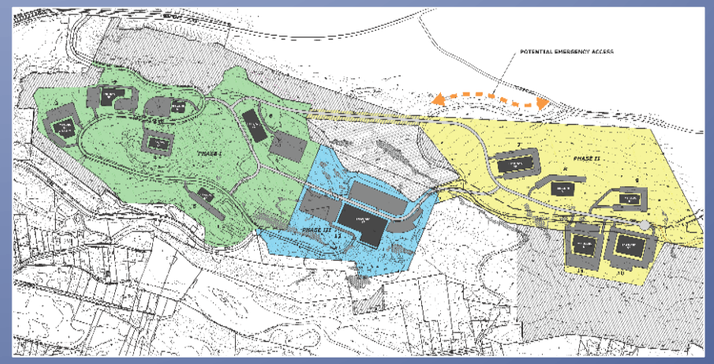

City of Meriden Roadway Evaluation Study
South Mountain Road Site (1 South Mountain Road and 600 South Mountain Road/Former NRG Site)

Final Study Report

Prepared by: Milone & MacBroom, Inc.
Prepared for: City of Meriden
South Central Regional Council of Governments

SCRCOG

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Executive Summary

The City of Meriden (the City) in collaboration with the South Central Regional Council of Governments (SCRCOG) identified the need to undertake a study relating to the 300-acre parcel of land located at 1 South Mountain Road and 600 South Mountain Road (former NRG site) in Meriden.

The goal of the study is to assess existing conditions and provide recommendations on roadway and traffic improvements to address traffic impacts that could result from the potential redevelopment of the former NRG site.

Milone & MacBroom, Inc. (MMI) was retained by the SCRCOG to serve as the primary consultant on the study. A study steering committee comprised of representatives from the City and the SCRCOG was formed to provide input and guidance throughout the study. The study findings and recommendations were presented at a special joint meeting of the Economic Development, Housing and Zoning Committee and the Planning Commission held on June 16, 2015.

Site Location and Conditions

The site is located off Chamberlain Highway, just north of the Westfield Meriden Mall and the MidState Medical Center. The site is over 300 acres, of which approximately 36 acres (NRG parcel) is owned by the Meriden Gas Turbines, LLC, and the remaining acreage city owned. The 36-acre parcel is served with electricity, sewer, gas, and water that can be extended for site development. There is a joint utility easement extending north from the former power plant pad site into the town of Berlin to provide gas and power from transmission lines in Berlin. One of the most challenging constraints to developing this entire 300-acre parcel is the site's topography and extent of ledge. Also, approximately 102 acres (30 percent) of the site are dedicated open spaces while approximately 7.8 acres are comprised of wetlands

Site Location

Land Use

A study conducted by the Connecticut Economic Research Center, Inc. (CERC) to evaluate the feasibility of development of the site suggested potential land uses as destination recreation, wind or solar power generation, technology or healthcare office space, and light manufacturing. These recommendations were consistent with a list of land uses previously suggested by the City Planning Department. Ultimately, a land use mix of two thirds light industrial and one third office space was adopted for this study.

Safety

A total of 83 accidents was reported within the study area for the most recent 3-year period that data was available (2010-2012). Twenty-seven accidents (33 percent) resulted in injuries while 56 accidents (67 percent) resulted in property damage.

Transportation

Regional access to the site is via Interstate 691 (I-691), which connects to I-84 to the west and I-91 to the east. Once off I-691, a series of arterial and local roads including Chamberlain Highway (Route 71), Kensington Avenue, and Lewis Avenue provide access to the site.

The average daily traffic on the study area roadways ranges from 6,000 vehicles on Kensington Avenue to approximately 11,300 vehicles on Lewis Avenue, south of the mall. The 85th percentile speeds ranged from 34 miles per hour on Lewis Avenue to 49 miles per hour on the Chamberlain Highway.

Currently, the study area intersections operate at acceptable levels of service (LOS) with an overall LOS B or better during peak-hour conditions. Under future (2034) background (No Build) conditions, all study intersections are expected to operate at overall LOS C. However, under future (2034) combined (Build) conditions, six study intersections are expected to operate at poor levels of service (LOS E or F) and would therefore require mitigation.

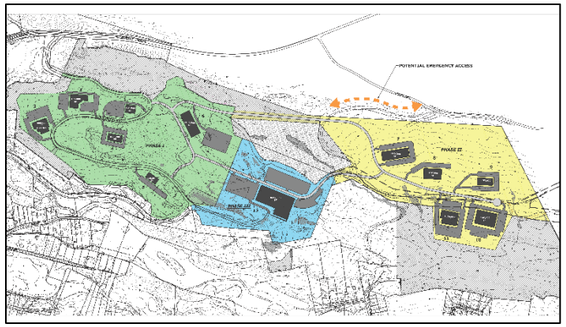
Pedestrian amenities in the form of sidewalks and crosswalks exist within the study area, most of which are in fairly good condition. However, there are gaps in the sidewalk system that should be completed.

There is little to no accommodation for bicyclists within the study area. Existing shoulders tend to be narrow, usually 1 to 2 feet wide, which makes the study area roadways unsafe and uninviting to bicyclists.

Transit service in the area is provided via CT Transit Bus Route A – Westfield Shoppingtown. This bus service operates every 30 minutes during weekdays from 7:00 a.m. to 5:30 p.m. and every 40 to 50 minutes on Saturdays from 9:40 a.m. to 5:20 p.m. There is no bus service on Sundays.

Site Development

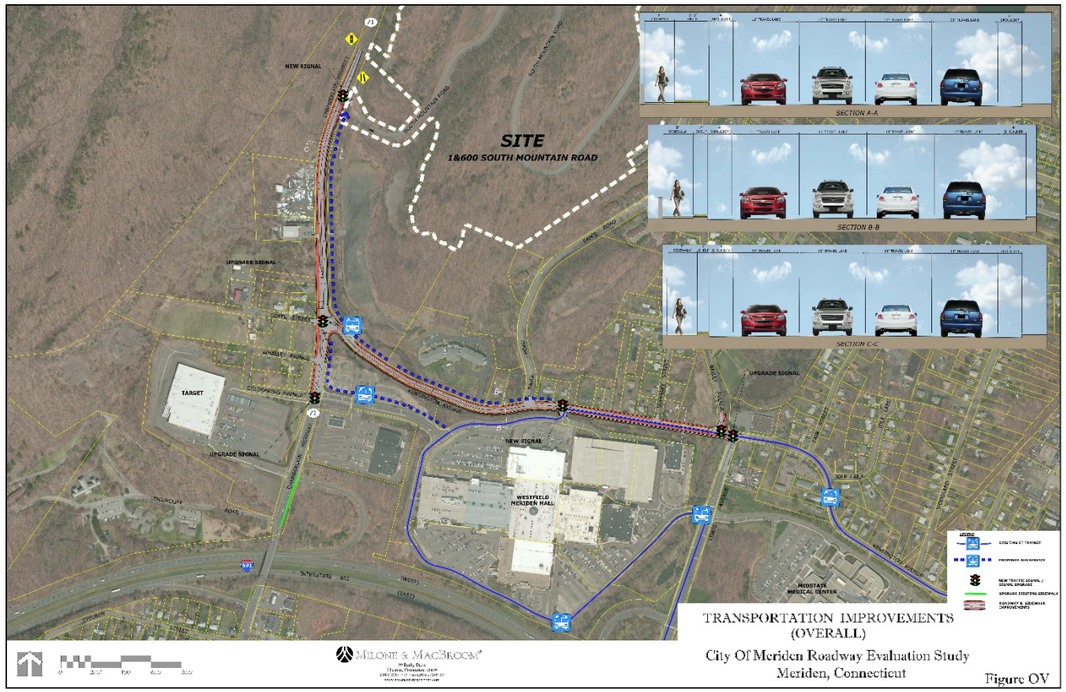
Three preliminary site concepts were initially developed for the site. These three concepts were screened using criteria such as the intensity of development, site layout, and traffic circulation into a Preferred Concept. The preferred concept would include approximately 1.22 million square feet of development and comprise of 12 buildings, two to three stories high.



Preferred Site Development Concept

Recommendations

A number of off-site traffic and roadway improvements are recommended to mitigate impacts associated with the preferred site development concept. Improvements to transit, pedestrian, and bicycle facilities within the study area are recommended. These improvements pertain to the immediate transportation/ roadway system and do not extend onto the I-691 highway and ramps as improvements to these facilities were not needed. Proposed improvements are summarized in the overall improvement concept plan and discussed in more detail in Chapter 7 of this report.



Construction Costs

Construction costs associated with recommended roadway and traffic signalization improvements were developed. Unit costs for the proposed improvements were based on CTDOT 2015 unit item list and cost estimating guidelines, past experience, and professional judgement. The estimated 2015 costs for the off-site improvements would be approximately $13.1 million.

1 Introduction

STUDY GOAL

To assess existing conditions and provide recommendations on roadway and traffic improvements to address traffic impacts that could result from the potential redevelopment of the former NRG site.

The City of Meriden (the City) in collaboration with the SCRCOG identified the need to undertake a study relating to the potential development of a 270-acre city-owned parcel and a privately owned 36-acre former power plant site located at 1 South Mountain Road and 600 South Mountain Road in Meriden. The goal of the study is to assess existing conditions and provide recommendations on roadway and traffic improvements to address traffic impacts that could result from the potential redevelopment of the site.

Milone & MacBroom, Inc. (MMI) was retained by the SCRCOG to serve as the primary consultant on the study.

The study includes the following:

- Collection and review of available land use, transportation, and safety data developed by the Connecticut Department of Transportation (CTDOT), the City, and other sources
- Evaluation of existing (2014) and future buildout year (2034) background land use and transportation conditions
- Analysis of variations of mixed-use site development scenarios and selection of a preferred future buildout development alternative
- Estimation of site-generated traffic associated with the preferred development alternative
- Analysis of the future buildout year (2034) combined roadway conditions at and near the site
- Development of near-term and long-term transportation improvement recommendations for the study area

This report summarizes the existing and future land use and transportation conditions and proposed improvements alternatives at and in the vicinity of the site.

2 Site Assessment

2.1 Site Location and Access

The site is located off Chamberlain Highway (Route 71), just north of the Meriden Westfield shopping mall (see **Figure 1**). This site is over 300 acres, of which approximately 36 acres (NRG parcel) is owned by Meriden Gas Turbines, LLC but are available for development, and the remaining acreage is owned by the City.

This parcel is bounded by the town of Berlin to the north, Kensington Avenue to the south, Chamberlain Highway to the west, and Sams Road and residential areas such as the Bailey Avenue neighborhood to the east. The Town of Berlin owns several hundred acres of abutting property to the north. The land in Berlin remains undeveloped and, while outside the purview of this study, should be considered with regard to potential impacts or opportunities associated with development on Meriden's acreage.

Primary access to the site is provided via South Mountain Road, a gated two-lane roadway, which is located off Chamberlain Highway. The roadway, which is 30 feet wide, was designed and constructed for the most part to City standards with a waiver for a maximum grade of 11 percent as the intent was for the NRG Development to turn the road over to the City upon completion and acceptance. This roadway was crack sealed in fall 2014. Given the substantial gravel base and free-draining soils, the roadway has held up well.

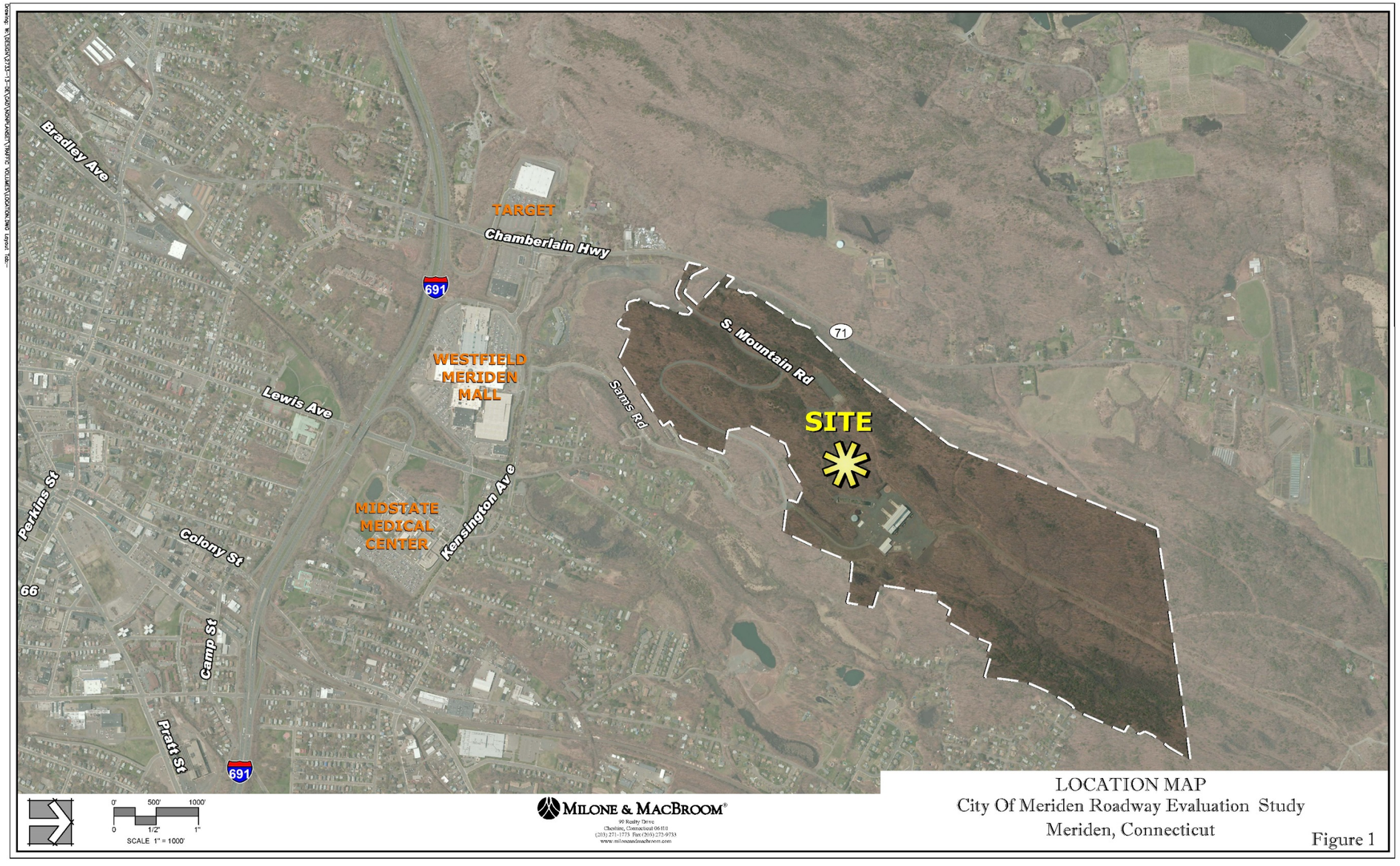
South Mountain Road

The intersection at Chamberlain Highway was improved to enhance sightlines looking north upon exiting the site. A crest vertical curve in the roadway to the north impacts available sight distance. Sightline to the south is hampered by vegetation and a curve in the road, so a sightline easement was established as part of the site plan process. The easement has not been maintained. When or if the City takes ownership of the 36-acre property, the easement would no longer be necessary. Any improvements to this intersection would require approval by CTDOT.

There is a secondary gated roadway connection via Sams Road, a private residential road to Summitwood, a Carabetta apartment development. This connection intersects Sams Road and the NRG parcel access drive in the form of a cul-de-sac. The roadway connection is gated. Since Sams Road is privately owned and maintained, it may not be a viable future secondary access to the development site unless the City obtains the necessary rights. Internally, the site consists of a series of paths and unpaved former haul roads that could potentially be utilized to provide internal connections to buildable areas and building pads.

2.2 Site Utilities

The 36-acre private parcel is served with electric, sewer, gas, and water; however, there are currently no utilities to the rest of the site. Previous work by the power development company involved extension of existing utilities from Sams Road to the plant site. The plant services are metered at the cul-de-sac and, while telemetry was to be installed, this has not been confirmed. Domestic water and fire protection are provided on the former plant site via the Sams Road connection while a separate pipeline from the north was to furnish cooling water, but it was never installed.



LOCATION MAP
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 1

The former plant site is served by electric power, gas, and telephone service also via extension of utilities from Sams Road. Further study would be necessary to determine capacity to serve a more intensive development scenario.

There is a joint utility easement, known as the Joint Utility Corridor (JUC), extending north from the former power plant pad site into the town of Berlin. This corridor was established to accommodate the natural gas service to the power plant as well as a connection from the power plant to the electric transmission lines north of the site. The JUC, strewn with wetland pockets and with ledge prevalent at the surface, was graded for construction access. Some electric utility foundations were installed; however, the power connection was never made. The utilities would have to be consulted to determine whether power and telephone could be routed or looped from Summitwood Road in Berlin to serve the north end of the Meriden site. It is understood that gas service was installed for most of the JUC but was never extended to the plant site. Further study will be required to determine its level of completion and whether the service could be retrofitted to accommodate an alternative development scenario. It is understood in consultation with the gas company that change of use for general distribution purposes would require state-level approval of the Public Utilities Regulatory Authority (PURA).

An extensive stormwater drainage system was installed in South Mountain Road. The system consists of a full-length catch basin and piping system with a number of outlets discharging to water quality basins. Given the extent of land area with runoff tributary to the roadway, riprap swales were installed behind the curb in many areas. The swales, in several cases, discharge back into the closed drainage system. The roadway drainage system is generally in very good condition but requires some maintenance including cleaning of catch basins.

There are two primary water quality basins on South Mountain Road - one nearer Chamberlain Highway and on the north side of the roadway and a second near the cul-de-sac and on the south side of the roadway. The basins were constructed of rock; however, topsoil and plantings were not installed in accordance with the approved site plans. Similarly, a large water quality basin was constructed downgradient of the power plant pad on the NRG parcel. That basin was not planted either. Given the free-draining capacity of the on-site soils and our observations, the basins may not be receiving and treating the intended volumes of runoff, the basins should be studied further as it is possible they may be repurposed to handle added flow from developed areas.

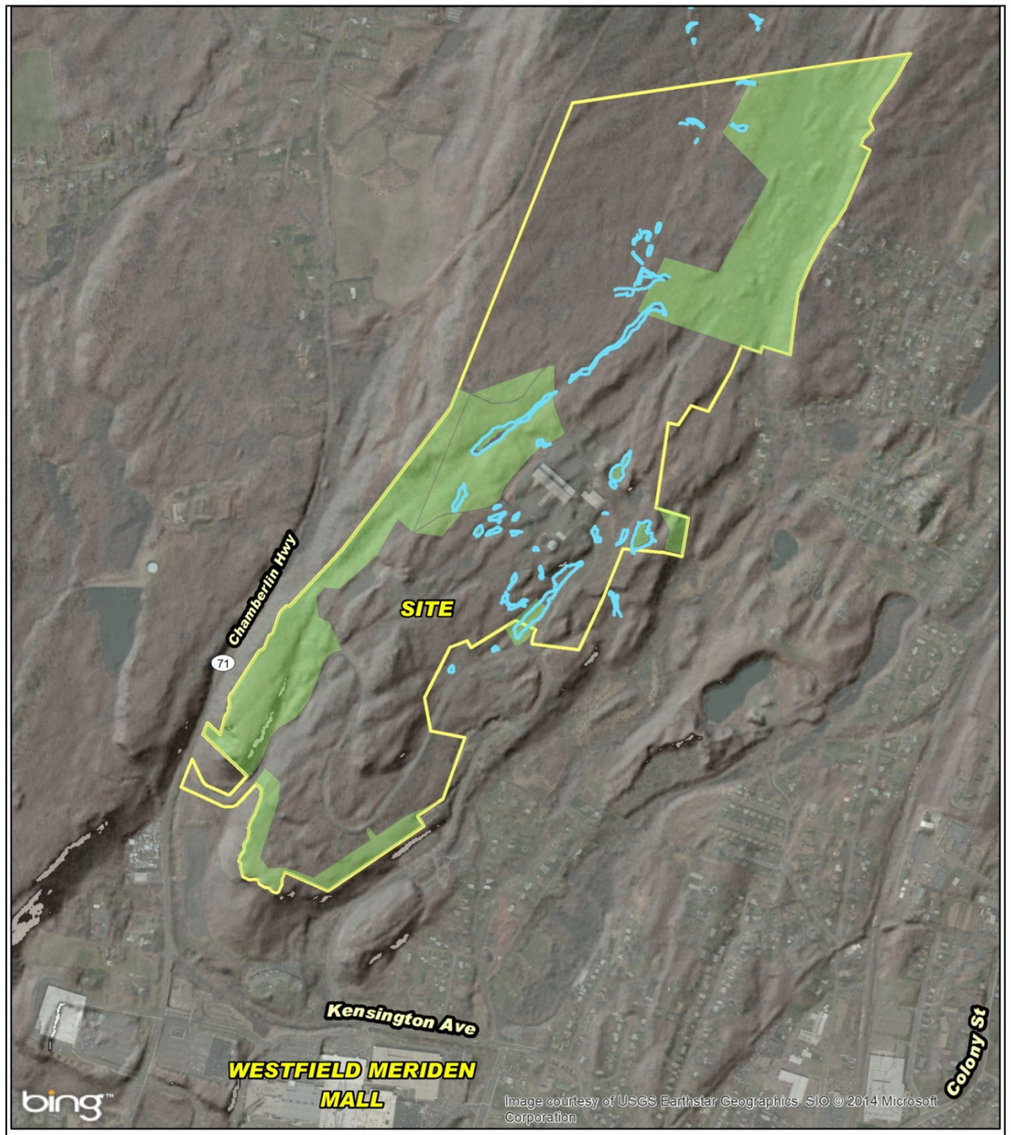
In summary, development along South Mountain Road will necessitate the need for utility installations. Given the presence of ledge throughout, it should be noted that installation costs could be higher than normal.

2.3 Site Constraints

One of the more challenging constraints posed by the site is its steep topography and extents of ledge. Based on geographic information systems (GIS) data provided by the City, approximately 25 percent of the total City-owned acreage outside the South Mountain Road right-of-way is in excess of 20 percent slopes, with significant elevation difference between the site and surrounding areas. There is a ridgeline protection area along the southern boundary of the site intended to preserve tremendous basalt resources previously impacted by quarrying activities on the site prior to construction of the power plant. Given the elevation differential between the NRG site and the surrounding areas, it will be important to incorporate low-impact development strategies to protect low-lying areas from increases in runoff such as the Bailey Avenue neighborhood.

Steep Grades and Rock Outcrops

Approximately 102 acres (30 percent) of the site are dedicated open spaces precluded from development. These open spaces are located primarily along the southwestern and northeastern boundaries of the site. A relatively smaller area of the site, approximately 7.8 acres, is comprised of wetlands. **Figure 2** shows the existing constraints at the NRG site. Protection of wetland resources was an integral component to the previous U. S. Army Corps of Engineers, State Department of Energy & Environmental Protection, and Connecticut Siting Council regulatory approval program. Vernal pools are present atop the rock face situated directly behind or north of the power plant pad site. A conservation easement was established based on a minimum offset distance requirement for the protection of these natural resources.



3 Land Use

City land use considerations for the site were explored in a special study during the update of the City's Plan of Conservation and Development (POCD) in 2009. Subsequently, the study team met with City officials to review the land use policy guidance from the adopted POCD to determine if any refinements have been made. City staff indicated that the general objective of sensitive development of the site, primarily for nonresidential uses over time, remains a policy objective of the City. The POCD states:

> **South Mountain Road Area: Light Industrial/Office/Residential/Open Space**
>
> This special use designation envisions a mixture of uses that will generate economic benefits for the City along with residential development of an appropriate scale in a development pattern that maximizes the retention of undisturbed open space and protects natural resources. The former NRG site, with the exception of the electric generation plant parcel itself, is the area of Meriden designated for this type of mixed use. City ownership of most of the land, and the size and topography of the area, make this particular area of Meriden unique.
>
> To ensure that high natural values of the site are conserved, approximately two thirds of total natural undisturbed lands (about 100 acres) should be dedicated as open space prior to lease, sale, or further development of any part of the site.
>
> The remainder of the projected protected open space (approximately 45 acres) would be determined and dedicated, in part or in whole, after a substantial amount of land is leased or sold or when approved to be developed.
>
> **Approximately 144.5 acres (50 percent) of land should be part of developed taxpaying projects.**
>
> Generally, development areas will be located within the interior of the site. Areas on the north side of South Mountain Road and within the center of the site are envisioned for industrial/office flex building space, and residential development is envisioned for the northeastern development part of the site.
> *Source: 2009 Meriden POCD pp133 -134*

Currently, the City has little interest in residential development on the property but would consider a limited quantity of specialized housing such as assisted living or life care facilities. Those areas of the site that have value as dedicated open space have been preserved by filing on the City land records' open space dedications for 102.52 acres of the City-owned property. Provision has been made to bisect the open space tracts with access corridors in designated locations so that developable sections of the property can be accessed.

The City retained the Connecticut Economic Resource Center, Inc. (CERC) to evaluate the feasibility of development along South Mountain Road. The land uses suggested as holding the most promise from a market perspective are:

- **Destination Recreation:** A destination recreational facility such as a sports complex or indoor theme park could take advantage of the site's unique attributes and scenic views. A destination recreation facility would benefit from the close proximity to the retail mall as well as the scenic landscape. However, the access to the highway could limit some of the potential to market the site for use as a destination recreational facility.

- **Wind or Solar Power Generation:** An alternative use for the site could be for wind or solar power generation. The state's extremely high renewable portfolio goals make the demand for energy produced from these sources definitive. The lofty terrain and site characteristics make the site a potential location for the development of a wind or solar farm. In addition, the large-scale electricity lines built to connect the former power plant site were constructed to accommodate a similar use and could easily be transitioned for these purposes.

- **Technology or Healthcare Office Space**: The scenic views and campus-like feel of the hilltop offer an attractive location for the development of an office park. Again, the winding entry road and distance from the Chamberlain Highway make development in this area problematic. The development of office or technology space marketed to companies in the health care, insurance, or inpatient medical facilities would complement the strengths of the regional workforce. Again, the continued shortage of industrial use property in the region will continue to make the South Mountain Road site a potential option for light manufacturing despite the inherent challenges.

- **Light Manufacturing**: The site has the potential for strategic development in light manufacturing due to the large amount of land available and the shortage of similarly zoned sites within the region. Development in this sector, however, could be problematic due to the steep and winding entry road. The distance from the Chamberlain Highway to the site also makes any large-scale manufacturing problematic. Manufacturing or intensive industrial development activity within the health care, aerospace, or medical research areas would complement the strengths of the regional economy. The continued shortage of industrial use property in the region will continue to make the South Mountain Road site a potential option for light manufacturing despite the inherent challenges.
Source: City of Meriden - A study evaluating the feasibility of development on property along South Mountain Road, 2014, p22

The following is a list of future land uses developed by City Planning Department staff as compatible with the property:

- **Office/Technology/University**
  - Professional office/buildings
  - State governmental offices

- **Medical Care/Services**
  - Senior care development (continuum care - nursing homes, assisted living, etc.)
  - Senior learning center
  - Outpatient physical rehabilitation center

- **Commercial**
  - Commercial resort
  - Commercial recreation facility
  - Wholesale industrial, commercial, and medical equipment sales

- **Light Industrial**
  - Computer/electronic/mechanical product development
  - Product assembly/packaging
  - Light manufacturing/production/fabrication of nonhazardous materials into finished products

- **Biomedical Research and Development facilities**
  - High security biomedical research facility
  - High security biomedical production facility
  - Low security biomedical research facility
  - Low security biomedical production facility

- **Indoor Storage/Distribution**
  - Warehouse and distribution facilities
  - Indoor storage with temperature controls
  - Garage for industrial/service vehicles
  - Indoor storage of building materials

- **Heavy Industrial**
  - Manufacturing or storage of industrial chemicals
  - Processing of raw materials into products
  - Truck terminals and truck service facilities
  - Vehicle maintenance/repair facility

- **Energy**
  - Solar energy facility
  - Agriculture
  - Greenhouses

- **Accessory Uses**
  - Outdoor storage (under 25 percent of coverage of indoor enclosed building with storage)
  - Employee housing or training facilities (for office, research, and senior care uses)

- **Institutional**
  - State correctional institutions
  - City uses/buildings

Both the City land use list and that proposed by CERC were generally similar in land use classifications and support each other. These land use categories were utilized as a guide in creating the development concept plans for the site.

4 Existing Transportation and Safety Conditions

4.1 Study Area Roadways and Intersections

Regional access to the site is via I-691, which connects directly to I-84 to the west and I-91 to the east. Once off I-691, a series of arterial and local streets provide access to the site. Major roadways in vicinity of the site include Chamberlain Highway (Route 71), Kensington Avenue, and Lewis Avenue. These are shown in **Figure 3** and described below.

Chamberlain Highway (Route 71) is classified as an urban principal arterial and runs along the site's west frontage. There are two travel lanes going northbound on Chamberlain Highway between the I-691 eastbound off ramp and Kensington Avenue, which then tapers to one northbound lane north of Kensington Avenue within the study area. Traveling southbound on Chamberlain Highway, there are two travel lanes between Coldspring Avenue and the south drive to the Target shopping center and one travel lane for the remaining segments within the study area. Sidewalks are present along the east side of Chamberlain Highway south of Kensington Avenue as well as along the west side between Coldspring Avenue and the Target driveway.

Chamberlain Highway

Kensington Avenue is classified as a minor arterial and is characterized by one travel lane in each direction. This roadway runs east-west along the southern boundary of the site. Sidewalks are present on the south side of Kensington Avenue between the Westfield Meriden Mall entrance on Kensington Avenue and Lewis Avenue. Land use along Kensington Avenue is generally residential.

Lewis Avenue, which is classified as a minor arterial in the vicinity of the Westfield Meriden Mall, is generally characterized by two travel lanes and dedicated turn lanes in each direction with sidewalks on both sides of the street. The two driveways to the MidState Medical Center and the east driveway to the Westfield Meriden Mall are located off this roadway.

Kensington Avenue

For the purposes of this roadway evaluation study, 10 intersections were identified for inclusion in the study area and include:

- Chamberlain Highway at Kensington Avenue (signalized)
- Chamberlain Highway at Cold Spring Avenue/Westfield Meriden Mall driveway (signalized)
- Chamberlain Highway at Target driveway/I-691 westbound on ramp (signalized)
- Chamberlain Highway at I-691 eastbound off ramp (signalized)
- Kensington Avenue at Sams Road (stop sign controlled)
- Kensington Avenue at Westfield Meriden Mall driveway (stop sign controlled)
- Lewis Avenue at Kensington Avenue and Bailey Avenue (signalized)
- Lewis Avenue at Westfield Meriden Mall driveway/MidState Medical Center driveway (signalized)
- Lewis Avenue at I-691 westbound off ramp/MidState Medical Center driveway (signalized)
- Lewis Avenue at I-691 eastbound on ramp and Columbia Street (signalized)

4.2 Safety

4.2.1 Accident History

Information on 3 years of traffic accidents occurring from January 1, 2010 through December 31, 2012 was obtained from CTDOT for the segment of Chamberlain Highway within the study area.

In total, 50 accidents were reported during the 3-year period (2010-2012) on Chamberlain Highway near the site. Approximately 42 percent of the accidents resulted in injuries while 58 percent resulted in property damage only. There were no reported fatalities. The majority of accidents were rear-end collisions (28 percent), which is typical at signalized intersections.

Sharp Curve on Chamberlain Highway

Information on 3 years of traffic accidents occurring from January 1, 2011 through December 31, 2013 was obtained from the City of Meriden Police Department for Kensington Avenue and Lewis Avenue within the study area.

A total of 15 accidents was reported during the 3-year period (2011-2013) on Kensington Avenue near the site. Approximately 20 percent of the accidents resulted in injuries while 80 percent resulted in property damage only. There were no reported fatalities. The majority of accidents on Kensington Avenue was rear-end collisions (60 percent).

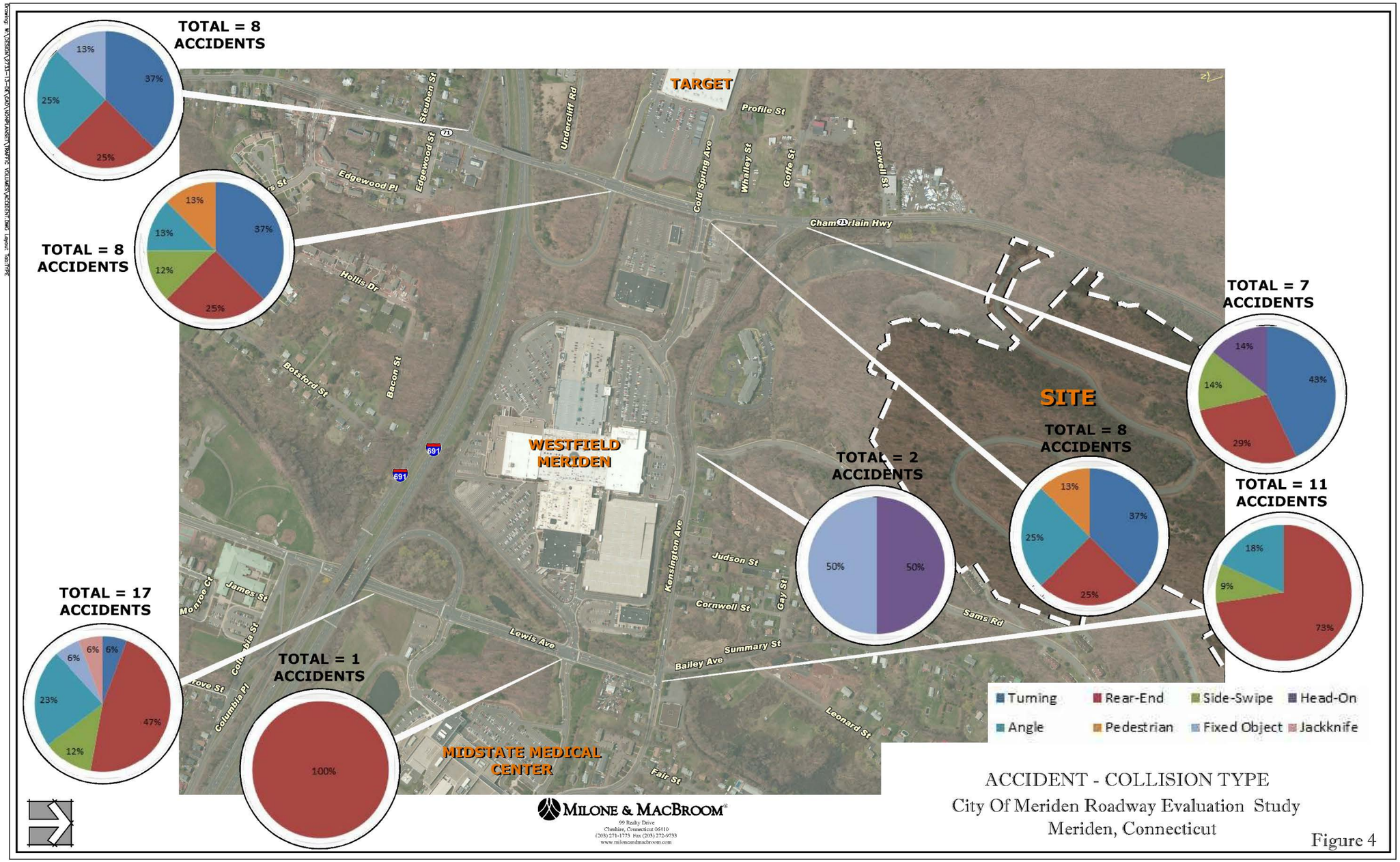
In total, 18 accidents were reported during the 3-year period on Lewis Avenue near the site. Approximately 17 percent of the accidents resulted in injuries while 83 percent resulted in property damage only. There were no reported fatalities. The majority of accidents on Lewis Avenue was rear-end collisions (50 percent).

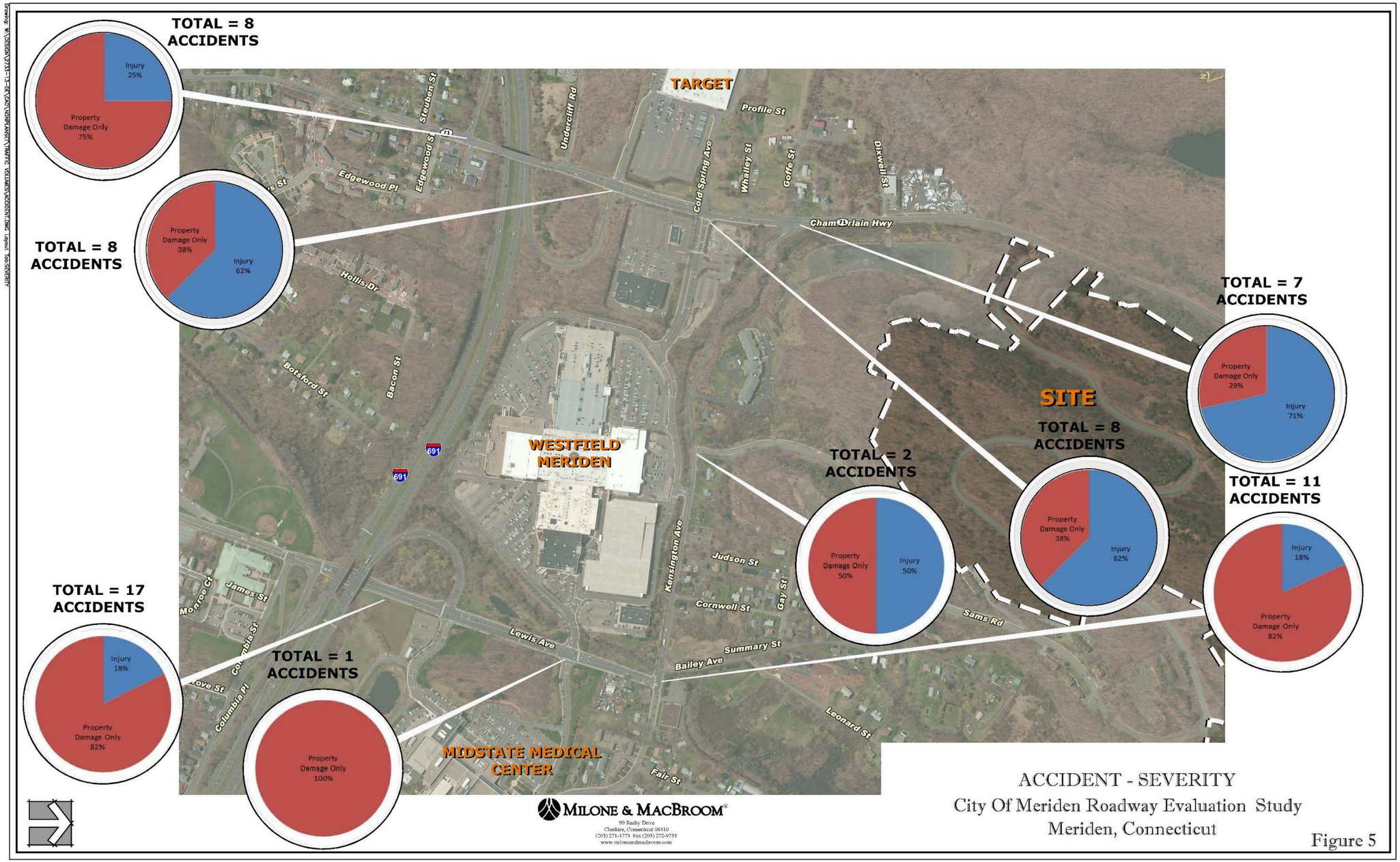
The accident data summarized by collision type and severity are illustrated in **Figures 4 and 5**, respectively. A detailed breakdown of accident data presented by location, accident severity, and collision type for the whole study area is presented in Appendix A of this technical memorandum.

4.2.2 Sightlines

An intersection sight distance design waiver was granted by CTDOT in 1999 as sight distances from South Mountain Road onto Chamberlain Highway did not meet minimum AASHTO requirements due to vegetation to the south and a vertical crest curve to the north. A sightline easement to clear vegetation south of South Mountain Road was established then to improve sightlines looking south (left) from South Mountain Road.

As part of this study, sightlines from South Mountain Road were verified using current guidelines from the CTDOT *Highway Design Manual*. The CTDOT *Highway Design Ma*nual provides minimum sight distance guidelines based on 85th percentile speed. The 85th percentile speed is the speed at or below which 85 percent of the vehicles were recorded to have traveled. Based on 85th percentile speeds on Chamberlain


TOTAL = 8 ACCIDENTS
13%
37%
25%
25%
TOTAL = 8 ACCIDENTS
13%
13%
37%
12%
25%
TOTAL = 17 ACCIDENTS
6%
6%
6%
23%
47%
12%
TOTAL = 1 ACCIDENTS
100%
TOTAL = 2 ACCIDENTS
50%
50%
TOTAL = 8 ACCIDENTS
13%
37%
25%
25%
TOTAL = 7 ACCIDENTS
14%
43%
14%
29%
TOTAL = 11 ACCIDENTS
18%
9%
73%
TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Steuben St
Underclift Rd
Profile St
Edgewood St
Edgewood Pl
Cold Spring Ave
Whalley St
Gorfe St
Dixwell St
Chamberlain Hwy
Hollis Dr
Botsford St
Bacon St
691
Kensington Ave
Judson St
Gay St
Cornwell St
Sams Rd
Summary St
Bailey Ave
Lewis Ave
Leonard St
Fair St
James St
Monroe Ct
Love St
Columbia Pl
Turning
Rear-End
Side-Swipe
Head-On
Angle
Pedestrian
Fixed Object
Jackknife
MILONE & MACBROOM
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
www.miloneandmacbroom.com
ACCIDENT - COLLISION TYPE
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 4


TOTAL = 8 ACCIDENTS
Injury 25%
Property Damage Only 75%
TOTAL = 8 ACCIDENTS
Property Damage Only 38%
Injury 62%
TOTAL = 17 ACCIDENTS
Injury 18%
Property Damage Only 82%
TOTAL = 1 ACCIDENTS
Property Damage Only 100%
TOTAL = 7 ACCIDENTS
Property Damage Only 29%
Injury 71%
TOTAL = 2 ACCIDENTS
Property Damage Only 50%
Injury 50%
TOTAL = 8 ACCIDENTS
Property Damage Only 38%
Injury 62%
TOTAL = 11 ACCIDENTS
Injury 18%
Property Damage Only 82%
TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Steuben St
Edgewood St
Edgewood Pl
Undercliff Rd
Profile St
Cold Spring Ave
Whalley St
Gorfe St
Dixwell St
Cham Drlain Hwy
Hollis Dr
Botsford St
Bacon St
691
Kensington Ave
Judson St
Gay St
Cornwell St
Sams Rd
Summary St
Bailey Ave
Leonard St
Lewis Ave
James St
Monroe Ct
Columbia Pl
Fair St
MILONE & MACBROOM
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
www.miloneandmacbroom.com
ACCIDENT - SEVERITY
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 5

Highway, the minimum acceptable intersection sight distance per CTDOT guidelines is 511 feet looking left (south) and 610 feet looking right (north). The measured sight distances looking left and right from the site driveway are approximately 350 feet and 380 feet, respectively. The sightline looking left is restricted by vegetation, which can be cleared, while the sightline looking right is restricted by a vertical crest curve on Chamberlain Highway.

4.3 Existing Traffic Conditions

4.3.1 Vehicular Speeds

Chamberlain Highway has a regulatory posted speed limit of 35 miles per hour in the study area while the speed limit on Kensington Avenue and Lewis Avenue is 25 miles per hour in the study area. Vehicular speed data was collected between October 3 and October 7, 2014 for the study area. The speed data was summarized in terms of 85th percentile speed and average speed. It was found that the 85th percentile speed for northbound traveling vehicles on Chamberlain Highway, just north of Kensington Avenue, was 46 miles per hour while southbound vehicles recorded an 85th percentile speed of 55 miles per hour. The average speed of vehicles traveling on Chamberlain Highway through this area was recorded to be 41 miles per hour traveling northbound and 49 miles per hour traveling southbound.

On Kensington Avenue, the 85th percentile speed was 41 miles per hour for eastbound traveling vehicles and 40 miles per hour for vehicles traveling westbound. The average speed of vehicles traveling on this roadway was recorded to be 37 miles per hour traveling eastbound and 35 miles per hour traveling westbound.

Lewis Avenue recorded 85th percentile speeds of 34 miles per hour northbound and 27 miles per hour southbound. The average speed of vehicles traveling on this roadway was 23 miles per hour northbound and 22 miles per hour southbound.

4.3.2 Traffic Volumes

A review of historical traffic volume data (years 2007, 2010, and 2013) at recorded CTDOT traffic monitoring stations in the vicinity of the study intersections was undertaken. Automatic Traffic Recorder counts were collected by MMI between October 3 and October 7, 2014. The historical Average Daily Traffic (ADT) volume data and the data collected by MMI are summarized in **Table 1**.

As shown in **Table 1**, the segment of Chamberlain Highway north of Kensington Avenue has experienced fairly consistent traffic volumes over the past 7 years while the segment between Kensington Avenue and the I-691 westbound on ramp has experienced some decline (10 percent) in traffic volumes from year 2010. Traffic volumes on Kensington Avenue have remained fairly constant since 2010. Lewis Avenue has an ADT of 6,200 vehicles per day north of the mall entrance per CTDOT's 2010 data while ADT south of the mall entrance is almost double (11,271 vehicles) the number of vehicles north of the mall entrance. This ratio is consistent with turning movement counts collected by MMI at the intersection of Lewis Avenue and the mall entrance.

TABLE 1
Two-Way Annual Daily Traffic (ADT)

Location	Year 2007	Year 2010	Year 2013	Year 2014*
Chamberlain Highway north of Kensington Avenue	6,100	6,000	5,800	6,203
Chamberlain Highway north of the I-691 WB on ramp	12,000	12,000	10,700	10,797
Kensington Avenue east of Chamberlain Highway	----	6,300	----	6,085
Lewis Avenue north of the mall entrance	----	6,200	----	----
Lewis Avenue south of the mall entrance	----	----	----	11,271

Source: Connecticut Department of Transportation (* ATR data collected by MMI)
"----": Not Available

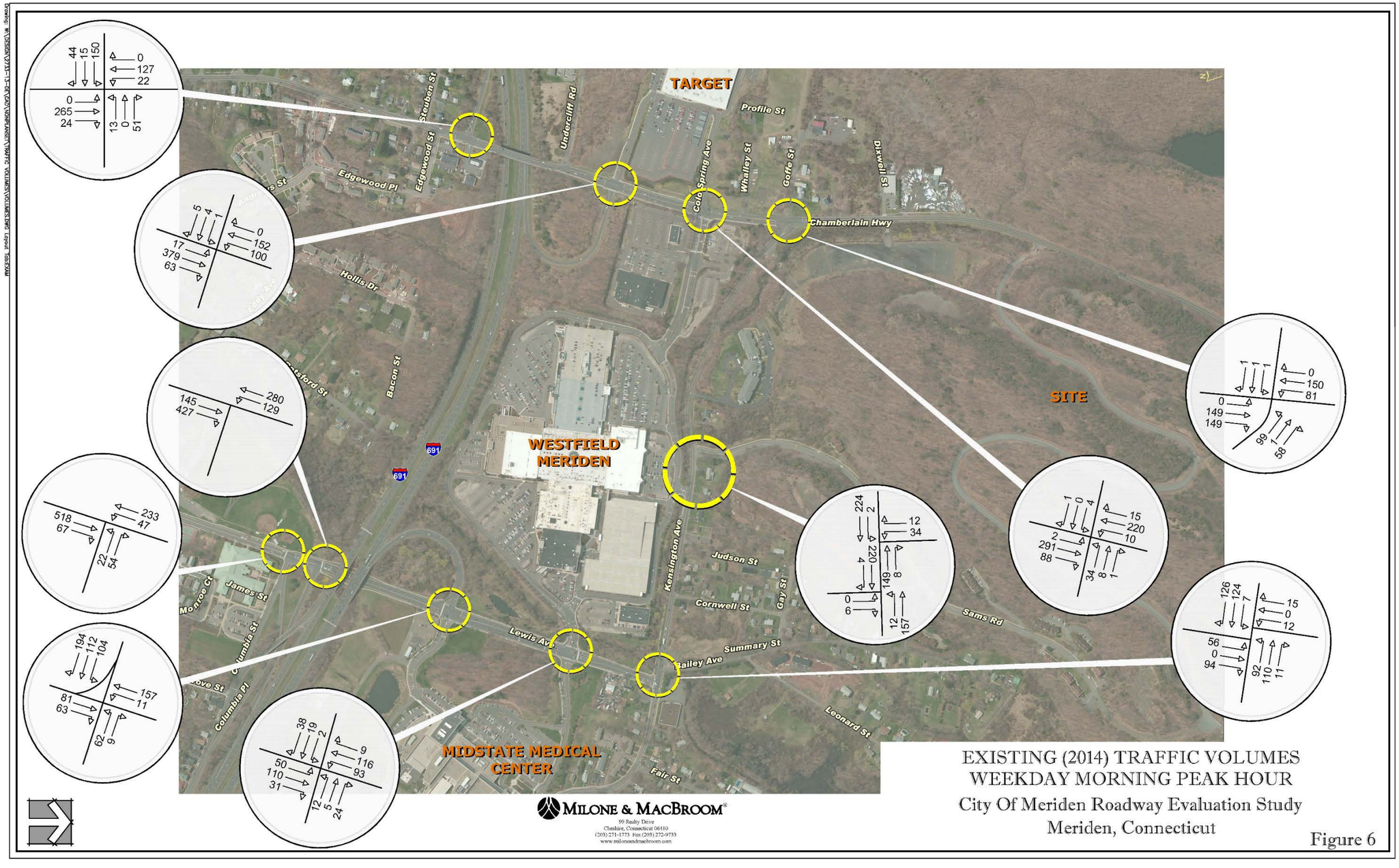
To supplement the average daily traffic data, turning movement traffic counts were manually conducted on Friday, October 10, 2014, during the weekday morning (7:00 a.m. to 9:00 a.m.) and afternoon (4:00 p.m. to 6:00 p.m.) commuter periods and Saturday, October 11, 2014, during the weekend midday peak period (11:00 a.m. to 1:00 p.m.) at the study area intersections.

The weekday morning peak hour generally occurred from 7:30 a.m. to 8:30 a.m. while the afternoon peak hour generally occurred from 4:45 p.m. to 5:45 p.m. The weekend midday peak hour occurred from 11:30 a.m. to 12:30 p.m. **Figures 6, 7, and 8**, respectively, illustrate the traffic volumes that were extracted from the counts during the weekday morning, weekday afternoon, and Saturday midday peak periods.

4.3.3 Capacity Analysis

The adequacy of the intersections to handle the peak-hour traffic volumes under existing (2014) conditions was evaluated using the *Synchro* program. This software package adheres to the methodologies outlined in the *Highway Capacity Manual* (HCM)[1] to determine Level of Service (LOS). LOS is a qualitative measure of the efficiency of intersection operations in terms of delay and inconvenience to motorists.

[1] *Highway Capacity Manual*, Transportation Research Board



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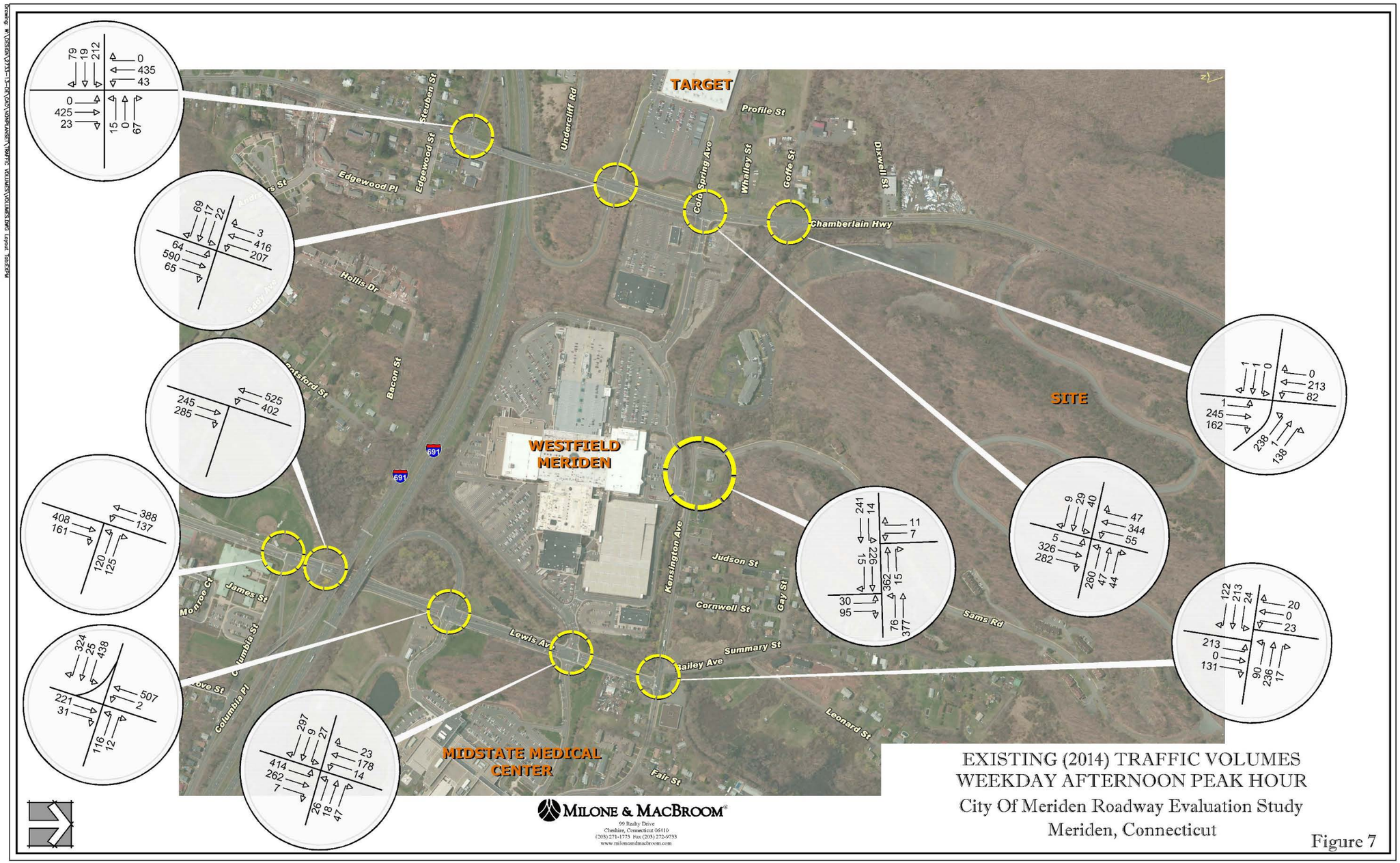
EXISTING (2014) TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut

Figure 6



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EXISTING (2014) TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR
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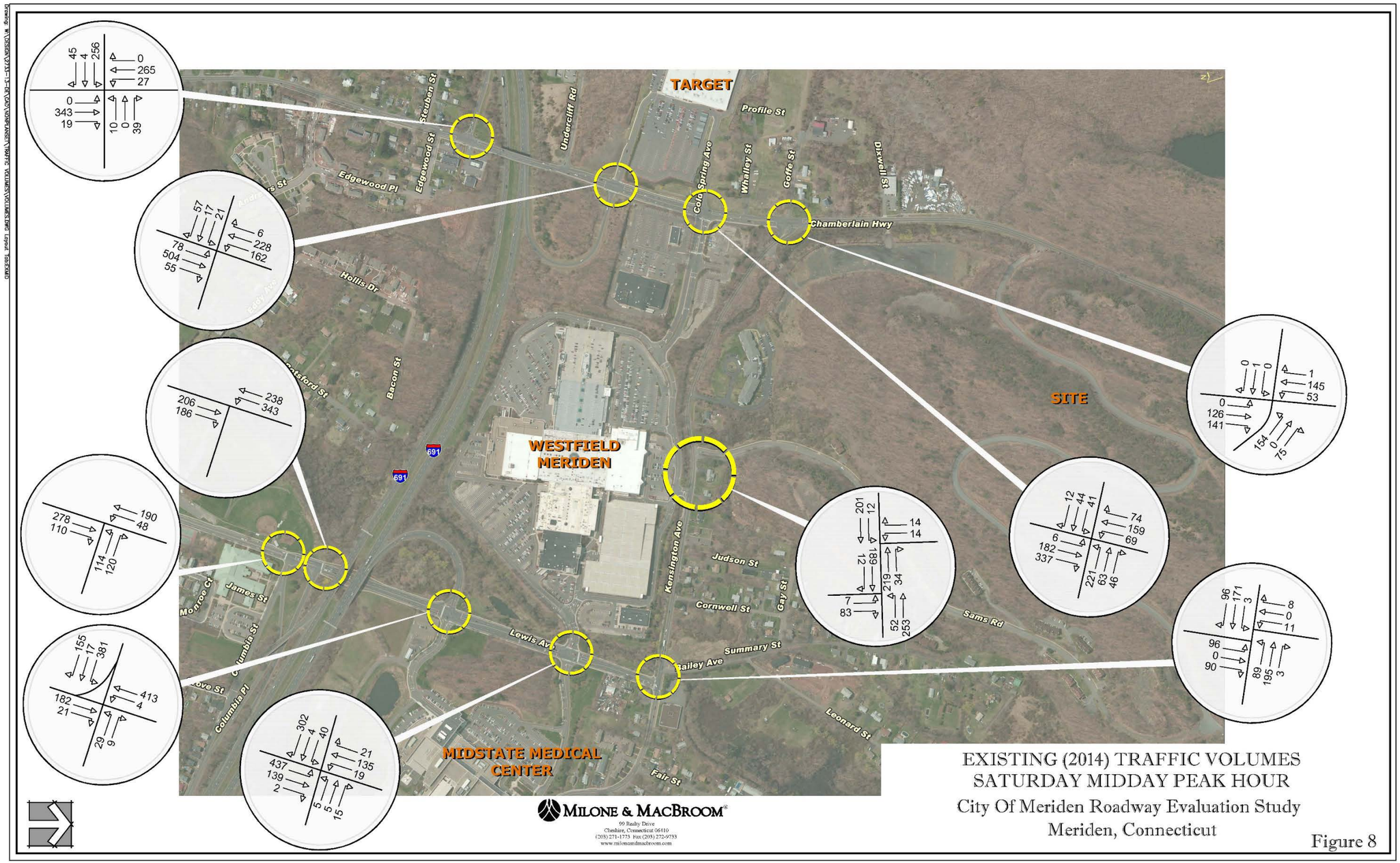
Figure 7



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EXISTING (2014) TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR
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Figure 8

A description of the various LOS designations, A through F, for signalized and unsignalized intersections is presented in Appendix B. LOS A describes operations with very low average delay per vehicle while LOS F describes operations with long average delays.

Figure 9 illustrates the LOS for the study area intersections under existing (2014) conditions. As shown in **Figure 9**, all intersections operate at overall LOS B or better under existing (2014) traffic conditions while all movements operate at LOS D or better.

A detailed breakdown of the analysis results and worksheets for the study area intersections under existing (2014) conditions are summarized in Appendices C and D, respectively.

4.4 Multimodal Amenities

Existing multimodal amenities within the study area were reviewed and are illustrated in **Figure 10.** A discussion of the existing amenities is presented below.

4.4.1 Pedestrian Amenities

The study area experiences pedestrian activity due to the residential land use along Kensington Avenue and the Westfield Meriden mall just south of the site. There are sidewalks within the study area, but there are also gaps in the network that can be improved. Sidewalks are currently present along the east side of Chamberlain Highway throughout the study area as well as along the west side of Chamberlain Highway between Coldspring Avenue and the Target driveway. There is a sidewalk along the south side of Kensington Avenue connecting the mall entrances on Kensington Avenue and Lewis Avenue. Lewis Avenue has sidewalks along both sides within the study area. Most of the sidewalks within the study area are in generally good condition.

Sidewalks along Chamberlain Highway

Crosswalks are currently present on Chamberlain Highway at the shopping mall entrance and Target driveway. Crosswalks are present on Lewis Avenue at the shopping mall entrance and the MidState Medical Center driveways as well as the I-691 eastbound ramps.

4.4.2 Bicyclist Amenities

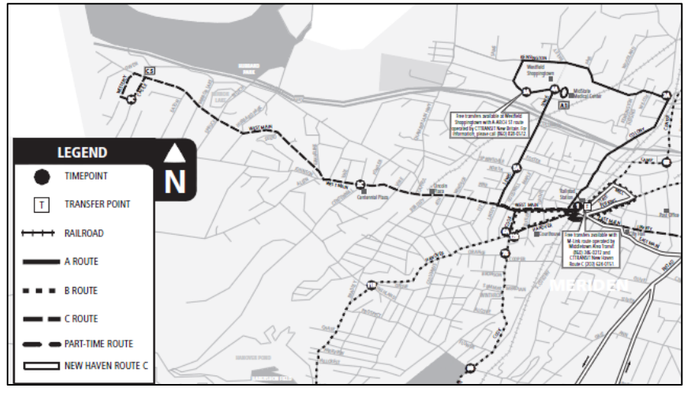
None of the roadways within the study area are designated bike routes. Bicycle amenities in the form of dedicated bike lanes, signage, pavement markings, and bike racks within the study area are nonexistent. Furthermore, roadway shoulders are generally narrow (1 to 2 feet) and, therefore, unsafe and uninviting to the average bicyclist.

4.4.3 Trails

The Metacomet Blue Trail currently runs west of the NRG site; however, there are currently no connections from the site to this trail. The 2009 update to the POCD identified a number of linkages to the trail from the site.

4.4.4 Transit Services

The study area is served by the CT Transit bus route (Route A - Westfield Shoppingtown). One bus stop is located at the Westfield Meriden Mall while a second is located at the northern entrance of MidState Medical Center on Lewis Avenue. The buses generally run every 30 minutes from 7:00 a.m. to 5:30 p.m., Mondays to Fridays, and every 40 or 50 minutes from 9:40 a.m. to 5:20 p.m. on Saturdays. There is no bus service on Sundays. Opportunities to expand transit service or provide connections to the study site were explored and are discussed in Chapter 7.



CT Transit Meriden Map

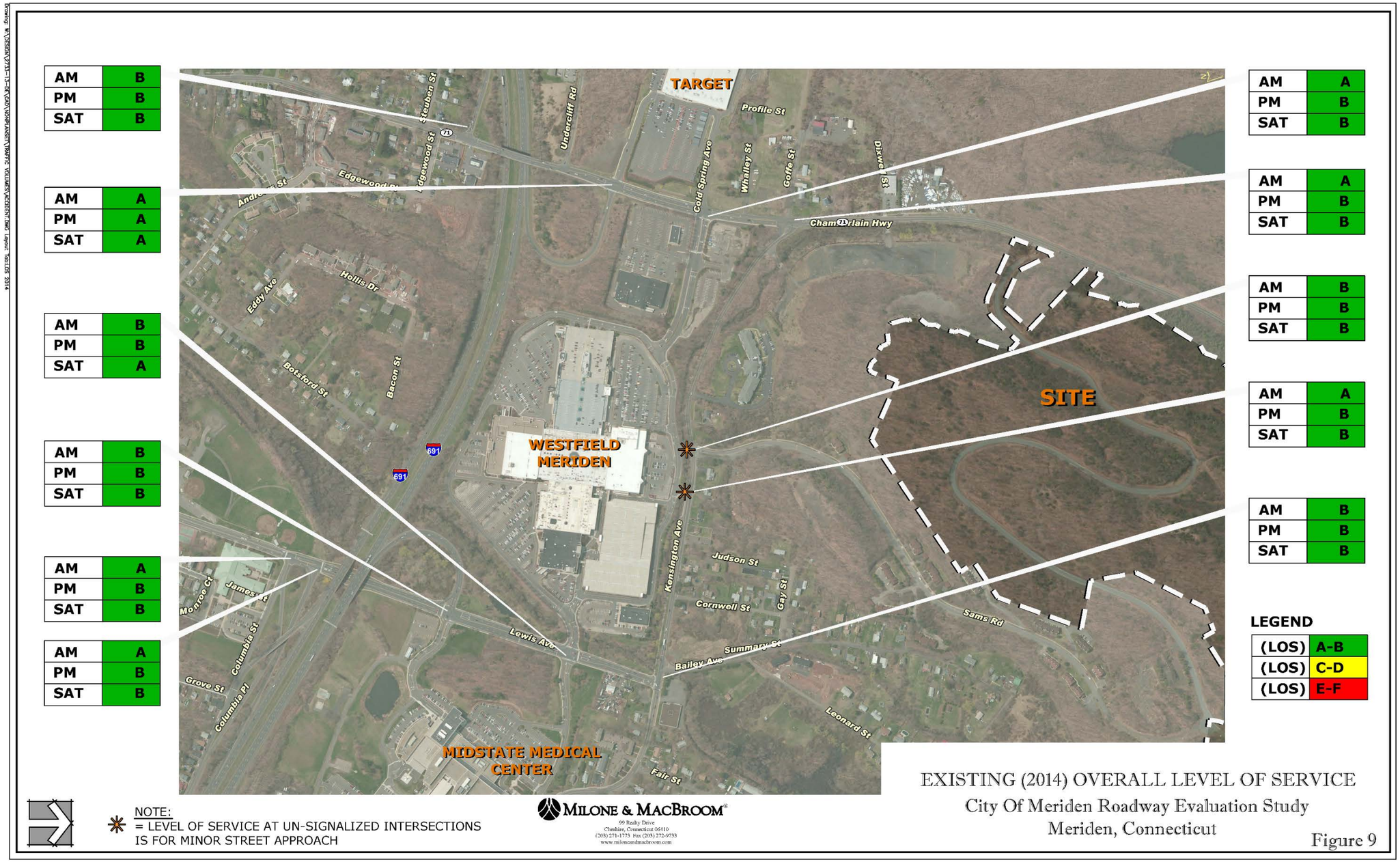
5 Future Site Development

5.1 Preliminary Site Development Concepts

Three areas were identified at the site for potential development. These include the southern portion representing the area south of the former power plant property along South Mountain Road, the former NRG property which constitutes the central portion, and the northern portion constituting the area between the former NRG property and the Berlin town line.

The extent and intensity of the development was shaped by site constraints as it relates to wetlands, dedicated open spaces, and steep topography and the need to reserve space for on-site stormwater management. Building and parking area footprints were established based on land available after the aforementioned constraints were considered. Building heights were kept at maximum three stories.

Internal roadways connecting the various parcels were provided to enhance internal traffic circulation and emergency access. The maximum grade on these internal roadways was kept at 10 percent.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LEGEND
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(LOS) C-D
(LOS) E-F
TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Steuben St
Edgewood St
Undercliff Rd
Profile St
Cold Spring Ave
Whalley St
Gorfe St
Dixwell St
Chamberlain Hwy
Eddy Ave
Hollis Dr
Botsford St
Bacon St
Kensington Ave
Judson St
Cornwell St
Gay St
Sams Rd
Lewis Ave
Summary St
Bailey Ave
Leonard St
Monroe Ct
James Ct
Columbia St
Columbia Pl
Grove St
Fair St
691
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EXISTING (2014) OVERALL LEVEL OF SERVICE
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Figure 9

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EXISTING MULTI-MODAL AMENITIES
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Figure 10

Based on these considerations, three preliminary concepts were initially developed and presented to the study Steering Committee for its review and input. It should be noted that, since these plans are conceptual and by no means engineered, information on grading, drainage, and utilities was not considered. It is anticipated that such level of detail would be evaluated and provided during actual design of the site. The three preliminary concepts that were developed are:

Preliminary Site Development Concept 1 would develop only the southern portion of the site along South Mountain Road. This alternative would accommodate seven buildings, totaling approximately 316,000 square feet of development. This concept would be the least aggressive of the three preliminary concepts and most likely have the least impacts on the site. Preliminary Site Development Concept 1 is presented in **Figure 11**.

Preliminary Site Development Concept 2 would develop the entire site including the southern and northern portions as well as the former NRG property. A total of 14 buildings totaling approximately 1.19 million square feet would be accommodated under this concept. A direct internal roadway connection would be provided between the southern portion and the former NRG property while a roadway running along the western boundary of the site would provide a connection between the southern and northern portions. No direct internal connection would be provided between the former NRG property and the northern portion of the site. Preliminary Site Development Concept 2 is illustrated in **Figure 12**.

Preliminary Site Development Concept 3 would develop the entire site including the southern portion, the former NRG property, and the northern portion. This preliminary concept, which would be the most aggressive of the three concepts, would accommodate 14 buildings totaling roughly 1.22 million square feet. Similar to Preliminary Site Development Concept Plan 2, there would be direct internal connection between the southern portion and the former NRG property and a roadway along the western boundary of the property connecting the southern and northern parcels. However, unlike Preliminary Concept 2, Preliminary Concept 3 would have a direct internal connection between the former NRG property and the northern parcels. This concept is presented in **Figure 13.**

Figure 11: Preliminary Site Development Concept 1

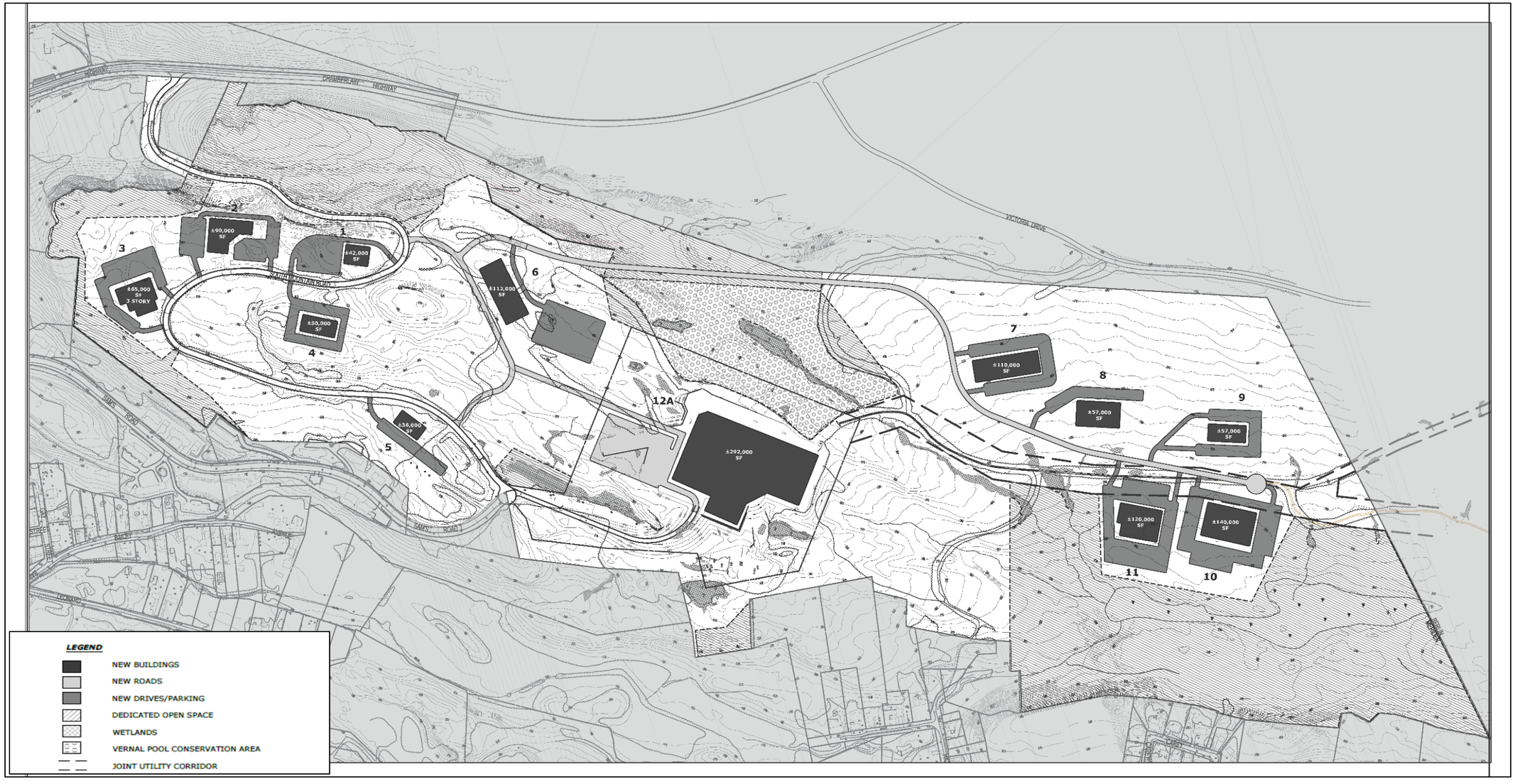


Figure 12: Preliminary Site Development Concept 2

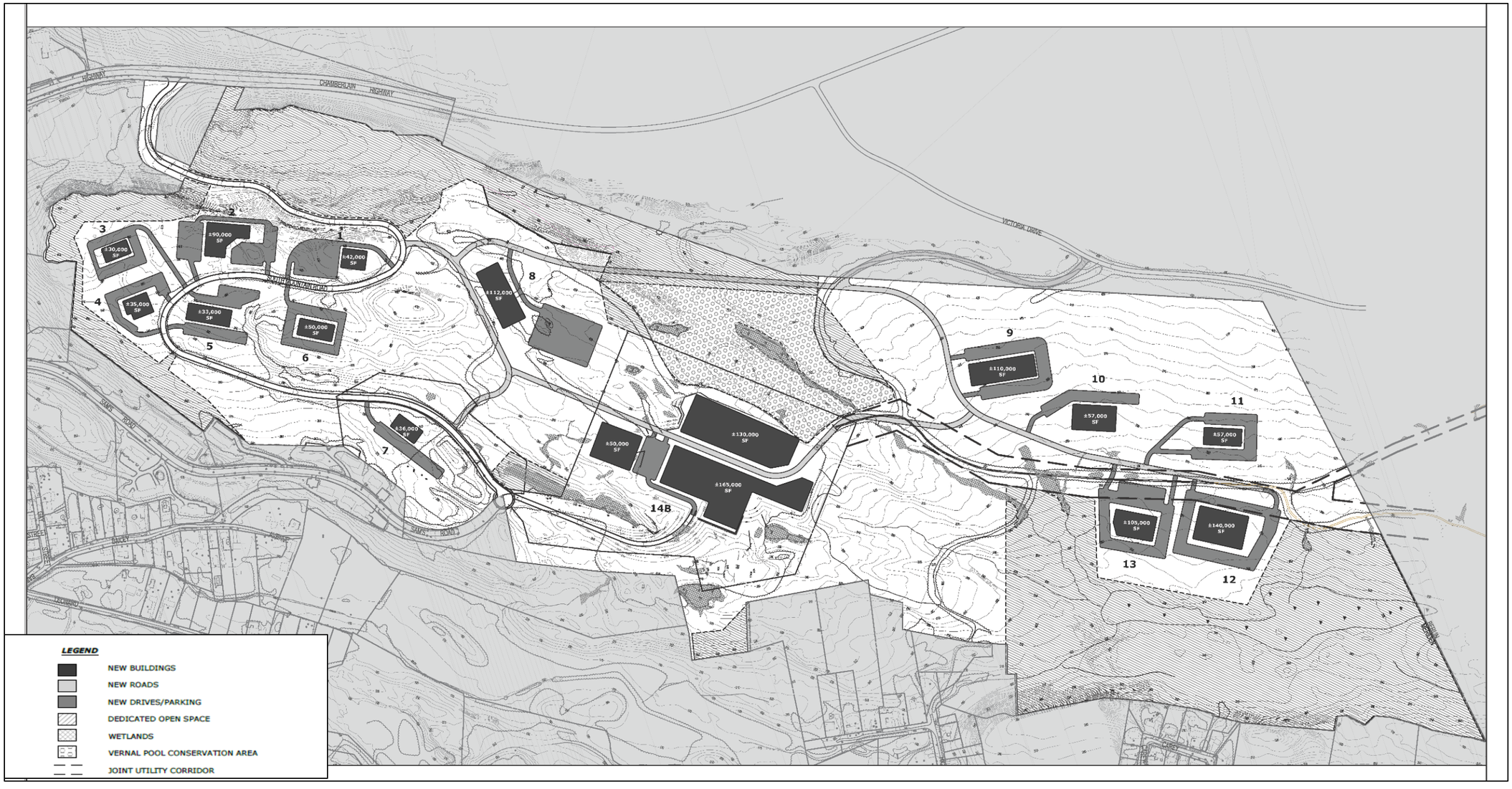


Figure 13: Preliminary Site Development Concept 3

5.2 Preferred Site Development Concept

The three preliminary site development concepts were reviewed and screened by the study steering committee to select a preferred concept. Some of the screening criteria considered were the intensity of development, types of land uses, site access, and internal functionality and circulation. Based on these criteria, the study steering committee agreed that Preliminary Site Development Concept 3 was the most realistic and beneficial of the development concepts. Therefore, Preliminary Site Development Concept 3 was selected as the preferred development concept with some minor revisions. These revisions included consolidating Buildings 3 and 4, eliminating Building 5 within the southern parcel, and increasing building sizes within the northern parcels to absorb the loss of Building 5.

The Steering Committee felt that the development of the site could potentially occur in three phases. Phase I of the development would likely involve the southern portion of the site along South Mountain Road. Phase II would involve the development of the northern portion of the site while Phase III could involve the former NRG property depending on whether this piece of property can be acquired by the City or incorporated into a master development agreement. **Figure 14** shows the Preferred Site Development Concept with the potential phases of development identified. A breakdown of the site development by construction phase is presented in Table 2.

TABLE 2
Preferred Site Development Concept Square Footage

PREFERRED DEVELOPMENT CONCEPT CITY OF MERIDEN ROADWAY EVALUATION STUDY (FORMER NRG SITE)	
Site Development	**Approximate Square Footage**
Phase I	
Building 1	42,000
Building 2	90,000
Building 3	65,000
Building 4	50,000
Building 5	36,000
Building 6	112,000
Subtotal	***395,000***
Phase II	
Building 7	110,000
Building 8	57,000
Building 9	57,000
Building 10	140,000
Building 11	120,000
Subtotal	***484,000***
Phase III	
Buildings 12B	165,000 130,000 50,000
Subtotal	***345,000***
TOTAL	**1,224,000**

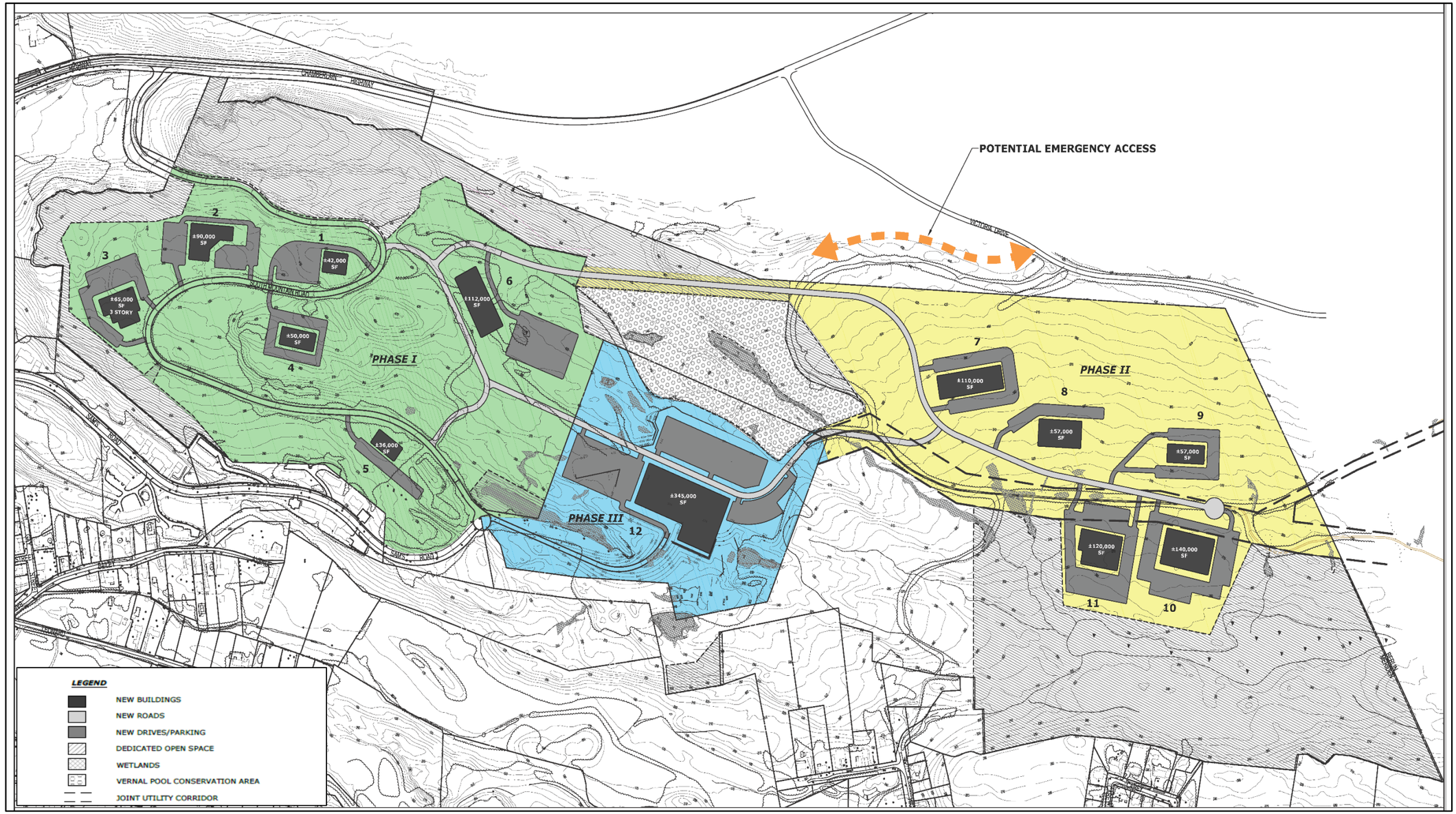


Figure 14: Preferred Site Development Concept

6 Future Traffic Conditions

6.1 Future Background (No Build) Traffic

Based on discussions with the study Steering Committee, a future (2034) planning year horizon was utilized for this study. Travel model forecast data for years 2011, 2015, and 2035 on Chamberlain Highway, Kensington Avenue, and Lewis Avenue in the study area was obtained from CTDOT. Based on the travel demand data provided by CTDOT, MMI determined a 1 percent per year growth rate for the study area. This rate is consistent with the traffic growth rate in the previously published *Interstate 691 Interchange 5, 6, and 7 Study* conducted by URS in July 2008. The existing intersection traffic volumes were projected to year 2034 using a 1 percent annual growth factor.

CTDOT and the City were contacted to determine whether there were any approved or yet to be constructed projects in the immediate vicinity of the study area to include as part of the future (2034) background traffic. CTDOT indicated there were no projects to include while the City indicated that the currently vacant J.C. Penney store in the mall will be occupied in the future and should therefore be included in the future traffic conditions. The City confirmed there were no future expansions planned for the MidState Medical Center while future development plans of the Undercliff property were not significant enough to include in future background traffic. **Figures 15, 16,** and **17** illustrate the future (2034) weekday morning, weekday afternoon, and Saturday midday peak-hour traffic volumes under background (No Build) conditions.

6.1.1 Capacity Analysis

Similar to the existing conditions analysis, the adequacy of the intersections to handle the peak-hour traffic volumes under 2034 background (No Build) conditions was evaluated using the *Synchro* program. This software package adheres to the methodologies outlined in the *Highway Capacity Manual* (HCM) to determine LOS as described in Section 4.3.3.

Figure 18 illustrates the LOS for the study area intersections under the future year (2034) background conditions. As shown in **Figure 18**, all the study intersections are expected to operate at overall LOS C or better under the future year (2034) background traffic conditions. All the movements would operate at LOS D or better except the eastbound shared left-through lane at the intersection of Lewis Avenue and the mall driveway, which is expected to operate at LOS E during the Saturday midday peak hour. However, with signal timing improvements, without diminishing other LOS at this intersection, the mall driveway eastbound shared left-through movement would be improved to operate at LOS D.

A detailed breakdown of the analysis results and worksheets for the study area intersections under the future year (2034) background conditions are summarized in Appendices C and D, respectively.

6.2 Future Buildout Traffic

6.2.1 Preferred Concept Site-Generated Traffic

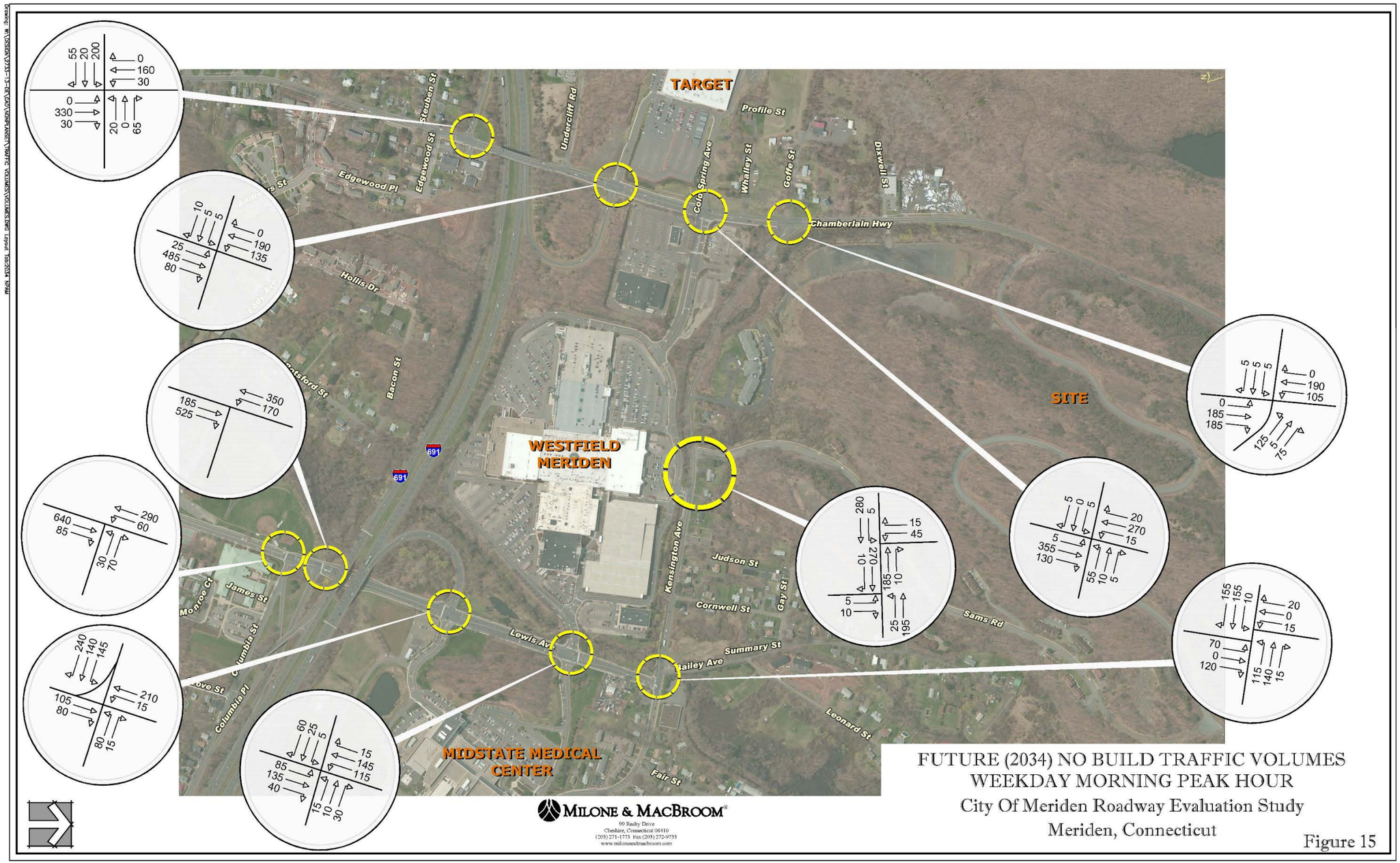
The preferred site development concept is anticipated to contain approximately 1.22 million square feet of development. Based on discussions with the Steering Committee, a likely land use mix could be a combination of two thirds light industrial (816,000 square feet) and one third general office (408,000 square feet). Vehicle trips to be generated by the proposed development were estimated based on statistical data contained in the 9th edition of the Institute of Transportation Engineers (ITE) *Trip Generation* publication and are summarized in Table 3. It is estimated that the proposed development would generate approximately 1,180 trips entering and 160 trips exiting the site during a typical weekday morning peak hour. During the weekday afternoon peak hour, it is estimated that 185 trips would enter the site while 1,140 trips would exit. During the Saturday midday peak hour, it is estimated that approximately 150 trips would enter the site, with 140 trips exiting.

TABLE 3
Estimated Site Traffic

Land Use	Size (TSF)	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Light Industrial	816	660	90	750	95	695	790	55	60	115
General Office	408	520	70	590	90	445	535	95	80	175
TOTAL		1,180	160	1,340	185	1,140	1,325	150	140	290

Source: Trip Generation, 9th Edition. Institute of Transportation Engineers. 2012

A distribution of the peak-hour site-generated traffic through the study area was determined utilizing the latest available Census Journey-to-Work (JTW) data for Meriden, the existing roadway network, and engineering judgement. Traffic was distributed to and from the NRG site via Chamberlain Highway, Kensington Avenue, and Lewis Avenue. In general, it is anticipated that 10 percent of the site traffic will be oriented to and from the north via Chamberlain Highway, 35 percent of the site traffic oriented to and from I-691 West via Chamberlain Highway, 35 percent of the site traffic oriented to and from I-691 East via Lewis Avenue, 10 percent of the site traffic oriented to and from the south via Chamberlain Highway, 5 percent of the site traffic oriented to and from the south via Lewis Avenue, with the remaining 5 percent of the site traffic oriented to and from the east via Kensington Avenue. **Figures 19, 20,** and **21** illustrate the assignment of the site traffic volumes for the weekday morning, weekday afternoon, and Saturday midday peak hours, respectively.



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FUTURE (2034) NO BUILD TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR
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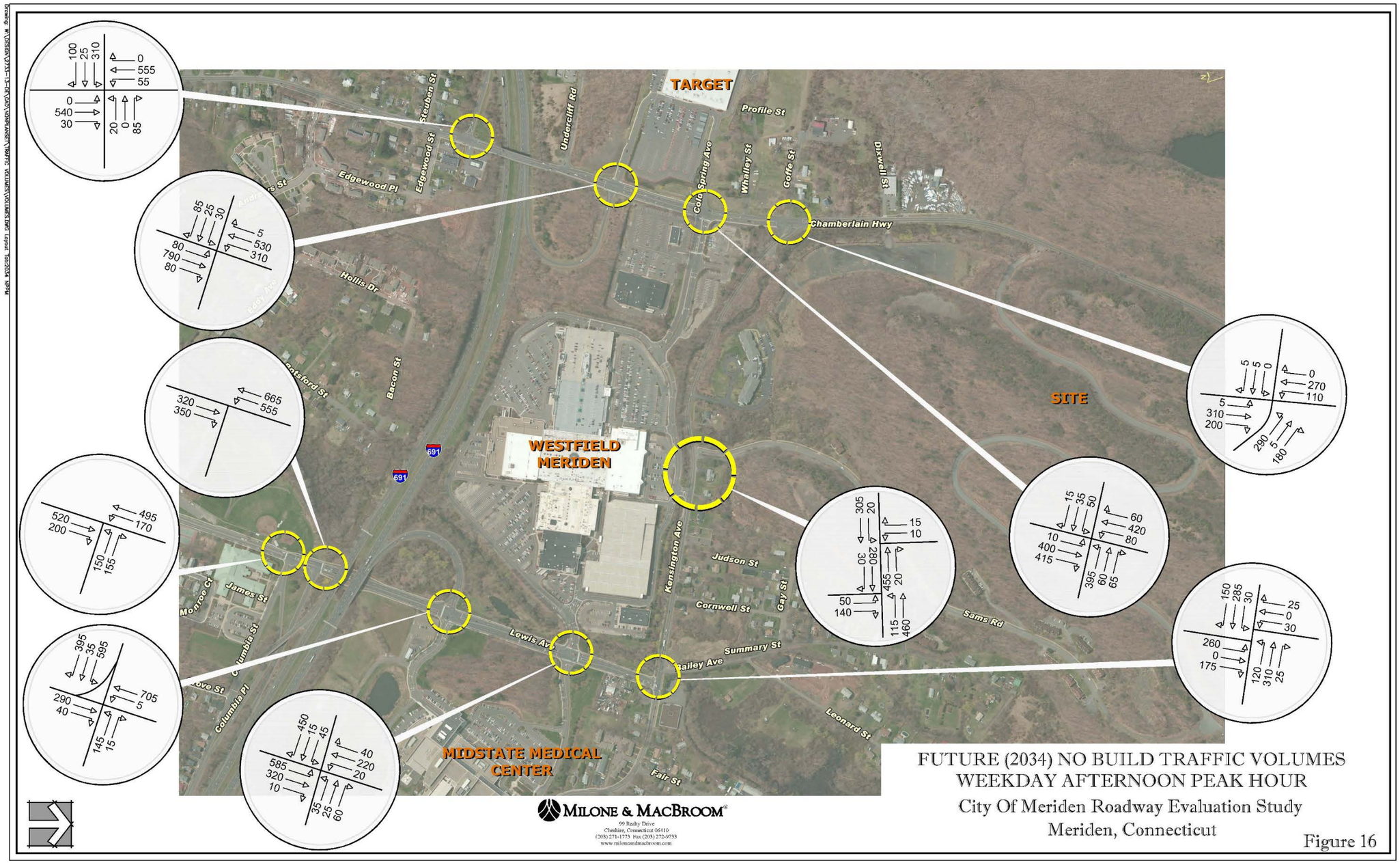
Meriden, Connecticut

Figure 15



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FUTURE (2034) NO BUILD TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR
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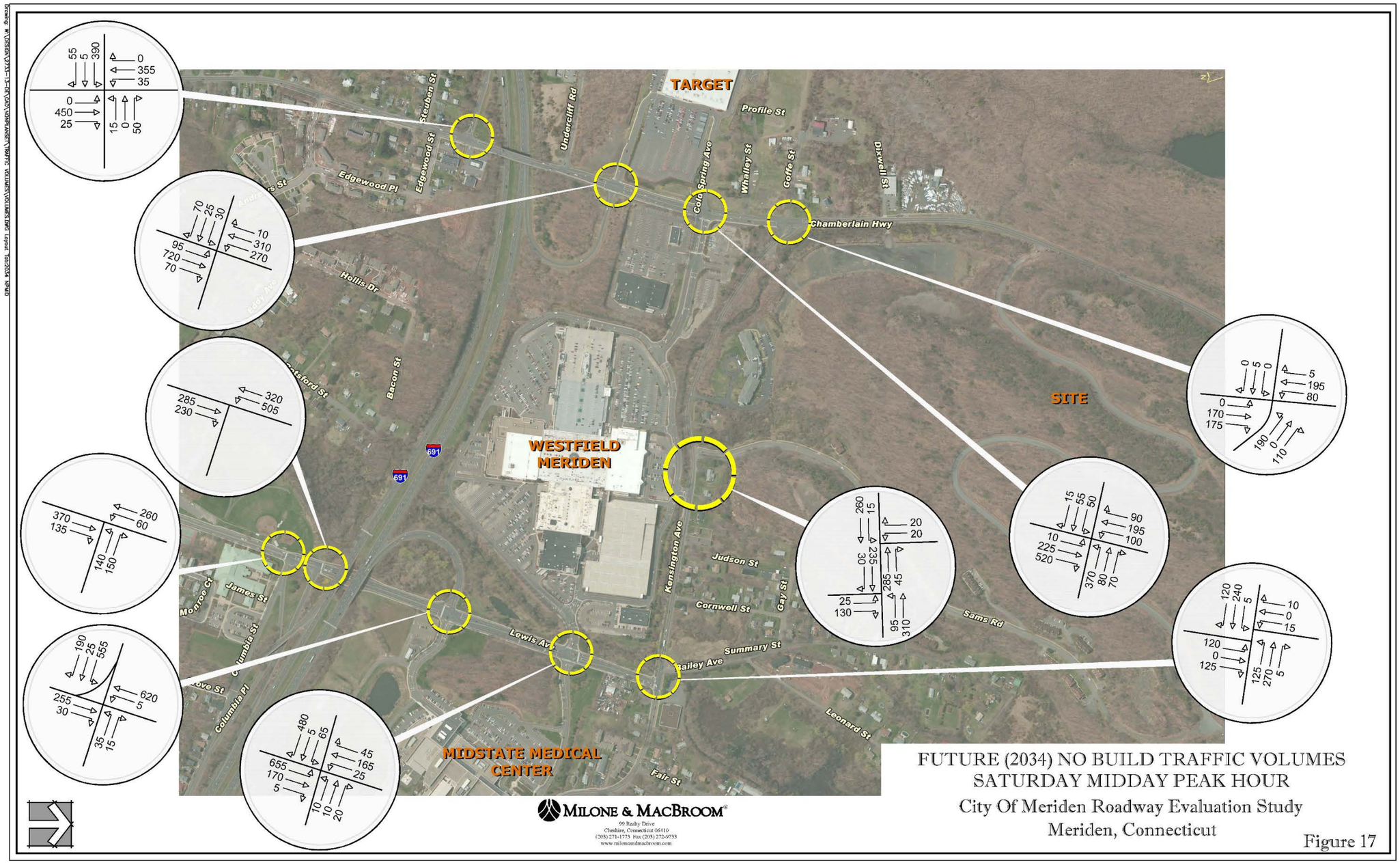
Figure 16



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FUTURE (2034) NO BUILD TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR
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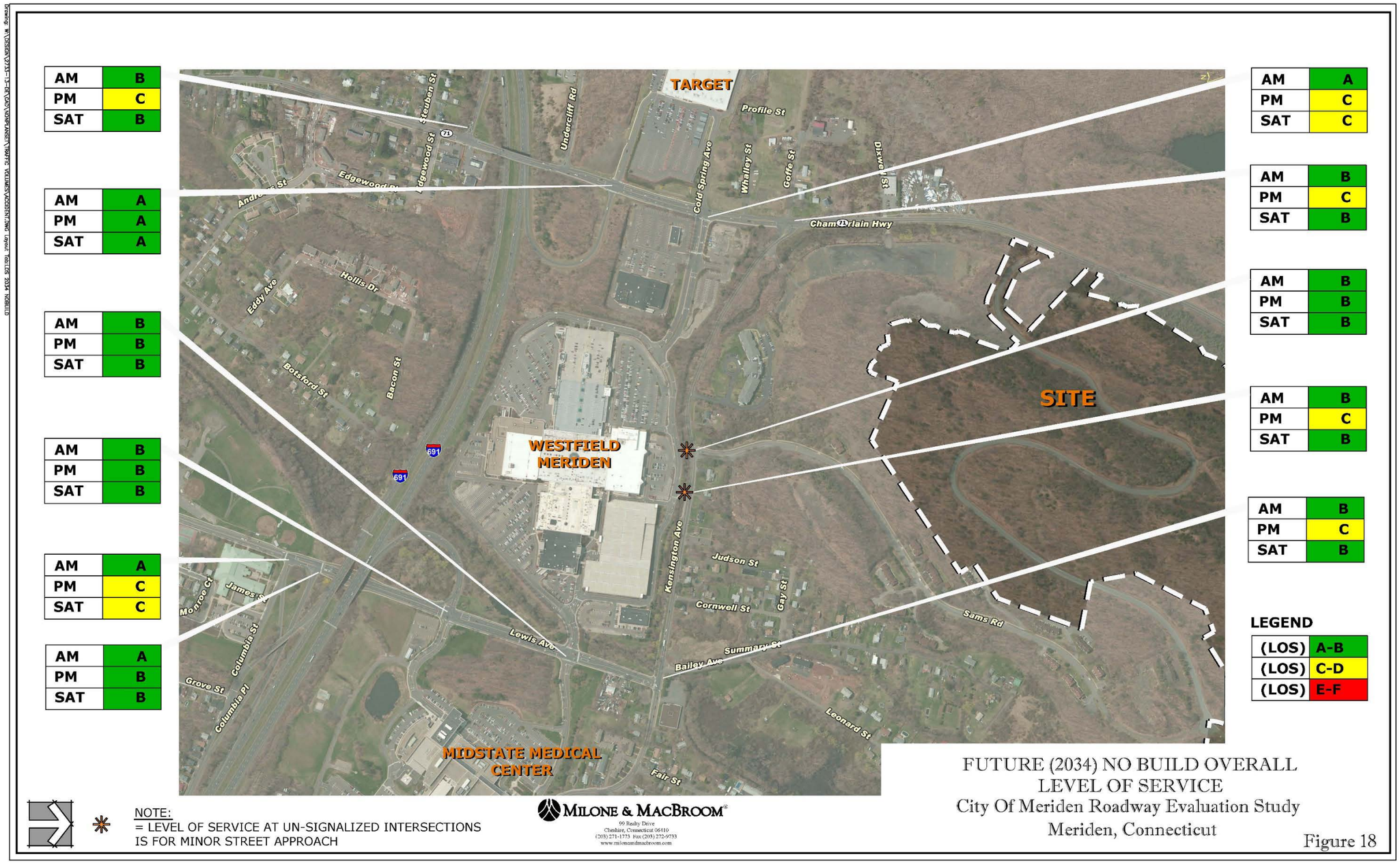
Figure 17


TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Profile St
Undercliff Rd
Steuben St
Edgewood St
Cold Spring Ave
Whalley St
Gorfe St
Dixwell St
Chamberlain Hwy
Eddy Ave
Hollis Dr
Botsford St
Bacon St
Kensington Ave
Judson St
Cornwell St
Gay St
Sams Rd
Summary St
Bailey Ave
Lewis Ave
Monroe Ct
James St
Columbia St
Columbia Pl
Grove St
Leonard St
Fair St
691
AM B
PM C
SAT B
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NOTE:
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FUTURE (2034) NO BUILD OVERALL
LEVEL OF SERVICE
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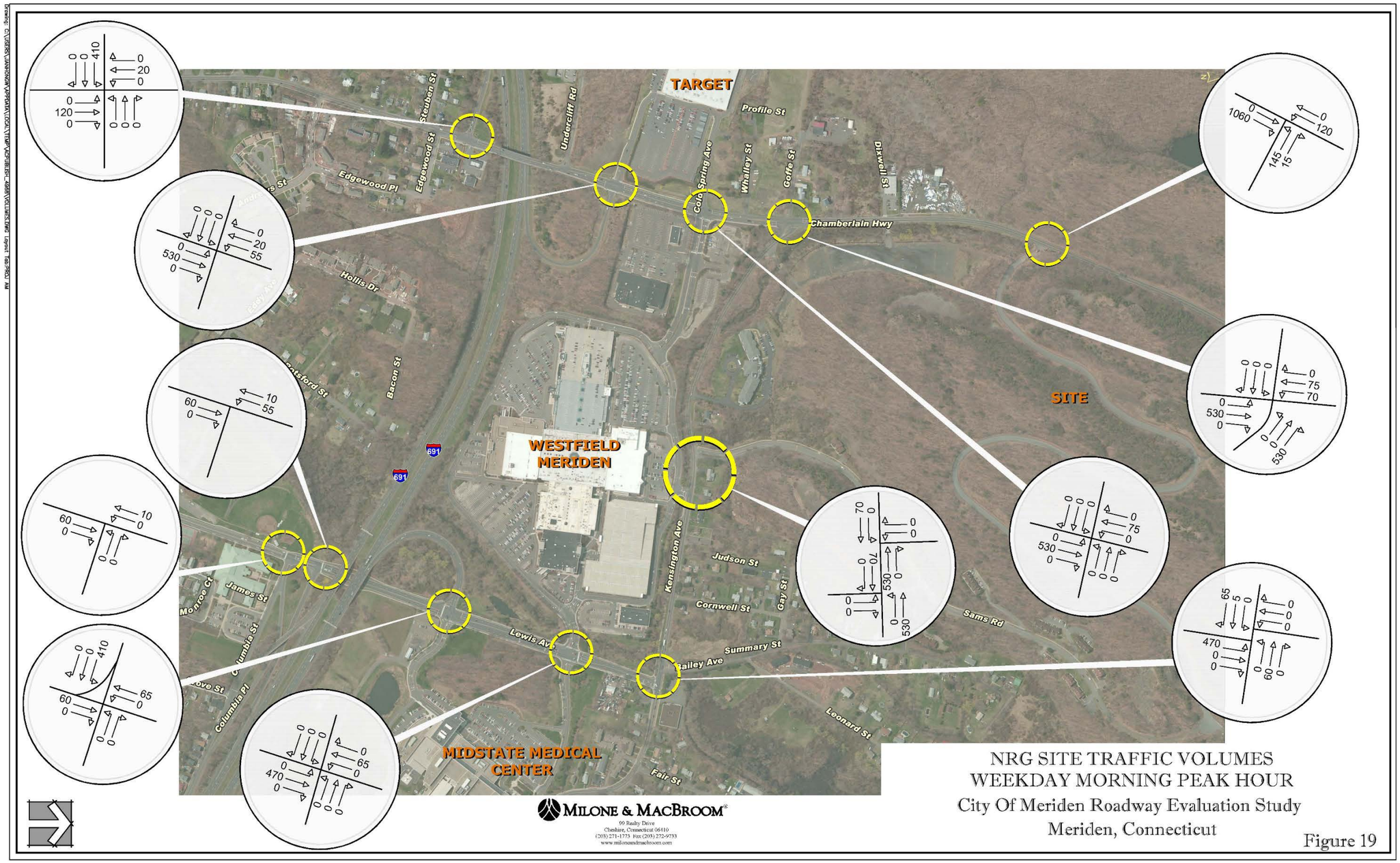
Figure 18



NRG SITE TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR
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Figure 19

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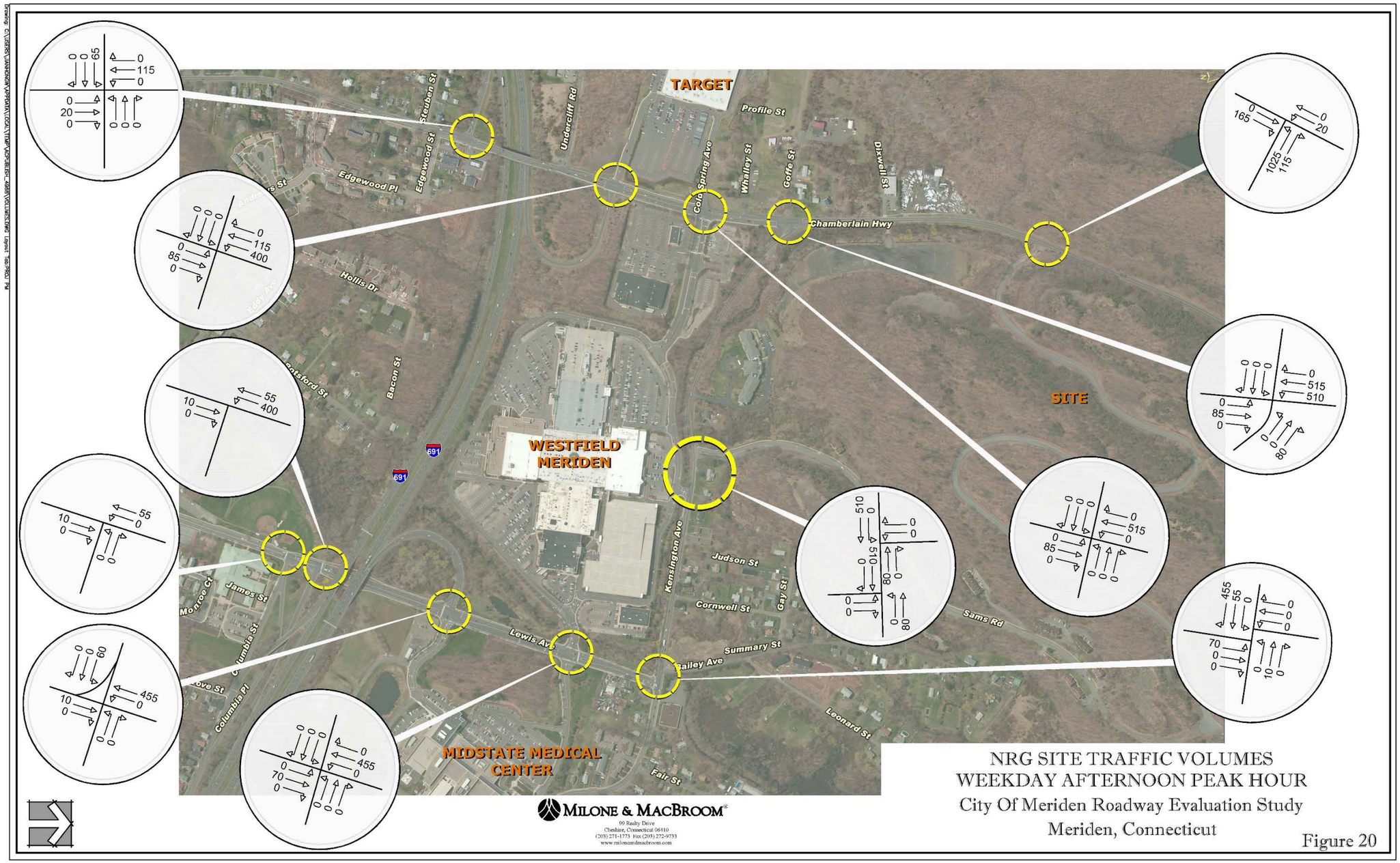

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NRG SITE TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR
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Figure 20

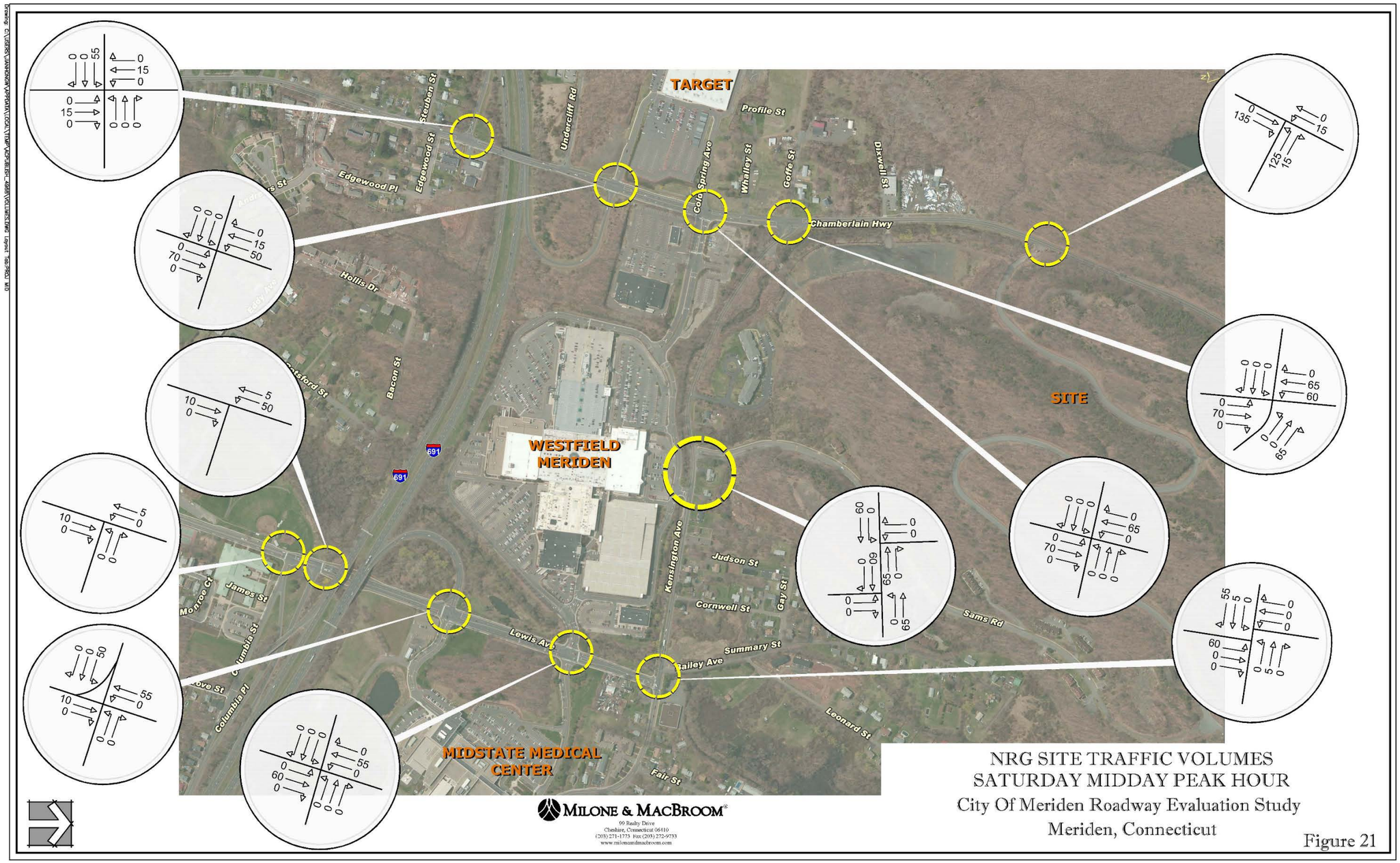
TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Steuben St
Underclift Rd
Profile St
Edgewood Pl
Edgewood St
Colony Spring Ave
Whalley St
Gorfe St
Dixwell St
Chamberlain Hwy
Hollis Dr
Bacon St
Kensington Ave
Judson St
Cornwell St
Gay St
Sams Rd
James St
Monroe Ct
Columbia St
Lewis Ave
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Figure 21

6.2.2 Future Combined (Build) Traffic Volumes (2034)

Future Combined (Build) traffic volumes, which are reflective of roadway traffic conditions with the site development in place, were estimated to assess traffic impacts on the adjacent roadway system. These volumes were developed by combining the estimated site-generated traffic volumes and the future background traffic. **Figures 22, 23,** and **24** depict the future (2034) combined weekday morning, weekday afternoon, and Saturday midday peak-hour traffic volumes, respectively.

6.2.3 Capacity Analysis

The future 2034 combined (Build) peak-hour traffic volumes were evaluated using the *Synchro* program. This software package adheres to the methodologies outlined in the *Highway Capacity Manual* (HCM) to determine LOS as described in Section 4.3.3.

Figure 25 illustrates the overall LOS for the study area intersections under the future year (2034) combined conditions. Based on the operational analysis, the following intersections and movements will operate at unacceptable LOS E or F under the future year (2034) combined peak-hour traffic conditions:

- **Chamberlain Highway at Kensington Avenue (Signalized)** – would operate at overall LOS E during the weekday a.m. peak hour and LOS F during the weekend p.m. peak hour. Most approaches would operate at LOS E or F.

- **Chamberlain Highway at Coldspring Avenue (Signalized)** – would operate at overall LOS E during the weekday p.m. peak hour. Northbound and southbound movements on Chamberlain Highway would operate at LOS E or F during the p.m. peak hour.

- **Lewis Avenue at Kensington Avenue (Signalized)** – would operate at overall LOS F during the weekday p.m. peak hour.

- **Lewis Avenue at Mall Driveway/Medical Center Driveway (Signalized) –** While the overall LOS is anticipated to be LOS D or better, certain movements at this intersection would operate at LOS E or F during peak-hour conditions.

- **Kensington Avenue at Sams Road (Unsignalized) –** The Sams Road southbound left-turn movement would operate at LOS E during the weekday p.m. peak hour.

- **Kensington Avenue at Westfield Meriden Mall Driveway (Unsignalized) –** The Westfield Meriden Mall driveway northbound left-turn movement would operate at LOS F during the weekday p.m. peak hour.

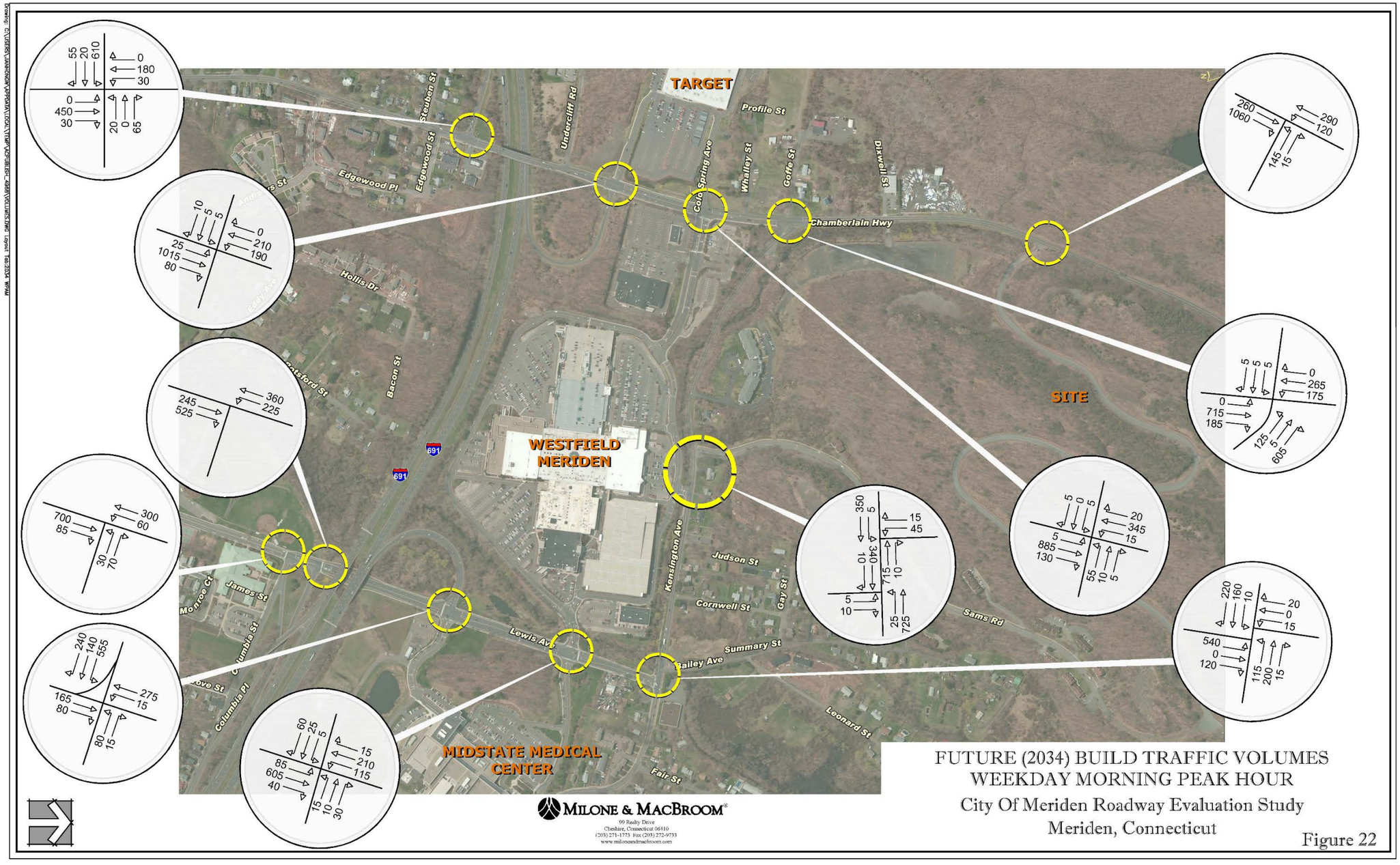
7 Recommendations

A number of off-site traffic and roadway improvements are recommended to mitigate impacts associated with the preferred site development concept. Improvements to transit, pedestrian, and bicycle facilities within the study area are recommended. These improvements pertain to the immediate transportation/roadway system and do not extend onto the I-691 highway and ramps as improvements to these facilities were not needed.

The URS I-691 study proposed a number of improvements to the I-691 highway/ramp system including new ramps, collector-distributor frontage roads, and widening of the Chamberlain Highway Bridge over I-691. While these improvements are not mandated for this study, it is important to recognize the significance of the I-691 study recommendations within the study area and more broadly, the City as a whole.

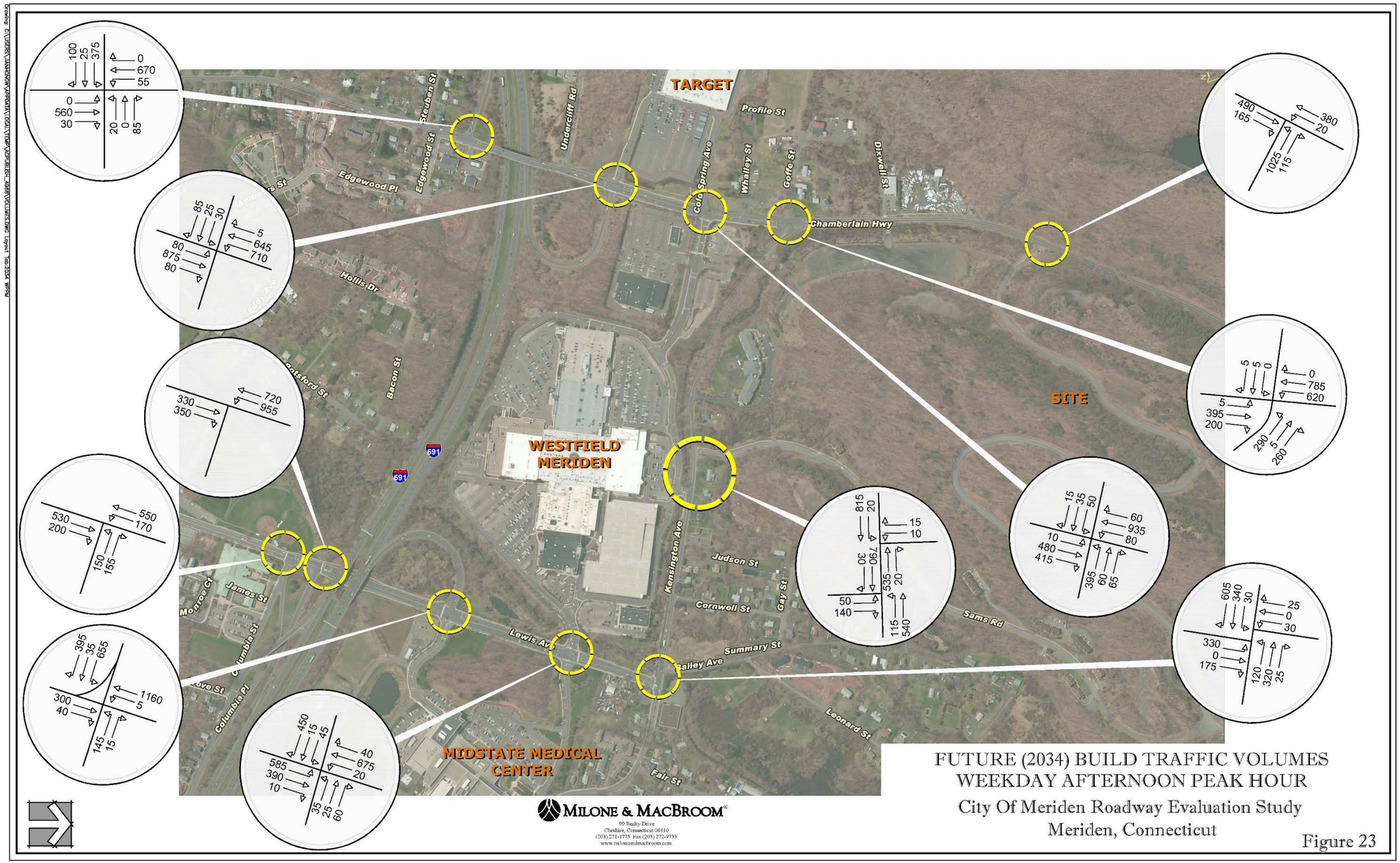
7.1 Off-site Traffic and Roadway Mitigation

The traffic and roadway recommendations from this study were identified to be implemented within the near- to mid-term time frame (5 to 10 years). These are improvements that would be required assuming full buildout under the preferred site development option. Specific off-site improvements associated with each of the three phases of the site development would be determined by the city during the site plan application process. These off-site improvements are illustrated in **Figures 26 through 29** and described below. A detailed breakdown of the analysis results and worksheets with the improvements are summarized in Appendices C and D, respectively.



FUTURE (2034) BUILD TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut

Figure 22



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FUTURE (2034) BUILD TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR
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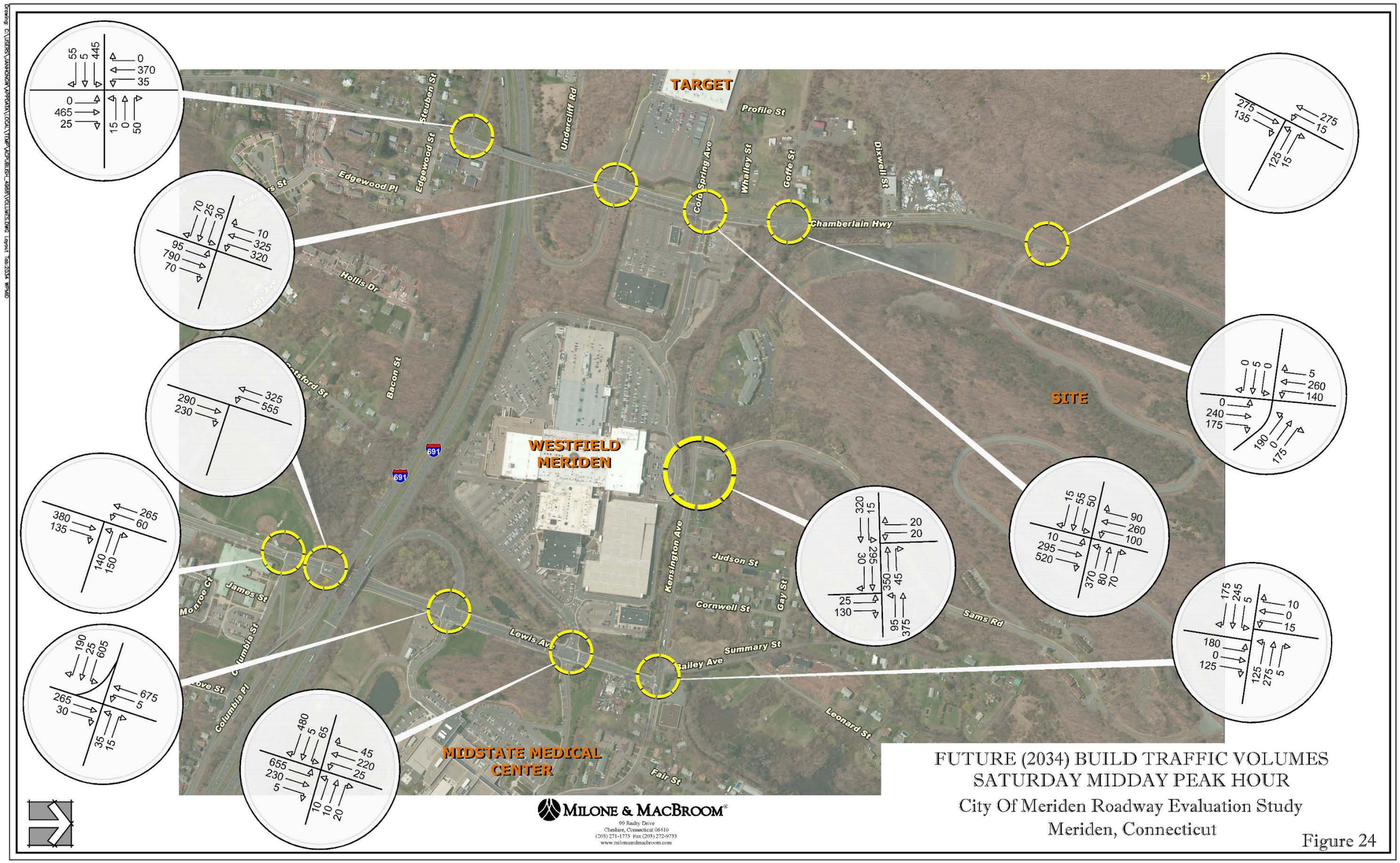
Meriden, Connecticut

Figure 23



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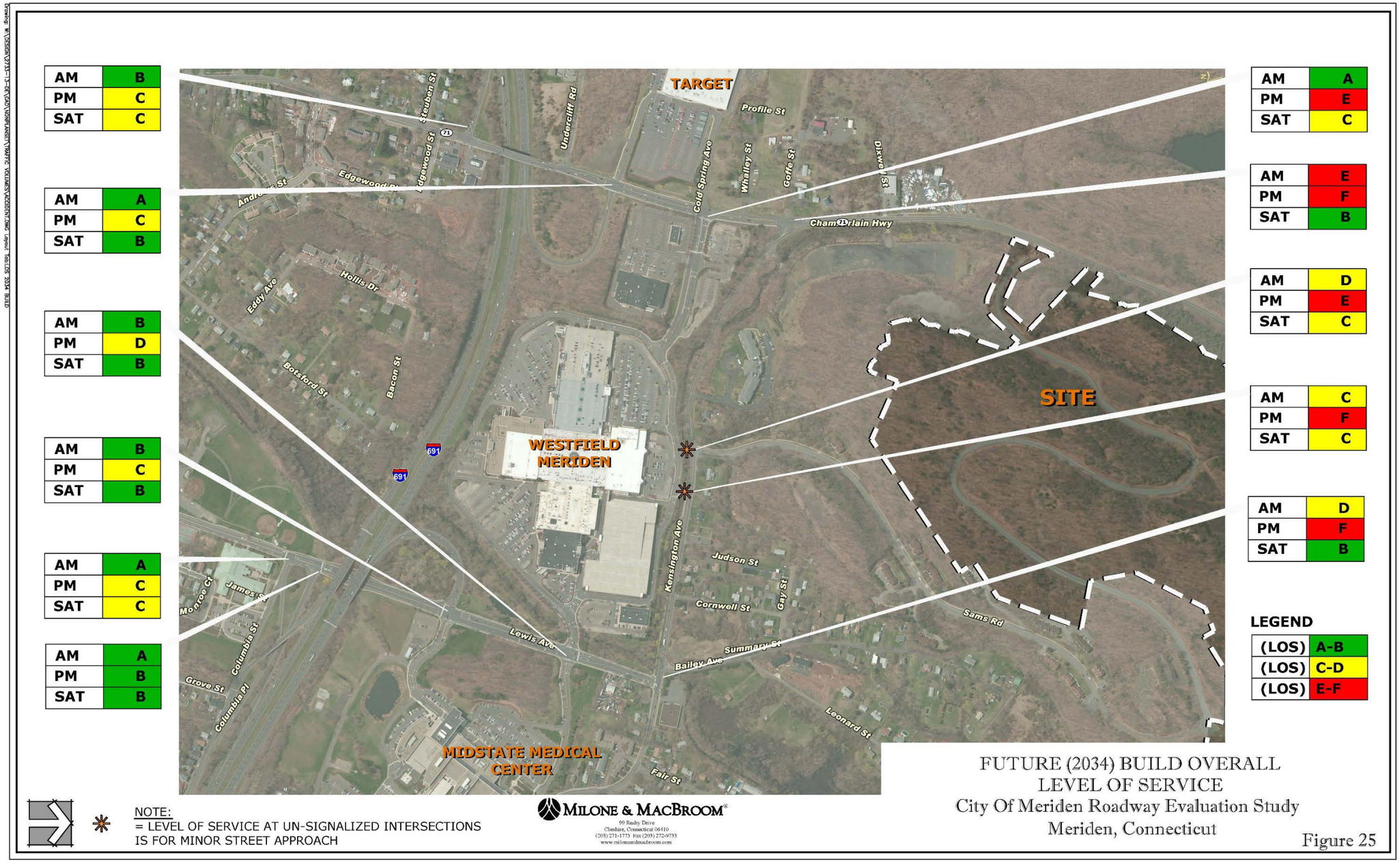
FUTURE (2034) BUILD TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut

Figure 24


AM B
PM C
SAT C
AM A
PM C
SAT B
AM B
PM D
SAT B
AM B
PM C
SAT B
AM A
PM C
SAT C
AM A
PM B
SAT B
AM A
PM E
SAT C
AM E
PM F
SAT B
AM D
PM E
SAT C
AM C
PM F
SAT C
AM D
PM F
SAT B
LEGEND
(LOS) A-B
(LOS) C-D
(LOS) E-F
TARGET
SITE
WESTFIELD MERIDEN
MIDSTATE MEDICAL CENTER
Profile St
Undercliff Rd
Steuben St
Edgewood St
Cold Spring Ave
Whalley St
Gorfe St
Dixwell St
Chamberlain Hwy
Hollis Dr
Eddy Ave
Botsford St
Bacon St
Kensington Ave
Judson St
Gay St
Cornwell St
Sams Rd
Summary St
Bailey Ave
Lewis Ave
Monroe Ct
James St
Columbia St
Columbia Pl
Grove St
Leonard St
Fair St
691
NOTE:
= LEVEL OF SERVICE AT UN-SIGNALIZED INTERSECTIONS IS FOR MINOR STREET APPROACH
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FUTURE (2034) BUILD OVERALL
LEVEL OF SERVICE
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Meriden, Connecticut
Figure 25


MATCHLINE OFFSITE IMPROVEMENT - 2
SUMMARY STREET
BAILEY AVENUE
FAIR STREET
KENSINGTON
LEWIS AVENUE
PROPOSED ROADWAY WIDENING (TYP.)
UPGRADE EXISTING TRAFFIC SIGNALS
WESTFIELD MALL
5' SIDEWALK
5'-6' SHELF
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
SECTION A-A
0 40' 80' 120' 160'
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OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENT
(SHEET 1 OF 4)
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 26


5' SIDEWALK
2' SHELF
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
SECTION B-B
MATCHLINE OFFSITE IMPROVEMENT - 3
KENSINGTON AVENUE
SAMS ROAD
B
B
INSTALL NEW SIGNAL
5' SIDEWALK
MATCH EX. SIDEWALK
PROPOSED ROADWAY WIDENING (TYP.)
MATCHLINE OFFSITE IMPROVEMENT - 1
0
40'
80'
120'
160'
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OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENT
(SHEET 2 OF 4)
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 27


COLDSPRING AVENUE
WHALLEY AVENUE
GOFFE STREET
PROPOSED ROADWAY WIDENING (TYP.)
CHAMBERLAIN HIGHWAY
UPGRADE EXISTING TRAFFIC SIGNAL
UPGRADE EXISTING TRAFFIC SIGNAL
RAISED ISLAND
5' SIDEWALK
RETAINING WALL
KENSINGTON AVENUE
B
B
5' SIDEWALK
MATCHLINE OFFSITE IMPROVEMENT - 2
MATCHLINE OFFSITE IMPROVEMENT - 4
5' SIDEWALK
2' SHELF
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
SECTION B-B
0
40'
80'
120'
160'
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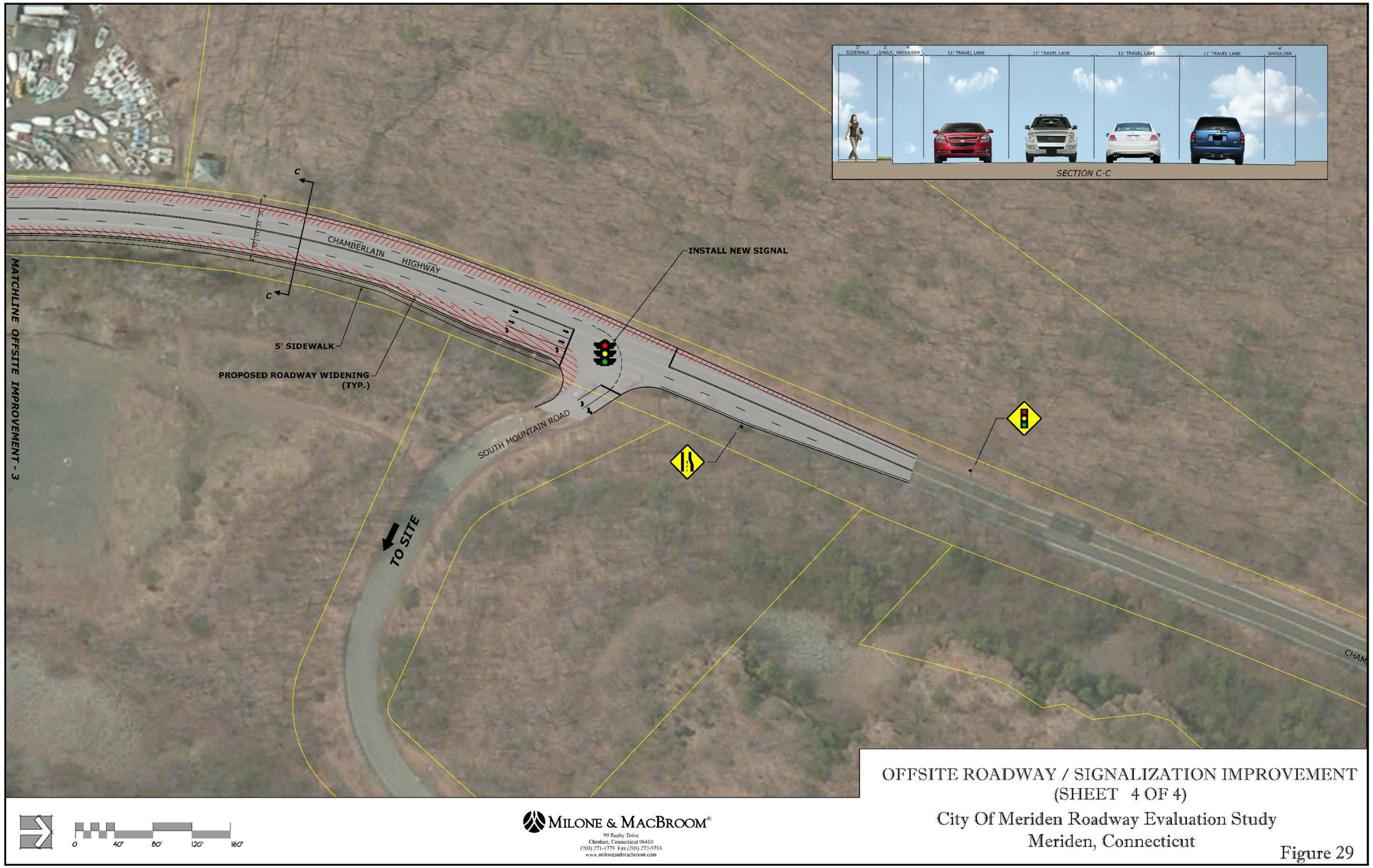
OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENT
(SHEET 3 OF 4)
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 28


5' SIDEWALK
2' SHELF
4' SHOULDER
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
4' SHOULDER
SECTION C-C
C
C
CHAMBERLAIN HIGHWAY
INSTALL NEW SIGNAL
5' SIDEWALK
PROPOSED ROADWAY WIDENING (TYP.)
SOUTH MOUNTAIN ROAD
TO SITE
MATCHLINE OFFSITE IMPROVEMENT - 3
0
40'
80'
120'
160'
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OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENT
(SHEET 4 OF 4)
City Of Meriden Roadway Evaluation Study
Meriden, Connecticut
Figure 29

Lewis Avenue at Kensington Avenue (Figure 26)

- *Restripe the Lewis Avenue northbound dedicated right-turn lane into a shared left-right turn lane.*
- *Widen Kensington Avenue eastbound to provide a dedicated right-turn lane on Kensington Avenue.*

Kensington Avenue between Chamberlain Highway and Lewis Avenue (Figure 27)

- *Widen the roadway to provide a four-lane roadway (two lanes in each direction).*
- *Install a traffic signal at the mall driveway off Kensington Avenue.*

Lewis Avenue at Mall Driveway/Medical Center Driveway (Figure 27)

- *Revise traffic signal timings.*

Chamberlain Highway at Coldspring Avenue (Figure 28)

- *Widen the Chamberlain Highway southbound approach to provide a dedicated left-turn lane and two through lanes.*
- *Upgrade existing traffic signal.*

Chamberlain Highway at Kensington Avenue (Figure 28)

- *Provide a dedicated westbound right-turn lane on Kensington Avenue in addition to the existing single approach lane.*
- *Realign the shared left-through lane on Kensington Avenue with Goffe Street.*
- *Widen the Chamberlain Highway southbound approach to provide dedicated double southbound left-turn lanes and two through lanes and then provide two receiving lanes on Kensington Avenue traveling to the east.*
- *Widen the Chamberlain Highway northbound approach to provide a dedicated right-turn lane and two through lanes.*

The following are proposed to accommodate bicyclists, pedestrians, and transit.

Chamberlain Highway at Site Driveway/South Mountain Road (Figure 29)

- *Install traffic signal.*
- *Install advanced "signal ahead" warning sign on Chamberlain Highway southbound approach.*
- *Widen Chamberlain Highway to provide dedicated northbound right-turn lane into South Mountain Road.*
- *Provide exclusive left-turn lane and shared left-right turn lane on NRG site driveway (South Mountain Road).*

I-691 Improvements

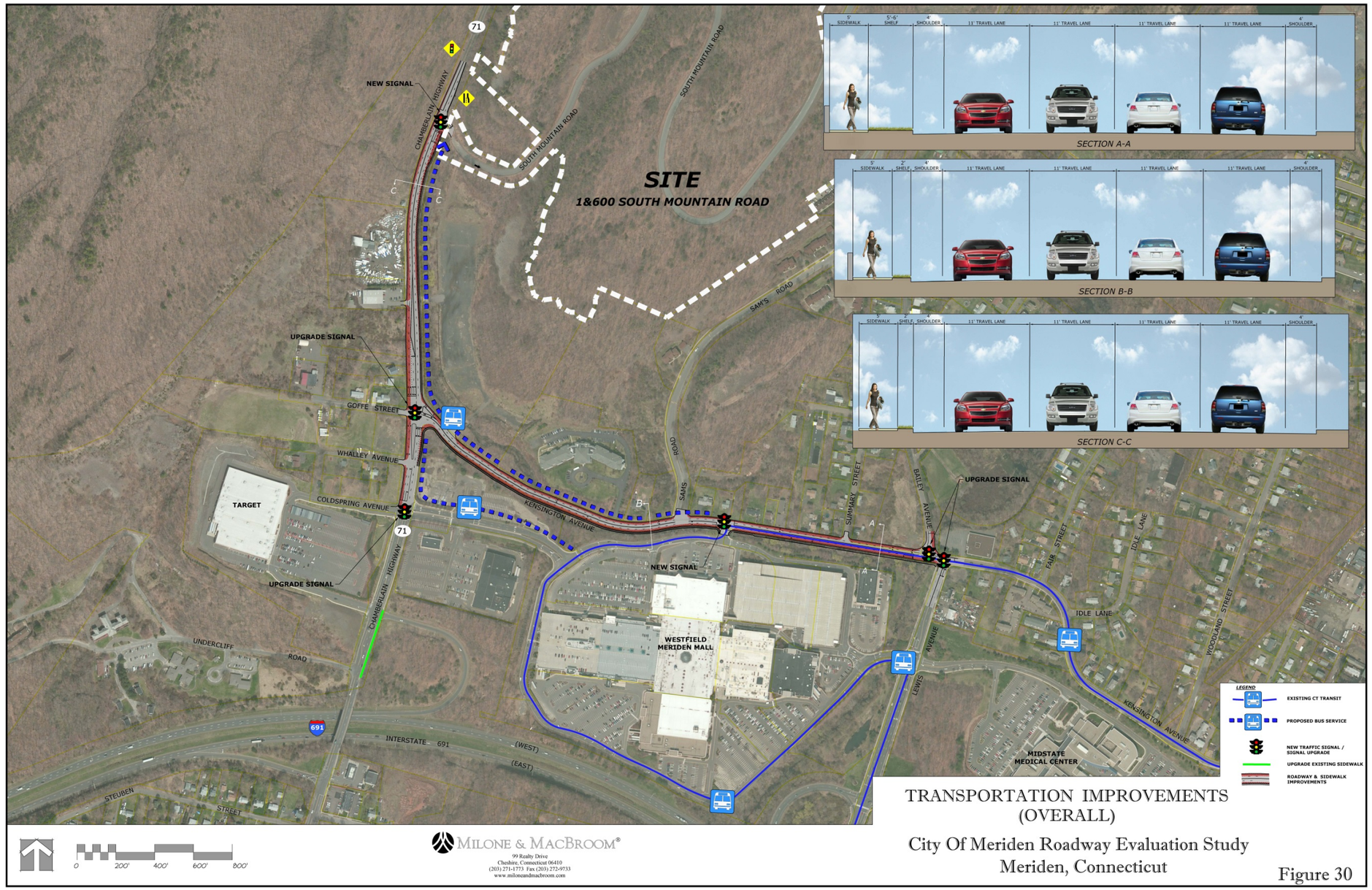
While improvements to I-691 and ramp systems were not required for this project, the study Steering Committee felt the need to recognize these improvements as potential long-term improvements for the general area that could be included in the next update of SCRCOG's regional long-range transportation plan (LRTP). The following improvements from the I-691 study were identified as improvements that could potentially be included in the next update of the LRTP:

- A new two-way frontage road between Lewis Avenue and Chamberlain Highway along the south side of I-691
- A new westbound I-691 off ramp to Chamberlain Highway
- Widening of the bridge on Chamberlain Highway over I-691 to provide additional travel lanes

7.2 Bicycle, Pedestrian, and Transit Improvements

Bicycle, Pedestrian, and Transit Improvements (Figure 30)

- *Install sidewalks on the segment of Kensington Avenue between Chamberlain Highway and the mall driveway. This improvement is also reflected in Figure 27.*
- *Replace the existing sidewalk along the east side of Chamberlain Highway from the I-691 bridge to the I-691 westbound on ramp (Reflected in Figure 30 overall improvement plan).*
- *Provide 4-foot shoulders in all areas where roadway improvements are proposed. This includes along Kensington Avenue and Chamberlain Highway. These improvements are reflected in Figures 26 through 29.*
- *Provide linkages to the Metacomet Blue Trail from the Site.*
- *Expand CT Transit service to Chamberlain Highway and to the Site.*


SITE
1&600 SOUTH MOUNTAIN ROAD
NEW SIGNAL
UPGRADE SIGNAL
UPGRADE SIGNAL
NEW SIGNAL
UPGRADE SIGNAL
CHAMBERLAIN HIGHWAY
SOUTH MOUNTAIN ROAD
SOUTH MOUNTAIN ROAD
GOFFE STREET
WHALLEY AVENUE
COLDSPRING AVENUE
KENSINGTON AVENUE
SAM'S ROAD
SUMMARY STREET
BAILEY AVENUE
FAIR STREET
IDLE LANE
IDLE LANE
WOODLAND STREET
LEWIS AVENUE
TARGET
WESTFIELD MERIDEN MALL
MIDSTATE MEDICAL CENTER
UNDERCLIFF ROAD
INTERSTATE 691 (WEST)
INTERSTATE 691 (EAST)
STEUBEN STREET
71
691
SECTION A-A
SECTION B-B
SECTION C-C
LEGEND
EXISTING CT TRANSIT
PROPOSED BUS SERVICE
NEW TRAFFIC SIGNAL / SIGNAL UPGRADE
UPGRADE EXISTING SIDEWALK
ROADWAY & SIDEWALK IMPROVEMENTS
0 200' 400' 600' 800'
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TRANSPORTATION IMPROVEMENTS (OVERALL)
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Meriden, Connecticut
Figure 30

8 Off-Site Construction Costs

Construction costs associated with recommended roadway and traffic signalization improvements were developed. Unit costs for the proposed roadway and signalization improvements were based on CTDOT 2015 unit item list and cost estimating guidelines, past experience, and professional judgement. The estimated costs for the off-site improvements would be approximately $13.1 million. Table 4 below presents a summary of anticipated project costs for the recommended off-site roadway and signalization improvements.

TABLE 4
Probable Construction Cost Estimate – Off-Site Improvements

	COST
2015 Construction Costs	$8,719,800.00
Contingencies (±25%)	$2,180,000.00
Incidentals to Construction (±25%)	$2,180,000.00
Total 2015 Project Cost	**$13,079,800.00**
TOTAL 2015 PROJECT COST (ROUNDED)	**$13,080,000.00**

A detailed breakdown of the estimated 2015 construction costs are presented in the Appendix D.

2733-13-jn2215-rpt

TECHNICAL APPENDIX

APPENDIX A: Accident Data Summary

TABLE A.1
ACCIDENT DATA SUMMARY

LOCATION	ACCIDENT SEVERITY			TYPE OF COLLISION													
				TURN													
	INJURY	PROPERTY DAMAGE ONLY	**TOTAL**	INTERSECTING PATHS	SAME DIRECTION	OPPOSITE DIRECTION	***TOTAL TURN***	REAR-END	SIDE-SWIPE (Same Direction)	HEAD-ON	JACKKNIFE	ANGLE	FIXED OBJECT	MOVING OBJECT	OVERTURN	PEDESTRIAN	**TOTAL**
Chamberlain Highway (Route 71)[1]																	
Between 300' North of Kensington Avenue and Kensington Avenue	0	2	**2**	0	1	0	***1***	0	0	0	0	0	0	1	0	0	**2**
At Kensington Avenue	5	2	**7**	0	1	2	***3***	2	1	1	0	0	0	0	0	0	**7**
Between Kensington Avenue and Coldspring Avenue	0	3	**3**	0	1	0	***1***	0	1	0	0	0	1	0	0	0	**3**
At Cold Spring Avenue	5	3	**8**	1	1	1	***3***	2	0	0	0	2	0	0	0	1	**8**
Between Coldspring Avenue and I-691 WB on ramp	1	2	**3**	0	0	0	***0***	2	1	0	0	0	0	0	0	0	**3**
At I-691 WB on ramp	5	3	**8**	0	0	3	***3***	2	1	0	0	1	0	0	0	1	**8**
Between I-691 WB on ramp and I-691 EB off ramp	2	4	**6**	0	1	0	***1***	3	0	0	0	0	2	0	0	0	**6**
At I-691 EB off ramp	2	6	**8**	1	2	0	***3***	2	0	0	0	2	1	0	0	0	**8**
Between I-691 EB off ramp and 300' South of I-691 EB off ramp	1	4	**5**	2	0	0	***2***	1	0	0	0	2	0	0	0	0	**5**
Kensington Avenue[2]																	
Between Chamberlain Highway and Sams Road	0	2	**2**				***1***	1	0	0	0	0	0	0	0	0	**2**
At Sams Road	1	1	**2**				***0***	0	0	1	0	0	1	0	0	0	**2**
Between Sams Road and Lewis Avenue	0	0	**0**				***0***	0	0	0	0	0	0	0	0	0	**0**
At Bailey Avenue/Lewis Avenue	2	9	**11**				***0***	8	1	0	0	2	0	0	0	0	**11**
Lewis Avenue[2]																	
At Mall Driveway	0	1	**1**				***0***	1	0	0	0	0	0	0	0	0	**1**
At I-691 ramps	3	14	**17**				***1***	8	2	0	1	4	1	0	0	0	**17**
TOTAL	27	56	**83**				***19***	32	7	2	1	13	6	1	0	2	**83**

Source: [1] CTDOT (January 1, 2010 through December 31, 2012)
[2] City of Meriden Police Department (January 1, 2011 through December 31, 2013)

APPENDIX B: Level of Service Criteria

LEVEL OF SERVICE
SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables including the quality of progression, the cycle length, the green ratio, and the volume to capacity (v/c) ratio for the lane group. The criteria are given below.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS	
LEVEL OF SERVICE	**CONTROL DELAY (seconds/vehicle)**
A	<10
B	>10 and <20
C	>20 and <35
D	>35 and <55
E	>55 and <80
F	>80

Specific descriptions of each LOS for signalized intersections are provided below:

Level of Service A describes operations with very low control delay, up to 10 seconds per vehicle (s/veh.). This LOS occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with delay greater than 10 and up to 20 s/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop with LOS B than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 s/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 s/veh. At LOS 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.

Level of Service E describes operations with control delay greater than 55 and up to 80 s/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 s/veh. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE
UNSIGNALIZED INTERSECTIONS

The LOS for a TWSC (two-way stop controlled) intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS is not defined for the intersection as a whole. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS criteria are given in the table below.

LEVEL OF SERVICE CRITERIA FOR TWSC INTERSECTIONS	
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (seconds/vehicle)**
A	**0-10**
B	**>10 and <15**
C	**>15 and <25**
D	**>25 and <35**
E	**>35 and <50**
F	**>50**

Reference: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

APPENDIX C: Level of Service Summary

TABLE A.2
Capacity Analysis Summary
- Existing (2014) Conditions

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
SIGNALIZED			
Chamberlain Highway at Kensington Avenue			
Chamberlain Hwy NB Left-Thru	A	B	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	A	A
Chamberlain Hwy SB Thru-Right	A	A	A
Goffe St EB Left-Thru-Right	B	B	B
Kensington Ave WB Left-Thru-Right	C	D	C
Overall	**A**	**B**	**B**
Chamberlain Highway at Coldspring Avenue			
Chamberlain Hwy NB Left-Thru	A	B	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	A	A
Chamberlain Hwy SB Thru-Right	A	B	A
Coldspring Ave EB Left	D	D	D
Coldspring Ave EB Thru-Right	A	C	D
Mall Dwy WB Left	D	D	D
Mall Dwy WB Left-Thru-Right	D	D	D
Overall	**A**	**B**	**B**
Chamberlain Highway at Target Driveway/I-691 Westbound On Ramp			
Chamberlain Hwy NB Left	A	A	A
Chamberlain Hwy NB Thru-Right	A	A	A
Chamberlain Hwy SB Left	A	A	A
Chamberlain Hwy SB Thru-Right	A	A	A
Target Dwy. EB Left-Thru	D	D	D
Target Dwy. EB Right	A	B	B
Overall	**A**	**A**	**A**
Chamberlain Highway at I-691 Eastbound Off Ramp			
Chamberlain Hwy NB Thru-Right	A	B	B
Chamberlain Hwy SB Left-Thru	B	B	B
I-691 EB Off-Ramp EB Left	B	C	B
I-691 EB Off-Ramp EB Left-Thru-Right	B	B	B
Private Dwy. WB Left-Right	A	B	A
Overall	**B**	**B**	**B**
Lewis Avenue at Kensington Avenue			
Lewis Ave NB Left-Thru	C	C	C
Lewis Ave NB Right	A	A	A
Bailey Ave SB Left-Thru-Right	A	A	A
Kensington Ave EB Left-Thru-Right	B	C	B
Kensington Ave WB Left-Thru-Right	A	B	A
Overall	**B**	**B**	**B**

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Lewis Avenue at Mall Driveway/Medical Center Driveway			
Lewis Ave NB Left	A	A	A
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	D	C	D
Lewis Ave SB Thru-Right	C	D	C
Mall Dwy. EB Left-Thru	C	D	D
Mall Dwy. EB Right	A	A	A
Med. Ctr. Dwy. WB Left-Thru	C	D	C
Med. Ctr. Dwy. WB Right	A	A	A
Overall	**B**	**B**	**A**
Lewis Avenue at I-691 Westbound Off Ramp/Medical Center Driveway			
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	A	B	B
Lewis Ave SB Thru	A	B	A
I-691 WB Off Ramp EB Left	C	D	D
I-691 WB Off Ramp EB Left-Thru	C	D	D
I-691 WB Off Ramp EB Right*	A	A	A
Med. Ctr. Dwy. WB Left	C	D	D
Med. Ctr. Dwy. WB Left-Right	A	A	A
Overall	**B**	**B**	**B**
Lewis Avenue at I-691 Eastbound On Ramp			
Lewis Ave NB Thru	A	A	A
Lewis Ave NB Right	A	A	A
Lewis Ave SB Left	C	C	C
Lewis Ave SB Thru	A	A	A
Overall	**A**	**B**	**B**
Lewis Avenue at Columbia Street			
Lewis Ave NB Thru-Right	A	B	B
Lewis Ave SB Left	A	A	A
Lewis Ave SB Thru	A	A	A
Columbia Street WB Left-Right	B	D	D
Overall	**A**	**B**	**B**
UNSIGNALIZED			
Sams Road at Kensington Avenue			
Sams Road SB Left	B	C	B
Kensington Ave EB Left	A	A	A
Westfield Meriden Mall Driveway at Kensington Avenue			
Westfield Meriden Mall Dwy NB Left	A	C	B
Kensington Ave WB Left	A	A	A

* Stop-Sign Controlled

TABLE A.3
Capacity Analysis Summary
Future (2034) Background Traffic Conditions

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
SIGNALIZED			
Chamberlain Highway at Kensington Avenue			
Chamberlain Hwy NB Left-Thru	B	C	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	A	A
Chamberlain Hwy SB Thru-Right	A	B	A
Goffe St EB Left-Thru-Right	B	B	B
Kensington Ave WB Left-Thru-Right	C	D	C
Overall	**B**	**C**	**B**
Chamberlain Highway at Coldspring Avenue			
Chamberlain Hwy NB Left-Thru	A	B	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	B	B
Chamberlain Hwy SB Thru-Right	A	B	B
Coldspring Ave EB Left	D	D	D
Coldspring Ave EB Thru-Right	A	C	D
Mall Dwy WB Left	D	D	D
Mall Dwy WB Left-Thru-Right	C	D	D
Overall	**A**	**C**	**C**
Chamberlain Highway at Target Driveway/I-691 Westbound On Ramp			
Chamberlain Hwy NB Left	A	A	A
Chamberlain Hwy NB Thru-Right	A	A	A
Chamberlain Hwy SB Left	A	A	A
Chamberlain Hwy SB Thru-Right	A	A	A
Target Dwy. EB Left-Thru	D	D	D
Target Dwy. EB Right	A	B	B
Overall	**A**	**A**	**A**
Chamberlain Highway at I-691 Eastbound Off Ramp			
Chamberlain Hwy NB Thru-Right	B	B	B
Chamberlain Hwy SB Left-Thru	B	C	B
I-691 EB Off Ramp EB Left	B	D	C
I-691 EB Off Ramp EB Left-Thru-Right	B	C	C
Private Dwy. WB Left-Right	A	B	B
Overall	**B**	**C**	**B**
Lewis Avenue at Kensington Avenue			
Lewis Ave NB Left-Thru	C	D	C
Lewis Ave NB Right	A	A	A
Bailey Ave SB Left-Thru-Right	A	A	A
Kensington Ave EB Left-Thru-Right	B	C	B
Kensington Ave WB Left-Thru-Right	A	C	A
Overall	**B**	**C**	**B**

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Lewis Avenue at Mall Driveway/Medical Center Driveway			
Lewis Ave NB Left	A	A	A
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	D	C	D
Lewis Ave SB Thru-Right	C	D	C
Mall Dwy. EB Left-Thru	C	D	E/D*
Mall Dwy. EB Right	A	A	A
Med. Ctr. Dwy. WB Left-Thru	C	D	D
Med. Ctr. Dwy. WB Right	A	A	A
Overall	**B**	**B**	**B**
Lewis Avenue at I-691 Westbound Off Ramp/Medical Center Driveway			
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	A	B	B
Lewis Ave SB Thru	A	B	B
I-691 WB Off Ramp EB Left	C	D	D
I-691 WB Off Ramp EB Left-Thru	C	D	D
I-691 WB Off Ramp EB Right**	A	A	A
Med. Ctr. Dwy. WB Left	C	D	D
Med. Ctr. Dwy. WB Left-Right	A	A	A
Overall	**B**	**B**	**B**

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Lewis Avenue at I-691 Eastbound On Ramp			
Lewis Ave NB Thru	A	A	A
Lewis Ave NB Right	A	A	A
Lewis Ave SB Left	C	C	C
Lewis Ave SB Thru	A	B	A
Overall	**A**	**B**	**B**
Lewis Avenue at Columbia Street			
Lewis Ave NB Thru-Right	A	C	B
Lewis Ave SB Left	A	A	A
Lewis Ave SB Thru	A	A	A
Columbia Street WB Left-Right	B	D	D
Overall	**A**	**C**	**C**
UNSIGNALIZED			
Sams Road at Kensington Avenue			
Sams Road SB Left	B	C	B
Kensington Ave EB Left	A	A	A
Westfield Meriden Mall Driveway at Kensington Avenue			
Westfield Meriden Mall Dwy NB Left	B	D	C
Kensington Ave WB Left	A	A	A

* With Signal Timing Improvements
** Stop-Sign Controlled

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TABLE A.4
Capacity Analysis Summary
Future (2034) Combined Traffic Conditions

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
SIGNALIZED			
Chamberlain Highway at Kensington Avenue			
Chamberlain Hwy NB Left-Thru	F	C	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	B	F	A
Chamberlain Hwy SB Thru-Right	A	C	A
Goffe St EB Left-Thru-Right	B	B	B
Kensington Ave WB Left-Thru-Right	E	F	C
Overall	E	F	**B**
Chamberlain Highway at Coldspring Avenue			
Chamberlain Hwy NB Left-Thru	B	F	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	B	B
Chamberlain Hwy SB Thru-Right	A	E	B
Coldspring Ave EB Left	D	D	D
Coldspring Ave EB Thru-Right	A	C	D
Mall Dwy WB Left	D	D	D
Mall Dwy WB Left-Thru-Right	D	D	D
Overall	**A**	E	**C**
Chamberlain Highway at Target Driveway/I-691 Westbound On Ramp			
Chamberlain Hwy NB Left	A	A	A
Chamberlain Hwy NB Thru-Right	A	C	A
Chamberlain Hwy SB Left	A	D	A
Chamberlain Hwy SB Thru-Right	A	A	A
Target Dwy. EB Left-Thru	D	D	D
Target Dwy. EB Right	A	B	B
Overall	**A**	**C**	**B**
Chamberlain Highway at I-691 Eastbound Off Ramp			
Chamberlain Hwy NB Thru-Right	B	B	B
Chamberlain Hwy SB Left-Thru	C	C	C
I-691 EB Off Ramp EB Left	C	D	C
I-691 EB Off Ramp EB Left-Thru-Right	B	D	C
Private Dwy. WB Left-Right	B	C	B
Overall	**B**	**C**	**C**
Lewis Avenue at Kensington Avenue			
Lewis Ave NB Left-Thru	F	D	D
Lewis Ave NB Right	A	A	A
Bailey Ave SB Left-Thru-Right	A	A	A
Kensington Ave EB Left-Thru-Right	C	F	B
Kensington Ave WB Left-Thru-Right	B	F	B
Overall	**D**	F	**B**

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Lewis Avenue at Mall Driveway/Medical Center Driveway			
Lewis Ave NB Left	B	A	A
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	E	C	D
Lewis Ave SB Thru-Right	C	F	D
Mall Dwy. EB Left-Thru	C	E	E
Mall Dwy. EB Right	A	B	A
Med. Ctr. Dwy. WB Left-Thru	C	E	D
Med. Ctr. Dwy. WB Right	A	A	A
Overall	**B**	**D**	**B**
Lewis Avenue at I-691 Westbound Off Ramp/Medical Center Driveway			
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	A	B	B
Lewis Ave SB Thru	A	C	B
I-691 WB Off Ramp EB Left	D	D	D
I-691 WB Off Ramp EB Left-Thru	C	D	D
I-691 WB Off Ramp EB Right*	A	A	A
Med. Ctr. Dwy. WB Left	C	D	D
Med. Ctr. Dwy. WB Left-Right	A	A	A
Overall	**B**	**C**	**B**
Lewis Avenue at I-691 Eastbound On Ramp			
Lewis Ave NB Thru	A	A	A
Lewis Ave NB Right	A	A	A
Lewis Ave SB Left	C	C	C
Lewis Ave SB Thru	A	B	A
Overall	**A**	**B**	**B**
Lewis Avenue at Columbia Street			
Lewis Ave NB Thru-Right	B	C	B
Lewis Ave SB Left	A	A	A
Lewis Ave SB Thru	A	A	A
Columbia Street WB Left-Right	B	D	D
Overall	**A**	**C**	**C**
UNSIGNALIZED			
Sams Road at Kensington Avenue			
Sams Road SB Left	D	E	C
Kensington Ave EB Left	A	A	A
Westfield Meriden Mall Driveway at Kensington Avenue			
Westfield Meriden Mall Dwy NB Left	C	F	C
Kensington Ave WB Left	A	B	A

* Stop-Sign Controlled

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TABLE A.5
Capacity Analysis Summary
Future (2034) Combined Traffic Conditions – With Improvements

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
SIGNALIZED			
Chamberlain Highway at South Mountain Road			
Chamberlain Hwy NB Thru	A	B	A
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left-Thru	A	B	A
South Mountain Road WB Left-Right	B	C	B
Overall	**A**	**B**	**A**
Chamberlain Highway at Kensington Avenue			
Chamberlain Hwy NB Left-Thru	B	C	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	B	A
Chamberlain Hwy SB Thru-Right	A	A	A
Goffe St EB Left-Thru-Right	B	B	B
Kensington Ave WB Left-Thru	B	D	C
Kensington Ave WB Right	C	A	A
Overall	**B**	**B**	**A**
Chamberlain Highway at Coldspring Avenue			
Chamberlain Hwy NB Left-Thru	A	C	B
Chamberlain Hwy NB Right	A	A	A
Chamberlain Hwy SB Left	A	B	B
Chamberlain Hwy SB Thru-Right	A	B	B
Coldspring Ave EB Left	D	D	D
Coldspring Ave EB Thru-Right	A	C	D
Mall Dwy WB Left	D	D	D
Mall Dwy WB Left-Thru-Right	C	D	D
Overall	**A**	**C**	**C**
Chamberlain Highway at Target Driveway/I-691 Westbound On Ramp			
Chamberlain Hwy NB Left			
Chamberlain Hwy NB Thru-Right			
Chamberlain Hwy SB Left			
Chamberlain Hwy SB Thru-Right			
Target Dwy. EB Left-Thru			
Target Dwy. EB Right			
Overall			
Chamberlain Highway at I-691 Eastbound Off Ramp			
Chamberlain Hwy NB Thru-Right			
Chamberlain Hwy SB Left-Thru			
I-691 EB Off Ramp EB Left			
I-691 EB Off Ramp EB Left-Thru-Right			
Private Dwy. WB Left-Right			
Overall			
Westfield Meriden Mall Driveway at Kensington Avenue			

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Westfield Meriden Mall Driveway NB Left	B	B	B
Westfield Meriden Mall Driveway NB Right	B	A	A
Kensington Ave EB Thru-Right	A	A	A
Kensington Ave WB Left-Thru	A	A	A
Overall	**A**	**A**	**A**
Lewis Avenue at Kensington Avenue			
Lewis Ave NB Left	C	D	C
Lewis Ave NB Left-Thru-Right	B	B	B
Bailey Ave SB Left-Thru-Right	A	A	A
Kensington Ave EB Left-Thru	C	C	B
Kensington Ave EB Right	A	A	A
Kensington Ave WB Left-Thru-Right	B	C	B
Overall	**B**	**C**	**B**
Lewis Avenue at Mall Driveway/Medical Center Driveway			
Lewis Ave NB Left	B	B	A
Lewis Ave NB Thru-Right	A	A	A
Lewis Ave SB Left	D	C	D
Lewis Ave SB Thru-Right	C	D	D
Mall Dwy. EB Left-Thru	D	D	D
Mall Dwy. EB Right	A	B	A
Med. Ctr. Dwy. WB Left-Thru	D	D	C
Med. Ctr. Dwy. WB Right	A	A	A
Overall	**B**	**C**	**B**

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
Lewis Avenue at I-691 WB Off Ramp/Medical Center Driveway			
Lewis Ave NB Thru-Right			
Lewis Ave SB Left			
Lewis Ave SB Thru			
I-691 WB Off Ramp EB Left			
I-691 WB Off Ramp EB Left-Thru			
I-691 WB Off Ramp EB Right*			
Med. Ctr. Dwy. WB Left			
Med. Ctr. Dwy. WB Left-Right			
Overall			
Lewis Avenue at I-691 EB On Ramp			
Lewis Ave NB Thru			
Lewis Ave NB Right			
Lewis Ave SB Left			
Lewis Ave SB Thru			
Overall			
Lewis Avenue at Columbia Street			
Lewis Ave NB Thru-Right			
Lewis Ave SB Left			
Lewis Ave SB Thru			
Columbia Street WB Left-Right			
Overall			

LOCATION/MOVEMENTS	LEVEL OF SERVICE		
	WEEKDAY MORNING PEAK HOUR	WEEKDAY AFTERNOON PEAK HOUR	SATURDAY MIDDAY PEAK HOUR
UNSIGNALIZED			
Sams Road at Kensington Avenue			
Sams Road SB Left	C	C	B
Kensington Ave EB Left	A	A	A

* Stop-Sign Controlled

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APPENDIX D: 2015 Construction Cost Estimates

ENGINEER'S OPINION OF COST - CONCEPTUAL DESIGN
OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENTS
ROADWAY EVALUATION STUDY FOR FORMER NRG SITE
MERIDEN, CONNECTICUT
APRIL 22, 2015

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
0202000	Earth Excavation	CY	10,000	$ 17.00	$ 170,000.00
0202100	Rock Excavation	CY	1,100	$ 60.00	$ 66,000.00
0207003	Borrow	CY	2,000	$ 18.00	$ 36,000.00
0209001	Formation of Subgrade	SY	12,000	$ 2.00	$ 24,000.00
0212003	Subbase	CY	2,700	$ 32.00	$ 86,400.00
0304002	Processed Aggregate Base	CY	2,000	$ 35.00	$ 70,000.00
0406010-1	Bituminous Concrete, Class 1	Ton	1,400	$ 110.00	$ 154,000.00
0406010-2	Bituminous Concrete, Class 2	Ton	4,200	$ 110.00	$ 462,000.00
0406236	Material For Tack Coat	Gallon	3,800	$ 6.00	$ 22,800.00
0406285A	Fine Milling of Hot Mix Asphalt (HMA) (0"- 4")	SY	25,000	$ 6.00	$ 150,000.00
0811001	Concrete Curbing	LF	1,500	$ 25.00	$ 37,500.00
0815001	Bituminous Concrete Lip Curbing	LF	2,000	$ 5.00	$ 10,000.00
0910170	Metal Beam Rail (Type R-B 350)	LF	2,600	$ 25.00	$ 65,000.00
0912510A	Remove Guide Rail	LF	2,600	$ 6.00	$ 15,600.00
0921001A	Concrete Sidewalk	SF	18,500	$ 12.00	$ 222,000.00
0944002	Furnishing and Placing Topsoil	SY	9,800	$ 6.00	$ 58,800.00
0950005	Turf Establishment	SY	9,800	$ 2.00	$ 19,600.00
0969062	Construction Field Office, Medium	Mo.	18	$ 2,200.00	$ 39,600.00
0970006A	Trafficperson (Municipal Police Officer)	Est. Cost	1	$ 250,000.00	$ 250,000.00
0970007A	Trafficperson (Uniformed Flagger)	Hr.	5,000	$ 55.00	$ 275,000.00
	Existing Traffic Signal Modifications (Site No. 1 - Kensington Ave./Lewis Ave.)	LS	1	$ 80,000.00	$ 80,000.00

ENGINEER'S OPINION OF COST - CONCEPTUAL DESIGN
OFFSITE ROADWAY / SIGNALIZATION IMPROVEMENTS
ROADWAY EVALUATION STUDY FOR FORMER NRG SITE
MERIDEN, CONNECTICUT
APRIL 22, 2015

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
	Existing Traffic Signal Modifications (Site No. 2 - Kensington Ave./Bailey Ave.)	LS	1	$ 80,000.00	$ 80,000.00
	New Traffic Signal (Site No. 1 - Kensington Ave./Mall Entrance)	LS	1	$ 150,000.00	$ 150,000.00
	New Traffic Signal (Site No. 2 - Chamberlain Hwy./South Mountain Rd.)	LS	1	$ 150,000.00	$ 150,000.00
	Retaining Wall (Southern Side of Kensington Ave between Chamberlain and Mall Driveway)	LS	1	$ 3,592,500.00	$ 3,592,500.00
	Drainage Modficiations	LS	1	$ 80,000.00	$ 80,000.00
	Minor Items (±20%)	LS	1	$ 1,280,000.00	$ 1,280,000.00
				EST. CONSTRUCTION PROJECT SUBTOTAL A =	$ 7,646,800.00
0201001A	Clearing and Grubbing (±3%)	L.S.	1	$ 230,000.00	$ 230,000.00
0971001A	Maintenance & Protection of Traffic (±3.5%)	L.S.	1	$ 268,000.00	$ 268,000.00
0975002	Mobilization (±6.5%)	L.S.	1	$ 498,000.00	$ 498,000.00
0980001A	Construction Staking (±1%)	L.S.	1	$ 77,000.00	$ 77,000.00
				EST. CONSTRUCTION PROJECT SUBTOTAL B =	$ 1,073,000.00
				EST. CONSTRUCTION PROJECT SUBTOTAL (A+B) =	$ 8,719,800.00
				CONTINGENCIES (±25%)	$ 2,180,000.00
				INCIDENTALS TO CONSTRUCTION (±25%)	$ 2,180,000.00
				PROJECT TOTAL =	$ 13,079,800.00
				PROJECT TOTAL (ROUNDED) =	$ **13,080,000.00**

Exclusions:
1. Inflation to Construction Year
2. Utility Relocations

APPENDIX E: Capacity Analysis Worksheets