
(Space above reserved for Recorder of Deeds certification)

Document Recording Cover Sheet

1. **Title of Document:** _____
2. **Date of Document:** _____
3. **Grantor(s)/Party indexed as Grantor(s):** _____

4. **Grantee(s)/Party indexed as Grantee(s):** _____

5. **Mailing Address of Grantee or Party:** _____

6. **Legal Description:** _____

7. **Reference Book and Page(s):** _____

(If there is not sufficient space on this page for the information required, state the page reference where it is contained within the document.)

DEVELOPMENT AGREEMENT

THIS AGREEMENT ("Agreement"), is made and entered into by and between Richland Olivet Farm, LLC, a Missouri limited liability company, Charlotte M. Frazier, and Melissa L. Ussery ("Owner") and the City of Columbia, Missouri, a municipal corporation of the State of Missouri ("City") and will be effective the date of signature by the Party last executing this Agreement ("Effective Date"). The City and Owner may hereinafter be collectively referred to as the Parties and individually as a Party.

RECITALS

WHEREAS, Owner holds title to approximately 103.73 acres of land currently located in the unincorporated area of Boone County legally described in the attached **Exhibit A** (the "Subject Property"); and

WHEREAS, the Subject Property is now located in the unincorporated area of Boone County, Missouri ("County"). Owner has filed with the City a Petition for Annexation of the Subject Property into the geographic limits of the City ("Annexation Petition"), provided that the Subject Property is rezoned per Owner's application that was submitted to the City in Case No. 114-2023 ("Owner's Zoning Application"); and

WHEREAS, Owner desires to develop the Subject Property for residential and commercial uses. The Owner's Zoning Application divides the Subject Property into two zoning districts, to wit, 97.02 acres zoned R-1 (One-family Dwelling) and 6.71 acres zoned M-N (Mixed-use Neighborhood); and

WHEREAS, when fully developed, the Subject Property is anticipated to be subdivided and developed into approximately 146 residential lots, 1 neighborhood commercial lot and various common lots; and

WHEREAS, the parties desire to set forth responsibility for the construction and dedication of certain public improvements associated with development of the Subject Property in this Agreement, it being the intent of this agreement to provide milestones for which the construction of such public improvements shall occur;

NOW, THEREFORE, in view of the foregoing Recitals and in consideration of the mutual promises, declarations, covenants and agreements of the City and Owner as hereinafter set forth, the Parties hereby agree as follows:

1. **Contingencies**. This Agreement is contingent upon Owner's Petition for Annexation and Zoning Application being granted by the City.

2. **Agreement to Run with the Land.** The provisions of this Agreement will constitute covenants running with the entirety of the Subject Property and each and every part of the Subject Property, and will bind the current Owner and all of such successors and assigns.

3. **Owner's Obligations.** Owner shall prepare the design for all improvements listed, and the designs will be approved by the City before construction may begin on any such improvements.

a) **Traffic Impact Study Improvements.** Owner agrees to construct the following improvements identified in the March 22, 2023 Traffic Impact Study by CBB Transportation Engineers + Planners, which is attached hereto as **Exhibit C**. Design for the improvements described in this section shall be prepared by Owner and approved by the City before construction may begin on any project. Unless otherwise specified, projects listed below must be completed by Owner, at Owner's expense, before approval of any final plat for the Subject Property:

i. Construct a westbound left-turn lane on Richland Road at Olivet Road. This improvement shall be completed prior to the approval of any final plat for Lot 147 of the Preliminary Plat of the Subject Property (i.e., the commercial tract).

ii. Construct an eastbound right-turn lane on Richland Road at Olivet Road. This improvement shall be completed prior to the approval of any final plat for Lot 147 of the Preliminary Plat of the Subject Property (i.e., the commercial tract).

iii. Construct an eastbound right-turn lane on Richland Road at Burghley Drive. This improvement shall be built concurrently with the construction of Burghley Drive.

b) **Walsby Drive.** Walsby Drive shall be constructed such that Walsby Drive and Bonita Bay Drive north of Richland Road directly align.

c) **Olivet Road.**

i. Realignment. Owner shall dedicate right-of-way for the realignment of Olivet Road to provide for a roadway width of no less than one hundred feet (100'), as shown in the Preliminary Plat of the Subject Property. The realignment of Olivet Road shall be such that Olivet Road north of Richland Road and Olivet Road south of Richland Road directly align. No final plat for Lot 147 of the Preliminary Plat of the Subject Property (i.e., the commercial tract) shall be approved prior to the construction of the realigned Olivet Road south of Richland Road.

ii. Roundabout. Owner shall dedicate right-of-way for a future single-lane roundabout not less than one hundred forty feet (140') in diameter as measured from the

outside curb of the roundabout at the intersection of Richland Road and Olivet Road, as realigned. The dedication of the right-of-way shall be included in a final plat prior to or concurrent with any final plat for Lot 147 of the Preliminary Plat of the Subject Property (i.e., the commercial tract).

d) Richland Road. Owner shall dedicate right-of-way for Richland Road to provide a width of no less than fifty-five feet (55') when measured southward from the existing centerline of Richland Road, as shown in the Preliminary Plat of the Subject Property. The dedication of all the required Richland Road right-of-way shall be included in a final plat prior to or concurrent with any final plat for any residentially zoned lot.

e) Payment Offset for Richland Road Intersection Improvements.

i. Payment Amount. Owner shall pay the City a lump sum of sixty-five thousand, eight hundred thirty-four dollars, and nine cents (\$65,834.09) as a contribution to intersection improvements to Richland Road. This Payment Offset must be submitted to the City before the approval of any final plat for the Subject Property.

ii. Use of Funds. The City shall hold the funds paid by Owner to the City under this section 3(e) in escrow and may authorize, at the direction of the Director of Public Works, the use of such funds for any Richland Road improvements and/or maintenance within three (3) miles of the Subject Property which the City, in its sole reasonable discretion, determines to be necessary as a result of the development of the Subject Property. The funds shall be used by the City for such purposes within a period of ten (10) years following the payment into escrow by the Owner. Any portion of the funds remaining in escrow at the expiration of ten (10) years shall be returned to the Owner or Owner's successors and assigns as it relates to the Subject Property at the time of the return of funds.

4. **Construction and Bonding of Improvements.** Except as otherwise expressly indicated herein, all public improvements required under the regulations of the City or this Agreement must be constructed in accordance with the City's Street, Storm Sewer, and Sanitary Sewer Specifications and Standards, as may be amended, or any successor specifications and standards adopted by the City together with any final construction plans approved by the City prior to construction of such facilities. In connection with construction, the Owner shall be required to post bonds or other security as required by the city code. Owner is responsible for obtaining all necessary easements to construct improvements related to Owner's Development of the Subject Property.

5. **Phasing Plan.** If any development of the Subject Property, including final platting, will be phased, then a plan which generally describes the sequence of development of the Subject Property ("Phasing Plan") must be submitted to the Director of Community Development ("Director") concurrently with the first application for a Final Plat on the Subject Property. The Phasing Plan shall become final and binding upon

Owner upon approval of the first Final Plat on the Subject Property. Thereafter, development and platting of the Subject Property shall occur in the sequence established in the Phasing Plan, and any amendments thereto. However, nothing contained in this paragraph shall be construed as precluding Owner from filing or developing more than one phase at a time. The Phasing Plan may not be amended except upon written approval of the Director, which shall not be unreasonably withheld, conditioned or delayed. .

6. **Recording.** The City shall record this Agreement in the office of the Boone County Recorder of Deeds at the cost and expense of the Owner.

7. **Amendments.** Any amendment to this Agreement must be in writing and must be executed by the City and the Owner, and any future Owner of any part of the Subject Property who would otherwise be obligated to perform any of the requirements imposed upon the Owner by this Agreement. Oral modifications or amendments of this Agreement are of no force or effect.

8. **Remedies.** The parties to this Agreement may, either in law or equity, by suit, action, mandamus or other proceedings in court, seek declaratory relief, enforce and compel specific performance of this Agreement provided that in no event will the City have any liability in damages, costs or any other monetary liability to Owner or any affiliate of Owner, any person claiming through Owner, or to their respective successors, assigns, heirs and personal representatives in respect of any suit, claim, or cause of action arising out of this Agreement or any of the actions or transactions contemplated herein.

9. **Third Party Actions.** Owner will have the right, but not the obligation to assume the costs of defense of any action or proceeding initiated by a third party challenging this Agreement, the zoning or rezoning of the Subject Property, or any other actions or transactions contemplated by this Agreement (including, without limitation, to settle or compromise any claim or action for which Owner has assumed the defense) with counsel of Owner's choosing and the City and Owner agree that so long as no conflicts of interest exist between them, the same attorney or attorneys may simultaneously represent the City and Owner in any such proceeding. In no event will the City have any liability to Owner for damages or otherwise in the event that all or any part of this Agreement, or the approval of a zoning request or platting request, are declared invalid or unconstitutional in whole or in part by a final (as to which all rights of appeal have been exhausted or expired) judgment of a court of competent jurisdiction, and, in the event Owner elects not to assume such defense and costs, the City will have no obligation to defend or to assume the costs of defense of any such action.

10. **Notices.** All notices between the parties hereto must be in writing and must be sent by certified or registered mail, return receipt requested, by personal delivery against receipt or by overnight courier, will be deemed to have been validly served, given or delivered immediately when delivered against receipt or three (3) business days after deposit in the mail, postage prepaid, or one (1) business day after deposit with an overnight courier, and must be addressed as follows:

If to the City:

City of Columbia
Attn: City Manager
701 E. Broadway
Columbia, MO 65205

If to Owner:

Richland Olivet Farm, LLC
4240 Philips Farm Rd, Suite 109
Columbia, MO 65201

Charlotte M. Frazier and Melissa L. Ussery
10950 State Rte PP
West Plains, MO 65775

Each party will have the right to specify that notice is to be addressed to another address by giving to the other party ten (10) days written notice thereof.

11. **Insurance.** Owner must provide, at its sole expense, and maintain during all times in which Owner is constructing public improvements pursuant to this Agreement commercial general liability insurance with a reputable, qualified, and financially sound company licensed to do business in the State of Missouri, and unless otherwise approved by the City, with a rating by Best of not less than "A," that will protect the Owner, the City, and the City's officials, officers, and employees from claims which may arise from operations under this Agreement, whether such operations are by the Owner, its officers, directors, employees and agents, or any subcontractors of Owner. This liability insurance must include, but will not be limited to, protection against claims arising from bodily and personal injury and damage to property, resulting from all Owner operations, products, services or use of automobiles, or construction equipment. The amount of insurance required herein must be in no event less than the individual and combined sovereign immunity limits established by § 537.610 RSMo. for political subdivisions; provided that nothing herein will be deemed to waive the City's sovereign immunity. An endorsement must be provided which states that the City is named as an additional insured and stating that the policy will not be canceled or materially modified so as to be out of compliance with the requirements of this Section, or not renewed without 30 days advance written notice of such event being given to the City.

12. **Hold Harmless.** Owner at its sole cost and expense, hereby agrees to indemnify, protect, release, defend (with counsel acceptable to the City) and hold harmless the City, its municipal officials, elected officials, boards, commissions, officers, employees, attorneys, and agents from and against any and all causes of action, claims,

demands, all contractual damages and losses, economic damages and losses, all other damages and losses, liabilities, fines, charges, penalties, administrative and judicial proceedings and orders, judgments, remedial actions of any kind, and all costs and expenses of any kind, including, without limitation, reasonable attorney's fees and costs of defense arising, directly or indirectly, in whole or in part, from the action or inaction of Owner, its agents, representatives, employees, contractors, subcontractors or any other person for whose acts Owner may be liable, in the activities performed, or failed to be performed, by Owner under this Agreement or in the development of the Subject property, except to the extent arising from or caused by the sole or gross negligence or willful misconduct of the City, its elected officials, officers, employees, agents or contractors. The indemnification, duty to defend and hold harmless obligations set forth in this Section will survive for a period of five (5) years from the date of expiration or termination of this Agreement.

13. **Sovereign Immunity.** Nothing in this Agreement shall constitute or be construed as a waiver of the City's governmental or official immunity or its officers or employees from liability or suit pursuant to Section 537.600 RSMo.

14. **No Third Party Beneficiaries.** There are no third party beneficiaries to this Agreement.

15. **Failure or Delay to Enforce.** No failure to exercise or delay in exercising any right hereunder on the part of any Party to this Agreement shall operate as a waiver thereof, and no single or partial exercise of any right of such Party shall preclude any other or further exercise of such right or the exercise of any other right.

16. **Power of the City.** Notwithstanding anything set forth in this Agreement to the contrary, no provision contained herein shall in any manner diminish or usurp the inherent rights and powers of the City to act in its capacity as a public body. Nothing herein shall relieve Owner from complying with all applicable laws and requirements.

17. **Inspection.** Upon reasonable prior notice, the City may conduct such periodic inspections of the projects herein, including any applicable phase, as may be generally provided in the applicable law or regulation for inspection thereof in order to confirm compliance with the terms of this Agreement. The Owner shall not deny the City and its officers and employees the right to inspect, upon reasonable prior written request, all engineering plans, construction contracts or other documents pertaining to the construction of the public infrastructure on the Subject Property. Notwithstanding the foregoing, Owner shall not be required to produce documents for inspection if such documents are attorney-client privileged or contain confidential, proprietary information or if production would violate the rights of any third parties.

18. **Governing Law.** This Agreement will be construed according to the laws of the State of Missouri. The Parties will comply with all local, state, and federal laws and regulations relating to the performance of this Agreement.

19. **Venue.** Any action at law, suit in equity, or other judicial proceeding to enforce or construe this Agreement, or regarding its alleged breach, must be instituted only in the Circuit Court of Boone County, Missouri.

20. **Entire Agreement.** This Agreement contains the entire and complete agreement between the City and the Owner with respect to the requirements imposed upon the Owner for the providing of certain rights-of-way and interests in land, and the construction and installation of certain improvements, all as hereinabove described in the Recitals for this Agreement and the above numbered paragraphs of this Agreement. Parties agree that this Agreement constitutes a lawful contract between the Parties and Owner hereby acknowledges and agrees that this Agreement and provisions of the City's Code of Ordinances applicable to this Agreement constitute lawful exercises of the City's authority and police power.

[Remainder of page intentionally blank. Signature pages follow.]

IN WITNESS WHEREOF, the Parties have executed this Agreement and shall be effective on the last day and year indicated below.

CITY:

City of Columbia, Missouri



By: _____

De'Carlton Seewood, City Manager

Date: _____

ATTEST:

Sheela Amin, City Clerk

Approved as to form:

Nancy Thompson, City Counselor/rgt

On this _____ day of _____, 20__, before me appeared De'Carlton Seewood, to me personally known, who, being by me duly sworn, did say that he is the City Manager of the City of Columbia, Missouri, and that the seal affixed to the foregoing instrument is the corporate seal of the City and that this instrument was signed and sealed on behalf of the City by authority of its City Council and the City Manager acknowledged this instrument to be the free act and deed of the City.

IN TESTIMONY WHEREOF, I have hereunto set by hand and affixed my official seal, at my office in Columbia, Boone County, Missouri, the day and year first above written.

Notary Public

My commission expires: _____.

OWNER:

Richland Olivet Farm, LLC, a Missouri limited liability company

By: _____

Name Printed: _____

Jon Odle

Date 5/19/23

STATE OF MISSOURI)

) SS

COUNTY OF BOONE)

On this 19th day of May, 2023, before me appeared Jon Odle, to me personally known, who, being by me duly sworn did say that he or she is Manager of Richland Olivet Farm, LLC and that said instrument was signed on behalf of said corporation, acknowledged said instrument to be the free act and deed of said corporation and that he or she executed the same for the purposes therein stated.

IN TESTIMONY WHEREOF, I have hereunto affixed my hand and notarial seal at my office in the State and County aforesaid, on the day and year hereinabove first written.

[Signature]
Notary Public

My commission expires: 12/19/26



OWNER:
Charlotte M. Frazier

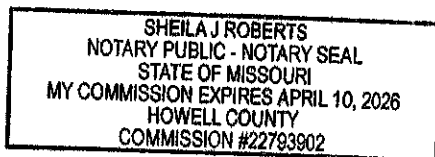
Charlotte M. Frazier

Date 5-17-23

STATE OF MISSOURI)
) SS
COUNTY OF BOONE)

On this 17th day of May, 2023, before me appeared Charlotte M. Frazier, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her authorized capacity, and that by her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument for the purposes therein stated.

IN TESTIMONY WHEREOF, I have hereunto affixed my hand and notarial seal at my office in the State and County aforesaid, on the day and year hereinabove first written.



Sheila J Roberts
Notary Public

My commission expires: 4-10-26

OWNER:
Melissa L. Ussery

Melissa L. Ussery

Date 05/18/23

STATE OF MISSOURI)
) SS
COUNTY OF BOONE)

On this 18th day of May, 2023, before me appeared Melissa L. Ussery, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her authorized capacity, and that by her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument for the purposes therein stated.

IN TESTIMONY WHEREOF, I have hereunto affixed my hand and notarial seal at my office in the State and County aforesaid, on the day and year hereinabove first written.

Heather Hays
Notary Public

My commission expires: 7/14/26

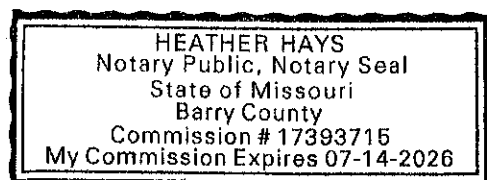


EXHIBIT A

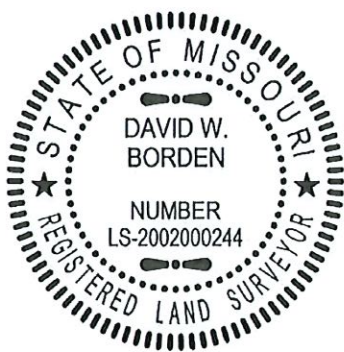
Legal Description Subject Property


DESCRIPTION OF RICHLAND OLIVET FARM – ANNEXATION TRACT WEST
FOR RICHLAND OLIVET FARMS, LLC.
JOB #220385

MAY 4, 2023

A TRACT OF LAND LOCATED IN THE WEST HALF OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST AND BEING DESCRIBED BY THE TRUSTEES DEED RECORDED IN BOOK 5670, PAGE 52 AND BEING PART OF TRACT 2 AS SHOWN IN THE SURVEY RECORDED IN BOOK 5157, PAGE 33 AND CONTAINING ALL OF THE LAND SHOWN IN THE SURVEY RECORDED IN BOOK 1453, PAGE 371 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 14 AND WITH THE NORTH LINE OF THEREOF, N 88°37'30"E, 336.09 FEET TO THE NORTHWEST CORNER OF TRACT B OF A SURVEY RECORDED IN BOOK 410, PAGE 871; THENCE LEAVING SAID NORTH LINE AND WITH THE LINES OF SAID TRACT B, S 0°37'55"W, 351.00 FEET; THENCE N 89°37'50"E, 226.00 FEET; THENCE N 4°15'35"W, 355.20 FEET TO THE NORTH LINE OF SAID SECTION 14; THENCE LEAVING THE LINES OF SAID SURVEY AND WITH SAID NORTH LINE THEREOF, N 88°37'30"E, 745.05 FEET TO THE NORTHWEST CORNER OF ZUMWALT ESTATES, RECORDED IN PLAT BOOK 35 PAGE 56; THENCE LEAVING THE NORTH LINE OF SAID SECTION WITH THE LINES OF SAID ZUMWALT ESTATES, S 0°55'00"W, 750.10 FEET; THENCE N 88°37'55"E, 52.03 FEET TO THE EAST LINE OF SAID TRUSTEES DEED RECORDED IN BOOK 5670, PAGE 52; THENCE LEAVING THE LINES OF SAID ZUMWALT ESTATES AND WITH THE EAST LINE OF SAID DEED, S 1°26'55"W, 1854.77 FEET TO THE SOUTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE WITH SAID SOUTH LINE, N 88°56'05"W, 1346.90 FEET TO THE CENTER OF SAID SECTION 14 AS SHOWN IN BOONE COUNTY SURVEY NUMBER 7968; THENCE LEAVING SAID SOUTH LINE AND WITH THE WEST LINE OF THE NORTHEAST QUARTER THEREOF, N 1°43'50"E, 2548.42 FEET TO THE POINT OF BEGINNING AND COUNTING 76.63 ACRES.





DAVID W. BORDEN, PLS-2002000244
5-4-23

DATE

CROCKETT ENGINEERING CONSULTANTS 1000 W. Nifong Blvd. Building 1 Columbia, Missouri 65203 (573) 447-0292 www.crockettengineering.com	CORPORATE NUMBER 2000151304	RICHLAND OLIVET FARM – ANNEXATION TRACT
	DATE: 5/4/2023 PROJECT: 220385	NE QUARTER, SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST, COLUMBIA, BOONE COUNTY, MISSOURI

RICHLAND ESTATES

RICHLAND OLIVET FARMS, LLC.

SCALE: 1" = 300'

THE BROOKS AT COLUMBIA, LLC
WARRANTY DEED RECORDED IN BOOK 5040, PAGE 2

EXISTING APPROVED PRELIMINARY
PLAT OF SILVER LAKES
PRELIMINARY PLAT APPROVED BY CITY OF COLUMBIA.

SURVEY RECORDED IN BOOK 858, PAGE 180

N 88°37'30" E 336.09'

N 88°37'30" E 745.05'

RICHLAND ROAD
SECTION LINE

NW CORNER
NE QUARTER
SECTION 14
P.O.B.

OLD HAWTHORN NORTH LLC
RECORDED IN
PLAT BOOK 56, PAGE 66

N 4°15'35" W
355.20'

WARRANTY DEED
RECORDED IN
BOOK 4580, PAGE 47

SURVEY RECORDED IN
BOOK 900, PAGE 454

ZUMWALT ESTATES RECORDED IN
PLAT BOOK 35, PAGE 56

N 89°37'50" E 226.00'

SURVEY RECORDED IN
BOOK 1453, PAGE 371
TRUSTEES DEED
RECORDED IN
BOOK 1467, PAGE 435

TRACT B
SURVEY RECORDED IN
BOOK 410, PAGE 871

N 88°37'55" E 52.03'

S 0°55'00" W 750.10'

TRACT 2
76.63 AC.

SURVEY RECORDED IN
BOOK 5157, PAGE 33

TRUSTEES DEED
RECORDED IN
BOOK 5670, PAGE 52

SURVEY RECORDED IN BOOK 5157, PAGE 33

EXISTING APPROVED PRELIMINARY
PLAT OF OAK MILL ESTATES
PRELIMINARY PLAT APPROVED IN
BOONE COUNTY.

S 1°26'55" W 1854.77'

OLD HAWTHORN NORTH LLC
RECORDED IN
PLAT BOOK 56, PAGE 66

1/4 SECTION LINE

CENTER SECTION 14
SURVEY #7968
BOONE COUNTY

N 88°56'05" W 1346.90'

1/4 SECTION LINE

JOHN C. MRUZIK & NANCY J. ROSSON
WARRANTY DEED RECORDED
IN BOOK 3631, PAGE 61

JOSH RAMSEY & KALYN RAMSEY
WARRANTY DEED RECORDED IN
BOOK 5493, PAGE 148

OLD HAWTHORNE PLAT NO. 5
RECORDED IN
PLAT BOOK 41, PAGE 38

516
515
514
513
506
509
510
511



SCALE: 1"=300'



DESCRIPTION OF RICHLAND OLIVET FARM – ANNEXATION TRACT EAST
FOR CHARLOTTE M. FRAZIER & MELISSA L. USSERY
JOB #220385


MAY 4, 2023

A TRACT OF LAND LOCATED IN THE EAST HALF OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST AND BEING DESCRIBED BY THE TRUSTEES DEED RECORDED IN BOOK 5199, PAGE 75 AND BEING PART OF TRACTS 2 AND 3 AS SHOWN IN THE SURVEY RECORDED IN BOOK 5157, PAGE 33 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTER OF SAID SECTION 14 AS SHOWN IN BOONE COUNTY SURVEY # 7968 AND THE NORTHEAST CORNER OF THE SURVEY RECORDED IN BOOK 2591, PAGE 24; THENCE WITH THE SOUTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION, S 88°56'05"E, 1346.90 FEET TO THE SOUTHWEST CORNER OF SAID TRUSTEE'S DEED RECORDED IN BOOK 5199, PAGE 75; THENCE LEAVING SAID SOUTH LINE AND WITH THE WEST LINE OF SAID DEED, N 1°26'55"E, 1373.24 FEET TO THE POINT OF BEGINNING:

THENCE FROM THE POINT OF BEGINNING AND CONTINUING WITH SAID WEST LINE, N 1°26'55" E, 481.53 FEET TO THE SOUTH LINE OF ZUMWALT ESTATES RECORDED IN PLAT BOOK 35 PAGE 56; THENCE WITH THE LINES OF SAID ZUMWALT ESTATES, N 88°37'55"E, 356.97 FEET; THENCE N 0°55'00"E, 750.15 FEET TO THE NORTH LINE OF SAID SECTION; THENCE LEAVING THE LINE OF SAID ZUMWALT ESTATES AND WITH THE NORTH LINE OF SAID SECTION 14, N 88°37'30"E, 402.15 FEET TO NORTHWEST CORNER OF THE SURVEY RECORDED IN BOOK 383 PAGE 582; THENCE LEAVING SAID NORTH LINE OF SAID SECTION AND WITH THE LINES OF SAID SURVEY AND THE TRACT DESCRIBED IN BOOK 3181 PAGE 13, S 1°11'00"W, 413.85 FEET; THENCE N 88°49'00"E, 208.71 FEET; THENCE N 1°11'00"W, 414.55 FEET TO THE NORTH LINE OF SAID SECTION; THENCE WITH SAID NORTH LINE N 88°37'30"E, 361.55 FEET TO THE NORTHEAST CORNER OF SAID SECTION 14; THENCE LEAVING SAID NORTH LINE AND WITH THE EAST LINE OF SAID SECTION S 0°53'20"W, 845.23 FEET TO THE NORTH LINE OF THE SURVEY RECORDED IN BOOK 474, PAGE 884; THENCE LEAVING SAID

PAGE 1 OF 2

 CROCKETT ENGINEERING CONSULTANTS 1000 W. Nifong Blvd. Building 1 Columbia, Missouri 65203 (573) 447-0292 www.crockettengineering.com	CORPORATE NUMBER 2000151304	RICHLAND OLIVET FARM – ANNEXATION TRACT
	DATE: 5/4/2023 PROJECT: 220385	NE QUARTER, SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST, COLUMBIA, BOONE COUNTY, MISSOURI

EAST LINE AND WITH THE LINES OF SAID SURVEY, AND THE TRACT OF LAND DESCRIBED IN DEED RECORDED IN BOOK 1176, PAGE 431, S 88°44'10"W, 330.18 FEET, THENCE S 0°27'55"W, 434.21 FEET TO THE SOUTHWEST CORNER THEREOF; THENCE LEAVING THE LINES OF SAID TRACT, N 88°40'20"W, 1006.71 FEET TO THE POINT OF BEGINNING AND COUNTING 27.09 ACRES.



DAVID W. BORDEN, PLS-2002000244

5-4-23

DATE

 1000 W. Nifong Blvd. Building 1 Columbia, Missouri 65203 (573) 447-0292 www.crockettengineering.com	CORPORATE NUMBER 2000151304	RICHLAND OLIVET FARM – ANNEXATION TRACT NE QUARTER, SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST, COLUMBIA, BOONE COUNTY, MISSOURI
	DATE: 5/4/2023	
	PROJECT: 220385	

RICHLAND ESTATES
CHARLOTTE M. FRAZIER & MELISSA L. USSERY

SCALE: 1" = 300'

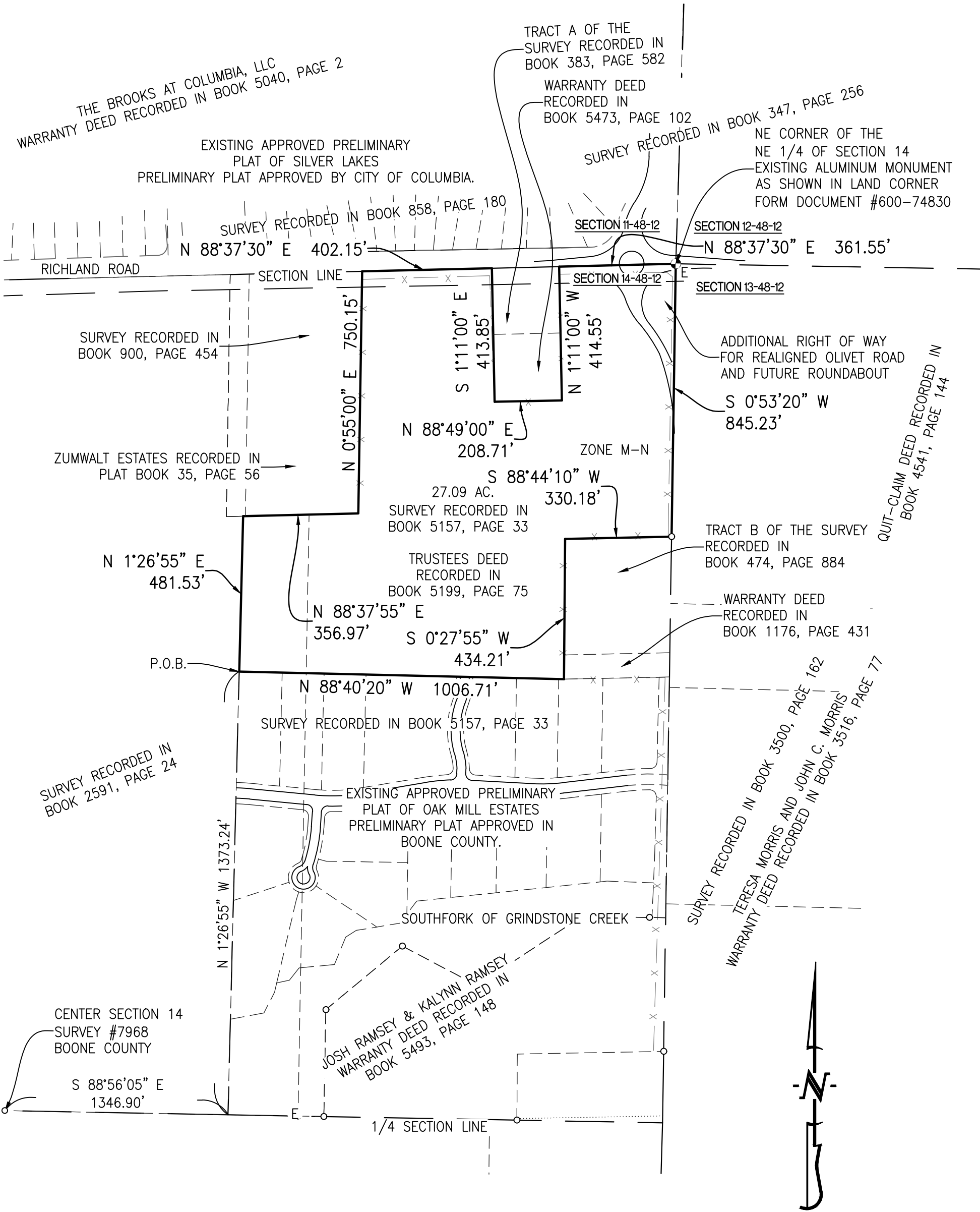


EXHIBIT B
Richland Estates Preliminary Plat

OWNER:
CHARLOTTE M. FRAZIER & MELISSA L. USSERY
10950 STATE RTE PP
WESTPLAINS, MO 65775

OWNER/DEVELOPER:
RICHLAND OLIVET FARM, L.L.C.
4240 PHILIPS FARM RD SUITE 109
COLUMBIA, MO 65201

PRELIMINARY PLAT RICHLAND ESTATES

A MAJOR SUBDIVISION LOCATED IN SECTION 14,
TOWNSHIP 48 NORTH, RANGE 12 WEST
COLUMBIA, BOONE COUNTY, MISSOURI
FEBRUARY 13, 2023



LOCATION MAP
NOT TO SCALE

BEARINGS ARE REFERENCED TO GRID
NORTH, OF THE MISSOURI STATE PLANE
COORDINATE SYSTEM (CENTRAL ZONE),
OBTAINED FROM GPS OBSERVATION.

SCALE: 1"=150'
0 75 150 300

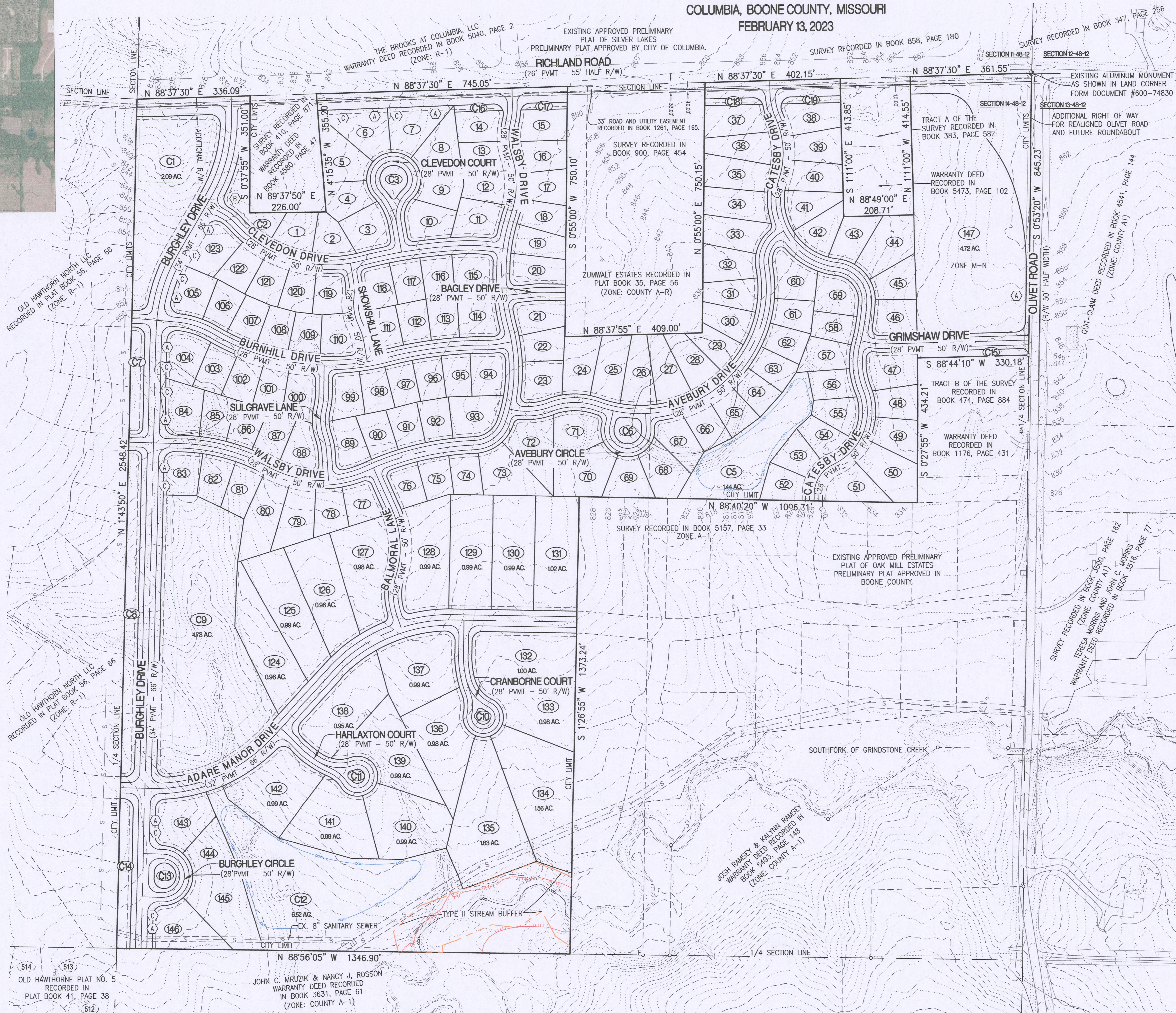
- LEGEND:**
- 805 --- EXISTING MINOR CONTOUR
 - 820 --- EXISTING MAJOR CONTOUR
 - CURB
 - S --- EXISTING SANITARY SEWER
 - S --- PROPOSED SANITARY SEWER
 - MANHOLE/CLEANOUT
 - PROPOSED WATERLINE
 - PROPOSED LIGHT POLE
 - PROPOSED FIRE HYDRANT
 - EXISTING STORM SEWER
 - PROPOSED STORM SEWER
 - BUILDING LINE
 - EASEMENT
 - XX LOT NUMBER
 - PROPOSED PAVEMENT
 - PROPOSED DETENTION
 - EXISTING TREELINE
 - SECTION LINE
 - FLOODPLAIN
 - TYPE II STREAM BUFFER



4/17/2023
TIMOTHY D. CROCKETT - PE-2004000775

APPROVED BY THE CITY OF COLUMBIA PLANNING AND ZONING
COMMISSION, THIS 4th DAY OF May, 2023.

SHARON GEUEA JONES, CHAIRPERSON



CERTIFICATION:

THREE TRACTS OF LAND LOCATED IN THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 48 NORTH, RANGE 12 WEST, COLUMBIA, BOONE COUNTY, MISSOURI AND BEING DESCRIBED BY TRUSTEE'S DEED RECORDED IN BOOK 5670, PAGE 52 AND BOOK 5199, PAGE 75 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE SOUTHWEST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 14 AND WITH THE WEST LINE THEREOF, N 1°43'50"E, 2548.42 FEET TO THE NORTHWEST CORNER OF THE NORTHEAST CORNER OF SAID SECTION 14; THENCE LEAVING SAID WEST LINE AND WITH THE NORTH LINE OF SAID SECTION 14, N 88°37'30"E, 336.09 FEET TO THE NORTHWEST CORNER OF TRACT B OF THE SURVEY RECORDED IN BOOK 410, PAGE 871 AND DESCRIBED IN WARRANTY DEED RECORDED IN BOOK 4580, PAGE 47; THENCE WITH THE WEST LINE OF SAID TRACT B, S 0°37'55"W, 351.00 FEET TO THE SOUTHWEST CORNER OF SAID TRACT B; THENCE LEAVING SAID WEST LINE AND WITH THE SOUTH LINE OF SAID TRACT B, N 89°37'50"E, 226.00 FEET TO THE SOUTHEAST CORNER OF SAID TRACT B; THENCE LEAVING SAID SOUTH LINE AND WITH THE EAST LINE OF SAID TRACT B, N 4°15'35"W, 355.20 FEET TO THE NORTH LINE OF SAID SECTION 14; THENCE LEAVING SAID EAST LINE AND WITH SAID NORTH LINE, N 88°37'30"E, 745.05 FEET TO THE NORTHWEST CORNER OF A TRACT OF LAND AS SHOWN IN SURVEY RECORDED IN BOOK 900, PAGE 454; THENCE LEAVING SAID NORTH LINE AND WITH THE WEST LINE OF SAID TRACT, S 0°55'00"W, 750.10 FEET TO THE SOUTHWEST CORNER OF SAID TRACT; THENCE LEAVING SAID WEST LINE AND WITH THE SOUTH LINE OF SAID TRACT, N 88°37'55"E, 409.00 FEET TO THE SOUTHEAST CORNER OF SAID TRACT; THENCE LEAVING SAID SOUTH LINE AND WITH THE EAST LINE OF SAID TRACT, N 0°55'00"E, 750.15 FEET TO THE NORTHEAST CORNER OF SAID TRACT, SAID POINT BEING ON SAID NORTH LINE OF SECTION 14; THENCE LEAVING SAID EAST LINE AND WITH SAID NORTH LINE, N 88°37'30"E, 361.55 FEET TO THE NORTHEAST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE LEAVING SAID NORTH LINE AND WITH THE WEST LINE OF SAID TRACT A, N 1°11'00"E, 413.85 FEET TO THE SOUTHWEST CORNER OF SAID TRACT A; THENCE LEAVING SAID WEST LINE AND WITH THE SOUTH LINE OF SAID TRACT A, N 88°49'00"E, 208.71 FEET TO THE SOUTHEAST CORNER OF SAID TRACT A; THENCE LEAVING SAID SOUTH LINE AND WITH THE EAST LINE OF SAID TRACT A, N 1°11'00"W, 414.55 FEET TO THE NORTHEAST CORNER OF SAID TRACT A, SAID POINT BEING ON SAID NORTH LINE OF SECTION 14; THENCE LEAVING SAID EAST LINE AND WITH SAID NORTH LINE, N 88°37'30"E, 361.55 FEET TO THE NORTHEAST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE LEAVING SAID NORTH LINE AND WITH THE EAST LINE OF SAID SECTION 14, S 0°53'20"W, 845.23 FEET TO THE NORTHEAST CORNER OF TRACT B OF THE SURVEY RECORDED IN BOOK 474, PAGE 884 AN DESCRIBED IN WARRANTY DEED RECORDED IN BOOK 1176, PAGE 431; THENCE LEAVING SAID EAST LINE AND WITH THE NORTH LINE OF SAID TRACT B, S 88°44'10"W, 330.18 FEET TO THE NORTHWEST CORNER OF SAID TRACT B; THENCE LEAVING SAID NORTH LINE AND WITH THE WEST LINE OF SAID TRACT B, S 0°27'55"W, 434.21 FEET TO THE SOUTHWEST CORNER OF SAID TRACT B; THENCE LEAVING SAID WEST LINE, N 88°40'20"W, 1006.71 FEET TO THE WEST LINE OF THE EAST HALF OF SAID NORTHEAST QUARTER; THENCE WITH SAID WEST LINE, S 1°26'55"W, 1373.24 FEET TO THE SOUTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE LEAVING SAID WEST LINE AND WITH SAID SOUTH LINE, N 88°56'05"W, 1346.90 FEET TO THE POINT OF BEGINNING AND CONTAINING 103.73 ACRES.

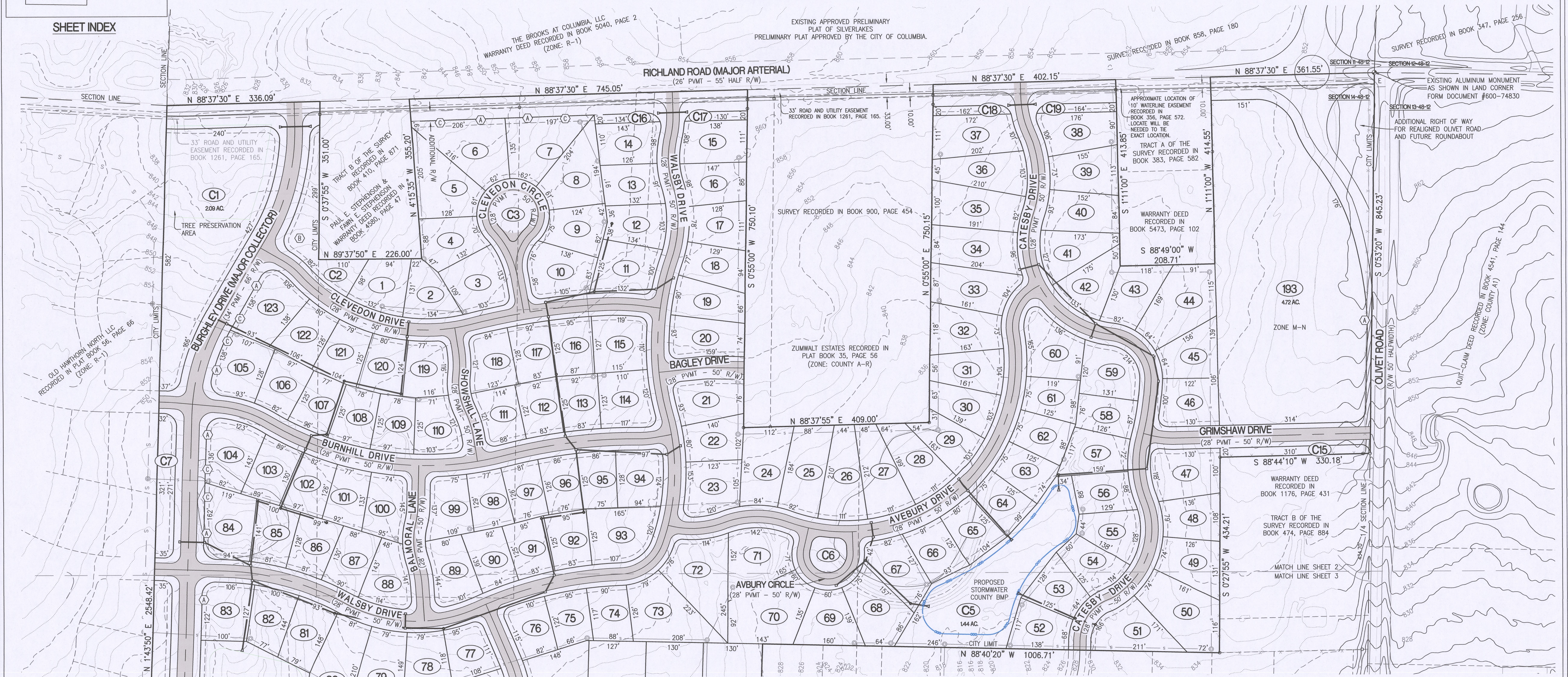
NOTES:

- A PORTION OF THIS TRACT IS LOCATED WITHIN ZONE AE AS SHOWN ON THE FEMA F.I.R.M. PANEL #29019C0305E, DATED APRIL 19, 2017.
- REGULATED STREAM BUFFER EXISTS ON THIS TRACT AND IS REGULATED BY THE STREAM BUFFER REQUIREMENTS IN SECTION 12A-230, ARTICLE X OF THE CITY OF COLUMBIA CODE OF ORDINANCES AS SHOWN BY THE MILLERSBURG USGS QUADRANGLE MAP.
- THE STREET R/W SHALL BE 50 FOOT WIDE, UNLESS OTHERWISE NOTED.
- THERE SHALL BE A 10 FOOT UTILITY EASEMENT ALONG THE SIDE OF EACH LOT ADJACENT TO STREET RIGHT-OF-WAY.
- WATER DISTRIBUTION TO BE PROVIDED BY PWSD #9.
- ELECTRIC DISTRIBUTION TO BE DESIGNED BY THE BOONE ELECTRIC COOPERATIVE.
- NATURAL GAS DISTRIBUTION TO BE DESIGNED BY AMEREN.
- LOT NUMBERS SHOWN ARE FOR INVENTORY PURPOSES ONLY.
- THE EXISTING ZONING OF THIS TRACT IS R-1 AND M-N.
- THIS PLAT CONTAINS 103.73 ACRES.
- THE INTENT FOR THIS DEVELOPMENT IS TO BE DEVELOPED IN, MULTIPLE PHASES. HOWEVER DEVELOPING IT IN ONE SINGLE PHASE WOULD BE ALLOWED.
- ALL STORM SEWER AND WATER QUALITY DESIGN SHALL MEET THE CITY OF COLUMBIA STORM WATER MANUAL AND DESIGN REGULATIONS.
- THERE SHALL BE NO DIRECT ACCESS FROM ANY LOT ONTO BURGHLEY DRIVE, RICHLAND ROAD, OR OLIVET ROAD WITH THE EXCEPTION OF LOT 147 WHICH MAY HAVE ACCESS ONTO OLIVET ROAD WITH APPROVAL FROM BOONE COUNTY RESOURCE MANAGEMENT.
- AT THE TIME OF PLATTING AN ACCESS EASEMENT SHALL BE GRANTED ACROSS LOT C2 TO PROVIDE ACCESS FROM TRACT B OF THE SURVEY RECORDED IN BOOK 410, PAGE 871 TO BURGHLEY DRIVE AND/OR CLEVEDON DRIVE. EXACT LOCATION OF EASEMENT TO BE DETERMINED BY THE DEVELOPER AND APPROVED BY THE CITY.
- PER 29-4.4(d)(4) - LOTS THAT CONTAIN DETACHED OR ATTACHED RESIDENCES AND WHICH HAVE SIDE OR REAR PROPERTY BOUNDARIES ABUTTING COLLECTOR OR ARTERIAL STREET RIGHT-OF-WAY SHALL HAVE SCREENING EITHER ALONG SUCH BOUNDARIES OR AROUND ANY PATIOS ON THE LOT WHICH ARE VISIBLE FROM THE RIGHT-OF-WAY.

PRELIMINARY PLAT RICHLAND ESTATES

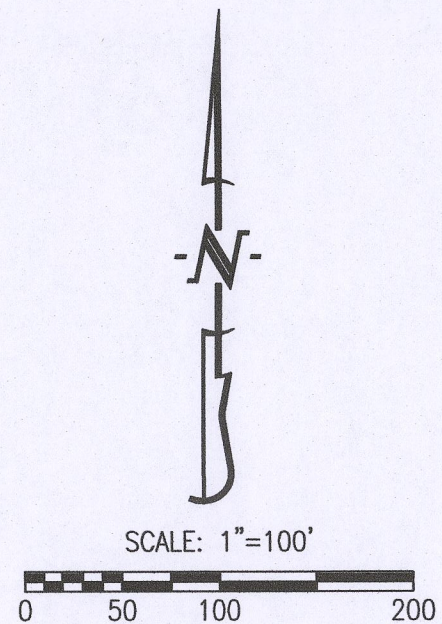
A MAJOR SUBDIVISION LOCATED IN SECTION 14,
TOWNSHIP 48 NORTH, RANGE 12 WEST
COLUMBIA, BOONE COUNTY, MISSOURI
FEBRUARY 13, 2023

SHEET INDEX



LEGEND:

805	EXISTING MINOR CONTOUR	EXISTING STORM SEWER
820	EXISTING MAJOR CONTOUR	PROPOSED STORM SEWER
---	CURB	BUILDING LINE
-S-	EXISTING SANITARY SEWER	EASEMENT
-S-	PROPOSED SANITARY SEWER	LOT NUMBER
⊙	MANHOLE/CLEANOUT	PROPOSED PAVEMENT
-W-	PROPOSED WATERLINE	PROPOSED DETENTION
⬤	PROPOSED LIGHT POLE	EXISTING TREELINE
⬤	PROPOSED FIRE HYDRANT	SECTION LINE
---	FLOODPLAIN	
---	TYPE II STREAM BUFFER	



BEARINGS ARE REFERENCED TO GRID
NORTH, OF THE MISSOURI STATE PLANE
COORDINATE SYSTEM (CENTRAL ZONE),
OBTAINED FROM GPS OBSERVATION.

OWNER:
CHARLOTTE M. FRAZIER &
MELISSA L. USSERY
10950 STATE RTE PP
WEST PLAINS, MO 65775

OWNER/DEVELOPER:
RICHLAND OLIVET FARM L.L.C.
4220 PHILIPS FARM RD.
COLUMBIA, MO 65201

NOTES:

1. A PORTION OF THIS TRACT IS LOCATED WITHIN ZONE AE AS SHOWN ON THE FEMA F.I.R.M. PANEL #29019C0305E, DATED APRIL 19, 2017.
2. REGULATED STREAM BUFFER EXISTS ON THIS TRACT AND IS REGULATED BY THE STREAM BUFFER REQUIREMENTS IN SECTION 12A-230, ARTICLE X OF THE CITY OF COLUMBIA CODE OF ORDINANCES AS SHOWN BY THE MILLERSBURG USGS QUADRANGLE MAP.
3. THE STREET R/W SHALL BE 50 FOOT WIDE, UNLESS OTHERWISE NOTED.
4. THERE SHALL BE A 10 FOOT UTILITY EASEMENT ALONG THE SIDE OF EACH LOT ADJACENT TO STREET RIGHT-OF-WAY.
5. WATER DISTRIBUTION TO BE PROVIDED BY PWSO #9.
6. ELECTRIC DISTRIBUTION TO BE DESIGNED BY THE BOONE ELECTRIC COOPERATIVE.
7. NATURAL GAS DISTRIBUTION TO BE DESIGNED BY AMEREN.
8. LOT NUMBERS SHOWN ARE FOR INVENTORY PURPOSES ONLY.
9. THE EXISTING ZONING OF THIS TRACT IS R-1 AND M-N.

10. THIS PLAT CONTAINS 103.73 ACRES.

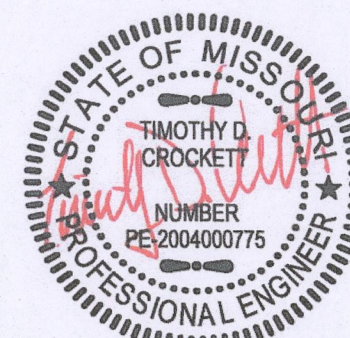
11. THE INTENT FOR THIS DEVELOPMENT IS TO BE DEVELOPED IN, MULTIPLE PHASES. HOWEVER DEVELOPING IT IN ONE SINGLE PHASE SHOULD BE ALLOWED.
12. ALL STORM SEWER AND WATER QUALITY DESIGN SHALL MEET THE CITY OF COLUMBIA STORM WATER MANUAL AND DESIGN REGULATIONS.
13. THERE SHALL BE NO DIRECT ACCESS FROM ANY LOT ONTO BURGHLEY DRIVE, RICHLAND ROAD, OR OLIVET ROAD WITH THE EXCEPTION OF LOT 147 WHICH MAY HAVE ACCESS ONTO OLIVET ROAD WITH APPROVAL FROM BOONE COUNTY RESOURCE MANAGEMENT.
14. AT THE TIME OF PLATTING AN ACCESS EASEMENT SHALL BE GRANTED ACROSS LOT C2 TO PROVIDE ACCESS FROM TRACT B OF THE SURVEY RECORDED IN BOOK 410, PAGE 871 TO BURGHLEY DRIVE AND/OR CLEVEDON DRIVE. EXACT LOCATION OF EASEMENT TO BE DETERMINED BY THE DEVELOPER AND APPROVED BY THE CITY.
15. PER 29-4.4(d)(4) - LOTS THAT CONTAIN DETACHED OR ATTACHED RESIDENCES AND WHICH HAVE SIDE OR REAR PROPERTY BOUNDARIES ABUTTING COLLECTOR OR ARTERIAL STREET RIGHT-OF-WAY SHALL HAVE SCREENING EITHER ALONG SUCH BOUNDARIES OR AROUND ANY PATIOS ON THE LOT WHICH ARE VISIBLE FROM THE RIGHT-OF-WAY.



4/17/2023
TIMOTHY D. CROCKETT - PE-2004000775

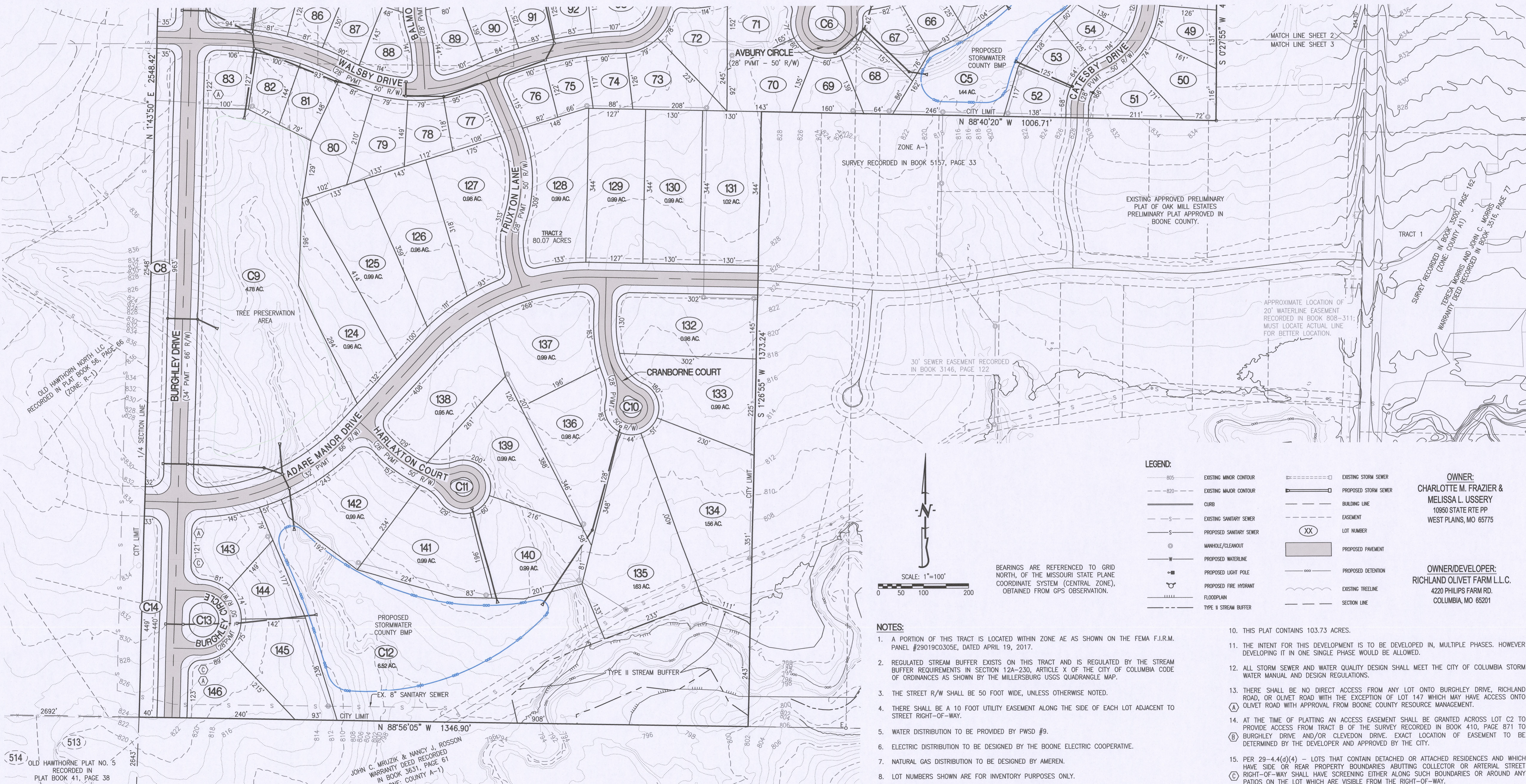
PRELIMINARY PLAT
RICHLAND ESTATES

A MAJOR SUBDIVISION LOCATED IN SECTION 14,
TOWNSHIP 48 NORTH, RANGE 12 WEST
COLUMBIA, BOONE COUNTY, MISSOURI
FEBRUARY 13, 2023



4/17/2023
TIMOTHY D. CROCKETT - PE-2004000775

SHEET INDEX



LEGEND:

805	EXISTING MINOR CONTOUR	EXISTING STORM SEWER
820	EXISTING MAJOR CONTOUR	PROPOSED STORM SEWER
CURB		BUILDING LINE
EXISTING SANITARY SEWER		EASEMENT
PROPOSED SANITARY SEWER		LOT NUMBER
MANHOLE/CLEANOUT		PROPOSED PAVEMENT
PROPOSED WATERLINE		PROPOSED DETENTION
PROPOSED LIGHT POLE		EXISTING TREELINE
PROPOSED FIRE HYDRANT		SECTION LINE
FLOODPLAIN		
TYPE II STREAM BUFFER		

OWNER:
CHARLOTTE M. FRAZIER &
MELISSA L. USSERY
10950 STATE RTE PP
WEST PLAINS, MO 65775

OWNER/DEVELOPER:
RICHLAND OLIVET FARM L.L.C.
4220 PHILLIPS FARM RD.
COLUMBIA, MO 65201

NOTES:

- A PORTION OF THIS TRACT IS LOCATED WITHIN ZONE AE AS SHOWN ON THE FEMA F.I.R.M. PANEL #29019C0305E, DATED APRIL 19, 2017.
- REGULATED STREAM BUFFER EXISTS ON THIS TRACT AND IS REGULATED BY THE STREAM BUFFER REQUIREMENTS IN SECTION 12A-230, ARTICLE X OF THE CITY OF COLUMBIA CODE OF ORDINANCES AS SHOWN BY THE MILLERSBURG USGS QUADRANGLE MAP.
- THE STREET R/W SHALL BE 50 FOOT WIDE, UNLESS OTHERWISE NOTED.
- THERE SHALL BE A 10 FOOT UTILITY EASEMENT ALONG THE SIDE OF EACH LOT ADJACENT TO STREET RIGHT-OF-WAY.
- WATER DISTRIBUTION TO BE PROVIDED BY PWSD #9.
- ELECTRIC DISTRIBUTION TO BE DESIGNED BY THE BOONE ELECTRIC COOPERATIVE.
- NATURAL GAS DISTRIBUTION TO BE DESIGNED BY AMEREN.
- LOT NUMBERS SHOWN ARE FOR INVENTORY PURPOSES ONLY.
- THE EXISTING ZONING OF THIS TRACT IS R-1 AND M-N.

- THIS PLAT CONTAINS 103.73 ACRES.
- THE INTENT FOR THIS DEVELOPMENT IS TO BE DEVELOPED IN, MULTIPLE PHASES. HOWEVER DEVELOPING IT IN ONE SINGLE PHASE WOULD BE ALLOWED.
- ALL STORM SEWER AND WATER QUALITY DESIGN SHALL MEET THE CITY OF COLUMBIA STORM WATER MANUAL AND DESIGN REGULATIONS.
- THERE SHALL BE NO DIRECT ACCESS FROM ANY LOT ONTO BURGHLEY DRIVE, RICHLAND ROAD, OR OLIVET ROAD WITH THE EXCEPTION OF LOT 147 WHICH MAY HAVE ACCESS ONTO OLIVET ROAD WITH APPROVAL FROM BOONE COUNTY RESOURCE MANAGEMENT.
- AT THE TIME OF PLATTING AN ACCESS EASEMENT SHALL BE GRANTED ACROSS LOT C2 TO PROVIDE ACCESS FROM TRACT B OF THE SURVEY RECORDED IN BOOK 410, PAGE 871 TO BURGHLEY DRIVE AND/OR CLEVELAND DRIVE. EXACT LOCATION OF EASEMENT TO BE DETERMINED BY THE DEVELOPER AND APPROVED BY THE CITY.
- PER 29-4.4(d)(4) - LOTS THAT CONTAIN DETACHED OR ATTACHED RESIDENCES AND WHICH HAVE SIDE OR REAR PROPERTY BOUNDARIES ADJUTING COLLECTOR OR ARTERIAL STREET RIGHT-OF-WAY SHALL HAVE SCREENING EITHER ALONG SUCH BOUNDARIES OR AROUND ANY PATIOS ON THE LOT WHICH ARE VISIBLE FROM THE RIGHT-OF-WAY.

EXHIBIT C

Traffic Impact Study (March 22, 2023)

March 22, 2023

Mr. Brian Maenner
Intrinsic Development
3622 Endeavor Avenue, Suite 101
Columbia, Missouri 65201

RE: Traffic Impact Study – Richland Estates Mixed-Use Development
Richland Road and Olivet Road
Columbia, Missouri
CBB Job No. 012-23

Dear Mr. Maenner:

As requested, CBB has completed a traffic impact study pertaining to a residential development, known as the Richland Estates, located in the southwest quadrant of the Richland Road and Olivet Road intersection in Columbia, Missouri. The location of the site relative to the surrounding area is depicted in **Figure 1**.

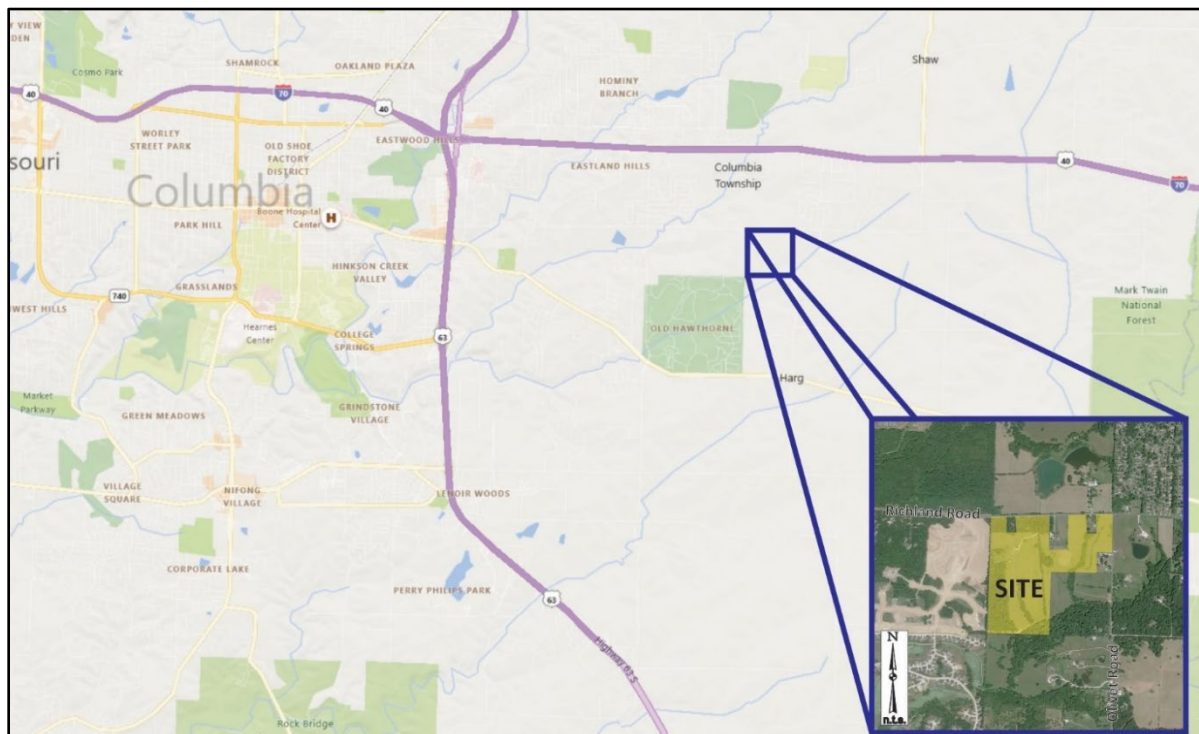


Figure 1: Project Location Map



Based on the latest site plan provided by Crockett Engineering, the proposed development will include approximately 152 single-family homes. In addition, a portion of the tract at the corner of Richland Road and Olivet Road would be designated as future commercial. For the purposes of this study, it was assumed the commercial tract would develop with a 20,000 square-foot retail shopping plaza and a daycare.

In conjunction with the proposed development, a new collector road would be constructed along the west side of the property. Access to the residential portion of the Richland Estates is proposed via three new drives on Richland Road, one new drive on Olivet Road and four new drives on the new collector road. In addition, two stub streets are shown to connect to the approved Estates at Oak Mill subdivision. Access to the commercial portion of the Richland Tract is proposed via one new drive on Olivet Road (a shared access with the residential portion). A schematic of the concept plan provided is shown in **Exhibit 1**.

The purpose of this study was to determine the number of additional trips that would be generated by the proposed development, assign the trips to the adjoining roadways, evaluate the impact of the additional trips on the operating conditions for the adjacent roadways, and determine the ability of motorists to safely enter and exit the site. If necessary, roadway improvements (lane additions and/or traffic control modifications) would be recommended to mitigate the impact of the development and to accommodate the additional traffic. The focus of this study was the AM and PM peak hours of a typical weekday.

CBB discussed the scope of work for this traffic study with the City of Columbia and Boone County at the commencement of the traffic study process. CBB also provided the City and Boone County a Technical Memo summarizing the proposed site trip generation and directional distribution estimates, as well as the Base traffic conditions and gained their consensus on the assumptions prior to completing the traffic analyses.

As requested, the following key intersections were included in the study:

- Richland Road and Rolling Hills Road;
- Richland Road and Olivet Road;
- Richland Road and new Collector Road(Burghley Drive)/Silver Lakes Drive;
- Richland Road and the two proposed site access drives (Walsby Drive and Catesby Drive);
- Olivet Road and the proposed site access drive (Grimshaw Drive); and
- Olivet Road and the proposed Estates at Oak Mill collector street.

RICHLAND ESTATES

SCALE: 1"=300'



PREPARED BY:
CROCKETT
ENGINEERING CONSULTANTS
1000 W. Nifong Blvd., Bldg. 1
Columbia, Missouri 65203
(573) 447-0292
www.crockettengineering.com
Crockett Engineering Consultants, LLC
Missouri Certificate of Authority
#2000151301



Exhibit 1: Preliminary Site Plan (provided by others)



As requested, the traffic impact study evaluated the following analysis scenarios for the weekday AM and PM peak hours:

- 2023 Base Conditions (Existing plus approved area developments); and
- 2023 Build Conditions (2023 Base plus Richland Estates and Future Commercial).

The following report presents the methodology and findings relative to the 2023 Existing/Base and 2023 Build conditions.



EXISTING CONDITIONS

Area Roadway System: Richland Road is a local east-west roadway owned by Boone County, east of Rolling Hills Road and the City of Columbia west of Rolling Hills Road. Within the study area, Richland Road provides two travel lanes, one lane in each direction, and connects St. Charles Road on the west to Rangeline Road to the east. Richland Road has a posted speed limit of 45 miles per hour (mph). Shoulders, sidewalks, and marked bike lanes are not provided along the roadway.

Rolling Hills Road is two-lane roadway that runs north/south along the east side of Columbia and connects to Highway 63 approximately 4.75 miles to the south. Rolling Hills Road is owned by the City of Columbia. Rolling Hills Road consists of a 30-foot cross-section with two travel lanes, one lane in each direction, with curb and gutter. Sidewalk is provided along the east side of the roadway to near Highway WW. The posted speed on Rolling Hills Road south of Richland Road is 35 mph.

Rolling Hills Road north of Richland Road changes names to **Grace Lane** to the north to St. Charles Road and is owned by Boone County. Sidewalk is provided adjacent to some of the developed areas. Grace Lane has two travel lanes, one lane in each direction. Some sidewalk is also provided along Grace Lane between Peeble Beach Drive/Volunteer Drive to Olivia Ray Drive. The posted speed on Grace Lane is 30 mph.

Olivet Road is a local, north-south, roadway owned by Boone County. Olivet Road consist of two-lanes (one lane in each direction) from Richland Road to New Haven Road. The posted speed limit is 45 mph. Shoulders, sidewalks, and marked bike lanes are not provided along the roadway.

The intersection of Rolling Hills Road/Grace Lane and Richland Road is currently controlled as an All-Way STOP. A separate left-turn lane and one shared through/right-turn lane is provided on northbound Rolling Hills Road and eastbound Richland Road, while a single lane approach (shared left/through/right-turn lane) is provided for westbound Richland Road and southbound Grace Lane. **Figure 2** provides an aerial view of the Richland Road and Rolling Hills Road/Grace Lane intersection.

The intersection of Richland Road and Olivet Road operates under side-street stop control with Olivet Road stopping at Richland Road. All approaches consist of a single lane. **Figure 3** provides an aerial view of the Richland Road and Olivet Road intersection.



Figure 2: Aerial View of the Richland Road and Rolling Hills Road Intersection

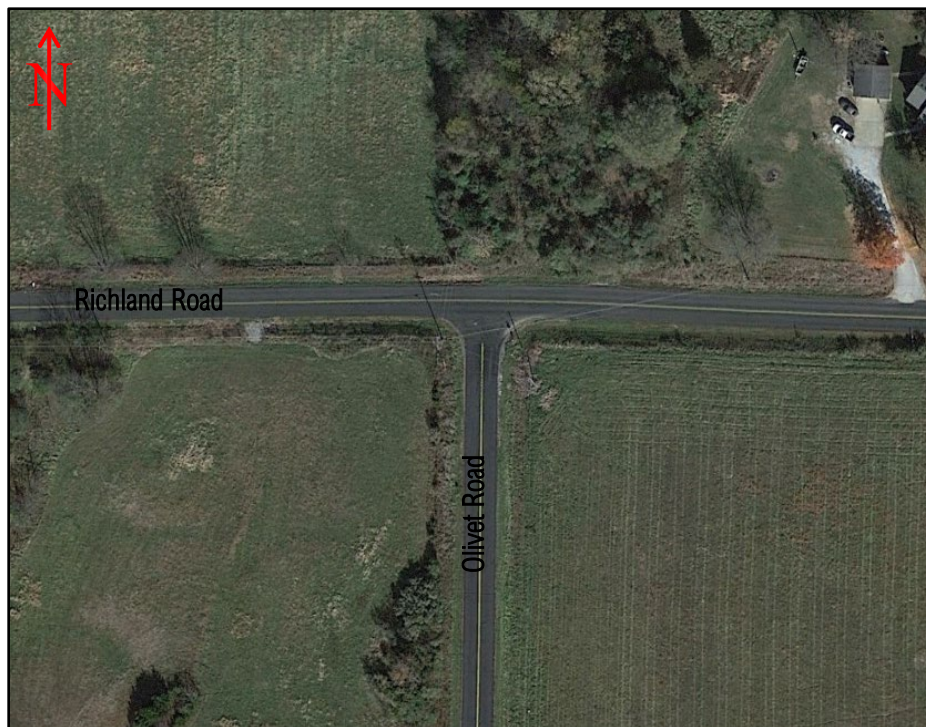


Figure 3: Aerial View of the Richland Road and Olivet Road Intersection



Existing Traffic Volumes: Video, turning movement traffic counts were conducted on Thursday, February 2, 2023. An 11-hour turning movement count (7:00 a.m. - 6:00 p.m.) was collected at the intersection of Richland Road and Rolling Hills Road. Morning commuter peak period (7:00 - 9:00 a.m.) and afternoon commuter peak period (3:00 - 6:00 p.m.) video traffic counts were collected at the intersection of Richland Road and Olivet Road.

Based on the traffic data collected, the morning peak hour occurred between 7:15 and 8:15 a.m. and the afternoon peak hour occurred between 4:45 and 5:45 p.m. The existing peak hour volumes are summarized in **Exhibit 2**. The area schools were in session and there were no wet weather conditions.

Given the traffic characteristics in the area and the anticipated trip generation for the proposed development, the weekday AM and PM peak periods would represent a “worst-case scenario” with regards to the traffic impact. If traffic operations are acceptable during these peak periods, it can be reasoned that conditions would be acceptable throughout the remainder of the day.



Exhibit 2: Existing Traffic Volumes



AREA APPROVED DEVELOPMENTS

At the time of the February 2023 traffic counts, there were several approved developments in the immediate area that were approved but not fully built out, including the following:

- The Vineyards;
- Brooks Phase I and II;
- Crestview;
- Zumwalt Tract;
- Estates at Oak Mill;
- Silver Lakes; and
- Five Pines.

The approved developments are graphically shown in **Figure 4**.

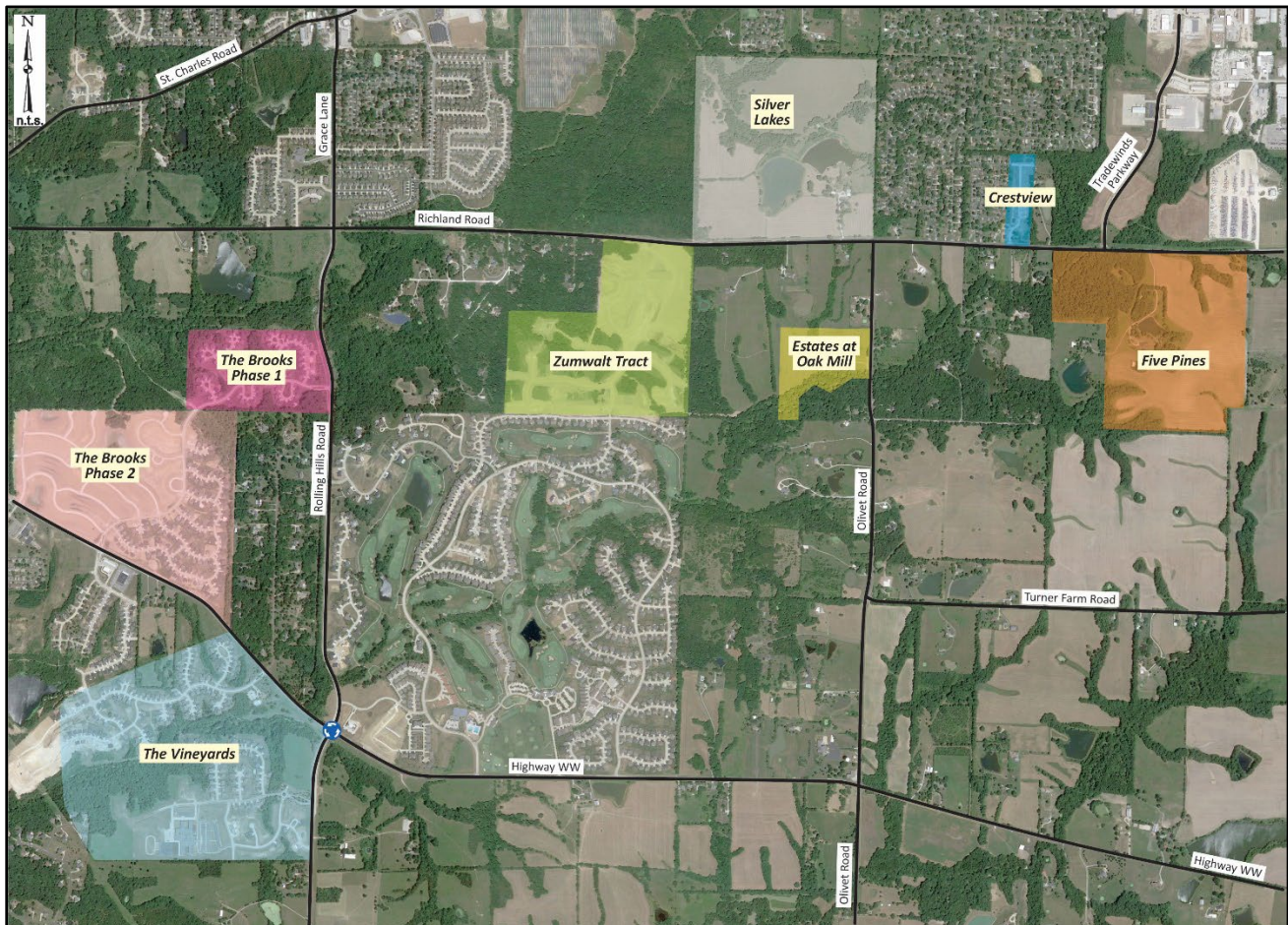


Figure 4: Approved Developments in Area



Based on information provided by Crocket Engineering and prior traffic impact studies completed by CBB for the planned developments, it is our understanding that as of February 1, 2023 (the time of the traffic counts) the following approximate number of homes within the respective developments are yet to be built:

- The Vineyards – 250 homes
- Brooks Phase I and II – 251 homes
- Crestview – 32 homes
- Zumwalt Tract – 157 homes
- Estates at Oak Mill – 19 homes
- Silver Lakes – 348 homes
- Five Pines – 370 homes

In summary, this study considers the potential build-out of an additional 1,427 homes in the Base conditions.

To account for these approved/proposed but not built developments, the trip generation for the remaining homes within the seven developments were estimated and assigned to the study intersections based on the respective traffic studies for each development. The amount of traffic the approved but not built residential developments would generate during the weekday AM and PM peak hours is shown in **Table 1** as previously presented in the respective traffic studies.

Table 1: Trip Estimate – Approved/Proposed Residential Developments

Land Use (ITE Code)	# Homes	ADT (VPD)	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
The Vineyards	250	2,345	45	130	175	150	85	235
The Brooks	251	2,355	45	130	175	150	85	235
Crestview	32	355	10	20	30	20	15	35
Zumwalt Tract	157	1,575	30	85	115	100	60	160
Estates at Oak Mill	19	220	5	10	15	15	5	20
Silver Lakes	348	3,275	65	190	255	210	125	335
Five Pines	370	3,465	65	200	265	225	130	355
Total Approved/Proposed Residential Developments	1,427	13,590	265	765	1,030	870	505	1,375

* Trips rounded to nearest 5



The site-generated trips for the approved but not built developments were assigned to the study intersections based on the respective trip distribution estimates from the traffic studies for each development, if available. The site-generated trips for the approved residential developments are shown in **Exhibit 3**.

The site-generated trips for the area approved developments (Exhibit 3) were added to the Existing Traffic Volumes (Exhibit 2) to develop the 2023 Base Traffic Volumes. The 2023 Base Traffic Volumes for the AM and PM peak hours are shown in **Exhibit 4**. The estimated average daily traffic (ADT) volumes are also shown in Exhibit 4 for the 2023 Base conditions.

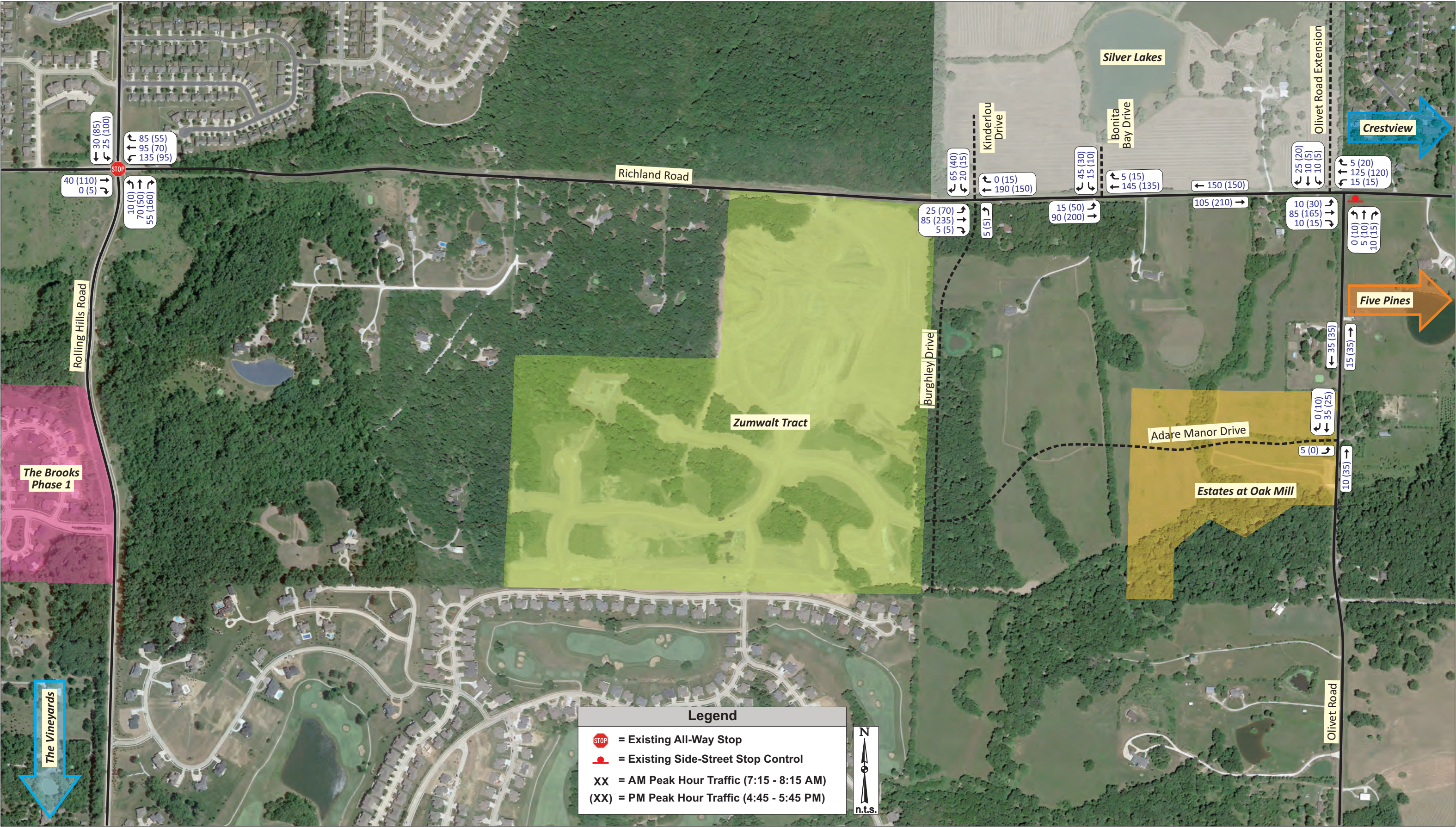


Exhibit 3: Approved/Planned Area Subdivision Trips

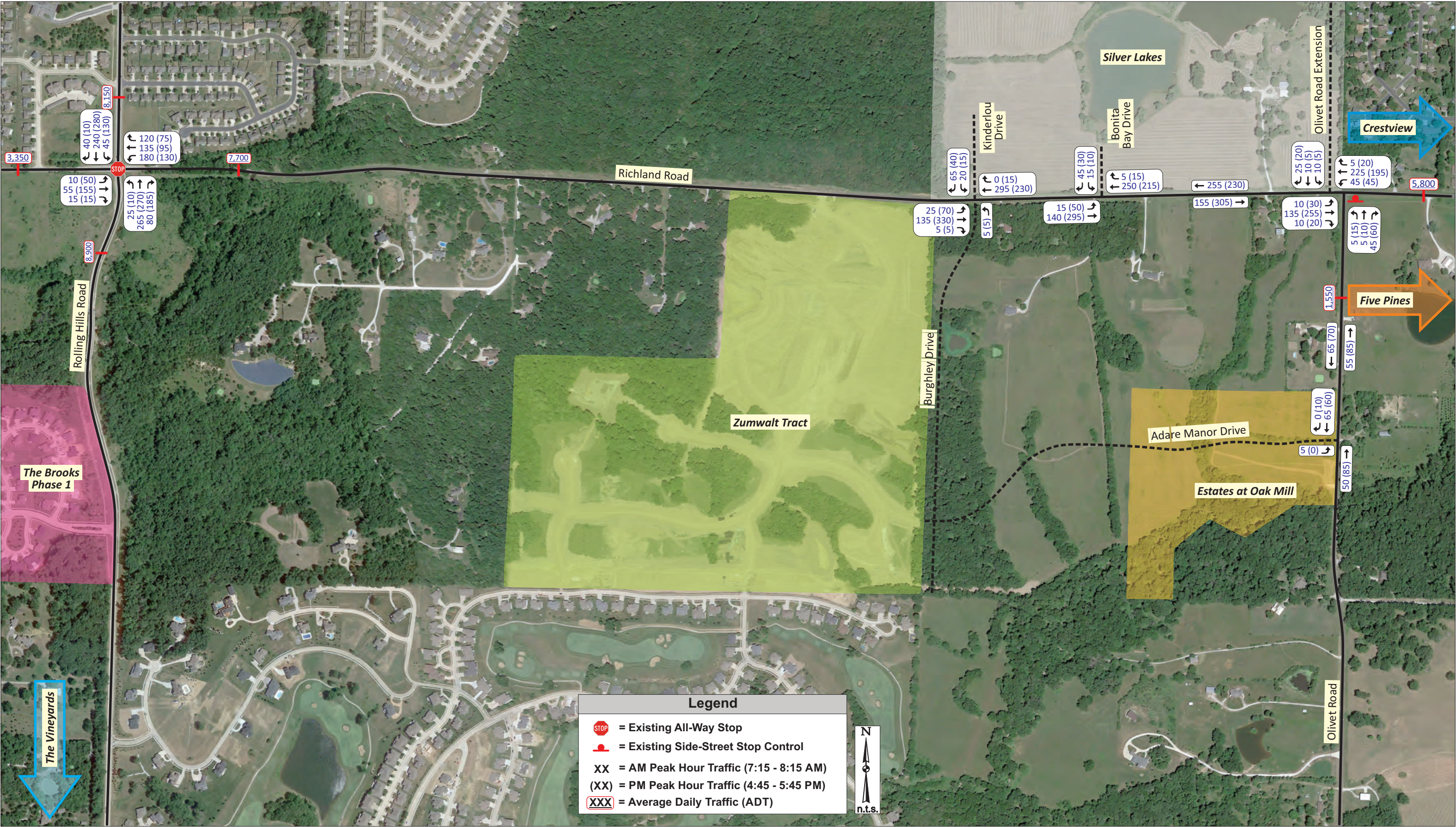


Exhibit 4: 2023 Base Traffic Volumes



PROPOSED SITE

Once the base traffic volumes within the study area have been established, we then considered the traffic associated with the proposed Richland Estates development.

Proposed Land Use: Based upon the concept plan provided by Crockett Engineering Consultants, previously shown in Exhibit 1, the proposed development will include approximately 152 single-family homes. In addition, a portion of the tract at the corner of Richland Road and Olivet Road would be designated as future commercial. For the purposes of this study, it was assumed the commercial tract would develop with a 20,000 square-foot retail shopping plaza and a daycare.

Site Access: As shown on the concept plan in conjunction with the proposed development, a new collector road (Burghley Drive) would be constructed along the west side of the property. Access to the residential portion of the Richland Estates is proposed via three new drives on Richland Road (Burghley Drive, Walsby Drive and Catesby Drive), one new drive on Olivet Road (Grimshaw Drive) and four new drives on the new collector road (Burghley Drive). In addition, two stub streets are shown to connect to the approved Estates at Oak Mill subdivision. Access to the commercial portion of the Richland Tract is proposed via Grimshaw Drive on Olivet Road (a shared access with the residential portion).

For arterial roadways, such as Richland Road and Olivet Road, the County requires a minimum of 400 feet between intersections (measured from point of curvature (POC) to POC). The distance between Burghley Drive to Walsby Drive is 740 feet, the distance between Walsby Drive to Catesby Drive is 680 feet, the distance between Catesby Drive to Olivet Road is 720 feet, and the distance between Richland Road to Grimshaw Drive is 720 feet. As noted, the existing spacing for the proposed drives on both Richland Road and Olivet Road exceeds the County's recommended minimum of 400 feet.

Intersection Sight Distance: Based on guidelines published in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO) often referred to as the *Green Book*, the intersection sight distance requirement for the proposed drives on both Richland Road and Olivet Road is 555 feet (assuming a 45 mph posted speed limit and 50 mph design speed). Note that the sight distance was not measured in the field to evaluate the available sight distance at the proposed site drive. It is recommended the site design engineer verify adequate sight distance is provided at the proposed site drives.

Furthermore, careful consideration should be given to sight distance obstructions when planning any future aesthetic enhancements, such as berms, fencing and landscaping, at any of the subdivision entrances to ensure that these improvements do not obstruct the view of entering and exiting traffic at the site intersections with the public roads. It is generally



recommended that all improvements wider than two inches (posts, tree trunks, etc.) and higher than 3.5 feet above the elevation of the nearest pavement edge be held back at least 20 feet from the traveled roadway.

Trip Generation: Forecasts were prepared to estimate the amount of traffic the proposed development would generate during the weekday AM and PM peak periods. These forecasts were based upon information provided in the latest edition of the *Trip Generation Manual*. Estimates for the proposed development were based upon the following land uses:

- Land Use 210 – Single-Family Detached Housing
- Land Use 565 – Daycare
- Land Use 822 – Strip Retail Plaza (<40k)

The peak hour of adjacent street traffic (one hour between 7 and 9 a.m.) was utilized for the AM peak hour and the peak hour of adjacent street traffic (one hour between 4 and 6 p.m.) was utilized for the PM peak hour trip generation.

It should be noted that not all of these trips would represent *new* traffic on the adjacent roadways. Nationwide studies have found that a percentage of convenience-oriented trips, such as retail plazas, would already be present on the adjacent roads and would be attracted to the development on their way to or from home, work or another destination (i.e., pass-by trips). The actual percentage of traffic attributable to pass-by depends upon the nature of the use, the time of day and the traffic volume on the adjacent street.

Based on the statistical information provided in the ITE Trip Generation Appendices *Pass-By Data and Rate Tables/2021*, a pass-by percentage of 40% was used for the retail plaza during the weekday PM peak hour.

Based on this data, the trip generation forecast for the proposed Richland Estates residential development is shown in **Table 2**. As shown, the proposed Richland Estates residential development would generate a total of 110 new trips during the weekday AM peak hour and 150 new trips during the weekday PM peak hour.

The trip generation forecast for the future commercial tract is shown in **Table 3**. As shown, the future commercial tract is estimated to generate a total of 120 new trips during the weekday AM peak hour and 160 new trips during the weekday PM peak hour with another 50 pass-by trips in the PM peak hour.



Table 2: Trip Estimate – Richland Estates

ITE Code	Land Use	Unit	ADT (VPD)	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single-Family Homes	152 Homes	1,485	25	85	110	95	55	150
New Trips				25	85	110	95	55	150

* Rounded to nearest 5

Table 3: Trip Estimate – Future Commercial Tract

ITE Code	Land Use	Unit	ADT (VPD)	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
565	Daycare	100 Students	410	40	35	75	40	40	80
822	Strip Retail Plaza	20,000 SF	1,075	25	20	45	65	65	130
Total Trips			2,970	65	55	120	105	105	210
Pass-By Trips				0	0	0	25	25	50
New Trips				65	55	120	80	80	160

* Rounded to nearest 5

Trip Distribution: The site-generated trips for the proposed Richland Estates residential and future commercial developments were then assigned into and out of the site based upon an estimated directional distribution. Based upon the existing travel patterns and the surrounding area and roadway network, it is anticipated that the distribution of new site-generated trips would be as summarized in **Table 4**. Note that the trip distribution assumptions for the residential portion were assumed to be the same as those approved as part of the Silver Lakes development since the proposed development is across the street from the approved Silver Lakes development.

It should be noted that the pass-by trips for the commercial tract were assigned in accordance with the adjacent street traffic along Richland Road and Olivet Road.



Table 4: Trip Distribution Assumptions – New Trips

DIRECTION OF TRAVEL	PROPOSED RESIDENTIAL	FUTURE COMMERCIAL
To/from the south via Olivet Road	10%	20%
To/from the north via Olivet Road/Silver Lakes/Sunrise Estates		15%
To/from the east on Richland Road	18%	30%
To/from the west on Richland Road	72%	35% ¹
To/from the west on Richland Road	22%	5%
To/from the north on Rolling Hills Road	15%	5%
To/from the south on Rolling Hills Road	35%	5%

¹ the retail would primarily serve the immediate neighborhoods so not all 35% of the traffic to/from the west would reach Rolling Hills Road

The Richland Estates site-generated trips, as well as the ADT trips, were assigned to the adjacent roadway for the weekday AM and PM peak hours and are shown in **Exhibit 5**. The future commercial tract site-generated trips, as well as the ADT trips, were assigned to the adjacent roadway for the weekday AM and PM peak hours and are shown in **Exhibit 6**.

2023 Build Traffic Volumes (2023 Base plus Richland Estates Trips): The assigned traffic volumes resulting from the trip distribution for the proposed Richland Estates and commercial developments (Exhibits 5 and 6) were added to the 2023 Base traffic volumes (Exhibit 4) to determine the total volumes in the forecasted scenario. The forecasted, 2023 Build, traffic volumes for the weekday AM and PM peak hours are shown in **Exhibit 7**. The estimated ADT volumes are also shown in Exhibit 7 for the 2023 Build conditions.

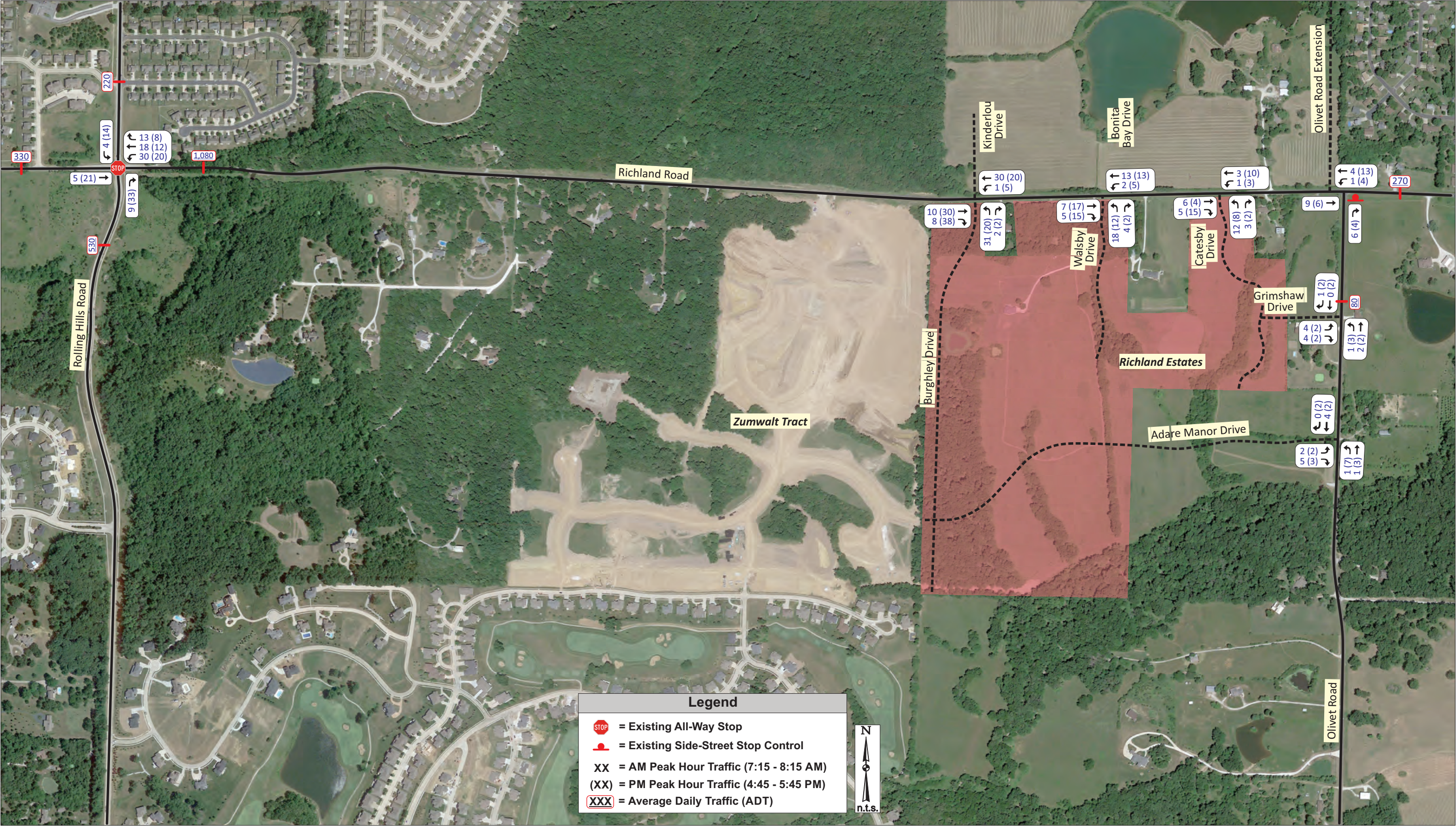


Exhibit 5: Site-Generated Trips - Proposed Richland Estates



Exhibit 6: Site-Generated Trips - Future Commercial

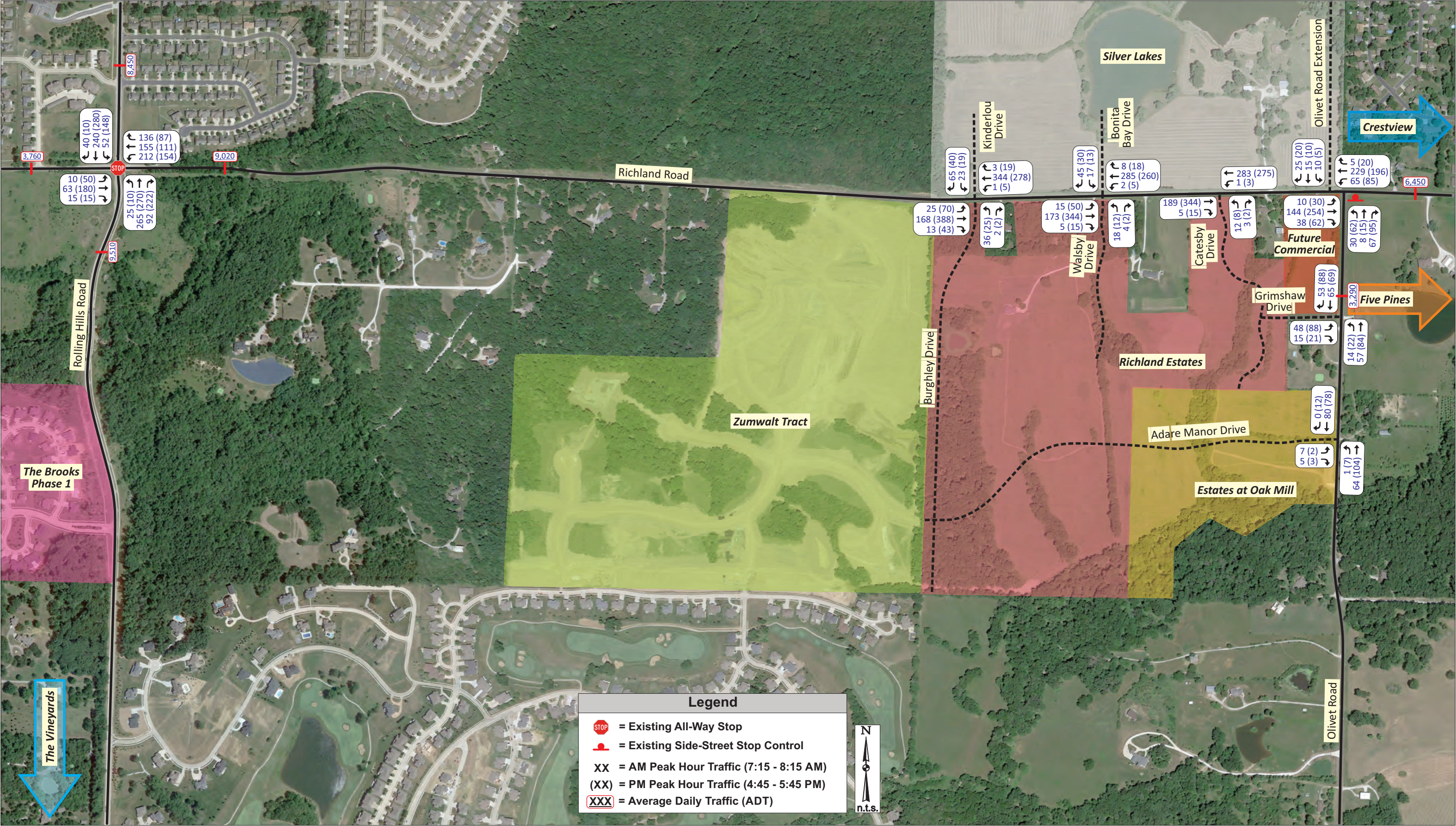


Exhibit 7: 2023 Build Traffic Volumes



In an effort to better illustrate the increase in trips as a result of the proposed Richland Estates residential development, the percent increase in residential site trips over the 2023 Base traffic volumes is summarized in **Table 5**. As shown in Table 5, the proposed Richland Estates residential development will have the greatest traffic volume increase on Richland Road between Rolling Hills Road and Olivet Road with an estimated increase of 14 percent (i.e., 1,080 ADT) over the 2023 Base traffic volumes. The remaining roadway segments would have an estimated increase of less than 530 daily trips, or about 50 peak hour trips.

Table 5: Richland Estates Residential Site Trips as a Percent Increase over the 2023 Base Traffic Volumes

INTERSECTION	AVERAGE DAILY TRAFFIC VOLUMES (ADT)		
	2023 BASE TRAFFIC VOLUMES	RICHLAND ESTATES RESIDENTIAL TRIPS	% INCREASE IN TRAFFIC VOLUMES
Grace Lane – North of Richland Road	8,150	220	3%
Rolling Hills Road – South of Richland Rd	8,900	530	6%
Richland Road – West of Rolling Hills	3,350	330	10%
Richland Road – East of Rolling Hills	7,700	1,080	14%
Richland Road – East of Olivet Road	5,800	270	5%
Olivet Road – South of Richland Road	1,550	80	5%



TRAFFIC ANALYSIS

Study Procedures: The 2023 Base and Build operating conditions were analyzed using SYNCHRO 11, a macro-level analytical traffic flow model. SYNCHRO is based on study procedures outlined in the *Highway Capacity Manual*, published by the Transportation Research Board. This manual, which is used universally by traffic engineers to measure roadway capacity, establishes six levels of traffic service: Level A ("Free Flow"), to Level F ("Fully Saturated"). Levels of service (LOS) are measures of traffic flow, which consider such factors as speed, delay, traffic interruptions, safety, driver comfort, and convenience. Level C, which is normally used for highway design, represents a roadway with volumes ranging from 70% to 80% of its capacity. However, Level D is often considered acceptable for peak period conditions in urban and suburban areas.

The thresholds that define level of service at an intersection are based upon the type of control used (i.e., whether it is signalized or unsignalized) and the calculated delay. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and aggregated for each approach and then the intersection as a whole. At intersections with partial (side-street) stop control, delay is calculated for the minor movements only since motorists on the main road are not required to stop.

Level of service is directly related to control delay. At signalized intersections, the level of service criteria differ from that at unsignalized intersections primarily because varying transportation facilities create different driver expectations. The expectation is that a signalized intersection is designed to carry higher traffic volumes, and consequently may experience greater delay than an unsignalized intersection. **Table 6** summarizes the thresholds used in the analysis for signalized and unsignalized intersections.

Table 6: Level of Service Thresholds

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC/VEH)	
	SIGNALIZED INTERSECTIONS	UNSIGNALIZED INTERSECTIONS
A	≤ 10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50



Auxiliary Left-Turn Lane Warrants: The need for westbound left-turn lanes on Richland Road at the proposed site drives (Burghley Drive, Walsby Drive and Catesby Drive) and Olivet Road were evaluated using the *Left-Turn Guidelines for Two-lane Roadway* nomograph which is based on criteria using MoDOT's Access Management Guidelines (AMG). The MoDOT criteria provides guidelines for separate left-turn lanes on the through roadway by comparing the total advancing volume (which includes all turning traffic) to the total opposing volume (which includes opposing through and right-turn movements) during the design hour with respect to the number of mainline left-turns. Then, the percentage of left-turns is determined by dividing the number of left-turns by the total advancing volume. If the point lies to the right of the percentage line, then a left-turn lane should be considered. If the point is to the left of the line, then a left-turn lane is not necessary. Since, the posted speed on Richland Road is 45 mph, the 50-mph nomograph was used.

Note that the westbound left-turn volumes on Richland Road at the proposed site drives are all less than 10 vph in the peak hours, as such, separate left-turn lanes are not warranted on Richland Road at the proposed Burghley Drive, Walsby Drive and Catesby Drive.

Figure 5, graphically illustrate the westbound left-turn evaluation at Olivet Road assuming the 2023 full Build traffic volumes during the weekday AM and PM peak hours. As can be seen in Figure 5, a separate westbound left-turn lane on Richland Road at Olivet Road is warranted assuming the 2023 Build traffic volumes.

Note that the proposed Richland Estates residential development only adds one (1) left-turn in the AM peak hour and four (4) left-turns in the PM peak hour. As such, the need for a westbound left-turn lane on Richland Road at Olivet Road would be attributable to the future commercial tract.

The need for northbound left-turn lane on Olivet Road at the proposed site drive (Grimshaw Drive) was also evaluated using MoDOT's *Left-Turn Guidelines for Two-lane Roadway* nomograph. Since, the posted speed on Olivet Road is 45 mph, the 50-mph nomograph was used.

Figure 6, graphically illustrate the northbound left-turn evaluation at Grimshaw Drive assuming the 2023 full Build traffic volumes during the weekday AM and PM peak hours. As can be seen in Figure 6, a separate northbound left-turn lane on Olivet Road at Grimshaw Drive is not warranted.

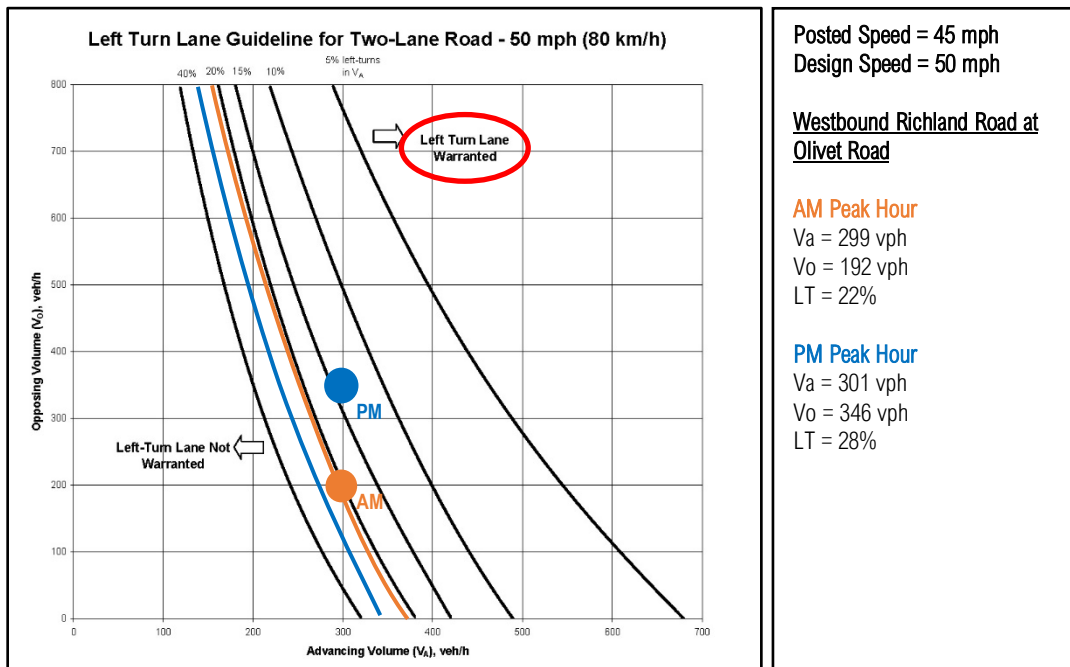


Figure 5: Westbound Richland Road Left-Turn Warrant at Olivet Road – 2023 Full Build

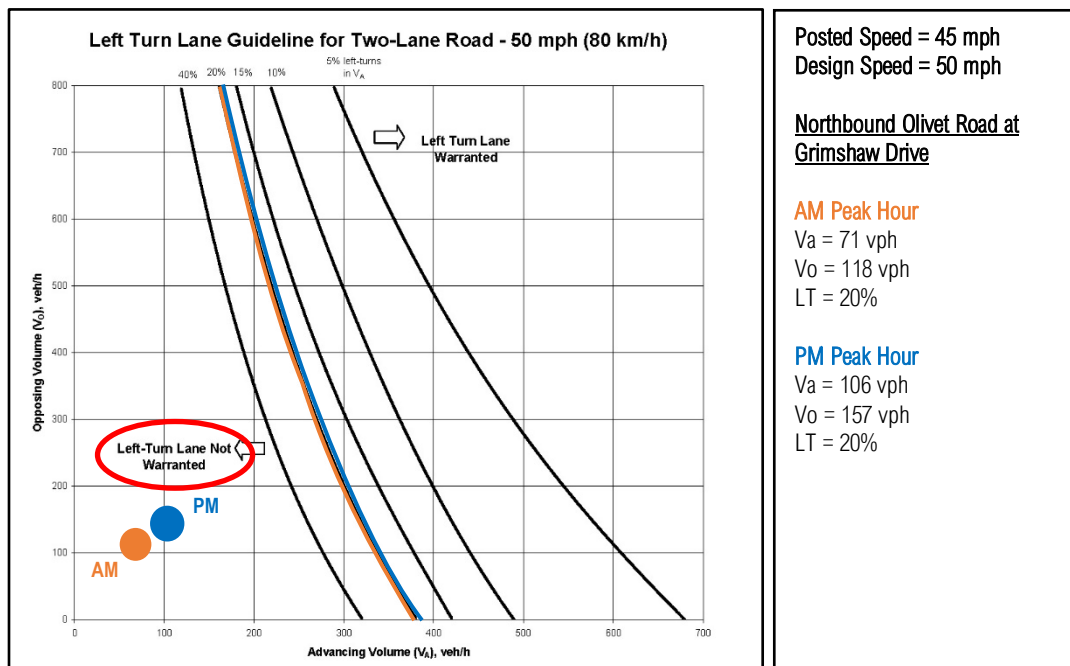


Figure 6: Northbound Olivet Road Left-Turn Warrant at Grimshaw Drive – 2023 Full Build



Auxiliary Right-Turn Lane Warrants: The need for eastbound right-turn lanes on Richland Road at the proposed site drives (Burghley Drive, Walsby Drive and Catesby Drive) and Olivet Road were evaluated using the *Right-Turn Guidelines for Two-Lane Roadway* nomograph which is based on criteria from MoDOT's AMG criteria. The MoDOT AMG provides guidelines for separate right-turn lanes on the through roadway by comparing the total advancing volume (which includes all turning traffic) to the number of mainline right-turns. The operating speed (posted speed limit) of the major roadway is used to determine if a right-turn lane is warranted. If the point lies to the right of the operating speed line, then a right-turn lane should be considered. If the plotted point is to the left of the line, then a left-turn lane is not necessary. Richland Road has a posted speed of 45 mph, so the 50-mph graph line was used.

Figure 7 graphically illustrates the eastbound right-turn evaluations at the proposed site drives assuming the 2023 Build traffic volumes. Only the PM peak hour traffic volumes are depicted as the PM peak hour traffic volumes are nearly double the AM peak hour volumes. As can be seen in Figure 7, a separate eastbound right-turn lane on Richland Road is warranted at the proposed new collector road (Burghley Drive) in the 2023 Build conditions (i.e., all approved residential development built out). Separate eastbound right-turn lanes on Richland Road are not warranted at the other two site drives (Walsby Drive and Catesby Drive).

Figure 8 graphically illustrates the eastbound right-turn evaluations on Richland Road at Olivet Road assuming the 2023 Build traffic volumes during the weekday AM and PM peak hours. As shown in Figure 8, a separate eastbound right-turn lane is warranted on Richland Road at Olivet Road assuming the 2023 Build traffic volumes.

Note that the proposed Richland Estates residential development is not expected to add any right turns to this movement. As such, the need for an eastbound right-turn lane on Richland Road at Olivet Road would be attributable to the future commercial tract which is expected to add 28 trips in the AM peak hour and 42 trips in the PM peak hour.

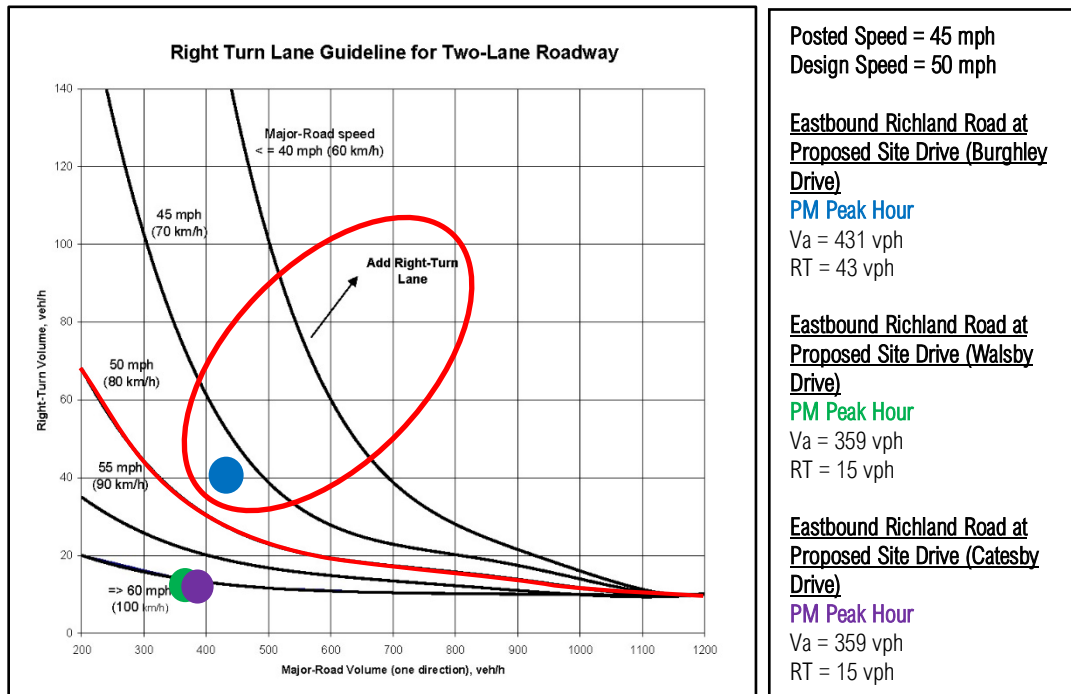


Figure 7: Eastbound Richland Road Right-Turn Warrant at Site Drives – 2023 Full Build

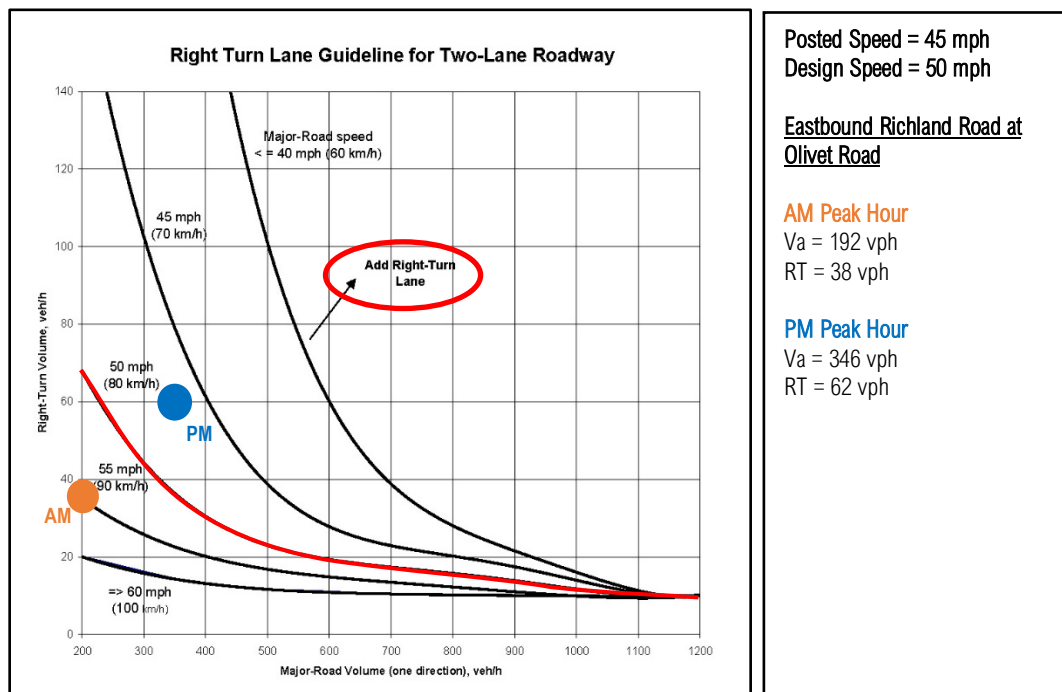


Figure 8: Eastbound Richland Road Right-Turn at Olivet Road – 2023 Full Build



The need for southbound right-turn lane on Olivet Road at the proposed site drive (Grimshaw Drive) was also evaluated using MoDOT's *Right-Turn Guidelines for Two-lane Roadway* nomograph. Since, the posted speed on Olivet Road is 45 mph, the 50-mph nomograph was used.

Figure 9, graphically illustrate the southbound right-turn evaluation at Grimshaw Drive assuming the 2023 full Build traffic volumes during the weekday AM and PM peak hours. As can be seen in Figure 9, the data plot falls outside the volume parameters (advancing volume of Olivet Road of less than 200 vph), as such, a separate southbound right-turn lane on Olivet Road at Grimshaw Drive is not warranted. However, as traffic volumes on Olivet Road increase a southbound right-turn lane may be warranted in the future.

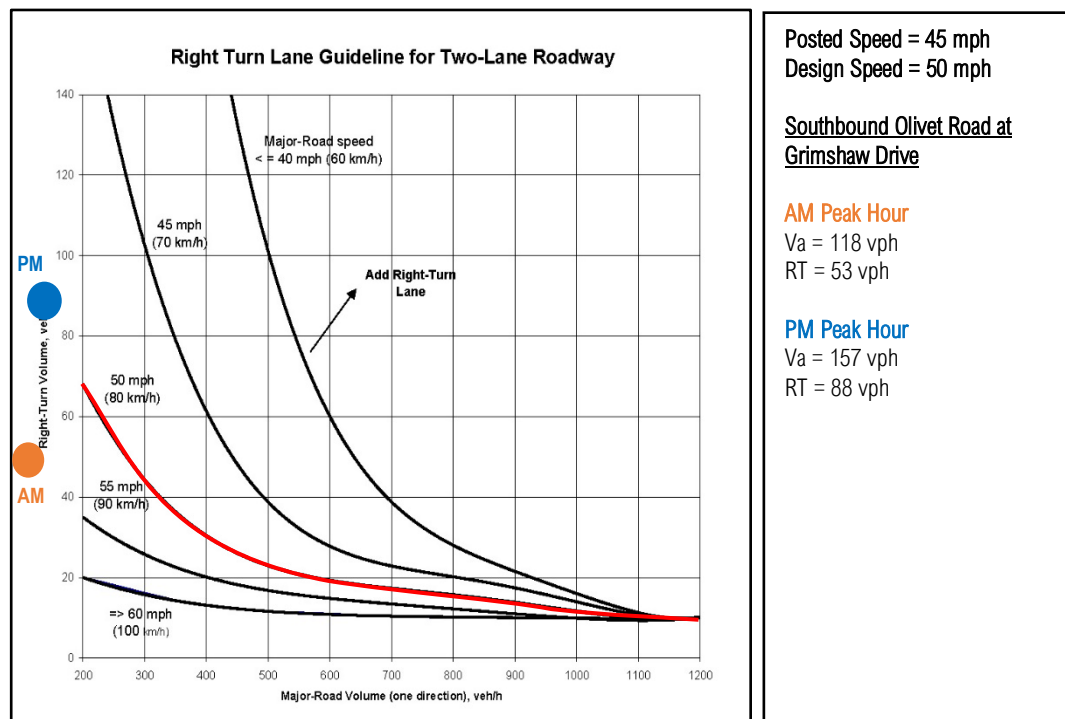


Figure 9: Southbound Olivet Road Right-Turn Warrant at Grimshaw Drive – 2023 Build

Operating Conditions: The study intersections were evaluated using the methodologies described previously. The existing lane configurations and traffic control were used in the analysis (i.e., no roadway or traffic control improvements) with the exception of the eastbound left-turns lanes planned on Richland Road at the two streets serving the Silver Lakes subdivision and the recommended eastbound right-turn lane on Richland Road at Burghley Drive (new collector street) for the proposed Richland Estates residential development. The proposed site drives were assumed to have one lane exiting and one lane entering. Note that the potential future eastbound right-turn lane and westbound left-turn lane on Richland Road at Olivet Road warranted as a result of the future potential commercial tract are not reflected in the analysis.



to show a worst-case scenario since these auxiliary lanes are conditional based on the development of the future commercial tract.

Table 7 summarizes the results of these analyses, which reflect the 2023 Base and 2023 Build operating conditions and average delay for each of the study intersections during the weekday AM and PM peak hours. The maximum volume to capacity ratio (v/c) is also noted in the table to better understand the available capacity of the intersection and the impact of the proposed Richland Estates development on the overall capacity. The 95th percentile Synchro estimated queues for movements with a queue greater than 50 feet is also noted in the table.

Table 7: 2023 Capacity Analysis Summary

Intersection / Approach	AM Peak Hour		PM Peak Hour	
	2023 Base	2023 Build	2023 Base	2023 Build
Richland Road and Rolling Hills Road/Grace Lane (All-Way STOP)				
Eastbound Richland Road Approach	B (12.3)	B (12.8)	C (17.6) 95 th Queue: 65'	C (21.0) 95 th Queue: 85'
Westbound Richland Road Approach	F (71) 95 th Queue: 360'	F (130) 95 th Queue: 540'	E (39.2) 95 th Queue: 180'	F (67) 95 th Queue: 270'
Northbound Rolling Hills Road Approach	D (32.1) 95 th Queue: 190'	E (35.9) 95 th Queue: 190'	F (96) 95 th Queue: 410'	F (157) 95 th Queue: 545'
Southbound Grace Lane Approach	D (32.9) 95 th Queue: 180'	E (35.9) 95 th Queue: 200'	F (97) 95 th Queue: 385'	F (143) 95 th Queue: 470'
Overall	E (45.0) v/c: 0.77	F (70.5) v/c: 0.82	F (72) v/c: 0.87	F (111) v/c: 0.95
Richland Road and Olivet Road (Side-Street STOP)				
Eastbound Richland Road Approach	A (<1.0)	A (<1.0)	A (1.0)	A (1.0)
Westbound Richland Road Approach	A (1.5)	A (2.1)	A (1.7)	A (2.9)
Northbound Olivet Road Approach	B (10.2)	B (12.9)	B (13.1)	C (22.0) 95 th Queue: 65'
Southbound Olivet Road Approach	B (12.0)	B (13.3)	B (12.6)	C (15.1)
Overall	A (3.0) v/c: 0.38	A (4.2) v/c: 0.46	A (3.3) v/c: 0.36	A (6.4) v/c: 0.60
Olivet Road and Adare Manor Drive (Estates at Oak Mill) (Side-Street STOP)				
Eastbound Adare Manor Drive Approach	A (8.9)	A (9.2)	A (9.1)	A (9.1)
Northbound Olivet Road Approach	A (<1.0)	A (<1.0)	A (<1.0)	A (<1.0)
Southbound Olivet Road Approach	Free Flow	Free Flow	Free Flow	Free Flow

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)



The v/c ratio, also referred to as degree of saturation, represents the sufficiency of an intersection to accommodate the vehicular demand. A v/c ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are not expected to experience significant queues and delays. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur. Once the demand exceeds the capacity (i.e., a v/c ratio greater than 1.0), traffic flow is unstable and excessive delay and queuing is expected.

As shown in the table, in the AM peak hour, the v/c ratio for the Richland Road and Rolling Hills Road intersection increases from 0.77 to 0.82 with the Richland Tract development trips utilizing about five percent of the intersection capacity. In the PM peak hour, the v/c ratio increase from 0.87 to 0.95 with the Richland Tract development trips utilizing about eight percent of the Richland Road and Rolling Hills Road intersection capacity. More importantly, in the PM peak hour full build out conditions, the v/c ratio at the intersection of Richland Road and Rolling Hills Road is 0.95 which is essentially “at capacity” and will likely result in long delays without roadway and/or traffic control improvements.

As shown, all of the study intersections operate at overall favorable levels of service (i.e., LOS D or better) in the 2023 Base conditions and would continue to operate at overall favorable levels of service during the peak hours for the 2023 Build conditions with the exception of the Richland Road and Rolling Hills Road intersection.

As shown, during the AM peak hour, the Richland Road and Rolling Hills Road intersection is forecasted to decline from overall LOS E with approximately 45 seconds of delay per vehicle on average for the 2023 Base conditions to LOS F with approximately 71 seconds of delay per vehicle on average for the 2023 Build conditions.

As shown, during the PM peak hour, the Richland Road and Rolling Hills Road intersection is forecasted to decline from overall LOS F with approximately 72 seconds of delay per vehicle on average for the 2023 Base conditions to LOS F with approximately 111 seconds of delay per vehicle on average for the 2023 Build conditions.

With the full build-out of the area approved developments the intersection of Richland Road and Rolling Hills Road will operate poorly (i.e., LOS F) in the base conditions without any additional trips from the proposed Richland Estates development. As such, improvement alternatives were considered at the intersection of Richland Road and Rolling Hills Road/Grace Lane as follows:

- Maintain All-Way Stop control with the addition of a southbound left-turn lane on Grace Lane and a westbound left-turn lane on Richland Road; and
- Construct a single-lane roundabout at the intersection.



Tables 8 and 9 respectively summarize the analysis results of the improved All-Way STOP and roundabout alternatives for the intersection of Richland Road and Rolling Hills Road/Grace Lane during the weekday AM and PM peak hours for the 2023 Base and 2023 Build conditions.

Table 8: 2023 Capacity Analysis Summary – Improved All-Way STOP Control

Intersection / Approach	AM Peak Hour		PM Peak Hour	
	2023 Base	2023 Build	2023 Base	2023 Build
Richland Road and Rolling Hills Road/Grace Lane (All-Way STOP w/ SB and WB Lefts Added)				
Eastbound Richland Road Approach	B (10.8)	B (11.5)	C (14.6) 95 th Queue: 55'	C (16.6) 95 th Queue: 70'
Westbound Richland Road Approach	C (15.1) 95 th Queue: 80'	C (18.0) 95 th Queue: 115'	B (14.4)	C (16.3) 95 th Queue: 65'
Northbound Rolling Hills Road Approach	C (22.7) 95 th Queue: 160'	D (27.2) 95 th Queue: 190'	F (56) 95 th Queue: 355'	F (94) 95 th Queue: 490'
Southbound Grace Lane Approach	C (17.1) 95 th Queue: 105'	C (18.5) 95 th Queue: 115'	C (19.4) 95 th Queue: 130'	C (21.5) 95 th Queue: 140'
Overall	C (17.7) v/c: 0.49	C (20.4) v/c: 0.51	D (29.8) v/c: 0.62	E (43.1) v/c: 0.68

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)

Table 9: 2023 Capacity Analysis Summary – Improved Roundabout Control

Intersection / Approach	AM Peak Hour		PM Peak Hour	
	2023 Base	2023 Build	2023 Base	2023 Build
Richland Road and Rolling Hills Road/Grace Lane (Roundabout)				
Eastbound Richland Road Approach	A (5.7)	A (6.1)	A (8.9) 95 th Queue: 35'	B (10.2) 95 th Queue: 50'
Westbound Richland Road Approach	B (10.1) 95 th Queue: 95'	B (11.8) 95 th Queue: 145'	A (7.7) 95 th Queue: 45'	A (8.6) 95 th Queue: 55'
Northbound Rolling Hills Road Approach	A (6.3) 95 th Queue: 50'	A (6.6) 95 th Queue: 55'	B (11.2) 95 th Queue: 120'	B (13.5) 95 th Queue: 165'
Southbound Grace Lane Approach	A (8.5) 95 th Queue: 50'	A (9.4) 95 th Queue: 65'	A (8.4) 95 th Queue: 65'	A (9.3) 95 th Queue: 75'
Overall	A (8.2) v/c: 0.51	A (9.3) v/c: 0.58	A (9.2) v/c: 0.55	B (10.7) v/c: 0.62

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)

As shown in Table 8, the improved All-Way stop control with adding the southbound and westbound left-turn lanes provides a significant improvement over the existing lane configuration. However, with the full build-out of all the approved area developments and the



Richland Estates tract, the northbound Rolling Hills Road approach would still operate poorly at LOS F with approximately 94 seconds of delay on average per vehicle in the PM peak hour.

As shown in Table 9, a single-lane roundabout provides a significant improvement over the existing lane configuration with all approaches operating at LOS A or B in the peak hours.

As it will likely be several years before the 2023 Build traffic volumes are realized, since they account for the full build out of The Brooks, The Vineyards, the Zumwalt Tract, Silver Lakes, Five Pines and the proposed Richland Estates development or about 1,580 homes in the area, the improvement alternative of adding the southbound and westbound left-turns lanes at the intersection and maintaining All-Way Stop control is reasonable.

Table 10 summarizes the 2023 Build operating conditions and average delay for the proposed site drive study intersections during the weekday AM and PM peak hours.

As shown, all of the site drive study intersections are forecasted to operate at favorable levels of service in the 2023 Build conditions with most movements operating at LOS A or B in the peak hours.



Table 10: 2023 Build Capacity Analysis Summary – Site Drives

Intersection / Approach	AM Peak Hour	PM Peak Hour
Richland Road and Proposed Burghley Drive/Kinderlou Drive (Side-Street STOP)		
Eastbound Richland Road Approach	A (1.0)	A (1.1)
Westbound Richland Road Approach	A (<1.0)	A (<1.0)
Northbound Proposed Burghley Drive Approach	C (17.5)	C (23.8)
Southbound Kinderlou Drive Approach	B (12.6)	B (14.7)
Richland Road and Proposed Walsby Drive/Bonita Way Drive (Side-Street STOP)		
Eastbound Richland Road Approach	A (<1.0)	A (1.0)
Westbound Richland Road Approach	A (<1.0)	A (<1.0)
Northbound Proposed Walsby Drive Approach	B (14.0)	C (18.4)
Southbound Bonita Way Drive Approach	B (11.5)	B (12.9)
Richland Road and Proposed Catesby Drive (Side-Street STOP)		
Eastbound Richland Road Approach	A (<1.0)	A (<1.0)
Westbound Richland Road Approach	A (<1.0)	A (<1.0)
Northbound Proposed Catesby Drive Approach	B (11.7)	B (13.3)
Olivet Road and Proposed Grimshaw Drive (Side-Street STOP)		
Eastbound Proposed Grimshaw Drive Approach	A (9.8)	B (10.7)
Northbound Olivet Road Approach	A (1.5)	A (1.7)
Southbound Olivet Road Approach	Free Flow	Free Flow

X (XX.X) – Level of Service (Vehicular delay in seconds per vehicle)



SUMMARY

CBB completed the preceding study to address the anticipated traffic impacts associated with the proposed Richland Estates development located in the southwest quadrant of the Richland Road and Olivet Road intersection in Columbia, Missouri.

In summary, the following findings and improvements should be considered in conjunction with the proposed Richland Estates development:

- The 2023 Base traffic volumes include the build-out of an additional 1,427 homes in the area.
- In conjunction with the proposed development, a new collector road (Burghley Drive) would be constructed along the west side of the property.
- Access to the residential portion of the Richland Estates is proposed via three new drives on Richland Road (Burghley Drive, Walsby Drive and Catesby Drive), one new drive on Olivet Road (Grimshaw Drive) and four new drives on the new collector road. Access to the commercial portion of the Richland Tract is proposed via Grimshaw Drive on Olivet Road (a shared access with the residential portion).
- The existing spacing for the proposed drives on both Richland Road and Olivet Road exceeds the County's recommended minimum of 400 feet.
- Careful consideration should be given to sight distance obstructions when planning any future aesthetic enhancements, such as berms, fencing and landscaping, at any of the subdivision entrances to ensure that these improvements do not obstruct the view of entering and exiting traffic at the site intersections with the public roads. It is generally recommended that all improvements wider than two inches (posts, tree trunks, etc.) and higher than 3.5 feet above the elevation of the nearest pavement edge be held back at least 20 feet from the traveled roadway.
- It is recommended the site design engineer verify adequate sight distance is provided at all proposed site drives.
- The proposed Richland Estates residential development is expected to add 110 trips during the weekday AM peak hour and 150 trips during the weekday PM peak hour to the adjacent roadways.
- While a user has not been identified for the future commercial tract, with the assumption of a day care and retail shopping plaza, the future commercial tract is estimated to generate a total of 120 new trips during the weekday AM peak hour and 160 new trips during the weekday PM peak hour with another 50 pass-by trips in the PM peak hour.
- Based on the 2023 Build traffic volumes, a separate eastbound right-turn lane on Richland Road is warranted at the proposed new collector road (Burghley Drive). It is



recommended this eastbound right-turn lane be constructed with the proposed Richland Estates residential development.

- Based on the 2023 Build traffic volumes, a separate westbound left-turn lane on Richland Road at Olivet Road is warranted. However, the proposed Richland Estates residential development only adds one (1) left-turn in the AM peak hour and four (4) left-turns in the PM peak hour to this movement. As such, the need for a westbound left-turn lane on Richland Road at Olivet Road would be attributable to the future commercial tract.
- Based on the 2023 Build traffic volumes, a separate eastbound right-turn lane is warranted on Richland Road at Olivet Road. However, the proposed Richland Estates residential development is not expected to add any right turns to this movement. As such, the need for an eastbound right-turn lane on Richland Road at Olivet Road would be attributable to the future commercial tract which is expected to add 28 trips in the AM peak hour and 42 trips in the PM peak hour.
- All of the study intersections operate at overall acceptable levels of service in the 2023 Base conditions and would continue to operate at overall favorable levels of service during the peak hours for the 2023 Build conditions with the exception of the Richland Road and Rolling Hills Road intersection. In fact, most of the study intersections and the respective approaches to those intersections are forecasted to operate at highly desirable LOS B or better.
- Improvement alternatives were considered at the intersection of Richland Road and Rolling Hills Road/Grace Lane including maintaining All-Way Stop control with the addition of southbound and westbound left-turn lanes and the provision of a single-lane roundabout.

The improved All-Way stop control provides a significant improvement over the existing lane configuration. However, with the full build-out of all the approved area developments and the Richland Estates tract, the northbound Rolling Hills Road approach would still operate poorly in the PM peak hour.

A single-lane roundabout provides a significant improvement over the existing lane configuration with all approaches operating at LOS A or B in the peak hours.

As it will likely be several years before the 2023 Build traffic volumes are realized, since they account for the full build out of The Brooks, The Vineyards, the Zumwalt Tract, Silver Lakes, Five Pines and the proposed Richland Estates development or about 1,580 homes in the area, the improvement alternative of adding the southbound and westbound left-turns lanes at the intersection and maintaining All-Way Stop control is reasonable.



We trust this traffic impact study adequately describes the forecasted traffic conditions that should be expected as a result of the proposed Richland Estates development. If additional information is desired, please feel free to contact me at 314-449-9572 or swhite@cbbtraffic.com.

Sincerely,

Shawn Lerai White, P.E., PTOE
Associate - Senior Traffic Engineer

