Clinton US 30/67 Corridor Study

Transportation Model and Operations Analysis

December 2001

Howard R. Green Company

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Executive Summary

Howard R. Green Company was retained to complete a corridor study for the US 30/67 Corridor within the City of Clinton from the west intersection of US 30 and US 67 to the intersection of Camanche Avenue and 4th Street. The initial phase of the project was constructed. The second phase, which extends from 14th Street to 4th Street, is currently being designed. This phase includes completion of a travel demand model to forecast future traffic volumes for the corridor and a traffic operations analysis of select alternatives.

Traffic forecasts for 2030 were developed using a computer model and validation procedures consistent with recognized transportation planning guidelines. A base year model was created using roadway attribute data from the Iowa Department of Transportation, and socioeconomic data (1990 and 2000 Census data) from the East Central Intergovernmental Association (ECIA). The model network was altered to represent Year 2030 conditions with the addition of programmed and committed projects. Socioeconomic data was estimated by ECIA using historical growth information. Considering future development plans, the City of Clinton Planning Department assigned the future employment and household projections to each travel analysis zone. Year 2030 PM peak turning movement volumes were developed for the preferred design alternative which consists of a one-way couplet utilizing Camanche Avenue for westbound traffic and Liberty Avenue for eastbound traffic from 14th Street to 4th Street. The volumes were entered into a simulation model in order to complete an operations analysis to determine appropriate signal locations and level of service of roadways and intersections for the study area. The approach to the traffic operation analysis is derived from the established methodologies documented in the *Highway Capacity Manual* (TRB, 2000).

The one-way pair alternative was analyzed assuming three lanes in each direction and a posted speed of 35 miles per hour on each roadway. For this design, signals should be placed at the intersections of Camanche Avenue and 14th Street, Camanche Avenue and 5th Street, Liberty Avenue and 5th Street, and Camanche Avenue and 4th Street at a minimum. With this configuration, signalized intersections will operate at level of service (LOS) A and B, and thru-stop intersections will operate at LOS A. Camanche Avenue will operate at LOS A, and Liberty Avenue will operate at the LOS A/B boundary. Additional signals may be placed at select locations experiencing high delay on the minor street. These locations include the intersections of Camanche Avenue with 23rd Place and 15th Avenue as well as the intersections of Liberty Avenue with 23rd Place and 15th Avenue. This placement will cause slight reductions the overall level of service of the corridor, but should still be considered during reconstruction of the corridor.

1 Introduction

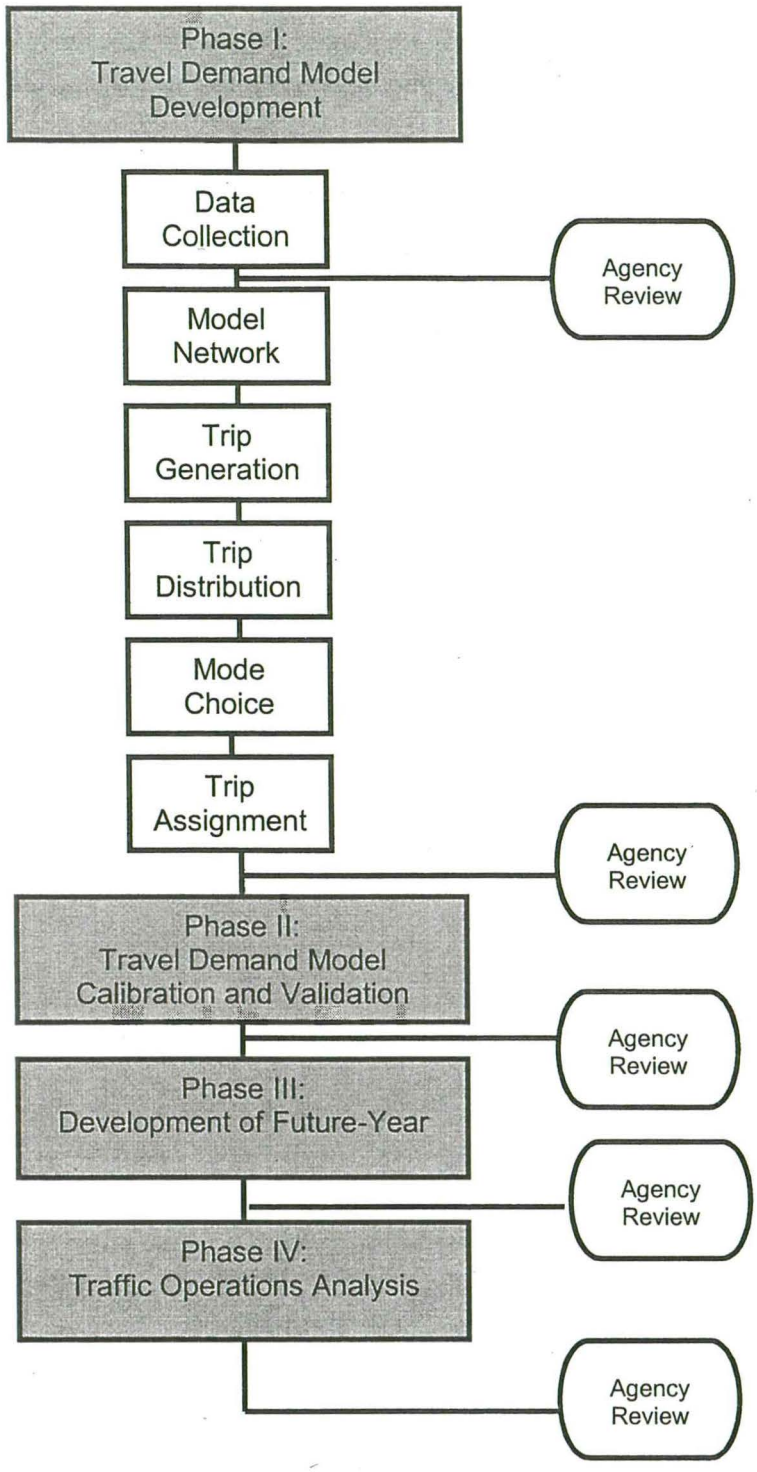
This report documents the process used to develop average daily traffic (ADT) forecasts for the urbanized area encompassing the Cities of Clinton, Camanche, and Fulton, and assess the traffic operations for various alternatives along the US 30/67 corridor from 14th Street South to 4th Street South.

The overall process followed in developing travel demand forecasts is depicted in Figure 1. As shown, 1998 baseline data used as inputs to model development were collected first and presented to the Iowa Department of Transportation (IDOT), the City of Clinton, and East Central Intergovernmental Association (ECIA) for review and comment. The base year model was designed and validated to reflect 1998 traffic conditions. The model study area was bounded by Clinton city limits to the north and west, Camanche city limits to the south, and the intersection of US 30 and Highway 136 in Illinois to the east as shown in Figure 2. Calibration statistics were given to the agencies for review. The model was modified to represent future conditions by adding any committed projects and estimated changes in employment and households in order to develop 2030 ADT forecasts and turning movements along the US 30/67 Corridor. The resultant forecasts were given to the agencies for their review and comment. After the review, US 30/67 Corridor improvement alternatives were developed in Synchro in order to complete a traffic operations analysis. The operations analysis was presented to the agencies for their review. Summaries of the agency reviews are included in Appendix A.

The following chapters of this report describe the process used to develop 2030 travel demand forecasts and traffic operations analysis for the US 30/67 Corridor in more detail. Chapter 2, Traffic Demand Model Development, addresses the process used to develop 2030 travel demand forecasts in more detail. Chapter 3 addresses the existing plus committed forecast scenario, alternatives for the US 30/67 Corridor, and their respective PM peak turning movement projections. Chapter 4 explains the traffic operations analysis for the US 30/67 roadway improvement alternatives.

Figure 1

Travel Demand Model Development



Clinton US 30/67 Corridor Study

Travel Demand Model Boundary

Fulton

Clinton

Camanche

N

0 6 Miles

Legend

- Study Boundary
- Roadway
- Railroad
- River
- Stream
- Camanche
- Clinton
- Fulton

Figure 2

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company

2 Travel Demand Model Development

A number of inputs are needed in the development of a travel demand model. Two major inputs include a computer representation of the roadway network and its attributes and an estimate of the socioeconomic conditions within the study area.

A computer representation of the roadway network was developed in TRANPLAN using files from the Iowa Department of Transportation (IDOT.) The roadway network includes all roadways within the Cities of Clinton, Camanche, and Fulton with over 1,000 average annual vehicles per day in the base year. Additional roads were included in the network to create connectivity throughout the system. A map of the roadway network is shown in Figure 3.

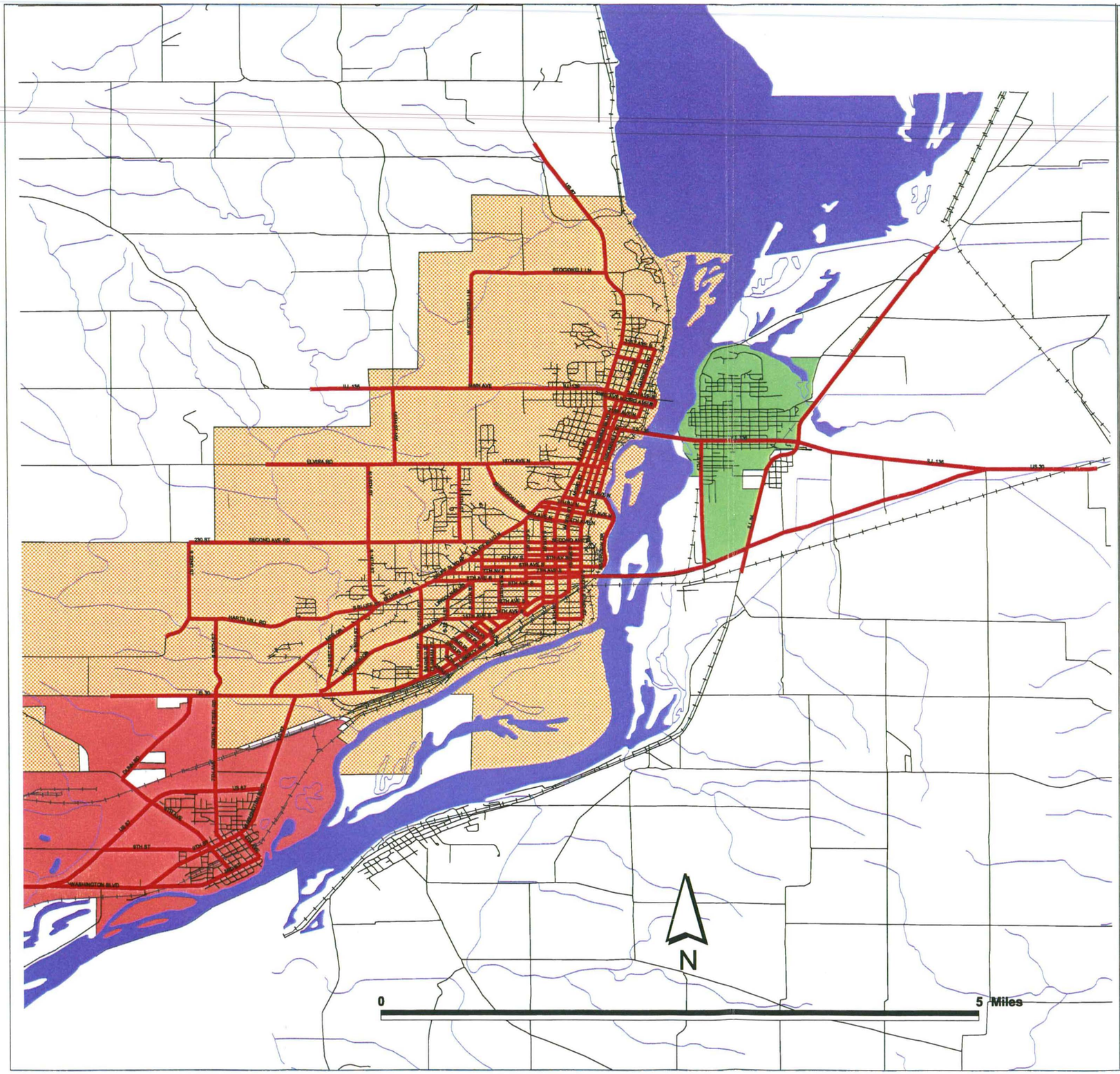
A number of attributes were added to the network to describe the individual roadways. Attributes included distance, posted speed (Figure 4), functional classification (Figure 5), geometry (lanes), land use, and base-year traffic volumes (Figure 6). Attributes were obtained using data from the IDOT. Capacities developed by the Des Moines Metropolitan Planning Organization were used in the network. Capacities were based upon number of lanes and access condition for LOS D.

Socioeconomic information is used to generate and distribute trips through the network. Data includes population, households, and employment. Socioeconomic data was taken from 1990 and 2000 Census. Census block groups were used to divide the study area into travel analysis zones (TAZ). The travel demand model contains 178 internal TAZs (see Figure 7). An additional 11 stations are located at select roadways where traffic is allowed to enter and leave the study area.

Travel demand modeling is a four-step process. The process includes trip generation, trip distribution, mode choice, and traffic assignment. Trip generation estimates the trip productions and attractions. Trip distribution determines the origin and destination of each trip. Mode choice is used to evaluate person trips traveling by alternative modes. Traffic assignment loads the trips to the network. Throughout the process, checks for reasonableness and validation tests were completed for all four steps. Reasonableness checks compare estimates with rates in other regions. Validation tests compare observed and estimated values for the model output to base year traffic counts.

Clinton US 30/67 Corridor Study

Travel Demand Model Base Year Network



Legend

- Network
- Roadway
- Railroad
- Stream
- River
- Camanche
- Clinton
- Fulton

Figure 3

Clinton Iowa
Gateway to Opportunity

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Clinton US 30/67 Corridor Study

Speed in
Miles per Hour

Legend

- 20 mph
- 25 mph
- 30 mph
- 35 mph
- 40 mph
- 45 mph
- 55 mph
- Railroad
- Stream
- River
- Camanche
- Clinton
- Fulton

N

0 5 Miles

Figure
4

Clinton
Iowa
Gateway to
Opportunity

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Clinton US 30/67 Corridor Study

Functional Classification

Legend

- Principal Arterial
- Minor Arterial
- Collector
- Local
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

N

0 5 Miles

Figure 5

Clinton Iowa
Gateway to Opportunity

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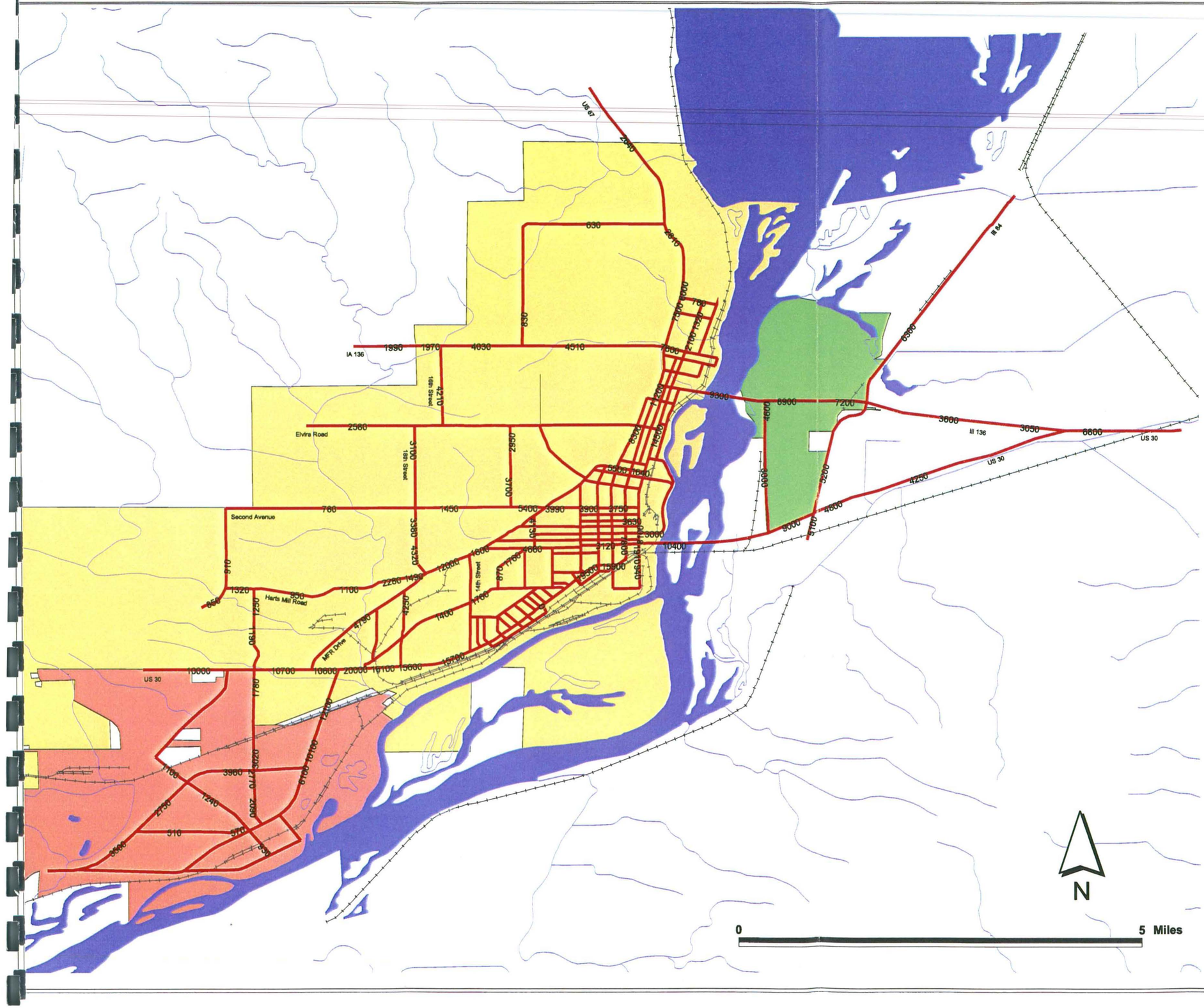
Clinton US 30/67 Corridor Study

1998 Average Annual Daily Traffic



Legend

- Network
- 1050 1998 AADT Count
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

Figure 6

Clinton Iowa
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Clinton US 30/67 Corridor Study

Traffic Analysis Zones

Legend

- TAZ
- Railroad
- River
- Stream
- Camanche
- Clinton
- Fulton

N

0 5 Miles

Figure 7

Clinton Iowa
Gateway to Opportunity

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2.1 Trip Generation

The first step in developing a travel demand model is trip generation. Three types of trips are generated in a model: Internal/Internal (I/I), External/External (E/E), and External/Internal (E/I). I/I trips are trips in which the origin and destination are within the model boundaries. E/E trips are developed when the origin and destination of a trip are both outside the model boundaries, but the trip travels through the model. E/I trips are generated when the trip's origin and destination are on different sides of the boundary. In order to calculate I/I trips, socioeconomic data (see Appendix B) was used to calculate the trip productions and attractions in each TAZ defined in the model. A trip production was made at the home location for home-based trips and the origin location for non-home-based trips. Trip attraction refers to the location other than home for home-based trips and the destination for non-home-based trips.

2.1.1 Trip Production

Trip production rates vary by the size of the urbanized area, income class, household size, and auto ownership per household. Information was available from the 1990 Census on income class by census block. Using production rates, trip production was calculated for each TAZ. Trip production rates were taken from *NCHRP Report 365: Travel Estimation Techniques for Urban Planning (1998) (see Table 1)*. Rates were calculated for three different purposes: home-based work (HBW), home-based other (HBO), and non-home-based (NHB).

Table 1

Trip Production Rates

Income	*Average Autos per Household*	*Average Daily Person Trips per Household*	*Average Daily Vehicle Trips per Household*	*% Average Daily Person Trips by Purpose*		
				HBW	*HBO*	*NHB*
Low	1.2	6.0	4.8	16	60	24
Medium	1.9	9.3	8.1	21	56	23
High	2.4	12.7	11.7	20	55	25
Weighted Average	1.8	9.2	8.1	20	57	23

NCHRP 365: Travel Estimation Techniques for Urban Planning (Transportation Research Board, January 1998)
Trip estimation for urban areas with a population of 50,000 to 199,999

2.1.2 Trip Attraction

Trip attraction rates are a factor of employment, households, and area type. Retail employers draw more home-based-other trips than non-retail employers.

Employers within central business districts generate more foot traffic than suburban and rural areas. The rates shown in Table 2 were obtained from *NCHRP 365: Travel Estimation Techniques for Urban Planning* and used to calculate trips within the Clinton travel demand model study area.

Table 2

Trip Attraction Rates

Purpose	Central Business District				Non-Central Business District			
	Employment			Households	Employment			Households
	Retail	Service	Other		Retail	Service	Other	
HBW	1.45	1.45	1.45	0.00	1.45	1.45	1.45	0.00
HBO	2.00	1.70	0.50	0.90	9.00	1.70	0.50	0.90
NHB	1.40	1.20	0.50	0.50	4.10	1.20	0.50	0.50

NCHRP 365:Travel Estimation Techniques for Urban Planning (Transportation Research Board, January 1998)
Trip estimation for urban areas with a population of 50,000 to 199,999

2.1.3 External/External and External/Internal Trips

A portion of vehicle traffic in the network does not originate and/or is not generated within the study boundary. All eleven arterials and collectors leaving the study boundary were included as external stations to account for this traffic. This traffic can be classified as external-external (E/E) or external-internal (E/I). E/E trips represents thru vehicle traffic, or vehicles traveling through the study area without stopping. E/E trips were estimated using previously collected origin-destination information, 1990 Census information, engineering judgment, and calculations from *NCHRP Report 365: Travel Estimation Techniques for Urban Planning (1998)*. Functional class and vehicle class were factors in this calculation. The percentage of external trips acting as E/E trips is 19.5%. E/I trips include vehicles originating from or destined to a location outside the study area. Census information from 1990 indicated that 55% of HBW trips of E/I trips originated within the study limits, and also gave an indication of terminal times. Figure 8 shows the external station locations and their respective E/E and E/I trip percentages.

2.2 Trip Distribution

Trip distribution links trip productions to trip attractions for each zonal pair. A gravity model was used to distribute trips geographically for all trip purposes in the Clinton model. Gravity models use mathematical procedures to preserve the observed

Clinton US 30/67 Corridor Study

External/External Trips by Station

2640
15%
85%

6300
10%
90%

1520
5%
95%

1970
10%
90%

2580
5%
95%

6800
40%
60%

5100
10%
90%

850
5%
95%

10000
30%
70%

1090
5%
95%

4220
15%
85%

N

0 5 Miles

Legend

6800
40%
60%
Average Daily Traffic (ADT)
Percentage of Thru Trips
Percentage of Local Trips

Network
Roadway
Railroad
Stream
River
Camanche
Clinton
Fulton

Figure 8

Clinton Iowa
Gateway to Opportunity

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frequency distribution of trip lengths for each modeled trip purpose. Gravity model inputs include trip productions, trip attractions and intrazonal travel impedances. Travel impedances reflect the spatial separation of the zones based on shortest travel time paths for each zone to zone interchange. The gravity model theory assumes the number of trips between two traffic analysis zones will be directly proportional to the number of productions in the production zone and attractions in the attraction zone. The number of interchanges will be inversely proportional to the special separation between the zones. The gravity model for trip distribution is defined as follows:

$$Tij = Pi \frac{Aj\ Fij\ Kij}{\Sigma\ Ak\ Fij\ Kik}$$

where:

Tij = the number of trips from zone *i* to zone j,

P*i* = the number of trip productions in zone *i*,

A*j* = the number of trip attraction in zone *j*,

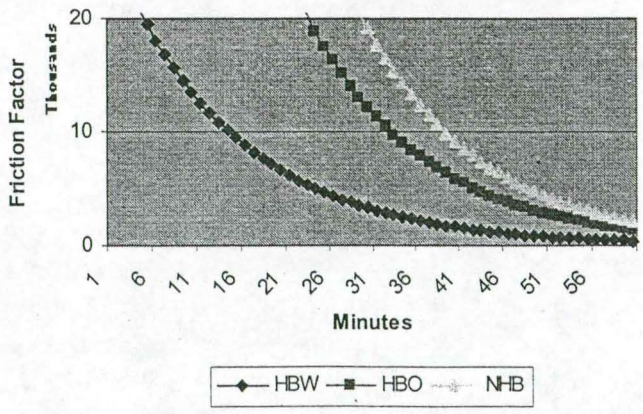
F*ij* = the friction factor relating the spatial separation between zone *i* and zone *j*, and

K*ij* = an optional trip-distribution adjustment factor for interchanges between zone *i* and zone *j*.

Friction factors represent the behavior of a traveler in terms of the perception of distance. They are inversely related to spatial separation of the zones as the travel time increases. Friction factors for the Clinton model can be seen on Figure 9.

Figure 9

Friction Factors by Purpose



K-factors are sector-to-sector factors, which correct for major discrepancies in trip interchanges. In cities with major rivers, the river often acts as a barrier. In the Clinton model, K-factors were used in zones near the Mississippi River bridge crossings to balance the attraction of trips from one side of the bridge to the other.

2.3 Mode Choice

Mode choice analysis considers usage of other modes of travel (i.e. bicycles, transit, walking). In areas where use of these alternative modes is large, person trips need to be split between the available modes. Alternative modes are not substantial in the Cities of Clinton, Camanche and Fulton. Therefore, this analysis was not necessary.

2.4 Trip Assignment

Traffic assignment assigns vehicle trips to the simulated roadway network. The roadway assignment algorithm used by the travel model produces an equilibrium assignment. The equilibrium assignment procedure initially produced a minimum path assignment in which trips from zone to zone are assigned to the shortest time paths between each zone pair. The assignment program then calculates congested travel times based on the resulting volume to capacity ratios, chooses portions of volumes from the previous assignment that will minimize like travel times for each zone pair, and then produces a new minimum path assignment using the congested travel times and weighted impedances. This process is repeated until time paths between zones have reached equilibrium, meaning that the final travel paths between zone pairs cannot be improved upon by taking alternate paths. The computation of congested travel times in the equilibrium assignment process is made through the use of a volume delay function, which contains free flow speed, distance, assigned volume, and roadway capacity as independent variables.

2.5 Travel Demand Model Calibration and Validation

The following is a summary of the statistics for the Clinton Travel Demand Model. The model was calibrated using methods from *NCHRP Report 255 Highway Traffic Data for Urbanized Area Project Planning and Design (1982)* and *TMIP Model Validation and Reasonableness Checking Manual (1997).*

2.5.1 Trip Generation

Trip generation refers to the origins and destinations of trips to land use and socioeconomic characteristics of the region. Trip productions and trip attractions are the major components of a trip generation model. A trip production is a trip end made at the home location for home-based trips and the origin location for non-home-based trips.

Internal

Several reasonableness checks were run on socioeconomic data supplied by ECIA. As shown in Tables 3 and 4, the average motorized person trips per household were compared to other regions. To determine this rate, data was averaged from zones with no employment.

The Clinton model was in range by purpose and total. An additional check on socioeconomic data involves comparison to the reasonable rate of 3.5 to 4.0 motorized trips per capita. The Clinton model is reasonable with 3.67 motorized trips per capita.

Table 3

Average Motorized Person Trips per Household by Region

Region	Survey Year	Population	Person Trips/HH
Clinton	**1998 Model**	**36,100**	***9.53***
Twin Cities, MN	1990	2,464,000	10.11
Nashua, NH	1990	154,000	10.08
Reno, NV	1987	254,000	8.58
Vancouver, WA	1985	259,000	5.83
Charlotte, NC	1985	511,433	9.29

Source:FHWA Analysis of Survey Trip Rates

Table 4

Average Motorized Person Trips per Household by Purpose

Purpose	Clinton	Houston	Dallas/Ft. Worth	Denver	San Francisco	Atlanta	Delaware Valley
	1998 Model	1985 Models	1984 Travel Survey	1985 Travel Survey	1985 Travel Survey	1980 Travel Survey	1986 Travel Survey
HBW	**1.84**	1.71	2.29	1.96	1.89	1.95	2.27
HBO	**5.37**	4.80	4.32	3.40	4.49	4.45	4.19
NHB	**2.32**	2.96	2.07	1.97	2.35	1.87	1.64
Total	**9.53**	9.47	8.68	7.33	8.73	8.27	8.10

Source: Model Validation and Reasonable Checking Manual (TMIP, 1997)

Balancing Productions and Attractions

The last step in trip generation is the balancing of trip productions and attractions. Before balancing begins, productions and attractions should be compared to determine if the socioeconomic data is reasonable. The total ratio of productions to attractions is in the recommended range of 0.9 to 1.10. The ratio of total production to attractions is 1.04 in the Clinton model as shown in Table 5.

Table 5
Comparison of Production and Attractions
Before Balancing

	Purpose	Internal
Productions	HBW	26,432
	HBO	77,138
	NHB	33,410
	Total	136,981
Attractions	HBW	22,669
	HBO	80,809
	NHB	28,103
	Total	131,581
Ratio Productions/Attractions	HBW	1.17
	HBO	0.955
	NHB	1.19
	Total	1.04

External Stations

Initially external stations were selected based upon functional classification. This excluded collectors. The first run of the model showed very little traffic in the northwest section of Clinton, because of the importance of the external points in this area. Collectors with annual average daily traffic (AADT) volumes above 500 were added into the model. The updated E/E vehicle trips are shown in Table 6.

Table 6

External/External Vehicle Trips

Destination	Origin											
	US 67 South	US 30 West	Elvira Road	24th Avenue North/Main	US 67 North	US 30 East	CR 84 South	CR 84 North	Harts Mill Road	9th Avenue South	16th Street NW	Total
US 67 South	0	38	4	12	55	127	15	61	1	2	2	**316**
US 30 West	38	0	9	12	87	1,120	107	114	3	4	5	**1,499**
Elvira Road	4	9	0	7	8	8	11	10	2	2	3	**64**
24th Avenue North/Main	12	12	7	0	5	25	6	22	2	3	4	**98**
US 67 North	55	87	8	5	0	21	8	3	3	3	5	**198**
US 30 East	127	1,121	8	25	21	0	26	24	2	3	4	**1,361**
CR 84 South	15	107	11	6	8	26	0	68	3	4	6	**255**
CR 84 North	61	114	10	22	3	24	68	0	3	4	6	**315**
Harts Mill Road	1	3	2	2	3	2	3	3	0	1	1	**21**
9th Avenue South	2	4	2	3	3	3	4	4	1	0	1	**27**
16th Street NW	2	5	3	4	5	4	6	6	1	1	0	**38**
Total	**317**	**1,500**	**65**	**99**	**198**	**1,360**	**255**	**315**	**21**	**27**	**38**	**4,194**

2.5.2 Trip Distribution

Since the purpose of trip distribution is to link trip productions to trip attractions, validation includes evaluating trip lengths and intrazonal trips.

Trip Lengths

In the initial model run, trip lengths were averaging around five minutes for I/I trips. In order to increase these lengths the friction factors were changed. After the adjustment, trip lengths were evaluated by purpose and compared to rates in other regions. As shown in Table 7, the trip rates for home based work trips are within range, but the HBW and NHB trips are on the high end of the range.

Table 7

Trip Length Comparisons Among Cities

City	Survey Year	Average Trip Length in Minutes		
		HBW	HBO	NHB
Clinton	1998 Model	**21.9**	**17.0**	**17.1**
San Juan	1991	35.4	16.1	16.2
Denver	1985	22.7	12.9	13.8
Northern NJ	1986	23.2	15.3	17.1
Phoenix	1988	19.3	13.0	13.6
Charleston, WV	1993	20.7	17.3	15.7
Reno	1990	11.2	10.4	8.1
Houston	1985	20.9	11.4	12.7

Source: NPTS

Intrazonal Trips

Intrazonal trips are trips the model assigns which start and end in the same zone. Typically, intrazonal trips account for less than 5% of total trips. As shown in Table 8, the intrazonal trips assigned in the Clinton model account for only 2% of the total trips which is well below the recommended maximum.

Table 8

Intrazonal Trip Percentages by Purpose

Purpose	Intrazonal	Total	Percentage
HBW	199	30,110	0.66%
HBO	1,512	52,705	2.87%
NHB	411	23,370	1.76%
Total	**2,122**	**106,185**	**2.00%**

2.5.3 Trip Assignment

The assignment of trips to the network is the final output of the modeling process. Validation of trip assignment includes reviewing like volumes and vehicle miles traveled from different grouping methods. The Clinton model review included grouping information by functional class, link AADT, and screenlines. The coefficient of determination for all areas with base year counts is 0.98, well above the recommended 0.88.

Functional Classification

Table 9 shows the deviation of volumes by functional class. Deviation target rates are compared to rates from FHWA, *Calibration and Adjustment of System Planning Models (1982)*. The Clinton model currently meets rates for major arterials but is below that recommended for minor arterials and collectors. When the root mean square error (RMSE) for these volumes was calculated, values were similar to calibrated models for other regions. These values are shown in Table 10. Vehicle miles traveled (VMT) were also calculated by functional class and are shown in Table 11. These figures are within a reasonable range.

Table 9

Volume Deviation by Functional Classification

Functional Class	Base Year Volume	Assigned Volume	Assigned / Base Volume	Deviation (Assigned-Count)	Percent Deviation (Deviation / Count)	FHWA
Major Arterial	1,228,070	1,115,056	0.91	-113,014	10%	10%
Minor Arterial	337,290	283,499	0.84	-53,791	19%	15%
Collector	106,030	58,387	0.55	-47,643	82%	25%
Local Road	61,410	43,933	0.72	-17,477	40%	NA
Total	**1,732,800**	**1,500,875**	**0.87**	**-231,925**	**15%**	**NA**

Table 10

RMSE by Functional Classification

Functional Class	Root Mean Square (RMSE)		
	Clinton	Reno	Phoenix
Major Arterial	**26.1**	36.8	38.5
Minor Arterial	**59.1**		
Collector	**72.4**	77.5	62.7
Local Road	**81.0**	NA	NA
Total	**38.5**	36.8	40.6

Table 11

VMT Deviation by Functional Class

Functional Class	Base Year VMT	Assigned VMT	Assigned / Base VMT	VMT Deviation	Percent VMT Deviation (Deviation / Count)
Major Arterial	153,229	154,280	1.01	1,051	1%
Minor Arterial	46,714	43,742	0.94	-2,972	6%
Collector	26,812	15,192	0.57	-11,619	43%
Local Road	9,329	6,484	0.70	-2,845	30%
Total	**236,084**	**219,699**	**0.93**	**-16,385**	**7%**

Average Annual Daily Traffic

Table 12 shows the deviation of volumes by AADT. All volume groups are in range when compared to target rates given by the FHWA. Deviations of vehicle miles traveled are also in range as shown in Table 13.

Table 12

Volume Deviation by AADT

Link AADT	Base Year Count	Assigned Volume	Assigned / Base Volume	Deviation (Assigned-Count)	Percent Deviation (Deviation / Count)	FHWA
1 - 2,500	352,400	275,948	0.78	-76,452	22%	47%
2,501 - 5,000	369,800	320,601	0.87	-542	1%	36%
5,001 - 7,500	345,500	291,356	0.84	1,419	3%	29%
7,501 - 10,000	665,100	612,970	0.92	-4,203	9%	29%

Table 13

VMT Deviation by AADT

Link AADT	Base Year VMT	Assigned VMT	Assigned / Base VMT	VMT Deviation	Percent VMT Deviation (Deviation / Count)
1 - 2,500	79,198	66,139	0.84	-13,058	16%
2,501 - 5,000	60,584	60,042	0.99	-542	1%
5,001 - 7,500	46,311	47,730	1.03	1,419	3%
7,501 - 10,000	49,991	45,787	0.92	-4,203	8%

Screenlines

Deviation comparisons were also made across six screenlines as shown in Figure 10. Tables 14 and 15 show these comparisons. The deviation for screenline volumes is also shown in Figure 11. The line represents the maximum desirable deviation recommended by NCHRP Report 255. All screenlines except Screenline 4 meet the recommended criteria which indicates that the model reasonably reflects base year conditions.

Table 14

Deviation of Screenline Volumes

Screenline	Base Year Volume	Assigned Volume	Deviation (Assigned-Count)	Percent Deviation (Deviation / Count)	Model / Count
1	16,230	17,921	1,691	10%	1.10
2	16,340	8,673	-7,667	47%	0.53
3	8,930	5,247	-3,683	41%	0.59
4	29,100	15,963	-13,137	45%	0.55
5	30,300	23,155	-7,145	24%	0.76
6	19,700	23,508	3,808	19%	1.19

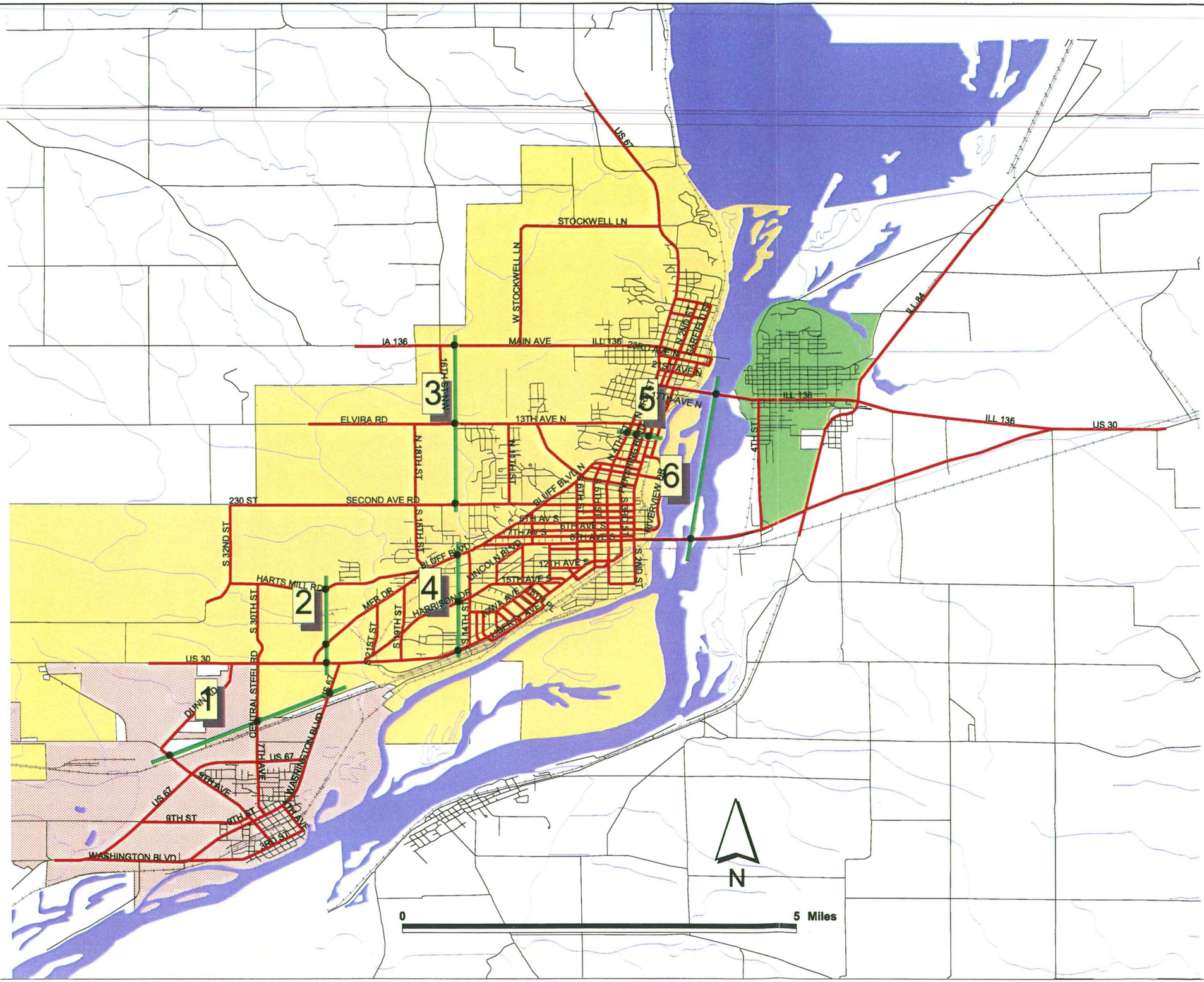
Table 15

Screenline Vehicle Miles Traveled

Screenline	Base Year VMT	Assigned VMT	VMT Model / Count
1	8,400	9,421	**1.12**
2	3,291	3,169	**0.96**
3	4,026	2,367	**0.59**
4	9,226	5,144	**0.56**
5	6,464	4,912	**0.76**
6	13,932	16,499	**1.18**
Total	**45,340**	**41,511**	**0.92**

Clinton US 30/67 Corridor Study

Screenlines



Legend

- Road in Screenline
- Screenline
- Network
- Roadway
- Railroad
- River
- Streams
- Camanche
- Clinton
- Fulton

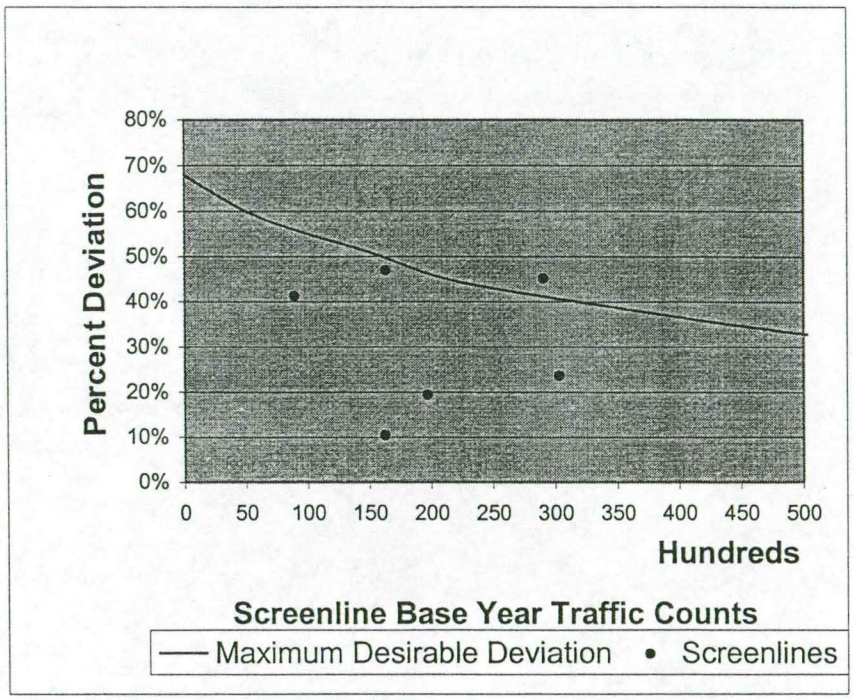
Figure 10

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company

Figure 11

Deviation of Screenline Volumes



3 Developments of Future-Year Forecasts

Future conditions were developed for the year 2030. The base year network was modified to include any programmed and committed projects. The only project currently programmed within the City of Clinton was Mill Creek Expressway. Future socioeconomic projections for Year 2030 were developed by ECIA using historical growth data for Clinton County. Using these projections, ECIA and the City of Clinton Planning Department projected estimates for households and employment by TAZ. Socioeconomic projections for 2030 are included in Appendix C. Traffic volume projections at external stations were calculated using historical traffic counts as shown in Table 16. The correlation (r) and coefficient of determination (r^2) were calculated for each external station. Correlation refers to the degree and direction of linear relationship between two variables. The coefficient of determination measures the proportion of variability in one variable that can be determined from the relationship with the other variable. Because the base year model assignments deviate from the corresponding base year counts, the future year model assignments needed adjustment. The adjustment assumes the deviation occurring between the count and assignment in the base year would also occur in the forecast year. Year 2030 traffic projections for the no-build condition can be seen in Figure 12.

Table 16

2030 Traffic Projections for External Stations

Location	1998	2030	r	r2	Annualized Growth Rate
US 30 East	6,800	11,957	0.94	0.87	1.78%
CR 84 South	5,100	8,128	0.91	0.83	1.47%
CR 84 North	6,300	9,977	0.86	0.74	1.45%
US 67 South	4,220	8,002	0.96	0.93	2.02%
US 30 West	10,000	16,712	0.87	0.75	1.62%
Elvira Road	2,580	3,678	0.95	0.90	1.11%
24th Avenue North/Main	1,970	4,144	0.99	0.98	2.35%
US 67 North	2,640	4,166	0.84	0.70	1.44%
16th Street NW	1,520	2,140	0.86	0.74	1.07%
Harts Mill Road	850	1,204			1.09%
9th Avenue South	1,090	1,544			1.09%
Total	**43,070**	**71,652**			**1.60%**

3.1 One-way Couplet

Additional analysis was completed to analyze the US 30/67 Corridor. The future year model network was adjusted to include a one-way couplet beginning at 14th Street and ending at 4th Street. The couplet was entered as major arterials with three lanes in each direction and posted speeds of 35 miles per hour. Connectors were placed at select locations throughout the corridor. Figure 13 includes 2030 traffic projections for the network with the one-way couplet alternative. In order to complete a traffic operation analysis, PM peak turning movement projections were calculated (See Figures 14 – 18).

Clinton US 30/67 Corridor Study

Year 2030 Forecasted Average Daily Traffic No Build Condition

0 5 Miles

N

US 67

US 30

Mill Creek Expressway

Legend

- Principal Arterial
- Minor Arterial
- Collector
- Local
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

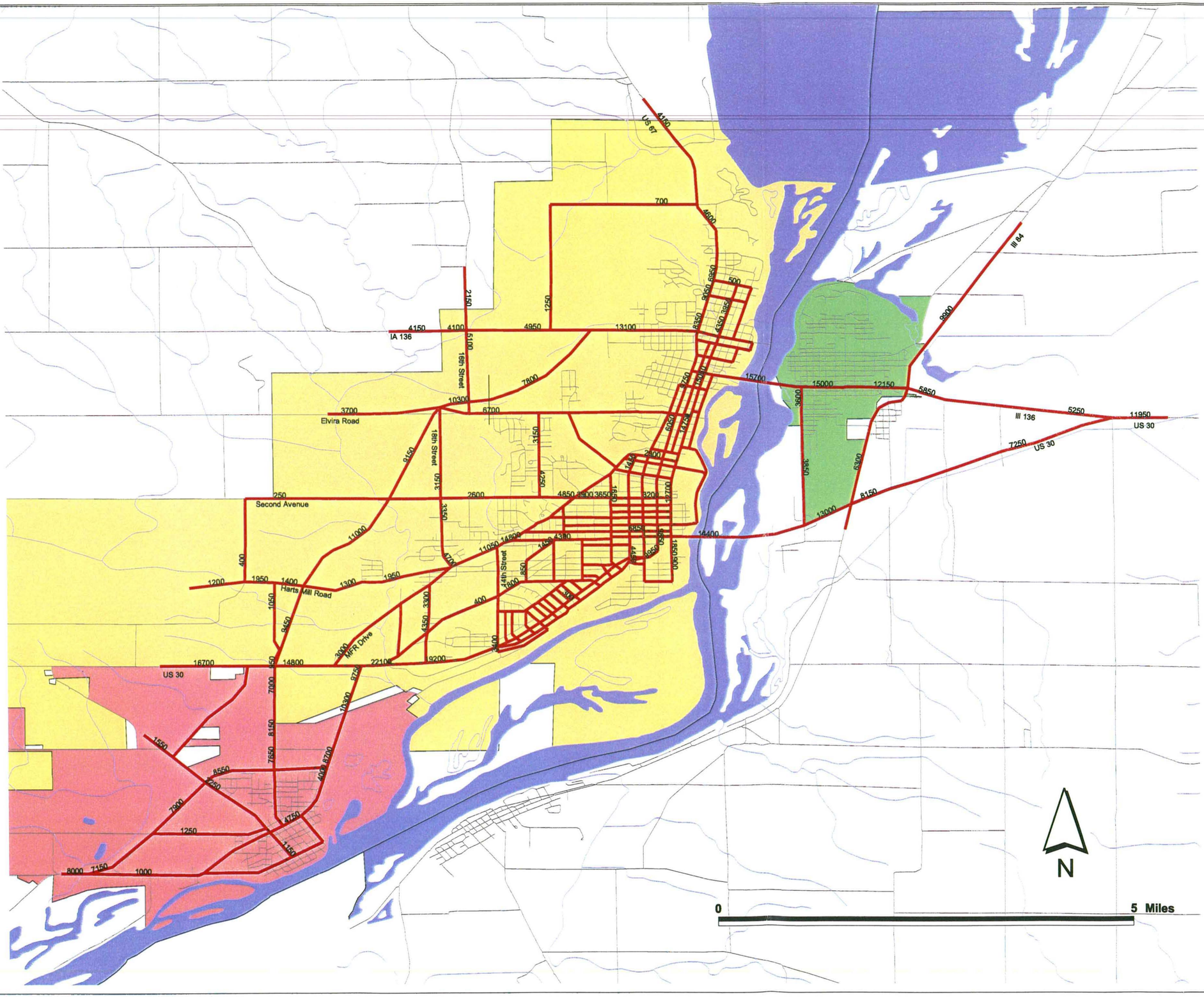
Figure 12

Clinton Iowa Gateway to Opportunity

Howard R. Green Company

Clinton US 30/67 Corridor Study

Year 2030 Forecasted Average Daily Traffic With Oneway Pair



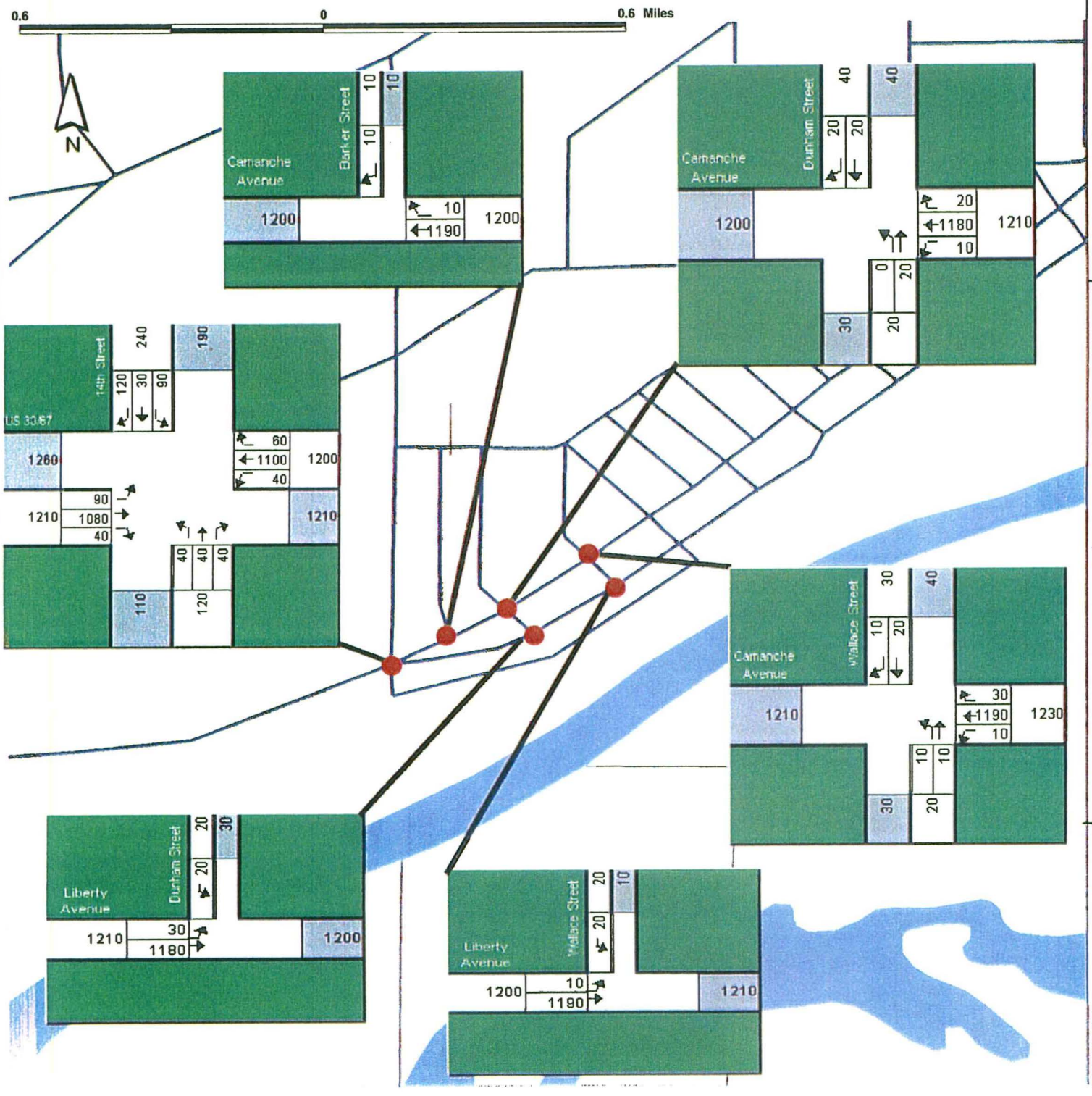
Legend

- Principal Arterial
- Minor Arterial
- Collector
- Local
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

Figure 13

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Year 2030 Forecasted PM Peak Hour Turning Movements (Page 1)

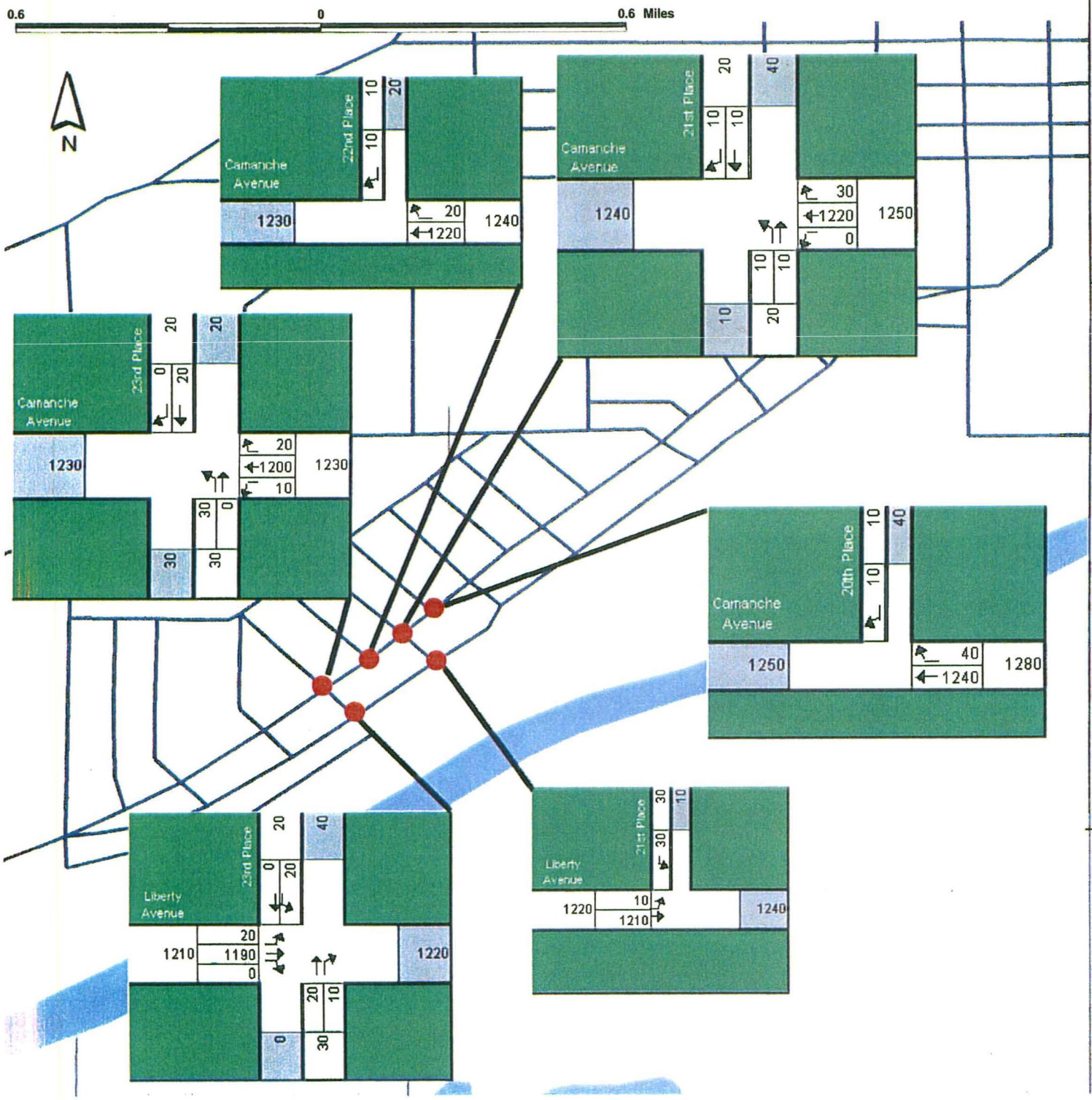
Legend

- Turning Movement Location
- Peak Hour Turning Movement
- Roadway
- Streams
- River

Figure 14

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Year 2030 Forecasted PM Peak Hour Turning Movements (Page 2)

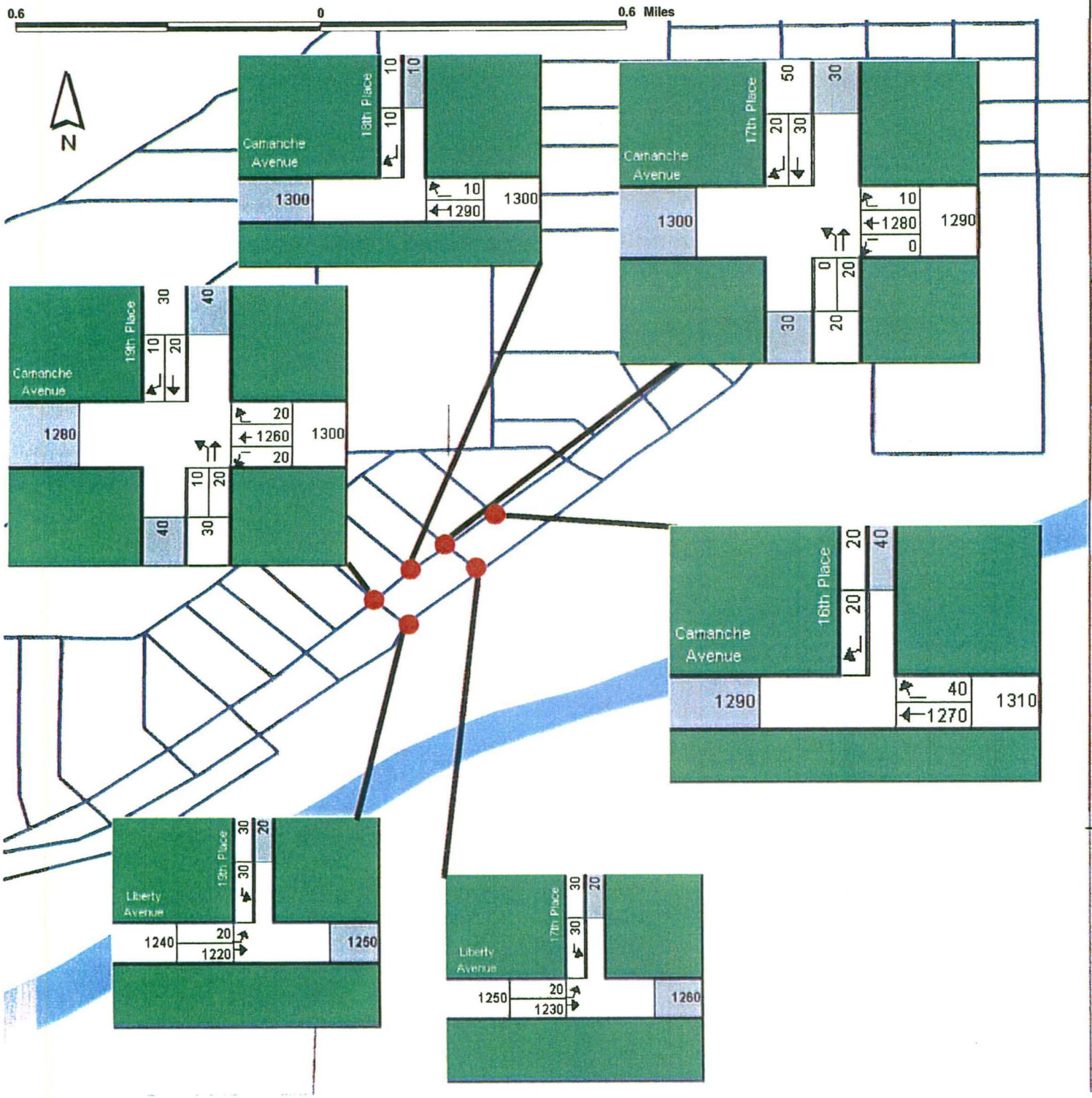
Legend

- Turning Movement Location
- Peak Hour Turning Movement
- Roadway
- Streams
- River

Figure 15

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Year 2030 Forecasted PM Peak Hour Turning Movements (Page 3)

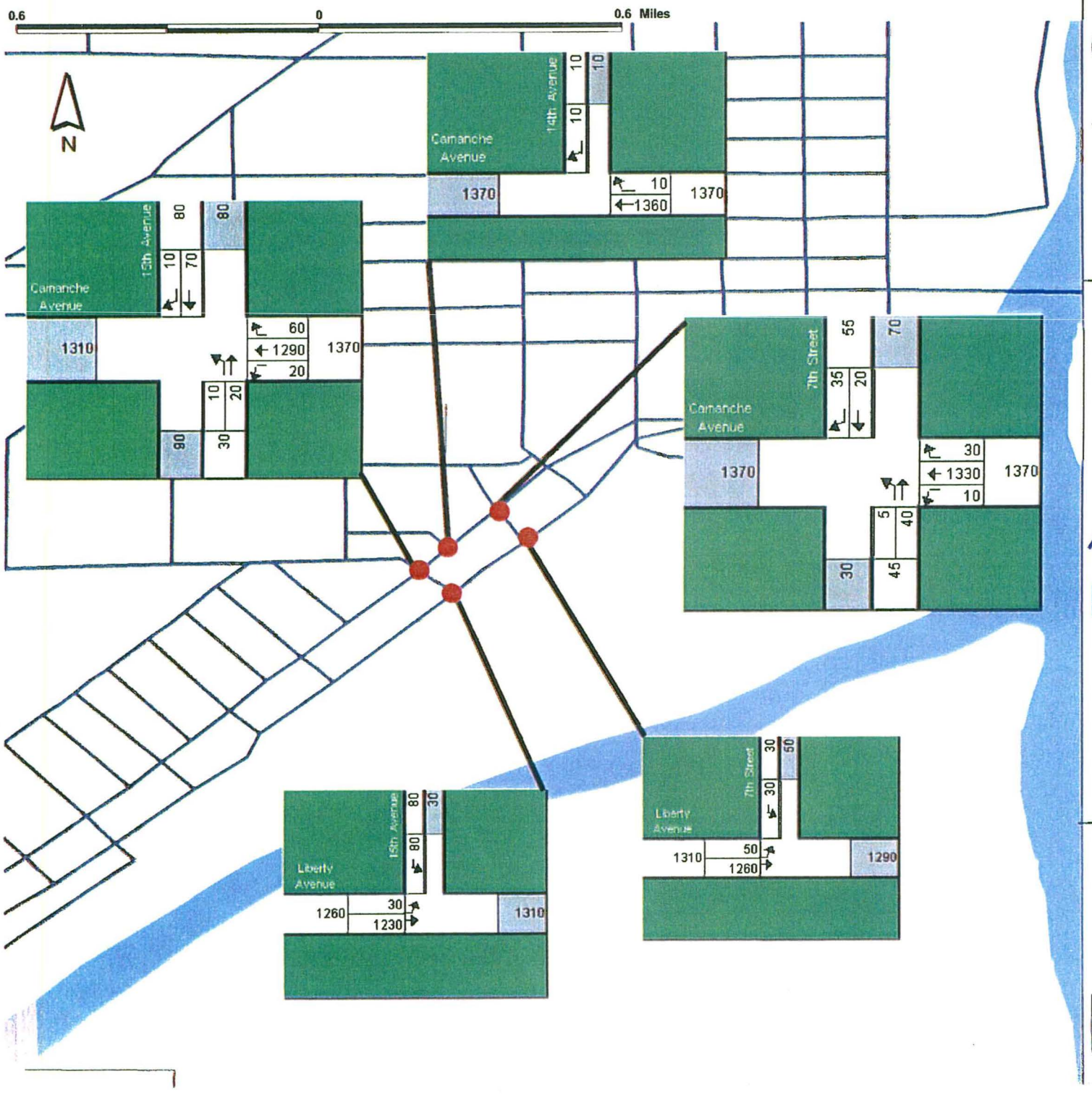
Legend

- Turning Movement Location
- Peak Hour Turning Movement
- Roadway
- Streams
- River

Figure 16

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Year 2030 Forecasted PM Peak Hour Turning Movements (Page 4)

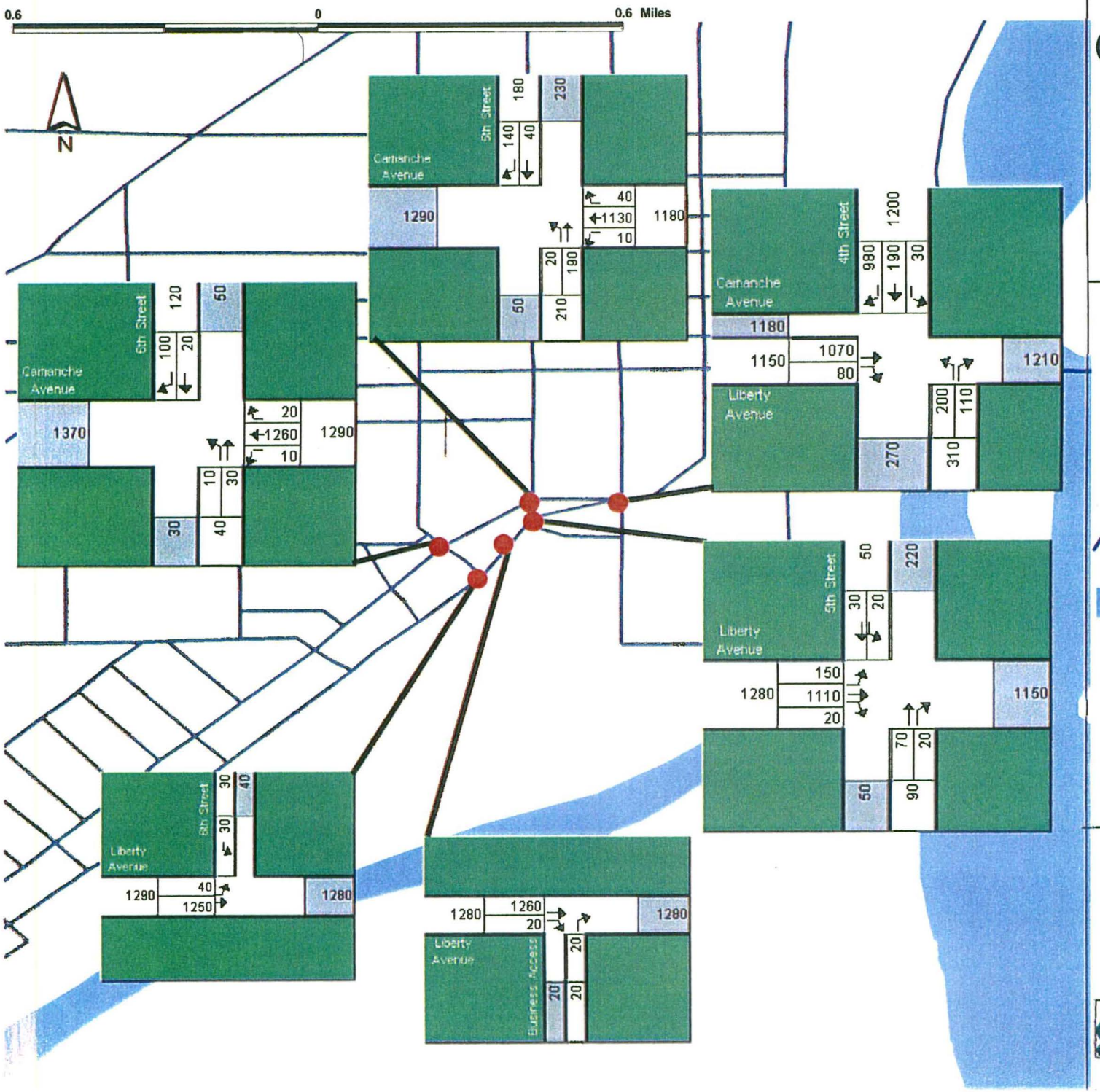
Legend

- Turning Movement Location
- Peak Hour Turning Movement
- Roadway
- Streams
- River

Figure 17

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Year 2030 Forecasted PM Peak Hour Turning Movements (Page 5)

Legend

- Turning Movement Location
- Peak Hour Turning Movement
- Roadway
- Streams
- River

Figure 18

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company

4 Traffic Operations Analysis

A traffic operations analysis was completed on the US 30/67 Corridor for Year 2030 conditions. The purpose of a traffic operations analysis is to evaluate the traffic conditions resulting from identified roadway characteristics and traffic volumes. This analysis consists of PM peak hour capacity analyses at twenty-eight intersections and arterial capacity analyses for the Camanche Avenue and Liberty Avenue corridors.

The approach to the traffic operations analysis is derived from the established methodologies documented in the *Highway Capacity Manual* (TRB, 2000). *The Highway Capacity Manual* (HCM) contains a series of analysis techniques used to evaluate the operation of transportation facilities under specific conditions.

The results of an HCM analysis are typically presented in the form of a letter grade (A-F) providing a qualitative estimate of the operational efficiency or effectiveness. The letter grade determined by the HCM analysis is referred to as level-of-service (LOS). By definition, LOS A conditions represent high-quality operations (i.e., motorists experience very little delay or interference) and LOS F conditions represent very poor operations (i.e., extreme delay or severe congestion). The HCM has different LOS criteria for several different classes of roadway. It is important to note that level-of-service is defined differently for the two HCM analysis techniques applied in this study. The intersection analysis focuses on the average control delay for all traffic at an intersection. The arterial roadway analysis focuses on the average travel speed along a roadway segment which may include several intersections. It is therefore possible to have an efficient intersection located along a poorly operating roadway segment, or a poorly operating intersection along an otherwise free-flowing arterial.

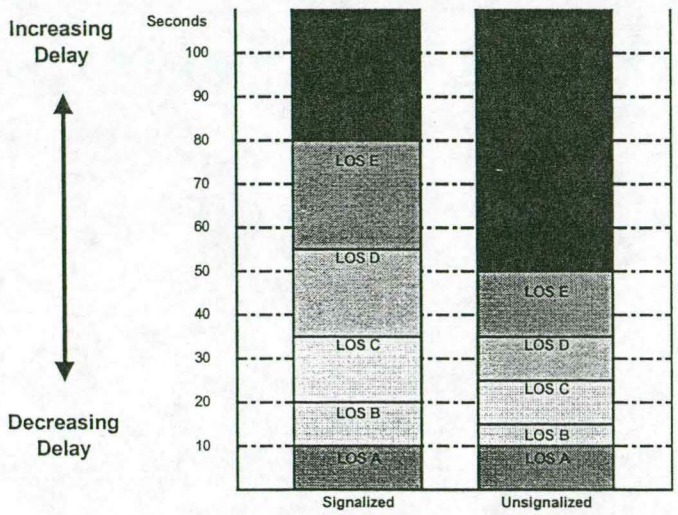
4.1 Intersection Capacity Analysis

LOS at roadway intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control measures. For intersection analysis, HCM defines LOS in terms of the average control delay at the intersection in seconds per vehicle (see Figure 19). The threshold values for unsignalized intersections are slightly less than for signalized intersections because driver expectation of the intersection performance varies for different types of traffic control.

Two alternatives were considered for intersection analysis. The first alternative includes four signalized intersections: Camanche Avenue with 14th Street, 5th Street and 4th Street and Liberty Avenue with 5th Street. The second alternative includes four additional intersections; Camanche Avenue with 23rd Place and 15th Avenue, and Liberty Avenue with 23rd Place and 15th Avenue. These alternatives are shown in Figures 20 and 21.

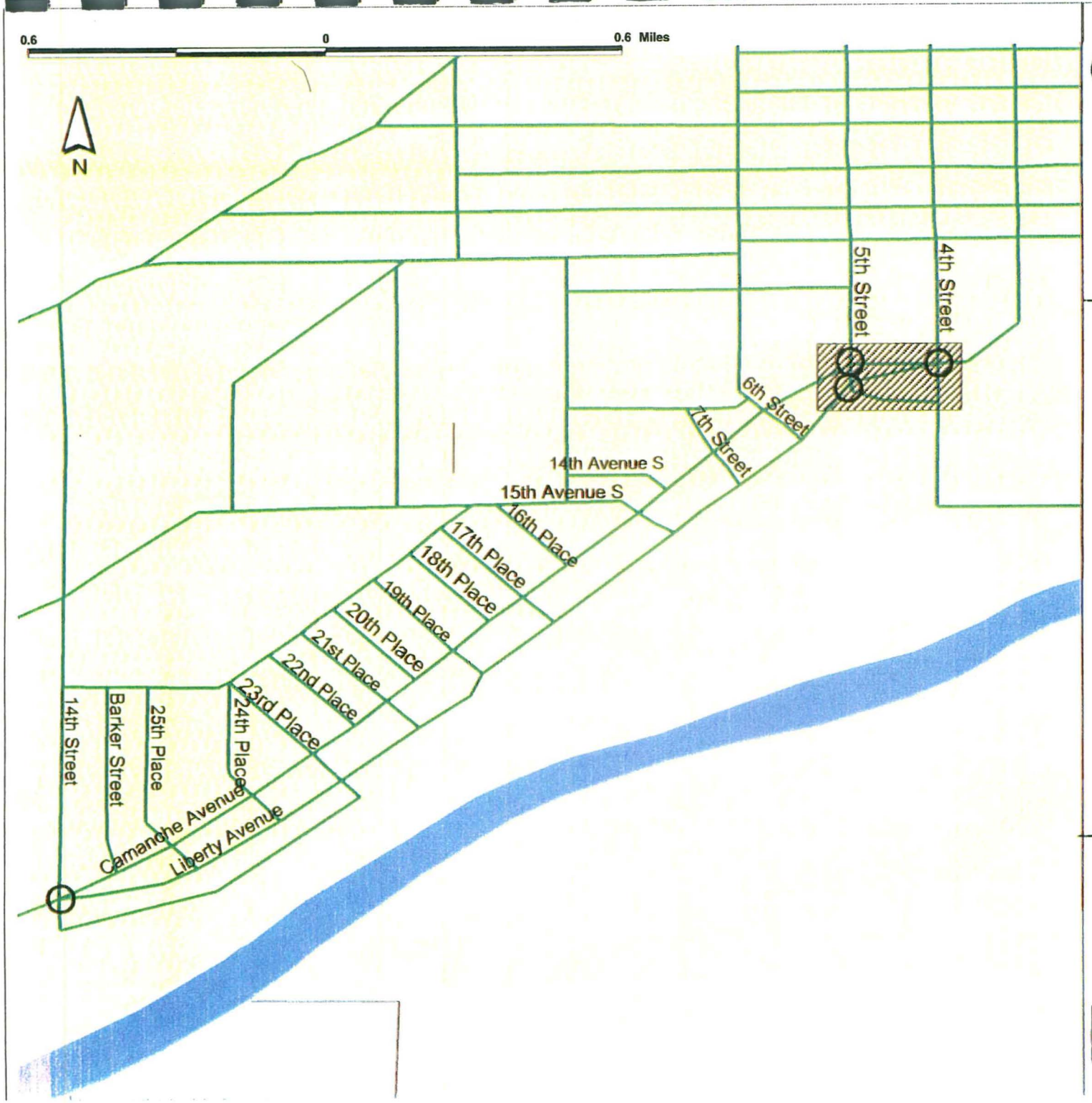
Figure 19

Intersection Level of Service



Source: Tables 16-2 and 17-2, 2000 Highway Capacity Manual

Table 17 shows the existing intersection level of service at each of the key intersections for 95th percentile PM peak hour traffic with Alternative 1. Each signalized intersection is predicted to serve at LOS A or B. For a thru-stop controlled intersection, all intersections are predicted to operate at LOS A. In certain locations, the movements on the minor street will experience significant delay. These intersections are highlighted in gray. Because the vehicle traffic on the minor street is minor compared to that on the one-way couplet, the overall intersection average vehicle delay is still LOS A. Additional analysis was completed to determine the impacts of placing signals at these intersections as shown in Table 18. As shown, the minor legs operated more efficiently (LOS B), but the average approach delay increased slightly. These impacts are compared in Figure 22. As shown, adding these signals reduces delay for 4-7% of vehicles entering the intersection. A final recommendation regarding signals at these locations is not offered in this document. The determination must, rather, involve a comparison of the cost of the signals to the amount of traffic positively impacted by reduced delay.



Clinton US 30/67 Corridor Study

Traffic Control Concept Alternative 1

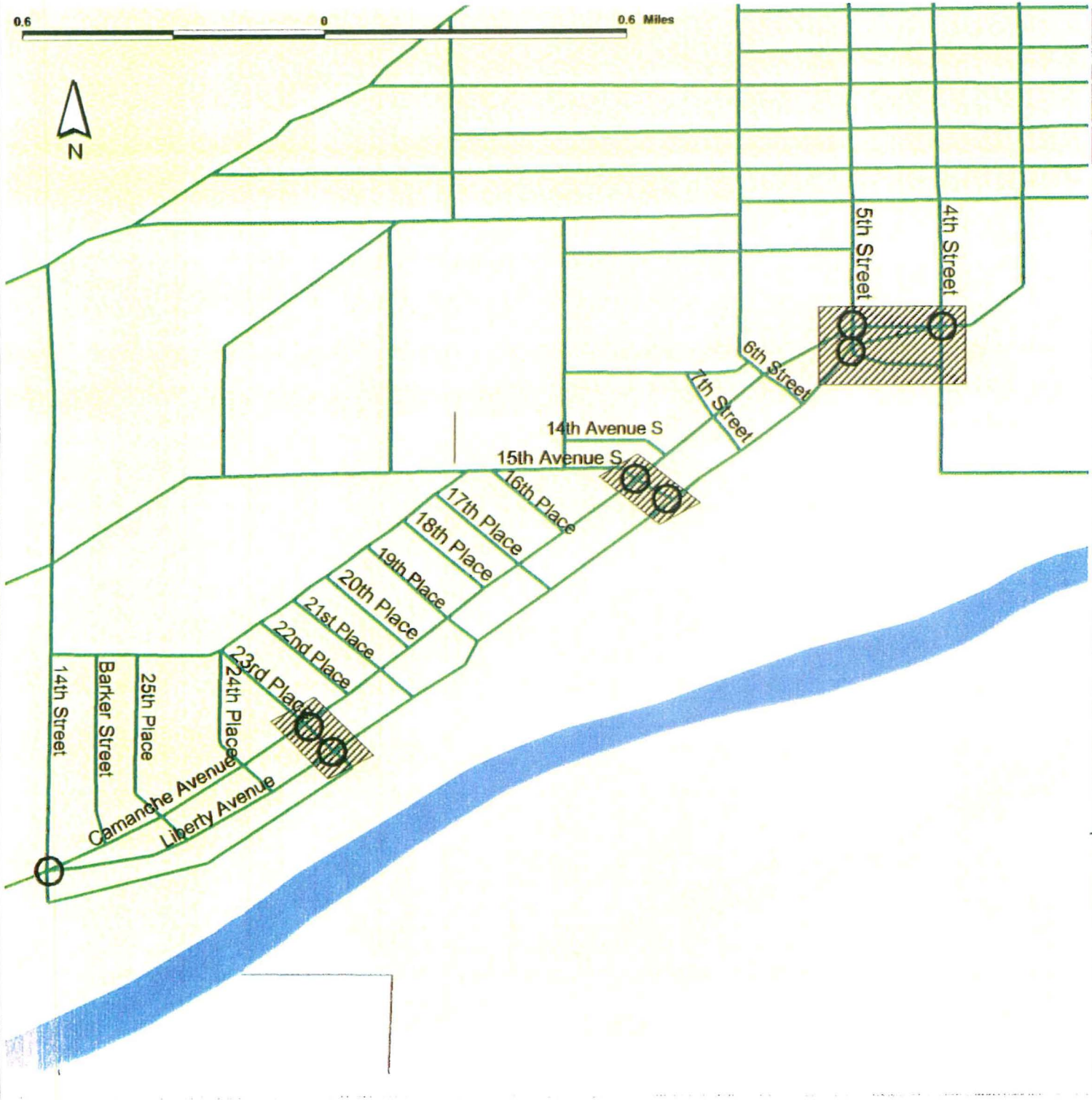
Legend

- Interconnect
- Signal
- Roadway
- Stream
- River

Figure 20

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company



Clinton US 30/67 Corridor Study

Traffic Control Concept Alternative 2

Legend

- Interconnect
- Signal
- Roadway
- Stream
- River

Figure 21

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company

Table 17

Alternative 1 - PM Peak Hour Intersection Level of Service

Intersection	Traffic Control	Worst Approach		Intersection	
		LOS	Delay (sec)	LOS	Delay (sec)
Camanche Ave & 14th Street	Uncoordinated Actuated Signal	D	38.4	B	14.3
Camanche Ave & Barker Street	Thru Stop	B	11.5	A	0.1
Camanche Ave & 25th Place	Thru Stop	D	33.2	A	1.3
Camanche Ave & 24th Place	Thru Stop	D	27.0	A	1.1
Camanche Ave & 23rd Place	Thru Stop	D	33.1	A	1.0
Camanche Ave & 22nd Place	Thru Stop	B	11.7	A	0.1
Camanche Ave & 21st Place	Thru Stop	C	20.8	A	0.9
Camanche Ave & 20th Place	Thru Stop	B	11.9	A	0.1
Camanche Ave & 19th Place	Thru Stop	D	31.2	A	1.5
Camanche Ave & 18th Place	Thru Stop	B	12.7	A	0.4
Camanche Ave & 17th Place	Thru Stop	D	29.8	A	1.6
Camanche Ave & 16th Place	Thru Stop	B	12.1	A	0.2
Camanche Ave & 15th Avenue	Thru Stop	F	70.7	A	4.8
Camanche Ave & 14th Avenue	Thru Stop	B	12.2	A	0.1
Camanche Ave & 7th Street	Thru Stop	E	49.4	A	2.5
Camanche Ave & 6th Street	Thru Stop	E	35.7	A	2.8
Camanche Ave & 5th Street	Coordinated Actuated Signal	C	25.6	A	7.3
Camanche Ave & 4th Street	Coordinated Actuated Signal	C	20.8	B	15.3
Liberty Ave & 25th Place	Thru Stop	B	12.5	A	0.4
Liberty Ave & 24th Place	Thru Stop	B	11.9	A	0.3
Liberty Ave & 23rd Place	Thru Stop	F	70.2	A	2.1
Liberty Ave & 21st Place	Thru Stop	B	13.6	A	0.5
Liberty Ave & 19th Place	Thru Stop	B	13.9	A	0.5
Liberty Ave & 17th Place	Thru Stop	B	14.0	A	0.5
Liberty Ave & 15th Avenue	Thru Stop	B	13.3	A	1.0
Liberty Ave & 7th Street	Thru Stop	B	13.6	A	0.6
Liberty Ave & 6th Street	Thru Stop	B	13.2	A	0.6
Liberty Ave & Business Access	Thru Stop	B	12.0	A	0.2
Liberty Ave & 5th Street	Coordinated Actuated Signal	C	27.8	A	6.4

Source : Howard R. Green Company *11/15/01*

Table 18

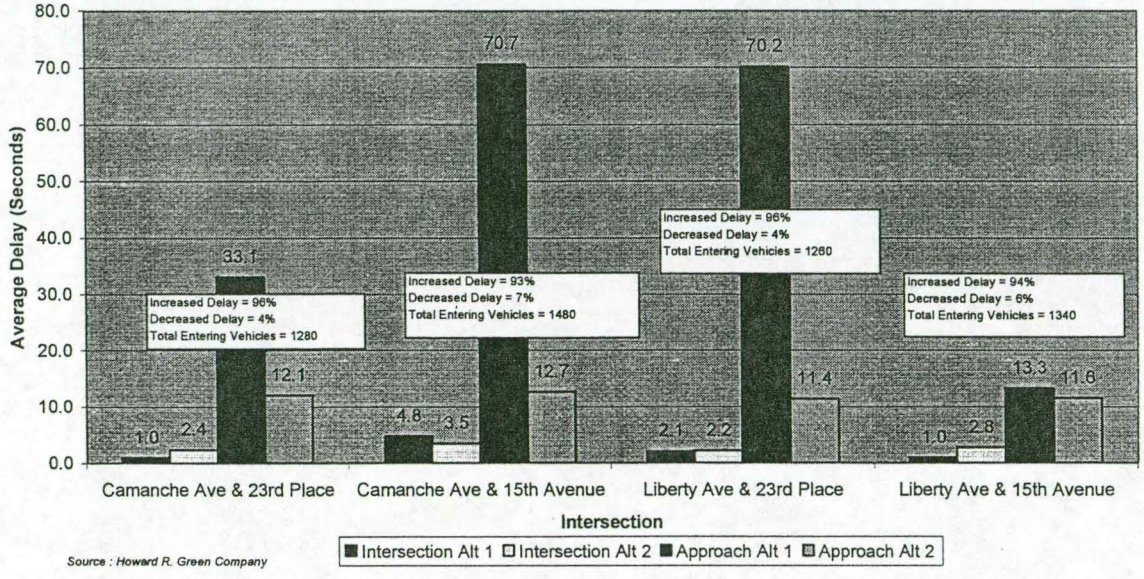
Alternative 2 – PM Peak Hour Intersection Level of Service

Intersection	Traffic Control	Worst Approach		Intersection	
		LOS	Delay (sec)	LOS	Delay (sec)
Camanche Ave & 14th Street	Uncoordinated Actuated Signal	D	38.4	B	14.3
Camanche Ave & Barker Street	Thru Stop	B	11.5	A	0.1
Camanche Ave & 25th Place	Thru Stop	D	33.2	A	1.3
Camanche Ave & 24th Place	Thru Stop	D	27.0	A	1.1
Camanche Ave & 23rd Place	Coordinated Actuated Signal	B	12.1	A	2.4
Camanche Ave & 22nd Place	Thru Stop	B	11.7	A	0.1
Camanche Ave & 21st Place	Thru Stop	C	20.8	A	0.9
Camanche Ave & 20th Place	Thru Stop	B	11.9	A	0.1
Camanche Ave & 19th Place	Thru Stop	D	31.2	A	1.5
Camanche Ave & 18th Place	Thru Stop	B	12.7	A	0.4
Camanche Ave & 17th Place	Thru Stop	D	29.8	A	1.6
Camanche Ave & 16th Place	Thru Stop	B	12.1	A	0.2
Camanche Ave & 15th Avenue	Coordinated Actuated Signal	B	12.7	A	3.5
Camanche Ave & 14th Avenue	Thru Stop	B	12.2	A	0.1
Camanche Ave & 7th Street	Thru Stop	E	49.4	A	2.5
Camanche Ave & 6th Street	Thru Stop	E	35.7	A	2.8
Camanche Ave & 5th Street	Coordinated Actuated Signal	C	25.6	A	7.3
Camanche Ave & 4th Street	Coordinated Actuated Signal	C	20.8	B	15.3
Liberty Ave & 25th Place	Thru Stop	B	12.5	A	0.4
Liberty Ave & 24th Place	Thru Stop	B	11.9	A	0.3
Liberty Ave & 23rd Place	Coordinated Actuated Signal	B	11.4	A	2.2
Liberty Ave & 21st Place	Thru Stop	B	13.6	A	0.5
Liberty Ave & 19th Place	Thru Stop	B	13.9	A	0.5
Liberty Ave & 17th Place	Thru Stop	B	14.0	A	0.5
Liberty Ave & 15th Avenue	Coordinated Actuated Signal	B	11.6	A	2.8
Liberty Ave & 7th Street	Thru Stop	B	13.6	A	0.6
Liberty Ave & 6th Street	Thru Stop	B	13.2	A	0.6
Liberty Ave & Business Access	Thru Stop	B	12.0	A	0.2
Liberty Ave & 5th Street	Coordinated Actuated Signal	C	27.8	A	6.4

Source : Howard R. Green Company *11/15/01*

Figure 22

PM Peak Hour Intersection and Approach Leg Average Delay



Source : Howard R. Green Company

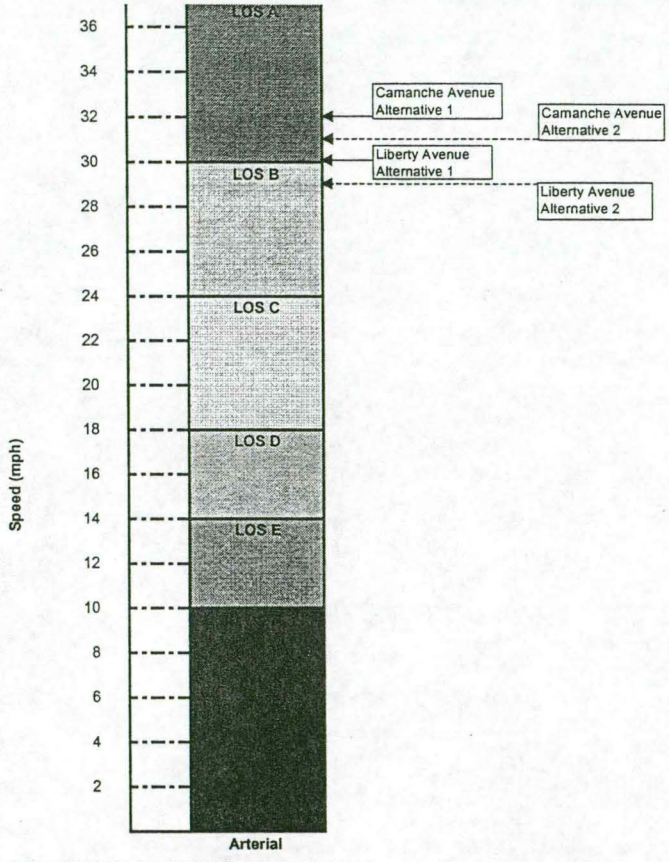
4.2 Arterial Roadway Capacity Analysis

Arterial roadway LOS is a function of traffic volume, traffic flow characteristics, roadway cross-sections, traffic signal spacing, and traffic signal timing. For arterial roadway analysis, HCM defines LOS in terms of the average peak hour travel speed along a segment, including delay and stops.

Based on free-flow speeds of 35 MPH, Camanche Avenue and Liberty Avenue have been classified as Class III arterials for the basis of this study. Figure 23 includes the LOS service criteria for a Class III arterial along with the operating speed for Camanche Avenue and Liberty Avenue for both alternatives. As shown, Camanche Avenue operates at LOS A, while Liberty Avenue operates at the LOS A/B boundary for Alternative 1. The addition of four signals in Alternative 2 slightly dropped the speeds for both arterials.

Figure 23

Segment Level of Service



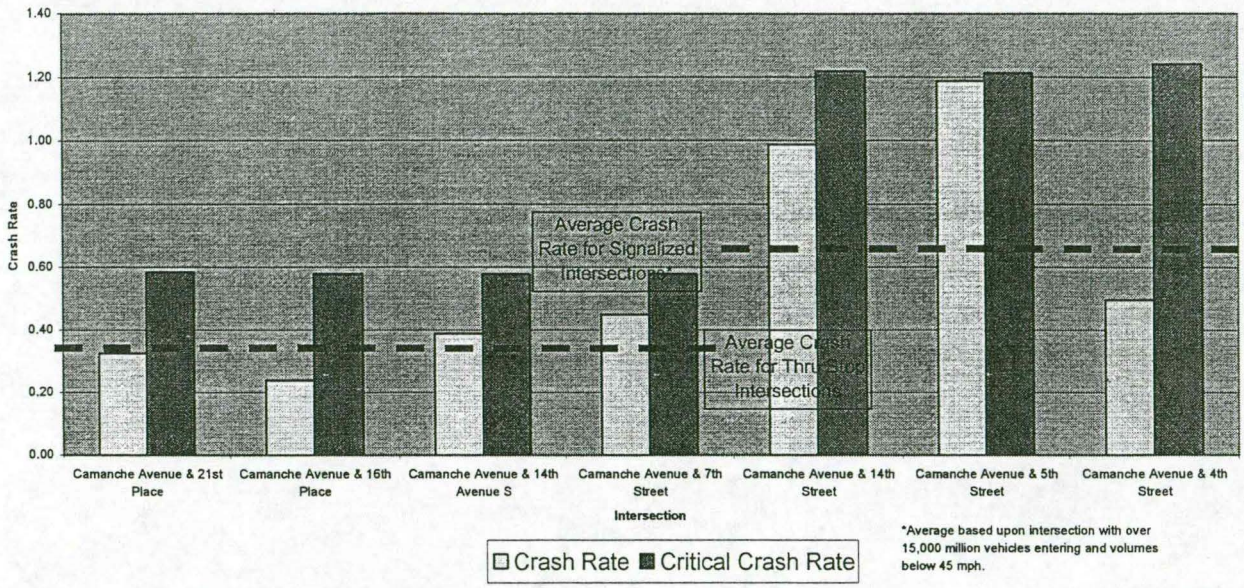
Source : Exhibit 15-2, Class III, 2000 Highway Capacity Manual

4.3 Safety Analysis

Historical crash data from 1995 to 1999 were examined to determine if intersections were experiencing safety deficiencies. Crash rates were calculated using methods in the Traffic Safety Fundamentals Handbook (MnDOT, 2001.) Critical rates are a function of the design of the facility, the type of intersection, the amount of exposure (traffic volumes), and the random nature of crashes. The crash analysis shown in Figure 24 demonstrates that all intersections were below the critical rate for signalized and unsignalized intersections. Since the new design for this corridor is a compete transformation from the existing condition, comparison of the existing and conditions would be unreliable. It should be noted that a one-way pair as viewed from a vehicle crash standpoint as a safer design than the present configuration.

Figure 24

Crash Analysis



*Average based upon intersection with over 15,000 million vehicles entering and volumes below 45 mph.

Source : Howard R. Green Company

11/15/01

5 Conclusion

A travel demand model for the urbanized area surrounding the City of Clinton was created to determine traffic forecasts for the Year 2030. PM peak hour traffic projections were calculated for the US 30/67 Corridor from 14th Street to 4th Street. This information was used to complete a traffic operation analysis for alternatives for the reconstruction of this roadway. The key conclusions of the operations analysis are as follows:

- The one-way pair alternative will operate at LOS A if constructed as three lane facilities in both directions.

- Signals should be included at the intersections of Camanche Avenue with 14th Street, 5th Street and 4th Street as well as the intersection of Liberty Avenue with 5th Street. With this configuration, signalized intersections will operate at LOS A and B. All unsignalized intersections will operate at a LOS A.

- Additional signals may be placed at the intersections of Camanche Avenue with 23rd Place and 15th Avenue as well as the intersections of Liberty Avenue with 23rd Place and 15th Avenue to reduce delay on the minor streets during PM peak hour. The additional cost would accommodate 4 to 7% of traffic entering the intersections on the minor leg. As additional signals are added to the system, the overall level of service will be reduced slightly.

- Vehicle crashes at intersections on the current facility are below the critical rate for the years 1995-1999. At locations where 14th Street, 5th Street, 14th Avenue, and 7th Street intersect with Camanche Avenue, crash rates are higher than the average at similar types of intersections. Although the predicted crash rate of the alternatives was not pursued, it can be noted that a one-way pair is viewed as a safer facility than the current configuration.

Appendix A Meeting Summaries

Clinton US 30/67 Corridor Study
Travel Demand Model Meeting Summary
Clinton Council Chambers
1:30 p.m. Monday, July 9, 2001

Participants:

John Staszewski, Planner/C.D. Director, City of Clinton
Jim Haag, Public Works Director, City of Clinton
Steve Williams, Transportation Planner, ECIA
Allen Burr, Transportation Planner, ECIA
Kevin Pape, Transportation Planner, Howard R. Green Company
Lynn Kiesow, Transportation Planner, Howard R. Green Company

Review/revise travel demand model attributes:

Mr. Pape and Ms. Kiesow presented six attribute maps including the study boundary, travel demand model network, TAZ boundaries, functional classification, posted speed limit and external/external trip percentages and internal/external and external/external trip tables. Ms. Kiesow noted the west part of Clinton and Camanche were not in the study area, and asked if the study area should be expanded to the Cities limits?

Mr. Williams did not feel it was necessary to add the additional area because no development was expected to occur in this segment over the next twenty years.

Mr. Staszewski agreed.

Mr. Haag asked why 18th Street was not included in the study area map?

Mr. Williams mentioned that the IDOT shape files used for mapping were not completely accurate.

Ms. Kiesow said she would review the map and make necessary changes to the roadway shape file.

Mr. Pape recommending extending14th Street south in the travel demand model network to connect to TAZ 205 to better represent the actual condition.

Mr. Haag made the following changes to the posted speed limit map:

- Springdale Drive is 35 mph between 13th Avenue North and Bluff Boulevard
- The northern half of 18th Street is 35 mph between 2nd Avenue North and Elvira Road
- Main Avenue is 45 mph west of 8th Street

Ms. Kiesow said changes were made to the external/external trips as recommended during a previous conference call. She said concerns were raised at that time because of the number of trips originating on US 30 coming from the west into Clinton going out of town on both the north and south legs of CR 84. She added due to the high volumes of traffic and the recommended 30% through traffic, the traffic needed to exit on CR 84 unless the through percentage was decreased.

Mr. Williams stated the recent origin-destination study completed for Dubuque did not differ that much from the data collected in the 1970's. He recommended reviewing the Clinton origin-destination study even though the information was old.

Discuss possible special generators for inclusion into the model:

Mr. Pape explained the purpose of adding special generators to the model. The following special generators were recommended:

- Clinton Community College
- Mount St. Claire
- Mississippi Belle II

Present new capacity information developed by DMAMPO:

Consensus was reached on using the new capacity information created by the DMAMPO. The capacity information will assume random arrivals for signal progression, and will not assume favorable progression in future years like the Des Moines model.

Discuss future scheduled improvements to the network:

Mr. Haag noted the following improvements:

- The truck inspection station was moving from south of the railroad tracks to Liberty Avenue west of 14th Street. The current situation should be reflected in the base-year model, but the new condition should be shown in the future-year model.
- The parking area for the Mississippi Belle II may be relocated to Main Avenue to the Mc Eleney Auto Dealership location.
- Nineteenth Avenue North may be connected to Mill Creek Road. Steve Williams would model this section after completion of the calibrated base model.
- Howard R. Green was completing a traffic study to examine a 25th Street connection of US 30/67 and Manufacturing Drive.

Discuss development of future-year socioeconomic forecasts:

Ms. Kiesow presented Mr. Staszewski with a table of employment and households divided by TAZ. Mr. Staszewski and Mr. Williams will work together to create socioeconomic forecasts for the future-year model. Ms. Kiesow asked about the future plans for redevelopment directly north of US 30 in the Liberty Square redevelopment area.

Mr. Staszewski stated the area would be commercial.

Discuss date for model validation meeting:

The next meeting will be scheduled the week of August 20 – 24. Ms. Kiesow stated she would contact interested parties who were not at this meeting.

Clinton US 30/67 Corridor Study
Travel Demand Model Meeting Summary
Clinton Council Chambers
1:30 p.m. Thursday, August 23, 2001

Participants:

Jim Haag, City of Clinton
Steve Williams, ECIA
Doug Rick, Iowa DOT, Davenport
Jim Schnoebelen, Iowa DOT, Cedar Rapids
Ralph Crawford, Iowa DOT, Ames
Lalit Patel, Bi-State Regional Commission
Gil Janes, Howard R. Green Company
John Estrem, Howard R. Green Company
Kevin Pape, Howard R. Green Company
Lynn Kiesow, Howard R. Green Company

Discuss Travel Demand Model Attribute Meeting

Mr. Pape gave a summary of the previous travel demand model attribute meeting.

Ms. Kiesow presented the new external-external trip table for use in the model. She said the new table was created using information from the origin destination studies which had been completed in 1966 and 1972. Concerns were raised at the previous meeting about the large percentage of traffic on US 30 from the west connecting with State Highway 84 to the north and south. The new distribution presented a more realistic view.

Present Base-Year Model Calibration Efforts to Date

Mr. Pape gave a brief description of the major steps in creating a travel demand model; trip generation, distribution, and assignment. He noted output at each step should be validated to ensure that the model is reasonable. Validation was completed using comparisons in the Model Validation and Reasonableness Checking Manual and NCHRP 255.

Ms. Kiesow gave the results of the validation for trip generation and distribution. A comparison was made between the productions and attractions before balancing occurred. According to NCHRP 255, the difference should be less than 5%. The Clinton model was at 3.9%. Comparisons of national averages were also made for average motorized person trips. The Clinton model had 9.53 person trips per household and 3.67 person trips per capita. Recommended figures were between 8 to 14 person trips per household and 3.5 to 4.0 person trips per capita. In addition, intrazonal trips were reviewed to make sure a fair percentage of trips were in fact leaving the zone in which they were produced. The Clinton model had 3.45% intrazonal trips, within the TMIP recommendation of less than 5%.

Mr. Pape compared average trip lengths with that of other cities. He noted the Clinton model was high due to the terminal time entered into the model for external trips. He said census information would be used at each external station to create more realistic numbers.

Mr. Pape presented a map and tables of screenline comparisons, and explained screenlines were taken to estimate whether the model was producing the proper number of trips on a regional level before looking at individual links. After comparing vehicle miles traveled and volumes by screenline and functional class, he noted the volumes produced by the model were slightly under that of the counted volumes.

Mr. Patel asked how the commercial traffic was taken into account?

Mr. Pape noted the count volumes entered into the model included trucks and therefore were included in the model. He noted information had been collected on ADM. He added if truck trips were added as a separate purpose, future projection would be needed. Typically, these estimates are difficult to obtain, and are often inaccurate. Mr. Pape suggested that the design for US 30/67 should incorporate existing truck movement information.

Mr. Pape then presented the loaded model.

Mr. Crawford asked if the average trip length included intrazonal trips?

Ms. Kiesow said she would review the average trip length and let him know.

Mr. Crawford also recommended reviewing the traffic assignment by volume group.

Mr. Patel noted the capacities on the bridges seemed low.

Ms. Kiesow said the capacities were taken from Des Moines. She said she would review these in more detail.

Mr. Crawford also recommended using current turning movement counts along US 30/67 and sum total number of ons and offs.

Mr. Janes noted turning movement counts had been taken throughout the US 30/67 study area.

Mr. Patel recommended running a screenline along cross streets within the study area.

Discuss Future Forecasts and Project Schedule

Mr. Pape noted the future scheduled improvements were Mill Creek and the US 30/67 improvements. He said Mr. Williams was working with the City of Clinton to create 2030-year socioeconomic forecasts.

Mr. Williams explained the process he was using for these projections.

Mr. Pape indicated the expected completion of the calibrated model was three weeks. At that time, statistics would be sent to the IDOT and ECIA for review. A summary would be completed after receiving comments.

Clinton US 30/67 Corridor Study
Traffic Operation Meeting Summary
Howard R. Green Company, Cedar Rapids Office
Thursday, November 15, 2001, 10:30 a.m.

Participants:

Jim Haag, Public Works Director, City of Clinton
Jim Schnoebelen, Iowa Department of Transportation
Ralph Crawford, Iowa Department of Transportation
Jon Estrem, Howard R. Green Company
Craig Rasmussen, Howard R. Green Company
Lynn Kiesow, Howard R. Green Company

Present Traffic Operations Analysis:

Ms. Kiesow said the purpose of this meeting was to present and discuss the traffic operations analysis for the US 30/67 Corridor. She said a simulation model was created in Synchro using attributes and roadway alignment for a one-way pair. She said Year 2030 turning movement counts created from the travel demand model were entered into the simulation model.

Ms. Kiesow explained the approach to traffic operations was derived from Highway Capacity Manual. She noted the Intersection Level of Service Figure in the handout. She noted the level of service for unsignalized intersection was different than for signalized because of driver expectations were different for the intersections. After analysis, signals were placed four locations, Camanche Avenue & 14th Street, Camanche Avenue & 5th Street, Liberty Avenue & 5th Street, and Camanche Avenue & 4th Street. She noted a LOS A and B at the signalized intersections and LOS A at the thru-stop intersections for this alternative. She noted LOS was an average for all vehicles entering the intersection. Two thru-stop intersections; Camanche Avenue & 15th Avenue and Liberty Avenue & 23rd Place did have LOS F on the minor legs. Additional analysis was completed with additional signals at these locations. This addition increased the operation on the minor legs to LOS B, while decreasing the average delay at the intersection.

Mr. Rasmussen ran the simulation model for the two alternatives.

Segment Level of Service:

Ms. Kiesow explained level of service comparisons for segments was also taken from the Highway Capacity Manual. She said the LOS is based upon speed. For the first alternative, Camanche had a segment LOS A, and Liberty was operating on the LOS A/B boundary. She noted the addition of signal in Alternative 2 lowered the operating speeds slightly pushing Liberty Avenue into LOS B.

Crash Analysis:

Ms. Kiesow explained the process used for the crash analysis. She said crash rates were calculated using methods from the Traffic Safety Fundamentals Handbook. She said crash rates were compared to critical rates, which were a function of the design of the facility, the type of intersection, the amount of exposure (traffic volumes), and the random nature of crashes. She said from 1995 to 1999, Camanche Avenue & 7th Street, Camanche Avenue & 14th Street, and Camanche Avenue and 5th Street had above average crashes for similar types of intersections, but these rates were below the critical rate.

Mr. Rasmussen noted one-way pairs were viewed as safer from a vehicle crash perspective than four lane sections and five lane sections with a center turn bay.

Discuss Analysis and Potential Design Impacts:

Mr. Crawford recommended discussing the signal at 15th Avenue with the land use planners because more trip generators may be located next to the signal.

Mr. Crawford said a sensitivity analysis would be interesting on 5th Street to see how many vehicles could enter the intersection before creating a queuing problem.

Mr. Estrem considered the design issues along 5th Street. He noted a possible design on eastbound Liberty Avenue with two thru lanes and one right turn lane at 5th Street, and two lanes on Liberty from 5th Street to 4th Street.

Mr. Schnoebelen asked if it was possible to construct a two lane facility with turn lanes rather than a three lane facility. He added the cost for construction may be higher for a two lane because of the difficulty in creating turn lanes. He said it may be possible to install wiring during construction for the additional signals, but wait with the signals until they are needed. He added if the City of Clinton would like larger conduit, they would be expected to pay the difference. He recommended the cost of the extra signals be added to the design cost, but noted they may be removed from the design at a later time.

Appendix B Base Year Socioeconomic Information

Clinton US 30/67 Corridor Study
Socioeconomic Data by TAZ

TAZ	Employment							Household				Income					
	NCBD			CBD			Total	1990		2000		Percentage			Number		
	Retail	Service	Other	Retail	Service	Other		HH	Pop	HH	Pop	Low	Medium	High	Low	Medium	HIINC
1	0	0	0	0	0	0	0	25	79	33	104	34.54	13.82	51.64	11	5	17
2	0	0	0	0	0	0	0	999	2666	1063	2838	27.66	19.66	52.68	294	209	560
3	0	0	0	0	0	0	0	122	314	110	282	34.54	13.82	51.64	38	15	57
4	0	0	0	0	0	0	0	470	1113	497	1172	48.60	23.36	28.04	242	116	139
5	0	1	3	0	0	0	4	10	34	12	40	26.23	19.46	54.31	3	2	7
6	0	0	0	0	0	0	0	38	108	45	129	25.64	13.46	60.90	12	6	27
7	0	3	5	0	0	0	8	47	139	56	166	25.64	13.46	60.90	14	8	34
8	0	5	0	0	0	0	5	9	24	11	30	25.64	13.46	60.90	3	1	7
9	0	106	269	0	0	0	375	717	1842	778	1992	34.38	14.41	51.21	267	112	398
10	0	3	0	0	0	0	3	253	634	252	628	36.54	13.78	49.68	92	35	125
11	0	0	50	0	0	0	50	91	229	88	222	37.26	20.68	42.06	33	18	37
12	0	0	0	0	0	0	0	58	146	51	127	37.26	20.68	42.06	19	11	21
13	82	4	0	0	0	0	86	182	436	169	403	37.08	25.84	36.36	63	44	61
14	12	46	0	0	0	0	58	104	262	92	230	37.08	25.84	36.36	34	24	33
15	1	2	1	0	0	0	4	62	124	57	114	37.80	25.84	36.36	22	15	21
16	6	13	11	0	0	0	30	19	51	16	44	14.70	25.81	59.50	2	4	10
17	5	30	23	0	0	0	58	4	13	6	18	20.00	20.00	60.00	1	1	4
18	57	4	28	0	0	0	89	120	361	134	403	20.00	20.00	60.00	27	27	80
19	8	65	41	0	0	0	114	426	1065	399	998	24.46	23.17	52.37	98	92	209
20	0	0	7	0	0	0	7	189	473	186	466	20.00	20.00	60.00	37	37	112
21	0	757	0	0	0	0	757	159	398	174	435	20.00	20.00	60.00	35	35	104
22	55	69	3	0	0	0	127	21	48	17	41	55.98	13.13	30.89	10	2	5
23	34	49	0	0	0	0	83	51	97	68	130	55.98	13.13	30.89	38	9	21
24	0	0	0	0	0	0	0	46	105	43	99	55.98	13.13	30.89	24	6	13
25	6	3	0	0	0	0	9	21	51	17	42	55.98	13.13	30.89	10	2	5
26	0	1	0	0	0	0	1	106	262	96	236	55.98	13.13	30.89	54	13	30
27	128	69	74	0	0	0	271	67	183	55	150	41.60	13.97	44.43	23	8	24
28	0	0	46	0	0	0	46	22	61	18	49	32.61	14.49	52.90	6	3	10
29	5	3	5	0	0	0	13	26	61	21	48	32.16	14.49	52.90	7	3	11
30	0	0	0	0	0	0	0	33	94	27	76	32.61	14.49	52.90	9	4	14
31	20	21	0	0	0	0	41	29	53	38	69	32.61	14.49	52.90	12	6	20
32	7	15	0	0	0	0	22	35	90	29	74	32.61	14.49	52.90	9	4	15
33	0	0	0	0	0	0	0	40	65	51	83	33.59	29.30	37.11	17	15	19
34	0	0	0	0	0	0	0	60	169	55	154	32.61	14.49	52.90	18	8	29
35	0	0	0	0	0	0	0	69	182	60	158	32.61	14.49	52.90	20	9	32
36	46	29	0	0	0	0	75	49	141	31	89	32.61	14.49	52.90	10	4	16
37	50	38	4	0	0	0	92	7	19	2	6	32.61	14.49	52.90	1	0	1
38	4	352	589	0	0	0	945	43	88	35	71	32.00	13.88	54.12	11	5	19
39	0	0	2	0	0	0	2	123	259	123	260	31.32	13.19	55.49	39	16	68
40	0	0	4	0	0	0	4	62	158	63	159	31.32	13.19	55.49	20	8	35
41	72	6	0	0	0	0	78	63	163	52	132	31.32	13.19	55.49	16	7	29
42	142	69	6	0	0	0	217	26	74	16	46	32.00	13.88	54.12	5	2	9
43	0	0	0	0	0	0	0	46	109	45	107	31.32	13.19	55.49	14	6	25
44	3	16	2	0	0	0	21	51	103	43	86	31.32	13.19	55.49	13	6	24
45	127	90	0	0	0	0	217	24	55	15	35	52.99	35.33	11.68	8	5	2
46	0	0	0	0	0	0	0	19	50	14	36	41.20	26.18	32.62	6	4	5
47	0	0	0	0	0	0	0	34	78	33	76	41.20	26.18	32.62	14	9	11
48	3	0	0	0	0	0	3	26	57	28	62	52.99	35.33	11.68	15	10	3
49	0	0	229	0	0	0	229	0	36	0	48	52.99	35.33	11.68	0	0	0
50	0	0	0	0	0	0	0	53	123	51	114	41.20	26.18	32.62	21	13	17
51	0	0	0	0	0	0	0	65	142	72	158	41.20	26.18	32.62	30	19	23
52	0	0	0	0	0	0	0	49	102	48	100	52.99	35.33	11.68	25	17	6
53	60	6	0	0	0	0	66	52	117	48	107	52.99	35.33	11.68	25	17	6
54	0	0	0	0	0	0	0	160	409	164	419	45.26	30.41	24.33	74	50	40
55	10	0	0	0	0	0	10	186	461	185	456	43.79	28.88	27.33	81	53	51
56	2	2	11	0	0	0	15	114	295	115	297	43.79	28.88	27.33	50	33	31
57	4	5	7	0	0	0	16	109	264	101	245	52.99	35.33	11.68	54	36	12
58	32	8	4	0	0	0	44	85	204	79	190	52.99	35.33	11.68	42	28	9
59	78	15	124	0	0	0	217	3	4	2	2	62.69	22.54	14.77	1	0	0
60	15	199	153	0	0	0	367	288	951	279	920	15.89	19.21	64.90	44	54	181

Clinton US 30/67 Corridor Study
Socioeconomic Data by TAZ

TAZ	Employment							Household				Income					
	NCBD			CBD			Total	1990		2000		Percentage			Number		
	Retail	Service	Other	Retail	Service	Other		HH	Pop	HH	Pop	Low	Medium	High	Low	Medium	HIINC
61	22	336	11	0	0	0	369	500	1153	506	1164	39.37	16.14	44.49	199	82	225
62	2	9	107	0	0	0	118	542	1551	536	1535	22.83	13.85	63.32	122	74	339
63	0	0	0	0	0	0	0	17	51	17	51	22.83	13.85	63.32	4	2	11
64	0	1	0	0	0	0	1	17	51	17	51	22.83	13.85	63.32	4	2	11
65	0	0	0	0	0	0	0	0	0	0	0	28.80	37.60	33.60	0	0	0
66	0	0	0	0	0	0	0	9	28	11	35	29.43	5.47	65.10	3	1	7
67	0	0	0	0	0	0	0	139	418	116	348	29.43	5.47	65.10	34	6	76
68	1	4	7	0	0	0	12	207	502	168	406	25.30	9.86	64.84	43	17	109
69	0	319	30	0	0	0	349	522	1441	510	1409	25.30	9.86	64.84	129	50	331
70	0	11	147	0	0	0	158	227	573	213	538	33.04	15.93	51.03	70	34	109
71	16	0	42	0	0	0	58	52	142	46	128	33.04	15.93	51.03	15	7	23
72	2	4	2	0	0	0	8	29	84	26	75	69.23	13.92	16.85	18	4	4
73	6	32	0	0	0	0	38	31	79	25	63	69.23	13.92	16.85	17	3	4
74	5	6	0	0	0	0	11	55	101	54	99	69.23	13.92	16.85	37	8	9
75	0	0	0	3	0	0	3	2	2	2	2	69.23	13.92	16.85	1	0	0
76	0	0	0	0	0	0	0	53	134	45	114	33.04	15.93	51.03	15	7	23
77	0	0	0	0	0	0	0	20	37	13	24	69.23	13.92	16.85	9	2	2
78	0	0	0	0	16	0	16	0	0	0	0	69.23	13.92	16.85	0	0	0
79	0	0	0	16	45	0	61	37	77	28	59	69.23	13.92	16.85	19	4	5
80	0	0	0	4	3	15	22	0	12	0	13	69.23	13.92	16.85	0	0	0
81	0	1	0	0	0	0	1	51	113	45	100	33.04	15.93	51.03	15	7	23
82	0	2	15	0	0	0	17	34	68	32	63	69.23	13.92	16.85	22	4	5
83	0	0	0	0	95	0	95	8	32	6	22	69.23	13.92	16.85	4	1	1
84	0	0	0	33	49	8	90	4	7	2	3	69.23	13.92	16.85	1	0	0
85	0	0	0	40	17	14	71	3	6	5	10	69.23	13.92	16.85	3	1	1
86	23	4	7	0	0	0	34	0	0	0	0	0.00	0.00	0.00	0	0	0
87	0	0	11	0	0	0	11	57	128	42	93	35.48	25.54	38.99	15	11	16
88	0	0	0	0	0	1	1	66	109	75	124	69.23	13.92	16.85	52	10	13
89	0	0	0	33	228	17	278	1	2	3	5	69.23	13.92	16.85	2	0	1
90	0	0	0	76	46	12	134	12	25	2	5	69.23	13.92	16.85	1	0	0
91	0	0	0	25	44	13	82	24	35	12	17	69.23	13.92	16.85	8	2	2
92	0	1	0	0	0	0	1	116	277	127	302	33.59	29.30	37.11	43	37	47
93	0	0	0	0	0	0	0	112	308	109	301	35.48	25.54	38.99	39	28	42
94	0	0	0	0	0	0	0	108	301	107	297	35.48	25.54	38.99	38	27	42
95	0	11	0	0	0	0	11	64	147	66	152	35.48	25.54	38.99	23	17	26
96	0	0	175	0	0	0	175	48	105	50	110	69.23	13.92	16.85	35	7	8
97	0	0	0	0	3	0	3	71	73	71	73	69.23	13.92	16.85	49	10	12
98	0	0	0	9	177	327	513	2	5	2	4	69.23	13.92	16.85	1	0	0
99	0	0	0	14	4	14	32	82	87	80	85	69.23	13.92	16.85	55	11	13
100	0	0	0	0	0	0	0	83	208	77	193	33.59	29.30	37.11	26	23	29
101	0	0	0	0	0	0	0	102	337	91	299	35.48	25.54	38.99	32	23	35
102	0	4	0	0	0	0	4	51	139	50	135	35.48	25.54	38.99	18	13	19
103	40	2	0	0	0	0	42	16	29	15	28	69.23	13.92	16.85	10	2	3
104	0	0	0	13	81	0	94	1	12	1	12	69.23	13.92	16.85	1	0	0
105	0	0	0	0	2	30	32	15	24	2	3	69.23	13.92	16.85	1	0	0
106	21	7	1	0	0	0	29	82	87	0	0	0.00	0.00	0.00	0	0	0
107	0	12	0	0	0	0	12	0	0	0	0	0.00	0.00	0.00	0	0	0
108	16	0	1	0	0	0	17	203	519	181	462	42.39	23.67	33.94	77	43	61
109	0	0	179	0	0	0	179	170	375	161	354	41.69	22.68	35.62	67	37	57
110	0	4	210	0	0	0	214	275	735	247	660	41.69	22.68	35.62	103	56	88
111	0	0	0	0	0	0	0	62	173	59	165	41.25	20.34	38.40	24	12	23
112	4	1	15	0	0	0	20	183	519	192	543	41.25	20.34	38.40	79	39	74
113	0	0	0	0	0	0	0	13	29	12	26	62.76	11.03	26.21	8	1	3
114	0	0	65	0	0	0	65	22	39	27	48	41.25	20.34	38.40	11	5	10
115	21	0	1	0	0	0	22	117	307	119	311	41.25	20.34	38.40	49	24	46
116	40	1	11	0	0	0	52	129	308	91	217	63.87	10.47	25.65	58	10	23
117	236	0	0	0	0	0	236	87	198	0	0	63.87	10.47	25.65	0	0	0
118	1	3	23	0	0	0	27	0	0	0	0	0.00	0.00	0.00	0	0	0
119	0	0	198	0	0	0	198	0	0	0	0	0.00	0.00	0.00	0	0	0
120	0	0	9	0	0	0	9	107	260	88	214	68.54	8.15	23.31	60	7	21

Clinton US 30/67 Corridor Study
Socioeconomic Data by TAZ

TAZ	Employment							Household				Income					
	NCBD			CBD			Total	1990		2000		Percentage			Number		
	Retail	Service	Other	Retail	Service	Other		HH	Pop	HH	Pop	Low	Medium	High	Low	Medium	HIINC
121	2	0	0	0	0	0	2	13	28	12	25	62.76	11.03	26.21	8	1	3
122	3	4	21	0	0	0	28	215	560	181	470	68.54	8.15	23.31	124	15	42
123	0	0	28	0	0	0	28	33	74	26	58	68.54	8.15	23.31	18	2	6
124	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
125	13	0	6	0	0	0	19	11	21	4	8	62.76	11.03	26.21	2	1	1
126	0	0	0	0	0	0	0	243	624	217	555	39.55	31.82	28.63	86	69	62
127	6	0	14	0	0	0	20	9	16	8	14	62.76	11.03	26.21	5	1	2
128	32	0	0	0	0	0	32	9	16	8	15	62.76	11.03	23.21	5	1	2
129	8	82	137	0	0	0	227	42	121	40	116	28.80	37.60	33.60	12	15	13
130	0	43	993	0	0	0	1036	20	51	16	40	28.80	37.60	33.60	5	6	5
131	219	79	0	0	0	0	298	247	571	268	618	28.80	37.60	33.60	77	101	90
132	155	67	60	0	0	0	282	0	0	2	4	0.00	0.00	0.00	0	0	0
133	0	327	144	0	0	0	471	48	113	53	125	28.80	37.60	33.60	15	20	18
134	0	1	209	0	0	0	210	1	1	0	0	0.00	0.00	0.00	0	0	0
135	104	21	69	0	0	0	194	11	27	12	29	48.67	6.84	44.49	6	1	5
136	195	186	5	0	0	0	386	1	2	1	1	28.80	37.60	33.60	0	0	0
137	0	4	349	0	0	0	353	6	17	2	5	28.80	37.60	33.60	1	1	1
138	0	4	0	0	0	0	4	11	29	5	14	47.86	24.12	28.02	2	1	1
139	7	20	5	0	0	0	32	4	14	4	13	25.00	15.63	59.38	1	1	2
140	0	0	8	0	0	0	8	4	14	4	16	25.00	15.63	59.38	1	1	2
141	0	147	424	0	0	0	571	35	81	36	84	30.77	15.10	54.13	11	5	19
142	28	12	57	0	0	0	97	272	809	250	743	30.77	15.10	54.13	77	38	135
143	3	4	48	0	0	0	55	508	1342	431	1138	25.00	15.63	59.38	108	67	256
144	0	0	52	0	0	0	52	10	30	70	74	19.43	29.68	50.88	14	21	36
145	0	6	0	0	0	0	6	177	475	158	423	25.47	26.88	47.66	40	42	75
146	9	17	40	0	0	0	66	215	567	194	509	31.83	25.31	42.86	62	49	83
147	41	16	30	0	0	0	87	151	333	197	433	19.43	29.68	50.88	38	58	100
148	0	0	28	0	0	0	28	132	310	131	307	31.83	25.31	42.86	42	33	56
149	0	23	480	0	0	0	503	36	100	0	0	0.00	0.00	0.00	0	0	0
150	0	49	51	0	0	0	100	104	228	97	213	30.77	15.10	54.13	30	15	53
151	0	0	0	0	0	0	0	18	44	14	34	41.25	20.34	38.40	6	3	5
152	0	35	0	0	0	0	35	0	0	0	0	0.00	0.00	0.00	0	0	0
153	48	0	0	86	0	0	134	21	57	25	68	42.06	32.39	25.55	11	8	6
154	19	1	0	0	0	0	20	14	34	17	41	34.65	30.71	34.65	6	5	6
155	0	51	811	0	0	0	862	0	0	0	0	0.00	0.00	0.00	0	0	0
156	0	208	9	0	0	0	217	0	0	0	0	0.00	0.00	0.00	0	0	0
157	16	0	0	0	0	0	16	8	28	2	6	50.00	17.86	32.14	1	0	1
158	0	0	0	0	0	0	0	16	41	12	33	50.00	17.86	32.14	6	2	4
159	0	0	0	0	0	0	0	15	40	11	32	50.00	17.86	32.14	5	3	3
160	0	0	0	0	0	0	0	15	44	3	8	50.00	17.86	32.14	2	0	1
161	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
162	14	4	7	0	0	0	25	82	202	90	215	41.25	20.34	38.40	38	17	35
163	0	0	0	0	0	0	0	34	97	26	74	41.25	20.34	38.40	10	6	10
164	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
167	0	0	12	0	0	0	12	15	43	7	19	62.76	11.03	26.21	4	1	2
168	0	9	0	0	0	0	9	8	22	4	10	62.76	11.03	26.21	3	0	1
169	32	26	0	0	0	0	58	13	35	8	25	62.76	11.03	26.21	5	1	2
170	55	4	0	4	0	0	63	36	85	39	92	42.06	32.39	25.55	16	14	9
171	0	0	0	0	0	0	0	40	113	30	87	42.06	32.39	25.55	13	8	9
172	0	5	0	0	0	0	5	37	89	32	76	42.06	32.39	25.55	13	10	9
173	3	0	0	0	0	0	3	52	134	49	126	42.06	32.39	25.55	21	17	11
174	4	52	5	0	0	0	61	29	73	29	74	42.06	32.39	25.55	12	9	8
175	0	1	0	0	0	0	1	0	0	0	0	0.00	0.00	0.00	0	0	0
176	4	0	2	0	0	0	6	82	188	95	218	34.65	30.71	34.65	33	29	33
177	0	4	3	0	0	0	7	52	128	65	157	34.65	30.71	34.65	22	20	23
178	0	0	1	0	0	0	1	65	151	57	134	34.65	30.71	34.65	20	18	19
Total	1020	1512	4108	90	0	0	6730	3220	8222	3042	7579				1037	736	1265

Appendix C Future Year Socioeconomic Information

Clinton US 30/67 Corridor Study
2030 Socioeconomic Data by TAZ

TAZ	Employment							Household							
	NCBD			CBD			Total	2030		Income Percentage			Income Number		
	Retail	Service	Other	Retail	Service	Other		NCBD	HH CBD	Low	Medium	High	Low	Medium	High
1	0	0	30	0	0	0	30	43	0	34.54	13.82	51.64	15	6	22
2	0	72	20	0	0	0	92	1105	0	27.66	19.66	52.68	306	217	582
3	0	0	20	0	0	0	20	130	0	34.54	13.82	51.64	45	18	67
4	8	70	31	0	0	0	109	527	0	48.60	23.36	28.04	256	123	148
5	0	1	3	0	0	0	4	12	0	26.23	19.46	54.31	3	2	7
6	0	0	0	0	0	0	0	95	0	25.64	13.46	60.90	24	13	58
7	0	3	5	0	0	0	8	56	0	25.64	13.46	60.90	14	8	34
8	0	5	0	0	0	0	5	61	0	25.64	13.46	60.90	16	8	37
9	0	200	269	0	0	0	469	1073	0	34.38	14.41	51.21	369	155	549
10	0	3	0	0	0	0	3	252	0	36.54	13.78	49.68	92	35	125
11	0	0	2	0	0	0	2	88	0	37.26	20.68	42.06	33	18	37
12	0	0	0	0	0	0	0	51	0	37.26	20.68	42.06	19	11	21
13	82	4	0	0	0	0	86	169	0	37.08	25.84	36.36	63	44	61
14	12	46	0	0	0	0	58	92	0	37.08	25.84	36.36	34	24	33
15	1	2	1	0	0	0	4	57	0	37.80	25.84	36.36	22	15	21
16	6	13	11	0	0	0	30	16	0	14.70	25.81	59.50	2	4	10
17	5	530	123	0	0	0	658	6	0	20.00	20.00	60.00	1	1	4
18	57	4	28	0	0	0	89	623	0	20.00	20.00	60.00	125	125	374
19	8	115	41	0	0	0	164	399	0	24.46	23.17	52.37	98	92	209
20	0	0	7	0	0	0	7	186	0	20.00	20.00	60.00	37	37	112
21	0	957	0	0	0	0	957	174	0	20.00	20.00	60.00	35	35	104
22	55	69	3	0	0	0	127	17	0	55.98	13.13	30.89	10	2	5
23	34	49	0	0	0	0	83	68	0	55.98	13.13	30.89	38	9	21
24	0	0	0	0	0	0	0	43	0	55.98	13.13	30.89	24	6	13
25	6	3	0	0	0	0	9	17	0	55.98	13.13	30.89	10	2	5
26	0	1	0	0	0	0	1	96	0	55.98	13.13	30.89	54	13	30
27	128	269	74	0	0	0	471	55	0	41.60	13.97	44.43	23	8	24
28	0	0	0	0	0	0	0	18	0	32.61	14.49	52.90	6	3	10
29	5	3	5	0	0	0	13	21	0	32.16	14.49	52.90	7	3	11
30	0	0	0	0	0	0	0	27	0	32.61	14.49	52.90	9	4	14
31	20	21	0	0	0	0	41	38	0	32.61	14.49	52.90	12	6	20
32	7	15	54	0	0	0	76	29	0	32.61	14.49	52.90	9	4	15
33	0	0	0	0	0	0	0	51	0	33.59	29.30	37.11	17	15	19
34	0	0	0	0	0	0	0	55	0	32.61	14.49	52.90	18	8	29
35	0	0	0	0	0	0	0	60	0	32.61	14.49	52.90	20	9	32
36	46	29	0	0	0	0	75	31	0	32.61	14.49	52.90	10	4	16
37	50	38	59	0	0	0	147	2	0	32.61	14.49	52.90	1	0	1
38	4	352	589	0	0	0	945	35	0	32.00	13.88	54.12	11	5	19
39	0	0	2	0	0	0	2	123	0	31.32	13.19	55.49	39	16	68
40	0	0	4	0	0	0	4	63	0	31.32	13.19	55.49	20	8	35
41	72	6	0	0	0	0	78	52	0	31.32	13.19	55.49	16	7	29
42	142	69	6	0	0	0	217	16	0	32.00	13.88	54.12	5	2	9
43	0	0	0	0	0	0	0	45	0	31.32	13.19	55.49	14	6	25
44	3	16	2	0	0	0	21	43	0	31.32	13.19	55.49	13	6	24
45	127	90	0	0	0	0	217	15	0	52.99	35.33	11.68	8	5	2
46	0	0	0	0	0	0	0	14	0	41.20	26.18	32.62	6	4	5
47	0	0	0	0	0	0	0	33	0	41.20	26.18	32.62	14	9	11
48	3	0	0	0	0	0	3	28	0	52.99	35.33	11.68	15	10	3
49	0	0	229	0	0	0	229	0	0	52.99	35.33	11.68	0	0	0
50	0	0	0	0	0	0	0	51	0	41.20	26.18	32.62	21	13	17
51	0	0	0	0	0	0	0	72	0	41.20	26.18	32.62	30	19	23
52	0	0	0	0	0	0	0	48	0	52.99	35.33	11.68	25	17	6
53	60	6	0	0	0	0	66	48	0	52.99	35.33	11.68	25	17	6
54	0	0	0	0	0	0	0	164	0	45.26	30.41	24.33	74	50	40
55	10	0	0	0	0	0	10	185	0	43.79	28.88	27.33	81	53	51
56	2	2	11	0	0	0	15	115	0	43.79	28.88	27.33	50	33	31
57	4	5	7	0	0	0	16	101	0	52.99	35.33	11.68	54	36	12
58	32	8	4	0	0	0	44	79	0	52.99	35.33	11.68	42	28	9
59	78	15	124	0	0	0	217	2	0	62.69	22.54	14.77	1	0	0
60	15	199	153	0	0	0	367	279	0	15.89	19.21	64.90	44	54	181

Clinton US 30/67 Corridor Study
2030 Socioeconomic Data by TAZ

TAZ	Employment							Household							
	NCBD			CBD			Total	2030		Income Percentage			Income Number		
	Retail	Service	Other	Retail	Service	Other		NCBD	HH CBD	Low	Medium	High	Low	Medium	High
61	22	436	11	0	0	0	469	506	0	39.37	16.14	44.49	199	82	225
62	2	9	107	0	0	0	118	661	0	22.83	13.85	63.32	151	92	419
63	0	0	0	0	0	0	0	17	0	22.83	13.85	63.32	4	2	11
64	0	1	0	0	0	0	1	17	0	22.83	13.85	63.32	4	2	11
65	0	0	0	0	0	0	0	0	0	28.80	37.60	33.60	0	0	0
66	0	0	0	0	0	0	0	11	0	29.43	5.47	65.10	3	1	7
67	0	0	0	0	0	0	0	116	0	29.43	5.47	65.10	34	6	76
68	1	4	7	0	0	0	12	348	0	25.30	9.86	64.84	88	34	226
69	0	319	30	0	0	0	349	510	0	25.30	9.86	64.84	129	50	331
70	0	11	147	0	0	0	158	213	0	33.04	15.93	51.03	70	34	109
71	16	0	42	0	0	0	58	46	0	33.04	15.93	51.03	15	7	23
72	2	4	2	0	0	0	8	26	0	69.23	13.92	16.85	18	4	4
73	6	32	0	0	0	0	38	25	0	69.23	13.92	16.85	17	3	4
74	5	6	0	0	0	0	11	54	0	69.23	13.92	16.85	37	8	9
75	0	0	0	3	0	0	3	2	0	69.23	13.92	16.85	1	0	0
76	0	0	0	0	0	0	0	45	0	33.04	15.93	51.03	15	7	23
77	0	0	0	0	0	0	0	13	0	69.23	13.92	16.85	9	2	2
78	0	0	0	0	16	0	16	0	0	69.23	13.92	16.85	0	0	0
79	0	0	0	16	45	0	61	0	28	69.23	13.92	16.85	0	0	0
80	0	0	0	4	3	15	22	0	0	69.23	13.92	16.85	0	0	0
81	0	1	0	0	0	0	1	45	0	33.04	15.93	51.03	15	7	23
82	0	2	15	0	0	0	17	32	0	69.23	13.92	16.85	22	4	5
83	0	0	0	0	95	0	95	0	6	69.23	13.92	16.85	0	0	0
84	0	0	0	33	49	8	90	0	22	69.23	13.92	16.85	0	0	0
85	0	0	0	40	17	14	71	0	5	69.23	13.92	16.85	0	0	0
86	23	54	7	0	0	0	84	0	0	0.00	0.00	0.00	0	0	0
87	0	0	11	0	0	0	11	42	0	35.48	25.54	38.99	15	11	16
88	0	0	0	0	0	1	1	75	0	69.23	13.92	16.85	52	10	13
89	0	0	0	33	253	17	303	3	0	69.23	13.92	16.85	2	0	1
90	0	0	0	76	71	12	159	2	0	69.23	13.92	16.85	1	0	0
91	0	0	0	25	44	13	82	12	0	69.23	13.92	16.85	8	2	2
92	0	1	0	0	0	0	1	0	127	33.59	29.30	37.11	0	0	0
93	0	0	0	0	0	0	0	0	109	35.48	25.54	38.99	0	0	0
94	0	0	0	0	0	0	0	0	107	35.48	25.54	38.99	0	0	0
95	0	11	0	0	0	0	11	66	0	35.48	25.54	38.99	23	17	26
96	0	0	175	0	0	0	175	50	0	69.23	13.92	16.85	35	7	8
97	0	0	0	0	28	0	28	71	0	69.23	13.92	16.85	49	10	12
98	0	0	0	9	177	327	513	2	0	69.23	13.92	16.85	1	0	0
99	0	0	0	14	4	14	32	80	0	69.23	13.92	16.85	55	11	13
100	0	0	0	0	0	0	0	77	0	33.59	29.30	37.11	26	23	29
101	0	0	0	0	0	0	0	91	0	35.48	25.54	38.99	32	23	35
102	0	4	0	0	0	0	4	50	0	35.48	25.54	38.99	18	13	19
103	40	2	0	0	0	0	42	15	0	69.23	13.92	16.85	10	2	3
104	0	0	0	13	81	0	94	0	1	69.23	13.92	16.85	0	0	0
105	0	0	0	0	2	30	32	0	2	69.23	13.92	16.85	0	0	0
106	21	7	1	0	0	0	29	0	0	0.00	0.00	0.00	0	0	0
107	0	112	0	0	0	0	112	0	0	0.00	0.00	0.00	0	0	0
108	16	0	1	0	0	0	17	181	0	42.39	23.67	33.94	77	43	61
109	0	0	179	0	0	0	179	161	0	41.69	22.68	35.62	67	37	57
110	0	4	210	0	0	0	214	247	0	41.69	22.68	35.62	103	56	88
111	0	0	0	0	0	0	0	59	0	41.25	20.34	38.40	24	12	23
112	4	1	15	0	0	0	20	192	0	41.25	20.34	38.40	79	39	74
113	0	0	0	0	0	0	0	0	0	62.76	11.03	26.21	0	0	0
114	0	0	65	0	0	0	65	27	0	41.25	20.34	38.40	11	5	10
115	21	20	1	0	0	0	42	119	0	41.25	20.34	38.40	49	24	46
116	40	21	11	0	0	0	72	91	0	63.87	10.47	25.65	58	10	23
117	236	0	0	0	0	0	236	0	0	63.87	10.47	25.65	0	0	0
118	1	3	23	0	0	0	27	0	0	0.00	0.00	0.00	0	0	0
119	0	0	198	0	0	0	198	0	0	0.00	0.00	0.00	0	0	0
120	0	0	9	0	0	0	9	88	0	68.54	8.15	23.31	60	7	21

Clinton US 30/67 Corridor Study
2030 Socioeconomic Data by TAZ

TAZ	Employment							Household								
	NCBD			CBD			Total	2030		Income Percentage			Income Number		
	Retail	Service	Other	Retail	Service	Other		NCBD	HH CBD	Low	Medium	High	Low	Medium	High
121	2	0	0	0	0	0	2	0	0	62.76	11.03	26.21	0	0	0
122	3	4	121	0	0	0	128	181	0	68.54	8.15	23.31	124	15	42
123	0	0	28	0	0	0	28	26	0	68.54	8.15	23.31	18	2	6
124	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
125	13	0	6	0	0	0	19	0	0	62.76	11.03	26.21	0	0	0
126	0	0	0	0	0	0	0	217	0	39.55	31.82	28.63	86	69	62
127	6	0	14	0	0	0	20	0	0	62.76	11.03	26.21	0	0	0
128	48	13	0	0	0	0	61	0	0	62.76	11.03	23.21	0	0	0
129	8	82	137	0	0	0	227	40	0	28.80	37.60	33.60	12	15	13
130	0	43	993	0	0	0	1036	16	0	28.80	37.60	33.60	5	6	5
131	219	79	0	0	0	0	298	268	0	28.80	37.60	33.60	77	101	90
132	155	67	60	0	0	0	282	2	0	0.00	0.00	0.00	0	0	0
133	0	379	144	0	0	0	523	53	0	28.80	37.60	33.60	15	20	18
134	0	51	309	0	0	0	360	0	0	0.00	0.00	0.00	0	0	0
135	104	21	69	0	0	0	194	12	0	48.67	6.84	44.49	6	1	5
136	345	236	5	0	0	0	586	1	0	28.80	37.60	33.60	0	0	0
137	0	4	449	0	0	0	453	2	0	28.80	37.60	33.60	1	1	1
138	0	4	0	0	0	0	4	5	0	47.86	24.12	28.02	2	1	1
139	7	20	38	0	0	0	65	4	0	25.00	15.63	59.38	1	1	2
140	0	0	41	0	0	0	41	4	0	25.00	15.63	59.38	1	1	2
141	0	147	458	0	0	0	605	36	0	30.77	15.10	54.13	11	5	19
142	28	12	57	0	0	0	97	250	0	30.77	15.10	54.13	77	38	135
143	3	4	48	0	0	0	55	431	0	25.00	15.63	59.38	108	67	256
144	4	77	52	0	0	0	133	144	0	19.43	29.68	50.88	28	43	73
145	0	6	0	0	0	0	6	158	0	25.47	26.88	47.66	40	42	75
146	9	17	40	0	0	0	66	194	0	31.83	25.31	42.86	62	49	83
147	41	92	30	0	0	0	163	231	0	19.43	29.68	50.88	45	69	118
148	0	0	28	0	0	0	28	131	0	31.83	25.31	42.86	42	33	56
149	0	23	480	0	0	0	503	0	0	0.00	0.00	0.00	0	0	0
150	0	49	51	0	0	0	100	97	0	30.77	15.10	54.13	30	15	53
151	0	20	0	0	0	0	20	14	0	41.25	20.34	38.40	6	3	5
152	0	35	0	0	0	0	35	0	0	0.00	0.00	0.00	0	0	0
153	48	20	0	86	0	0	154	25	0	42.06	32.39	25.55	11	8	6
154	19	1	0	0	0	0	20	17	0	34.65	30.71	34.65	6	5	6
155	0	51	811	0	0	0	862	0	0	0.00	0.00	0.00	0	0	0
156	0	208	9	0	0	0	217	0	0	0.00	0.00	0.00	0	0	0
157	16	30	0	0	0	0	46	2	0	50.00	17.86	32.14	1	0	1
158	0	30	0	0	0	0	30	0	0	50.00	17.86	32.14	0	0	0
159	0	30	0	0	0	0	30	0	0	50.00	17.86	32.14	0	0	0
160	0	30	0	0	0	0	30	0	0	50.00	17.86	32.14	0	0	0
161	0	30	0	0	0	0	30	0	0	0.00	0.00	0.00	0	0	0
162	14	24	7	0	0	0	45	90	0	41.25	20.34	38.40	37	18	35
163	0	20	0	0	0	0	20	26	0	41.25	20.34	38.40	11	5	10
164	0	30	0	0	0	0	30	0	0	0.00	0.00	0.00	0	0	0
165	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
166	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0	0
167	0	0	12	0	0	0	12	0	0	62.76	11.03	26.21	0	0	0
168	16	22	0	0	0	0	38	0	0	62.76	11.03	26.21	0	0	0
169	2	26	3	0	0	0	31	15	0	62.76	11.03	26.21	9	2	4
170	55	4	0	4	0	0	63	39	0	42.06	32.39	25.55	16	13	10
171	0	0	0	0	0	0	0	30	0	42.06	32.39	25.55	13	10	8
172	0	5	0	0	0	0	5	32	0	42.06	32.39	25.55	13	10	8
173	3	0	0	0	0	0	3	49	0	42.06	32.39	25.55	21	16	13
174	2	26	3	0	0	0	31	14	0	42.06	32.39	25.55	6	5	4
175	0	1	0	0	0	0	1	0	0	0.00	0.00	0.00	0	0	0
176	4	0	2	0	0	0	6	95	0	34.65	30.71	34.65	33	29	33
177	0	4	3	0	0	0	7	65	0	34.65	30.71	34.65	23	20	23
178	0	0	1	0	0	0	1	57	0	34.65	30.71	34.65	20	18	20
Total	1174	2077	4509	90	0	0	7850	3073	0				1014	755	1302

Clinton US 30/67 Corridor Study

Year 2030 Forecasted Average Daily Traffic No Build Condition

0 5 Miles

N

US 67

US 30

Mill Creek Expressway

Legend

- Principal Arterial
- Minor Arterial
- Collector
- Local
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

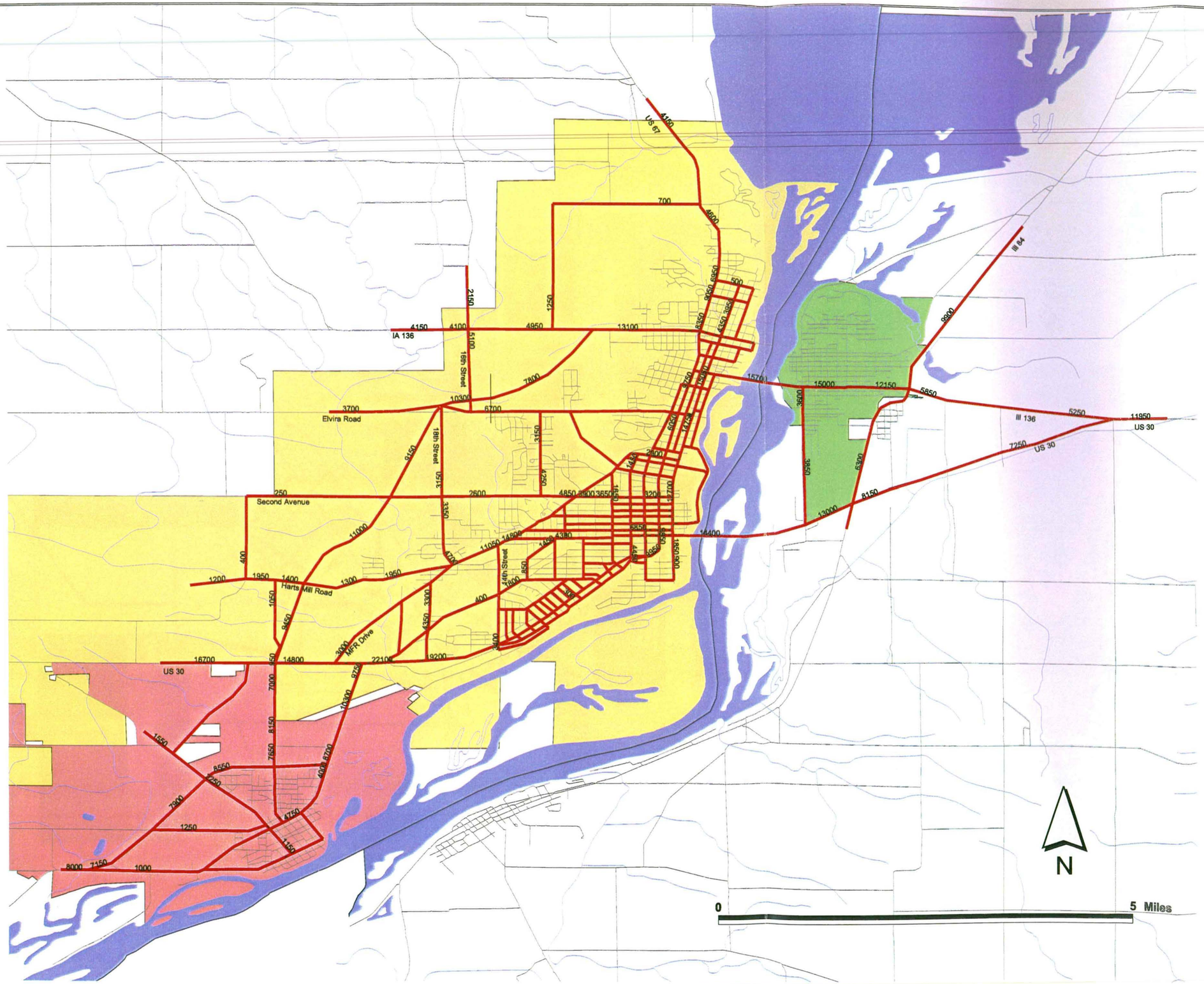
Figure 12

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company

Clinton US 30/67 Corridor Study

Year 2030 Forecasted Average Daily Traffic With Oneway Pair



Legend

- Principal Arterial
- Minor Arterial
- Collector
- Local
- Railroad
- Streams
- River
- Camanche
- Clinton
- Fulton

Figure 13

Clinton Iowa
Gateway to Opportunity

Howard R. Green Company