TABLE OF CONTENTS

Introduction ........................................................................................................................................ 1

Background Data .................................................................................................................................. 2

Public Road Network .......................................................................................................................... 2
Study Intersections ............................................................................................................................... 3
Road Adequacy and Level of Service Threshold ................................................................................. 8
Level of Service Criteria for Signalized Intersections ...................................................................... 9
Level of Service Criteria for Two-way Stop Controlled Intersections ............................................... 10
Approximate Capacity of Ramp Roadways ......................................................................................... 11

Existing Analysis ............................................................................................................................... 12

Existing Traffic Counts ..................................................................................................................... 12
2008 Existing Capacity Analysis ........................................................................................................ 12

Future Analysis .................................................................................................................................. 21

Forecasted Traffic Volumes for 2018 & 2028 .................................................................................... 21
Future Capacity Analysis .................................................................................................................. 21

Mitigation ........................................................................................................................................... 33

Immediate Improvements ................................................................................................................ 33
Near-Term (2018) Improvements ....................................................................................................... 34
Long-Term (2028) Improvements ....................................................................................................... 35

Roundabout Design and Operations .................................................................................................. 39

Accident Analysis ............................................................................................................................... 41

Master Plan Improvements ............................................................................................................... 45

Conclusions ....................................................................................................................................... 48
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>City Overview</td>
<td>4</td>
</tr>
<tr>
<td>2A</td>
<td>Existing Lane Use &amp; Traffic Control (North &amp; West Solon)</td>
<td>5</td>
</tr>
<tr>
<td>2B</td>
<td>Existing Lane Use &amp; Traffic Control (South &amp; East Solon)</td>
<td>6</td>
</tr>
<tr>
<td>2C</td>
<td>Existing Lane Use &amp; Traffic Control (Central Solon)</td>
<td>7</td>
</tr>
<tr>
<td>3A</td>
<td>2008 Average Daily Traffic Volumes</td>
<td>14</td>
</tr>
<tr>
<td>3B</td>
<td>2008 Existing Traffic Volumes (North &amp; West Solon)</td>
<td>15</td>
</tr>
<tr>
<td>3C</td>
<td>2008 Existing Traffic Volumes (South &amp; East Solon)</td>
<td>16</td>
</tr>
<tr>
<td>3D</td>
<td>2008 Existing Traffic Volumes (Central Solon)</td>
<td>17</td>
</tr>
<tr>
<td>4A</td>
<td>2018 Average Daily Traffic Volumes</td>
<td>23</td>
</tr>
<tr>
<td>4B</td>
<td>2018 Traffic Forecasts (North &amp; West Solon)</td>
<td>24</td>
</tr>
<tr>
<td>4C</td>
<td>2018 Traffic Forecasts (South &amp; East Solon)</td>
<td>25</td>
</tr>
<tr>
<td>4D</td>
<td>2018 Traffic Forecasts (Central Solon)</td>
<td>26</td>
</tr>
<tr>
<td>5A</td>
<td>2028 Average Daily Traffic Volumes</td>
<td>27</td>
</tr>
<tr>
<td>5B</td>
<td>2028 Traffic Forecasts (North &amp; West Solon)</td>
<td>28</td>
</tr>
<tr>
<td>5C</td>
<td>2028 Traffic Forecasts (South &amp; East Solon)</td>
<td>29</td>
</tr>
<tr>
<td>5D</td>
<td>2028 Traffic Forecasts (Central Solon)</td>
<td>30</td>
</tr>
<tr>
<td>6A</td>
<td>Future Lane Use &amp; Traffic Control (North &amp; West Solon)</td>
<td>36</td>
</tr>
<tr>
<td>6B</td>
<td>Future Lane Use &amp; Traffic Control (South &amp; East Solon)</td>
<td>37</td>
</tr>
<tr>
<td>6C</td>
<td>Future Lane Use &amp; Traffic Control (Central Solon)</td>
<td>38</td>
</tr>
</tbody>
</table>

LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Levels of Service Summary</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Accident Summary</td>
<td>44</td>
</tr>
</tbody>
</table>
INTRODUCTION

This report presents an updated Master Transportation Plan Study for the City of Solon, Ohio. This study updates the Traffic Engineering Study: Intersection & Capacity Analysis – 20 Locations prepared by Traff-Pro Consultants, Inc. and dated October 1995. This updated study examines existing (2008) conditions at 37 selected intersections, presents an assessment of future conditions in 2018 and 2028, evaluates accident data, and identifies road improvements needed to adequately accommodate future traffic in 2018 and 2028.

The 37 subject intersections were selected based on their inclusion in the original 1995 traffic study and/or the Coral project (now withdrawn), and comments from City staff.

Tasks undertaken in this study included the following:

1. Collection of existing peak hour traffic information at 21 of the study intersections, as requested by City staff.
2. Review of existing peak hour traffic information collected at 16 intersections by GPD Group as part of the Coral project (now withdrawn).
3. Projected future traffic volumes 10 (2018) and 20 (2028) years hence, based on existing traffic and regional traffic growth.
4. Calculation of intersection levels of service based on the Highway Capacity Manual (HCM) methodology.
5. Identification of road improvements potentially needed to adequately accommodate future traffic in 2018 and 2028.
6. A review and analysis of accident data for the study intersections.
7. Recommendations for remedial actions based on a review of the accident data.

Sources of data for this analysis included the City of Solon, Traff-Pro Consultants, Inc., GPD Group, the Ohio Department of Transportation (ODOT), and the Northeast Ohio Areawide Coordination Agency (NOACA).
BACKGROUND DATA

Public Road Network

Primary regional access to the City of Solon is provided by US Route 422, OH Route 43 (Aurora Road), and OH Route 91 (SOM Center Road). Arterials within the city include Bainbridge, Cannon, Cochran/Harper, Liberty, Miles, Pettibone, and Solon Roads. These roads are shown on Figure 1 and described below:

**US Route 422** is a four-lane freeway with a posted speed limit of 55 miles per hour (mph). This roadway provides access to I-271, I-480, and Cleveland to the west. Interchanges provide access to the City of Solon at Harper Road and OH Route 91 (SOM Center Road).

**OH Route 43 (Aurora Road)** is a two-lane state highway with a posted speed limit of 35 mph throughout most of the City of Solon. It is a four-lane roadway through central Solon from near Old South Miles Road east to a point just beyond OH Route 91 (SOM Center Road) with a posted speed limit of 25 mph. This roadway provides access to I-480 and Cleveland to the west and Geauga Lake and Aurora to the southeast.

**OH Route 91 (SOM Center Road)** is a two-lane state highway with a posted speed limits of 35 mph from the city line near Miles Road south to the US Route 422 interchange. From the US Route 422 interchange south to the city line near Pettibone Road it is a four-lane roadway with posted speed limits of 25 and 35 mph. OH Route 91 (SOM Center Road) provides north-south access to the city.

**Bainbridge Road** is a two-lane local road with posted speed limits of 25 and 35 mph. Bainbridge Road provides east-west access within the city from Harper Road through central Solon connecting to points east of the city.

**Cannon Road** is a two-lane roadway with a posted speed limit of 35 mph. It provides east-west access to areas north of central Solon and US Route 422, connecting Solon Road to OH Route 43 (OH Route 43) west of the City.

**Cochran/Harper Road** is a two-lane local road from Miles Road south to the US Route 422 interchange and a four-lane arterial from US Route 422 to Pettibone Road south of the city. It has a posted speed limit of 35 mph. It provides access to the industrial areas on the west side of the City of Solon. This roadway is heavily traveled by large trucks serving this industrial area.

**Liberty Road** is a two-lane local road with a posted speed limit of 35 mph. It runs north-south, parallel to OH Route 91 (SOM Center Road) east of central Solon.

**Miles Road** is a two-lane local road with a posted speed limit of 35 mph. It is aligned east-west along the northern border of the city.

**Pettibone Road** is a two-lane local road running east-west near the southern border of the city. It has a posted speed limit of 35 mph.
Solon Road is primarily a two-lane roadway with a four-lane section in central Solon between OH Route 91 (SOM Center Road) and Davis Industrial Parkway. It has posted speed limits of 25 and 35 mph and provides access to central Solon.

Study Intersections

The 37 study intersections listed below were determined by reviewing the 1995 Traff-Pro study and consulting with city staff. The lane geometry and traffic controls at each of these intersections are shown on Figures 2A, 2B, and 2C. The Solon Road/Liberty Road and Solon Road/Cannon Road intersections are located outside of the City limits.

1. Hawthorne Parkway/Solon Road.
2. Harper Road/Cannon Road.
5. Harper Road/Bainbridge Road.
6. Harper Road/Cochran Road/OH Route 43 (Aurora Road).
7. Cochran Road/Solon Road.
8. OH Route 91 (SOM Center Road)/Miles Road.
9. OH Route 91 (SOM Center Road)/Cannon Road.
10. OH Route 91 (SOM Center Road)/Sherbrook Park Drive.
11. OH Route 91 (SOM Center Road)/US Route 422 Westbound Ramps.
12. OH Route 91 (SOM Center Road)/US Route 422 Eastbound Ramps.
13. OH Route 91 (SOM Center Road)/Solon Road.
14. OH Route 91 (SOM Center Road)/Sears Grand Entrance.
15. OH Route 91 (SOM Center Road)/Bainbridge Road.
16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road).
17. OH Route 91 (SOM Center Road)/Portz Parkway/Inwood Drive.
18. OH Route 91 (SOM Center Road)/Craemer Drive/School Driveway.
19. OH Route 91 (SOM Center Road)/Pettibone Road.
20. Solon Road/Liberty Road (outside City limits).
21. Solon Road/Cannon Road (outside City limits).
22. Solon Road/Timberlane Drive.
23. Solon Road/Brushwood Drive.
24. Solon Road/Lakeview Drive.
25. Solon Road/Kruse Drive.
26. Solon Road/Bainbridge Road.
27. Solon Road/OH Route 43 (Aurora Road).
28. OH Route 43 (Aurora Road)/Solon Boulevard.
29. OH Route 43 (Aurora Road)/Burger King/Solar Shopping Center Entrance.
30. OH Route 43 (Aurora Road)/Portz Parkway.
31. OH Route 43 (Aurora Road)/Ayleshire Drive.
32. OH Route 43 (Aurora Road)/Liberty Road.
33. OH Route 43 (Aurora Road)/Flanders Drive.
34. OH Route 43 (Aurora Road)/Pettibone Road.
35. Liberty Road/ Derby Downs Drive.
36. Liberty Road/Bainbridge Road.
37. Liberty Road/Pettibone Road.
Figure 1
City Overview

City of Solon
Solon, Ohio
Figure 2A
2008 Existing Lane Use and Traffic Control (North & West)

- Represents One Travel Lane
- Signalized Intersection
- Stop Sign

North
Figure 2B
2008 Existing Lane Use and Traffic Control (South & East)

City of Solon
Solon, Ohio

North
Figure 2C
2008 Existing Lane Use and Traffic Control (Central)

Portz Parkway

School Driveway

Figures 2C
2008 Existing Lane Use and Traffic Control (Central)

Portz Parkway

School Driveway

City of Solon
Solon, Ohio

Wells + Associates, Inc.

North

Represents One Travel Lane

Signalized Intersection

Stop Sign
Roadway Adequacy and Level of Service Threshold

The Ohio Department of Transportation "State Highway Access Management Manual" provides design standards for roadway and intersection adequacy based on Access Category. The manual specifies Level of Service (LOS) "C" as the standard for intersections on State routes for Categories III and IV. Individual movements or approaches may operate at LOS "D" but not at LOS "E" or "F". Levels of service definitions for signalized and unsignalized intersections and ramps as defined in Highway Capacity Manual (HCM) are attached.

Consistent with previously prepared traffic studies in the City of Solon, the minimum acceptable threshold of LOS "D" was used in this study for overall delay and individual approaches. This threshold is nationally recognized within the traffic engineering industry as an acceptable design standard.

The intersections were studied using the Highway Capacity Manual (HCM) software for individual locations as recommended by ODOT, however, the inputs were derived from a Synchro/SimTraffic 7 model that accounts for the affects of adjacent intersections, green times, and through traffic progression. The use of the Synchro 7 method is more dynamic and realistic than the HCM isolated intersection evaluation.
Level of Service Criteria for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle for a 15-min analysis period. The criteria are given in the following table. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

**LOS A** describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

**LOS B** describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

<table>
<thead>
<tr>
<th>LEVEL OF SERVICE</th>
<th>STOPPED DELAY PER VEHICLE (SEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤10.0</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10.0 and ≤20.0</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 20.0 and ≤35.0</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 35.0 and ≤55.0</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 55.0 and ≤80.0</td>
</tr>
<tr>
<td>F</td>
<td>&gt;80.0</td>
</tr>
</tbody>
</table>

**LOS C** describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

**LOS D** describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**LOS E** describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

**LOS F** describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in the following table. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

### Level of Service Criteria for TWSC Intersections

<table>
<thead>
<tr>
<th>LEVEL OF SERVICE</th>
<th>AVERAGE CONTROL DELAY (sec/veh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤ 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10 and ≤ 15</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 15 and ≤ 25</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 25 and ≤ 35</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 35 and ≤ 50</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 50</td>
</tr>
</tbody>
</table>

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 16 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorists waits. LOS F may also appear in the form of side street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queuing, which is more obvious.

**Approximate Capacity of Ramp Roadways**

The capacity in passenger cars per hour for ramps is shown below.

<table>
<thead>
<tr>
<th>Free-Flow Speed of Ramp (mph)</th>
<th>Capacity (pc/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50 mph</td>
<td>2,200</td>
</tr>
<tr>
<td>&gt;40-50 mph</td>
<td>2,100</td>
</tr>
<tr>
<td>&gt;30-40 mph</td>
<td>2,000</td>
</tr>
<tr>
<td>≥20-30 mph</td>
<td>1,900</td>
</tr>
<tr>
<td>&lt;20 mph</td>
<td>1,800</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Single-Lane Ramps</th>
<th>Two-Lane Ramps</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50 mph</td>
<td>4,400</td>
<td></td>
</tr>
<tr>
<td>&gt;40-50 mph</td>
<td>4,100</td>
<td></td>
</tr>
<tr>
<td>&gt;30-40 mph</td>
<td>3,800</td>
<td></td>
</tr>
<tr>
<td>≥20-30 mph</td>
<td>3,500</td>
<td></td>
</tr>
<tr>
<td>&lt;20 mph</td>
<td>3,200</td>
<td></td>
</tr>
</tbody>
</table>

EXISTING ANALYSIS

Existing Traffic Counts

Existing AM and PM peak hour traffic counts were conducted at the study intersections on Tuesday, October 30, 2007; Wednesday, October 31, 2007; Thursday, March 13, 2008; Wednesday, March 19, 2008; Thursday, March 27, 2008; Tuesday, April 1, 2008; Wednesday, April 2, 2008; and Wednesday, October 1, 2008 by Wells + Associates and GPD Group. The traffic count data are presented in the Appendix to this report and summarized on Figures 3A through 3D and include current Average Daily Traffic (ADT) on selected City streets.

In order to account for fluctuations in traffic volumes over these various dates, through traffic was balanced at immediately adjacent intersections with no significant mid-block access on a case-by-case basis.

2008 Existing Capacity Analyses

Existing levels of service were calculated at each study intersection based on: the existing lane use and traffic control shown on Figures 2A, 2B, and 2C; the existing traffic volumes shown on Figures 3B, 3C, and 3D; and the Highway Capacity Manual (HCM) methodology using HCS+ Version 5.3. The results are shown on Table 1 and are summarized below:

Signalized Intersections

1. Seventeen (17) of the 28 signalized study intersections during the AM peak hour, and 12 intersections during the PM peak hour, currently operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach.

2. Eight (8) intersections during the AM peak hour, and 10 intersections during the PM peak hour, operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.

3. The remaining three (3) intersections during the AM peak hour, and six (6) intersections during the PM peak hour, operate beyond capacity, at LOS “E” or “F”, as identified below:

- Int. 5. Harper Road/Bainbridge Road (AM/PM).
- Int. 12. OH Route 91 (SOM Center Road)/US Route 422 Eastbound Ramps (PM).
- Int. 13. OH Route 91 (SOM Center Road)/Solon Road (PM).
- Int. 16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road) (AM/PM).
- Int. 27. Solon Road/OH Route 43 (Aurora Road) (PM).
- Int. 32. OH Route 43 (Aurora Road)/Liberty Road (AM/PM).
Unsignalized (stop controlled) Intersections

1. All of the turning movements and approaches at seven (7) of the nine (9) unsignalized study intersections during the AM peak hour, and six (6) intersections during the PM peak hour, currently operate at acceptable levels of service (LOS “D” or better).

2. The remaining two (2) intersections during the AM peak hour, and three (3) intersections during the PM peak hour, operate beyond capacity, at LOS “E” or “F”, as identified below:
   - Int. 30. OH Route 43 (Aurora Road)/Portz Parkway (AM/PM).
   - Int. 31. OH Route 43 (Aurora Road)/Ayleshire Drive (AM/PM).
   - Int. 33. OH Route 43 (Aurora Road)/Flanders Drive (PM).

Roadway Link Capacity

The Synchro/SimTraffic analysis along the major corridors was reviewed to ascertain locations of potential link capacity deficiencies since these sections are generally controlled by the system of signalized intersections rather than the capacity of the through lanes. The results indicate that the key roadway links on SOM Center Road operate near or capacity in the peak hour, peak direction from just south of Solon Road to the U.S. Route 422 interchange. All links at the Aurora Road intersection operate near capacity since this intersection is constrained.

Harper Road experiences congestion between Bainbridge Road and the U.S. Route 422 ramps during both the AM and PM peak hours, and from south of Aurora Road in the northbound direction during the evening peak hour.

Ramp Capacity

A review of the peak hour ramp volumes at the Harper Road and SOM Center Road interchanges on U.S. Route 422 shows that all of the volumes are within the recommended approximate ramp capacities as identified previously based on the existing number of lanes provided. However, some key ramps carry 1,300 to 1,500 peak hour vehicles, approaching their theoretical capacity and experience capacity constraints at their junctions with the U.S. Route 422 mainline.

Capacity analysis worksheets are contained in the Technical Appendix.
Figure 3A
2008 Existing Average Daily Traffic (ADT) Volumes

City of Solon
Solon, Ohio
Figure 3B
2008 Existing Peak Hour Traffic Volumes (North & West)

City of Solon
Solon, Ohio

Wells + Associates, Inc.
Figure 3C
2008 Existing Peak Hour Traffic Volumes (South & East)
Figure 3D  
2008 Existing Peak Hour Traffic Volumes
<table>
<thead>
<tr>
<th>Intersection</th>
<th>Signal</th>
<th>Lane</th>
<th>Phase</th>
<th>Duration (s)</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>Color</th>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 Moultrie Park</td>
<td>Signal</td>
<td>3000</td>
<td>4000</td>
<td>1.5</td>
<td>3.0</td>
<td>1.5</td>
<td>100</td>
<td>Red</td>
<td>Steel</td>
<td>30</td>
<td>3.0</td>
</tr>
<tr>
<td>28 Miami Road</td>
<td>Signal</td>
<td>3000</td>
<td>4000</td>
<td>1.5</td>
<td>3.0</td>
<td>1.5</td>
<td>100</td>
<td>Red</td>
<td>Steel</td>
<td>30</td>
<td>3.0</td>
</tr>
<tr>
<td>29 Miami Road</td>
<td>Signal</td>
<td>3000</td>
<td>4000</td>
<td>1.5</td>
<td>3.0</td>
<td>1.5</td>
<td>100</td>
<td>Red</td>
<td>Steel</td>
<td>30</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Note: All vehicles must stop at all signs.
<table>
<thead>
<tr>
<th>Location</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.4.1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Note: This is a summary of the data provided in the table. The actual data is not shown here. The table is used to display the data in a more organized manner.
<table>
<thead>
<tr>
<th>Subdivision</th>
<th>Intersection</th>
<th>Approached</th>
<th>1963</th>
<th>1975</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th Street</td>
<td>9th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>9th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>16th St</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>10th St</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>10th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>11th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>11th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>12th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>12th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>14th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>14th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>15th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>15th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>16th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>16th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>17th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>17th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>18th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>18th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>19th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>19th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>20th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>20th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>21st St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>21st St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>22nd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>22nd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>23rd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>23rd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>24th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>24th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>25th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>25th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>26th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>26th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>27th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>27th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>28th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>28th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>29th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>29th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>30th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>30th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>31st St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>31st St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>32nd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>32nd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>33rd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>33rd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>34th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>34th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>35th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>35th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>36th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>36th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>37th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>37th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>38th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>38th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>39th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>39th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>40th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>40th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>41st St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>41st St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>42nd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>42nd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>43rd St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>43rd St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>44th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>44th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>45th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>45th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>46th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>46th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>47th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>47th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>48th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>48th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>49th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>49th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>50th St</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th Street</td>
<td>50th St</td>
<td>187</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FUTURE ANALYSIS

Forecasted Traffic Volumes for 2018 and 2028

Traffic volume forecasts for 2018 and 2028 were prepared based on: (1) existing (2008) traffic counts and (2) a growth rate of 0.5 percent per year compounded applied to all movements at all intersections for 10 (2018) and 20 years (2028). This rate was obtained through discussions with the Northeast Ohio Areawide Coordination Agency (NOACA). It is consistent with the rate used in the 1995 master plan study and the recently submitted traffic studies for the former Coral property development proposal. In addition, a comparison of the average daily traffic counts from 1995 to 2008 indicate that the overall traffic volume has remained consistent or has slightly declined over this period. Thus, the 0.5 percent growth rate used in the study appears to be reasonable.

It is noted that the traffic volume forecasts are based on the existing land uses within the City and the pace and effect of growth from the surrounding areas. It is assumed that proposed development projects (similar to Coral) of significant size would be required to assess their traffic impacts independently, accounting for growth and other approved development. Since no other significant projects are currently planned, they are not specifically accounted for in this study.

The results are shown on Figures 4A through 4D for 2018 and 5A through 5D for 2028 and include both peak hour and Average Daily Traffic (ADT) forecasts.

Future Capacity Analyses

Intersection capacity analyses were prepared for the 37 study intersections for 2018 and 2028 conditions based on the HCM and Synchro/SimTraffic methodologies, as described previously in this report. The results are summarized on Table I and outlined below:

Year 2018

Signalized Intersections

1. Seventeen (17) of the 28 signalized study intersections during the AM peak hour, and 12 intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach in 2018.

2. Six (6) intersections during the AM peak hour, and nine (9) intersections during the PM peak hour, would operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.

3. The remaining five (5) intersections during the AM peak hour, and seven (7) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”, as identified below:
   - Int. 5. Harper Road/Bainbridge Road (AM/PM).
   - Int. 6. Harper Road/Cochran Road/OH Route 43 (Aurora Road) (PM).
• Int. 12. OH Route 91 (SOM Center Road)/US Route 422 Eastbound Ramps (PM).
• Int. 13. OH Route 91 (SOM Center Road)/Solon Road (AM/PM).
• Int. 15. OH Route 91 (SOM Center Road)/Bainbridge Road (AM).
• Int. 16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road) (AM/PM).
• Int. 27. Solon Road/OH Route 43 (Aurora Road) (PM).
• Int. 32. OH Route 43 (Aurora Road)/Liberty Road (AM/PM).

Unsignalized (stop controlled) Intersections

1. All of the turning movements and approaches at six (6) of the nine (9) study intersections during the AM peak hour, and five (5) intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS "D" or better).

2. The remaining three (3) intersections during the AM peak hour, and four (4) intersections during the PM peak hour, would operate beyond capacity, at LOS "E" or "F", as identified below:

• Int. 30. OH Route 43 (Aurora Road)/Portz Parkway (AM/PM).
• Int. 31. OH Route 43 (Aurora Road)/Ayleshire Drive (AM/PM).
• Int. 33. OH Route 43 (Aurora Road)/Flanders Drive (PM).
• Int. 36. Liberty Road/Bainbridge Road (AM/PM).
Figure 4A
2018 Future Average Daily Traffic (ADT) Volumes

North
Figure 4B
2018 Future Peak Hour Traffic Volumes (North & West)
Figure 4C
2018 Future Peak Hour Traffic Volumes (South & East)

City of Solon
Solon, Ohio
Figure 4D
2018 Future Peak Hour Traffic Volumes

City of Solon
SOLON, OHIO

Walls + Associates, Inc.
Figure 5A
2028 Future Average Daily Traffic (ADT) Volumes

City of Solon
Solon, Ohio
Figure 58
2028 Future Peak Hour Traffic Volumes (North & West)

City of Solon
Solon, Ohio
Figure 5C
2028 Future Peak Hour Traffic Volumes (South & East)

City of Solon
Solon, Ohio

29
Year 2028

Signalized Intersections

1. Sixteen (16) of the 28 signalized study intersections during the AM peak hour, and 11 intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach.

2. Seven (7) intersections during the AM peak hour and nine (9) intersections during the PM peak hour operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.

3. The remaining five (5) intersections during the AM peak hour and eight (8) intersections during the PM peak hour operate beyond capacity, at LOS “E” or “F”, as identified below:

   - Int. 5. Harper Road/Bainbridge Road (AM/PM).
   - Int. 6. Harper Road/Cochran Road/OH Route 43 (Aurora Road) (PM).
   - Int. 7. Cochran Road/Solon Road (PM).
   - Int. 12. OH Route 91 (SOM Center Road)/US Route 422 Eastbound Ramps (PM).
   - Int. 13. OH Route 91 (SOM Center Road)/Solon Road (AM/PM).
   - Int. 15. OH Route 91 (SOM Center Road)/Bainbridge Road (AM).
   - Int. 16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road) (AM/PM).
   - Int. 27. Solon Road/OH Route 43 (Aurora Road) (PM).
   - Int. 32. OH Route 43 (Aurora Road)/Liberty Road (AM/PM).

Unsignalized (stop controlled) Intersections

1. All of the turning movements and approaches at six (6) intersections of the nine (9) unsignalized study intersections during the AM peak hour, and five (5) intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better).

2. The remaining three (3) intersections during the AM peak hour, and four (4) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”, as identified below:

   - Int. 30. OH Route 43 (Aurora Road)/Portz Parkway (AM/PM).
   - Int. 31. OH Route 43 (Aurora Road)/Ayleshire Drive (AM/PM).
   - Int. 33. OH Route 43 (Aurora Road)/Flanders Drive (PM).
   - Int. 36. Liberty Road/Bainbridge Road (AM/PM).

Roadway Link Capacity

The roadway link and arterial performance were reviewed as discussed under existing conditions to access the roadway link capacity on the major corridors in the City. Those locations that currently experience peak hour congestion would continue under both 2018 and 2028 conditions without further
road improvements. These generally include SOM Center Road, between Aurora Road and U.S. Route 422, Aurora Road in the vicinity of SOM Center Road, and Harper Road, from Aurora Road to U.S. Route 422.

Ramp Capacity

The peak hour ramp volumes at the Harper Road and SOM Center Road interchanges on U.S. Route 422 are expected to remain within the recommended approximate ramp capacities. However, as discussed previously, mainline delays and capacity constraints on U.S. Route 422 at the ramp junctions occur near the interchanges.

Capacity analysis worksheets are contained in the Technical Appendix.
MITIGATION

Iterative capacity analyses were conducted to identify road improvements required today and in the near-term (2018) and long-term (2028) futures. These analyses tested the ability of signal timing improvements, re-striping of existing lanes, and lane additions/widenings to restore deficient intersections to adequate levels of operation.

Two traffic signal systems operate within the city along the Harper/Cochran Road and SOM Center Road/Aurora Road/Solon Road corridors. Some intersections adjacent to those proposed for signal timing modifications also required adjustment in consideration of the coordinated traffic signal systems. Further, the recommended geometric improvements may require further investigation to determine construction feasibility, cost, and review of signage.

Deficient levels of service could be adequately mitigated by signal timing modifications as identified on Figures 6A through 6C. Specific geometric improvements are summarized below. It is noted that where widening of the intersection or approach is proposed, the anticipated signal timing modifications include provisions for pedestrian access.

Immediate Improvements

1. Int. 5. Harper Road/Bainbridge Road.
   - Add a northbound right turn lane on Harper Road, and a separate westbound left turn lane and a second westbound right on Bainbridge Road. This intersection currently operates at LOS “F” during both the AM and PM peak hours. This would improve to LOS “C” during the AM peak hour and LOS “E” during the PM peak hour with these improvements.

2. Int. 32. OH Route 43 (Aurora Road)/Liberty Road.
   - As identified in previous studies, there is an immediate need to provide increased capacity at this intersection. The primary need is for additional through lanes on Aurora Road in this area since Aurora Road widens to a four-lane section east and west of Liberty Road. Separate right turn lanes are necessary on westbound Aurora Road and southbound Liberty Road.
   - If the Connector Road is constructed between Aurora Road and Solon Road, Aurora Road will serve as the primary access to this facility to and from the east. Increased capacity at this intersection and the Connector Road would reduce the travel demands on Bainbridge Road to the north through the residential area.
   - These improvements affect operations at the Portz Parkway and Ayleshire Drive intersections. Therefore, the potential for widening of Aurora Road to four-lanes with turn lanes should be further pursued to serve immediate and long-range needs.
3. Int. 30. OH Route 43 (Aurora Road)/Portz Parkway.

- Individual movements at this stop controlled intersection operate beyond capacity during the peak traffic periods. A traffic signal warrant study was prepared in 2007 which indicated that warrants are satisfied along with a separate westbound left turn lane that has been installed. This intersection was assumed to be signalized in the immediate future.

4. Int. 31. OH Route 43 (Aurora Road)/Ayleshire Drive.

- Although some individual movements currently operate beyond capacity, given the relatively low side-street volume and the fixed traffic demand of Ayleshire Drive due to the lack of connections to other roads, no additional improvements are recommended in the immediate future. Separate turn lanes are assumed in the future if Aurora Road is widened.

5. Int. 16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road).

- Signal timing improvements are necessary immediately to optimize the operations and reduce delays at this key intersection. This would significantly reduce overall delays and approach delays at this location. This finding is consistent with that reported in a safety study prepared for ODOT in June 2007. The report also recommended restricting access to the gas station on the south leg of SOM Center Road to right turns in and right turns out.

Ultimately, this intersection would require widening of the southbound approach from three to five lanes to provide dual left turn lanes, two through lanes, and a separate right turn lane. A second westbound right turn lane also would be required. These improvements are similar to those identified in the June 2007 report, but may be difficult to achieve given right-of-way constraints and possible construction of the Connector Road discussed later in this report.

Near-Term (2018) Improvements

1. Int. 4. Harper Road/US Route 422 Eastbound Ramps.

- Add a northbound right turn lane on Harper Road. This lane would increase capacity in the northbound direction and allow additional green time to be allocated to the eastbound ramp approach to better accommodate eastbound left turns.
2. Int. 6. Harper Road/Cochran Road/OH Route 43 (Aurora Road).

- Separate right turn lanes on of the intersection approaches would be necessary to provide for adequate levels of service, however, this may be difficult to achieve on the westbound approach of Aurora Road. There is the potential to re-stripe this approach to provide separate left, through, and right turn lanes. This modification would only result in a minimal decrease in overall intersection delay and queuing of westbound traffic would continue to inhibit the ability for vehicles to access the turn lanes. Thus, lengthening of the re-striped right turn lane also would be necessary.

3. Int. 13. OH Route 91 (SOM Center Road)/Solon Road.

- Construct a separate northbound right turn lane on SOM Center Road. While the addition of this lane would not restore the overall LOS to "D", it would significantly reduce the eastbound and westbound Solon Road approach delays. The need for this improvement ultimately may be mitigated with the construction of the Connector Road to the east of SOM Center Road.

4. Int. 36. Liberty Road/Bainbridge Road.

- Some individual approaches at this all-way stop intersection would operate beyond capacity by 2018. A new traffic signal and separate left turn lanes on Liberty Road have been contemplated by the city at this location. These improvements would effectively mitigate the 2018 and 2028 travel demands. Alternatively, a roundabout also may be a viable option for this location. The ultimate travel demands at this intersection could be impacted significantly if substantial re-development or new development occurs to the west along SOM Center Road.

**Long-Term (2028) Improvements**

1. Int. 7. Harper Cochran Road/Solon Road.

- Add separate eastbound and westbound right turn lanes on Solon Road.

Based on a review of the arterial analyses, the intersection improvements mentioned previously would improve overall vehicle progression and travel speeds along the major routes. However, it is anticipated that peak period congestion would continue to be experienced along these routes. Other long-range improvements should be planned for congestion relief and provide for the long-term economic growth within the City.

Capacity analysis worksheets are contained in the Technical Appendix.
Figure 6A:
Future Lane Use and Traffic Control (North & West)

- Modify Signal Timings
- Immediate Improvements
- 2018 Future Improvements
- 2020 Future Improvements

- Represents One Travel Lane
- Signalized Intersection
- Stop Sign

North
Figure 6B
Future Lane Use and Traffic Control (South & East)

- Modify Signal Timings
- Immediate Improvements
- 2018 Future Improvements
- 2028 Future Improvements

- Represents One Travel Lane
- Signalized Intersection
- Stop Sign

North
Figure 6C
Future Lane Use and Traffic Control (Central)

Modify Signal Timings
Immediate Improvements
2018 Future Improvements
2028 Future Improvements

Represents One Travel Lane
Signalized Intersection
Stop Sign
North

City of Solon
SOLON, OHIO
Roundabout Design and Operations

As mentioned previously, there appears to be the potential to install a roundabout at the Liberty Road/Bainbridge Road intersection. This intersection has been considered for a new traffic signal and additional turn lanes by the City. There appear to be other locations where a roundabout is a viable alternative to installing a traffic signal. However, there are advantages and disadvantages to roundabouts that require consideration during the design process before being chosen for implementation.

Typical advantages to roundabouts include:

- Reduction in overall delay.
- Reduction in vehicle speeds.
- Continuous flow of traffic.
- Lower maintenance costs when compared to signalized intersections.
- Generally safer than other forms of at-grade intersections. Lower accident rates for low and medium capacity conditions.
- Provide environmental benefits through reduced emissions and fuel savings.
- Service life approximately 25-years versus 10-years for a signal.

Typical Disadvantages include:

- Continuous flow makes bike and pedestrian movements more difficult.
- Higher proportion of pedestrian and bike injury accidents than other at-grade intersections.
- Can be confusing to some drivers.
- Difficult to cross for blind or visually impaired.
- Does not accommodate dedicated bike lanes.
- Major street delays can be greater than desired.
- Reduces available gaps for adjacent unsignalized intersections.
- Impacts vehicle progression.
- Requires more right-of-way.
- Higher landscaping maintenance costs.
- Legal implications for handling crashes.

Candidate locations for roundabouts are generally two-way or all-way stop locations that experience significant delays on one or more approaches. Roundabouts are most effective for continuous traffic flow where traffic volumes are balanced among the approaches. Large imbalances of volume result in the circulating traffic flow being dominated by the high volume approach, creating delays on the minor approaches.

Based on a review of the study intersections, the following intersections appear to be candidate locations for roundabouts:

- Liberty Road/Bainbridge Road (previously mentioned).
- Solon Road/Hawthorne Parkway.
- Harper Road/Cannon Road.
• Liberty Road/Pettibone Road.

The Liberty Road/Bainbridge Road intersection was the only location selected for further study in this report. However, as discussed previously, more detailed studies and information would need to be evaluated at any location that may be a candidate for this alternative treatment.
Accident Analysis

Accident studies were prepared for 37 study intersections based on the existing traffic volumes and accident data provided by the City of Solon for a four-year period (2005 through 2008). The accident data were tabulated and reviewed to determine accident rates per million entering vehicles (MEV) at each location by both analysis year and over the four-year period. The calculated rates were then compared to rates identified in the previously prepared master plan traffic study from 1995.

The traffic count data collected at each of intersections were expanded to estimate Average Daily (24-hour) Traffic (ADT) by applying a factor of 1.19 to 1.42, depending on the number of hours data were collected and the functional classification of the roadway. The ADT totals were then adjusted to reflect the Average Annual Daily Traffic (AADT) by applying a seasonal factor that was dependent on the month and day of the week the data were collected and the functional classification of the roadway. These factors were obtained through ODOT's Division of Planning, Office of Technical Services and verified by city staff in February 2009.

The calculated accident rates at the 37 studied intersections were compared to the 20 intersections studied in 1995 and to similar intersections in the City of Solon, and is summarized on Table 2. The results indicate that seven (7) intersections have experienced either a significant increase in the accident rate compared to 1995 conditions or rates higher than similar intersections within the City. The following summarizes each of the key intersections and potential remedial actions:

1. Int. 4. Harper Road/US Route 422 Eastbound Ramps.
   - This intersection was calculated to have an accident rate of 2.82 accidents per MEV. This is significantly higher than the 2.21 accidents per MEV calculated in 1995.
   - The majority of accidents at this intersection occur within the eastbound queues on the ramp approaching the intersection. Based on historical accident data, it appears that vehicles exiting US Route 422 cause rear-end collisions with vehicles waiting in the queue approaching Harper Road.
   - **Action:** As suggested previously, the traffic signal timings are proposed to be modified to provide additional green time for the eastbound approach to reduce congestion and queuing on the ramp. It is also recommended that the signage from eastbound US Route 422 be reviewed to identify the potential for warning signs and/or striping for eastbound motorists approaching the exit.

2. Int. 12. OH Route 91 (SOM Center Road)/US Route 422 Eastbound Ramps.
   - This intersection was calculated to have an accident rate of 2.57 accidents per MEV. This is significantly higher than the 1.05 accidents per MEV calculated in 1995.
• Similar to the eastbound ramps at Harper Road, historical accident data reveals that vehicles exiting US Route 422 cause rear-end collisions with vehicles waiting in the queue approaching OH Route 91 (SOM Center Road).

• **Action**: As suggested previously, the traffic signal timings are proposed to be modified to provide additional green time for the eastbound approach to reduce congestion and queuing on the ramp. It also is recommended that the signage from eastbound US Route 422 be reviewed to identify the potential for warning signs and/or striping for eastbound motorists approaching the exit in the near-term future. The potential improvements identified with the Connector Road include a grade-separation of the ramp that would reduce the eastbound ramp volume, queuing, and delay at the SOM Center Road intersection.

3. Int. 15. OH Route 91 (SOM Center Road)/Bainbridge Road.

• This intersection was calculated to have an accident rate of 1.72 accidents per MEY. This is significantly higher than the 0.95 accidents per MEY calculated in 1995. It is noted that this rate is within the range of similar intersections in the City.

• The skew of Bainbridge Road requires large gaps in through traffic and a longer travel distance for left turns to be made from SOM Center Road. Several accidents relate to the southbound left turn movement and rear-end collisions likely due to congestion.

• **Action**: Review signal phasing to restrict permissive left turns at the intersection in the near-term. Realign the intersection to remove the skew in the long-term.

4. Int. 16. OH Route 91 (SOM Center Road)/OH Route 43 (Aurora Road)

• This intersection was calculated to have an accident rate of 2.18 accidents per MEY. This is significantly higher than the 1.61 accidents per MEY calculated in 1995.

• Historical accident data reveals that rear-end collisions are common on the northbound, southbound, and westbound approaches of the intersection.

• **Action**: As identified in the capacity analysis section, the traffic signal timings and phasings are proposed to be modified to reduce congestion and improve the level of service at this intersection. Construction of the Connector Road likely would impact through traffic on both Aurora Road and SOM Center Road.

5. Int. 31. OH Route 43 (Aurora Road)/Liberty Road

• This intersection was calculated to have an accident rate of 1.71 accidents per MEY. This is significantly higher than the 1.47 accidents per MEY calculated in 1995. It is noted that this rate is within the range of similar intersections in the City.
• The high volume of traffic likely contributes to the large number of ear-end accidents on the mainline of Aurora Road at this intersection.

• **Action:** Install improvements at the intersection to increase capacity.

6. **Int. 34. OH Route 43 (Aurora Road)/Pettibone Road.**

• This intersection was calculated to have an accident rate of 2.53 accidents per MEV. This rate is significantly higher than other similar intersections in the City.

• Historical accident data reveals that rear-end collisions are common within the mainline queues in both directions of OH Route 43 (Aurora Road) at the traffic signal.

• **Action:** It is recommended that the signage on all approaches be reviewed for potential modifications. Further, the speeds along Aurora Road in this area and the level terrain may be contributing factors to the frequency of accidents on Aurora Road. The eastbound Pettibone Road approach appears to have sight distance constraints. Thus, a follow-up speed study and verification of the eastbound sight distance is suggested for this intersection.

7. **Int. 36. Liberty Road/Bainbridge Road.**

• This intersection was calculated to have an accident rate of 0.79 accidents per MEV. This rate is significantly higher than other similar intersections in the City.

• This is higher than both the 85th percentile rate of similar intersections in the state (0.17 accidents per MEV) and the 85th percentile rate of similar intersections in the city (0.54 accidents per MEV).

• Historical accident data reveals that rear-end collisions are common on all approaches of the intersection.

• **Action:** This intersection has been identified for installation of a new traffic signal and separate left turn lanes on Liberty Road. This should reduce accidents at this location. Further, the potential for a roundabout as identified and discussed previously in this study should be further examined.

Collision diagrams are contained in the Technical Appendix.
## Table 2
### Accident Data Summary
#### City of Solon, Ohio

<table>
<thead>
<tr>
<th>Intersection</th>
<th>2005-2008 Four-year Period</th>
<th>1995 Study</th>
<th>05-08 Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Rate (2)</td>
<td>(I) Total</td>
</tr>
<tr>
<td></td>
<td>Acc/yr Rate (1)</td>
<td></td>
<td>Diff</td>
</tr>
<tr>
<td>1. Hawthorne Parkway/Solon Road</td>
<td>5</td>
<td>1.33</td>
<td>4</td>
</tr>
<tr>
<td>2. Harper Road/Cannon Road</td>
<td>4</td>
<td>0.91</td>
<td>3</td>
</tr>
<tr>
<td>3. Harper Road/US Route 422 WB Ramps</td>
<td>2</td>
<td>0.24</td>
<td>-</td>
</tr>
<tr>
<td>4. Harper Road/US Route 422 EB Ramps</td>
<td>29</td>
<td>2.82</td>
<td>14</td>
</tr>
<tr>
<td>5. Harper Road/Bainbridge Road</td>
<td>10</td>
<td>0.86</td>
<td>6</td>
</tr>
<tr>
<td>6. Harper Road/Coehran Road/Aurora Road</td>
<td>14</td>
<td>1.57</td>
<td>11</td>
</tr>
<tr>
<td>7. Coehran Road/Solon Road</td>
<td>9</td>
<td>1.20</td>
<td>6</td>
</tr>
<tr>
<td>8. SOM Center Road/Miles Road</td>
<td>2</td>
<td>0.50</td>
<td>6</td>
</tr>
<tr>
<td>9. SOM Center Road/Cannon Road</td>
<td>4</td>
<td>0.96</td>
<td>1</td>
</tr>
<tr>
<td>10. SOM Center Road/Shebrook Park Drive</td>
<td>2</td>
<td>0.43</td>
<td>N/A</td>
</tr>
<tr>
<td>11. SOM Center Road/US Route 422 WB Ramps</td>
<td>2</td>
<td>0.33</td>
<td>4</td>
</tr>
<tr>
<td>12. SOM Center Road/US Route 422 EB Ramps</td>
<td>39</td>
<td>2.57</td>
<td>11</td>
</tr>
<tr>
<td>13. SOM Center Road/Solon Road</td>
<td>31</td>
<td>1.89</td>
<td>33</td>
</tr>
<tr>
<td>14. SOM Center Road/Seხ Drive</td>
<td>6</td>
<td>0.52</td>
<td>N/A</td>
</tr>
<tr>
<td>15. SOM Center Road/Bainbridge Road</td>
<td>21</td>
<td>1.72</td>
<td>10</td>
</tr>
<tr>
<td>16. SOM Center Road/Aurora Road</td>
<td>29</td>
<td>2.18</td>
<td>21</td>
</tr>
<tr>
<td>17. SOM Center Road/Portz Parkway/Inwood Drive</td>
<td>6</td>
<td>0.81</td>
<td>N/A</td>
</tr>
<tr>
<td>18. SOM Center Road/School Driveway/Craemer Drive</td>
<td>0</td>
<td>0.04</td>
<td>-</td>
</tr>
<tr>
<td>19. SOM Center Road/Pettibone Road</td>
<td>11</td>
<td>1.72</td>
<td>4</td>
</tr>
<tr>
<td>20. Solon Road/Liberty Road (3)</td>
<td>-</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>21. Solon Road/Cannon Road (3)</td>
<td>-</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>22. Solon Road/Timberlane Drive</td>
<td>1</td>
<td>0.50</td>
<td>N/A</td>
</tr>
<tr>
<td>23. Solon Road/Brushwood Drive</td>
<td>0</td>
<td>0.09</td>
<td>N/A</td>
</tr>
<tr>
<td>24. Solon Road/Lakeview Drive</td>
<td>0</td>
<td>0.07</td>
<td>N/A</td>
</tr>
<tr>
<td>25. Solon Road/Kruse Drive</td>
<td>9</td>
<td>1.60</td>
<td>N/A</td>
</tr>
<tr>
<td>26. Solon Road/Bainbridge Road</td>
<td>9</td>
<td>1.26</td>
<td>4</td>
</tr>
<tr>
<td>27. Solon Road/Aurora Road</td>
<td>13</td>
<td>1.49</td>
<td>5</td>
</tr>
<tr>
<td>28. Aurora Road/Solon Boulevard</td>
<td>4</td>
<td>0.69</td>
<td>8</td>
</tr>
<tr>
<td>29. Aurora Road/Solar Shopping Center</td>
<td>3</td>
<td>0.49</td>
<td>N/A</td>
</tr>
<tr>
<td>30. Aurora Road/Portz Parkway</td>
<td>4</td>
<td>0.57</td>
<td>N/A</td>
</tr>
<tr>
<td>31. Aurora Road/Ayleshire Drive</td>
<td>-</td>
<td>-</td>
<td>N/A</td>
</tr>
<tr>
<td>32. Aurora Road/Liberty Road</td>
<td>14</td>
<td>1.71</td>
<td>7</td>
</tr>
<tr>
<td>33. Aurora Road/Flanders Drive</td>
<td>2</td>
<td>0.45</td>
<td>N/A</td>
</tr>
<tr>
<td>34. Aurora Road/Pettibone Road</td>
<td>10</td>
<td>2.53</td>
<td>N/A</td>
</tr>
<tr>
<td>35. Liberty Road/Derby Downs Drive</td>
<td>1</td>
<td>0.46</td>
<td>N/A</td>
</tr>
<tr>
<td>36. Liberty Road/Bainbridge Road</td>
<td>3</td>
<td>0.79</td>
<td>N/A</td>
</tr>
<tr>
<td>37. Liberty Road/Pettibone Road</td>
<td>4</td>
<td>1.03</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Notes:
1. Accident Rate per Million Vehicles = (Number of Accidents x 1,000,000) / (365 x ADT x Number of Years)
3. Intersections outside of City limits. Data unavailable.
Master Plan Improvements

Based on experience gained through the traffic analyses and the Coral project, the following potential master plan improvements warrant further discussion and consideration by the City.

• **Connector Road.** The construction of the Connector Road, between Aurora Road and Solon Road, was discussed at length during review of the traffic studies prepared as part of the former Coral property project. The Coral site is located on the east side of SOM Center Road, between Solon Road and Bainbridge Road. Improvements to SOM Center Road and the US Route 422 interchange were proposed to accommodate the additional vehicle trips that would have been generated by the project as well as background traffic. This study re-affirms the need for the Connector Road, with or without the development of this property. Improvements beyond those reported were necessary along SOM Center Road to provide acceptable levels of service for all approaches. These improvements included widening to provide three through lanes in each direction between the Sears Driveway and the US Route 422 interchange. This six-lane section could continue to Bainbridge Road but is constrained to the south due to the railroad bridge.

Although not an immediate need, if planned now, the Connector Road would provide a means of attracting new development as well as re-development of prime properties within the city. The city also could obtain land for the necessary right-of-way for this roadway. The ability for future development to be accommodated by the road network relies on the Connector Road to relieve through traffic demands on SOM Center Road and requires additional improvements at the US Route 422 interchange that include widening of the northbound-to-westbound loop ramp and a flyover ramp for eastbound US Route 422 traffic to access the new road. The roadway should consider all transport modes including bikes, pedestrians, and transit facilities.

• **Harper Road/SOM Center Road/U.S. Route 422 Interchanges.** Given the similar layout and travel demands at both interchanges, primarily the eastbound to southbound and northbound to westbound movements, the operation of the ramp junction (merge/diverge) areas on U.S. Route 422 needs to be further assessed. These ramps carry 1,300 to 1,500 vehicles during the AM and/or PM peak hours, and experience congestion on the mainline of U.S. Route 422. Since the viability and economic development potential in the City is dependent on these interchanges in the near-term, there may be mainline improvements, such as lengthening the accel/decel lanes or providing dual on- or off-ramps at these locations that could be implemented. These types of improvements should be pursued in the near-term since they take several years to be designed and programmed for construction.

• **Aurora Road Widening.** Aurora Road currently exists as a four-lane section west of SOM Center Road and south and east of Pettibone Road. This roadway appears to function as a primary east-west connection for commuter and commercial traffic. The ability of traffic to use this route and its access to the future Connector Road would require upgrading of the existing two-lane sections to four lanes with auxiliary turn lanes at key intersections. Thus, a review of the existing available right-of-way should be investigated. It is noted that the through capacity issues along Aurora Road also were identified in the 1995 city traffic study.
• **Solon Road/I-480/271 Interchange.** The feasibility for a new interchange on I-480/271 at Solon Road, between Rockside Road and Forbes Road, should be investigated. While it is outside of the City limits, this improvement may prove beneficial to the City of Solon and neighboring communities. An interchange at this location would reduce the travel demands on U.S. Route 422 at Harper Road and SOM Center Road and serve the industrial properties on the east side of the City. In addition, based on the travel demands at the Solon Road/Hawthorne Parkway intersection, it appears that through traffic currently uses Forbes Road and Richmond Road to access the industrial areas and impacts residential communities. A frontage road or collector-distributor road and/or access to and from the north only may be necessary to accomplish this improvement.

• **Access Management.** The location of driveways and their proximity to key intersections impacts capacity along the major corridors in the City. There are locations where driveways have been constructed within the functional area of the intersection and where offsets exist that creates turbulence within the traffic flow and affects traffic operations. It is recommended that a detailed review of the driveways on SOM Center Road, Solon Road, Bainbridge Road, and Harper Road be prepared in conjunction with the redevelopment of properties or future repaving or widening projects along these corridors.

• **Intersection/Road Realignment.** Based on a review of the arterial analyses and progression of traffic along the City's major corridors, the realignment of existing intersections and/or roadways, such as Solon Road between Kruse Drive and SOM Center Road and Bainbridge Road at SOM Center Road, should be explored as part of long-range redevelopment in the City. This type of improvement would increase spacing between signalized intersections and improve traffic operations and safety in the area.

• **ITS Deployment.** Improve traffic flow within the City through Intelligent Transportation Systems (ITS). This includes installing traffic cameras with a link to the City offices for real-time traffic monitoring of the signalized intersections to minimize delays and improve incident management.

• **Road Rating System Evaluation.** Employ a system to evaluate existing roadways in order to prioritize them for upgrades and improvements. This system would include an examination of physical features that results in an overall score that can then be rank ordered. Factors such as lane and shoulder widths, sight distance, sidewalks, bike lanes, access frequency, safety, pavement condition, roadside friction, utilities, and drainage would be part of the evaluation.

• **Bicycle and Pedestrian Paths and Trails Evaluation.** Evaluate the bike and pedestrian master plan for the City to ensure that connectivity exists between paths, bike lanes, and trails. This includes pavement conditions, widths, crossings at intersections and standards for new development. Any roadway widening should consider installation of new bike lanes where feasible and coincide with context sensitive design features.

• **Parking Strategy.** Review the City standards for parking to include provisions for shared parking standards among complementary uses. Using shared parking techniques results in fewer parking
spaces and a more efficient use of infrastructure. Consider use of these principles for existing and future development proposals as well as the potential for curbside parking where appropriate.

- **Green Initiatives.** It is clear that the nation is moving towards reducing auto dependence and use of “Green” technology. This includes using green building construction techniques (through “LEED” certification), replacement of old equipment and street lighting to energy saving devices, and promoting other forms of mobility to reduce vehicular travel demands in the city and region. This study recommends that these initiatives be pursued and implemented over time to ensure the long-term sustainability of the city and its residents.

- **Mixed-Use Development.** Review current zoning conditions and review to encourage mixed-use development that will reduce overall vehicle trips and congestion in the City.

- **Transit (Bus and Rail).** The City of Solon is served by the RTA (Greater Cleveland Regional Transit Authority) with routes on Cochran Road and Aurora Road (routes 41A, 41C, and 27F), and a park-n-ride facility (approximately 110 spaces) located on the south side of Portz Parkway. The City should continue to discuss service changes and expansions to best serve the community and consider these initiatives part of future development approvals. This strategy will help reduce long-distance auto commute trips that contribute to the congestion in and around the city. The development of “activity centers” within the city and surrounding communities may ultimately benefit from a local bus or shuttle system to encourage non-auto trips within these areas. Since the RTA has identified the rail corridor through Solon as a potential for long-range expansion of its facilities, it is recommended that convenient areas along the route be identified for station stops and future TOD (Transit Oriented Development) locations. Reservation of these areas could be a condition of future development approvals to ensure the long-term viability of the area and should be coordinated with regular discussions and updates with RTA representatives.

- **Transportation Demand Management (TDM).** Consider TDM measures as part of future development approvals that may include bike lockers and shower facilities, transit stops, preferential parking for carpools and vanpools, websites, and on-site business centers for residential buildings, to encourage an alternate means of transport for workers.

It is recognized that these potential improvements require coordination and prioritization by the City, ODOT, NOACA, FHWA, and other agencies.
CONCLUSIONS

The results of the updated master transportation plan study are as follows:

1. Regarding existing traffic conditions:
   - Seventeen (17) of the 28 signalized study intersections during the AM peak hour, and 12 intersections during the PM peak hour, currently operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach.
   - Eight (8) signalized intersections during the AM peak hour, and 10 intersections during the PM peak hour, operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.
   - The remaining three (3) signalized intersections during the AM peak hour, and six (6) intersections during the PM peak hour, operate beyond capacity, at overall LOS “E” or “F”.
   - All of the turning movements and approaches at seven (7) of the nine (9) stop controlled intersections during the AM peak hour, and six (6) intersections during the PM peak hour, currently operate at acceptable levels of service (LOS “D” or better).
   - The remaining two (2) stop controlled intersections during the AM peak hour, and three (3) intersections during the PM peak hour, operate beyond capacity, at LOS “E” or “F”.

2. The future analyses for 2018 and 2028 assume a 0.50 percent annual growth rate for all movements at all of the intersections studied. These resulting intersection capacity analyses indicate the following:

   Year 2018
   - Seventeen (17) of the 28 signalized study intersections during the AM peak hour, and 12 intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach.
   - Six (6) signalized intersections during the AM peak hour, and nine (9) intersections during the PM peak hour, would operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.
   - The remaining five (5) signalized intersections during the AM peak hour, and seven (7) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”.

48
• All of the turning movements and approaches at six (6) of the nine (9) stop controlled study intersections during the AM peak hour, and five (5) intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better).

• The remaining three (3) stop controlled intersections during the AM peak hour, and four (4) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”.

Year 2028

• Sixteen (16) of the 28 signalized study intersections during the AM peak hour, and 11 intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better) for overall delay and by intersection approach.

• Seven (7) signalized intersections during the AM peak hour, and nine (9) intersections during the PM peak hour, would operate at overall acceptable levels of service, but with individual approaches operating at LOS “E” or “F”.

• The remaining five (5) signalized intersections during the AM peak hour, and eight (8) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”.

• All of the turning movements and approaches at six (6) of the nine (9) stop controlled intersections during the AM peak hour, and five (5) intersections during the PM peak hour, would continue to operate at acceptable levels of service (LOS “D” or better).

• The remaining three (3) stop controlled intersections during the AM peak hour, and four (4) intersections during the PM peak hour, would operate beyond capacity, at LOS “E” or “F”.

3. The results of the accident analyses indicate that seven intersections have accident rates significantly higher than those calculated in the 1995 study, or higher than similar intersections within the City of Solon. Remedial actions that include signal timing adjustments or phasing to reduce delays, potential changes in signage, new traffic signals, or roundabouts have been identified at each of these intersections.

4. This study recommends immediate, short-term improvements at several intersections to address current capacity and safety issues. In addition, long-range improvements that include the construction of the Connector Road, widening Aurora Road, and modifications to the US Route 422/SOM Center Road interchange, and non-auto improvements should be pursued to maintain adequate levels of service for city residents and to accommodate future growth and development. This approach is necessary to ensure the long-term viability of the city.