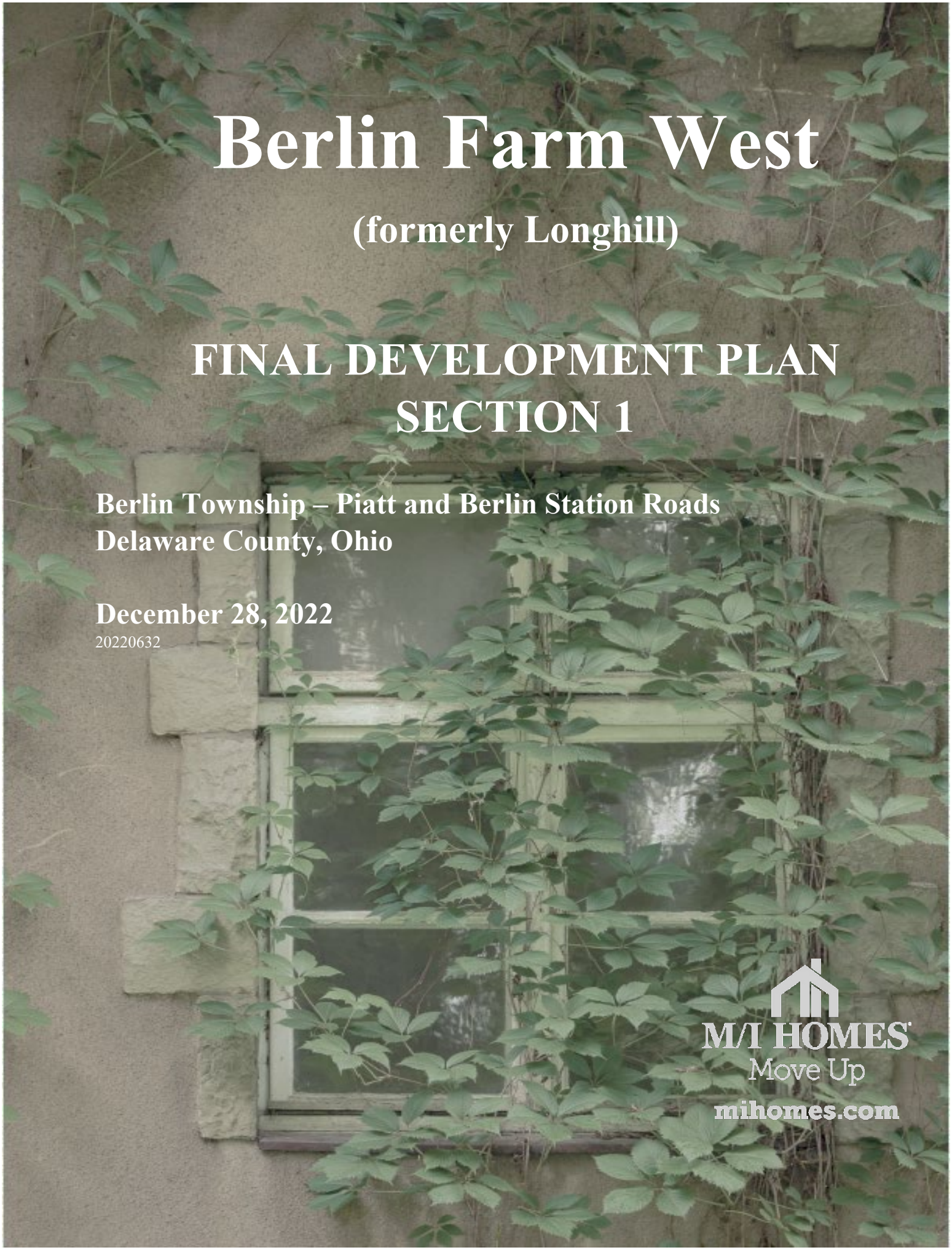

Berlin Farm West

(formerly Longhill)

FINAL DEVELOPMENT PLAN
SECTION 1

Berlin Township – Piatt and Berlin Station Roads
Delaware County, Ohio

December 28, 2022
20220632

M/I HOMES
Move Up
mihomes.com

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BERLIN FARM WEST – SECTION 1

EXHIBITS

www.berlintwp.us

BERLIN TWP. ZONING OFFICE
3271 CHESHIRE ROAD
DELAWARE, OH 43015
740.548.5217 – PHONE / 740.548.7458 – FAX

Date _____
BZC# _____
Fee: $ _____ **Rec#** _____
Hearing Date: _____

APPLICATION FOR FINAL DEVELOPMENT PLAN

Name of Owner: M/I Homes of Central Ohio

Mailing Address: 4131 Worth Avenue, Suite 260, Columbus Ohio 43219

Email Address: jbarkan@MIHomes.com

Business Telephone: 614-418-8608 Home Telephone: _____

Address of Property: Berlin Station Road, Delaware Ohio 43015

Parcel (s): 418-230-01-001-000, 418-230-01-002-000, 418-240-01-056-000, 418-240-01-057-000, 418-240-01-058-000, 418-240-01-058-001 Acreage: 40.53 acres Present Zoning: R-3 / PRD

Range: 18 Twp: 4 Section: 2 Farm Lot No: 13 and 15

Subdivision Name: Berlin Farm West Section 1

Present Use: Agriculture Requested Zoning: None

Proposed Plan: Develop 52 lots as per plan for Section 1.

The undersigned certifies that this application and the attachments thereto contain all information required by the Zoning Resolution and that all information contained herein is true and accurate and is submitted to induce the amendment of the Zoning Map. Applicant agrees to be bound by the provisions of the Zoning Resolution of Berlin Township, Delaware County, Ohio. *Revised 12/27/19*

Date: 12/7/22 **Agent/Applicant Signature:** John Barkan

Agent/Applicant Address: _____

Phone: _____ **Fax:** _____

Email address: _____

Date: _____ **Zoning Inspector Signature:** _____

INCOMPLETE APPLICATIONS WILL NOT BE PROCESSED

Berlin Farm West PRD (Formerly Longhill PRD)

Introduction and Summary.

The property that is the subject of this text consists of 278.81± acres that are located to the northwest of the intersection of Piatt Road and Berlin Station Road. It is to the west of and adjacent to a planned future northward extension of Piatt Road to be undertaken by Delaware County. In 2019, a zoning application and preliminary development plan were approved to create the Longhill PRD. M/I Homes of Central Ohio, LLC seeks to amend the approved preliminary development plan such that the Longhill PRD will be renamed as Berlin Farm West to reflect the continuation of a master plan that includes the Berlin Farm PRD that is to be developed by M/I Homes to the east of this zoning district and which was previously approved by Berlin Township. Berlin Farm West will be subject to the standards set forth in this text, and will be developed in accordance with the site plan which accompanies this application as Exhibit G-1. This residential community will consist of 434 single-family homes among 109.4+/- acres of open space. This is a reduction of 48 units (roughly 10% of permitted density) as compared to the previously approved preliminary development plan.

The development standards contained within this text and the plans that accompany it are intended to govern the proposed development and replace and supersede the previously approved text and preliminary development plan for the Longhill PRD. This Berlin West PRD is already zoned into the R-3, Residential District High Density base zoning district under the Zoning Resolution of Berlin Township (the "Zoning Resolution"). In the event of a conflict between the standards in this text and those found within the Zoning Resolution, the standards in this text shall govern. To the extent that a development standard is not contained herein, then the provisions of the Zoning Resolution shall govern with respect to that standard including, but not necessarily limited to, those contained in Article 9 of the Zoning Resolution and pertaining to the R-3 zoning district.

This PRD shall include two subareas, namely Subarea A and Subarea B. Subarea A will be known as Aberdeen at Berlin Farm and consists of 104.6+/- acres. Subarea B will be known as Longhill at Berlin Farm and includes 174.25+/- acres.

ARTICLE 11 PLANNED RESIDENTIAL DISTRICT (PRD)

SECTION 11.01: PURPOSE: SEE SECTION 5.055

SECTION 11.02: INITIAL DISCUSSIONS

The applicant is encouraged to engage in informal consultations with the Zoning Inspector, Zoning Commission and the Delaware County Regional Planning Commission prior to formal submission of a development plan and application to amend the zoning map.

No statement by officials of the Township or County made prior to formal submission of a development plan and application to the Zoning Commission under 11.10 shall be binding. Any and/or all such informal consultations may be subject to Ohio's open meeting laws (ORC §121.22) and may be required to be held in an open public meeting.

In addition to any other procedures set out in this Resolution, all applications for amendments to the zoning map to rezone lands to this PRD district shall follow the procedures set forth in Article 11 herein.

SECTION 11.03: LOCATION OF PLANNED RESIDENTIAL (OPEN SPACE) DEVELOPMENTS

Planned Residential Development zoning may be overlaid on FR-1, R-2, R-3, R-4, and TPUD zones pursuant to a zoning map amendment approved by the township. The net density of the underlying zoning shall be used to determine the number of units allowed. All other standards shall be as defined in Article 11.

SECTION 11.04: PERMITTED USES

A.) Single Family detached residential dwelling units in FR-1 and R-2, R-3, and R-4 PRDs;

Response: Applicant proposes R-3 single family detached residential dwelling units (434 lots in total). Subarea A shall contain 165 lots and Subarea B shall contain 269 lots.

B.) Single family dwellings in R-2, R-3, and R-4 PRDs, or multi-family buildings (including condominiums separated by vertical firewalls) in TPUD PRDs.

Response: No single family attached dwellings are proposed.

C.) Common Area: upon approval of the final development plan by the township, the following uses and improvements may be permitted in the common area:

1. **Outdoor sports (active recreation) and recreational activities.**

2. **Accessory service buildings and structures incidental and pertinent to the uses set forth in Section 11.04(C)(1) above, where said accessory service buildings and structures are necessary to the pursuit of a permitted recreational use on the premise.**

Response: Applicant proposes ±109.4 acres of open space that generally will be used for open space, recreation, and leisure trail, consisting of 39.2% of the total site acreage. The centrally-located 9.0+/- acres of open space will contain a silo, clubhouse, and other amenities which will have a rural character, as well as an outdoor pool. The open space consisting of 17.0+/- acres found in the southeastern portion of the zoning district will provide for community gardens and leisure trails, as will a portion of the 61.0+/- acres of open space that is located in the northwestern portion of the zoning district. These amenities will provide for agricultural opportunities for residents. A dog park is also planned in the open space within the northwestern portion of the property. See Exhibit "I-2 Open Space Plan". All open spaces will be owned and managed by a forced and funded Homeowners' Association.

D.) Natural Area: restricted to passive recreational uses such as fishing, swimming, hiking, canoeing, and such other recreation that does not alter any of the natural features of the area. Agriculture may also be used as natural open space, provided it does not permit hog operations, poultry barn, and fur bearing farms or feed lots. Accessory buildings should be discouraged in the natural area.

Response: Areas located outside of those described as having specific amenities in the immediately preceding response will be passive open spaces with leisure trails in many locations. Grading is permitted within these areas to accommodate retention ponds, utilities and other improvements shown on the accompanying plans. Within the open space along the western and southern frontages, no improvements are permitted except for leisure trails and sidewalks.

SECTION 11.05: ACCESSORY USES

A. Non-residential uses of a religious, cultural, educational or recreational nature or character to the extent that they are designed and intended to serve the residents of the Planned Residential District. Said facilities may be designed to serve adjoining neighborhoods or residents if they are located in such proximity to major thoroughfares as to permit access without burdening residential streets.

Response: No divergence.

B. Schools, if they occupy a lot of not less than 1 acre, with adequate area for indoor and outdoor recreation, and additional setbacks as may be necessary to avoid disruption to adjacent residences.

Response: No divergence.

C. Adult Family Homes as provided for and defined in ORC Chapter 3722.

Response: No divergence.

D. Child Day Care provided in the provider's permanent residence for six or fewer children, who are not members of the immediate resident family, provided the day care is accessory to the use of the dwelling as a residence.

Response: No divergence.

E. Temporary structures such as manufactured or mobile homes, or mobile offices, and temporary buildings of a non-residential character may be used incidental to construction work on the premises or on adjacent public projects or during a period while the permanent dwelling is being constructed. The user of said structure shall obtain a permit for such temporary use, which permit shall be valid for six (6) months and may be renewed not more than twice for a total combined period of time under all issued permits not exceeding eighteen (18) months. Renewal of the permit shall be at the discretion of the Zoning Inspector on finding of reasonable progress toward completion of the permanent structure or project. The Zoning Inspector may require provisions for sanitary waste disposal, solid waste disposal, and water supply, as he/she deems necessary. The fees for such permit and renewals thereof shall be established by the Board of Township Trustees. Said temporary structure shall be removed not later than ten (10) days after expiration of said permit.

Response: Up to 5 model homes shall be provided in accordance with Exhibits "H-1 Phasing Plan and Model Home Location" and "C-5 Model Home Enlargements and Signage." Downcast lighting shall be required when parking areas next to model homes are illuminated. Notwithstanding anything to the contrary in the Zoning Resolution, prior to the approval of a final plat by Delaware County the developer may commence construction of one of these model homes. Construction of one model home may occur in advance of, or in conjunction with, installation of infrastructure for the subdivision.

F. Conducting of casual sale of goods in what are commonly referred to as garage sales or yard sales provided that such sales shall not be conducted on more than six (6) days in any calendar year or more than three (3) consecutive days. The sale and parking area shall be outside of the right-of-way and shall not interfere with traffic on adjacent thoroughfares. Any signage must be consistent with Article 22.

Response: This development shall adhere to this requirement.

G. Limited home occupation, as prescribed in Section 24.15 of this resolution.

Response: Limited home occupation uses will be in accordance with Section 24.15.

H. Licensed Family Homes as provided for in ORC §5123.19. All such facilities shall possess all approvals and/or licenses as required by state or local agencies.

Response: Licensed Family Home uses will not be included in this development.

SECTION 11.06: CONDITIONAL USES

A) Model Homes in Subdivisions, the same being defined as residential type structures used as sales offices by builders/developers and to display the builder's/developer's product. The same may be furnished within, since its purpose is to display to prospective buyer the builder's/developer's features (such as exterior siding treatment, roofing materials, interior trim, moldings, floor coverings, etc.), in the

environment of a completed home. Model homes may be staffed by the builder's/developer's sales force. Model homes shall be subject to the following restrictions:

1. **Lighting: All exterior lighting, except for security lighting, must be down-lighting, so that no light shall be cast onto adjoining residential properties. All off-street parking areas must be illuminated. All exterior lighting, except for security lighting, shall be extinguished at the closing time of the model home.**

Response: No divergence.

2. **Parking: All model homes shall provide off-street paved parking for the public. Such off-street paved parking shall be located as directed by the Board of Zoning Appeals. The number of required parking spaces shall be six (6) per model home. The driveway of the model home may be utilized for not more than two (2) parking spaces.**

Response: No divergence.

3. **Screening and Trash Receptacles: Landscape drawing shall be required and show adequate landscaping and screening from adjoining residential lots, together with the clear marking of the boundaries of the model home lot. Trash receptacles shall be provided around the model home for use by visitors to the home.**

Response: Landscaping for model homes is consistent with the overall landscape and provides adequate landscaping and screening from adjoining lots. Locations of trash receptacles will be identified in the building permit application for each model home.

4. **Termination of Use: The use of model homes within a residential subdivision, or within any single phase of a multi-phase subdivision, shall terminate after five (5) years from its opening date, or when building permits have been issued for ninety percent (90%) of the lots, whichever comes first.**

Response: No divergence.

5. **Model Home Signs: Model home signs may be approved by the Board of Zoning Appeals provided the following conditions are met:**

   a. **the sign shall not exceed 16 (sixteen) square feet per side with 32 (thirty two) square feet maximum total display area;**

Response: No divergence. Applicant's proposed signage, as shown in accompanying exhibit, complies with the display area requirements.

   b. **the overall height of the sign shall be no more than four (4) feet above grade.**

Response: No divergence.

   c. **model home sign shall be located on the same lot as the model home.**

Response: No divergence.

6. **If sign information is not presented at the time the development is submitted and approved, the applicant will apply for a conditional use permit to the Board of Zoning Appeals, which will rule on additional sign conditions.**

Response: Sign information is being provided at this time for review and approval.

SECTION 11.07: PROHIBITED USES

A. Uses not specifically authorized by the express terms of this Article of the Zoning Resolution shall not be permitted.

Response: No divergence. Development will be subject to such prohibited uses.

B. Outdoor storage of inoperable, unlicensed, or unused vehicles or trailers, for a period exceeding fourteen (14) days is prohibited. Said vehicles if stored on the premises shall be enclosed within a building so as not to be visible from any adjoining property or public road.

Response: No divergence. Development will be subject to outdoor storage restrictions.

C. No trailer of any type, no boats, no motor homes, nor equipment of any type shall be parked in front of the building line on any parcel within this district for more than twenty-four (24) hours in any ten (10) day period. If a dwelling is located on said lot, the building line shall be considered to be the front wall of the dwelling even if said dwelling is located behind the minimum building line established by this code or the restrictions on the plat or subdivision.

Response: No divergence.

D. No motor home, mobile home or camper of any type may be occupied by a guest of the resident/owner for more than fourteen (14) days per calendar year and only one (1) occupied motor home or camper is permitted at any time.

Response: No divergence.

E. Except as specifically permitted in Section 11.01(G) or approved in the approved development plan, no manufactured/mobile home shall be placed or occupied in this district. This provision does not apply to permanently-sited manufactured homes.

Response: No divergence.

F. No trash, debris, unused property, or discarded materials which create an eyesore, hazard, or nuisance to the neighborhood or general public shall be permitted to accumulate on any lot or portion thereof.

Response: No divergence.

G. In subdivided areas that meet the requirements of section 711.131 of the Ohio Revised Code, the keeping of livestock and poultry is prohibited.

Response: No divergence.

H. Boat or vehicle storage yards of facilities within common open space areas are prohibited.

Response: No divergence.

SECTION 11.08: DESIGN FEATURES REQUIRED OF A PRD

The development plan shall incorporate the following standards:

A. Open space shall be distributed throughout the development as part of a unified open space system, which shall serve to unify the development visually and functionally, and buffer surrounding land uses;

Response: No divergence. As shown in Exhibit "I-2 Open Space Plan", the open space has been distributed throughout the development, is visually and functionally harmonious with the development, and provides buffers to surrounding land. Applicant proposes ±109.4 acres of open space that generally will be used for open space, recreation, and leisure trails, consisting of 39.4% of the total site acreage. The centrally-located 9.0+/- acres of open space will contain a silo, clubhouse, and other amenities which will have a rural character, as well as an outdoor pool. The open space consisting of 17.0+/- acres found in the southeastern portion of the zoning district will provide for community gardens and leisure trails, as will a portion of the 61.0+/- acres of open space that is located in the northwestern portion of the zoning district. These amenities will provide for agricultural opportunities for residents. A dog park is also planned in the open space within the northwestern portion of the property. See Exhibit I-2 Open Space Plan.

B. The zoning commission may require walkways to connect all dwelling areas with open space and to interconnect the open spaces;

Response: No divergence. Applicant has provided for walkways and interconnected open spaces, as shown in Exhibit I-5.

C. Moderate to thick coverage by trees and natural undergrowth is desirable to most intended functions of the open space. Where such foliage exists naturally, it should be retained where practicable. Where adequate foliage does not exist, the Zoning Commission may require establishment of such tree cover or other foliage as may be necessary to achieve the purpose of the open space and the buffer of adjacent uses;

Response: No divergence. Applicant has incorporated existing foliage into the open space as shown in the accompanying plans.

D. Scenic areas and views shall be preserved to the maximum extent practicable, including views from the adjacent road;

Response: No divergence. Applicant has strategically placed open spaces along the perimeters of the site and centrally within the zoning district. See accompanying plans.

E. Open spaces may be used for the natural disposal of storm water drainage. No features should be designed which are likely to cause erosion or flooding of the proposed or existing houses;

Response: No divergence. Open spaces have been utilized throughout the site plan for the natural disposal of storm water drainage, as shown on Exhibit G-1. Ponds with headwalls and end walls that are exposed to view shall be treated with real or synthetic stone to resemble stone walls. All stone shall extend to or below the grade of earth so that any exposure due to low water conditions only has exposed stone, not concrete. Additionally, all ponds shall have a fountain or fountains depending on the size of each and what is reasonably necessary. Fountains shall have a spray pattern of 10' height minimum.

F. Minimum overall tract size for a PRD is 20 acres, unless adjacent to a neighborhood of comparable density or design, in which case the Zoning Commission may permit the tract size to be reduced to 10 acres;

Response: No divergence. Applicant meets and exceeds the 20-acre minimum for a PRD, as this development consists of ±278.81 gross acres.

G. Improvements within the PRD shall conform to the subdivision standards for Delaware County Ohio;

Response: No divergence. Applicant's design will conform to county's subdivision standards, unless otherwise specified in this application or otherwise approved by Delaware County.

H. Wetlands, steep (over 20%) slopes, forests, 100 year floodplains, ravines and noted wildlife habitat are to be preserved to the greatest extent possible;

Response: No divergence.

I. The permitted density shall not be exceeded.

Response: No divergence. The Longhill PRD zoning permits 482 lots, while this amended PRD provides for 434 lots.

J. The required percent of open space shall be provided. The percent of open space required varies according to the zoning district overlaid;

1. FR-1: 40% (of gross tract area) open space

2. R-2, R-3 and R-4: 20% (of gross tract area) open space

In calculating open space, the areas of fee simple lots conveyed to homeowners shall not be included. Unbuildable areas, (defined as jurisdictional wetlands, floodplains, slopes greater than 20%, utility rights-of-way and existing bodies of water) may count for up to 50% of the required open space. That portion of land dedicated to public purpose that remains either open and unbuilt upon by any structure (including parking) or which houses a recreational facility approved by the Zoning Commission on the Development Plan may count toward the open space requirement.

Response: No divergence. Applicant meets and exceeds this requirement by proposing 109.4+/- acres of open space, which amounts to approximately 39.2% of the gross tract area.

L. No residential dwelling structures shall be constructed within the 100-year floodplain of any stream or river.

Response: No divergence.

M. In FR-1 zones, water supply and sanitary sewage disposal shall be as approved by the Delaware County Board of Health and/or the Ohio EPA. Feasibility shall be indicated by the appropriate agency at the time of the preliminary plan. In the R-2, R-3 and/or R-4 zones, centralized water supply and sanitary sewage disposal systems shall be provided, subject to Delaware County Sanitary Engineer, Board of Health, and/or Ohio Environmental Protection Agency approval. Feasibility of water supply and wastewater disposal systems shall be indicated by the appropriate agencies at the time of the preliminary plan.

Response: No divergence. Applicant has obtained verifications that public water supply and wastewater disposal systems are available with capacity to serve this project.

N. The project architect shall give due regard to the footprints, building orientation, massing, roof shape, pitch and exterior materials to blend with other traditional or historic architecture in the community or with the site. All residential roofs must be a minimum of 5:12 pitch, or as approved by plan. Permanently sited manufactured housing must have a minimum pitch of 3:12.

Response: No divergence. See Architectural Elevations in Exhibits K and L. The architectural characteristics to be constructed in this zoning district are to be reflective of said exhibits. These exhibits are intended to be used as a guide in terms of defining the styles and designs of homes. A number of home designs will be used to meet market demand and to provide diversity in terms of home sizes and exterior appearances and finishes, subject to the requirements of this text. The same home design shall not be constructed on lots that are adjacent to or directly across the street from one another

and one on either side of the house across the street. A lot shall be deemed to be directly across the street from any other lot that is located in whole or in part between two imaginary straight-line extensions of the side lot lines for the first lot which extend to the opposite site of the public right-of-way on which the first lot has frontage. Front loaded garages shall not extend greater than 4 feet from the primary front façade of a home or front porch. Garage doors shall correspond to the architectural style of the house.

For illustrative purposes only, the diversity standard laid out above shall be applied as:	**XXX** **XOX**

O. Residential lots shall be fenced for safety if they abut agriculture.

Response: No divergence.

P. Sidewalks or paths shall be provided. Sidewalks shall be separated from the paved street surface by at least five feet (5') of landscaped or grassed green strip. Deciduous, broad leaf street trees (i.e., maple, oak, sycamore, chestnut, and sweet gum) shall be planted (or saved) at the rate of one per 60 feet of frontage on both sides of the street. Trees must be at least a 2.5 inch caliper at planting. Trees may not be placed in the 5' green strip between the street and sidewalk. Trees shall be placed in the front lawn of the residences.

Response: No divergence.

Q. Setbacks, front, side and rear: as defined in the underlying zoning district.

Response:

R-3 District Requirements	*Applicant's Proposal*
Building Setback: Per Section 24.05, as approved in the Development Plan.	*No divergence. The minimum building setback shall be 30 feet from the right-of-way line, provided that stoops, steps, and porches shall be permitted to encroach a maximum of five (5) feet within the front yard setback line.*
Side Yard Setback: 12.5 ft. minimum to any side lot line.	*A divergence is requested. Each lot will provide a minimum of 12.5 ft. side yard on each side of the lot and therefore meet the requirements of the Zoning Resolution, but Applicant requests a divergence to permit side yard encroachments such as eaves (up to 12"), overhangs (up to 12"), bay windows (up to 3'), egress wells (up to 3'), and fences (fences shall not be forward of the back rear corner of the house most closely to the right-of-way). Air conditioning units shall only be permitted to be located along the rear façade of each home. For purposes of clarity, notwithstanding anything in this provision to the contrary, in no event shall there be less than 9.5' between the side lot line and any encroachment.*
Rear Yard Setback: 25 ft. minimum for principal buildings.	*No divergence, provided that patios shall be permitted to encroach a maximum of 10 feet into the required rear yard setbacks.*

R. Minimum lot size: as defined in the underlying zoning district.

Response:

R-3 District Requirements	*Applicant's Proposal*
10,890 square feet	*No divergence. Each lot within Subarea A will have a minimum lot area of 11,250 square feet, and Subarea B will have a minimum lot area of 12,000 square feet..*

S. Minimum lot width: as defined in the underlying zoning district.

Response: A divergence is requested. R-3 zoning district, Section 9.06(B) of the Zoning Resolution calls for minimum continuous lot frontage of 80 feet. The Applicant requests that in Subarea A a minimum lot width of 80 feet will be permitted at the minimum building setback line for each lot, and in Subarea B a minimum lot width of 75 feet will be permitted at the minimum building setback line, both to accommodate various conditions for lots located within street curvatures. The divergence is reasonable and consistent with the spirit and intent of the zoning requirement.

T. Detached garages with one-hour fire rated construction may be constructed within ten (10) feet of the lot line provided the garage is located to the rear of the house, and that the garage does not abut an adjacent residence.

Response: No divergence.

U. Street layouts should relate to natural topography, and be designed to provide open space views to as many homes as possible.

Response: No divergence. Street layouts relate to natural topography and seek to maximize open space views to as many homes as possible.

V. Attached garages shall be setback at least 12 feet from the front building line of the house, if on street parking is not provided.

Response: No divergence. On-street parking is being provided. Two or three attached car garages will be provided for each lot within the development. All lots within Subarea A will include side-loaded garages (which is 165 lots or over 38% of the total lots in the subdivision). Side-loaded garages shall be permitted but not required in Subarea B.

W. Porches: A covered porch or portico across some portion of the front of the house is a recommended structural design element.

Response: No divergence.

X. Street lighting, if provided, must be of white light, with light standards of traditional or Victorian design (no modern gooseneck lamps or yellow lighting). Maximum height of standards is 16 feet.

Response: No divergence.

Y. Building Height Limits: No buildings in this district shall exceed thirty-five (35) feet in height measured from the elevation of the threshold plate at the front door to the highest point of the roof. Chimneys, barns, silos, grain handling conveyors, church spires, domes, flag poles, and elevator shafts are exempted from the height regulation and may be erected to any safe height, not to exceed one-hundred (100) feet in height. No windmills, antennas, or towers shall be constructed to a height greater than the distance from the center of the base thereof to the nearest property line of said tract and not to exceed one hundred (100) feet in height.

Response: No divergence. Applicant's proposal meets the building height limits.

Z. Building Dimensions: (Floor space requirements): Each detached single family dwelling hereafter erected in this district shall have a living area not less than one-thousand (1000) square feet or eight-hundred (800) square feet of ground floor living area, if the residence is multi-story. All such living areas shall be exclusive of basements, porches, or garages.

All attached single-family structures constructed within this district shall contain the following minimum living area:

1. One (1) bedroom unit: 800 square feet

2. Two (2) bedroom unit: 900 square feet

3. Three or more bedroom units: 1000 square feet

Response: No divergence. Applicant's proposal meets these requirements.

AA) Landscaping: All yards, front, side and rear, shall be landscaped, and all organized open spaces or non-residential use areas shall be landscaped and shall meet the requirements of Article 26, unless a

variation from these standards is specifically approved as part of the final development plan. A landscape plan showing the caliper, height, numbers, name, and placement of all material, prepared by a licensed landscape architect shall be approved as a part of the final development plan.

Response: Landscaping to be provided in accordance with approved final development plans. Individual lots shall include landscaping in the front, rear, and side yards, with the selection of plantings to be determined by individual home buyers.

BB.) Parking: Off-street parking shall be provided, at the time of construction of the main structure or building, with adequate provisions for ingress and egress according to the development plan. In preparing and approving the parking plan, the provisions of Article 24 of this Resolution, when appropriate, shall be incorporated.

Response: Off-street parking will be provided in garages. In addition, each home shall provide for a minimum of 2 automobiles to park on the driveway.

CC.) Signs: Except as provided under the provisions of this Article for home occupations or as controlled by Article 25 (Signs) of this Resolution and except as permitted by the Board of Zoning Appeals incidental to Conditional Uses, no signs shall be permitted in this district except a "For Sale" or "For Rent or Lease" sign advertising the tract on which the said sign is located. Such sign shall not exceed six (6) square feet in area on each side.

Response: A divergence is requested. Applicant requests a divergence to permit all signage as shown and detailed in accompanying exhibit.

DD.) The owner or developer of a subdivision or similar area, upon the conditions and for the time period established by the Zoning Commission, may erect one (1) sign not exceeding thirty-two (32) square feet in area per side advertising said subdivision, development or tract for sale.

Response: Applicant will erect such sign in accordance with the conditions and for the time period established by the Zoning Commission.

EE.) Exterior Lighting: All exterior lighting shall meet the lighting requirements of Article 24 of this zoning resolution, unless a variation from these standards is specifically approved as part of the final development plan.

Response: A divergence is requested to accommodate development signs, which will provide down lighting directed toward the sign in a manner that does not interfere with driver visibility on adjacent streets.

FF.) Other required provisions as stated in this ordinance. The Berlin Township Zoning Commission and/or Board of Trustees may impose special additional conditions relating to the development with regard to type and extent of public improvements to be installed, landscaping, development, improvement and maintenance of common open space, and any other pertinent development characteristics.

Response: Delaware County plans to build a roundabout at the intersection of Berlin Station Road and Piatt Road and extend Piatt Road to the north. When requested by the County, the Developer will dedicate right-of-way for the required improvement.

In addition, clustered mailbox units shall be located in the major open space areas in 2-3 locations in the community so that all residents are not required to go to a single location to retrieve their mail and parking shall be available at each location. Access to all CBUs shall be constructed in compliance with ADA accessibility standards. All CBUs shall be maintained by the HOA and be plumb.

Miscellaneous Commitments:

1. Developer shall communicate and cooperate with Delaware County on pedestrian access to and from the subdivision and Berlin Station Road.

2. Buffering shall be installed pursuant to the Preliminary Landscape Plan submitted herewith and shall be supplemented as engineering requires.

3. North street stub will be constructed to the property line to County standards provided Delaware County supports such extension and construction.

4. “No mow” where used in this PRD shall mean mowing or bushhogging 1-4 times per year and the HOA spraying for weeds at the same frequency.

5. Paths located along Rolson Piatt Road and Berlin Station Road shall be 10’. All other paths shall be 8’.

6. HOA will be turned from the developer to the homeowners at no later than 85% of the homes in the subdivision being transferred to third party homeowners.

LONGHILL PARTNERSHIP II
2877 BERLIN STATION RD
DELAWARE OH 43015

JORDAN HALL & TERI L
2862 BERLIN STATION RD
DELAWARE OH 43015

KARELIN E &
COOK BRADLEY T
2820 BERLIN STATION RD
DELAWARE OH 43015

HILDEBRAND & CORTNEY
3159 BERLIN STATION RD
DELAWARE OH 43015

MI OF LLC
3238 LOGSDON LOOP
DELAWARE OH 43015

MI OF LLC
2877 BERLIN STATION RD
DELAWARE OH 43015

MI OF LLC
3254 LOGSDON LOOP
DELAWARE OH 43015

LUKAVA LLC
3003 BERLIN STATION RD
DELAWARE OH 43015

GATCHELL R
2981 BERLIN STATION RD
DELAWARE OH 43015

CULBERTSON J
2961 BERLIN STATION RD
DELAWARE OH 43015

BEARD V
2945 BERLIN STATION RD
DELAWARE OH 43015

BERLIN PRESBYTERIAN WEST CHURCH
2911 BERLIN STATION RD
DELAWARE OH 43015

HASHMI
2880 BERLIN STATION RD
DELAWARE OH 43015

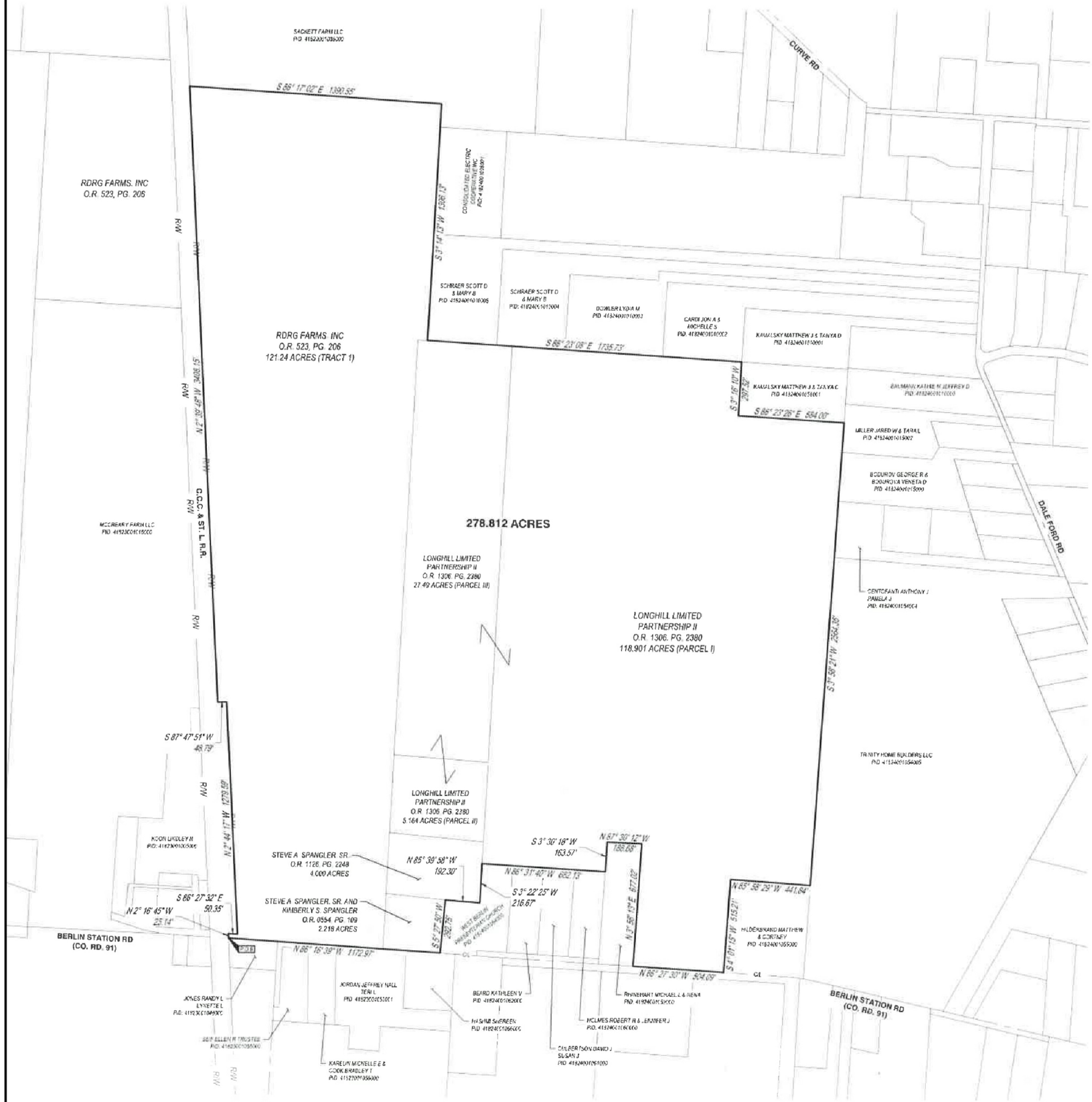
GAVLAK & HEATHER
2922 BERLIN STATION RD
DELAWARE OH 43015

BOARD OF EDUCATION OF THE OLENTANGY LOCAL SCHOOL
3140 BERLIN STATION RD
DELAWARE OH 43015

MI OF LLC
3222 LOGSDON LOOP
DELAWARE OH 43015

ZONING EXHIBIT OF 278.812 ACRES

STATE OF OHIO, COUNTY OF DELAWARE, TOWNSHIP OF BERLIN,
FARM LOT 13 & 15, RANGE 18, TOWNSHIP 4, SECTION 2,
UNITED STATES MILITARY LANDS



THIS EXHIBIT WAS PREPARED FROM EXISTING RECORDS AND IS FOR ZONING PURPOSES ONLY.

STATE OF OHIO
JEFFREY A. MILLER
7211
REGISTERED PROFESSIONAL SURVEYOR

2-20-19

JEFFREY A. MILLER
OHIO P.S. #7211

DATE

300 0 300 600
GRAPHIC SCALE (IN FEET)

BERLIN STATION	
ZONING EXHIBIT	
BERLIN STATION ROAD TOWNSHIP OF BERLIN	DELAWARE COUNTY, OH
SCALE: 1"=300'	DATE: FEBRUARY 2019
DESIGN: N/A	JOB NO.: 755988
DRAWN: ALB	SHEET NO.: 1 OF 1
CHECKED JAM	CESO WWW.CESOINC.COM

ZONING DESCRIPTION
278.812 Acres

Situated in the State of Ohio, County of Delaware, Township of Berlin, Farm lots 13 and 15, Range 18, Township 4, Section 2, United States Military Lands, and being all out of that 118.901 acre, 27.49 acre and 5.164 acre tracts as conveyed to Longhill Limited Partnership II, of record in Official Record 1306, page 2380, a 121.24 acre tract as conveyed to RDRG Farms, Inc. of record in Official Record 523 page 206, a 4.000 acre tract (tract 1) as conveyed to Steve A. Spangler SR. of record in Official Record 1126 page, 2248, and 2.218 acres as conveyed to Steve A. Spangler and Kimberly S. Spangler of record in Official Record 554, page 109, all deed references refer to the records of the Recorder's Office Delaware County and described as follows:

Beginning at the intersection of the center line of Berlin Station Road with the Easterly Right of Way line of the existing Railroad and the southwesterly corner of the above referenced parcels;

Thence with the perimeter of the above reference parcels the following courses:

North 02°16'45" West a distance of 25.14 feet to a corner thereof;

South 86°27'32" East a distance of 50.35 feet to a corner thereof;

North 02°44'17" West a distance of 1,279.59 feet to a corner thereof;

South 87°47'51" West a distance of 48.79 feet to a corner thereof;

North 02°39'48" West a distance of 3,408.15 feet to a corner thereof;

South 86°17'02" East a distance of 1,390.55 feet to a corner thereof;

South 03°14'13" West a distance of 1,306.13 feet to a corner thereof;

South 86°23'08" East a distance of 1,735.73 feet to a corner thereof;

South 03°16'10" West a distance of 297.52 feet to a corner thereof;

South 86°23'26" East a distance of 584.00 feet to a corner thereof;

South 03°58'21" West a distance of 2,564.35 feet to a corner thereof;

North 85°58'29" West a distance of 441.84 feet to a corner thereof;

South 04°01'15" West a distance of 515.21 feet to a corner thereof in said center line;

North 86°27'30" West with said center line a distance of 504.09 feet to a corner thereof;

North 03°58'13" East a distance of 677.02 feet to a corner thereof;

North 87°30'12" West a distance of 188.68 feet; to a corner thereof;

South 03°30'18" West a distance of 163.57 feet; to a corner thereof;

North 86°31'40" West a distance of 682.13 feet to a corner thereof;

South 03°22'25" West a distance of 216.67 feet to a corner thereof;

North 85°39'58" West a distance of 192.30 feet to a corner thereof;

South 05°27'50" West a distance of 292.75 feet to a corner thereof in said centerline;

North 86°16'39" West with said center line a distance of 1,172.97 feet to the TRUE PLACE OF BEGINNING and containing 278.812 acres, more or less.

This description was prepared from existing records and is for zoning purposes only.

STATE OF OHIO
JEFFREY A. MILLER
7211
REGISTERED PROFESSIONAL SURVEYOR

CESO, Inc.

2-20-19

Jeffrey A. Miller, PS
Registered Surveyor No. 7211

CESO

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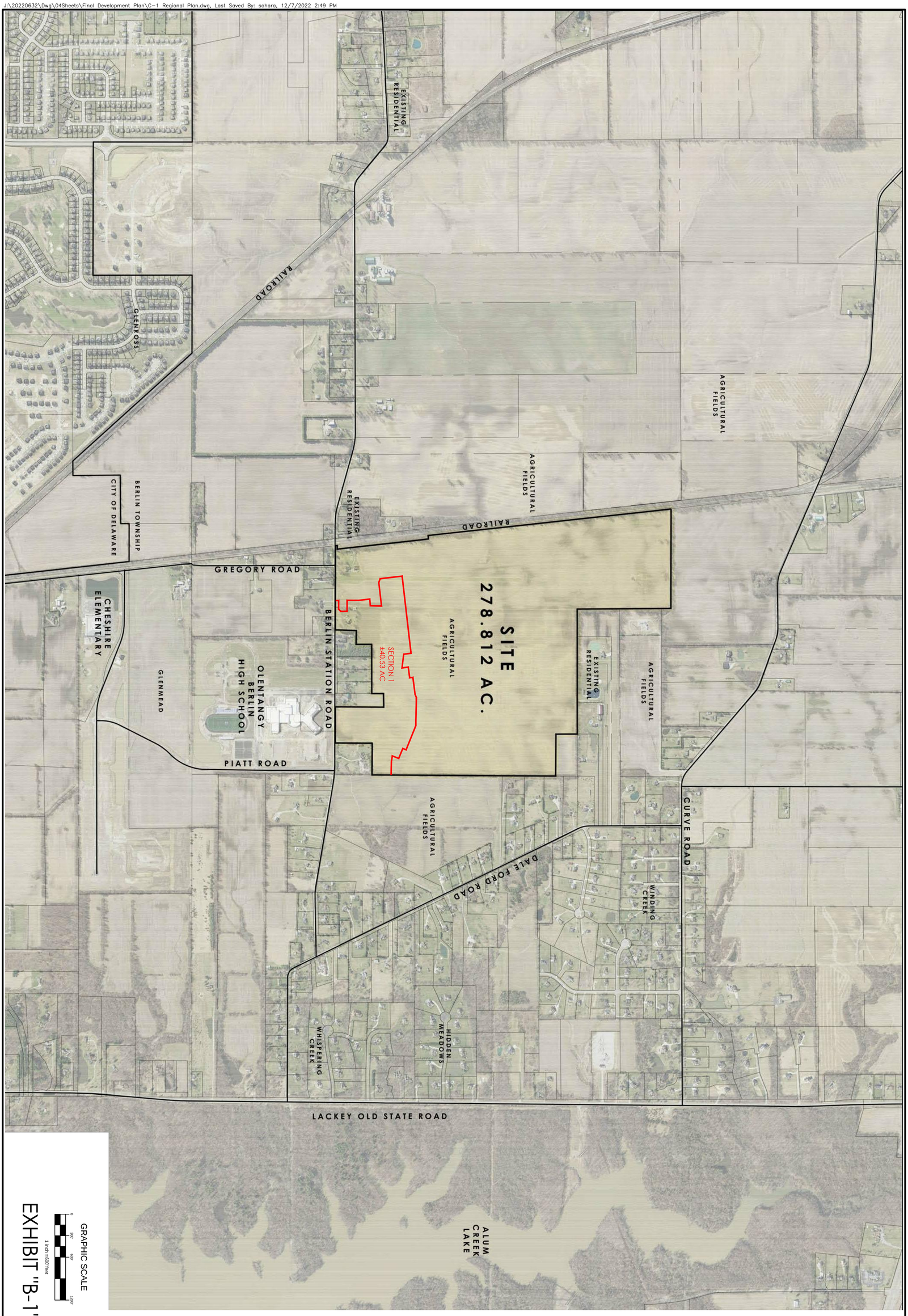

GRAPHIC SCALE
0 300' 600' 1200'
1 inch = 600' feet

EXHIBIT "B-1"

FINAL DEVELOPMENT PLAN

BERLIN FARM WEST

SECTION 1

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

REGIONAL PLAN

PREPARED FOR:

M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PREPARED BY:

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE:	NOVEMBER 12, 2022
REVISED:	
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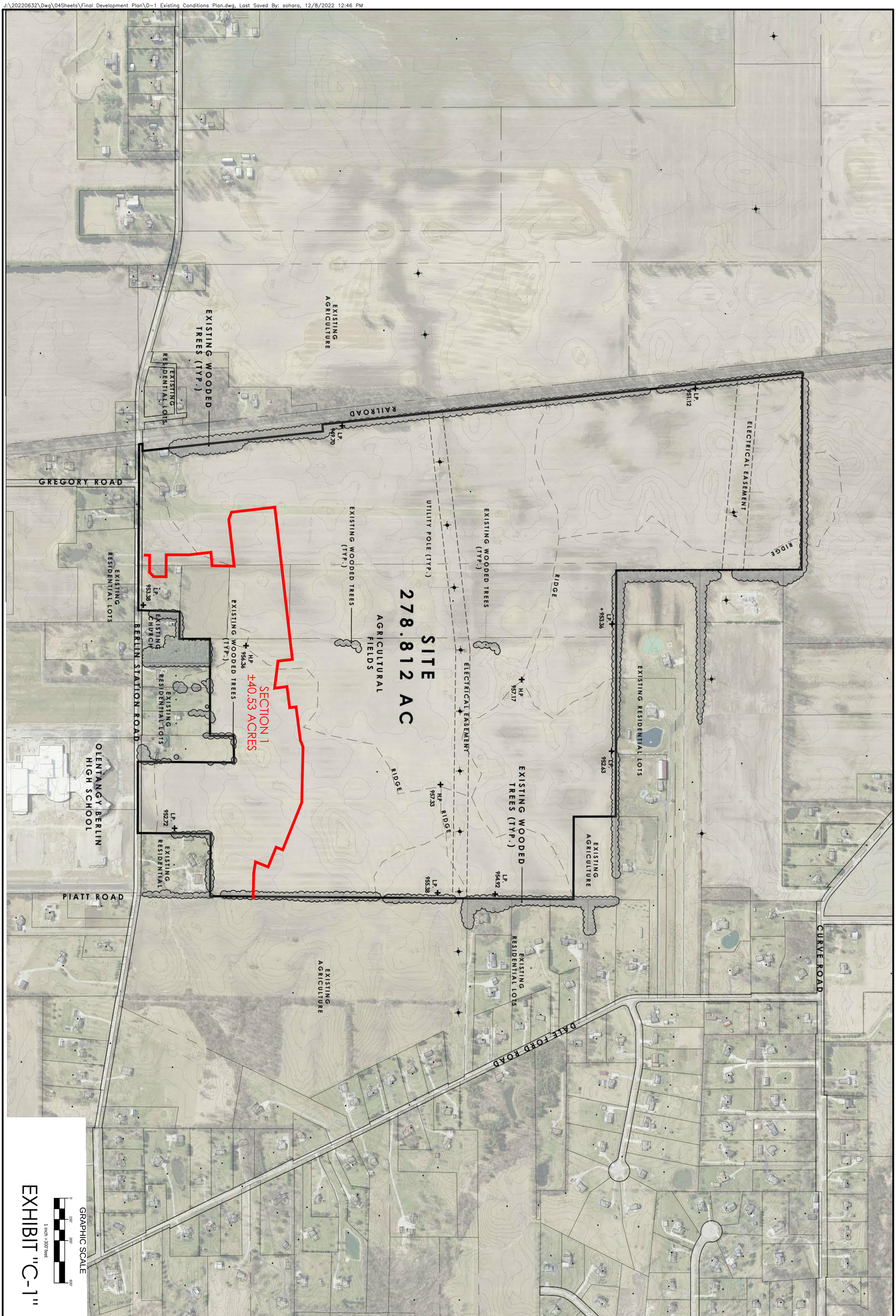

FINAL DEVELOPMENT PLAN

BERLIN FARM WEST

SECTION 1

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

EXISTING CONDITIONS PLAN

PREPARED FOR:

M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PREPARED BY:

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5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE:	NOVEMBER 12, 2022
REVISED:	
REVISED:	
REVISED:	
REVISED:	
REVISED:	

250'

M/I HOMES
mihomes.com

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Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
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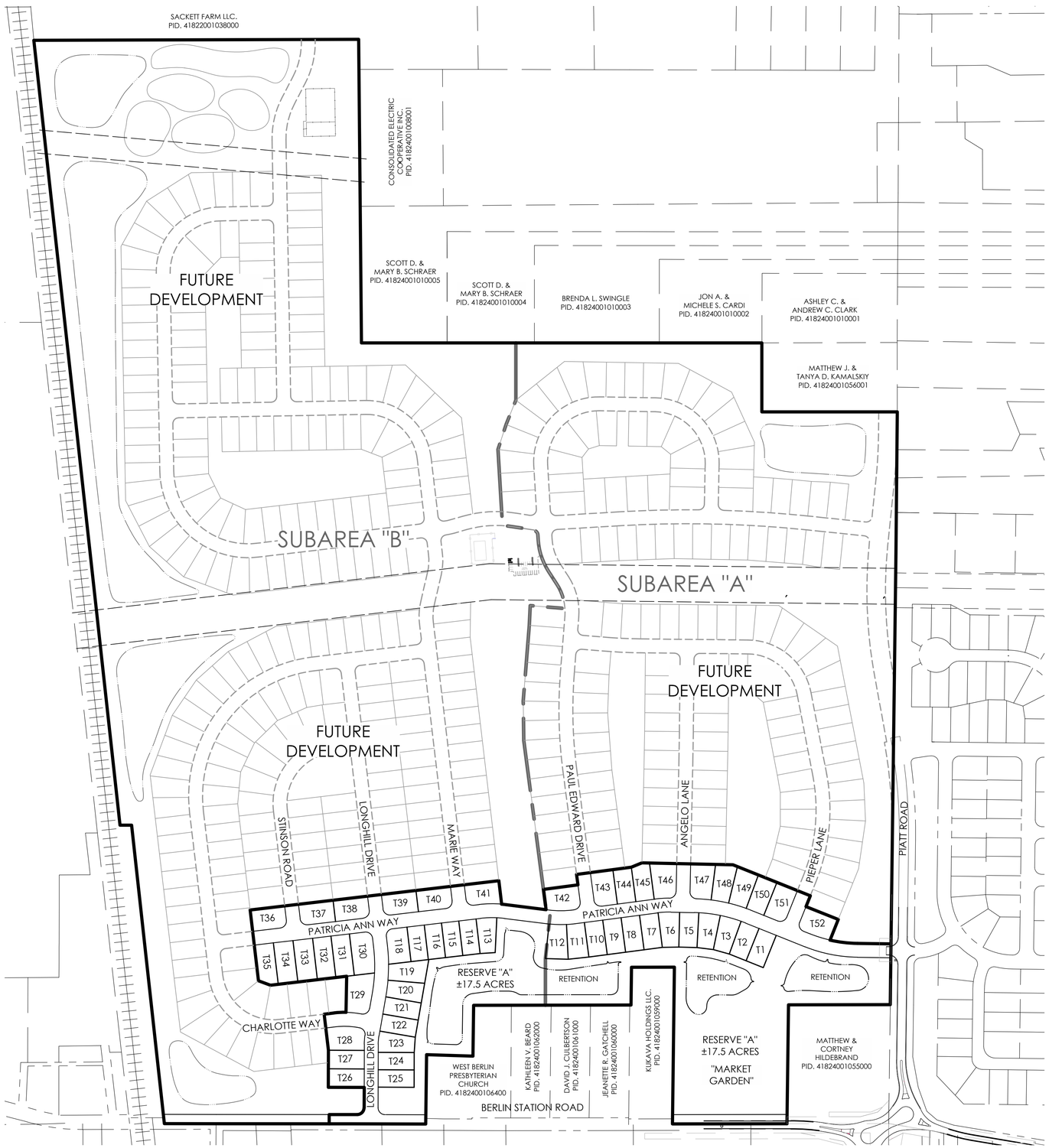
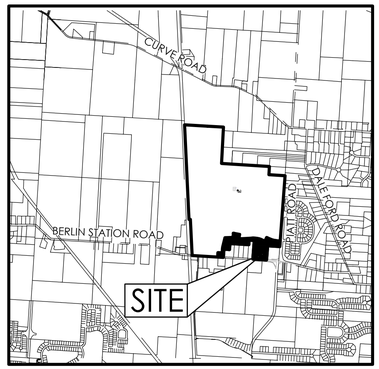


GRAPHIC SCALE

0 125' 250' 500'

1 inch =250' feet



LOCATION MAP

SITE STATISTICS:

TOTAL ACREAGE:	±40.53 ACRES
EXISTING ZONING:	R-3 PRD
TOTAL NUMBER OF LOTS:	52 LOTS
SUBAREA "A" (75' X ±150'):	23 LOTS
SUBAREA "B" (80' X ±150'):	29 LOTS
OPEN SPACE:	
REQUIRED:	±17.0 ACRES*
PROVIDED:	±17.5 ACRES

* 17.0 acres was established for Reserve A on the Preliminary Development Plan dated Feb. 14, 2022.

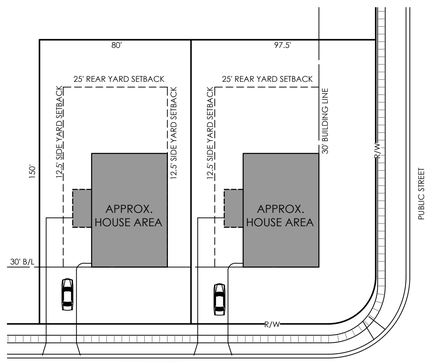
DESIGN STANDARDS:

SUBAREA "A": ABERDEEN (LOTS T-1 - T12, T42 - T52)

MINIMUM LOT FRONTAGE (BUILDING LINE):	80 FEET
MINIMUM LOT AREA:	12,00 SQUARE FEET
MINIMUM FRONT YARD SETBACK:	30 FEET (BUILDING LINE)
MINIMUM SIDE YARD SETBACK:	12.5 FEET (TOTAL 25 FEET)
MINIMUM REAR YARD SETBACK:	25 FEET
MAXIMUM BUILDING HEIGHT:	35 FEET

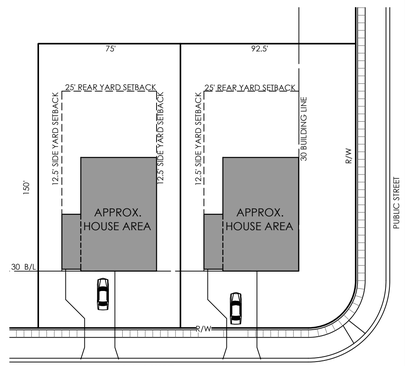
SUBAREA "B": WINDROW (LOTS T13 - T41)

MINIMUM LOT FRONTAGE (BUILDING LINE):	75 FEET
MINIMUM LOT AREA:	11,250 SQUARE FEET
MINIMUM FRONT YARD SETBACK:	30 FEET (BUILDING LINE)
MINIMUM SIDE YARD SETBACK:	12.5 FEET (TOTAL 25 FEET)
MINIMUM REAR YARD SETBACK:	25 FEET
MAXIMUM BUILDING HEIGHT:	35 FEET



ABERDEEN
SUB-AREA "A"
(80' X ±150')

NOT TO SCALE



WINDROW
SUB-AREA "B"
(75' X ±150')

NOT TO SCALE

EXHIBIT "E-1"

DATE: NOVEMBER 12, 2022
REVISED:
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REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

PREPARED FOR:

M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

OVERALL SITE PLAN

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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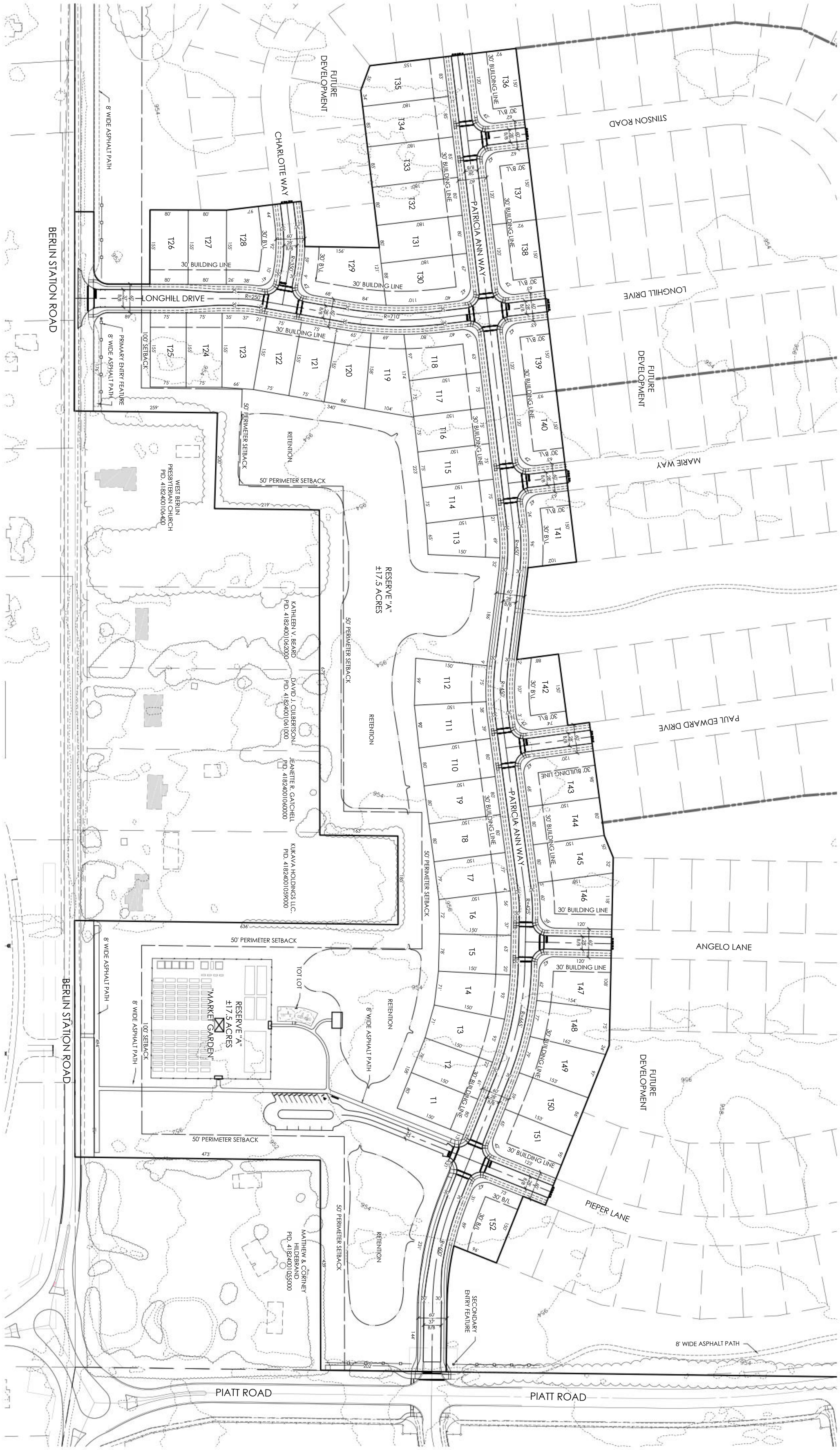

GRAPHIC SCALE
0 50 100 200
1 inch = 100 feet

EXHIBIT "E-2"

FINAL DEVELOPMENT PLAN

BERLIN FARM WEST
SECTION 1

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

SITE PLAN ENLARGEMENTS-1

PREPARED FOR:

M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PREPARED BY:

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE:	NOVEMBER 12, 2022
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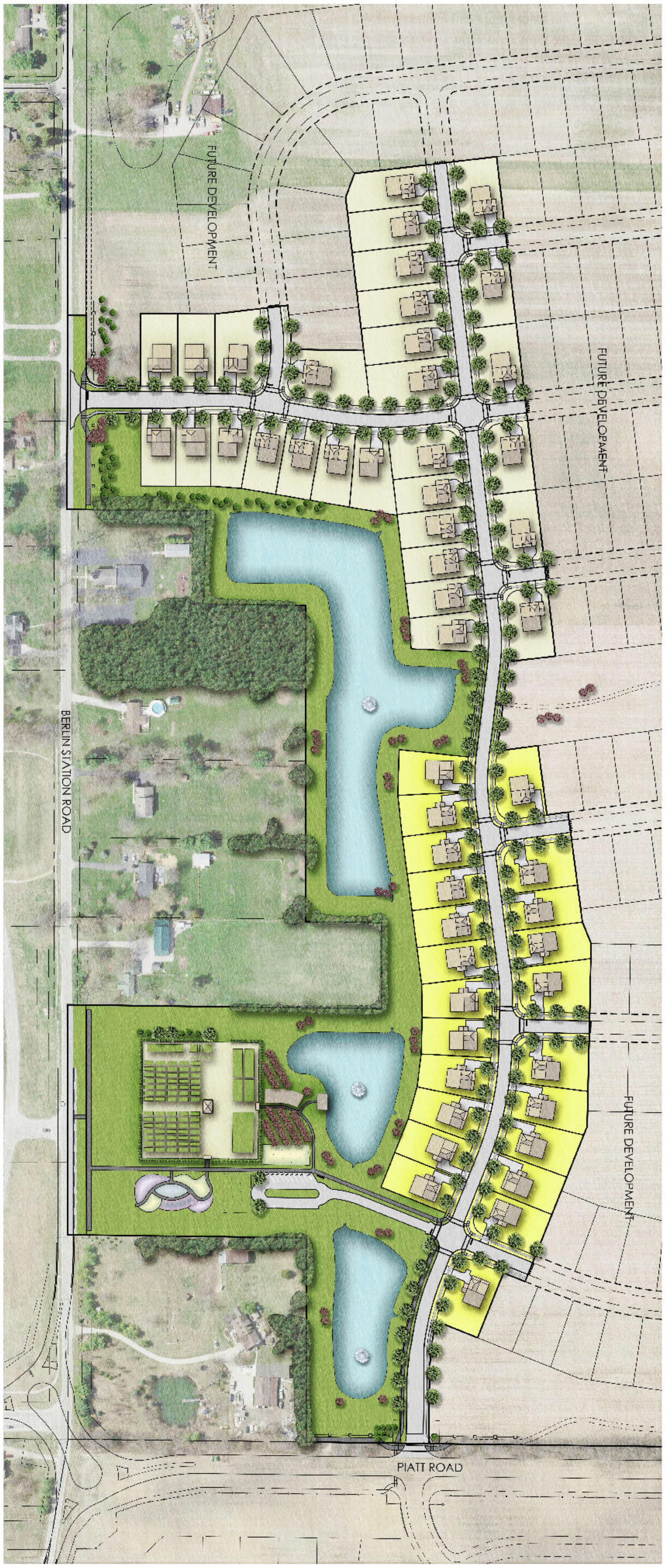

LEGEND:
ABERDEEN
WINDROW

GRAPHIC SCALE
1 inch = 120 feet

EXHIBIT "F-1"

BERLIN FARM WEST

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

ILLUSTRATIVE SITE PLAN

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PREPARED BY:
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Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE:	NOVEMBER 10, 2022
REVISED:	
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REVISED:	
REVISED:	

SITE STATISTICS:

PHASE 1:	52 LOTS
PHASE 2:	59 LOTS
PHASE 3:	43 LOTS
PHASE 4:	57 LOTS
PHASE 5:	54 LOTS
PHASE 6:	56 LOTS
PHASE 7:	68 LOTS
PHASE 8:	45 LOTS
TOTAL:	434 LOTS

NOTE:

PHASING IS PRELIMINARY AND SUBJECT TO CHANGE DUE TO MARKET CONDITIONS AND CLIENT PREFERENCES. MULTIPLE PHASES OR A PORTION OF A PHASE MAY BE CONSTRUCTED TOGETHER.

✳ CENTRAL MAIL BOXES
- APPROXIMATE LOCATION
- TO BE LOCATED IN THE 3 PARK AREAS WITH OFFSTREET PARKING.

GRAPHIC SCALE

0 125' 250' 500'

1 inch = 250' feet

EXHIBIT "F-1"

DATE: NOVEMBER 12, 2022
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMH&T
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone (614) 775-4500 Toll Free 866.775.5348
emht.com

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PHASING PLAN

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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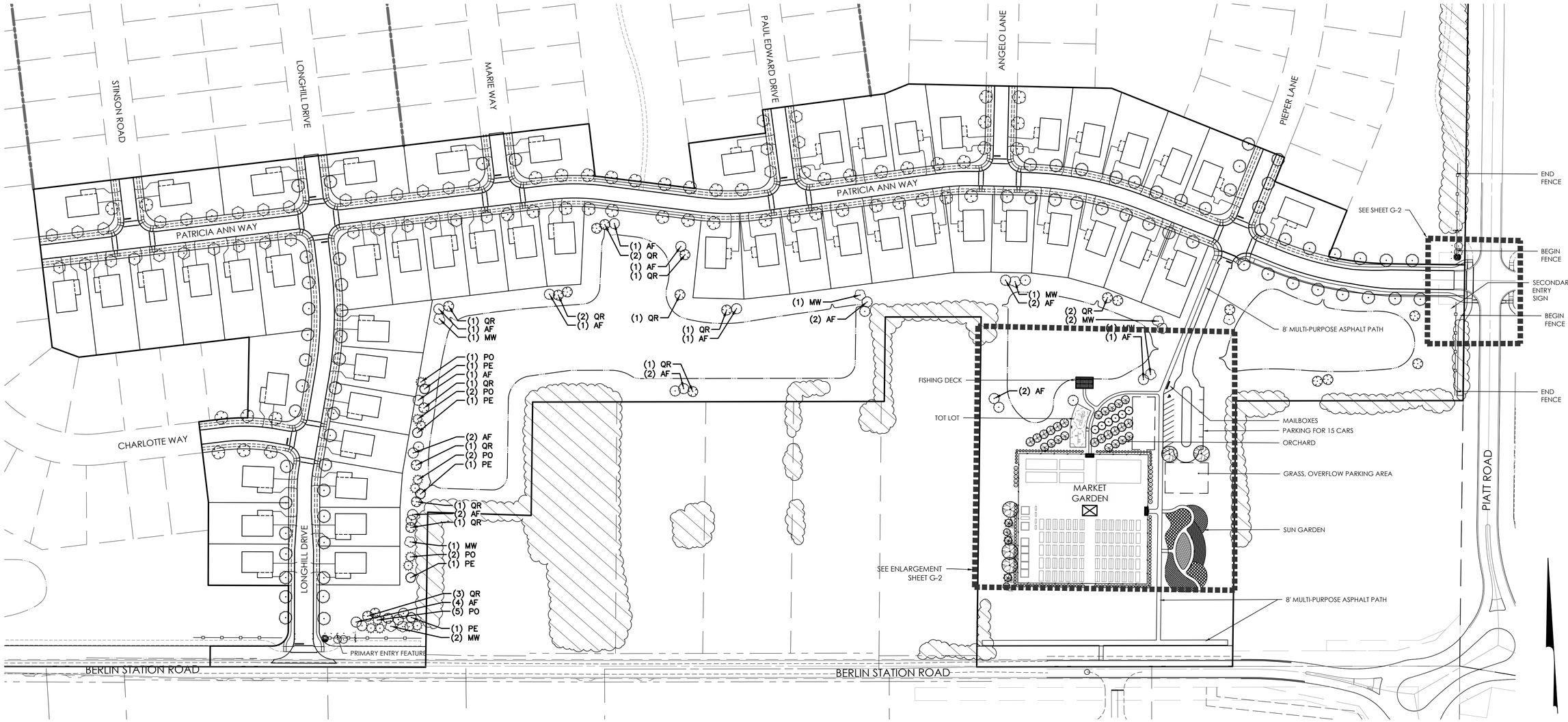

GRAPHIC SCALE

0 50 100 200

1 inch = 100 feet

PLANT SCHEDULE SITE TREES

SITE TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION
	23	Acer ginnala 'Flame'	Flame Amur Maple	2" Cal.	B&B
	10	Maclura pomifera 'White Shield'	White Shield Osage Orange	2" Cal.	B&B
	5	Picea abies	Norway Spruce	6' Ht.	B&B
	12	Picea obovata	Serbian Spruce	6' Ht.	B&B
	23	Quercus rubra	Red Oak	2" Cal.	B&B

PLANT SCHEDULE STREET TREES

STREET TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION
	71	Acer x freemanii 'Jeffersred'	Autumn Blaze Freeman Maple	2.5" Cal.	B&B
	37	Acer x freemanii 'Sienna'	Sienna Glen Maple	2.5" Cal.	B&B
	46	Liriodendron tulipifera	Tulip Tree	2.5" Cal.	B&B

CONCEPTUAL PRIMARY ENTRY SIGN
BERLIN STATION ROAD

CONCEPTUAL SECONDARY ENTRY SIGN
PIATT ROAD

CONCEPTUAL IMAGERY

EXHIBIT "G-1"

DATE: NOVEMBER 12, 2022
REVISED:
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REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone 614.775.4500 Fax 614.775.4800 Toll Free 866.775.5648
emht.com

PREPARED FOR:
M I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

PRELIMINARY LANDSCAPE PLAN

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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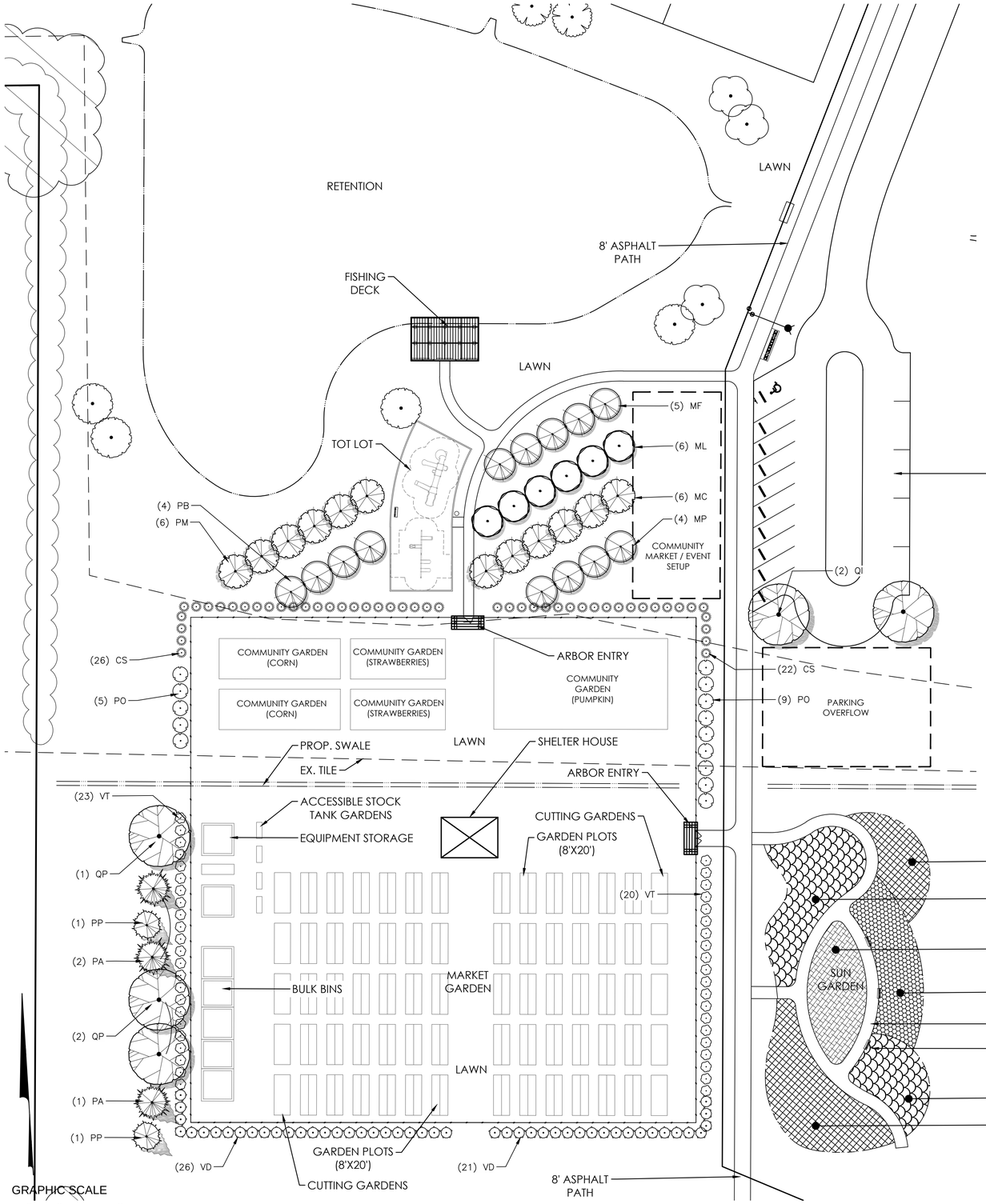
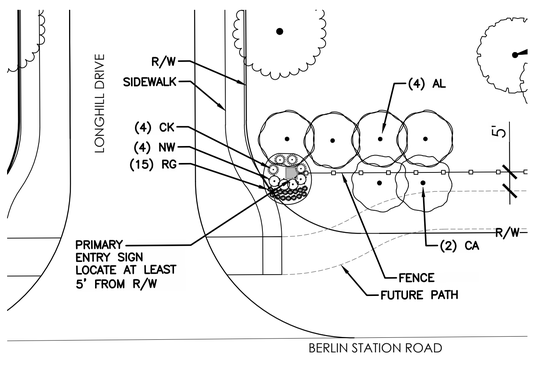
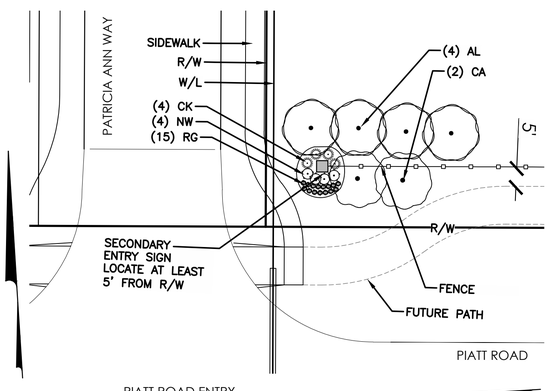


SOUTH GARDENS LANDSCAPE ENLARGEMENT



BERLIN STATION ROAD ENTRY
PRIMARY SIGN LOCATION
AND LANDSCAPE



PIATT ROAD ENTRY
SECONDARY SIGN LOCATION
AND LANDSCAPE

PLANT_SCHEDULE_ENTRY_PLANITNGS

ORNAMENTAL TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AL	8	Amelanchier laevis 'Rogers'	Lustre Allegheny Serviceberry	1.5" Cal.
CA	4	Cercis canadensis 'Appalachian Red'	Appalachian Red Eastern Redbud	1.5" Cal.
PERENNIALS	**QTY**	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**
CK	8	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	24" Ht.
NW	8	Nepeta x 'Walker's Low'	Walker's Low Catmint	18" Ht.
RG	30	Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac	#1

PLANT_SCHEDULE_FARM_AND_GARDEN_PLANTINGS

FRUIT TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	NOTE
	PM	6	Prunus 'Montmorency'	Montmorency Cherry	1.5" Cal.	
	PB	4	Pyrus communis 'Bartlett'	Bartlett Pear	1.5" Cal.	
	MF	5	Malus 'Freedom'	Freedom Apple	1.5" Cal.	
	ML	6	Malus 'Liberty'	Liberty Apple	1.5" Cal.	
	MC	6	Malus 'Cortland'	Cortland Apple	1.5" Cal.	
	MP	4	Malus 'Pristine'	Pristine Apple	1.5" Cal.	Cross pollination from other apple varieties on this list are necessary to produce fruit.
FENCE ROW TREES						
	VD	47	Viburnum dentatum	Arrowood Viburnum	3 gallon	
	VT	43	Viburnum trilobum compactum	Compact Amer. Cranberrybush	3 gallon	
	PO	14	Physocarpus opulifolius	Summer Wine Nine Park	3 gallon	
	CS	48	Cornus sericea	Cardinal Red Twig Dogwood	3 gallon	
BUFFER TREES						
	QP	3	Quercus palustris	Pin Oak	2" Cal.	
	PA	3	Picea abies	Norway Spruce	6' HT	
	PP	2	Picea pungens	Colorado Spruce	6' HT	
PARKING LOT TREES						
	QI	2	Quercus impricaria	Shingle Oak	2" Cal	
SUN GARDEN						
	Seed Mix #1					
	Seed Mix #2					
	Seed Mix #3					
	Seed Mls #4					

EXHIBIT "G-2"

DATE: NOVEMBER 12, 2022
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: Phone: 866.775.5646
emht.com

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

MARKET GARDENS
LANDSCAPE
ENLARGEMENT

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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SHELTER HOUSE

ARBOR ENTRY

GARDEN PLOTS

FISHING DECK

FISHING DECK

The images on this sheet that portray site elements for the Market Garden are subject to change. The intent of these images is to show overall design intent, scale, and character of the proposed features. Minor deviations may occur and shall be permitted with the Township's administrative approval.

EXHIBIT "G-3"

DATE: NOVEMBER 12, 2022
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone 614.775.4500 Fax 614.775.4800
emht.com

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

LANDSCAPE DETAILS

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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Amherst


Elevation E


Elevation B

Elevation D

Square Feet: 2,437-2,581
Bedrooms: 3-4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

Xavier


Elevation B


Elevation A


Elevation C

Square Feet: 1,807-2,260
Bedrooms: 3-4
Full Baths: 2-3

Half Baths: 0
Garages: 2-3
Stories: 7-2

M/I HOMES
Welcome to Better

Citadel


Elevation E


Elevation B


Elevation D

Square Feet: 2,669-2,949
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

Bucknell


Elevation E


Elevation B


Elevation D

Square Feet: 2,514-2,714
Bedrooms: 3-4
Full Baths: 2-3

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

Wesleyan


Elevation C


Elevation B

Square Feet: 1,924 – 2,680
Bedrooms: 3-4
Full Baths: 2-3

Half Baths: 0
Garages: 2-3
Stories: 1-2

M/I HOMES
Welcome to Better

Dartmouth


Elevation A


Elevation B


Elevation C

Square Feet: 2,962-3,106
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

Emory


Elevation A


Elevation D


Elevation E

Square Feet: 3,147-3,292
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

Fordham II

Farms at Jefferson


Elevation C


Elevation A


Elevation B

Square Feet: 3,008-3,407
Bedrooms: 4-5
Full Baths: 2-4

Half Baths: 1
Garages: 2-3
Stories: 2

M/I HOMES
Welcome to Better

EXHIBIT "H-1"

DATE: NOVEMBER 12, 2022
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone 614.775.4500 Fax 614.775.4800
emht.com

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

SUB-AREA A
PRODUCT
CHARACTER

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

J:\20220632\Dwg\04Sheets\Final Development Plan\K-1 Sub-Area A Product Character.dwg, Last Saved By: sahara, 12/8/2022 12:48 PM

Smart Series Bexley


Elevation C


Elevation A

Elevation B

Square Feet: 1,711
Bedrooms: 3
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M I HOMES
Welcome to Better

Smart Series Dearborn


Elevation C


Elevation A


Elevation B

Square Feet: 1,948-1,978
Bedrooms: 3-4
Full Baths: 2

Half Baths: 1
Garages: 2
Stories: 2

M I HOMES
Welcome to Better

Smart Series Worthington


Elevation C - Shown w/Opt Stone Watertable


Elevation A


Elevation B

Square Feet: 2,406-2,862
Bedrooms: 3
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M I HOMES
Welcome to Better

Smart Series Findlay


Elevation A


Elevation B


Elevation C

Square Feet: 2,3112-2,336
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2
Stories: 2

M I HOMES
Welcome to Better

Smart Series Canton


Elevation B


Elevation A


Elevation C

Square Feet: 1,832-1,882
Bedrooms: 3
Full Baths: 2

Half Baths: 1
Garages: 2
Stories: 2

M I HOMES
Welcome to Better

Smart Series Erie

Elevation C

Elevation A

Elevation B

Square Feet: 2,161-2,499
Bedrooms: 3-4
Full Baths: 2

Half Baths: 1
Garages: 2
Stories: 2

M I HOMES
Welcome to Better

Smart Series Fremont

Elevation C

Elevation A

Elevation B

Square Feet: 1,523-1,976
Bedrooms: 3-4
Full Baths: 2-3

Half Baths: 0
Garages: 2
Stories: 2

M I HOMES
Welcome to Better

Smart Series Hilliard

Elevation C - Shown w/Opt Stone Watertable

Elevation A

Elevation B

Square Feet: 2,207
Bedrooms: 3
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M I HOMES
Welcome to Better

Smart Series Madison

Elevation C - Shown w/Opt Stone Watertable

Elevation A

Elevation B

Square Feet: 2,450-2,611
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M I HOMES
Welcome to Better

Smart Series Riverside

Elevation C

Elevation A

Elevation B

Square Feet: 1,805-1,932
Bedrooms: 3
Full Baths: 2

Half Baths: 0
Garages: 2
Stories: 1

M I HOMES
Welcome to Better

Smart Series Granville

Elevation C - Shown w/Opt Stone Watertable

Elevation A

Elevation B

Square Feet: 2,549
Bedrooms: 4
Full Baths: 2

Half Baths: 1
Garages: 2-3
Stories: 2

M I HOMES
Welcome to Better

EXHIBIT "H-2"

DATE: NOVEMBER 12, 2022
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: 614.775.4800
emht.com

PREPARED FOR:
M I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

SUB-AREA B
PRODUCT
CHARACTER

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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Model ID/Parking Sign

12" X 24" VINYL GRAPHICS ON DOUBLED-FACED ALUMINUM PANEL / CUSTOM BUILT ALUMINUM FRAME

PROD # 8791 (MODEL ID)
PROD # 8793 (PARKING)

7

Information Center Sign

4

Aframe

24" X 36" VINYL MOUNTED ON MOLDED PLASTIC A-FRAME – PROD # 6628

8

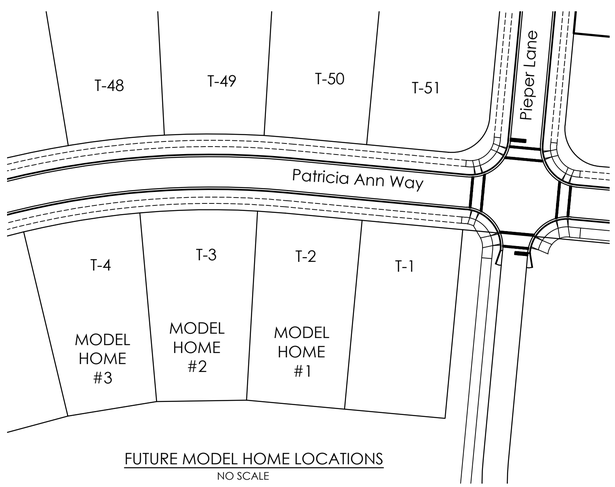
Model Door Hours
15" x 12"

HOME GALLERY HOURS

Mon-Wed: 11:00am -6:00pm
Thurs-Fri: By Appointment
Sat: 11:00am -6:00pm
Sun: 12:00pm -5:00pm

WHITE VINYL ON FIRST SURFACE OF GLASS DOOR

NOTE:
LOCATED AT DECORATED MODEL



FUTURE MODEL HOME LOCATIONS
NO SCALE

Potential Model Home Sites.
Exact location and quantity of Model Homes shall be presented on the Final Development Plan with the potential for up to 5 model home sites and some off-street parking.

CAZ Sign & Safety Sign

16" X 10" SCREENPRINTED STYRENE PANEL. -
PROD # 11277

8' X 4' VINYL MOUNTED TO PLYWOOD WITH PAINTED 4X4 POST. VERTICAL VERSION AVAILABLE UPON REQUEST.

8.5" X 11" SCREENPRINTED STYRENE PANEL

20

Brochure Box

PVC CONSTRUCTION WITH VINYL GRAPHICS MOUNTED TO TRAILER OR 4x4 METAL POST W/CAP

PROD # 8792 (NO POST)

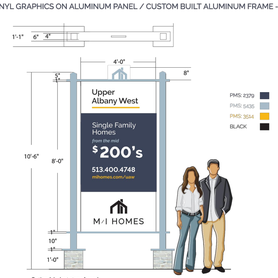
PROD # 9221 (WITH 4X4 POST)

This display can either be affixed to the exterior of the sales office or mounted on a sunken 4x4 post to present a branded greeting and office status.

6

Marketing Sign

VINYL GRAPHICS ON ALUMINUM PANEL / CUSTOM BUILT ALUMINUM FRAME - PR



Option 1 (w/out stone bases)
4' x 8' x 3/8" Alumicore Panel with Digital Print / (1) Aluminum M/I Logo
Centered on Top / (2) 1" x 6" Aluminum Tubes at Top and Bottom / Mounted to
(2) 4" x 4" Aluminum Posts

Option 2 (with stone bases)
4' x 8' x 3/8" Alumicore Panel with Digital Print / (1) Aluminum M/I Logo
Centered on Top / (2) 1" x 6" Aluminum Tubes at Top and Bottom / Mounted to
(2) 4" x 4" Aluminum Posts / Texture Plus Stone Bases with HDU Cap

5

Lot Signs

24" X 24" LOT SIGN, FRAME AND "SOLD" OVERLAY
PROD # 472 (SOLD DECAL), PROD # 277 (MAIN PANEL), PROD # 309 (FRAME), PROD # 1114 (PHONE CHANGE)

18

EXHIBIT "I-1"

NOVEMBER 12, 2022
DATE:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:
REVISED:

PREPARED BY:
EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: Phone: 866.775.5646
emht.com

PREPARED FOR:
M/I HOMES
mihomes.com
4131 WORTH AVENUE, SUITE 310
COLUMBUS, OHIO 43219

MODEL HOME SIGNAGE

FINAL DEVELOPMENT PLAN
BERLIN FARM WEST
SECTION 1
BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

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Kimley»Horn

November 14, 2018

Mr. Dan Pardi
Longhill Limited Partnership II
448 W. Nationwide Blvd, Loft 100
Columbus, OH 43215

Re: Utility Availability Summary
Longhill Single-Family Residential Development

Dear Mr. Pardi:

Kimley-Horn has had conversations with local utility providers and investigated the availability of utility connections and service provisions for the proposed Longhill single-family residential development on the northwest corner of Berlin Station Road and Piatt Road in Berlin Township, Delaware County, Ohio. The following is a summary of the available utilities.

Site Access

The Delaware County Engineer has reviewed the proposed conceptual layout for the development of a 531-lot subdivision and has concluded that the layout, including stormwater management, appears generally feasible. The County Engineer requests that the location of the Piatt Road extension be coordinated with the 62.66-acre development parcel to the east and that entry streets be 3-lanes wide with limited driveways in this area.

Stormwater

Stormwater runoff release rates are required to meet county standards. Delaware County Engineering Standards require that the post-construction release rate from the 100-year storm be less than the pre-construction release rate from the 2-year storm. The proposed single-family development site sits at the top of the watershed divide between Alum Creek and the Olentangy River. The site can be separated into 8 separate watersheds. Most of the site drains to the west towards the existing railroad tracks where two 42" culverts and one 36" culvert serve as an adequate outlet for site runoff. A 30" pipe in the Berlin Station right-of-way provides an outlet to runoff the releases southwest. Two watersheds release north and stormwater will be controlled from these releases to continue to feed offsite ponds. The remaining runoff drains east, and adequate outlets will be designed into the Piatt Road extension. A Preliminary Drainage Map and stormwater management summary are attached.

Sanitary Sewer

A 12" sanitary sewer is available with adequate depth and capacity within the Pines subdivision by M/I Homes to serve the proposed development. M/I has extended the sewer to the end of Phase 1 of the development and will extend the sewer to the northern property line of their project as part of future phases. An offsite extension from the Pines to Berlin Station Road will be part of the effort to bring sanitary sewer service to the proposed development.

Kimley»Horn

Water
A 12" waterline exists on the Berlin High School property along Piatt Road. An offsite extension of a 16" waterline is required along Piatt Road to bring water service to the site. The developer will be required to extend a 16" waterline along the Piatt Road extension.

Electric
American Electric Power has facilities available at the site and will provide service to the proposed development.

Gas
Columbia Gas has facilities available at the single-family developments along Piatt Road between Cheshire Road and Berlin Station Road. Gas service will be available by extending facilities from these developments to the proposed development.

Communications
Frontier Communications has facilities available at the site and will provide service to the proposed development.

Cable
Spectrum has facilities available at the site and will provide service to the proposed development.

Closure

The information provided in this summary letter is based on communication with the Delaware County Engineer's Office, Delaware County Sewer District, Del-Co Water and utility service providers. Letters are provided attached to this summary detailing communications.

We appreciate the opportunity to provide this summary to you.
Sincerely,

Kimley-Horn and Associates, Inc.

Michael C. Reeves

Michael C Reeves, P.E.
Associate

Delaware County
Regional Sewer District

Executive Director
Michael A. Frommer, P.E.

Director/Sanitary Engineer
Tiffany M. Maag, P.E.

November 8, 2018

Michael C. Reeves, P.E.
Kimley-Horn
2400 Corporate Exchange Drive, Suite 120
Columbus, OH 43231

sent via email: Mike.Reeves@kimley-horn.com

Re: **Request for Sewer Capacity**
Berlin Station
Parcels: 41823001002000, 41823001001000, 41824001058001, 41824001058000, 41824001057000, 41824001056000

Dear Mr. Reeves:

The Delaware County Regional Sewer District (the "County") has considered your request for approval to discharge sanitary sewage into the Delaware County Sanitary Sewer System from the above referenced location, representing 531 Equivalent Residential Unit(s) (ERU).

Capacity is conditionally available to serve the proposed project. Extensions from the sanitary sewer currently under construction on the property at 1856 Lackey Old State Road will be necessary to provide service to the proposed lots.

The current assessment of capacity availability is subject to periodic reevaluation by the County and shall not be valid after 18 months from the date of this letter.

If you have any questions, please feel free to contact me.

Sincerely,

Kelly Thiel

Kelly Thiel
Staff Engineer III
Delaware County Regional Sewer District

cc: Correspondence File

DEL-CO WATER COMPANY

6658 OLENTANGY RIVER ROAD
DELAWARE, OHIO 43015
www.delcowater.org
Phone (740) 548-7746 • Fax (740) 548-6203

October 25, 2018

Benjamin A. Siembida, P.E. Via Email: Ben.Siembida@kimley-horn.com
Kimley-Horn
2400 Corporate Exchange Dr., Suite 120
Columbus, Ohio 43231

RE: Water Availability – Berlin Station Road Property

Dear Mr. Siembida:

As requested, this is to inform you that Del-Co Water can provide water service to the site described below upon plan approval and payment of the required fees:

Development: Berlin Station Property
Proposed Land Use: ±531 single-family homes
Location: Northwest corner of Berlin Station Road and Piatt Road Extended
Land Size: ±301.97 acres

Water is available where an existing 12-inch waterline currently ends on Piatt Road at Olentangy High School No. 4 (a.k.a Berlin High School). The developer will be required to extend a new 16-inch waterline along Piatt Road and the proposed Piatt Road extended.

This letter of water availability is valid for a period of one year from the date of this letter. Del-Co makes no guarantee of water availability beyond this period. Contact our Engineering Department if you have any questions on the plan review process, or our Customer Service Department for information on tap fees.

Sincerely,
DEL-CO WATER COMPANY, INC.

Shane F. Clark, P.E.
Deputy General Manager

Delaware County Engineer

Chris Bauserman, P.E., P.S.
County Engineer

Robert M. Riley, P.E.
Chief Deputy Engineer

November 5, 2018

Berlin Township Zoning Board
3271 Cheshire Rd.
Delaware, OH 43015

Re: Berlin Station Road Property Development – Pardi Property, Berlin Township

Dear Zoning Board Members:

The Delaware County Engineer's Office (DCEO) has reviewed the proposed conceptual layout dated November 15, 2018 for the development of a 531 lot, single family development on approximately 301.97-acres along the north side of Berlin Station Road, west of the future extension of Piatt Road in Berlin Township. The proposed conceptual layout, including storm water management, appears in general to be feasible; however, we recommend the following modifications:

1) Coordinate the location of Piatt Road with the adjacent 62.66-acre development parcel to the east.
2) Remove the extension of the road bearing north between lots 375-C and 376-C, towards the 7.50-acre tract with PID number 41824001010002.
3) The entry streets into the development are required to be 3-lanes wide, per County standards. The westerly entrance from Berlin Station Road and the entrance from Piatt Road will be required to be 3-lanes to the first intersection. The easterly entrance from Berlin Station Road must have 3-lanes to include 100-feet of storage plus a 50-foot divergent taper per Article VI, Section 601 Part C. Our preference would be to not have residential drive access in this area.

A traffic impact study is required to determine if any on-site and/or off-site roadway improvements are required. We have received the MOU for this project and are currently reviewing it.

Please note the plans reviewed are preliminary in nature and, therefore, only address the conceptual layout. Final engineering plans will need to be submitted that comply with the current edition of the Delaware County Engineer's Design, Construction and Surveying Standards Manual. Thank you for the opportunity to comment on this proposal. Subject to the Township's approval, we will review the detailed engineering plans for this site.

Sincerely,

John Piccin, P.E., P.S.
Deputy Development Engineer

cc: John Pardi, Developer
Mike Reeves, Kimley-Horn
David Loveless, Berlin Township Zoning Inspector
Scott Sanders, DCRPC
Rob Riley, Mike Love, Doug Riedel, Erik Mackling, DCEO

encl

50 Channing Street, P.O. Box 8006, Delaware, Ohio 43015-8006
E-Mail: delcoeng@co.delaware.oh.us *Web Site:* www.delawarecountyengineer.org
(740) 833-2400 • (740) 548-7313, Ext. 2400 • *Fax:* (740) 833-2399

Columbia Gas of Ohio
A NiSource Company

October 24, 2018

Ben Siembida
Kimley-Horn
2400 Corporate Exchange Dr, Suite 120
Columbus, OH 43231

Re: Berlin Station Rd in Delaware County, OH

Thank you for wanting to choose Columbia Gas of Ohio, Inc. (COH), a NiSource Company, to serve your natural gas needs to your new proposed project. This letter is to confirm COH does have facilities in the area along Cheshire Rd. Although COH facilities may be in the vicinity of your proposed property, further investigation will need to take place for capacity. Once Attachment A of the Information Request Packet has been answered and returned and all other requested information is released to the COH New Business Team, gas availability and any capacity issues will be determined; as well as any deposit and/or Aid-To-Construction costs that may be required.

Please note that availability is contingent upon a cost benefit analysis. If the project is not deemed economically feasible for Columbia Gas, a deposit may be necessary

If you have any questions regarding availability, or how it is determined, please feel free to contact me at 614-506-7023 Monday-Friday, 8:00am to 4:30pm. Columbia Gas and I look forward to partnering with you on this and future projects.

Sincerely,

Todd Schwarz

Columbia Gas of Ohio a Nisource Company
Todd Schwarz
Development Manager

SUBURBAN NATURAL GAS COMPANY
ESTABLISHED 1882

211 FRONT STREET, P.O. BOX 130
CYGNET, OHIO 43413-0130
(419) 655-2345
FAX: (419) 655-2274
2626 LEWIS CENTER ROAD
LEWIS CENTER, OHIO 43035-9206
(740) 548-2450
FAX: (740) 549-4939

April 8, 2019

John Pardi
Longhill PL II
4050 Lyon Drive
Columbus, Ohio 43220

RE: Spangler, RDRG, and Longhill PL II Premises

Dear Mr. Pardi:

In response to your request for natural gas service availability to the approximately 301.964 acres located on the east of Dale Ford Road and north of Berlin Station Road, Delaware County, Ohio, Suburban Natural Gas Company does have natural gas service available to the above described location.

As always, natural gas service to the area as well as any other served or to be served by Suburban Natural Gas Company is subject to the terms and conditions of our PUCO tariff.

We look forward to working with you on the proposed project. If you have any questions, feel free to contact me directly.

Cordially,

A L Roll

Aaron Roll
Vice President
System Development

AR/hc

cc: Andrew Sonderman

An AEP Company

BOUNDLESS ENERGY™

AEP Ohio
700 Morrison Rd
Gahanna, OH 43230
AEPOhio.com

10/25/2018

Benjamin A. Siembida, P.E.
Kimley-Horn
2400 Corporate Exchange Dr, Suite 120
Columbus, OH 43231

RE: AVAILABILITY OF ELECTRICAL SERVICE

Berlin Station Road Property

To Whom It May Concern:

This letter will confirm that American Electric Power has electric service facilities adjacent to your new project. These facilities will be made available to serve your project with some Contribution-In-Aid-To-Construction charged to the project developer.

Our records indicate your project; a 531-single family residential development is located on the north side of Berlin Station Rd and west of Piatt Rd, in Berlin Township, Delaware County, Ohio.

American Electric Power anticipates providing your new project the best possible service. I look forward to working with you and remain available to coordinate your project needs. Please contact me to discuss any questions you may have or other assistance you may require.

Sincerely,

Erik Schaas
Customer Design Supervisor

Berlin Township
Fire Department
2708 Lackey Old State Road
Delaware, Ohio 43015
(740) 548-6031

Fire Chief Craig Hall
Lt. Steve Arnold, Fire Prevention

Date: 11/08/2018

To: Benjamin A. Siembida, PE

From: Lt. Steve Arnold

Subject: Letter of Berlin Twp. Fire Department Service

I am writing in response to your request regarding the proposed land use development known as Berlin Station Road Property parcels 418-240-01-056-000, 418-01-057-000, 418-240-01-058-000, 418-230-01-002-000, 418-230-01-001-000, 418-240-01-058-001 This Section of land is located in Berlin Township and Berlin Township Fire Department does provide fire protection for this area.

We appreciate the opportunity to work with you in the future and thank you for your interest in Berlin Township. If we can be of any further assistance please do not hesitate to call or visit our 2708 Lackey Old State location.

Respectfully,

Lt. Steve Arnold, CFSI

DELAWARE COUNTY SHERIFF'S OFFICE
Sheriff Russell L. Martin

Administration Division 149 N. Sandusky Street Delaware, OH 43015
Phone (740) 833-2810 Fax (740) 833-2809

November 12, 2018

Benjamin A. Siembida, P.E.
Kimley-Horn |
2400 Corporate Exchange Drive, Suite 120
Columbus, OH 43231

Mr. Siembida,

This letter is to complete your request for written verification that the Delaware County Sheriff's Office provides services for a specific property.

The Delaware County Sheriff's Office is the primary law enforcement responder 2807 Berlin Station Road.

If you have any other questions please feel free to contact me at 740-833-2863.

Sincerely,

Russell L. Martin Jr.

Sheriff Russell L. Martin, C.L.E.E.
Delaware County

EMH&T
Engineers, Surveyors, Planners, Scientists
Delivering Solutions.

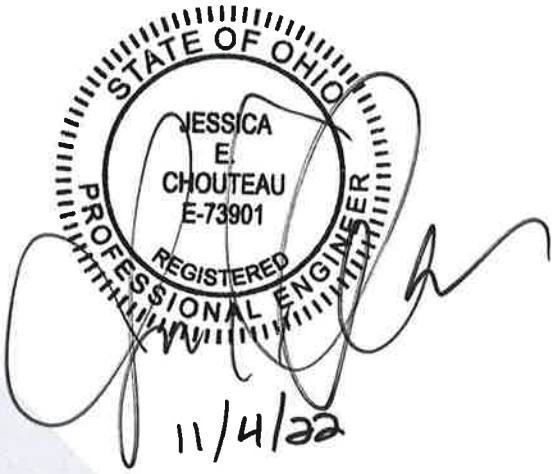
5500 New Albany Rd., Columbus, OH 43054
p. 614.775.4500
f. 614.775.4800
info@emht.com
Job Number: 2022-0132/2022-0632

Berlin Farm West

Preliminary Stormwater Management Plan (SWMP)

Prepared For: M/I Homes

November 4, 2022



Reduced Version

EMH&T

A legacy of **experience**. A reputation for **excellence**.

PROJECT SUMMARY

Project Name:	Berlin Farm West
Location:	Delaware County, Ohio
Type:	Stormwater Management Plan
Reviewing Agency:	Delaware County, Ohio EPA

HYDROLOGIC SUMMARY

Rainfall Data: NOAA Atlas 14, Volume 2, Version 3, 2004

1-yr	2.18”
2-yr	2.61”
5-yr	3.21”
10-yr	3.69”
25-yr	4.38”
50-yr	4.95”
100-yr	5.54”

Rainfall Distribution:	NRCS Type II 24 hour
Detention Policy:	Delaware County
Water Quality:	Delaware County, Ohio EPA
Hydrology Modeling Program:	HydroCAD 10.20

DESIGN SUMMARY

Detention:	Wet Basins
Water Quality:	Wet Basins
Receiving Water Body:	Unnamed Tributaries of Alum Creek and unnamed tributaries of the Olentangy River

REVISIONS

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

The following report provides a detailed analysis and design of the Stormwater Management Plan for Berlin Farm West. The proposed site is located north of Berlin Station Road, west of Dale Ford Road, east of a railroad, and south of Curve Road. The proposed project area involves the development of an agricultural field into a housing development. The runoff from this site will be routed through a series of wet basins for water quality and quantity control before discharging to existing storm sewer systems and eventually an unnamed tributary of Alum Creek to the east and unnamed tributary of Olentangy River to the west. The Stormwater Management Plan was prepared in accordance with the requirements of both Delaware County and the Ohio EPA.

Portions of Berlin Farm West will drain to the east, connect to new Piatt roadway extension project and will utilize the basins provided by Berlin Farms Section 1 (located to the east) for water quality and quantity control.

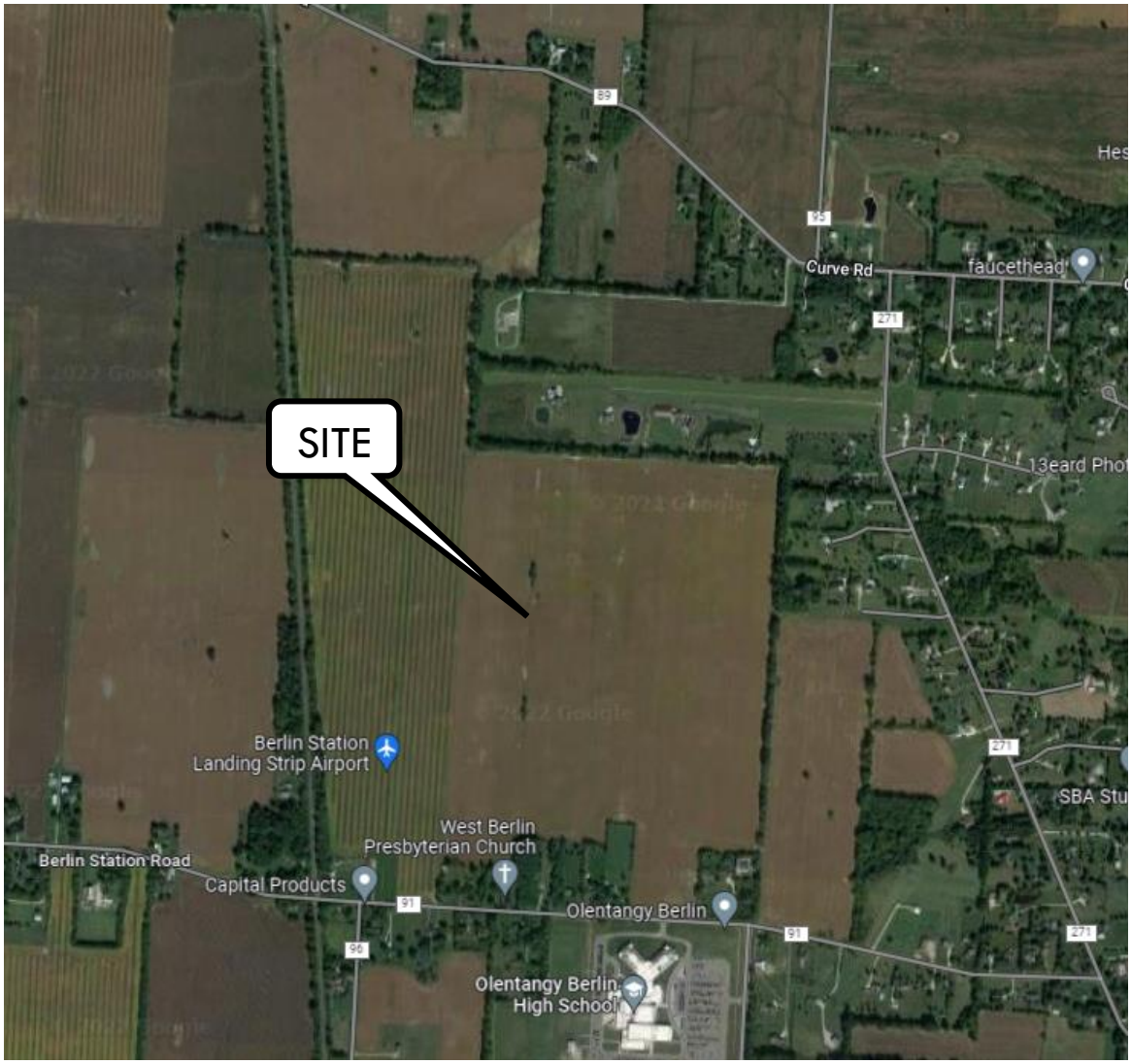


Figure 1 – Site Location Map

2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from NOAA Atlas 14, Volume 2, Version 3, 2004. The peak flow rates were computed using the HydroCAD 10.20 computer program.

3.0 PRE-DEVELOPED ANALYSIS

The pre-developed condition, as seen on Exhibit 1 in Appendix E, consists of mainly agricultural area in good condition Type "C/D" and Type "D" soils. The Delaware County Supplemental Specifications states that in un-developed areas, a maximum CN value of 77 shall be used for pre-developed conditions.

All pre-developed subarea characteristics are summarized in Table 1. Pre-developed peak flow rates are provided in Table 2. All time of concentration calculations can be found in the HydroCAD output in Appendix D.

Table 1 -Pre-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)
Pre-Developed Northwest	29.00	Agricultural	77	0	66.1
Pre-Developed West	118.71	Agricultural	77	0	126.4
Pre-Developed Southwest	21.43	Agricultural	77	0	54.3
Pre-Developed Southeast	44.96	Agricultural	77	0	164.9

Table 2 -Pre-developed Peak Flow Rates

Storm Event (year)	Pre Northwest Peak Flow Rates (cfs)	Pre West Peak Flow Rates (cfs)	Pre Southwest Peak Flow Rates (cfs)	Pre Southeast Peak Flow Rates (cfs)
1	6.67	16.98	5.73	5.25
2	10.53	26.65	9.07	8.22
5	16.68	41.90	14.27	12.93
10	22.00	55.11	18.76	17.03
25	30.09	75.20	25.64	23.26
50	37.04	92.45	31.55	28.63
100	44.42	110.93	37.83	34.34

4.0 POST-DEVELOPED ANALYSIS

Exhibit 2, provided within Appendix E, shows the post-developed condition. The Berlin Farm West project will utilize eight wet basins to provide water quality and quantity control for the proposed development. Phase 1 will include installation of Basins A, B, and C which will remain in the sediment control phase until full build.

The proposed basins will discharge to one of four outlets with several connected basins. The post-developed subarea characteristics are summarized in Table 3. The post-developed allowable release rates and proposed release rates can be found in Tables 4 through 7. Individual basin release rates and water surface elevations are provided in Tables 8 through 13.

Table 3 -Post-developed Subarea Characteristics

Subarea Identifier	Tributary Area (acres)	Land Usage	Runoff Curve Number	% Impervious (%)	Time of Concentration (min)
Sub to A	13.26	Open Space, Impervious Cover	88	43	10
Sub to A road	2.88	Open Space, Impervious Cover	87	38	10
Sub to B	22.99	Open Space, Impervious Cover	87	41	10
Sub to C	43.15	Open Space, Impervious Cover	88	43	10
Sub to D	33.58	Open Space, Impervious Cover	88	44	10
Sub to E	9.53	Open Space, Impervious Cover	88	46	10
Sub to F	27.18	Open Space, Impervious Cover	88	42	10
Sub to G	95.25	Open Space, Impervious Cover	88	43	15
Sub to H	14.36	Open Space, Impervious Cover	83	19	10
Offsite C	3.05	Open Space, Impervious Cover	80	8	25.7
Offsite C road	3.80	Open Space, Impervious Cover	83	19	44.3
Offsite E road	6.12	Open Space, Impervious Cover	82	12	18.9
Offsite H	3.27	Open Space, Impervious Cover	77	0	14.9

Table 4 - Southeast Allowable and Proposed Release Rates

Storm Event (yr.)	Pre-developed Southeast Peak Flow Rates (cfs)	Total Site Allowable Release Rates (cfs)	Basin A Total Proposed Release Rates (cfs)
1	5.25	5.25	2.50
2	8.22	8.22	3.07
5	12.93	8.22	3.72
10	17.03	8.22	4.27
25	23.26	8.22	5.96
50	28.63	8.22	7.01
100	34.34	8.22	8.06

Table 5 - Southwest Allowable and Proposed Release Rates

Storm Event (yr.)	Pre-developed Southwest Peak Flow Rates (cfs)	Total Site Allowable Release Rates (cfs)	Basin E Total Proposed Release Rates (to Southwest) (cfs)	Basin E Total Proposed Release Rates (to Basin D) (cfs)
1	5.73	5.73	0	0.68
2	9.07	9.07	0	1.13
5	14.27	9.07	0	1.93
10	18.76	9.07	0	2.68
25	25.64	9.07	0	3.65
50	31.55	9.07	0.24	4.28
100	37.83	9.07	0.90	4.69

Table 6 - West Allowable and Proposed Release Rates

Storm Event (yr.)	Pre-developed West Peak Flow Rates (cfs)	Total Site Allowable Release Rates (cfs)	Basin D, G, H West Proposed Release Rates (cfs)
1	16.98	16.98	2.17
2	26.65	26.65	3.07
5	41.90	26.65	6.66
10	55.11	26.65	10.68
25	75.20	26.65	15.27
50	92.45	26.65	19.56
100	110.93	26.65	24.21

Table 7 - Northwest Allowable and Proposed Release Rates

Storm Event (yr.)	Pre-developed Northwest Peak Flow Rates (cfs)	Onsite Allowable Release Rates (cfs)	Offsite H Peak Flow Rates (cfs)	Total Site Allowable Release Rates (cfs)	Basin D, G, H Secondary Proposed Release Rates (to Northwest) (cfs)
1	6.67	6.67	2.12	8.79	0.45
2	10.53	10.53	3.29	13.82	1.14
5	16.68	10.53	5.10	15.63	2.07
10	22.00	10.53	6.65	17.18	2.69
25	30.09	10.53	8.99	19.52	3.44
50	37.04	10.53	11.00	21.53	3.74
100	44.42	10.53	13.12	23.65	4.06

Table 8 - Basin A Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin A Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 953.00 (feet)	Storage Volume Utilized (ac-ft)
1	24.23	2.50	948.53	1.385
2	33.00	3.07	948.98	1.899
5	46.20	3.72	949.62	2.643
10	57.16	4.27	950.11	3.243
25	72.63	5.96	950.61	3.871
50	86.95	7.01	951.05	4.443
100	101.29	8.06	951.62	5.207

Storage Utilized (100-yr event): 5.207 ac-ft
Storage Provided (Top of Bank = 953.00 ft.): 7.203 ac-ft

Table 9 - Basin B Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin B (to A) Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 953.00 (feet)	Storage Volume Utilized (ac-ft)
1	37.18	2.80	948.57	1.172
2	49.65	4.58	949.01	1.680
5	67.60	7.38	949.63	2.445
10	82.16	9.56	950.12	3.081
25	103.23	11.98	950.63	3.779
50	120.68	12.67	951.08	4.420
100	138.74	12.37	951.67	5.296

Storage Utilized (100-yr event): 5.296 ac-ft
Storage Provided (Top of Bank = 953.00 ft.): 7.469 ac-ft

Table 10 - Basin C Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin C (to B) Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 953.00 (feet)	Storage Volume Utilized (ac-ft)
1	75.30	0.85	948.65	4.016
2	99.86	1.19	949.06	5.553
5	135.00	1.65	949.68	7.903
10	163.57	1.81	950.16	9.785
25	204.78	2.01	950.75	12.195
50	238.89	2.24	951.24	14.258
100	274.17	2.50	951.68	16.181

Storage Utilized (100-yr event): 16.181 ac-ft
Storage Provided (Top of Bank = 953.00 ft.): 22.213 ac-ft

Table 11 - Basin D, G, H Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin D, G, H Primary Release Rates (cfs)	Basin D, G, H Secondary Release Rates (cfs)	Basin D, G, H Total Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 951.50 (feet)	Storage Volume Utilized (ac-ft)
1	208.43	2.17	0.45	2.62	948.33	11.482
2	278.17	3.07	1.14	4.21	948.56	14.649
5	378.44	6.66	2.07	8.74	948.81	18.247
10	459.83	10.68	2.69	13.37	949.01	21.135
25	578.10	15.27	3.44	18.66	949.34	26.093
50	676.16	19.56	3.74	23.29	949.63	30.395
100	777.68	24.21	4.06	28.27	949.92	34.870

Storage Utilized (100-yr event): 34.870 ac-ft
Storage Provided (Top of Bank = 951.50 ft.): 59.863 ac-ft

Table 12 - Basin E Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin E Primary to Basin D Release Rates (cfs)	Basin E Secondary to Southwest Release Rates (cfs)	Basin E Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 952.00 (feet)	Storage Volume Utilized (ac-ft)
1	20.21	0.68	0	0.68	948.76	0.807
2	27.27	1.13	0	1.13	948.96	1.053
5	37.49	1.93	0	1.93	949.24	1.424
10	45.84	2.68	0	2.68	949.48	1.731
25	56.76	3.65	0	3.65	949.80	2.159
50	63.97	4.28	0.24	4.48	950.05	2.504
100	71.45	4.69	0.90	5.49	950.29	2.847

Storage Utilized (100-yr event): 2.847 ac-ft
Storage Provided (Top of Bank = 952.00 ft.): 5.399 ac-ft

Table 13 - Basin F Performance Summary

Storm Event (yr.)	Peak Inflow Rates (cfs)	Basin F Proposed Release Rates (cfs)	Maximum W.S.E., T.O.B. = 955.50 (feet)	Storage Volume Utilized (ac-ft)
1	46.59	1.44	952.26	1.594
2	61.56	2.14	952.49	2.092
5	82.98	2.80	952.85	2.887
10	100.27	3.42	953.15	3.559
25	125.24	4.17	953.59	4.554
50	145.86	4.70	953.96	5.404
100	167.18	5.20	954.34	6.302

Storage Utilized (100-yr event): 6.302 ac-ft
Storage Provided (Top of Bank = 955.50 ft.): 9.159 ac-ft

5.0 OUTLET DESIGN

The location of outlet structures for each basin can be seen on Exhibit 2 in Appendix E.

Basin A - Outlet Control Structure

- Normal Pool – 947.20 ft.
- Top of Bank – 953.00 ft.
- 1st stage outlet – 10-inch WQ orifices, invert at 947.20 ft.
- 2nd stage outlet – 12-inch wide by 6-inch high window, invert at 950.00 ft.
- Tailwater Control – 18-inch outlet pipe with 0.26% slope, invert at 947.20 ft. (controls 1st through 2nd stage outlets)

Basin B - Outlet Control Structure (to Basin A)

- Normal Pool – 947.50 ft.
- Top of Bank – 953.00 ft.
- Tailwater Control – 24-inch outlet pipe with 0.25% slope, inlet invert at 947.50 ft.

Basin C - Outlet Control Structure (to Basin B)

- Normal Pool – 947.50 ft.
- Top of Bank – 953.00 ft.
- Tailwater Control – 15-inch outlet pipe with 0.28% slope, inlet invert at 947.50 ft.
- Tailwater Control – 4 foot wide earthen weir, invert at 951.20 ft.

Basin D, G, H - Outlet Control Structure

- Normal Pool – 947.50 ft.
- Top of Bank – 951.50 ft.
- 1st stage outlet – 12-inch WQ orifices, invert at 947.50 ft.
- 2nd stage outlet – (2) 36-inch wide by 8-inch high windows, invert at 948.50 ft.
- 3rd stage outlet (secondary) – 12-inch outlet pip with 1.0% slope, invert at 948.00, drains to northwest discharge point
- Tailwater Control – 36-inch outlet pipe with 0.37% slope, invert at 947.50 ft. (controls 1st through 2nd stage outlets), drains to west discharge point

Basin E - Outlet Control Structure

- Normal Pool – 948.10 ft.
- Top of Bank – 952.00 ft.
- Tailwater Control – 24-inch outlet pipe with 0.15% slope, invert at 948.10 ft., drains to Basin D
- Tailwater Control – 24-inch outlet pipe with 0.15% slope, invert at 949.76 ft., drains to southwest discharge point

Basin F - Outlet Control Structure (to Basin A)

- Normal Pool – 951.50 ft.
- Top of Bank – 955.50 ft.
- Tailwater Control – 12-inch outlet pipe with 0.50% slope, inlet invert at 951.50 ft, discharging to a 24-inch pipe with 0.15% slope

6.0 WATER QUALITY

The Ohio EPA requires that the water quality volume for wet basins be detained for a period of 24 hours while not discharging more than the first half of the water quality volume in less than 8 hours. Water quality drawdown for the basin will be provided by the basin's 1st stage outlet listed in Section 5.0. Water Quality Calculations are described in Table 14 below and provided within Appendix C.

Table 14 -Water Quality Calculations

Basin Identifier	Tributary area (acres)	Percent Impervious (%)	Water Quality Volume (ac-ft)	Water Quality Elevation (feet)
Basin A	113.43	41	3.535	948.09
Basin D, G, H	162.11	39	4.900	947.86

7.0 SEDIMENT BASIN CALCULATIONS

The Ohio EPA requires that during construction a site must provide a means by which to control the sediment laden runoff from the construction site. For each acre of drainage area that is tributary to the sediment basin, a drawdown volume of 67 yd^3 is provided above the normal pool elevation. The basin will additionally provide more than the required 37 yd^3 of settling volume below the normal pool elevation for each acre of disturbed area tributary to the basin.

Basins A, B, and C will be used as sediment basins during construction with outlet controls on Basin A. Sediment Basin Calculations are described in Table 15 below and provided within Appendix C.

Table 15 -Sediment Basin Calculations

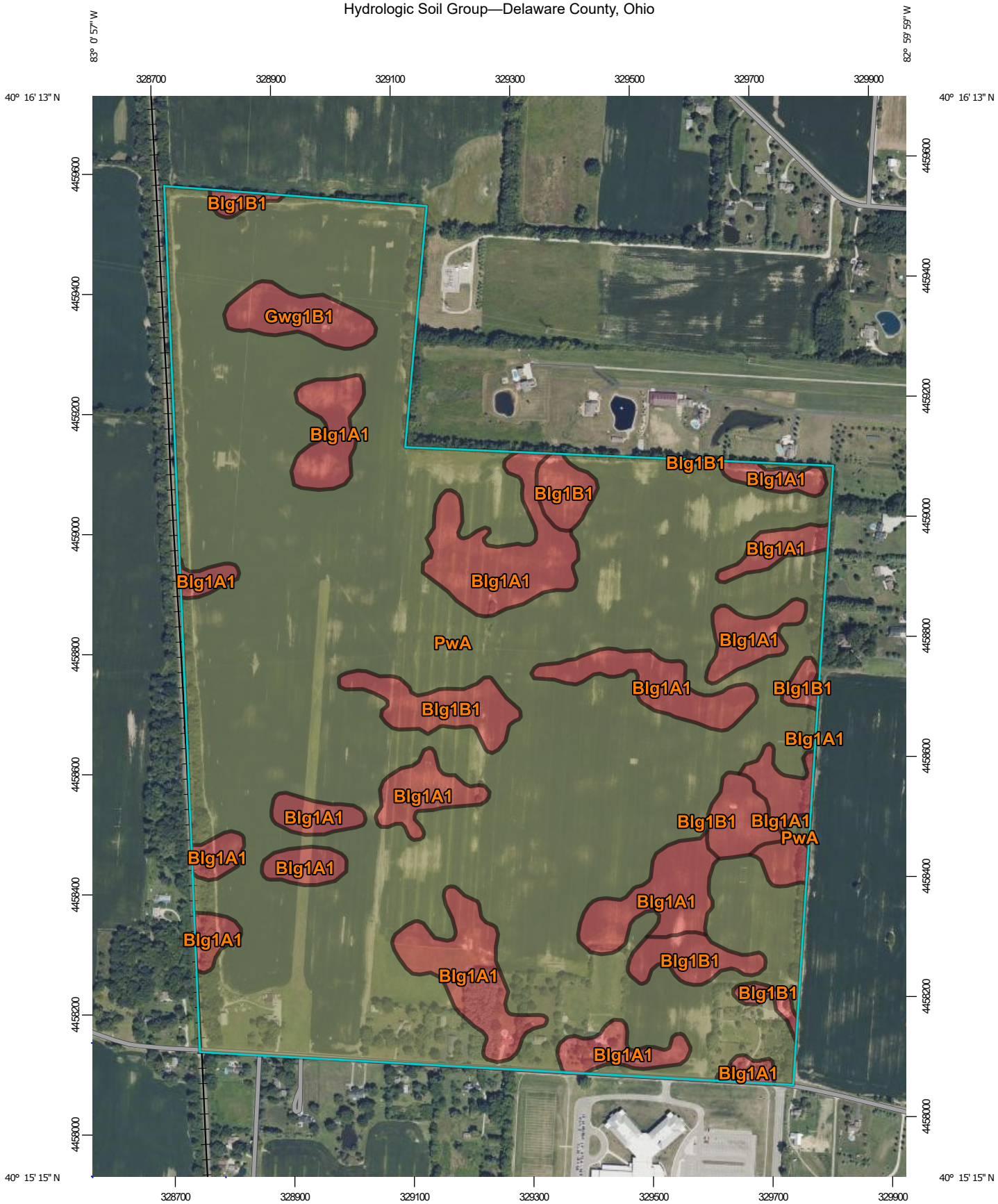
Basin Identifier	Tributary area (acres)	Disturbed area (acres)	Required Dewatering Volume (ac-ft)	Provided Dewatering Volume (ac-ft)	Provided Dewatering Volume Elevation (ft)	Required Sediment Storage Volume (ac-ft)	Provided Sediment Storage Volume (ac-ft)	Skimmer Orifice Size (inches)
Phase 1	89.13	89.13	3.70	3.70	948.12	2.04	5.76	6" Marlee Float Skimmer with 6" orifice
Basins A, B, and C	116.31	113.26	4.83	4.83	948.32	2.60	5.76	6" Marlee Float Skimmer with 6" orifice

8.0 CONCLUSION

The proposed stormwater management plan for Berlin Farm West meets all requirements for detention and water quality as set forth by Delaware County and the Ohio EPA.

APPENDIX A:

USDA Soils Report



Map Scale: 1:8,770 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Delaware County, Ohio
Survey Area Data: Version 20, Sep 7, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Blg1A1	Blount silt loam, ground moraine, 0 to 2 percent slopes	D	53.6	17.3%
Blg1B1	Blount silt loam, ground moraine, 2 to 4 percent slopes	D	15.4	5.0%
Gwg1B1	Glynwood silt loam, ground moraine, 2 to 6 percent slopes	D	4.2	1.3%
PwA	Pewamo silty clay loam, 0 to 1 percent slopes	C/D	236.0	76.4%
Totals for Area of Interest			**309.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

0.51 Ac.
2.10 Ac.
5.99 Ac.
2.75 Ac.
7.67 Ac.
16.54 Ac.
2.29 Ac.
17.05 Ac.
6.30 Ac.
1.72 Ac.
0.28 Ac.
4.15 Ac.

GRAPHIC SCALE
0 50 100 200
1 inch = 100 feet

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
PLAN SET DATE
NOVEMBER, 2022

REVISIONS

MARK	DATE	DESCRIPTION

M/I HOMES
mihomes.com

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO
STREET, STORM SEWER AND WATER IMPROVEMENTS
FOR
BERLIN FARM WEST
SECTION 1

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
NOVEMBER, 2022

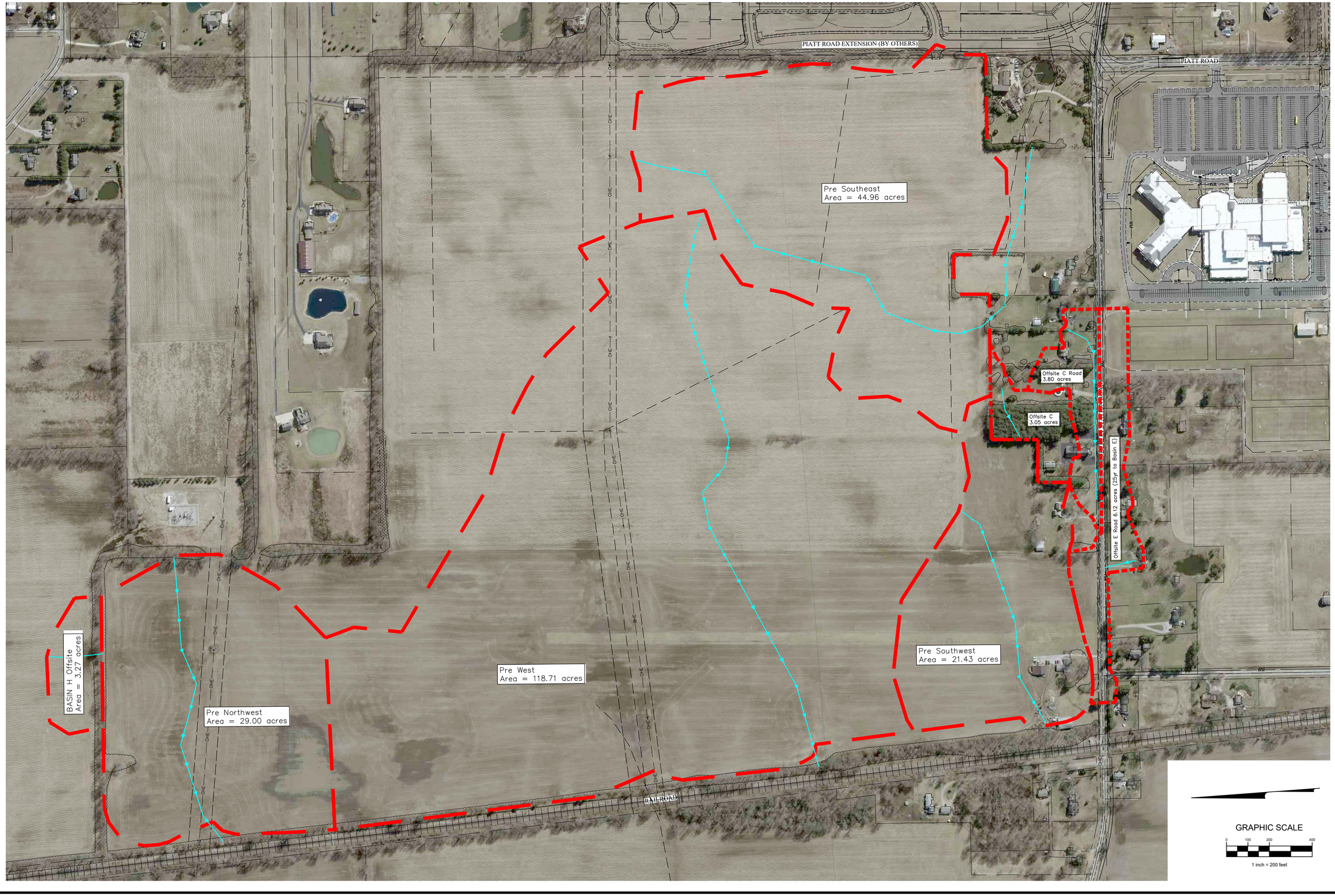
SCALE
1" = 100'

JOB NO.
20220632

SHEET
1/1

APPENDIX E:

Exhibits



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REVISIONS

MARK	DATE	DESCRIPTION

M/I HOMES
mihomes.com

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO

BERLIN FARM WEST

PRE-DEVELOPED STORMWATER TRIBUTARY MAP

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
September 2022

SCALE
1" = 200'

JOB NO.
2022-0632

SHEET
1/2

** NOTE: Future Piatt Road extension has an inadequate outlet in this area. Drainage naturally flows east via both a county tile & sheet flow, and requires either downstream outlet improvements or a variance for partial diversion. Pending further investigation & final design, this area has been preliminarily shown to drain low flows up to the 10yr storm to Basin A with routing (higher storms) continuing east.

To Berlin Farm East Basin C
Area = 2.70 acres

25Yr To Berlin Farm East Basin A Flood Route to Berlin West Basin A
Area = 2.88 acres

PIATT ROAD EXTENSION (BY OTHERS)

PIATT ROAD

Basin A
Area = 13.26 acres

BASIN A

BASIN F

BASIN F
Area = 27.18 acres

BASIN B
Area = 22.99 acres

BASIN B

Offsite C Road
3.80 acres

Offsite C
3.05 acres

BASIN C
Area = 43.15 acres

BASIN C

Offsite E Road 6.12 acres (25yr to Basin E)

BASIN H Offsite
Area = 3.27 acres

BASIN D
Area = 33.58 acres

BASIN G
Area = 95.25 acres

BASIN E
Area = 9.53 acres

BASIN E

BASIN H
Area = 14.36 acres

BASIN D

BASIN G

BASIN H

RAILROAD

GRAPHIC SCALE

0 100 200 400

1 inch = 200 feet

REVISIONS

MARK	DATE	DESCRIPTION

M/I HOMES
mihomes.com

BERLIN TOWNSHIP, DELAWARE COUNTY, OHIO
STREET, STORM SEWER AND WATER IMPROVEMENTS
FOR

BERLIN FARM WEST SECTION 1

POST-DEVELOPED TRIBUTARY MAP

EMHT
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Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE
September 2022

SCALE
1" = 200'

JOB NO.
20220632

SHEET
2/2

Longhill
Traffic Impact Study

Prepared For:

Kimley-Horn & Associates, Inc.

Prepared By:

1900 Crown Park Court, Suite E
Columbus, OH 43235
(614) 914-5543

February 2019

REV. 2
11/2019

SSI Project #: 745301

Longhill
Traffic Impact Study

Prepared For:

Kimley-Horn & Associates, Inc.
2400 Corporate Exchange Drive
Columbus, Oh 43231

Telephone: (614) 454-6696

Prepared By:

Smart Services, Inc.
1900 Crown Park Court, Suite E
Columbus, OH 43235

Telephone: (614) 914-5543
e-mail: tstanhope@smartservices-inc.com

Under the direction of:

Registered Engineer No. E-64507, Ohio

11-22-2019
Date

February 2019

REV. 2
11/2019

TABLE OF CONTENTS

BACKGROUND

Longhill Limited Partnership II is proposing to develop a site with approximately 482 single family lots. The site is located on the north side of Berlin Station Road between Gregory Road and the Proposed Piatt Road Extension. Figure 1 shows the location of the site. There are two accesses proposed on Berlin Station Road (the east access is emergency only) and two on the Piatt Road extension. Figure 2 shows the proposed site layout. The Delaware County Engineer's Office (DCEO) is the permitting agency for the accesses. Preliminary analysis indicates that the trips generated by the site will exceed the 100 peak hour trip threshold for a Traffic Impact Study (TIS) as identified in the DCEO's *TIS Standards*.

The trips generated by the site will exceed the 100-peak hour trip threshold for a Traffic Impact Study (TIS) as identified in the DCEO's *TIS Standards*. The Delaware County Engineer's Office (DCEO) is the reviewing agency for the traffic study. Smart Services, Inc. (SSI) has been retained by the developer to perform the TIS. A pre-meeting for the study was held October 30, 2018 at the Delaware County Engineers Office (DCEO). The scope of the TIS was discussed at this meeting and a memo of understanding (MOU) dated 2/19/2019 was submitted to the DCEO. The submitted MOU is in the Appendix.

Two previous versions of the traffic study dated 3/01/2019 and 10/9/2019 were submitted to the Delaware County Engineer's Office (DCEO). Comments were received from the DCEO in an emails dated 4/22/2019 and 11/04/2019. The comments are in the Appendix. This revision incorporates the DCEO comments.

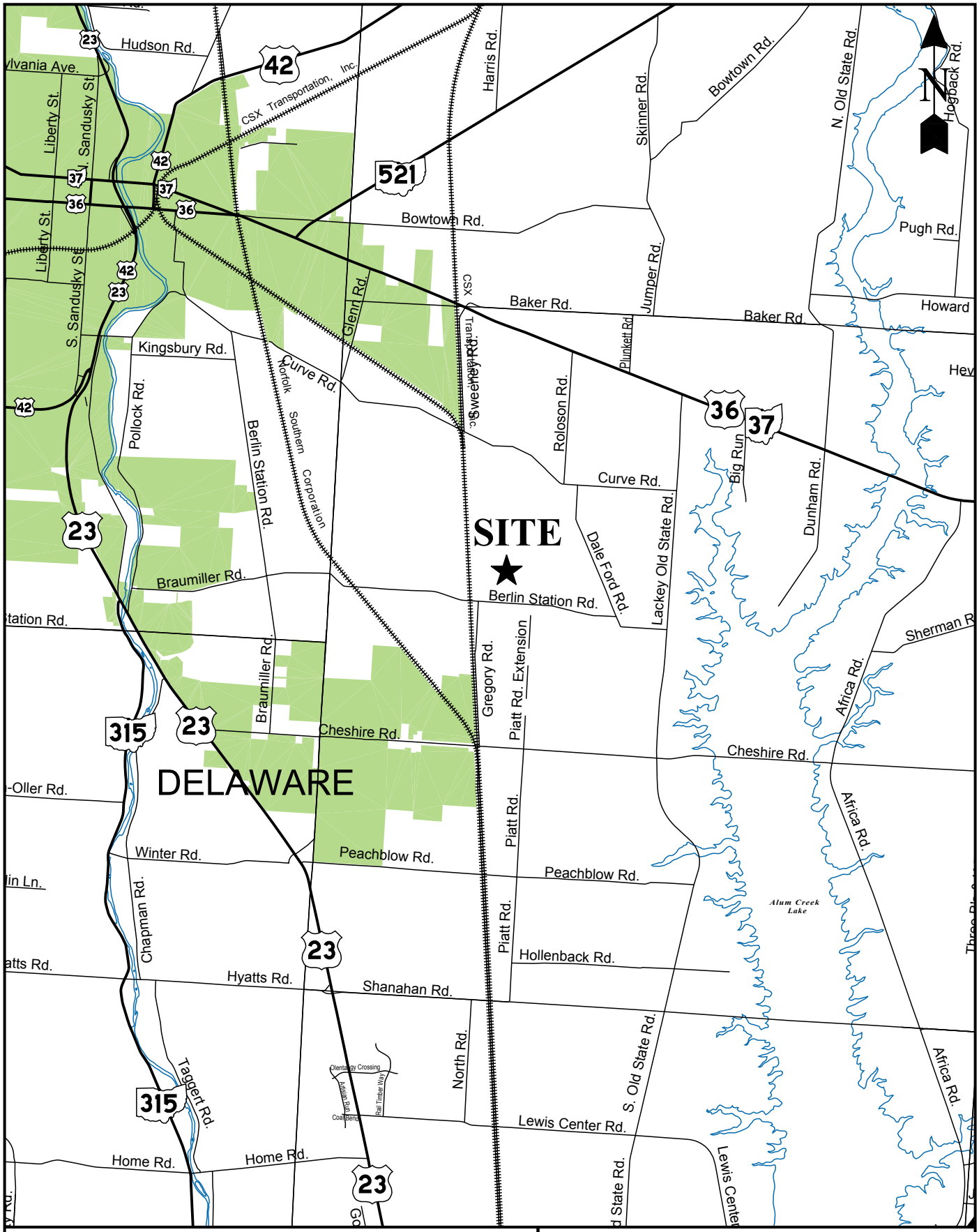
EXISTING CONDITIONS

The existing intersection at Berlin Station Road & Piatt Road is controlled by a "stop" sign on Piatt Road. This intersection is planned to be a single lane roundabout built by others and analyzed as such in this traffic study. The intersection of Berlin Station Road & Dale Ford Road is controlled by a "stop" sign on the Dale Ford Road north approach. Table 1 shows the speed limit and classification of each roadway in the study area.

Street	Speed Limit	Design Speed	Delaware County Thoroughfare Plan Classification
Berlin Station Road	45 MPH	45 MPH	Major Collector
Piatt Road (Extension)	45 MPH	45 MPH	Major Collector

TABLE 1 – Summary of Roadway Designations

There was no data collection as part of the project. 2019 and 2039 volume plates contained in the draft *Berlin Station Road Traffic Analysis* performed by Jobes Henderson are the basis of background traffic for the study.

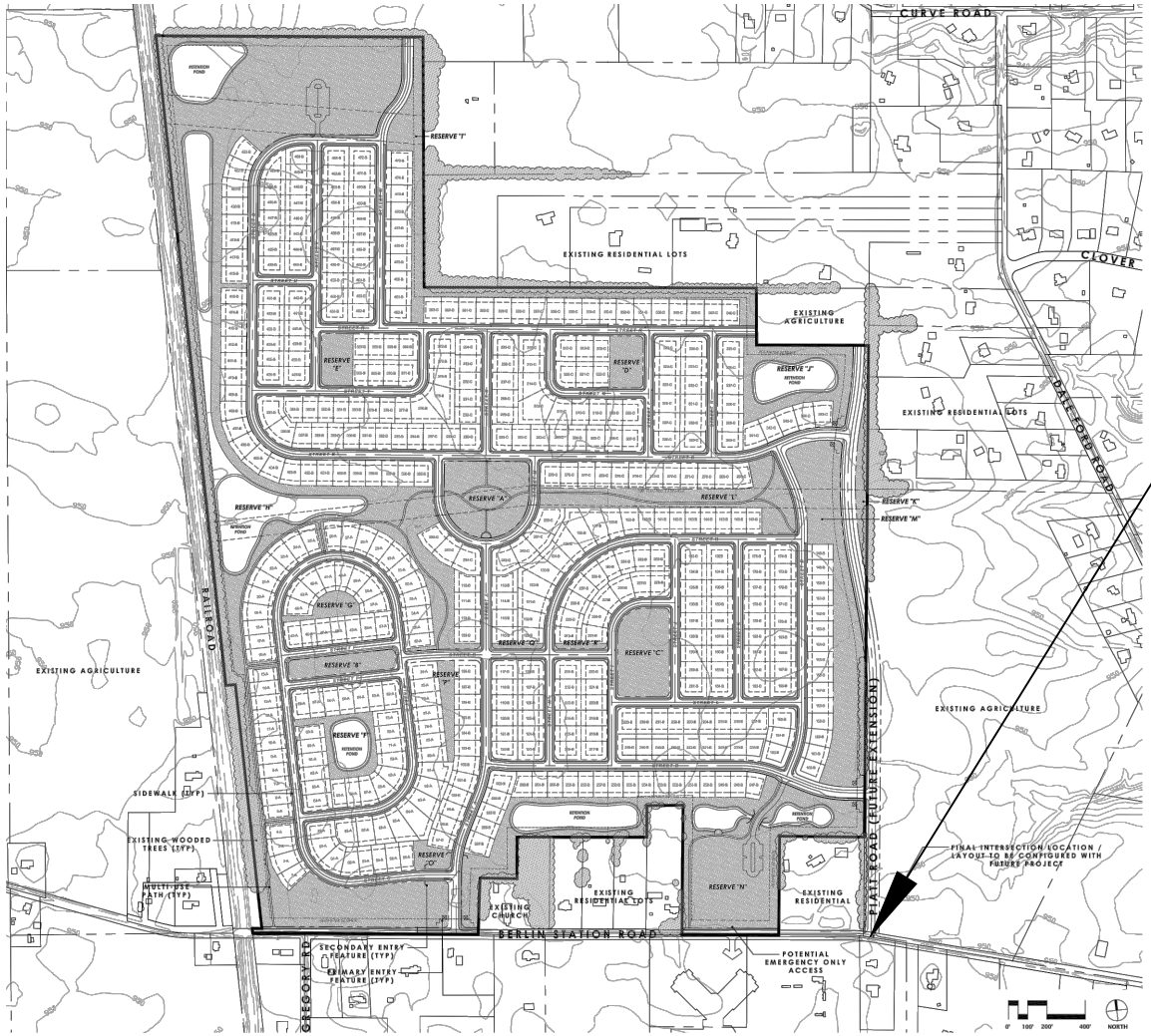


LONGHILL
TRAFFIC IMPACT STUDY

PREPARED BY: SMART SERVICES, INC. 2/2019

FIGURE 1

SITE LOCATION



The intersection of Berlin Station Road & Piatt Road is planned to be a single lane roundabout constructed by others.

N

0' 500' 1000' 2000'

SCALE

FIGURE 2

SITE LAYOUT

LONGHILL TRAFFIC IMPACT STUDY

REV. 1
10/2019

PREPARED BY:

SMART SERVICES, INC.

PROJECTED SITE TRAFFIC

Trip Generation

The site traffic was computed using *Trip Generation, 10th Edition*, published by the Institute of Transportation Engineers (ITE). The land use that represents the development on the site is "Single Family Detached Housing" (ITE Code #210). Table 2 shows a summary of the trip generation calculations.

Trip Distribution

The distribution of traffic was assumed to be the same as the 2039 PM Peak Background traffic coming toward the site (into the study area). Since the AM school peak coincides with the AM Street Peak, the distribution was based on the PM Peak so it would not be skewed by the school traffic. The resulting distribution is as follows (the volume basis is in parenthesis):

- 3% to/from the north on Dale Ford Road (23/898)
- 35% to/from the south on Dale Ford Road (316/898)
- 39% to/from the south on Piatt Road (352/898)
- 23% to/from the west on Berlin State Road (207/898)

Traffic Study Subarea	Land Use	Time of Day	Data Set from: *Trip Generation Manual, 10th Edition* (Unless noted Otherwise)	Regression Equation from: *Trip Generation Manual 10th Edition*	Total Trips	Total Primary Trips	Entering		Exiting	
							%	Total Trips	%	Total Trips
2	Single-Family Detached Housing (ITE Code #210)	Daily	Weekday	ln(T)=0.92ln(X)+2.71	1192	1192	50%	596	50%	596
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	T=0.71(X)+4.80	87	87	25%	22	75%	65
	Ind. Variable (X) = 116 Dwelling Units	PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	ln(T)=0.96ln(X)+0.20	117	117	63%	74	37%	43
TOTALS		**Daily**			**1192**	**1192**		**596**		**596**
		AM Peak			**87**	**87**		**22**		**65**
		PM Peak			**117**	**117**		**74**		**43**

Longhill Traffic Impact Study - 2/2019

TABLE 3 - TRINITY HOME BUILDERS SITE TRIP GENERATION SUMMARY

2019 & 2039 TRAFFIC

Background Growth

The results of the trip generation calculations indicate that the site will generate just over 400 trip ends. The *TIS Standards* require a 20-year design horizon for trip ends greater than 400. Opening day will be 2019, therefore the design year will be 2039. 2019 and 2039 volume plates contained in the draft *Berlin Station Road Traffic Analysis* performed by Jobes Henderson are the basis of background traffic for the study. It is noted that the Jobes Henderson Study did not have PM Peak 'Build' plates. Presumably this is because in the afternoon the school peak occurs before the street peak. Therefore, the background traffic for this study is the AM Peak 'Build' and PM Peak 'No Build' of the *Berlin Station Road Traffic Analysis*. **At DCEO's direction, the 2039 volumes on the east leg of Berlin Station Road at Piatt Road were balanced with the volumes on the west leg of the intersection of Berlin Station Road at Dale Ford Road by reducing proportionally the volumes at Piatt Road.** There is still an imbalance to the east (volumes at Greogry lower) but there is a school access between. Therefore, no further adjustment was made since the higher volumes would be conservative and would not affect the results of the roundabout capacity analysis.

Trinity Home Builders, LLC (2039 Additional Background)

Traffic from the undeveloped 62.662-acre site to the east owned by Trinity Home Builders was estimated in the study. The property information from the Delaware County GIS is in the Appendix.

Per the MOU, the estimation was to assume the same density as the development site. Since the proposed density was 1.85 dwelling units per acre, the Trinity Home Builders site is expected to have 116 units. *Trip Generation, 10th Edition* was used to estimate the traffic generated by the Trinity Homes site. The land use that represents the Trinity Homes site is "Single Family Detached Housing" (ITE Code #210). Table 3 shows the trip generation. The traffic was applied to the network with the same distribution as the development site. Figure 3 and 4 show the AM and PM Peak traffic from the Trinity Home Builders site applied to the street network.

Traffic Exhibits

Figures 5 and 6 show the components of the 2019 traffic. Figures 7 and 8 show the components of the 2039 traffic. Figure 9 shows the daily site traffic generated at each access. To assist with the review, exhibits showing the 2019 and 2039 'No Build' volumes have been provided in the Appendix.

Traffic Study Subarea	Land Use	Time of Day	Data Set from: *Trip Generation Manual, 10th Edition* (Unless noted Otherwise)	Overide with Average	Regression Equation from: *Trip Generation Manual 10th Edition*	Total Trips	Entering		Exiting	
							%	Total Trips	%	Total Trips
1	Single-Family Detached Housing (ITE Code #210)	Daily	Weekday	☐	ln(T)=0.92ln(X)+2.71	4419	50%	2210	50%	2209
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	☐	T=0.71(X)+4.80	347	25%	87	75%	260
	Ind. Variable (X) = 482 Dwelling Units	PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	☐	ln(T)=0.96ln(X)+0.20	460	63%	290	37%	170
TOTALS		**Daily**		☐		**4419**		**2210**		**2209**
		AM Peak				**347**		**87**		**260**
		PM Peak				**460**		**290**		**170**

TABLE 2 - SITE TRIP GENERATION SUMMARY

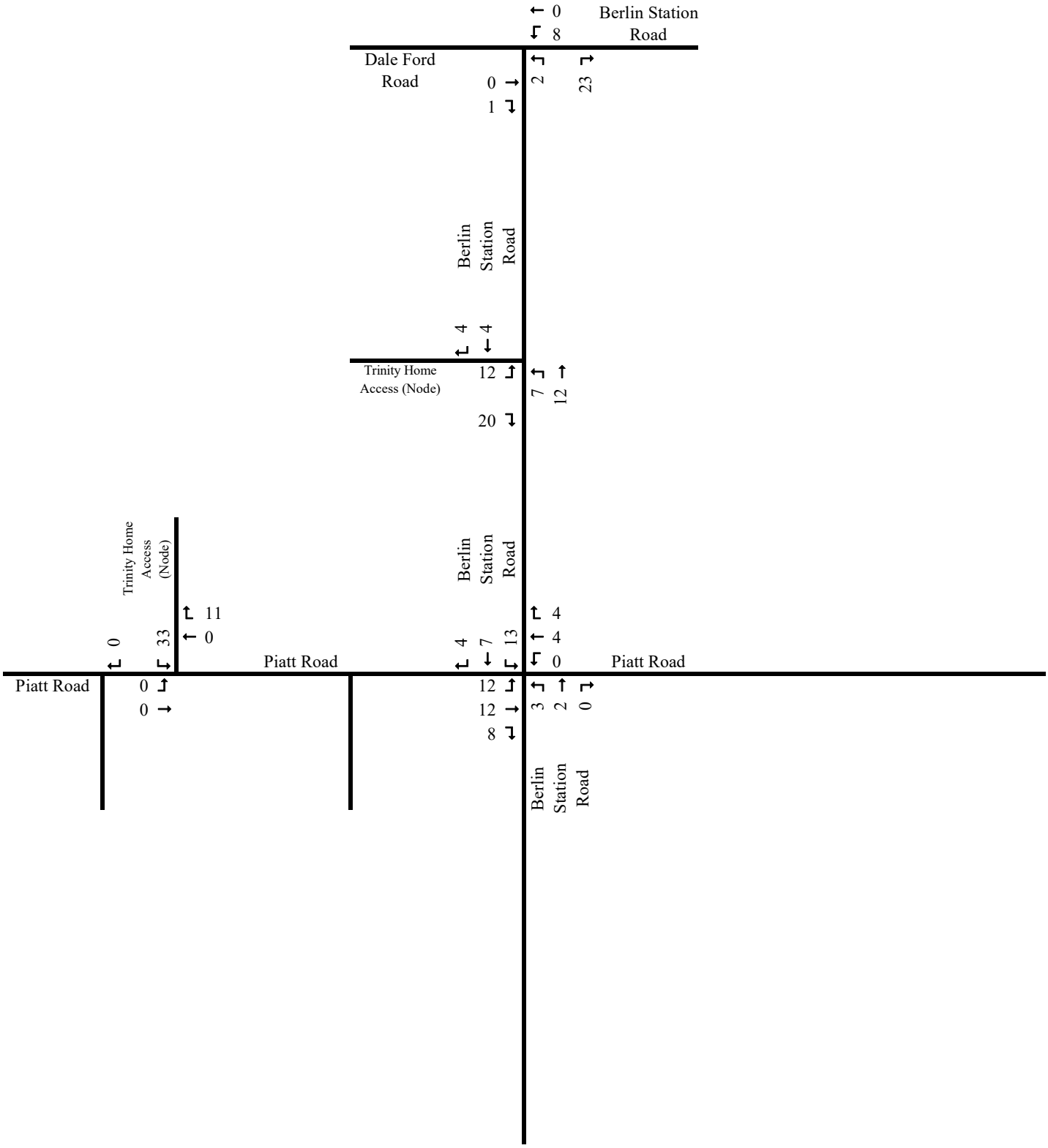


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FIGURE 3
TRINITY HOME BUILDERS SITE TRAFFIC - AM PEAK

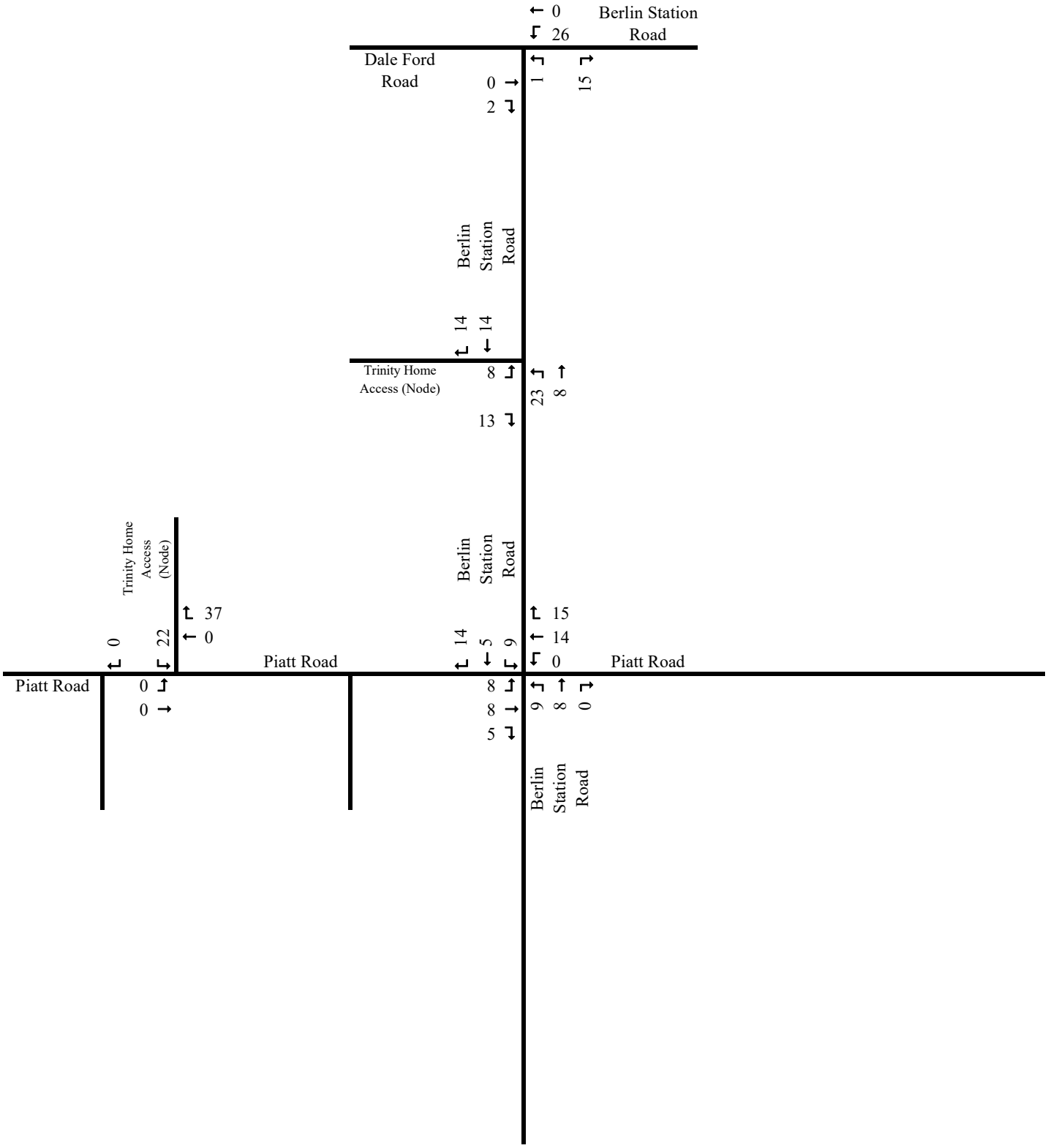

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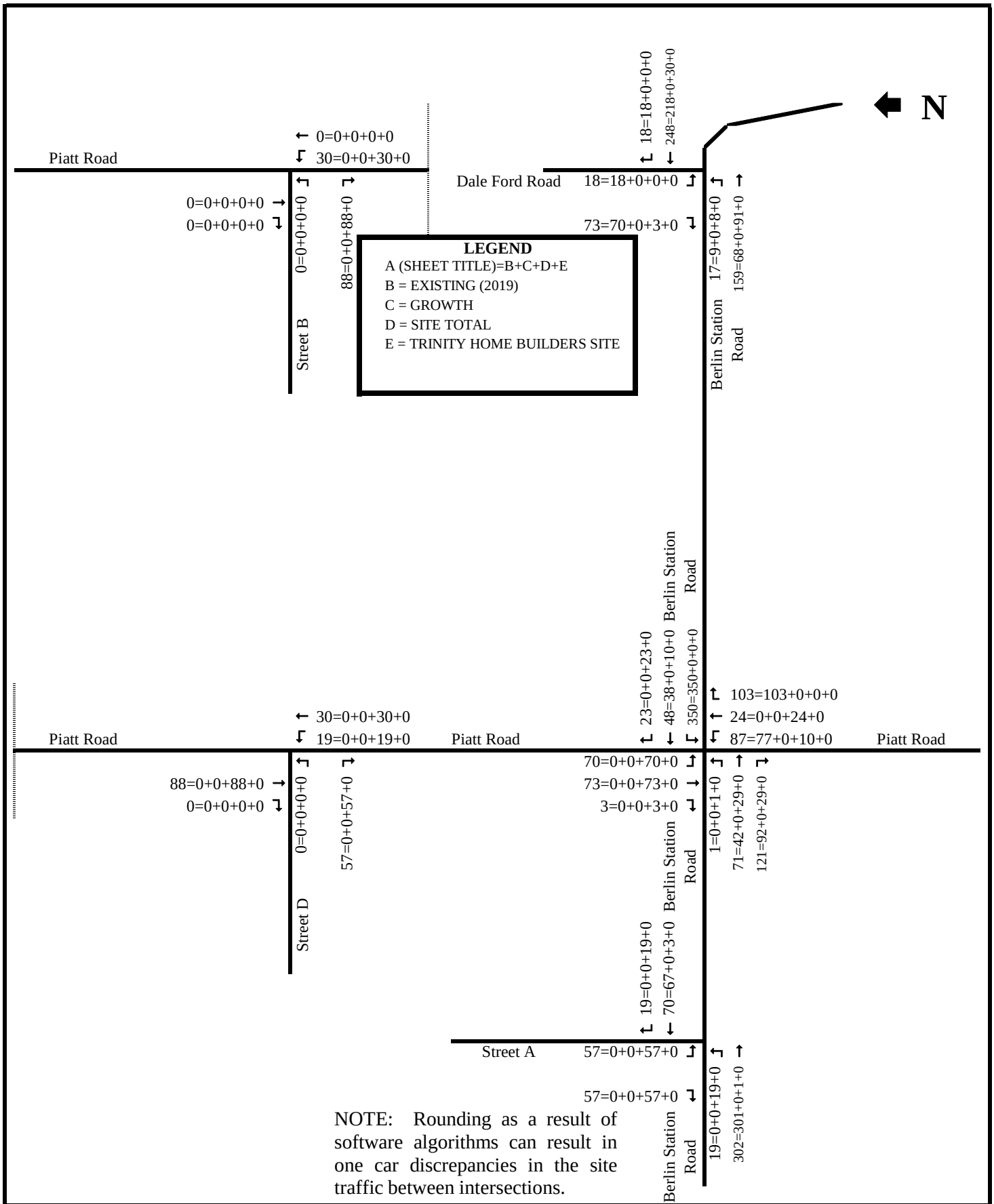
FIGURE 4
TRINITY HOME BUILDERS SITE TRAFFIC - PM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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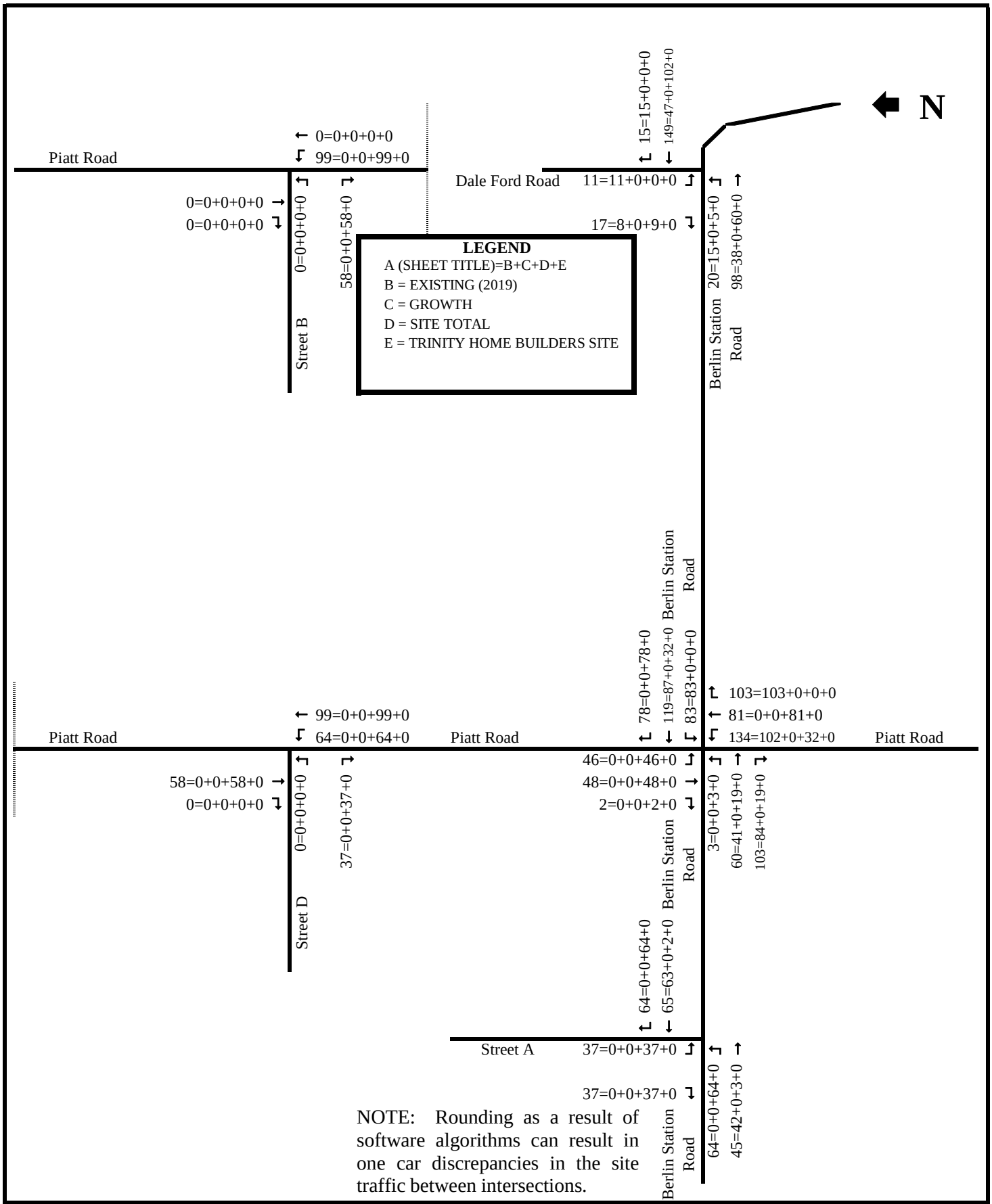
FIGURE 5

2019 'BUILD' - AM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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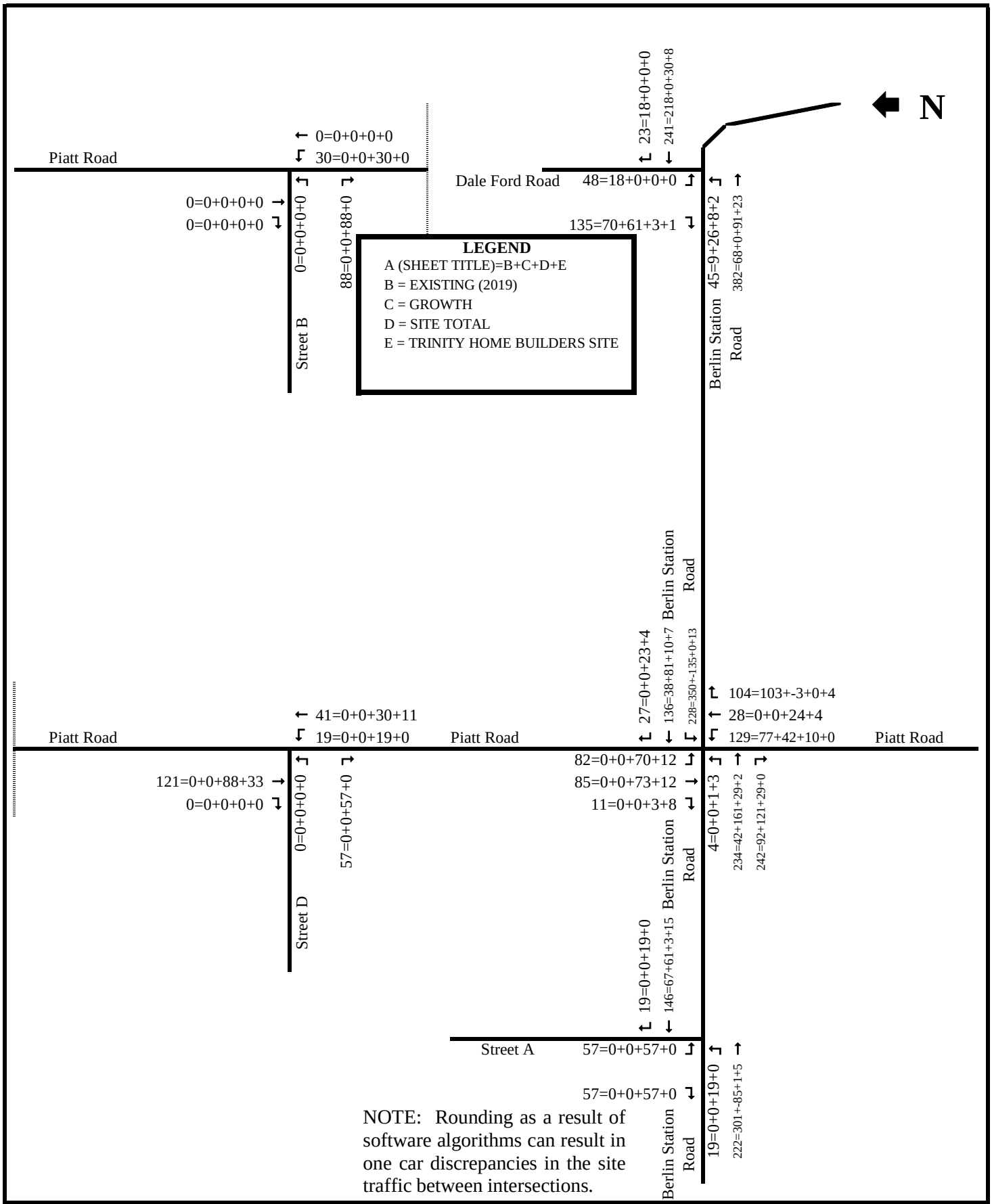
FIGURE 6

2019 'BUILD' - PM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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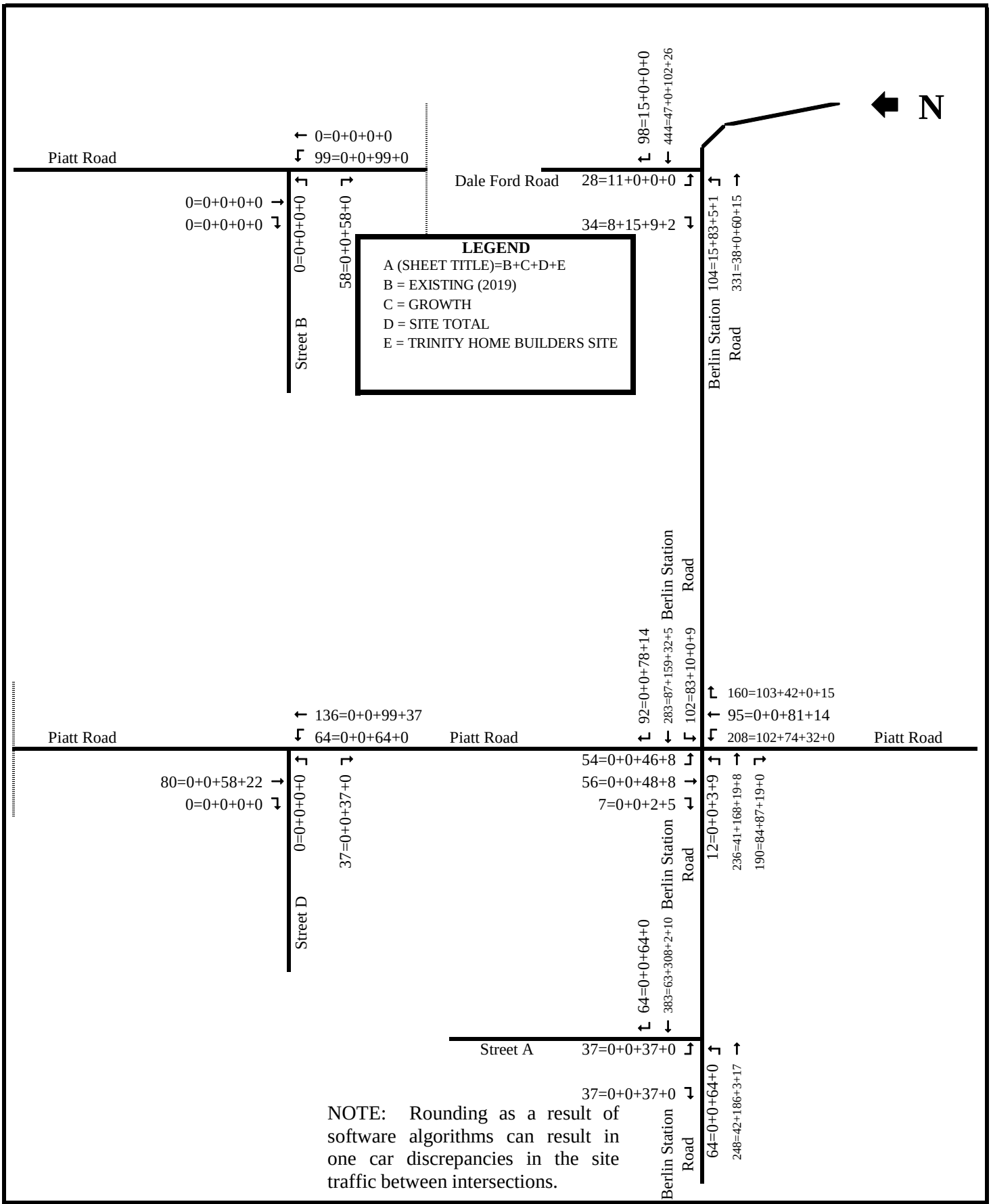
FIGURE 7

2039 'BUILD' W/ TRINITY HOME BUILDERS SITE - AM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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FIGURE 8

2039 'BUILD' W/ TRINITY HOME BUILDERS SITE - PM PEAK

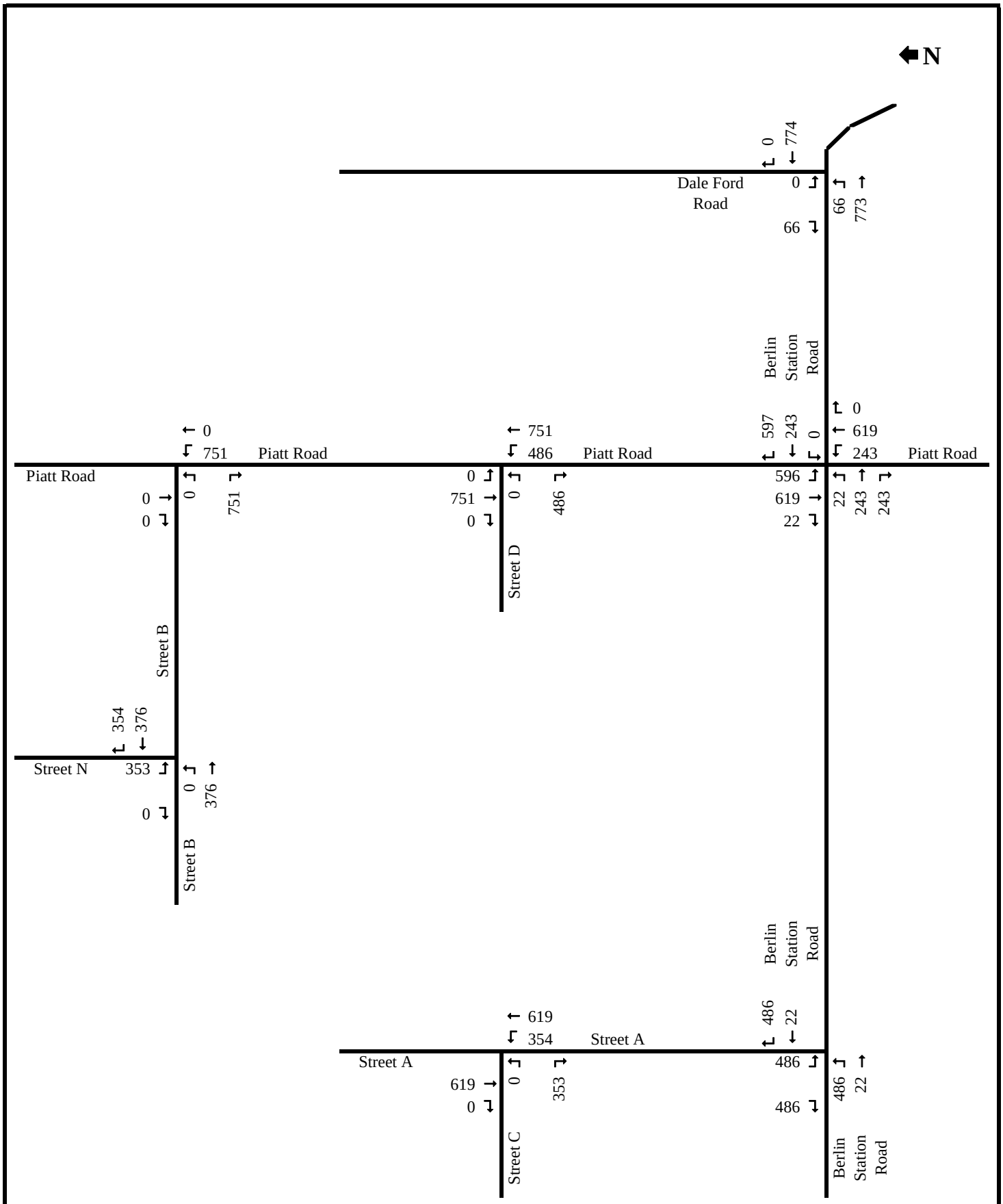

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FIGURE 9

SITE GENERATED TRAFFIC - DAILY

TRAFFIC ANALYSES

Turn Lane Warrant Analysis

Left Turn Lanes – According to the *TIS Standards*, the criteria for whether a left turn lane is required for Major Collectors with posted speed limits over 40 MPH, is if there are more than 10 left turning vehicles during the peak hour for full build-out of the development. Table 4 shows a summary of the results of the left turn lane warrants.

Right Turn Lanes - Per the *TIS Standards*, the procedure for determining whether a right turn lane is required is according to the procedures found in the *ODOT L&D Manual* which is referenced from the *SHAMM*. Table 4 also shows a summary of the results of the right turn lane warrants. The graphs from the *ODOT L&D Manual* are in the Appendix.

INTERSECTION	DIRECTION	CRITICAL PEAK HOUR	2019 'BUILD'	2039 'BUILD'
Berlin Station Road & Street A	EB LT	AM Peak	**Warranted >10 EB LT**	**Warranted >10 EB LT**
		PM Peak		
	WB RT	AM Peak	Not Warranted	Not Warranted
		PM Peak	Not Warranted	**Warranted**
Piatt Road & Street D	NB LT	AM Peak	**Warranted >10 NB LT**	**Warranted >10 NB LT**
		PM Peak		
	SB RT	AM Peak	Not Warranted (No Traffic)	Not Warranted (No Traffic)
		PM Peak	Not Warranted (No Traffic)	Not Warranted (No Traffic)
Piatt Road & Street B	NB LT	AM Peak	**Warranted >10 NB LT**	**Warranted >10 NB LT**
		PM Peak		
	SB RT	AM Peak	Not Warranted (No Traffic)	Not Warranted (No Traffic)
		PM Peak	Not Warranted (No Traffic)	Not Warranted (No Traffic)

TABLE 4 – Summary of Turn Lane Warrant Analyses

Unsignalized (TWSC) Capacity Analyses

Unsignalized capacity analyses were performed at the off-site unsignalized intersections within the study area. In the analysis, delays are computed which correspond to a Level of Service (LOS) "A" through "F". Typically, Level of Service (LOS) "D" or above is considered an acceptable LOS. For a Two-Way Stop condition, the unsignalized capacity analysis gives LOS results for vehicles that must wait for gaps to make their maneuver. In this case, it would be the left turns from the major street and the minor street movements. All other movements are free flowing, so they don't encounter delay. Since driver expectations are different for various types of traffic control, there are different LOS criteria for unsignalized intersections versus signalized intersections. The LOS criteria for both two-way stop control and all-way stop control is shown in Table 5.

LEVEL OF SERVICE	**DELAY RANGE (seconds/vehicle)**
A	< 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: *Highway Capacity Manual 2010*

TABLE 5- Level of Service Criteria for Unsignalized Intersections

The following comprises the background of the analysis:

- *HCS V7* was used to perform the analysis.
- The following default values and guidance were applied per the ODOT *L&D Manual:*
  - The HCM 2010 default values for Intersection Peak Hour Factor were used:
    - If the analysis period is 0.25 h and hourly data are used:
      - Total entering volume >= 1,000 veh/h: 0.92
      - Total entering volume <= 1,000 veh/h: 0.90
- A 3% heavy vehicle percentage was assumed

The results are shown in Table 6. The results are discussed in the Conclusions section. The *HCS 7* reports are in the Appendix.

Intersection	Time	Year	Delay (Level of Service)			
			Main Street		Minor Street	
			Eastbound Left	Westbound Left	Northbound All	Southbound All
Berlin Station Road & Dale Ford Road	AM Peak	2019 'No Build' Traffic	7.8 (A)			10.5 (B)
		2019 'Build' Traffic	7.9 (A)			11.1 (B)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	7.8 (A)			13.0 (B)
		2039 'Build' Traffic W/ Trinity Home Builders Site	8.0 (A)			14.9 (B)
	PM Peak	2019 'No Build' Traffic	7.4 (A)			9.1 (A)
		2019 'Build' Traffic	7.6 (A)			9.9 (A)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	8.7 (A)			17.0 (C)
		2039 'Build' Traffic W/ Trinity Home Builders Site	9.1 (A)			20.5 (C)

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TABLE 6 - Unsignalized Capacity Summary - (2-Way-Stop, East-West Major Street)

Roundabout Capacity Analyses

Roundabout capacity analyses were performed at the intersection of Berlin Station Road & Piatt Road. In the capacity analyses, delays are computed which correspond to a Level of Service (LOS) "A" through "F". The LOS criteria for roundabouts are shown in Table 7.

LEVEL OF SERVICE	DELAY RANGE (seconds/vehicle)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: *Highway Capacity Manual 2010*

TABLE 7 - Level of Service Criteria for Roundabouts

The following comprises the background of the signalized capacity analysis:

- *HCS 7* was used to perform the analysis.
- The following default values and guidance were applied per the ODOT *L&D Manual:*
  - The HCM 2010 default values for Intersection Peak Hour Factor were used:
    - If the analysis period is 0.25 h and hourly data are used:
      - Total entering volume >= 1,000 veh/h: 0.92
      - Total entering volume <= 1,000 veh/h: 0.90
- A 2% heavy vehicle percentage was assumed in the analysis.

A summary of the results is shown in Table 8. The *HCS* reports are in the Appendix. The results are discussed in the Conclusions section.

Turn Lane Length Analysis

Turn lane lengths for the warranted turn lanes per the analyses were calculated. The calculations were performed per Section 400 of the *ODOT L&D Manual*. The posted speed limit was used as the speed in the calculations. Table 9 shows a summary of the results. The calculations are in the Appendix.

LOCATION	2019 'BUILD' *ODOT L&D Manual*	2039 'BUILD' *ODOT L&D Manual*
Berlin Station Road & Street A - EB Left Turn	175'	175'
Berlin Station Road & Street A - WB Right Turn	NA	175'
Piatt Road & Street D – NB Left Turn	175'	175'
Piatt Road & Street B – NB Left Turn	225'	225'

TABLE 9 – Turn Lane Length Results (includes 50' diverging taper)

Internal ADT

The daily site traffic shown in Figure 9, page 13, indicates that Street A and Street B exceeds 1500 ADT at the minor collector intersection. The Street A segment that exceeds 1500 ADT would extend from Berlin Station Road to Street C. The Street B segment that exceeds 1500 ADT extends from Piatt Road to Street N.

Based on the projected ADT of 7,200 on Piatt Road north of Cheshire Road, the Delaware County Engineer's Office anticipates an ADT in the range of 5,000-6000 on Piatt Road north of Berlin Station when the street connection is made.

Intersection	Time	Year	Delay (Level of Service)				
			Intersection	Eastbound	Westbound	Northbound	Southbound
Berlin Station Road & Piatt Road	AM Peak	2019 'No Build' Traffic	5.6 (A)	5.7 (A)	6.3 (A)	4.1 (A)	4.6 (A)
		2019 'Build' Traffic	6.8 (A)	8.1 (A)	7.1 (A)	5.1 (A)	7.1 (A)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	7.2 (A)	8.8 (A)	6.3 (A)	5.7 (A)	5.0 (A)
		2039 'Build' Traffic W/ Trinity Home Builders Site	9.6 (A)	13.7 (B)	7.1 (A)	7.1 (A)	7.6 (A)
	PM Peak	2019 'No Build' Traffic	4.2 (A)	3.9 (A)	4.4 (A)	4.3 (A)	3.7 (A)
		2019 'Build' Traffic	5.8 (A)	4.8 (A)	6.4 (A)	5.9 (A)	5.1 (A)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	7.1 (A)	6.7 (A)	7.2 (A)	7.4 (A)	5.2 (A)
		2039 'Build' Traffic W/ Trinity Home Builders Site	10.0 (A)	8.5 (A)	11.3 (B)	10.6 (B)	7.4 (A)

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TABLE 8 - Unsignalized Capacity Summary - (Roundabout)

CONCLUSIONS

2019 and 2039 'No Build' and 'Build' volumes were developed for use in turn lane warrant analyses, signalized capacity analyses and turn lane length analyses. The following is a summary of the conclusions for each analysis condition:

2019 'No Build'

- Berlin Station Road & Piatt Road
  - The intersection and all approaches operate at an acceptable LOS.
- Berlin Station Road & Dale Ford Road
  - The impeded movements operate at an acceptable LOS.

2019 'Build'

- Olentangy Berlin High School Pedestrian Access
  - The Delaware County Engineer's Office will require a Rectangular Rapid Flash Beacon (RRFB) across Berlin Station Road to facilitate pedestrian access from the Longhill development to Olentangy Berlin High School. Details will be finalized prior to plan approval.
- Berlin Station Road & Piatt Road
  - Same as No Build: The intersection and all approaches operate at an acceptable LOS.
- Berlin Station Road & Dale Ford Road
  - Same as No Build: The impeded movements operate at an acceptable LOS.
- Berlin Station Road & Street A
  - An eastbound left turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper. Due to there being a planned CIP project in the area, the developer requests consideration of a fee in lieu of constructing this turn lane. This fee is in addition to the developer's contribution to the Piatt Road extension.
  - A westbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Berlin Station Road to Street C.
- Piatt Road & Street D
  - A northbound left turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper. An agreement has been made on this developer's contribution to the Piatt Road extension so this is included in that contribution.
  - A southbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is less than 1500 vehicles.
- Piatt Road & Street B
  - A northbound left turn lane is warranted. The length of the lane is 225 feet which includes the 50-foot diverging taper. An agreement has been made on this developer's contribution to the Piatt Road extension so this is included in that contribution.
  - A southbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Piatt Road to Street N.

2039 'No Build'

- Berlin Station Road & Piatt Road
  - The intersection and all approaches operate at an acceptable LOS.
  - Based on the projected 2038 ADT of 7,200 on Piatt Road north of Cheshire Road, the Delaware County Engineer's Office anticipates an ADT in the range of 5,000-6000 on Piatt Road north of Berlin Station when the street connection is made.
- Berlin Station Road & Dale Ford Road
  - The impeded movements operate at an acceptable LOS.

2039 'Build'

- Olentangy Berlin High School Pedestrian Access
  - The Delaware County Engineer's Office will require a Rectangular Rapid Flash Beacon (RRFB) across Berlin Station Road to facilitate pedestrian access from the Longhill development to Olentangy Berlin High School. Details will be finalized prior to plan approval.
- Berlin Station Road & Piatt Road
  - Same as 'No Build': The intersection and all approaches operate at an acceptable LOS.
- Berlin Station Road & Dale Ford Road
  - Same as No Build: The impeded movements operate at an acceptable LOS.
- Berlin Station Road & Street A
  - An eastbound left turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper. Due to there being a planned CIP project in the area, the developer requests consideration of a fee in lieu of constructing this turn lane. This fee is in addition to the developer's contribution to the Piatt Road extension.
  - A westbound right turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper. Due to there being a planned CIP project in the area, the developer requests consideration of a fee in lieu of constructing this turn lane. This fee is in addition to the developer's contribution to the Piatt Road extension.
  - The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Berlin Station Road to Street C.
- Piatt Road & Street D
  - A northbound left turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper. An agreement has been made on this developer's contribution to the Piatt Road extension so this is included in that contribution.
  - A southbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is less than 1500 vehicles.
- Piatt Road & Street B
  - A northbound left turn lane is warranted. The length of the lane is 225 feet which includes the 50-foot diverging taper. An agreement has been made on this developer's contribution to the Piatt Road extension so this is included in that contribution.
  - A southbound right turn lane is not warranted.

- ○The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Piatt Road to Street N.

- ●Piatt Road north of Berlin Station Road
  - ○Based on the projected 2038 ADT of 7,200 on Piatt Road north of Cheshire Road, the Delaware County Engineer's Office anticipates an ADT in the range of 5,000-6000 on Piatt Road north of Berlin Station when Piatt Road is connected to Roloson Road.
  - ○The developer is working with the DCEO and other developers in the area on actual construction of the extension of Piatt Road. Details will be finalized prior to plan approval.

APPENDIX

From: Love, Michael
To: Todd Stanhope
Cc: Piccin, John
Subject: Longhill TIS
Date: Monday, November 04, 2019 10:50:15 AM
Attachments: image003.png

Todd

I missed something important in the early stages of this TIS. Table 1 is incorrect. Berlin Station Road and Piatt Rd extension are both major collectors (they are shown as minor collectors)

We will need the report adjusted to reflect this.

This changes the Piatt Rd extension to a three lane section. We have already come to an agreement on the developer's contribution regarding the extension of Piatt Rd, so it shouldn't impact the conclusions/recommendations in the TIS.

Note that the developer will still be responsible for the fee-in-lieu of for the EB left turn lane on Berlin Station Rd @ Street A

If you have any questions, please call

Michael Love P.E., PTOE
Traffic Engineer
Delaware County Engineer's Office
a: 50 Channing St., Delaware, OH 43015
p: (740) 833-2428
e: mlove@co.delaware.oh.us
w: www.delawarecountyengineer.org

4/22/2019 MAL
Address review comments and resubmit for approval

Longhill
Traffic Impact Study

Prepared For:

Kimley-Horn & Associates, Inc.

Prepared By:

SMART SERVICES, INC.

1900 Crown Park Court, Suite E
Columbus, OH 43235
(614) 914-5543

February 2019

SSI Project #: 745301

BACKGROUND

Longhill Limited Partnership II is proposing to develop a site with approximately 492 single family lots. The site is located on the north side of Berlin Station Road between Gregory Road and the Proposed Piatt Road Extension. Figure 1 shows the location of the site. There are two accesses proposed on Berlin Station Road (the east access is emergency only) and two on the Piatt Road extension. Figure 2 shows the proposed site layout. The Delaware County Engineer's Office (DCEO) is the permitting agency for the accesses. Preliminary analysis indicates that the trips generated by the site will exceed the 100 peak hour trip threshold for a Traffic Impact Study (TIS) as identified in the DCEO's *TIS Standards*.

The trips generated by the site will exceed the 100-peak hour trip threshold for a Traffic Impact Study (TIS) as identified in the DCEO's *TIS Standards*. The Delaware County Engineer's Office (DCEO) is the reviewing agency for the traffic study. Smart Services, Inc. (SSI) has been retained by the developer to perform the TIS. A pre-meeting for the study was held October 30, 2018 at the Delaware County Engineers Office (DCEO). The scope of the TIS was discussed at this meeting and a memo of understanding (MOU) dated 2/19/2019 was submitted to the DCEO. The submitted MOU is in the Appendix.

EXISTING CONDITIONS

The existing intersection at Berlin Station Road & Piatt Road is controlled by a "stop" sign on Piatt Road. The intersection of Berlin Station Road & Dale Ford Road is controlled by a "stop" sign on the Dale Ford Road north approach. Table 1 shows the speed limit and classification of each roadway in the study area.

Street	Speed Limit	Design Speed	Delaware County Thoroughfare Plan Classification
Berlin Station Road	45 MPH	45 MPH	Minor Collector
Piatt Road (Extension)	45 MPH	45 MPH	Minor Collector

TABLE 1 – Summary of Roadway Designations

There was no data collection as part of the project. 2019 and 2039 volume plates contained in the draft *Berlin Station Road Traffic Analysis* performed by Jobes Henderson are the basis of background traffic for the study.

Assume single lane roundabout at Berlin Station/Piatt as the E+C condition. Show as "by others" in all exhibits

Is this the current site plan? A RI-RO will not be permitted opposite the school entrance

Show roundabout at the intersection of Berlin Station & Piatt Road "by others"

SCALE

FIGURE 2

SITE LAYOUT

LONGHILL TRAFFIC IMPACT STUDY

2/2019

PREPARED BY:

SMART SERVICES, INC.

Roundabout Capacity Analyses

Roundabout capacity analyses were performed at the intersection of Berlin Station Road & Piatt Road. In the capacity analyses, delays are computed which correspond to a Level of Service (LOS) "A" through "F". The LOS criteria for roundabouts are shown in Table 7.

LEVEL OF SERVICE	DELAY RANGE (seconds/vehicle)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: *Highway Capacity Manual 2010*

TABLE 7 - Level of Service Criteria for Roundabouts

The following comprises the background of the signalized capacity analysis:

- *HCS 7 V7.7* was used to perform the analysis.
- The following default values and guidance were applied per the ODOT *L&D Manual:*
  - The HCM 2010 default values for Intersection Peak Hour Factor were used:
    - If the analysis period is 0.25 h and hourly data are used:
      - Total entering volume >= 1,000 veh/h: 0.92
      - Total entering volume <= 1,000 veh/h: 0.90
- A 2% heavy vehicle percentage was assumed in the analysis.

A summary of the results is shown in Table 8. The *HCS* reports are in the Appendix. The results are discussed in the Conclusions section.

Turn Lane Length Analysis

Turn lane lengths for the warranted turn lanes per the analyses were calculated. The calculations were performed per Section 400 of the *ODOT L&D Manual*. The posted speed limit was used as the speed in the calculations. Table 9 shows a summary of the results. The calculations are in the Appendix.

LOCATION	2019 'BUILD' *ODOT L&D Manual*	2039 'BUILD' *ODOT L&D Manual*
Berlin Station Road & Street A - EB Left Turn	175'	175'
Berlin Station Road & Street A - WB Right Turn	NA	175'

TABLE 9 – Turn Lane Length Results (includes 50' diverging taper)

Internal ADT

The daily site traffic shown in Figure 9, page 13, indicates that Street A and Street B exceeds 1500 ADT at the minor collector intersection. The Street A segment that exceeds 1500 ADT would extend from Berlin Station Road to Street C. The Street B segment that exceeds 1500 ADT extends from Piatt Road to Street N.

Provide ADT on the Piatt Rd extension (assume connection Roloson Rd). This will result in Piatt extension being 3 lanes upto Curve Rd.

Intersection	Time	Year	Delay (Level of Service)				
			Intersection	Eastbound	Westbound	Northbound	Southbound
Berlin Station Road & Piatt Road	AM Peak	2019 'No Build' Traffic	5.6 (A)	5.7 (A)	6.3 (A)	4.1 (A)	0.0 (A)
		2019 'Build' Traffic	6.9 (A)	8.1 (A)	7.1 (A)	5.1 (A)	7.1 (A)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	11.9 (B)	15.7 (C)	11.4 (B)	6.6 (A)	7.4 (A)
		2039 'Build' Traffic W/ Trinity Home Builders Site	18.9 (C)	33.8 (D)	13.5 (B)	8.3 (A)	12.5 (B)
	PM Peak	2019 'No Build' Traffic	4.2 (A)	3.9 (A)	4.4 (A)	4.3 (A)	0.0 (A)
		2019 'Build' Traffic	5.8 (A)	4.8 (A)	6.5 (A)	5.9 (A)	5.1 (A)
		2039 'No Build' Traffic W/ Trinity Home Builders Site	13.0 (B)	8.8 (A)	17.9 (C)	8.5 (A)	8.4 (A)
		2039 'Build' Traffic W/ Trinity Home Builders Site	31.4 (D)	11.6 (B)	55.4 (F)	12.8 (B)	13.3 (B)
		2039 'Build' Traffic W/ Trinity Home Builders Site & WB RT Lane	16.7 (C)	11.6 (B)	22.2 (C)	12.8 (B)	13.3 (B)

Longhill Traffic Impact Study - 2/2019

TABLE 8 - Unsignalized Capacity Summary - (Roundabout)

Add paragraph discussing how students/pedestrians will access the high school from this development. (will there be a RRFB at Reserve "M"?)

2039 'Build'

- Berlin Station Road & Piatt Road
  - The intersection and all approaches operate at an acceptable LOS with the exception of the westbound approach that operates at LOS F. The addition of a westbound right turn lane would allow this approach to operate at an acceptable LOS.

- Berlin Station Road & Dale Ford Road
  - Same as No Build: The impeded movements operate at an acceptable LOS.

- Berlin Station Road & Street A
  - An eastbound left turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper.
  - A westbound right turn lane is warranted. The length of the lane is 175 feet which includes the 50-foot diverging taper.
  - The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Berlin Station Road to Street C.
- Piatt Road & Street D
  - A northbound left turn lane is not warranted.
  - A southbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is less than 1500 vehicles.

- Piatt Road & Street B
  - A northbound left turn lane is not warranted.
  - A southbound right turn lane is not warranted.
  - The projected ADT on the Site Access leg is greater than 1500 vehicles. The segment that exceeds 1500 ADT would extend from Piatt Road to Street N.

Since DCEO has a CIP project in the area, if the developer wishes to participate in this CIP project in lieu of constructing the warranted turn lanes on Berlin Station, he may request this option. The agreed cost can be included in this traffic study or under separate agreement.

Add paragraph stating the developer is working with DCEO and other developers in the area on actual construction of the extension of Piatt Rd. Details will be finalized prior to plan approval.

SMART SERVICES, INC.
Surveying ◆ Environmental ◆ Traffic ◆ CA/CM
An Ohio DBE/EDGE Certified Firm

February 19, 2019

Mr. Michael A. Love, PE
Delaware County Engineer's Office
50 Channing Street
Delaware, OH 43015

Re: Longhill Traffic Study
Berlin Township, Delaware County, Ohio

Dear Mike:

Please consider this letter as a Memo of Understanding (MOU) for the subject traffic impact study. The subject site is proposed to be developed with approximately 492 single family lots. The site is located on the north side of Berlin Station Road between Gregory Road and the Proposed Piatt Road Extension. There are two accesses proposed on Berlin Station Road (the east access is emergency only) and two on the Piatt Road extension. The Delaware County Engineer's Office (DCEO) is the permitting agency for the accesses. Preliminary analysis indicates that the trips generated by the site will exceed the 100 peak hour trip threshold for a Traffic Impact Study (TIS) as identified in the DCEO's *TIS Standards*.

An initial meeting was held with the Delaware County Engineer's Office (DCEO) on October 30, 2018. The following is the scope of the study discussed which includes some follow up information:

- The study area will be all site accesses and the intersections of Berlin Station Road & Piatt Road and Berlin Station Road & Dale Ford Road.
- The table below includes information for study area roads:

Street	Speed Limit	Design Speed	Delaware County Thoroughfare Plan Classification
Berlin Station Road	45 MPH	45 MPH	Minor Collector
Piatt Road (Extension)	45 MPH	45 MPH	Minor Collector

- No new data is needed for the project. Traffic plates contained in the draft *Berlin Station Road Traffic Analysis* performed by Jobes Henderson will be the basis of background traffic for the study.
- Trip Generation - Site traffic will be computed using *Trip Generation Manual, 10th Edition* published by ITE.
- The distribution of traffic will be assumed to be the same general distribution that was used in the study for the Homewood Corporation property on the northeast corner of Berlin Station Road & Piatt Road.
- Design Year Traffic Development – The results of the preliminary trip generation indicate

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- Trip Generation - Site traffic will be computed using *Trip Generation Manual, 10th Edition* published by ITE.
- The distribution of traffic will be assumed to be the same general distribution that was used in the study for the Homewood Corporation property on the northeast corner of Berlin Station Road & Piatt Road.
- Design Year Traffic Development – The results of the preliminary trip generation indicate

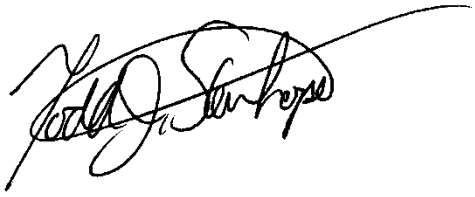
that the site will generate just over 400 trips. Therefore, the *TIS Standards* require a 20-year design horizon. Opening day will be 2019, therefore the design year will be 2039.

- The Piatt Road extension north of Berlin Station Road will be built when the Homewood Corporation property to the east develops. **Since part of this extension to the north is on property not controlled by the developer, an agreement with the Homewood Corporation will have to be reached prior to the access being granted.** The traffic study will assume this agreement will be in place. The background traffic on the Piatt Road extension will include the Homewood Corporation property on the northeast corner of Berlin Station Road & Piatt Road but at the same density as the proposed site.
- Analyses
  - Capacity analyses will be performed on the off-site intersections.
  - Turn lane warrant analyses will be performed per the *DCEO Standards* at all site accesses to public streets.
  - The length of any warranted turn lanes will be calculated using the method in Section 400 of the *ODOT L&D Manual* and the speed limit of the road.
- All necessary public improvements associated with the development, including any off-site improvements, shall be constructed with the first phase of construction, except as agreed upon by the Delaware County Engineer.

If this MOU is acceptable to you, please indicate your approval in the space provided below. If not, please let us know what items need to be changed.

If you have any questions, please contact me. Thank you!

Sincerely,
SMART SERVICES, INC.



Todd J. Stanhope, PE, PTOE
Director of Traffic Engineering

Submitted: One electronic copy (PDF format) via e-mail

cc: J. Piccin – Delaware County Engineer's Office
M. Reeves – Kimley Horn

Delaware County Engineers Office

Approved:_____ Date:_____

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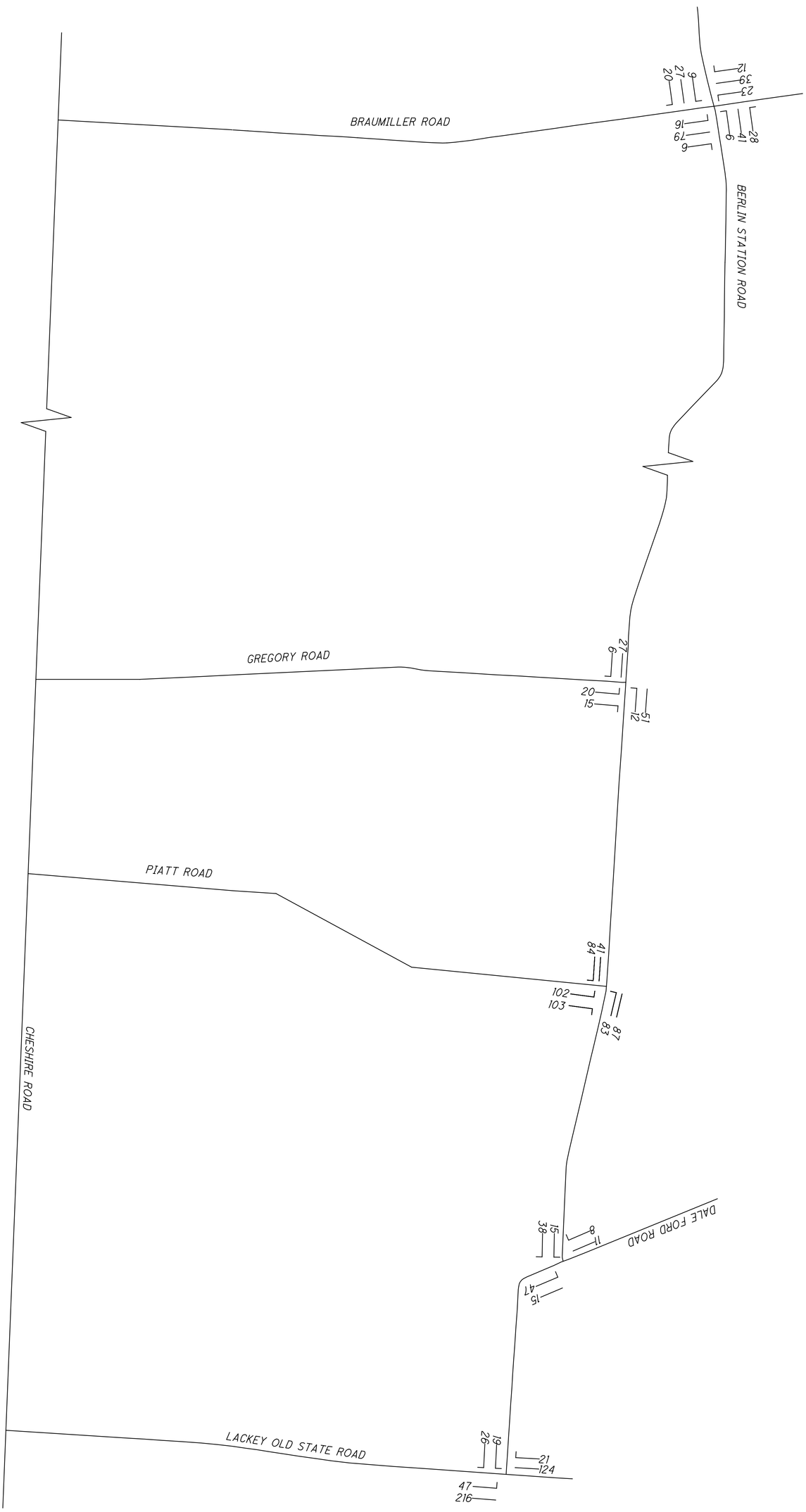

5 / 10	**2019 PM BACKGROUND**	**BERLIN STATION ROAD DELAWARE COUNTY**	CALCULATED SJD / CHECKED SJD	N

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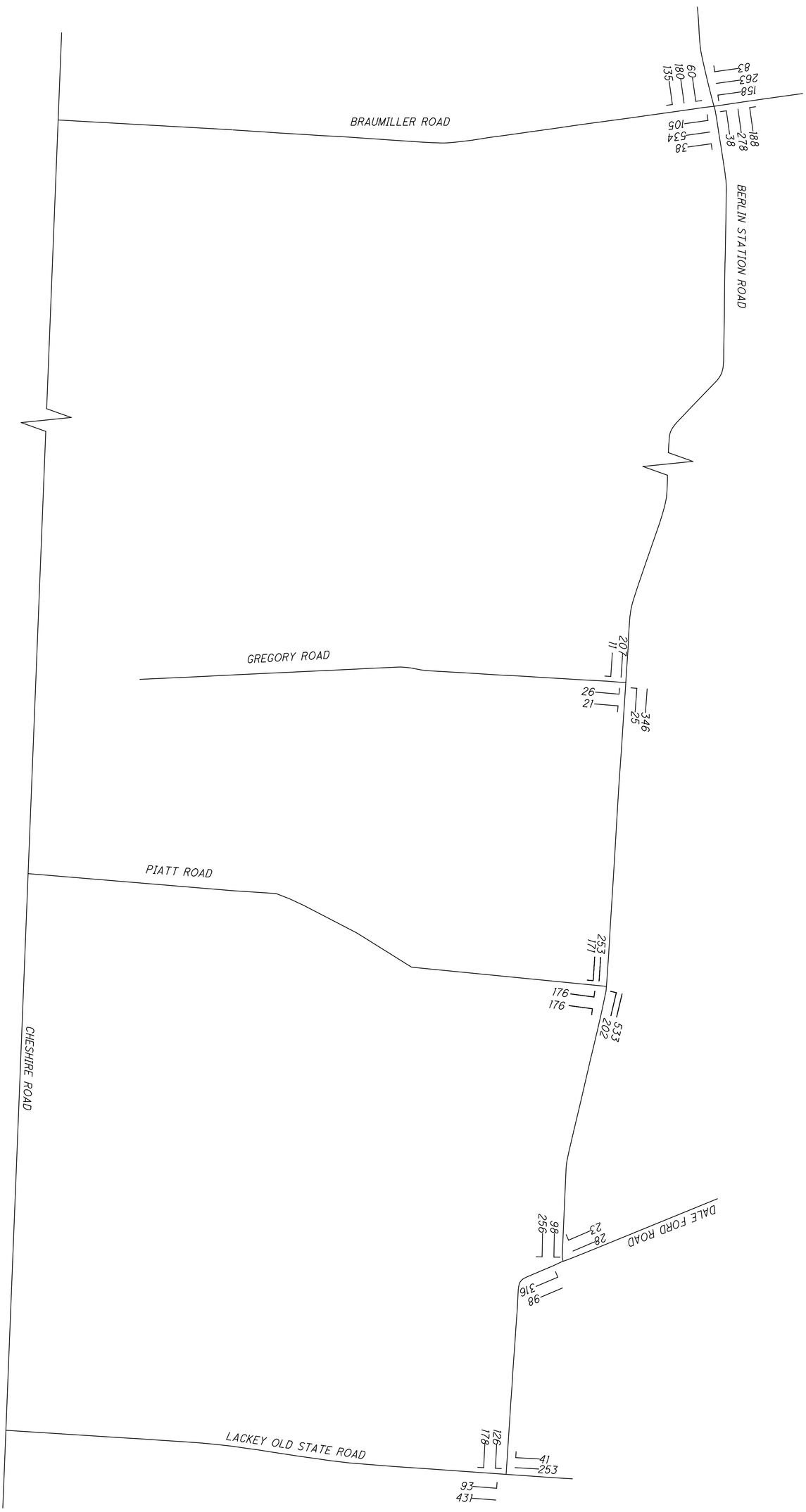

9 / 10	**2039 PM BACKGROUND**	**BERLIN STATION ROAD DELAWARE COUNTY**	CALCULATED SJD / CHECKED SJD	N

BACKGROUND+BUSES+STUDENT DRIVERS+PARENTS PICKUP/DROP-OFF+STAFF=TOTAL TRAFFIC

BERLIN STATION ROAD

BRAUMILLER ROAD

GREGORY ROAD

PIATT ROAD

CHESHIRE ROAD

DALE FORD ROAD

LACKEY OLD STATE ROAD

20+0+28+4+7=59
48+0+0+0+0=48
6+0+0+0+0=6

21+0+0+4+0=25
15+0+0+2+0=17
6+0+0+2+0=8

2+0+0+0+0=2
11+0+14+2+3=30
7+0+0+0+0=7

21+0+0+0+0=21
57+0+0+0+0=57
10+0+14+2+3=29

30+0+56+8+13=107
15+0+0+0+0=15

12+0+0+8+0=20
22+8+0+17+0=47
0+0+187+25+42=254

194=28+13+17+8+9+11
11+0+0+0+0=11

0+0+0+25=25

84+8+0+0+0=92

42

38+0+0+0+0=38
85+9+188+25+43=350

69+9+0+25+0=103
69+8+0+0+0=77

18+0+0+0+0=18
18+0+38+5+9=70

4+0+0+5+0=9
39+9+0+20+0=68

18+0+0+0+0=18
3+5+150+20+36=218

22+6+0+13+0=41
41+3+0+7+0=51

201+0+0+0+0=201
12+69+69+1+22=169

107=53+14+4+5+31

101+0+0+0+0=101

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CALCULATED SJD
CHECKED SJD

BERLIN STATION ROAD
DELAWARE COUNTY

2019 AM
TOTAL TRAFFIC

7
10

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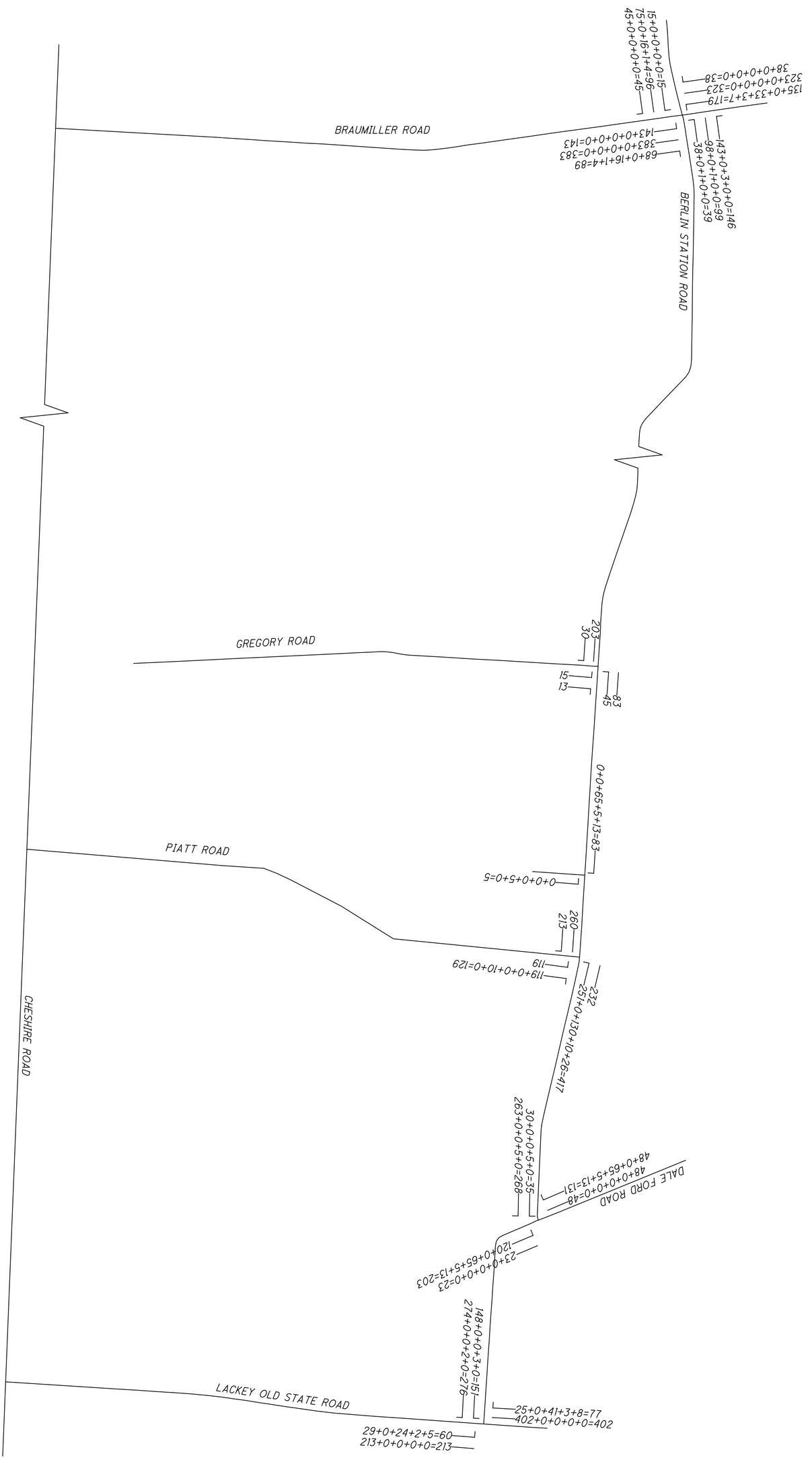
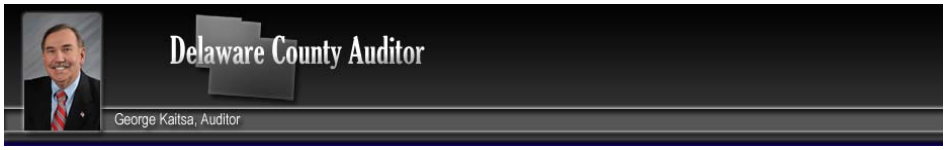


BACKGROUND+BUSES+STUDENT DRIVERS+PARENTS PICKUP/DROP-OFF+STAFF=TOTAL TRAFFIC

8 / 10	**2039 AM TOTAL TRAFFIC**	**BERLIN STATION ROAD DELAWARE COUNTY**	CALCULATED SJD / CHECKED SJD	N



Property Report for 418-240-01-054-005

Property Information

Parcel Number:	41824001054005
Owner(s)	TRINITY HOME BUILDERS LLC
Address	BERLIN STATION RD
Tax Dist	5
School	2104 OLENTANGY
Use Code:	100
Acres:	62.662

Description

LANDS 18 4 2 7

Property Address

BERLIN STATION RD DELAWARE

Current Value

Land	Impr	Total
783300	0	783300

Current Tax

Due	Paid	Balance
3079.48	1539.74	1539.74

Assessment Information

Board of Revision:	N	Homestead/Disability:	N
Owner Occ Credit:	N	Divided Property:	N
New Construction:	N	Foreclosure:	N
Other Assessments:	N	Front Ft.:	N

Land

Land Type	Acres	Square Ft.	Actual Frontage	Eff. Frontage	No. Units	Value

Land

Land Type	Acres	Square Ft.	Actual Frontage	Eff. Frontage	No. Units	Value
A1-Primary Site	62.662	0	0	0	0	783280

CAUV Land

Land Type	Acres	Soil Type	Acres	Adj. Rate	Value
A0	0.376	PWA-PEWAMO SILTY CLAY	0.376	0	0
A0	0.125	BOB-BLOUNT SILT LOAM	0.125	0	0
A5	20.552	BOB-BLOUNT SILT LOAM	20.552	1990	40900
A5	14.538	BOA-BLOUNT SILT LOAM	14.538	2280	33150
A5	10.339	GWB-GLYNWOOD SILT LOAM	10.339	1325	13700
A5	13.41	PWA-PEWAMO SILTY CLAY	13.41	3190	42780
A8	0.376	BOA-BLOUNT SILT LOAM	0.376	545	200
A8	1.379	BOB-BLOUNT SILT LOAM	1.379	365	500
A8	1.065	GWB-GLYNWOOD SILT LOAM	1.065	395	420
A8	0.439	PWA-PEWAMO SILTY CLAY	0.439	1405	620
A9	0.063	GWB-GLYNWOOD SILT LOAM	0.063	0	0

Transfer History

Date	Amount	To	Type	Conveyance
6/10/2009	0	TRINITY HOME BUILDERS LLC	Change Owner	0
11/15/2006	0	TRINITY HOME BUILDERS INC	Split Property	0
5/4/2004	790691	TRINITY HOME BUILDERS INC	Change Owner	0
5/4/2004	0	DAVIDSON BRUCE M	Split Property	0

Value History

Year	Land	Improvement	Total	Reason
2017	783300	0	783300	Reappraisal, Update or Annual Equalization
2014	877300	0	877300	Reappraisal, Update or Annual Equalization
2011	783300	0	783300	Reappraisal, Update or Annual Equalization
2008	877300	0	877300	Reappraisal, Update or Annual Equalization
2007	783300	0	783300	Miscellaneous
2006	783300	0	783300	CAUV Loss or Recoupment
2005	790700	0	790700	Reappraisal, Update or Annual Equalization
2004	790700	0	790700	Changes by Board of Revision, Tax Appeals, Courts

Tax Detail Information

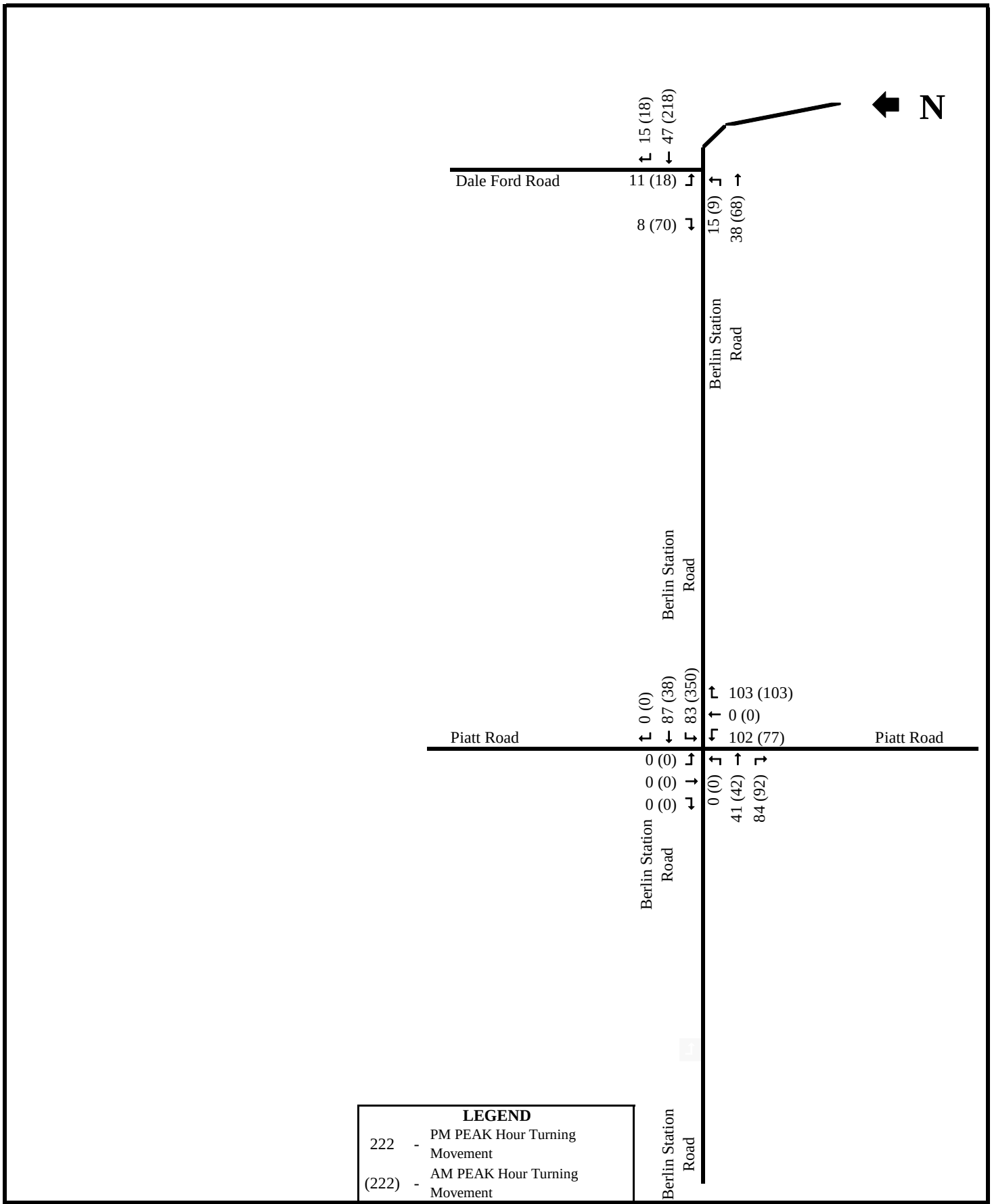
Full Rate: 106.13 Effective Rate 72.820006
Annual Tax: $3079.48

	Prior		1st Half		2nd Half	
	Chg	Adj	Chg	Adj	Chg	Adj
Orig Tax	$0.00	$0.00	$2456.38	$0.00	$2456.38	$0.00
Reduction			$770.96	$0.00	$770.96	$0.00
Subtotal	$0.00		$1685.42		$1685.42	
10% Rollback			$145.68	$0.00	$145.68	$0.00
Own Occ Cred			$0.00	$0.00	$0.00	$0.00
Homestead			$0.00	$0.00	$0.00	$0.00
CR			$0.00	$0.00	$0.00	$0.00
NET	$0.00		$1539.74		$1539.74	
Penalty/Int	$0.00		$0.00	$0.00	$0.00	$0.00
RE Chg	$0.00		$0.00		$1539.74	
RE Paid	$0.00		$1539.74		$0.00	
SPA Chg	$0.00		$0.00		$0.00	
SPA Paid	$0.00		$0.00		$0.00	
Total Owed	$0.00		$1539.74		$1539.74	
Total Paid	$0.00		$1539.74		$0.00	

Tax Detail Information

Balance Due	$0.00	$0.00	$1539.74

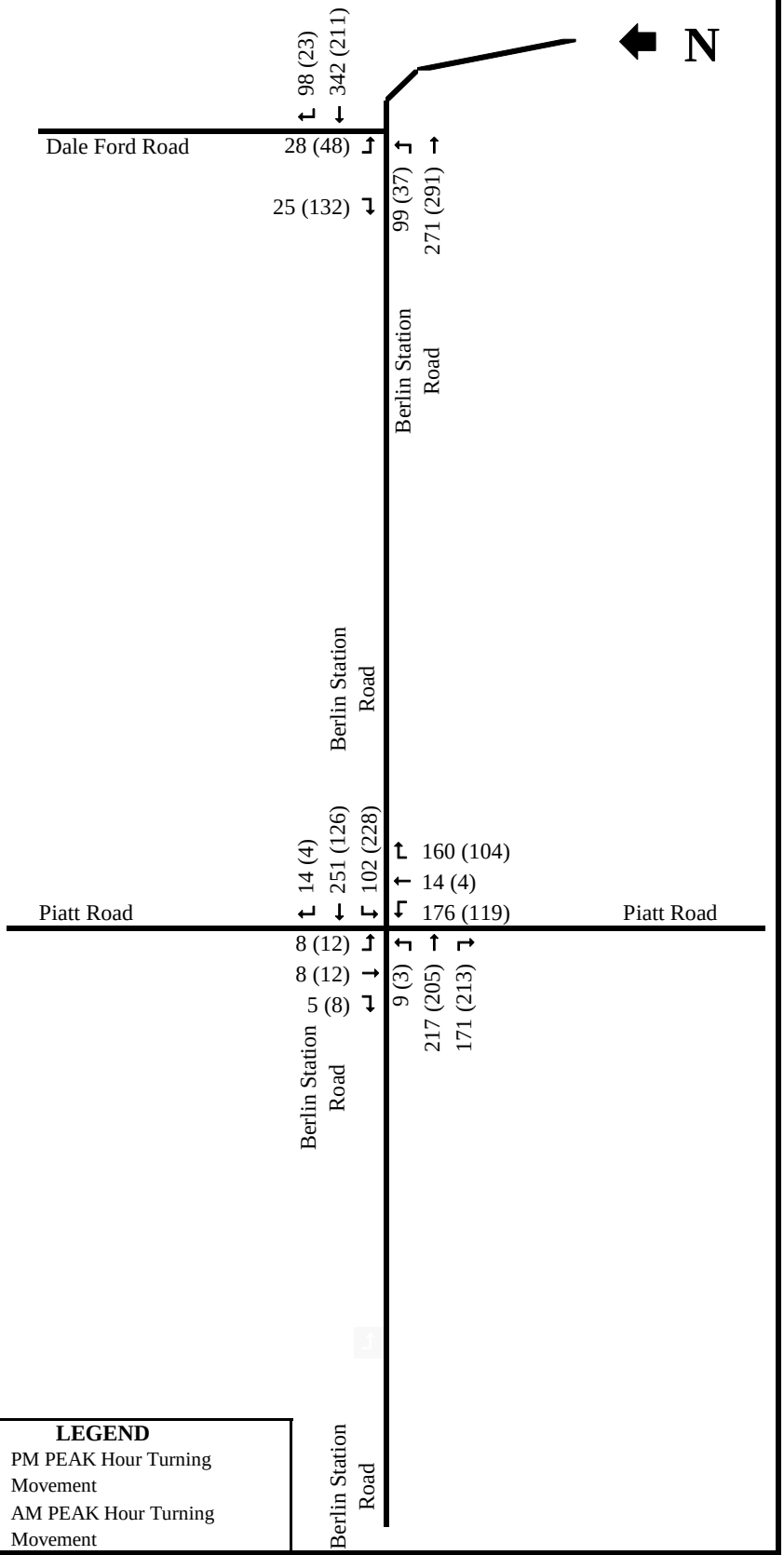
Eff. Rate	Amount	Type
53.732566	$2,238.57	OLENTANGY LSD
2.258938	$94.11	DELAWARE AREA CAREER CENTER
0.545659	$22.73	DELAWARE COUNTY HEALTH DEPT.
0.822729	$34.27	PRESERVATION PARK DISTRICT
0.872457	$36.35	DELAWARE CO. DISTRICT LIBRARY
1.05	$43.74	BERLIN TWP
6.231405	$259.60	BERLIN TWP
5.876038	$244.81	DELAWARE COUNTY
0.874862	$36.45	DELAWARE-MORROW MENTAL HEALTH
0.555352	$23.13	DELAWARE COUNTY 9-1-1 DISTRICT



LONGHILL
TRAFFIC IMPACT STUDY
PREPARED BY: SMART SERVICES, INC. 2/2019

APPENDIX EXHIBIT

2019 'NO BUILD' TRAFFIC



LONGHILL
TRAFFIC IMPACT STUDY
PREPARED BY: SMART SERVICES, INC. REV. 1 10/2019

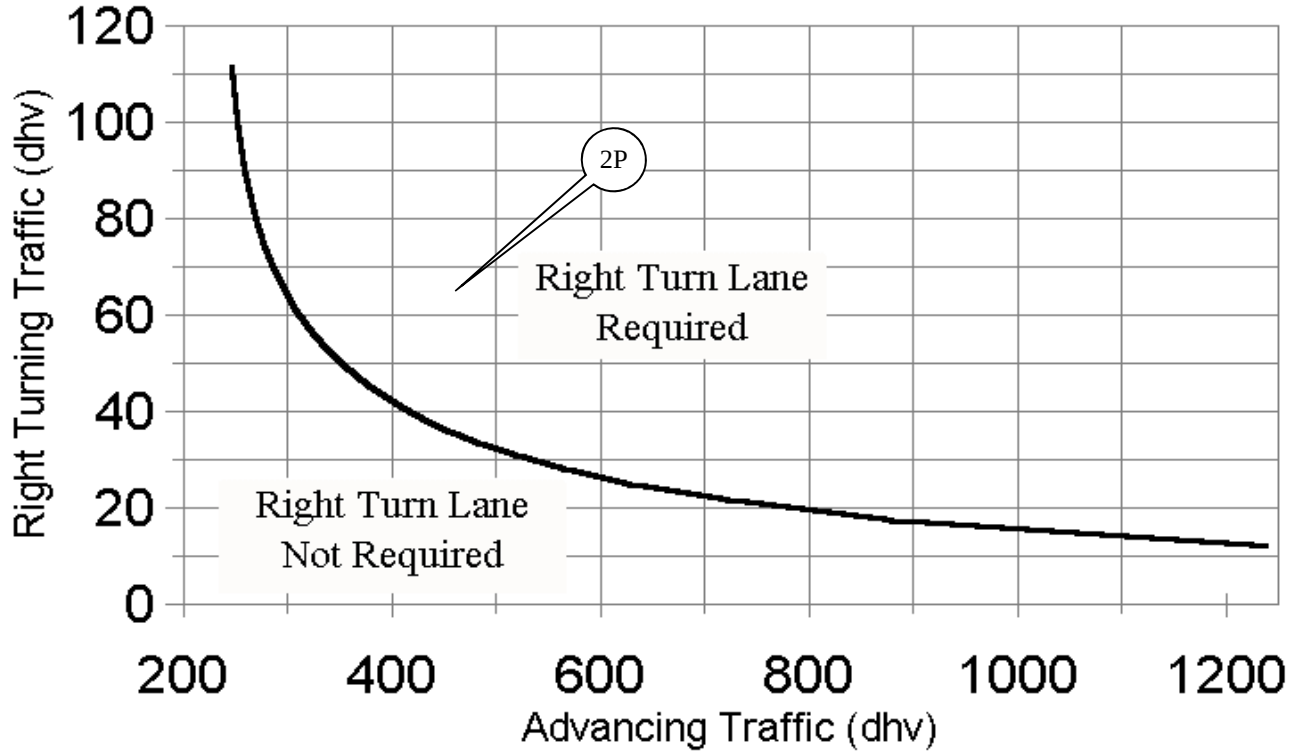
APPENDIX EXHIBIT

2039 'NO BUILD' TRAFFIC W/ TRINITY HOME BUILDERS SITE

2-Lane Highway Right Turn Lane Warrant

> 40 mph or 70 kph Posted Speed

Note: Only the volumes within the chart were plotted.



WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)		RESULT
1	Berlin Station Road & Street A [WB RT] - 2019 'BUILD'	(89,19)	(129,64)		NOT MET
2	**Berlin Station Road & Street A [WB RT] - 2039 'BUILD' W/ TRINITY HOME BUILDERS SITE**	(165,19)	**(447,64)**		**MET**

HCS7 Two-Way Stop-Control Report

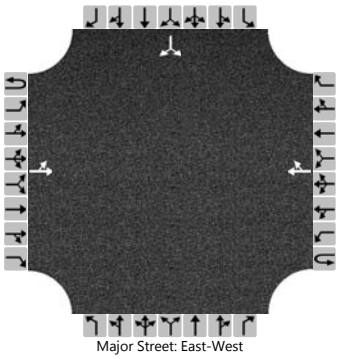
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	2/27/2019
Analysis Year	2019
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2019 No Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		9	68				218	18						18		70
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		10													96	
Capacity, c (veh/h)		1303													756	
v/c Ratio		0.01													0.13	
95% Queue Length, Q_{95} (veh)		0.0													0.4	
Control Delay (s/veh)		7.8													10.5	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		1.0												10.5		
Approach LOS														B		

HCS7 Two-Way Stop-Control Report

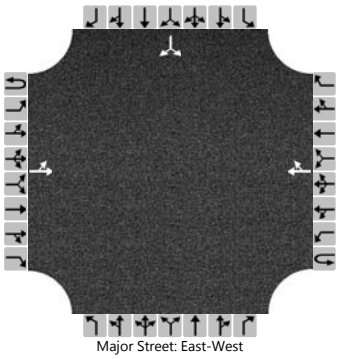
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	2/27/2019
Analysis Year	2019
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2019 No Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		15	38				47	15						11		8
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		16													21	
Capacity, c (veh/h)		1528													908	
v/c Ratio		0.01													0.02	
95% Queue Length, Q_{95} (veh)		0.0													0.1	
Control Delay (s/veh)		7.4													9.1	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)		2.1												9.1		
Approach LOS														A		

HCS7 Two-Way Stop-Control Report

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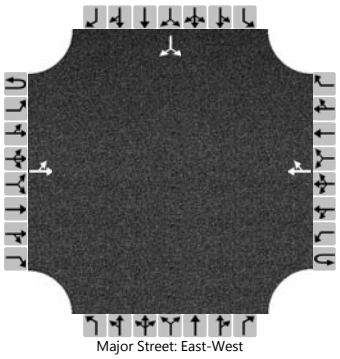
Agency/Co.	Smart Services, Inc.
Date Performed	2/27/2019
Analysis Year	2019
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2019 Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		17	161				249	18						18		73
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage																

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		19													101	
Capacity, c (veh/h)		1259													689	
v/c Ratio		0.02													0.15	
95% Queue Length, Q_{95} (veh)		0.0													0.5	
Control Delay (s/veh)		7.9													11.1	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)	0.9												11.1			
Approach LOS													B			

HCS7 Two-Way Stop-Control Report

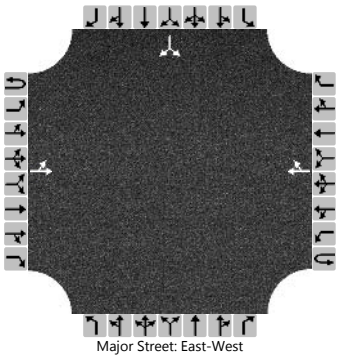
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	10/8/2019
Analysis Year	2019
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2019 Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		20	98				149	15						11		17
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		22													31	
Capacity, c (veh/h)		1387													768	
v/c Ratio		0.02													0.04	
95% Queue Length, Q_{95} (veh)		0.0													0.1	
Control Delay (s/veh)		7.6													9.9	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)	1.4												9.9			
Approach LOS													A			

HCS7 Two-Way Stop-Control Report

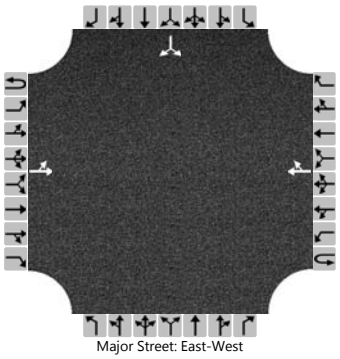
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	2/27/2019
Analysis Year	2039
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2039 No Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		37	291				211	23						48		132
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage																

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40													196	
Capacity, c (veh/h)		1305													643	
v/c Ratio		0.03													0.30	
95% Queue Length, Q_{95} (veh)		0.1													1.3	
Control Delay (s/veh)		7.8													13.0	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		1.1												13.0		
Approach LOS														B		

HCS7 Two-Way Stop-Control Report

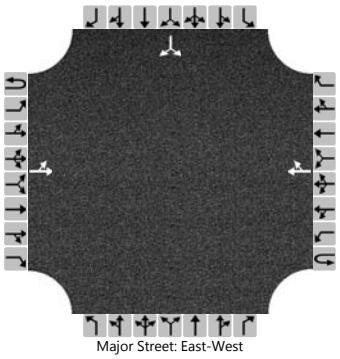
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	2/27/2019
Analysis Year	2039
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2039 No Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		99	271				342	98						28		25
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		108													58	
Capacity, c (veh/h)		1079													358	
v/c Ratio		0.10													0.16	
95% Queue Length, Q_{95} (veh)		0.3													0.6	
Control Delay (s/veh)		8.7													17.0	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)		3.1												17.0		
Approach LOS														C		

HCS7 Two-Way Stop-Control Report

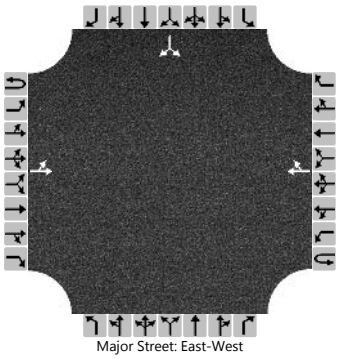
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2039 Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		45	382				241	23						48		135
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		50													203	
Capacity, c (veh/h)		1263													566	
v/c Ratio		0.04													0.36	
95% Queue Length, Q_{95} (veh)		0.1													1.6	
Control Delay (s/veh)		8.0													14.9	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		1.2												14.9		
Approach LOS														B		

HCS7 Two-Way Stop-Control Report

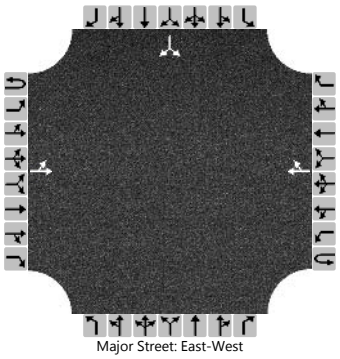
General Information

Analyst	BCK
Agency/Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2039 Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Dale Ford
Jurisdiction	DCEO
East/West Street	Berlin Station Road
North/South Street	Dale Ford Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		104	331				444	98						28		34
Percent Heavy Vehicles (%)		3												3		3
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												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		113													67	
Capacity, c (veh/h)		981													300	
v/c Ratio		0.12													0.22	
95% Queue Length, Q_{95} (veh)		0.4													0.8	
Control Delay (s/veh)		9.1													20.5	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)		3.2												20.5		
Approach LOS														C		

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2019
Time Analyzed	AM Peak
Project Description	2019 No Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	0	42	92	0	350	38	0	0	77	0	103	0	0	0	0
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	0	48	105	0	401	43	0	0	88	0	118	0	0	0	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		153			444			206			0	
Entry Volume, veh/h		149			431			200			0	
Circulating Flow (v_c), pc/h	401			88			48			532		
Exiting Flow (v_{ex}), pc/h	166			131			0			506		
Capacity (c_{pce}), pc/h		917			1262			1314			802	
Capacity (c), veh/h		890			1225			1276			779	
v/c Ratio (x)		0.17			0.35			0.16			0.00	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.7			6.3			4.1			4.6	
Lane LOS		A			A			A			A	
95% Queue, veh		0.6			1.6			0.6			0.0	
Approach Delay, s/veh	5.7			6.3			4.1					
Approach LOS	A			A			A					
Intersection Delay, s/veh | LOS	5.6						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2019
Time Analyzed	PM Peak
Project Description	2019 No Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	0	41	84	0	83	87	0	0	102	0	103	0	0	0	0
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	0	47	96	0	95	100	0	0	117	0	118	0	0	0	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		143			195			235			0	
Entry Volume, veh/h		139			189			228			0	
Circulating Flow (v_c), pc/h	95			117			47			312		
Exiting Flow (v_{ex}), pc/h	165			217			0			191		
Capacity (c_{pce}), pc/h		1253			1225			1315			1004	
Capacity (c), veh/h		1216			1189			1277			975	
v/c Ratio (x)		0.11			0.16			0.18			0.00	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.9			4.4			4.3			3.7	
Lane LOS		A			A			A			A	
95% Queue, veh		0.4			0.6			0.6			0.0	
Approach Delay, s/veh	3.9			4.4			4.3					
Approach LOS	A			A			A					
Intersection Delay, s/veh | LOS	4.2						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2019
Time Analyzed	AM Peak
Project Description	2019 Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	1	71	121	0	350	48	23	0	87	24	103	0	70	73	3
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	1	81	138	0	401	55	26	0	100	27	118	0	80	84	3
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		220			482			245			167	
Entry Volume, veh/h		214			468			238			162	
Circulating Flow (v_c), pc/h	565			128			162			556		
Exiting Flow (v_{ex}), pc/h	279			158			54			623		
Capacity (c_{pce}), pc/h		776			1211			1170			783	
Capacity (c), veh/h		753			1176			1136			760	
v/c Ratio (x)		0.28			0.40			0.21			0.21	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.1			7.1			5.1			7.1	
Lane LOS		A			A			A			A	
95% Queue, veh		1.2			1.9			0.8			0.8	
Approach Delay, s/veh	8.1			7.1			5.1			7.1		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	6.8						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2019
Time Analyzed	PM Peak
Project Description	2019 Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	3	60	103	0	83	119	78	0	134	81	103	0	46	48	2
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	3	69	118	0	95	136	89	0	153	93	118	0	53	55	2
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		190			320			364			110	
Entry Volume, veh/h		184			311			353			107	
Circulating Flow (v_c), pc/h	203			249			125			384		
Exiting Flow (v_{ex}), pc/h	240			291			185			268		
Capacity (c_{pce}), pc/h		1122			1070			1215			933	
Capacity (c), veh/h		1089			1039			1179			906	
v/c Ratio (x)		0.17			0.30			0.30			0.12	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.8			6.4			5.9			5.1	
Lane LOS		A			A			A			A	
95% Queue, veh		0.6			1.3			1.3			0.4	
Approach Delay, s/veh	4.8			6.4			5.9			5.1		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	5.8						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	AM Peak
Project Description	2039 No Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	3	205	213	0	228	126	4	0	119	4	104	0	12	12	8
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	3	230	238	0	255	141	4	0	133	4	116	0	13	13	9
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		471			400			253			35	
Entry Volume, veh/h		457			388			246			34	
Circulating Flow (v_c), pc/h	281			140			246			529		
Exiting Flow (v_{ex}), pc/h	359			283			11			506		
Capacity (c_{pce}), pc/h		1036			1196			1074			805	
Capacity (c), veh/h		1006			1162			1042			781	
v/c Ratio (x)		0.45			0.33			0.24			0.04	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.8			6.3			5.7			5.0	
Lane LOS		A			A			A			A	
95% Queue, veh		2.4			1.5			0.9			0.1	
Approach Delay, s/veh	8.8			6.3			5.7			5.0		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.2						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	PM Peak
Project Description	2039 No Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	9	217	171	0	102	251	14	0	176	14	160	0	8	8	5
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	10	243	191	0	114	281	16	0	197	16	179	0	9	9	6
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		444			411			392			24	
Entry Volume, veh/h		431			399			381			23	
Circulating Flow (v_c), pc/h	132			223			262			592		
Exiting Flow (v_{ex}), pc/h	431			484			42			314		
Capacity (c_{pce}), pc/h		1206			1099			1056			754	
Capacity (c), veh/h		1171			1067			1026			732	
v/c Ratio (x)		0.37			0.37			0.37			0.03	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.7			7.2			7.4			5.2	
Lane LOS		A			A			A			A	
95% Queue, veh		1.7			1.8			1.7			0.1	
Approach Delay, s/veh	6.7			7.2			7.4			5.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.1						A					

HCS7 Roundabouts Report

General Information

Analyst	BCK
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	AM Peak
Project Description	2039 Build - AM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	4	234	242	0	228	136	27	0	129	28	104	0	82	85	11
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	4	262	271	0	255	152	30	0	144	31	116	0	92	95	12
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		537			437			291			199	
Entry Volume, veh/h		521			424			283			193	
Circulating Flow (v_c), pc/h	442			179			358			551		
Exiting Flow (v_{ex}), pc/h	470			308			65			621		
Capacity (c_{pce}), pc/h		879			1150			958			787	
Capacity (c), veh/h		854			1116			930			764	
v/c Ratio (x)		0.61			0.38			0.30			0.25	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.7			7.1			7.1			7.6	
Lane LOS		B			A			A			A	
95% Queue, veh		4.3			1.8			1.3			1.0	
Approach Delay, s/veh	13.7			7.1			7.1			7.6		
Approach LOS	B			A			A			A		
Intersection Delay, s/veh | LOS	9.6						A					

HCS7 Roundabouts Report

General Information

Analyst	TJS
Agency or Co.	Smart Services, Inc.
Date Performed	10/08/2019
Analysis Year	2039
Time Analyzed	PM Peak
Project Description	2039 Build - PM Peak

Site Information

Intersection	Berlin Sta Rd & Piatt Rd
E/W Street Name	Berlin Station Road
N/S Street Name	Piatt Road
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	DCEO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	12	236	190	0	102	283	92	0	208	95	160	0	54	56	7
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v_{PCE}), pc/h	0	13	264	213	0	114	317	103	0	233	106	179	0	60	63	8
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		490			534			518			131	
Entry Volume, veh/h		476			518			503			127	
Circulating Flow (v_c), pc/h	237			352			337			664		
Exiting Flow (v_{ex}), pc/h	503			558			222			390		
Capacity (c_{pce}), pc/h		1084			964			979			701	
Capacity (c), veh/h		1052			936			950			681	
v/c Ratio (x)		0.45			0.55			0.53			0.19	

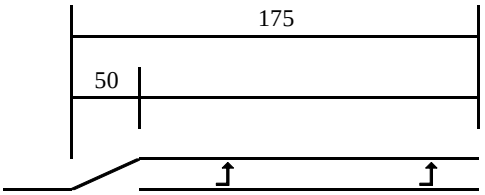
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.5			11.3			10.6			7.4	
Lane LOS		A			B			B			A	
95% Queue, veh		2.4			3.5			3.2			0.7	
Approach Delay, s/veh	8.5			11.3			10.6			7.4		
Approach LOS	A			B			B			A		
Intersection Delay, s/veh | LOS	10.0						A					

(1) BERLIN STATION ROAD & STREET A - EB LT - 2019 'BUILD'

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	50	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	64	VPH	Turn Lane Length =	175	feet
# of Turning Lanes =	1				
Advancing Volume =	109	VPH			
Turning % (>10% HIGH) =	58.7%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.1				
Storage Length (Calc) =	50	feet			

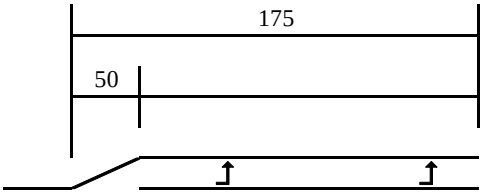


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(2) BERLIN STATION ROAD & STREET A - EB LT - 2039 'BUILD' W/ TRINITY HOME BUILDERS SITE

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	50	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	64	VPH	Turn Lane Length =	175	feet
# of Turning Lanes =	1				
Advancing Volume =	312	VPH			
Turning % (>10% HIGH) =	20.5%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.1				
Storage Length (Calc) =	50	feet			

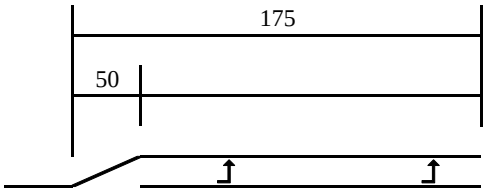


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(3) STREET D & PIATT ROAD - NB LT - 2019 'BUILD'

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	50	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	64	VPH	Turn Lane Length =	175	feet
# of Turning Lanes =	1				
Advancing Volume =	163	VPH			
Turning % (>10% HIGH) =	39.3%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.1				
Storage Length (Calc) =	50	feet			

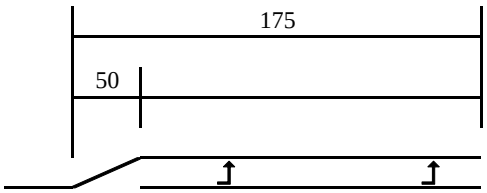


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(4) STREET D & PIATT ROAD - NB LT - 2039 'BUILD' W/ TRINITY HOME BUILDERS SITE

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	50	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	64	VPH	Turn Lane Length =	175	feet
# of Turning Lanes =	1				
Advancing Volume =	200	VPH			
Turning % (>10% HIGH) =	32.0%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.1				
Storage Length (Calc) =	50	feet			

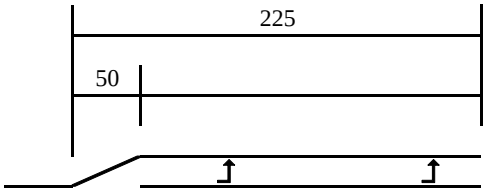


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(5) STREET B & PIATT ROAD - NB LT - 2019 'BUILD'

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	100	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	99	VPH	Turn Lane Length =	225	feet
# of Turning Lanes =	1				
Advancing Volume =	99	VPH			
Turning % (>10% HIGH) =	100.0%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.7				
Storage Length (Calc) =	100	feet			

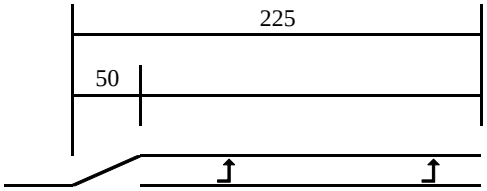


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(6) STREET B & PIATT ROAD - NB LT - 2039 'BUILD' W/ TRINITY HOME BUILDERS SITE

Critical Analysis Period: PM PEAK

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	100	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	99	VPH	Turn Lane Length =	225	feet
# of Turning Lanes =	1				
Advancing Volume =	99	VPH			
Turning % (>10% HIGH) =	100.0%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.7				
Storage Length (Calc) =	100	feet			



Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

LONGHILL
TRAFFIC IMPACT STUDY

PREPARED BY: SMART SERVICES, INC. REV. 2 11/2019

LEFT TURN LANE CALCULATIONS

(2) BERLIN STATION ROAD & STREET A - WB RT - 2039 'BUILD' W/ TRINITY HOME BUILDERS SITE

Critical Analysis Period: PM Peak

Type =	Unsignalized Through Road				
Speed =	45	MPH	Storage Length (Adj) =	50	feet
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	64	VPH	Turn Lane Length =	175	feet
# of Turning Lanes =	1				
Advancing Volume =	447	VPH			
Turning % (>10% HIGH) =	14.3%	HIGH			
Design Condition =	C				
Vehicles per Cycle =	1.07				
Storage Length (Calc) =	50	feet			

Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.