

# Canal Winchester

*Town Hall  
10 North High Street  
Canal Winchester, OH 43110*



## Meeting Agenda

**Monday, March 9, 2020**

**7:00 PM**

### Planning and Zoning Commission

*Bill Christensen - Chairman  
Michael Vasko - Vice Chairman  
Joe Donahue - Secretary  
Brad Richey  
Joe Wildenthaler  
Mark Caulk  
Kevin Serna*

Call To Order

Time In: \_\_\_\_\_

Declaring A Quorum (Roll Call)

Bill Christensen                      Brad Richey                      Mike Vasko                      Kevin Serna  
Joe Wildenthaler                      Joe Donahue                      Mark Caulk

Excused: \_\_\_\_\_ Motion By: \_\_\_\_\_

Second By: \_\_\_\_\_ Vote: \_\_\_\_\_

Approval of Minutes

February 10, 2020 Planning and Zoning Commission Meeting Minutes

Motion By: \_\_\_\_\_ 2<sup>nd</sup> By: \_\_\_\_\_ Vote: \_\_\_\_\_

Public Comment

*Discussion of issues unrelated to agenda items.  
Time limit of four minutes per speaker*

Public Oath

*Administration of an oath by the Commission Chair to anyone who will speak at the meeting.*

Public Hearings

**CU-20-001**

Property Owner: Travis Jacks  
Applicant: Hilary Jacks  
Location: 36 East Waterloo Street  
Request: Conditional Use from Section 1187.03 of the Home Occupation section of the code to allow for the conduct of the home occupation to be within a structure accessory to the principal structure.

Motion to close Public Hearing By: \_\_\_\_\_

2<sup>nd</sup> By: \_\_\_\_\_ Vote: \_\_\_\_\_

Motion By: \_\_\_\_\_ 2<sup>nd</sup> By: \_\_\_\_\_

Vote: \_\_\_\_\_

Conditions: \_\_\_\_\_

**SDP-20-002**

Property Owner: Waterloo Crossing, LTD  
Applicant: Bank of America  
Location: PID 184-00308 (6.164 acres located on the south side of Winchester Blvd)  
Request: Site Development Plan for a 3,960 sq. ft. commercial bank.

Motion By: \_\_\_\_\_ 2<sup>nd</sup> By: \_\_\_\_\_  
Vote: \_\_\_\_\_  
Conditions: \_\_\_\_\_

**FDP-20-002**

Property Owner: Pifer Tract Five Limited Partnership  
Applicant: DDC Management  
Location: PID 042-0388600 & 042-0388500  
Request: Final Development Plan for a 191 unit detached condominium community.

Motion By: \_\_\_\_\_ 2<sup>nd</sup> By: \_\_\_\_\_  
Vote: \_\_\_\_\_  
Conditions: \_\_\_\_\_

Old Business

New Business

Adjournment

Motion by: \_\_\_\_\_ 2<sup>nd</sup> by: \_\_\_\_\_ Vote: \_\_\_\_\_  
Time Out: \_\_\_\_\_

# Canal Winchester

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## Meeting Minutes

Monday, February 10, 2020

7:00 PM

## Planning and Zoning Commission

*Bill Christensen - Chairman  
Michael Vasko - Vice Chairman  
Joe Donahue - Secretary  
Brad Richey  
Joe Wildenthaler  
Mark Caulk  
Kevin Serna*

Call To Order

*Time In: 7:00pm*

Declaring A Quorum (Roll Call)

**A motion was made by Joe Donahue, seconded by Brad Richey that Joe Wildenthaler be excused.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

**Excused: 2** – Wildenthaler & Vasko

Approval of Minutes

January 13, 2020 Planning and Zoning Commission Meeting Minutes

**A motion was made Brad Richey, seconded by Mark Caulk, that the December January 13, 2020 Minutes be approved.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

Public Comment

Julie Cecutti spoke to the commission in regards to a project underway at 18 West Waterloo Street. Rumors were heard that Town Hall was going to be demolished for future development. Mrs. Cecutti noted that she did not feel that the current redevelopment on the old Marathon site fit into context with the Old Town Plan or the character of the area. Rumors are also heard that adjacent property in the corridor may be redeveloped and that any redevelopment should be carefully considered.

Mrs. Cecutti discussed that she had no idea the project was going to happen until the previous home was being demolished and there was no attempt to notify adjacent property owners about the process and gain public input.

Concerns were brought up over the access to the rear parking behind the building and the possible change of the traffic flow along the alley behind the site, as it would affect how she pulls in and out of her garage.

Public Oath

Public Hearings

**VA-20-001**

Property Owner: Winchester Office Park LLC  
 Applicant: Deno Duros  
 Location: PID 184-003366 (1.27 acres in the Winchester Office Park.)  
 Request: Variance to Chapter 1185.03 to reduce the minimum number of parking spaces.

Mr. Moore presented the application for the Winchester Office Park for Parcel 184-003366. The applicant is requesting approval to reduce the minimum number of parking spaces required on the lot. Staff discussed that this site is three separate buildings that share a central parking lot. The total lot will have 117 parking spaces and the zoning code requires 153 spaces based on the 30,500 sq. ft. of the building floor area.

Staff discussed that the applicant originally designed the site with four 7,000 sq. ft. buildings with the same total number of parking spaces. By the time they reached approvals for building #4 they would need to request the parking variance. Since the original approval in 2017 the property owner has redesigned the 3<sup>rd</sup> building to be larger to accommodate a potential end user that did not need as much parking. While the variance was still necessary the appearance of the variance need perceived larger.

Staff discussed that the applicant owns the adjacent property and does have the ability to add additional parking if the need arises from a tenant demand.

Staff recommends that the variance application VA-20-001 be approved as presented. The applicant has developed a multi-unit office complex with a shared central parking lot. The parking lot was designed to fit the final built-out needs. The applicant controls the 2 acre parcel next door and could potentially add an additional phase of buildings, which could further increase the size of the lot if found necessary.

Mr. Caulk asked the applicant what the plans were for the parking if they have a different user in the future that requires additional parking. Shawn Bogenrife representing the property owner noted that currently the uses in the spaces are not very parking intensive. If a more parking intensive user looks at the space in the future there is the current ability to add additional parking to the east. Mr. Caulk asked the applicant why they want reduced parking. Staff indicated that the parking code in Canal Winchester is parking intensive. It requires 1 parking space per every 200 sq. ft. of office. The original plan for the complex build out with phase 1 had the same parking layout and intensity. The developer programed the site to fix the parking needed based on real world layouts and felt it was not necessary to overpark the site and to maximize on building layouts.

Mr. Caulk asked staff what kind of commitment can be provided that if more parking is needed it will be provided on the adjacent property. Staff indicated that if the variance is granted there is no commitment to add future parking necessary. The land owner will fix parking issues they have because it will affect leasing of the space.

Mr. Serna asked staff if the variance approval would apply for the adjacent

property where future building expansion could occur. Staff indicated that the variance only applies to this subject property and not any future expansion of property.

Mr. Richey asked staff about other parking variances in town. Staff discussed the two most recent parking variances that were granted were for the OPUS site across the street from the subject property and for the Northpoint Development on Bixby Road. Both of those projects were industrial sites. There is not any strictly office development in the city to compare this site too as most of the office space is in the shopping center as an in-line tenant or in Old Town where there are no parking requirements. Staff also discussed that unrelated to this application staff is researching new parking codes and trends to update the Canal Winchester Zoning.

Mr. Caulk asked staff about parking within Canal Pointe and if there are any office components out there. Staff indicated that currently there is only one building that was built for office space and they have multi-tenant space in the building.

Mr. Haire commented that communities are starting to take a look at what value parking brings and how to not overpark a site.

Mr. Christensen opened up the application for the Public Hearing.

**A motion was made by Joe Donahue, seconded by Brad Richey that this Public Hearing be closed.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

**A motion was made by Brad Richey, seconded by Joe Donahue that Variance Application #VA-20-001 be approved as presented.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

**SDP-19-011**

Property Owner: Winchester Office Park LLC

Applicant: Deno Duros

Location: PID 184-003366 (1.27 acres in the Winchester Office Park.)

Request: Site Development Plan for a 16,500 speculative office building.

Mr. Moore presented the application for Deno Duros for property located at 6355 Winchester Blvd, for Phase 3 of the Winchester Office Park. The applicant

is requesting approval for a 16,500 sq. ft. speculative office building towards the rear of the site.

The subject property consists of 2.68 acres zoned General Commercial and Planned Commercial District located south of Winchester Blvd. To the north consists of Winchester Office Park phases 1 and 2. Property to the east is a 1.69 acre parcel with Primrose Daycare zoned Planned Commercial District. Property to the south consists of the development site for Fairfield Inn on 2.28 acres zoned General Commercial. Property to the west is 13 acres of undeveloped land zoned General Commercial.

The site will be accessed from Winchester Blvd off a shared access drive for both the Winchester Office Park complex and the Fairfield Inn Hotel. The applicant received approval for Phase 1 in November 2017 and Phase 2 in November of 2018 which approved the two 7,000 sq. ft. office buildings to the north of the site. Phase 3 is proposed to add a third building at 16,500 sq. ft. to the rear of the site. With the final building the shared parking lot will be completed with an additional 47 spaces, putting the total number of parking spaces at 117. A pedestrian access sidewalk connecting the front door and side door to a sidewalk along Winchester Blvd. has been provided.

Phases 1 and 2 of the site construction installed all necessary utility lines and stormwater system for the entire build out of the project.

The proposed landscaping plan shows the planting schedule for Phase 3. This plan calls for heavily landscape beds around the building and trees in the landscape islands. The applicant is showing 24 trees on site, meeting the landscape requirements for building and parking.

The applicant has provided a site lighting plan that meets the standards in chapter 1199.06. Decorative light fixtures and poles have been provided. The proposed pole height is 16 feet, the code states that parking lots with over 30 parking spaces shall allow pole heights up to thirty feet in height. The photometric plan for the parking lot also meets the requirements of Chapter 1199.06.

The applicant has submitted that the building will have wall signage available on the north elevation. The north elevation will have the availability for up to three (3) signage locations above the entryways at 38 sq. ft. per entry. The applicant has also submitted to staff the internal signage requirements for the buildings so that all phasing's have consistent signage.

The applicant has provided elevations of the proposed 16,500 sq. ft. building for Phase 3. This building will match the previously approved buildings in Phase 1 &

2 and meets all of the applicable development requirements. The rear of the building has been slightly modified from Phases 1 and 2 to include a well on the roof to house the mechanical equipment and a variation of brick and fiber cement siding on the rear elevation.

Mr. Richey asked staff if the mechanical screening wall and its requirements for seeing the rooftop units. Staff indicated that the wall on the plans is a placeholder and the actual screening wall height will be determined by the HVAC equipment.

Mr. Bogenrife commented that the intention with the rooftop units is that they will be distributed towards the center of the building so screening them should not be an issue.

Mr. Caulk asked if the wall behind the rooftop units will be a white TPO material. Mr. Bogenrife stated that he was thinking an EPDM so it would be a darker material and blend in with the shingles.

Mr. Richey commented that he is concerned about the ground accessed ladder with the hotel directly behind the site. Staff indicated that the building code will require it to be gated.

**A motion was made by Brad Richey, seconded by Kevin Serna that Site Development Plan SDP-19-011 be approved as presented.**

**The motion carried by the following vote:**

**Yes: 5 – Caulk, Donahue, Richey, Serna & Christensen**

**FDP-20-001**

Property Owner: Meijer Stores Limited Partnership

Applicant: Leesman Engineering and Associates

Location: PID 042-0389000

Request: Final Development Plan for a 6,620 sq. ft. Shooters Sports Grill

Mr. Moore presented the application for Leesman Engineering for a Final Development Plan for Outlot 3 of the Meijer development. The applicant is requesting approval for new 6,620 sq. ft. Shooters Sports Grill.

Staff discussed the subject property is zoned Planned Industrial District and is subject to the Meijer Outparcel Development Pattern Book that was approved by City Council with ORD-74-06 on September 5, 2006. The outparcel development pattern book set a standard for building orientation and design, site layout, landscaping standards and signage regulations. The development was designed with the intent of all buildings to face outwardly and not internally

to the development with a cohesive architectural design and enhanced landscape requirements.

The building being proposed for outlot 3 is a standalone restaurant consisting of approximately 6,620 sq. ft. The restaurant is positioned to face both Diley Road and to the North with dual entryways. The facility also features an 890 sq. ft. patio on the front of the building facing Diley Road.

The subject site is accessed from Road 'B' of the Meijer development with a single curb cut internal to the development. The site plan shows a total of 84 parking spaces to be provided on the north and east ends of the proposed building. The proposed building has entry features facing both Diley Road to the east and the main parking lot to the north. A 5 foot concrete walk connecting the building to the existing asphalt multi-use path along Diley Road and a 5 foot concrete sidewalk around the east and north of the site is provided.

Sanitary service is provided to the east with an existing 8" public main to serve the development. Water service will be obtained by a new 8" public main being installed as part of the Pediatric Associates project to the south. Stormwater is handled with a regional onsite detention system. Violet Township Fire Department reviewed the plans and recommends that the FDC location shown be relocated south of the electric transformers so it is parallel with the private hydrant in the adjacent parking island.

Staff discussed that the outparcel development pattern book discusses that all service areas, storage areas and refuse enclosures shall be screened from all roads, and screened from adjacent sites and be constructed with decorative construction materials on all four sides. The dumpster enclosure provided in the plans meets this requirement. The electric transformer on the west side of the building needs to be screened to meet the development standards. Staff recommends that the transformer be relocated to be behind the 3 arborvitae located to the south of the transformer.

The Meijer outparcel development pattern book discusses specific landscape standards for the parking area, building, and screening purposes. The proposed site plan meets the landscape requirements in the number of trees required along with screening the parking lot. The building is required to provide a minimum planting width of 3 feet adjacent to the building with multi-stemmed ornamental trees, shrubs, perennial flowers and ground cover, consisting of no less than 40% of the building perimeter. The building perimeter landscaping meets this requirement.

The proposed lighting plan features nine parking lot lights that are proposed to be a max 16 foot tall with a decorative bell shaped fixture. The proposed lighting meets the specs of the outparcel development book.

The Meijer outparcel development pattern book requires that similar colors, materials and textures of the buildings need to match that of the Meijer store. Details and features on the Meijer building should be incorporated to the smaller scale of the outparcel developments. All sides of the buildings shall express a consistent architectural detail and character. All buildings are required to be traditional and natural in appearance such as brick, precast stone, wood and glass. No less than 60% of each façade shall be brick or stone. The proposed building is comprised of brick, stone and Eifs and meets the 60% brick requirement. The street frontage of the building walls shall be no less than 40% window glass. The applicant is proposing 46.3% window glass on the Diley Road elevation.

The development text has specific signage restrictions for the outparcels. The applicants signage drawings show metal individual mounted letters that are back-lit on the oval backing of the sign meeting the requirements for the wall signage.

Staff has worked with the applicant on ensuring that the plans meet the development text for the site and is recommending that Final Development Plan FDP-20-001 be approved with the following conditions:

1. The electric transformer be screened on three sides by the arborvitae shown on the plan.
2. The FDC be relocated per Violet Township Fire Dept. recommendation.

Mike Chandler with Leesman Engineering stated that they are the designers for project and they consent with the staff recommendation comments and are confident they can get them addressed.

Mr. Christensen asked if there were any questions for the applicant.

**A motion was made by Brad Richey, seconded by Mark Caulk that Final Development Plan #FDP-20-001 be approved with the following conditions and recommend to City Council for Approval:**

1. **The electric transformer be screened on three sides by the arborvitae shown on the plan.**
2. **The FDC be relocated per Violet Township Fire Dept. recommendation.**

**The motion carried by the following vote:**

**Yes: 4 – Caulk, Richey, Serna & Christensen**

**Abstain: 1 - Donahue**

**ZM-20-001**

Property Owner: Winchester Office Park LLC

Applicant: Deno Duros

Location: PID 184-003366 (1.27 acres in the Winchester Office Park.)

Request: Rezone a portion of the property from General Commercial to Planned Commercial District.

Mr. Haire presented the application for Deno Duros for property located at Parcel ID 184-003366. The applicant is requesting approval to rezone a portion of the property from General Commercial to Planned Commercial District.

The subject site is the same as the previously requested Site Development Plan for the 16,500 sq. ft. office building in the Winchester Office Park. The applicant is requesting that 1.279 acres of this site be rezoned from General Commercial to Planned Commercial District to be incorporated into the adjacent PCD district for Winchester Investment Corporation. The piece to be rezoned would encompass an area 155 feet by 358 feet.

Staff discussed that the Winchester Investment Corp PCD was adopted by ORD 112-96. When looking at the site, properties to the east are part of the existing Planned Commercial District which covers +/- 30 acres from Gender Road to this subject property. The Fairfield Inn to the south of this site is zoned General Commercial. To the north is the OPUS industrial project zoned Limited Manufacturing. To the west is undeveloped ground zoned General Commercial.

Staff shared a site plan for the area proposed to be rezoned. The area includes the previously approved 16,500 sq. ft. office building and parking for that building. When looking at a rezoning application there are a number of criteria that need to be considered. The first being the compatibility to adjacent land uses. Due to the adjacent land uses consisting of a school, professional office buildings and a hotel, the proposed rezoning would be permitted since it encompasses the same zoning categories. The Planned Commercial Development text permits all uses that are within the Neighborhood Commercial, General Commercial, and Suburban Office Districts.

The second criteria is looking at the relationship of traffic and utility services. A traffic study was initially done when this site and the industrial parcel were being proposed for development. That traffic study took into account 28,000 sq. ft. of office space. Mr. Haire discussed that the proposed use for this building is a school so it should generate less traffic in peak hours than office space. The traffic study did show there would be some delay factors in the build condition in 2030. The city is already evaluating what improvements to be made to decrease the impacts of development during traffic peak times.

The existing PCD allows for uses permitted within the Suburban Office zoning district. The SO district allows for schools as permitted uses. The proposed

tenant for this building is a company called Skilled Learning Center. This user is currently located on Franklin Street behind the library branch in the modular trailers. This school serves special needs students and this project would allow for them to expand their operation in Canal Winchester. This use is not permitted within the General Commercial zoning district so the proposal is to incorporate this site to the adjacent property zoning to allow the proposed use.

Staff feels that this project allows for the long-term flexibility in the space. It currently allows for an existing user to remain and grow in the community and allows for multiple business types to occupy this space in the future if necessary.

Staff is recommending that Planning and Zoning Commission recommend approval of the proposed rezoning of 1.279-acre parcel from General Commercial to Planned Commercial District with the development text adopted by Ordinance 112-96.

Mr. Christensen asked the applicant if they had any comments.

Mr. Bogenrife commented that they are excited to move a business already in the community to a new location.

Mr. Christensen asked the applicant if the user is taking the entire building. Mr. Bogenrife affirmed and commented that with the proposed user they would have an excess of parking from what is needed on the site.

Mr. Christensen opened up the application for the Public Hearing.

**A motion was made by Joe Donahue seconded by Brad Richey that this Public Hearing be closed.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

**A motion was made by Brad Richey, seconded by Kevin Serna that Zoning Map Amendment #ZM-20-001 be recommended to City Council for adoption.**

**The motion carried by the following vote:**

**Yes: 5** – Caulk, Donahue, Richey, Serna & Christensen

Old Business

New Business

Mr. Haire addressed Mrs. Cecutti's comments from the beginning of the meeting noting that there is zero truth to the rumor that Town Hall would be demolished with the move to the new building. With the relocation of the Public Assembly portion of this building to the McDorman rehab Town Hall will be rehabbed to another use but will stay under the ownership of the city.

Mrs. Cecutti asked staff about the two residential homes purchased by the developer on West Waterloo Street. Mr. Haire responded saying that if you study the Old Town Plan the public recommended to add more commercial and mixed-use buildings in the area. The only way to achieve that goal is to remove some existing structures. That plan identified West Waterloo Street as the best opportunity for future redevelopment given the converted residential homes to business space, which is not using the property to its highest and best use. Several properties along West Waterloo including those two homes are specifically not shown on the Old Town Plan as they provide opportunity for future redevelopment potential. Mrs. Cecutti asked if the information shown in the Old Town Plan is set in stone. Staff indicated that any redevelopment is subject to all of the approval processes by both Landmarks Commission and Planning and Zoning Commission.

Mr. Haire address the question in regards to access along the alley behind this property noting that the intention is to recommend it be change to one-way traffic. This is something that is approved by City Council. Other traffic changes are also being evaluated in the downtown area to remove the conflict of West Waterloo, Elm Street, Washington Street and Groveport Road intersections.

Mr. Haire stated that in regards to the building architecture it all went through two public processes. The first was with the Landmarks Commission and the second with Planning and Zoning Commission. There were no variances required with the project so there is no public notification requirement for projects that meet zoning standards. Staff suggested that Mrs. Cecutti sign up on the city website to receive notifications for P&Z and Landmarks meetings.

Adjournment

*Time Out: 7:59 pm*

**A motion was made by Joe Donahue, seconded by Brad Richey, that this Meeting be adjourned. The motion carried by the following vote:**

**Yes: 5 – Caulk, Donahue, Richey, Serna & Christensen**

\_\_\_\_\_  
Date

\_\_\_\_\_  
Bill Christensen - Chairman

\_\_\_\_\_  
Joe Donahue - Secretary

**Conditional Use #CU-20-001  
36 East Waterloo Street**

Owner: Travis Jacks  
Applicant: Hillary Jacks  
Location: 36 East Waterloo Street  
Existing Zoning: OT-C (Old Town Commercial)  
Request: Conditional Use from Section 1187.03 Home Occupation, to allow for the conduct of the home occupation to be within a structure accessory to the principal structure.

Location and Surrounding Land Uses

The subject property consists of .127 acres located on the north side of East Waterloo Street and is zoned OT-C (Old Town Commercial), which allows for both commercial and residential as permitted uses. Properties to the left and right are zoned OT-C. The property to the left contains a legal non-conforming property with several multi-family structures. Property to the right contains a single family residence. Property to the north is vacant undeveloped ground zoned OT-MF (Old Town Multi-Family). Property to the south is zoned OTC and consists of commercial businesses.

**Chapter 1187 HOME OCCUPATIONS**

**1187.01 PURPOSE.**

The purpose of these provisions is to allow where appropriate limited, non-residential activities in residential structures that are compatible with the neighborhoods in which such structures and related home occupation activities are located. The standards provided for herein are intended to ensure compatibility of home occupations with other permitted uses and with the residential character of the neighborhood.”

**1187.02 PERMITTED USE.**

A home occupation use shall be permitted within a dwelling unit provided the occupation does not occupy more than twenty (20) percent of the gross floor area or two hundred (200) square feet of the dwelling unit, whichever is larger, and provided the following criteria are met.

(a) Requirements. The following requirements shall apply to permitted home occupation uses:

- (1) The home occupation shall only be conducted within a principal structure and shall not be conducted within an accessory use or structure.
- (2) The external appearance of the principal structure or property shall not be altered and the home occupation within the residence shall not be conducted in a manner which would cause the premises to differ in any way.

(3) No more than one (1) non-resident employee shall be engaged in such home occupation.

(4) No equipment or process shall be used in such home occupation which creates noise, vibration, glare, fumes, odors or electrical interference detectable to the normal senses off the lot. In the case of electrical interference, no equipment or process shall be used which creates visual or audible interference in any radio or television receivers off the premises, or causes fluctuations in line voltage off the premises.

(5) There shall only be limited sales on the premises of goods produced on the premises.

(6) There shall be no external indication of such home occupation other than one (1) sign, controlled by the sign regulations in this Zoning Code under Chapter 1189.

(7) There shall be no outside storage of any kind related to such home occupation.

(8) Specialized tutoring or instruction shall be limited to one (1) individual in the principal structure during said tutoring or instruction.

(9) No traffic shall be generated by such home occupation in greater volume than would normally be expected in a residential neighborhood, and any need for parking generated by the conduct of such home occupation shall meet the off-street parking requirements as to use as specified under Chapter 1185, and shall not be located in front of the building line.

### **1187.03 CONDITIONAL USE.**

It is recognized that there may exist certain home occupations that fail to meet the criteria of Section 1187.02, but which may be appropriate for a residential area provided the following additional criteria are met through the Conditional Use procedure of Chapter 1145 including the requirements therein.

(a) Requirements. Home occupation conditional uses shall be limited by the following criteria and/or any other conditions as determined by the Planning and Zoning Commission in order to protect the residential character of the subject area:

(1) There shall be no more than three (3) non-resident employees.

(2) The conduct of the home occupation may be approved within a structure accessory to the principal structure.

(3) Sales of commodities not produced on the premises may be permitted provided such commodities are specified and approved as a part of the application for a Conditional Use, provided the Planning and Zoning Commission determines that such sales will not become a detriment to the existing residential character of the lot or neighborhood through a resulting increase in traffic, noise, vibration, glare, fumes, odors or electrical interference or any other factor resulting in an adverse impact.

(4) Organized instruction may be permitted provided the class size does not exceed six (6) pupils during any one period of instruction, provided the Planning and Zoning Commission determines that such organized instruction will not become a detriment to the existing residential character of the lot or neighborhood through a resulting increase in traffic, on-street parking, or any other factor resulting in an adverse impact.

(5) No outside storage of any kind associated with a home occupation conditional use shall be permitted unless it is totally screened from the adjacent residential lots and the abutting street(s).

(6) The off-street parking requirements of Chapter 1185 apply and such off- street parking area shall not be located in front of the building line.

(b) Validity. For the purposes of this Zoning Code, a Home Occupation Conditional Use ceases to be valid once the premises used for the home occupation is no longer occupied by the holder of the Certificate of Zoning Compliance or upon the conduct of a home occupation in a manner not approved by the Planning and Zoning Commission.

#### Conditional Use Criteria

A conditional use to Section 1187.03(a)(2) has been requested to allow for a commercial business operation to take place within an accessory structure.

The following criteria from Chapter 1145.03 shall apply:

- a. The proposed use is a conditional use of the zoning district and the applicable development standards of this Zoning Code are met.
- b. The proposed use is compatible with adjacent land use, adjacent zoning, and to appropriate plans for the area.
- c. The proposed use will not adversely impact access, traffic flow, and other public facilities and services.
- d. The proposed use will not result in the destruction, loss or damage of a natural, scenic, or historic feature.
- e. The proposed use will not adversely affect the public health, safety, convenience, comfort, prosperity, and general welfare.

#### Analysis

Staff was notified of a noise complaint on two separate occasions in regards to woodworking equipment being used at 36 East Waterloo Street consistently through the early morning and late evening hours. Both complainants informed the zoning officer that a commercial business operation manufacturing furniture was being run on of the property, resulting in the noise complaint.

During a digital investigation of the property staff found several internet sites advertising the sale of products (made from wood) that were being produced on the subject property. Photographs from these sites depict the detached structure in which the products were being produced. Staff contacted the property owner and informed them of the noise complaint which trigged the investigation and informed the property owner that a home occupation within a structure accessory to the principal structure is a conditional use request that can be granted by the Planning and Zoning Commission if the criteria from Chapter 1145 is being met.

The applicant has submitted a conditional use application to allow for the home occupation to continue. The applicant notes that the construction of furniture and operation of woodworking equipment is typical between the hours of 10am and 6pm. This equipment typically involves a miter saw and palm sander. Possible solutions to reduce any further noise complaints involve moving the

power tools to the far side of the garage to lessen the impact from the equipment being used from the western property owner.

Staff Recommendation

The subject property is unique in that it is zoned Old Town Commercial where both commercial and residential uses are both permitted. The blend of these uses can be seen along East Waterloo and West Waterloo Street and is not an unusual condition. All of the complaints that staff has received regarding noise from this home occupation has been sited that such noise from the production of furniture was well into the evening hours, sometimes as late as 10pm. Therefore, subject to comments from abutting property owners, staff recommends that the applicants Conditional Use request be approved with the following conditions:

1. The hours of operation for the business within the accessory structure be limited from 10am to 6pm.
2. The doors and windows on the structure be closed while any equipment is being operated.



# City of Canal Winchester

36 South High Street  
Canal Winchester, Ohio 43110  
Development Department  
Phone (614) 837-7501 Fax (614) 837-0145

## CONDITIONAL USE APPLICATION

rev. 09/24/2013

### PROPERTY OWNER

Name Travis Jacks

Address 36 E Waterloo St.

Daytime Phone (614)

Email Travisjcks@gmail.com

### APPLICANT

Name Hilary Jacks

Address 36 E Waterloo St.

Daytime Phone (614) 209-3551

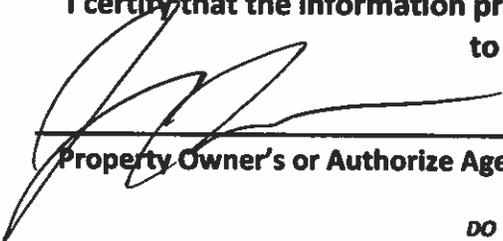
Email hilaryalmendez@yahoo.ca

Address of Subject Property same

Current Zoning residential Description of Proposed Use use detached garage to operate a portion of business

Attach legal description and current survey (within 2 years) of the subject property and all supporting materials as required by Section 1145.02 (c) (see attachment). Additional information may be required by the Planning and Zoning Administrator or the Planning and Zoning Commission

I certify that the information provided with this application is correct and accurate to the best of my ability.

  
\_\_\_\_\_  
Property Owner's or Authorize Agent's Signature

1/18/2020  
\_\_\_\_\_  
Date

DO NOT WRITE BELOW THIS LINE

Date Received: 1/23/20

Fee: \$ 250<sup>00</sup>  
Paid

Historic District:  Yes  No  
Preservation District:  Yes  No

Date of Action: \_\_\_/\_\_\_/\_\_\_

Application  No

Expiration Date: \_\_\_/\_\_\_/\_\_\_

Approved:  Yes

Tracking Number: CU - 20-001

Yes, with conditions

January 18, 2020

City of Canal Winchester  
Development Department  
36 South High Street  
Canal Winchester, OH 43110

To whom it may concern:

We are hereby applying for a conditional use permit under Chapter 1187.03 of the Canal Winchester Zone and Planning Regulations to use a structure accessory to conduct a portion of our home-based business on the property located at 36 East Waterloo Street.

I also hereby request that Mark Caulk of the Planning and Zoning Committee be excluded from the discussion and/or voting on the application due to a conflict of interest.

Relating to the proposal, please see the attached documents.

As owner of the property, I hereby authorize Hilary Jacks to apply on my behalf to the City of Canal Winchester for all permits and approvals related to this property.

Sincerely,

A handwritten signature in black ink, appearing to read 'Travis Jacks', with a long horizontal flourish extending to the right.

Travis Jacks

To whom it may concern,

I am requesting a conditional use permit to utilize a portion of my detached garage for the production of small wood craft items for my online business, Belliesop.

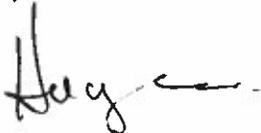
I run a small portion of the business out of the accessory structure. Approximately 60% of the everyday business including painting, shipping, marketing and managing is done within the main dwelling. I do not have any employees as I am a sole proprietor. My sales are done entirely online. I do not have customers that come to my home, there is no additional traffic generated or parking needed nor any signage. I am not requesting any changes to the structure or design of the garage or any additional modifications from the existing state.

I feel that there is minimal impact made by the business to the neighborhood other than the positive contributions this and all small businesses bring to our community. The taxes paid by Belliesop directly benefit the City of Canal Winchester, as does my support of the local economy as I buy the majority of my supplies locally. I consistently patron and promote our local small businesses such as Fantasy Cupcake and NomNomNom, among others by including their products in my packaging that ships, not only throughout central Ohio, but all over the country. A great deal of revenue is generated from the packages I ship out weekly from our local post office. I also include marketing materials from Canal Winchester's "Crafted in Canal Winchester" branding/marketing initiative to share my pride in this community. I have always felt a great deal of support from my community members as I often have neighbors stop by the workshop to chat.

It was brought to my attention that a noise complaint was made about after-hours noise by an adjacent property owner that does not actually reside at the property. I would like to make it known that I work only during business hours. I do not run any sort of tool before 10:00 AM and almost always wait until my closest neighbor leaves for work to begin any noisy tasks. On typical work days I am done in the workshop by 6:00 PM. Many days I do not use the workshop at all. Much of my business is done within the main dwelling. The main source of any additional noise beyond a normal garage usage is typically a miter saw and a palm sander.

As a solution to the noise complaint I propose to operate power tools on the opposite side (east side) of the garage, further away from my adjacent neighbor who might be impacted by the noise. Additionally, I plan to log my hours spent working in the garage to show that there is no excessive amounts of noise or noise being generated during inappropriate hours.

-Hilary Jacks

A handwritten signature in black ink, appearing to read "Hilary Jacks", with a horizontal line extending to the right from the end of the signature.

## Conditional Use Required Materials Section 1145.02 (C)

1. Travis, Samme and Hilary Jacks, 36 E Waterloo St, 614-209-3551.
2. Detached garage/accessory structure.
3. The current primary dwelling serves as a single-family home. The secondary unit is a detached garage that is used partly for personal storage and partly as a small basic workshop. Our home is zoned residential but is surrounded on 3 sides by a mixture of residential and commercially zoned properties. The proposed conditional use is to utilize a portion of garage to produce a fraction of the business' wood crafts.
4. Austin Caulk 32 E Waterloo (to the west of the property)  
Mark Caulk 40 E Waterloo (to the east of the property)  
There is a vacant field to the rear of the property.
5. No changes to interior or exterior of the structure are being requested. There is minimal impact to the general welfare of the community beyond the increase of activity (in comparison to a typical resident's detached garage) within the structure.
6. There is no additional traffic, parking or potential nuisances relating to the proposed use as the business is run entirely through online sales. There is a minimal amount of noise generated from basic woodworking equipment (mainly a miter saw and palm sander) that is done during business hours only (10AM-5PM). As a solution to the noise complaint I propose to move any power tools to the opposite side of the workshop where there is no adjacent dwellings, as well as, log the hours of operation within the workshop to show that there is not work being done outside of reasonable working hours.
7. A. See survey, no changes being proposed.  
  
B. No traffic access/circulation, or parking needed. There are no additional utilities needed or being used other than the existing electrical being pulled from our home/primary dwelling. There is no signage, lighting or landscaping used.

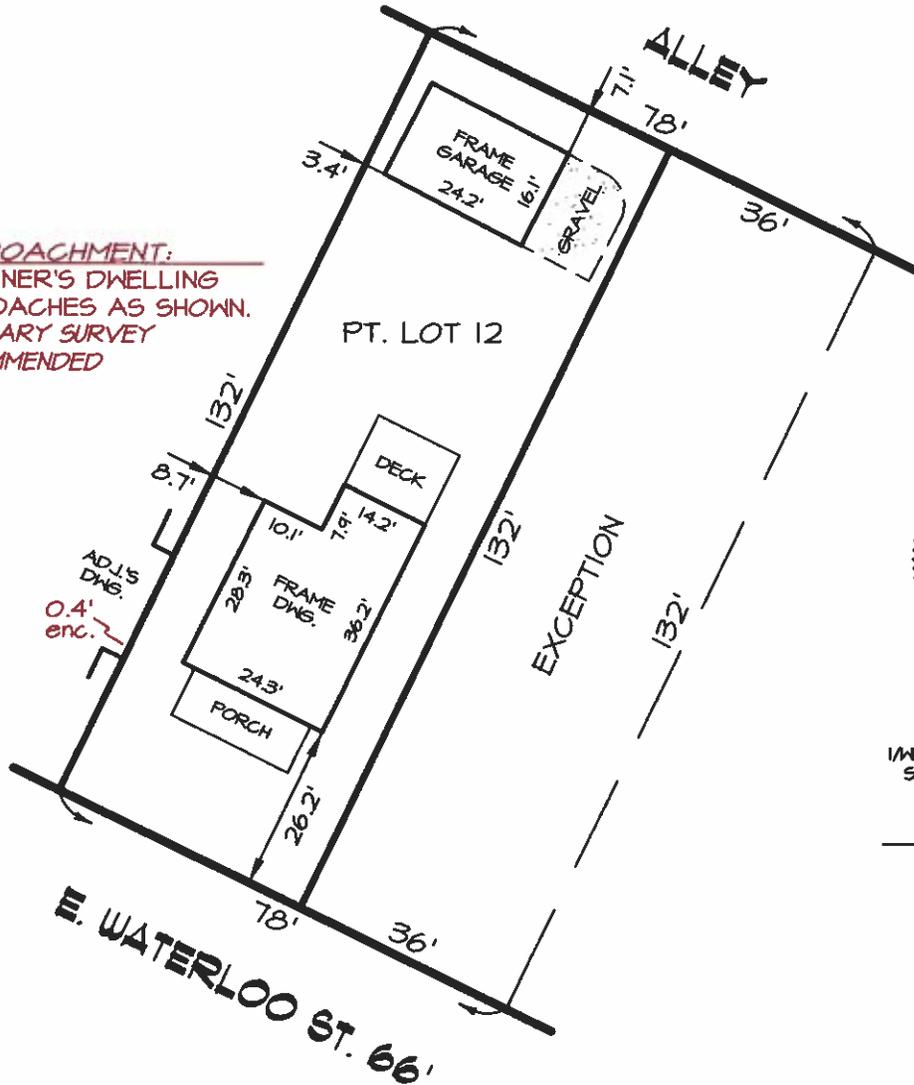


**CAMPBELL &  
ASSOCIATES, INC.**  
Land Surveying

614.785.9340  
Fax: 614.785.9342  
77 E Wilson Bridge Road  
Suite 205  
Worthington, OH 43085  
<http://www.campbellsurvey.com>

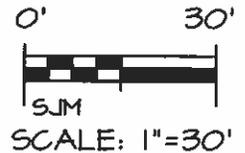
### MORTGAGE LOCATION SURVEY

ENCROACHMENT:  
ADJOINER'S DWELLING  
ENCROACHES AS SHOWN.  
BOUNDARY SURVEY  
RECOMMENDED



I/WE HAVE RECEIVED A COPY OF THIS SURVEY AND FIND THE CONDITIONS ACCEPTABLE TO ME/US.

BUYER/OWNER



Address 36 E Waterloo Street

Allotment: Ruebin Doves Addition

State of Ohio, County of Franklin

Plat Book: 3 Page: 142

City of Canal Winchester

Client Order No. 50728.OH

New Owner Travis W Jacks and Samme R Jacks

Date January 25, 2016

Present Owner William C Bennett

C & A Order No.  
CO133899

This is to certify to **NOIC, Inc., ISAOA and/or Great American Title Agency, LLC**

that a visual inspection of the property and buildings shown (if any) has been made and there are no apparent encroachments or visible easements unless otherwise shown. This service was not performed for the purpose of establishing boundary lines, and is not to be used for that purpose.

This Mortgage Location Survey has been prepared in accordance with Chapter 4733-38, Ohio Administrative code, and is not a boundary survey pursuant to Chapter 4733-37, Ohio Administrative Code

*Matthew L. Campbell*

Matthew L. Campbell - Reg. Surveyor No. 8546

**Site Development Plan #SDP-20-002  
Bank of America**

Owner: Waterloo Crossing LTD  
Applicant: Bank of America  
Location: PID 184-003208 – Property located at the Waterloo Shopping Center.  
Existing Zoning: GC (General Commercial)  
Request: Site Development Plan for a 3,960 sq. ft. commercial bank.

Location and Surrounding Land Uses

The subject property is zoned GC (General Commercial) and consists of 1.28 acres on the south side of Winchester Blvd (out of the 6.16 acre parcel). All surrounding properties are zoned GC and are part of the Waterloo Crossing Shopping Center. This property is subject to the Commercial Development Standards of the Zoning Code.

Setbacks

The proposed structure has the following minimum setbacks.

Front: 25 ft. Side: 20 ft. Rear: 25 ft.

The subject property has a front build-to-line at 25 feet. The commercial development standards, code section 1199.04(a)(1) allows a variation from the build-to line of 0 feet to 5 feet if the project provides additional green space or outdoor seating.

The proposed building is located 87 feet from the Winchester Blvd property line. This is an additional setback of 62 feet from the 25 foot build-to-line. The applicant received a variance to the build-to line requirement during the August 12, 2019 meeting.

Parking and Access

The site will be accessed by vehicle from the existing service roads surrounding the site and an expansion to the existing parking lot. To the immediate south of the proposed building is an east-to-west connecting access drive that will connect the existing access drive to the west with the larger Walmart parking lot to the east. The Bank of America site will have a dedicated parking lot entry to the west of the building and a dedicated drive-thru entry to the east of the building. The drive-thru will have an exit only curb cut to the north of the site. A pedestrian access sidewalk connecting the front door to the sidewalk along Winchester Blvd has been provided.

The proposed site plan provides 20 parking spaces within the Bank of America Site. An additional 134 parking spaces will be constructed off site, completing the parking gap within this area of the shopping center

Per section 1185.03 of the Zoning Code, parking shall be provided at 1 space per 200 sq. ft. of gross floor area for banks, savings and loans, and other financial businesses. The proposed Bank of America has 3,960 sq. ft. of building therefore requires 20 spaces.

### Landscaping and Lighting

The proposed landscaping plan shows parking lot screening along Winchester Blvd right-of-way and the private commercial access drive to the west, east and north. The applicant has provided the number of new trees on site to meet building and parking requirements.

The parking lot lighting plan provided is showing two (2) parking lot lights will be constructed on site and an additional four (4) in the offsite parking will be added. The parking lot lights will feature a historic bell head fixture with LED lighting. The plan shows that the maximum lighting intensity for the site will be at 19.5 foot candles while the average light intensity at 2.37 foot candles.

### Signage

The development text for the Waterloo Shopping Center allows monument signs to be a maximum of 50 sq. Ft. of copy area per face, maximum 8 feet tall and a minimum 15 feet from the public right-of-way. The plans submitted show the applicant is going to construct a monument sign that meets the Waterloo Shopping Center standards.

The development text for the Waterloo Shopping Center allows for a maximum total of 175 sq ft of total wall signage. Wall signs are permitted on up to four (4) elevations, with a maximum area per elevation of 100 sq. ft. The maximum length of any wall sign shall not exceed 80% of the building face on which the sign is located. Details for the wall signage has not been submitted at this time for review.

### Utilities

Sanitary sewer service is proposed to be connected from the east from an existing 8" sanitary main that leads to Walmart. Water service is proposed to come from the south from the 12" water line that serves the shopping center to the south. The plans show the site will drain into an existing storm water system to tie into the regional detention system for the shopping center.

### Elevations

The applicant has provided elevations of the proposed Bank of America. The Commercial Development standards require that exterior walls be composed of 80% natural materials with brick or stone as the predominant material. The proposed elevations meet this requirement.

The Commercial Development Standards require the building to have four sided architecture. The standards also require that for every 100 ft. of elevation width, each side and rear elevation must have two (2) design elements and the front must have three (3) design elements.

- The north elevation is the primary entry into the facility. This elevation features a red brick façade with a split face CMU water table in combination with storefront window glass. A false brick entry arch is on the right hand side of the building at the entrance.
- The west elevation features a similar material breakdown as the north with red brick and CMU water table. This elevation faces the main parking area and features four small windows.
- The east elevation has a similar façade treatment as the north and west with red brick, CMU and window glass. The detached ATM drive thru is located on this side of the building and sits under an overhead awning.
- The south elevation shows a man door and a horizontal window to the left side of the wall.

The applicant has not submitted samples of what the proposed CMU material looks like on the facility. Staff requests that the CMU be submitted for review by the P&Z Commission prior to plan approval.

Additionally, the updated elevation drawings do not show that the rooftop mechanical units will be completely screened behind the parapet walls. Staff requests that the applicant confirm that the new building elevation does not alter the previously approved rooftop mechanical unit screening.

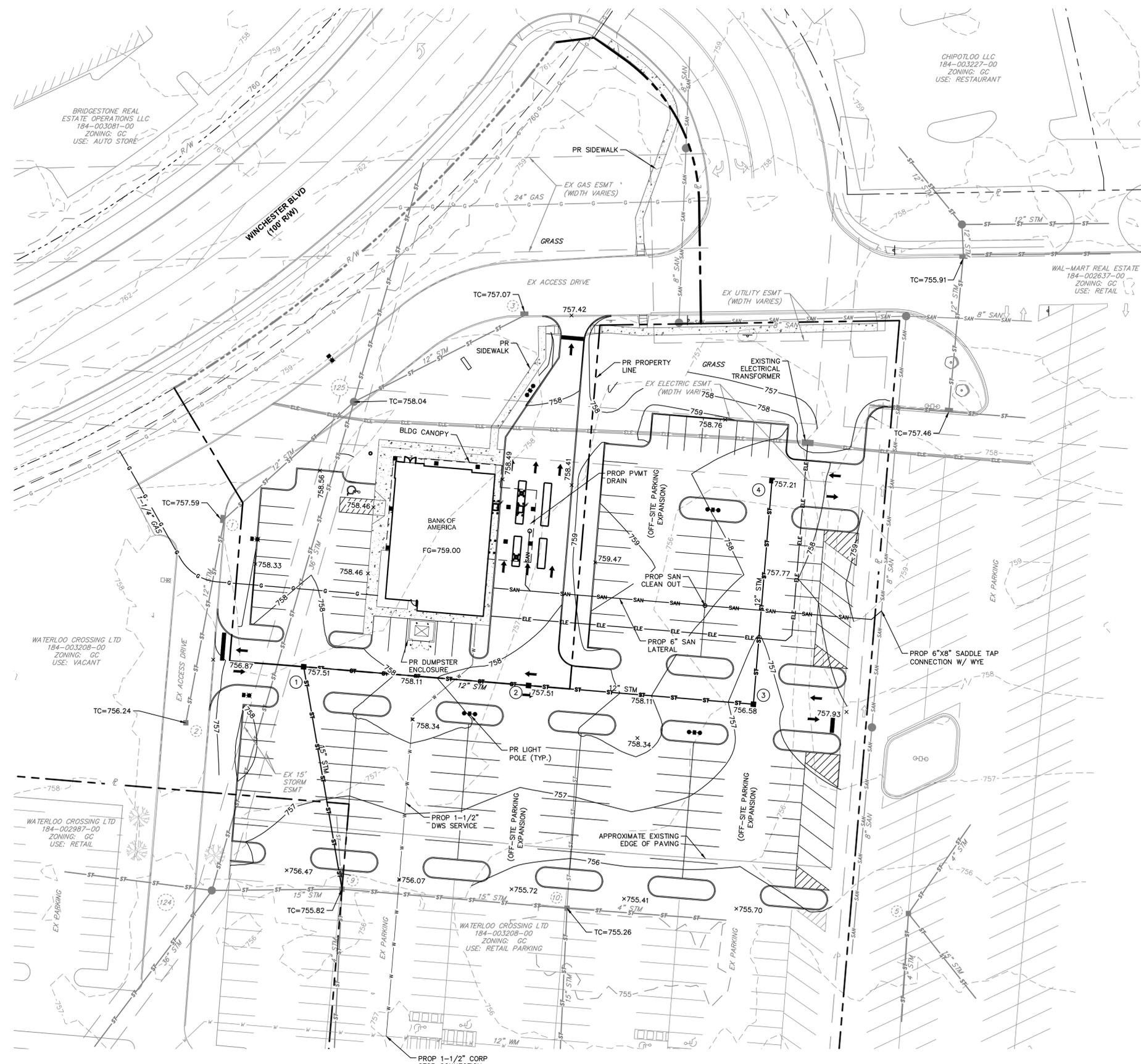
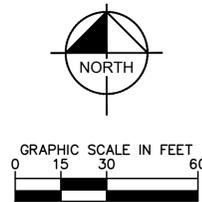
Staff Recommendation

Staff has reviewed the modifications to the proposed site plan and has found that they meet the appropriate development standards for the Waterloo Crossing shopping center and other applicable zoning requirements. Based on feedback from the P&Z Commission, staff recommends that SDP-20-002 be approved as presented with the conditions:

1. A sample of the CMU material be provided for the March 9 P&Z Meeting for review.
2. The applicant verify the rooftop mechanical units will be screened from view.



Drawing name: \\kimley-horn.com\NW\_CIB\_DEV\190056001\_Nelson\_Bank\_of\_America\_Canal\_Winchester\2\_Design\CAD\PlanSheets\1\_Site\_Development\_Plan\Utility\_Grading\_Plan.dwg SKETCH PLAN Feb 14, 2020 10:35am By: Nick Stauffer  
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LEGEND	
	EXISTING PROJECT BOUNDARY LINE
	EXISTING PROPERTY LINE
	EXISTING RIGHT-OF-WAY
	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING CURB
	EXISTING SIDEWALK
	EXISTING BUILDING
	EXISTING SANITARY SEWER
	EXISTING WATER LINE
	EXISTING MANHOLE
	EXISTING CURB INLET
	EXISTING CATCH BASIN
	EXISTING STORM SEWER
	EXISTING SIGN
	EXISTING SINGLE LUMINAIRE LIGHT POLE
	EXISTING DOUBLE LUMINAIRE LIGHT POLE
	PROPOSED CURB
	PROPOSED BUILDING
	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR
	PROPOSED WATER SERVICE
	PROPOSED GAS SERVICE
	PROPOSED UNDERGROUND ELECTRIC
	PROPOSED SANITARY SERVICE
	PROPOSED STORM SEWER
	PROPOSED CATCH BASIN
	PROPOSED SINGLE LUMINAIRE LIGHT POLE
	PROPOSED DOUBLE LUMINAIRE LIGHT POLE
	PROPOSED WALL MOUNT LIGHT
	PROPOSED CANOPY LIGHT

No.	REVISIONS	DATE	BY

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 DESIGNED BY: NS  
 DRAWN BY: NS  
 CHECKED BY: BAS

**UTILITY & GRADING PLAN**

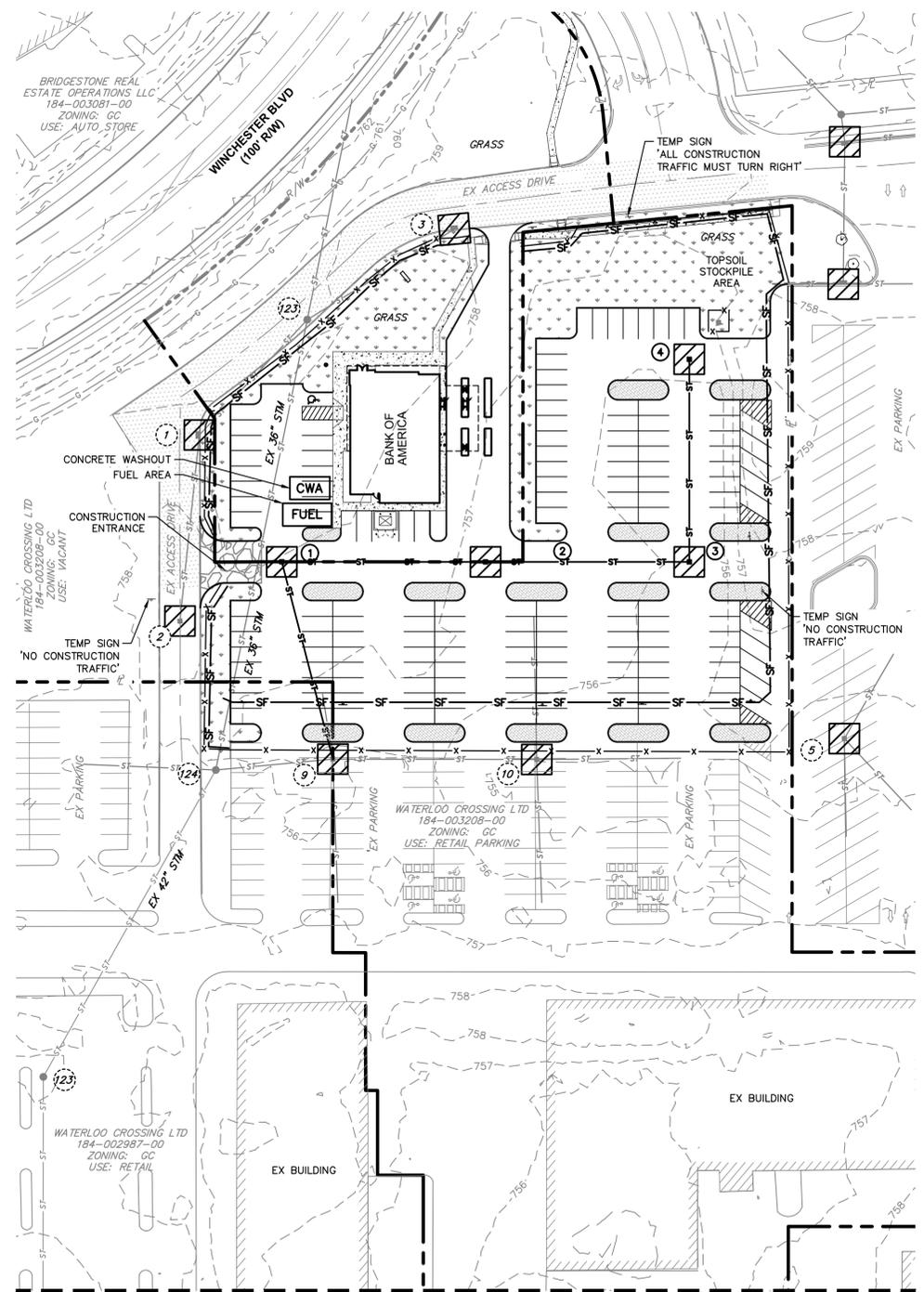
**BANK OF AMERICA**  
 WINCHESTER BOULEVARD  
 CANAL WINCHESTER, OH 43110

ORIGINAL ISSUE:  
 2/6/2020

KHA PROJECT NO.  
 190056001

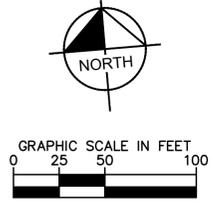
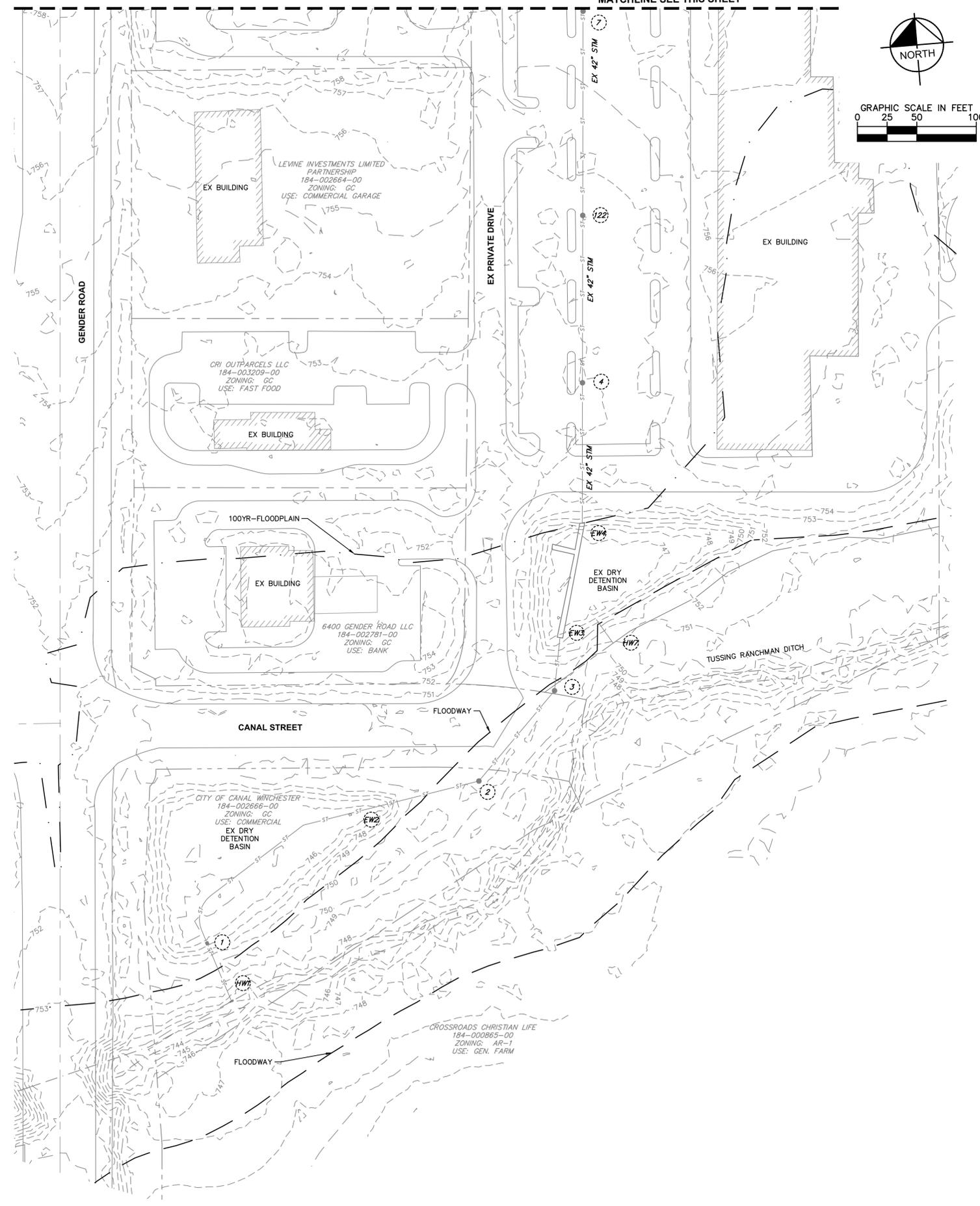
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**LEGEND**

---	EXISTING BOUNDARY LINE	=====	PROPOSED CURB
- - -	EXISTING PROPERTY LINE	-SAN-SAN-	PROPOSED SANITARY SERVICE
- - - - -	EXISTING RIGHT-OF-WAY	-W-W-W-	PROPOSED WATER SERVICE
- - - - - 895	EXISTING INDEX CONTOUR	■	PROPOSED STORM CATCH BASIN
- - - - - 894	EXISTING INTERMEDIATE CONTOUR	●	PROPOSED STORM MANOLE
- - - - -	FEMA FLOODWAY	-ST-ST-ST-	PROPOSED STORM SEWER
- - - - -	FEMA 100YR-FLOODPLAIN	-X-X-X-	PROPOSED CONSTRUCTION FENCE
=====	EXISTING CURB	-SF-SF-	PROPOSED SILT FENCE
=====	EXISTING SIDEWALK	[Pattern]	PROPOSED CONSTRUCTION ENTRANCE
=====	EXISTING PAVEMENT MARKING	[Pattern]	PROPOSED SEEDING
=====	EXISTING RETAINING WALL	[Pattern]	PROPOSED INLET PROTECTION
=====	EXISTING BUILDING	[Pattern]	CONSTRUCTION TRAFFIC RESTRICTION
■ ● ■	EXISTING STORM STRUCTURES	[Pattern]	PROPOSED MULCHING
-ST-ST-ST-	EXISTING STORM SEWER		
○	EXISTING SIGN		



No.	REVISIONS	DATE	BY

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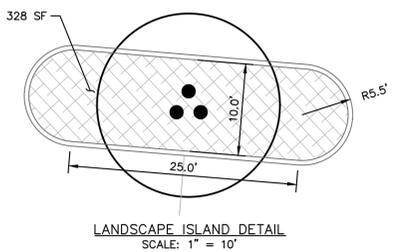
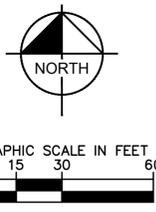
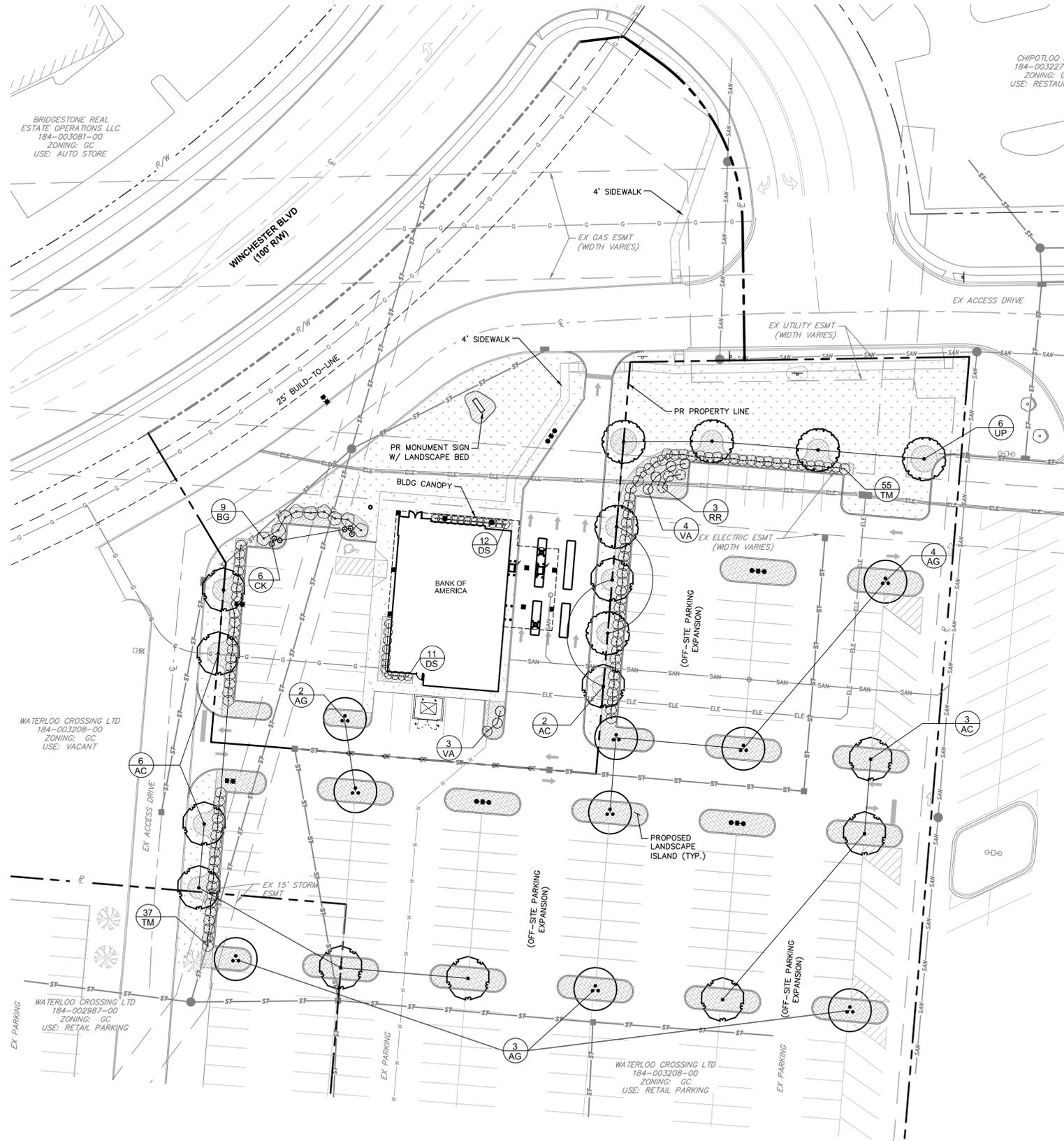
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 DRAWN BY: NNS  
 CHECKED BY: BAS

**EROSION CONTROL PLAN**

**BANK OF AMERICA**  
 WINCHESTER BOULEVARD  
 CANAL WINCHESTER, OH 43110

ORIGINAL ISSUE:  
 2/6/2020  
 KHA PROJECT NO.  
 190056001  
 SHEET NUMBER  
**3**  
 OF 5

Drawing name: \\kimley-horn.com\WWW\CLB\_DEV\190056001\_Nelson\_Bank\_of\_America\_Canal\_Winchester\1\_Site\_Development\_Plan\_Landscape\_Plan.dwg 4 LANDSCAPE Feb 14, 2020 10:35am by: Nick Stauffer  
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**SITE DATA**

OWNER:	WATERLOO CROSSING LTD
STREET ADDRESS:	6591-6635 WINCHESTER BLVD
ZONING:	GENERAL ZONING CATEGORY: GENERAL COMMERCIAL (GC)
EXISTING PARCEL AREA:	6.16 AC
PROPOSED SITE AREA:	1.28 AC
PROPOSED BUILDING DATA	
USE:	BANK (FINANCIAL SERVICES)
GROSS FLOOR AREA:	3,960 SQ.FT.
LANDSCAPING / SCREENING	
BANK	
REQUIRED LANDSCAPED AREA:	118 SF
PROPOSED LANDSCAPED AREA:	8,230 SF
REQUIRED TREES:	1 TREE : 1,000 GROSS SF = 4 TREES
PROPOSED TREES:	4 TREES
PARKING LOT EXPANSION	
PROPOSED PARKING SPACES:	134
REQUIRED TREES:	1 TREE : 6 PARKING SPACES = 23 TREES
PROPOSED TREES:	22 PROPOSED + 1 EXISTING = 23 TREES
REQUIRED ISLAND AREA (DOUBLE-BAY):	324 SF MIN.
PROPOSED ISLAND AREA (DOUBLE-BAY):	328 SF MIN.

**LEGEND**

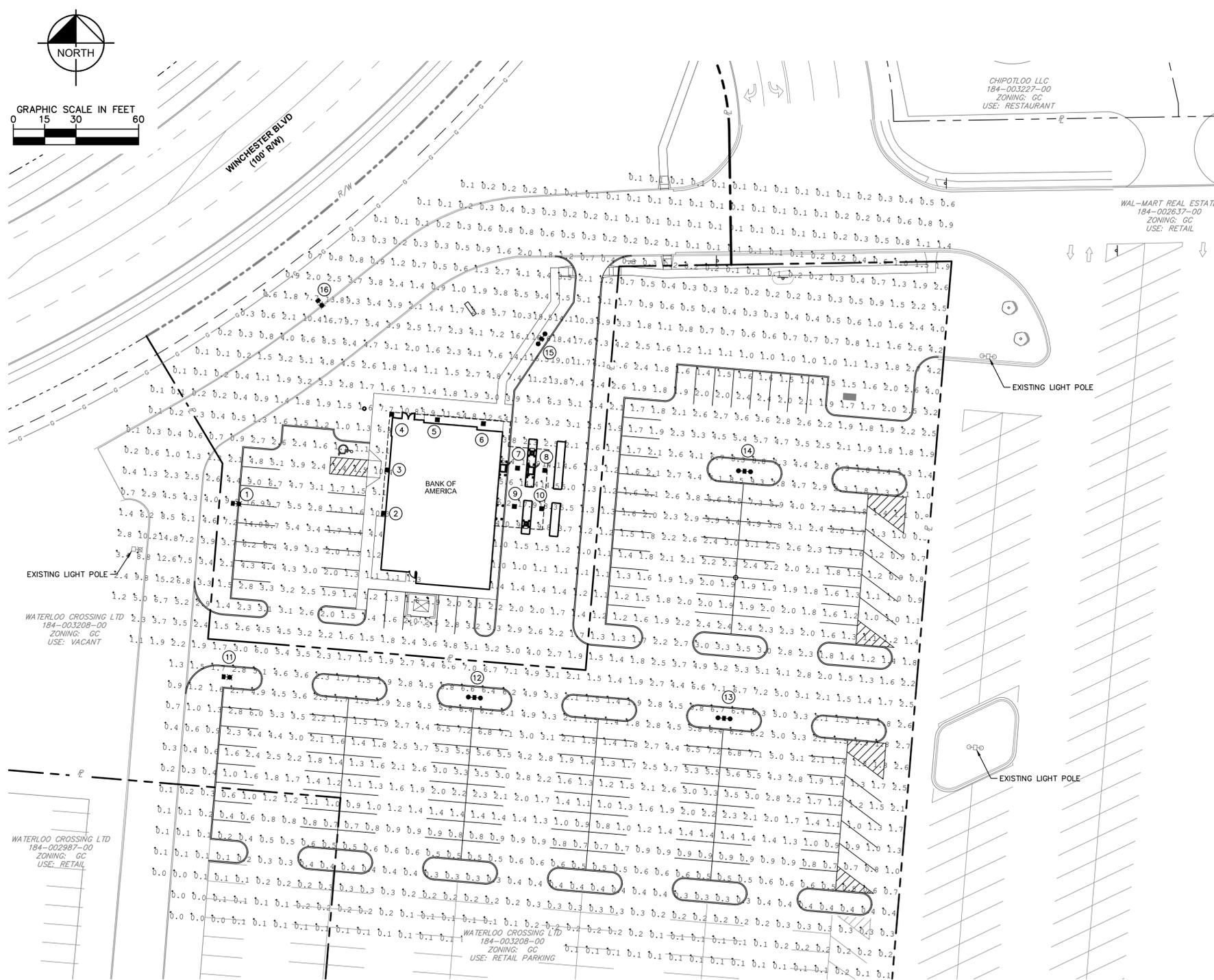
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	EXISTING STORM SEWER
	EXISTING SIGN
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	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR
	PROPOSED WATER SERVICE
	PROPOSED GAS SERVICE
	PROPOSED UNDERGROUND ELECTRIC
	PROPOSED SANITARY SERVICE
	PROPOSED STORM SEWER
	PROPOSED CATCH BASIN
	PROPOSED LIGHT POLE

**PLANT SCHEDULE**

TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	CONT	CAL	SIZE
	AC	11	ACER CAMPESTRE	'HEDGE MAPLE'	B & B		6' HT MIN
	AG	9	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	'AUTUMN BRILLIANCE' SERVICEBERRY	B & B		6' HT MIN
	UP	6	ULMUS PARVIFOLIA	LACEBARK ELM	B & B		3' CAL MIN
SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	CONT	SPACING	SIZE
	BG	9	BUXUS 'GREEN VELVET'	'GREEN VELVET' BOXWOOD	3 GAL	SEE PLAN	24" HT MIN
	DS	23	DIERVILLA RIVULARIS 'SMDNDRSP'	KODIAK BLACK BUSH HONEYSUCKLE	-	SEE PLAN	24" HT MIN
	RR	3	ROSA X 'KNOCKOUT' TM	ROSE	-	SEE PLAN	18" HT MIN
	TM	93	TAXUS X MEDIA 'TAUNTONI'	TAUNTON'S YEW	3 GAL	4' O.C.	24" HT MIN
	VA	7	VIBURNUM DENTATUM 'CHRISTOM'	BLUE MUFFIN VIBURNUM	-	SEE PLAN	36" HT MIN
GRASSES	CODE	QTY	BOTANICAL NAME	COMMON NAME	CONT	SPACING	SIZE
	CK	6	CALAMAGROSIS X ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	2 GAL	SEE PLAN	
	PS2	52	PIRIOPE SPICATA 'BIG BLUE'	CREEPING LILY TURF	1 GAL	18" o.c.	
SHRUB AREAS	CODE	QTY	BOTANICAL NAME	COMMON NAME	CONT	SPACING	
	PA2	4	PENNISETUM ALOPECUROIDES 'HAMELN'	HAMELN DWARF FOUNTAIN GRASS	1 GAL		32" o.c.
GROUND COVERS	CODE	BOTANICAL NAME	COMMON NAME	CONT			
	MU		SHREDED HARDWOOD MULCH	COVER			
	SE		TURF SEED	SEED			

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<p>SCALE: AS NOTED DESIGNED BY: NS DRAWN BY: NS CHECKED BY: BAS</p>	<p><b>LANDSCAPE PLAN</b></p>
<p>ORIGINAL ISSUE: 2/6/2020</p>	
<p>KHA PROJECT NO. 190056001</p>	
<p>SHEET NUMBER</p>	
<p><b>4</b></p>	
<p>OF 5</p>	

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SITE INTENSITY		
	INTENSITY	TARGET INTENSITY
MAXIMUM	19.5	20 FC
AVERAGE	2.37	1-3 FC

**LEGEND**

- EXISTING PROJECT BOUNDARY LINE
- EXISTING PROPERTY LINE
- EXISTING RIGHT-OF-WAY
- ⊗ EXISTING SINGLE LUMINAIRE LIGHT POLE
- ⊗⊗ EXISTING DOUBLE LUMINAIRE LIGHT POLE
- ==== PROPOSED CURB
- ▭ PROPOSED BUILDING
- PROPOSED SINGLE LUMINAIRE LIGHT POLE
- PROPOSED DOUBLE LUMINAIRE LIGHT POLE
- PROPOSED CANOPY LIGHT

LUMINAIRE SCHEDULE					
NUMBER	ARRANGEMENT	MOUNTING HEIGHT	LUMENS	WATTS	DESCRIPTION
1	SINGLE	18 FEET	23805	113	ODN-2-L-T4_96LC_7_4K_UNV_AM_BK_C3/H3
2	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
3	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
4	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
5	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
6	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
7	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
8	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
9	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
10	SINGLE	9 FEET	4420	31	CYP-250-B-DM-F-C-UL-WH-40K
11	SINGLE	30 FEET	25412	121	ODN-2-L-T3_96LC_7_4K_UNV_AM_BK_C3/H3
12	DOUBLE	30 FEET	25412	121	ODN-2-L-T3_96LC_7_4K_UNV_AM_BK_C3/H3
13	DOUBLE	30 FEET	25412	121	ODN-2-L-T3_96LC_7_4K_UNV_AM_BK_C3/H3
14	DOUBLE	30 FEET	23805	113	ODN-2-L-T4_96LC_7_4K_UNV_AM_BK_C3/H3
15	DOUBLE	18 FEET	23805	113	ODN-2-L-T4_96LC_7_4K_UNV_AM_BK_C3/H3
16	SINGLE	18 FEET	23805	113	ODN-2-L-T4_96LC_7_4K_UNV_AM_BK_C3/H3

**ODEN LED Specifications**



Project Name: \_\_\_\_\_

Category Number: \_\_\_\_\_

Type: \_\_\_\_\_

With six interchangeable caps and spun shade styles, the Oden - LED offers architects, designers and engineers endless possibilities for a custom fixture to fit their unique application.

The Oden - LED Arrays high-quality, durable construction makes it an ideal fixture for any application.

**Ordering Information**

MODEL	OPTICS	LEDs	CURRENT	KELVIN	VOLTAGE	MOUNTING	FINISH	CAP/SHADE	OPTIONS
ODN-1-L	T3	96LC	7	4K	UNV	AM	BK	C3/H3	-
ODN-1-L	T1	16LC	3	3K	UNV	YM	BZ	C1	PC-120
	T2	32LC	5	3000K	8	YM	WB	C2	PC-208
	T3	48LC	5	4K	8	YM	WB	C3	PC-240
	T4	72LC	7	5K	5	AM	BK	C4	PC-277
ODN-2-L	T5	96LC	7	5000K	5	AM	BK	C5	WSC-8
	TSW	48LC	3	3000K	5	AM	BK	C6	WSC-30
		64LC	4	3000K	5	AML	WH	H1	WSC-40
		80LC	5	3000K	5	AML	WH	H2	WSC-40
ODN-3-L		96LC	7	3000K	5	AML	SWH	H3	WSC-40
		128LC	9	3000K	5	AML	SWH	H4	WSC-40
						AML	GY	H5	WSC-40
						AML	SL	H6	WSC-40



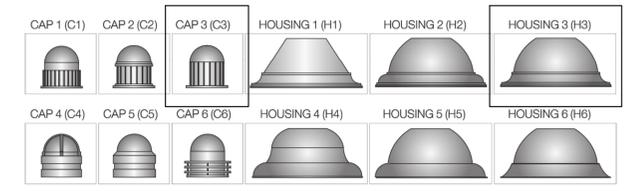
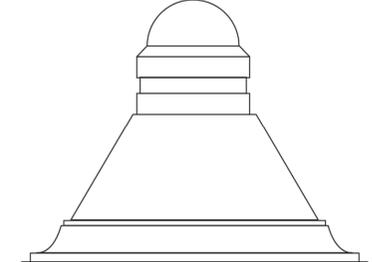
**ODEN LED Specifications**

Photometric Optical Summary

Not all optics are available on all fixtures. Check ordering chart for availability.

EPA Data	Type I (T1)	Type II (T2)	Type III (T3)	Type IV (T4)	Type V (T5)	Type VW (TSW)
Full Fixture	1.2	2.2	4.1	5.5	5.5	5.5
ODN-1	2.5	3.5	6.5	6.5	4.9	5.5
ODN-2	3.5	4.5	6.5	6.5	5.5	5.5

Dimensions	Size 1	Size 2	Size 3
Width:	ODN-1 20"	ODN-2 25"	ODN-3 30"
Height:	ODN-1 19.5"	ODN-2 22.5"	ODN-3 24"
Weight:	40 LBS	53 LBS	74 LBS



**Kimley-Horn**  
 © 2019 KIMLEY-HORN AND ASSOCIATES, INC.  
 2400 CORPORATE EXCHANGE DRIVE, SUITE 120  
 WINCHESTER, OH 43081  
 PHONE: 614-434-6697  
 WWW.KIMLEY-HORN.COM

SCALE: AS NOTED  
 DESIGNED BY: NNS  
 DRAWN BY: NNS  
 CHECKED BY: BAS

**BANK OF AMERICA**  
 WINCHESTER BOULEVARD  
 CANAL WINCHESTER, OH 43110

ORIGINAL ISSUE:  
 2/6/2020  
 KHA PROJECT NO.  
 190056001  
 SHEET NUMBER

**5**  
 OF 5

**EXTERIOR FINISH SCHEDULE:**

**STONE/MASONRY**

- BR-1 MASONRY - GLEN-GERY ADRIAN BRICK (MATCH CASTRO SHOPPING CENTER STANDARD)
- BR-2 MASONRY - GLEN-GERY ADRIAN BRICK (PAINT TO MATCH HARDIE BOARD CHARCOAL SLATE)
- CMU-1 MASONRY - SPLIT FACE CMU

**EXTERIOR GLAZING**

- GL-1 1" HEAT STRENGTHENED CLEAR INSULATED GLAZING AS SPECIFIED
- GL-2 1" TEMPERED INSULATED GLAZING AS SPECIFIED

**ALUMINUM GLAZING FRAME**

- AF-1 STOREFRONT SYSTEM AS SPECIFIED

**ALUMINUM FACED COMPOSITE METAL WALL PANEL**

- ACM-1 CITADEL ARCHITECTURAL PRODUCTS - CLEAR SATIN ANODIZED METAL

**FIBER CEMENT SIDING**

- HB-1 HARDIE BOARD VERTICAL SIDING - CHARCOAL SLATE

**EXTERIOR PAINT**

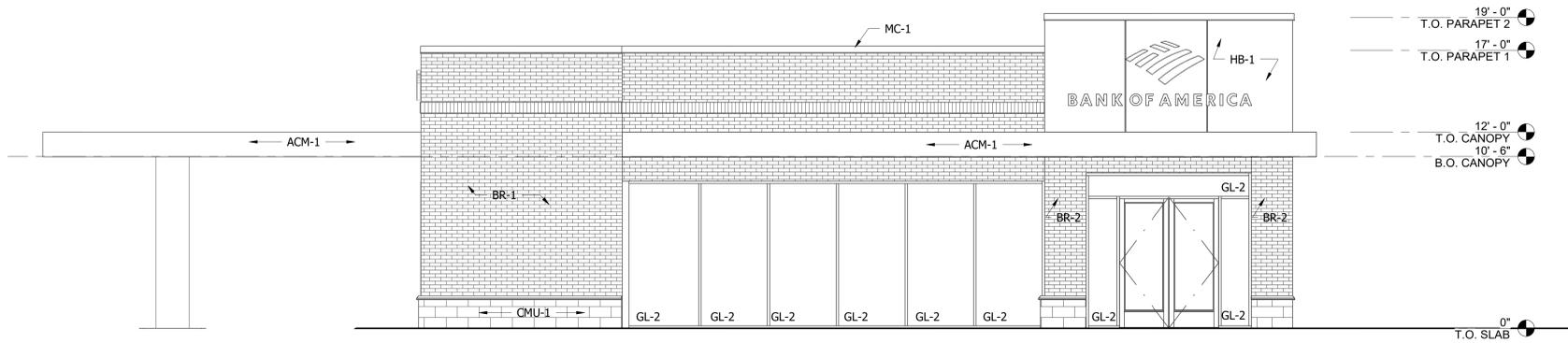
- EXPT-1 EXTERIOR PAINT TO MATCH ADJACENT EXTERIOR FINISH

**METAL COPING**

- MC-1 PREFINISHED METAL COPING. CUSTOM COLOR: MATCH BR-1

**EXTERIOR SEALANT COLOR**

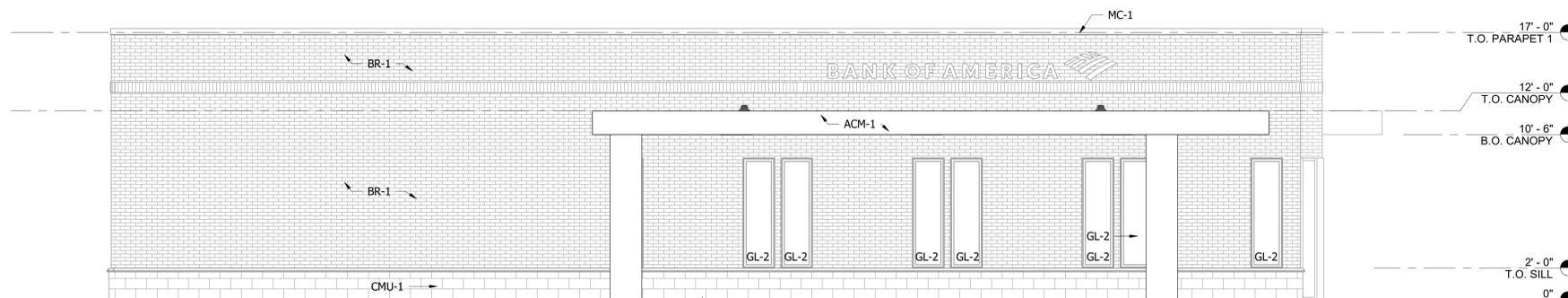
- GLAZING AT EXTERIOR STOREFRONT - BLACK
- WINDOW FRAME/STOREFRONT - MATCH METAL FRAME



1 NORTH ELEVATION MATERIAL  
1/4" = 1'-0"

**MATERIAL PERCENTAGE TOTALS**

BRICK	427 SF = 80%	TOTAL SF BETWEEN 2' - 10' = 422.24 SF
HARDIE BOARD	109 SF = 20%	GLASS SF BETWEEN 2' - 10'
TOTAL = 536 SF		253.68 SF = 60%



2 EAST ELEVATION MATERIAL  
1/4" = 1'-0"

**MATERIAL PERCENTAGE TOTALS**

BRICK	1091.54 SF = 100%
TOTAL = 1091.54 SF	

**EXTERIOR FINISH SCHEDULE:**

**STONE/MASONRY**

- BR-1 MASONRY - GLEN-GERY ADRIAN BRICK (MATCH CASTRO SHOPPING CENTER STANDARD)
- BR-2 MASONRY - GLEN-GERY ADRIAN BRICK (PAINT TO MATCH HARDIE BOARD CHARCOAL SLATE)
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**ALUMINUM GLAZING FRAME**

- AF-1 STOREFRONT SYSTEM AS SPECIFIED

**ALUMINUM FACED COMPOSITE METAL WALL PANEL**

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**FIBER CEMENT SIDING**

- HB-1 HARDIE BOARD VERTICAL SIDING - CHARCOAL SLATE

**EXTERIOR PAINT**

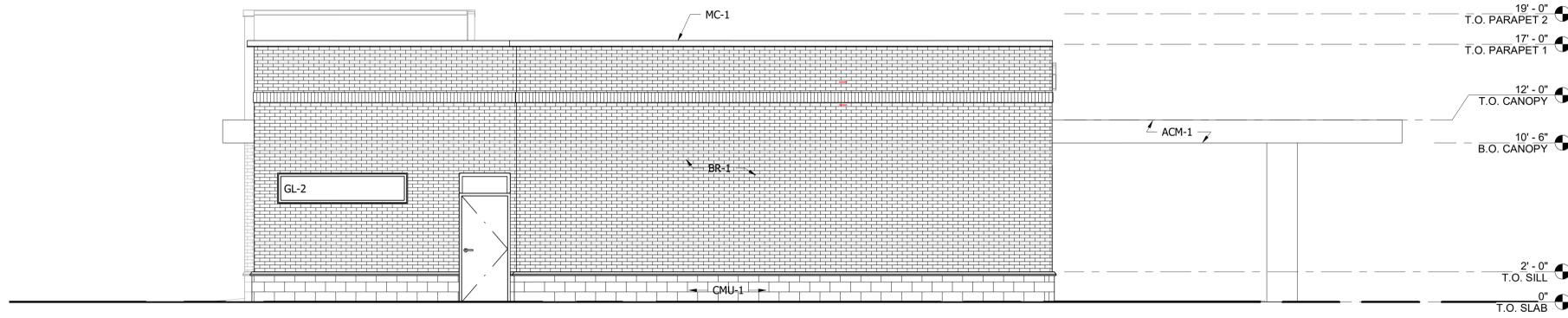
- EXPT-1 EXTERIOR PAINT TO MATCH ADJACENT EXTERIOR FINISH

**METAL COPING**

- MC-1 PREFINISHED METAL COPING, CUSTOM COLOR: MATCH BR-1

**EXTERIOR SEALANT COLOR**

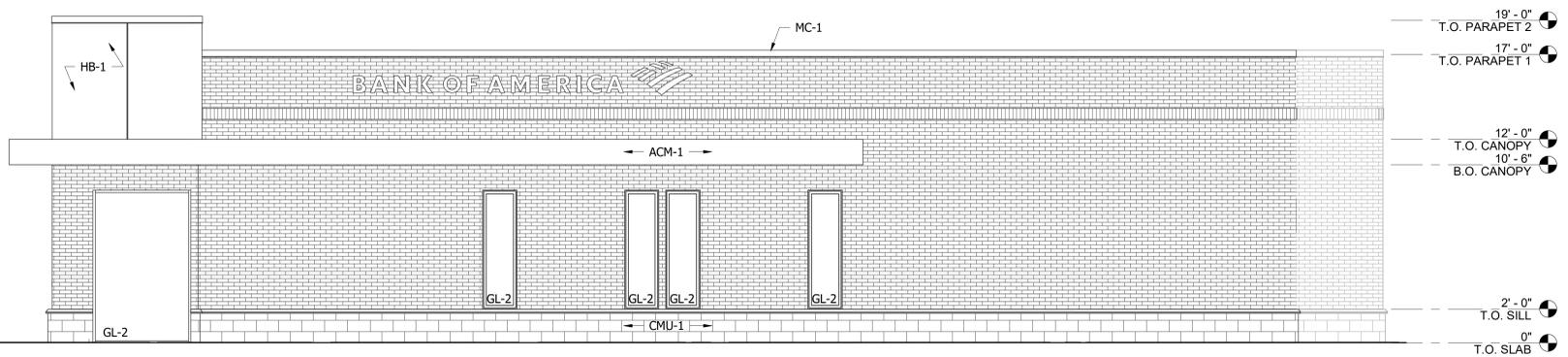
- GLAZING AT EXTERIOR STOREFRONT - BLACK
- WINDOW FRAME/STOREFRONT - MATCH METAL FRAME



1 SOUTH ELEVATION MATERIAL  
1/4" = 1'-0"

**MATERIAL PERCENTAGE TOTALS**

BRICK	856.80 SF = 100%
TOTAL	856.80 SF



2 WEST ELEVATION MATERIAL  
1/4" = 1'-0"

**MATERIAL PERCENTAGE TOTALS**

HARDIE BOARD	115.39 SF = 9%
BRICK	1107 SF = 91%
TOTAL	1222.39 TOTAL SF

**CONSTRUCTION PLAN NOTES:**

- A. ALL PARTITIONS TO BE TYPE "A1", UNLESS OTHERWISE NOTED. REFER TO SHEET A12.01 FOR PARTITION TYPES.
- B. UNLESS OTHERWISE NOTED, LOCATE HINGE SIDE OF ALL DOORS 6" FROM ADJACENT PERPENDICULAR PARTITION.
- C. CONTRACTOR SHALL PROVIDE BLOCKING FOR ALL EQUIPMENT AND ACCESSORIES MOUNTED ON WALLS.
- D. DIMENSIONS PROVIDED ARE SHOWN FROM FACE OF GYP TO FACE OF GYP UNLESS OTHERWISE NOTED.

**CONSTRUCTION KEY NOTES:**

1. TACTILE EXIT SIGNAGE. SEE 9/A00.40
2. APPROXIMATE LOCATION OF KNOX BOX. COORDINATE WITH LOCAL FIRE AUTHORITY FOR FINAL LOCATION.
3. LADDER TO ROOF HATCH - SEE DETAIL ON SHEET A09.29.
4. ROOF HATCH ABOVE - SEE DETAIL ON SHEET A09.29.
5. PROVIDE SH-1 ROLLER SHADE WITH VALANCE. TOP SIDE MOUNTED.
6. PROVIDE FIRE RATED 3/4" PLYWOOD BACKBOARD ON ALL WALLS, H = 8'-0".
7. FLAG POLE.
8. PROVIDE FRAMING FOR MEDIA GANGBOX. SEE ELECTRICAL FOR MORE INFORMATION. COORDINATE WITH ELECTRICAL DRAWINGS AND TECHNOLOGY VENDOR. REFER TO INSTALLATION INSTRUCTIONS AND PROVIDE BLOCKING IN WALL AS REQUIRED.
9. NEW 2010 ADA ACCESSIBLE TTW ATM. SEE A08.11 FOR MORE INFORMATION.
10. NEW DRIVE UP ATM. SEE A08.11 FOR MORE INFORMATION.
11. NO WATER PIPING SHALL BE ROUTED THROUGH OR OVERHEAD THIS ROOM.
12. LOCATION OF TRASH CONTAINER.
13. LOCATION OF MOP BUCKET.
14. PROVIDE BLOCKING IN WALL AS REQUIRED FOR LOCKERS. COORDINATE WITH VENDOR.
15. BIKE RACK. SEE CIVIL DRAWINGS.

**CONSTRUCTION PLAN LEGEND:**

- NIC NOT IN CONTRACT (NIC)
- A1 NEW PARTITION (SEE SCHEDULE)
- NEW PARTITION WITH PLY BLOCKING
- NEW PARTITION WITH KEVLAR REINFORCEMENT
- OFFICE ROOM NAME
- 04F06 ROOM NUMBER
- XXXX DOOR NUMBER (SEE SCHEDULE)
- ELEVATION DATUM POINT
- ALIGN ALIGN SURFACES
- MILLWORK MILLWORK SCHEDULE TAG
- FIRE EXTINGUISHER CABINET
- NEW SWING DOOR WITH DOOR TYPE. (SEE DOOR SCHEDULE)

**EXTERIOR ELEVATION INDICATOR**

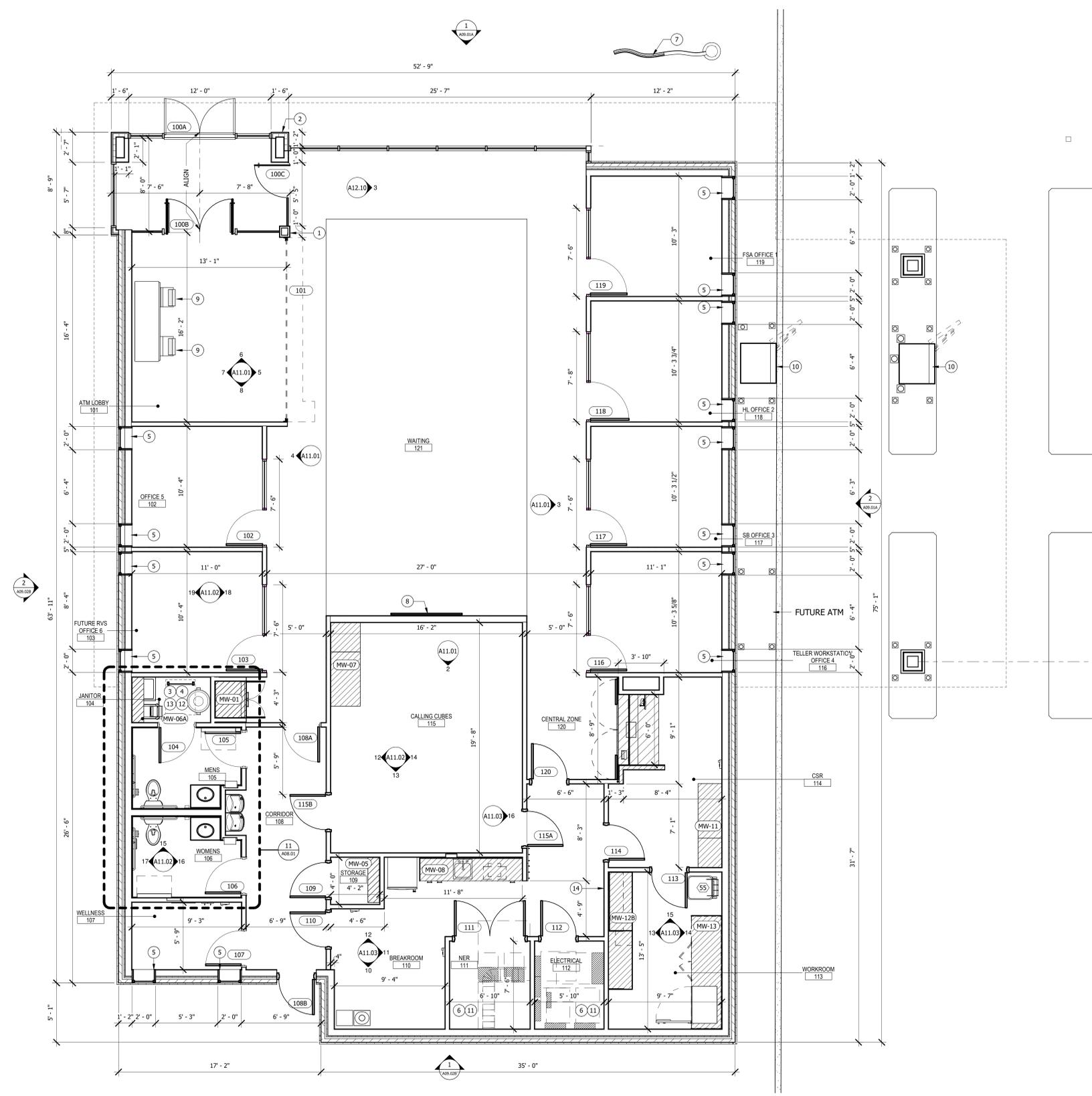
- ROW ON ELEVATION SHEET WHERE SHOWN
- DIRECTION OF ELEVATION VIEW
- SHEET WHERE SHOWN
- DESCRIPTION OF SIMILAR OR OPPOSITE DETAIL NUMBER
- AREA TO BE DETAILED

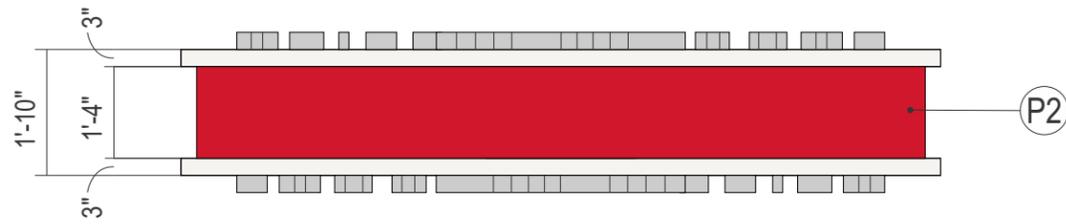
**INTERIOR ELEVATION INDICATION**

- LOCATION ON ROW WHERE SHOWN
- ROW ON ELEVATION SHEET WHERE SHOWN
- DIRECTION OF ELEVATION
- SHEET WHERE SHOWN
- DIRECTION OF SECTION/ELEVATION
- SHEET WHERE SHOWN

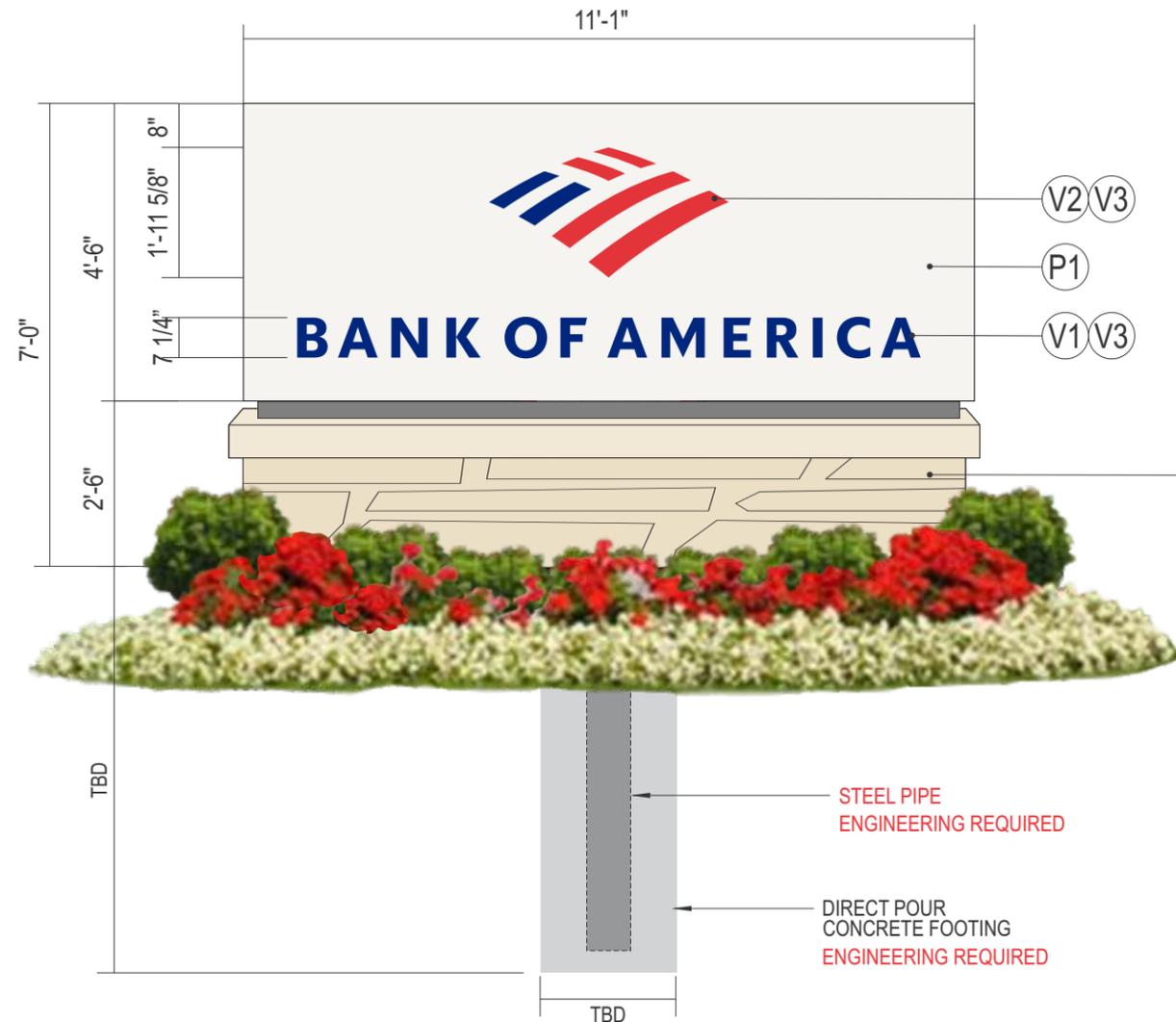
**CONSTRUCTION PLAN**

**A02.01**





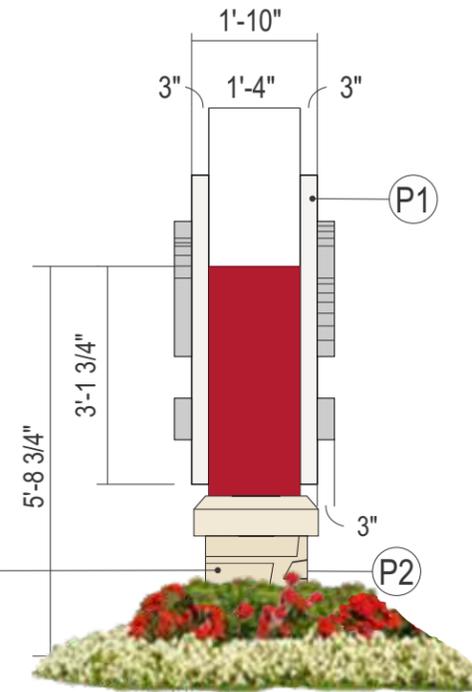
**TOP VIEW**  
Scale: 3/8" = 1'-0"



MASONRY TO MATCH BUILDING

STEEL PIPE  
ENGINEERING REQUIRED

DIRECT POUR  
CONCRETE FOOTING  
ENGINEERING REQUIRED



**SIDE VIEW**  
Scale: 3/8" = 1'-0"

**Q B3ng - 7'-0" MONUMENT (49.88 SQFT)**  
Scale: 3/8" = 1'-0"

**FINISHES:**

<b>V1</b> 3M 3630-8530 W/ 3M 3660M OVERLAMINATE	<b>V2</b> 3M 3630-2413 W/ 3M 3660M OVERLAMINATE	<b>V3</b> 3M 3660M OVER LAMINATE	<b>P1</b> GARBO SILVER GLOSS FINISH	<b>P2</b> RED MP 49696	<b>P3</b> DARK GRAY

**Final Development Plan #FDP-20-002  
Greengate**

Owner: Pifer Tract Five Limited Partnership  
Applicant: DDC Management  
Location: 46.17 acres off Hill Road located at PID #042-0388600 & 042-0388500  
Existing Zoning: PRD (Planned Residential District)  
Request: Requesting approval for a Final Development Plan for 191 Detached Condominiums for the Greengate Residential Development.

Location and Surrounding Land Uses

The subject property consists of 46.17 acres on the west side of Hill Road. This property is part of the original PRD District for GreenGates. The development exhibit for the the site indicates it is planned for detached condominiums. To the north is Busey Road Park. To the west is Phase 1 - 4 of the Winchester Ridge community that contains 329 multi-family units. To the east is undeveloped land within the PRD designated for an Assisted Living/Independent Living Condominiums. To the south is the Meijer Shopping Center zoned Planned Industrial District (PID).

Zoning

The subject parcels are zoned PRD (Planned Residential District), subject to the GreenGates development text and conditions adopted by Ordinance 52-01. This area of the PRD is designated in the plan for Detached Condominiums (246 Dwelling Units). The approved development standards as part of the GreenGate PRD district are as follows:

The Preliminary Site Plan conditions (Ordinance #52-01):

1. The maximum overall PRD density shall be four (4.0) dwelling units per acre based upon the number of actual units divided by the net developable acres (including open space), pursuant to Section 1173.04 (c) (4) of the Canal Winchester Codified Ordinances.
2. Revise Note "A" to read as follows: All acreages shown on this plan are approximate. The number of units permitted to be constructed within each designated use area as shown on this plan are approximate. The owner, or their agents and/or assigns, shall be permitted to build fewer units in each designated use area than are shown on this plan.
3. The developer, its successors or assigns, shall be responsible for their fair share of the costs of any off-site improvements to Diley Road, Busey Road or Hill Road. The fair share of these costs shall be determined from the required traffic study.
4. The developer, its successors or assigns, shall be responsible for all internal infrastructure improvements.

5. The developer, its successors or assigns, shall be responsible for all costs for getting water service to the site.
6. Water service to all residential development, except for detached condominiums, shall be provided by a private water system with a master meter.
7. Sanitary sewer service to the site shall be provided by a public system. Appropriate maintenance easements shall be provided to the village by the developer, its successors or assigns, if and where appropriate for the maintenance of this system. The size and location of these easements shall be subject to review and approval by the village.
8. The maximum number of total apartments shall be 258. This is based on the overall density requirement of 4.0 dwellings per acre, and the number of residential units and acreages shown on the revised site plan dated July 9, 2001.
9. Uses to be allowed and/or prohibited on the 33-acre school site are to be resolved between the developer and the school board prior to final site plan approval of the school site.
10. As each phase of the PCD, PID and PRD districts becomes ready for development, the Preliminary Site Plan and Final Site Plan shall be submitted for review and approval by the Planning & Zoning Commission and Village Council.

The approved development standards as part of Green Gate Planned Residential District are as follows.

- Units Per Building: Multiple-Unit residential structures shall not exceed sixteen (16) units per building except that assisted living and Independent Living Facilities may exceed this limit and shall be reviewed and approved on an individual basis.
- Minimum Finished Floor Area: The Minimum Finished Floor Area of a One Bedroom Units shall be 750 sq. ft. All other units shall be delineated in the Village of Canal Winchester Zoning Code. The minimum percentage of one (1) bedroom apartments shall be twenty (20) percent. Assisted Living and Independent Living Facilities shall not be required to meet the Minimum Finished Floor Area as set forth above and may include studio apartments as well as one and two bedroom units.
- Parking: The proposed final development plan for the residential areas will comply with the Village of Canal Winchester Zoning Code, Chapter 1185 Off-Street Parking and Loading for the required number of spaces and parking lot layout standards. A detailed parking lot layout will be submitted to the Village for each individual lot at the time of their individual site plan approval.
- Sidewalks: All development on the PRD area shall have sidewalks that comply with current American's with Disabilities Act (ADA) requirements. In situations where there is a bike path running parallel with the sidewalk along the same roadway, sidewalks shall be constructed only on the opposite side of the roadway as the bike path.
- Signage: A main entrance sign shall be constructed at the entrance of each residential area on the internal road and one entrance sign shall be constructed on Busey Road to

identify the attached condominium development. The specification for these signs shall be submitted to the Village for review and approval with the final development plan for each area and shall be approved on an individual basis. All signage shall follow the overall design criteria of the Canal Winchester-Violet Township Economic Development Agreement Land Use Plan.

- Building Location: The uses set forth in the final development plan have no maximum lot coverage or size, however, they must provide for adequate yard space as follows:
  - (A) Front Yard setback shall be a minimum of twenty-five (25) feet.
  - (B) Side Yard setback shall be a minimum of ten (10) feet.
  - (C) Rear Yard setback shall be a minimum of twenty-five (25) feet.
- Building Height: Buildings shall not exceed the height of thirty-five (35) feet and/or three (3) stories. This does not include any decorative elements such as cupolas, bell towers, clock towers etc. which shall be approved on an individual basis.
- Exterior Building Standards: The attached condominiums, detached condominiums and apartments shall each incorporate common elements of style, color schemes and materials such that they are architecturally compatible and complimentary. The exact style, color and materials for each area and use shall be submitted for the Villages approved along with the Final Site Plans and Final Engineered Drawings for each site.
- Landscaping: The proposed final development plan will comply with the Village of Canal Winchester Zoning Code for the individual lot and parking lot landscaping and screening requirements. The landscaping along Diley Road, Hill Road and Busey Road shall be described on attached Exhibit "C", entitled Landscape Plan for Diley/Hill Road.
- Utilities: Final Design of the utilities (sanitary sewers, storm sewers, water and street lighting) will be completed with the submission of the engineering plans for the development approval from the Village Engineer. All dumpsters will be enclosed as required by the Village of Canal Winchester Zoning Code. The street lighting plans for the streets and parking lot areas will be submitted for approval with the final development plans. All utilities shall be placed underground.

### Zoning Analysis

One condition of approval in rezoning this property to the PRD district was that all Final Development Plans are to be submitted and approved by both Planning and Zoning Commission and City Council. Final Development Plan FDP-20-002 meets the development text for the planned district in terms of maximum number of units and unit type.

### Site Plan

The proposed development will have primary access from Hill Road with the construction of Greengate Blvd. Greengate Blvd was designed as part of the PRD to be an east to west connector from Hill Road to Diley Road. The layout of this project is a typical grid pattern with public roads varying in width by travel intensity. The applicant is requesting seven (7) phases for the development.

The applicant has planned an 8 foot asphalt path to be located on the north side of the Greengate Blvd and along Hill Road. Additional 8' asphalt paths have been provided around the retention basin and open space to the south along with two (2) asphalt paths stubbing to Busey Road Park to the north. A 5 foot pedestrian sidewalk is provided elsewhere on all streets.

All residential dwellings will have an attached front loaded two (2) car garage and will face the public streets. The spacing provided between driveways is 18 feet to provide for additional on-street parking on all roadways. The architecture of these units consists of two-story detached condominiums varying in elevation styles. The elevations shown in the development proposal are indicated as samples of the products proposed for this development. The indication of a product sample allows for future building designs to be incorporated into the development as necessary.

The landscape plan provided shows that with the development there will be the removal of 61 trees. Based on our landscape code requirements the applicant will be planting 101 2.5" caliper trees on site to make up for what is being removed. The applicant is showing the replacement trees in strategic locations on sheets G1 through G3. Additionally, the landscape code requires 1 tree per 500 sq. ft. of building ground coverage. The applicant is showing an estimated three (3) trees to be planted per unit to meet the landscape requirements. Corner lots are shown to have an additional three (3) trees for a total of six (6) trees to make up for some of the additional planting requirements. The applicant is proposing landscape screening along Hill Road meeting the development text for the GreenGates/Pifer zoning exhibit.

The applicant is proposing a residential identification monument sign along Hill Road for the development. The signage submitted with the plans meets both the Violet Pointe Overlay District and the GreenGate development text requirements.

#### Traffic Study

*At the time the staff report was generated for P&Z distribution, the traffic study has not been updated by the applicant to be sent out for review. The comments below are dated 2/28/20 based on the most up-to-date information. Further updates will be provided at the P&Z Meeting on 3/9/20 to reflect the current status of the plans.*

The applicant has submitted a traffic study as part of the development requirements. The traffic study shows that this project warrants a left turn lane on Hill Road into the site. The turn lane is designed to have 125 feet of storage plus a 50 foot taper. A portion of Hill Road right-of-way is within Fairfield County and the plans show the need to obtain additional right-of-way to the west within the County. Fairfield County was provided a copy of the traffic study for review. The county has anticipated that their review should be completed by 3/6/20.

The traffic study notes that the improvements along Hill Road for the turn lane are to be completed by 2023 based on a previous phasing plan for the subdivision. Staff has asked that the Hill Road improvements be installed with Phase 2 of the development, when Greengate Blvd construction through this site is completed to the western property line. The plan the applicant has submitted does not show the applicant has the ability to construct the necessary improvements along Hill Road due to it requiring additional right-of-way being obtained from a property owner to the west. The additional right-of-way needs to be obtained for this project prior to the Final Development Plan being approved.

The traffic study submitted does not show any connection to Diley Road in the scope of the study. Staff has notified the applicants that Canal Winchester has made a commitment with adjacent properties within the planned development to have the connection of Greengate Blvd to Diley Road be completed by 2025. Staff has asked the applicant to revise the traffic study to include this information and to study the impacts of this development with the existing multi-family and future commercial property that will share this new intersection (Diley/Greengate). The applicant is revising the traffic study for staff to send out to EMH&T for review. Staff anticipates having an updated traffic study comments at the 3/9/20 P&Z meeting.

CEDA Recommendation

CEDA Meeting is scheduled for March 3, 2020 and an update will be provided at the P&Z Meeting.

Staff Recommendation

Staff recommends the applicant's request for the Final Development Plan be tabled at this time so that the traffic study can be amended and reviewed by Canal Winchester. Additionally, the applicant needs to show that they have the ability to construct the necessary improvements along Hill Road prior to approval of the Final Development Plan.

*\*Note\* The above recommendation is subject to change based on a revised traffic study being submitted and reviewed by Canal Winchester prior to the meeting on 3/9/20.*

Application for  
Final Development Plan  
**Greengate Residential Development**

City of Canal Winchester, Ohio

January 21, 2020

Applicant: DDC Management  
3601 Rigby Rd, Suite 300  
Miamisburg, OH 45342  
(937) 401-3844  
Ryan Reed

Property Owners: Pifer Tract Five Limited Partnership  
1519 Bottomwood Dr.  
Hebron, KY 41048  
  
Tipani Pifer Hickey  
9450 E. State Road 32  
Zionsville, IN 46077

Property: Hill Rd, Canal Winchester, Ohio 43110

Approx. Site Total: 46.17± acres

Tax Parcel Numbers: 0420388600  
0420388500

Project Engineer/Planner: CESO, Inc.  
2800 Corporate Exchange Drive, Suite 160  
Columbus, Ohio 43231  
(614) 942-3019  
Jonathan S. Buchanan, PE

Project Developer: DDC Management  
3601 Rigby Rd, Suite 300  
Miamisburg, OH 45342  
(937) 401-3844  
Ryan Reed

Proposed Application: PRD-Planned Residential District development plan and text  
detached condominiums (Zoning per Ordinance No. 52-01 passed  
9/17/2001)

Project Narrative:

The project site consists of approximately 46.17 acres located on the west side of Hill Road, north of Carriage Place. The site, zoned PRD, is comprised of farm field and woods.

Currently located around the proposed development to the:

- north of the property is Busey Rd
- south of the property is US 33
- east of the property is farm field
- west of the property is Redwood Canal Winchester Subdivision

The proposed development will consist of a detached condominium development (approximately 191 pads).

Utilities/Public Services:

- A. All utilities shall be underground, whenever possible, except for telephone and cable pedestals and electric transformers.
  1. Waterline: Waterline service throughout the development will be public.
  2. Sanitary: Sanitary service throughout the development will be public.
  3. Drainage: A retention pond is being proposed at the southwest corner of the residential development. Maintenance of the retention pond will be the responsibility of the Condominium Association.

Traffic

A. Traffic Impact Study

- 1. A Traffic Impact Study has been conducted and provided with the Final Development Plan. Traffic improvements shall be subject to County and City approval.
- 2. Roadway improvements along Hill Road shall be installed in accordance with the approved Traffic Study recommendations.

Residential Development Standards

The following are Development Standards for the Subdivision, provided however, in the event a standard, provision, or requirement is not provided, the standards, provisions and requirements set forth in the Ordinance 41-01 including any amendments as were in effect as of September 17, 2001.

A. General Standards

Site Acreage:	46.17 Acres
Number of Pads:	191 pads
Typical Pad Size:	30'x 75'
Building Setbacks:	25' (Front) from Right of Way / 10' (Side) Between Buildings / 25' (Rear)

- 1. All proposed roads are public and designed to comply with city standards, unless otherwise noted on the Development Plan.
- 2. On street parking will be allowed on both sides of the street.

B. Building, Setback and Height Restrictions

- 1. Subject to rules the board of directors adopts, the board may authorize the use of Limited Common Elements, as distinguished from the Common Elements and Exclusive Use Areas, for the construction of open, unenclosed patios and decks or similar improvements provided that the improvements are attached to the Unit, maintained and insured by the owner of the Unit to which the Limited Common Area is appurtenant.
  - i. The side boundaries of the Limited Common Area shall generally be as follows:
    - The side boundary line shall be the line that divides the distance between the Unit and the adjacent Unit extending from the front of the primary structure of the Unit to the rear of the primary structure of the Unit.
    - If the side of a Unit is not adjacent to another Unit, then the side

boundary line on that side of the Unit shall be a maximum of five (5') feet.

- ii. The rear boundary of the Limited Common Area shall generally be as follows:
  - The rear boundary line shall be thirty (30') feet from the rear of the primary structure of the Unit extending from one side boundary of the Unit to the other side boundary of the Unit.

2. No fences other than "invisible fences" for pet containment shall be allowed.
3. Dwelling Units shall be single-family, detached residences. The maximum building height shall not exceed thirty feet (35') in height from top of foundation to ridge of roof line.
4. There shall be no maximum lot coverage requirement.
5. House square footages (which shall be defined as habitable, heated, above-ground living space) shall be not less than twelve hundred (1,200) square feet.

C. Architectural and Design Standards:

1. In accordance with Ordinance 41-01, including any amendments as were in effect as of September 17, 2001, detached condominiums shall incorporate common elements of style, color schemes and materials such that they are architecturally compatible and complimentary.

Elevations shown in Appendix D are sample elevations and not the ONLY building design permitted.

Condominium Association Responsibilities

1. Condominium Association: All residential property owners located within Greengate will be required to join and maintain membership in a forced and funded condominium association (the "Association"), which will be formed prior to any units being sold.
2. Association shall be responsible for lawn maintenance for common areas and exclusive use areas. Lawn maintenance, by the Association, for Limited Common Areas shall be determined by the board of directors on a case by case basis.
3. Reserve areas/common areas and landscaping of those reserve areas are to be maintained by the Association.
4. The homeowner will be responsible for maintenance and repair of own dwelling structure.
5. The Board will be turned over at the expiration of the Development Period. Within ninety

(90) days after the expiration of the Development Period, the President of the Association shall call a special membership meeting (“Development Period Special Meeting”). At the Development Period Special Meeting, all Declarant appointed Directors shall be deemed removed from office, and the Class A Members, including the Declarant if it is then an Owner, shall elect a Director to fill each vacancy on the Board.

Development Period. "Development Period" means the period commencing on the date on which this Declaration is recorded and terminating on the earlier to occur of: (i) within thirty (30) days following the date when one hundred percent (100%) of the Dwelling Units which may be built on the Property or Additional Property have been deeded by either Declarant and/or any Builder to a third party purchaser; or (ii) thirty (30) years from the date of recording of the Declaration.

#### Landscaping, and/or Screening Commitments

The proposed development shall comply with all landscape regulations set forth in part eleven Chapter 1191 of the codified ordinances of Canal Winchester.

## APPENDICES

- A. Final Development Plan Application
- B. Final Development Plan
- C. Traffic Study
- D. Detached Condominium Elevations
- E. Council Ordinance 52-01

**APPENDIX A:  
FINAL DEVELOPMENT PLAN APPLICATION**



# City of Canal Winchester

36 South High Street  
Canal Winchester, Ohio 43110  
Development Department  
Phone (614) 837-7501 Fax (614) 837-0145

## DEVELOPMENT PLAN APPLICATION

\_\_\_\_\_ Preliminary                       X  Final

rev. 09/24/2013

### PROPERTY OWNER

Name Pifer Tract Five Limited Partnership  
Address 1519 Bottomwood Dr., Hebron, KY 41048  
Daytime Phone 317-523-5269 Email jd.pifersllc@twc.com

### APPLICANT

Name DDC Management, LLC  
Address 3601 Rigby Road, Suite 300, Miamisburg, OH 45342  
Daytime Phone 937.401.3844 Email rreed@ddcconstruct.com

Address/Location of Subject Property Hill Road south of Busey Road  
042-03885-00 &  
Tax Parcel ID ~~042-03886-00~~ Current Zoning PRD Acreage 46.17-16.18 AC

Attach a current survey (within 2 years) of the subject property and all supporting materials as required by Chapter 1141 and Chapter 1173 as applicable (see attachment). Additional information may be required by the Planning and Zoning Administrator or the Planning and Zoning Commission.

**I certify that the information provided with this application is correct and accurate to the best of my ability.**

[Signature]  
Property Owner's or Authorize Agent's Signature  
Michael Simpson

1-20-20  
Date

DO NOT WRITE BELOW THIS LINE

Date Received: \_\_\_/\_\_\_/\_\_\_ Fee: \$ \_\_\_ Paid  Historic District: \_\_\_ Yes \_\_\_ No  
Preservation District: \_\_\_ Yes \_\_\_ No  
Date of Action: \_\_\_/\_\_\_/\_\_\_ Application \_\_\_ No  
Expiration Date: \_\_\_/\_\_\_/\_\_\_ Approved: \_\_\_ Yes  
\_\_\_ Yes, with conditions  
Tracking Number: PDP - \_\_\_\_\_



# City of Canal Winchester

36 South High Street  
Canal Winchester, Ohio 43110  
Development Department  
Phone (614) 837-7501 Fax (614) 837-0145

## DEVELOPMENT PLAN APPLICATION

\_\_\_\_\_ Preliminary       X  Final

rev. 09/24/2013

### PROPERTY OWNER

Name Tipani D. Fel Hickey  
Address 9450 E. State ~~Street~~ Road 32, Zionsville  
Daytime Phone 317 695 5255 Email tippi.hickey@outlook.com

### APPLICANT

Name DDC Management, LLC  
Address 3601 Rigby Road, Suite 300, Miamisburg, OH 45342  
Daytime Phone 937.401.3844 Email rreed@ddcconstruct.com

Address/Location of Subject Property Hill Road south of Busey Road

~~042-03885-00 &~~  
Tax Parcel ID 042-03886-00 Current Zoning PRD Acreage 46.17 29.98

Attach a current survey (within 2 years) of the subject property and all supporting materials as required by Chapter 1141 and Chapter 1173 as applicable (see attachment). Additional information may be required by the Planning and Zoning Administrator or the Planning and Zoning Commission.

**I certify that the information provided with this application is correct and accurate to the best of my ability.**

Michael Simpson  
Property Owner's or Authorize Agent's Signature

1/20/20  
Date

Michael Simpson DO NOT WRITE BELOW THIS LINE

Date Received: \_\_\_/\_\_\_/\_\_\_ Fee: \$ \_\_\_\_\_ Historic District: \_\_\_ Yes \_\_\_ No  
Paid  Preservation District: \_\_\_ Yes \_\_\_ No

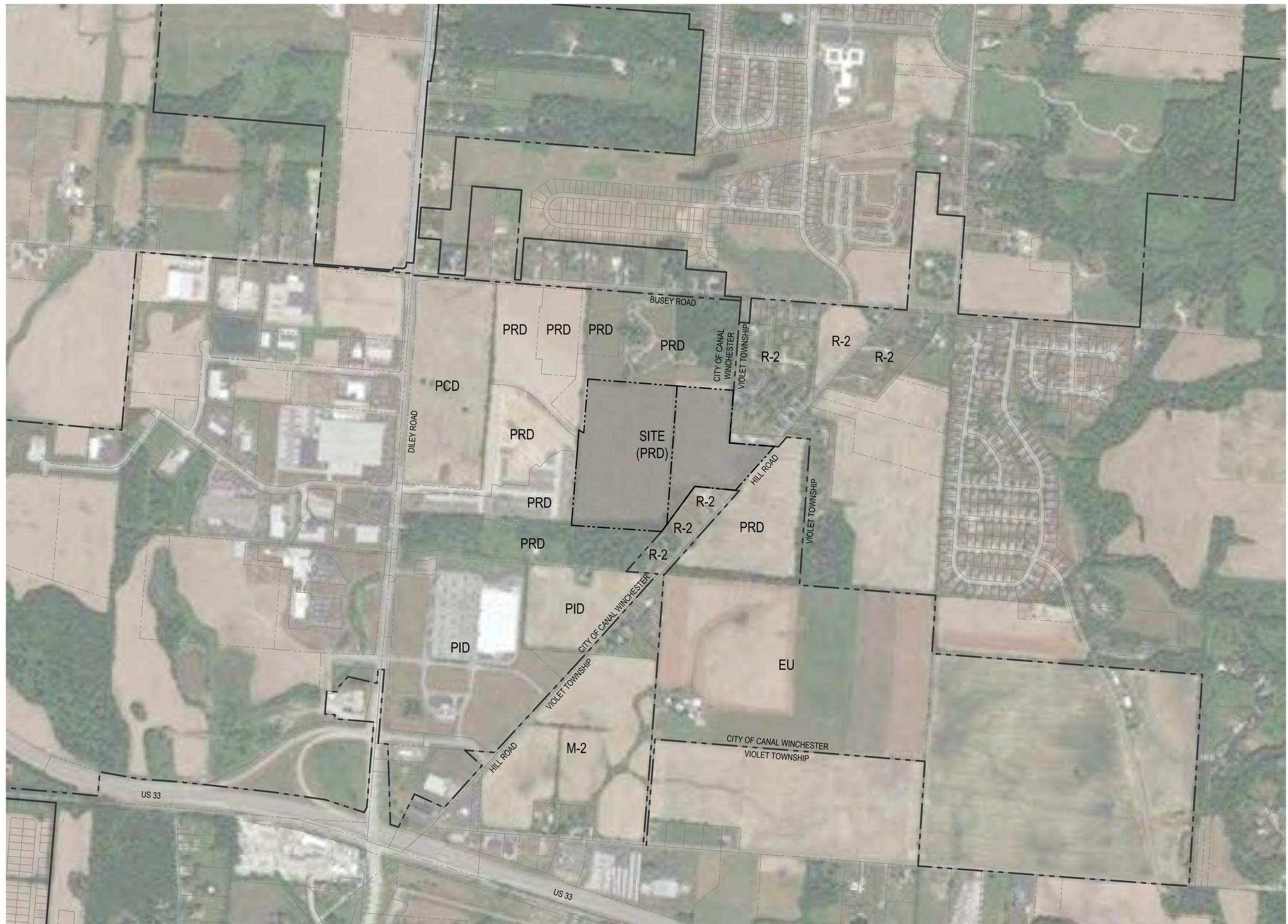
Date of Action: \_\_\_/\_\_\_/\_\_\_ Application \_\_\_ No  
Expiration Date: \_\_\_/\_\_\_/\_\_\_ Approved: \_\_\_ Yes  
\_\_\_ Yes, with conditions

Tracking Number: PDP - \_\_\_\_\_

**APPENDIX B:  
FINAL DEVELOPMENT PLAN**



COPYRIGHT: THESE DRAWINGS ARE THE PROPERTY OF CESO, INC.



NO.	DATE	REVISION DESCRIPTION
•••••	•••••	•••••
•••••	•••••	•••••

FINAL DEVELOPMENT PLAN  
**GREENGATE**  
CANAL WINCHESTER      FAIRFIELD COUNTY, OHIO

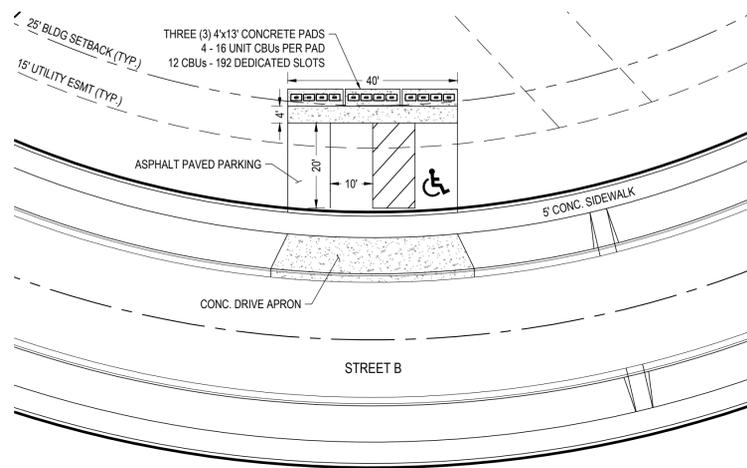
REGIONAL  
CONTEXT MAP

ISSUE:	NOT FOR CONSTRUCTION
DATE:	2.17.2020
JOB NO.:	757010
DESIGN:	JSB
DRAWN:	CWS
CHECKED:	JEE
SHEET NO.	EXHIBIT 'B'

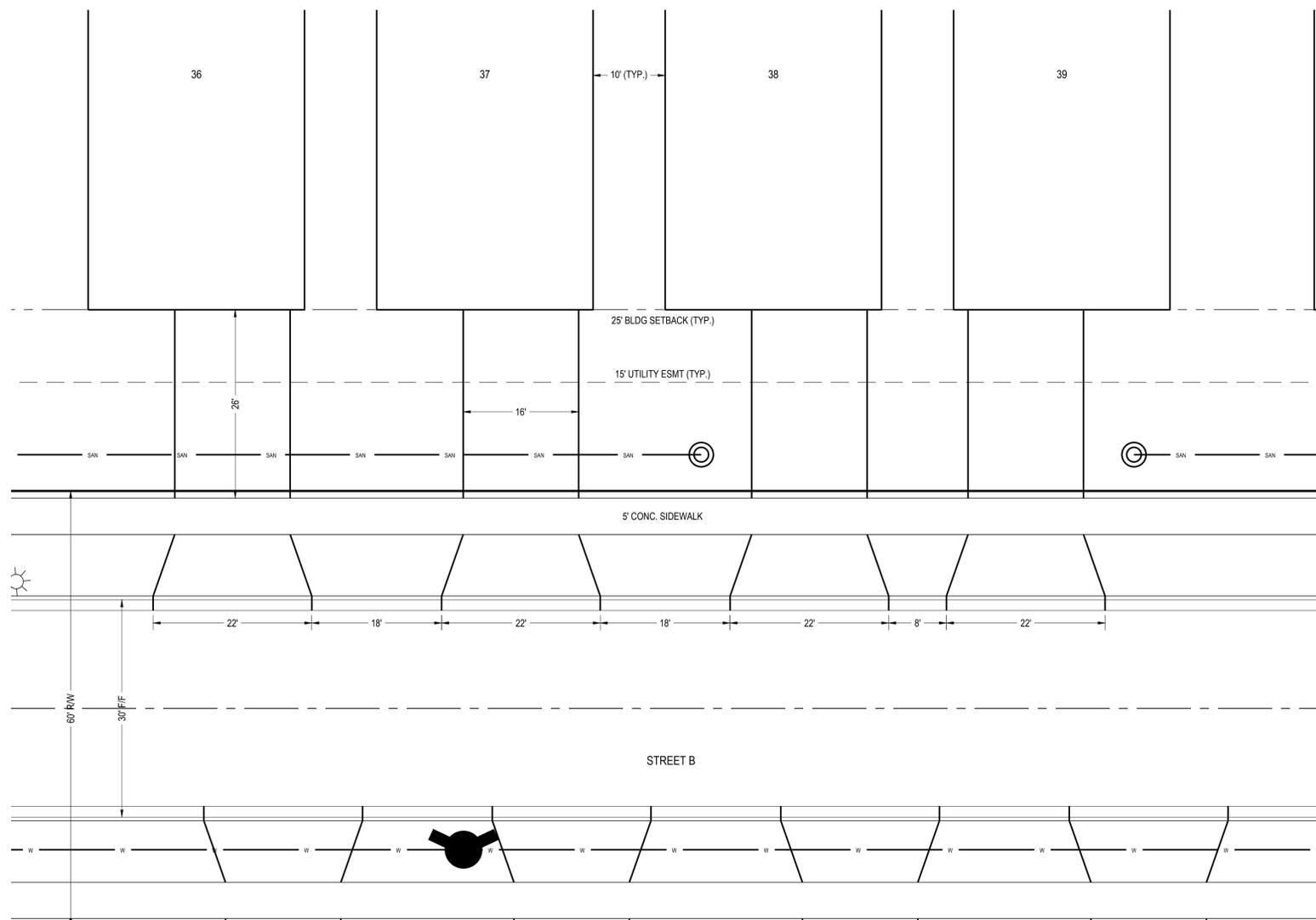




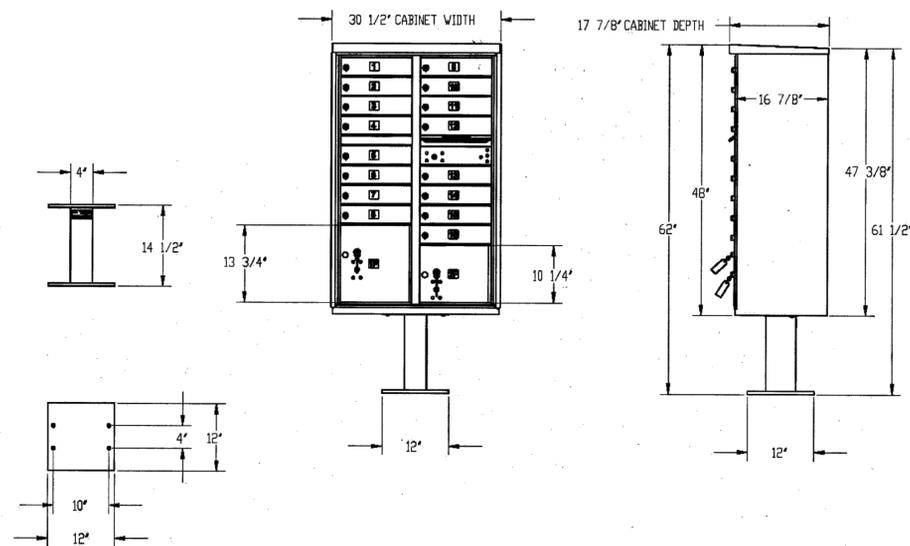




MAIL CENTER  
OFF-STREET PARKING DETAIL  
SCALE: 1" = 20'



ON-STREET PARKING DETAIL  
SCALE: 1" = 10'



16 UNIT - CLUSTER BOX UNIT (CBU)  
NTS

NOTE: CBUs TO BE BLACK IN COLOR TO MATCH OTHER APPROVED UNITS WITHIN THE CITY OF CANAL WINCHESTER.

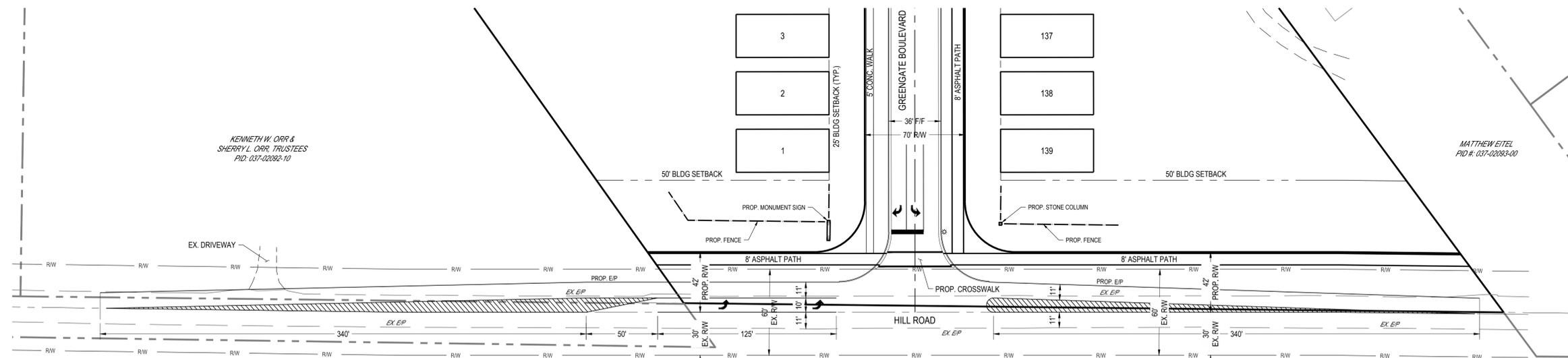
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71

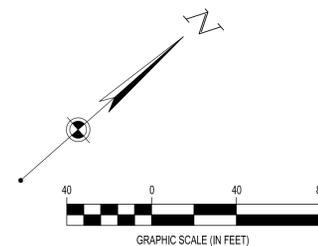
70

69



THE PAWPAW PATCH, LLC  
PID #: 042-03885-10

**HILL ROAD IMPROVEMENTS**  
SCALE: 1" = 40'



**NOTES:**

- ROADWAY IMPROVEMENTS ALONG HILL ROAD SHALL BE INSTALLED IN ACCORDANCE WITH THE APPROVED TRAFFIC STUDY RECOMMENDATIONS.
- FINAL LAYOUT AND GEOMETRY OF THE HILL ROAD IMPROVEMENTS SHALL BE SUBJECT TO CITY OF CANAL WINCHESTER ENGINEER AND FAIRFIELD COUNTY ENGINEER APPROVALS.





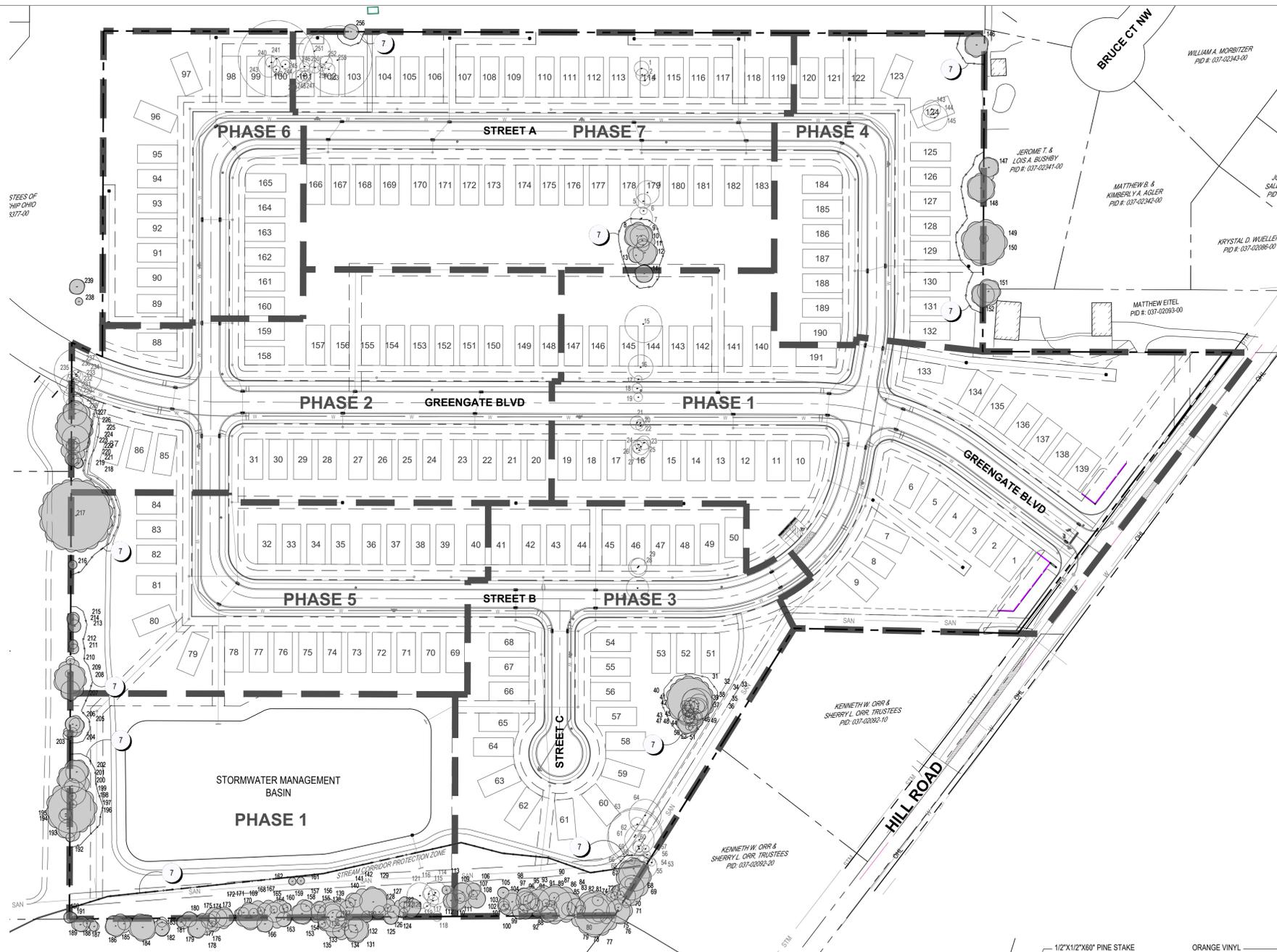




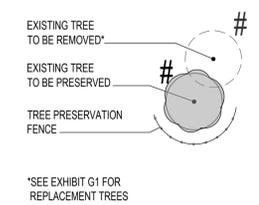






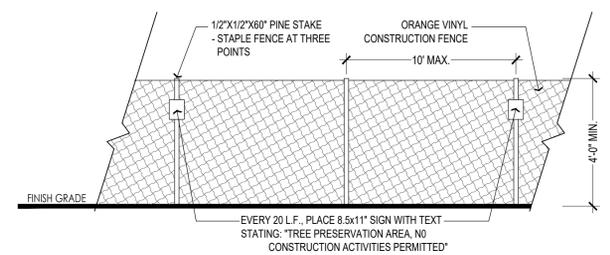


**TREE PRESERVATION KEY**



**CODED LAYOUT & MATERIALS NOTES**

KEY	ITEM	REFERENCE	NOTES
7			INSTALL 10' FROM DRIPLINE OF EXISTING TREES TO BE PRESERVED PER PLAN. SEE DETAIL A, THIS SHEET, FOR MORE INFORMATION
A	EX. H1		



**A TREE PROTECTION FENCE**  
SCALE: N.T.S.

**Letter of Certification**

I, Stephan Carbonara, certify that:

- I personally visited the Greengate site, and identified size, species, and condition of the trees while Phil Moorehead of G2 provided their location.
- I have no current or prospective interest in the vegetation or the property that is the subject of this survey and have no personal interest or bias with respect to the parties involved.
- This survey has been prepared according to common accepted arboricultural practices.
- No one provided significant professional assistance to me in compiling this survey with the exception of the Phil Moorehead who provided the precise locations.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party or upon the results of the survey, the attainment of stipulated results, or the occurrence of subsequent events.

I further certify that I am a member in good standing of the International Society of Arboriculture, that I am an ISA Certified Arborist (# OH-1377A) and that I have been involved in the practice of arboriculture for 31 years.

Stephan Carbonara  
ISA Cert #OH-1377A  
01/09/2020



NO.	DATE	REVISION DESCRIPTION



FINAL DEVELOPMENT PLAN

**GREENGATE**

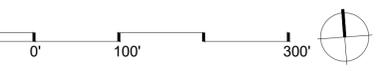
FAIRFIELD COUNTY, OHIO  
CANAL WINCHESTER

TREE PRESERVATION PLAN

ISSUE: FINAL DEVELOPMENT PLAN  
DATE: 2/18/2020

JOB NO.: 757010  
DESIGN:  
DRAWN:  
CHECKED:

SHEET NO. EXHIBIT 'H1'

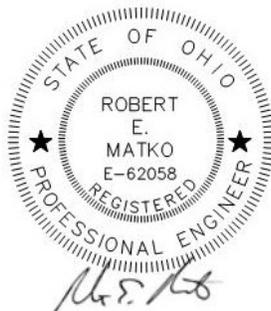




**APPENDIX C:  
TRAFFIC STUDY**

# TRAFFIC IMPACT STUDY

Greengate Residential Development  
City of Canal Winchester  
Fairfield County, Ohio  
January 21<sup>st</sup>, 2020





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## 1. Executive Summary

### 1.1. Summary

This report is submitted on behalf of Cap 5 Development in connection with its application to the City of Canal Winchester, Ohio (OH) for Site Plan approval. The Traffic Impact Study (TIS) conducted by CESO, Inc. addresses the traffic related impacts associated with the proposed Greengate Residential Development; referred to herein as “Greengate Development.” The proposed Greengate Development is to be located on the west side of Hill Road, south of Busey Road, within the City of Canal Winchester, Fairfield County, OH. The full buildout of the Greengate Development is projected to have 197 lots over three (3) phases. Greengate Development’s application requests approval of the following access points:

- Full access driveway connection to Hill Road (referred to as “Greengate Boulevard”), approximately 0.4 miles south (center-line-to-center-line) of Busey Road.
- A future extension of Greengate Boulevard that will connect to Diley Road at the intersection with Howe Industrial Parkway.

The Site Plan application also requests approval to conduct work within the right-of-way for construction of the Site driveway along with the recommended roadway improvements. Hill Road is under jurisdiction of Fairfield County. Busey Road, Kings Crossing, and Diley Road are under jurisdiction of the City of Canal Winchester.

This report presents the methodologies, analyses, and results of the Traffic Impact Study (TIS) for traffic generated by the proposed Greengate Development. The purpose of the TIS was to identify the traffic related impacts, if any, during typical weekday AM and PM Peak Hours of the adjacent street traffic corresponding with the weekday hours of operation for the proposed Greengate Development. The study parameters of this report were generated based upon a recent concept plan, and a memorandum of understanding dated January 20, 2020 between CESO and the City of Canal Winchester outlining the TIS scope of service (See Appendix A).

As requested in the 1-20-20 MOU, the following traffic scenarios were evaluated. The term “Build” represents the first day of full use of the Greengate Development.

**Existing Traffic Scenario** – Represents current (year 2019) traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network. The Existing Traffic Scenario served as a baseline for comparison of the traffic impacts in relation to the proposed Greengate Development.

**2022/2023/2024 and 2034 No-Build Traffic Scenario** – Represents traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network that would exist during year 2022/2023/2024 and 2034, without the proposed Greengate Development.

**2022/2023/2024 and 2034 Build Traffic Scenario** – Represents traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network that would exist during year 2022/2023/2024 and 2034, with the proposed Greengate Development phases constructed and fully operational.

Traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, December 12<sup>th</sup>, 2019 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM for a total of 6 hours at the following intersections:

- Hill Road & Busey Road (Stop Controlled).
- Hill Road & Kings Crossing (Stop Controlled).

After discussion with the City of Canal Winchester, additional traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, January 9<sup>th</sup>, 2020 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM for a total of 6 hours at the following intersections:

- Diley Road & Howe Industrial Parkway (Stop Controlled).

The weekday peak hours of the Traffic Impact Study roadway network were determined to occur between the hours of:

- 7:15 AM – 8:15 AM (AM Peak Hour).
- 5:00 PM – 6:00 PM (PM Peak Hour).

## 1.2. Conclusions

**Note: At the intersection of Hill Road and Busey Road, Hill Road is labeled as the NB direction. Busey Road is an EB/WB roadway with a stop sign in the EB direction. For analysis purposes, WB Busey Road is labeled as SB in the capacity analysis as part of the major street, and EB Busey Road is labeled as the minor street approach. At the Hill Road and Greengate Boulevard intersection, Hill Road is labeled as the EB/WB roadway and Greengate Boulevard is labeled as SB. At the Hill Road and Kings Crossing intersection, Hill Road is labeled as the EB/WB roadway and Kings Crossing is labeled as SB.**

Under the Existing Traffic Scenario, all movements operate at level of service (LOS) “B” or better condition with the exception of the SBLR movement at the Hill Road and Kings Crossing intersection, which operates at LOS “E” during the PM Peak Hour.

Under the 2022/2023/2024/2034 No-Build Traffic Scenario, all movements operate at level of service (LOS) “C” or better condition with the exception of the SBLR movement at the Hill Road and Kings Crossing intersection, which operates at LOS “E” under the 2022 No-Build PM Peak Hour. With recommended improvements in the 2022 No-Build Scenario, all movements operate at LOS “C” or better condition.

According to the Institute of Transportation Engineers’ (ITE) *Trip Generation Manual, 10th Edition*, the Greengate Development will be constructed in three phases as follows:

- Phase I (2022 Opening Year):
  - Single-Family Detached Housing – 75 Lots (ITE Category 210).
- Phase II (2023 Opening Year):
  - Single-Family Detached Housing – 61 Lots (ITE Category 210).
- Phase III (2024 Opening Year):
  - Single-Family Detached Housing – 61 Lots (ITE Category 210).

Under Build conditions, the following trips are proposed:

- Phase I (2022 Opening Year):  
798 trips/day (399 in/399 out), 58 AM trips (14 in/44 out), 77 PM trips (49 in/28 out)
- Phase II (2023 Opening Year):  
660 trips/day (330 in/330 out), 48 AM trips (12 in/36 out), 63 PM trips (40 in/23 out)
- Phase III (2024 Opening Year):  
660 trips/day (330 in/330 out), 48 AM trips (12 in/36 out), 63 PM trips (40 in/23 out)

Trips for the proposed Greengate Development are anticipated to approach and depart the Site via the directional distribution percentages shown on Figure 9 (see pg. 23).

Highway Capacity Software (HCS) Version 7 methodology was used to analyze the current level of service at the key study intersections.

The intersection of Diley Road and Howe Industrial Parkway was not analyzed in the TIS. It is assumed that once the future Greengate Boulevard extension is completed, a portion of the generated traffic will be reassigned to Diley Road. Based on the location of the Greengate Development, it is estimated that 12% of the generated trips will use the Diley Road entrance in the AM Peak Hour and 27% in the PM Peak Hour. The traffic at the Diley Road and Howe Industrial Parkway/Greengate Boulevard intersection will increase by 1% overall in the AM Peak Hour and 2% overall in the PM Peak Hour under the 2034 Build Traffic Scenario. Although the extension of Greengate Boulevard will have an impact on the Diley Road and Howe Industrial Parkway intersection, it is concluded that the impact will be minimal.

Under the 2022/2023/2024/2034 Build Traffic Scenario, all movements operate at level of service (LOS) "D" or better condition with the exception of the SBL movement at the Hill Road and Kings Crossing intersection, which operates at LOS "E" during the 2034 Build PM Peak Hour. Although the movement operates at LOS "E," the delay is 36.2 seconds, which is only 1.2 seconds more than a LOS "D".

CESO conducted turn lane analyses for the study network and reached the following conclusions:

- Left-turn and right-turn lane analyses were completed using the turn lane warrant charts from the ODOT *Location & Design Manual – Volume I (July 2019)*. Based on a discussion with the City of Canal Winchester and Fairfield County, a 45 mph design speed was used for the analysis, therefore, the high-speed turn lane warrant charts were used.
- According to ODOT Chart 401-5b, a NB left-turn lane **is warranted** at the intersection of Hill Road and Busey Road starting in the 2022 No-Build Scenario. In addition, an EB left-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2022 No-Build Scenario. According to ODOT Chart 401-5b, an EB left-turn lane **is warranted** at the intersection of Hill Road and Greengate Boulevard during the PM Peak Hour starting in the 2023 Build Scenario.
- According to capacity analysis results, a SB right-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2022 No-Build Scenario. According to ODOT Chart 401-6b, a WB right-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2023 Build Traffic Scenario. **Note:** Due to the poor levels of service at the intersection, CESO recommends the WB right-turn lane be constructed under the 2022 No-Build Scenario.

CESO conducted queue length analyses for the study network and reached the following conclusions:

- A new NBL turn lane is warranted at the Hill Road and Busey Road intersection and shall be constructed to satisfy the ODOT required queue lengths (125' of storage with a 50' diverging taper).
- A new EBL turn lane is warranted at the Hill Road and Greengate Boulevard intersection and shall be constructed to satisfy the ODOT required queue lengths (125' of storage with a 50' diverging taper).
- A new EBL turn lane is warranted at the Hill Road and Kings Crossing intersection and shall be constructed to satisfy the ODOT required queue lengths (225' of storage with a 50' diverging taper).
- New WBR and SBR turn lanes are warranted at the Hill Road and Kings Crossing intersection and shall be constructed to satisfy the ODOT required queue lengths (250' of storage with a 50' diverging taper).

**1.3. Summary of Recommendations**

All recommendations are illustrated on Figures 15.A-15.C (pg. 42-44) of the report.

**2022 No-Build Traffic Scenario (Responsibility – Others):**

*Hill Road & Busey Road:*

- Construct NB to WB left-turn lane to have 125 feet of storage plus a 50-foot taper.

*Hill Road & Kings Crossing:*

- Construct EB to NB left-turn lane to have 225 feet of storage plus a 50-foot taper.
- Construct WB to NB right-turn lane to have 250 feet of storage plus a 50-foot taper.
- Construct SB to WB right-turn lane to have 250 feet of storage plus a 50-foot taper.

**2022 Build Traffic Scenario (Responsibility – Cap 5 Development):**

*Hill Road & Greengate Boulevard:*

- Construct full access roadway connection to Hill Road, which will be named 'Greengate Boulevard'. Control Greengate Boulevard with one stop sign.

**2023 Build Traffic Scenario (Responsibility – Cap 5 Development):**

*Hill Road & Greengate Boulevard:*

- Construct EB to NB left-turn lane to have 125 feet of storage plus a 50-foot taper.

**2024 Build Traffic Scenario (Responsibility – Cap 5 Development):**

- No further improvements are required.

**2034 Build Traffic Scenario (Responsibility – Cap 5 Development):**

- No further improvements are required.

## 2. Introduction

This report is submitted on behalf of Cap 5 Development in connection with its application to the City of Canal Winchester, Ohio (OH) for Site Plan approval. The Traffic Impact Study (TIS) conducted by CESO, Inc. addresses the traffic related impacts associated with the proposed Greengate Residential Development; referred to herein as “Greengate Development.” The proposed Greengate Development is to be located on the west side of Hill Road, south of Busey Road, within the City of Canal Winchester, Fairfield County, OH. The full buildout of the Greengate Development is projected to have 197 lots over three (3) phases. Greengate Development’s application requests approval of the following access points:

- Full access driveway connection to Hill Road (referred to as “Greengate Boulevard”), approximately 0.4 miles south (center-line-to-center-line) of Busey Road.
- A future extension of Greengate Boulevard that will connect to Diley Road at the intersection with Howe Industrial Parkway.

The Site Plan application also requests approval to conduct work within the right-of-way for construction of the Site driveway along with the recommended roadway improvements. Hill Road is under jurisdiction of Fairfield County. Busey Road, Kings Crossing, and Diley Road are under jurisdiction of the City of Canal Winchester.

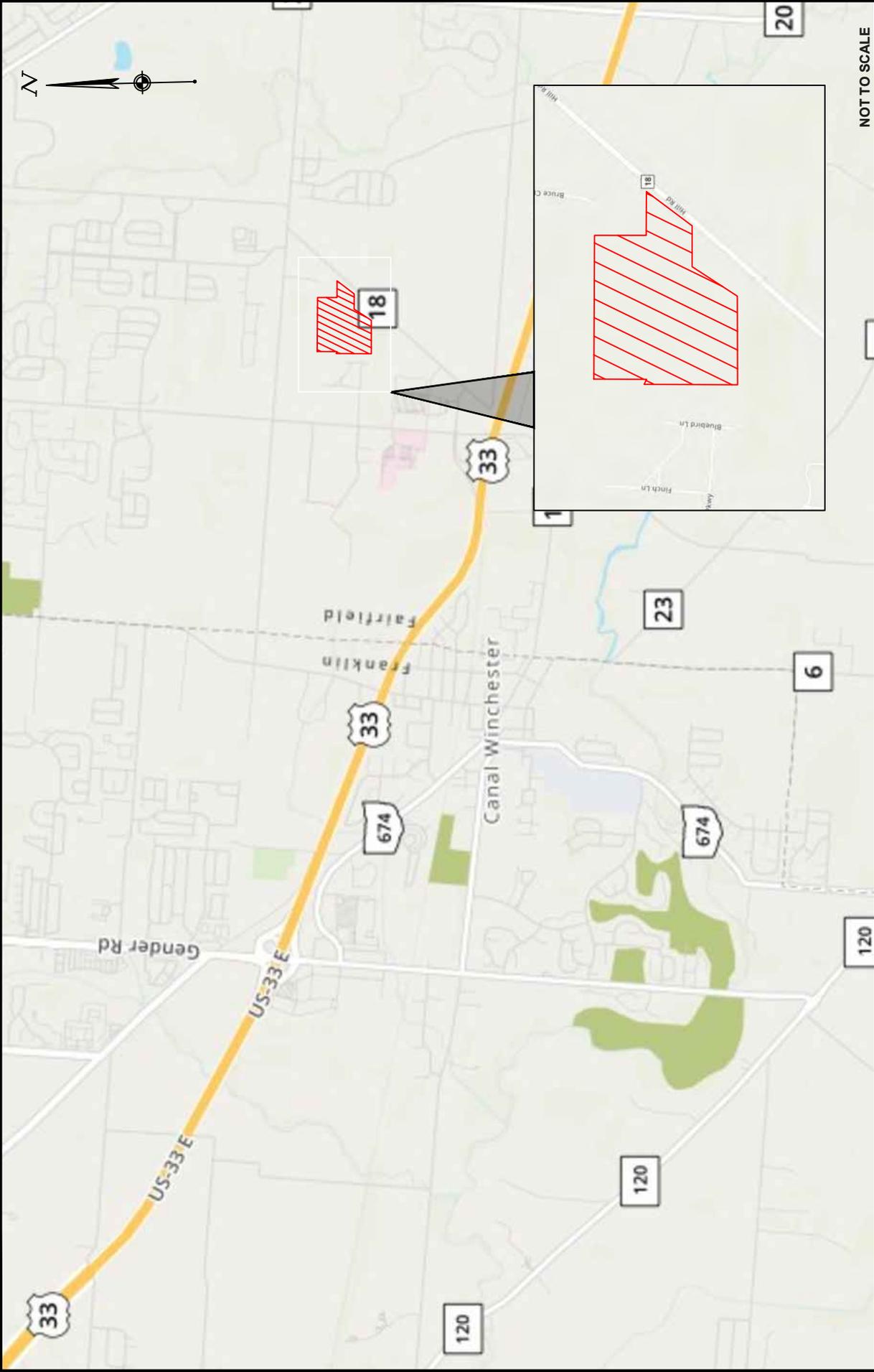
This report presents the methodologies, analyses, and results of the Traffic Impact Study (TIS) for traffic generated by the proposed Greengate Development. The purpose of the TIS was to identify the traffic related impacts, if any, during typical weekday AM and PM Peak Hours of the adjacent street traffic corresponding with the weekday hours of operation for the proposed Greengate Development. The study parameters of this report were generated based upon a recent concept plan, and a memorandum of understanding dated January 20, 2020 between CESO and the City of Canal Winchester outlining the TIS scope of service (See Appendix A).

As requested in the 1-20-20 MOU, the following traffic scenarios were evaluated. The term “Build” represents the first day of full use of the Greengate Development.

**Existing Traffic Scenario** – Represents current (year 2019) traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network. The Existing Traffic Scenario served as a baseline for comparison of the traffic impacts in relation to the proposed Greengate Development.

**2022/2023/2024 and 2034 No-Build Traffic Scenario** – Represents traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network that would exist during year 2022/2023/2024 and 2034, without the proposed Greengate Development.

**2022/2023/2024 and 2034 Build Traffic Scenario** – Represents traffic conditions during the weekday AM and PM Peak Hours of the adjacent roadway network that would exist during year 2022/2023/2024 and 2034, with the proposed Greengate Development phases constructed and fully operational.



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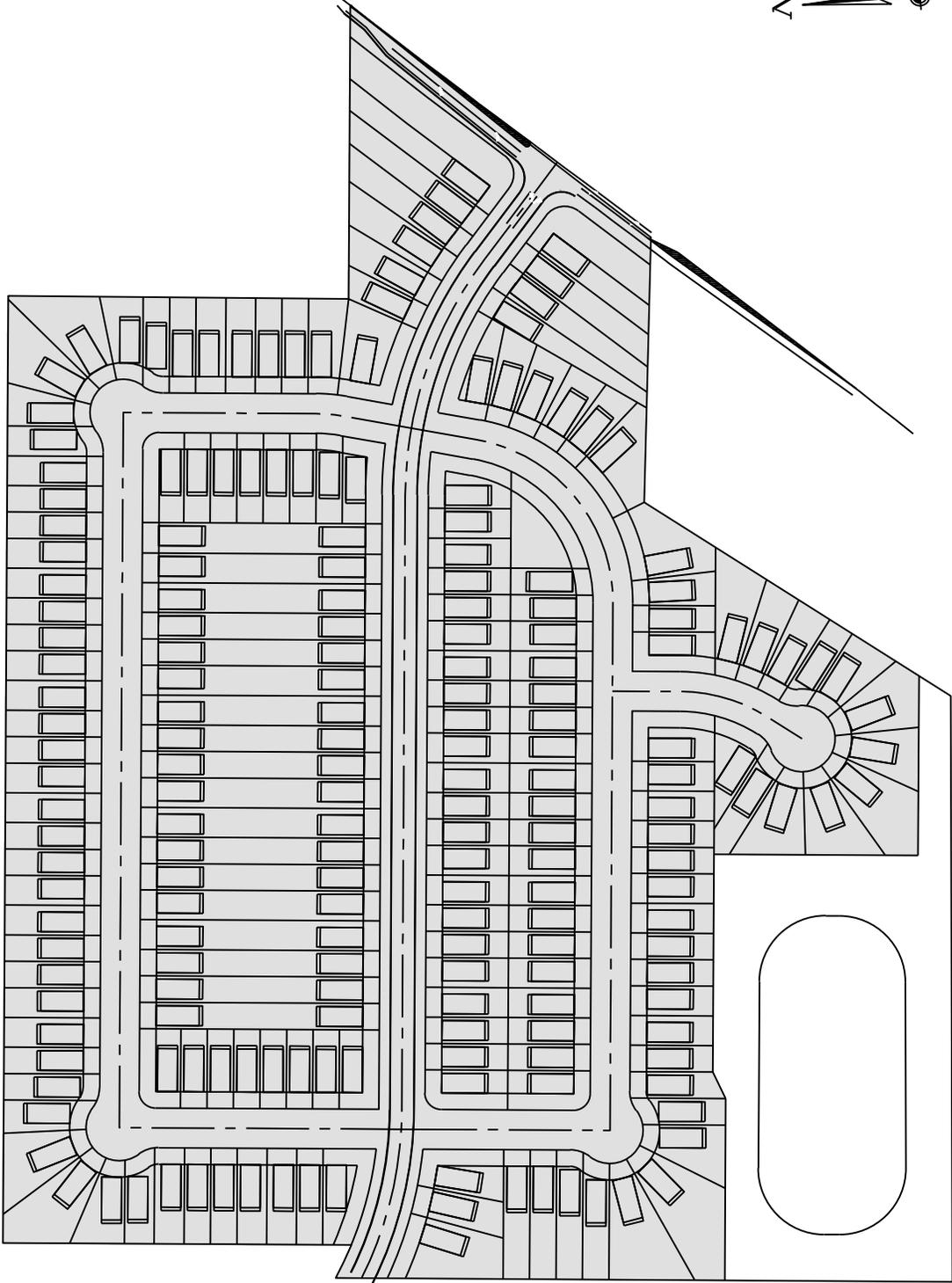
FIGURE 1	
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SITE LOCATION

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER

FAIRFIELD COUNTY, OHIO



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FIGURE 2

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SITE PLAN

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER

FAIRFIELD COUNTY, OHIO



## 2.1. Study Procedure

The following studies and analyses were undertaken:

1. Traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, December 12<sup>th</sup>, 2019 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM at the following intersections in order to ascertain existing traffic patterns and volumes:
  - Hill Road & Busey Road (Stop Controlled).
  - Hill Road & Kings Crossing (Stop Controlled).
2. After discussion with the City of Canal Winchester, additional traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, January 9<sup>th</sup>, 2020 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM for a total of 6 hours at the following intersections:
  - Diley Road & Howe Industrial Parkway (Stop Controlled).
3. The Existing Weekday Peak Hour Traffic Volumes were reviewed and balanced. The volumes are illustrated on Figure 4. Capacity analyses were then conducted to determine the capacity of the key study intersections under the Existing Traffic Scenario during AM and PM Peak Hours using HCS Version 7 methodology.
4. The 2022/2023/2024 and 2034 No-Build Traffic Volumes (Figures 5-8) were calculated by applying a growth rate to the Existing Weekday Peak Hour Traffic Volumes (Year 2019, Figure 4) to account for background growth in the vicinity of the Site. Growth rate requests were made to Mid-Ohio Regional Planning Commission (MORPC). However, due to not receiving those growth factors in time, CESO moved forward with a conservative 1.0 percent (%).
5. Capacity analyses of the 2022/2023/2024 and 2034 No-Build Weekday Peak Hour Traffic Volumes (Figures 5-8) to determine the capacity of the key study intersections during AM and PM Peak Hours using HCS Version 7 methodology.
6. Directional distribution analyses were conducted to determine the potential distribution of residents for the proposed Greengate Development under the 2022/2023 and 2024 Opening Year Build Traffic Scenarios (see Figure 9).
7. Analyses were conducted to determine the potential traffic volumes generated by the proposed Greengate Development under the 2022/2023 and 2024 Opening Year Build Traffic Scenarios utilizing data provided in the Institute of Transportation Engineers' *Trip Generation Manual, 10th Edition* (see Table 3).
8. Addition of the Greengate Development Generated Traffic Volumes (Figures 10.A-10.B) to the 2022/2023/2024 and 2034 No-Build Weekday Peak Hour Traffic Volumes (Figures 5-8) to reflect the 2022/2023/2024 and 2034 Build Weekday Peak Hour Traffic Volumes (Figures 11-14).
9. Capacity analyses of the 2022/2023/2024 and 2034 Build Weekday Peak Hour Traffic Volumes (Figures 11-14) to determine the capacity of the key study intersections during AM and PM Peak Hours using HCS Version 7 methodology.

10. Turn lane analyses were completed to determine if left-turn lanes or right-turn lanes were required as a result of the Greengate Development. Turn-lane analyses utilized ODOT charts for unsignalized free-flowing approaches and capacity analyses results for unsignalized stopped approaches.
11. Queue Length Analyses were completed based upon ODOT's L&D Manual Methodology.
12. Recommendations for roadway improvements were generated under the 2022/2023/2024 and 2034 Traffic Scenarios based upon the capacity analyses of the surrounding roadway network. Application of the recommendations and evaluation of the capacity of the key study intersections under the applicable traffic scenarios, during AM and PM Peak Hours, was completed using HCS Version 7 methodology.

## 2.2. References

This report utilizes information provided by the following sources:

1. *Highway Capacity Manual* Special Report 209. (2010 Edition). Transportation Research Board.
2. *Trip Generation Manual*. 10<sup>th</sup> ed. Washington, DC: Institute of Transportation Engineers, 2017.
3. Hooper, Kevin G. *Trip generation handbook: An ITE Proposed Recommended Practice*. Washington, D.C.: Institute of Transportation Engineers.
4. Most recent Site Plan.
5. "The City of Canal Winchester." 39°51'12" N and 82°46'11" W, *Google Earth*. January 16<sup>th</sup>, 2020.
6. *Location & Design Manual – Volume I (July 2019)*. Ohio Department of Transportation (ODOT).

### 3. Roadway and Traffic Conditions in the Vicinity of the Site

An inventory of existing transportation conditions in the vicinity of the Site was created to form a database for use in projecting Build conditions.

#### 3.1. Study Location and Area Land Use

The Site is located on the west side of Hill Road, south of Busey Road, within the City of Canal Winchester, Fairfield County, Ohio (OH). Land use in the direct vicinity of the Site is primarily agricultural and residential.

Access to the proposed Greengate Development is projected via one (1) access point on Hill Road; one new full access driveway connection to Hill Road (referred to as “Greengate Boulevard”). In the future, Greengate Boulevard will be extended to connect with Diley Road, which will provide an additional access point for the Greengate Development.

#### 3.2. Area Roadway Characteristics

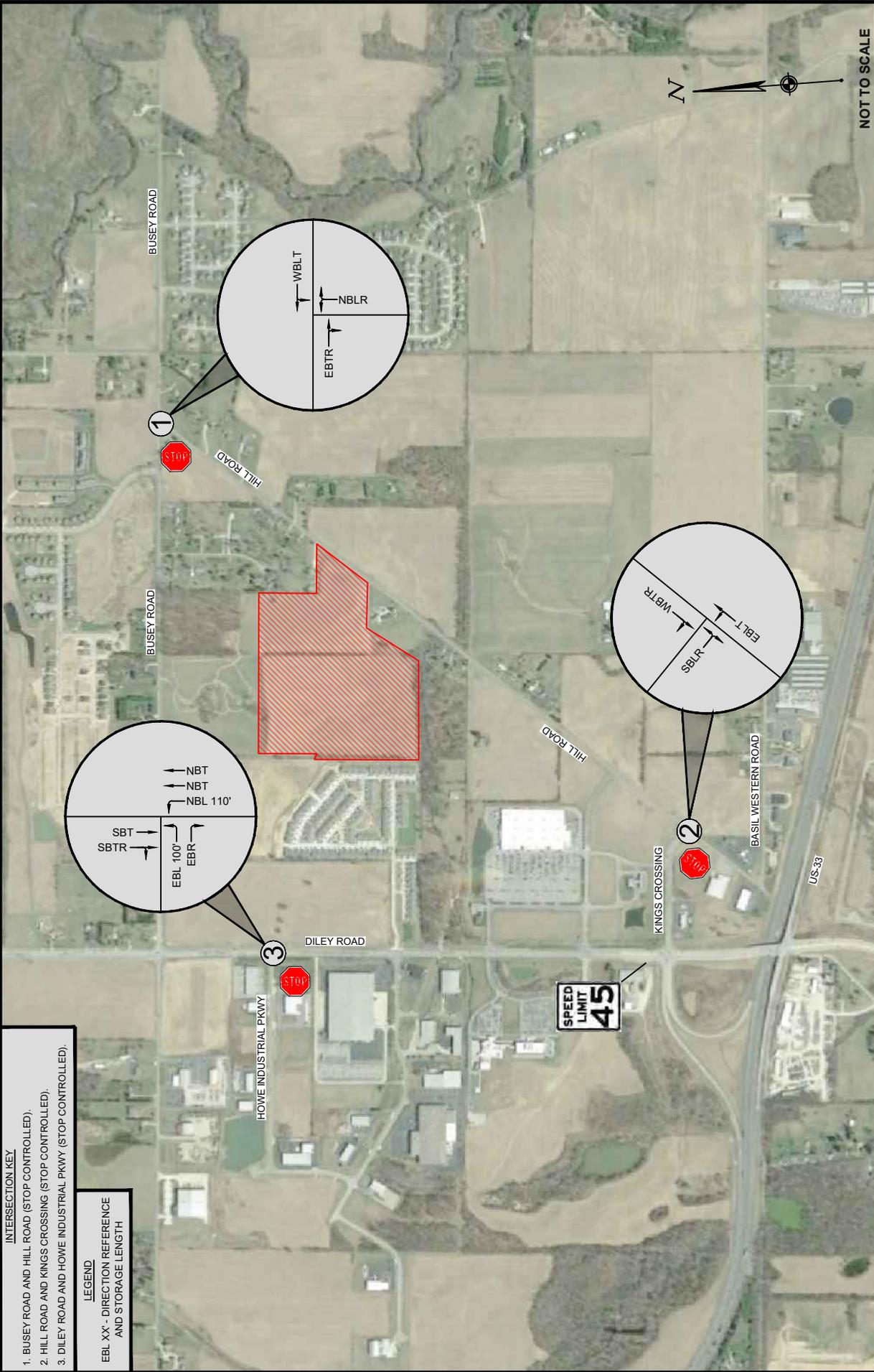
**Hill Road** – Hill Road runs in the northeast/south westbound direction in the vicinity of the Site. At the intersection with Kings Crossing and the proposed Greengate Boulevard, Hill Road is labeled as east/westbound throughout the analysis. At the intersection with Busey Road, Hill Road is labeled as northbound. Hill Road is a two-lane minor collector. Hill Road is under jurisdiction of Fairfield County. The speed limit on Hill Road is unposted. After discussion with the City of Canal Winchester and Fairfield County, the design speed is assumed to be 45 mph.

**Busey Road** – Busey runs in the east/westbound direction in the vicinity of the Site. Busey Road is a two-lane major collector. Busey Road is stop controlled in the eastbound direction only at the intersection with Hill Road. Due to the geometry and signage at the intersection with Hill Road, westbound Busey Road is labeled as the southbound major street approach (northbound major approach is Hill Road). Eastbound Busey Road is labeled as the minor street approach in the analysis. Busey Road is under jurisdiction of the City of Canal Winchester. The speed limit on Busey Road is unposted.

**Kings Crossing** – Kings Crossing runs in the east/westbound direction in the vicinity of the Site. Due to the skewed orientation of the intersection with Hill Road, Kings Crossing is labeled as southbound throughout the analysis and report. Kings Crossing is a two-lane major collector. Kings Crossing is stop controlled at its intersection with Hill Road. Kings Crossing is under jurisdiction of the City of Canal Winchester. The speed limit on Kings Crossing is assumed to be 35 mph.

**Diley Road** – Diley Road runs in the north/southbound direction in the vicinity of the Site. Diley Road is a four-lane principal arterial. Diley Road is stop controlled at its intersection with Howe Industrial Parkway. Diley Road is under jurisdiction of the City of Canal Winchester. The speed limit on Diley Road is 45 mph.

The Existing Transportation System is shown on Figure 3 of the report.



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EXISTING TRANSPORTATION SYSTEM
GREENGATE RESIDENTIAL DEVELOPMENT
CITY OF CANAL WINCHESTER
FAIRFIELD COUNTY, OHIO

**INTERSECTION KEY**

- BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
- HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
- DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

EBL-XX'- DIRECTION REFERENCE AND STORAGE LENGTH



### 3.3. Existing Traffic Volumes

Traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, December 12<sup>th</sup>, 2019 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM for a total of 6 hours at the following intersections:

- Hill Road & Busey Road (Stop Controlled).
- Hill Road & Kings Crossing (Stop Controlled).

After discussion with the City of Canal Winchester, additional traffic counts were conducted by Gewalt Hamilton Associates, Inc. on Thursday, January 9<sup>th</sup>, 2020 between the hours of 6:00 – 9:00 AM and 3:00 – 6:00 PM for a total of 6 hours at the following intersections:

- Diley Road & Howe Industrial Parkway (Stop Controlled).

The weekday peak hours of the Traffic Impact Study roadway network were determined to occur between the hours of:

- 7:15 AM – 8:15 AM (AM Peak Hour).
- 5:00 PM – 6:00 PM (PM Peak Hour).

Traffic counts were conducted with schools in session for the season. Count data collected consists of turning movement counts with classification breakouts of lights, busses, single-unit trucks, and articulated trucks.

The Existing Traffic Count Data is in Appendix B. The Existing Weekday Peak Hour Traffic Volumes (Year 2019) are illustrated on Figure 4.

**INTERSECTION KEY**

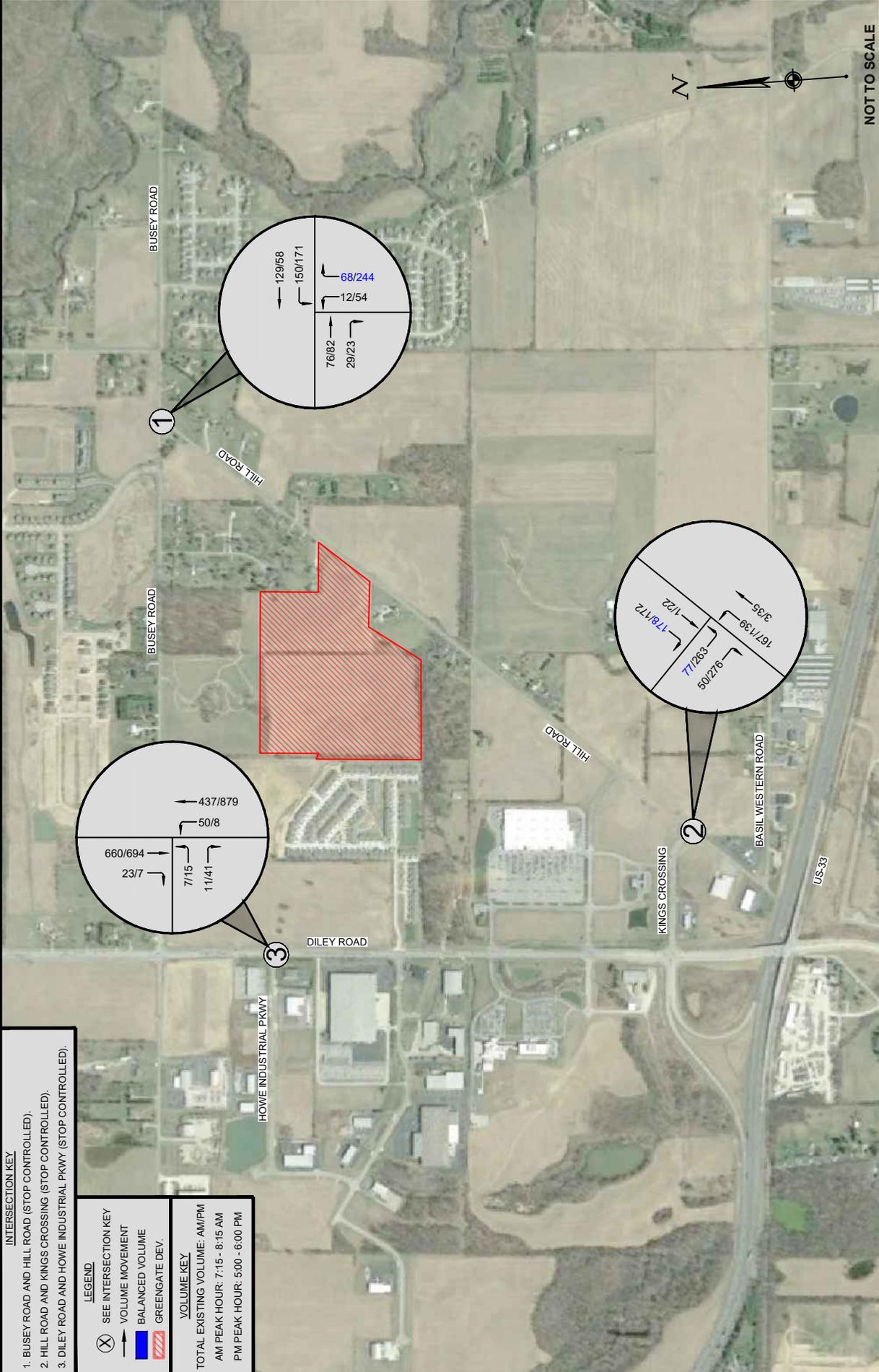
1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
3. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

- ⊗ SEE INTERSECTION KEY
- VOLUME MOVEMENT
- ▬ BALANCED VOLUME
- ▨ GREENGATE DEV.

**VOLUME KEY**

TOTAL EXISTING VOLUME: AM/PM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM



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**FIGURE 4**

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**EXISTING WEEKDAY PEAK HOUR TRAFFIC VOLUMES**

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER  
 FAIRFIELD COUNTY, OHIO



### 3.4. Capacity Analysis Parameters

The capacity of an intersection (signalized or unsignalized) can best be described by its corresponding level of service (LOS). The level of service of an intersection is a qualitative measure of the various attributes of an intersection. There are six levels of service ranging from “ideal” free flow conditions at LOS “A”, to forced or “breakdown” conditions at LOS “F”.

The level of service for unsignalized intersections is based upon total delay. Total delay is defined in the *Highway Capacity Manual (HCM)*, 2010 as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. Table 1 summarizes the LOS definitions for unsignalized intersections. Throughout the report “unsignalized intersections” are commonly referred to as “stop controlled.”

**Table 1**  
**Level of Service Criteria (Unsignalized Intersections)**

Level of Service	Delay per Vehicle (Sec.)	Description
A	≤ 9.0	Little or no delay.
B	> 9.0 and ≤ 15.0	Short traffic delays.
C	> 15.0 and ≤ 25.0	Average traffic delays.
D	> 25.0 and ≤ 35.0	Long traffic delays.
E	> 35.0 and ≤ 50.0	Very long traffic delays.
F	≥ 50.0	Extreme traffic delays.

Source: *Highway Capacity Manual Special Report 209*. (2010 Edition). Transportation Research Board.

*Highway Capacity Manual (HCM)*, 2010 methodology was used in the Traffic Impact Study to remain consistent with “state-of-the-practice” professional standards. Highway Capacity Software (HCS) Version 7.8 was utilized to calculate delay and level of service values. HCS Version 7 model parameters include traffic volumes, movements, heavy vehicle percentage, and peak hour factor (PHF). A PHF of 0.92 was used throughout the analysis.

### 3.5. Existing Traffic Scenario Capacity Analysis

Utilizing the Existing Weekday Peak Hour Traffic Scenario (Year 2019) shown on Figure 4, capacity calculations were performed for the key study intersections. All capacity calculations within the TIS followed procedures documented in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2010 Edition). The capacity analyses were completed using HCS Version 7 methodology.

Under the Existing Traffic Scenario, capacity calculations were performed at the following intersections:

- Hill Road and Busey Road (Stop Controlled).
- Hill Road and Kings Crossing (Stop Controlled).

Table 2 summarizes the capacity analysis results for the Existing Traffic Scenario.

**Table 2**  
**Summary of Existing Traffic Scenario Capacity Analysis**

Intersection ↓	Year →	2019 AM and PM Peak Hours			
	Volume →	Existing – Year 2019			
	Geometry →	Existing			
	Movement	AM Peak Hour		PM Peak Hour	
LOS		*Delay	LOS	*Delay	
Hill Road & Busey Road (Stop Controlled)	EBLR	B	11.3	B	14.7
	NBLT	A	7.9	A	7.8
Hill Road & Kings Crossing (Stop Controlled)	EBLT	A	8.0	A	7.9
	SBLR	B	12.8	E	38.7
*Delay in seconds L – Left T – Through R – Right					

Under the Existing Traffic Scenario, all movements operate at level of service (LOS) “B” or better condition with the exception of the SBLR movement at the Hill Road and Kings Crossing intersection, which operates at LOS “E” during the PM Peak Hour.

The Existing Traffic Scenario Capacity Analysis Summary Sheets are contained in Appendix C of the report.

## 4. Estimates of 2022/2023/2024/2034 No-Build Traffic in the Vicinity of the Site

### 4.1. 2022/2023/2024/2034 No-Build Traffic Volumes

The 2022/2023/2024/2034 No-Build Weekday Peak Hour Traffic Volumes (Figures 5, 6, 7, and 8) were calculated by applying growth factors to the Existing Weekday Peak Hour Traffic Volumes (Year 2019, Figure 4). Growth rate requests were made to Mid-Ohio Regional Planning Commission (MORPC). However, due to not receiving those growth factors in time, CESO moved forward with a conservative 1.0 percent (%).

### 4.2. 2022/2023/2024/2034 No-Build Traffic Scenario Capacity Analysis

Utilizing the 2022/2023/2024/2034 No-Build Weekday Peak Hour Traffic Volumes (Figures 5, 6, 7, and 8), capacity calculations were performed for the key study intersections. All capacity calculations within the TIS followed procedures documented in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2010 Edition). The capacity analyses were completed using HCS Version 7 methodology.

Under the 2022/2023/2024/2034 No-Build Traffic Scenario, all movements operate at level of service (LOS) "C" or better condition with the exception of the SBLR movement at the Hill Road and Kings Crossing intersection, which operates at LOS "E" under the 2022 No-Build PM Peak Hour. With recommended improvements in the 2022 No-Build Scenario, all movements operate at LOS "C" or better condition.

For simplicity, the capacity analysis results for all scenarios are shown in Table 5 and Table 6 in Section 6.2 of the report. The 2022/2023/2024/2034 No-Build Traffic Scenario Capacity Analysis Summary Sheets are contained in Appendix D of the report.

**INTERSECTION KEY**

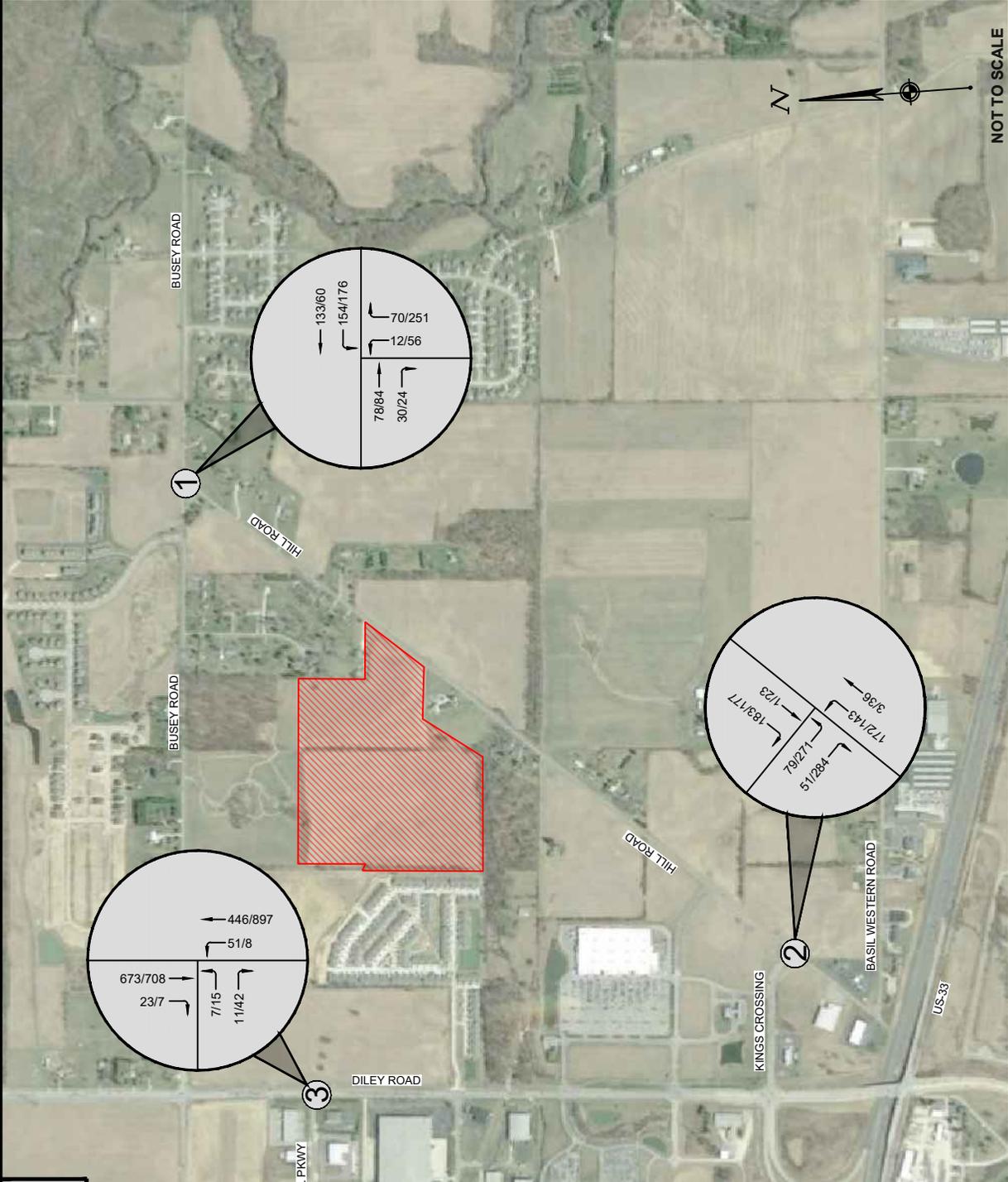
1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
3. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

- ⊗ SEE INTERSECTION KEY
- VOLUME MOVEMENT
- ▬ BALANCED VOLUME
- ▨ GREENGATE DEV.

**VOLUME KEY**

TOTAL 2022 NB VOLUME: AMPM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM



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**FIGURE 5**

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<b>2022 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES</b>	
GREENGATE RESIDENTIAL DEVELOPMENT	
CITY OF CANAL WINCHESTER	FAIRFIELD COUNTY, OHIO



**INTERSECTION KEY**

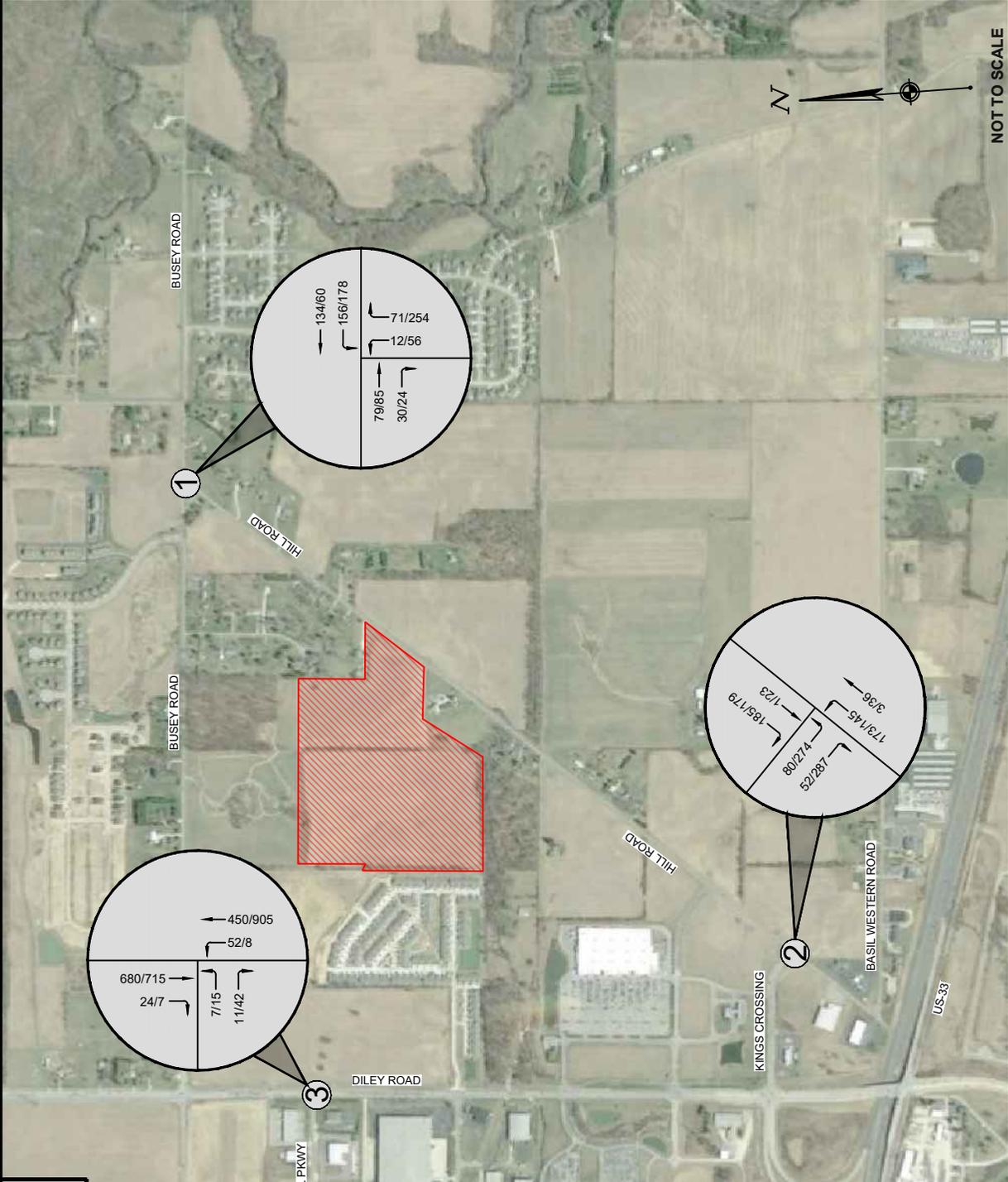
1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
3. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

- ⊗ SEE INTERSECTION KEY
- VOLUME MOVEMENT
- ▬ BALANCED VOLUME
- ▨ GREENGATE DEV.

**VOLUME KEY**

TOTAL 2023 NB VOLUME: AMPM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM



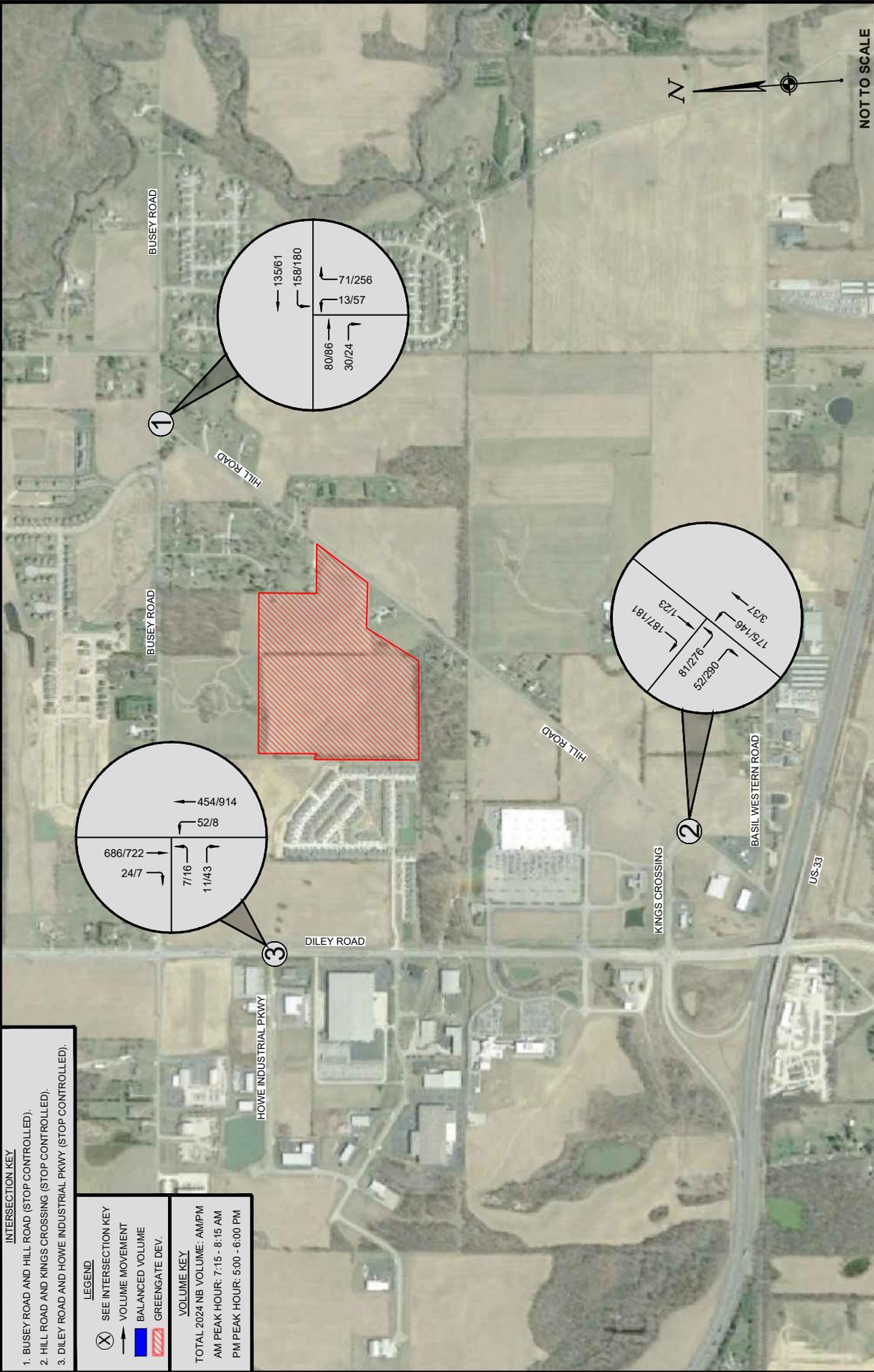
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**FIGURE 6**

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<b>2023 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES</b>	
GREENGATE RESIDENTIAL DEVELOPMENT	
CITY OF CANAL WINCHESTER	FAIRFIELD COUNTY, OHIO





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FIGURE 7	
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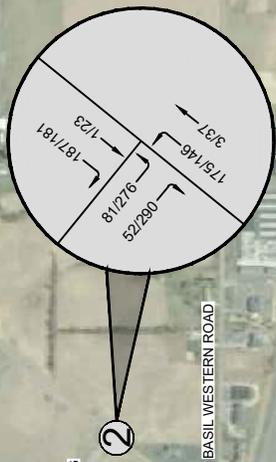
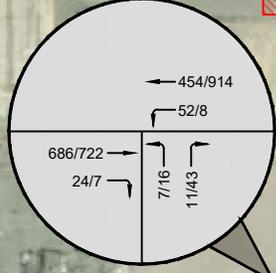
2024 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES	
GREENGATE RESIDENTIAL DEVELOPMENT	
CITY OF CANAL WINCHESTER	FAIRFIELD COUNTY, OHIO

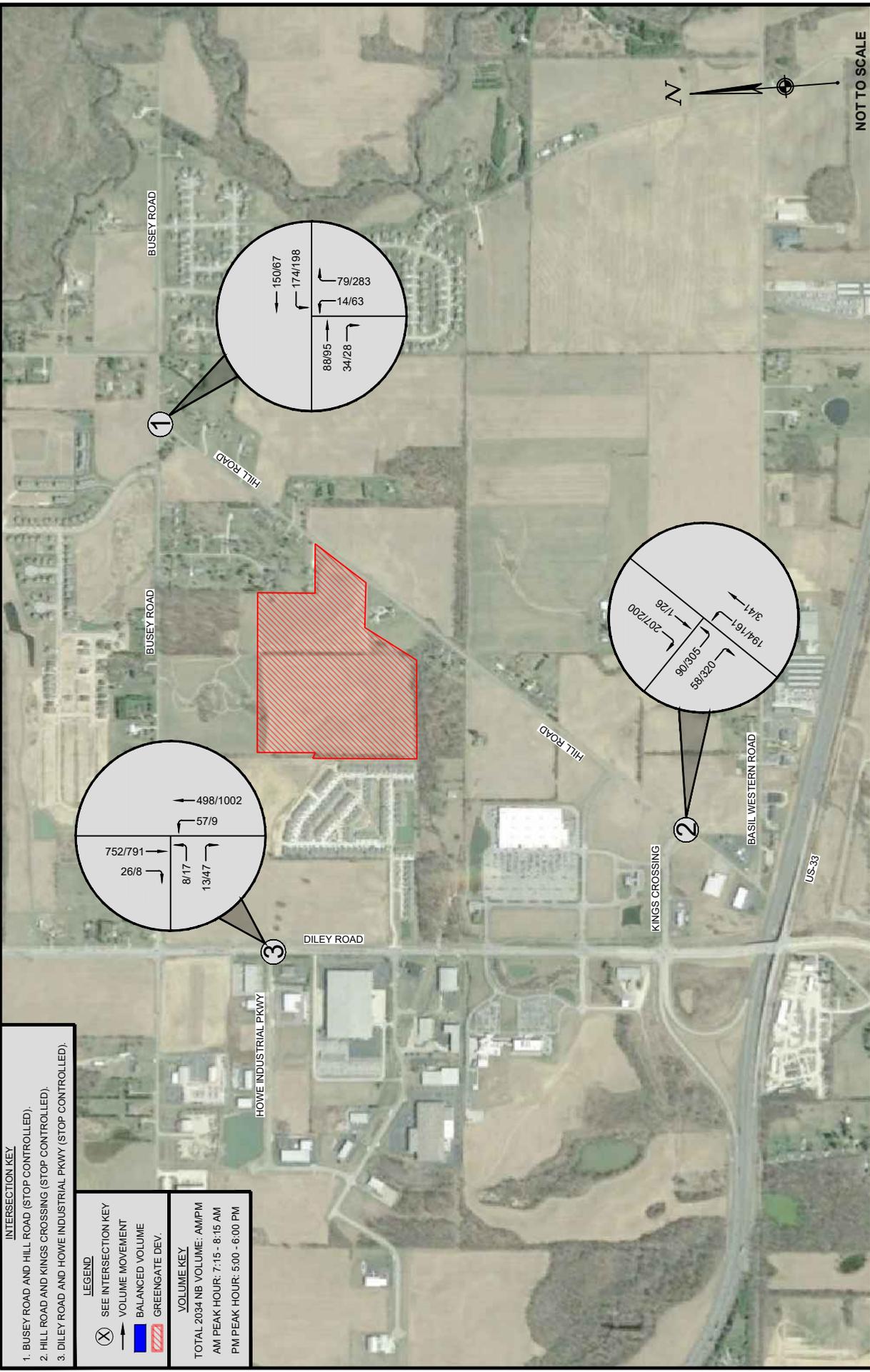
**INTERSECTION KEY**

- BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
- HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
- DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

<b>LEGEND</b>	
	SEE INTERSECTION KEY
	VOLUME MOVEMENT
	BALANCED VOLUME
	GREENGATE DEV.

<b>VOLUME KEY</b>	
TOTAL 2024 NB VOLUME: AMPM	
AM PEAK HOUR: 7:15 - 8:15 AM	
PM PEAK HOUR: 5:00 - 6:00 PM	





**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
3. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

- ⊗ SEE INTERSECTION KEY
- VOLUME MOVEMENT
- ▬ BALANCED VOLUME
- ▨ GREENGATE DEV.

**VOLUME KEY**

TOTAL 2034 NB VOLUME: AMPM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM

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FIGURE 8

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2034 NO-BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER  
 FAIRFIELD COUNTY, OHIO



## 5. Trip Generation

### 5.1. Greengate Development-Generated Traffic Volumes

Studies of similar developments throughout North America have shown that the amount of traffic generated will be functionally related to some unit of activity (i.e., number of fueling stations, gross floor area, service bays, etc). In development, site traffic fluctuates substantially on different days and hours throughout the year. Therefore, it is imperative to select an appropriate hourly volume on which to base the design of the external roadway and site access facilities. The Weekday AM and PM Peak Hours were selected based on the adjacent street traffic during this hour.

The 2022/2023/2024 Opening Year Build Traffic Scenarios include the proposed use of the Site as a Greengate Development that consists of:

- Phase I (2022 Opening Year) 75 lots plus construction of Greengate Boulevard entrance.
- Phase II (2023 Opening Year) 61 lots.
- Phase III (2024 Opening Year) 61 lots.

For analysis purposes, the base variable units for the trip-generation rates were number dwelling units. The Greengate Development-Generated Traffic Volumes (Table 3) were calculated by utilizing data contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition. Appendix E includes the ITE Trip Generation Category 210 Sheets utilized to calculate the values presented in Table 3.

**Table 3**  
**Greengate Development-Generated Traffic Volumes**

ITE Land Use Description	ITE Cat.	Size	Unit	Total Generated Trips								
				Weekday			Weekday AM Peak Hour			Weekday PM Peak Hour		
				Trips			Trips			Trips		
				Tot	In	Out	Tot	In	Out	Tot	In	Out
Phase I (2022 Opening Year)												
Single-Family Detached Housing	210	75	Lots	798	399	399	58	14	44	77	49	28
ITE Cat. 210 Entering (%)/Exiting (%)				100%	50%	50%	100%	25%	75%	100%	63%	37%
<b>PHASE TOTAL</b>				<b>798</b>	<b>399</b>	<b>399</b>	<b>58</b>	<b>14</b>	<b>44</b>	<b>77</b>	<b>49</b>	<b>28</b>
Phase II (2023 Opening Year)												
Single-Family Detached Housing	210	61	Lots	660	330	330	48	12	36	63	40	23
ITE Cat. 210 Entering (%)/Exiting (%)				100%	50%	50%	100%	25%	75%	100%	63%	37%
<b>PHASE TOTAL</b>				<b>660</b>	<b>330</b>	<b>330</b>	<b>48</b>	<b>12</b>	<b>36</b>	<b>63</b>	<b>40</b>	<b>23</b>
Phase III (2024 Opening Year)												
Single-Family Detached Housing	210	61	Lots	660	330	330	48	12	36	63	40	23
ITE Cat. 210 Entering (%)/Exiting (%)				100%	50%	50%	100%	25%	75%	100%	63%	37%
<b>PHASE TOTAL</b>				<b>660</b>	<b>330</b>	<b>330</b>	<b>48</b>	<b>12</b>	<b>36</b>	<b>63</b>	<b>40</b>	<b>23</b>
<b>TOTAL</b>				<b>2,118</b>	<b>1,059</b>	<b>1,059</b>	<b>154</b>	<b>38</b>	<b>116</b>	<b>203</b>	<b>129</b>	<b>74</b>

## 5.2. Directional Distribution of Greengate Development-Generated Traffic Volumes

The directional distribution of the development-generated traffic is a function of several variables. The assumptions and methods used in estimating the direction in which traffic will approach and depart the Site varies with several location-specific conditions such as:

- Size and type of the proposed development.
- Population distribution within the defined area of influence.
- Prevailing operating conditions on the existing street system.

The analysis of directional distribution is based on the observation that drivers normally will choose the fastest (not necessarily the most direct) routes to and from a given traffic generator.

The internal trip assignment was based upon the proposed Site Plan and the understanding of a residential developments’ operation. The traffic entering and exiting the residential development will not always travel the most direct route.

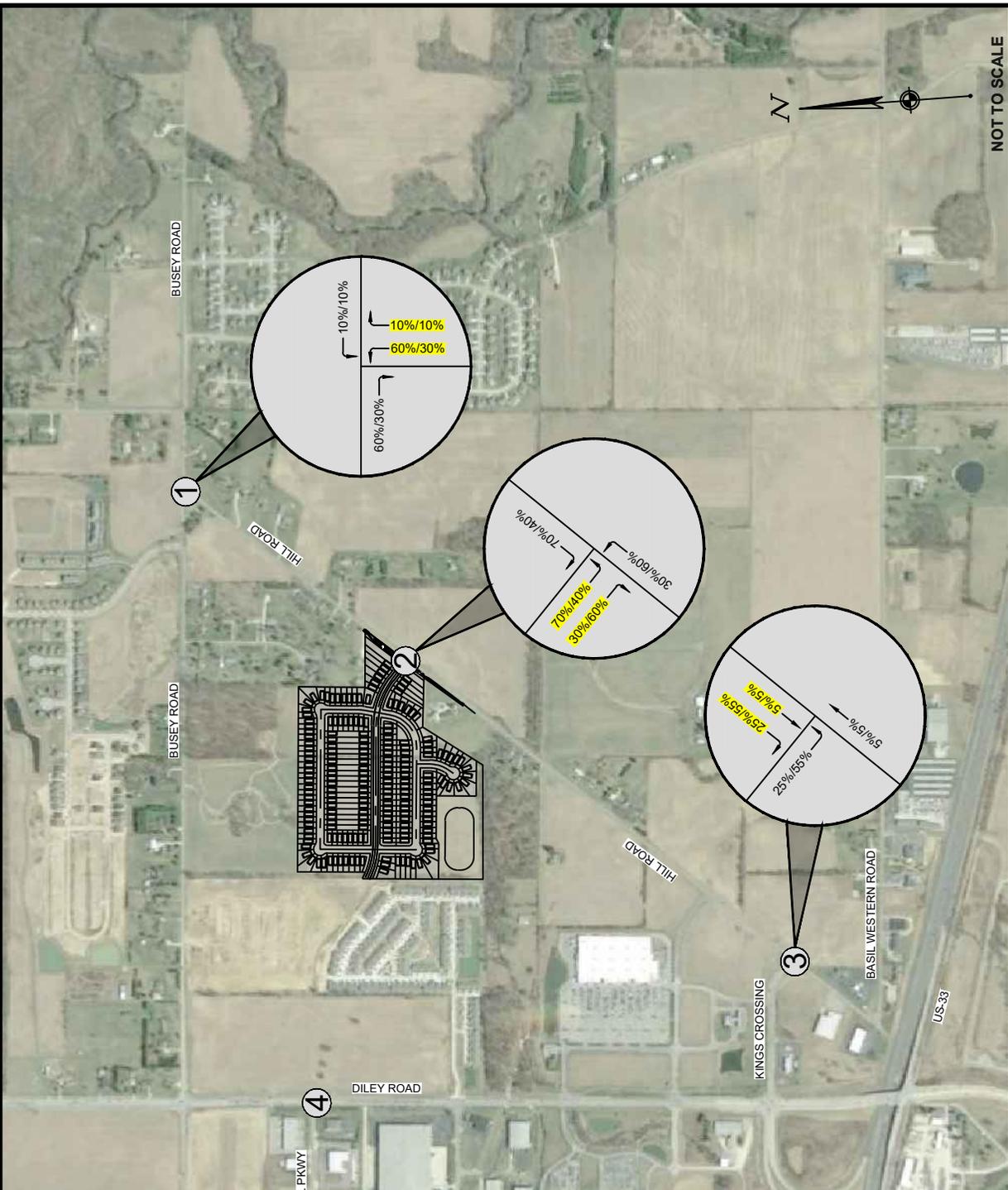
The anticipated directional distribution of trips generated by the proposed Greengate Development is shown in Table 4. Additionally, Figure 9 illustrates the primary directional distribution for passenger cars.

**Table 4**  
**Directional Distribution of Greengate Development-Generated Traffic Volumes**

Route	Directional Distribution - Passenger Cars	
	Passenger Cars	
	AM Peak Hour	PM Peak Hour
Primary Trip Distribution (Figure 9)		
To/From the East on Busey Road	10%/10%	10%/10%
To/From the West on Busey Road	60%/60%	30%/30%
To/From the West on Hill Road	5%/5%	5%/5%
To/From the North on Kings Crossing	25%/25%	55%/55%
<b>TOTAL</b>	<b>100%/100%</b>	<b>100%/100%</b>

Based upon the directional distributions listed in Table 4 and illustrated on Figure 9, the estimated Greengate Development-Generated Weekday Peak Hour Traffic Volumes shown in Table 3 were distributed to the adjacent roadway system. The Greengate Development Generated Weekday Peak Hour Traffic Volumes are illustrated on Figures 10.A-10.B.

- INTERSECTION KEY**
1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
  2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED.)
  3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
  4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).



NOT TO SCALE

**FIGURE 9**

DATE:	01/20/2020
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DIRECTIONAL DIST. OF DEV. GENERATED TRAFFIC VOLUMES (2022, 2023, AND 2024)	
GREENGATE RESIDENTIAL DEVELOPMENT	
CITY OF CANAL WINCHESTER	FAIRFIELD COUNTY, OHIO



- INTERSECTION KEY**
- 1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
  - 2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED)
  - 3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
  - 4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

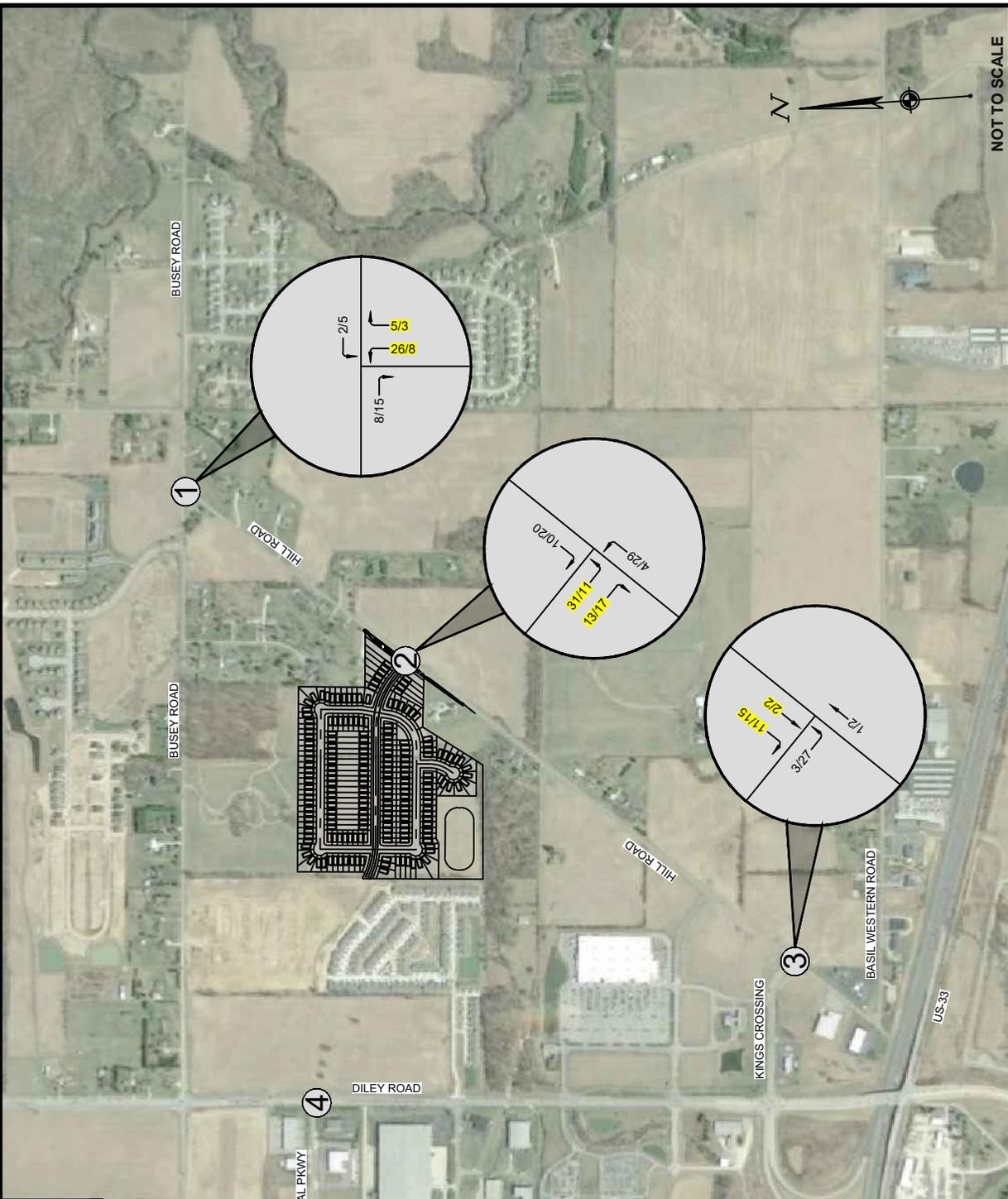
**LEGEND**

<b>TRIP GENERATION</b>	
AM	PM
IN	OUT
14	44 49 28

SEE INTERSECTION KEY  
 DIST. MOVEMENT  
 OUTBOUND VALUE (%)

**MOVEMENT KEY**

**DIRECTIONAL DISTRIBUTION**  
 PRIMARY TRIPS: AM/PM



NOT TO SCALE

**FIGURE 10-A**

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GREENGATE DEV. GENERATED TRAFFIC VOLUMES (2022 OPENING YEAR)
GREENGATE RESIDENTIAL DEVELOPMENT
CITY OF CANAL WINCHESTER
FAIRFIELD COUNTY, OHIO



**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED.)
3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

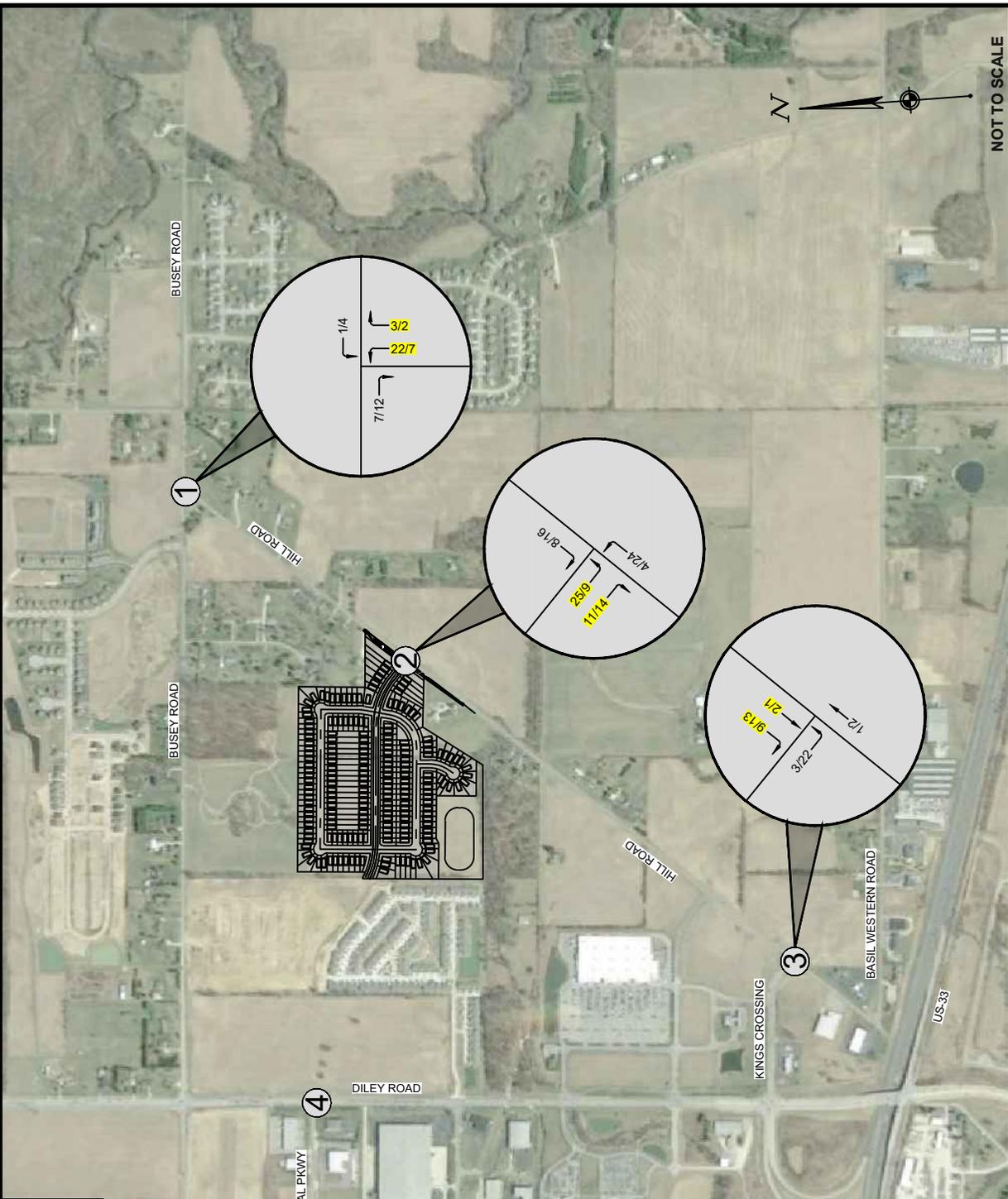
**LEGEND**

SEE INTERSECTION KEY  
 DIST. MOVEMENT  
 OUTBOUND VALUE (%)

TRIP GENERATION	
AM	PM
IN	IN
OUT	OUT
12	36
40	23

**MOVEMENT KEY**

**DIRECTIONAL DISTRIBUTION**  
 PRIMARY TRIPS: AM/PM



NOT TO SCALE

**FIGURE 10.B**

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GREENGATE DEV. GENERATED TRAFFIC VOLUMES (2023 AND 2024 OPENING YEAR)
GREENGATE RESIDENTIAL DEVELOPMENT
CITY OF CANAL WINCHESTER
FAIRFIELD COUNTY, OHIO



## 6. Estimates of 2022/2023/2024/2034 Build Traffic in the Vicinity of the Site

### 6.1. 2022/2023/2024/2034 Build Traffic Volumes

The 2022/2023/2024/2034 Build traffic volumes in the vicinity of the Greengate Development are composed of the 2022/2023/2024/2034 No-Build Weekday Peak Hour Traffic Volumes (Figures 5-8) and the estimated Greengate Development Generated Weekday Peak Hour Traffic Volumes for the specified year (Figures 10.A-10.B). Figures 11-14 illustrate the 2022/2023/2024/2034 Build Weekday Peak Hour Traffic Volumes.

### 6.2. 2022/2023/2024/2034 Build Traffic Scenario Capacity Analysis

Utilizing the 2022/2023/2024/2034 Build Weekday Peak Hour Traffic Volumes (Figures 11-14), capacity calculations were performed for the key study intersections and Site driveway. All capacity calculations within the TIS followed procedures documented in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2010 Edition). The capacity analyses were completed using HCS Version 7 methodology.

Under the 2022/2023/2024/2034 Build Traffic Scenario, all movements operate at level of service (LOS) “D” or better condition with the exception of the SBL movement at the Hill Road and Kings Crossing intersection, which operates at LOS “E” during the 2034 Build PM Peak Hour. Although the movement operates at LOS “E,” the delay is 36.2 seconds, which is only 1.2 seconds more than a LOS “D”.

For simplicity, the capacity analysis results for all scenarios are shown in Table 5 and Table 6 below. The 2022/2023/2024/2034 Build Traffic Scenario Capacity Analysis Summary Sheets are contained in Appendix F of the report.



**Table 5**  
**Summary of Capacity Analysis – AM Peak Hour**

Intersection →	2022/2023/2024/2034 AM Peak Hour																					
	No-Build & Build - Year 2022/2023/2024/2034																					
	Existing																					
Year →	2022 NB		2022 NB IMP		2022 BD		2023 NB		2023 BD		2023 BD IMP		2024 NB		2024 BD		2024 NB		2024 BD			
Volume →	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del		
Geometry →																						
Movement	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del		
Hill Rd. & Busey Rd. (Stop Controlled)	EBLR	B	11.4	B	11.4	B	12.1	B	11.4	B	12.7	B	11.5	B	13.5	B	12.0	B	14.4	B	14.4	
	NBLT	A	7.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	NBL	--	--	A	7.9	A	8.0	A	7.9	A	8.0	--	A	7.9	A	8.1	A	8.0	A	8.2	A	8.2
Hill Rd. & Kings Crossing (Stop Controlled)	EBLT	A	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	EBL	--	--	A	8.1	A	8.1	A	8.1	A	8.1	--	A	8.1	A	8.2	A	8.2	A	8.3	A	8.3
	SBLR	B	13.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	SBL	--	--	B	12.9	B	13.0	B	13.0	B	13.2	--	B	13.1	B	13.4	B	14.1	B	14.5	B	14.5
Hill Rd. & Greengate Blvd. (Stop Controlled)	SBR	--	--	A	8.5	A	8.5	A	8.5	A	8.5	--	A	8.5	A	8.6	A	8.5	A	8.6	A	8.6
	EBLT	--	--	--	--	A	7.6	--	--	A	7.7	--	--	--	--	--	--	--	--	--	--	--
	EBL	--	--	--	--	--	--	--	--	--	--	A	7.7	--	A	7.7	--	--	A	7.7	A	7.7
	SBLR	--	--	--	--	B	10.3	--	--	B	10.7	B	10.7	--	B	11.3	--	--	B	11.6	B	11.6

\*Delay in seconds L – Left T – Through R – Right



**Table 6**  
**Summary of Capacity Analysis – PM Peak Hour**

Intersection →	2022/2023/2024/2034 PM Peak Hour																			
	No-Build & Build – Year 2022/2023/2024/2034																			
	Existing																			
Movement	2022 NB		2022 IMP		2022 BD		2023 NB		2023 BD		2023 BD IMP		2024 NB		2024 BD		2024 NB		2024 BD	
	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del	LOS	*Del
Hill Rd. & Busey Rd. (Stop Controlled)	EBLR	C	15.1	B	15.0	C	15.3	C	15.1	C	15.6	--	C	15.3	C	16.2	C	17.0	C	18.4
	NBLT	A	7.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	NBL	--	--	A	7.9	A	7.9	A	7.9	A	7.9	--	A	7.9	A	8.0	A	8.0	A	8.1
Hill Rd. & Kings Crossing (Stop Controlled)	EBLT	A	8.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	EBL	--	--	A	8.0	A	8.0	A	8.0	A	8.1	--	A	8.0	A	8.1	A	8.1	A	8.3
	SBLR	E	45.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	SBL	--	--	C	18.4	C	20.2	C	18.8	C	22.7	--	C	19.1	D	25.6	C	23.9	E	36.2
Hill Rd. & Greengate Blvd. (Stop Controlled)	SBR	--	--	A	9.8	A	9.8	A	9.8	A	9.9	--	A	9.9	A	9.9	B	10.1	B	10.2
	EBLT	--	--	--	--	A	7.8	--	--	A	7.9	--	--	--	--	--	--	--	--	--
	EBL	--	--	--	--	--	--	--	--	--	--	A	7.9	--	A	8.0	--	--	A	8.0
SBLR	--	--	--	--	B	11.2	B	--	B	12.0	B	12.0	B	B	12.9	B	--	B	13.5	

\*Delay in seconds L – Left T – Through R – Right

**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED.)
3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

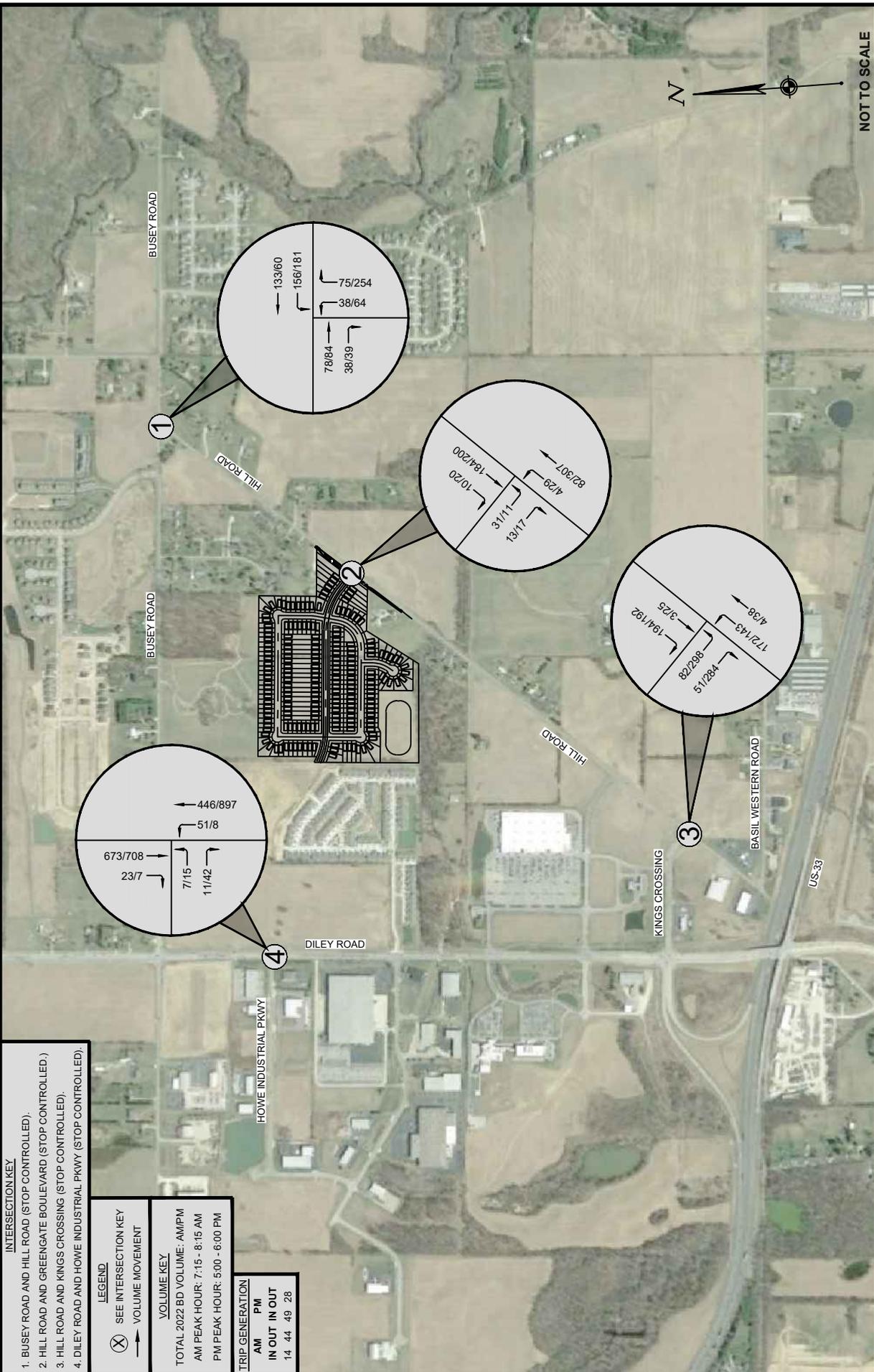
⊗ SEE INTERSECTION KEY  
 → VOLUME MOVEMENT

**VOLUME KEY**

TOTAL 2022 BD VOLUME: AM/PM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM

**TRIP GENERATION**

AM	PM
IN	IN
OUT	OUT
14	44
49	28



NOT TO SCALE

FIGURE 11  
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2022 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER  
 FAIRFIELD COUNTY, OHIO



**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED)
3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

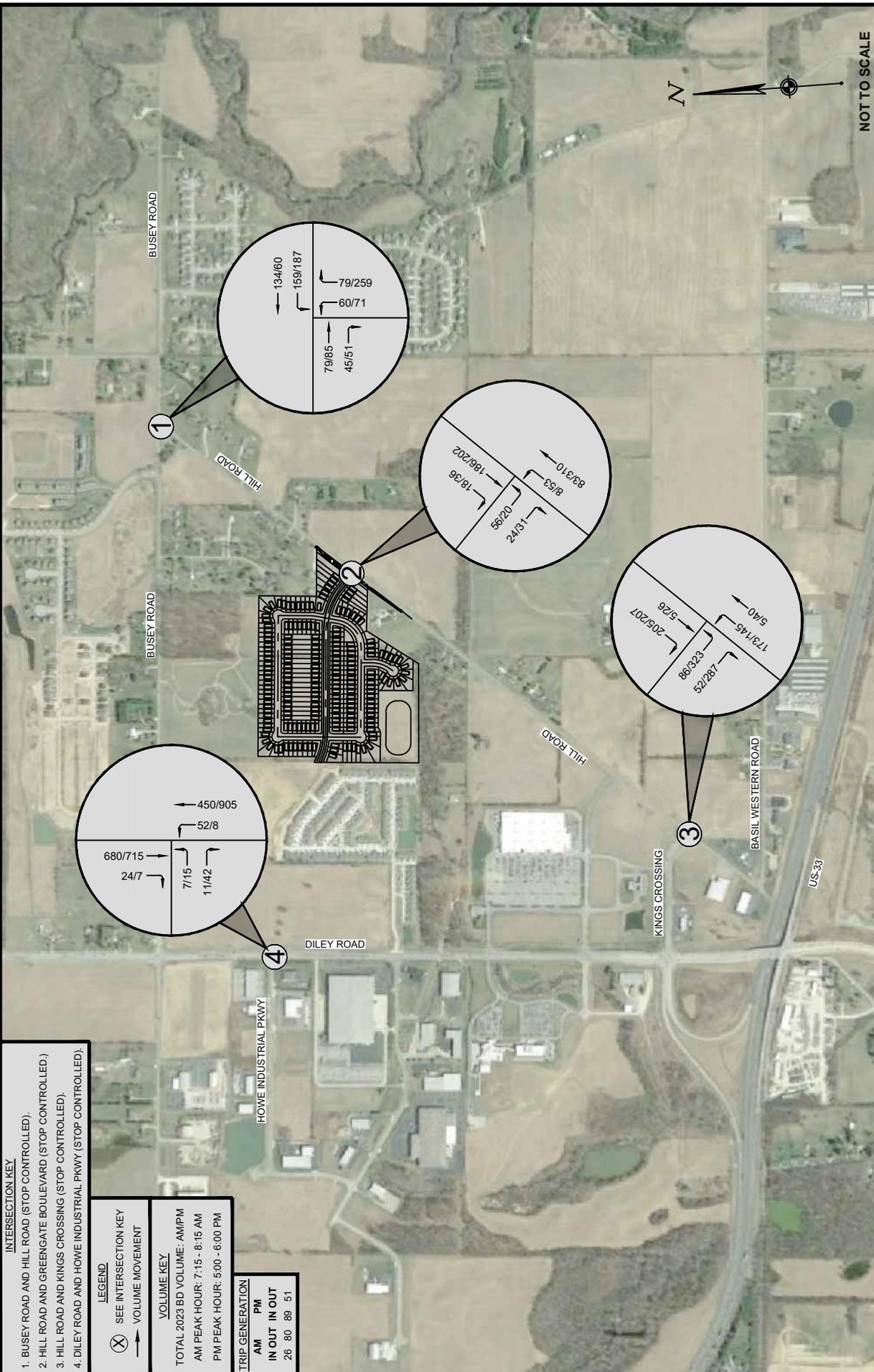
⊗ SEE INTERSECTION KEY  
 → VOLUME MOVEMENT

**VOLUME KEY**

TOTAL 2023 BD VOLUME: AM/PM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM

**TRIP GENERATION**

AM	PM
IN	IN
OUT	OUT
26 80	88 51



NOT TO SCALE

FIGURE 12

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2023 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER

FAIRFIELD COUNTY, OHIO



**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED)
3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

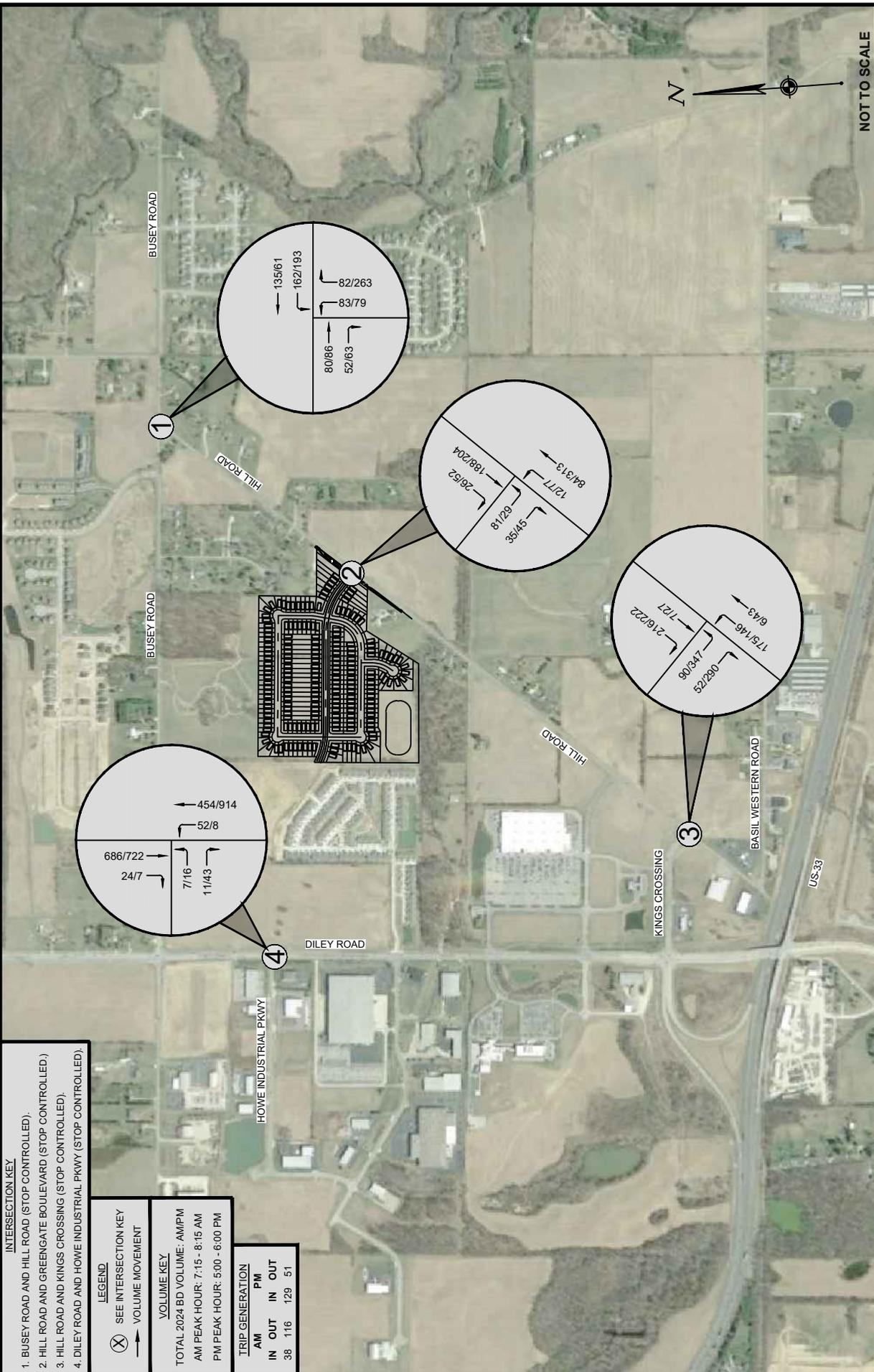
⊗ SEE INTERSECTION KEY  
 → VOLUME MOVEMENT

**VOLUME KEY**

TOTAL 2024 BD VOLUME: AM/PM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM

**TRIP GENERATION**

	AM	PM
IN	38	116
OUT	129	51



NOT TO SCALE

FIGURE 13

DATE:	01/20/2020
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2024 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES	
GREENGATE RESIDENTIAL DEVELOPMENT	
CITY OF CANAL WINCHESTER	FAIRFIELD COUNTY, OHIO



**INTERSECTION KEY**

1. BUSEY ROAD AND HILL ROAD (STOP CONTROLLED).
2. HILL ROAD AND GREENGATE BOULEVARD (STOP CONTROLLED.)
3. HILL ROAD AND KINGS CROSSING (STOP CONTROLLED).
4. DILEY ROAD AND HOWE INDUSTRIAL PKWY (STOP CONTROLLED).

**LEGEND**

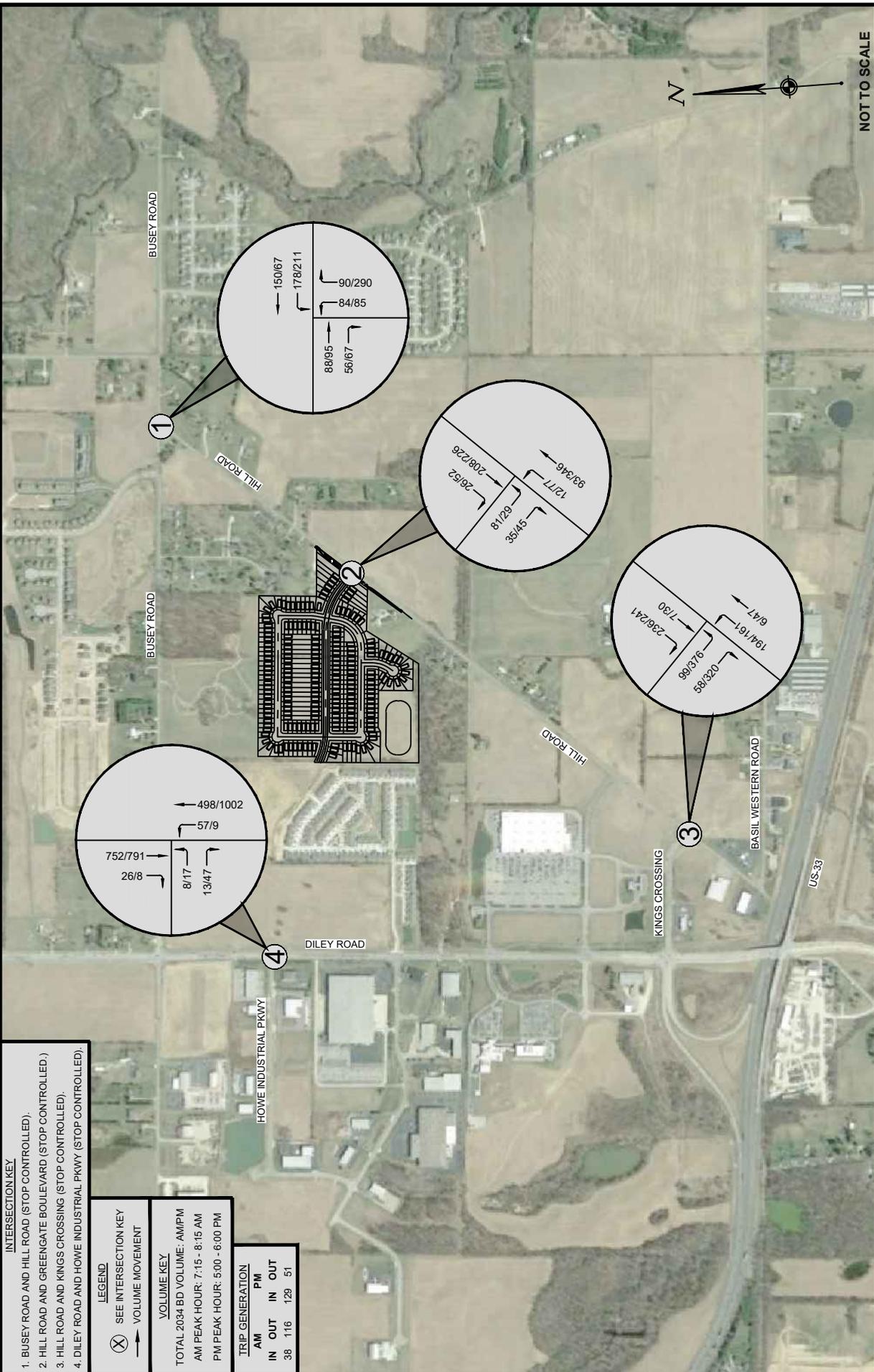
⊗ SEE INTERSECTION KEY  
 → VOLUME MOVEMENT

**VOLUME KEY**

TOTAL 2034 BD VOLUME: AM/PM  
 AM PEAK HOUR: 7:15 - 8:15 AM  
 PM PEAK HOUR: 5:00 - 6:00 PM

**TRIP GENERATION**

	AM	PM
IN	38	116
OUT	129	51



NOT TO SCALE

FIGURE 14

DATE: 01/20/2020  
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2034 BUILD WEEKDAY PEAK HOUR TRAFFIC VOLUMES

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER

FAIRFIELD COUNTY, OHIO



## 7. Turn Lane Analysis

Right and left-turn lane analyses were completed using the turn lane warrant charts from the ODOT *Location & Design Manual – Volume I (July 2019)* and capacity analysis results. Based on discussions with the City of Canal Winchester and Fairfield County, a 45-mph design speed on Hill Road was to be used for the analyses, therefore, the high-speed turn lane warrant charts were used.

### 7.1. Right-Turn Lane Analysis

Table 7 provides a summary of the data utilized in the review of each study location for a right-turn lane.

**Table 7**  
**Year 2022-2034 Right-Turn Lane Warrant Review**

Intersection	Lane	Advancing Traffic (am/pm)	Right-Turn (am/pm)	Chart Used	Warranted
2022 No-Build Traffic Scenario					
Hill Road and Kings Crossing	WBR	184/200	183/177	401-6b	No/No
	SBR	130/555	51/284	Capacity	No/Yes
2022 Build Traffic Scenario					
Hill Road and Greengate Boulevard	WBR	194/220	10/20	401-6b	No/No
Hill Road and Kings Crossing	WBR	197/217	194/192	401-6b	No/No
	SBR	133/582	51/284	Capacity	No/Yes
2023 No-Build Traffic Scenario					
Hill Road and Kings Crossing	WBR	186/202	185/179	401-6b	No/No
	SBR	132/561	52/287	Capacity	No/Yes
2023 Build Traffic Scenario					
Hill Road and Greengate Boulevard	WBR	204/238	18/36	401-6b	No/No
Hill Road and Kings Crossing	WBR	210/233	205/207	401-6b	No/Yes
	SBR	138/610	52/287	Capacity	No/Yes
2024 No-Build Traffic Scenario					
Hill Road and Kings Crossing	WBR	188/204	187/181	401-6b	No/No
	SBR	133/566	52/290	Capacity	No/No
2024 Build Traffic Scenario					
Hill Road and Greengate Boulevard	WBR	214/256	26/52	401-6b	No/No
Hill Road and Kings Crossing	WBR	223/249	216/222	401-6b	Yes/Yes
	SBR	142/637	52/290	Capacity	No/Yes
2034 No-Build Traffic Scenario					
Hill Road and Kings Crossing	WBR	208/226	207/200	401-6b	No/Yes
	SBR	148/625	58/320	Capacity	No/No
2034 Build Traffic Scenario					
Hill Road and Greengate Boulevard	WBR	234/278	26/52	401-6b	No/No
Hill Road and Kings Crossing	WBR	243/271	236/241	401-6b	Yes/Yes
	SBR	157/696	58/320	Capacity	No/Yes

### 7.2. Year 2022-2034 Right-Turn Lane Warrant Review Summary

According to capacity analysis results, a SB right-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2022 No-Build Scenario. According to ODOT Chart 401-6b, a WB right-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2023 Build Traffic Scenario. **Note:** Due to the poor levels of service at the intersection, CESO recommends the WB right-turn lane be constructed under the 2022 No-Build Scenario.

### 7.3. Left-Turn Lane Analysis

Table 8 provides a summary of the data utilized in the review of each study location for a left-turn lane.

**Table 8**  
**Year 2022-2034 Left-Turn Lane Warrant Review**

Intersection	Lane	Advancing Traffic (am/pm)	Opposing Traffic (am/pm)	Left-Turn Volume (am/pm)	% Left Turns	Chart Used	Warranted
<b>2022 No-Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	82/307	287/236	12/56	15%/18%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	EBL	175/179	184/200	172/143	98%/80%	401-5b	<b>Yes/Yes</b>
<b>2022 Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	113/318	289/241	38/64	34%/20%	401-5b	<b>No/Yes</b>
Hill Road and Greengate Boulevard	EBL	86/336	194/220	4/29	4.7%/8.6%	401-5b	<b>No/No</b>
Hill Road and Kings Crossing	EBL	176/181	197/217	172/143	98%/79%	401-5b	<b>Yes/Yes</b>
<b>2023 No-Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	83/310	290/238	12/56	14%/18%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	EBL	176/181	186/202	173/145	98%/80%	401-5b	<b>Yes/Yes</b>
<b>2023 Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	139/330	290/238	60/71	43%/22%	401-5b	<b>No/Yes</b>
Hill Road and Greengate Boulevard	EBL	91/363	204/238	8/53	8.8%/14.6%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	EBL	178/185	210/233	173/145	97%/78%	401-5b	<b>Yes/Yes</b>
<b>2024 No-Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	84/313	293/241	13/57	15%/18%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	NBL	178/183	188/204	175/146	98%/80%	401-5b	<b>Yes/Yes</b>
<b>2024 Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	165/342	297/254	83/79	50%/23%	401-5b	<b>Yes/Yes</b>
Hill Road and Greengate Boulevard	EBL	96/390	214/256	12/77	12.5%/19.7%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	EBL	181/189	223/249	175/146	97%/77%	401-5b	<b>Yes/Yes</b>
<b>2034 No-Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	93/346	324/265	14/63	15%/18%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	NBL	197/202	208/226	194/161	98%/80%	401-5b	<b>Yes/Yes</b>
<b>2034 Build Traffic Scenario</b>							
Hill Road and Busey Road	NBL	174/375	328/278	84/85	48%/23%	401-5b	<b>Yes/Yes</b>
Hill Road and Greengate Boulevard	EBL	105/423	234/278	12/77	11.4%/18.2%	401-5b	<b>No/Yes</b>
Hill Road and Kings Crossing	EBL	200/208	243/271	194/161	98%/80%	401-5b	<b>Yes/Yes</b>

### 7.4. Year 2022-2034 Left-Turn Lane Warrant Review Summary

According to ODOT Chart 401-5b, a NB left-turn lane **is warranted** at the intersection of Hill Road and Busey Road starting in the 2022 No-Build Scenario. In addition, an EB left-turn lane **is warranted** at the intersection of Hill Road and Kings Crossing starting in the 2022 No-Build Scenario. According to ODOT Chart 401-5b, an EB left-turn lane **is warranted** at the intersection of Hill Road and Greengate Boulevard during the PM Peak Hour starting in the 2023 Build Scenario.

ODOT Chart 401-5b and 401-6b are located in Appendix G of the report.

## 8. Queue Length Analysis

### 8.1. Queue Length Analysis Procedure and Results

Queue length and turn lane storage length calculations were completed based upon procedures in the ODOT Location & Design Manual – Volume I, Section 400. Specifically, ODOT sheet 401-9E – Basis for Computing Length of Turn Lanes and sheet 401-10E – Storage Length at Intersections were used. The queue length analysis was conducted to provide the final design length of existing/proposed turn lanes under the 2022/2023/2024 and 2034 Build Traffic Scenarios. Table 9 summarizes the queue lengths required for the AM Peak Hour while Table 10 summarizes the queue lengths for the PM Peak Hour. ODOT Queue Length Resources are located in Appendix H.



**Table 9**  
**Queue Length Analysis - Year 2022-2034 (AM Peak Hour)**

Intersection	Direction	Prop. Storage Length	DHW	No. of Lanes	Cycles /Hour	Avg. Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition			Backup Length (ft)	Turn Lane Length (ft)*	Queue Exceeds Ex or Prop Storage?
									A	B	C			
2022 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	12	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	143	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	183	1	60	3.1	45	150	--	175	275	--	275	No
	SBL	--	79	1	60	1.3	40	50	--	--	--	50	--	--
	SBR	250'	51	1	60	0.9	40	50	100	--	--	--	100	No
2022 Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	38	1	60	0.6	45	50	--	175	175	--	175	No
	EBL	225'	172	1	60	2.9	45	150	--	175	275	--	275	No
	WBR	250'	194	1	60	3.2	45	150	--	175	275	--	275	No
	SBL	--	82	1	60	1.4	40	50	--	--	--	50	--	--
SBR	250'	51	1	60	0.9	40	50	100	--	--	--	100	No	
2023 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	12	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	173	1	60	2.9	45	150	--	175	275	--	275	No
	WBR	250'	185	1	60	3.1	45	150	--	175	275	--	275	No
	SBL	--	80	1	60	1.3	40	50	--	--	--	50	--	--
	SBR	250'	52	1	60	0.9	40	50	100	--	--	--	100	No
2023 Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	60	1	60	1.0	45	50	--	175	175	--	175	No
	EBL	125'	8	1	60	0.1	45	50	--	175	--	--	175	No
	EBL	225'	173	1	60	2.9	45	150	--	175	275	--	275	No
	WBR	250'	205	1	60	3.4	45	150	--	175	275	--	275	No
	SBL	--	86	1	60	1.4	40	50	--	--	--	50	--	--
SBR	250'	52	1	60	0.9	40	50	100	--	--	--	100	No	
2024 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	13	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	175	1	60	2.9	45	150	--	175	275	--	275	No
	WBR	250'	187	1	60	3.1	45	150	--	175	275	--	275	No
	SBL	--	81	1	60	1.4	40	50	--	--	--	50	--	--
	SBR	250'	52	1	60	0.9	40	50	100	--	--	--	100	No

\* Includes 50' diverging taper.



**Table 9 (Continued)**  
**Queue Length Analysis - Year 2022-2034 (AM Peak Hour)**

Intersection	Direction	Ex. Storage Length	DHW	No. of Lanes	Cycles /Hour	Avg. Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition			Backup Length (ft)	Turn Lane Length (ft)*	Queue Exceeds Ex or Prop Storage?
									A	B	C			
<b>2024 Build Traffic Scenario</b>														
Hill Road & Busey Road Hill Road & Greengate Blvd Hill Road & Kings Crossing	NBL	125'	83	1	60	1.4	45	50	--	175	175	--	175	No
	EBL	125'	12	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	175	1	60	2.9	45	150	--	175	275	--	275	No
	WBR	250'	216	1	60	3.6	45	175	--	175	300	--	300	No
	SBL	--	90	1	60	1.5	40	100	--	--	--	100	--	--
	SBR	250'	52	1	60	0.9	40	50	100	100	--	--	150	No
<b>2034 No-Build Traffic Scenario</b>														
Hill Road & Busey Road Hill Road & Kings Crossing	NBL	125'	14	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	194	1	60	3.2	45	150	--	175	275	--	275	No
	WBR	250'	207	1	60	3.5	45	175	--	175	300	--	300	No
	SBL	--	90	1	60	1.5	40	100	--	--	--	100	--	--
	SBR	250'	58	1	60	1.0	40	50	100	100	--	--	150	No
<b>2034 Build Traffic Scenario</b>														
Hill Road & Busey Road Hill Road & Greengate Blvd Hill Road & Kings Crossing	NBL	125'	84	1	60	1.4	45	50	--	175	175	--	175	No
	EBL	125'	12	1	60	0.2	45	50	--	175	175	--	175	No
	EBL	225'	194	1	60	3.2	45	150	--	175	275	--	275	No
	WBR	250'	236	1	60	3.9	45	175	--	175	300	--	300	No
	SBL	--	99	1	60	1.7	40	100	--	--	--	100	--	--
SBR	250'	58	1	60	1.0	40	50	100	100	--	--	150	No	

\* Includes 50' diverging taper.



**Table 10**  
**Queue Length Analysis - Year 2022-2034 (PM Peak Hour)**

Intersection	Direction	Ex. Storage Length	DHW	No. of Lanes	Cycles /Hour	Avg. Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition			Backup Length (ft)	Turn Lane Length (ft)*	Queue Exceeds Ex or Prop Storage?
									A	B	C			
2022 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	56	1	60	0.9	45	50	--	175	175	--	175	No
	EBL	225'	143	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	177	1	60	3.0	45	150	--	175	275	--	275	No
	SBL	--	271	1	60	4.5	40	200	--	--	--	200	--	--
SBR	250'	284	1	60	4.7	40	200	250	--	--	--	--	250	No
2022 Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	64	1	60	1.1	45	50	--	175	175	--	175	No
	EBL	225'	143	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	192	1	60	3.2	45	150	--	175	275	--	275	No
	SBL	--	298	1	60	5.0	40	200	--	--	--	200	--	--
SBR	250'	284	1	60	4.7	40	200	250	--	--	--	--	250	No
2023 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	56	1	60	0.9	45	50	--	175	175	--	175	No
	EBL	225'	145	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	179	1	60	3.0	45	150	--	175	275	--	275	No
	SBL	--	274	1	60	4.6	40	200	--	--	--	200	--	--
SBR	250'	287	1	60	4.8	40	200	250	--	--	--	--	250	No
2023 Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	71	1	60	1.2	45	50	--	175	175	--	175	No
	EBL	225'	53	1	60	0.9	45	50	--	175	175	--	175	No
	EBL	225'	145	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	207	1	60	3.5	45	175	--	175	300	--	300	No
SBL	--	323	1	60	5.4	40	200	--	--	--	200	--	--	
SBR	250'	287	1	60	4.8	40	200	250	--	--	--	--	250	No
2024 No-Build Traffic Scenario														
Hill Road & Busey Road	NBL	125'	57	1	60	1.0	45	50	--	175	175	--	175	No
	EBL	225'	146	1	60	2.4	45	100	--	175	225	--	225	No
	WBR	250'	181	1	60	3.0	45	150	--	175	275	--	275	No
	SBL	--	276	1	60	4.6	40	200	--	--	--	200	--	--
SBR	250'	290	1	60	4.8	40	200	250	--	--	--	--	250	No

\* Includes 50' diverging taper.



**Table 10 (Continued)**  
**Queue Length Analysis - Year 2022-2034 (PM Peak Hour)**

Intersection	Direction	Ex. Storage Length	DHW	No. of Lanes	Cycles /Hour	Avg. Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition			Backup Length (ft)	Turn Lane Length (ft)*	Queue Exceeds Ex or Prop Storage?	
									A	B	C				
<b>2024 Build Traffic Scenario</b>															
Hill Road & Busey Road	NBL	125'	79	1	60	1.3	45	50	--	175	175	--	175	No	
	EBL	125'	77	1	60	1.3	45	50	--	175	175	--	175	No	
	EBL	225'	146	1	60	2.4	45	100	--	175	225	--	225	No	
	WBR	250'	222	1	60	3.7	45	175	--	175	300	--	300	No	
	SBL	--	347	1	60	5.8	40	250	--	--	--	250	--	--	--
SBR	250'	290	1	60	4.8	40	200	250	--	--	--	--	300	No	
<b>2034 No-Build Traffic Scenario</b>															
Hill Road & Busey Road	NBL	125'	63	1	60	1.1	45	50	--	175	175	--	175	No	
	EBL	225'	161	1	60	2.7	45	150	--	175	275	--	275	No	
	WBR	250'	200	1	60	3.3	45	150	--	175	275	--	275	No	
	SBL	--	305	1	60	5.1	40	200	--	--	--	200	--	--	--
	SBR	250'	320	1	60	5.3	40	200	250	--	--	--	--	250	No
<b>2034 Build Traffic Scenario</b>															
Hill Road & Busey Road	NBL	125'	85	1	60	1.4	45	50	--	175	175	--	175	No	
	EBL	125'	77	1	60	1.3	45	50	--	175	175	--	175	No	
	EBL	225'	161	1	60	2.7	45	150	--	175	275	--	275	No	
	WBR	250'	241	1	60	4.0	45	175	--	175	300	--	300	No	
	SBL	--	376	1	60	6.3	40	250	--	--	--	250	--	--	--
SBR	250'	320	1	60	5.3	40	200	250	--	--	--	--	300	No	

\* Includes 50' diverging taper.

## 8.2. Queue Length Analysis Summary

CESO reviewed all study locations to determine if calculated queue lengths exceeded existing or proposed turn lane storage lengths. The queue length analysis revealed the following:

- A new NBL turn lane is warranted at the Hill Road and Busey Road intersection and shall be constructed to satisfy the ODOT required queue lengths (125' of storage with a 50' diverging taper).
- A new EBL turn lane is warranted at the Hill Road and Greengate Boulevard intersection and shall be constructed to satisfy the ODOT required queue lengths (125' of storage with a 50' diverging taper).
- A new EBL turn lane is warranted at the Hill Road and Kings Crossing intersection and shall be constructed to satisfy the ODOT required queue lengths (225' of storage with a 50' diverging taper).
- New WBR and SBR turn lanes are warranted at the Hill Road and Kings Crossing intersection and shall be constructed to satisfy the ODOT required queue lengths (250' of storage with a 50' diverging taper).

## 9. Summary of Recommendations

### 9.1. Recommendations

Based upon the results of the Traffic Impact Study conducted for the proposed Greengate Development, CESO has generated the following summary of recommendations. All recommendations are illustrated on Figures 15.A-15C.

#### **2022 No-Build Traffic Scenario (Responsibility – Others):**

##### *Hill Road & Busey Road:*

- Construct NB to WB left-turn lane to have 125 feet of storage plus a 50-foot taper.

##### *Hill Road & Kings Crossing:*

- Construct EB to NB left-turn lane to have 225 feet of storage plus a 50-foot taper.
- Construct WB to NB right-turn lane to have 250 feet of storage plus a 50-foot taper.
- Construct SB to WB right-turn lane to have 250 feet of storage plus a 50-foot taper.

#### **2022 Build Traffic Scenario (Responsibility – Cap 5 Development):**

##### *Hill Road & Greengate Boulevard:*

- Construct full access roadway connection to Hill Road, which will be named 'Greengate Boulevard'. Control Greengate Boulevard with one stop sign.

#### **2023 Build Traffic Scenario (Responsibility – Cap 5 Development):**

##### *Hill Road & Greengate Boulevard:*

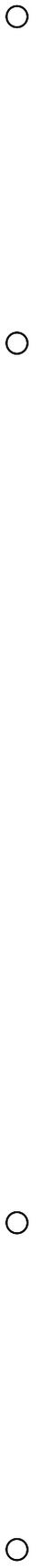
- Construct EB to NB left-turn lane to have 125 feet of storage plus a 50-foot taper.

#### **2024 Build Traffic Scenario (Responsibility – Cap 5 Development):**

- No further improvements are required.

#### **2034 Build Traffic Scenario (Responsibility – Cap 5 Development):**

- No further improvements are required.



NOT TO SCALE

FIGURE 15-A	
DATE:	01/20/2020
JOB NO.:	757010-01
DESIGN:	TMC
DRAWN:	TMC
CHECKED:	REM
PAGE:	42

RECOMMENDED IMPROVEMENTS AT INTERSECTION OF HILL ROAD AND BUSEY ROAD

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER

FAIRFIELD COUNTY, OHIO





NOT TO SCALE

FIGURE 15.B
DATE: 01/20/2020
JOB NO.: 757010-01
DESIGN: TMC
DRAWN: TMC
CHECKED: REM
PAGE 43

RECOMMENDED IMPROVEMENTS AT INTERSECTION OF HILL ROAD AND GREENGATE BOULEVARD

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER  
FAIRFIELD COUNTY, OHIO





NOT TO SCALE

FIGURE 15-C	
DATE:	01/20/2020
JOB NO.:	757010-01
DESIGN:	TMC
DRAWN:	TMC
CHECKED:	REM
PAGE:	44

RECOMMENDED IMPROVEMENTS AT INTERSECTION OF HILL ROAD AND KINGS CROSSING

GREENGATE RESIDENTIAL DEVELOPMENT

CITY OF CANAL WINCHESTER  
FAIRFIELD COUNTY, OHIO



**APPENDIX A**  
**MEMORANDUM OF UNDERSTANDING BETWEEN**  
**CESO/CITY OF CANAL WINCHESTER DATED 01-20-20**

## MEMORANDUM OF UNDERSTANDING

**TO:** William Sims, City of Canal Winchester Construction Services Administrator  
Mathew Peoples, City of Canal Winchester DPS

**CC:** Jon Buchanon, P.E., CESO Project Manager

**FROM:** Robert Matko, PE, PS, PTOE, CESO Engineering Manager

**DATE:** January 20, 2020

**SUBJECT:** Traffic Impact Study Scope  
Proposed Residential Development  
West side of Hill Road, South of Busey Road  
City of Canal Winchester, Ohio

The following TIS Scope was prepared based on past experience with traffic impact studies within the City of Canal Winchester area. Please review the following tasks and provide your concurrence prior to commencing with the study.

### **Traffic Impact Study Scope:**

The proposed Residential Development is a subdivision located on the west side of Hill Road, south of Busey Road, within the City of Canal Winchester, Fairfield County, OH. The Residential Development is proposing to develop 197 lots over three (3) phases consisting of the following:

- Phase I (2022 Opening Year):
  - Single-Family Detached Housing – 75 Lots.
- Phase II (2023 Opening Year):
  - Single-Family Detached Housing – 61 Lots.
- Phase III (2024 Opening Year):
  - Single-Family Detached Housing – 61 Lots.

**1. Conduct weekday (Tuesday – Thursday) peak hour (6:00 – 9:00 am and 3:00 – 6:00 pm) turning movement traffic counts at the following study intersections.**

- Hill Road & Busey Road (stop sign controlled)
- Hill Road & Kings Crossing (stop sign controlled)
- Diley Road & Howe Industrial Parkway (Stop Controlled)

Traffic counts will be conducted by our sub-consultant (Miovision) and will be video collected and downloaded for the above referenced hours.

**2. Inventory the existing roadway system (existing traffic controls, signage, and lane geometry).**

**3. Perform capacity analysis (Existing Traffic Scenario ~ 2019) at the study intersections during the peak study hours.**

Perform capacity analyses using procedures documented in the most recent edition of the Highway Capacity Manual (HCS 7.8.5) at the study intersections utilizing 2019 Existing traffic volumes during the study peak hour time periods.

**4. Traffic Growth Rate**

CESO will contact the City of Canal Winchester/MORPC for growth rates to be used in the analysis. This growth rate will be applied to the 2019 Weekday Peak Hour Traffic Volumes to arrive at 2022/2023/2024 and 2034 Weekday Peak Hour No-Build Traffic Volumes.

**5. 2022/2023 and 2024 No-Build Traffic Volumes**

Apply growth rate from #4 to the 2019 Existing weekday peak hour traffic volumes to arrive at 2022/2023 and 2024 No-Build Traffic Volumes.

**6. Perform capacity analysis (2022/2023 and 2024 No-Build Traffic Scenario) at the study intersections during the peak study hours.**

Perform capacity analyses using procedures documented in the most recent edition of the Highway Capacity Manual (HCS 7.8.5) at the study intersections utilizing 2022/2023 and 2024 No-Build traffic volumes during the study peak hour time periods.

**7. Prepare trip generation**

Prepare trip generation for the proposed Residential Development using the Institute of Transportation Engineers *Trip Generation* manual, 10<sup>th</sup> edition.

**8. Determine directional distribution of development traffic**

The directional distribution of Residential Development traffic will be based on population and existing traffic patterns within the study area.

**9. Assign project traffic.**

Based on the traffic projections, the Residential Development generated traffic volumes will be assigned to the adjacent street network.

**10. 2022/2023 and 2024 Build Traffic Volumes.**

Add 2022/2023 and 2024 No-Build traffic volumes to the Residential Development Site Generated traffic to arrive at 2022/2023 and 2024 Build Traffic Volumes.

**11. Perform capacity analysis (2022/2023 and 2024 Build Traffic Scenario) at the study intersections and site driveways during the peak study hours.**

Perform capacity analyses using procedures documented in the most recent edition of the Highway Capacity Manual (HCS 7.8.5) at the study intersections and site driveways utilizing 2022/2023 and 2024 Build traffic volumes during the study peak hour time periods.

**12. 2034 No-Build Traffic Volumes**

Apply growth rate from #4 to the 2019 Existing weekday peak hour traffic volumes for fifteen (15) years to arrive at 2034 No-Build Traffic Volumes.

**13. Perform capacity analysis (2034 No-Build Traffic Scenario) at the study intersections during the peak study hours.**

Perform capacity analyses using procedures documented in the most recent edition of the Highway Capacity Manual (HCS 7.8.5) at the study intersections utilizing 2034 No-Build traffic volumes during the study peak hour time periods.

**14. 2034 Design Year traffic scenario**

2034 Design Year traffic volumes consist of adding the 2034 No-Build traffic volumes with the Residential Development Generated traffic volumes.

**15. Perform capacity analysis (2034 Design Year Traffic Scenario) at the study intersections and Site Driveways during the peak study hours.**

Perform capacity analyses using procedures documented in the most recent edition of the Highway Capacity Manual (HCS 7.8.5) at the study intersections and site driveway utilizing 2030 Design Year traffic volumes during the study peak hour time periods.

**16. Perform turn lane warrant/queuing analysis**

Perform turn lane warrant/queuing analysis to determine if turn lanes or turn lane extensions are required at the study intersections and Site Driveway(s).

**17. Based on Projected traffic volumes, recommend geometry for the proposed Residential Development.**

Based on the projected volumes from the analysis, CESO will recommend the geometry for the proposed Residential Development including turn lane length calculations at the study intersections and site driveway(s) per ODOT L&D Manual, Figure 401-9E. In addition, turn lane length determinations for study access points/intersections will also need to consider queue lengths predicted by capacity analysis for the design year.

**18. Prepare a written report summarizing the study process, conclusions, and recommendations**

Prepare a detailed report and submit to the City of Canal Winchester for review and approval.

**APPENDIX B**  
**EXISTING TRAFFIC COUNT DATA**

# Hill Road & Busey Road - TMC

Thu Dec 12, 2019

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Busey Rd Eastbound				Busey Rd Westbound				Hill Rd Northbound				Int
	T	R	U	App	L	T	U	App	L	R	U	App	
2019-12-12 6:00AM	2	8	0	10	42	5	0	47	0	4	0	4	61
6:15AM	3	14	0	17	31	7	0	38	3	12	0	15	70
6:30AM	10	7	0	17	38	18	0	56	1	17	0	18	91
6:45AM	15	8	0	23	53	19	0	72	5	19	0	24	119
Hourly Total	30	37	0	67	164	49	0	213	9	52	0	61	341
7:00AM	9	12	0	21	31	22	0	53	1	12	0	13	87
7:15AM	13	9	0	22	40	26	0	66	3	17	0	20	108
7:30AM	34	2	0	36	39	38	0	77	1	16	0	17	130
7:45AM	22	11	0	33	44	31	0	75	4	20	0	24	132
Hourly Total	78	34	0	112	154	117	0	271	9	65	0	74	457
8:00AM	7	7	0	14	27	34	0	61	4	12	0	16	91
8:15AM	17	4	0	21	33	13	0	46	3	23	0	26	93
8:30AM	12	14	0	26	37	15	0	52	3	15	0	18	96
8:45AM	6	6	0	12	36	19	0	55	8	15	0	23	90
Hourly Total	42	31	0	73	133	81	0	214	18	65	0	83	370
3:00PM	17	11	0	28	48	37	0	85	6	38	0	44	157
3:15PM	23	5	0	28	30	14	0	44	3	42	0	45	117
3:30PM	27	3	0	30	35	21	0	56	6	28	0	34	120
3:45PM	20	8	0	28	45	22	0	67	12	28	0	40	135
Hourly Total	87	27	0	114	158	94	0	252	27	136	0	163	529
4:00PM	17	8	0	25	37	29	0	66	8	53	0	61	152
4:15PM	22	12	0	34	54	14	0	68	9	56	0	65	167
4:30PM	26	11	0	37	30	12	0	42	8	50	0	58	137
4:45PM	20	12	0	32	31	15	0	46	13	45	0	58	136
Hourly Total	85	43	0	128	152	70	0	222	38	204	0	242	592
5:00PM	20	4	0	24	44	14	0	58	13	59	0	72	154
5:15PM	16	5	0	21	48	14	0	62	9	60	0	69	152
5:30PM	26	6	0	32	36	14	0	50	20	66	0	86	168
5:45PM	20	8	0	28	42	16	0	58	12	53	0	65	151
Hourly Total	82	23	0	105	170	58	0	228	54	238	0	292	625
<b>Total</b>	404	195	0	599	931	469	0	1400	155	760	0	915	2914
<b>% Approach</b>	67.4%	32.6%	0%	-	66.5%	33.5%	0%	-	16.9%	83.1%	0%	-	-
<b>% Total</b>	13.9%	6.7%	0%	20.6%	31.9%	16.1%	0%	48.0%	5.3%	26.1%	0%	31.4%	-
<b>Lights</b>	382	190	0	572	908	444	0	1352	155	751	0	906	2830
<b>% Lights</b>	94.6%	97.4%	0%	95.5%	97.5%	94.7%	0%	96.6%	100%	98.8%	0%	99.0%	97.1%
<b>Articulated Trucks and Single-Unit Trucks</b>	8	1	0	9	12	11	0	23	0	7	0	7	39
<b>% Articulated Trucks and Single-Unit Trucks</b>	2.0%	0.5%	0%	1.5%	1.3%	2.3%	0%	1.6%	0%	0.9%	0%	0.8%	1.3%
<b>Buses</b>	14	4	0	18	11	14	0	25	0	2	0	2	45
<b>% Buses</b>	3.5%	2.1%	0%	3.0%	1.2%	3.0%	0%	1.8%	0%	0.3%	0%	0.2%	1.5%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Hill Road & Busey Road - TMC

Thu Dec 12, 2019

Full Length (6 AM-9 AM, 3 PM-6 PM)

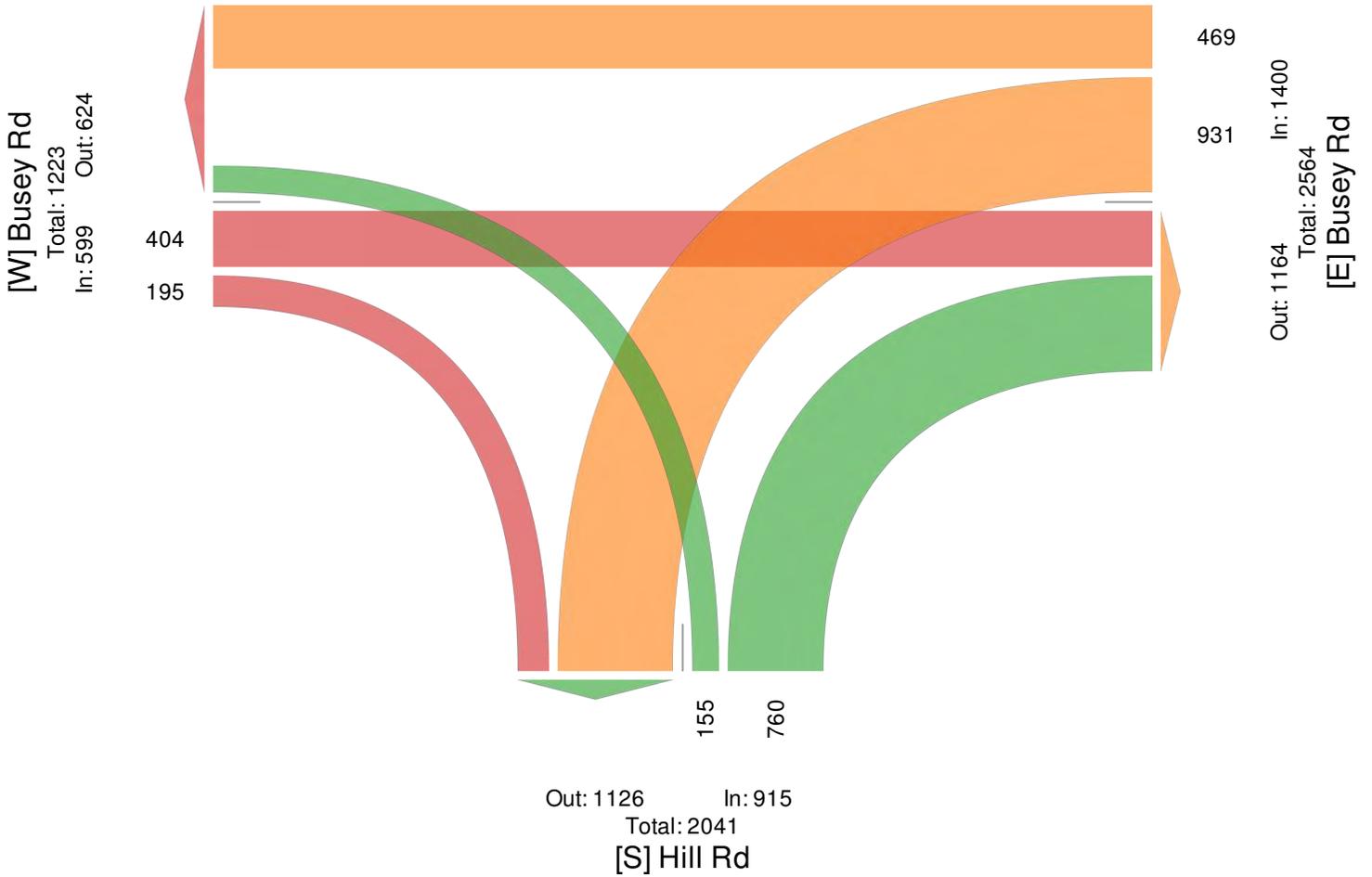
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Hill Road & Busey Road - TMC

Thu Dec 12, 2019

AM Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Busey Rd Eastbound				Busey Rd Westbound				Hill Rd Northbound				Int
	T	R	U	App	L	T	U	App	L	R	U	App	
2019-12-12 7:15AM	13	9	0	22	40	26	0	66	3	17	0	20	108
7:30AM	34	2	0	36	39	38	0	77	1	16	0	17	130
7:45AM	22	11	0	33	44	31	0	75	4	20	0	24	132
8:00AM	7	7	0	14	27	34	0	61	4	12	0	16	91
<b>Total</b>	76	29	0	105	150	129	0	279	12	65	0	77	461
<b>% Approach</b>	72.4%	27.6%	0%	-	53.8%	46.2%	0%	-	15.6%	84.4%	0%	-	-
<b>% Total</b>	16.5%	6.3%	0%	22.8%	32.5%	28.0%	0%	60.5%	2.6%	14.1%	0%	16.7%	-
<b>PHF</b>	0.559	0.659	-	0.729	0.852	0.849	-	0.906	0.750	0.813	-	0.802	0.873
<b>Lights</b>	73	29	0	102	140	125	0	265	12	63	0	75	442
<b>% Lights</b>	96.1%	100%	0%	97.1%	93.3%	96.9%	0%	95.0%	100%	96.9%	0%	97.4%	95.9%
<b>Articulated Trucks and Single-Unit Trucks</b>	1	0	0	1	5	2	0	7	0	2	0	2	10
<b>% Articulated Trucks and Single-Unit Trucks</b>	1.3%	0%	0%	1.0%	3.3%	1.6%	0%	2.5%	0%	3.1%	0%	2.6%	2.2%
<b>Buses</b>	2	0	0	2	5	2	0	7	0	0	0	0	9
<b>% Buses</b>	2.6%	0%	0%	1.9%	3.3%	1.6%	0%	2.5%	0%	0%	0%	0%	2.0%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Hill Road & Busey Road - TMC

Thu Dec 12, 2019

AM Peak (7:15 AM - 8:15 AM)

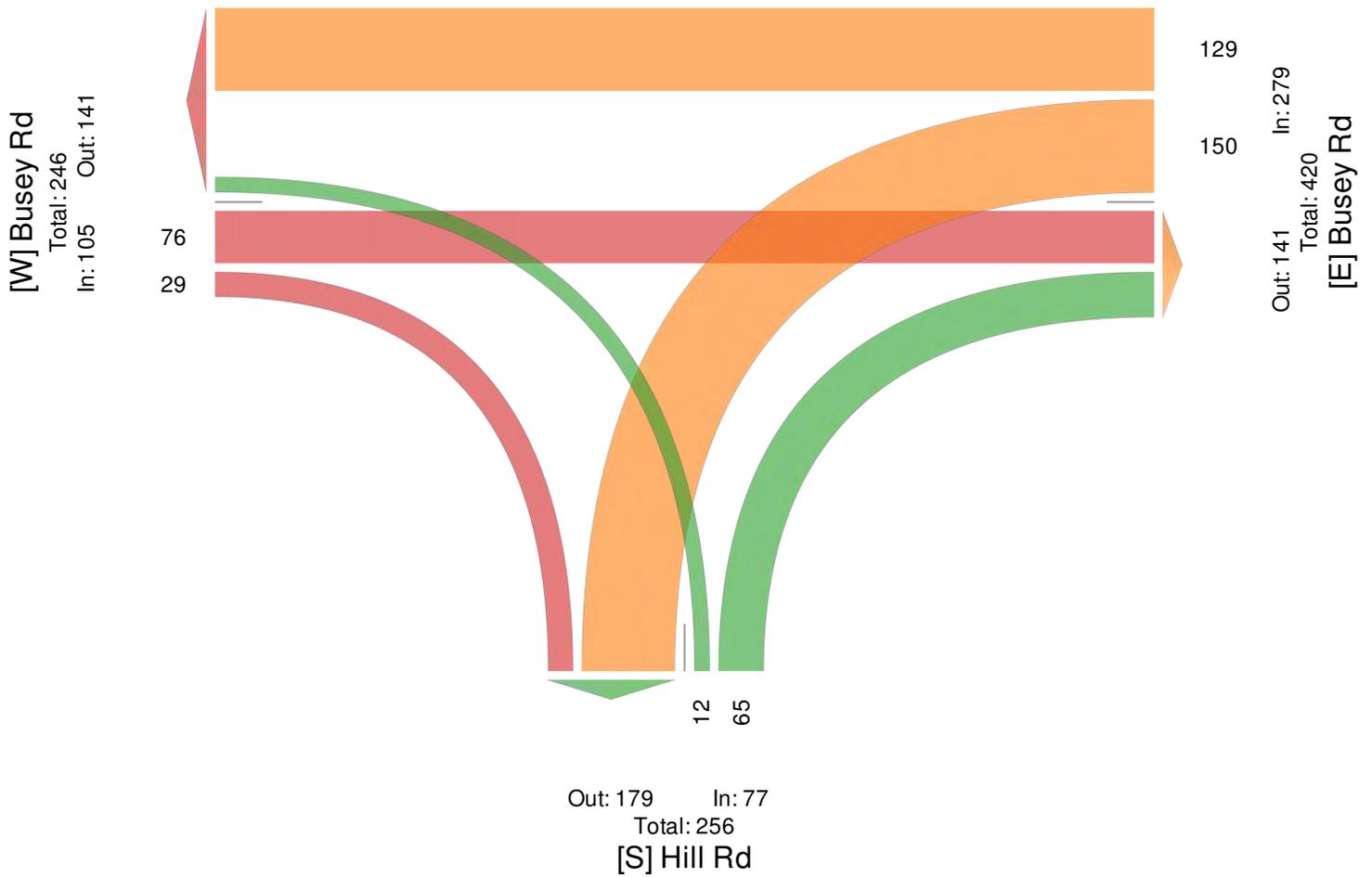
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Hill Road & Busey Road - TMC

Thu Dec 12, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Busey Rd Eastbound				Busey Rd Westbound				Hill Rd Northbound				Int
	T	R	U	App	L	T	U	App	L	R	U	App	
2019-12-12 5:00PM	20	4	0	24	44	14	0	58	13	59	0	72	154
5:15PM	16	5	0	21	48	14	0	62	9	60	0	69	152
5:30PM	26	6	0	32	36	14	0	50	20	66	0	86	168
5:45PM	20	8	0	28	42	16	0	58	12	53	0	65	151
<b>Total</b>	82	23	0	105	170	58	0	228	54	238	0	292	625
<b>% Approach</b>	78.1%	21.9%	0%	-	74.6%	25.4%	0%	-	18.5%	81.5%	0%	-	-
<b>% Total</b>	13.1%	3.7%	0%	16.8%	27.2%	9.3%	0%	36.5%	8.6%	38.1%	0%	46.7%	-
<b>PHF</b>	0.788	0.719	-	0.820	0.885	0.906	-	0.919	0.675	0.902	-	0.849	0.930
<b>Lights</b>	78	23	0	101	170	58	0	228	54	238	0	292	621
<b>% Lights</b>	95.1%	100%	0%	96.2%	100%	100%	0%	100%	100%	100%	0%	100%	99.4%
<b>Articulated Trucks and Single-Unit Trucks</b>	4	0	0	4	0	0	0	0	0	0	0	0	4
<b>% Articulated Trucks and Single-Unit Trucks</b>	4.9%	0%	0%	3.8%	0%	0%	0%	0%	0%	0%	0%	0%	0.6%
<b>Buses</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% Buses</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

\* L: Left, R: Right, T: Thru, U: U-Turn

**Hill Road & Busey Road - TMC**

Thu Dec 12, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

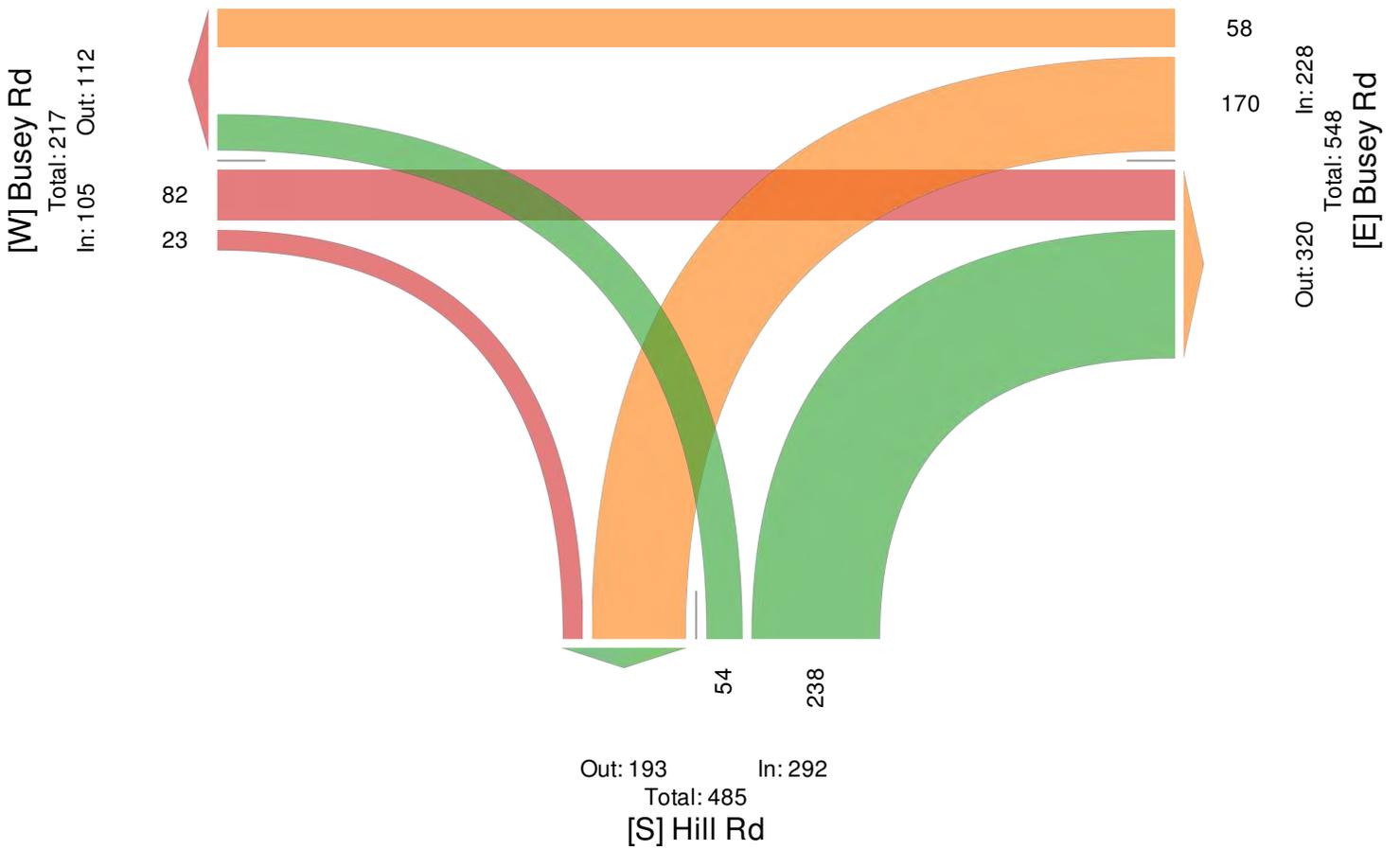
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732093, Location: 39.857599, -82.763316



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Hill Rd Eastbound				Hill Rd Westbound				Kings Crossing Southbound				
Time	L	T	U	App	T	R	U	App	L	R	U	App	Int
2019-12-12 6:00AM	45	0	0	45	0	44	0	44	6	4	0	10	99
6:15AM	44	0	0	44	0	46	0	46	13	7	0	20	110
6:30AM	44	1	0	45	0	42	0	42	15	9	0	24	111
6:45AM	45	2	0	47	0	67	0	67	25	3	0	28	142
Hourly Total	178	3	0	181	0	199	0	199	59	23	0	82	462
7:00AM	58	2	0	60	1	48	0	49	11	9	0	20	129
7:15AM	31	0	0	31	0	46	0	46	20	11	0	31	108
7:30AM	49	1	0	50	0	44	0	44	19	14	0	33	127
7:45AM	52	1	0	53	0	52	0	52	22	16	0	38	143
Hourly Total	190	4	0	194	1	190	0	191	72	50	0	122	507
8:00AM	35	1	0	36	1	34	0	35	15	9	0	24	95
8:15AM	35	1	0	36	1	38	0	39	24	8	0	32	107
8:30AM	22	0	0	22	4	47	0	51	17	12	0	29	102
8:45AM	25	0	0	25	0	44	0	44	23	10	0	33	102
Hourly Total	117	2	0	119	6	163	0	169	79	39	0	118	406
3:00PM	18	2	0	20	3	59	0	62	42	50	0	92	174
3:15PM	26	6	0	32	3	35	0	38	41	42	0	83	153
3:30PM	39	0	0	39	4	34	0	38	34	37	0	71	148
3:45PM	28	4	0	32	5	39	0	44	40	47	0	87	163
Hourly Total	111	12	0	123	15	167	0	182	157	176	0	333	638
4:00PM	30	3	0	33	5	39	0	44	58	55	0	113	190
4:15PM	23	1	0	24	5	58	0	63	64	50	0	114	201
4:30PM	36	6	0	42	5	43	0	48	52	62	0	114	204
4:45PM	26	6	0	32	6	39	0	45	53	61	0	114	191
Hourly Total	115	16	0	131	21	179	0	200	227	228	0	455	786
5:00PM	37	10	0	47	7	38	0	45	63	66	0	129	221
5:15PM	26	7	0	33	3	52	0	55	66	70	0	136	224
5:30PM	36	12	0	48	6	40	0	46	69	62	0	131	225
5:45PM	40	6	0	46	6	42	0	48	65	78	0	143	237
Hourly Total	139	35	0	174	22	172	0	194	263	276	0	539	907
<b>Total</b>	850	72	0	922	65	1070	0	1135	857	792	0	1649	3706
<b>% Approach</b>	92.2%	7.8%	0%	-	5.7%	94.3%	0%	-	52.0%	48.0%	0%	-	-
<b>% Total</b>	22.9%	1.9%	0%	24.9%	1.8%	28.9%	0%	30.6%	23.1%	21.4%	0%	44.5%	-
<b>Lights</b>	831	72	0	903	62	1045	0	1107	847	777	0	1624	3634
<b>% Lights</b>	97.8%	100%	0%	97.9%	95.4%	97.7%	0%	97.5%	98.8%	98.1%	0%	98.5%	98.1%
<b>Articulated Trucks and Single-Unit Trucks</b>	16	0	0	16	1	13	0	14	8	11	0	19	49
<b>% Articulated Trucks and Single-Unit Trucks</b>	1.9%	0%	0%	1.7%	1.5%	1.2%	0%	1.2%	0.9%	1.4%	0%	1.2%	1.3%
<b>Buses</b>	3	0	0	3	2	12	0	14	2	4	0	6	23
<b>% Buses</b>	0.4%	0%	0%	0.3%	3.1%	1.1%	0%	1.2%	0.2%	0.5%	0%	0.4%	0.6%

\* L: Left, R: Right, T: Thru, U: U-Turn

**Hill Road & Kings Crossing - TMC**

Thu Dec 12, 2019

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



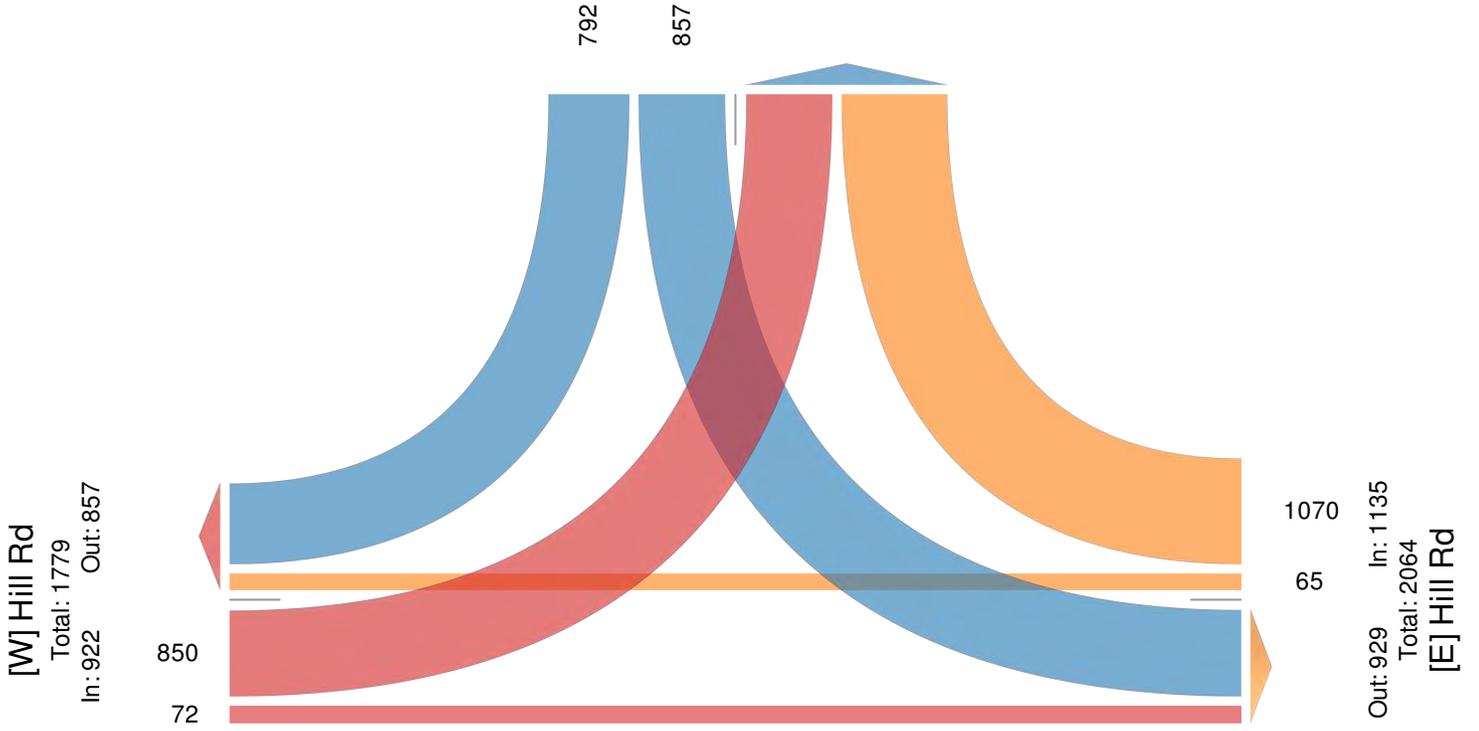
Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

**[N] Kings Crossing**

Total: 3569

In: 1649

Out: 1920



# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Hill Rd Eastbound				Hill Rd Westbound				Kings Crossing Southbound				Int
	L	T	U	App	T	R	U	App	L	R	U	App	
2019-12-12 7:00AM	58	2	0	<b>60</b>	1	48	0	<b>49</b>	11	9	0	<b>20</b>	<b>129</b>
7:15AM	31	0	0	<b>31</b>	0	46	0	<b>46</b>	20	11	0	<b>31</b>	<b>108</b>
7:30AM	49	1	0	<b>50</b>	0	44	0	<b>44</b>	19	14	0	<b>33</b>	<b>127</b>
7:45AM	52	1	0	<b>53</b>	0	52	0	<b>52</b>	22	16	0	<b>38</b>	<b>143</b>
<b>Total</b>	190	4	0	<b>194</b>	1	190	0	<b>191</b>	72	50	0	<b>122</b>	<b>507</b>
<b>% Approach</b>	97.9%	2.1%	0%	-	0.5%	99.5%	0%	-	59.0%	41.0%	0%	-	-
<b>% Total</b>	37.5%	0.8%	0%	<b>38.3%</b>	0.2%	37.5%	0%	<b>37.7%</b>	14.2%	9.9%	0%	<b>24.1%</b>	-
<b>PHF</b>	0.819	0.500	-	<b>0.808</b>	0.250	0.913	-	<b>0.918</b>	0.818	0.781	-	<b>0.803</b>	0.886
<b>Lights</b>	182	4	0	<b>186</b>	0	183	0	<b>183</b>	70	48	0	<b>118</b>	487
<b>% Lights</b>	95.8%	100%	0%	<b>95.9%</b>	0%	96.3%	0%	<b>95.8%</b>	97.2%	96.0%	0%	<b>96.7%</b>	96.1%
<b>Articulated Trucks and Single-Unit Trucks</b>	6	0	0	<b>6</b>	0	3	0	<b>3</b>	2	0	0	<b>2</b>	11
<b>% Articulated Trucks and Single-Unit Trucks</b>	3.2%	0%	0%	<b>3.1%</b>	0%	1.6%	0%	<b>1.6%</b>	2.8%	0%	0%	<b>1.6%</b>	2.2%
<b>Buses</b>	2	0	0	<b>2</b>	1	4	0	<b>5</b>	0	2	0	<b>2</b>	9
<b>% Buses</b>	1.1%	0%	0%	<b>1.0%</b>	100%	2.1%	0%	<b>2.6%</b>	0%	4.0%	0%	<b>1.6%</b>	1.8%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

AM Peak (7 AM - 8 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

## [N] Kings Crossing

Total: 502

In: 122

Out: 380

50 72



# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

Forced Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Hill Rd Eastbound				Hill Rd Westbound				Kings Crossing Southbound				Int
	L	T	U	App	T	R	U	App	L	R	U	App	
2019-12-12 7:15AM	31	0	0	31	0	46	0	46	20	11	0	31	108
7:30AM	49	1	0	50	0	44	0	44	19	14	0	33	127
7:45AM	52	1	0	53	0	52	0	52	22	16	0	38	143
8:00AM	35	1	0	36	1	34	0	35	15	9	0	24	95
<b>Total</b>	167	3	0	170	1	176	0	177	76	50	0	126	473
<b>% Approach</b>	98.2%	1.8%	0%	-	0.6%	99.4%	0%	-	60.3%	39.7%	0%	-	-
<b>% Total</b>	35.3%	0.6%	0%	35.9%	0.2%	37.2%	0%	37.4%	16.1%	10.6%	0%	26.6%	-
<b>PHF</b>	0.803	0.750	-	0.802	0.250	0.846	-	0.851	0.864	0.781	-	0.829	0.827
<b>Lights</b>	162	3	0	165	1	166	0	167	75	48	0	123	455
<b>% Lights</b>	97.0%	100%	0%	97.1%	100%	94.3%	0%	94.4%	98.7%	96.0%	0%	97.6%	96.2%
<b>Articulated Trucks and Single-Unit Trucks</b>	4	0	0	4	0	5	0	5	1	0	0	1	10
<b>% Articulated Trucks and Single-Unit Trucks</b>	2.4%	0%	0%	2.4%	0%	2.8%	0%	2.8%	1.3%	0%	0%	0.8%	2.1%
<b>Buses</b>	1	0	0	1	0	5	0	5	0	2	0	2	8
<b>% Buses</b>	0.6%	0%	0%	0.6%	0%	2.8%	0%	2.8%	0%	4.0%	0%	1.6%	1.7%

\* L: Left, R: Right, T: Thru, U: U-Turn

**Hill Road & Kings Crossing - TMC**

Thu Dec 12, 2019

Forced Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

**[N] Kings Crossing**

Total: 469

In: 126

Out: 343

50 76



# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Hill Rd Eastbound				Hill Rd Westbound				Kings Crossing Southbound				Int
	L	T	U	App	T	R	U	App	L	R	U	App	
2019-12-12 5:00PM	37	10	0	47	7	38	0	45	63	66	0	129	221
5:15PM	26	7	0	33	3	52	0	55	66	70	0	136	224
5:30PM	36	12	0	48	6	40	0	46	69	62	0	131	225
5:45PM	40	6	0	46	6	42	0	48	65	78	0	143	237
<b>Total</b>	139	35	0	174	22	172	0	194	263	276	0	539	907
<b>% Approach</b>	79.9%	20.1%	0%	-	11.3%	88.7%	0%	-	48.8%	51.2%	0%	-	-
<b>% Total</b>	15.3%	3.9%	0%	19.2%	2.4%	19.0%	0%	21.4%	29.0%	30.4%	0%	59.4%	-
<b>PHF</b>	0.869	0.729	-	0.906	0.786	0.827	-	0.882	0.953	0.885	-	0.942	0.957
<b>Lights</b>	139	35	0	174	22	172	0	194	263	275	0	538	906
<b>% Lights</b>	100%	100%	0%	100%	100%	100%	0%	100%	100%	99.6%	0%	99.8%	99.9%
<b>Articulated Trucks and Single-Unit Trucks</b>	0	0	0	0	0	0	0	0	0	1	0	1	1
<b>% Articulated Trucks and Single-Unit Trucks</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.4%	0%	0.2%	0.1%
<b>Buses</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% Buses</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Hill Road & Kings Crossing - TMC

Thu Dec 12, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 732094, Location: 39.8455, -82.777523



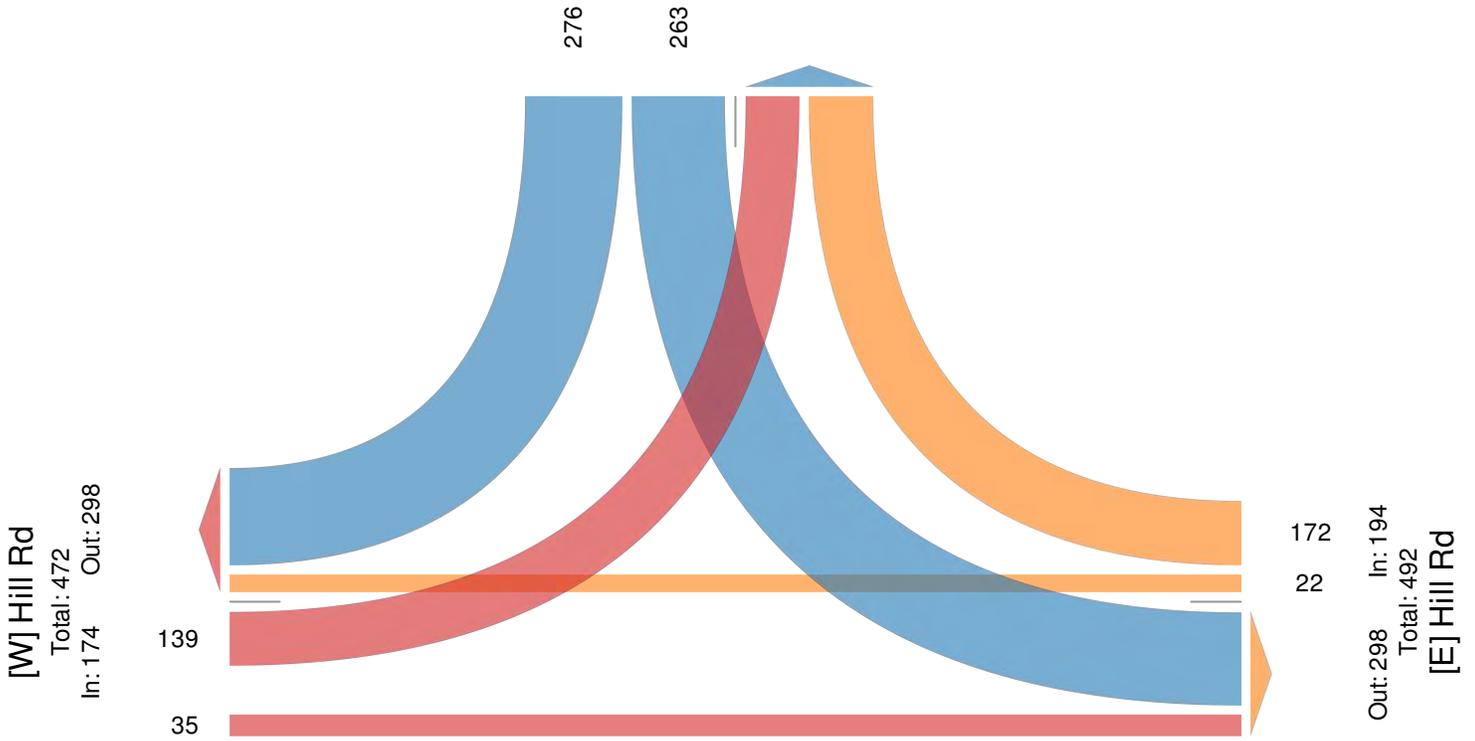
Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

## [N] Kings Crossing

Total: 850

In: 539

Out: 311



# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

Full Length (6 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Howe Industrial Eastbound				Diley Northbound				Diley Southbound				Int
	L	R	U	App	L	T	U	App	T	R	U	App	
2020-01-09 6:00AM	0	0	0	0	4	38	0	42	114	1	0	115	157
6:15AM	0	2	0	2	4	71	0	75	112	0	0	112	189
6:30AM	0	0	0	0	3	139	0	142	125	4	0	129	271
6:45AM	3	2	0	5	8	135	0	143	159	8	0	167	315
Hourly Total	3	4	0	7	19	383	0	402	510	13	0	523	932
7:00AM	3	2	0	5	4	106	0	110	166	6	0	172	287
7:15AM	1	2	0	3	7	110	0	117	169	5	0	174	294
7:30AM	2	0	0	2	14	117	0	131	164	3	0	167	300
7:45AM	1	3	0	4	18	117	0	135	169	7	0	176	315
Hourly Total	7	7	0	14	43	450	0	493	668	21	0	689	1196
8:00AM	3	6	0	9	11	93	0	104	158	8	0	166	279
8:15AM	1	4	0	5	6	84	0	90	175	8	0	183	278
8:30AM	2	8	0	10	10	102	0	112	160	4	0	164	286
8:45AM	0	3	0	3	6	104	0	110	126	2	0	128	241
Hourly Total	6	21	0	27	33	383	0	416	619	22	0	641	1084
3:00PM	1	4	0	5	5	144	1	150	149	2	0	151	306
3:15PM	0	5	0	5	3	177	0	180	153	1	0	154	339
3:30PM	6	12	0	18	4	195	0	199	151	0	0	151	368
3:45PM	1	6	0	7	0	160	0	160	151	3	0	154	321
Hourly Total	8	27	0	35	12	676	1	689	604	6	0	610	1334
4:00PM	3	16	0	19	2	175	0	177	179	1	0	180	376
4:15PM	5	4	0	9	4	203	0	207	167	1	0	168	384
4:30PM	6	7	0	13	3	202	0	205	181	2	0	183	401
4:45PM	4	7	0	11	1	170	0	171	175	1	0	176	358
Hourly Total	18	34	0	52	10	750	0	760	702	5	0	707	1519
5:00PM	5	20	0	25	2	223	0	225	172	3	0	175	425
5:15PM	5	8	0	13	0	207	0	207	184	3	0	187	407
5:30PM	4	7	0	11	4	242	0	246	167	1	0	168	425
5:45PM	1	6	0	7	2	207	0	209	171	0	0	171	387
Hourly Total	15	41	0	56	8	879	0	887	694	7	0	701	1644
<b>Total</b>	57	134	0	191	125	3521	1	3647	3797	74	0	3871	7709
<b>% Approach</b>	29.8%	70.2%	0%	-	3.4%	96.5%	0%	-	98.1%	1.9%	0%	-	-
<b>% Total</b>	0.7%	1.7%	0%	2.5%	1.6%	45.7%	0%	47.3%	49.3%	1.0%	0%	50.2%	-
<b>Lights</b>	53	126	0	179	119	3431	1	3551	3722	72	0	3794	7524
<b>% Lights</b>	93.0%	94.0%	0%	93.7%	95.2%	97.4%	100%	97.4%	98.0%	97.3%	0%	98.0%	97.6%
<b>Articulated Trucks and Single-Unit Trucks</b>	4	7	0	11	6	79	0	85	63	2	0	65	161
<b>% Articulated Trucks and Single-Unit Trucks</b>	7.0%	5.2%	0%	5.8%	4.8%	2.2%	0%	2.3%	1.7%	2.7%	0%	1.7%	2.1%
<b>Buses</b>	0	1	0	1	0	11	0	11	12	0	0	12	24
<b>% Buses</b>	0%	0.7%	0%	0.5%	0%	0.3%	0%	0.3%	0.3%	0%	0%	0.3%	0.3%

\* L: Left, R: Right, T: Thru, U: U-Turn

**Diley Road & Howe Industrial Pkwy - TMC**

Thu Jan 9, 2020

Full Length (6 AM-9 AM, 3 PM-6 PM)

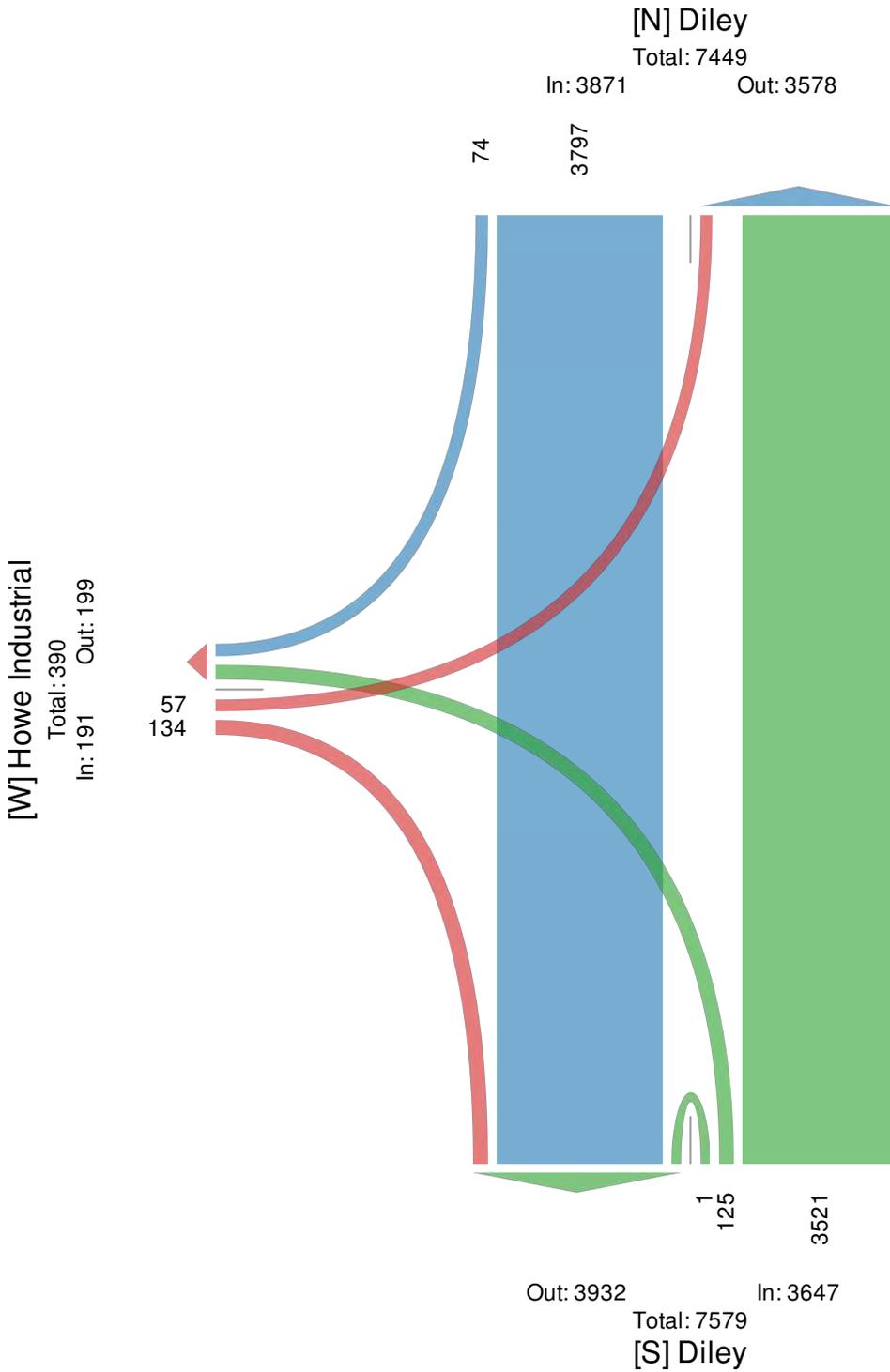
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

AM Peak (6:45 AM - 7:45 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Howe Industrial Eastbound				Diley Northbound				Diley Southbound				Int
	L	R	U	App	L	T	U	App	T	R	U	App	
2020-01-09 6:45AM	3	2	0	5	8	135	0	143	159	8	0	167	315
7:00AM	3	2	0	5	4	106	0	110	166	6	0	172	287
7:15AM	1	2	0	3	7	110	0	117	169	5	0	174	294
7:30AM	2	0	0	2	14	117	0	131	164	3	0	167	300
<b>Total</b>	9	6	0	15	33	468	0	501	658	22	0	680	1196
<b>% Approach</b>	60.0%	40.0%	0%	-	6.6%	93.4%	0%	-	96.8%	3.2%	0%	-	-
<b>% Total</b>	0.8%	0.5%	0%	1.3%	2.8%	39.1%	0%	41.9%	55.0%	1.8%	0%	56.9%	-
<b>PHF</b>	0.750	0.750	-	0.750	0.589	0.867	-	0.876	0.973	0.688	-	0.977	0.949
<b>Lights</b>	9	5	0	14	33	454	0	487	652	22	0	674	1175
<b>% Lights</b>	100%	83.3%	0%	93.3%	100%	97.0%	0%	97.2%	99.1%	100%	0%	99.1%	98.2%
<b>Articulated Trucks and Single-Unit Trucks</b>	0	1	0	1	0	12	0	12	4	0	0	4	17
<b>% Articulated Trucks and Single-Unit Trucks</b>	0%	16.7%	0%	6.7%	0%	2.6%	0%	2.4%	0.6%	0%	0%	0.6%	1.4%
<b>Buses</b>	0	0	0	0	0	2	0	2	2	0	0	2	4
<b>% Buses</b>	0%	0%	0%	0%	0%	0.4%	0%	0.4%	0.3%	0%	0%	0.3%	0.3%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

AM Peak (6:45 AM - 7:45 AM)

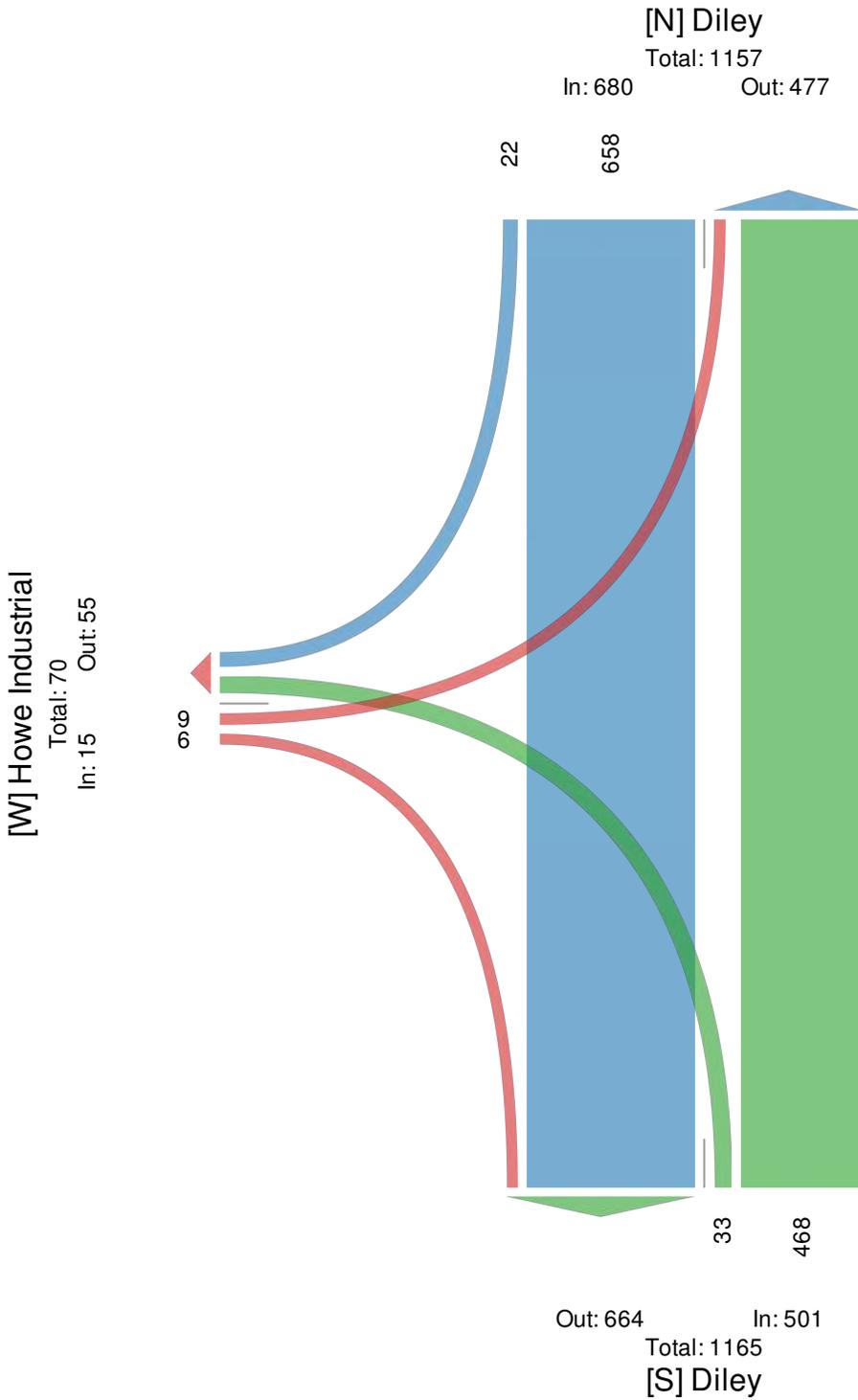
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

Forced Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Howe Industrial Eastbound				Diley Northbound				Diley Southbound				Int
	L	R	U	App	L	T	U	App	T	R	U	App	
2020-01-09 7:15AM	1	2	0	3	7	110	0	117	169	5	0	174	294
7:30AM	2	0	0	2	14	117	0	131	164	3	0	167	300
7:45AM	1	3	0	4	18	117	0	135	169	7	0	176	315
8:00AM	3	6	0	9	11	93	0	104	158	8	0	166	279
<b>Total</b>	7	11	0	18	50	437	0	487	660	23	0	683	1188
<b>% Approach</b>	38.9%	61.1%	0%	-	10.3%	89.7%	0%	-	96.6%	3.4%	0%	-	-
<b>% Total</b>	0.6%	0.9%	0%	1.5%	4.2%	36.8%	0%	41.0%	55.6%	1.9%	0%	57.5%	-
<b>PHF</b>	0.583	0.458	-	0.500	0.694	0.934	-	0.902	0.976	0.719	-	0.970	0.943
<b>Lights</b>	5	10	0	15	48	415	0	463	647	22	0	669	1147
<b>% Lights</b>	71.4%	90.9%	0%	83.3%	96.0%	95.0%	0%	95.1%	98.0%	95.7%	0%	98.0%	96.5%
<b>Articulated Trucks and Single-Unit Trucks</b>	2	1	0	3	2	20	0	22	8	1	0	9	34
<b>% Articulated Trucks and Single-Unit Trucks</b>	28.6%	9.1%	0%	16.7%	4.0%	4.6%	0%	4.5%	1.2%	4.3%	0%	1.3%	2.9%
<b>Buses</b>	0	0	0	0	0	2	0	2	5	0	0	5	7
<b>% Buses</b>	0%	0%	0%	0%	0%	0.5%	0%	0.4%	0.8%	0%	0%	0.7%	0.6%

\* L: Left, R: Right, T: Thru, U: U-Turn

**Diley Road & Howe Industrial Pkwy - TMC**

Thu Jan 9, 2020

Forced Peak (7:15 AM - 8:15 AM)

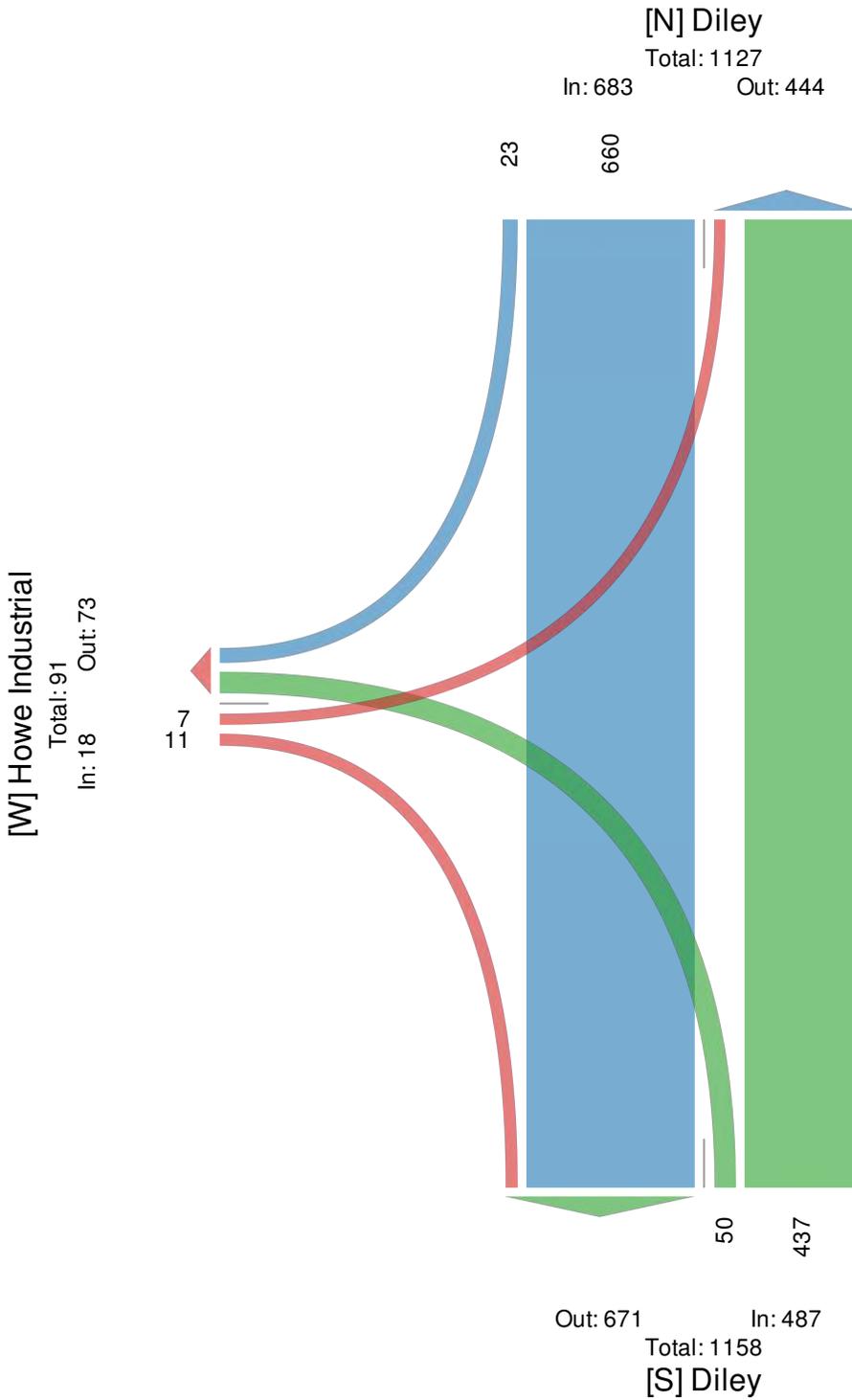
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Howe Industrial Eastbound				Diley Northbound				Diley Southbound				
Time	L	R	U	App	L	T	U	App	T	R	U	App	Int
2020-01-09 5:00PM	5	20	0	25	2	223	0	225	172	3	0	175	425
5:15PM	5	8	0	13	0	207	0	207	184	3	0	187	407
5:30PM	4	7	0	11	4	242	0	246	167	1	0	168	425
5:45PM	1	6	0	7	2	207	0	209	171	0	0	171	387
<b>Total</b>	15	41	0	56	8	879	0	887	694	7	0	701	1644
<b>% Approach</b>	26.8%	73.2%	0%	-	0.9%	99.1%	0%	-	99.0%	1.0%	0%	-	-
<b>% Total</b>	0.9%	2.5%	0%	3.4%	0.5%	53.5%	0%	54.0%	42.2%	0.4%	0%	42.6%	-
<b>PHF</b>	0.750	0.513	-	0.560	0.500	0.908	-	0.901	0.943	0.583	-	0.937	0.967
<b>Lights</b>	15	41	0	56	8	873	0	881	689	7	0	696	1633
<b>% Lights</b>	100%	100%	0%	100%	100%	99.3%	0%	99.3%	99.3%	100%	0%	99.3%	99.3%
<b>Articulated Trucks and Single-Unit Trucks</b>	0	0	0	0	0	6	0	6	5	0	0	5	11
<b>% Articulated Trucks and Single-Unit Trucks</b>	0%	0%	0%	0%	0%	0.7%	0%	0.7%	0.7%	0%	0%	0.7%	0.7%
<b>Buses</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% Buses</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

\* L: Left, R: Right, T: Thru, U: U-Turn

# Diley Road & Howe Industrial Pkwy - TMC

Thu Jan 9, 2020

PM Peak (5 PM - 6 PM) - Overall Peak Hour

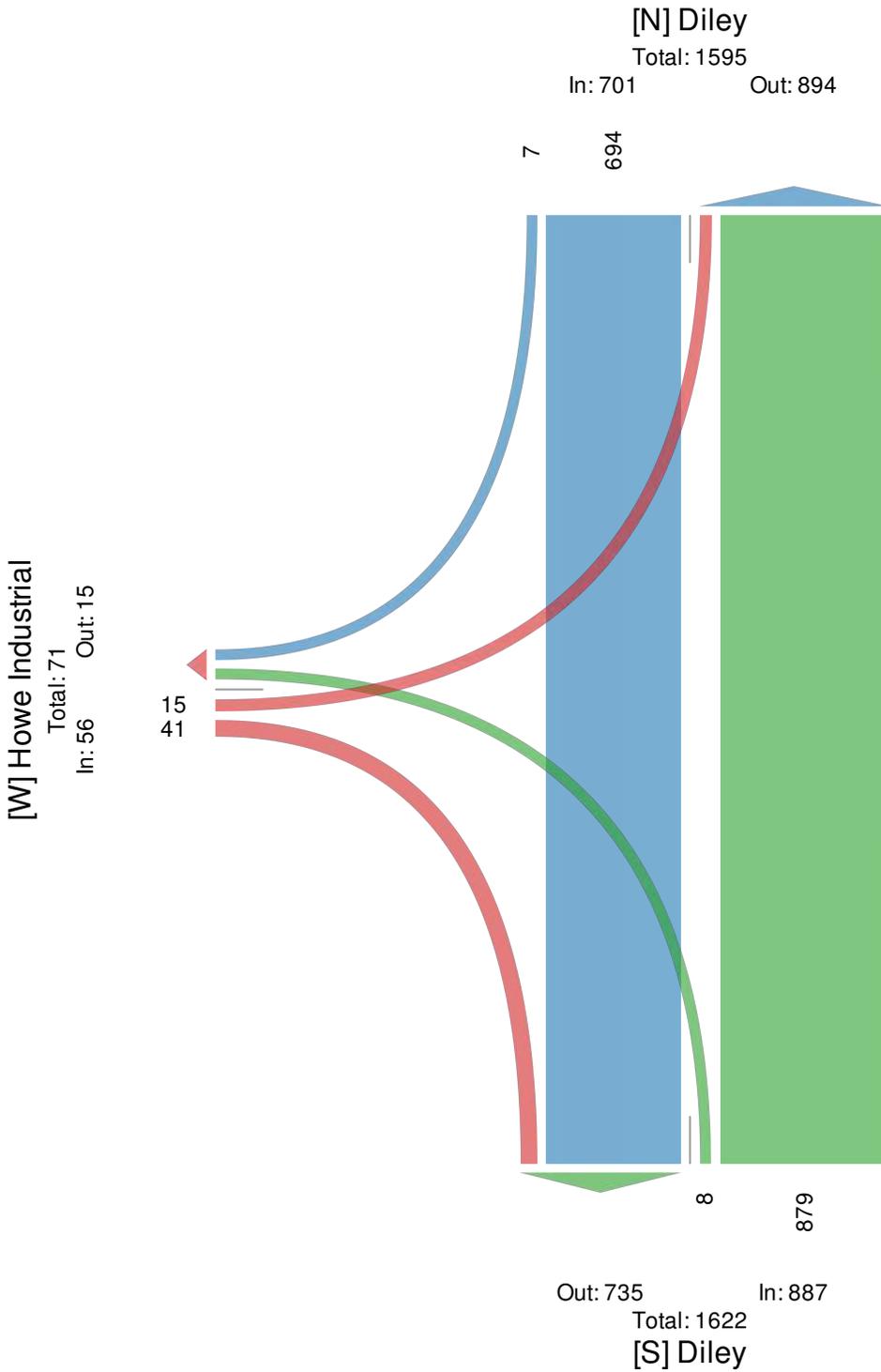
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses)

All Movements

ID: 739028, Location: 39.855832, -82.780544



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

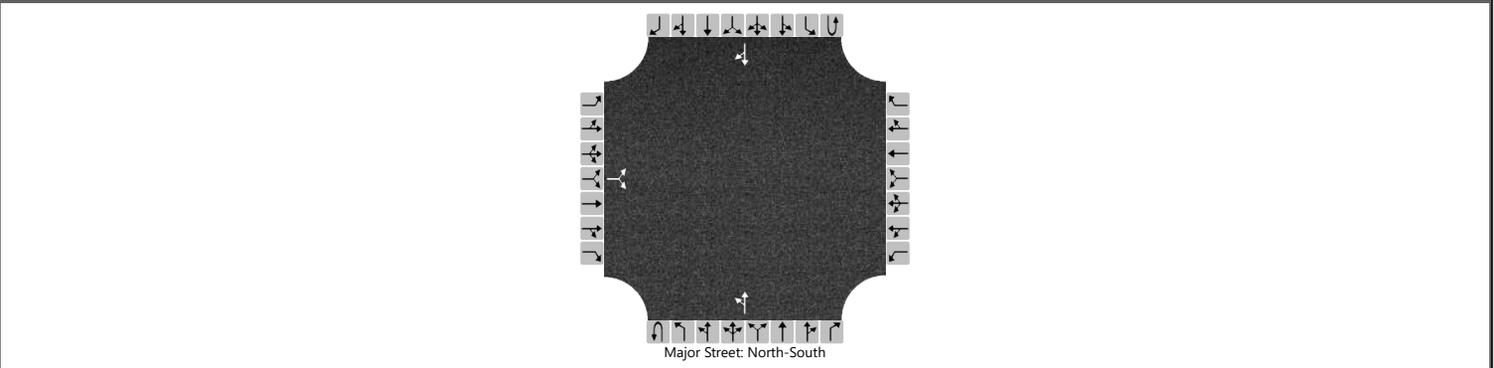


**APPENDIX C**  
**EXISTING TRAFFIC SCENARIO CAPACITY**  
**ANALYSIS SUMMARY SHEETS**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2019	North/South Street	HILL/BUSEY				
Time Analyzed	EXISTING AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		76		29						12	68				150	129
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

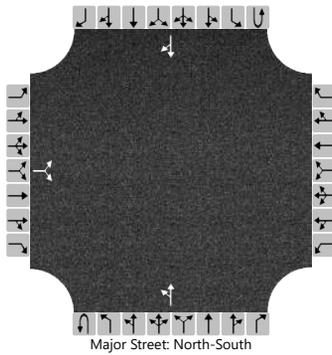
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			114							13						
Capacity, c (veh/h)			688							1269						
v/c Ratio			0.17							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.6							0.0						
Control Delay (s/veh)			11.3							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.3								1.3						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2019	North/South Street	HILL/BUSEY				
Time Analyzed	EXISTING PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		82		23						54	244				171	58
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

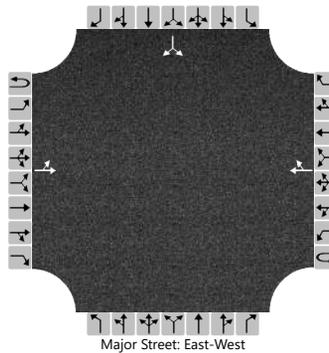
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			114							59						
Capacity, c (veh/h)			486							1329						
v/c Ratio			0.24							0.04						
95% Queue Length, Q <sub>95</sub> (veh)			0.9							0.1						
Control Delay (s/veh)			14.7							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.7								1.8						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	KINGS CROSSING & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2019	North/South Street	KINGS CROSSING
Time Analyzed	EXISTING AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0		0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		167	3				1	178						77		50
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

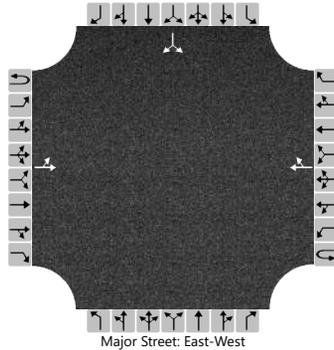
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		182														138
Capacity, c (veh/h)		1373														600
v/c Ratio		0.13														0.23
95% Queue Length, Q <sub>95</sub> (veh)		0.5														0.9
Control Delay (s/veh)		8.0														12.8
Level of Service (LOS)		A														B
Approach Delay (s/veh)	7.9												12.8			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2019	North/South Street	KINGS CROSSING				
Time Analyzed	EXISTING PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		139	35				22	172						263		276
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		151														586	
Capacity, c (veh/h)		1372														658	
v/c Ratio		0.11														0.89	
95% Queue Length, Q <sub>95</sub> (veh)		0.4														11.0	
Control Delay (s/veh)		7.9														38.7	
Level of Service (LOS)		A														E	
Approach Delay (s/veh)		6.5												38.7			
Approach LOS														E			

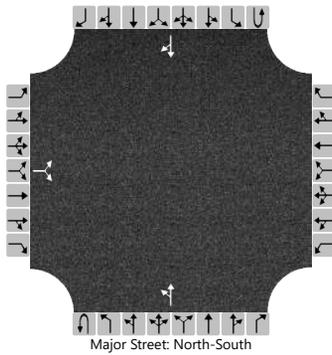
**APPENDIX D**  
**2022/2023/2024/2034 NO-BUILD TRAFFIC SCENARIO**  
**CAPACITY ANALYSIS SUMMARY SHEETS**

**2022 NO-BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		78		30						12	70				154	133
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

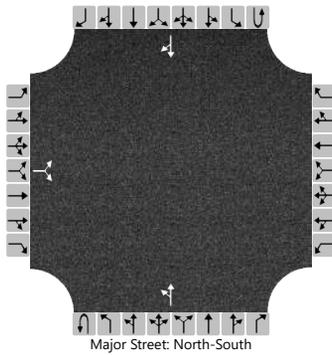
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			117							13						
Capacity, c (veh/h)			681							1260						
v/c Ratio			0.17							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.6							0.0						
Control Delay (s/veh)			11.4							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.4								1.2						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		84		24						56	251				176	60
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

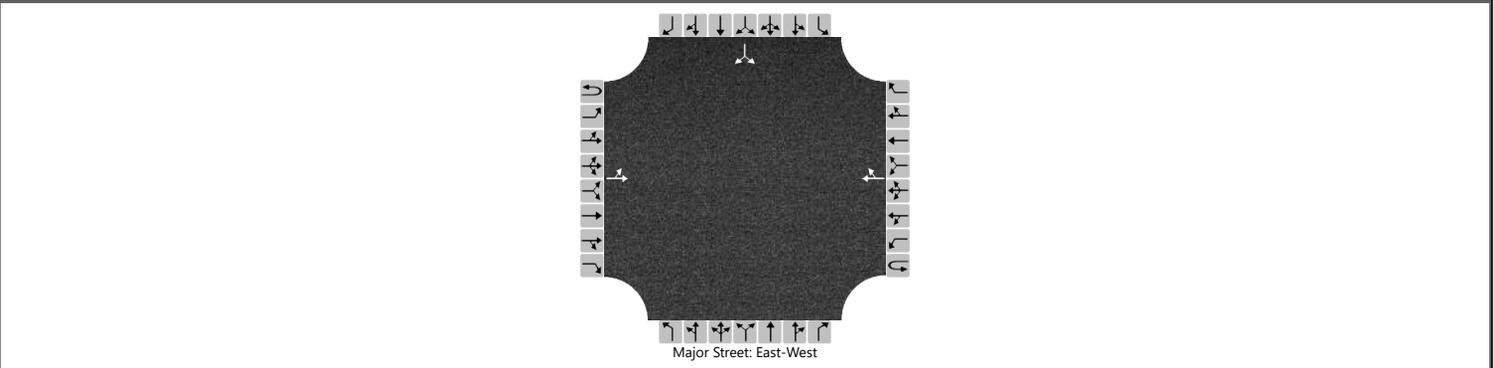
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			117							61						
Capacity, c (veh/h)			474							1320						
v/c Ratio			0.25							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.0							0.1						
Control Delay (s/veh)			15.1							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.1								1.8						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	KINGS CROSSING & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2022	North/South Street	KINGS CROSSING
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		172	3				1	183						79		51
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

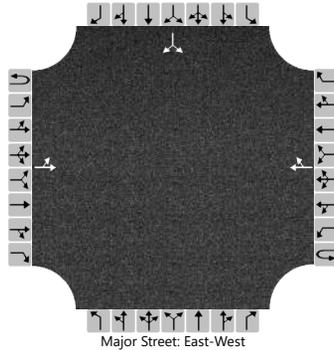
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		187														141	
Capacity, c (veh/h)		1366														589	
v/c Ratio		0.14														0.24	
95% Queue Length, Q <sub>95</sub> (veh)		0.5														0.9	
Control Delay (s/veh)		8.1														13.0	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		7.9												13.0			
Approach LOS														B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0		0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		143	36				23	177					271		284	
Percent Heavy Vehicles (%)		0											0		1	
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

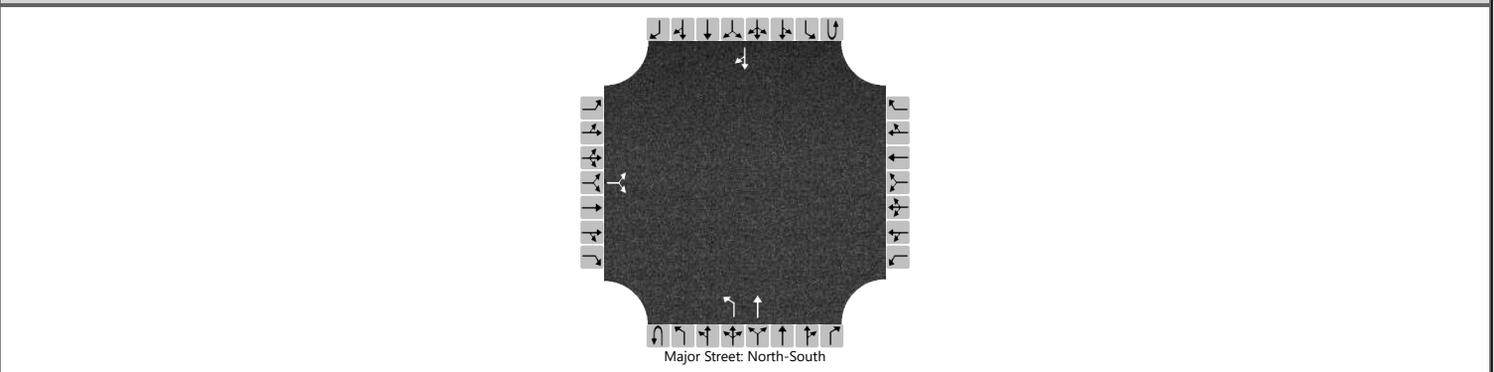
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		155														603	
Capacity, c (veh/h)		1364														647	
v/c Ratio		0.11														0.93	
95% Queue Length, Q <sub>95</sub> (veh)		0.4														12.5	
Control Delay (s/veh)		8.0														45.9	
Level of Service (LOS)		A														E	
Approach Delay (s/veh)		6.6												45.9			
Approach LOS														E			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD AM PEAK W/ IMP	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		78		30						12	70				154	133
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

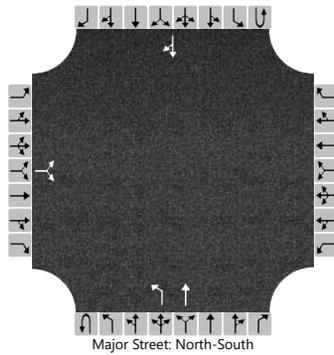
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			117							13						
Capacity, c (veh/h)			681							1260						
v/c Ratio			0.17							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.6							0.0						
Control Delay (s/veh)			11.4							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.4								1.2						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD PM PEAK W/ IMP	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		84		24						56	251				176	60
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

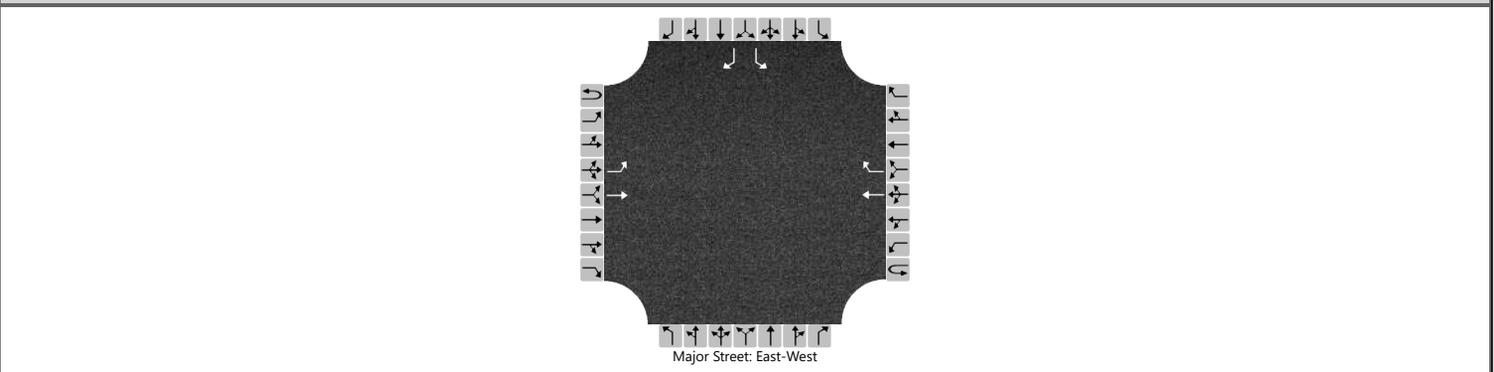
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			117							61						
Capacity, c (veh/h)			478							1320						
v/c Ratio			0.25							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.0							0.1						
Control Delay (s/veh)			15.0							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		15.0								1.4						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD AM PEAK W/ IMP	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Priority																	
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1	
Configuration		L	T				T	R						L		R	
Volume (veh/h)		172	3				1	183						79		51	
Percent Heavy Vehicles (%)		3												1		4	
Proportion Time Blocked																	
Percent Grade (%)														0			
Right Turn Channelized							No							No			
Median Type   Storage		Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

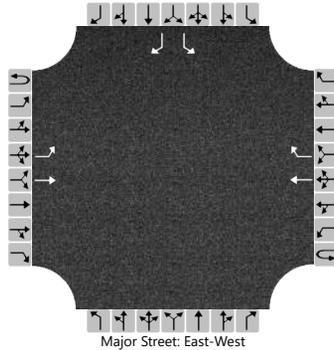
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		187												86		55
Capacity, c (veh/h)		1366												540		1078
v/c Ratio		0.14												0.16		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.6		0.2
Control Delay (s/veh)		8.1												12.9		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.2		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	KINGS CROSSING & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2022	North/South Street	KINGS CROSSING
Time Analyzed	NO-BUILD PM PEAK W/ IMP	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	1	1	0	0	0	1	1	0	0	0		1	0	1	
Configuration		L	T				T	R					L		R	
Volume (veh/h)		143	36				23	177					271		284	
Percent Heavy Vehicles (%)		0											0		1	
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

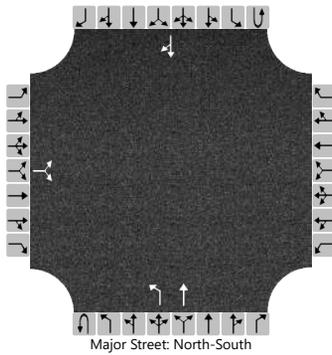
Flow Rate, v (veh/h)		155												295		309
Capacity, c (veh/h)		1364												558		1054
v/c Ratio		0.11												0.53		0.29
95% Queue Length, Q <sub>95</sub> (veh)		0.4												3.1		1.2
Control Delay (s/veh)		8.0												18.4		9.8
Level of Service (LOS)		A												C		A
Approach Delay (s/veh)	6.4												14.0			
Approach LOS													B			

**2023 NO-BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2023	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		79		30						12	71				156	134
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

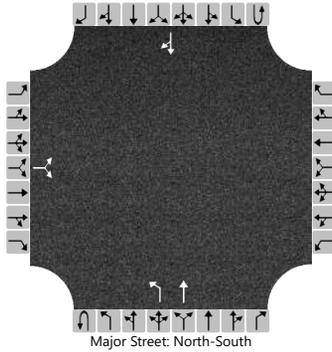
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			118							13						
Capacity, c (veh/h)			678							1256						
v/c Ratio			0.17							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.6							0.0						
Control Delay (s/veh)			11.4							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.4								1.1						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2023	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		85		24						56	254				178	60
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

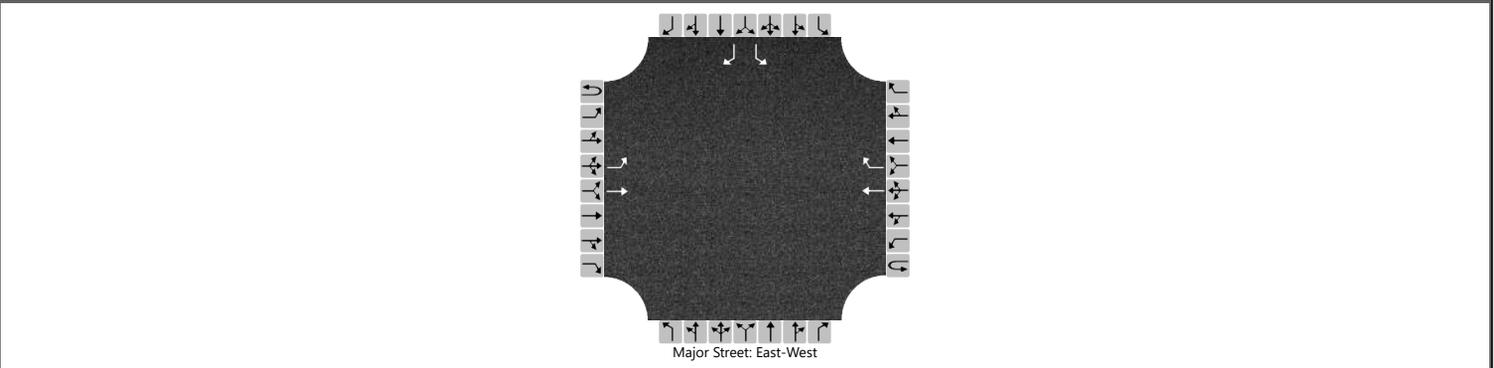
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			118							61						
Capacity, c (veh/h)			474							1318						
v/c Ratio			0.25							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.0							0.1						
Control Delay (s/veh)			15.1							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.1								1.4						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2023	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		173	3				1	185						80		52
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized							No							No		
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

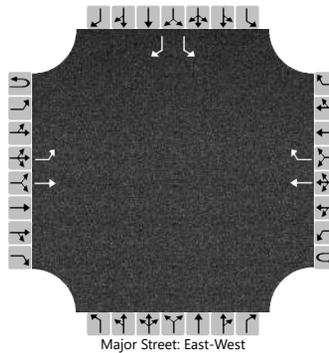
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		188												87		57
Capacity, c (veh/h)		1364												538		1078
v/c Ratio		0.14												0.16		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.6		0.2
Control Delay (s/veh)		8.1												13.0		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.2		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2023	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		145	36				23	179						274		287
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized							No									No
Median Type   Storage							Undivided									

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

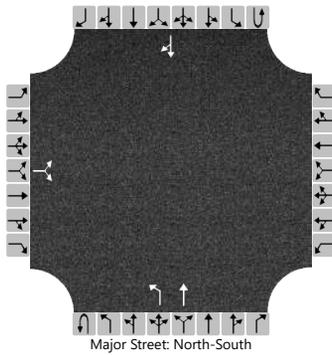
Flow Rate, v (veh/h)		158												298		312	
Capacity, c (veh/h)		1362												554		1054	
v/c Ratio		0.12												0.54		0.30	
95% Queue Length, Q <sub>95</sub> (veh)		0.4												3.2		1.2	
Control Delay (s/veh)		8.0												18.8		9.8	
Level of Service (LOS)		A												C		A	
Approach Delay (s/veh)		6.4												14.2			
Approach LOS														B			

**2024 NO-BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2024	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		80		30						13	71				158	135
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

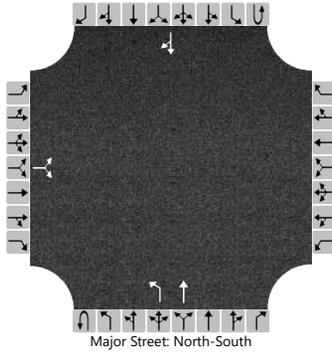
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			120							14						
Capacity, c (veh/h)			673							1253						
v/c Ratio			0.18							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.6							0.0						
Control Delay (s/veh)			11.5							7.9						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.5								1.2						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2024	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0		1	1	0		0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		86		24						57	256				180	61
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

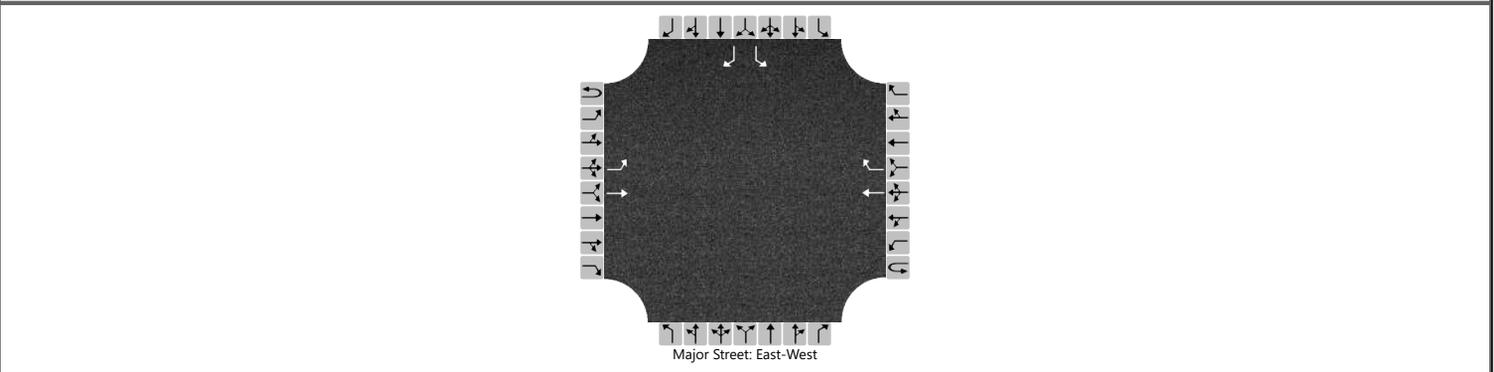
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			120							62						
Capacity, c (veh/h)			469							1314						
v/c Ratio			0.25							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.0							0.1						
Control Delay (s/veh)			15.3							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.3								1.4						
Approach LOS		C								A						

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2024	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Priority																	
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1	
Configuration		L	T				T	R						L		R	
Volume (veh/h)		175	3				1	187						81		52	
Percent Heavy Vehicles (%)		3												1		4	
Proportion Time Blocked																	
Percent Grade (%)														0			
Right Turn Channelized							No							No			
Median Type   Storage		Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

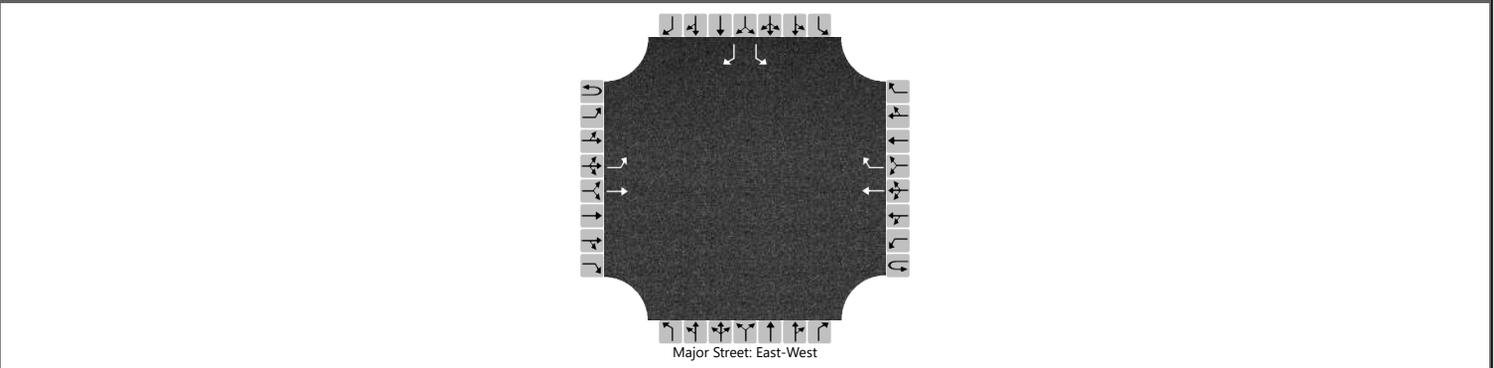
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		190												88		57
Capacity, c (veh/h)		1361												533		1078
v/c Ratio		0.14												0.17		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.6		0.2
Control Delay (s/veh)		8.1												13.1		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.3		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2024	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	1	1	0	0	0	1	1	0	0	0		1	0	1	
Configuration		L	T				T	R					L		R	
Volume (veh/h)		146	37				23	181					276		290	
Percent Heavy Vehicles (%)		0											0		1	
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

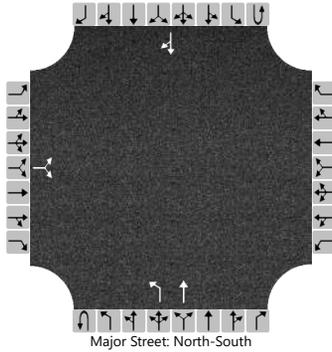
Flow Rate, v (veh/h)		159												300		315
Capacity, c (veh/h)		1359												551		1054
v/c Ratio		0.12												0.54		0.30
95% Queue Length, Q <sub>95</sub> (veh)		0.4												3.2		1.3
Control Delay (s/veh)		8.0												19.1		9.9
Level of Service (LOS)		A												C		A
Approach Delay (s/veh)	6.4												14.4			
Approach LOS													B			

**2034 NO-BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2034	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		88		34						14	79				174	150
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

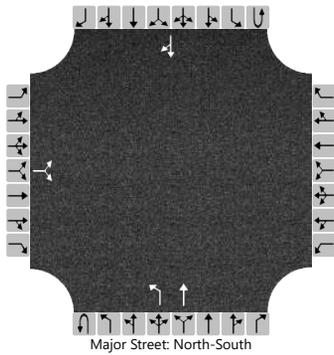
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			133							15						
Capacity, c (veh/h)			644							1218						
v/c Ratio			0.21							0.01						
95% Queue Length, Q <sub>95</sub> (veh)			0.8							0.0						
Control Delay (s/veh)			12.0							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.0								1.2						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2034	North/South Street	HILL/BUSEY				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		95		28						63	283				198	67
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

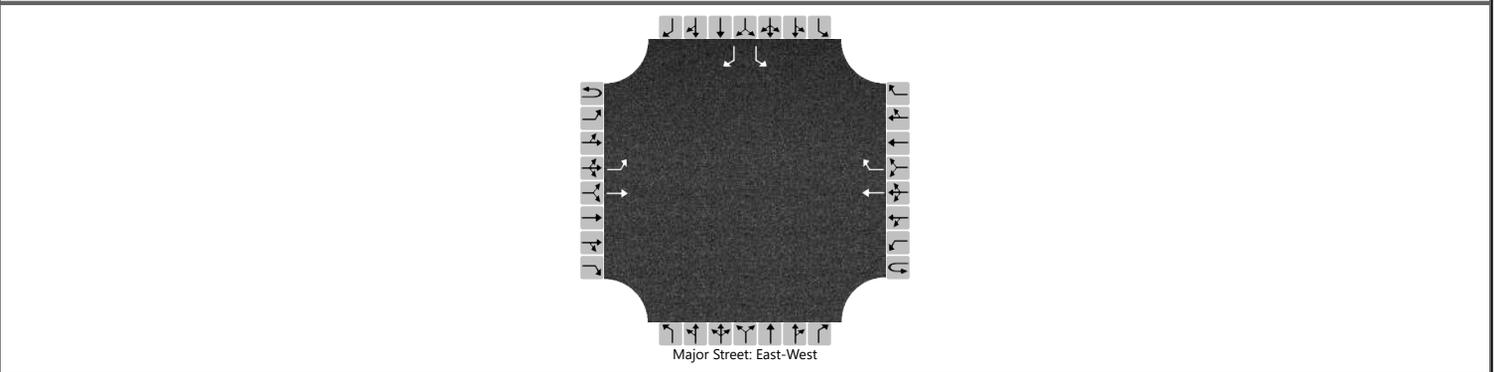
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			134							68						
Capacity, c (veh/h)			433							1286						
v/c Ratio			0.31							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.3							0.2						
Control Delay (s/veh)			17.0							8.0						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		17.0								1.4						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2034	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Priority																	
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1	
Configuration		L	T				T	R						L		R	
Volume (veh/h)		194	3				1	207						90		58	
Percent Heavy Vehicles (%)		3												1		4	
Proportion Time Blocked																	
Percent Grade (%)														0			
Right Turn Channelized							No							No			
Median Type   Storage		Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

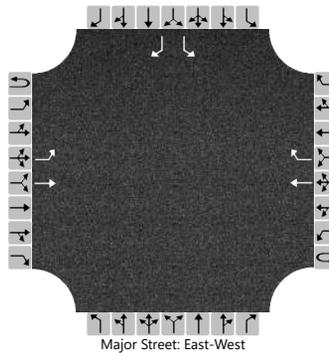
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		211												98		63
Capacity, c (veh/h)		1336												494		1078
v/c Ratio		0.16												0.20		0.06
95% Queue Length, Q <sub>95</sub> (veh)		0.6												0.7		0.2
Control Delay (s/veh)		8.2												14.1		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		8.1												11.9		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2034	North/South Street	KINGS CROSSING				
Time Analyzed	NO-BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		161	41				26	200						305		320
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized							No									No
Median Type   Storage							Undivided									

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		175												332		348
Capacity, c (veh/h)		1332												514		1050
v/c Ratio		0.13												0.65		0.33
95% Queue Length, Q <sub>95</sub> (veh)		0.5												4.5		1.5
Control Delay (s/veh)		8.1												23.9		10.1
Level of Service (LOS)		A												C		B
Approach Delay (s/veh)		6.5												16.8		
Approach LOS														C		

**APPENDIX E**  
**ITE TRIP GENERATION CATEGORY**  
**210 SHEETS**

# Land Use: 210

## Single-Family Detached Housing

### Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

### Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

### Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

# Single-Family Detached Housing (210)

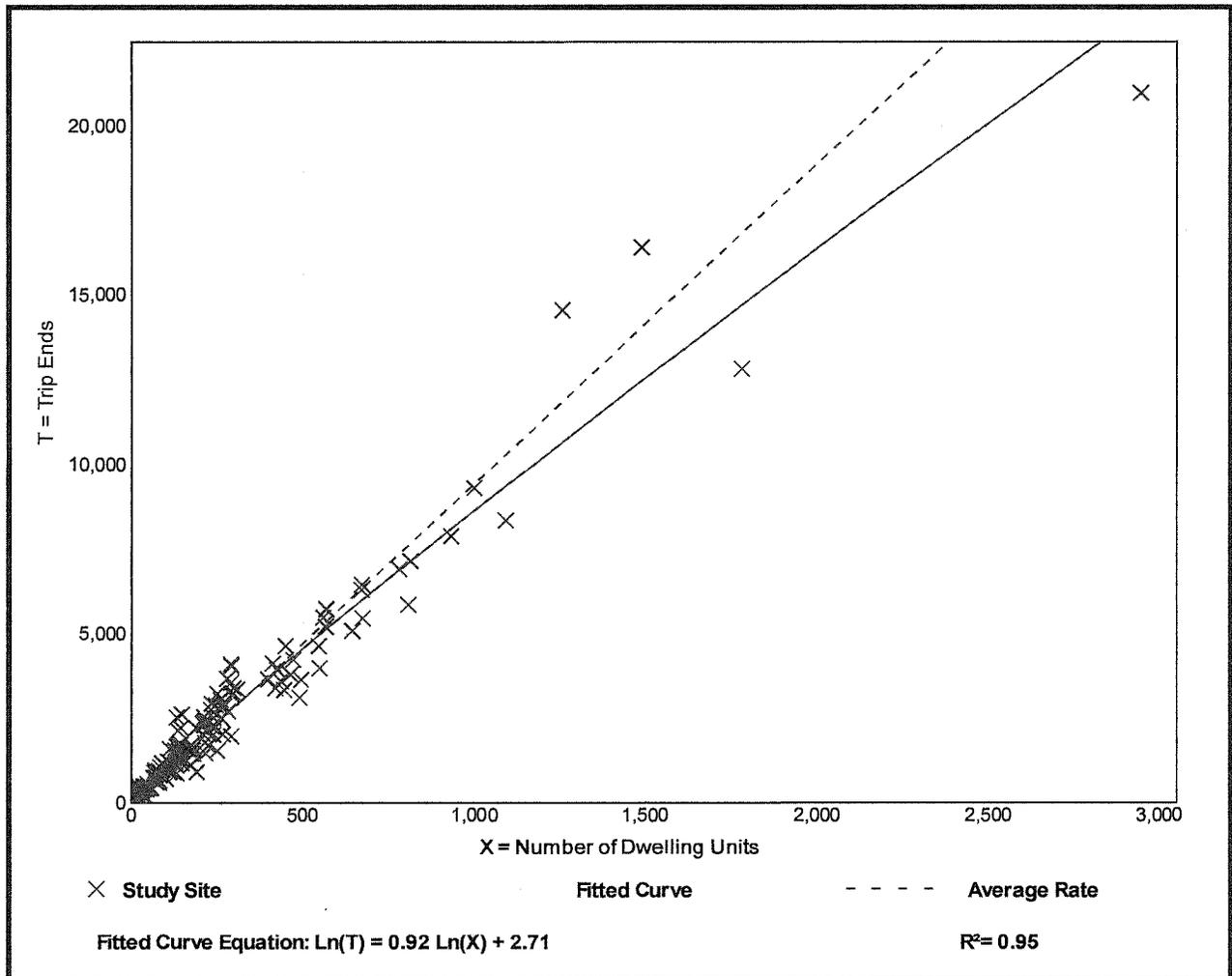
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 159  
Avg. Num. of Dwelling Units: 264  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

## Data Plot and Equation



# Single-Family Detached Housing (210)

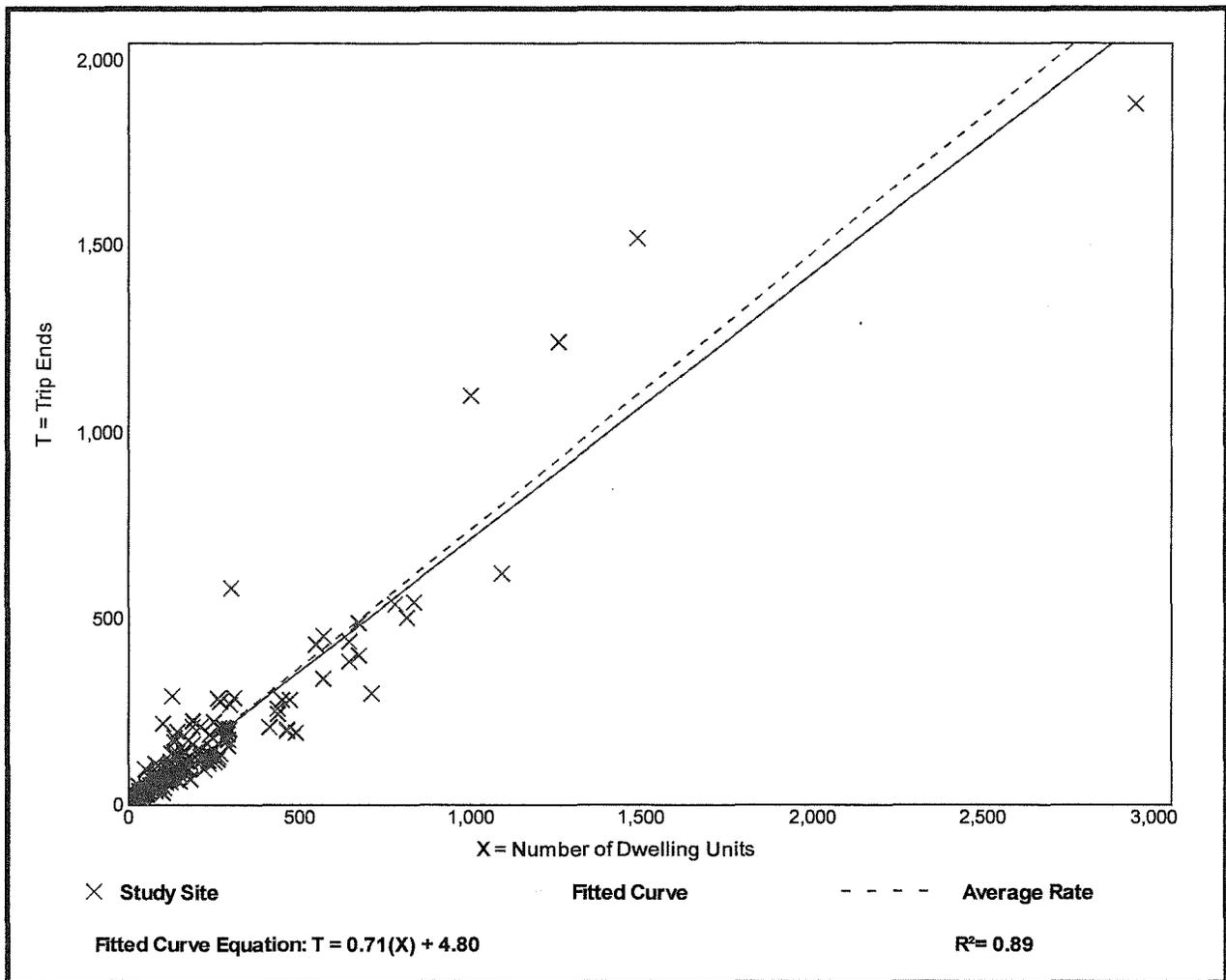
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 173  
 Avg. Num. of Dwelling Units: 219  
 Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

## Data Plot and Equation



# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

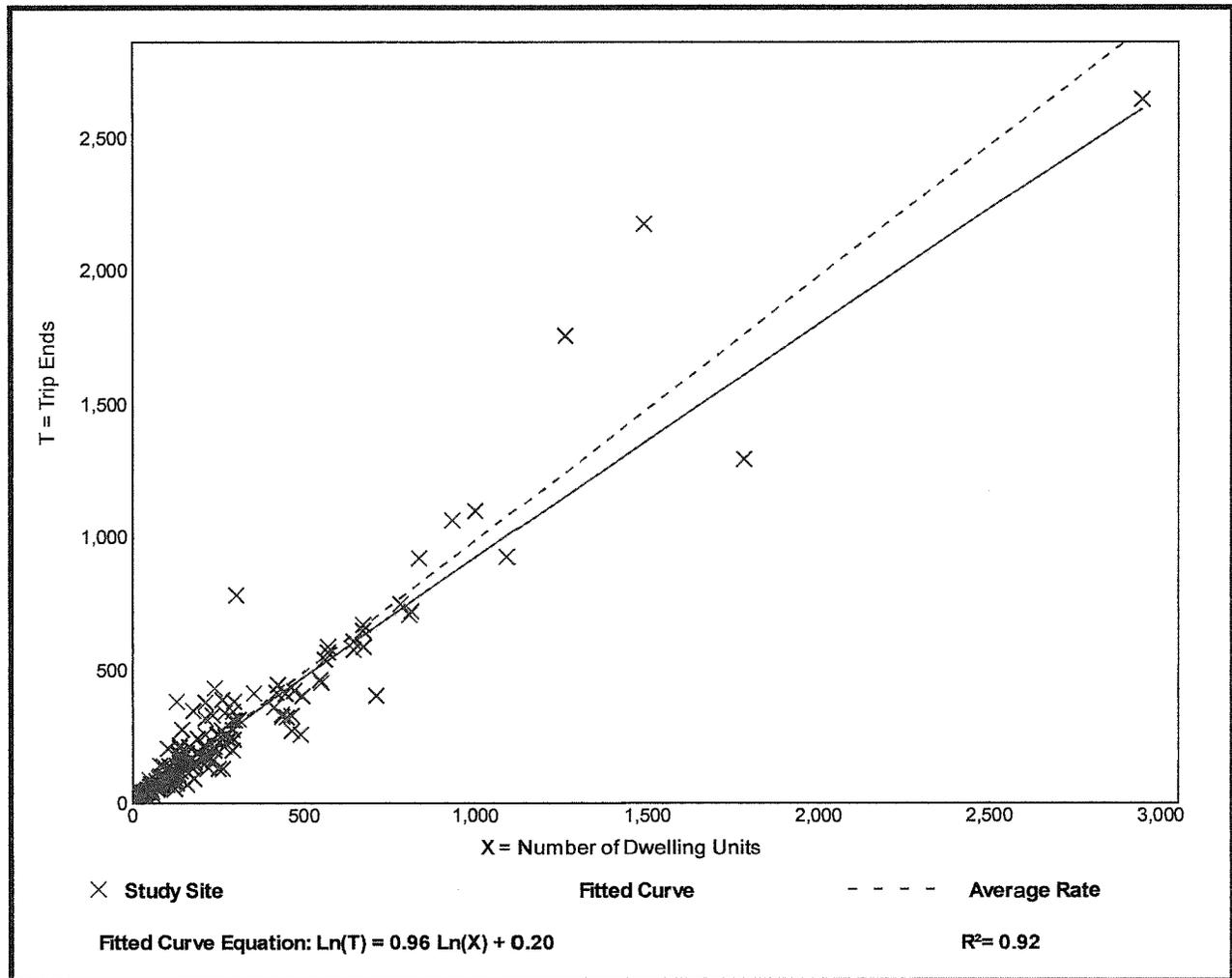
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

## Data Plot and Equation



January 20, 2020

Traffic Impact Study – Proposed Greengate Development

City of Canal Winchester, Ohio

CESO Trip Generation Calculations – 2022 Opening Year Build Traffic Scenario:

**ITE 210 – Single-Family Detached Housing**

**For Weekday → 50% Enter/50% Exit**

$\ln(T) = [0.92 \times \ln(75 \text{ Dwelling Units})] + 2.71$ ;  $T = 797.98 \approx 798 \text{ Trips}$  (For Even Number)

$798 \text{ Trips} \times 0.50 \text{ (50\%)} = 399 \text{ Trips Enter/399 Trips Exit}$

**For AM Peak Hour → 25% Enter/75% Exit**

$T = 0.71 \times (75 \text{ Dwelling Units}) + 4.80$ ;  $T = 58.05 \approx 58 \text{ Trips}$

$58 \text{ Trips} \times 0.25 \text{ (25\%)} = 14 \text{ Trips Enter}$

$58 \text{ Trips} \times 0.75 \text{ (75\%)} = 44 \text{ Trips Exit}$

**For PM Peak Hour → 63% Enter/37% Exit**

$\ln(T) = [0.96 \times \ln(75 \text{ Dwelling Units})] + 0.20$ ;  $T = 77.07 \approx 77 \text{ Trips}$

$77 \text{ Trips} \times 0.63 \text{ (63\%)} = 49 \text{ Trips Enter}$

$77 \text{ Trips} \times 0.37 \text{ (37\%)} = 28 \text{ Trips Exit}$

January 20, 2020

Traffic Impact Study – Proposed Greengate Development

City of Canal Winchester, Ohio

CESO Trip Generation Calculations – 2023 Opening Year Build Traffic Scenario:

**ITE 210 – Single-Family Detached Housing**

**For Weekday → 50% Enter/50% Exit**

$\text{Ln}(T) = [0.92 \times \text{Ln}(61 \text{ Dwelling Units})] + 2.71$ ;  $T = 659.84 \approx 660 \text{ Trips}$  (For Even Number)

$660 \text{ Trips} \times 0.50 (50\%) = 330 \text{ Trips Enter/330 Trips Exit}$

**For AM Peak Hour → 25% Enter/75% Exit**

$T = 0.71 \times (61 \text{ Dwelling Units}) + 4.80$ ;  $T = 48.11 \approx 48 \text{ Trips}$

$48 \text{ Trips} \times 0.25 (25\%) = 12 \text{ Trips Enter}$

$48 \text{ Trips} \times 0.75 (75\%) = 36 \text{ Trips Exit}$

**For PM Peak Hour → 63% Enter/37% Exit**

$\text{Ln}(T) = [0.96 \times \text{Ln}(61 \text{ Dwelling Units})] + 0.20$ ;  $T = 63.20 \approx 63 \text{ Trips}$

$63 \text{ Trips} \times 0.63 (63\%) = 40 \text{ Trips Enter}$

$63 \text{ Trips} \times 0.37 (37\%) = 23 \text{ Trips Exit}$

January 20, 2020

Traffic Impact Study – Proposed Greengate Development

City of Canal Winchester, Ohio

CESO Trip Generation Calculations – 2024 Opening Year Build Traffic Scenario:

**ITE 210 – Single-Family Detached Housing**

**For Weekday → 50% Enter/50% Exit**

$\ln(T) = [0.92 \times \ln(61 \text{ Dwelling Units})] + 2.71$ ;  $T = 659.84 \approx 660 \text{ Trips}$  (For Even Number)

$660 \text{ Trips} \times 0.50 \text{ (50\%)} = 330 \text{ Trips Enter/330 Trips Exit}$

**For AM Peak Hour → 25% Enter/75% Exit**

$T = 0.71 \times (61 \text{ Dwelling Units}) + 4.80$ ;  $T = 48.11 \approx 48 \text{ Trips}$

$48 \text{ Trips} \times 0.25 \text{ (25\%)} = 12 \text{ Trips Enter}$

$48 \text{ Trips} \times 0.75 \text{ (75\%)} = 36 \text{ Trips Exit}$

**For PM Peak Hour → 63% Enter/37% Exit**

$\ln(T) = [0.96 \times \ln(61 \text{ Dwelling Units})] + 0.20$ ;  $T = 63.20 \approx 63 \text{ Trips}$

$63 \text{ Trips} \times 0.63 \text{ (63\%)} = 40 \text{ Trips Enter}$

$63 \text{ Trips} \times 0.37 \text{ (37\%)} = 23 \text{ Trips Exit}$

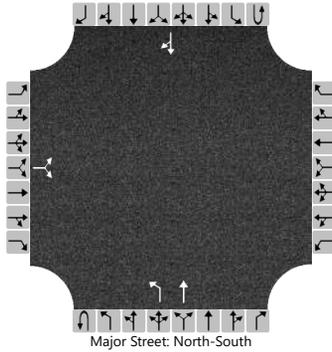
**APPENDIX F**  
**2022/2023/2024/2034 BUILD TRAFFIC SCENARIO**  
**CAPACITY ANALYSIS SUMMARY SHEETS**

**2022 BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		78		38						38	75				156	133
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

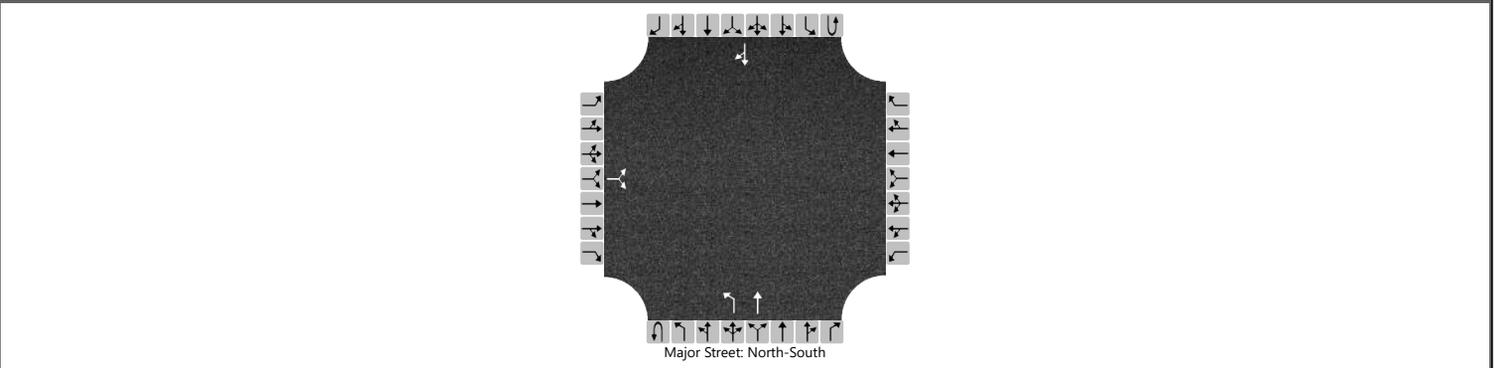
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			126							41						
Capacity, c (veh/h)			636							1258						
v/c Ratio			0.20							0.03						
95% Queue Length, Q <sub>95</sub> (veh)			0.7							0.1						
Control Delay (s/veh)			12.1							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.1								2.7						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2022	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		84		39						64	254				181	60
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

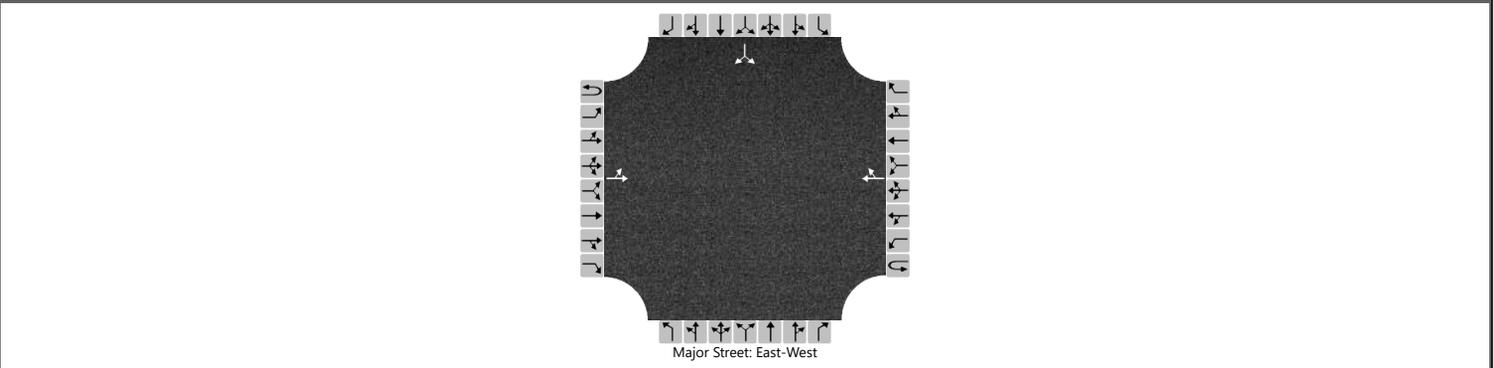
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			134							70						
Capacity, c (veh/h)			486							1314						
v/c Ratio			0.28							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			1.1							0.2						
Control Delay (s/veh)			15.2							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.2								1.6						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	GREENGATE & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	GREENGATE BLVD				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		4	82				184	10						31		13
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

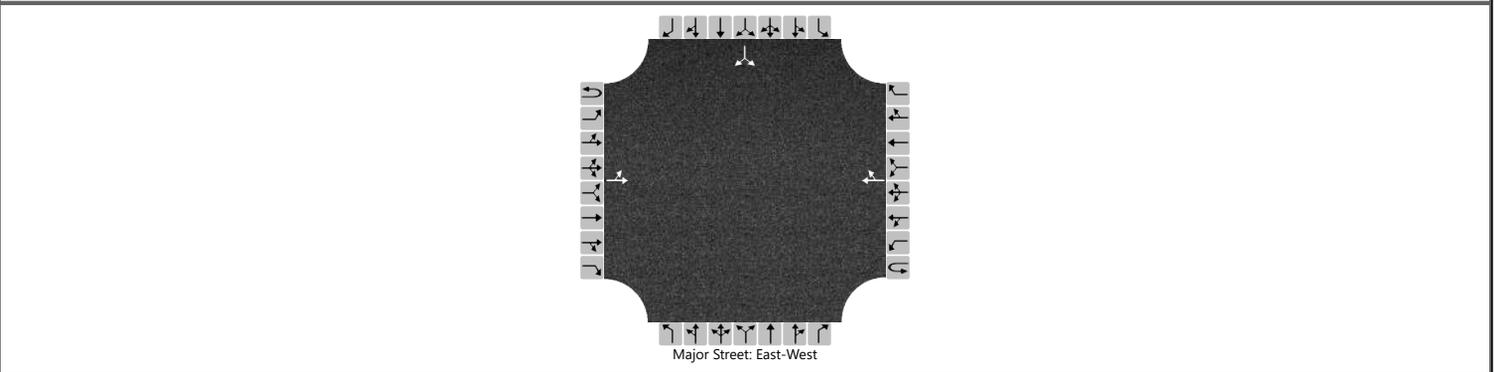
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4														48	
Capacity, c (veh/h)		1372														729	
v/c Ratio		0.00														0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.2	
Control Delay (s/veh)		7.6														10.3	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		0.4												10.3			
Approach LOS														B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	GREENGATE & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	GREENGATE BLVD				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		29	307				200	20						11		17
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

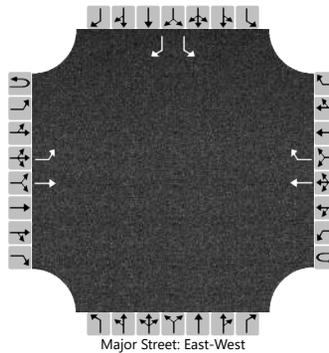
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32													30		
Capacity, c (veh/h)		1340													610		
v/c Ratio		0.02													0.05		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.2		
Control Delay (s/veh)		7.8													11.2		
Level of Service (LOS)		A													B		
Approach Delay (s/veh)		0.9												11.2			
Approach LOS														B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		172	4				3	194						82		51
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized							No							No		
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

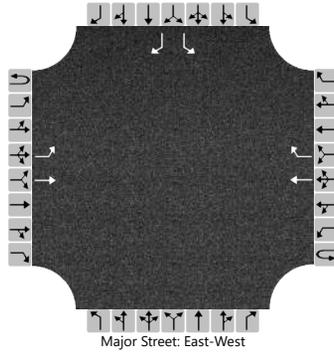
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		187												89		55
Capacity, c (veh/h)		1350												537		1075
v/c Ratio		0.14												0.17		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.6		0.2
Control Delay (s/veh)		8.1												13.0		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.3		
Approach LOS		A												B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2022	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		143	38				25	192						298		284
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized							No							No		
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

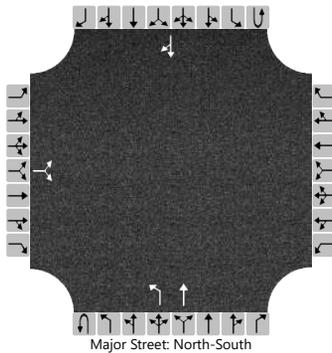
Flow Rate, v (veh/h)		155												324		309
Capacity, c (veh/h)		1343												554		1051
v/c Ratio		0.12												0.58		0.29
95% Queue Length, Q <sub>95</sub> (veh)		0.4												3.7		1.2
Control Delay (s/veh)		8.0												20.2		9.8
Level of Service (LOS)		A												C		A
Approach Delay (s/veh)		6.3												15.2		
Approach LOS														C		

**2023 BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2023	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		79		45						60	79				159	134
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

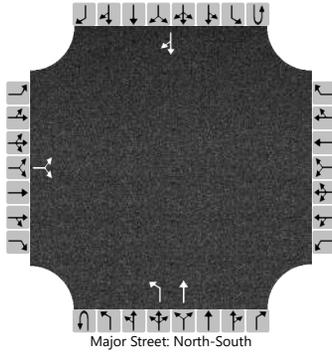
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			135							65						
Capacity, c (veh/h)			600							1253						
v/c Ratio			0.22							0.05						
95% Queue Length, Q <sub>95</sub> (veh)			0.9							0.2						
Control Delay (s/veh)			12.7							8.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.7								3.5						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2023	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0		1	1	0		0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		85		51						71	259				187	60
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

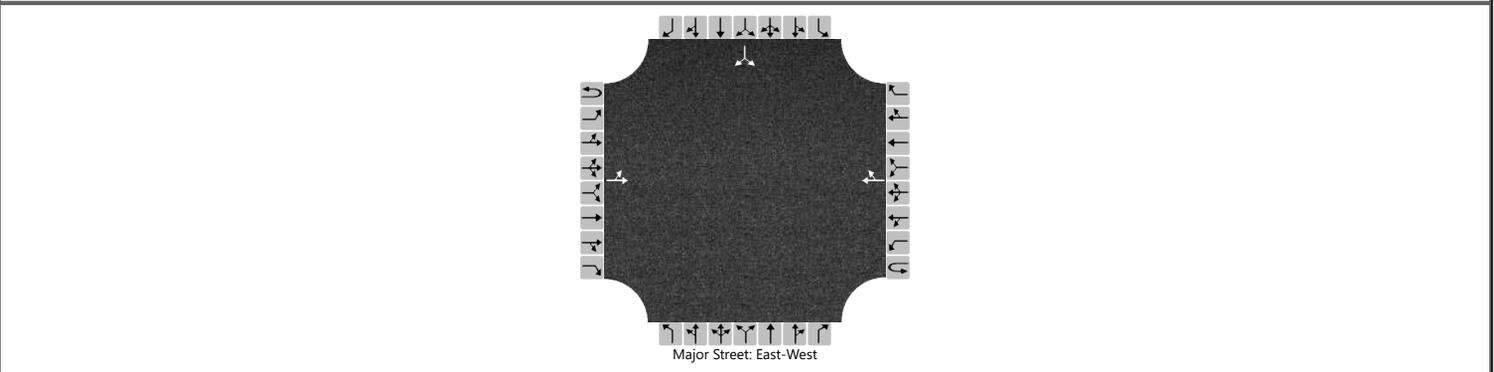
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			148							77						
Capacity, c (veh/h)			486							1307						
v/c Ratio			0.30							0.06						
95% Queue Length, Q <sub>95</sub> (veh)			1.3							0.2						
Control Delay (s/veh)			15.6							7.9						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		15.6								1.7						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	GREENGATE & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2023	North/South Street	GREENGATE BLVD
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		8	83				186	18						56		24
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

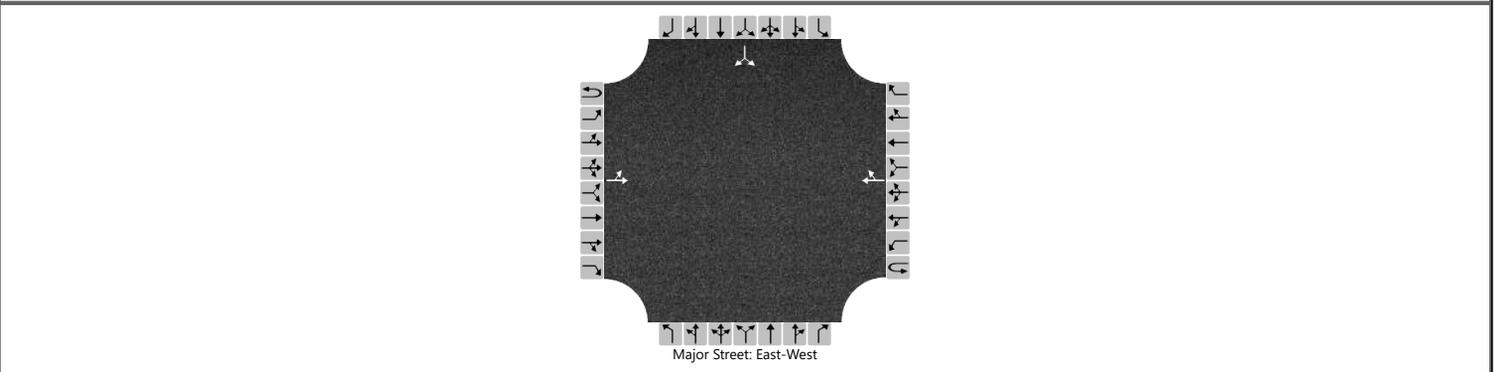
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9														87	
Capacity, c (veh/h)		1359														715	
v/c Ratio		0.01														0.12	
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.4	
Control Delay (s/veh)		7.7														10.7	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		0.7												10.7			
Approach LOS														B			

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	GREENGATE & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2023	North/South Street	GREENGATE BLVD
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	
Configuration		LT						TR							LR	
Volume (veh/h)		53	310				202	36						20		31
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

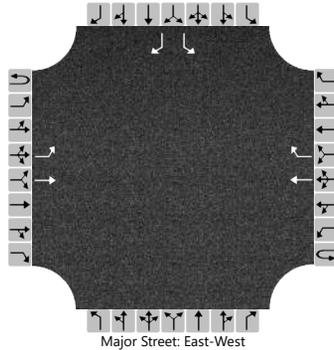
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		58													55		
Capacity, c (veh/h)		1318													569		
v/c Ratio		0.04													0.10		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.3		
Control Delay (s/veh)		7.9													12.0		
Level of Service (LOS)		A													B		
Approach Delay (s/veh)		1.5												12.0			
Approach LOS														B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2023	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Priority																	
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1	
Configuration		L	T				T	R						L		R	
Volume (veh/h)		173	5				5	205						86		52	
Percent Heavy Vehicles (%)		3												1		4	
Proportion Time Blocked																	
Percent Grade (%)														0			
Right Turn Channelized							No							No			
Median Type   Storage		Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

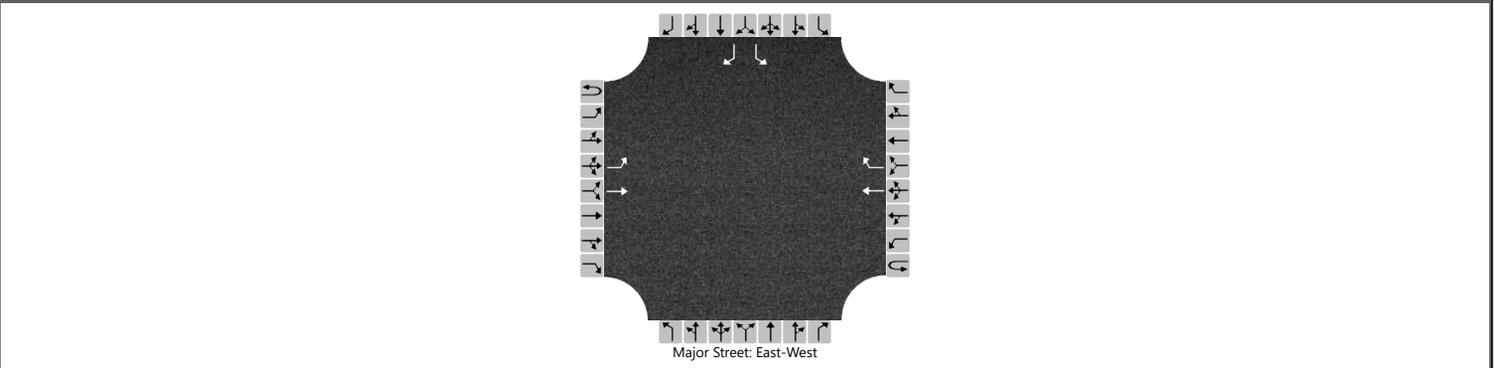
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		188												93		57
Capacity, c (veh/h)		1334												531		1072
v/c Ratio		0.14												0.18		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.6		0.2
Control Delay (s/veh)		8.1												13.2		8.5
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.5		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2023	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	1	1	0	0	0	1	1	0	0	0		1	0	1	
Configuration		L	T				T	R					L		R	
Volume (veh/h)		145	40				26	207					323		287	
Percent Heavy Vehicles (%)		0											0		1	
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

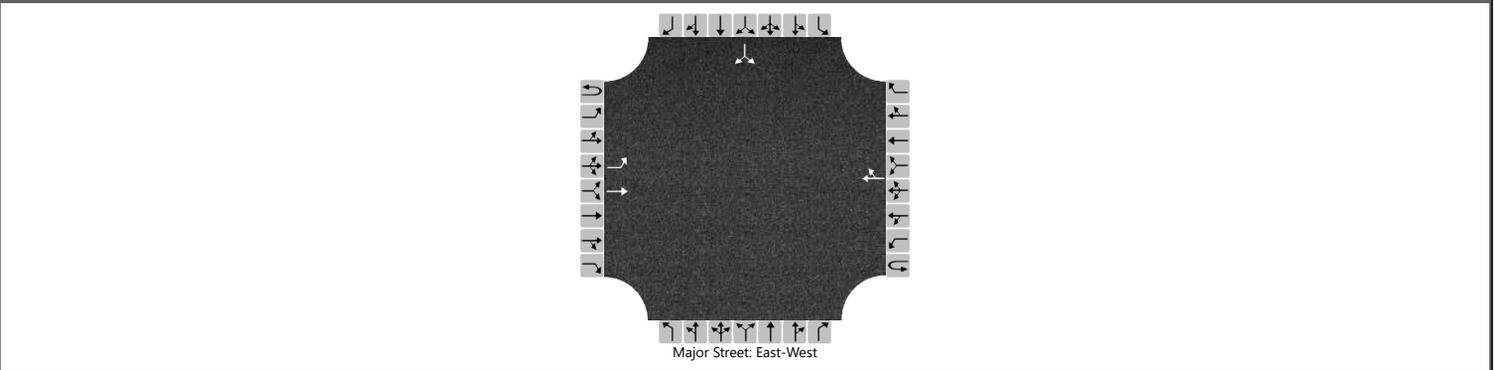
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		158												351		312
Capacity, c (veh/h)		1324												546		1050
v/c Ratio		0.12												0.64		0.30
95% Queue Length, Q <sub>95</sub> (veh)		0.4												4.5		1.3
Control Delay (s/veh)		8.1												22.7		9.9
Level of Service (LOS)		A												C		A
Approach Delay (s/veh)	6.3												16.6			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	GREENGATE & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2023	North/South Street	GREENGATE BLVD
Time Analyzed	BUILD AM PEAK W/ IMP	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		L	T					TR							LR	
Volume (veh/h)		8	83				186	18						56		24
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

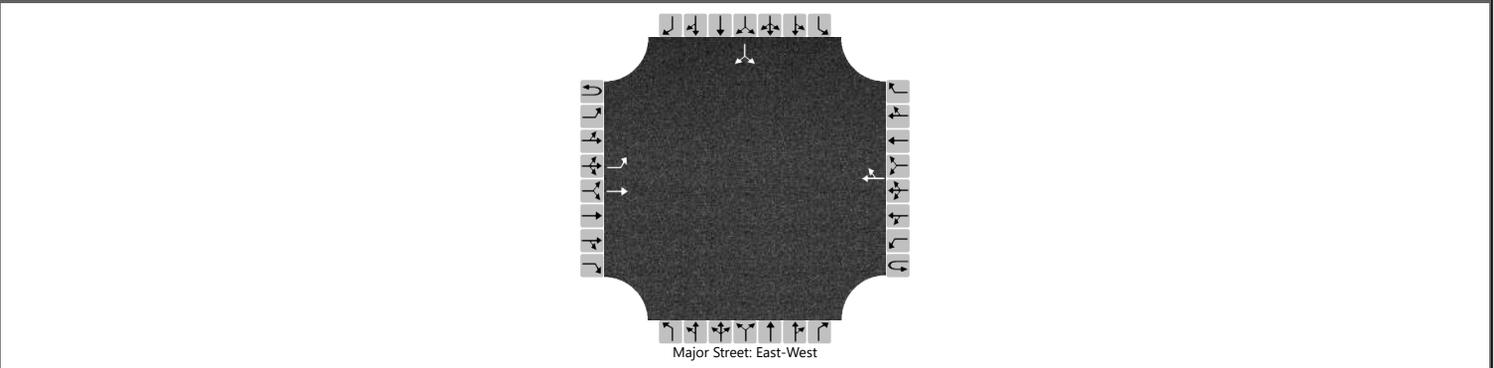
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		9														87
Capacity, c (veh/h)		1359														715
v/c Ratio		0.01														0.12
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.4
Control Delay (s/veh)		7.7														10.7
Level of Service (LOS)		A														B
Approach Delay (s/veh)		0.7												10.7		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	GREENGATE & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2023	North/South Street	GREENGATE BLVD				
Time Analyzed	BUILD PM PEAK W/ IMP	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		L	T					TR							LR	
Volume (veh/h)		53	310				202	36						20		31
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

## Delay, Queue Length, and Level of Service

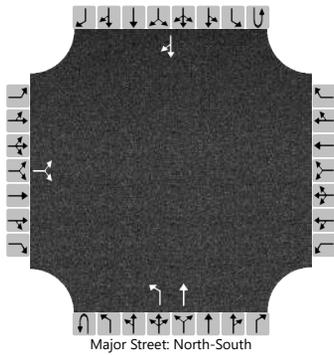
Flow Rate, v (veh/h)		58														55	
Capacity, c (veh/h)		1318														572	
v/c Ratio		0.04														0.10	
95% Queue Length, Q <sub>95</sub> (veh)		0.1														0.3	
Control Delay (s/veh)		7.9														12.0	
Level of Service (LOS)		A														B	
Approach Delay (s/veh)		1.1												12.0			
Approach LOS														B			

**2024 BUILD**

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2024	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		80		52						83	82				162	135
Percent Heavy Vehicles (%)		4		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

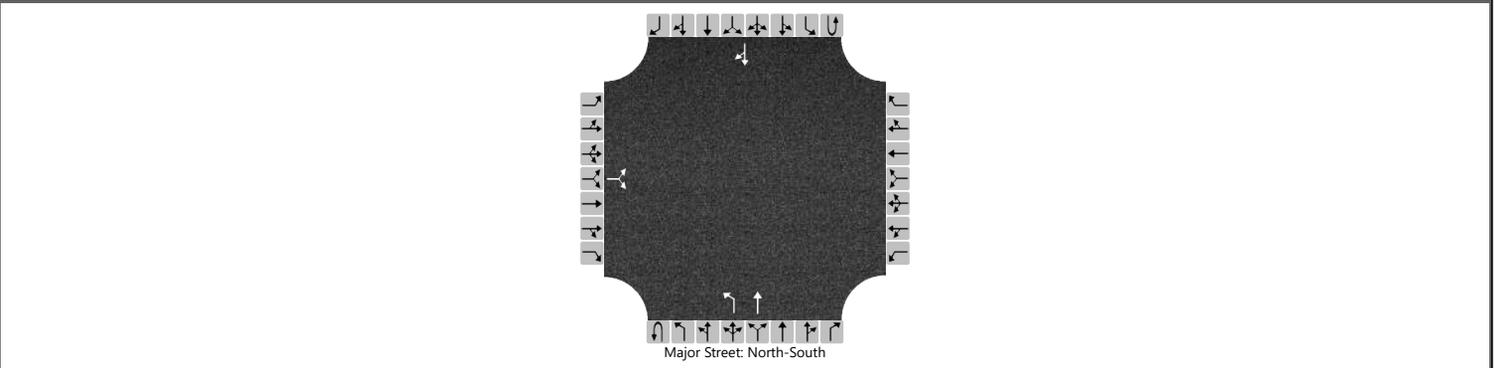
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			143							90						
Capacity, c (veh/h)			566							1248						
v/c Ratio			0.25							0.07						
95% Queue Length, Q <sub>95</sub> (veh)			1.0							0.2						
Control Delay (s/veh)			13.5							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		13.5								4.1						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2024	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		86		63						79	263				193	61
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

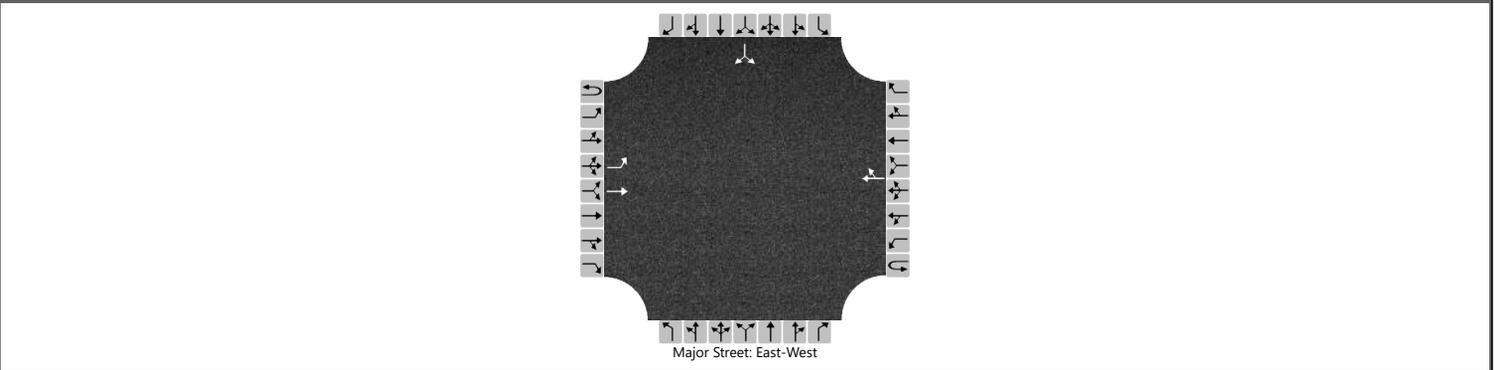
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			162							86						
Capacity, c (veh/h)			483							1299						
v/c Ratio			0.34							0.07						
95% Queue Length, Q <sub>95</sub> (veh)			1.5							0.2						
Control Delay (s/veh)			16.2							8.0						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		16.2								1.8						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	GREENGATE & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2024	North/South Street	GREENGATE BLVD
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		L	T					TR							LR	
Volume (veh/h)		12	84				188	26						81		35
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

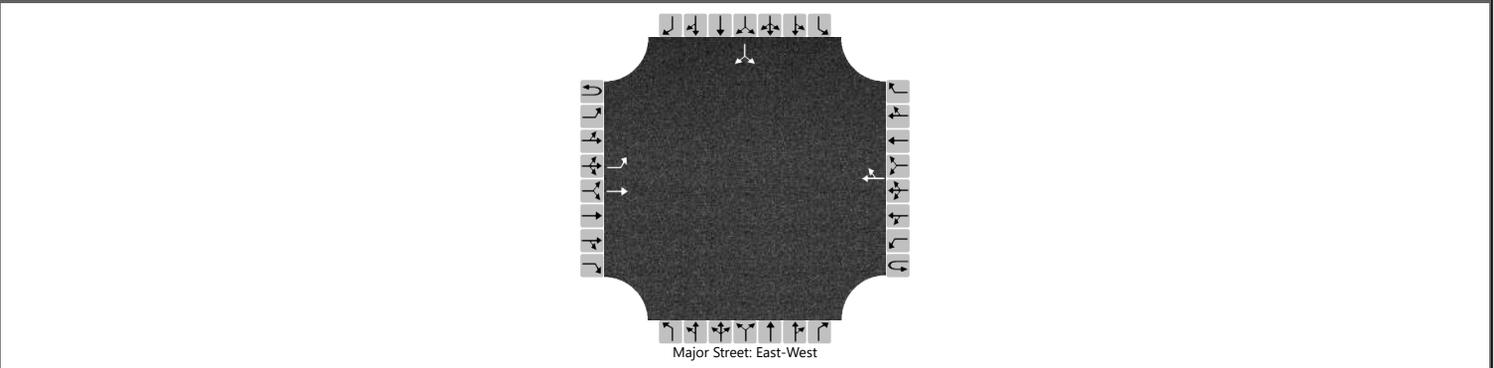
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13														126
Capacity, c (veh/h)		1347														700
v/c Ratio		0.01														0.18
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.7
Control Delay (s/veh)		7.7														11.3
Level of Service (LOS)		A														B
Approach Delay (s/veh)		1.0												11.3		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	GREENGATE & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2024	North/South Street	GREENGATE BLVD				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		L	T					TR							LR	
Volume (veh/h)		77	313				204	52						29		45
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

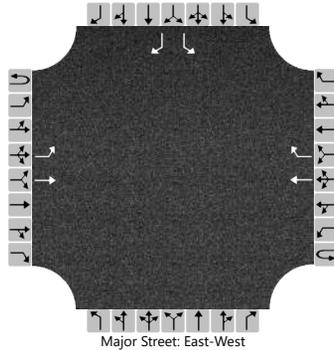
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		84														80
Capacity, c (veh/h)		1296														533
v/c Ratio		0.06														0.15
95% Queue Length, Q <sub>95</sub> (veh)		0.2														0.5
Control Delay (s/veh)		8.0														12.9
Level of Service (LOS)		A														B
Approach Delay (s/veh)		1.6												12.9		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2024	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		175	6				7	216						90		52
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized							No							No		
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

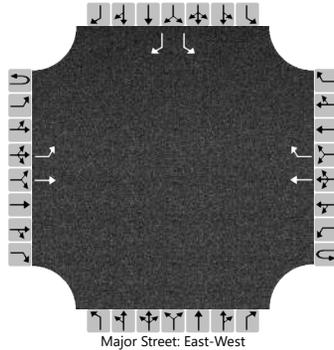
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		190												98		57
Capacity, c (veh/h)		1318												524		1069
v/c Ratio		0.14												0.19		0.05
95% Queue Length, Q <sub>95</sub> (veh)		0.5												0.7		0.2
Control Delay (s/veh)		8.2												13.4		8.6
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)		7.9												11.7		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2024	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		146	43				27	222						347		290
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized							No							No		
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

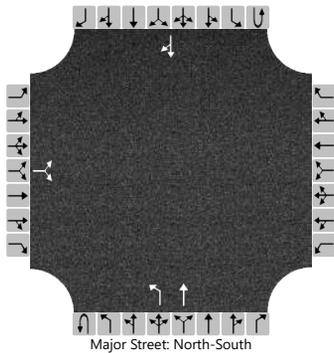
Flow Rate, v (veh/h)		159												377		315
Capacity, c (veh/h)		1304												540		1048
v/c Ratio		0.12												0.70		0.30
95% Queue Length, Q <sub>95</sub> (veh)		0.4												5.5		1.3
Control Delay (s/veh)		8.1												25.6		9.9
Level of Service (LOS)		A												D		A
Approach Delay (s/veh)		6.3												18.5		
Approach LOS														C		

**2034 BUILD**

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	BUSEY & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	BUSEY RD
Analysis Year	2034	North/South Street	HILL/BUSEY
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0	
Configuration			LR							L	T					TR	
Volume (veh/h)		88		56						84	90					178	150
Percent Heavy Vehicles (%)		4		0						0							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized																	
Median Type   Storage		Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.44		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.30						2.20						

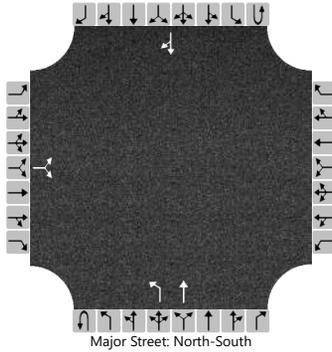
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			157							91						
Capacity, c (veh/h)			538							1213						
v/c Ratio			0.29							0.08						
95% Queue Length, Q <sub>95</sub> (veh)			1.2							0.2						
Control Delay (s/veh)			14.4							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.4								4.0						
Approach LOS		B								A						

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	BUSEY & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	BUSEY RD				
Analysis Year	2034	North/South Street	HILL/BUSEY				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		95		67						85	290				211	67
Percent Heavy Vehicles (%)		5		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type   Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.55		3.30						2.20						

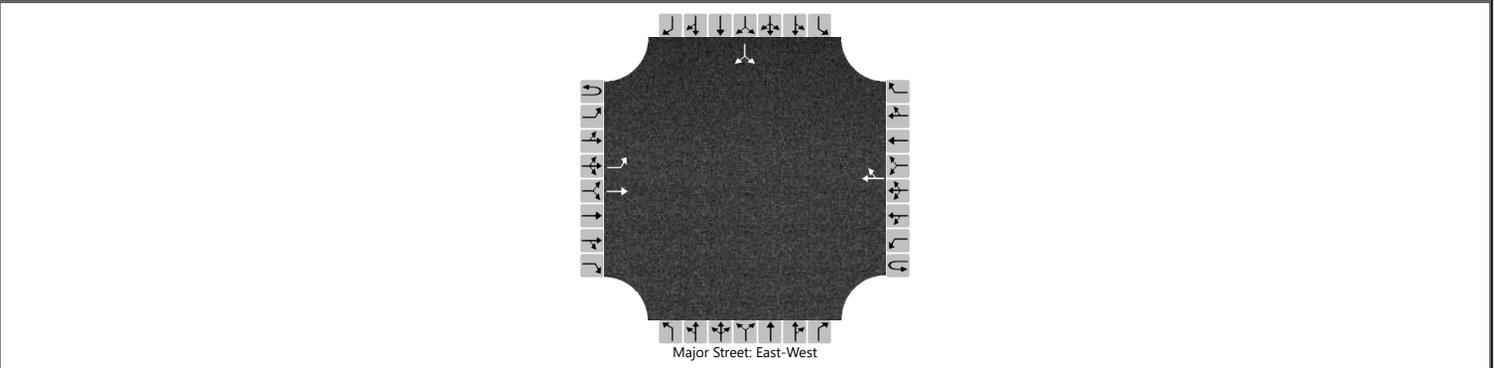
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			176							92						
Capacity, c (veh/h)			443							1270						
v/c Ratio			0.40							0.07						
95% Queue Length, Q <sub>95</sub> (veh)			1.9							0.2						
Control Delay (s/veh)			18.4							8.1						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		18.4								1.8						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	GREENGATE & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2034	North/South Street	GREENGATE BLVD
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	1	1	0	0	0	1	0	0	0	0		0	1	0	
Configuration		L	T					TR							LR	
Volume (veh/h)		12	93				208	26					81		35	
Percent Heavy Vehicles (%)		0											0		0	
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

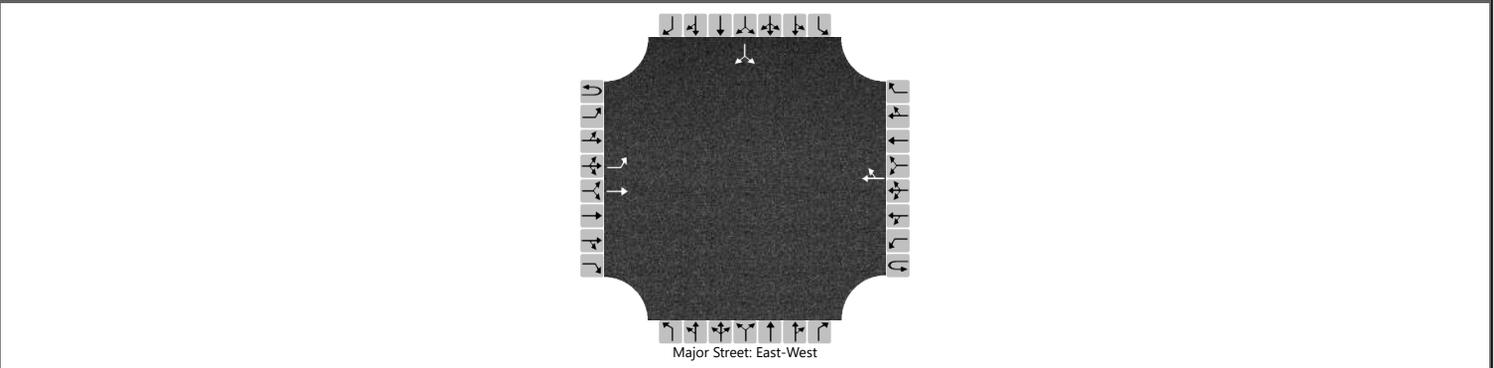
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		13														126
Capacity, c (veh/h)		1322														674
v/c Ratio		0.01														0.19
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.7
Control Delay (s/veh)		7.7														11.6
Level of Service (LOS)		A														B
Approach Delay (s/veh)	0.9												11.6			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	GREENGATE & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2034	North/South Street	GREENGATE BLVD				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		L	T					TR							LR	
Volume (veh/h)		77	346				226	52						29		45
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

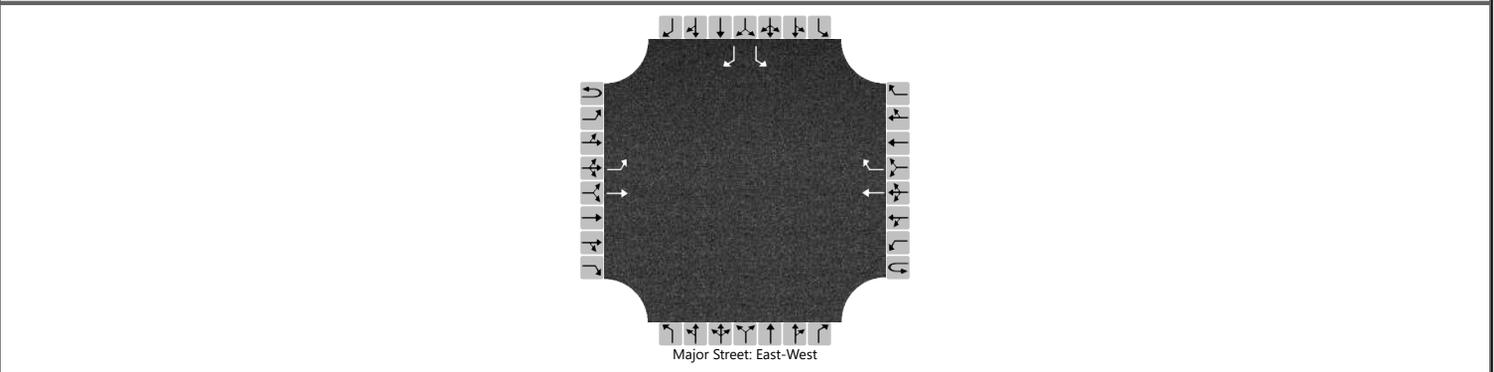
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		84														80
Capacity, c (veh/h)		1270														502
v/c Ratio		0.07														0.16
95% Queue Length, Q <sub>95</sub> (veh)		0.2														0.6
Control Delay (s/veh)		8.0														13.5
Level of Service (LOS)		A														B
Approach Delay (s/veh)		1.5												13.5		
Approach LOS														B		

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SKG	Intersection	KINGS CROSSING & HILL
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER
Date Performed	1/15/2020	East/West Street	HILL RD
Analysis Year	2034	North/South Street	KINGS CROSSING
Time Analyzed	BUILD AM PEAK HOUR	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	GREENGATE RESIDENTIAL DEV. TIS		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		194	6				7	236						99		58
Percent Heavy Vehicles (%)		3												1		4
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type   Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.41		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.51		3.34

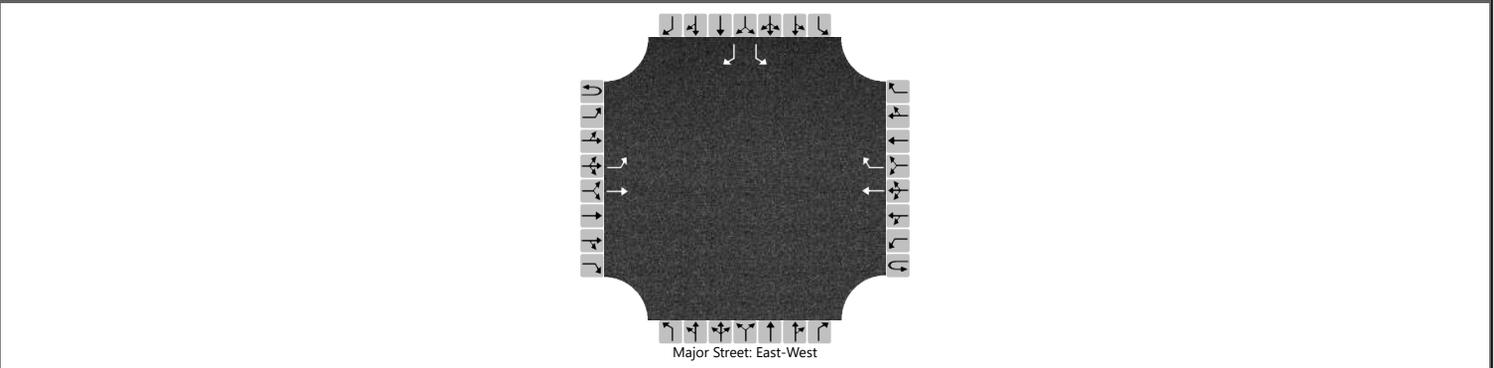
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		211												108		63
Capacity, c (veh/h)		1294												485		1069
v/c Ratio		0.16												0.22		0.06
95% Queue Length, Q <sub>95</sub> (veh)		0.6												0.8		0.2
Control Delay (s/veh)		8.3												14.5		8.6
Level of Service (LOS)		A												B		A
Approach Delay (s/veh)	8.1												12.3			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	SKG	Intersection	KINGS CROSSING & HILL				
Agency/Co.	CESO	Jurisdiction	CANAL WINCHESTER				
Date Performed	1/15/2020	East/West Street	HILL RD				
Analysis Year	2034	North/South Street	KINGS CROSSING				
Time Analyzed	BUILD PM PEAK HOUR	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	GREENGATE RESIDENTIAL DEV. TIS						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	1	0	0	0	1	1		0	0	0		1	0	1
Configuration		L	T				T	R						L		R
Volume (veh/h)		161	47				30	241						376		320
Percent Heavy Vehicles (%)		0												0		1
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized							No									No
Median Type   Storage							Undivided									

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		175												409		348
Capacity, c (veh/h)		1278												503		1044
v/c Ratio		0.14												0.81		0.33
95% Queue Length, Q <sub>95</sub> (veh)		0.5												7.8		1.5
Control Delay (s/veh)		8.3												36.2		10.2
Level of Service (LOS)		A												E		B
Approach Delay (s/veh)		6.4												24.2		
Approach LOS														C		

**APPENDIX G**  
**TURN LANE WARRANT FIGURES**

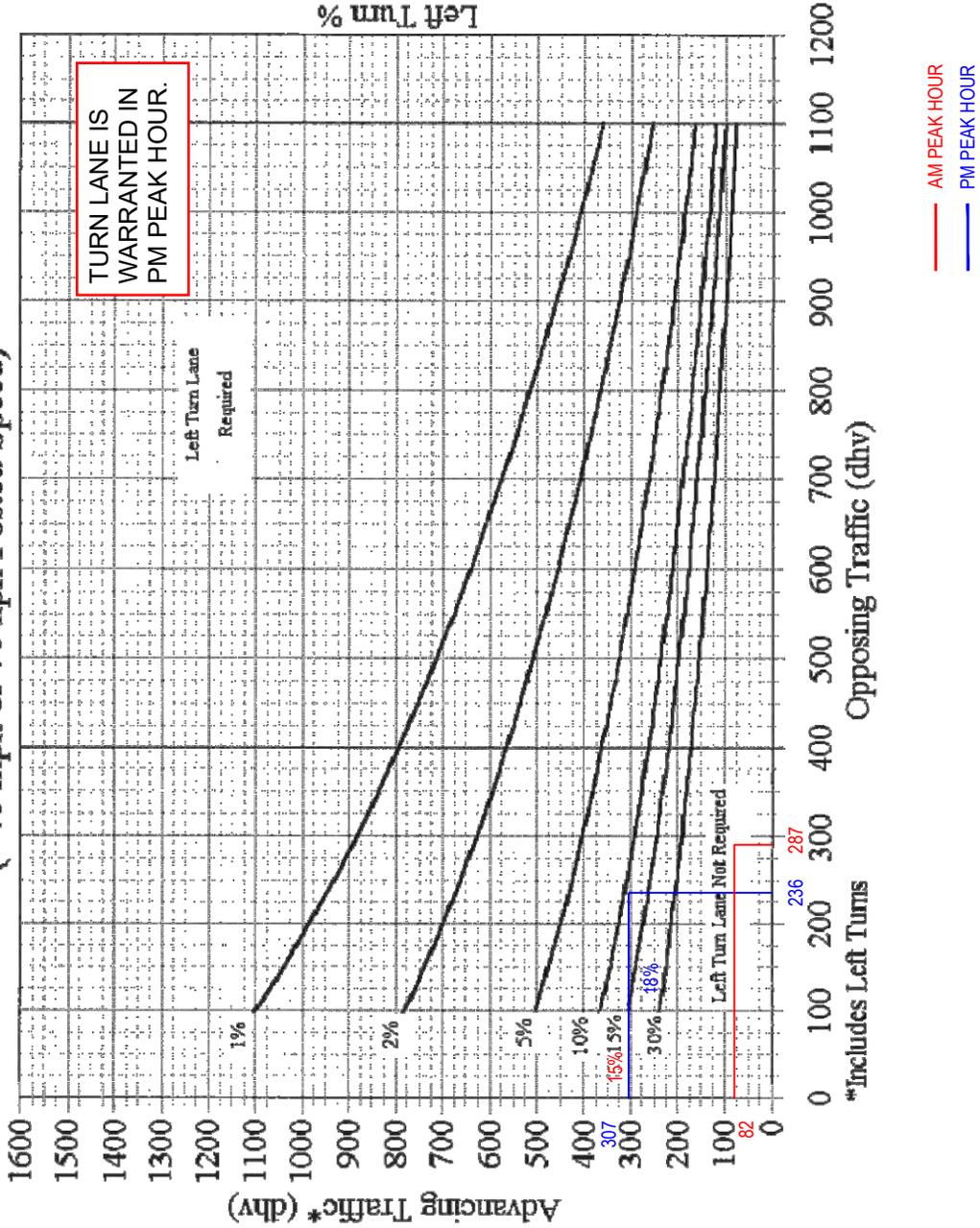
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2022 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

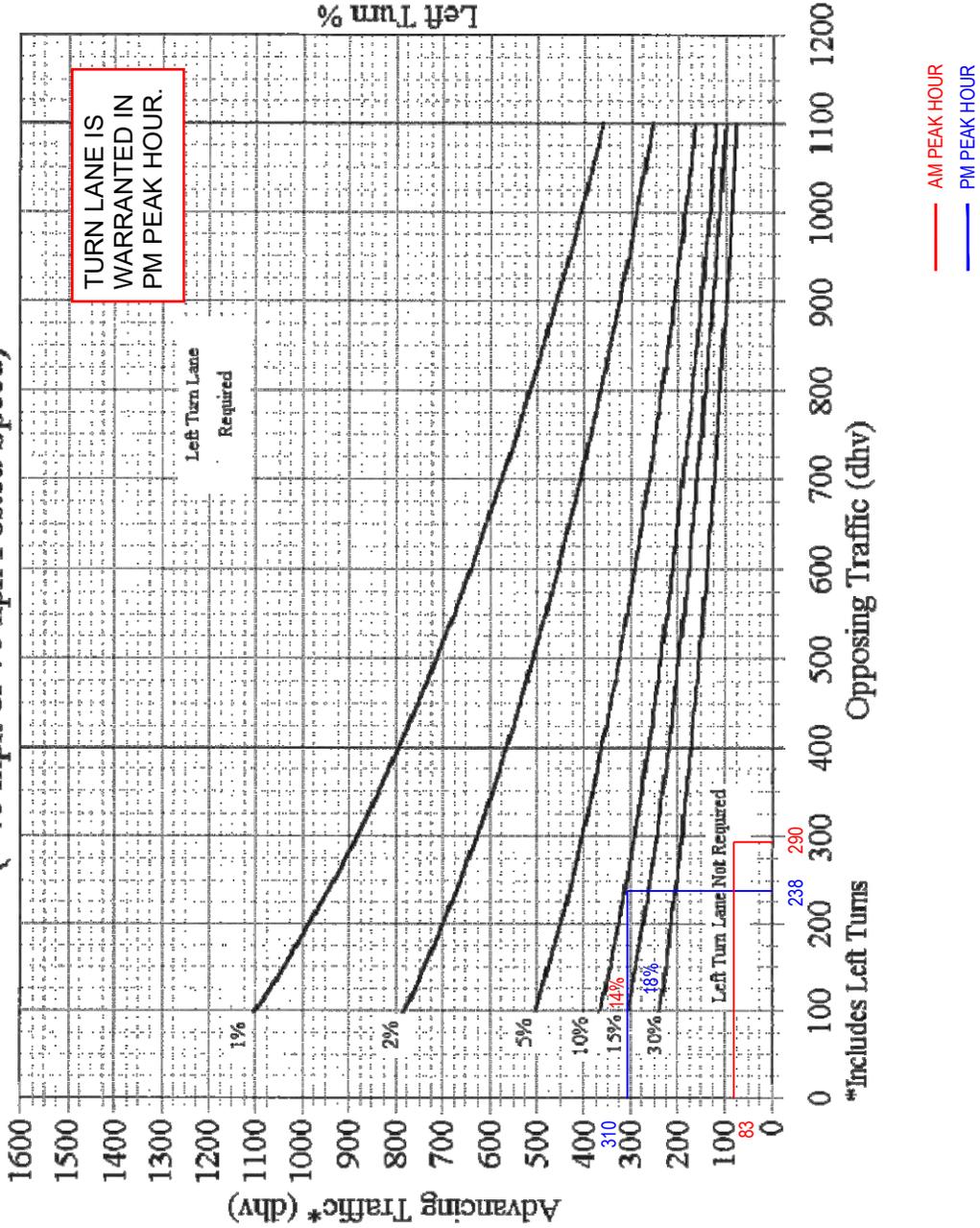
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2023 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

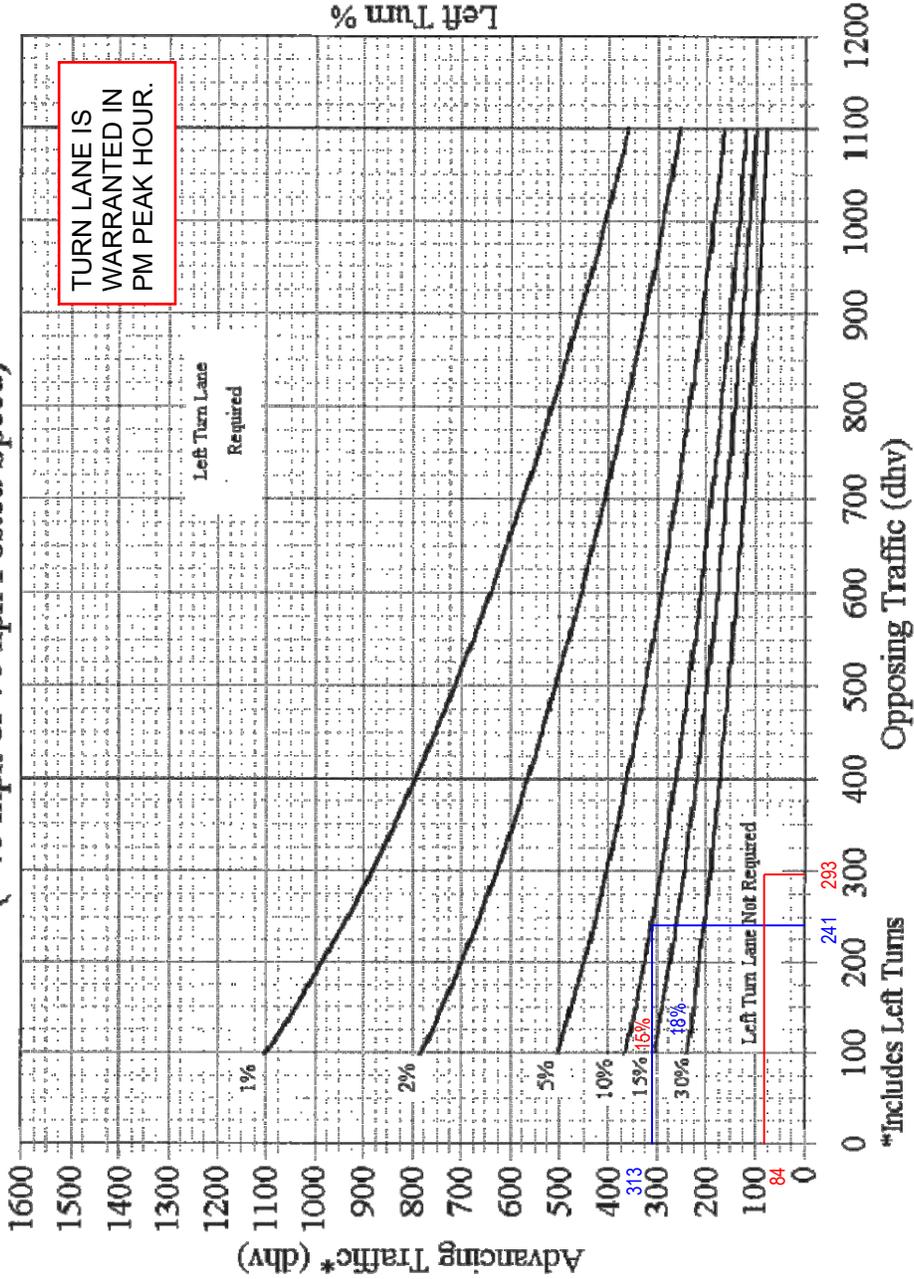
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2024 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



— AM PEAK HOUR  
— PM PEAK HOUR

Opposing Traffic (dhv)

\*Includes Left Turns

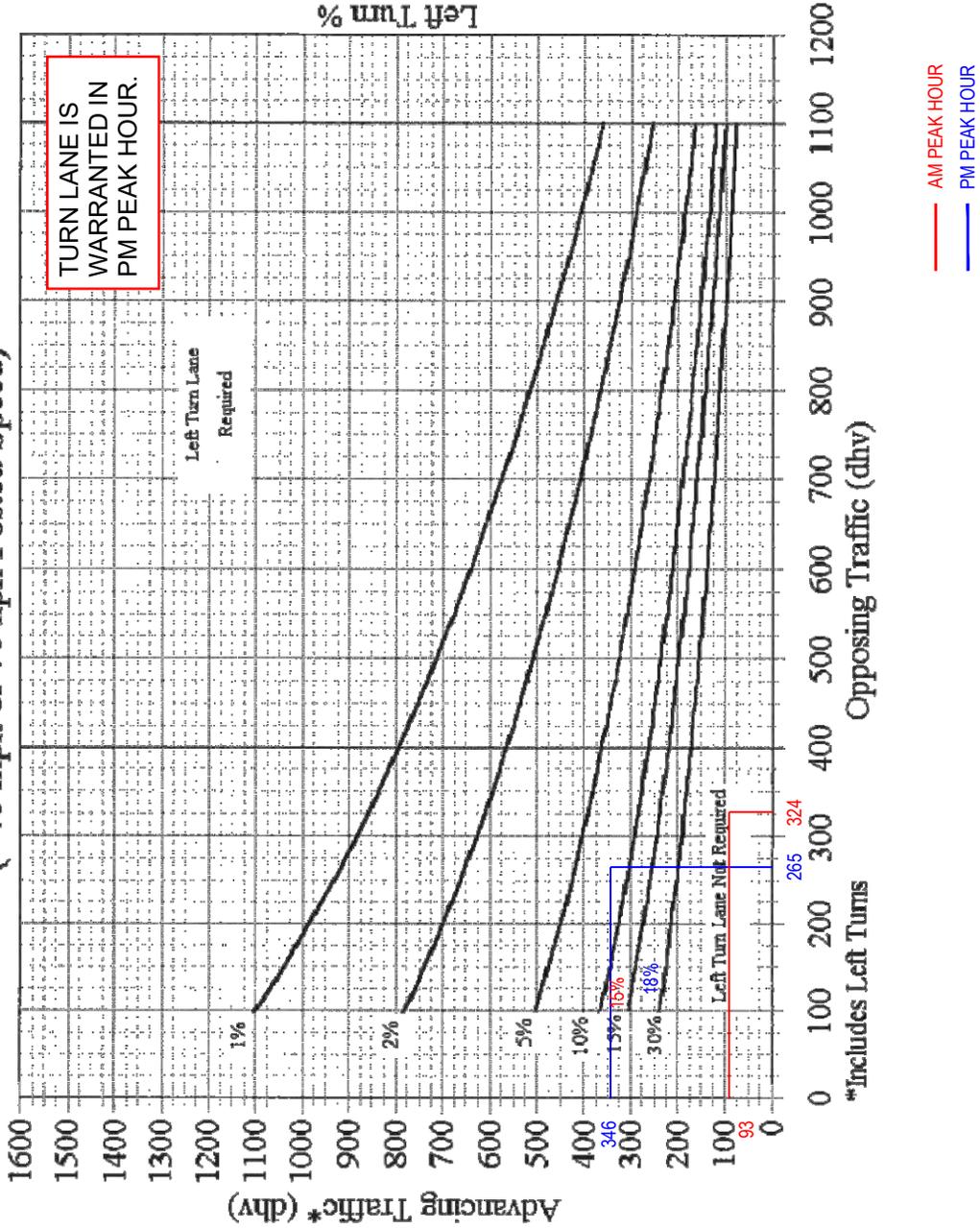
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2034 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

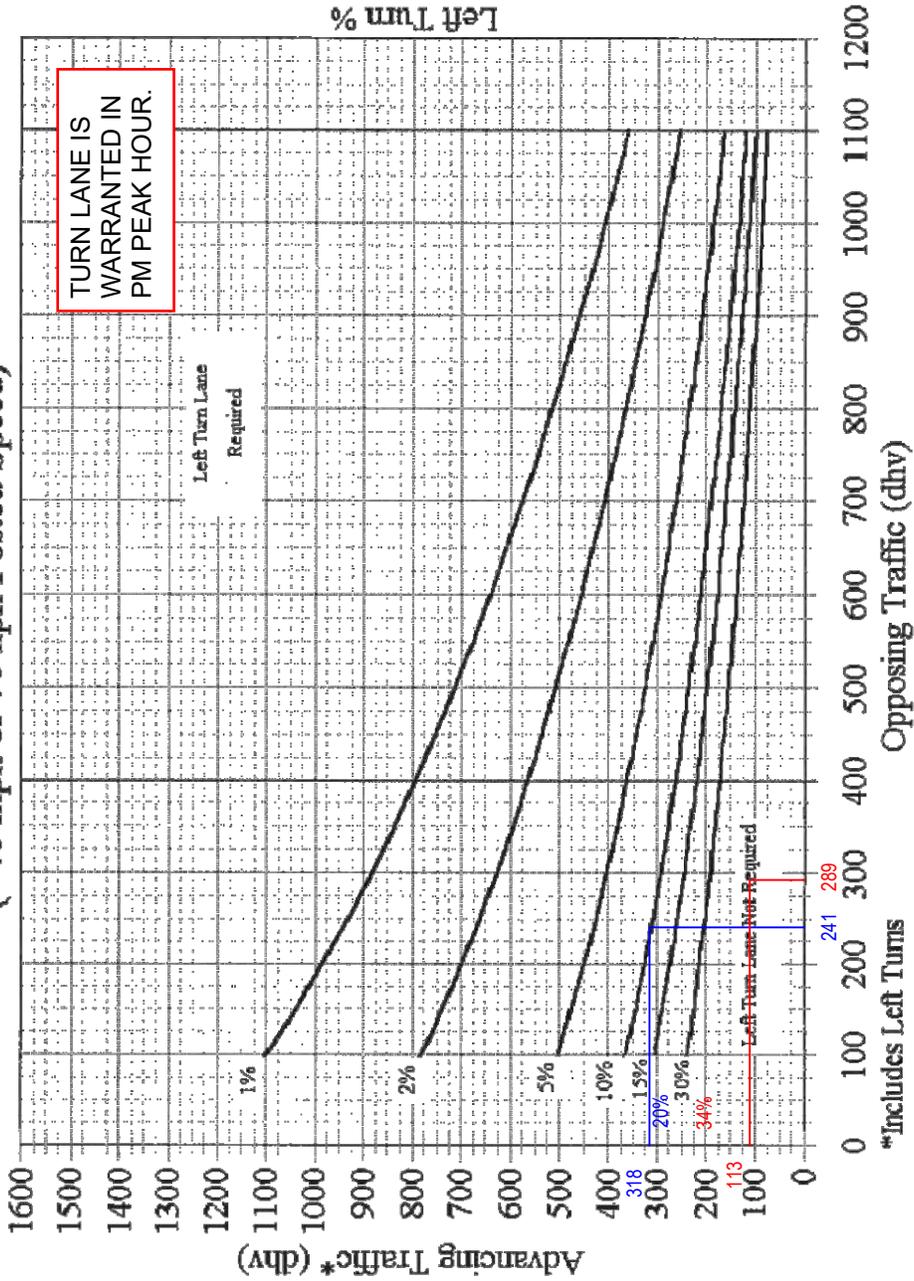
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2022 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

\*Includes Left Turns

Left Turn Lane Not Required

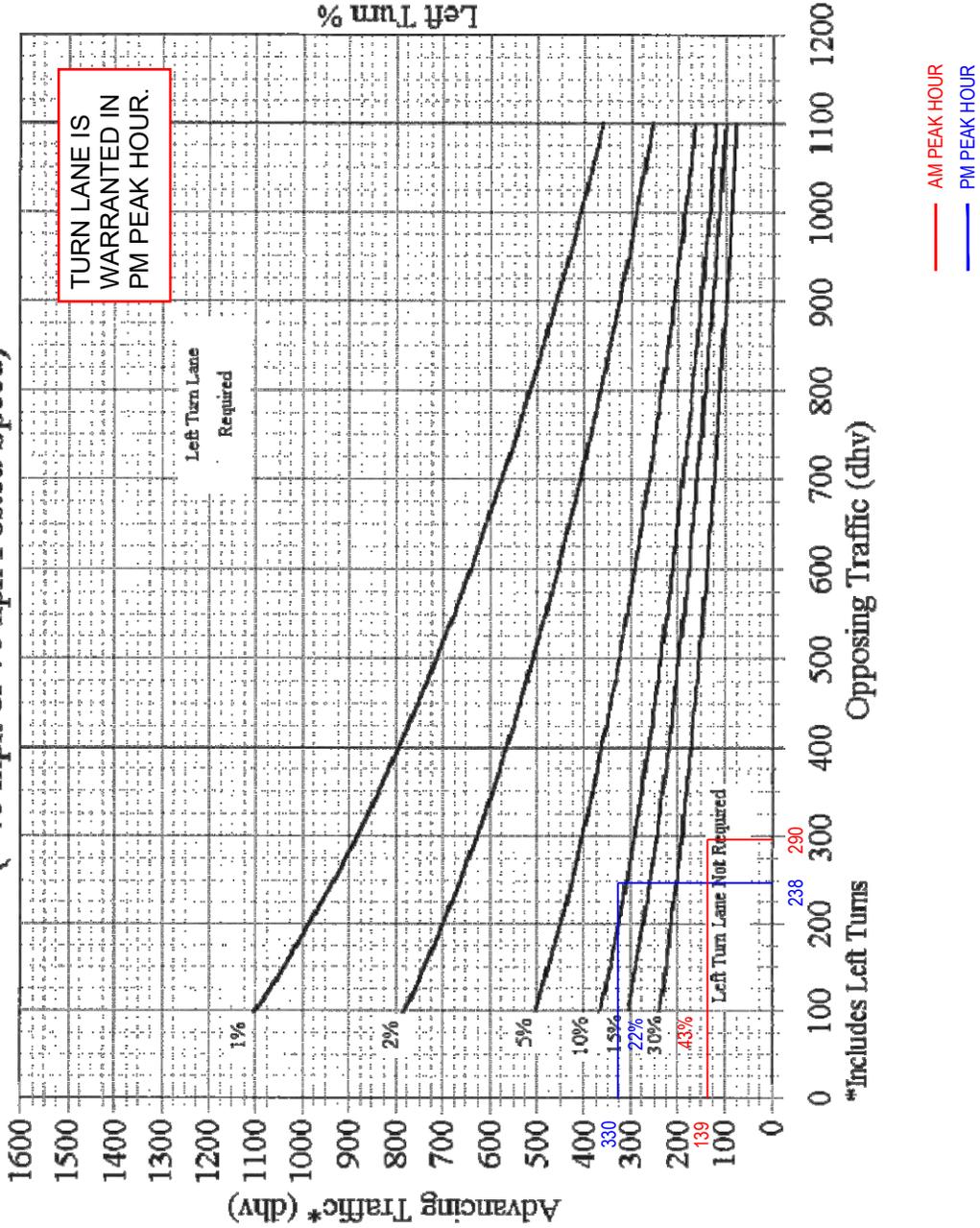
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2023 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

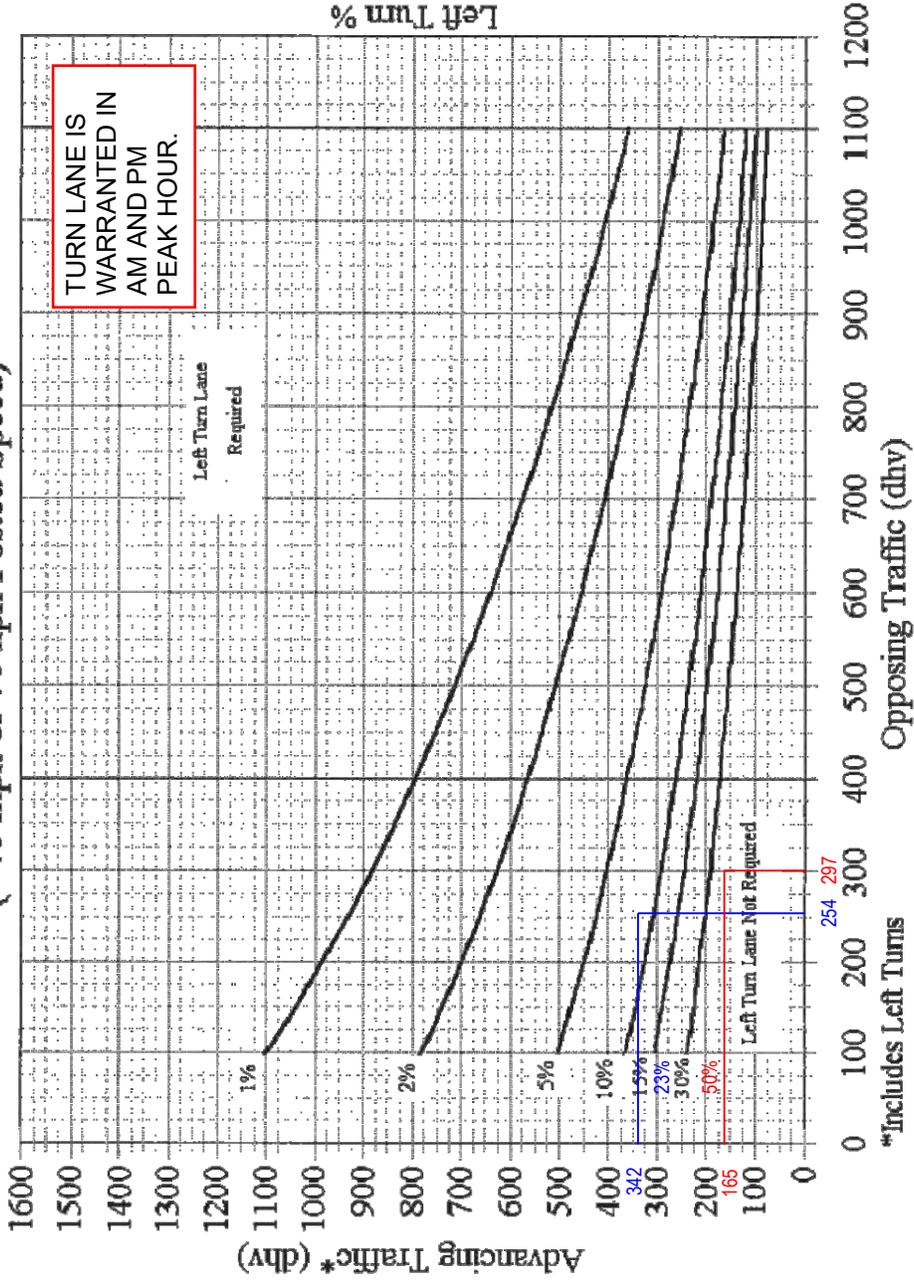
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2024 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



— AM PEAK HOUR  
— PM PEAK HOUR

\*Includes Left Turns

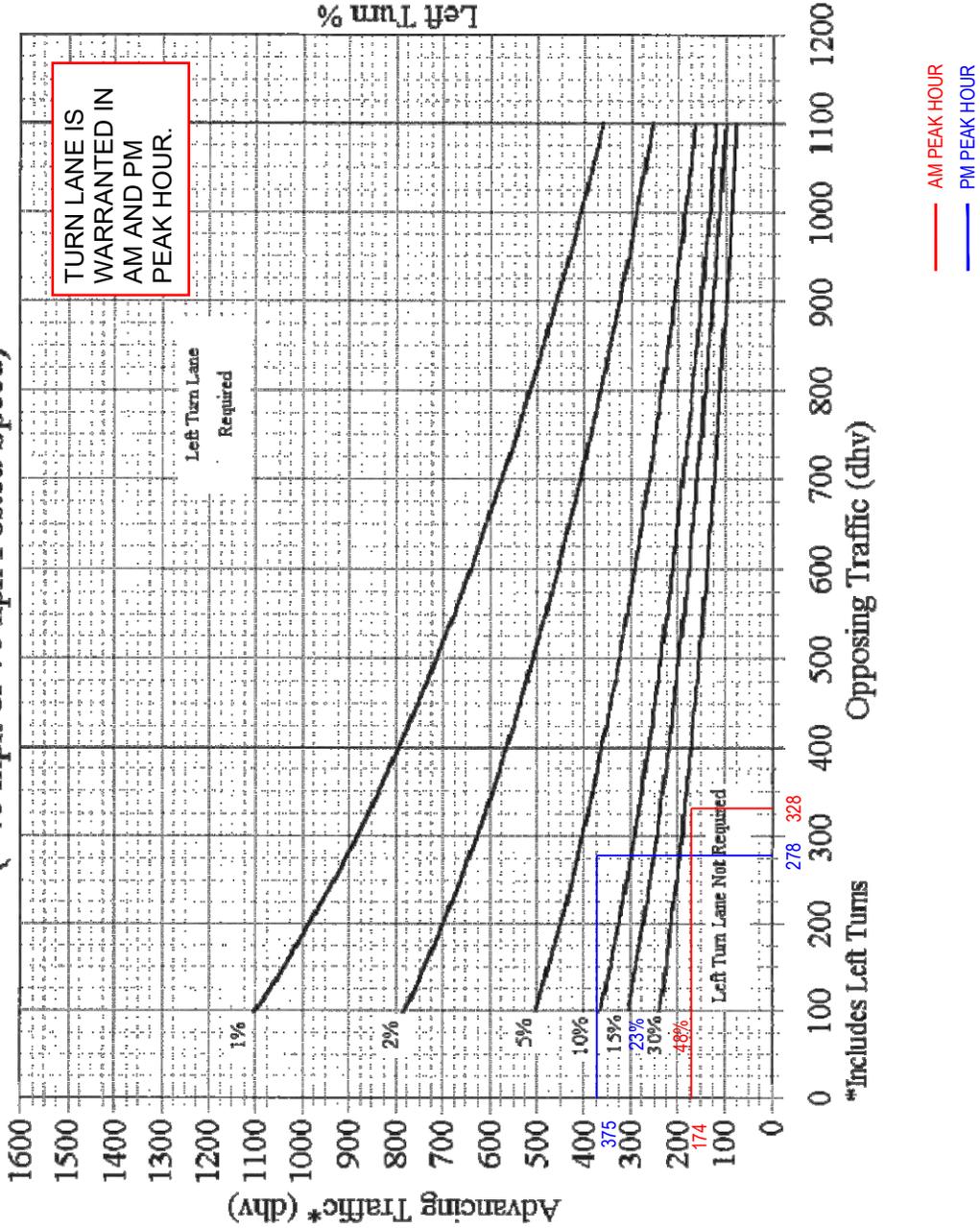
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND BUSEY ROAD - NBL  
2034 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

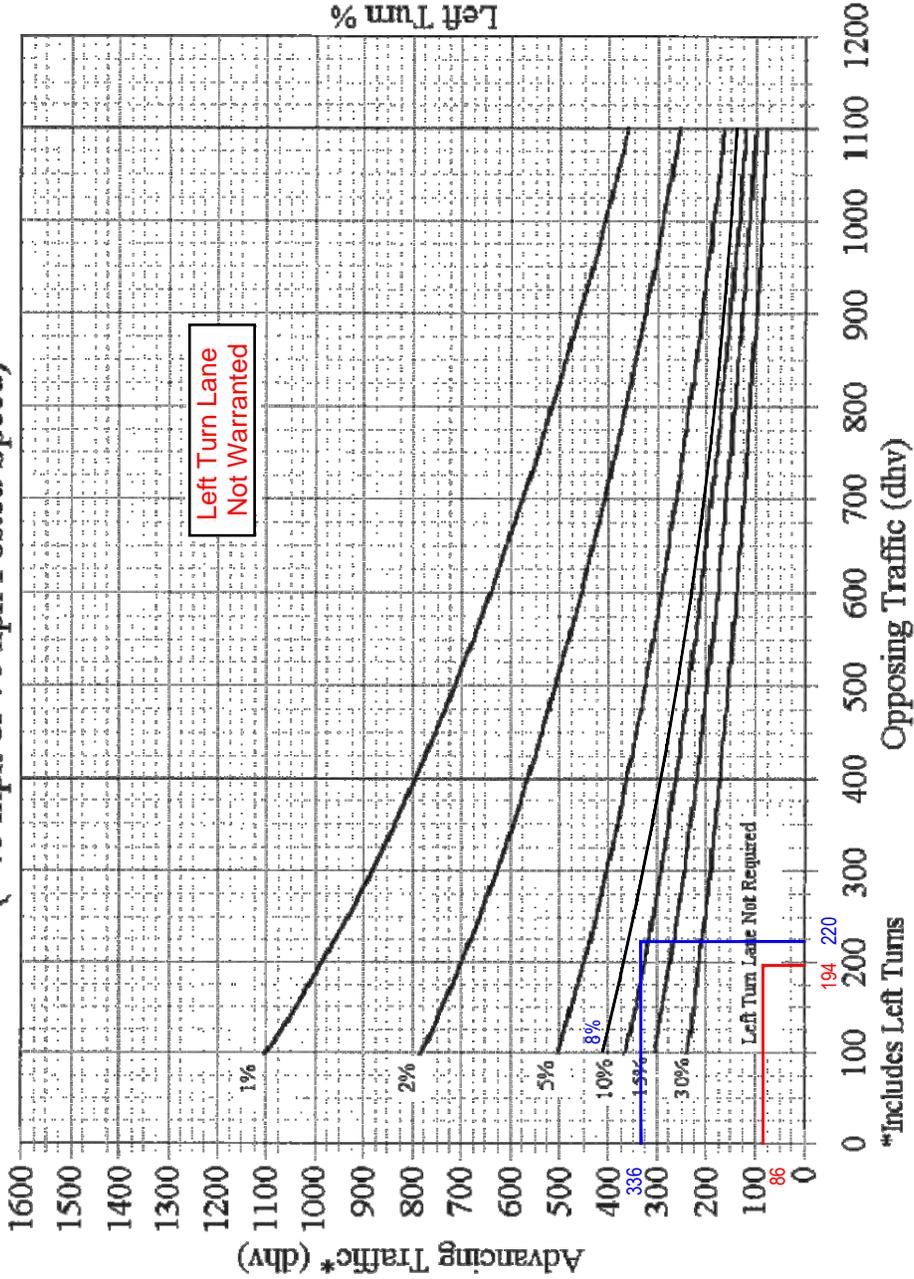
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND GREENGATE BOULEVARD - EBL  
2022 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



Advancing Traffic (AM/PM): 86/336  
Opposing Traffic (AM/PM): 194/220  
% Left-Turns (AM/PM): 4.7%/8.6%

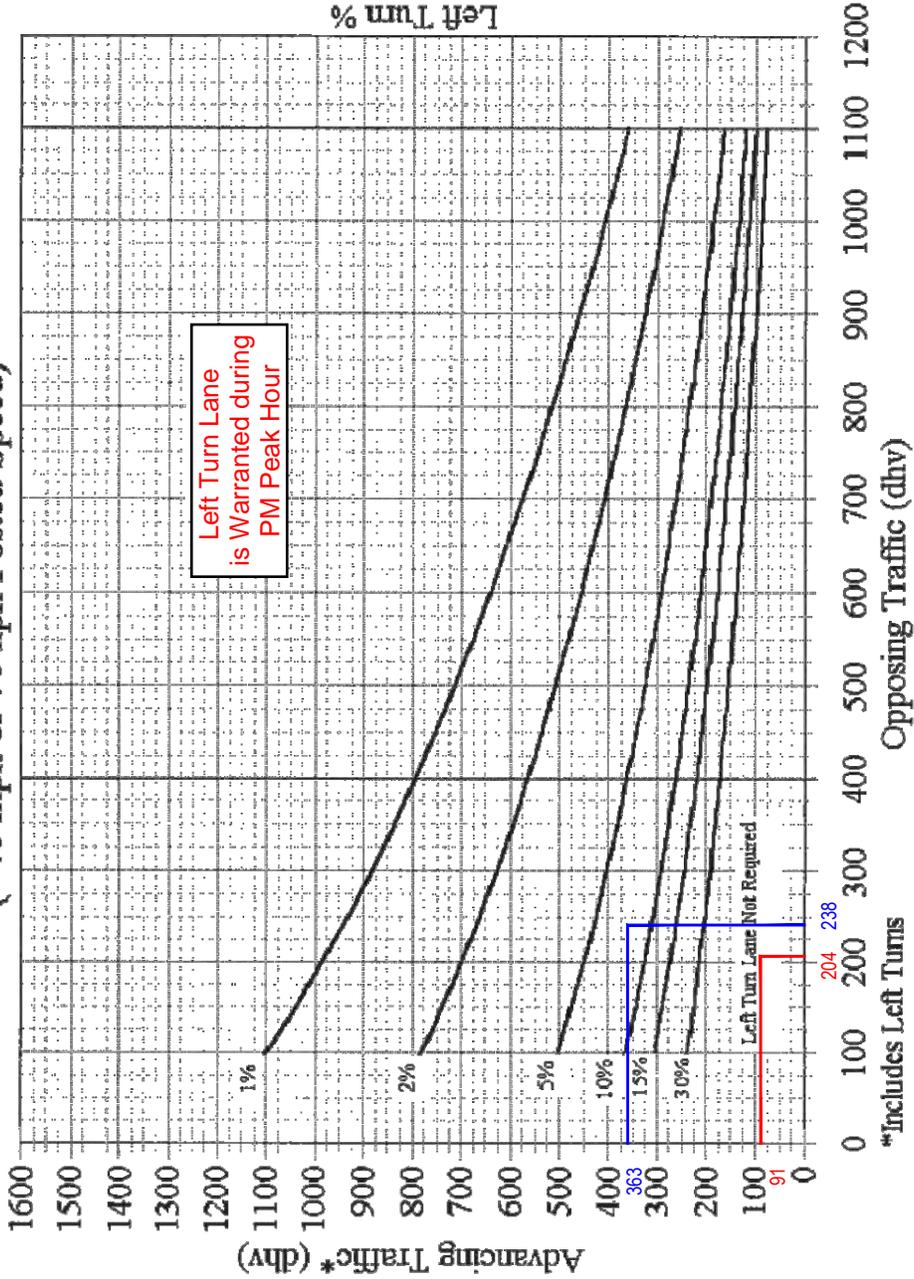
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND GREENGATE BOULEVARD - EBL  
2023 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



Advancing Traffic (AM/PM): 91/363  
 Opposing Traffic (AM/PM): 204/238  
 % Left-Turns (AM/PM): 8.8%/14.6%

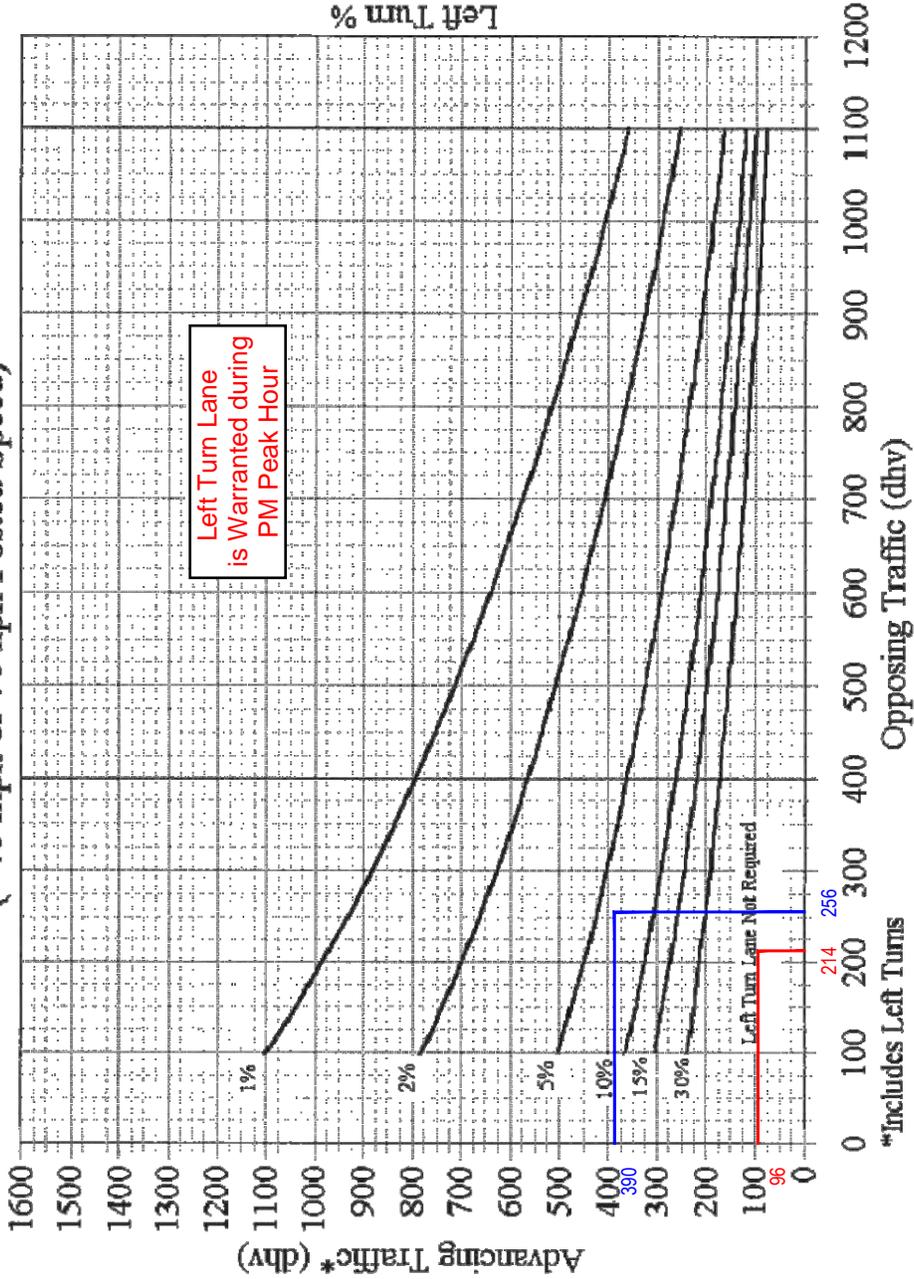
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND GREENGATE BOULEVARD - EBL  
2024 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



AM PEAK HOUR  
PM PEAK HOUR

Advancing Traffic (AM/PM): 96/390  
Opposing Traffic (AM/PM): 214/256  
% Left-Turns (AM/PM): 12.5%/19.7%

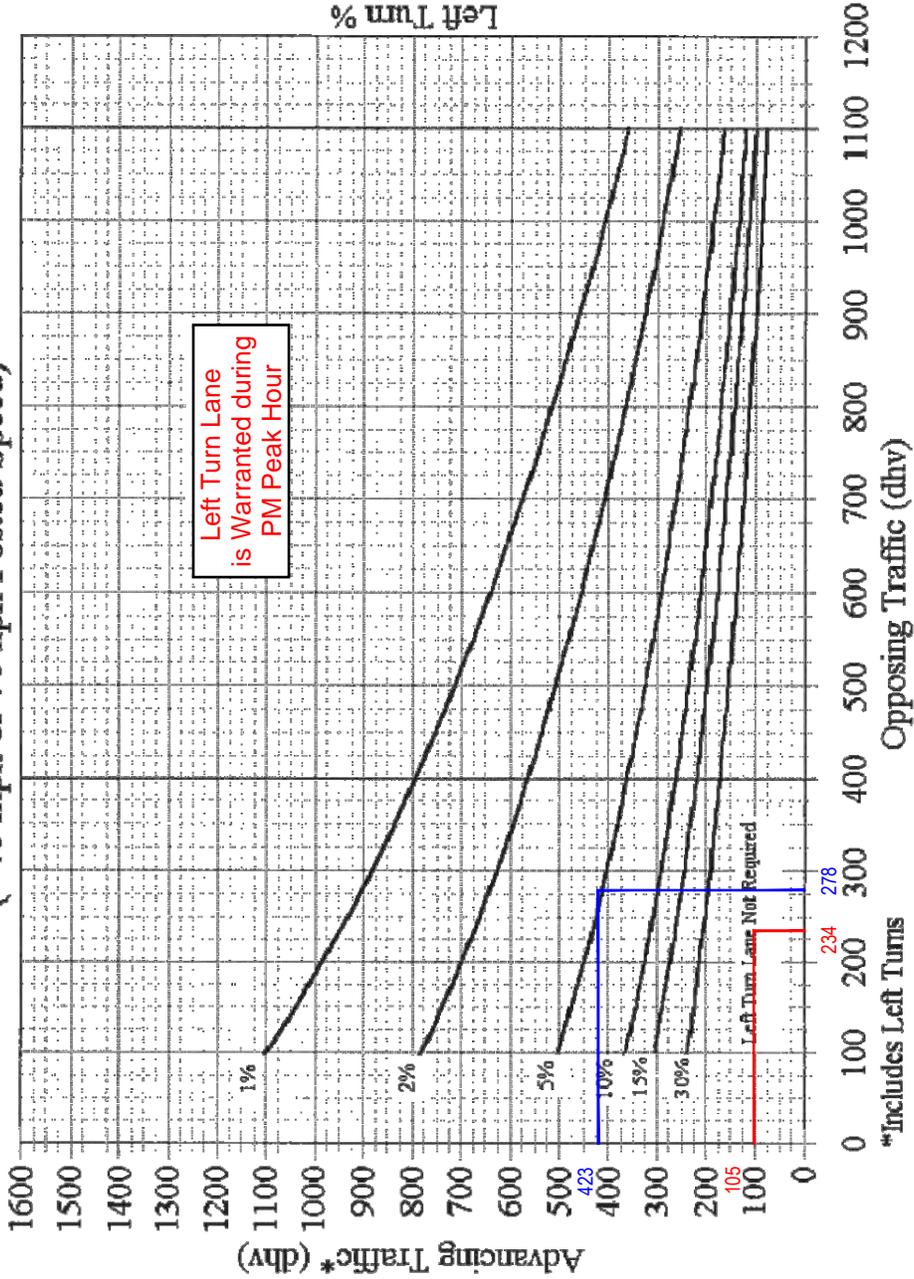
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND GREENGATE BOULEVARD - EBL  
2034 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



— AM PEAK HOUR  
— PM PEAK HOUR

Advancing Traffic (AM/PM): 105/423  
Opposing Traffic (AM/PM): 234/278  
% Left-Turns (AM/PM): 11.4%/18.2%

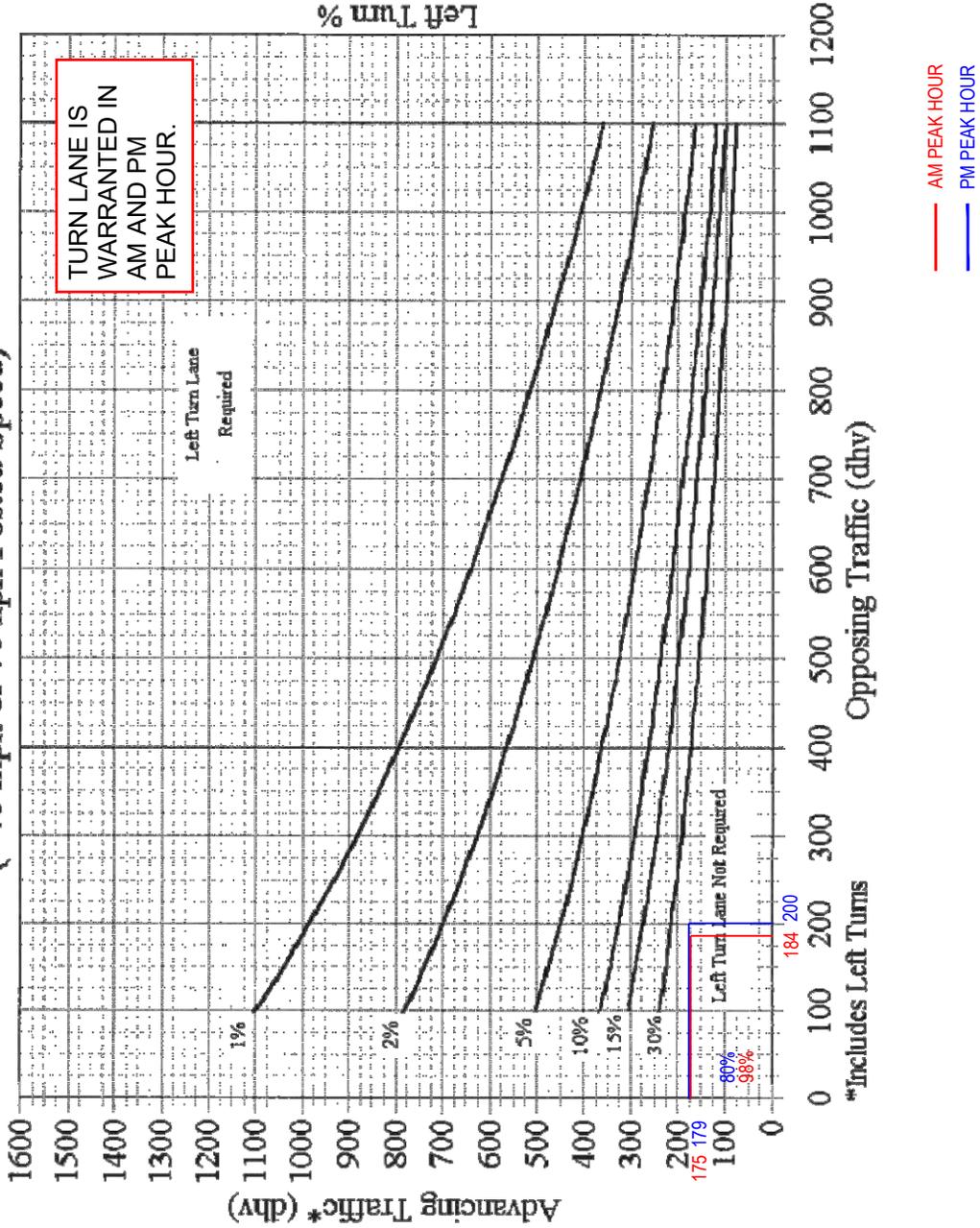
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2022 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

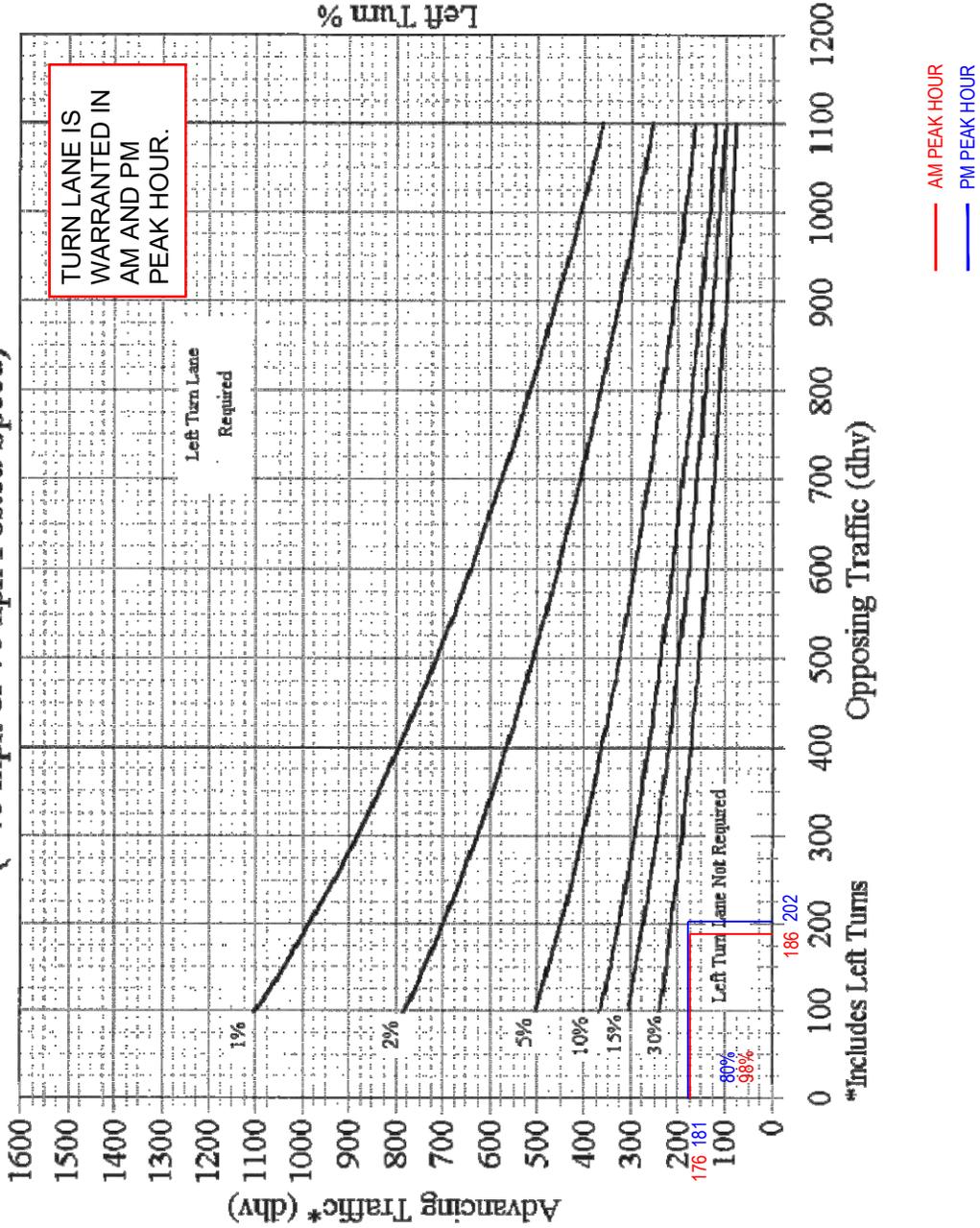
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2023 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

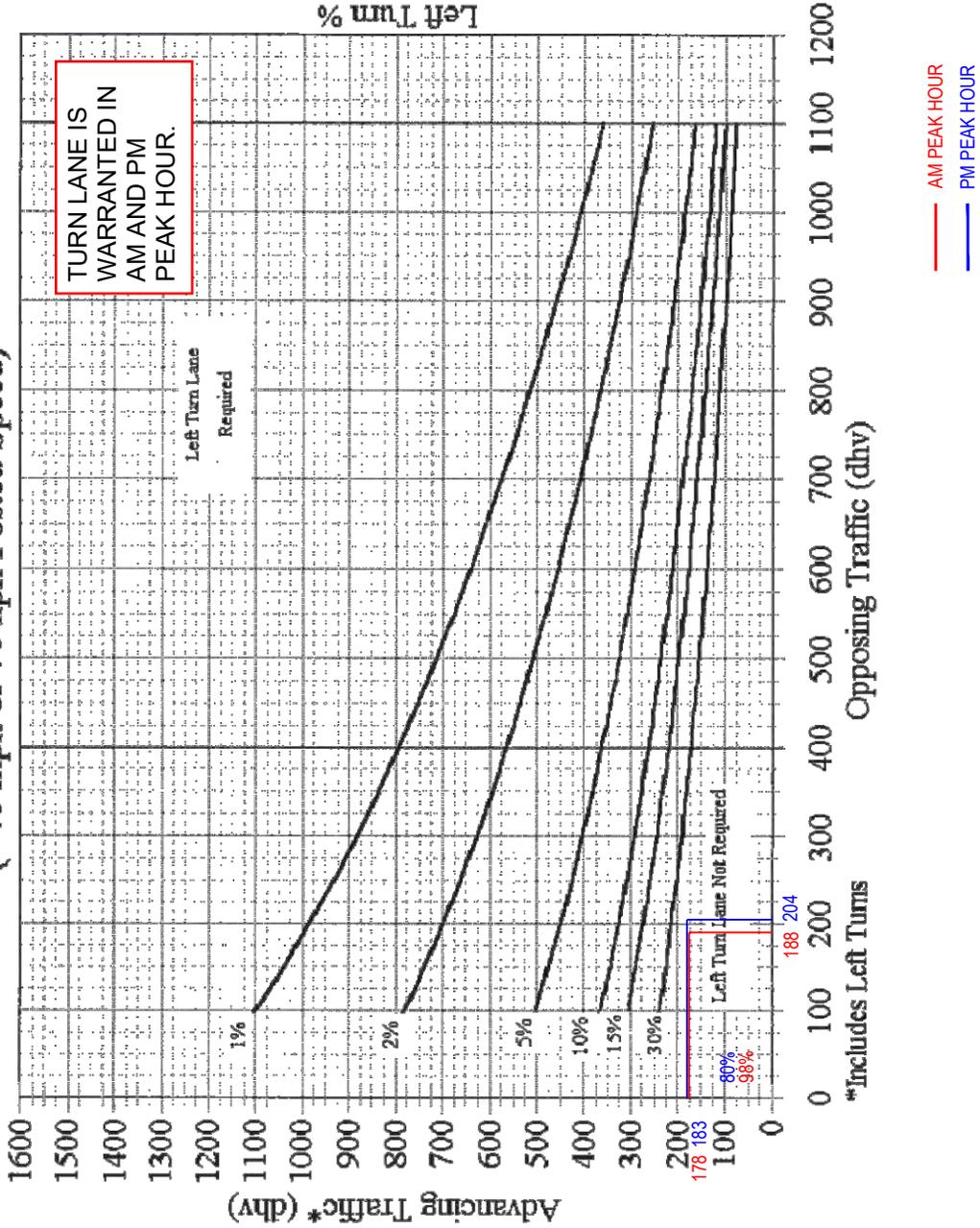
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2024 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

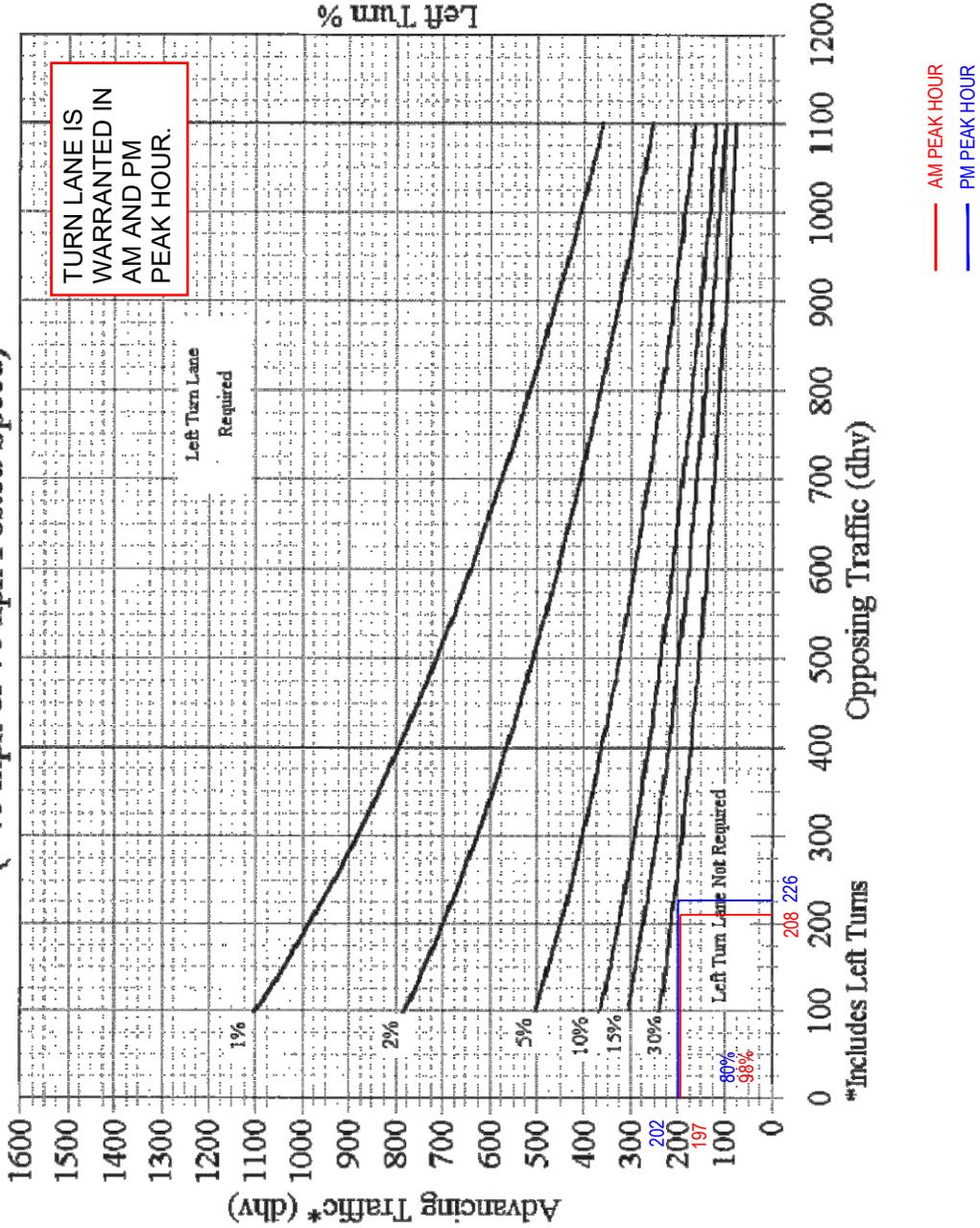
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2034 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



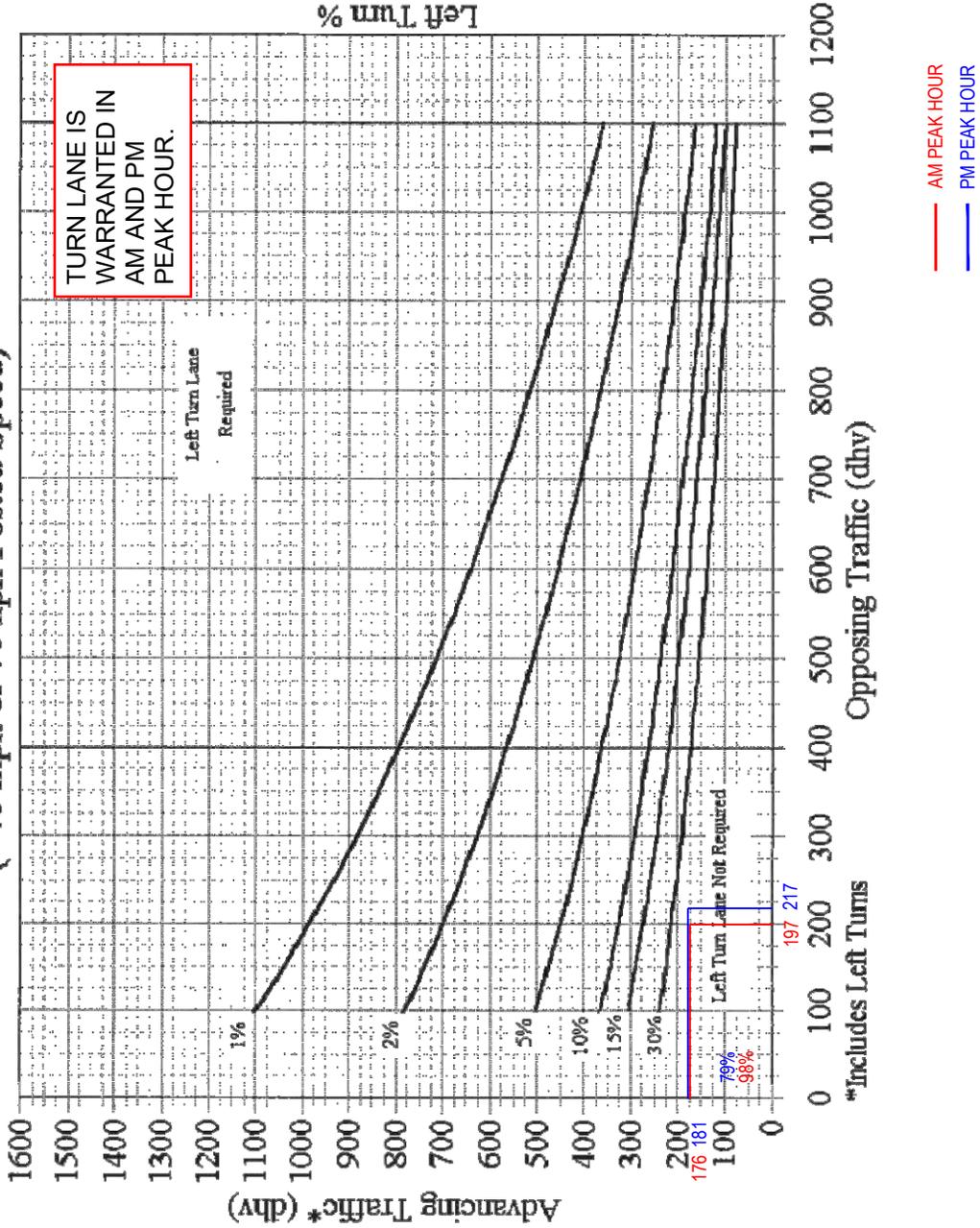
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2022 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

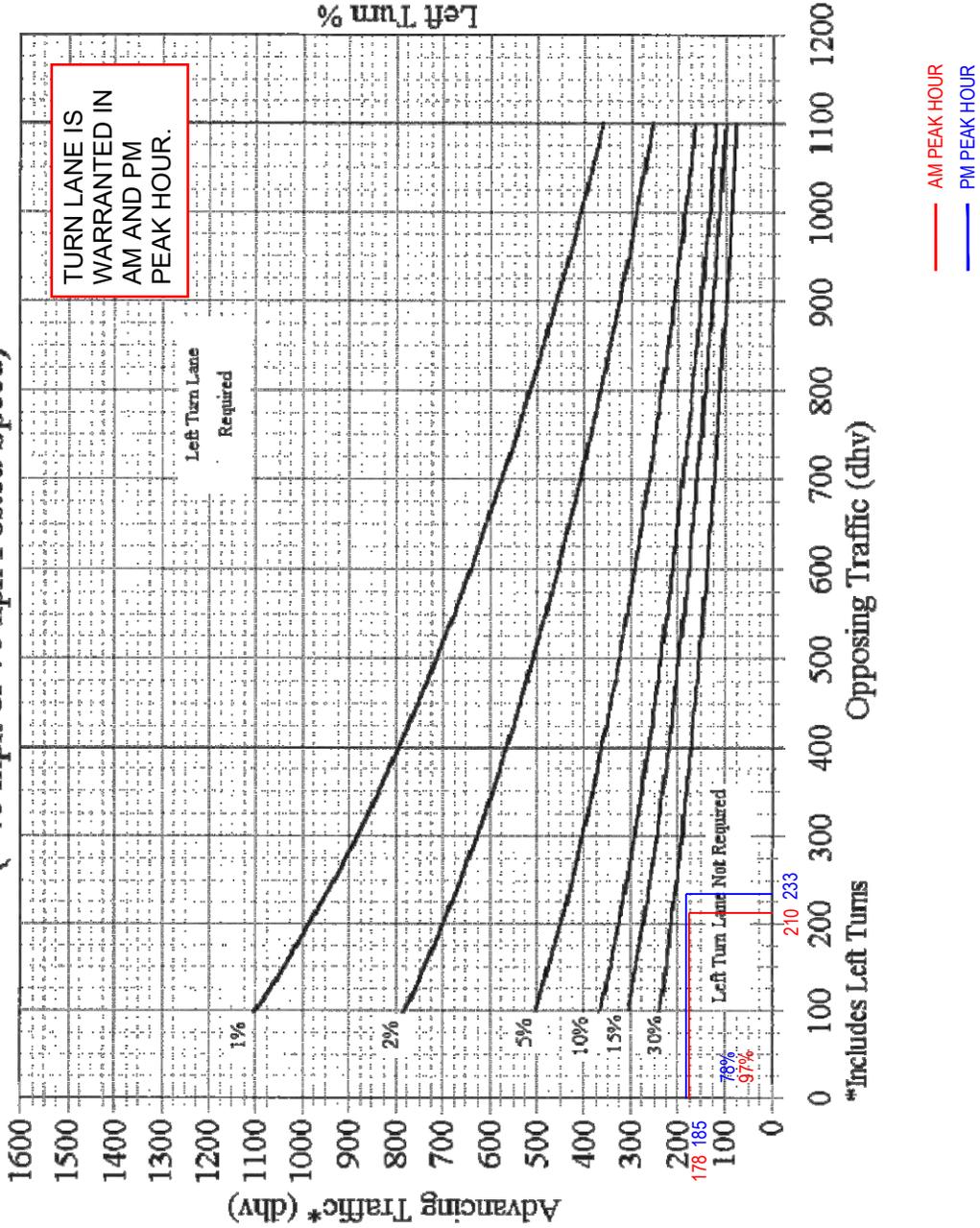
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2023 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

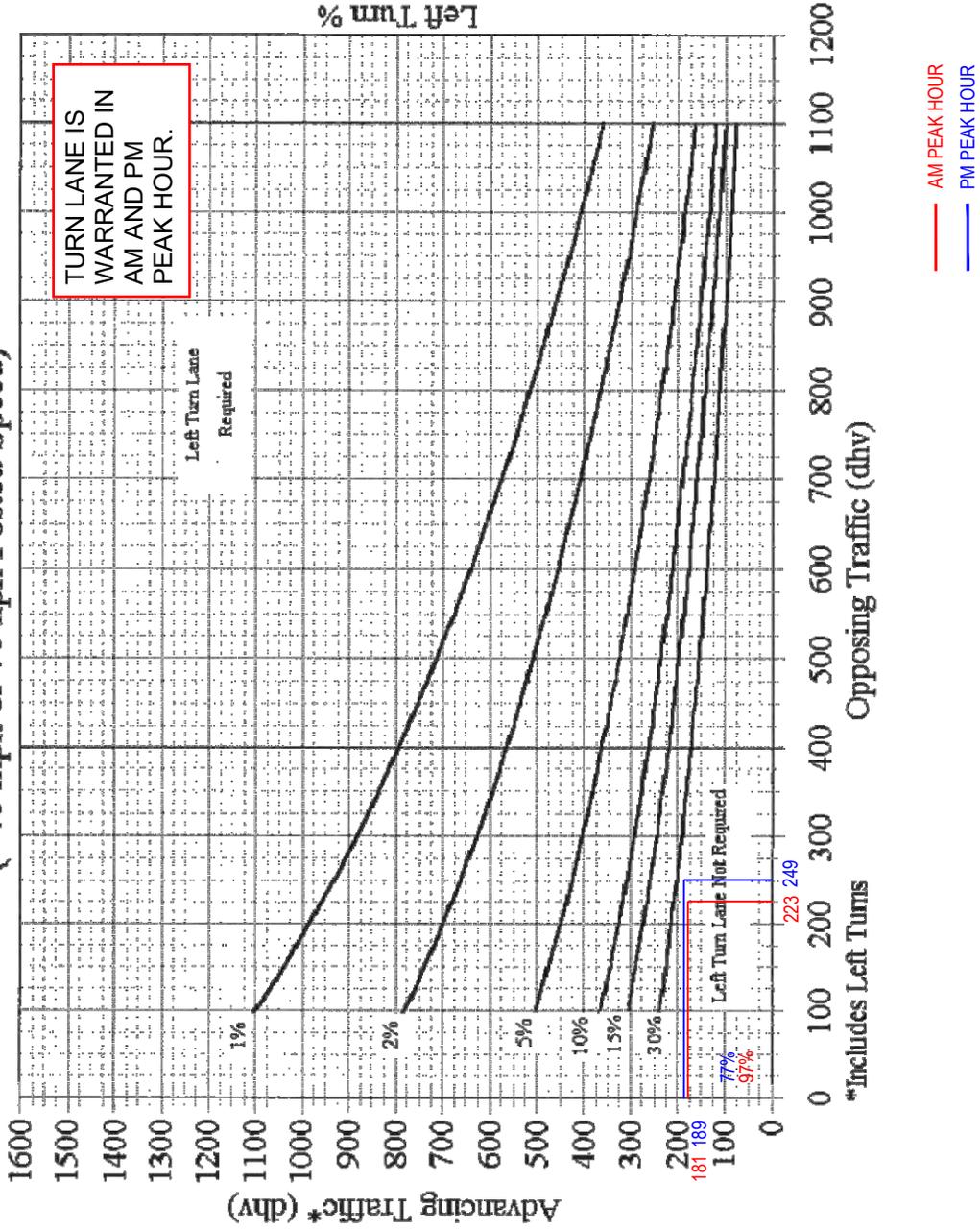
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2024 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



October 2004

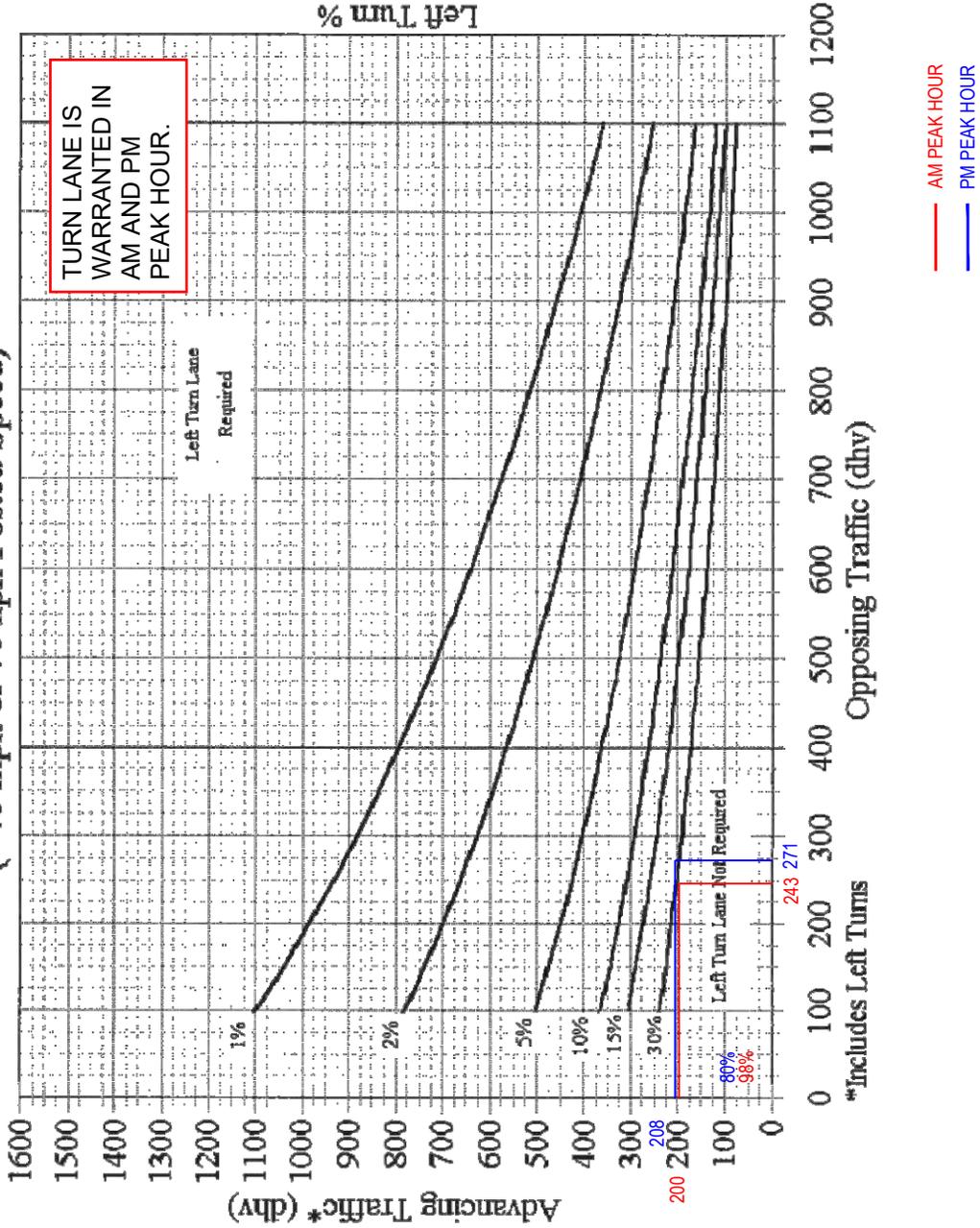
# 2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5bE

REFERENCE SECTION  
401.6.1

HILL ROAD AND KINGS CROSSING - EBL  
2034 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)

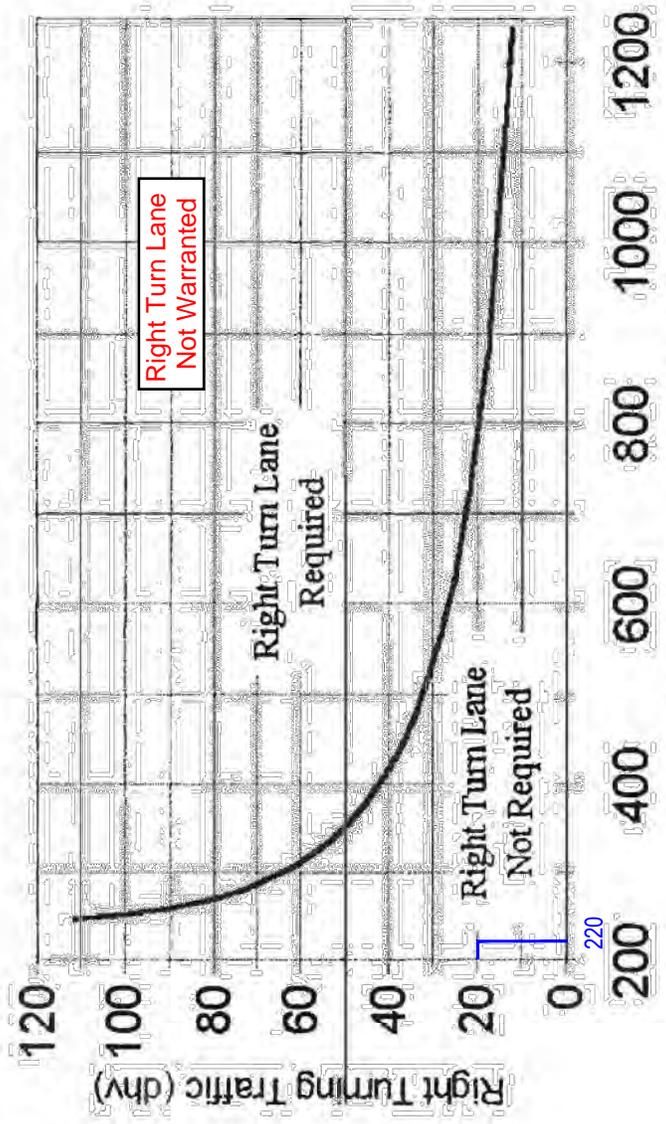


October 2004

HILL ROAD AND GREENGATE BOULEVARD - WBR  
2022 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

Advancing Traffic (AM/PM): 194/220  
Right-Turn (AM/PM): 10/20

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6b

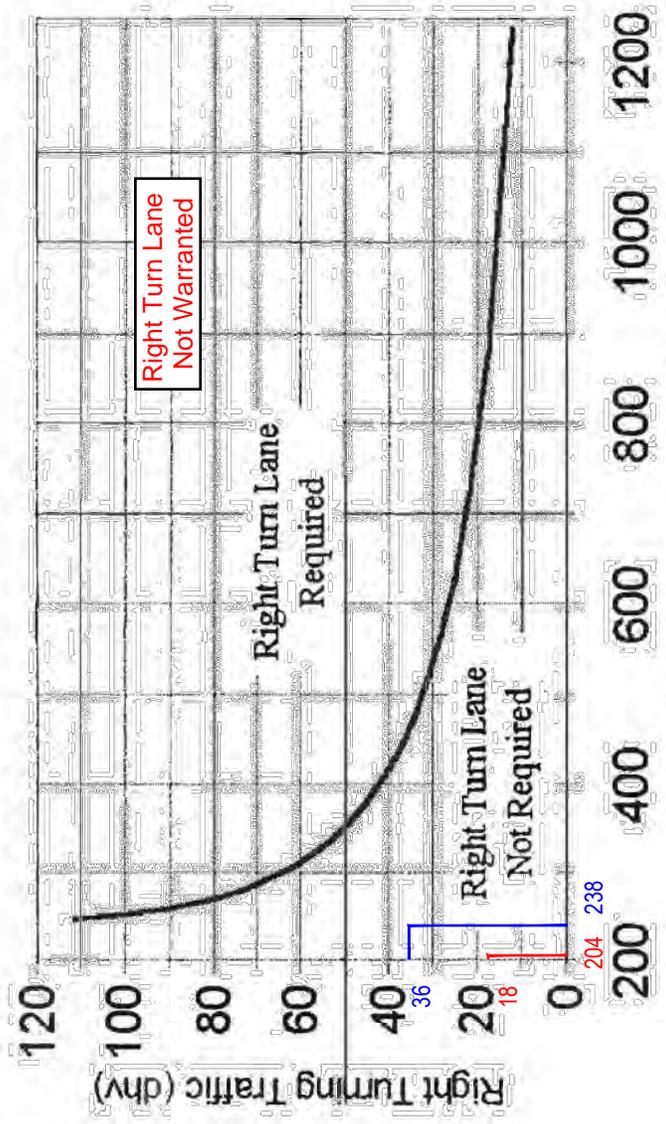
REFERENCE SECTION  
401.6.3

HILL ROAD AND GREENGATE BOULEVARD - WBR  
2023 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

<h1>2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)</h1>	401-6b
	REFERENCE SECTION 401.6.3



Right Turn Lane  
Not Warranted

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

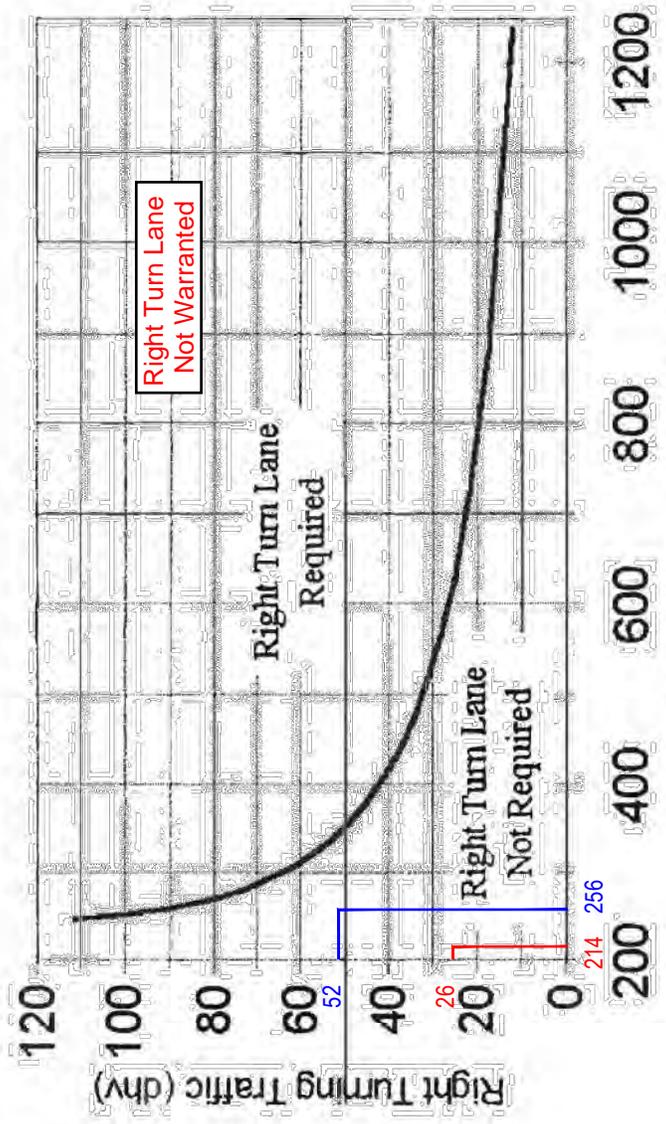
Advancing Traffic (AM/PM): 204/238  
Right-Turn (AM/PM): 18/36

HILL ROAD AND GREENGATE BOULEVARD - WBR  
2024 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

<h1>2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)</h1>	401-6b
	REFERENCE SECTION 401.6.3



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

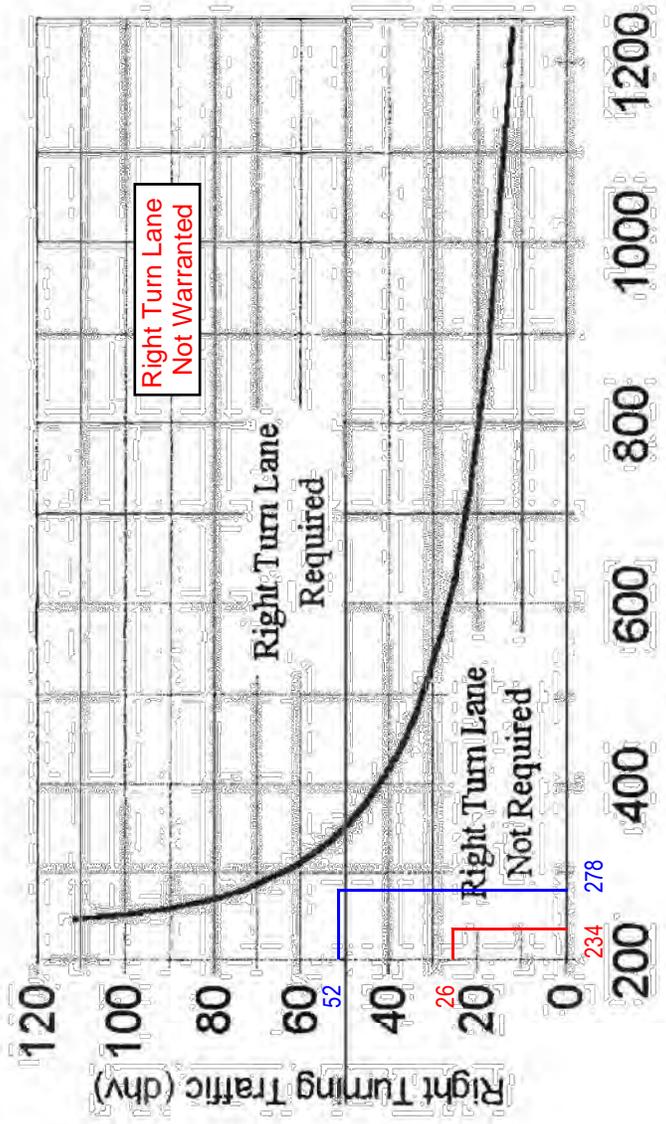
Advancing Traffic (AM/PM): 214/256  
Right-Turn (AM/PM): 26/52

HILL ROAD AND GREENGATE BOULEVARD - WBR  
2034 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

<h1>2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)</h1>	401-6b
	REFERENCE SECTION 401.6.3



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

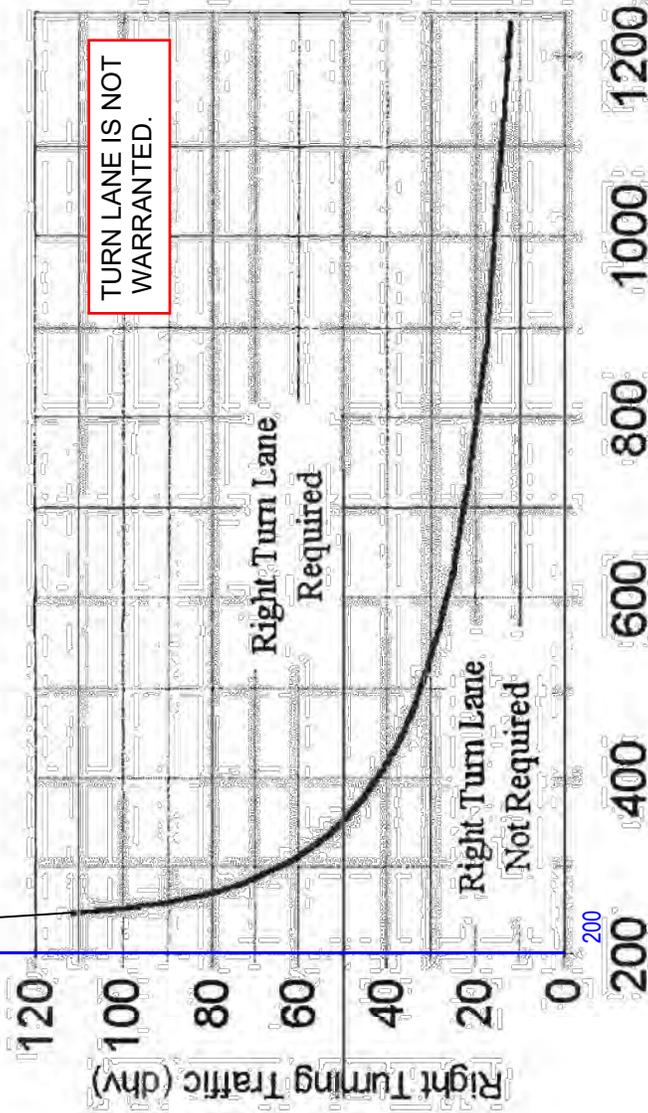
Advancing Traffic (AM/PM): 234/278  
Right-Turn (AM/PM): 26/52

HILL ROAD AND KINGS CROSSING - WBR  
2022 NO-BUILD TRAFFIC SCENARIO

177

### 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

## 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

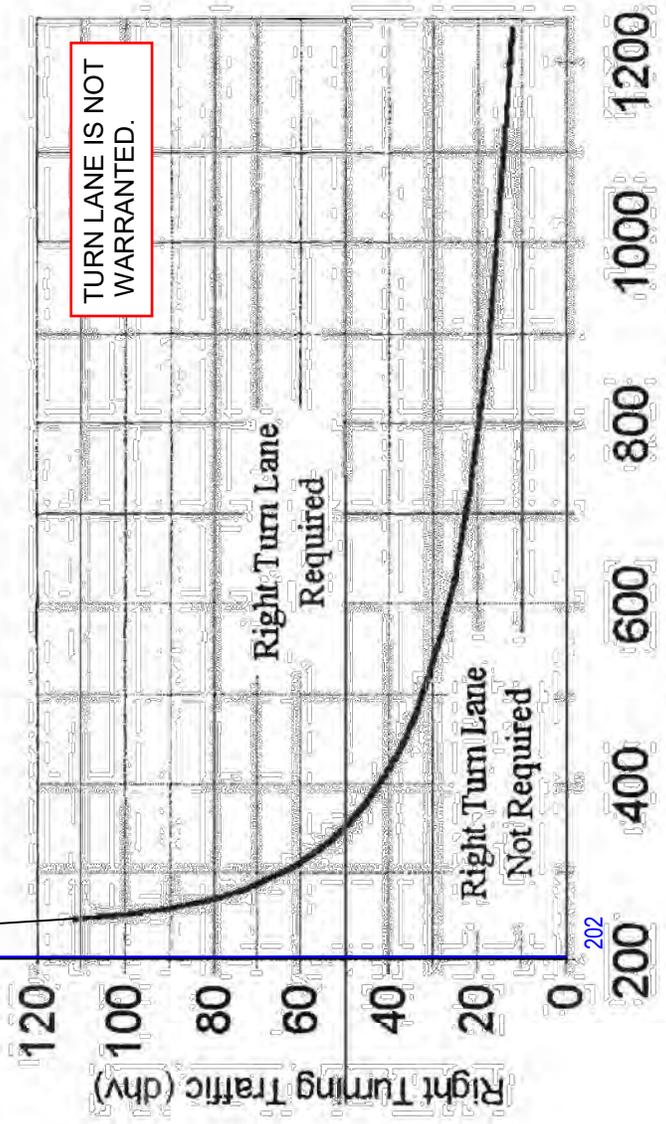
401-6b

REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2023 NO-BUILD TRAFFIC SCENARIO

179

### 2-Lane Highway Right Turn Lane Warrant > 40 mph or 70 kph Posted Speed



TURN LANE IS NOT WARRANTED.

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

## 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6b

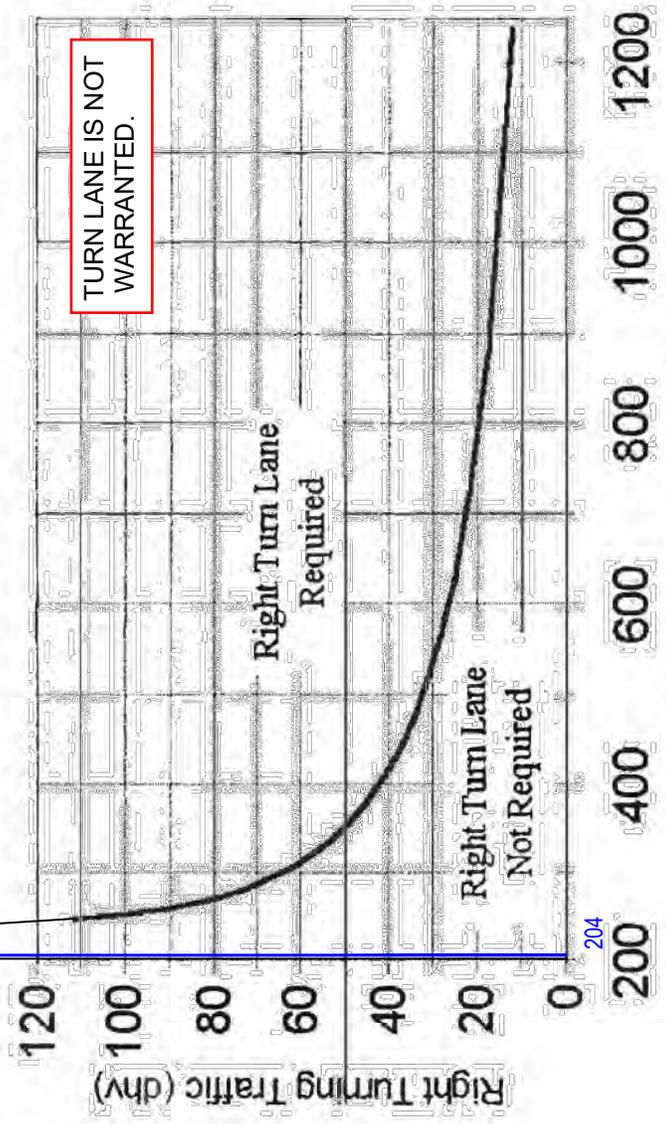
REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2024 NO-BUILD TRAFFIC SCENARIO

### 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

181



TURN LANE IS NOT WARRANTED.

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

## 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6b

REFERENCE SECTION  
401.6.3

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

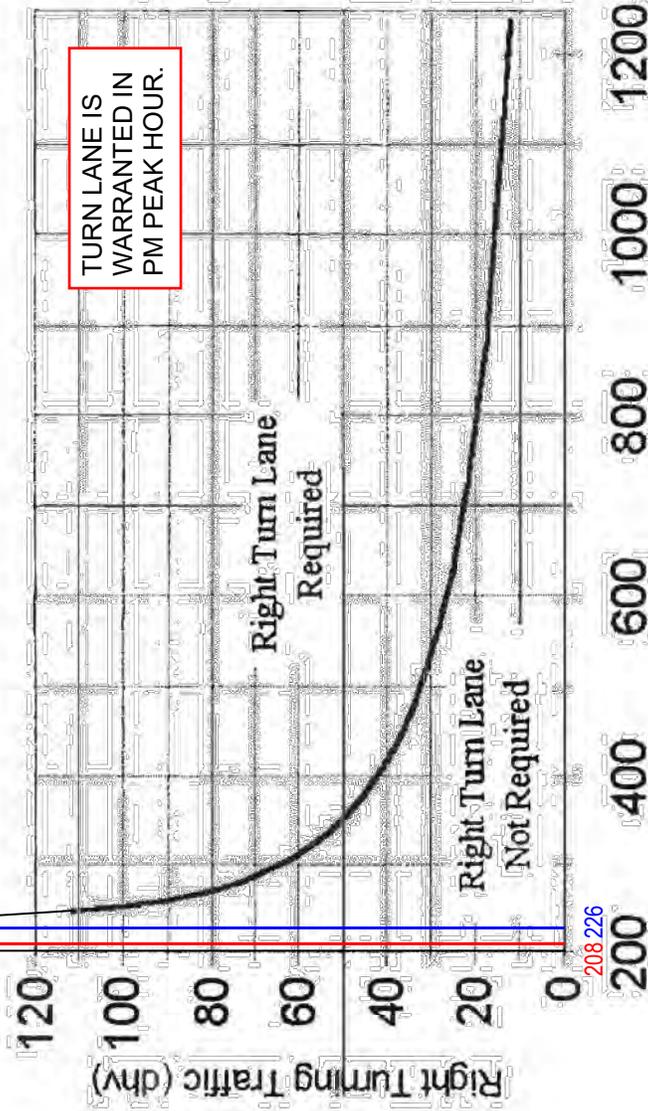
401-6b

REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2034 NO-BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

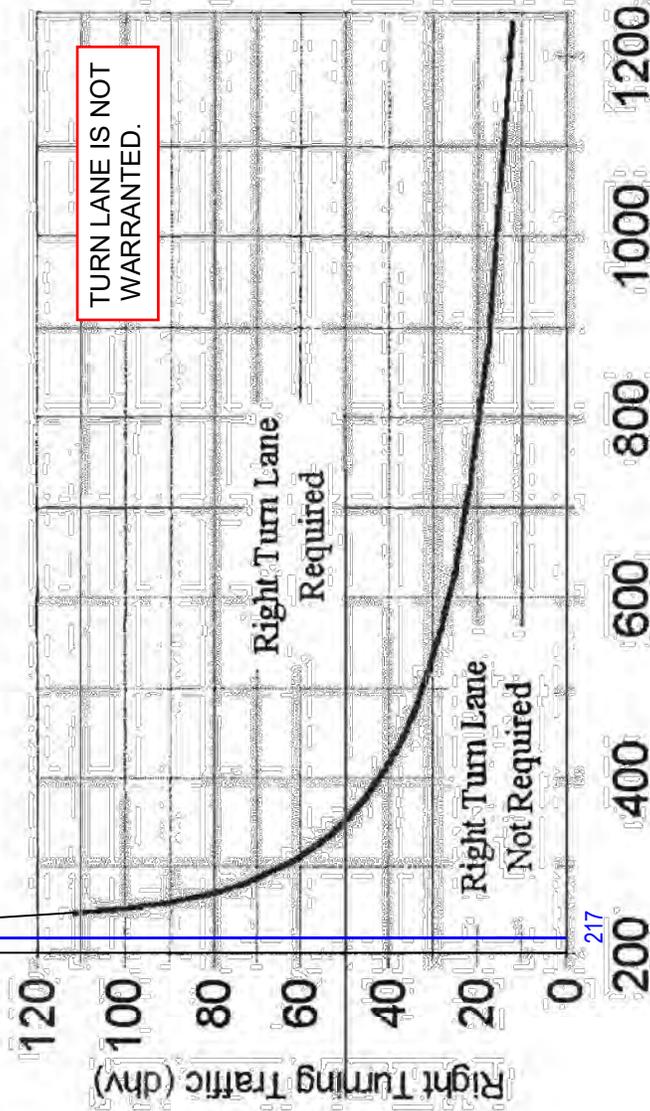
401-6b

REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2022 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



TURN LANE IS NOT WARRANTED.

Right Turn Lane Required

Right Turn Lane Not Required

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

192

217

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

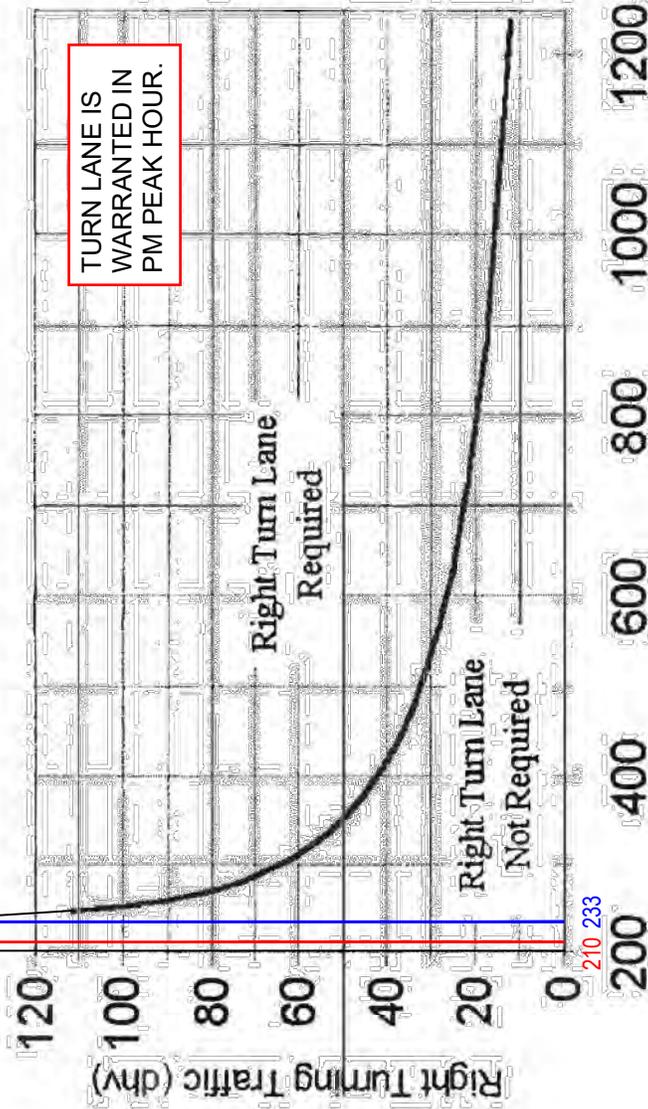
401-6b

REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2023 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



TURN LANE IS WARRANTED IN PM PEAK HOUR.

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

207  
205

210 233

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6b

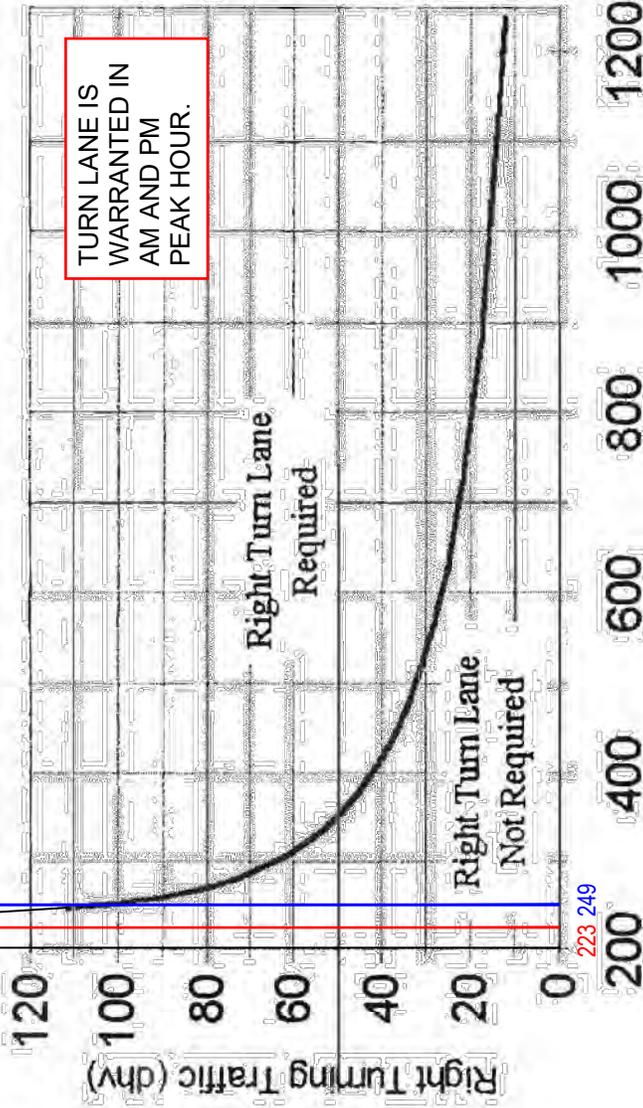
REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2024 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

222  
216



Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

# 2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

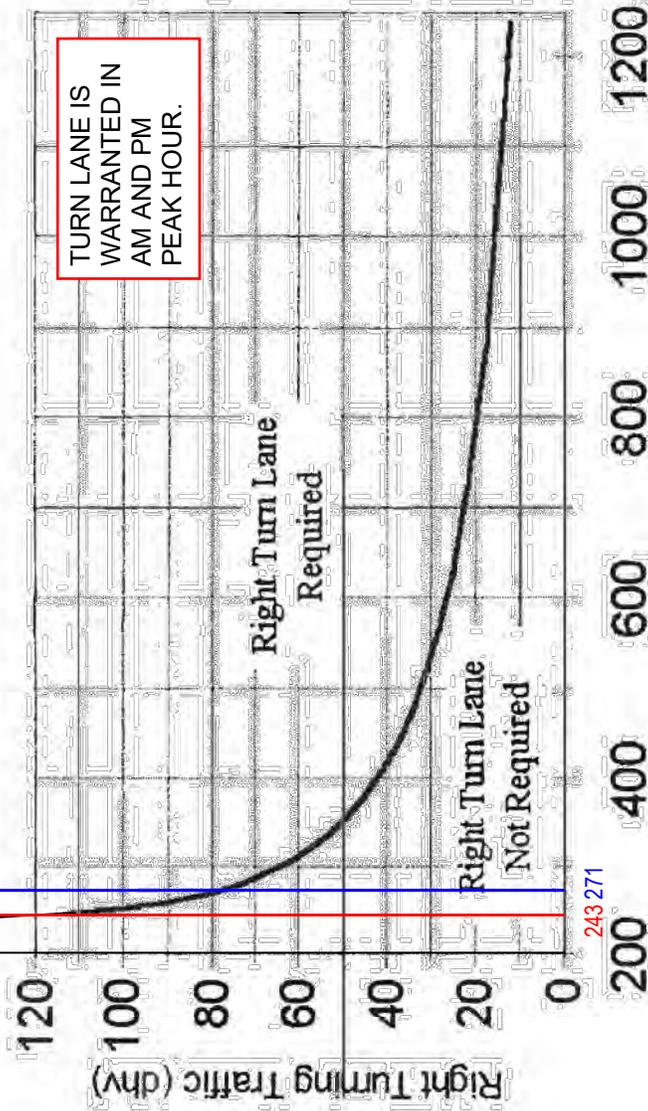
401-6b

REFERENCE SECTION  
401.6.3

HILL ROAD AND KINGS CROSSING - WBR  
2034 BUILD TRAFFIC SCENARIO

## 2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed



TURN LANE IS WARRANTED IN AM AND PM PEAK HOUR.

Advancing Traffic\* (dhv)

\*Includes Right Turns

— AM PEAK HOUR  
— PM PEAK HOUR

243 271

**APPENDIX H**  
**ODOT QUEUE LENGTH RESOURCES**

<b>BASIS FOR COMPUTING LENGTH OF TURN LANES</b>	<b>401-9</b>
	<b>REFERENCE SECTIONS 401.6.1, 401.6.3</b>

Type of Traffic Control	Design Speed		
	30-35	40-65	
	Turn Demand Volume		
	All	Low*	High
Signalized	A	** B or C	** B or C
Unsignalized Stopped Crossroad	A	A	A
Unsignalized Through Road	A	B	** B or C

\*Low is considered 10% or less of approach traffic volume

\*\*Whichever is greater

CONDITION A	STORAGE ONLY
Length = 50' (diverging taper) + Storage Length (Figure 401-10)	

CONDITION B	HIGH SPEED DECELERATION ONLY
Design Speed	Length (including 50' Diverging Taper)
40	125
45	175
50	225
55	285
60	345
65	405

CONDITION C	MODERATE SPEED DECELERATION AND STORAGE
Design Speed	Length (including 50' Diverging Taper)
40	115 + Storage Length (Figure 401-10)
45	125 "
50	145 "
55	165 "
60	185 "
65	205 "

For explanation, see Turn Lane Design Example

<h1 style="margin: 0;">STORAGE LENGTH AT INTERSECTIONS</h1>	<h2 style="margin: 0;">401-10</h2>
	REFERENCE SECTIONS 401.6.1, 401.6.3

* AVERAGE NO. OF VEHICLES/CYCLE	REQUIRED LENGTH (FT.)	* AVERAGE NO. OF VEHICLES/CYCLE	REQUIRED LENGTH (FT.)
1	50	17	600
2	100	18	625
3	150	19	650
4	175	20	675
5	200	21	725
6	250	22	750
7	275	23	775
8	325	24	800
9	350	25	825
10	375	30	975
11	400	35	1125
12	450	40	1250
13	475	45	1400
14	500	50	1550
15	525	55	1700
16	550	60	1850

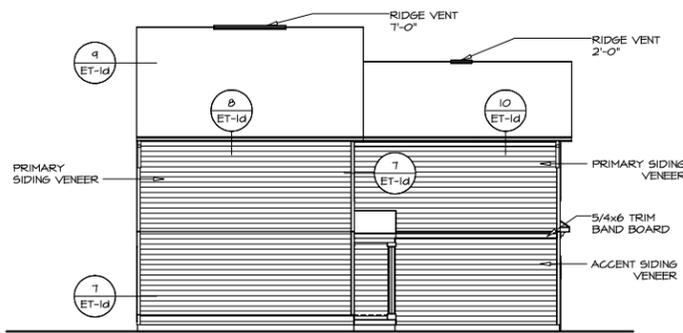
\* AVERAGE VEHICLES PER CYCLE =  $\frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$

IF CYCLES ARE UNKNOWN ASSUME:

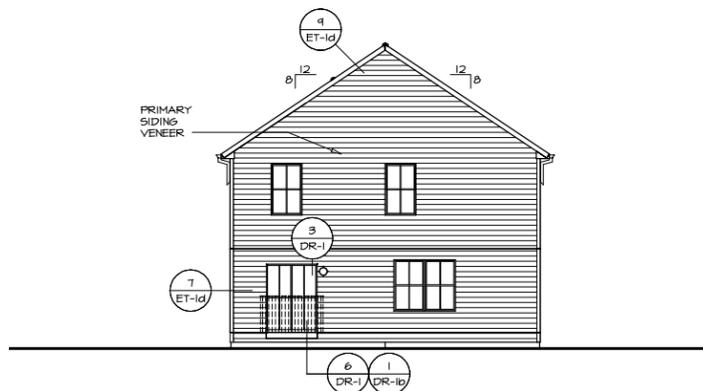
- UNSIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
- 3 PHASE = 40 CYCLES/HOUR
- 4 PHASE = 30 CYCLES/HOUR

**APPENDIX D:  
DETACHED CONDOMINIUM ELEVATIONS**

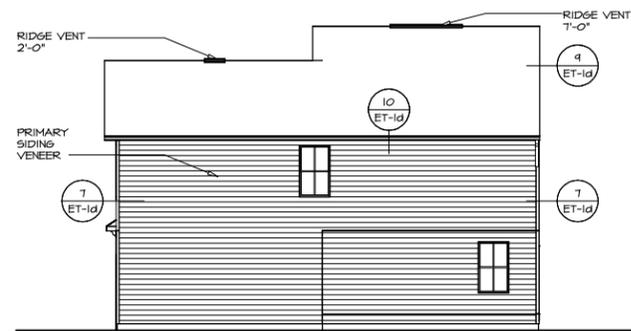




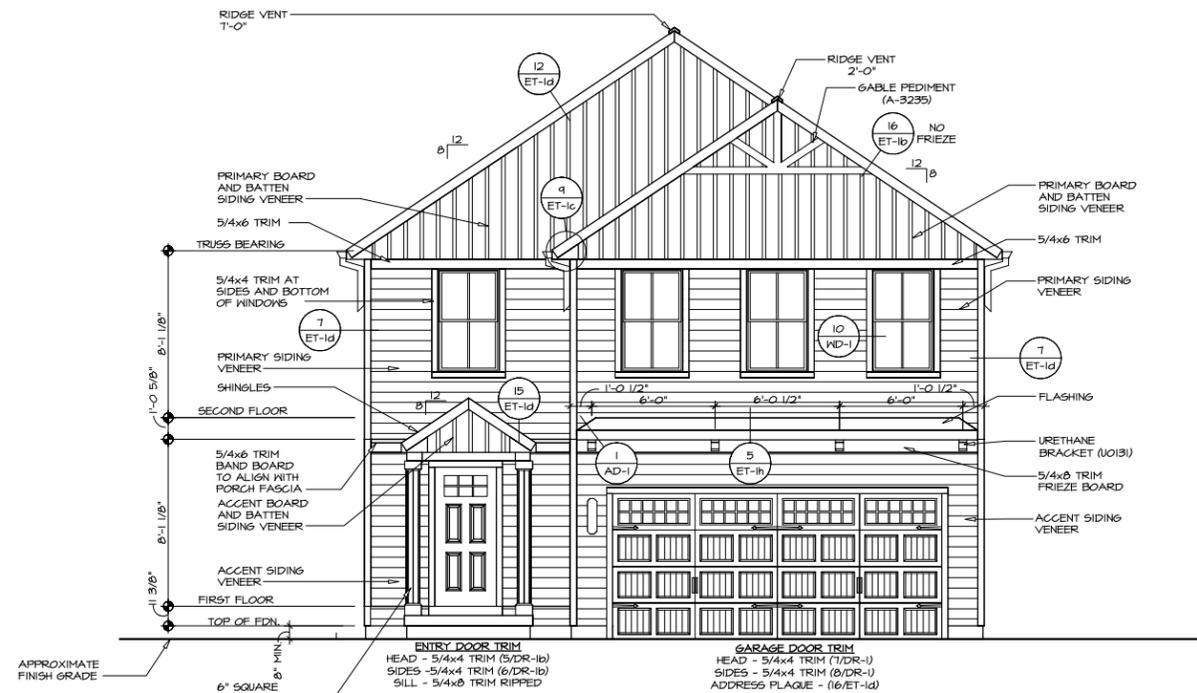
**2 LEFT ELEVATION**  
SCALE: 1/8" = 1'-0"



**3 REAR ELEVATION**  
SCALE: 1/8" = 1'-0"



**4 RIGHT ELEVATION**  
SCALE: 1/8" = 1'-0"

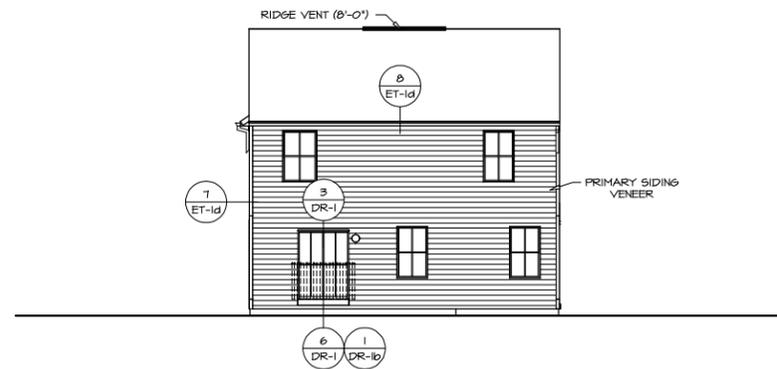


**1 FRONT ELEVATION "L"**  
SCALE: 1/4" = 1'-0"

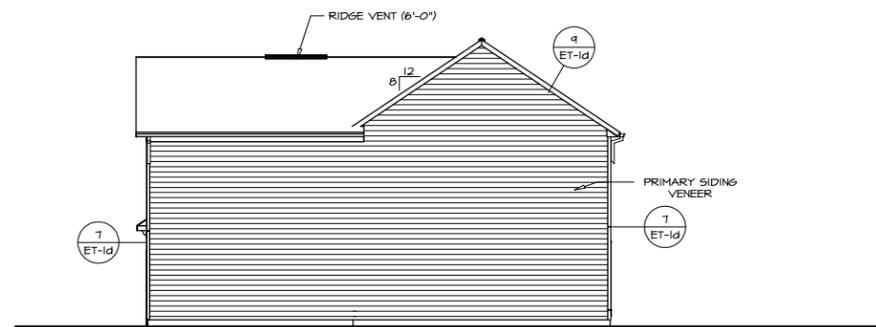
**NOTE:**  
GARAGE DOOR GLASS DESIGN MAY VARY BY MANUFACTURER.

SHEET NO. <b>A-2</b>	SUBJECT <b>IRIS</b>	SET NO. IR500	VERSION 01	DATE	REV. NO.	DATE	REMARKS
		DRAWING TITLE ELEVATION	DRAWN BY KAD	DATE: 4/17/18			
		OPTION DESCRIPTION ELEVATION L	OPTION ELL				
		<b>5</b>					

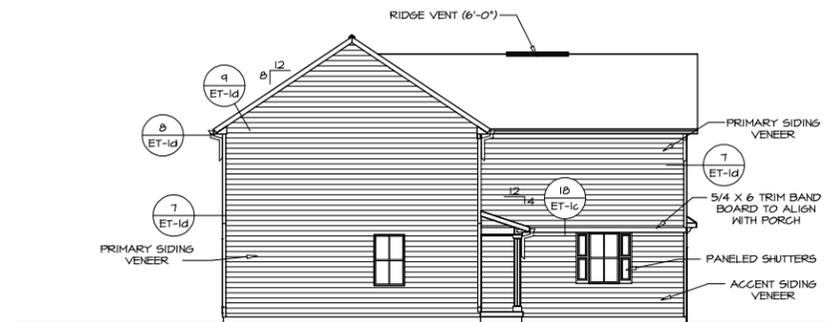
PROJECT: IRIS IR500 01A SHEET: ELEVATION L A-2 ELL.dwg 10/17/18 - 4:11 PM  
 NVR, Inc. Architectural Services 5285 Washview Drive, Suite 100 Frederick, MD 21703



**2 REAR ELEVATION**  
SCALE: 1/8" = 1'-0"



**3 RIGHT ELEVATION**  
SCALE: 1/8" = 1'-0"



**4 LEFT ELEVATION**  
SCALE: 1/8" = 1'-0"



**1 FRONT ELEVATION "K"**  
SCALE: 1/4" = 1'-0"

**NOTE:**  
GARAGE DOOR GLASS  
DESIGN MAY VARY BY  
MANUFACTURER

REMARKS

REV. NO. DATE

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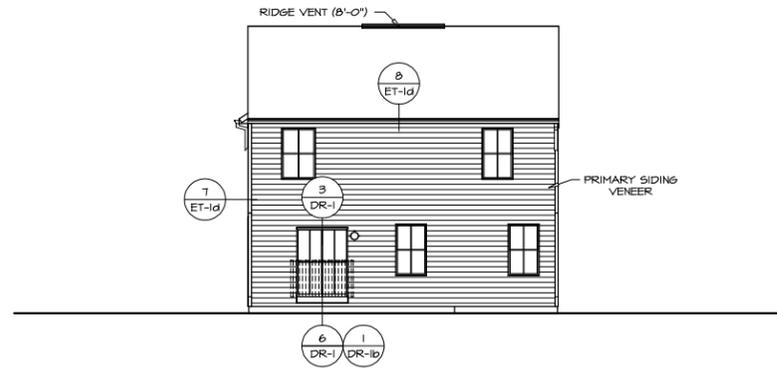


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5285 Washview Drive, Suite 100  
Frederick, MD 21703

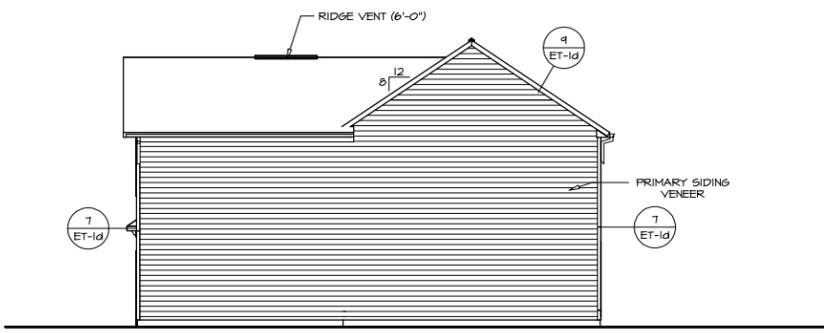
SET NO. LILLOO  
VERSION 01  
DRAWN BY CDP  
DATE: 9/28/18  
OPTION  
ELK

MODEL  
LILLY  
DRAWING TITLE  
FRONT, REAR, AND SIDE ELEVATIONS  
OPTION DESCRIPTION  
ELEVATION K

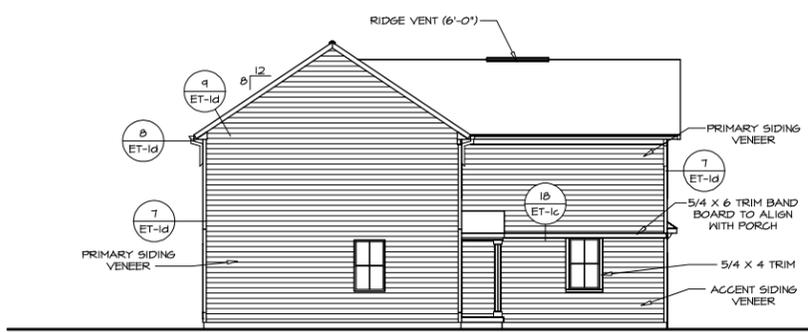
SHEET NO.  
A-1  
4



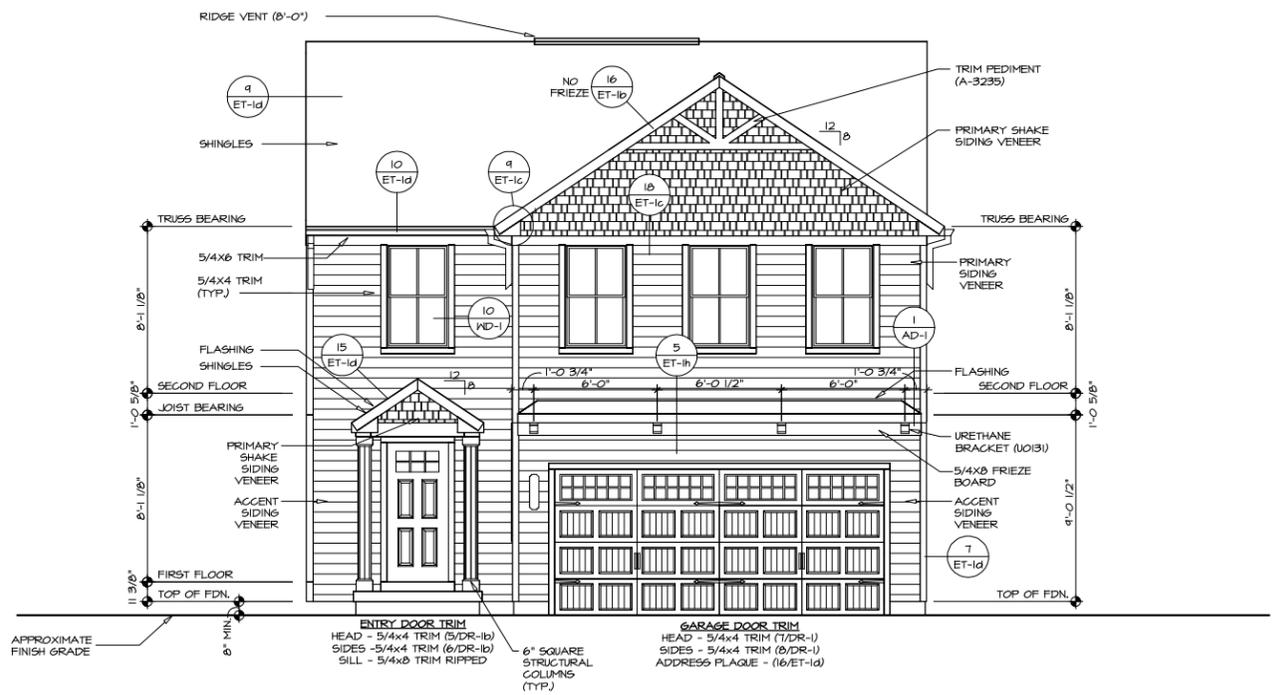
**2 REAR ELEVATION**  
SCALE: 1/8" = 1'-0"



**3 RIGHT ELEVATION**  
SCALE: 1/8" = 1'-0"



**4 LEFT ELEVATION**  
SCALE: 1/8" = 1'-0"



**1 FRONT ELEVATION "L"**  
SCALE: 1/4" = 1'-0"

REV. NO. DATE

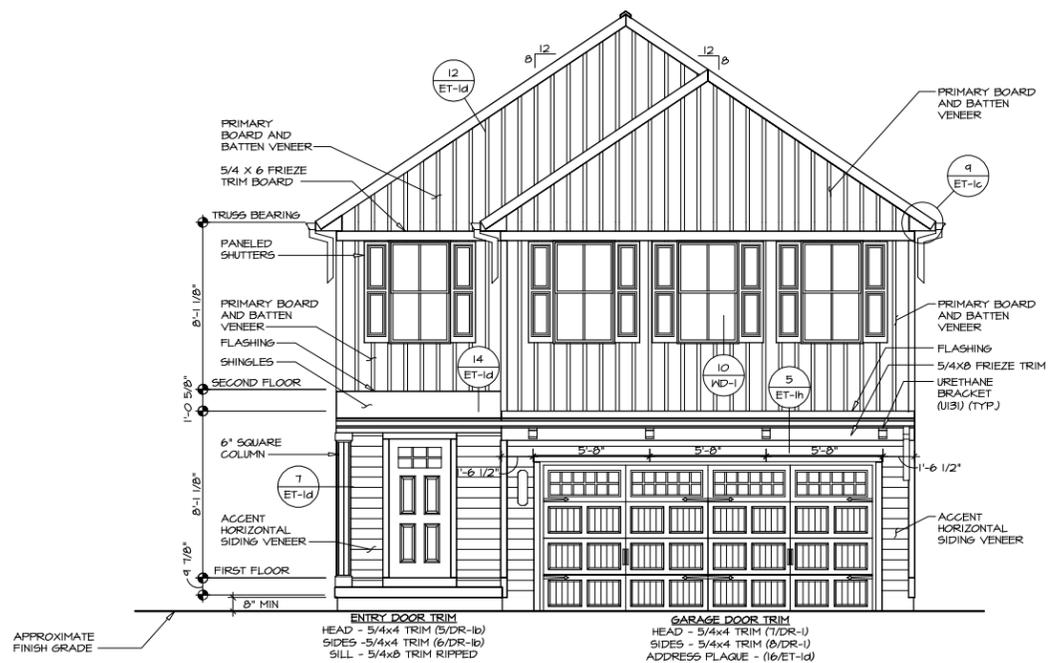
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5285 Washview Drive, Suite 100  
Frederick, MD 21703

SET NO. LILLO  
VERSION 01  
DRAWN BY CDP  
DATE: 9/28/18  
OPTION  
ELL

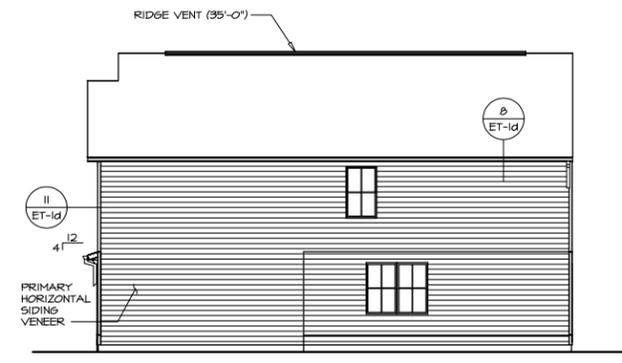
MODEL  
**LILY**  
DRAWING TITLE  
FRONT, REAR, AND SIDE ELEVATIONS  
OPTION DESCRIPTION  
ELEVATION L

SHEET NO.  
**A-1**  
5

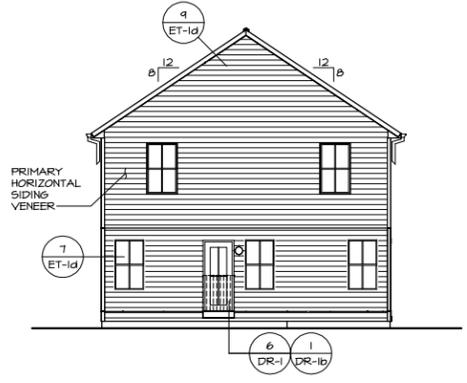


1 FRONT ELEVATION "K"  
SCALE: 1/4" = 1'-0"

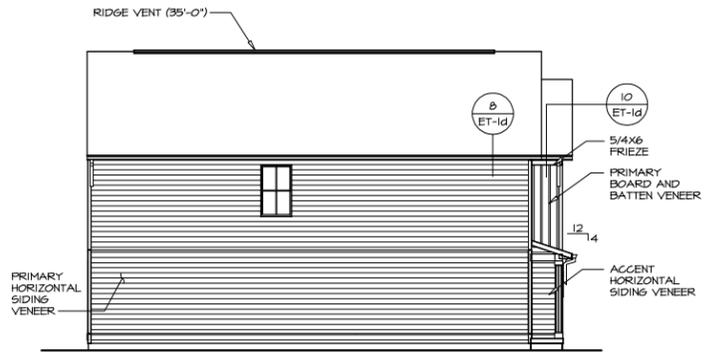
NOTE:  
GARAGE DOOR GLASS  
DESIGN MAY VARY BY  
MANUFACTURER



2 RIGHT ELEVATION  
SCALE: 1/8" = 1'-0"



3 REAR ELEVATION  
SCALE: 1/8" = 1'-0"



4 LEFT ELEVATION  
SCALE: 1/8" = 1'-0"

REMARKS

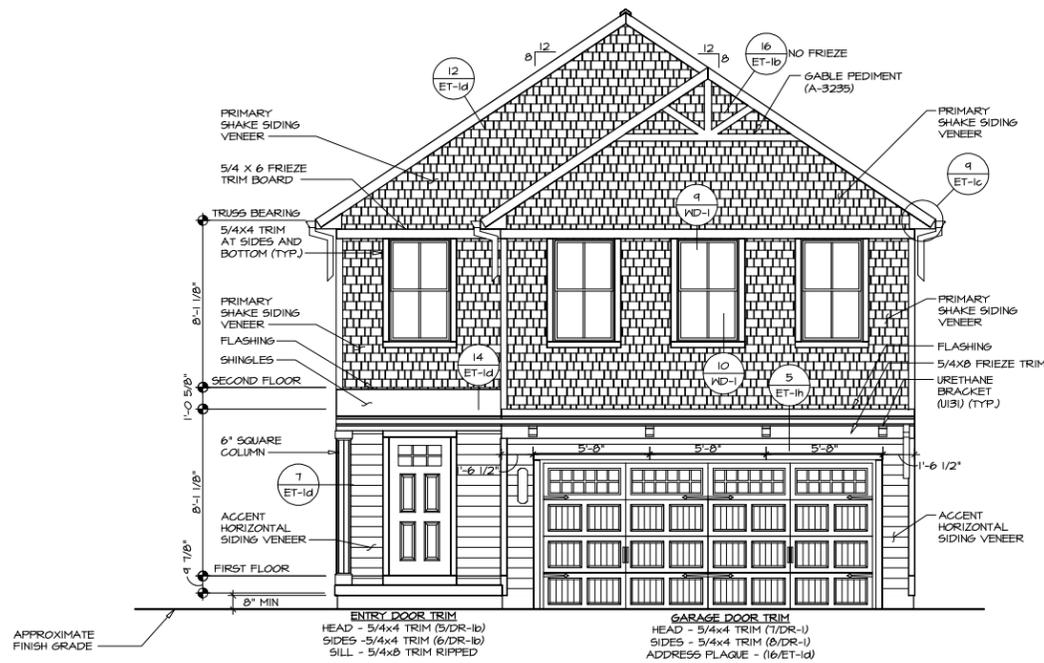
REV. NO. DATE

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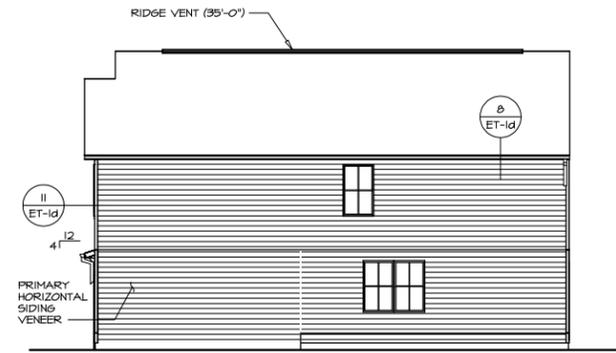
SET NO. MR500  
VERSION 01  
DRAWN BY SGA  
DATE: 8/12/18  
OPTION  
ELK

SHEET NO. A-1  
MODEL: MARGOLD  
DRAWING TITLE: ELEVATIONS  
OPTION DESCRIPTION: ELEVATION "K"  
5

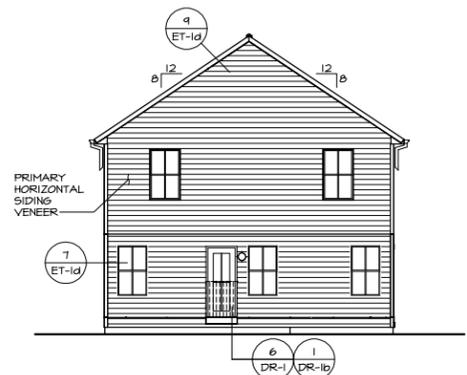


1 FRONT ELEVATION "L"  
SCALE: 1/4" = 1'-0"

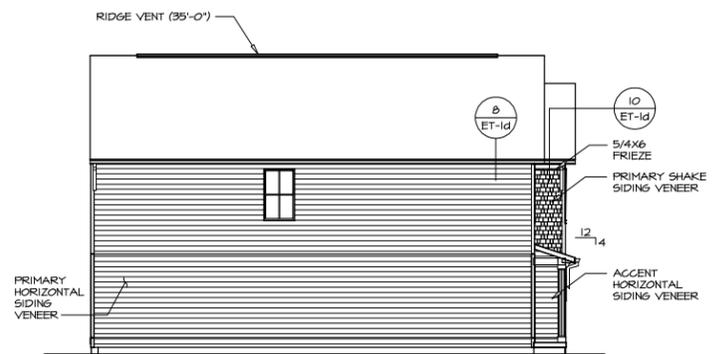
NOTE:  
GARAGE DOOR GLASS  
DESIGN MAY VARY BY  
MANUFACTURER



2 RIGHT ELEVATION  
SCALE: 1/8" = 1'-0"



3 REAR ELEVATION  
SCALE: 1/8" = 1'-0"



4 LEFT ELEVATION  
SCALE: 1/8" = 1'-0"

REMARKS

REV. NO. DATE

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Frederick, MD 21703

SET NO. MR500  
VERSION 01  
DRAWN BY SGA  
DATE: 9/27/18  
OPTION  
ELL

MODEL: MARIGOLD  
DRAWING TITLE: ELEVATIONS  
OPTION DESCRIPTION: ELEVATION "L"

SHEET NO. A-1  
6

**APPENDIX E:  
COUNCIL ORDINANCE 52-01**

08-06-01  
O-08-01H  
Sponsor:

ORDINANCE NO. 52-01

AN ORDINANCE TO ZONE 40.346 +/- ACRES OF PROPERTY OWNED BY RUTH E. PIFER, ET AL., TO PLANNED COMMERCIAL DISTRICT, TO ZONE 87.945 +/- ACRES OF SUCH PROPERTY TO PLANNED INDUSTRIAL DISTRICT, TO ZONE 168.967 +/- ACRES OF SUCH PROPERTY TO PLANNED RESIDENTIAL DISTRICT, TO APPROVE THE PRELIMINARY PLAN AND DEVELOPMENT STANDARDS TEXT FOR SUCH TRACT

WHEREAS, a petition for annexation of 297.258 +/- acres in Violet Township was duly filed by Ruth E. Pifer, et al. and approved for annexation by the Village of Canal Winchester; and

WHEREAS, the applicant wishes to rezone this property into appropriate planned districts;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE VILLAGE OF CANAL WINCHESTER, STATE OF OHIO:

SECTION 1. That, immediately upon annexation, the zoning map of the Village of Canal Winchester, Ohio be and the same is hereby amended as follows:

That the 40.346 +/- acres of such annexed property, owned by Ruth E. Pifer, et al., as fully set forth in the Rezoning Boundary Plan attached hereto as Exhibit "D" and incorporated herein by reference, is zoned Planned Commercial District (PCD).

SECTION 2. That, immediately upon annexation, the zoning map of the Village of Canal Winchester, Ohio be and the same is hereby amended as follows:

That the 87.945 +/- acres of such annexed property, owned by Ruth E. Pifer, et al., as fully set forth in the Rezoning Boundary Plan attached hereto as Exhibit "D" and incorporated herein by reference, is zoned Planned Industrial District (PID).

SECTION 3. That, immediately upon annexation, the zoning map of the Village of Canal Winchester, Ohio be and the same is hereby amended as follows:

That the 168.967 +/- acres of such annexed property, owned by Ruth E. Pifer, et al., as fully set forth in the Rezoning Boundary Plan attached hereto as Exhibit "D" and incorporated herein by reference, is zoned Planned Residential District (PRD).

SECTION 4. That Village Council hereby approves the preliminary plan and development standards text for such 297.258 +/- acre tract, which is attached hereto as Exhibit "E" and incorporated herein by reference, contingent upon and subject to the following conditions:

1. The maximum overall PRD density shall be four (4.0) dwelling units per acre based upon the number of actual units divided by the net developable acres (including open space), pursuant to Section 1173.04 (c) (4) of the Canal Winchester Codified Ordinances.
2. Revise Note "A" to read as follows: All acreages shown on this plan are approximate. The number of units permitted to be constructed within each designated use area as shown on this plan are approximate. The owner, or their agents and/or assigns, shall be permitted to build fewer units in each designated use area than are shown on this plan.
3. The developer, its successors or assigns, shall be responsible for their fair share of the costs for any off-site improvements to Diley Road, Busey Road or Hill Road. The fair share of these costs shall be determined from the required traffic study.
4. The developer, its successors or assigns, shall be responsible for all internal infrastructure improvements.
5. The developer, its successors or assigns, shall be responsible, including all costs, for getting water service to the site (refer to the pre-annexation agreement).
6. Water service to all residential development, except for detached condominiums, shall be provided by a private water system with a master meter.
7. Sanitary sewer service to the site shall be provided by a public system. Appropriate maintenance easements shall be provided to the village by the developer, its successors or assigns, if and where appropriate for the maintenance of this system. The size and location of these easements shall be subject to review and approval by the village.
8. The maximum number of total apartments shall be 258. This is based on the overall density requirement of 4.0 du/acre, and the number of residential units and acreages shown on the revised site plan dated July 9, 2001.
9. Uses to be allowed and/or prohibited on the 33-acre school site are to be resolved between the developer and the school board prior to final site plan approval of the school site.
10. As each phase of the PCD, PRD and PID districts becomes ready for development, the Preliminary Site Plan and Final Site Plan shall be submitted for review and approval by the Planning & Zoning Commission and Council.

DATE PASSED 9/17/01

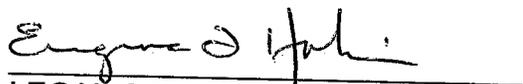
  
PRESIDENT OF COUNCIL

ATTEST   
CLERK OF COUNCIL

  
MAYOR

APPROVED AS TO FORM:

DATE APPROVED 9/17/01

  
LEGAL COUNSEL

I hereby certify that the ordinance as set forth above was published for a period of not less than fifteen days after passage by the Council, by posting a copy thereof in not less than three (3) public places in the municipal corporation, as determined by Council and as set forth in the Canal Winchester Charter.

CLERK-TREASURER 