# 3.0 Future (2040) Transportation Conditions

Future traffic and structural bridge conditions within the I-84 Hartford Project Area have been analyzed to identify the needs and deficiencies which the Project will address moving forward. This assessment builds on the Existing Conditions summarized in Chapter 2.0, projecting traffic volumes and structural bridge conditions to the Project's design year, 2040.

## 3.1 Future (2040) Traffic Data

An important component of the Project is to project traffic data out to the design year, 2040. This chapter describes the future traffic conditions within the study area, development steps of the Future No-Build Scenario Travel Demand Model (TDM), documentation of the traffic forecast process, and application of TDM results to other software such as Vissim, Synchro, and HCS.

It should be noted that the Future No-Build Scenario represents future conditions expected in the study area assuming year 2040 land-use, employment and housing levels currently identified by the City of Hartford and the Capitol Region Council of Governments (CRCOG). It assumes only limited improvements to the transportation system – typically only those that are programmed in either the Regional or the City of Hartford's Transportation Improvement Plan and have committed funding.

### 3.1.1 Methodology

Like most traffic forecasts, the CRCOG Model is a traditional daily four-step travel demand model with trip generation, trip distribution, mode choice, and traffic assignment that reflects population and employment projections and future land use development. These projections are used to predict traffic growth and to show how the transportation network will be impacted by this growth. In order to develop a calibrated future network, several steps were taken to ensure validity of the model.

To start the process, CDM Smith updated the CRCOG Daily Model with a time-of-day module to support the I-84 viaduct project and the I-84 value pricing pilot program study. The intent of the time-of-day implementation was to provide period-level traffic forecasts while maintaining as much of the basic CRCOG model structure as possible. The steps taken to develop the four periods using purpose-specific time-of-day (diurnal) factors are described in Appendix A.2.9, Technical Memorandum.

Next, using the updated CRCOG Time-of-Day Model, Cambridge Systematics developed the I-84 TransCAD subarea model to assist in future year demand analyses and to provide refined AM and PM peak period trip table demand estimates for the existing (2012) and future (2040) microscopic simulations. It should be noted that Cambridge Systematics performed their calibration process on the extracted subarea model for both the base year and the future year of 2040. Appendix A.2.10 includes

the technical memorandum that provides background on the development of the base year (2012) existing conditions subarea origin-destination (OD) demand tables and the accompanying base year subarea assignment model. Similarly, Appendix A.2.11 includes the technical memorandum that provides background on the development of the 2040 no-build existing conditions subarea OD demand tables and the accompanying 2040 no-build subarea assignment model. Both memoranda describe in great detail the traffic forecast's development from the various traffic data sources, identification of any anomalies or significant variations between the forecasts, and planned improvements to the transportation system within the region.

The TDM's main function is to produce long-range traffic forecasts, which are then used in a variety of ways, including supporting the analysis of alternatives, regional capacity needs, and congestion issues. The results of these analyses are important not only in identifying potential highway network needs, but also in providing inputs for further analysis of traffic flows, including intersection performance on arterial and collector roadways. Figure 3-1, following, illustrates the interaction between the TDM, HCS, Synchro, and Vissim. Each program is used to establish a baseline condition against which future conditions can be evaluated and provides different analysis elements within the Traffic Analysis Area.

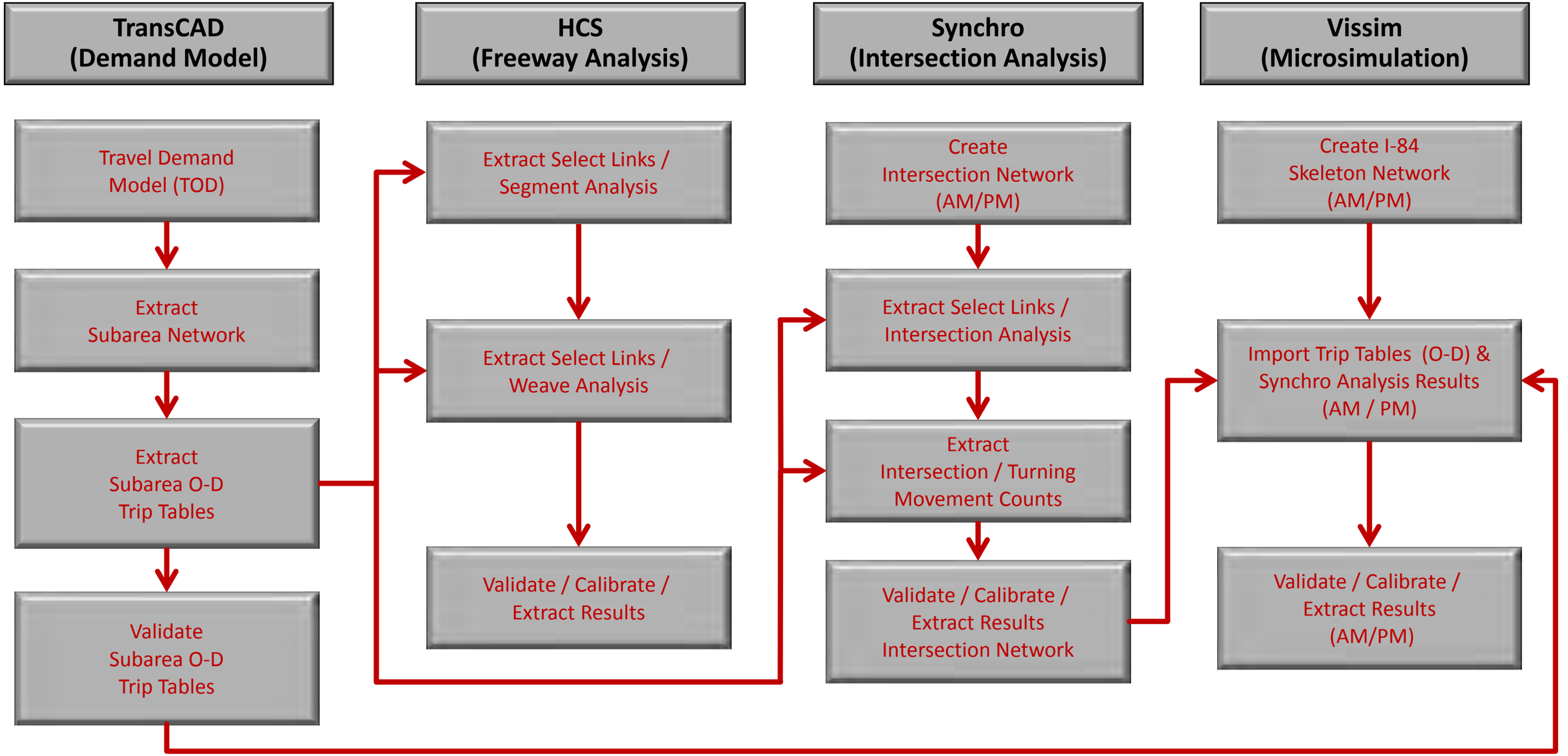
### 3.1.2 Volumes

Based on forecast traffic growth in the study area, daily and peak hour traffic volumes were developed for the mainline, on- and off-ramps, weaving sections, and key intersections under study. Morning and evening peak hour volumes were used to evaluate the operating conditions based on these forecast traffic demands. These projected volumes account for potential development in the region, as well as growth expected elsewhere in the state. A detailed analysis of these roadway segments is summarized in following sections. Table 3-1 illustrates the overall pattern of traffic growth crossing the Connecticut River and the accuracy of calibration to traffic count data. During the AM and PM peak, the average annual growth rate is 0.3%.

**Table 3-1: AM and PM Traffic Volume Comparison at CT River Crossings**

| Roadway | Direction | AM | | | | PM | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Count Profile Volume | 2012 TDM Volume | 2040 TDM Volume | AAPC | Count Profile Volume | 2012 TDM Volume | 2040 TDM Volume | AAPC |
| I-84-Bulkeley Bridge | Westbound | 12,700 | 12,500 | 13,200 | 0.21% | 14,500 | 14,300 | 15,600 | 0.31% |
| I-84-Bulkeley Bridge | Eastbound | 8,500 | 8,400 | 9,100 | 0.29% | 18,700 | 18,600 | 19,700 | 0.20% |
| Rt. 2-Founders Bridge | Westbound | 6,600 | 6,400 | 7,000 | 0.33% | 3,700 | 3,100 | 3,300 | 0.23% |
| Rt. 2-Founders Bridge | Eastbound | 1,000 | 1,000 | 1,400 | 1.08% | 6,900 | 6,900 | 8,300 | 0.65% |
| Rts. 5/15 -Charter Oak Bridge | Westbound | 6,000 | 6,600 | 7,400 | 0.41% | 6,200 | 7,300 | 8,200 | 0.43% |
| Rts. 5/15-Charter Oak Bridge | Eastbound | 4,000 | 4,100 | 4,600 | 0.41% | 8,800 | 8,900 | 9,900 | 0.36% |
| **Total Traffic** | | **38,700** | **39,000** | **42,800** | **0.33%** | **58,700** | **59,000** | **64,900** | **0.34%** |

# Methodology Flow Chart



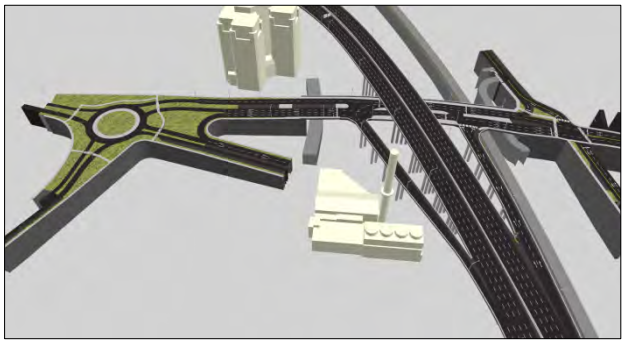

| The I-84 Hartford Project | | |
|---|---|---|
| Methodology Flow Chart | | |
| Date: 6/27/2014 | Drawn By: TranSystems | Figure No: 3-1 |

## 3.2 Future (2040) Traffic Operations

The future traffic operations have been evaluated for the design year of 2040, using the future traffic volumes development process illustrated in Section 3.1.

### 3.2.1 Vissim (Microsimulation)

The modeling approach detailed in Section 2-4: Existing Traffic Conditions was also used for the 2040 future conditions no-build scenario to create Vissim AM peak and PM peak models. The origin-destination matrices for the 2040 no-build models were generated by the Travel Demand Model through extraction of trip tables as explained in Figure 3-1, page 3-3.



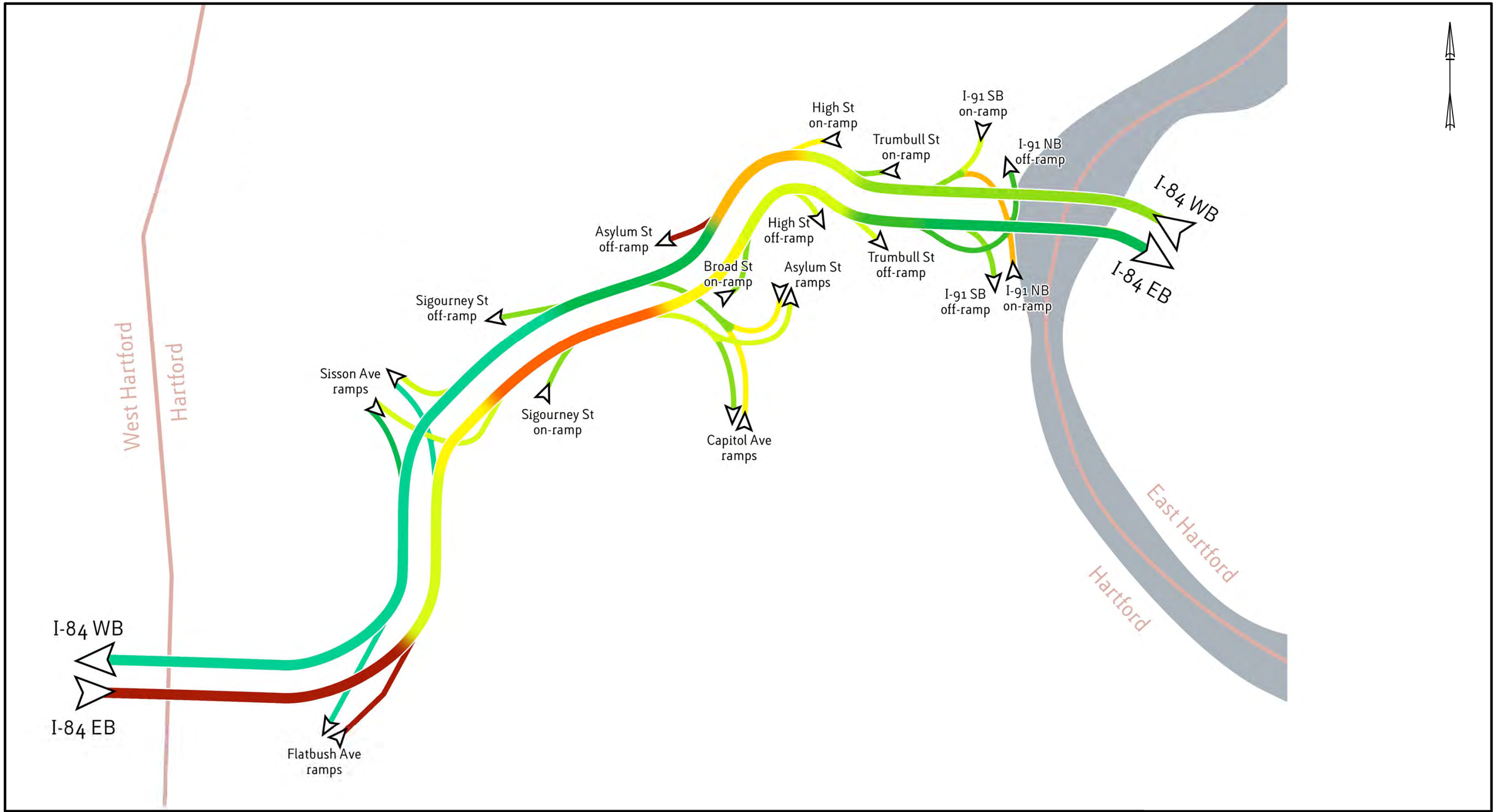
**Screenshot of Vissim Modeled Roadway: Changes to Russ Street/Park Terrace/ Sigourney St. Intersection/Roundabout**

Several modifications to the Vissim model roadway geometry were required to preserve the integrity of the study itself. These changes reflect future committed or in-construction geometry changes to 2040 Vissim networks:

- Conversion of the 4-way intersection at Russ Street, Park Terrace, and Sigourney Street into a modern roundabout;
- Reversal of the direction of flow on Union Place, to operate in the southbound direction only;
- Reversal of the direction of flow on High Street between Church Street and Asylum Street, to operate in the northbound direction only;
- Lane use changes on Asylum Street, Spruce Street, and High Street;
- Widening and lane use changes on Broad Street, Asylum Avenue, and Farmington Avenue;
- Alignment changes at Hawthorn Street, Sigourney Street, and Aetna Drive; and
- Reconfiguration and capacity improvement of the interchange between I-91 and CT 15.

The following sections show the Vissim simulation results for the 2040 AM and PM peak hours. These results include the traffic conditions for the I-84 corridor and those adjacent at-grade intersections that significantly affect mainline operations.

Average speeds for I-84 in Hartford in the morning and afternoon peaks are shown in Figure 3-2, following, and Figure 3-3, page 3-6, respectively. Note that speeds were collected lane-by-lane in 100-foot segments; while these diagrams summarize average speeds along a segment, more detailed data is also available. Speeds for the entire corridor are provided in Appendix A.2.14. Detailed Vissim results are provided in Appendix A.2.15.



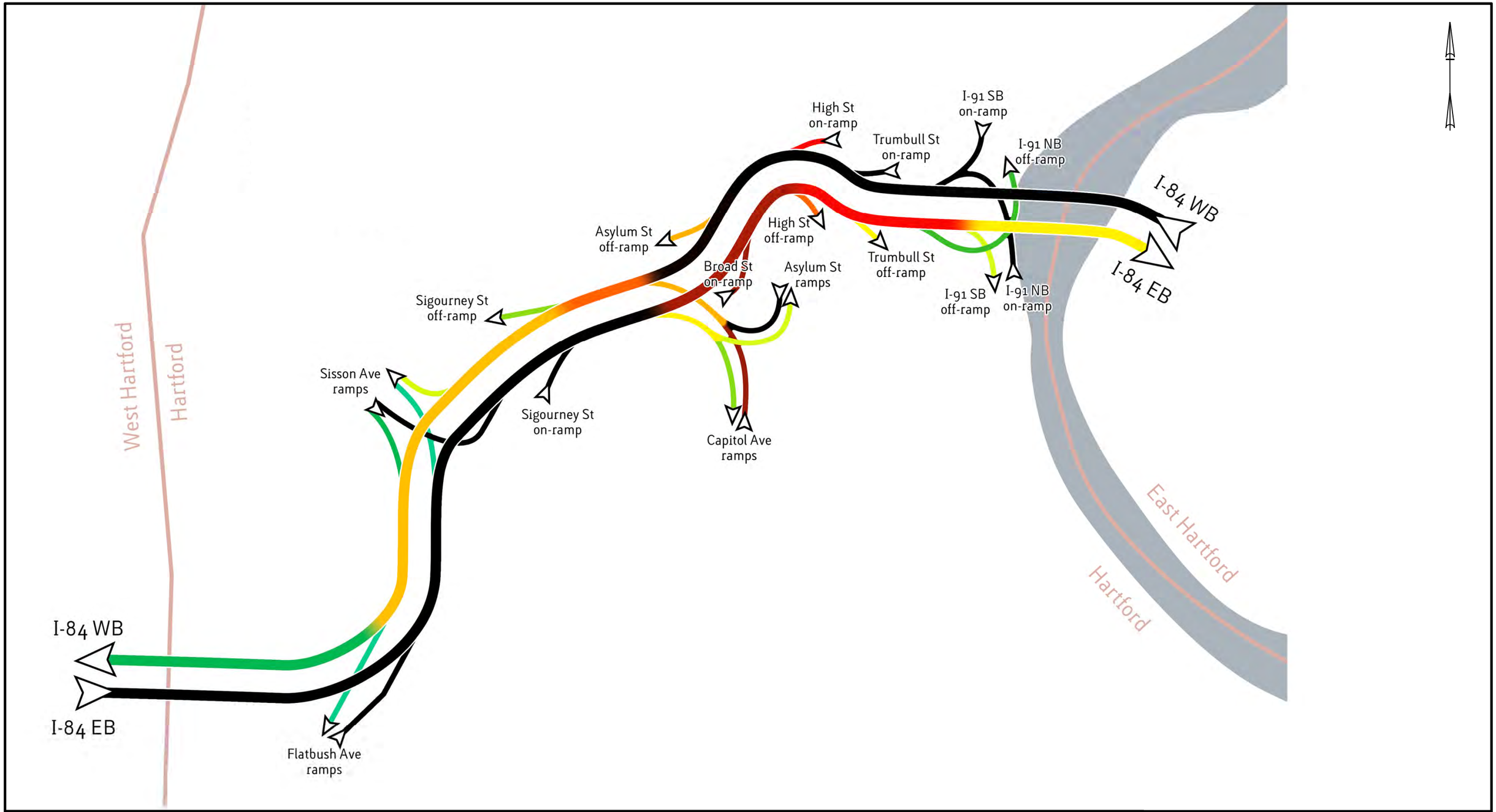

**LEGEND**

60 mph - 65 mph
50 mph - 55 mph
40 mph - 45 mph
30 mph - 35 mph
20 mph - 25 mph
10 mph - 15 mph
5 mph

# The I-84 Hartford Project

## Future (2040) Vissim Average Speed Map – AM Peak

| Date: 5/19/2014 | Drawn By: TranSystems | Figure No: 3-2 |
|---|---|---|




**LEGEND**

60 mph - 65 mph
50 mph - 55 mph
40 mph - 45 mph
30 mph - 35 mph
20 mph - 25 mph
10 mph - 15 mph
5 mph

# The I-84 Hartford Project

## Future (2040) Vissim Average Speed Map – PM Peak

| Date: 5/19/2014 | Drawn By: TranSystems | Figure No: 3-3 |
|---|---|---|

In the morning peak, eastbound traffic flows slightly slower than 2012 existing. Similarly, the average speeds were lowest west of the Flatbush Ave on-ramp with average speed range of 15-20 mph. The weave section between the Sigourney Street on-ramp and Exits 48A and 48B exhibits an average speed of 25 mph. Past this point, the speeds improve slightly to 35-45 mph until the recovery point of uncongested speeds after the Trumbull Street off-ramp, where speeds reach 55 mph and higher. Westbound, traffic improves substantially between 2012 and 2040. This is a direct result of the realignment and optimization of traffic and signal timings on Asylum Street intersections. In the existing conditions model, the Asylum Street off-ramp queue backs up into the rightmost lane of freeway, causing congestion that extends past the I-91 interchange. With the improvements to the local road network, the freeway experiences significantly less congestion and delay.

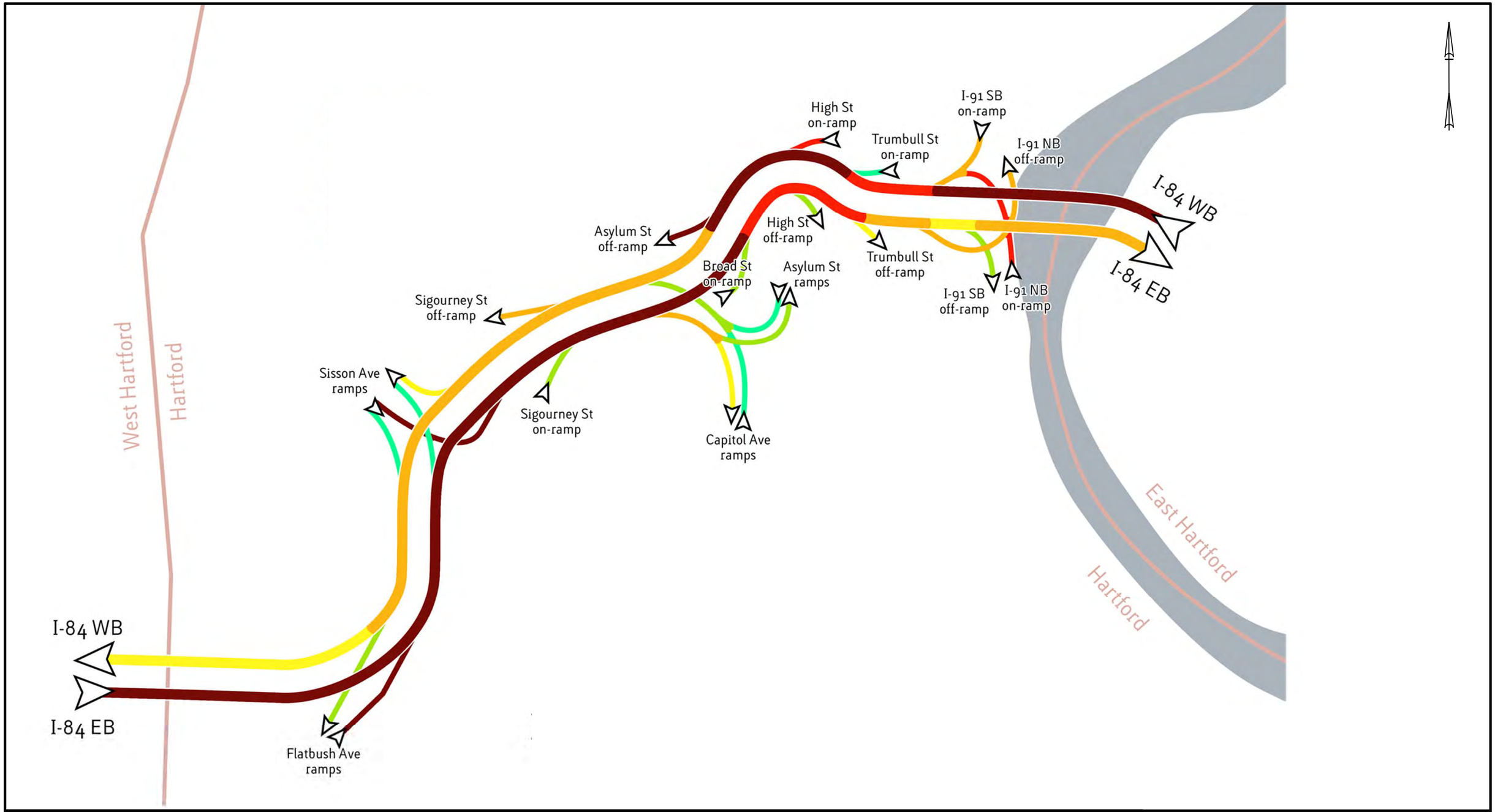
In the afternoon, average speeds are slower than in the morning for both directions. Eastbound traffic is backed up from West Hartford through Hartford, only improving marginally after crossing the Connecticut River with speeds of 35 mph. Westbound traffic is heavy throughout East Hartford and Hartford, only beginning to improve past the Sigourney St off-ramp (Exit 47). Free flow conditions are experienced west of Flatbush Avenue off Ramp (Exit 45), though it is relevant to note that the simulation area does not continue past this point. Downstream congestion would almost certainly degrade speeds in this area, as was noted in the field.

Density on I-84 through the study area was also analyzed in Vissim. This density was then used to calculate Level or Service (LOS). The AM and PM LOS results for I-84 in Hartford are shown in Figure 3-4, following, and Figure 3-5, page 3-9, respectively. LOS values for the entire corridor are provided in Appendix A.2.15.

In the morning peak, both directions of I-84, as well as several ramps, experience heavy congestion. I-84 eastbound operates at LOS F from West Hartford easterly to the Broad Street on-ramp, and then alternates between LOS E and C across the Connecticut River and into East Hartford. Westbound, traffic operates at LOS F from the East Hartford town line westerly to the Asylum Street off-ramp, and improves marginally thereafter, reaching LOS C after the Flatbush Avenue off-Ramp (Exit 45).

The afternoon peak brings greater levels of traffic congestion. Both directions through Hartford operate at LOS F. Along with the mainline, several ramps are influenced by this congestion. The on-ramps from I-91, in particular, are heavily congested during both peak periods. The Flatbush Avenue on-ramp and Sisson Avenue on-ramp to I-84 eastbound experience significant congestion due to heavy volumes on the freeway. Similarly, in the westbound direction, heavy congestion and weaving on the freeway cause congestion on the High Street on-ramp.

With the future no-build model complete, proposed alternatives can now be compared to determine their impact on traffic flow.



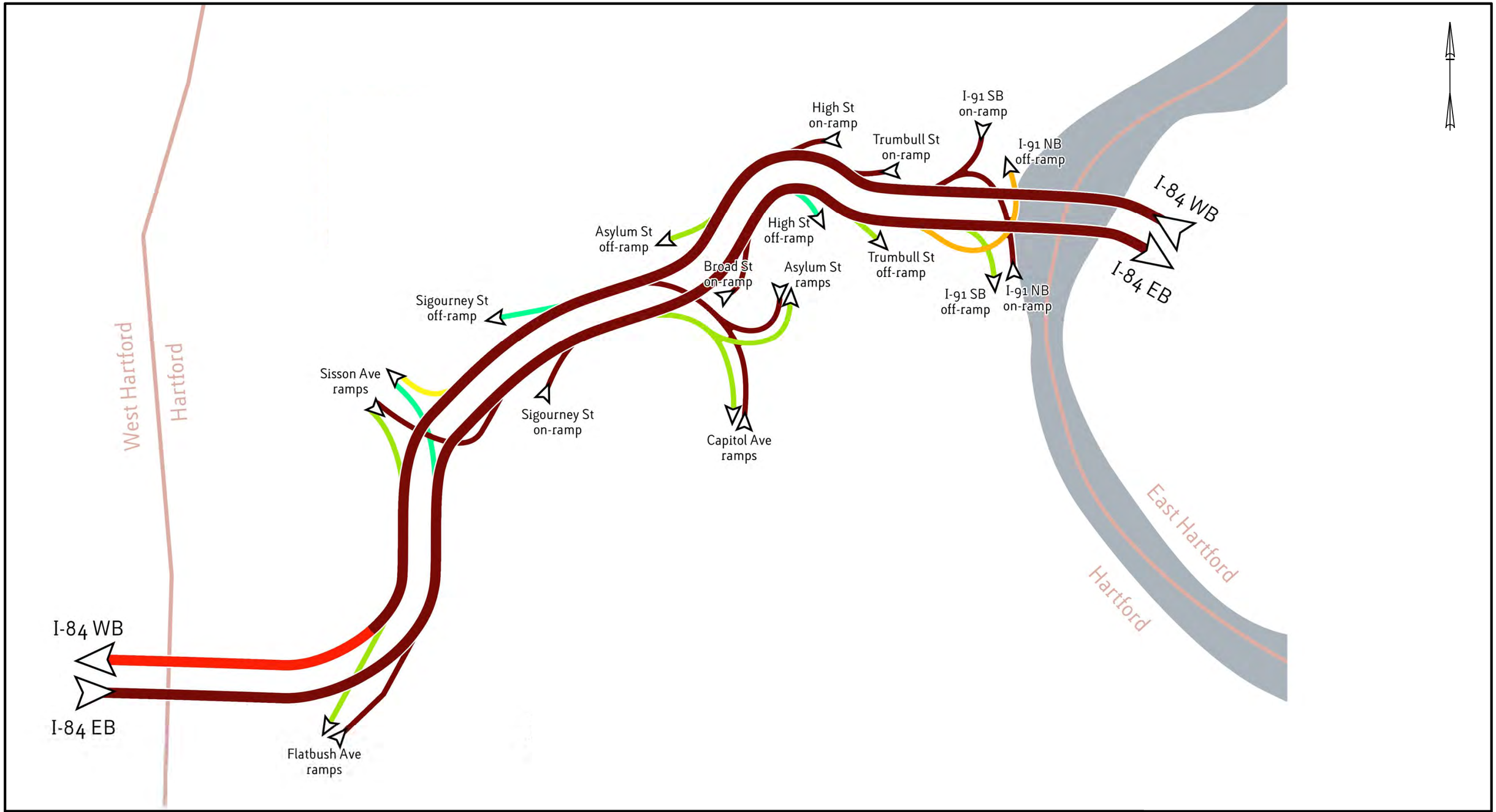

**LEGEND**

LOS A
LOS B
LOS C
LOS D
LOS E
LOS F

# The I-84 Hartford Project

Future (2040) Vissim Level of Service Map – AM Peak

| Date: 5/19/2014 | Drawn By: TranSystems | Figure No: 3-4 |
|---|---|---|




**LEGEND**

LOS A
LOS B
LOS C
LOS D
LOS E
LOS F

# The I-84 Hartford Project

## Future (2040) Vissim Level of Service Map – PM Peak

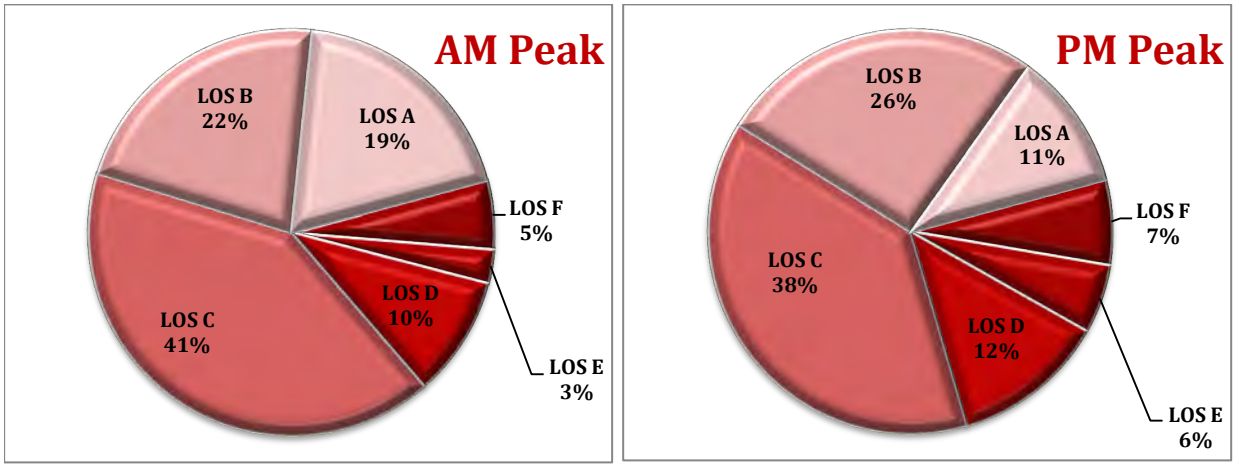
| Date: 5/19/2014 | Drawn By: TranSystems | Figure No: 3-5 |
|---|---|---|

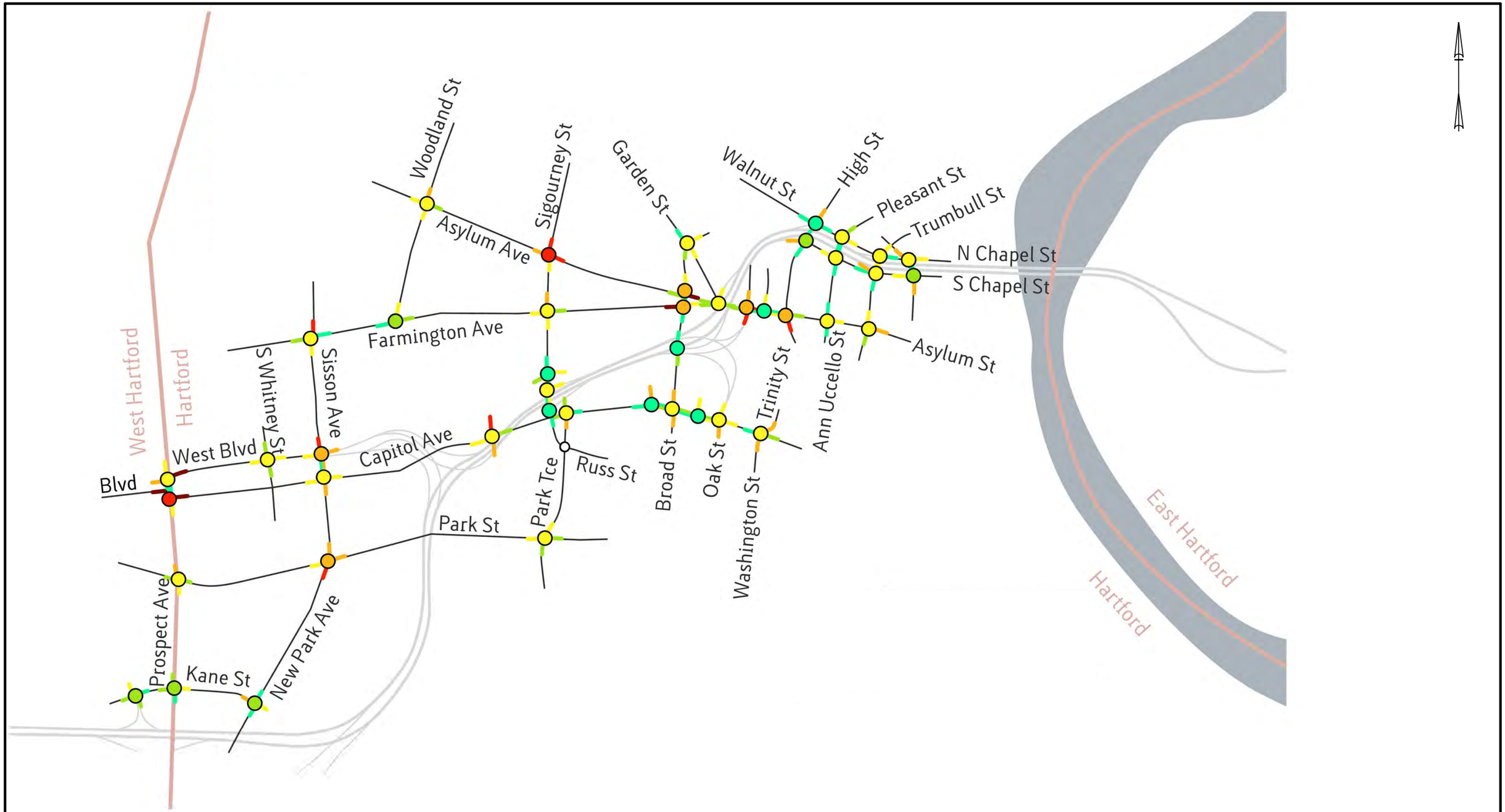
### 3.2.2 Synchro (Intersection Analysis)

The results of the intersection analysis under 2040 traffic conditions are summarized in Appendix A.2.13 for all signalized intersections in the study area. The tables and figures encompass the intersections that were evaluated for the 2040 future conditions morning and evening peak hour levels of service with and without optimized traffic signal times. Partial results of the intersection LOS results are also presented graphically in Figure 3-7, following, for the AM Peak and Figure 3-8, page 3-12, for the PM Peak. All signal timings for the future conditions analysis have been optimized in Synchro to account for the City of Hartford's impending signal system upgrades. The following paragraphs summarize the expected 2040 operating conditions using Synchro.

Overall, under 2040 conditions, the operating LOS of most intersections is expected to deteriorate from existing conditions due to increased volumes. At all intersections where there will be volume increases, longer delays and higher volume to capacity (v/c) ratios are expected. Note that the count of signalized intersections changes from 75 to 73 in 2040 due to the realignment of one intersection and the redesign of another to a roundabout. Figure 3-6, below, shows that the number of signalized intersections with LOS E or F during the AM peak hour is expected to increase from 4% under existing conditions to 8% under 2040 conditions. In PM peak hour, there is a similar increase from 10% to 13% with LOS of E or F. The percent of signalized intersections with LOS E or F increases due to the increased number of congested intersections rather than the removal of intersections, as further explained following the figures and tables.

**Figure 3-6: Summary of Synchro Optimized Intersection Peak Hour Results**

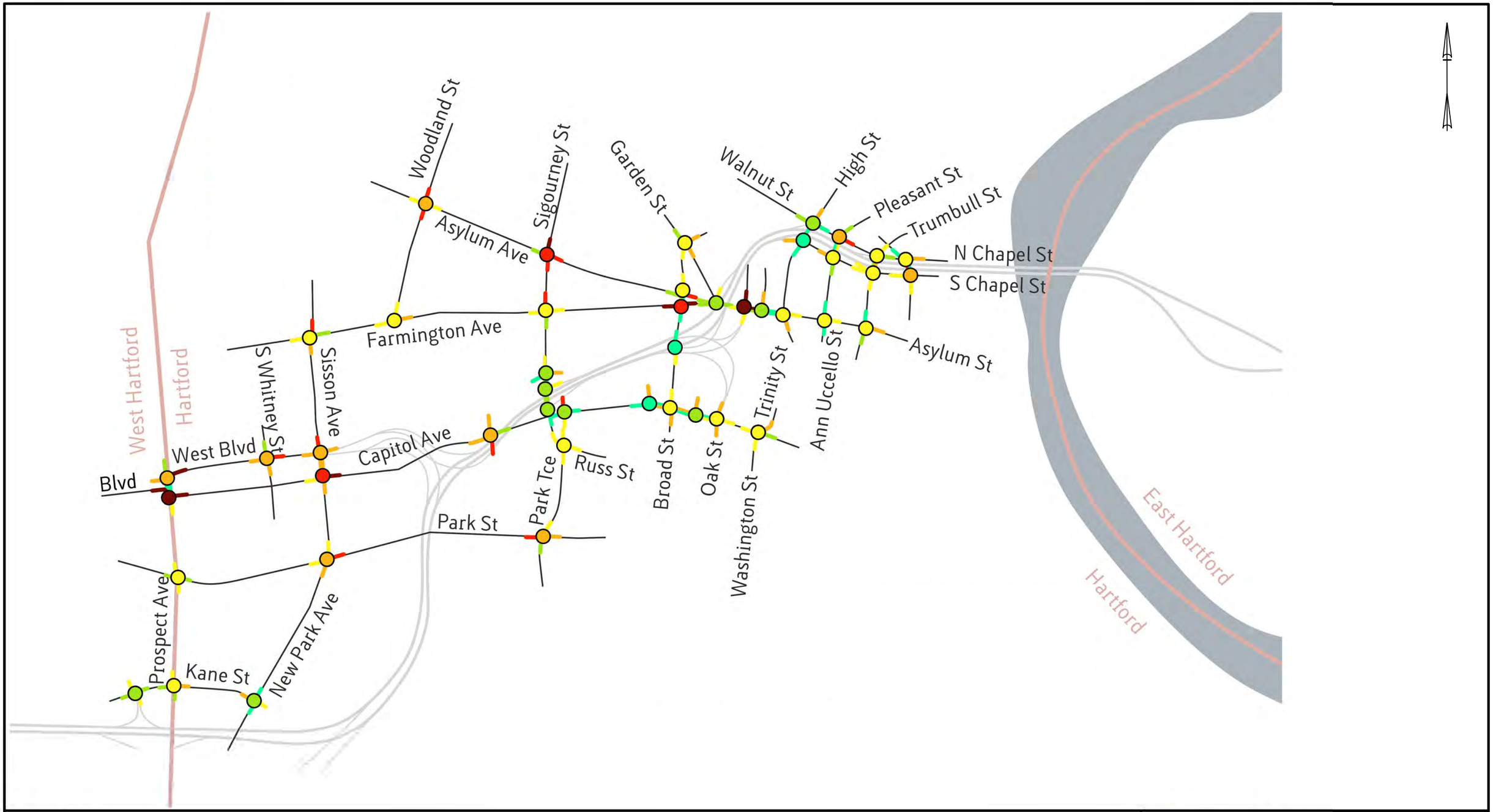





# The I-84 Hartford Project

## Future (2040) Synchro Intersection Level of Service Map – AM Peak

Date: 6/27/2014 | Drawn By: TranSystems | Figure No: 3-7




**LEGEND**

LOS A
LOS B
LOS C
LOS D
LOS E
LOS F

Intersection LOS
Approach LOS

# The I-84 Hartford Project

Future (2040) Synchro Intersection Level of Service Map – PM Peak

| Date: 6/27/2014 | Drawn By: TranSystems | Figure No: 3-8 |
|---|---|---|

Table 3-2, below, illustrates partial results for selected key intersections that are directly impacted by operations on I-84. Only intersections 67 & 68 have one or more approaches with a LOS lower than E; the other three intersections perform at LOS A through LOS C.

**Table 3-2: Summary of Selected Synchro Future (2040) Conditions – Intersection Analysis Results**

| Intersection/Direction | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | LOS | Approach Delay (sec/veh) | LOS | Approach Delay (sec/veh) |
| **Sigourney St & I-84 Eastbound On-Ramp** | | | | |
| Northbound - Sigourney St | A | 7.9 | B | 13.4 |
| Southbound - Sigourney St | A | 2.6 | A | 8.0 |
| **Overall** | A | 4.4 | B | 10.5 |
| **Sigourney St & I-84 Westbound Off-Ramp** | | | | |
| Northbound - Sigourney St | C | 30.2 | B | 17.6 |
| Southbound - Sigourney St | B | 10.9 | B | 12.9 |
| Westbound - I-84 EB Off Ramp | C | 30.6 | B | 19.6 |
| **Overall** | C | 26.8 | B | 16.0 |
| **Asylum Ave & Garden St & I-84 Westbound Off-Ramp** | | | | |
| Southbound - I-84 Westbound Off Ramp | C | 26.5 | C | 32.6 |
| Eastbound - Asylum Ave & Farmington Ave | B | 12.4 | B | 10.4 |
| Westbound - Asylum St | B | 16.3 | B | 16.7 |
| **Overall** | C | 20.2 | B | 19.2 |
| **Broad St/Cogswell St & Asylum Ave** | | | | |
| Northbound - Broad St | A | 4.9 | A | 8.9 |
| Southbound - Cogswell St | C | 23.0 | C | 25.2 |
| Eastbound - Asylum Ave | B | 10.6 | B | 18.0 |
| Westbound - Asylum Ave | F | 84.8 | D | 39.7 |
| **Overall** | D | 35.0 | C | 24.3 |
| **Broad St & Farmington Ave** | | | | |
| Northbound - Broad St | A | 9.0 | B | 11.4 |
| Southbound - Broad St | B | 13.1 | B | 18.6 |
| Eastbound - Farmington Ave | F | 157.1 | F | 101.5 |
| Westbound - Farmington Ave | C | 29.8 | E | 62.7 |
| **Overall** | D | 46.2 | E | 58.4 |

Out of the 73 signalized intersections analyzed for 2040 traffic conditions, 18 intersections are expected to experience saturated conditions during at least one of the peak hours, and nine of the intersections will operate at a LOS E or F during both peak hours. An estimated 16 signalized intersections are projected to be significantly over capacity, with a volume-to-capacity (v/c) ratio in excess of 1.2 during the PM peak hour for a least one of the approaches. When v/c ratios significantly exceed 1.0, the intersection cannot process the traffic demands placed upon it and will fail (LOS F), causing significant delays. During the AM peak hour, nine locations have one approach with a V/C ratio in excess of 1.2 or LOS F. Of the 16 intersections reviewed where I-84 ramps intersect with the local streets, 12 intersections during the AM peak hour and 16 during the PM peak hour are expected to operate under LOS A through C. Only one signal, the intersection of Asylum Avenue with the I-84 eastbound off-ramp and Spruce Street, performs with V/C ratios higher than 1.2.

It should be noted there are several exceptions to the general trend of worsening intersection performance. Where traffic volumes did not exceed capacity limits, the optimized signal timings used in the 2040 analysis improved performance of several intersections overall. Also, due to the reconstruction of Park Terrace at Russ Street from a signalized intersection to a roundabout, two nearby intersections improve their performance: Park Terrace at Capitol Avenue improves from LOS D to LOS B and Sigourney Street at I-84 eastbound on-ramp also shows improvement from LOS B to LOS A. The latter signal also benefits from roadway improvements related to the CT*fastrak* project, which reconstructed both Sigourney Street and Hawthorn Street.

In addition to these improvements, changes to other roadway segments had similar impacts on Synchro's intersection analysis. In the 2040 TDM, two roads reverse their direction of operation: High Street and Union Place. High Street from Asylum Street to Church Street will change its flow of direction from southbound-only to northbound-only, and Union Place will operate only in southbound direction in future years. In addition to the change of traffic direction on these two streets, lane arrangements have changed on Asylum Street from Spruce Street to High Street. The net results of these changes, along with the optimization of traffic signal timings, has improved the performance of these intersections as well as their neighbors.

Finally, the reconfiguration of Broad Street between the I-84 eastbound on-ramp and Cogswell Street has resulted in major operational changes, including the improvement of the on-ramp itself and better traffic flow between the two closely spaced intersections to the north. These differences are critical to traffic flow on I-84 in 2040.

### 3.2.3 HCS (Freeway Analysis)

The procedures and criteria used to evaluate the future conditions were based on the methodology presented in the Highway Capacity Manual, similar to the analyses completed for the 2012 Existing Conditions. Level of Service (LOS) values for intersections and roadway segments can range from A to F, with LOS A representing the best operational conditions. LOS F represents congested conditions. A detailed description of the LOS methodology and criteria is provided in Section 2.4. The full results of the freeway segment analysis under 2040 traffic conditions are summarized in Appendix A.2.12.

When comparing 2012 to 2040, the LOS of mainline segments through the corridor remains the same or gets worse within Hartford in both directions. The traffic through I-84 Hartford in 2040 was determined to range between LOS C and LOS F for both peak periods, with the majority of segments operating at LOS E or worse. For this study, freeway operations of LOS D or better were considered acceptable; however, in this instance, the segment's operating at LOS D had short length and was adjacent to LOS E/F segments. In such conditions, it can be assumed that HCS does not properly reflect real-world operations and the LOS for these segments would be worse.

## 3.3 Future (2040) Structural Conditions

Accurate prediction of the future condition of bridge components is an important part of any bridge management system. Past bridge inspection data and information on repairs and/or retrofits were used to provide a baseline for predicting the future condition of bridge components in the Project Study Corridor. These future condition ratings are crucial for the Project's no-build alternative.

To predict the future condition, historical bridge condition ratings were used to create scatterplots depicting ratings over time. Deterioration curves were drawn using known ratings and a trend line was established for each bridge. These trend lines or curves were then projected forward to the design year, 2040. From the curve values, engineering judgment was made to determine what level of bridge rehabilitation or replacement would be required to keep the bridges in fair or better condition (Rating of '5' or above).

The number of previous rehabilitation projects was considered in order to determine each bridge's ability to be effectively rehabilitated in the future. For instance, if the existing rating of a bridge is '4' (poor) and the bridge has already undergone multiple rehabilitation projects, it is likely that substantial replacement will be required by 2040. Table 3-3, below, shows programmed rehabilitation projects, projected condition ratings for 2040, and anticipated future projects for the corridor based on the deterioration curves. Figure 3-9, page 3-20, shows which bridges would need to be replaced or rehabilitated by 2040. See Appendix A.1 for further details, including the condition rating curves used for future condition assessment.

It is important to note that rehabilitations in the corridor have cost $60 million since 2005 and an additional $63 million is planned to be spent by 2018. It is anticipated that additional funding will be required in future years to keep these bridges in fair condition (rating '5').

**Table 3-3: Programmed and Proposed Rehabilitation/Replacement Projects**

| Bridge No. | Current Needs/Programmed Rehabilitation Projects | 2040 Deck Rating | 2040 Superstructure Rating | 2040 Substructure Rating | 2040 Rehabilitation/Replacement Recommendations |
|---|---|---|---|---|---|
| 00980B | None | 4.5 | 4.3 | 5.0 | General Maintenance |
| 01426 | None | 5.9 | 5.1 | 4.2 | General Maintenance |
| 01428A | None | 6.0 | 5.2 | 5.2 | General Maintenance |
| 01428B | None | 6.0 | 4.1 | 5.2 | General Maintenance |
| 01428D | Project 63-653 will increase the condition ratings of all major components in 2015. | 5.7 | 4.3 | 4.5 | General Maintenance |
| 01686A | This bridge is scheduled for rehabilitation on List 27, although no specific project has been initiated. | 5.0 | 4.0 | 4.5 | General Maintenance |

## Table 3-3 (ctd.): Programmed and Proposed Rehabilitation/Replacement Projects

| Bridge No. | Current Needs/Programmed Rehabilitation Projects | 2040 Deck Ratings | 2040 Superstructure Rating | 2040 Substructure Ratings | 2040 Rehabilitation/Replacement Recommendations |
|---|---|---|---|---|---|
| 01686B | Project 65-654 will increase the condition ratings of all components in 2016. | 4.7 | 4.8 | 4.3 | General Maintenance |
| 01763 | None | 5.9 | 4.4 | 5.3 | General Maintenance |
| 01764 | None | 5.9 | 4.5 | 4.0 | General Maintenance |
| 01765 | General Rehabilitation required. No project has been established. Increased condition ratings (deck and superstructure to a 6) have been applied to year 2017. | 3.5 | 3.3 | 3.7 | Substantial Replacement will be required. |
| 01766 | General Rehabilitation required. No project has been established. Increased condition ratings (deck and superstructure to a 6) have been applied to year 2017 | 3.6 | 3.5 | 3.8 | Substantial Replacement will be required. |
| 03023 | None | 3.1 | 4.5 | 3.9 | Deck Replacement will be required. |
| 03160A | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 3.2 | 1.5 | 1.8 | Substantial Replacement will be required. |
| 03160B | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 3.2 | 1.4 | 1.7 | Substantial Replacement will be required. |
| 03160C | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 5.7 | 1.5 | 2.7 | Substantial Replacement will be required. |

## Table 3-3 (ctd.): Programmed and Proposed Rehabilitation/Replacement Projects

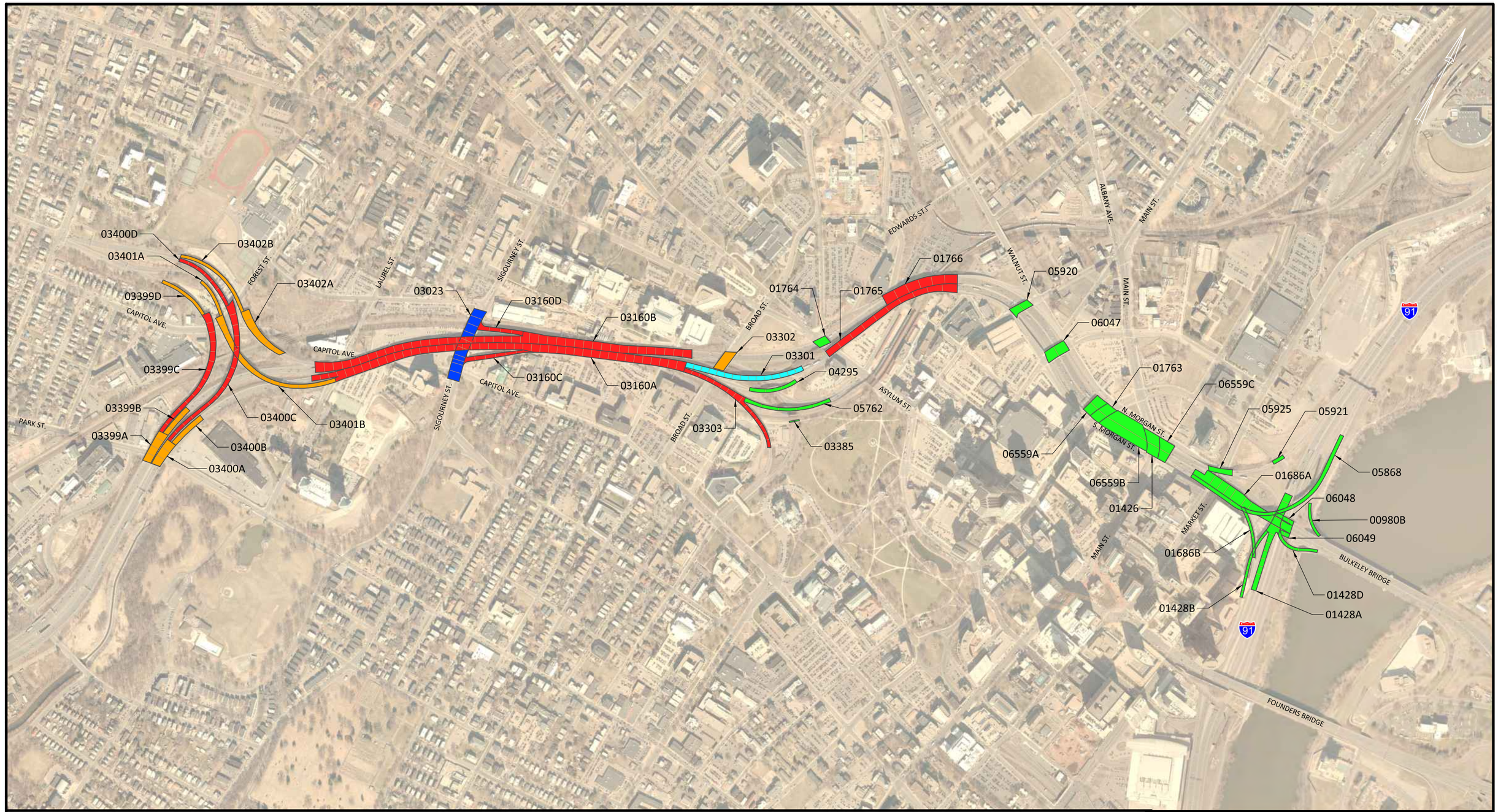
| Bridge No. | Current Needs/Programmed Rehabilitation Projects | 2040 Deck Ratings | 2040 Superstructure Rating | 2040 Substructure Ratings | 2040 Rehabilitation/Replacement Recommendations |
|---|---|---|---|---|---|
| 03160D | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 6.1 | 2.1 | 2.7 | Substantial Replacement will be required. |
| 03301 | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 4.5 | 1.9 | 3.4 | Superstructure Replacement will be required prior to 2040. |
| 03302 | None | 5.3 | 3.7 | 2.5 | General Rehabilitation will be required prior to 2040. |
| 03303 | Project 63-616 Rehabilitation project -- intent is to bring superstructure condition rating to a 5 and address outstanding deficiencies. | 5.0 | 2.2 | 2.5 | Substantial Replacement will be required. |
| 03385 | None | N/A | 4.3 | 4.7 | General Maintenance |
| 03399A | None | 3.3 | 2.3 | 3.7 | General Rehabilitation will be required prior to 2040 (See Note A). |
| 03399B | None | 3.8 | 2.3 | 3.7 | General Rehabilitation will be required prior to 2040 (See Note A). |
| 03399C | None | 3.9 | 1.4 | 2.2 | Substantial Replacement will be required. |
| 03399D | Project 63-695 is planned for general rehabilitation expected to increase deck, superstructure, and substructure rating to a 6 in 2016. | 3.9 | 3.4 | 3.3 | General Rehabilitation will be required prior to 2040. |
| 03400A | None | 3.4 | 2.3 | 2.3 | General Rehabilitation will be required prior to 2040 (See Note B). |
| 03400B | None | 5.0 | 2.3 | 4.1 | General Rehabilitation will be required prior to 2040 (See Note A). |

## Table 3-3 (ctd.): Programmed and Proposed Rehabilitation/Replacement Projects

| Bridge No. | Current Needs/Programmed Rehabilitation Projects | 2040 Deck Ratings | 2040 Superstructure Rating | 2040 Substructure Ratings | 2040 Rehabilitation/Replacement Recommendations |
|---|---|---|---|---|---|
| 03400C | General Rehabilitation required. No project has been established. Increased condition ratings have been applied to year 2018. | 3.4 | 2.2 | 2.3 | Substantial Replacement will be required. |
| 03400D | Project 63-694 is planned for general rehabilitation expected to increase deck, superstructure, and substructure rating to a 6 in 2016. | 4.4 | 2.2 | 2.3 | Substantial Replacement will be required. |
| 03401A | None | 4.9 | 3.5 | 4.3 | Superstructure Rehabilitation will be required prior to 2040. |
| 03401B | None | 3.8 | 3.5 | 2.5 | General Rehabilitation will be required prior to 2040. |
| 03402A | Project 63-695 is planned for general rehabilitation expected to increase superstructure and substructure rating to a 5 in 2016. | 3.4 | 3.1 | 3.3 | General Rehabilitation will be required prior to 2040. |
| 03402B | None | 4.1 | 3.9 | 3.2 | General Rehabilitation will be required prior to 2040. |
| 04295 | None | 5.4 | 5.7 | 5.7 | General Maintenance |
| 05762 | None | 7.0 | 5.8 | 5.8 | General Maintenance |
| 05868 | None | 6.3 | 6.1 | 5.3 | General Maintenance |
| 05920 | None | 5.0 | 5.1 | 5.3 | General Maintenance |
| 05921 | None | 6.1 | 6.3 | 5.6 | General Maintenance |
| 05925 | None | 5.6 | 5.6 | 5.5 | General Maintenance |
| 06047 | None | 5.8 | 5.8 | 5.5 | General Maintenance |
| 06048 | None | 5.2 | 4.6 | 4.4 | General Maintenance |
| 06049 | None | 5.5 | 5.5 | 5.1 | General Maintenance |
| 06559A | None | 5.9 | 5.6 | 5.5 | General Maintenance |
| 06559B | None | 5.9 | 5.6 | 5.5 | General Maintenance |
| 06559C | None | 5.9 | 5.6 | 5.5 | General Maintenance |

**Note A:** Superstructure rehabilitation is expected to increase rating prior to 2040. No previous superstructure rehabilitations have been performed.

**Note B:** Superstructure and substructure rehabilitations expected to increase ratings sufficiently prior to 2040. No previous superstructure or substructure rehabilitations have been performed.




## Legend

- Deck Replacement
- Superstructure Replacement
- General Rehabilitation
- General Maintenance
- Substantial Replacement

# The I-84 Hartford Project

Future (2040) Bridge Rehabilitation/Replacement Recommendations

| Date: 06/27/2014 | Drawn By: TSC | Fig. No: 3-9 |
|---|---|---|

 Not to Scale