APPLICATION OF H374, LLC FOR SPECIAL PERMIT WITH DESIGN REVIEW, 400 HEBRON AVENUE, GLASTONBURY, CT

Applicant's Second Set of Supplemental Materials

June 9, 2022

Andrea L. Gomes, Esq.
agomes@hinckleyallen.com
Hinckley Allen
20 Church Street
Hartford, CT 06103
PHONE: (860) 725-6200

Allan Schwartz
mdrealtor54@msn.com
Evan Schwartz
evanzschwartz@gmail.com
H374, LLC
606 North Ocean Boulevard
Delray Beach, FL 33483
PHONE: (860) 707-6943

Jonathan H. Sczurek, P.E.
jhs@megsonandheagle.com
Megson, Heagle & Friend C.E. & L.S., LLC
81 Rankin Road
Glastonbury, CT 06033
PHONE: (860) 659-0587

Mark Vertucci, P.E., P.T.O.E.
MVertucci@fando.com
Fuss & O'Neill, Inc.
146 Hartford Road
Manchester, CT 06040
PHONE: (860) 646-2469, x5381

Carmelo Rosa, AIA
carm@hra.bz
Hibbard & Rosa Architects
100 Riverview Center – Suite 272
Middletown, CT 06457
PHONE: (860) 346-1809, x702

Thomas Graceffa, ASLA, PLA
thomasgraceffa1@gmail.com
Thomas Graceffa Landscape Architect, LLC
19 Flag Drive
Manchester, CT 06042
PHONE: (815) 742-1930

Table of Contents

TABLE OF CONTENTS
June 9, 2022

SUBMITTED SEPARATELY

Revised civil plan sheets, prepared by Megson, Heagle & Friend C.E. & L.S., LLC (14 copies, full-sized).

Dropbox link with all materials.

1

HINCKLEY ALLEN

20 Church Street
Hartford, CT 06103-1221

p: 860-725-6200 f: 860-278-3802
hinckleyallen.com

MEMORANDUM

TO: Glastonbury Town Plan and Zoning Commission

CC: Rebecca Augur, Director of Planning & Land Use Services
Jonathan Mullen, Planner

FROM: Hinckley, Allen & Snyder LLP

DATE: June 9, 2022

Re: Applicant's Second Set of Supplemental Materials – Application of H374, LLC For Special Permit With Design Review, 400 Hebron Avenue, Glastonbury, Connecticut

---

In anticipation of the June 21, 2022 continued public hearing, this memorandum is intended to provide the Commission with additional information pertaining to the above-captioned application, including responses to comments and questions posed by the Commission and members of the public during the May 17, 2022 public hearing, and responses to recently-issued staff comments. Supplemental materials are appended to this memorandum, or have been submitted separately to staff, as noted.

1. Staff Comments. The applicant's responses to additional staff comments are included in this memorandum as follows:

- April 28, 2022 Environmental Planner comments – *see* Tab 2.
- May 16, 2022 Fire Marshal comments – *see* Tab 3.
- May 31, 2022 Town Engineer comments regarding civil plan set – *see* Tab 4.
- May 31, 2022 Town Engineer comments regarding traffic – *see* Tab 5 and response no. 10, below.

2. Civil Plan Revisions. The applicant has revised its plans in response to comments received from town staff, *see* revised plans submitted herewith and Tab 4.

In addition, and in response to Commission and public comments, the applicant has revised its site plan to include a pedestrian connection, from Linden Street to the store entrance on the south side of the 400 Hebron Avenue building. The inclusion of this pedestrian connection results in a small amount of additional greenspace, which, as noted below, will be landscaped with additional plantings.

3. Landscaping Plan Revisions. To summarize, the applicant revised its landscaping plan in advance of the May 17, 2022 public hearing in response to Commission, town staff, and ASDRC comments as follows:

- The plantings, berm and stone proposed for the corner island at Linden Street and Hebron Avenue were removed.
- A landscaped peninsula was added to the south of the Linden Street curb, which includes 3' – 5' dwarf lilacs and short grasses; the end of that island is lawn.
- The transformer in the proposed employee parking was screened with Purple "Nepeta" and 3' ornamental Feather Reed Grass.
- The gate originally proposed for the Hebron Avenue delivery vehicle entrance was removed.
- The east and west patios along Hebron Avenue were reduced by 400 square feet each, and boxwood hedges were proposed to partially enclose those patios and screen the existing boulders in those areas.
- Existing shrubs along Hebron Avenue were proposed to be replanted in groups.
- Three shade trees were incorporated into the plantings proposed along Hebron Avenue, including River Birch, Bradford Pear and Ginkgo.
- "Smaragd" American Aroborvitae were proposed to flank both sides of the existing sign kiosk.
- A 48-inch lattice trellis and eight additional "Sky Pencil" Holly were added to the plans to screen the existing utility meters on the east side of the building.

In response to Commission comments at the May 17 meeting and the comments provided by Glastonbury Environmental Planner, Suzanne Simone, the applicant is willing to replace all daylilies with a mix of native perennials / pollinators, including: Yarrow (Achillea millefolium); False Aster (Boltonia asteroides); Purple Coneflower (Echinacea purpurea); and Black Eyed Susan (Rudbeckia fulgida). In addition, the open area created along the pedestrian connection from Linden Street will be planted with a mix of Karlfoerster Grasses, Hydrangea, and "My Monet" Purple Weigela. These revisions to the landscaping plan may be imposed as a condition of the Commission's approval.

4. Grocer Entrance. The applicant has confirmed that the grocer is not able to provide a second entrance into its retail space along Hebron Avenue. As the Commission can see on the grocer's floor plan at Tab 6, a Hebron Avenue entrance would lead directly into the grocer's "back of the house" operations, near the employee bathrooms. Thus, the proposed interior layout of the grocer could not accommodate a second, rear entrance.

More importantly, however, is the security risk posed by providing two separate entrances into a retail store. Providing one entrance for all patrons will enable the grocer's employees to monitor that entrance at all times. This is standard industry practice, and is best exemplified by other retailers in Glastonbury that provide for only one entrance, including but not limited to the retail building at 277 Hebron Avenue, which contains Connecticut Shade and Blind / Close To Home; Whole Foods; Pet Valu; and the various shops at Somerset Square.

5. Building Design. The applicant understands the Commission's desire to enhance site activity along Hebron Avenue. As such, the applicant is willing to provide two large tables, with umbrellas, on the western and eastern patio areas along Hebron Avenue, for patron and pedestrian use. Two proposed table designs are attached at Tab 7.

In addition, the grocer is willing to incorporate window graphics on its windows along Hebron Avenue. The applicant defers to the Commission on the content of the graphics, but respectfully suggests graphics that consist of photographs of historic Glastonbury buildings, to commemorate the history of the town. Samples of these graphics will be provided to the Commission in advance of the June 21 continued public hearing.

The retail building at 277 Hebron Avenue, which was constructed in approximately 2015 and as noted above only provides one patron entrance in the parking area to the rear of the building, also utilizes window graphics to enliven the Hebron Avenue façade of the building. A photo of that building is at Tab 8.

6. Grocer Operation Details. At the May 17 public hearing, members of the Commission also requested details on the proposed grocer's deliveries, trash removal, and hours of operation. The applicant has confirmed the following with the grocer:

- The grocer will be open for daily business from 8 AM to 9 PM.

- The grocer anticipates two daily deliveries from the grocer's warehouse. While one delivery will likely occur in the morning, before the grocer opens for business, with the second delivery occurring in the evening hours, before close, the two anticipated deliveries may sometimes occur in the evening hours, depending on supply / driver availability. Because the deliveries are coordinated with the grocer's own warehouse, the grocer has the ability to coordinate the deliveries so that only one delivery vehicle will be on-site at any given time, and only during off-peak hours.

- Trash removal will be based on grocer volume and, therefore, is hard to predict. That being said, the applicant anticipates that its trash removal subcontractor, All Waste,

will remove the grocer's trash approximately three times per week, between 7 AM and 8 AM.

7. Delivery Vehicle Details. Commissioner Hassett requested at the May 17 public hearing that the applicant provide details on the approximate timing of the grocer's WB-62 delivery vehicle movements – i.e., how long it would take the delivery vehicles to enter the site, maneuver into position for unloading, and then exit the site. The applicant's traffic engineer, Mark Vertucci, has calculated the following:

- Approximately 57.4 seconds to pull into the site from Hebron Avenue, maneuver within the site, and back in to the loading dock.
- Approximately 10.2 seconds to exit out of the site, up to the Linden Street stop bar, assuming a speed of 10 miles per hour.
- Approximately 19.2 seconds to exit Linden Street, turn left on Hebron Avenue, enter the roundabout, and exit onto House Street. This calculation assumes the delivery vehicle, which will only be at the site on off-peak hours, does not have to stop for other vehicles in the vicinity.

8. Neighbor Improvements. The applicant and its engineer, Jonathan Sczurek, met, on May 20, 2022, with Gerald Satin, the owner of 9-11 Linden Street, to discuss Mr. Satin's concerns with the proposed improvements. The applicant's June 1, 2022 letter to Mr. Satin, in which the applicant communicates its offer to install, at its own cost, a yard drain on Mr. Satin's property, among other things, is at Tab 9.

9. ASDRC Referral. The ASDRC has issued two separate advisory reports regarding the proposed improvements, the first of which is dated April 27, 2022; the second report is dated May 11, 2022. Both advisory reports were based on the same application materials. Since the issuance of the reports, the applicant has made significant revisions to its plans, largely in response to the comments made by the ASDRC.

In the most recent advisory report, the ASDRC does not recommend design approval here because, according to the ASDRC: the proposed improvements are inconsistent with the existing building and streetscape; the site access is inconsistent with the Town Center Village District ("TCVD") guidelines (which have yet to be drafted – *see* Building Zone Regulation § 4.19.5); the proposed improvements are inconsistent with the pattern of open spaces and buildings in the TCVD; the proposed landscaping does not promote a pedestrian friendly use or activity; and the proposal is not an appropriate scale, proportion, massing and detailing for the TCVD.

Respectfully, the applicant must point out that *the 400 Hebron Avenue building is an existing, approved part of the TCVD*. Thus, the proposed improvements, necessarily are consistent with the building, streetscape and land use pattern in the area. The applicant must also highlight that many of the ASDRC's criticisms focus not on the new improvements, but on the

entire 400 Hebron Avenue site, which, again, was approved by the Commission and constructed in accordance with that approval.

The ASDRC's focus on the alleged importance of the 366 Hebron Avenue building is also misplaced in that the Committee ignores the fact that the building is not ADA or code compliant, may accommodate only one tenant, and is in need of significant repairs – all reasons the 366 Hebron Avenue building has lain vacant for approximately 18 months.

While the applicant could respond to each of the remaining comments made by the ASDRC, the applicant believes the better course here is to focus on the *benefits* of this proposal, including:

- The proposal will create a walkable, neighborhood amenity, that will serve Glastonbury residents, employees, and nearby small businesses;
- The proposal will transform *two* mostly-vacant, under-utilized commercial buildings (400 Hebron Avenue and 366 Hebron Avenue), and an abutting residential building, into a vibrant retail use that will serve the community, in accordance with the Glastonbury Plan of Conservation and Development ("POCD") (*see* POCD at 24);
- The proposed landscaping improvements will vastly improve the existing streetscape along Hebron Avenue, in accordance with the POCD (*see* POCD at 43);
- The proposed tables on the east and west patios along Hebron Avenue, together with the proposed graphics on the grocer's windows, will add interest and life along the Hebron Avenue corridor;
- The proposal will relocate the majority of the deliveries originally intended to occur within the 400 Hebron Avenue parking lot, on the south side of the building, to the employee-only parking area, thereby enhancing pedestrian and vehicle safety and circulation in that parking lot;
- The proposal will add an additional 13 parking spots to the 400 Hebron Avenue site, thereby ensuring adequate parking for the 400 Hebron Avenue building in accordance with the POCD (*see* POCD at 24);
- The proposal will enhance pedestrian safety and access by incorporating a sidewalk along the abutting portion of Linden Street, and extending that sidewalk to the 400 Hebron Avenue entrance;
- The proposal will enhance pedestrian and vehicular circulation and safety at 366 Hebron Avenue / 7 Linden Street by incorporating additional lighting, which will be Dark Sky-compliant and avoid light spillage beyond the property line in accordance with the POCD (*see* POCD at 23);
- The proposal will improve stormwater drainage at 366 Hebron Avenue and 7 Linden Street by, among other things, treating stormwater runoff from impervious surfaces, in accordance with Town policies regarding the MS4 General Permit and the POCD (*see* POCD at 23, 44);
- The proposal will improve existing traffic circulation at the Hebron Avenue / Sycamore Street intersection by adding a turn lane on Sycamore Street; and

- The specialty grocer, which operates nationwide, will attract additional business to the Town (indeed, a prospective tenant for the remaining vacant space at 400 Hebron Avenue is waiting to see if the proposed grocer is approved before signing a lease for the building).

10. Responses to May 31, 2022 Comments from Town Engineer regarding traffic. The applicant's traffic engineer, Mark Vertucci, has responded to the Town Engineer's traffic-related comments at Tab 5. In addition, the applicant offers the following supplemental response:

> Comment No. 2: Town staff also has concerns regarding the very low trip generation assumption for the retail furniture space. While these rates may be accurate for this use, this space could transition to other types of retail space in the future without the need for a Town Plan Zoning Commission special permit. Other types of retail will likely have higher trip generation rates as compared to a furniture store. Town staff believes that it is reasonable to assume higher rates for this space to, again, ensure a conservative analysis.
>
> ***Response***: As noted in Mr. Vertucci's response memorandum, the applicant intends to lease the vacant space in the existing building to a furniture retailer, and is presently in negotiations with that retailer. Nevertheless, Mr. Vertucci has recalculated the anticipated traffic for that space using a "variety store", resulting in an increase of 21 trips in the Friday afternoon peak hour and 16 trips in the Saturday midday peak hour. As with all of Mr. Vertucci's other calculations, these numbers are ultra-conservative and likely overstating the actual traffic impact of the development.
>
> In addition, the applicant notes that if it were to change the proposed use of the vacant space from the previously-approved retail or office uses to a use that requires additional parking, the Commission would have the discretion to require an amendment to the approved plan here pursuant to Building Zone Regulations §§ 12.8 and 4.13.5. Lastly, the applicant reminds the Commission that it already has agreed to a condition of approval, prohibiting the use of the vacant space for two "busier" uses -- a sit-down / fine dining restaurant or athletic club – while the grocer is operating in the building.

2

April 28, 2022 Comments from Environmental Planner, Suzanne Simone

1. The proposed erosion control measures are suitable for the site conditions and proposed activities.

   Response: Noted.

2. The proposed management of the sediment and erosion control measures is identified on Sheet 7 and is in conformance with the 2002 CT Erosion and Sediment Guidelines.

   Response: Noted.

3. The planting palette identifies the location of 102 daylily plants. The applicant is encouraged to diversify the planting plan by reducing/eliminating the daylily plants in favor of native perennials that support native pollinators.

   Response: The 102 daylily plants will be replaced with a mix of the following native perennials, which also support native pollinators: Yarrow (Achillea millefolium); False Aster (Boltonia asteroides); Purple Coneflower (Echinacea purpurea); and Black Eyed Susan (Rudbeckia fulgida).

4. The applicant is encouraged to incorporate integrated pest management in place of conventional pesticide applications.

   Response: The applicant is happy to work with town staff to incorporate an integrated pest management plan for the improved site.

3

May 16, 2022 Comments from Fire Marshal's Office

1. Exterior doors serving as exits will require exterior emergency lighting fixtures.

   Response: Noted. The Commission may impose the inclusion of exterior emergency lighting fixtures on exterior exit doors as a condition of its approval here.

2. Semi-Truck deliveries with trailers of 53 feet attempting approach and departure from the specified loading area may present challenges as depicted with the proposed site configuration. It is noted that the turning templates submitted for semi-truck maneuvering is based solely on a trailer length of 48 feet.

   Response: The grocer will utilize WB-62 delivery vehicles (with a trailer length of 48 feet), or smaller, for its deliveries. As such, the proposed site configuration is sufficient / appropriate.

3. On street standing of tractor trailers or trucks of any size for deliveries would be problematic due to the close proximity of the intersections.

   Response: The grocer receives deliveries only during off-peak hours. As such, extended on-street standing of the delivery vehicles is not anticipated.

4

May 31, 2022 Comments from
Daniel A. Pennington, Town Engineer/Manager of Physical Services
(Memo No. 1)

1. Comments concerning the Traffic Impact study submitted with the application are provided via separate memorandum exclusive to that topic.

   Response: Noted. *See* Tab 5.

2. Project plans indicate installation of hardscape type treatments within the Town road Right of Way to facilitate truck turning movements. If approved as proposed, an agreement for requiring abutting property owner maintenance of same is recommended.

   Response: Noted.

3. The landscaping plan depicts various proposed plantings being installed on Town property within the Linden Street right-of-way. These plantings should be eliminated from the proposal since they would be subject to damage from Town snow removal operations and future public utility excavations within the right-of-way. As proposed, these plantings would need to be maintained by the Town unless a maintenance agreement is executed.

   Response: The applicant is willing to enter into a maintenance agreement with the Town for this area. The Commission may impose the maintenance agreement as a condition of its approval here.

4. The town right-of-way line for Hebron Avenue and Linden Street should be labeled on all plan sheets for clarity.

   Response: The "Right-of-Way" Line has been labeled for clarity on the revised site plan.

5. After review of the Hydrology and Hydraulics report the Engineering Division finds that the proposed storm water management system was appropriately sized to support the development and is consistent with Town standards for stormwater management.

Response: Noted.

6. The long-term stormwater maintenance schedule for the proposed stormwater management system should be moved to the Site Plan Sheet 4 for ease of reference. The narrative should also be revised to indicate that the property owner is responsible for this maintenance.

Response: The narrative, which has been revised to indicate the property owner as responsible for maintenance of the stormwater management system, has been included on the revised site plan (sheet 4).

7. Existing and proposed catch basins should be depicted with different symbols on the plans for clarity.

Response: The symbols have been updated on the plans.

8. Existing contours should be labeled on the site plan to clarify grading intent.

Response: Existing contour labels have been labeled on the site plan.

9. Existing improvements on the residential property to the south near the property line should be depicted on the plans, including the residential structure, fence, and any vegetation that would function as screening. A note regarding protection of the existing fence along the southerly property line should also be added.

Response: The existing fence at 9-11 Linden Street has been depicted on the plan. The residential structure at that property was also added to the plan, per Town of Glastonbury GIS. The existing lilac bushes, which will be protected at the request of that property owner (*see* Tab 9), have been noted on the plans.

10. The Engineering Division standard inspection note should be added Sheet 4 of the plans.

Response: The Engineering Division standard inspection note has been added to the plans.

11. Town of Glastonbury Concrete Sidewalk Detail on Sheet 8 should be replaced with the latest version found on the town website.

Response: The sidewalk detail has been updated accordingly.

12. Existing buildings at 7 Linden Street and 366 Hebron are connected to the Town sanitary sewer. Approximate locations of the existing sewer laterals should be shown on the Demolition Plan Sheet 3 with notes regarding disconnection of the sewer laterals at the street line. Sewer Permits are required for disconnection of these structures from the Engineering Division office.

Response: Approximate sewer locations have been depicted on sheet 3 per the sewer tie cards. The applicant will obtain the necessary sewer permits from the Engineering Division office.

13. A supplemental sewer assessment may be required as part of this development which will be determined at the time that Building Permit Application is submitted.

Response: Noted.

14. Applicant shall provide a copy of final stamped and signed plans, stormwater management report, and traffic report in PDF form to the Town Engineer.

Response: Noted.

5

FUSS & O'NEILL

June 8, 2022

Mr. Daniel A. Pennington P.E.
Town Engineer/Manager of Physical Services
Town of Glastonbury, CT
2155 Main Street
Glastonbury, CT 06033

Re: Response to Traffic Comments
Proposed Change In Use
400 Hebron Avenue
Glastonbury, Connecticut

Dear Mr. Pennington:

This letter will serve as a response to the comments received from your office in a memorandum dated May 31, 2022. The text of the comment is provided below in *italicized text*, along with a response to the comment following.

Trip Generation

1. *The initial study utilized industry standard trip generation rates that assumed tenant spaces occupied by a 13,154 square foot grocery store and a 4600 square foot retail furniture store. Town staff concerns that said rates could understate actual trip generation rates by a significant degree were addressed by obtaining actual trip counts from existing like specialty grocery stores elsewhere in New England. Results of this effort revealed trip generation rates which were almost exactly double the industry standard rates previously used. These rates were then used to assess capacity and queueing at intersections at both ends of Sycamore Street during the Friday PM and Saturday midday peak periods. The prior study had only analyzed the signalized intersection which includes Sycamore Street, Hebron Avenue and the Route 2 Eastbound Exit 8 off ramp and did not include Saturday midday peak period analysis. It is noted that the revised analysis assumes a "pass by" trip generation credit of 20% for the development proposed. Town staff sees this assumption as being reasonable and acceptable. The applicant also assumes a 10% trip generation reduction credit for internal capture and multimodal trips. Town staff disagrees with inclusion of this credit and believes it should be eliminated to ensure a conservative analysis.*

   Response: Incorporated. The 10% internal capture and multi-modal use credit has been eliminated in the trip generation and combined condition volume figures as well as the revised capacity analysis included in the updated traffic impact study enclosed. It should be noted however that it is very conservative to assume that everyone will arrive to this site via an automobile and that there will be no visitors to the other retail uses in this plaza who will also visit the specialty grocer in the same trip. The applicant has

146 Hartford Road
Manchester, CT
06040
t 860.646.2469
800.286.2469
f 860.533.5143

www.fando.com

California
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

provided additional sidewalk connectivity from Hebron Avenue and Linden Street to the main entrance of the store at the Town's request to encourage pedestrian traffic to this site from the nearby residential developments and adjacent bus transit stops. It is also noted that the industry standard pass-by trip percentages for specialty grocers as published by ITE have been shown to exceed 35 percent of the total trips accessing the store however our analysis only includes a 20 percent credit. Using a significantly lower pass-by credit and no multi-use/capture credit ensures the capacity analysis is ultra-conservative and likely overstating the actual traffic impact of the development.

2. *Town staff also has concerns regarding the very low trip generation assumption for the retail furniture space. While these rates may be accurate for this use, this space could transition to other type of retail space in the future without the need for a Town Plan Zoning Commission special permit. Other types of retail will likely have higher trip generation rates as compared to a furniture store. Town staff believes that it is reasonable to assume higher rates for this space to, again, ensure a conservative analysis.*

   Response: Incorporated. While the applicant proposes to utilize the remaining 4,600 square feet of additional space for a furniture store use, this space could transition into an office use or more intense retail use at some point in the future under present zoning. Therefore, trip generation for this space was calculated for both an office use and a variety store. After a review of the trip generation rates for an office space and for a variety store, it was determined that the office space would generate less trips overall than the variety store during the Friday afternoon and Saturday midday peak periods. Therefore, in order to provide a conservative analysis, a variety store was utilized for the additional 4,600 square feet of vacant retail space, resulting in an increase of 21 trips in the Friday afternoon peak hour and 16 trips in the Saturday midday peak hour. Revised trip generation and combined condition volume figures as well as the revised capacity analysis are included in the updated traffic impact study enclosed.

   Additional response regarding this comment can be found in Tab 1 of this package.

3. *Given the extraordinary trip generation associated with the intended specialty grocery use, it would be prudent to analyze the peak period parking demand with respect to the available parking on site. The proposal includes addition of 15 employee parking spaces on the west side of the building structure, however, staff has not demonstrated that the site's ability to accommodate the expected site generated traffic. The applicant has not demonstrated that the site has sufficient parking capacity given the proposed retail space utilization.*

   Response: The primary reason the peak hour trip generation for this type of specialty grocer use is higher than a typical supermarket is that patrons of the store turnover much more quickly. Based on information provided by the proposed tenant, the average time a

customer spends within the store is 15 minutes and despite the small store size, the grocer typically has 8-10 cashiers open during peak times ensuring customers are in and out of the store quickly. Given a maximum trip generation rate of 206 entering and 206 exiting trips during the Saturday peak hour and an average 15-minute shopping time per customer, each parking space in the site will turnover on average 4 times per hour during the busiest times. Thus, a total of approximately 52 parking spaces would be required for the grocery store use under typical peak conditions.

It is noted that 131 parking spaces are provided on the site and only 106 spaces are required by Town Zoning regulations. Of the 106 spaces, 8 are required for the Hartford Baking Company use, 27 spaces are required for the vacant retail space, and 71 spaces are required for the specialty grocer use. Thus, with 131 available spaces on site, a total of 96 spaces is available for use by customers of the specialty grocer availability and an additional 35 shared parking spaces with the other uses on site.

Finally, a primary site selection criteria for the prospective specialty grocer is the availability of adequate parking. The grocer has thoroughly vetted this site and confirmed the parking supply at 400 Hebron Avenue is consistent with the parking supply and demand provided at their other stores throughout Southern New England, the majority of which also are in shared retail plaza settings. Indeed, many of these other stores are located in much larger retail plazas, with higher trip generators and parking requirements, than that proposed here. For these reasons, the applicant is certain there is more than enough parking available on-site.

Trip Distribution

4. *The May 13, 2022 Traffic impact statement does include revised trip distribution percentages following Town staff expressed inquiry. However, the applicant has only provided a general statement explaining the reasoning for distribution assumptions utilized. The Applicant is again asked to provide detail to support these assumptions. Trip distribution utilized in the analysis can have a significant impact on projected intersection capacity and queuing. Thus, a well-reasoned roadway network trip distribution plan is essential for producing an accurate traffic model.*

Response: The additional site generated traffic distribution was determined based on the site driveway location as well as the existing traffic volume distributions within the study area. A review of the existing traffic volume distributions for traffic exiting Sycamore Street revealed the following average distributions:

- 18 percent of the trips depart to the west on Hebron Avenue

- 42 percent of the trips depart to the east on Hebron Avenue
- 16 percent of the trips depart to the north on New London Turnpike
- 24 percent of the trips depart to the south on New London Turnpike

These distributions were then adjusted to account for the site driveway's proximity to the signalized intersection of Hebron Avenue at Sycamore Street, the off-site improvements proposed on the Sycamore Street northbound approach to Hebron Avenue, and projected delays at the intersection of New London Turnpike at Sycamore Street to yield the following site generated traffic distributions:

- 10 percent of the trips arrive from the north on Route 2
- 45 percent arrive and 50 percent depart from/to the east on Route 94 (Hebron Avenue)
- 20 percent arrive and 25 percent depart from/to the west on Hebron Avenue
- 10 percent arrive/depart to/from the north on New London Turnpike
- 15 percent arrive/depart to/from the south on New London Turnpike

While existing traffic volumes revealed that 40 percent of the existing Sycamore Street traffic departs to New London Turnpike, a review of the existing land uses on Sycamore Street reveals several medium sized developments within close proximity to the intersection of New London Turnpike at Sycamore Street that would concentrate their trips at this intersection. Additionally, the site driveway is proposed to be approximately 450 feet south of the intersection with Hebron Avenue and the Route 2 Off-Ramp, therefore it is unlikely patrons of the site heading west towards the Town Center will travel south on Sycamore Street to head back north on New London Turnpike. The proposed road widening on the Sycamore Street approach to Hebron Avenue, which is discussed later in this letter, will also provide more efficient operations at this signalized intersection and encourage more traffic to exit the north end of Sycamore Street. Given these factors and peak hour delays which currently exist on the Sycamore Street approach to New London Turnpike, 25 percent of the site generated traffic is anticipated from Sycamore Street to the south while 75 percent of the traffic is anticipated from the north (Hebron Avenue). In other words, drivers will take the "path of least resistance" and because the applicant proposes to improve the Sycamore Street / Hebron Avenue intersection with an additional turn lane, most drivers are expected to take this route in and out of the site.

This rationale has also been incorporated in the revised traffic impact study enclosed.

Intersection Capacity and Queue Analysis

5. *The traffic signal located at the Sycamore Street/Hebron Avenue/Rt 2 Exit 8 off ramp is owned and maintained by the State Department of Transportation (CONNDOT). Sycamore St. and Hebron Avenue west of the intersection are Town owned roadways while Hebron Avenue east of the intersection and Rt 2 off ramp are owned by CONNDOT. The applicant indicates that CONNDOT is in the progress of evaluating phase timings on State-owned signals and has offered to evaluate the potential for establishing a dedicated left turn lane on Hebron Ave westbound approach per long standing Town preference. The Town is pleased to hear of these initiatives. However, for purposes of the subject application, signal phase timing modifications cannot be considered. The timeframes associated with these evaluations are uncertain and the results of the analysis are unknown at this time. This, the Traffic Impact report sections which provide assumed modifications have not been reviewed by Town staff and no additional comment is offered with respect to this item.*

   Response: The previous version of the traffic impact study had included two combined condition analysis scenarios – one that included only the proposed road widening on the northbound Sycamore Street approach to Hebron Avenue and one that included both the widening and the anticipated CTDOT timing improvements. The analysis revealed that the majority of the delay and queue improvements at this intersection were realized from the road widening being completed by the applicant. While the additional timing modifications would also help, the additional delay and queue improvements were relatively minor compared to those realized from the widening. The analysis scenarios including the pending CTDOT signal timing/phasing modifications to the intersection of Hebron Avenue at Sycamore Street/Route 2 Off-Ramp have been removed from the study. Again, this has resulted in a more conservative analysis.

6. *Eastbound approach queue at the Hebron Avenue/off ramp/Sycamore Street signal as depicted in the Traffic Impact Study are not consistent with peak hour observations in the existing condition. Lane utilization factors should be adjusted to more accurately reflect usage. Consequently, queue lengths, level of service delay and available vehicle storage lengths are questioned in both the existing and build conditions. This concern relates to operational efficiency of the Town roundabout to the west. Eastbound approach queue to the signal could adversely affect roundabout operation.*

   Response: Lane utilization factors on Hebron Avenue eastbound have been adjusted and lane arrangements have been modified to more accurately reflect observed traffic operations at the intersection of Hebron Avenue at Sycamore Street/Route 2 Off-Ramp. Additionally, a Simtraffic simulation was conducted for the intersection to confirm and illustrate the modeled existing and proposed queue lengths at the intersection. A figure has been prepared

and attached illustrating the modeled existing queue lengths for the eastbound approach to the intersection.

It is important to note, regardless of existing conditions, that the proposed increase in development traffic will have no noticeable increase to vehicle delays and queues on the Hebron Avenue eastbound approach during the peak hours. Hebron Avenue eastbound queueing during the peak hours already occurs and the proposed development will increase these queues by only 1 to 2 vehicle lengths during the Friday afternoon and Saturday midday peak periods. Queue increases on this approach will be even less during off peak hours.

7. *The applicant is proposing construction of an additional turn lane on the northbound Sycamore Street approach to the signalized intersection in order to mitigate build condition impacts to queue lengths and level of service delays. No preliminary plan depicting such an improvement has been provided in the application materials. Town staff observation of field conditions coupled with road Right-of-Way research raises serious questions concerning the physical and legal ability to implement the solution. Right-of-Way width beyond the curb line on the east side of Sycamore Street is only about 8'. Several heavily laden overhead utility poles and sidewalk exist within the east side snow shelf and there are minor grade issues. The developed site on the west side of the road would seem to offer limited ability for road widening. The ability to implement this suggested turn lane addition in accordance with Town standards for proper lane width, shoulder width and pedestrian accommodation is questioned. It is further noted that the Synchro model results for the existing Sycamore Street approach are deemed questionable and inconsistent with field observations.*

Response: Please find attached a concept plan prepared illustrating the proposed road widening on Sycamore Street. The concept plan depicts the proposed addition of a second northbound turn lane as well as the required roadway modifications to accommodate this turn lane, while remaining consistent with Town standards. The plan provides a northbound 10 foot shared left/right turn lane, an 11 foot exclusive right turn lane, and a 15 foot southbound lane. The approximate 5 feet of road widening is accomplished by widening on the west side of the road, relocating a catch basin, and relocating the proposed sidewalk further west to maintain the existing grass strip between the sidewalk and roadway. All proposed work can be accomplished within the Town right of way and property owned by the applicant, and without the need to relocate the nearby utility poles or impacting the nearby snow shelf area.

Regarding existing northbound queue lengths on Sycamore Street, a Simtraffic simulation was run to verify modeled queue lengths on the approach. Synchro queues on the approach were calculated to average 7 vehicle lengths during the Friday afternoon peak hour and 5 vehicle lengths during the Saturday midday peak period. The attached figure illustrates the

Simtraffic modeled existing condition queues on the northbound approach during the Friday afternoon peak period. The Simtraffic back of queue is generally consistent with the Synchro output and Fuss & O'Neill's field observations during the peak hours.

8. *The initial Traffic Impact Study did not analyze the unsignalized Sycamore Street/New London Turnpike intersection. The revised May 13, 2022 report does evaluate this intersection in the existing and build conditions per Town request. The report is correct in stating that the left turn movements from Sycamore Street in the Saturday midday peak period experience a level of Service F in the existing condition and would continue to do so in the build condition. Study of the traffic model results, however, indicate that delay for this movement would increase from 88 seconds to 233 seconds and 95th percentile queue lengths would increase from 170' to 335'. Development driven impacts of this magnitude are considered extreme and unacceptable. This projected situation also raises concerns for increased motor vehicle accident rates as motorists grow impatient with the delay and may potentially attempt left turns onto New London Turnpike without sufficient gaps to safely accomplish the maneuver. The Traffic Impact report does not document existing accident history at relevant locations adjacent to the development as is typical for such reports.*

Response: Crash history for the most recent three years of available data has been collected at each of the study area intersections as well as the site frontage. The data is provided in the updated traffic study enclosed. The results of the crash data analysis revealed that the intersection of Sycamore Street at New London Turnpike experienced an average of one crash per year over the three year study period and only one of these crashes involved a vehicle turning left out of Sycamore Street onto New London Turnpike. No crashes resulted in a fatality. The number and severity of crashes was not considered abnormal for the volume of traffic utilizing the intersection and there was no identifiable crash pattern. Intersection sight lines and stopping sight distances at this intersection are acceptable and there is no indication based on the crash history that peak hour delays on the Sycamore Street approach are resulting in unsafe conditions. While additional peak hour queueing from the proposed development traffic may increase vehicle delay on the approach, it is not anticipated to deteriorate the safety of operations at this intersection.

Regarding the efficiency of intersection operations at the New London Turnpike/Sycamore Street intersection, the more significant delay and queue increases on the Sycamore Street approach referenced above are confined to the Saturday midday peak hour of traffic. It is important to note the following:

1. Delay and queue increases during the weekday morning peak hour, Friday afternoon peak hour and especially off peak hours are substantially less on this approach. The

Saturday midday peak hour delays and queues are not expected to be representative of typical operations during the majority of the week.

2. As noted in the previous responses above, the updated capacity analysis is very conservative in that it assumes:
    a. No internal capture/multi-use credit
    b. A 20% pass-by credit which is considerably lower than industry standard pass-by rates for grocery stores (shown to exceed 36%)
    c. A conservative trip rate for the vacant retail space
    d. No signal timing improvements at the Hebron/Sycamore intersection which are currently being contemplated by CTDOT

    Therefore, the reported delay and queue increases are unlikely to materialize to the magnitude noted above.

3. Significant infrastructure improvements are being proposed by the applicant which will improve traffic operations on the Sycamore Street approach to Hebron Avenue. This will encourage more customers to exit the site via Hebron Avenue. Additionally, if queues do develop on the Sycamore Street approach to New London Turnpike, it is likely that repeat visitors to the development site will take the path of least resistance and exit via the Hebron Avenue signal.

4. Lastly, we note that more holistic geometric improvements are needed along New London Turnpike in the vicinity of the offset intersections of Sycamore Street, Douglas Road, and the Route 17 southbound off-ramp to improve existing overall traffic operations in this area. Any improvements to the Sycamore Street intersection cannot be made without impacting operations at the adjacent closely spaced intersections with Douglas Road and the Route 17 ramps. More significant roadway improvements in this area have been the subject of past study by both the Town and CTDOT however they are beyond the scope of this land use application.

9. *The applicant has also provided revised delivery and service truck turning movement plans showing access via Hebron Avenue and departure via Linden Street to Hebron Avenue. While the access and truck movements within the site are considered less than ideal, the scheme does not create undue safety concerns. Few, if any Town roads outside of the Corporate Park can fully accommodate tractor trailer type trucks without opposing or adjacent lane encroachment. Similarly, few, if any, commercial sites can fully accommodate these vehicle types without similar on-site encroachments.*

Response: Noted.

We trust this information will be sufficient for your review and approval. Please contact us if you have any questions or require additional information.

Sincerely,

Tyler Rudolph, EIT
Transportation Engineer

Reviewed By,

Mark G. Vertucci, PE, PTOE
Vice President

Attachments: Revised Traffic Impact Study
Simtraffic Simulation Figures
Concept Plan One

cc: Mr. Evan Schwartz, Schwartz Realty Corporation, w/attachments
Mr. Allen Schwartz, Schwartz Realty Corporation, w/o attachments

FOR INFORMATION PURPOSES ONLY.

No.	DATE	DESCRIPTION		
1.			XX/XX	XX
			DESIGNER	REVIEWER

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

CITY OF STAMFORD

DRAFT CONCEPT PLAN

400 HEBRON AVENUE CHANGE IN USE

GLASTONBURY CONNECTICUT

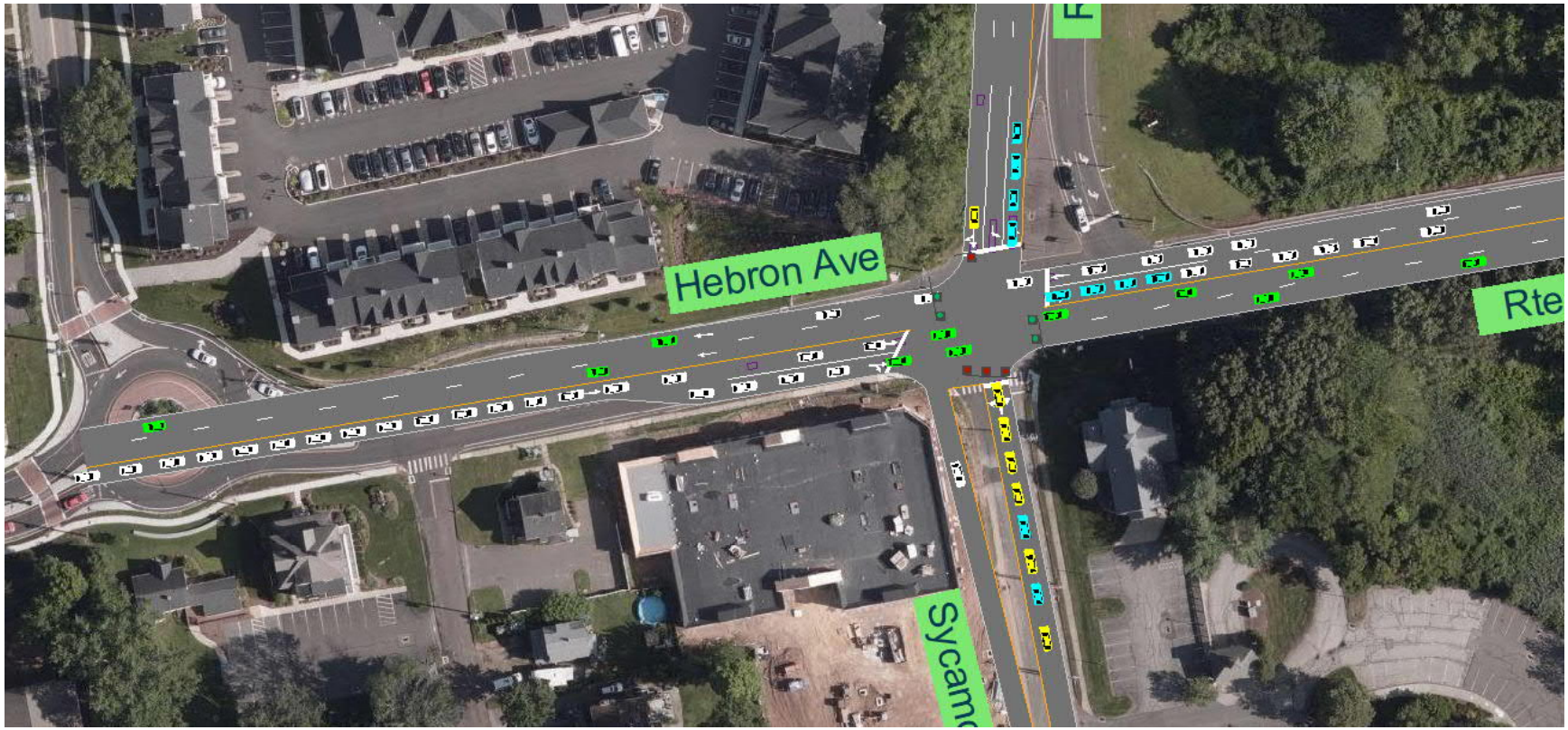
PROJ. No.: 20220036.A10
DATE: JUNE 2022

CON-01

File Path: J:\DWG\P2022\00036\A10\civil\Concepts\20220036A10_CON02.dwg Layout: CON-01 Plotted: Tue, June 07, 2022 - 2:10 PM User: trudolph
MS VIEW: LAYER STATE:
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB

Figure 7

Intersection of Hebron Avenue at Sycamore Street/Route 2 Off-Ramp
Eastbound and Northbound Approach Simulated Queue Lengths
Glastonbury, Connecticut



FUSS & O'NEILL

June 8, 2022

Mr. Daniel A. Pennington P.E.
Town Engineer/Manager of Physical Services
Town of Glastonbury, CT
2155 Main Street
Glastonbury, CT 06033

Re: Updated Traffic Impact Statement
400 Hebron Avenue Change in Use
Glastonbury, Connecticut
Fuss & O'Neill Reference No. 20220036.A10

Dear Mr. Pennington:

Fuss & O'Neill has reviewed the traffic impact of the proposed conversion of a portion of the previously approved 19,904 square foot mixed-use development at 400 Hebron Avenue to include a small-scale grocery store and retail variety store use. This statement has been prepared to document the findings of our review and is being submitted to the Town of Glastonbury in support of the Planning and Zoning Application of H374, LLC For Special Permit with Design Review.

Existing Conditions

The 19,904 square foot commercial/retail building is located on the southwest corner of the intersection of Hebron Avenue at Sycamore Street and is vacant with the exception of 2,150 square feet of retail space occupied by the Hartford Baking Company. The existing parking lot site access is provided by a single driveway located on Sycamore Street approximately 450 feet south of the intersection with Hebron Avenue.

Traffic Counts

Traffic entering and exiting the site on Sycamore Street will either originate from the intersection of Sycamore Street/Hebron Avenue/Route 2 Eastbound Off Ramp to the north of the site driveway or the intersection of Sycamore Street and New London Turnpike to the southwest of the site driveway. Consequently, these two intersections were analyzed for impacts. In order to determine existing traffic volumes at these intersections, manual turning movement traffic counts were conducted during the Friday afternoon and Saturday midday retail peak periods on May 6 and 7, 2022. The existing traffic volumes collected are depicted in Figure 1 attached.

146 Hartford Road
Manchester, CT
06040
t 860.646.2469
800.286.2469
f 860.533.5143

www.fando.com

California
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Proposed Conditions

The site was previously approved by the Town of Glastonbury for a 19,904 square foot mixed-use development. The approved development consisted of a 1,250 square foot office building, an 8,030 square foot shopping center, and 10,567 square feet for two quality restaurants. The proposed land uses include a 13,154 square foot specialty grocery store and 4,600 square feet of retail furniture store use along with the existing 2,150 square foot fast casual restaurant (Hartford Baking Company).

Site access for patrons of the site will continue to be provided via one full access driveway located on Sycamore Street. One additional full access driveway is proposed on Linden Street and a truck only entrance driveway is proposed on Hebron Avenue to provide access to a small employee only parking lot and the grocery store loading dock.

Trip Generation and Distribution

Site generated traffic for the proposed land uses was initially reviewed using existing empirical data from the Institute of Transportation Engineers (ITE) publication Trip Generation, 11th edition, 2021. This publication is an industry-accepted resource for determining trip generation. As a conservative measure, trip generation for the proposed furniture store use was calculated using a more intense retail land use code given a number of different retail uses would be permitted on this site under current zoning. Trip generation for the Friday afternoon and Saturday midday peak hours was calculated using the ITE land use code 814 (Variety Store) for the vacant store space and ITE land use code 850 (Supermarket) for the specialty grocer use. The ITE manual indicated that the proposed grocery store would generate a total of 149 trips (74 entering and 75 exiting) during the Friday afternoon peak hour and 204 trips (102 entering and 102 exiting) during the Saturday midday peak hour using the fitted curve equation. For the variety store, the ITE manual projects a total of 31 vehicle trips (16 entering and 15 exiting) during the Friday afternoon and Saturday midday peak hour of traffic using the average rate. It should be noted that the ITE manual does not provide rates for the Saturday peak hour of the generator, therefore, the Friday afternoon peak hour rates were utilized.

In order to cross check the ITE trip generation for the proposed specialty grocer, manual trip counts at similar specialty retail grocer locations in Manchester, Connecticut and Hingham, Massachusetts were conducted. The actual traffic counts at the similar locations yielded a trip generation rate of 302 trips (151 entering and 151 exiting) during the Friday afternoon peak hour and 412 trips (206 entering and 206 exiting) during the Saturday midday peak hour. Consequently, these higher specialty grocery store trip rates were used in our analysis.

Overall, the development conversion consisting of a 13,154 square foot grocery store and 4,600 square foot variety retail store use is expected to generate a total of 333 vehicle trips (167 entering, 166 exiting) during the Friday afternoon peak hour and a total of 443 vehicle trips (222 entering, 221 exiting) during the Saturday midday peak hour. Trip generation for the existing Hartford Baking Company was not calculated as the trips generated by this land use were accounted for within the conducted traffic counts.

It should be noted that the grocery store and retail variety store land uses rely heavily on "pass-by" trips. These types of business typically generate a significant proportion of their driveway traffic volumes by attracting vehicles from the existing traffic already using the transportation network in the vicinity of the site. This amount of traffic which enters and leaves the proposed project not as a primary origin or destination but as an intermediate stop in a trip made for some other purpose is defined as the "pass-by" trip percentage. This percentage is applied to the total trip generation of the proposed project to calculate the total amount of new traffic that will be added to the adjacent transportation facilities as a result of the development.

Pass-by trips are attracted from traffic passing the site on an adjacent roadway with direct access to the generator. Pass-by trip percentages reported in the ITE Trip Generation Handbook for site impact assessment of a grocery store have been shown to exceed 36% of the total site generated traffic during the peak hours. This study utilized a conservative retail pass-by credit of 20% in the analysis in accordance with typical CTDOT methodology.

As a result of the aforementioned pass-by trips, the proposed development uses are expected to generate a net total of 267 new trips (134 entering, 133 exiting) during the Friday afternoon peak hour and 355 new trips (178 entering, 177 exiting) during the afternoon peak hour. A summary of peak hour trip generation for the proposed development is provided in ***Table 1*** on the following page.

Additionally, multi-use developments such as the proposed development frequently generate trips for patrons who visit multiple businesses within the site. The trips of these patrons who visit multiple uses within the development are defined as "internal capture" trips. In accordance with standard CTDOT methodology, a 10 percent trip reduction is typically applied to the site generated traffic volumes for these types of developments in order to account for captured trips as well as anticipated multi-modal trips to the site via transit, bicycle, or walking. The analysis in this study did not take any credit for internal captured trips or pedestrian, bicycle, or transit trips to the site therefore the results presented in this study should be considered conservative.

Table 1
Site Generated Traffic Volumes
400 Hebron Avenue
Glastonbury, Connecticut

*13,307 sq. ft. Grocery Store	Trips Entering	Trips Exiting	Total Trips
Friday Afternoon Peak Hour	151	151	302
Saturday Midday Peak Hour	206	206	412
4,600 sq. ft. Variety Store			
Friday Afternoon Peak Hour	16	15	31
**Saturday Midday Peak Hour	16	15	31
20% Pass-By			
Friday Afternoon Peak Hour	-33	-33	-66
Saturday Midday Peak Hour	-44	-44	-88
Total New Trips			
Friday Afternoon Peak Hour	134	133	267
Saturday Midday Peak Hour	178	177	355

Notes:

*- Trip generation based on similar specialty grocery store traffic counts conducted in Hingham, MA and Manchester, CT in May 2022.

**- Trip generation for Saturday peak hour is not provided in the ITE trip generation manual. Therefore, the weekday afternoon peak hour trip rates were also utilized for the Saturday peak hour

As a point of comparison, *Table 2* on the following page presents a summary of the trip generation rates for the 2018 previously approved development at 400 Hebron Avenue. In comparison, the currently proposed land use conversion is anticipated to generate 188 more total trips (86 more entering, 102 more exiting) during the Friday afternoon peak hour and 252 more total trips (120 more entering, 132 more exiting) during the Saturday midday peak hour.

Table 2
Site Generated Traffic Volume Comparison
Current Proposed Development vs. Originally Proposed Development
400 Hebron Avenue
Glastonbury, Connecticut

1,250 sq. ft. Small Office Building	Trips Entering	Trips Exiting	Total Trips
Friday Afternoon Peak Hour	1	2	3
Saturday Midday Peak Hour	0	0	0
8,030 sq. ft. Shopping Center			
Friday Afternoon Peak Hour	13	14	27
Saturday Midday Peak Hour	18	17	35
10,567 sq. ft. Quality Restaurant			
Friday Afternoon Peak Hour	55	27	82
Saturday Midday Peak Hour	67	46	113
10% Internal Capture/TOD			
Friday Afternoon Peak Hour	-7	-4	-11
Saturday Midday Peak Hour	-9	-6	-15
20% Pass-By			
Friday Afternoon Peak Hour	-14	-8	-22
Saturday Midday Peak Hour	-18	-12	-30
Originally Proposed Total New Trips			
Friday Afternoon Peak Hour	48	31	79
Saturday Midday Peak Hour	58	45	103
Net Change in New Trips			
Friday Afternoon Peak Hour	+86	+102	+188
Saturday Midday Peak Hour	+120	+132	+252

Notes: Trip generation based on Rate per Land use Code 712 (Small Office Building), 820 (Shopping Center), and 931 (Quality Restaurant), as published in *Trip Generation,* 10th Edition, 2017.

The additional site generated traffic distribution was determined based on the site driveway location as well as the existing traffic volume distributions within the study area. A review of the existing traffic volume distributions for traffic exiting Sycamore Street revealed the following average distributions:

- 18 percent of the trips depart to the west on Hebron Avenue
- 42 percent of the trips depart to the east on Hebron Avenue
- 16 percent of the trips depart to the north on New London Turnpike
- 24 percent of the trips depart to the south on New London Turnpike

These distributions were then adjusted to account for the site driveway's proximity to the signalized intersection of Hebron Avenue at Sycamore Street, the off-site improvements proposed on the Sycamore Street northbound approach to Hebron Avenue, and projected delays at the intersection of New London Turnpike at Sycamore Street to yield the following site generated traffic distributions:

- 10 percent of the trips arrive from the north on Route 2
- 45 percent arrive and 50 percent depart from/to the east on Route 94 (Hebron Avenue)
- 20 percent arrive and 25 percent depart from/to the west on Hebron Avenue
- 10 percent arrive/depart to/from the north on New London Turnpike
- 15 percent arrive/depart to/from the south on New London Turnpike

While existing traffic volumes revealed that 40 percent of the existing Sycamore Street traffic departs to New London Turnpike, a review of the existing land uses on Sycamore Street reveals several medium sized developments within close proximity to the intersection of New London Turnpike at Sycamore Street that would concentrate their trips at this intersection. Additionally, the site driveway is proposed to be approximately 450 feet south of the intersection with Hebron Avenue and the Route 2 Off-Ramp, therefore it is unlikely patrons of the site heading west towards the Town Center will travel south on Sycamore Street to head back north on New London Turnpike. Additionally, the proposed road widening on the Sycamore Street approach to Hebron Avenue, which is discussed later in this letter, will provide more efficient operations at this signalized intersection and encourage more traffic to exit the north end of Sycamore Street. Given these factors and peak hour delays which are experienced on the Sycamore Street approach to New London Turnpike, 25 percent of the site

generated traffic is anticipated from Sycamore Street to the south while 75 percent of the traffic is anticipated from the north (Hebron Avenue).

Crash Analysis

Crash data was gathered from CTDOT via the University of Connecticut Crash Repository for the following intersections:

- Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Eastbound Off-Ramp
- Site Driveway at Sycamore Street
- New London Turnpike at Sycamore Street

The records were gathered for the most recent three years of available data, 2019 through 2021. A summary of the crash data per intersection is provided in *Table 3*, below. Copies of the crash data records can be found, attached.

Table 3

Intersection Crash Data Summary
400 Hebron Avenue
Glastonbury, Connecticut

Intersections/Road Segments	Crashes Per Year			
	2019	2020	2021	Average/Year
Route 94 (Hebron Avenue) at Sycamore Street/ Route 2 Eastbound Off-Ramp	13*	6	8	9
Site Driveway at Sycamore Street	0	0	0	0
New London Turnpike at Sycamore Street	1	0	2	1

Notes: *Values indicated are number of crashes within 200 feet of each intersection during time period shown.
Data provided by the Connecticut Department of Transportation via the UConn Crash Data Repository.

The intersection of Route 94 (Hebron Avenue) at Sycamore Street/Route2 Eastbound Off-Ramp experienced an average of nine crashes per year. The majority of these crashes (12) were front to rear collisions. Additionally, the intersection experienced six angle crashes, four same direction sideswipes,

two fixed object crashes, one front to front crash, one animal crash, and one rear to side crash. Of the total crashes reported, six resulted in non-fatal injuries while the remainder were property damage only collisions.

The intersection of the Site Driveway at Sycamore Street did not experience any crashes during the three-year study period.

The intersection of New London Turnpike at Sycamore Street experienced an average of only one crash per year over the three year study period. The intersection experienced one angle collision, one front to rear collision, and one fixed object collision. Of the total crashes reported, one resulted in a non-fatal injury while the remainder were property damage only collisions. The non-fatal injury occurred during dark-lighted conditions on a dry roadway and involved a driver crashing into a light/utility pole. Only one of the collisions involved a vehicle turning out of Sycamore Street and there were no identifiable crash patterns at this intersection.

Overall, the frequency and severity of the reported crashes are not considered abnormal for the volume of traffic and classification of roadways within the study area.

Intersection Capacity Analysis

The site generated traffic, along with the pass-by traffic, from the proposed land use change was added to the 2022 existing traffic volumes to obtain the 2022 combined traffic volumes. The site generated traffic distributions, site generated traffic volumes, and combined volumes are depicted in Figures 2 through 6, attached.

Capacity analyses for both signalized and unsignalized intersections were conducted using Synchro Professional Software, version 10.0.

In discussing intersection capacity analyses results, two terms are used to describe the operating condition of the road or intersection. These two terms are volume to capacity ratio (v/c) and level of service (LOS).

The v/c ratio is a ratio of the volume of traffic using an intersection to the total capacity of the intersection (the maximum number of vehicles that can utilize the intersection during an hour). The v/c ratio can be used to describe the percentage of capacity utilized by a single intersection movement, a combination of movements, an entire intersection approach, or the intersection as a whole.

LOS is a measure of the delay experienced by stopped vehicles at an intersection. LOS is rated on a scale from A to F, with A describing a condition of very low delay (less than 10 seconds per vehicle), and F describing a condition where delays will exceed 50 seconds per vehicle for unsignalized intersections and 80 seconds per vehicle for signalized intersections. Delay is described as a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Therefore, intersections with longer delay times are less acceptable to most drivers.

LOS is generally used to describe the operation (based on delay time) of both signalized and unsignalized intersections, while v/c ratio is applied to signalized intersections only. These definitions for v/c ratio and LOS, as well as the methodology for conducting signalized and unsignalized intersection capacity analyses, are taken from the "Highway Capacity Manual 6th Edition" published by the Transportation Research Board.

In discussing two way stop controlled unsignalized intersection capacity analyses, LOS is used to provide a description of the delay and operational characteristics of the turns from the minor street (stop sign controlled) to the major street, and turns from the major street to the minor street. Through vehicles are not delayed by the minor street and do not experience delay, therefore they are not rated with a level of service.

Using the above referenced methodologies, Friday afternoon and Saturday midday peak hour capacity analyses were conducted at the signalized intersection of Hebron Avenue at Sycamore Street/Route 2 Eastbound Off-Ramp.

Friday afternoon and Saturday midday peak hour capacity analyses were also conducted at the unsignalized intersections of Sycamore Street at the Site Driveway and Sycamore Street at New London Turnpike.

Tables No. 4 and 5 attached presents a summary of the levels of service at the signalized and unsignalized intersections, for both Existing and Combined Conditions traffic volumes. Copies of the analysis worksheets can also be found attached.

The determination of the traffic impact from the proposed land use conversion is made through a comparison of the Existing Conditions LOS (without the proposed conversion) versus the Combined Conditions LOS (with the proposed conversion).

The signalized intersection of Route 94 (Hebron Avenue) at Route 2 EB Off-Ramp/Sycamore Street is expected to operate acceptably at LOS C or D under existing and combined conditions, respectively, during the Friday afternoon peak hour and the Saturday midday peak hour.

At the unsignalized intersection of the Site Driveway at Sycamore Street the northbound Sycamore Street approach is expected to operate efficiently at LOS A under existing and combined conditions during the Friday afternoon and Saturday midday peak hours. The eastbound site driveway approach is expected to operate acceptably at LOS B or C during the Friday afternoon and Saturday midday peak hours, respectively, under existing and combined conditions.

At the unsignalized intersection of New London Turnpike at Sycamore Street the eastbound New London Turnpike approach is expected to operate efficiently at LOS A or B during the Friday afternoon and Saturday midday peak hours during the existing and combined conditions. The southbound Sycamore Street approach operates at LOS E or F with higher peak hour delays during the Friday afternoon and Saturday midday peak hours under both existing and combined conditions. It should be noted that these more significant delays are an existing condition and are generally focused on the commuter and retail peak periods. This approach operates more efficiently during off peak hours.

Queue Analysis

Background and Combined Conditions 95th percentile (design) queue lengths were reviewed at each intersection in the study area. The 95th percentile (design) vehicle queue lengths represent the maximum queue lengths that can be expected at each of the critical approach lanes of the study area intersections. The queue lengths are provided in the Synchro capacity analysis worksheets, which are attached. *Tables 6 and 7* attached provide a summary of the queue lengths for the critical lanes at each intersection.

At the intersection of Hebron Avenue at Sycamore Street and the Route 2 Eastbound Off Ramp, the analysis revealed peak hour queue length increases of two vehicle lengths or less on the Hebron Avenue eastbound and Route 2 off ramp southbound approaches and approximately seven vehicle lengths on the westbound approach. Ample lane storage is available to accommodate the queue length increase on the westbound approach. On the Sycamore Street northbound approach, existing queue lengths increase by up to 12 vehicle lengths as a result of the proposed development traffic. Therefore, it is recommended that the northbound approach of Sycamore Street be widened to provide a second turn lane with the lanes striped as a shared left/right lane and an exclusive right turn only lane.

Upon completion of the proposed road widening, the maximum back of queue lengths on the northbound Sycamore Street approach will be significantly reduced resulting in Friday afternoon peak hour queue length increases of only two vehicle lengths as a result of the proposed development traffic.

At the intersection of Sycamore Street and the site driveway all approaches are expected to experience a queue length increase of four vehicles or less. All approaches maintain sufficient storage length to accommodate the increase in queue length.

At the intersection of Sycamore Street and New London Turnpike, the eastbound New London Turnpike approach to Sycamore Street experiences minimal queueing of one vehicle length or less in the existing condition with no change in the combined conditions. The southbound Sycamore Street approach is expected to experience a maximum queue length increase of two to three vehicles in the Friday afternoon peak hour and up to nine vehicles during the Saturday midday peak hour. These queues are substantially lower during off peak periods.

Autoturn Analysis

The parking area providing access to the shopping center delivery dock and garbage area on the west side of the building was designed utilizing a WB-62, a tractor trailer with a 48 foot trailer, and a garbage truck. The analysis determined that the WB-62 and garbage truck can safely maneuver through the new curb cut entrance on Hebron Avenue and through the parking area to the loading dock/garbage area without encroachment on Hebron Avenue or Linden Street. See attached *Auto-01to Auto-05* Plans.

The presence of a westbound left turn lane and two through lanes on Hebron Avenue will ensure that a tractor trailer waiting to turn into the site will not block through traffic on Hebron Avenue. Tractor trailers and garbage trucks will exit onto Linden Street and turn left onto Hebron Avenue to access House Street (and ultimately Route 2) via the adjacent roundabout.

It should be noted that truck deliveries to the site and garbage pickup will arrive and depart during off peak hours and therefore have minimal impact on the adjacent road network.

Conclusions

The purpose of preparing this Traffic Impact Statement was to identify the impact of the expected traffic generation by the proposed development conversion.

Intersection capacity analysis revealed that the intersection of Route 94 (Hebron Avenue) at Route 2 EB Off-Ramp/Sycamore Street will operate acceptably at LOS C during the Friday afternoon and Saturday midday peak hours under existing conditions and will decrease to LOS D under combined conditions. Upon completion of the proposed road widening on Sycamore Street, the LOS can be restored to LOS C under combined conditions. It should be noted that the Connecticut Department of Transportation is in the process of analyzing and retiming all coordinated closed loop signal

systems within District 1, including the intersection of Hebron Avenue at Route 2 Off-Ramp/Sycamore Street and nearby signals to the east on Hebron Avenue. This intersection will be reviewed for allocation of additional green time to the Sycamore Street phase, allowing for potentially improved operations on this approach.

At the intersection of the Site Driveway at Sycamore Street, intersection capacity analysis revealed that the northbound Sycamore Street approach to the intersection will operate efficiently at LOS A during the Friday afternoon and Saturday midday peak hours under combined conditions. The eastbound site driveway approach will operate acceptably at LOS B or C during the Friday afternoon and Saturday midday peak hours, respectively.

At the intersection of New London Turnpike at Sycamore Street the eastbound New London Turnpike approach is expected to operate efficiently at LOS A or B during the Friday afternoon and Saturday midday peak hours under existing conditions and combined conditions. The southbound Sycamore Street approach is anticipated to operate with higher peak hour delays during the Friday afternoon and Saturday midday peak hours under both existing and combined conditions. It should be noted that these more significant delays are an existing condition and are generally focused on the commuter and retail peak periods. This approach operates more efficiently during off peak hours.

Queue analysis at the intersection of Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Off-Ramp during the Friday afternoon and the Saturday midday peak hours revealed no significant queue length increases on the Hebron Avenue approaches however queues on the Sycamore Street northbound approach experience an increase of up to 12 vehicle lengths as a result of the proposed development traffic. Therefore, it is recommended that the northbound approach of Sycamore Street be widened to provide a second turn lane with the lanes striped as a shared left/right lane and an exclusive right turn only lane. Upon completion of the proposed road widening and CTDOT signal timing improvements, the maximum back of queue lengths on the northbound Sycamore Street approach will be restored closer to their existing lengths during the Friday afternoon peak hour.

At the intersection of Sycamore Street and the site driveway queue length increases of four vehicles or less are expected at each approach to the intersection during the Friday afternoon and Saturday midday peak hours.

At the intersection of Sycamore Street and New London Turnpike, minimal queueing is experienced on the New London Turnpike approaches to the intersection while the southbound Sycamore Street approach is expected to experience a maximum queue length increase of two to three vehicles in the Friday afternoon peak hour and up to nine vehicles during the Saturday midday peak hour. These queues are substantially lower during off peak periods.

Review of the most recent three years of available crash data provided by the University of Connecticut Crash Data Repository indicated that the type and frequency of crashes reported at the study area intersections is not abnormal for the traffic volumes and geometric characteristics of the roadway.

Autoturn analysis revealed that the proposed employee parking and loading dock area on Linden Street can safely accommodate a WB-62 truck and garbage truck without either vehicle encroaching on Hebron Avenue or Linden Street to complete the maneuver to the loading dock or dumpster area.

The following improvements are recommended as part of this project to improve traffic operations within the study area:

- Widen Sycamore Street to provide an additional northbound approach lane at the intersection with Hebron Avenue at Route 2 Off-Ramp/Sycamore Street. Stripe the two approach lanes as a shared left/right lane and an exclusive right turn only lane.
- Coordinate with CTDOT to optimize signal timings at the Hebron Avenue at Route 2 Off-Ramp/Sycamore Street intersection during their ongoing District wide closed loop signal system retiming project.

It is the professional opinion of Fuss & O'Neill that the proposed development conversion, upon implementation of the above recommendations, will not have a significant impact to traffic operations or safety within the study area.

Sincerely,

Mark G. Vertucci, PE, PTOE
Vice President

Table 4

Signalized Intersection Level of Service Summary
400 Hebron Avenue
Glastonbury, Connecticut

Signalized Intersections	2022 Friday Afternoon Peak Hour			2022 Saturday Midday Peak Hour		
	Existing	Combined	Combined Improved**	Existing	Combined	Combined Improved **
Rte. 94 (Hebron Ave) at Sycamore St/Rte. 2 EB Off-Ramp	25.6/LOS C*	43.5/LOS D	32.5/LOS C	21.3/LOS C	38.4/LOS D	28.9/LOS C

*Values indicated are intersection delay/LOS

** Denotes intersection delay and LOS with the addition of a northbound left/right turn lane at the intersection of Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Off-Ramp.

Table 5

Unsignalized Intersection Level of Service Summary
400 Hebron Avenue
Glastonbury, Connecticut

Unsignalized Intersections	2022 Friday Afternoon Peak Hour		2022 Saturday Midday Peak Hour	
	Existing	Combined	Existing	Combined
Site Driveway at Sycamore Street				
Eastbound Approach	N/A	LOS B	N/A	LOS C
Northbound Approach	N/A	LOS A	N/A	LOS A
New London Turnpike at Sycamore Street				
Eastbound Approach	LOS A	LOS A	LOS A	LOS B
Southbound Approach	LOS E	LOS F	LOS F	LOS F

*Values indicated are intersection approach delay

Table 6
Friday Afternoon Peak Hour Queue Length Summary
400 Hebron Avenue
Glastonbury, Connecticut

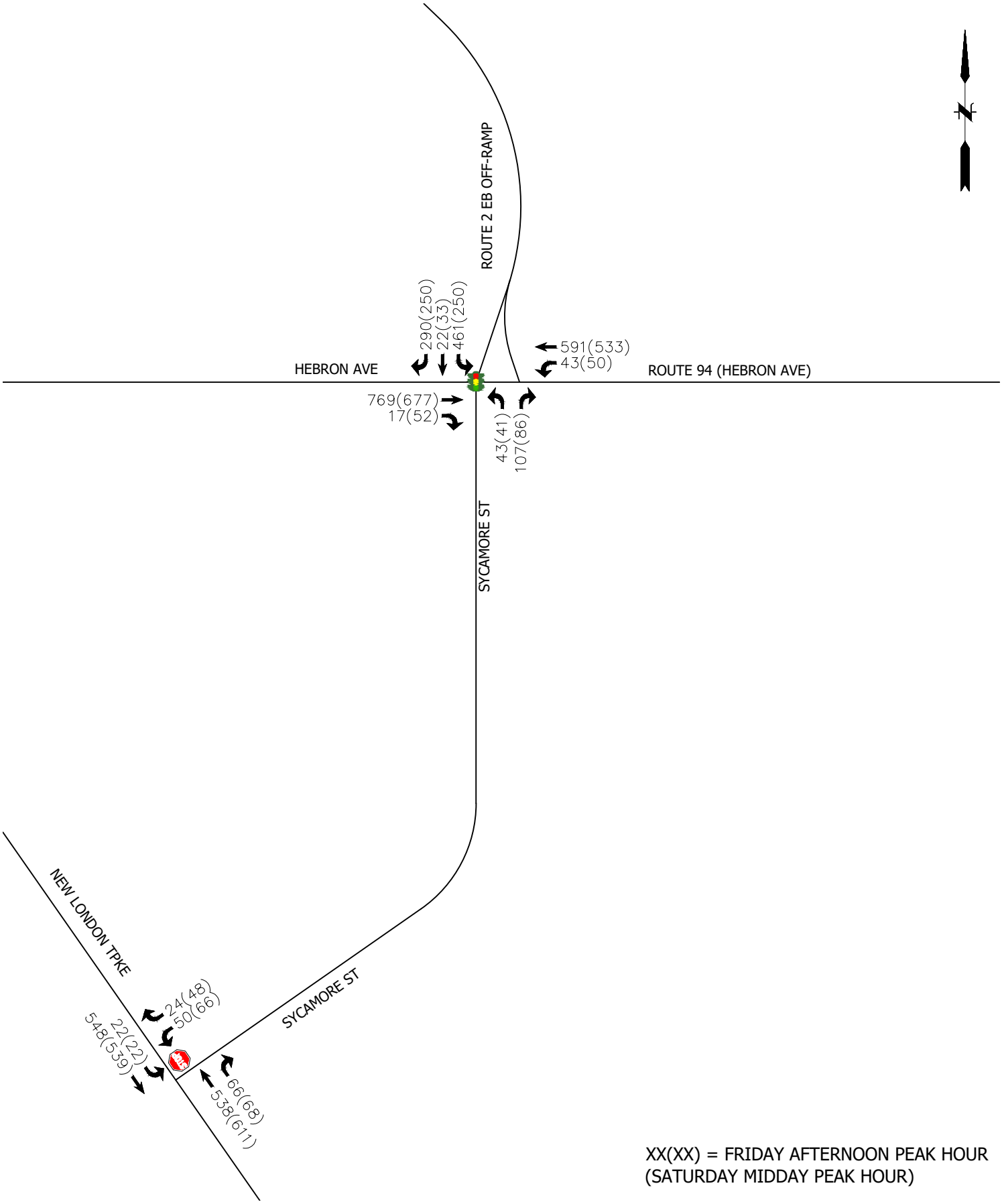
Intersection	Approach Lane	2022 Existing Queue (Feet)	2022 Combined Queue (Feet)	2022 Combined Improved Queue* (feet)	Available Storage (Feet)
Rte. 94 (Hebron Ave) at Sycamore St/Rte. 2 EB Off-Ramp	EB Approach	390	415	415	400
	WB Approach	220	360	355	680
	NB Left/Right	170	410	220	>1,000
	NB Right	N/A	N/A	210	225
	SB Left	170	170	170	400
	SB Through/Right	110	165	165	>1,000
Site Driveway at Sycamore Street	EB Approach	N/A	40	N/A	125
	NB Approach	N/A	5	N/A	>1,000
New London Turnpike at Sycamore Street	EB Approach	5	5	N/A	>1,000
	SB Approach	55	125	N/A	>1,000

NOTE: Values indicated represent 95th percentile (design) vehicle queue lengths. Values are rounded to the nearest 5 feet.
* Denotes intersection delay and LOS with the addition of a northbound left/right turn lane at the intersection of Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Off-Ramp.

Table 7
Saturday Midday Peak Hour Queue Length Summary
400 Hebron Avenue
Glastonbury, Connecticut

Intersection	Approach Lane	2022 Existing Queue (Feet)	2022 Combined Queue (Feet)	2022 Combined Improved Queue* (feet)	Available Storage (Feet)
Rte. 94 (Hebron Ave) at Sycamore St/Rte. 2 EB Off-Ramp	EB Approach	320	370	370	400
	WB Approach	180	335	330	680
	NB Left/Right	125	415	210	>1,000
	NB Right	N/A	N/A	195	225
	SB Left	105	100	100	400
	SB Through/Right	90	140	140	>1,000
Site Driveway at Sycamore Street	EB Approach	N/A	80	N/A	125
	NB Approach	N/A	5	N/A	>1,000
New London Turnpike at Sycamore Street	WB Approach	5	5	N/A	>1,000
	SB Approach	170	375	N/A	>1,000

NOTE: Values indicated represent 95th percentile (design) vehicle queue lengths. Values are rounded to the nearest 5 feet.
* Denotes intersection delay and LOS with the addition of a northbound left/right turn lane at the intersection of Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Off-Ramp.

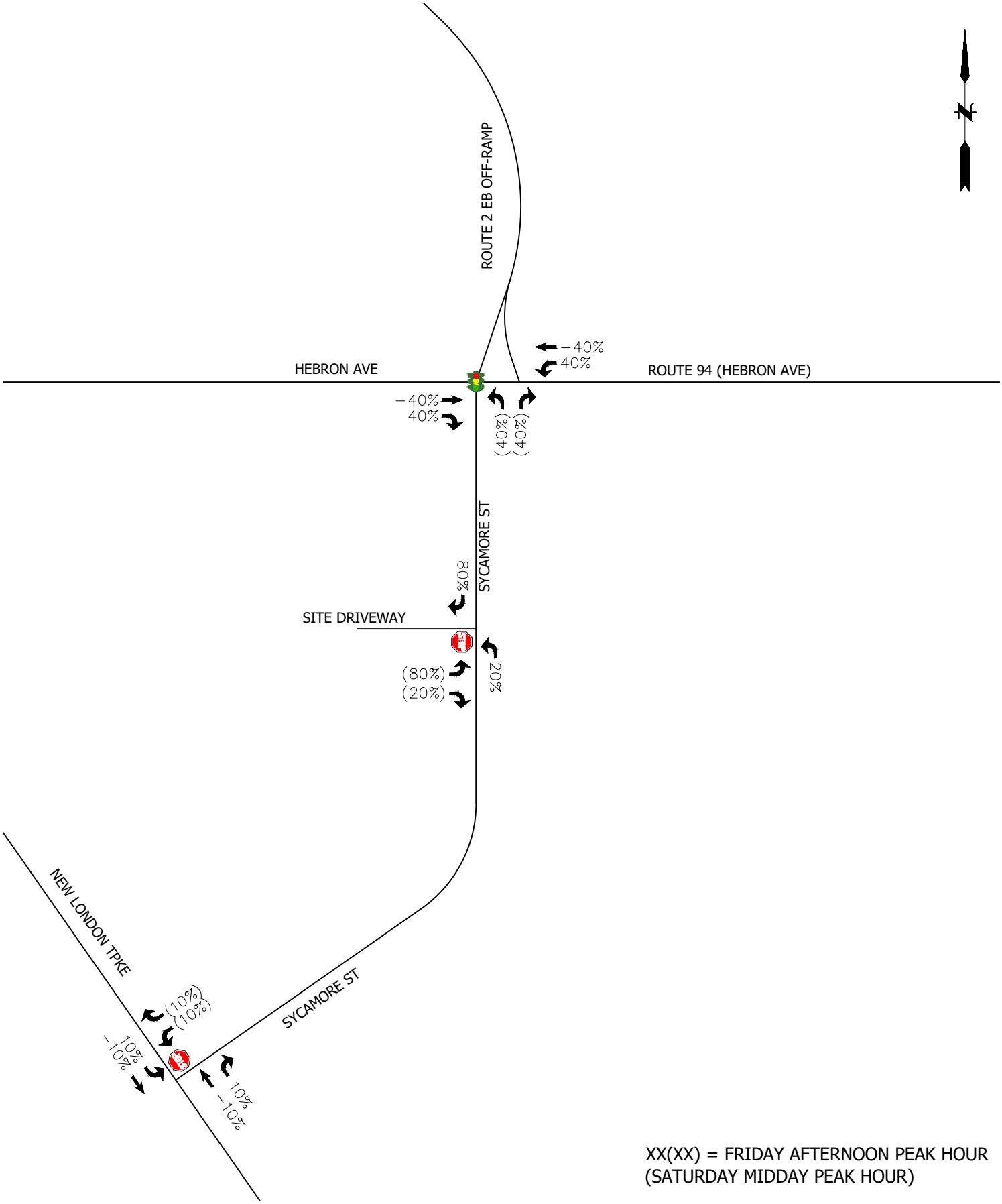


XX(XX) = FRIDAY AFTERNOON PEAK HOUR
(SATURDAY MIDDAY PEAK HOUR)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 1: 2022 EXISTING TRAFFIC VOLUMES

PROJ. NO: 20220036.A10 | 400 HEBRON AVENUE | JUNE 2022

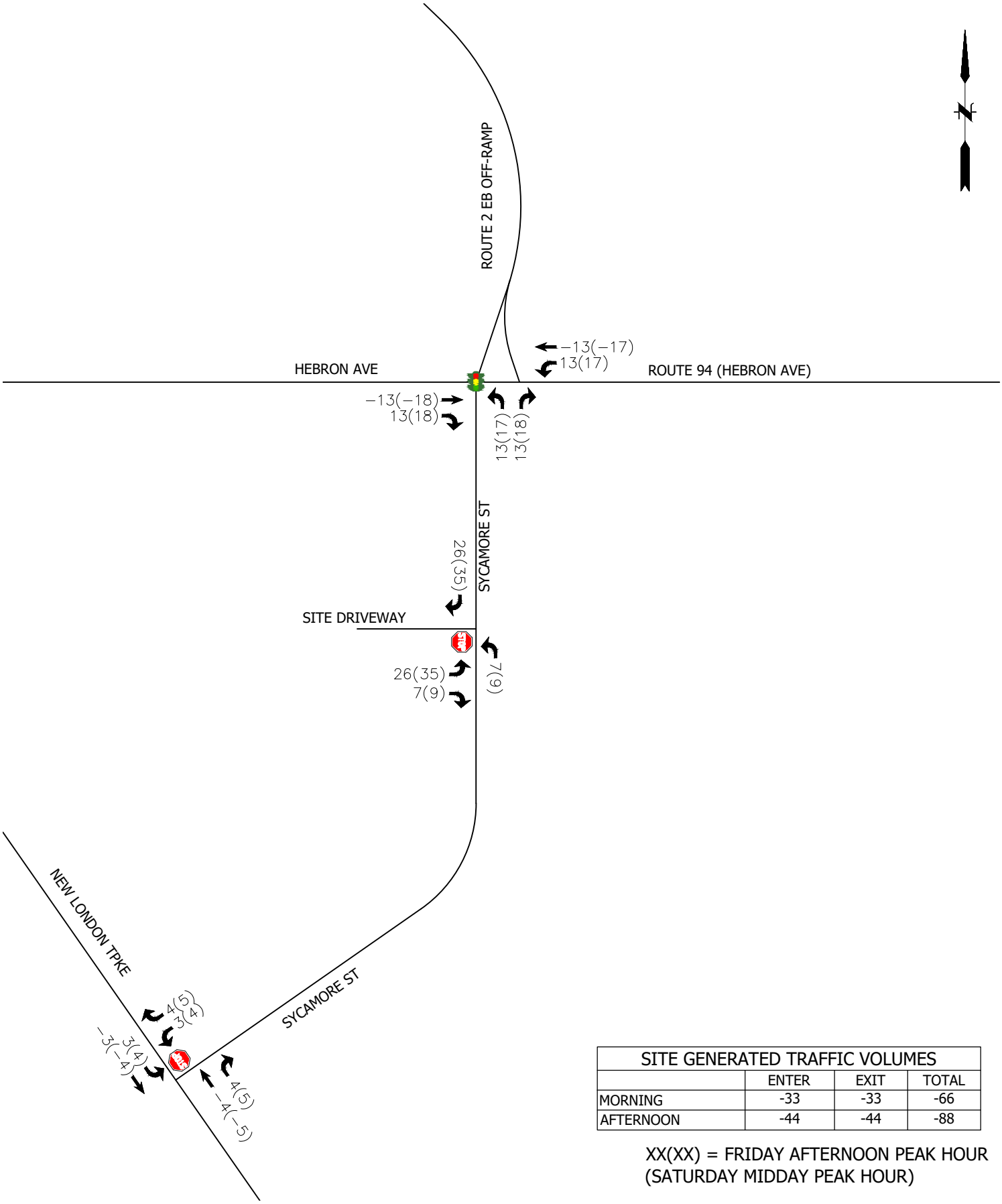


XX(XX) = FRIDAY AFTERNOON PEAK HOUR
(SATURDAY MIDDAY PEAK HOUR)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 2: SITE GENERATED TRAFFIC PASS-BY DISTRIBUTION

PROJ. NO: 20220036.A10 | 400 HEBRON AVENUE | JUNE 2022



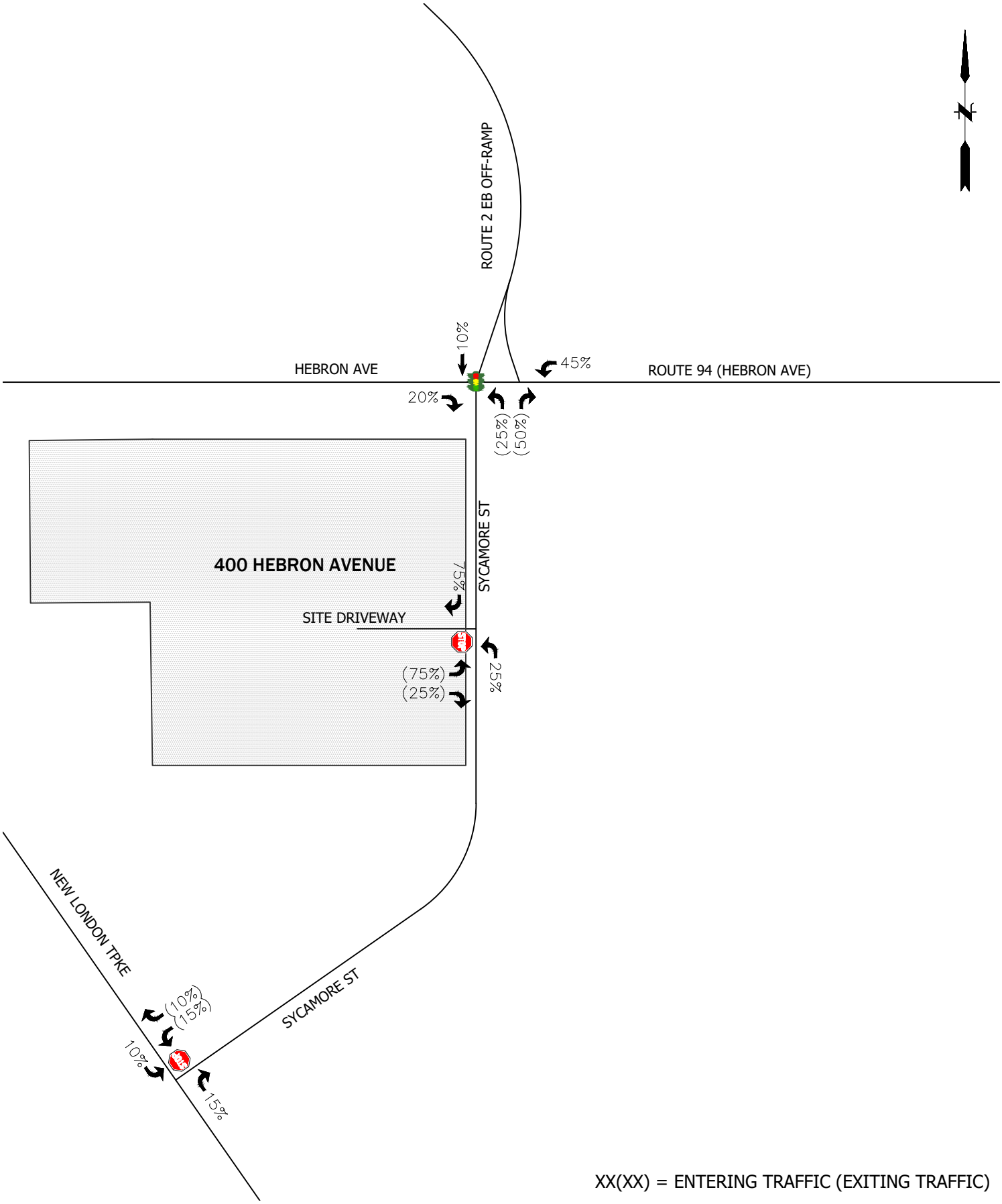
SITE GENERATED TRAFFIC VOLUMES			
	ENTER	EXIT	TOTAL
MORNING	-33	-33	-66
AFTERNOON	-44	-44	-88

XX(XX) = FRIDAY AFTERNOON PEAK HOUR
(SATURDAY MIDDAY PEAK HOUR)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 3: SITE GENERATED TRAFFIC PASS-BY VOLUMES

PROJ. NO: 20220036.A10 400 HEBRON AVENUE JUNE 2022

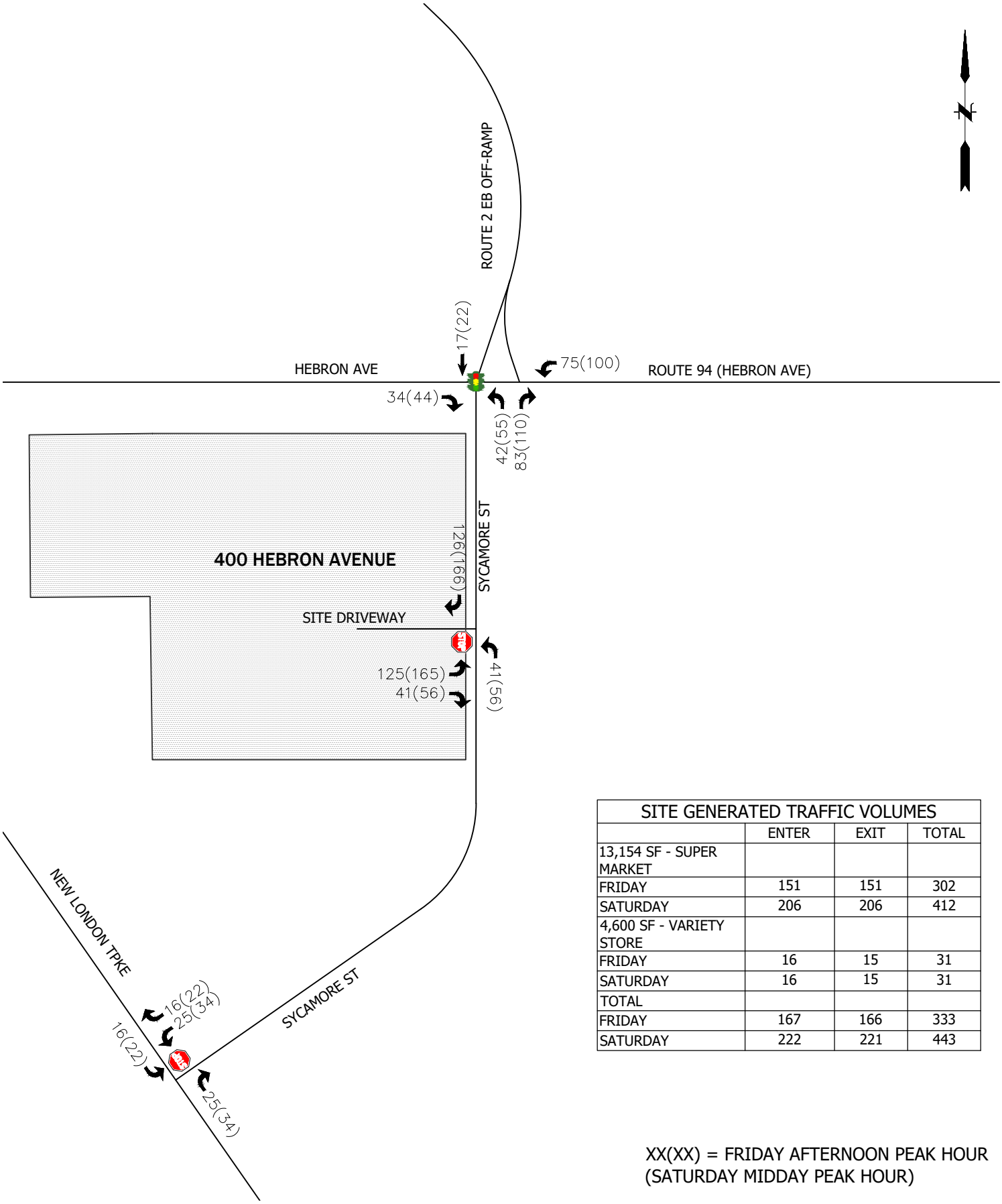


XX(XX) = ENTERING TRAFFIC (EXITING TRAFFIC)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 4: SITE GENERATED TRAFFIC DISTRIBUTION

PROJ. NO: 20220036.A10 | 400 HEBRON AVENUE | JUNE 2022



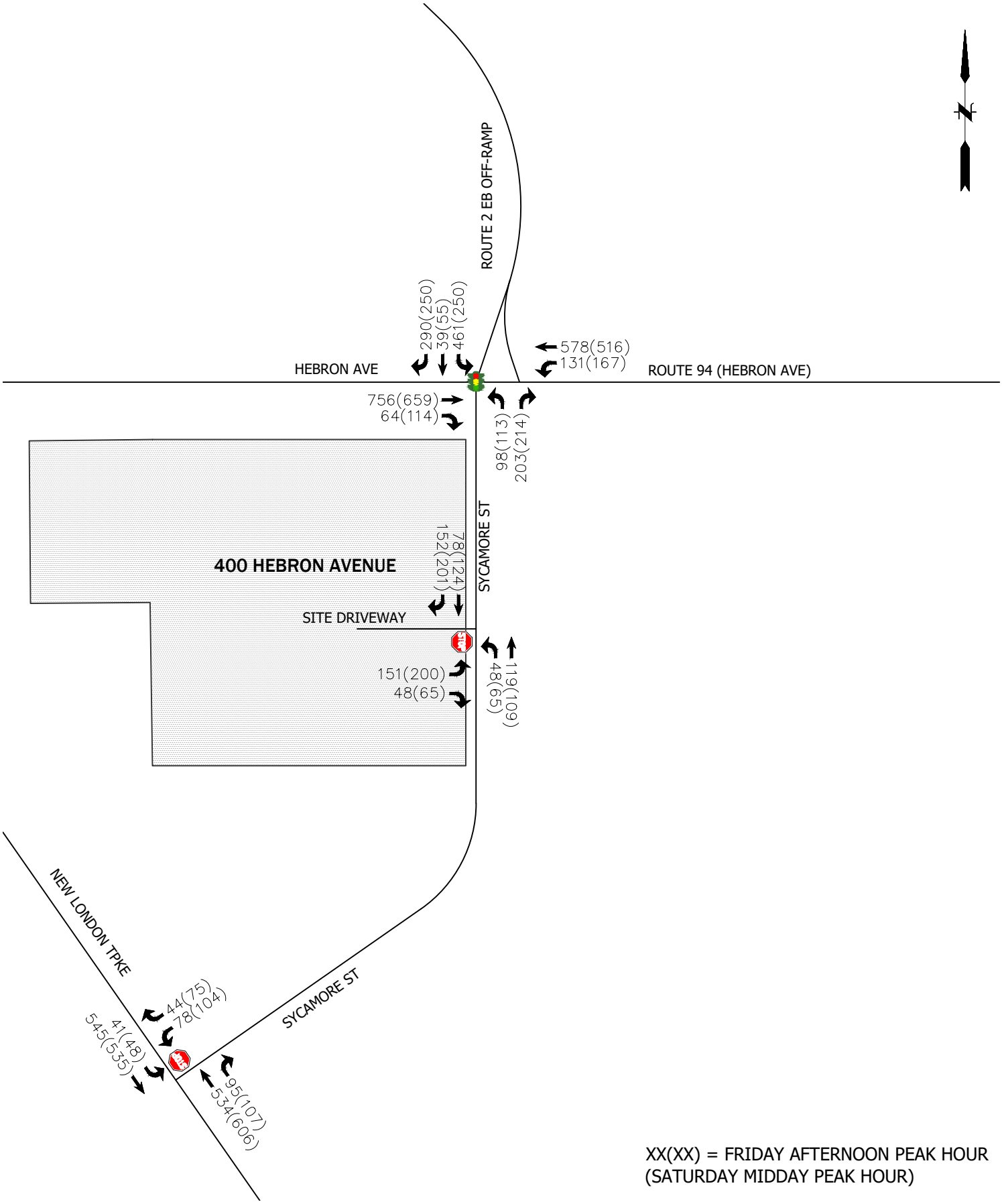
SITE GENERATED TRAFFIC VOLUMES			
	ENTER	EXIT	TOTAL
13,154 SF - SUPER MARKET			
FRIDAY	151	151	302
SATURDAY	206	206	412
4,600 SF - VARIETY STORE			
FRIDAY	16	15	31
SATURDAY	16	15	31
TOTAL			
FRIDAY	167	166	333
SATURDAY	222	221	443

XX(XX) = FRIDAY AFTERNOON PEAK HOUR
(SATURDAY MIDDAY PEAK HOUR)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 5: SITE GENERATED TRAFFIC VOLUMES

PROJ. NO: 20220036.A10 400 HEBRON AVENUE JUNE 2022

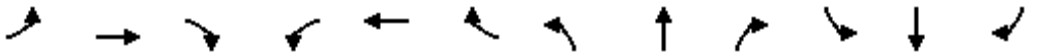


XX(XX) = FRIDAY AFTERNOON PEAK HOUR
(SATURDAY MIDDAY PEAK HOUR)

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

FIGURE 6: 2022 COMBINED TRAFFIC VOLUMES

PROJ. NO: 20220036.A10 | 400 HEBRON AVENUE | JUNE 2022



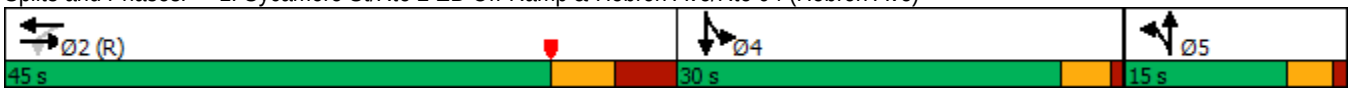
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	769	17	43	591	0	43	0	107	461	22	290
Future Volume (vph)	0	769	17	43	591	0	43	0	107	461	22	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	16	12	12	12	12
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.997						0.904			0.861	
Flt Protected					0.997			0.986		0.950		
Satd. Flow (prot)	0	2690	0	0	3599	0	0	1892	0	3467	1634	0
Flt Permitted					0.730			0.986		0.950		
Satd. Flow (perm)	0	2690	0	0	2635	0	0	1892	0	3467	1634	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		2									261	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			799			772			538	
Travel Time (s)		5.3			18.2			17.5			12.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Adj. Flow (vph)	0	827	18	46	635	0	46	0	115	496	24	312
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	845	0	0	681	0	0	161	0	496	336	0
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5		4	4	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)		13.5		13.5	13.5		9.1	9.1		20.3	20.3	
Total Split (s)		45.0		45.0	45.0		15.0	15.0		30.0	30.0	
Total Split (%)		50.0%		50.0%	50.0%		16.7%	16.7%		33.3%	33.3%	
Maximum Green (s)		36.5		36.5	36.5		10.9	10.9		25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0		3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1		4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		43.1			43.1			11.3		18.7	18.7	
Actuated g/C Ratio		0.48			0.48			0.13		0.21	0.21	
v/c Ratio		0.66			0.54			0.68		0.69	0.62	
Control Delay		22.3			19.9			52.8		37.7	12.8	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		22.3			19.9			52.8		37.7	12.8	
LOS		C			B			D		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		22.3			19.9			52.8			27.6	
Approach LOS		C			B			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 88.6%		ICU Level of Service E	
Analysis Period (min) 15			

* User Entered Value

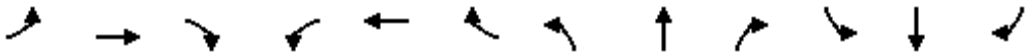
Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	845	681	161	496	336
v/c Ratio	0.66	0.54	0.68	0.69	0.62
Control Delay	22.3	19.9	52.8	37.7	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	19.9	52.8	37.7	12.8
Queue Length 50th (ft)	254	141	88	134	36
Queue Length 95th (ft)	388	220	#169	170	108
Internal Link Dist (ft)	154	719	692		458
Turn Bay Length (ft)					
Base Capacity (vph)	1290	1262	252	990	653
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.54	0.64	0.50	0.51

Intersection Summary

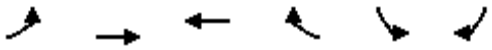
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	769	17	43	591	0	43	0	107	461	22	290
Future Volume (vph)	0	769	17	43	591	0	43	0	107	461	22	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	16	12	12	12	12
Total Lost time (s)		8.5			8.5			4.1		4.3	4.3	
Lane Util. Factor		*0.71			0.95			1.00		0.97	1.00	
Frt		1.00			1.00			0.90		1.00	0.86	
Flt Protected		1.00			1.00			0.99		0.95	1.00	
Satd. Flow (prot)		2689			3598			1891		3467	1633	
Flt Permitted		1.00			0.73			0.99		0.95	1.00	
Satd. Flow (perm)		2689			2635			1891		3467	1633	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	827	18	46	635	0	46	0	115	496	24	312
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	207	0
Lane Group Flow (vph)	0	844	0	0	681	0	0	161	0	496	129	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Actuated Green, G (s)		43.1			43.1			11.3		18.7	18.7	
Effective Green, g (s)		43.1			43.1			11.3		18.7	18.7	
Actuated g/C Ratio		0.48			0.48			0.13		0.21	0.21	
Clearance Time (s)		8.5			8.5			4.1		4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		1287			1261			237		720	339	
v/s Ratio Prot		c0.31						c0.09		c0.14	0.08	
v/s Ratio Perm					0.26							
v/c Ratio		0.66			0.54			0.68		0.69	0.38	
Uniform Delay, d1		17.8			16.5			37.6		33.0	30.7	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.6			1.7			6.0		2.2	0.3	
Delay (s)		20.4			18.1			43.6		35.2	30.9	
Level of Service		C			B			D		D	C	
Approach Delay (s)		20.4			18.1			43.6			33.5	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	548	538	66	50	24
Future Volume (vph)	22	548	538	66	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.985		0.956	
Flt Protected		0.998			0.967	
Satd. Flow (prot)	0	1876	1851	0	1964	0
Flt Permitted		0.998			0.967	
Satd. Flow (perm)	0	1876	1851	0	1964	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		200	243		1336	
Travel Time (s)		4.5	5.5		30.4	
Peak Hour Factor	0.94	0.94	0.82	0.82	0.77	0.77
Heavy Vehicles (%)	3%	1%	1%	2%	2%	0%
Adj. Flow (vph)	23	583	656	80	65	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	606	736	0	96	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.6%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	548	538	66	50	24
Future Vol, veh/h	22	548	538	66	50	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	82	82	77	77
Heavy Vehicles, %	3	1	1	2	2	0
Mvmt Flow	23	583	656	80	65	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	736	0	-	0	1325	696
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	629	-
Critical Hdwy	4.13	-	-	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.227	-	-	-	3.518	3.3
Pot Cap-1 Maneuver	865	-	-	-	172	445
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	531	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	865	-	-	-	165	445
Mov Cap-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	531	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	36.6
HCM LOS			E

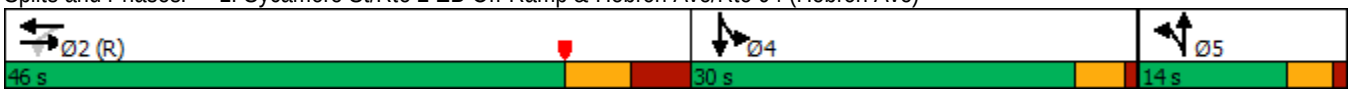
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	865	-	-	-	207
HCM Lane V/C Ratio	0.027	-	-	-	0.464
HCM Control Delay (s)	9.3	0	-	-	36.6
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	2.2

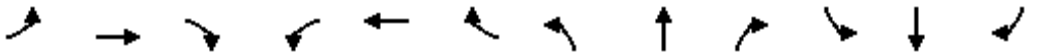
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	677	52	50	533	0	41	0	86	250	33	250
Future Volume (vph)	0	677	52	50	533	0	41	0	86	250	33	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	16	12	12	12	12
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.989						0.909			0.867	
Flt Protected					0.996			0.984		0.950		
Satd. Flow (prot)	0	2579	0	0	3476	0	0	1913	0	3467	1643	0
Flt Permitted					0.765			0.984		0.950		
Satd. Flow (perm)	0	2579	0	0	2670	0	0	1913	0	3467	1643	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		8									266	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		176			818			763			527	
Travel Time (s)		4.0			18.6			17.3			12.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Adj. Flow (vph)	0	720	55	53	567	0	44	0	91	266	35	266
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	775	0	0	620	0	0	135	0	266	301	0
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5		4	4	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)		13.5		13.5	13.5		9.1	9.1		20.3	20.3	
Total Split (s)		46.0		46.0	46.0		14.0	14.0		30.0	30.0	
Total Split (%)		51.1%		51.1%	51.1%		15.6%	15.6%		33.3%	33.3%	
Maximum Green (s)		37.5		37.5	37.5		9.9	9.9		25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0		3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1		4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		50.2			50.2			10.8		12.1	12.1	
Actuated g/C Ratio		0.56			0.56			0.12		0.13	0.13	
v/c Ratio		0.54			0.42			0.59		0.57	0.67	
Control Delay		15.6			13.9			47.4		40.9	14.6	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		15.6			13.9			47.4		40.9	14.6	
LOS		B			B			D		D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		15.6			13.9			47.4			26.9	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)		177			97			74		75	18	
Queue Length 95th (ft)		321			178			125		105	90	
Internal Link Dist (ft)		96			738			683			447	
Turn Bay Length (ft)												
Base Capacity (vph)		1442			1489			247		990	659	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.54			0.42			0.55		0.27	0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 82.5%		ICU Level of Service E	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)

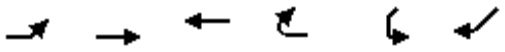




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	677	52	50	533	0	41	0	86	250	33	250
Future Volume (vph)	0	677	52	50	533	0	41	0	86	250	33	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	16	12	12	12	12
Total Lost time (s)		8.5			8.5			4.1		4.3	4.3	
Lane Util. Factor		*0.71			0.95			1.00		0.97	1.00	
Frt		0.99			1.00			0.91		1.00	0.87	
Flt Protected		1.00			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		2580			3475			1913		3467	1644	
Flt Permitted		1.00			0.76			0.98		0.95	1.00	
Satd. Flow (perm)		2580			2669			1913		3467	1644	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	720	55	53	567	0	44	0	91	266	35	266
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	230	0
Lane Group Flow (vph)	0	771	0	0	620	0	0	135	0	266	71	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Actuated Green, G (s)		50.2			50.2			10.8		12.1	12.1	
Effective Green, g (s)		50.2			50.2			10.8		12.1	12.1	
Actuated g/C Ratio		0.56			0.56			0.12		0.13	0.13	
Clearance Time (s)		8.5			8.5			4.1		4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		1439			1488			229		466	221	
v/s Ratio Prot		c0.30						c0.07		c0.08	0.04	
v/s Ratio Perm					0.23							
v/c Ratio		0.54			0.42			0.59		0.57	0.32	
Uniform Delay, d1		12.6			11.5			37.5		36.5	35.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.4			0.9			2.5		1.1	0.3	
Delay (s)		14.0			12.3			40.0		37.6	35.5	
Level of Service		B			B			D		D	D	
Approach Delay (s)		14.0			12.3			40.0			36.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	22	539	611	68	66	48
Future Volume (vph)	22	539	611	68	66	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.986		0.943	
Flt Protected		0.998			0.972	
Satd. Flow (prot)	0	1893	1873	0	1943	0
Flt Permitted		0.998			0.972	
Satd. Flow (perm)	0	1893	1873	0	1943	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		200	273		1379	
Travel Time (s)		4.5	6.2		31.3	
Peak Hour Factor	0.91	0.91	0.82	0.82	0.66	0.66
Heavy Vehicles (%)	4%	0%	0%	0%	2%	1%
Adj. Flow (vph)	24	592	745	83	100	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	616	828	0	173	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.5%		ICU Level of Service B	
Analysis Period (min) 15			

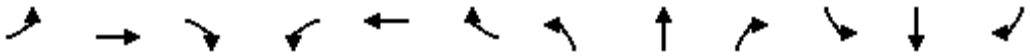
Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	22	539	611	68	66	48
Future Vol, veh/h	22	539	611	68	66	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	82	82	66	66
Heavy Vehicles, %	4	0	0	0	2	1
Mvmt Flow	24	592	745	83	100	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	828	0	-	0	1427	787
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	640	-
Critical Hdwy	4.14	-	-	-	6.42	6.21
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.236	-	-	-	3.518	3.309
Pot Cap-1 Maneuver	795	-	-	-	149	393
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	795	-	-	-	142	393
Mov Cap-2 Maneuver	-	-	-	-	142	-
Stage 1	-	-	-	-	429	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	SW
HCM Control Delay, s	0.4	0	88.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	795	-	-	-	194
HCM Lane V/C Ratio	0.03	-	-	-	0.89
HCM Control Delay (s)	9.7	0	-	-	88.6
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	6.8

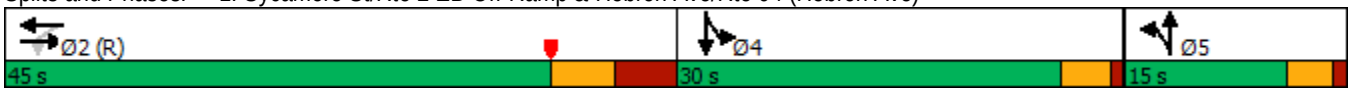


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Future Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	16	12	12	12	12
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.988						0.909			0.868	
Flt Protected					0.991			0.984		0.950		
Satd. Flow (prot)	0	2666	0	0	3578	0	0	1900	0	3467	1645	0
Flt Permitted					0.511			0.984		0.950		
Satd. Flow (perm)	0	2666	0	0	1845	0	0	1900	0	3467	1645	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		8									193	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		222			817			470			538	
Travel Time (s)		5.0			18.6			10.7			12.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Adj. Flow (vph)	0	813	69	141	622	0	105	0	218	496	42	312
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	882	0	0	763	0	0	323	0	496	354	0
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5		4	4	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		9.0	9.0		10.0	10.0	
Minimum Split (s)		23.5		23.5	23.5		13.1	13.1		20.3	20.3	
Total Split (s)		45.0		45.0	45.0		15.0	15.0		30.0	30.0	
Total Split (%)		50.0%		50.0%	50.0%		16.7%	16.7%		33.3%	33.3%	
Maximum Green (s)		36.5		36.5	36.5		10.9	10.9		25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0		3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1		4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		36.5			36.5			17.6		19.0	19.0	
Actuated g/C Ratio		0.41			0.41			0.20		0.21	0.21	
v/c Ratio		0.81			1.68dl			0.87		0.68	0.71	
Control Delay		30.9			66.4			62.8		37.0	22.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		30.9			66.4			62.8		37.0	22.2	
LOS		C			E			E		D	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.9			66.4			62.8			30.8	
Approach LOS		C			E			E			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 44.1		Intersection LOS: D	
Intersection Capacity Utilization 101.8%		ICU Level of Service G	
Analysis Period (min) 15			
* User Entered Value			
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			

Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)



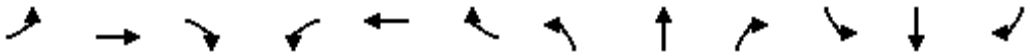
Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	882	763	323	496	354
v/c Ratio	0.81	1.68dl	0.87	0.68	0.71
Control Delay	30.9	66.4	62.8	37.0	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	66.4	62.8	37.0	22.2
Queue Length 50th (ft)	303	~233	180	134	82
Queue Length 95th (ft)	413	#358	#411	168	164
Internal Link Dist (ft)	142	737	390		458
Turn Bay Length (ft)					
Base Capacity (vph)	1085	748	371	990	607
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.81	1.02	0.87	0.50	0.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

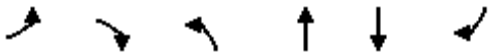


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Future Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	16	12	12	12	12
Total Lost time (s)		8.5			8.5			4.1		4.3	4.3	
Lane Util. Factor		*0.71			0.95			1.00		0.97	1.00	
Frt		0.99			1.00			0.91		1.00	0.87	
Flt Protected		1.00			0.99			0.98		0.95	1.00	
Satd. Flow (prot)		2666			3577			1900		3467	1645	
Flt Permitted		1.00			0.51			0.98		0.95	1.00	
Satd. Flow (perm)		2666			1845			1900		3467	1645	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	813	69	141	622	0	105	0	218	496	42	312
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	152	0
Lane Group Flow (vph)	0	877	0	0	763	0	0	323	0	496	202	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Actuated Green, G (s)		36.5			36.5			17.6		19.0	19.0	
Effective Green, g (s)		36.5			36.5			17.6		19.0	19.0	
Actuated g/C Ratio		0.41			0.41			0.20		0.21	0.21	
Clearance Time (s)		8.5			8.5			4.1		4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		1081			748			371		731	347	
v/s Ratio Prot		0.33						c0.17		c0.14	0.12	
v/s Ratio Perm					c0.41							
v/c Ratio		0.81			1.68dl			0.87		0.68	0.58	
Uniform Delay, d1		23.7			26.8			35.1		32.7	31.9	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		6.6			38.1			18.9		2.0	1.6	
Delay (s)		30.3			64.8			54.0		34.7	33.5	
Level of Service		C			E			D		C	C	
Approach Delay (s)		30.3			64.8			54.0			34.2	
Approach LOS		C			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	151	48	48	119	78	152
Future Volume (vph)	151	48	48	119	78	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.967				0.911	
Flt Protected	0.963			0.986		
Satd. Flow (prot)	1735	0	0	2082	1810	0
Flt Permitted	0.963			0.986		
Satd. Flow (perm)	1735	0	0	2082	1810	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	165			292	470	
Travel Time (s)	3.8			6.6	10.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	52	52	129	85	165
Shared Lane Traffic (%)						
Lane Group Flow (vph)	216	0	0	181	250	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	151	48	48	119	78	152
Future Vol, veh/h	151	48	48	119	78	152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	52	52	129	85	165

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	401	168	250	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	233	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	605	876	1316	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	806	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	579	876	1316	-	-	-
Mov Cap-2 Maneuver	579	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	806	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	2.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	631	-	-
HCM Lane V/C Ratio	0.04	-	0.343	-	-
HCM Control Delay (s)	7.8	0	13.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	-	-

Lane Group	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	41	545	534	95	78	44
Future Volume (vph)	41	545	534	95	78	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.980		0.951	
Flt Protected		0.996			0.969	
Satd. Flow (prot)	0	1871	1841	0	1959	0
Flt Permitted		0.996			0.969	
Satd. Flow (perm)	0	1871	1841	0	1959	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		222	211		1367	
Travel Time (s)		5.0	4.8		31.1	
Peak Hour Factor	0.94	0.94	0.82	0.82	0.83	0.83
Heavy Vehicles (%)	3%	1%	1%	2%	2%	0%
Adj. Flow (vph)	44	580	651	116	94	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	624	767	0	147	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

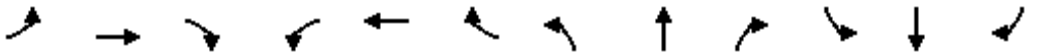
Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	41	545	534	95	78	44
Future Vol, veh/h	41	545	534	95	78	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	82	82	83	83
Heavy Vehicles, %	3	1	1	2	2	0
Mvmt Flow	44	580	651	116	94	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	767	0	-	0	1377	709
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	668	-
Critical Hdwy	4.13	-	-	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.227	-	-	-	3.518	3.3
Pot Cap-1 Maneuver	842	-	-	-	160	438
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	510	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	842	-	-	-	148	438
Mov Cap-2 Maneuver	-	-	-	-	148	-
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	510	-

Approach	EB	WB	SW
HCM Control Delay, s	0.7	0	65.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	842	-	-	-	194
HCM Lane V/C Ratio	0.052	-	-	-	0.758
HCM Control Delay (s)	9.5	0	-	-	65.5
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Future Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	16	12	12	12	12
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.978						0.912			0.877	
Flt Protected					0.988			0.983		0.950		
Satd. Flow (prot)	0	2551	0	0	3448	0	0	1918	0	3467	1660	0
Flt Permitted					0.515			0.983		0.950		
Satd. Flow (perm)	0	2551	0	0	1797	0	0	1918	0	3467	1660	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		18									208	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		187			810			461			538	
Travel Time (s)		4.3			18.4			10.5			12.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Adj. Flow (vph)	0	701	121	178	549	0	120	0	228	266	59	266
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	822	0	0	727	0	0	348	0	266	325	0
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5		4	4	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)		13.5		13.5	13.5		9.1	9.1		20.3	20.3	
Total Split (s)		46.0		46.0	46.0		14.0	14.0		30.0	30.0	
Total Split (%)		51.1%		51.1%	51.1%		15.6%	15.6%		33.3%	33.3%	
Maximum Green (s)		37.5		37.5	37.5		9.9	9.9		25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0		3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1		4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		37.5			37.5			21.8		13.8	13.8	
Actuated g/C Ratio		0.42			0.42			0.24		0.15	0.15	
v/c Ratio		0.77			1.60dl			0.75		0.50	0.76	
Control Delay		27.8			54.2			45.8		37.2	24.4	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		27.8			54.2			45.8		37.2	24.4	
LOS		C			D			D		D	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		27.8			54.2			45.8			30.2	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)		269			207			180		73	62	
Queue Length 95th (ft)		371			#335			#413		97	139	
Internal Link Dist (ft)		107			730			381			458	
Turn Bay Length (ft)												
Base Capacity (vph)		1073			748			465		990	622	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.77			0.97			0.75		0.27	0.52	

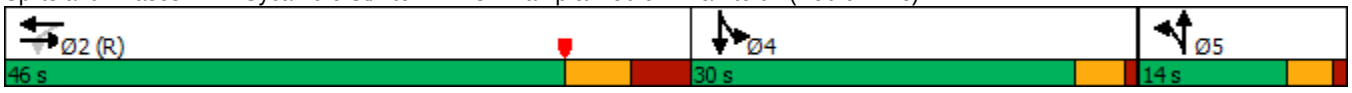
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 38.6		Intersection LOS: D	
Intersection Capacity Utilization 99.9%		ICU Level of Service F	
Analysis Period (min) 15			

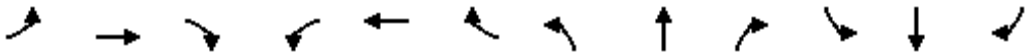
* User Entered Value

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)



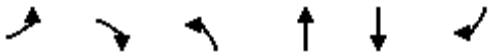


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Future Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	16	12	12	12	12
Total Lost time (s)		8.5			8.5			4.1		4.3	4.3	
Lane Util. Factor		*0.71			0.95			1.00		0.97	1.00	
Frt		0.98			1.00			0.91		1.00	0.88	
Flt Protected		1.00			0.99			0.98		0.95	1.00	
Satd. Flow (prot)		2550			3447			1917		3467	1661	
Flt Permitted		1.00			0.52			0.98		0.95	1.00	
Satd. Flow (perm)		2550			1797			1917		3467	1661	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	701	121	178	549	0	120	0	228	266	59	266
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	176	0
Lane Group Flow (vph)	0	812	0	0	727	0	0	348	0	266	149	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			2		5	5		4	4	
Permitted Phases				2								
Actuated Green, G (s)		37.5			37.5			21.8		13.8	13.8	
Effective Green, g (s)		37.5			37.5			21.8		13.8	13.8	
Actuated g/C Ratio		0.42			0.42			0.24		0.15	0.15	
Clearance Time (s)		8.5			8.5			4.1		4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		1062			748			464		531	254	
v/s Ratio Prot		0.32						c0.18		0.08	c0.09	
v/s Ratio Perm					c0.40							
v/c Ratio		0.76			1.60dl			0.75		0.50	0.59	
Uniform Delay, d1		22.5			25.7			31.6		34.9	35.4	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		5.2			26.7			6.0		0.3	2.2	
Delay (s)		27.7			52.5			37.5		35.2	37.7	
Level of Service		C			D			D		D	D	
Approach Delay (s)		27.7			52.5			37.5			36.6	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	200	65	65	109	124	201
Future Volume (vph)	200	65	65	109	124	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.967				0.917	
Flt Protected	0.964			0.982		
Satd. Flow (prot)	1736	0	0	2073	1822	0
Flt Permitted	0.964			0.982		
Satd. Flow (perm)	1736	0	0	2073	1822	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	161			302	461	
Travel Time (s)	3.7			6.9	10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	71	71	118	135	218
Shared Lane Traffic (%)						
Lane Group Flow (vph)	288	0	0	189	353	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.2%		ICU Level of Service A	
Analysis Period (min) 15			

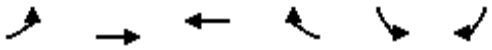
Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	200	65	65	109	124	201
Future Vol, veh/h	200	65	65	109	124	201
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	71	71	118	135	218

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	504	244	353	0	-	0
Stage 1	244	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	528	795	1206	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	795	1206	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.8	3.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1206	-	545	-	-
HCM Lane V/C Ratio	0.059	-	0.529	-	-
HCM Control Delay (s)	8.2	0	18.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	3.1	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	48	535	606	107	104	75
Future Volume (vph)	48	535	606	107	104	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.980		0.944	
Flt Protected		0.996			0.972	
Satd. Flow (prot)	0	1886	1862	0	1945	0
Flt Permitted		0.996			0.972	
Satd. Flow (perm)	0	1886	1862	0	1945	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		200	158		1350	
Travel Time (s)		4.5	3.6		30.7	
Peak Hour Factor	0.91	0.91	0.82	0.82	0.74	0.74
Heavy Vehicles (%)	4%	0%	0%	0%	2%	1%
Adj. Flow (vph)	53	588	739	130	141	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	641	869	0	242	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	37.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	535	606	107	104	75
Future Vol, veh/h	48	535	606	107	104	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	82	82	74	74
Heavy Vehicles, %	4	0	0	0	2	1
Mvmt Flow	53	588	739	130	141	101

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	869	0	-	0	1498	804
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	694	-
Critical Hdwy	4.14	-	-	-	6.42	6.21
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.236	-	-	-	3.518	3.309
Pot Cap-1 Maneuver	767	-	-	-	~ 135	385
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	496	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	767	-	-	-	~ 121	385
Mov Cap-2 Maneuver	-	-	-	-	~ 121	-
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	271.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	767	-	-	-	170
HCM Lane V/C Ratio	0.069	-	-	-	1.423
HCM Control Delay (s)	10	0	-	-	271.7
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	15

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Future Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		200	0		0
Storage Lanes	0		0	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.988						0.944	0.850		0.868	
Flt Protected					0.991			0.970		0.950		
Satd. Flow (prot)	0	2666	0	0	3578	0	0	1640	1504	3467	1645	0
Flt Permitted					0.518			0.970		0.950		
Satd. Flow (perm)	0	2666	0	0	1870	0	0	1640	1504	3467	1645	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		8									193	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		222			817			470			538	
Travel Time (s)		5.0			18.6			10.7			12.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Adj. Flow (vph)	0	813	69	141	622	0	105	0	218	496	42	312
Shared Lane Traffic (%)									29%			
Lane Group Flow (vph)	0	882	0	0	763	0	0	168	155	496	354	0
Turn Type		NA		Perm	NA		Split	NA	Prot	Split	NA	
Protected Phases		2			2		5	5	5	4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5	5	4	4	
Switch Phase												
Minimum Initial (s)		15.0		15.0	15.0		9.0	9.0	9.0	10.0	10.0	
Minimum Split (s)		23.5		23.5	23.5		13.1	13.1	13.1	20.3	20.3	
Total Split (s)		45.0		45.0	45.0		15.0	15.0	15.0	30.0	30.0	
Total Split (%)		50.0%		50.0%	50.0%		16.7%	16.7%	16.7%	33.3%	33.3%	
Maximum Green (s)		36.5		36.5	36.5		10.9	10.9	10.9	25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0	3.0	3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1	1.1	1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0	2.0	2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		41.4			41.4			12.7	12.7	19.0	19.0	
Actuated g/C Ratio		0.46			0.46			0.14	0.14	0.21	0.21	
v/c Ratio		0.72			1.16dl			0.73	0.73	0.68	0.71	
Control Delay		25.0			38.6			56.9	58.9	37.0	22.2	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	

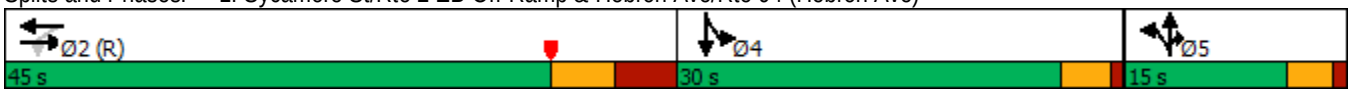
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		25.0			38.6			56.9	58.9	37.0	22.2	
LOS		C			D			E	E	D	C	
Approach Delay		25.0			38.6			57.9			30.8	
Approach LOS		C			D			E			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

* User Entered Value

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)



Lane Group	EBT	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	882	763	168	155	496	354
v/c Ratio	0.72	1.16dl	0.73	0.73	0.68	0.71
Control Delay	25.0	38.6	56.9	58.9	37.0	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	38.6	56.9	58.9	37.0	22.2
Queue Length 50th (ft)	288	212	93	87	134	82
Queue Length 95th (ft)	413	#355	#218	#208	168	164
Internal Link Dist (ft)	142	737	390			458
Turn Bay Length (ft)				200		
Base Capacity (vph)	1230	860	236	217	990	607
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.89	0.71	0.71	0.50	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Future Volume (vph)	0	756	64	131	578	0	98	0	203	461	39	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Lane Util. Factor		*0.71			0.95			0.95	0.95	0.97	1.00	
Frt		0.99			1.00			0.94	0.85	1.00	0.87	
Flt Protected		1.00			0.99			0.97	1.00	0.95	1.00	
Satd. Flow (prot)		2666			3577			1640	1504	3467	1645	
Flt Permitted		1.00			0.52			0.97	1.00	0.95	1.00	
Satd. Flow (perm)		2666			1868			1640	1504	3467	1645	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	813	69	141	622	0	105	0	218	496	42	312
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	152	0
Lane Group Flow (vph)	0	878	0	0	763	0	0	168	155	496	202	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA	Prot	Split	NA	
Protected Phases		2			2		5	5	5	4	4	
Permitted Phases				2								
Actuated Green, G (s)		41.4			41.4			12.7	12.7	19.0	19.0	
Effective Green, g (s)		41.4			41.4			12.7	12.7	19.0	19.0	
Actuated g/C Ratio		0.46			0.46			0.14	0.14	0.21	0.21	
Clearance Time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1226			859			231	212	731	347	
v/s Ratio Prot		0.33						0.10	c0.10	c0.14	0.12	
v/s Ratio Perm					c0.41							
v/c Ratio		0.72			1.16dl			0.73	0.73	0.68	0.58	
Uniform Delay, d1		19.6			22.2			37.0	37.0	32.7	31.9	
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.6			13.2			9.3	10.6	2.0	1.6	
Delay (s)		23.2			35.4			46.3	47.6	34.7	33.5	
Level of Service		C			D			D	D	C	C	
Approach Delay (s)		23.2			35.4			46.9			34.2	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

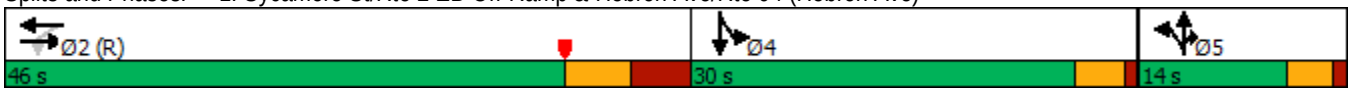
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Future Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	0		200	0		0
Storage Lanes	0		0	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	*0.71	0.95	0.95	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.978						0.949	0.850		0.877	
Flt Protected					0.988			0.968		0.950		
Satd. Flow (prot)	0	2551	0	0	3448	0	0	1653	1519	3467	1660	0
Flt Permitted					0.524			0.968		0.950		
Satd. Flow (perm)	0	2551	0	0	1829	0	0	1653	1519	3467	1660	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		18									208	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		187			810			461			538	
Travel Time (s)		4.3			18.4			10.5			12.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Adj. Flow (vph)	0	701	121	178	549	0	120	0	228	266	59	266
Shared Lane Traffic (%)									27%			
Lane Group Flow (vph)	0	822	0	0	727	0	0	182	166	266	325	0
Turn Type		NA		Perm	NA		Split	NA	Prot	Split	NA	
Protected Phases		2			2		5	5	5	4	4	
Permitted Phases				2								
Detector Phase		2		2	2		5	5	5	4	4	
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)		13.5		13.5	13.5		9.1	9.1	9.1	20.3	20.3	
Total Split (s)		46.0		46.0	46.0		14.0	14.0	14.0	30.0	30.0	
Total Split (%)		51.1%		51.1%	51.1%		15.6%	15.6%	15.6%	33.3%	33.3%	
Maximum Green (s)		37.5		37.5	37.5		9.9	9.9	9.9	25.7	25.7	
Yellow Time (s)		4.4		4.4	4.4		3.0	3.0	3.0	3.3	3.3	
All-Red Time (s)		4.1		4.1	4.1		1.1	1.1	1.1	1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0		2.0	2.0	2.0	2.0	2.0	
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	
Walk Time (s)										15.0	15.0	
Flash Dont Walk (s)										1.0	1.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)		43.6			43.6			15.7	15.7	13.8	13.8	
Actuated g/C Ratio		0.48			0.48			0.17	0.17	0.15	0.15	
v/c Ratio		0.66			1.12dl			0.63	0.63	0.50	0.76	
Control Delay		21.6			31.3			46.0	46.7	37.2	24.4	

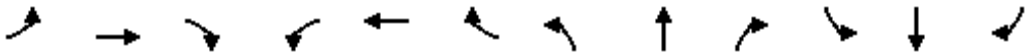
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	
Total Delay		21.6			31.3			46.0	46.7	37.2	24.4	
LOS		C			C			D	D	D	C	
Approach Delay		21.6			31.3			46.3			30.2	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)		233			178			100	91	73	62	
Queue Length 95th (ft)		371			#331			#210	#197	97	139	
Internal Link Dist (ft)		107			730			381			458	
Turn Bay Length (ft)									200			
Base Capacity (vph)		1244			885			289	265	990	622	
Starvation Cap Reductn		0			0			0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	
Reduced v/c Ratio		0.66			0.82			0.63	0.63	0.27	0.52	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 29.9 Intersection LOS: C
Intersection Capacity Utilization 91.1% ICU Level of Service F
Analysis Period (min) 15
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 1: Sycamore St/Rte 2 EB Off-Ramp & Hebron Ave/Rte 94 (Hebron Ave)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Future Volume (vph)	0	659	114	167	516	0	113	0	214	250	55	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	12	12
Total Lost time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Lane Util. Factor		*0.71			0.95			0.95	0.95	0.97	1.00	
Frt		0.98			1.00			0.95	0.85	1.00	0.88	
Flt Protected		1.00			0.99			0.97	1.00	0.95	1.00	
Satd. Flow (prot)		2550			3447			1652	1519	3467	1661	
Flt Permitted		1.00			0.52			0.97	1.00	0.95	1.00	
Satd. Flow (perm)		2550			1829			1652	1519	3467	1661	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	701	121	178	549	0	120	0	228	266	59	266
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	176	0
Lane Group Flow (vph)	0	813	0	0	727	0	0	182	166	266	149	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	0%
Turn Type		NA		Perm	NA		Split	NA	Prot	Split	NA	
Protected Phases		2			2		5	5	5	4	4	
Permitted Phases				2								
Actuated Green, G (s)		43.6			43.6			15.7	15.7	13.8	13.8	
Effective Green, g (s)		43.6			43.6			15.7	15.7	13.8	13.8	
Actuated g/C Ratio		0.48			0.48			0.17	0.17	0.15	0.15	
Clearance Time (s)		8.5			8.5			4.1	4.1	4.3	4.3	
Vehicle Extension (s)		3.0			3.0			2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1235			886			288	264	531	254	
v/s Ratio Prot		0.32						c0.11	0.11	0.08	c0.09	
v/s Ratio Perm					c0.40							
v/c Ratio		0.66			1.12dl			0.63	0.63	0.50	0.59	
Uniform Delay, d1		17.6			19.9			34.5	34.4	34.9	35.4	
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.8			8.4			3.3	3.4	0.3	2.2	
Delay (s)		20.3			28.3			37.8	37.8	35.2	37.7	
Level of Service		C			C			D	D	D	D	
Approach Delay (s)		20.3			28.3			37.8			36.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.9
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

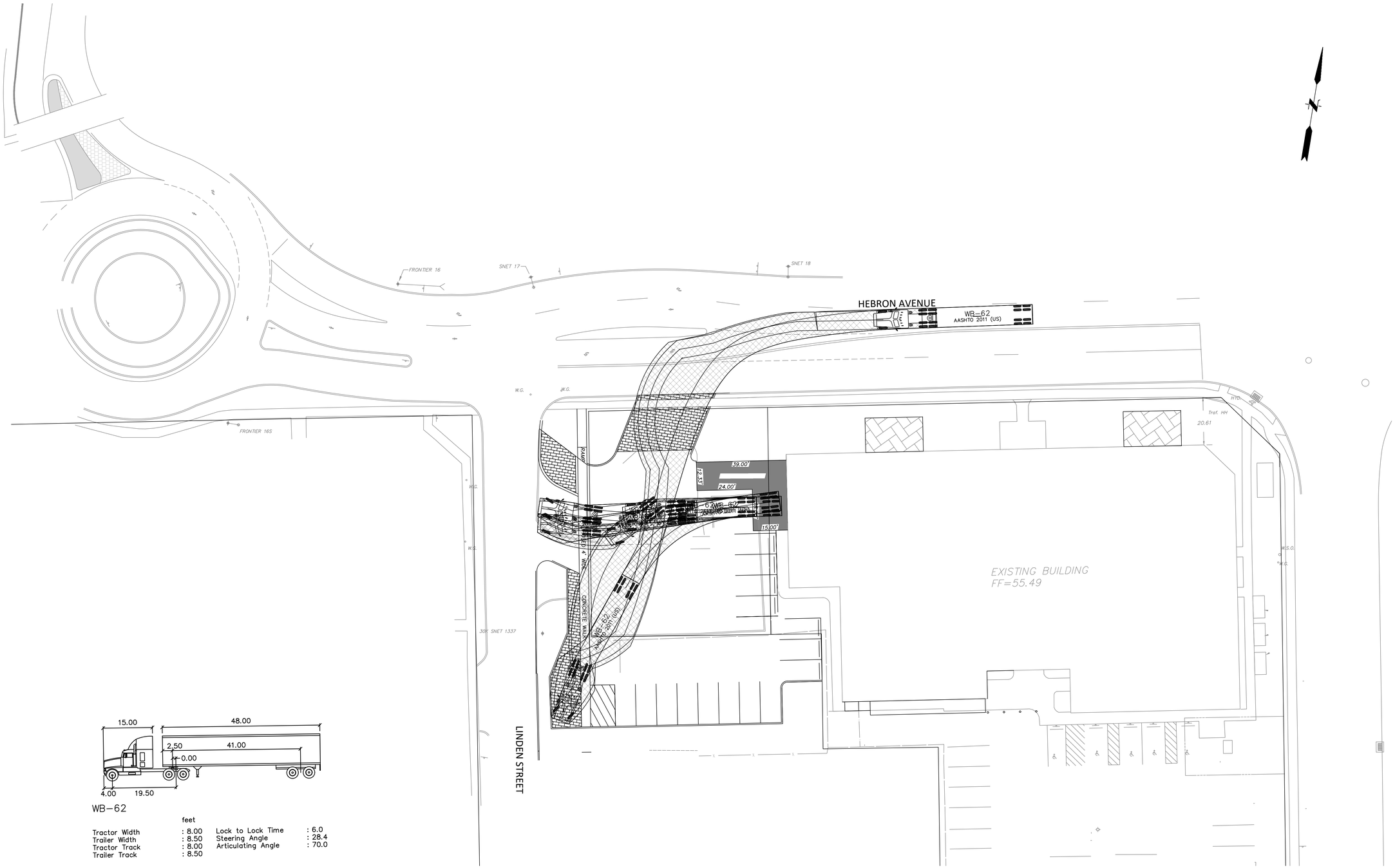
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Uconn Crash Data

400 Hebron Avenue
Glastonbury, Connecticut
January 1, 2019 - December 31, 2021

Date Of Crash	Time of Crash	Severity PDO = Property Damage Only	No. Of Veh.	No. Of Non-Motorists	Intersecting Roadway Name	Collision Type	Weather	Light Condition	Road Surface Condition	Contributing Circumstances
01) Route 94 (Hebron Avenue) at Sycamore Street/Route 2 Eastbound Off-Ramp										
1/22/2019	8:00:00	PDO	2	0		Front to rear	Clear	Daylight	Wet	Weather Conditions
2/14/2019	10:27:00	PDO	2	0		Sideswipe, same direction	Clear	Daylight	Dry	None
3/19/2019	13:25:00	PDO	2	0		Front to rear	Clear	Daylight	Dry	None
3/28/2019	16:55:00	PDO	2	0		Front to rear	Clear	Daylight	Dry	None
4/5/2019	19:24:00	Possible Injury	2	0	Sycamore St	Front to rear	Rain	Dusk	Wet	Weather Conditions
5/29/2019	16:40:00	Suspected Minor Injury	2	0	SYCAMORE ST	Front to rear	Clear	Daylight	Dry	None
6/16/2019	15:50:00	PDO	1	0		Deer	Rain	Daylight	Wet	None
6/27/2019	16:35:00	PDO	2	0		Front to rear	Clear	Daylight	Dry	None
7/10/2019	14:56:00	PDO	2	0	SYCAMORE ST	Angle	Clear	Daylight	Dry	None
8/8/2019	14:36:00	PDO	2	0		Sideswipe, same direction	Clear	Daylight	Dry	None
10/1/2019	20:30:00	PDO	2	0		Rear to side	Clear	Dark-Not Lighted	Dry	None
10/4/2019	12:56:00	PDO	2	0	SYCAMORE ST	Front to front	Clear	Daylight	Dry	None
12/13/2019	13:19:00	Suspected Minor Injury	2	0	SYCAMORE ST	Angle	Clear	Daylight	Dry	None
2/20/2020	16:31:00	PDO	2	0	SYCAMORE ST	Angle	Clear	Daylight	Dry	None
2/24/2020	20:07:00	Suspected Minor Injury	1	0		Curb	Clear	Dark-Lighted	Dry	None
4/8/2020	10:07:00	Suspected Minor Injury	2	0		Angle	Rain	Daylight	Wet	None
7/22/2020	11:13:00	PDO	2	0	Sycamore Street	Sideswipe, same direction	Clear	Daylight	Dry	None
8/30/2020	12:09:00	Suspected Minor Injury	2	0		Angle	Clear	Daylight	Dry	None
11/11/2020	17:08:00	PDO	2	0	SYCAMORE ST	Front to rear	Rain	Dark-Lighted	Wet	None
1/18/2021	13:01:00	PDO	2	0	SYCAMORE ST	Front to rear	Cloudy	Daylight	Dry	None
1/26/2021	16:01:00	PDO	2	0		Front to rear	Snow	Daylight	Slush	Weather Conditions
3/1/2021	10:47:00	PDO	2	0	SYCAMORE ST	Front to rear	Fog, Smog, Smoke	Daylight	Wet	None
3/3/2021	16:57:00	PDO	1	0		Impact Attenuator/Crash Cushion	Clear	Daylight	Dry	None
9/10/2021	8:38:00	PDO	2	0		Sideswipe, same direction	Clear	Daylight	Dry	None
9/29/2021	19:56:00	PDO	2	0		Front to rear	Clear	Dark-Lighted	Dry	None
10/12/2021	18:07:00	PDO	2	0	94-E	Angle	Clear	Daylight	Dry	None
11/10/2021	15:35:00	PDO	2	0		Front to rear	Clear	Daylight	Dry	None
02) Site Driveway at Sycamore Street										
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03) New London Turnpike at Sycamore Street										
12/20/2019	16:09:00	PDO	2	0	NEW LONDON TPK	Angle	Clear	Daylight	Dry	Visual Obstruction(s)
3/11/2021	23:18:00	Suspected Serious Injury	1	0		Utility Pole/Light Support	Clear	Dark-Lighted	Dry	None
10/12/2021	13:53:00	PDO	2	0	SYCAMORE ST	Front to rear	Clear	Daylight	Dry	None



WB-62

feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

FOR INFORMATION PURPOSES ONLY.

File Path: J:\DWG\P2022\00036\A10\Civil\Plan\20220036.A10_AUTO_01.dwg Layout: AUT-01 Plotted: Thu, May 12, 2022 - 4:57 PM User: trudolph
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
LAYER STATE:
MS VIEW:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			XX/XX	XX

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

SCHWARTZ REALTY CORPORATION

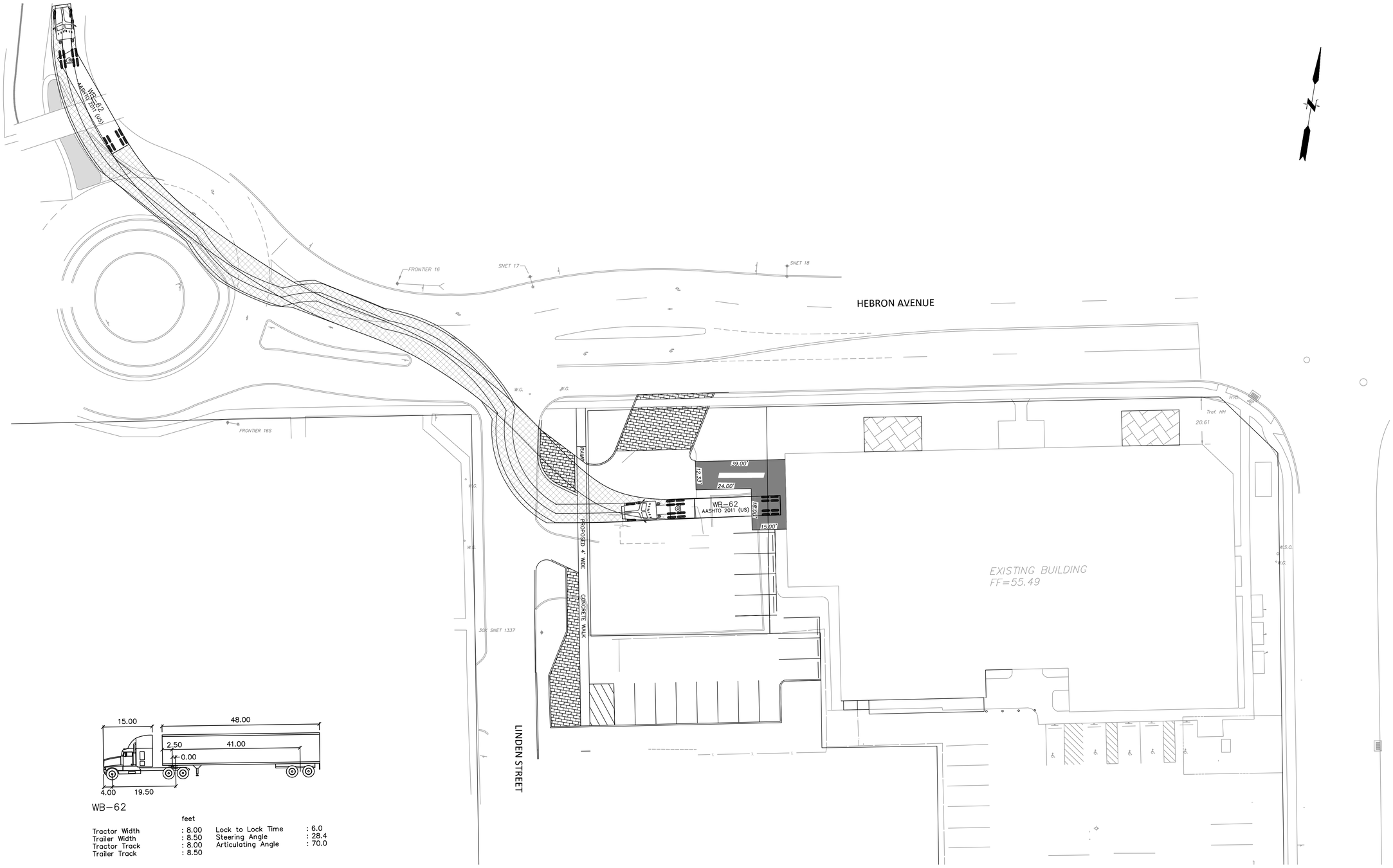
WB-62 TURNING MOVEMENT PLAN

400 HEBRON AVENUE

GLASTONBURY CONNECTICUT

PROJ. No.: 20220036.A10
DATE: MAY 2022

AUTO-01



WB—62

feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

FOR INFORMATION PURPOSES ONLY.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			XX/XX	XX

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

SCHWARTZ REALTY CORPORATION

WB-62 TURNING MOVEMENT PLAN

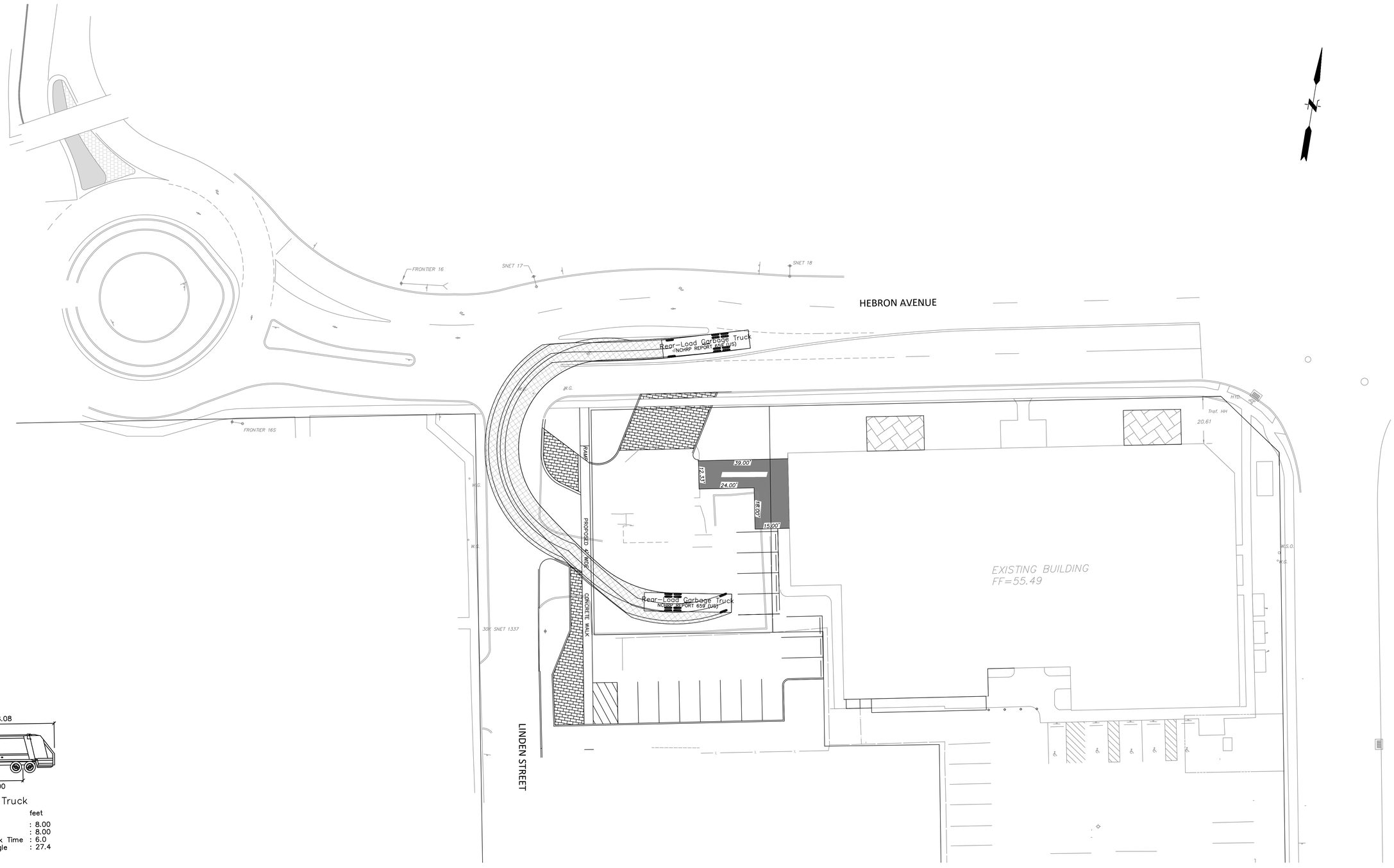
400 HEBRON AVENUE

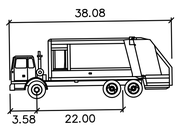
GLASTONBURY CONNECTICUT

PROJ. No.: 20220036.A10
DATE: MAY 2022

AUTO-02

File Path: J:\DWG\P2022\0036\A10\Civil\Plan\20220036.A10_AUTO_01.dwg Layout: AUT-02 Plotted: Thu, May 12, 2022 - 4:57 PM User: trudolph
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
LAYER STATE:
MS VIEW:





Garbage Truck

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 27.4

FOR INFORMATION PURPOSES ONLY.

File Path: J:\DWG\P2022\00036\A10\Civil\Plan\20220036.A10_AUTO_01.dwg Layout: AUT-03 Plotted: Thu, May 12, 2022 - 4:57 PM User: trudolph
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			XX/XX	XX

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

SCHWARTZ REALTY CORPORATION

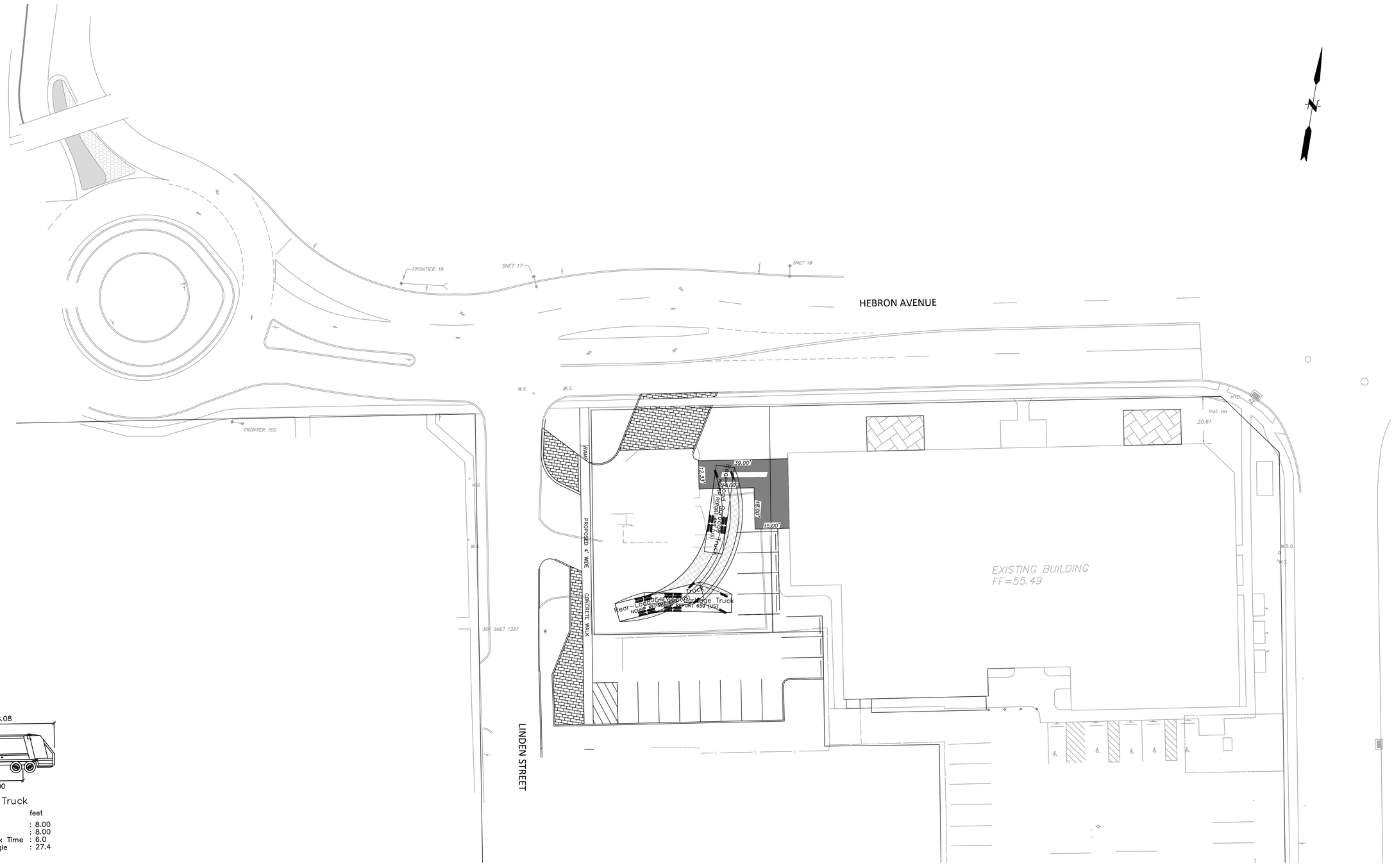
GARBAGE TRUCK TURNING MOVEMENT PLAN

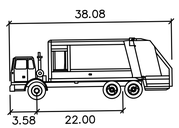
400 HEBRON AVENUE

GLASTONBURY CONNECTICUT

PROJ. No.: 20220036.A10
DATE: APRIL 2022

AUTO-03





Garbage Truck

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 27.4

FOR INFORMATION PURPOSES ONLY.

File Path: J:\DWG\P2022\0036A10\Civil\Plan\20220036.A10_AUTO_01.dwg Layout: AUT-04 Plotted: Thu, May 12, 2022 - 4:57 PM User: trudolph
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			XX/XX	XX

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

SCHWARTZ REALTY CORPORATION

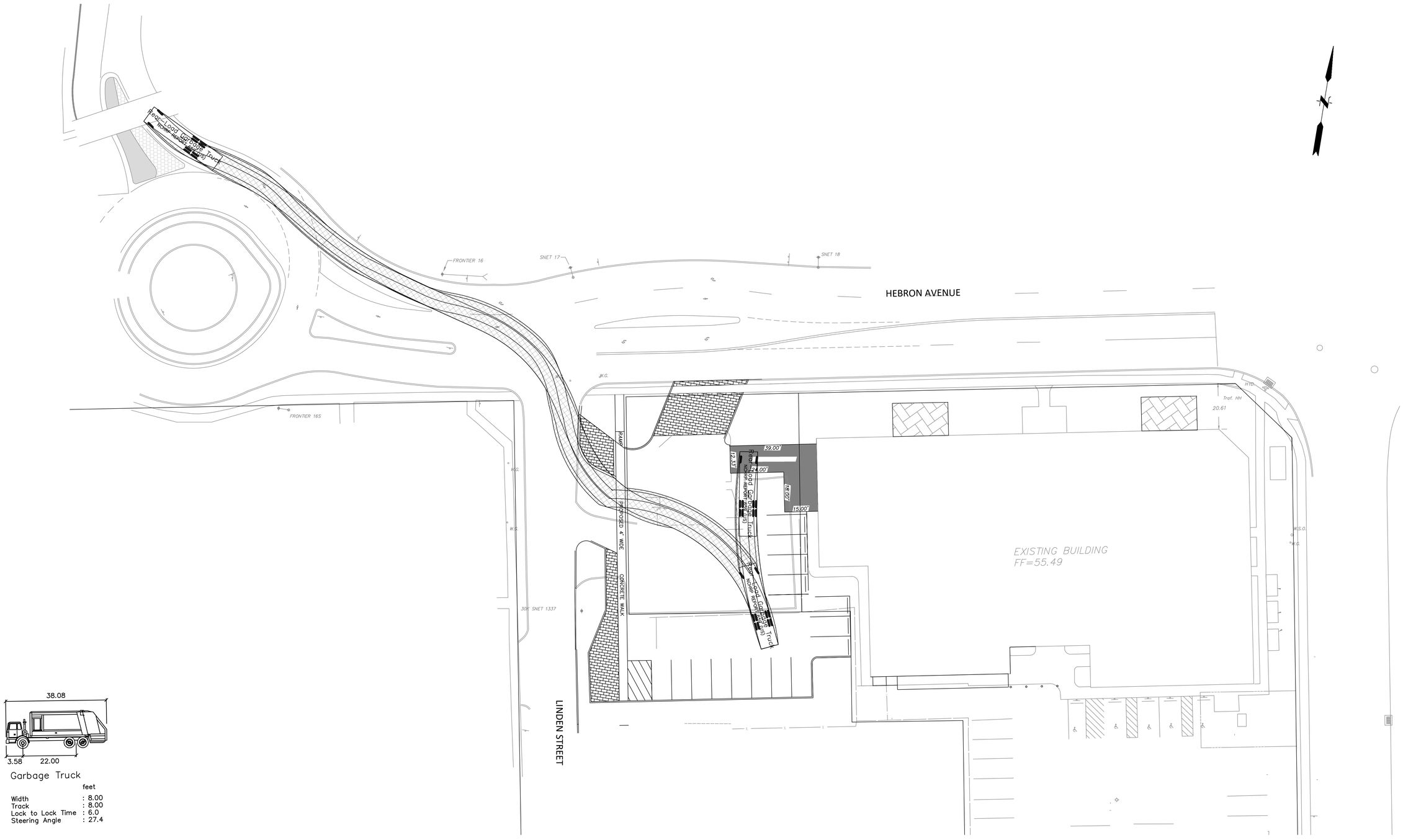
GARBAGE TRUCK TURNING MOVEMENT PLAN

400 HEBRON AVENUE

GLASTONBURY CONNECTICUT

PROJ. No.: 20220036.A10
DATE: APRIL 2022

AUTO-04



Garbage Truck

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 27.4

FOR INFORMATION PURPOSES ONLY.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.			XX/XX	XX

SEAL

SEAL

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
146 HARTFORD ROAD
MANCHESTER, CONNECTICUT 06040
860.646.2469
www.fando.com

SCHWARTZ REALTY CORPORATION

GARBAGE TRUCK TURNING MOVEMENT PLAN

400 HEBRON AVENUE

GLASTONBURY CONNECTICUT

PROJ. No.: 20220036.A10
DATE: APRIL 2022

AUTO-05

File Path: J:\DWG\P2022\00036\A10\Civil\Plan\20220036.A10_AUTO_01.dwg Layout: AUT-05 Plotted: Thu, May 12, 2022 - 4:57 PM User: trudolph
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:

6

GENERAL CONTRACTOR NOTES:

REFRIGERATION PIPE & ELECTRICAL LINE CHASE ENCLOSURES BY LOCATE PER REP. AND COORDINATE W/ FINAL FIXTURE LAYOUT - VERIFY FINISHES.

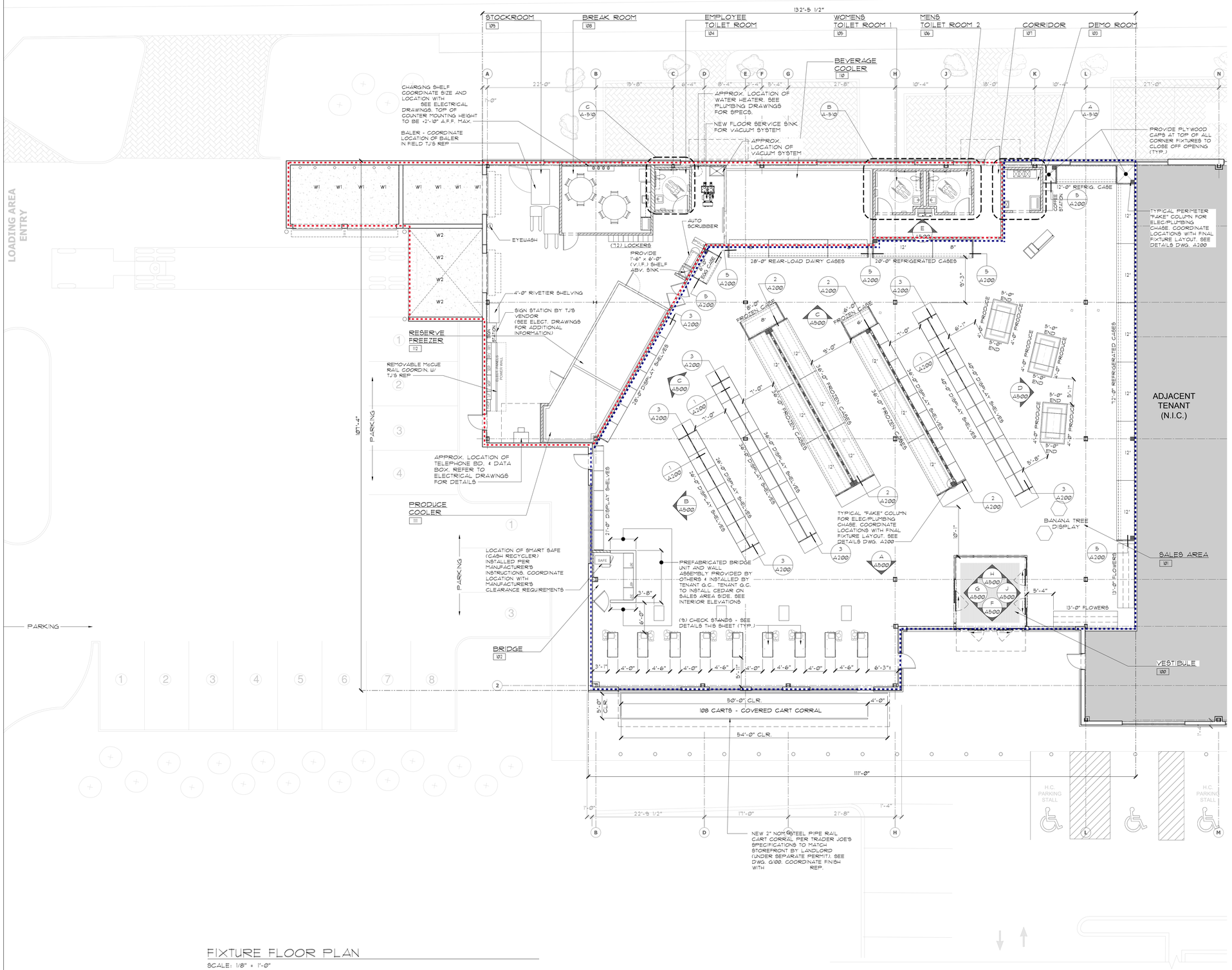
ALL SOLID BASE FIXTURES TO RECEIVE 4" VINYL COVE BASE. COLOR TO BE VERIFIED W/ REP.

COORDINATE LOCATION OF ADDITIONAL WOOD TRIM ON DISPLAY SHELVES, VERIFY IN FIELD W/ REP.

PROVIDE STEEL CLEATS AS REQUIRED TO SECURE IN-PLACE CASH DESKS TO FLOOR SLAB. CLEAT TO BE CONCEALED

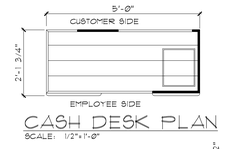
DISPLAY SHELVING NOTES:

T.G.C. TO INSTALL RIVETIER DISPLAY SHELVING FRAMING WITH (6) HORIZONTAL SHELVES FOR EACH SECTION PER MANUFACTURERS INSTRUCTIONS (EACH SECTION IS TYPICALLY 4'-0" WIDE). COORDINATE INSTALLATION WITH REP AND INSTALL.



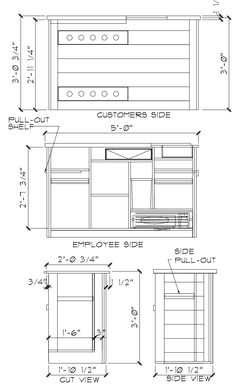
FIXTURE FLOOR PLAN

SCALE: 1/8" = 1'-0"



CASH DESK PLAN

SCALE: 1/2"=1'-0"



CASH DESK ELEVATIONS

SCALE: 1/2"=1'-0"

Jeffrey Taylor
Architect
572 North Broadway
White Plains, N.Y. 10603
tel 914 289 0011
fax 914 328 7769

CONTENTS

REVISIONS

NO.	DATE	
	03.21.22	ISSUED FOR BID

DATE 03/21/22

JOB No. FT-10642

TENANT STORE No. TBD

SPACE No. ---

SALES AREA: 9,391 sq. ft.

STOCK: 2,883 sq. ft.

MISC.: 578 sq.ft.

TOTAL: 12,850 sq. ft.

PROJECT

GLASTONBURY COMMONS
400 HEBRON AVENUE
GLASTONBURY, CT

SHEET NAME

FIXTURE FLOOR PLAN

A-110.00

7

8

277 Hebron Avenue

9

June 1, 2022

Mr. Gerald Satin
101 Clinton Street
Glastonbury, CT 06033

RE: Response to your letter, dated May 11, 2022, regarding proposed improvements to 400 Hebron Avenue building

Dear Mr. Satin,

Thank you for meeting with me, and our consulting engineer, Jonathan Sczurek, P.E., on your 9-11 Linden Street property on Friday May 20th, 2022 to communicate your concerns with our proposed improvements to the 400 Hebron Avenue development. We appreciate you affording us the opportunity to answer your questions and to offer potential solutions to alleviate your concerns. We also appreciate your support for our proposed specialty grocery store.

As discussed, and at your request, we will eliminate the fence proposed along the south of the 7 Linden Street property, and do everything possible to protect the lilac bushes you pointed out to us in that same area. We will also ensure that your property is not disturbed during the demolition process, which should only take a few days to complete. In consideration of your tenants, we will notify you in advance of when the demolition work is to take place.

With respect to the questions listed in your May 11, 2022 letter:

1. Between your property at 9-11 Linden Street and our property, we are proposing a 10 foot buffer of grass and new plantings, including a line of columnar oak trees between your fence and the curb of the proposed employee parking area. During our site meeting, we discussed leaving your existing fence untouched and maintaining our side of the property, which presently includes a plan to grade the property with a gradual downward slope, away from your property. Please see attached planting plan.

2. See the attached planting plan showing the new plantings we are planting on our property. As noted above, the lilacs on the northern portion of your property will not be disturbed.

3. We were only recently made aware of your concerns with drainage on your property. While it is unclear to us that the drainage occurred as a result of the development at 400 Hebron Avenue, if the proposed grocer is approved, we would be willing to install, at our cost, a 24" flush yard drain at the low point of your rear yard. Mr. Sczurek, a licensed professional engineer, believes in his professional opinion that this drain would provide a solution to your drainage concerns. Once installed, the ongoing maintenance and repair of the yard drain will be the responsibility of the property owner of 9-11 Linden Street.

4. The delivery and trash vehicles will enter the western portion of the building via into the delivery area from the Hebron Avenue curb cut, and will exit the site via Linden Street. The vehicles will then maneuver north (right) onto Linden, and exit west on Hebron Avenue. No

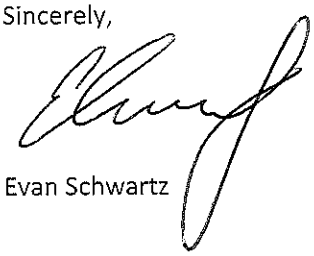
delivery or trash vehicles will turn south (left) on Linden Street and, thus, there will be no delivery or trash vehicle traffic headed south on Linden Street, and on Clinton Street.

5. The specialty grocer anticipates two deliveries per day: typically one in the morning before the store opens at 8 AM, and one in the evening before the store closes at 9 PM. Trash pick-ups will occur between 7 am – 8 am. While the number of trash pick-ups will depend on the grocer's volume, we anticipate approximately three pick-ups per week.

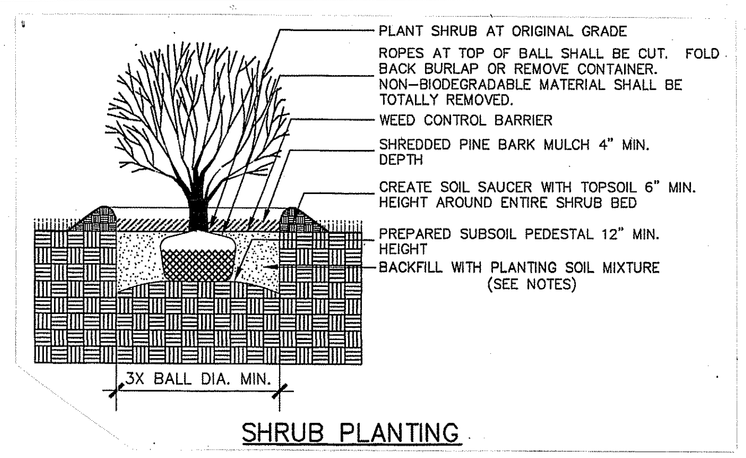
We hope that the above fully addresses your concerns and questions. As such, we would appreciate your support at the next Town Plan and Zoning Commission meeting, scheduled for June 7 at 7:00 PM.

We look forward to maintaining our reputation as good neighbors in the community. Should you have any further questions, please do not hesitate to contact me at any time.

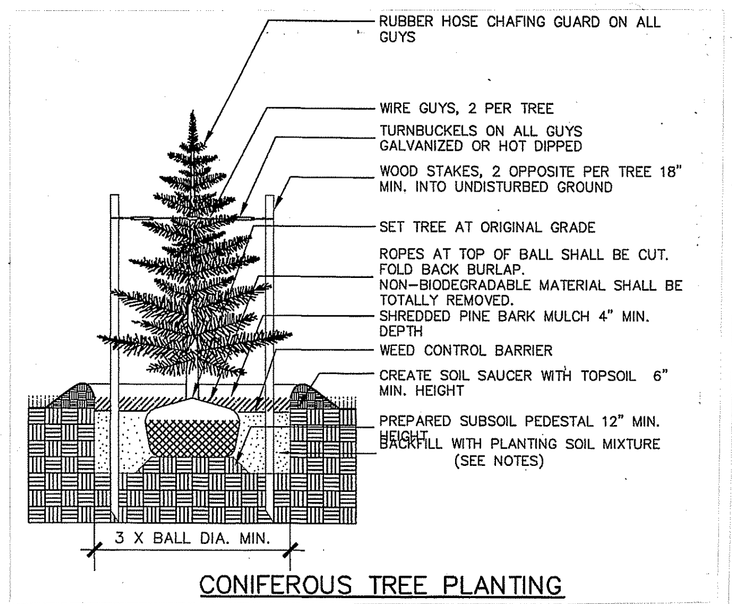
Sincerely,



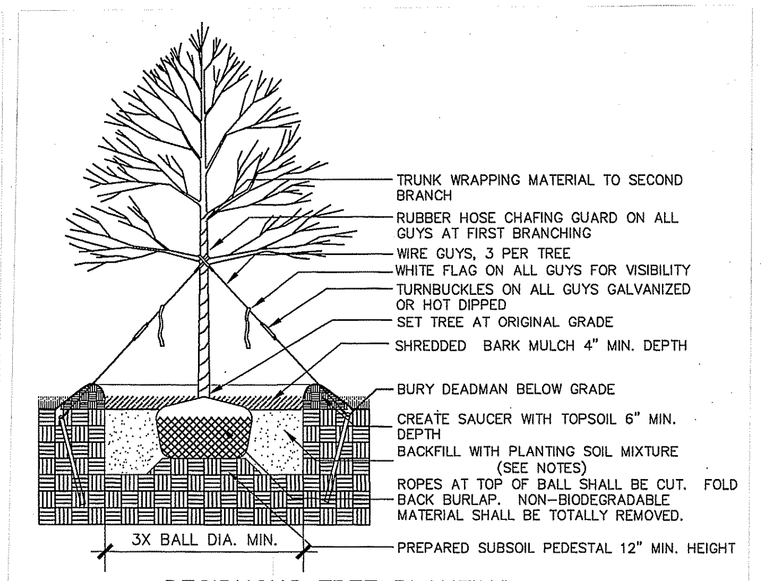
Evan Schwartz



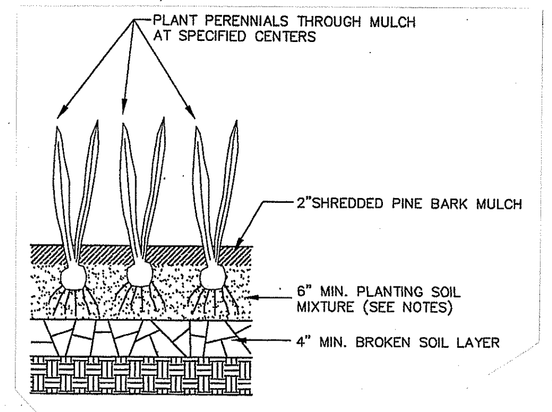
SHRUB PLANTING



CONIFEROUS TREE PLANTING

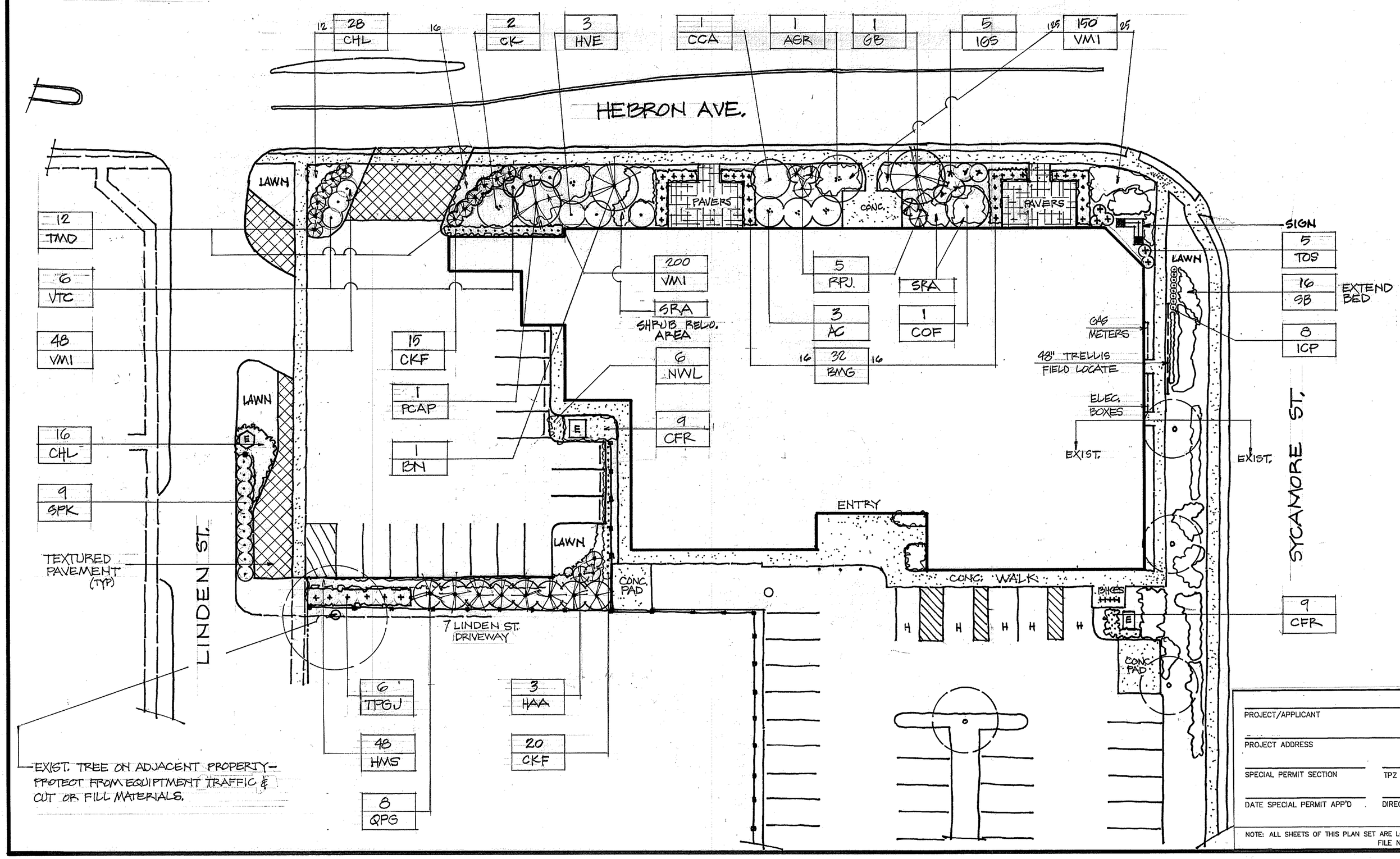


DECIDUOUS TREE PLANTING



PERENNIAL PLANTING

All locations of existing utilities may not be shown on this plan. See other plan sheets for utility locations. Contractor shall be solely responsible for determining actual locations of existing utilities. Utility conflicts may require adjustments to proposed construction. Contractor shall be responsible for repair of any utilities damaged during construction. Contact call before you dig 1-800-922-4455 www.cbyd.com two (2) working days before starting construction to locate utilities.



PLANT LIST — 400 Hebron

KEY	QTY	BOTANIC NAME / COMMON NAME	SIZE	REMARKS
AC	3	Amelanchier canadensis SHADBLOW SERVICEBERRY	6'-7'	LOW BRANCHED
AGR	1	Acer griseum PAPERBARK MAPLE	8'-10' B&B	MULTI-STEM
BMG	32	Buxus 'Green Velvet' GREEN VELVET BOXWOOD	18" #3	30" O.C.
BN	1	Betula nigra RIVER BIRCH	8'-10' B&B	3, 4 & 5 STEM
CCA	1	Cercis canadensis EASTERN REDBUD	6'-7'	MULTI-STEM
CFR	18	Calamagrostis acutiflora stricta FEATHER REED GRASS	2 GAL	
CHL	44	Chasmanthium latifolium NORTHERN SEA OATS	2 GAL	
CK	2	Cornus kousa JAPANESE DOGWOOD	8' B&B	MULTI-STEM
CKF	35	Calamagrostis acutiflora 'Karl Foerster' KARL FOERSTER REED GRASS	2 GAL	
COF	1	Cornus florida FLOWERING DOGWOOD	6'-7' B&B	MULTI-STEM
GB	1	Ginkgo biloba MAIDENHAIR TREE	2½" CAL	
HAA	3	Hydrangea arborescens 'Annabelle' ANNABELLE HYDRANGEA	3 GAL	
HMS	48	Hemerocallis 'Stella-de-oro' STELLA-DE-ORO DAYLILY	1 GAL	
HVE	3	Hamamelis vernalis VERNAL WITCH HAZEL	4'-5'	
ICP	8	Ilex crenata 'Sky Pencil' SKY PENCIL HOLLY	4' B&B	MATCHED
IGS	5	Ilex glabra 'Shamrock' SHAMROCK INKBERRY	36"	
NWL	6	Nepeta racemosa 'Walker's Low' WALKER'S LOW CATMINT	2 GAL	
PCAP	1	Pyrus calleryana 'Bartlett Pear' BARTLETT PEAR	2½" CAL	
QPG	8	Quercus paulustris 'Green Pillar' GREEN PILLAR OAK	3"	MATCHED HEIGHT 8' O.C.
RPJ	5	Rhododendron 'P.J.M.' P.J.M. RHODODENDRON	24"	
SB	16	Sedum 'Brilliant' SEDEM	1 GAL	
SPK	9	Syringa patula 'Miss Kim' MISS KIM DWARF LILAC	36"	
SPK	9	Syringa patula 'Miss Kim' MISS KIM DWARF LILAC	3'-4'	
TMD	12	Taxus x media 'Densiformis' DENSE YEW	18"-24"	
TOS	5	Thuja occidentalis 'Smaragd' EMERALD GREEN ARBORVITAE	36"	
TPGJ	6	Thuja plicata 'Green Giant Junior' ARORVITAE GREEN GIANT JUNIOR	6' B&B	
VMI	350	Vinca minor PERIWINKLE	4" POT	
VPR	8	Viburnum prunifolium BLACK HAW VIBURNUM	5'-6' B&B	
VTC	6	Viburnum trilobum 'Compactum' COMPACT AMERICAN CRANBERRYBUSH VIBURNUM	4'	

PLANTING NOTES — 400 HEBRON AVE.

1. All plant materials shall conform to the guidelines established by the American Nursery & Landscape Association.
2. All disturbed areas not covered by buildings, or planting shall be **sodded lawn**. New lawn areas shall receive a minimum of 6" topsoil of the proper pH and organic content suitable for the healthy growth of lawns. Contractor will be responsible for mowing and watering during the guarantee period. Lawn areas shall be guaranteed for 60 days or second cutting, whichever is later.
3. Contractor shall set plants out in field for approval of locations by Landscape Architect prior to planting.
4. Spade edge all planting beds within lawn areas. Provide clean spaded edge at perimeter of all planting beds and tree pits adjacent to lawn areas. Spade edge of newly planted lawn areas following second mowing.
5. All planting beds and bits to receive approved mulch to depths indicated in planting details.
6. Where discrepancies occur between planting quantities or types shown on plan and in the Plant List, the quantity of plantings shown on plan shall prevail.
7. Landscape Contractor shall guarantee all plant material for one (1) full year from date of acceptance. Proper landscape maintenance shall be the responsibility of the owner.
8. Shade trees shall have the branching height of five (5') minimum.
9. All tree and shrub pits shall be at least 2 feet wider and 2 feet deeper than the tree or shrub root ball to be planted in it. Backfill shall be high quality loam of the proper pH and organic content suitable for the healthy growth of plant materials.
10. All areas to be mulched shall receive 4 inches minimum 100% shredded bark mulch within 48 hours of planting unless otherwise noted in planting details.
11. Plants shall be handled at all times in accordance with the best horticultural practices. Plants in-leaf shall be sprayed with anti-desiccant before digging. Plants shall be dug with firm natural balls and shall conform to the ratios and sizes specified in ANSI Z60.1. B&B plants shall be wrapped in burlap and tied firmly. Plant materials shall be delivered immediately prior to placement, shall be kept moist, and shall be protected from sun and wind. Plants having broken or cracked balls prior to or during planting will not be accepted.
12. All trunks of deciduous trees shall be wrapped immediately after planting with tree wrap. Wrap shall be wound spirally, from the bottom of the trunk to the second branches. All trees in windy areas shall be staked or guyed immediately after planting.
13. The period for planting shall be from March 15 to May 15 and from September 15 to November 15, weather permitting.

PROJECT/APPLICANT — ZONE

PROJECT ADDRESS

SPECIAL PERMIT SECTION — TPZ CHAIRMAN

DATE SPECIAL PERMIT APP'D — DIRECTOR OF COMMUNITY DEVELOPMENT

NOTE: ALL SHEETS OF THIS PLAN SET ARE LOCATED IN THE OFFICE OF COMMUNITY DEVELOPMENT FILE NO.

BASE INFORMATION PROVIDED BY MEGSON HEAGLE & FRIEND, GLASTONBURY, CT-SEE ARCHITECTURAL AND ENGINEERING PLANS FOR COORDINATING WORK.

I HEREBY DECLARE TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS PLAN IS SUBSTANTIALLY CORRECT.

THOMAS G. GRACEFFA, RLA #497

Thomas Graceffa Landscape Architect, LLC
19 Flag Drive Manchester, Connecticut 06042
815-742-1930
thomasgraceffa1@gmail.com

PLANTING PLAN
PROPOSED DELIVERY AREA — 400 HEBRON AVENUE
Prepared For
H374, LLC
GLASTONBURY, CONNECTICUT

REVISED

DATE 5/12/2022

SHEET 1/1