FINAL STUDY DOCUMENT

BREAK IN ACCESS STUDY: SOULE ROAD

(CARLING ROAD EXTENSION EVALUATION)

TOWN OF CLAY
ONONDAGA COUNTY, NEW YORK

JUNE 27, 2003

Prepared for the Syracuse Metropolitan Transportation Council

SMTC

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2. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, NYSDOT - TRAFFIC AND SAFETY DIVISION, 2001.

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9. SMTC BICYCLE & PEDESTRIAN PLAN, Ongoing

I. EXECUTIVE SUMMARY

The Break in Access Study: Soule Road (Carling Road Extension) was completed to determine if a New York State Department of Transportation (NYSDOT) Break in Access (BIA) was warranted to connect Carling Road to the Soule Road/Route 481 On-ramp intersection.

Four study alternatives were evaluated to determine the future roadway network configuration that would best accommodate the existing and Future 20-year traffic volumes:

- No Build Alternative (Figure 11) - No changes to area roadways (no Carling Road extension).
- Alternative 1, Carling Road Extension (Figure 12) - Soule Road is relocated to the west and intersects Route 31 opposite Carling Road.
- Alternative 2, Realign Soule Road (Figure 13) - Soule Road is relocated to the west and intersects Route 31 opposite Carling Road. The portion of Soule Road between the Route 481 southbound on ramp and Route 31 would become an on ramp to Interstate 481 southbound.
- Alternative 3, Realign Soule Road with NB ramp to Route 481 southbound (Figure 14)- This alternative is the same as Alternative 2 except a northbound ramp would be constructed from Soule Road to Interstate 481 southbound.

Background traffic volumes were projected 20-years into the future for the four study alternatives using the Syracuse Metropolitan Transportation Council's Regional Travel Demand Model. Traffic analysis was completed using the Future 20-year traffic volumes to determine if future improvements to the highway networks would be necessary to accommodate the future traffic volumes. The analysis indicated that all alternatives require mitigation measures (Figures 17, 18, 19, and 20).

Operational, Safety, and Cost Evaluations were completed to determine, after mitigation, how the alternatives would operate accommodating the future traffic volumes and how the cost of the alternatives relate to one another. The Operational Evaluation results indicated that Alternative 2 provided the best operating characteristics with the 20-year traffic volumes followed by Alternative 3, then Future No Build, and finally Alternative 1. The Safety Evaluation indicated that Alternative 2 provided the safest roadway configuration, followed by Alternative 3, then the Future No Build, and finally Alternative 1. It was determined that the Cost Evaluation should be computed for comparative purposes only as there are several factors that could greatly influence the actual cost to design and construct the alternatives. The comparative cost analysis indicated that the Future No Build Alternative was the least costly, followed by Alternative 2, Alternative 3, and finally Alternative 1.

The public input collected throughout the course of the study did not identify one alternative that was consistently favored over the others. The diversity of the public comments reflects the diversity of the trip destinations in and around the study area.

Considering the public comments, Safety, Operational, and Cost Evaluations presented in this study, Alternative 2 provides the best operational and safety characteristics and is the second least costly to build hence a Break-in-Access is not warranted for this alternative.

II. INTRODUCTION

The entire Route 31 corridor in the Town of Clay has experienced significant development since the construction of the Great Northern Mall in the mid-1980's. This development has been rapid and continuous through to present day conditions with no signs of slowing. The NYSDOT has widened Route 31 to the west of the Mall and is planning on widening Route 31 to the east of the Mall in the next few years to help alleviate congestion in the area. In addition, the Town is continually receiving site plan applications for new development near the Route 31/Soule Road/Route 481 interchange. This existing and proposed development has resulted in poor operating conditions for the intersections surrounding the interchange.

The Break in Access Study: Soule Road (Carling Road Extension) was completed to determine if a New York State Department of Transportation (NYSDOT) Break in Access (BIA) was warranted to connect Carling Road to the Soule Road/Route 481 On-ramp intersection. The final study documentation serves as a guide for the Town and is not intended to serve as an official NYSDOT Break-in-Access application.

A NYSDOT Break-in-Access is required when an entity other than the NYSDOT would like to add an access point to an access controlled highway. Access-controlled highways are typically expressways that primarily serve to move large volumes of traffic at relatively high speeds. Therefore, the NYSDOT "controls" the access by not allowing public agencies or private developers to gain direct access to the highway without completing a Break-in-Access Study. Two of the alternatives in this study propose to gain direct access to Route 481 (an access-controlled highway) through the existing Soule Road/Route 481 southbound on-ramp intersection, therefore the Break-in-Access would be necessary.

This study is a proactive measure by the Town and the Syracuse Metropolitan Transportation Council (SMTC) to improve the operating conditions of the Route 31/Soule Road/Route 481 southbound On-ramp interchange now, and for the future. Several alternatives have been developed including, but not limited to, the separation of Soule Road and the Route 481 southbound ramp or an extension of Carling Road, south of Route 31, to the existing Soule Road/Route 481 On-ramp intersection.

A major goal of this study is to safely alleviate existing traffic congestion around the Soule Road/Route 31/Route 481 interchange while also planning for the 20-year horizon. Existing traffic volumes were projected 20 years into the future to determine the future operating conditions surrounding the interchange. Four study alternatives were then analyzed using the 20-year traffic volumes to determine the alternative that would provide the best traffic flow, safest roadway configuration, and be the least costly.

III. PUBLIC INVOLVEMENT

In addition to the technical criteria evaluated as a part of this study, a comprehensive Public Involvement Plan (PIP) was developed in order to inform and involve the public in the study. The two major identified goals of the PIP are:

1. Create public awareness relative to the study's goals, objectives, and process, as well as publicize the public participation opportunities and activities available throughout the study, and
2. Involve the public throughout the planning process.

Two groups were formed to assist with the study efforts. A Study Advisory Committee (SAC) comprised of representatives from affected organizations, and local government and associated agencies met regularly throughout the project to assist in the study management and study direction. A broader group of interested individuals, known as the Stakeholders Group, were sent pertinent study information, kept apprised of significant study developments, and encouraged to attend and participate at public meetings. The PIP created for this study is included in Appendix A, Public Involvement Plan.

Three public meetings and four SAC meetings were held throughout the duration of the study. The SAC meetings were held to update the progress of the study and to discuss the next steps in the process. Three public meetings were held to present the study to the public. The first public meeting presented the purpose of the study to the public. The second meeting presented the Existing Conditions and the last public meeting presented the future conditions and alternative analysis. Table 1 contains a summary of the SAC and public meeting dates.

Table 1 STUDY MEETINGS	
SAC Meeting #1	August 16, 2001
Public Meeting #1	September 13, 2001
SAC Meeting #2	December 5, 2001
Public Meeting #2	January 8, 2002
SAC Meeting #3	May 22, 2002
SAC Meeting #4	January 10, 2003
Public Meeting #3	January 30, 2003

Comments and questions were solicited at all public meetings in order to gather as much data as possible to incorporate into the study. All comments received throughout the study, as well as the meeting minutes from the public meetings, are included in Appendix B, Public Comments & Meeting Minutes.

IV. STUDY AREA

The entire study area is shown in Figure 1 and has the following limits:

- ü Verplank Road to the North
- ü Wetzel Road to the South
- ü Route 57 to the West
- ü Morgan Road to the East

Route 31 is the principal east-west artery for the study area and is dominated by commercial development. Traffic along this roadway is a mix of commuter and commercial vehicles destined for locations within and outside the study area. The NYSDOT recently widened Route 31, west of Route 481, to a five-lane section including additional intersection improvements. Additionally, NYSDOT is scheduled to widen Route 31, east of Route 481, to a four or five-lane section, with construction to be completed in 2003.

Figure 1 - Entire Study Area (aerial photography from NYSDOT GIS Clearinghouse, www.nysgis.state.ny.gis - 2001)

Route 481 is a north-south, access-controlled expressway containing both commuter and commercial traffic and serves as a high-speed link between the City of Oswego and Interstate 81. Additionally, the interchange of Route 31 and Route 481 is the only location within the study area where traffic can access Route 481. Several other roadways, including, but not limited to, Route 57, Morgan Road, and Verplank Road provide access to the commuter routes and the local roadway network. These roadways service a significant amount of residential land-use as well as some agricultural and commercial properties.

V. <u>EXISTING CONDITIONS INVENTORY</u>

An existing infrastructure inventory was conducted to determine the sidewalk, roadway, and traffic-related sign conditions. The 2000 NYSDOT Highway Sufficiency Ratings indicate that Route 31 was resurfaced in 1999 with a single course, 1”-1 ½” pavement overlay. The Surface Score rating is currently a “9” indicating that the pavement is in excellent condition with no pavement distress. Field visits indicate that the curbs, along with the pavement appear to be in good condition. Route 481 was last worked on in 1991 with a double course, 2 ½”-3” pavement overlay. The Surface Score rating is currently a “6” showing general alligator cracking as the dominant pavement distress. The Soule Road pavement was in good condition with only some slight cracking along its length.

The pavement striping was in good condition throughout most of the study area. Only the area surrounding the Route 31/Soule Road/Route 481 interchange appeared slightly faded due to the heavy traffic volumes. New sidewalks are located along Route 31 in front of the commercial developments. These sidewalks are in excellent condition, however, they do not appear to be heavily used. Neither Route 481 nor Soule Road has sidewalks along their length. The traffic-related signs along the study area roadways are in excellent condition. Recent development and roadway widening along Route 31 has likely replaced any old signs to keep the overall corridor in good condition.

VI. <u>IMMEDIATE STUDY AREA</u>

The focus of the study is on the Soule Road/Route 31/Route 481 interchange (See Figure 2). Four signalized intersections and one unsignalized intersection are located within the immediate study area. The four signalized intersections are located along Route 31:

- Carling Road
- Wegmans East Drive
- Soule Road/Route 481 southbound off-ramp
- Route 481 northbound ramp

The one unsignalized intersection is located along Soule Road at the Route 481 southbound on-ramp. These five intersections were evaluated in-depth throughout the study to determine the alternative that best alleviates congestion through the Soule Road/Route 31/Route 481 interchange.

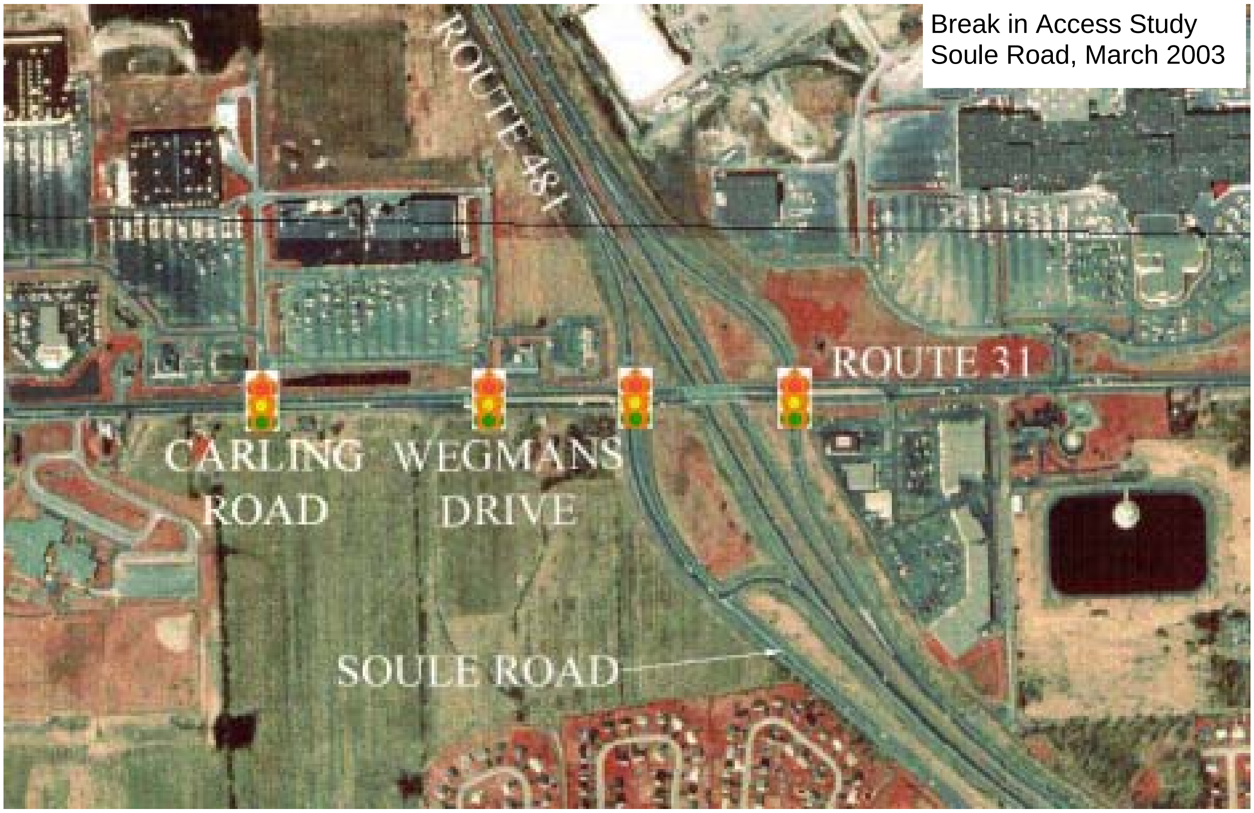

Figure 2 – Immediate Study Area

Route 31 is classified as an Urban Principal Arterial. The 2000 New York State Highway Sufficiency Ratings indicate that the Average Annual Daily Traffic (AADT) on Route 31, between Route 57 and Route 481 is 19,200 vehicles per day (vpd). East of Route 481 the AADT drops to 18,400 vpd. Auxiliary turn lanes exist at most signalized intersections along Route 31. The posted speed limit is 40 mph.

Route 481 is classified as an Urban Principal Arterial Expressway south of VerPlank Road and classified as a Rural Principal Arterial north of VerPlank Road. The AADT's are 23,500 vpd and 20,800 vpd, respectively. The northbound on/off-ramps and the southbound off-ramp intersect Route 31 in a typical diamond interchange. The southbound on-ramp, however, intersects Soule Road, which in turn intersects Route 31.

Soule Road is a north/south roadway connecting Route 31 to Route 57, and provides direct access to the Route 481 southbound on-ramp. Soule Road, between Route 31 and the Route 481 southbound on-ramp, is owned by NYSDOT (Route 931K) and carries approximately 14,500 vpd. The 2000 NYSDOT Highway Sufficiency Ratings classify Soule Road as an Urban Collector. Onondaga County maintains ownership of Soule Road from the Route 481 southbound on-ramp to Route 57. Carling Road and Wegmans Drive are two local access points to retail developments along the north side of Route 31.

VII. <u>*MULTI-MODAL ASSESSMENT*</u>

A. *Transit*

The Central New York Regional Transportation Authority (CNYRTA) was created in 1970 to improve public transportation in Central New York. The CNYRTA's transportation district includes Onondaga, Cayuga and Oswego counties and services approximately 13,000,000 passengers per year. The CNYRTA includes several operating subsidiary corporations, one of which being, CNY Centro, Inc. (Centro). Centro operates 6 bus routes on Route 31, Route 57, Morgan Road, Soule Road, and Wetzel Road within the study area. Figure 3 presents an overview of all the Centro bus routes for the study area. Specific bus routes are shown in Appendix C, Centro Bus Routes.

Three Centro bus routes travel through the immediate study area. These routes are the 9M, 9T, and 9D. The 9M and 9T routes are commuter trip routes while the new 9D route has been designed to provide convenient access to shopping and social activities. The 9M travels between Downtown Syracuse and Great Northern Mall. Buses travel this route five times per day during the week and twice a day on Saturdays. The main stops within the study area are at the Park-N-Ride locations at

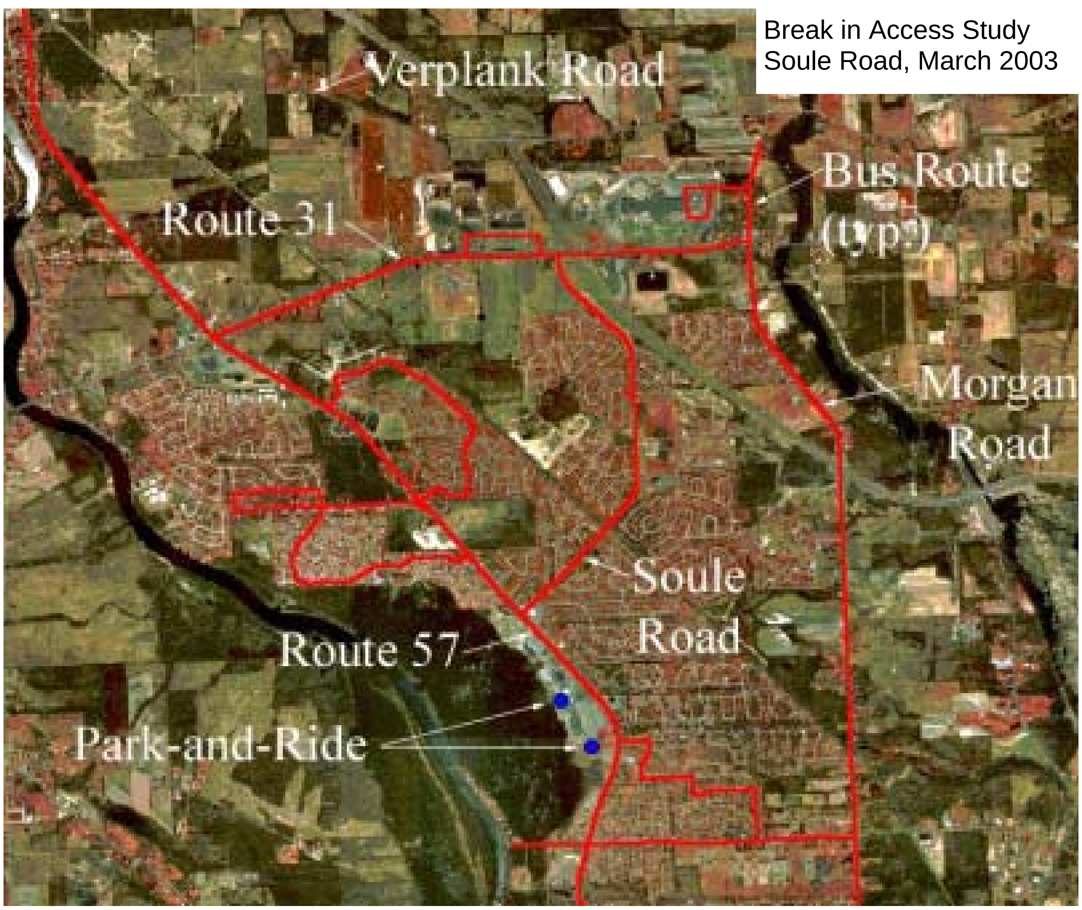

Figure 3 – Centro Bus Routes (bus routes provided by SMTC GIS data, 2001)

the Great Northern Mall, Seneca Mall, and Wegmans on Route 57. The 9T travels the same route and has the same stops as the 9M but begins in the city of Oswego. This route is traveled five times per day during the week, three times per day on Saturdays, and three times per day on Sundays. Once a day, during the afternoon, the 9T has an express trip that travels from Carousel Center to Great Northern Mall via Route 481. In addition, the 9T also pulls into Wal-Mart on Route 31 upon request on certain trips.

The 9D travels between Downtown Syracuse and Great Northern Mall 3 times per day during the week and 4 times per day on Saturdays. The main stops on this route within the study area are the Great Northern Mall and Seneca Mall Park-N-Rides. During the week and on Saturday mornings additional stops can also be made at Wal-Mart and Wegmans upon request. In addition, CNYRTA operates a "Call-A-Bus" Paratransit Service. This service extends the Centro bus routes to those riders that meet certain requirements that prevent them from using the existing Centro bus routes. Centro bus schedules and route diagrams are shown in Appendix C, Centro Bus Routes.

The local Centro bus routes also provide connections to the William F. Walsh Regional Transportation Center, a hub where the several transportation modes converge. Greyhound and Trailways are two national bus services located within the Center that provide bus service to locations outside the immediate Syracuse area. The Centro bus routes, Call-A-Bus service, and Greyhound and Trailways bus service combine to form a transit service that allows travelers the opportunity to travel to destinations throughout the country without needing a personal automobile.

B. Rail

The William F. Walsh Regional Transportation Center is also home to Amtrak, a national passenger rail service. This rail service, similar to Greyhound and Trailways bus services, provides travel opportunities throughout the country by a transportation mode other than personal automobile.

C. Hancock International Airport

The Hancock International Airport is located north of the City of Syracuse and services travelers to and from the greater Syracuse area. Those persons from the immediate study area wishing to use the Hancock International Airport can gain access through Centro bus routes with a stop at the William F. Walsh Regional Transportation Center. The airport and bus routes allow those choosing to fly in and out of the Syracuse area the flexibility of again traveling without the use of an automobile.

D. Pedestrian & Bicycle Facilities

There are three schools within the study area; Willowfield Elementary School, and the Soule Road Elementary and Middle Schools. Willowfield Elementary School is located on Route 31 approximately 0.25 miles west of the Route 31/Soule Road/Route 481 interchange. The Soule Road schools are located on Soule Road approximately one mile south of the interchange.

The pedestrian assessment indicated that pedestrians do not typically travel along the study roadways. High pedestrian concentrations were identified within the commercial developments along Route 31 (within parking lots), within the school grounds at the three schools near the interchange, and within the housing subdivisions and at the houses along Soule Road (children waiting for the bus).

Sidewalks are located along Route 31 within the immediate study area, however, there were no existing pedestrian routes linking the pedestrian concentration centers. In this regard, however, a proposed residential development, west of the existing Pine Gate community, will construct a pedestrian walkway to the Willowfield Elementary School. This walkway will not cross any study area roadways, therefore, will not be considered in the traffic analysis for the study.

Route 31, throughout the study area, is NYS Bicycle Route 5 (SBR 5). Figure 4 presents the existing and proposed bicycle routes for New York State. Although SBR 5 runs through the immediate study area, no bicycle traffic was observed during the pedestrian assessment.

The SMTC is currently completing a Bicycle and Pedestrian Plan for all of Onondaga County including the City of Syracuse. The primary goals of the plan are to "preserve and enhance the bicycling and pedestrian network; and to improve the safety, attractiveness, and the overall viability of cycling and walking as legitimate transportation alternatives to the transportation system in the Greater Syracuse area" (SMTC Bicycle & Pedestrian Plan, www.smtcmpo.org/bike-ped/). The plan will better assess and evaluate the existing pedestrian and bicycle facilities in the area, and make future recommendations to better accommodate these facility users.

E. Interstate Highway System

The study area is located such that easy access to and from the Interstate Highway System is provided in the east, west, and south directions. Drivers heading eastbound on Route 31 can access I-81 north of Syracuse at Exit 30. I-81 then connects to both I-481 and I-90. Those drivers heading westbound can access Route 690, which in turn connects to both I-690 and I-90. Finally drivers headed southbound can use the Soule Road On-ramp to Route 481, then access I-481, I-81, and I-90. Figure 5 presents a map showing the local Interstate Highway System highways in relation to the immediate study area (obtained from the Syracuse Hancock International Airport Website).

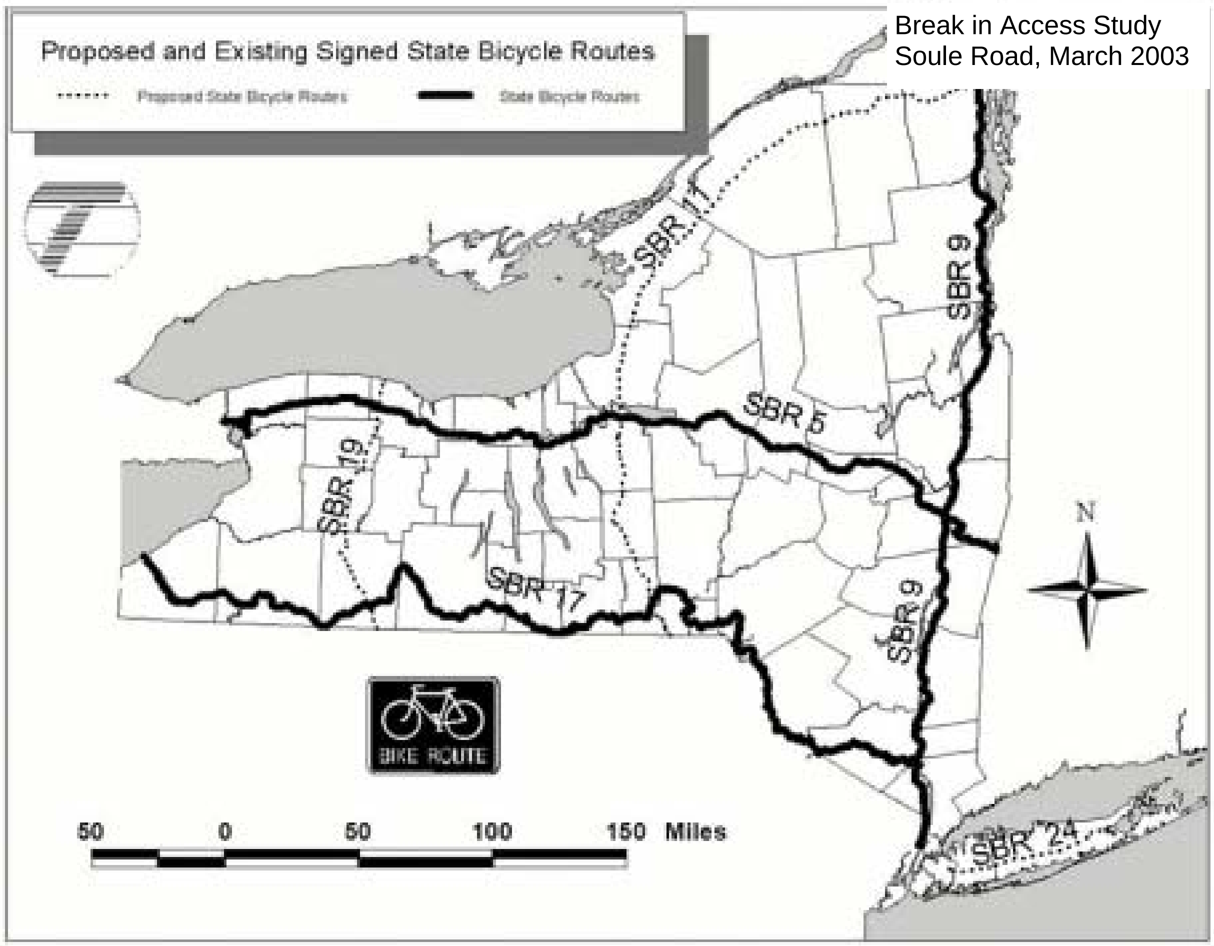

Figure 4 – New York State Bicycle Routes (http://www.dot.state.ny.us/pubtrans/images/bicycle-map.gif)

The Multi-Modal Assessment indicated that the existing Centro bus routes adequately canvas the study area. These bus routes provide direct linkages to commercial bus routes (Greyhound and Trailways), rail service (Amtrak), and the Hancock International Airport allowing passengers to easily travel outside the Greater Syracuse area. This system currently accommodates the existing users. New Centro stops and/or routes should be considered for all future commercial and residential developments in the area. Sidewalks should be included in all future developments as well as along Route 31 to create pedestrian linkages between the residential developments, schools, and commercial developments. Finally, future improvements to Route 31 should include the addition of bicycle amenities as necessary and/or warranted, as Route 31 is also NYS Bicycle Route 5.

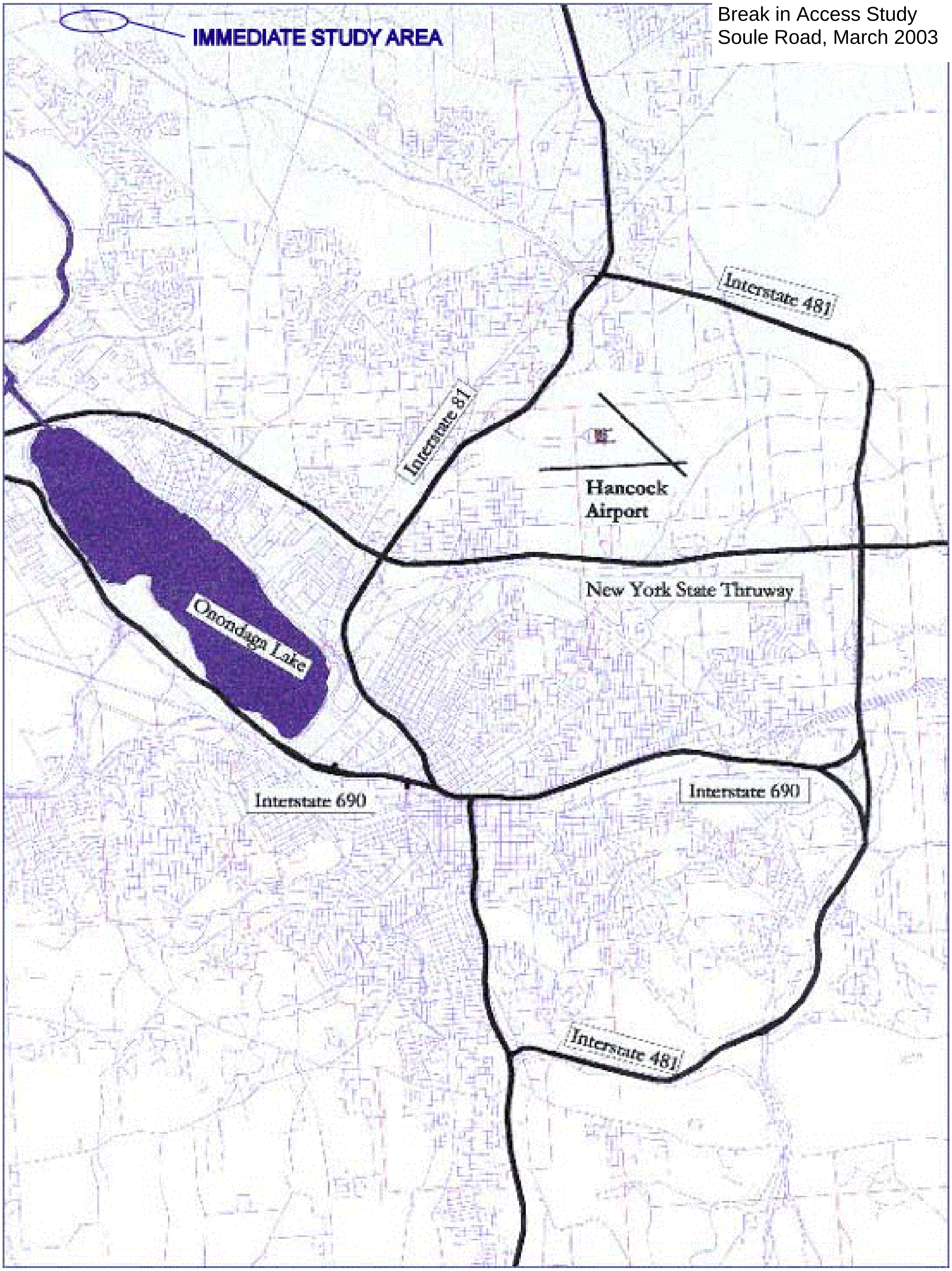

Figure 5 – Interstate Highway System (http://www.syrairport.org/ground/directions/maps.cfm).

VIII. <u>LAND USE ISSUES</u>

The *Route 31 & Route 57 Land Use and Circulation Study* (Land Use Study, Figure 6) was completed for the Town of Clay in November 1999 (Clough, Harbour & Associates). This study investigated the existing Land Use along Route 57 and Route 31 (including this Soule Road study area) to:

> "provide the Town of Clay with an updated set of land use and vehicular & pedestrian recommendations which are to be used when evaluating new development proposals within the corridors of these two routes."
> (*Route 31 & Route 57 Land Use and Circulation Study, 1999*)

This document was an update of "The Route 57 Corridor Study" (1978) and "The Route 31 Corridor Study" (1987), as well as an updated assessment of the transportation circulation, and land use issues presented since the completion of each of the studies. The recommendations contained within the study are intended to guide land-use decisions for the next ten to fifteen years. Figure 7 presents the future land use recommendations from the Land Use Study.

The Land Use Study indicates that the immediate study area for this Soule Road study has experienced a significant amount of development pressure since the 1987 study. The north side of Route 31 has continued to develop westward from the Route 481 interchange with several large commercial developments with the most recent being the Clay Shopping Center development. This area has, and will continue to be, a 'hot-bed' of commercial development and needs careful planning to avoid further congestion and traffic issues in the future. Presently, the developments in the area are consistent with the future land use recommendations presented in the Land Use Study.

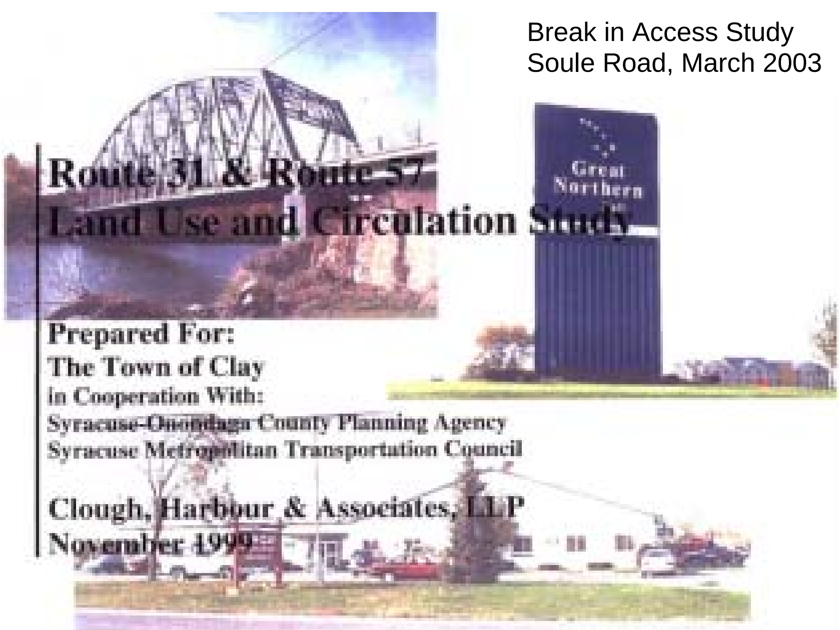

Figure 6 – Land Use Study Cover

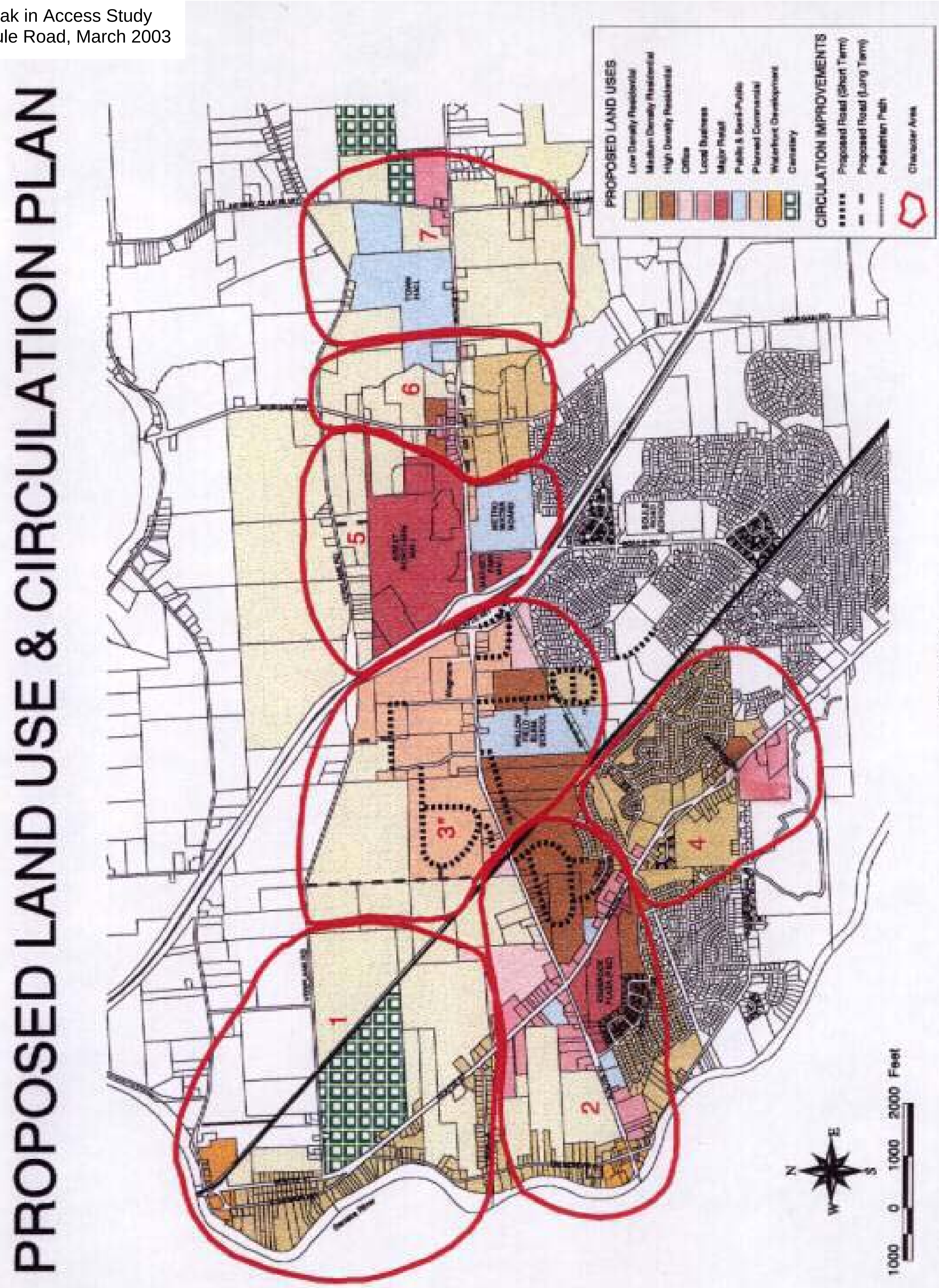

Figure 7 – Land Use Map *(Route 31 & Route 57 Land Use and Circulation Study, 1999 CHA)*

The future ten to fifteen-year recommendation from the Land Use Study is that the corner of Route 31 and Soule Road contain an area of planned commercial land-use along the roadway, then transition into office and high density residential, then to medium and low density residential. The Raymour & Flanigan site recently approved by the Town is again consistent with these land use recommendations. As of March 2003, the Town of Clay has approved commercial development on the southwest corner of the Carling Road/Route 31 intersection. The Town has not approved any developments for the other areas between the Raymour & Flanigan and the Pinegate community.

Finally, the Land Use Study provided a number of future year traffic circulation recommendations and possible new roadways within the study area. In particular, the Land Use Study made mention of a separation of Soule Road and the Route 481 southbound on-ramp, while leaving a ramp from Soule Road northbound to Route 481 southbound. The individual developers should be required to further investigate the traffic circulation recommendations presented in the Land Use Study as they bring development proposals before the Town.

Similar to the actual assessed land use, the study area contains a mix of residential, commercial, and agriculturally zoned lands. C-5 zoning, Shopping Center District, represents the majority of the land north of Route 31 within the study area. South of Route 31 the land is typically zoned residential with some agricultural and commercial interspersed. The study area zoning appears to be consistent with the assessed study area land use.

IX. <u>BACKGROUND TRAFFIC CONDITIONS</u>

A. Peak Intervals for Analysis

Given the existing land use and the existing nature of traffic, the peak hours selected for analysis are the weekday AM (7-9 AM) and PM (4-6 PM) peak and Saturday midday (11 AM – 1 PM) peak.

B. Background Peak Hour Volumes

The background peak-hour volume conditions were obtained from full-build volumes contained in “Appendix 2 – Traffic Study” of the *Clay Shopping Center, Draft Environmental Impact Statement* (DEIS). This study investigated the impact 570,000 SF of new retail space would have on the surrounding roadway network. The new retail space will be built on 70 acres of land, located on Route 31, approximately 0.5 miles west of the immediate study area. Additionally, the DEIS incorporated the proposed traffic generated by a new Raymour & Flanigan store located south of Route 31 within the immediate study area, directly across from the existing Wegmans supermarket. Figure 8 presents the locations of the proposed Clay shopping center and the new Raymour & Flanigan. Appendix D, DEIS, Raymour & Flanigan Site Plans, contains copies of the site plan layouts for both the DEIS and Raymour & Flanigan developments.

Figure 8 – Clay Shopping Center and Raymour & Flanigan Locations

The retail nature of the developments considered in the DEIS necessitated the analysis of the AM, PM, and Saturday peak hours. Since this study also considered these three peak periods, no additional traffic counts were necessary. Additionally, the developments analyzed in the DEIS have been approved by the appropriate agencies. Therefore, this study included the volumes generated by the developments, or full build volumes, into the background analysis. Figure 9 presents the background volumes used in this study. Route 31 and Route 481 typically contain approximately five percent heavy vehicles while Carling Road and Wegmans Drive contain approximately three percent heavy vehicles.

X. <u>BACKGROUND CAPACITY ANALYSIS</u>

A. Level of Service

The capacity of a highway system is predicated on two components: the capacity of the roadway sections and the capacity of the affected intersections along the route. Intersecting roadways generally provide the initial constraint on a system's capacity due to the centralization of vehicular interactions. Efficiency at the intersections becomes the critical constraint for capacity. Vehicle interactions at these points must therefore be analyzed to assess the projected capacity levels.

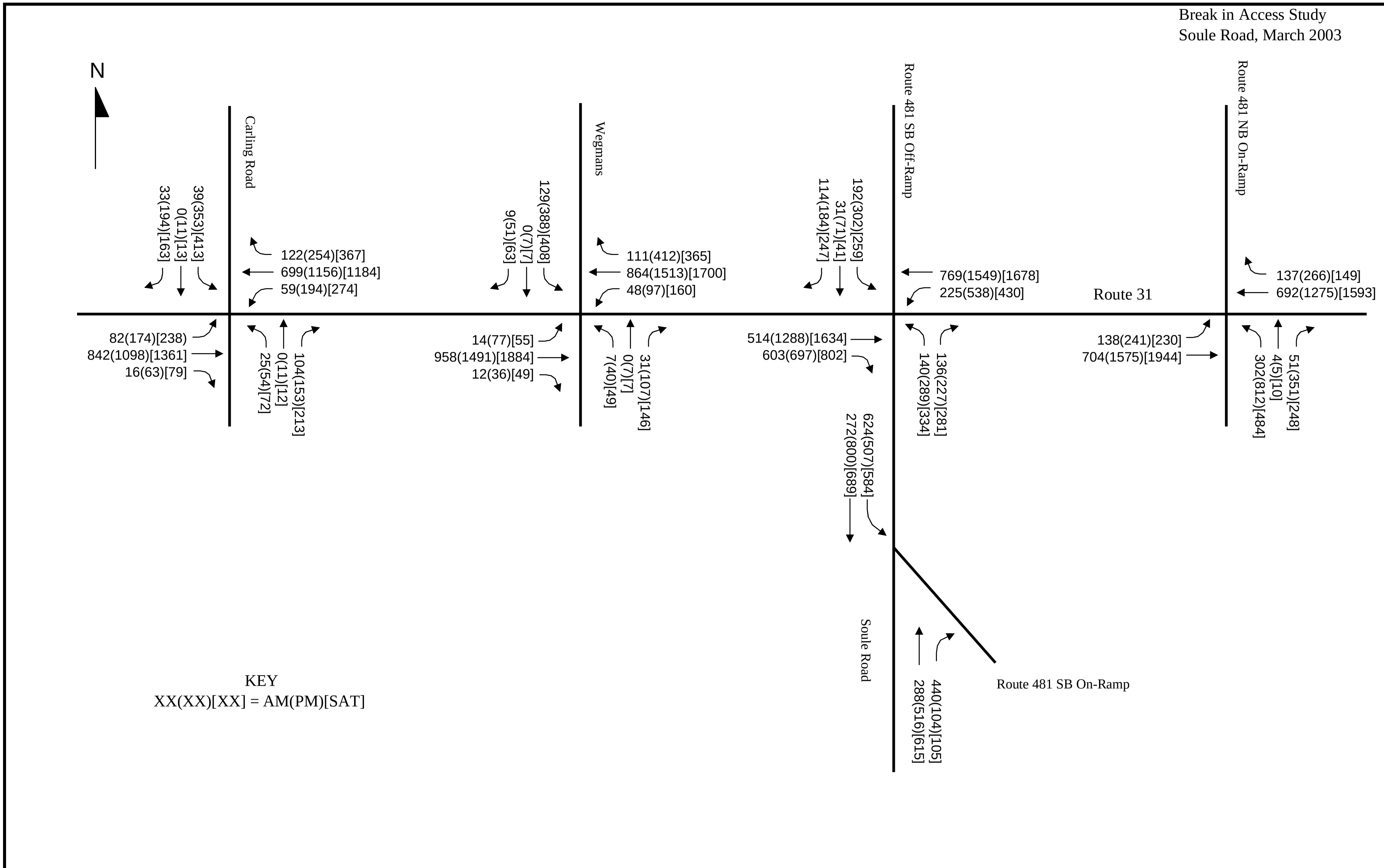

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FIGURE 9 -
BACKGROUND PEAK HOUR VOLUMES

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The standard procedure for capacity analysis of signalized and unsignalized intersections is that of the 2000 Highway Capacity Manual published by the Transportation Research Board. The procedure yields a Level of Service (LOS) as an indicator of how well intersections operate. LOS is defined by delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

The concept of Level of Service is defined as a qualitative measure describing operating conditions within a traffic stream and their perception by motorists and/or passengers. Six Levels of Service are defined for analysis. They are assigned letter designations, from "A" to "F", with LOS "A" representing the best conditions and LOS "F" the worst. Suggested ranges of service capacity and an explanation of Levels of Service are included in Appendix E, Level of Service Description.

B. Background Analysis

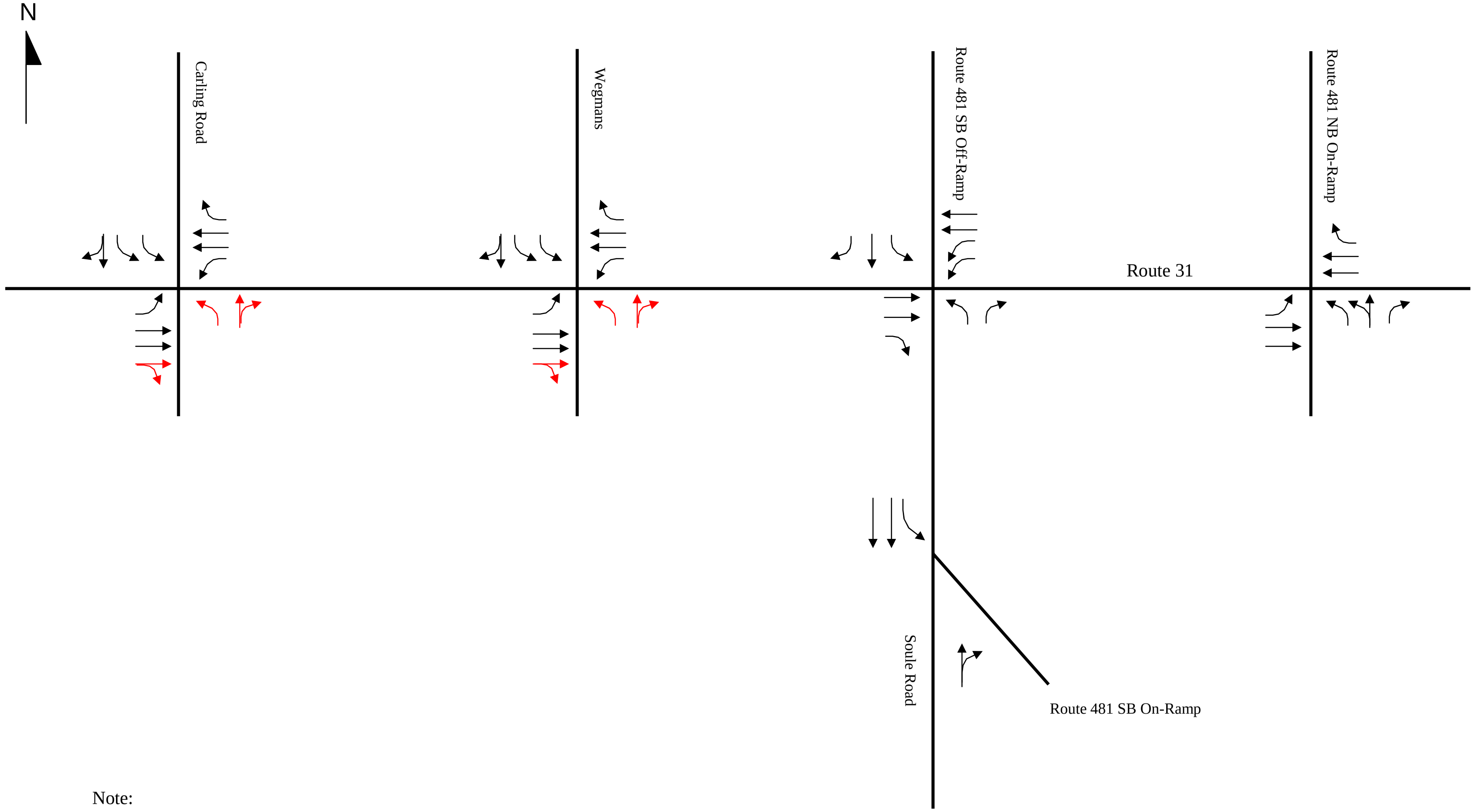
The developments included in the DEIS have added a significant volume of traffic to the background highway network. Figure 10 presents the background lane configurations. In order to accommodate the increased traffic volumes, the following mitigation measures were constructed by the developers within the immediate study area (red arrows on Figure 10):

- ü A new eastbound through/right-turn lane from the proposed Clay Shopping Center, through the immediate study area, and connecting to the existing right turn lane at Soule Road,
- ü New northbound approaches to the Carling Road and Wegmans Drive intersections, each containing a left-turn and a shared through/right-turn lane, and
- ü Signal timing modifications at each of the study intersections to optimize traffic flow throughout the Route 31 corridor.

Similar to the background traffic volumes, these full build mitigation measures were incorporated into the background model for this study. The full-build Synchro 5.0 model was obtained from the DEIS and used as the starting point for this background analysis. The mitigation measures mentioned above were incorporated into the model and the background LOS was obtained. Table 2 presents the background LOS at each of the immediate study area intersections. All capacity analysis calculations and output sheets are contained in Appendix F, Background Capacity Analysis.

The background capacity analysis indicates that the three of the four signalized intersections along Route 31; Carling Road, Wegmans Drive, and Route 481 NB on/off-ramp intersections operate at an acceptable overall LOS. The left-turn movements at all intersections typically experience the most delay (typically LOS C or D), which is typical of many high volume commuter roadways.

Break in Access Study
Soule Road, March 2003



Note:
Red arrows denote new lanes/approaches
currently being built by developers for previously approved projects.

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FIGURE 10 -
EXISTING LANE CONFIGURATIONS

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Table 2
BACKGROUND CAPACITY ANALYSIS RESULTS – NETWORK INTERSECTIONS

Route 31 Intersection	Approach	Movement	AM Peak		PM Peak		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
Carling Road (signalized)	EB	Left	D	37.3	D	43.3	D	40.5
		Thru/Right	A	9.0	B	18.9	C	26.7
	WB	Left	D	38.4	D	43.8	E	60.0
		Thru	A	7.7	C	20.3	B	19.0
		Right	A	0.0	A	0.0	A	0.1
	NB	Left	D	39.1	D	38.1	D	42.5
		Thru/Right	A	0.0	A	8.4	B	10.3
	SB	Left	D	39.4	D	38.3	D	39.7
		Thru/Right	A	0.0	A	6.7	A	7.9
	Overall		**B**	**10.4**	**C**	**21.5**	**C**	**25.1**
Wegmans Drive (signalized)	EB	Left	D	53.2	D	39.2	C	32.7
		Thru/Right	A	3.1	C	20.2	D	39.2
	WB	Left	D	51.4	D	45.2	D	48.0
		Thru	A	5.5	E	65.7	D	42.9
		Right	A	0.4	A	0.5	A	0.6
	NB	Left	D	39.7	D	38.7	D	43.5
		Thru/Right	A	0.0	A	9.5	A	8.9
	SB	Left	D	38.5	C	34.5	D	39.5
		Thru/Right	A	0.0	B	10.5	B	10.9
	Overall		**A**	**7.5**	**D**	**36.6**	**D**	**36.5**
Soule Road/ Route 481 SB Off-ramp (signalized)	EB	Thru	B	10.5	F	118.2	F	140.0
		Right	A	3.4	B	18.2	B	12.7
	WB	Left	C	34.0	C	30.2	C	29.9
		Thru	B	11.5	A	9.5	C	25.4
	NB	Left	C	28.7	D	36.5	E	67.9
		Right	C	25.3	B	17.5	C	24.3
	SB	Left	C	29.4	C	27.7	C	29.3
		Thru	D	36.9	C	33.1	D	35.8
		Right	A	7.5	C	30.0	E	55.6
	Overall		**B**	**14.3**	**D**	**44.1**	**E**	**60.8**
Route 481 NB On/Off-ramp (signalized)	EB	Left	A	3.1	B	17.8	C	28.3
		Thru	A	4.5	A	9.6	B	12.9
	WB	Thru	B	13.2	D	49.8	D	49.0
		Right	A	2.2	A	2.4	A	2.9
	NB	Left	C	29.2	D	38.2	C	34.0
		Left/Thru	C	29.3	D	38.9	C	34.3
		Right	A	7.9	C	30.5	C	33.5
	Overall		**B**	**11.0**	**C**	**27.8**	**C**	**29.0**
Soule Road / Route 481 SB On-Ramp – Southbound Left (unsignalized)			**D**	**30.2**	**C**	**15.6**	**C**	

The Soule Road/Route 481 SB off-ramp operates at an unacceptable LOS E during the Saturday peak period. The capacity analysis indicates that the Soule Road/ Route 481 SB off-ramp intersection experiences unacceptable LOS E or F for three movements during the Saturday peak and one movement during the PM peak. The eastbound through movement (PM and Saturday) experiences LOS F while the northbound left-turn movement (Saturday), and southbound right-turn (Saturday) movement experience LOS E. The DEIS considered mitigation measures to improve the LOS for these movements, however, no feasible measure was possible.

The capacity analysis for the Soule Road/Route 481 southbound on-ramp unsignalized intersection indicates that the southbound left-turn onto the ramp operates at an acceptable LOS for all peak periods. No other movements at this intersection experience delay, therefore, the LOS is A (free-flow traffic). It was observed, and mentioned at the first public meeting, that queues tend to develop for the southbound left-turn movement during the peak hour periods.

The DEIS indicated that nine (9) accidents occurred during a four year, six month period from 1993 to 1997. Eight of these accidents involved southbound left-turning vehicles colliding with northbound through vehicles. The predominant cause of the accidents was the failure to yield the right-of-way. The remaining accident was a northbound rear-end accident on Soule Road at the on-ramp. Five of the nine accidents occurred on dry pavement. The crash rate at this intersection was slightly above the statewide average (0.34 to 0.17 accidents per million entering vehicles) for this type of intersection.

Additional accident information supplied by NYSDOT's Safety Information Management System (September 1996 to September 1999) supplemented the accident diagram. These accidents were broken down as 16 percent injury, 33 percent property damage only and 51 percent non-reportable. There were no reported fatalities. Appendix G, Accident Analysis, contains the accident diagram and supplemental NYSDOT data contained in the DEIS.

XI. __STUDY ALTERNATIVES__

This study originally included three roadway alternatives for the immediate study area. The Future No Build Alternative maintains the existing roadway network configuration (i.e. No Carling Road Extension). Alternative 1 provides the Carling Road extension to create the eastbound leg of the existing three-leg intersection at the Soule Road/Route 481 southbound on-ramp intersection. Alternative 2 separates Soule Road from the Route 481 southbound on-ramp and realigns Soule Road to intersect Route 31, opposite Carling Road. Figures 11, 12, and 13 present the proposed roadway configurations for the original three alternatives.

As a result of resident input during the second public meeting, another alternative was added to the study. Alternative 3 provides the same network configuration as Alternative 2 with one slight modification. Alternative 3 constructs a slip ramp from Soule Road northbound to the Route 481 southbound on-ramp. Figure 14 presents the proposed roadway configuration for Alternative 3.

Figure 11 – Future No Build

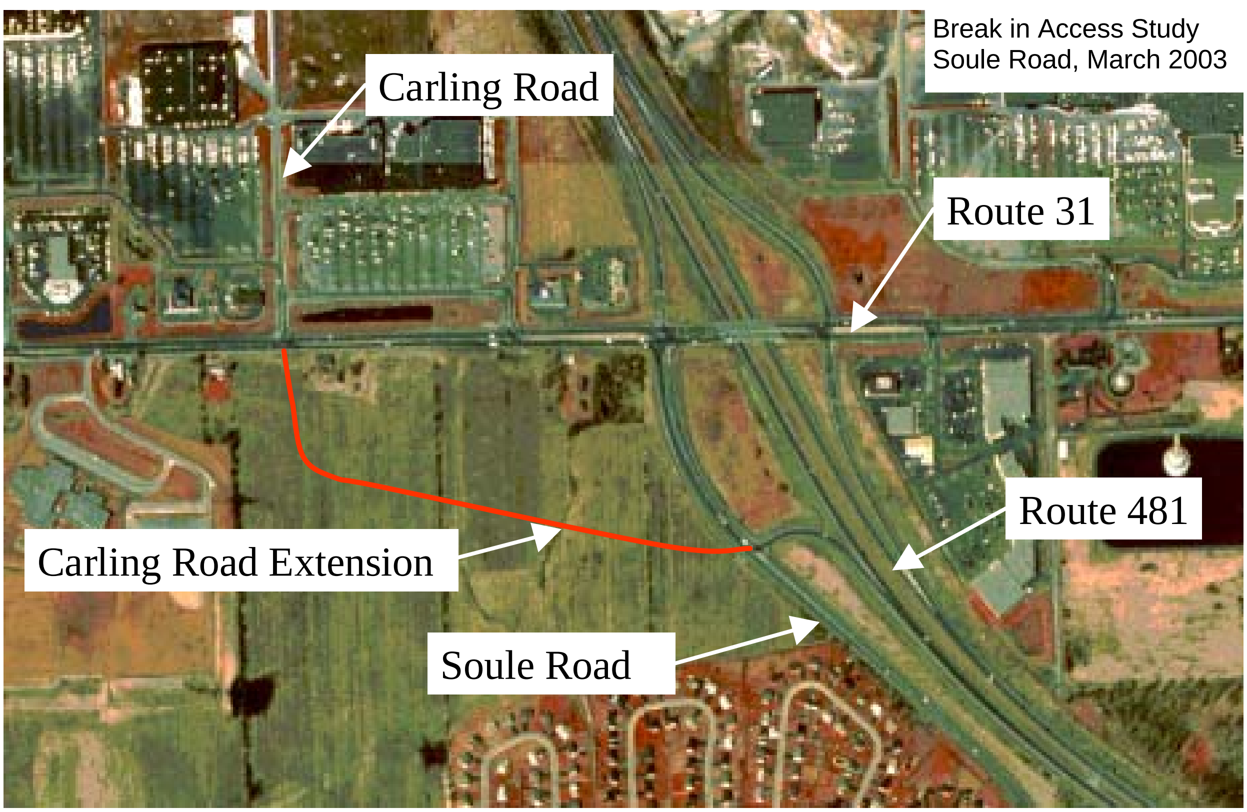


Figure 12 – Alternative 1 - Carling Road Extension

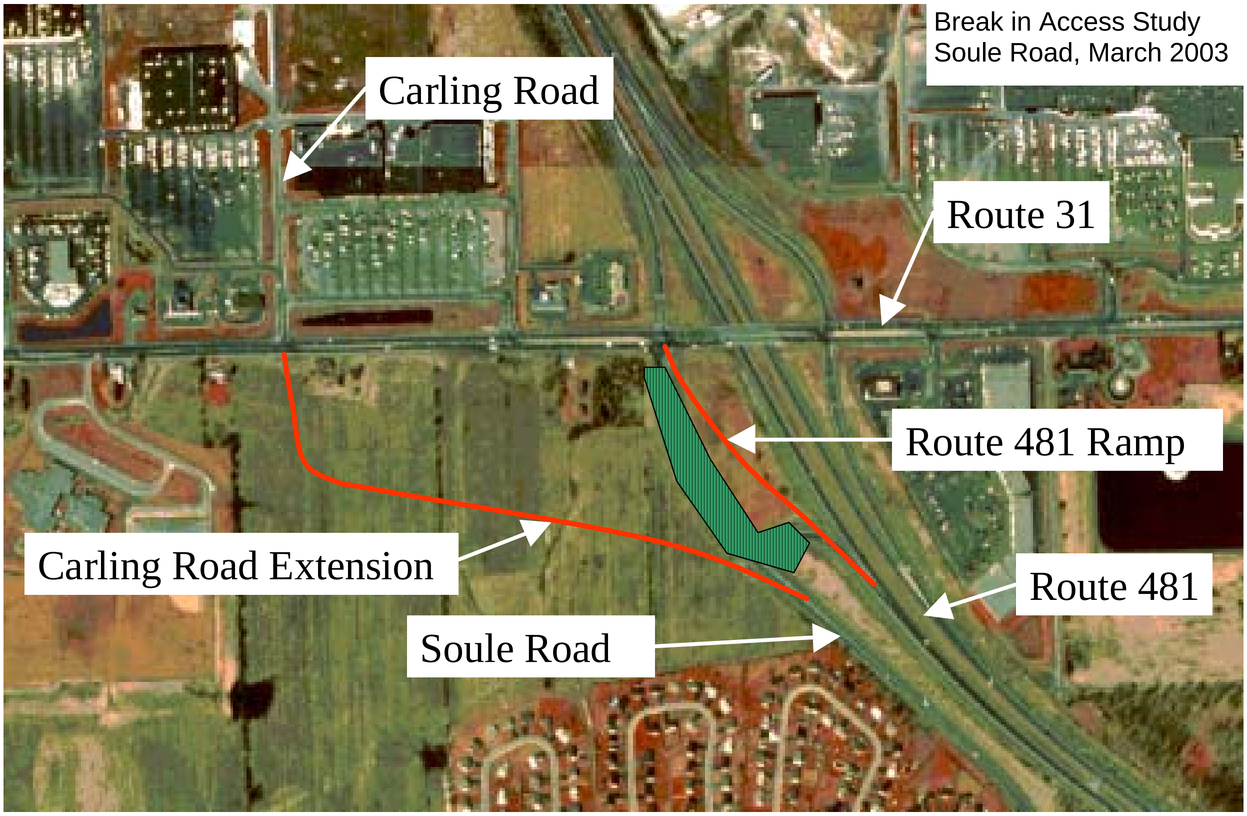


Figure 13 – Alternative 2 – Separate Soule Road

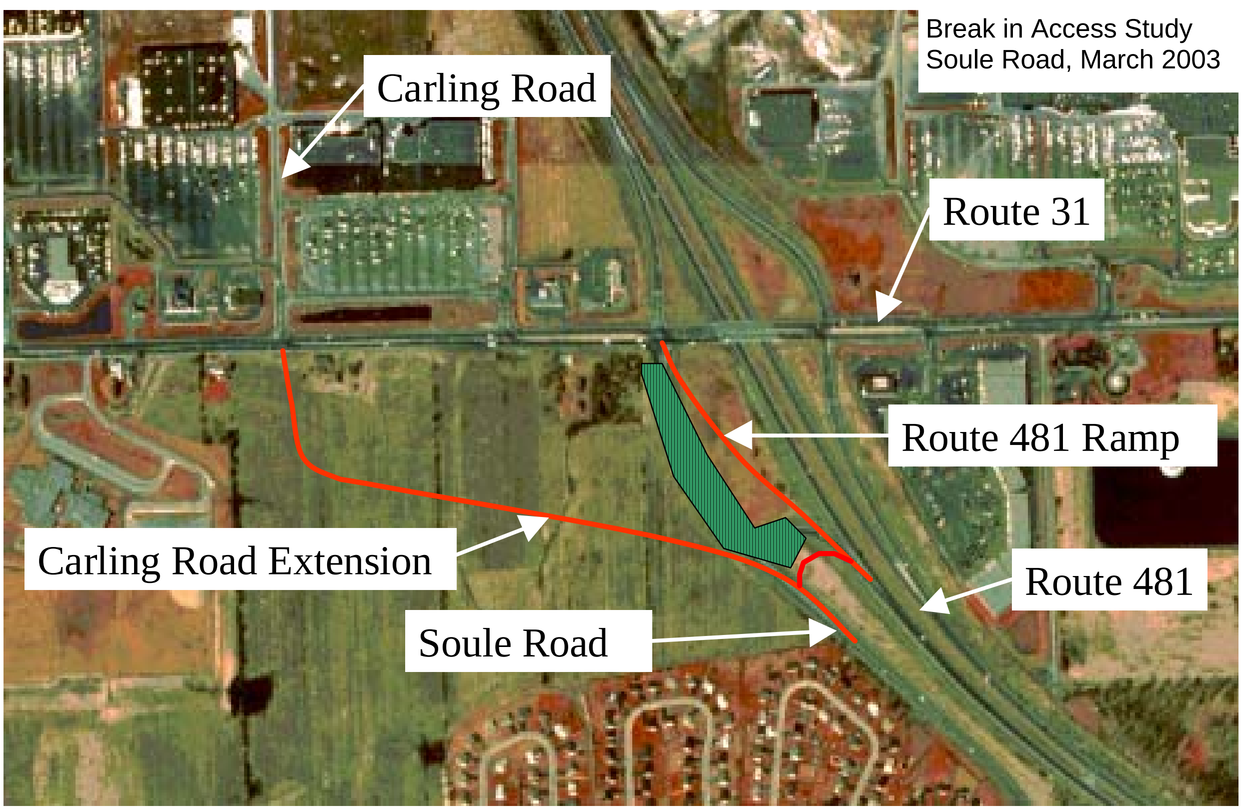


Figure 14 – Alternative 3 – Separate Soule Road with ramp to Route 481

XII. <u>*20-YEAR TRAFFIC PROJECTION*</u>

A. *Traffic Modeling*

The traffic volumes for the various Soule Road alternatives were developed using the SMTC Regional Travel Demand Model. The original regional model was developed in the early 1990's. Since then the model has been continuously updated with the most recent land use information (residential and employment data). Sub-areas of the model have been updated as necessary during the completion of specific SMTC projects.

The SMTC Regional Travel Demand Model is based on the TMODEL2 microcomputer based software package and uses a highway network and geographic land use zones to estimate hourly traffic movements. The PM peak hour roughly equating to 4:30 to 5:30 PM was used as the basis for the model. The regional travel demand model incorporates socio-economic data and trip rates to estimate the number of trips originating from and destined to the transportation analysis zones (TAZ's) in Onondaga County. The vehicle trips are then assigned to the highway network along the model's calculated minimum travel paths. Numerous factors go into the model to try to represent how humans decide whether to make a vehicle trip, where to go, and which route to take. The primary use of the regional model is to determine expected changes in traffic patterns and performance measures for alternative land use scenarios or altered highway networks.

The unique part of the SMTC Regional Travel Demand Model is that it incorporates alternative modes of transportation, including, bus, public transportation, bicycle, and walking. Bus and public transportation information is based on information provided by the CNYRTA and bicycle and walking information is based on the results of the 1990 census.

The Regional Travel Demand Model is based on a traditional model development. First, a roadway network was defined for the Onondaga County area. Second, household and employment data for the TAZ's were gathered to be used in the trip generation process. In this process, PM peak hour vehicle trip origins and destinations were calculated for each TAZ. The third step, trip distribution, uses a gravity model to produce a final TAZ-to-TAZ trip table based on the relative attractiveness of the zone pairs. The initial gravity model trip table was combined with a manually estimated external-external through trip table. In the fourth step, trip assignment, separate increments of the final trip table were allocated to the highway network based on minimum calculated travel time paths. The final travel times were the result of free flow speed, distance, link volume/capacity delays, and intersection volume/delay capacity delays. The resulting assigned traffic volumes were compared to the actual observed traffic volumes. The parameters governing trip generation, distribution and assignment were selectively adjusted and the model rerun several times during the calibration process until the assigned volumes matched the actual link traffic counts.

To model the various Soule Road alternatives, the first step was to review the current model generated traffic volumes and compare them to the background volumes. Adjustments were then made to the land use information so that the model predicted volumes more closely matched to the actual traffic volumes. Land use information was then added to the model for the area south of Route 31 and west of Soule Road. The model initially had no employment data for this area since it was previously undeveloped. Based on recently completed traffic studies for the area, estimates of employment were made so that the model predicted traffic that closely matched the anticipated volumes.

Once the model was calibrated in the Route 31/Soule Road area, the next step was to model each of the four alternatives. A review of the four alternatives is presented below:

- No Build Alternative (Figure 11) – No changes to the roadway network are made and land use information based on Year 2020 data (currently in the regional model) is used.

- Alternative 1 (Figure 12) – Soule Road is relocated to the west and intersects Route 31 opposite Carling Road. The portion of Soule Road between the Interstate 481 southbound on ramp and Route 31 would remain.

- Alternative 2 (Figure 13) - Soule Road is relocated to the west and intersects Route 31 opposite Carling Road. The portion of Soule Road between the Interstate 481 southbound on ramp and Route 31 would become an on ramp to Interstate 481 southbound. All traffic destined for Soule Road southbound from Route 31 would be forced to use the relocated Soule Road. Traffic traveling north on Soule Road to the Interstate 481 southbound on ramp would be forced to use relocated Soule Road to Route 31.

- Alternative 3 (Figure 14) – This alternative is the same as Alternative 2 except a ramp would be constructed from Soule Road to Interstate 481 southbound so that traffic traveling north on Soule Road can access the Interstate 481 southbound on-ramp without having to travel to Route 31.

The results of the modeling are described below. It should be noted that when comparing alternatives, traffic volumes for Alternatives 1, 2 and 3 were compared back to the No Build Alternative. Traffic volume diagrams for the Future peak hours for each alternative are contained in Appendix H, Future (2023) Peak Hour Volumes (AM and Saturday peak hour traffic determination is described in the next section of the report).

No Build

The results of the modeling for the No Build Alternative show that there is not predicted to be a significant change in traffic. Traffic increases of generally less than one percent per year are projected for study area roadways. Due to the recent widening of Route 31 and the planned widening of Route 31 east of Great Northern Mall, traffic flow is generally projected to be good. It is not predicted that there will be any major shifts in traffic.

Alternative 1

The results of the modeling for Alternative 1 show that there is projected to be slight increases in traffic on Soule Road and a slight decrease in traffic on Route 31 west of the project area. This is likely due to the slightly quicker connection to Soule Road. Traffic that had previously traveled west of Route 31 to Route 57 south is projected to use the relocated Soule Road to travel in a generally southerly direction to reach Route 57. The amount of traffic using the Interstate 481 southbound on-ramp will generally be the same as under the No Build condition.

Alternative 2

The results of the modeling for Alternative 2 show that there will be a small change in travel patterns mainly due to the separation of Soule Road traffic and Interstate 481 southbound on-ramp traffic. A small portion of both the traffic traveling north on Soule Road that had previously used the Interstate 481 southbound on ramp and the traffic traveling west on Route 31 that had previously turned left onto Soule Road is projected to disperse through other local roads. The shifted traffic is expected to disperse through Route 57, Morgan Road, and Henry Clay Boulevard depending on the ultimate destination of the traffic. The shifted traffic is not expected to have an impact on the actual operations of any of the roadways.

Alternative 3

The results of the modeling for Alternative 3 are generally the same as Alternative 2, except that there is not the shift in traffic traveling north on Soule Road since Alternative 3 has a connection between Soule Road and the Interstate 481 southbound on-ramp. Traffic volumes are still projected to be lower on Soule Road mainly due to the additional travel time that is incurred traveling between Soule Road and Route 31 to and from the east.

B. AM & Saturday Traffic Determination

The SMTC Regional Travel Demand Model used to project future traffic volumes generated only PM peak hour traffic. Therefore, it was necessary to interpolate the AM and Saturday traffic projections from the PM peak hour data. The first step was to calculate the 20-year Future No Build percentage growth experienced by each movement of the PM peak hour traffic. These percentages were then applied to the AM and Saturday Background peak hour traffic to obtain the 20-year AM and

Saturday Future No Build traffic. Appendix I, Traffic Volume Worksheets, contains the worksheets used to calculate the AM and Saturday Future No Build traffic data.

The next step in the interpolation process was to determine the percentage relationship between the PM Future No Build turning movement volumes and the turning movement volumes in each of the Future Alternatives. A direct relationship was established between each movement for the intersections along Route 31. Since the Soule Road/Route 481 southbound On-ramp has a different configuration for each Alternative, assumptions were made to determine the individual percentage relationships for each Alternative. Once the percentage relationships were determined for the PM turning movement volumes, the percentages were applied to the AM and Saturday Future No Build turning movement volumes to determine the Future Alternative turning movement volumes. Appendix I, Traffic Volume Worksheets, contains the worksheets and assumptions used to determine the percentage relationships for all Alternatives. Appendix H, Future (2023) Peak Hour Volumes, contains the AM, PM, and Saturday Future volumes for all Alternatives.

XIII. TRAFFIC SIGNAL WARRANT ANALYSIS

Future No Build and Alternative 1 retain an intersection at Soule Road and the Route 481 southbound On-ramp. Photographs of the existing intersection were taken, looking both north and south, and are shown in Figures 15 and 16, respectively. The New York State Manual of Uniform Traffic Control Devices (NYS MUTCD) warrants were investigated to determine if a new traffic signal would be warranted at this location for either the Future No Build or Alternative 1 conditions. Table 3 summarizes the NYS MUTCD signal warrant results for the two alternatives. **The results indicate that a new traffic signal is warranted at the intersection for both alternatives.**

Table 3
SIGNAL WARRANT SUMMARY

Alternative	NYS MUTCD Signal Warrants										
	1	2	3	4	5	6	7	8	9	10	11
Future No Build	N	N	N	N	N	Y	N	N	N	M	N
Alternative 1	M	M	N	N	N	Y	N	M	M	Y	Y

Y - Meets warrants
N - Does not meet warrant
M - May meet warrant (further information required to fulfill warrant requirement)

The No Build scenario contains the intersection of Soule Road with the Route 481 southbound On-Ramp. There is no entering traffic from a minor street at this intersection, therefore, it will not be considered for Warrants 1, 2, 8, 9, and 11, which are based on side street volumes. Alternative 1 contains the addition of an eastbound leg to this intersection and will be considered for all 11 warrants. The following lists each warrant and the relation to the intersection.

Figure 15 – Photograph of Soule Road/Route 481 On-ramp intersection looking north

Figure 16 – Photograph of Soule Road/Route 481 On-ramp intersection looking south

Warrant 1 (minimum vehicular volume) states that there is excessive traffic entering the intersection. For eight hours of an average day, the major street requires a total of 600 vehicles on both approaches per hour, while the minor street, or driveway, requires 200 vehicles on one approach leg per hour. Appendix H, Future (2023) Peak Hour Volumes, contains the turning movement counts proposed for the AM, PM, and Saturday peak hours. The intersection in Alternative 1 does meet the warrant requirements in the AM, PM and Saturday peak hours and would likely meet the requirement for eight hours of an average day.

Warrant 2 (interruption of continuous flow) states that traffic volume on the major street is so severe that minor street, or driveway, traffic experiences extreme delay or hazard when in entering the major street. For eight hours of an average day, the major street requires a total of 900 vehicles on both approaches per hour while the minor street requires 100 vehicles on one approach leg per hour. The Alternative 1 intersection does meet the warrant requirement for the AM, PM, and Saturday peak hours and would likely meet the requirement for eight hours of an average day.

Warrant 3 (minimum pedestrian volume) states that a minimum pedestrian volume attempts to cross the major street. A traffic signal may be warranted if one of the following requirements is met:

- During each of any four hours of an average day 100 or more pedestrians cross the artery and there are fewer than 60 gaps per hour in traffic for them to cross, or
- During any one hour of an average day 190 or more pedestrians cross the artery and there are fewer than 60 gaps per hour in traffic for them to cross.

Neither the No Build nor Alternative 1 scenarios will increase pedestrian traffic enough to meet either requirement of this warrant.

Warrant 4 (school crossing) states that for an established school crossing, there are insufficient gaps in the vehicle stream to allow for pedestrian crossing. There is no school or established school crossing at this intersection.

Warrant 5 (progressive movement) states that a signal, as part of a coordinated system, would provide for progressive movement. A signal at this location would be part of the coordinated system but does not meet the spacing requirements to justify a signal through this warrant.

Warrant 6 (accident experience) states that five or more accidents have occurred within a twelve month period for that location. The Clay Shopping Center DEIS indicated that 5 accidents happened at this intersection between September 1994 and September 1995, therefore, this warrant is met for both scenarios.

Warrant 7 (systems) states that a traffic signal may be warranted at an intersection of two major routes to encourage organization and concentration of traffic flow. The proposed signal location is not the intersection of two major routes and does not meet the requirements of this warrant.

Warrant 8 (combination of warrants) states that if no single warrant is satisfied, but at least two of warrants 1 and 2 are attained to eighty percent of the normal volumes a signal is justified. Warrants 1 and 2 are attained to eighty percent of the normal values in the AM, PM, and Saturday peak hours, for Alternative 1, and would likely meet the requirement for eight hours of an average day.

Warrant 9 (four hour volumes) states that for short periods of the day the side road traffic experiences excessive delays in attempting to enter or cross the artery. For four hours of an average day the plotted points must fall above the appropriate curve on Figure 271-1 of the NYS MUTCD (included in Appendix J, NYS MUTCD Signal Warrant Figures 271-1 & 271-3). The plotted points fall well above the appropriate curve for Alternative 1 during the AM, PM and Saturday peak hours and would likely meet the requirement for four hours of an average day.

Warrant 10 (peak hour delay) states that for brief periods of an average day the side road traffic is subject to excessive delays in attempting to enter or cross the artery. For one hour of an average day, the total entering volume entering the intersection is 650 or more vehicles and the side road has 150 or more entering vehicles and experiences five vehicle-hours or more of delay. The proposed eastbound movement in Alternative 1 will meet this warrant for the AM, PM, and Saturday peak hours. The delay for the eastbound movement also exceeds five vehicle-hours of delay. The No Build scenario does not contain a side road with entering traffic. However, the total volume entering the intersection is over 650 vehicles and the southbound left turn movement experiences an excessive delay of per vehicle of 6.88-hours during the AM peak period (629 vehicles at 39.4 sec/veh). Therefore, it should be considered as meeting this warrant.

Warrant 11 (peak hour volume) states that for brief periods of an average day the side road traffic is subject to excessive delays in attempting to enter or cross the artery. For one hour of an average day the plotted point falls above the appropriate curve on Figure 271-3 of the NYS MUTCD (included in Appendix J, NYS MUTCD Signal Warrant Figures 271-1 & 271-3). The plotted point falls well above the appropriate curve for the AM, PM and Saturday peak hours, therefore, the peak hour volume warrant is met for Alternative 1.

XIV. TRANSPORTATION ISSUES

A. Future 20-Year Capacity Analysis

The four alternatives presented in Figures 11, 12, 13, and 14 were analyzed in Synchro 5.0 to determine if the existing highway network will adequately accommodate the 20-year traffic projections. The AM, PM, and Saturday Future traffic volumes for each alternative were first analyzed using the existing highway network. Figure 10 presented the background lane configurations for each immediate study area intersection. Timing, phasing, and cycle length optimizations were performed in an attempt to maintain the Background LOS. Tables 4, 5, 6, and 7 present the overall Background and Future (20-year) LOS at each intersection, for each alternative, within the immediate study area. Appendices K-N contain the movement LOS and delay summary and calculations for the Background and optimized Future LOS for all immediate study area intersections.

Table 4 FUTURE (2023) NO BUILD OVERALL LOS SUMMARY							
Route 31 Intersection	**Signalized (S) Unsignalized (U)**	**AM Peak**		**PM Peak**		**Saturday Peak**	
Background 2003 (B), Future 2023 (F)		**B**	**F**	**B**	**F**	**B**	**F**
Carling Road	S	B	B	C	C	C	D
Wegmans Drive	S	A	A	D	D	D	E
Soule Road	S	B	B	D	D	E	E
Route 481 NB ramps	S	B	B	C	D	C	C
Soule Road/Route 481 SB On-Ramp	U	D	E	C	C	C	D

Table 5 FUTURE (2023) ALTERNATIVE 1 OVERALL LOS SUMMARY							
Route 31 Intersection	**Signalized (S) Unsignalized (U)**	**AM Peak**		**PM Peak**		**Saturday Peak**	
Background 2003 (B), Future 2023 (F)		**B**	**F**	**B**	**F**	**B**	**F**
Carling Road	S	B	B	C	C	C	C
Wegmans Drive	S	A	A	D	D	D	D
Soule Road	S	B	B	D	C	E	D
Route 481 NB ramps	S	B	B	C	D	C	C
Soule Road/Route 481 SB On-Ramp	S	N/A	C	N/A	C	N/A	C

N/A – Not Applicable as this required a new signal as per the signal warrant analysis

Table 6 FUTURE (2023) ALTERNATIVE 2 OVERALL LOS SUMMARY							
Route 31 Intersection	**Signalized (S) Unsignalized (U)**	**AM Peak**		**PM Peak**		**Saturday Peak**	
Background 2003 (B), Future 2023 (F)		**B**	**F**	**B**	**F**	**B**	**F**
Carling Road	S	B	B	C	C	C	D
Wegmans Drive	S	A	A	D	D	D	D
Soule Road	S	B	B	D	B	E	B
Route 481 NB ramps	S	B	B	C	C	C	C
Soule Road/Route 481 SB On-Ramp	U	D	N/A	C	N/A	C	N/A

N/A – Not Applicable as the intersection does not exist in this alternative

Table 7 FUTURE (2023) ALTERNATIVE 3 OVERALL LOS SUMMARY							
Route 31 Intersection	**Signalized (S) Unsignalized (U)**	**AM Peak**		**PM Peak**		**Saturday Peak**	
Background 2003 (B), Future 2023 (F)		**B**	**F**	**B**	**F**	**B**	**F**
Carling Road	S	B	B	C	C	C	D
Wegmans Drive	S	A	A	D	D	D	D
Soule Road	S	B	B	D	B	E	B
Route 481 NB ramps	S	B	B	C	C	C	C
Soule Road/Route 481 SB On-Ramp	U*	D	C	C	D	C	D

* The Background LOS represents the SB left-turn movement, the Future LOS represents the NB merge onto the Route 481 SB ramp

In each alternative, there were peak periods where the LOS improved between the Background and Future years and peak periods where the LOS was degraded between Background and Future years. The instances where the LOS improved between Background and Future years were due to either the modified traffic flow (typically a decrease in traffic through the individual intersection) from an individual alternative or the timing, phasing, and/or cycle length optimization.

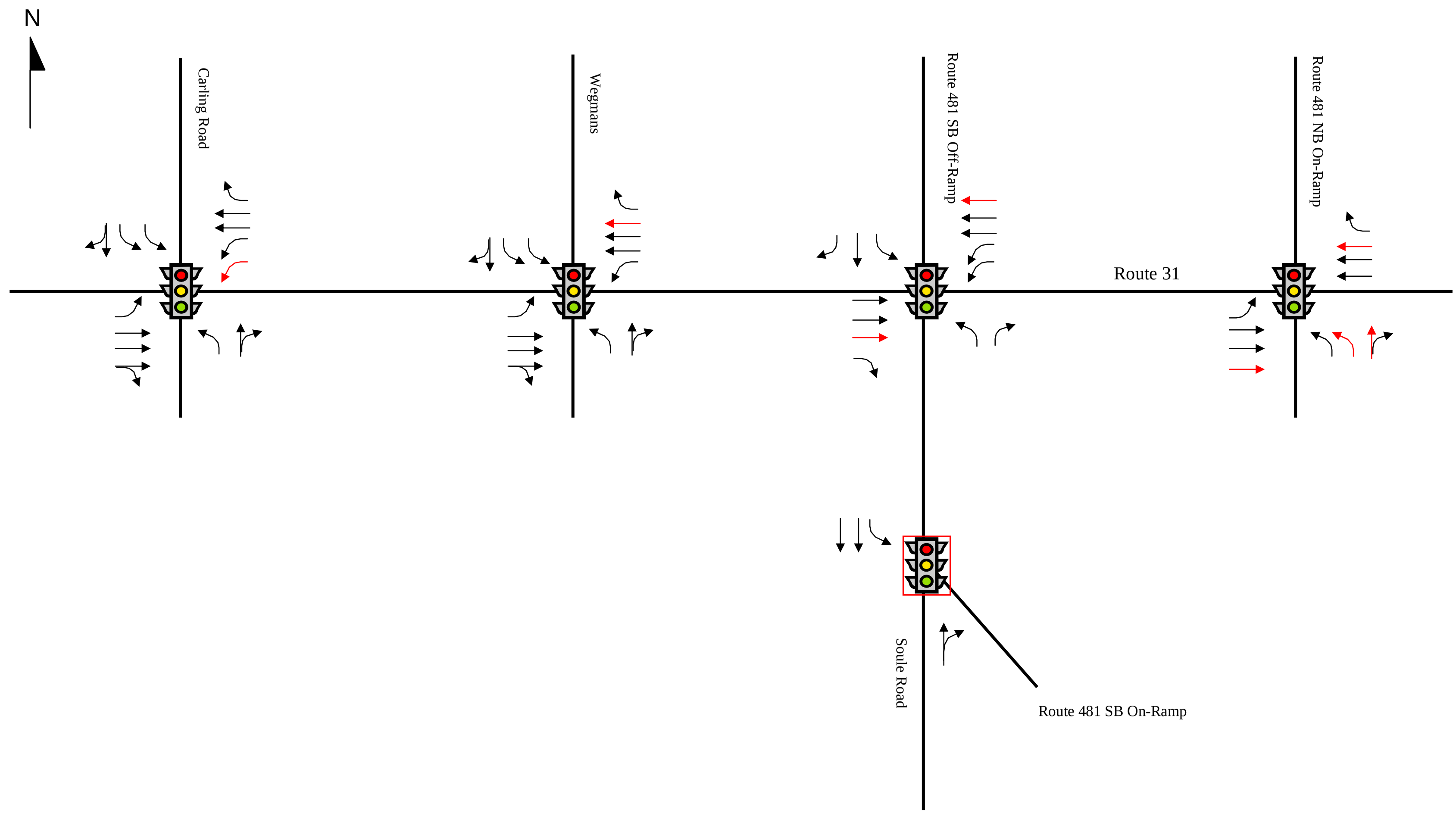
The instances where the LOS degraded in the Future 20-year scenario were due to the increased 20-year traffic flows in the area and the change in traffic flows from an individual alternative. The following section investigates the instances where either the Future 20-year overall LOS was degraded or significant individual movements experienced degradation in LOS to unacceptable levels (typically LOS F). Progressively more intrusive mitigation measures were evaluated until a measure was identified that would mitigate the degraded LOS back to an acceptable level. For example, timing/phasing/cycle length optimizations would first be considered, then striping modifications, then auxiliary lane additions, then through movement lane additions, then bridge widening.

1. Future No Build (Figure 11)

For the Future No Build Alternative, the existing highway network configuration experienced no modifications (i.e. no Carling Road extension). This alternative did however, allow for modifications to individual intersections to mitigate LOS deficiencies. The existing Soule Road/Route 31/Route 481 southbound On-ramp interchange was maintained and the Future No Build traffic volumes were applied. The LOS results in Table 4 indicate that mitigation measures were required for this alternative to accommodate the 20-year traffic volumes. Appendix K, Future No Build Level of Service Results, contains the Background, Future (without mitigation measures), and Future (with mitigation measures) LOS results. Figure 17 presents the proposed mitigation measures necessary for the Future No Build Alternative to accommodate the Future 20-year traffic volumes.

At the Route 31/Carling Road intersection the overall LOS degraded during the Saturday peak hour. A second westbound left-turn lane was added at this intersection to mitigate the change in delays. The westbound through movement still experiences a change in LOS (B to C) for the Saturday peak period, however, the Background LOS is just below the threshold for LOS C and the actual change in delay will be barely perceivable to the average driver.

Break in Access Study
Soule Road, March 2003



Key:
Red arrows or outlines indicate mitigation measures

Syracuse Metropolitan Transportation Council
Transportation Planning for the Syracuse Metropolitan Area

**FIGURE 17
FUTURE NO BUILD (WITH MITIGATION) LANE CONFIGURATIONS**

Fisher Associates
ENGINEERS AND SURVEYORS

The westbound through movement at the Route 31/Wegmans Drive intersection deteriorates to LOS F during all peak periods. The eastbound through movement experiences a decrease in LOS during both the AM and Saturday peak periods. These decreases in LOS during the Saturday peak period cause the overall LOS to deteriorate from LOS D to LOS E. The addition of a third westbound through lane at this intersection, in combination with timing and offset optimization, improves the LOS to acceptable levels for all peak periods. The final analysis shows a decrease in LOS for the eastbound left-turn and northbound through movements. In both cases the final LOS is slightly over the threshold between levels. Further mitigation is not warranted, the change in LOS is not likely to be noticed by the average driver.

The Route 31/Soule Road intersection experiences failing LOS for the eastbound and westbound through movements during the Saturday peak periods. In addition, the eastbound right-turn movement deteriorates during the PM and Saturday peak periods. The addition of a third eastbound and third westbound through lane brings the LOS to acceptable levels. These additional through lanes require a widening of the Route 31 bridge over Route 481. The final LOS at the Route 31/Soule Road intersection shows a decrease in LOS for the eastbound right-turn and westbound left-turn movements. Further mitigation would have been a third westbound left-turn lane and/or second eastbound right-turn lane to mitigate LOS increases for only two movements. These measures, if implemented, would decrease the safety of the intersection, while providing only a slight improvement in delay and LOS therefore, they are not recommended. The final LOS for the southbound right-turn movement shows a decrease in LOS during the PM peak period, however, the actual change in delay is only 4.1 seconds as the Background and Future delays are at the threshold between two levels.

The Route 31/Route 481 NB ramp intersection experienced an overall decrease in LOS during the PM peak period. Prior to determining mitigation measures for this intersection, the additional through lanes over the Route 31/Route 481 bridge (required for the Route 31/Soule Road intersection) were analyzed at this intersection. The addition of these through lanes mitigated most LOS concerns. The northbound left-turn movement during the PM peak period was still experiencing a decrease in LOS, therefore, a striping modification was made to the northbound approach. The center lane was modified from a shared through/left to a second exclusive left-turn lane, the exclusive right-turn lane modified to a shared through/right-turn lane.

The Soule Road/Route 481 southbound On-ramp intersection experiences a decrease in LOS for the AM and Saturday peak periods. A mitigation measure to improve the southbound left-turn LOS is to install a new traffic signal at this location. The signal warrant analysis discussed above indicates that this location does meet one or more NYSDOT traffic signal warrants.

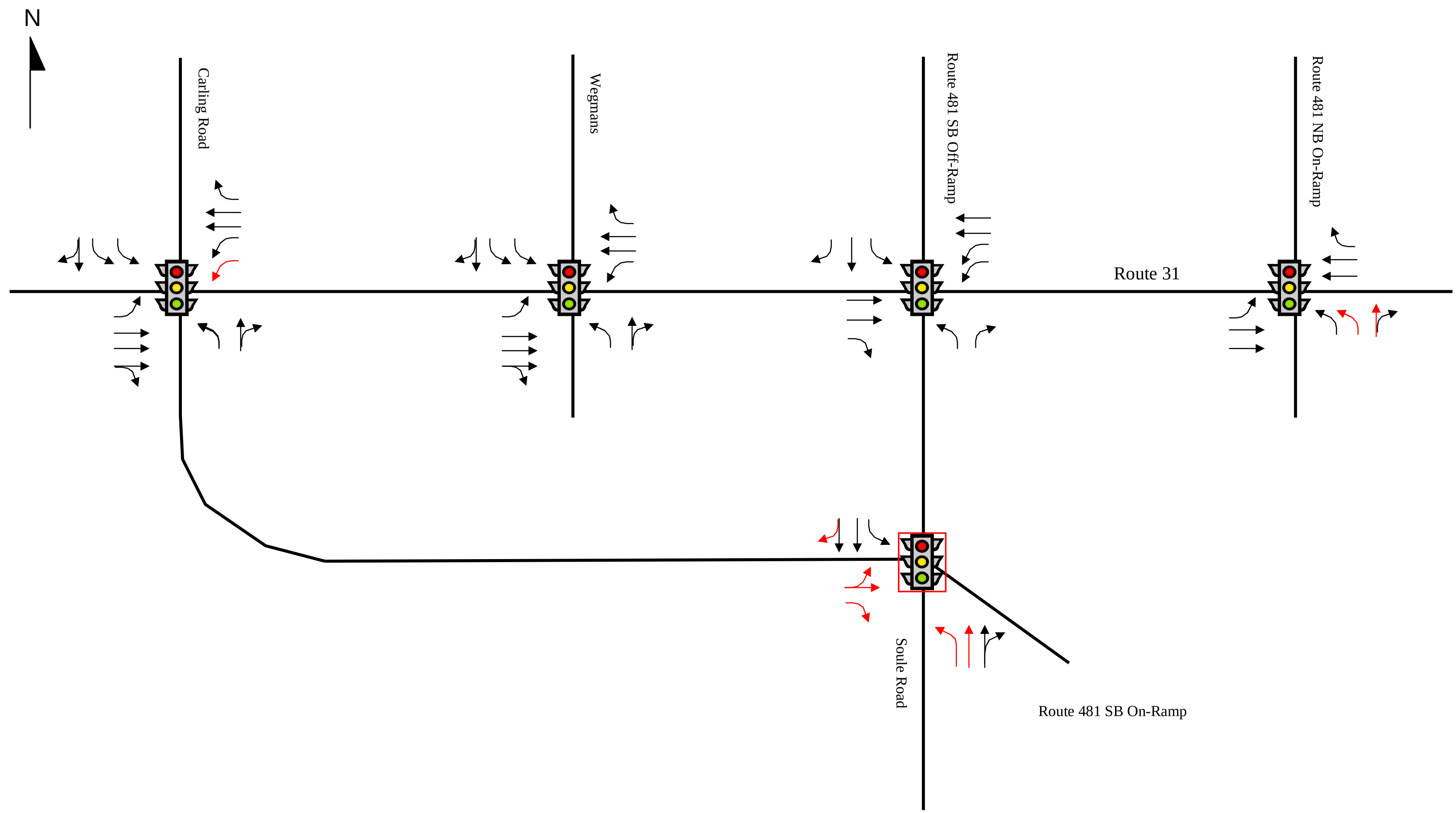
2. Alternative 1 (Figure 12)

For Alternative 1, Soule Road is relocated to the west and intersects Route 31 opposite Carling Road. The portion of Soule Road between the Interstate 481 southbound on ramp and Route 31 would remain. The 20-year Alternative 1 traffic was applied to the Alternative 1 highway network to determine where there would be an overall decrease in LOS or a decrease in a significant individual movement LOS. The LOS results in Table 5 indicate mitigation measures were required for this alternative to accommodate the 20-year traffic volumes. Appendix L, Alternative 1 Level of Service Results, contains the Background, Future (without mitigation measures), and Future (with mitigation measures) LOS results. Figure 18 presents the proposed mitigation measures necessary for Alternative 1 to accommodate the Future 20-year traffic volumes.

The Route 31/Carling Road intersection experiences a decrease in movement LOS during the PM and Saturday peak periods. The PM peak period decrease in LOS occurred for the eastbound through/right movement and the northbound through/right movement. The Saturday peak period decrease in LOS occurred for the westbound left-turn movement. The measure identified to mitigate the decreased LOS was a second WB left-turn lane. The final analysis shows a decrease in LOS for the westbound through movement during the Saturday peak period and for the northbound through/right turn movement during the PM peak period. The decrease in delay for the westbound through movement was only 5.1 seconds and the Background LOS was just below the threshold between levels, therefore, no further mitigation was warranted. The northbound through/right turn movement decrease in delay can be mitigated with a signal phasing modification that cannot be modeled in Synchro. Similar to the existing signal phasing at the Wegmans Drive intersection, it is recommended that a northbound right-turn arrow be implemented during both the northbound phase and during the eastbound/westbound left-turn phase. This should improve the Future delay to Background levels.

The Route 31/Wegmans Drive intersection experienced a LOS decrease for the northbound through/right movement during the PM and Saturday peak periods. As discussed for the Carling Road intersection, Synchro cannot model the actual signal phases currently in place. Therefore, the decrease shown for the analysis is not anticipated to occur in the future. The final analysis shows a decrease in LOS for the eastbound left-turn movement during the Saturday peak period. This decrease was created, as additional green time was necessary for the westbound through movement to mitigate vehicle queuing in the westbound direction. The traffic volumes indicate there will only be 16 eastbound left-turning vehicles during the Saturday peak period, therefore, mitigation measures were not considered appropriate.

Break in Access Study
Soule Road, March 2003



Key:
Red arrows or outlines indicate mitigation measures

Syracuse Metropolitan Transportation Council
Transportation Planning for the Syracuse Metropolitan Area

FIGURE 18
ALTERNATIVE 1 (WITH MITIGATION)
LANE CONFIGURATIONS

Fisher Associates
ENGINEERS AND SURVEYORS

The Route 31/Soule Road intersection contained a LOS F for the eastbound through movement during Background and Future, PM and Saturday peak periods. Signal timing and offset optimization reduced the delay to LOS D without significantly impacting other movements within the intersection. The final analysis shows a LOS decrease during the PM peak period for the westbound through, northbound right-turn, and southbound right-turn movements. As green time and offsets were shifted to improve the failing eastbound movement, these other movements experienced slight decreases in delay, however, none warranted mitigation measures. The overall delay for the intersection actually increased over 16 seconds during the PM peak period and over 29 seconds during the Saturday peak period.

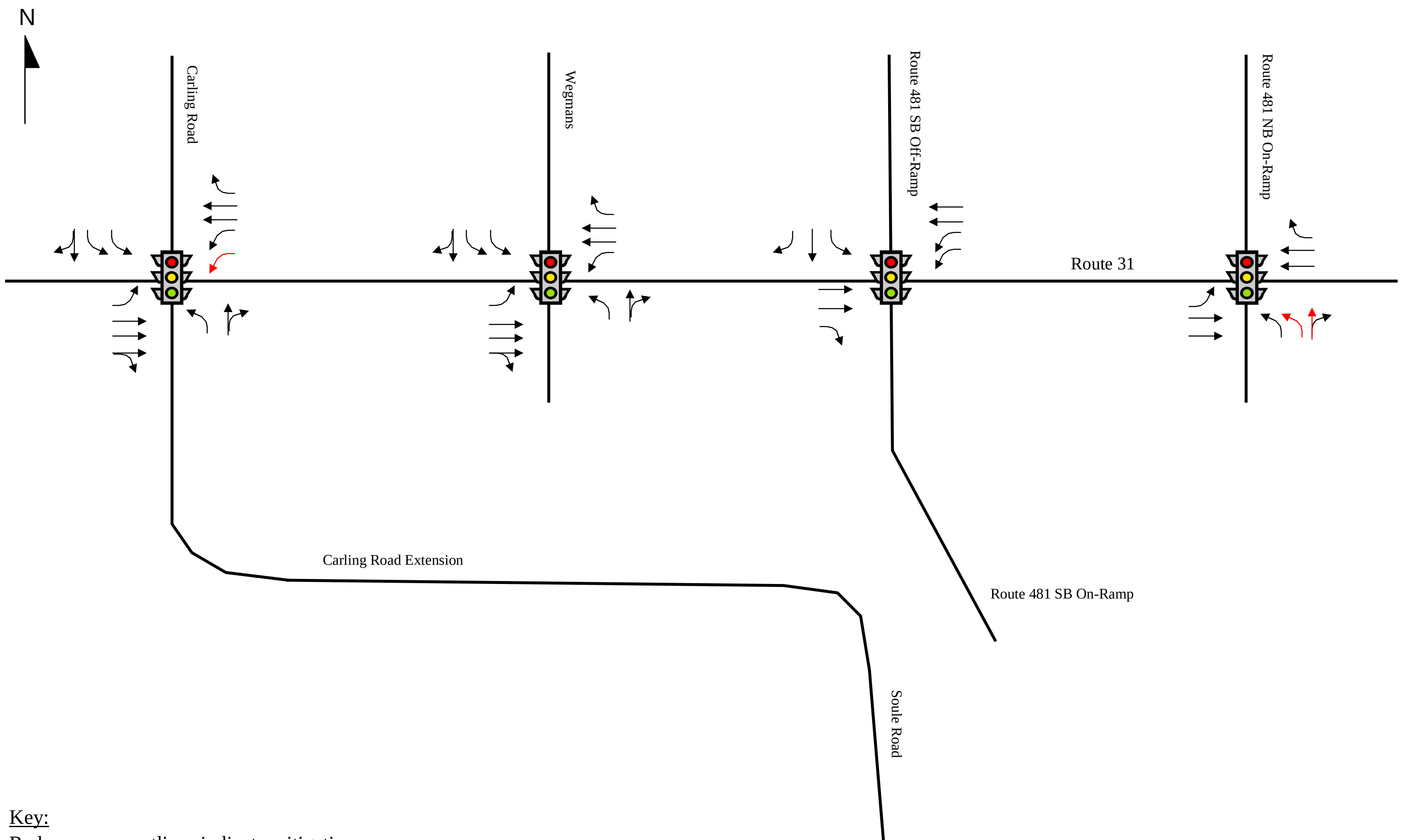
The Route 31/Route 481 NB ramps intersection experienced an overall decrease in delay for the PM peak period. The northbound approach was re-striped to provide two exclusive left-turn lanes and one shared through/right-turn lane. This modification, along with timing and offset optimization, mitigated the LOS decrease. The final analysis shows a decrease in LOS for the eastbound through movement, however, the decrease is only 1.3 seconds (not perceivable to the average driver).

3. Alternative 2 (Figure 13)

In Alternative 2, Soule Road is relocated to the west and intersects Route 31 opposite Carling Road. The portion of Soule Road between the Interstate 481 southbound on ramp and Route 31 would become an on ramp to Interstate 481 southbound. All traffic destined for Soule Road southbound from Route 31 would be forced to use the relocated Soule Road. Traffic traveling north on Soule Road to the Interstate 481 southbound on ramp would be forced to use relocated Soule Road to Route 31. The LOS results in Table 6 indicate mitigation measures were required for this alternative to accommodate the 20-year traffic volumes. Appendix M, Alternative 2 Level of Service Results, contains the Background, Future (without mitigation measures), and Future (with mitigation measures) LOS results. Figure 19 presents the proposed mitigation measures necessary for Alternative 2 to accommodate the 20-year traffic volumes.

Similar to Alternative 1, the Route 31/Carling Road intersection experiences a decrease in overall LOS during the Saturday peak period. The measure identified to mitigate the decreased LOS was a second WB left-turn lane. The final analysis shows a decrease in LOS for the northbound through/right movement during the PM peak period and for the southbound through/right movement during the Saturday peak period. As mentioned previously, a right-turn overlap phase for the northbound and southbound movements should eliminate the decreases in delay.

Break in Access Study
Soule Road, March 2003



Key:
Red arrows or outlines indicate mitigation measures

Syracuse Metropolitan Transportation Council
Transportation Planning for the Syracuse Metropolitan Area

FIGURE 19
ALTERNATIVE 2 (WITH MITIGATION)
LANE CONFIGURATIONS

Fisher Associates
ENGINEERS AND SURVEYORS

The Route 31/Wegmans Drive intersection experiences decreases in movement LOS during the PM and Saturday peak periods. No physical mitigation measures are proposed for this intersection as signal timing, phasing, and offset optimization will reduce the LOS concerns. The final analysis shows LOS decreases for the northbound and southbound movements (PM and Saturday peak periods) that will likely not be present due to the previously discussed overlap phases. The eastbound left-turn phase shows a decrease in LOS during the Saturday peak period, however, this is a minor movement (62 vehicles) that does not warrant mitigation measures. Finally, the southbound left-turn movement experiences a decrease in LOS during the PM peak period, however, the decrease in delay is only 0.9-seconds.

The Route 31/Soule Road intersection experienced movement LOS decreases during the PM and Saturday peak periods. No physical mitigation measures are proposed for this intersection as signal timing, phasing, and offset optimization reduced the LOS concerns. The final analysis shows a decrease in LOS for the westbound through movement during the PM peak period from LOS A to LOS B that will not significantly affect traffic flow. The westbound left-turn and southbound left-turn movements show LOS decreases during the Saturday peak period. The westbound left-turn delay is just over the threshold to cause a decrease in LOS and does not warrant mitigation measures. The southbound left-turn movement has experienced a decrease in delay as green time was shifted to the mainline Route 31 vehicles to optimize traffic flow. The overall delay for this intersection during the Saturday peak period was reduced over 47 seconds.

Timing, phasing, and offset optimization, along with a re-striping of the northbound approach, mitigated the movement LOS decreases at the Route 31/Route 481 northbound ramps intersection experienced during the PM peak period. The northbound approach was re-striped to provide two exclusive left-turn lanes and a shared through/right-turn lane. The final analysis shows a LOS decrease for the northbound left-turn movement during the Saturday peak period. The actual delay decrease, however, is only 2.1 seconds that will not be perceivable to most drivers.

4. Alternative 3 (Figure 14)

Alternative 3 is the same as Alternative 2 except a ramp would be constructed from Soule Road to Interstate 481 southbound so that traffic traveling north on Soule Road can access the Interstate 481 southbound on-ramp without having to travel to Route 31. The LOS results in Table 7 indicate mitigation measures were required for this alternative to accommodate the 20-year traffic volumes. Appendix N, Alternative 3 Level of Service Results, contains the Background, Future (without mitigation measures), and Future (with mitigation measures) LOS results. Figure 20 presents the proposed mitigation measures necessary for Alternative 3 to accommodate the 20-year traffic volumes.

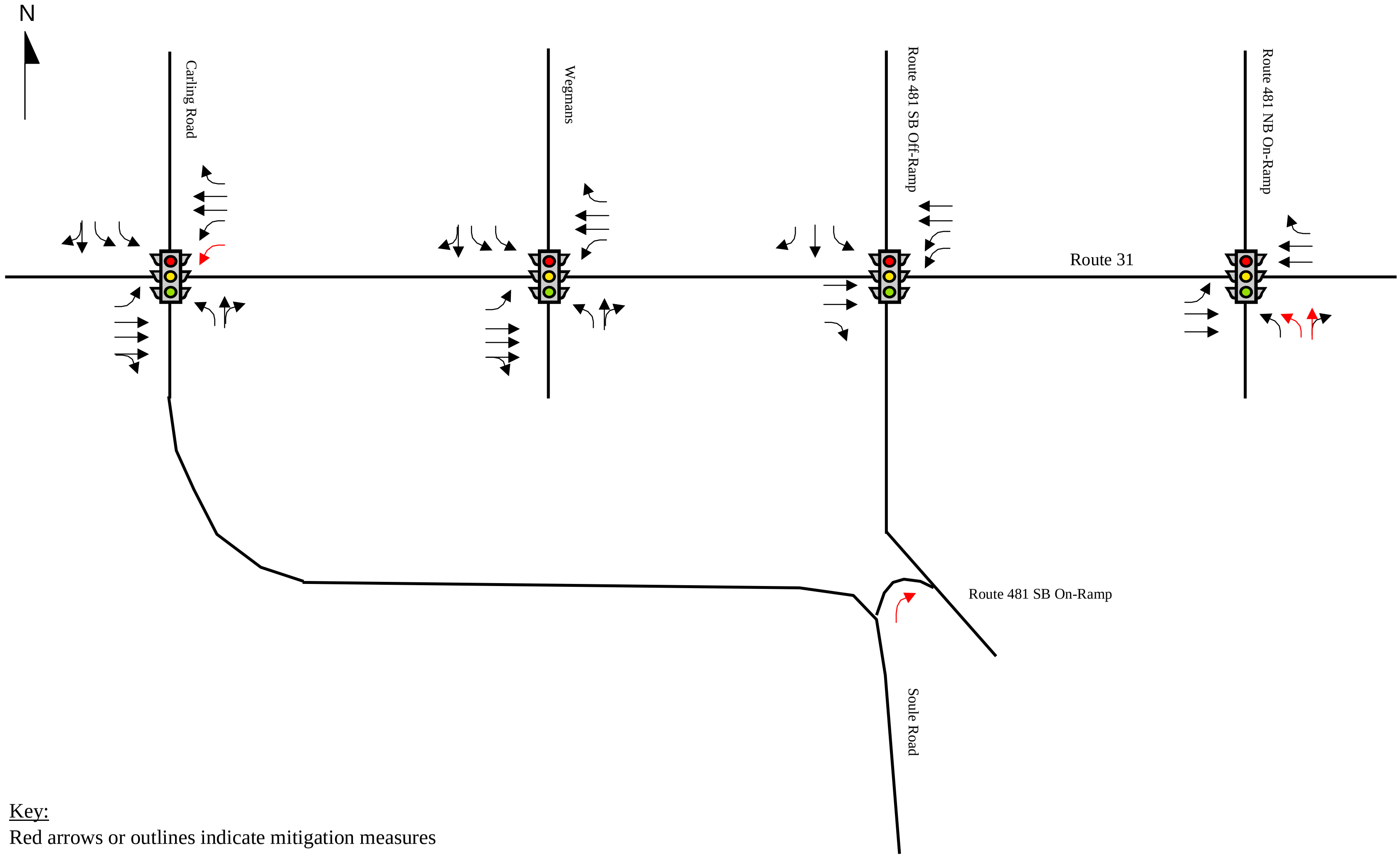
Similar to Alternatives 1 & 2, the Route 31/Carling Road intersection experiences a decrease in overall LOS during the Saturday peak period. The measure identified to mitigate the decreased LOS was the same as Alternatives 1 & 2, a second WB left-turn lane. The final analysis shows a decrease in LOS for the northbound through/right movement during the PM peak period and for the southbound through/right movement during the Saturday peak period. As mentioned previously, a right-turn overlap phase for the northbound and southbound movements should eliminate the decreases in delay. The westbound through movement shows a decrease in LOS during the Saturday peak period, however, the Background LOS is just below the threshold between levels of service, therefore, the actual delay decrease does not warrant mitigation measures.

The Route 31/Wegmans Drive intersection experiences decreases in movement LOS during the PM and Saturday peak periods. No physical mitigation measures are proposed for this intersection as signal timing, phasing, and offset optimization will reduce the LOS concerns. The final analysis shows LOS decreases for the northbound and southbound movements (PM and Saturday peak periods) that will likely not be present due to the previously discussed overlap phases. The eastbound left-turn phase shows a decrease in LOS during the Saturday peak period, however, this is a minor movement (63 vehicles) that does not warrant mitigation measures.

The Route 31/Soule Road intersection experienced movement LOS decreases during the PM and Saturday peak periods. No physical mitigation measures are proposed for this intersection as signal timing, phasing, and offset optimization reduced the LOS concerns.

The final analysis shows a decrease in LOS for the westbound through movement during the PM peak period from LOS A to LOS B that will not significantly affect traffic flow. The westbound left-turn and southbound left-turn movements show LOS decreases during the Saturday peak period. The southbound left-turn delay is just over the threshold to cause a decrease in LOS and does not warrant mitigation measures. The westbound left-turn movement has experienced a decrease in delay as offsets were shifted along the corridor to optimize traffic flow. The overall LOS for this intersection during the Saturday peak period was improved from LOS E to LOS B.

Break in Access Study
Soule Road, March 2003



Key:
Red arrows or outlines indicate mitigation measures

Syracuse Metropolitan Transportation Council
Transportation Planning for the Syracuse Metropolitan Area

FIGURE 20
ALTERNATIVE 3 (WITH MITIGATION)
LANE CONFIGURATIONS

Fisher Associates
ENGINEERS AND SURVEYORS

Timing, phasing, and offset optimization, along with a re-striping of the northbound approach, reduced the movement LOS concerns at the Route 31/Route 481 northbound ramps intersection experienced during the PM peak period. The northbound approach was re-striped to provide two exclusive left-turn lanes and a shared through/right-turn lane. The final analysis shows a LOS decrease for the eastbound through movement and left-turn movement during the PM peak period. These LOS decreases are a result of green time shifted to the high volume of northbound left-turning vehicles (922 vehicles). Further mitigation measures were not warranted as the overall intersection LOS was maintained.

B. ***Alternative Safety***

The safety of each alternative was investigated to determine the roadway configuration that would provide the safest travel for the motorists. The Safety Evaluation was completed assuming the mitigation measures discussed above are in place. All alternatives include lane additions along Route 31 to improve traffic flow through the corridor. These improvements should improve safety by reducing congestion and driver frustration. In turn, the associated accident types (i.e. rear-end) should also decrease. As this is true for all alternatives, only the actual roadway configuration changes have been considered in the Safety Evaluation below. The roadway configuration for each alternative will be restated followed by a discussion of the safety of each of the alternative configurations.

The Future No Build alternative maintains the existing roadway configuration with a new traffic signal at the Soule Road/Route 481 southbound on-ramp. The new traffic signal will reduce the number of left-turn accidents between southbound vehicles attempting to access the Route 481 southbound on-ramp and the northbound through vehicles traveling to Route 31. The new traffic signal will not, however, reduce the overall number of accidents at the intersection. The traffic signal will reduce the severity of the accidents, replacing the left-turn accidents with less severe accident types, such as rear-end accidents. Therefore, the safety will improve as the likelihood of injury at the intersection will decrease, however, the overall accident rate will likely not decrease.

Alternative 1 includes the addition of the Carling Road extension from the Route 31/Carling Road intersection to the Soule Road/Route 481 southbound on-ramp intersection. Similar to the Future No Build alternative, a new traffic signal will be provided at the Soule Road/Route 481/(and now Carling Road) intersection. As with the Future No Build Alternative, the new traffic signal will reduce the severity of the accidents at this intersection. The addition of the fourth intersection leg, however, will provide a greater opportunity for more accidents. This intersection configuration will provide an improvement in safety from the existing condition, but will not be as safe as the Future No Build configuration.

Alternative 2 separates Soule Road from the Route 481 southbound on-ramp to provide a traditional diamond interchange between Route 31 and Route 481. The existing identified accident concern will be eliminated, as there will no longer be a conflict between the southbound traffic destined for Route 481 southbound and the northbound traffic on Soule Road. The northbound traffic is re-routed to intersect Route 31 opposite Carling Road. Northbound Soule Road traffic destined for Route 481 southbound will now be required to make a right-turn at the Route 31/Soule Road/Carling Road intersection, travel straight through the Wegmans Drive intersection, and then turn right onto the new Route 481 southbound on-ramp. Any possible accidents associated with the additional travel movements are not anticipated to be severe type accidents as the vehicles would actually turn right onto Route 31, stay in the right hand lane and exit Route 31 in the right-turn only lane. Alternative 2 will provide an improvement in safety from the existing condition as the existing Route 31/Route 481 southbound on-ramp intersection is eliminated. For this same reason, Alternative 2 will also provide a safer roadway configuration than the Future No Build alternative or Alternative 1. The additional travel movements created by Alternative 2 will not produce as many accidents as the new traffic signal in the Future No Build alternative or Alternative 1.

Alternative 3 provides the same roadway configuration as Alternative 2 with the addition of a slip ramp from Soule Road northbound to Route 481 southbound. This alternative eliminates the existing accident pattern at the Soule Road/Route 481 southbound on-ramp intersection. The addition of a slip ramp from Soule Road to Route 481 southbound, however, introduces new, possibly severe, accident potential. Traffic traveling north on Soule Road, destined for Route 481 southbound will now have to merge with traffic coming from Route 31 and quickly accelerate onto Route 481 southbound. This new merge point at the middle of an on-ramp is not a common situation and violates typical driver expectation. A new accident potential includes high speed, accelerating vehicles from Route 31 sideswiping or rear-ending merging vehicles from the Soule Road slip ramp. Another accident potential is between vehicles waiting to merge onto the ramp from Soule Road. Drivers will typically be looking back over their shoulder to find a gap in traffic and may not realize a vehicle in front of them is also still waiting to merge rear-ending and possibly pushing them into the path of an on-coming vehicle. Alternative 3, therefore, is considered the least safe of the alternatives analyzed, and may not even be considered safer than the existing condition.

In summary, Alternative 2 provides the safest roadway configuration of the alternatives analyzed. The Future No Build is considered the next safest alternative, followed by Alternative 1. Alternative 3 is considered the least safe of the alternatives and is not necessarily safer than the existing condition.

C. *Alternative Costs*

A Cost Evaluation was completed to evaluate the alternatives against one another with respect to the construction costs of the final network configurations. During the course of the study, it became apparent that the actual cost to construct the final network configurations could vary significantly due to several outstanding variables. Several of the variables include:

- The acquisition of additional Right-of Way along Route 31,
- The width of the proposed Carling Road Extension,
- The acquisition of the land for the Carling Road Extension (purchased or donated)
- The ROW width along Soule Road,
- The waterline though the immediate study area,
- Any other utility issues through the immediate study area, and
- Any possible environmental issues within the immediate study area.

Considering these outstanding variables, the costs used in the evaluation of the alternatives should not be used to program money for the construction of any of the alternatives, these costs are for comparative purposes only.

The mitigation measures identified above, and shown in Figures 17 through 20, were reviewed to determine the amount of new roadway and new bridge that will be required for each alternative. Appendix O, Square Footage Calculations, contains copies of Figures 17 through 20 along with the square footage calculations for each alternative.

For the comparative purposes of this study, the new roadway costs were estimated using a rough assumption cost of $1,000,000 per lane mile of new roadway. This equates into a square footage cost of approximately $16 per s.f. of new roadway. The new bridge construction costs were estimated using a rough assumption cost of $130 per s.f. of new structure. The cost of a new traffic signal is based on the complexity of the signal phasing desired. The Future No Build and Alternative 1 scenarios propose a new signal at the Soule Road / Route 481 southbound ramp intersection. The Future No Build Alternative proposes a relatively simple signal layout and phasing with Alternative 1 proposing a slightly more complex layout and phasing due to the additional intersection leg. Therefore, the cost estimate below will include a slightly higher cost for the Alternative 1 signal. Table 8 presents the results of the cost estimate calculations.

Table 8 NEW SQUARE FOOTAGE SUMMARY								
	ALTERNATIVE							
	Future No Build		Alternative 1		Alternative 2		Alternative 3	
CRITERIA	SF	Cost	SF	Cost	SF	Cost	SF	Cost
New Roadway	37	0.59	108	1.73	107	1.71	113	1.81
New Bridge	6	0.78	-	-	-	-	-	-
New Traffic Signal	-	0.08	-	0.10	-	-	-	-
Total Cost	**1.45**		**1.83**		**1.71**		**1.81**	

SF = Thousands of Square Feet
Cost = millions of dollars

The results in Table 8 indicate the Future No Build Alternative mitigation measures will be the least expensive at almost $300,000 less than the Alternative 2 mitigation measures. Alternatives 1 and 3 are both approximately $1.8 million. Alternatives 1, 2, & 3 are estimated to cost more than the Future No Build Alternative due to the construction of the connector road. The connector road itself may cost approximately $1.38 million using the $16 per s.f. assumption. Note that the costs in Table 8 should not be used to program money for the construction of any alternatives due to the outstanding variables discussed above. These costs should only be used to evaluate the alternatives against one another.

XV. __ALTERNATIVE EVALUATION__

Seven evaluation criteria were identified to measure the operational characteristics, safety, and costs associated with the four Future alternatives being investigated. The first five criteria are discussed together as Operational Criteria. The final two criteria, Safety and Cost of Improvements, were previously mentioned.

The Operational Criteria were obtained from Synchro 5.0. The values correspond to the total of each criterion for the individual peak hour investigated. The following is a definition of each of the Operational evaluation criteria:

ü **Average Speed:** This is the average speed of all vehicles for the peak hour. It includes both the vehicles in the through lanes and the vehicles in the turning lanes.

ü **Fuel Economy:** The calculation used to determine the fuel consumption. This calculation is a function of the speed, total vehicle miles traveled, signal delay, and total vehicle stops.

ü **Total Signalized Intersection Delay:** The intersection delay is the sum of the delay experienced by all vehicles traveling through the signalized intersections.

ü **Total Travel Time:** The total travel time is the hourly summary of the travel time for all vehicles in the immediate study area.

ü **Performance Index:** The Performance Index is a measure of the delays, stops, and queuing along the corridor. Synchro uses the Performance Index to assist in determining the optimal cycle length for intersections and corridors.

Tables 9, 11, 13, and 15 present Operational Comparison Matrices for the AM, PM, Saturday and Overall Average results, respectively. Appendix P, Operational Comparison Synchro Output Sheets, contains the Synchro output sheets for the Operational Comparison. Tables 10, 12, 14, and 16 present Operational Ranking Matrices for each peak hour and for the overall average. A ranking of "1" represents the best score for each individual criterion while a ranking of "4" represents the worst score for that criterion.

The Overall Rankings indicate Alternatives 2 & 3 will operate more efficiently than both the Future No Build Alternative and Alternative 1. This is due to the elimination of the Soule Road / Route 481 intersection for Alternatives 2 & 3. Elimination of an intersection will reduce overall delays, increase speeds, and improve overall fuel economy.

Tables 9 & 10 indicate that Alternative 2 and Alternative 3 will display the best operating characteristics during the AM peak period for the alternatives evaluated. The elimination of the Soule Road / Route 481 southbound on-ramp intersection (present in the Future No Build Alternative and Alternative 1) and associated delays, make Alternatives 2 & 3 the most desirable.

The results in Tables 11 & 12 indicate the Future No Build Alternative will produce the best operating characteristics during the PM peak period for the alternatives evaluated. This is primarily due to the use of a 90-second cycle length. A 100-second cycle length would reduce the overall delay for the signalized intersections in Alternative 2 and Alternative 3 with the exception of the Route 31/Route 481 northbound ramps intersection. This intersection would experience an increase in delay, as not all vehicles would be able to clear the intersection in one signal cycle (the longer cycle length would require vehicles to queue longer on the mainline and northbound off-ramp). These queues of vehicles would eventually compound and deteriorate the traffic flow in Route 31. The 90-second cycle length creates higher overall delay, however, all vehicles are accommodated in one signal cycle.

The results in Tables 13 & 14 indicate that Alternative 2 and Alternative 3 provide the best operating characteristics during the Saturday peak period for the alternatives evaluated. Similar to the AM peak period, the elimination of the Soule Road / Route 481 southbound on-ramp intersection (present in the Future No Build Alternative and Alternative 1) and associated delays, make Alternatives 2 & 3 the most desirable. The cycle length issue encountered during the PM peak period analysis is not an issue during the Saturday peak period as the Route 481 northbound off-ramp traffic is significantly lower.

Table 9 AM OPERATIONAL COMPARISON MATRIX					
CRITERIA	Background (2003)	**FUTURE (2023) ALTERNATIVE**			
		Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	23	19	19	22	24
Fuel Economy (mpg)	13.0	10.8	11.4	12.6	13.5
Total Intersection Delay (hr)	27	40	43	24	24
Total Travel Time (hr)	64	78	84	55	60
Performance Index	39.4	56.7	58.4	34.8	34.7

Table 10 FUTURE (2023) AM OPERATIONAL RANKING MATRIX				
CRITERIA	**ALTERNATIVE**			
	Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	3	3	2	1
Fuel Economy (mpg)	4	3	2	1
Total Intersection Delay (hr)	3	4	1	1
Total Travel Time (hr)	3	4	1	2
Performance Index	3	4	2	1
Average	**3.2**	**3.6**	**1.6**	**1.2**

Table 11 PM OPERATIONAL COMPARISON MATRIX					
CRITERIA	Background (2003)	**FUTURE (2023) ALTERNATIVE**			
		Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	11	15	13	13	14
Fuel Economy (mpg)	7.3	8.5	8.0	7.6	8.8
Total Intersection Delay (hr)	163	114	147	130	126
Total Travel Time (hr)	230	184	227	191	196
Performance Index	237.5	161.2	212.1	190.4	181.5

Table 12 FUTURE (2023) PM OPERATIONAL RANKING MATRIX				
CRITERIA	**ALTERNATIVE**			
	Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	1	3	3	2
Fuel Economy (mpg)	2	3	4	1
Total Intersection Delay (hr)	1	4	3	2
Total Travel Time (hr)	1	4	2	3
Performance Index	1	4	2	3
Average	**1.2**	**3.6**	**2.8**	**2.2**

Table 13 SATURDAY OPERATIONAL COMPARISON MATRIX					
CRITERIA	Background (2003)	FUTURE (2023) ALTERNATIVE			
		Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	10	13	13	14	14
Fuel Economy (mpg)	6.8	7.9	7.7	8.3	8.7
Total Intersection Delay (hr)	214	160	172	131	142
Total Travel Time (hr)	289	238	255	201	223
Performance Index	319.0	216.8	249.8	187.8	210.5

Table 14 FUTURE (2023) SATURDAY OPERATIONAL RANKING MATRIX				
CRITERIA	ALTERNATIVE			
	Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	3	3	1	1
Fuel Economy (mpg)	3	4	2	1
Total Intersection Delay (hr)	3	4	1	2
Total Travel Time (hr)	3	4	1	2
Performance Index	3	4	1	2
Average	**3.0**	**3.8**	**1.2**	**1.6**

Table 15 OVERALL OPERATIONAL COMPARISON MATRIX					
CRITERIA	Background (2003)	FUTURE (2023) ALTERNATIVE			
		Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	14.7	15.7	15	16.3	17.3
Fuel Economy (mpg)	9.0	9.1	9.0	9.5	10.3
Total Intersection Delay (hr)	134.7	104.7	120.7	95.0	97.3
Total Travel Time (hr)	194.3	166.7	188.7	149.0	159.7
Performance Index	198.6	144.9	173.4	137.7	142.2

Table 16 FUTURE (2023) OVERALL OPERATIONAL RANKING MATRIX				
CRITERIA	ALTERNATIVE			
	Future No Build	Alternative 1	Alternative 2	Alternative 3
Average Speed (mph)	3	4	2	1
Fuel Economy (mpg)	3	4	2	1
Total Intersection Delay (hr)	3	4	1	2
Total Travel Time (hr)	3	4	1	2
Performance Index	3	4	1	2
Average	**3.0**	**4.0**	**1.4**	**1.6**

XVI. PUBLIC INPUT

The results of the alternative evaluation were presented to the attendees of the final public meeting on January 30th, 2003. In addition, the alternatives were displayed on the SMTC website and at the Town of Clay Town Hall for two weeks after the final public meeting. These measures were used to maximize the amount of public input regarding the alternative evaluation and for use in preparing the final study recommendation.

All comments received throughout the study as well as the meeting minutes from the public meetings are contained in Appendix B, Public Comments & Meeting Minutes.

XVII. CONCLUSION

The Safety Evaluation indicated that Alternative 2 provides the safest roadway configuration of the alternatives considered. The Future No Build alternative and Alternative 1 provide safety improvements from the existing condition but are not as safe as Alternative 2. Alternative 3 is not considered an improvement from the existing condition.

The Operational Evaluation indicated that both Alternative 2 and Alternative 3 provide better operating characteristics than both the Future No Build Alternative and Alternative 1. Alternatives 2 & 3 minimize the number of signalized intersections within the immediate study area, thereby reducing the overall delay and congestion while increasing the average speeds and improving fuel economy. The Traffic Signal Warrant Analysis indicated that the Future No Build Alternative and Alternative 1 both require the construction of a new traffic signal at the Soule Road / Route 481 southbound on-ramp intersection (this signalized intersection is eliminated under Alternatives 2 & 3).

The Cost Evaluation indicated that the Future No Build Alternative appears to be less expensive to construct than the other alternatives. This is primarily due to the lack of the connector road in the Future No Build Alternative versus the other alternatives. Next is Alternative 2, followed by Alternative 3, then Alternative 1.

Considering the public comments, Safety Evaluation, Cost Evaluation, and Operational Evaluation presented in this study, Alternative 2 was shown to provide the best safety and operational characteristics of the alternatives evaluated and to have the second lowest estimated construction cost. Should the Town of Clay progress Alternative 2, it should be noted that a NYSDOT Break-in-Access will not be necessary as long as the interchange is constructed into a traditional diamond interchange.