PORT
	Local Trips	2,331/207	88%/71%
	Through Trips	310/ 85	12%/ 29%
	TOTAL	2,641/292	100%/100%
#81	CTH "J", 0.2 MI N of CTH "JJ"	*	
	Local Trips	747/56	93%/ 77%
	Through Trips	_54/17	7%/ 23%
	TOTAL	801/73	100%/100%
#82	USH 41N, Weigh Station	through the orbital areas	visio quito has
102	Local Trips	17,575/1,923	68%/ 53%
	Through Trips	8,260/1,734	32%/ 47%
108 10	TOTAL	25,835/3,657	100%/100%
som s	이 가슴이 가지 않는 것이 가지 않는 것이 있다. NAMAC 이 가지 않았다. 이 가슴가지? 	G. 201 1050.017000 0700.01900	
#83	STH 96, 0.4 MI E of CTH "JJ"	noch verhen so strips (5.6	0001500
ad for	Local Trips	2,494/129	90%/58%
	Through Trips	282/ 95	10%/ 42%
	TOTAL	2,776/224	100%/100%
		solutions descent on the start	112 22 2000 200

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	Station Location	ж 1	Total Trips <u>All Veh/Hvy Trk</u>	Trip% <u>All Veh/Hvy Trk</u>
#84	CTH "Z", 0.4 MI E of CTH "GG" Local Trips Through Trips	4. 2	1,011/ 76 102/ 27	91%/ 74% 9%/ 26%
	TOTAL		1,113/103	100%/100%
#85	CTH "CE", 0.4 MI W of CTH "GG" Local Trips Through Trips TOTAL		2,528/152 <u>147/39</u> 2,675/191	95%/ 80% _ <u>5%/ 20%</u> 100%/100%
<i>#</i> 90	USH 45S, 1.0 MI N of USH 41 Local Trips Through Trips TOTAL		2,632/188 2,028/440 4,660/628	56%/ 30% 44%/ 70% 100%/100%
<b>#</b> 91	CTH "A"S, 0.6 MI N of CTH "GG" Local Trips Through Trips TOTAL		5,043/162 <u>230/0</u> 5,273/162	96%/100% _ <u>4%/_0%</u> 100%/100%
<b>#93</b>	USH 41S, North of USH 45 Local Trips Through Trips TOTAL		32,102/2,325 7,224/1,232 39,326/3,557	82%/ 65% _ <u>18%/ 35%</u> 100%/100%

More than four out of every five trips collected along the Appleton external survey locations has an origin or destination within the Appleton zonal network. Conversely less than one in five trips (17.1%) pass completely through the urban area. Not surprisingly, the majority of the through trips were recorded on USH 41 which is a four-lane limited access freeway running north and south through the region. Together USH 41 north (8,260) and USH 41 south (7,224) account for more than 55% of all the through trips collected throughout the survey. This is followed by USH 45 south with 2,028 trips (7.3%), USH 45 north with 1,559 trips (5.6%) and CTH "A" north with 1,355 trips (4.9%). No other interview station recorded more than 1,000 through trips. These five survey stations accounted for nearly three-quarters of all the trips passing through the Appleton urban area. Table A summarizes the trip types at all thirty-two interview stations including heavier trucks separated from all vehicles.

# TABLE A TRIP TYPE TOTAL

TRIP TYPE	ALL O-D STATIONS	PERCENT
Local Trips	134,891/10,769	82.9%/ 65.9%
Through Trips	27,900/ 5,582	17.1%/ 34.1%
TOTAL	162,791/16,351	100.0%/100.0%

Heavy trucks (delivery, semi-trailers, etc.) accounted for 10% of the total vehicle trips. When comparing only through trips the percentage increases to 20% while the local trip percentage separately decreases to 8%. Of all the heavy trucks collected in the external study area, slightly more than one out of three (34.1%) passes through or does not make a stop in the Appleton urban area.

#### THROUGH TRIP PATTERNS

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() () The largest concentration of through trips were recorded at the stations on USH 41 and USH 45. For additional information the complete tabulation of through trips from each of the thirty-two O-D stations to all of the exit routes from the study area is included in Table B. These trips are listed for trucks as well as all vehicles and are useful in determining through trip traffic between any two stations. The left hand column represents the O-D station each trip passed through while the remaining columns list the possible through trip routes.

As can be seen from the table nearly 40% of the through trips pass through station #93 on USH 41 south. An additional 20% of the through trips pass through station #82 on USH 41 north. Together these two stations on USH 41 account for 60% of the trips passing through the Appleton urbanized area. USH 10 west and USH 45 south followed with 8% and 7%, respectively.

## TABLE B

# Tabulation of Through Trips -- All Vehicles/Heavy Trucks (Recording station left hand column; through trip route remaining columns)

sta#									
	Station#	#30	#31	#32	#33	#34	#35	#36	#37
	#30 STH 114			4			18		- 9
	#31 USH 10E	6		4			9		23
	#32 STH 55S	4	15		27/12				
	#33 CTH "KK"	к. 	7	22/5					
	#34 Shady Ln				5. 10				
	#35 STH 150	8	30	5		7			
	#36 Oakridge					5			
	#37 Breezewood		5			8/8		5 N.	
	#38 CTH "G"		3	*		2	13/13	· .	
	#39 CTH "GG"	4			:				
64	#67 CTH "BB"	3					9/7		
	#68 USH 10W	18	222						
410 ×	#69 USH 45N	7	32					10	
	#70 CTH "JJ"	4	23/6		1. I				
412	#71 STH 76	13/8	8/4				43/34		
	#72 Mayflower								
	#73 CTH "A" N								
	#74 STH 47	6	10/4	9			8		
	#75 Meade		6						
•	#76 CTH "EE"		4/4						
	#77 CTH "E"	×				8	11		
ж. –	#78 French		8				4	ч.	
2	#79 CTH "N"	•	6						
	#80 STH 55N	9/9	45/6	62/8					
	#81 CTH "J"						3		
	#82 USH 41N	12	56/34	32			36		
	#83 STH 96		13	10/6			6/6		
	#84 CTH "Z"			4					
×	#85 CTH "CE"			58/5					
	#90 USH 45S						110/13	10	
	#91 CTH "A" S	14	35	12			6		
	#93 USH 41S		338/100	61			88		
	TOTAL	108/17	858/158	283/24	27/12	20/8	360/73	20/0	32/0

# Tabulation of Through Trips -- All Vehicles/Heavy Trucks (Recording station left hand column; through trip route remaining columns)

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Station#	#38	#39	#67	#68	<b>#69</b> .	#70	#71	#73
#30 STH 114		4		185/43	71/12	7		
#31 USH 10E	5	Sale S		278/77	82/30	4	21	5
#32 STH 55S	10.14	1.00			18			
#33 CTH "KK"	and a share the second	15		-				
#34 Shady Ln						0		A. Caker
#35 STH 150				13	34/11	ante	14	317.3
#36 Oakridge				7/7	5			long i te
#37 Breezewood								
#38 CTH "G"		4		14/11	9			ustro a
#39 CTH "GG"				3	3	<i>.</i>	1	10000
#67 CTH "BB"	· · ·				11	F	100	and the
#68 USH 10W		1	8	T	121/68	<u>}</u>	8	and a
#69 USH 45N				128		9	10	12211.0
#70 CTH "JJ"			•	13	21/3	· min	48/7	ATT S O
#71 STH 76				22	115/9	38/4		
#72 Mayflower				4/4		13/5		6
#73 CTH "A" N				27/10	20/10	5	1	
#74 STH 47		ornicia.		17	27/4		4/4	
#75 Meade						-		A
#76 CTH "EE"					13		1	in the
#77 CTH "E"					29	6	4	11
#78 French					4			
#79 CTH "N"				16	5			5
#80 STH 55N				6	8/4			uići s
#81 CTH "J"				. 4/4	and the second s			
#82 USH 41N		110		421/60	169/17	1		
#83 STH 96					1374	-		1.
#84 CTH "Z"				21/18	6/6	5		
#85 CTH "CE"				15/7	5			
#90 USH 45S	14	512		124/35	1051/291		19	7
#91 CTH "A" S	29	61		7			5	12
#93 USH 41S	67	14		782/10	591/64	17	360/82	
TOTAL	115/0	720/0	8/0	2107/286	2431/529	104/9	493/93	46/0

# Tabulation of Through Trips -- All Vehicles/Heavy Trucks (Recording station left hand column; through trip route remaining columns)

Station#	415 #74	#76	#77	#78	#79	#80	#82	#83
#30 STH 114	14/6			2			46/7	5
#31 USH 10E	15	-	2		62/15	5	43/4	
#32 STH 55S	7/3	3/3	23/19		15/4	11/4	269/52	10/3
#33 CTH "KK"			6					
#34 Shady Ln	2							
#35 STH 150	10/10		11/11		4		56/4	
#36 Oakridge								
#37 Breezewood							10	3
#38 CTH "G"							18	
#39 CTH "GG"	3						21	
#67 CTH "BB"							6	
#68 USH 10W	16			а.		5	312/27	1
#69 USH 45N	64	1	9				40	
#70 CTH "JJ"	87/8		5			4	27	
#71 STH 76							15/4	
#72 Mayflower								
#73 CTH "A" N				5		2	36/10	
#74 STH 47					434/120		38/8	8
#75 Meade							3	
#76 CTH "EE"							6	3
#77 CTH "E"							11	(12)
#78 French			5					
#79 CTH "N"						11	21	6
#80 STH 55N								12/7
#81 CTH "J"							3	
#82 USH 41N	57/17		12					
#83 STH 96	4/4		7				25/4	
#84 CTH "Z"	14		10				8	
#85 CTH "CE"	25/19		1			2		
#90 USH 45S	14						153/57	
#91 CTH "A" S							36	: :
#93 USH 41S	168/72		29/12				4586/877	7
TOTAL	500/139	3/3	117/42	5/0	511/139	36/4	5789/1054	54/10

# Tabulation of Through Trips -- All Vehicles/Heavy Trucks (Recording station left hand column; through trip route remaining columns)

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Station#	#84	#85	#90	#91	#93	TOTAL
#30 STH 114		alt to comp	35/19	10214 <sup>2</sup>	210/27	608/114
#31 USH 10E		ē.	32/4	20/5	/ 339/70 )	952/205
#32 STH 55S		3	5		18/10	429/110
#33 CTH "KK"					13	63/5
#34 Shady Ln			7		12	22/0
#35 STH 150	aanne fastra	the (Se	125/33	11/11	204/72	528/153
#36 Oakridge	A later (N) is	187 560 6 85.	19	sana 80E a	10 13 101	40/7
#37 Breezewood	umrnth li	5 v.80580	33	3	33	95/8
#38 CTH "G"	QL SHOT YON	esábon Jác	47	5	36	149/24
#39 CTH "GG"	a Children an Annas	Zina All	377/58	16	118	544/58
#67 CTH "BB"	ð		54		44/3	127/10
#68 USH 10W			16		244/27	970/122
#69 USH 45N	· · · · · ·	2 - 00 16 00 - 19 17 - 1	138/61	ALAT ALL A	1112/301	1559/362
#70 CTH "JJ"	to kipi escono	001603, 8556	9	36/14	474	280/41
#71 STH 76	the good same	16 . 15 12 10	101	ath provide	68/9	421/74
#72 Mayflower	na sell mesil 1	- 14815 pr. 5	12	Cutting work	14	48/9
#73 CTH "A" N			46	111/62	1106/289	1355/381
#74 STH 47			27/4			586/143
#75 Meade					6	14/0
#76 CTH "EE"					45	70/4
#77 CTH "E"					176/32	247/32
#78 French					6	16/0
#79 CTH "N"			10/5		56/45	137/50
#80 STH 55N	15/10	18/4	6		128/36	310/85
#81 CTH "J"					44/14	54/17
#82 USH 41N			855/110	14	6487/1448	8260/1734
#83 STH 96			4		200/71	282/95
#84 CTH "Z"				12	22/3	102/27
#85 CTH "CE"	4/4		15/4		25	147/39
#90 USH 45S					13	2028/440
#91 CTH "A" S	е. 9				13	230/0
#93 USH 41S	41		14		61/16	7224/1232
TOTAL	60/14	21/4	1987/298	228/92	10860/2477	27900/5582

Each origin or destination is known as a trip end. Figure 3 illustrates the through trip ends by origin and destination by county. Winnebago County constitutes 28.8% of the through trips at either the origin or destination end. This was followed by Brown County with 19.2%, Outagamie County with 9.6% and Waupaca County with 5.2%. Michigan was the largest of the out-of-state through trip contributors with 1.8% of the overall trips.

#### LOCAL TRIP ANALYSIS

The internal external trips by traffic analysis zone (TAZ) and by survey station are shown in Table C. The trip totals for each of the 398 zones range from 6,233 for Zone 206 and 3,496 for Zone 207 down to none for Zones 7, 76, 91, 286, 337, 344, 397 and 398. Zone 206 represents the Fox River Mall just west of USH 41, whereas Zone 207 is a large tract of land northeast of Zone 206 representing extensive commercial development. Third in the ranking is Zone 318 with 1,947 trips and a location in downtown Neenah. Zones without any trips are scattered throughout the study area. The zone with the largest number of heavy truck traffic is Zone 194 located along USH 10 between USH 41 and downtown Appleton with 283 trips. Locations for all 398 zones are represented on Figure 2. Station #93 on USH 41 from the south provided the largest number of internal trips with 32,102 while station #34 on Shady Lane had the least with 248. Station #82 on USH 41 from the north was runner-up with 17,575 trips.

#### FIGURE 3

#### THROUGH TRIP END TOTALS BY ORIGIN AND DESTINATION COUNTY FOR ALL STATIONS



TABLE C

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#1	#2	#3	#4	#5	#6	#8	#9
#30 STH 114								
#31 USH 10E					5/5			8
#32 STH 55S		43/8	29	41	128/30		11	63/8
#33 CTH "KK"		6			34		13	37
#34 Shady Ln			2	κi.				
#35 STH 150	7	7						
#36 Oakridge					1			÷.
#37 Breezewood			1				2	
#38 CTH "G"			3					
#39 CTH "GG"								
109 #67 CTH "BB"		3			2			2
#68 USH 10W			8					6
#69 USH 45N		17/17		8	7			
#70 CTH "JJ"		8			30			
#71 STH 76		5/5						
#72 Mayflower		3					(a)	
#73 CTH "A" N								13/13
#74 STH 47		88/32	8 .		17/9			9
#75 Meade	3		×				1	
#76 CTH "EE"				5	10	6	3	3
#77 CTH "E"								180
#78 French					10			
#79 CTH "N"	5	10		5	5			6
#80 STH 55N	5	36/15	69/23		177/22	15	31/5	31/5
#81 CTH "J"	4	17	15	5	8			7/7
#82 USH 41N		81	62		298/77	12	12	
#83 STH 96		93/8	18	11	75			5
#84 CTH "Z"		25	7	. 7	36/9	13/5	23	32/6
#85 CTH "CE"	4	24	8	21	77/4	6	24/4	40
#90 USH 45S								
#91 CTH "A" S								
#93 USH 41S	5	36	13		7			
TOTAL	21/0	502/85	242/23	103/0	924/156	52/5	117/9	254/39

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#10	#11	#12	#13	#14	#15	#16	#17
#30 STH 114			14			1.11.11.11.11.11.11.11.11.11.11.11.11.1	4	5.
#31 USH 10E			5					
#32 STH 55S	26/11	142/14	187/15	63	96/15	80/4	79/7	65/4
#33 CTH "KK"	-	40	43		24	6	7	25/5
#34 Shady Ln					5/5	<u>}</u>		11 2 11
#35 STH 150		-			6	1	·	
#36 Oakridge		· · · · ·						
#37 Breezewood								
#38 CTH "G"							6	
#39 CTH "GG"								11
#67 CTH "BB"				÷		4		
#68 USH 10W			8	6		<u> </u>		16
#69 USH 45N				· · ·		1		10
#70 CTH "JJ"			5		4		8	5
#71 STH 76								-11-2-5-
#72 Mayflower			· · · · ·			· · · · · · · · · · · ·		3.16.15
#73 CTH "A" N	20/20			6				i Valu
#74 STH 47		7				8	7/7	14
#75 Meade	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·						
#76 CTH "EE"	5			1- A-	5		3	13334 E.S.
#77 CTH "E".		· t						Pil 2 Co
#78 French					3/3			3
#79 CTH "N"	5				11		5	17
#80 STH 55N	38	33	90/4	21	53	46/6	70/5	71
#81 CTH "J"	11	20	9	18	29	24	11	35/10
#82 USH 41N	36/24	52/24	107	9	73/18	45	21	170/58
#83 STH 96		32/4	21/4	12	25	48	87/10	43
#84 CTH "Z"	13	55	28	34	32	23/6	28	36
#85 CTH "CE"	68	197	83/4	56/4	45	136	51/4	41
#90 USH 45S				equal:		21166	·	112.6
#91 CTH "A" S	7		13					HIEU EV
#93 USH 41S	7	41/35	46		7	6	73/73	17
TOTAL	236/55	619/77	649/27	225/4	418/41	426/16	460/106	573/77

# TABLE C (Cont'd) Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#18	#19	#20	#21	#22	#23	. #24	#25
#30 STH 114				5			13	
#31 USH 10E							5	
#32 STH 55S	17	11	75/23	19/8	13	87/19	74/27	6
#33 CTH "KK"	22	6	30/11		7	15/9	13	
#34 Shady Ln					3			
#35 STH 150		ст.		5				
#36 Oakridge								
#37 Breezewood							3	đ
#38 CTH "G"					3		8	2
#39 CTH "GG"			3					
#67 CTH "BB"	5		2	5				
#68 USH 10W							18	8
#69 USH 45N			14	8	10			
#70 CTH "JJ"	5		9			5	14	4
#71 STH 76	3						3	
#72 Mayflower								
#73 CTH "A" N				7			6	
#74 STH 47	ġ		7/7				14	
#75 Meade			4/4				6	
#76 CTH "EE"	8	5			3		3	
#77 CTH "E"			4	15/5			5	
#78 French		· · ·	3				3	
#79 CTH "N"	11		32	11	6		5	6
#80 STH 55N	55/13		100	24	25	52/5	116/16	4 4
#81 CTH "J"	6		17	4	7		31/7	
#82 USH 41N	172/24	77	152/17	.67		9	226	11
#83 STH 96	11	18	100/7	6/6	10	17	39	5
#84 CTH "Z"	15	4	40/9	12		9	36	3
#85 CTH "CE"	21/4		101/23	. 7		8	32	5
#90 USH 45S			12/5					
#91 CTH "A" S							5	
#93 USH 41S	14		60	32	14	26	29	
TOTAL	374/41	121/0	765/106	227/19	101/0	228/33	707/50	52/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#26	#27	#28	#29	#30	#31	#32	#33
#30 STH 114				13/8				
#31 USH 10E								
#32 STH 55S	47/10	84/8	135/11	91/3	35/7	8	40/3	34
#33 CTH "KK"	24	31	19	72/21	26	6	6	
#34 Shady Ln								
#35 STH 150		8	· · · · · · · · · · · · · · · · · · ·	5				10216
#36 Oakridge			in the state of		-			
#37 Breezewood			· · · · · · · · · · · · · · · · · · ·					
#38 CTH "G"								
#39 CTH "GG"						1	3	
#67 CTH "BB"	•	4				4/4	3	
#68 USH 10W		14	37	30/16		6	30/19	8
#69 USH 45N	-	8	10/10	······				
#70 CTH "JJ"	4		9			5		
#71 STH 76	-							
#72 Mayflower								
#73 CTH "A" N	· · · · · · · ·				10			
#74 STH 47								
#75 Meade								
#76 CTH "EE"		8	3					
#77 CTH "E"					4			
#78 French		a de la constante a constante			1			
#79 CTH "N"	17		11	5		5		17
#80 STH 55N	113	46	91/8	19/4	10	8/4	27	28
#81 CTH "J"	23	11/4	14	8/3	4	3	6	3/3
#82 USH 41N	36	62	111	25	23	24	36	47
#83 STH 96	40	34	27	4	16		19	28
#84 CTH "Z"	22	24	14	16		8	. 11	4
#85 CTH "CE"	34	54/4	97	51	8		24	14
#90 USH 45S		4/4					1	
#91 CTH "A" S								
#93 USH 41S	76	7		13	23	. 8	19	
TOTAL	436/10	399/20	578/29	352/55	159/7	85/8	224/22	183/

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#34	#35	#36	#37	#38	#39	#40	#41
#30 STH 114	5				R V			5
#31 USH 10E		13/13	4				5	10/5
#32 STH 55S	8	28/8	26/6				5	7/4
#33 CTH "KK"		. 24	21	×			7	21
#34 Shady Ln								<u>.</u>
#35 STH 150	6	7			6			5 5
#36 Oakridge					а.			(1) (1)
#37 Breezewood					×			
#38 CTH "G"								3
#39 CTH "GG"	3							
#67 CTH "BB"								
#68 USH 10W	8	6	6				8	· ·
#69 USH 45N		8	18/18					9
#70 CTH "JJ"		9	17/3	20			4	
#71 STH 76	5							4/4
#72 Mayflower								
#73 CTH "A" N		6	5					
#74 STH 47			14/7			4/4		12/4
#75 Meade						,	4	
#76 CTH "EE"		. 3	3					9
#77 CTH "E"			5					
#78 French			3	<i></i>			3	145-150
#79 CTH "N"		50/5	37		5	1	39/5	45
#80 STH 55N	19	59	72/8	9	16	5		4
#81 CTH "J"		10						.14
#82 USH 41N	101	122/42	260/35	14			24/24	96/17
#83 STH 96	19	35	23				5	14/3
#84 CTH "Z"	16	13/5	13					4
#85 CTH "CE"	10	79	22					19
#90 USH 45S				÷		5		
#91 CTH "A" S								2
#93 USH 41S		73	17					14
TOTAL	200/0	545/73	561/77	23/0	27/0	9/4	104/29	290/37

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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TABLE C (Cont'd)

Station#	#42	#43	#44	#45	#46	#47	#48	#49
#30 STH 114	21/7	4	5		4	9	16	4
#31 USH 10E		5			5	5	5	10
#32 STH 55S	3	12		5	3	13		8
#33 CTH "KK"		15						
#34 Shady Ln								
#35 STH 150						33		
#36 Oakridge								
#37 Breezewood			•					
#38 CTH "G"						3		
#39 CTH "GG"							-	
#67 CTH "BB"					3			
#68 USH 10W	5				29	15	8	8
#69 USH 45N	7						9	16
#70 CTH "JJ"	4		1.			1		
#71 STH 76								
#72 Mayflower								
#73 CTH "A" N	6		-					
#74 STH 47	14							4/4
#75 Meade	4			4				
#76 CTH "EE"						3	8	in .
#77 CTH "E"								
#78 French	-			4				8
#79 CTH "N"	38	31	11	44	10	38	12	27
#80 STH 55N	12		15/4	·	27/4	21	5	4
#81 CTH "J"						8	5	3
#82 USH 41N	136/34	45		129/51	168/82	91	27	82
#83 STH 96	9	6	7	5	4	14	7	11
#84 CTH "Z"	3				13	10/5	4	
#85 CTH "CE"					5	5	. 12/12	18/12
#90 USH 45S								
#91 CTH "A" S			· · · ·			5		
#93 USH 41S	13	44	-		14	26	6	
TOTAL	275/41	162/0	38/4	191/51	285/86	299/5	124/12	203/16

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#50	#51	#52	#53	#54	#55	#56	#57
#30 STH 114	13/8	28		ħ	a K	12/12	9	40
#31 USH 10E	5					15		14
#32 STH 55S		4		3		12/4	21	17/4
#33 CTH "KK"	7			6		79/28	12	6
#34 Shady Ln								
#35 STH 150		37			-			6
#36 Oakridge								
#37 Breezewood		18						
#38 CTH "G"								
#39 CTH "GG"								
#67 CTH "BB"							4	
#68 USH 10W	14	14		8			13	
#69 USH 45N			10/10			8		
#70 CTH "JJ"	5	4/4			5	4	15	8
#71 STH 76								4
#72 Mayflower								
#73 CTH "A" N		13				13/13		
#74 STH 47		19/4		16/16	4/4		- 8	36/30
#75 Meade								
#76 CTH "EE"		÷.,				3	9/6	6
#77 CTH "E"								
#78 French					10		9/4	. 5
#79 CTH "N"	11	22	5	18	6		28	54
#80 STH 55N		·~~9		5	4	7	17	23
#81 CTH "J"	5							16
#82 USH 41N	43	43				11	12 .	29
#83 STH 96	7	9		5			17	25
#84 CTH "Z"		9	-	3				
#85 CTH "CE"	5					16	20	11
#90 USH 45S								
#91 CTH "A" S								
#93 USH 41S	14	22					7	6
TOTAL	.129/8	251/8	15/10	64/16	29/4	180/57	201/10	306/34

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#58	#59	#60	#61	#62	#63	#64	#65
#30 STH 114		4						8
#31 USH 10E		4	11				5	10
#32 STH 55S	8		4	5	15	5		
#33 CTH "KK"		6	11					111,220
#34 Shady Ln		· · · · · · · · · · · · · · · · · · ·						
#35 STH 150								
#36 Oakridge								
#37 Breezewood								
#38 CTH "G"		÷						
#39 CTH "GG"			- Concidential and an effective of the set		· · · · · · · · · · · · · · · · · · ·			111-0
#67 CTH "BB"								
#68 USH 10W			6					
#69 USH 45N								
#70 CTH "JJ"							<u></u>	2160
#71 STH 76	•	· · · · · · · · · · · · · · · · · · ·						1.1.1.1.1.1
#72 Mayflower							·	
#73 CTH "A" N		5						5
#74 STH 47			and the second					4/4
#75 Meade		·						
#76 CTH "EE"	3	11						
#77 CTH "E"								
#78 French	6							12.4.1.1
#79 CTH "N"	21		19-10-10-10-10-10-10-10-10-10-10-10-10-10-		5			
#80 STH 55N	4	·	- arma					283
#81 CTH "J"		<u></u>						
#82 USH 41N	58	34		31				
#83 STH 96	6	6	6	ROM &				
#84 CTH "Z"	N. 9	· · · · ·			4			13 1
#85 CTH "CE"					5		6	27/8
#90 USH 45S				80.06				13423
#91 CTH "A" S	8							
#93 USH 41S				· · · · · · · · · · · · · · · · · · ·				
TOTAL	. 114/0	70/0	38/0	36/0	29/0	5/0	11/0	54/1

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#66	#67	#68	#69	#70	#71	#72	#73
#30 STH 114		28/12	73/4	5		13	53	5
#31 USH 10E	14/10	14/4	33/7	15	10		6	
#32 STH 55S	3	16/3	95/20	7	11/4		7/3	3
#33 CTH "KK"	6	7	31	6		6	38	
#34 Shady Ln					11			
#35 STH 150		24 - 24 2		6				
#36 Oakridge		9/9	21					
#37 Breezewood			2		3			
#38 CTH "G"						14		
#39 CTH "GG"		9	3					
#67 CTH "BB"		2				2		
#68 USH 10W		33/19	46	14			5	6
#69 USH 45N			10			-		
#70 CTH "JJ"			45				5	
#71 STH 76			3	5				
#72 Mayflower						•		
#73 CTH "A" N		7	11					•
#74 STH 47	8		148/91	8		23/23		8
#75 Meade	3		19					
#76 CTH "EE"		6	28		6		3	7/7
#77 CTH "E"		רור					e.	· .
#78 French		19	3	3			2 	9
#79 CTH "N"		32/5	124/5	173/53	6	33	15	5
#80 STH 55N		10	33/5		12		7	
#81 CTH "J"		9	16			- 4	3	
#82 USH 41N		24	431/75		63	24	12	
#83 STH 96		6	59	4	5	. 8	24	10
#84 CTH "Z"			44/22			2		
#85 CTH "CE"			41/19	6			59	6
#90 USH 45S								7
#91 CTH "A" S		р.	7		5			
#93 USH 41S		22	74	32				
TOTAL	34/10	251/59	1377/248	284/53	121/4	113/23	237/3	66/7

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#74	#75	#77	#78	#79	#80	#81	#82
#30 STH 114	53	127	21/7	26/17			14	5
#31 USH 10E	15	107/4		30	10		10	· · · · · · · · · · · · · · · · · · ·
#32 STH 55S	10/4	26	*	7/4	·	8/8		-
#33 CTH "KK"	12	12						_
#34 Shady Ln								.*
#35 STH 150	8	5				5		
#36 Oakridge		*						
#37 Breezewood			V V	· · · · · · · · · · · · · · · · · · ·				
#38 CTH "G"		3	and the second					
#39 CTH "GG"					and an and a state of the second s		and a second	
#67 CTH "BB"	3	3						
#68 USH 10W	14	32	8	6				
#69 USH 45N		43						
#70 CTH "JJ"		5		5				
#71 STH 76								
#72 Mayflower		3	Second Contractor States and					
#73 CTH "A" N		6						
#74 STH 47	16	23/8	7					
#75 Meade		9						
#76 CTH "EE"	6	. 13	*	9				
#77 CTH "E"	· · · · · ·							
#78 French	. 4	. 6						
#79 CTH "N"	33	119/11	1999 - 1999 -	11			5	14/9
#80 STH 55N	11	16/5	4		1			and the second second
#81 CTH "J"						5		
#82 USH 41N		278/35	24					
#83 STH 96	11/4	42				4		
#84 CTH "Z"	9/6	7						111454
#85 CTH "CE"	10	18		8	5			AL .
#90 USH 45S		7			[		6	
#91 CTH "A" S	5	· · · · ·		-				196.7.4
#93 USH 41S	88	150/19	28	13			A	26
TOTAL	308/14	1060/82	92/7	115/21	15/0	22/8	35/0	45/9

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#83	#84	#85	#86	#87	#88	#89	#90
#30 STH 114	13	4			30/4	16/7	18/12	4
#31 USH 10E		6			6		11	5
#32 STH 55S							22	
#33 CTH "KK"			·		8	14	<u>.</u>	-
#34 Shady Ln							2	
#35 STH 150			·					
#36 Oakridge								
#37 Breezewood								
#38 CTH "G"								
#39 CTH "GG"							Ω.	
#67 CTH "BB"								
#68 USH 10W				<i>s</i> .		12/12		
#69 USH 45N	9							
#70 CTH "JJ"						_		
#71 STH 76								
#72 Mayflower							-	
#73 CTH "A" N			5					
#74 STH 47								
#75 Meade						13		
#76 CTH "EE"								
#77 CTH "E"			2					5
#78 French				10				
#79 CTH "N"		5			5	5		2
#80 STH 55N						· .		
#81 CTH "J"					3			
#82 USH 41N				12				
#83 STH 96		3						
#84 CTH "Z"						2.4		
#85 CTH "CE"	*0							
#90 USH 45S								6. 1
#91 CTH "A" S								
#93 USH 41S	•						2	
TOTAL	22/0	18/0	5/0	12/0	64/16	35/7	29/12	14/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#92	#93	#94	#95	<b>#96</b>	#97	#98	#99
#30 STH 114			11/7	32	12	23		4
#31 USH 10E	10		6	21		6	4	24
#32 STH 55S	3					3		
#33 CTH "KK"			5			14		
#34 Shady Ln								
#35 STH 150		· · · · · · · · · · · · · · · · · · ·		7		14		
#36 Oakridge		1						
#37 Breezewood						-		
#38 CTH "G"								
#39 CTH "GG"				3		3		
#67 CTH "BB"				8		. 5		
#68 USH 10W				15		16		18
#69 USH 45N				34		25		
#70 CTH "JJ"			4	9		14		4
#71 STH 76		EIC.		4		4		
#72 Mayflower				3		· · · · · · · · · · · · · · · · · · ·		
#73 CTH "A" N	-			18		22/5		20/10
#74 STH 47						16		18
#75 Meade				6		3	5	
#76 CTH "EE"				6		3		18
#77 CTH "E"	6	4	DC AVE	6	4			9
#78 French		- 68				4		
#79 CTH "N"	-			32/11		21/11		5
#80 STH 55N						5		
#81 CTH "J"			4				4	6-213
#82 USH 41N			· · · · · · · · · · · · · · ·	37	9	82	12	34/24
#83 STH 96		641	7	3		9	100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	
#84 CTH "Z"				4	15			
#85 CTH "CE"				16	20	19		5
#90 USH 45S								
#91 CTH "A" S				5	6		6	
#93 USH 41S				41	14	60		66/11
TOTAL	19/0	4/0	37/7	310/11	80/0	371/16	31/0	225/4

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#100	#101	#102	#103	#104	#105	#106	#107
#30 STH 114	92	4	#102		1		#100	#107
#31 USH 10E	92	1		70	36	11		4
	1	· 11		41	6			
#32 STH 55S	4			4	3	4		
#33 CTH "KK"	22	6		24			6	
#34 Shady Ln					2			
#35 STH 150	5			5	6		5	
#36 Oakridge								
#37 Breezewood	3							
#38 CTH "G"								
#39 CTH "GG"	6			3				
#67 CTH "BB"	$\square$		3	6	2			
#68 USH 10W	(109/	×.		55	45		6	8
#69 USH 45N	7		8	40	37			
#70 CTH "JJ"	88/11	4	4	86	50		4/4	
#71 STH 76	4			10				
#72 Mayflower	6			2				-
#73 CTH "A" N	16			35				
#74 STH 47	84/7	8		49	44/4			23/5
#75 Meade	12			3	15	4		65/4
#76 CTH "EE"	133/3			178/10	69		6	72/9
#77 CTH "E"	87/6	6	4	119/3	88	4	12/12	25
#78 French	27	10	19/11	11	29		15/3	14
#79 CTH "N"	23			22				
#80 STH 55N	9			9				
#81 CTH "J"		ан салан салан Салан салан сал			4			8
#82 USH 41N	290/24	23	12	384/51	118	26		
#83 STH 96	69/3	4	4	12	14			
#84 CTH "Z"	4			22			4	4
#85 CTH "CE"	23			6	20		· · ·	
#90 USH 45S					7		×	T.
#91 CTH "A" S	5/5	•				6		
#93 USH 41S	137	14		271	177	<u> </u>		
TOTAL	1309/59	90/0	54/11	1467/64	772/4	55/0	58/19	223/18

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#108	#109	#110	#111	#112	#113	#114	#115
#30 STH 114	5	R	1		31	19	14	
#31 USH 10E	·	4	6	6	9	16		9/4
#32 STH 55S			3	8	16	4	8/4	1995 S S S S S S S S S S S S S S S S S S
#33 CTH "KK"				2	1	1.11	15	Letter .
#34 Shady Ln					2		1.1	ybadž be
#35 STH 150			11					5
#36 Oakridge								à.140 \$
#37 Breezewood		3					6000	W Bergs
#38 CTH "G"			3		τ		<ul> <li>*D</li> </ul>	RTD 87
#39 CTH "GG"					9	1	4	4
#67 CTH "BB"	3	3	2		15	7	3	7
#68 USH 10W	6	60/52	38/16	53 . ·	132/82	27	53	14
#69 USH 45N	· · · · · · · ·		8	1	.8	27	25	7
#70 CTH "JJ"		14	2	9	51	36	13	22
#71 STH 76	4	£	8	- 5	3	3	8	8
#72 Mayflower	-			5		8	¥26075	Breddi G
#73 CTH "A" N	13/13	01	6	11	19	12	12	6
#74 STH 47	- Net	35/20	7		24	83/14	49	1152.15
#75 Meade		69	. 8	2	43	41/3	19	11
#76 CTH "EE"	5	14/11	46	- 25	85/16	15	30	27
#77 CTH "E"	. 4	10	20	32,3	113	31	19	17/3
#78 French		4			4		6	is Fread
#79 CTH "N"		2		· 11	- k	13/7	141	6
#80 STH 55N				2	4	5	5	5
#81 CTH "J"	4				C.		4	NTO IN
#82 USH 41N	12		23	12	105	101	69	84
#83 STH 96				8,0	15	4	5	HOT
#84 CTH "Z"					ł		•3	(073.44
#85 CTH "CE"		-2961			12	6	'30'	8
#90 USH 45S		24/16			5/5		5	1921.000
#91 CTH "A" S				7		8	-A." S	6
#93 USH 41S	32	41	· 01	1.812	60	19	37	62
TOTAL	88/13	183/27	171/16	32/0	765/103	477/24	381/4	308/7

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

	T T							
Station#	#116	#117	#118	· #119	#120	#121	#122	#123
#30 STH 114	32	54	36	31	9	9	18	22
#31 USH 10E	29/4	62	31	5	5	9	5	5
#32 STH 55S	4	8	5			4		
#33 CTH "KK"	14	5	6	13				
#34 Shady Ln		2						
#35 STH 150		5	6	33	14	5		7
#36 Oakridge			÷					
#37 Breezewood								
#38 CTH "G"		7						
#39 CTH "GG"	3	13	8	7				
#67 CTH "BB"	19	7		4	3	·		7
#68 USH 10W	69	103	53	19	60/52	35/27	49	35/27
#69 USH 45N	17	83	15	8.	15/15	7		17
#70 CTH "JJ"	17/4	50	13	5			4	5
#71 STH 76	3	23	12	8	3			
#72 Mayflower	8		- 2			1		
#73 CTH "A" N	11	16	11	•	19	11	11	
#74 STH 47	50/8	120	29/4	4/4	35/20	14/4	39	15
#75 Meade	44	76	17		11	4	14	e .
#76 CTH "EE"	13	29	28	5	. 5	5	11	3
#77 CTH "E"	34	53	39/5	6	4	4	20	5
#78 French		7					13	
#79 CTH "N"		5	17			6		
#80 STH 55N		4	9		5		5	
#81 CTH "J"		3	3					
#82 USH 41N	32	157	184/48	14	12	23	41	21
#83 STH 96	(i.e.	28	9/3					
#84 CTH "Z"		4	4					
#85 CTH "CE"	5	25	6		19/11	6	4/4	6
#90 USH 45S				5				
#91 CTH "A" S								6
#93 USH 41S	128	304	223	50		13	7	93
TOTAL	532/16	1253/0	766/60	213/4	205/98	155/31	241/4	247/27

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#124	#125	#126	#127	#128	#129	#130	#131
#30 STH 114	21/12	38	13	17	8	38	33	5
#31 USH 10E	26	11	23	5	10	5	9/4	15
#32 STH 55S	4			5		8		
#33 CTH "KK"	11	6			6	5	10/5	6
#34 Shady Ln								
#35 STH 150			33		- 11		10	1.492
#36 Oakridge								
#37 Breezewood			· ·					n fan Ge
#38 CTH "G"								
#39 CTH "GG"			3					3
#67 CTH "BB"	5		3	2	4		7	
#68 USH 10W	37	32	39	29	13	17	57/19	27/27
#69 USH 45N	42/10	17	8	15	9	17	27	
#70 CTH "JJ"	5	10		4	5	15	22	1167.161
#71 STH 76		81	. 3	3	3			61 C 2 SD
#72 Mayflower	2						P	2
#73 CTH "A" N	11	23	17			7	10	5
#74 STH 47	18/4	26	23	38	7/7	37/13	24/7	30
#75 Meade	3		14	21	24/3	5	38	
#76 CTH "EE"		· · · · ·	7	11	3		39/7	7
#77 CTH "E"	32	9	22	16	13	12/3	74/5	20
#78 French	9/3				4	7	18	6
#79 CTH "N"	11		5	5		:	17	1999 1 B
#80 STH 55N								
#81 CTH "J"				3			4	
#82 USH 41N	67	12		42	34	24	131/24	
#83 STH 96	7	5	8		· · · ·	6	34/6	
#84 CTH "Z"		3						1112 6-
#85 CTH "CE"					·		19/14	Mary Pr
#90 USH 45S	6	13		5		:		7
#91 CTH "A" S	19			6		E A z	5	7/24 14
#93 USH 41S	79	98	109	38	74	71	98/53	17
TOTAL	415/29	303/0	330/0	265/0	228/10	276/16	686/144	150/27

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# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#132	#133	#134	#135	#136	#137	#138	#139
#30 STH 114		9	22	9			9	12
#31 USH 10E	16		36/5	6			46	10
#32 STH 55S							12/4	-
#33 CTH "KK"	6	6	7		×		7	
#34 Shady Ln								3
#35 STH 150	5	6	8		• •	6	25/5	
#36 Oakridge	· · · ·					-		
#37 Breezewood						• *		
#38 CTH "G"	,							2
#39 CTH "GG"							4	3
#67 CTH "BB"			8	10	2	3		4
#68 USH 10W		19	44/20	34	33	6	39/12	45
#69 USH 45N	27	8	54	19			9	17
#70 CTH "JJ"	2		18	37	18	5	35	15
#71 STH 76		5			5	4	.6	4
#72 Mayflower								
#73 CTH "A" N		5	34/5	15		24	32	33/10
#74 STH 47	7	21	38	60	19/4	82/15	110/21	69/4
#75 Meade	13	27/13	32	62/2	9		24	19
#76 CTH "EE"	6	11	35	33		3	6	10
#77 CTH "E"	4	12	38	43	6	18	45/9	8
#78 French			3					. 3
#79 CTH "N"	19	5		5			10	۰.
#80 STH 55N	251							5
#81 CTH "J"	3	3/3		4	14 -		2	3
#82 USH 41N	51	27	62	51	14	80	65	46
#83 STH 96		8	18	7		7	13	12
#84 CTH "Z"	8	4		5		•		
#85 CTH "CE"	5							7
#90 USH 45S	7	15	-1	3				
#91 CTH "A" S	7			7				6
#93 USH 41S	45	14	57	22	* 	71	28	74
TOTAL	229/0	205/16	514/29	429/2	106/4	309/15	525/51	405/14

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#140	#141	#142	#143	#144	#145	#146	#147
#30 STH 114	9	9	9		20	37	18/6	87
#31 USH 10E	· · · · · · · · · ·	6		10	6	10	10	70
#32 STH 55S		· · · · · · · · · · · · · · · · · · ·			16	3		7
#33 CTH "KK"				7		6	7	
#34 Shady Ln		2	· · · · · · · · · · · · · · · · · · ·		5	2		10.00
#35 STH 150	7	7	5			11		rhade.
#36 Oakridge		4					·	Ald .
#37 Breezewood			· · · · · ·			5	7/4	47-10-11
#38 CTH "G"	·		3				6	4
#39 CTH "GG"	5							. 3
#67 CTH "BB"	5/3		5	3	3	2	5	14
#68 USH 10W	28	23	21		35	11	72	97/20
#69 USH 45N		17	10	16	17	46	(101)	109
#70 CTH "JJ"	28/7	4	4	9		18	9	17
#71 STH 76		3		6	3	3	7	7
#72 Mayflower					2		2	<u>1996 ()</u> .
#73 CTH "A" N	11	29	12	10	23	42	24	56/10
#74 STH 47	74/28	37/8	46/30	45/5	47	46	159/51	126/5
#75 Meade		2	12	3	2	2	3	17
#76 CTH "EE"		8		14	16	11	12	21
#77 CTH "E"	4	6	13	17	6	11	31	27
#78 French	3	3			10	. 3		H
#79 CTH "N"			5		5	11	5	
#80 STH 55N	9			4/4	8/4	7		110 1
#81 CTH "J"	5161	· · · · · ·		· ,·		10	M2	4
#82 USH 41N	41/18	68	73	21		26	242/68	237/17
#83 STH 96	- <u>H</u>	4	19	12		9	12	15
#84 CTH "Z"								9
#85 CTH "CE"		10	7		6	10		31
#90 USH 45S			13					15
#91 CTH "A" S		13	·	6	13	. 7	12	18
#93 USH 41S	49	28	56	27	173/35	89	271	308
TOTAL	273/56	275/8	294/30	210/9	416/39	438/0	1015/129	1299/52

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#148	#149	#150	#151	#152	#153	#154	#155
#30 STH 114	12	26	14	5	13	9	14	18
#31 USH 10E	9	15	10		5		5	11
#32 STH 55S								2 2
#33 CTH "KK"		12		6	14			7
#34 Shady Ln	a							
#35 STH 150		42						
#36 Oakridge					3		2	2
#37 Breezewood	×	7/4				3		
#38 CTH "G"		3	4			· · · ·		
#39 CTH "GG"		3	3	7		· .	i.	
#67 CTH "BB"	9	9	8		3	÷		5
#68 USH 10W		51	25		14	27	19	27
#69 USH 45N	26	87		31/15	22	43		16
#70 CTH "JJ"		13	5			10	4	4
#71 STH 76		7			3		3	8
#72 Mayflower								
#73 CTH "A" N	6	39	10	5	17	15	2	22
#74 STH 47	39	57		8	43/4	30/16	19/4	49
#75 Meade	3	16	5		8		6	4
#76 CTH "EE"	3	10	6					3
#77 CTH "E"	20/5	46	9	4	9/5	4	18	10
#78 French	2	4	9		÷		3	
#79 CTH "N"		5	12		5			
#80 STH 55N		5	5		4	10/4		
#81 CTH "J"		3				4		4
#82 USH 41N		55	58	19	27	11	14	71/24
#83 STH 96		16		4		7		7
#84 CTH "Z"		4		÷				
#85 CTH "CE"	8			7				14/14
#90 USH 45S			5	6			5	7
#91 CTH "A" S	7	7						
#93 USH 41S	13	178	82	7	25	13	35	18
TOTAL	155/5	720/4	270/0	109/15	215/9	186/20	140/4	305/38

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#156	#157	#158	#159	#160	#161	#162	#163
#30 STH 114		5	13	10	48	5	8	
#31 USH 10E	5	5	10	35	43		5	5/5
#32 STH 55S					11			1121
#33 CTH "KK"	-	5	6	12	12			6
#34 Shady Ln								
#35 STH 150		and the second sec			5			
#36 Oakridge			·				3	
#37 Breezewood		· · · · · · · · · · · · · · · · · · ·	6/4	11 11	9			
#38 CTH "G"	· · · · · · · · · · · · · · · · · · ·				9			
#39 CTH "GG"					7			3
#67 CTH "BB"			4	2	15		3	10.0
#68 USH 10W	8	29	47	41	. 73		13	
#69 USH 45N	24	9	8	8	66	9		12
#70 CTH "JJ"	13		9	34	145	5	12/3	1989 M
#71 STH 76		5	3	7	30/4		4	
#72 Mayflower					3			
#73 CTH "A" N	7	58/24	11	41	128		7	25/13
#74 STH 47	15	38	58	81	317/17	36	55/9	23
#75 Meade	6	11	3/3	9	24			2116
#76 CTH "EE"	5	11/6	3	8	55	6	9/4	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.
#77 CTH "E"	12	· · ·	18	23/6	81/13		12	842.5
#78 French					3	<u>61</u>		
#79 CTH "N"		5	6	15	49			5
#80 STH 55N		5		4	4	1	- 14	128
#81 CTH "J"	4	) 		1	21	P	4	HIS OF
#82 USH 41N	21	37	37	35	242		45	<u>1973</u> 18
#83 STH 96	10/10			5	22			A
#84 CTH "Z"			·		· · · · · · · · · · · · · · · · · · ·	<u></u>		1922 (1
#85 CTH "CE"				L.	8			
#90 USH 45S		· · · · ·		15				
#91 CTH "A" S			4/4	8	6			12.1
#93 USH 41S	22	32/8	55	110	147/9		24	27/12
TOTAL	152/10	255/38	301/11	503/6	1583/43	61/0	204/16	94/30

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#164	#165	#166	#167	#168	#169	#170	#171
#30 STH 114	14	4	21	4	7		14	18
#31 USH 10E		10/5	5	15	4/4	10	15	16
#32 STH 55S			5				4	
#33 CTH "KK"					5			2
#34 Shady Ln	2		2					
#35 STH 150		8	5					5
#36 Oakridge							4	
#37 Breezewood		÷	3	3				3
#38 CTH "G"								
#39 CTH "GG"		3					5	
#67 CTH "BB"	3	7	3		3	5	7	2
#68 USH 10W	35	51	40	27		13	32	19
#69 USH 45N	10	61	19	31	15	22	14	16
#70 CTH "JJ"	12	3/3		16/16	4	4/4	5	8
#71 STH 76	4		5	4		4	3	
#72 Mayflower			5	3		6		
#73 CTH "A" N	29	33	24	60		52/22	21	33
#74 STH 47	18	44	8	17	8	12/4		- 24
#75 Meade		5	3		4	5	3	4
#76 CTH "EE"	5	6/6	3		3	. 8		29/7
#77 CTH "E"	16	10/6		14	10	20	4	4
#78 French								3
#79 CTH "N"	6	5	5	5	5		2	
#80 STH 55N	4		4					
#81 CTH "J"			3					
#82 USH 41N	119	105	24	66/18		47	43	24
#83 STH 96	10	5	4	4				9
#84 CTH "Z"			3					
#85 CTH "CE"					5		7	
#90 USH 45S				13			8	6
#91 CTH "A" S							6	7
#93 USH 41S	89	56/12		72	77	64	166/44	58
TOTAL	379/0	416/32	192/0	354/34	145/4	272/30	357/44	288/7

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#172	#173	#174	#175	#176	#177	#178	#179
#30 STH 114	54	8/4	16	19		4	47/6	27
#31 USH 10E	28/4	5	5	5/5	5		58/17	5/5
#32 STH 555	4						4/4	
#33 CTH "KK"	24						14	
#34 Shady Ln								
#35 STH 150	85				5			6
#36 Oakridge	3							
#37 Breezewood				4		.3	······································	
#38 CTH "G"	6						5	
#39 CTH "GG"	6							
#67 CTH "BB"	40	9		10	2	7	7	6
#68 USH 10W	198/22	5	26/11	43	8	8	118/31	49
#69 USH 45N	131	26	8	48	17	24	54	( 186/32
#70 CTH "JJ"	8				9	5	8	8
#71 STH 76	13			3			15	. 16
#72 Mayflower	9		2	3	2		2	7
#73 CTH "A" N	195/40		5	16	7	25/13	90/10	83/13
#74 STH 47	73/4			25		9	41	22
#75 Meade	2			9		7	18	
#76 CTH "EE"	16				8	1	14	3
#77 CTH "E"	79	13	10	4		9	10	10
#78 French							-	
#79 CTH "N"	45			9/9				5
#80 STH 55N	4							9
#81 CTH "J"	10/3			4			4	
#82 USH 41N	126/34	28		122/27	36/24	-	217	49
#83 STH 96	13					16/16	7	11
#84 CTH "Z"	4							
#85 CTH "CE"	14/4	8	5		6		6	12
#90 USH 45S	14	6	6					15
#91 CTH "A" S	8			6			5	
#93 USH 41S	308/96	39	7	39		178/95	115	129/56
TOTAL	1520/207	147/4	90/11	369/41	105/24	295/124	859/68	658/10

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#180	#181	#182	#183	#184	#185	#186	#187
#30 STH 114	14	38	97/12	14	4	5		11
#31 USH 10E	20	6	34	9	20	16	6	
#32 STH 55S			3/3		5	4		
#33 CTH "KK"			7		•			
#34 Shady Ln								
#35 STH 150	. 8		28	6	7	. 6		
#36 Oakridge						-		
#37 Breezewood	e.				3	4		
#38 CTH "G"			3		3			3
#39 CTH "GG"	+	. 5	6					
#67 CTH "BB"	3	4	10		5	5		2
#68 USH 10W	57/39	65/12	97/20		27	21	11	19
#69 USH 45N	32	65	110	8	15	39/15	16	9
#70 CTH "JJ"	. 9	4	10		9	13	8	. 5
#71 STH 76		4	13	4	-	3		6
#72 Mayflower	5							
#73 CTH "A" N	48/30	129/5	115	20	29	48		16
#74 STH 47	31	102/37	99/9	31/16	8	31/7		9
#75 Meade			20	6			4	
#76 CTH "EE"	10/4	3	9	3/3	8		3	5
#77 CTH "E"		26/6	58	11		13		17/11
#78 French			3	15		3/3		
#79 CTH "N"	9/9	10	5	5	6	5/5		
#80 STH 55N		10	5	9/9	5			ż
#81 CTH "J"				4				
#82 USH 41N	59/27	136	112/24	12	73	57		14
#83 STH 96	8	7	5			12		3
#84 CTH "Z"	3					3	9	
#85 CTH "CE"		11	35				6	
#90 USH 45S						13		
#91 CTH "A" S		12/4	13	_ 9	6	5		
#93 USH 41S	85	261/22	285	12/12	23	183		42
TOTAL	401/109	898/86	1182/68	169/40	256/0	489/30	63/0	161/11
Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#188	#189	#190	#191	#192	#193	#194	#195
#30 STH 114		9	4	5			80	29
#31 USH 10E			4	5	14/5	10	82/10	11
#32 STH 55S	4						19	
#33 CTH "KK"		and generate sector from				7	24	
#34 Shady Ln								
#35 STH 150				8	6		22	6
#36 Oakridge								
#37 Breezewood							8	
#38 CTH "G"			3		•		3	6
#39 CTH "GG"			in a second s	4		14	3	3
#67 CTH "BB"		5		5	3	1	23	
#68 USH 10W	8	8	18	21	6	15	271/58	) 88
#69 USH 45N	7			8	25	18	264/31	54
#70 CTH "JJ"	4	4	17	5	9		22	13
#71 STH 76					3	6	64/5	19
#72 Mayflower	5					2	- 21	
#73 CTH "A" N	22	33/10	11/5	47	22	40	401/10	46
#74 STH 47	9	7		15			54/8	9
#75 Meade			3	9			26	
#76 CTH "EE"				3			23	15
#77 CTH "E"	5	4	15	4			79/15	6/6
#78 French	1							
#79 CTH "N"			6	10/5		1	18	5
#80 STH 55N						9	5	
#81 CTH "J"	1			4	3	3/3		
#82 USH 41N		62	21	36	36	12	91/42	116
#83 STH 96	7	4	11/4				26/13	12
#84 CTH "Z"					(		4	•
#85 CTH "CE"							16	6
#90 USH 45S	in the second se			8			15	8
#91 CTH "A" S		11						
#93 USH 41S	15	33	22	· · · · · · · · · · · · · · · · · · ·	49	31/12	175/91	128/3
TOTAL	86/0	180/10	135/9	197/5	176/5	167/15	1839/283	580/4

### Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#196	#197	#198	#199	#200	#201	#202	#203
#30 STH 114	82/12	30	24	47	12	47	87	36
#31 USH 10E	41/5	15	5	43/9	19	10	26/8	15
#32 STH 55S	5	3			-		9	
#33 CTH "KK"		6	6		7	7	6	14
#34 Shady Ln							8	
#35 STH 150	8	6	12	11	33	70-	45/4	7
#36 Oakridge				2			12	2
#37 Breezewood				2	3			4
#38 CTH "G"		11						
#39 CTH "GG"	3	3		7			13	3
#67 CTH "BB"	5/3	15	13	7	4	4	19	9
#68 USH 10W	80	89	48	48/16	80	26	(191)	.69
#69 USH 45N	113	68	40/18	33	56	92/17	233	86
#70 CTH "JJ"	3/3		10		4	11/6	8	
#71 STH 76	10	· · ·	3	12	12	16	54	3
#72 Mayflower	11				3	2	39	
#73 CTH "A" N	173/29	28	22	46	17	40	153/20	30/13
#74 STH 47	30	22	15	62/14	32	39	77/11	29
#75 Meade				5	2	14		4
#76 CTH "EE"	9	3	3	8	· 3	12	17	8
#77 CTH "E"	4	20/5	5	19	25	12	66	21
#78 French		9					7	
#79 CTH "N"	32		6	5			6	
#80 STH 55N	4	5	6					
#81 CTH "J"			4					
#82 USH 41N	129/35	108	88	39	173	119/24	122	130
#83 STH 96	18	17	4	13	4	7	33/6	11
#84 CTH "Z"	4			4		4		
#85 CTH "CE"	14	8		5/5			15	
#90 USH 45S		12		28/9			25	7
#91 CTH "A" S					7		8	
#93 USH 415	125/12	78/12	73	182/10	198	99	345	200
TOTAL	903/99	556/17	387/18	626/63	694/0	561/47	1624/43	686/19

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#204	#205	#206	#207	#208	#209	#210	#211
#30 STH 114	16	41	196/8	206	8		5	
#31 USH 10E	20	21	261/8	90			5	
#32 STH 55S			• 19		3			4
#33 CTH "KK"			43	20		5		
#34 Shady Ln	•		7					
#35 STH 150	20		63/4	59		19		
#36 Oakridge								
#37 Breezewood			33	5		5		
#38 CTH "G"	4		68	16				
#39 CTH "GG"			56	17			3	
#67 CTH "BB"	25	. 4	30	13	4	2	3	
#68 USH 10W	58	65	813	(170/11)	14	14	8	8
#69 USH 45N	41	81	586	253/30		17	16	8
#70 CTH "JJ"	5	4	57	59			5	
#71 STH 76		6	135/16	14	7	6	3	
#72 Mayflower			60	5				
#73 CTH "A" N	30	25	390/48	195	23	38/20		
#74 STH 47	21	26	78	150/14		54		
#75 Meade	5		13					
#76 CTH "EE"	-	. 3	62	22	5			
#77 CTH "E"	11	9	100	43	5	18	5	
#78 French								
#79 CTH "N"	10	5	81	26	6	-	5	
#80 STH 55N			8/4	5				
#81 CTH "J"			10					
#82 USH 41N	56	83	1144/42	244/97	28	37		2,5
#83 STH 96	17	6/6	132/6	10		9		
#84 CTH "Z"			7	3		4		
#85 CTH "CE"		9	30	6				
#90 USH 45S	27/4	9/4	34	39	7			5
#91 CTH "A" S	7		28	41	6			
#93 USH 41S	65	187/104	1689	1785	23	52		7
TOTAL	438/4	584/114	6233/136	3496/152	139/0	280/20	58/0	57/0

### Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

TABLE C (Cont'd)

Station#	#212	#213	#214	#215	#216	#217	#218	#219
#30 STH 114	13			4	8 15			
#31 USH 10E	13/5		5	5			6	
#32 STH 55S								
#33 CTH "KK"						8		
#34 Shady Ln								
#35 STH 150			6				5	
#36 Oakridge	-							
#37 Breezewood								12
#38 CTH "G"			6					
#39 CTH "GG"			τ.		4			
#67 CTH "BB"	14	8	4		19/7		6	3
#68 USH 10W	25	đ	38	Ŧ	6			
#69 USH 45N	40/14		9		8		8	
#70 CTH "JJ"	38	11/7	4		4		8	5.
#71 STH 76	19	с.						
#72 Mayflower	37/33		3			• .		
#73 CTH "A" N	31	43/32	15/10	7	10		15/10	7
#74 STH 47	25	8	44/9	14	7/7	14	26	
#75 Meade	5		5		17	4		
#76 CTH "EE"	18/6		5		3		12	
#77 CTH "E"	17	12/6	14/6	6	11	10		
#78 French			4	3				
#79 CTH "N"	5	13/13	15/11					14.
#80 STH 55N	9		4					
#81 CTH "J"	3	4	6					
#82 USH 41N	12	14	26	11				21
#83 STH 96	4			4				
#84 CTH "Z"	12		6					
#85 CTH "CE"	5	0						
#90 USH 45S	7					1		
#91 CTH "A" S				6				12
#93 USH 41S	160		21		29		59/46	52/46
TOTAL	500/58	105/58	240/36	60/0	108/14	36/0	145/56	112/46

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#220	#221	#222	#223	#224	#225	#226	#227
#30 STH 114			4	4		24	18	
#31 USH 10E						àre	·`	
#32 STH 55S		÷						
#33 CTH "KK"						-		
#34 Shady Ln							2	
#35 STH 150				6		19		1999 BY
#36 Oakridge	2.1							
#37 Breezewood								A COND O
#38 CTH "G"						4		1039745 I
#39 CTH "GG"				4		3		19429.8
#67 CTH "BB"		5	4/2	4/2	2	7	6	12
#68 USH 10W	13	· · · · · · · · · · · · · · · · · · ·			37/16	35	22	19
#69 USH 45N	8	16	27	8	44	133	89	. 8
#70 CTH "JJ"	9	13	18	7/3	5	41	9	
#71 STH 76		4	97/7	130	9	10/7	9/4	
#72 Mayflower		. 10 .	100	2		26	6	
#73 CTH "A" N	6	· · · · · · · · · · · · · · · · · · ·	18		20/20	16	5	6
#74 STH 47		4/4				23	6	15 142 5
#75 Meade				9			5	
#76 CTH "EE"		6						
#77 CTH "E"				3/3		4	7/7	5
#78 French				3/3			4	1110
#79 CTH "N"							5	
#80 STH 55N			0.2	7/7		al formation and the second		
#81 CTH "J"							<u>^/</u>	
#82 USH 41N		12		18/18		23	36	1113
#83 STH 96		· · · · · · · · · · · · · · · · · · ·		3		1 45.12	3	BRA
#84 CTH "Z"				4	3/3			
#85 CTH "CE"		······				5		812 8
#90 USH 45S	5	25/5	5	28/4	9/4	30	45/4	
#91 CTH "A" S							P2	161/1
#93 USH 41S	25	29		24	6	24		.212
TOTAL	66/0	124/9	173/9	264/40	135/43	427/7	277/15	38/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#228	#229	#230	#231	#232	#233	#234	#235
#30 STH 114		. 9		48		7	13	4
#31 USH 10E	87	4/4		14			5	10
#32 STH 55S				3				
#33 CTH "KK"				15				
#34 Shady Ln				5		2		
#35 STH 150	- 14 - C			23		11		
#36 Oakridge								
#37 Breezewood								
#38 CTH "G"		3		17				
#39 CTH "GG"				3	3			
#67 CTH "BB"		4		A		2	2	
#68 USH 10W		.14		264	13	20	15	
#69 USH 45N	31	15	15	146			32	16
#70 CTH "JJ"	4		5	-23				4
#71 STH 76	14	11		44				3
#72 Mayflower	10			8	÷		3	
#73 CTH "A" N			12	57	3 <b>.</b>	6	5	
#74 STH 47				23		8		4/4
#75 Meade				9	3	2	·	-
#76 CTH "EE"				3				
#77 CTH "E"				13		8/8		5/5
#78 French						10 (M)	e	
#79 CTH "N"		5		40		5		
#80 STH 55N						-	9	
#81 CTH "J"								
#82 USH 41N	58/34	12		14	23			9
#83 STH 96	3			17				
#84 CTH "Z"								
#85 CTH "CE"				6		4	2.2	6
#90 USH 45S				26			7	
#91 CTH "A" S			5 B					
#93 USH 41S			25	223/10	21	14		<u>ٌ</u> . 37
TOTAL	120/34	77/4	57/0	1048/10	63/0	85/8	91/0	98/9

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#236	#237	#238	#239	#240	#241	#242	#243
#30 STH 114	18	21		a	4			
#31 USH 10E	5	24/5			1		5	
#32 STH 55S		. 4						MXD 1
#33 CTH "KK"			7					1016
#34 Shady Ln		4						19122.5
#35 STH 150		28/5	<u> </u>			7		
#36 Oakridge		3						
#37 Breezewood		6						ndisu of
#38 CTH "G"	5	· · · · · · · · · · · · · · · · · · ·	3				MONT	19011
#39 CTH "GG"		5						HR. LU
#67 CTH "BB"	7	9/2					125	
#68 USH 10W	33	(96)	14			25	27	33
#69 USH 45N	18	67	8	8	· · · · · · · · · · · · · · · · · · ·	27	17	102
#70 CTH "JJ"	5	4		4	· · · · · · · · · · · · · · · · · · ·			3/3
#71 STH 76	3	12	4			6		12
#72 Mayflower		15		3				
#73 CTH "A" N	5	28					6	11/5
#74 STH 47	7	23	5/5		7		9	13.02.0
#75 Meade		3					3	3
#76 CTH "EE"		3						Property of
#77 CTH "E"	-	28/3	. 8			10/6	22	1933
#78 French								HUD Y
#79 CTH "N"		15	an alam bergin at shirts		5		5	NET I
#80 STH 55N							73	5
#81 CTH "J"				4	· · · · ·			4
#82 USH 41N	27	59			11			36
#83 STH 96	4	19	5					
#84 CTH "Z"	4		4			4	-	1116.6
#85 CTH "CE"						-	· · · · · · · · · · · · · · · · · · ·	10/01/20
#90 USH 45S	5	118/4	15			7		H.Q. 5.
#91 CTH "A" S						· · · · · · · ·		1992.9
#93 USH 41S	0	330	25	23		29	8	NIC II
TOTAL	146/0	920/19	98/5	42/0	27/0	115/6	80/0	209/8

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#244	#245	#246	#247	#248	#249	#250	#251
#30 STH 114				4				
#31 USH 10E	6					·.		9/5
#32 STH 55S								-
#33 CTH "KK"								
#34 Shady Ln				2/2			а.	
#35 STH 150						, .		
#36 Oakridge								
#37 Breezewood			2	5	9			
#38 CTH "G"					14/9			
#39 CTH "GG"		5						3
#67 CTH "BB"	2		2	4	3/3	16		. 2
#68 USH 10W	6	8	29	8			25/12	
#69 USH 45N	8	17				8		
#70 CTH "JJ"	4							
#71 STH 76		6	5		3			
#72 Mayflower								
#73 CTH "A" N		12			27/27	6		6
#74 STH 47					16			9
#75 Meade				4	2			
#76 CTH "EE"								
#77 CTH "E"				5	5		6	
#78 French							25	
#79 CTH "N"							-	
#80 STH 55N		5						
#81 CTH "J"	÷							
#82 USH 41N	9			2				12
#83 STH 96	4							
#84 CTH "Z"								
#85 CTH "CE"		2		-				
#90 USH 45S			6			6	2	
#91 CTH "A" S						6		
#93 USH 41S		21			18		6.	
TOTAL	35/0	74/0	42/0	27/2	86/39	42/0	31/12	41/5

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#252	#253	#254	#255	#256	#257	#258	#259
#30 STH 114	9	13/4	20	44/4	9/4	23	85/12	15
#31 USH 10E		14	4	36	5	15/5	38	6
#32 STH 55S				4	3	70 x 8 8	4	
#33 CTH "KK"			12	12	5		19	
#34 Shady Ln			10	9	3	2		
#35 STH 150	5	17	21/4	48	6	16	23	6
#36 Oakridge				3				
#37 Breezewood			3		5		7	
#38 CTH "G"		3	3	5		3	3	2010
#39 CTH "GG"			3	10	5		5	
#67 CTH "BB"	4	2	16	-31/7	10	6	2	4
#68 USH 10W	23/12		27	90	24	21	45	27
#69 USH 45N	14	7	14	45			38	8
#70 CTH "JJ"		4			amonte ante	4	9	9
#71 STH 76	6	3		41	3		12	3
#72 Mayflower	4	2	2	7				mine i
#73 CTH "A" N	18/5	6	16	161/10	5	6	18	13
#74 STH 47		8	8	59	22/8		53	9
#75 Meade			8098		10	4	10	
#76 CTH "EE"			3	10/4			3	
#77 CTH "E"	6		13	43	11	6	30	1810 h
#78 French			9					11. A.A.
#79 CTH "N"		5	- 10	16	11		21/9	ansad a
#80 STH 55N							6	
#81 CTH "J"	-		•		3	· · · · · ·		hit
#82 USH 41N			36	143	12	37	109	14
#83 STH 96		6		13			11	3
#84 CTH "Z"				16				
#85 CTH "CE"		· · · · · · · · · · · · · · · · · · ·	4	15			5	
#90 USH 45S	7	1000 etc	13	29		7		013
#91 CTH "A" S				14	7	7	7	1122 01
#93 USH 41S		· · · · · · · · · · · · · · · · · · ·		280/16	60	67	236	17/1
TOTAL	97/17	90/4	238/4	1184/41	219/12	<sup>`</sup> 220/5	799/21	134/1

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#260	#261	#262	#263	#264	#265	#266	#267
#30 STH 114	5	17	19/4	18	45/6	37	13	193/4
#31 USH 10E	4/4		41/10	5	29/5	10	10	116/4
#32 STH 55S						3	3	4
#33 CTH "KK"	6	6	33/4	6	6	27		45
#34 Shady Ln								2
#35 STH 150			46/4	7	17/11			7
#36 Oakridge						4	-	
#37 Breezewood			53					4
#38 CTH "G"			8	3	3			9
#39 CTH "GG"		3			9			11
#67 CTH "BB"	2/2	2	2	4	13	2/2	2	4
#68 USH 10W	22	-	25	i.	40/12	52	13	130/20
#69 USH 45N	41		31	15	41	24	10	100
#70 CTH "JJ"		4	19/8	9		4	5	30
#71 STH 76	3	3	9		5	3		4
#72 Mayflower		·	3		4	3		5
#73 CTH "A" N	17	20/20	17/10	20/10	18	16		87
#74 STH 47	14	9	98/52	30/8	46/5	47	25	139
#75 Meade	5		3	5	11	. 8		24
#76 CTH "EE"		6	2	11	3	3	3	36
#77 CTH "E"			6	6				43
#78 French				3				
#79 CTH "N"			11		16			22
#80 STH 55N						5		10
#81 CTH "J"						3		3
#82 USH 41N	14	21		53	45	72		176
#83 STH 96			5			7		26
#84 CTH "Z"		3 7	7			4	4	
#85 CTH "CE"	6		6					27
#90 USH 45S	5		15		12	11		7
#91 CTH "A" S	7		7	8	17	6		8
#93 USH 41S	14	22		77	107	32	29	184
TOTAL	165/6	113/20	464/92	280/18	482/39	383/2	119/0	1456/28

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#268	#269	#270	#271	#272	#273	#274	#275
#30 STH 114	38	13	and the second	16	26	12	9	46
#31 USH 10E	31		14	5	6	···** .	10	15
#32 STH 55S		5	3	7			8	
#33 CTH "KK"	18	10	11	6		1	8	7
#34 Shady Ln								
#35 STH 150	6	÷	5			6		10
#36 Oakridge		(						
#37 Breezewood			4					
#38 CTH "G"	· · · · · · · · · · · · · · · · · · ·							4
#39 CTH "GG"	·				Ì			
#67 CTH "BB"	2			2	3			8
#68 USH 10W	15	11	11	21	25	35/27	27	8
#69 USH 45N	39	16	42	16	15		24	36/17
#70 CTH "JJ"	9	13	ļ.:	4	5		10	1180 60
#71 STH 76	3		8			and in the second	3	8
#72 Mayflower	· · · · · · · · · · · · · · · · · · ·	<sup>2</sup>	and the second state of th					1143
#73 CTH "A" N	10	6	12	11	5		12.443	10
#74 STH 47	16	13	22	23	U118	7	30	13
#75 Meade			2	5			7	2
#76 CTH "EE"	8	15	3	3		a programmenta a series de la	3	
#77 CTH "E"	9/6	11	12	15			4	10
#78 French				4		1		HILD I
#79 CTH "N"	5		5	5			5	5
#80 STH 55N	<u> </u>				1		5	1.2.2
#81 CTH "J"	-			3			NC.	1418.04
#82 USH 41N	77/24	112	47	55	33	12	28	36
#83 STH 96		4			102.03	4	4	7
#84 CTH "Z"	3	4	and the second					
#85 CTH "CE"	4		8	6			23	14
#90 USH 45S		6	8	7				1.10
#91 CTH "A" S		8	13	7			7	12
#93 USH 41S	56	83	127	57	. 56	6	47	36
TOTAL	349/30	330/0	357/0	278/0	174/0	82/27	252/0	287/1

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Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#276	#277	#278	#279	#280	#281	#282	#283
#30 STH 114	22	79/6	26	5			24/12	4
#31 USH 10E	9	38/8	41	5	15		15	
#32 STH 55S		3	2.					
#33 CTH "KK"	11	51	23	6				
#34 Shady Ln					2			
#35 STH 150			5/5		8		6	6
#36 Oakridge								
#37 Breezewood								
#38 CTH "G"			9					
#39 CTH "GG"	3							
#67 CTH "BB"	3	8	17		2		5	3
#68 USH 10W	8	39	42		6	6	8	
#69 USH 45N		49/15	17	10	7	10	18/18	
#70 CTH "JJ"			5	3/3				
#71 STH 76			8/4		4	5	3	
#72 Mayflower				28	·			-
#73 CTH "A" N	17	28/10	11	13/13		5	18	
#74 STH 47		15	30	16	16	F.	4/4	
#75 Meade		5			3	3	3	
#76 CTH "EE"		е. — <sup>3</sup>	17				6	
#77 CTH "E"							4	6
#78 French						-		
#79 CTH "N"	11	10	5		5	5/5	5	5
#80 STH 55N			7					
#81 CTH "J"								
#82 USH 41N	66	105/24	59	12				Ξ.
#83 STH 96			4					
#84 CTH "Z"		-				а		
#85 CTH "CE"			8					
#90 USH 45S							8	
#91 CTH "A" S	19	5					, 7	
#93 USH 41S	109/7	98	202		31/31		38	14
TOTAL	278/7	533/63	536/9	70/16	99/31	34/5	172/34	38/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#284	#285	#287	#288	#289	#290	#291	#292
#30 STH 114	4		64/24		9	35	6/6	
#31 USH 10E	9		29		20	10	6	
#32 STH 55S			7					
#33 CTH "KK"	5	5	19		6	5	14	
#34 Shady Ln								
#35 STH 150			17		12	10		
#36 Oakridge						8		
#37 Breezewood				5	1			
#38 CTH "G"						3		
#39 CTH "GG"							· · · · · · · · · · · · · · · · · · ·	
#67 CTH "BB"	4		3			17		
#68 USH 10W			45		6	13	5	
#69 USH 45N	17		58	8		8	18	
#70 CTH "JJ"	4		36	10 E 1 WC	4	4		
#71 STH 76			19			-		
#72 Mayflower			2			3		
#73 CTH "A" N	34/24		111			24	5 .	6
#74 STH 47			252	1.8	6	8		
#75 Meade	3	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	19		3	3/3	4	
#76 CTH "EE"	5		34			5	· · · · · · · · · · · · · · · · · · ·	
#77 CTH "E"		5	68		6			
#78 French			8/4					
#79 CTH "N"			16/5		5	12		
#80 STH 55N	5	A A.	5					
#81 CTH "J"	4		11					
#82 USH 41N	12		35		24	35/24	·····	12
#83 STH 96			18			. 3		
#84 CTH "Z"								
#85 CTH "CE"	· · · · · · · · · · · · · · · · · · ·					4		*
#90 USH 45S						6	3.7	
#91 CTH "A" S	13				6		6	12
#93 USH 41S			29			10	49/7	
TOTAL	119/24	10/0	905/33	13/0	107/0	226/27	113/13	30/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#293	#294	#295	#296	#297	#298	#299	#300
#30 STH 114	13	13	53	14	24	9	9	26
#31 USH 10E	22	25	23/4	24	10/5		5	61
#32 STH 55S				3	3			
#33 CTH "KK"	7							
#34 Shady Ln			8					
#35 STH 150	19	51	17	15	9/4		8	
#36 Oakridge			2 9.15	2				
#37 Breezewood	3	9	3		3	3		
#38 CTH "G"	3	5	8		8			
#39 CTH "GG"	11	12	3	3	7	4		
#67 CTH "BB"	11	9	7	4	10	2	7	4
#68 USH 10W	34	28	25	5	16	16	8	
#69 USH 45N	19	49	87/14		33			17
#70 CTH "JJ"		5						
#71 STH 76	3	· 3	3	6	5			
#72 Mayflower		5			6			
#73 CTH "A" N	16	27	17		156/127			
#74 STH 47	24/7	22	8	6	18/4	8		8
#75 Meade		4	5		3			
#76 CTH "EE"	6		8	3			3	
#77 CTH "E"	7		11		er (			
#78 French			5					6
#79 CTH "N"		12		5	17			
#80 STH 55N	9/5	10/5	9		4			
#81 CTH "J"		7/3	6				10	
#82 USH 41N	22	110	23	25	49	26	79	17/17
#83 STH 96	13	5	8					
#84 CTH "Z"								
#85 CTH "CE"	5							
#90 USH 45S					7			
#91 CTH "A" S	19	6	24	14	.14	6	6	6
#93 USH 41S	168	256	262/55	100	153/16	12/12	37	39
TOTAL	434/12	673/8	618/73	229/0	555/156	86/12	93/0	184/17

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#301	#302	#303	#304	#305	#306	#307	#308
#30 STH 114	10	60	52/8		35	- 22	21	23
#31 USH 10E	20	49	34	11	30	10	69/9	45/5
#32 STH 55S							8	
#33 CTH "KK"								
#34 Shady Ln							3	
#35 STH 150	5	68	18	6	10/4	28/4	23/11	15
#36 Oakridge					5	1 en		
#37 Breezewood	3		3				5	3
#38 CTH "G"			3			5	.3	5
#39 CTH "GG"		6			3		9	6
#67 CTH "BB"	5	9	8	3	4	6		4
#68 USH 10W		51	8.		21		25/20	
#69 USH 45N	16	17			7	22		15
#70 CTH "JJ"		i prima na Maria na sa				5		
#71 STH 76		5	4	1		8		
#72 Mayflower		· · · · · · ·	6	3				2
#73 CTH "A" N	17	17			28/10		7	11
#74 STH 47		· · · · · · · · · ·			25		24	14
#75 Meade	01				6			
#76 CTH "EE"					3		· · · · · · · · · · · · · · · · · · ·	
#77 CTH "E"	6				6		6	10
#78 French	\$1 							2012
#79 CTH "N"	5						5	6
#80 STH 55N	5					1		4
#81 CTH "J"	650					4	·	. 4
#82 USH 41N	14	47			31	59/27	46/18	72
#83 STH 96	. 7		4			5	······	1100
#84 CTH "Z"	5	7						
#85 CTH "CE"	-							
#90 USH 45S	4/4	. 7					6	
#91 CTH "A" S	30/4	24	21	22	25	6	8	27
#93 USH 41S	165	98	56	13	290/28	183	84	49
TOTAL	317/8	465/0	217/8	58/0	529/42	363/31	352/58	315/5

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#309	#310	#311	#312	#313	#314	#315	#316
#30 STH 114	101/86	17	43	9	49	58	5	31
#31 USH 10E	54/5	58	30	5	52	45/4	15	21
#32 STH 55S	3							4
#33 CTH "KK"					6		7	
#34 Shady Ln	12	2			2	2		2
#35 STH 150	70/17	61	31		(102)	(124)	29/4	31/4
#36 Oakridge			17		25	3	4	10
#37 Breezewood	5	3	11	7/4	38	19	4	28
#38 CTH "G"	9	9	24	3	28	39	3	17
#39 CTH "GG"	9	3	14	3	22	32	7	6
#67 CTH "BB"	14	9	2 .		2	2	2	4
#68 USH 10W	21	23	30	35	8 ·	52/12	14	8
#69 USH 45N	14/14	15	8		26	32	24/14	17
#70 CTH "JJ"					3/3	4		
#71 STH 76	3	3	3		10	9	3	7
#72 Mayflower	3						3	
#73 CTH "A" N	7	23	5	6	16	10	16	20
#74 STH 47	33/8	6	7		32	16	17	
#75 Meade							5	4
#76 CTH "EE"					3	3		
#77 CTH "E"			5	4		14		11
#78 French					•			
#79 CTH "N"		5	11					11/5
#80 STH 55N		4			·	6/6		6
#81 CTH "J"		1		E.	4		4/4	
#82 USH 41N	12	34/34	49/24	12	61	86	26	34/18
#83 STH 96	3							7
#84 CTH "Z"								
#85 CTH "CE"			6				5 - S	
#90 USH 45S			4/4		39		4/4	12
#91 CTH "A" S	59/10	38	65	62	257/4	165	144	97/45
#93 USH 41S	154/22	204	164	61	407	475	139	76
TOTAL	586/162	517/34	523/28	202/4	1192/7	1196/22	475/26	464/72

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#317	#318	#319	#320	#321	#322	#323	#324
#30 STH 114	23	82	22/6		5	26	Anna an an Anna An	5
#31 USH 10E	24	100/18	24	10		20	14	5
#32 STH 55S		4		2				Ling the
#33 CTH "KK"				··· ····				
#34 Shady Ln	2	2	6					
#35 STH 150	88	(118)	33/12	18	15	6	.53/4	25
#36 Oakridge		13	6			6		2
#37 Breezewood	3	23	14	.12	8	20	3	4
#38 CTH "G"	26	66	3	10	. 3	5	8	4
#39 CTH "GG"	12	36/6	9/6		3		3	9
#67 CTH "BB"	47/8	16/2	5		4		4	2
#68 USH 10W	8	32	11/11					5
#69 USH 45N	34	50	17		16	15	7	16
#70 CTH "JJ"	4	•						
#71 STH 76		13		8				
#72 Mayflower	3							3
#73 CTH "A" N	12	40	6	13		10		10
#74 STH 47	25	35		16/7		15	7/7	1000 100
#75 Meade			3				3	
#76 CTH "EE"	3	10		· · · · · · · · · · · · · · · · · · ·		3	1	130913-91
#77 CTH "E"		11		4	1	6/6	5	6
#78 French								
#79 CTH "N"		6				5		11
#80 STH 55N								
#81 CTH "J"		11						43.572.23
#82 USH 41N	12	91/42	63		12			35
#83 STH 96		24			1		10/10	
#84 CTH "Z"						7	-	internet in a
#85 CTH "CE"		4						
#90 USH 45S	7	224/10	24/17		20	49		7
#91 CTH "A" S	55/21	280/5	82	66	68	104/9	59	105/9
#93 USH 41S	344/85	656/130	242	62	45	169	208	91
TOTAL	730/114	1947/213	570/52	219/7	195/0	466/15	384/21	345/9

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#325	#326	#327	#328	#329	#330	#331	#332
#30 STH 114	1	26	4	7		28	9	66
#31 USH 10E	1	24	30	21	20	28	9.	20
#32 STH 55S				21	20	21		8
#33 CTH "KK"			7					°
#34 Shady Ln		~				4	2	
#35 STH 150		71	28/4	105	14	120/	15	47
#36 Oakridge			2011	5	2	120	15	18
#37 Breezewood		6	23	6	5	23	5	44
#38 CTH "G"	7	3	5	16	4	16		11
#39 CTH "GG"		3	22	15	7	26		20
#67 CTH "BB"		4	2	9	5	4		4
#68 USH 10W	8	6	44	6		8		17
#69 USH 45N		26	15	7		14		16
#70 CTH "JJ"								5
#71 STH 76		9	6	. 9		4		
#72 Mayflower			-2	2				3
#73 CTH "A" N		23/5	22/10	10	. s.	5		6
#74 STH 47	8	18			9	9		8
#75 Meade								
#76 CTH "EE"		3				3		7
#77 CTH "E"		11/7		5/5		11	3/3	
#78 French				4				
#79 CTH "N"						18		11/6
#80 STH 55N								
#81 CTH "J"			10/3			4		8
#82 USH 41N		77/24	62/27	12	47	23	18/18	36
#83 STH 96				3				5
#84 CTH "Z"			3			. 12		
#85 CTH "CE"				6				
#90 USH 45S	6	22	12/5	27	13	14	7	32
#91 CTH "A" S	19	94	79	19	32	88	15	76
#93 USH 41S	23	189	119/12	180	22	182/20	63	347
TOTAL	71/0	615/36	493/61	474/5	180/0	653/20	137/21	823/6

#### Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#333	#334	#335	#336	#338	#339	#340	#341
#30 STH 114	40	42			48	inder an	6/6	5
#31 USH 10E	10	20	6	6	27/8		13/4	5
#32 STH 55S					4/4			
#33 CTH "KK"	6	7			5		· · · ·	
#34 Shady Ln	2/2		and the second second		2		<u>0.0</u>	2
#35 STH 150	43/24	74/4	12	22	137/9	5	27	21
#36 Oakridge	14	10	3	11	16/8			
#37 Breezewood	19	14/4	4		7			5
#38 CTH "G"	5	12		· · · · · · · · · · · · · · · · · · ·	17			7
#39 CTH "GG"	18	15			6			3
#67 CTH "BB"	15	15/9	4	2	40			2
#68 USH 10W	6	27		e-722 - 7	68/30			11
#69 USH 45N	9	61			33	9	8	15
#70 CTH "JJ"	5			61012 	· · · · · · · · · · · · · · · · · · ·	1		
#71 STH 76	9	13		·····	24			4
#72 Mayflower							· · · · · · · · · · · · · · · · · · ·	
#73 CTH "A" N	22	25	5		60/10		6	
#74 STH 47	7	8	30/30		17/9		9	
#75 Meade		3						1115
#76 CTH "EE"					3			
#77 CTH "E"	4	4			8		25/11	1112
#78 French		ļ			3/3		G.	
#79 CTH "N"		5			31/20			5
#80 STH 55N		· · · · · · ·		•		•		4
#81 CTH "J"				·····	4			1016 un
#82 USH 41N	36/17	78	· · · · · · · · · · · · · · · · · · ·		106/18		36/24	46
#83 STH 96	5	5			11	· · ·	11	UDAV S
#84 CTH "Z"		3						
#85 CTH "CE"		6			5			
#90 USH 45S	18	29		Arrive.	7		6	M1.0 S
#91 CTH "A" S	40	71			42	11		15
#93 USH 41S	210	286/30	30/16	56/16	462/136		11/11	184/90
TOTAL	543/43	833/47	94/46	97/16	1193/255	25/0	147/56	334/90

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#342	#343	#345	#346	#347	#348	#349	#350
#30 STH 114		32	13	. 5	· · · · · ·		5	
#31 USH 10E		21	6					
#32 STH 55S								
#33 CTH "KK"		6						
#34 Shady Ln		5	15			2	2	4
#35 STH 150	33	139	16/4				15	5
#36 Oakridge		1. Jack						
#37 Breezewood		12	3					1
#38 CTH "G"		14	9					
#39 CTH "GG"		6						
#67 CTH "BB"		9	6	9		2		2
#68 USH 10W		99/68	101/38					
#69 USH 45N	9	8	68/14	.7				
#70 CTH "JJ"								
#71 STH 76		4	12					
#72 Mayflower			2					
#73 CTH "A" N			st	12				
#74 STH 47		17						
#75 Meade			2					
#76 CTH "EE"		8	19		•			
#77 CTH "E"		4	5/5			2		
#78 French					2			
#79 CTH "N"			5		2	2 20		
#80 STH 55N		4	5					
#81 CTH "J"								
#82 USH 41N		25	49		14			-
#83 STH 96			5					
#84 CTH "Z"						•		. ,
#85 CTH "CE"			×					•
#90 USH 45S	12	5	19	14			5/5	• •
#91 CTH "A" S		7	23				6	
#93 USH 41S	26	172/19	86	31				14
TOTAL	68/0	597/87	469/61	77/0	14/0	4/0	33/5	25/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#351	#352	#353	#354	#355	#356	#357	#358
#30 STH 114					9	(*************************************	7	7
#31 USH 10E		6	<u> </u>		4		5	5
#32 STH 55S								
#33 CTH "KK"								
#34 Shady Ln		2		2	2	3		
#35 STH 150		c	6	13	38	5	18/6	16/5
#36 Oakridge					12			
#37 Breezewood		the second second second second second		4			3	
#38 CTH "G"	· · · · · ·							
#39 CTH "GG"								
#67 CTH "BB"	-		2	2	8			
#68 USH 10W					5		5	19/19
#69 USH 45N				19			15	1000 01
#70 CTH "JJ"								
#71 STH 76			· · · · · · · · · · · · · · · · · · ·		3	. 4		
#72 Mayflower				<u></u>				
#73 CTH "A" N				5	5		6	
#74 STH 47						· · · · · · · · · · · · · · · · · · ·	9	
#75 Meade								
#76 CTH "EE"		· ·						· 7/7
#77 CTH "E"						1		
#78 French			· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·	
#79 CTH "N"								5
#80 STH 55N								
#81 CTH "J"								
#82 USH 41N					24			27/27
#83 STH 96								
#84 CTH "Z"								
#85 CTH "CE"								
#90 USH 45S	6	6		7	20		7	
#91 CTH "A" S				8				
#93 USH 41S	41	1		14	13	13	104	
TOTAL	47/0	14/0	8/0	74/0	143/0	25/0	179/6	86/58

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#359	#360	#361	#362	#363	#364	#365	#366
#30 STH 114	4		51	22	7 .			
#31 USH 10E			64/14	10				5
#32 STH 55S								
#33 CTH "KK"			. 6	7				
#34 Shady Ln	3		16	4	5	•	14	
#35 STH 150	19	7	158/29	(157)	39		40	5
#36 Oakridge					3	4		
#37 Breezewood	3		21					4
#38 CTH "G"		.3	23	16	11	3		
#39 CTH "GG"			20	3	7			
#67 CTH "BB"	5		11/3	8		2/2		2
#68 USH 10W	8		58	27			21.	
#69 USH 45N			73	22	8			
#70 CTH "JJ"				2				
#71 STH 76			40	3	3			
#72 Mayflower	4		2	3				-2
#73 CTH "A" N	7		33	5				
#74 STH 47			16					
#75 Meade								
#76 CTH "EE"	3	÷ .	14 .					
#77 CTH "E"			34	4	4		6/6	
#78 French								
#79 CTH "N"			28					· · · · · · · · · · · · · · · · · · ·
#80 STH 55N								
#81 CTH "J"	4					4		
#82 USH 41N	35		199/24	14				
#83 STH 96			7					
#84 CTH "Z"				2				15
#85 CTH "CE"			5	14				
#90 USH 45S			198	56	48	5	7	3
#91 CTH "A" S	13	7	49	5	6			
#93 USH 41S	100	a.	628/173	83		2		
TOTAL	204/0	17/0	1754/243	449/0	141/0	18/2	53/6	16/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#367	#368	#369	#370	#371	#372	#373	#374
#30 STH 114				19/19	11	desertations		15
#31 USH 10E	. 5	4		6	· · · · · · · · · · · · · · · · · · ·	5	5	9
#32 STH 55S								4/4
#33 CTH "KK"								
#34 Shady Ln			5			-	8	
#35 STH 150	17/17	12/12		5		41/21	56	24
#36 Oakridge		4		2	11	3	3	5
#37 Breezewood	8	7	3	14	72/8	4	34/4	23
#38 CTH "G"	10		13	6	3	3	13	9
#39 CTH "GG"		6/6		4		3	9	11
#67 CTH "BB"	-	. 03		4		4		. 2
#68 USH 10W				76/68	22	<u>, (1</u>	4:83	8
#69 USH 45N				8				25/15
#70 CTH "JJ"	- <u>Ce</u>	576	4	10/6				
#71 STH 76	5/5			4	3	37/29		-
#72 Mayflower								5
#73 CTH "A" N	· [			6	hard the second second	6		13/13
#74 STH 47	9		14				<u></u>	22.5.2
#75 Meade	6		Le construction de la construcción de			· · · · · · · ·		
#76 CTH "EE"			P			· · · ·		
#77 CTH "E"		6/6	· · · · ·	-				
#78 French		· · · · · · · · · · · · · · · · · · ·			h			Philippine and the second
#79 CTH "N"			· · · · · · · · · · · · · · · · · · ·	5	· · · · · · · · · · · · · · · · · · ·			0.0.014
#80 STH 55N				a a chairte ann an		·		
#81 CTH "J"				4/4				1016.00
#82 USH 41N					24	12		46
#83 STH 96				3		5	1916	1089 N
#84 CTH "Z"				· · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·		
#85 CTH "CE"								4.2×
#90 USH 45S	33	4/4	28	41	110	74		51
#91 CTH "A" S	19		13	91		13	33	40
#93 USH 41S	65	6	113	97/12	307/63	104	303/51	205
TOTAL	177/22	49/28	193/0	314/109	563/71	314/50	464/55	495/32

# Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#375	#376	#377	#378	#379	#380	#381	#382
#30 STH 114		13/4	4	26	5	12/12	9	5
#31 USH 10E			20/5	17	36/4	51/5	15	15
#32 STH 55S					÷.			
#33 CTH "KK"								
#34 Shady Ln			2		5	915	2	2
#35 STH 150	5	5	64/	40	169/5	102	46/4	18
#36 Oakridge	6	2	14	5		55	11	
#37 Breezewood	4/4	12	52	49	53	48	50	14
#38 CTH "G"	6	3	30	16	76	14	9	23
#39 CTH "GG"	3	20	15	6	10	14	18	6
#67 CTH "BB"	16	9	11	3	. 22	8	6	2
#68 USH 10W		19		13	31/11	19/11	6	15
#69 USH 45N	8		34		30	36	9	15
#70 CTH "JJ"			4					
#71 STH 76	8	8	25	10	19	-	7	
#72 Mayflower					9	3		
#73 CTH "A" N	6		24	5	67	11	7	
#74 STH 47		22/7			27	··· 15		11/4
#75 Meade				4	2	5		3
#76 CTH "EE"	3	1 a.		5		6		
#77 CTH "E"		5		4	27	12/3		9
#78 French				-		- x - 7		
#79 CTH "N"					. *			11
#80 STH 55N		5						
#81 CTH "J"								
#82 USH 41N	23	38	65	51	37	57/24	36/24	16
#83 STH 96			11		4		4	
#84 CTH "Z"	ж. 							
#85 CTH "CE"					4	6	6	
#90 USH 45S	13	5	26		20/5		10/5	19
#91 CTH "A" S	23	25	102/4	47	196/4	201/4	221	176/16
#93 USH 41S	44	207	576/29	161	937/112	328	410/51	220
TOTAL	168/4	398/11	1079/38	462/0	1788/141	1012/64	882/84	578/20

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

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Station#	#383	#384	#385	#386	#387	#388	#389	#390
#30 STH 114	10	5	18	23	45/9			4
#31 USH 10E	6		16	19/4	22/12	6	•	
#32 STH 55S	· · · · · ·						4/4	
#33 CTH "KK"							7	
#34 Shady Ln				4				
#35 STH 150	7	8	32/4	17	24	5		
#36 Oakridge	18			2	2			
#37 Breezewood			16	29	29/9		16	
#38 CTH "G"	3	5	18	15	15		3	
#39 CTH "GG"	6	3	6	9	16	10	7	
#67 CTH "BB"	2		2	6	6	2		
#68 USH 10W			8	46/19	8		· · · · · · · · · · · · · · · · · · ·	
#69 USH 45N			34/17	15	48/17			
#70 CTH "JJ"								Correct of
#71 STH 76			. 7	12	20		4	
#72 Mayflower			2					
#73 CTH "A" N	6	1	10	6	16		10/10	
#74 STH 47	7		• •		18			
#75 Meade					4	1.		
#76 CTH "EE"	3		3	3	1			
#77 CTH "E"			6	8/3	33/3			
#78 French	· · · ·							
#79 CTH "N"	5		5			5		
#80 STH 55N	11		· · · · · ·	4		2		- <u>a</u>
#81 CTH "J"								
#82 USH 41N	25		73	54	75		12	
#83 STH 96	9	1	7	7				13.252 3
#84 CTH "Z"				4				
#85 CTH "CE"			6					
#90 USH 45S			5	42/16	45/18	5.	6	6
#91 CTH "A" S	114	21	113/5	90/3	94			THE LET
#93 USH 41S	136		346/8	214/52	645	97	41	27
TOTAL	368/0	42/0	733/34	629/97	1165/68	130/0	110/14	37/0

Tabulation of Interview Station & Internal Zone Trips - All Vehicles/Heavy Trucks ZONE #

Station#	#391	#392	#393	#394	#395	#396	TOTAL	
#30 STH 114		7	2.1				6,072/379	
#31 USH 10E	5	4/4	6		5		4,527/316	
#32 STH 55S				50 <u>5</u>			2,568/331	
#33 CTH "KK"			э				1,860/82	
#34 Shady Ln							248/14	
#35 STH 150		17		. 41		6	4,668/260	
#36 Oakridge							412/18	
#37 Breezewood							1,238/43	
#38 CTH "G"		23	11	11	8	3	1,135/9	
#39 CTH "GG"	3	12	4	3			959/19	
#67 CTH "BB"		5					1,424/62	
#68 USH 10W	5	5					8,771/990	
#69 USH 45N	7			7			7,668/409	
#70 CTH "JJ"							2,134/103	
#71 STH 76		4					1,680/91	
#72 Mayflower		4					464/33	
#73 CTH "A" N		2			7		6,205/843	
#74 STH 47	8/8	8					6,651/891	
#75 Meade							1,398/33	
#76 CTH "EE"						-	2,081/116	
#77 CTH "E"		5	10 at				3,201/248	
#78 French							446/36	
#79 CTH "N"		5					2,620/225	
#80 STH 55N							2,331/207	
#81 CTH "J"					8		747/56	
#82 USH 41N		70/61	40	11			17,575/1,923	
#83 STH 96							2,494/129	
#84 CTH "Z"							1,011/76	
#85 CTH "CE"			•				2,528/152	
#90 USH 45S	14/4	31/21		10		32	2,632/188	
#91 CTH "A" S	6	54/5	66 <sup>°</sup>	18			5,043/162	
#93 USH 41S	1	83/29	· · · · · · · · · · · · · · · · · · ·	108	28	68	32,102/2,325	
TOTAL	48/12	328/120	127/0	209/0	48/0	109/0	134,891/10,769	

#### VEHICLE TYPE

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Following are the vehicle type percentage breakdowns at each of the thirty-two external origindestination station locations. Light trucks include pick-ups, vans and mini-vans while heavy trucks include any vehicles larger such as 2 D's, 3 AX and 3 S-2's. The classification identification chart in Figure 4 gives an indication of the types of vehicles considered to be heavy trucks as presented in Table D.

Slightly more than two-thirds of all the vehicles recorded in the Appleton urban area transportation survey were automobiles. The remaining one-third was split between light trucks (pick-ups, vans, etc.) at 22.6% and heavy trucks (delivery, semi-trailers, etc.) at 10%. The largest concentration of heavy trucks was on CTH "A" North (16.2%), STH 55 South (14.7%), STH 47 (14.3%), USH 41 North (14.1%) and USH 45 South (13.5%). The largest total truck volumes were found on USH 41 North with (3,657), USH 41 South (3,557), CTH "A" North (1,224), USH 10 West (1,112) and STH 47 (1,034). All of the other stations recorded less than 1,000 heavy trucks. As expected, the heavy truck volumes were found on the major north-south and east routes to the Appleton area with the exception of CTH "A" which runs northward into Outagamie County.

venicie Type						
STATION#	Passenger Cars	Light Trucks	Heavy Trucks			
#30 STH 114	78.3%	14.3%	7.4%			
#31 USH 10E	70.7%	19.8%	9.5%			
#32 STH 55S	67.8%	17.5%	14.7%			
#33 CTH "KK"	73.8%	21.6%	4.6%			
#34 SHADY LN	83.0%	11.8%	5.2%			
#35 STH 150	70.2%	21.9%	7.9%			
#36 OAKRIDGE	68.8%	25.9%	5.3%			
#37 BREEZEWOOD	69.2%	27.0%	3.8%			
#38 CTH "G"	73.7%	23.7%	2.6%			
#39 CTH "GG"	73.2%	21.7%	5.1%			
#67 CTH "BB"	72.0%	23.3%	4.7%			
#68 USH 10W	60.0%	28.6%	11.4%			
#69 USH 45N	63.5%	28.1%	8.4%			
#70 CTH "JJ"	74.2%	19.8%	6.0%			
#71 STH 76	65.7%	26.5%	7.8%			
#72 MAYFLOWER	63.9%	27.9%	8.2%			
#73 CTH "A" N	63.1%	20.7%	16.2%			
#74 STH 47	66.3%	19.4%	14.3%			
#75 MEADE	78.8%	18.9%	2.3%			
#76 CTH "EE"	74.8%	19.6%	5.6%			
#77 CTH "E"	75.1%	16.8%	8.1%			
#78 FRENCH	71.0%	21.0%	8.0%			
#79 CTH "N"	67.5%	22.5%	10.0%			
#80 STH 55N	68.1%	20.8%	11.1%			
#81 CTH "J"	68.7%	22.1%	9.2%			
#82 USH 41N	62.3%	23.6%	14.1%			
#83 STH 96	67.9%	24.0%	8.1%			
#84 CTH "Z"	67.2%	23.5%	9.3%			
#85 CTH "CE"	71.6%	21.2%	7.2%			
#90 USH 45S	66.2%	20.3%	13.5%			
#91 CTH "A" S	76.6%	20.3%	3.1%			
#93 USH 41S	67.3%	23.7%	9.0%			
OVERALL AVERAGE	67.4%	22.6%	10.0%			

# TABLE D Vehicle Type

## CLASSIFICATION IDENTIFICATION CHART TRUCKS AND TRUCK COMBINATIONS

FIGURE 4



#### **TRIP PURPOSE**

Along with information such as the origin of the trip, destination of the trip and the type of vehicle used in making the trip, each interview station also collected data pertinent as to why the trip was made. Seven different reasons to travel were provided on the survey form including home, work, recreation, shopping, personal business, school and medical-dental. Following are the trip purpose percentage breakdowns at each of the thirty-two external origin-destination locations.

The most common trip purpose is the "home" trip with slightly over 50% of all trips being made. The second most common category is the "work" trip with one-quarter of all trips. The reason for this percentage split is the fact that all interview stations were conducted between the hours of 10 AM and 6 PM when many people are on their way home from work throughout the afternoon traffic peak volume period. Together these two trip purpose categories accounted for three-quarters of all trips being made. Both the recreational and personal business trip had 9.5% of the total trips.

# TABLE E Trip Purpose

Station#	Home	Work	Recreation	Shopping	Personal Business	School	Medical Dental
#30 STH 114	60.0%	20.1%	14.5%	0.6%	4.3%	0.2%	0.3%
#31 USH 10E	55.2%	27.8%	10.8%	1.2%	4.2%	0.2%	0.6%
#32 STH 55S	49.8%	27.8%	17.7%	1.9%	2.3%	-	0.5%
#33 CTH "KK"	67.5%	17.1%	8.5%	2.3%	4.3%	-	0.3%
#34 Shady Ln	70.4%	9.1%	15.1%	1.4%	4.0%	(20202/202	
#35 STH 150	61.2%	17.2%	15.4%	0.9%	5.0%	0.2%	0.1%
#36 Oakridge	64.2%	8.4%	17.2%	4.2%	5.3%	0.7%	ton-not
#37 Breezewood	. 67.5%	10.5%	18.2%	2.4%	1.0%	a set or de	0.4%
#38 CTH "G"	68.6%	12.0%	16.7%	0.3%	2.4%	-	-
#39 CTH "GG"	63.9%	18.3%	12.7%	1.0%	3.5%		0.6%
#67 CTH "BB"	35.1%	9.1%	50.4%	. 3.5%	1.9%	-	-
#68 USH 10W	59.9%	18.8%	7.1%	2.0%	11.6%	0.6%	-
#69 USH 45N	56.5%	19.6%	6.0%	3.2%	13.6%	1.1%	ani kaloma
#70 CTH "JJ"	69.8%	18.1%	7.3%	0.9%	2.8%	0.2%	0.9%
#71 STH 76	73.2%	13.3%	9.3%	1.3%	2.9%	wet- <u>sp</u> ride b	secol <sup>a</sup> nças
#72 Mayflower	68.0%	15.0%	10.7%	a co- sero	6.3%	asses vina	msqabm
#73 CTH "A" N	61.3%	22.6%	13.2%	0.9%	2.0%	an a <del>-</del> adua	darp-grad
#74 STH 47	59.4%	25.6%	10.2%	0.8%	3.7%	0.2%	0.1%
#75 Meade	74.2%	7.4%	12.0%	0.5%	5.9%	asti to sa	a ust or
#76 CTH "EE"	72.6%	13.2%	9.6%	0.3%	4.3%	tone -	
#77 CTH "E"	70.0%	16.4%	9.6%	1.4%	2.6%	-	-
#78 French	65.3%	17.7%	11.4%	1.2%	3.2%	1.2%	-
#79 CTH "N"	57.7%	21.5%	13.2%	3.7%	3.7%	-	0.2%
#80 STH 55N	51.2%	26.0%	17.7%	2.4%	2.7%	-	-
#81 CTH "J"	55.7%	22.8%	15.5%	0.8%	5.2%	-	-
#82 USH 41N	37.8%	35.1%	10.1%	2.6%	13.3%	1.1%	-
#83 STH 96	68.0%	19.2%	8.4%	2.3%	1.8%	-	0.3%
#84 CTH "Z"	63.1%	20.9%	11.6%	2.3%	2.1%	-	-
#85 CTH "CE"	62.9%	20.4%	11.1%	2.0%	3.6%	-	-
#90 USH 45S	36.3%	39.4%	7.8%	5.0%	5.1%	4.5%	1.9%
#91 CTH "A" S	47.6%	22.8%	13.7%	3.9%	8.8%	2.5%	0.7%
#93 USH 41S	39.4%	27.1%	3.3%	9.4%	16.8%	4.0%	-
OVERALL AVERAGE	50.8%	24.7%	9.5%	3.8%	9.5%	1.5%	0.2%

#### **VEHICLE OCCUPANCY**

Last but not least of the information collected is the vehicle occupancy averages for each of the thirtytwo origin-destination station locations. Vehicle occupancy refers to the average number of people traveling in each of the vehicles recorded throughout the Appleton urban area survey.

The vehicle occupancy rates range from a low of 1.26 on CTH "G" to a high of 1.57 on Shady Lane with an overall average of 1.41 persons per vehicle. Typically the major highway routes around an urban area survey are slightly above the overall occupancy average. In this instance, USH 10 West and USH 41 North were in excess of 1.5 persons per vehicle.

#### SUMMARY

The external origin-destination analysis provides a general overview of the trip-making behavior of all vehicles traveling through as well as between the Appleton urban area and locations outside the region. This particular study was conducted during the latter part of May and all of June, 1993 and encompassed thirty-two interview stations and nearly four hundred internal zones. It allows the reader to independently assess any distinctive characteristics of the project and leaves open the possibility of interpretation from varying viewpoints. In light of this fact the survey data has been presented in a format which attempts to limit any degree of bias necessary in providing a factual account of the results. The last page of the report provides another look at the vehicle type, trip purpose and trip type distribution for all stations of the Appleton O-D survey.

# TABLE F Vehicle Occupancy

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**[**]^.

Station#	Average Occupancy			
#30 STH 114	1.40			
#31 USH 10E	1.39			
#32 STH 55S	1.47			
#33 CTH "KK"	1.35			
#34 Shady Ln	1.57			
#35 STH 150	1.32			
#36 Oakridge	1.32			
#37 Breezewood	1.36			
#38 CTH "G"	1.26			
#39 CTH "GG"	1.30			
#67 CTH "BB"	1.39			
#68 USH 10W	1.56			
#69 USH 45N	1.49			
#70 CTH "JJ"	1.34			
#71 STH 76	1.38			
#72 Mayflower	1.39			
#73 CTH "A" N	1.47			
#74 STH 47	1.35			
#75 Meade	1.44			
#76 CTH "EE"	1.36			
#77 CTH "E"	1.37			
#78 French	1.38			
#79 CTH "N"	1.49			
#80 STH 55N	1.45			
#81 CTH "J"	1.48			
#82 USH 41N	1.54			
#83 STH 96	1.38			
#84 CTH "Z"	1.51			
#85 CTH "CE"	1.36			
#90 USH 45S	1.27			
#91 CTH "A" S	1.35			
#93 USH 41S	1.31			
OVERALL AVERAGE	1.41			

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## SELECTED ALL STATION PIE CHARTS



Figure 5

APPENDIX D

Phone: Fax: E-mail: Operational Analysis MAH Analyst: Agency or Company: OMNNI 6/12/04 Date Performed: Analysis Time Period: Freeway/Direction: northbound STH 15 to STH 47 From/To: Jurisdiction: Analysis Year: 2000 Description: No Interchange 2000 count northbound Flow Inputs and Adjustments veh/h Volume, V 3064 Peak-hour factor, PHF 0.90 851 v Peak 15-min volume, v15 10 8 Trucks and buses 00 Recreational vehicles 0 Level Terrain type: 0.00 % Grade Segment length 0.00 mi 1.5\* Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.952 Driver population factor, fp 1.00 pc/h/ln 1787 Flow rate, vp Speed Inputs and Adjustments\_\_\_\_\_ 12.0 ft Lane width 6.0 ft Right-shoulder lateral clearance 0.33 interchange/mi Interchange density Number of lanes, N 2 Free-flow speed: Base mi/h FFS or BFFS 65.0 0.0 mi/h Lane width adjustment, fLW Lateral clearance adjustment, fLC 0.0 mi/h mi/h 0.0 Interchange density adjustment, fID Number of lanes adjustment, fN 4.5 mi/h 60.5 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures 1787 pc/h/ln Flow rate, vp 60.5 mi/h Free-flow speed, FFS Average passenger-car speed, S 60.2 mi/h Number of lanes, N 2 29.7 pc/mi/ln Density, D
Phone: Fax: E-mail: Operational Analysis\_\_\_\_\_ Analyst: MAH Agency or Company: OMNNI Date Performed: 6/12/04 Analysis Time Period: Freeway/Direction: southbound From/To: STH 47 to STH 15 Jurisdiction: Analysis Year: 2000 Description: No Interchange 2000 count southbound Flow Inputs and Adjustments Volume, V 3086 veh/h Peak-hour factor, PHF 0.90 Peak 15-min volume, v15 857 v Trucks and buses 00 10 Recreational vehicles 00 0 Terrain type: Level Grade 0.00 00 Segment length 0.00 mi Trucks and buses PCE, ET 1.5\* Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.952 Driver population factor, fp 1.00 Flow rate, vp 1800 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.33 interchange/mi Number of lanes, N 2 Free-flow speed: Base 65.0 FFS or BFFS mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.5 mi/h Urban Freeway \_\_\_\_\_LOS and Performance Measures\_\_\_\_ pc/h/ln Flow rate, vp 1800 Free-flow speed, FFS 60.5 mi/h Average passenger-car speed, S 60.1 mi/h Number of lanes, N 2 Density, D 30.0 pc/mi/ln

Phone: E-mail: Fax:

Operational Analysis MAH Analyst: OMNNI Agency or Company: 7/01/04 Date Performed: Analysis Time Period: Freeway/Direction: northbound STH 47 to CTH E From/To: Jurisdiction: 2000 Analysis Year: Description: No Interchange 2000 count northbound Flow Inputs and Adjustments 2842 veh/h Volume, V 0.90 Peak-hour factor, PHF 789 v Peak 15-min volume, v15 10 8 Trucks and buses % Recreational vehicles 0 Level Terrain type: 0.00 8 Grade 0.00 mi Segment length 1.5\* Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.952 Driver population factor, fp 1.00 1658 pc/h/ln Flow rate, vp Speed Inputs and Adjustments ft Lane width 12.0 Right-shoulder lateral clearance 6.0 ft 0.33 interchange/mi Interchange density 2 Number of lanes, N Base Free-flow speed: mi/h 65.0 FFS or BFFS mi/h Lane width adjustment, fLW 0.0 Lateral clearance adjustment, fLC 0.0 mi/h 0.0 mi/h Interchange density adjustment, fID mi/h 4.5 Number of lanes adjustment, fN 60.5 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures pc/h/ln 1658 Flow rate, vp 60.5 mi/h Free-flow speed, FFS Average passenger-car speed, S 60.5 mi/h Number of lanes, N 2 pc/mi/ln 27.4 Density, D

Phone: I-mail:

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Fax:

\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst: Agency or Company: Date Performed:	MAH OMNNI 7/01/04
Analysis Time Period: Freeway/Direction:	southbound
From/To:	STH 47 to CTH E
Jurisdiction: Analysis Year:	2000
Description: No Interc	hange 2000 count southbound

\_\_\_\_\_Flow Inputs and Adjustments\_\_\_\_\_\_

Volume, V Peak-hour factor, PHF		2886 0.90	veh/h
Peak 15-min volume, v15		802	V
Trucks and buses		10	8
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, ET		1.5*	
Recreational vehicle PCE,	ER	1.2	
Heavy vehicle adjustment,		0.952	
Driver population factor,		1.00	
Flow rate, vp		1684	pc/h/ln

\_\_\_\_\_Speed Inputs and Adjustments\_\_\_\_\_\_

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.33	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	60.5	mi/h
	Urban Freeway	

LOS and Performance Measures\_\_\_\_\_

Flow rate, vp	1684	pc/h/ln	
Free-flow speed, FFS	60.5	mi/h	
Average passenger-car speed, S	60.4	mi/h	
Number of lanes, N Density, D	2 27.9	pc/mi/ln	

Phone: E-mail: Fax:

E-mail:							
]	Me:	rge Anal	ysis				
Analyst Mau			1.21.11	Ja 2			
Analyst: MAH Agency/Co.:							
	5/2004						
Analysis time period:	5/2004						
	41 SB						
	47 SB 01	n-ramp					
Jurisdiction:	1, 55 0.						
Analysis Year: 2000	0						
Description: STH 47 SB on-	ramp, 20	00 exist	ing				
	F	reeway D	ata		718 U	e in e	e da
Type of analysis			Merge	L. Knock L			
Number of lanes in freeway			2	•.0			
Free-flow speed on freeway			65.0		mph		
Volume on freeway			2298		vph		
	0	n Ramp I	ata				
Side of freeway			Right				
Number of lanes in ramp			1				
Free-flow speed on ramp			50.0		mph		
Volume on ramp			788		vph		
Length of first accel/decel			750		ft		
Length of second accel/dece	l lane				ft		
Ad	jacent Ra	amp Data	(if c	one exist	s)		
Does adjacent ramp exist?			No				
Volume on adjacent Ramp					vph		
Position of adjacent Ramp							
Type of adjacent Ramp							
Distance to adjacent Ramp					ft		
Convers:	ion to p	c/h Unde	r Base	Conditi	ons		
Junction Components		Free	way	Ramp		Adjacent	
						Ramp	
Volume, V (vph)		2298		788			vph
Peak-hour factor, PHF		0.90		0.90			
Peak 15-min volume, v15		638		219			v
Trucks and buses		10		10			00 0
Recreational vehicles		0	-	0			olo
Terrain type:		Leve		Level			0
Grade			8		8		%
Length			mi		mi		mi
Trucks and buses PCE, ET	D	1.5		1.5			
Recreational vehicle PCE, EI	κ.	1.2		1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.952 1.00 2681	0.952 1.00 919		pcph
	_Estimation of	V12 Merge A	Areas		
	(Equ 1.000 Usin	ation 25-2 c g Equation		)	
- Constant of the second se	(P) = 268 F FM	1 pc/h			
	Capacit	y Checks			
v	Actual 3600	Maximum 4700		LOS F? No	
FO V R12	3600	4600		No	
Level o	f Service Dete	rmination (i	lf not	F)	
Density, D = 5.475 + 0.0 R Level of service for ram	R	12		A	pc/mi/ln
	Speed Est	imation			
Intermediate speed varia			0.389		
Space mean speed in ramp	influence are	a, S =	56.1	mph	
Space mean speed in oute	r lanes,	R S = 0	N/A	mph	
Space mean speed for all	vehicles,	S =	56.1	mph	

Fax: Phone: E-mail: Diverge Analysis\_\_\_\_\_ Analyst: MAH Agency/Co.: Date performed: 6/15/2004 Analysis time period: Freeway/Dir of Travel: USH 41 NB Junction: NB off-ramp at STH 47 Jurisdiction: 2000 Analysis Year: Description: STH 47 NB off-ramp, 2000 existing Freeway Data Type of analysis Diverge Number of lanes in freeway 2 Free-flow speed on freeway 65.0 mph Volume on freeway 3064 vph \_\_\_\_\_Off Ramp Data Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 50.0 mph Volume on ramp 522 vph Length of first accel/decel lane 212 ft Length of second accel/decel lane ft \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_ Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions\_\_\_\_ Junction Components Adjacent Freeway Ramp Ramp Volume, V (vph) 522 3064 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 851 145 v Trucks and buses 00 10 10 00 Recreational vehicles 0 0 Level Terrain type: Level 0.00 % 0.00 0.00 mi 0.00 00 Grade % Length mi mi 1.5 Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 1.2

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.952 1.00 3575	0.952 1.00 609		pcph
	_Estimation of	V12 Diverge	e Areas		
L = EQ P =	(Equ	ation 25-8 c ng Equation		)	
	+ (v - v ) F R F R	P = 3575 FD	pc/h		
	Capacit	y Checks			
v = v Fi F	Actual 3575	Maximum 4700		LOS F? No	
v 12	3575	4400		No	
v = v - v	2966	4700		No	
FO F R V R	609	2100		No	
Level c	f Service Dete	ermination (i	f not	F)	
	= 4.252 + 0.0 R	086 v - 0.0 12			pc/mi/ln
Level of service for ram	p-freeway junc	ction areas c	of infl	uence D	
	Speed Est	imation			
Intermediate speed varia	ble,	D = S	0.288		
Space mean speed in ramp	influence are	ea, S = R	58.4	mph	
Space mean speed in oute	r lanes,		N/A	mph	
Space mean speed for all	vehicles,	-	58.4	mph	

TWO-WAY STOP CONTROL SUMMARY

7		TWO-	-WAY	STO	OP CONT	TROL SUM	IMAR	Y				
Analyst:		MAH										
		OMNN1	г									
Agency/Co.:												
Date Performed		6/14/	02									
Analysis Time	Period:											
Intersection:		CTH A										
Jurisdiction:		Outag	jamie	e Co	ounty							
Units: U. S. (	Customary	7										
Analysis Year:	:	2000										
Project ID:												
East/West Stre	et:	CTH J	JJ									
North/South St		CTH A	A									
Intersection (						St	udv	perio	d (hrs)	: 0.2	25	
1							1	Perret				
		Vehic	cle V	Joli	imes ar	nd Adjus	tme	nts				
Major Street:					thbour				uthbour	nd		
, J	Movemen		1		2	3	1	4	5	6		
			L		T	R	i i	L	Т	R		
			Ц		1	IC IC	1		-	R		
Volume					357	86		74	175			
Peak-Hour Fact	or DUF				0.90	0.90		0.90	0.90			
					396	95		82	194			
Hourly Flow Ra					390	95			194			
Percent Heavy		;						8				
Median Type/St			Und	נעוג	lded	1 Jac 1 1		/				
RT Channelized	1?					No						
Lanes					1	1		1	1			
Configuration					TF	2		$\mathbf{L}$	т			
Upstream Signa	11?				No				No			
Miner Charach		-1-		1.7	. <b>.</b>							
Minor Street:	Approac		-	wes	stbound		i		stbound			
	Movemen	IC	7		8	9		10	11	12		
			L		Т	R	I	Г	Т	R		
Volume			54			131	1			381		
Peak Hour Fact	or. PHF		0.9	90		0.90						
Hourly Flow Ra			60			145						
Percent Heavy			8			8						
Percent Grade		,	0		0	0			0			
Flared Approac		+ - 2 / (	7+ 0 ***		0		7		0		/	
	II: EXIS	sts?/S	SLOIG	ige		1	/				/	
Lanes				Τ		1						
Configuration				$\mathbf{L}$	F	2						
						LY I C						
	Dela	ıy, Qu	ieue	Ler	ngth, a	nd Leve	l o	f Servi	ice			
	Dela		ieue SB	Ler		nd Leve tbound	l o	f Servi		bound	1919	
Approach			SB	Ler 					East		12	
Approach Movement	NE		SB 4	Ler	Wes 7	tbound	9			bound 11	12	
Approach	NE		SB	Ler   	Wes	tbound			East		12	
Approach Movement	NE		SB 4	Ler   	Wes 7	tbound	9		East		12	45 ( 2) 55 () 57 (5 7 (5) 7 (5)
Approach Movement Lane Config v (vph)	NE		SB 4 L 82		Wes 7 L 60	tbound	9 R 14	:	East		12	10 ( 2) 5 ( ) 7 [ ] 7 [ ]
Approach Movement Lane Config v (vph) C(m) (vph)	NE		SB 4 L 82 1042	   2	Wes 7 L 60 339	tbound	9 R 14 64	50	East		12	10, 17, 15, 11 17, 12 17, 14 17, 14 1
Approach Movement Lane Config v (vph) C(m) (vph) v/c	NE 1		SB 4 L 82 1042 0.08	   2 3	Wes 7 L 60 339 0.18	tbound	9 R 14 64 0.	5 0 23	East		12	
Approach Movement Lane Config V (vph) C(m) (vph) v/c 95% queue leng	NE 1		SB 4 L 82 1042 0.08 0.26	   2 3	Wes 7 L 60 339 0.18 0.63	tbound	9 R 14 64 0.	5 5 0 23 87	East		12	
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue leng Control Delay	NE 1		SB 4 L 1042 0.08 0.26 8.7	   2 3	Wes 7 L 60 339 0.18 0.63 17.9	tbound	9 R 14 64 0. 0. 12	5 5 0 23 87	East		12	
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue leng Control Delay LOS	NE 1		SB 4 L 82 1042 0.08 0.26	   2 3	Wes 7 L 60 339 0.18 0.63	tbound 8	9 R 14 64 0.	5 5 0 23 87	East		12	
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue leng Control Delay	NE 1		SB 4 L 1042 0.08 0.26 8.7	   2 3	Wes 7 L 60 339 0.18 0.63 17.9	tbound	9 R 14 64 0. 0. 12	5 5 0 23 87	East		12	

Phone: E-Mail: Fax:

\_\_\_\_\_TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_\_\_\_

Analyst:	MAH
Agency/Co.:	OMNNI
Date Performed:	6/14/02
Analysis Time Period:	
Intersection:	CTH A & CTH JJ
Jurisdiction:	Outagamie County
Units: U. S. Customary	У
Analysis Year:	2000
Project ID:	
East/West Street:	CTH JJ
North/South Street:	CTH A
Intersection Orientat:	ion: NS

Study period (hrs): 0.25

	Vehicle Vo	lumes	and Ad	justment	.s		
Major Street Movements	1	2	3	4	5	6	
	L	т	R	L	Т	R	
Volume		357	86	74	175		
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90		
Peak-15 Minute Volume		99	24	21	49		
Hourly Flow Rate, HFR		396	95	82	194		
Percent Heavy Vehicles				8			
Median Type/Storage	Undivi	ded		/			
RT Channelized?	0110111	aca	No	,	8		
Lanes		1 1		1	1		
Configuration		TR		L	T		
Upstream Signal?		No		1	No		
opscieam bighai.		NO			NO		
Minor Street Movements	7	8	9	10	11	12	
	Г	т	R	L	т	R	
Volume	54		131				
Peak Hour Factor, PHF	0.90		0.90				
Peak-15 Minute Volume	15		36				
Hourly Flow Rate, HFR	60		145				
Percent Heavy Vehicles	8		8				
Percent Grade (%)		0			0		
Flared Approach: Exists	?/Storage			/			/
RT Channelized?	. 5		No				
Lanes	1	1					
Configuration	L	R					
Pe	edestrian N	/olumes	and A	djustmer	nts		
Movements	13	14	15	16			
Flow (ped/hr)	0	0	0	0			

alking Speed	t) (ft/sec)	-	L2.0 1.0	12.0 4.0	12.0 4.0	12.0 4.0		
ercent Block			)	0	0	0		
	Prog.	Sat		am Signa val (		Cycle	Prog.	Distance
	Flow vph	Flow vph		be 1	Cime Sec	Length sec	Speed mph	to Signal feet
2 Left-Turr	1	L. S. d. S.				1011 2001		
Through								
5 Left-Turr Through	1							
Jorksheet 3-I	Data for Co	mputing	a Effec	t of De	elay to	Major S	Street V	 Zehicles
					Moveme		Moveme	
1							(65,000,05) 1100 million	
Shared ln vol Shared ln vol								
Sat flow rate				ñ., j)				
Sat flow rate	e, major rt	vehic]	les:					
Jumber of mag	jor street	through	n lanes	3:				
				32.0				
orksheet 4-0	Critical Ga	ap and I	Follow-	up Time	e Calcu	lation	a	
Critical Gap Novement		on 4	7	8	9	10	11	12
lovement	1 L	4 L	, L	o T	R	L	T	R
	Ц	Ц	Ц	1	R	Ц	1	R .
		4 7	7.1		6.2			
:(c,base)		4.1	/.1		0.2			
(c,hv)	1.00	4.1 1.00	1.00	1.00	1.00	1.00	1.00	1.00
c(c,hv) P(hv)	1.00		1.00 8		1.00 8			
:(c,hv) ?(hv) :(c,g)	1.00	1.00	1.00 8 0.20	0.20	1.00 8 0.10	0.20	0.20	0.10
(c,hv) (hv) (c,g) Frade/100	1.00	1.00 8	1.00 8 0.20 0.00		1.00 8 0.10 0.00	0.20		
c(c,hv) 2(hv) c(c,g) Grade/100 c(3,lt)		1.00 8 0.00	1.00 8 0.20 0.00 0.70	0.20 0.00	1.00 8 0.10 0.00 0.00	0.20	0.20 0.00	0.10 0.00
c(c,hv) P(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st	cage 0.00	1.00 8 0.00 0.00	1.00 8 0.20 0.00 0.70 0.00	0.20 0.00 0.00	1.00 8 0.10 0.00 0.00	0.20 0.00 0.00	0.20 0.00 0.00	0.10 0.00 0.00
(c,hv) (hv) (c,g) Frade/100 (3,lt) (c,T): 1-st 2-st	cage 0.00 cage 0.00	1.00 8 0.00 0.00 0.00	1.00 8 0.20 0.00 0.70 0.00 1.00	0.20 0.00	1.00 8 0.10 0.00 0.00 0.00	0.20 0.00 0.00	0.20 0.00	0.10 0.00
(c, hv) (hv) (c,g) (rade/100 (3,lt) (c,T): 1-st 2-st (c) 1-st	cage 0.00	1.00 8 0.00 0.00	1.00 8 0.20 0.00 0.70 0.00	0.20 0.00 0.00	1.00 8 0.10 0.00 0.00	0.20 0.00 0.00	0.20 0.00 0.00	0.10 0.00 0.00
<pre>c(c, hv) P(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st 2-st c(c) 1-st 2-st Follow-Up Time</pre>	cage 0.00 cage 0.00 cage cage	1.00 8 0.00 0.00 0.00 4.2	1.00 8 0.20 0.00 0.70 0.00 1.00	0.20 0.00 0.00	1.00 8 0.10 0.00 0.00 0.00	0 0.20 0 0.00 0 0.00 0 0.00 1.00	0.20 0.00 0.00 1.00	0.10 0.00 0.00
<pre>c(c, hv) P(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st 2-st c(c) 1-st 2-st Follow-Up Time</pre>	cage 0.00 cage 0.00 cage cage	1.00 8 0.00 0.00 0.00 4.2	1.00 8 0.20 0.00 0.70 0.00 1.00	0.20 0.00 0.00	1.00 8 0.10 0.00 0.00 0.00	0.20 0.00 0.00	0.20 0.00 0.00 1.00	0.10 0.00 0.00 0.00
<pre>c(c, hv) P(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st</pre>	cage 0.00 cage 0.00 cage cage ne Calculat	1.00 8 0.00 0.00 0.00 4.2	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5	0.20 0.00 0.00 1.00	1.00 8 0.10 0.00 0.00 0.00 6.3	0 0.20 0 0.00 0 0.00 0 0.00 1.00	0.20 0.00 0.00 1.00	0.10 0.00 0.00 0.00
c(c, hv) (hv) c(c,g) Grade/100 c(3,1t) c(c,T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin Movement	cage 0.00 cage 0.00 cage cage ne Calculat 1	1.00 8 0.00 0.00 0.00 4.2	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L	0.20 0.00 0.00 1.00	1.00 8 0.10 0.00 0.00 0.00 6.3	0 0.20 0 0.00 0 0.00 0 1.00 10 L	0.20 0.00 0.00 1.00	0.10 0.00 0.00 0.00
<pre>c(c, hv) p(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin fovement c(f, base)</pre>	cage 0.00 cage 0.00 cage cage ne Calculat 1	1.00 8 0.00 0.00 4.2 cions 4 L	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5	0.20 0.00 0.00 1.00	1.00 8 0.10 0.00 0.00 6.3 9 R	0 0.20 0 0.00 0 0.00 0 1.00 10 L	0.20 0.00 0.00 1.00	0.10 0.00 0.00 0.00
<pre>c(c, hv) p(hv) c(c, g) Grade/100 c(3, lt) c(c, T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin fovement c(f, base) c(f, HV) P(HV)</pre>	age 0.00 age 0.00 age age ne Calculat 1 L	1.00 8 0.00 0.00 4.2 t cions 4 L	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	0.20 0.00 1.00 8 T	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30	0 0.20 0 0.00 0 0.00 0 1.00 10 L	0.20 0.00 1.00 11 T	0.10 0.00 0.00 0.00 12 R
<pre>c(c, hv) P(hv) c(c, g) Grade/100 c(3, lt) c(c, T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin Movement c(f, base) c(f, HV) P(HV)</pre>	age 0.00 age 0.00 age age ne Calculat 1 L	1.00 8 0.00 0.00 4.2 tions 4 L 2.20 0.90	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90	0.20 0.00 1.00 8 T	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90	0 0.20 0 0.00 0 0.00 0 1.00 10 L	0.20 0.00 1.00 11 T	0.10 0.00 0.00 0.00 12 R
<pre>c(c, hv) P(hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tim fovement c(f, base) c(f, HV) c(f)</pre>	age 0.00 age 0.00 age me Calculat 1 L 0.90	1.00 8 0.00 0.00 4.2 cions 4 L 2.20 0.90 8 2.3	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90 8 3.6	0.20 0.00 1.00 8 T 0.90	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90 8	0 0.20 0 0.00 0 0.00 0 1.00 10 L	0.20 0.00 1.00 11 T	0.10 0.00 0.00 0.00 12 R
<pre>c(c, hv) P(hv) c(c, g) Grade/100 c(3, lt) c(c, T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin Aovement c(f, base) c(f, HV) P(HV) c(f) Norksheet 5-1</pre>	age 0.00 age 0.00 age ne Calculat 1 L 0.90	1.00 8 0.00 0.00 4.2 cions 4 L 2.20 0.90 8 2.3 Jpstrear	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90 8 3.6 n Signa	0.20 0.00 1.00 8 T 0.90	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90 8 3.4	0 0.20 0 0.00 0 0.00 0 1.00 10 L 0 0.90	0.20 0.00 1.00 11 T 0.90	0.10 0.00 0.00 0.00 12 R 0.90
2-st c(c) 1-st	age 0.00 age 0.00 age ne Calculat 1 L 0.90	1.00 8 0.00 0.00 4.2 cions 4 L 2.20 0.90 8 2.3 Jpstrear	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90 8 3.6 n Signa	0.20 0.00 1.00 8 T 0.90 als	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90 8 3.4	0 0.20 0 0.00 0 0.00 0 1.00 10 L 0 0.90	0.20 0.00 1.00 11 T 0.90	0.10 0.00 0.00 0.00 12 R 0.90
<pre>c(c, hv) P(hv) c(c, g) Grade/100 c(3, lt) c(c, T): 1-st 2-st c(c) 1-st 2-st Follow-Up Tin Aovement c(f, base) c(f, HV) P(HV) c(f) Norksheet 5-1</pre>	age 0.00 age 0.00 age ne Calculat 1 L 0.90	1.00 8 0.00 0.00 4.2 cions 4 L 2.20 0.90 8 2.3 Jpstrear	1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90 8 3.6 n Signa	0.20 0.00 1.00 8 T 0.90 als	1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90 8 3.4	0 0.20 0 0.00 0 0.00 0 1.00 10 L 0 0.90	0.20 0.00 1.00 11 T 0.90	0.10 0.00 0.00 0.00 12 R 0.90

Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green g(q1) g(q2) g(q)	P				
Computation 2-Proportion of TWSC Inte	rsection	Time bloc	ked		
	Mo V(t)	vement 2		Movement	
	V(L)	V(l,prot	.) V(L)	, ∧(⊥,	prot)
alpha					
beta Travel time, t(a) (sec)					
Smoothing Factor, F					
Proportion of conflicting flow, f					
Max platooned flow, V(c,max)					
Min platooned flow, V(c,min) Duration of blocked period, t(p)					
Proportion time blocked, p		0.000		0.000	
Computation 3-Platoon Event Periods	Result				
p(2)	0.000				
p(5)	0.000				
p(dom)					
p(subo) Constrained or unconstrained?					
constrained of unconstrained:					
Proportion					
unblocked (1)	(2)		(3)		
for minor Single-stage movements. p(x) Process		o-Stage Pr		гт	
movements, p(x) Process	Stage	T	Stage 1	L	
p(1)					
p(4)					
p(7)					
p(8) p(9)					
p(10)					
p(11)					
p(12)					
Computation 4 and 5					
Single-Stage Process					
Movement 1 4	7 8	9	10	11	12
L L	L T	R	$\mathbf{L}$	Т	R
V c,x 491	754	396		-	
S	/54	390			
Px					
V c,u,x					
C r,x C plat,x					
· pruch					
Two-Stage Process					
7	8	10		11	2

1500		
P(x)		
V(c,u,x)		
C(r,x)		
C(plat,x)		
Worksheet 6-Impedance and Capacity Equ	ations	
Step 1: RT from Minor St.	9	12
Conflicting Flows	396	
Potential Capacity	640	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	640	
Probability of Queue free St.	0.77	1.00
Step 2: LT from Major St.	4	1
		-
Conflicting Flows	491	
Potential Capacity	1042	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1042	
Probability of Queue free St. Maj L-Shared Prob Q free St.	0.92	1.00
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
C	0.92	0.92
the second s		
Movement Capacity		
Movement Capacity	1.00	1.00
Movement Capacity Probability of Queue free St.	1.00	1.00
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St.		san san san sa
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows	7	san san san sa
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity	7	san san san sa
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor	7 754 368	10
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor	7 754 368	10
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.	7 754 368 1.00	10 1.00 0.92
Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity	7 754 368 1.00	10 1.00 0.92 0.94
Movement Capacity Probability of Queue free St. Step 4: LT from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	7 754 368 1.00 0.92 339	10 1.00 0.92 0.94 0.73

Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding	g mvmnt					
Movement Capacity						
Part 3 - Single Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor		1	.00		1.00	
Cap. Adj. factor due to Impeding	mvmnt	0	.92		0.92	
Movement Capacity						
Result for 2 stage process:						
a						
У						
Ct						
Probability of Queue free St.		1	.00		1.00	
<u> </u>						
Step 4: LT from Minor St.			7		10	
1						
Part 1 - First Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding	g mvmnt					
Movement Capacity						
Part 2 - Second Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor	· · · · · · · ·					
Cap. Adj. factor due to Impeding	g mvmnt					
Movement Capacity						
Part 3 - Single Stage		7	<b>F</b> 4			
Conflicting Flows			54			
Potential Capacity			68		1 0 0	
Pedestrian Impedance Factor		T	.00		1.00	
Maj. L, Min T Impedance factor					0.92	
Maj. L, Min T Adj. Imp Factor.	u				0.94	
Cap. Adj. factor due to Impeding	g mvmnt		.92		0.73	
Movement Capacity		3	39			
Degulte for The start						
Results for Two-stage process:						
a						
У С +		2	20			
Ct		3	39			
Worksheet 8-Shared Lane Calculat	ions					
Movement				1.0	11	10
Movement	7 L	8 T	9 R	10 L	11 T	12 R
	Ц	1	IC.	Ц	Т	IC IC
Volume (vph)	60		145			
Movement Capacity (vph)	339		640			
Shared Lane Capacity (vph)						
					•	

Worksheet	9-Computation	of	Effect	of	Flared	Minor	Street	Approaches

Movement			7	8		9	10	11	12
			$\mathbf{L}$	Т		R	L	Т	R
C sep			339	)		540			
Volume			60		-	145			
Delay									
Q sep									
Q sep +1									
round (Qsep +1)									
n max	·								
C sh									
SUM C sep									
n									
C act									
Movement Lane Config	1	4 L	7 L	8	9 R		10	11	12
v (vph)		82	60		145				
		82 1042	60 339		145 640			28 - 1 - 1 - 1	No Portan No e Altraca
C(m) (vph)		1042 0.08		<sup>а</sup> . в		3			10 89 898 10 82 10 10 10 10 10
v (vph) C(m) (vph) v/c 95% queue length		1042 0.08 0.26	339 0.18 0.63	- -	640 0.23 0.8	7			(Romver 2) Moleck Ethere = 1 older
C(m) (vph) v/c 95% queue length Control Delay		1042 0.08 0.26 8.7	339 0.18 0.63 17.9		640 0.23 0.87 12.3	7		22	Rossie Clause V e Canoz - Laco - Long
C(m) (vph) v/c 95% queue length Control Delay LOS		1042 0.08 0.26	339 0.18 0.63		640 0.23 0.8	7			1963 - 2004 - 2007 Maria (2004 - 2004) 2014 - 2005 - 2004 2014 - 2014 - 2014 2014 - 20
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay		1042 0.08 0.26 8.7	339 0.18 0.63 17.9	13.9	640 0.23 0.87 12.3	7			1964 - 2015 Maria (1975) - 41 - 1962 - 1 - 1964 - 1975 - 1964 - 1975 - 1964 - 1975 - 1
C(m) (vph) v/c 95% queue length Control Delay LOS		1042 0.08 0.26 8.7	339 0.18 0.63 17.9	13.9 B	640 0.23 0.87 12.3	7			
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	ed Major	1042 0.08 0.26 8.7 A	339 0.18 0.63 17.9 C	В	640 0.23 0.8 12.3 B	7			
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	ed Major	1042 0.08 0.26 8.7 A	339 0.18 0.63 17.9 C	В	640 0.23 0.8 12.3 B	7 3	nt 2	Move	ement 5
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS Worksheet 11-Share	ed Major	1042 0.08 0.26 8.7 A	339 0.18 0.63 17.9 C	В	640 0.23 0.8 12.3 B	7 3			ement 5
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay		1042 0.08 0.26 8.7 A	339 0.18 0.63 17.9 C	В	640 0.23 0.8 12.3 B	7 3 veme			idnei nad
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS Worksheet 11-Share	stream 2	1042 0.08 0.26 8.7 A LT Impe	339 0.18 0.63 17.9 C	В	640 0.23 0.8 12.3 B	7 3 veme			idnei nad
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS Worksheet 11-Share p(oj) v(il), Volume for	stream 2 stream 3	1042 0.08 0.26 8.7 A LT Impe	339 0.18 0.63 17.9 C	B und Del	640 0.23 0.8 12.3 B	7 3 veme			idnei nad
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS Worksheet 11-Share p(oj) v(il), Volume for v(i2), Volume for s(i1), Saturation s(i2), Saturation	stream 2 stream 3 flow rat	1042 0.08 0.26 8.7 A LT Impe	339 0.18 0.63 17.9 C edance a	B and Del	640 0.23 0.8 12.3 B	7 3 veme			idnei nad
C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS Worksheet 11-Share p(oj) v(il), Volume for v(i2), Volume for	stream 2 stream 3 flow rat flow rat	1042 0.08 0.26 8.7 A LT Impe	339 0.18 0.63 17.9 C edance a	B and Del	640 0.23 0.8 12.3 B	7 3 veme		0	idnei nad

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TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analvst: MAH			
<i>1</i>	-		
Agency/Co.: OMNNI			
Date Performed: 6/25/	2004		
Analysis Time Period:			
Intersection: STH 4	47 & CTH A		
Jurisdiction:			
Units: U. S. Customary			
Analysis Year: 2000			
Project ID: STH 47 & CTH A	Intersection	no intercha	nge
East/West Street: CTH A			
North/South Street: STH 4			
Intersection Orientation: N		Ctudy nor	iod (hrs): 0.25
Intersection offentation: I	6	Scudy per	10d (IIIS): 0.25
	· · · · · · · · · · · · · · · · · · ·		
	cle Volumes and		
Major Street: Approach	Northbound		Southbound
Movement	1 2	3 4	5 6
	L T	R   L	T R
Volume	8 262		142
Peak-Hour Factor, PHF	1.00 1.00		1.00
Hourly Flow Rate, HFR	8 262		142
Percent Heavy Vehicles	8		
Median Type/Storage	Undivided	/	
RT Channelized?	onarviaca	1	
Lanes	0 1		1
	LT		T
Configuration			
Upstream Signal?	No		No
Miner Observe Deserve all	Westbound		Eastbound
Minor Street: Approach		748 C 2	
Movement	7 8	9 10	11 12
	L T	R L	T R
Volume		240	
Peak Hour Factor, PHF		1.0	
Hourly Flow Rate, HFR		240	2
Percent Heavy Vehicles		8	8
Percent Grade (%)	0		0
Flared Approach: Exists?/S	Storage	/	No /
Lanes			0 0
Configuration			LR
Delay, Qu	leue Length, an	d Level of Se	rvice
Approach NB		bound	Eastbound
Movement 1	4   7	8 9	10 11 12
Lane Config LT	· / /	~ ~	LR 12
	ł	Į	шк
w (wpb)			242
v (vph) 8			
C(m) (vph) 1405			578
v/c 0.01			0.42
95% queue length 0.02			2.06
Control Delay 7.6			15.6
LOS A			С
Approach Delay			15.6
Approach LOS			C

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:	MAH			
Agency/Co.:	OMNNI			
Date Performed: Analysis Time Period:	6/25/2004			
Intersection:	STH 47 & CTH A			
Jurisdiction:				
Units: U. S. Customar	У			
Analysis Year:	2000			
Project ID: STH 47 &	CTH A Intersection,	no interchange		
East/West Street:	CTH A			
North/South Street:	STH 47			
Intersection Orientat	ion: NS	Study period	(hrs): 0.25	

	Vehicle V							
Major Street Movements	1	2	3	4	5	6		
	L	т	R	L	Т	R		
Volume	8	262			142			
Peak-Hour Factor, PHF	1.00	1.00			1.00			
Peak-15 Minute Volume	2	66			36			
Hourly Flow Rate, HFR	8	262			142			
Percent Heavy Vehicles	8					<b></b> , 2		
Median Type/Storage RT Channelized?	Undiv	ided		/				
Lanes	0	1			1			
Configuration	LT	53.00			т			
Upstream Signal?	5 01.1	No			No			
-							e peo e so	-
Minor Street Movements	7	8	9	10	11	12		
	L	Т	R	L	Т	R		
					6.0.0	18		
Volume				240		2		
Peak Hour Factor, PHF				1.00		1.00		
Peak-15 Minute Volume				60		0		
Hourly Flow Rate, HFR				240		2		
Percent Heavy Vehicles				8		8		
Percent Grade (%)		0			0			
Flared Approach: Exist RT Channelized?	s?/Storage			1		No	/	
Lanes				0		0		
Configuration					LR			

Pedestrian	Volumes	and Ad	justments_	
13	14	15	16	
0	0	0	0	
	Pedestrian 13 0	and the second se		Pedestrian Volumes and Adjustments_ 13 14 15 16 0 0 0 0

Flow (ped/hr)

	th (ft) Speed (ft	-/sec)			12.0 4.0	12.0 4.0	12.0 4.0			
	Blockage	2/ 500/			0	0	0			
			τ	Jpstrea	m Signa	l Data				
		Prog.	Sat	Arri			Cycle	Prog.	Distan	
		Flow	Flow	и Тур			Length	Speed	to Sig	
		vph	vph		S	ec	sec	mph	feet	
S2 Left	-Turn									
Thro	ugh									
	-Turn									
Thro	ugh									
	t 3-Data	for Co	mputing	a Effec	t of De	lav to	Maior S	Street V	Vehicles	
						Moveme		Moveme		
	n volume,					262				
	n volume, rate, ma					0 1700				
odi LlOW	rate, ma					1700				
	rate ma	aior rt				T/00				
Sat flow	rate, ma f major s				:	1				
Sat flow					:					
Sat flow Number o Workshee	f major : t 4-Crit:	street 	through	n lanes		1				
Sat flow Number o Workshee Critical	f major s t 4-Crit: Gap Calo	street 	through	n lanes		1		11	12	
Sat flow Number o Workshee Critical	f major s t 4-Crit: Gap Calo	ical Ga	through up and h on	n lanes Follow-	up Time	1 Calcu	lation	11 T	12 R	
Sat flow Number o Workshee Critical Movement	f major s t 4-Crit: Gap Calo	ical Ga culatic	through up and h on 4	n lanes Follow- 7	up Time	1 Calcu 9	lation 10 L			
Sat flow Number o Workshee Critical Movement t(c,base	f major s t 4-Crit: Gap Calo	ical Ga culatic L	through up and h on 4	n lanes Follow- 7	up Time	1 Calcu 9	1ation 10 L 7.1		R	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv)	f major s t 4-Crit: Gap Calo	street ical Ga culatic 1 L 4.1	through p and p on 4 L	1 lanes Follow- 7 L	up Time 8 T	1 Calcu 9 R	10 10 L 7.1	Т	R 6.2	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g)	f major s t 4-Crit: Gap Calo	street ical Ga culatic 1 L 4.1 1.00	through p and p on 4 L	1 lanes Follow- 7 L 1.00 0.20	up Time 8 T 1.00 0.20	1 Calcu 9 R 1.00 0.10	lation 10 L 7.1 1.00 8 0.20	T 1.00 0.20	R 6.2 1.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10	f major s t 4-Crit: Gap Calo	ical Ga culatic 1 L 4.1 1.00 8	through p and p on 4 L	Tollow- Follow- 7 L 1.00	up Time 8 T 1.00	1 Calcu 9 R 1.00	10 10 L 7.1 1.00 8 0.20 0.00	T 1.00	R 6.2 1.00 8 0.10 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt)	f major s t 4-Crit: Gap Calo	ical Ga culatic 1 L 4.1 1.00 8 0.00	through p and p n 4 L 1.00	1 lanes Follow- 7 L 1.00 0.20 0.00	up Time 8 T 1.00 0.20 0.00	1 Calcu 9 R 1.00 0.10 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70	T 1.00 0.20 0.00	R 6.2 1.00 8 0.10 0.00 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt)	f major s t 4-Crit: Gap Calo ) 0 1-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00	through p and h n 4 L 1.00	1 lanes Follow- 7 L 1.00 0.20 0.00 0.00	up Time 8 T 1.00 0.20 0.00 0.00	1 Calcu 9 R 1.00 0.10 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00	T 1.00 0.20 0.00 0.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T):	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 0.00	through p and p n 4 L 1.00	1 lanes Follow- 7 L 1.00 0.20 0.00	up Time 8 T 1.00 0.20 0.00	1 Calcu 9 R 1.00 0.10 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00	T 1.00 0.20 0.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T):	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 0.00	through p and h n 4 L 1.00	1 lanes Follow- 7 L 1.00 0.20 0.00 0.00	up Time 8 T 1.00 0.20 0.00 0.00	1 Calcu 9 R 1.00 0.10 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00	T 1.00 0.20 0.00 0.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T):	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 0.00	through p and h n 4 L 1.00	1 lanes Follow- 7 L 1.00 0.20 0.00 0.00	up Time 8 T 1.00 0.20 0.00 0.00	1 Calcu 9 R 1.00 0.10 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00	T 1.00 0.20 0.00 0.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 0.00	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c) Follow-U	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat	through p and 1 pn 4 L 1.00 0.00 0.00	1 lanes Follow- 7 L 1.00 0.20 0.00 0.00 1.00	up Time 8 T 1.00 0.20 0.00 0.00 1.00	1 Calcu 9 R 1.00 0.10 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5	T 1.00 0.20 0.00 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c) Follow-U	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat 1	through p and 1 p 1.00 0.00 0.00 0.00 1.00 4	1 lanes Follow- 7 L 1.00 0.20 0.00 1.00 7	up Time 8 T 1.00 0.20 0.00 0.00 1.00	1 Calcu 9 R 1.00 0.10 0.00 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.00 0.00 1.00 6.5	T 1.00 0.20 0.00 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c) Follow-U	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat	through p and 1 pn 4 L 1.00 0.00 0.00	1 lanes Follow- 7 L 1.00 0.20 0.00 0.00 1.00	up Time 8 T 1.00 0.20 0.00 0.00 1.00	1 Calcu 9 R 1.00 0.10 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5	T 1.00 0.20 0.00 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c)	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat 1	through p and 1 p 1.00 0.00 0.00 0.00 1.00 4	1 lanes Follow- 7 L 1.00 0.20 0.00 1.00 7	up Time 8 T 1.00 0.20 0.00 0.00 1.00	1 Calcu 9 R 1.00 0.10 0.00 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.00 0.00 1.00 6.5	T 1.00 0.20 0.00 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c) Follow-U Movement	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat 1 L	through p and 1 p 1.00 0.00 0.00 0.00 1.00 4	1 lanes Follow- 7 L 1.00 0.20 0.00 1.00 7	up Time 8 T 1.00 0.20 0.00 0.00 1.00	1 Calcu 9 R 1.00 0.10 0.00 0.00 0.00	lation 10 L 7.1 1.00 8 0.20 0.00 0.00 0.00 1.00 6.5 10 L 3.50	T 1.00 0.20 0.00 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3 12 R	
Sat flow Number o Workshee Critical Movement t(c,base t(c,hv) P(hv) t(c,g) Grade/10 t(3,lt) t(c,T): t(c) Follow-U Movement t(f,base	f major s t 4-Crit: Gap Calo ) 0 1-stage 2-stage 1-stage 2-stage 2-stage	street ical Ga culatic 1 L 4.1 1.00 8 0.00 0.00 0.00 4.2 alculat 1 L 2.20	through p and 1 n 4 L 1.00 0.00 0.00 0.00 cions 4 L	1 lanes Follow- 7 L 1.00 0.20 0.00 1.00 7 L	up Time 8 T 1.00 0.20 0.00 1.00 8 T	1 Calcu 9 R 1.00 0.10 0.00 0.00 0.00 9 R	lation 10 L 7.1 1.00 8 0.20 0.00 0.00 0.00 1.00 6.5 10 L 3.50	T 1.00 0.20 0.00 1.00	R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00 6.3 12 R 3.30	

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue	Clearance	Time	at	Upstream	Signal		
				Mot	vement 2	Mov	rement 5
				V(t)	V(l,prot)	V(t)	V(l,prot)

Effective Green, g (s Cycle Length, C (sec) Rp (from Exhibit 16-1 Proportion vehicles a g(q1) g(q2) g(q)	1)	on greer	ı P					
Computation 2-Proport	ion of	TWSC Inte	ersect	cion Tim	e bloo	cked		. <u>.</u> .
			7	Movem 7(t) V	ent 2 (l,prot		lovement V(l,	
alpha								
beta								
Travel time, t(a) (se	c)							
Smoothing Factor, F		c						
Proportion of conflic								
Max platooned flow, V Min platooned flow, V								
Duration of blocked p								
Proportion time block				0.0	0 0		0.000	
Computation 3-Platoon	Event	Periods	Re	esult				1999 1990 - 19
		28.25						
p(2)				.000 .000				
p(5) p(dom)			U	.000				
p(dom) p(subo)								
Constrained or uncons	trained	1?						
				-			<u>ن</u>	
Proportion						17		
unblocked		(1)		(2)		(3)		
for minor	-	.e-stage	~		tage Pi			
movements, p(x)	Pro	cess	SI	tage I		Stage I	. <b>L</b>	
p(1)						1. 2.371	<u>, Ören ver</u>	10 7 11
p(4)								
p(7)								
p(8)								
p(9)								
p(10)								
p(11)								
p(12)								
Computation 4 and 5		0.00			na para		1.1.1	
Single-Stage Process								
Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	Т	R
V.C.Y	142					420		142
V c,x s	142					720		174
Px								
V c,u,x								
								A sector
C r,x		- to - DC-MIL-10 <mark>-11-4 - 10-25-30-260-26</mark>						
C plat,x								
Two-Stage Process								

V(c,x) s	1500	
P(x)	1500	
/(c,u,x)		
C(r,x)		
C(plat,x)		
Norksheet 6-Impedance and Capacity Equation	າຣ	
Step 1: RT from Minor St.	9	12
Conflicting Flows		142
Potential Capacity		890
Pedestrian Impedance Factor	1.00	1.00
Novement Capacity		890
Probability of Queue free St.	1.00	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows		142
Potential Capacity		1405
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	.). 	1405
Probability of Queue free St.	1.00	0.99
Maj L-Shared Prob Q free St.		0.99
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99
Movement Capacity	1 00	1 00
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		420
Potential Capacity		579
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.99	
Maj. L, Min T Adj. Imp Factor.	0.99	
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99
Movement Capacity		576
Norksheet 7-Computation of the Effect of T	wo-stage Gap Acc	eptance
Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		

Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity

Probability of Queue free St.

Volume (vph) Movement Capacity (vph)			240 576		2 890
Movement 7 L	8 T	9 R	10 L	11 T	12 R
Worksheet 8-Shared Lane Calculations					
C t				576	
Results for Two-stage process: a Y					
Movement Capacity Results for Two-stage process:	a o n	4		576	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt		0.99 0.99		0.99	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor		1.00 0.99		1.00	
Conflicting Flows Potential Capacity		1 00		420 579	
Part 3 - Single Stage					
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity					
Part 2 - Second Stage Conflicting Flows			2		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity					
Conflicting Flows Potential Capacity					
Step 4: LT from Minor St. Part 1 - First Stage		7		10	
Probability of Queue free St.	ed a	1.00		1.00	
a Y C t					
Movement Capacity Result for 2 stage process:		<u></u>			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt		1.00 0.99		1.00 0.99	
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity					
Conflicting Flows Potential Capacity					

Movement			7	8	9	10	11	12
			L	Т	R	L	Т	R
C sep						576		890
Volume						240		2
Delay								
Q sep								
Q sep +1								
round (Qsep +1)								
n max								
C sh							578	
SUM C sep								
n								
C act								
Worksheet 10-Delay	, Queue	Length,	and Leve	el of §	Service			
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	8						242	
C(m) (vph)	1405						578	
v/c	0.01						0.42	
95% queue length	0.02						2.06	
Control Delay	7.6						15.6	
LOS	A						С	
Approach Delay							15.6	
Approach LOS							С	
Worksheet 11-Share	d Major	LT Impe	dance and	l Delay	7			
					Movem	ont 2	Mottor	ient 5
p(oj)					0.		1.	00
v(il), Volume for					26	2		
v(i2), Volume for					0			
s(il), Saturation					17			
s(i2), Saturation	flow rat	te for s	stream 3 c	or 6	17			
P*(oj)					Ο.	99		
					-			

7.6

0.1

1

d(M,LT), Delay for stream 1 or 4

d(rank,1) Delay for stream 2 or 5

N, Number of major street through lanes

## Worksheet 9-Computation of Effect of Flared Minor Street Approaches

APPENDIX E

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Phone: E-mail: Fax:

Analyst:	MAH		
Agency or Company:	OMNNI		
Date Performed:	1/8/2004		
Analysis Time Period:			
Freeway/Direction:	one way		
From/To:	STH 47 to STH 1	5 4	
Jurisdiction:			
Analysis Year:	2020*		
Description: No Intere	change		
	Flow Inputs and	d Adjustments	
Volume, V		4090	veh/h
Peak-hour factor, PHF		0.90	
Peak 15-min volume, v15	5	1136	v
Trucks and buses		10	00
Recreational vehicles		0	00
Terrain type:		Level	
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, H	ET	1.5	
Recreational vehicle PO		1.2	
Heavy vehicle adjustmer		0.952	
Driver population facto		1.00	
Flow rate, vp		2386	pc/h/ln
		a das services	
	Speed Inputs an	nd Adjustments	
	Speed Inputs an		£+
Lane width		12.0	ft
Right-shoulder lateral		12.0 6.0	ft
Right-shoulder lateral Interchange density		12.0 6.0 0.50	
Right-shoulder lateral Interchange density Number of lanes, N		12.0 6.0 0.50 2	ft
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed:		12.0 6.0 0.50 2 Base	ft interchange/mi
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	clearance	12.0 6.0 0.50 2 Base 65.0	ft interchange/mi mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment,	clearance fLW	12.0 6.0 0.50 2 Base 65.0 0.0	ft interchange/mi mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus	fLW stment, fLC	12.0 6.0 0.50 2 Base 65.0 0.0 0.0	ft interchange/mi mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adj	clearance fLW stment, fLC justment, fID	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0	ft interchange/mi mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density ad Number of lanes adjustr	clearance fLW stment, fLC justment, fID	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adj	clearance fLW stment, fLC justment, fID	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density ad Number of lanes adjustr	clearance fLW stment, fLC justment, fID	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density ad Number of lanes adjustr	clearance fLW stment, fLC justment, fID	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density ad Number of lanes adjustr	fLW stment, fLC justment, fID ment, fN	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adj Number of lanes adjustr Free-flow speed, FFS	fLW stment, fLC justment, fID ment, fN	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway	ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjus Interchange density adj Number of lanes adjustr Free-flow speed, FFS 	clearance fLW stment, fLC justment, fID ment, fN LOS and Perform	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway mance Measures 2386	ft interchange/mi mi/h mi/h mi/h mi/h mi/h pc/h/ln
Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad Number of lanes adjust Free-flow speed, FFS Flow rate, vp Free-flow speed, FFS	clearance fLW stment, fLC justment, fID ment, fN LOS and Perform	12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway mance Measures 2386	ft interchange/mi mi/h mi/h mi/h mi/h mi/h pc/h/ln mi/h

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Phone: E-mail:

Fax:

	Operational Ar	alysis	
Analyst:	МАН		
Agency or Company:	OMNNI		
Date Performed:	1/8/2004		
Analysis Time Period:	_, _,		
Freeway/Direction:	one way		
From/To:	STH 47 to STH 1	5	
Jurisdiction:			
Analysis Year:	2020		
Description: No Inter	change 3 lanes		
	Flow Inputs an	d Adjustments	
Volume, V		4090	veh/h
Peak-hour factor, PHF		0.90	V CII/ II
Peak 15-min volume, v1	5	1136	v
Trucks and buses	5	10	* %
Recreational vehicles		0	\$ \$
Terrain type:		Level	0
Grade		0.00	%
Segment length		0.00	mi
Trucks and buses PCE,	ET	1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme	•	0.952	
Driver population fact		1.00	
Flow rate, vp	, <u>1</u>	1591	pc/h/ln
	Speed Inputs a	nd Adjustments	
Lane width		12.0	ft
Right-shoulder lateral	clearance	6.0	ft
Interchange density		0.50	interchange/mi
Number of lanes, N		3	5 /
Free-flow speed:		Base	
FFS or BFFS		65.0	mi/h
Lane width adjustment,	fLW	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad	justment, fID	0.0	mi/h
Number of lanes adjust	ment, fN	3.0	mi/h
Free-flow speed, FFS		62.0	mi/h
		Urban Freeway	
	LOS and Perfor	mance Measures	
Flow rate, vp		1591	pc/h/ln
Free-flow speed, FFS		62.0	mi/h
Average passenger-car	speed, S	62.0	mi/h
Number of lanes, N		3	·······
Density, D		25.7	pc/mi/ln

ENGINEERING ARCHITECTURE ENVIRONMENTAL ONE SYSTEMS DRIVE APPLETON, WI 54914-1654 920-735-6900 1-800-571-6677 FAX 920-830-6100



JOB NUMBER	SHEET NO.	_
CLIENT		
PROJECT		
MADE BY	DATE	
CHECKED BY	DATE	



Phone: I-mail:

Π

Fax:

]	Operational Ana	lysis	-
Analyst:	MAH		
Agency or Company:	OMNNI		
Date Performed:	7/1/04		
Analysis Time Period:	.,_, _,		
Freeway/Direction:	one way		
From/To:	STH 47 to CTH E		
Jurisdiction:	- 1992 - San Andrew Market - A		
Analysis Year:	2020		
Description: No Inter			
-	Flow Inputs and	Adjustments	
	1		. /.
Volume, V		4518	veh/h
Peak-hour factor, PHF		0.90	
Peak 15-min volume, v1	5	1255	v
Trucks and buses		10	8
Recreational vehicles		0	8
Terrain type:		Level	0.
Grade		0.00	8 
Segment length		0.00	mi
Trucks and buses PCE,		1.5	
Recreational vehicle P		1.2	
Heavy vehicle adjustme		0.952	
Driver population fact	or, fp	1.00	pc/h/ln
Flow rate, vp		2636	pe) II/ III
	Speed Inputs an	nd Adjustments	
Tome width		12.0	ft
Lane width Right-shoulder lateral	clearance	6.0	ft
Interchange density	cicaranee	0.50	interchange/mi
Number of lanes, N		2	_
Free-flow speed:		Base	
FFS or BFFS		65.0	mi/h
Lane width adjustment,	ft.W	0.0	mi/h
Lateral clearance adju		0.0	mi/h
Interchange density ad	iustment, fID	0.0	mi/h
Number of lanes adjust		4.5	mi/h
Free-flow speed, FFS		60.5	mi/h
1100 110# Speed, 110		Urban Free	way
	LOS and Perform	mance Measures_	
		2626	pc/h/ln
Flow rate, vp		2636	mi/h
		60.5	
Free-flow speed, FFS	1 7		
Average passenger-car	speed, S	2	mi/h
	speed, S	2	mı/n pc/mi/ln

hone: -mail:

Fax:

Operational Analysis

	Operacionar inte		
Product .	МАН		
Analyst: Agency or Company:	OMNNI		
ate Performed:	7/1/04		
Analysis Time Period:	.,_, =		
Freeway/Direction:	one way		
	STH 47 to CTH E		
'rom/To: 'urisdiction:			
	2020		
Analysis Year: Description: No Inter		USH 41	
-	Flow Inputs and		
		4518	veh/h
Jolume, V		0.90	,
Peak-hour factor, PHF		1255	v
Peak 15-min volume, v	15	10	8
Trucks and buses		0	00
Recreational vehicles		Level	·
Terrain type:		0.00	0
Grade		0.00	mi
Segment length		1.5	
Trucks and buses PCE,	ET	1.2	
Recreational vehicle	PCE, ER	0.952	
Heavy vehicle adjustm	ent, IHV	1.00	
Driver population fac	tor, Ip	1757	pc/h/ln
Flow rate, vp		1/3/	
	Speed Inputs ar	nd Adjustments_	
Lane width		12.0	ft
Right-shoulder latera	l clearance	6.0	ft
Interchange density		0.50	interchange/mi
Number of lanes, N		3	
Free-flow speed:		Base	
FFS or BFFS		65.0	mi/h
Lane width adjustment	. flW	0.0	mi/h
Lateral clearance adj	justment, fLC	0.0	mi/h
Interchange density a	diustment, fID	0.0	mi/h
Number of lanes adjus	stment, fN	3.0	mi/h
Free-flow speed, FFS		62.0	mi/h
Fiee-filow speed, filo		Urban Free	eway
	LOS and Perfor	mance Measures	
		1757	pc/h/ln
Flow rate, vp		62.0	mi/h
Free-flow speed, FFS		61.6	mi/h
Average passenger-car	r speed, S	3	
Number of lanes, N		28.5	pc/mi/ln
Density, D		20.5	F - /
SHEET NO. JOB NUMBER ONE SYSTEMS DRIVE ENGINEERING CLIENT APPLETON, WI 54914-1654 ARCHITECTURE PROJECT 920-735-6900 ENVIRONMENTAL MADE BY DATE 1-800-571-6677 ASSO CHECKED BY DATE FAX 920-830-6100 www.omnni.com 47 - CTHE STH 2000 KISting Coo 26000 SB 25400 NB 51600 TOTAL 74000 volumes NoInterchante Projected \$5 OS storaight line grow th Assum 66,000 ween Vr Q 2012.9 2000 χ= 64,000 -51,600 2013 Say 74,000 -51,600 - 2000 7,070 Existing inter change STH 47 counts Zac on TIDOATT 0.0 1700 ADT K 30 10.5 T(DHD)+ -----798 SBON 12 01 Rahn NB 52 D 27800-7100= 20 700 2298 vph US H 41 SBON (0) 8 20700 27600 X.111 = 3064 DSH 41 Q NA Ban Q No I. Jarchange Projection 0505

777Uph NBOR 7000 ADIT US 788 (2000 count 777 ph SB 40 4 58 1154 26500 Apt 2942 500 x ,111= NBUSH 1 33500

Phone: E-mail: Fax:

erge Analysis				
On-ramp				
020 4 lanes				
Freeway Data				
Merce				
		mph		
On Ramp Data				
Right				
1				
50.0		mph		
788		vph		
750		ft		
		ft		
Ramp Data (if on	ne exists)			
No				
		vph		
		-		
		ft		
pc/h Under Base	Condition	s		
Freeway	Ramo		Adjacent	
TTEEway	Ramp		Ramp	
2942	788			vph
	0.90			
0.90	0.90			
0.90 817	219			v
				00
817	219			
817 10	219 10			00
817 10 0	219 10 0	010	5	00
817 10 0 Level	219 10 0	۶ mi		olo olo
817 10 0 Level %	219 10 0			00 00
	Dn-ramp D20 4 lanes Freeway Data Merge 2 65.0 2942 On Ramp Data Right 1 50.0 788 750 Ramp Data (if or No pc/h Under Base Freeway 2942	Dn-ramp D20 4 lanes Freeway Data Merge 2 65.0 2942 On Ramp Data Right 1 50.0 788 750 Ramp Data (if one exists) No Pc/h Under Base Condition Freeway Ramp 2942 788	Dn-ramp D20 4 lanes Freeway Data Merge 2 65.0 mph 2942 vph On Ramp Data Right 1 50.0 mph 788 vph 750 ft ft Ramp Data (if one exists) No vph ft pc/h Under Base Conditions Freeway Ramp 2942 788	On-ramp D20 4 lanes Freeway Data Merge 2 65.0 mph 2942 vph On Ramp Data Right 1 50.0 mph 788 vph 750 ft ft Ramp Data (if one exists) No vph ft pc/h Under Base Conditions Freeway Ramp Adjacent Ramp 2942 788

Ieavy vehicle adj Driver population Flow rate, vp	ustment, fHV 1 factor, fP	1	.952 .00 432	0.952 1.00 919		pcph
	Estimat	ion of V:	12 Merge	Areas		
]	L = EQ	(Equat:	ion 25-2	or 25-3	)	
		Using 1	Equation	0		
		= 3432	pc/h			
]	C	apacity (	Checks			
v	Actua 4351		Maximum 4700		LOS F? No	
FO V	4351		4600		No	
R12						
	Level of Servic	e Determ	ination (	if not	F)	
Density, D = 5.4 R Level of service	R		12		A	3 pc/mi/l
	Spe	ed Estim	ation			
		104.03				New Array India
Intermediate spee	ed variable,		M = S	= 0.548		
Space mean speed	in ramp influen	.ce area,	S = R	= 52.4	mph	
Space mean speed	in outer lanes,		S = 0	= N/A	mph	
			0			

32. **•** 

Phone: E-mail: Fax:

	М	erge	Analysi	ls				
		J -	4					
Analyst:	MAH							
Agency/Co.:								
-	6/15/2004							
Analysis time period:								
Freeway/Dir of Travel:								
	STH 47 SB	On-ra	mp					
Jurisdiction:								
1	2020		a tara dalar					
Description: STH 47 SB	on-ramp, 2	020 6	anes					
		Freev	way Data	a				
Type of analysis			Me	erge				
Number of lanes in freev	ay		3	-				
Free-flow speed on freev			65	5.0		mph		<u> </u>
Volume on freeway			29	942		vph		
		On Ra	amp Data	a		50 		
Side of freevou			ם-	ight				
Side of freeway Number of lanes in ramp			1					
Free-flow speed on ramp				0.0		mph		
Volume on ramp				38		vph		
Length of first accel/de	cel lane			50		ft		
Length of second accel/d			/ .			ft		
	Adjacent	Ramp	Data (:	if on	e exist:	s)		
Deeg adjagant name avid	- 2		N	-				
Does adjacent ramp exist			No	5		vph		
Volume on adjacent Ramp	22					vpn		
Position of adjacent Ram Type of adjacent Ramp	чЪ							
Distance to adjacent Ramp	np					ft		
-	version to	pc/h	Under H	Base	Conditio	ons		
	526 -	-						
Junction Components			Freeway	Y	Ramp		Adjacent Ramp	
Volume, V (vph)			2942		788			vph
Peak-hour factor, PHF			0.90		0.90			
Peak 15-min volume, v15			817		219			v
Trucks and buses			10		10			00
Recreational vehicles			0		0			olo
			Level		Level			
Terrain type:				1224				
Grade				8		%		e.
Grade Length				% mi		% mi		% mi
Grade			1.5		1.5			550 gr

Heavy vehicle adjustment, Driver population factor, Flow rate, vp	fP	0.952 1.00 3432	0.952 1.00 919		pcph
	Estimation of	V12 Merge	Areas		
L = EQ	-	tion 25-2		)	
P = FM	0.599 Using	Equation	1		
v = v $12 F$		pc/h			
	Capacity	Checks		= 0 p.	5. 
v	Actual 4351	Maximum 7050		LOS F? No	
FO	2973	4600		No	
R12					
Level of	Service Deter	mination (	if not :	F)	s al s' ésecto <u>s étalores - s'ès</u>
Density, D = 5.475 + 0.00 R Level of service for ramp	R	12	1	A	pc/mi/ln
П	Speed Esti	mation			
Intermediate speed variab		M =	0.322		ter da frederina
Space mean speed in ramp	influence area	s , S = R	57.6	mph	
Space mean speed in outer	lanes,		61.8	mph	
Space mean speed for all	vehicles,	0 S =	58.9	mph	

Phone: E-mail: Fax:

	I	liver	ge Analy	sis_				
	ман	5. <del>.</del>	-					
Analyst: Agency/Co.:	MAH							
	6/15/2004							
Analysis time period:	0/15/2004							
-	USH 41 NB							
	NB off-ram	no at	STH 47					
Jurisdiction:								
	2020							
Description: STH 47 NB		2020	4 lane					
		Freev	way Data	L				
Type of analysis			Di	verg	e			
Number of lanes in freew	ay			-				
Free-flow speed on freew			65	5.0		mph		
Volume on freeway	-		37	19		vph		
	C	Off Ra	amp Data	ı				
Side of freeway	±		Ri	ght				
Number of lanes in ramp			1					
Free-Flow speed on ramp			50	0.0		mph		
Volume on ramp			77	7		vph		
Length of first accel/de			21	.2		ft		
Length of second accel/d	ecel lane					ft		
	_Adjacent	Ramp	Data (i	f on	e exist	s)		
Does adjacent ramp exist	?		Nc	<b>)</b>				
Volume on adjacent ramp						vph		
Position of adjacent ram	р							
Type of adjacent ramp								
Distance to adjacent ram	p					ft		
Conv	ersion to	pc/h	Under B	Base	Conditi	ons		
Junction Components			Freeway	7	Ramp		Adjacent	
						5	Ramp	
Volume, V (vph)			3719		777			vph
Peak-hour factor, PHF			0.90		0.90			
Peak 15-min volume, v15			1033		216			v
Trucks and buses			10		10			00 0
Recreational vehicles			0		0			00
Terrain type:			Level		Level			
Grade			0.00	8.	0.00	%		
Length			0.00	mi	0.00	mi	1	mi
Trucks and buses PCE, ET			1.5		1.5			
Recreational vehicle PCE	, ER		1.2		1.2			

	factor, fP		1.00 907	pcph
	Estimation o	of V12 Diverge	Areas	
7	10-11-10-11-11-11-11-11-11-11-11-11-11-1	uation 25-8 or	25-9)	
	EQ P = 1.000 Usi	ng Equation 0		
	$ \begin{array}{c} FD \\ v = v + (v - v) \\ 12 R F R \end{array} $	P = 4339 p FD	c/h	
]	Capaci	ty Checks	5 - 14	
v = v	Actual 4339	Maximum 4700	LOS No	F?
Fi F V	4339	4400	No	
12 $v = v - v$	3432	4700	No	
FOFR V R	907	2100	No	
1	Level of Service Det	ermination (if	not F)	e a l'hare sh
Intermediate speed Space mean speed i Space mean speed i Space mean speed i	in ramp influence ar in outer lanes,	D = 0 $S$ $S = 5$ $R$ $S = 1$ $0$ $S = 5$	7.8 mpl N/A mpl	n de la construction de la constru La construction de la construction d
space mean speca .				
				utgaliett raag ealar room ganwomt aangi (am as acterating af adteacht aang of adgescht faa
		and a string of string and		
		and a stand of some		
				د (مساطق المنزية متوسيل الألم من المساطق المنزية متوسيل الألم المراجع من المراجع الألمية ال المراجع المراجع المراجع الألمية ال المراجع المراجع من المراجع المراجع المساطر المراجع المراجع المساطر المراجع
				د (مساطق المنزية متوسيل الألم من المساطق المنزية متوسيل الألم المراجع من المراجع الألمية ال المراجع المراجع المراجع الألمية ال المراجع المراجع من المراجع المراجع المساطر المراجع المراجع المساطر المراجع
				<ul> <li>(cm as accessent table)</li> <li>(cm as accest to comp</li> <li>(cm as accest to comp</li> <li>(cm accest to comp</li> <li(cm accest="" comp<="" li="" to=""> <li>(cm acc</li></li(cm></ul>

Phone: E-mail: Fax:

	D	iverge	Analy	sis_				
Analyst:	МАН							
Agency/Co.:								
Date performed:	6/15/2004							
Analysis time period:	0, 20, 2001							
Freeway/Dir of Travel:	USH 41 NB							
Junction:	NB off-ram	p at SI	TH 47					
Jurisdiction:		F						
Analysis Year:	2020							
Description: STH 47 NB	off-ramp,	2020 6	lane					
	,	Freeway	v Data					
Type of analysis			рi	verg	0			
Number of lanes in free	wav		3	verg	C			
Free-flow speed on free	-			.0		mph		
Volume on freeway	- 1			19		vph		
						T		
	0	ff Ramp	) Data					
Side of freeway			Ri	ght				
Number of lanes in ramp			1					
Free-Flow speed on ramp			50	.0		mph		
Volume on ramp			77	7		vph		
Length of first accel/d	ecel lane		21	2		ft		
Length of second accel/	decel lane					ft		
	Adjacent	Ramp Da	ata (i	f on	e exist	s)		
Does adjacent ramp exis	t?		No	ř.				
Volume on adjacent ramp						vph		
Position of adjacent ra								
Type of adjacent ramp								
Distance to adjacent ra	mp					ft		
Con	version to	pc/h Un	nder B	ase	Conditi	ons		
Junction Components		Fr	reeway		Ramp		Adjacent	
pononos			I		r		Ramp	
Volume, V (vph)		37	/19		777			vph
Peak-hour factor, PHF			90		0.90			1.00
Peak 15-min volume, v15			)33		216			v
Trucks and buses		10			10			00
Recreational vehicles		0	5		0			6
Terrain type:		10 <del>- 1</del> 0	evel		Level			
Grade			00	00	0.00	olo	ç	5
Length			00	mi	0.00	mi		ni
Trucks and buses PCE, E	Т	1.			1.5			
Recreational vehicle PC		1.			1.2			
	*							

_				
Heavy vehicle adjus Driver population f Flow rate, vp		1.00	0.952 1.00 907	pcph
	Estimation of	of V12 Diverge	Areas	
	= (E0	quation 25-8 or	25-9)	
P	= 0.610 Us:	ing Equation 5		
	FD = v + (v - v) 12 R F R	P = 3000 p FD	hc/h	
]	Capac:	ity Checks		
v = v	Actual 4339	Maximum 7050	LOS F? No	
Fi F V	3000	4400	No	
12 $v = v - v$	3432	7050	No	
FOFR V R	907	2100	No	
Le	vel of Service De	termination (if	not F)	
Density,	R	12	2	pc/mi/l
Level of service fo	r ramp-freeway ju	nction areas of	influence D	
	Speed E	stimation		
Intermediate speed	variable,	D = 0 S	.315	
Space mean speed in	ramp influence a	rea, S = 5 R	7.8 mph	
Space mean speed in	outer lanes,	S = 7 0	0.0 mph	
Space mean speed fo	or all vehicles,	S = 6	1.1 mph	

JOB NUMBER SHEET NO. ENGINEERING ONE SYSTEMS DRIVE CLIENT ARCHITECTURE APPLETON, WI 54914-1654 PROJECT ENVIRONMENTAL 920-735-6900 1-800-571-6677 MADE BY DATE FAX 920-830-6100 CHECKED BY DATE www.omnni.com CTH A 2020 No Interchange From North 15800 ADT 974 phv 30% CT 70% thor 682 292 CTHJJ 376 154 From South From East 8600 ADT 530 phv 29% LT 71% RT 17000 ADT phy 10417 81% thur 848 199 19% Existing geometrics 12 1  $\langle \lambda \rangle^{\frac{1}{2}}$ 3 12025 ~ N A P - 31/ 3 ------

SHEET NO. JOB NUMBER ONE SYSTEMS DRIVE ENGINEERING CLIENT APPLETON, WI 54914-1654 ARCHITECTURE PROJECT ENVIRONMENTAL 920-735-6900 DATE MADE BY 1-800-571-6677 CHECKED BY DATE FAX 920-830-6100 www.omnni.com JJ and CHI A Troporsection From 3.23.00 courts Peak hour 4:15-5:15 From borth 74 L, 175 Th 249 total From bouch 357 thru 86 R 443 total From East 54 L, 31RT, 185 total Assume same truck % for CTH JJ. as CTH A Total trucks 9.6% + (PHW) 5.8% + (DHW) 7.7% Use 7.7% for stop control intersection analysis 16 Interchange - Year 2020 Assume same % of turn movements as existing From north From South 15800 ADT ZOZO 17000 ADT 2020 Fron East 8600 6505 TCTA  $K_{30} = \frac{1}{55} \frac{1}{45}$ 

\_TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analyst: Agency/Co.: Date Performed: Analysis Time Period: Intersection: Jurisdiction: Units: U. S. Customar Analysis Year: Project ID: East/West Street: North/South Street: Intersection Orientat	2020 CTH JJ CTH A		Study	period	(hrs):	0.25	
	Vehicle Volu	umes and A	Adjustme	nts			
Major Street: Approa	ch No:	rthbound		Sout	hbound		
Moveme	nt 1	2 3	3		5	6	
	L	T I	R	L	Т	R	
Volume		848 1	199	292	682		
Peak-Hour Factor, PHF			0.90		0.90		
Hourly Flow Rate, HFR			221	324	757		
Percent Heavy Vehicle				8			
Median Type/Storage	Undiv	ided		/			
RT Channelized?		No	o				
Lanes		1 1			1		
Configuration		TR			Т		
Upstream Signal?		No			No		
Minor Street: Approa	ch Wes	stbound		East	bound		
Moveme			9		11	12	
	L	T F	R	L	Т	R	
Volume	154		376				
Peak Hour Factor, PHF			0.90				
Hourly Flow Rate, HFR			417				
Percent Heavy Vehicle			B				
Percent Grade (%)		0	-		0		
Flared Approach: Exi	sts?/Storage		/			/	
Lanes	1	1					
Configuration	$\mathbf{L}$	R					
Del	ay, Queue Ler	ngth, and	Level o	f Servic	е		
Approach N	Constant of the second se	Westbo			Eastbo	ound	
Movement 1	4	7 8	9	10	11	. 12	
Lane Config	L	L	R	I			
v (vph)	324	171	41	7			
C(m) (vph)	580	171	41				
v/c	0.56	10.06	1.				
95% queue length	3.43	22.15		.78			
Control Delay	18.8	4516		6.7			
LOS	C	F	F	1995. AA 888.01			
Approach Delay		14	460				
Approach LOS		F	F				

L II

## HCS2000: Unsignalized Intersections Release 4.1d

Phone: E-Mail: Fax:

## TWO-WAY STOP CONTROL (TWSC) ANALYSIS

L	Analyst:	MAH	
	Agency/Co.:	OMNNI	
ŕ	Date Performed:	6/14/04	
	Analysis Time Period:		
1	Intersection:	CTH A & CTH JJ	
	Jurisdiction:	Outagamie County	
1	Units: U. S. Customary	7	
l.	Analysis Year:	2020	
	Project ID:		
ľ	East/West Street:	CTH JJ	
	North/South Street:	CTH A	
	Intersection Orientati	lon: NS	1

Study period (hrs): 0.25

ndivi	1 1 T R No 8	3 R 199 0.90 55 221  NO	4 L 292 0.90 81 324 8 / 1 L	5 T 682 0.90 189 757  1 T No	6 R 		
ndivi	848 0.90 236 942  ded 1 1 T R No	199 0.90 55 221  No	292 0.90 81 324 8 / 1 L	682 0.90 189 757  1 T			
ndivi	0.90 236 942  ded 1 1 T R No	0.90 55 221  No	0.90 81 324 8 / 1 L	0.90 189 757  1 T			
ndivi	236 942  ded 1 1 T R No 8	55 221  No	81 324 8 / 1 L	189 757  1 T			
ndivi	942  ded 1 1 T R No 8	221  No	324 8 / 1 L	757  1 T			
ndivi	 ded 1 1 T R No	 No	8 / 1 L	 1 T			
	1 1 T R No 8	No	/ 1 L	Т			
	1 1 T R No 8	20 g 1 (s 15 - 1 (s)	L	Т			
	T R No	20 g 1 (s 15 - 1 (s)	L	Т			
	T R No	9	L	Т			
	No 8	9	11 - 10 				
	8	9	in din Berthe	No			
	-	9					
		-	10	11	12	_	91-9-1-9 91-9-1-9
	Т	R	L	Т	R		
L .		376					
90		0.90					
		104					
L		417					
		8					
	0			0			
age			/				/
		No					
1	1						
L	R						
	oo age 1	00	00 0.90 104 417 8 0 rage No 1 1	00 0.90 104 . 417 8 0 rage / No 1 1	00 0.90 104 417 8 0 0 cage / No 1 1	00 0.90 104 417 8 0 0 rage / No 1 1	00 0.90 104 417 8 0 0 cage / No 1 1

Lane Width (ft Walking Speed			12.0 4.0	12.0 4.0	12.0 4.0	12.0 4.0		
Percent Blocka			0	0	0	0		
			Jostrea	am Sign	al Data	 a		
	Prog.	Sat			Green	Cycle	Prog.	Distance
	Flow	Flow	и Тур	be	Time	Length	Speed	to Signal
	vph	vph			sec	sec	mph	feet
52 Left-Turn								
Through								
55 Left-Turn								
Through								
Vorksheet 3-Da	ta for C		T Effor	t of D		- Major (	Stroot J	
orksneet 3-Da			J EITEC		elay lo	5 Major A	street v	
					Moveme	ent 2	Moveme	ent 5
Shared ln volu	me, majo	r th vel	nicles:	:				
Shared ln volu	me, majo:	r rt vel	nicles:					
Sat flow rate,								
Sat flow rate	major r							
	r street	through	n lanes	3:				
	r street	through	n lanes	3:				
Number of majo					e Calcı	ulation		
Number of majo 	itical Ga	ap and 1			e Calcı	ulation		
Number of majo Norksheet 4-Cr Critical Gap C	itical Ga	ap and 1			e Calcu 9	ulation 10	11	12
Number of majo Norksheet 4-Cr Critical Gap C	itical Ga	ap and 1	Follow-	up Tim			11 T	12 R
Number of majo Worksheet 4-Cr Critical Gap C Movement	itical Ga alculatio 1	ap and l on L	Follow- 7 L	-up Tim 8	9 R	10		
Number of majo Norksheet 4-Cr Critical Gap C Novement	itical Ga alculatio 1 L	ap and l on L 4.1	Follow- 7 L 7.1	-up Tim 8 T	9 R 6.2	10 L	Т	R
Number of majo Norksheet 4-Cr Critical Gap C Novement :(c,base) :(c,hv)	itical Ga alculatio 1	ap and 1 on 4 L 4.1 1.00	Follow- 7 L 7.1 1.00	-up Tim 8	9 R 6.2 1.00	10 L		
Number of majo Norksheet 4-Cr Critical Gap C Movement c(c,base) c(c,hv) P(hv)	itical Ga alculatio 1 L	ap and l on L 4.1	Follow- 7 L 7.1	-up Tim 8 T	9 R 6.2	10 L 0 1.00	Т	R
Number of majo Norksheet 4-Cr Critical Gap C Movement c(c,base) c(c,hv) P(hv) c(c,g)	itical Ga alculatio 1 L	ap and 1 on 4 L 4.1 1.00	Follow- 7 L 7.1 1.00 8	-up Tim 8 T 1.00 0.20	9 R 6.2 1.00 8	10 L 0 1.00 0 0.20	T 1.00 0.20	R 1.00 0.10
Number of majo Norksheet 4-Cr Critical Gap C Movement c(c,base) c(c,hv) c(c,hv) c(c,g) Grade/100	itical Ga alculatio 1 L	ap and 1 on 4 L 4.1 1.00 8	Follow- 7 L 7.1 1.00 8 0.20 0.00	-up Tim 8 T 1.00	9 R 6.2 1.00 8 0.10 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00	R 1.00
Number of majo Norksheet 4-Cr Critical Gap C Movement (c,base) (c,hv) (c,p) (hv) (c,g) Grade/100 (3,lt)	itical Galculatio	ap and 1 on 4 L 4.1 1.00 8 0.00	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70	-up Tim 8 T 1.00 0.20 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00 0.20 0.00	R 1.00 0.10 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement c(c,base) c(c,hv) c(c,g) Grade/100 c(3,lt) c(c,T): 1-sta	itical Galculation alculation L 1.00 ge 0.00	ap and 1 on 4 L 4.1 1.00 8	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00	-up Tim 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20	R 1.00 0.10 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Aovement t(c,base) t(c,hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1-sta 2-sta	itical Ga alculatio L 1.00 ge 0.00 ge 0.00	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00 0.00	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00	-up Tim 8 T 1.00 0.20 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00
Number of majo Norksheet 4-Cr Critical Gap C Novement (c,base) (c,hv) (c,p) (hv) (c,g) Grade/100 (3,lt) (c,T): 1-sta 2-sta	itical Ga alculatio L 1.00 ge 0.00 ge 0.00 ge 0.00 ge	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00	-up Tim 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1-sta 2-sta t(c) 1-sta 2-sta	itical Ga alculatio 1 L 1.00 ge 0.00 ge 0.00 ge ge	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00 0.00 4.2	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00	-up Tim 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement (c, base) (c, hv) (c, hv) (c, g) Grade/100 (3, lt) (c, T): 1-sta 2-sta (c) 1-sta 2-sta Follow-Up Time	itical Ga alculation L 1.00 ge 0.00 ge 0.00 ge ge	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00 0.00 0.00 4.2 tions	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5	-up Tim 8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 6.3	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 0.00 0 1.00	T 1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Norksheet 4-Cr Critical Gap C Movement (c,base) (c,hv) (c,hv) (c,g) Grade/100 (3,lt) (c,T): 1-stan 2-stan (c) 1-stan 2-stan Follow-Up Time	itical Ga alculatio 1 L 1.00 ge 0.00 ge 0.00 ge ge	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00 0.00 4.2	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00	-up Tim 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(c,T): 1-sta 2-sta t(c) 1-sta 2-sta Follow-Up Time Movement	itical Ga alculation L 1.00 ge 0.00 ge 0.00 ge Calculat	ap and 1 on 4 L 4.1 1.00 8 0.00 0.00 0.00 4.2 tions 4 L	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L	-up Tim 8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 6.3 9 R	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement (c,base) (c,hv) (c,g) Grade/100 (3,lt) (c,T): 1-stan 2-stan (c) 1-stan 2-stan Follow-Up Time Movement	itical Ga alculation 1 L 1.00 ge 0.00 ge 0.00 ge ge Calculat 1 L	ap and 1 on 4 1. 4.1 1.00 8 0.00 0.00 0.00 4.2 tions 4 L 2.20	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	-up Tim 8 T 1.00 0.20 0.00 1.00 8 T	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 6.3 9 R 3.30	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
Number of majo Norksheet 4-Cr Critical Gap C Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1-stan 2-stan t(c) 1-stan 2-stan Follow-Up Time Movement	itical Ga alculation L 1.00 ge 0.00 ge 0.00 ge Calculat	ap and 1 on 4 1. 4.1 1.00 8 0.00 0.00 0.00 4.2 tions 4 L 2.20 0.90	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90	-up Tim 8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 8 0.10 0.00 0.00 6.3 9 R 3.30 0.90	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Number of majo Norksheet 4-Cr Critical Gap C Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1-stan 2-stan t(c) 1-stan 2-stan Follow-Up Time Movement	itical Ga alculation 1 L 1.00 ge 0.00 ge 0.00 ge ge Calculat 1 L	ap and 1 on 4 1. 4.1 1.00 8 0.00 0.00 0.00 4.2 tions 4 L 2.20	Follow- 7 L 7.1 1.00 8 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	-up Tim 8 T 1.00 0.20 0.00 1.00 8 T	9 R 6.2 1.00 8 0.10 0.00 0.00 0.00 6.3 9 R 3.30	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R

Computation 1-Queu	e Clearance	Time	at	Upstream	Signal		
				Mot	vement 2	Mov	rement 5
				V(t)	V(l,prot)	V(t)	V(l,prot)

Effective Green, g (se Cycle Length, C (sec) Ap (from Exhibit 16-11 Proportion vehicles ar 3(q1) 3(q2) g(q)	)	g on gree	en P					
Computation 2-Proporti	on of	TWSC Int		Moven	ne bloc nent 2 7(1,prot	ľ	lovement V(l,	5 prot)
alpha						8		an 1.4 179
beta								
Travel time, t(a) (sec	)							
Smoothing Factor, F Proportion of conflict Max platooned flow, V(								
Min platooned flow, V(								
Duration of blocked pe Proportion time blocke		t(p)		0.0	000		0.000	in part
Computation 3-Platoon	Event	Periods	Re	sult		10.151		hi Carlan Sami Carl
p(2) p(5) p(dom) p(subo) Constrained or unconst	rained	1?		000		1991 - 1995 1999 - 1997 1997 - 1997	sta Line de la Line do Line Line do Line	(1990)80 - 2 "to - Karal P - Sea pol - Sea -
Proportion							5.53	
unblocked for minor movements, p(x)	Singl	(1) Le-stage ocess		(2) Two-S age I	Stage Pr	(3) ocess Stage I	I	
						12 641	<u>, y y</u>	
o(1) p(4)								
p(7)								
p(8)								
p(9) p(10)								
p(11)								
p(12)								
Computation 4 and 5				i a f	tas Base	e we	808 SC	
Single-Stage Process	-	4	-	0	0	10	11	12
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	R
V c,x		1163	2347		942	3.0		
S								
Px V c,u,x								
C r,x C plat,x					29.16 2 <sup>1</sup>	ana an	e provinsi da Recordancias Recordancias	an cur an cur 11. car

5 5 5 5	<b>0 0</b>		
V(c,x)			
s 1500			
P(x)			
V(c,u,x)			
C(r,x)			
C(plat,x)			
Worksheet 6-Impedance and Capacity Equations	5		
Chan 1. DE from Minor Ct	9	12	
Step 1: RT from Minor St.	9	12	
Conflicting Flows	942		
Potential Capacity	311		
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	311	1.00	
		1 00	
Probability of Queue free St.	0.00	1.00	
Step 2: LT from Major St.	4	1	
	-	-	
Conflicting Flows	1163		
Potential Capacity	580		
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	580		
Probability of Queue free St.	0.44	1.00	
Maj L-Shared Prob Q free St.			
Step 3: TH from Minor St.	8	11	
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.44	0.44	
Movement Capacity			
Probability of Queue free St.	1.00	1.00	
			2
Step 4: LT from Minor St.	7	10	
Conflicting Flows	2347		
Potential Capacity	38		
Potential Capacity Pedestrian Impedance Factor		1 00	
이에는 이번에 이렇게 이번에 가지 않는 것이 가지 않는 것이 있다. <mark>-</mark> 이 가지에 가지 않는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있 것이 있는 것이 있다. 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있 것이 것이 있는 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있는 것이 있다. 것이 있는 것이 있 것이 있는 것이 있다. 것이 있는 것이 있는 것이 있다. 것이 있 것이 있 것이 있 것이 있다. 것이 있 것이 있 것이 것이 있다. 것이 있 것이 있 것이 있 같이 않이 있다. 것이 있 것이 있 것이 있 않이 않이 있 것이 것이 것이 있 것이 있 것이 있 것이 있 것이 있 것이 있	1.00	1.00	
Maj. L, Min T Impedance factor		0.44	
Maj. L, Min T Adj. Imp Factor.	0.44	0.56	
Cap. Adj. factor due to Impeding mvmnt	0.44	0.00	
Movement Capacity	17		

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

11

8

Step 3: TH from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage				25.7		
Conflicting Flows						
Potential Capacity						
edestrian Impedance Factor	**********************					
Cap. Adj. factor due to Impeding r	mvmnt					
Novement Capacity						
Part 3 - Single Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor		200	.00		1.00	
Cap. Adj. factor due to Impeding m	mvmnt	C	.44		0.44	
Novement Capacity						
Result for 2 stage process:						1000 000 000 000 000 000 000 000 000 00
a						
Y						
Ct						
Probability of Queue free St.		1 n bi	1.00		1.00	
Step 4: LT from Minor St.			7	-	10	
Part 1 - First Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding m	mvmnt					
Novement Capacity						
Part 2 - Second Stage						
Conflicting Flows					a. 10 - 11	
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding a	mvmnt					
Movement Capacity						
Part 3 - Single Stage		-	2347			
Conflicting Flows			38			- H
Potential Capacity			L.00		1.00	
Pedestrian Impedance Factor		7. <del>-</del>	1.00		0.44	
Maj. L, Min T Impedance factor					0.44	
Maj. L, Min T Adj. Imp Factor.	mampt		0.44		0.00	
Cap. Adj. factor due to Impeding a			J.44 L7		0.00	
Movement Capacity		-	. /	n :		7
Results for Two-stage process:		2.3.5	al protection			
a						
Y						
Ct		1	L7			
Norksheet 8-Shared Lane Calculatio	ons			10		
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (vph)	171		417			
Movement Capacity (vph)	17		311			
Shared Lane Capacity (vph)						

Π

lovement		7	8	9	10	11	12
		$\mathbf{L}$	т	R	L	Т	R
C sep		17		311			
/olume		171		417			
Delay							
) sep							
2 sep +1							
cound (Qsep +1)							
n max							
2 sh							
UM C sep							
1							
2 act							
	- 1	1 -					
Norksheet 10-Delay, Que	ue Length,	, and Le	vel or	Service			
lovement 1	4	7	8	9	10	11	12
ane Config	L	L		R			
(vph)	324	171		417			
(m) (vph)	580	17		311			
/c	0.56	10.06		1.34			
5% queue length	3.43	22.15		20.78			
Control Delay	18.8	4516		206.7			
IOS	С	F		F			
pproach Delay			1460				
pproach LOS			F				
Norksheet 11-Shared Maj	or LT Impe	edance ai	na Dela	ау 			
				Moveme	ent 2	Moven	nent 5
)(oj)				1.0	0	0.	. 4 4
(11) Volume for stream	m 2 or 5						
(ii), volume for seree	ma 7 0 20 F						
(i2), Volume for strea							
r(i2), Volume for strea s(il), Saturation flow	rate for s						
r(i2), Volume for strea s(i1), Saturation flow s(i2), Saturation flow	rate for s						
r(i2), Volume for strea s(i1), Saturation flow s(i2), Saturation flow P*(oj)	rate for s rate for s						
r(il), Volume for strea r(i2), Volume for strea s(il), Saturation flow s(i2), Saturation flow P*(oj) d(M,LT), Delay for stre	rate for s rate for s am 1 or 4	stream 3				18	3.8
(i2), Volume for strea (i1), Saturation flow (i2), Saturation flow *(oj)	rate for s rate for s am 1 or 4 set through	stream 3 n lanes				18	3.8

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Analyst: MAHInter.: CTH A & CTH JJ EastAgency:<br/>Date: 6/14/2004Area Type: All other areas<br/>Jurisd: Outagamie County<br/>Year : 2020Period:<br/>Project ID: CTH A & CTH JJ (East), 2020 No Interchange Add Lanes<br/>S/W St: CTH JJN/S St: CTH A

	E a a	tboun	5	Mon	tbou		CTION	thbou		1 501	uthbou	ind	1
											ucnbou T	R	
	L	т	R	L	Т	R	L	Т	R		1	R	
No. Lanes	0	0	0	1	0	1	0	2	0	0	2	0	
LGConfig				L		R		TR		Defi	LТ		
Volume	i			154		376		848	199	292	682		10.00
Lane Width	i			12.0		12.0	1	12.0		12.0	12.0		
RTOR Vol	İ					0	1.210		160	1			
Duration	0.25		Area 7		ררא	other	27025						
Duración	0.25		Alea			Operat							
Phase Combi	nation	1	2	3	4			5	6	7	8	3	
EB Left						NB	Left						
Thru							Thru		P				
Right							Right	5	Р				
Peds							Peds						
WB Left		Р				SB	Left	Р	Р				
Thru						- I - I	Thru	Ρ	P				
Right		Р					Right	5					
Peds						i i	Peds						
NB Right						EB	Right	2					
SB Right						WB	Right	E P					
Green		22.0					-	15.0	o 40.	0			
Yellow		3.0						3.0	3.0	)			
All Red													
		2.0						0.0	2.0	)			
		2.0								) ength:	90.0		secs
	5	Ir	ntersed					Cyc nary	cle Le	ength:		3	secs
Appr/ Lan	e	Ir Adj	Sat		Perf tios			Сус	cle Le				secs
Appr/ Lan Lane Gro	e up	Ir Adj Flow	i Sat v Rate	Ra	tios		Lane	Cyc  Grour	cle Le p Ap	ength:	h		secs
Appr/ Lan Lane Gro Grp Cap	e	Ir Adj Flow	Sat		tios		Lane	Cyc nary	cle Le p Ap	ength:	h		secs
Appr/ Lan Lane Gro	e up	Ir Adj Flow	i Sat v Rate	Ra	tios		Lane	Cyc  Grour	cle Le p Ap	ength:	h		SECS
Appr/ Lan Lane Gro Grp Cap	e up	Ir Adj Flow	i Sat v Rate	Ra	tios		Lane	Cyc  Grour	cle Le p Ap	ength:	h		SECS
Appr/ Lan Lane Gro Grp Cap	e up	Ir Adj Flow	i Sat v Rate	Ra	tios		Lane	Cyc  Grour	cle Le p Ap	ength:	h		secs
Appr/ Lan Lane Gro Grp Cap Eastbound	e up	Ir Adj Flow	i Sat v Rate	Ra	tios		Lane	Cyc  Grour	cle Le p Ap	ength:	h		secs
Appr/ Lan Lane Gro Grp Cap Eastbound	e up acity	Ir Adj Flow (	Sat Rate (s)	Ra  v/c	g	7c	Lane  Delay	Cyc nary_ Group / LOS	cle Le p Ap	ength:	h		secs
Appr/ Lan Lane Gro Grp Cap Eastbound	e up acity	Ir Adj Flow	Sat Rate (s)	Ra	g		Lane	Cyc  Grour	cle Le	ength: oproacl	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound Westbound L 44	e up acity 1	Ir. Adj Flow (	Sat Rate (s)	Ra  0.39	g 0	.24	Lane Delay	Cyc mary_ Group 7 LOS C	cle Le p Ap	ength: oproacl	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound Westbound L 44 R 75	e up acity 1	Ir Adj Flow (	Sat Rate (s)	Ra  v/c	g 0	7c	Lane  Delay	Cyc nary_ Group / LOS	cle Le	ength: oproacl	h S		Secs
Appr/ Lan Lane Gro Grp Cap Eastbound Westbound L 44	e up acity 1	Ir. Adj Flow (	Sat Rate (s)	Ra  0.39	g 0	.24	Lane Delay	Cyc mary_ Group 7 LOS C	cle Le	ength: oproacl	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound L 44 R 75 Northbound	e up acity 1	Ir. Adj Flow ( 180 161	) Sat 7 Rate (s) )5	Ra v/c 0.39 0.55	tios  0 0	/C .24 .47	Lane Delay 30.9 20.2	Cyc nary_ Group / LOS C C	cle Le p Ap Del	ay LOS	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound L 44 R 75 Northbound	e up acity 1	Ir. Adj Flow (	) Sat 7 Rate (s) )5	Ra  0.39	tios  0 0	.24	Lane Delay	Cyc mary_ Group 7 LOS C	cle Le	ay LOS	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound L 44 R 75 Northbound TR 15	e up acity 1	Ir. Adj Flow ( 180 161	) Sat 7 Rate (s) )5	Ra v/c 0.39 0.55	tios  0 0	/C .24 .47	Lane Delay 30.9 20.2	Cyc nary_ Group / LOS C C	cle Le p Ap Del	ay LOS	h S		Secs
Appr/ Lan Lane Gro Grp Cap Eastbound L 44 R 75 Northbound TR 15 Southbound	e up acity 1 4 94	Ir. Adj Flow ( 180 161 358	) Sat 7 Rate (s) )5 .5	Ra v/c 0.39 0.55 0.62	tios  0 0	/C .24 .47 .44	Lane Delay 30.9 20.2 21.0	Cyc mary Group / LOS C C C	cle Le p Ap Del	ay LOS	h S		secs
Appr/ Lan Lane Gro Grp Cap Eastbound L 44 R 75 Northbound TR 15 Southbound DefL 44	e up acity 1 4 94	Ir. Adj Flow ( 180 161	) Sat 7 Rate (s) )5 .5 36	Ra v/c 0.39 0.55	tios  0 0 0	/C .24 .47	Lane Delay 30.9 20.2	Cyc nary_ Group / LOS C C	cle Le p Ap Del	ay LOS	h S		secs

Phone: E-Mail: Fax:

	OPERATIONAL ANALYSIS
	МАН
Analyst: Agency/Co.:	РАП
Date Performed:	6/14/2004
Analysis Time Period:	
Intersection:	CTH A & CTH JJ East
Area Type:	All other areas
Jurisdiction:	Outagamie County
Analysis Year:	2020
Project ID: CTH A & CTH	JJ (East), 2020 No Interchange Add Lanes
Eas	st/West Street North/South Street
CTH JJ	CTH A

## \_\_\_\_\_VOLUME DATA\_\_\_\_\_

	Eas	stbou	nd	Wes	tbo	und	No	rthbo	und	So	uthbou	nd
	L	т	R	L	Т	R	L	т	R	L	т	R
Volume				154		376		848	199	292	682	
% Heavy Veh				0		0		0	0	0	0	
PHF				0.90		0.90	i	0.90	0.90	0.90	0.90	
PK 15 Vol				43		104	i i	236	55	81	189	
Hi Ln Vol				i			i			i		
% Grade				İ	0		İ	0		İ	0	
Ideal Sat				1900		1900		1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	0	0	0	1	0	1	0	2	0	0	2	0
LGConfig				L		R		TR		Def		
Lane Width				12.0		12.0		12.0		12.0	12.0	
RTOR Vol						0			160			
Adj Flow				171		418		985		324	758	
%InSharedLn												
Prop LTs								0.0	00	1.00	0 0.00	0
Prop RTs						1.000		.044		0	.000	
Peds Bikes	0			0			0					
Buses				0		0		0		0	0	
%InProtPhase										0.0		
Duration	0.25		Area	Type:	All	other a	areas					

\_\_\_\_OPERATING PARAMETERS\_\_\_\_\_

	Eas L	stbou T	nd R	We:	stbou T	nd R	No L	rthbo T	und R	So   L	uthboı T	und   R
Init Unmet				0.0		0.0		0.0		0.0	0.0	
Arriv. Type				3		3		3		3	3	i
Unit Ext.				3.0		3.0	İ	3.0		3.0	3.0	i i
I Factor				İ	1.00	0		1.00	0	İ	1.000	o j
Lost Time				2.0		2.0	ĺ	2.0		2.0	2.0	l l
Ext of g				2.0		2.0		2.0		2.0	2.0	1

Sec.

fLpb

fRpb

S Sec.

Ped Min g		I		l'		I
			PHASE DATA			
Phase Combin	nation 1	2 3	4	5	6 7	8
EB Left Thru Right Peds			NB     	Left Thru Right Peds	P P	
WB Left Thru Right Peds	P P		SB     	Left P Thru P Right Peds	P P	
NB Right			EB	Right		
SB Right			WB	Right P		
Green Yellow All Red	22.0 3.0 2.0		- <b>1</b> 3 - 0	15.0 3.0 0.0	40.0 3.0 2.0	a 3.) 16.1 9.
U				Сус	le Length:	90.0 secs
Volume Adjus				RATION FLOW		
N	Eastbound   L T 	l   Wes R   L	tbound T R	Northboun   L T 		hbound T R
Volume, V PHF Adj flow No. Lanes	0 0	154 0.90 171 0 1	376 0.90 418 0 1	0.90 0 942 4 0 2	.90 0.90 0 3 324 7 0 0	2 0
Lane group Adj flow Prop LTs Prop RTs		L  171 	R 418 1.000	TR 985 0.000 0.044	DefL  324 7  1.000   0.0	0.000
				etermine the		
LG	stbound	Westbo L	R	Northbound TR	DefL	hbound T
So Lanes 0 fW	0 0	1900 1 0 1.000	1900 1 0 1.000	1900 2 0 1.000	1900 0 1.000	1900 2 0 1.000
fHV fG fP		1.000 1.000 1.000	1.000 1.000 1.000	1.000 1.000 1.000	1.000 1.000 1.000	1.000 1.000
fBB fA fLU		1.000 1.00 1.00	1.000 1.00 1.00	1.000 1.00 0.95	1.000 1.00 1.00	
fRT fLT Sec		0.950	0.850	0.993 1.000	0.950	1.000

1.000 1.000 1.000 1.000 1615 1805 3586 CAPACITY AND LOS WORKSHEET

0.154

1805

293

1.000 1.000

1.000

1900

Capacity Appr/ Mvmt	Analysi Lane Group		Lane G Adj w Rate (v)	Ādj Flow	apacit Sat Rate s)	y Flow Ratio (v/s)	Gree Rati (g/0	o Cap	Lane Gr pacity (c)	-	
Eastbound											
Prot											
Perm											
Left											
Prot											
Perm											
Thru											
Right											
Westbound											
Prot											
Perm	_	-		1.0	<b>.</b> -					0 00	
Left	L	1	71	18	05	# 0.09	0.2	4 4	141	0.39	
Prot											
Perm											
Thru	_		1.0	_			-			0	
Right	R	4	18	16	15	0.26	0.4	/ /	754	0.55	
Northboun	.d										
Prot											
Perm											
Left											
Prot											
Perm											
Thru	TR	9	85	35	86	# 0.27	0.4	4	1594	0.62	
Right											
Southboun	d										
Prot		3	01	18	05	0.17	0.1		301	1.00	
Perm		2	3	29	3	0.08	0.4	78	140	0.16	
Left	DefL	3	24				0.6	54 4	141	0.73	
Prot											
Perm											
Thru	Т	7	58	19	00	# 0.40	0.6	54 .	1224	0.62	
Right											
·	t time flow ra	per cy te to d LOS Unf	cle, 1 capacit Determ: Prog	L = 15 ty rat inatio Lane	.00 se io, n Incre	xc Xc mental	= (Yc) Res	um (v/: (C)/(( Lane (	C-L) =	0.77 0.92 Appros	ach
Lane		Del	Adj	Grp		r Del	Del	Deler	. 100	Delaw	100
Grp v/c	g/C	d1	Fact	Cap	k	d2	d3	Dera	Y LOS	Delay	LOS
Eastbound	l						6				<u> </u>
Westbound	l										
ь 0.39	0.24	28.4	1.000	441	0.50	2.6	0.0	30.9	C		
										23.3	C
R 0.55	0.47	17.3	1.000	754	0.50	2.9	0.0	20.2	С		
Northboun	ıd										
TR 0.62	0.44	19.1	1.000	1594	0.50	1.8	0.0	21.0	С	21.0	С
Southboun	ıd										
DefL 0.73	0.64	14.1	1.000	441	0.50	10.4	0.0	24.5	С		

Г

Intersection delay = 19.3 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET\_\_\_\_\_ for exclusive lefts

Input		EB	WB	NB	SB
Cycle length, C	90.0	sec	n.D	112	55
Total actual green time for LT		500			58.0
Effective permitted green time	for LT lane group.	a(s)			43.0
Opposing effective green time,		5(~)			40.0
Number of lanes in LT lane gro					1
Number of lanes in opposing ap					2
Adjusted LT flow rate, VLT (ve					324
Proportion of LT in LT lane gr					1.000
Proportion of LT in opposing f					0.00
Adjusted opposing flow rate, V					985
Lost time for LT lane group, t					5.00
Computation	fight for the state for the fight				
LT volume per cycle, LTC=VLTC/	3600				8.10
Opposing lane util. factor, fL				1.00	0.95
Opposing flow, Volc=VoC/[3600(		C)		_	12.96
<pre>gf=G[exp(- a * (LTC ** b))]-t1</pre>		0)			0.0
Opposing platoon ratio, Rpo (r					1.00
Opposing Queue Ratio, qro=Max[					0.56
qq, (see Exhibit C16-4,5,6,7,8					20.23
gu=g-gq if $gq>=gf$ , or = $g-gf$ i					22.77
$g_{u-g-g-gq} = g_{q-g1}, o_1 = g_{g1} = n=Max(gq-gf)/2,0)$	1 34/31				10.11
PTHO=1-PLTO					1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.	24)]				1.00
EL1 (refer to Exhibit C16-3)					3.44
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or $fmin=2(1+P)$	1)/a				0.09
<pre>gdiff=max(gq-gf, 0)</pre>	-//5				0.00
$\int_{fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]}^{gull - mar(gq} g_{2}, 0)$	. (min=fmin:max=1.0	0)		g scheg	0.15
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1	-1)]+[qdiff/q]/[1+P	L(EL2-1)	],(fmin<=	=fm<=1.	00)
or flt=[fm+0.91(N-1)]/N**	_,],[]=,],[]===,]],[]=				
Left-turn adjustment, fLT					0.154
For special case of single-lan	e approach opposed	by multi	lane appr	coach,	
see text.					
* If Pl>=1 for shared left-tur	n lanes with N>1, t	hen assu	me de-fac	to	
left-turn lane and redo calc	ulations.				
[]** For permitted left-turns wi	th multiple exclusi	ve left-	turn lane	es, flt	=fm.
For special case of multilane	approach opposed by	' single-	lane appi	coach	
or when gf>gq, see text.	х. Х				
0					
SUPPLEME	NTAL PERMITTED LT W	ORKSHEET		Sec. 1	2.5 1.3 0
D	for shared lefts				
Input					
	82.4 x	EB	WB	NB	SB
Cycle length, C	90.0	sec			
Total actual green time for LT		13 MAN			
Effective permitted green time	for LT lane group,	g(s)			
Opposing effective green time,	go (s)				
Number of lanes in LT lane gro	up, N				
Number of lance in encoding an	nroach No				

Number of lanes in opposing approach, No

Adjusted LT flow rate, VLT (veh/h) Proportion of LT in LT lane group, PLT 0.000 0.000 Proportion of LT in opposing flow, PLTo Adjusted opposing flow rate, Vo (veh/h) Lost time for LT lane group, tL Computation LT volume per cycle, LTC=VLTC/3600 Opposing lane util. factor, fLUo 1.00 0.95 Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) qf=G[exp(-a \* (LTC \*\* b))]-tl, qf <= qOpposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] gq, (see Exhibit C16-4,5,6,7,8) qu=q-qq if qq>=qf, or = q-qf if qq<qf n=Max(qq-qf)/2,0)PTHo=1-PLTo PL\*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0) fmin=2(1+PL)/g or fmin=2(1+PL)/gqdiff=max(qq-qf,0) fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00) flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when qf>qq, see text. SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET Permitted Left Turns EB WB NB SB Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Pedestrian flow rate, Vpedg (p/h) OCCpedq Opposing queue clearing green, gg (s) Eff. ped. green consumed by opp. veh. queue, gq/gp OCCpedu Opposing flow rate, Vo (veh/h) OCCr Number of cross-street receiving lanes, Nrec Number of turning lanes, Nturn ApbT Proportion of left turns, PLT Proportion of left turns using protected phase, PLTA Left-turn adjustment, fLpb Permitted Right Turns Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Conflicting bicycle volume, Vbic (bicycles/h) Vpedg OCCpedq Effective green, g (s) Vbicq OCCbicg

Number of ApbT Proports Proports	of turnin ion right	ng lanes t-turns, t-turns w	, Nturn PRT using pr	g lanes, otected		RTA			
( ). 		SU	PPLEMENT	AL UNIFO	RM DELAY	WORKSHE	ET		
Adj. LT v/c rat: Protecte Opposing Unoppose Red time Arrival Protecte Permitte XPerm XProt Case Queue at Residua	io from o ed phase g queue o ed green e r=(C-g rate, qu ed ph. do ed ph. do t beginn	Capacity effective interva -gq-gu) a=v/(360 eparture eparture ing of gr ing of un Qr	Workshe ve green e green l, gu 0 (max[X, rate, S rate, S rate, S	interva interval 1.0])) p=s/3600 s=s(gq+g	l, g (s) , gq u)/(gu*3	sec	BLT WBL	T NBLT	SBLT 324 0.73 15.0 20.23 22.77 32.0 0.09 0.501 0.15 1.11 0.56 3 3.25 1.82 0.37 14.1
Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand		SHEET WI Delay Adj. dl sec	Initial Queue	Final Unmet	1	Group Delay	
Eastbou	nd							2	-
Westbour	nd								
7									
5									
Northbo	una								
Southbo	und								
								-	
	Intersec		BACK	OF QUEU	E WORKSH			В	
		Eastboun	d	Westboun	d N	orthbour	nd S	Southbour	ıd

				10				
LaneGroup				L	R	TR	DefL	
Init Queue	1			0.0	0.0	0.0	0.0	0.0
Flow Rate	1			171	418	518	324	758
So	Ì			1900	1900	1900	1900	1900
No.Lanes	0	0	0	1 0	1 0	2 0	0	2 0
SL	İ			1805	1615	1887	684	1900
LnCapacity	i			441	754	838	441	1224
Flow Ratio	i			0.09	0.26	0.27	0.47	0.40
v/c Ratio	i			0.39	0.55	0.62	0.73	0.62
Grn Ratio	i –			0.24	0.47	0.44	0.64	0.64
I Factor	i			1.00		1.000		1.000
AT or PVG	ł			3	3	3	1	3
Pltn Ratio	ł			1.00	1.00	1.00	1.00	
PF2	ł			1.00	1.00	1.00	1.00	200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200
Q1	ł			3.6	7.5	9.9		11.2
kB	1			0.6	0.9	1.0		1.3
Q2	1			0.4	1.1	1.6	Contract of the second	2.1
Q Average	1			4.0	8.7	11.5		13.3
Q Spacing	{			25.0	25.0	25.0	25.0	
Q Storage				125.0	0	0		0
-					0	0		
Q S Ratio		0	-	1			1	Į.
70th Percen	LITE	Outpu	:	11.2	1.2	1.2	11.2	1.2
fB%	{			4.9				16.0
BOQ	1			4.9	10.5	13.9	0.0	10.0
QSRatio		0		1	1			
85th Percen	tile	Outpu			I	1 4		<b>7</b> 4 1
fB%				1.5	1.5	1.4		1.4
BOQ	!			6.1	12.6	16.4	7.4	18.9
QSRatio	1				1		1	1
90th Percen	tile	Outpu	t:	1	1			1
fB%	!			1.7	1.6	1.6		1.5
BOQ	ļ			6.9	13.7	17.8	8.3	20.4
QSRatio	1			1	1			
95th Percen	tile	Outpu	it:	<ul> <li>2000 - 200</li> </ul>				
fB%				2.1	1.8	1.7		1.7
BOQ				8.1	15.4	19.5	9.7	22.2
QSRatio	1							
98th Percen	tile	Outpu	it:		(*)			
fB%				2.4	2.0	1.9		1.8
BOQ	1			9.4	17.0	21.3	11.1	24.0
QSRatio	1						1	

ERROR MESSAGES

No errors to report.

R 0 B

ENGINEERING ARCHITECTURE ENVIRONMENTAL ONE SYSTEMS DRIVE APPLETON, WI 54914-1654 920-735-6900 1-800-571-6677 FAX 920-830-6100



IOB NUMBER	SHEET NO.	
CLIENT		
PROJECT		
MADE BY MAT	DATE	
CHECKED BY	DATE	



TWO-WAY STOP CONTROL SUMMARY

<u>}</u>	TWC								
Analyst:	МАН								
Agency/Co.:	OMNI								
Date Performed:		5/2004							
		5/2004							
Analysis Time P									
Intersection:	STH	47 & CTI	H A						
Jurisdiction:									
Units: U. S. Cu	stomary								
Analysis Year:	2020	0							
Project ID: ST	H 47 & CTH	A Inter	section	, no	inter	chang	Je		
East/West Stree	t: CTH	A							
North/South Str	eet: STH	47							
Intersection Or		NS		:	Study	perio	d (hrs)	: 0.25	
					-	3.40.0			
	Veh:	icle Vol	umes an	d Adjı	ustmer	nts		* MOLENN hug	-162 - 5
Major Street:	Approach		rthboun			Sc	uthboun	d	70.075
5	Movement	1	2	3	1	4	5	6	
	rio v cilicite	L	T	R	i	L	Т	R	
		Ц	1		1	-	Ē.,		
Volume		18	567				503		
Peak-Hour Facto	r DUF	1.00	1.00				1.00		
		18	567				503		
Hourly Flow Rat							503		
Percent Heavy V		8				,			
Median Type/Sto		Undiv	ıded		/				
RT Channelized?									
Lanes		0	1				1		
Configuration		$\mathbf{L}$	т				Т		
Upstream Signal	?		No				No		
6					1.6				
Minor Street:	Approach	We	stbound				astbound		
	Movement	7	8	9		10	11	12	
		$\mathbf{L}$	Т	R		L	т	R	
Volume						451		5	
Peak Hour Facto	or, PHF					1.00		1.00	
Hourly Flow Rat						451		5	
Percent Heavy W						8		8	
Percent Grade (			0				0		
Flared Approach		/Storage	-		1			No	1
Lanes	. BAIDCON	, cooluge			,	0		0	a kanad
Configuration						v	LR	-	
							шк		
contrigutation									
	Delay		ngth a	nd Le	vel of	Ser	rice		
		Queue Le				E Serv	vice	bound	
Approach	NB	SB		tboun	d	E Serv	East	bound	2
Approach Movement	NB 1					E Serv	vice East 10	11 1	2
Approach Movement	NB	SB		tboun	d	E Serv	East		2
Approach Movement Lane Config	NB 1 LT	SB		tboun	d	E Serv	East	11 1 LR	2
Approach Movement Lane Config v (vph)	NB 1 LT 18	SB		tboun	d	Serv	East	11 1 LR 456	2
Approach Movement Lane Config v (vph) C(m) (vph)	NB 1 LT 18 1031	SB		tboun	d	5 Serv	East	11 1 LR 456 224	2
Approach Movement Lane Config v (vph) C(m) (vph) v/c	NB 1 LT 18 1031 0.02	SB		tboun	d	5 Serv	East	11 1 LR 456 224 2.04	2
Approach Movement Lane Config v (vph) C(m) (vph)	NB 1 LT 18 1031 0.02	SB		tboun	d	E Serv   	East	11 1 LR 456 224 2.04 34.03	2
Approach Movement Lane Config v (vph) C(m) (vph) v/c	NB 1 LT 18 1031 0.02	SB		tboun	d	E Serv   	East	11 1 LR 456 224 2.04	2
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue lengt	NB 1 LT 18 1031 0.02 :h 0.05	SB		tboun	d	E Serv   	East	11 1 LR 456 224 2.04 34.03	2
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue lengt Control Delay LOS	NB 1 LT 18 1031 0.02 ch 0.05 8.6	SB		tboun	d	E Serv   	East	11 1 LR 456 224 2.04 34.03 516.8	2
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue lengt Control Delay	NB 1 LT 18 1031 0.02 ch 0.05 8.6	SB		tboun	d	E Serv   	East	11 1 LR 456 224 2.04 34.03 516.8 F	2

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS\_\_\_\_\_

Analyst:	MAH	
Agency/Co.:	OMNNI	
Date Performed:	6/25/2004	
Analysis Time Period:		
Intersection:	STH 47 & CTH A	
Jurisdiction:		
Units: U. S. Customar	У	
Analysis Year:	2020	
Project ID: STH 47 &	CTH A Intersection, no interchange	
East/West Street:	CTH A	
North/South Street:		
Intersection Orientat	ion: NS Study period (hrs): 0.25	
	Vehicle Volumes and Adjustments	

	Vehicle	Volumes	and	Adjustment	.s			
Major Street Movements	1	2	3	4	5	6		
	L	т	R	L	т	R		
Volume	18	567			503			
Peak-Hour Factor, PHF	1.00	1.00			1.00			
Peak-15 Minute Volume	4	142			126			
Hourly Flow Rate, HFR	18	567			503			
Percent Heavy Vehicles	8							
Median Type/Storage	Und	ivided		/				
RT Channelized?		-			1			
Lanes	0	1			1 T			
Configuration	1	LT						
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12		
	$\mathbf{L}$	Т	R	L	Т	R		
Volume				451		5		
Peak Hour Factor, PHF				1.00		1.00		
Peak-15 Minute Volume				113		1		
Hourly Flow Rate, HFR				451		5		
Percent Heavy Vehicles				8		8		
Percent Grade (%)		0			0			
Flared Approach: Exist	s?/Storag	qe		/		No	/	
RT Channelized?		-						
Lanes				0		0		
Configuration					LR			
	edestria 13	n Volume: 14		d Adjustmer 15 16	nts			
Movements	13	14	-	10 10				

Flow (ped/hr)	0	0	0	0	

Lane Width (ft)	12.0	12.0 4.0	12.0 4.0	12.0 4.0	
Walking Speed (ft/sec) Percent Blockage	4.0 0	0	4.0 0	0	

		Up	stream Sig	nal Dat	a	
Π	Prog. Flow vph	Sat Flow vph	Arrival Type			Distance to Signal feet

S2 Left-Turn Through S5 Left-Turn

Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

Movement 2	Movement 5
567	
0	
1700	
1700	
1	
	567 0 1700

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Movement	-	1	4	7	8	9	10	11	12	
		L	L	L	Т	R	L	Т	R	
t(c,base	)	4.1			127		7.1		6.2	i e-i
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)		8					8		8	
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Grade/10	0			0.00	0.00	0.00	0.00	0.00	0.00	
t(3, lt)		0.00					0.70		0.00	
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7	2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage						6.5		6.3	
]-(-)	2-stage									

Follow-Up T:	ime Calculat	cions							
Movement	1	4	7	8	9	10	11	12	
0	L	L	L	Т	R	L	Т	R	
t(f,base)	2.20		4			3.50		3.30	
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
P(HV)	8					8		8	
t(f)	2.3					3.6		3.4	

Worksheet 5-Effect of Upstream Signals

	Computation	1-Queue	Clearance	Time	at	Upstream	Signal			
						Mov	vement 2	Mov	ement 5	
U						V(t)	V(l,prot)	V(t)	V(l,prot)	

Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g(q2) g(q)									
Computation 2-Proport:	ion of 7	WSC Int		Movem	ent 2		Iovement V(1,	5 prot)	
alpha									
beta									
Travel time, t(a) (see	2)								
Smoothing Factor, F	ting fl	w f							
Proportion of conflict Max platooned flow, V		JW, L							
Min platooned flow, V									
Duration of blocked pe	eriod, t	c(p)							
Proportion time block	ed, p			0.0	00		0.000		
Computation 3-Platoon	Event I	Periods	Re	sult					
p(2)			0.	000					
p(5)			Ο.	000					
p(dom)									
p(subo) Constrained or unconst	trained	0							
constrained of unconst	LIAINEU								
Proportion	_								
unblocked	( ]			(2)		(3)			
for minor		e-stage	~	Two-Stage Process					
movements, p(x)	Proc	cess	St	Stage I Stage II					
p(1)									
p(4)									
p(7)									
p(8)									
(9) (9)									
p(10)									
p(11) p(12)									
P(12)									
Computation 4 and 5									
Single-Stage Process	-		-	0	0	1.0	1 1	10	
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	
	Ц	Ц		-			-	••	
V c,x	503					1106		503	
S									
Px									
V c,u,x									
Cr,x									
C plat,x									
Two-Stage Process	7		0		10			r.	
	7		8		10		11	L	

5 5 5 5			
V(c,x)	1500	11	
3	1500		
P(x)			
/(c,u,x)			
C(r,x)			
C(plat,x)			
Norksheet 6-Impedance and Capacity Equation	ıs		
Step 1: RT from Minor St.	9	12	_
Conflicting Flows		503	
Potential Capacity		557	
Pedestrian Impedance Factor	1.00	1.00	
Novement Capacity		557	
Probability of Queue free St.	1.00	0.99	
Step 2: LT from Major St.	4	1	
Conflicting Flows		503	-
Potential Capacity		1031	
Pedestrian Impedance Factor	1.00	1.00	
Novement Capacity		1031	
Probability of Queue free St.	1.00	0.98	
Maj L-Shared Prob Q free St.		0.97	
Step 3: TH from Minor St.	8	11	1
C. C. L. L. L. D. L. L.			
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.97	0.97	
Movement Capacity	0.57	0.57	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows		1106	
Potential Capacity		227	
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor	0.97		
Maj. L, Min T Adj. Imp Factor.	0.98		
Cap. Adj. factor due to Impeding mvmnt	0.97	0.98	
Novement Capacity		223	
Norksheet 7-Computation of the Effect of Tw	vo-stage Gap Acce	eptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Probability of Queue free St.			
ionaniity of guene free be.			

Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmr Movement Capacity	nt					
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmm Movement Capacity	ıt	20	00 97		1.00 0.97	
Result for 2 stage process: a Y C t						
Probability of Queue free St.		1.	00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm Movement Capacity	nt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmm Movement Capacity	nt					
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmm Movement Capacity	nt	0. 0.	00 97 98 97		1106 227 1.00 0.98 223	
Results for Two-stage process: a Y C t			-	-	223	
Worksheet 8-Shared Lane Calculations						
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)				451 223	224	5 557

Worksheet	9-Computation	of	Effect	of	Flared	Minor	Street	Approaches
-----------	---------------	----	--------	----	--------	-------	--------	------------

Movement	7	8	9	10	11	12
	L	Т	R	L	т	R
C sep				223		557
Volume				451		5
Delay						
Q sep						
Q  sep  +1						
round (Qsep +1)						
n max						
C sh					224	
SUM C sep						
n						
C act						
Worksheet 10-Delay, Queue Len	oth and Leve	l of Se	rvice			
WOIKSHEEC IV-Delay, Queue Len	igen, and heve	.I UI DC	T A TCC			

Movement	1	4	7	8	9	10	11	12
Lane Config	$\mathbf{LT}$						LR	
v (vph)	18						456	
C(m) (vph)	1031						224	
v/c	0.02						2.04	
95% queue length	0.05						34.03	
Control Delay	8.6						516.8	
LOS	A						F	
Approach Delay							516.8	
Approach LOS							F	

Worksheet 11-Shared Major LT Impedance and Delay

-	Movement 2	Movement 5
p(oj)	0.98	1.00
v(il), Volume for stream 2 or 5	567	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P* (oj)	0.97	
d(M,LT), Delay for stream 1 or 4	8.6	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	0.2	

APPENDIX F

1

1

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ENGINEERING ARCHITECTURE ENVIRONMENTAL ONE SYSTEMS DRIVE APPLETON, WI 54914-1654 920-735-6900 1-800-571-6677 FAX 920-830-6100



JOB NUMBER	SHEET NO.	1 and 1
CLIENT		
PROJECT		
MADE BY	DATE	
CHECKED BY	DATE	

Britial Tuterchange USH41- CTH00/STH 15 to CTH A Assume Hay M. line prow M. Detween Busting 2000 count and 2020 projection by portal option Capacity : 46,000 4 Danes - 66,000 - 55400 -74400 - 55400 x= 2011 x- 2000 2020-2000 2020 Projections K30= 11.1 T(D+11)=10-5 74,400 ADT D= 5= 45 Peak hr one sire fins - 11 - 4542 uph CYH A to STH 47 USH 411-2020 Projeden 6400AD Peak he and direction 6/400 x.55 x.11= 3748 uph Ramp untions 5TH 47 NB - 14 4200 ADT 4664,015 30700 ×.111= 3407 20700ADT

ENGINEERING ARCHITECTURE	ONE SYSTEMS DRIVE APPLETON, WI 54914-1654	MANT	JOB NUMBER CLIENT	SHEET NO.
ENVIRONMENTAL	920-735-6900 1-800-571-6677 FAX 920-830-6100	WWW.omnni.com	PROJECT MADE BY CHECKED BY	DATE DATE
	ASRON	temp		
	6500 ADT 30700 SB USH	4/ 30700		uph 18 uph
C+4				
	6500 ADT 37200 NBUS	4 4 1 3 7 2 0		1/29
····· · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		xx         xx<	

2	Operational Ana	1	
Analyst:	MAH		
Agency or Company:	OMNNI		
Date Performed:	6/28/04		
Analysis Time Period:	0,20,01		
Freeway/Direction:	southbound		
From/To:	CTH A to STH 15		
Jurisdiction:			
Analysis Year:	2020		
Description: Partial		S	
	Flow Inputs and	Adjustments	
Volume, V		4542	veh/h
Peak-hour factor, PHF		0.90	ven, n
Peak 15-min volume, v1	5	1262	v
Trucks and buses		1202	00
Recreational vehicles		0	0 0
Terrain type:		Level	0
Grade		0.00	00
Segment length		0.00	mi
Trucks and buses PCE, 1	рт	1.5	
Recreational vehicle P		1.2	
		0 952	
Heavy vehicle adjustment		0.952	
Driver population facto		0.952 1.00 2650	pc/h/ln
		1.00 2650	pc/h/ln
Driver population facto Flow rate, vp	or, fp	1.00 2650 d Adjustments	
Driver population facto Flow rate, vp Lane width	or, fp Speed Inputs an	1.00 2650 d Adjustments 12.0	ft
Driver population factor Flow rate, vp Lane width Right-shoulder lateral	or, fp Speed Inputs an	1.00 2650 d Adjustments 12.0 6.0	ft ft
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density	or, fp Speed Inputs an	1.00 2650 d Adjustments 12.0 6.0 0.50	ft
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N	or, fp Speed Inputs an	1.00 2650 d Adjustments 12.0 6.0 0.50 2	ft ft
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed:	or, fp Speed Inputs an	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base	ft ft interchange/mi
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS	or, fp Speed Inputs an clearance	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0	ft ft interchange/mi mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment,	or, fp Speed Inputs an clearance fLW	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0	ft ft interchange/mi mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust	or, fp Speed Inputs an clearance fLW stment, fLC	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0	ft ft interchange/mi mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0	ft ft interchange/mi mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adjust	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adjust	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density adjust	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad Number of lanes adjust Free-flow speed, FFS	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID ment, fN	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway ance Measures	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density add Number of lanes adjust Free-flow speed, FFS Flow rate, vp	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID ment, fN	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway ance Measures 2650	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h pc/h/ln
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad Number of lanes adjust Free-flow speed, FFS Flow rate, vp Free-flow speed, FFS	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID ment, fN LOS and Perform	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway ance Measures	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h pc/h/ln mi/h
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad Number of lanes adjust Free-flow speed, FFS Average passenger-car	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID ment, fN LOS and Perform	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway ance Measures 2650 60.5	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h pc/h/ln
Driver population factor Flow rate, vp Lane width Right-shoulder lateral Interchange density Number of lanes, N Free-flow speed: FFS or BFFS Lane width adjustment, Lateral clearance adjust Interchange density ad Number of lanes adjust Free-flow speed, FFS Flow rate, vp Free-flow speed, FFS	or, fp Speed Inputs an clearance fLW stment, fLC justment, fID ment, fN LOS and Perform	1.00 2650 d Adjustments 12.0 6.0 0.50 2 Base 65.0 0.0 0.0 0.0 4.5 60.5 Urban Freeway ance Measures 2650	ft ft interchange/mi mi/h mi/h mi/h mi/h mi/h mi/h pc/h/ln mi/h

Overall results are not computed when free-flow speed is less than 55 mph.

Fax: Phone: E-mail: Operational Analysis\_\_\_\_\_ Analyst: MAH Agency or Company: OMNNI Date Performed: 6/28/04 Analysis Time Period: Freeway/Direction: southbound CTH A to STH 15 From/To: Jurisdiction: Analysis Year: 2020 Description: Partial Interchange 6 lanes Flow Inputs and Adjustments 4542 veh/h Volume, V Peak-hour factor, PHF 0.90 Peak 15-min volume, v15 v 1262 00 Trucks and buses 10 Recreational vehicles 0 % Level Terrain type: 0.00 % Grade 0.00 Segment length mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.952 Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 1766 Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 3 Free-flow speed: Base FFS or BFFS 65.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h 0.0 Interchange density adjustment, fID mi/h Number of lanes adjustment, fN 3.0 mi/h 62.0 Free-flow speed, FFS mi/h Urban Freeway \_\_\_\_\_LOS and Performance Measures pc/h/ln Flow rate, vp 1766 Free-flow speed, FFS 62.0 mi/h Average passenger-car speed, S 61.6 mi/h

3

28.7

pc/mi/ln

Number of lanes, N

Density, D

Overall results are not computed when free-flow speed is less than 55 mph.

Fax:

Operational Analysis\_\_\_\_\_ MAH Analyst: Agency or Company: OMNNI 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: southbound From/To: CTH A to STH 47 Jurisdiction: Analysis Year: 2020 Description: Partial Interchange 4 lanes \_\_\_\_\_Flow Inputs and Adjustments 3748 veh/h Volume, V 0.90 Peak-hour factor, PHF 1041 v Peak 15-min volume, v15 Trucks and buses 10 % Recreational vehicles 0 00 Level Terrain type: 0.00 % Grade Segment length 0.00 mi 1.5 Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.952 Driver population factor, fp 1.00 2186 pc/h/ln Flow rate, vp Speed Inputs and Adjustments Lane width 12.0 ft ft Right-shoulder lateral clearance 6.0 0.50 interchange/mi Interchange density Number of lanes, N 2 Free-flow speed: Base FFS or BFFS 65.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h mi/h Number of lanes adjustment, fN 4.5 60.5 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures\_\_\_\_ pc/h/ln 2186 Flow rate, vp Free-flow speed, FFS 60.5 mi/h Average passenger-car speed, S 54.7 mi/h Number of lanes, N 2 pc/mi/ln 40.0 Density, D

Overall results are not computed when free-flow speed is less than 55 mph.

Onemation-1 31	wała	
Operational Anal	ysis	
Analyst: MAH		
Agency or Company: OMNNI		
Date Performed: 6/28/04		
Analysis Time Period:		
Freeway/Direction: southbound		
From/To: CTH A to STH 47		
Jurisdiction:		
Analysis Year: 2020		
Description: Partial Interchange 6 lanes		
Flow Inputs and	Adjustments	
Volume, V	3748	veh/h
Peak-hour factor, PHF	0.90	,
Peak 15-min volume, v15	1041	v
Trucks and buses	1041	00
Recreational vehicles	0	o 00
Terrain type:	Level	70
Grade	0.00	00
Segment length	0.00	mi
Irucks and buses PCE, ET	1.5	шт
Recreational vehicle PCE, ER	1.2	
	0.952	
Heavy vehicle adjustment, fHV		
Driver population factor, fp	1.00	
Flow rate, vp	1458	pc/h/ln
Speed Inputs and	Adjustments	а. 
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	,
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	62.0	mi/h
receilew speed, res	Urban Freeway	m1/11
	orban Freeway	
LOS and Performa	nce Measures	
Flow rate, vp	1458	pc/h/ln
Free-flow speed, FFS	62.0	mi/h
Average passenger-car speed, S	62.0	mi/h
	3	
Number of lanes. N		
		pc/mi/ln
	23.5	pc/mi/ln
Number of lanes, N Density, D		pc/mi/ln

Overall results are not computed when free-flow speed is less than 55 mph.

E-mail:							
	Merg	je Analys	is			: 	
Analyst:	MAH						
Agency/Co.:							
Date performed:	6/29/2004						
Analysis time period:							
Freeway/Dir of Travel:	USH41 Southbo	ound					
Junction:	STH 47 on ram	np					
Jurisdiction:							
Analysis Year:	2020		-				
Description: STH47 sou	ichdound on rai	ip Partia	Т				
and anti-sec	Fre	eeway Dat	a		<u> </u>		<u> </u>
Type of analysis		M	erge				
Number of lanes in free	eway						
Free-flow speed on free	eway		5.0		mph		
Volume on freeway		2	942		vph		
	On	Ramp Dat	a				
		3	ight			6175 - 17 - 27 6	187 T.L.
Side of freeway Number of lanes in ramp		1					
Free-flow speed on ram			0.0		mph		
Volume on ramp			66		vph		
Length of first accel/o	lecel lane		50		ft		
Length of second accel,					ft		
-	Adjacent Ram	np Data (	if or	e exist	s)		
Does adjacent ramp exis	st?	N	ю				
Volume on adjacent Ram					vph		
Position of adjacent Ra					-		
Type of adjacent Ramp	-						
Distance to adjacent Ra	amp				ft		
Cor	nversion to pc/	h Under	Base	Conditi	ons		
Junction Components		Freewa	v	Ramp		Adjacent	
builderon componences		110000	.1	rump		Ramp	
Volume, V (vph)		2942		466		<b>L</b>	vph
Peak-hour factor, PHF		0.90		0.90			-
Peak 15-min volume, v1	5	817		129			v
Trucks and buses		10		10			00
Recreational vehicles		0		0			olo
Terrain type:		Level		Level	in the set		_
Grade			00		00		%
Length			mi		mi	1	mi
Trucks and buses PCE, I		1.5		1.5			
Recreational vehicle Po	CE, ER	1.2		1.2			

eavy vehicle adjus Driver population f Flow rate, vp		1.00 1	.952 .00 44	pcph
	Estimation c	of V12 Merge Are	as	
	EQ	uation 25-2 or	25-3)	
I	P = 1.000 Usi FM	ng Equation 0		
7	v = v (P) = 34 12 F FM	32 pc/h		
	Capaci	ty Checks		
		Maximum 4700	LOS F?	
V FO	3976	4700	No	
v R12	3976	4600	No	
Le	evel of Service Det	ermination (if	not F)	
R	+ 0.00734 v + 0.0 R or ramp-freeway jun	12	A	pc/mi/ln
	Speed Es	timation		
Intermediate speed	variable,	M = 0. S		
Space mean speed in	n ramp influence ar	ea, S = 54 R	.6 mph	
Space mean speed in	n outer lanes,	S = N 0	/A mph	
Space mean speed fo	or all vehicles,	S = 54	.6 mph	

Phone: E-mail:			I	Fax:				
d-mail.								
	<u> </u>	Merge	Analy	ysis	24	1		
Analyst:	MAH							
Agency/Co.:	МАП							
Date performed: Analysis time period:	6/29/2004							
Freeway/Dir of Travel:	USH41 Sout	hbou	nd					
Junction:	STH 47 on	ramp						
Jurisdiction:	2020							
Analysis Year: Description: STH47 sou	2020 thbound on	ramp	Part	ial				
	ono o una on	T or mp	1 41 01					
		Free	way Da	ata	4 <u>5</u> 24	0.00		
Type of analysis				Merge				
Number of lanes in free	way			3				
Free-flow speed on free	way			65.0		mph		
Volume on freeway				2942		vph		
7		0 D	D					
		_On R	amp Da	ata		- (j)		
Side of freeway				Right				
Number of lanes in ramp				1				
Free-flow speed on ramp				50.0		mph		
Volume on ramp				466		vph		
Length of first accel/d				750		ft		
Length of second accel/	decel lane					ft		
	Adjacent	Ramp	Data	(if o	ne exists	s)		
Does adjacent ramp exis	t?			No				
Volume on adjacent Ramp						vph		
Position of adjacent Ra						_		
Type of adjacent Ramp								
Distance to adjacent Ra	mp					ft		-
Con	version to	pc/h	Under	Base	Conditio	ons		
Junction Components			Freev	vay	Ramp		Adjacent	
				-	1		Ramp	
Volume, V (vph)			2942		466			vph
Peak-hour factor, PHF			0.90		0.90			20222-4
Peak 15-min volume, v15			817		129			V
Trucks and buses			10		10			00 00
Recreational vehicles Terrain type:			0 Level		0 Level			6
Grade			пелет		Dever	olo		00
Length				mi		mi		mi
Trucks and buses PCE, E	Т		1.5		1.5		3	
Recreational vehicle PC			1.2		1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.952 1.00 3432	0.952 1.00 544		pcph
	Estimation o:	f V12 Merge A	Areas		
L = EQ	(Equ	uation 25-2 (	or 25-3	)	
	0.599 Usi	ng Equation	1		
v = v	F (P) = 209 F FM	54 pc/h			
	Capaci	ty Checks			
	Actual	Maximum		LOS F?	2
v FO	3976	7050		No	
v R12	2598	4600		No	
Level c	of Service Dete	ermination (:	if not 1	F)	
Density, D = 5.475 + 0.0 R Level of service for ram	R	12	7	A .	pc/mi/ln
	Speed Est				
Intermediate speed varia	ble,	M = S	0.298		
Space mean speed in ramp	influence are	ea, S = R	58.1	mph	
Space mean speed in oute	r lanes,		61.8	mph	
Space mean speed for all	vehicles,		59.4	mph	

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To Berger Andread Andread Andread Charles Charles Charles							
	Dive	rge Anal	ysis_		77		3
Applycet.	MATI						
Analyst:	MAH						
Agency/Co.: Date performed:	6/15/2004						
Analysis time period:	6/15/2004						
Freeway/Dir of Travel:	USH 41 NB						
Junction:	NB off-ramp a	t STH 47					
Jurisdiction:	nd oll lamp a	0 0111 17					
Analysis Year:	2020						
Description: STH 47 NB		0 4 lane	P				
	Fre	eway Dat	а				
	110	eway bac	.u				
Type of analysis		D	iverg	e			
Number of lanes in free	way	2					
Free-flow speed on free		6	5.0		mph		
Volume on freeway		3	407		vph		
	Off	Ramp Dat	a		e egine.		
		1967 J. HAR	to sa	heady's		and the French State of the second	
Side of freeway			light				
Number of lanes in ramp					a di Quina.		
Eree Elevi aneed on ramp		5	0.0		mph		
Free-Flow speed on ramp			~ ~		1		
Volume on ramp		4	66		vph		
Volume on ramp Length of first accel/d	ecel lane	4	66 12		ft		
Volume on ramp	ecel lane	4					
Volume on ramp Length of first accel/d	ecel lane	4 2	12	e exist	ft ft		
Volume on ramp Length of first accel/d Length of second accel/	ecel lane decel lane Adjacent Ram	4 2 p Data (	if on	e exist	ft ft		o po dese o por taño ôna taño
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis	ecel lane decel lane Adjacent Ram t?	4 2 p Data (	12	e exist	ft ft s)	10 /0 /0	с IX - Кыз осруг алд <u>Осна - (88</u>
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp	ecel lane decel lane Adjacent Ram t?	4 2 p Data (	if on	e exist	ft ft	10 /0 /0	
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra	ecel lane decel lane Adjacent Ram t?	4 2 p Data (	if on	e exist	ft ft s)	10 /0 /0	
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis	ecel lane decel lane Adjacent Ram t? mp	4 2 p Data (	if on	e exist	ft ft s)	10 /0 /0	с р. 1846 0175 <sup>°</sup> 200 <u>014</u> а <u>189</u>
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra	ecel lane decel lane Adjacent Ram t? mp mp	4 2 p Data ( N	if on Io		ft ft s) vph ft	10 /0 /0	с (р. жыз 995° ай <u>бол (189</u>
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra	ecel lane decel lane Adjacent Ram t? mp	4 2 p Data ( N	if on Io		ft ft s) vph ft	10 /0 /0	
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra	ecel lane decel lane Adjacent Ram t? mp mp	4 2 p Data ( N	if on To Base		ft ft s) vph ft	Adjacen	t
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components	ecel lane decel lane Adjacent Ram t? mp mp	4 2 p Data ( N h Under Freewa	if on To Base	Conditi Ramp	ft ft s) vph ft		
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph)	ecel lane decel lane Adjacent Ram t? mp mp	4 2 p Data ( N h Under Freewa 3407	if on To Base	Conditi Ramp 466	ft ft s) vph ft	Adjacen	t vph
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90	if on To Base	Conditio Ramp 466 0.90	ft ft s) vph ft	Adjacen	vph
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946	if on To Base	Conditi Ramp 466 0.90 129	ft ft s) vph ft	Adjacen	vph v
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10	if on To Base	Conditi Ramp 466 0.90 129 10	ft ft s) vph ft	Adjacen	vph v %
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10 0	if on To Base	Conditi Ramp 466 0.90 129 10 0	ft ft s) vph ft	Adjacen	vph v
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10 0 Level	if on To Base	Conditi Ramp 466 0.90 129 10 0 Level	ft ft s) vph ft ons	Adjacen	vph v % %
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10 0 Level 0.00	12 if on No Base Y	Condition Ramp 466 0.90 129 10 0 Level 0.00	ft ft s) ft ons %	Adjacen	vph v %
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10 0 Level 0.00 0.00	if on To Base	Conditio Ramp 466 0.90 129 10 0 Level 0.00 0.00	ft ft s) vph ft ons	Adjacen	vph v % %
Volume on ramp Length of first accel/d Length of second accel/ Does adjacent ramp exis Volume on adjacent ramp Position of adjacent ra Type of adjacent ramp Distance to adjacent ra Con Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade	ecel lane decel lane Adjacent Ram t? mp mp version to pc/	4 2 p Data ( N h Under Freewa 3407 0.90 946 10 0 Level 0.00	12 if on No Base Y	Condition Ramp 466 0.90 129 10 0 Level 0.00	ft ft s) ft ons %	Adjacen	vph v %

Heavy vehicle adjustmen Driver population facto Flow rate, vp		1.00	0.952 1.00 544	pcph
	Estimation of	f V12 Diverge A	Areas	
L = EQ	(Equ	uation 25-8 or	25-9)	
	1.000 Usin	ng Equation 0		
v = 12	v + (v - v) 1 R F R	Reported and the second s	c/h	
	Capacit	ty Checks		
v = v Fi F	Actual 3975	Maximum 4700	LOS F? No	
v 12	3975	4400	No	
v = v - v FO F R	3431	4700	No	
V R	544	2100	No	
Level	of Service Dete	ermination (if	not F)	
Density,	D = 4.252 + 0.0	0086 v - 0.009 12	9 L = 36.5	pc/mi/ln
Level of service for ra	.mp-freeway junc			
	Speed Est	timation	5 	
Intermediate speed vari	able,	D = 0. S	. 282	
Space mean speed in ram	p influence are		3.5 mph	
Space mean speed in out	er lanes,	S = N	N/A mph	
Space mean speed for al	l vehicles,	S = 58	3.5 mph	

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Π							
Phone: [E-mail:		Fax	۲:				
E-mail:							
	Diver	ge Analy	ysis_				
Analyst:	МАН						
Agency/Co.:	PIATI						
Date performed:	6/15/2004						
Analysis time period:							
Freeway/Dir of Travel:	USH 41 NB						
Junction:	NB off-ramp at	STH 47					
Jurisdiction: Analysis Year:	2020						
Description: STH 47 NB		6 lane	Ρ				
	Free	way Data	a				
Type of analysis		Di	iverg	е			
Number of lanes in free	way	3					
Free-flow speed on free	way		5.0		mph		
Volume on freeway		34	107		vph		
	Off R	amp Data	a				
		D	abt				
Side of freeway Number of lanes in ramp		1	ight				
Free-Flow speed on ramp			0.0		mph		
Volume on ramp			56		vph		
Length of first accel/d		21	12		ft		
Length of second accel/	decel lane				ft		
	Adjacent Ramp	Data (i	if on	e exists	s)	l baar	2 2 - 1176-978
Does adjacent ramp exis	+ 2	Nc	2				
Volume on adjacent ramp		INC	<i>.</i>		vph		
Position of adjacent ra	mp				- F		
Type of adjacent ramp							
Distance to adjacent rai	mp				ft		
Con:	version to pc/h	Under H	Base	Conditio	ons		
Junction Components		Freeway	7	Ramp		Adjacent Ramp	
Volume, V (vph)		3407		466		Ramp	vph
Peak-hour factor, PHF		0.90		0.90			
Peak 15-min volume, v15		946		129			v
Trucks and buses		10		10			00
Recreational vehicles		0		0			00
Terrain type: Grade		Level 0.00	010	Level 0.00	olo	00	
Length		0.00	~ mi	0.00	~ mi		ii
Trucks and buses PCE, E	Т	1.5		1.5			
Recreational vehicle PC		1.2		1.2			

Heavy vehicle adjustmen Driver population facto Flow rate, vp		0.952 1.00 3975	0.952 1.00 544	pcph
	Estimation of	of V12 Diverge	Areas	
L =	(E0	quation 25-8 c	or 25-9)	
EQ P = FD	0.636 Us:	ing Equation	5	
	v + (v - v) R F R		pc/h	
-	Capac:	ity Checks		
V = V	Actual 3975	Maximum 7050	LOS F? No	
Fi F V 12	2725	4400	No	
v = v - v FO F R	3431	7050	No	
v R	544	2100	No	
Level	of Service Det	termination (i	f not F)	
	R	12	D	5.8 pc/mi/ln
Level of service for ra				
	Speed E:	stimation		
Intermediate speed vari	able,	D = S	0.282	
Space mean speed in ram	np influence an	rea, S =	58.5 mph	
Space mean speed in out	er lanes,	R S = 0	70.3 mph	
Space mean speed for al	l vehicles,	S =	61.8 mph	

Merg	e Analysis				
Analyst: MAH					
Agency/Co.: OMNNI					
Date performed: 6/28/04					
Analysis time period:					
Freeway/Dir of Travel: SB USH 41					
Junction: CTH A SB On r	amp				
Jurisdiction:					
Analysis Year: 2020					
Description: CTH A SB On-ramp 2020 4	lanes Par				
Fre	eway Data	0			
Type of analysis	Merge	2			
Number of lanes in freeway	2				
Free-flow speed on freeway	65.0		mph		
Volume on freeway	3408		vph		
On	Ramp Data		1.019		1.11.1.1
Side of freeway	Right	:			
Number of lanes in ramp	1				
Free-flow speed on ramp	55.0		mph		
Volume on ramp	722		vph		
Length of first accel/decel lane	750		ft		
Length of second accel/decel lane			ft		
Adjacent Ram	np Data (if c	one exists	5)		L -
Deer alienet warm anisto	No				
Does adjacent ramp exist?	No		unh		
Volume on adjacent Ramp Position of adjacent Ramp			vph		
Type of adjacent Ramp					
Distance to adjacent Ramp			ft		
			T C		
Conversion to pc/	h Under Base	e Conditio	ons		
	h Under Base Freeway	e Conditic Ramp	ons	Adjacent	
Conversion to pc/ Junction Components	Freeway	Ramp	ons	Adjacent Ramp	vnh
Conversion to pc/ Junction Components Volume, V (vph)	Freeway 3408	Ramp 722	ons		vph
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF	Freeway 3408 0.90	Ramp 722 0.90	ons		
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15	Freeway 3408 0.90 947	Ramp 722 0.90 201	ons		v
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses	Freeway 3408 0.90 947 10	Ramp 722 0.90 201 10	ons		V %
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles	Freeway 3408 0.90 947 10 0	Ramp 722 0.90 201 10 0	ons		v
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	Freeway 3408 0.90 947 10 0 Level	Ramp 722 0.90 201 10		Ramp	V % %
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade	Freeway 3408 0.90 947 10 0 Level %	Ramp 722 0.90 201 10 0 Level	00	Ramp	V % %
Conversion to pc/ Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	Freeway 3408 0.90 947 10 0 Level	Ramp 722 0.90 201 10 0 Level		Ramp	V % %

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.952 1.00 3976	0.952 1.00 842		pcph
	Estimation of	V12 Merge A	Areas		
L = EQ	(Equ	ation 25-2 c	or 25-3)	)	
P = FM	1.000 Usin	g Equation	0		
	(P) = 397 FM	6 pc/h			
	Capacit	v Checks			
v	Actual 4818	Maximum 4700		LOS F? Yes	
FO	4010	4700		165	
v R12	4818	4600		Yes	
K12					
Level of	Service Dete	rmination (i	if not 1	준)	
Density, D = 5.475 + 0.00 R					pc/mi/ln
Level of service for ramp	-freeway junc	tion areas o	of influ	lence F	
	Speed Est	imation			
Intermediate speed variab	le,	M =	0.721		
Space mean speed in ramp	influence are	a, S = R	48.4	mph	
Space mean speed in outer	lanes,		N/A	mph	
Space mean speed for all	vehicles,	S =	48.4	mph	-

E-mail:							
	Mer	ge Analy	sis		З	* 5 	
Analyst:	MAH						
Agency/Co.:	OMNNI						
Date performed:	6/28/04						
Analysis time period:							
Freeway/Dir of Travel:							
Junction:	CTH A SB On	ramp					
Jurisdiction:							
Analysis Year:	2020						
Description: CTH A SB	On-ramp 2020	6 lanes	Par				
	Fr	ceeway Da	ita		C20	0	
Type of analysis			Merge				
Number of lanes in fre	eway		3				
Free-flow speed on fre	_		65.0		mph		
Volume on freeway	chuy		3408		vph		
Volume on lieeway			5400		vpn		
1	Or	n Ramp Da	ita		1.0.00		
Side of freeway			Right				
Number of lanes in ram	n fen t. fe .		1				
Free-flow speed on ram	-		55.0		mph		
Volume on ramp	P		722		vph		
Length of first accel/	decel lane		750		ft		
Length of second accel			/30		ft		
_	Adjacent Ra	amp Data	(if or	ne exist	g)		
		mp Ducu	(11 01				
Does adjacent ramp exi			No				
Volume on adjacent Ram					vph		
Position of adjacent R	amp						
Type of adjacent Ramp							
Distance to adjacent R	amp				ft		
Cc	nversion to po	/h Under	Base	Conditio	ons		
Junction Components		Freev	av	Ramp		Adjacent	
components		TTCCM	ay	Ramp		Ramp	-
Volume, V (vph)		3408		722		£	vph
Peak-hour factor, PHF		0.90		0.90			-
Peak 15-min volume, v1	5	947		201			v
Trucks and buses		10		10			olo
Recreational vehicles		0		0			010
Terrain type:		Leve]		Level			
Grade		20101	00		010		olo
Length			mi		mi		mi
Trucks and buses PCE,	ET	1.5		1.5			
Recreational vehicle P		1.2		1.2			
Rectractonat ventore r		1.2		т. с			

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.952 1.00 3976	0.952 1.00 842		pcph
	Estimation of	V12 Merge A	Areas		
L = EQ	(Equ	ation 25-2 d	or 25-3	)	
	0.599 Usin	g Equation	1		
	(P) = 238 FM	0 pc/h		c	
	Capacit	y Checks			
	Actual	Maximum		LOS F?	
v	4818	7050		No	
FO V R12	3222	4600		No	
Level of	Service Dete	rmination (i	if not :	F)	
Density, D = 5.475 + 0.00					pc/mi/ln
R Level of service for ramp					
	Speed Est	imation			
Intermediate speed variab	le,	M = S	0.336		
Space mean speed in ramp	influence are	10-20	57.3	mph	
Space mean speed in outer	lanes,		61.1	mph	
Space mean speed for all	vehicles,		58.5	mph	

	Diverg	e Anal	lysis_	19 	R		
Analyst: MAH							
Agency/Co.:							
	/2004						
Analysis time period:							
	41 Northbou	nd					
	A NB off Ra						
Jurisdiction:		T					
Analysis Year: 2020							
Description: CTH A NB Off R	amp 4 lanes	Parti	ial				
- <sup>342</sup> -	Freew	ay Dat	ca				
Turne of analyzaia		т	Diverg				
Type of analysis Number of lanes in freeway			2	e			
Free-flow speed on freeway			55.0		mph		
Volume on freeway			4129		vph		
Volume on fleeway		ak uto	1129		vpn		
	Off Ra	mp Dat	ca				
Side of freeway		I	Right				
Number of lanes in ramp		1	L				
Free-Flow speed on ramp		5	50.0		mph		
Volume on ramp		5	722		vph		
Length of first accel/decel	lane	2	212		ft		
Length of second accel/decel	lane				ft		
Adi	acent Ramp	Data	(if on	e exist	3)	5	و فلم الحرود بي
			lo				
Does adjacent ramp exist?			10		vph		
Does adjacent ramp exist? Volume on adjacent ramp			10		vph		
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp			10		vph		
Does adjacent ramp exist? Volume on adjacent ramp			10		vph ft		
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp	on to pc/h	Ĩ		Conditio	ft		
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi		1 Under	Base		ft		ent
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp		Ĩ	Base	Conditio Ramp	ft	Adjace	ent
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components		) Under Freewa	Base	Ramp	ft		
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph)		Under Freewa 4129	Base		ft	Adjace	ent vph
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF		1 Under Freewa 4129 0.90	Base	Ramp 722 0.90	ft	Adjace	vph
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph)		1 Under Freewa 4129 0.90 1147	Base	Ramp 722	ft	Adjace	vph v
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses		1 Under Freewa 4129 0.90	Base	Ramp 722 0.90 201	ft	Adjace	vph
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles		Under Freewa 4129 0.90 1147 10 0	Base	Ramp 722 0.90 201 10 0	ft	Adjace	vph v %
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:		Under Freewa 4129 0.90 1147 10 0 Level	Base	Ramp 722 0.90 201 10 0 Level	ft	Adjace	vph v %
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade		Under Freewa 4129 0.90 1147 10 0 Level 0.00	Base ay %	Ramp 722 0.90 201 10 0 Level 0.00	ft ons %	Adjace	vph v % %
Does adjacent ramp exist? Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversi Junction Components Volume, V (vph) Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:		Under Freewa 4129 0.90 1147 10 0 Level	Base	Ramp 722 0.90 201 10 0 Level	ft	Adjace	vph v % %

Estimation of V12 Diverge Areas L = (Equation 25-8 or 25-9) EQ	
EQ	
D 1 000 Using Equation 0	
P = 1.000 Using Equation 0	
FD v = v + (v - v) P = 4817 pc/h 12 R F R FD	
Capacity Checks	
Actual Maximum LOS F?	
v = v 4817 4700 Yes Fi F	
v 4817 4400 Yes	
v = v - v 3975 4700 No FO F R	
v 842 2100 No R	
Level of Service Determination (if not F)	
Density, $D = 4.252 + 0.0086 v - 0.009 L = 43.8 pc/mR 12 D$	mi/in
Level of service for ramp-freeway junction areas of influence F	
Speed Estimation	
Intermediate speed variable, D = 0.309 S	
Space mean speed in ramp influence area, $S = 57.9$ mph	
Space mean speed in outer lanes, $R$ S = N/A mph 0	
Space mean speed for all vehicles, $S = 57.9$ mph	

Div	erge Analy:	sis_				
Analyst: MAH Agency/Co.: Date performed: 6/29/2004 Analysis time period:						
Freeway/Dir of Travel: USH 41 North Junction: CTH A NB off						
Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 6 la	nes Partia	1				
Fr	eeway Data				ж	ä
Type of analysis		verg	е			
Number of lanes in freeway	3	•				
Free-flow speed on freeway	65			mph		
Volume on freeway	413	29		vph		
Off	Ramp Data					
Side of freeway	Rig	ght				
Number of lanes in ramp	1					
Free-Flow speed on ramp	50			mph		
Volume on ramp	723			vph		
Length of first accel/decel lane	212	2		ft		
Length of second accel/decel lane				ft		
Adjacent Ra	mp Data (i:	f on	e exist:	s)	an an an an an an an an an an an an an a	9 106-5-0
Does adjacent ramp exist?	No					
Volume on adjacent ramp	NO			vph		
Position of adjacent ramp				. 1		
Type of adjacent ramp						
Distance to adjacent ramp				ft		
Conversion to pc	/h Under Ba	ase	Conditio	ons		
Junction Components	Freeway		Ramp		Adjacent Ramp	č. s
Volume, V (vph)	4129		722		Ramp	vph
Peak-hour factor, PHF	0.90		0.90			. 5
Peak 15-min volume, v15	1147		201			v
Trucks and buses	10		10			00
Recreational vehicles	0		0			00
Terrain type:	Level		Level			
Grade	0.00	00	0.00	olo		00
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.952 1.00 4817	0.952 1.00 842	2	pcph
	_Estimation of	V12 Diverge	e Areas	3	
L = EQ	(Equ	ation 25-8 c	or 25-9	))	
	0.601 Usin	g Equation	5		
v = v	+ (v - v ) P R F R	P = 3230 FD	pc/h		
	Capacit	y Checks			
v = v	Actual 4817	Maximum 7050		LOS F? No	
Fi F V 12	3230	4400		No	
v = v - v FO F R	3975	7050		No	
v R	842	2100		No	
Level o	f Service Dete	ermination (i	if not	F)	
	= 4.252 + 0.0 R	086 v - 0.0 12			pc/mi/ln
Level of service for ram	p-freeway junc				
	Speed Est	imation			
Intermediate speed varia	ble,	D = S	0.309		
Space mean speed in ramp	influence are		57.9	mph	
Space mean speed in oute	r lanes,		69.0	mph	
Space mean speed for all	vehicles,	S =	61.1	mph	

Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Fax:

Diverge Analysis MAH Analyst: Agency/Co.: 6/29/2004 Date performed: Analysis time period: Freeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 6 lanes Partial, 500' Taper Freeway Data Diverge Type of analysis Number of lanes in freeway 3 65.0 mph Free-flow speed on freeway Volume on freeway 4129 vph Off Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 50.0 Free-Flow speed on ramp mph Volume on ramp 722 vph Length of first accel/decel lane 500 ft ft Length of second accel/decel lane Adjacent Ramp Data (if one exists) Does adjacent ramp exist? No Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp ft Distance to adjacent ramp Conversion to pc/h Under Base Conditions\_ Adjacent Freeway Junction Components Ramp Ramp vph 722 Volume, V (vph) 4129 Peak-hour factor, PHF 0.90 0.90 1147 201 v Peak 15-min volume, v15 % 10 10 Trucks and buses % Recreational vehicles 0 0 Level Level Terrain type: 8 0.00 Grade 0.00 00 % mi 0.00 0.00 mi mi Length

1.5

1.2

1.5

1.2

Heavy vehicle adjustment Driver population facto: Flow rate, vp		0.952 1.00 4817	0.952 1.00 842		pcph		
Estimation of V12 Diverge Areas							
L = EQ	(Equ	lation 25-8 c	or 25-9	)			
P =	0.601 Usir	ng Equation	5				
FD V = 7 12	r + (v - v ) F R F R	P = 3230 FD	pc/h				
	Capacit	cy Checks					
V = V	Actual 4817	Maximum 7050		LOS F? No			
Fi F V 12	3230	4400		No			
v = v - v FO F R	3975	7050		No			
v R	842	2100		No			
Level	of Service Dete	ermination (i	if not i	F)			
Density,	D = 4.252 + 0.0	0086 v - 0.0 12	009 L D	= 27.5	pc/mi/ln		
Level of service for rat	S. Tour	A CONTRACTOR OF A CONTRACTOR O	10-10-10-10-10-10-10-10-10-10-10-10-10-1	uence C			
	Speed Est	cimation					
Intermediate speed varia	able,	D = S	0.309				
Space mean speed in ram	o influence are	ea, S = R	57.9	mph			
Space mean speed in out	er lanes,		69.0	mph			
Space mean speed for all	l vehicles,	S =	61.1	mph			

ENGINEERING ARCHITECTURE ENVIRONMENTAL	ONE SYSTEMS DRIVE APPLETON, WI 54914-1654 920-735-6900 1-800-571-6677 FAX 920-830-6100	<b>ONNI</b> ASSOCIATES WWW.omnni.com	JOB NUMBER CLIENT PROJECT MADE BY CHECKED BY	SHEET NO. DATE DATE
[ From 51 7700 ph 1061 ph 30% 11 70% th			CTAL J ZOZ T K Z D Z S Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	5 : CTH A 20 Partial 10 rolargo 2.9 TOHUS = 8.9 55/45
[ <i>Fishi Sout</i> <i>Zzrocz A</i> <i>1319 phi</i> <i>818 thr</i> <i>192 Zt</i>	>t 0 1068	3 251		
Assume	e same % o erchaige op	tion move	nerts as	64 0505

\_\_\_TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

		VAI SIU	P CONIRC		"ART_				
P	N/7 TT								
Analyst:	MAH								
Agency/Co.:	OMNNI								
Date Performed:	6/14/0	)4							
Analysis Time Period:									
Intersection:	CTH A	& CTH	JJ						
Jurisdiction:	Outaga	amie Co	untv						
Units: U. S. Customar									
	2020								
Analysis Year:									
Project ID: Partial		-	ption						
East/West Street:	CTH JJ	J							
North/South Street:	CTH A								
Intersection Orientat	ion: NS	3		Sti	udy p	eriod	(hrs):	0.25	5
	_Vehic]	le Volu	mes and	Adjus	tment	.s			
Major Street: Approa	ch	Nor	thbound			Sout	hbound		
Moveme		1	2	3	4		5	6	
		L	т	R	İг		т	R	
		D D	-		1 -		-		
Volume			1068	251	3	18	743		
Peak-Hour Factor, PHF			0.90	0.90		.90	0.90		
Hourly Flow Rate, HFR			1186	278		53	825		
Percent Heavy Vehicle	S				9				
Median Type/Storage		Undivi	ded		/				
RT Channelized?			]	No					
Lanes			1 1			1	1		
Configuration			T R			L	т		
Upstream Signal?			No				No		
opseicam bignai.			NO				110		
Minor Street: Approa	ch	Wes	tbound			East	bound		
Moveme		7	8	9	1	.0	11	12	
Hovenie	ne	Ĺ	Т	R	l I		Т	R	
		Ц	1	R	1 1	1	1	K	
Volume		164		400					
Peak Hour Factor, PHF		0.90		0.90					
		182		444					
Hourly Flow Rate, HFR									
Percent Heavy Vehicle	S	9	10.0	9					
Percent Grade (%)			0				0		
Flared Approach: Exi	sts?/St	corage			/				/
Lanes		1	1						
Configuration		$\mathbf{L}$	R						
		96.77							
Del	ay, Que	eue Len	gth, and	d Leve	l of	Servio	ce		
		eue Len SB		d Leve bound	l of	Servio	Eastb	ound	
Approach N	B S	SB	West	bound			Eastb		12
Approach N Movement 1	B S	3B 1	West 7		9	Servio	Eastb		12
Approach N Movement 1	B S	3B 1	West	bound			Eastb		12
Approach N Movement 1 Lane Config	B 9 4 1	5B 1   1	West 7 L	bound	9 R		Eastb		12
ApproachNMovement1Lane Configv (vph)	B 9 4 1	3B 1   353	West 7 L 182	bound	9 R 444		Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph)	B 5 4 1 	BB 1   353 141	West 7 L 182 4	bound	9 R 444 222		Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph) v/c	B 9 4 1 	SB         353  41 ).80	West 7 L 182 4 45.50	bound	9 R 444 222 2.00		Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph) v/c 95% queue length	B 9 4 1 	SB 1   353 141 0.80 7.25	West 7 L 182 4 45.50 24.98	bound	9 R 444 222 2.00 32.8	10         	Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph) v/c 95% queue length	B 9 4 1 	SB 1   353 141 0.80 7.25	West 7 L 182 4 45.50	bound	9 R 444 222 2.00	10         	Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph) v/c	B 9 4 1 	SB 1   353 141 0.80 7.25	West 7 L 182 4 45.50 24.98	bound	9 R 444 222 2.00 32.8	10         	Eastb		12
Approach N Movement 1 Lane Config v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS	B 9 4 1 	SB 1   353 141 0.80 7.25 38.7	West) 7 L 182 4 45.50 24.98 21811 F	bound	9 R 444 222 2.00 32.8 501.	10         	Eastb		12
ApproachNMovement1Lane Configv (vph)C(m) (vph)v/c95% queue lengthControl Delay	B 9 4 1 	SB 1   353 141 0.80 7.25 38.7	West) 7 L 182 4 45.50 24.98 21811 F	bound 8 	9 R 444 222 2.00 32.8 501.	10         	Eastb		12

## HCS2000: Unsignalized Intersections Release 4.1d

Phone: E-Mail: Fax:

## \_TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_

Analyst:	MAH		
Agency/Co.:	OMNNI		
Date Performed:	6/14/04		
Analysis Time Period:			
Intersection:	CTH A & CTH JJ		
Jurisdiction:	Outagamie County		
Units: U. S. Customar	У		
Analysis Year:	2020		
Project ID: Partial	interchange option		
East/West Street:	СТН ЈЈ		
North/South Street:	CTH A		
Intersection Orientat	ion: NS	Study period (hrs): 0	.25
П			
	Vehicle Volumes and	l Adjustments	

VV	ehicle \	/olumes	and Ad	justment	S			1.19.2
Major Street Movements	1	2	3	4	5	6		
	L	Т	R	L	Т	R		
								2
Volume		1068	251	318	743			
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90			
Peak-15 Minute Volume		297	70	88	206			
Hourly Flow Rate, HFR		1186	278	353	825			
Percent Heavy Vehicles				9				
Median Type/Storage	Undiv	vided		1				
RT Channelized?			No					
Lanes		1 1		1	1			
Configuration		T R		$\mathbf{L}$	т			
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12		5
· · · · · · · · · · · · · · · · · · ·	L	т	R	L	т	R		
 Volume	164		400					
Peak Hour Factor, PHF	0.90		0.90					
Peak-15 Minute Volume	46		111					
Hourly Flow Rate, HFR	182		444					
Percent Heavy Vehicles	9		9					
Percent Grade (%)	2	0	-		0			
Flared Approach: Exists?	/Storage	0		/	U		/	
RT Channelized?	/ bcoruge		No	/			/	
Lanes	1	1	IVO					
Configuration	L	R						
				ljustmen	ts		<u>.</u>	
Movements	13	14	15	16				
Flow (ped/hr)	0	0	0	0				

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

		Prog.	Sat	Jpstream Arriv		reen	Cycle	Prog.	Distance
		Flow	Flov				Length	Speed	to Signal
		vph	vph	и турс		ec	sec	mph	feet
S2 Le	ft-Turn								
	rough								
	ft-Turn								
Th	rough								
Worksh	eet 3-Dat	a for Co	omputing	g Effect	c of De	lay to	Major	Street N	Vehicles
						Moveme	ent 2	Moveme	ent 5
Worksh	eet 4-Cri	tical Ga	ap and H	Jollow-u	up Time	Calcu	lation		
Critic	al Gap Ca	lculatio	on						
Critic	al Gap Ca	lculatio 1	on 4	7	8	9	10	11	12
Critic	al Gap Ca	lculatio	on					11 T	12 R
Critic Moveme:	al Gap Ca nt	lculatio 1	on 4	7	8	9	10		
Critic Moveme t(c,ba	al Gap Ca nt se)	lculatio 1	on 4 L	7 L	8	9 R	10 L	Т	
Critic Moveme t(c,ba t(c,hv P(hv)	al Gap Ca nt se)	lculatio 1 L	on 4 L 4.1	7 L 7.1 1.00 9	8 T 1.00	9 R 6.2 1.00 9	10 L 0 1.00	T 1.00	R 1.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g)	al Gap Ca nt se) )	lculatio 1 L	on 4 L 4.1 1.00	7 L 7.1 1.00 9 0.20	8 T 1.00 0.20	9 R 6.2 1.00 9 0.10	10 L 0 1.00 0 0.20	T 1.00 0.20	R 1.00 0.10
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/	al Gap Ca nt se) ) 100	lculatio 1 L	on 4 L 4.1 1.00 9	7 L 7.1 1.00 9 0.20 0.00	8 T 1.00	9 R 6.2 1.00 9 0.10 0.00	10 L ) 1.00 ) 0.20 ) 0.00	T 1.00 0.20	R 1.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt	al Gap Ca nt se) ) 100	lculatio 1 L 1.00	on 4 L 4.1 1.00 9	7 L 7.1 1.00 9 0.20 0.00 0.70	8 T 1.00 0.20 0.00	9 R 6.2 1.00 9 0.10 0.00 0.00	10 L ) 1.00 ) 0.20 ) 0.00	T 1.00 0.20 0.00	R 1.00 0.10 0.00
	al Gap Ca nt se) ) 100 ) : 1-stag	lculatio 1 L 1.00	on 4 L 4.1 1.00 9	7 L 7.1 1.00 9 0.20 0.00	8 T 1.00 0.20	9 R 6.2 1.00 9 0.10 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Critic Movemes t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T)	al Gap Ca nt se) ) 100	lculatio 1 L 1.00 e 0.00 e 0.00	Dn 4 L 4.1 1.00 9 0.00 0.00	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00	8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00
Critic Movemes t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T)	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag	lculatio 1 L 1.00 e 0.00 e 0.00 e	Dn 4 L 4.1 1.00 9 0.00 0.00 0.00 0.00	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00	8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c) Follow	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 1-stag 2-stag	lculatio 1 L 1.00 e 0.00 e 0.00 e e	Dn 4 L 4.1 1.00 9 0.00 0.00 0.00 4.2	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00	8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00 0.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c) Follow	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 1-stag 2-stag	lculatio 1 L 1.00 e 0.00 e 0.00 e c Calculat	on 4 L 4.1 1.00 9 0.00 0.00 0.00 4.2 tions 4	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00 6.5	8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00 0.00 6.3	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00	T 1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c) Follow	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 1-stag 2-stag	lculatio 1 L 1.00 e 0.00 e 0.00 e calculat	on 4 L 4.1 1.00 9 0.00 0.00 0.00 4.2 tions	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00 6.5	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00 6.3	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00	T 1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Critic Movemes t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c) Follow Movemes t(f,ba	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 2-stag 2-stag -Up Time nt	lculatio 1 L 1.00 e 0.00 e 0.00 e calculat 1 L	on 4 L 4.1 1.00 9 0.00 0.00 0.00 4.2 tions 4 L 2.20	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	8 T 1.00 0.20 0.00 1.00 8 T	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00 6.3 9 R 3.30	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
Critic Movemes t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c) Follow Movemes t(f,ba t(f,HV	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 2-stag 2-stag -Up Time nt	lculatio 1 L 1.00 e 0.00 e 0.00 e c Calculat	on 4 L 4.1 1.00 9 0.00 0.00 0.00 0.00 4.2 tions 4 L 2.20 0.90	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50 0.90	8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00 6.3 9 R 3.30 0.90	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Critic Moveme t(c,ba t(c,hv P(hv) t(c,g) Grade/ t(3,lt t(c,T) t(c)	al Gap Ca nt se) ) 100 ) : 1-stag 2-stag 2-stag 2-stag -Up Time nt	lculatio 1 L 1.00 e 0.00 e 0.00 e calculat 1 L	on 4 L 4.1 1.00 9 0.00 0.00 0.00 4.2 tions 4 L 2.20	7 L 7.1 1.00 9 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	8 T 1.00 0.20 0.00 1.00 8 T	9 R 6.2 1.00 9 0.10 0.00 0.00 0.00 0.00 6.3 9 R 3.30	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue	Clearance	Time	at	Upstream	Signal		
				Mot	vement 2	Mov	rement 5
				V(t)	V(l,prot)	V(t)	V(l,prot)

Arrival Type Effective Gr Cycle Length Rp (from Exh Proportion v g(q1) g(q2) g(q)	een, g (se , C (sec) ibit 16-11	L)	on gree	en P					
Computation	2-Proport	ion of	TWSC Int	ersecti		ne bloch nent 2		ovement	5
				v		(1,prot			prot)
alpha									
beta									
Travel time,	t(a) (sec	2)							
Smoothing Fa									
Proportion c			ow, f						
Max platoone Min platoone									
Duration of			t(p)						
Proportion t			- (1)		0.0	00		0.000	
			Dorioda	Por	sult			0-3 	
Computation	3-Placoon	Evenc	Perious				1.1.1	57,7629	cond are h
p(2)				0.0					
p(5)				0.0	000				
p(dom) p(subo)									
Constrained	or unconst	trained	!?						
Proportion									1100014
unblocked		(	1)		(2)		(3)		
for minor			e-stage			Stage Pro			
movements, p	(x)		cess	Sta	age I	the states	Stage I	I	
p(1)	2.1.1		11 - C				2. agra 1	9.25	10 1320
p(4)									
p(7)									
p(8)									
p(9) p(10)									
p(10) p(11)									
p(12)									
									Min T
Computation Single-Stage									
Movement	FIOCESS	1	4	7	8	9	10	11	12
		L	L	Г	Т	R	L	Т	R
V c,x			1464	2717		1186		1. 1. oc. 14 Qui	<u></u>
S									
Px									
V c,u,x									
C r,x								500 G	2.1.2.1.2
C plat,x									
Two-Stage Pr	ocess								

V(c,x)		
s 1500		
P(x)		
V(c,u,x)		
C(r,x)		
C(plat,x)		
Worksheet 6-Impedance and Capacity Equation	ons	
Step 1: RT from Minor St.	9	12
Conflicting Flows	1186	
Potential Capacity	222	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	222	
Probability of Queue free St.	0.00	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows	1464	
Potential Capacity	441	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	441	
Probability of Queue free St.	0.20	1.00
Maj L-Shared Prob Q free St.		2.00
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.20	0.20
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	2717	
Potential Capacity	22	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.20
Maj. L, Min T Adj. Imp Factor.		0.34
Cap. Adj. factor due to Impeding mvmnt	0.20	0.00
Movement Capacity	4	0.00

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.811Part 1 - First Stage<br/>Conflicting Flows<br/>Potential Capacity<br/>Pedestrian Impedance Factor<br/>Cap. Adj. factor due to Impeding mvmnt<br/>Movement Capacity<br/>Probability of Queue free St.811

vmnt					
		1.00		1.00	
mnt		0.20		0.20	
		1 00		1 00	
		1.00		1.00	
		7		10	
					הדברות
		67 120			
rmn +					
JIIII					
rmnt					
754.20					
		0.045			
					11
		1.00		1.00	
				0.34	
mnt		0.20		0.00	
		4			
·	100		7 100		10 19
		4			
ıs					
7	8	9	10	11	12
$\mathbf{L}$	Т	R	Г	т	R
182		444			
182		444			
182 4		444 222			
	rmnt rmnt rmnt	rmnt rmnt rmnt rmnt	rmnt 1.00 0.20 1.00 7 rmnt 2717 22 1.00 rmnt 0.20 4 4 15	rant 1.00 0.20 1.00 7 rant 2717 22 1.00 rant 0.20 4 4	1.00       1.00         1.00       0.20         1.00       1.00         7       10         7       10         7       10         7       10         7       10         7       10         7       10         7       10         7       10         7       10         7       10         1.00       1.00         0.20       0.20         0.20       0.34         0.20       0.00         4       15         7       8       9       10

Movement			7	8	9	10	11	12
			L	Т	R	L	Т	R
C sep			4		222			
Volume			182		444			
Delay								
Q sep								
Q sep +1								
round (Qsep +1)								
n max								
C sh								
SUM C sep								
n								
C act								
Worksheet 10-Delay	7, Queue	Length	, and Le	vel of	Service			
Movement	1	4	7	8	9	10	11	12
Lane Config		L	L		R			
v (vph)		353	182		444			
C(m) (vph)		441	4		222			
v/c		0.80	45.50		2.00			
95% queue length		7.25	24.98		32.82			
Control Delay		38.7	21811		501.6			
LOS		E	F		F			
Approach Delay				6697				
Approach LOS				F				
Worksheet 11-Share	ed Major	LT Impe	edance a	nd Del	ay			
					Moveme	ent 2	Mover	ment 5
 p(oj)					1.0	0	0	.20
v(il), Volume for								5 .TT T
v(i2), Volume for				_				
s(il), Saturation								
-(1)	flow ra	te for s	stream 3	or 6				
							_	
P*(oj)		I or 4					3	8.7
P*(oj) d(M,LT), Delay for			7					
s(i2), Saturation P*(oj) d(M,LT), Delay for N, Number of major d(rank,1) Delay fo	street	through						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches
Analyst: MAHInter.: CTH A & CTH JJ EastAgency:<br/>Date: 6/14/2004Area Type: All other areas<br/>Jurisd: Outagamie County<br/>Year : 2020Project ID: CTH A & CTH JJ (East), 2020Partial Exist Geometry<br/>N/S St: CTH A

7				GNALIZE									
	Eas	tbour	nd	West	bound	d	Nor	thbou	ind	So	uthbou	nd	
	L	т	R	L	т	R	L	Т	R	L	Т	R	
No. Lanes	0	0	0	1	0	1	0	1	1	1	1	0	-
LGConfig				L		R	i	т	R	L	т		1 I .
Volume				164		400		1068	251	318	743		
Lane Width				12.0		12.0		12.0			12.0		
RTOR Vol						0	-	abait p	160	i			I
Duration	0.25		Area	Туре: А	11 0	ther	areas		31 16	1010	- <u>'à ce</u>	7	14.44
buración	0.25	2.0	ALCA		al O			138.1	L-KA-S	E AN			
Phase Combin	nation	n 1	2	3	4		-	5	6	7	8		
EB Left						NB	Left						
Thru							Thru		Р				
Right							Right		Р				
Peds							Peds						
WB Left		Р				SB	Left	Р	Р				
Thru							Thru	Р	Р				
Right		Р					Right						
Peds							Peds						
NB Right		Ρ				EB	Right						
SB Right						WB	Right						
Green		25.0						12.0	40.	0			
Yellow		3.0						3.0	3.0				
All Red		2.0						0.0	2.0				
2		т.					Cumm		le Le	ngth:	90.0	S	ecs
				ction F		rmanc			7~~				12.511
Appr/ Lane Grou			j Sat w Rate		ios		Lane	Group	apj	proac	[]		
	acity		(s)	v/c	g/9	ē	Delay	LOS	Del	ay LO	S		
Eastbound	-)	Silv 2			1		p.p.a.						
Westbound													
L 501		180	15	0.36	0.3	20	28.1	С					
ш 50.		TO	55	0.50	0	20	20.1	C	59.	4 E			
	- -	10	IE	0 00	0	20	72 2	Е	59.4	* C			
R 449	2	16:	10	0.99	0.3	40	72.2	E.					
Northbound													
T 044	1	10	20	7 / 7	0	1 1	215 0	च	100	2 17			
T 844		190		1.41	0.4		215.0		198	.3 F			,
R 125	56	163	15	0.08	0.	18	2.5	A					
Southbound					_			_					

Intersection Delay = 110.3 (sec/veh) Intersection LOS = F

1.08

0.71

326

1161

L

T

1805

1900

0.61

0.61

101.1 F

15.8 B

41.3

D

Phone: E-Mail: Fax:

OPERATIONAL ANALYSIS													
Analyst:	МАН												
Agency/Co.:													
Date Performed:	6/14/2004												
Analysis Time Period:													
Intersection:	CTH A & CTH JJ East												
Area Type:	All other areas												
Jurisdiction:	Outagamie County												
Analysis Year:	2020												
Project ID: CTH A & CTH d	JJ (East), 2020 Partial Exist Geometry												
East	t/West Street North/South Street												
CTH JJ	CTH A												

VO	LU	ME	DATA	4

	Eastbound			Westbound			No	rthbo	und	Southbound		
	L	т	R	L	Т	R	L	Т	R	L	Т	R
Volume				164		400		1068	251	318	743	
% Heavy Veh				0		0	i	0	0	0	0	
PHF				0.90		0.90	i	0.90	0.90	0.90	0.90	
PK 15 Vol				46		111	i	297	70	88	206	
Hi Ln Vol				İ			İ			1		
% Grade				İ	0		İ	0		i	0	
Ideal Sat				1900		1900	Ì	1900	1900	1900	1900	
ParkExist				1								
NumPark				1								
No. Lanes	0	0	0	1	0	1	0		1	1	1	0
LGConfig				L		R		Т	R	L	т	
Lane Width				12.0		12.0		12.0		12.0	12.0	
RTOR Vol						0			160			
Adj Flow				182		444		1187	101	353	826	
%InSharedLn												
Prop LTs								0.0			0.00	0
Prop RTs						1.000		.000	1.000	0	.000	
Peds Bikes	0			0			0				12/2	
Buses				0		0		0	0	0	0	
%InProtPhase					_		1			0.0		
Duration	0.25		Area	Type:	All	other	areas					

	Eas L	stbou T	nd R	Wes L	stbou T	nd R	No	rthbo T	und R	So   L	uthbou T	nd   R
Init Unmet Arriv. Type				0.0		0.0	   	0.0	0.0	0.0	0.0	
Unit Ext. I Factor Lost Time Ext of g				3.0	1.00	3.0 0 2.0 2.0		3.0 1.00 2.0 2.0	3.0 0 2.0 2.0	3.0 2.0 2.0	3.0 1.000 2.0 2.0	

### \_\_\_\_OPERATING PARAMETERS\_\_\_\_\_OPERATING PARAMETERS\_\_\_\_\_

Ped Min g

. 1

1

1

1

-											
				PHASE	DATA						
Phase Combir	nation 1	2	3	4	1		5	6	7	8	
					NB	Left					
EB Left								Б			
Thru					!	Thru		P			
Right					ļ	Right		Р			
Peds						Peds					
WB Left	P				SB	Left	Ρ	Р			
Thru					-	Thru	P	Р			
Right	P				i	Right					
Peds	-				10.1	Peds					
reab					1	reab					
NB Right	Р				EB	Right					
NB RIGHT	P					RIGHT					
SB Right					WB	Right					
Green	25.0						12.0	40.0	0		
Yellow	3.0						3.0	3.0			
All Red	2.0						0.0	2.0			
							Cyc	cle Le	ength:	90.0	sec
		IE ADJ	USTMEN	T AND	SATU	RATION	FLOW	WORKS	SHEET_		
Volume Adjus			1		-	1			1 -		
	Eastbour			tbound			hbou			thbound	
	L T	R	L	Т	R	L	Т	R	L	Т	R
		_ 8.9.	343 5		2-2-3		1.4		8.4.4		
Volume, V			164	4	400	] ]	1068 2	251	318	743	
PHF			0.90	(	0.90	(	.90 (	0.90	0.90	0.90	ĺ
Adj flow			182	4	444	i ı	187 3	101	353	826	2
No. Lanes	0 0	0	1	0	1	0	1	1	1		o i
			L		R		T	R	L	Т	
Lane group						-	187 3			826	
			1102	/					555	020	
Adj flow			182	4	444						
Adj flow Prop LTs			182			030.00	0.000	0	1.000	0.000	
Adj flow Prop LTs			182   		.000	030.00	0.000		1.000		
Adj flow Prop LTs Prop RTs	Flow Pate	COO F		1	.000	0.0	0.000	0 .000	1.000	0.000	arg)
Adj flow Prop LTs Prop RTs Saturation B			   	1. 16-7	.000	   0.0 etermir	0.000 000 1 ne the	0 .000 e adjı	1.000 0.	0.000 000 t facto	
Adj flow Prop LTs Prop RTs Saturation H Eas	Flow Rate			1 16-7 und	.000	   0.0 etermir Northk	0.000 000 1 ne the	0 .000 e adjı	1.000   0. ustmen Sou	0.000 000 t facto thbound	
Adj flow Prop LTs Prop RTs Saturation E Eas LG		$\mathbf{L}$	     Westbo	1 16-7 und R	.000 to d	   0.0 etermir Northk	0.000 000 1 ne the cound	0 .000 e adjı R	1.000   0. ustmen Sou L	0.000 000 t facto thbound T	
Adj flow Prop LTs Prop RTs Saturation H Eas LG So	stbound	L 190	     Westbo 0	1 16-7 und R 19(	.000 to d 00	0.0 etermir Northk 19	0.000 000 1 ne the cound 5 1 000 1	0 .000 e adjı R 1900	1.000   0. ustmen Sou L 1900	0.000 000 t facto thbound T 1900	đ
Adj flow Prop LTs Prop RTs Saturation H Eas LG So		L 190 1	   Westbo 0 0	16-7 und R 190 1	.000 to d 00 0	0.0 etermin Northh 19 1	0.000 000 1 ne the pound 5 1 900 2	0 .000 e adju R 1900 1	1.000 0. ustmen Sou L 1900 1	0.000 000 t facto thbound T 1900 1	
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0	stbound	L 190	   Westbo 0 0	16-7 und R 190 1	.000 to d 00	0.0 etermin Northh 19 1	0.000 000 1 ne the pound 5 1 900 2	0 .000 e adju R 1900 1	1.000   0. ustmen Sou L 1900	0.000 000 t facto thbound T 1900 1	đ
Adj flow Prop LTs Prop RTs Saturation F Eas LG So Lanes 0 fW	stbound	L 190 1	kxhibit Westbo 0 0 00	16-7 und R 19( 1 1.(	.000 to d 00 0	etermir Northk 19 1	0.000 000 1 ne the bound 5 1 900 1	0 .000 e adju R 1900 1 1.000	1.000 0. ustmen Sou L 1900 1	0.000 000 t facto thbound T 1900 1 1.000	a
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0 fW fHV	stbound	L 190 1 1.0 1.0	kxhibit Westbo 0 00 00	16-7 und R 19( 1 1.( 1.(	.000 to d 00 000 000	0.0 etermir Northk 19 1 1. 1.	0.000 000 1 ne the bound 5 1 000 1 .000 1	0 .000 e adju R 1900 1 1.000 1.000	1.000 0. sou L 1900 1 1.000 1.000	0.000 000 t facto thbound T 1900 1 1.000 1.000	đ
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0 fW fHV fG	stbound	L 190 1 1.0 1.0	kxhibit Westbo 0 00 00 00 00	16-7 und R 19( 1.( 1.( 1.(	.000 to d 00 000 000 000	0.0 etermir Northk 19 1 1. 1. 1.	0.000 000 1 ne the cound 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1 .000 1.000 1.000	1.000 stmen Sou L 1900 1 1.000 1.000 1.000	0.000 000 t facto thbound T 1900 1 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0 fW fHV fG fP	stbound	L 190 1 1.0 1.0 1.0	   Westbo 0 00 00 00 00 00 00	16-7 und R 19( 1.( 1.( 1.( 1.(	.000 to d 00 000 000 000 000	0.0 etermir Northk 19 1 1. 1. 1. 1.	0.000 000 1 ne the oound 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1 .000 1.000 1.000 1.000	1.000 source 1900 1.000 1.000 1.000 1.000	0.000 000 t facto thbound T 1900 1 1.000 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB	stbound	L 190 1.0 1.0 1.0 1.0 1.0	xhibit Westbo 0 00 00 00 00 00 00	16-7 und 190 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1	0.000 000 1 ne the bound 000 1 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1 .000 1.000 1.000 1.000	1.000 0. Sou 1 1900 1 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto thbound T 1900 1 1.000 1.000 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB fA	stbound	L 190 1.0 1.0 1.0 1.0 1.0	<pre></pre>	16-7 und 190 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the bound 000 1 000 1 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000	1.000 Sou 1900 1 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto thbound 1 1900 1 1.000 1.000 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU	stbound	L 190 1.0 1.0 1.0 1.0 1.0	<pre></pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the ound 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000 1.00	1.000 0. Sou 1 1900 1 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto thbound 1 900 1 1.000 1.000 1.000 1.000 1.000 1.00 1.00	a
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU	stbound	L 190 1.0 1.0 1.0 1.0 1.0	<pre></pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the bound 000 1 000 1 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000 1.00	1.000 Sou 1900 1 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto thbound 1 1900 1 1.000 1.000 1.000 1.000 1.000	đ
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT	stbound	L 190 1.0 1.0 1.0 1.0 1.0	<pre></pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the ound 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1 000 1	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000 1.00	1.000 Sou 1 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto thbound 1 900 1 1.000 1.000 1.000 1.000 1.000 1.00 1.00	a —
Adj flow Prop LTs Prop RTs Saturation E Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0	<pre></pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 he the bound 000 1 0	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000 1.00	1.000 Sou 1900 1.000 1.000 1.000 1.000 1.000 1.000 1.00 0.950	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000	a —
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT Sec.	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0 0.9	<pre>khibit Westbo 0 0 0 0 0 0 0 0 0 0 0 0 0 50</pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 000	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the 000 1 0	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.000 1.00	1.000 Sou 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 0.950 0.093	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation H Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT Sec. fLpb	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0	<pre>khibit Westbo 0 0 0 0 0 0 0 0 0 0 0 0 0 50</pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 000 00	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 1000 1	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.00 1.00	1.000 Sou 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 0.950 0.093	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	a
Adj flow Prop LTs Prop RTs Saturation F Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT Sec. fLpb fRpb	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0 0.9 1.0	<pre>i xhibit Westbo 0 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0</pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.	.000 to d 00 000 000 000 000 000 000 000 850	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the ound 000 1 00	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.00 1.00	1.000 Source 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	a
LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT Sec. fLpb fRpb S	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0 0.9	<pre>i xhibit Westbo 0 0 0 0 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0</pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	.000 to d 00 000 000 000 000 000 000 000 850	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 ne the ound 000 1 00	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.00 1.00	1.000 Sou 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	đ
Adj flow Prop LTs Prop RTs Saturation F Eas LG So Lanes 0 fW fHV fG fP fBB fA fLU fRT fLT Sec. fLpb fRpb	stbound	L 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	<pre>i cxhibit Westbo 0 0 0 0 0 0 0 0 0 5 0 5 0 5</pre>	16-7 und R 190 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.	.000 to d 00 000 000 000 000 000 850	etermir Northk 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.000 000 1 he the bound 000 1 0	0 .000 e adju R 1900 1.000 1.000 1.000 1.000 1.00 1.00	1.000 Source 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	0.000 000 t facto T 1900 1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000	a lat

Capacity	Analysi					_		<b>G</b>				
Appr/ Mvmt	Lane Group		Adj w Rate (v)	Flow	Sat Rate s)	Flo Rat (v/	io	Gre Rat (g/	io Ca	Lane G apacity (c)		
Eastbound	1											
Prot Perm												
Left												
Prot												
Perm												
Thru												
Right												
Westbound	1											
Prot												
Perm	-		~ ~						~ ~			
Left	L	1	82	18	05	0.	10	0.	28	501	0.36	
Prot Perm												
Thru												
Right	R	4	44	16	15	# 0.	27	0.	28	449	0.99	
Northbour		-		10	10	"			20	112	0.55	
Prot												
Perm												
Left												
Prot												
Perm	-											
Thru	Т		187	19		0.			44	844	1.41	
Right Southbour	R	1	01	16	15	0.	06	0.	78	1256	0.08	
Prot	iu	2	41	18	05	# 0.	1 3	0	133	241	1.00	
Perm			12	17		# 0.			478	85	1.32	
Left	L		53	- /	,		00		61	326	1.08	
Prot												
Perm												
Thru	Т	8	26	19	00	0.	43	Ο.	61	1161	0.71	
Right												
Sum of fl	ow rati	og for	ariti				Va		um (v/	(a)	1 04	
Total los					-	-	IC	= 5		5) =	1.04	
Critical							Xc	= (Yc	(C) / (	(C-L) =	1.17	
			oupuor		207			(10	/ (0// (	0 1)		
Control I	elay ar	ld LOS	Determ	inatio	n						4	
	Ratios	Unf	Prog					Res	Lane	Group	Appro	ach
Lane		Del	Adj	Grp	Facto			Del				
Grp v/c	g/C	d1	Fact	Cap	k	d2		d3	Dela	y LOS	Delay	LOS
Eastbound	1											
Westbound												
L 0.36	0.28	26.1	1.000	501	0.50	2.	C	0.0	28.1	С		
D 0.00		22.4	1 000				~			-	59.4	Е
R 0.99		32.4	1.000	449	0.50	39	. 8	0.0	72.2	E		
Northbour	ια											
T 1.41	0.44	25.0	1.000	844	0.50	10		0.0	215.0	F	198.3	F
R 0.08		2.4	1.000		0.50	0.		0.0	2.5	A	C.0CT	r
Southbour					2.00	5.	-		2.5			
L 1.08		27.4	1.000	326	0.50	73	. 8	0.0	101.1	F		

Т

Intersection delay = 110.3 (sec/veh) Intersection LOS = F

\_\_\_\_\_SUPPLEMENTAL PERMITTED LT WORKSHEET\_\_\_\_\_ for exclusive lefts

IOI EXCIUS.	
Input	
Guala longth C	EB WB NB SB
Cycle length, C	90.0 sec
Total actual green time for LT lane group	
Effective permitted green time for LT lan	
Opposing effective green time, go (s)	40.0
Number of lanes in LT lane group, N	1
Number of lanes in opposing approach, No	
Adjusted LT flow rate, VLT (veh/h)	353
Proportion of LT in LT lane group, PLT	1.000
Proportion of LT in opposing flow, PLTo	0.00
Adjusted opposing flow rate, Vo (veh/h)	1187
Lost time for LT lane group, tL	5.00
Computation	
LT volume per cycle, LTC=VLTC/3600	8.82
Opposing lane util. factor, fLUo	1.00 1.00
Opposing flow, Volc=VoC/[3600(No)fLUo] (v	<i>r</i> eh/ln/cyc) 29.67
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0
Opposing platoon ratio, Rpo (refer Exhib:	
Opposing Queue Ratio, qro=Max[1-Rpo(go/C]	0.56
gq, (see Exhibit C16-4,5,6,7,8)	35.08
gu=g-gq if gq>=gf, or = g-gf if gq <gf< td=""><td>7.92</td></gf<>	7.92
n=Max(gq-gf)/2,0)	17.54
PTHo=1-PLTo	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00
EL1 (refer to Exhibit C16-3)	3.96
EL2=Max((1-Ptho**n)/Plto, 1.0)	
fmin=2(1+PL)/g or $fmin=2(1+Pl)/g$	0.09
gdiff=max(gq-gf,0)	0.00
fm = [gf/g] + [gu/g] / [1+PL(EL1-1)], (min=fmin)	
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdif:	E/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt= $[fm+0.91(N-1)]/N**$	- DD
Left-turn adjustment, fLT	0.093
	anna dharaith an san ann an dharaith an an an an an an an an an an an an an
For special case of single-lane approach	opposed by multilane approach,
see text.	
* If Pl>=1 for shared left-turn lanes with	th N>1, then assume de-facto
left-turn lane and redo calculations.	
** For permitted left-turns with multiple	
For special case of multilane approach op	pposed by single-lane approach
or when gf>gq, see text.	
SUPPLEMENTAL PERMIT	
	ed Terts
Input	EB WB NB SB
Cycle length, C	90.0 sec
Total actual green time for LT lane group	
Effective permitted green time for LT lan	
Opposing effective green time, go (s)	
Number of lanes in LT lane group, N	
Number of lanes in opposing approach, No	
is an of tanes in opposing approach, no	

Adjusted LT flow rate, VLT (veh/h) Proportion of LT in LT lane group, PLT 0.000 0.000 Proportion of LT in opposing flow, PLTo Adjusted opposing flow rate, Vo (veh/h) Lost time for LT lane group, tL Computation LT volume per cycle, LTC=VLTC/3600 Opposing lane util. factor, fLUo 1.00 1.00 Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) gf=G[exp(- a \* (LTC \*\* b))]-tl, gf<=g</pre> Opposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] gq, (see Exhibit C16-4,5,6,7,8) gu=g-gq if gq>=gf, or = g-gf if gq<gf n=Max(gq-gf)/2,0)PTHo=1-PLTo PL\*=PLT[1+(N-1)q/(qf+qu/EL1+4.24)]EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0) fmin=2(1+PL)/g or fmin=2(1+Pl)/g gdiff=max(gq-gf,0) fm = [gf/g] + [gu/g] / [1+PL(EL1-1)], (min=fmin;max=1.00)flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text. SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET Permitted Left Turns EB WB  $\mathbf{NB}$ SB Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Pedestrian flow rate, Vpedg (p/h) OCCpedg Opposing queue clearing green, gq (s) Eff. ped. green consumed by opp. veh. queue, gq/gp OCCpedu Opposing flow rate, Vo (veh/h) OCCr Number of cross-street receiving lanes, Nrec Number of turning lanes, Nturn ApbT Proportion of left turns, PLT Proportion of left turns using protected phase, PLTA Left-turn adjustment, fLpb Permitted Right Turns Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Conflicting bicycle volume, Vbic (bicycles/h) Vpedg OCCpedg Effective green, g (s) Vbicq OCCbicg

1.1									
OCCr	1012								
	of cross			g lanes,	Nrec				
ApbT	of turni	ng lanes	, Nturn						
	ion righ	t-turns.	PRT						
	ion righ			otected	phase, F	PRTA			
Right t	urn adju	stment,	fRpb						
11				 					
~		SU	PPLEMENT	'AL UNIFC	ORM DELAY	WORKSHE	EET	1-7 <b>6-11-26-1</b> -7	
1						F	EBLT WBI	T NBLT	SBLT
Cycle 1	ength, C	6			90.0	sec			ODDI
	r vol fro		justment	Workshe	eet, v				353
	cio from	-							1.08
	ed phase		-		-				12.0
	ng queue sed green			interval	-, gq				35.08
	ne r=(C-g		r, gu						7.92 35.0
	rate, q		0(max[X.	1.0]))					0.09
	ed ph. d				)				0.501
Permitt	ed ph. d	eparture	rate, S	s=s(gq+g	gu)/(gu*3	600)			0.27
XPerm									1.84
XProt									0.71
Case	at beginn	ing of g	reen arr						3 4.95
	at beginn				ı. Ou				3.18
	al queue,			5	-, 2				1.78
	n Delay,								27.4
<u> </u>		DELAY/	LOS WORK	SHEET WI	TH INITI	AL QUEUE			
U	T								
	Initial	Dur.	Uniform	Delay	Initial	Final	Initial	Lane	
Appr/	Unmet	Dur. Unmet	Uniform	_	Initial Queue	. Final Unmet	Initial Queue	Lane Group	
Lane	Unmet Demand	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
	Unmet	Unmet Demand		_	Queue	Unmet	Queue	Group	
Lane Group	Unmet Demand Q veh	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane	Unmet Demand Q veh	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Unmet Demand Q veh	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Unmet Demand Q veh	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Unmet Demand Q veh and	Unmet Demand	Unadj.	- Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Unmet Demand Q veh and	Unmet Demand t hrs.	Unadj. ds	Adj. dl sec	Queue Param. u	Unmet Demand	Queue Delay d3 sec	Group Delay	
Lane Group Eastbou Westbou	Unmet Demand Q veh and ound	Unmet Demand t hrs.	Unadj. ds	Adj. dl sec	Queue Param. u	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Unmet Demand Q veh and ound	Unmet Demand t hrs.	Unadj. ds	Adj. dl sec 3 sec/v	Queue Param. u	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Unmet Demand Q veh and and ound ound Intersec	Unmet Demand t hrs.	Unadj. ds ay 110. BACK	Adj. dl sec 3 sec/v	Queue Param. u reh I JE WORKSH	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Unmet Demand Q veh and and ound ound Intersec	Unmet Demand t hrs.	Unadj. ds ay 110. BACK	Adj. dl sec 3 sec/v	Queue Param. u reh I JE WORKSH	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	d

LaneGroup Init Queue Flow Rate So No.Lanes SL LnCapacity Flow Ratio	0	0	0	L  0.0  182  1900  1  1805  501  0.10	0	R 0.0 444 1900 1 1615 449 0.27	     0	1 1900 844	R 0.0 101 1900 1 1615 1256 0.06	1 532 326	T 0.0 826 1900 1 1900 1161 0.43	0
v/c Ratio	l			0.36		0.99	ĺ	1.41	0.08	1.08		1
Grn Ratio				0.28		0.28			0.78	0.61	0.61	
I Factor AT or PVG				3	1.00			1.00			1.000	)
Pltn Ratio				1.00		3 1.00		3	3 1.00	3	3 1.00	
PF2				1.00		1.00			1.00	A Read to Read and	1.00	
Q1	1			3.7		11.1	1	29.7		4.0	14.2	
кВ	i			0.7		0.7	i	1.0	1.3	0.5	1.3	i
Q2	İ			0.4		5.7	i	46.1	0.1	6.8	2.9	i
Q Average	ĺ			4.1		16.8	ĺ	75.8	0.7	10.7	17.1	Í
Q Spacing				25.0		25.0		25.0	25.0	25.0	25.0	
Q Storage				0		0	1	0	0	0	0	
Q S Ratio		<u> </u>					I			I		
70th Percent fB%	LITE	Outpi	10:	11.2		1.2	ř.	1 0	1 2	11 0	1 0	,
BOQ				5.0		20.2		1.2 91.0	1.3	1.2	1.2 20.6	
QSRatio				15.0		20.2	1	91.0	0.5	113.0	20.0	
85th Percent	cile	Outpu	it:	1			1			1		
fB%		-		1.5		1.4	I	1.4	1.7	1.4	1.4	1
BOQ	ĺ			6.2		23.6	İ	106	1.2	15.4	24.1	j
QSRatio				1			1			1		Í
90th Percent	cile	Outpu	it:									
fB%				1.7		1.5		1.5	1.9	1.6	1.5	
BOQ				7.0		25.4		114	1.4	16.7	26.0	
QSRatio		0	. L				1			1		
95th Percent fB%	l	Outpu	10:	2.0		1.6	r I	1.6	2.5	1.7	1.6	1
BOQ				8.3		27.4	1	121	1.8	10.03 10 101	28.0	
QSRatio						27.1	i	121	1.0	1 10.1	20.0	
98th Percent	ile	Outpu	it:				,			1		,
fB%		-		2.4		1.8	1	1.7	3.0	1.9	1.7	1
BOQ				9.6		29.4		129	2.1	20.1	30.0	j
QSRatio												İ

\_\_ERROR MESSAGES\_

No errors to report.

Analyst: MAHInter.: CTH A & CTH JJ EastAgency:<br/>Date: 6/14/2004Area Type: All other areas<br/>Jurisd: Outagamie County<br/>Year : 2020Project ID: CTH A & CTH JJ (East), 2020Partial, Add Lanes<br/>N/S St: CTH A

#### SIGNALIZED INTERSECTION SUMMARY

	Eas	stbou	nd	Wes	stbou	Ind	No	rthbo	und	Sou	Southbound			
	L	Т	R	L	т	R	Ĺ	т	R	L	т	R		
No. Lanes	0	0	0	-	0	1		2	0		2	0		
LGConfig		U	0	L	U	R		TR	Ū	Defl	LT	Ū	1, 5 0	
Volume				164		400	1.1.1	1068	251	318	743			
Lane Width				12.0		12.0	14 A 16	12.0		12.0	12.0			
RTOR Vol	1			1		0	1		160	1				

Duration 0.25 Area Type: All other areas

		163-5-5		1984 N	S	igna	l Op	perat	ions	2	- M - C - G - D	10		
Pha	se Comb	ination	1	2	3		4			5	6	7	8	
EB	Left							NB	Left					
Π	Thru								Thru		Р			
	Right								Right		Ρ			
	Peds						pu $[k]$		Peds					
WB	Left		P				1	SB	Left	Ρ	P			
	Thru								Thru	Р	Ρ			
	Right		P						Right					
-	Peds						ĺ		Peds					
NB	Right							EB	Right					
SB	Right							WB	Right	Ρ				
Gre	en	2	2.0				8			15.0	40.0			
Yel	low	3	.0							3.0	3.0			
All	Red	2	.0							0.0	2.0			
Access of the second										Cycl	e Leng	gth: 90	. 0	secs
0			Int	erse	ctic	n Pe	erfor	manc	e Summa	ary				

Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rat	ios	Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/C	Delay LOS	Delay LOS	
Eastbou	ind	1353	8.953		54.5		in sum

Westbour	nd								
L	441	1805	0.41	0.24	31.4	С	24.0	С	
R	754	1615	0.59	0.47	21.0	С			
Northbo	und								
11									
TR	1586	3568	0.81	0.44	26.4	С	26.4	C	
Southbo	und								
DefL	386	1805	0.91	0.64	54.5	D			
$\cup_{\mathbf{T}}$	1224	1900	0.67	0.64	13.1	В	25.5	С	
0	Inters	ection Dela	v = 25.6	(sec/v	reh) Ir	iters	ection L	OS =	С
			1						

Phone: E-Mail: Fax:

	OPERATIONAL ANALYSIS
Analyst:	МАН
Agency/Co.:	
Date Performed:	6/14/2004
Analysis Time Period:	
Intersection:	CTH A & CTH JJ East
Area Type:	All other areas
Jurisdiction:	Outagamie County
Analysis Year:	2020
Project ID: CTH A & CTH	JJ (East), 2020 Partial, Add Lanes
Eas	t/West Street North/South Street
CTH JJ	CTH A

VOLUME DAT	Ά

	Eas	stboi	ınd	Wes	tbou	ınd	No	orthbo	und	Southbound		
	L	Т	R	L	т	R	L	Т	R	L	Т	R
Volume				164		400		1068	251	318	743	
% Heavy Veh	l			0		0	İ	0	0	j o	0	
PHF				0.90		0.90	ĺ	0.90	0.90	0.90	0.90	
PK 15 Vol				46		111	1	297	70	88	206	
Hi Ln Vol	1			1			1			ĺ		
% Grade				1	0		1	0		İ	0	
Ideal Sat				1900		1900	1	1900		1900	1900	
ParkExist				1								
NumPark				1						1		
No. Lanes	0	0	0	1	0	1	0	2	0	0	2	0
LGConfig				L		R		TR		Defi	ΓЗ	
Lane Width				12.0		12.0		12.0		12.0	12.0	
RTOR Vol						0			160			
Adj Flow				182		444		1288		353	826	
%InSharedLn										1		
Prop LTs								0.0	00	1.000	0.00	0
Prop RTs						1.000	0	.078		0	.000	
Peds Bikes	0			0			0			Ì		
Buses				0		0		0		0	0	
%InProtPhase	9									0.0		
Duration	0.25		Area	Type:	All	other a	areas			-		

#### OPERATING PARAMETERS

\_\_\_\_\_

	Ea: L	stbou T	nd R	We L	stbou T	nd R	No   L	rthbo T	und R	So   L	und   R	
Init Unmet				0.0		0.0		0.0		0.0	0.0	
Arriv. Type				3		3	i	3		3	3	i
Unit Ext.				3.0		3.0	İ	3.0		3.0	3.0	i
I Factor					1.00	0	1	1.00	0	ĺ	1.000	o į
Lost Time				2.0		2.0	1	2.0		2.0	2.0	i
Ext of g				2.0		2.0	1	2.0		2.0	2.0	i

Ped	Min g													Ι
<u> </u>			2001			PHA	SE	DATA						
Phas	e Combin	nation	1	2	3		4			5	6	7	8	
EB	Left Thru Right Peds							NB	Left Thru Right Peds		P P			
WB	Left Thru Right Peds		P P					SB	Left Thru Right Peds	P P	P P			
NB	Right							EB	Right					
SB	Right							WB	Right	Ρ				
7							1							
Gree Yell All	ow		22.0 3.0 2.0							15.0 3.0 0.0	40.0 3.0 2.0			
										Сус	le Len	gth:	90.0	secs
Volu	ıme Adjus	stment		e adj	USTME	ENT A	ND	SATU	RATION	FLOW	WORKSH	IEET		<u> </u>
			tbound T	l R	We	estbo T		R	Nort   L	hboun T			hbound T R	

	1 100	c. c. c. c. a.		1			1 1020110	0 411 4	1			
	L	Т	R	L	т	R	L T	R	L	Т	R	
Volume, V			718 E	164		400	106	8 251	318	743	1300	-
PHF				0.90		0.90	0.9	0 0.90	0.90	0.90		
Adj flow	İ			182		444	118	7 101	353	826		
No. Lanes	0	0	0	1	0	1	0 2	0	0	2	0	1.1
Lane group	Ì			L		R	Т	R	Def	L T		
Adj flow				182		444	128	8	353	826		
Prop LTs	0.0						0.	000	1.00	0 0.00	00	
Prop RTs	İ			ĺ		1.000	0.078		0	.000		

L	Saturation Flow Rate	(see	Exhibit 16-7	to	determine	the	adjustment	factors)_	
	Eastbound		Westbound		Northbou	ind	South	nbound	

	Eastboun	a	wes	SCDO	una		INC	JIC	mbound	1	Sou	choound	0.1.0210	
LG			L			R			TR		DefL	Т		
So			1900			1900			1900		1900	1900		
Lanes 0	0	0	1	0		1	0		2	0	0	2	0	
fW			1.000			1.000			1.000		1.000	1.000		
fHV			1.000			1.000			1.000		1.000	1.000		
fG			1.000			1.000			1.000		1.000	1.000		
fP			1.000			1.000			1.000		1.000	1.000		
fBB			1.000			1.000			1.000		1.000	1.000		
fA			1.00			1.00			1.00		1.00	1.00		
fLU			1.00			1.00			0.95		1.00	1.00		
fRT						0.850			0.988			1.000		
fLT			0.950						1.000		0.950	1.000		
Sec.											0.093			
fLpb			1.000						1.000		1.000	1.000		
fRpb						1.000			1.000			1.000		
S			1805			1615			3568		1805	1900		
Sec.											177			
			CAPA	CITY	AN	D LOS	WORE	KSH	EET					

Capacity Appr/ Mvmt			Lane G Adj w Rate (v)	Adj Flow	apacit Sat Rate s)	y Flow Ratio (v/s)	Gree Rat (g/	io Ca	-Lane G apacity (c)	-	9
Eastboun Prot Perm Left Prot Perm Thru	d										
Right Westboun Prot Perm											
Left Prot Perm Thru	L .	1	82	18	05	# 0.10	0.2	24	441	0.41	
Right Northbou Prot Perm Left Prot		4	44	16	15	0.27	0.4	47	754	0.59	
Perm Thru Right Southbou		1	288	35	68	# 0.36	0.4	44	1586	0.81	
Prot Perm Left Prot Perm Thru Right	DefL T	5 3	01 2 53 26	17		0.17 0.29 # 0.43			301 85 386 1224	1.00 0.61 0.91 0.67	
Sum of f Total lo Critical	low rati st time	per cy	cle, I	L = 15	.00 se	C		um (v/	/s) = (C-L) =	0.90	
Control Appr/ Lane Grp v/	Ratios	d LOS Unf Del d1	Determi Prog Adj Fact	Lane Grp		mental r Del d2	Res Del d3		Group ay LOS	Appro Delay	
Eastboun	d										
Westboun L 0.4		28.6	1.000	441	0.50	2.8	0.0	31.4	С	24.0	С
R 0.5 Northbou		17.7	1.000	754	0.50	3.4	0.0	21.0	С		
TR 0.8 Southbour		21.7	1.000	1586	0.50	4.6	0.0	26.4	С	26.4	С
DefL 0.9		25.9	1.000	386	0.50	28.6	0.0	54.5	D		

٠.

т

Intersection delay = 25.6 (sec/veh) Intersection LOS = C

\_SUPPLEMENTAL PERMITTED LT WORKSHEET\_\_\_\_\_\_ for exclusive lefts

	FOR CACINDIVE FEED			
T	Input			<b>G</b> D
L	Cycle length, C 90.0 sec	EB WB	NB	SB
	Total actual green time for LT lane group, G (s)		0 e <sup>2</sup> - 11 c2	58.0
[	Effective permitted green time for LT lane group, g(s)			43.0
	Opposing effective green time, go (s)			40.0
-	Number of lanes in LT lane group, N			1
	Number of lanes in opposing approach, No			2
L	Adjusted LT flow rate, VLT (veh/h)			353
	Proportion of LT in LT lane group, PLT			1.000
r	Proportion of LT in opposing flow, PLTo			0.00
1	Adjusted opposing flow rate, Vo (veh/h)			1288
	Lost time for LT lane group, tL			5.00
-	Computation			
	LT volume per cycle, LTC=VLTC/3600			8.82
L	Opposing lane util. factor, fLUo		1.00	0.95
	Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)			16.95
Ē	<pre>qf=G[exp(- a * (LTC ** b))]-tl, qf&lt;=q</pre>			0.0
	Opposing platoon ratio, Rpo (refer Exhibit 16-11)			1.00
×	Opposing Queue Ratio, gro=Max[1-Rpo(go/C),0]			0.56
	gg, (see Exhibit C16-4,5,6,7,8)			30.21
	gu=g-gq if gq>=gf, or = g-gf if gq <gf< td=""><td></td><td></td><td>12.79</td></gf<>			12.79
	n=Max(gq-gf)/2,0)			15.10
	PTHO=1-PLTO			1.00
	PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]			1.00
	EL1 (refer to Exhibit C16-3)			4.65
	EL2=Max((1-Ptho**n)/Plto, 1.0)			4.05
	fmin=2(1+PL)/g or $fmin=2(1+PL)/g$			0.09
1	gdiff=max(gq-gf,0)			
U				0.00
	fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	1)] (fmin	£	0.09
C	flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2	) ] , ( _ ( _ ( _ 1	1<=111<=1.	00)
	or flt= $[fm+0.91(N-1)]/N**$			
U	Left-turn adjustment, fLT			0.093
			1	
1	For special case of single-lane approach opposed by mu	Itilane ap	proach,	
U	see text.			
	* If Pl>=1 for shared left-turn lanes with N>1, then as	ssume de-f	acto	
$\overline{O}$	left-turn lane and redo calculations.			
	** For permitted left-turns with multiple exclusive let			=fm.
IJ	For special case of multilane approach opposed by sing	le-lane ap	proach	
	or when gf>gq, see text.			
1				
U	SUPPLEMENTAL PERMITTED LT WORKSHI	EET	9 - 1997 - La Constantia († 1897) 1997 - La Constantia († 1897) 1997 - La Constantia († 1897)	
	for shared lefts			
	Input			
Н		EB WB	NB	SB
	Cycle length, C 90.0 sec			
	Total actual green time for LT lane group, G (s)			
11	Effective permitted green time for LT lane group, g(s)			
4	Opposing effective green time, go (s)			
	Number of lanes in LT lane group, N			
$\square$	Number of lanes in opposing approach, No			
11				

Adjusted LT flow rate, VLT (veh/h) Proportion of LT in LT lane group, PLT 0.000 0.000 Proportion of LT in opposing flow, PLTo Adjusted opposing flow rate, Vo (veh/h) Lost time for LT lane group, tL Computation LT volume per cycle, LTC=VLTC/3600 Opposing lane util. factor, fLUo 1.00 0.95 Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) qf=G[exp(- a \* (LTC \*\* b))]-tl, qf<=q</pre> Opposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] gq, (see Exhibit C16-4,5,6,7,8) gu=g-gq if gq>=gf, or = g-gf if gq<gf n=Max(gq-gf)/2,0)PTHo=1-PLTo PL\*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0)fmin=2(1+PL)/g or fmin=2(1+PL)/ggdiff=max(gq-gf,0) fm = [qf/q] + [qu/q] / [1+PL(EL1-1)], (min=fmin;max=1.00)flt=fm=[qf/q]+[qu/q]/[1+PL(EL1-1)]+[qdiff/q]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text. SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET Permitted Left Turns EB SB WB NB Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Pedestrian flow rate, Vpedg (p/h) OCCpedq Opposing queue clearing green, gq (s) Eff. ped. green consumed by opp. veh. queue, gq/gp OCCpedu Opposing flow rate, Vo (veh/h) OCCr Number of cross-street receiving lanes, Nrec Number of turning lanes, Nturn ApbT Proportion of left turns, PLT Proportion of left turns using protected phase, PLTA Left-turn adjustment, fLpb Permitted Right Turns Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Conflicting bicycle volume, Vbic (bicycles/h) Vpedg OCCpedg Effective green, g (s) Vbicq OCCbicg

OCCr Number of cross-s Number of turning		ng lanes,	Nrec			
ApbT Proportion right- Proportion right- Right turn adjust	turns using pr	rotected	phase, P	RTA		
	SUPPLEMEN	TAL UNIFO	RM DELAY	WORKSHEET		
Π	0	NF. 0				
			~ ~ ~	EBL	T WBLT NBL	r sblt
Cycle length, C Adj. LT vol from	Vol Adjustment	Workshe	90.0	sec		353
v/c ratio from Ca	-		cc, v			0.91
Protected phase e			l, g (s)			15.0
Opposing queue ef		interval	, gq			30.21
Unopposed green is						12.79
Red time r=(C-g-ge Arrival rate, ga=		1 01))				32.0 0.10
Protected ph. dep						0.10
Permitted ph. dep				600)		0.17
XPerm		.51.5				1.99
XProt						0.61
Case		2.2.1				3
Queue at beginning Queue at beginning			011			5.24 2.96
Residual queue, Q	—	ted green	, Qu			2.10
Uniform Delay, d1						25.9
0						
0	DELAY/LOS WORI	KSHEET WI	TH INITI	AL QUEUE	s	ercent in
Initial D		m Delay	Initial		nitial Lane	
	nmet	-	Initial Queue Param.	Unmet Q	ueue Group	
Appr/ Unmet U Lane Demand D	nmet	-	Queue	Unmet Qu Demand De	ueue Group	
Appr/ Unmet U Lane Demand D Group Q veh t	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	n a, Pargant i l
Appr/ Unmet U Lane Demand D	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	e, 3, es repetit 1, et repetit 1, et rando
Appr/ Unmet U Lane Demand D Group Q veh t	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	i naepaen 1 i naepaen 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Appr/ Unmet U Lane Demand D Group Q veh t	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	i traccon titrac titra
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	i i nepa m i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i i nepa m i i nepa m i i nepa m i nepa m i i nepa m i
Appr/ Unmet U Lane Demand D Group Q veh t	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj.	Adj.	Queue Param.	Unmet Qu Demand De	ueue Group elay Delay	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound Northbound Southbound	nmet emand Unadj. hrs. ds	Adj. d1 sec	Queue Param. u	Unmet Qu Demand Do Q veh di	ueue Group elay Delay 3 sec d sec	
Appr/ Unmet U Lane Demand D Group Q veh t Eastbound Westbound	nmet emand Unadj. hrs. ds	Adj. d1 sec	Queue Param. u	Unmet Qu Demand De	ueue Group elay Delay 3 sec d sec	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound Northbound Southbound	nmet emand Unadj. hrs. ds	Adj. d1 sec	Queue Param. u	Unmet Qu Demand Do Q veh di	ueue Group elay Delay 3 sec d sec	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound Northbound Southbound	nmet emand Unadj. hrs. ds on Delay 25.6	Adj. dl sec 5 sec/v X OF QUEU	Queue Param. u eh I: E WORKSH	Unmet Qu Demand Do Q veh di ntersection EET	ueue Group elay Delay 3 sec d sec	
Appr/ Unmet U: Lane Demand D Group Q veh t Eastbound Westbound Northbound Southbound	nmet emand Unadj. hrs. ds on Delay 25.6	Adj. dl sec	Queue Param. u eh I: E WORKSH	Unmet Qu Demand Do Q veh di	ueue Group elay Delay 3 sec d sec	and

LaneGroup Init Queue Flow Rate				L  0.0  182	R   0.0   444	TR 0.0 677	DefL T 0.0 0.0 353 826
So				1900	1900	1900	1900 1900
No.Lanes	0	0	0	1 0	1 0	2 0	0 2 0
SL				1805	1615	1877	598 1900
LnCapacity				441	754	834	386 1224
Flow Ratio				0.10	0.27	0.36	0.59 0.43
v/c Ratio				0.41	0.59	0.81	0.91 0.67
Grn Ratio				0.24	0.47	0.44	0.64 0.64
I Factor				1.00		1.000	1.000
AT or PVG				3	3	3	3 3
Pltn Ratio				1.00	1.00	1.00	1.00 1.00
PF2				1.00	1.00	1.00	1.00 1.00
Q1				3.8	8.2	14.7	3.7 13.0
kB				0.6	0.9	1.0	0.6 1.3
Q2				0.4	1.3	3.7	3.4 2.6
Q Average				4.3	9.5	18.4	7.1 15.6
Q Spacing				25.0	25.0	25.0	25.0 25.0
Q Storage				0	0	0	0 0
Q S Ratio				1			
70th Percent	tile	Outpu	t:				
fB%				1.2	1.2	1.2	1.2 1.2
BOQ				5.3	11.5	22.1	8.7 18.8
QSRatio							
85th Percent	tile	Outpu	t:				
fB%				1.5	1.4	1.4	1.5 1.4
BOQ				6.5	13.7	25.9	10.5 22.0
QSRatio				1			
90th Percent	tile	Outpu	t:				
fB%				1.7	1.6	1.5	1.6 1.5
BOQ				7.3	14.9	27.8	11.5 23.7
QSRatio				l.			
95th Percent	tile	Outpu	t:				
fB%				2.0	1.8	1.6	1.8 1.6
BOQ				8.6	16.6	29.9	13.1 25.6
QSRatio				1			1
98th Percent	tile	Outpu	t:	1			<ul> <li>even state task stars</li> </ul>
fB%				2.3	1.9	1.7	2.1 1.8
BOQ				10.0	18.2	31.9	14.7 27.5
QSRatio				1	1		1 1

\_\_\_\_\_ERROR MESSAGES\_\_\_\_\_

No errors to report.



TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analyst: Agency/Co.: Date Performed: Analysis Time Period: Intersection: Jurisdiction: Units: U. S. Customar Analysis Year: Project ID: Partial East/West Street: North/South Street: Intersection Orientat	CTH A & CTH Outagamie C Y 2000 interchange CTH JJ CTH A	ounty	Sti	udy period	(hrs):	0.25	
	Vehicle Vol	umes and	Adius	tments			
Major Street: Approa		rthbound	majub		thbound		
Moveme		2	3	4	5	6	
	L	т	R	L	Т	R	
Volume		675	158	227	528		
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR		750	175	252	586		
Percent Heavy Vehicle				9			
Median Type/Storage	Undiv		NIC	/			
RT Channelized?		1 1	No	1	1		
Lanes Configuration		TR		L	T		
Upstream Signal?		No		Ц	No		
opscieam bignai:		NO			NO		
Minor Street: Approa	ch We	stbound		Eas	tbound		5
Moveme		8	9	10	11	12	
	$\mathbf{L}$	Т	R	L	т	R	
Volume	111		273				
Peak Hour Factor, PHF			0.90				
Hourly Flow Rate, HFR			303				
Percent Heavy Vehicle	es 9	0	9		0		
Percent Grade (%)	sts?/Storage	0		1	0		/
Flared Approach: Exi Lanes	.scs:/scorage	1		/			/
Configuration	L						
conriguration	1						
Del	ay, Queue Le	ngth, and	d Leve	l of Servi			
Approach N	IB SB	West	bound	Non-	Eastb	ound	
Movement 1	. 4	7	8	9   1	0 1	1 :	12
Lane Config	L	L		R			
v (vph)	252	123		303			
C(m) (vph)	711	51		400			
v/c	0.35	2.41		0.76			
95% queue length	1.60	12.65		6.20			
Control Delay	12.8	814.6		37.2			
LOS	В	F	261 6	E			
Approach Delay			261.6 F				
Approach LOS			1				

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_\_\_\_

Analyst: Agency/Co.: Date Performed: Analysis Time Period:	MAH OMNNI 6/14/04
Intersection: Jurisdiction: Units: U. S. Customar Analysis Year:	CTH A & CTH JJ Outagamie County
Project ID: Partial East/West Street: North/South Street: Intersection Orientat	СТН ЈЈ СТН А

Study period (hrs): 0.25

J	Vehicle V	7olumes	and Ad	justment	S		4 - Cel 1 Lon	140
Major Street Movements	1	2	3	4	5	6		
	L	т	R	L	т	R		
			150					
Volume		675	158	227	528			
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90			
Peak-15 Minute Volume		188	44	63	147			
Hourly Flow Rate, HFR		750	175	252	586			
Percent Heavy Vehicles				9				
Median Type/Storage	Undiv	rided		/				
RT Channelized?			No					
Lanes		1 1		1	1			
Configuration		T R		L	Т			
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12		
	L	т	R	L	Т	R		
Volume	111		273	T.				
Peak Hour Factor, PHF	0.90		0.90					
Peak-15 Minute Volume	31		76					
Hourly Flow Rate, HFR	123		303					
Percent Heavy Vehicles	9		9					
Percent Grade (%)		0			0			
Flared Approach: Exists'	/Storage	2		1			1	
RT Channelized?	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-	No	•				
Lanes	1	1						
Configuration	Ĺ	R						
	ш 							
Peo	destrian	Volumes	and A	djustmer	nts			
Movements	13	14	15	16				
Flow (ped/hr)	0	0	0	0				

	(sec)			12.0 4.0	12.0 4.0	12.0 4.0		
Valking Speed (f Percent Blockage	2, 500,	0	63005. U	0	0	0		
		U	ostrea	m Sign	al Data	a		
	Prog.	Sat	Arri		Green	Cycle	Prog.	Distance
	Flow	Flow	Тур	е	Time	Length	Speed	to Signal
	vph	vph			sec	sec	mph	feet
2 Left-Turn								
Through								
5 Left-Turn								
Through								
orksheet 3-Data	for Co	mputing	Effec	t of D	elay t	o Major	Street V	Vehicles
					Movem	ent 2	Moveme	ent 5
Shared ln volume	. maior	th veh	icles					
Shared in volume								
Sat flow rate, m								
Sat flow rate, ma	-							
Jumber of major				:				
<b>..</b>		J						
Critical Gap Cal Novement	culatio 1 L	on 4 L	7 L	8 T	9 R	10 L	11 T	12 R
	-	_						
t(c,base)		4.1	7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00		0 1.00	1.00	1.00
?(hv)		9	9		9			
c(c,g)			0.20	0.20				0.10
Frade/100		0.00	0.00	0.00			0.00	0.00
(		0.00	0.70	0 00	0.0		0.00	0.00
	0 0 0							
t(c,T): 1-stage		0.00	0.00	0.00				0.00
c(c,T): 1-stage 2-stage	0.00	0.00	1.00	1.00	0.0	0 1.00		0.00
t(c,T): 1-stage 2-stage	0.00					0 1.00		
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage	0.00	0.00 4.2	1.00		0.0	0 1.00		
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C	0.00	0.00 4.2	1.00		0.0	0 1.00		
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C	0.00 alculat	0.00 4.2	1.00 6.5	1.00	0.0	0 1.00	1.00	0.00
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C Movement	0.00 alculat 1	0.00 4.2 cions 4	1.00 6.5 7	1.00	9 0.0	0 1.00 10 L	1.00	0.00
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C Movement t(f,base)	0.00 alculat 1	0.00 4.2 tions 4 L	1.00 6.5 7 L	1.00	9 0.0 6.3 9 R 3.3	0 1.00 10 L 0	1.00 11 T	0.00
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C Movement t(f,base) t(f,HV)	0.00 alculat 1 L	0.00 4.2 cions 4 L 2.20	1.00 6.5 7 L 3.50	1.00 8 T	9 8 8 9 8 8 3.3 9 9 9	0 1.00 10 L 0 0 0.90	1.00 11 T	0.00 12 R
2-stage t(c) 1-stage	0.00 alculat 1 L	0.00 4.2 cions 4 L 2.20 0.90	1.00 6.5 7 L 3.50 0.90	1.00 8 T	9 8 8 9 8 3.3 0.9	0 1.00 10 L 0 0 0.90	1.00 11 T	0.00 12 R
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time C Movement t(f,base) t(f,HV) P(HV)	0.00 alculat 1 L	0.00 4.2 cions 4 L 2.20 0.90 9	1.00 6.5 7 L 3.50 0.90 9	1.00 8 T	9 8 8 9 8 8 3.3 9 9 9	0 1.00 10 L 0 0 0.90	1.00 11 T	0.00 12 R
<pre>c(c,T): 1-stage 2-stage c(c) 1-stage 2-stage Follow-Up Time C Movement c(f,base) c(f,HV) P(HV)</pre>	0.00 alculat L 0.90	0.00 4.2 cions 4 L 2.20 0.90 9 2.3	1.00 6.5 7 L 3.50 0.90 9 3.6	1.00 8 T 0.90	9 8 8 9 8 8 3.3 9 9 9	0 1.00 10 L 0 0 0.90	1.00 11 T	0.00 12 R

Computation	1-Queue	Clearance	Time	at	Upstream	Signal			
,_					Mov	vement 2	Move	ement 5	
					V(t)	V(l,prot)	V(t)	V(l,prot)	

Arrival Type Effective Green, g (se Cycle Length, C (sec) Rp (from Exhibit 16-11 Proportion vehicles an g(q1) g(q2) g(q)	.)	on gree	n P					
Computation 2-Proport	on of	TWSC Int		Movem	e bloc ent 2 (l,prot	M	lovement V(1,	5 prot)
alpha								
beta								
Travel time, t(a) (see Smoothing Factor, F	2)							
Proportion of conflict Max platooned flow, V Min platooned flow, V	(c,max)	ow, f						
Duration of blocked pe	eriod,	t(p)						
Proportion time block	ed, p			0.0	00		0.000	
Computation 3-Platoon	Event	Periods	Res	ult		Non-besent		eget Lei
p(2)			0.0	00				
p(2) p(5)			0.0					
p(dom)								
p(subo) Constrained or unconst	rained	?						
Proportion		1)		(2)		(3)		
unblocked for minor		1) e-stage			tage Pr			
movements, p(x)	-	cess	Sta	ge I		Stage ]	I	
p(1)		1.10.2.2				e Berañ	000.00	is yaits
p(4)								
p(7)								
p(8) p(9)								
p(10)								
p(11)								
p(12)								
Computation 4 and 5		retio			1	- JI - D I		ost (b
Single-Stage Process			_		0	1.0	11	10
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
	Ц	. 9 - <sup>0</sup> - 9 - 9	un andre i	10 100			. No Cologitad	0.0.385
V c,x		925	1840		750			
S								
Px V c,u,x								
C r,x C plat,x		1					C / Correction	
Two-Stage Process								
	7		8		10		11	

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x) s P(x) V(c,u,x)		1500						
C(r,x) C(plat,x)								
Worksheet 6-	Impedance	e and Cap	acity Eq	quations				
Step 1: RT f	from Minor	st.			9		12	
Conflicting	Flowe				750			
Potential Ca					400			
Pedestrian ]		Factor			1.00		1.00	
Movement Car		ractor			400			
Probability	28 J 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	free St.			0.24		1.00	
Step 2: LT f	from Majon	st.			4		1	
Conflicting	FLOWS				925			
Potential Ca					711			
Pedestrian		Factor			1.00		1.00	
Movement Cap		ruccor			711			
Probability Maj L-Shared	of Queue				0.65		1.00	
Step 3: TH	Erom Minor	r St.			8		11	
Conflicting								
Potential Ca Pedestrian		Factor			1.00		1.00	
Cap. Adj. fa	actor due		ding mvm	nt	0.65		0.65	
Movement Ca Probability		free St	•		1.00		1.00	)
Step 4: LT :	from Mino:	r St.			7		10	)
Conflicting	Flows				1840			
Potential Ca					79			
Pedestrian	-	Factor			1.00		1.00	)
	_		- r		1.00		0.65	
Maj. L, Min							0.72	
Maj. L, Min				~+	0 65		0.18	
Cap. Adj. f	actor due	to imped	aring mym		0.65		0.10	

Movement Capacity

51

8

11

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity 1.00 Pedestrian Impedance Factor 1.00 0.65 0.65 Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y Ct 1.00 1.00 Probability of Queue free St. 7 10 Step 4: LT from Minor St. Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage 1840 Conflicting Flows 79 Potential Capacity Pedestrian Impedance Factor 1.00 1.00 0.65 Maj. L, Min T Impedance factor 0.72 Maj. L, Min T Adj. Imp Factor. 0.18 Cap. Adj. factor due to Impeding mvmnt 0.65 51 Movement Capacity Results for Two-stage process: а Y C t 51 Worksheet 8-Shared Lane Calculations 7 9 10 11 12 8 Movement т R L т R L 123 303 Volume (vph) 400 51 Movement Capacity (vph) Shared Lane Capacity (vph)

Worksheet 9-Computation of Effect	of Flared	Minor	Street	Approac	hes	
Movement	7	8	9	10	11	12
	L	т	R	L	Т	R
C sep	51		400			
Volume	123		303			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						
Worksheet 10-Delay, Queue Length,	and Level	of Se	rvice			

Movement	1	4	7	8	9	10	11	12
Lane Config	-	Ĺ	Ĺ	Ū	R			
Lane conrig		-	-					
v (vph)		252	123		303			
C(m) (vph)		711	51		400			
v/c		0.35	2.41		0.76			
95% queue length		1.60	12.65		6.20			
Control Delay		12.8	814.6		37.2			
LOS		В	F		E			
Approach Delay				261.6				
Approach LOS				F				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.65
v(il), Volume for stream 2 or 5		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6		
P*(oj)		
d(M,LT), Delay for stream 1 or 4		12.8
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		



TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analysis Time Period: Intersection: STH Jurisdiction: Units: U. S. Customary Analysis Year: 202 Project ID: STH 47 & CTH East/West Street: CTH	INI 25/2004 H 47 & CTH A CO H A Intersection, H A H 47	partial Study period	(hrs): 0.25
Vol	nicle Volumes and	Adjustments	
Major Street: Approach Movement	Northbound 1 2 L T		thbound 5 6 T R
Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized?	18 462 1.00 1.00 18 462 9 Undivided	/	387 1.00 387 
Lanes Configuration Upstream Signal?	0 1 LT NO		l T No
Minor Street: Approach Movement	Westbound 7 8 L T	Eas 9   10 R   L	tbound 11 12 T R
Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists Lanes Configuration	0 ?/Storage	529 1.00 529 9 / 0	5 1.00 5 9 0 No / 0 LR
Delay, Approach NB Movement 1 Lane Config LT	SB West	bound	ce Eastbound 0 11 12 LR
v (vph)18C(m) (vph)1134v/c0.0295% queue length0.05Control Delay8.2LOSAApproach DelayApproach LOS			534 304 1.76 34.55 382.9 F 382.9 F

## HCS2000: Unsignalized Intersections Release 4.1d

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS\_\_\_\_\_

Analyst: Agency/Co.: Date Performed: Analysis Time Period:	MAH OMNNI 6/25/2004		
Intersection: Jurisdiction:	STH 47 & CTH A		
Units: U. S. Customar Analysis Year:	2020		
Project ID: STH 47 &	CTH A Intersection, CTH A STH 47	<pre>partial   Study period (hrs):</pre>	0.25

			and Adj					
Major Street Movements	1	2	3	4	5	6		
	L	Т	R	L	Т	R		
Volume	18	462			387			
Peak-Hour Factor, PHF	1.00	1.00			1.00			
Peak-15 Minute Volume	4	116			97			
Hourly Flow Rate, HFR	18	462			387			
Percent Heavy Vehicles	9							
Median Type/Storage RT Channelized?	Undi	vided		/				
Lanes	0	1			1			
Configuration	I	т			т			
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12	10000	2
	L	Т	R	L	Т	R		
Volume	1.00			529		5		ii.
Peak Hour Factor, PHF				1.00		1.00		
Peak-15 Minute Volume				132		1		
Hourly Flow Rate, HFR				529		5		
Percent Heavy Vehicles				9		9		
Percent Grade (%)		0			0			
Flared Approach: Exist RT Channelized?	s?/Storag	le		/		No	/	
Lanes				0		0		
Configuration					LR			

1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Pedestrian	Volumes	and Ad	justments_	
Movements	13	14	15	16	
Flow (ped/hr)	0	0	0	0	 

Lane Width (ft)	12.0	12.0	12.0	12.0	
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0	
Percent Blockage	0	0	0	0	
	Upstr	eam Sig	nal Dat	a	

	υp	SCICAL DI	gillar Dac	.u		
Prog. Flow vph	_	Arrival Type	Green	Cycle	Distance to Signal feet	

S2 Left-Turn Through

S5 Left-Turn

Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	462	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

## Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	culatio	on							
Movement		1	4	7	8	9	10	11	12	
		L	$\mathbf{L}$	$\mathbf{L}$	Т	R	L	т	R	
t(c,base	)	4.1					7.1		6.2	
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)		9					9		9	
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Grade/10	0			0.00	0.00	0.00	0.00	0.00	0.00	
t(3,1t)		0.00					0.70		0.00	
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage						6.5		6.3	
- ( - )	2-stage									
	5									
Follow-U	p Time C	alcula	tions							
Movement		1	4	7	8	9	10	11	12	
		L	L	L	т	R	L	т	R	
t(f,base	:)	2.20					3.50		3.30	
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
P(HV)		9					9		9	
t(f)		2.3					3.6		3.4	
- ( - )										

Worksheet 5-Effect of Upstream Signals

Computation 1	-Queue	Clearance	Time	at	Upstream	Signal		
					Mov	vement 2	Mov	ement 5
					V(t)	V(l,prot)	V(t)	V(l,prot)

Iotal Saturation Flow	Rate, s	s (vph)						
Arrival Type Effective Green, g (se	-c)							
Cycle Length, C (sec)								
Rp (from Exhibit 16-11	1)							
Proportion vehicles an	rriving	on gree	n P					
3(d1)								
g(q2)								
g(q)								
Computation 2-Proport:	ion of 7	WSC Int	ersect	ion Time Moveme	e bloc	ked v	lovement	5
			v			) V(t)		prot)
							5 <u>15</u> 35 al	<u>101 J.J.</u>
alpha beta								
Travel time, t(a) (see	c)							
Smoothing Factor, F								
Proportion of conflict	ting flo	ow, f						
Max platooned flow, V	(c,max)							
Min platooned flow, V	(c,min)	- (n)						
Duration of blocked po Proportion time block		C(P)		0.0	00		0.000	
							ovic.	19. ord, 10
Computation 3-Platoon	Event 1	Periods	Re	sult		7.0000.00		ng sa man <u>ga Luga ka</u>
p(2)				000				
p(5)			0.	000				
p(dom)								
p(subo) Constrained or uncons	trained	?						
Proportion	1	- )		(2)		(3)		
unblocked for minor		1) e-stage			tage Pr			
movements, p(x)		cess	St	age I	cage	Stage ]	II	
2								
p(1)								
p(4) p(7)								
p(7) p(8)								
p(9)								
p(10)								
p(11)								
p(12)							- 56	a alter y
Computation 4 and 5		1987.0				- 71 c.u	iu 7 1295	iden 1 - pro-
Single-Stage Process	-	Δ	7	0	9	10	11	12
Movement	1 L	4 L	7 L	8 T	9 R	L	T	R
	Ц	-941-959					. 1.3 s <u>1995</u> 6	<u>0</u>
	387					885		387
V c,x								
V c,x s Px								
S								
s Px			0					
s Px V c,u,x								ан (1) Ан (1) (6) (1) (6) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
s Px V c,u,x C r,x	7		8		10			

(c,x)	1500	
$P(\mathbf{x})$		
(c,u,x)		
(r,x)		
(plat,x)		
orksheet 6-Impedance and Capacity Equation	S	
Step 1: RT from Minor St.	9	12
onflicting Flows		387
otential Capacity		646
edestrian Impedance Factor	1.00	1.00
lovement Capacity	1 00	646
Probability of Queue free St.	1.00	0.99
Step 2: LT from Major St.	4	1
Conflicting Flows		387
Potential Capacity		1134
Pedestrian Impedance Factor	1.00	1.00
Novement Capacity		1134
Probability of Queue free St.	1.00	0.98
Maj L-Shared Prob Q free St.		0.98
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity	1 00	1 00
Pedestrian Impedance Factor	1.00	1.00 0.98
Cap. Adj. factor due to Impeding mvmnt	0.98	0.98
Movement Capacity Probability of Queue free St.	1.00	1.00
- Step 4: LT from Minor St.	7	10
		00F
Conflicting Flows		885 307
Potential Capacity	1 00	1.00
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.98 0.98	
Maj. L, Min T Adj. Imp Factor.	0.98	0.98
Cap. Adj. factor due to Impeding mymnt	0.90	302
Movement Capacity		502

11

8

Step 3: TH from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)			529 302	304	5 646
Movement 7 L	8 T	9 R	10 L	11 T	12 R
Worksheet 8-Shared Lane Calculations		e .			
c t				302	
a Y					
Results for Two-stage process: a					
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0			302	
Maj. L, Min T Adj. Imp Factor.		.98 .98		0.98	
Maj. L, Min T Impedance factor		.98			
Pedestrian Impedance Factor		.00		1.00	
Potential Capacity				307	
Part 3 - Single Stage Conflicting Flows				885	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity					
Pedestrian Impedance Factor					
Potential Capacity					
Conflicting Flows					
Part 2 - Second Stage			1		
Novement Capacity					
Cap. Adj. factor due to Impeding mvmnt					
Pedestrian Impedance Factor					
Potential Capacity					
Conflicting Flows					
Part 1 - First Stage					1 2 2
Step 4: LT from Minor St.		7		10	
91 - 1 - 1 0 MCG	<u>.</u>	d.te	<u></u>		
C t Probability of Queue free St.	1	.00		1.00	
1					
Result for 2 stage process:					
Novement Capacity					
Cap. Adj. factor due to Impeding mvmnt	0	. 70		0.90	
Pedestrian Impedance Factor		.00 .98		1.00 0.98	
Potential Capacity	-	0.0		1 00	
Conflicting Flows					
Part 3 - Single Stage					
Iovement Capacity					
ap. Adj. factor due to Impeding mvmnt					
Pedestrian Impedance Factor					
Potential Capacity					

lovement				7	8	9	10	11	12
			נ		т	R	L	Т	R
C sep							302		646
Volume							529		5
Delay									
Q sep									
Q sep +1									
round (Qsep +1)									
n max									
C sh								304	
SUM C sep									
n									
C act									
Worksheet 10-Delay	, Queue	Length,	and	Level	of Se	rvice			
Movement	1	4	7	8		9	10	11	12
Lane Config	LT							LR	
v (vph)	18							534	
· (· F )	1134							304	
C(m) (vph)	0.02							1.76	
	0.02							34.55	
v/c	0.02							382.9	
v/c 95% queue length									
C(m) (vph) v/c 95% queue length Control Delay LOS	0.05							F	
v/c 95% queue length Control Delay	0.05 8.2							F 382.9 F	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.98	1.00
v(il), Volume for stream 2 or 5	462	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.98	
d(M,LT), Delay for stream 1 or 4	8.2	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	0.2	

# **APPENDIX G**



SHEET NO. JOB NUMBER ENGINEERING ONE SYSTEMS DRIVE CLIENT APPLETON, WI 54914-1654 ARCHITECTURE PROJECT ENVIRONMENTAL 920-735-6900 DATE MADE BY 1-800-571-6677 CHECKED BY DATE FAX 920-830-6100 www.omnni.com , hterehans CTH 00/571 15 to CTH A USA 41-Assume straight line growth between existing 2000 Count and 2020 projection Capacity = Cro 000 4 lanes x-2000 - 66,000 - 55400 2020 - 2000 - 7,000 - 55100 X= 2014 2020 provedier 71,000 k30 = 10.9 7(0+1) = 10.7 D=55/4/5 Peak hr one direction = 71,000 x.55 x.109 = 425 Cauph USH 41 CTH A TO STH 47 x= 2013 66,000 - 55100 X-2000 2020-2000 72000 - 55000 Peak hr one direction 72000x,55. 109 = 4316 uph USH41 Castor 574 47 78000 K. 55 X. 19 - 4676 uph Korp 1 A SR ON Raip 6500 ADT 6500 x.109 = 709 uph 29000 ADT 41 prior tu raip 2900 x.109 CTH 316/401 CTA A NA JA Ramp 7094ph 35500 × 109 - 387 500


Fax: Phone: E-mail: \_\_Operational Analysis\_\_\_\_\_ MAH Analyst: Agency or Company: OMNNI 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: southbound From/To: CTH A to STH 15 Jurisdiction: Analysis Year: 2020 Description: Full Interchange 4 lanes Flow Inputs and Adjustments veh/h Volume, V 4256 Peak-hour factor, PHF 0.90 Peak 15-min volume, v15 1182 v Trucks and buses 11 % Recreational vehicles 0 % Terrain type: Level % 0.00 Grade 0.00 mi Segment length Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.948 Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 2494 Speed Inputs and Adjustments Lane width 12.0 ft ft Right-shoulder lateral clearance 6.0 interchange/mi Interchange density 0.50 2 Number of lanes, N Free-flow speed: Base mi/h FFS or BFFS 65.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC mi/h 0.0 Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.5 mi/h Urban Freeway LOS and Performance Measures pc/h/ln Flow rate, vp 2494 60.5 mi/h Free-flow speed, FFS Average passenger-car speed, S mi/h 2 Number of lanes, N pc/mi/ln Density, D

Fax:

Operational Analysis Analyst: MAH OMNNI Agency or Company: 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: southbound From/To: CTH A to STH 15 Jurisdiction: Analysis Year: 2020 Description: Full Interchange 6 lanes Flow Inputs and Adjustments veh/h 4256 Volume, V 0.90 Peak-hour factor, PHF Peak 15-min volume, v15 1182 v % Trucks and buses 11 Recreational vehicles 0 % Level Terrain type: 0.00 % Grade 0.00 Segment length mi Trucks and buses PCE, ET 1.5 Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.948 Driver population factor, fp 1.00 pc/h/ln Flow rate, vp 1663 Speed Inputs and Adjustments Lane width 12.0 ft 6.0 ft Right-shoulder lateral clearance 0.50 interchange/mi Interchange density 3 Number of lanes, N Free-flow speed: Base FFS or BFFS 65.0 mi/h mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 Number of lanes adjustment, fN mi/h 3.0 Free-flow speed, FFS 62.0 mi/h Urban Freeway LOS and Performance Measures\_\_\_\_ pc/h/ln Flow rate, vp 1663 Free-flow speed, FFS 62.0 mi/h Average passenger-car speed, S 61.9 mi/h Number of lanes, N 3 26.9 pc/mi/ln Density, D

Fax:

\_\_\_\_\_Operational Analysis\_\_\_\_\_\_ MAH Analyst: OMNNI Agency or Company: 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: southbound CTH A to STH 47 From/To: Jurisdiction: Analysis Year: 2020 Description: Full Interchange 4 lanes Flow Inputs and Adjustments\_\_\_\_\_ veh/h 4316 Volume, V 0.90 Peak-hour factor, PHF v 1199 Peak 15-min volume, v15 11 00 Trucks and buses % 0 Recreational vehicles Level Terrain type: % 0.00 Grade 0.00 mi Segment length 1.5 Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 0.948 Heavy vehicle adjustment, fHV Driver population factor, fp 1.00 pc/h/ln 2530 Flow rate, vp Speed Inputs and Adjustments\_\_\_\_\_ 12.0 ft Lane width ft Right-shoulder lateral clearance 6.0 interchange/mi 0.50 Interchange density 2 Number of lanes, N Base Free-flow speed: mi/h 65.0 FFS or BFFS mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h 60.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures pc/h/ln 2530 Flow rate, vp mi/h 60.5 Free-flow speed, FFS mi/h Average passenger-car speed, S 2 Number of lanes, N pc/mi/ln Density, D

Fax:

Operational Analysis MAH Analyst: Agency or Company: OMNNI 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: southbound From/To: CTH A to STH 47 Jurisdiction: Analysis Year: 2020 Description: Full Interchange 6 lanes Flow Inputs and Adjustments veh/h 4316 Volume, V Peak-hour factor, PHF 0.90 1199 v Peak 15-min volume, v15 % Trucks and buses 11 % 0 Recreational vehicles Level Terrain type: 0.00 % Grade mi Segment length 0.00 1.5 Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 Heavy vehicle adjustment, fHV 0.948 Driver population factor, fp 1.00 pc/h/ln 1686 Flow rate, vp Speed Inputs and Adjustments\_\_\_\_\_ ft 12.0 Lane width ft 6.0 Right-shoulder lateral clearance interchange/mi 0.50 Interchange density Number of lanes, N 3 Base Free-flow speed: mi/h 65.0 FFS or BFFS mi/h 0.0 Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID mi/h 0.0 Number of lanes adjustment, fN 3.0 mi/h 62.0 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures 1686 pc/h/ln Flow rate, vp 62.0 mi/h Free-flow speed, FFS mi/h 61.9 Average passenger-car speed, S Number of lanes, N 3 27.3 pc/mi/ln Density, D

Fax:

\_\_\_\_\_Operational Analysis\_\_\_\_\_ MAH Analyst: Agency or Company: OMNNI Date Performed: 6/28/04 Analysis Time Period: Freeway/Direction: oneway STH 47 East From/To: Jurisdiction: 2020 Analysis Year: Description: Full Interchange 4 lanes \_\_\_\_Flow Inputs and Adjustments\_\_\_\_\_\_ veh/h 4676 Volume, V 0.90 Peak-hour factor, PHF 1299 v Peak 15-min volume, v15 % 11 Trucks and buses % 0 Recreational vehicles Level Terrain type: % 0.00 Grade 0.00 mi Segment length 1.5 Trucks and buses PCE, ET Recreational vehicle PCE, ER 1.2 0.948 Heavy vehicle adjustment, fHV Driver population factor, fp 1.00 pc/h/ln 2741 Flow rate, vp Speed Inputs and Adjustments ft 12.0 Lane width ft 6.0 Right-shoulder lateral clearance interchange/mi 0.50 Interchange density 2 Number of lanes, N Base Free-flow speed: mi/h FFS or BFFS 65.0 0.0 mi/h Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h 60.5 Free-flow speed, FFS Urban Freeway LOS and Performance Measures pc/h/ln 2741 Flow rate, vp mi/h 60.5 Free-flow speed, FFS mi/h Average passenger-car speed, S 2 Number of lanes, N pc/mi/ln Density, D

Fax:

Operational Analysis MAH Analyst: OMNNI Agency or Company: 6/28/04 Date Performed: Analysis Time Period: Freeway/Direction: oneway STH 47 East From/To: Jurisdiction: Analysis Year: 2020 Description: Full Interchange 6 lanes Flow Inputs and Adjustments\_\_\_\_\_ veh/h 4676 Volume, V 0.90 Peak-hour factor, PHF v 1299 Peak 15-min volume, v15 00 11 Trucks and buses % 0 Recreational vehicles Level Terrain type: 00 0.00 Grade 0.00 mi Segment length 1.5 Trucks and buses PCE, ET 1.2 Recreational vehicle PCE, ER 0.948 Heavy vehicle adjustment, fHV Driver population factor, fp 1.00 pc/h/ln 1827 Flow rate, vp Speed Inputs and Adjustments\_\_\_\_ 12.0 ft Lane width ft 6.0 Right-shoulder lateral clearance interchange/mi 0.50 Interchange density Number of lanes, N 3 Base Free-flow speed: mi/h 65.0 FFS or BFFS mi/h 0.0 Lane width adjustment, fLW mi/h Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID mi/h 0.0 mi/h Number of lanes adjustment, fN 3.0 62.0 mi/h Free-flow speed, FFS Urban Freeway LOS and Performance Measures pc/h/ln 1827 Flow rate, vp 62.0 mi/h Free-flow speed, FFS mi/h Average passenger-car speed, S 61.2 3 Number of lanes, N pc/mi/ln 29.8 Density, D

>hone:
L-mail:

Fax:

Merge Analysis MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: SB USH 41 STH 47 SB On ramp Junction: Jurisdiction: Analysis Year: 2020 Description: STH 47 SB On-ramp 2020 4 lanes Fu Freeway Data Merge Type of analysis Number of lanes in freeway 2 65.0 mph Free-flow speed on freeway vph 3543 Volume on freeway On Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp vph 382 Volume on ramp ft 750 Length of first accel/decel lane ft Length of second accel/decel lane \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions Adjacent Freeway Ramp Junction Components Ramp 3543 382 vph Volume, V (vph) 0.90 0.90 Peak-hour factor, PHF 984 106 v Peak 15-min volume, v15 00 11 11 Trucks and buses % 0 0 Recreational vehicles Level Level Terrain type: 00 00 % Grade mi mi mi Length Trucks and buses PCE, ET 1.5 1.5 1.2 Recreational vehicle PCE, ER 1.2

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.948 1.00 4153	0.948 1.00 448		pcph			
	Estimation of	V12 Merge A	reas					
L = EQ	· · · · · · ·	ation 25-2 c		)				
FM V = V	1.000 Usin (P) = 415 FM		0					
	Capacit	y Checks						
v	Actual 4601	Maximum 4700		LOS F? No				
FO V R12	4601	4600		Yes				
Level of	Service Dete	rmination (i	f not	F)				
Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.5 pc/mi/ln R R 12 A Level of service for ramp-freeway junction areas of influence F								
	Speed Est	imation						
Intermediate speed variab	le,		0.627					
Space mean speed in ramp	influence are		50.6	mph				
Space mean speed in outer	lanes,	R S = 0	N/A	mph				
Space mean speed for all	vehicles,	S =	50.6	mph				

Recreational vehicle PCE, ER

Fax:

Merge Analysis\_\_\_\_ Analyst: MAH Agency/Co.: OMNNI Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: SB USH 41 STH 47 SB On ramp Junction: Jurisdiction: Analysis Year: 2020 Description: STH 47 SB On-ramp 2020 6 lanes Fu Freeway Data Type of analysis Merge Number of lanes in freeway 3 Free-flow speed on freeway 65.0 mph 3543 vph Volume on freeway \_\_\_\_\_On Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp vph Volume on ramp 382 ft Length of first accel/decel lane 750 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)\_\_\_\_\_ Does adjacent ramp exist? No Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_\_ Adjacent Freeway Ramp Junction Components Ramp 382 vph Volume, V (vph) 3543 0.90 0.90 Peak-hour factor, PHF 984 106 v Peak 15-min volume, v15 11 % 11 Trucks and buses % 0 0 Recreational vehicles Level Level Terrain type: % % % Grade mi mi mi Length 1.5 1.5 Trucks and buses PCE, ET 1.2 1.2

Heavy vehicle adjus Driver population f Flow rate, vp		0.948 1.00 4153	0.948 1.00 448	pcph
	Estimation o	f V12 Merge	Areas	
2.000	= (Eq EQ	uation 25-2	or 25-3)	
P	= 0.599 Usi FM	ng Equation	1	
v	= v (P) = 24 12 F FM	86 pc/h		
	Capaci	ty Checks		
v	Actual 4601	Maximum 7050	LOS F? No	
FO	4001	7050	NO	
v R12	2934	4600	No	
Le	vel of Service Det	ermination (	if not F)	
Density, $D = 5.475$	+ 0.00734 v + 0.0 R	078 v - 0.	00627 L = 2	3.5 pc/mi/ln
Level of service fo				
	Speed Es	timation		
Intermediate speed	variable,		0.312	
Space mean speed in	ramp influence ar		57.8 mph	
Space mean speed in	outer lanes,		60.8 mph	
Space mean speed fo	r all vehicles,	S =	58.9 mph	

Fax:

Diverge Analysis

D1Ve	erge Analysi	S		
Analyst: MAH				
Analyst: MAH Agency/Co.:				
Date performed: 6/29/2004				
Analysis time period: 6/29/2004				
	bound			
Freeway/Dir of Travel: USH 41 North Junction: STH 47 NB off				
Jurisdiction:	- Ramp			
Analysis Year: 2020				
Description: STH 47 NB Off Ramp 4 la	aneg Full			
Jescription. Sin 47 NB orr Ramp 1 10				
Fre	eeway Data			
Type of analysis	Dive	rge		
Number of lanes in freeway	2			
Free-flow speed on freeway	65.0		mph	
Volume on freeway	3924		vph	
Off	Ramp Data			
	161 T 161	2 Let 10 L		
Side of freeway	Righ	IC		
Number of lanes in ramp	1		mph	
Free-Flow speed on ramp	50.0		mph vph	
Volume on ramp	382		ft	
Length of first accel/decel lane	212		ft	
Length of second accel/decel lane			IC	
Adjacent Ram	mp Data (if	one exis	sts)	tedt (der ed. 6. t
Does adjacent ramp exist?	No			
Volume on adjacent ramp			vph	
Position of adjacent ramp			-	
Type of adjacent ramp				
Distance to adjacent ramp			ft	
Conversion to pc,	/h Under Bas	e Condit	ions	
Junction Components	Freeway	Ramp		Adjacent
	2024	200		Ramp
Volume, V (vph)	3924 0.90	382		vph
	n un	0.90		
		100		v
Peak 15-min volume, v15	1090	106		
Peak 15-min volume, v15 Trucks and buses	1090 11	11		00
Peak 15-min volume, v15 Trucks and buses Recreational vehicles	1090 11 0	11 0	2	
Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	1090 11 0 Level	11 0 Level		ଚ ୧
Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade	1090 11 0 Level 0.00 %	11 0 Level 5 0.00	olo	00 09 09
Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade Length	1090 11 0 Level 0.00 % 0.00 m	11 0 Level 5 0.00 1 0.00		ବ ୧
	1090 11 0 Level 0.00 %	11 0 Level 5 0.00	olo	00 00 00 00

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4600	0.948 1.00 448	pcph
	_Estimation o	f V12 Diverge	Areas	
L = EQ	(Eq	uation 25-8 or	r 25-9)	
P = FD	1.000 Usi	ng Equation (	C	
	v + (v - v) R F R	P = 4600 p FD	pc/h	
	Capaci	ty Checks		-
$\mathbf{v} = \mathbf{v}$	Actual 4600	Maximum 4700	LOS F? No	
Fi F V 12	4600	4400	Yes	
v = v - v FO F R	4152	4700	No	
V R	448	2100	No	
Level o	of Service Det	ermination (if	f not F)	
Density, I	P = 4.252 + 0.	0086 v - 0.00 12	09 L = 41.9 D	pc/mi/ln
Level of service for ran		The second second second second second second second second second second second second second second second se	1000 Carlos Carl	
	Speed Es	timation		
Intermediate speed varia	able,	D = ( S	0.273	
Space mean speed in ramp	o influence ar	ea, S = 5	58.7 mph	
Space mean speed in oute	er lanes,	R S = 0	N/A mph	
Space mean speed for all	vehicles,	-	58.7 mph	

Fax:

<u> </u>	Diver	ge Ana	alys	is_				
Analyst:	MAH							
Agency/Co.:								
	5/29/2004							
Analysis time period:								
	JSH 41 Northbo	und						
Junction:	STH 47 NB off	Ramp						
Jurisdiction:								
initial joint in the second se	2020							
Description: STH 47 NB	Off Ramp 6 lan	les Ful	11					
	Free	way Da	ata					
		way be	icu_					
Type of analysis			Div	erg	е			
Number of lanes in freew	ау		3					
Free-flow speed on freew.	ay		65.			mph		
Volume on freeway			392	4		vph		
	Off R	amp Da	ata					
		- 5 - 1	101	25	39396			
Side of freeway			Rig	ht				
Number of lanes in ramp			1	-				
Free-Flow speed on ramp			50.			mph		
Volume on ramp			382			vph		
Length of first accel/de			212			ft ft		
Length of second accel/d	ecel lane					ΓU		
	_Adjacent Ramp	Data	(if	on	e exist	s)	<u>, to ti bres</u> ,	ean in
Does adjacent ramp exist	?		No				1.44.0	
Volume on adjacent ramp						vph		
Position of adjacent ram	p							
Type of adjacent ramp	-							
Distance to adjacent ram	p					ft		
Conv	ersion to pc/h	1 Unde:	r Ba	se	Conditi	ons		
	9708 - 12 -						<b>7 1 1 1 1 1 1 1 1 1 1</b>	
Junction Components		Free	way		Ramp		Adjacent Ramp	
Volume, V (vph)		3924			382		an anna anna anna anna anna anna anna	vph
Peak-hour factor, PHF		0.90			0.90			-
Peak 15-min volume, v15		1090			106			v
Trucks and buses		11			11			80
Recreational vehicles		0			0			00
Terrain type:		Leve	1		Level			
Grade		0.00		00	0.00	olo		olo
Length		0.00		mi	0.00	mi		mi
Trucks and buses PCE, ET		1.5			1.5			
Recreational vehicle PCE	, ER	1.2			1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4600	0.948 1.00 448		pcph
	_Estimation of	E V12 Diverge	Areas_		
L = EQ	(Equ	lation 25-8 of	r 25-9)		
P = FD	0.624 Usir	ng Equation	5		
v = v	+ (v - v ) I R F R	P = 3040 ; FD	pc/h		
	Capacit	cy Checks			
v = v Fi F	Actual 4600	Maximum 7050		LOS F? No	
v 12	3040	4400		No	
v = v - v FO F R	4152	7050		No	
v R	448	2100		No	
Level o	f Service Dete	ermination (i	f not F	')	
	= 4.252 + 0.0 R	0086 v - 0.0 12	09 L D	= 28.5	pc/mi/ln
Level of service for ram				lence D	
	Speed Est	timation			
Intermediate speed varia	ble,	D = S	0.273		
Space mean speed in ramp	influence are	ea, S = R	58.7	mph	
Space mean speed in oute	r lanes,	S =	69.1	mph	
Space mean speed for all	vehicles,	S =	61.9	mph	

## HCS2000: Ramps and Ramp Junctions Release 4.1d

Phone: E-mail: Fax:

	Dive	rge An	alys	sis_	V 31			
Analyst:	MAH							
Agency/Co.:								
Date performed:	6/29/2004							
Analysis time period:	0,20,2001							
Freeway/Dir of Travel:	USH 41 Southbo	ound						
	STH 47 SB off							
Jurisdiction:		-						
	2020							
Description: STH 47 SB		nes Fu	11					
202011901000								
	Fre	eway D	ata_					
Type of analysis				verg	е			
Number of lanes in freew			2					
Free-flow speed on freew	ау							
Volume on freeway			42	51		vph		
	Off	Ramp D	ata					
	hits special and second second second second	noi :	ismi.	USU.	beed -			
Side of freeway				ght				
Number of lanes in ramp			1			9194617		
Free-Flow speed on ramp				.0		mph		
Volume on ramp	en <u>e</u> Street					vph		
Length of first accel/de	cel lane		21:	2		ft		
Length of second accel/d	ecel lane					ΤL		
	_Adjacent Ram	p Data	(i:	f on	e exist	s)	C. 101 0994	<u>98 (11 3</u> )
Does adjacent ramp exist	?		No					
Volume on adjacent ramp						vph		
Position of adjacent ram	p							
Type of adjacent ramp						No.2733		
Distance to adjacent ram	.p					ft		
Conv	ersion to pc/	h Unde	r B	ase	Conditi	ons		
Junction Components		Free	wav		Ramp		Adjacent	
ounceron components			1		- E		Ramp	
Volume, V (vph)		4251			709		<b>.</b>	vph
Peak-hour factor, PHF		0.90			0.90			-
Peak 15-min volume, v15		1181			197			v
Trucks and buses		11			11			olo
Recreational vehicles		0			0			00
Terrain type:		Leve	1		Level			
Grade		0.00		00	0.00	olo		00
Length		0.00		mi	0.00	mi		mi
Trucks and buses PCE, ET	1	1.5			1.5			
Recreational vehicle PCE		1.2			1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4983	0.948 1.00 831	pcph				
	_Estimation of	V12 Diverge	Areas					
L = EQ	(Equ	ation 25-8 or	r 25-9)					
	1.000 Usin	g Equation (	0					
v = v	+ (v - v ) P R F R	= 4983 I FD	pc/h					
	Capacit	y Checks						
v = v Fi F	Actual 4983	Maximum 4700	LOS F? Yes					
v 12	4983	4400	Yes					
v = v - v FO F R	4152	4700	No					
V R	831	2100	No					
Level of	Service Dete	rmination (if	E not F)					
	= 4.252 + 0.0	086 v - 0.00	D9 L = 45.2	2 pc/mi/ln				
Level of service for ram								
Speed Estimation								
Intermediate speed variab	ole,	D = 0 S	0.308					
Space mean speed in ramp	influence are	a, S = 5	57.9 mph					
Space mean speed in outer	lanes,	R S = 0	N/A mph					
Space mean speed for all	vehicles,	S = 5	57.9 mph					

Recreational vehicle PCE, ER

Fax:

Diverge Analysis MAH Analyst: Agency/Co.: 6/29/2004 Date performed: Analysis time period: Freeway/Dir of Travel: USH 41 Southbound STH 47 SB off Ramp Junction: Jurisdiction: Analysis Year: 2020 Description: STH 47 SB Off Ramp 6 lanes Full Freeway Data Diverge Type of analysis Number of lanes in freeway 3 65.0 mph Free-flow speed on freeway vph Volume on freeway 4251 Off Ramp Data\_\_\_\_ Side of freeway Right Number of lanes in ramp 1 50.0 mph Free-Flow speed on ramp Volume on ramp 709 vph ft Length of first accel/decel lane 212 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? vph Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp ft Distance to adjacent ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_ Adjacent Freeway Ramp Junction Components Ramp Volume, V (vph) 4251 709 vph 0.90 0.90 Peak-hour factor, PHF 197 v 1181 Peak 15-min volume, v15 % 11 11 Trucks and buses 00 Recreational vehicles 0 0 Level Level Terrain type: 0.00 % 0.00 % 00 Grade 0.00 mi 0.00 mi mi Length 1.5 1.5 Trucks and buses PCE, ET

1.2

1.2

Heavy vehicle adjustmen Driver population facto Flow rate, vp		1.00 1	0.948 L.00 331	pcph
	Estimation o	f V12 Diverge A	Areas	
L = EQ	(Eq	uation 25-8 or	25-9)	
P = FD	0.597 Usi	ng Equation 5		
	v + (v - v) R F R	P = 3311 pc FD	c/h	
	Capaci	ty Checks		
v = v Fi F	Actual 4983	Maximum 7050	LOS F? No	
v 12	3311	4400	No	
v = v - v	4152	7050	No	
FO F R V R	831	2100	No	
Level	of Service Det	ermination (if	not F)	
Density,	D = 4.252 + 0.	0086 v - 0.009 12	9 L = 30.8 D	pc/mi/ln
Level of service for ra	mp-freeway jun	ction areas of	influence D	
	Speed Es	timation		
Intermediate speed vari	able,	D = 0. S	.308	
Space mean speed in ram	p influence ar		7.9 mph	
Space mean speed in out	er lanes,	S = 68	8.7 mph	
Space mean speed for al	l vehicles,	S = 61	1.1 mph	

Recreational vehicle PCE, ER

Fax:

Merge Analysis MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: NB USH 41 Junction: STH 47 NB On ramp Jurisdiction: Analysis Year: 2020 Description: STH 47 NB On-ramp 2020 4 lanes Fu Freeway Data\_\_\_\_ Merge Type of analysis Number of lanes in freeway 2 mph 65.0 Free-flow speed on freeway 3543 vph Volume on freeway On Ramp Data Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp 709 vph Volume on ramp Length of first accel/decel lane ft 750 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)\_\_\_\_\_ Does adjacent ramp exist? No vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_ Adjacent Junction Components Freeway Ramp Ramp 709 vph Volume, V (vph) 3543 0.90 0.90 Peak-hour factor, PHF Peak 15-min volume, v15 984 197 v % 11 11 Trucks and buses % Recreational vehicles 0 0 Level Level Terrain type: 00 % % Grade mi mi mi Length 1.5 Trucks and buses PCE, ET 1.5

1.2

1.2

Heavy vehicle adju Driver population Flow rate, vp	istment, fHV factor, fP	0.948 1.00 4153	0.948 1.00 831		pcph				
	Estimation o	f V12 Merge A	Areas						
	L = (Eq EQ	uation 25-2 c	or 25-3)						
		ng Equation	0						
	v = v (P) = 41 12 F FM	53 pc/h							
	Capaci	ty Checks							
v	Actual 4984	Maximum 4700		LOS F? Yes					
FO	4984	4600		Yes					
v R12	4904	4000							
	Level of Service Det	ermination (:	if not F	·)					
Density, $D = 5.47$	Level of Service Determination (if not F) Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.3 pc/mi/ln$ R R 12 A Level of service for ramp-freeway junction areas of influence F								
	Speed Es	stimation							
Intermediate spee	d variable,	M = S	0.808						
Space mean speed	in ramp influence an	rea, S = R	46.4	mph					
Space mean speed	in outer lanes,		N/A	mph					
Space mean speed	for all vehicles,	S =	46.4	mph	:				

Fax:

Merge Analysis MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: NB USH 41 STH 47 NB On ramp Junction: Jurisdiction: 2020 Analysis Year: Description: STH 47 NB On-ramp 2020 6 lanes Fu Freeway Data Type of analysis Merge Number of lanes in freeway 3 65.0 mph Free-flow speed on freeway Volume on freeway 3543 vph On Ramp Data Side of freeway Right Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph 709 vph Volume on ramp ft Length of first accel/decel lane 750 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions Adjacent Freeway Junction Components Ramp Ramp Volume, V (vph) 3543 709 vph 0.90 0.90 Peak-hour factor, PHF 197 984 v Peak 15-min volume, v15 11 8 Trucks and buses 11 % Recreational vehicles 0 0 Terrain type: Level Level % 8 % Grade mi mi mi Length 1.5 Trucks and buses PCE, ET 1.5 1.2 Recreational vehicle PCE, ER 1.2

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4153	0.948 1.00 831		pcph			
	_Estimation of	V12 Merge A	Areas					
L = EQ	(Equ	ation 25-2 o	or 25-3	)				
	0.599 Usir	ng Equation	1					
v = v	(P) = 248 F FM	86 pc/h						
	Capacit	y Checks						
	Actual	Maximum		LOS F?				
v	4984	7050		No				
FO V	3317	4600		No				
R12	5517	1000		NO				
Level o	f Service Dete	ermination (:	if not	F)				
Level of Service Determination (if not F) Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.3 pc/mi/ln$ R R 12 A Level of service for ramp-freeway junction areas of influence C								
		imation						
	speed Est							
Intermediate speed varia	ble,	M = S	0.346					
Space mean speed in ramp	influence are	ea, S = R	57.0	mph				
Space mean speed in oute	r lanes,		60.8	mph				
Space mean speed for all	vehicles,	S =	58.2	mph				

Fax:

Merge Analysis MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: SB USH 41 Junction: CTH A SB On ramp Jurisdiction: Analysis Year: 2020 Description: CTH A SB On-ramp 2020 4 lanes Ful Freeway Data Merqe Type of analysis Number of lanes in freeway 2 65.0 Free-flow speed on freeway mph Volume on freeway 3161 vph On Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph 709 vph Volume on ramp ft Length of first accel/decel lane 750 Length of second accel/decel lane ft \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? Volume on adjacent Ramp vph Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_\_ Freeway Ramp Adjacent Junction Components Ramp 709 Volume, V (vph) 3161 vph 0.90 0.90 Peak-hour factor, PHF 878 197 v Peak 15-min volume, v15 % Trucks and buses 11 11 % Recreational vehicles 0 0 Level Terrain type: Level Grade % 00 Ŷ mi mi mi Length Trucks and buses PCE, ET 1.5 1.5 1.2 Recreational vehicle PCE, ER 1.2

Heavy vehicle adj Driver population Flow rate, vp		0.948 1.00 3705	0.948 1.00 831	pcph
	Estimation of	of V12 Merge A	reas	
	EQ	quation 25-2 o		
	FM v = v (P) = 37 12 F FM		•	
	Capaci	ity Checks		
v	Actual 4536	Maximum 4700	LOS F? No	
FO V R12	4536	4600	No	
	Level of Service Det	cermination (i	f not F)	
R	5 + 0.00734 v + 0.0 R for ramp-freeway jur	12	A	8 pc/mi/ln
	Speed Es	stimation		
Intermediate spee	d variable,	M = S	0.602	
Space mean speed	in ramp influence as	rea, S = R	51.1 mph	
Space mean speed	in outer lanes,	S = 0	N/A mph	
Space mean speed	for all vehicles,	S =	51.1 mph	

Fax:

E-mail:						
Merg	e Analys	sis	N			
Analyst: MAH						
J 1,						
Analysis time period:						
Freeway/Dir of Travel: SB USH 41						
Junction: CTH A SB On ra	amp					
Jurisdiction:						
Analysis Year: 2020	lanaal	<b>2</b> ]				
Description: CTH A SB On-ramp 2020 6	Tanes	Fui				
Fre	eway Dat	ta		н Р.У :		1 
Type of analysis	r	Merge				
Number of lanes in freeway		3				
Free-flow speed on freeway		65.0		mph		
Volume on freeway		3161		vph		
On 1	Ramp Dat	ta				n neeg
Side of freeway	I	Right				
Number of lanes in ramp		1				
Free-flow speed on ramp	Į.	55.0		mph		
Volume on ramp		709		vph		
Length of first accel/decel lane		750		ft		
Length of second accel/decel lane				ft		
						and of \$15
Adjacent Ram	p Data	(if on	ne exist	s)		
Does adjacent ramp exist?	1	NO				
Volume on adjacent Ramp				vph		
Position of adjacent Ramp						
Type of adjacent Ramp						
Distance to adjacent Ramp				ft		
Conversion to pc/	h Under	Base	Conditi	ons		
Tungtion Components	Freedry	210	Ramp		Adjacent	
Junction Components	Freewa	ay	καιιμ		Ramp	
Volume, V (vph)	3161		709			vph
	0 00		0.90			
	0.90					v
Peak-hour factor, PHF	878		197			
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses			197 11			olo
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses	878					olo olo
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles	878 11		11			00
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles	878 11 0	00	11 0	010		
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type:	878 11 0		11 0	% mi		00
Peak-hour factor, PHF Peak 15-min volume, v15 Trucks and buses Recreational vehicles Terrain type: Grade	878 11 0	010	11 0			010

Heavy vehicle adjust Driver population fac Flow rate, vp		1.00	0.948 1.00 831	pcph
-	Estimation	of V12 Merge Ar	ceas	
L E(		quation 25-2 or	25-3)	
	= 0.599 Us	ing Equation 1	L	
	= v (P) = 2	217 pc/h		
	Capac	ity Checks		
	Actual	Maximum	LOS F?	
V FO	4536	7050	No	
v R12	3048	4600	No	
Lev	el of Service De	termination (if	not F)	
Density, D = 5.475 + R	0.00734 v + 0. R			pc/mi/ln
Level of service for	ramp-freeway ju	nction areas of	influence C	
	Speed E	stimation		
Intermediate speed va	ariable,	M = 0 S	.321	
Space mean speed in :	camp influence a		57.6 mph	
Space mean speed in (	outer lanes,		51.4 mph	
Space mean speed for	all vehicles,	S = 5	58.8 mph	

Fax: Phone: E-mail: Diverge Analysis MAH Analyst: Agency/Co.: Date performed: 6/29/2004 Analysis time period: Freeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 4 lanes Full \_\_\_\_\_Freeway Data\_\_\_\_\_ Diverge Type of analysis Number of lanes in freeway 2 Free-flow speed on freeway 65.0 mph Volume on freeway 3870 vph \_\_\_\_\_Off Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 Free-Flow speed on ramp 50.0 mph 709 vph Volume on ramp Length of first accel/decel lane ft 212 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists) No Does adjacent ramp exist? Volume on adjacent ramp vph Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions Adjacent Freeway Junction Components Ramp Ramp 709 vph 3870 Volume, V (vph) Peak-hour factor, PHF 0.90 0.90 v 1075 197 Peak 15-min volume, v15 % Trucks and buses 11 11 % Recreational vehicles 0 0 Terrain type: Level Level 8 0.00 0.00 % % Grade mi 0.00 0.00 mi Length mi Trucks and buses PCE, ET 1.5 1.5 Recreational vehicle PCE, ER 1.2 1.2

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4537	0.948 1.00 831	pcph			
	_Estimation of	V12 Diverge	Areas				
L = EQ	(Equ	ation 25-8 of					
FD V = V	+ (v - v ) F						
	Capacit	y Checks					
v = v Fi F	Actual 4537	Maximum 4700	LOS F? No				
Fi F V 12	4537	4400	Yes				
v = v - v FO F R	3706	4700	No				
v R	831	2100	No				
Level o	f Service Dete	ermination (if	f not F)				
Density, $D = 4.252 + 0.0086 v - 0.009 L = 41.4 pc/mi/ln$ R 12 D							
Level of service for ramp-freeway junction areas of influence F							
Speed Estimation							
Intermediate speed varia	ble,	D = ( S	0.308				
Space mean speed in ramp	influence are	ea, S = 5 R	57.9 mph				
Space mean speed in oute	r lanes,	S = 0	N/A mph				
Space mean speed for all	vehicles,	S = 5	57.9 mph				

Fax:

Number of lanes in freeway 3 Free-flow speed on freeway 65.0 mph Volume on freeway 3870 vph 	E-mail:							
Agency/Co.: Date performed: 6/29/2004 Malysis time period: Freeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Description: CTH A NB Off Ramp 6 lanes Full 		Diver	ge Ana	lysis_	<u></u>	~	5	
Agency/Co.: Date performed: 6/29/2004 Malysis time period: Freeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Description: CTH A NB Off Ramp 6 lanes Full 	Analyst.	мдн						
Date performed: 6/29/2004 Analysis time period: Freeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Diverge Description: CTH A NB Off Ramp 6 lanes Full Freeway Data Type of analysis Diverge Number of lanes in freeway 3 Free-flow speed on freeway 65.0 mph Volume on freeway 00ff Ramp Data Off Ramp Data Side of freeway Right Number of lanes in ramp 1 Free-Flow speed on ramp 50.0 mph Volume on ramp 20.0 mph Volume on ramp 1 Free-Flow speed on ramp 50.0 mph Volume on ramp 50.0 mph Volume on ramp 50.0 mph Volume on ramp 50.0 mph Volume on ramp ft Length of second accel/decel lane ft Adjacent Ramp Data (if one exists) Does adjacent ramp ft Adjacent ramp ft Conversion to pc/h Under Base Conditions Junction Components Freeway Ramp Adjacent Ramp Volume, V (vph) 3870 709 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 1075 197 v Trucks and buses 11 11 % Recreational vehicles 0 0 0 Trucks and buses PCE, ET 1.5 1.5		MAII						
Analysis time period: Preeway/Dir of Travel: USH 41 Northbound Junction: CTH A NB off Ramp Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 6 lanes Full 		6/20/2004						
Freeway/Dir of Travel: USR 41 Northbound Junction: CTH A NB off Ramp Description: CTH A NB Off Ramp 6 lanes Full 		0/29/2004						
Junction: CTH A NB off Ramp Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 6 lanes Full 		UCU 41 Northbe	hund					
Jurisdiction: Analysis Year: 2020 Description: CTH A NB Off Ramp 6 lanes Full 								
Analysis Year:       2020         Description:       CTH A NB Off Ramp 6 lanes Full         Freeway Data         Type of analysis       Diverge         Number of lanes in freeway       3         Free-flow speed on freeway       3870       vph         Off Ramp Data         Side of freeway         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft		CIN A NB OIL P	amp					
Description: CTH A NB Off Ramp 6 lanes Full 		2020						
Freeway Data         Type of analysis       Diverge         Number of lanes in freeway       3       65.0       mph         Yolume on freeway       3870       vph         Off Ramp Data         Side of freeway       Right         Number of lanes in ramp       1       Free-Flow speed on ramp       50.0       mph         Volume on ramp       50.0       mph       Volume on ramp       70.9       vph         Length of first accel/decel lane       212       ft       ft         Length of second accel/decel lane       ft       ft			e Full					
Type of analysis     Diverge       Number of lanes in freeway     3       Free-flow speed on freeway     65.0     mph       Volume on freeway     3870     vph       Off Ramp Data       Side of freeway     Right       Number of lanes in ramp     1       Free-Flow speed on ramp     50.0     mph       Volume on ramp     709     vph       Volume on ramp     709     vph       Length of first accel/decel lane     212     ft       Length of second accel/decel lane     ft	Description: CIR A NB	OII Ramp o Iane	to rull					
Number of lanes in freeway       3         Free-flow speed on freeway       65.0       mph         Volume on freeway       3870       vph		Free	eway Dat	ta			×	
Free-flow speed on freeway       65.0       mph         Volume on freeway       3870       vph         Off Ramp Data         Off Ramp Data         Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft	Type of analysis		oo isa hij	Diverg	je			
Free-flow speed on freeway       65.0       mph         Volume on freeway       0ff Ramp Data		eway		3				
Wolume on freeway     3870     vph       Off Ramp Data				55.0		mph		
Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft	Volume on freeway			3870		vph		
Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft		Off F	amp Dat	t a				
Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft		011 1	tump Du		099 <i>4</i>			
Free-Flow speed on ramp       50.0       mph         Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft       ft         Adjacent Ramp Data (if one exists)	Side of freeway		I	Right				
Volume on ramp       709       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft       ft	Number of lanes in ram	)		1				
Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft	Free-Flow speed on ramp	)		50.0		_		
Length of second accel/decel lane       ft	Volume on ramp							
Adjacent Ramp Data (if one exists) Does adjacent ramp exist? No Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions Conversion to pc/h Under Base Conditions Junction Components Freeway Ramp Adjacent Ramp Volume, V (vph) 3870 709 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 1075 197 v Trucks and buses 11 11 % Recreational vehicles 0 0 0 % Terrain type: Level Level Grade 0.00 % 0.00 % % Length 0.00 mi 0.00 mi mi	Length of first accel/o	lecel lane	2	212				
Does adjacent ramp exist? No Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp Conversion to pc/h Under Base Conditions Conversion to pc/h Under Base Conditions Junction Components Volume, V (vph) Peak-hour factor, PHF Volume, V (vph) Peak 15-min volume, v15 Trucks and buses Conversion to pc/h Under Base Conditions Volume, V (vph) Peak-hour factor, PHF Conversion to pc/h Under Base Conditions Volume, V (vph) Peak-hour factor, PHF Conversion to pc/h Under Base Conditions Trucks and buses Conversion to pc/h Under Base Conditions Preeway Conversion to pc/h Under Base Conditions Preeway Ramp Adjacent Ramp Volume, V (vph) Conversion to pc/h Under Base Conditions Preeway Ramp Adjacent Ramp Volume, V (vph) Peak-hour factor, PHF Conversion to pc/h Under Base Conditions Preeway Ramp Adjacent Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Preeway Ramp Adjacent Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Preeway Ramp Adjacent Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Ramp Volume, V (vph) Peak 15-min volume, v15 Conversion to pc/h Under Base Conditions Ramp Volume, V (vph) Peak 15-min volume, v15 No No No No No No No No No No	Length of second accel,	decel lane				ft		
Volume on adjacent rampvphPosition of adjacent rampftType of adjacent rampftConversion to pc/h Under Base Conditions		Adjacent Ram	Data	(if on	ne exist	s)	pred (or	ស៊ុក ភេមារ
Volume on adjacent ramp     vph       Position of adjacent ramp     ft       Type of adjacent ramp     ft      Conversion to pc/h Under Base Conditions	Does adjacent ramp exis	st?	1	No				
Position of adjacent ramp Type of adjacent ramp Distance to adjacent ramp ft Conversion to pc/h Under Base Conditions Junction Components Freeway Ramp Adjacent Ramp Volume, V (vph) 3870 709 vph Peak-hour factor, PHF 0.90 0.90 Peak 15-min volume, v15 1075 197 v Trucks and buses 11 11 % Recreational vehicles 0 0 % Terrain type: Level Level Grade 0.00 % 0.00 % % Length 0.00 mi 0.00 mi mi Trucks and buses PCE, ET 1.5 1.5						vph		
Type of adjacent rampftDistance to adjacent rampftConversion to pc/h Under Base ConditionsJunction ComponentsFreewayVolume, V (vph)3870709Peak-hour factor, PHF0.900.90Peak 15-min volume, v151075197Trucks and buses1111Recreational vehicles00Grade0.00%Length0.00%Trucks and buses PCE, ET1.51.5						-		
Distance to adjacent rampftConversion to pc/h Under Base ConditionsJunction ComponentsFreewayRampAdjacent RampVolume, V (vph)3870709vphPeak-hour factor, PHF0.900.90vphPeak 15-min volume, v151075197vTrucks and buses1111%Recreational vehicles00%Grade0.00%0.00%Length0.00mimiTrucks and buses PCE, ET1.51.5		-						
Junction ComponentsFreewayRampAdjacent RampVolume, V (vph)3870709vphPeak-hour factor, PHF0.900.90vPeak 15-min volume, v151075197vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00%0.00Length0.00mimiTrucks and buses PCE, ET1.51.5		amp				ft		
Ramp         Volume, V (vph)       3870       709       vph         Peak-hour factor, PHF       0.90       0.90       v         Peak 15-min volume, v15       1075       197       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Grade       0.00       %       %         Length       0.00       mi       0.00         Trucks and buses PCE, ET       1.5       1.5	Cor	nversion to pc/h	n Under	Base	Conditi	ons		
Ramp         Volume, V (vph)       3870       709       vph         Peak-hour factor, PHF       0.90       0.90       v         Peak 15-min volume, v15       1075       197       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Grade       0.00       %       %         Length       0.00       mi       0.00         Trucks and buses PCE, ET       1.5       1.5	Jungtion Components		Freed	310	Ramo		Adjacent	
Volume, V (vph)       3870       709       vph         Peak-hour factor, PHF       0.90       0.90       v         Peak 15-min volume, v15       1075       197       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Grade       0.00       %       %         Length       0.00       mi       0.00       mi         Trucks and buses PCE, ET       1.5       1.5       1.5	ounceron components		FIGEW	чY	Kamp			
Peak-hour factor, PHF       0.90       0.90         Peak 15-min volume, v15       1075       197       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Terrain type:       Level       Level       %         Grade       0.00       %       0.00       %         Trucks and buses PCE, ET       1.5       1.5       %	Volume, V (vph)		3870		709		E	vph
Peak 15-min volume, v15       1075       197       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Terrain type:       Level       Level       %         Grade       0.00       0.00       %         Length       0.00       mi       0.00       mi         Trucks and buses PCE, ET       1.5       1.5       1.5	Peak-hour factor, PHF							_
Trucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00%0.00Length0.00mi0.00Trucks and buses PCE, ET1.51.5	The second line contraction of the second second second second second second second second second second second	5						v
Recreational vehicles00%Terrain type:LevelLevelGrade0.00 %0.00 %%Length0.00 mi0.00 mimiTrucks and buses PCE, ET1.51.5	Trucks and buses							00
Terrain type:       Level       Level         Grade       0.00 % 0.00 % %       %         Length       0.00 mi 0.00 mi       mi         Trucks and buses PCE, ET       1.5       1.5	Recreational vehicles							
Grade       0.00 % 0.00 % %         Length       0.00 mi 0.00 mi mi         Trucks and buses PCE, ET       1.5								
Length 0.00 mi 0.00 mi mi Trucks and buses PCE, ET 1.5 1.5			0.00	00		olo	00	5
Trucks and buses PCE, ET 1.5 1.5								
	<b>U</b>	ΞT						
			1.2		1.2			

Heavy vehicle adjustment Driver population factor Flow rate, vp		0.948 1.00 4537	0.948 1.00 831		pcph	
	_Estimation of	E V12 Diverge	e Areas			
L = EQ	(Equ	ation 25-8 o	or 25-9	)		
P = FD	0.608 Usir	ng Equation	5			
v = v	+ (v - v ) I R F R		pc/h			
	Capacit	y Checks				
v = v	Actual 4537	Maximum 7050		LOS F? No		
Fi F V	3086	4400		No		
$ \begin{array}{c} 12 \\ v = v - v \\ \hline \end{array} $	3706	7050		No		
FOFR V R	831	2100		No		
Level o	f Service Dete	ermination (:	if not	F)		
Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.9 pc/mi/ln$ R 12 D						
Level of service for ramp-freeway junction areas of influence D						
Speed Estimation						
Intermediate speed varia	ble,	D = S	0.308			
Space mean speed in ramp	influence are	ea, S = R	57.9	mph		
Space mean speed in oute	r lanes,		69.5	mph		
Space mean speed for all	vehicles,		61.2	mph		
Trucks and buses PCE, ET

Recreational vehicle PCE, ER

Fax:

Diverge Analysis MAH Analyst: Agency/Co.: 6/29/2004 Date performed: Analysis time period: Freeway/Dir of Travel: USH 41 Southbound CTH A SB off Ramp Junction: Jurisdiction: 2020 Analysis Year: Description: CTH A SB Off Ramp 4 lanes Full Freeway Data Diverge Type of analysis Number of lanes in freeway 2 65.0 mph Free-flow speed on freeway 3924 vph Volume on freeway Off Ramp Data Right Side of freeway Number of lanes in ramp 1 50.0 mph Free-Flow speed on ramp 763 vph Volume on ramp ft Length of first accel/decel lane 212 ft Length of second accel/decel lane Adjacent Ramp Data (if one exists)\_\_\_\_\_ Does adjacent ramp exist? No vph Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp ft Distance to adjacent ramp Conversion to pc/h Under Base Conditions Adjacent Freeway Ramp Junction Components Ramp vph 763 3924 Volume, V (vph) 0.90 0.90 Peak-hour factor, PHF 212 v Peak 15-min volume, v15 1090 00 11 11 Trucks and buses 0 0 0 Recreational vehicles Level Level Terrain type: 8 0.00 20 0.00 % 0.00 0.00 mi 0.00 00 Grade mi mi Length 1.5 1.5

1.2

1.2

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.948 1.00 4600	0.948 1.00 894		pcph
	Estimation of	V12 Diverge	e Areas		
L = EQ		ation 25-8 c		)	
P = FD	1.000 Usir	ng Equation	0		
v = v 12 R		P = 4600 FD	pc/h		
	Capacit	y Checks			
	Actual	Maximum		LOS F?	
$\mathbf{v} = \mathbf{v}$	4600	4700		No	
Fi F V	4600	4400		Yes	
12 $v = v - v$	3706	4700		No	
FO F R				No	
V R	894	2100		No	
Level of	Service Dete	ermination (:	if not	F)	
	= 4.252 + 0.0				nc/mi/ln
R	2	12	I	1	pc/ ((1/ 11)
Level of service for ramp	o-freeway jund	ction areas o	of infl	uence F	
	Speed Est	timation			
Intermediate speed variab	ole,	D = S	0.313		
Space mean speed in ramp	influence are	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	57.8	mph	
Space mean speed in outer	lanes,	R S = 0	N/A	mph	
Space mean speed for all	vehicles,	S =	57.8	mph	

Fax:

Analyst:       MAH         Agency/Co.:       6/29/2004         Analysis time period:       Freeway/Dir of Travel:       USH 41 Southbound         Junction:       CTH A SB off Ramp         Juridiction:       Analysis Year:       2020         Description: CTH A SB Off Ramp 6 lanes Full       Freeway Data         Type of analysis       Diverge         Number of lanes in freeway       3         Pree-flow speed on freeway       65.0         Mumber of lanes in ramp       1         Free-Flow speed on freeway       50.0         Mumber of lanes in ramp       1         Free-Flow speed on ramp       50.0         Volume on ramp       763         Volume on ramp       763         Length of first accel/decel lane       212         Adjacent ramp       ft	Dive	erge Analysi	s	nd i i	
Agency/Co.:       Date performed:       6/29/2004         Analysis time period:       Preeway/Dir of Travel:       USH 41 Southbound         Junction:       CTH A SB off Ramp         Junction:       CTH A SB off Ramp         Junction:       TTA SB off Ramp         Junction:       TTA SB off Ramp         Junction:       CTH A SB off Ramp 6 lanes Full					
Date performed:       6/29/2004         Analysis time period:       Freeway/Dir of Travel:       USH 41 Southbound         Junction:       CTH A SB off Ramp         Jurisdiction:       Analysis Year:       2020         Description:       CTH A SB off Ramp 6 lanes Full	Analyst: MAH				
Date performed:       6/29/2004         Analysis time period:       Freeway/Dir of Travel:       USH 41 Southbound         Junction:       CTH A SB off Ramp         Jurisdiction:       Analysis Year:       2020         Description:       CTH A SB off Ramp 6 lanes Full	Agency/Co.:				
Analysis time period:         Freeway/Dir of Travel: USH 41 Southbound         Junction:       CTH A SB off Ramp         Jurisdiction:         Analysis Year:       2020         Description: CTH A SB Off Ramp 6 lanes Full					
Freeway/Dir of Travel: USH 41 Southbound Junction: Duridiction: Analysis Year: Description: CTH A SB off Ramp 6 lanes Full         Image: Star in the sta					
Junction:       CTH A SB off Ramp         Jurisdiction:       2020         Description:       CTH A SB off Ramp 6 lanes Full		ound			
Jurisdiction:       Analysis Year:       2020         Description:       CTH A SB Off Ramp 6 lanes Full         Freeway Data         Type of analysis       Diverge         Number of lanes in freeway       3         Free-flow speed on freeway       3924         Volume on freeway       3924		Ramp			
Analysis Year:       2020         Description:       CTH A SB Off Ramp 6 lanes Full					
Description: CTH A SB Off Ramp 6 lanes Full         Freeway Data					
Freeway Data         Type of analysis       Diverge         Number of lanes in freeway       3         Pree-flow speed on freeway       3224         Volume on freeway       3224         Volume on freeway       3224         Off Ramp Data		eg Full			
Type of analysis       Diverge         Number of lanes in freeway       3         Free-flow speed on freeway       65.0       mph         Yolume on freeway       3924       vph         Off Ramp Data	bescription. Cin A bb orr Ramp o ran				
Number of lanes in freeway       3         Free-flow speed on freeway       65.0       mph         Volume on freeway       3924       vph	Fre	eway Data			<u> </u>
Number of lanes in freeway       3         Free-flow speed on freeway       65.0       mph         Volume on freeway       3924       vph	14 tén 441				
Number of lanes in freeway       3         Free-flow speed on freeway       65.0       mph         Volume on freeway       3924       vph	Type of analysis	Dive	rge		
Volume on freeway       3924       vph         Off Ramp Data         Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       763       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft       ft	Number of lanes in freeway	3			
Volume on freeway       3924       vph         Off Ramp Data         Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       763       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft       ft		65.0		mph	
Off Ramp Data         Side of freeway       Right         Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       763       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft       ft		3924		vph	
Side of freewayRightNumber of lanes in ramp1Free-Flow speed on ramp50.0Mumber of lanes in ramp763Volume on ramp763Volume on ramp763Length of first accel/decel lane212Adjacent Ramp Data (if one exists)					
Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       763       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       1       ft	0ff	Ramp Data			
Number of lanes in ramp       1         Free-Flow speed on ramp       50.0       mph         Volume on ramp       763       vph         Length of first accel/decel lane       212       ft         Length of second accel/decel lane       1       ft	Cide of freevour	Dich	÷		
Free-Flow speed on ramp50.0mphVolume on ramp763vphLength of first accel/decel lane212ftLength of second accel/decel laneft			C C		
Volume on ramp763vphLength of first accel/decel lane212ftLength of second accel/decel lane11ft				mph	
Length of first accel/decel lane       212       ft         Length of second accel/decel lane       ft				-	
Length of second accel/decel lane       ft	-				
		212			
Does adjacent ramp exist?       No         Volume on adjacent ramp       vph         Position of adjacent ramp       vph         Type of adjacent ramp       ft        Conversion to pc/h Under Base Conditions       ft        Conversion to pc/h Under Base Conditions	Length of second accel/decel lane			IC	
Does adjacent ramp exist?       No         Volume on adjacent ramp       vph         Position of adjacent ramp       vph         Type of adjacent ramp       ft        Conversion to pc/h Under Base Conditions       ft        Conversion to pc/h Under Base Conditions		Data 115			
Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent rampvphConversion to pc/h Under Base ConditionsftConversion to pc/h Under Base ConditionsJunction ComponentsFreeway Ramp Adjacent RampVolume, V (vph)3924 0.90763 0.90Peak-hour factor, PHF0.90 10900.90 212 v v 	Adjacent Ram	ip Data (II	one exist	s)	
Volume on adjacent ramp Position of adjacent ramp Type of adjacent ramp Distance to adjacent rampvphConversion to pc/h Under Base ConditionsftConversion to pc/h Under Base ConditionsJunction ComponentsFreeway Ramp Adjacent RampVolume, V (vph)3924 0.90763 0.90Peak-hour factor, PHF0.90 10900.90 212 v v Trucks and busesTerrain type: Grade LengthLevel 0.00 0.00% % 0.00Trucks and buses PCE, ET1.51.5	Does adjacent ramp exist?	No			
Position of adjacent ramp Type of adjacent ramp Distance to adjacent rampftConversion to pc/h Under Base Conditions 				vph	
Type of adjacent rampftDistance to adjacent rampftConversion to pc/h Under Base ConditionsJunction ComponentsFreewayRampAdjacent RampVolume, V (vph)3924Peak-hour factor, PHF0.90Peak 15-min volume, v151090Trucks and buses11Recreational vehicles0Grade0.00LevelLevelGrade0.00Length0.00Trucks and buses PCE, ET1.5				• • • •	
Distance to adjacent rampftConversion to pc/h Under Base ConditionsJunction ComponentsFreewayVolume, V (vph)3924Peak-hour factor, PHF0.90Peak 15-min volume, v151090Trucks and buses11Recreational vehicles0Grade0.00Length0.00Trucks and buses PCE, ET1.5					
Distance to dajacent rampConversion to pc/h Under Base ConditionsJunction ComponentsFreewayRampAdjacent RampVolume, V (vph)3924763vphPeak-hour factor, PHF0.900.90vphPeak 15-min volume, v151090212vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevel%Grade0.00%0.00%Length0.00mimiTrucks and buses PCE, ET1.51.51.5				ft	
Junction ComponentsFreewayRampAdjacent RampVolume, V (vph)3924763vphPeak-hour factor, PHF0.900.90vPeak 15-min volume, v151090212vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00%0.00Length0.00mimiTrucks and buses PCE, ET1.51.5	Distance to adjacent ramp			LL	
Volume, V (vph)3924763RampPeak-hour factor, PHF0.900.900.90Peak 15-min volume, v151090212vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00%%Length0.00mimiTrucks and buses PCE, ET1.51.5	Conversion to pc/	'h Under Bas	e Conditi	ons	
Volume, V (vph)3924763RampPeak-hour factor, PHF0.900.900.90Peak 15-min volume, v151090212vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00%%Length0.00mimiTrucks and buses PCE, ET1.51.5	Tungtion Components	Freewow	Ramo	лdн	acent
Volume, V (vph)       3924       763       vph         Peak-hour factor, PHF       0.90       0.90       v         Peak 15-min volume, v15       1090       212       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Terrain type:       Level       Level       %         Length       0.00       %       0.00       %         Trucks and buses PCE, ET       1.5       1.5       1.5	Junction components	гтеемау	кашр		
Peak-hour factor, PHF       0.90       0.90         Peak 15-min volume, v15       1090       212       v         Trucks and buses       11       11       %         Recreational vehicles       0       0       %         Terrain type:       Level       Level       %         Length       0.00       %       0.00       %         Trucks and buses PCE, ET       1.5       1.5       %	Volume, V (vph)	3924	763		-
Peak 15-min volume, v151090212vTrucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00 %0.00 %%Length0.00 mi0.00 mimiTrucks and buses PCE, ET1.51.5					
Trucks and buses1111%Recreational vehicles00%Terrain type:LevelLevelGrade0.00 %0.00 %%Length0.00 mi0.00 mimiTrucks and buses PCE, ET1.51.5					v
Recreational vehicles00Terrain type:LevelGrade0.00 %Length0.00 miTrucks and buses PCE, ET1.5					
Terrain type:LevelGrade0.00 % 0.00 % %Length0.00 mi 0.00 miTrucks and buses PCE, ET1.5					
Grade       0.00 % 0.00 % %         Length       0.00 mi 0.00 mi         Trucks and buses PCE, ET       1.5			. 70		ΤΟ
Length0.00mimiTrucks and buses PCE, ET1.51.5				0,	0_
Trucks and buses PCE, ET 1.5 1.5					2005 g
				mı	mı
Recreational vehicle PCE, ER 1.2 1.2					
	□ Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adju Driver population Flow rate, vp	stment, fHV factor, fP	0.948 1.00 4600	0.948 1.00 894		pcph
	Estimation of	V12 Diverge	Areas		
		ation 25-8 c	or 25-9)	1	
	EQ P = 0.604 Usin FD	g Equation	5		
	v = v + (v - v) P 12 R F R		pc/h		
	Capacit	y Checks			
v = v	Actual 4600	Maximum 7050		LOS F? No	
Fi F V	3132	4400		No	
$ \begin{array}{c} 12 \\ v = v - v \\ \hline \end{array} $	3706	7050		No	
FOFR V R	894	2100		No	
I	Level of Service Dete	ermination (	if not	F)	
Density,	D = 4.252 + 0.0	0086 v - 0. 12	009 L D	= 29.3	pc/mi/ln
Level of service t	for ramp-freeway junc	ction areas	of infl	uence D	
	Speed Est	cimation			
Intermediate speed	d variable,	D = S	0.313		
Space mean speed	in ramp influence are	ea, S = R	57.8	mph	
Space mean speed	in outer lanes,		69.5	mph	
Space mean speed	for all vehicles,	S =	61.1	mph	

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Merge Analysis MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: NB USH 41 CTH A NB On ramp Junction: Jurisdiction: 2020 Analysis Year: Description: CTH A NB On-ramp 2020 4 lanes Ful Freeway Data Merge Type of analysis Number of lanes in freeway 2 65.0 mph Free-flow speed on freeway vph 3161 Volume on freeway \_\_\_\_\_On Ramp Data\_\_\_\_\_ Right Side of freeway Number of lanes in ramp 1 Free-flow speed on ramp 55.0 mph 763 vph Volume on ramp 750 ft Length of first accel/decel lane ft Length of second accel/decel lane \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_ Adjacent Freeway Ramp Junction Components Ramp 3161 763 vph Volume, V (vph) 0.90 0.90 Peak-hour factor, PHF 212 v 878 Peak 15-min volume, v15 00 11 11 Trucks and buses 00 0 Recreational vehicles 0 Level Terrain type: Level 8 00 % Grade mi mi mi Length 1.5 1.5 Trucks and buses PCE, ET 1.2 Recreational vehicle PCE, ER 1.2

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.948 1.00 3705	0.948 1.00 894		pcph
	Estimation of	V12 Merge A	Areas		
L = EQ	(Equ	ation 25-2 c	or 25-3	)	
-~ P = FM	1.000 Usin	g Equation	0		
v = v 12 F	•	5 pc/h			
	Capacit	y Checks			
	Actual	Maximum		LOS F?	
v	4599	4700		No	
FO					
v R12	4599	4600		No	
Level of	Service Dete	rmination (i	if not	F)	
Density, $D = 5.475 + 0.00$		78 v - 0.0 12		= 36.2 A	pc/mi/ln
Level of service for ramp	-freeway junc	tion areas o	of infl	uence E	
	Speed Est	imation		1	
		24	0 606		
Intermediate speed variab	le,	M = S	0.626		
Space mean speed in ramp	influence are	a, S = R	50.6	mph	
Space mean speed in outer	lanes,	S = 0	N/A	mph	
Space mean speed for all	vehicles,	S =	50.6	mph	

Fax:

\_\_\_\_\_Merge Analysis\_\_\_\_\_ MAH Analyst: OMNNI Agency/Co.: Date performed: 6/28/04 Analysis time period: Freeway/Dir of Travel: NB USH 41 CTH A NB On ramp Junction: Jurisdiction: Analysis Year: 2020 Description: CTH A NB On-ramp 2020 6 lanes Ful Freeway Data Merge Type of analysis Number of lanes in freeway 3 65.0 mph Free-flow speed on freeway 3161 vph Volume on freeway On Ramp Data Right Side of freeway Number of lanes in ramp 1 55.0 mph Free-flow speed on ramp vph 763 Volume on ramp Length of first accel/decel lane ft 750 ft Length of second accel/decel lane \_\_\_\_\_Adjacent Ramp Data (if one exists)\_\_\_\_\_ No Does adjacent ramp exist? vph Volume on adjacent Ramp Position of adjacent Ramp Type of adjacent Ramp ft Distance to adjacent Ramp Conversion to pc/h Under Base Conditions\_\_\_\_\_ Adjacent Freeway Ramp Junction Components Ramp 763 vph 3161 Volume, V (vph) 0.90 Peak-hour factor, PHF 0.90 v 878 212 Peak 15-min volume, v15 11 11 00 Trucks and buses 00 0 0 Recreational vehicles Level Level Terrain type: 00 00 8 Grade mi mi mi Length Trucks and buses PCE, ET 1.5 1.5 1.2 Recreational vehicle PCE, ER 1.2

Heavy vehicle adjustment, Driver population factor, Flow rate, vp		0.948 1.00 3705	0.948 1.00 894		pcph
	Estimation of	V12 Merge A	Areas		
L = EQ P =	(Equ 0.599 Usin	ation 25-2 d g Equation		)	
	(P) = 221 FM	7 pc/h			
	Capacit	y Checks			
v	Actual 4599	Maximum 7050		LOS F? No	
FO V R12	3111	4600		No	
Level of	Service Dete	rmination (i	if not	F)	
Density, D = 5.475 + 0.00 R Level of service for ramp	R	12		A	pc/mi/ln
	Speed Est	imation			
Intermediate speed variab	le,	M = S	0.326		
Space mean speed in ramp	influence are	ea, S =	57.5	mph	
Space mean speed in outer	lanes,		61.4	mph	
Space mean speed for all	vehicles,	S =	58.7	mph	

SHEET NO. JOB NUMBER ENGINEERING ONE SYSTEMS DRIVE CLIENT ARCHITECTURE APPLETON, WI 54914-1654 PROJECT ENVIRONMENTAL 920-735-6900 MADE BY DATE 1-800-571-6677 DATE FAX 920-830-6100 CHECKED BY www.omnni.com CTH JJ : CTH A 2020 Full Interchango 430 = 10.7 T(DHU) = 10.0 D=55/45 CTHM FICM North 18700 ADT 1100 Phy 770 330 512 LT 7.2 % Thru 251 102 From East 6000 ADT From South 24400ADT 14/36 phv 8170 thro 19% RT 353 phu 29% LT 1163 273 P Assume some & afturna. 2020 NOINterchange movenets 05

TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analyst:	MAH							
Agency/Co.:	OMNI							
Date Performed:		4/04						
Analysis Time Pe		1/01						
Intersection:		A & CTH						
Jurisdiction:		agamie C	ounty					
Units: U. S. Cus								
Analysis Year:	2020	0						
Project ID: Ful	l intercha	ange opt	ion					
East/West Street	: CTH	JJ						
North/South Stre	et: CTH	A						
Intersection Ori	entation:	NS		St	udy period	d (hrs):	0.25	
	Veh	icle Vol	umes and	Adjus	tments			
Major Street: A	pproach		rthbound			thbound	1	
-	ovement	1	2	3	4	5	6	
	ovemente	L	T	R	L	Т	R	
		D	1	IC IC		-	R	
Volume			1163	273	330	770		
Peak-Hour Factor	DHF		0.90	0.90	0.90	0.90		
Hourly Flow Rate			1292	303	366	855		
Percent Heavy Ve				203	10	055		
—					10			
Median Type/Stor	age	Undiv			/			
RT Channelized?				No				
Lanes			1 1		1	1		
Configuration			T R		L	Т		
Upstream Signal?			No			No		
	pproach		stbound	-	14 C	stbound		
M	lovement	7	8	9	10	11	12	
	ы. 	L	т	R	L	т	R	
		100		051		24		
Volume		102		251				
Peak Hour Factor		0.90		0.90				
Hourly Flow Rate		113		278				
Percent Heavy Ve		10		10				
Percent Grade (%	)		0			0		
Flared Approach:	Exists?	/Storage	2		/		/	
Temer		1	1					
Lanes								
		I	R					
		I	R					
				2 7				
Configuration		Queue Le	ength, an		l of Serv:			
Lanes Configuration Approach	NB	Queue Le SB	ength, an West	bound		Easth		
Configuration Approach Movement		Queue Le SB 4	ength, an West 7		9   2	Easth	oound 11 12	
Configuration Approach Movement	NB	Queue Le SB	ength, an West	bound		Easth		
Configuration Approach Movement Lane Config	NB	Queue Le SB 4   L	ength, an West 7 L	bound	9   2 R	Easth		
Configuration Approach Movement Lane Config v (vph)	NB	Queue Le SB 4   L   366	ength, an West 7 L 113	bound	9   2 R   278	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph)	NB	Queue Le SB 4   L   366 389	ength, an West 7 L 113 1	bound	9   2 R   278 191	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph) v/c	NB 1	Queue Le SB 4   L   366 389 0.94	ength, an West 7 L 113 1 113.00	bound	9   2 R   278 191 1.46	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length	NB 1	Queue Le SB 4   L   366 389 0.94 10.37	ength, an West 7 L 113 1 113.00 16.56	bound	9   2 R   278 191 1.46 17.01	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length Control Delay	NB 1	Queue Le SB 4   L   366 389 0.94 10.37 64.9	ength, an West 7 L 113 1 113.00 16.56 57407	bound	9   2 R   278 191 1.46 17.01 277.5	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS	NB 1	Queue Le SB 4   L   366 389 0.94 10.37	ength, an West 7 L 113 1 113.00 16.56	bound 8	9   2 R   278 191 1.46 17.01	Easth		
Configuration Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length Control Delay	NB 1	Queue Le SB 4   L   366 389 0.94 10.37 64.9	ength, an West 7 L 113 1 113.00 16.56 57407	bound	9   2 R   278 191 1.46 17.01 277.5	Easth		

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## TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Agency/Co.:	MAH OMNNI 6/14/04						
	CTH A & CTH						
Jurisdiction: ( Units: U. S. Customary	Outagamie C	ouncy					
	2020						
Project ID: Full inte		ion					
	CTH JJ						
	CTH A						
Intersection Orientatio	on: NS		St	udy per	iod (h	rs):	0.25
0	Vehicle V	olumes a	and Ad	justment	S	-21	n ale ferre i sta
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume	- <u>}</u>	1163	273	330	770		
Peak-Hour Factor, PHF		0.90	0.90	0.90	0.90		
Peak-15 Minute Volume		323	76	92	214		
Hourly Flow Rate, HFR		1292	303	366	855		
Percent Heavy Vehicles				10			
Median Type/Storage	Undiv	rided		/			
RT Channelized?			No				
Lanes		1 1		1	1		
Configuration		TR		$\mathbf{L}$	Т		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume	102		251				
Peak Hour Factor, PHF	0.90		0.90				
Peak-15 Minute Volume	28		70				
Hourly Flow Rate, HFR	113		278				
Percent Heavy Vehicles	10		10				
Percent Grade (%)		0			0		,
	ts?/Storage	2		/			/
RT Channelized?			No				
Lanes	1	1					
Configuration	L	R					
2 Jangal M. K.	Pedestrian	Volumes	and A	diustmen	ts		
Movements	13	14	15	16			
Flow (ped/hr)	0	0	0	0			

	eed (ft/sec)		1.0	4.0	4.0	4.0		
Percent Bl	ockage	(	)	0	0	0		ŝ
		τ	Jpstrea	m Signa	al Data	a		
	Prog.	Sat	Arri	val (	Green	Cycle	Prog.	Distance
	Flow	Flov	и Тур		ſime	Length	Speed	to Signal
	vph	vph		5	sec	sec	mph	feet
S2 Left-T	urn							
Throug								
S5 Left-T								
Throug	h							
lorksheet	3-Data for Co	mputing	g Effec	t of De	elay to	o Major i	Street V	ehicles
					Moveme	ent 2	Moveme	ent 5
Shared ln	volume, major	th ver	nicles:					
Shared ln	volume, major	rt veh	nicles:					
Sat flow r	ate, major th							
	and the second second second second second second second second second second second second second second second	1	00.					
Number of	ate, major rt major street 4-Critical Ga	through	n lanes		e Calcu	ulation		
Number of Worksheet Critical G	major street 4-Critical Ga ap Calculatic 1	through ap and H on 4	n lanes Follow- 7	up Time	9	10	11	12
Number of Worksheet Critical G	major street 4-Critical Ga ap Calculatio	through ap and H on	n lanes Follow-	up Time			11 T	12 R
Number of Worksheet Critical G Movement	major street 4-Critical Ga ap Calculatic 1	through ap and H on 4	n lanes Follow- 7	up Time	9	10		
Number of Worksheet Critical G Movement t(c,base) t(c,hv)	major street 4-Critical Ga ap Calculatic 1	through ap and H on 4 L 4.1 1.00	1 lanes Follow- 7 L 7.1 1.00	up Time	9 R 6.2 1.00	10 L		
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv)	major street 4-Critical Ga ap Calculatic 1 L	through ap and H on 4 L 4.1	n lanes Follow- 7 L 7.1 1.00 10	up Time 8 T 1.00	9 R 6.2 1.00 10	10 L 0 1.00	T 1.00	R 1.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g)	major street 4-Critical Ga ap Calculatic 1 L	through ap and H on 4 L 4.1 1.00	n lanes Follow- 7 L 7.1 1.00 10 0.20	up Time 8 T 1.00 0.20	9 R 6.2 1.00 10 0.10	10 L 0 1.00 0 0.20	T 1.00 0.20	R 1.00 0.10
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100	major street 4-Critical Ga ap Calculatic 1 L	through ap and H A L 4.1 1.00 10	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00	up Time 8 T 1.00	9 R 1.00 10 0.10 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00	R 1.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt)	major street 4-Critical Ga ap Calculatio 1 L 1.00	through ap and H on 4 L 4.1 1.00 10 0.00	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70	up Time 8 T 1.00 0.20 0.00	9 R 6.2 1.00 10 0.10 0.10 0.00	10 L 0 1.00 0 0.20 0 0.00	T 1.00 0.20 0.00	R 1.00 0.10 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00	through ap and H n 4.1 1.00 10 0.00 0.00	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00	up Time 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00	through ap and H bn 4 L 4.1 1.00 10 0.00 0.00 0.00 0.00	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00	up Time 8 T 1.00 0.20 0.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00	R 1.00 0.10 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00	through ap and H n 4.1 1.00 10 0.00 0.00	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00	up Time 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00 -stage -stage	through ap and H n 4.1 1.00 10 0.00 0.00 0.00 4.2	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00	up Time 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1 Follow-Up	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00 -stage	through ap and H n 4.1 1.00 10 0.00 0.00 0.00 4.2	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00	up Time 8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 0.00	T 1.00 0.20 0.00 0.00	R 1.00 0.10 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1 Follow-Up	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00 -stage -stage Time Calculat	through ap and H n 4.1 1.00 10 0.00 0.00 0.00 4.2	n lanes Follow- 7 L 7.1 1.00 0.20 0.00 0.70 0.00 1.00 6.5	up Time 8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00 6.3	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 0.00 0 1.00	T 1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1 Follow-Up Movement	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00 -stage -stage Time Calculat	through ap and H n 4.1 1.00 10 0.00 0.00 0.00 4.2 cions 4	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00 6.5	up Time 8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 10 0.10 0.00 0.00 0.00 6.3	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1	major street 4-Critical Ga ap Calculatio 1 L 1.00 -stage 0.00 -stage 0.00 -stage -stage Time Calculat	through ap and H an 4 L 4.1 1.00 10 0.00 0.00 0.00 4.2 cions 4 L	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00 6.5 7 L	up Time 8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 10 0.10 0.00 0.00 6.3 9 R	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00
Number of Worksheet Critical G Movement t(c,base) t(c,hv) P(hv) t(c,g) Grade/100 t(3,lt) t(c,T): 1 2 t(c) 1 2 Follow-Up Movement t(f,base)	major street 4-Critical Ga ap Calculatio 1 1.00 -stage 0.00 -stage 0.00 -stage -stage Time Calculat 1 L	through ap and H A	n lanes Follow- 7 L 7.1 1.00 10 0.20 0.00 0.70 0.00 1.00 6.5 7 L 3.50	up Time 8 T 1.00 0.20 0.00 1.00 8 T	9 R 6.2 1.00 10 0.10 0.00 0.00 6.3 9 R 3.30	10 L 0 1.00 0 0.20 0 0.00 0 0.00 0 1.00 1.00 10 L	T 1.00 0.20 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R

Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)

Arrival Type Effective Green, g (se Cycle Length, C (sec)	c)							
Rp (from Exhibit 16-11	)							
Proportion vehicles ar		on area	en P					
(q1)		, 9200	-					
(q2)								
l (d)								
				·····				
Computation 2-Proporti	on of	TWSC Int	cersect		ne bloc nent 2		lovement	5
			Z		/(l,prot		V(1, V(1))	
						31	16.1	
alpha								
eta								
Travel time, t(a) (sec	:)							
Smoothing Factor, F Proportion of conflict	ing fl	ow f						
ax platooned flow, V(	-							
In platooned flow, V(								
Juration of blocked pe								
Proportion time blocke				0.0	000		0.000	
lownutation 2 Distance	Enert	Dominde					n de Twit	<u>14. jaug</u>
Computation 3-Platoon	Event	rerioas	Re	esult				
(2)		369	0.	000				
o(5)			0.	000				
o(dom)								
o(subo)								
Constrained or unconst	rained	1?						
Proportion	·							
inblocked	(	(1)		(2)		(3)		
for minor		.e-stage			Stage Pr			
novements, p(x)	_	ocess			-	Stage 3	II	
p(1)								
(4)								
(7)								
(8)								
<b>b</b> (9)								
p(10)								
p(11)								
p(12)								
Computation 4 and 5		21.					<u>11 </u>	<u></u>
Single-Stage Process								
lovement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	т	R
	daeza/		0.0		1000			
/c,x		1595	2879		1292			
5 ?x								
/ c,u,x								
, ., .								
Cr,x							1	
C plat,x								
F=0.0,00								

V(c,x) s 1500 P(x) V(c,u,x)			
C(r,x) C(plat,x)			
Worksheet 6-Impedance and Capacity Equations			
Step 1: RT from Minor St.	9	12	
Conflicting Flows Potential Capacity	1292 191		
Pedestrian Impedance Factor Movement Capacity	1.00 191	1.00	
Probability of Queue free St.	0.00	1.00	
Step 2: LT from Major St.	4	1	
Conflicting Flows Potential Capacity	1595 389		
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	389		
Probability of Queue free St. Maj L-Shared Prob Q free St.	0.06	1.00	
Step 3: TH from Minor St.	8	11	
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.06	0.06	
Movement Capacity Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows	2879		
Potential Capacity	17 1.00	1 00	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00 0.06	
Maj. L, Min T Adj. Imp Factor.		0.16	
Cap. Adj. factor due to Impeding mvmnt	0.06	0.00	
Movement Capacity	1		

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

8

11

Step 3: TH from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage				7.57		
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor	mnt					
Cap. Adj. factor due to Impeding mv						
Movement Capacity						
Part 3 - Single Stage						
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor		1.			1.00	
Cap. Adj. factor due to Impeding my	mnt	0.	06		0.06	
Movement Capacity						
Result for 2 stage process:						G -
a						
Y .						
C t		- 1	0.0		1 00	
Probability of Queue free St.	. The Association	1.	00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage		3				- Ed -
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding my	mnt					
Movement Capacity				L.F	<u>6</u>	gud - gb
Part 2 - Second Stage		1	7			Carrier
Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding mv Movement Capacity	mnc					
	, is 1550 - 13		02-qute	29 26 90 91	berst	13 - D.L , D.S.
Part 3 - Single Stage		20	70			
Conflicting Flows		28				142.1
Potential Capacity		17			1.00	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor		1.	00		0.06	Sugal of
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.					0.08	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mv	mnt	0.	06		0.18	
Movement Capacity		0. 1	00		0.00	
					مىلارتىيەر مەرىكىكە	
Results for Two-stage process:						
a						
y C t		1				
		ـــــــــــــــــــــــــــــــــــــ				
Worksheet 8-Shared Lane Calculation	S					
Movement	7	8	9	10	11	12
	L	T	R	L	Т	R
Volume (vph)	113		278			
Movement Capacity (vph)	1		191			

Movement			7	8	9	10	11	12
			L	Т	R	L	Т	R
C sep			1		191			
Volume			113		278			
Delay	ĩ							
Q sep								
Q sep +1								
round (Qsep +1)								
n max								
C sh								
SUM C sep								
n C act								
CaCL						6: 		
			] -	1.6	a			
Worksheet 10-Delay	r, Queue	Lengtn,	and Lev	vel or	Service			
Movement	1	4	7	8.	9	10	11	12
Lane Config		L	L		R			
v (vph)		366	113		278			
C(m) (vph)		389	1		191			
v/c		0.94	113.00		1.46			
95% queue length		10.37	16.56		17.01			
Control Delay		64.9	57407		277.5			
LOS		F	F		F			
Approach Delay				16788				
Approach LOS				F				
Worksheet 11-Share	ed Major	LT Impe	dance a	nd Dela	ay			
					Movem	ent 2	Mover	ment 5
					Hovem		110 V CI	
p(oj)					1.	00	0	.06
v(il), Volume for								
s(il), Saturation		te for s	stream 3	or 6				
s(il), Saturation s(i2), Saturation	flow ra							
<pre>s(il), Saturation s(i2), Saturation P*(oj)</pre>							-	
<pre>s(il), Saturation s(i2), Saturation P*(oj) d(M,LT), Delay for</pre>	r stream	1 or 4	7				64	4.9
s(i2), Saturation P*(oj)	r stream r street	1 or 4 through					64	4.9

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

## HCS2000: Signalized Intersections Release 4.1d

Analyst: MAHInter.: CTH A & CTH JJ EastAgency:Area Type: All other areasDate:6/14/2004Jurisd: Outagamie CountyPeriod:Year : 2020Project ID: CTH A & CTH JJ (East), 2020Full, Exist GeometryE/W St: CTH JJN/S St: CTH A

Π				GNALI	ZED I	NTERSE							
	Eas	tbour	nd	We	stbou	nd	Nor	thbou	ind	So	uthbo	und	
4.7	L	т	R	L	т	R	L	т	R	L	т	R	
m													
No. Lanes	0	0	0	1	0	1	0	1	1	1	1	0	
LGConfig				L		R		Т	R	$\mathbf{L}$	т		
Volume				102		251		1163	273	330	770		
Lane Width				12.0		12.0		12.0	12.0	12.0	12.0		
RTOR Vol						0			160				
Duration	0.25		Area			other							
		1.000		Si	gnal	Operat	ions						
Phase Combin	nation	1	2	3	4			5	6	7		8	
EB Left						NB	Left						
Thru							Thru		Р				
Right							Right	:	Р				
Peds							Peds						
WB Left		Ρ				SB	Left	Р	P				
Thru							Thru	P	Р				
Right		P					Right	2					
Peds							Peds						
NB Right		Р				EB	Right						
USB Right						WB	Right	:					
Green		25.0						12.0		)			
Yellow		3.0						3.0					
All Red		2.0						0.0	2.0				

				Cycl	e Length: 90.0	secs
1		Intersec	tion Performar	ice Summary		
Appr/	Lane	Adj Sat	Ratios	Lane Group	Approach	
Lane	Group	Flow Rate				
Grp	Capacity	(s)	v/c g/C	Delay LOS	Delay LOS	

Eastbound

Π

11									
West	bound								
L	501	1805	0.23	0.28	26.1	C			
UR	449	1615	0.62	0.28	34.7	С	32.2	С	
	hbound								
т	844	1900	1.53	0.44	269.9	F	246.1	F	
R	1256	1615	0.10	0.78	2.6	А			
Sout	hbound								
L	326	1805	1.13	0.61	115.9	F			
$\square_{\mathbf{T}}$	1161	1900	0.74	0.61	16.6	В	46.4	D	

Intersection Delay = 137.9 (sec/veh) Intersection LOS = F

 $\square$ 

ParkExist NumPark No. Lanes

LGConfig

RTOR Vol

Adj Flow

Lane Width

0

0

0

Fax:

L Marr.				OP	ERAT	IONAL A	NALYS	IS				
Analyst:				МАН								
				МАП								
Agency/Co.:				c / 2 4 / 0	001							
Date Perform				6/14/2	004							
Analysis Tin		riod:										
Intersection	1:			CTH A	& CTH	H JJ Ea	st					
Area Type:				All ot	her a	areas						
Jurisdiction	1:			Outaga	mie (	County						
Analysis Yea	ar:			2020								
Project ID:	CTH	A &	CTH .	JJ (Eas	t), 2	2020 Fu	11, E	xist (	Geomet	ry		
			East	t/West	Stree	et		No	orth/S	outh :	Street	
	CTH	JJ		15			CTH		6			
					VOLUN	IE DATA						
	-		-	1		7	1		7			-
	1000	stbou			stbou		1000	rthbou			uthbou	
	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume				102		251	·	1163	273	330	770	
% Heavy Veh				0		0		0	0	0	0	
PHF				0.90		0.90	1		0.90		0.90	
PK 15 Vol				28		70	}	323	76	92	214	
Hi Ln Vol				20		70		545	10	92	214	
2000 8000 AL					0			0			0	
% Grade				11000	0	1000		0	1000	11000	0	
Ideal Sat				1900		1900		TA00	1900	1900	1900	

%InSharedLn	1								
Prop LTs	1						0.0	000	
Prop RTs					1.000	0	.000	1.000	Ì
Peds Bikes	0		0			0			
Buses	1		0		0		0	0	
%InProtPhas	e								1
Duration	0.25	Area	Type:	A11	other	areas			

1

 $\mathbf{L}$ 

12.0

113

0

1

R

12.0

279

0

0

1

т

12.0 12.0

1292 126

1

160

R

1

12.0 12.0

367 856

1.000 0.000

0.000

0

L

0

0.0

1

т

0

	Ea L	stbou T	.nd R	We   L	stbou T	nd R	Nc L	rthbo T	und R	So   L	d   R	
Init Unmet				0.0		0.0		0.0	0.0	0.0	0.0	
Arriv. Type				3		3		3	3	3	3	i
Unit Ext.				3.0		3.0	İ	3.0	3.0	3.0	3.0	i
I Factor				ĺ	1.00	0	ĺ	1.00	0	İ	1.000	İ
Lost Time				2.0		2.0	1	2.0	2.0	2.0	2.0	Í
Ext of g				2.0		2.0		2.0	2.0	2.0	2.0	1

\_OPERATING PARAMETERS\_

PHASE DATA

1

Pha	se Comb:	inatior	ı 1	2	3	4			5	6	7	8	
CB	Left Thru Right Peds						NB	Left Thru Right Peds		P P			
WB	Left Thru Right Peds		P P				SB	Left Thru Right Peds	P P	P P			
NB	Right		Ρ				EB	Right					
SB	Right						WB	Right					
n													
and the second s	en low Red		25.0 3.0 2.0	)		,			12.0 3.0 0.0	40.0 3.0 2.0			
0									Сус	le Leng	gth:	90.0	secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

stment												
Eas	tbou	ınd	Wes	tbou	ınd	N	orthbo	und	So	uthbou	ınd	1.0
L	т	R	L	т	R	L	Т	R	L	т	R	
2.1		36	8.5 b 6		- 6 - 7 G		5.1.5		126			
10		82.8	102		251		1163	273	330	770		1 1
			0.90		0.90		0.90	0.90	0.90	0.90		
			113		279		1292	126	367	856		- 472
0	0	0	1	0	1		0 1	1	1	1	0	
			L		R		Т	R	L	т		3.0
			113		279		1292	126	367	856		
			1 U.U. E.			197 - T	0.0	00	1.00	0 0.00	00	
					1.000	5	0.000	1.000	0	.000		01
	Eas L	L T	Eastbound L T R	Eastbound Wes L T R L 102 0.90 113 0 0 0 1 L	Eastbound Westbou L T R L T 102 0.90 113 0 0 0 1 0 L	Eastbound     Westbound       L     T     R       I     T     R       I     102     251       0.90     0.90       113     279       0     0     1       L     R       I13     279       I13     279       I13     279       I13     279	Eastbound       Westbound       No         L       T       R       L       T       R       L         102       251       0.90       0.90       113       279       113       279         0       0       1       0       1       L       R       113       279       113       279       113       279       113       279       113       279       113       279       113       279       113       279       113       279       113       <	Eastbound       Westbound       Northbo         L       T       R       L       T         IO2       251       1163         0.90       0.90       0.90         113       279       1292         0       0       1       0       1         L       R       T       T       T         0       0       1       0       1         113       279       1292       1292         0       0       1       0       1         113       279       1292       1292         0       0       0       0       0         0       0       0       0       0         0       0       0       0       0         113       279       1292       0.0	Eastbound       Westbound       Northbound         L       T       R       L       T       R         L       T       R       L       T       R         102       251       1163       273         0.90       0.90       0.90       0.90         113       279       1292       126         0       0       1       0       1         L       R       T       R         113       279       1292       126         0       0       1       0       1         IL       R       T       R         113       279       1292       126         0       0       0       1       0       1         IL       R       T       R       1         113       279       1292       126         0       0       0       0       0       0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)\_\_\_ Eastbound Westbound Northbound Southbound

r.	LG			L			R		т	R	L	Т		
1	So			1900			1900		1900	1900	1900	1900		
L	Lanes 0	0	0	1	0		1	0	1	1	1	1	0	
	fW			1.000			1.000		1.000	1.000	1.000	1.000		
1	fHV			1.000			1.000		1.000	1.000	1.000	1.000		
	fG			1.000			1.000		1.000	1.000	1.000	1.000		
	fP			1.000			1.000		1.000	1.000	1.000	1.000		
ſ	fBB			1.000			1.000		1.000	1.000	1.000	1.000		
1	fA			1.00			1.00		1.00	1.00	1.00	1.00		
1	fLU			1.00			1.00		1.00	1.00	1.00	1.00		
$\overline{p}$	fRT						0.850		1.000	0.850		1.000		
	fLT			0.950					1.000		0.950	1.000		
L	Sec.										0.093			
	fLpb			1.000					1.000		1.000	1.000		
1	fRpb						1.000		1.000	1.000		1.000		
	S			1805			1615		1900	1615	1805	1900		
	Sec.										177			
				CAPA	CITY	A	ID LOS	WORKS	HEET					

Anny/	Tano	Adj Flow Ra		Sat Rate	Flow Ratio	Gree Rati		ane Gr acity	-	
Appr/ Mvmt	Lane Group	FIOW Ra (v)		s)	(v/s)	(g/C		(c)	Ratio	
Eastbound	1									
Prot										
Perm										
Left										
Prot										
Perm										
Thru										
Right	_									
estbound	1									
Prot										
Perm	-									
Left	$\mathbf{L}$	113	18	05	0.06	0.2	8 5	01	0.23	
Prot										
Perm										
Thru	_							10	0 50	
Right	R	279	16	15	# 0.17	0.2	8 4	49	0.62	
lorthbour	nd									
Prot										
Perm										
Left										
Prot										
Perm	m	1202	1.0	00	0.68	0.4	1 0	44	1.53	
Thru Right	T R	1292 126		15	0.08	0.4		44 256	0.10	
Southbour		120	10	10	0.08	0.7	0 1	200	0.10	
Prot	Iu	241	1.8	05	# 0.13	0.1	33 2	41	1.00	
Perm		126	17		# 0.13	0.4		5	1.48	
Left	L	367	± /	,		0.6		26	1.13	
Prot	-									
Perm										
Thru	т	856	19	00	0.45	0.6	1 1	161	0.74	
Right										
um of fl	Low ratio	os for cri	tical la	ne gro	ups, Yc	= Su	m (v/s	) =	1.02	
		per cycle,								
ritical	flow rat	te to capa	city rat	io,	Xc	= (Yc)	(C)/(C	-L) =	1.15	
	Delay and Ratios	d LOS Dete Unf Pro			mental	Res	Lane G	roup	Approa	ach
.ppr/ H ane	Callos	Del Adj			or Del	Del	Lane G	roup	Abbrog	acii
rp v/c	c g/C	d1 Fac	-	k	d2	d3	Delay	LOS	Delay	LOS
_									_	
astbound	1									
lestbound	£									
0.23	3 0.28	25.0 1.0	00 501	0.50	1.0	0.0	26.1	С		
									32.2	С
0.62		28.4 1.0	00 449	0.50	6.3	0.0	34.7	C		
orthbour	nd									
1.53			00 844	0.50	244.9		269.9	F	246.1	F
0.10		2.4 1.0	00 1256	0.50	0.2	0.0	2.6	A		
outhbour				0	<u> </u>			-		
1.13	3 0.61	27.7 1.0	00 326	0.50	88.3	0.0	115.9	F		

Intersection delay = 137.9 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET for exclusive lefts Input WB NB SB EB Cycle length, C 90.0 sec 55.0 Total actual green time for LT lane group, G (s) 43.0 Effective permitted green time for LT lane group, g(s) 40.0 Opposing effective green time, go (s) 1 Number of lanes in LT lane group, N Number of lanes in opposing approach, No 1 Adjusted LT flow rate, VLT (veh/h) 367 Proportion of LT in LT lane group, PLT 1.000 Proportion of LT in opposing flow, PLTo 0.00 1292 Adjusted opposing flow rate, Vo (veh/h) 5.00 Lost time for LT lane group, tL Computation 9.18 LT volume per cycle, LTC=VLTC/3600 1.00 1.00 Opposing lane util. factor, fLUo Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) 32.30 gf=G[exp(- a \* (LTC \*\* b))]-tl, gf<=g 0.0 1.00 Opposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] 0.56 gq, (see Exhibit C16-4,5,6,7,8) 37.42 5.58 gu=g-gq if gq>=gf, or = g-gf if gq<gf 18.71 n=Max(gq-gf)/2,0)1.00 PTHo=1-PLTo PL\*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]1.00 4.38 EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0) 0.09 fmin=2(1+PL)/g or fmin=2(1+Pl)/g0.00 gdiff=max(gq-gf,0) 0.09 fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00) flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT 0.093 For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when qf>qq, see text. SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts Input SB EB WB NB 90.0 Cycle length, C sec Total actual green time for LT lane group, G (s) Effective permitted green time for LT lane group, g(s)Opposing effective green time, go (s) Number of lanes in LT lane group, N

Number of lanes in opposing approach, No

Adjusted LT flow rate, VLT (veh/h) Proportion of LT in LT lane group, PLT 0.000 0.000 Proportion of LT in opposing flow, PLTo Adjusted opposing flow rate, Vo (veh/h) Lost time for LT lane group, tL Computation LT volume per cycle, LTC=VLTC/3600 Opposing lane util. factor, fLUo 1.00 1.00 Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) qf=G[exp(- a \* (LTC \*\* b))]-tl, gf<=g</pre> Opposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] gq, (see Exhibit C16-4,5,6,7,8) gu=g-gq if gq>=gf, or = g-gf if gq<gf n=Max(gq-gf)/2,0)PTHo=1-PLTo PL\*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0)fmin=2(1+PL)/g or fmin=2(1+PL)/ggdiff=max(gq-gf,0) fm = [gf/g] + [gu/g] / [1+PL(EL1-1)], (min=fmin;max=1.00)flt=fm=[qf/q]+[qu/q]/[1+PL(EL1-1)]+[qdiff/q]/[1+PL(EL2-1)], (fmin<=fm<=1.00)or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text. SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET Permitted Left Turns EB WB NB SB Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Pedestrian flow rate, Vpedg (p/h) OCCpedg Opposing queue clearing green, gq (s) Eff. ped. green consumed by opp. veh. queue, gq/qp OCCpedu Opposing flow rate, Vo (veh/h) OCCr Number of cross-street receiving lanes, Nrec Number of turning lanes, Nturn ApbT Proportion of left turns, PLT Proportion of left turns using protected phase, PLTA Left-turn adjustment, fLpb Permitted Right Turns Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Conflicting bicycle volume, Vbic (bicycles/h) Vpedq OCCpedg Effective green, g (s) Vbicq OCCbicg



LaneGroup       L       R       T       R       L       T         Init Queue       0.0		8					(27)				
Flow Rate       113       279       1292       126       367       856         So       1900       1900       1900       1900       1900       1900       1900         No.Lanes       0       0       1       0       1       1       1       0       1       0       1       1       1       0       1       0       1       1       1       0       1       0       1       1       1       0       1       0       1       1       1       0       1       0       1       1       1       0       1       0       1       1       1       0       0       0       0       0       0       0       0       0       0       1       0       1       0       1       0       1       0       1       0       1       0       1       0       1       0	-						1		R	L	T I
So         1900         1400         1900         1410         1900         1410         1900         1410         1900         1410         1900         1410         1900         1410         1900         1410         1	Init Queue				0.0			0.0	0.0		0.0
No.Lanes       0       0       1       0       1       1       1       1       1       1       1       1       0         SL       1805       1615       1900       1615       532       1900         LnCapacity       501       449       844       1256       326       1161         Flow Ratio       0.06       0.17       0.68       0.08       0.69       0.45         V/C Ratio       0.23       0.62       1.53       0.01       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3       3       3         Pltn Ratio       1.00 </td <td>Flow Rate</td> <td></td> <td></td> <td></td> <td>113</td> <td>279</td> <td> </td> <td>1292</td> <td>126</td> <td>367</td> <td>856</td>	Flow Rate				113	279		1292	126	367	856
SL       1805       1615       1900       1615       532       1900         LnCapacity       501       449       844       1256       326       1161         Flow Ratio       0.06       0.17       0.68       0.08       0.69       0.45         V/c Ratio       0.23       0.62       1.53       0.10       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3         P1tn Ratio       1.00       1.00       1.00       1.00       1.00       1.00         Q1       2.2       6.1       32.3       0.8       4.1       15.1         KB       0.7       0.7       1.0       1.8       1.3       2         Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q3       25.0       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0 <td>So</td> <td></td> <td></td> <td></td> <td>1900</td> <td>1900</td> <td></td> <td>1900</td> <td>1900</td> <td>1900</td> <td>1900</td>	So				1900	1900		1900	1900	1900	1900
LnCapacity       501       449       844       1256       326       1161         Flow Ratio       0.06       0.17       0.68       0.08       0.69       0.45         V/c Ratio       0.23       0.62       1.53       0.10       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3       3         Pltn Ratio       1.00       1.00       1.00       1.00       1.00       1.00       1.00         Q1       2.2       6.1       32.3       0.8       4.1       15.1       15         KB       0.7       0.7       1.0       1.3       0.5       1.3       12         Q2       0.2       1.0       58.8       0.1       8.1       3.3       12       1.2       1.4       15         Q2       0.2       1.0       58.8       0.1       8.1       3.3       12       1.2       1.4       1       12       1.4       12       1.4       12       1	No.Lanes	0	0	0	1 0	1	0	1	1	1	1 0
Flow Ratio       0.06       0.17       0.68       0.08       0.69       0.45         V/c Ratio       0.23       0.62       1.53       0.10       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3       3       3         Pltn Ratio       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00         QT       2.2       6.1       32.3       0.8       4.1       15.1       1.5         KB       0.7       0.7       1.00       1.00       1.00       1.00       1.00         Q2       0.2       1.0       58.8       0.1       8.1       3.3       0         Q Spacing       25.0 <td>SL</td> <td>i</td> <td></td> <td></td> <td>1805</td> <td>1615</td> <td>i</td> <td>1900</td> <td>1615</td> <td>532</td> <td>1900</td>	SL	i			1805	1615	i	1900	1615	532	1900
Flow Ratio       0.06       0.17       0.68       0.08       0.69       0.45         V/c Ratio       0.23       0.62       1.53       0.10       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3       3       3         Pltn Ratio       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00         QT       2.2       6.1       32.3       0.8       4.1       15.1       1.5         KB       0.7       0.7       1.00       1.00       1.00       1.00       1.00         Q2       0.2       1.0       58.8       0.1       8.1       3.3       0         Q Spacing       25.0 <td>LnCapacity</td> <td>Í</td> <td></td> <td></td> <td>501</td> <td>449</td> <td>i</td> <td>844</td> <td>1256</td> <td>326</td> <td>1161</td>	LnCapacity	Í			501	449	i	844	1256	326	1161
v/c Ratio       0.23       0.62       1.53       0.10       1.13       0.74         Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3       3         Pltn Ratio       1.00       1.00       1.00       1.00       1.00       1.00       1.00         Q1       2.2       6.1       32.3       0.8       4.1       15.1         KB       0.7       0.7       1.0       1.3       0.5       1.3         Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q Average       2.4       7.1       91.1       0.9       12.2       18.4         Q Spacing       25.0		i			0.06	0.17	i	0.68	0.08	0.69	0.45
Grn Ratio       0.28       0.28       0.44       0.78       0.61       0.61         I Factor       1.000       1.000       1.000       1.000         AT or PVG       3 <td< td=""><td></td><td>İ</td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td>and a second second second second second second second second second second second second second second second</td><td>and a second second second second second second second second second second second second second second second</td></td<>		İ					1			and a second second second second second second second second second second second second second second second	and a second second second second second second second second second second second second second second second
I Factor       1.000       1.000       1.000       1.000         AT or PVG       3       3       3       3       3       3         Pltn Ratio       1.00       1.00       1.00       1.00       1.00       1.00         PF2       1.00       1.00       1.00       1.00       1.00       1.00       1.00         Q1       2.2       6.1       32.3       0.8       4.1       15.1         KB       0.7       0.7       1.0       1.3       0.5       1.3         Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q Average       2.4       7.1       91.1       0.9       12.2       18.4         Q Spacing       25.0       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0.3       8.7       109       1.2       1.4       1.7       2.2       1.8         BOQ       3.8       10.5       1.4       1.7       1.4       1.4       1.4       1.4       1.4       1.4       1.4		l					1.				
AT or PVG       3		1					1			10.01	
Pltn Ratio       1.00					1					12	
PF2       1.00											1
Q1       2.2       6.1       32.3       0.8       4.1       15.1         kB       0.7       0.7       1.0       1.3       0.5       1.3         Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q Average       2.4       7.1       91.1       0.9       12.2       18.4         Q Spacing       25.0       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0							-				
kB       0.7       0.7       1.0       1.3       0.5       1.3         Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q Average       2.4       7.1       91.1       0.9       12.2       18.4         Q Spacing       25.0       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0       0       0         Q S Ratio       1.3       1.2       1.2       1.3       1.2       1.2       1.2         Procentile Output:       1.3       1.2       1.2       1.3       1.2       1.2         BOQ       3.0       8.7       109       1.2       1.4       7       1.4         BOQ       3.8       10.5       128       1.5       17.4       2.9         QSRatio       3.8       10.5       128       1.5       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       2.9         QSRatio       4.3       11.5       1.6       2.4       1.7       1.6         BOQ       5.3       13.1										100000 G 100	
Q2       0.2       1.0       58.8       0.1       8.1       3.3         Q Average       2.4       7.1       91.1       0.9       12.2       18.4         Q Spacing       25.0       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       3.0       8.7       109       1.2       1.4.7       2.2       2.2         QSRatio       3.8       10.5       1.4       1.7       1.4       1.4       1.4         BOQ       3.8       10.5       128       1.5       1.5       1.5         GSRatio       9       4.3       11.5       1.37       1.7       18.8       27.9         QSRatio       9       5.3       13.1       146       2.2		1								100000000000000000000000000000000000000	
Q Average       2.4       7.1       91.1 0.9       12.2 18.4         Q Spacing       25.0       25.0       25.0       25.0       25.0       25.0         Q Storage       0       0       0       0       0       0       0         Q Storage       0       0       0       0       0       0       0       0         Q Storage       0       0       0       0       0       0       0       0       0         Q Storage       0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td> </td><td></td><td></td><td></td><td></td></td<>											
Q Spacing       25.0       20.0											
Q Storage       0       0       0       0       0       0       0         Q S Ratio       -								-			
Q S Ratio										1	
70th Percentile Output:       1.3       1.2       1.2       1.3       1.2       1.2       1.2       1.2         BOQ       3.0       8.7       109       1.2       14.7       22.2         QSRatio       85th Percentile Output:       1.6       1.5       1.4       1.7       1.4       1.4         BOQ       3.8       10.5       1.28       1.5       17.4       25.9         QSRatio       3.8       10.5       128       1.5       1.7       25.9         QSRatio       3.8       10.5       128       1.5       1.7       25.9         QSRatio       90th Percentile Output:       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9       9         QSRatio       9       4.3       11.5       137       1.7       18.8       27.9       9         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9       9         98th Percentile Output: <td< td=""><td></td><td></td><td></td><td></td><td>0</td><td>0</td><td></td><td>0</td><td>0</td><td>0</td><td>0</td></td<>					0	0		0	0	0	0
fB%       1.3       1.2       1.2       1.3       1.2       1.3       1.5       1					1						
BOQ       3.0       8.7       109       1.2       14.7       22.2         QSRatio       1       1       1       1       1       1       1         85th Percentile Output:       1.6       1.5       1.4       1.7       1.4       1.4       1         BOQ       3.8       10.5       128       1.5       17.4       25.9       1         QSRatio       3.8       10.5       128       1.5       17.4       25.9       1         90th Percentile Output:       1.8       1.6       1.5       1.9       1.5       1.5       1         BOQ       4.3       11.5       137       1.7       18.8       27.9       1         QSRatio       9       4.3       11.5       137       1.7       18.8       27.9       1         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9       1         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9       1         98th Percentile Output:       1       1       1.7       3.0       1.8       1.7       1         BOQ       6.3		tile	Outpu	t:			20			10	
QSRatio   </td <td>fB%</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td> </td> <td>1.2</td> <td></td> <td></td> <td>ALL ALL ALL ALL ALL ALL ALL ALL ALL ALL</td>	fB%							1.2			ALL ALL ALL ALL ALL ALL ALL ALL ALL ALL
85th Percentile Output:       1.6       1.5       1.4       1.7       1.4       1.4         BOQ       3.8       10.5       128       1.5       17.4       25.9         QSRatio       90th Percentile Output:       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       4.3       11.5       137       1.7       18.8       27.9         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9         QSRatio       9       5.3       13.1       146       2.2       20.6       29.9         QSRatio       9       6.3       14.7       155       2.7       22.3       32.0	BOQ		•		3.0	8.7		109	1.2	14.7	22.2
fB%       1.6       1.5       1.4       1.7       1.4       1.4         BOQ       3.8       10.5       128       1.5       17.4       25.9         QSRatio       90th Percentile Output:       1       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9       9         QSRatio       4.3       11.5       137       1.7       18.8       27.9       9         QSRatio       4.3       11.5       137       1.7       18.8       27.9       9         QSRatio       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       9       1.3       146       2.2       20.6       29.9       9         QSRatio       9       1.7       3.0       1.8       1.7       1         98th Percentile Output:       1       1.7       3.0       1.8       1.7       1         BOQ       6.3       14.7       155       2.7       22.3       32.0											
BOQ       3.8       10.5       128       1.5       17.4       25.9         QSRatio       90th Percentile Output:       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       4.3       11.5       137       1.7       18.8       27.9         QSRatio       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9         QSRatio       5.3       13.1       146       2.2       20.6       29.9         QSRatio       2.6       2.1       1.7       3.0       1.8       1.7         BOQ       6.3       14.7       155       2.7       22.3       32.0	85th Percent	tile	Outpu	t:							
QSRatio       90th Percentile Output:         fB%       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       95th Percentile Output:       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       98th Percentile Output:       1.7       3.0       1.8       1.7       180         BOQ       6.3       14.7       155       2.7       22.3       32.0       1	fB%				1.6	1.5	1	1.4	1.7	1.4	1.4
90th Percentile Output:         fB%       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       95th Percentile Output:       1.6       2.4       1.7       1.6       1.7         BOQ       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       98th Percentile Output:       1.7       3.0       1.8       1.7       18         BOQ       6.3       14.7       155       2.7       22.3       32.0       1	BOQ	ĺ			3.8	10.5	1	128	1.5	17.4	25.9
fB%       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       2.2       1.8       1.6       2.4       1.7       1.6         95th Percentile Output:       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9       29.9         QSRatio       98th Percentile Output:       2.6       2.1       1.7       3.0       1.8       1.7         BOQ       6.3       14.7       155       2.7       22.3       32.0       1	QSRatio	İ			1		İ			İ	
fB%       1.8       1.6       1.5       1.9       1.5       1.5         BOQ       4.3       11.5       137       1.7       18.8       27.9         QSRatio       2.2       1.8       1.6       2.4       1.7       1.6         95th Percentile Output:       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9       29.9         QSRatio       98th Percentile Output:       2.6       2.1       1.7       3.0       1.8       1.7         BOQ       6.3       14.7       155       2.7       22.3       32.0       1	90th Percent	tile	Outpu	t:			8				
QSRatio   </td <td></td> <td> </td> <td>50</td> <td></td> <td>1.8</td> <td>1.6</td> <td>1</td> <td>1.5</td> <td>1.9</td> <td>1.5</td> <td>1.5</td>			50		1.8	1.6	1	1.5	1.9	1.5	1.5
95th Percentile Output:         fB%       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9         QSRatio       98th Percentile Output:       1       1.7       3.0       1.8       1.7         BOQ       6.3       14.7       155       2.7       22.3       32.0	BOQ	i			4.3	11.5	i	137	1.7	18.8	27.9
95th Percentile Output:         fB%       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9         QSRatio       98th Percentile Output:       1       1.7       3.0       1.8       1.7         BOQ       6.3       14.7       155       2.7       22.3       32.0	OSRatio	i								1	
fB%       2.2       1.8       1.6       2.4       1.7       1.6         BOQ       5.3       13.1       146       2.2       20.6       29.9       9         QSRatio       98th Percentile Output:       1.7       3.0       1.8       1.7       1.6         BOQ       6.3       14.7       1.5       2.7       22.3       32.0       1		tile	Outpu	t:			,				
BOQ       5.3       13.1       146       2.2       20.6       29.9       98         QSRatio       98       Percentile Output:       1 <td< td=""><td></td><td> </td><td>1</td><td></td><td>2.2</td><td>1.8</td><td>1</td><td>1.6</td><td>2.4</td><td>1.7</td><td>1.6</td></td<>			1		2.2	1.8	1	1.6	2.4	1.7	1.6
QSRatio   </td <td></td> <td>i</td> <td></td> <td></td> <td></td> <td></td> <td>i</td> <td>146</td> <td></td> <td>20.6</td> <td>29.9</td>		i					i	146		20.6	29.9
98th Percentile Output:         fB%               2.6       2.1       1.7       3.0       1.8       1.7                 BOQ               6.3       14.7       155       2.7               22.3       32.0		ĺ			1		i				
fB%2.62.11.73.01.81.7BOQ6.314.71552.722.332.0		- ile	Outpu	t:	1		1			1	1
BOQ 6.3 14.7 155 2.7 22.3 32.0					12.6	2.1	1	1.7	3.0	11.8	1.7
		i					1	1777 N. 18			
						± ± • /		100	2.7	1 22.5	22.0
	2011010	I			1		1			I.	I.

ERROR MESSAGES\_\_\_\_\_

No errors to report.

HCS2000: Signalized Intersections Release 4.1d

Analyst: MAHInter.: CTH A & CTH JJ EastAgency:<br/>Date: 6/14/2004Area Type: All other areas<br/>Jurisd: Outagamie County<br/>Year : 2020Period:<br/>Project ID: CTH A & CTH JJ (East), 2020Full, Add Lanes<br/>N/S St: CTH A

1		SIG	SNALIZED	INTERS	ECTION	SUMMAR	Y		
	Eas	tbound	Westb	ound	Nor	thboun	.d	Southbou	nd
	L	TR	L T	R	L	т	R	L T	R
No. Lanes	0	0 0	1	0 1		2	0	0 2	0
LGConfig			L	R		TR		DefL T	201112
Volume			102	251	4 1. 0. 1.45	1163 2	73	330 770	me i nee
Lane Width			12.0	12.0		12.0		12.0 12.0	3400
RTOR Vol			12.0	0	1.1000		60	10.0 10.0	
KIOK VOI	I				I	6			- 1 129 Y - 6 I
Duration	0.25	Area 7	Signa	l other l Opera					
Phase Comb	oination	1 2	3	4		5	6	7 8	
EB Left				NB	Left				
Thru				A	Thru		Р		
Right					Right		Р		
Peds				1 014	Peds				
WB Left		Р		SB		Р	P		
Thru					Thru	P	Р		
Right		Р			Right				
Peds		5 60			Peds				
NB Right				EB					
SB Right				WB	-				
Green		22.0		1		15.0	40.0		
Yellow		3.0				3.0	3.0		
All Red		2.0				0.0	2.0		
nii neu		2.0						gth: 90.0	secs
		Intersec							
	ane	Adj Sat	Rati	os	Lane	Group	App	roach	
	roup	Flow Rate							
Grp Ca	apacity	(s)	v/c	g/C	Delay	LOS	Dela	y LOS	
Eastbound					29.00				2 h 1/0 h
	•								
Westbound									
L 4	441	1805	0.26	0.24	28.8	C			
							20.3	C	
R	754	1615	0.37	0.47	16.9	В			
Northbound	d								
TR 1	1583	3562	0.90	0.44	31.4	С	31.4	С	
Southbound	đ								
	386	1805	0.95	0.64	62.1	Е			
	1224	1900	0.70	0.64	13.7	B	28.2	С	
1	Intersec	tion Delay	= 28.7	(sec/v	reh) I	nterse	ction	LOS = C	

Fax:

E-Mall.	OPERATIONAL ANALYSIS							
Analyst:	МАН							
Agency/Co.:								
Date Performed:	6/14/2004							
Analysis Time Period:								
Intersection:	CTH A & CTH JJ East							
Area Type:	All other areas							
Jurisdiction:	Outagamie County							
Analysis Year:	2020							
	JJ (East), 2020 Full, Add Lanes							
	:/West Street North/South Street							
CTH JJ	CTH A							

VOLUME DATA\_\_\_\_\_\_

	Eastbound			Westbound			No	orthbo	und	Southbound		
	L	т	R	L	т	R	L	Т	R	L	Т	R
Volume				102		251		1163	273	330	770	
% Heavy Veh	ĺ			0		0	ĺ	0	0	0	0	
PHF	ĺ			0.90		0.90	1	0.90	0.90	0.90	0.90	
PK 15 Vol				28		70	1	323	76	92	214	
Hi Ln Vol	1											
% Grade					0			0			0	
Ideal Sat	1			1900		1900	1	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	0	0	0	1	0	1	0	2	0	0	2	0
LGConfig				L		R		TR		Def	LТ	
Lane Width				12.0		12.0		12.0		12.0	12.0	
RTOR Vol						0			160			
Adj Flow				113		279		1418		367	856	
%InSharedLn												
Prop LTs								0.0	00	1.00	0 0.00	0
Prop RTs						1.000	0	.089		0	.000	
Peds Bikes	0			0			0					
Buses				0		0		0		0	0	
%InProtPhase	9									0.0		
Duration	0.25		Area	Type:	All	other a	areas	;				

	Ea: L	stbou T	nd R	We   L	stbou T	nd R	No L	rthbo T	und R	Southbound L T R		
Init Unmet				0.0		0.0		0.0		0.0	0.0	
Arriv. Type				3		3	ĺ	3		3	3	i
Unit Ext.				3.0		3.0		3.0		3.0	3.0	i i
I Factor				1	1.00	0	ĺ	1.00	0	1	1.000	o į
Lost Time				2.0		2.0	ĺ	2.0		2.0	2.0	Í
Ext of g				2.0		2.0		2.0		2.0	2.0	i

## OPERATING PARAMETERS

Ped Min g I PHASE DATA 4 5 6 7 8 Phase Combination 1 2 3 EB Left NB Left Thru Thru Ρ Right Ρ Right Peds Peds Left SB Left Ρ Ρ WB Ρ Thru Ρ Thru Ρ Right Right Ρ Peds Peds NB Right EB Right SB Right WB Right P 15.0 40.0 Green 22.0 Yellow 3.0 3.0 3.0 0.0 2.0 All Red 2.0 Cycle Length: 90.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET Volume Adjustment

vorume Aujus	scillenc												÷.
67	Eas	tbou	nd	Wes	tbo	und	No	rthbo	und	Sou	ithbo	und	
$\mathbf{V}$	L	Т	R	L	Т	R	L	Т	R	L 	Т	R	
Volume, V				102		251		1163	273	330	770	0.2841	
PHF				0.90		0.90	1	0.90	0.90	0.90	0.90		
Adj flow				113		279		1292	126	367	856		
No. Lanes	0	0	0	1	0	1	0	2	0	0	2	0	
Lane group				L		R		TR		Defl	с т		
Adj flow				113		279		1418		367	856		
└ Prop LTs				1.000				0.0	00	1.000	0.0	00	
Prop RTs						1.000	0	.089		0	.000		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)\_\_\_ Eastbound Westbound Northbound Southbound

		Ба	SCDOUII	u	ME	SCDOUII	u	NOLU	mooun	u	bou	cinocuire	4
ſ	LG				L		R		TR		DefL	Т	
	So				1900		1900		1900		1900	1900	
L.	Lanes	0	0	0	1	0	1	0	2	0	0	2	0
	fW				1.000		1.000		1.000		1.000	1.000	
	fHV				1.000		1.000		1.000		1.000	1.000	
L	fG				1.000		1.000		1.000		1.000	1.000	
	fP				1.000		1.000		1.000		1.000	1.000	
ſ	fBB				1.000		1.000		1.000		1.000	1.000	
+	fA				1.00		1.00		1.00		1.00	1.00	
1	fLU				1.00		1.00		0.95		1.00	1.00	
7	fRT						0.850		0.987			1.000	
1	fLT				0.950				1.000		0.950	1.000	
L	Sec.										0.093		
	fLpb				1.000				1.000		1.000	1.000	
1	fRpb						1.000		1.000			1.000	
1	S				1805		1615		3562		1805	1900	
	Sec.										177		
(					CAPA	CITY A	ND LOS	WORKSH	IEET				

Appr/Lane         Flow Rate         Flow Rate         Patio         Ratio         Capacity $v/c$ Mvmt         Group         (v)         (s)         (v/s)         (g/C)         (c)         Ratio           stbound         Prot         Perm         Image: Strength Strengt Strengt Strength Strength Strengt Strength Strength Strength S	Capacity	Analysi							G		T		
Write         Group         (v)         (s)         (v/s)         (g/C)         (c)         Ratio           stbound         Prot         Perm         Image: Stress of the stress of the	Annr/	Lano		Adj w Bate									
Prot Perm Jeft Perm Jeft Prot Perm Thru Right Right R 279 1615 0.17 0.47 754 0.37 Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Perm Thru Perm Thru Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Perm Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Nuthbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 65 0.78 Left DefL 367 Perm Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Stal lost time per cycle, L = 15.00 sec Stal lost time per cycle, L = 15.00 sec Stal lost time per cycle, L = 15.00 sec Stal lost time per cycle, L = 15.00 sec Stal lost time per cycle, L = 15.00 sec Stal lost time per cycle, L = 15.00 sec Stal lost 1.40 7.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B Perthocund Stal 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C Stalbound			FIC								the second second second second second second second second second second second second second second second se		)
Perm Left Prot Perm Thru Right setbound Prot Perm Left L 113 1805 $\# 0.06$ 0.24 441 0.26 Prot Perm Left L 113 1805 $\# 0.06$ 0.24 441 0.26 Prot Perm Right R 279 1615 0.17 0.47 754 0.37 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Prot Perm Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Right Nuthbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 65 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 $\# 0.45$ 0.64 1224 0.70 Right m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 tical flow rate to capacity ratio, $Xc = (Yc)(C)/(C-L) = 1.09$ ontrol Delay and LOS Determination Def Adj Grp Factor Del Del p $v/c$ $g/c$ dl Fact Cap k d2 ds Delay LOS Delay LOS Testbound setbound 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C puthbound	Eastbound	d											
Left Prot Perm Thru Right Stbound Prot Perm Left L 113 1805 $\#$ 0.06 0.24 441 0.26 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Thru Right R 279 1615 0.17 0.47 754 0.37 Thru Perm Left Perm Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Uthbound Prot Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 Prot Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 Prot Perm Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 tital lost time per cycle, L = 15.00 sec Tital flow rate to capacity ratio, Xc = (Yc) (C) / (C-L) = 1.09 mtrol Delay and LOS Determination mod flow ratios for critical lane Incremental Res Lane Group Approach me Del Adj Grp Factor Del Del Del Adj Grp Factor Del Del Stbound stbound stbound stbound c 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound c 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C suthbound	Prot												
Prot Perm Thru Right SetSound Prot Perm Left L 113 1805 $\#$ 0.06 0.24 441 0.26 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Prot Perm Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Right Thru TR 1418 3562 $\#$ 0.40 0.44 1583 0.90 Prot Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 0.478 85 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Right Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Fisht Im of flow ratios for critical lane groups, Yc = Sum ( $\forall$ /s) = 0.91 thal lost time per cycle, L = 15.00 sec Thical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Subtrol Delay and LOS Determination Thru T 856 1900 $\#$ 0.45 0.64 1224 0.70 Subound Setbound Setbound Setbound C 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B Setbound C 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C Setbound	Perm												
Perm Thru Right stbound Prot Perm Left L 113 1805 $\# 0.06$ 0.24 441 0.26 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 rfthound Prot Perm Left Prot Perm Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Right Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Right Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Right Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Right Thru TR 1418 3562 $\# 0.40$ 0.44 1583 0.90 Perm 66 177 0.37 0.473 85 0.78 Left DefL 367 Perm Thru T 856 1900 $\# 0.45$ 0.64 1224 0.70 Right mo of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 tal lost time per cycle, L = 15.00 sec Hital lost time per cycle, L = 20.3 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B The cycle perm Stbound R 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C Hital buthbound	Left												
Thru Right stabound Prot Perm Left L 113 1805 # 0.06 0.24 441 0.26 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Prot Perm Left Prot Perm Thru TR 1418 3562 # 0.40 0.44 1583 0.90 Right Unthound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 Prot 0.64 386 0.95 Prot 7 0.64 1224 0.70 Prot Perm 7 1.55 1.000 Prot Perm 8 1.5 Prot 9 Prot 1.5 1.00 Prot 1.5 1.4 0.0 16.9 Prot 1.5 1.4 0	Prot												
Right erstbound Prot Perm Left L1131805# 0.060.244410.26Perm Left L1131805# 0.060.244410.26Perm Thru Right0.130.244410.26Perm Thru Right0.170.470.470.470.470.470.4410.09Perm Thru TR141835620.410.470.643860.99OLD ADD TALL TALL TALL TALL TALL TALL TAL	Perm												
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Thru												
Prot       Perm       113       1805       # 0.06       0.24       441       0.26         Prot       Perm       Thru       Right R       279       1615       0.17       0.47       754       0.37         Prot       Perm       Perm       Perm       0.40       0.44       1583       0.90         Right       Perm       1418       3562       # 0.40       0.44       1583       0.90         Right       Perm       66       177       0.37       0.478       85       0.78         Perm       66       177       0.37       0.478       85       0.79         Post       Perm       66       177       0.37       0.478       85       0.78         Perm       66       177       0.37       0.478       85       0.78         Prot       Perm       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Matios for critical lane groups, Yc =       Sum (v/s) = 0.91       1.09       1.01       1.00       1.00         prot	Right												
Perm       113       1805       # 0.06       0.24       441       0.26         Prot       Perm       Thru       Right R       279       1615       0.17       0.47       754       0.37         Prot       Perm       Intru       Thru       Right R       279       1615       0.17       0.47       754       0.37         Prot       Perm       Intru       Thru       TR       1418       3562       # 0.40       0.44       1583       0.90         Right       Thru       TR       1418       3562       # 0.40       0.44       1583       0.90         Right       Thru       TR       1418       3562       # 0.40       0.44       1583       0.90         Right       101       1805       0.17       0.167       301       1.00         Perm       66       177       0.37       0.478       85       0.78         Perm       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Infor flow ratios for critical lane groups, Y	Westbound	d											
Left L 113 1805 # 0.06 0.24 441 0.26 Prot Perm Thru Right R 279 1615 0.17 0.47 754 0.37 Prot Perm Left Perm Thru TR 1418 3562 # 0.40 0.44 1583 0.90 Right Nuthbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 # 0.45 0.64 1224 0.70 Right m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 tal lost time per cycle, L = 15.00 sec Titical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 ontrol Delay and LOS Determination me Del Adj Grp Factor Del Del prot y/c g/C dl Fact Cap k d2 d3 Delay LOS Estbound 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B Trithound t 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C puthbound	Prot												
Prot       Perm         Thru       Right R       279       1615       0.17       0.47       754       0.37         Prithbound       Port       Perm       1418       3562       # 0.40       0.44       1583       0.90         Right       Perm       Thru       TR       1418       3562       # 0.40       0.44       1583       0.90         Right       Nuthbound       Perm       66       177       0.37       0.478       85       0.78         Perm       66       177       0.37       0.478       85       0.78         Perm       66       177       0.37       0.478       85       0.78         Perm       66       1900       # 0.45       0.64       1224       0.70         Right       Model time per cycle, L = 15.00 sec       1.400       1.40 sec       1.09       1.100         Pip/       Ratios       Unf       Prog Lane       Incremental Res       Lane Group       Approach         me       Del       Adj       Grp       Factor Del       Del       Delay LOS       Delay LOS         stabound       0.26       0.24       27.4       1.000 441       0.50       <	Perm												
Perm Thru       Perm Thru       Perm       Output </td <td>Left</td> <td>L</td> <td>1</td> <td>13</td> <td>18</td> <td>05</td> <td># (</td> <td>0.06</td> <td>Ο.</td> <td>24</td> <td>441</td> <td>0.26</td> <td></td>	Left	L	1	13	18	05	# (	0.06	Ο.	24	441	0.26	
Thru Right R 279 1615 0.17 0.47 754 0.37 Prothbound Prot Perm Left Prot Perm Thru TR 1418 3562 # 0.40 0.44 1583 0.90 Right Nuthbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 # 0.45 0.64 1224 0.70 Right mof flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 otal lost time per cycle, L = 15.00 sec titical flow rate to capacity ratio, $Xc = (Yc)(C)/(C-L) = 1.09$ Nutrol Delay and LOS Determination Depr/ Ratios Unf Prog Lane Incremental Res Lane Group Approach prov/c g/C dl Fact Cap k d2 d3 Delay LOS Delay LOS Istbound 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound & 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C puthbound	Prot												
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Right	R	2	79	16	15	(	0.17	0.	47	754	0.37	
Perm Left Prot Perm Thru TR 1418 3562 # 0.40 0.44 1583 0.90 Right Withbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 # 0.45 0.64 1224 0.70 Right m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 titlcal flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 Mathematical flow rate		nd											
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Prot Perm       Prot Thru       TR       1418       3562       # 0.40       0.44       1583       0.90         Right       Nuthbound       Prot       301       1805       0.17       0.167       301       1.00         Perm       66       177       0.37       0.478       85       0.78         Left       DefL       367       0.64       386       0.95         Prot       Perm       0.64       386       0.95         Prot       Perm       0.64       386       0.95         Prot       Perm       0.64       386       0.95         Perm       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Model flow ratios for critical lane groups, Yc =       Sum (v/s) = 0.91       0.91       0.167       0.91       0.91         otal lost time per cycle, L = 15.00 sec       Istical flow rate to capacity ratio,       Xc = (Yc)(C)/(C-L) = 1.09       Approach         me       Del Adj Grp       Factor Del Del       Del       Delay LOS       Delay LOS         stbound       0.26       0.24       27.4       1.000       441       0.50       1.4       0.0       16.9 </td <td>Perm</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Perm												
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Thru TR 1418 3562 # 0.40 0.44 1583 0.90 Right Muthbound Prot 301 1805 0.17 0.167 301 1.00 Perm 66 177 0.37 0.478 85 0.78 Left DefL 367 0.64 386 0.95 Prot Perm Thru T 856 1900 # 0.45 0.64 1224 0.70 Right m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 titlal lost time per cycle, L = 15.00 sec ritical flow rate to capacity ratio, Xc = (Yc) (C) / (C-L) = 1.09 mutrol Delay and LOS Determination pr/ Ratios Unf Prog Lane Incremental Res Lane Group Approach me Del Adj Grp Factor Del Del frp v/c g/C d1 Fact Cap k d2 d3 Delay LOS Delay LOS tstbound estbound 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound a 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C puthbound	Prot												
Right         Prot       301       1805       0.17       0.167       301       1.00         Perm       66       177       0.37       0.478       85       0.78         Left       DefL       367       0.64       386       0.95         Prot       Perm       0.64       386       0.95         Prot       Perm       0.64       386       0.95         Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Thru       T       856       1900       # 0.45       0.64       1224       0.70         Right       Iost time per cycle, L = 15.00 sec       Stical flow rate to capacity ratio,       Xc = (Yc) (C) / (C-L) = 1.09       Nor         ontrol Delay and LOS Determination	Perm												
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Prot Perm Thru T 856 1900 # 0.45 0.64 1224 0.70 m of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 tal lost time per cycle, L = 15.00 sec critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 ontrol Delay and LOS Determination ppr/ Ratios Unf Prog Lane Incremental Res me Del Adj Grp Factor Del Del Del Del Delay LOS tstbound setbound $0.26 \ 0.24 \ 27.4 \ 1.000 \ 441 \ 0.50 \ 1.4 \ 0.0 \ 28.8 \ C 0.37 \ 0.47 \ 15.5 \ 1.000 \ 754 \ 0.50 \ 1.4 \ 0.0 \ 16.9 \ B \ C 0.90 \ 0.44 \ 23.1 \ 1.000 \ 1583 \ 0.50 \ 8.3 \ 0.0 \ 31.4 \ C \ 31.4 \ C \ C 0.90 \ 0.44 \ 23.1 \ 1.000 \ 1583 \ 0.50 \ 8.3 \ 0.0 \ 31.4 \ C \ 31.4 \ C \ C \ C \ C \ C \ C \ C \ C \ C \ $	Perm		6	6	17	7	(	0.37	0.	478	85	0.78	
Perm Thru       T       856       1900       # 0.45       0.64       1224       0.70         Im of flow ratios for critical lane groups, Yc =       Sum (v/s) = 0.91         Ital lost time per cycle, L = 15.00 sec         critical flow rate to capacity ratio,       Xc = (Yc) (C) / (C-L) = 1.09         Ital lost time per cycle, L = 15.00 sec         critical flow rate to capacity ratio,       Xc = (Yc) (C) / (C-L) = 1.09         Ital lost time per cycle, L = 15.00 sec         critical flow rate to capacity ratio,       Xc = (Yc) (C) / (C-L) = 1.09         Ital lost time per cycle, L = 15.00 sec         critical flow rate to capacity ratio,       Xc = (Yc) (C) / (C-L) = 1.09         Ital lost time per cycle, L = 15.00 sec         opt (C) di Forg Lane Tricemental Res       Lane Group         Approach       Del Adj Grp         restbound       0.26       0.24       27.4         0.26       0.24       27.4       1.000 441       0.50       1.4       0.0       28.8       C         0.37       0.47       15.5       1.000 754       0.50       1.4       0.0       16.9       B         orthbound       0.90       0.44       23.1       1.000 1583       0.50       8.3       0.0       31.4       C	Left	DefL	3	67					Ο.	64	386	0.95	
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<pre>mm of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.91 that lost time per cycle, L = 15.00 sec ritical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.09 performed belay and LOS Determination per/ Ratios Unf Prog Lane Incremental Res Lane Group Approach me Del Adj Grp Factor Del Del Delay LOS</pre>		т	8	56	19	00	# (	0.45	Ο.	64	1224	0.70	
batal lost time per cycle, L = 15.00 sec critical flow rate to capacity ratio, $Xc = (Yc)(C)/(C-L) = 1.09$ control Delay and LOS Determination ppr/ Ratios Unf Prog Lane Incremental Res Del Adj Grp Factor Del Del $\frac{V/c}{Vc}$ g/C d1 Fact Cap k d2 d3 $\frac{V}{Delay LOS}$ $\frac{Approach}{Delay LOS}$ is thound control Delay 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B control Delay 20.3 C 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C bouthbound	Right												
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						stand wanted stands in which the	emei	ntal	Res	Lan	le Group	Appro	ach
rp       v/c       g/C       d1       Fact       Cap       k       d2       d3       Delay LOS       Delay LOS         Istbound       0.26       0.24       27.4       1.000       441       0.50       1.4       0.0       28.8       C         0.37       0.47       15.5       1.000       754       0.50       1.4       0.0       16.9       B         0.90       0.44       23.1       1.000       1583       0.50       8.3       0.0       31.4       C       31.4       C         outhbound       0.90       0.44       23.1       1.000       1583       0.50       8.3       0.0       31.4       C       31.4       C	Lane			-							F		
estbound 0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound	and the second states of the second states of the second states of the second states of the second states of the	c g/C			-					De	elay LOS	Delay	LOS
0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound a 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound	Eastbound	d											
0.26 0.24 27.4 1.000 441 0.50 1.4 0.0 28.8 C 0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound a 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound													
0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B Orthbound 20.3 C a 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound	Westbound	d											
0.37 0.47 15.5 1.000 754 0.50 1.4 0.0 16.9 B orthbound 2 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound	L 0.2	6 0.24	27.4	1.000	441	0.50		1.4	0.0	28.	8 C		
orthbound 2 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C outhbound												20.3	С
2 0.90 0.44 23.1 1.000 1583 0.50 8.3 0.0 31.4 C 31.4 C			15.5	1.000	754	0.50		1.4	0.0	16.	9 B		
outhbound	Jorthbou	nd											
outhbound													
	TR 0.9	0 0.44	23.1	1.000	1583	0.50	8	8.3	0.0	31.	4 C	31.4	С
fL 0.95 0.64 27.2 1.000 386 0.50 34.9 0.0 62.1 E													
	DefL 0.9	5 0.64	27.2	1.000	386	0.50		34.9	0.0	62.	1 E		

Т

Intersection delay = 28.7 (sec/veh) Intersection LOS = C

\_\_\_\_SUPPLEMENTAL PERMITTED LT WORKSHEET\_\_\_\_\_ for exclusive lefts

Input	EB WB NB SB
Cycle length, C 90.0	Sec an ad se
Total actual green time for LT lane group, G (s	
Effective permitted green time for LT lane group	
Opposing effective green time, go (s)	40.0
Number of lanes in LT lane group, N	1
Number of lanes in opposing approach, No	2
Adjusted LT flow rate, VLT (veh/h)	367
Proportion of LT in LT lane group, PLT	1.000
Proportion of LT in opposing flow, PLTo	0.00
Adjusted opposing flow rate, Vo (veh/h)	1418
Lost time for LT lane group, tL	5.00
Computation	
LT volume per cycle, LTC=VLTC/3600	9.18
Opposing lane util. factor, fLUo	1.00 0.95
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln,	
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-	
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.56
gq, (see Exhibit C16-4,5,6,7,8)	35.41 7.59
<pre>gu=g-gq if gq&gt;=gf, or = g-gf if gq<gf n=Max(gq-gf)/2,0)</gf </pre>	17.71
PTHO=1-PLTO	1.00
$PL^* = PLT [1+ (N-1)g/(gf+gu/EL1+4.24)]$	1.00
EL1 (refer to Exhibit C16-3)	5.31
EL2=Max((1-Ptho**n)/Plto, 1.0)	
fmin=2(1+PL)/g or $fmin=2(1+Pl)/g$	0.09
gdiff=max(gq-gf,0)	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=)	
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[3	1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt= $[fm+0.91(N-1)]/N**$	
Left-turn adjustment, fLT	0.093
For special case of single-lane approach oppose	ed by multilane approach,
see text.	then aggime do facto
<pre>\[ * If Pl&gt;=1 for shared left-turn lanes with N&gt;1 left-turn lane and redo calculations.</pre>	, then assume de-racto
** For permitted left-turns with multiple exclu	usive left-turn lanes flt-fm
For special case of multilane approach opposed	
or when gf>gq, see text.	by bingic lune approach
SUPPLEMENTAL PERMITTED L	I WORKSHEET
for shared left	
Input	
	EB WB NB SB
Cycle length, C 90.0	sec
Total actual green time for LT lane group, G (	
Effective permitted green time for LT lane group	up, g(s)
Opposing effective green time, go (s)	
Number of lanes in LT lane group, N	
Number of lanes in opposing approach, No	

Adjusted LT flow rate, VLT (veh/h) Proportion of LT in LT lane group, PLT 0.000 0.000 Proportion of LT in opposing flow, PLTo Adjusted opposing flow rate, Vo (veh/h) Lost time for LT lane group, tL Computation LT volume per cycle, LTC=VLTC/3600 Opposing lane util. factor, fLUo 1.00 0.95 Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc) gf=G[exp(- a \* (LTC \*\* b))]-tl, gf<=g Opposing platoon ratio, Rpo (refer Exhibit 16-11) Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0] gq, (see Exhibit C16-4,5,6,7,8) gu=g-gq if gq>=gf, or = g-gf if gq<gf n=Max(gq-gf)/2,0)PTHo=1-PLTo PL\*=PLT[1+(N-1)q/(qf+qu/EL1+4.24)]EL1 (refer to Exhibit C16-3) EL2=Max((1-Ptho\*\*n)/Plto, 1.0)fmin=2(1+PL)/g or fmin=2(1+PL)/ggdiff=max(gq-gf,0) fm = [gf/g] + [gu/g] / [1+PL(EL1-1)], (min=fmin;max=1.00)flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N\*\* Left-turn adjustment, fLT For special case of single-lane approach opposed by multilane approach, see text. \* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations. \*\* For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text. SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET Permitted Left Turns EB WB NB SB Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Pedestrian flow rate, Vpedg (p/h) OCCpedq Opposing queue clearing green, gq (s) Eff. ped. green consumed by opp. veh. queue, gq/gp OCCpedu Opposing flow rate, Vo (veh/h) OCCr Number of cross-street receiving lanes, Nrec Number of turning lanes, Nturn ApbT Proportion of left turns, PLT Proportion of left turns using protected phase, PLTA Left-turn adjustment, fLpb Permitted Right Turns Effective pedestrian green time, gp (s) Conflicting pedestrian volume, Vped (p/h) Conflicting bicycle volume, Vbic (bicycles/h) Vpedq OCCpedg Effective green, g (s) Vbicg OCCbicg

)CCr Number	of cross	-street :	receivin	g lanes,	Nrec				
	of turni	ng lanes	, Nturn						
ApbT Proport	ion righ	t-turns.	PRT						
+	ion righ			otected	phase, P	RTA			
Right t	urn adju	stment, :	fRpb						
1		SU	PPLEMENT	AL UNIFO	RM DELAY	WORKSHE	ET		
7						T	BLT WBL	r nblt	SBLT
Cvcle ]	ength, C				90.0	sec			SPUI
-	vol fro		justment	Workshe	et, v				367
	io from								0.95
	ed phase								15.0
	ng queue		-	interval	, gq				35.41 7.59
	ed green ne r=(C-g		I, gu						32.0
	. rate, q		0(max[X.	1.01))					0.10
	ed ph. d								0.501
	ed ph. d			100 March 100 Ma		600)			0.28
XPerm									2.07
XProt									0.64
Case	+ heripp	ing of g		ou 00					3 5.53
	at beginn at beginn				011				3.61
	al queue,		libacurac	cu green	, gu				2.27
	n Delay,			5 5 7					27.2
1		DELAY/	LOS WORK	SHEET WI	TH INITI.	AL QUEUE			
Appr/	Initial	Dur.	Uniform	Delaw					
	IInmet		OHIIOIM	Delay		Final Unmet			
Lane	Unmet Demand	Unmet Demand	Unadj.		Queue	Unmet	Initial Queue Delay	Group	
		Unmet Demand			Queue	Unmet	Queue	Group Delay	
Lane	Demand Q veh	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Demand Q veh	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Demand Q veh	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh und	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou	Demand Q veh and	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Demand Q veh and	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Demand Q veh and	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Demand Q veh and	Unmet Demand	Unadj.	Adj.	Queue Param.	Unmet Demand	Queue Delay	Group Delay	
Lane Group Eastbou Westbou	Demand Q veh and and bund	Unmet Demand t hrs.	Unadj. ds	Adj. dl sec	Queue Param. u	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Demand Q veh and and bund	Unmet Demand	Unadj. ds	Adj. dl sec	Queue Param. u	Unmet Demand	Queue Delay d3 sec	Group Delay	
Lane Group Eastbou Westbou	Demand Q veh and and bund	Unmet Demand t hrs.	Unadj. ds	Adj. dl sec	Queue Param. u	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Demand Q veh and and ound ound Intersec	Unmet Demand t hrs.	Unadj. ds ay 28.7 BACK	Adj. dl sec sec/v	Queue Param. u eh I: E WORKSH	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	
Lane Group Eastbou Westbou	Demand Q veh and and ound ound Intersec	Unmet Demand t hrs.	Unadj. ds ay 28.7 BACK	Adj. dl sec sec/v	Queue Param. u eh I: E WORKSH	Unmet Demand Q veh	Queue Delay d3 sec	Group Delay d sec	nd

LaneGroup				L	R	TR	DefL T
Init Queue				0.0	0.0	0.0	0.0 0.0
Flow Rate				113	279	746	367 856
So	1			1900	1900	1900	1900 1900
No.Lanes	0	0	0	1 0	1 0	2 0	0 2 0
SL				1805	1615	1874	598 1900
LnCapacity	i			441	754	833	386 1224
Flow Ratio	i			0.06	0.17	0.40	0.61 0.45
v/c Ratio	i			0.26	0.37	0.90	0.95 0.70
Grn Ratio	i			0.24	0.47	0.44	0.64 0.64
I Factor	i			1.00	0	1.000	1.000
AT or PVG	i			3	3	3	3 3
Pltn Ratio				1.00	1.00	1.00	1.00 1.00
PF2	i i			11.00	1.00	1.00	1.00 1.00
Q1	1			2.3	4.5	17.2	3.9 13.9
kB	1			0.6	0.9	1.0	0.6 1.3
Q2	1			0.2	0.5	5.7	4.1 2.9
Q Average				2.5	5.0	22.9	8.0 16.7
Q Spacing	1			25.0	25.0	25.0	25.0 25.0
Q Storage	1			10	0	0	
Q S Ratio					•	0	
70th Percen	 + 1 ] 0	Outpu	+.	1	1		1 1
fB%		oucpu		1.3	1.2	1.2	1.2 1.2
BOQ				3.1	6.2	27.5	9.8 20.1
QSRatio	1			13.1	0.2	27.5	9.8 20.1
85th Percen	 + 1 ] o	0.1+	÷.	1	1		1 1
	LITE	Outpu	ι:	11 C	1.5	1.4	1.5 1.4
fB%				1.6			11.7 23.6
BOQ				4.0	7.6	32.1	11.7 23.6
QSRatio		0	L	1	I		1 1
90th Percen	tile	Outpu	τ:	11 0			
fB%				1.8	1.7	1.5	1.6 1.5
BOQ				4.5	8.5	34.4	12.8 25.4
QSRatio		- ·		1	I.		1 1
95th Percen	tile	Outpu	t:				
fB%				2.2	2.0	1.6	1.8 1.6
BOQ				5.5	9.9	36.8	14.4 27.4
QSRatio				1	I		1 1
98th Percen	tile	Outpu	t:				
fB%				2.6	2.2	1.7	2.0 1.8
BOQ				6.5	11.3	39.2	16.0 29.3
QSRatio							1 1

\_\_\_\_\_ERROR MESSAGES\_\_\_\_\_

No errors to report.

ENGINEERING ARCHITECTURE ENVIRONMENTAL ONE SYSTEMS DRIVE APPLETON, WI 54914-1654 920-735-6900 1-800-571-6677 FAX 920-830-6100



JOB NUMBER	SHEET NO.
CLIENT	0
PROJECT	
MADE BY	DATE
CHECKED BY	DATE



TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

		MAI C	101	CONTR		JI 11 11						
2	МАН											
Analyst:												
Agency/Co.:	OMNNI											
Date Performed:	6/25/:	2004										
Analysis Time Period:												
Intersection:	STH 4	7&0	CTH	A								
Jurisdiction:												
Units: U. S. Customan	CY .											
Analysis Year:	2020											
Project ID: STH 47 8	CTH A	Inte	erse	ection,	fu	11						
East/West Street:	CTH A											
North/South Street:												
Intersection Orientat					5	stud	vb	peri	od (hrs)	: 0.25	5	
Incersection orientat	.10m. N	5			1	ocu		Poll				
	Vehic	le Vo	ונורכ	mes and	a Adiu	ustr	mer	its				
Major Street: Approa				thbound					outhbour	nd		
<b>J</b>		1	UOL	2	3		I.	4	5	6		
Moveme	enc			Z T	R		1	L	Т	R		
		$\mathbf{L}$		1	ĸ		I	Ц	T	R		
		18		406					325			
Volume	-		~						1.00			
Peak-Hour Factor, PH		1.00	J	1.00								
Hourly Flow Rate, HFI		18		406					325			
Percent Heavy Vehicle	es	10										
Median Type/Storage		Und	ivi	ded			/					
RT Channelized?									0.2			
Lanes		(	0	1					1			
Configuration			$\mathbf{LT}$						т			
Upstream Signal?				No					No			
-F												
Minor Street: Approx	ach	1	Wes	tbound				E	Castbound			
Movem		7		8	9			10	11	12		
		L		т	R		1	L	т	R		
Volume								566		5		
Peak Hour Factor, PH	F							1.00	)	1.00		
Hourly Flow Rate, HF	R							566		5		
Percent Heavy Vehicl								10		10		
Percent Grade (%)				0					0			
	ists?/S	tora	qe				1			No	/	
Lanes	,		2					(	)	0		
Configuration									LR			
conriguration						,						
De	lay, Qu	leue	Len	gth, a	nd Le	vel	01	E Sei	rvice			
	NB	SB			tboun					tbound		
	1	4	Ĩ.	7	8		9	1	10	11	12	
	LT	-	ł		•		-	- i		LR		
Lane Config	11		I.					1		2		
v (vph)	18									571		
· · · · · ·										356		
The second second second second second second second second second second second second second second second se	1191									1.60		
	0.02									33.30		
1 3	0.05											
	8.1									311.5		
LOS	A									F		
Approach Delay										311.5		
Approach LOS										F		
15 p												

## HCS2000: Unsignalized Intersections Release 4.1d

Phone: E-Mail: Fax:

P ]	N# 75 TT						
marjoot	MAH OMNNI						
igener/ corr							
	6/25/2004						
Analysis Time Period:		א זויד					
Jurisdiction:	STH 47 & C	IH A					
Units: U. S. Customary Analysis Year:	2020						
Project ID: STH 47 &	CTH A Inte	rsectio	n, full	1			
East/West Street:	CTH A						
North/South Street:	STH 47						
Intersection Orientati	on: NS		St	tudy per	ciod (	hrs): O	.25
	Vehicle	Volumes	and Ad	justment		ang (sa	
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume	18	406		ů.	325		
Peak-Hour Factor, PHF	1.00	1.00			1.00		
Peak-15 Minute Volume	4	102			81		
Hourly Flow Rate, HFR	18	406			325		
Percent Heavy Vehicles						01	
Median Type/Storage	Undi	vided		/			
RT Channelized?							
Lanes	0	1			1		
Configuration	L				т		BID: BID BE E
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	3-1-1-1-1-5
	L	Т	R	L	т	R	
				566	<u></u>	5	61.52 0
Volume				1.00		1.00	
Peak Hour Factor, PHF Peak-15 Minute Volume				142		1	
				566		5	
Hourly Flow Rate, HFR				10		10	
Percent Heavy Vehicles		0		10	0	10	
Percent Grade (%)	tal/atoma	•		1	0	No	/
	ts?/Storag	e		/		NO	/
RT Channelized? Lanes				0		0	
				0	LR	Ū	
Configuration							
	Pedestrian	Volume	s and A	diustme	nts		
Movements	13	14	15 and A	16			
	0.0000						

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Prog.	Sat	Arrival	Green	Cycle	Prog.	Distance
Flow	Flow	Туре	Time	Length	Speed	to Signal
vph	vph		sec	sec	mph	feet

Through

S5 Left-Turn

Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	406	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation										
Movement		1	4	7	8	9	10	11	12	
		L	$\mathbf{L}$	$\mathbf{L}$	Т	R	L	Т	R	
									3	
t(c,base	:)	4.1					7.1		6.2	
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)		10					10		10	
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Grade/10	0			0.00	0.00	0.00	0.00	0.00	0.00	
t(3,1t)		0.00					0.70		0.00	
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage						6.5		6.3	
	2-stage									
	2									
Follow-Up Time Calculations										
Movement	2000 C	1	4	7	8	9	10	11	12	
		L	L	L	т	R	L	т	R	
t(f,base	e)	2.20					3.50		3.30	
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
P(HV)		10					10		10	
t(f)		2.3					3.6		3.4	
ticht in consider										

Worksheet 5-Effect of Upstream Signals

Computation	1-Queue	Clearance	Time	at	Upstream	Signal			
					Movement 2		Mov	rement 5	
					V(t) V(l,prot)		V(t)	V(l,prot)	
Total Saturat Arrival Type Effective Gre Cycle Length, Rp (from Exhi Proportion ve g(q1) g(q2) g(q)	een, g (se C (sec) bit 16-11 ehicles ar	c) ) riving	on greer						
--	--	-------------------------------	----------------------------	--------	------------------------------	---------	--------------------------	-----------------	---
Computation 2	2-Proporti	on of T	WSC Inte		Moveme	ent 2	ked M ) V(t)	ovement V(l,	5 prot)
alpha									
beta Fravel time, Smoothing Fac Proportion of Max platooned Min platooned	ctor, F f conflict d flow, V d flow, V	ing flo (c,max) (c,min)							
Duration of D Proportion t	ime blocke	ed, p	(5)		0.0	00		0.000	
Computation :	3-Platoon	Event I	Periods	Re	sult				in the
									n Carolan
p(2) p(5) p(dom) p(subo) Constrained	or unconst	trained	0.0 1	0.	000				
p(5) p(dom) p(subo)	e e C <sup>1</sup> C <sup>1</sup> C ac a - c	(: Single	? 1) e-stage cess	0.	(2)	tage Pr	(3) cocess Stage I	I	an criss 7 Lorgo 18 mar 18 mar 19 cast
p(5) p(dom) p(subo) Constrained Proportion unblocked for minor	e e C <sup>1</sup> C <sup>1</sup> C ac a - c	(: Single	1) e-stage	0.	000 (2) Two-S	tage Pr	ocess		All ( Shi ( Shi ( Shi ( Shi ( Shi ( Shi ( Shi ( Shi ( Sh
<pre>p(5) p(dom) p(subo) Constrained Proportion unblocked for minor movements, p p(1) p(4) p(7) p(8) p(9) p(10) p(11)</pre>	(x) 4 and 5	(: Single Prod	1) e-stage cess 4	0. 	000 (2) Two-S age I	9	COCESS Stage I	I 11 T	12 R
<pre>p(5) p(dom) p(subo) Constrained Proportion unblocked for minor movements, p p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12) Computation Single-Stage</pre>	(x) 4 and 5	(: Single Prod	1) e-stage cess	0. 	000 (2) Two-S age I		cocess Stage I	11	

V(c,x) s P(x) V(c,u,x)	1500	
C(r,x) C(plat,x)		
Worksheet 6-Impedance and Capacity Equation	S	
Step 1: RT from Minor St.	9	12
Conflicting Flows		325
Potential Capacity		698
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		698
Probability of Queue free St.	1.00	0.99
Step 2: LT from Major St.	4	1
Conflicting Flows		325
Potential Capacity		1191
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1191
Probability of Queue free St.	1.00	0.98
Maj L-Shared Prob Q free St.		0.98
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.98	0.98
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		767
Potential Capacity		359
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.98	
Maj. L, Min T Adj. Imp Factor.	0.98	
Cap. Adj. factor due to Impeding mymnt	0.98	0.98
Movement Capacity	0.00	354
rinde a sourcesson a late <b>F Z</b>		

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

8

11

Step 3: TH from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage							
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mvmr	IL						
Movement Capacity							
Part 3 - Single Stage							
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor				1.00		1.00	
Cap. Adj. factor due to Impeding mvm	nt			0.98		0.98	
Movement Capacity							
Result for 2 stage process:							<u>da.</u>
a							
У							
Ĉt							
Probability of Queue free St.				1.00		1.00	
		1223	1940 - C	10.2 June (2)	ned ten of		. <u>(</u>
Step 4: LT from Minor St.				7		10	
Part 1 - First Stage					4.4		1277240
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mvm	nt						
Movement Capacity							
		-				<u>.</u>	
Part 2 - Second Stage							
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mvm	nt						
Movement Capacity							
Part 3 - Single Stage							
Conflicting Flows						767	
Potential Capacity						359	
Pedestrian Impedance Factor				1.00		1.00	
Maj. L, Min T Impedance factor				0.98			
Maj. L, Min T Adj. Imp Factor.				0.98			
Cap. Adj. factor due to Impeding mvm	nt			0.98		0.98	
Movement Capacity	IIC			0.00		354	
Movement capacity				R	J. azora		9750
Results for Two-stage process:				en en en en en en en en en en en en en e			
a							
Y						254	
Ct						354	10
Worksheet 8-Shared Lane Calculations							1
Movement	7		8	9	10	11	12
	Ĺ		Т	R	L	Т	R
Volume (vph)					566		5
Movement Capacity (vph)					354		698
Shared Lane Capacity (vph)						356	
· · · · ·							

Movement			7		8	9		11	12
			L		Т	R	L	Т	R
C sep							354		698
Volume							566		5
Delay									
Q sep									
Q sep +1									
round (Qsep +1)									
n max									
C sh								356	
SUM C sep									
n									
C act									
Worksheet 10-Delay	, Queue	Length	, and L	evel	of S	Servic	e		
Movement	1	4	7	8		9	10	11	12
Lane Config	LT							LR	
v (vph)	18							571	
C(m) (vph)	1191							356	
v/c	0.02							1.60	
95% queue length	0.05							33.30	
Control Delay	8.1							311.5	
LOS	A							F	
Approach Delay								311.5	
Approach LOS								F	
Worksheet 11-Share	d Major	LT Imp	edance	and D	elay	ł			
						Move	ment 2	Moven	nent 5
p(oj)							.98	1.	.00
v(il), Volume for							06		
v(i2), Volume for						0			
s(il), Saturation							700		
s(i2), Saturation	flow ra	te for	stream	3 or	6		700		
P*(oj)							.98		
	stream						.1		
d(M,LT), Delay for			1 1			1			
	street						.2		

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

APPENDIX H



#### **APPENDIX H Road User Costs**

For the alternates to be economically equal, the additional construction costs of the full or partial interchange alternatives plus incurred costs to peripheral facilities caused by these alternates would have to be offset by savings in road user costs and savings in construction costs of peripheral traffic facilities. Peripheral facilities would include the CTH A/Capitol Drive intersection, USH 41/STH 47 interchange, USH 41, CTH A and the local street system in general.

Following tables show the values that WisDOT central office planners uses in computing road user costs. The costs of the alternates are normally compared over a 50-year period with money valued at 5%.

Vehicle Operating costs (\$/vehicle mile)

**Combination Truck** 

5	Auto	\$0.17	
	Single Unit Truck	\$0.41	
	Combination Truck	\$0.74	
Valı	ues of Travel Time (\$/hour)	1998 dollars	
	Auto	\$7.50	(per person)
	Single Unit Truck	\$19.59	(per vehicle)

In the year 2020, the north to west movement of the STH 47 interchange is 5,000 vehicles
for the no interchange alternate and 2,400 vehicles for the partial interchange alternate.
This means that 2,600 vehicles avoided the indirection of STH 47 by using the northwest
ramp at CTH A. This also applies to the return trip. The total vehicles avoiding this
indirection in year 2020 would be 5,200. See Exhibits 12 and 17 for the projected traffic
movements. Using the proportion of traffic decrease on STH 47 in the year 2020, the
traffic avoiding the indirection in the year 2000 would be 3,500.

(per vehicle)

\$22.25

Since there is debate as to whether the travel time costs of persons in passenger cars are legitimate road user costs, these costs will not be included in the calculations. Road user costs will be computed for a 20-year period because that is the time when structures normally need maintenance work such as redecking and would be the logical time to add ramps not built at this time. The right-of-way for ramp construction is already available. For this reason the ramps could also be added at a later date such as adding ramps at time of conversion of USH 41 from four lanes to six lanes.

For the calculation of user costs, the average traffic design parameters were used for CTH A and STH 47 assuming 10% trucks of which 70% would be single unit trucks. Exhibits 13, 18 and 22 show the traffic volumes along CTH A and STH 47 north of USH 41. The amount of traffic at the merge of CTH A and STH 47 is 10,600 vehicles in the year 2000

and 15,700 vehicles in the year 2020. For the partial interchange alternate, 900 vehicles would be diverted from STH 47 to CTH A in year 2000 and 1,400 vehicles in the year 2020. This is the amount of traffic at the merger point that is avoiding the 2.1 mile extra travel distance along STH 47 route to head west and south on USH 41.

For the full interchange alternate the amount of traffic diverted onto CTH A is greater, however, this is traffic that would head east at USH 41 and there would be no indirection for this traffic and no savings in the user costs.

Most of the traffic diverted from the west ramps at STH 47 to the west ramps at CTH A would be generated in the area located between CTH A and STH 47 from USH 41 to the merge of CTH A and STH 47. The following computations assume the indirection of this traffic is one mile and two miles for traffic diverted at the merge.

#### **Road User Cost Computations**

#### CTH A route vs. STH 47 route

Vehicles			Extra V	ehicle Mi	les	
<b>Total Year</b>	2000		2020			
	At Merge	Rest	At Merge	Rest	2000	2020
Total Vehicles	900	2,600	1,400	3,800	4,400	6600
Passenger Vehicle	810	2,340	1,260	3,420	3,960	5,940
Trucks	90	260	140	380	440	660
Single Unit Trucks	60	180	100	260	300	460
<b>Combination Trucks</b>	30	80	40	120	140	200

Using a 1.5 percent inflation rate, the 1998 user costs would increase by a factor of 1.03 for year 2000 and 1.388 for year 2020. The average travel speed is assumed to be 55 mph.

Year	<u>2000</u>	<u>2020</u>
Passenger Vehicle Operating Costs Single Unit Truck Operating Costs Combination Truck Operating Costs Single Unit Time Costs Combination Truck Time Cost	<ul> <li>\$ 690</li> <li>\$ 130</li> <li>\$ 110</li> <li>\$ 110</li> <li>\$ 60</li> </ul>	\$1,400 \$260 \$210 \$230 \$110
Total Cost Per Day	\$ 1,100	\$2,210
User Cost Per Year	\$401,000	\$807,000

Following road user costs are incurred by the traveling public due to distance and inconvenience of travel from north of USH 41 via CTH A and CTH "OO". The extra distance traveled is 0.3 miles.

The north to west movement at CTH A for the full and partial interchange alternates is 5,500 vehicles in the year 2020. Subtracting the 2,600 vehicles reduction at STH 47 leaves 2,900 vehicles or a total of 5,800 vehicles in both directions are avoiding the inconvenience and indirection of getting to southbound USH 41 via CTH A and CTH OO. In the year 2000 this number would be 3,700 vehicles.

	Vehie	cles	<b>Extra Vehicle Mi</b>		
Total Year	2000	2020	2000	2020	
All Vehicles	3,700	5,800	1,110	1,740	
Passenger Vehicle	3,330	5,200	1,000	1,560	
All Trucks	370	600	110	180	
Single Unit Trucks	260	420	80	130	
Combination Trucks	110	180	30	50	

The assumed average travel speed along USH 41 is 60 mph and the average speed along the CTH A and CTH OO route is 40 mph. To travel the CTH OO route would take 1.7/40 = .043 hours and 1.4/60 = .023 hours via USH 41 route, a difference of .02 hours per vehicle.

Year	<u>2000</u>	<u>2020</u>
Passenger Vehicle Operating Costs Single Unit Truck Operating Costs	\$ 180 \$ 30	\$370 \$70
Combination Truck Operating Costs	\$ 20	\$ 50
Single Unit Time Costs Combination Truck Time Cost	\$ 100 \$ 50	\$ 230 \$ 110
Total Cost Per Day	\$ 380	\$ 830
User Cost Per Year	\$139,000	\$303,000

Using present worth factors for a uniform series and gradient series, the present worth of road user costs is \$9,500,000 with money valued at 5% over a 20 year period.

These same savings in road user costs would also apply when comparing the full interchange alternate to the no interchange alternate. The full interchange alternate eliminates the same indirection from the north as the partial interchange. The full interchange further eliminates some indirection and inconvenience to the traffic generated from south of USH 41. However these savings in user costs would be very minor when compared to the savings for the traffic from the north and will not be computed.

One of the major cost factors would be associated with the timing of improving USH 41 from four to six lanes. USH 41 is six lanes already from CTH "OO" to the south. The next logical segment to be converted to six lanes would include the area of CTH A and

USH 41 intersection. Exhibit 14 shows the projected traffic for USH 41 in Outagamie County. The segment at CTH A has the least projected traffic when compared to the next three segments to the east. Therefore it would be one of these other segments that would dictate the time of conversion of USH 41 from four lanes to six lanes at CTH A.

Even though the traffic at CTH A on USH 41 will not govern the timing of the conversion of USH 41 from four lanes to six lanes, the costs associated with the timing of the conversion were computed for the alternates. The computations assume that the conversion will be warranted when the daily traffic on USH 41 reaches 66,000 at a cost of \$800,000 for a  $1\frac{1}{2}$  mile segment in year 2000 dollars.

Another cost to be considered is the timing of when CTH A south of USH 41 will be converted from a rural 2 lane section to an urban four lane section. Using CTH OO (Richmond Street to Meade Street) as an example of such a conversion, the cost would be about \$2,000,000 per mile in year 2000 dollars. This conversion was computed for the time when traffic on CTH A would reach 14,300 vehicles per day.

APPENDIX I

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#### **Peggy Hawley**

-----Original Message----- **From:** Walt Raith [mailto:wraith@eastcentralrpc.org] **Sent:** Tuesday, September 14, 2004 1:47 PM **To:** peggy.hawley@omnni.com **Subject:** USH 41/CTH A

#### Hi Peggy:

East Central Planning staff has historically supported the ½ interchange at CTH A and USH 41 based on the premise it would remove through traffic on portions of CTH A and CTH OO. Origin and destination studies completed in the late 90s, and more recently 2002, show that significant northbound/southbound USH 41/CTH A traffic, currently using the STH 15/CTH OO interchange, would use the ½ interchange with USH 41 and CTH A if provided. Staff's position is that through traffic removed would improve the level of service at the USH 41/STH 15 interchange, and while the USH 41 mainline level of service may suffer from the ½ interchange, it may be a wash.

Walt

#### MINUTES OF MAY 21, 2001 HIGHWAY AND SOLID WASTE COMMITTEE

**MEMBERS PRESENT:** William Errington, Marion DeLaHunt, Alfred Krause, Leon Vanevenhoven and Kenneth VandenHeuvel

MEMBERS ABSENT AND EXCUSED: None

**OTHERS PRESENT:** 

\*Richard Wood, Property Owner \*Joe Guidote, Corporation Counsel \*Philip Stecker, Solid Waste Superintendent Gene Hojan, Deputy Highway Commissioner Alvin Geurts, Director of Public Works Cynthia Roberts, Administrative Assistant

\* Attended a portion of the meeting.

MOTION: SUPERVISOR ERRINGTON CALLED THE MEETING TO ORDER AT 8:30 A.M.

#### MINUTES

MOTION: SUPERVISORS DE LA HUNT/VANEVENHOVEN MOVED APPROVAL OF THE MINUTES OF MAY 7, 2001.

#### **REQUEST FOR ACCESS ON CTH "OO"**

Mr. Richard Wood addressed the committee requesting access to his parcel of property located at the northeast corner of CTH "OO" and Conkey Street. Mr. Wood provided a copy of the county construction plans showing his frontage along CTH "OO", and the proposed location of his request. Mr. Wood explained the history of the parcels he previously owned contiguous to the parcel in question.

He advised that an access to CTH "OO" is necessary in order to sell for a commercial venture. He advised that he currently accesses the property by an ingress/egress easement he holds on the neighboring property.

He advised that the city of Appleton acquired a three foot spite strip along Conkey Street to prevent him from accessing Conkey Street, however, the city has since abandoned that strip and has granted permission for an access on the far northern end of the parcel.

He advised that he cooperated with Outagamie County in acquiring the vision corner necessary at the corner. At that time he was concerned about access to his parcel. He advised that Michael Marsden assured him that as long as he was in the city of Appleton he would be okay.

Page 2 Highway & Solid Waste Committee May 21, 2001

Mr. Wood handed out the Outagamie County Access Control Ordinance and advised that the has a purchase agreement with Motomart and the agreement was contingent upon obtaining access to CTH "OO". Mr. Wood stated that a representative of Motomart had discussions with Mr. Geurts, and according to that individual, Mr. Geurts advised that due to the access control ordinance the access to this parcel of property must be obtained from the secondary road, which is Conkey Street. Mr. Wood then consulted with Mr. Marsden and he advised that there shouldn't be a problem obtaining access to CTH "OO". Mr. Marsden had him refer to Page 3 of the Access Control Ordinance Section 3.b. in that the ordinance doesn't apply because his parcel has been annexed into the city of Appleton. He advised that he submitted an application to relocate the existing access to the west onto his property and Mr. Geurts sent him a letter advising that in order to grant his request we would need permission from the neighboring property owner to relocate their access. Mr. Wood advised that he spoke with the neighbor and they are not willing to relocate their access.

Mr. Wood advised that the access at CTH "OO" & Meade is the same situation as he is requesting, and he doesn't understand why he can't obtain the proposed access.

He then referred to Page 5 (g) of the Ordinance in that Outagamie County should have removed the access when the city of Appleton razed the house on the parcel just east of his. Mr. Guidote asked if he was using the access after the house was razed. Mr. Wood responded that he was continuing to use the access. Mr. Guidote advised that Mr. Wood was stating in one instance that the access was abandoned and in the next instance that he was using the access; he stated that Mr. Wood could not argue both positions. Mr. Guidote advised that his ingress/egress easement doesn't grant him authority to relocate the access without consent of the current owner.

Mr. Geurts advised that the ordinance reads that 1 access shall be granted per parcel, and whenever possible the secondary road shall be accessed. He spoke with Appleton Public Works Director Paula Vandehey and the city is prepared to grant access on Conkey Street to his parcel. He also advised that the parcel was annexed after the Ordinance was implemented in 1982.

Mr. Guidote stated for the record that the Public Works Director's reason for denying access is due to the proposed access' proximity to the corner and the availability of access onto Conkey Street.

Mr. Errington expressed his view that the committee would not support the application.

Mr. Wood indicated that he wished to withdraw his application for driveway access.

# MOTION: SUPERVISORS ERRINGTON/DE LA HUNT MOVED TO DENY THE REQUEST TO RELOCATE AN ACCESS ON CTH "OO" FURTHER TO THE WEST TO SERVICE RICHARD WOOD'S PARCEL. MOTION CARRIED UNANIMOUSLY.

#### VOUCHERS AND PERMITS

The Committee reviewed Highway Voucher Numbers 870 - 925, Solid Waste Voucher Numbers 264 - 302, utility permits, and the cellular telephone report.

#### **RESOLUTION/ORDINANCE REVIEW**

#### Request Lobbyist Assistance With Transportation Aids

MOTION: SUPERVISORS DE LA HUNT/VANDEN HEUVEL MOVED TO AUTHORIZE DRAFTING A RESOLUTION REQUESTING THE LOBBYIST'S ASSISTANCE IN PURSUING TRANSPORTATION AIDS FOR OUTAGAMIE COUNTY. <u>MOTION CARRIED.</u>

#### HSW.2-2001-02 - CTH "A" & USH 41 Project

Mr. Errington advised that he spoke with State District Director George McLeod if the state will support an interchange at CTH "A" & STH 47 if a partial interchange is constructed at CTH "A" & USH 41. He advised that he was not aware of this concern, however, would consider his request. Mr. Geurts advised that he would not sign the agreement for CTH "A" & USH 41 with the state until they have addressed the concern with the intersection of CTH "A" & STH 47.

MOTION: SUPERVISORS KRAUSE/ERRINGTON MOVED TO AUTHORIZE THE OUTAGAMIE COUNTY DIRECTOR OF PUBLIC WORKS TO EXECUTE THE STATE/MUNICIPAL PROJECT AGREEMENT WITH THE WISDOT COMMITTING TO PROCEED WITH THE CTH "A" BRIDGE OVER USH 41 AND A PARTIAL INTERCHANGE, CONTINGENT UPON THE STATE ADDRESSING THE INTERSECTION OF CTH "A" AND STH 47. <u>MOTION CARRIED.</u>

#### HSW.3–2001-02 - Budget Adjustments

Mr. Geurts advised that due to the cancellation of the CTH "AA" project funds are available for repairing the slope failures on CTH "K" and CTH "Z".

MOTION: SUPERVISORS DE LA HUNT/ERRINGTON MOVED TO AUTHORIZE TRANSFERRING FUNDS FROM THE CTH "AA" PROJECT TO FUND SLOPE FAILURE REPAIRS ON CTH "K" AND CTH "Z". <u>MOTION CARRIED.</u>

#### HSWLA.1--2001-02

Mr. Errington advised that this resolution opposes any attempt by the State to shift costs for highway employees to Outagamie County property taxpayers.

### MOTION: SUPERVISORS DE LA HUNT/ERRINGTON MOVED TO AUTHORIZE SUBMITTING THIS RESOLUTION TO THE COUNTY BOARD FOR REVIEW. <u>MOTION CARRIED.</u>

#### SOLID WASTE REPORT

#### Co-Generation Operation

Mr. Stecker advised that the annual maintenance shutdown was completed. He'll have a more thorough report at the next meeting. Engine No. 1, which is furthest to the east and runs on both methane and natural gas, has the most hours at 51,000 hours. There is an issue with wear on the main bearing and our insurance carrier may be concerned about continuing insurance on this engine, without a major overhaul. The other two engines are at 41,000 and 46,000 hours.

Page 4 Highway & Solid Waste Committee He advised that he will be applying with the DNR for a plan modification to add additional gas collection wells to the site.

#### Solid Waste Operation

Mr. Stecker advised that he's still looking for a renter for the land around the complex.

He advised that our customers have agreed to 3% interest on the containers they lease from Outagamie County.

He advised that Waste Management has requested a listing of haulers utilizing our facility. He's working with the Corporation Counsel on this matter.

#### Recycling

Mr. Stecker advised that he will be sending out request for proposals for disposing appliances, as well as recovering the freon from certain appliances.

#### Regionalization

Mr. Stecker advised that Brown County has the regionalization of recyclables on hold awaiting a decision on the prison labor issue in Winnebago County.

#### Clean Sweep

Mr. Stecker advised that he would like to submit a grant application for the upcoming agricultural and residential clean sweep programs.

MOTION: SUPERVISORS KRAUSE/DE LA HUNT MOVED TO AUTHORIZE DRAFTING A RESOLUTION TO SUBMIT A GRANT APPLICATION FOR FUNDING THE CLEAN SWEEP PROGRAM. <u>MOTION CARRIED.</u>

BEGIN CLOSED SESSION, PURSUANT TO WISCONSIN STATS §19.85(1)(e) NEGOTIATING THE TERMS OF PUBLIC CONTRACTS WHERE COMPETITIVE OR BARGAINING REASONS REQUIRE A CLOSED SESSION.

AT 9:58 A.M., SUPERVISORS ERRINGTON/DE LA HUNT MOVED TO BEGIN CLOSED SESSION, PURSUANT TO WISCONSIN STATS §19.85(1)(e) NEGOTIATING THE TERMS OF PUBLIC CONTRACTS WHERE COMPETITIVE OR BARGAINING REASONS REQUIRE A CLOSED SESSION. <u>ROLL CALL VOTE: ERRINGTON, AYE; DE LA HUNT, AYE; KRAUSE,</u> <u>AYE; VANDEN HEUVEL, AYE; VANEVENHOVEN, AYE. MOTION CARRIED.</u>

END CLOSED SESSION, AND RESUME REGULAR BUSINESS OF COMMITTEE CHAIRS COMMITTEE

Page 5 Highway & Solid Waste Committee May 21, 2001

AT 9:26 A.M., SUPERVISORS DE LA HUNT/ERRINGTON MOVED TO END CLOSED SESSION AND RESUME REGULAR BUSINESS OF THE HIGHWAY & SOLID WASTE COMMITTEE MEETING. <u>ROLL CALL VOTE: ERRINGTON, AYE; DE LA HUNT, AYE; KRAUSE, AYE;</u> VANDEN HEUVEL, AYE; VANEVENHOVEN, AYE. <u>MOTION CARRIED.</u>

## MOTION: SUPERVISORS ERRINGTON/DE LA HUNT MOVED TO AUTHORIZE SUBMITTING A PROPOSAL TO ONEIDA COUNTY FOR SOLID WASTE DISPOSAL . <u>MOTION CARRIED.</u>

Mr. Geurts advised that he and Mr. Stecker are contacting several local businesses in an attempt to have their solid waste delivered to Outagamie County.

#### PUBLIC WORKS REPORT

Vine Road Jurisdictional Transfer

Mr. Geurts advised that the town of Freedom has denied acceptance of 1.7 miles of CTH "O", however proposed accepting 2 miles of CTH "J" from CTH "C" to STH 55. Mr. Geurts would like to analyze this prior to making a recommendation.

#### CTH "F" Project

Mr. Geurts advised that there is one property owner yet to settle with on the CTH "F" project. There are no administrative settlements at this time.

#### Street Connection on CTH "EE"

The committee reviewed a request for a street connection on the east side of CTH "EE", just south of CTH "O" from Dave & Sandy Lenz.

#### MOTION: SUPERVISORS DE LA HUNT/VANEVENHOVEN MOVED TO AUTHORIZE GRANTING A STREET CONNECTION ON CTH "EE" CONTINGENT UPON RECEIVING ACCEPTANCE BY THE TOWN OF FREEDOM. MOTION CARRIED UNANIMOUSLY.

#### Fox River Lift Bridges

Mr. Geurts advised that he attended a meeting to discuss the concern about the lift bridges along the Fox River if the locks system becomes operational. The committee reviewed a report listing all of the bridges between Green Bay and Oshkosh, the structure type, clearance, ownership, etc. There is concern on funding the replacement, maintenance and operations of these bridges, in addition to the locks.

#### Reports

The committee reviewed the maintenance expense report and contracts with municipalities reports through April 30, 2001.

Page 6 Highway & Solid Waste Committee May 21, 2001

#### CTH "J" Street Connection

Mr. Geurts advised that an application for a street connection on CTH "J" in the city of Kaukauna was received, however not yet processed due to concerns. The developer has since started construction of the subdivision and the contractors have been driving through the ditch on CTH "J" in order to access the property. Mr. Geurts will have a meeting with the developers and the city of Kaukauna regarding this issue.

#### STH 55 & CTH "VV" Intersection

Mr. Geurts advised that he would like to have some improvements made at the intersection of STH 55 and CTH "VV". He will discuss this matter with the WisDOT.

#### **Brewster Street Contamination**

Mr. Geurts advised that he received correspondence from the DNR that the application for closure of the Brewster Street site was not approved. There is one well that still has contaminates and recommended four additional testing periods prior to re-application.

#### CTH "A" (Spencer Street to Wisconsin Avenue)

Mr. Geurts advised that he attended a meeting at East Central Regional Planning Commission and learned that \$1.3 million in federal funding has been approved for this project in 2005. Therefore funds need to be allocated for engineering and right of way in 2003 and 2004, to be ready for construction in 2005.

#### Correspondence

The committee reviewed correspondence to Brown County and Winnebago County regarding the regional recycling partnership.

#### MEETING SCHEDULE

The next meetings will be June 11, 2001 and June 25, 2001.

#### ADJOURNMENT

## MOTION: SUPERVISORS ERRINGTON/DE LA HUNT MOVED TO ADJOURN AT 11:10 A.M. MOTION CARRIED.

Respectfully submitted,

Cynthia Roberts Administrative Assistant May 23, 2001 C:Documents and Settings/Toerp/052101.wpd

DATE APPROVED:

#### TOWN OF GRAND CHUTE, WISCONSIN COMPREHENSIVE LAND USE PLAN

#### FACILITIES AND UTILITIES

As growth and development continues to occur in the Town of Grand Chute through the year 2020, there will be a need to add facilities and various utilities to service the future areas of development. A review of existing utility capacities and plans suggests that development should occur in an orderly manner from west to east. The first area for new utility development should be the industrial-commercial-multi-family area located west of Highway 41 between Greenville road and one quarter mile north of Capitol Drive. The second phase of development should occur north of Capitol Drive and Highway 41 east from Casaloma to Gillette Street. The third phase of future development should occur east of the Wisconsin Central Railroad and Gillette Street north of Highway 41. A sewer lift station will be needed near the northwest corner of Highways 41 and 15, and in sections 5 and 6 (northwest). The last phase of expanded utilities should provide service to the area north of McCarthy Road beginning about one-quarter mile north of Capitol Drive. This is also the area projected for a new water tower.

Transit services are not likely to expand significantly beyond the present limits of service according to the director of Valley Transit due to the projected density of development with the exception being the area proposed for expanded commercial and multiple development west of the mall. The Town should continue to support provision of transit services to accommodate the needs of persons lacking other means of transportation particularly around the Mall and major employment centers.

The Town will need to upgrade existing highways and roads, as well as the construct new roads to provide access and service to the developing areas. Standards for street construction in the Town are included in the appendix to this report. In summary they call for 80 foot rights-of-way for major streets and 66 foot rights-of-way for local streets, see Figure 13. Pavement widths of 37 feet back-to-back-of-curb are the standard. During the planning period, the following highways and roads are recommended for improvements based on town planning, Outagamie County, and the Long - Range Transportation / Land Use Plan - Fox Cities Urbanized Area as prepared by the East Central Wisconsin Regional Planning Commission.

#### **New Roads - Streets**

- West Packard should be connected between Casaloma and Mayflower Roads.
- Grand Market Drive should be connected between McCarthy and the present end adjacent to American TV and Appliance (just west of Casaloma)
- Integrity Way should be extended west from the end by Sam's Club (just west of Casaloma) to Mayflower Road where a stub street has been installed.
- McCarthy Road should be extended north from Wisconsin Avenue to link up just south of Greenville Road.
- Frontage Roads should be installed along new Highway 15 west of Casaloma Drive with a connection south to Greenville Road.
- An east-west road north of and parallel to Greenville Road linking McCarthy and Casaloma is needed to service future industrial development in this area.
- A connection west from the north end of Casaloma (about one-half mile north of Capitol) to link up with McCarthy Road is needed.
- A new road connecting Rifle Range Road to County Highway A is needed to open up this area for residential development
- Elsner Road is proposed to be extended west across the tracks from Gillette to County Highway A.
- A collector road will be needed to open up the area east of County Highway A which

#### TOWN OF GRAND CHUTE, WISCONSIN COMPREHENSIVE LAND USE PLAN

links County Highway A and JJ.

- Evergreen Drive should be extended west from Highway 47 to Gillette Street.
- A collector road will be needed to connect Casaloma Drive, just north of Highway 15, to Capitol Drive near Rifle Range Road.

#### Road Improvements

- Bluemound Road from Wisconsin to College should be widened to 4 lanes to accommodate the increased traffic volumes on the present 2 lane road.
- A new half-interchange at Highway 41 and County Highway A should be constructed.
- Replace the bridge structure over Highway 41 at County Highway A; 4-lanes.
- County Highway A from JJ to BB should be widened to 4 lanes and reconstructed. A connection at the south end to BB will be needed.
- County Highway BB from Highway 41 to Seminole should be widened to 5 lanes.
- The intersection of College Avenue and Mall Drive needs to be redesigned and reconstructed to accommodate traffic flow.
- County Highway JJ (Edgewood Drive) from Highway 47 to Holiday Drive needs to be reconstructed.
- Highway 47 between Ridgeview Drive and County Highway JJ should be reconstructed to a 4 to 5 lane urban section.
- The interchange at Highway 41 and 47 should be reconstructed.
- Highway 125 (College Avenue) between Highway 41 and Westhill Boulevard should be widened to 6 lanes.
- The bridge at Capitol Drive over Highway 41 should be reconstructed and widened to 4 lanes.
- Casaloma Drive should be widened to 4 lanes from College Avenue south to BB.
- Highway JJ between Highway A and French Road should be widened to 4 lanes.
- A pedestrian overpass should be constructed over Highway 41 north of Wisconsin Avenue by Fox Valley Technical College.

#### **Sewer and Water Utilities**

Utility studies have been prepared for the town by McMahon Engineers. These studies recommend the following:

- In order to develop areas north of Highway 41 that flow to Gillette Street, replace the 10inch sanitary sewer in Gillette Street with a 15-inch between Capitol and Highway 41. Estimated cost \$108,200.
- In order to develop areas north of Highway 41, and north of Suncrest Lane, replace the 8-inch sanitary sewer in Suncrest Lane with a 10-inch between Capitol and Highway 41. Estimated cost \$71,100. Additional costs, not yet estimated, will be needed to tunnel under Highway 41 with the sewer line.
- In order to develop the areas north of Highway 41 north of Bluemound, replace the 8inch sanitary sewer in Bluemound Drive with a 12-inch between Capitol and Highway 41. Estimated cost \$78,700. Additional costs, not yet estimated, will be needed to tunnel under Highway 41 with the sewer line.
- In order to develop areas north of Wisconsin Avenue and west of Casaloma Drive, replace the existing 8-inch sanitary sewer on Old Casaloma Drive between Wisconsin and Parkway with an 18-inch between Wisconsin and Greenville Road and a 12-inch between Greenville Road and Parkway. This upgrade will be needed when

- Construct a new water tower in the northwest section of the Town on McCarthy Road.
- Construct a major storm sewer line on Lynndale Drive discharging to either Mud Creek or directly to the Fox River. Estimated cost \$1.6 million.
- Construct detention ponds to manage storm water as outlined earlier. Estimated cost for all ponds \$3.5 million.

The following map illustrates the present service areas for the sewer and water services of the Town.

#### **Other Facilities and Services**

As the Town of Grand Chute continues to grow, there will be a need to acquire or upgrade various facilities and services in the community. During the planning period the following recommendations are made:

The Town of Grand Chute is currently studying alternatives to providing police and fire services within the Town. Options may include expanding the present department, joint services with adjacent communities, or contracting with the Outagamie County Sheriff's Department for law enforcement and public safety needs. By the year 2020, Grand Chute is expected to have more than 27,000 residents within its town boundaries, which may be instrumental in determining the level of law enforcement services needed.

During the next several years, the Grand Chute Fire Department is expected to need additional funding from to upgrade or add additional fire equipment and apparatus to the department which will improve fire protection and safety. The possibility of another station on the west side of the Town should be considered.

Discussions should be pursued with the City of Appleton concerning joint library services and establishing a branch facility in the Town possibly in conjunction with the new Town Hall.

### ENGINEERING • ARCHITECTURE • ENVIRONMENTAL



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