CITY OF BLOOMINGTON

PLAN COMMISSION
Special Session

March 19, 2024 5:30 p.m.
Council Chambers, Room #115
Hybrid Zoom Link:

https://bloomington.zoom.us/j/82362340978?pwd=ZnExeVNaSUNGVGdZQTJHNjBBb3M0UT09

Meeting ID: 823 6234 0978 Passcode: 622209

CITY OF BLOOMINGTON
PLAN COMMISSION (Hybrid Meeting) SPECIAL MEETING
❖City Council Chambers, 401 N Morton Street Bloomington – Room #115
March 19, 2024 at 5:30 p.m.

❖Virtual Link:

https://bloomington.zoom.us/j/82362340978?pwd=ZnExeVNaSUNGVGdZQTJHNjBBb3M0UT09

Meeting ID: 823 6234 0978 Passcode: 622209

Petition Map: https://arcg.is/1aTHOD

ROLL CALL

PETITIONS:

PUD-18-23 **Sudbury Development Partners LLC**
S. Weimer Rd
Request: Request to rezone approximately 140 acres to Planned Unit Development and a request for approval of a District Ordinance and Preliminary Plan.
Case Manager: Jackie Scanlan

Next Meeting April 8, 2024 **Last Updated: 3/15/2024**

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BLOOMINGTON PLAN COMMISSION **CASE #: PUD-18-23**
STAFF REPORT **DATE: March 19, 2024**
Location: S. Weimer Road

PETITIONER: Sudbury Partners LLC
3225 S. Hoyt Avenue Muncie

CONSULTANTS: CarminParker P.C.
116 W. 6th Street Bloomington

REQUEST: The petitioner is requesting to rezone approximately 140 acres to Planned Unit Development and a request for approval of a District Ordinance and Preliminary Plan.

BACKGROUND:

Area:	138.51 acres
Current Zoning:	Planned Unit Development
Comprehensive Plan Designation:	Neighborhood Residential
Existing Land Use:	Undeveloped
Proposed Land Use:	Multiple
Surrounding Uses:	North – Dwelling, Multifamily / Dwelling, Single-Family (attached) West – Dwelling, Single-Family (detached) East – Vacant / Park South – Dwelling, Single-Family (detached) / Dwelling, Single-Family (attached)

REPORT: The property is located east of S. Weimer Road, south of the terminus of S. Adams Street, north of Summit Woods, and east of RCA Park, as well as Monroe County-owned property. The property is currently zoned Planned Unit Development (PUD) under the Sudbury PUD, which was approved in 1999, with a small portion of Residential Medium Lot (R2) adjacent to S. Weimer Road. The 138.51 acre property is currently undeveloped. Surrounding zoning includes PUD and County Residential Single-Family (RS) and County PUD zoning to the north, with PUD and R2 to the south, Parks and Open Space (PO) and PUD to the east, and county RS zoning to the west across S. Weimer Road. Properties to the north, developed as Arbor Ridge under the existing PUD, contain paired homes. There are existing single-family homes developed to the southwest, and single-family homes across S. Weimer Road. Summit Woods is almost entirely built to the south, developed under the existing PUD. The petition site maintains frontage on S. Weimer Road, Sudbury Road, two termini of S. Adams Street right-of-way, and the terminus of the S. Breaking A Way right-of-way.

The site is almost 140 acres, which is the remaining portion of the partially developed 1999 Sudbury PUD with a small portion of RS. The petitioner is requesting a map amendment to rezone the property to a new PUD, which includes the approval of a new District Ordinance and Preliminary Plan. The petitioner is proposing a PUD to include roughly 4,250 new housing units. The petition will also contain some commercial uses including a proposed hotel, as well as multiple roadway, trail, and utility connections. The petitioner intends to dedicate land for a trailhead and a fire station on the eastern portion of the site. The petition has been heard by the Plan Commission in three previous hearings. The Plan Commission will review the petition and make a

recommendation to the Common Council, in accordance with the procedures described in the Unified Development Ordinance (UDO).

The project is large in scale and has many complexities because of its location, surroundings, and environmental constraints. The petitioner is requesting to rezone the property in order to develop housing and commercial uses. Rezoning to Planned Unit Development involves approval of a District Ordinance, as well as approval of a Preliminary Plan.

PETITION OVERVIEW: The petitioner is proposing five 'neighborhoods' or development areas on the 138.51 acres. The rough outline of those neighborhoods can be seen in Image One below, from the District Ordinance. Each area is expected to be delivered separately, as shown in Image Two below.

Image One: Area and Neighborhood Plan / Corridor Streets

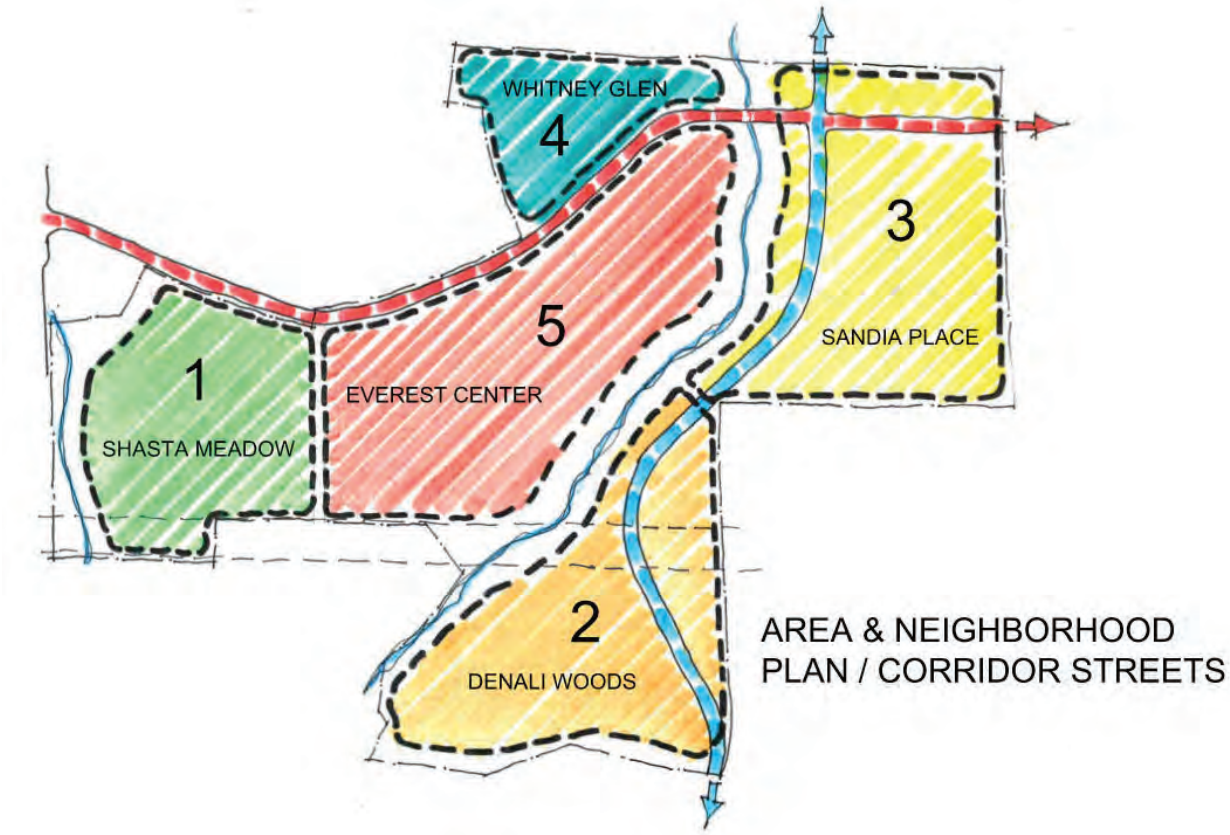


Image Two: Table of Neighborhood Details

Neighborhood	Shasta Meadow	Denali Woods	Sandia Place	Whitney Glen	Everest Center	Total
Approximate Size	23 acres	33 acres	33 acres	11 acres	38 acres	138 acres
Expected Units	~550	~500	~1,100	~400	~1,700	~4,250
Expected Delivery	2025-2028	2025-2029	2028-2032	2033-2034	2027-2034	10 years

The petitioner is expecting that all neighborhoods will be developed over the course of roughly ten years, with construction to begin first in Shasta Meadow and Denali Woods. These two

neighborhoods are chosen to be developed first because of the likelihood that these will be the easiest areas to receive utility infrastructure.

The petitioner is required to build the roadways in the Transportation Plan per Chapter 20.06 of the Unified Development Ordinance (UDO) when the property is subdivided. The largest of those connections are the extension of Sudbury Drive and the connection of Adams Street, which can be seen in the Transportation Plan in Image Three below (labels added). Those roadways, as well as other internal roads and alleys are planned with the project, as seen in Image Four below. The project will also be responsible for some off-site roadway improvements identified in the Traffic Study.

Image Three: Transportation Plan Roads

Image Four: Trails and Open Space Map

The property contains a number of environmentally sensitive areas, which are discussed in the Preliminary Plan portion of the report below. The petitioner has noted the rough areas of anticipated open space in Image Four above.

DISTRICT ORDINANCE: The District Ordinance sets the development and use requirements for the PUD. Those items that are not specifically discussed in the District Ordinance revert to the relevant UDO regulations per 20.02.040(c)(3) and 20.02.040(d)(3).

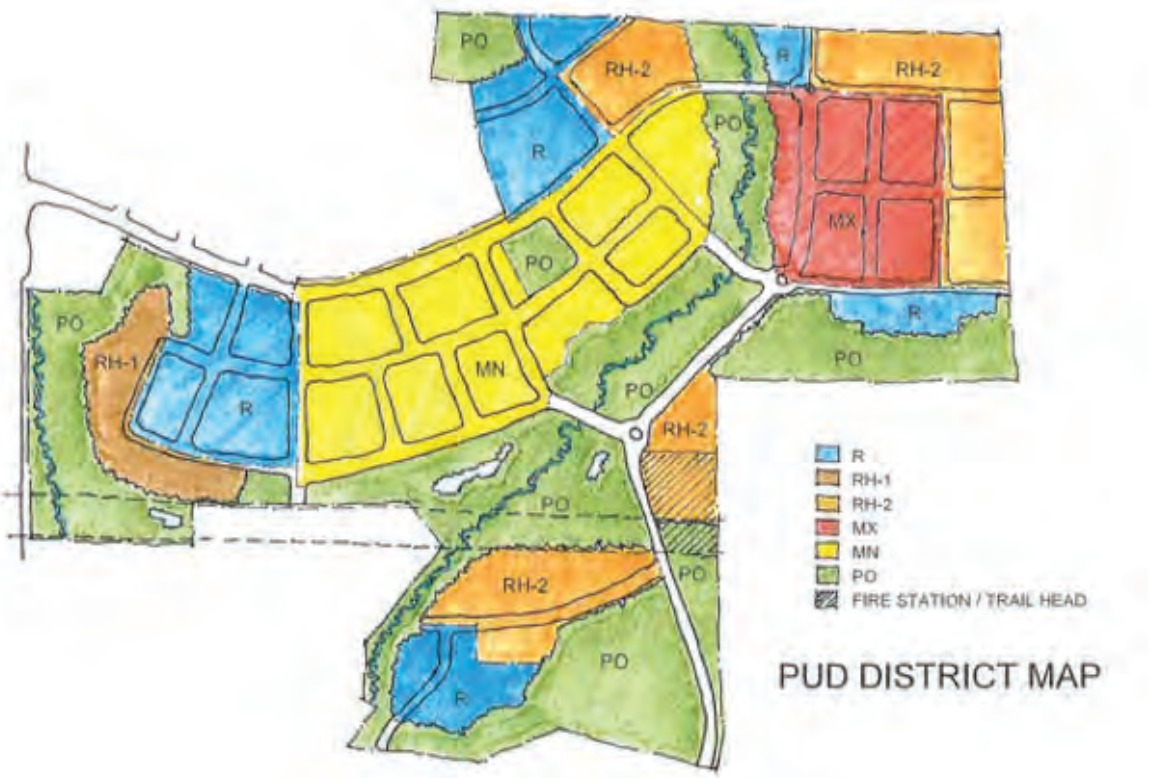
ZONING DESIGNATIONS: The petitioner has identified three zoning districts from the UDO that they will use as the base for their regulations, Mixed-Use Neighborhood Scale (MN), Residential High-Density Multifamily (RH), and Parks and Open Space (PO). As is typical in a Planned Unit Development, the petitioner has proposed a number of changes to these districts in the PUD, both in development standards and uses. The petitioner is proposing six separate zoning designations for the PUD: R, RH-1, RH-2, MN, MX, and PO. Image Five below shows the UDO base districts and their PUD counterparts.

Image Five: UDO District and PUD Designation Comparison

UDO Base District	PUD Designation
MN	MN ; MX
RH	R ; RH1 ; RH2
PO	PO

The petitioner is proposing to utilize the six zoning designations across the site, as seen in Image Six, below, from the District Ordinance.

Image Six: PUD Designation Map



USES: The petitioner is using the zoning districts RH, MN, and PO from the UDO as the base of their proposed uses for the PUD.

R designation: In the R designation, the focus is on less intense uses. There are 20 uses proposed for this district, with 8 of those being accessory or temporary. The focus of this designation is largely single-family or duplex residential development with allowances for other uses such as a place of worship or community center.

RH-1 designation: The RH-1 designation allows 31 uses, with 8 of those being accessory or temporary. The residential uses in RH-1 contain the same uses that are in R with the addition of triplex, fourplex, and multifamily uses. A PUD Use-Specific Standard has been included for the dwelling, multifamily use in the RH-1 designation to allow a maximum of 25 units per building. However, with the use of affordable housing incentives, buildings can increase to 50 units per building.

RH-2 designation: The RH-2 designation has slightly more uses, at 39, with 6 of those being accessory or temporary. Supportive housing is added, as well as some professional service uses, such as fitness center and office. The use vehicle parking garage is also included in the RH-2.

MN designation: The MN designation has the most use options with 52 uses, 6 of those being accessory or temporary. The only residential use allowed is multifamily, and the group living uses are reduced from what is allowed in the RH-2. More commercial and public facing uses such as the art gallery, museum, or library use and the medical clinic use are included. The same professional services are included as in RH-2 with the addition of the personal services use and the tattoo or piercing parlor use. This district contains by far the most retail options, as well as all of the food, beverage, and lodging uses in the PUD, including the hotel or motel use. The MN designation encompasses much of the District Center, which is in the Everest Center neighborhood and is the primary commercial space

on the site.

MX designation: The MX designation includes slightly less uses at 43 with 6 of those as temporary or accessory. The only residential uses listed are dwelling, multifamily and dwelling, live/work. MX contains the same group living use options as RH-2, and all of the public/civic uses listed in the PUD use table are allowed. MX also includes many of the public uses included in MN, but far fewer retail uses.

PO designation: The PO designation includes only 6 potential uses: solar collector, ground- or building-mounted; wind energy system, small; electric vehicle charging facility; swimming pool, seasonal sales; and special event. While all 6 of these uses are shown with the UDO use-specific standards attached, because of the nature of the PUD PO land being largely for preservation, much of the PO area will be in a preservation or conservation easement and will not be available for development.

All of the uses proposed by the petitioner originate in the UDO except for two. The petitioner is proposing to add two uses: “surface parking lot” and “off-site parking/surface parking lot shared” to this PUD. Both are proposed as Permitted in MN and “off-site parking/surface parking lot shared” is also permitted in MX. Per the proposed PUD use-specific standards, the first use, surface parking lot, is intended to be allowed for parking lots of no more than 50 vehicles, requires a 600 foot separation between surface parking lots, and is not tied to the approval of a different development. Conversely, the second use, off-site parking / surface parking lot, does not have a parking space total limit, or a spatial separation requirement, and it is only allowed when it is proposed with a development plan for a different use. Both uses are time limited. The first use can be approved for three years, with the potential for two 1-year extensions. The second use can be approved for three years, with the potential for one 3-year extension. For both uses, when the approved time period has expired, the owner of the parcels must construct an approved site plan or convert the parcel back to greenspace per 04.04.040 of the proposed PUD. The purpose of these uses is to allow for parking to be considered in stages in the PUD. The petitioner envisions situations where a parcel can be used as parking for a restricted period of time and then converted to development as the PUD progresses. The time limits included ensure that no stand-alone parking lots will be created for extended periods of time.

DIMENSIONAL STANDARDS: The Dimensional Standards table from the District Ordinance is in Image Seven below.

Image Seven: Dimensional Standards Table from District Ordinance

Summit District PUD

District Dimensional Standards

		Residential	Mixed Residential	Mixed Multi- Family	District Center	Mixed Use	Parks & Open Space
	District	R	RH1	RH2	MN	MX	PO
	Lot Dimensions (Minimum unless noted)						
A	Lot area (Sq Ft)	1,000	2,000	2,000	5,000	5,000	N/A
B	Lot width (feet)	15	20	20	50	50	N/A
	Building Setbacks (Minimum uunless noted)						
C	Front build-to range - (feet)	5-15	5-15	5-15	0-10	0-10	15**
D	Front builidng façade at build-to-range (feet)	80%	80%	80%	80%	80%	N/A
E	Side (feet)	5	5	5	5	5	15
F	Rear (feet)	3	3	3	3	3	15
	Other Standards						
G	Primary structure height (maximum -feet)	40	63	63	86	75	40
H	Step back required at (story / depth Ft.)	N/A***	4/15	4/15	7/15***	6/15	N/A
I	Non-Residential on ground level height (minimum ft)	N/A	N/A	N/A	12	12	N/A
J	Impervious surface coverage (maximum percent of lot)	70%	70%	70%	95%	90%	10%
K	Landscape area (minimum percent of lot)	None	0	0	0	0	None
L	Front parking setback (minimum feet)*	None	20	20	20	20	N/A
M	Accessory structure height (maximum - feet)	30	30	30	30	30	20

Note: See Section 04.04.060 (Incentives for Alternative Standards)

* Behind primary structures front buidling wall, excluding drive entrance/exit.
** PO has a setback of 15 feet from property line.
*** Transitional Standards specific to Arbor Ridge see (PUD 04.04.030(c)

Lot Size and Setbacks: The petitioner is proposing lot size minimums that range from 1,000 square feet to 5,000 square feet with no minimum size in the PO designated areas. Lot width minimums range from 15 feet in the R zoning designation to 50 feet in the MX zoning designation. Front building build-to ranges are 5-15 feet in the three residential-focused designations, and 0-10 feet in the mixed-use designations. With a maximum of 15 feet from the front property line and a requirement in all districts that 80% of a building must meet the build-to range, the development will focus on front-forward building design. With side building setbacks of 5 feet for all districts, it is unlikely that a single R district lot would be developed on its own, unless it was part of attached housing. All districts propose 3 foot rear yard building setbacks, with exceptions in the Arbor Ridge Condominium adjacent RH-2 properties, described below.

Impervious Surface Coverage: The petitioner is proposing a 70% allowance of lot coverage in the three R designations. The RH zoning district in the UDO allows for 65% coverage. The PUD MN designation proposes 95% coverage and the PUD MX designation proposes 90% coverage, while the UDO MN zoning district allows 60% coverage. While individual lots will have increased impervious surface coverage from the UDO base districts, the petitioner expects to offset that by having roughly 38 percent of the PUD area set aside as preservation or open space. With a large area being set aside for environmental, reduced impervious surface regulations for the developable area allows for more housing to be developed.

Height and Step Back: The petitioner is proposing a 40 foot height maximum in the R designated areas, which amounts to 3-4 stories. In the two other residentially-focused designations, RH-1 and RH-2, the height maximum is 63 feet, which amounts to 5-6 stories. In both the RH-1 and RH-2 designations, stories above the 3rd story have to step back 15 feet from the front building wall. The

maximum height in the UDO RH district is 5 stories, not to exceed 63 feet. In the PUD PO designation, the maximum height is 20 feet, which is the same as the UDO PO district. The UDO MN district has a maximum height of 3 stories, not to exceed 40 feet. In the MX designation, the height maximum is 75 feet, which amounts to roughly 7 stories. Stories above the 5th story have to step back 15 feet from the front building wall. In the MN designation, which covers the District Center, the height maximum is 86 feet, which is roughly 8 stories. The step back required is 15 feet for stories over the 6th story. Additionally, there are transition standards for areas abutting the Arbor Ridge Condominiums neighborhood to the northwest, described below. In all designations except the R designation, additional height can be earned through the use of incentives, discussed later in this report. In all designations, accessory structure height maximum is 30 feet, except for a maximum of 20 feet in the PO designation.

> **Transition to Arbor Ridge:** Transition standards are included for the areas immediately adjacent to Arbor Ridge Condominiums and those areas across Sudbury Drive from the Arbor Ridge Condominiums to lessen the immediate impact felt by the residents in smaller scale buildings when larger buildings are built in the vicinity. Buildings built on the south side of Sudbury Drive across from Arbor Ridge Condominiums in the Everest Center (MN and PO designations) neighborhood will have an additional step back of 10 feet for the 4th through 6th stories, while maintaining the 15 foot minimum step back at the 7th floor and higher. Buildings built on the south side of Sudbury Drive in the Shasta Meadows (R) neighborhood shall also have a 10 foot step back for the fourth floor. Buildings built in Whitney Glen (R) that are adjacent to the Arbor Ridge Condominiums shall have an 8 foot side building setback and a 20 foot rear building setback. Those buildings will also have a five foot step back for the fourth floor.

Building Floor Plate: The petitioner includes building floor plate maximums for the use, dwelling, multifamily, in the PUD use-specific standards, Section 03.30.020. In designations RH-1 and RH-2, the maximum building floor plate allowance is proposed to be 10,000 square feet. In the MN and MX designations, the maximum building floor plate size is proposed to be 30,000 square feet. In the UDO, buildings with the dwelling, multifamily use are only allowed to be 30,000 square feet if they are utilizing both affordable housing and sustainable incentives. The Department proposes that the by-right for building floor plate size in the MN and MX designations be 20,000 square feet and that projects utilizing at least 1 incentive in the MN and MX designations be allowed to have a building floorplate of 30,000 square feet. A condition of approval has been added.

ENVIRONMENT: The petitioner is proposing no changes to the UDO regulations related to environmental standards in this PUD. The PUD is completely silent on environmental regulations, therefore per UDO 20.02.040(d)(3), the UDO regulations are applied to development in the PUD. Some of the regulations that will be derived directly from the UDO include regulations related to steep slopes, riparian buffers, karst geology, wetlands, tree and forest preservation, and development in or near a floodplain. The petitioner has provided some preliminary analysis of environmental constraints on the site as part of the supporting documents for the preliminary plan, both through mapping and an environmental constraints report, which are included in this packet. However, the Department believes that additional or modified areas of preservation may be required once a thorough survey is done during the platting process, and has discussed this at length with the petitioner. Both parties acknowledge that changes to the preliminary plan resulting from UDO required preservation may occur. The UDO allows minor deviations from an approved preliminary plan per UDO 20.06.070(c)(3)(C)(ii)(3). Additional discussion of this occurs further

in the report in the Preliminary Plan section.

ACCESS AND CONNECTIVITY: The petitioner is proposing no changes to the UDO regulations related to access and connectivity in this PUD. The PUD is completely silent on access and connectivity regulations, therefore per UDO 20.02.040(d)(3), the UDO regulations are applied to development in the PUD. Some of the regulations that will be derived directly from the UDO include regulations related to driveways and access, pedestrian and bicycle circulation, and public transit.

Driveways and Access: The Department has spoken with the petitioner regarding vehicular access to development sites. Alleys are discussed in every neighborhood description, but no regulation is included in the PUD or the base zoning districts in the UDO that will require access from alleys where they will be built. However, in the R and RH-1 areas, the PUD requires that the subdivision type to be used is Traditional Subdivision, which requires 67% of the lots in a subdivision to derive access from alleys. So, in that way, alleys will be required in the R and RH-1 areas. As can be seen in Image Nine below, the petitioner has shown that alleys are part of the Preliminary Plan in MN and MX, as well. Alleys need to be included in the design of the northern block of MN and in the MX area. A condition of approval has been added.

Pedestrian and Bicycle Circulation: The petitioner is proposing protected bicycle lanes on multiple roadways, as seen in Image Four. Additionally, an off-street trail is planned to connect the future City trail in the Duke easement to the existing trail south of the site, west of Breaking A Way. All new roadways will also have pedestrian facilities, as seen in the cross-sections proposed by the petitioner, in this packet.

Public Transit: The petitioner has had preliminary discussions with Bloomington Transit about possible route extension through this PUD.

Right-of-Way Connection: As can be seen in Image Seven below, the petition site, outlined in black, has a number of improvements in the adopted Transportation Plan. The northernmost connection is the extension of Sudbury as a General Urban street from the end of the existing W. Sudbury Drive right-of-way to the eastern end of the petition site. (NC-19) That roadway is proposed to contain a protected bike lane. On the eastern side of the petition site, S. Adams Street stubs at both the north and south ends of the petition site, and the Transportation Plan shows a Neighborhood Connector with bike lanes and sidewalks. (NC-20) The petitioner is including the entirety of the Adams Street connection on their parcel and has worked with the Department and the Engineering Department on a general location, as can be seen in the Preliminary Plan maps. There is a third new right-of-way shown in the Transportation Plan on the southern end of the petition site. (NC-24) That road is shown as a Neighborhood Connector that appears to be aligned with the Duke Energy easement to the east, and moves southwest to connect to the existing Weimer Road right-of-way through a neighboring parcel. It has been determined that because of changes to the east of this site, an eastern connection of NC-24 is unlikely and this PUD will not plan for that connection. A condition of approval has been added. Additionally, NC-24 will curve south and connect to the existing ROW for Breaking A Way with a stub to the west for a possible future connection to Wapehani and Weimer Roads. In that way, NC-24 will provide immediate connection to the south, but leave open the possibility of vehicular connection to the intersection of Wapehani and Weimer Roads in the future.

Image Nine below from the Preliminary Plan shows two stub streets that could be extended in the

event that the property to the southwest of the site is every developed beyond its current condition. This petition in no way requires or makes that development happen. Considering potential future connection through that property is prudent because of where Weimer Road intersects with Wapehani Road.

Image Eight: Transportation Plan Connections on Aerial of Site

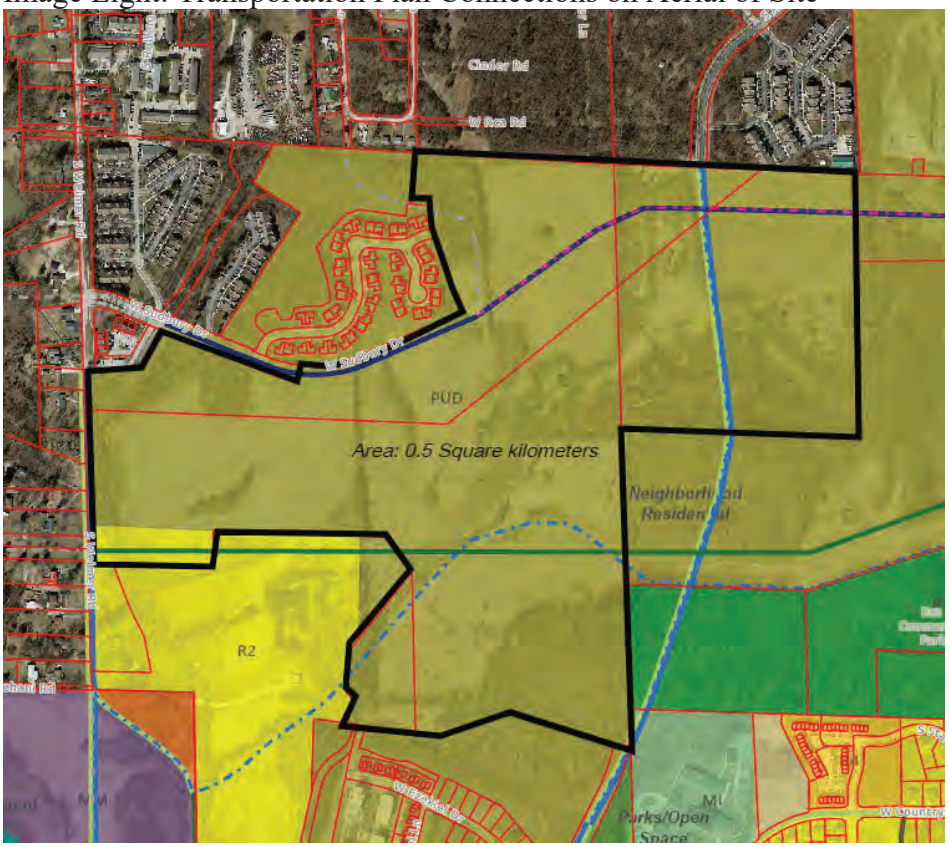
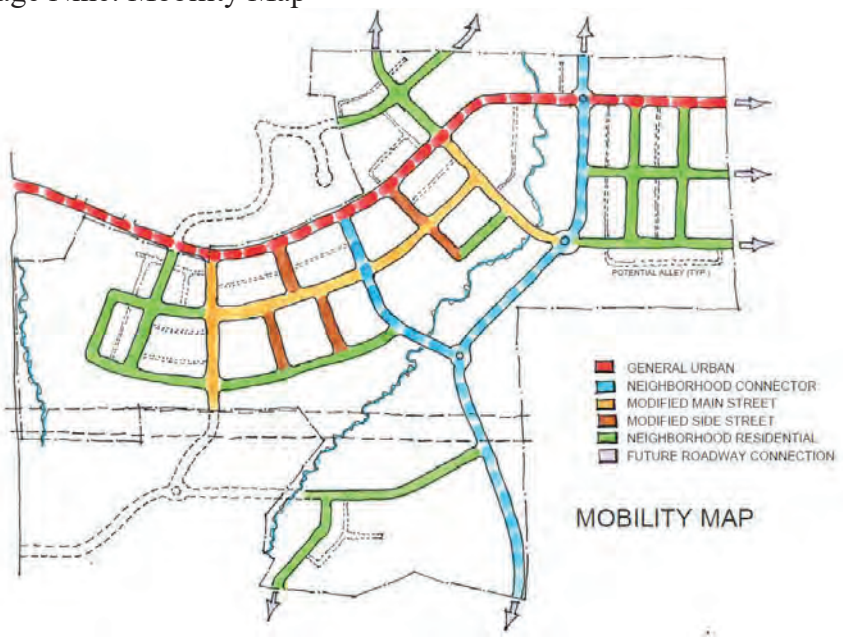


Image Nine: Mobility Map



The remainder of the site, as can be seen in Image Nine above, includes various right-of-way

connections for vehicular travel. Two additional stubs are included to the north for potential future connection, as well as three to the east, stubbing to the Monroe County Government-owned property. The petitioner has made an effort to increase the gridded nature of most of the property, within the confines of the existing environmental conditions. The connection of Adams Street, and preparation for a potential future Sudbury Drive connection east to Strong Drive provide important additional roadway options for all city roadway users.

PARKING AND LOADING: The petitioner is proposing no changes to the UDO regulations related to parking and loading in this PUD. The PUD is completely silent on parking and loading regulations with the exception of public parking planned in the right-of-way, therefore per UDO 20.02.040(d)(3), the UDO regulations are applied to developments for the parking standards that are not included in the PUD. The petitioner has included in the PUD the same ratio of electric vehicle spaces required for new parking lots as exists now in the UDO. By inclusion, if the UDO changes that percentage, the PUD will not have to increase the percentage.

SITE AND BUILDING DESIGN: The petitioner is proposing a few changes to the UDO Site and Building Design standards. The first is to remove the third party review option for development in this PUD. The second, and more substantive item is the transition standards included for development immediately adjacent or across Sudbury Drive from the Arbor Ridge Condominiums, which was discussed above. Outside of those two changes, typical site and building design standards such as materials, roof design, universal design, and solar ready design will apply to development in the PUD.

LANDSCAPING, BUFFERING, AND FENCING: The petitioner is proposing to utilize UDO Multifamily Development Landscaping standards, 20.04.080(i), for development in the R, RH-1, and RH-2 designations. The petitioner is proposing to utilize UDO MD District Landscaping standards, 20.04.080(j), for development in the MX and MN designations. The PUD regulations remove the requirements for buffer yards and exempt single family and plex uses from UDO landscaping standards. The petitioner has included a section in 04.04.040 that pairs with the two new uses proposed, so that it is explicit that when the approval time limits have expired, that every portion of those sites that do not have a new approved development must be converted to greenspace with groundcover.

The property to the southwest of the development site contains an old quarry site with roughly 2.5 acres of open quarry, as well a residence and a cell tower. There is an existing fence that separates the development site from that property. The Department has worked with the owners of that property and discussed with the petitioner, and has added a condition of approval related to maintaining fencing on the petition site, in order to clearly separate it from the neighboring property, in perpetuity.

LIGHTING: The petitioner is proposing no changes to the UDO regulations related to lighting in this PUD. The PUD is completely silent on lighting regulations, therefore per 20.02.040(d)(3), the UDO regulations are applied to development in the PUD.

SIGNS: The petitioner is proposing that the Residential District Sign Standards in the UDO, 20.04.100(i), be used for the R, RH-1, and RH-2 designations. Additionally, they propose to use UDO MD District Sign Standards, 20.04.100(l), and Multifamily Sign Standards, 20.04.100(j) for signage in the MX and MN designations. Some alterations to the regulations being used in the MX and MN designations are included to allow larger limitations for wall signage and to allow multiple

freestanding signs.

INCENTIVES: The petitioner is proposing a number of changes to and clarifications for how to apply the Incentives section in UDO 20.04.110.

- The standards related to reduced bulk requirements for R1-R4 in the UDO are to be applied to single-family and plex development in R, RH-1, and RH-2.
- The PUD explicitly states that projects in R cannot seek additional height incentives regardless of project design.
- The PUD proposes that Tier 2 projects that are seeking affordable housing and sustainable incentives may increase their height by an additional 2 stories, not to exceed 24 feet, with an additional 10 foot step back. This height increase is in addition to the 2 stories received initially from the Tier 2 affordable housing incentives. The UDO allows 1 additional story on top of the originally gained 2, and that story has the step back requirement, plus can only cover 50 percent of the building footprint. So, the PUD is proposing and additional 1.5 stories when both incentives are used. This would allow 12 stories in the MN. The Department is proposing to limit the locations where the extra height incentive can be used to four blocks in the development. A condition of approval has been added.
- In the MN and MX designations, a project utilizing the affordable housing incentives must include 20% of the units at or below the 120% of Area Median Income (AMI). The rest of the PUD only requires 15% of a project when those incentives are used.
- In the RH-1 designation, a project utilizing the affordable housing incentives can have a maximum of 50 units per building.
- The PUD alters the eligibility for the Sustainable Development incentives and removes the requirement for a property to be served by sewer and water for at least five years to be eligible.
- The PUD clarifies that single-family and duplex development in R, RH-1, and RH-2 that meet the sustainable development criteria are eligible for reduced bulk requirements.
- The PUD clarifies that single-family and plex development in R that satisfy sustainable development criteria are not eligible for additional height.

Most of the changes proposed are in line with the UDO regulations related to the use of incentives. The biggest difference is the additional height allowed when using both incentives, which would allow an additional four stories on top of the PUD designation height maximums if both incentives are sought. The Department has added a condition to limit the area allowed to developments that utilize both incentives.

SUBDIVISION REGULATIONS: The PUD is not proposing any changes to the subdivision regulations in the UDO. The only mention is that subdivisions done in the R and RH-1 shall use the Traditional Subdivision. Subdivision types used for the rest of the PUD will be determined with staff at the time of subdivision.

PRELIMINARY PLAN: Per 20.06.070(c)(3)(B), a Preliminary Plan is required with rezoning to Planned Unit Development.

Scaled Site Plan: The petitioner has submitted several conceptual and scaled site plans indicating where proposed public improvements, proposed development areas, and existing environmentally sensitive areas are on the site. As noted earlier in the report, though environmentally sensitive areas have been identified, the exact areas will be determined during the platting process.

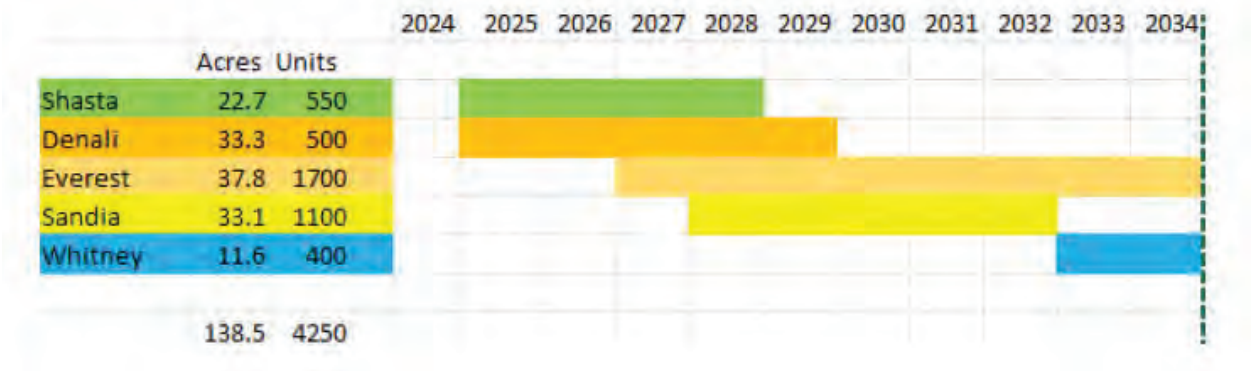
Infrastructure Plan: The petitioner has included a plan for roadways and paths, which can be seen in Image Four above. The infrastructure built on site will include roadways that connect the property to existing Adams Street stubs to the north and south, extend Sudbury Drive to the eastern property line, as well as create a partially gridded roadway design on-site. The petitioners are including some road cross-sections from the UDO, with some modified or new cross-sections, as well. The petitioner will also build a portion of a trail that will then become a City trail, connecting one existing and one future City trail. A trailhead will also be included. The petitioners will also have to build water, sewer, and stormwater infrastructure on the site with financial contributions to the City of Bloomington Utilities Department for some offsite improvements related to water and sewer.

Traffic Analysis: The petitioner has worked on a traffic analysis to determine what effects will be had on surrounding roadways and key intersections near the proposed development. The Engineering Department has been working with the petitioner's engineering consultant, on identifying what improvements will be required in the surrounding areas as a result of this project. A condition of approval has been included.

Description of Character: The petitioner includes a description of the concepts for this property in the petitioner's statement. The petitioner seeks to develop distinct developments that help address the community's need for housing, while enhancing the natural ecosystems that are present on this site.

Development Schedule: The petitioner has proposed a phasing matrix in the District Ordinance for the general delivery of each neighborhood, as seen in Image Ten below. A more detailed schedule and trigger discussion is in PUD-Specific Considerations, further in this report.

Image Ten



Environmental Plan: As noted earlier in the report, though the petitioner has had the property surveyed and environmentally sensitive areas identified, the Department believes that there may be need to update and amend those locations during the platting process. For example, at this scale, it is difficult to determine where the dripline of trees in a closed canopy is, and to then add the required ten foot buffer. However, when the petitioner does their first subdivision on the property, they will have to identify those locations, as well as all regulated environmental features on the site and their respective buffers. And the Department will have to agree to that assessment. Those features include riparian buffers, floodplain, wetlands, karst, steep slope, and mature closed canopy trees. We have heard from neighbors and other interested members in the community that there is

a history of flooding along Weimer Road and it is a priority of the Department that the effects of this development do not increase the negative effects of that flooding on the surrounding properties. To that end, we have worked with the Assistant Director of Environmental Programs at the City of Bloomington Utilities to craft conditions related to stormwater control during construction and once construction is complete. Those conditions are included below. As can be seen in the supporting documentation provided by the petitioner, there are also karst features on this site. We have received input from the public about these features, as well. The Department will require a karst survey done by a geologist at the time of primary platting, so that safe building sites can be confirmed. A condition of approval has been added. It is extremely apparent that this property contains sensitive areas, and the planned development seeks to protect those areas, and will be required to do so.

Architectural Character: The petitioner is not proposing any changes to building material, uniform architecture, or anti-monotony standards in the UDO. The proposed height and massing in the PUD is larger than is allowed in most of the UDO, and some step backs have been included in the PUD, which affect architectural character.

PUD-SPECIFIC CONSIDERATIONS: There are a number of topics that have been discussed related to this specific PUD request that are discussed below.

Sustainability of Design: The petitioner has included all of the typical Sustainable Development standards from the UDO. Additionally, the petitioner proposes a number of initiatives aimed at sustainability in their PUD. For example, they will work with Duke Energy in the New Construction Energy Efficient Design Assistance (NCEEDA) program, in which Duke provides assistance to developments in order to maximize efficient design, as well as provides construction incentives to encourage energy-efficient strategies during construction and design of buildings. There are a number of measures listed in the District Ordinance by type of building that will be required, including all electric services for heating, cooling, cooking, and water heaters in all non-multifamily residential buildings; and energy efficiency program minimum requirements for all other buildings. All buildings will also have to meet the Solar Ready Building Design requirements in 20.04.070(g).

Public Benefit: Beyond the general benefit of much needed additional housing, the PUD will provide land to the City of a potential future fire station and trailhead on the eastern portion of the site. The petitioner will also construct the trail from the City's portion on the County Government-owned parcel and connect it to the existing trail to the south. The roadway connection of Adams Street will provide an additional north-south vehicular connection for all users in this area. Additionally, the project will provide a minimum of 15 percent of affordable units for units built on-site. The petitioner will work with the City in order to identify areas of housing affordability need and work to incorporate projects to address those needs, as well. The commitment to environmentally-sensitive building design such as all-electric for the smaller scale housing developments is also an important benefit for the community.

Housing: Per the addendum created in 2023 for the Indiana Uplands Regional Housing Study, to meet the needs of the projected growth of Bloomington through 2030, 2,236 additional housing units will need to be supplied, and of a greater variety than was built between 2015 and 2018. While the life of construction of this PUD is project to be 10 years, some of the units produced here could help to alleviate that need. Additionally, many of the projects that we currently see are larger multifamily projects, which this PUD plans for, as well. However, this PUD also proposes

smaller scale development in the R and RH-1 areas, which serve an important need for housing type diversity.

Affordability: The petitioner must provide that 15% of the units constructed on the site are at or below 120 percent of the HUD AMI for Monroe County Indiana in perpetuity, per the PUD Qualifying Standards, unless the City otherwise adjusts or releases the requirement. The petitioner may work with the Housing and Neighborhood Development (HAND) Department on projects that meet the needs for affordable units at a lower AMI than 120 percent. Additionally, the PUD links the use of both incentives in a project in the MN and MX designations to a requirement to provide 20% of the units in that project at 120 percent of the HUD AMI or lower. The petitioner has included in the District Ordinance requirements that seek to spread the affordable and workforce units across the development. Those are summarized below.

- Each of the five neighborhoods will contain affordable units.
- The first two neighborhoods that are platted will meet or exceed the 15% requirement.
- When the third, fourth, and fifth neighborhoods develop, if there is excess (over the 15%) in a previously developed neighborhood, the excess percentage can be applied to any of those three neighborhoods, up to a total of 5% carryover from the original neighborhood with excess.
    - A 20% MX or MN project can only contribute to excess for carryover if they are over 20%.

The included affordability provisions seek to require affordability to be built throughout the life of the PUD, while allowing some flexibility across neighborhoods.

Phasing and Triggers: The petitioner has proposed a phasing matrix in the District Ordinance for the general delivery of each neighborhood. The petitioner has also included a more detailed phasing matrix with the supporting documents of the Preliminary Plan, shown in Image Eleven below.

Image Eleven: Petitioner Proposed Phasing Matrix

Neighborhood	Acres	Development Period	Units	Anticipated Affordable Units	Affordable Units Delivered
Shasta Meadow	22.7	2025-2028	550	83	
Denalie Woods	33.3	2025-2029	200	30	
Everest Center	37.8	2027-2034	1700	255	
Sandia Place	33.1	2028-2032	1100	165	
Whitney Glen	11.6	2033-2034	400	60	

Infrustructure	Development Period	Outside Date
Adams Street	Prior to any occupancy in Summit District PUD	2025
Sudbury Drive	Prior to any occupancy in Summit Distirict PUD	2025
Street F	With first platting of developable lots within Everest Center	2028
Shasta Meadow	Water and Sanitary at time of construction gravity to West	2026
Denalie Woods	Water and Sanitary with lift station to West	2028
Everest, Sandian, Whitney	Water and Sanitary with lift station to West	2030

Neighborhood Construction Phasing Requirements		Preceding Unit Requirements	Other Requirments
Shasta Meadow	Internal infrustruture	None	
Denalie Woods	Internal infrustruture	None	
Everest Center	Internal Infrustructure	50% of the planned units in Shasta Meadow or Denalie Woods Combinted	Detication of Firestation Land
Sandia Place	Internal Infrustructure	75% of the planned units in Shasta Meadow or Denalie Woods Combinted	
Whitney Glen	Internal Infrustructure	90% completion of any single previsouly intiated neighborhood	

Image Twelve: Amended Proposed Phasing Matrix

Improvement	Trigger for Specific Infrastructure or Phase to Begin	Preceding Requirements	Trigger for Completion Requirement
Adams Street	Platting, bonding, and construction will take place with the first plat in the PUD	N/A	The road will be completed and accepted by the City before the first building occupancy recommendation is issued in the PUD
Sudbury Drive	Platting, bonding, and construction will take place with the first plat in the PUD	N/A	The road will be completed and accepted by the City before the first building occupancy recommendation is issued in the PUD
Street F	To be platted with first developable lots in Everest Center	N/A	The road will be completed and accepted by the City before the first building occupancy recommendation is issued in Everest Center
Land for Fire Station / Trailhead	Land will be delineated as intended for the City with the first plat for lots in the Denali neighborhood	N/A	Transfer of the property to the City will be per agreed upon schedule with both parties
MOU for Funding / Construction for Off-Site Sewer Improvements	Per MOU with CBU	N/A	MOU to be executed before grading permit issued for the site
MOU for Funding / Construction for Off-Site Transportation	Per MOU with City	N/A	MOU to be executed before grading permit issued for the site
Construction of Additional Stormwater Protections	Any designated as necessary by CBU to be installed with first Grading Permit issuance	N/A	Before each grading permit is issued, the site as a whole will be analyzed to make sure that erosion controls are working as expected. If they are not, updates will be required.
Agreement for Trail in Duke Easement	To be executed with Duke Energy, with City as a third party, when feasible for City to complete its portion to the east	N/A	To be executed in conjunction with City's trail timeline
All Internal Infrastructure in Shasta	To be completed and accepted within 5 years of first Shasta secondary plat for developable lots or end of 2028, whichever comes first. Each plat is beholden to time limits in the UDO.	N/A	
All Internal Infrastructure in Denali	To be completed and accepted within 5 years of first Denali secondary plat for developable lots or end of 2029, whichever comes first. Each plat is beholden to time limits in the UDO.	N/A	
All Internal Infrastructure in Everest	To be completed and accepted within 5 years of secondary plat or end of 2034, whichever comes first. Each plat is beholden to time limits in the UDO.	N/A	
All Internal Infrastructure in Sandia	To be completed and accepted within 5 years of secondary plat or end of 2032, whichever comes first. Each plat is beholden to time limits in the UDO.	N/A	
All Internal Infrastructure in Whitney	To be completed and accepted within 5 years of secondary plat or end of 2034, whichever comes first	N/A	
Certificate of Zoning Compliance for first building in Everest Center		At least 50% of total planned units in Shasta and Denali are under construction or completed AND at least 25% of the total planned affordable units in Shasta and Denali are under construction or completed	
Certificate of Zoning Compliance for first building in Sandia Place		At least 75% of total planned units in Shasta and Denali are under construction or completed AND at least 50% of the total planned affordable units in Shasta and Denali are under construction or completed	
Certificate of Zoning Compliance for first building in Whitney Glen		50% of the total planned units in any one of the preceding neighborhoods have final occupancy recommendation	

The Department has worked with the petitioner on an updated matrix, labeled Image Twelve

above. This matrix takes a number of the ideas from the originally proposed matrix in Image Eleven, while adding additional triggers that involve the delivery of affordable housing units in the first two phases, as well as ongoing expectations for stormwater protections. A condition of approval has been added to include the new matrix in the Preliminary Plan.

Environment: As discussed above in the Preliminary Plan section, there are a number of environmental constraints on this site. The petitioner has adjusted the District Ordinance over time so that the regulations on this property match those in the UDO.

Stormwater: As mentioned above in the Preliminary Plan section, the Department is working closely with staff at CBU to ensure that development on this property is responsible for the stormwater output that it creates. It is of the utmost importance to sensitively develop this property, so that existing issues are no exacerbated.

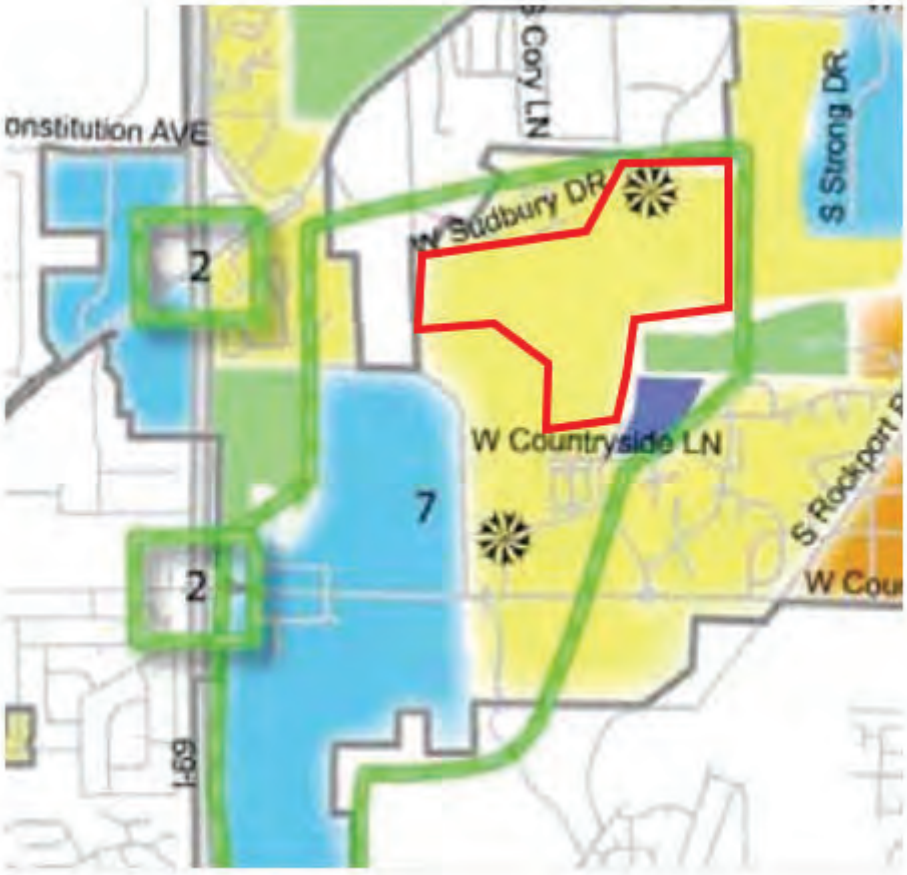
PUD Qualifying Standards: The petitioner addresses the Qualifying Standards in the petitioner's statement. The UDO contains 13 general Qualifying Standards for rezoning to Planned Unit Development. The first and second cover location and size of the property and are met. The third is related to permanently-income limited dwelling units and is discussed above. The fourth standard is that the PUD could not be developed using traditional zoning districts and the processes in the UDO. For a property of this size under single ownership, a PUD makes sense so that all of the public improvements across the site can be planned together. For example, the Department can work with the petitioners on requiring phasing from one part of the property to another, a process that would not be part of a typical site plan approval. The fifth is verification that the land is under single ownership or control, and it is. The sixth through ninth requirements are related to highly-valued design features. Six and seven are related to protecting and retaining environmental and natural resources on the site. The petitioner has worked with the Department to ensure that the environmental regulations on the site will meet the existing UDO requirements of protection. The eighth and ninth standards are related to low impact design features being used throughout the site, as well as solar orientation and passive energy-efficient design throughout the development. Because of the size of the proposed PUD, we are not seeing detailed building plans as we sometimes do during this process. So confirming solar orientation is difficult at this stage. But, as the final plans are submitted, the eighth and ninth standards will be verified. Standards ten through thirteen also focus on highly-valued design features, but are more open-ended, as they are determined by the Department Director. Standard ten allows no block length longer than 1,400 linear feet, and the Department believes this is an important and impactful standard, so the petitioner has designed to that standard. Standard eleven includes area for a centralized gathering or recreation space for the development, and the petitioner has included that in their District Center plans. The twelfth standard suggests internally and externally connected parks, trails, and an open space system. The petitioner is constructing a trail to connect to a City built trail to the east, with a connection to an existing trail to the south. The thirteenth standard is related to community-level energy production. The Department does not think that the community would best be served by focusing the use of this land on community-level energy production.

COMPREHENSIVE PLAN: This property is designated as *Neighborhood Residential*, and is located in Focus Area 7, the West Fork Clear Creek Focus Area. The Comprehensive Plan notes the following about the *Neighborhood Residential* area:

- The Neighborhood Residential district is primarily composed of residential land uses with densities ranging from 2 units per acre to 15 units per acre.

- Single family residential development is the dominant land use activity for this district.
- These areas are largely built out, homogenous neighborhoods, but some vacant tracts of land exist as well as opportunities for small-scale neighborhood redevelopment activity…
- For larger tracts of land, single-family, attached single-family, and multifamily residential uses may be appropriate, and in some instances small-scaled neighborhood mixed use is also appropriate.
- Create neighborhood focal points, gateways, and centers.
- Ensure that appropriate linkages to neighborhood destinations are provided.
- Large developments should develop a traditional street grid with short blocks to reduce the need for circuitous trips.
- Support incentive programs that increase owner occupancy and affordability (including approaches promoting both permanent affordability and home ownership for all income levels).

Image Thirteen: Rough Area of Petition Site on Comprehensive Plan



While the Comprehensive Plan calls for less density in this area than the PUD proposes, the Plan acknowledges that this site is part of a much larger region in the southwestern part of Bloomington that contains some of the last large, open spaces for development. You can see most of Focus Area 7 in Image Thirteen, with the rough area of the petition site outlined in red. Additionally, while the number of potential units is included by the petitioner, the UDO has almost entirely moved away from regulating development based on the number of units, and moved toward focusing on design. This property will include a focal point, with the open green space in the District Center, as well as providing connection between existing and future

roadways and trails. The Comprehensive Plan also acknowledges repeatedly that there will be a need for housing in the community. The Community Profile portion of the document states that the community does have some large, undeveloped tracts of land, and that we may need to seek denser development in some places, in order to also provide environmental protections where those are needed. That is what this project aims to achieve.

20.06.040(d)(6)(B) General Compliance Criteria

i. Compliance with this UDO
ii. Compliance with Other Applicable Regulations
iii. Compliance with Utility, Service, and Improvement Standards
iv. Compliance with Prior Approvals

PROPOSED FINDING: The PUD meets the Qualifying Standards prescribed in the UDO, and incorporates many of the existing UDO standards, as well. The petitioner has worked with City of Bloomington Utilities to ensure that capacity for this development can be achieved. The Department and petitioner will continue to work closely with CBU as the project moves forward. No prior approvals affect this petition.

20.06.040(d)(6)(D) Additional Criteria Applicable to Primary Plats and Zoning Map Amendments (Including PUDs)

i. Consistency with Comprehensive Plan and Other Applicable Plans

The proposed use and development shall be consistent with and shall not interfere with the achievement of the goals and objectives of the Comprehensive Plan and any other adopted plans and policies.

ii. Consistent with Intergovernmental Agreements

The proposed use and development shall be consistent with any adopted intergovernmental agreements and shall comply with the terms and conditions of any intergovernmental agreements incorporated by reference into this UDO.

iii. Minimization or Mitigation of Adverse Impacts

1. The proposed use and development shall be designed to minimize negative environmental impacts and shall not cause significant adverse impacts on the natural environment. Examples of the natural environment include water, air, noise, stormwater management, wildlife habitat, soils, and native vegetation.
2. The proposed use and development shall not result in the excessive destruction, loss or damage of any natural, scenic, or historic feature of significant importance.
3. The proposed use and development shall not result in significant adverse fiscal impacts on the city.
4. The petitioner shall make a good-faith effort to address concerns of the adjoining property owners in the immediate neighborhood as defined in the pre-submittal neighborhood meeting for the specific proposal, if such a meeting is required.

iv. Adequacy of Road Systems

1. Adequate road capacity must exist to serve the uses permitted under the proposed development, and the proposed use and development shall be designed to ensure safe ingress and egress onto the site and safe road conditions around the site, including adequate access onto the site for fire, public safety, and EMS services.
2. The proposed use and development shall neither cause undue traffic congestion nor draw significant amounts of traffic through residential streets.

v. Provides Adequate Public Services and Facilities

Adequate public service and facility capacity shall exist to accommodate uses permitted under the proposed development at the time the needs or demands arise, while maintaining adequate levels of service to existing development. Public services and facilities include, but are not limited to, streets, potable water, sewer, stormwater management structures, schools, public safety, fire protection, libraries, and vehicle/pedestrian connections and access within the site and to adjacent properties.

vi. Rational Phasing Plan

If the petition involves phases, each phase of the proposed development shall contain all of the required streets, utilities, landscaping, open space, and other improvements that are required to comply with the project's cumulative development to date and shall not depend upon subsequent phases for those improvements.

PROPOSED FINDING: The proposed use and development does not interfere with the goals of the Comprehensive Plan, and in fact aims to provide housing that is called for in the Plan, while protecting existing neighborhoods and residents and environmentally sensitive areas. The proposal is not affected by any existing interlocal agreements. The proposed development incorporates all existing UDO regulations related to environmental features in order to minimize negative impacts on those areas on site and surrounding it. The extensive natural features on this site will be protected to the scale required by the UDO. The petitioner is working with the Economic and Sustainable Development (ESD) Department to ensure that any fiscal impact on the City is appropriate and in line with the goals of the community. The petitioner has met repeatedly with neighbors of the site, and the Department has assisted with that communication, and changes to the PUD have been included to address as many of their concerns, as possible. The development is required to make the largest vehicular connections at the beginning of the project, in part to ensure that safe access to the site is present before anyone occupies the site. The petitioner will also be responsible for upgrades to areas around the site that are identified in the Traffic Analysis, in order to ensure that those roadways are not negatively affected by the development. With the infrastructure being built by the development, adequate public facilities are available when needed on this site. The petitioner has worked extensively with the Department on a phasing plan, and no requirements needed for early phases is pushed to later phases. The site phasing is rational.

20.06.070(b)(3)(E)(i)(1) Specific Approval Criteria

[a] The recommendations of the Comprehensive Plan;
[b] Current conditions and character of structures and uses in each zoning district;
[c] The most desirable use for which the land in each zoning district is adapted;
[d] The conservation of sensitive environmental features;
[e] The conservation of property values throughout the jurisdiction; and
[f] Responsible development and growth.

PROPOSED FINDING: The development supports the recommendations of the Comprehensive Plan, including the connections envisioned in the Transportation Plan. The site is currently vacant with no improvements, and future development will protect the sensitive environmental features on the site. This almost 140 acre parcel has long been planned for development, including single-family, multifamily, commercial, office, and industrial uses. Per the Comprehensive Plan, the goals for this area have shifted and are largely of a residential nature, with some supporting commercial. The proposed development is a desirable use of this area. Environmentally sensitive

areas will be protected during this development. While it is difficult to speak to property values in the jurisdiction, the development of additional housing is unlikely to have negative effects on the property values throughout the jurisdiction. The development balances varied needs in the community, including the need for more housing, the need for sustainable development, the need to reduce sprawl, and the need to protect existing resources.

CONCLUSION: The proposed PUD would develop a large piece of property that has not been fully developed since the existing PUD was approved in 1999. That PUD was built out until it ran into triggers for public improvements. As a result, the Department is not recommending altering the typical subdivision control requirements of the construction of Transportation Plan improvements with platting. This land contains a number of important environmentally sensitive areas, and while development is also important, those areas need to be protected during construction and beyond. As one of the largest areas left in the developed areas of Bloomington, development of the property is an important part of providing additional housing for the community in areas that are already served by existing infrastructure. The petitioner has worked with various Departments in the City to find a balance that allows the project to work while meeting City goals. Development of the parcel is an exciting prospect for the City, and the Department has worked with the petitioner to revise the PUD District Ordinance and Preliminary Plan from those that were submitted last year, in order to meet City goals related to connectivity, responsible development, housing, and environmental protection.

RECOMMENDATION: The Planning and Transportation Department recommends that the Plan Commission forwards PUD-18-23 to the Common Council with a positive recommendation and the following conditions:

1. The District Ordinance shall be amended as follows:
    a. Section 03.03.020(b)(2)(C) shall read: Buildings in the RH1 and RH2 districts cannot have a floor plate larger than 10,000 square feet. Buildings in the MN or MX Districts cannot have a floor plate larger than 20,000 square feet unless one or more incentives is utilized through 04.04.060.
    b. Section 04.04.060(c)(v) shall be added and all other numbers below will be renumbered accordingly. It will read: In the MX and MN Districts if either the affordability or sustainable development incentive is utilized for a project, the project may utilize a floor plate of 30,000 square feet.
    c. Section 04.04.060(c)(iii) shall read: UDO section 20.04.110(c)(5)()B)(iv)(2) shall provide: Tier 2 Projects: Projects that are eligible for increased primary structure height for the affordable housing and sustainable development shall be eligible for two additional floors or building height not to exceed 24 feet. The additional floors of building height granted under this subsection (iv)(2) shall step-back at least 10 feet further than the lower floors of the building. This provision (two additional floors) shall only be utilized on four blocks in the development.
    d. Section 01.01.070 shall be added. It will be titled: Subdivision Standard applicable to MN and MX. It will read: In the MN designated area, either the northern blocks or the southern blocks shall all incorporate east-west alleys. In the MX designated area, at least two of the blocks shall incorporate contiguous alleys. This regulation of the PUD is applicable no matter which subdivision type is used.
    e. Section 04.04.040(e) shall be added. It will read: A fence along the property line between the petition site and the parcels to the southwest (53-08-07-100-001.008-009 and 53-08-07-100-001.005-009) will be installed and maintained in perpetuity.

If the existing fence is on the petition site, it can meet this requirement. Said fence shall be a maximum of six feet tall in front of the front building line of the house on the 53-08-07-100-001.005-009 property.

2. The Preliminary Plan shall be amended to include the matrix shown in Image Twelve.
3. The petitioner shall be responsible for the agreed upon off-site improvements identified in the Traffic Analysis. Said improvements must be completed per a Memorandum of Understanding executed between the petitioner and City of Bloomington Administration.
4. A karst study, performed by a geologist, shall be submitted at the time of the initial primary plat for the property. Said study must be reviewed and approved by the City before primary plat approval is recommended.
5. The petitioner shall be responsible for the agreed upon improvements related to water and sewer service for this site, both on and off site, identified in discussions with City of Bloomington Utilities. Said improvements must be completed per a Memorandum of Understanding executed between the petitioner and City of Bloomington Utilities.
6. The petitioner will be responsible for incorporating the following stormwater detention requirements during development:
    a. Release rates for this project should be 0.25 cfs per acre of development for 0-10 year return interval storms and 0.45 cfs for 11-100 year return interval storms.
    b. The petitioner shall use the 24-hours NRCS Type 2 Rainfall Distribution to determine storage volume requirements.
    c. The storage volume shall be determined by calculating the volume of outflow from the site that exceeds the given allowable release rate.
    d. The petitioner submit all detention calculations to City of Bloomington Utilities Engineering for review.
7. The petitioner must incorporate more than 1 BMP as part of a treatment train during development. The site as a whole will be reviewed by City of Bloomington Utilities with the issuance of each grading permit in order to confirm that preceding and proposed measures are addressing stormwater and runoff issues created by the Development. Grading permits will not be issued until City of Bloomington Utilities confirms that satisfactory measures are and will be in place.
8. The petitioner shall continue to work with the Parks and Recreation Department and Duke Energy to fulfill the trail construction and dedication proposal through an agreement between the parties.
9. The petitioner will continue to work with the Housing and Neighborhood Development Department and the City may alter the percentage of units (15%) required in particular neighborhoods if housing is provided that meets the needs of households that make less than 90% AMI for Monroe County, as is allowed by the PUD Qualifying Standard #3.
10. The PUD allows that the eastern leg of NC-24 from the Transportation Plan will not be platted or built.

MEMORANDUM

Date: March 19, 2024

To: Bloomington Plan Commission

From: Bloomington Environmental Commission

Subject: PUD-18-23: Sudbury Development Partners, LLC. (Summit District PUD)
South Weimer Road
Request to rezone to a Planned Unit Development and a request for approval of a District Ordinance and Preliminary Plan

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The purpose of Environmental Commission's memorandums to the Plan Commission (PC) is to express the environmental concerns and recommendations of the Environmental Commission (EC) with the hope that action will be taken to safeguard and enhance the environment-enriching attributes that provide ecosystem services to all of Bloomington. The EC believes that any Planned Unit Development (PUD) District Ordinance (DO) should not reduce the environmental protection requirements to less than the minimum Unified Development Ordinance (UDO) standards and be *at least* as environmentally protective as any regular development that would be following the standard UDO regulations. The purpose of a PUD is not to avoid environmental standards.

This is a large site that will influence about 140 acres of Bloomington's ecosystem services, carbon footprint, and plant and animal biodiversity. Additionally, it is located within the 'circle' of the wildlife habitat corridor, and is rated number five of the top ten areas of Greenspace, according to the 2017 Bloomington Habitat Connectivity Plan. The size of this site alone necessitates the very best environmental protections. In addition to the large size, there are countless environmental features dotting the entire area, including mature tree stands, streams and riparian buffers, steep slopes, wetlands, sinkholes, and rich biodiversity.

The EC understands the current demand for housing, but is opposed to prioritizing that need over the need for environmental protection during this time of climate and ecological crisis. Climate change and biodiversity loss has long-term impacts on all residents and must be prioritized.

The EC has a number of recommendations pertaining to the Summit District Ordinance dated March 4, 2024 that they would like to have addressed by the Petitioner. Some issues stem from the UDO and some others from current preferred practices (CPPs) that are not covered in the UDO.

Regulatory comments:

1. FLOODPLAIN
   The Stantec Exhibit #4, Mapped Floodplain, shows the FEMA Floodway and the IDNR Best Available Flood Mapping boundary for the floodway. The floodplain boundary should be used as

the limits of disturbance because it represent the limits of the Base Flood Elevation and the 1-percent-annual-chance flood. A floodplain is the area susceptible to being inundated by floodwaters, and is comprised of the floodway and the floodway fringe. The floodway includes the channel and adjacent overbank areas necessary to effectively convey floodwaters. The floodway fringe are lands outside the floodway, at or below the Base Flood Elevation, that store but do not effectively convey floodwaters. Please redraw this to show the boundary of the floodplain as the limits of disturbance.

2. TREE & FOREST PRESERVATION
   The Stantec Exhibit #6, Canopy Estimates shows that the Tree and Forest canopy coverage is incomplete and not depicted properly. There is Tree and Forest Canopy coverage missing in the northeastern block of the site. Is this intended to be the forest cover after the base coverage is calculated and the minimum required vegetation canopy is left, or is this the base coverage? Additionally, it appears the boundary was not measured at ten feet beyond the dripline of the trees as the UDO requires. Please recalculate the Tree and Forest Canopy cover to include the ten feet beyond the drip lines and all closed canopy areas to derive the base coverage. Provide the base coverage acreage and the calculations for getting a final Tree and Forest protection acreage for the trees to be protected in easements. The EC would like to see one illustration with the original tree coverage and all the environmental features on top of each other.

3. PARK & OPEN SPACE
   The DO, page 4, (5) reads "Unless expressly stated otherwise in this PUD, to resolve any conflict that might exist, Districts designated PO shall adopt UDO provisions of the PO zoning district." That is 20.02.030 (b) PO- Parks and Open Space.

   The UDO definition for a park is: "A parcel of land available to the public for passive and/or active recreation and is maintained and governed by the Bloomington parks department." The definition for open space is: "An area of land not covered by buildings, parking structures, or accessory uses except for recreational structures. Open space may include nature areas, streams and floodplains, meadows or open fields containing baseball, football, and soccer fields, golf courses, swimming pools, bicycle paths, etc. Open space does not include street rights-of-way, platted lot area, private yards, patio areas, or land scheduled for future development."

   The UDO states that "The PO district is intended to accommodate and protect City-owned parks and open spaces and to limit structures and land uses to those compatible with the City's management plan for such," which would be the Parks and Recreation (P&R) Department's long-term plan. It allows for structures, parking lots, and impervious surfaces. The only exception the EC would agree with would be a paved trail head.

   This means the tree and forest areas, riparian buffers, floodplains, and wetlands could all be converted to amenity space for the development, and not actually preserved. These areas need to be protected within easements not as parks and open spaces, but as the environmental features that they are.

   The EC understands that the PUD PO District needs to be called a district of some kind, but the Use Table, page 23 of the DO also allows such uses as swimming pools, seasonal sales, special events, EV charging facilities, and solar and wind systems either ground or building mounted. Figure 12 on page 18 also states that the PO district is allowed 10% impervious surface coverage

and that the building setback is 15 feet, which is the same width as for residential lots. The EC believes there is no reason to have a building setback on a lot that is supposed to be preserved. The EC believes the PO District should follow all of the same UDO standards as found in the Environmental and Easement sections for preservation and conservation.

4. PRIVATELY OWNED PARKS
   In circumstances where there is a conservation easement along the back of individually-owned lots, the owners usually encroach into it. It has turned out to be a poor idea for homeowners with small lots to own a part of a conservancy easement. The EC recommends that all protected areas be placed in common areas as the UDO directs.

5. DENSITY
   The PUD DO, page 19 in Figure 12 shows that all three residential districts are allowed up to 70% impervious surface coverage, and 90% and 95% for the mixed use. The PO district is allowed 10% impervious surface despite supposedly being preserved land. The EC opposes this. Although Bloomington and the EC focus on density, the EC believes that these amounts of impervious surface coverage are too dense for good quality of life and environmental ecosystem services.

   The lot size for the R zoning district is 1000 sq. ft. (5000 sq. ft. in UDO). For the lots in RH1 & RH2 the sizes are both 2000 sq. ft. These are awfully small to get a house or other structure on and then to have any kind of greenspace, garden, or play area for single-family dwellings.

   For zone R the lot width is 15 ft. wide, (UDO allows for 50 ft.) which means it would be about 66 ft. deep. There are 5 ft. setbacks on each side, a 3 ft. setback on the back, and 5-15 ft. on the front. If the lot is 15 ft. wide minus 10 ft. side setbacks, doesn't that mean the house can only be 5 ft. wide? At 66 ft. deep minus 3 ft. in back, and 15 ft. in the front (making it 15 instead of 5 to accommodate for street trees & sidewalk), the hypothetical house could be 5 ft. by 48 ft. in size. Is this incorrect?

6. LANDSCAPE AREA
   Figure 12, page 19, shows that there are no minimum landscape size requirements for **any** of the 6 districts. Can the Petitioner please explain what this means? Additionally, with density and impervious surface coverage so high, it appears there is no way that UDO landscape rules will be able to apply.

7. ACCESSORY USES
   The EC believes that the Petitioner should add to the Use Table Figure 13, on page 23, accessory uses including chicken flocks, bee hives, noncommercial greenhouses, home occupations, and recycling drop off or self-serve facilities. Forbidding these uses is too restrictive for homeowners in today's world of sustainability.

8. SURFACE PARKING LOTS
   All surface parking lots should contain 'Green Infrastructure' to capture all surface stormwater from the lots before flowing into Clear Creek. Examples include, bioswales, permeable pavement, openings in curbs, infiltration basins, etc.

9. STEEP SLOPE CALCULATION

The steep slope areas depicted on EX-2 show that on the 12-18% slopes, the 50% of slopes that are allowed to be used was calculated incorrectly, according to the UDO. The EX-2 legend states 12-18% slope (approx. 17 acres) = 12% of **total 139-acre site**, therefore the allowable impact = 50% = 8.5 Acres. The UDO states "Any development on slopes between 12 percent and 18 percent shall be allowed a maximum disturbance of 50 percent of the **total slope area**." It does not allow for using the total acreage of the site to calculate the acreage of slopes that can be disturbed. Slope protection needs to be recalculated.

Additionally, it appears that on some of the slopes that exceed 18% (Excessive Slopes) there are plans for development instead of total protection as the UDO calls for. Please remove those areas from the development design.

10. RIPARIAN BUFFER OMISSION
    The Landscape and Open Space Plan shows that some of the riparian buffer in the southern edge of the site is not protected at all.

11. SINKHOLE PROTECTION
    In EX-8, Karst Points, some of the sinkholes have not been protected at all and show development over them. Please adjust land-disturbing activities to delineate 35 ft. (25 ft. for the Karst Conservation Easement (KCE) and 10 ft. for construction setback) out from the last closed contour of every sinkhole.

12. NEW SINKHOLE OPENING PLAN
    This entire site is riddled with evidence of karst geology. It would be very surprising if a currently-unidentified sinkhole or cave were not exposed during construction activities. This may require the consultation of a 3rd party Certified Professional Geologist (CPG). Please include in the DO the Petitioner's plan for karst protection in the event a sinkhole or cave is encountered at a later date.

    Also, will the Petitioner require sinkhole insurance for all structures?

13. SINKHOLE IDENTIFICATION
    Please show an illustration of the contours of all the sinkholes so it may be easily seen where the last closed contours are thought to be.

14. CAVE
    There is a reported cave near Arbor Ridge that is not shown. Please address this. Are you sure there are no springs?

Non-regulatory comments:

1. HOME OWNERS ASSOCIATION ALLOWANCES
   Many times a Home Owners Association (HOA) is started by the developer, then transferred to the people who have moved there after the subdivision is sufficiently populated. The EC asks that the HOA specifically allows clothes lines, chicken coops, bee hives, solar panels, gardens, tall native plants, and any other environmental accoutrements that homeowners often desire for sustainability.

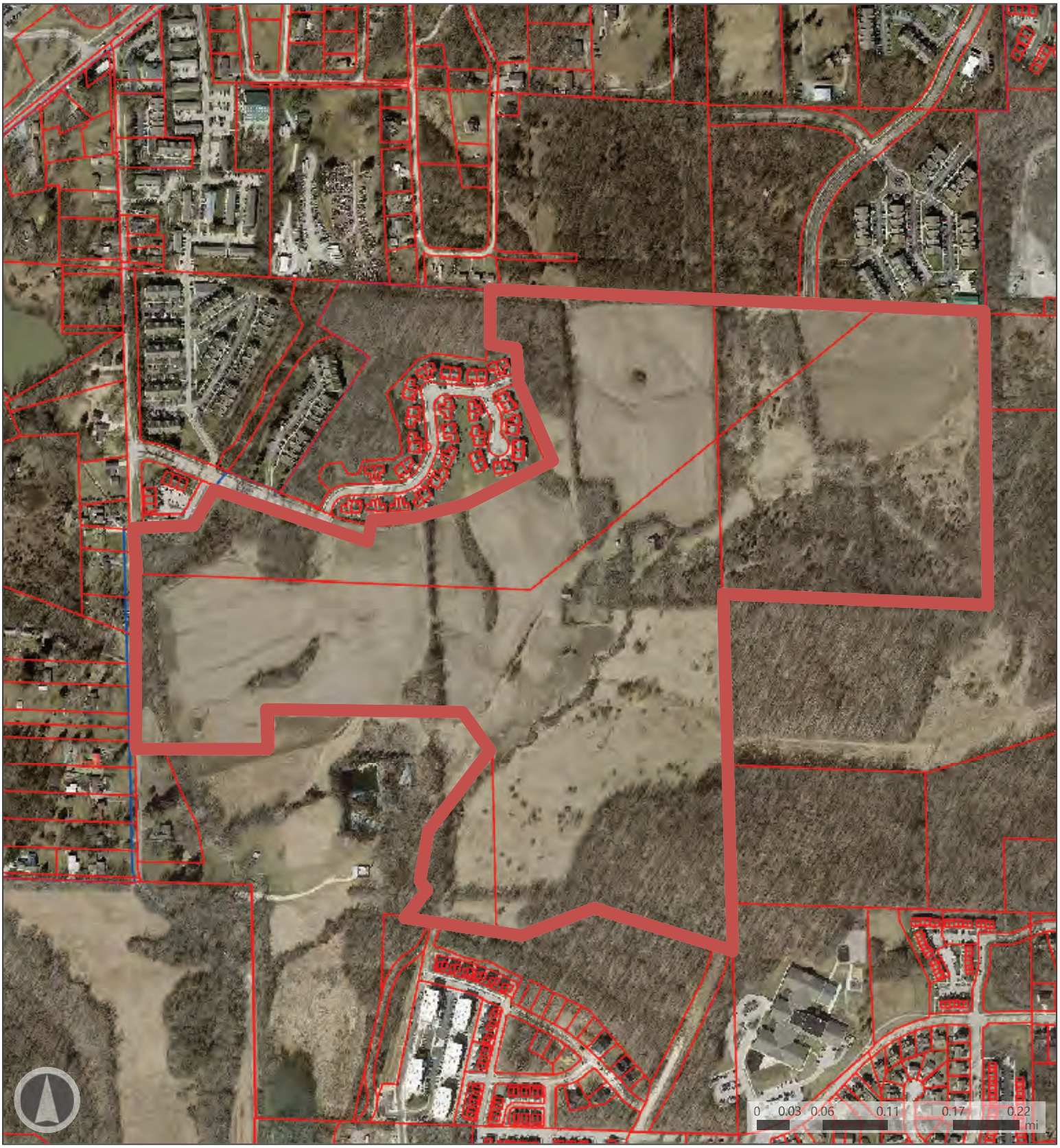
2 ELECTRIC VEHICLE PARKING CHARGING STATIONS
Even though the Petitioner proposes the same number of electric vehicle (EV) parking sites as required by the UDO, the EC believes they need more. Instead of two EV spaces per fifty regular spaces, the EC suggests four EV spaces per fifty regular spaces.

3. HEAT-PROTECTED BUS STOPS
In an effort to reduce the Urban Heat Island Effect, all bus stops should be covered and have at least one large tree planted on its south or west side to provide shade.

4. RIPARIAN BUFFER MEASUREMENT
The riparian buffers should be measured from the top-of-bank, not the centerline of the stream. The EC realizes the UDO was recently changed to now use the centerline as the way to begin delineating the first edge of a riparian buffer, but the EC believes this is contrary to industry standards and should not be used. There is one stream that bisects the property that is highly incised and if the centerline is used, it will miss much of the protection that the stream and its steep banks require. Measuring from the top of bank won't have much influence on the other creeks on this site. Please recalculate the location of the riparian buffers.

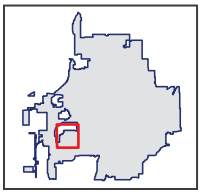
City of Bloomington

Planning and Transportation Department



Map Legend

- Parcels
- Bloomington Municipal Boundary



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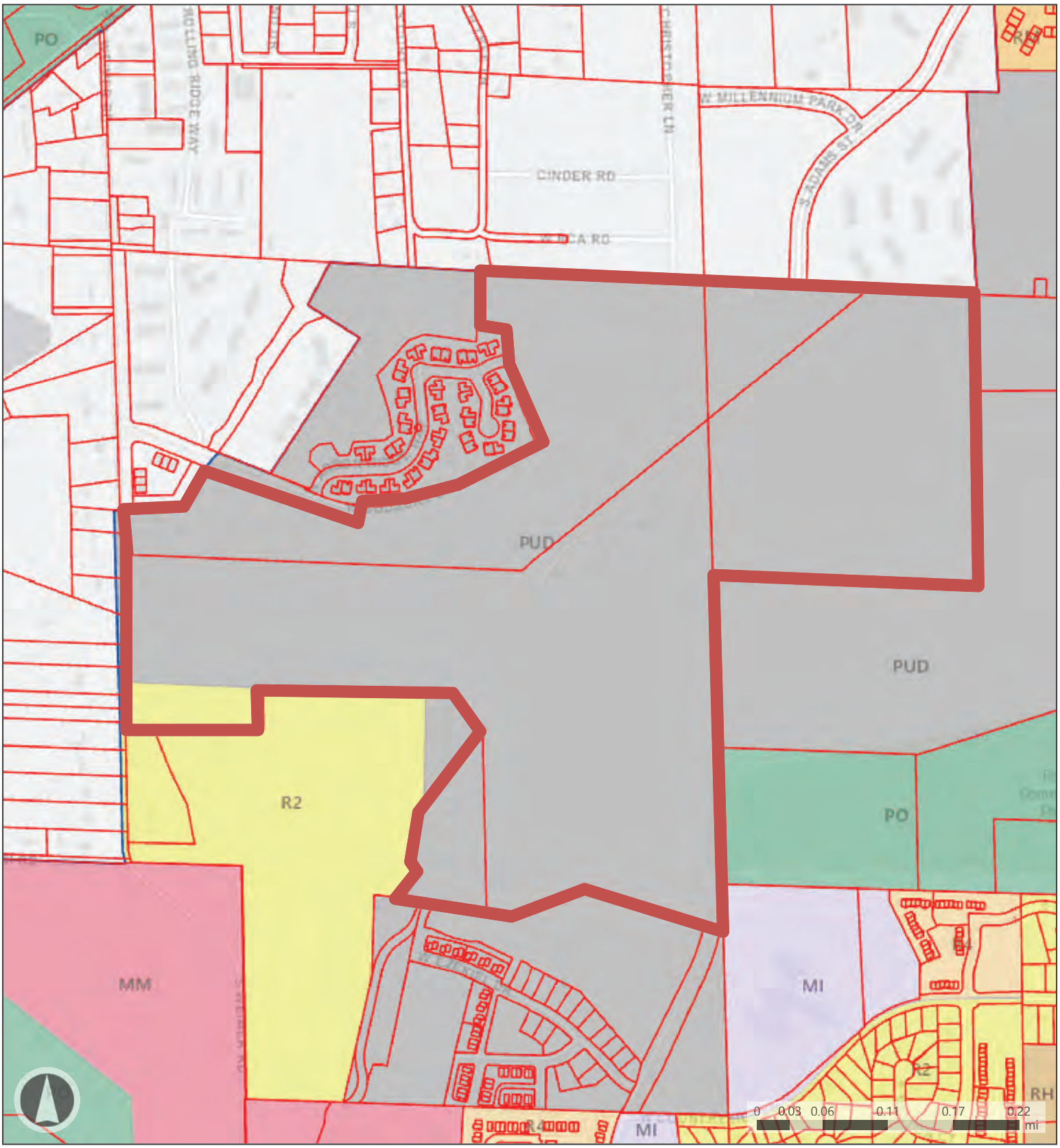
City of Bloomington

Planning and Transportation Department

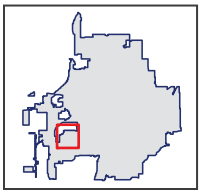


Map Legend

- Parcels
- Bloomington Municipal Boundary

Code : Description

- R2 : Residential Medium Lot
- R4 : Residential Urban
- RH : Residential High-Density Multifamily
- RM : Residential Multifamily
- MI : Mixed-Use Institutional



Created: 5/1/2023 *Map By:*

For use as map information only, information is NOT warranted.

CARMIN PARKER

116 W. 6th St., Suite 200
P.O. Box 2639
Bloomington, Indiana 47402-2639
TEL: 812.332.6556
FAX: 812.331.4511
angela@carminparker.com

November 22, 2023

SUMMIT DISTRICT PUD:
PETITIONER'S STATEMENT

A. Project: Description of Character:

Summit District PUD is a proposed multi-phased development that encompasses planning for 138.51 acres of unimproved land located in the southwest quadrant of the municipal boundaries of the City of Bloomington. The property is currently in a zoned planned unit development with a small southern portion in the R2 zoning district. The current zoning designations have not been fully implemented over the course of nearly twenty years, and upon examination, the current zoning is insufficient to achieve the overall vision and planning goals for this property. Since the initial creation of the PUD in the 1990's, there have been significant changes in the need for housing, the availability of infrastructure and the comprehensive goals of the City for residential and mixed use development. Previously anticipated infrastructure has not taken place which thwarted the potential development of this site. Instead of amending the existing PUD, the most effective approach is to wholly redesign the development plan for the undeveloped portion and propose a new PUD to meet current and future planning objectives, consistent with the City's Comprehensive Plan, Transportation Plan and related policy and vision documents.

The Summit District PUD presents new and imaginative concepts in urban design and land use development over a broad area. The PUD is crafted to promote and improve the health-safety, and general welfare of the residents of the City and to create distinct developments with unique urban design, mixed uses, enhanced ecosystems, and substantial benefit to the City that would not otherwise result from the general application of the UDO. Summit District PUD will accommodate innovative development layouts and preserve and enhance the natural, environmental, and scenic features of the site and will further address challenges presented by specific site conditions within the Summit District. A total of 53 acres of land will be preserved as parks and open spaces, which will include conservation areas, tree preservation, park space, water and drainage areas, karst features and trails – all enhancing the natural attributes.

The Summit District PUD faithfully meets all requirements of the UDO, as more fully set forth below, and provides for a longer-term development effort to create various types of residential housing, with specifically designed intensity and density of development, coupled with supportive services, commercial opportunities and a resultant series of neighborhood concepts to promote quality of life and place within the City. The PUD will provide a minimum of 15% affordable housing, promote homeownership and offer incentives to increase the percentage of needed affordable housing. The PUD reflects the vision, objectives and policies of the City's

Comprehensive Plan adopted in 2018. In particular, the Comprehensive Plan objectives aimed toward the Environment, Housing & Neighborhoods, Transportation, and Land Use are all included in the overall plan and design of Summit District.

Summit District will offer a wide variety of quality housing options, including much-needed affordable and workforce housing that will also promote homeownership. The PUD will further the City's stated policies for land use as articulated in the Comprehensive Plan, which include:

(1) Neighborhood focal points, gateways and urban centers with accessible public and private services (e.g. transit, police, fire, sewer/water, telecommunication, modern utilities)
(2) Linkages to neighborhood destinations to promote a "20 minute neighborhood metric"
(3) Respect and enhance environmental assets and natural features
(4) Promote innovative architectural design strategies
(5) Develop connectivity in neighborhoods with street, bike & pedestrian pathways
(6) Support incentive programs to increase owner-occupancy and affordability
(7) A diverse mix of housing types and densities including small-scale commercial complements

Summit District PUD is designed to create a new identity for use of this land and the natural attributes of the property. The development principles include mixed-use, green building, grid circulation, appropriate densities, housing diversity, including workforce/affordable housing and commercial/employment development within higher-density areas within the property. Access and connectivity are thoughtfully designed to create roadways, pathways and connections to the areas within the PUD as well as adjacent amenities and services. The City's Transportation Plan envisions both north-south and east-west connectivity at this location, which are included in the overall development plan of the PUD. The plan includes appropriate connectivity to adjacent off-site areas to further the City's vision within the municipal boundaries.

B. **Property and Plan**

Sudbury Development Partners, LLC acquired the 138.51-acre tract of land on February 6, 2023 with the express purpose of creating development on property that has been idle for many years in spite of prior planning efforts. A legal description of the land and survey is included here to define the area legally forming the zoning district. Mapping included in the PUD separates the nearly 140 acres into distinct areas for development. The PUD sets forth five areas of development, with sub-areas designated for refined and targeted zoning consideration. Given the massive size of the Property, the planning and development period is expected to take place over a period of at least ten (10) years. Based on the availability of existing infrastructure and connections, including utility and roadways, the development is anticipated to begin along the south and west boundaries of the property, to the north and east side of the property; then south and to the west. Each separate development project (smaller parcels with street frontage and access as planned) will necessarily result in subdivision of the Property with platting and site plans submitted by individual development parcel. The development process will be necessarily require the City's participation

through defining utility capacity and expansion opportunities, as well as developing funding sources, including tax incremental financing, to support road and related infrastructure completions through a separate understanding between the petitioner and the City.

Affordability and sustainability, along with the incentives available for each will accompany development plans submitted to achieve goals articulated in this ordinance. A minimum of 15% of the residential housing offered by this Project will fall in the affordable category and be income-limited, as provided by the UDO. Units will be designated as affordable to meet the requirement and to provide diversity in housing types and affordable units across the entire project. The entire project will achieve the minimum 15% dedication of affordable residential housing and integrated over the entire Property by development area and sub-area, as further described in the PUD. This integration of this housing requirement across the entire scope of the development will ensure that there is no single concentration of affordable housing in a defined area, but that it is appropriately disbursed throughout the Property. The calculation for each development project will be carried forward from area-to-area such that the aggregate housing dedicated to affordability will total a minimum of 15%, thereby meeting and likely exceeding the PUD requirement for affordability. Some incentives will require an increase of affordability to a minimum of 20%.

Each separate development area within the PUD will necessarily result in further subdivision of the property, with platting and site plans submitted by individual development parcels moving forward. As parcels are planned for development, other participants will accept ownership of tracts through a subdivision process to develop to specific uses and purposes as defined by the PUD.

C. **Qualifying Standards (UDO: Section 20.02.040)**

(1) The PUD zoning district is 138.51 acres, well more than the 5-acre minimum requirement.

(2) The PUD zoning district is not within the Mixed-Use Downtown (MD) zoning district, prohibited by the UDO.

(3) A minimum of 15% of the proposed dwelling units will be permanently income-limited through deed restriction to households earning less than 120 percent of the HUD AMI for Monroe County, Indiana and the development will be subject to the applicable standards of Subsection 04.04.110(c) Affordable Housing.

(4) Summit District PUD would not be feasible through the conventional zoning regulations and standards found in the UDO and is best served by a planned unit development ordinance. Given the massive scale development of the singularly owned and un-subdivided parcel, a broader planning approach is critical to the orderly development of the land and implementation of the overall vision for housing and complementary services and commercial activity. The PUD is optimal to meet the objectives of the Comprehensive Plan and Transportation Plan adopted by the City.

(5) Summit District land is singularly owned by Sudbury Development Partners, LLC under Deed Record, Instrument No 2023001200, recorded with the Recorder of Monroe County, Indiana on the 6th day of February 2023.

(6) Summit District is protective of highly-valued design features that include specific

natural, environmental and scenic resources and green spaces as well as retaining natural landforms throughout the development, including:

a. Protecting the natural features through inventive design that consider the natural characteristics of the site:
b. Retaining the natural landforms to the extent possible while designing residential densities to meet the needs of the community;
c. Designing low impact design in areas of sensitivity and more intense development where appropriate; and
d. Utilizing green incentive and passive energy design strategies, where feasible.

(7) Summit District is designed in a manner that no block perimeter will exceed 1400 feet, it will retain and introduce greenspace, trails, pedestrian and bike paths as well as open spaces, incorporating the following factors:

a. Connectivity to promote pedestrian, public transportation and the "20-minute neighborhood" concept;
b. Design of Summit Center to adequately support the neighborhood and larger community;
c. Connectivity to the existing and planned infrastructure as prescribed in the Comprehensive and Transportation Plans adopted by the City; and
d. Designs that promote and support the use of renewable energy.

Respectfully submitted,

Sudbury Development Partners, LLC

By Angela F. Parker, Counsel

Attachments:
Deed
Survey

445551/25528-1

DULY ENTERED
FOR TAXATION
FEB 06, 2023
Auditor Monroe County, Indiana

2023001200 SPEC WAR $25.00
2/6/2023 11:20:11 AM 6 PGS
Amy Swain
Monroe County Recorder IN
Recorded as Presented

SPECIAL WARRANTY DEED

THIS INDENTURE WITNESSETH, that **J & E DEVELOPMENT, LLC**, an Indiana limited liability company (hereinafter "Grantor"), CONVEYS AND WARRANTS to **SUDBURY DEVELOPMENT PARTNERS, LLC**, an Indiana limited liability company (hereinafter "Grantee"), for the sum of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the following described real estate in Monroe County, Indiana (hereinafter the "Real Estate"):

SEE EXHIBIT "A" Attached Hereto and Incorporated Herein by Reference.

This conveyance is subject to (i) all current, non-delinquent real estate taxes and assessments; and (ii) any and all easements, agreements, restrictions, and other matters of record.

Grantor, as its sole warranty herein, warrants to Grantee, and the successors and assigns of Grantee, that it will forever defend title to the Real Estate (subject to the matters set forth above to which this conveyance is made subject) against those claims, and only those claims, of all persons or entities who shall claim title to, or assert claims affecting the title to, the Real Estate, or any part thereof, under, by, or through, or based upon the acts of, Grantor, but not otherwise.

Grantor is a limited liability company duly organized under the laws of the State of Indiana, and the person executing this deed on behalf of Grantor is an authorized Officer of Grantor. Grantor has full capacity to convey the Real Estate and all necessary corporate action for the making of such conveyance has been taken and done.

[Signature Page Follows]

IN WITNESS WHEREOF, Grantor has executed this Special Warranty Deed this 31st day of January, 2023.

J & E Development, LLC
an Indiana limited liability company

By: Joseph P. Kemp Manager
Name: Joseph P. Kemp
Title: Manager

STATE OF INDIANA)
) SS:
COUNTY OF MONROE)

Before me a Notary Public in and for said County and State, personally appeared Joseph P. Kemp, as Manager of J & E Development, LLC, and acknowledged the execution of the foregoing Special Warranty Deed for an on behalf of said entity.

WITNESS my hand and Notarial Seal this 31 day of January, 2023

My Commission Expires:
5/18/27

Residing in Monroe
County, Indiana

Nina K. Walls
Notary Public

Nina K. Walls
Printed Name

NINA K. WALLS
MY COMMISSION EXPIRES
MAY 18, 2027
NOTARY SEAL
COMMISSION NUMBER
KP0026543
MONROE COUNTY
NOTARY PUBLIC STATE OF INDIANA

Return recorded deed and send tax statements to Grantee's mailing address at: 3225 S. Hoyt Ave., Muncie, IN 47302

This instrument was prepared by Ted W. Nolting, Kroger Gardis & Regas, LLP, 111 Monument Circle, Suite 900, Indianapolis, IN 46204-5125.

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law. Ted W. Nolting

EXHIBIT A

The Land is described as follows:

TRACT 1:

A part of the East half of Section 7, Township 8 North, Range 1 West, Monroe County, Indiana, more particularly described as follows:

Commencing at a 5/8 inch rebar at the Southwest corner of the Northeast quarter of said Section 7; thence North 01 degree 37 minutes 11 seconds West along the west line of said quarter a distance of 610.00 feet to a 5/8 inch rebar with yellow plastic cap stamped "BRG, INC 6892", hereinafter referred to as a rebar with BRG cap, at the Point of Beginning; thence North 01 degree 37 minutes 11 seconds West along said west line a distance of 753.08 feet to a mag nail at the Southwest corner of the North half of said quarter; thence South 88 degrees 01 minute 59 seconds East along the north line of said north half a distance of 1796.39 feet; thence North 50 degrees 34 minutes 15 seconds East 1061.42 feet to the east line of the Northeast quarter of said Section 7; thence South 02 degrees 31 minutes 28 seconds East along said east line a distance of 704.03 feet to a drill hole in the top of a 8" x 8" stone at the Southeast corner of the Northeast quarter of said Northeast quarter; thence South 01 degree 41 minutes 33 seconds East along the east line of said Northeast quarter a distance of 710.38 feet to a 5/8 inch rebar at the northwest corner of Lot 4 in Thompson Community Park, of record in Plat Cabinet C, Envelope 69 in the office of the Recorder of Monroe County, Indiana; thence South 01 degree 43 minutes 04 seconds East along the east line of said quarter and the west line of said Thompson Community Park a distance of 609.81 feet to a drill hole in the top of an 8" x 8" stone at the Southeast corner of said Northeast quarter; thence South 01 degree 35 minutes 11 seconds West along the west right-of-way of Adams Street Extension as dedicated by the plat of Woolery Planned Community Phase VIII, of record in Plat Cabinet C, Envelope 379 in the office of the Recorder of Monroe County, Indiana, a distance of 80.28 feet to a rebar with BRG cap at the beginning of a curve concave westerly having a radius of 785.00 feet and a chord which bears South 05 degrees 57 minutes 18 seconds West 119 96 feet; thence Southerly along said curve an arc length of 120.08 feet to a rebar with BRG cap on the north line of the property conveyed to Philip and Barbara Tapp by Instrument Number 2011001304 in the office of the Recorder of Monroe County, Indiana; thence along the north line of Tapp the next four (4) courses:

1. North 79 degrees 38 minutes 29 seconds West 70.68 feet to a 5/8 inch rebar with Tapp cap; thence

2. North 75 degrees 49 minutes 21 seconds West 531.71 feet to a 5/8 inch rebar with Tapp cap; thence

3. South 70 degrees 59 minutes 29 seconds West 349.09 feet to a 5/8 inch rebar with Tapp cap; thence

4. North 82 degrees 58 minutes 17 seconds West 114.38 feet to a rebar with BRG cap; thence

North 01 degree 37 minutes 11 seconds West 785.38 feet to a rebar with BRG cap; thence North 36 degrees 20 minutes 08 seconds West 209.87 feet to a rebar with BRG cap; thence North 88 degrees 10 minutes 15 seconds West 850.00 feet to a rebar with BRG cap; thence South 01 degree 37 minutes 11 seconds East 178.71 feet to a rebar with BRG cap; thence North 88 degrees 57 minutes 44 seconds West 629.92 feet to the Point of Beginning, containing 65.63 acres, more or less.

TRACT 2:

A part of the North half of the Northeast quarter of Section 7, Township 8 North, Range 1 West, Monroe County, Indiana, more particularly described as follows:

Commencing at a 5/8 inch rebar at the Southwest corner of said Northeast quarter; thence North 01 degree 37 minutes 11 seconds West along the west line of said quarter a distance of 610.00 feet to a 5/8 inch rebar with yellow plastic cap stamped "BRG, INC 6892", hereinafter referred to as a rebar with BRG cap; thence continuing along said west line North 01 degree 37 minutes 11 seconds West 753.08 feet to a mag nail at the Southwest corner of the North half of said Northeast quarter and the Point of Beginning; thence continuing along said west line North 01 degree 37 minutes 11 seconds West 194.56 feet to a mag nail; thence North 88 degrees 34 minutes

EXHIBIT A
(Continued)

57 seconds East along the south line of Lot 3 in Sudbury Farm, Phase 1, of record in Plat Cabinet C, Envelope 272 in the office of the Recorder of Monroe County, Indiana, a distance of 258.71 feet to a mag nail at the Southeast corner of said Lot 3; thence North 28 degrees 40 minutes 00 seconds East along the east line of said Lot 3 a distance of 245.45 feet to a rebar with BRG cap at the northeast corner of said Lot 3; thence South 67 degrees 55 minutes 45 seconds East along the south line of Sudbury Drive, as dedicated by the plat of said Sudbury Farm, a distance of 529.86 feet to a rebar at the beginning of a curve concave Northerly having a radius of 680.00 feet and a chord which bears South 74 degrees 47 minutes 28 seconds East 161.56 feet; thence Easterly along said curve an arc length of 161.94 feet to a rebar at the southeast corner of said platted Sudbury Drive; thence North 08 degrees 27 minutes 32 seconds East 80.09 feet to a rebar on the south line of the Arbor Ridge at Sudbury Farm, a Replat of Lot 7 in Sudbury Farm, Phase 1, of record in Plat Cabinet C Envelope 272 in the office of the Recorder of Monroe County, Indiana and the beginning of a non-tangent curve concave Northerly having a radius of 600.00 feet and a chord which bears North 82 degrees 19 minutes 57 seconds East 330.58 feet; thence along the south and east lines of said Arbor Ridge the next seven (7) courses:

1. Easterly along said curve an arc length of 334.91 feet to a rebar with BT cap; thence

2. North 66 degrees 18 minutes 33 seconds East 517.50 feet to a rebar with BT cap at the beginning of a curve concave Westerly having a radius of 25.00 feet and a chord which bears North 21 degrees 12 minutes 02 seconds East 35.42 feet; thence

3. Northerly along said curve an arc length of 39.36 feet to a rebar with BT cap; thence

4. North 23 degrees 32 minutes 04 seconds West 160.11 feet to a rebar with BT cap at the beginning of a curve concave easterly having a radius of 1030.00 feet and a chord which bears North 13 degrees 52 minutes 16 seconds West 354.74 feet; thence

5. Northerly along said curve an arc length of 356.52 feet to a rebar with BT cap; thence

6. North 85 degrees 42 minutes 27 seconds West 130.48 feet to a rebar with BT cap; thence

7. North 01 degree 30 minutes 36 seconds East, passing a rebar at 236.74 feet, a total distance of 246.82 feet to a rebar with BRG cap on the north line of said Northeast quarter; thence

South 87 degrees 18 minutes 14 seconds East along said north line a distance of 1017.37 feet to a 4" x 4" cut limestone at the Northeast corner of said quarter; thence South 02 degrees 31 minutes 28 seconds East along the east line of said quarter a distance of 627.00 feet; thence South 50 degrees 34 minutes 15 seconds West 1061.42 feet to the south line of the North half of said Northeast quarter; thence North 88 degrees 01 minute 59 seconds West 1796.39 feet to the Point of Beginning, containing 33.52 acres, more or less.

TRACT 3:

A part of the Northwest quarter of the Northwest quarter of Section 8, Township 8 North, Range 1 West, Monroe County, Indiana, more particularly described as follows:

Beginning at a 4" x 4" cut limestone at the Northwest corner of said quarter quarter; thence South 84 degrees 51 minutes 05 seconds East along the north line of said quarter a distance of 20.38 feet to a rebar with BFA cap at the Southwest corner of Seminary Lot 178; thence continuing along the north line of said quarter quarter South 88 degrees 14 minutes 26 seconds East a distance of 739.62 feet; thence South 50 degrees 34 minutes 15 seconds West 947.62 feet to the west line of said quarter quarter; thence North 02 degrees 31 minutes 28 seconds West along said west line a distance of 627.00 feet to the Point of Beginning, containing 5.44 acres, more or less.

TRACT 4:

A part of the Northwest quarter of the Northwest quarter of Section 8, Township 8 North Range 1 West, Monroe County, Indiana, more particularly described as follows:

Beginning at a drill hole in the top of an 8" x 8" stone at the Southwest corner of said quarter quarter; thence North

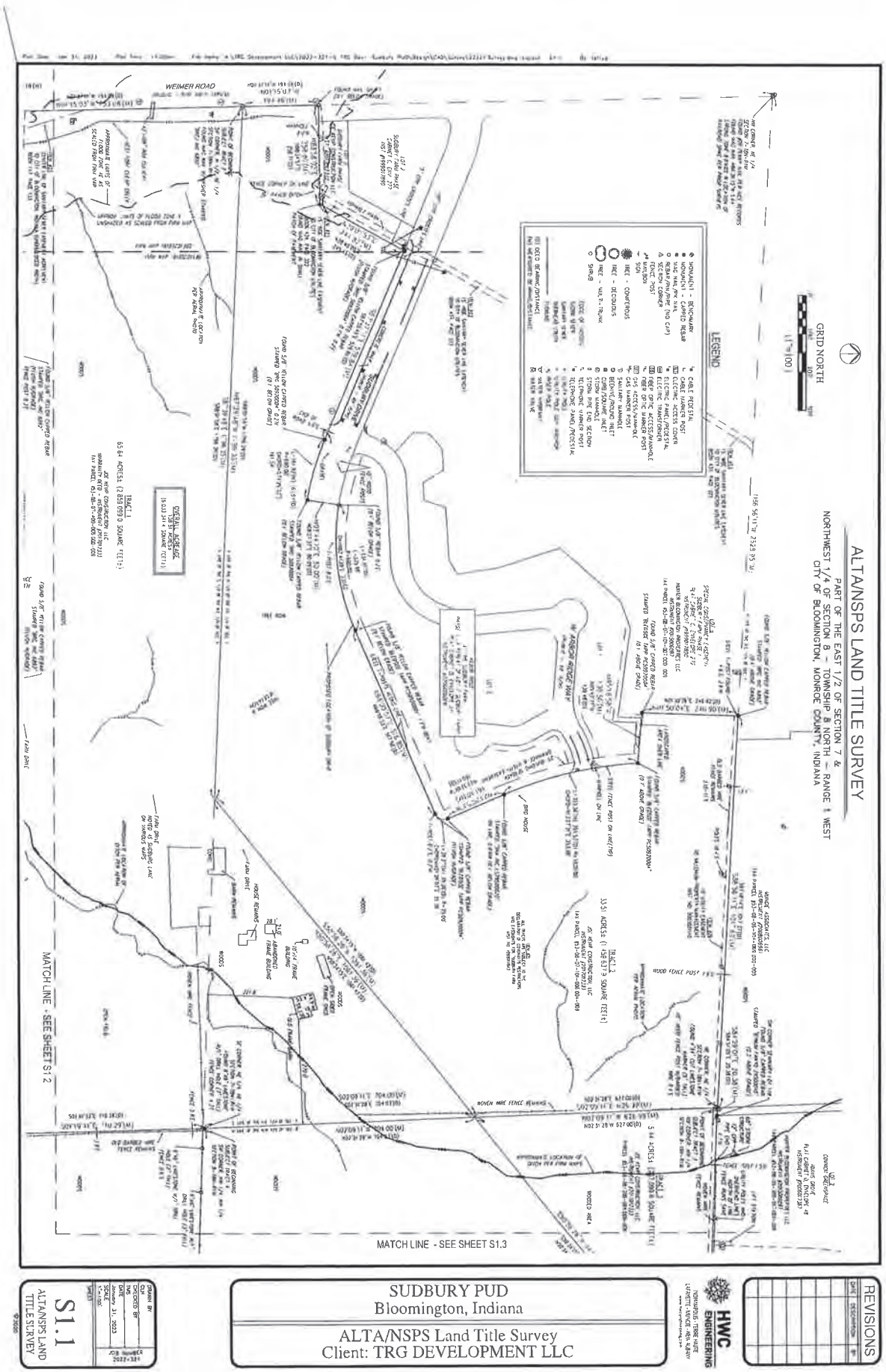
EXHIBIT A
(Continued)

02 degrees 31 minutes 28 seconds West along the west line of said quarter quarter a distance of 704.03 feet; thence North 50 degrees 34 minutes 15 seconds East 947.62 feet to the north line of said quarter quarter; thence South 88 degrees 14 minutes 26 seconds East along said north line a distance of 395.00 feet; thence South 02 degrees 31 minutes 28 seconds East, parallel with the west line of said quarter quarter, a distance of 1325.21 feet to the south line of said quarter quarter; thence North 88 degrees 28 minutes 09 seconds West along said south line a distance of1154.54 feet to the Point of Beginning, containing 29.65 acres, more or less.

TRACT 5:

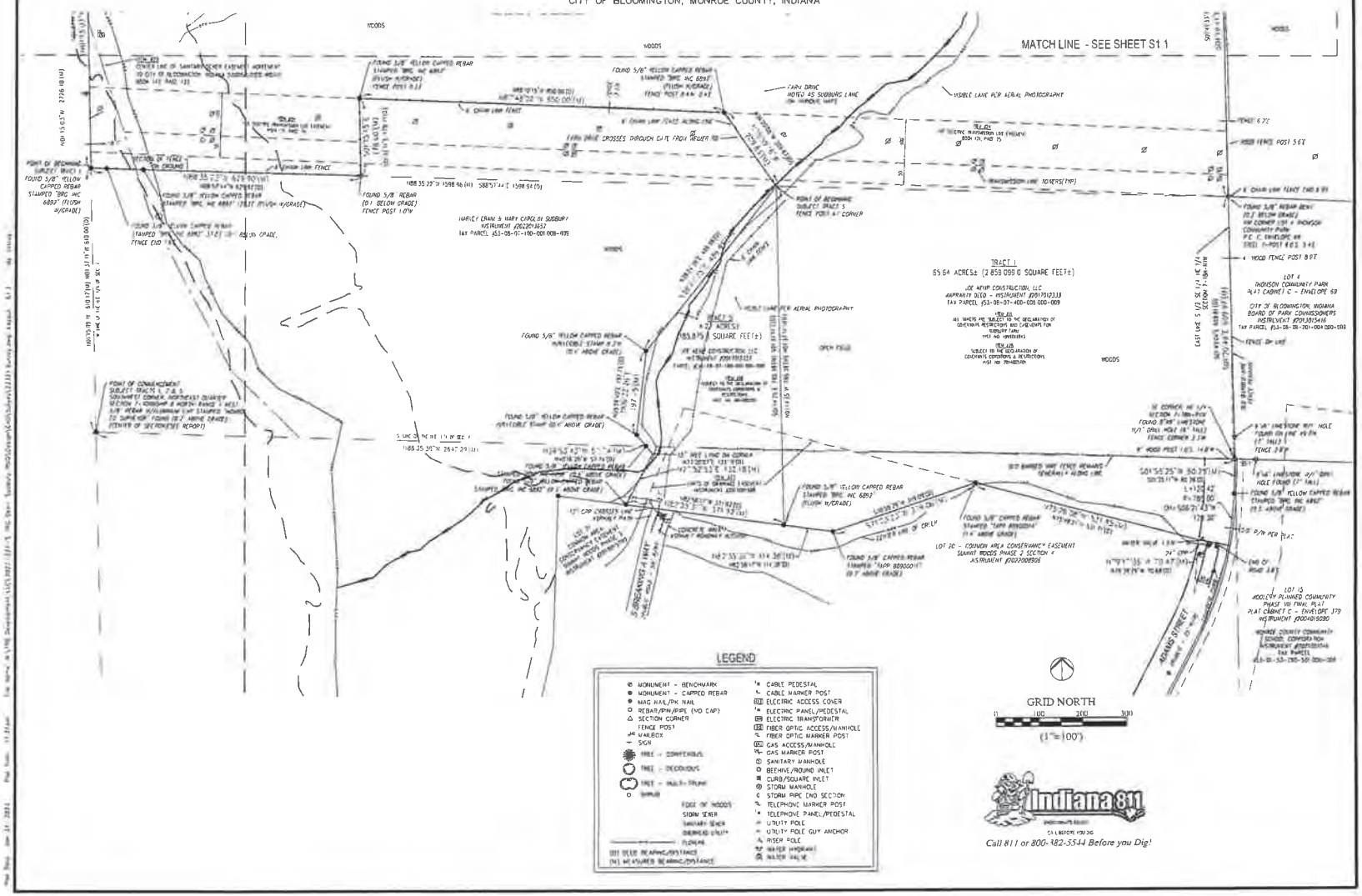
A part of the East half of Section 7, Township 8 North, Range 1 West, Monroe County, Indiana, more particularly described as follows:

Commencing at a 5/8 inch rebar at the Southwest corner of the Northeast quarter of said Section 7; thence North 01 degree 37 minutes 11 seconds West along the west line of said quarter a distance of 610.00 feet to a rebar with yellow plastic cap stamped 'BRG INC 6892", hereinafter referred to as a rebar with BRG cap; thence South 88 degrees 57 minutes 44 seconds East 1598.94 feet to a rebar with BRG cap at the Point of Beginning; thence South 01 degree 37 minutes 11 seconds East 785.38 feet to a rebar with BRG cap on the north line of the property conveyed to Philip and Barbara Tapp by Instrument Number 2011001304 in the office of the Recorder of Monroe County, Indiana; thence North 82 degrees 58 minutes 17 seconds West along said north line a distance of 371.92 feet to a rebar with BRG cap; thence North 27 degrees 30 minutes 07 seconds East 132.19 feet to a rebar with BRG cap; thence North 40 degrees 16 minutes 29 seconds West 57.74 feet to a rebar with BRG cap; thence North 05 degrees 59 minutes 40 seconds East 197.75 feet to a rebar with BRG cap; thence North 38 degrees 24 minutes 39 seconds East 486.98 feet to the Point of Beginning, containing 4.27 acres, more or less.


ALTA/NSPS LAND TITLE SURVEY
PART OF THE EAST 1/2 OF SECTION 7 & NORTHWEST 1/4 OF SECTION 8 – TOWNSHIP 8 NORTH – RANGE 1 WEST
CITY OF BLOOMINGTON, MONROE COUNTY, INDIANA
GRID NORTH
1" = 100'
LEGEND
WEIMER ROAD
MATCH LINE - SEE SHEET S1.2
MATCH LINE - SEE SHEET S1.3
TRACT 1
65.64 ACRES (2,859,059 SQUARE FEET)
TRACT 2
55.15 ACRES (2,402,579 SQUARE FEET)
OVERALL ACREAGE
120.79 ACRES
(5,261,344 SQUARE FEET)
SUDBURY PUD
Bloomington, Indiana
ALTA/NSPS Land Title Survey
Client: TRG DEVELOPMENT LLC
REVISIONS
HWC ENGINEERING
S1.1
ALTA/NSPS LAND TITLE SURVEY
DRAWN BY
CHECKED BY
DATE
January 31, 2023
SCALE
1" = 100'
JOB NUMBER
2022-329
SHEET

ALTA/NSPS LAND TITLE SURVEY

PART OF THE EAST 1/2 OF SECTION 7 &
NORTHWEST 1/4 OF SECTION 8 – TOWNSHIP 8 NORTH – RANGE 1 WEST
CITY OF BLOOMINGTON, MONROE COUNTY, INDIANA



REVISIONS

DATE	DESCRIPTION	BY

HWC ENGINEERING

SUDBURY PUD
Bloomington, Indiana
ALTA/NSPS Land Title Survey
Client: TRG DEVELOPMENT LLC

DRAWN BY: DLW
CHECKED BY: TWS
DATE: January 31, 2023
SCALE: 1"=100'
JOB NUMBER: 2022-231

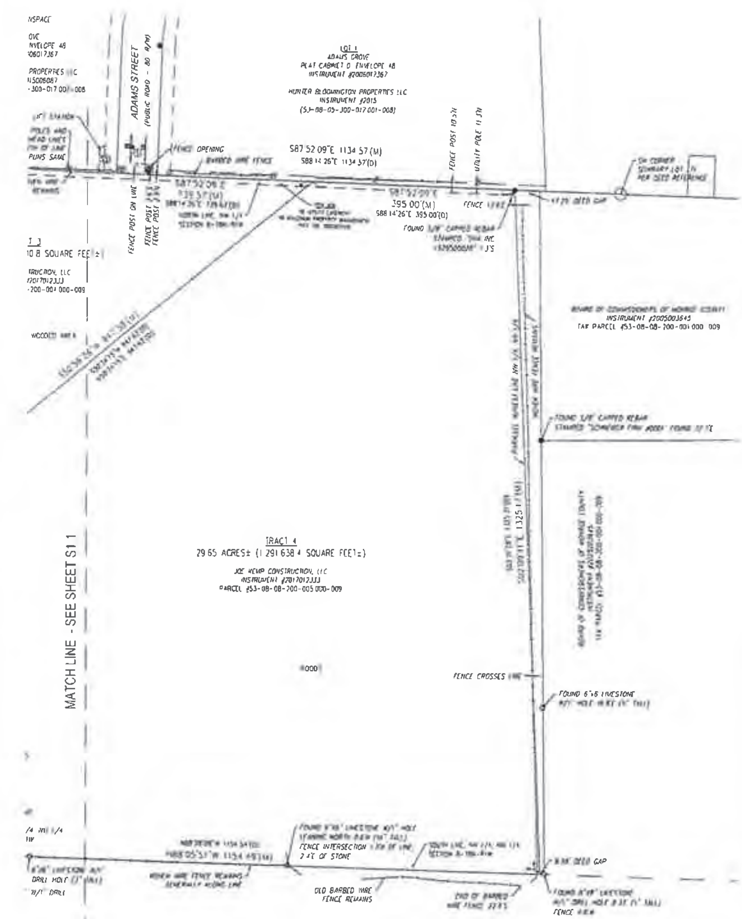
SHEET
S1.2
ALTA/NSPS LAND TITLE SURVEY

ALTA/NSPS LAND TITLE SURVEY

PART OF THE EAST 1/2 OF SECTION 7 &
NORTHWEST 1/4 OF SECTION 8 – TOWNSHIP 8 NORTH – RANGE 1 WEST
CITY OF BLOOMINGTON MONROE COUNTY INDIANA

GRID NORTH

(1"=100')



LAND DESCRIPTIONS

Warranty Deed – Joe Kemp Construction LLC
Instrument No 2017012333 Dated 08/31/2017
Monroe County, Indiana Recorder

(The land described below is one and the same as that described in Monroe County Land Title Co Inc dba TitlePlus as issuing agent for Chicago Title Insurance Company, Commitment No 51855 dated January 10, 2023)

TRACT 1:
A part of the East half of Section 7 Township 8 North Range 1 West Monroe County, Indiana, more particularly described as follows

Commencing at a 5/8 inch rebar at the Southwest corner of the Northeast quarter of said Section 7 thence NORTH 01 degree 37 minutes 11 seconds WEST along the west line of said quarter a distance of 610.00 feet to a 5/8 inch rebar with yellow plastic cap stamped "BRG, INC 6892" hereinafter referred to as a rebar with BRG cap at the POINT OF BEGINNING, thence NORTH 01 degree 37 minutes 11 seconds WEST along said west line a distance of 753.08 feet to a mag nail at the Southwest corner of the North half of said quarter thence SOUTH 88 degrees 01 minute 59 seconds EAST along the north line of said north half a distance of 1796.39 feet thence NORTH 50 degrees 34 minutes 15 seconds EAST 1061.42 feet to the east line of the Northeast quarter of said Section 7 thence SOUTH 02 degrees 31 minutes 28 seconds EAST along said east line a distance of 704.03 feet to a drill hole in the top of a 8"x8" stone at the Southeast corner of the Northeast quarter of said Northeast quarter thence SOUTH 01 degree 41 minutes 33 seconds EAST along the east line of said Northeast quarter a distance of 710.38 feet to a 5/8 inch rebar at the northwest corner of Lot 4 in Thompson Community Park of record in Plat Cabinet C Envelope 69 in the office of the Recorder of Monroe County, Indiana thence SOUTH 01 degree 43 minutes 04 seconds EAST along the east line of said quarter and the west line of said Thompson Community Park a distance of 609.81 feet to a drill hole in the top of an 8"x8" stone at the Southeast corner of said Northeast quarter thence SOUTH 01 degree 35 minutes 11 seconds WEST along the west right-of-way of Adams Street Extension as dedicated by the plat of Woolery Planned Community Phase VIII of record in Plat Cabinet C, Envelope 379 in the office of the Recorder of Monroe County, Indiana a distance of 80.28 feet to a rebar with BRG cap at the beginning of a curve concave westerly having a radius of 785.00 feet and a chord which bears SOUTH 05 degrees 57 minutes 18 seconds WEST 119.96 feet thence SOUTHERLY along said curve an arc length of 120.08 feet to a rebar with BRG cap on the north line of the property conveyed to Philip and Barbara Topp by Instrument Number 2011001304 in the office of the Recorder of Monroe County, Indiana; thence along the north line of Topp the next four (4) courses

1. NORTH 79 degrees 38 minutes 29 seconds WEST 70.68 feet to a 5/8 inch rebar with Topp cap thence
2. NORTH 75 degrees 49 minutes 21 seconds WEST 531.71 feet to a 5/8 inch rebar with Topp cap thence
3. SOUTH 70 degrees 59 minutes 29 seconds WEST 349.09 feet to a 5/8 inch rebar with Topp cap thence
4. NORTH 82 degrees 58 minutes 17 seconds WEST 114.38 feet to a rebar with BRG cap thence

NORTH 01 degree 37 minutes 11 seconds WEST 785.38 feet to a rebar with BRG cap, thence NORTH 36 degrees 20 minutes 08 seconds WEST 209.87 feet to a rebar with BRG cap thence NORTH 88 degrees 10 minutes 15 seconds WEST 850.00 feet to a rebar with BRG cap thence SOUTH 01 degree 37 minutes 11 seconds EAST 178.71 feet to a rebar with BRG cap, thence NORTH 88 degrees 57 minutes 44 seconds WEST 629.92 feet to the POINT OF BEGINNING, containing 65.63 acres more or less

TRACT 2:
A part of the North half of the Northeast quarter of Section 7 Township 8 North Range 1 West Monroe County, Indiana more particularly described as follows

Commencing at a 5/8 inch rebar at the Southwest corner of said Northeast quarter thence NORTH 01 degree 37 minutes 11 seconds WEST along the west line of said quarter a distance of 610.00 feet to a 5/8 inch rebar with yellow plastic cap stamped "BRG INC 6892" hereinafter referred to as a rebar with BRG cap; thence continuing along said west line NORTH 01 degree 37 minutes 11 seconds WEST 753.08 feet to a mag nail at the Southwest corner of the North half of said Northeast quarter and the POINT OF BEGINNING thence continuing along said west line NORTH 01 degree 37 minutes 11 seconds WEST 194.56 feet to a mag nail, thence NORTH 88 degrees 34 minutes 57 seconds EAST along the south line of Lot 3 in Sudbury Farm Phase 1 of record in Plat Cabinet C Envelope 272 in the office of the Recorder of Monroe County, Indiana, a distance of 258.71 feet to a mag nail at the Southeast corner of said Lot 3, thence NORTH 28 degrees 40 minutes 00 seconds EAST along the east line of said Lot 3 a distance of 245.45 feet to a rebar with BRG cap at the northeast corner of said Lot 3 thence SOUTH 67 degrees 55 minutes 45 seconds EAST along the south line of Sudbury Drive, as dedicated by the plat of said Sudbury Farm, a distance of 529.86 feet to a rebar at the beginning of a curve concave Northerly having a radius of 680.00 feet and a chord which bears SOUTH 74 degrees 47 minutes 28 seconds EAST 161.56 feet, thence EASTERLY along said curve an arc length of 161.94 feet to a rebar at the southeast corner of said platted Sudbury Drive; thence NORTH 08 degrees 27 minutes 32 seconds EAST 80.09 feet to a rebar on the south line of the Arbor Ridge at Sudbury Farm a Replat of Lot 7 in Sudbury Farm Phase 1 of record in Plat Cabinet C Envelope 272 in the office of the Recorder of Monroe County, Indiana and the beginning of a non-tangent curve concave Northerly having a radius of 600.00 feet and a chord which bears NORTH 87 degrees 19 minutes 57 seconds EAST 330.58 feet; thence along the south and east lines of said Arbor Ridge the next seven (7) courses

1. EASTERLY along said curve an arc length of 334.91 feet to a rebar with BT cap, thence
2. NORTH 66 degrees 18 minutes 33 seconds EAST 517.50 feet to a rebar with BT cap at the beginning of a curve concave Westerly having a radius of 25.00 feet and a chord which bears NORTH 21 degrees 12 minutes 02 seconds EAST 35.42 feet thence
3. NORTHERLY along said curve an arc length of 39.36 feet to a rebar with BT cap thence
4. NORTH 23 degrees 37 minutes 04 seconds WEST 160.11 feet to a rebar with BT cap at the beginning of a curve concave easterly having a radius of 1030.00 feet and a chord which bears NORTH 13 degrees 52 minutes 16 seconds WEST 354.74 feet; thence
5. NORTHERLY along said curve an arc length of 356.52 feet to a rebar with BT cap thence
6. NORTH 85 degrees 47 minutes 27 seconds WEST 130.48 feet to a rebar with BT cap thence
7. NORTH 01 degree 30 minutes 36 seconds EAST passing a rebar at 236.74 feet a total distance of 246.82 feet to a rebar with BRG cap on the north line of said Northeast quarter thence

SOUTH 87 degrees 18 minutes 14 seconds EAST along said north line a distance of 1017.37 feet to a 4" x 4" cut limestone at the Northeast corner of said quarter thence SOUTH 02 degrees 31 minutes 28 seconds EAST along the east line of said quarter a distance of 627.00 feet thence SOUTH 50 degrees 34 minutes 15 seconds WEST 1061.42 feet to the south line of the North half of said Northeast quarter, thence NORTH 88 degrees 01 minute 59 seconds WEST 1796.39 feet to the POINT OF BEGINNING containing 33.57 acres more or less

TRACT 3:
A part of the Northwest quarter of the Northwest quarter of Section 8 Township 8 North Range 1 West Monroe County, Indiana more particularly described as follows

BEGINNING at a 4"x4" cut limestone at the Northwest corner of said quarter quarter thence SOUTH 84 degrees 51 minutes 05 seconds EAST along the north line of said quarter a distance of 20.38 feet to a rebar with BFA cap at the Southwest corner of Seminary Lot 178 thence continuing along the north line of said quarter quarter SOUTH 88 degrees 14 minutes 26 seconds EAST a distance of 739.62 feet thence SOUTH 50 degrees 34 minutes 15 seconds WEST 947.62 feet to the west line of said quarter quarter; thence NORTH 02 degrees 31 minutes 28 seconds WEST along said west line a distance of 627.00 feet to the POINT OF BEGINNING containing 5.44 acres, more or less

TRACT 4:
A part of the Northwest quarter of the Northwest quarter of Section 8 Township 8 North Range 1 West Monroe County, Indiana more particularly described as follows:

BEGINNING at a drill hole in the top of an 8"x8" stone at the Southwest corner of said quarter quarter thence NORTH 02 degrees 31 minutes 28 seconds WEST along the west line of said quarter quarter a distance of 704.03 feet, thence NORTH 50 degrees 34 minutes 15 seconds EAST 947.62 feet to the north line of said quarter quarter thence SOUTH 88 degrees 14 minutes 26 seconds EAST along said north line a distance of 395.00 feet thence SOUTH 02 degrees 31 minutes 28 seconds EAST, parallel with the west line of said quarter quarter a distance of 1325.21 feet to the south line of said quarter quarter thence NORTH 88 degrees 28 minutes 09 seconds WEST along said south line a distance of 1154.54 feet to the POINT OF BEGINNING, containing 29.65 acres more or less

TRACT 5:
A part of the East half of Section 7 Township 8 North Range 1 West Monroe County, Indiana more particularly described as follows

Commencing at a 5/8 inch rebar at the Southwest corner of the Northeast quarter of said Section 7, thence NORTH 01 degree 37 minutes 11 seconds WEST along the west line of said quarter a distance of 610.00 feet to a rebar with yellow plastic cap stamped BRG INC [illegible], hereinafter referred to as a rebar with BRG cap; thence SOUTH 88 degrees 57 minutes 44 seconds EAST 1598.94 feet to a rebar with BRG cap at the POINT OF BEGINNING thence SOUTH 01 degree 37 minutes 11 seconds EAST 785.38 feet to a rebar with BRG cap on the north line of the property conveyed to Philip and Barbara Topp by Instrument Number 2011001304 in the office of the Recorder of Monroe County, Indiana, thence NORTH 82 degrees 58 minutes 17 seconds WEST along said north line a distance of 371.92 feet to a rebar with BRG cap; thence NORTH 27 degrees 30 minutes 07 seconds EAST 132.19 feet to a rebar with BRG cap; thence NORTH 40 degrees 16 minutes 29 seconds WEST 57.74 feet to a rebar with BRG cap, thence NORTH 05 degrees 59 minutes 40 seconds EAST 197.15 feet to a rebar with BRG cap thence NORTH 38 degrees 24 minutes 39 seconds EAST 486.98 feet to the POINT OF BEGINNING containing 4.27 acres more or less

LEGEND

MONUMENT – BENCHMARK	CABLE PEDESTAL
MONUMENT – CAPPED REBAR	CABLE MARKER POST
MAG NAIL/PK NAIL	ELECTRIC ACCESS COVER
REBAR/PIN/PIPE (NO CAP)	ELECTRIC PANEL/PEDESTAL
SECTION CORNER	ELECTRIC TRANSFORMER
FENCE POST	FIBER OPTIC ACCESS/MANHOLE
MAILBOX	FIBER OPTIC MARKER POST
SIGN	GAS ACCESS/MANHOLE
TREE – CONIFEROUS	GAS MARKER POST
TREE – DECIDUOUS	SANITARY MANHOLE
TREE – MULTI-TRUNK	BEEHIVE/ROUND INLET
SHRUB	CURB/SQUARE INLET
EDGE OF WOODS	STORM MANHOLE
STORM SEWER	STORM PIPE END SECTION
SANITARY SEWER	TELEPHONE MARKER POST
OVERHEAD UTILITY	TELEPHONE PANEL/PEDESTAL
FLOWLINE	UTILITY POLE
	UTILITY POLE GUY ANCHOR
	POWER POLE
(D) DEED BEARING/DISTANCE	WATER HYDRANT
(M) MEASURED BEARING/DISTANCE	WATER VALVE

REVISIONS

DATE	DESCRIPTION	BY

HWC ENGINEERING
INDIANAPOLIS | TERRE HAUTE
LAFAYETTE MUNCIE NEW ALBANY

SUDBURY PUD
Bloomington, Indiana
ALTA/NSPS Land Title Survey
Client: TRG DEVELOPMENT LLC

DRAWN BY
CHECKED BY
DATE January 31, 2023
SCALE 1"=100'
SHEET

S1.3

ALTA/NSPS LAND TITLE SURVEY

ALTA/NSPS LAND TITLE SURVEY

PART OF THE EAST 1/2 OF SECTION 7 & NORTHWEST 1/4 OF SECTION 8 – TOWNSHIP 8 NORTH – RANGE 1 WEST CITY OF BLOOMINGTON, MONROE COUNTY, INDIANA

SURVEYOR'S REPORT

In accordance with Title 865 Article 1 Chapter 12 of the Indiana Administrative Code ("Rule 12") the following observations and opinions are submitted regarding the various uncertainties in the locations of the lines and corners established lines surveyed as a result of uncertainties in reference monumentation in record descriptions and plats in lines of occupation and as witnessed by random errors in measurement ("Relative Positional Accuracy"). There may be unwritten rights associated with these uncertainties. This client should assume there is an amount of uncertainty along any line equal in magnitude to the discrepancy in the location of the lines and accession from the surveyed lines.

There may be differences of deed dimensions versus measured dimensions along the boundary lines shown hereon and, likewise, there may be found survey markers near but not precisely at some boundary corners to which where the magnitudes of these differences are less than the Relative Positional Accuracy stated below and less than the uncertainty identified for the reference monumentation (discussed below), the differences may be considered insignificant and are shown only for purposes of mathematical closure. Such differences that are greater than the Relative Positional Accuracy and the uncertainty in reference monumentation should be considered worthy of evidence and are interpreters further discussed below.

This survey and report are based on party wall agreements formed in accordance with an Indiana Land Surveyor's responsibility to conduct a survey in accordance with Federal laws, state and local laws and court precedent (865 IAC 1-12-11(5), Rules of the Indiana State Board of Registration for Land Surveyors). Since Indiana has no statutes addressing how to resolve boundary lines, a solution based on principles derived from common law precedent must be relied upon as the basis for a boundary resolution.

Unless otherwise noted or depicted hereon there is no evidence of occupation along the perimeter lines of the subject tract. All survey monuments set or found this survey are flush with existing grade unless otherwise noted.

The Relative Positional Accuracy (due to random errors in measurement) of this survey is within the specifications for an Urban Class Survey (0.07 feet plus 50 ppm) as defined in IAC 865

PURPOSE

The author survey is a retracement of the lines and corners of a 138.51 acre tract of land pursuant to the minimum standard detail requirements set forth by the American Land Title Association ("ALTA") and the National Society of Professional Surveyors ("NSPS") and in accordance with the minimum standards outlined in Rule 12 Title 865 of the Indiana Administrative Code. The last deed of record into Joe Kemp Construction LLC as the owner of the subject tract. The ownership was conveyed by Warranty Deed recorded August 31 2007 as instrument #2007032333 in the Office of the Recorder of Monroe County, Indiana. The overall surveyed parcel is made up of 5 tracts of land as described in said deed and shown hereon.

The subject tracts of land are parcel created for a few abandoned buildings most of which are in a state of disrepair as shown hereon and are located in the Northeast and Southeast Quarters of Section 7 Township 8 North Range 1 West and on the Northwest Quarter of Section 8 Township 8 North Range 1 West of the Second Principal Meridian in Monroe County, Indiana.

The following are recorded surveys and subdivision plat(s) made reference to in this survey:

1. Sudbury Property Boundary & Topographic Survey of surveyed property by Bledsoe Riggert Guerrettaz Inc recorded as Instrument #2004004467. This survey may be referenced hereafter as the "prior recorded survey" "recorded survey at the site" etc.
2. Original Boundary Survey of Sudbury Farmsteads property lying southwest of Sudbury as platted by Bledsoe Riggert Guerrettaz Inc recorded as Instrument #2007027449
3. Sudbury Farm Phase 1 – Plat Cabinet C, Envelope 272, Instrument #1996029880
4. There are several replats of Lot 7 in Sudbury Farm between to Arbor Ridge at the Sudbury Farm which were completed to plat which of which some have been amended. Each of the replats are:
   - Arbor Ridge Phase 1 as the Sudbury Farm Final Plat (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet C, Envelope 388, Instrument #2004015568 (Units 1, 2, 3, 19, 20, 21, 22, 23 and 24)
   - Arbor Ridge Phase 2 of the Sudbury Farm Final Plat (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet C, Envelope 377, Instrument #2004031980
   - Arbor Ridge Phase III of the Sudbury Farm Final Plat (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet C, Envelope 388, Instrument #2004124560 (Units 10, 18, 19, 20, 25 and 26)
   - Arbor Ridge at the Sudbury Farm Phase IV (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope 14, Instrument #2005008008 (Units 27, 28, 29, 30, 43 and 44)
   - Arbor Ridge at the Sudbury Farm Phase V (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope 34 Instrument #2005008008 (Units 37 and 38)
   - Arbor Ridge at the Sudbury Farm Phase VI (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope 41 Instrument #2006010841 (Units 7, 8, 35 and 36)
   - Arbor Ridge at the Sudbury Farm Phase VII (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope 47 Instrument #2006017085 (Units 21, 22, 23 and 24)
   - Arbor Ridge at the Sudbury Farm Phase VIII (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope 52 Instrument #2006021673 (Units 13, 14, 31 and 32)
   - Arbor Ridge at the Sudbury Farm Phase IX Final Plat (a Replat of Lot 7 Sudbury Farm) – Plat Cabinet D, Envelope not noted Instrument #2007014286 (Units 3, 4, 9, 10, 17, 18, 33 and 34)
5. Boundary Survey noted as Parcel 10 Sudbury Farm – Instrument #2010020032
6. Summit Woods Phase 3 – Instrument #2719015786
7. Summit Woods Phase 2 Section 4 – Instrument #2002016806
8. Hooker, Planned Community Phase VIII Final Plat – Plat Cabinet C Envelope 378 Instrument #2004019090
9. Thomson Community Park – Plat Cabinet C Envelope 69 Instrument #2013015416
10. Adams Grove Final Plat – Plat Cabinet D Envelope 48 Instrument #2006017367
11. Seminary – Book H Pages 503–504
12. ALTA/ACSM Land Title Survey of Seminary Lot 178 and part of Seminary Lot 177 by Bynum Fanyo & Associates Inc

BASIS OF BEARINGS

The basis of bearings for this project is Grid North established per GPS observations processed by National Geodetic Survey (NGS) utilizing OPUS on January 9 2023 the coordinate system utilized is the Indiana Geospatial Coordinate System (INCGS) – Monroe-Morgan County (1105) (NAD83(2011) NSRS11 The prior survey of the site recorded as Instrument #2004004467 of which the current record descriptions were created was based on Indiana State Plane Coordinates Zone 1302W The deeded and measured bearings and distances are shown hereon to reflect any differences.

THEORY OF LOCATION

RETRACE MONUMENTATION

The lines and corners of the subject tract are referenced to the United States Public Land Survey System (PLSS) section corners. The geographic location composition of reference monument and its uncertainty in location relative to the original government corner is discussed below.

SECTION CORNERS

The following monuments were found and held at the noted locations in Section 7 and 8 in Township 8 North Range 2 West based upon information found on the Monroe County Surveyor's Office Monuments Records:

North Quarter corner of Section 7 (GPS) – A #20 penny nail was found flush as shown on the monument records. The S. a railroad spike I long N35°W 7.88 down mud nail was not found however a strong tone was detected at this location. A mag nail was found N66.36.15 W 5.64 from the penny nail which is also shown on the prior recorded survey of the site. Said survey notes that the origin of the railroad spike is unknown and was not accepted as the corner monument and discusses several ballenes which were reviewed to determine the location of the corner. Holding the platted geometry of the Sudbury Farm Phase 1 plat (Instrument #1996017890 PC C Env 272) and monuments found in the field at the corners thereof the location of this corner falls where the Mag nail was found this survey, yet the plat states that a railroad spike was found and held at this location. The monument record reflects that the railroad spike was originally tied off as the corner September 10 1999 and after evidence was reviewed on December 28 1999 it was determined that the penny nail was the location of the corner the record also notes that the Sudbury Farm survey was used as a reference, however this creates more confusion as the surveys/plat notes that a railroad spike was found plat geometry places the corner where the Mag nail was found and they determined the corner location to be where the penny nail is.

The prior recorded survey notes that the majority of surveys completed in the area held the #20 penny nail and accepted that monument as the corner, therefore, said #20 penny nail was held. There is, in my opinion up to 10.0 ± of uncertainty associated with the location of this corner

Northeast corner of Section 7/Northwest corner of Section 8 (GPS) – A 4"x4" limestone standing 5 inches left was found at this location. Per the monument records, this stone was set on May 23, 2005, to replace a 10" rolled fence post with a PK nail in the top of it which was dug up and previously recorded as the corner's location. The record notes that the 2007 monument record accepted the stone per a boundary survey by Douglas R Curry archived as RS0003415, which was reviewed. Said survey is a retracement of Seminary Lot 178 & Part of Lot 177 to the north and reflects that a PK nail found on top of a fence post was held as the corner. The prior recorded survey of the site accepted the stone as the corner monument based upon said Curry survey and a Location Control Route Survey for Proposed I-69 Section 5 recorded July 18, 2013 as Instrument #2013012750.

At the time the field work was completed for this survey, a 10" wood fence post with a nail in the top of it was found south of the stone monument. There is approximately 0.4' between the stone and north face of the post. This fence post is not noted on a 12" but did exist on 12/22/2021 when the reference ties were last updated by the Surveyor's Office. This wood post matches the description of the post held as the corner monument by Curry and the Location Control Route Survey noted above. This post has existed for some time and has several sections of barbed wire wrapped around it. In my opinion this may be the post with a PK nail that was held as the corner location during the surveys references and there is up to 1.0 ± of uncertainty associated with the location of this corner.

North Quarter corner of Section 8 – There is no information available for this corner. See below re establishment of the north line of the Northwest Quarter of Section 8

East Quarter corner of Section 7/West Quarter corner of Section 8 (GPS) – A 8"x8" limestone marker standing 5" tall with 1" drill hole on top was found. Stone was witnessed by Monroe County Surveyor on January 31 1996 and has been held as the corner monument in numerous recorded surveys and plats in my opinion there is a negligible amount of uncertainty associated with the location of this monument

Center of Section 7 (GPS) – There are no monument records available for this corner. The center of section is not an original government corner. A 5/8 rebar with aluminum cap stamped Monroe Co Surveyor was found 0.2 ± above grade and accepted as the location of this corner. Per the prior recorded survey of the site a 5/8" rebar was found and nailed as being set by Smith Neubecker. Said monument had been held per that and other recorded surveys in the area. The location of this monument was held as it appears it has been largely accepted and held and there is evidence that the Monroe County Surveyor accepts it as well. In my opinion there is a negligible amount of uncertainty associated with the location of this monument

South Quarter corner of Section 7 (GPS) – Rebar with an aluminum cap stamped Monroe Co Surveyor found flush with the surface. This monument was witnessed by the Monroe County Surveyor on August 21 1900 and has been held as the corner monument in numerous recorded surveys and plats. In my opinion there is a negligible amount of uncertainty associated with the location of this monument

Southwest corner of Section 7/Southeast corner of Section 8 (GPS) – Mag nail found 0.1 below grade This monument was witnessed by Monroe County Surveyor on October 30, 2008 and has been held as the corner monument in numerous recorded surveys and plats. In my opinion there is a negligible amount of uncertainty associated with the location of this monument

The lines and corners of the author survey were established as follows:

The "prior recorded survey" and current deed of record reference monuments found and held along the east line of the Northwest Quarter of Section 7 which is also the west line of the Northeast Quarter of Section 8. A 5/8 limestone with 1" drill hole on top was found at the southeast corner of the Northwest Quarter of the Northeast Quarter of said Section 7. A 5/8 rebar was found at the northeast corner of Lot 1 of Hoosier Community Park which is also the southwest corner of the Northeast Quarter of the Southeast Quarter of said Northeast Quarter. Said rebar was found bent 0.3 feet below the surface. Per said plat recorded in 1983 a rebar was found at this location with no notary. Per the record description for the adjoining tract of land a straight line was held from the east quarter corner to the 1" IP corner and the record distance along this line agrees with the measured distance between the two stone monuments. One rebar found and held per record documents ties 0.1 west of this straight line which is to be expected due to this current condition. In my opinion an angle break should not have been created along this line but it was held to follow the prior survey.

Prior recorded survey of the site notes that the north line of the Northwest Quarter of Section 8 was established holding the locations of monuments found at the northwest corner thereof the southwest corner of Seminary Lot 178 and a stone found 46.95 feet of the general location of the northeast corner of the overall surveyed parcel of land.

The north line of the Northwest Quarter was to be established between the northwest and north quarter corners thereof and should not contain an angle break. The south lines of Seminary Lots 178 and 177 in the north as surveyed by Douglas R Curry of Bynum Fanyo & Associates Inc April 14 2004 are connected with this section line. A 5/8 rebar with cap stamped Bynum Fanyo 290500010 was found at the southwest corner of Lot 178 as shown on said survey. Said survey held the wood fence post with PK nail on the top of it as the northwest corner and does not contain a break in the section line. If the north line of Tracts 3 and 4 (the 1133.57 foot course) was extended west to the section line it would intersect at the wood fence post with the PK nail.

Monuments shown on the prior recorded survey and the survey of Lots 178 and 177 near the northeast corner of the surveyed parcel were not found. It appears that the widely company had come through and cleared the land within the power line easement which parallels the section line in the last year and likely destroyed them.

For the purpose of this retracement survey, due to a lack of existing called for monuments the north line of the Quarter Section was created based upon the record geometry shown on the prior survey and contained in the current deed of record. A 5/8 rebar with cap stamped SHA INC LS29500020 was found 1.3 feet south of the northeast corner of the surveyed parcel of land.

Tract 1 begins on the west line of the Northwest Quarter of Section 7 at a 5/8 rebar with yellow cap stamped BRG INC 0897 hereafter referred to as a rebar with BRG cap which was found and held. The west line continues north along the section line to a Mag nail which was found at the southwest corner of the North Half of the Northwest Quarter. Deed geometry and controlling calls were held to establish the north and east lines thereof. Plat geometry for Hackery Planned Community Phase VII was created and situated to monuments found. Monuments as called for and shown on the record plats for Summit Woods which immediately were the north lines of the property conveyed to Paul and Barbara Topp by Instrument 2011001304 and called for in the description were held to create the location of the remaining courses around the perimeter of tract 1 and Tract 5. Said Summit Woods was originally platted as one parcel and over time has been re-platted into smaller sections of lots and blocks.

Tract 2 begins at the northeast corner of Tract 1 and continues north along the west line to a Mag nail which was found. The next 12 courses follow along the perimeter of Sudbury Farm Phase 1 recorded as Instrument #1996017890 in Plat Cabinet C, Envelope 272. Lot 7 of Sudbury Farm was re-platted one times as Arbor Ridge at the Sudbury Farm Phase 1 as Each Phase plats a progressive block of units within the development as listed above.

The overall geometry for Sudbury Farm Phase 1 was recreated and adjusted upon monuments found at the perimeter corners thereof. When retracing a survey the order of importance of conflicting elements within the description must be considered as the written intentions of the parties. There are a call for a survey or an actual survey on which a conveyance is based, a call for monuments natural or artificial, adjoiners, direction and distance, direction or distance, and the area. The record description for the surveyed parcel of land was based upon a survey which was recorded and obtained from the Monroe County Recorder's Office as a reference for this survey. Each course in the record description was compared with controlling calls to a monument as shown hereon and are shown as either found or set. The record plat for Sudbury Farm does not indicate that monuments were set and are not noted by of the description thereon. Rebar with caps were found near or as much of the plat corners. It appears as most lines set by the Bledsoe Riggs & Guerrettaz, Inc. as was were stamped "BRG INC 0897" (hereinafter "BLEDSOE RIGGS" RS0003000) by BRG, INC 0897" but it is apparent that they were not set at the same time. The 2014 survey reflects that some were set and some were found. When the description for Tract 1 was modernized the bearings and distances were changed to match the physical locations of the monuments and did not follow the plat geometry. Plat geometry in this case ranks higher than the physical called for monuments as the monuments do not appear to have been set when the land was platted and lack consistency in character amongst themselves. Also – the perimeter of the plat lies along the right-of-way lines of Sudbury Drive. The 529.84 foot course lies along the south right-of-way line of Sudbury Drive as dedicated per said plat and the remaining courses are along the north and west lines of the proposed location of the roadway. When the description was rewritten to the monuments the geometry for this right-of-way was changed in a way such that the curves were no longer tangent to courses leading to at least three which in the future would result in a signific right-of-way width when the surveyed parcel is platted and Sudbury Drive is potentially landlocked existing right-of-way limits. Due to the uncertainty with the monuments found near or at the plat corners and issues with the geometry as described in the deed the plat geometry was held. All monuments were found to be within 0.8' ± from the corners they represent with the exception of an which was found bent. Steel H-posts were found in agreement along the perimeter boundary of the plat.

The monuments were held above plat geometry along the south line of Lot 2 due to the uncertainty with the location of the northwest corner of the Quarter Section and the curves proximity to said line. The Mag nail is not an original monument per the plat however the description and survey were prepared by one and the same as the plat and was held. This course measured over 8 feet long.

Due to uncertainties with the locations of said north quarter corner as well as the northeast corner of Section 7 there is up to 10 feet of uncertainty associated with the north and west lines along the north and west lines of the Northwest Quarter of Section 7

Tract 3 begins at the northeast corner of the Northwest Quarter of Section 8 and continues west along the north line of said Quarter. First course commences at the stone and the bearing and distance to the called for 8"x stone was held. Remains courses were established per controlling calls.

Tract 4 commences at the northeast corner of tract 3. Controlling calls along and to the section lines were held to establish the lines there. The east line was held parallel with the west line of the Quarter Section as stated.

OCCUPATION

The west lines lie within the physical location of Weimer Road. A 36 paved ditch crosses the 258.80 course onto the surveyed property. The south corner of is a fence around a dumpster pad lies on said line. Storm pipes cross the 244.82 foot and 528.84 foot courses. The stub for the extension of West Arbor Ridge Way south of Sudbury Drive lies 5.0 feet south of the 529.84 foot course. Steel fence posts lie on and along the boundary of Sudbury Farm. A monitor lies on the 265.56 foot curve. A canvassed area lies over the 130.50' course. Utility poles and overhead lines lie up to 18.5 south of the 1067.62 foot course. Fence posts and the remains of an old barbed wire fence lie up to 11 feet south of said line.

End of a storm pipe lies 4.3 feet north of the 1134.57 foot course. Fence posts and utility poles with overhead lines lie as near as 1.5 feet north of said line and up to 11.3 feet north towards the east end. A cleared utility corridor lies north of this line. Fence posts lie on said line and up to 2.5 feet south of the end of the improved portion of Adams Street in Adams Grove. It appears that the fence posts are set to impede vehicular access to the property at this location.

Wire fence remains lie between 13.6 feet east and 4.0 feet west of the east line.

Section of barbed wire fencing lies generally along the 1154.48 foot course and up to 22.9 feet south near the east end.

Fence continues south and lies between 3.8 feet and 5.7 feet west of the 710.29 foot course.

Steel T-post and wood fence posts lie between 3.1 feet and 8.9 feet west of the 609.57 foot course. Old barbed wire fence remains lie generally along the line and up to 2.8 feet west.

The end of Adams Street lies 3.8 feet south of the 70.47' foot course. A water valve lies 1.5 feet north of said line. A creek winds along the east lines adjacent to Summit Woods as shown. The end of a Driveway to Way lies 2.7' ± south of the 277.52 foot course.

The creek winds to the north generally following the west lines of Tract 5. A home lies down crosses the west remaining tract of land and a gravel road exists to the 208.83 foot course from Weimer Road through a gate. A dozen 8" tall trees and fences run along this course and continues west along the remaining south lines of Weimer Road. Said fences and generally define a few of the lines

NOTES

Ownership information indicated hereon is as identified in County or Township records or on title work provided by others

This survey reflects existence of above ground indications of utilities. Utility locations were not requested from Indiana 811 as the property does not adjoin any roadways. The surveyor does not warrant if there are or are not any underground utilities on the property as it is unknown.

Access to the site from Weimer Road is obtained via a drive through the southwest adjoining "Sudbury" property which is part of the proposed tract of land. There is a gate in a 5' chain link fence across this drive where it enters the property. Several different maps such as the FIRM maps note this as "Sudbury Lane"

Adams Street to the north is blocked from vehicular entry by fence posts. Adams Drive from the south road ends as a wooded area as does S Browning S Way.

West Sudbury Drive and West Arbor Ridge Way stub dead end roads adjoining the property. There are fence posts set on said lines. It appears as though it wasn't even or those where vehicles can enter the property onto the field. West Arbor Ridge Way stubs south into a gravel drive and then now.

A standard utility corridor parallels the north lines of the property. Electric and cable lines run along this road, along the north side of Lot 8 in Sudbury Farms, and appears to turn up the subdivision to the northwest generally near the northwest corner. There are water line breaks entering the property from this lane across the northwest corner.

Platted Christopher Lane to the north is not improved

There appears to be vehicular passage from S Breckinridge Lane to the utility corridor as well

TABLE A NOTES

5(a) – The surveyor has not been provided with a zoning report or letter to certify zoning and/or setback information

7(a) 7(b)(1) – The site is mostly vacant. There are several inhabitable buildings situated on the property as noted relative to the adjacent real estate. Exterior dimensions are shown

9 – No marked parking spaces. The site is vacant

16 – No evidence of earth moving work and/or building construction was observed on the subject tract at the time of field survey

FLOOD INFORMATION

The accuracy of any flood hazard data shown on this report is subject to map scale uncertainty and to any other uncertainties in location or elevation on the referenced flood insurance rate map. The above described tract of land lies within flood hazard Zone "X" (unshaded) and Flood Zone AE as flood flood zones by scale on Map Number 18105C0125E and 18105C0140E of the Flood Insurance Rate Maps for the City of Bloomington 180169 (maps dated 12/17/2010)

TITLE COMMITMENT NOTES

Evidence of chains of title for the subject tract was provided in the form of Owners Policy of Title Ins. Co., dba FirstPlus as agents for Chicago Title Insurance Company Commitment No. 21415, dated January 18, 2023. Some of the items disclosed in Schedule B of said Policy may have been dispelled on the survey and are identified by item referencing notes. Should any additional items need to be depicted on the survey, please advise and provide the appropriate documents.

21. Declaration of Covenants, Restrictions and Easement for Sudbury Farm dated June 14, 1999, recorded March 17, 1999, as Instrument Number 1999011843, in the office of the Recorder of Monroe County, Indiana. [The subject tracts 1 through 5 are contained within the described real estate having been submitted to the within Declaration. No particular easements are defined.]
22. Agreement made by the City of Bloomington, Indiana recorded June 14, 1973, in Miscellaneous Book 88, page 61, and recorded in Miscellaneous Book 147, page 133, in the office of the Recorder of Monroe County, Indiana. [The center line of the described easement crosses the southwest corner of tract 1 as shown hereon. The documents language does not disclose the width of the reservation.]
23. Sanitary Sewer Line Easement in favor of City of Bloomington Utilities recorded in Deed Record 434 page 227, in the office of the Recorder of Monroe County, Indiana. [The 15 foot easement is located near the north end of tract 1 as shown hereon & portion of the easement described as the 258.71 foot course.]
24. Easement in favor of Public Service Company of Indiana, Inc recorded in Deed Record 121 page 75 in the office of the Recorder of Monroe County, Indiana. [The 150 foot wide Electric Transmission Line Easement is located on tract 1 as shown hereon. The easement is positioned over the physical center line of the existing lower bodies.]
25. Anchor Permit in favor of Public Service Company of Indiana, Inc recorded in Deed Record 125 page 324, in the office of the Recorder of Monroe County, Indiana. [No permit portions lie on area 80 feet east of the northwest corner which would not impact the subject tracts.]
26. Easement in favor of Millennium Property Management recorded as Instrument Number 2013021110, in the office of the Recorder of Monroe County, Indiana. [The 10 foot wide Easement is located along the north lines of tract 3, 4 & 5 as shown hereon.]
27. Drainage Easement recorded as Instrument Number 2019R1(A)10 re-recorded as Instrument Number 2019R05508, in the office of the Recorder of Monroe County, Indiana. [The variable width Drainage Easement for a retention pond is located on Tracts 1 & 5 as shown hereon.]
28. Declaration of Covenants and Restrictions recorded as Instrument Number 2014025701 in the office of the Recorder of Monroe County, Indiana. [Tracts 1 & 5 are subject to the within CC&R's in their entirety.]
29. Terms of Annexation recorded as Instrument Number 2003007826, in the office of the Recorder of Monroe County, Indiana. [The Sudbury Farm Area" (145 acres) includes all of Tract 1 and that part of Tracts 2 & 5 lying in the Northwest Quarter Tracts 3 & 4 are not included.]
30. Ordinance concerning annexation recorded as Instrument Number 2003031587, in the office of the Recorder of Monroe County, Indiana [Same as item #29 above.]

CERTIFICATE OF SURVEY:

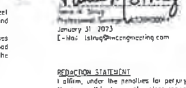
ALTA/NSPS LAND TITLE SURVEY

To: Sudbury Development Partners, LLC
Joe Kemp Construction, LLC, an Indiana limited liability company
Chicago Title Insurance Company
Monroe County Land Title Co dba FirstPlus
FRG Development LLC
J & C Development LLC

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys jointly established and adopted by ALTA and NSPS, and includes items 1, 2, 3, 4, 5(a), 7(a) 7(b1) 8 9 11(a), 13, 14, and 15 of Table A thereof. The fieldwork was completed on January 9, 2023

To the best of my knowledge and belief, the within plat represents a survey made under my supervision in accordance with Title 865, Article 1, Chapter 12 of the Indiana Administrative Code

PREPARED BY: Tanner W. Stroug



Tanner W. Stroug
Professional Surveyor #LS20800047
January 31 2023
E-Mail: tstroug@hwcengineering.com

REDACTION STATEMENT

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security Number in this document, unless required by law. Tanner W. Stroug

VICINITY MAP

Bloomington, IN – Not to Scale

REVISIONS		
DATE	DESCRIPTION	BY

HWC ENGINEERING
INDIANAPOLIS - TERRE HAUTE
LAFAYETTE - MUNCIE - NEW ALBANY
www.hwcengineering.com

SUDBURY PUD
Bloomington, Indiana

ALTA/NSPS Land Title Survey
Client: TRG DEVELOPMENT LLC

DRAWN BY: DLM
CHECKED BY: TWS
DATE: January 31, 2023
SCALE: 1"=100'
JOB NUMBER: 2022-151
SHEET: S1.4

ALTA/NSPS LAND TITLE SURVEY

Plot Date: Jan 31 2023 Plot Time: 11:24am File Name: W:\TRG Development LLC\2022-151-S ING Dev - Sudbury - Multifamily\dwg\ALTA\Survey.dwg Layout: S1.4 By: Danny

Proposed District Ordinance

SUMMIT DISTRICT

SUMMIT DISTRICT PUD
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SUMMIT DISTRICT
PLANNED UNIT DEVELOPMENT
Bloomington, Monroe County, Indiana

Section 01.01 DEVELOPMENT, DESCRIPTION, AND PHASES

01.01.010 Neighborhoods

The neighborhoods for development with the Summit District PUD are depicted in the below map. The neighborhoods have varying districts applied to each to reflect the base-zoning and uses, as well as design and dimensional standards associated with each neighborhood. The PUD is designed to create walkable communities, interconnected by roadways as well as bike and pedestrian pathways while preserving and protecting environmental features throughout the property.

FIGURE 1: Neighborhood Map

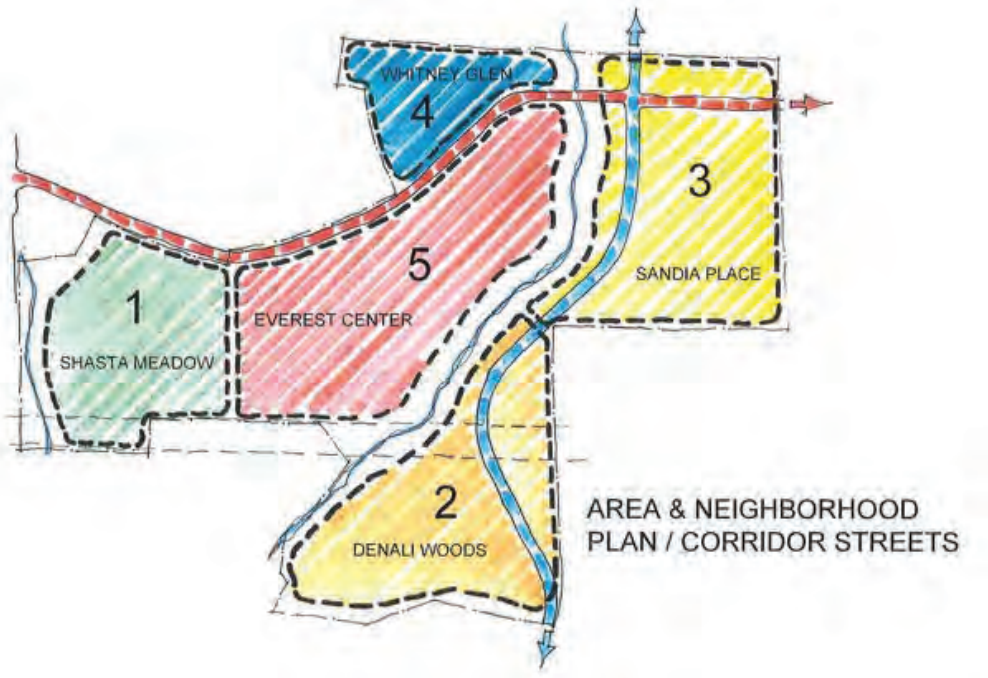


FIGURE 2: Mobility Map

Shasta Meadow

Shasta Meadow consists of approximately 23 acres and will be subdivided and developed into separate areas for development with expected delivery in 2025-2028. This neighborhood is designed as a single family and multi-family development at mid-scale and will promote affordability and ownership in the single-family area. In total the neighborhood is estimated to have approximately 550 dwelling units. Alleys will be incorporated to the extent possible and on-street parking will be available on all public streets. The mature tree, creek and floodway located in the western part of this area will be preserved with a total of over 7.5 acres (30%) of the neighborhood being set aside as greenspace and designated as park and open space.

Denali Woods

Denali Woods consists of approximately 33 acres and will be subdivided and developed into areas with expected delivery in 2025-2029. Denali Woods will allow for the development of single family and multi-family buildings abutting the preservation areas. The neighborhood is also the location of a proposed new fire station and trail head and access to RCA Park. The total neighborhood is estimated to have 500 dwelling units. Alleys will be incorporated with single-family homes as much as possible, given the constraints of the area. Parking will be incorporated on the neighborhood streets in accordance with the Transportation Plan. The Duke Trail will be continued through this neighborhood and connect with existing Clear Creek Trail at Breaking A Way. The southern portion of this neighborhood has a large stand of mature trees and some karst features which will be preserved. The mature trees preservation will provide connectivity of the conservation area to the south and the RCA park woods to the east. A total of 13 acres of preservation is planned for this neighborhood, nearly 40 % of the total land area and designated parks and open space on the land use plan. The continuation of Adams to the north will be included as part of Denali Woods and the potential connectivity of a neighborhood and the Everest Center.

Sandia Place

Sandia Place consists of approximately 33 acres, with expected delivery in 2028-2032. Structures located within Sandia Place are designed to allow for density and transition to the Everest Center. The development will promote high-density mixed-use buildings providing services and amenities to the neighborhood, with a total estimated unit count of approximately 1,100 units. A smaller area is set aside, near the preservation area, for single family development of townhomes with alley access as a transition from the preservation area to the denser center of the neighborhood, similarly the norther portion of the site is reserved for less dense multi family buildings. Street parking is planned for all public streets in accordance with the Transportation Plan. This neighborhood has natural features that will require preservation and designated parks and open space on the land use plan, this represents about 20% of the neighborhood or just under 7 acres.

Whitney Glen

Whitney Glen consists of approximately 11 acres and will be subdivided into areas with expected delivery in 2033-2034. Structures within Whitney Glen are designed to allow for density and transition to the Everest Center and the existing residential areas to the north and west. Special transition standards address development adjacent to Arbor Ridge. This is the smallest neighborhood in both density and area with a total of 400 residential units planned. Alleys will be incorporated with the single-family development and street parking is planned for all streets. The mature trees located in the northwestern part of this neighborhood is about 2 acres and will be preserved as park and open space providing connectivity of the existing conservation area to the west.

Everest Center

Everest Center consists of approximately 38 acres and will be subdivided into three areas with expected delivery in 2027-2034. Everest Center will allow for the development of mixed-use buildings with high density residential above commercial uses on the ground floor. Special transition standards are designed to address the adjacent PUD Arbor Ridge to the north. A large park and open space is planned in the center of the neighborhood which will serve as an area serving amenity and public space. The center of Summit District, Everest, will have a variety of retail and entertainment establishments, which will not only serve the District but the greater residential neighborhoods of the city and aid in creating a walkable community. The area will have parking facilities as well as on-street parking of urban design and including gridded streets, alleys where appropriate and wider sidewalks and pedestrian facilities. Overall density in Everest Center is estimated to be just under 1700 residential units. While this is the most urban portion of the District, just under 10 percent of the land area or 3 acres is set aside as preservation area and additional areas is set aside as park and open space.

01.01.020 Summit District Development Standards

(1) Summit District PUD sets forth zoning designations by district, as well as design and development standards, creating a combination of zoning and standards that will enhance overall development of the property in an orderly and predictable manner.

(2) Summit District PUD sets forth residential and mixed-use areas with specifically defined standards, dimensions, and design & development standards to maintain consistency in development over a period of years. Where such development standards are made in this PUD, the UDO will not apply.

(3) Unless expressly stated otherwise in the PUD, to resolve any conflict that might exist, Districts designated as R, RH1 and RH2 shall adopt the UDO provisions of RH zoning district.

(4) Unless expressly stated otherwise in this PUD, to resolve any conflict that might exist, Districts designated as MN and MX shall adopt UDO provisions of the MN zoning district.

(5) Unless expressly stated otherwise in this PUD, to resolve any conflict that might exist, Districts designated PO shall adopt UDO provisions of the PO zoning district.

01.01.030 Sustainability

Summit District is fully approved as a Duke Energy NCEEDA project. The program through Duke Energy is an energy design assistance program that provides energy consultants for the development and individual projects and buildings to assist in the most efficient design and construction possible. Energy Design Assistance assists in the design and construction of energy-efficient buildings better for the environment and less expensive to operate. The Duke program provides construction incentives to assist in lower cost implementation of energy-efficient strategies. The program assists in the engineering, application, and verification support necessary to qualify for Smart $aver Customer Program.

Summit District will promote programs appropriate for the development, including but not limited to Indiana's GoGreen initiative.

All residential and commercial structures must meet a minimal standard for environmental stewardship for site plan approval, as required below. Affordability and sustainability, along with the available incentives provided in Section 04.04.070, will accompany development plans submitted to achieve goals articulated in this ordinance. A minimum design standard for projects to include the following:

All Non-Multi-Family Residential

Must demonstrate sustainability by meeting the minimum requirements of ENERGY STAR's Single-family New Homes National (SFNH) program. Requirements shall be based on the current standard at the time of plan submission for building permits. Additionally, the homes shall:

- Utilize all electric services for heating, cooling, cooking, and water heaters.
- Include Heat Pumps.
- Provide infrastructure for future installation of rooftop solar panels. Includes, at a minimum, conduit from roof to location of main electrical gear and a roof structural load assuming an additional 10 lbs / sq. ft. above code minimum.
- Where private garage parking is provided for individual residential units, including cable/ conduit and space in the electrical panel for future installation of an electrical vehicle charging station.

Multi-family residential, Commercial and Mixed-use:

Must demonstrate energy efficiency built to the minimum standards established by one of the following programs:

- ENERGY STAR Multifamily New Construction (MFNC) program (Multifamily buildings with dwellings that are not sleeping units and mixed-use buildings with dwellings)
- LEED certification – V4 Certified for single family attached, detached low-rise and mid-rise residential structures, and V4 Certified for commercial and mixed-use structures
- Bronze Rating National Green Building Standards
- Enterprise Green Communities – 2020 Criteria Community Certification

All dwelling units shall utilize all electric services for heat pumps for heating & cooling, cooking, and water heaters within the dwelling unit.

Buildings shall also be equipped with the following:

- Provide infrastructure for future installation of rooftop solar panels. Including, at a minimum, conduit from roof to location of main electrical gear, space for electrical gear, and a roof structural load assuming an additional 10 lbs / sq. ft. above code minimum.
- Where covered parking is provided and dedicated for tenant use, include infrastructure: cable/ conduit, space in the electrical panel, space for future panels, and space for future transformers for the future installation of electrical vehicle charging stations. For every fifty (50) parking spaces built, 4% shall include an electrical vehicle charging station.

01.01.040 Affordable Housing

Affordable housing is necessary to help maintain a diverse housing stock and to allow all residents to have better access to jobs and to improve economic status. The Summit District PUD requires a minimum of 15% of the units constructed to meet the permanent affordability standard by being income restricted to households earning below 120 percent of the HUD AMI for Monroe County Indiana. There are elements in the design of the PUD where the minimum percentage of affordable housing increases to 20% to achieve certain incentives.

Affordability and sustainability, along with the available incentives provided in Section 04.04.070, will accompany development plans submitted to achieve goals articulated in this ordinance. A minimum of 15% of the residential housing offered by the PUD will fall in the affordable category and be permanently income limited. The entire project will achieve the minimum 15% dedication of affordable residential housing and it will be integrated over the

entire Property. This integration of this housing requirement across the entire scope of the development will ensure that there is no single concentration of affordable housing to attain the 15% calculation, but that it is appropriately disbursed throughout the development. The calculation of affordability for each development project will be carried forward from area-to-area such that the aggregate housing dedicated to affordability will total a minimum of 15%, thereby meeting the PUD requirement for affordability.

- Affordable units will be in each of the five described neighborhoods of the PUD.
- The first two neighborhoods platted will each meet the minimum 15% affordable housing requirement.
- As development expands to the third, fourth and fifth neighborhoods, there shall be allowed an affordable unit credit carryover to the extent that the excess from a neighborhood that exceeds the 15% minimum requirement, except where incentives are utilized in the MN or MX districts to achieve a 20% affordability level and any carry-over must exceed the 20%. The available carry-over will be applied to neighborhoods three, four and five, up to a total carryover credit of five percent (5%) of the excess units from one neighborhood to any other single neighborhood.

01.01.050 Summit District Phasing

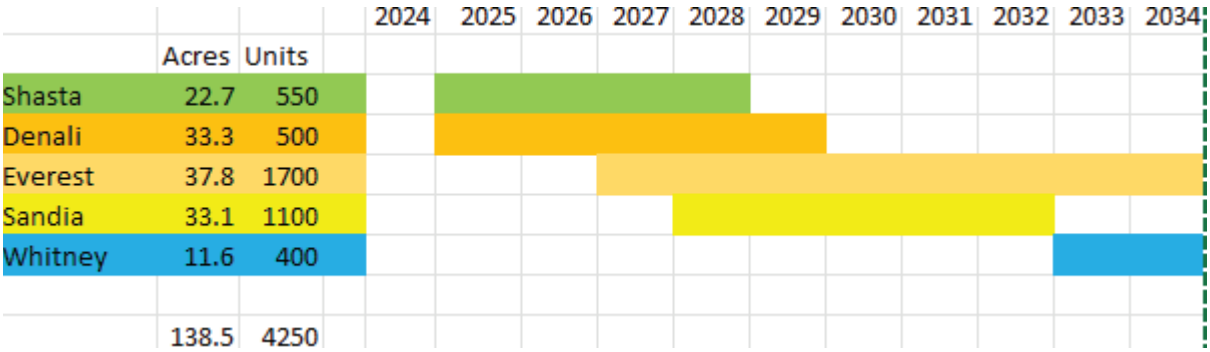
An important part of a large, planned development is to assure that the infrastructure, both public and private, is delivered as planned and on a schedule that supports the development and the larger area of the community. There is a need for predictability on both the part of the developer and City as to infrastructure obligations over the development period, which in this case is estimated to be up to ten (10) years. Specific infrastructure improvements must be completed before specific neighborhoods are activated for construction in some instances, while others can accompany construction or even follow construction.

Infrastructure improvements are classified as onsite or off site and generally are limited to public streets, utilities, paths/trails, and storm water facilities. Improvements such as Sudbury Drive and Adams Street are required to be in place early in the development of the Summit District and prior to occupancy of any improvements. Other improvements such as local streets, utilities, drainage, and paths would be committed to and delivered with specific phases of development, though each will have a separate time limit for delivery. Affordable housing is an essential part of the Summit District Planned Development and important to the overall community, thus the phasing plan for this is also important and commitment to affordable housing must also accompany each phase of development, to ensure overall minimum requirements as set forth herein are met.

These goals and commitments are identified on the Preliminary Plan and will be subsequently developed through Final Plans, Preliminary Plats, and Secondary Plats or amendments to the Preliminary Plan. Goals or requirements for completion of specific infrastructure may be triggered with the completion, platting, or permitting of a specific area, number of units, percentage of units, percentage of buildable areas or a predetermined date. The phasing and scheduling of these commitments may be modified to accompany market demands and physical constraints with subsequent plan approvals as allowed by the Plan Commission.

The proposed phasing plan of the development by neighborhood is outlined below, showing construction periods for each.

1. Shasta Meadows 2025-2028
2. Denali Woods 2025-2029
3. Everest Center 2027-2034
4. Sandia Place 2028-2032
5. Whitney Glen 2033-2034



FN: The above schedule is necessarily dependent on the City of Bloomington's support concerning utility capacity and expansion as well as developing funding sources, including tax incremental financing to support road and related infrastructure completion.

01.01.060 Subdivision Standard applicable to R and RH-1 Districts

In the R and RH-1 Districts, all projects must comply with the Traditional Subdivision type, as provided by UDO 20.05.030(c).

Section 02.02 Summit District PUD: Districts

02.02.010 Districts Established.

(a) Summary of PUD Districts.

The following districts are established in Summit District PUD, as described below. All development shall comply with standards and regulations in the Planned Unit Development except where no such PUD standard is articulated, in which case the UDO shall apply as to the specific zoning designation, as provided in the below equivalency standards.

(i) Unless expressly stated otherwise in the PUD, Districts designated as R, RH1 and RH2 shall adopt the UDO provisions of the RH zoning district.

(ii) Unless expressly stated otherwise in this PUD, Districts designated as MN and MX shall adopt UDO provisions of the MN zoning district.

(iii) Unless expressly stated otherwise in this PUD, the District designated PO shall adopt UDO provisions of the PO zoning district.

Summit District has land areas which are defined by natural boundaries as well as land uses and locations on the site. These areas are designed and designated to reflect specific land uses that when put together make up the Summit District PUD. The district has six designated zoning districts. These areas allow for a wide range of uses that support the overall neighborhood concept of walkability and connectivity and diversity in housing type and building type.

The districts will each focus on developing in areas with limited environmental and infrastructure constraints, while continuing infrastructure including roads, streets, pathways and trails consistent with the City's vision, transportation, and planning policies. Roads will be designed to promote connectivity and walkability including gridded patterns to the extent possible, while respecting constraints of the property.

(b) Districts

(1) Residential -R

The Residential district includes a wider range of housing types in an effort to increase the viability of owner-occupied and affordable housing.

FIGURE 4: District - R

(2) Mixed Residential -RH1

The Mixed Residential district includes a wider range of housing types to allow for greater density and diversity, including townhomes, condominiums, and apartments to support affordability and home ownership opportunities.

Figure 5: District - RH 1

(3) Mixed Multi-Family -RH2

The Mixed Multi-Family district includes a broader range of housing types. The limited list of nonresidential uses is designed to aid in the transition between Neighborhoods. Natural features will limit the overall connectivity to a larger gridded street pattern. In addition to the local streets, Adams Street and Sudbury Street will continue through these areas, which have an integrated street design to support the other shared transportation facilities.

FIGURE 6: District - RH 2

(4) Mixed Use -MX

The Mixed-Use District includes a broader range of uses and housing types to better promote the walkability of Summit District. Development in this area is intended to promote high-density mixed-use buildings providing services and amenities to the neighborhood. While ground floor residential is allowed, the area will promote walkability and nonresidential uses at the street-level. This area will include structure parking and shared parking options, as well as adequate on-street parking for the retail, service, and restaurant tenants.

FIGURE 7: District - MX

(5) District Center -MN

The District Center district includes a broader range of uses and housing types. The Center is conceived as a gathering space for the broader neighborhood and the larger southwest residential areas of the City of Bloomington. Standards are provided in the PUD to provide appropriate transition from the development to the Arbor Ridge Subdivision to the north. While ground floor residential is allowed, the area will promote walkability and nonresidential uses at the street-level. This designated area will include structure parking and shared parking options, as well as on-street parking for the retail, service, and restaurant tenants. Development in this area is intended to promote high-density mixed-use buildings providing services and amenities. Roads within the Center will be designed to promote connectivity and walkability, while providing visitors with on-street parking.

FIGURE 8: District - MN

(6) PO - Parks and Open Space

The PO district is based on the PO District in the UDO intended to accommodate and protect public and privately owned parks, open spaces, and conservation areas. All land uses, structures, and development in the PO district shall comply with all other provisions of the PUD except as otherwise specifically stated. .While the PO District in the UDO includes only public spaces, in the PUD, it will also include privately owned property, designated as Parks and Open Spaces. The PO District includes 53 acres which are designated conservation areas, tree preservation, park space, water and drainage area, karst features, and trails – all enhancing the natural attributes of the PUD (See Figure 10).

FIGURE 9: District - PO

FIGURE 10: TRAILS & OPEN SPACE MAP

Green denotes Open Space.
Red denotes protected bike lanes.
Dotted lines refer to off-street/pedestrian trails.

(c) Base Districts

(1) Each of the districts described by this PUD authorizes the land uses listed for that base district in Section 03.03 (Use Regulations), subject to the development standards applicable to that type of development in PUD Section 04.04 and UDO Section 20.04 (Development Standards and Incentives), as applicable, and subdivision standards in UDO Section 20.05 (Subdivision Standards) and the requirements for development approval in UDO Section 20.06 (Administration & Procedures).

(2) In the event of an inconsistency between the provisions of the Summit District PUD and the provisions in UDO Sections 20.03, 20.04, 20.05 or 20.07, the provisions of the PUD shall apply.

(d) PUD Official Map Revisions

(1) Only persons authorized by the Planning and Transportation Director may revise the PUD Preliminary Plan Map when amendments are passed. Such revisions shall be made as soon as possible after the effective date of the amendment.

02.02.020 Standards

Upon subdivision within the Summit District PUD, the specific district boundaries shall be interpreted as follows:

(1) District boundaries indicated as following or being parallel to section or fractional sectional lot lines, or city corporate boundary lines shall be construed as following or paralleling such lines.

(2) District boundaries indicated as approximately following the center line of streams, rivers, or other bodies of water shall be construed to follow such centerlines.

(3) Where a district boundary divides a lot or parcel or follows or crosses property that is not subdivided the location of such boundary, unless indicated by legal description with distance and bearing or other dimension, shall be determined by the scale of the Preliminary Plan Map as interpreted by the Planning and Transportation Director.

(4) Whenever any street, alley, public right-of-way, waterway, or other similar area is vacated by proper authority, the districts adjoining each side of vacated areas shall be extended automatically to the center of the vacated area. All areas included in the vacation shall after the vacation be subject to all regulations of the extended districts. In the event of a partial vacation, the adjoining district or district nearest the portion vacated, shall be extended automatically to include all of the vacated area.

(5) Any disputes as to the exact district boundaries shall be determined by the Planning and Transportation Director. The Planning and Transportation Director may refuse to make a determination when the Director cannot definitely determine the location of a district boundary. In such cases, the Planning and Transportation Director shall refer the interpretation to the Plan Commission. The Plan Commission may then interpret the location of the district boundary with reference to the scale of the Preliminary Plan Map and the purposes set forth in all relevant provisions of this PUD and the UDO, where applicable.

All district boundary determinations made pursuant to this section may be appealed to the Board of Zoning Appeals.

02.02.030 District Dimensional Standards

The color-coded district map is below (Figure 11). Additional standards from Section 02.04.020 (Dimensional Standards) also apply.

FIGURE District 11: Area Map

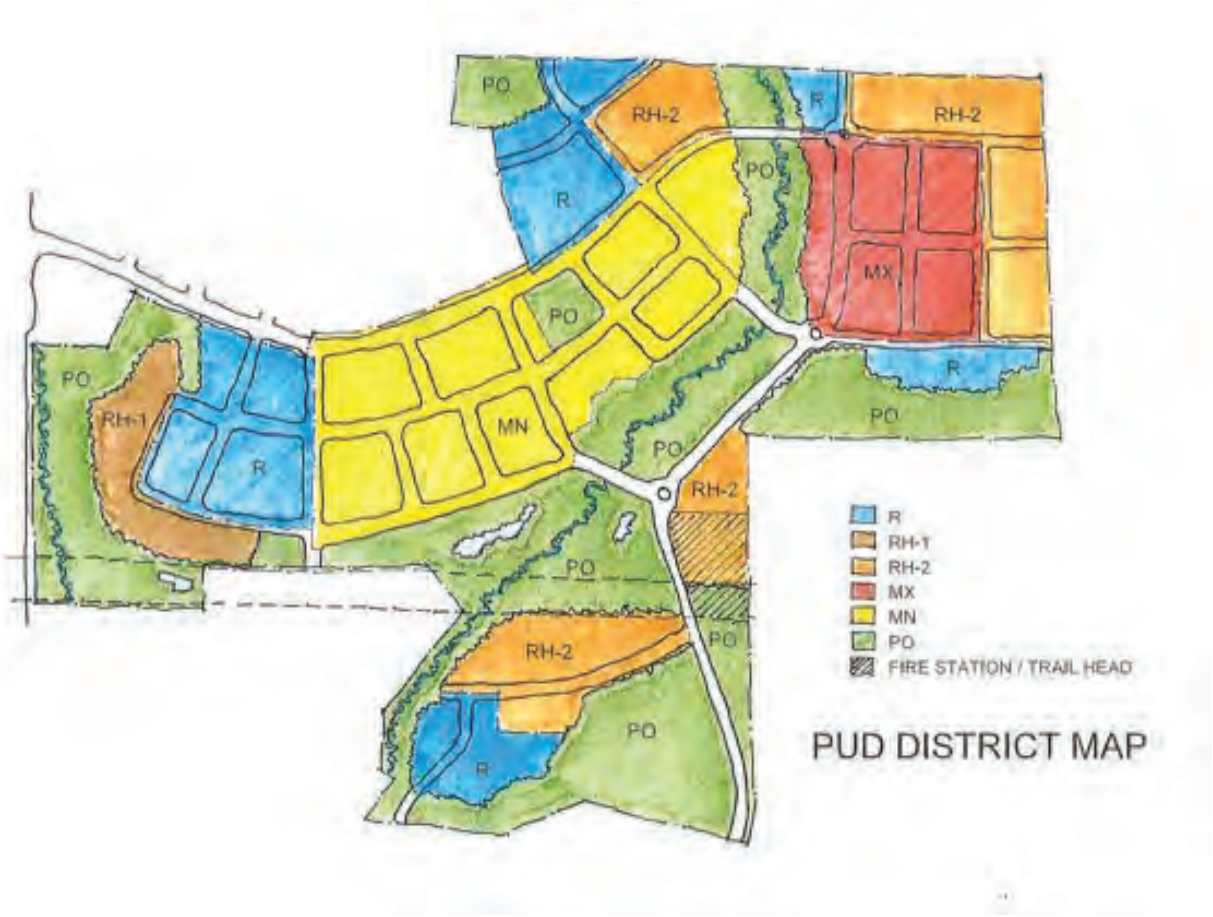


FIGURE 12: District Dimensional Standards

Summit District PUD

District Dimensional Standards

		Residential	Mixed Residential	Mixed Multi- Family	District Center	Mixed Use	Parks & Open Space
	District	R	RH1	RH2	MN	MX	PO
	Lot Dimensions (Minimum unless noted)						
A	Lot area (Sq Ft)	1,000	2,000	2,000	5,000	5,000	N/A
B	Lot width (feet)	15	20	20	50	50	N/A
	Building Setbacks (Minimum uunless noted)						
C	Front build-to range - (feet)	5-15	5-15	5-15	0-10	0-10	15**
D	Front builidng façade at build-to-range (feet)	80%	80%	80%	80%	80%	N/A
E	Side (feet)	5	5	5	5	5	15
F	Rear (feet)	3	3	3	3	3	15
	Other Standards						
G	Primary structure height (maximum -feet)	40	63	63	86	75	20
H	Step back required at (story / depth Ft.)	N/A***	4/15	4/15	7/15***	6/15	N/A
I	Non-Residential on ground level height (minimum ft)	N/A	N/A	N/A	12	12	N/A
J	Impervious surface coverage (maximum percent of lot)	70%	70%	70%	95%	90%	10%
K	Landscape area (minimum percent of lot)	None	0	0	0	0	None
L	Front parking setback (minimum feet)*	None	20	20	20	20	N/A
M	Accessory structure height (maximum - feet)	30	30	30	30	30	20

Note: See Section 04.04.060 (Incentives for Alternative Standards)
* Behind primary structures front building wall, excluding drive entrance/exit.
** PO has a setback of 15 feet from property line.
*** Transitional Standards specific to Arbor Ridge see (PUD 04.04.030(c)

Section 03.03: Summit District Use Regulations

Section 03.03.010: General

(1) In the Allowed Use Table, land uses are classified into general use categories and specific uses based on common functional, product, or physical characteristics such as the type and amount of activity, the type of customers or residents, how goods or services are sold or delivered, and site conditions. This classification provides a systematic basis for assigning present and future land uses into the appropriate district.

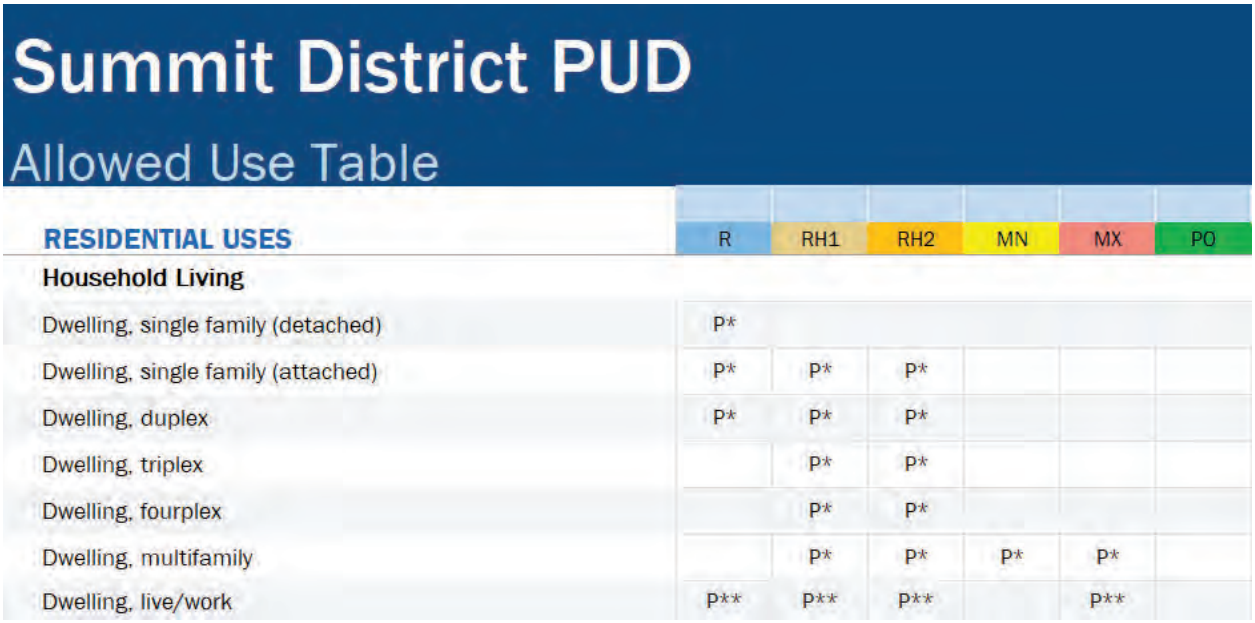
(2) A lot or parcel may include multiple principal uses, including a combination of residential and non-residential uses.

(3) When a proposed land use is not explicitly listed in the Allowed Use Table, the Planning and Transportation Director shall make a determination in accordance with UDO Section 20.06.080(c).

(4) All uses required by any unit of local, state, or federal government to have an approval, license, or permit to operate are required to have that local, state, or federal approval, license or permit in effect at all times, and failure to do so is a violation of this PUD and the UDO.

(5) All uses subject to operational standards of a local, state, or federal government agency, including without limitation the regulations of the Bloomington Municipal Code, and regulations of the Indiana Department of Health and Human Services, shall operate in compliance with those standards and regulations at all times and failure to do so is a violation of this PUD and the UDO.

FIGURE 13: Summit District PUD Allowed Use Table



Summit District PUD

Allowed Use Table

RESIDENTIAL USES	R	RH1	RH2	MN	MX	PO
Household Living						
Dwelling, single family (detached)	P*					
Dwelling, single family (attached)	P*	P*	P*			
Dwelling, duplex	P*	P*	P*			
Dwelling, triplex		P*	P*			
Dwelling, fourplex		P*	P*			
Dwelling, multifamily		P*	P*	P*	P*	
Dwelling, live/work	P**	P**	P**		P**	

Group Living						
Assisted living facility		P	P	P	P	
Continuing care retirement facility		P	P	P	P	
Group care home, FHAA small	P**	P**	P**	P**	P**	
Group care facility, FHAA large	P**	P**	P**	P**	P**	
Nursing or convalescent home		P	P		P	
Supportive housing, small			P		P	
Supportive housing, large			P		P	
PUBLIC, INSTITUTIONAL, AND, CIVIC USES	R	RH1	RH2	MN	MX	PO
Community and Cultural Facilities						
Art gallery, museum, or library				P	P	
Community center	P**	P**	P	P	P	
Day-care center, adult or child				P**	P**	
Meeting, banquet, or event facility				P	P	
Places of worship	P	P	P	P	P	
Club or Lodge	P	P	P	P	P	
Parks			P		P	
Police Station, Fire or Rescue			P		P	
Education Facilities						
School, college, or university			P	P	P	
School, public or private		P**	P**	P**	P**	
School, trade or business			P	P	P	

COMMERCIAL USES	R	RH1	RH2	MN	MX	PO
Healthcare Facilities						
Medical clinic				P		
Agricultural and Animal Uses						
Pet Grooming				P**		
Veterinarian clinic				P		
Entertainment and Recreation						
Amenity center		P**	P**	P**	P**	
Recreation, indoor		P**	P**	P	P	
Recreation, outdoor			P			
Food, Beverage, and Lodging						
Bar or dance club				P		
Bed and Breakfast	P**	P**		P		
Brewpub, distillery, or winery				P**	P**	
Hotel or motel				P	P	
Restaurant		P**	P**	P**	P**	
Office, Business, and Professional Services						
Artist studio or workshop		P**	P**	P	P	
Financial institution				P	P	
Fitness center, small			P	P	P	
Fitness center, large			P	P	P	
Office			P	P	P	
Personal service, small				P	P	
Personal service, large				P		
Tattoo or piercing parlor				P		
Retail Sales						
Grocery or supermarket				P		

Liquor or tobacco sales				P		
Retail sales, small				P		
Retail sales, medium				P		
Vehicles and Equipment						
Off site parking / Surface parking lot shared		P*	P*	P*	P*	
Surface parking lot				P*		
Vehicle fleet operations, small				P		
Vehicle fuel station				P*		
Vehicle parking garage			P**	P**	P**	
Vehicle sales or rental				P		
EMPLOYMENT USES	R	RH1	RH2	MN	MX	PO
Artisan Manufacturing			P	P	P	
UTILITIES AND COMMUNICATION	R	RH1	RH2	MN	MX	PO
Solar collector, ground- or building-mounted	P**	P**	P**	P**	P**	P**
Utility substation and transmission facility				P**	P**	
Wind energy system, small	P**	P**	P**	P**	P**	P**
ACCESSORY USES	R	RH1	RH2	MN	MX	PO
Detached garage	P**	P**				
Dwelling, accessory unit	P**	P**				
Electric vehicle charging facility	P	P	P	P	P	P
Home occupation	P**	P**	P**	P**	P**	
Swimming pool	P**	P**	P**	P**	P**	P**

TEMPORARY USES	R	RH1	RH2	MN	MX	PO
Real estate sales or model home	P**	P**	P**	P**	P**	
Seasonal sales	P**	P**	P**	P**	P**	P**
Special event	P**	P**	P**	P**	P**	P**

No * means there are no applicable Use-Specific Standards

* Refer to Use-Specific Standards in 03.03.020 of the Summit District PUD as defined below, as applicable.

**Refer to Use-Specific Standards in UDO Use-Specific Standards 20.03.030, as applicable.

Section 03.03.020 Use-Specific Standards

(a) Generally

The Use Specific Standards listed in this Section 03.03.020 apply to those uses listed in Figure 13 and are exclusive to application in the Summit District PUD. Where a Use-specific standard is not referenced in this PUD Section 03.03.020, the provisions of the UDO shall apply as to applicable Use Specific Standard(s).

(b) Residential Uses

(1) Dwelling, Single-Family (Attached), Dwelling, Single-Family (Detached), Dwelling Duplex, Dwelling Triplex and Dwelling Fourplex
as provided by UDO Sections 20.03.030(b)(l)(2), (3) and (4) do not apply to this PUD, except that Occupancy of a residence is subject to the definition of "family" in UDO Section 20.07: (Definitions).

(2) Dwelling, Multifamily

(A) Ground Floor Parking

i. Any portions within the ground floor of a structure used for vehicular parking shall be located at least 20 feet behind the building façade facing a public street. If there are multiple primary buildings on a site, this requirement only applies to the building closet to a public street.

(B) Size

i. In the RH-1 district no more than 24 multifamily dwelling units shall be constructed in a single Building, except as provided in PUD Section 04.04.060(c)v with the use of affordability incentives, in which case the Building shall not exceed 50 multifamily dwelling units.

(C) Building Floor Plate

i. Buildings in the RH1 and RH2 districts cannot have a floor plate larger than 10,000 square feet. Buildings in the MN or MX Districts cannot have a floor plate larger than 30,000 square feet.

(c) Commercial Uses

(1) Vehicle Fuel Station

(A) The use shall be limited to a total of eight metered fuel dispenser units. For the purpose of this section, each hose shall count as one fuel dispenser unit.

(B) Major overhaul, body and fender work, upholstering, welding and spray painting shall be prohibited as an accessory use of a vehicle fuel station.

(C) All activities other than vehicle fueling shall be conducted within a completely enclosed building.

(D) No outdoor storage of automobile parts, discarded tires, or similar materials shall be permitted.

(E) Outdoor storage of more than one wrecked or temporarily inoperable vehicles awaiting repairs shall be prohibited.

(F) All structures including fuel canopies shall be similar in appearance to the surrounding development with respect to architectural style, color, and materials.

(G) Fuel canopies shall be located to the side or rear of properties to minimize visual impact from public streets.

(H) At least 50% of the total number of dispenser units shall provide alternate fuels including, but not limited to biodiesel, electricity, majority ethanol blend, hydrogen or natural gas.

(2) Surface Parking Lot

(A) A freestanding primary use vehicle surface parking lot for a maximum of 50 cars shall be permitted only in accordance with these provisions:

i. The surface parking lot shall have ingress and egress to adjacent rights-of-way that are clearly marked with directional signage.

ii. A surface parking lot shall be limited by a minimum of 600' separation by distance from another surface parking lot.

iii. Surface parking may be shared by the public or its owners through a Shared Parking Agreement.

iv. A surface parking lot shall be approved for use for a period not

to exceed three (3) years from the date of approval of temporary use and may be extended two times for a period of up to one (1) year each by the Director of Planning and Transportation but only upon submission of a study by petitioner demonstration of a continuing need.

v. Upon the end of the approved time period for use of a surface parking lot, the area must be converted by the owner through approved construction of improvements or a conversion of the lot to greenspace in compliance with PUD Section 04.04.080 (Landscaping, Buffers and Fences).

(3) Off-Site Parking / Surface Parking Lot Shared

A. With the filing of a final site plan for development of a different approved use, the owners of two or more properties may request the use of a shared parking lot on a parcel that is adjacent to at least one of the proposed development sites. Upon review of the request, the Planning and Transportation Department may authorize the offsite parking/surface parking lot shared use.

B. Any property utilizing the parking created by this use shall be located within 600 feet of the off-site parking/surface parking lot shared facility providing compliant pedestrian connections to all developments utilizing the off-site parking/surface parking lot shared.

C. Off-site parking/Surface parking lot shall be approved for use for a period not to exceed three (3) years from the date of the approval of the related final plan and may be extended for a period of up to three (3) years by the Director of Planning and Transportation but only upon a submission of a study by petitioner demonstrating a continuing need.

D. Upon the end of the approved time period for use of an Off-Site Parking / Surface Parking Lot Shared, the area must be converted by the owner through approved construction of improvements or a conversion of the lot to greenspace in compliance with PUD Section 04.04.080 (Landscaping, Buffers and Fences).

Section 04.04 Development Standards & Incentives

04.04.010 Applicability

(a) New Development

The requirements of this Section shall apply to all new development pursuant to Section 04.04.010 (Applicability) of this PUD, unless otherwise exempted in this Section 04.04.010.

(b) Activities That Trigger Compliance

(1) Construction of any new primary structure on a lot shall require compliance with all standards in this Section unless an exception is stated in this PUD.

(2) Figure 14: identifies activities that trigger compliance for conforming sites and structures with specific development standards contained in this Section 04.04. These standards shall not exempt development activity that falls below the thresholds identified in Figure 14: from complying with applicable standards of this PUD or any applicable federal, state, or local regulations. Additional information on applicability is provided in the referenced sections.

(3) Section 20.06.090(f) (Nonconforming site features) identifies activities that trigger full and limited compliances for lawful nonconforming sites and structures with specific development standards as set forth by the UDO 20.04, except if a specific provision of the PUD in this Section 04.04 applies, in which case the PUD section 04.04 Standard shall apply.

(4) For purposes of this section, "entire site" shall mean the total area of the lot on which development is occurring. "Disturbed area" shall mean those areas of the lot or those portions of the structure that are included in the project area or that are affected by the proposed development activity.

FIGURE 14: Development Standards Compliance Thresholds For Conforming Sites and Structures

PUD or UDO Standard	Section	Change in Use		New Development		Redevelopment			
						Minor Site Plan		Major Site Plan	
		Entire Site	Disturbed Areas Only	Entire Site	Disturbed Areas Only	Entire Site	Disturbed Areas Only	Entire Site	Disturbed Areas Only
Dimensional Standards	04.04.020		✓	✓			✓	✓	
Environment	20.04.030		✓	✓			✓	✓	
Floodplain	20.04.040		✓	✓			✓	✓	
Access and Connectivity	20.04.040		✓	✓			✓	✓	
Parking and Loading	20.04.050		✓	✓			✓	✓	
Site and Building Design	04.04.060		✓	✓			✓	✓	
Landscape, Buffering, and Fences	04.04.070		✓	✓			✓	✓	
Outdoor Lighting	20.04.090		✓	✓			✓	✓	
Signs	04.04.080		✓	✓			✓	✓	

04.04.020 Dimensional Standards

(a) Purpose

This section is intended to provide dimensional standards and uniform methods of measurement for interpretation and enforcement of the lot and building standards in this PUD.

(b) Applicability

Compliance with this Section 04.04.020 (Dimensional Standards) shall be required pursuant to Section 04.04.010 (Applicability). The Development Standards provided by this Section 04.04.020 are applicable to all development within the Summit District PUD as expressly provided without reference to the UDO provisions regarding the same standards. Where a standard is not specified in this Section 04.04.020, the relevant provisions of the UDO shall apply.

(c) General Dimensional Standards

Figure 12 establishes the dimensional standards for residential, mixed- use, and other districts contained in Section 02.02: (Districts). In case of a conflict between the dimensions shown in

Section 04.04.020 and the dimensions referenced in Figure 12, the provisions of this Section 04.04.020 shall govern.

(d) Lot and Space Requirements

(1) Minimum Lot Dimensions
No space that is needed to meet the width, setback, area, open space, impervious surface coverage, landscaping, or other requirements of this PUD for a lot or building may be sold, leased, or subdivided away from such lot or building. All lots affected by a proposed subdivision shall meet the standards of this PUD.

(2) Number of Primary Buildings or Uses per Lot
Where a lot or parcel is used for multifamily, mixed-use, or commercial, more than one primary building may be located upon the lot when such buildings conform to all requirements of this PUD applicable to the uses and district.

04.04.030 Site and Building Design

(a) Applicability

(1) Compliance with this Section (Site and Building Design) shall be required pursuant to Section 04.04.010 (Applicability) and the specific applicability criteria established in Sections 04.04.060(b). Except as expressly provided by Sections 04.04.030(a), Section 04.04.030(b) and 04.04.030(c), UDO Section 20.04.060 (Site and Building Design) shall be applied to all Site and Building Design standards.

(b) Building Design

(1) Applicability
The following building design standards shall apply to all development.

(2) Exception: UDO 20.04.070(d)(1) Third Party Review shall not apply to this PUD.

(c) Transition to Arbor Ridge Subdivision

(1) Setback

i. Buildings located adjacent to Arbor Ridge Subdivision in Whitney Glen shall comply with minimum setbacks of an eight-foot side building setback and a twenty-five foot rear building setback.

(2) Height

i. Buildings located adjacent to Arbor Ridge Condominiums in Whitney Glen, when exceeding three (3) stories shall step back at the fourth (4th) story at a minimum five (5) additional feet from the required step back above.

ii. Buildings located along Sudbury Drive in Everest Center or Shasta Meadows directly across from Arbor Ridge Condominiums shall comply with a step back at the fourth (4th) floor for a minimum of ten (10) additional feet from the property line. For buildings that exceed six (6) stories, any additional step back shall be in compliance with the requirements provided in Figure 12.

04.04.040 Landscaping, Buffering, and Fences

(a) Applicability

Compliance with this Section 04.04.070 (Landscaping, Buffering and Fences) shall be required pursuant to Section 04.04.010 (Applicability) and the specific applicability criteria established in Sections 04.04.040(a), 04.04.040(b), and 04.04.040(c). Except as expressly provided by Sections 04.04.040(a), Section 04.04.040(b) and 04.04.040(c), UDO Section 20.04.080 (Landscape, Buffering and Fences) shall be applied to all Landscape, Buffering and Fences.

(b) District-Specific Applicability

i. For purposes of the PUD, the Multifamily Development Landscaping standard found in Section 20.04.080(i), shall apply to PUD districts R, RH1 and RH2.

ii. For purposes of the PUD, the MD District Landscaping standard found in Section 20.04.080(j), shall apply to PUD districts MX and MN.

(c) Exception

i. The PUD shall not be subject to the standards of Section 20.04.080(g) (Buffer Yards).

ii. Single family dwellings and plexes shall not be subject to the requirements of landscaping of UDO Section 20.04.080.

(d) Conversion of Uses "Surface Parking Lot" and Off-Site Parking/Surface Parking Lot Shared"

i. If the time period for the approved use under PUD 03.03.020(c)2 and PUD 03.03.020(c)3 has ended, all portions of the parcel for which no new development has been approved must be converted to green space with ground cover.

04.04.050 Signs

(a) Applicability

No sign or advertising device shall be established, altered, changed, erected, constructed, reconstructed, moved, divided, enlarged, demolished, or maintained except in compliance with this Section 04.04.050. Compliance with this Section 04.04.050 (Signs) shall be required pursuant to Section 04.04.010 (Applicability) and the specific applicability criteria established in Sections 04.04.050(a) and 04.04.050(b). Except as expressly provided by Sections 04.04.050(a), and Section 04.04.050(b), UDO Section 20.04.100 (Signs) shall be applied to all Sign standards.

(b) District-Specific applicability

i. For purposes of the PUD, the Residential District Sign Standards found in Section 20.04.100(i), shall apply to residential uses in PUD districts R, RH1 and RH2.

ii. For purposes of the PUD, the MD District Sign Standards found in Section 20.04.100(l) and the Multifamily Sign Standard found in Section 20.04.100(j) shall apply to PUD districts MX and MN and non-residential uses with the RH1 and RH2 districts.

iii. The following provisions of the UDO 20.04.100 shall be modified as expressly stated below:

1. Section 20.04.100(l)(4)(B) shall state:

i. Lots with 30 feet or less of public street frontage are not permitted any freestanding signs. Multiple free-standing signs shall be allowed for lots with 30 feet or more of public street frontage, but each free-standing sign must be a minimum of 60 feet apart.

2. Section 20.04.100(l)(4)(E) shall state that "No freestanding sign shall be allowed unless the primary structure on a lot is set back from the public right-of-way by a minimum of 10 feet."

3. Section 20.02.100(I)(2)(A)(iv) shall state "no property shall be limited to less than 20 square feet of wall signage and no use or tenant shall be permitted to exceed 300 square feet of wall signage."

04.04.060 Incentives

(a) Purpose

Affordable housing and sustainable development incentives are available to all development within the PUD. The purpose of this Section 04.04.060 is to establish a framework by which affordability and sustainability standards may be implemented to achieve the requirements of

the PUD and create standards to allow development to incorporate expanded affordability and sustainability measures by providing enhanced development incentives.

(b) Applicability

Except as expressly provided by PUD Section 04.04.060(a), Section 04.04.060(b), and Section 04.04.060(c), the UDO Section 20.04.110 (Incentives) shall apply.

(c) Summit District PUD-specific applicability

i. UDO Section 20.04.110(c)(5)(A) shall provide: For purposes of the PUD, regarding the Reduced Bulk Requirements, the dimension standards found in UDO Section 20.04.110(c)(5)(A) shall apply to residential single family and plexes in Districts R, RH-1 and RH-2.

ii. UDO Section 20.02.110(c)(5)(B)(i) Eligibility shall provide: In addition to the UDO requirements, a project in the "R" district shall not be eligible for an increase in primary structure height over one floor regardless of the incentives achieved

iii. UDO Section 20.04.110(c)(5)(B)(iv)(2) shall provide: Tier 2 Projects: Projects that are eligible for increased primary structure height for the affordable housing and sustainable development shall be eligible for two additional floors or building height not to exceed 24 feet. The additional floors of building height granted under this subsection (iv)(2) shall step-back at least 10 feet further than the lower floors of the building.

iv. In the MX and MN Districts, if the affordability incentive is utilized for a Project, the percentage of affordable housing shall equal twenty percent (20%) and not fifteen percent (15%) otherwise required under this PUD.

v. In the RH-1 District, if the affordability incentive is utilized for a Building, the Building may have a maximum number of units not to exceed 50.

vi. UDO Section 20.04.110(d)(2) Eligibility shall be modified to provide: Projects seeking the sustainable development incentives established by Section 20.04.110(d)(3) shall meet the qualifying criteria established in 20.04.110(a) and shall satisfy one of the following two options below."

vii. UDO Section 20.04.110(d)(3) shall be modified as follows:

Sustainable Development Incentives

(A) Single-Family, Duplex, Triplex, and Fourplex Uses

i. Single-family and duplex residential projects in the R, RH1 and RH2 districts that satisfy the sustainable development criteria in Option 1 or Option 2 above shall be eligible for the reduced bulk requirements established in Section 20.04.110(c)(5)(A) (Reduced Bulk Requirements).

ii. Single-family, duplex, triplex and fourplex in the R district that satisfy the sustainable development criteria in Option 1 or Option 2 above shall not be eligible for additional primary structure height.

(B) All Other Uses

Projects that satisfy the sustainable development criteria in Option 1 or Option 2 above shall be eligible for additional primary structure height as established below:

i. One floor of building height, not exceed 12 feet, beyond the maximum primary structure height established for zoning district where the project is located, as identified in Section 04.04.02 (Dimensional Standards).

ii. Projects that qualify for the affordable housing incentives in Section 20.04.110(c) (Affordable Housing) in addition to the sustainable development incentive in 20.04.110(d)(2) shall be eligible for the additional incentive height described in Section 04.04.060(c)(iii).

07.07.010 Definitions

(A) The following definitions apply specifically to this PUD:

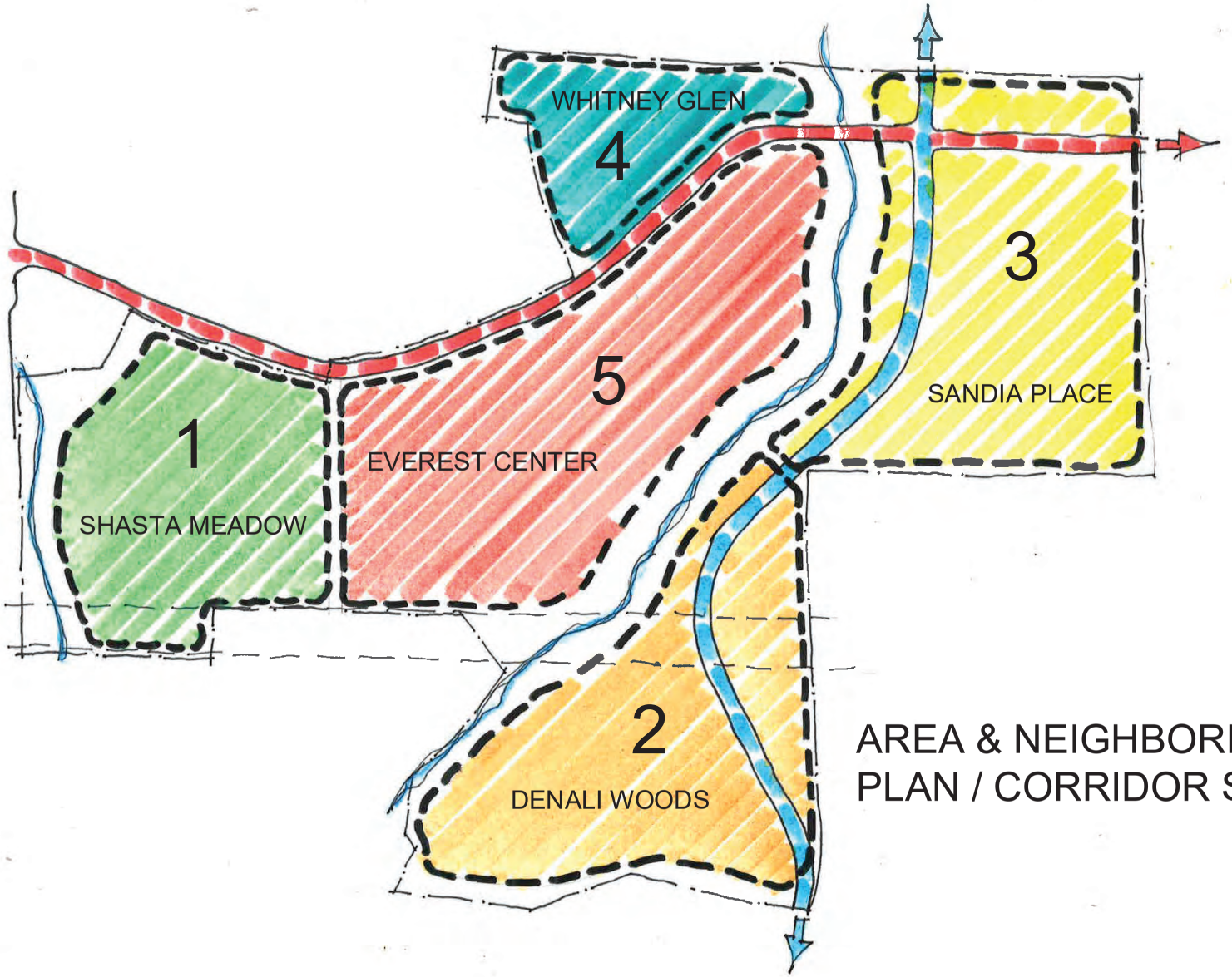
i. Surface Parking Lot

A free-standing parcel of land with single, ground-level improvements, such as paved parking areas, constructed to allow for the parking of motor vehicles in accordance with the Use Specific Standards in PUD 03.03.020(C)2.

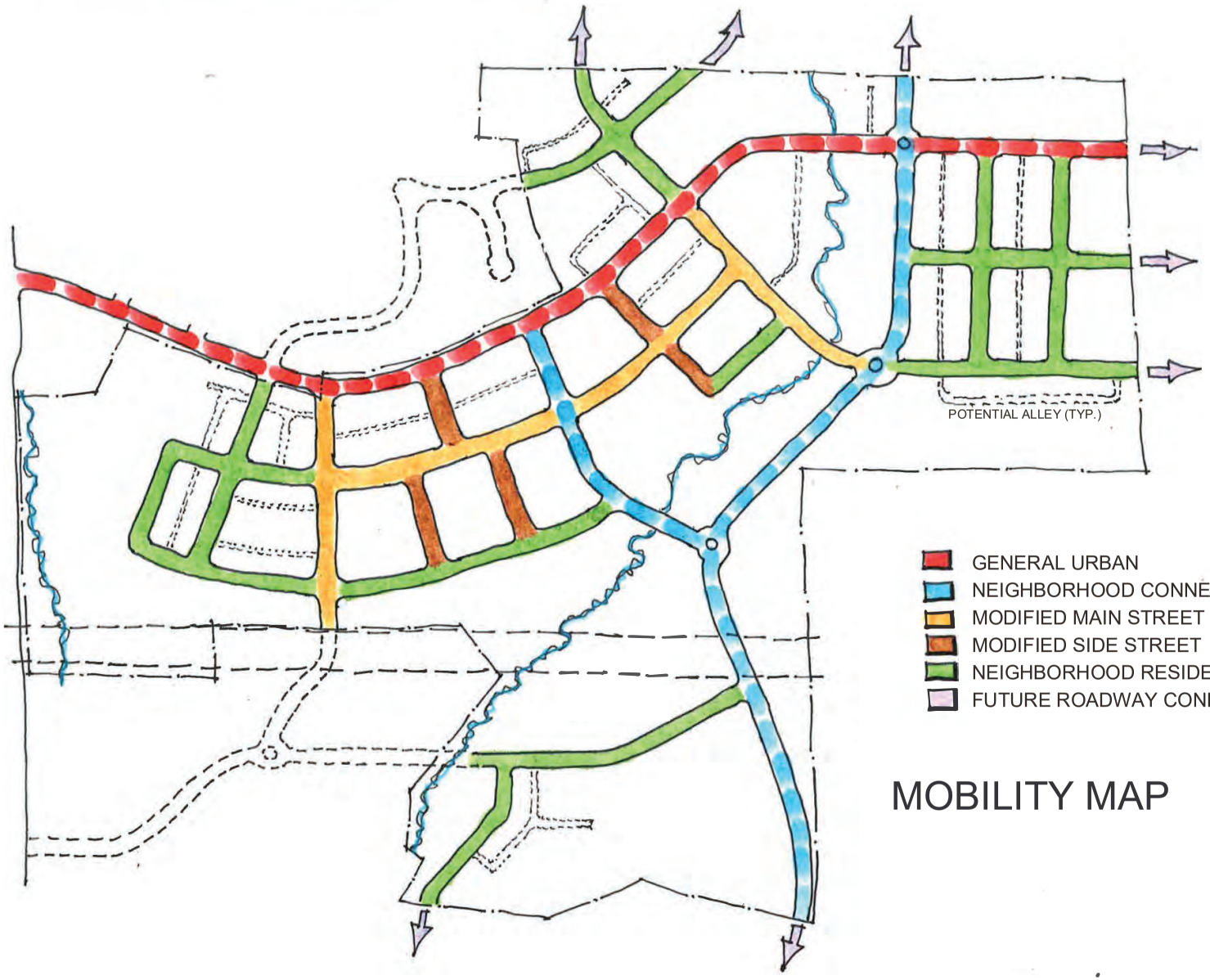
ii. Off-Site Parking/ Surface Parking Lot Shared

A free-standing parcel of land with single, ground-level improvements, such as paved parking areas, constructed to allow for the parking of motor vehicles, which parking lot is utilized by other property owners or users and may be shared by users from different properties, in accordance with the Use Specific Standards in PUD 03.03.020 (c)3.

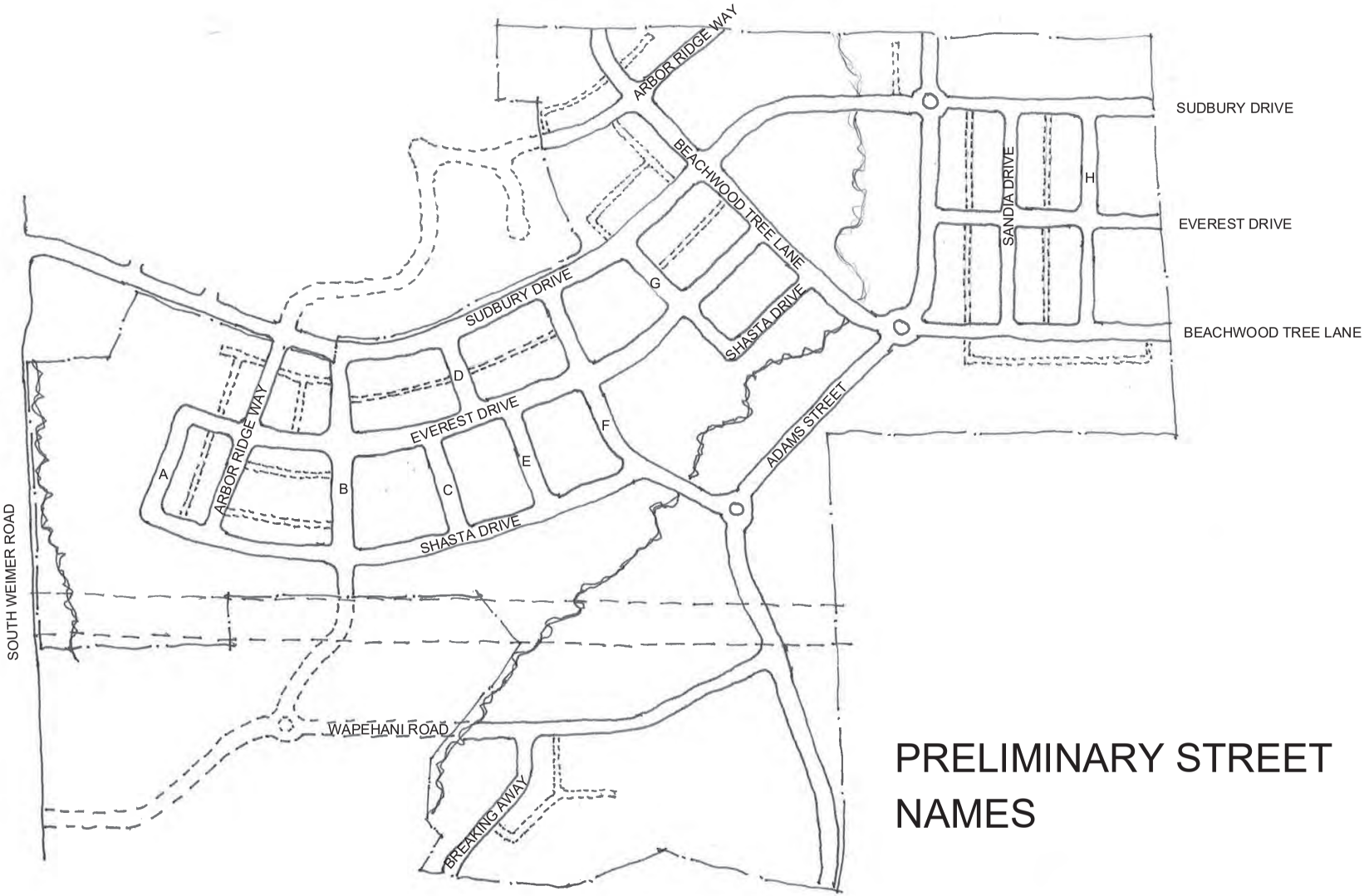
Preliminary Plan



AREA & NEIGHBORHOOD
PLAN / CORRIDOR STREETS

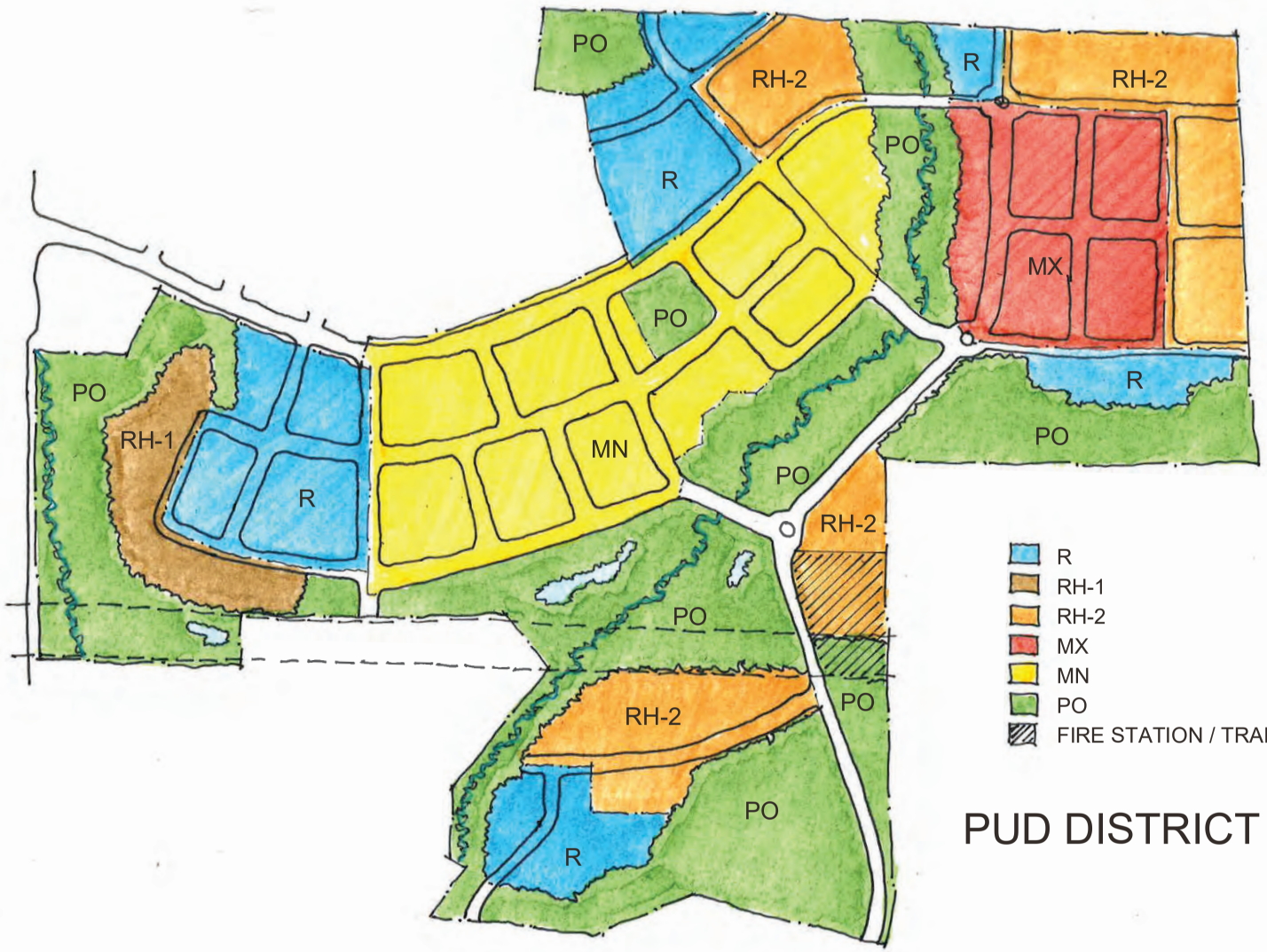


MOBILITY MAP

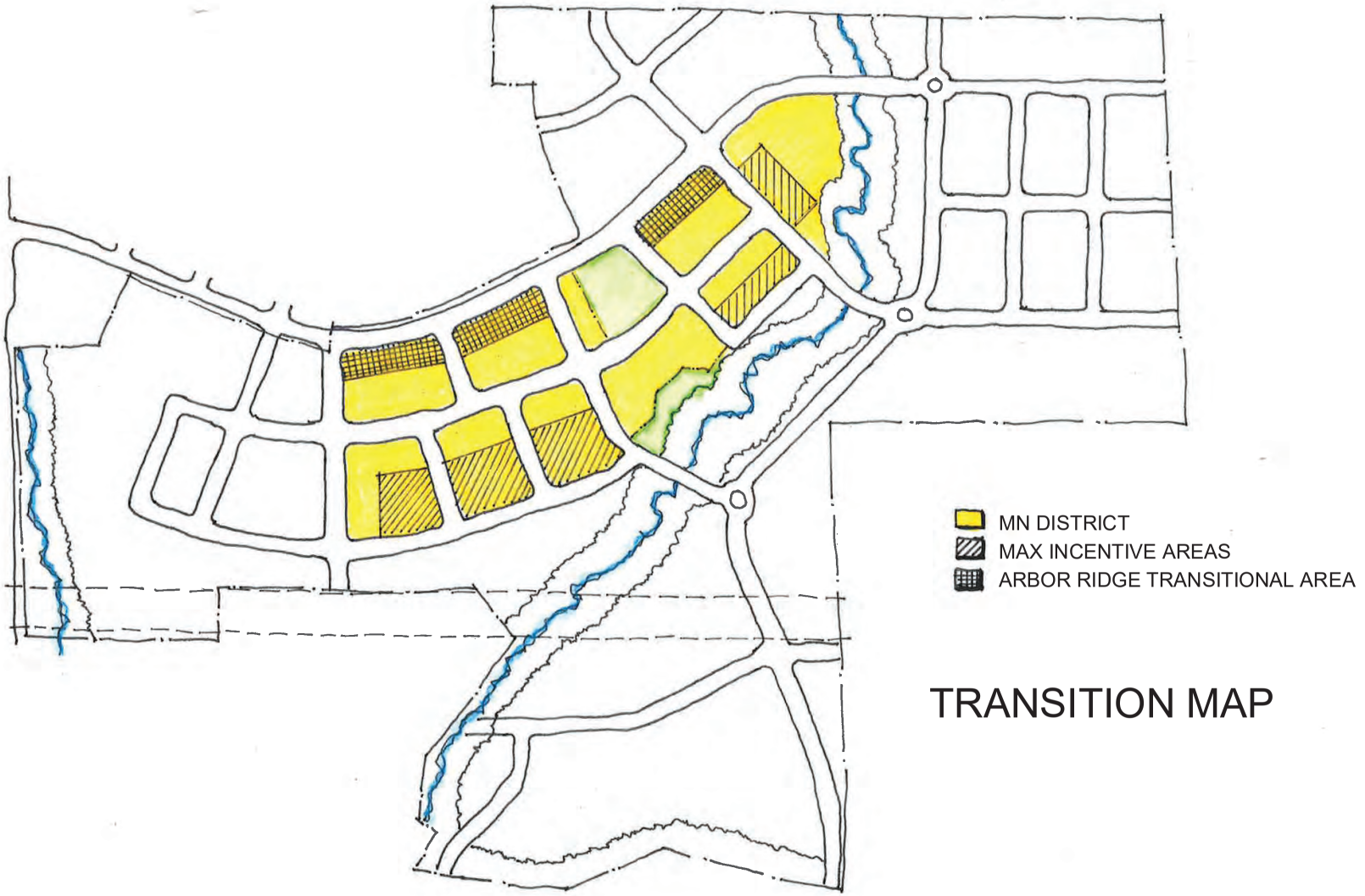


PRELIMINARY STREET NAMES

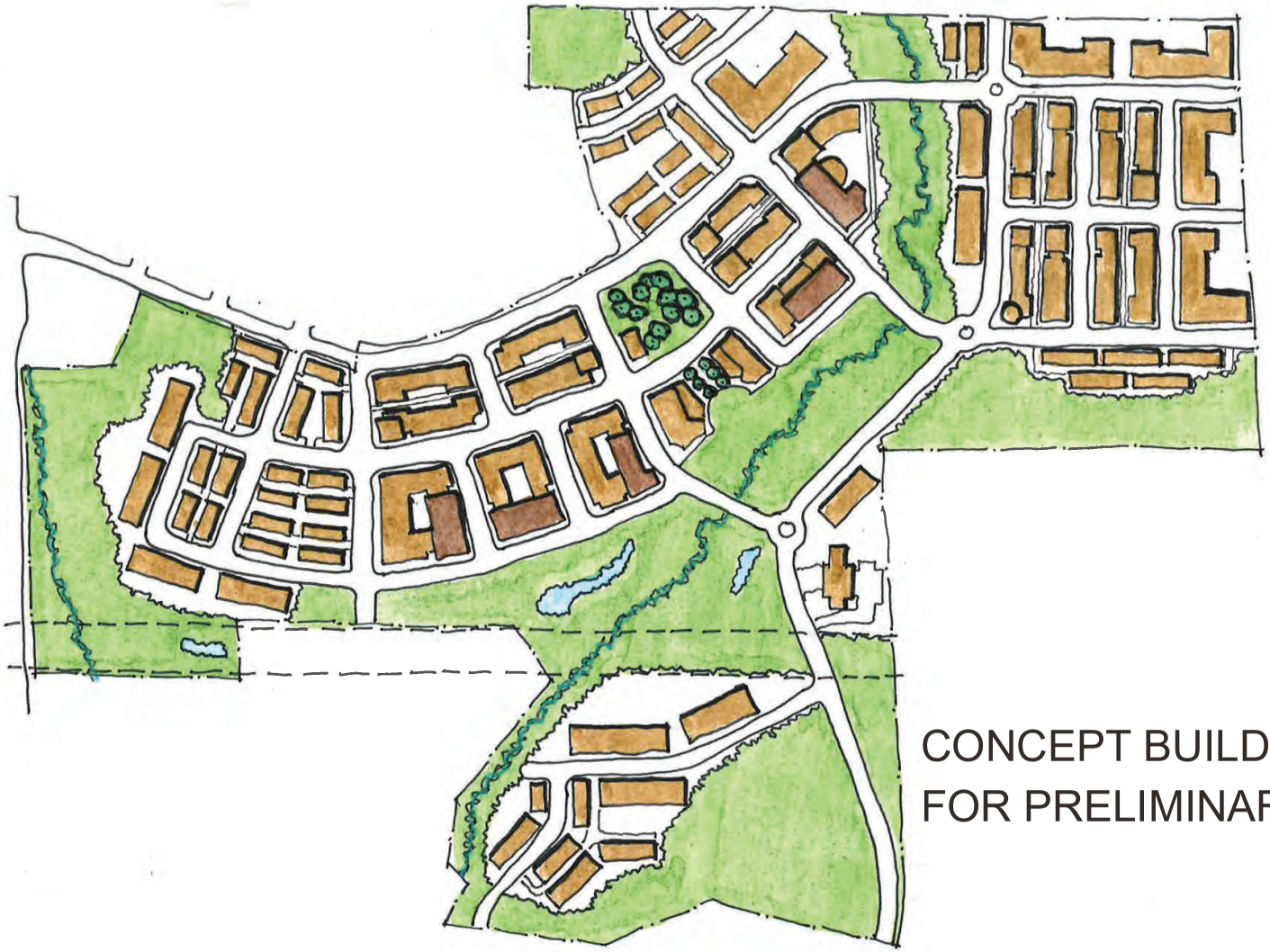
TRAILS & OPEN SPACE MAP



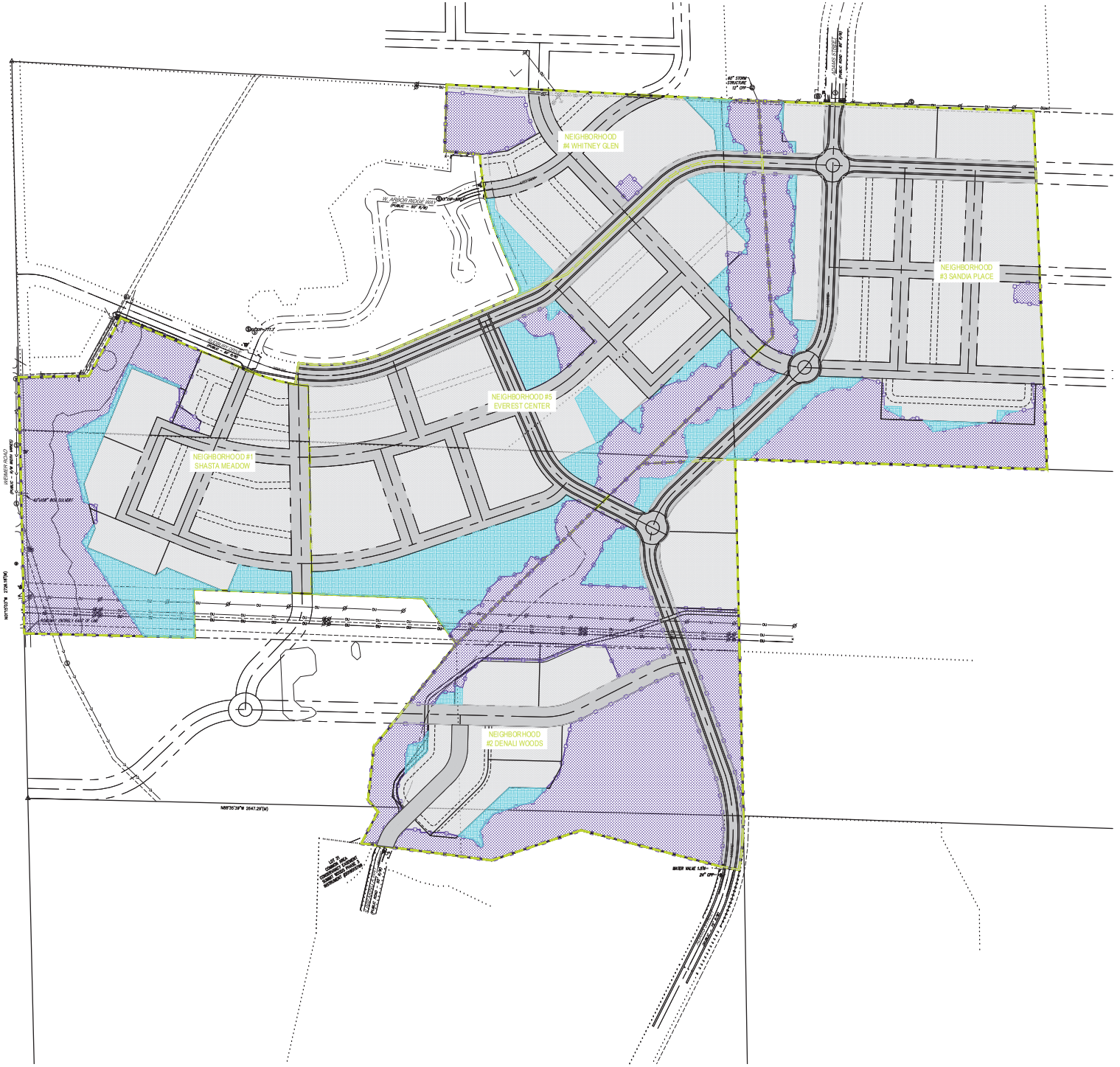
PUD DISTRICT MAP

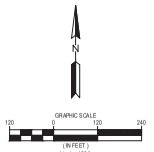


TRANSITION MAP



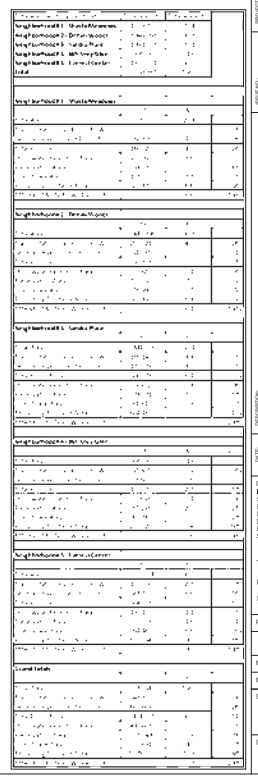
CONCEPT BUILDING LAYOUT
FOR PRELIMINARY PLAN





LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PUBLIC ROW
- PRIVATE BUILDABLE AREA
- OPEN AREA
- COMBINED PRESERVATION AREA



Stantec
733 MARQUETTE AVE.
MINNEAPOLIS, MN 55402
PHONE: (612) 712-2000
WWW.STANTEC.COM

CLIENT:

TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765) 282-3715
WWW.RIDGECORPORATION.COM

PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DESCRIPTION	DATE
1	PUD SUBMITTAL RESUBMIT	10/26/2023

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:

DATE:

PROJECT NO. 68

DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:

ISSUE NO.:

SHEET TITLE:

OPEN SPACE EXHIBIT

SHEET NO.:

EX-12

GRAPHIC SCALE
120 0 120 240
(IN FEET)
1 inch = 120 ft.

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE

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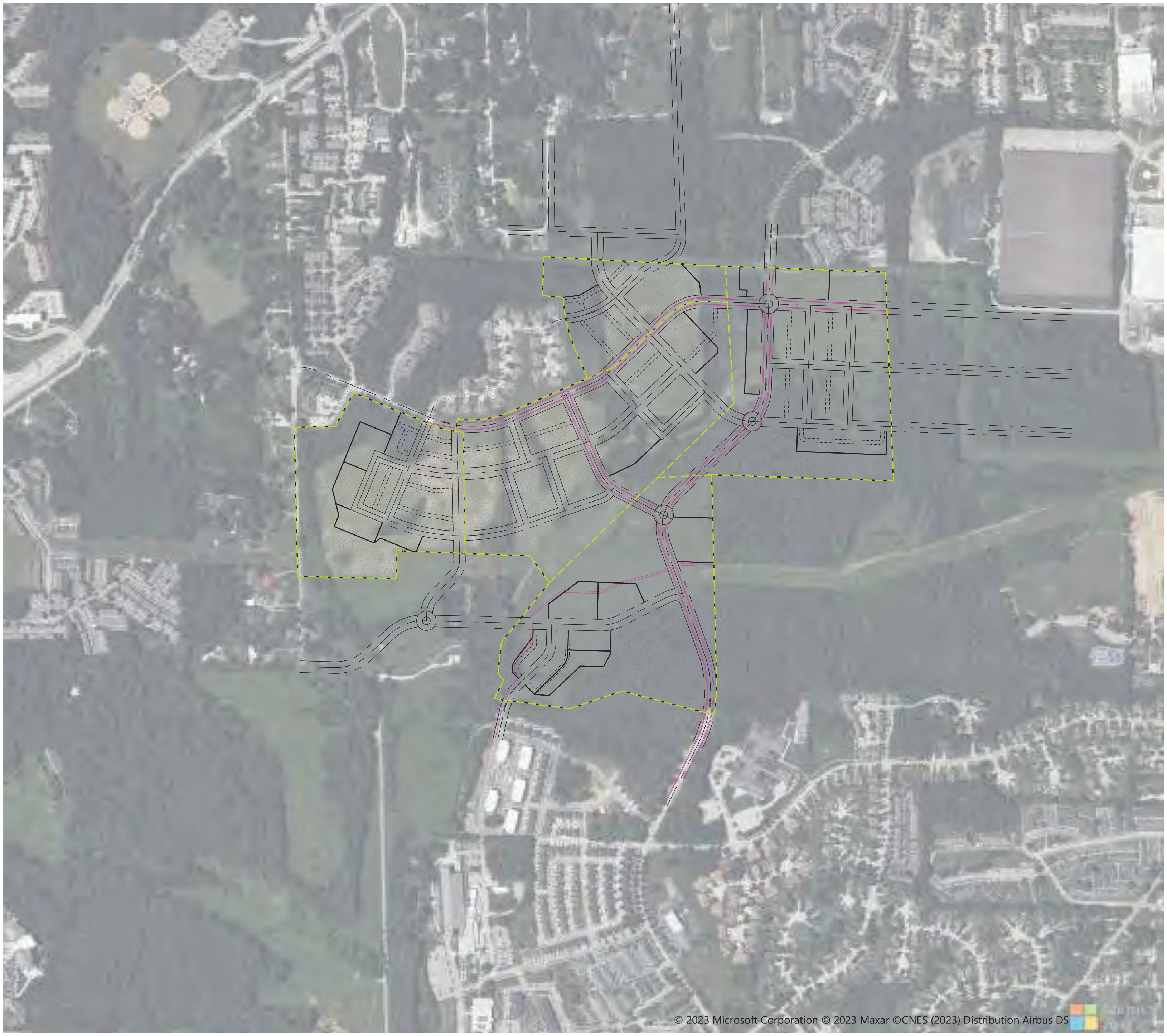
CLIENT:
TRG THE RIDGE GROUP
TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765)-282-3778
WWW.RIDGECORPORATION.COM

PROJECT TITLE
SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	10/26/2023	PUD SUBMITTAL REVISIONS

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:
PROJECT NO.: 90
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
OVERALL WITH CONCEPT SITE
SHEET NO.:
PR-2



GRAPHIC SCALE
200 0 200 400
(IN FEET)
1 inch = 200 ft.

LEGEND

PROPERTY BOUNDARY
LOT LINE
EASEMENT LINE
SETBACK LINE
RIGHT OF WAY LINE
SECTION LINE
QUARTER LINE
EXISTING EASEMENT LINE
EXISTING PROPERTY LINE
EXISTING FENCE LINE
EXISTING STORM SEWER
EXISTING SANITARY SEWER
EXISTING WATERMAIN
EXISTING EDGE OF PAVEMENT
EXISTING EDGE OF GRAVEL
EXISTING CURB AND GUTTER
EXISTING TREE LINE
EXISTING WETLAND BOUNDARY
EXISTING SANITARY MANHOLE
EXISTING STORM SEWER MANHOLE
EXISTING STORM SEWER INLET
EXISTING STORM SEWER INLET
EXISTING FLARED END SECTION
EXISTING HYDRANT
EXISTING WATER VALVE

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CLIENT:
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TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765)-282-3778
WWW.RIDGECORPORATION.COM

PROJECT TITLE
SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.:	DATE:	DESCRIPTION:
1	10/26/2023	PUD SUBMITTAL REVISIONS

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:
PROJECT NO.:
91
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
OVERALL WITH CONCEPT SITE WITH AERIAL
SHEET NO.:
PR-3

11/7/2023 11:35:21 AM
\\us0242-ppfss01\shared_projects\193806201\6_DESIGN\1_CAD\2 EXHIBITS\PROPOSED CONDITIONS EXHIBIT.dwg 11/7/2023 SVEUM, PATRICK

LEGEND

	PROPERTY BOUNDARY
	LOT LINE
	EASEMENT LINE
	SETBACK LINE
	RIGHT OF WAY LINE
	SECTION LINE
	QUARTER LINE
	EXISTING EASEMENT LINE
	EXISTING PROPERTY LINE
—x—x—	EXISTING FENCE LINE
—>>—>>—	EXISTING STORM SEWER
—>—>—	EXISTING SANITARY SEWER
—I—I—	EXISTING WATERMAIN
	EXISTING EDGE OF PAVEMENT
	EXISTING EDGE OF GRAVEL
	EXISTING CURB AND GUTTER
	EXISTING TREE LINE
—WET—WET—	EXISTING WETLAND BOUNDARY
	EXISTING SANITARY MANHOLE
	EXISTING STORM SEWER MANHOLE
	EXISTING STORM SEWER INLET
	EXISTING STORM SEWER INLET
	EXISTING FLARED END SECTION
	EXISTING HYDRANT
	EXISTING WATER VALVE

Stantec
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WWW.STANTEC.COM

CLIENT:
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TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765)-282-3778
WWW.RIDGECORPORATION.COM

PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DESCRIPTION	DATE
1	PUD SUBMITTAL REVISIONS	10/26/2023

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:
PROJECT NO.: 92
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
OVERALL WITH CONCEPT SITE
SHEET NO.:
PR-1

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 inch = 50 ft

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE

Stantec
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MINNEAPOLIS, MN 55402
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WWW.STANTEC.COM

CLIENT:

TRG THE RIDGE GROUP
TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765) 282-3715
WWW.RIDGECORPORATION.COM

PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	10/28/2023	PUD SUBMITTAL RESPONSE

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:

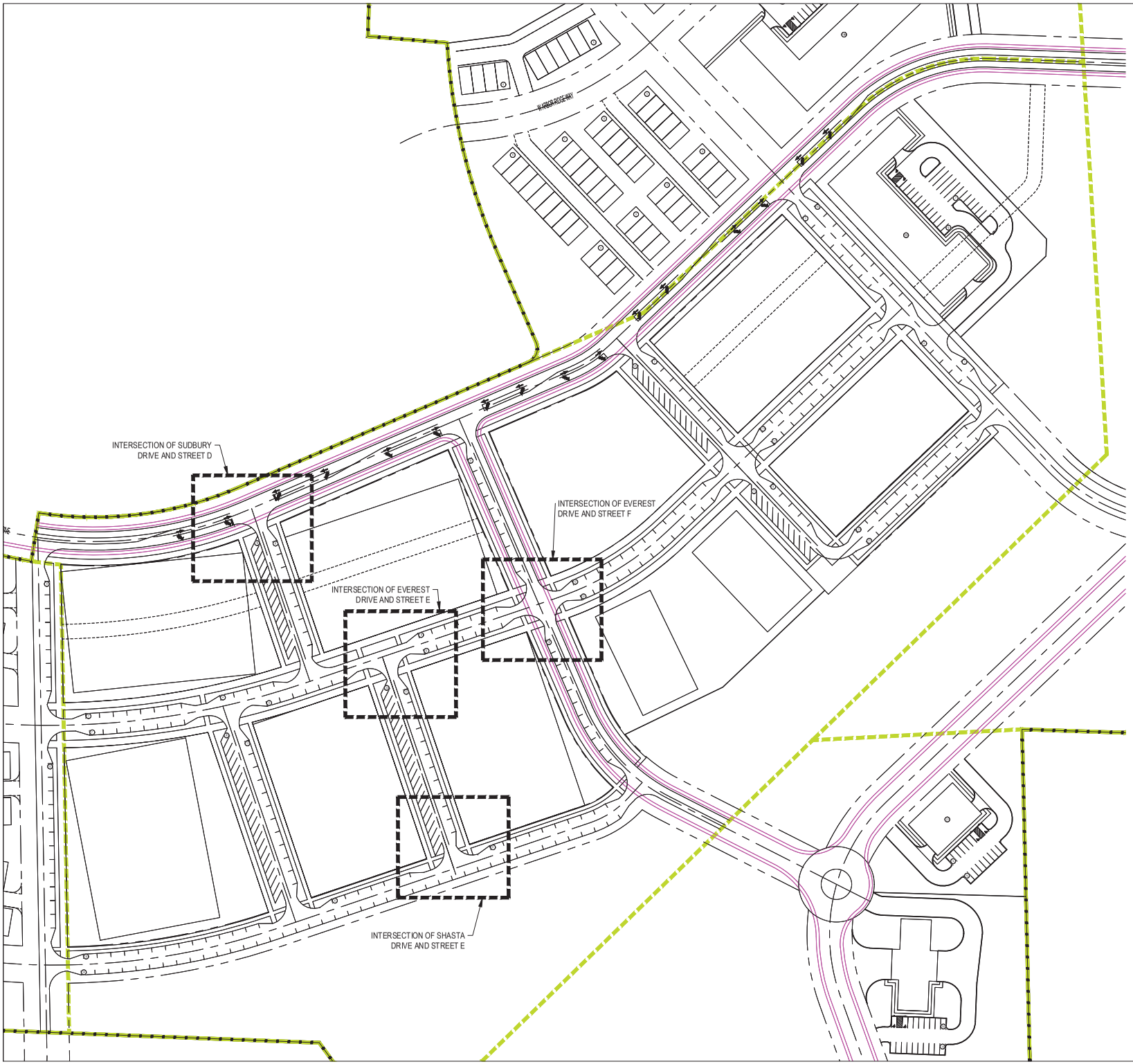
PROJECT NO. 193

DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:
ISSUE NO.:

SHEET TITLE:
EVEREST CONCEPT PARKING

SHEET NO:
PR-4



GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 inch = 50 ft

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE

Stantec
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MINNEAPOLIS, MN 55402
PHONE: (612) 712-2000
WWW.STANTEC.COM

CLIENT:

TRG THE RIDGE GROUP
TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765) 282-3715
WWW.RIDGECORPORATION.COM

PROJECT TITLE
SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	10/26/2023	PUD SUBMITTAL RESPONSE

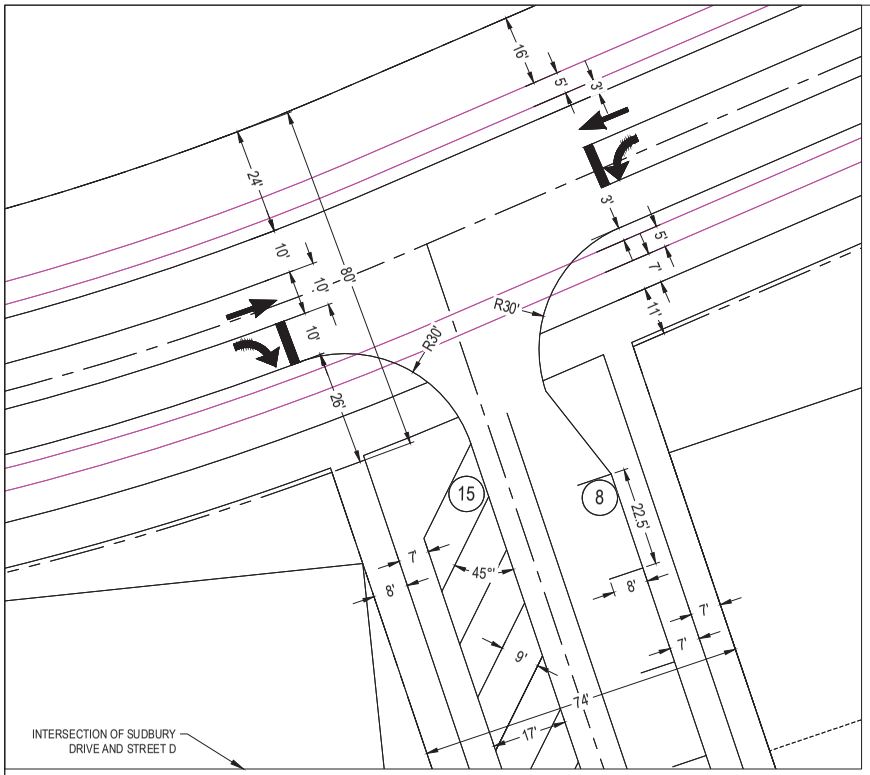
CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

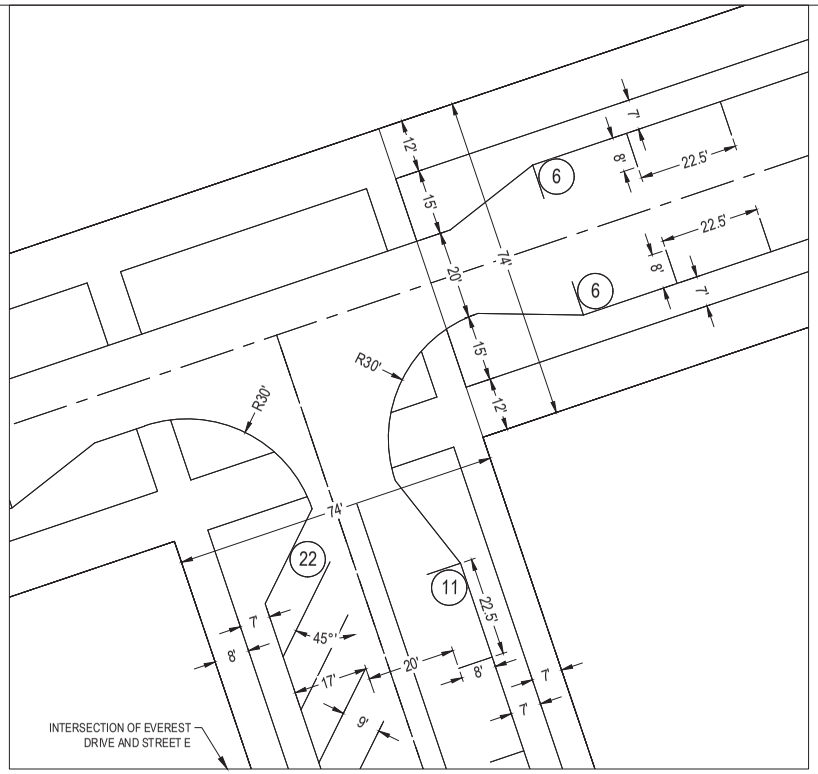
LICENSE NO.:
DATE:

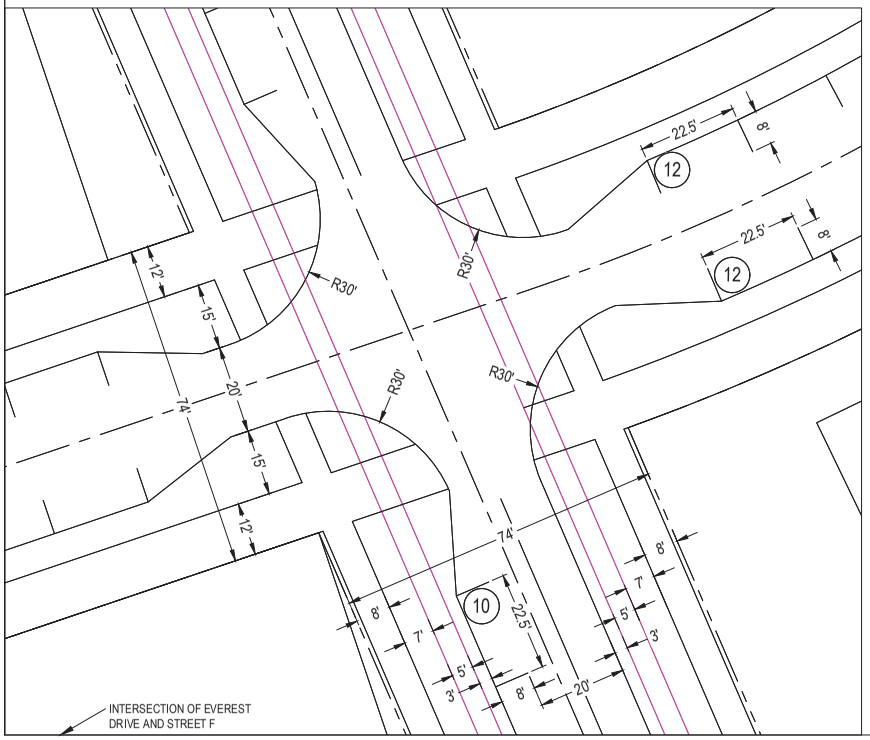
PROJECT NO. 194

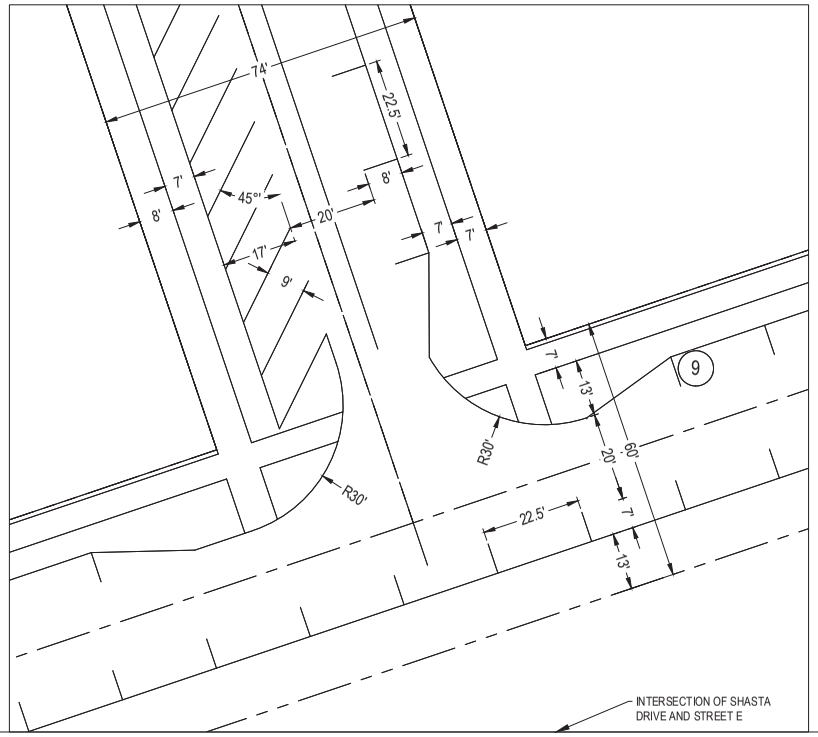
DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:
ISSUE NO.:
SHEET TITLE: EVEREST CONCEPT PARKING
SHEET NO.: PR-4









LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE

Stantec
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MINNEAPOLIS, MN 55402
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WWW.STANTEC.COM

CLIENT:

TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765) 282-3715
WWW.REDGECORPORATION.COM

PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	10/26/2023	2ND SUBMITTAL REVISIONS

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:

DATE:

PROJECT NO: 195

DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:

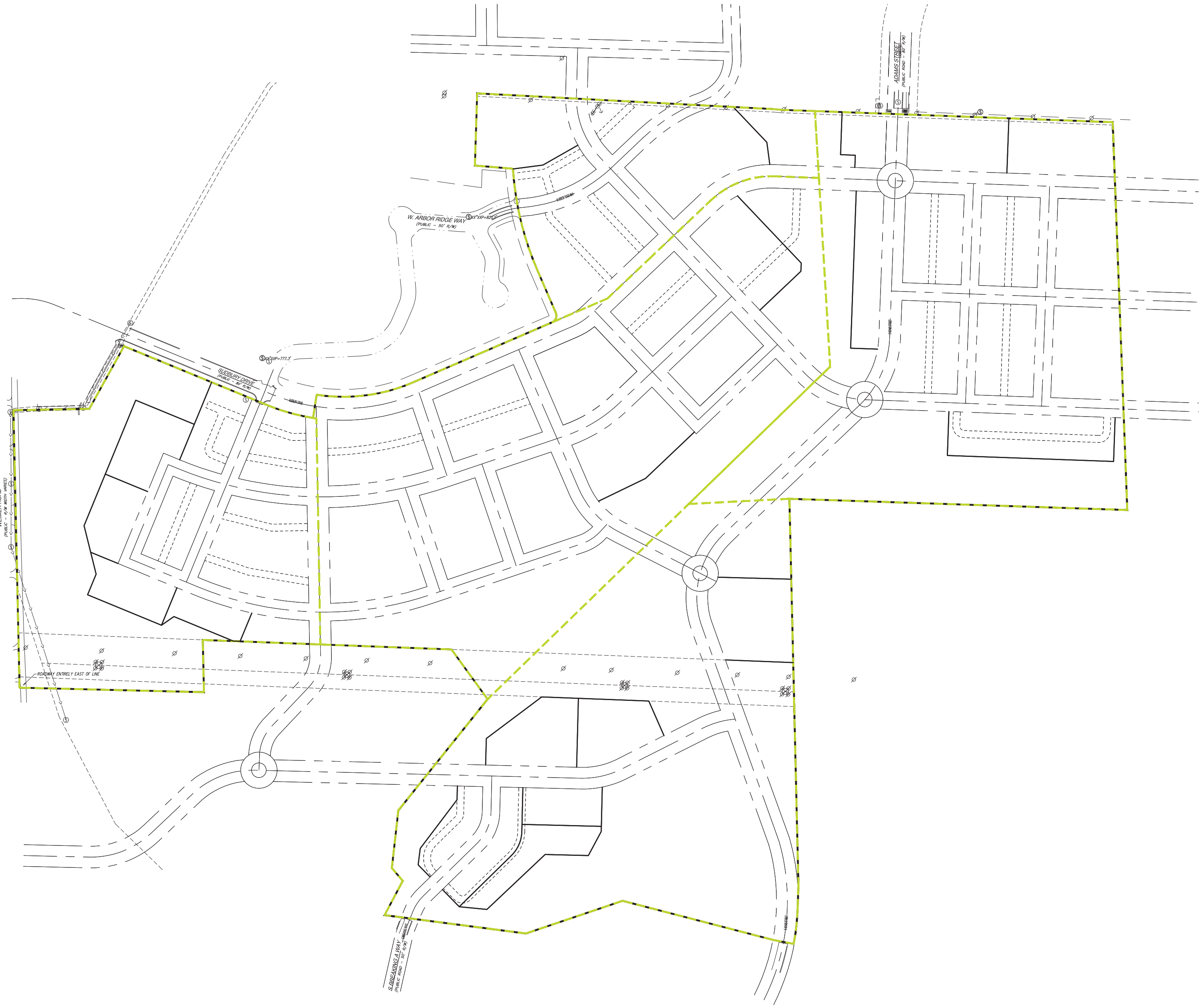
ISSUE NO.:

SHEET TITLE:

ENLARGED EVEREST CONCEPT PARKING

SHEET NO:

PR-5



GRAPHIC SCALE
120 0 120 240
(IN FEET)
1 inch = 120 ft.

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE

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CLIENT:
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TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765)-282-3778
WWW.RIDGECORPORATION.COM

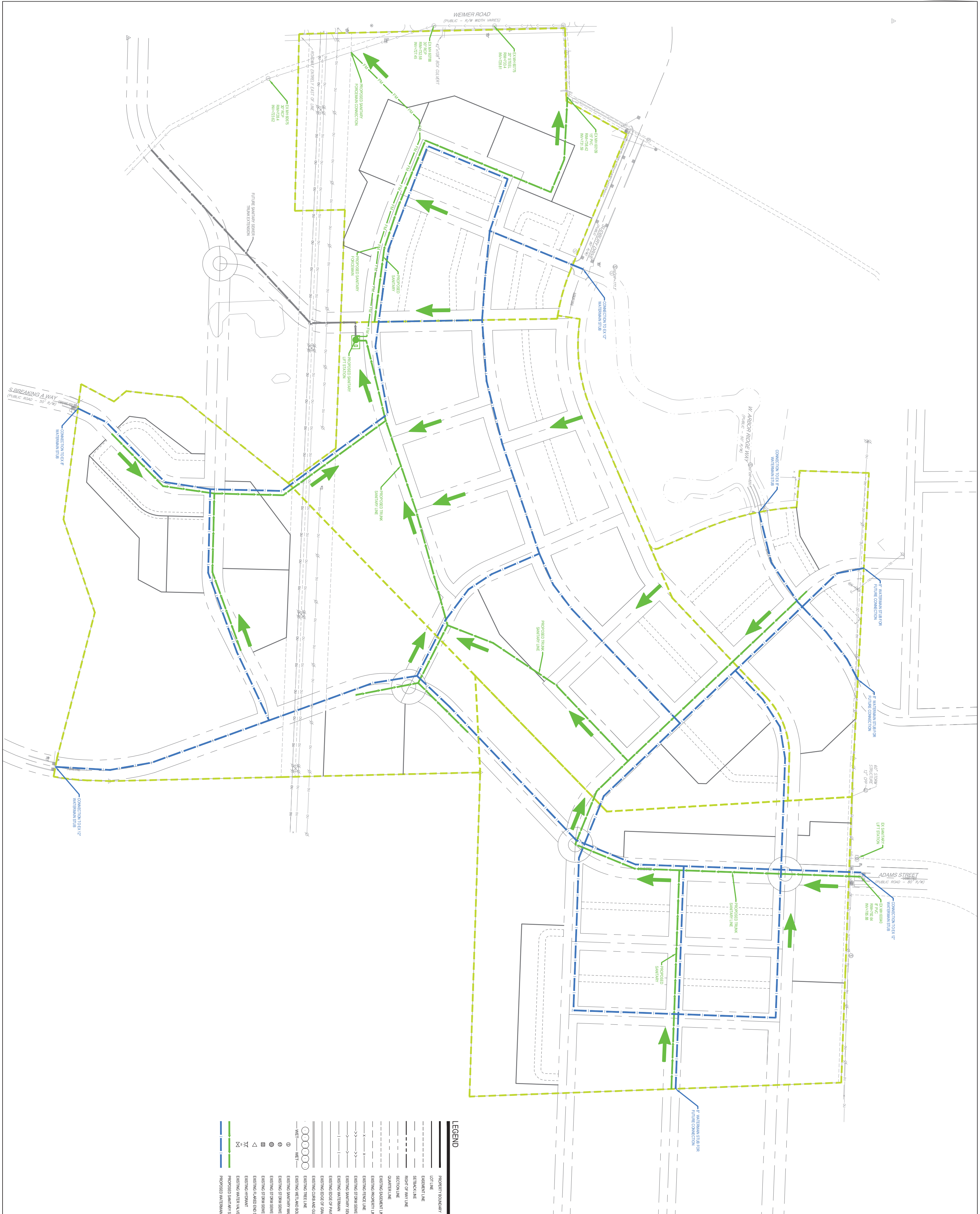
PROJECT TITLE
SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE:	DESCRIPTION:
1	10/26/2023	PUD SUBMITTAL REVISIONS

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:
PROJECT NO.: 96
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
OVERALL WITH CONCEPT SITE
SHEET NO.:
PR-1

10/26/2023 12:51:21 PM
\\us0242-ppfss01\shared_projects\193806011_DESIGN\1_CAD\2 EXHIBITS\PROPOSED CONDITIONS EXHIBIT.dwg 10/26/2023 SVELIM, PATRICK



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WWW.STANTEC.COM

CLIENT:
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PHONE: (765) 282-2178
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PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.:	DESCRIPTION:	DATE:
1	PUD SUBMITTAL REVISIONS	10/26/2023

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:
DATE:
PROJECT NO.: 97
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
OVERALL CONCEPT UTILITY PLAN
SHEET NO.:
PR-2

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CLIENT:

TRG DEVELOPMENT, LLC
MUNCIE, IN 47302
PHONE: (765) 282-3776
WWW.RIDGECORPORATION.COM

PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	10/26/2023	PUD SUBMITTAL RESPONSE

CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:

DATE:

PROJECT NO: 186

DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:

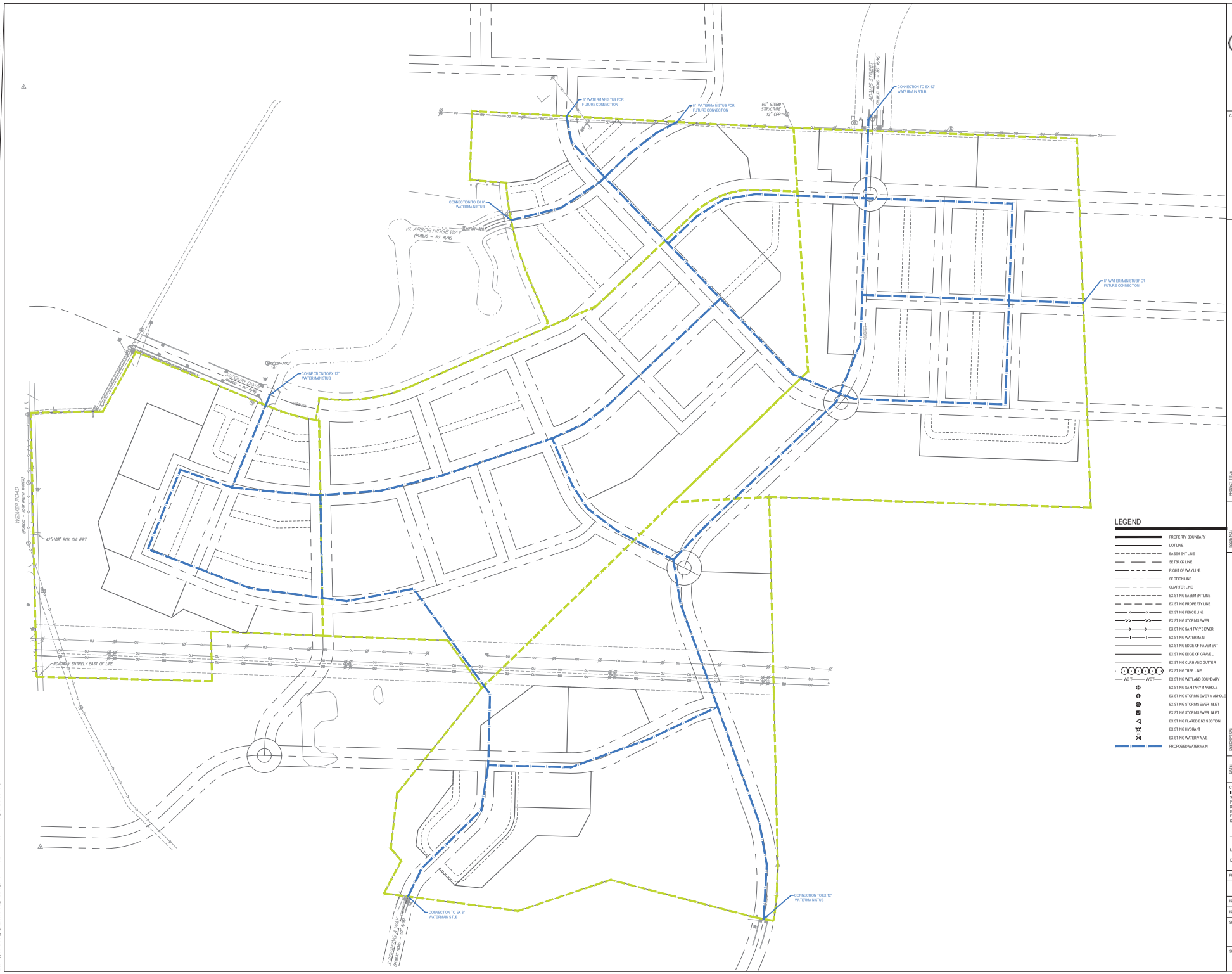
ISSUE NO.:

SHEET TITLE:

CONCEPT SANITARY SEWER PLAN

SHEET NO:

PR-3



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PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT

S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE AND REVISION	DESCRIPTION	DATE
1	PUD SUBMITTAL RESPONSE	10/26/2023

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DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:

ISSUE NO.:

SHEET TITLE:

CONCEPT WATERMAIN PLAN

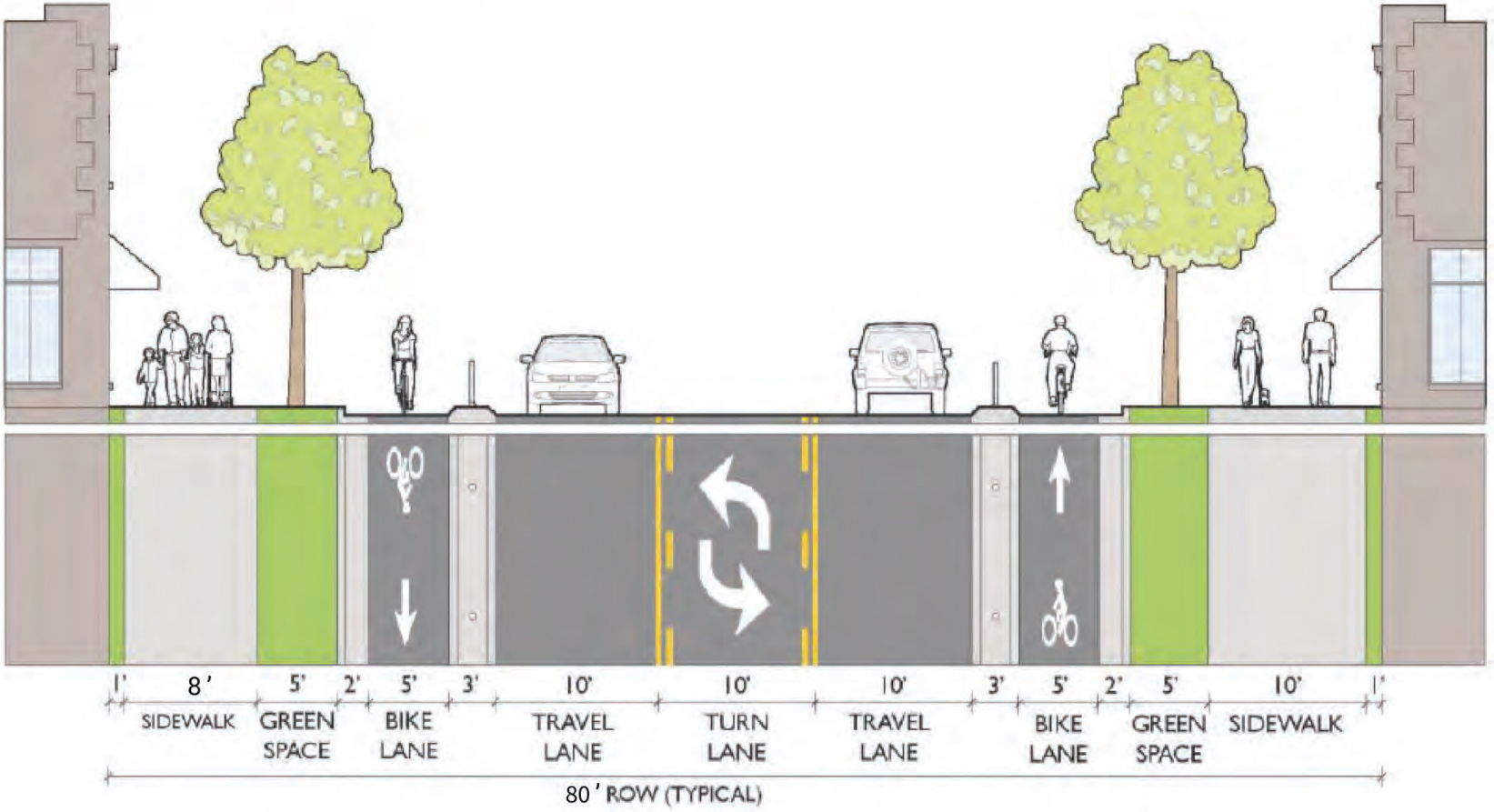
SHEET NO:

PR-4

Section 2: General Urban Street Typical Cross - Section (FIGURE 15, PG 29 OF TRANSPORTATION PLAN)

SUDBURY DRIVE

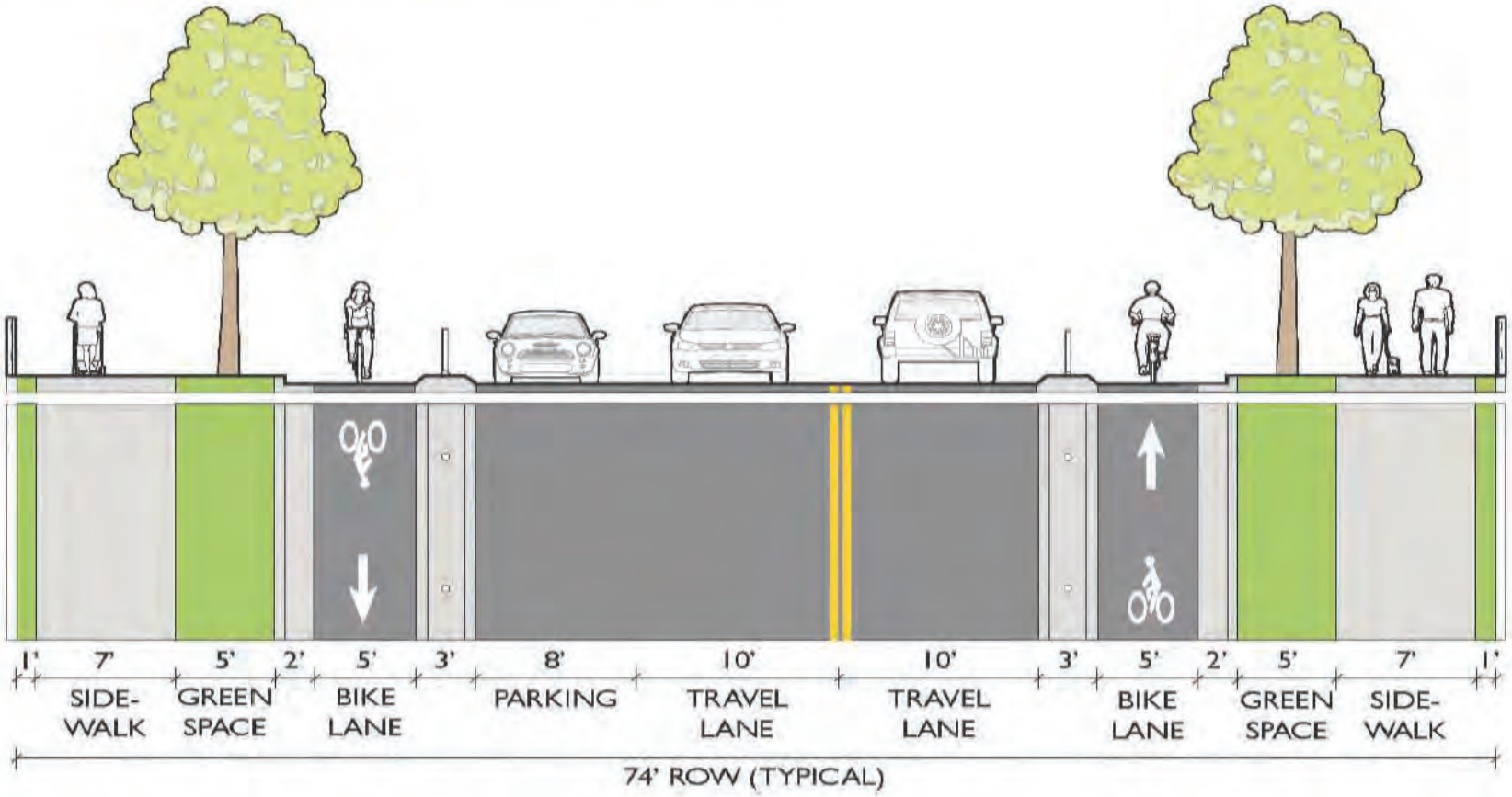
Figure 15. General Urban Street typical cross-section



Section 3: Neighborhood Connector Typical Cross - Section (FIGURE 16, PG 30 OF TRANSPORTATION PLAN)

S ADAMS STREET

Figure 16. Neighborhood Connector Street typical cross-section

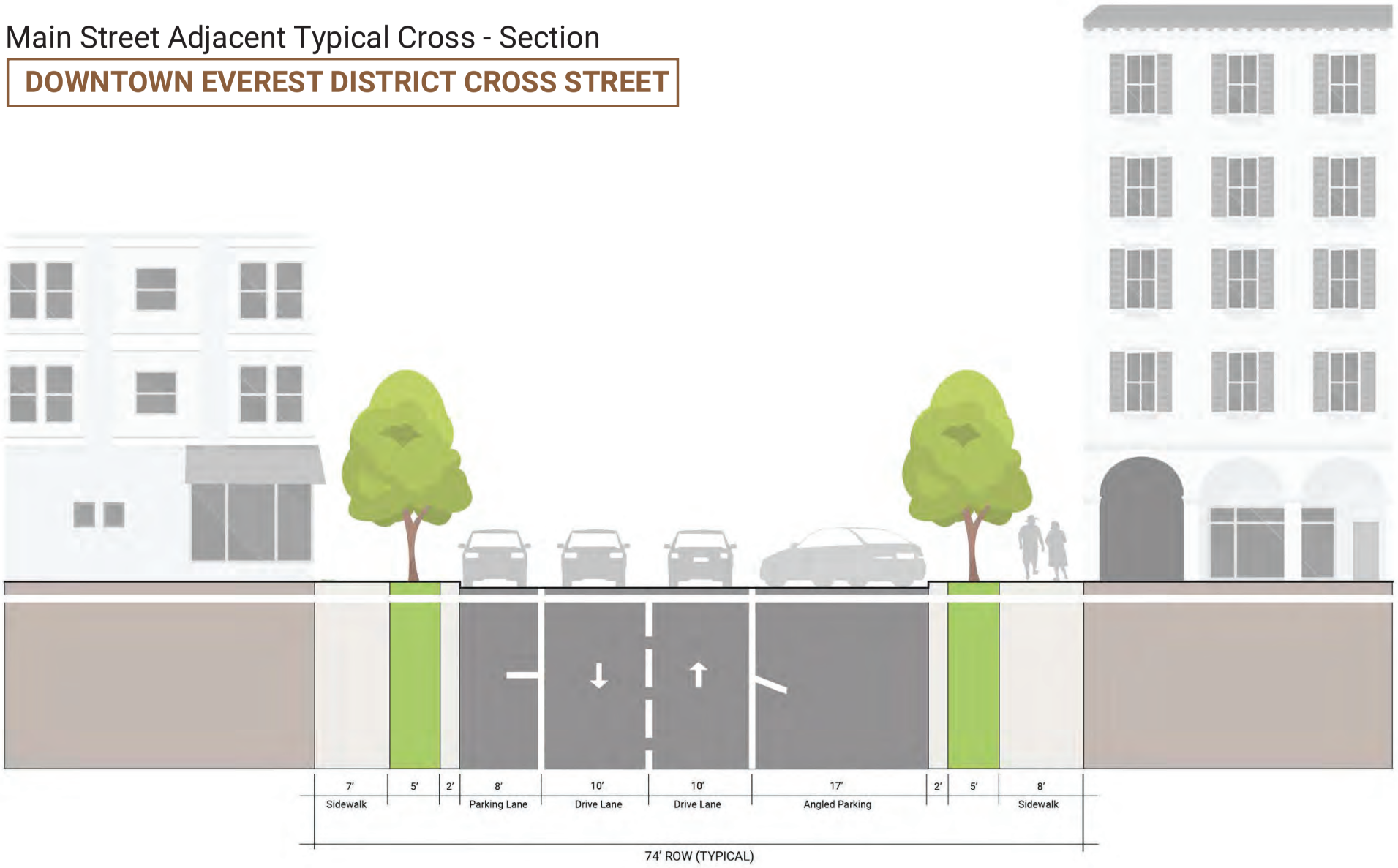


Main Street Modified Typical Cross - Section

DOWNTOWN EVEREST DISTRICT THROUGH STREET

Main Street Adjacent Typical Cross - Section

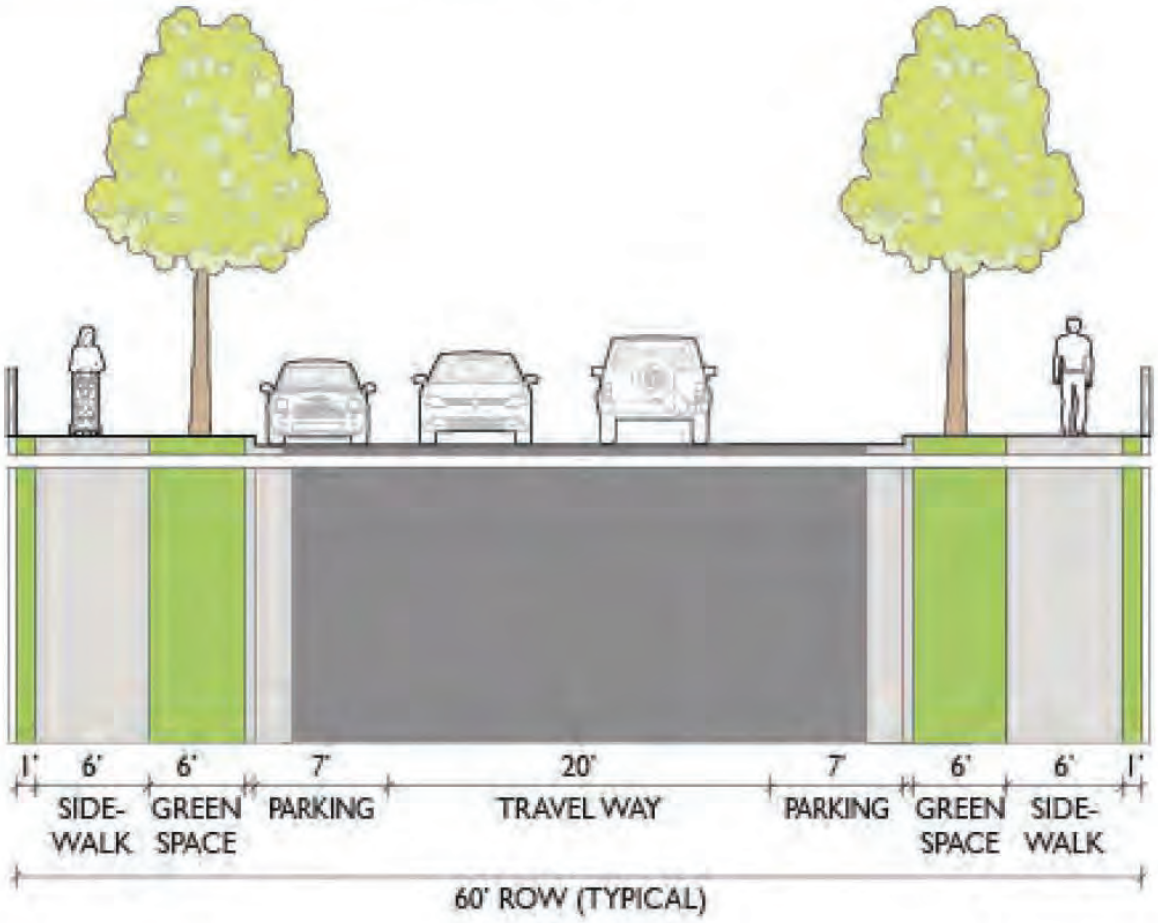
DOWNTOWN EVEREST DISTRICT CROSS STREET

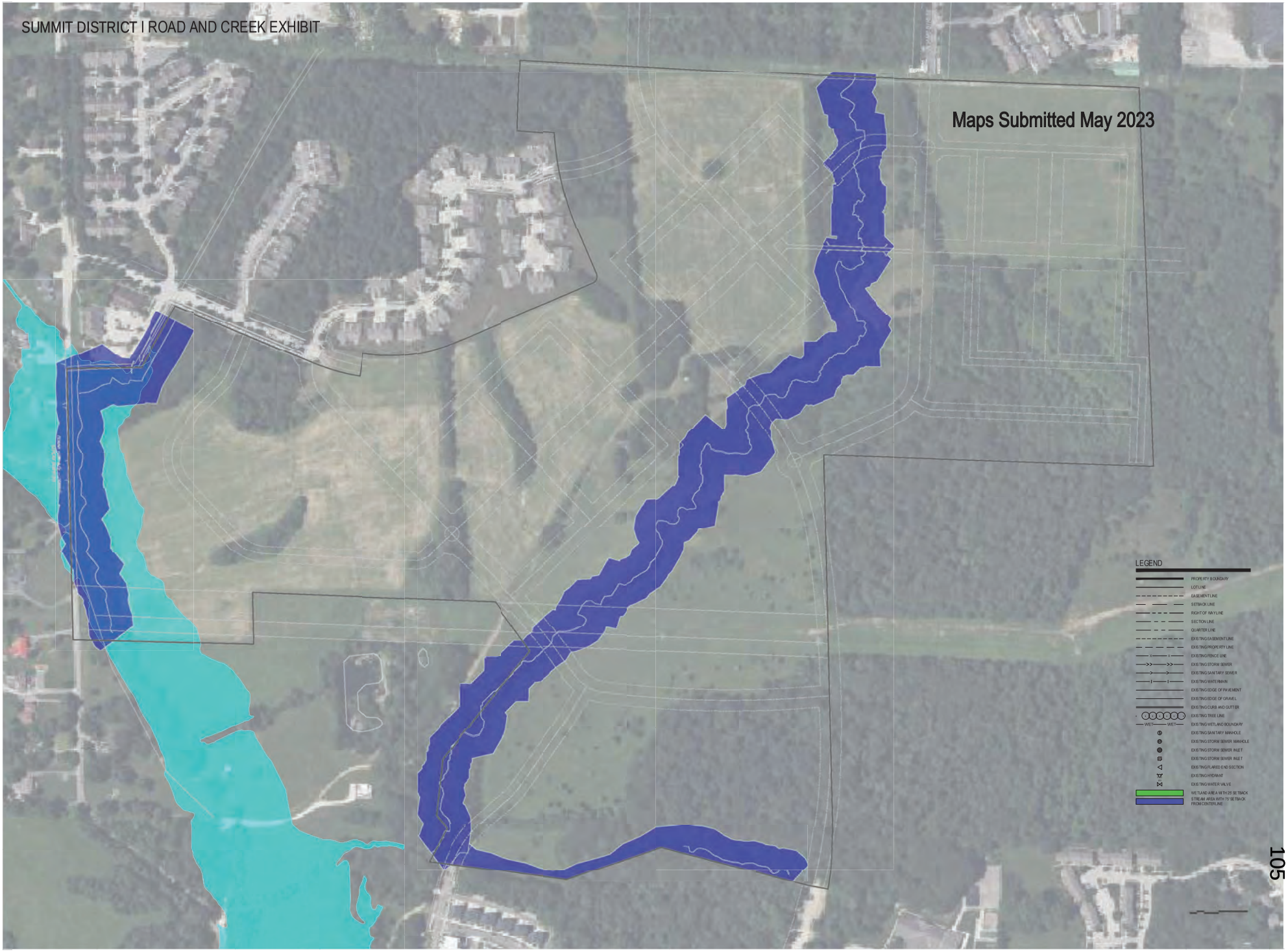


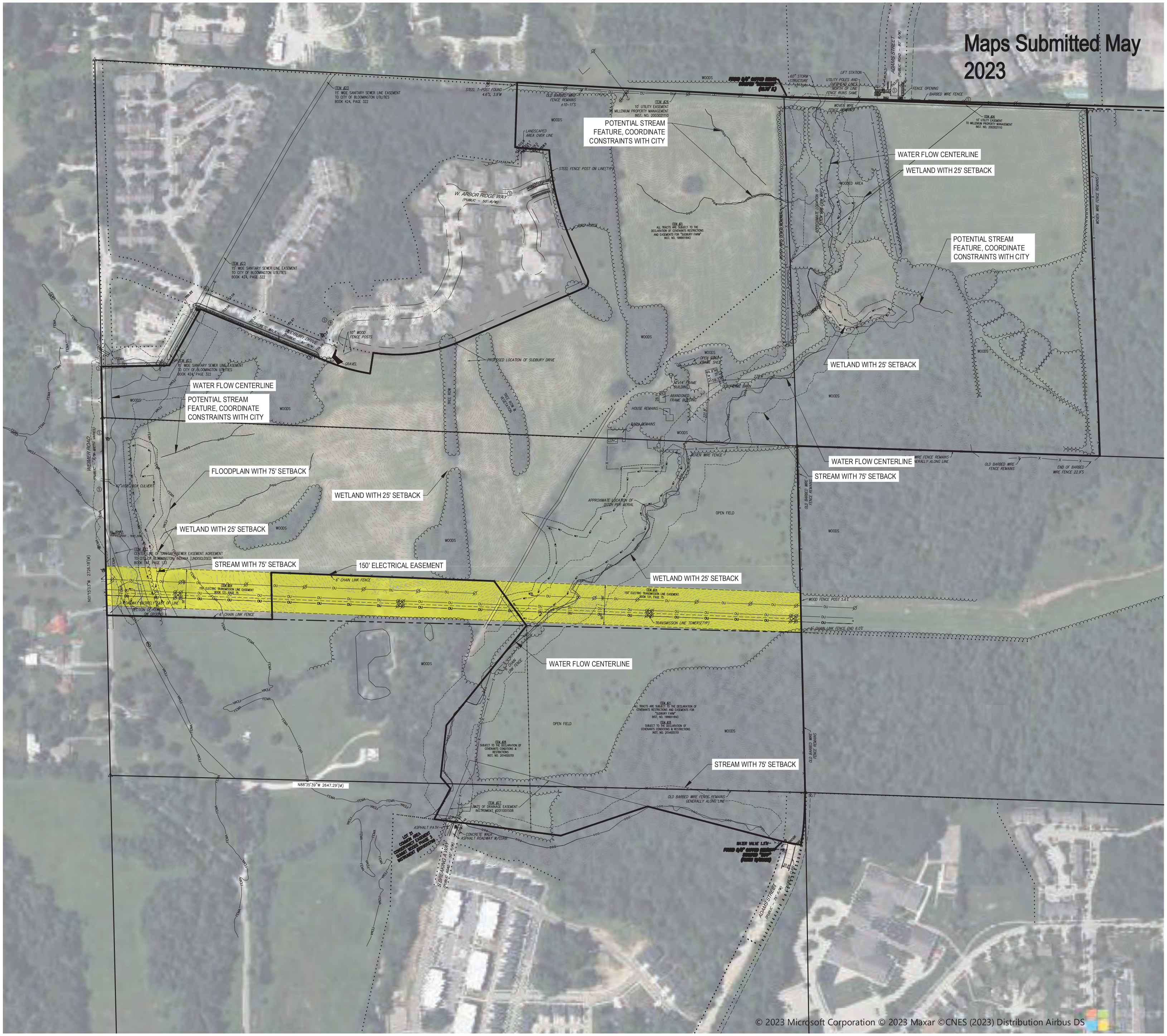
Section 4: Neighborhood Residential Street Typical Cross - Section (FIGURE 11, PG 25 OF TRANSPORTATION PLAN)

RESIDENTIAL STREET

Figure 11. Neighborhood residential street typical cross-section




SUMMIT DISTRICT I ROAD AND CREEK EXHIBIT
Maps Submitted May 2023
LEGEND
PROPERTY BOUNDARY
LOT LINE
EASEMENT LINE
SETBACK LINE
RIGHT OF WAY LINE
SECTION LINE
QUARTER LINE
EXISTING EASEMENT LINE
EXISTING PROPERTY LINE
EXISTING FENCE LINE
EXISTING STORM SEWER
EXISTING SANITARY SEWER
EXISTING WATER MAIN
EXISTING EDGE OF PAVEMENT
EXISTING EDGE OF GRAVEL
EXISTING CURB AND GUTTER
EXISTING TREE LINE
EXISTING WETLAND BOUNDARY
EXISTING SANITARY MANHOLE
EXISTING STORM SEWER MANHOLE
EXISTING STORM SEWER INLET
EXISTING STORM SEWER INLET
EXISTING FLARED END SECTION
EXISTING HYDRANT
EXISTING WATER VALVE
WETLAND AREA WITH 25' SETBACK
STREAM AREA WITH 75' SETBACK FROM CENTERLINE



GRAPHIC SCALE
240 0 120 240
(IN FEET)
1 inch = 120 ft.

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB AND GUTTER
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING UTILITY AREA

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PROJECT TITLE
SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE:	DESCRIPTION:
1	3/12/2023	EXISTING SITE CONSTRAINTS EXHIBIT

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LICENSE NO.
DATE: 106
PROJECT NO.
DWN BY: CHK'D BY: APP'D BY:
ISSUE DATE:
ISSUE NO.:
SHEET TITLE:
EXISTING UTILITY EASEMENTS
SHEET NO.:
EX-7

4/14/2023 1:13:00 PM

Maps Submitted May 2023

GRAPHIC SCALE
240 0 120 240
(IN FEET)
1 inch = 120 ft.

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
- SECTION LINE
- QUARTER LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY LINE
- EXISTING FENCE LINE
- EXISTING STORM SEWER
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- EXISTING EDGE OF GRAVEL
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- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE
- KARST AREA WITH 25' SETBACK
- KARST POINT APPROX. DEPTH TO BEDROCK (FROM INDIANA MAP)

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SUMMIT DISTRICT DEVELOPMENT
S ADAMS STREET AND SUDBURY DRIVE
BLOOMINGTON, IN 47403, MONROE COUNTY

PROJECT TITLE

ISSUE NO.	DATE	DESCRIPTION
1	5/1/2023	EXISTING SITE CONSTRAINTS EXHIBIT

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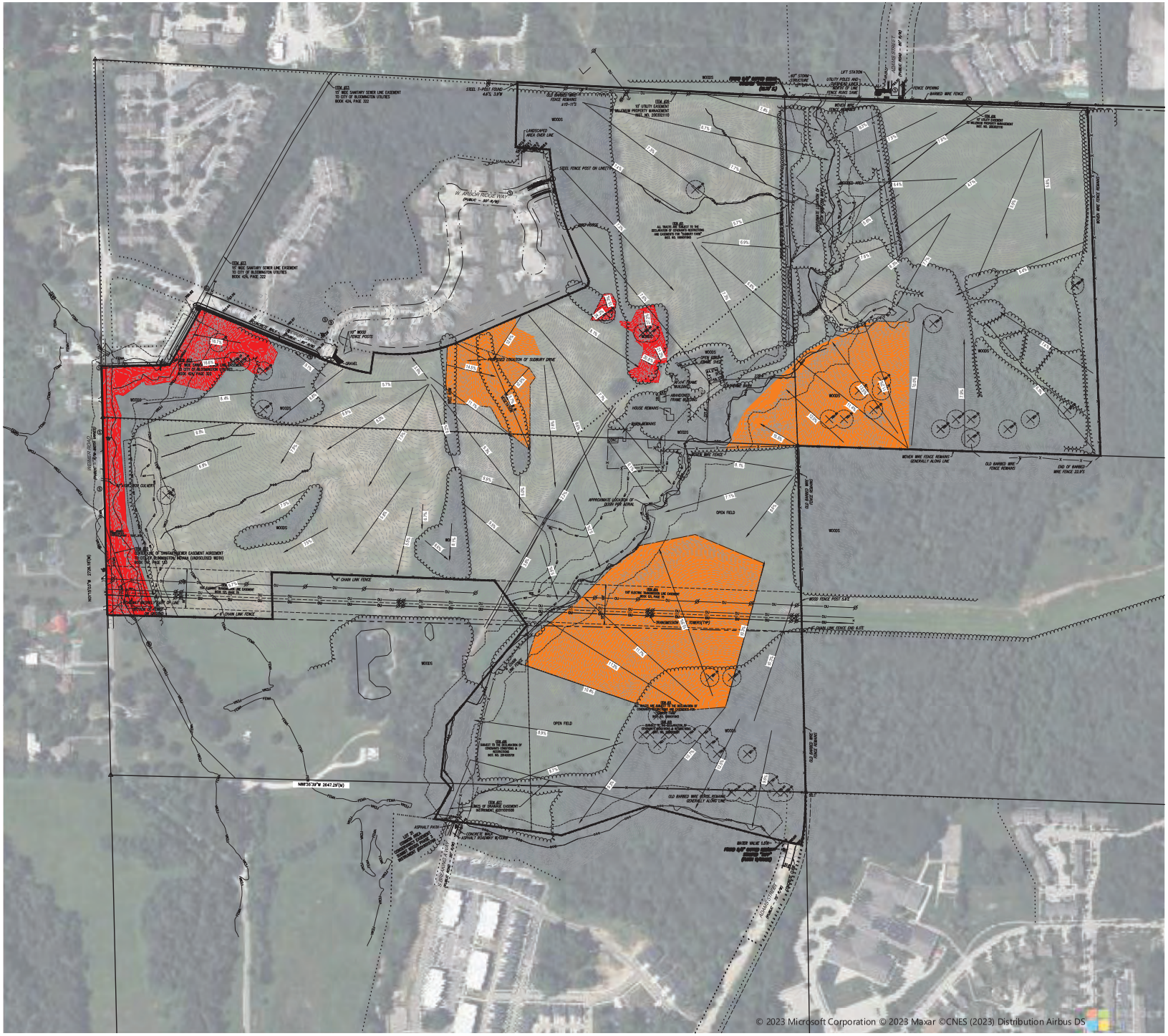
ISSUE NO.:
SHEET TITLE: KARST POINTS
SHEET NO.: EX-8

Maps Submitted May 2023



GRAPHIC SCALE
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(IN FEET)
1 inch = 120 ft.

LEGEND

- PROPERTY BOUNDARY
- LOT LINE
- EASEMENT LINE
- SETBACK LINE
- RIGHT OF WAY LINE
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- QUARTER LINE
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- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER INLET
- EXISTING FLARED END SECTION
- EXISTING HYDRANT
- EXISTING WATER VALVE
- 12-18% SLOPE (APPROX. 17 ACRES = 10% OF TOTAL 139 ACRES SITE - ALLOWABLE IMPACT = 50% = 8.5 AC)
- MORE THAN 18% SLOPE AREA (APPROX. 5 ACRES = 4% OF THE TOT AL 139 ACRE SITE - UNDEVELOPEABLE EXCEPT FOR UTILITY INSTALLATION)

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PROJECT TITLE

SUMMIT DISTRICT DEVELOPMENT
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BLOOMINGTON, IN 47403, MONROE COUNTY

ISSUE NO.	DATE	DESCRIPTION
1	5/1/2023	EXISTING SITE CONDITIONS EXHIBIT

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LICENSE NO.: 108
DATE:

PROJECT NO.:

DWN BY:	CHKD BY:	APPD BY:

ISSUE DATE:

ISSUE NO.:

SHEET TITLE:
SITE SLOPE ANALYSIS

SHEET NO:
EX-2

ENVIRONMENTAL CONSTRAINTS ANALYSIS
Summit District Development Project

August 15, 2023

Prepared for:
The Ridge Group, Inc.
3225 S. Hoyt Ave.
Muncie, IN 47302

Prepared by:
Stantec Consulting Services Inc.
3901 Industrial Blvd.
Indianapolis, IN 46254

Project Number:
193806201

The conclusions in the Report titled ENVIRONMENTAL CONSTRAINTS ANALYSIS are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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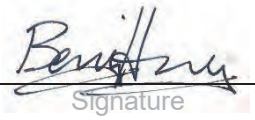
Prepared by: 

Signature

Benjamin Harvey

Printed Name

Approved by: 

Signature

Jared Ward, Project Manager

Printed Name

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Executive Summary

On behalf of The Ridge Group Development, Stantec conducted an Environmental Constraints Analysis (ECA) of water resources, biological resources, and protected lands; and a review of regulatory and permitting considerations for the proposed Summit District Development Project in Monroe County, Indiana (Project). The total Project area encompasses approximately 138.51 acres. The Project area is primarily fallow cropland, scrub undeveloped land, and forested land. This ECA provides an overview of the key environmental resources identified during preliminary planning and site investigations. This ECA further provides recommendations and/or mitigation of potential risks to each resource before Project implementation.

The ECA results indicate that some environmental constraints exist for the Project and are of low to moderate significance (Table 1). The Project is a proposed private action occurring on private land with low risk of adversely affecting the natural environment. The primary federal requirements anticipated are compliance with the Clean Water Act. Further protected species and cultural resources reviews may be triggered through regulatory processes if the Project cannot avoid affecting water resources. The primary local requirements are the City of Bloomington Unified Development Ordinance and associated permitting and approvals. Steep slopes may also be a potential constraint on development of the site, however this will be considered under the engineering analysis instead of this report, and there will be coordination where overlapping environmental and steep slope areas exist.

Many of the environmental constraints identified during this study are similarly situated with other environmental constraints, as is the case with mature canopy cover and karst features. These areas should be prioritized for preservation during site design. Additional areas that have environmental constraints may be suitable for use as stormwater detention, development amenities, or as green space.

Table 1 – Environmental Constraints Summary

Constraint	Potential Constraint Severity	Comments	Recommendations
Streams and Wetlands • USACE and IDEM Regulated	Low	Streams and wetlands were identified on the property, but impacts should be small and permittable	Avoid and minimize impacts to these resources wherever practicable
Streams and Wetlands • Buffer Zones	Moderate	Buffers must be established on all streams on the site, with restrictions on what types of development may occur	Avoid where feasible Utilize for green space or site amenities, or where permitted, stormwater detention
Floodplains	Low	Floodplain exists at the western Project area limits	Avoid structures and fill Utilize as green space or detention where possible
Karst Geology	Moderate	Karst features spread throughout the site, concentrated in several forested areas	Avoid impacts where feasible Coordinate potential impacts with state and local requirements/agencies
Tree and Forest Canopy	Moderate	Large sections of mature woods were identified, as well as a few smaller stands of canopy	Limit impacts where feasible Focus preservation on the larger contiguous stands and overlapping constraint areas Utilize as green space or amenities

1 Introduction

The Ridge Group Development (Ridge Group) is evaluating an approximately 138.51-acre area in Monroe County, Indiana (Project area) for a proposed mixed use development project referred to as the Summit District Development Project (Project). The Project is on private lands approximately 2 miles southwest of Bloomington, Indiana (Figures 1 and 2). On behalf of the Ridge Group, Stantec conducted a field and desktop-level Environmental Constraints Analysis (ECA) of water resources, floodplain constraints, karst features, and forest canopy cover and a review of regulatory and permitting considerations. The purpose of this ECA is to 1) identify the regulatory requirements and environmental constraints that were evaluated and may impact development, 2) summarize the results of field and desktop reviews relating to these environmental constraints, and 3) provide recommendations for how to best address these constraints while completing the required development of the site.

There are additional constraints, some environmental, which may impact development of the site. A notable example for this site would include steep slopes, which will be addressed during the civil engineering design process and coordinated with other environmental constraints where appropriate. These additional constraints may also include existing comprehensive plans, transportation plans, and planning codes, among others. These are considered outside the scope of this report and will not be addressed. The primary objective of this report is to evaluate environmental constraints applicable to early phase development of this site, and also those which will need to be addressed for Planned Unit Development (PUD) approval.

2 Background

Several overlapping jurisdictions exist on the Project area. These may include federal, state, or local agencies; and some resources are also regulated by multiple agencies under different programs.

Federal

The primary federal agency applicable at this time includes the US Army Corps of Engineers (USACE) in their regulatory authority over streams and wetlands (waters). The USACE regulates discharges (placement of fill) within streams and wetlands under their jurisdiction. Once the USACE establishes that a permit is required for impacts to a stream or wetland on the project, they agency has additional requirements to ensure the project meets other federal environmental regulations, including the endangered species act (ESA), which is administered by the US Fish and Wildlife (USFWS). The level of involvement required by the USFWS varies by project, and is determined after initial contact with the USACE is made, often in the form of a request for a Jurisdictional Determination (JD) or permit application submission.

The Federal Emergency Management Agency (FEMA) may also be consulted during development of the site, as they regulate mapped FEMA-designated flood zones. In Indiana, flood zone development more often involves the jurisdiction of state and local authorities. FEMA involvement is only typically triggered by local or state request, or if a flood zone map amendment is requested.

State

Two primary state agencies may have jurisdiction on the site, including the Indiana Department of Environmental Management (IDEM) and Indiana Department of Natural Resources (IDNR). IDEM also regulates impacts to streams and wetlands (waters), and through the state isolated wetland program also regulates wetlands that may not fall under the USACE's jurisdiction. The requirements for IDEM waters permitting are distinct from USACE permitting, but permitting is similar and generally performed in tandem with the USACE process. The IDEM Construction Stormwater General Permit (CSGP) also regulates aspects of construction and development, primarily to prevent sedimentation within streams. While much of the CSGP focuses on construction activities it also specifies that a 50-foot buffer should remain on stream resources, with certain exceptions.

The IDNR regulates floodway development in Indiana, including on all streams with a drainage area greater than 1 square mile, and requires permitting for most construction activities proposed within a floodway. The IDNR has several general licenses for activity with a floodway, and do not require formal permit application submission. In conjunction with floodway permitting, a biological review of the project is required for any action the IDNR approves. This biological review is often limited to the specific area where a floodway impact is proposed, however.

Local

The project will require approval by the City of Bloomington, and therefore must comply with requirements of the City's Unified Development Ordinance (UDO). The UDO lays out many requirements for development approval but for this ECA the focus will be on riparian areas, karst geology features, and tree and forest canopy features.

Similar to both federal and state agencies, the UDO regulates streams and wetlands, but the primary constraint on site development is through riparian area setbacks to said development. Three zones are designated in the site's draft PUD, located at 60-feet, 40-feet, and 20-feet respectively from the stream; and with increasing limits on what development activities can occur and requirements for development.

Karst geology exists in areas that are underlain by soluble bedrock and that is characterized by the development of sinkholes, caves, and springs. Karst features are identified as important for preservation in the UDO, and there are specific requirements to buffer development around the area which drains to these karst features. The UDO restricts development activities within a 25-foot buffer around karst features.

The UDO has requirements for tree and forest canopy preservation, which are based on the existing site canopy cover. The baseline canopy cover of the site is evaluated, and then used to calculate an amount

of canopy cover that will be retained after the site is developed. The ordinance places a higher value on large, mature trees and also places a preference towards preserving stands of intact mature forest.

3 Methodology

Following a review of the relevant potential environmental constraints that may apply to development of this site, Stantec developed a methodology to survey and evaluate the conditions on the site relative to these constraints. A desktop review was conducted to identify potential features ahead of field work. This desktop review utilized multiple years of aerial imagery, publically available light detection and ranging (lidar) elevation data, USFWS national wetland inventory, FEMA and IDNR floodplain mapping, and national hydrography dataset information to identify potential features and direct follow-up field verification activities. Stantec conducted a site visit in spring of 2023, after the growing season had commenced but before full vegetation cover on the site. This allowed an evaluation of the plant communities and canopy cover, while at the same time allowing easier identification and verification of potential karst features. Site data was collected using sub-meter accuracy geographic positioning system devices and software. Following the site visit, data were rectified against desktop review features to produce final versions of the identified environmental constraints.

4 Results

4.1 Streams and Wetlands

For purposes of this report, streams and wetlands as defined by USACE/IDEM guidelines are considered the same as what is described and regulated by the City of Bloomington under the UDO. A total of four streams and three wetlands were identified within the Project area. These features are shown on Figure 3 in the appendix.

Two streams were identified along the western Project area limits, one running north-south along the western boundary at South Weimer Road, and one tributary to this stream running generally northeast to southwest at the parcel boundary. The stream along Weimer Road is the largest on the site, with a drainage area of approximately 1.48 square miles. Another stream was identified bisecting the parcel and running generally northwest to southeast. This stream was small as it entered the parcel at the upstream extents but was more substantial by the time it exited the parcel, with its width going from 2 feet to 8 feet while flowing through the site. The overall drainage area of this stream was approximately 0.34 square miles. The final stream on the site ran east to west along the far southern boundary of the site, with portions within the parcel and the downstream end nearby but outside the parcel boundary.

Each of the wetlands on the parcel were located immediately adjacent to stream features, which means they would be regulated by both the USACE and IDEM. One wetland is larger in size, totaling approximately 0.3 acre, while the other wetlands are smaller by comparison and less than 0.1 acre in size. The larger wetland and one of the smaller ones are located along the streams at the western Project area boundary, and one wetland totaling 0.07 acre in size is located along the stream bisecting the Project area.

4.2 Floodplains

A FEMA-mapped floodplain is shown for the stream running along the western Project area boundary, associated with the large stream at that location. This floodplain boundary extends approximately 300 feet to the east into the Project area. The IDNR floodway mapping also shows mapped flood zone in this location. No other floodplain areas are shown within the Project area. Also, no other streams were determined to have a drainage area greater than 1 square mile, so would not be regulated by the IDNR. Floodplain mapping is shown on Figure 4 in the appendix.

4.3 Karst Geology

Karst areas present in this region include caves, springs, and sinkholes, with sinkholes being the most commonly occurring feature in this area. Sinkholes can be generally identified as a concave basin within the landscape, sometimes with a limestone opening (eye) located near the bottom of the depression. Lidar surface elevations were used to identify areas of closed drainage within the Project area. These were checked during field visits to confirm if they would be considered karst features based on the UDO requirements. A total of 48 potential sink holes were identified within the Project area. No caves or springs were identified during field or desktop investigations. Karst features were scattered throughout the site, but generally occurred where there is existing tree cover, and are clustered in the northwest of the site south of Sudbury Road, and at the far eastern and southeastern limits of the Project area. Karst features are shown on Figure 5 in the appendix.

4.4 Tree and Forest Canopy

Tree and forest canopy was initially identified based upon desktop review of aerial photography, and then the relative cover of canopy and the boundaries were confirmed during field investigation. Portions of the site appear to have been farmed as recently as 2020, with the northeastern and southeastern limits of the project apparently left fallow for longer than that. The site contained isolated stands and strips of trees in several locations, but the largest contiguous stands of tree canopy in the eastern, southeastern and northwest corners of the Project area. A total of approximately 27.43 acres of canopy cover was identified within the Project area. Tree and forest canopy cover is shown on Figure 6 in the appendix.

5 Environmental Constraints Discussion

A number of environmental constraints were identified on the Project area, each with specific protection mechanisms or potential impacts to development of the entire parcel. Some of the constraints are relatively easy to incorporate into project design or are possible to impact and mitigate, while others would be a significant challenge to impact or are not able to be impacted at all. This discussion section will briefly describe the regulatory environment surrounding each environmental constraint, and go on to discuss the feature's potential impact to development and how site development may proceed alongside existing environmental constraints.

5.1 Streams and Wetlands

Streams and wetlands are requested to be preserved based on the UDO, however under the USACE and IDEM regulatory environment can be impacted or removed as long as the site developer can demonstrate that the impact is required for development, tries to minimize these impacts, and provides compensatory mitigation if impacts reach certain thresholds. Because of the location of some streams within the Project area, crossing these streams will be required to develop the site. The long stream bisecting the parcel and the stream along the southern property boundary will each need to be crossed to access the eastern portion of the site and provide connectivity from the south. Crossing lengths should be minimized to the maximum extent practicable, and any other disturbance to the riparian buffer should be minimized based on the stream buffer restrictions identified in the PUD.

Stream Buffer Zones

Stream buffers are important to maintain to preserve the chemical, physical, and biological integrity of streams. Any preserved buffer is better than no buffer, however a good rule of thumb is that a 50-foot buffer should be preserved wherever possible. A 50-foot buffer is also required based on Indiana's CSGP, with exceptions for certain circumstances. Buffer areas were set at 20-feet (Zone 1), 40-feet (Zone 2), and 60-feet (Zone 3) from each stream corridor as based on the site's draft PUD. Development is constrained in each of these zones, with restrictions decreasing at each respective zone leading from the stream itself. These buffer areas are shown on Figure 7 in the appendix. The acreage of each zone within the Project area parcel boundary was calculated, finding a total of 5.43 acres will be classified as Zone 1, 4.89 acres are classified as Zone 2, and 4.70 acres are classified as Zone 3. Site development options are limited in these areas, however outermost zones are permitted to be used for green space, some site amenities, and stormwater detention.

5.2 Floodplains

The large area of floodplain on the western project area boundary is recommended for avoidance as much as practicable. This is because of constraints on development imposed by both FEMA and the IDNR. An exception to this may be that site detention basins or non-structural amenities could be planned within this area. Generally, regulatory agencies are more concerned with the placement of fill or a restriction of flow area within floodplains. If detention basins, unpaved trails, or green space could be

located within this area it may satisfy site development objectives and make the floodplain areas usable space. Any potential development would need to be approved locally and by the state, and modifications would need to be coordinated through FEMA.

5.3 Karst Geology

The primary areas of concentration of karst geology are located in clusters in the northwest of the site south of Sudbury Road, and at the far eastern and southeastern limits of the Project area. Based on the UDO, features that are close together can be combined into compound karst features for preservation, which may be applicable to some of these features. In general these areas should be avoided where possible, as capping sinkholes is typically expensive and only allowable where development cannot occur otherwise.

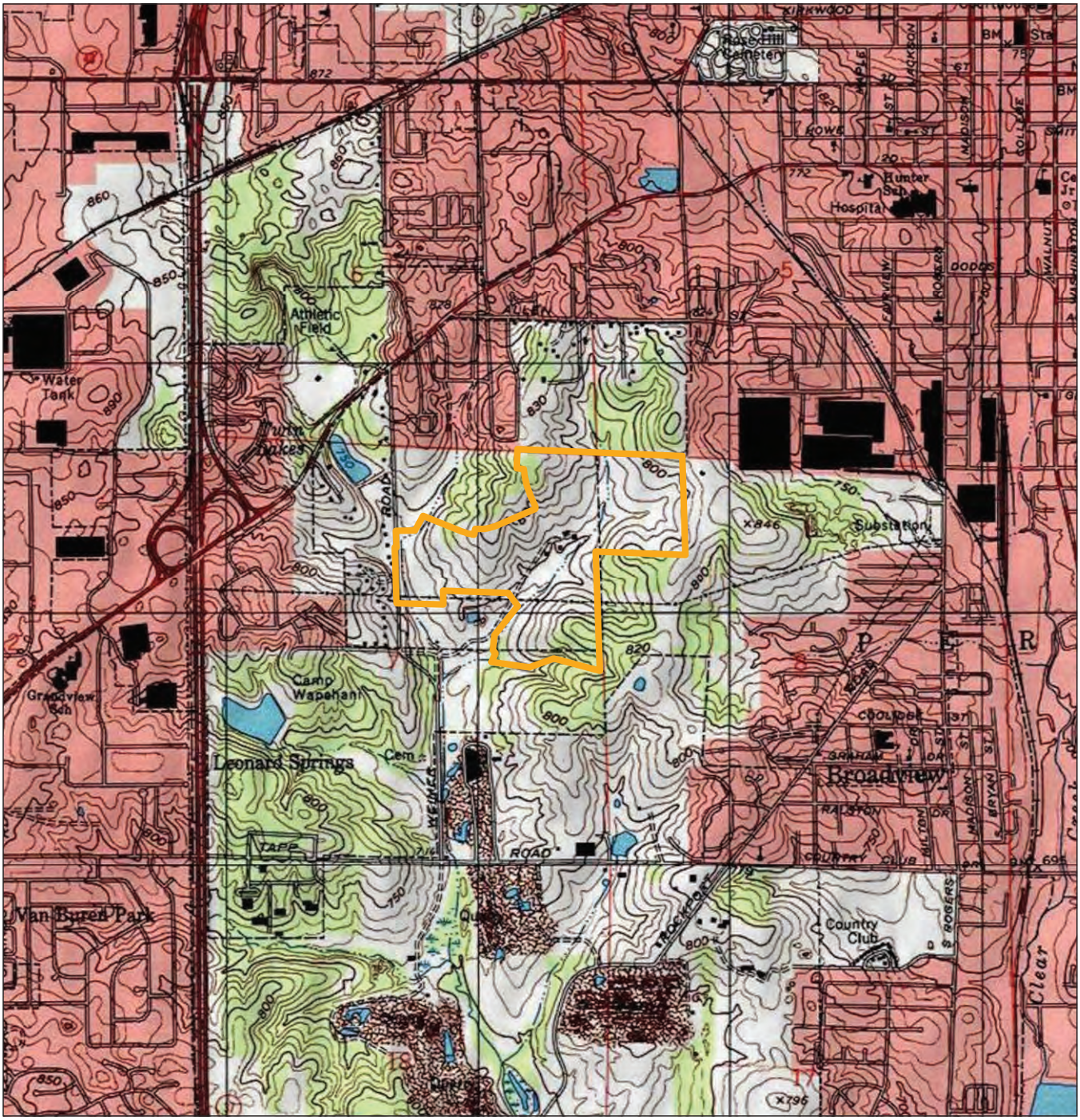
5.4 Tree and Forest Canopy

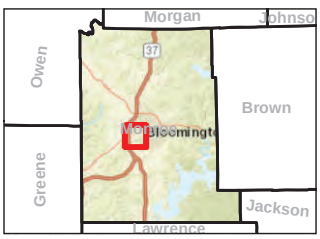
Large sections of tree canopy are located in contiguous stands, with the most mature forested stands occurring at the northwest, eastern, and southeastern Project area limits. There are limited stands of canopy scattered throughout the site as well, but these are generally of lesser quality or concentrated in narrow strips. To the maximum extent possible, the larger sections of mature forest canopy should be preserved on the site and this should be designated as the retained canopy as final design is developed. Other sections of forest canopy should be preserved wherever practicable for development.

5.5 Overlapping Constraints and Jurisdictions

Because of how the environmental constraints are located on the site, there is a potential to maximize preserved areas on the Project area. As is typical in this region, many of the areas containing karst features were not developed in the past and were allowed to grow in as tree canopy. This provides a potential to preserve both of these features in one undeveloped area. Similar to this, large areas of the floodplain and some of the stream buffer areas are also mature forest or wetland, so would not diminish developable area as much as if the overlap were less pronounced. Generally, as site configuration is finalized, the development team should retain and preserve areas with multiple overlapping environmental constraints.

Appendix A - Figures





Legend

Project Location

0 500 1,000 2,000 Feet

0 100 200 300 400 500 600 Meters

(At original document size of 8.5x11)
1:24,000

N

Stantec

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
1

Title
Project Location

Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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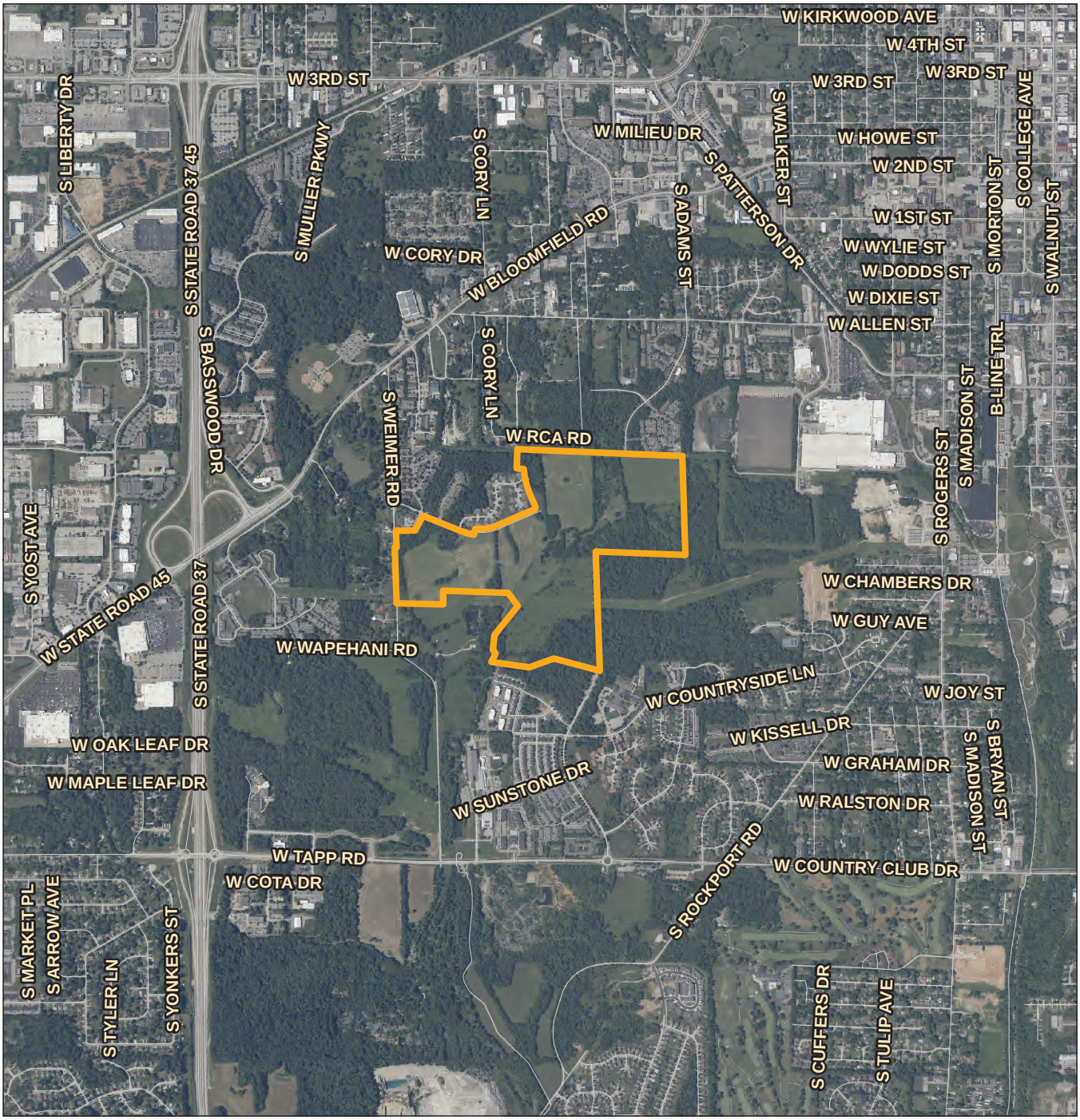
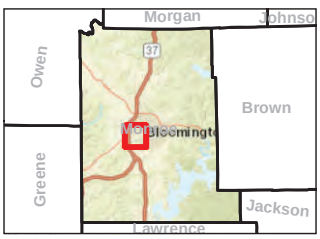
\\us0707-ppfss01\shared_projects\gis_projects\193806201\03_data\gis_cad\gis\mxds\DueDill\F1_ProjLocation.mxd Revised: 2023-06-15 By: bwharvey





Legend

Project Location

0 500 1,000 2,000 Feet

0 100 200 300 400 500 600 Meters

(At original document size of 8.5x11)
1:24,000

N

Stantec

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
2

Title
Project Location - 2022 Aerial Photography

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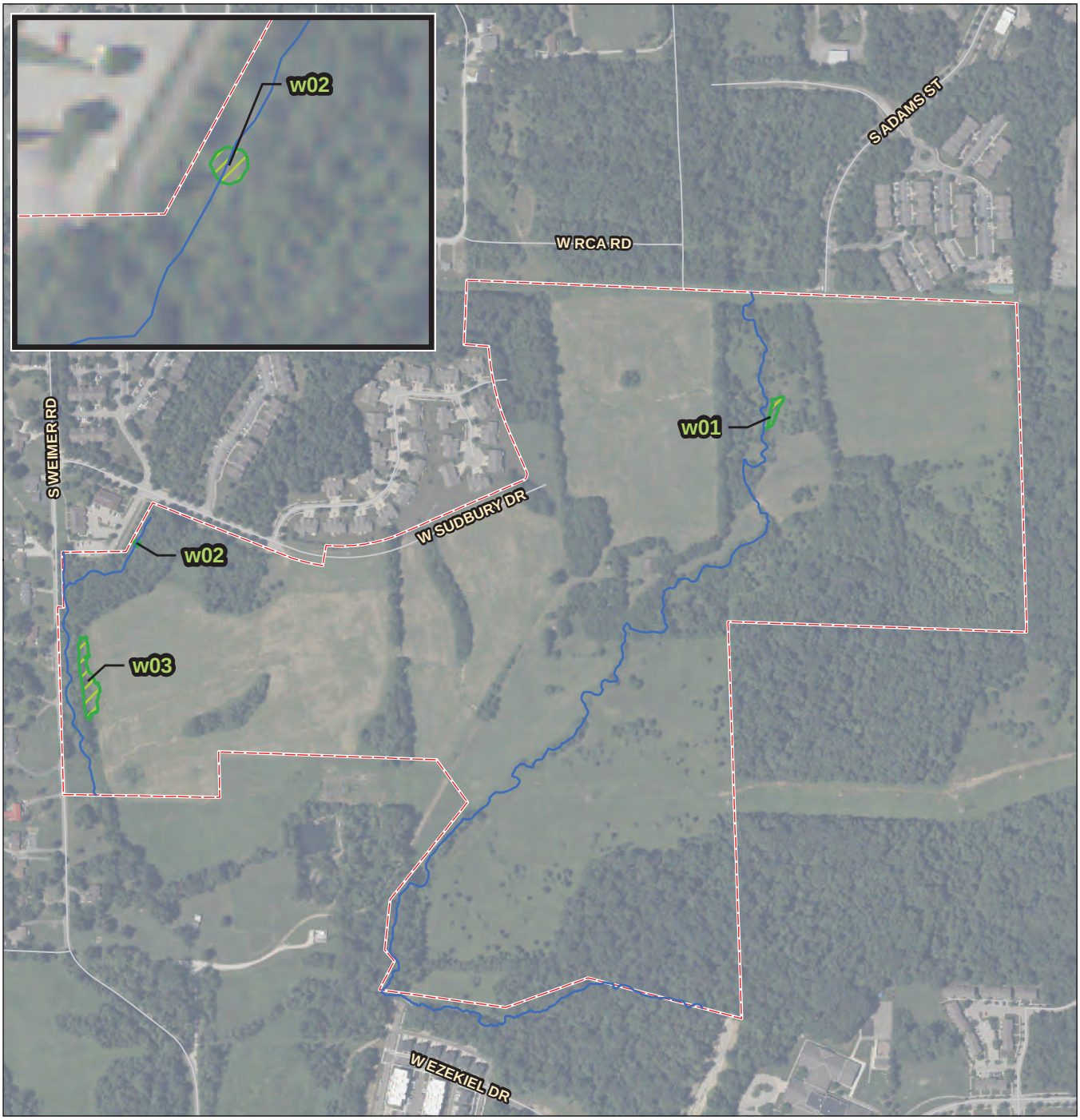

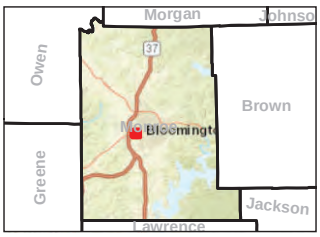

Legend

- Delineated Stream
- Delineated Wetland
- Project Location

0 300 600 Feet

0 60 120 180 Meters

(At original document size of 8.5x11)
1:7,200

N

Stantec

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec,2022 NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/19/2023
TR by LS on 6/19/2023
IR Review by DV on 6/19/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
3

Title
Streams and Wetlands

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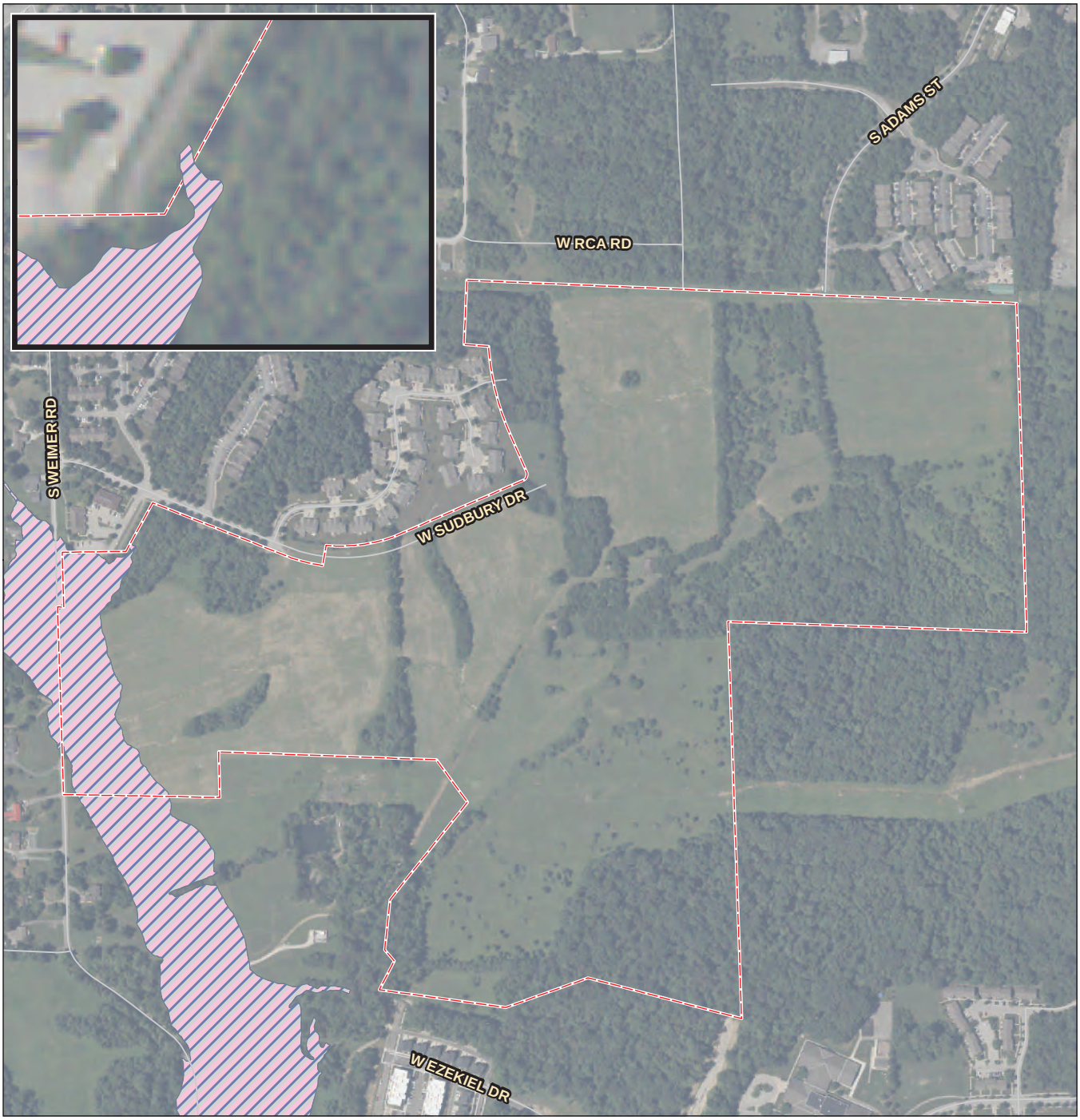

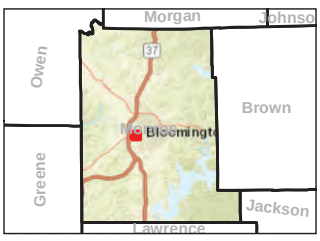

Legend

Project Location

FEMA Flood Zone

Floodway

IDNR Best Available Flood Mapping

Zone

Floodway

0 300 600 Feet

0 60 120 180 Meters

(At original document size of 8.5x11)
1:7,200

N

Stantec

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/16/2023
TR by LS on 6/16/2023
IR Review by DV on 6/16/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
4

Title
Mapped Floodplain

Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec,2022 NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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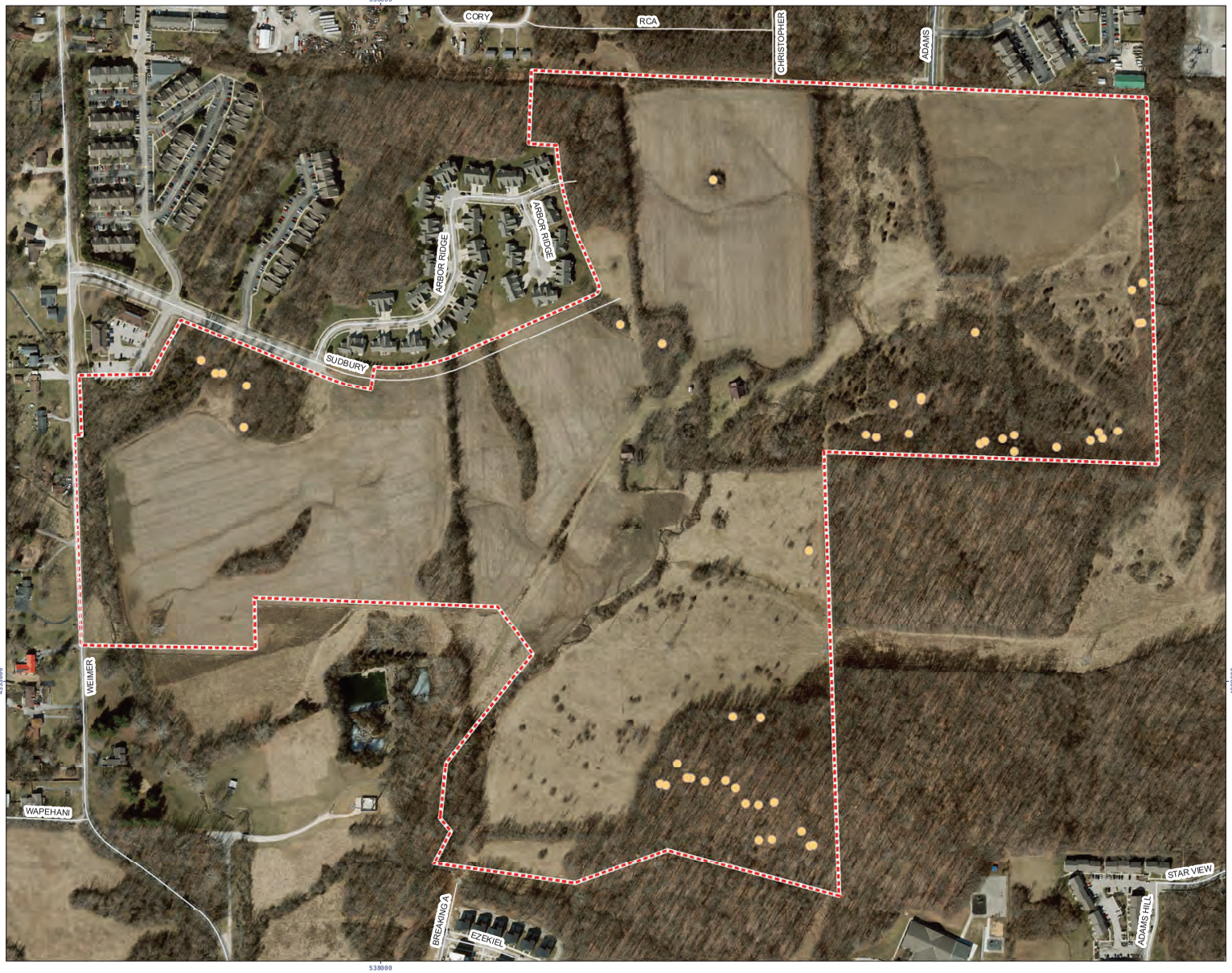


Figure No.
5

Title
Karst Data

Client/Project Karst Data REVA
Client: The Ridge Group
Project: Summit District

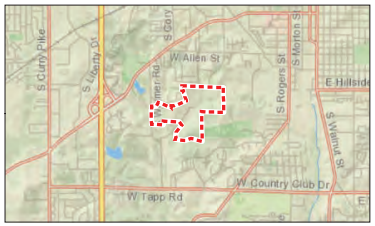
Project Location
Bloomington, IN

Prepared by ABC on 2019-01-01
TR by ABC on 2019-01-01
IR Review by ABC on 2019-01-01

N

0 75 150 metres
(At original document size of 11x17)
1:4,200

Legend
- Karst Point
- AOI



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources:
3. Background: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Stantec

Figure No.
6

Title
Canopy Estimate

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

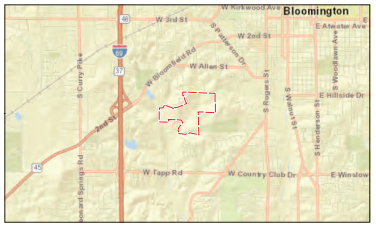
Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington, Monroe County, IN

Prepared by SKL on 8/14/2023
TR by LS on 8/14/2023
IR Review by DV on 8/14/2023

N

0 400 Feet
(At original document size of 11x17)
1:4,800

Legend
- Project Location
- Canopy Estimate = 27.43 acres



Notes
1. Coordinate System: WGS 1984 UTM Zone 16N
2. Data Sources:
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Stantec

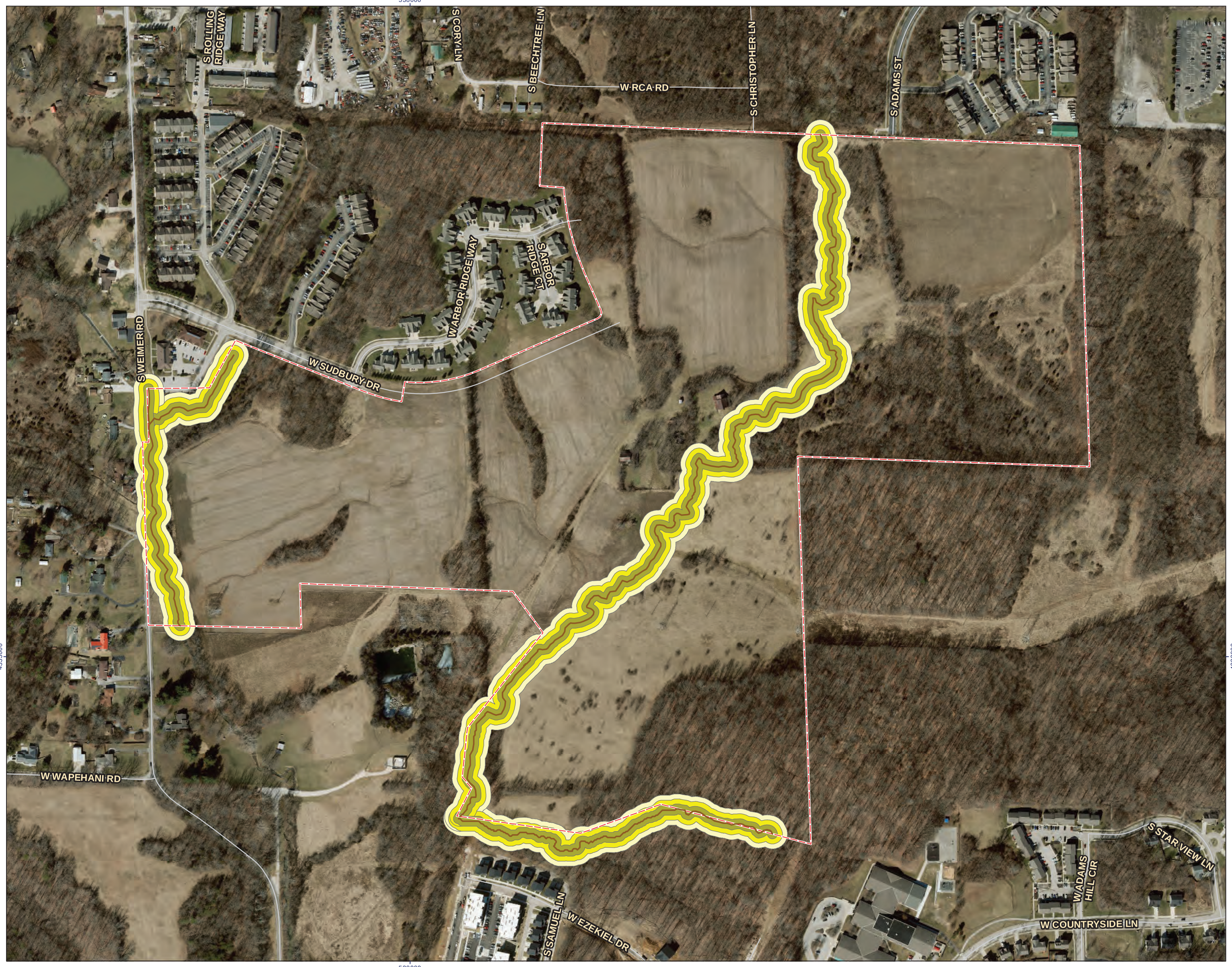


Figure No.

7

Title

Stream Buffer Zones

Client/Project Proj No. 193806201

The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

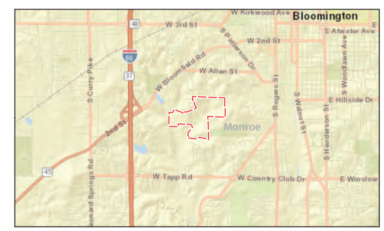
Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington, Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

N

0 400 Feet
(At original document size of 11x17)
1:4,800

Legend
- Project Location
- Zone 1 Stream Buffer
- Zone 2 Stream Buffer
- Zone 3 Stream Buffer



Notes
1. Coordinate System: WGS 1984 UTM Zone 16N
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3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Stantec

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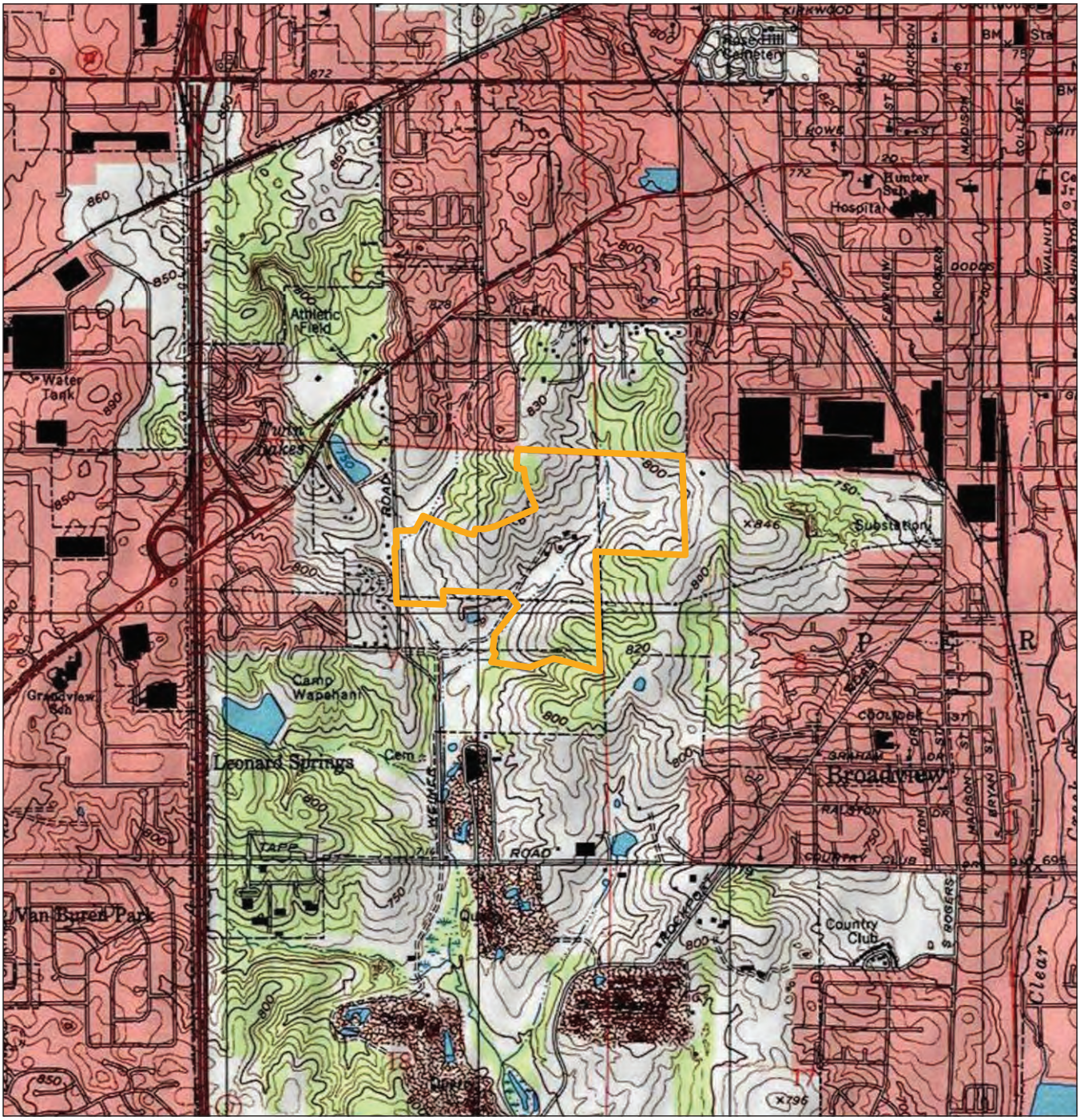
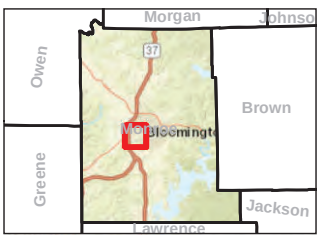
Appendix A - Figures





Legend

Project Location

0 500 1,000 2,000 Feet

0 100 200 300 400 500 600 Meters

(At original document size of 8.5x11)
1:24,000

N

Stantec

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community Copyright:© 2013 National Geographic Society, i-

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
1

Title
Project Location

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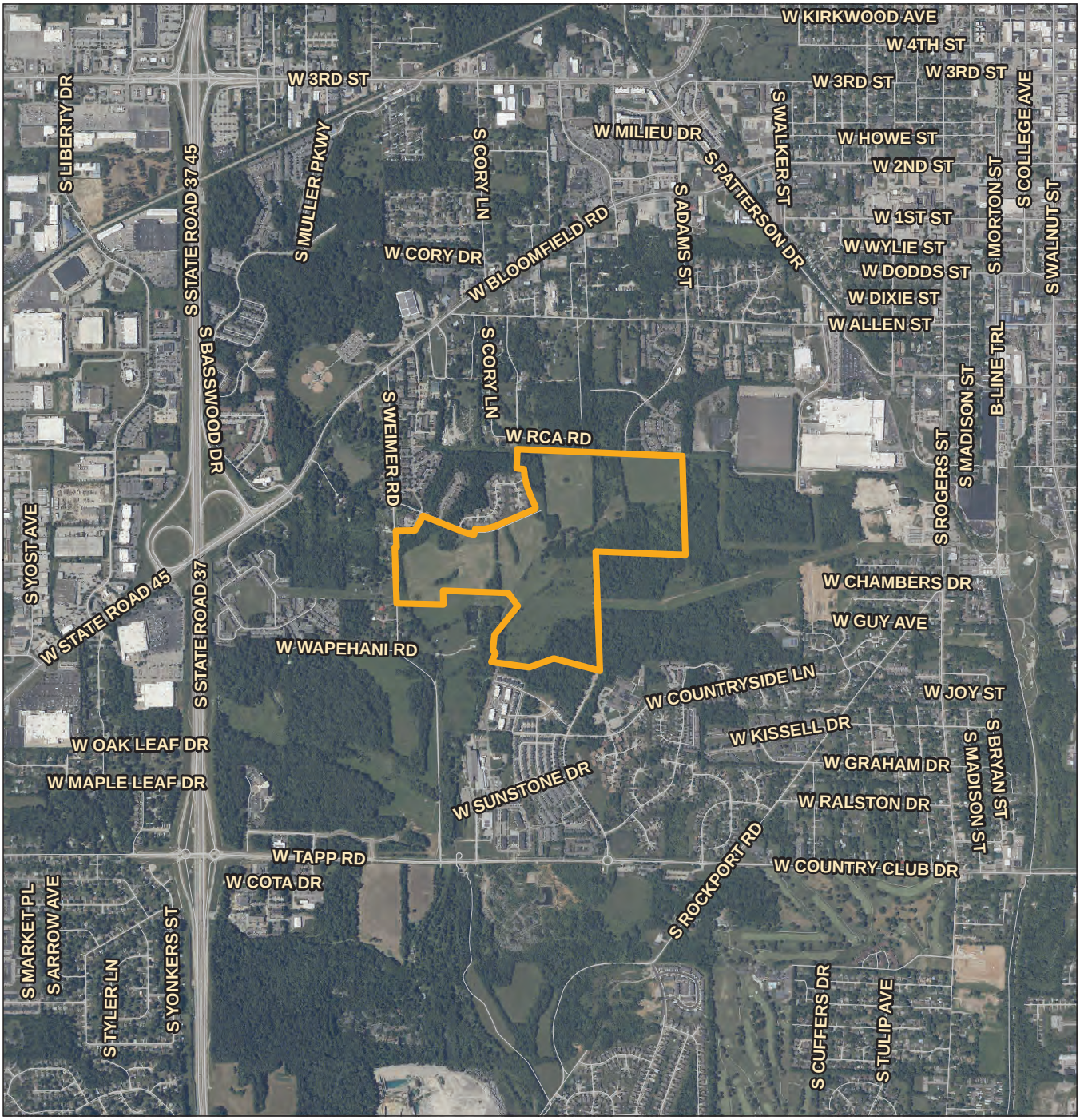

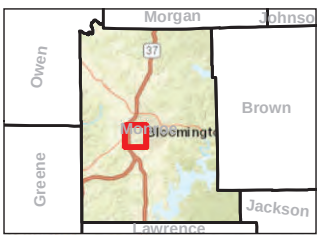

Legend

Project Location

0 500 1,000 2,000 Feet

0 100 200 300 400 500 600 Meters

(At original document size of 8.5x11)
1:24,000

N

Stantec

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
2

Title
Project Location - 2022 Aerial Photography

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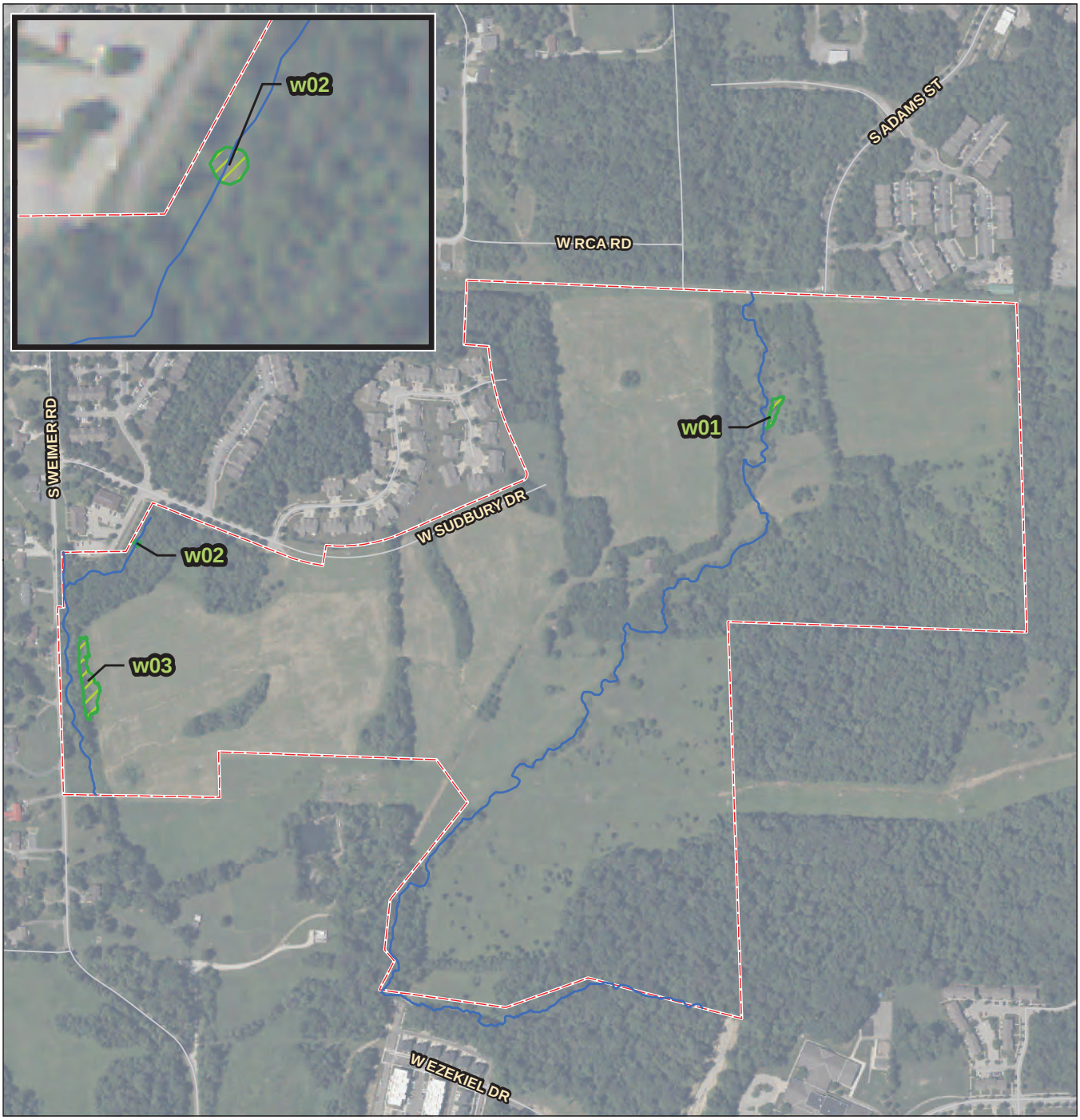

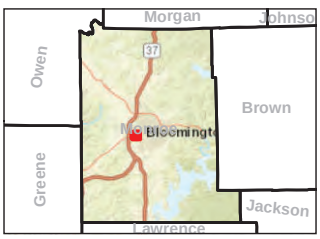

Legend

- Delineated Stream
- Delineated Wetland
- Project Location

0 300 600 Feet

0 60 120 180 Meters

(At original document size of 8.5x11)
1:7,200

N

Stantec

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec,2022 NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/19/2023
TR by LS on 6/19/2023
IR Review by DV on 6/19/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
3

Title
Streams and Wetlands

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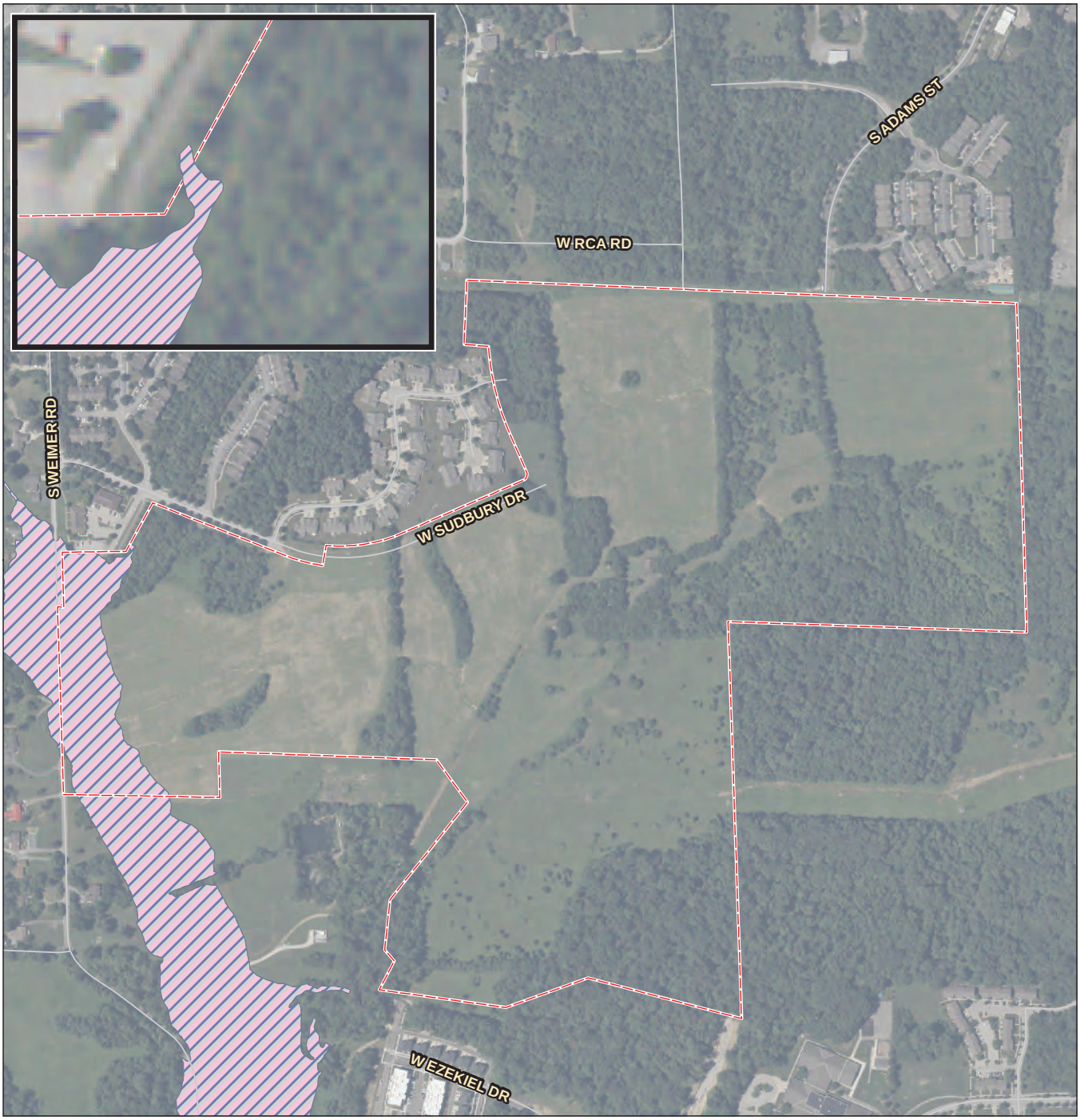

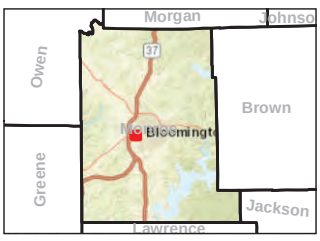

Legend

Project Location

FEMA Flood Zone

Floodway

IDNR Best Available Flood Mapping

Zone

Floodway

0 300 600 Feet

0 60 120 180 Meters

(At original document size of 8.5x11)
1:7,200

N

Stantec

Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington
Monroe County, IN

Prepared by SKL on 6/16/2023
TR by LS on 6/16/2023
IR Review by DV on 6/16/2023

Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

Proj No. 193806201

Figure No.
4

Title
Mapped Floodplain

Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec,2022 NAIP
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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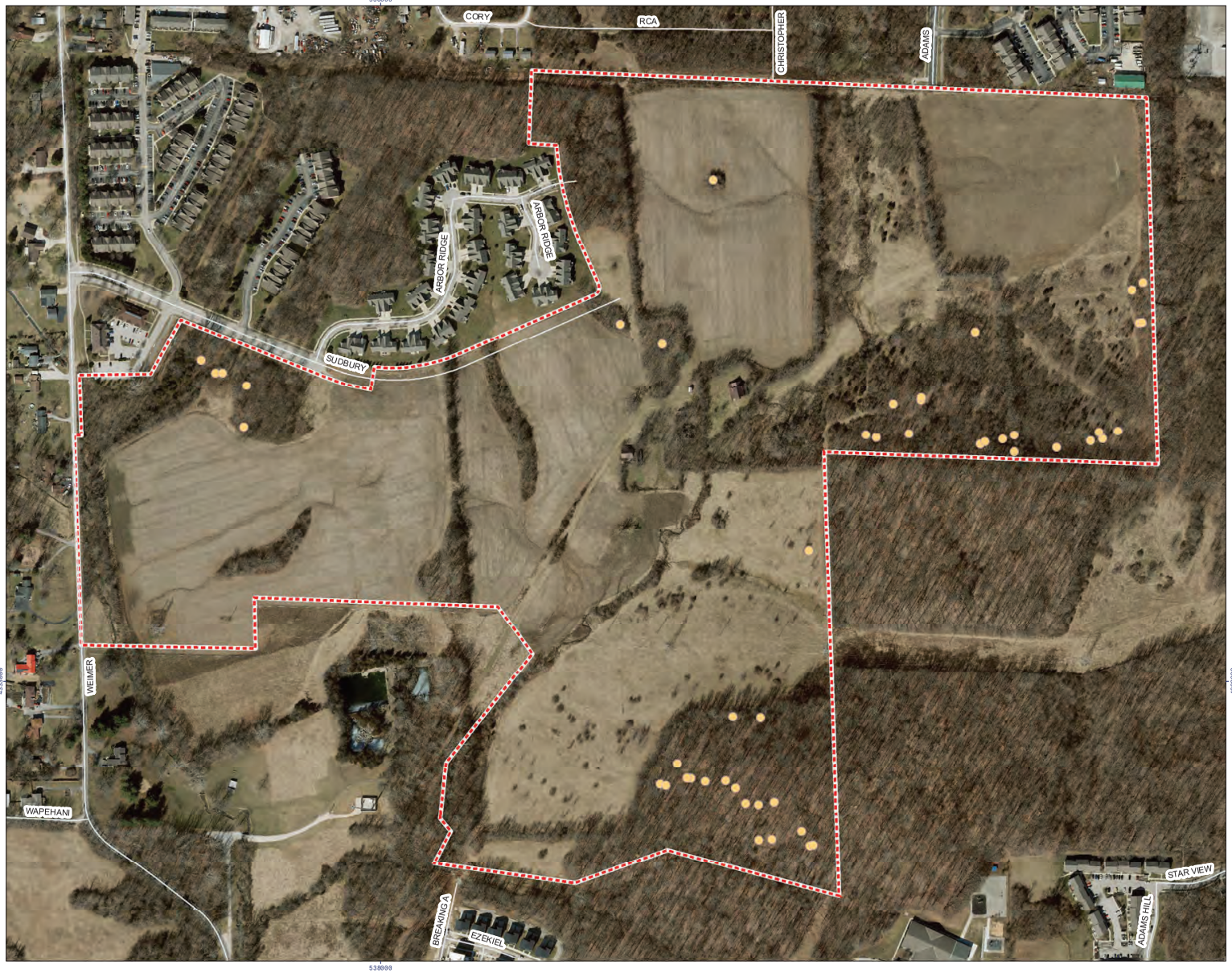


Figure No.
5

Title
Karst Data

Client/Project Karst Data REVA
Client: The Ridge Group
Project: Summit District

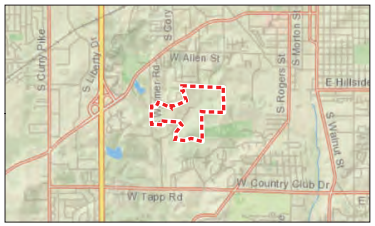
Project Location
Bloomington, IN

Prepared by ABC on 2019-01-01
TR by ABC on 2019-01-01
IR Review by ABC on 2019-01-01

N

0 75 150 metres
(At original document size of 11x17)
1:4,200

Legend
- Karst Point
- AOI



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources:
3. Background: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Stantec

Figure No.
6

Title
Canopy Estimate

Client/Project
Proj No. 193806201
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

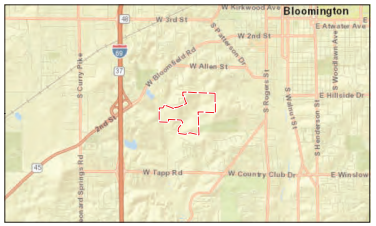
Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington, Monroe County, IN

Prepared by SKL on 8/14/2023
TR by LS on 8/14/2023
IR Review by DV on 8/14/2023

N

0 400 Feet
(At original document size of 11x17)
1:4,800

Legend
- Project Location
- Canopy Estimate = 27.43 acres



Notes
1. Coordinate System: WGS 1984 UTM Zone 16N
2. Data Sources:
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Stantec

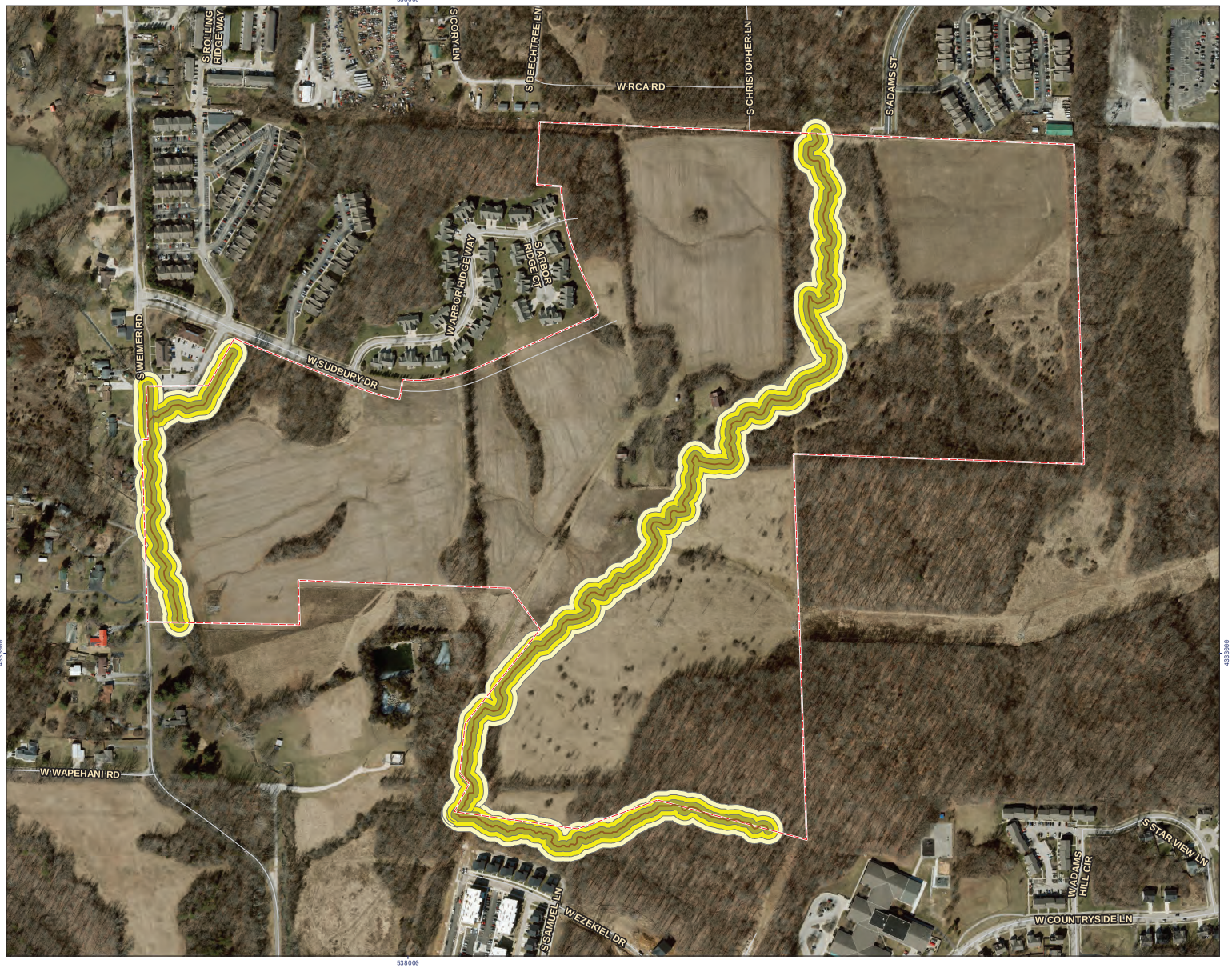


Figure No.
7

Title
Stream Buffer Zones

Client/Project Proj No. 193806201
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

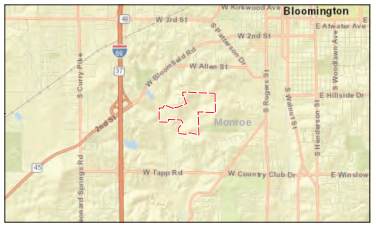
Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington, Monroe County, IN

Prepared by SKL on 6/15/2023
TR by LS on 6/15/2023
IR Review by DV on 6/15/2023

N

0 400 Feet
(At original document size of 11x17)
1:4,800

Legend
- Project Location
- Zone 1 Stream Buffer
- Zone 2 Stream Buffer
- Zone 3 Stream Buffer



Notes
1. Coordinate System: WGS 1984 UTM Zone 16N
2. Data Sources:
3. Background: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Stantec

Proposed Phasing Plan by neighborhood	Start Year	End Year	Total Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Total	%
Shasta meadows	2025	2028	4		137.5	137.5	137.5	137.5							550	13%
Denali Woods	2025	2029	5		100	100	100	100	100						500	12%
Everest Center	2027	2034	8				212.5	212.5	212.5	212.5	212.5	212.5	212.5	212.5	1700	40%
Sandia Place	2028	2032	5					220	220	220	220	220			1100	26%
Whitney Glen	2033	2034	2										200	200	400	9%
			Total	0	237.5	237.5	450	670	532.5	432.5	432.5	432.5	412.5	412.5	4250	100%
			%	0%	6%	6%	11%	16%	13%	10%	10%	10%	10%	10%	4250	100%

Proposed Units	Acres	Units
Shasta meadows	23.4	550
Denali Woods	33.3	500
Everest Center	37.2	1700
Sandia Place	33.1	1100
Whitney Glen	11.6	400
	138.6	4250

Indiana Administrative Code

327 IAC 3-6-11 Design flow rate requirements for collection systems and water pollution treatment/control facilities	
Type	gpd/Unit
1 Bedroom Apartment	200
2 Bedroom Apartment	300
Single-Family Home	310
MF - 3 Bedroom	350
1 & 2 Family Dwelling per Bedroom	150

*City Memo Uses 310 for all units

*

3.0 Summit District's Impact to Sewer Near Connection Point

Under full buildout conditions, the development will be composed of residential units, retail and commercial buildings, hotels, and a fire department. The following calculations to determine average daily and peak daily flows were completed using the unit matrix provided by the developer and Section 327 Indiana Administrative Code 3-6-11.

- Total Equivalent Dwelling Units (EDU) = 4,966
- Flow per EDU = 310 gallons per day
- Average Daily Flow (ADF) = 4,966 units X 310 gpd / unit = 1.54 MGD
- Peaking Factor (PF) = 4
- Peak Daily Flow (PDF) = 1.54 MGD X 4 = 6.16 MGD

The development is proposed to connect to the existing collection system at MH 7597, which is located on the twenty (20) inch sanitary sewer along Weimer Rd, as shown in **Figure 3-1**. Approximately 215 LF downstream of the proposed connection point, the sewer connects to the thirty (30) inch Dillman WWTP West Interceptor.

GPM TO CFS

1 CFS = 448.8 GPM

Overall Development (Total)	General Average	Proposed # of Residential Service Connections	ADF	Peak Factor	PDF (Peak Daily Flow Rate)	PDF (Peak Daily Flow Rate)	Peak Flow Rate (Q peak)	Peak Flow Rate (Q peak)	% Total
ADF (Avg Daily Flow) = GA x PRSC	GA (gpd)	PRSC (Units)	gpd/unit	PF	PDF = ADF x PF (gpd/unit)	MGD	(gal/min)	CFS	(%)
Shasta meadows	310	550	170,500	4	682,000	0.682	473.6	1.06	13%
Denali Woods	310	500	155,000	4	620,000	0.620	430.6	0.96	12%
Everest Center	310	1,700	527,000	4	2,108,000	2.108	1,463.9	3.26	40%
Sandia Place	310	1,100	341,000	4	1,364,000	1.364	947.2	2.11	26%
Whitney Glen	310	400	124,000	4	496,000	0.496	344.4	0.77	9%
Total	310	4,250	1,317,500	4	5,270,000	5.270	3,659.7	8.15	

Units per Year	General Average	Proposed # of Residential Service Connections	ADF	Peak Factor	PDF (Peak Daily Flow Rate)	PDF (Peak Daily Flow Rate)	Peak Flow Rate (Q peak)	Peak Flow Rate (Q peak)	% Total	Cumulative PFR (Q peak)	
ADF (Avg Daily Flow) = GA x PRSC	GA (gpd)	PRSC (Units)	gpd/unit	PF	PDF = ADF x PF (gpd/unit)	MGD	(gal/min)	CFS	(%)	CFS	% Total
2025	310	237.5	73,625	4	294,500	0.295	204.5	0.46	6%	0.46	6%
2026	310	237.5	73,625	4	294,500	0.295	204.5	0.46	6%	0.91	11%
2027	310	450	139,500	4	558,000	0.558	387.5	0.86	11%	1.77	22%
2028	310	670	207,700	4	830,800	0.831	576.9	1.29	16%	3.06	38%
2029	310	532.5	165,075	4	660,300	0.660	458.5	1.02	13%	4.08	50%
2030	310	432.5	134,075	4	536,300	0.536	372.4	0.83	10%	4.91	60%
2031	310	432.5	134,075	4	536,300	0.536	372.4	0.83	10%	5.74	70%
2032	310	432.5	134,075	4	536,300	0.536	372.4	0.83	10%	6.57	81%
2033	310	412.5	127,875	4	511,500	0.512	355.2	0.79	10%	7.36	90%
2034	310	412.5	127,875	4	511,500	0.512	355.2	0.79	10%	8.15	100%
Total		4250	1,317,500	4	5,270,000	5.270	3,659.7	8.15	100%		

ESTIMATED SCHEDULE:

The Project will be completed under the tentative milestones shown below. This tentative schedule is based on receiving a Notice to Proceed in January 2024 and receiving prompt review and approvals from the OWNER.

ITEM	TENTATIVE DATE
Kickoff Workshop	January 2024
Surveying and Geotechnical Field Work	January – April 2024
50% Design Services	January – June 2024
50% Review Workshop	July 2024
95% Design Services & Easement Descriptions	July – November 2024
95% Design Review Workshop	December 2024
Final Detailed Design Services and Permitting	January – June 2025
Bidding Phase	July – August 2025
Contract Award	September 2025
Construction Engineering Phase	October 2025 – March 2027

Petitioner Memo
Re: Sewer Impact

COMMONWEALTH ENGINEERS, INC.
A wealth of resources to master a common goal.

Environmental Engineers & Consultants
9604 Coldwater Road, Suite 203
Ft. Wayne, IN 46825
PH :-(260) 494-3223 FAX :-(260) 494-3224

DILLMAN WWTP WEST INTERCEPTOR - SUMMIT DISTRICT IMPACT MEMORANDUM

TO: City of Bloomington Utilities

FROM: Commonwealth Engineers, Inc.

DATE: September 5, 2023

SUBJECT: Dillman WWTP West Interceptor – Summit District Impact

1.0 Introduction

The Dillman Wastewater Treatment Plant (WWTP) Basin consists of three (3) main interceptors that convey sanitary flow south to the WWTP. The thirty-six (36) inch west interceptor generally follows Clear Creek Trail, the forty-two (42) inch central interceptor generally follows Clear Creek, and the forty-two (42) inch east interceptor generally follows Jackson Creek. The west and central interceptors converge near 5825 S Rogers Street. The interceptor then converges with the east interceptor near the confluence of Clear Creek and Jackson Creek. The forty-eight (48) inch interceptor then travels southwest to the treatment plant.

The WWTP has a permitted design capacity of 15 MGD with a peak capacity of 30 MGD. City of Bloomington Utilities (CBU) has made improvements to the WWTP to achieve a future capacity of 20 MGD and peak flow of 40 MGD. The influent pump station has a firm pumping capacity of 75 MGD with the largest unit out of service. The equalization (EQ) basin has a total capacity of 43 million gallons.

A development named Summit District is proposed to connect to the sanitary sewer collection system. The development is located on a 140 acre property located east of Weimer Road and west of the RCA Community Park as shown in **Figure 1-1**. The development will include a distribution of residential units, retail and commercial buildings, hotels, and a fire department. Full buildout of the property is estimated to occur by 2038. Under full buildout conditions, the sanitary sewer for the development will connect to Manhole 7597 in the Dillman WWTP West Interceptor Basin.

As a part of this study, the Dillman WWTP West Interceptor within the CBU's hydraulic collection system model was calibrated to dry weather and wet weather conditions. The hydraulic model is well calibrated and accurately represents the existing conditions of the collection system. The hydraulic model was utilized to evaluate planning-level alternative solutions to eliminate potential SSOs up to a defined level of control. **Figure 1-1** illustrates the extents of the Dillman WWTP West Interceptor model. The hydraulic model was developed and calibrated using the United States Environmental Protection Agency's (USEPA) hydraulic modeling program SWMM5 computational engine. The model is well calibrated and suitable for preliminary engineering alternative analyses.

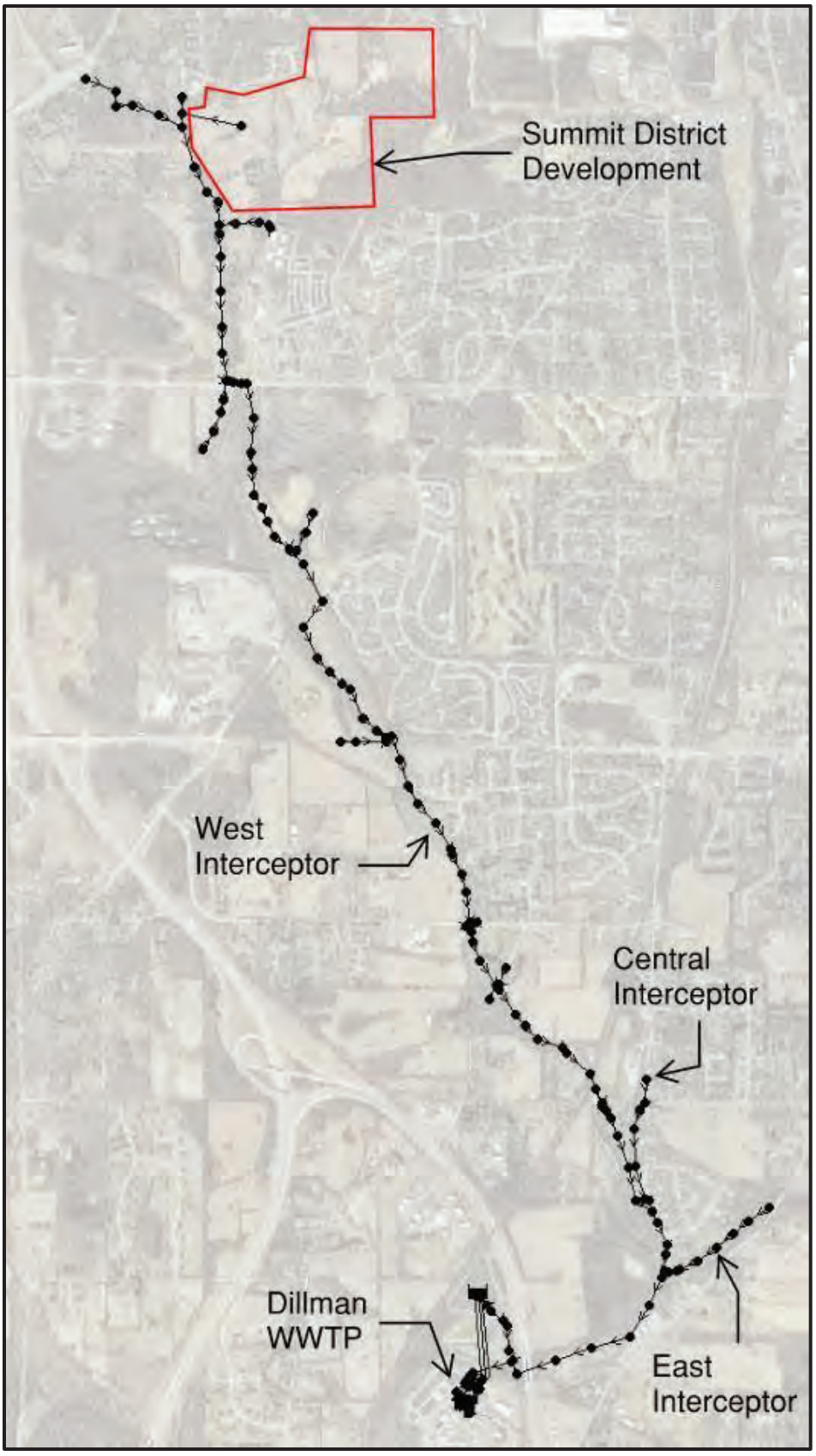


Figure 1-1: Dillman WWTP West Interceptor SWMM Hydraulic Model

2.0 Existing Conditions

To analyze the existing Dillman WWTP West Interceptor capacity during a large wet weather event, a fifty (50) year, one (1) hour storm was loaded into the model. The fifty (50) year, one (1) hour design storm equates to 2.89 inches of rain falling in one (1) hour. This design storm has been utilized for other similar SSO communities in the state. As shown in **Figure 2-1**, the downstream portion of the interceptor does not have the capacity to convey the peak flow. The majority of the flow reaching the WWTP comes from the Central Interceptor and East Interceptor.

Over the past five (5) years, MH 4749 near S. Rogers St. and Charlie Ave. has experienced several sanitary sewer overflows (SSOs). SSOs are prohibited in Indiana. The reality though is that sanitary sewer collection systems experience significant impacts due to infiltration and inflow. In older sanitary collection systems, infiltration and inflow can approach hydraulic behavior and wet weather response similar to a combined collection system. Growth within the Dillman WWTP sewershed is expected to occur further taxing the system and increasing the occurrence of SSOs. Specifically, the Summit District development adds additional flow to the collection system, further increasing the occurrence and volume of SSOs.

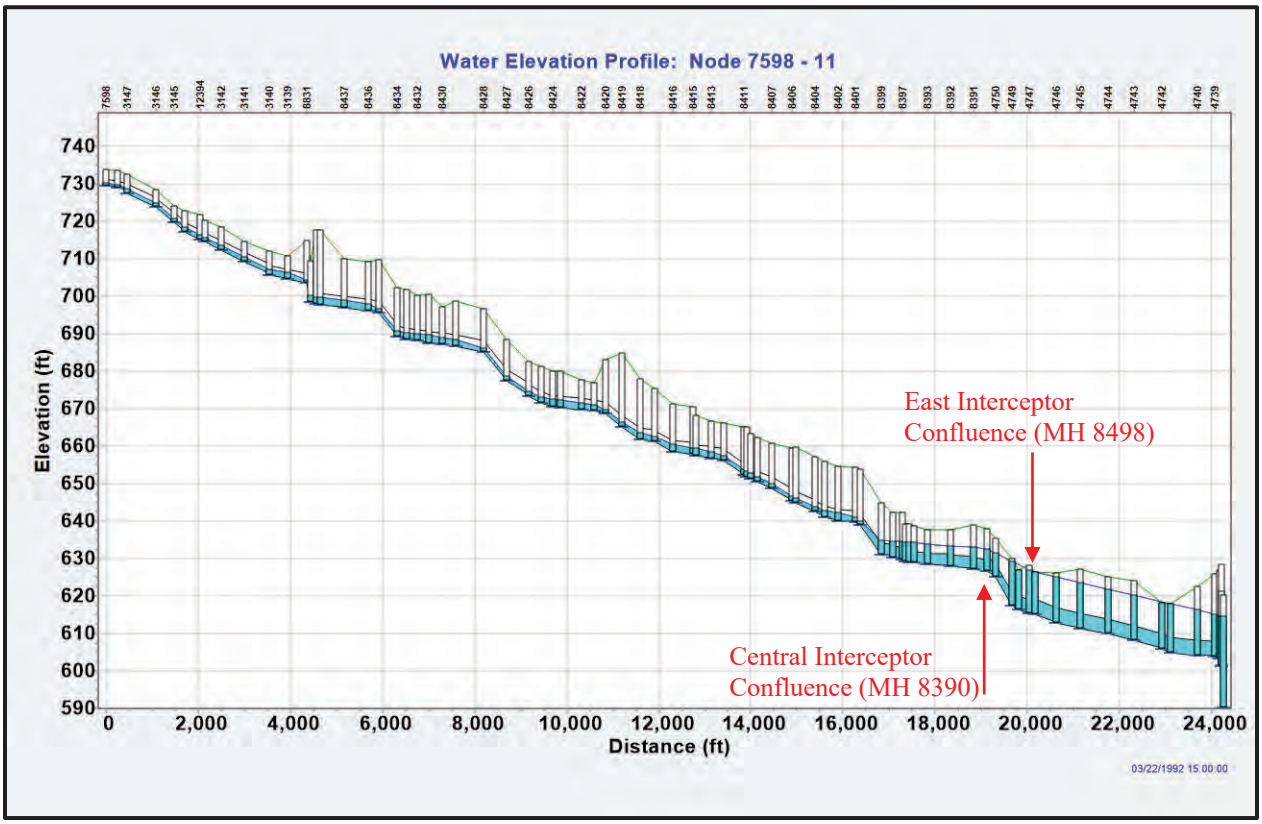


Figure 2-1: Dillman WWTP West Interceptor Hydraulic Grade Line 50-Year, 1-Hour Design Storm

3.0 Summit District's Impact to Sewer Near Connection Point

Under full buildout conditions, the development will be composed of residential units, retail and commercial buildings, hotels, and a fire department. The following calculations to determine average daily and peak daily flows were completed using the unit matrix provided by the developer and Section 327 Indiana Administrative Code 3-6-11.

Total Equivalent Dwelling Units (EDU) = 4,966

Flow per EDU = 310 gallons per day

Average Daily Flow (ADF) = 4,966 units X 310 gpd / unit = 1.54 MGD

Peaking Factor (PF) = 4

Peak Daily Flow (PDF) = 1.54 MGD X 4 = 6.16 MGD

The development is proposed to connect to the existing collection system at MH 7597, which is located on the twenty (20) inch sanitary sewer along Weimer Rd, as shown in **Figure 3-1**. Approximately 215 LF downstream of the proposed connection point, the sewer connects to the thirty (30) inch Dillman WWTP West Interceptor.

Table 3-1 includes a comparison of the full-flow capacity to the existing conditions flow and flow with Summit District. As shown in the table, the 20 (twenty) inch sewer is undersized for the peak design flow with Summit District. As shown in **Figure 3-2**, the hydraulic grade line (HGL) exceeds the crown of the pipe by less than one (1) foot during peak flow. It is recommended to monitor flows along the twenty (20) inch sewer as the development is built out to ensure there is adequate capacity during wet weather. Alternatively, if Summit District connects to MH 3147 or further downstream on the thirty (30) inch interceptor, no surcharging occurs for the peak wet weather flow.

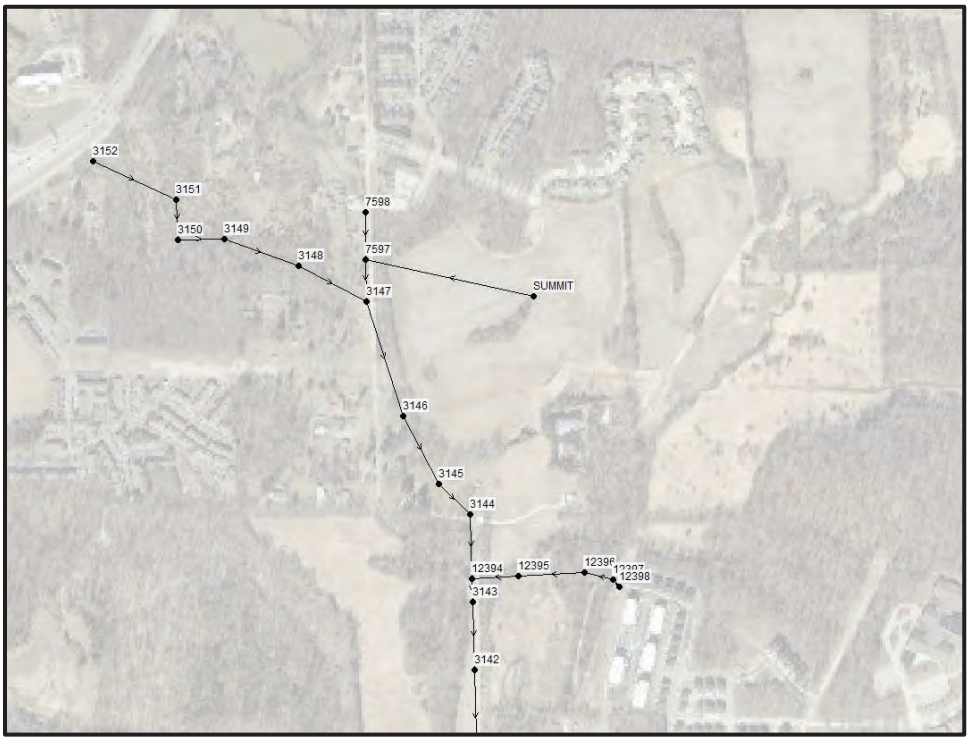


Figure 3-1: Summit District Connection to Existing Collection System

Table 3-1: 50-Year, 1-Hour Design Storm Flows Near the Connection Point with Summit District

	20-Inch Sewer Flow (MGD)	30-Inch Sewer Flow (MGD)
Full-Flow Capacity	4.3	20.6
Existing Conditions	1.9	11.0
Future Growth Conditions	8.0	17.5

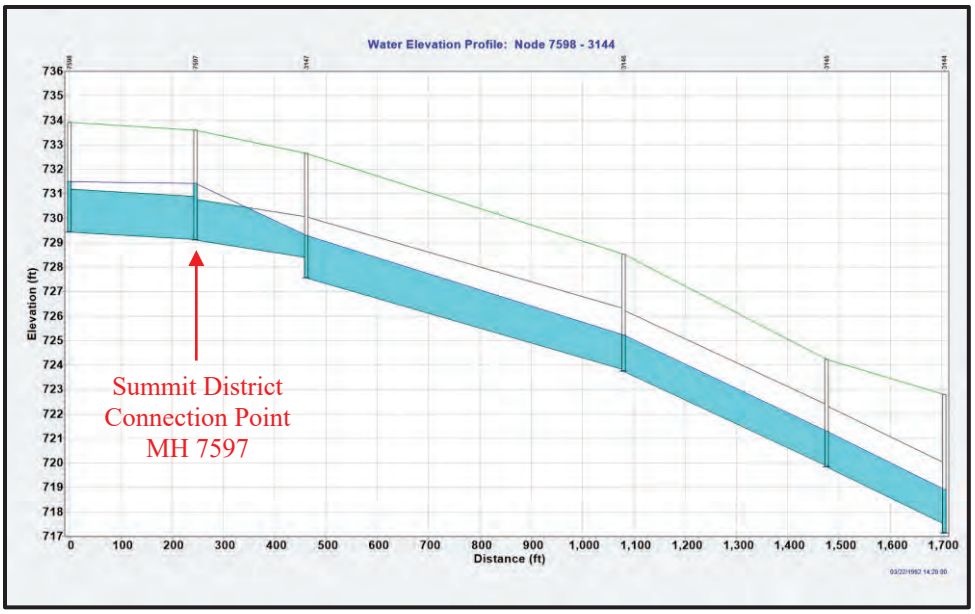


Figure 3-2: Connection Point of Summit District HGL 50-Year, 1-Hour Design Storm

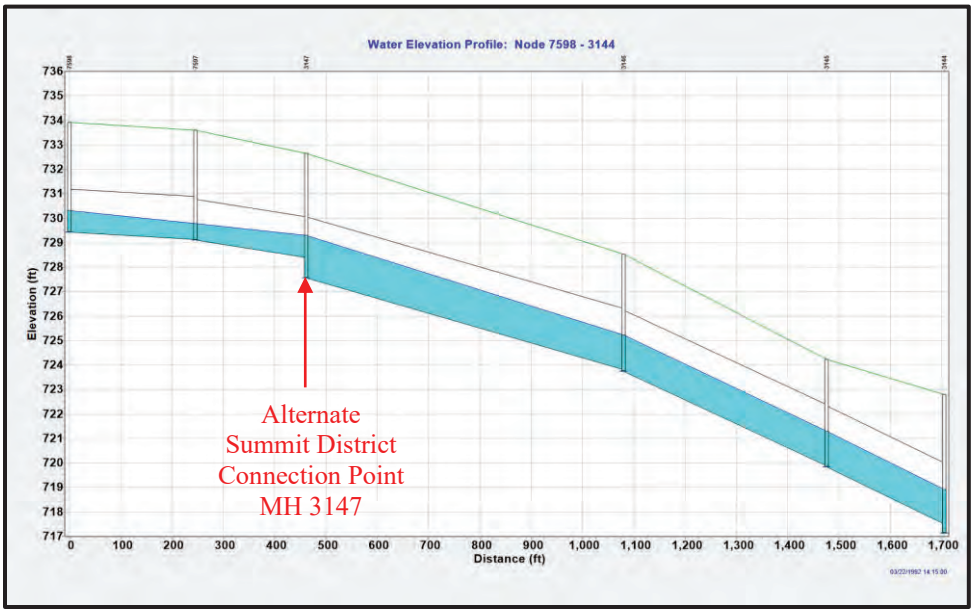


Figure 3-3: Alternate Connection Point of Summit District HGL 50-Year, 1-Hour Design Storm

4.0 Increase in Flow Reaching WWTP

During the metering period of May 2023 through August 2023, the existing conditions average dry weather flow was approximately 7.0 MGD. However, Monthly Report of Operation (MRO) data from May 2022 through July 2023 were reviewed to assess the average dry weather flow throughout year. It was determined that the yearly average dry weather flow is approximately 10.0 MGD. Assuming the interceptor was sized to receive these flows without surcharging, **Table 4-1** compares the dry weather and wet weather flow reaching the WWTP for the existing conditions and full buildout future flow conditions.

Table 4-1: Flow Reaching WWTP

	Existing Conditions (MGD)	Full Buildout Future Flow (MGD)	Increase in Flow (%)
Dry Weather	10.0	13.7	36.6
50 Year, 1 Hour	73.9	88.5	19.8

In addition to the Summit District development, several developments within the West Interceptor Basin are planned to connect to the collection system. Multiple developments in the Central and East Interceptor Basins are either currently under construction or recently completed. These Central and East Interceptor flows were not recorded during the metering period, so they are included in the future flow in **Table 4-1**.

The Summit District accounts for 46.5% of the future growth flow in the West Interceptor Basin. Additionally, the Summit District development increases the existing dry weather and wet weather flows by 15.4% and 8.3%, respectively. Calculations are shown below.

Future Growth in West Interceptor Basin = Full Buildout – Existing – Central and East Future Growth

= 13.7 MGD – 10.0 MGD – 0.4 MGD = 3.3 MGD

Summit District Share of Future Growth = Summit District Flow / Future Growth in West Interceptor

= 1.54 MGD / 3.3 MGD = 46.5%

Summit District Increase of Existing Dry Weather = Summit District Dry Weather / Existing Dry Weather

= 1.54 MGD / 10.0 MGD = 15.4%

Summit District Increase of Existing Wet Weather = Summit District Peak Flow / Existing Wet Weather

= 6.16 MGD / 73.9 MGD = 8.3%

5.0 Alternatives

Alternative solutions to eliminate potential sanitary sewer overflows occurring within Dillman WWTP West Interceptor Basin were developed for the fifty (50) year design storms. The following performance criteria were used when identifying and assessing alternative solutions for the collection system:

- Eliminate potential sanitary sewer overflows for the 50-year design storm.
- Achieve eight (8) feet of freeboard between the ground elevation and the maximum HGL in the collection system. If eight (8) feet of freeboard was not available, the HGL must be lower than the crown of the pipe.
- Firm (design) lift station pumping rate shall meet or exceed the peak inflow to each lift station.

Table 5-1 provides the total (construction and non-construction) cost of the three (3) alternatives presented below for the future growth conditions in the Dillman WWTP Basin.

Table 5-1: Alternative Total Cost Estimate

Alternative	Total Cost ($)
1	59,924,450
2	45,501,790
3	44,198,460

Alternative 1 – Wet Weather Overflow at MH 8397 and MH 4756 with Flow Control

Diversion structures at MH 8397 and MH 4756 will divert wet weather to a lift station located near W Church Lane. Both structures will include plates to control flow in the existing downstream interceptors and divert more toward the lift station. The lift station will pump to the existing EQ basin. The force main alignment is proposed to follow the Limestone Greenway, which was constructed in 2019.

Improvements considered in this alternative include:

- 36 MGD Lift Station*
- New Diversion Structures with Flow Control*
- 30” Diameter Gravity Sewer from MH 8397 and MH 4756 to new manhole (600 feet)*
- 36” Diameter Gravity Sewer from new manhole to new lift station (200 feet)*
- 36” Diameter Force Main from New Lift Station to EQ Basin (3,450 feet)*
- 36” Diameter Gravity Sewer from MH 3139 to MH 8831 (415 feet)
- 42” Diameter Gravity Sewer from MH 8399 to MH 8397 (460 feet)

Improvements required to address the existing issues include the items with asterisks above. Costs associated with these current improvements are estimated at $58,133,300. This value could be potentially reduced by designing a firm capacity station for current flows readily expandable to the future growth flow. The other items included above would be constructed as developments are connected to the system.

Alternative 2 – Wet Weather Relief Sewer

During wet weather, wastewater overflows a weir in a diversion structure at MH 8397. The wet weather sewer travels parallel to the existing West Interceptor. At two additional locations, diversion structures divert flow from the main interceptor to the wet weather sewer. A new wet weather lift station will accept flows in excess of the capacity of the influent pump station. The lift station will pump to the EQ basin. Challenges of this alternative include fitting the new gravity sewer on WWTP property dealing with other pipes and utilities. Additionally, this alternative requires a large diameter gravity sewer underneath I-69.

Improvements considered in this alternative include:

- 14 MGD Lift Station*
- 3 New Diversion Structures*
- 30" Diameter Gravity Relief Sewer from MH 8397 (1,800 feet)
- 42" Diameter Gravity Relief Sewer (1,150 feet)
- 48" Diameter Gravity Relief Sewer to Influent Pump Station (3,890 feet)*
- 24" Diameter Force Main from New Lift Station to EQ Basin (2,100 feet)*
- 36" Diameter Gravity Sewer Replacement from MH 3139 to MH 8831 (415 feet)

Improvements required to address the existing issues include the items with asterisks above. Note only two (2) diversion structures are required. Costs associated with these current improvements are estimated at $38,418,640. The other items included above would be constructed as developments are connected to the system.

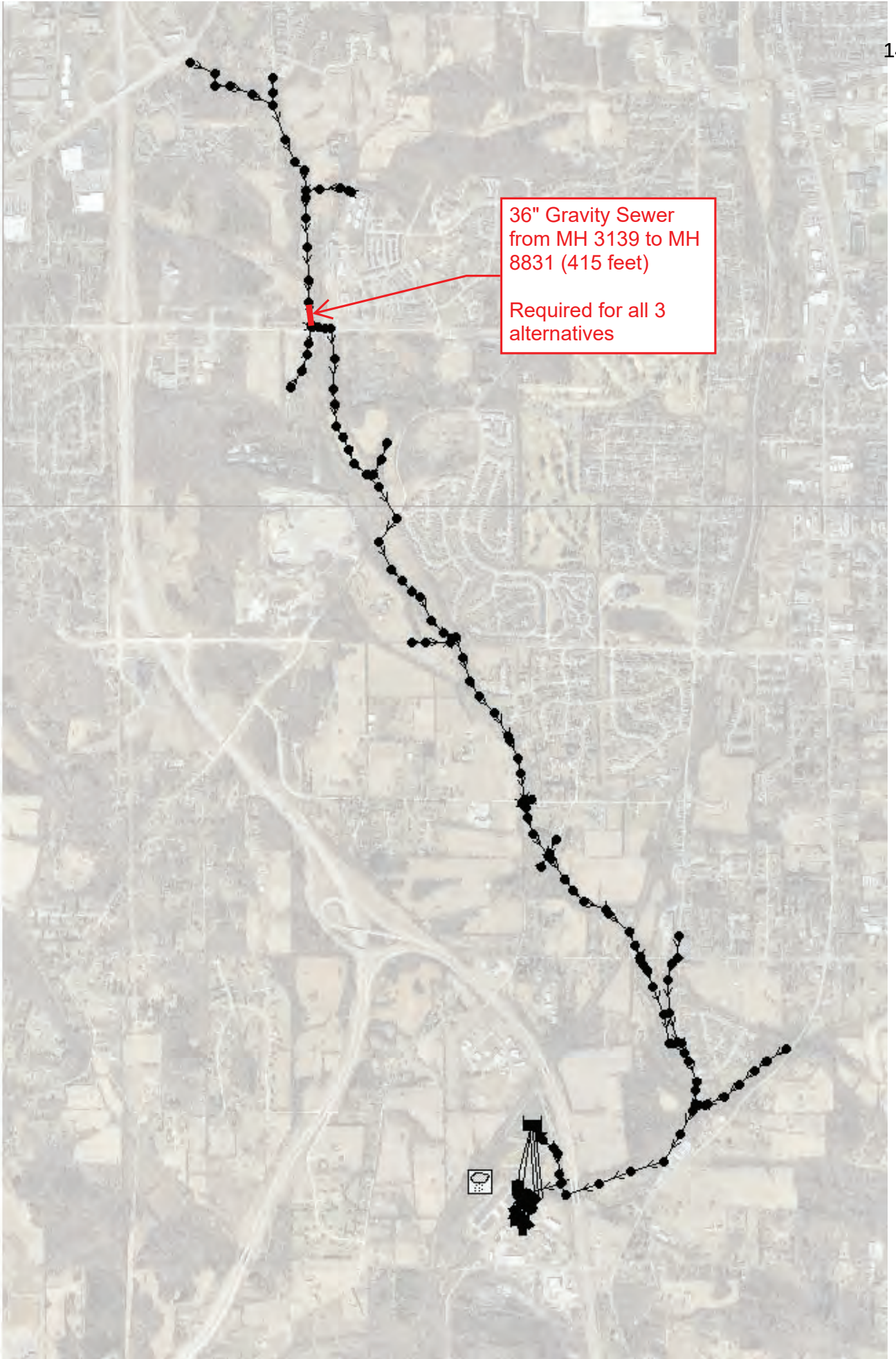
Alternative 3 – New Dry Weather Flow Sewer

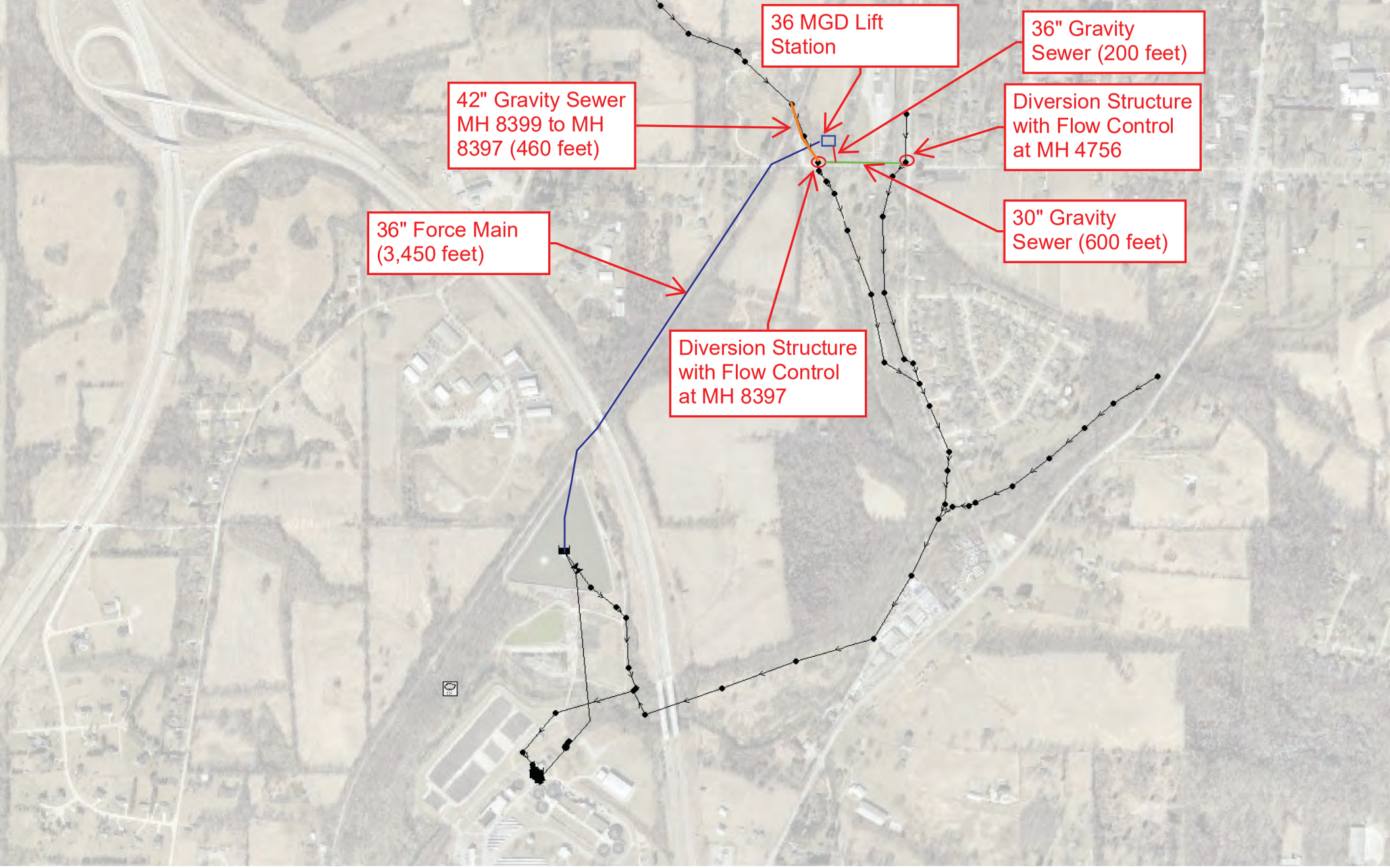
A diversion structure at MH 8498 diverts all dry weather flow through a new gravity sewer. When the depth in the diversion structure exceeds the maximum dry weather depth, flow overtops a weir into the existing gravity sewer. A new wet weather lift station will accept flows in excess of the capacity of the influent pump station. The lift station will pump to the EQ basin. Challenges of this alternative include fitting the new gravity sewer on WWTP property dealing with other pipes and utilities. Additionally, this alternative requires a large diameter gravity sewer underneath I-69. The pipe replacement instead of a parallel sewer also requires significant bypass pumping.

Improvements considered in this alternative include:

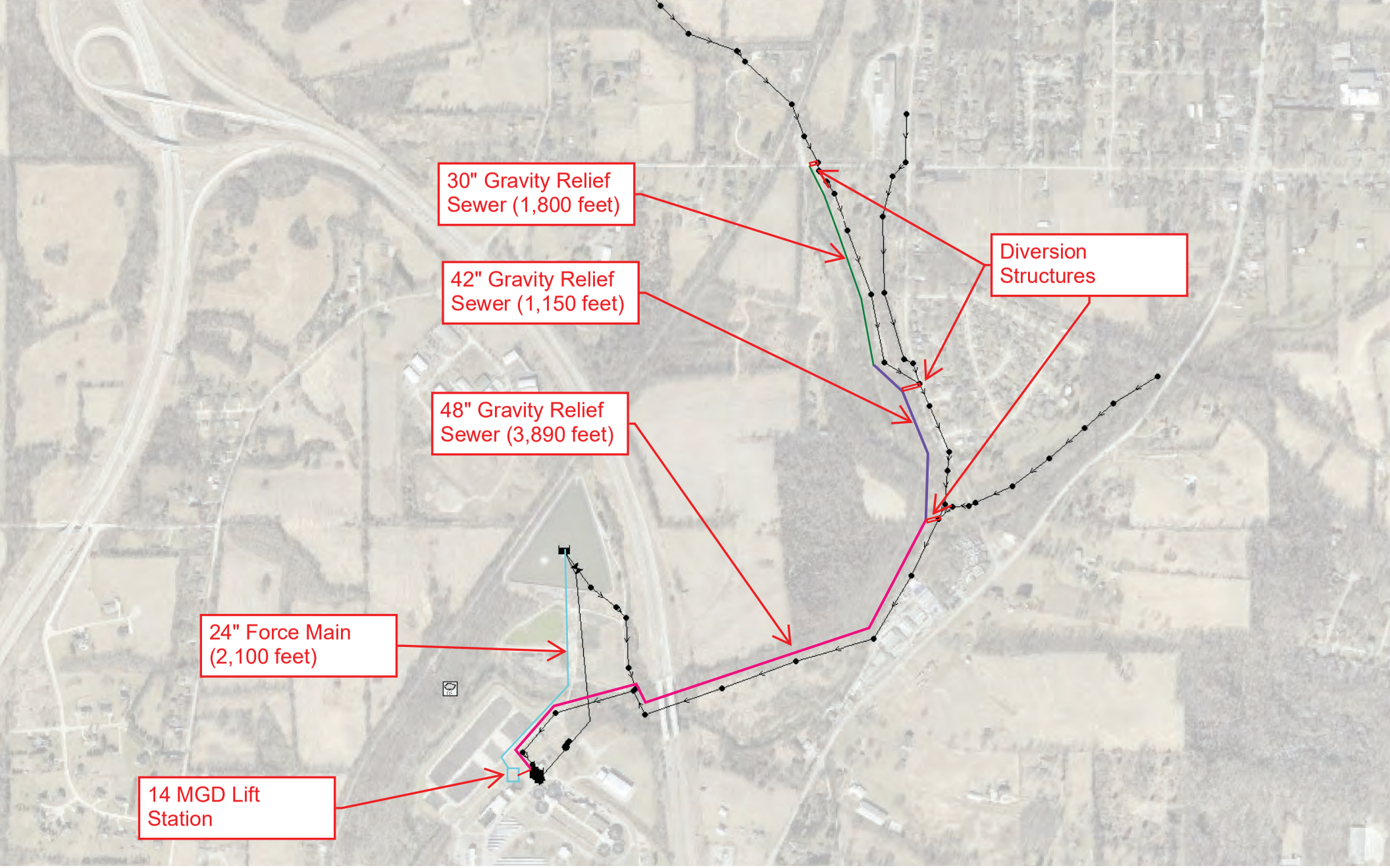
- 14 MGD Lift Station*
- New Diversion Structure*
- 48" Diameter Gravity Relief Sewer from MH 8498 (2,300 feet)*
- 54" Diameter Gravity Relief Sewer to Influent Pump Station (1,750 feet)*
- 24" Diameter Force Main from New Lift Station to EQ Basin (2,100 feet)*
- 36" Diameter Gravity Sewer Replacement from MH 3139 to MH 8831 (415 feet)
- 42" Diameter Gravity Sewer Replacement from MH 8396 to MH 8390 (1,790 feet)
- 48" Diameter Gravity Sewer Replacement from MH 8390 to MH 4747 (920 feet)

Improvements required to address the existing issues include the items with asterisks above. Costs associated with these current improvements are estimated at $38,300,230. The other items included above would be constructed as developments are connected to the system.

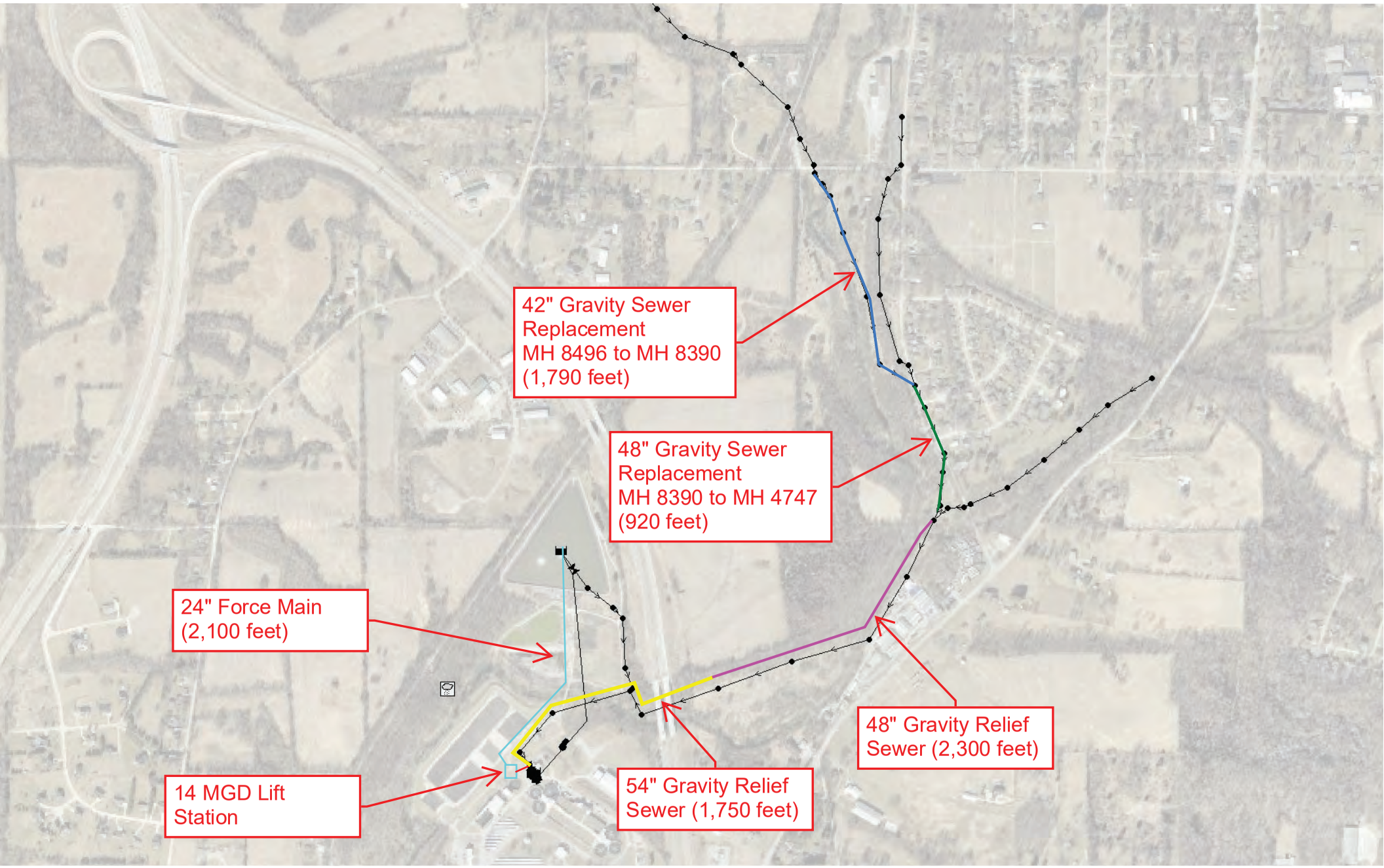

36" Gravity Sewer from MH 3139 to MH 8831 (415 feet)
Required for all 3 alternatives



ALTERNATIVE 1



ALTERNATIVE 2



ALTERNATIVE 3

ALTERNATIVE 3						WWTP (A)	DS Gravity (A)	mid gravity (B)	US gravity (C)
Item	**Description**	**QNTY**	**UNIT**	**UNIT COST ($)**	**TOTAL COST ($)**				
1	MOBILIZATION/ DEMOBILIZATION (5%)	1	LS	1,563,000	1,563,000	804,000	516,000	86,000	157,000
2	CONTRACTOR CONSTRUCTION ENGINEERING (2%)	1	LS	613,000	613,000	315,000	202,000	34,000	62,000
3	MISC. UTILITY RELOCATION ALLOWANCE	1	LS	100,000	100,000	50,000	25,000	12,500	12,500
4	MAINTENANCE AND PROTECTION OF TRAFFIC	1	LS	100,000	100,000	20,000	50,000	20,000	10,000
5	TEMPORARY EROSION CONTROL	1	LS	100,000	100,000	20,000	40,000	15,000	25,000
6	BYPASS PUMPING	1	LS	500,000	500,000	25,000	40,000	220,000	215,000
7	14 MGD LIFT STATION	1	LS	13,946,500	13,946,500	13,946,500			
8	24-INCH DIAMETER FORCE MAIN	2,100	LF	370	777,000	777,000			
9	EQ BASIN DISCHARGE	1	LS	185,000	185,000	185,000			
10	CONNECTION FROM LIFT STATION	1	LS	500,000	500,000	500,000			
11	54-INCH DIAMETER GRAVITY RELIEF SEWER	1,400	LF	1,430	2,002,000		2,002,000		
12	54-INCH DIAMETER GRAVITY RELIEF SEWER - UNDER I-69	400	LF	8,080	3,232,000		3,232,000		
13	48-INCH DIAMETER GRAVITY RELIEF SEWER	2,250	LF	1,280	2,880,000		2,880,000		
14	48-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 8390 TO MH 4747)	920	LF	1,280	1,177,600			1,177,600	
15	42-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 8396 TO MH 8390)	1,790	LF	1,130	2,022,700				2,022,700
16	DIVERSION STRUCTURE	1	LS	185,000	185,000		185,000		
17	BEDROCK EXCAVATION	9,865	CY	250	2,466,200	251,000	1,654,000	187,100	374,100
18	LATERAL CONNECTIONS	2	EA	25,000	50,000			50,000	
19	36-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 3139 TO MH 8831)	415	LF	1,000	415,000				415,000
				CONSTRUCTION COST SUBTOTAL ($) =	**32,815,000**	**16,893,500**	**10,826,000**	**1,802,200**	**3,293,300**
				10% CONSTRUCTION CONTINGENCY (ROUNDED) =	**3,282,000**	**1,689,500**	**1,082,700**	**180,300**	**329,500**
				TOTAL CONSTRUCTION COST =	**36,097,000**	**18,583,000**	**11,908,700**	**1,982,500**	**3,622,800**
				25% NON-CONSTRUCTION COSTS (ROUNDED) =	**9,025,000**	**4,646,000**	**2,977,300**	**495,800**	**905,900**
				TOTAL COST =	**45,122,000**	**23,229,000**	**14,886,000**	**2,478,300**	**4,528,700**

	9.70%	9.70%	11.50%	22%
	$ 2,253,213.00	$ 1,443,942.00	$ 285,004.50	$ 996,314.00
TOTAL =			$ 4,978,473.50	

COMMONWEALTH ENGINEERS, INC.
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Environmental Engineers & Consultants
9604 Coldwater Road, Suite 203
Ft. Wayne, IN 46825
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DILLMAN WWTP WEST INTERCEPTOR SWMM MODEL CALIBRATION, FUTURE GROWTH, & ALTERNATIVE TECHNICAL MEMORANDUM ADDENDUM NO. 1

TO: City of Bloomington Utilities

FROM: Commonwealth Engineers, Inc.

DATE: November 9, 2023 – Revised December 26, 2023

SUBJECT: SWMM Model Calibration, Future Growth, and Alternative Analysis

ATTACHMENTS:
Attachment 1 – Rainfall Classification
Attachment 2 – Dry Weather Calibration and Validation Figures
Attachment 3 – Wet Weather Calibration and Validation Figures
Attachment 4 – Peak Hydraulic Grade Lines
Attachment 5 – Cost Estimate
Attachment 6 – Alternatives Hydraulic Grade Lines

1.0 Introduction

The project area includes the City of Bloomington Utilities (CBU) Dillman WWTP Basin, which is depicted in **Figure 1-1**. As shown, the Dillman WWTP Basin is defined as a separate sanitary basin and approximately consists of the area south of Vernal Pike. Specifically, this study is focused on the West Interceptor Basin within the Dillman WWTP Basin.

During dry weather, sanitary flow is conveyed by the Dillman WWTP West Interceptor south towards the WWTP. Two (2) other interceptors convey flow from the central and eastern portions of the Dillman WWTP Basin. The three (3) interceptors converge near S Old Indiana 37 and S Roger Street. From there, sanitary flow is conveyed through a forty-eight (48) inch interceptor to the WWTP.

During wet weather, the Dillman WWTP West Interceptor Basin experiences significant wet weather flows and sanitary sewer overflows (SSOs) are potentially occurring throughout the system. Within the study area, MH 4749 near S. Rogers St. and Charlie Ave. has experienced several SSOs over the past five (5) years. SSOs are prohibited in Indiana. The reality though is that sanitary sewer collection systems experience significant impacts due to infiltration and inflow. In older sanitary collection systems, infiltration and inflow can approach hydraulic behavior and wet weather response similar to a combined collection system. Growth in the Dillman WWTP sewershed is expected to further tax the system and increase the occurrence of SSOs.

The Dillman WWTP has a permitted design capacity of fifteen (15) MGD with a peak capacity of thirty (30) MGD. CBU has made improvements to the WWTP to achieve a future capacity of twenty (20) MGD and peak capacity of forty (40) MGD. The influent pump station has a firm pumping capacity of seventy-five (75) MGD with the largest unit out of service. The equalization (EQ) basin has a total capacity of forty-three (43) million gallons.

As a part of this study, extensive surveying and field data were collected in order to develop a hydraulic model that accurately represents the existing conditions of the collection system. From there, the model was calibrated to dry and wet weather conditions. The hydraulic model is well calibrated and accurately represents the existing conditions of the collection system. The hydraulic model was utilized to evaluate planning-level alternative solutions to eliminate potential SSOs up to a defined level of service. **Figure 1-2** illustrates the extents of the Dillman WWTP West Interceptor model. The hydraulic model was developed and calibrated using the United States Environmental Protection Agency's (USEPA) hydraulic modeling program SWMM5 computational engine. The model is well calibrated to dry and wet weather events and is suitable for preliminary engineering alternative analyses.

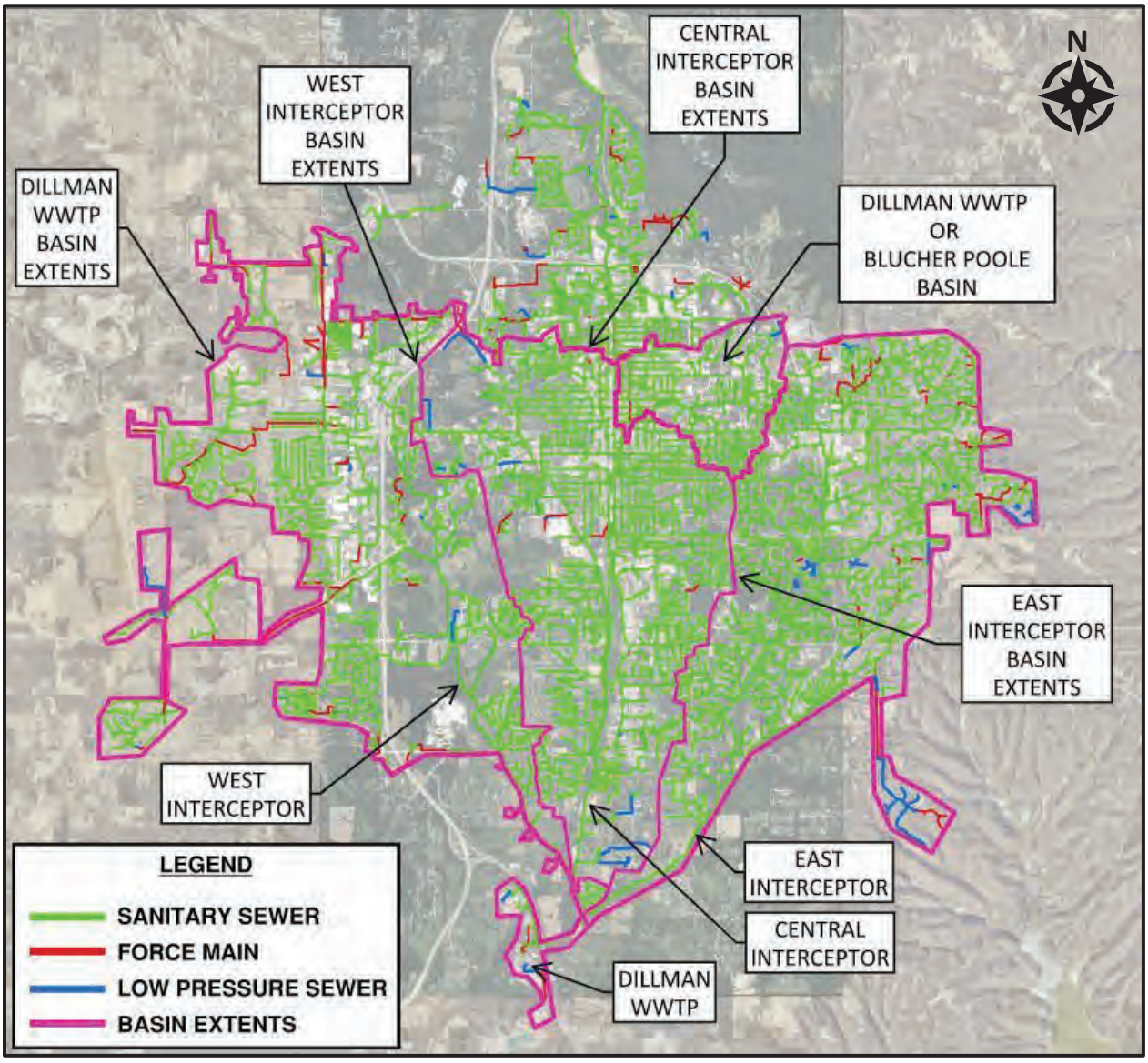


Figure 1-1: Dillman WWTP Basin

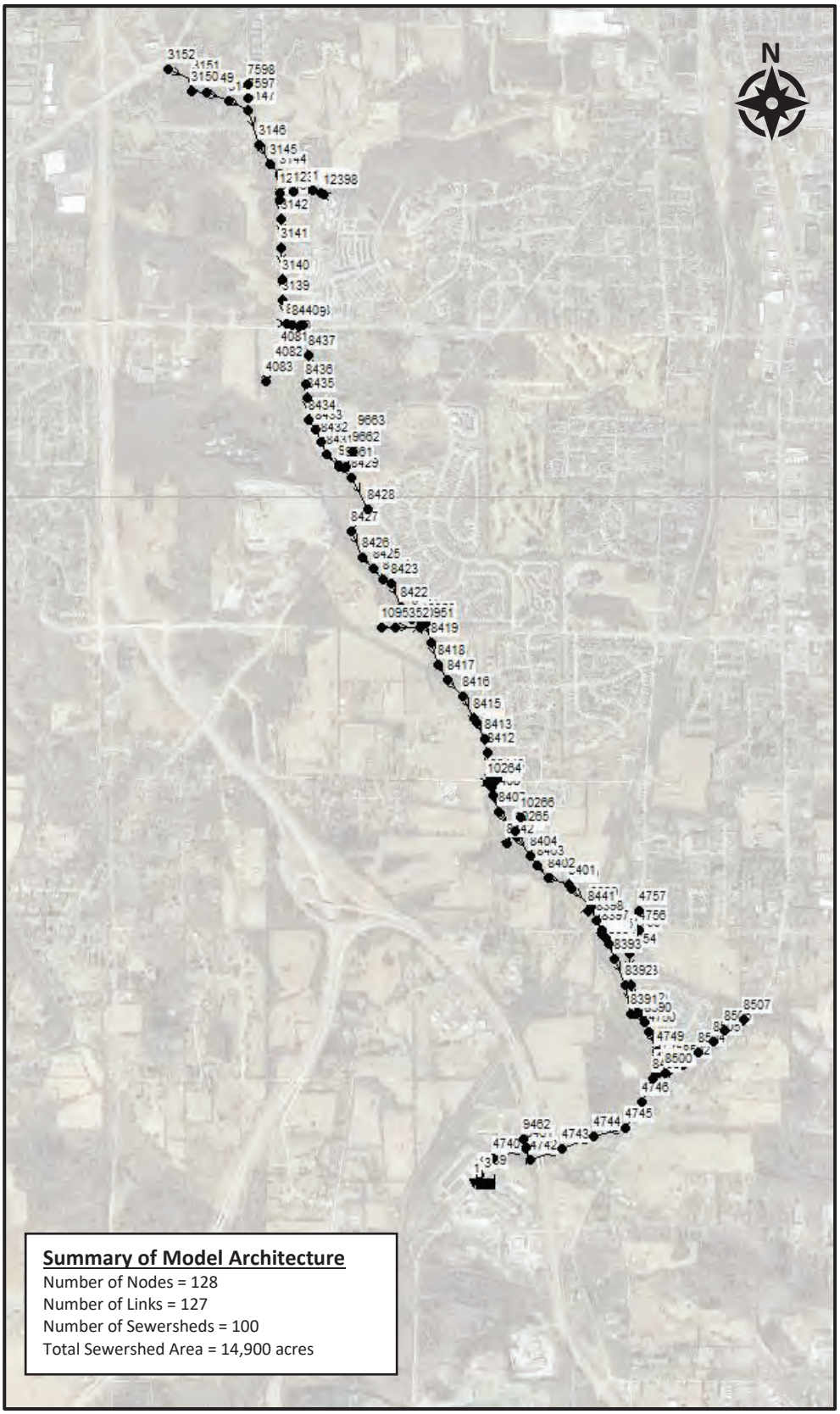


Figure 1-2: SWMM5 Model Architecture

2.0 Rainfall and Flow Meter Data

An accurate source of rainfall and flow meter data is necessary to develop a calibrated hydraulic model for the Dillman WWTP Basin. A temporary rain gauge and flow meters were installed as a part of this modeling effort. The following is a summary of the rainfall and flow meter data that was used for the model calibration.

2.1 Rainfall Data

One (1) temporary rainfall gauge was deployed at the Dillman WWTP and recorded data in five (5) minute intervals. **Figure 2-1** illustrates the location of the gauge in relation to the Dillman WWTP West Interceptor Basin. Rainfall data was downloaded and analyzed for the duration of the flow monitoring period from May 2023 through August 2023. Several wet weather events occurred during the flow monitoring period and are classified in **Table 2-1**. **Attachment 1** contains the detailed categorization of all wet weather events occurring during the flow monitoring period.

Table 2-1
Classification of Rainfall Events at Dillman WWTP

Date	Depth (in)	Duration (hr)	Recurrence Interval *
6/11/2023	0.93	1	4-6 Months
7/1/2023	0.66	1	< 2 Months
7/2/2023	0.99	1	4-6 Months
7/2/2023	2.67	48	6-9 Months
7/8/2023	0.74	1	2-3 Months
7/17/2023	1.10	1	6-9 Months
8/5/2023	1.66	1	2-5 Years

* Classification approximated using **Rainfall Frequency Atlas of the Midwest - Bulletin 71**.

2.2 Flow Meter Data

Flow metering was performed from May 2023 through August 2023. Six (6) temporary area-velocity (AV) flow meters were placed throughout the Dillman WWTP Basin. One (1) permanent flow meter is located on the Dillman WWTP West Interceptor. **Table 2-2** provides a summary of the flow meters, corresponding structure locations, and corresponding pipe diameters. **Figure 2-1** depicts the location of each flow meter used during dry and wet weather calibration and the contributary area to each meter, which represents the modeled SWMM5 subbasins.

Table 2-2
Summary of Flow Meters

Location in the Collection System (Manhole #)	Temporary/ Permanent	Pipe Diameter (in)	Meter Location (Influent/Effluent)
3148	Temporary	30	Influent
3144	Permanent	30	Influent
4080	Temporary	15	Influent
8391	Temporary	36	Influent
4752	Temporary	42	Influent
8501	Temporary	42	Influent
4740	Temporary	48	Influent

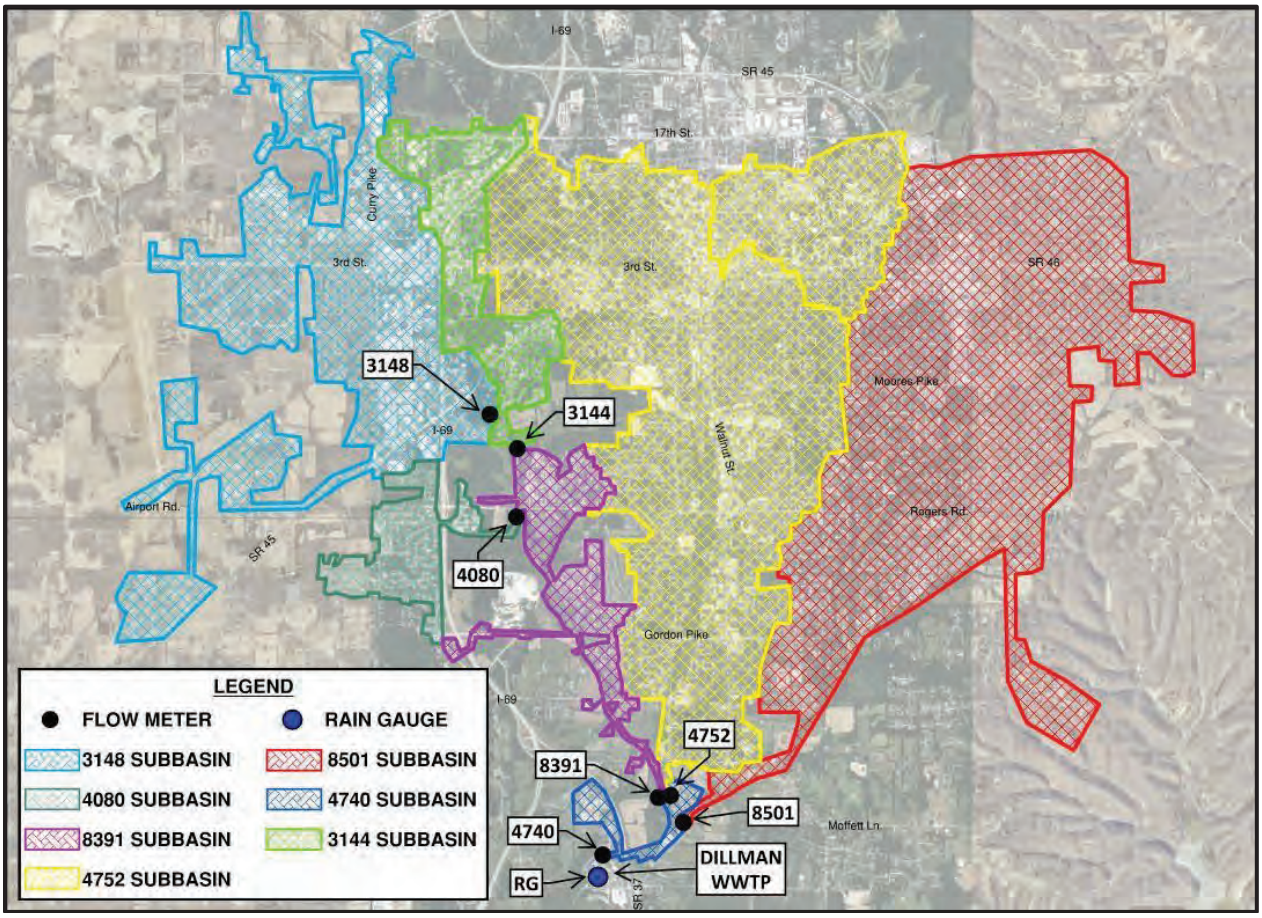


Figure 2-1: SWMM5 Flow Meter Subbasins

3.0 Model Calibration

Model calibration for both dry and wet weather conditions are critical components of collection system modeling. Proper dry weather calibration and validation ensure an accurate depiction of base sanitary flows and levels in the collection system. Likewise, proper wet weather calibration and validation ensure accurate predictions of the wet weather volumes and rates entering the collection system during various wet weather events along with corresponding effects to the hydraulic grade lines in the sanitary collection system. Dry and wet weather conditions were calibrated and validated separately, as summarized below.

3.1 Dry Weather Calibration and Validation

The flow metering data and rainfall data were reviewed to find an optimal seven (7) to fourteen (14) day span in which no significant rainfall had fallen during that span and no significant wet weather events had occurred in at least the two (2) preceding days. The dry weather span that occurred between May 26, 2023 and June 7, 2023 met these criteria (see **Figure 3-5**). During this period, the flow metering data was analyzed, and dry weather flow characteristics were calculated for each meter installed within the dry weather flow path. Dry weather calibration was performed by distributing the average dry weather flow metered at the monitoring locations to upstream nodes based on residential/business counts and approximate flow rates from industries and institutions. Diurnal patterns were also calculated based upon hourly and daily variation in the flow. These patterns allowed the average dry weather flow to accurately match the hydrographs collected by the flow meters.

Attachment 2 contains the graphical comparison of the modeled flow and depth data with the metered flow and depth data for the selected dry weather calibration period. As shown in **Attachment 2**, the model is adequately calibrated to dry weather conditions due to the consistent agreement between the metered data and model output.

The selected dry weather validation span to independently assess the dry weather calibration was July 23, 2023 to August 6, 2023 (see **Figure 3-5**). For the dry weather validation model run, the established dry weather flow patterns from the preceding calibration were not altered in the model, thus providing a secondary period in which the model output can be compared to the gauged metering data during dry weather. **Attachment 2** contains the graphical comparison of the modeled flow and depth data with the gauged metering data for the selected dry weather validation period. As shown, the model is adequately validated for planning-level purposes due to the consistent agreement between the metered data and model output.

3.2 Wet Weather Calibration & Validation

Generally, there are two (2) common methodologies in EPA SWMM5 utilized to calibrate collection system models to wet weather conditions. The first method is the Rainfall Derived Infiltration and Inflow (RDII) unit hydrograph method, which is commonly used to calibrate separate sewer areas. The second is the subcatchment method, which is used to calibrate combined sewer areas. The Dillman WWTP West Interceptor Basin is defined as a separate sanitary system; therefore; only the RDII unit hydrograph method was utilized during the wet weather calibration process. A summary of the RDII Unit Hydrograph Method, wet weather calibration, and wet weather validation is provided hereafter.

RDII Unit Hydrograph Method

Sanitary sewers are designed to collect and convey sanitary flows; however, collection systems are susceptible to collecting additional flows due to infiltration and inflow (I&I). Inflow is runoff that enters the system directly from manhole lids and frames, improperly connected downspouts, sump pumps, and cross-connections with storm sewers. Inflow usually occurs shortly after rainfall begins and quickly

recedes once it stops. It is typically the major component of the Rainfall Derived Infiltration and Inflow (RDII) peak flow. During dry weather, groundwater can infiltrate into the system through leaks in pipes and manholes. During wet weather, an increase in infiltration can be expected. Infiltration processes typically extend beyond the end of the wet weather event and take longer to recede. Systems are usually designed to accommodate I&I, though these flows often exceed design allowances with system age and growth. An RDII hydrograph represents the total flow that enters the collection system in the form of I&I.

The RDII unit hydrograph method is based on fitting up to three (3) triangular hydrographs to an observed RDII hydrograph: (a) short-term I&I response, (b) intermediate-term I&I response, and (c) long-term I&I response. Each unit hydrograph is defined by three (3) parameters:

- *R* = fraction of rainfall volume that enters the sewer system.
- *T* = time from the onset of rainfall to the peak of the unit hydrograph.
- *K* = ratio of time to recession of the unit hydrograph to the time to peak.

An RTK unit hydrograph was developed for each of the seven (7) flow metering locations, which represents the Rainfall Derived Infiltration and Inflow entering the Dillman WWTP Basin.

Wet Weather Calibration and Validation

The wet weather calibration process began by examining the rainfall and flow metering data in order to select a wet weather calibration event. Calibration proceeded by developing model unit hydrographs, which were systematically adjusted and revised by adjusting the RTK calibration parameters until the modeled data matched the observed data for the primary calibration event. As shown in **Table 2-1**, the storm events on July 17, 2023 and August 5, 2023 were the largest storm events. Each of these events were initially selected for calibration. Calibrating to these events resulted in the model not being well calibrated to any other event in the metering period. Therefore, the next largest storm event on July 2, 2023 was selected for model calibration (See **Figure 3-5**).

When the model was calibrated to the July 2, 2023 event, it was observed that the wet weather event that occurred on July 17, 2023 resulted in observed responses from the flow meters that were much greater than the predicted responses from the hydraulic model as shown in **Figure 3-1**. Inversely, it was observed that the wet weather event that occurred on August 5, 2023 resulted in observed responses from the flow meters that were much lower than the predicted responses from the hydraulic model as shown in **Figure 3-1**.

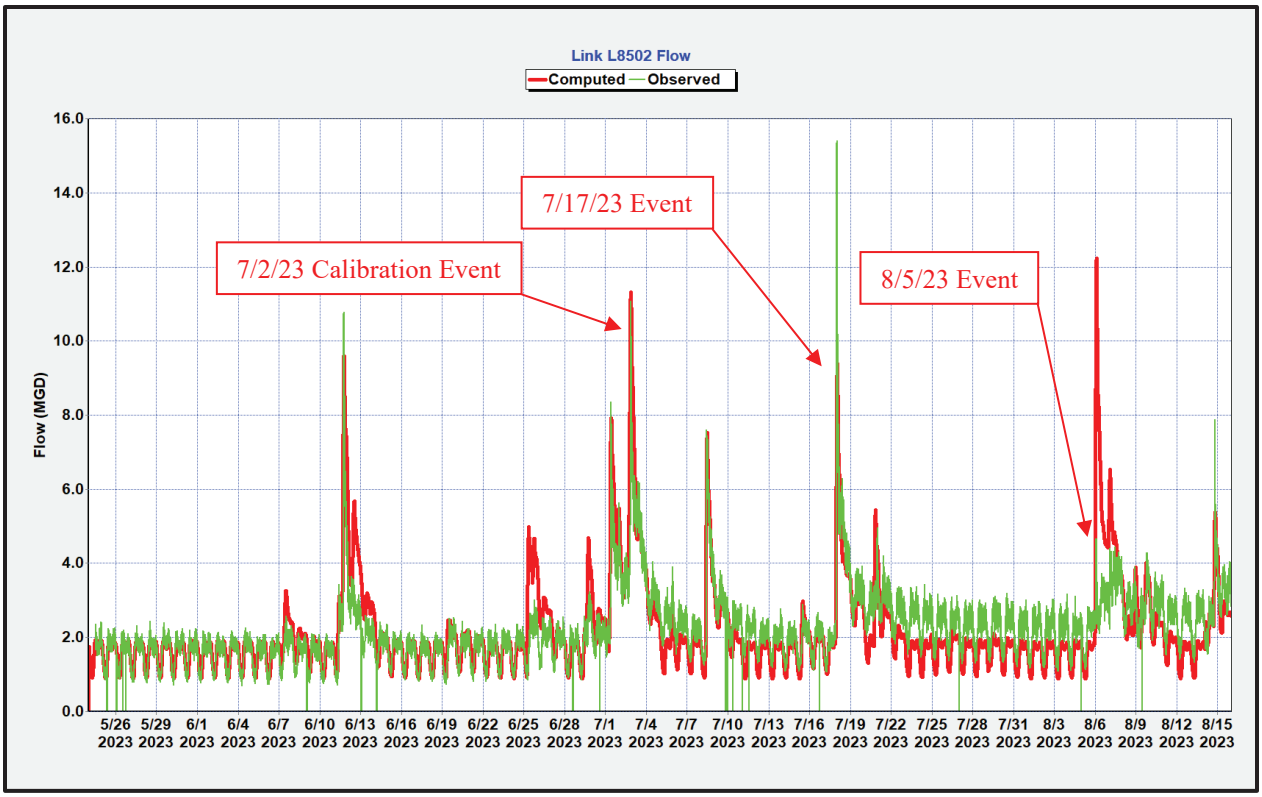


Figure 3-1: Wet Weather Calibration Spatial Variation

It is assumed that spatial variation of the storm caused these observed differences. Daily rainfall totals for three (3) rain gauges located in the City were gathered from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) site as shown in **Table 3-1**. **Figure 3-2** shows the location of the NOAA sites and the rain gauge deployed as part of this study. As detailed in **Table 3-1**, the study's rain gauge at Dillman WWTP recorded significantly less rain for the July 17, 2023 event and significantly more rain for the August 5, 2023 event compared to the NOAA gauges. This data suggests that more rain fell in the Dillman WWTP Basin than was recorded by the Dillman WWTP rain gauge for the July 17, 2023 event. Similarly, the data suggests a significant portion of the August 5, 2023 event missed the Dillman WWTP Basin.

Table 3-1
Study and NOAA Rain Gauge Storm Comparison

Station Name	7/17/23 Wet Weather Event	8/5/23 Wet Weather Event
Dillman WWTP RG	1.29	2.59
1.3 SE	2.42	1.57
2.7 E	2.65	1.41
Indiana University	2.06	Data Not Recorded

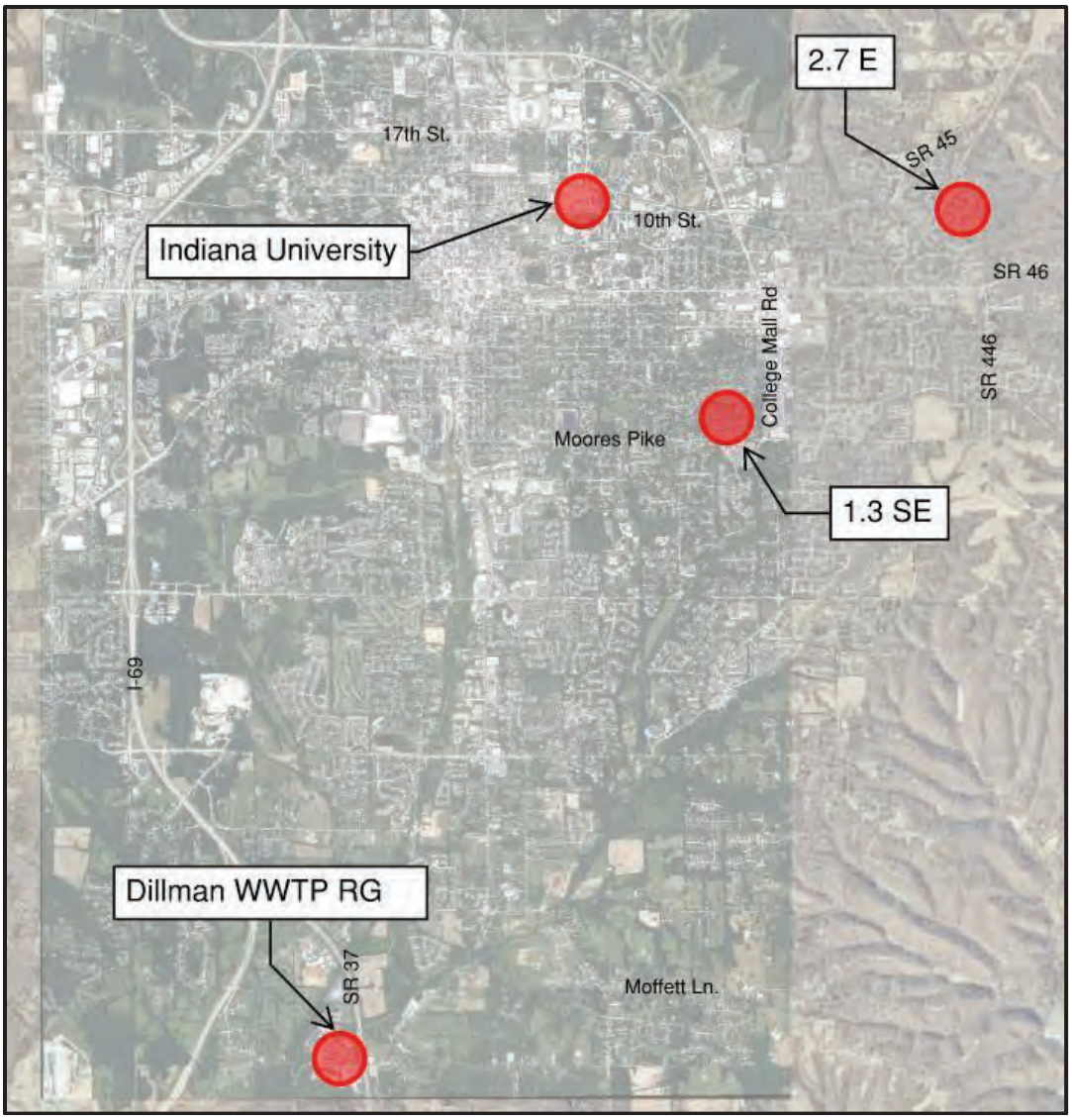


Figure 3-2: Study and NOAA Rain Gauge Locations

During the calibration, it was determined that restrictions are likely present downstream of MH 8391. This determination is based on observed depths in MH 8391 during the metering period. As shown in **Figure 3-3**, the depth generated in the model in MH 8391 was lower than the metered data. Since the flow at the structure is well calibrated, this suggests that potential downstream restrictions may have existed during the flow monitoring period.

Restrictions were systematically introduced via reducing the cross-sectional area of the sewer between MH 8390 and MH 8391 by sixty-six (66) percent. As shown in **Figure 3-4**, the depth generated in the model with added restrictions matched the metered data. It is advised that the City confirm this restriction and clean or repair this section of pipe.

The entire metering period was selected as the wet weather validation span. For the wet weather validation model run, the established RTK unit hydrographs from the preceding calibration were not altered in the model. **Attachment 3** contains the graphical comparison of the modeled flow and depth data with the gauged metering for the selected calibration and validation spans. As shown in **Attachment 3**, the model is adequately calibrated and validated and is suitable for preliminary engineering purposes.

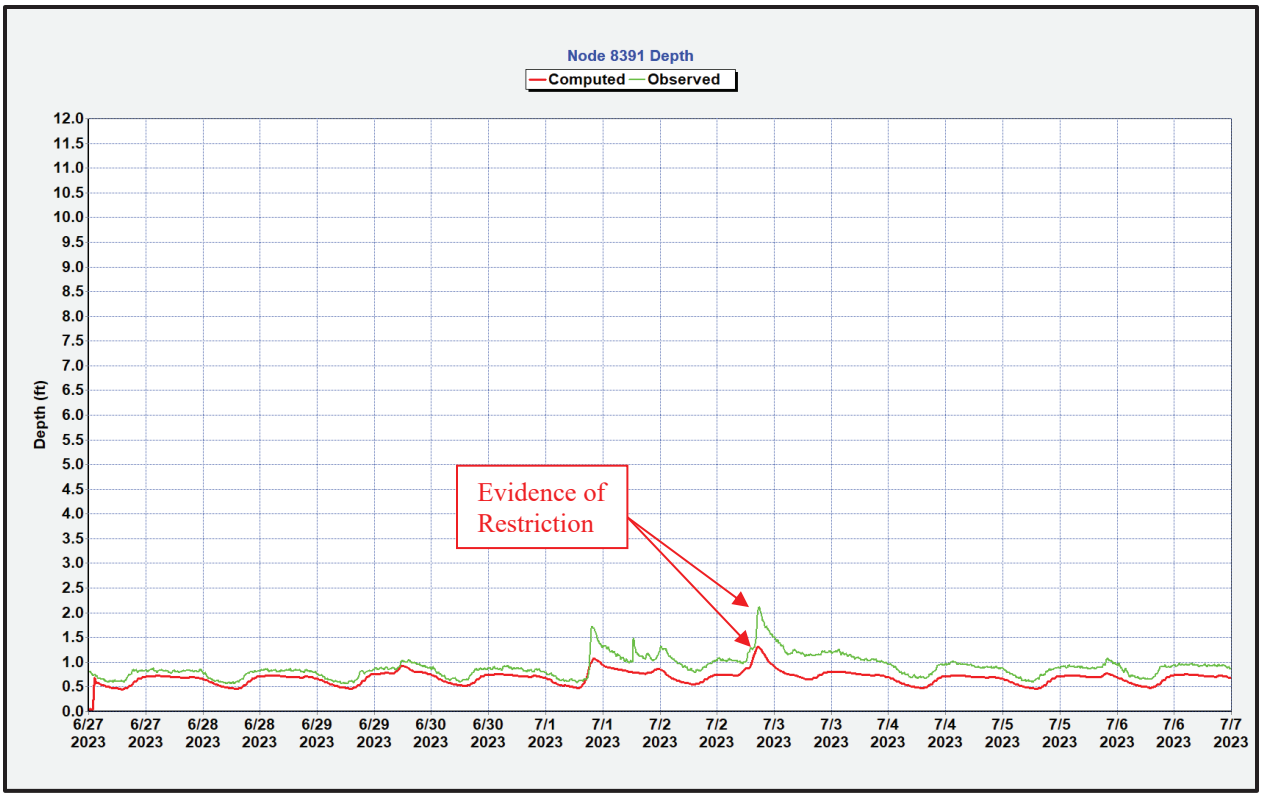


Figure 3-3: Meter MH 8391 Depth Without Restrictions Added

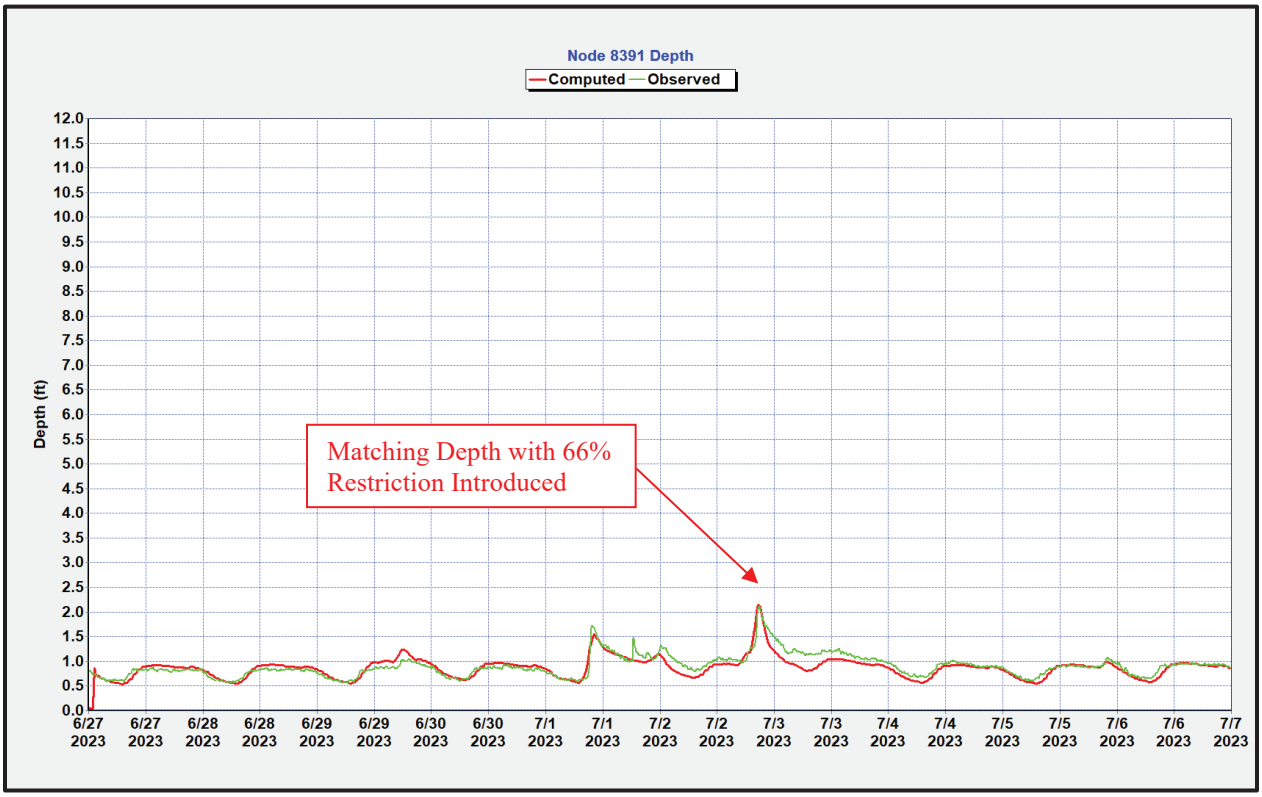


Figure 3-4: Meter MH 8391 Depth With Restrictions Added

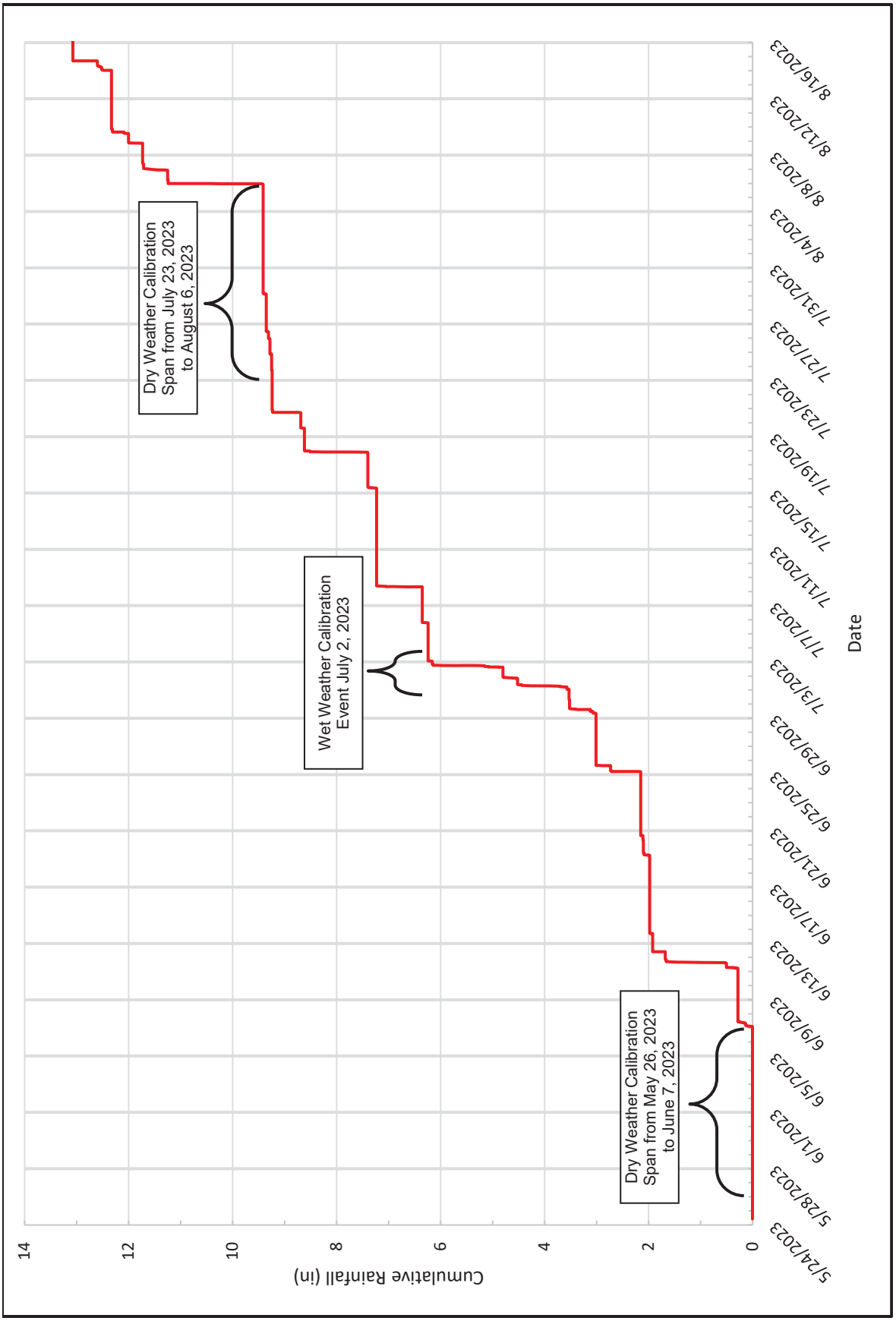


Figure 3-5: Cumulative Rainfall at Dillman WWTP

3.3 Dry Weather Flow Adjustment

Upon completion of dry weather and wet weather calibration and validation, it was observed that the dry weather flow for the metering period was lower than the yearly average dry weather flow into the Dillman WWTP. Monthly Operating Reports (MRO) from January 2021 through July 2023 were reviewed. Wet weather was omitted from the monthly average data as presented in **Figure 3-6**. It appears that beginning in April 2022, the dry weather flow is lower historic averages. The average dry weather flow from April 2022 through July 2023 was approximately ten (10) MGD. Based on discussions with CBU, it was determined that the modeled dry weather be artificially increased to match the average yearly dry weather flow into the WWTP. The dry weather flow reaching the WWTP in the model was increased to ten (10) MGD by equally distributing the additional flow across the model nodes.

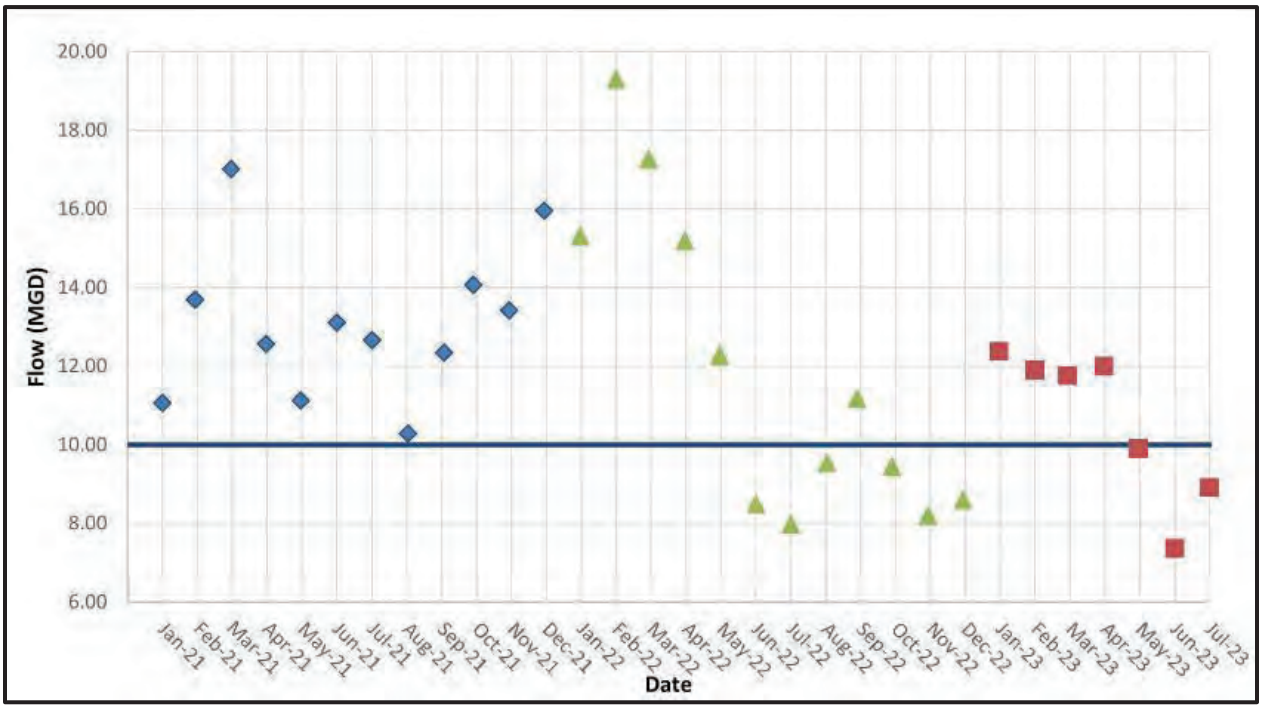


Figure 3-6: Average Monthly DWF into Dillman WWTP

4.0 Baseline Hydraulic Assessment

Upon completing the dry and wet weather calibration and validation of the West Interceptor, the existing system collection system model was analyzed using the ten (10) year, twenty-five (25) year, and fifty (50) year design storms (i.e. one (1) hour and twenty-four (24) hour storms) with the goal of identifying trouble spots in the collection system. **Table 4-1** contains a summary of design storms used during the baseline assessment; these design storms were created using the *Rainfall Frequency Atlas of the Midwest - Bulletin 71*. It is assumed the restrictions described in **Section 3.2** will be corrected and were therefore removed from the baseline assessment. **Figures 4-1 and 4-2** depict the hydraulic grade line (HGL) in the Dillman WWTP West Interceptor for the fifty (50) year, one (1) hour design storm. The HGL for the ten (10) year, and twenty-five (25) year, one (1) hour design storms are shown in **Attachment 4**.

As shown in **Figure 4-2**, the peak flow into the Dillman WWTP results in the sewer backing up. However, it should be noted that the interceptor is unable to convey the flow regardless of the WWTP capacity. **Figure 4-3** depicts the HGL in the downstream West Interceptor for the design storm with a free outfall replacing the WWTP. The portion of the West Interceptor downstream of the confluence with the Central Interceptor and East Interceptor is unable to convey the total flow from all three (3) interceptors.

Figure 4-4 illustrates the peak depth of flow and potential flooding locations for the fifty (50) year, one (1) hour design storm. It should be noted that the manholes on the WWTP property are bolted down and do not flood.

Table 4-1
Baseline Assessment Design Storms

Design Storm Recurrence Interval	Duration	Rainfall Depth (in)	Peak Flow at WWTP* (MGD)
10-Year	1-Hour	2.11	57.0
10-Year	24-Hour	4.49	54.1
25-Year	1-Hour	2.54	66.3
25-Year	24-Hour	5.40	63.7
50-Year	1-Hour	2.89	73.8
50-Year	24-Hour	6.15	71.8

* Assuming the collection system has the capacity to convey all flow without surcharging or SSOs occurring.

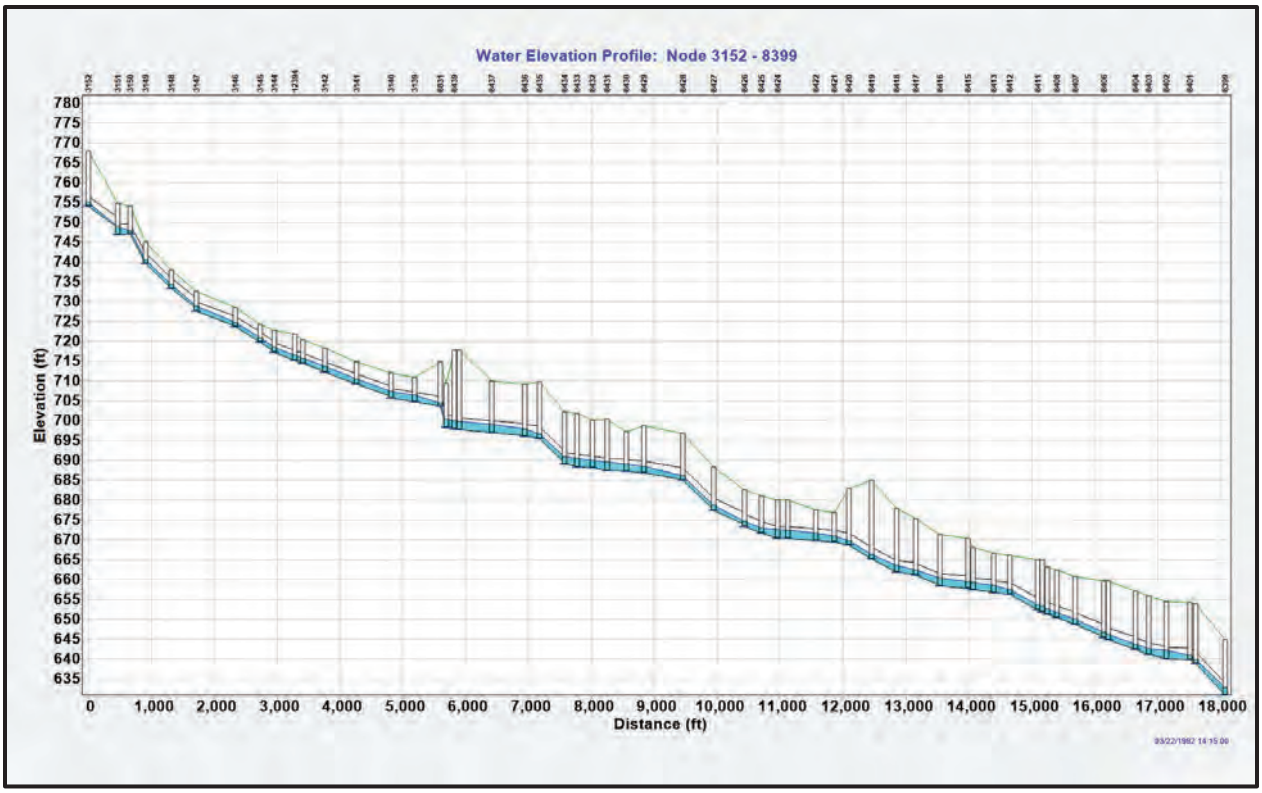


Figure 4-1: Upstream West Interceptor Hydraulic Grade Line 50-Year, 1-Hour Design Storm

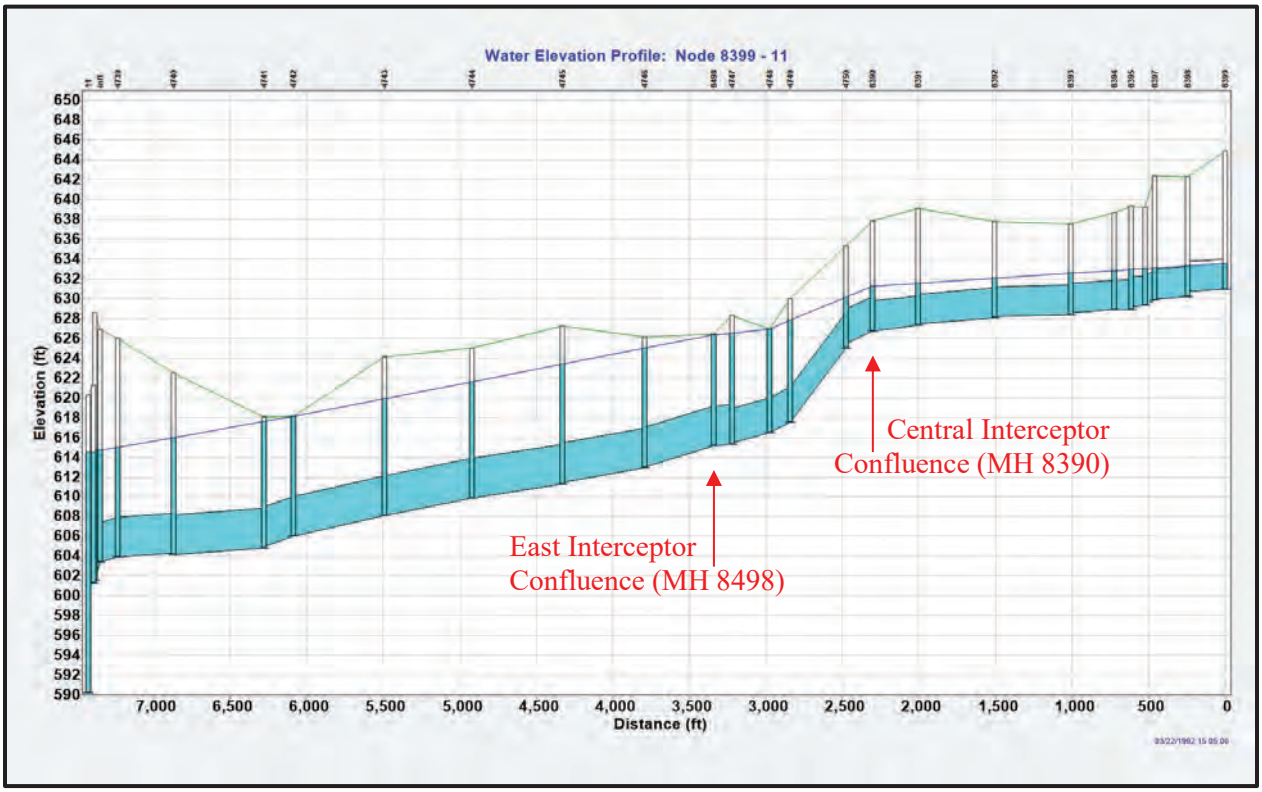


Figure 4-2: Downstream West Interceptor Hydraulic Grade Line 50-Year, 1-Hour Design Storm

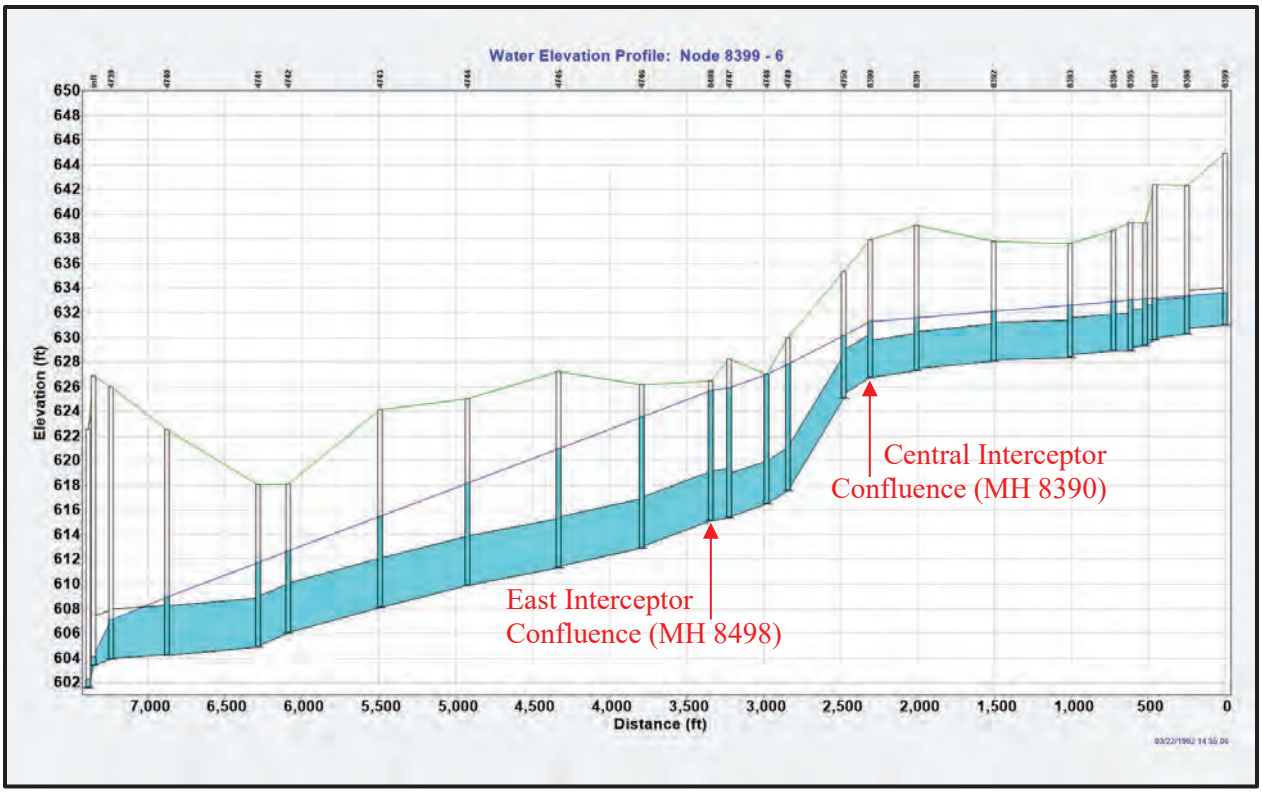


Figure 4-3: Downstream West Interceptor Hydraulic Grade Line 50-Year, 1-Hour Design Storm Without WWTP Capacity Limitations

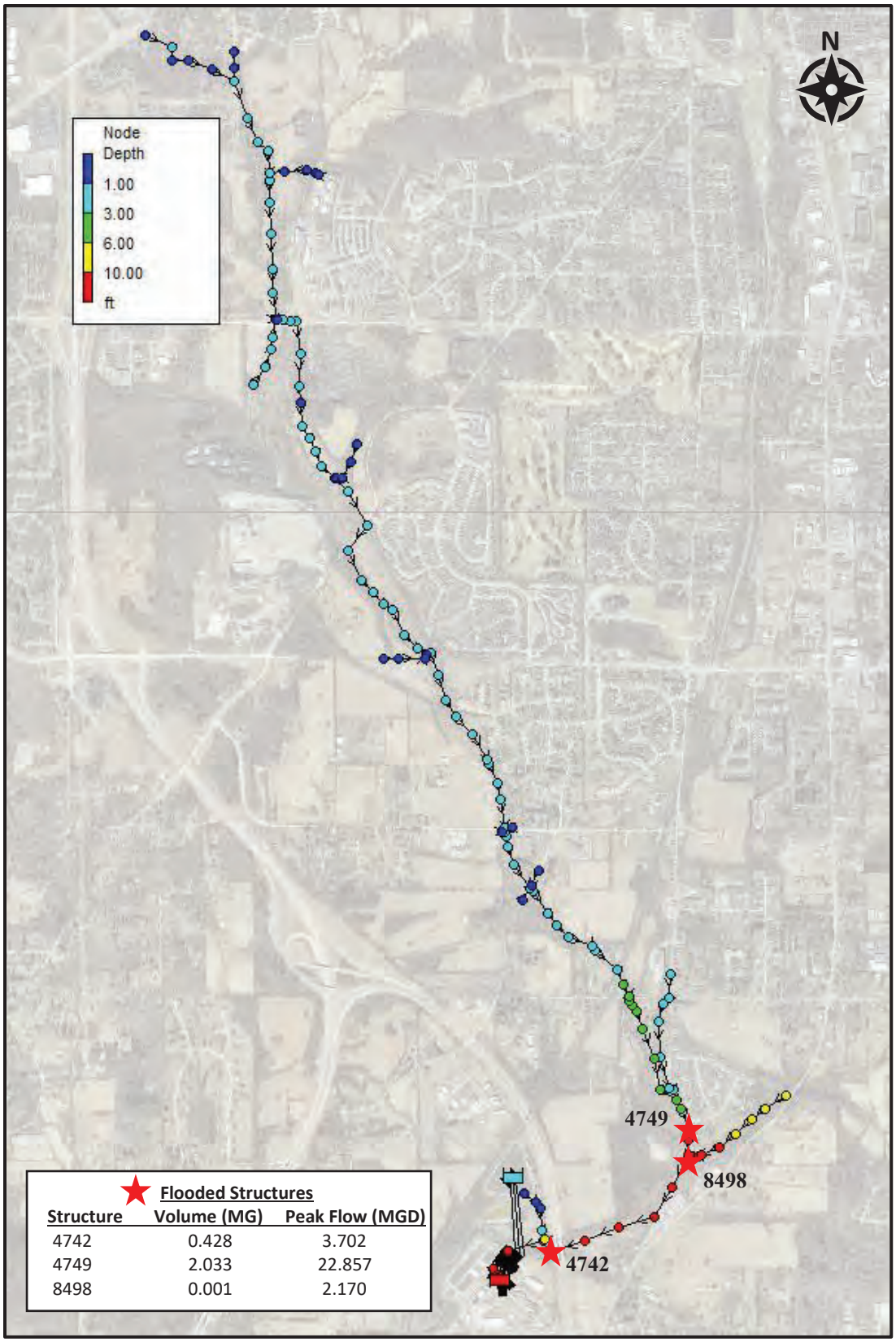


Figure 4-4: Existing System Peak Depth of Flow and Potential Flooding Locations for 50-Year 1-Hour Design Storm

5.0 Future Growth

After completing the baseline hydraulic assessment of the existing collection system, the calibrated model was adjusted to account for future growth conditions. Growth at four (4) locations is expected in the West Interceptor Basin based on discussions with CBU. These anticipated areas of growth for the future build-out conditions are shown in **Figure 5-1**. Approved wastewater flows within the central and eastern interceptor basins were also identified by CBU. **Table 5-1** displays the future flows associated with each growth area. Wet weather response for typical new sanitary construction was estimated using a peaking factor of four (4), and the RDII unit hydrograph values are summarized in **Table 5-2**. Following the addition of future growth, the model can be utilized as a planning-level tool to assess alternative solutions.

Table 5-1
Future Growth Design Flows

Area	Dry Weather Flow (MGD)
Summit District	1.32
NE Fullerton/I-69	1.66
4691 S Victor Pike	0.22
Westgate on 3rd	0.08
Central Interceptor Basin	0.15
East Interceptor Basin	0.23

Table 5-2
Future Growth Weather RDII Characteristics

Response	R[1]	T[2]	K[3]
Short Term	0.005	2	2
Medium-Term	0.009	4	5
Long-Term	0.03	10	10

[1]R = fraction of rainfall that becomes I&I.
[2]T = time of hydrograph peak (hr).
[3]K = falling limb duration / rising limb duration. (dimensionless).

The Summit District development is of key interest. The percentage of Summit District's dry weather flow to total future dry weather flow at several locations was calculated and is detailed in **Table 5-3**. The locations of measurement are shown on **Figure 5-1**. An example calculation for location A is shown below.

Summit District Percentage = Summit District Dry Weather / Total Future Dry Weather

= 1.32 MGD / 13.7 MGD = 9.6%

Table 5-3
Summit District's Dry Weather Flow Percentage

Location	Basins Serviced	Dry Weather Flow (MGD)	Summit District's Percentage
A	West + Central + East	13.7	9.7%
B	West + Central	11.5	11.5%
C	West	6.0	22.0%

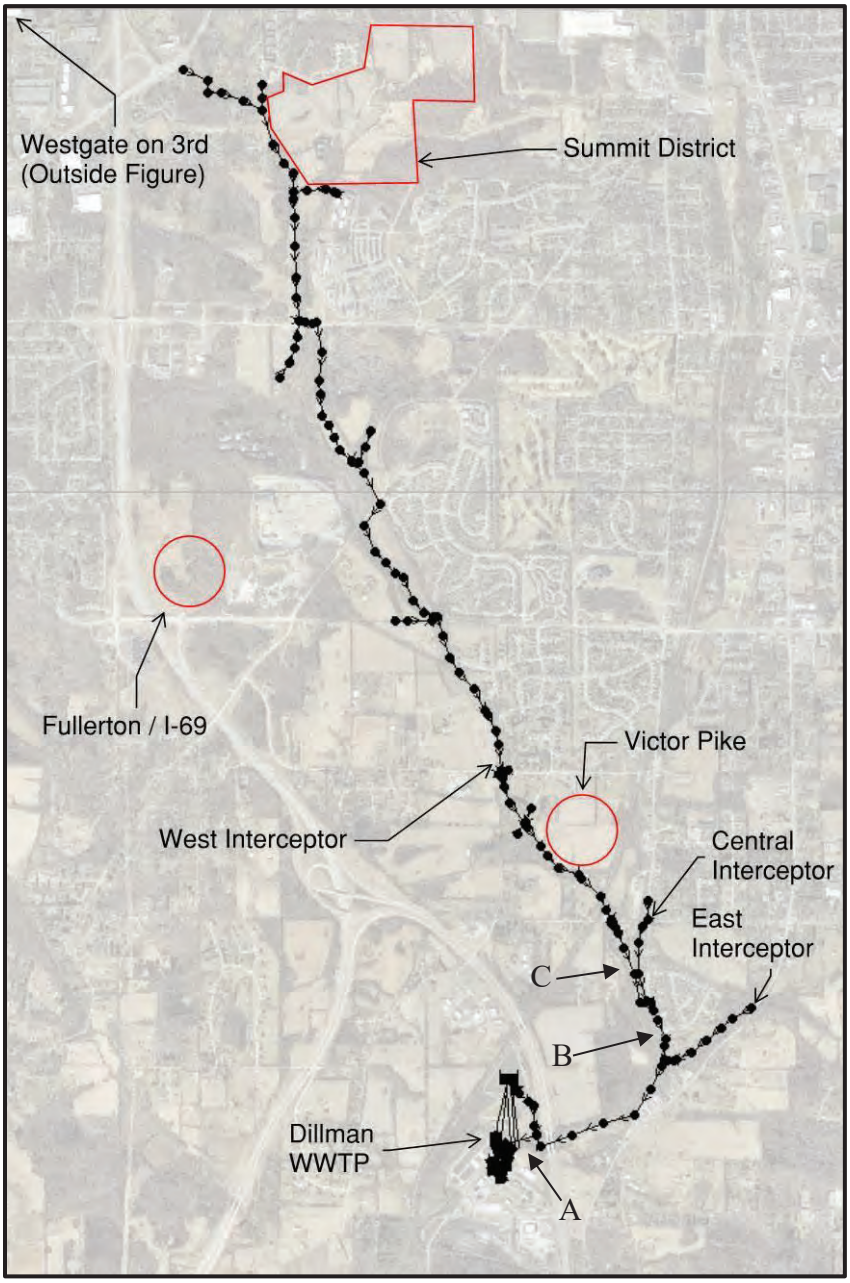


Figure 5-1: Potential Growth Areas

6.0 Alternative Analysis

Alternative solutions to eliminate potential sanitary sewer overflows occurring within the collection system under future growth conditions were developed for the fifty (50) year design storm. The following performance criteria were used when identifying and assessing alternative solutions for the Dillman WWTP West Interceptor:

- Eliminate potential sanitary sewer overflows for the 50-year design storm.
- Achieve eight (8) feet of freeboard between the ground elevation and the maximum hydraulic grade line (HGL) in the collection system. If eight (8) feet of freeboard was not available, the HGL must be lower than the crown of the pipe.
- Firm (design) lift station pumping rate shall meet or exceed the peak inflow to each lift station.

The eight (8) feet of freeboard requirement is set to protect homes from wastewater backing up into basements. However, the downstream portion of the interceptor is on the WWTP property and does not have any lateral connections to homes or businesses. Solutions with a relief sewer at the downstream portion of the system were allowed to have a minimum freeboard of six (6) feet in the existing pipe on the WWTP property.

Three (3) alternatives were developed to eliminate the potential sanitary sewer overflows and maximize the performance of the collection system. It should be noted that the alternatives do not account for future growth outside of what is stated in **Section 5.0**.

Under future growth conditions assuming no conveyance limitations, eighty-nine (89) MGD reaches the WWTP for the design storm. This exceeds the pumping capacity at the WWTP influent pump station by fourteen (14) MGD resulting in the collection system backing up. As described in **Section 4.0** and illustrated in **Figure 4-2**, the downstream interceptor is unable to convey the existing or future design storm flows regardless of the pumping capacity at the WWTP. The alternative solutions must address both of these issues.

Additionally, a section of interceptor north of Tapp Rd. is unable to convey the flow for the future growth conditions design storm and results in a freeboard of less than three (3) feet. This requires a section of pipe to be upsized. This solution is included in all alternatives and shown in **Figure 6-1**. The three (3) alternative figures for the downstream improvements are shown in **Figures 6-2, 6-3, and 6-4**. Cost estimates for each alternative are included in **Attachment 5**. Peak hydraulic grade lines for the fifty (50) year, one (1) hour design storm through each alternative are provided in **Attachment 6**.

The following describes each alternative solution to the fifty (50) year design storm. The gravity alternatives are separated into sections based on location in the system. These sections correspond to the flows in **Table 5-3**. Costs for each section and total cost are provided below.

- ***Alternative 1*** includes diversion structures at MH 8397 and MH 4756 to divert wet weather to a lift station located near W Church Lane. Both structures include plates to control flow in the existing downstream interceptors and divert more toward the lift station. The lift station will pump to the existing EQ basin. The force main alignment is proposed to follow the Limestone Greenway, which was constructed in 2019.

  Improvements considered in this alternative include:

  Lift Station Improvements
  - 36 MGD Lift Station
  - 2 Diversion Structures with Flow Control
  - 3,450-FT of 36-inch Dia. Force Main

- 460-FT of 42-inch Dia. Sanitary Sewer Replacement
- 200-FT of 36-inch Dia. Sanitary Sewer
- 600-FT of 30-inch Dia. Sanitary Sewer
- 415-FT of 36-inch Dia. Sanitary Sewer Replacement

Total: $59,937,000

- ***Alternative 2*** includes a diversion structure at MH 8397 to overflow wet weather into a relief sewer. The relief sewer travels parallel to the existing West Interceptor. At two additional locations, diversion structures divert flow from the main interceptor to the wet weather relief sewer. A new wet weather lift station on the WWTP property will accept flows in excess of the capacity of the influent pump station. The lift station will pump to the EQ basin. Challenges of this alternative include fitting the new gravity sewer on WWTP property dealing with other pipes and utilities. Additionally, this alternative requires a large diameter gravity sewer underneath I-69.

  Improvements considered in this alternative include:

  WWTP Improvements: $23,229,000
  - 14 MGD Lift Station
  - 2,100-FT of 24-inch Dia. Force Main

  (A) Downstream of Confluence with East Interceptor: $14,886,000
  - 1,800-FT of 54-inch Dia. Sanitary Relief Sewer
  - 2,250-FT of 48-inch Dia. Sanitary Relief Sewer
  - 1 Diversion Structure

  (B) Between Confluences with East Interceptor and Central Interceptor: $3,161,000
  - 970-FT of 42-inch Dia. Sanitary Relief Sewer
  - 1 Diversion Structure

  (C) Upstream of Confluence with Central Interceptor: $5,038,000
  - 1,830-FT of 30-inch Dia. Sanitary Relief Sewer
  - 415-FT of 36-inch Dia. Sanitary Sewer Replacement
  - 1 Diversion Structure

  Total: $46,314,000

- ***Alternative 3*** includes a diversion structure at MH 8498 diverts all dry weather flow through a new gravity sewer. When the depth in the diversion structure exceeds the maximum dry weather depth, flow overtops a weir into the existing gravity sewer. A new wet weather lift station on the WWTP property will accept flows in excess of the capacity of the influent pump station. The lift station will pump to the EQ basin. Challenges of this alternative include fitting the new gravity sewer on WWTP property dealing with other pipes and utilities. Additionally, this alternative requires a large diameter gravity sewer underneath I-69. The pipe replacement instead of a parallel sewer also requires significant bypass pumping.

  Improvements considered in this alternative include:

  WWTP Improvements: $23,229,000
  - 14 MGD Lift Station
  - 2,100-FT of 24-inch Dia. Force Main

(A) Downstream of Confluence with East Interceptor: $14,886,000
- 1,800-FT of 54-inch Dia. Sanitary Relief Sewer
- 2,250-FT of 48-inch Dia. Sanitary Relief Sewer
- 1 Diversion Structure

(B) Between Confluences with East Interceptor and Central Interceptor: $2,478,000
- 920-FT of 48-inch Dia. Sanitary Sewer Replacement

(C) Upstream of Confluence with Central Interceptor: $4,529,000
- 1,790-FT of 42-inch Dia. Sanitary Sewer Replacement
- 415-FT of 36-inch Dia. Sanitary Sewer Replacement

Total: $45,122,000

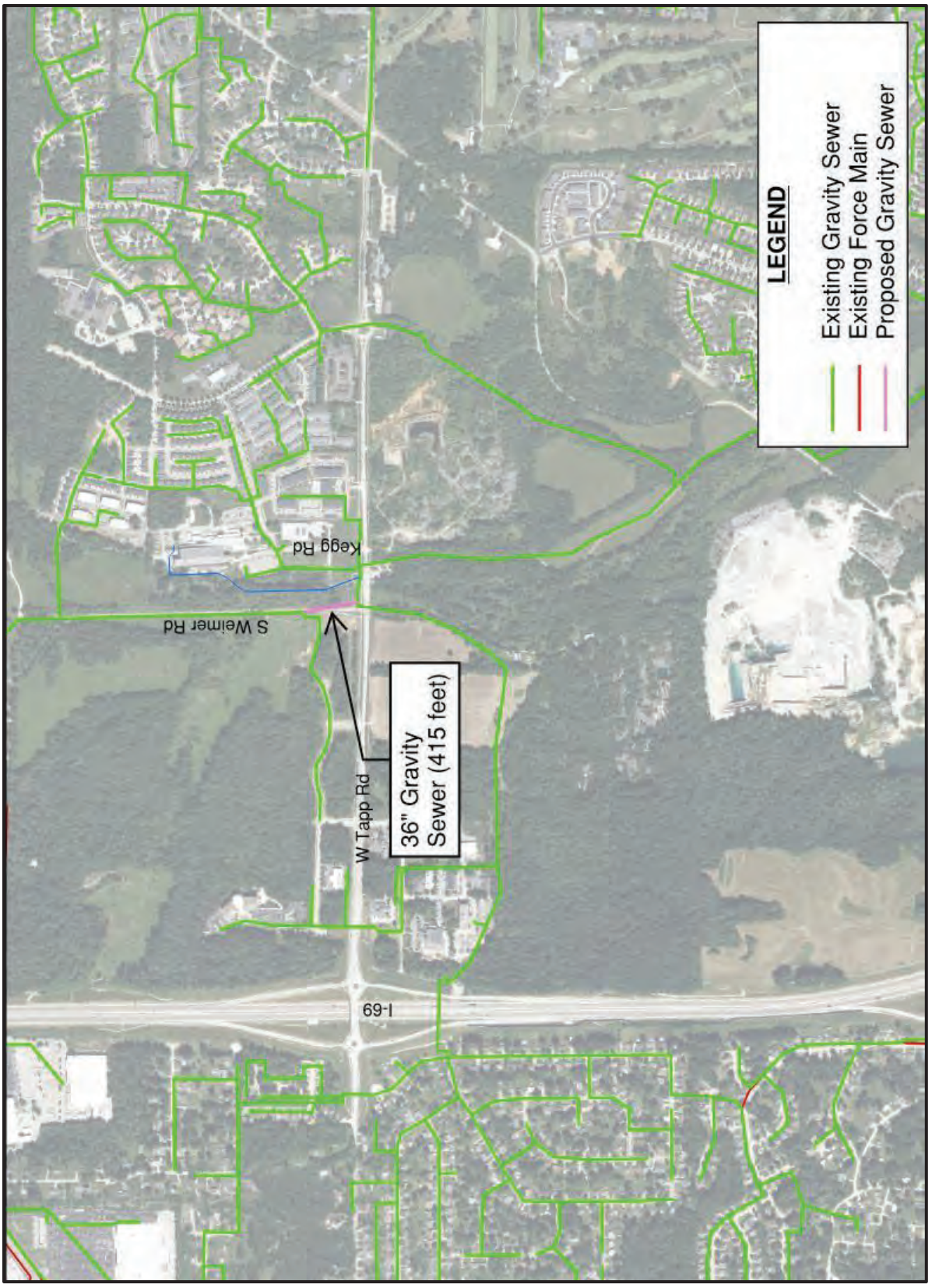


Figure 6-1: Upstream Solution for Alternatives 1, 2, and 3

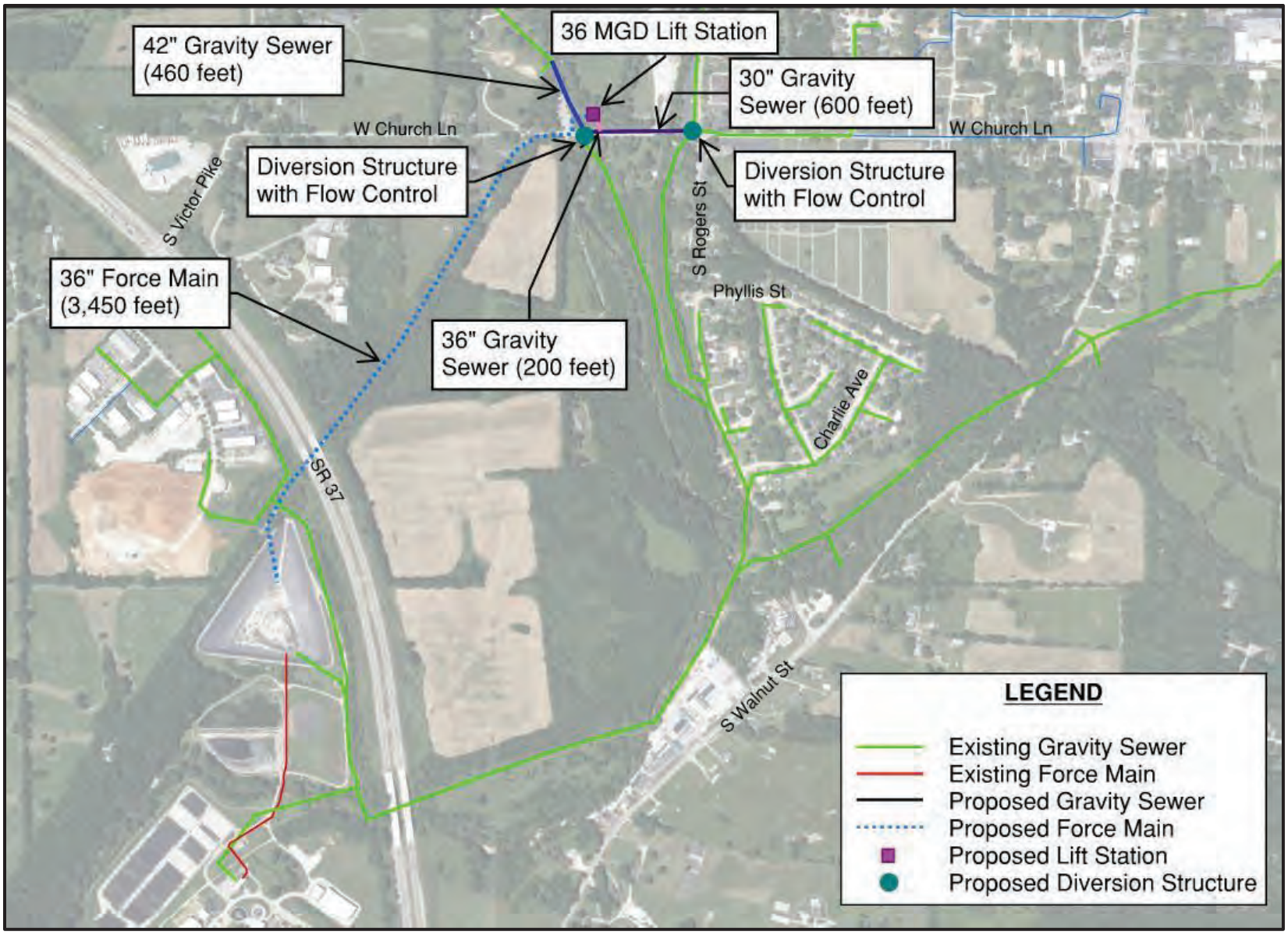


Figure 6-2: Alternative 1

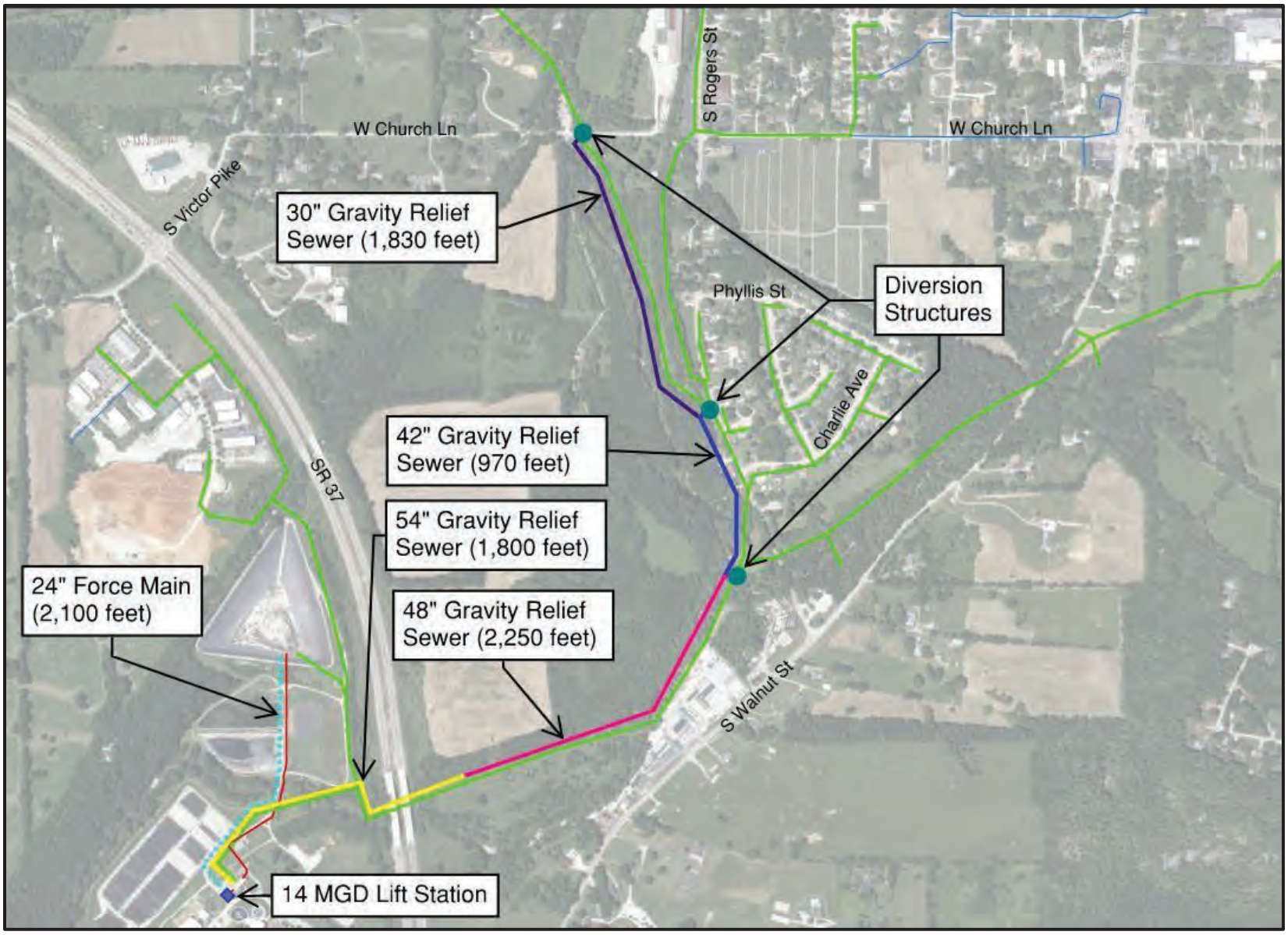


Figure 6-3: Alternative 2

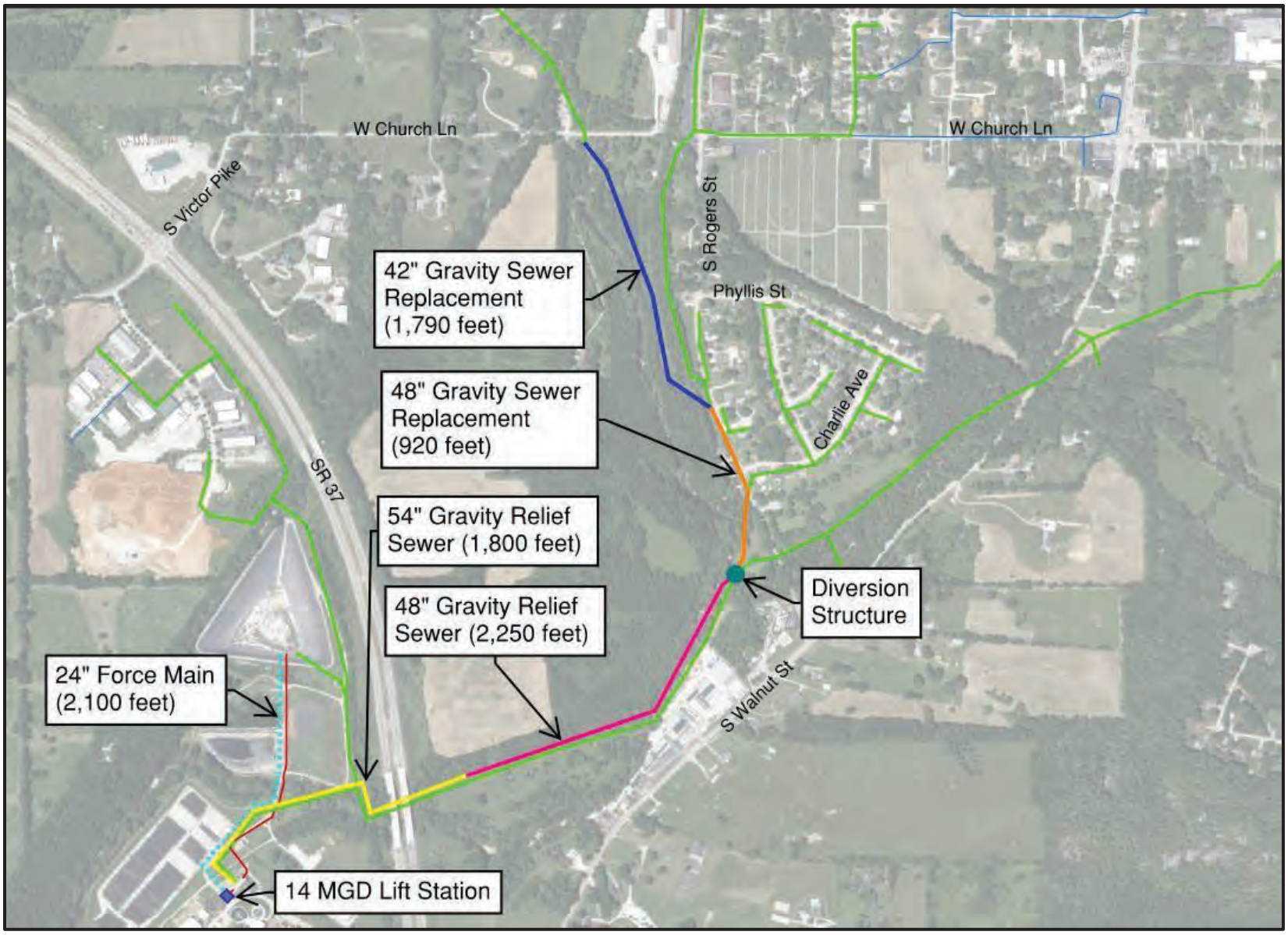


Figure 6-4: Alternative 3

Attachment 1

Rainfall Classifcation

Event #1: 6/11/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	**0.93**	**4 - 6 Months**
2 hr.	1.13	4 - 6 Months
3 hr.	1.14	3 - 4 Months
6 hr.	1.17	2 - 3 Months
12 hr.	1.38	2 - 3 Months
18 hr.	1.40	2 - 3 Months
24 hr.	1.42	< 2 Months
48 hr.	1.64	2 - 3 Months

Event #2: 7/1/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	0.66	< 2 Months
2 hr.	0.75	< 2 Months
3 hr.	0.87	< 2 Months
6 hr.	0.95	< 2 Months
12 hr.	0.99	< 2 Months
18 hr.	1.23	< 2 Months
24 hr.	1.27	< 2 Months
48 hr.	1.27	< 2 Months

Event #3: 7/2/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	0.99	4 - 6 Months
2 hr.	1.04	3 - 4 Months
3 hr.	1.26	4 - 6 Months
6 hr.	1.36	3 - 4 Months
12 hr.	1.44	2 - 3 Months
18 hr.	1.44	2 - 3 Months
24 hr.	1.63	2 - 3 Months
48 hr.	2.67	6 - 9 Months

Event #4: 7/8/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	0.74	2 - 3 Months
2 hr.	0.88	2 - 3 Months
3 hr.	0.88	< 2 Months
6 hr.	0.88	< 2 Months
12 hr.	0.88	< 2 Months
18 hr.	0.88	< 2 Months
24 hr.	0.88	< 2 Months
48 hr.	0.88	< 2 Months

Event #5: 7/17/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	1.10	6 - 9 Months
2 hr.	1.11	4 - 6 Months
3 hr.	1.21	4 - 6 Months
6 hr.	1.22	2 - 3 Months
12 hr.	1.22	< 2 Months
18 hr.	1.22	< 2 Months
24 hr.	1.22	< 2 Months
48 hr.	1.29	< 2 Months

Event #6: 8/5/2023

Duration	Rainfall (in)	Reccurence Interval
1 hr.	1.66	2 - 5 Years
2 hr.	1.66	1 - 2 Years
3 hr.	1.66	9 Months – 1 Year
6 hr.	1.67	6 - 9 Months
12 hr.	1.67	4 - 6 Months
18 hr.	1.67	3 - 4 Months
24 hr.	2.00	4 - 6 Months
48 hr.	2.15	4 - 6 Months

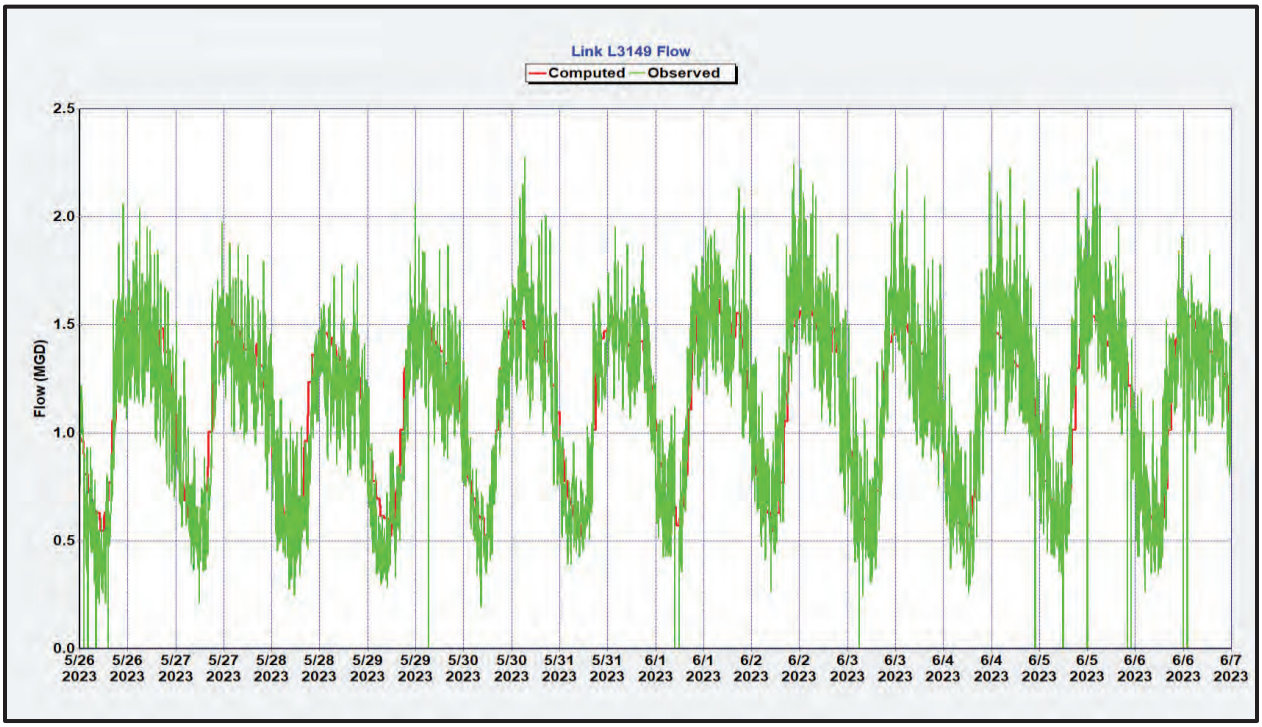
Attachment 2

Dry Weather Calibration & Validation Figures

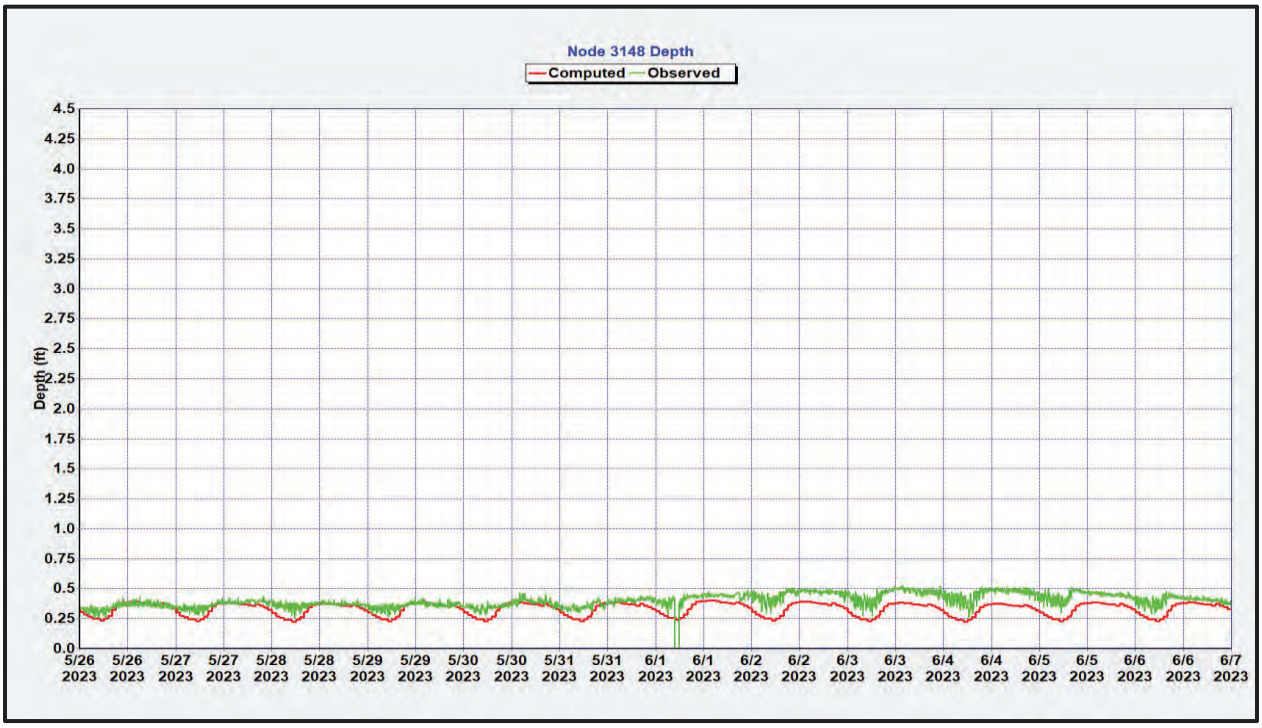
Dry Weather Calibration Period

May 26, 2023 – June 7, 2023

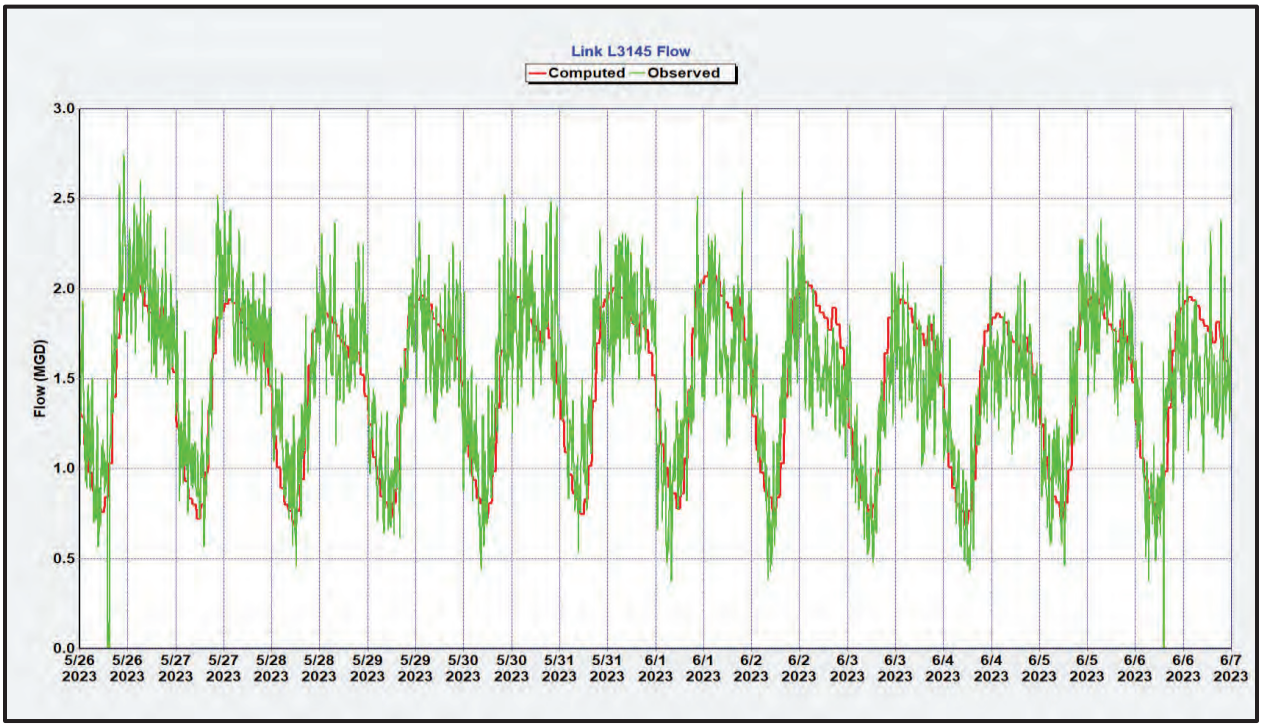
MH 3148 - 30-inch Influent: Flow (MGD)



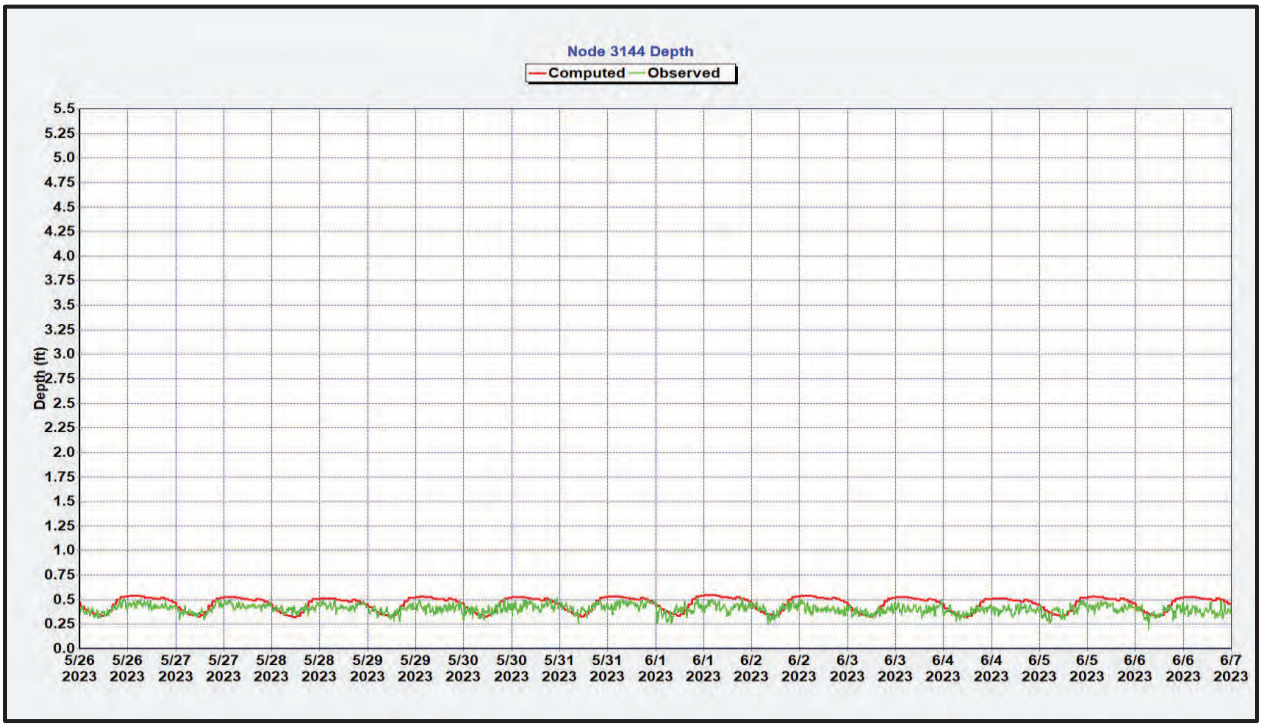
MH 3148 - 30-inch Influent: Depth (ft)



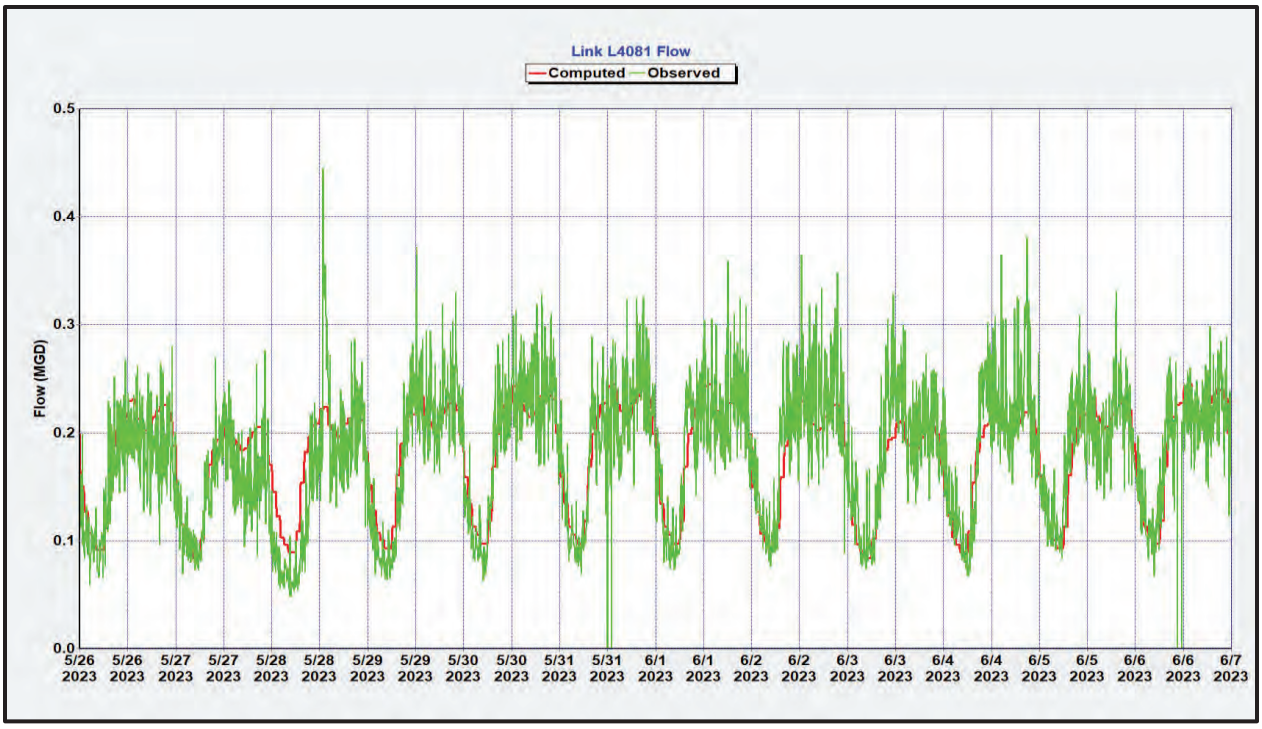
MH 3144 - 30-inch Influent: Flow (MGD)



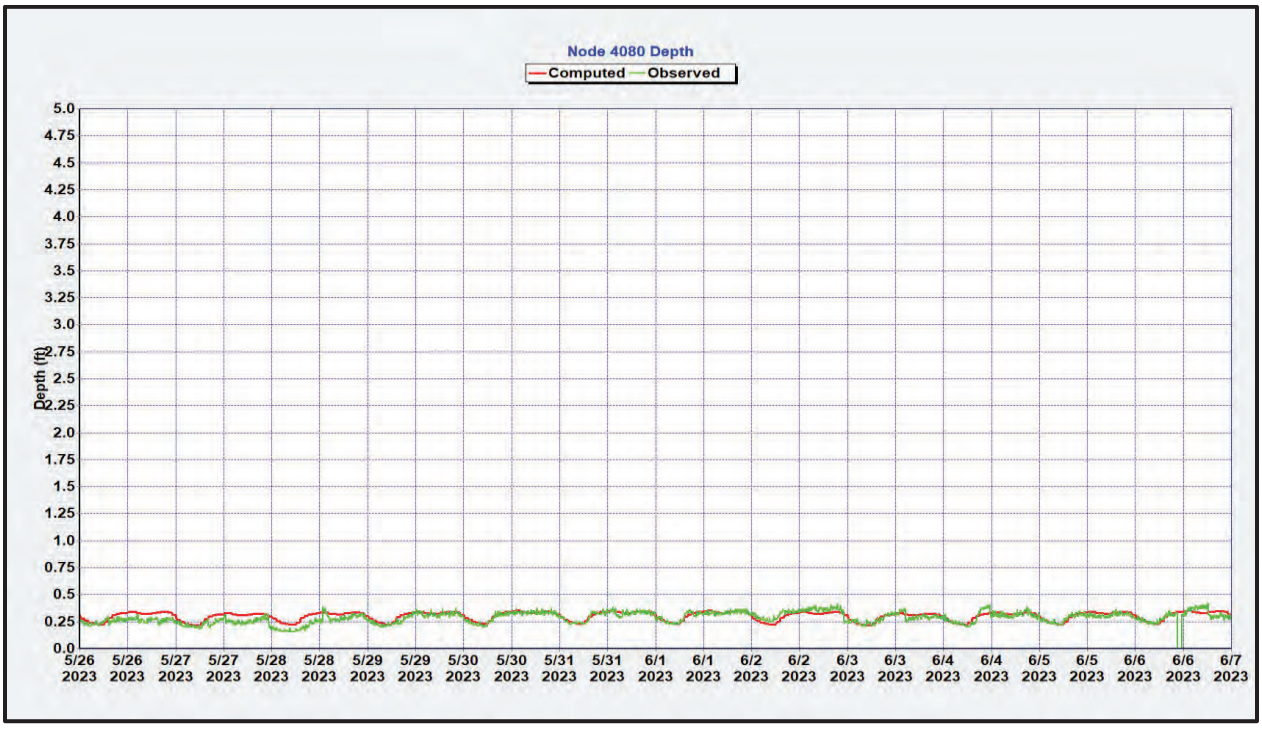
MH 3144 - 30-inch Influent: Depth (ft)



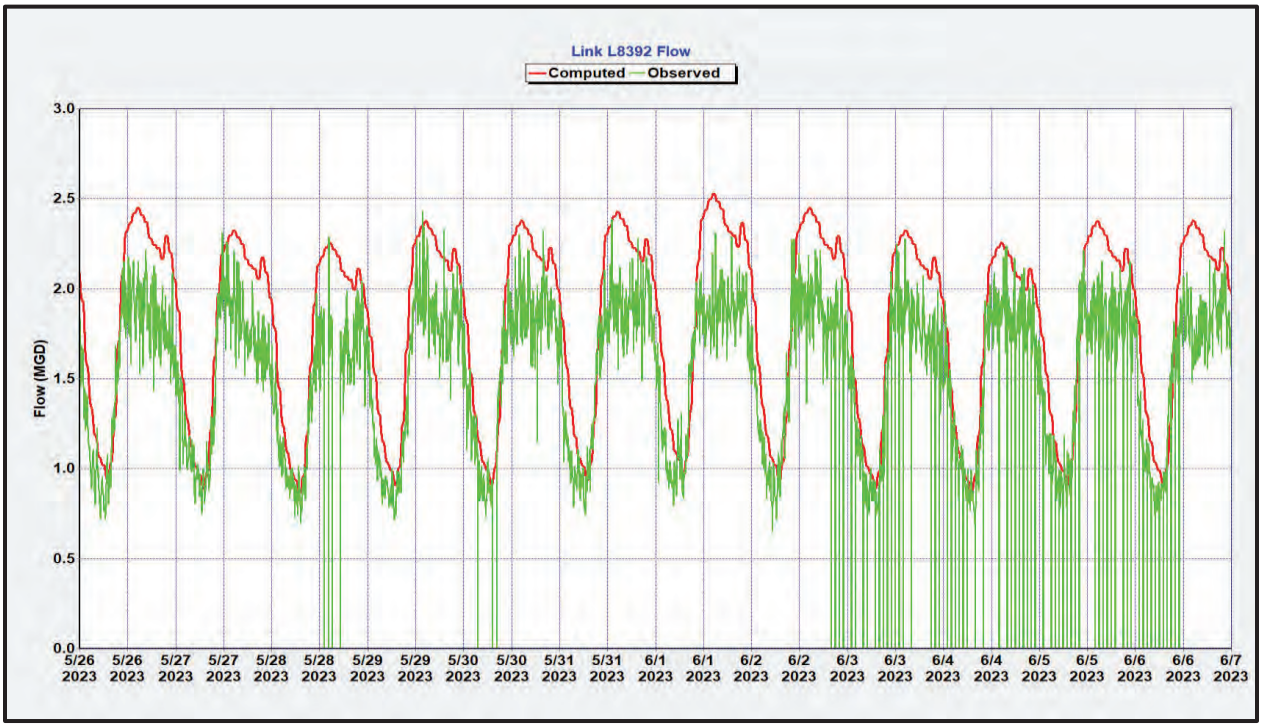
MH 4080 - 15-inch Influent: Flow (MGD)



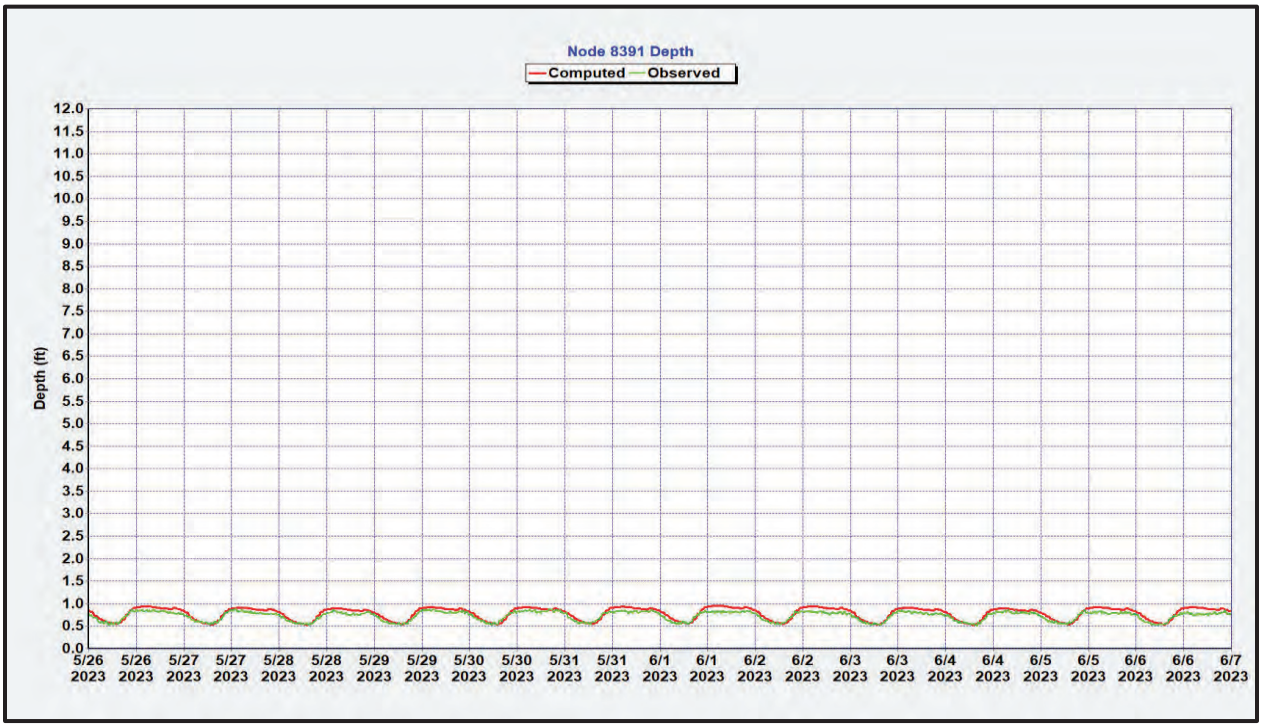
MH 4080 - 15-inch Influent: Depth (ft)



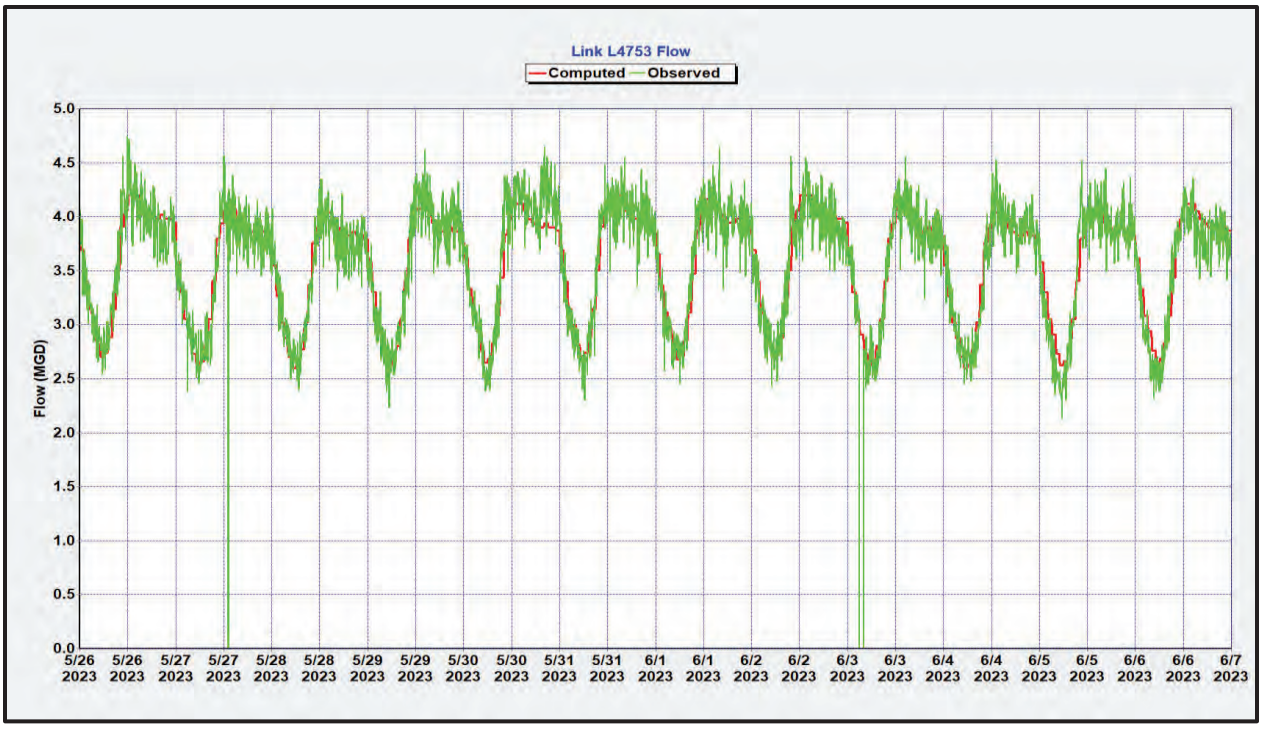
MH 8391 - 36-inch Influent: Flow (MGD)



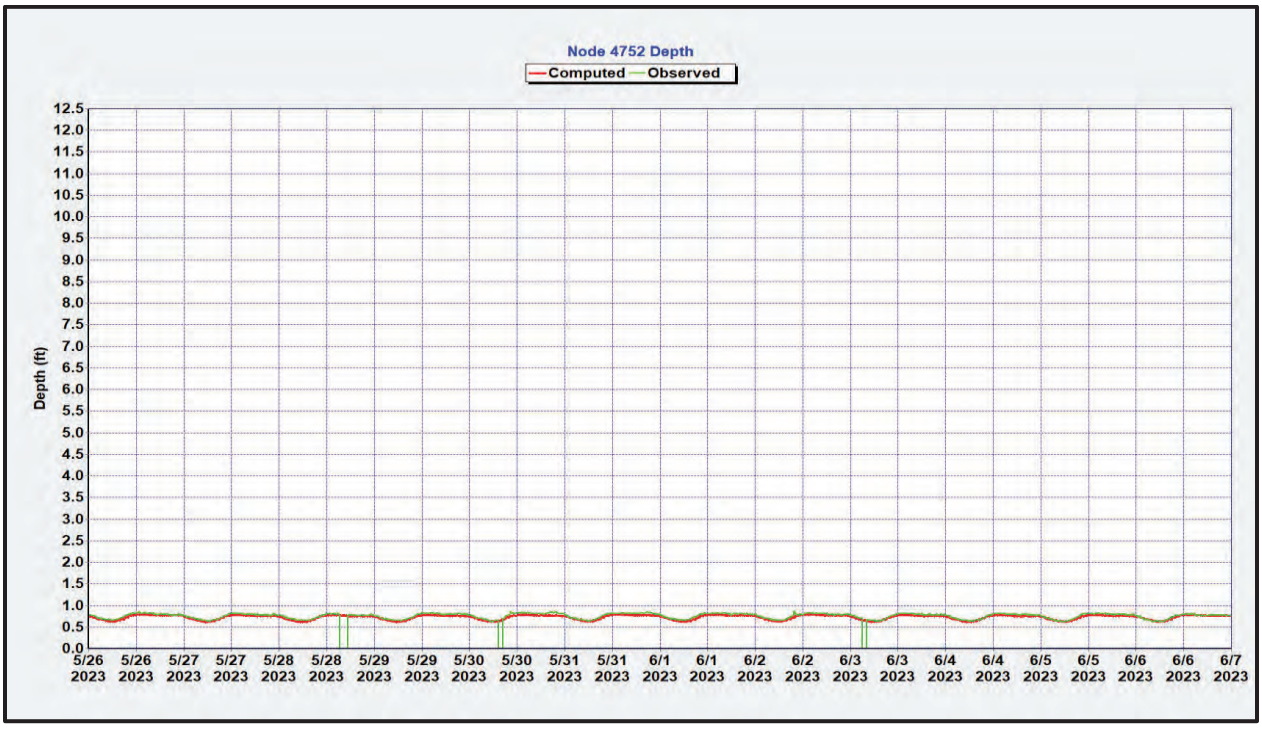
MH 8391 - 36-inch Influent: Depth (ft)



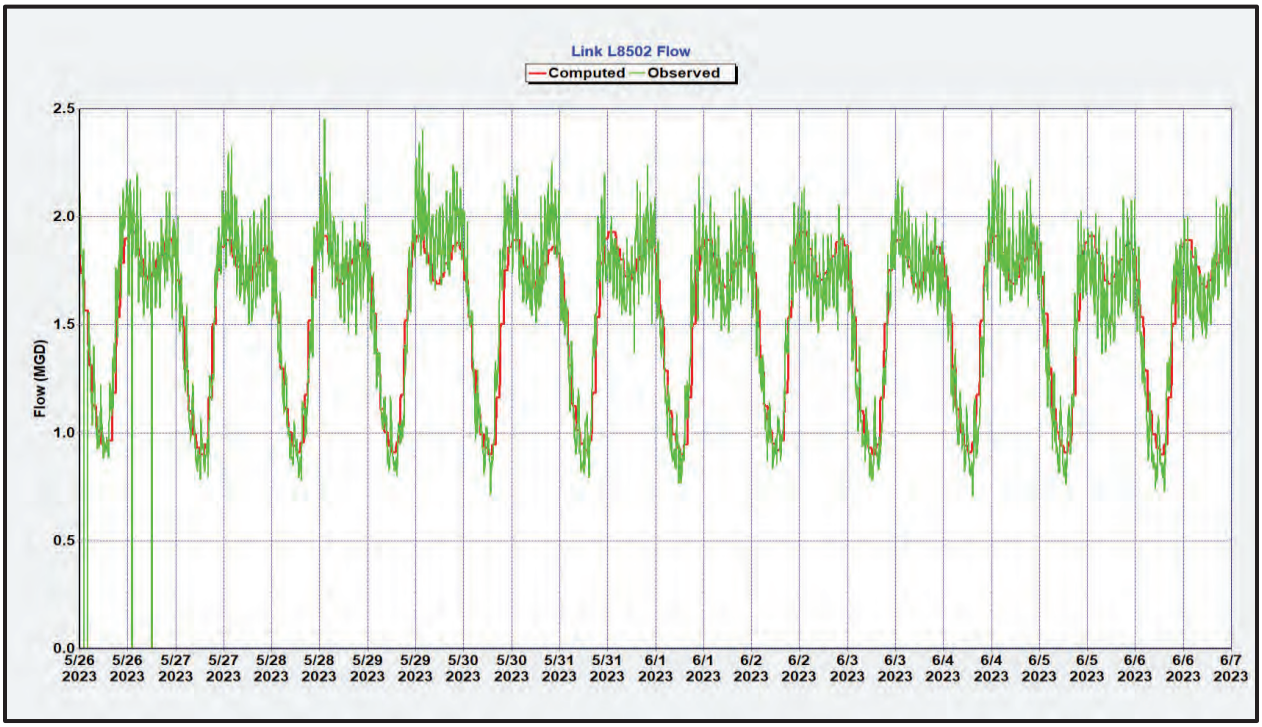
MH 4752 - 42-inch Influent: Flow (MGD)



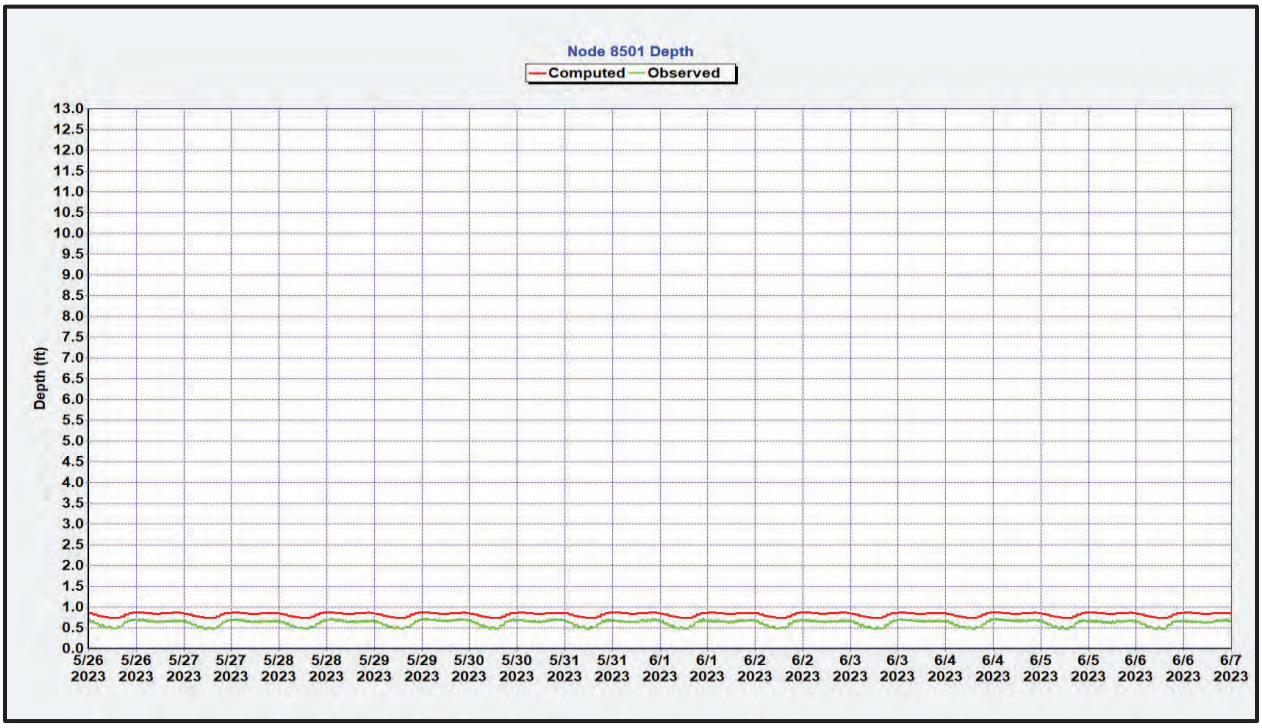
MH 4752 - 42-inch Influent: Depth (ft)



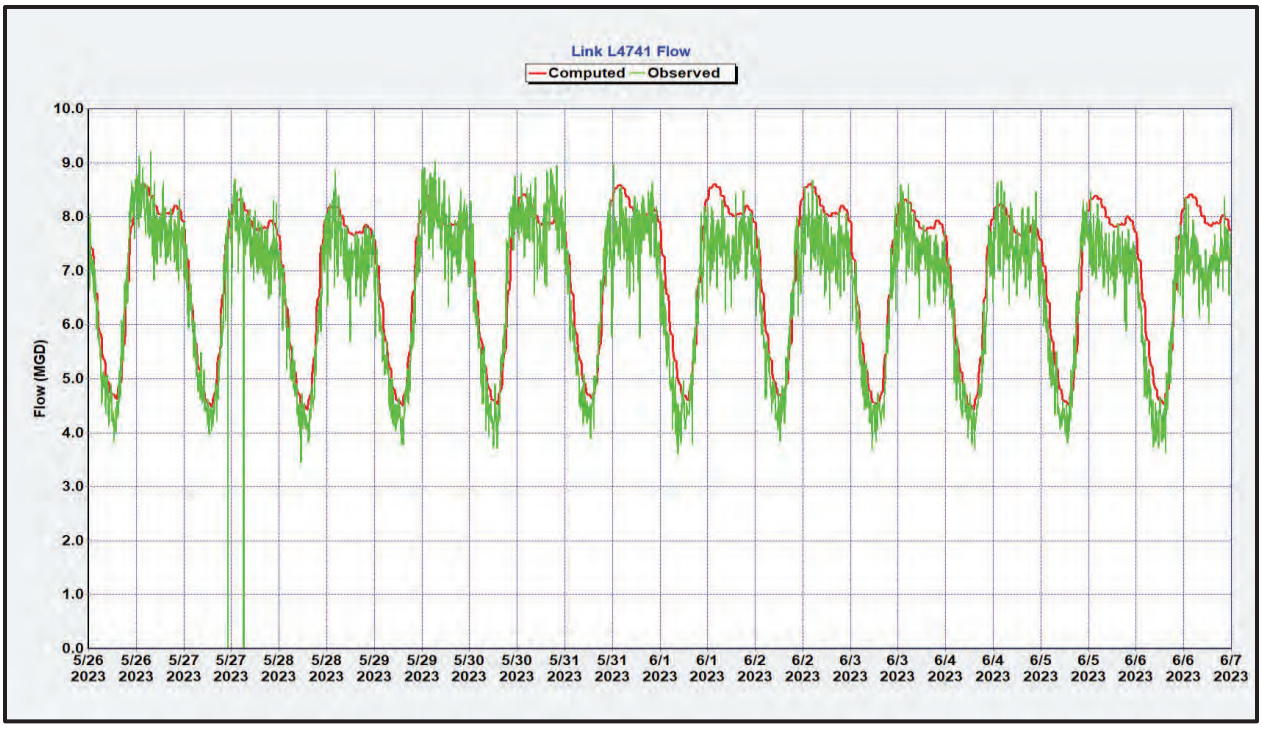
MH 8501 - 42-inch Influent: Flow (MGD)



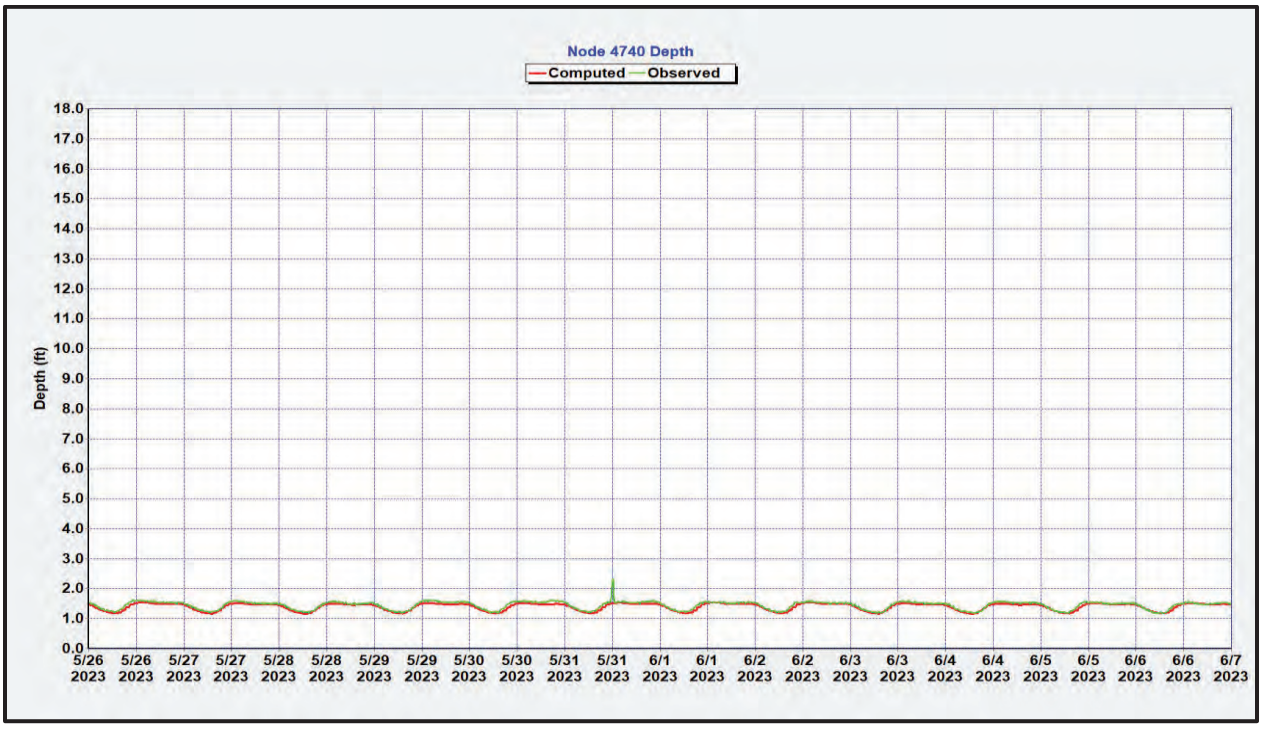
MH 8501 – 42-inch Influent: Depth (ft)



MH 4740 - 48-inch Influent: Flow (MGD)



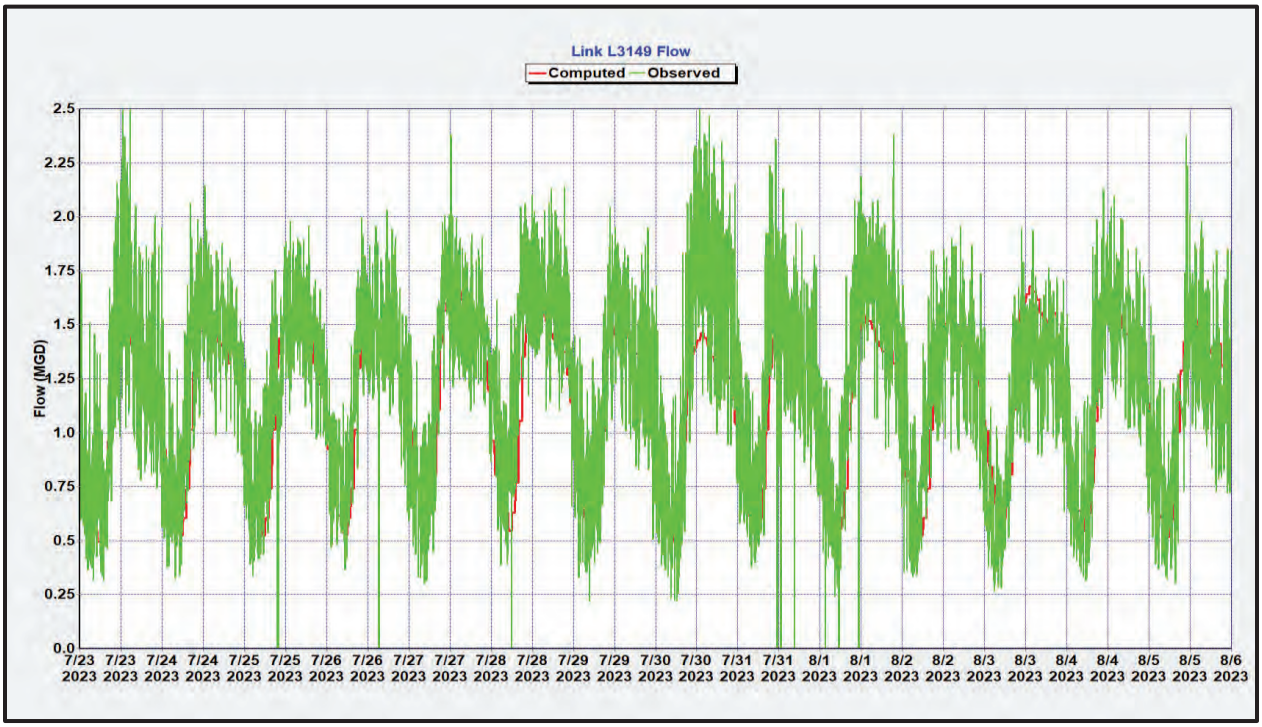
MH 4740 - 48-inch Influent: Depth (ft)



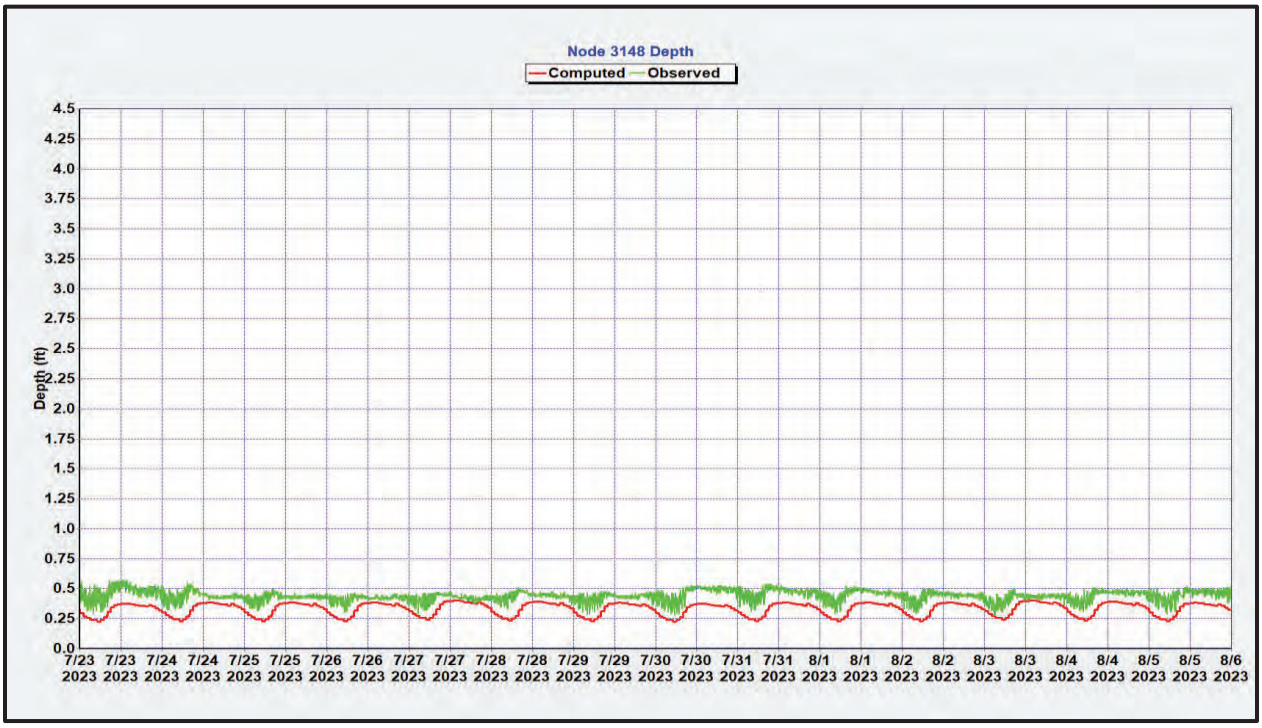
Dry Weather Validation Period

July 23, 2023 – August 6, 2023

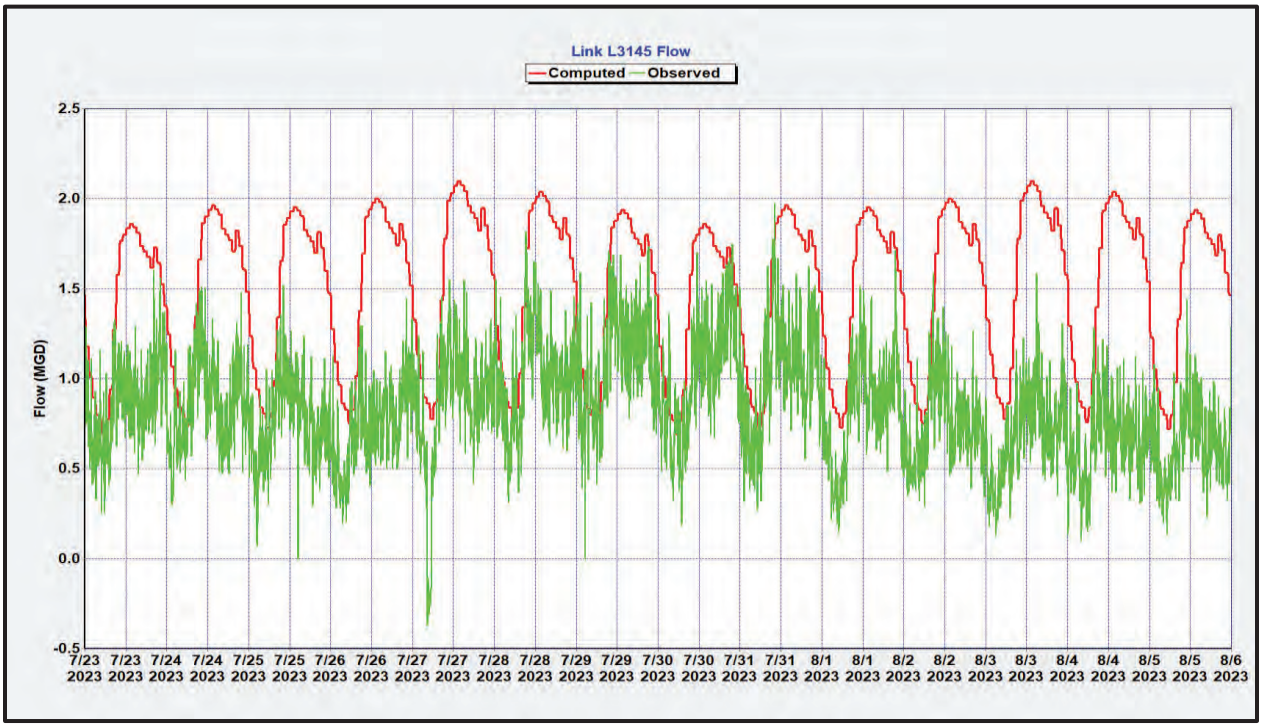
MH 3148 - 30-inch Influent: Flow (MGD)



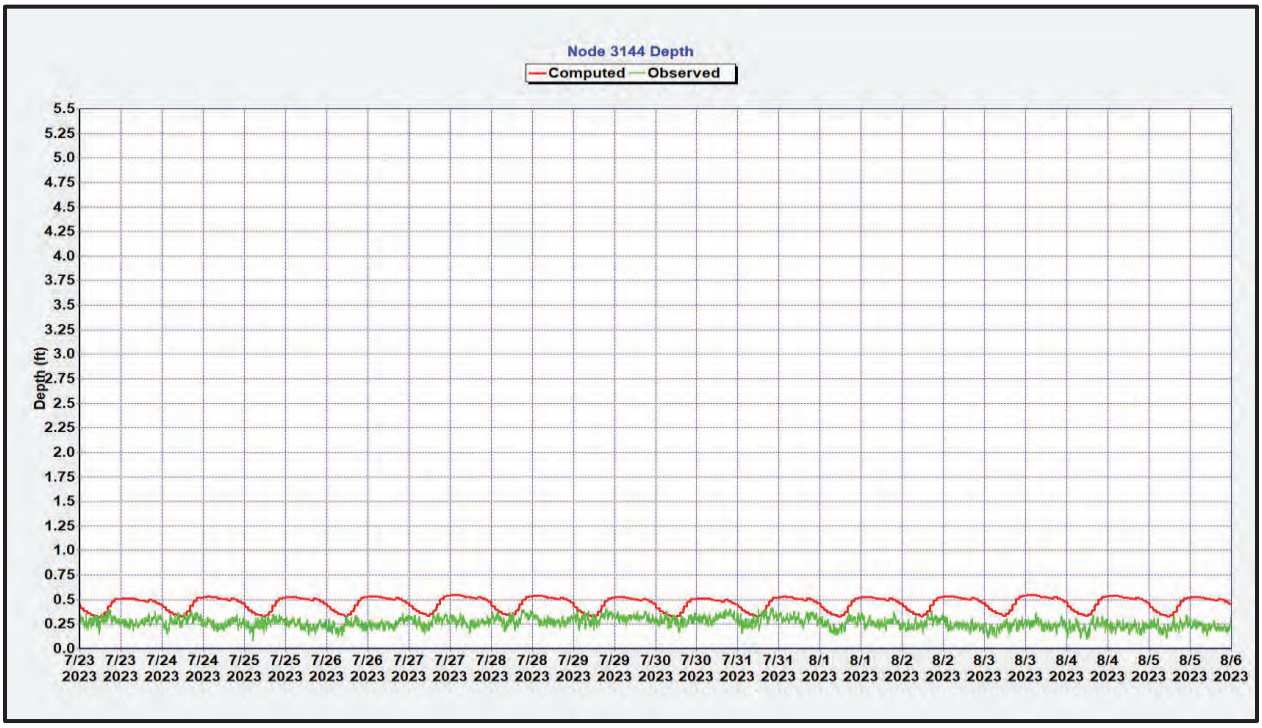
MH 3148 - 30-inch Influent: Depth (ft)



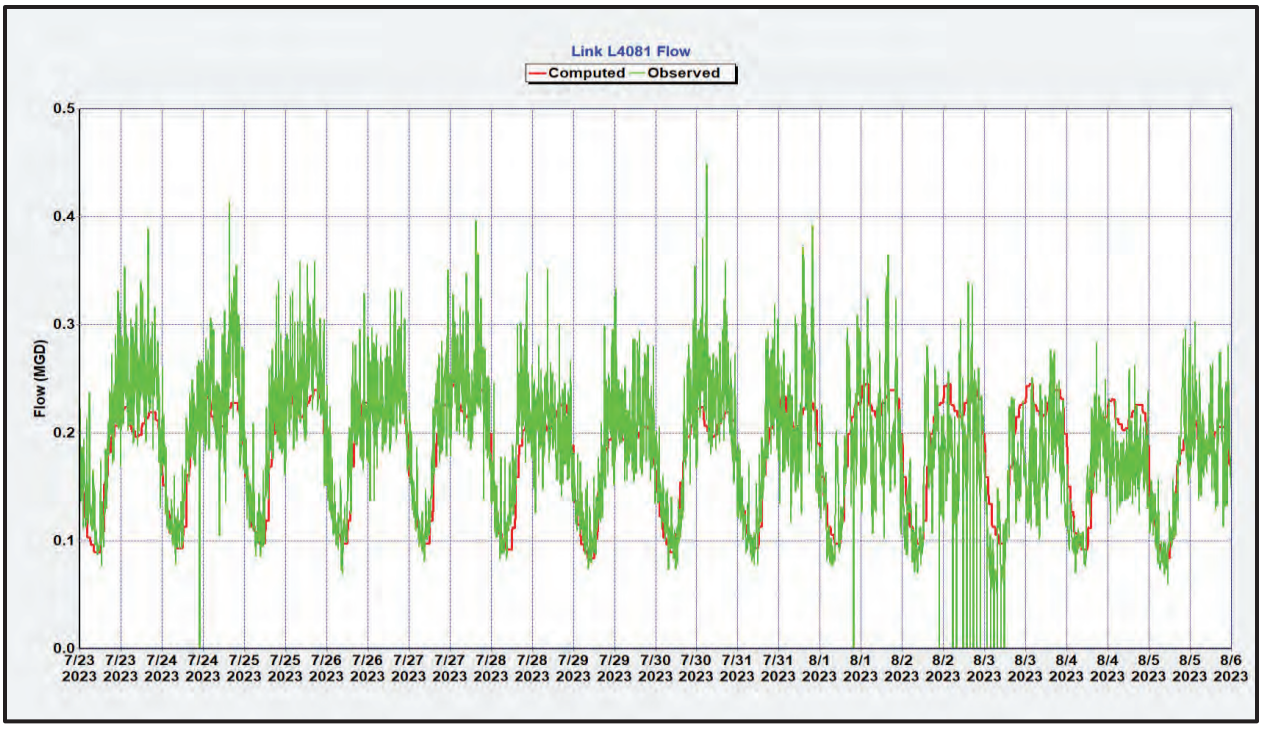
MH 3144 - 30-inch Influent: Flow (MGD)



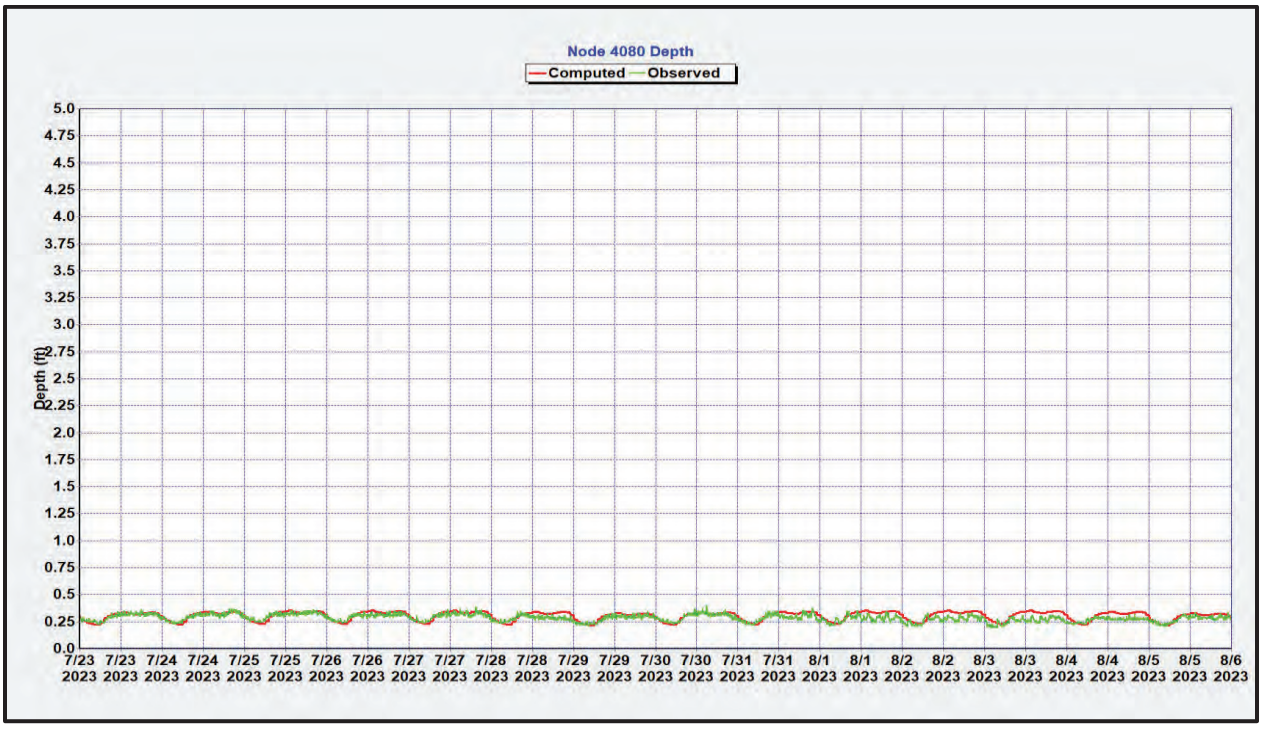
MH 3144 - 30-inch Influent: Depth (ft)



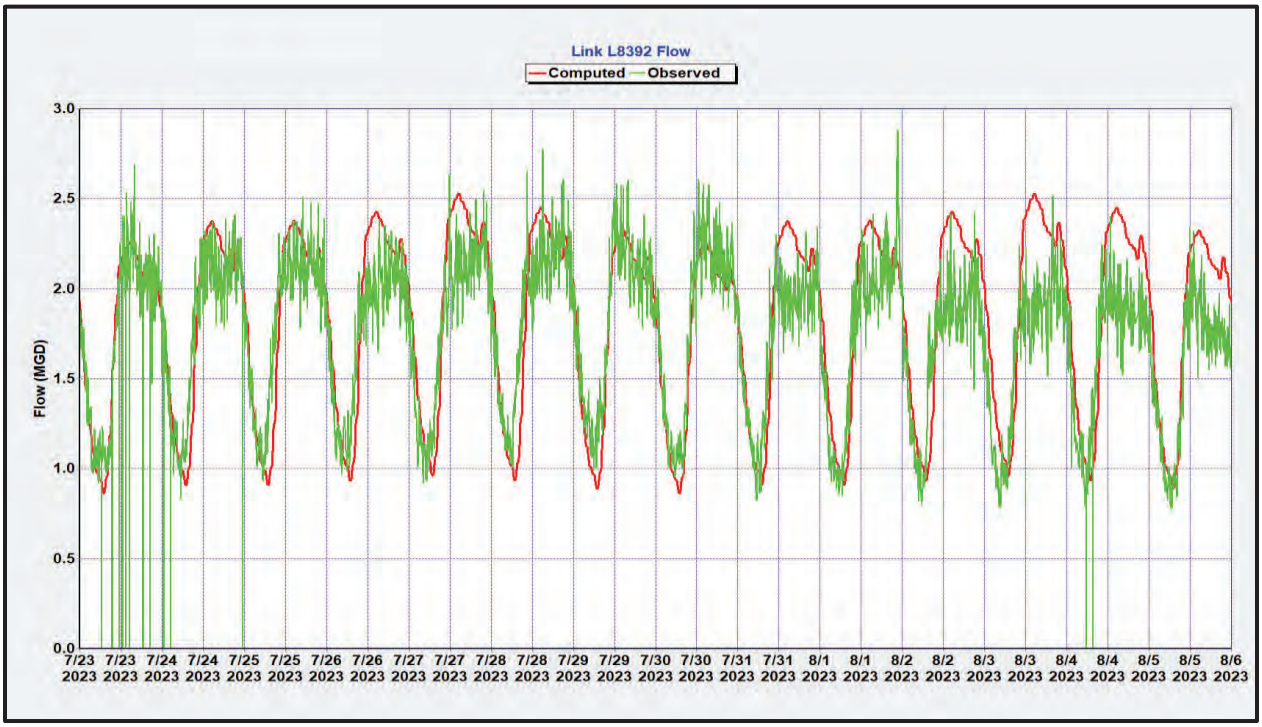
MH 4080 - 15-inch Influent: Flow (MGD)



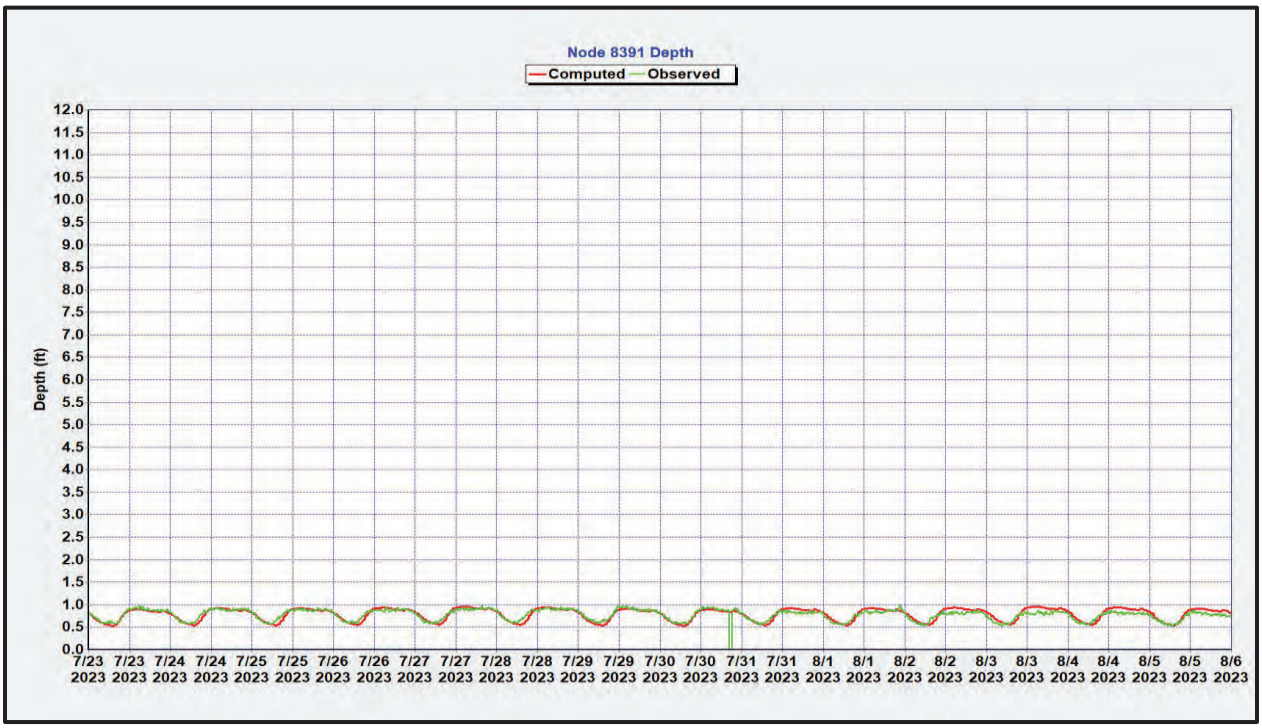
MH 4080 - 15-inch Influent: Depth (ft)



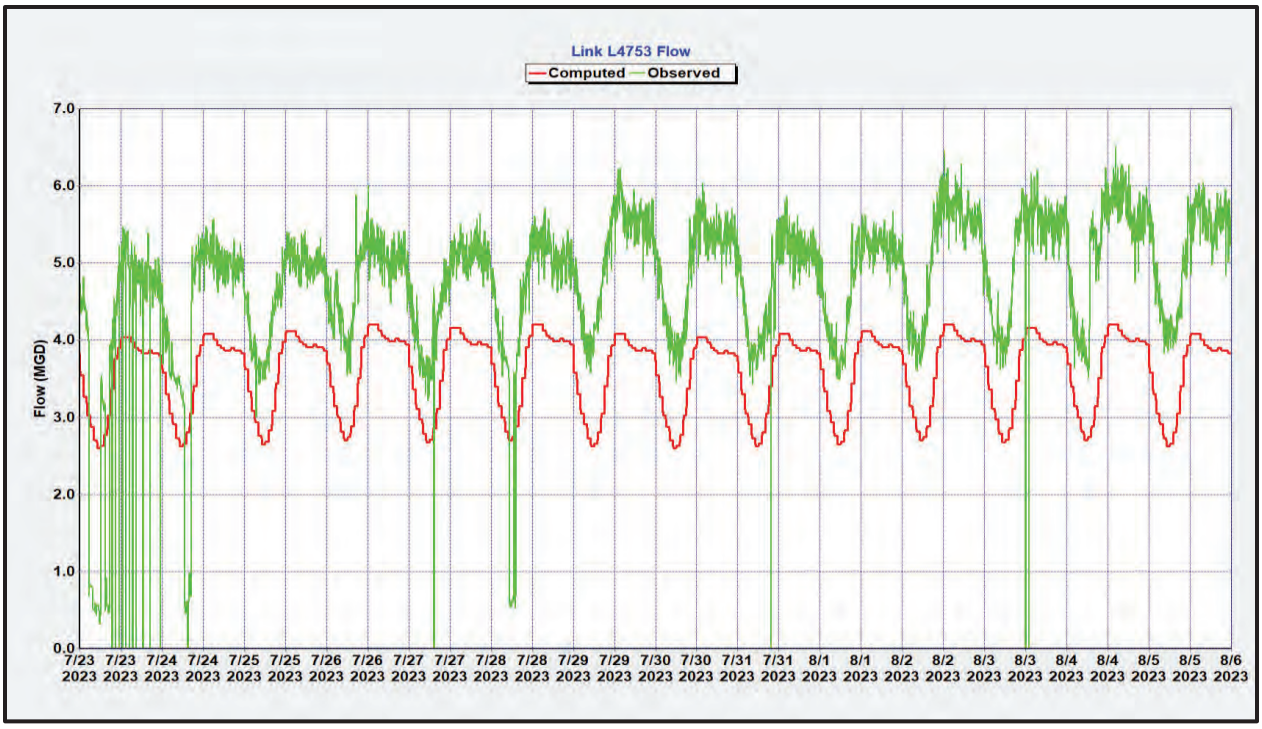
MH 8391 - 36-inch Influent: Flow (MGD)



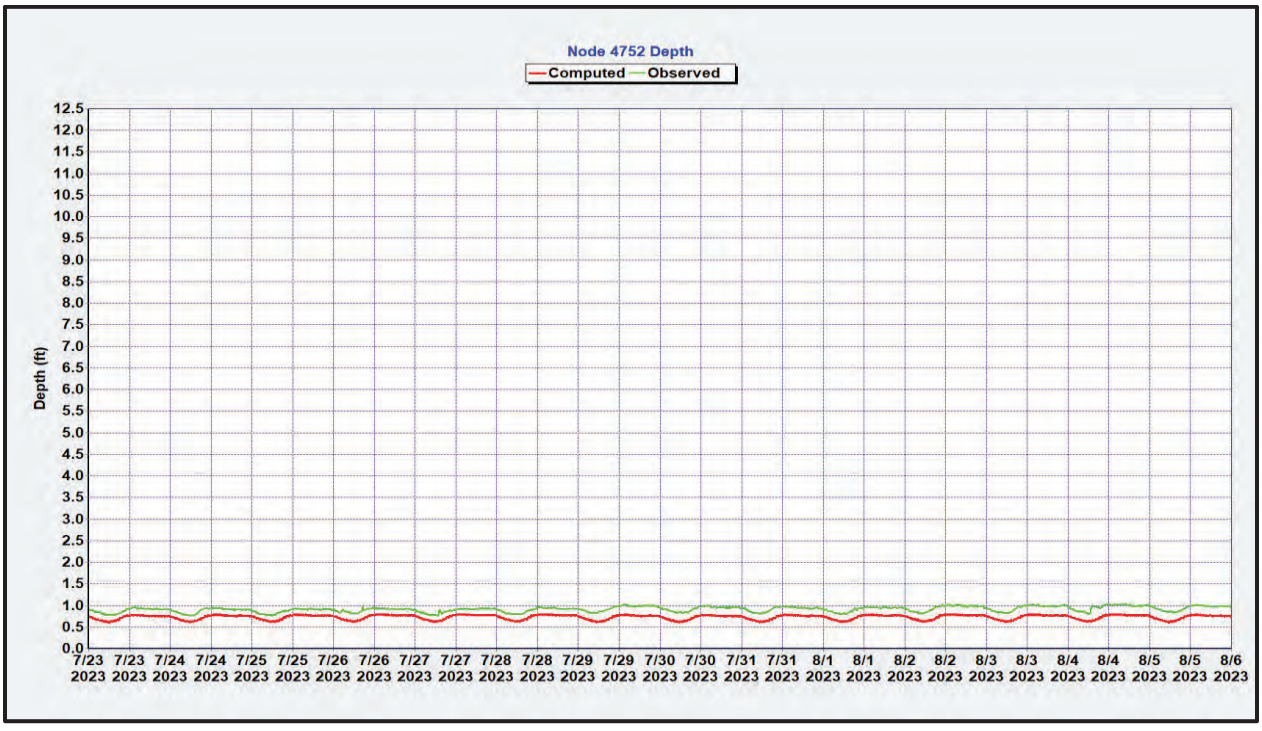
MH 8391 - 36-inch Influent: Depth (ft)



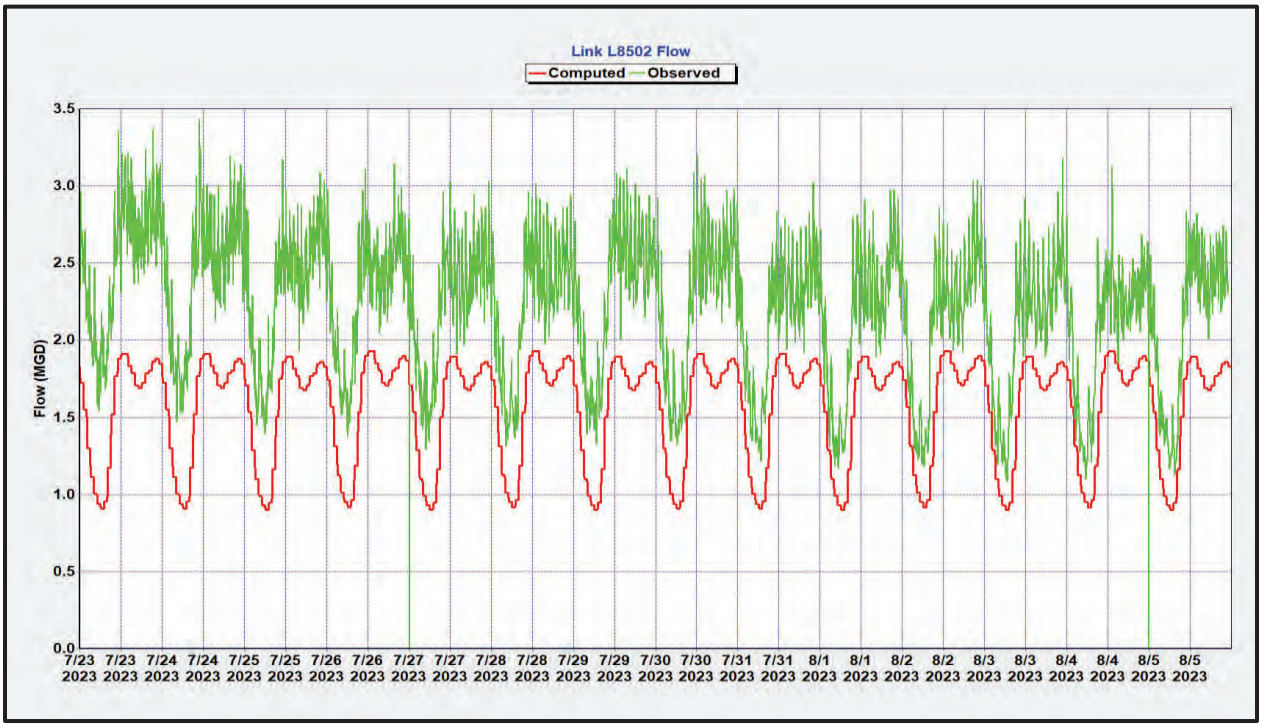
MH 4752 - 42-inch Influent: Flow (MGD)



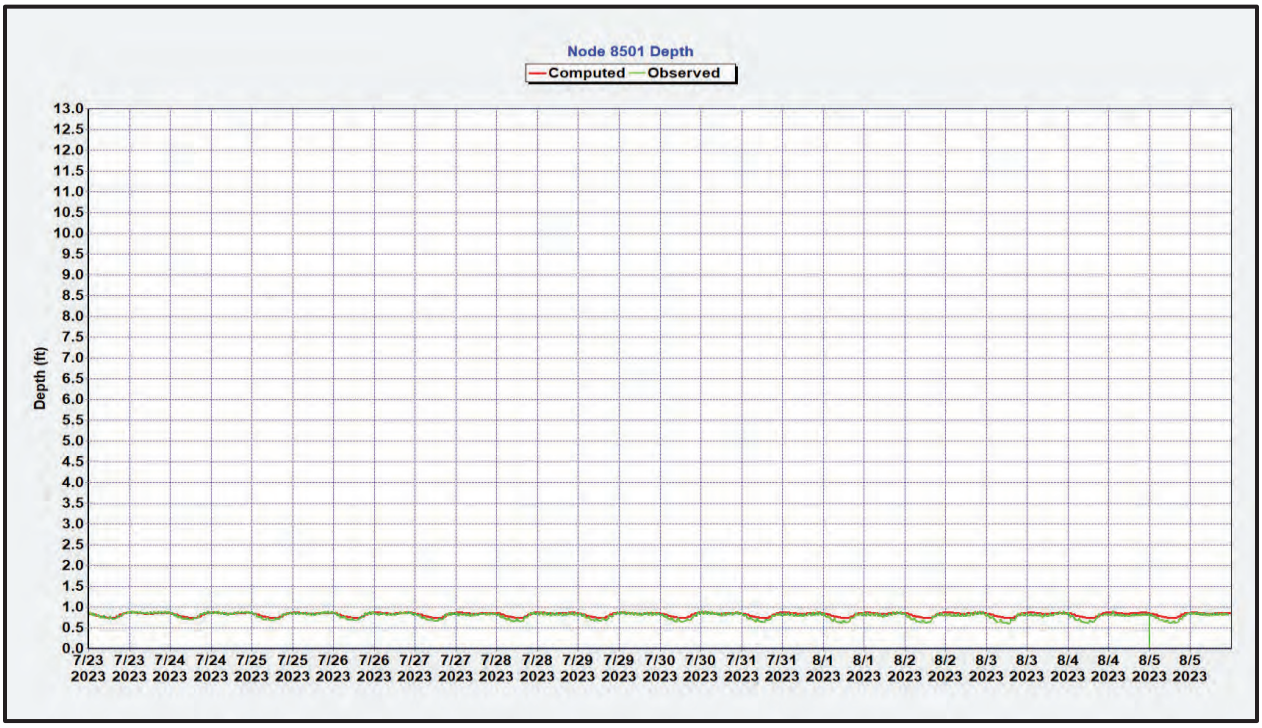
MH 4752 - 42-inch Influent: Depth (ft)



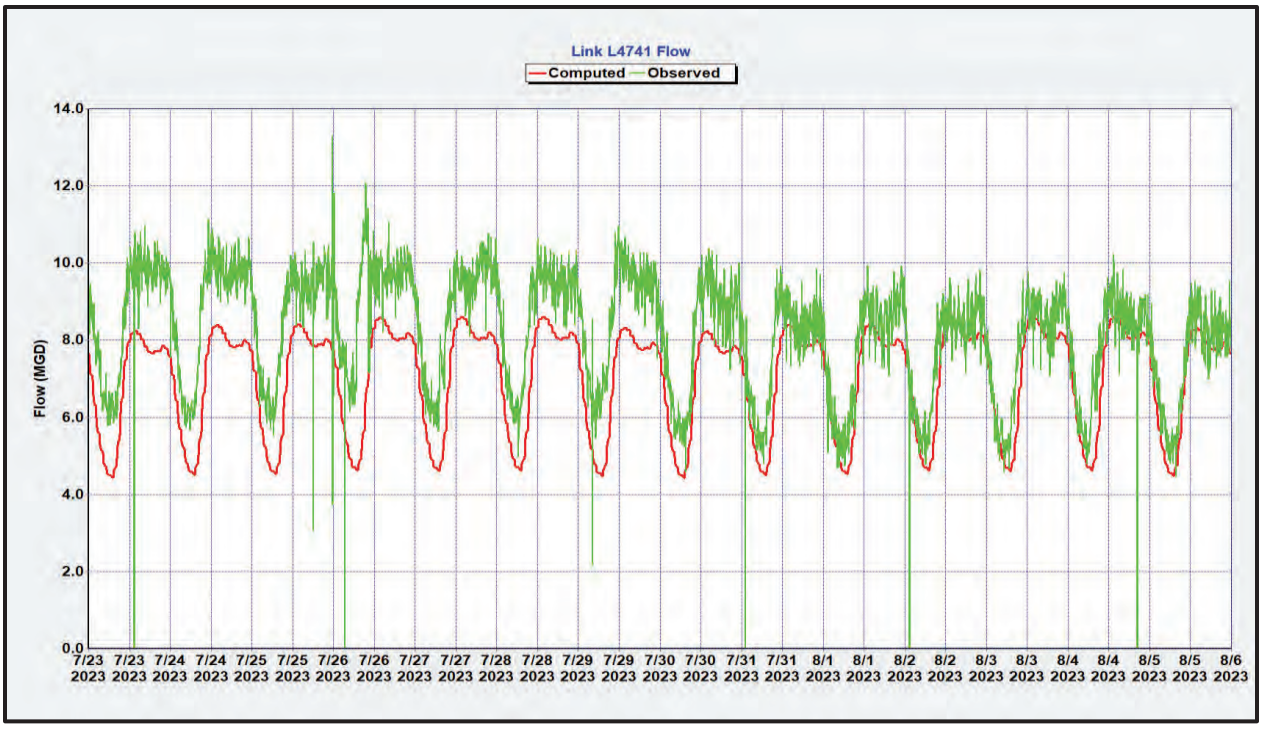
MH 8501 - 42-inch Influent: Flow (MGD)



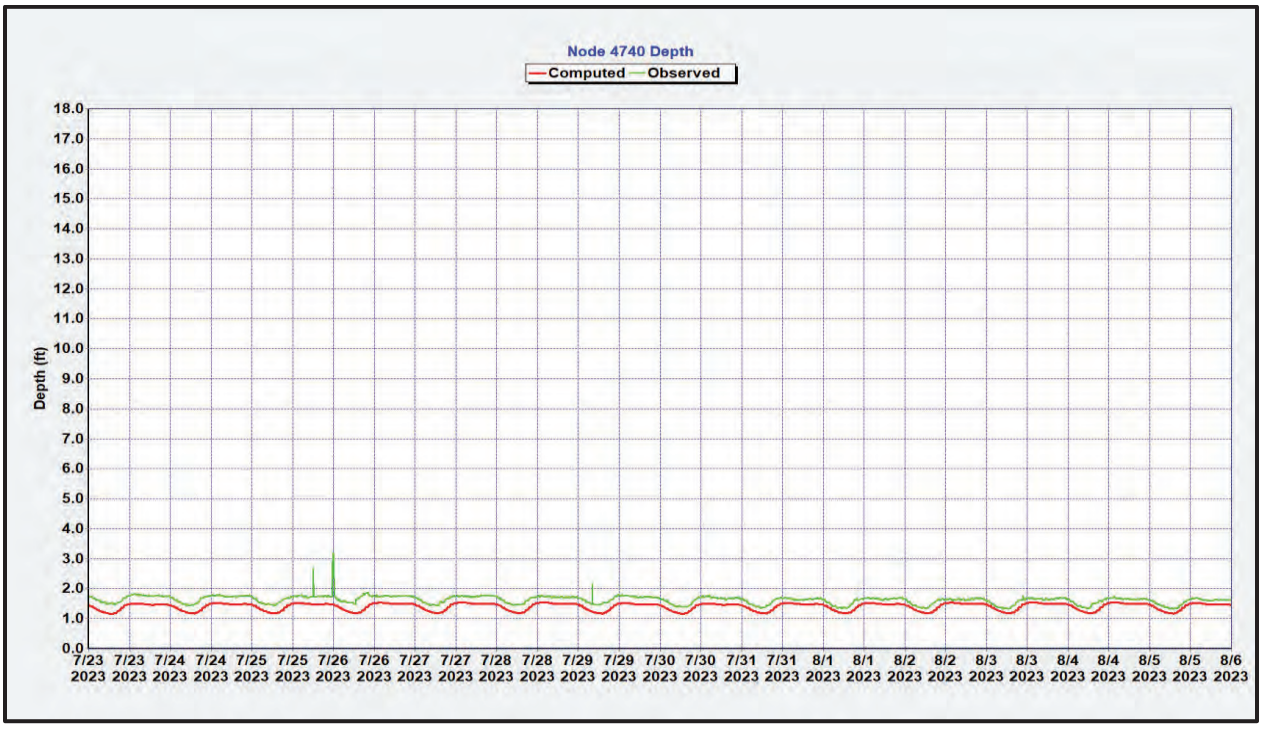
MH 8501 – 42-inch Influent: Depth (ft)



MH 4740 - 48-inch Influent: Flow (MGD)



MH 4740 - 48-inch Influent: Depth (ft)



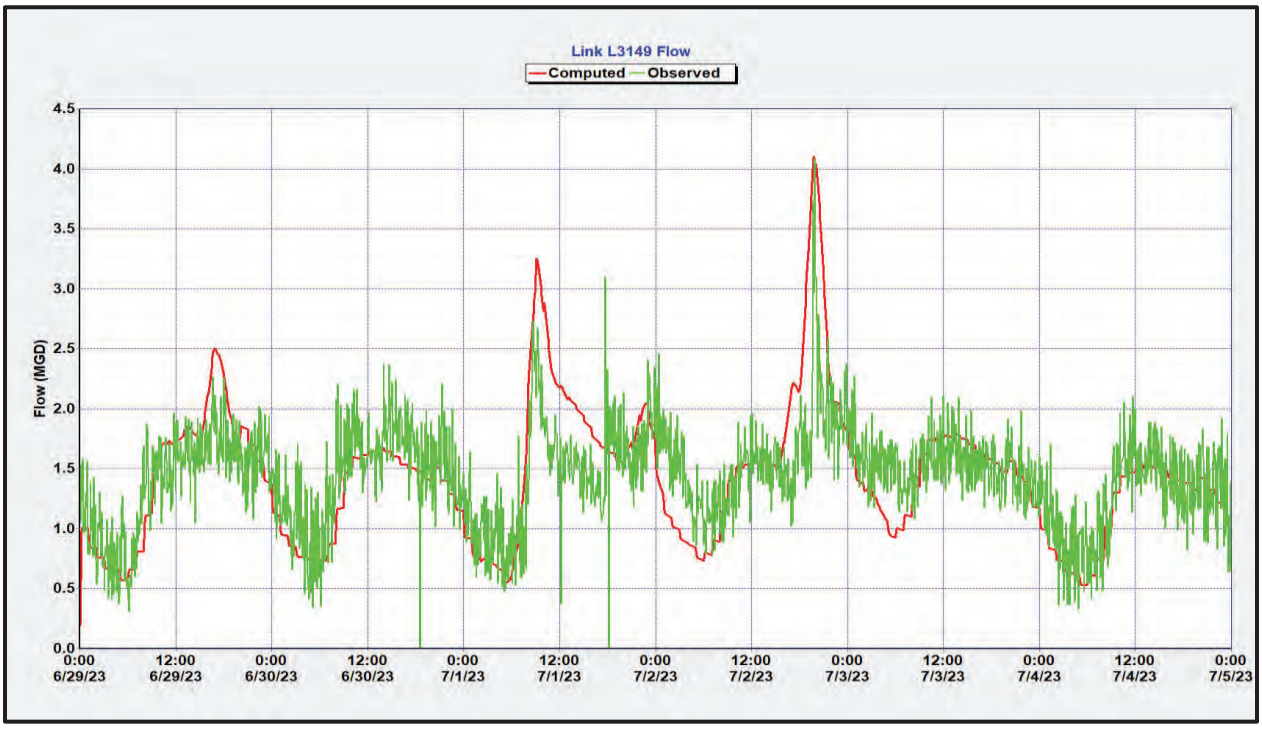
Attachment 3

Wet Weather Calibration & Validation Figures

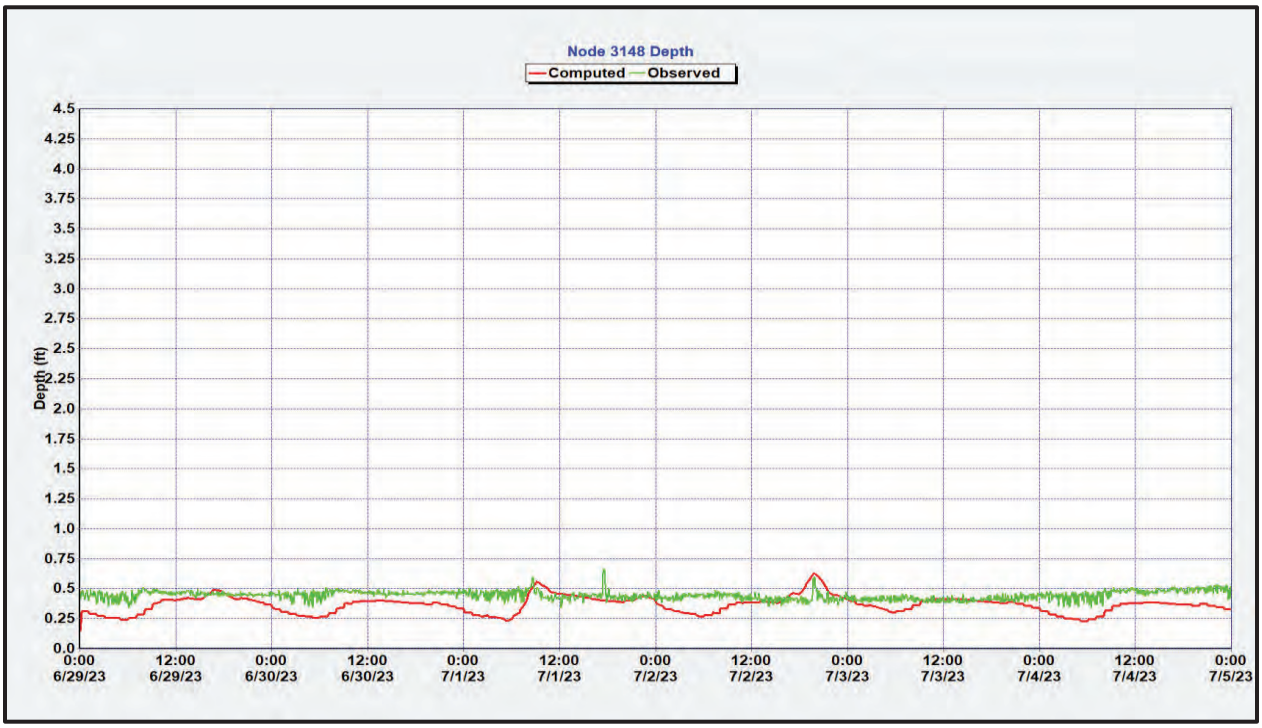
Wet Weather Calibration Event

July 2, 2023

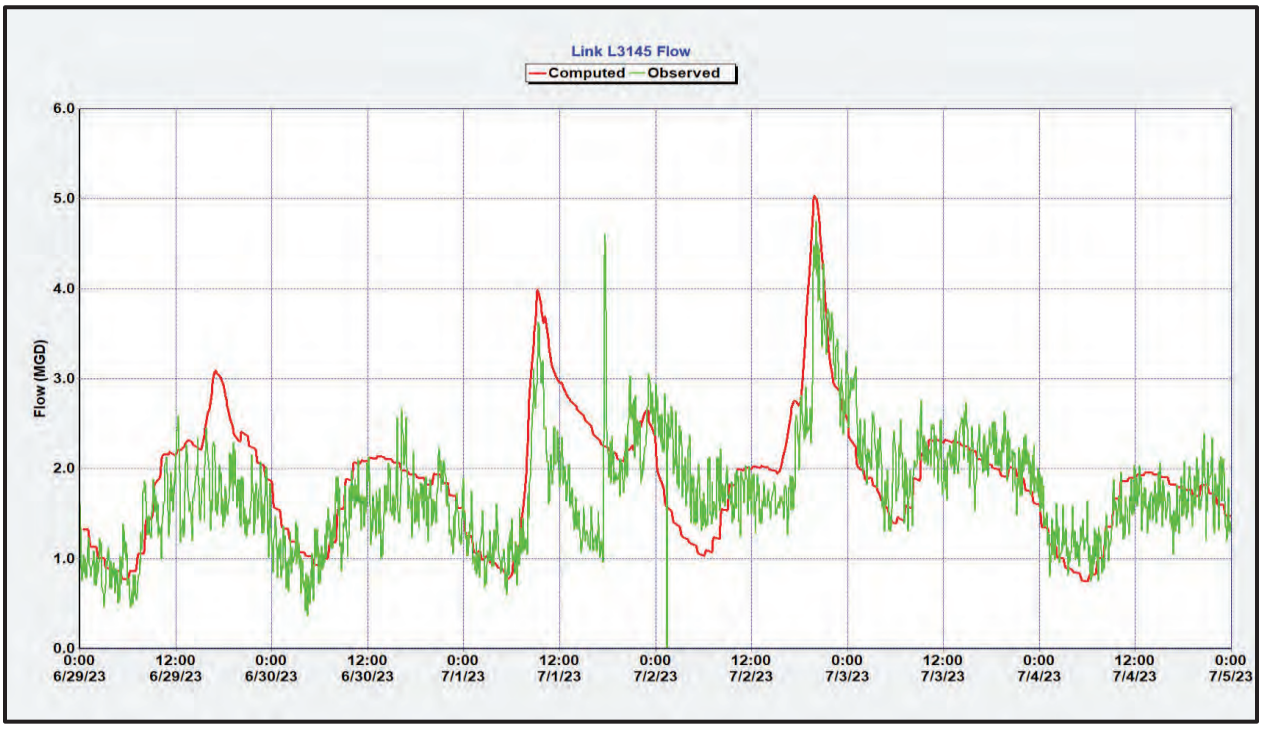
MH 3148 - 30-inch Influent: Flow (MGD)



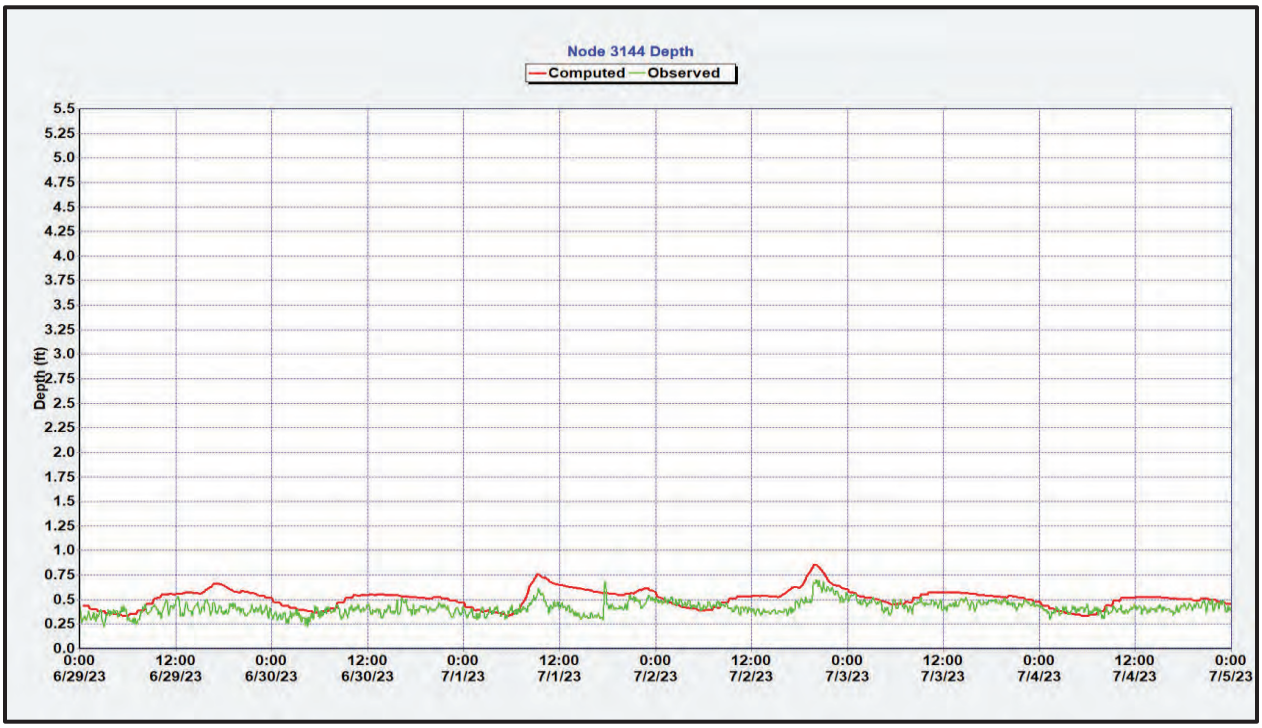
MH 3148 - 30-inch Influent: Depth (ft)



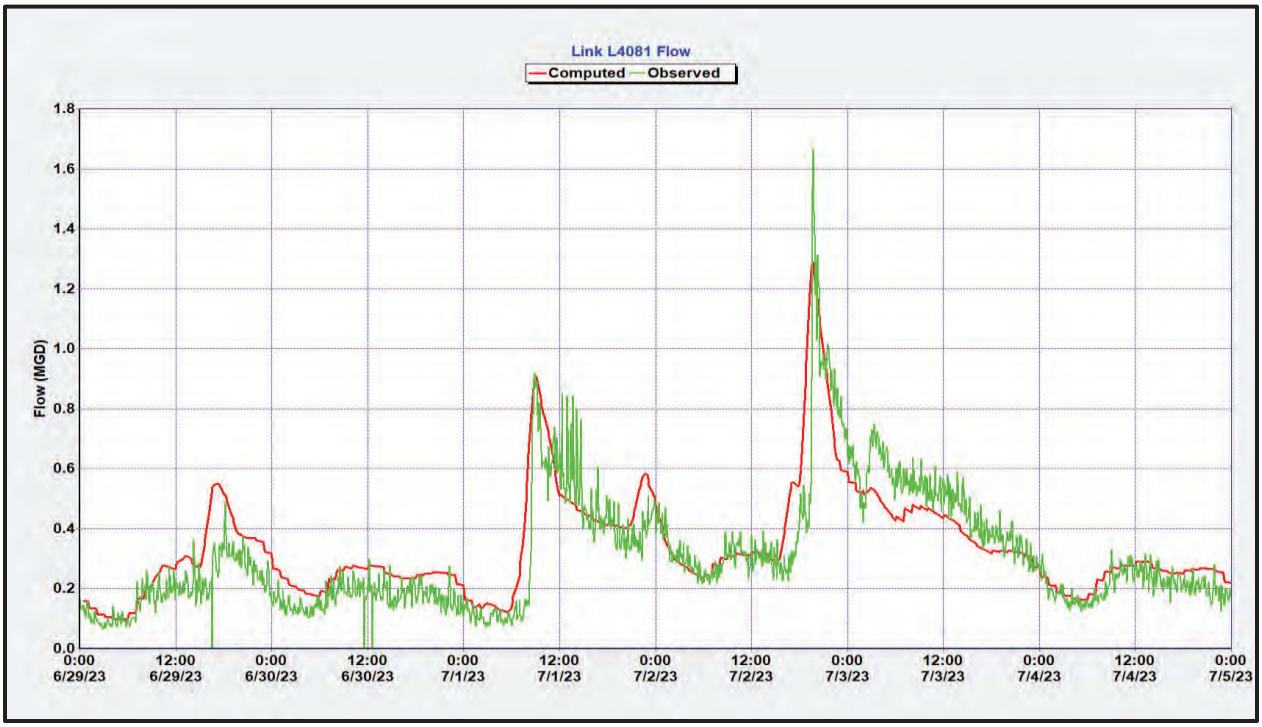
MH 3144 - 30-inch Influent: Flow (MGD)



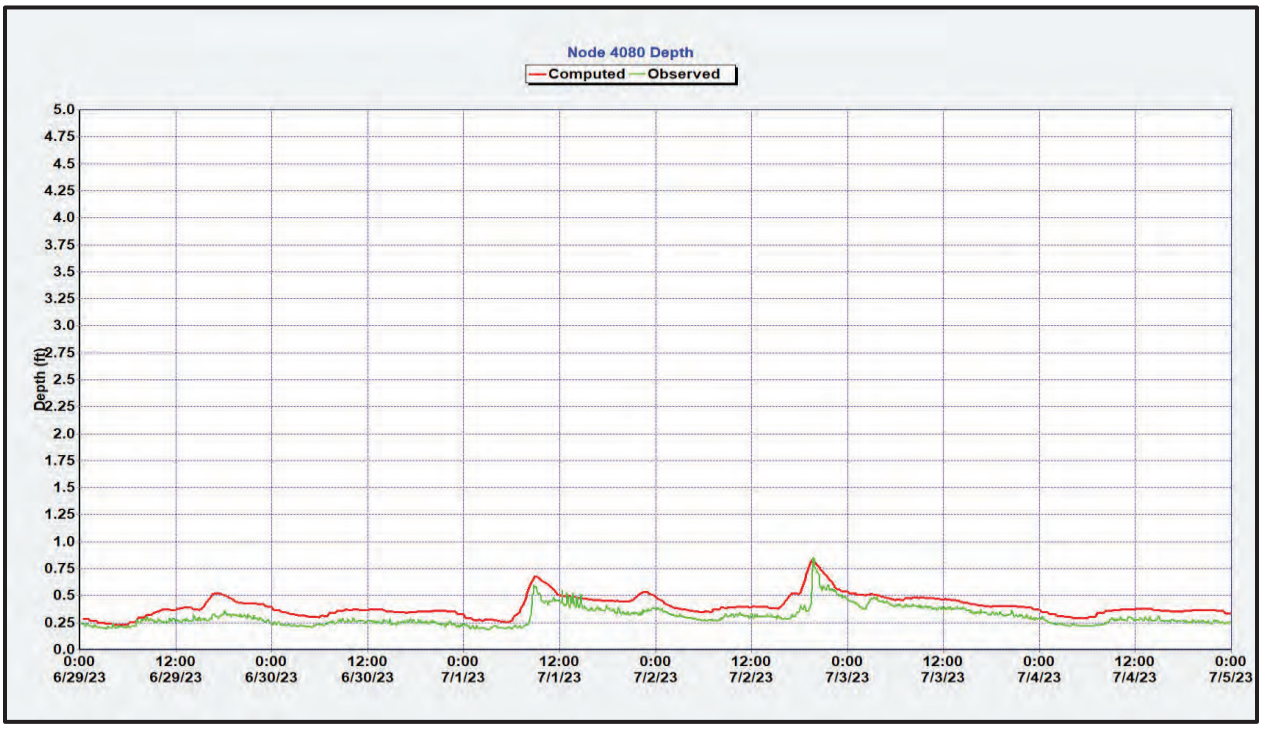
MH 3144 - 30-inch Influent: Depth (ft)



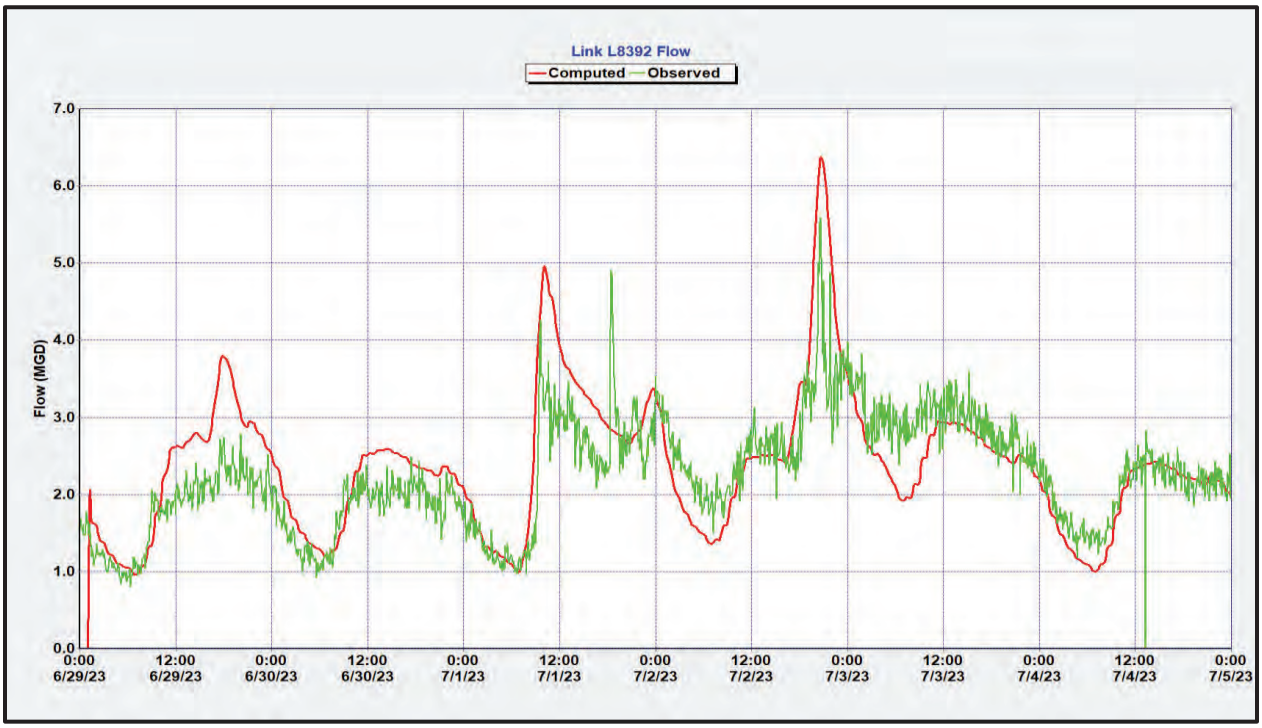
MH 4080 - 15-inch Influent: Flow (MGD)



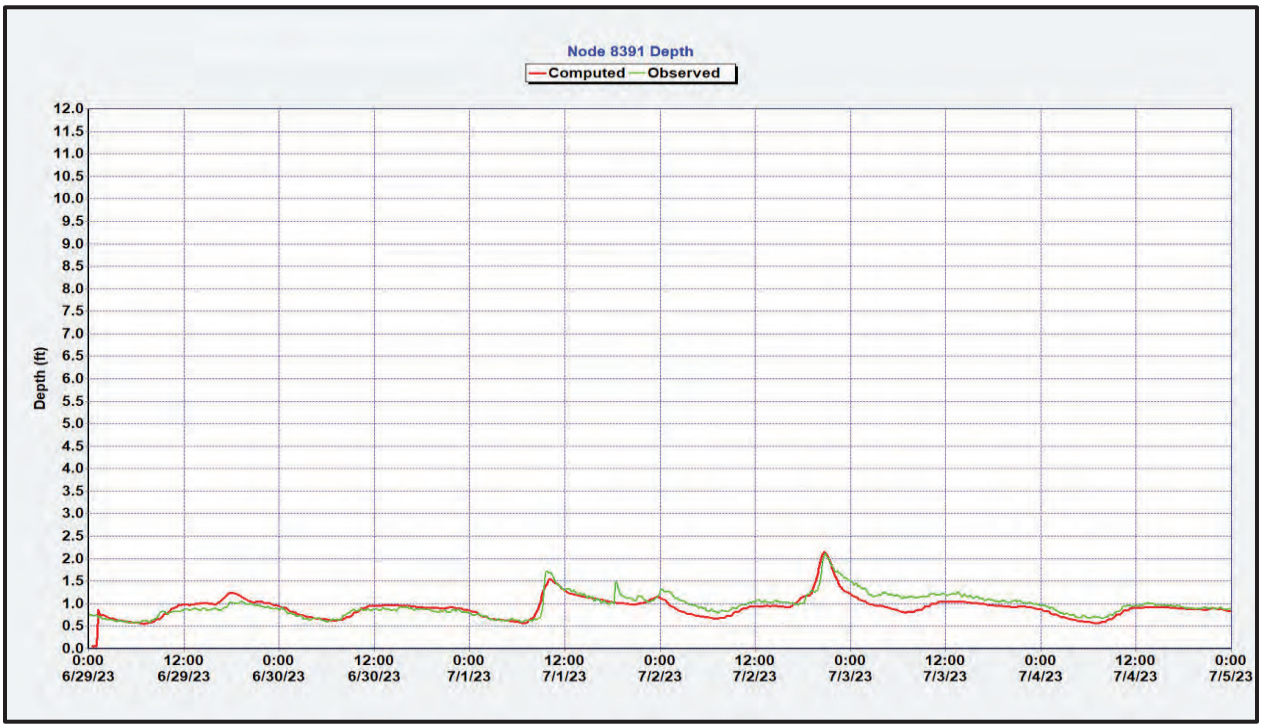
MH 4080 - 15-inch Influent: Depth (ft)



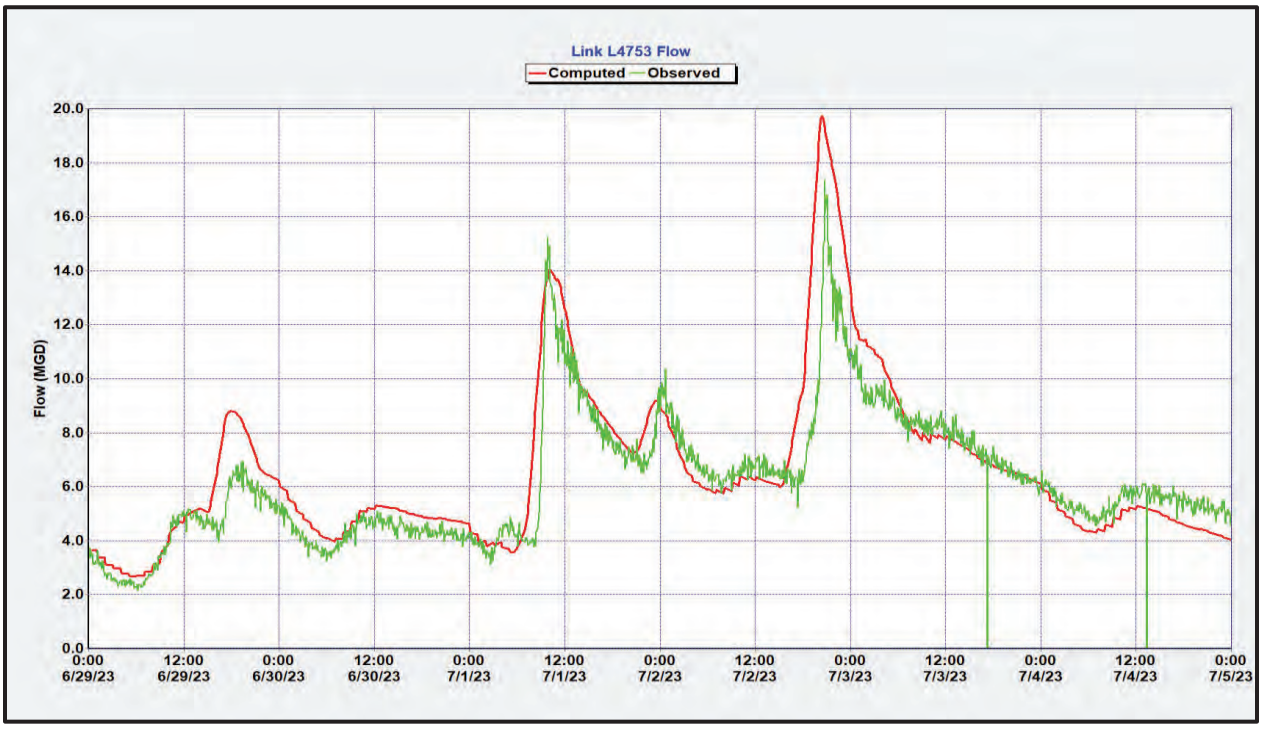
MH 8391 - 36-inch Influent: Flow (MGD)



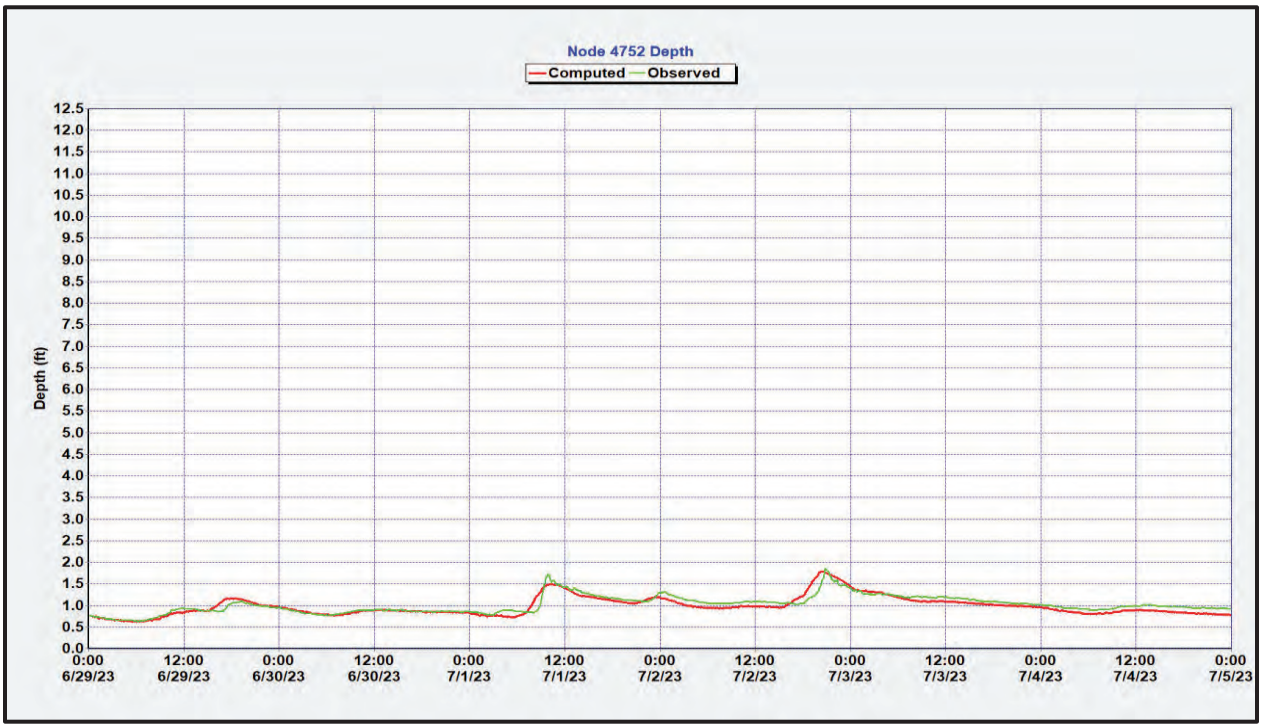
MH 8391 - 36-inch Influent: Depth (ft)



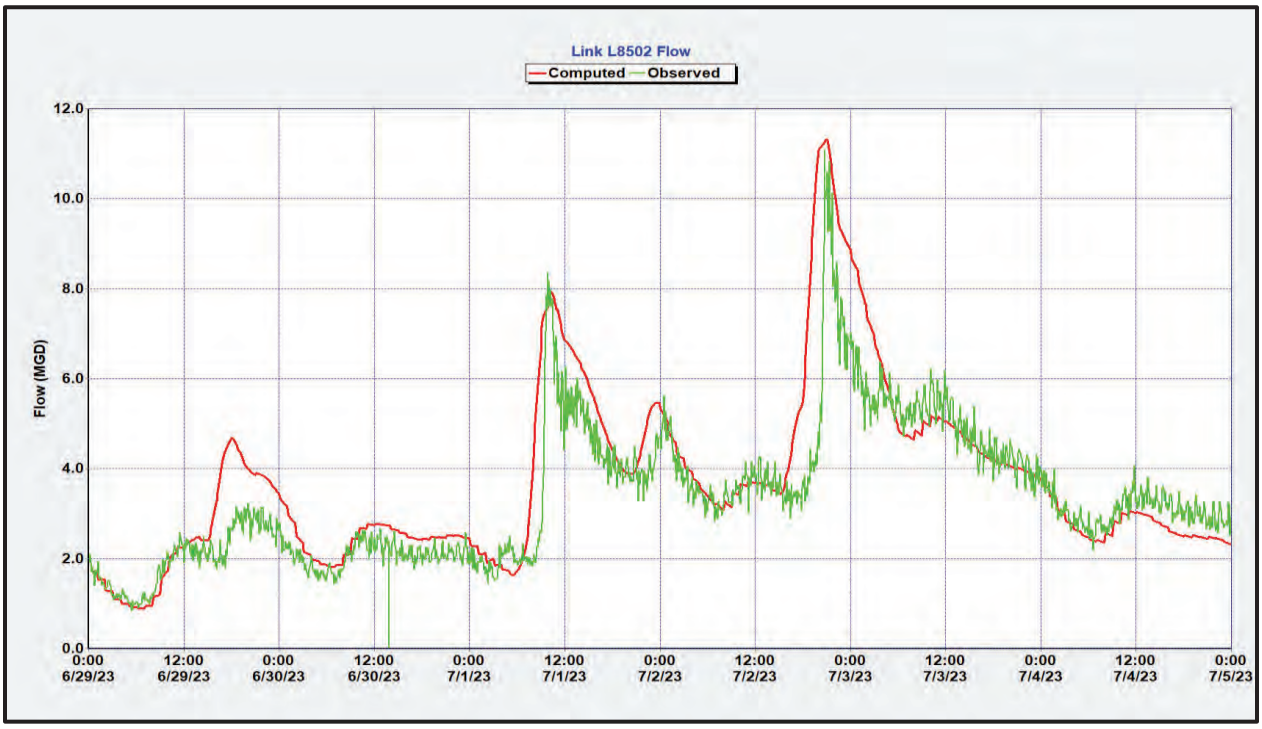
MH 4752 - 42-inch Influent: Flow (MGD)



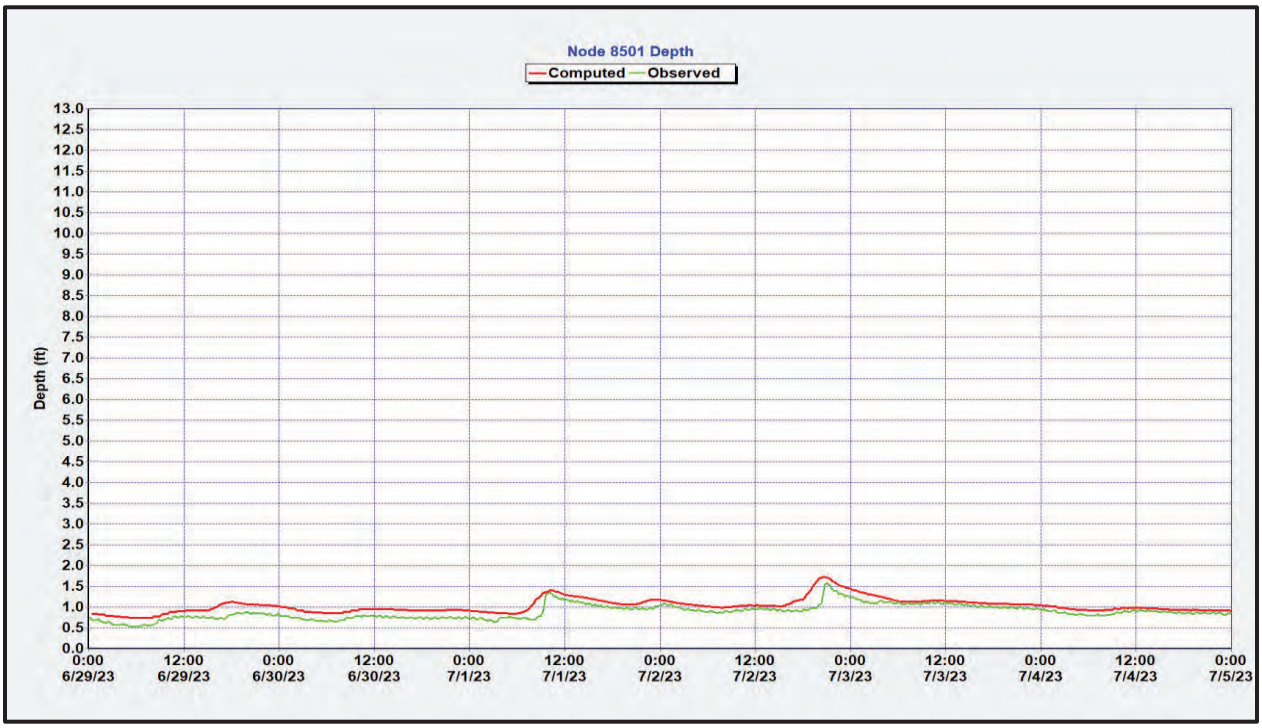
MH 4752 - 42-inch Influent: Depth (ft)



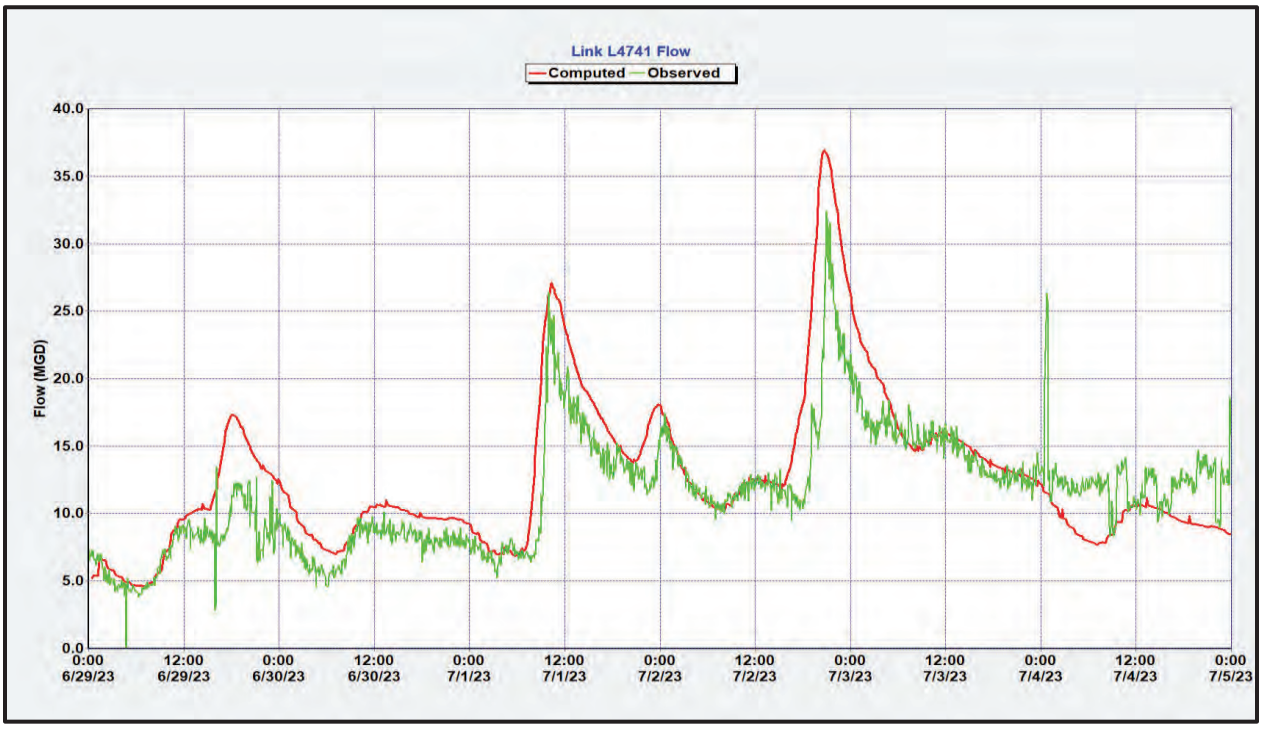
MH 8501 - 42-inch Influent: Flow (MGD)



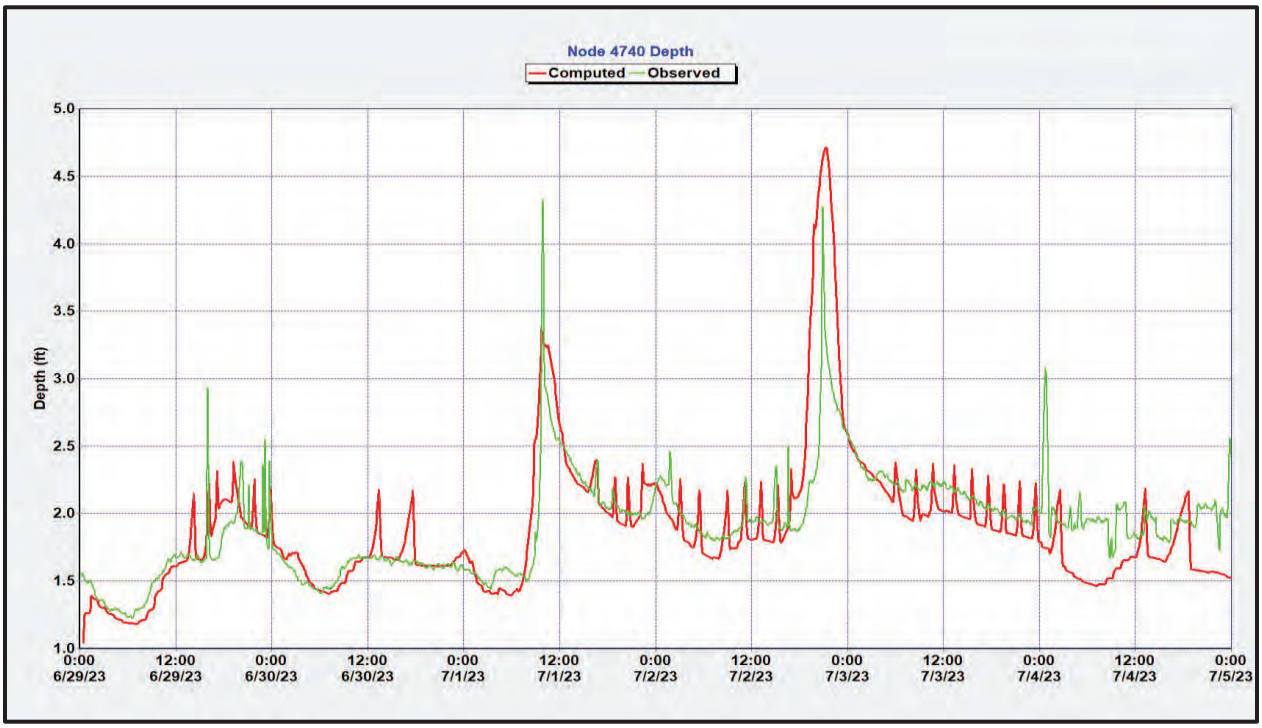
MH 8501 – 42-inch Influent: Depth (ft)



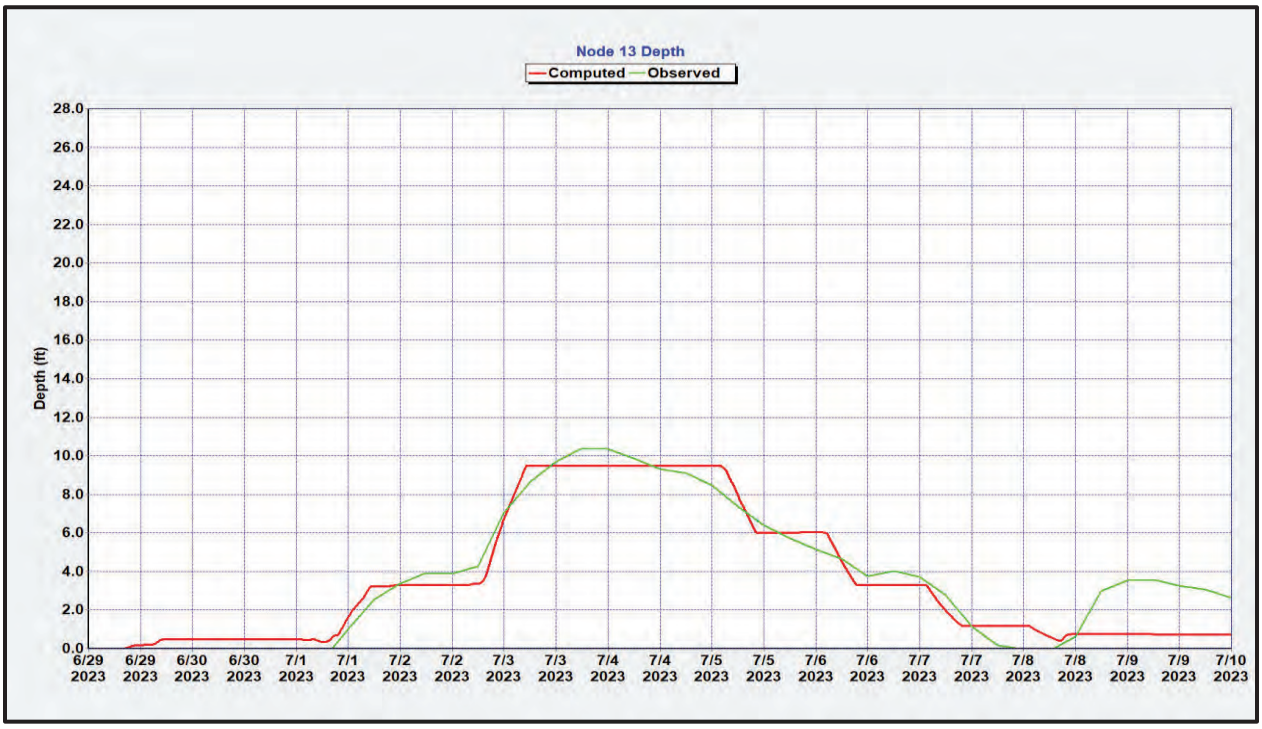
MH 4740 - 48-inch Influent: Flow (MGD)



MH 4740 - 48-inch Influent: Depth (ft)



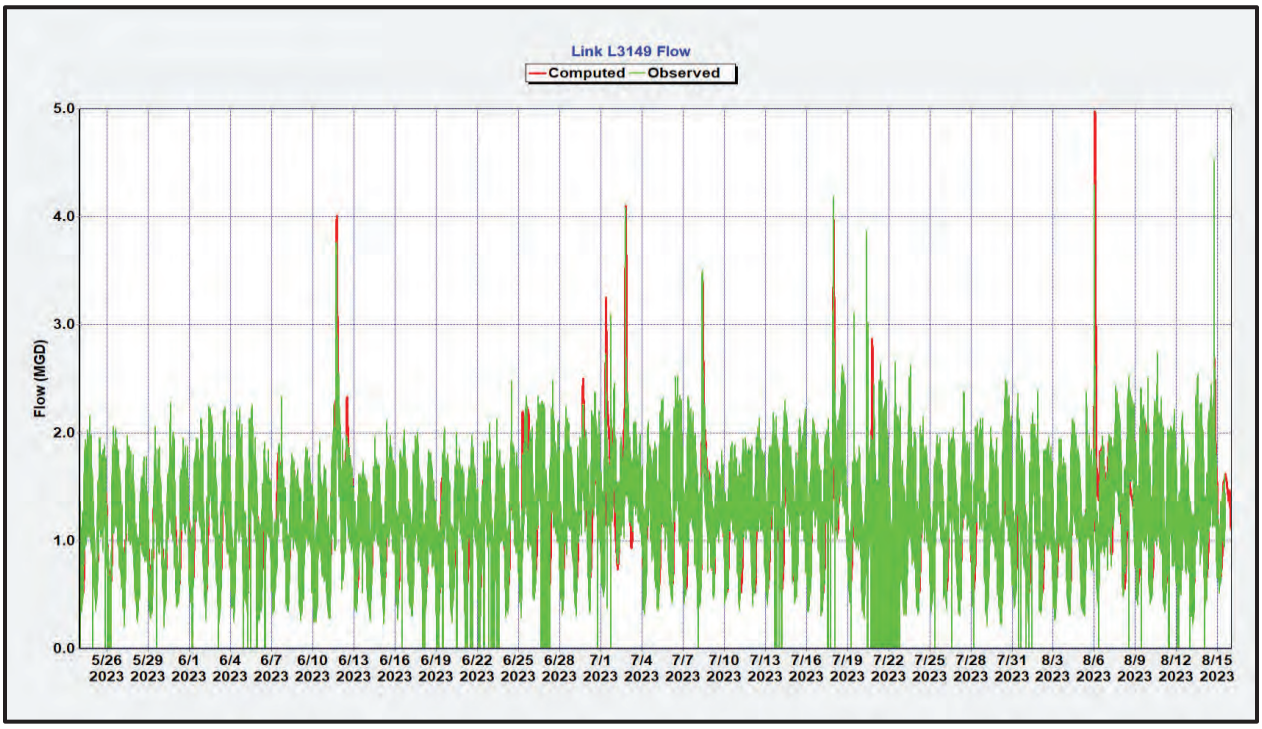
EQ Basin: Depth (ft)



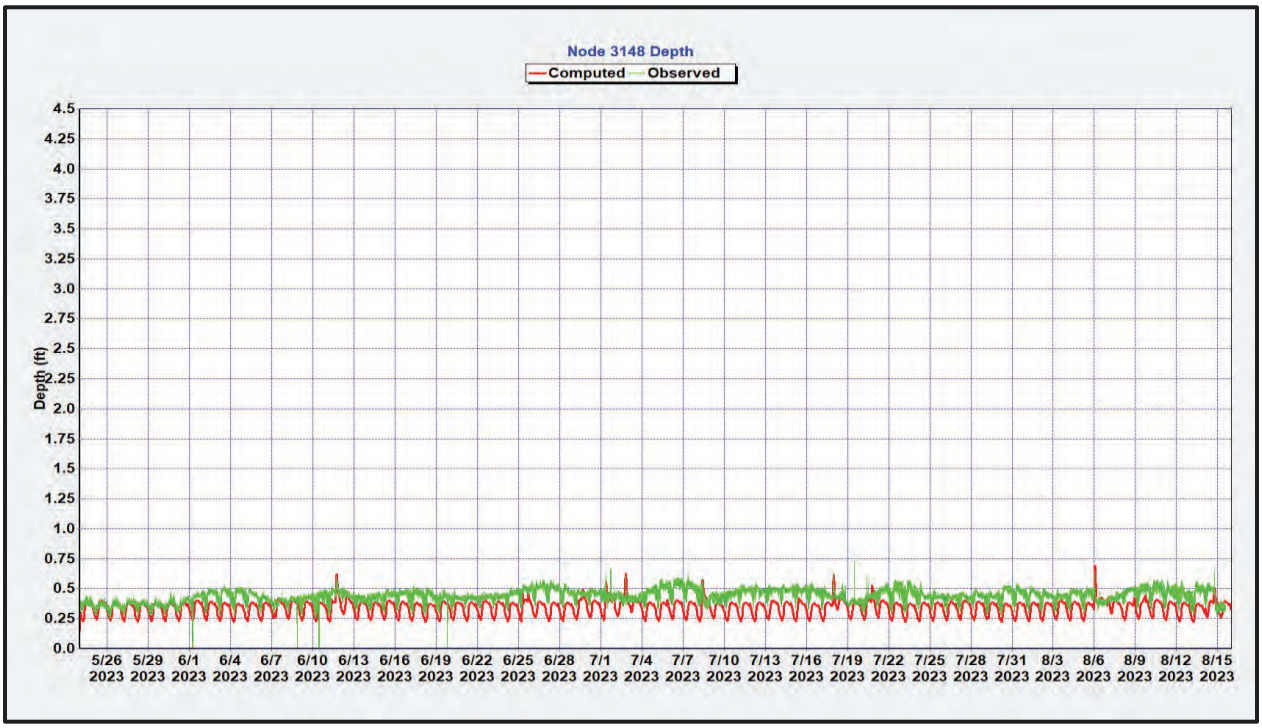
Wet Weather Full Span Validation Period

May 24, 2023 – August 14, 2023

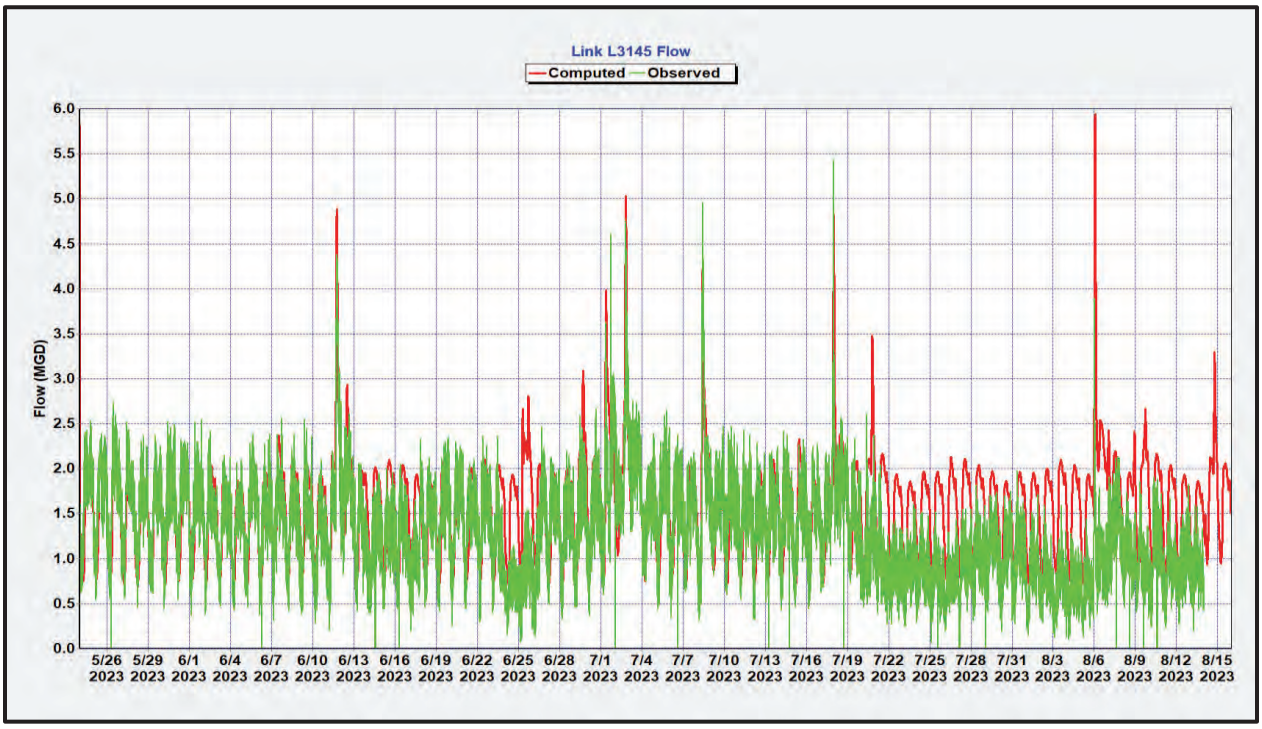
MH 3148 - 30-inch Influent: Flow (MGD)



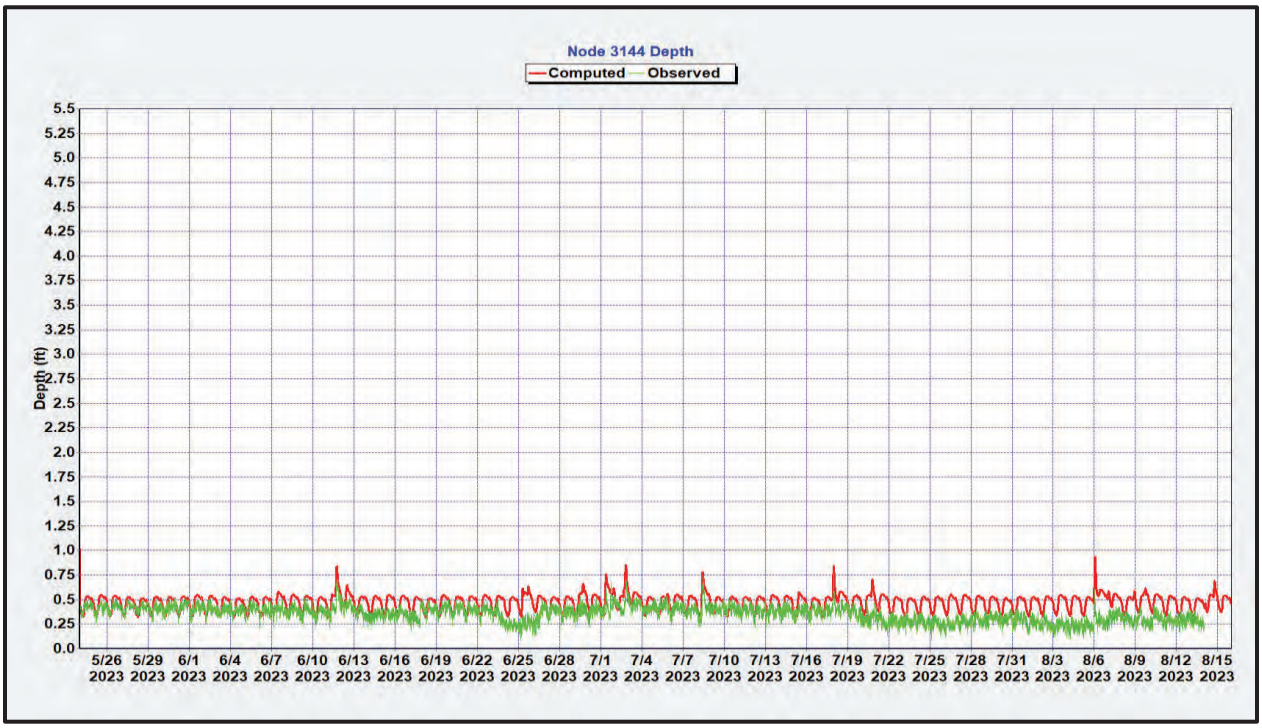
MH 3148 - 30-inch Influent: Depth (ft)



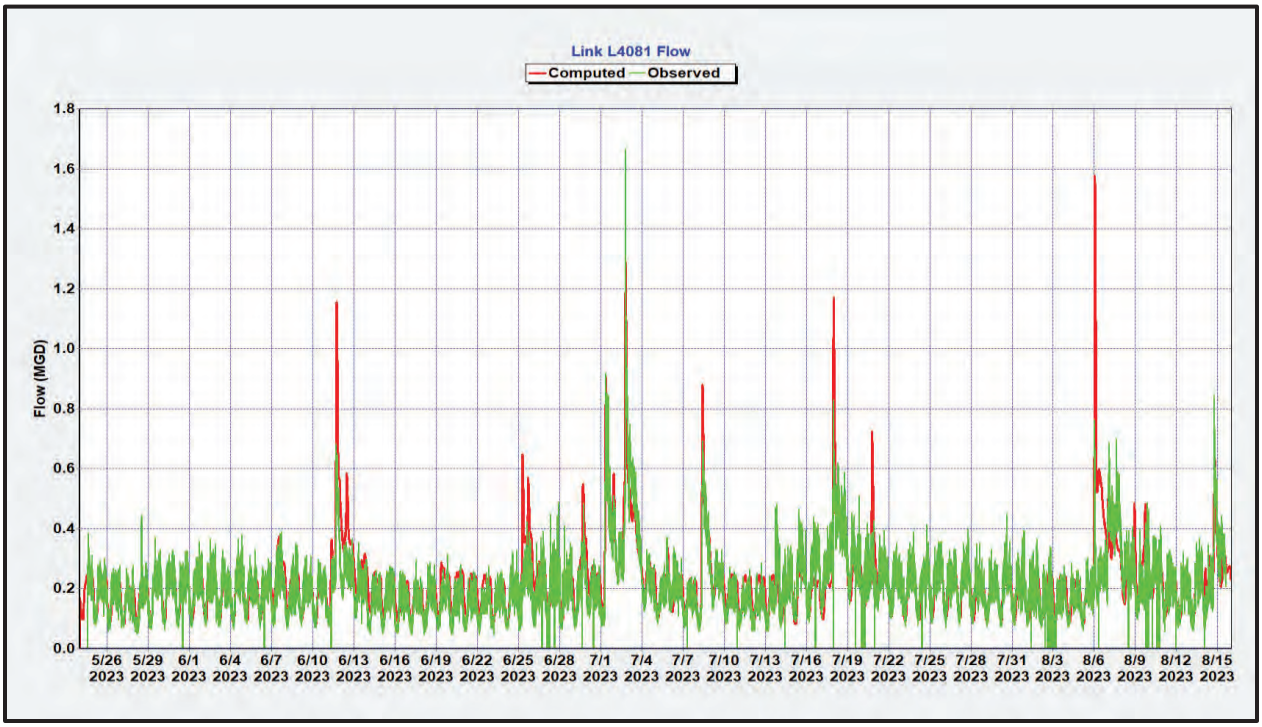
MH 3144 - 30-inch Influent: Flow (MGD)



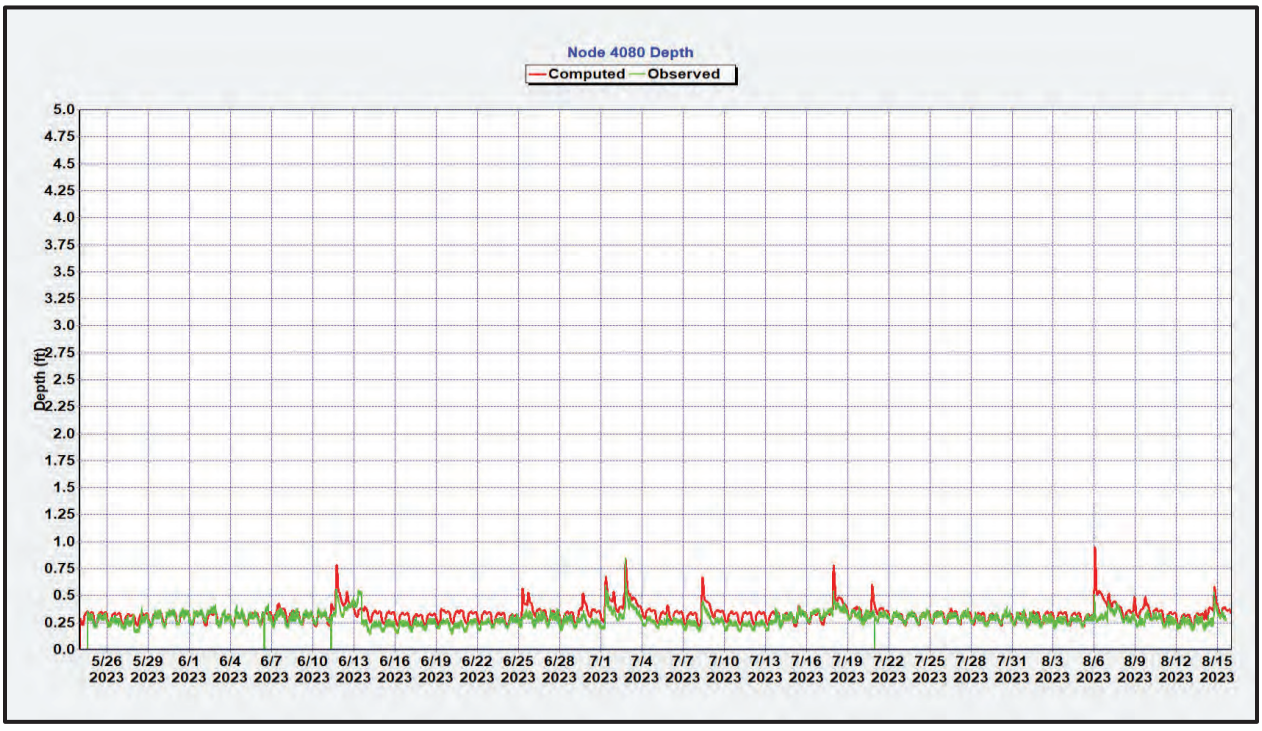
MH 3144 - 30-inch Influent: Depth (ft)



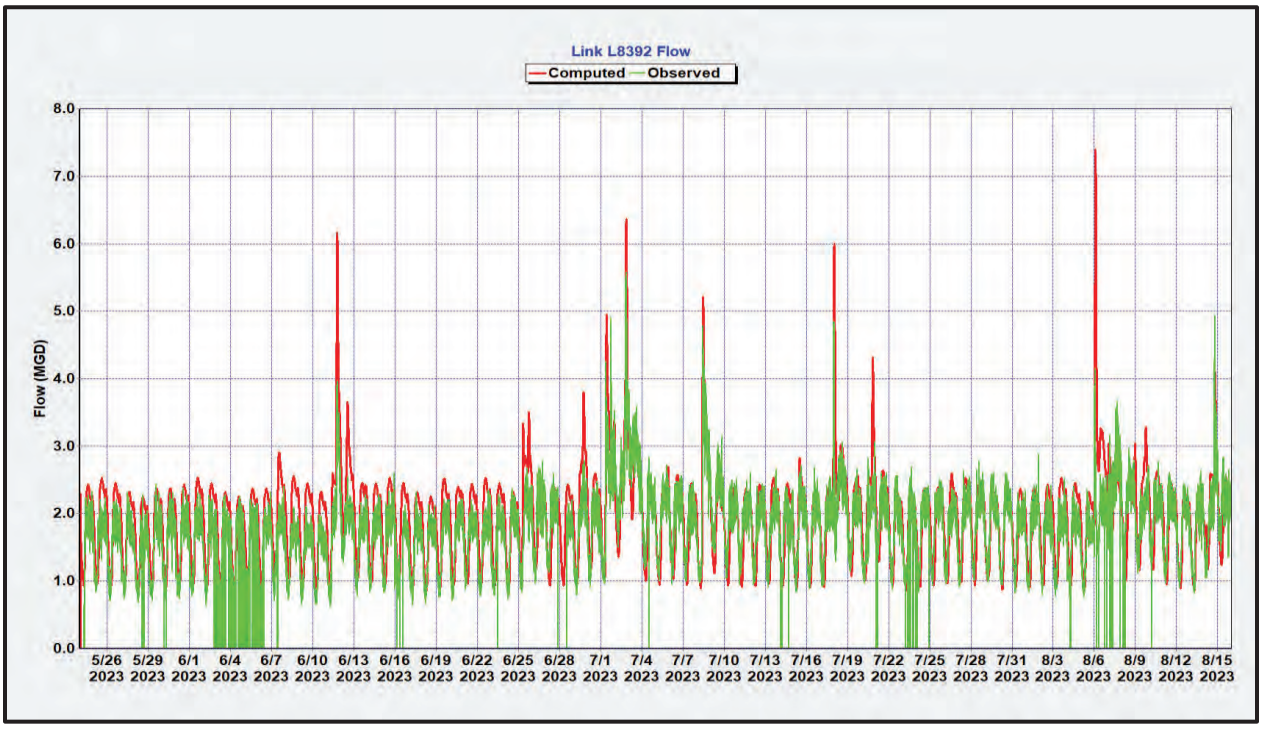
MH 4080 - 15-inch Influent: Flow (MGD)



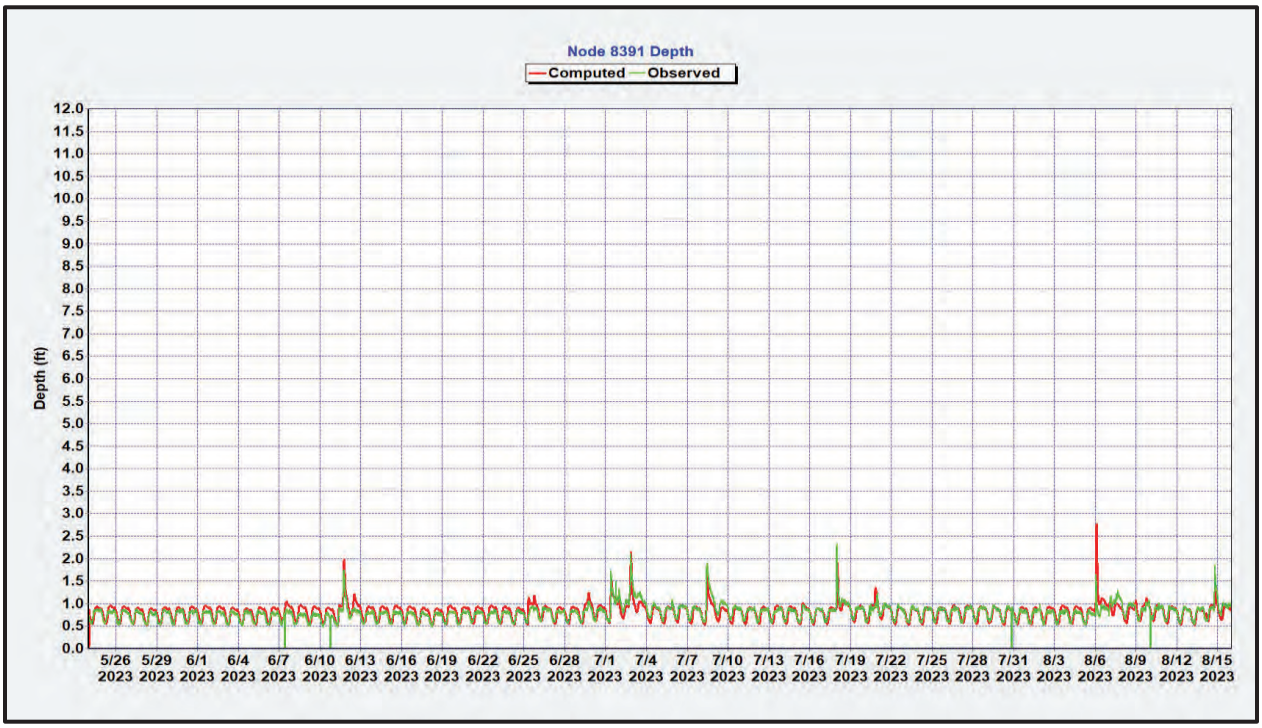
MH 4080 - 15-inch Influent: Depth (ft)



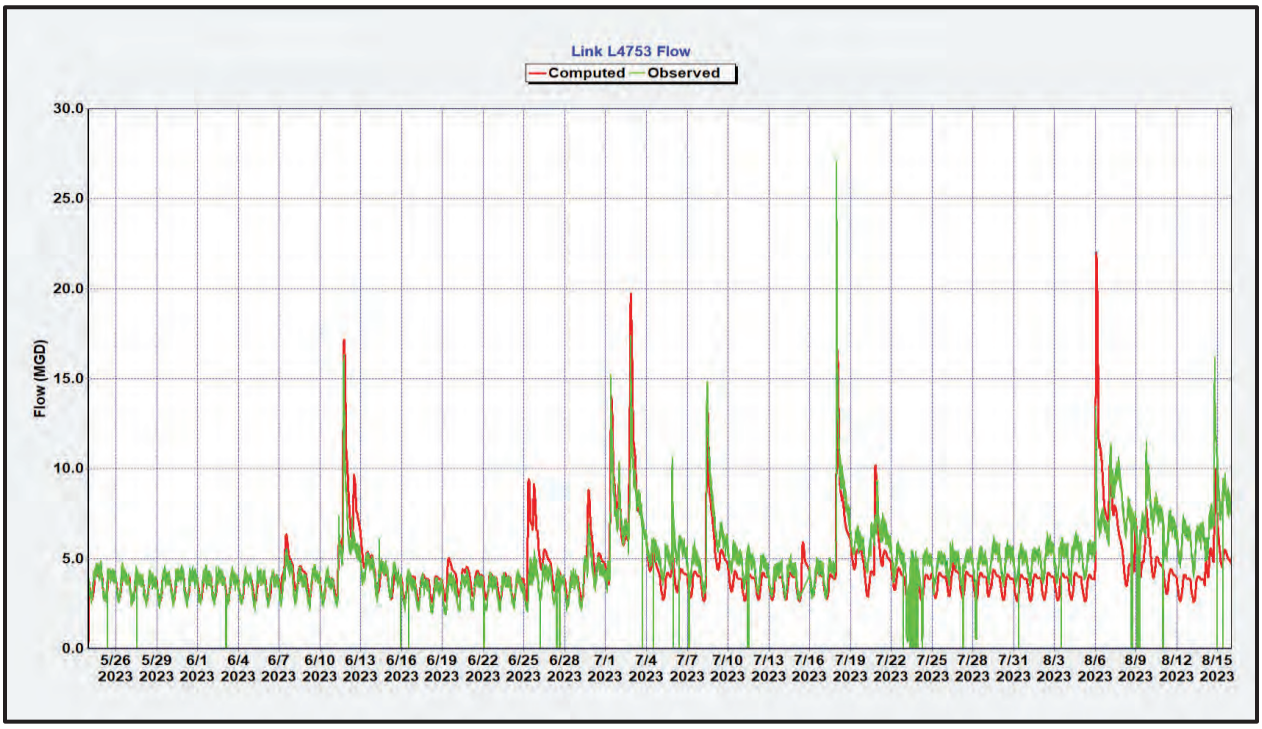
MH 8391 - 36-inch Influent: Flow (MGD)



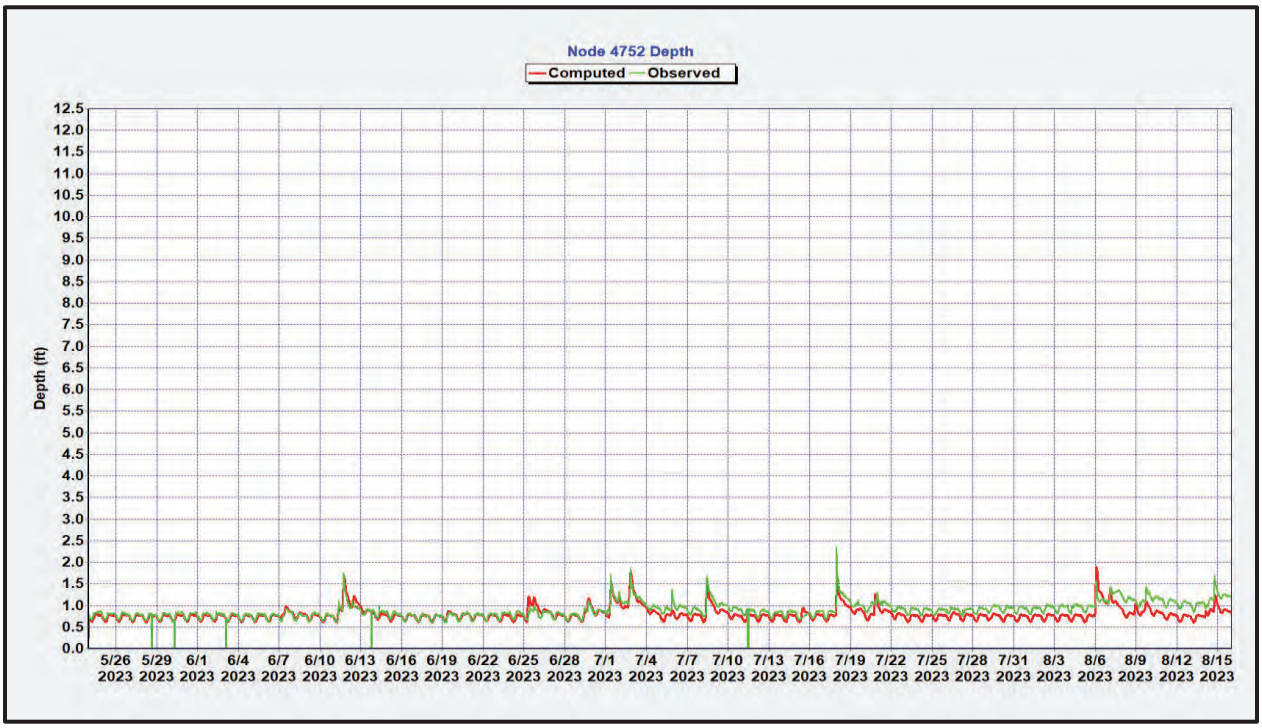
MH 8391 - 36-inch Influent: Depth (ft)



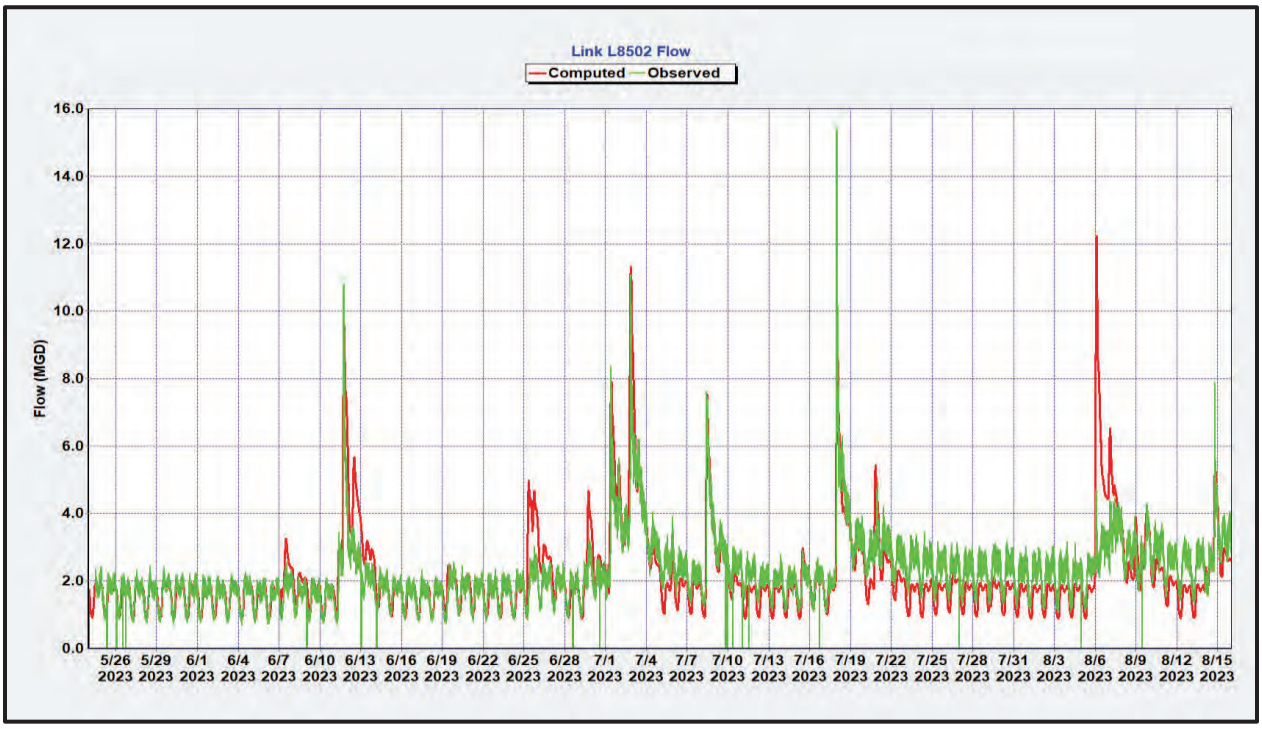
MH 4752 - 42-inch Influent: Flow (MGD)



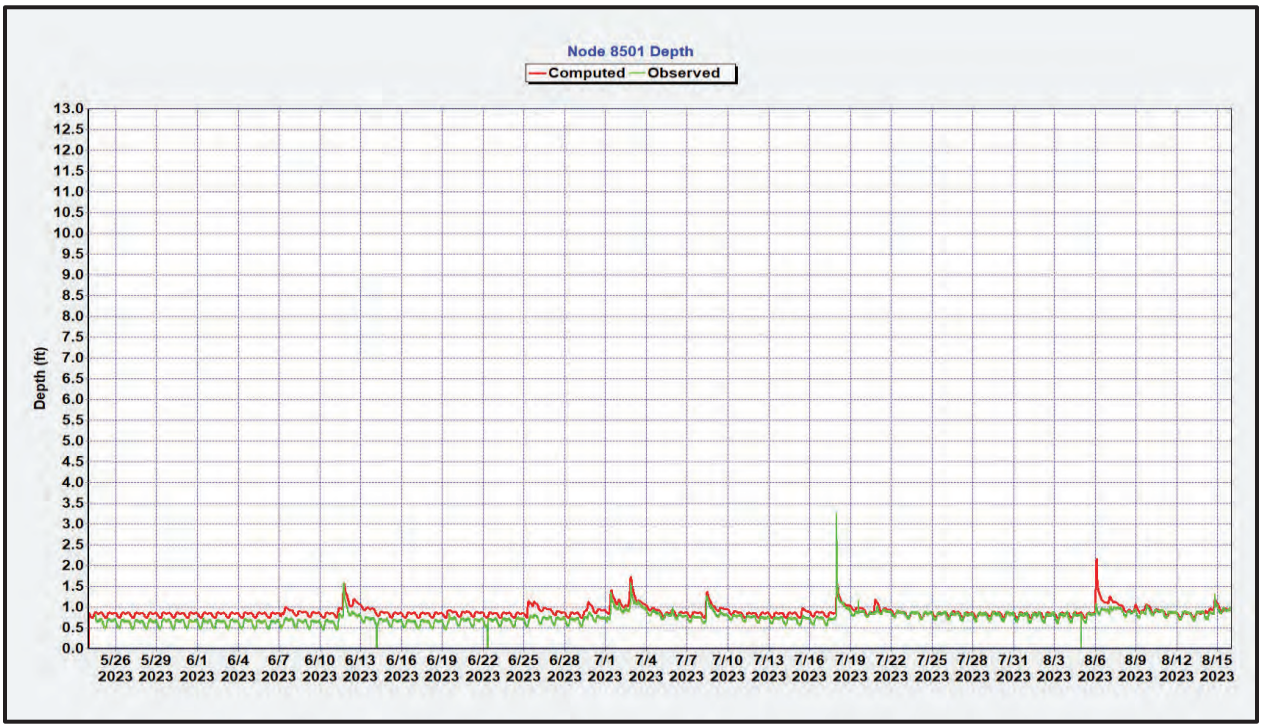
MH 4752 - 42-inch Influent: Depth (ft)



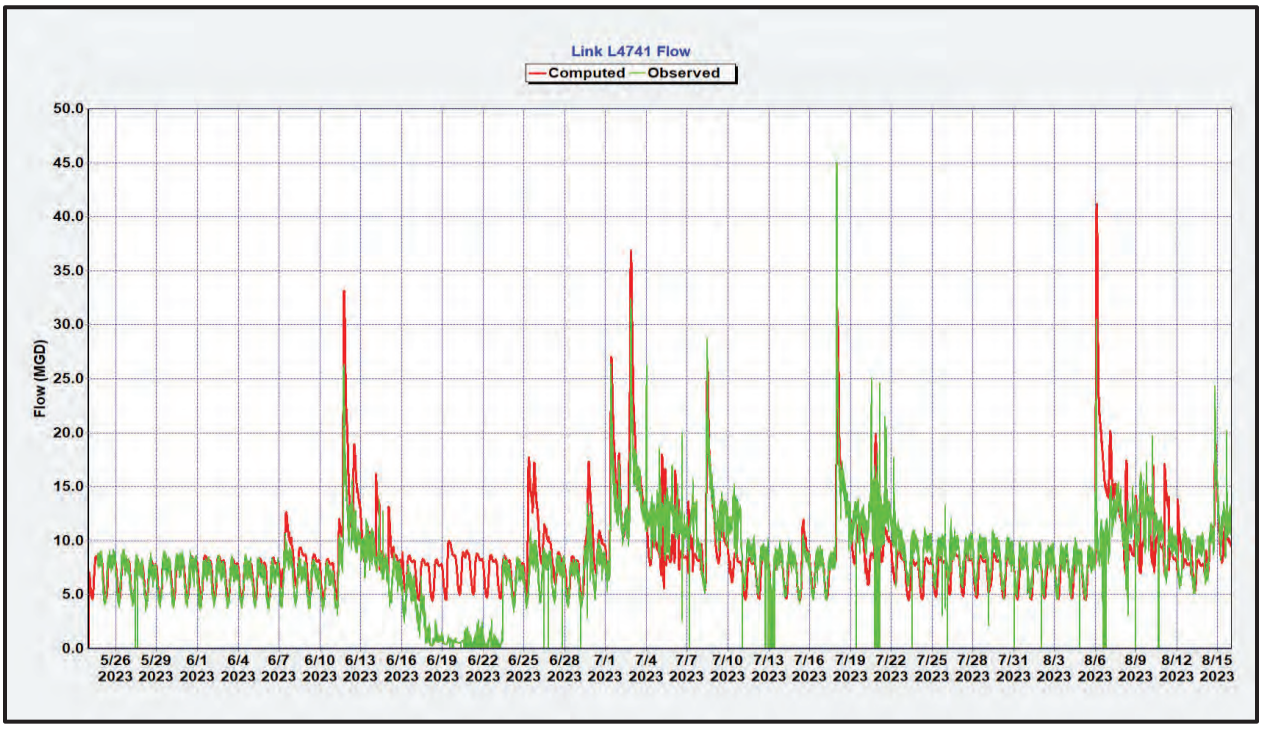
MH 8501 - 42-inch Influent: Flow (MGD)



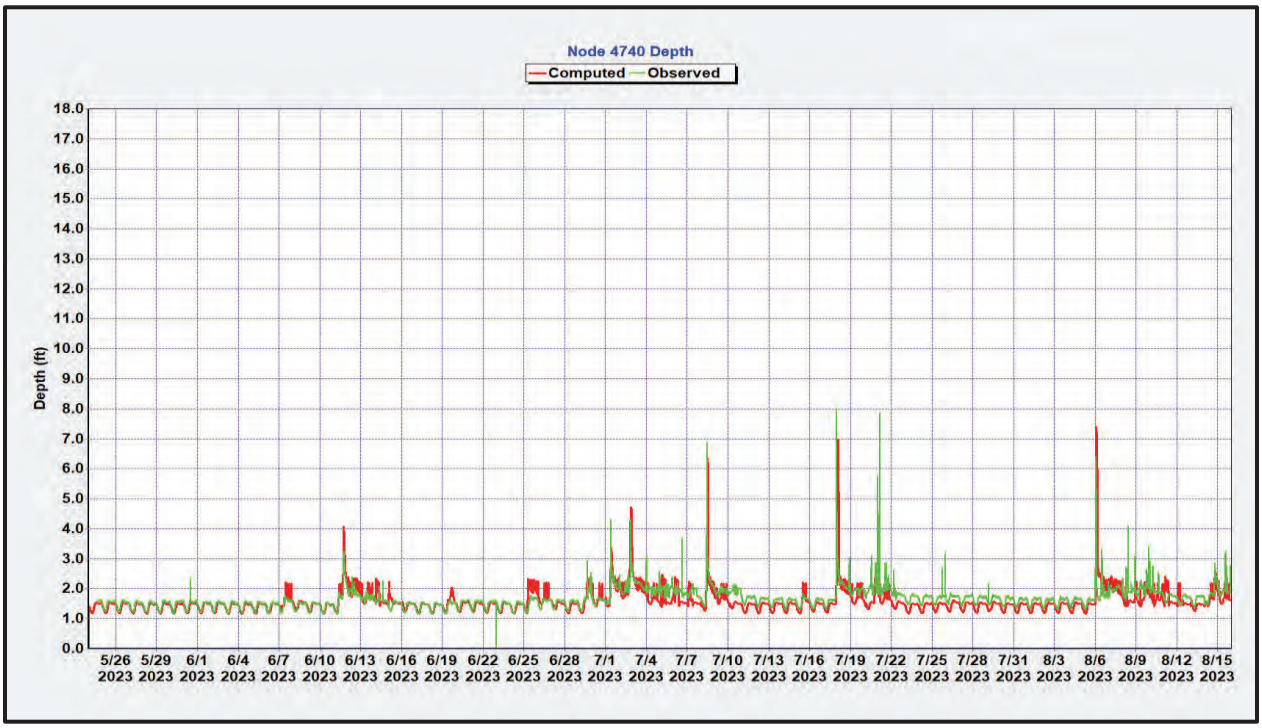
MH 8501 – 42-inch Influent: Depth (ft)



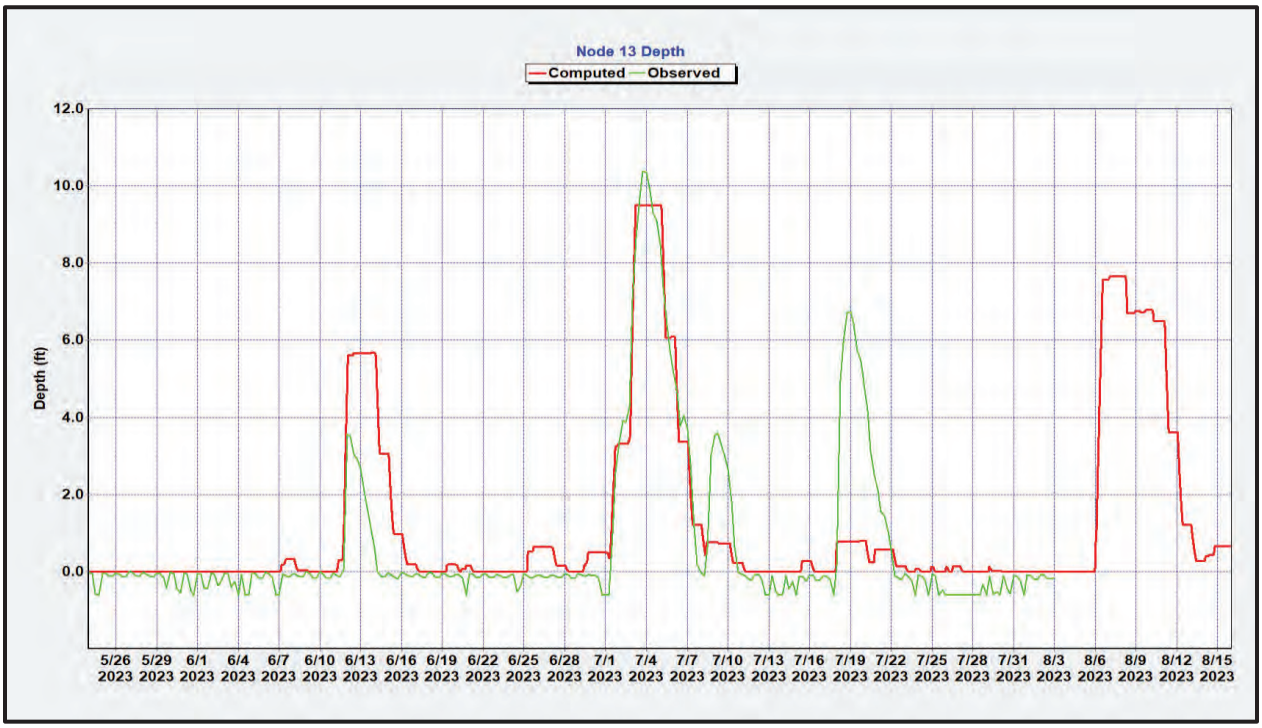
MH 4740 - 48-inch Influent: Flow (MGD)



MH 4740 - 48-inch Influent: Depth (ft)

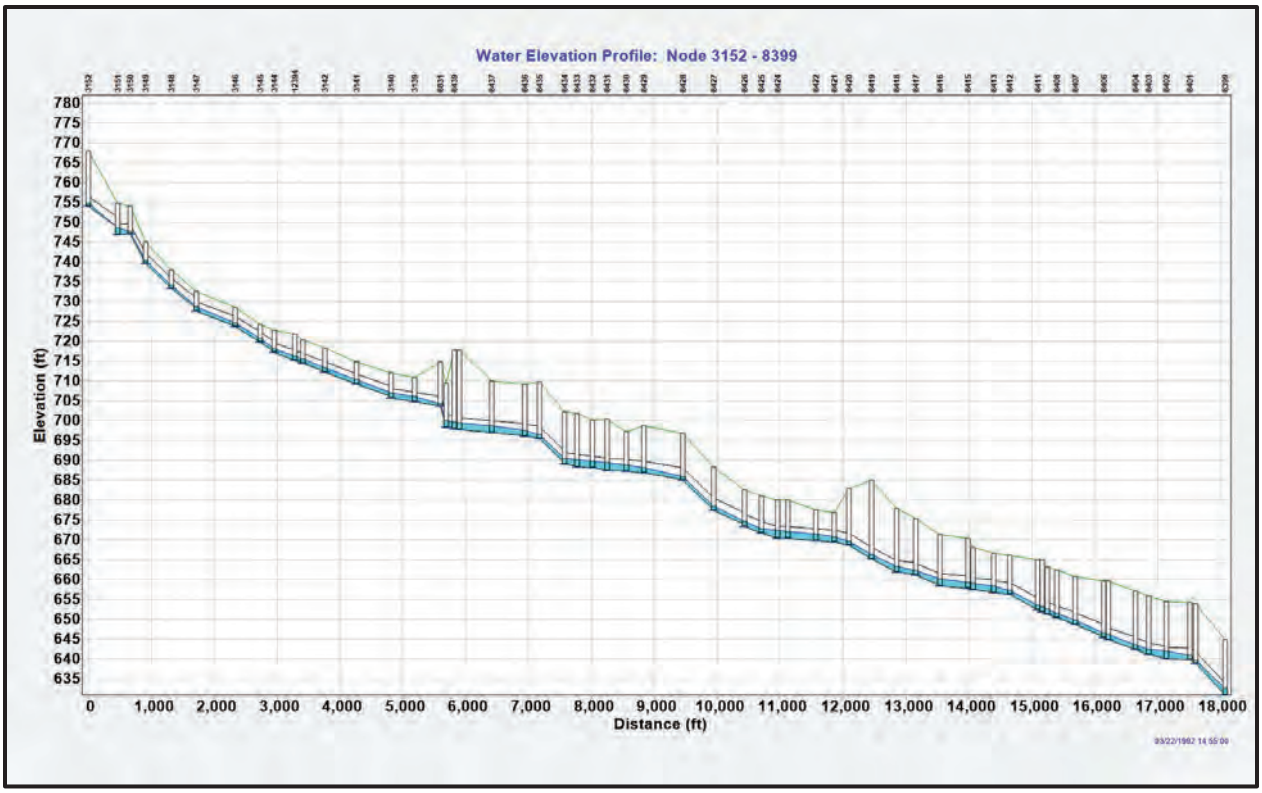


EQ Basin: Depth (ft)

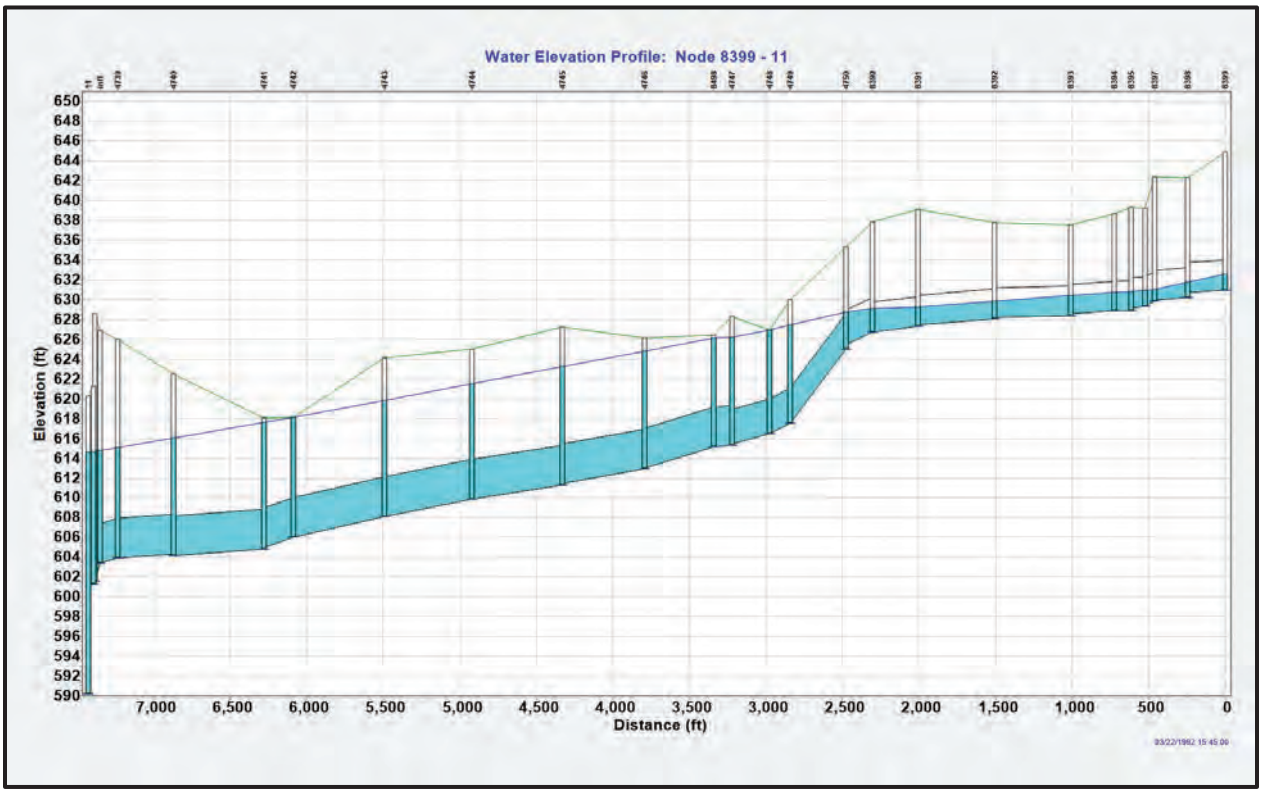


Attachment 4

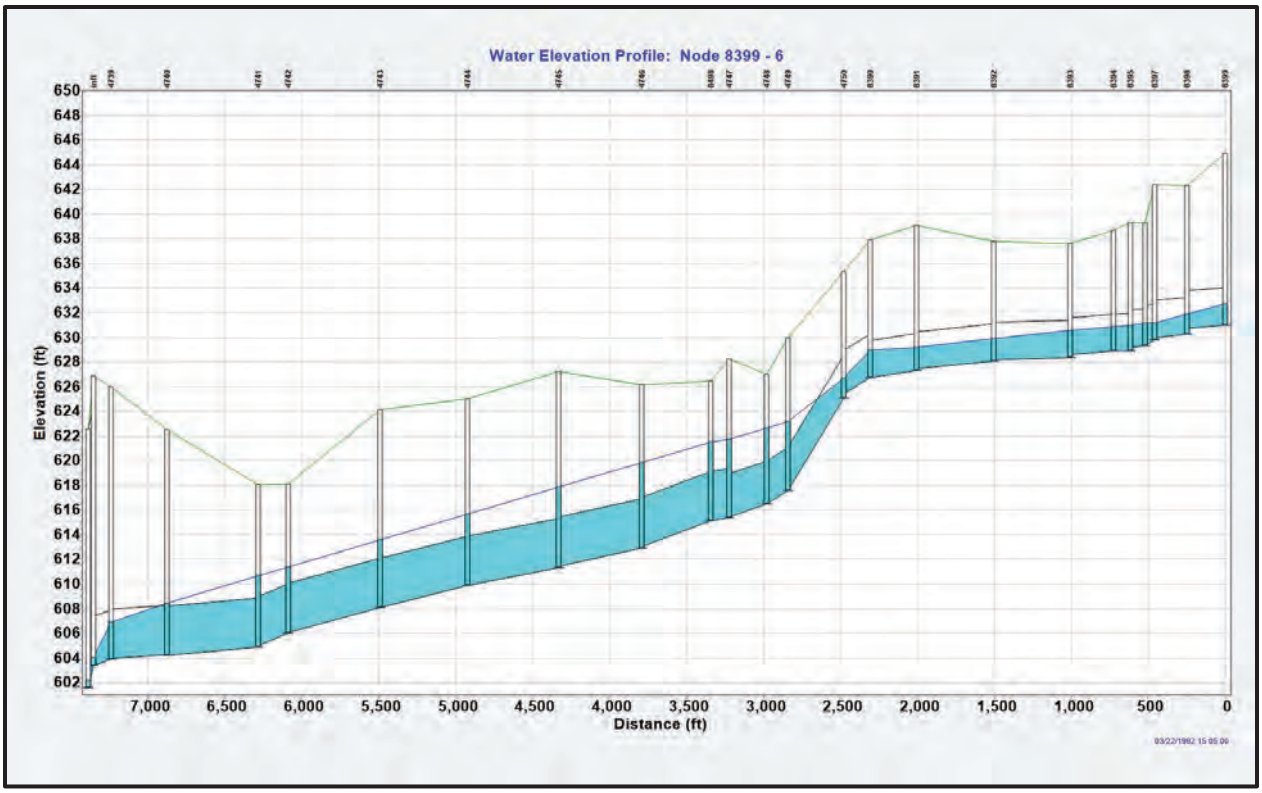
Peak Hydraulic Grade Lines



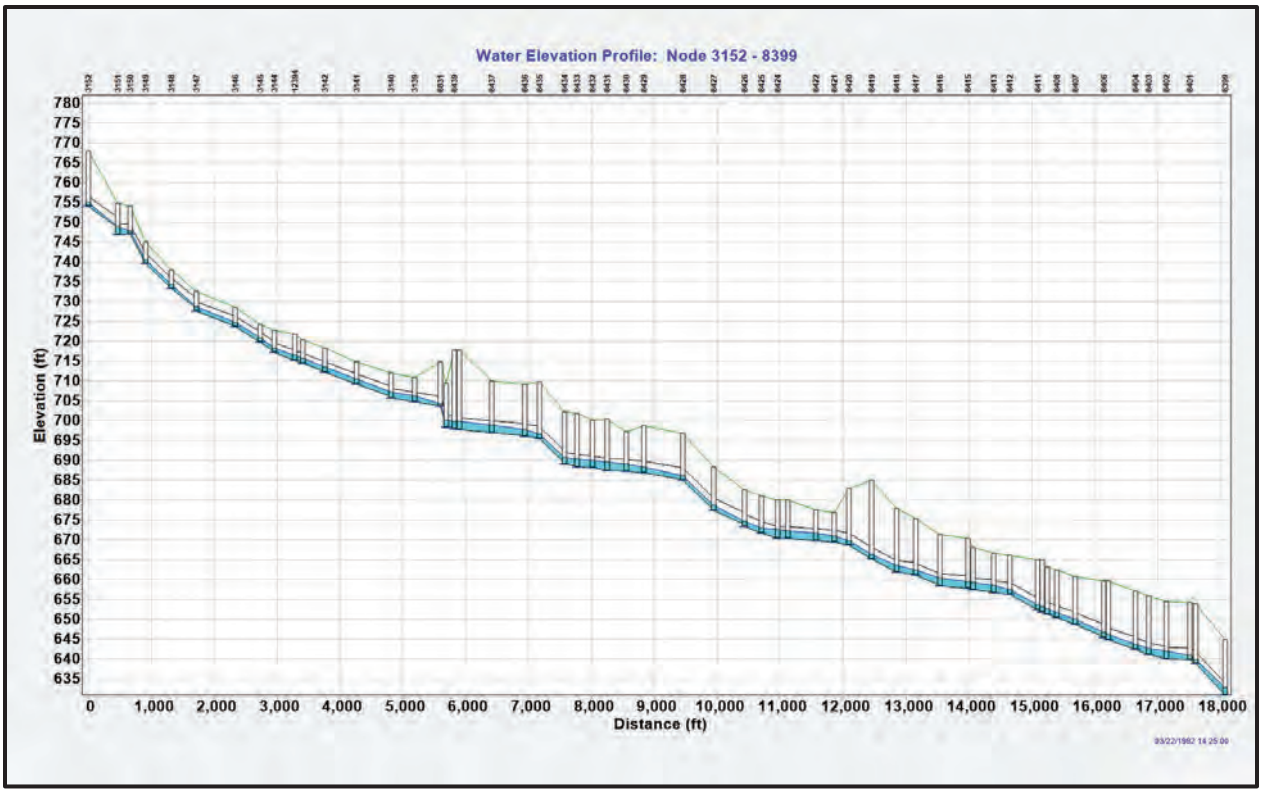
Upstream West Interceptor Hydraulic Grade Line 10-Year, 1-Hour Design Storm



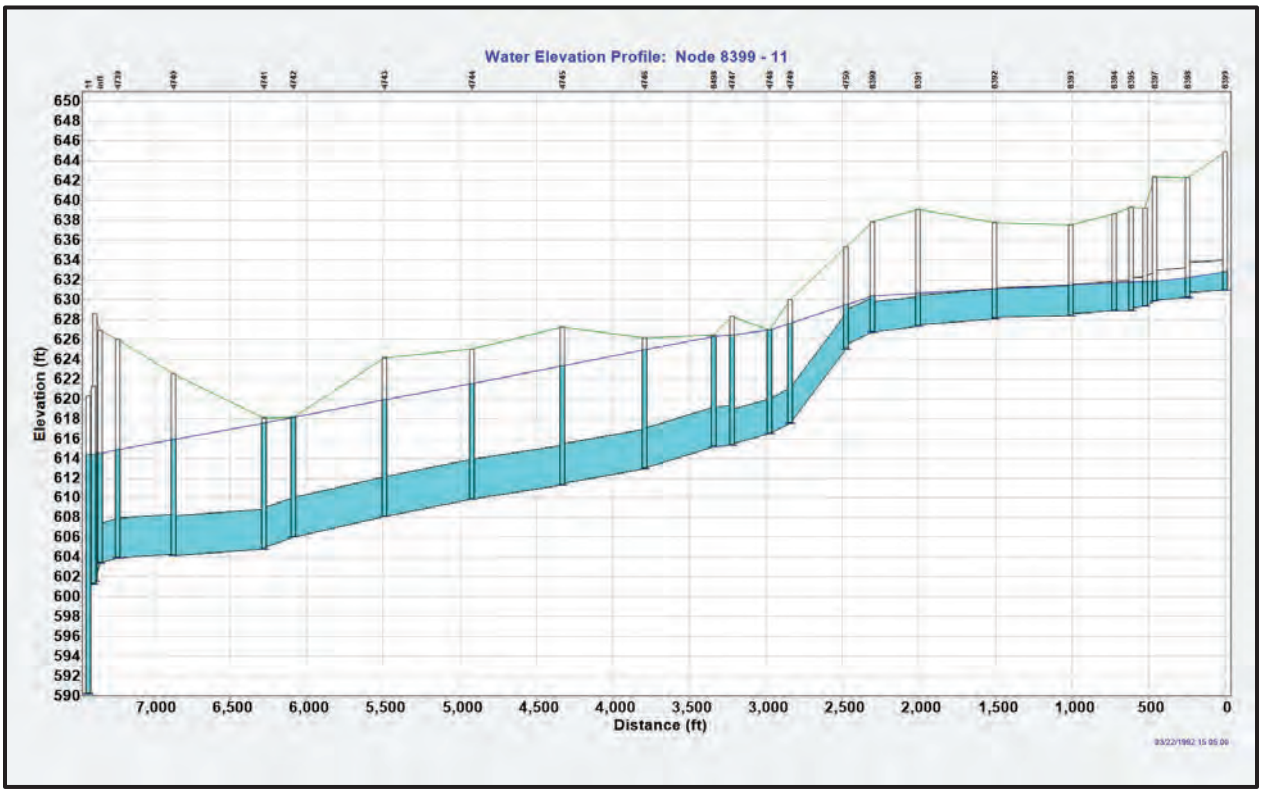
Downstream West Interceptor Hydraulic Grade Line 10-Year, 1-Hour Design Storm



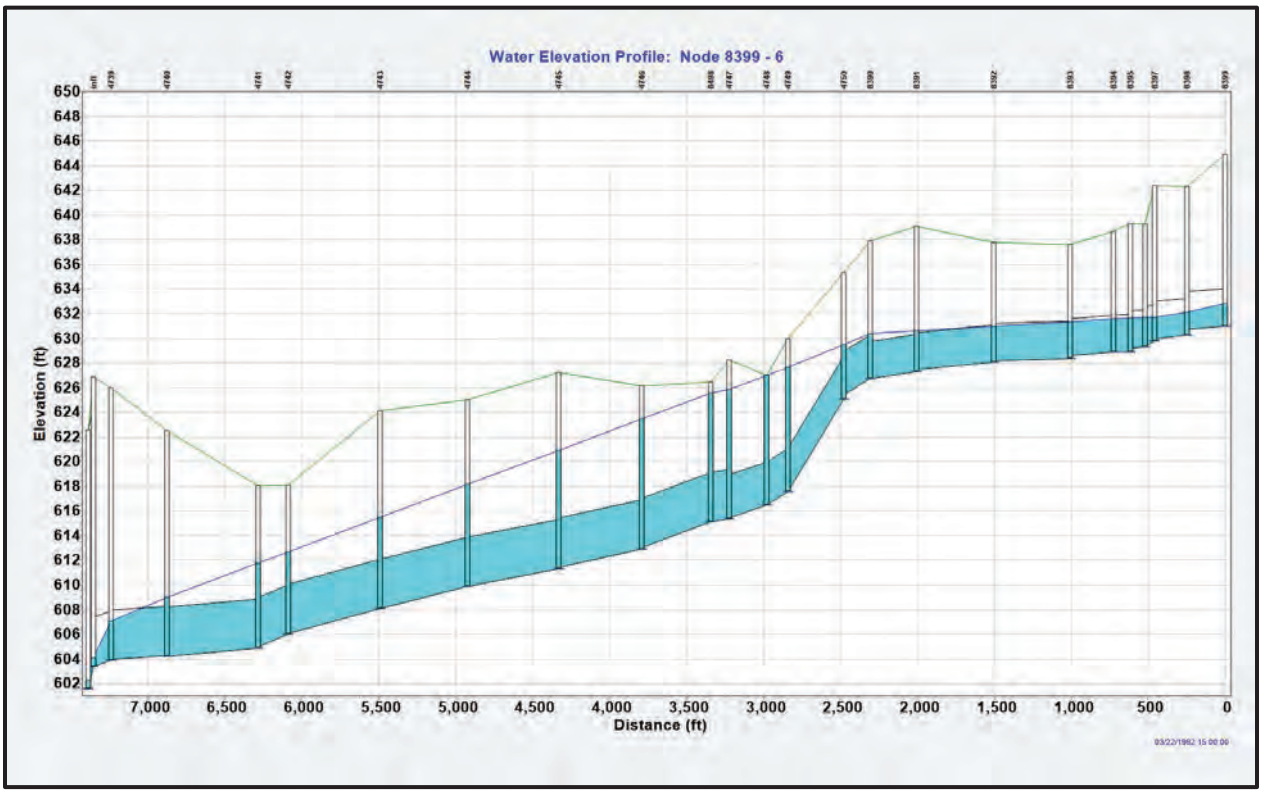
Downstream West Interceptor Hydraulic Grade Line 10-Year, 1-Hour Design Storm Without WWTP Capacity Limitations



Upstream West Interceptor Hydraulic Grade Line 25-Year, 1-Hour Design Storm



Downstream West Interceptor Hydraulic Grade Line 25-Year, 1-Hour Design Storm



Downstream West Interceptor Hydraulic Grade Line 25-Year, 1-Hour Design Storm Without WWTP Capacity Limitations

Attachment 5

Cost Estimate

ALTERNATIVE 1					
Item	**Description**	**QNTY**	**UNIT**	**UNIT COST ($)**	**TOTAL COST ($)**
1	MOBILIZATION/ DEMOBILIZATION (5%)	1	LS	2,076,000	2,076,000
2	CONTRACTOR CONSTRUCTION ENGINEERING (2%)	1	LS	814,000	814,000
3	MISC. UTILITY RELOCATION ALLOWANCE	1	LS	100,000	100,000
4	MAINTENANCE AND PROTECTION OF TRAFFIC	1	LS	100,000	100,000
5	TEMPORARY EROSION CONTROL	1	LS	100,000	100,000
6	BYPASS PUMPING	1	LS	100,000	100,000
7	36 MGD LIFT STATION	1	LS	34,434,200	34,434,200
8	36-INCH DIA. FORCE MAIN	3,050	LF	480	1,464,000
9	36-INCH DIA. FORCE MAIN - TRENCHLESS	400	LF	2,250	900,000
10	EQ BASIN DISCHARGE	1	LS	185,000	185,000
11	DIVERSION STRUCTURE WITH FLOW CONTROL	2	LS	222,000	444,000
12	42-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 8399 TO MH 8397)	460	LF	1,130	519,800
13	36-INCH DIA. GRAVITY SEWER	200	LF	1,000	200,000
14	30-INCH DIA. GRAVITY SEWER	600	LF	880	528,000
15	BEDROCK EXCAVATION	4,840	CY	250	1,210,000
16	36-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 3139 TO MH 8831)	415	LF	1,000	415,000
				CONSTRUCTION COST SUBTOTAL ($) =	**43,590,000**
				10% CONSTRUCTION CONTINGENCY (ROUNDED) =	**4,359,000**
				TOTAL CONSTRUCTION COST =	**47,949,000**
				25% NON-CONSTRUCTION COSTS (ROUNDED) =	**11,988,000**
				TOTAL COST =	**59,937,000**

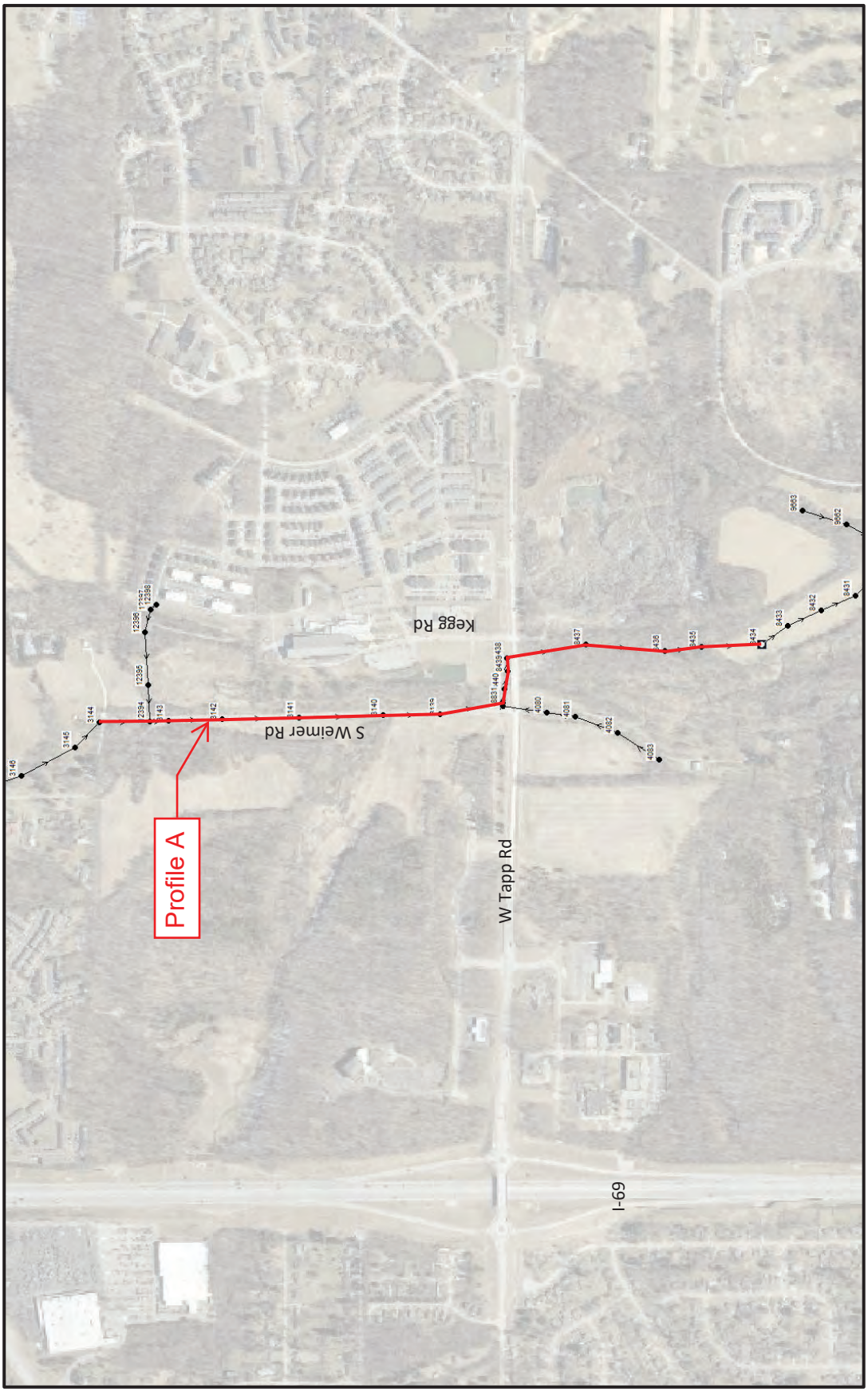
ALTERNATIVE 2					
Item	**Description**	**QNTY**	**UNIT**	**UNIT COST ($)**	**TOTAL COST ($)**
1	MOBILIZATION/ DEMOBILIZATION (5%)	1	LS	1,604,000	1,604,000
2	CONTRACTOR CONSTRUCTION ENGINEERING (2%)	1	LS	629,000	629,000
3	MISC. UTILITY RELOCATION ALLOWANCE	1	LS	100,000	100,000
4	MAINTENANCE AND PROTECTION OF TRAFFIC	1	LS	100,000	100,000
5	TEMPORARY EROSION CONTROL	1	LS	100,000	100,000
6	BYPASS PUMPING	1	LS	100,000	100,000
7	14 MGD LIFT STATION	1	LS	13,946,500	13,946,500
8	24-INCH DIA. FORCE MAIN	2,100	LF	370	777,000
9	EQ BASIN DISCHARGE	1	LS	185,000	185,000
10	CONNECTION FROM LIFT STATION	1	LS	500,000	500,000
11	54-INCH DIA. GRAVITY SEWER	1,400	LF	1,430	2,002,000
12	54-INCH DIA. GRAVITY SEWER - UNDER I-69	400	LF	8,080	3,232,000
13	48-INCH DIA. GRAVITY RELIEF SEWER	2,250	LF	1,280	2,880,000
14	42-INCH DIA. GRAVITY RELIEF SEWER	970	LF	1,130	1,096,100
15	30-INCH DIA. GRAVITY RELIEF SEWER	1,830	LF	880	1,610,400
16	DIVERSION STRUCTURE	3	LS	185,000	555,000
17	BEDROCK EXCAVATION	15,400	CY	250	3,850,000
18	36-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 3139 TO MH 8831)	415	LF	1,000	415,000
				CONSTRUCTION COST SUBTOTAL ($) =	**33,682,000**
				10% CONSTRUCTION CONTINGENCY (ROUNDED) =	**3,369,000**
				TOTAL CONSTRUCTION COST =	**37,051,000**
				25% NON-CONSTRUCTION COSTS (ROUNDED) =	**9,263,000**
				TOTAL COST =	**46,314,000**

ALTERNATIVE 3					
Item	**Description**	**QNTY**	**UNIT**	**UNIT COST ($)**	**TOTAL COST ($)**
1	MOBILIZATION/ DEMOBILIZATION (5%)	1	LS	1,563,000	1,563,000
2	CONTRACTOR CONSTRUCTION ENGINEERING (2%)	1	LS	613,000	613,000
3	MISC. UTILITY RELOCATION ALLOWANCE	1	LS	100,000	100,000
4	MAINTENANCE AND PROTECTION OF TRAFFIC	1	LS	100,000	100,000
5	TEMPORARY EROSION CONTROL	1	LS	100,000	100,000
6	BYPASS PUMPING	1	LS	500,000	500,000
7	14 MGD LIFT STATION	1	LS	13,946,500	13,946,500
8	24-INCH DIAMETER FORCE MAIN	2,100	LF	370	777,000
9	EQ BASIN DISCHARGE	1	LS	185,000	185,000
10	CONNECTION FROM LIFT STATION	1	LS	500,000	500,000
11	54-INCH DIAMETER GRAVITY RELIEF SEWER	1,400	LF	1,430	2,002,000
12	54-INCH DIAMETER GRAVITY RELIEF SEWER - UNDER I-69	400	LF	8,080	3,232,000
13	48-INCH DIAMETER GRAVITY RELIEF SEWER	2,250	LF	1,280	2,880,000
14	48-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 8390 TO MH 4747)	920	LF	1,280	1,177,600
15	42-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 8396 TO MH 8390)	1,790	LF	1,130	2,022,700
16	DIVERSION STRUCTURE	1	LS	185,000	185,000
17	BEDROCK EXCAVATION	9,865	CY	250	2,466,200
18	LATERAL CONNECTIONS	2	EA	25,000	50,000
19	36-INCH DIA. GRAVITY SEWER REPLACEMENT (MH 3139 TO MH 8831)	415	LF	1,000	415,000
				CONSTRUCTION COST SUBTOTAL ($) =	**32,815,000**
				10% CONSTRUCTION CONTINGENCY (ROUNDED) =	**3,282,000**
				TOTAL CONSTRUCTION COST =	**36,097,000**
				25% NON-CONSTRUCTION COSTS (ROUNDED) =	**9,025,000**
				TOTAL COST =	**45,122,000**

Attachment 6

Alternatives Hydraulic Grade Lines

Upstream Solution for Alternatives 1, 2, and 3



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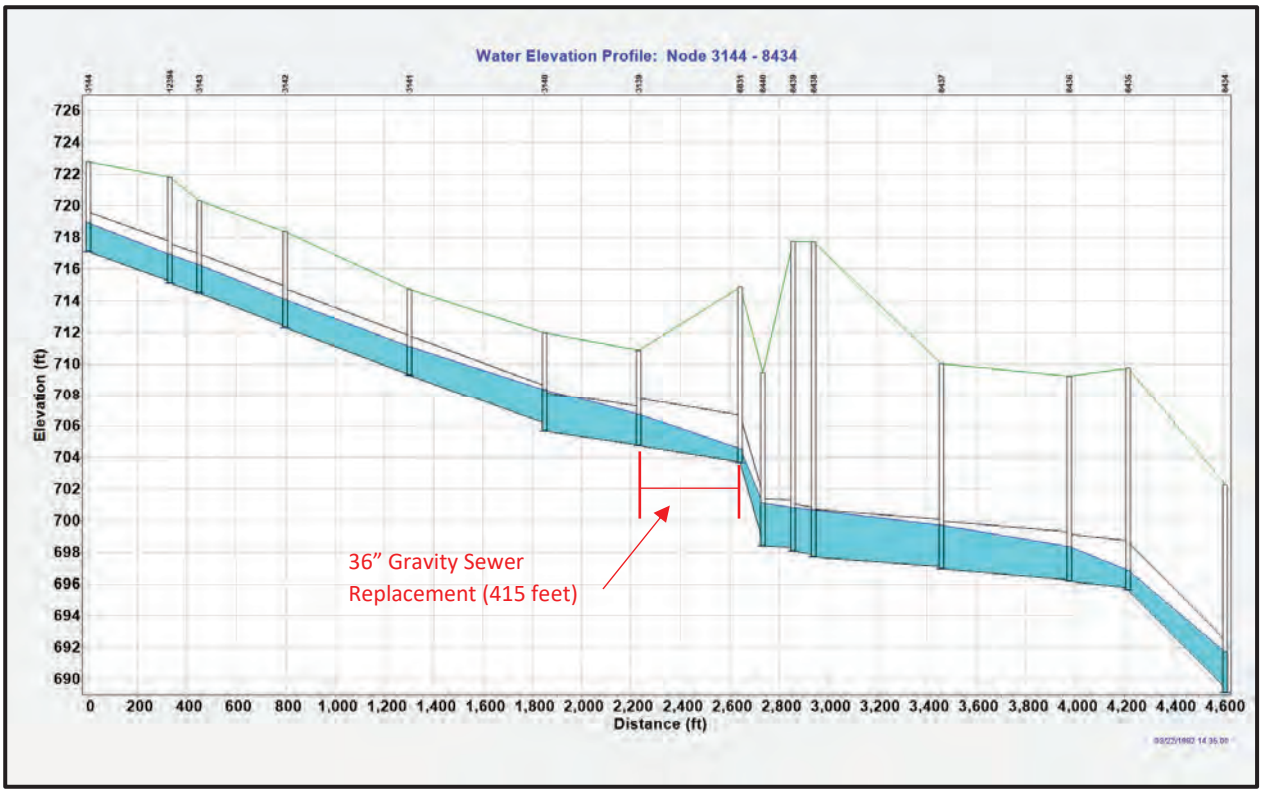
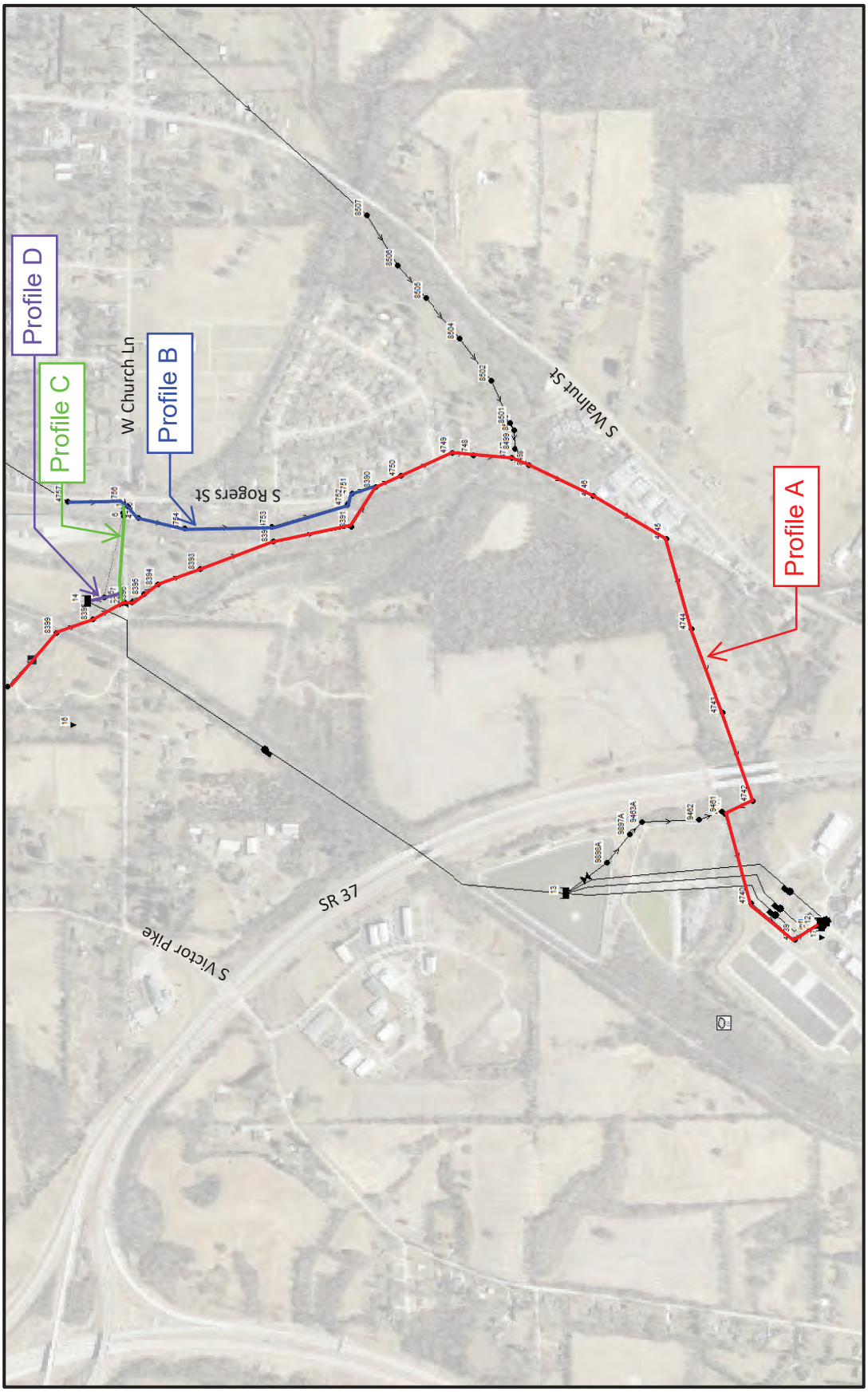


Profile A Hydraulic Grade Line 50-Year, 1-Hour Design Storm

Alternative 1



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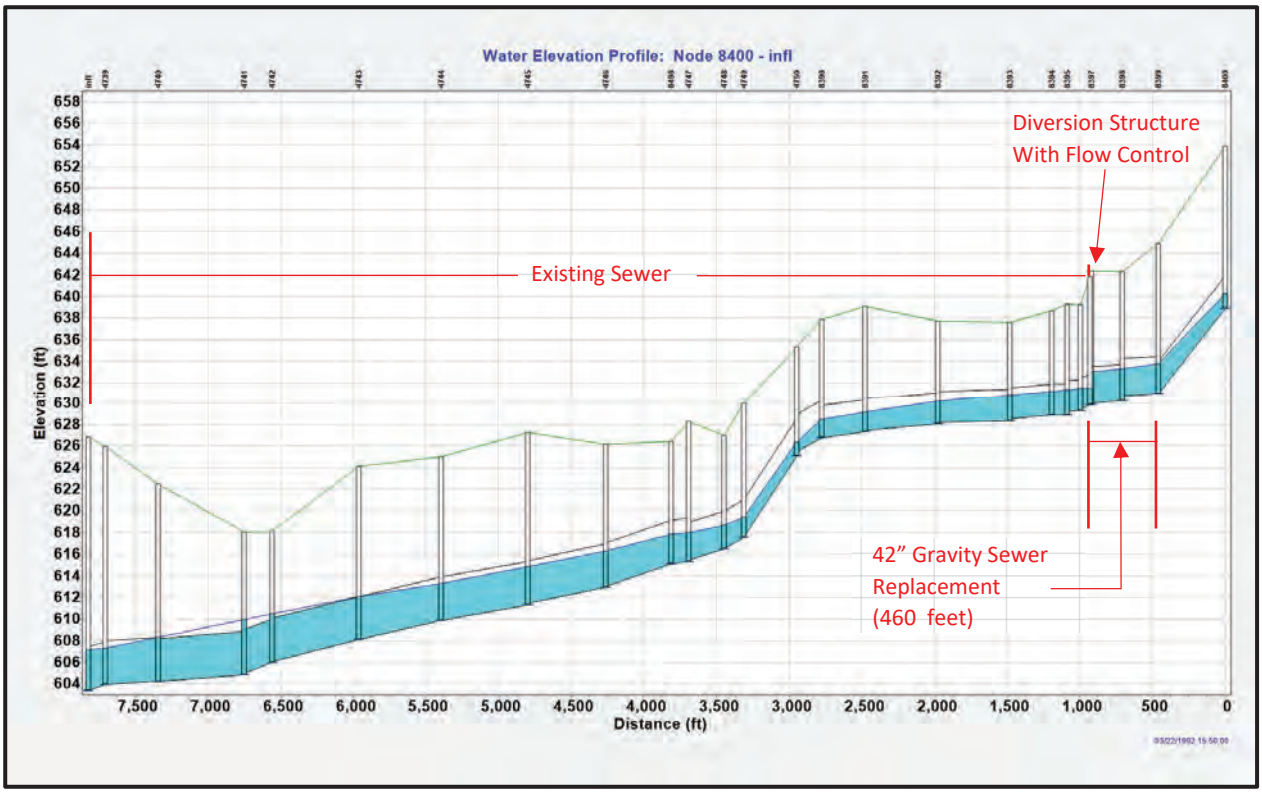
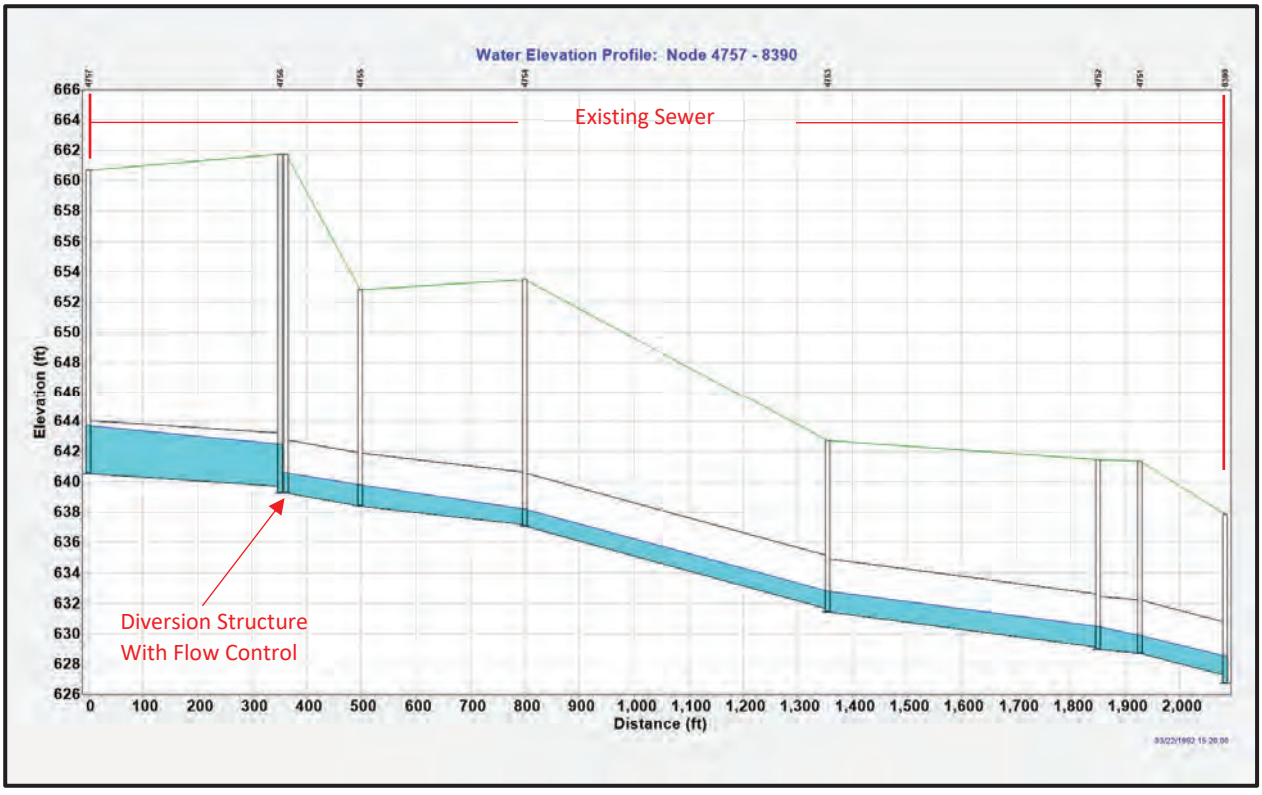
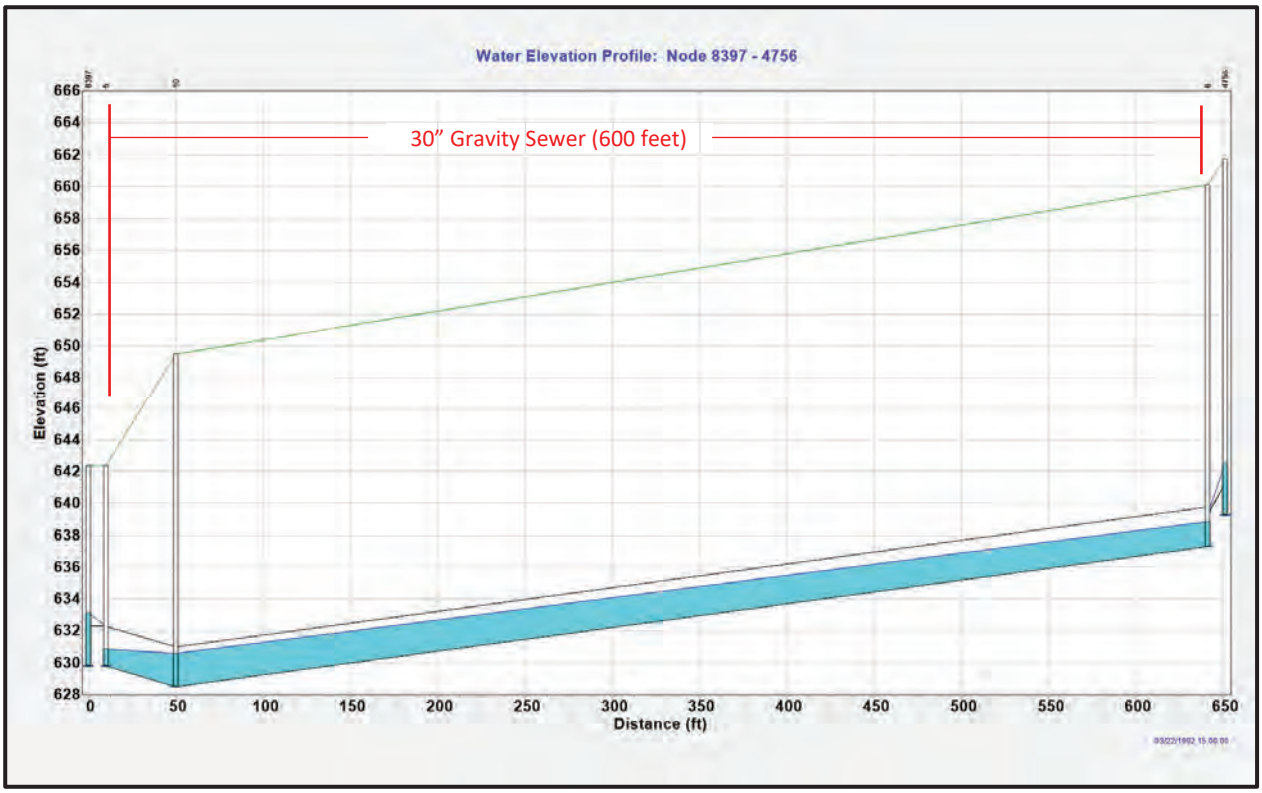


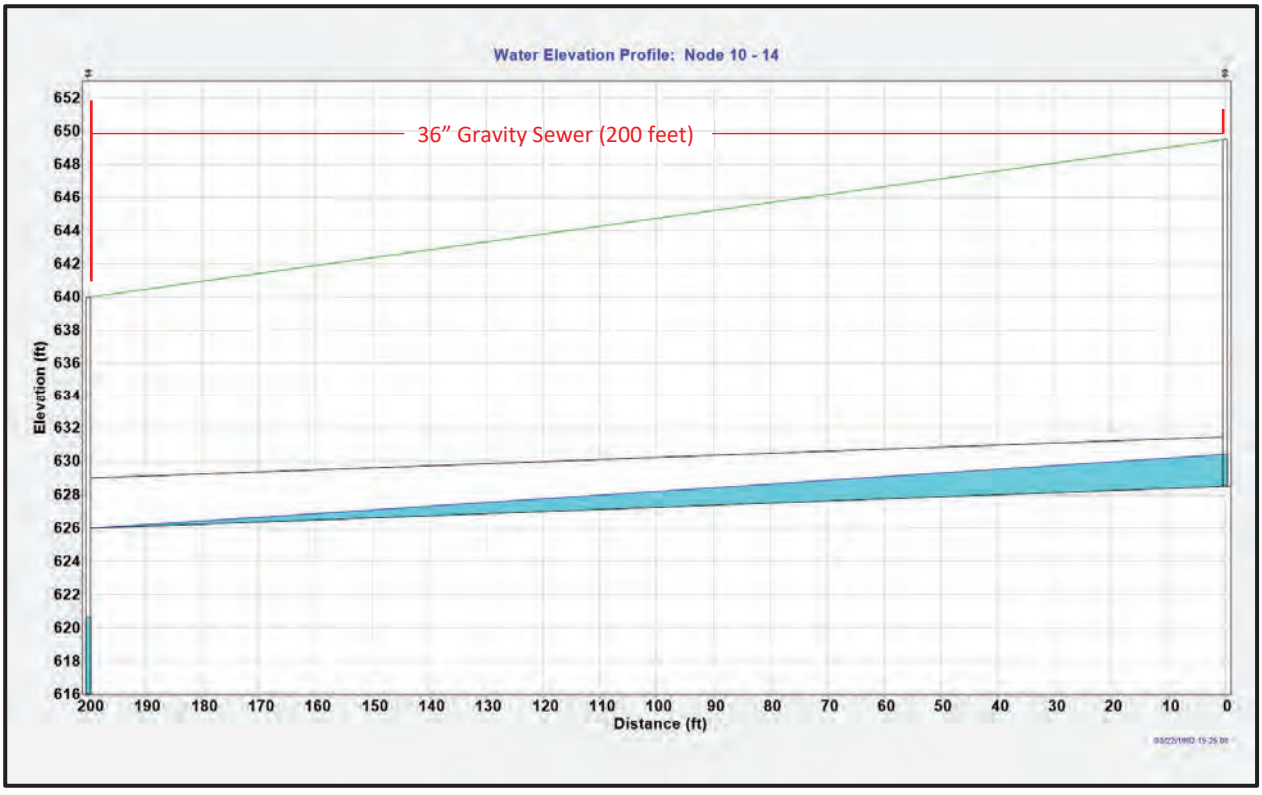
Profile A Hydraulic Grade Line 50-Year, 1-Hour Design Storm



Profile B Hydraulic Grade Line 50-Year, 1-Hour Design Storm



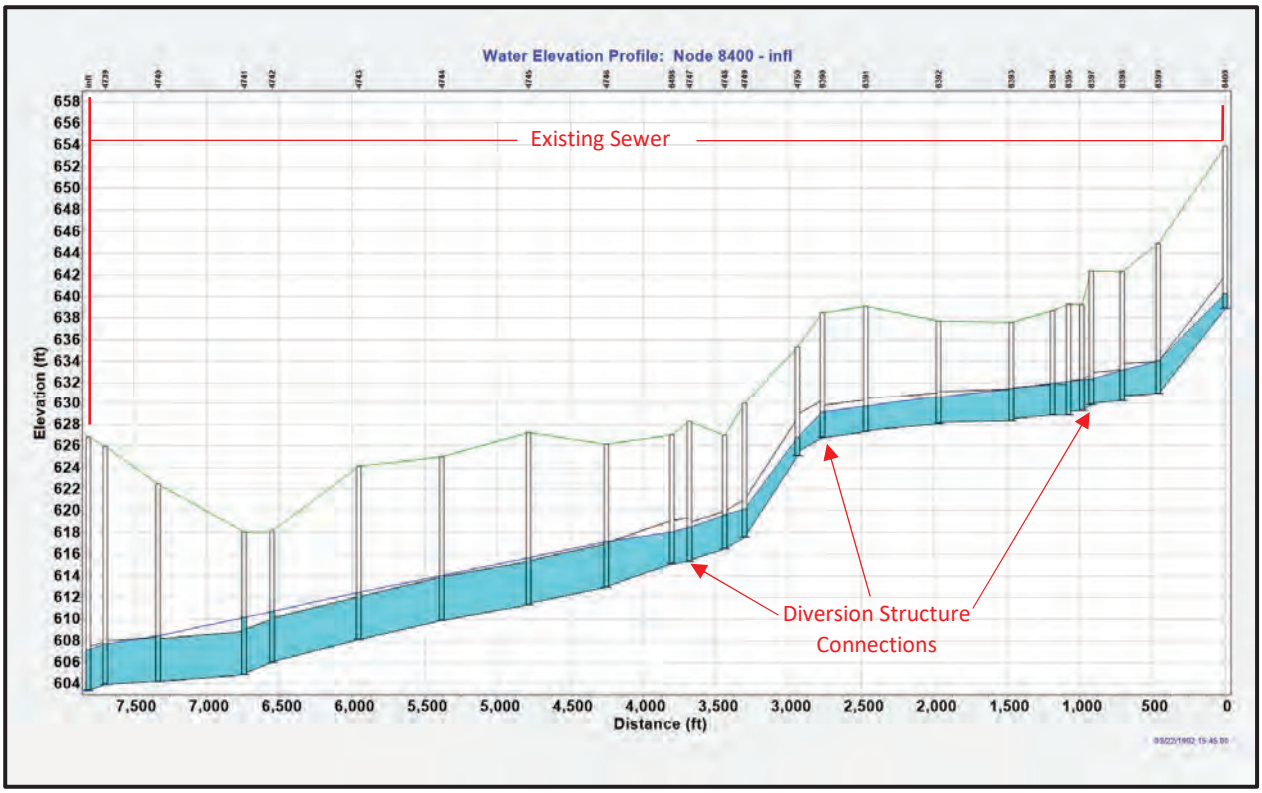
Profile C Hydraulic Grade Line 50-Year, 1-Hour Design Storm



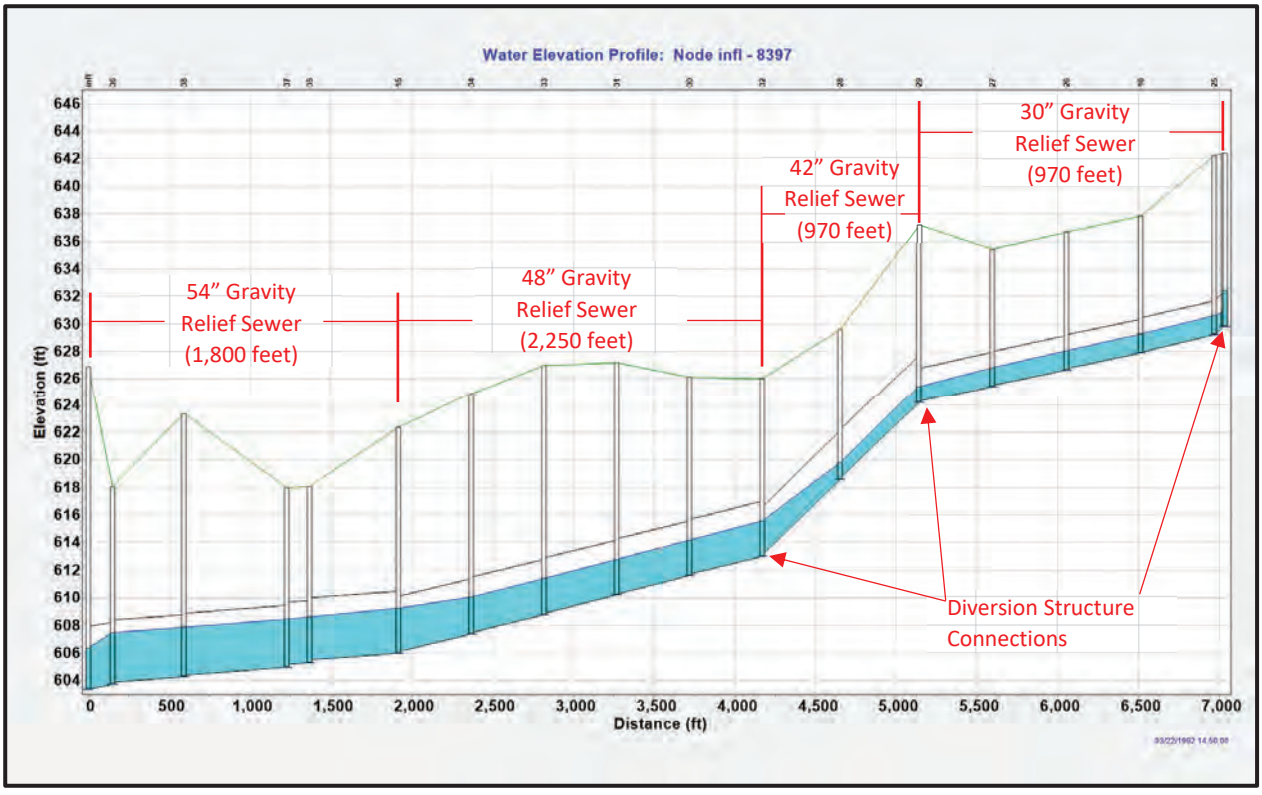
Profile D Hydraulic Grade Line 50-Year, 1-Hour Design Storm

Alternative 2

Profiles Shown



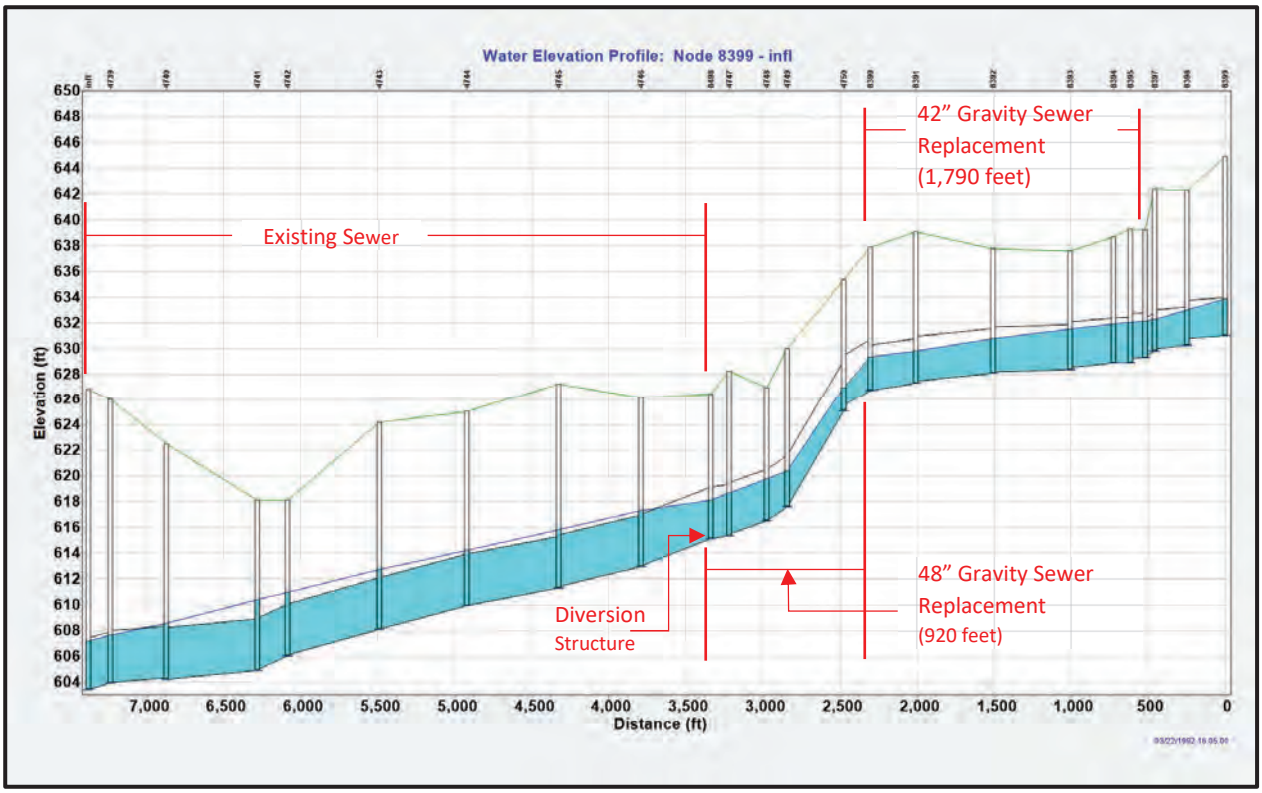
Profile A Hydraulic Grade Line 50-Year, 1-Hour Design Storm



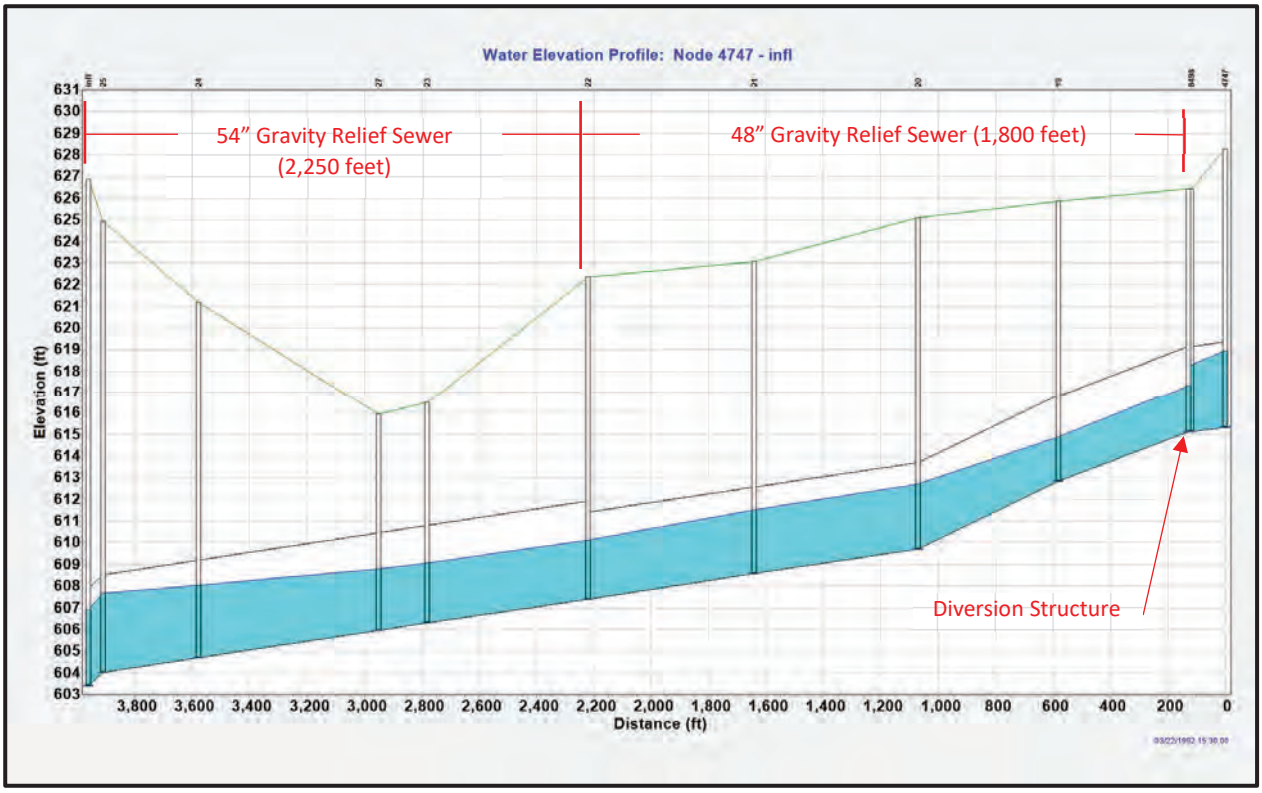
Profile B Hydraulic Grade Line 50-Year, 1-Hour Design Storm

Alternative 3

Profiles Shown



Profile A Hydraulic Grade Line 50-Year, 1-Hour Design Storm



Profile B Hydraulic Grade Line 50-Year, 1-Hour Design Storm

Stantec

Memo

To:	Phil Peden, PE	From:	Jared Ward
	City of Bloomington Utilities Department		Project Manager/ Stantec
Project/File:	Summit District PUD/193806201	Date:	January 25, 2024

Reference: RE: Sanitary Sewer and Water Capacity Analysis

This memo is to provide confirmation of the Summit District Development Teams understanding of the ability for the proposed PUD development to be served for both sanitary sewer and water.

Sanitary Sewer

The Dillman WWTP West Interceptor – Summit District Impact memo dated 9/5/2023 prepared by Commonwealth Engineers identified existing system capacity issues, overall impacts of planned development in the sewer shed and the impact of the Summit District PUD. The development team, the City and CBU are currently incorporating these findings, contributions and related improvement schedules into the development agreement.

Since the issuance of the above referenced memo, the development team has been working with CBU and subsequently Commonwealth Engineers to analyze refinements to the overall unit count and planned connection points for the development. The following design adjustments were analyzed:

- Development discharge points:
    - The updated design proposes two connection points for the development vs the single previous connection:
        - Phase 1 (Shasta Meadows) connection point will be at MH 7600 with a proposed Peak Daily Flow Rate of 0.682 MGD. The updated modeling by Commonwealth as noted in email on 1/10/2024 will meet the capacity at the connection point, and the downstream 20-inch segment with no SSO's.
        - Phases 2-5 connection point will be at MH 3147, or further downstream along the 30-inch segment with a proposed Peak Daily Flow of 4.588 MGD. The update will not create additional SSOs in the existing system, but will increase SSO volume at the existing locations identified in Section 4 of the report.
- Reduction in overall development flows
    - The updated development design reduces the overall unit count from 4,966 down to 4,250. With this adjustment, the updated Peak Daily Flow Rate of 5.27 MGD was modeled. This flow contribution still resulted in SSO's as identified in Section 4 of the report.

It is the development team's understanding that these modifications and required improvements are being incorporated into CBU's improvement assumptions. It is also our understanding that the planned delivery

dates in the PUD Submittal Package align with CBU's schedule for the necessary infrastructure improvements related to the sanitary sewer system. Summit District Development Team anticipates an MOU with CBU that specifies the timing and participation necessary with each final plan approved by the City Planning Department.

Water Supply

The Summit District Development team understands the need to provide modeling of the proposed water system to accommodate adequate fire flow within the development. While preliminary review of existing flows and pressures at the development connection points provided by CBU indicate there will be sufficient flows to accommodate the full development, we will be creating a model to verify both proposed phasing and full buildout are compliant with the fire flow requirements.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Jared Ward
Senior Principal, Engineering Design Services Manager
Phone: 763-479-5126
Mobile: 612-503-0797
jared.ward@stantec.com

Reference: RE: Sanitary Sewer and Water Capacity Analysis

From: Ted and Kathy Frick
1812 S. Weimer Rd.
Bloomington, IN 47403
Date: March 14, 2024
To: Bloomington Plan Commission
Re: Proposed Summit District PUD-18-23 along South Weimer Road

We have lived at our residence at 1812 S. Weimer Rd. since 1977. In our Sept. 6, 2023, letter to the Plan Commission, we mainly focused on storm water run-off and flooding concerns, and less so on transportation issues. Now we focus on transportation issues. We are very familiar with current traffic patterns in our area. For us, there are 2 ways we can go by automobile to destinations beyond Weimer Rd. We can go north to the Bloomfield Rd. or south to Tapp Rd. **The Weimer Rd. corridor currently has *no through connections* to the east or to the west on public right of ways, as indicated in Figure 1 below.** The Summit District PUD would create a new eastbound connection of Sudbury Dr. to Adams St. However, any new connections on the west side of Weimer Rd. are blocked by Interstate 69.

Summit District PUD Transportation Issues

The Summit District PUD is likely to create increased traffic congestion at 3 main choke points for outbound automobile traffic, especially during rush hours:

1. Weimer Rd. stop sign at Bloomfield Rd. Bloomfield Rd. traffic does not stop.
2. Weimer Rd. stop sign at Tapp Rd. Tapp Rd. traffic does not stop.
3. Adams St. at Allen St. Currently a 4-way stop.

See red circles 1, 2, and 3 in Fig. 1 below. The proposed Summit District PUD-18-23 would heavily impact traffic on Weimer Rd, as explained below, especially if many of the new people in the Summit District try to exit to the west via Sudbury Dr. and turn onto Weimer Rd. to get to Tapp Rd. or to W. 2nd St. (Bloomfield Rd.). The intersection of S. Adams St. and Tapp Rd. is now a roundabout, and unlikely to be a choke point (green circle 4 in Fig. 1).

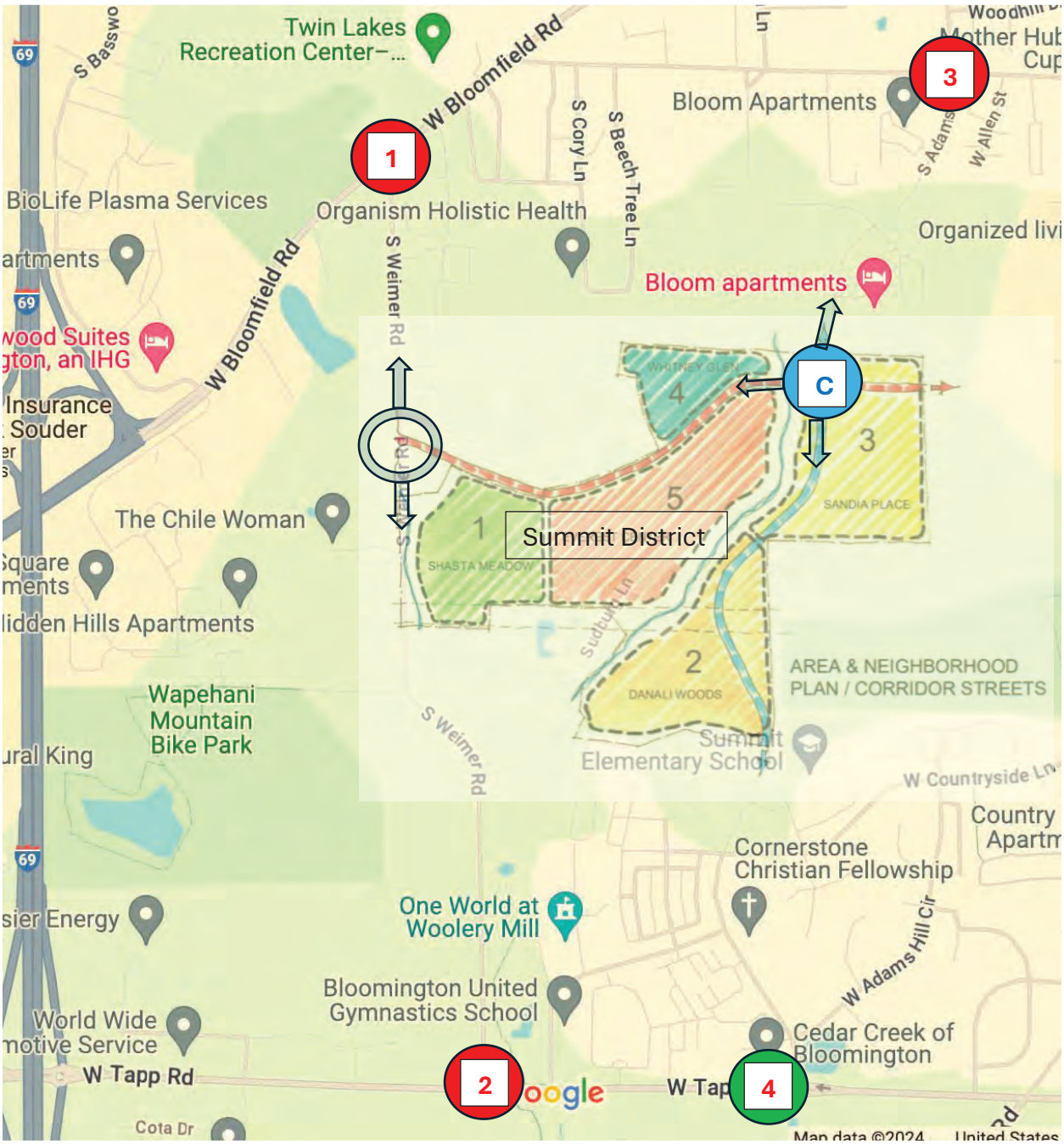
The total number of units was specified to be approximately 6,000 in the Summit PUD petition in July. At the Sept. 11 meeting of the Bloomington Plan Commission, the proposed number of units was less, possibly between 4,000 and 5,000. A further estimate has finally been provided *publicly* on March 13, less than a week before the next PC meeting on March 19, 2024. This latest estimate is 4,250 units total in the proposed Summit District PUD. When people are leaving for work, imagine the backed-up traffic at these choke points between 7 and 9 a.m. on weekdays! Likewise from 4 to 6 p.m. after work.

To put this in perspective, compare the city of Martinsville with the Summit PUD. Martinsville's population was 11,932 located on 5,862 acres, according to the 2020 U.S. Census. The Summit District PUD petition currently proposes 4,250 units, and assuming 2 adults per unit, this would be a population of about 8,500 adults in the 138.5-acre Summit District.

The main difference is their densities. Martinsville has 2 persons per acre, whereas Summit District would have 61 persons per acre. The density of Summit District is 61/2 = 30.7 times as

great as the city of Martinsville. While these are ballpark estimates, they do put things into perspective, as Table 1 shows. And this will impact traffic congestion, because currently there are only 4 main ways to get in or out of the Summit PUD area to nearby main arterials (Tapp Rd. and Bloomfield Rd.). Note that S. Adams intersects with W. 2nd St where there is currently a stoplight, which is north of the Adams and Allen St. intersection at circle 3.

Figure 1. Summit District PUD nearby streets. Red circles are anticipated choke points.



A 5th possible way was proposed in the Summit PUD by connecting Adams St. through privately owned land to Weimer Rd. at Wapehani Rd. While this would help decrease traffic congestion

within the Summit PUD, it does not alleviate the current choke points at the ends of Weimer Rd. See Table 1 below and Fig. 1 above.

Table 1. Comparing Martinsville to the proposed Summit PUD

	Martinsville (2020 Census)	**Summit PUD (March 13, 2024)**
Acres of land	~ 5,862	~ 138.5
Square miles of land	9.16	0.216
Population	11,932	~ 8,500 (4,250 units x 2 adults per unit)
Density of people per acre	11,932/5,862 = **2**	8,500/138.5 = **61**
How to get in or out: Main routes to arterials	??? but the routes are highly flexible to get to arterials	4 routes from the central point (blue circle): intersection at Adams St. and Sudbury Dr.***
Persons per main route to arterial	???	8,500/4 = 2,125 people on each of 4 main routes (average). During a 2-hour period, 2,125/120 min. = 18 people per minute at each circle in Fig. 1.

***Summit District PUD main routes from central point (blue circle) at intersection of Adams St. and Sudbury Drive to Tapp Rd. and Bloomfield Rd. arterials (all 2-lane roads or streets). While not everyone will be traveling at the same time, nor will they divide themselves equally among the 4 routes, the averages nonetheless provide a general idea of the potential congestion at the 4 circled intersections.

Other factors

Weimer Rd. is a 2-lane road. There is a one-lane bridge on the south part of Weimer, and a sharp S-curve in the middle portion. Adams St. is also a 2-lane road. **Thus far, no eastbound through connection from Summit District to S. Rogers St. or to Rockport Rd. has been specified in the PUD.**

Bottom line

The current infrastructure of roads and streets surrounding the proposed Summit District PUD will be inadequate to handle significantly increased automobile traffic. We anticipate significant congestion at the 3 choke points (red circles in Fig. 1).

Suggestions for decreasing congestion at choke points

1. Build a roundabout or add a stoplight at each end of Weimer Rd. Widen narrow bridge on south end of Weimer Rd. *or* build new section of S. Weimer Rd. from Wapehani Rd. to Tapp Rd., so as to avoid the current S-curve and narrow bridge. The closed portion of southern old Weimer could then become an extension of the Clear Creek Trail.
2. Make Sudbury Dr. a through route from Weimer Rd. to S. Rogers St. with a stoplight or a roundabout at Sudbury and Rogers.
3. Change intersection of S. Adams St. and Allen St. to a two-way stop on Allen, with Adams not stopping; or build a roundabout at the intersection.
4. Decrease overall density of the Summit District PUD by a significant amount, so that much less traffic would be going from and coming to the Summit District.

Ted + Kathy Frick

Public Comment from 2023

To: City of Bloomington Plan Commission
From: Arbor Ridge Homeowners Association Board of Directors
RE: Sudbury Partners LLC Rezoning Request
Date: July 28, 2023

Arbor Ridge is a 48-unit paired home community that will be significantly impacted by this rezoning proposal. This small community of 67 residents would see vastly greater financial and legal liability, increased light and noise pollution, reduced safety and security, and thus decreased property values, if this rezoning request is approved. Each of these concerns is explained in more detail in the following comments.

Financial and Legal Liability

If Sudbury Drive is extended along the Arbor Ridge property line, as currently proposed, approximately 1000 feet of sidewalk will be added about one foot outside our property line and thus very near to about half of our 48 homes. We have heard that we might be held responsible for maintaining this sidewalk, though we have definitely not conceded this point.

If Arbor Ridge were forced to maintain this sidewalk, our cost of lawn care and snow and ice removal would almost double, which would increase our residents' HOA dues significantly. As a community of mostly retired senior citizens living on fixed incomes, our residents would be very negatively impacted by this increase.

Arbor Ridge HOA has been sued in the past by a pedestrian who fell on one of the sidewalks that runs through our community. Thus, we are also concerned about the potential legal ramifications of a pedestrian falling on this new stretch of sidewalk, especially if the area is rezoned to allow for commercial property near our community. We request that the residential zoning included in the PUD that was approved in 1999 be retained in order to limit our potential financial and legal liability.

Light and Noise Pollution

If the extension of Sudbury Drive is lit with tall and bright streetlights, the light would shine directly into the back windows of about one third of our 48 homes, thus causing both privacy and health concerns due to sleep deprivation. We understand that the area would need to be lit, but we request that the streetlights be shorter, decorative street lights similar to the four streetlights that are currently in our neighborhood.

We are also concerned about the additional noise that would result from both foot and vehicle traffic associated with proposed commercial properties near our community. For this reason, as stated above, we request that all development near Arbor Ridge be residential and that the zoning approved in the 1999 PUD be retained without the requested changes.

Reduced Safety and Security

The rezoning request calls for commercial properties to be located next to our residential community, which we fear will lessen the safety and security we currently enjoy. For example, if one of these commercial properties were a restaurant with a bar that was open until late night or even early morning hours, we can easily imagine inebriated patrons wandering into our neighborhood and disturbing or even endangering residents.

Based on the PUD approved in 1999, we have always known that additional residential development was planned near our property; our concern is the adverse effect that nearby commercial property would have on the safety and security of our community of mostly retired senior citizens.

Decreased Property Values

Like all homeowners, Arbor Ridge residents work hard to keep our property in excellent condition and thus protect our property values. Visitors to our community often comment on how well-kept it is, even though the homes are between 15 and 19 years old.

Arbor Ridge homes usually sell quickly, often within a matter of days, with some buyers waiting for homes to become available. If the current rezoning proposal is approved, we fear that our property values will fall as a result of rising HOA dues made necessary by vastly greater financial and legal liability; increased light and noise pollution resulting from traffic and commercial property very near to our property line; and reduced safety and security due to commercial properties located near our community. For all of these reasons, we request that the Plan Commission deny this rezoning request and require changes that will address our concerns.

To: City of Bloomington Plan Commission
From: Arbor Ridge Homeowners Association Board of Directors
RE: Comments on Plan Commission Hearing of PUD-18-23 Sudbury Development Partners LLC, Sept. 11, 2023
Date: August 22, 2023

Arbor Ridge is a 48-unit paired home community that will be significantly impacted by this rezoning proposal. We are especially concerned about the areas directly adjacent to our community. We appreciated the specific mention of the transition to Arbor Ridge in the Sudbury Development LLC's revised request for the August 14 Plan Commission meeting. However, we agree with the concerns City staff presented on p. 5 of the packet for that meeting:

> 3. The MN areas were amended slightly and an MX area was created. **The same question stands related to the appropriateness of such tall buildings and commercial east of the stream area, as well as immediately adjacent to Arbor Ridge** [bold text added].
> 4. The petitioner is proposing to require additional setbacks for buildings being built adjacent to Arbor Ridge or immediately across the street of Sudbury Drive. The Department is not convinced that the currently proposed R2 Standards (from the UDO) and five (5) foot step back will suffice for those properties immediately adjacent, as the building can be up to 7 stories in height in the MX district. Similarly, a step back of the building is proposed for the buildings across Sudbury Drive. However, the current proposal is a step back of ten (10) feet for buildings over 4 stories. **The maximum proposed height in that area is 12 stories with incentives** [bold text added]**.**

Commercial Development Adjacent to Arbor Ridge

As we stated in our comments for the August 14 packet, we are concerned about the additional noise that would result from both foot and vehicle traffic associated with proposed commercial properties adjacent to our community. In addition, we fear that commercial properties adjacent to our residential community will lessen our safety and security due to the danger of patrons from these commercial properties wandering into our neighborhood of mostly retired senior citizens.

We request that no mixed use or commercial development be located adjacent to any area of Arbor Ridge, which include the areas the developers have labeled Shasta Meadows, the rear area of Everest Center, and Whitney Glen.

We request that the Plan Commission deny this rezoning request and require changes that will allow only residential development adjacent to Arbor Ridge.

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

Letter from Weimer Rd. resident with concerns about the Summit District PUD, for inclusion in Sept. 11 Plan Commission meeting packet

2 messages

Ted Frick <tedfrick@gmail.com> Wed, Sep 6, 2023 at 2:06 PM
To: planning@bloomington.in.gov, scanlanj@bloomington.in.gov, ron.smith@bloomington.in.gov
Cc: slsmith@smithdginc.com

To the Bloomington Plan Commission:

Please find attached our letter, for inclusion in the Plan Commission packet for the Mon. Sept. 11 meeting. This concerns the proposed Summit District PUD by Sudbury Development Partners LLC (who appear to be associated with The Ridge Group in Muncie, located at the same address).

My wife and I are long-time residents of Bloomington, and have lived at 1812 Weimer Rd. for the past 46 years. We attended the July and August Plan Commission via Zoom, and I have carefully read or scanned the documentation in the packets concerning the Summit District PUD.

We share our observations and concerns which are:

1. Potential flooding of Weimer Rd. and the Clear Creek flood plain from stormwater run-off, if proper mitigation is not in place.
2. Extreme traffic congestion on Weimer Rd. unless additional connecting roads are established, such as extending Sudbury Drive to Rogers, and completing S. Adams St. BEFORE construction begins on the Summit District PUD.

At least one of us plans to speak in the Monday meeting about our concerns during the public comment period. If the Plan Commission and staff read our letter in advance, then we can keep our comments brief in the meeting.

Thank you for your attention to this matter. Please acknowledge receipt.

--Ted Frick

p.s. I have cc'd Steve Smith here, mainly because we have quoted his excellent assessment of the Summit District PUD from the perspective of size, density, and traffic problems. His e-mail was included in the August packet.

Summit District PUD letter on storm water mitigation and traffic congestion from Fricks.pdf
649K

Jacqueline Scanlan <scanlanj@bloomington.in.gov> Fri, Sep 8, 2023 at 12:56 PM
To: Ted Frick <tedfrick@gmail.com>
Cc: planning@bloomington.in.gov, ron.smith@bloomington.in.gov, slsmith@smithdginc.com

Received.

Thanks,
Jackie Scanlan, AICP
Development Services Manager
[Quoted text hidden]

From: Ted and Kathy Frick
1812 S. Weimer Rd.
Bloomington, IN 47403

Date: September 6, 2023

To: Bloomington Plan Commission
Re: Proposed *Summit District PUD-18-23* along South Weimer Road

Storm Water Mitigation Issues and a Proposed Solution

We have lived in our home at 1812 S. Weimer Rd. for 46 years now. We have witnessed a lot of change as the city of Bloomington has been expanding into this largely undeveloped area to the southwest. When we bought our house in 1977, there was a large, fenced pasture across Weimer Road, with cows grazing on the Sudbury farm. Harvey Sudbury and his family lived in his parent's farmhouse in the middle of roughly 300 acres, before they more recently built their new house along Weimer Road near Wapehani Road.

Figure 1. View of "Shasta Meadow" Hillside from 1812 Weimer Road. Photo by T. Frick, 9/03/2023. Possible location of proposed Weimer Retention Pond and text annotations are superimposed (also see Figure 2). Clear Creek is not visible here because of the steep slopes along the riparian buffer.

Concerns about Flooding along Weimer Road

We have been looking out the windows of our house to the northeast at the increased erosion on the steep hillside for 5 decades. This hillside is now referred to as Shasta Meadow (Neighborhood #1) in the Summit District PUD proposal documentation from Plan Commission

meetings in July and August 2023. This western area along Weimer Road for Neighborhood #1 is mostly a hillside, and would be better named, Shasta Hillside. It will no longer be a meadow when covered with streets, buildings, sidewalks, driveways, and other parking areas.

We can easily tell how much it has rained recently—just by looking at how much surface water drains down the Shasta Hillside in the deepening ravines, and for how many hours the water drains.

That highly visible Shasta Hillside drainage down steep ravines is a good predictor of how much flooding there will be along Weimer Road to the north and south of our house, as well as flooding along the Clear Creek Trail south of Rockport Road. We don't even need to look at the overflowing banks of the Clear Creek branch that runs from the remaining Twin Lake through the valley along Weimer Road, and onward to the south along the Clear Creek Trail.

We've been watching this flooding problem get worse over the past several decades.

Water Flows Downhill

The proposed Summit District PUD is aptly named, as is Summit Elementary School. They are on the highest ground, as is the summit of a mountain. Surface water flows downhill when it rains. The proposed PUD will *increase* impermeable surface area, meaning more flowing rainwater will not be slowed by vegetation and absorbed by soil that is no longer there. That top soil and vegetation will be replaced by buildings with impermeable roofs, by impermeable sidewalks and driveways, and by impermeable streets and parking areas. If the rainwater can no longer soak in, where will it flow to and how fast will it flow? If not regulated in some way, the result is highly predictable: flooding in lower areas which drain more slowly.

What is the Plan for Storm Water Mitigation?

Our concern is how storm water mitigation will be handled in the new development being proposed in the Summit District PUD, something like 5,000 to 6,000 units in the present plans. This means there will be a substantial increase in the impermeable surfaces on what is now largely grassland and karst limestone. There will be many new rooftop surfaces, sidewalks, driveways, streets, and parking places that are not there now. This decreased permeability overall will undoubtably increase the storm water runoff after rainstorms and snow melts. The questions are: Where will all this extra surface water go? And at what rate will it go downhill?

The big concern and fear is that flooding will become worse in the valley areas along Weimer Road. There could be not only flooding of yards and residences in the valley portion, but also the flooding and closure of Weimer Road itself at times.

After a particularly heavy rainstorm about 2 years ago, the south portion of Weimer Road at the narrow bridge was completely flooded and impassable for about 2 days. And north of us, water was flooding across Weimer Road where the two tributaries from the Twin Lake go through culverts under the road. These parts of Clear Creek are already designated as a flood plain area. That's an environmental fact. For those of us who live on the higher ground along the middle

part of S. Weimer Road, we were living on an island, land-locked for about a day. There was no other way out by automobile. We stayed home until the flooding receded. Meanwhile, we could see that our neighbors to the north had flooded yards, and we wondered if the floodwater had damaged their houses.

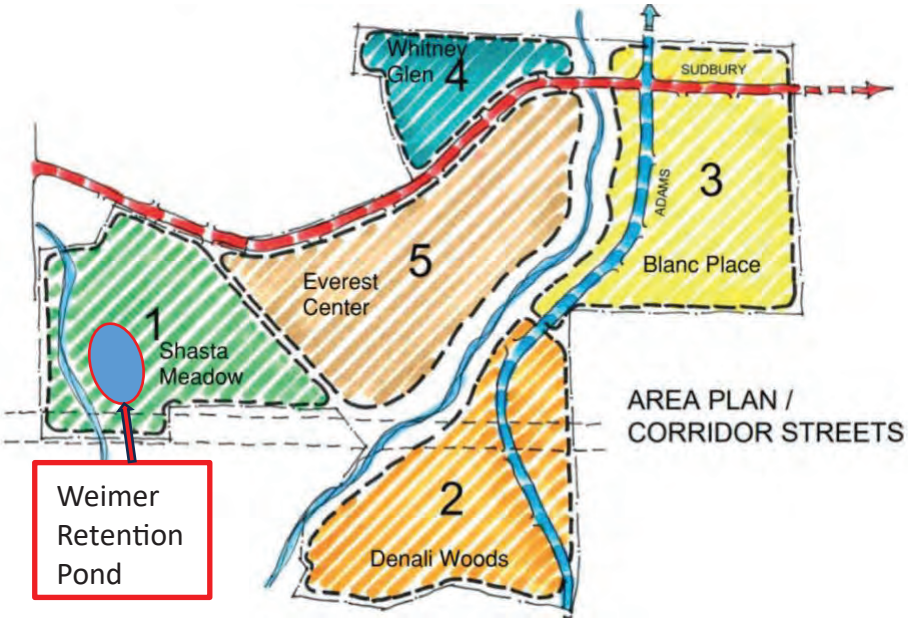
Therefore, we ask: How will storm water run-off be mitigated in the Summit District PUD?

A Proposal: Weimer Retention Pond (Figure 2)

One way to do this would be to build a storm-water retention pond along the bottom of the western hillside but above Clear Creek as part of the proposed Summit District PUD. Engineers would be able to figure out how big the pond should be, given the severe slope and the increased run-off from impermeable surfaces to be added in the development.

If designed carefully, the retention pond should *decrease* the amount of flooding along the Weimer-Road-Clear-Creek flood plain. If the Summit District PUD does provide this retention pond, it could actually reduce the overall flooding that currently occurs after heavy rainstorms. Instead of making the flooding problem worse, it could help decrease the flooding along Clear Creek and Weimer Road after heavy rains.

Figure 2. Proposed Weimer Retention Pond on Shasta Hillside[1]



While adding a retention pond for the development likely might decrease the available land area for buildings and streets in the Shasta Hill neighborhood, it could be also viewed as a major

[1] The retention pond would be placed and shaped by engineers to fit the contours of the land—unlikely to be an oval as depicted. The southwest corner of the Shasta Hillside is currently lowest in elevation in Neighborhood 1, but grading during construction and installation of storm-water sewers could dictate a different placement. Other factors to consider for pond location would include the necessary riparian buffer zone along Clear Creek, the Duke Energy easement, steepness of slope in that area, and subterranean karst limestone. The area plan was digitally copied from the staff report on the Summit District PUD that was included in the August 14, 2023, Bloomington Plan Commission meeting packet (Image One, p. 8). We have added the Weimer Retention Pond to this image, solely for purpose of illustration here. The retention pond was not part of Image One in the staff report.

aesthetic feature, making the development more attractive to prospective buyers. People in nearby units in the PUD would be looking out over a small pond to the west. People living across Weimer Road would have more peace of mind, even though they might be looking at an earthen dam to contain the retention pond on the western Shasta hillside. The proposed new Weimer Retention Pond on the lower southwest end of Shasta Hill also would serve as further wetlands for wildlife in the area.

To build up a suitable dam and sides for the Weimer Retention Pond, especially on the west and south sides, will presumably require additional soil and rocks. The developer could potentially save money by moving excavated soil and limestone from other parts of the development site to construct the retention pond on the severe western slope of Shasta Hill. This could help reduce the number of trips from the development site to an external location, as well as reduce wear and tear on local roads from big trucks heavily loaded with excavated soil and rocks.

There may very well be other parts of the Summit District PUD where significant storm water mitigation is needed, requiring additional retention ponds. If so, then soil and rocks excavated for construction could be moved within the PUD area, rather than trucking them to an external site.

The nearby Twin Lake along West 2nd Street is effectively a retention pond with an earthen dam, which regulates runoff into Clear Creek along Weimer Road. We also note the use of a nearby retention pond at the Tapp Road roundabout, where S. Adams Street terminates.

Other Solutions?

There are other ways to control flooding besides retention ponds. If a retention pond is not a good solution, then Sudbury Developers of the Summit District PUD and city of Bloomington environmental engineers should specify similarly effective storm water runoff mitigators, or even better ones. We have yet to see a report from the Bloomington Environmental Commission concerning the Summit District PUD.

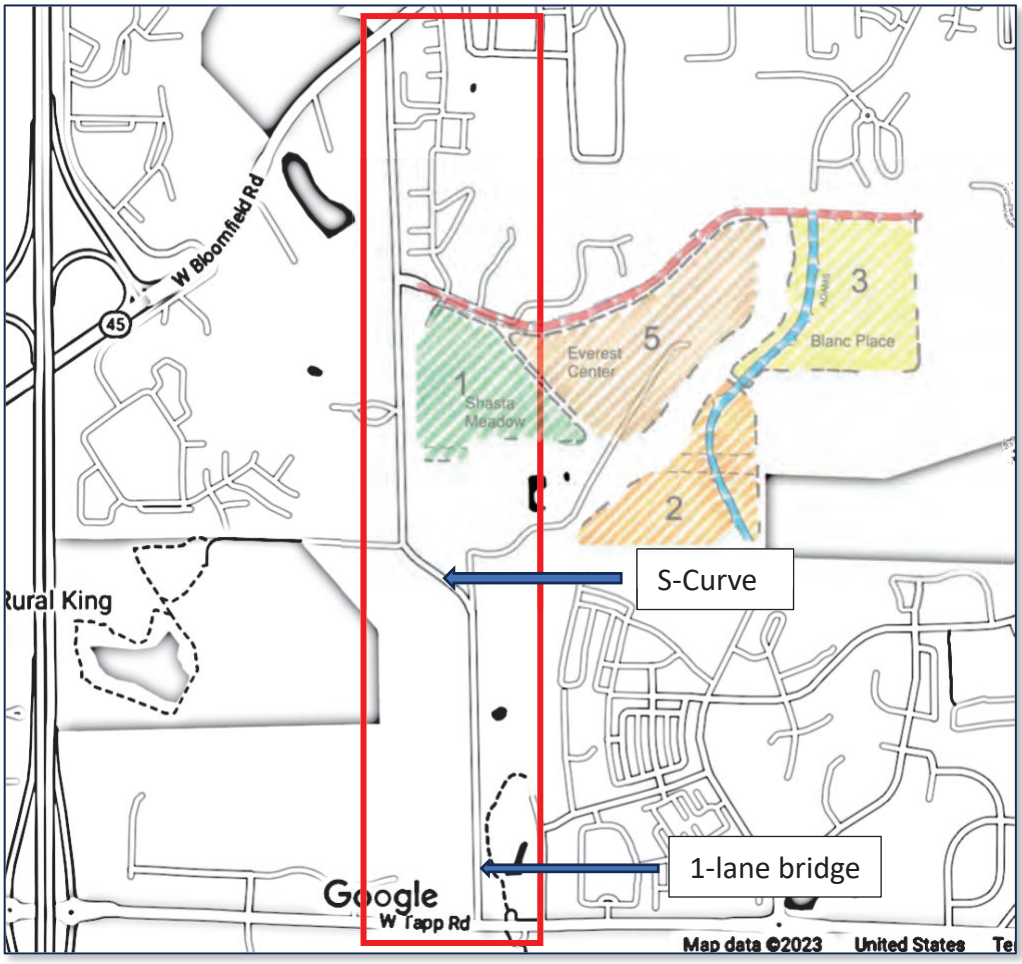
Extending the Clear Creek Trail

Imagine also the Clear Creek Trail extending north from Tapp Road along Clear Creek and eventually connecting to the new city trail that is proposed to run east-west along the utility easement from Rogers Street (at the Switchyard Park) to Weimer Road. The new Weimer Pond could even be visible from the trail, if designed properly.

Traffic Congestion Issues

The Summit District PUD proposal to build 5,000 to 6,000 units on about 140 acres will result in population density that is very high for the city of Bloomington context. The Bloomington Plan Commission packet for the August 14, 2023, meeting contained a significant e-mail message from Steve Smith, an engineer and surveyor who has been around Bloomington a long time and witnessed many different kinds of development.

Figure 3. Weimer Road corridor (outlined in red, about 1.5 miles long)



Smith's e-mail points out several facts which put the Summit District PUD proposal into perspective. He referred to the Sudbury PUD, which is technically the Summit District PUD petition, and was also referring to the information presented in the July 2023 meeting of the Plan Commission. He compared the Summit District PUD to a recent development in Bloomington: the apartments built on the old K-mart site on the east side of Bloomington, along 3rd Street, and behind Bloomingfoods grocery.

We quote from his e-mail on pp. 115-16 in the Plan Commission packet for the August 14, 2023, meeting:

> "By my calculations the proposed [Summit District] PUD is about 1.5 to 2.0 times the density of the K-mart multifamily site and about eight times larger in area….
>
> The K-mart site has 340 units on about 12 acres for 28 units per acre. The K-mart site plan is efficient with no land lost to environmental features, thoroughfares etc. The 140 acre [Summit District] site will lose about 40 acres to environmental features and through

roadways leaving about 100 acres for development. The density of the developed area will be between 44 and 60 units per acre. This is about 1.5 to 2.1 times denser than the K-mart site.

- [Summit District] is 1.57 to 2.14 times as dense as K-mart
- [Summit District] would be equal to 8 K-marts based on acreage
- [Summit District] would be equal to 13 to 17 K-marts based on number of units

Traffic was mentioned at the hearing [in July] and apparently a traffic study will be done. Rough projections are about 6 trips per day for each multifamily unit. Assuming a maximum of 6,000 units results in 36,000 newly generated trips per day. A two-lane road like Weimer or Adams typically can accommodate 3,000 to 5,000 ADT at a reasonable level of service. This doesn't account for the issues that those roads currently have.

The K-mart site with 340 units fronts on a State Highway with two signalized intersections and reasonable cross connections via Clarizz and entry to the College Mall. K-mart will largely serve students whose destination is a direct bus ride away. [Summit District], at 13 to 17 times the number of units, has access via 2 lane Weimer and Adams and is not close to the University or employers.

Traffic will be a problem."

Smith's e-mail is speaking largely to the Plan Commission (and potentially the City Council, if the petition is forwarded). And to engineers and city planners who routinely review these kinds of development petitions.

We Weimer Road residents experience the traffic issues on Weimer Road almost every day, especially the backups at the Bloomfield Road and Tapp Road intersections when lots of folks are trying to go to work or come home from work. We know how bad the congestion can get at those two ends of S. Weimer Road, especially when there is a lot of traffic. We witnessed significant backups, especially when I-69 intersections were constructed at Tapp Road and West 2nd Street.

In addition to safety issues, the big impact on us Weimer Road and Arbor Ridge residents would be significant delays and congestion when trying to leave our neighborhoods. The brutal fact is that we currently have only two ways to go. There are no alternatives by driving on public streets and roads. Because there are no current alternatives.

We also wonder who would want to live in apartments and condos in the Summit District, when there are significant traffic congestion problems if not adequately addressed? We don't know who those people will be, but why would anyone want to live in a neighborhood where it might take 15 minutes just to get from home to a major thoroughfare such as the Bloomfield Rd. or Tapp Rd. which is less than a mile away? Not only would that affect current residents on Weimer Road, Arbor Ridge, and Millennium Apartments, but also new residents in the Summit District.

Traffic currently backs up at both ends of Weimer Road when there are more cars. Steve Smith estimates about 36,000 new trips for day from the proposed 6,000-unit Summit District PUD, and that a 2-lane road such as Weimer can handle 3,000 to 5,000 average daily trips. This would mean about 7 to 10 times more traffic on Weimer Road, which currently has a S-curve on a hill with poor visibility of oncoming traffic, a one-lane bridge, and stop signs at Tapp Road and the Bloomfield Road which are busy thoroughfares with traffic that does not stop.

We hope that rational people will prevail when considering the Summit District PUD petition. We expect that the Summit District petition will be denied unless the petitioner can provide a feasible solution to the traffic congestion problem that will be created. We also expect the petition will be denied unless the significant environmental issues are addressed adequately—especially stormwater run-off and flooding along Weimer Road and Clear Creek.

Reports from the Bloomington Environmental Commission and the Transportation Department on the proposed PUD are essential for planning this PUD.

Let's All Work Together to Make This Work

Let's make this a win-win-win-win for current residents along Weimer Road, Sudbury Development Partners LLC (The Ridge Group from Muncie), Arbor Ridge residents, and the City of Bloomington.

Sincerely,

Ted + Kathy Frick

Ted and Kathy Frick

Mark and J. Vivian Furnish
1600 S. Weimer Rd
Bloomington, IN 47403

Aug 9, 2023

Letter to the City of Bloomington Plan Commission Regarding PUD-18-23

To be included in the meeting packet of the scheduled meeting on Aug 14, 2023

We are writing to request the Plan Commission to not approve (or approve with conditions) PUD-18-23. We also request the Plan Commission to not forward any favorable recommendation of PUD-18-23 to the Common Council.

If the Plan Commission elects to allow further hearings, we request the following prior to subsequent hearings:

1) an environmental impact study, including a state-of-the-art multi-phase study on karsts, including subterranean / subsurface karst features, be conducted and made available to the public,
2) an updated environmental resource inventory (COBERI) be conducted by the City of Bloomington to account for changes in the environment since the publication of the last COBERI report (November 2003) to the area under Summit District PUD, the Clear Creek Drainage System and the larger Bloomington area,
3) and all environmental investigations that the Bloomington Environmental Commission (EC) of the City of Bloomington deems necessary, because "the size of this site alone necessitates the very best environmental protections" (Memorandum on PUD-18-23, July 10, 2023; Page 97 of the July 10 meeting packet).

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References	Link
Plan Commission, Meeting Packet, July 10, 2023	https://bloomington.in.gov/onboard/meetingFiles/download?meetingFile_id=12163
City of Bloomington Environmental Resource Inventory report (COBERI), November 2003	https://bloomington.in.gov/sites/default/files/2017-07/City%20of%20Bloomington%20Environmental%20Resource%20Inventory%20%28COBERI%29%20%282003%29.pdf
City of Bloomington Environmental Resource Inventory report (COBERI), November 2003	https://bloomington.in.gov/sites/default/files/2017-07/City%20of%20Bloomington%20Environmental%20Resource%20Inventory%20%28COBERI%29%20%282003%29.pdf
2018 Comprehensive Plan City of Bloomington	https://bloomington.in.gov/sites/default/files/2018-04/Final%20Council%20Amended%20CMP%20%20Web%202.pdf
City of Bloomington Unified Development Ordinance (Last Amended Date: April 20, 2023)	https://bloomington.in.gov/sites/default/files/2023-05/UDO%20April_2023_Final_APPROVED_0.pdf
Indiana's 2022 303(d) List of Impaired Waters, IDEM	https://www.in.gov/idem/nps/watershed-assessment/water-quality-assessments-and-reporting/section-303d-list-of-impaired-waters/
Section 303(d) Frequently Asked Questions, IDEM	https://www.in.gov/idem/nps/watershed-assessment/water-quality-assessments-and-reporting/section-303d-list-of-impaired-waters/section-303d-frequently-asked-questions/
Total Maximum Daily Load Reports, IDEM	https://www.in.gov/idem/nps/resources/total-maximum-daily-load-reports/
Proper Investigative Techniques in Karst, IDEM Technical Guidance Document, September 15, 2019	https://www.in.gov/idem/cleanups/files/remediation_tech_guidance_karst_memo.pdf
City of Bloomington Parks and Recreation Department Master Plan 2021 – 2025	https://issuu.com/bloomingtonparks/docs/city_of_bloomington_indiana_bloomington_parks_and_

I. Introduction

A development of any size should be properly planned and managed in accordance with local, state and federal regulations; this we all agree upon, and we hope is what the City of Bloomington strives to do. The 138.51 acres of land in question is large in size and significant in biodiversity. As the EC has pointed out in its July 10 Memorandum to the Bloomington Plan Commission, "there are countless environmental features dotting the entire area, including mature tree stands, streams and riparian buffers, steep slopes, wetlands, sinkholes, and biodiversity". Yet the Petitioner has requested "numerous environmental exceptions" in its current plan.

We, as concerned citizens, as people that have spoken with neighbors familiar with this piece of land and its surrounding environ, have performed a "paper exercise" to further understand the inherent environmental features of the area, and what state-of-the-art environmental protections it deserves. We are not experts on this topic. We cannot perform field studies or any study of that nature. But to better educate ourselves, we've summarized what we've learnt on the internet, and wish to share these findings, unanswered questions, and concerns with the Plan Commission and all who are interested.

In addition, we understand that the EC has provided a Memorandum to the Plan Commission on July 10 "as a place holder for the EC's thorough discussion of this proposal" to be presented at the Aug 14 hearing. We look forward to the findings and discussion to be provided by the EC and support the EC to continue to hold the Petitioner accountable to the best environmental protections for this large section of land and its surrounding area, both now and in the future. Urbanization does not come without consequences. Its impact cannot simply be determined in the hypothetical, or in the short term, but by its long-term effect.

To understand the environmental features and their vulnerabilities, we first studied the City of Bloomington Environmental Resource Inventory (COBERI) Report (November 2003). The following sections (II to VII) include an overview of the report, and the features we consider worthy of note. We ended the letter with a Comparison with Brown's Woods (VIII), and other concerns and closing summary (IX).

II. Overview of the City of Bloomington Environmental Resource Inventory (COBERI) Report (November 2003)

The City of Bloomington Planning Department published an Environmental Resource Inventory report (COBERI) in November 2003, to "collect and analyze information on Bloomington's natural environment in an effort to help prioritize areas for future management and/or preservation". It is "part of a larger, on-going project that provides the factual foundation to further develop sustainable land-use and land development strategies for the City of Bloomington".

The report states that "… preserving natural areas provides immeasurable benefits to society". Further, "the City of Bloomington's Growth Policies Plan (note, the 2002 version) recognizes the importance of preserving high quality natural areas and promotes the use of sound conservation planning principles".

A series of four (4) steps were used for the analysis in the COBERI project, including "identifying primary research categories, collecting data, performing quality control activities, and data analyses and interpretation". A total of seven (7) categories were identified, which were "soils, wetlands, floodplains and water resources, karst geology, topography, sensitive habitat and vegetative cover".

In addition, "the City of Bloomington's Planning Department evaluated and ranked natural areas in Bloomington using an environmentally sensitive areas (ESA) analysis" … "to better understand their (i.e., natural resources) roles and functions they must be studied as an interconnected system".

The 2003 COBERI report is "the first step in identifying and prioritizing Bloomington's natural areas" to "preserve high quality natural areas in Bloomington in an effort to maintain the valuable ecosystem goods and services they provide".

Out of the seven categories identified, four of them are particularly present in the Summit District PUD, including sensitive soils (section III), wetland (section IV), flood plains and water resources (section V), and karst features (section VI).

III. **Soils**

The COBERI report identified "sensitive soil" as "having the following 5 characteristics":

1. Poor for crops and pasture
2. Poor for woodland management and productivity
3. **Poor for urban uses such as landscaping, building site development, sanitary facilities, construction materials, and water management**
4. Poor for intensive recreation development
5. Poor wildlife habitat potential

The report also states that,

> Bloomington's sensitive soils had the following physical properties: high shrink swell potentials; poor permeability rates; susceptible to frost heave action; prone to flooding; and highly susceptible to mass wasting processes (based on National Resource Conservation Service's guidelines).

Figure 1 of the November 2003 COBERI report illustrates the sensitive soils in Bloomington and surrounding areas. Note that much of the 140 acres of Summit District PUD contains sensitive soils, which are “highly susceptible to mass wasting process”, i.e., erosion.

FIGURE 1. Map of sensitive soils in Bloomington and surrounding areas

The shaded areas above depict sensitive soils. In Bloomington, sensitive soils were generally found along steep slopes, ridges, floodplains and riparian corridors. Sensitive soils accounted for approximately 25% of Bloomington's overall land area.

Has the Petitioner considered the sensitive soils present in this area in its planning? Given the age of the COBERI report, so much population growth, urban development and has occurred, and much green space has been lost since 2003. Have the sensitive soils areas grown since 2003? Have they become more prone to mass wasting process (erosion)?

The numerous exceptions to the UDO do not offer the assurance that the proposed use and development will be designed to minimize negative envrionmental impacts and not cause significant adverse impacts on the natural environment.

IV. **Wetland**

As stated in the 2003 COBERI report, wetlands "provide different types of ecological functions including critical habitat for wildlife, supplying water for recharge, controlling flooding and erosion, improving water quality, and offering recreational and educational opportunities". "Depending on the type and extent of wetland, these critical habitats may be protected under federal, state and/or local laws."

In addition, the report states that,

> The successful maintenance and improvement of wetlands depends heavily on watershed management and planning activities. Due to their ecological importance and sensitivity to development, wetlands must be considered for preservation and management when determining land uses and growth patterns. Information for this category came mainly from the United States Fish and Wildlife Service's National Wetland Inventory. Other sources included the United States Environmental Protection Agency and the City of Bloomington Planning Department.

Figure 2 of the November 2003 COBERI report illustrates potential wetland areas in Bloomington. In the area of the Summit District PUD, the creek and the former Lake Wapehani both are depicted in Figure 2.

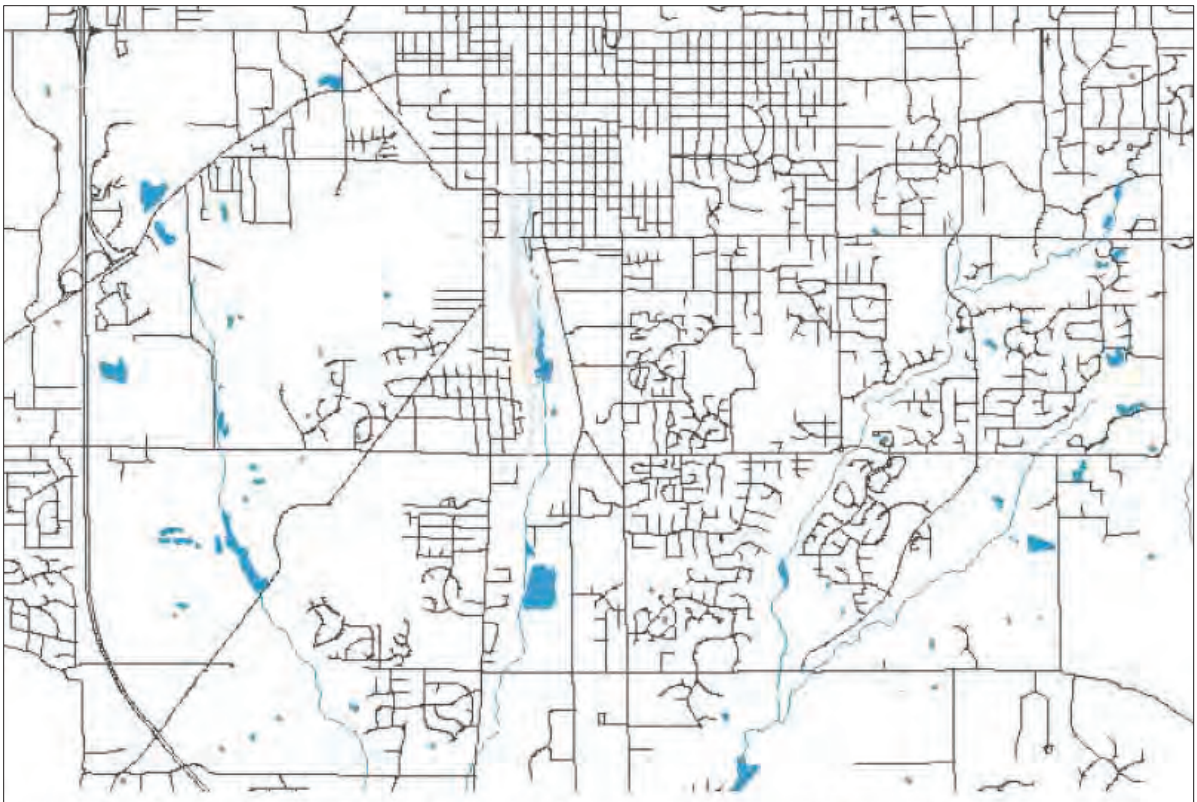


Figure 2. Map of wetland areas in Bloomington and surrounding areas

The shaded areas above represent potential wetland areas. In Bloomington, the majority of wetlands were found near lakes, reservoirs or major creeks. Wetlands accounted for approximately 2% of Bloomington's overall land area.

We would like to point out that, following the removal of the earthen Weimer Dam at Lake Wapehani in 2018, "the lake bed" was to be "restored to a wetland" (City of Bloomington News Release, July 3, 2018). The health of this new "wetland" and its impact to the surrounding environment has not been studied, as far as our research reveals to us.

Much has changed in Bloomington since 2003; the data to be analyzed, i.e., the environment, the regulations, and best practices/golden standards have all changed. As the EC has pointed out, "climate, thus environmental, change has long term impacts on all residents and must be prioritized". If the City wishes to make informed and sustainable decisions for its residents and the environment we dwell in, up-to-date information on the environment should be available to inform decision-making.

If the City of Bloomington has conducted further study following its 2003 COBERI project, which was considered "the first step in identifying and prioritizing Bloomington's natural areas", please make them available to the public. If the City of Bloomington is not able to allocate the needed staff and technology to continue the long-term monitoring they have promised to do in 2003, perhaps alternative budget allocation should be considered to truly "prioritize Bloomington's natural areas" in actions, not just words.

V. **Flood plains and water resources**

As stated in the 2003 COBERI report, the “important ecological functions” of water resources include:

- Providing critical terrestrial and aquatic habitat
- Providing surface water recharge and supply
- Controlling flooding and erosion
- Stabilization and moderation of climate
- Educational and recreational opportunities.

And the report underlined that,

> Issues pertaining to management of floodplains and water resources become more critical as land becomes more urbanized. Developing sound watershed management and planning activities that implement best management practices can help mitigate negative impacts.

The report also pointed out that “due to the challenging topography, Bloomington has an extensive network of watersheds that contribute to its waterways” (See Figure 3). The “two major waterways” in Bloomington are “Jackson Creek and Clear Creek”. “Both of these creeks have wide-spread tributary systems containing floodplains.” (See Figure 4 for 100 year floodplains)

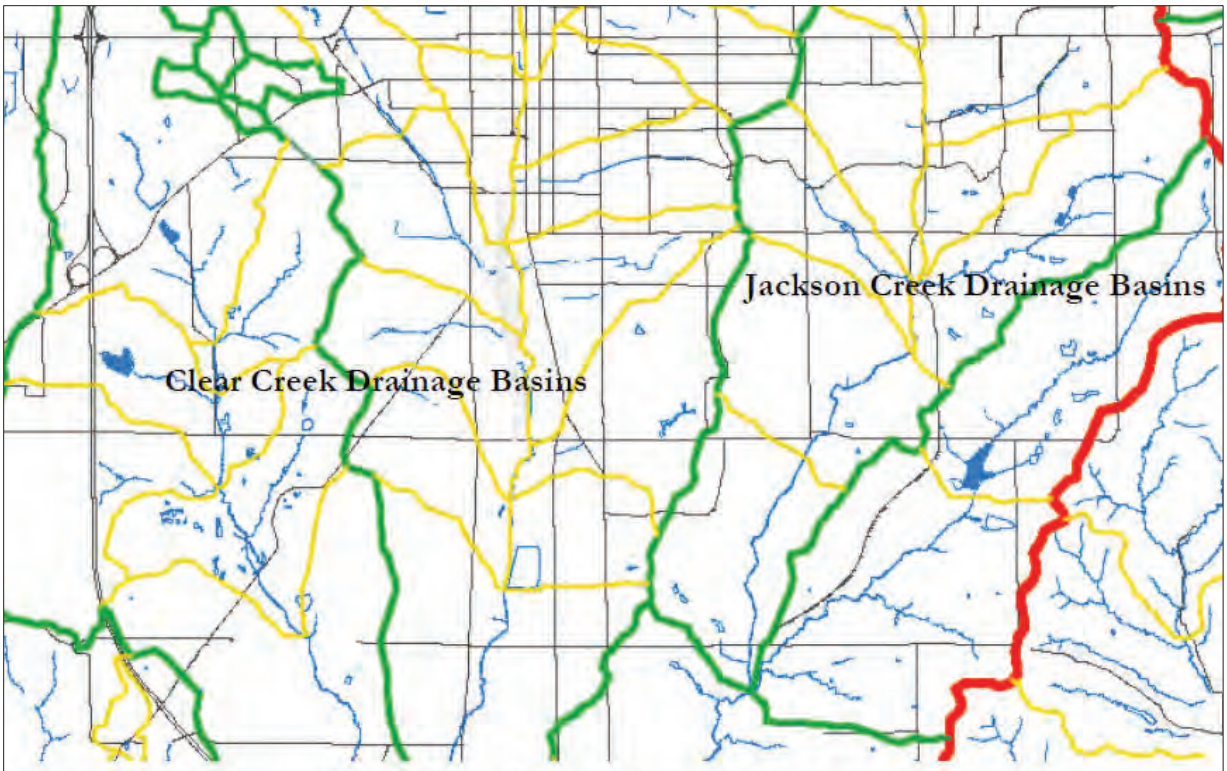


Figure 3. Map of watersheds in Bloomington and surrounding areas
The map above illustrates Bloomington's water resources, as well as its major and minor drainage basins. The 6 main drainage basins in Bloomington are the Stout Creek, Cascades Creek, Griffy Reservoir and Griffy Creek, Sycamore Creek, Clear Creek (and west fork), and Jackson Creek (and east fork) basins.

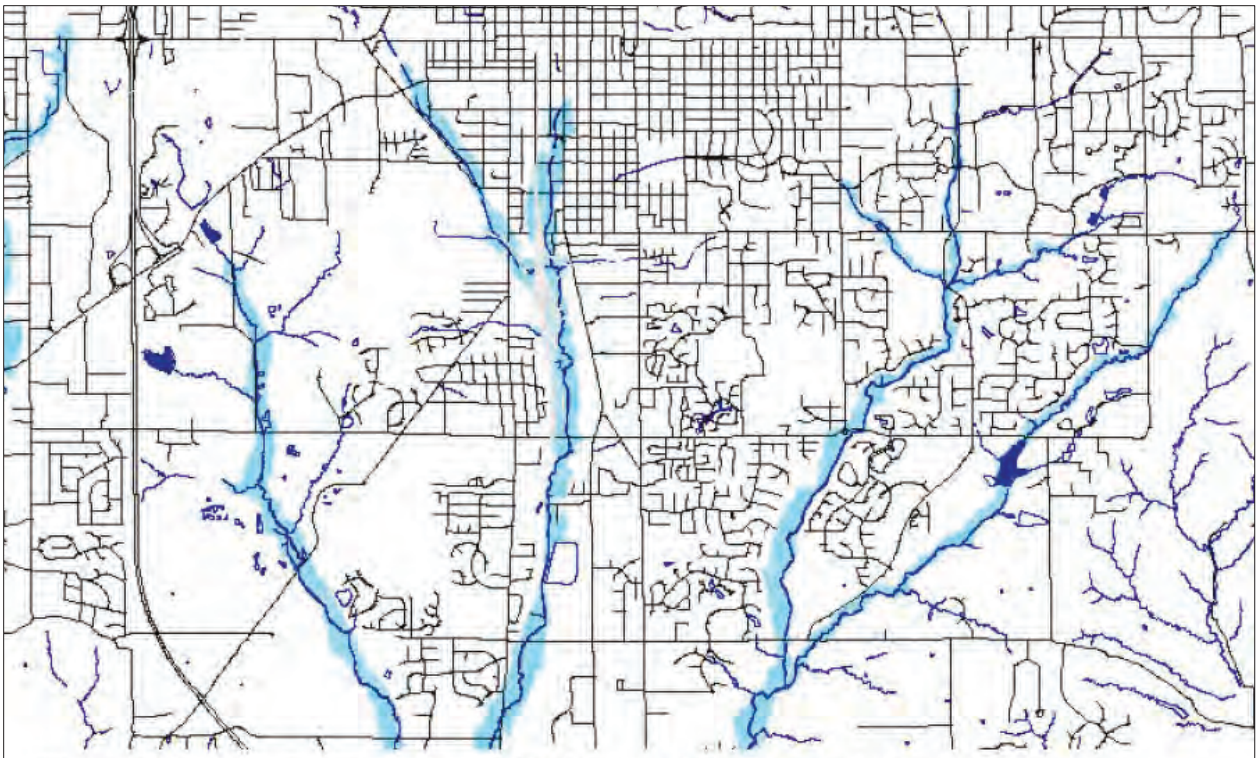


Figure 4. Map of water resources and floodplains in Bloomington and surrounding areas
The map above further illustrates the extent of Bloomington's water systems - the dark areas are water resources, and the lightly shaded areas represent their floodplains. Overall, 10% of Bloomington's land is water contained in creeks, lakes or reservoirs. Floodplains (100 year) cover 3% of Bloomington's land area, and are all regulated under local and state law.

The report highlighted that,

> Past industrial activities have significantly degraded some of Bloomington's water resources. The Indiana Department of Natural Resources has issued fish consumption advisories for Griffy Reservoir, Lake Wapehani and Clear Creek.
>
> Furthermore, Clear Creek has been listed by the Indiana Department of Environmental Management as one of Indiana's impaired waterways (emphasis added by author of letter) based on its current pollutant loads and poor habitat potential.

Impaired Waters

The report did not further elaborate on the impaired status of Clear Creek, its current pollutant loads, or its poor habitat potential.

By searching impaired water of Indiana on the internet, we found that the Indiana Department of Environmental Management (IDEM) has published "Indiana's 2022 303(d) List of Impaired Waters" at https://www.in.gov/idem/nps/watershed-assessment/water-quality-assessments-and-reporting/section-303d-list-of-impaired-waters/. Under Monroe County, Clear Creek was listed,

as well as Weimer Lake, to our surprise. Below is an excerpt of section 303(d) List of Impaired Waters.

COUNTY	ASSESSMENT UNIT NAME	WATER TYPE	SIZE	UNITS	PARAMETER	DESIGNATED USE	IR CATEGORY
Monroe	CLEAR CREEK	STREAM	3.11	Miles	BIOLOGICAL INTEGRITY	Warm Water Aquatic Life	5A
Monroe	CLEAR CREEK	STREAM	0.59	Miles	BIOLOGICAL INTEGRITY	Warm Water Aquatic Life	5A
Monroe	CLEAR CREEK - UNNAMED TRIBUTARY	STREAM	6.74	Miles	BIOLOGICAL INTEGRITY	Warm Water Aquatic Life	5A
Monroe	CLEAR CREEK - UNNAMED TRIBUTARY	STREAM	3.58	Miles	BIOLOGICAL INTEGRITY	Warm Water Aquatic Life	5A
Monroe	WEIMER LAKE	LAKE, FRESHWATER	6	Acres	MERCURY IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK	STREAM	9.12	Miles	NUTRIENTS	Warm Water Aquatic Life	5A
Monroe	CLEAR CREEK	STREAM	3.11	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK	STREAM	5.88	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK	STREAM	9.12	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK - UNNAMED TRIBUTARY	STREAM	2.51	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK	STREAM	6.29	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B
Monroe	CLEAR CREEK	STREAM	3.52	Miles	PCBS IN FISH TISSUE	Human Health and Wildlife	5B

Parameters including “biological integrity”, “nutrients”, and “PCBS in fish tissue” (Clear Creek), and “Human health and Wildlife” (Weimer Lake) categorized Clear Creek and Weimer Lake in Category 5A & 5B and Category 5B, respectively. Category 5 is defined as:

> Category 5: The available data and/or information indicate that at least one designated use is impaired or threatened and a Total Maximum Daily Load (TMDL) is required.

> Waters may be listed in both 5A and 5B depending on the parameter(s) causing the impairment. Indiana's 303(d) list is comprised of all waters in Category 5.
>
> A: The waterbody has one/more impaired biotic communities or is impaired for one/more pollutants.
>
> B: The waterbody is impaired due to the presences of presence of mercury or PCBs, or both in the edible tissue of fish collected from them at levels exceeding Indiana's human health criteria for these contaminants.

Please note, that Category 5 (5A and 5B) is the most severe category. Under the Clean Water Act (CWA), states are required to develop a TMDL for these waters in order to achieve compliance with the water quality standards.

> The Total Maximum Daily Load (TMDL) Program primary purpose is to assess streams, rivers and lakes that are considered impaired by the Indiana Department of Environmental Management and develop reports that identify the causes of the impairment, the reductions of pollutants needed, and the actions needed to improve water quality. Impaired waters do not meet designated water quality standards and do not support one or more designated uses, such as recreational, protection of aquatic life, drinking water, and fish consumption. Section 303(d) of the Clean Water Act established authority for the TMDL Program and guides states on how to develop these plans for waters that do not meet water quality standards.
>
> (https://www.in.gov/idem/nps/watershed-assessment/total-maximum-daily-loads/)

As shown on the IDEM's website, Clear Creek (Monroe County) has not had a TMDL report completed. We request the City to work with IDEM to prioritize Clear Creek's TDML if possible, given the scale of the development, and the impaired state of Clear Creek and Weimer Lake.

On the topic of Weimer Lake, we are surprised to see that it is still listed on the IDEM's "Indiana's 2022 303(d) List of Impaired Waters" list. Has the removal of the dam not been reported to IDEM? Or have the relevant databases the State uses to compile this list not been updated?

Comprehensive Plan – Environment - Water

In short, we would like to know how the City plans to take all measures possible to uphold its vision, policy, goals and programs in the "2018 Comprehensive Plan City of Bloomington"?

Under Chapter 3 Environment – Water of the Comprehensive Plan, the following stood out to us:

- Water is a vital natural resource for human survival. Most of us now live in an urban ecosystem, and we all need to be more cognizant of how water functions in it.

- Clean water is necessary to support the plants and animals in our ecosystems and food systems.
- Surface and stormwater quantity and quality are different, yet related, issues to consider in addition to drinking water. Moving surface water needs to be slowed down enough that it has the opportunity to infiltrate instead of flowing away at speeds that can cause dangerous and costly flooding and erosion and prevent the filtering of pollutants.
- Goal 3.3: Conserve water resources and protect water quality to support our natural environment, public health and safety, plant and animal life, and our urban activities.
    a. Policy 3.3.1: Reduce pollution in urban runoff from residential, commercial, industrial, municipal, and transportation land uses.
    b. Policy 3.3.2: Encourage conservation and protection of water sources in our region.
- Programs:
    a. Increase the use of modern best practices for water quality and quantity control.
    b. Utilize Low Impact Development measures such as rainwater harvesting and storm runoff infiltration, when feasible, as mitigation strategies for stormwater discharge.
    c. Assess karst features and regulations to protect sinkholes and other karst features.
    d. Simplify floodplain regulations without making them less restrictive.
    e. Incorporate a stream classification system into the UDO to use in waterway and riparian buffer protection and enhancement.

How does the City plan to control surface and stormwater quantity? What Low Impact Development measure will be utilized in the Summit District PUD?

How does the City plan to not cause further pollution and burden to the already impaired Clear Creek? How does the City plan to achieve its Policy 3.3.1 (reduce pollution in urban runoff) in the Summit District PUD? How does the City plan to restore clean water to Clear Creek, to support the plants and animals in our ecosystems and food systems?

Without an updated study on water quality, on stormwater runoff, on the impact of dense urban development to Clear Creek and its flood plain, it would be hard to achieve the COBERI report's original intent, which was "part of a larger, on-going project that provides the factual foundation to further develop sustainable land-use and land development strategies for the City of Bloomington".

VI. Karst Geology

"Karst terrains are extremely sensitive to development and changes in land uses", as stated in the 2003 COBERI report, and "often, areas containing karst features offer unique habitats for a variety of rare organisms such as blind cave fish, the Indiana bat and other obligate cave dwelling species". It adds, "it is important to properly manage all types of karst systems to protect their inherent geological, biological and ecological importance."

The report also pointed out specifically for Bloomington that,

> The most prominent surface karst features found in Bloomington include sinkholes, swallow holes, soil slumps and springs. Bloomington also contains extensive and complex underground water systems that have not been extensively mapped or studied. For that reason, this analysis will focus entirely on surface features, however, subterranean features should be considered for subsequent investigations.
>
> Surface karst features were found to be scattered throughout Bloomington. Initial analysis revealed the highest concentration of features was found in the west and southwest portions of the City, followed by the south and southeast.

It is worthy of note that Bloomington's "extensive and complex underground water systems" … "have not been extensively mapped or studied", and that surface features were the ONLY data available for analyses in 2003. To "guide and assist future decisions for land-use and land development strategies" as intended by the COBERI project, we request that "subterranean features should be considered for subsequent investigations".

Figure 5 of the report illustrates the general locations of large karst areas in Bloomington and surrounding areas, based on surficial karsts features.

One can easily see the large area of karst features on Summit District PUD, as well as a perennial spring identified to the north of the karst area.

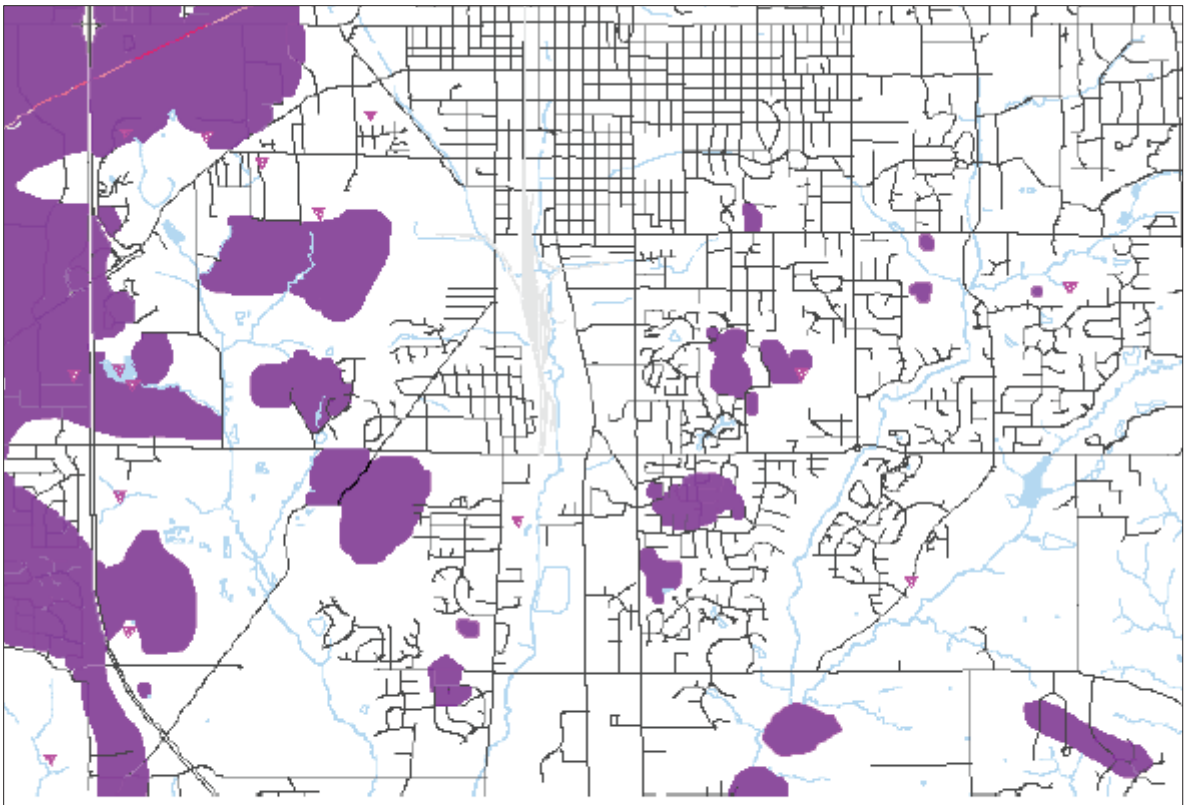
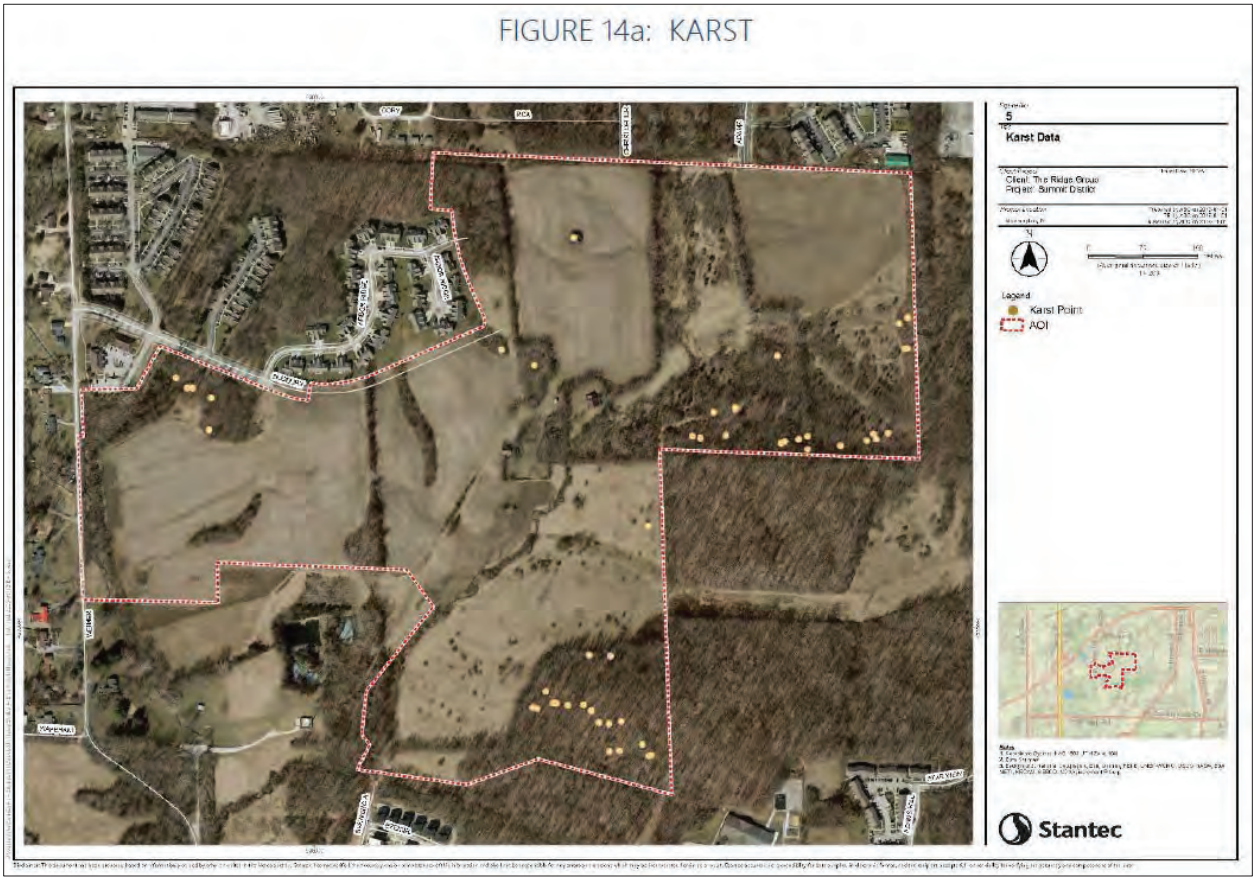


Figure 5. Map of karst areas and springs in Bloomington and surrounding areas
The dark shaded areas above represent the larger karst areas in Bloomington. The shaded triangles represent approximate spring locations. Overall, surficial karst features cover 3% of Bloomington's land area, and there are over 20 perennial springs currently inventoried.

In regard to karst features, the Petitioner (Sudbury Development Partners, LLC) provided a map, "establishing specific environmental site features" (FIGURE 14a: KARST) in its Preliminary Plan. FIGURE 14a: KARST can be found on Page 159 of the meeting packet of the July 10 Plan Commission meeting. See screenshot below for the map provided by the Petitioner.



One can easily count approximately a total of 45 to 48 yellow dots (some adjacent to each other) representing karst features dotted all around the Summit District PUD, with several of them being in very close proximity to each other. It is unclear whether these karsts are surface, subterranean (surface) or compound. A quick search in the PDF did not produce any further explanation from the Petitioner. The Petitioner did not request exceptions on karst, so the Unified Development Ordinance (UDO) of the City of Bloomington applies.

Chapter 20.04.030 (g) Karst Geology of the UDO states that

> This section shall apply to all land-disturbing activities on properties that contain surface and subsurface karst features.

Compound Kast Features is defined in Chapter 20.07.010 Defined Words of the UDO as

> Karst, Compound

> Any two or more karst features where the last closed contour of the features is located within one hundred feet of each other. The outer boundary of the compound karst feature shall be drawn by connecting the last closed contour of each individual karst feature with a tangential line.

We request that subsurface and compound karst features be identified in order to meet the requirements set forth in the UDO.

We request that a multi-phase karst investigation that is accordant with the latest State requirements and recommendations be conducted. “Proper Investigative Techniques in Karst, IDEM Technical Guidance Document, Updated: October 2021) states,

> Environmental investigations in karst areas present unique problems. Conventional site investigation methods and installation of monitoring wells may not provide an accurate picture of how contaminants behave in a karst aquifer. Because of the very different morphological and hydrological features, investigations in karst do not typically employ the same techniques used in site characterizations conducted in non-karst environments. The guidance in this document will assist in the proper characterization of a site located in a karst area and provide information on the IDEM preferred method to conduct the 2 different types of dye tracing.

The development proposed by the Petitioner is unprecedentedly dense and aggressive in nature. Would we even have comparable case studies to reference across the country to ensure that development does not result in devastating long-term effects to the karsts and surrounding areas?

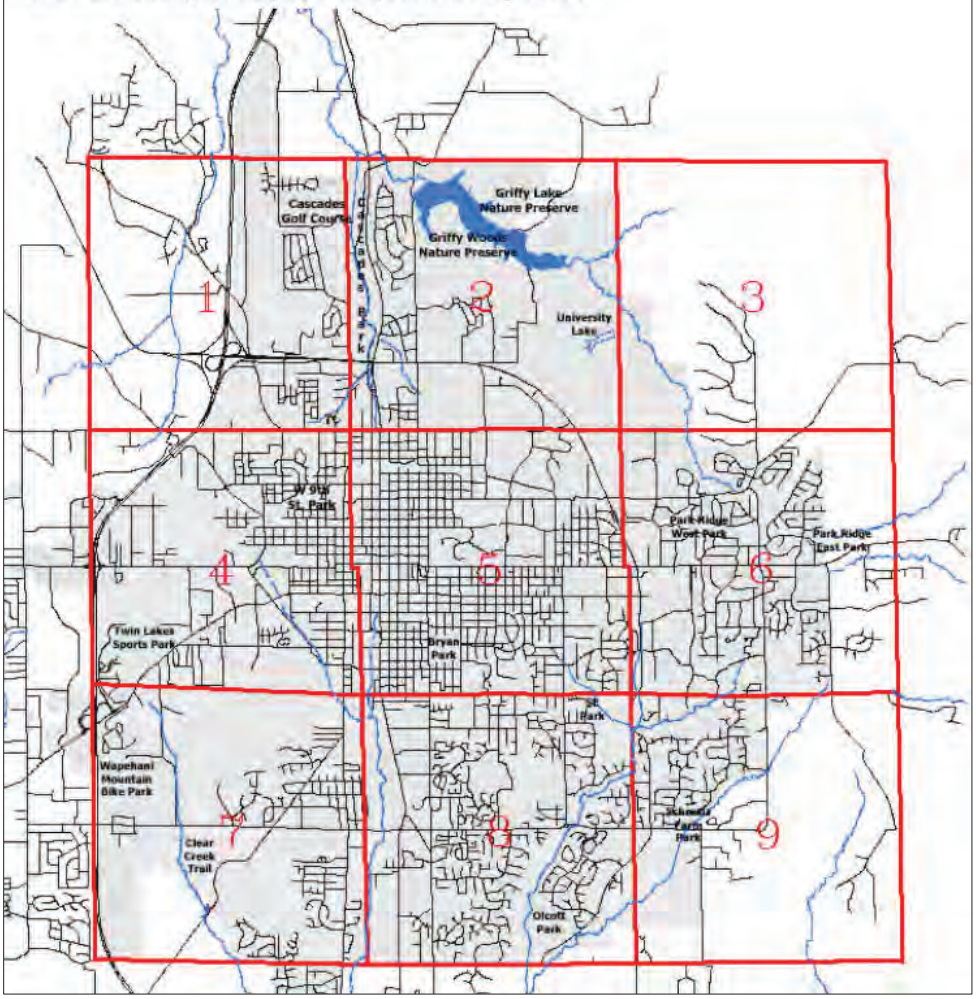
VII. Environmentally Sensitive Areas

In addition, “the City of Bloomington’s Planning Department evaluated and ranked natural areas in Bloomington using an environmentally sensitive areas (ESA) analysis” … “to better understand their (i.e., natural resources) roles and functions they must be studied as an interconnected system”.

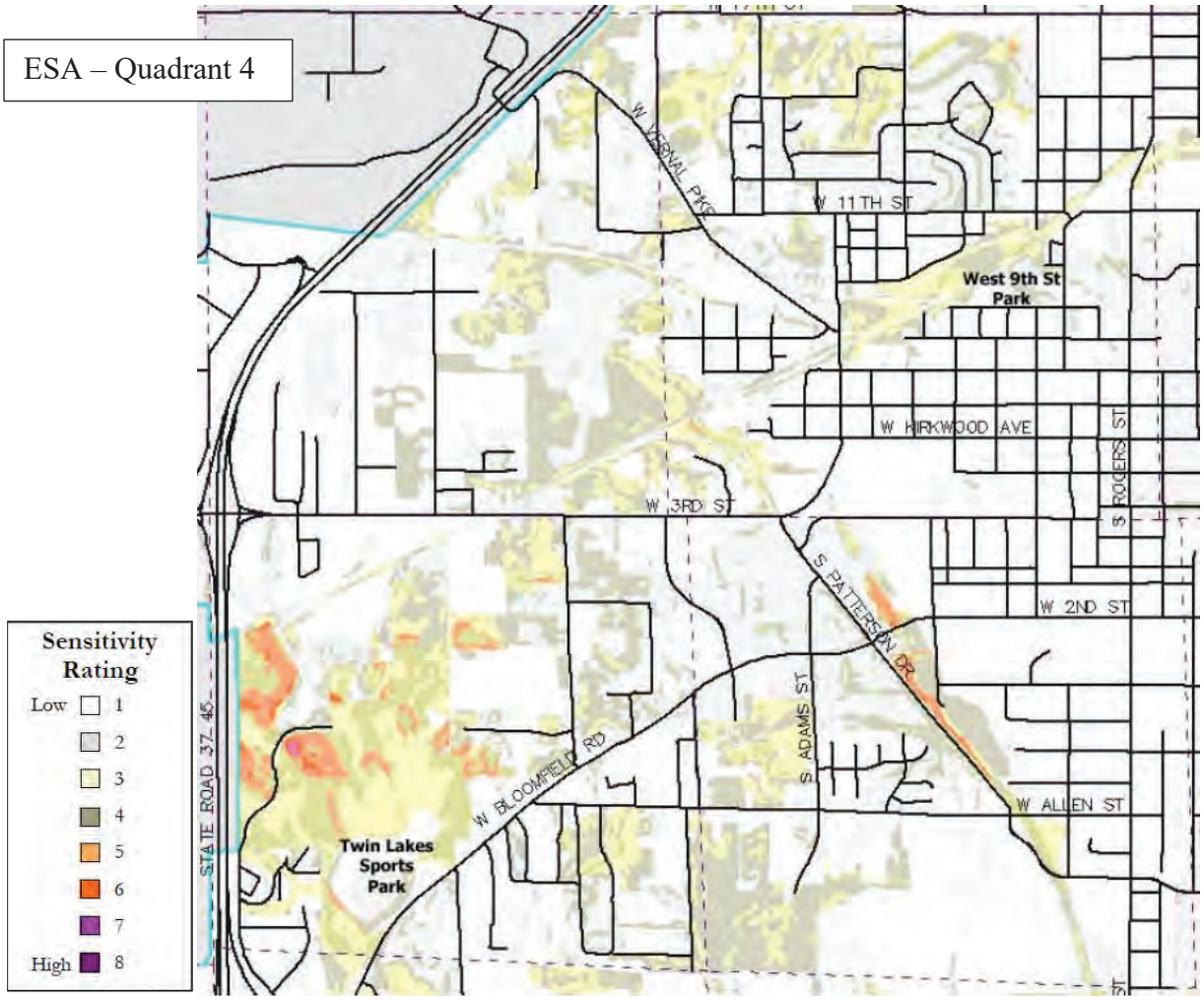
The figures below are screenshots of the Environmentally Sensitive Areas Quadrant Index Map, Quadrant 4, and Quadrant 7 from the COBERI report.

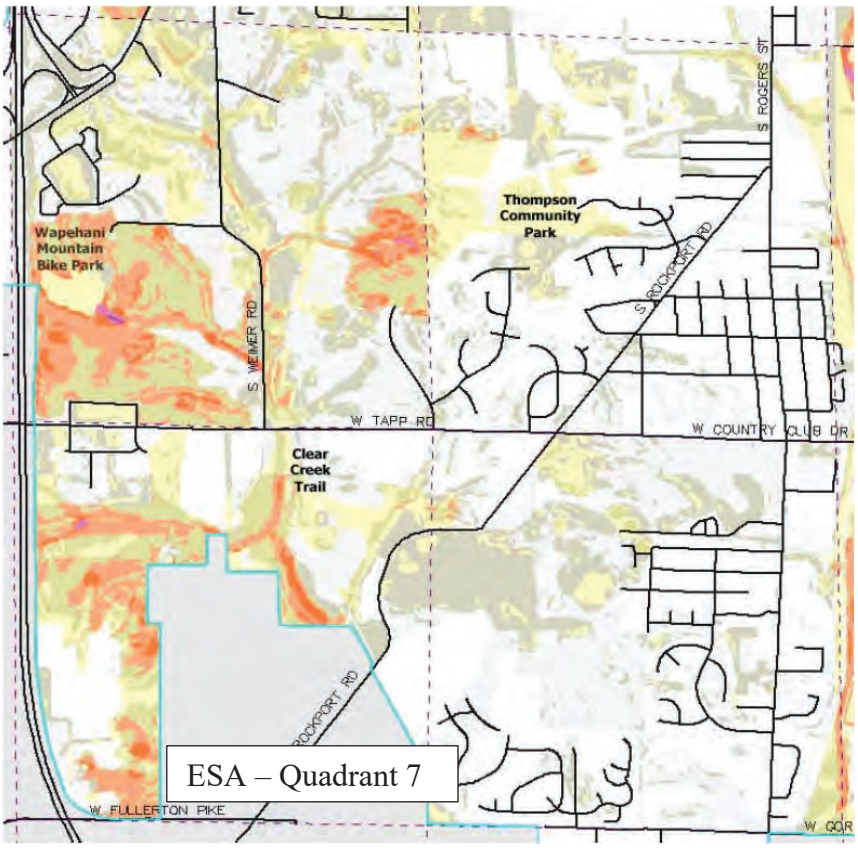
APPENDIX A

Environmentally Sensitive Areas Quadrant Map Index



ESA – Quadrant 4





The southern portion of the Summit District PUD is ranked high on the Sensitivity Rating, depicting the highly sensitive and diverse nature of the area.

VIII. Comparison with Brown's Woods

Brown's Woods sits at 16 total acres on the west side of town sandwiched between Interstate 69, Forest Ridge Apartments, Limestone Crossing Apartments and the Indiana Rail Road.

The two screenshots below are taken from the "City of Bloomington Parks and Recreation Department Master Plan 2021 – 2025".

PARK METRICS

- No metrics as of yet.

72 | Bloomington Parks Comprehensive Master Plan

Brown's Woods

Browns Woods sits at 16 total acres on the west side of town sandwiched between Interstate 65, Forest Ridge Apartments, Limestone Crossing Apartments and the Indiana Rail Road. The undeveloped woodland is loaded with karst topography and full of sink holes making it perfect for a trail walk. The land has no plans for futher development as of yet, but with the nearby Twin Lakes Sports Park this parkland could potentially be linked with via trail system and, and serve as additional nature park for the parks system and require little maintenance. With limited access (2 points) this would prohibit certain park development. Nonetheless, the property serves to be a considerable asset for the surrounding residents.

Accessibility
- Not ADA accessible

Park Address:
101 W Kirkwood Ave Ste 307
Bloomington, IN 47404

The Parks and Recreation Department pointed out that Brown's Woods – the "undeveloped woodland is loaded with karst topography and full of sink holes making it perfect for a trail walk".

Based on the karst features map (See below) in the COBERI report, both Brown's Woods and a significant portion of the Summit District PUD are covered in the dark shaded purple. One can deduce that they are equally loaded with karst topography and full of sink holes, making them both perfect for a trail walk or some other suitable park or recreational use, and assumably not perfect for high density residential development.

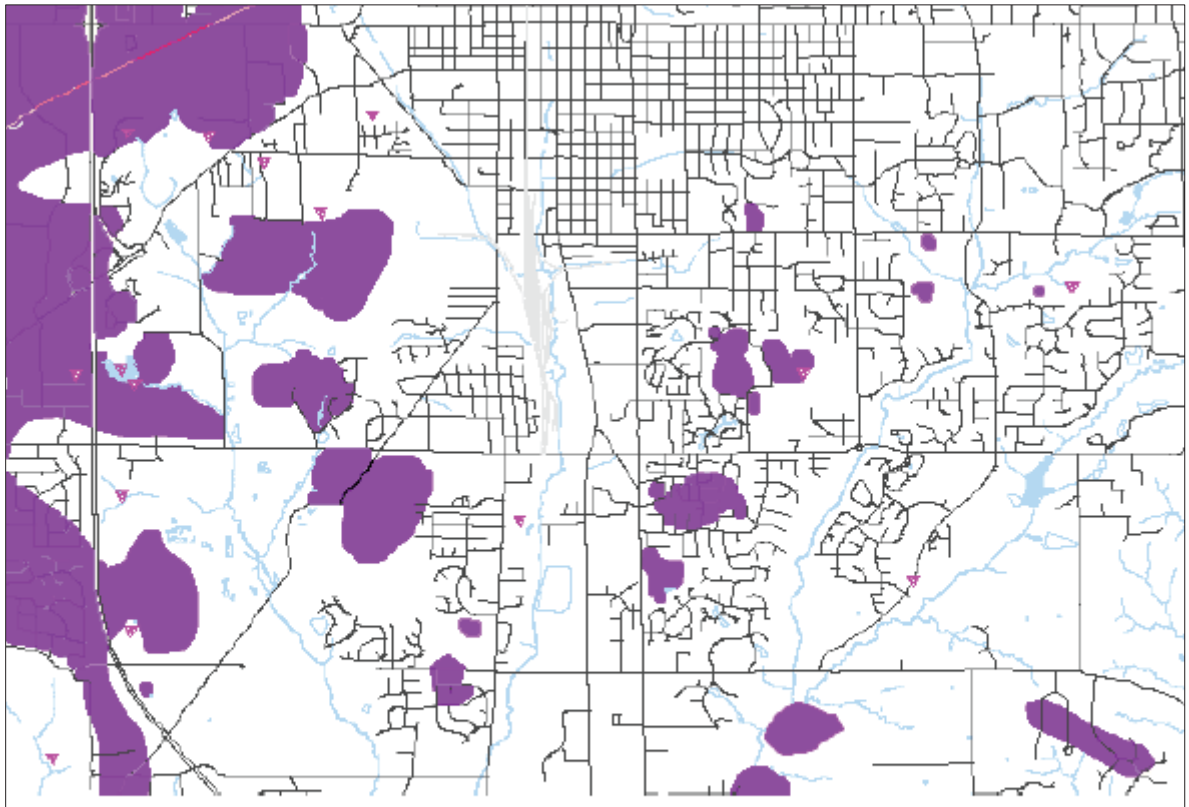


Figure 5. Map of karst areas and springs in Bloomington and surrounding areas
The dark shaded areas above represent the larger karst areas in Bloomington. The shaded triangles represent approximate spring locations. Overall, surficial karst features cover 3% of Bloomington's land area, and there are over 20 perennial springs currently inventoried.

The Parks and Recreation Department goes on to state that,

> The land has no plans for further development as of yet, but with the nearby Twin Lakes Sports Park this parkland could potentially be linked with via trail system and serve as additional nature park for the parks system and require little maintenance. With limited access (2 points) this would prohibit certain park development. Nonetheless, the property serves to be a considerable asset for the surrounding residents.

Is the area too “loaded with karst features” and too “full of sinkholes”, causing delay of further development of trail connection and nature park? Nevertheless, even in its current state, the Parks and Recreation Department considers the “property to be a considerable asset for the surrounding residents”.

Also, using the Environmentally Sensitive Area – Quadrant 4 and 7 maps for a comparison of both Brown’s Woods and Summit District PUD, one can see that they both contain portions that are high on the Sensitivity Index.

If Brown’s Woods is too loaded with karst features and sink holes and too high on the sensitivity index, why is an area (Summit District PUD) equally sensitive and rich in karst features, suitable for development?

IX. Other Concerns and Summary

Besides the environmental questions and concerns stated above, we also noticed that the Petitioner did not organize a Pre-Submittal Neighborhood Meeting as required by the UDO. Under *Chapter 20.06.040 Common Review Procedures, Section (b) Pre-Submittal Activities, sub-section (3) Pre-Submittal Neighborhood Meeting*, one can find the purpose, applicability, and the notification process, etc. of a Pre-Submittal Neighborhood Meeting.

> Chapter 20.06.040(b)(3)(A) Purpose
>
> The purpose of the pre-submittal neighborhood meeting is to allow residents, businesses, and organizations in the area surrounding a proposed development project an early opportunity to learn about the project details and to provide feedback to the petitioners before significant funds have been spent on project design and engineering.
>
> Chapter 20.06.040(b)(3)(B) Applicability
>
> A pre-submittal neighborhood meeting shall be required as indicated in Table 06-1: Summary Table of Review Procedures.

Table 06-1: Summary Table of Review Procedures

R = Review and Recommendation D = Decision A = Appeal * = Public Hearing Required

Procedure	UDO Section	Public Notice			Pre-Submittal Activities			Review and Decision-Making Bodies						
		Published	Mailed	Posted	Pre-Submittal Meeting	DRC Meeting	Neighborhood Meeting	Staff	Plan Commission	Plat Committee	Board of Zoning Appeals	Common Council	Hearing Officer	Historic Preservation Commission
Vacating Plat	20.06.060(d)	✓	✓	✓	✓	✓		R	D*/A	D*				
Plan/Ordinance Amendments														
Comprehensive Plan Amendment	20.06.070(a)	✓						R	R*			D*		
Zoning Map Amendment	20.06.070(b)	✓	✓	✓	✓	✓	✓	R	R*			D*		
Rezoning to Planned Unit Development (PUD)	20.06.070(c)	✓	✓	✓	✓	✓	✓	R	R*			D*		
Zoning Text Amendment	20.06.070(d)	✓	✓		✓			R	R*			D*		
Flexibility and Relief Procedures														
Minor Modification	20.06.080(a)				✓			As required for associated petition						
Variance	20.06.080(b)	✓	✓	✓	✓			R			D*/A		D*	
Administrative Interpretation	20.06.080(c)							D			A			
Administrative Appeal	20.06.080(d)	✓	✓					R			D*			

Staff at the Plan Commission has stated in its staff report (Page 86 of the July 10 meeting packet), “the petitioner is requesting a map amendment to rezone the property to a new PUD, which includes the approval of a new District Ordinance and Preliminary Plan”, which, per Table 06-1: Summary Table of Review Procedures, a Pre-Submittal Neighborhood Meeting is required for “Zoning Map Amendment”.

It also has not gone unnoticed to us that the Petitioner’s Preliminary Plan is very similar in font, font size, numbering system, footer style, table style to the City of Bloomington’s UDO. Other development projects’ planning documents do not seem to share this striking similarity!

In summary, we would like to encourage the Plan Commission and City Council members to put the environment at the foremost of Bloomington’s growth and development, as the City of Bloomington has strived do. The City of Bloomington stated in its “2018 Comprehensive Plan” that it “has a long-held commitment to protecting the environment”. The city also aims to “introduce ways to ensure that the current natural environment is not only protected, but nurtured and enhanced for the future”. Further, the City stated that “we have ways of thinking about what environmental protection is, and how it is accomplished now, that are different than years ago, and the philosophy of this chapter reflects that change.”

It’s important to note that the 2018 Comprehensive Plan renamed and replaced the Growth Policies Plan of 2002, with the hope that as time has changed, so should our plan; except that no new environmental resource inventory analyses have been conducted since 2003 to inform the

decisions and planning of the City of Bloomington. What was supposed to be “part of a larger, on-going project that provides the factual foundation to further develop sustainable land-use and land development strategies for the City of Bloomington” did not lead to any on-going project that we could identify online.

As emphasized by the EC, the numerous exceptions to the UDO do not offer the assurance that the proposed use and development will be designed to minimize negative envrionmental impacts and not cause significant adverse impacts on the natural environment. We share the same concern.

“Climate, thus environmental, change has long term impacts on all residents and must be prioritized”. We urge the Plan Commission to hold the Petitioner and all other developments to the integrity and best practices required of them in the UDO and all available environmental protection guidelines/requirements, and only allow for exceptions that will not negatively affect the environment both in the short-term, and the long-term.

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

PUD-18-23 Sudbury Development Partners LLC

2 messages

Joseph McKenna <joemckenna_07043@yahoo.com> Thu, Aug 17, 2023 at 3:22 PM
To: "scanlanj@bloomington.in.gov" <scanlanj@bloomington.in.gov>

Good Afternoon

I am an Arbor Ridge resident and my wife and I attended the meeting on Monday August 14.

I want to echo the concerns of my neighbors:

density, drainage, traffic conditions including current state of Weimer Road, along with environmental concerns.

I know that that property will be developed eventually, but the number of units seems high.

Finally, from my own personal experience, there is a lot of wildlife living in the area -- everything from deer to turtles.

We appreciate your efforts to keep the residents in the area informed.

Thanks
Joseph McKenna
1984 W Arbor Ridge Way
Bloomington, IN 47403
973 766 3428

Jacqueline Scanlan <scanlanj@bloomington.in.gov> Wed, Aug 23, 2023 at 8:48 AM
To: Joseph McKenna <joemckenna_07043@yahoo.com>

Thank you, Mr. McKenna. I will add this to the letters for the September hearing. We appreciate you being involved.

Thanks,
Jackie Scanlan, AICP
Development Services Manager
[Quoted text hidden]

Bloomington Plan Commission,

I would petition the commission to show some **respect** and **consideration** for the established neighborhood of Arbor Ridge by not connecting Arbor Ridge Way to the new development.

There are many foreseeable issues that could arise by extending Arbor Ridge Way:

1. The Arbor Ridge home owners are a predominately elderly population so safety is an utmost concern as it is likely cars from the new development will speed down our street. Our street is narrow, curvy and on a hill. It already is often down to a single lane as delivery vehicles, service vehicles and visitors of residents park on the street causing us to have to manipulate the curves with decreased visibility.

2. I also envision cars from the Sudbury development coming down onto our street to park.

3. Arbor Ridge Way will not sustain such an increase in traffic. Not to mention how disruptive this would be to our small, quiet 20 year old neighborhood. We all have to back out of our drives to get to the street so dealing with frequent oncoming cars would be a big safety issue. Also it is expected there would be traffic through our quiet neighborhood at all hours of the night.

4. We would appreciate staying as separate as possible from this vast development. Keeping the tree line at the end of Arbor Ridge Way intact would help us maintain some of our privacy and ensure more safety to our residents. Taking away our privacy and the separateness from the development would undoubtedly, in the long run, make our property less desirable and could ultimately decrease our property values.

5. The main issue is it is not necessary to connect the streets. Sudbury Drive through the development will come out at the same spot Arbor Ridge Way does, so there is no need for people to have to come through our neighborhood to arrive at the same location. It would be understandable to connect these roads if Arbor Ridge Way was the only access to get to Sudbury Dr. but since it is not, there is no advantage to do so.

A lot if future issues could be avoided by **not** extending Arbor Ridge Way. I do not see connecting our neighborhood to the Sudbury development as a benefit but as a definite detriment to our community.

Respectfully Submitted,

Pamela Arthur
18 year Arbor Ridge homeowner
1575 S. Arbor Ridge Ct.

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

Sudbury PUD

2 messages

Steve Smith <slsmith@smithdginc.com> Tue, Jul 11, 2023 at 3:35 PM
To: "ron.smith@bloomington.in.gov" <ron.smith@bloomington.in.gov>, "scanlanj@bloomington.in.gov" <scanlanj@bloomington.in.gov>, "robinsos@bloomington.in.gov" <robinsos@bloomington.in.gov>, "andrew.ciber@bloomington.in.gov" <andrew.ciber@bloomington.in.gov>

Greetings,

I casually watched last night's Plan Commission meeting but got drawn in by the amazing details of the Sudbury proposal that prompted me to write this message to you. By my calculations the proposed Sudbury PUD is about 1.5 to 2.0 times the density of the K-mart multifamily site and about eight times larger in area. I use the K-mart site for comparison because it is so visible and because I have heard only negative and sometimes very negative comments about it from my friends and neighbors. The K-mart site plan very effectively uses nearly all of the site and for Sudbury to be denser by a factor of 1.5 to 2.0 means that it must go higher; and K-mart site is already I believe up to 5 stories. I do not believe that those in attendance at the hearing (plan commissioners, public or staff) understand the immensity of the proposal.

The petitioner presented a perspective concept for the site at the meeting, but when questioned he indicated that it was not a true representation of what would be developed. A 2-D plan was included in the staff report page 240. I believe that to get between 4400 and 6000 units on that site, it will need to look like the drawing presented and will be the equivalent of more than 13 K-mart sites (based on number of units).

The K-mart site has 340 units on about 12 acres for 28 units per acre. The K-mart site plan is efficient with no land lost to environmental features, thoroughfares etc.

The 140 acre Sudbury site will lose about 40 acres to environmental features and through roadways leaving about 100 acres for development. The density of the developed area will be between 44 and 60 units per acre. This is about 1.5 to 2.1 times denser than the K-mart site.

- Sudbury is 1.57 to 2.14 times as dense as K-mart
- Sudbury would be equal to 8 K-marts based on acreage
- Sudbury would be equal to 13 to 17 K-marts based on number of units

Traffic was mentioned at the hearing and apparently a traffic study will be done. Rough projections are about 6 trips per day for each multifamily unit. Assuming a maximum of 6,000 units results in 36,000 newly generated trips per day. A two-lane road like Weimer or Adams typically can accommodate 3,000 to 5,000 ADT at a reasonable level of service. This doesn't account for the issues that those roads currently have.

Again, back to K-mart; there are traffic concerns though I think they are not warranted. The K-mart site with 340 units fronts on a State Highway with two signalized intersections and reasonable cross connections via Clarizz and entry to the College Mall. K-mart will largely serve students whose destination is a direct bus ride away. Sudbury, at 13 to 17 times the number of units, has access via 2 lane Weimer and Adams and is not close to the University or empoyers.

Traffic will be a problem.

One of the neighbors noted that this project proposes more units in the next eight years than the total projected need in the City. I would add that historically there have been about 500 new units in Bloomington each year (going back for 15 years). This project alone proposes up to 750 units per year. The math does not work.

I am writing to help ensure that all involved understand the immensity of the propsal. A shocking proposal that I believe is not consistent with the vision of our community as expressed in numerous plans

over the years and the current PUD zoning of the site.

thanks for your time
Steve Smith
Retired Professional Engineer and Land Surveyor

Jacqueline Scanlan <scanlanj@bloomington.in.gov> Tue, Jul 11, 2023 at 3:49 PM
To: Steve Smith <slsmith@smithdginc.com>

Thanks, Steve! I'll look through this and make sure we're discussing the issues clearly.

Thanks,
Jackie
[Quoted text hidden]

JOHN A. SCOTT
1966 W Arbor Ridge Way
Bloomington, IN 47403

August 1, 2023
Plan Commission
4071 N Morton St.
Suite130
Bloomington, IN 47404

President of the Commission

I am writing in response to the Sudbury Partners LLC petition. requesting an amendment to rezone the 140 Acres known as Sudbury Farm increasing the density of the current PUD zoning to a new PUD that will allow up to 6,000 new housing units. I am opposed to the plan as put forth by Sudbury Partners LLC and Sullivan Development.

The Commission needs to say no to issues 1 to 5 as expressed on page 89 of the July presentation.
The petitioner is requesting the following changes to the present zoning.

1. Density
2. Building Height Standard
3. Parking Square Footage
4. Environmental Requirements/Impact

Density

The proposal by the above seeks several changes in their request that are well beyond the density for the area. Taking their maximum number of units and the ratio for Bloomington of 1.99 to 2.09 individuals per housing unit and using the formula To calculate the population density (divide the population by the size of the area) Population Density = Number of People/Land Area. The unit of land area should be square miles or square kilometers. The figure 1.99 x 6,000 = 11,940 People. Using 2.09 x 6,000 = 12,540 people for the area. Converting 140 acres to square miles gives the figure 0.21875 square mile or 21.8% of a mile or 12,540 individuals living in under a square mile. This well exceeds the present number per square mile when compared to the overall density of Blooming using 2021 figures the population of Bloomington at 79,968 divided this figure by Bloomington's Square miles of 23.43 gives a population figure of 3,413 per individuals per square mile.

Building Height Standard

The petitioner is requesting a waiver of the building height standard. The present standard for mixed use under Code20.02.030 is six stories or a maximum not to exceed seventy-five feet. The height of a 7-story building is between 70 to 75 feet depending on the ceiling height. The present zoning allows them to go ahead with the 6-story height. However, a building of that height if built around the perimeter of the property will dwarf the existing neighborhood and homes which are single-family dwellings. Building of this height could block existing views and could cause privacy concerns if overlooking back yards. The addition of another floor benefits the developer in federal funding at the expense of the surrounding

neighborhoods. One of the pluses the developer is citing is the mixed-used development where 15% of the units would be set aside for low-income families. This would set aside 900 units if 6,000 were allowed a very high mixture. There are more benefits to the developer than to the City and Residents of Bloomington. The most common incentive to build mix use is more financial than ultraistic. The benefits are usually, zoning variances, such as reduction in site development standards, modification of architectural design and reduction in parking standards, all things the developers is seeking. There is also the issue of the density bonus granted to buildings accommodate a fair share of affordable units. The developer does not attempt to cite the impact this number of residents will have on Police, Fire, Sanitation and Schools. Summit Elementary would require an addition to be built. There is also a need for a police substation as well as the fire department.

Environmental

The Bloomington Environmental Commission in its July 13 memo stated it has not toured the site and is unable to make an assessment as to the scope the project will have on the environment. The Commission mentions that there are countless environmental features dotting the area and the request for numerous environmental changes will have excessive impact on environmental resources. 1. Runoff - one thing not mentioned is the issue of Runoff or NPS pollution caused by rainfall and snowmelt causing erosion and Runoff which picks up fertilizer, oil, pesticides, dirt, bacteria, and other pollutants as it makes its way from the roads, sidewalks and lawns which empty into

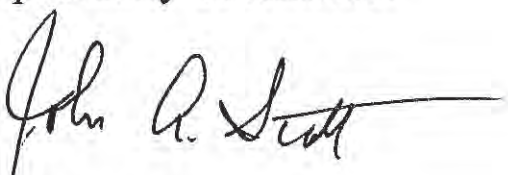
storm drains and ditches. 2. Water, Sanitation and Storm management issues have not been addressed. The partitioner has not provided a valid Environmental Impact Statement.

Traffic

The issue of Streets and Roads has not been adequately or clearly addressed. Depending on the final number of units approved, the number of cars can be anywhere from 6,000 to 9,000 cars assuming a ratio of 1.5 cars per unit which allows for units with no cars and those having two or more. This number of cars will cause extensive use of the following streets based on the vagueness of their plan, Weimer Rd, S. Adams St, W. Tapp Rd, W. Cherokee DR, W. Chambers DR, W. Duncan DR, W. Guy Ave all which can be potentially connected to depending on the layout of the development leading to potential degrading due to the intensity of the additional traffic as cars heading to I69 and down Country Club to Walnut. The last Traffic count conducted for W. Tapp Rd was done in 2019 with an average count of 13,806 cars a day.

I believe the present PUD standards should be maintained they were well thought out and represent the best utilization of undeveloped land. The present PUD plan creates realistic size neighborhoods creating cohesive communities.

Respectfully submitted.



John A. Scott

BLOOMINGTON

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

Sudbury PUD

Steve Smith <slsmith@smithdginc.com> Tue, Jul 11, 2023 at 3:35 PM
To: "ron.smith@bloomington.in.gov" <ron.smith@bloomington.in.gov>, "scanlanj@bloomington.in.gov" <scanlanj@bloomington.in.gov>, "robinsos@bloomington.in.gov" <robinsos@bloomington.in.gov>, "andrew.ciber@bloomington.in.gov" <andrew.ciber@bloomington.in.gov>

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thanks for your time
Steve Smith
Retired Professional Engineer and Land Surveyor

BLOOMINGTON

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

Fwd: Concern about storm water management regarding the Summit District PUD hearing by Bloomington Plan Commission on July 10, 2023:

1 message

Linda Thompson <thompsol@bloomington.in.gov> Sun, Jul 9, 2023 at 10:36 AM
To: Jacqueline Scanlan <scanlanj@bloomington.in.gov>
Cc: Scott Robinson <robinsos@bloomington.in.gov>

FYI.

---------- Forwarded message ---------
From: **TEDFRICK** <tedfrick@indiana.edu>
Date: Sun, Jul 9, 2023 at 9:48 AM
Subject: Concern about storm water management regarding the Summit District PUD hearing by Bloomington Plan Commission on July 10, 2023:
To: environment@bloomington.in.gov <environment@bloomington.in.gov>

Hello,

Where will the increased storm water run-off go if this proposed PUD goes forward?

My wife and I reside and own our home at 1812 S. Weimer Rd. As adjacent property owners, we recently received notice of the Bloomington Plan Commission hearings in July and Aug. regarding the proposed Summit District PUD. We've lived here since 1977, and have witnessed a number of heavy rainstorms and their after effects along Weimer Road, including:

1. flooding of the southern portion of Weimer Rd. where there is a narrow one-way bridge,
2. flooding in the valley in the northern portion which allows drainage into Clear Creek from the remaining Twin Lake along W. 2nd St. and
3. flooding along the Clear Creek Trail south of Tapp Road.

Storm water run-off from the western portion of the proposed Summit District PUD will be draining into the Clear Creek basin along Weimer Rd., directly across from the Twin Lake drainage basin. The run-off down that steep hillside area is already considerable, with evidence of deepening ravines caused by soil erosion in this now grassy hillside field.

In the current proposed Summit District PUD, it appears that most of the larger buildings will be multi-story, in order to provide up to 6,000 new housing units located on terrain with considerable slopes for storm water runoff. The rough drawing on p. 240 of the proposed PUD is very telling. The majority of the land use would have large buildings containing most of the 6,000 units, likely to be apartments. And that means paved parking lots will also be needed for residents in these larger multi-story buildings.

There will be considerable new non-permeable rooftops, parking lots, sidewalks and streets in the proposed PUD. Unless there is some kind of effective mitigation, storm water run-off will predictably exacerbate flooding issues along S. Weimer Rd. and further south along the Clear Creek Trail when there are heavy rainstorms.

The removal of the dam and draining of Weimer lake in the Wapahani Mountain Bike Park several years ago has already created more flooding issues surrounding the narrow bridge on the southern portion of Weimer Rd. Up until then, we do not recall any flooding along Weimer Rd. after heavy rainstorms—in the past 46 years we have lived here. More recently, flooding across Weimer Rd. has happened several times since the Weimer Lake dam was removed. Although this is not part of the proposed PUD, it is nonetheless a contributing factor to more flooding along Clear Creek near Tapp Rd. The PUD would likely contribute even more run-off to an already existing issue.

In summary, storm-water management is our biggest concern about the proposed PUD and the potential impact this would have on flooding along S. Weimer Rd. Increasing non-permeable surface areas in this hilly terrain will mean less water soaks into the soil and more water runs downhill.

Ted and Kathy Frick
1812 S. Weimer Rd.

Bloomington, IN 47403

--

Linda Pride Thompson
she/her
Senior Environmental Planner
Environmental Commission Administrator
Planning and Transportation Department
City of Bloomington
401 N. Morton St., Suite 130
PO Box 100
Bloomington, Indiana 47402
main office phone 812.349.3423
fax 812.349.3520
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mobile 812.369.0666

BLOOMINGTON

Jacqueline Scanlan <scanlanj@bloomington.in.gov>

Comments for PUD-18-23: Sudbury Development Partners, LLC. (Summit District PUD) South Weimer Road

Thomas Landis <landis.thomas@gmail.com> Wed, Nov 1, 2023 at 2:48 PM
To: scanlanj@bloomington.in.gov

Dear Planning Staff, Plan Commission, and Members of the Public,

This letter is in support of the Sudbury project and the idea of urban and suburban density in Bloomington. As a member of the community and real estate business owner, I support this project for the reasons many are against it: environmental conservation and affordable housing options.

My wife and I first moved to Bloomington in 2014. We were surprised to learn that while the city and the county both appeared to advocate against urban sprawl, the city rejected tall buildings and the county rejected small lots. I was struck, if the city cannot build up and the county cannot build close, how is sprawl not the only option? Especially when by-right zoning makes most forms of housing illegal except the single-family house.

We see the negative impact of urban sprawl in our community, across the nation, and around the world. Various non-profits like the Urban Land Institute and Strong Towns demonstrate how low-density housing concentrates wealth and leads to environmental degradation. At the simplest level, limited supply increases the market price of a house and leads to larger houses to support building costs. The increasing footprint leads to more non-native (and chemically manicured) lawn space and impermeable surface that exacerbates water runoff and limits biodiversity.

Encouraging dense development outside of the downtown area creates the potential for responsible growth that can exemplify the best of what real estate can offer: vibrant community, harmony between the built and natural environment, jobs for those servicing the shops and merchants created in a master planned community like this, and an example for others to follow.

The proposed development has the potential to provide much-needed housing and contribute to a more sustainable and equitable urban landscape. I support it.

Sincerely,
Thomas Landis

Dear Marsha, Saturday, July 7, 2023

Do you know or remember that Pauley's original plan showed Sudbury Drive NOT dead-ending where it does? His Plan showed Sudbury Drive continuing straight East behind our first 3 condos on the South side as you enter AR and continuing straight East fairly close to Leland & Betty Christman's condo and very close (behind) Andrew Vogel's 1569 S. AR Ct., still running East to eventually bisect a continuing Adams Street. Our condo at 1559 S. AR Ct would be effected, since that 2002 or 2003 plan also showed a new street behind our condo, which ran North/South thru the Karst and also bisected an extended E/W Sudbury Drive.

I'm bringing this up because below our hill in back and running at an angle from about 20 yards behind our 1559 condo NW to SE is an area of KARST which probably ends about 50 yards to the SE of 1559. It's a narrow strip of karst, true, but where it ends there is definitely a very smallish cave. My point is that I never could understand why Pauley had been allowed originally (evidently) to cross that narrow strip of Karst with 2 planned Streets. If one continues on SE from the little cave, there is a much larger area of Karst which ends near the road/path of dirt that the Sudburys used to access their old barn and their house.

I know that area, and in fact almost ALL the area that will be developed. Harvey Sudbury gave me the run of his entire property for several years, so I know the whole area well, clear to the back of RCA (?) park etc, plus the area where new electrical towers run through East/West clear to the new apartment buildings Pauley built 2/3 of a mile Northeast of AR. Anyway, my whole point is that I do NOT think a developer should be allowed to put streets or any houses or yards where Karst exists!

I will not attend meetings that our AR Board attends regarding ins and outs of the Sudbury Development, but I want you and the Board to know of my concerns. The 2 places of Karst I mention are not the only places on the entire 150 acres where Karst exists. If you feel our AR Board needs to know more about where the Karst is on that land, I'd be glad to show Dennis Drake the spots I'm bringing up and/or we could check out any place on the 150 acres you/we need to know about.

thanx — Tom F.

Summit District PUD

Traffic Impact Analysis

Bloomington, Indiana

March 15, 2024

Prepared For:
TRG Development, LLC

Prepared By:
EMCS, Inc.

Indianapolis
9955 Crosspoint Blvd, Ste 150
Indianapolis, IN 46256
317.343.2923

Milwaukee
1300 West Canal Street, Ste 200
Milwaukee, WI 53233
414.347.1347

Wausau
500 North 17th Avenue
Wausau, WI 54401
715.845.1081

Madison
1600 Aspen Commons, Ste 230
Middleton, WI 53562
608.827.8810

www.emcsinc.com

I certify that this Traffic Impact Analysis has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

Amanda M. Johnson, PE, PTOE
Indiana Registration #PE11200692
EMCS, Inc.

_____

Daniel Dugan, EI
ET32200115
EMCS, Inc.

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Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to identify the potential intersection improvements needed due to the proposed Summit District Planned Unit Development (PUD). The 138.5-acre site is located approximately 1.5 miles southwest of downtown Bloomington, IN. Summit District PUD will include residential and commercial uses. This report documents the analysis and findings.

Study Area

The study area consists of an area roughly bounded by the arterials of Bloomfield Road, Walnut Street, Tapp Road; and Interstate 69. The existing study intersections are:

1. Bloomfield Road & Recreation Center Drive (unsignalized)
2. Bloomfield Road & Weimer Road (unsignalized)
3. Bloomfield Road & Rolling Ridge Way (signalized)
4. Bloomfield Road & Allen Street (unsignalized)
5. Bloomfield Road & Landmark Avenue (signalized)
6. Bloomfield Road/2nd Street & Adams Street (signalized)
7. 2nd Street & Patterson Drive (signalized)
8. Tapp Road & Deborah Drive (signalized)
9. Tapp Road & Vanguard Parkway (unsignalized)
10. Tapp Road & Weimer Road (unsignalized)
11. Tapp Road & Adams Street (roundabout)
12. Tapp Road/Country Club Drive & Rockport Road (signalized)
13. Country Club Drive & Rogers Street (signalized)
14. Country Club Drive/Winslow Road & Walnut Street (signalized)
15. Weimer Road & Sudbury Drive (unsignalized)
16. Weimer Road & Wapehani Road (unsignalized)
17. Allen Street & Adams Street (unsignalized)
18. Allen Street & Strong Drive (unsignalized)
19. Patterson Drive & Allen Street (signalized)
20. Patterson Drive & Fairview Street (signalized)
21. Patterson Drive & Rogers Street (signalized)
22. Walnut Street & Grimes Lane (signalized)
23. Rogers Street & Rockport Road (signalized)

Proposed Development

The proposed development will be located south of Bloomfield Road and will be constructed in five zones consisting of single-family and multifamily housing. There will be a total of 4250 units built by 2034, including 835 single family houses. The development will be accessed by proposed roadway connections to the existing city street network. Sudbury Drive will be connected from Weimer Road to Adams Street. Adams Street will be connected to Allen Street in the north and Tapp Road in the south. These proposed accesses are expected to be open to all modes of traffic by opening day.

Phase	Multifamily Units	Single-Family Units	Ground-Floor Commercial (1000 sf)
Opening Day 2029	1283	553	20
Full Build Year 2034	2132	282	45
Subtotal	3415	835	65
Total	4250		65

Traffic Forecast

Existing turn movement counts were collected at each of the study area intersections. A background growth rate of 0.5% per year was then applied to each turning movement to obtain background opening day traffic volumes. See **Section 3.2** for more information. Existing traffic was then redistributed to the proposed Adams Street and Sudbury Drive connections. Finally, proposed trips from the new development were added to develop traffic forecasts for the following scenarios:

- Scenario 1: Existing Year 2023 volumes
- Scenario 2: Opening Day background 2029 volumes + Phase 1 site generated trips
- Scenario 3: Full Build Year background 2034 volumes + Phase 1 site generated trips
- Scenario 4: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips
- Scenario 4A: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips + proposed improvements

Analysis

A capacity and queuing analysis was performed for all study intersections using existing signal timings provided by the City of Bloomington for all study scenarios.

Non-Motorized and Transit Access

A review of existing bicycle and pedestrian facilities was conducted. The proposed Summit PUD will be in close proximity to the B-Line trail, B-Link Trail, and Clear Creek Trail. Many existing sidewalk facilities are present to provide access to these trails. An additional connection east through the development with a mid-block crossing on Rogers Street would increase access to the B-Line trail system.

Additionally, bus stop locations were reviewed. Although existing bus routes travel through the study area, the nearest stop would be an approximate 1-mile walk. Bloomington Transit has shown interest in expanding bus service along the proposed Adams Street connection from Tapp to 2nd Street which would increase access to bus facilities for the Summit PUD.

Findings and Recommendations

All six proposed internal intersections operate at or above acceptable levels of service during both peak hours of all scenarios with the proposed lane configurations. The following existing intersections operate at or above acceptable levels of service during both peak hours of all scenarios and do **not** need improvements:

- Bloomfield Road & Rolling Ridge Way
- 2nd Street & Patterson Drive
- Tapp Road & Deborah Drive
- Tapp Road & Adams Street
- Weimer Road & Sudbury Drive
- Weimer Road & Wapehani Road
- Allen Street & Strong Drive
- Patterson Drive & Allen Street
- Patterson Drive & Fairview Street
- Rogers Street & Rockport Road

The following table shows the intersections that need improvements by phase:

Existing Year 2023 — Without Development

Intersection	Improvement
4. Bloomfield Road & Allen Street	Install EB Right- & NB Left-Turn Lanes
5. Bloomfield Road & Landmark Avenue	Adjust Signal Timings
13. Country Club Drive & Rogers Street	Adjust Signal Timings, Install WB Right-Turn Lane

Opening Day 2029 — With Phase 1 (1836 Units)

Intersection	Improvement
2. Bloomfield Road & Weimer Road	Install Traffic Signal, Install NB Right-Turn Lane
9. Tapp Road & Vanguard Parkway*	Install Left-Turn Acceleration Lane

*Only recommended provided Weimer Road is realigned to Vanguard Parkway

Full Build Year 2034 — With Phase 1 (1836 Units)

Intersection	Improvement
22. Walnut Street & Grimes Lane	Adjust Signal Timings

Full Build Year 2034 — With Phases 1 & 2 (2414 Additional Units)

Intersection	Improvement
6. Bloomfield Road/2nd Street & Adams Street	Adjust Signal Timings
12. Tapp Road/Country Club Drive & Rockport Road	Adjust Signal Timings
14. Country Club Drive/Winslow Road & Walnut Street	Adjust Signal Timings
17. Allen Street & Adams Street	Install Turn Lanes on All Approaches
21. Patterson Drive & Rogers Street	Adjust Signal Timings

The following is a detailed description of the needed improvements:

Bloomfield Road & Recreation Center Drive / Weimer Road
The northbound approach to this intersection operates below the acceptable level of service during both peak hours of Scenarios 2, 3, & 4, starting on opening day 2029 with approximately 45% of units constructed. A traffic signal may be warranted based on available data and a preliminary peak hour volume warrant once the development is approximately 45% constructed. The installation of a new **traffic signal** and the addition of a northbound **right-turn lane** are recommended. If a traffic signal is constructed, it is recommended that Weimer Road and the Recreation Center Drive align and that the signal is coordinated with others along Bloomfield.

Bloomfield Road & Allen Street
The Allen Street approach to this intersection operates below acceptable levels of service during the PM peak hour of all scenarios. Adding an exclusive **left-turn lane** to the Allen Street approach and an exclusive **right-turn lane** to the Bloomfield Road eastbound approach are recommended. With these improvements the Allen Street approach will still be below the acceptable level of service during the PM peak hour. However, the available data showed that a traffic signal would likely not be warranted in any scenario. If the demand increases significantly above what is expected in this study, a signal warrant should be evaluated.

Bloomfield Road & Landmark Street
The southbound approach to this intersection operates below acceptable levels of service in the PM peak hour during all scenarios. **Optimized signal timings** are recommended.

Bloomfield Road/2nd Street & Adams Street
This intersection operates below acceptable levels of service during both peak hours of Scenario 4 when 100% of units are constructed and with the current signal timings. **Optimized signal timings** are recommended.

Tapp Road & Vanguard Parkway
This intersection operates below acceptable levels of service during both peak hours of Scenarios 3 and 4, starting in 2034 with no more than 45% of units built and with the volume from the Weimer Road realignment. Building a **left-turn acceleration lane** for the southbound left-turning movement could improve operations by allowing left-turning vehicles to make a two-stage turn if necessary. Adding an exclusive eastbound **left-turn lane** is also recommended. These improvements should be implemented concurrently with the realignment. The available data showed that a traffic signal would likely not be warranted in any scenario. However, the installation of a traffic signal or a roundabout would improve operations at this intersection. Volumes at this intersection should be monitored and reanalyzed when the Weimer Road realignment project is constructed.

Tapp Road & Weimer Road
The southbound approach to this intersection operates below acceptable levels of service during the PM peak hour of Scenario 1 (existing 2023), and both peak hours of Scenario 2 (2029 with 45% of units constructed). However, since Weimer Road is expected be realigned to Vanguard Parkway before Scenarios 3 and 4, **no additional improvements** at the intersection with Tapp Road are recommended.

Tapp Road/Country Club Drive & Rockport Road
The eastbound through movement has a volume-to-capacity ratio (v/c) >1 in Scenario 4, when 100% of units are built. **Optimized signal timings** are recommended.

Country Club Drive & Rogers Street
The westbound right-turning movement at this intersection has a volume-to-capacity ratio (v/c) >1 in the PM peak hour of Scenario 1 (existing 2023), and the level of service is below acceptable levels during both peak hours of Scenario 4 (2034 with 100% of units constructed). **Optimized signal timings**, coordination with Country Club Drive/Winslow Road & Walnut Street, and an exclusive westbound **right-turn lane** are recommended. After implementation of optimized traffic signal timings, this intersection should be observed for increased volume due to latent demand and signal timings should be adjusted accordingly.

Country Club Drive/Winslow Road & Walnut Street
The westbound approach to this intersection operates below the acceptable level of service in the PM peak hour during all scenarios. **Optimized signal timings** and coordinating signal timings with Country Club Drive & Rogers Street are recommended.

Allen Street & Adams Street

This intersection operates below the acceptable level of service in both peaks of Scenario 4 when 100% of units are constructed. Building an exclusive northbound **right-turn lane**, an exclusive westbound **left-turn lane**, an exclusive southbound **left-turn lane**, and exclusive eastbound **right-turn lane** are recommended. With these improvements it will still operate below the acceptable level of service during the PM peak hour. Alternatively, a future connection to Strong Drive would improve this intersection to an acceptable level of service. A signal or a roundabout at this intersection would also improve it to an acceptable level of service.

Patterson Drive & Rogers Street

The southbound approach of this intersection operates below the acceptable level of service in the PM peak hour during Scenario 4 when 100% of units are constructed. **Optimized signal timings** are recommended.

Walnut Street & Grimes Lane

The eastbound through and right-turning movements at this intersection have a volume-to-capacity ratio (v/c) >1 in Scenarios 3 and 4, starting in 2034 with at least 45% of units constructed. **Optimized signal timings** are recommended.

1.0 Introduction

1.1. Purpose

The purpose of this Traffic Impact Analysis (TIA) is to identify the potential intersection improvements needed due to the proposed Summit District Planned Unit Development (PUD).

1.2. Scope

EMCS coordinated with the City of Bloomington (City) and TRG Development to solidify the scope of this traffic impact analysis. The scope as we understand it is detailed below:

Study Intersections

1. Bloomfield Road & Recreation Center Drive (unsignalized)
2. Bloomfield Road & Weimer Road (unsignalized)
3. Bloomfield Road & Rolling Ridge Way (signalized)
4. Bloomfield Road & Allen Street (unsignalized)
5. Bloomfield Road & Landmark Avenue (signalized)
6. Bloomfield Road/2nd Street & Adams Street (signalized)
7. 2nd Street & Patterson Drive (signalized)
8. Tapp Road & Deborah Drive (signalized)
9. Tapp Road & Vanguard Parkway (unsignalized)
10. Tapp Road & Weimer Road (unsignalized)
11. Tapp Road & Adams Street (roundabout)
12. Tapp Road/Country Club Drive & Rockport Road (signalized)
13. Country Club Drive & Rogers Street (signalized)
14. Country Club Drive/Winslow Road & Walnut Street (signalized)
15. Weimer Road & Sudbury Drive (unsignalized)
16. Weimer Road & Wapehani Road (unsignalized)
17. Allen Street & Adams Street (unsignalized)
18. Allen Street & Strong Drive (unsignalized)
19. Patterson Drive & Allen Street (signalized)
20. Patterson Drive & Fairview Street (signalized)
21. Patterson Drive & Rogers Street (signalized)
22. Walnut Street & Grimes Lane (signalized)
23. Rogers Street & Rockport Road (signalized)
24. Sudbury Drive & Shasta Meadows Access (unsignalized)
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (unsignalized)
26. Sudbury Drive & Adams Street (roundabout)
27. Sudbury Drive & Sandia Place Access 1 (unsignalized)
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (roundabout)
29. Adams Street & Denali Woods Access (unsignalized)

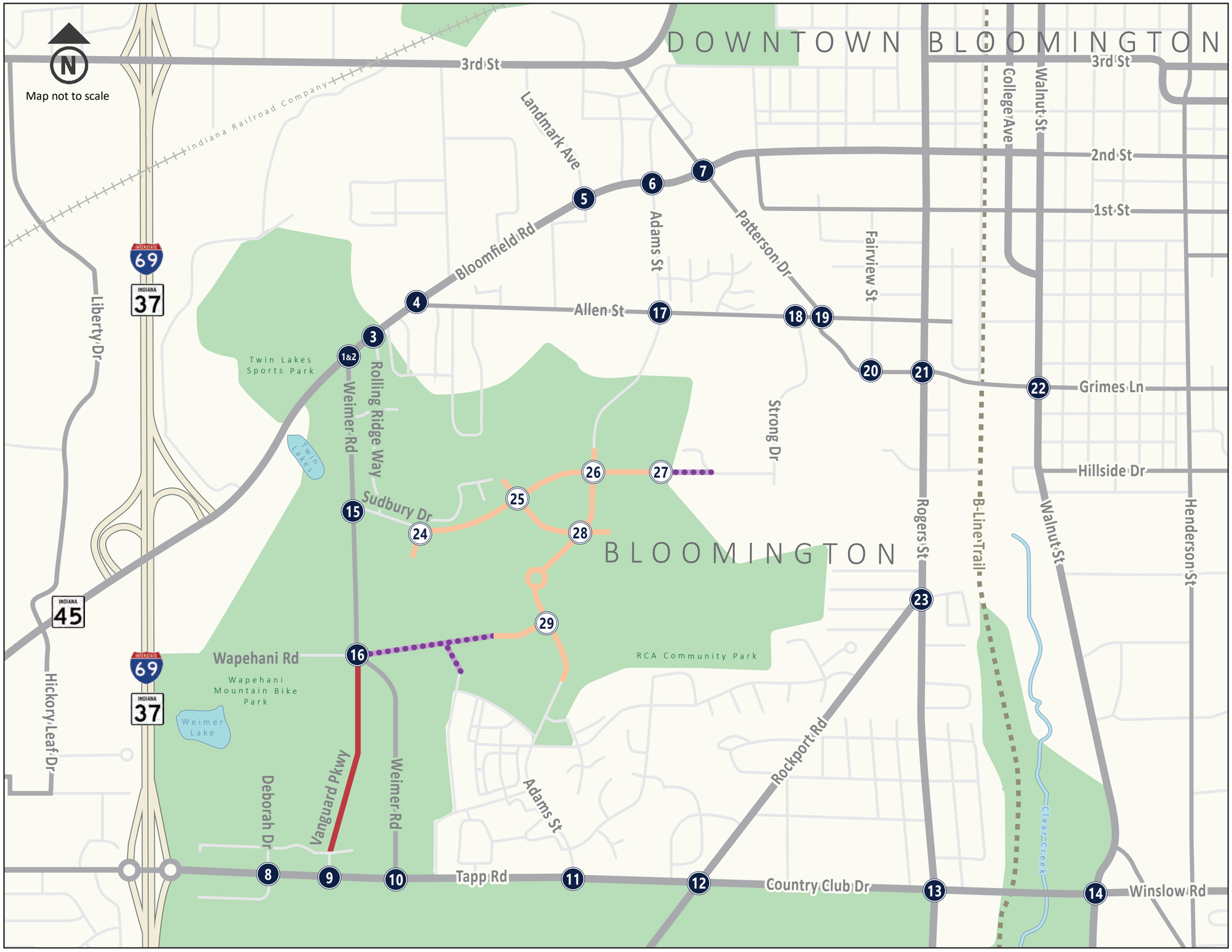

Figure 1: Study Intersections and Project Area

LEGEND

Existing Road:

Proposed Road:

Future Realignment:

Future Connection:

Existing Intersection: #

1. Bloomfield Road and Recreation Center Drive
2. Bloomfield Road and Weimer Road
3. Bloomfield Road and Rolling Ridge Way
4. Bloomfield Road and Allen Street
5. Bloomfield Road and Landmark Avenue
6. Bloomfield Road/2nd Street and Adams Street
7. 2nd Street and Patterson Drive
8. Tapp Road and Deborah Drive
9. Tapp Road and Vanguard Parkway
10. Tapp Road and Weimer Road
11. Tapp Road and Adams Street
12. Tapp Road/Country Club Drive and Rockport Road
13. Country Club Drive and Rogers Street
14. Country Club Drive/Winslow Road and Walnut Street
15. Weimer Road and Sudbury Drive
16. Weimer Road and Wapehani Road
17. Allen Street and Adams Street
18. Allen Street and Strong Drive
19. Patterson Drive and Allen Street
20. Patterson Drive and Fairview Street
21. Pattersobn Drive and Rogers Street
22. Walnut Street and Grimes Lane
23. Rogers Street and Rockport Road

Proposed Intersection: #

24. Sudbury Drive and Shasta Meadows Access
25. Sudbury Drive and Whitney Glen Access/ Everest Center Access 1
26. Sudbury Drive and Adams Street
27. Sudbury Drive and Sandia Place Access 1
28. Adams Street and Sandia Place Access 2/ Everest Center Access 2
29. Adams Street and Denali Woods Access

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

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Traffic Data and Forecast

EMCS obtained existing turning movement traffic data for the study intersections from Gewalt Hamilton Associates, Inc. (GHA). Data was collected for four hours from 7:00 AM to 9:00 AM and from 3:30 PM to 5:30 PM on Tuesday, October 24, 2023. The weather was clear, and school was in session.

EMCS identified and applied a growth rate to existing traffic volumes to obtain background traffic volumes for opening day and full build scenarios. The percentage of traffic volumes that may reroute and use the proposed roadways was also determined and added to obtain background traffic volumes.

EMCS determined the number of new vehicle trips generated to and from the proposed development, using information provided by the owner and ITE's *Trip Generation Manual, 11th Edition* [1]. The vehicle trips were then adjusted for mode split and internal trips. Then, all new trips were assigned and distributed to the surrounding roadways.

Finally, EMCS compiled all traffic data into forecasts for the following scenarios:

- Scenario 1: Existing Year 2023 volumes
- Scenario 2: Opening Day background 2029 volumes + Phase 1 site generated trips
- Scenario 3: Full Build Year background 2034 volumes + Phase 1 site generated trips
- Scenario 4: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips
- Scenario 4A: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips + proposed improvements

Traffic Analysis

EMCS completed a capacity analysis for the study intersections for all scenario traffic volumes for the two highest volume hours of the day: one during the AM peak hour and one during the PM peak hour using the software program Synchro 11 and *Highway Capacity Manual (HCM)* [2] methodologies.

Additionally, a queuing analysis at applicable intersections and a turn lane analysis were completed for publicly owned roadways.

Documentation

All data, analyses, results, and recommendations are presented in this comprehensive Traffic Impact Analysis.

2.0 Background Information

2.1. Existing Roadway

Below is a list of the roadways (which are all undivided) in the study area as classified by the City's Transportation Plan[3]. All roadway characteristics listed below are what is present within the study area.

Primary Arterial

Bloomfield Road/2nd Street is a 2-lane northeast-southwest roadway (for this study it is considered east-west) with a posted speed limit that varies from 40 to 30 miles per hour (mph).

Walnut Street is a 4-lane north-south roadway which has a posted speed limit of 30 mph.

Tapp Road/Country Club Drive/Winslow Road is a 2-lane east-west roadway, except at Deborah Drive where it has a 4-lane cross section. It has a posted speed limit of 30 mph.

Secondary Arterial

Patterson Drive/Grimes Lane is a 2-lane northwest-southeast roadway with a posted speed limit that varies between 30 and 40 mph. It is classified as a primary collector east of Walnut Street.

Rogers Street is a 2-lane north-south roadway with a posted speed limit that varies from 25 to 30 mph.

Adams Street is a 2-lane north-south roadway with a posted speed limit that varies from 25 to 30 mph. It provides access to mostly residential areas. It is split into a northern segment which terminates south of Allen Street and a southern segment which terminates north of Tapp Road. The Summit PUD will connect the two segments.

Primary Collector

Rockport Road is a 2-lane northeast-southwest roadway with a posted speed limit of 30 mph.

Allen Street is a 2-lane east-west roadway with a posted speed limit that varies from 25 to 30 mph. East of Patterson Drive it is a local street with midblock curb bump-outs, and a very low through capacity.

Weimer Road is a 2-lane north-south roadway with a speed limit of 35 mph. There are significant horizontal and vertical curves and a single-lane bridge on the southern portion of Weimer Road. The City's Transportation Plan shows a future realignment, discussed in **Section 2.5**.

Local

Sudbury Drive is a 2-lane east-west roadway which falls under the city's general 25 mph speed limit for unposted roads. It currently provides residential access to Weimer Road.

Strong Drive is a 2-lane north-south roadway with a posted speed limit of 25 mph. It currently provides access from Allen Street to an industrial area.

2.2. Existing Intersections

The geometry and traffic controls of the 23 existing intersections are shown in **Figure 2** and **Figure 3**.

2.3. Proposed Development

The 138.5-acre site is located 1.5 miles southwest of downtown Bloomington and will be constructed in five zones. TRG has provided the expected number and type of units in each zone. The zones are comprised of a mix of single family and multifamily residential housing, and ground floor commercial uses. The development will be built steadily over approximately 10 years, however for the purposes of this study, the generated traffic is split into two "phases", opening day and full build year. This is described in detail in **Section 3.3.**

2.4. Proposed Access

The proposed accesses, which are expected to be open to all modes of traffic by opening day, consists of proposed roadway connections built by the developer that will tie into the existing network in three places: Sudbury Drive just east of Weimer Road, Adams Street just south of Allen Street, and Adams Street just north of Tapp Road. These streets currently do not connect to each other and have few outlets. The proposed roadway connections will also provide improved access for the city and existing traffic in the area, especially by connecting the two segments of Adams Street. Any existing traffic which might reroute through the proposed roadway connections instead is discussed in **Section 3.2.1**. The proposed access includes six proposed internal intersections that were analyzed in this study. Each proposed intersection has one lane per approach as shown in **Figure 4.**

2.5. Weimer Realignment

The southern portion of Weimer Road currently consists of multiple horizontal and vertical curves and includes a single-lane bridge. The City Thoroughfare plan includes realigning Weimer Road to remove the single-lane bridge, but this project is dependent upon future development through this vacant area. The possible alignment will tie in to Weimer Road at Wapehani Road and utilize the existing intersection of Tapp Road & Vanguard Parkway. Additionally, an eastbound left-turn lane is anticipated to be installed at the intersection of Tapp Road & Vanguard Parkway. The old Weimer Road alignment may then be removed or disconnected. An illustration of the realignment is shown in **Figure 4**. In this analysis the proposed Weimer Road realignment is assumed to be open to traffic by the full build year (Scenario 3).

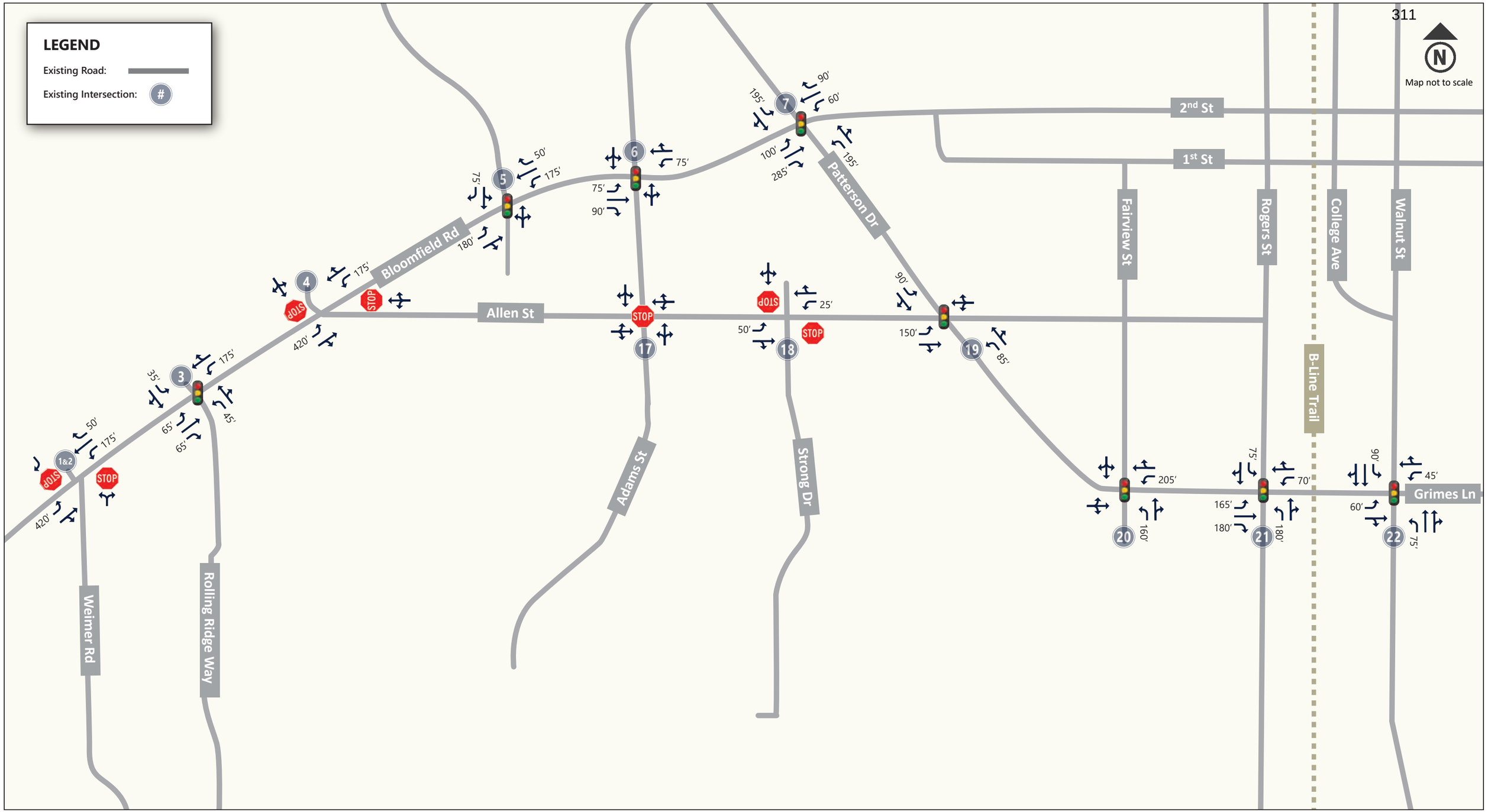

Figure 2: Existing Intersection Geometries: Bloomfield Road / 2nd Street, Allen Street, and Patterson Street

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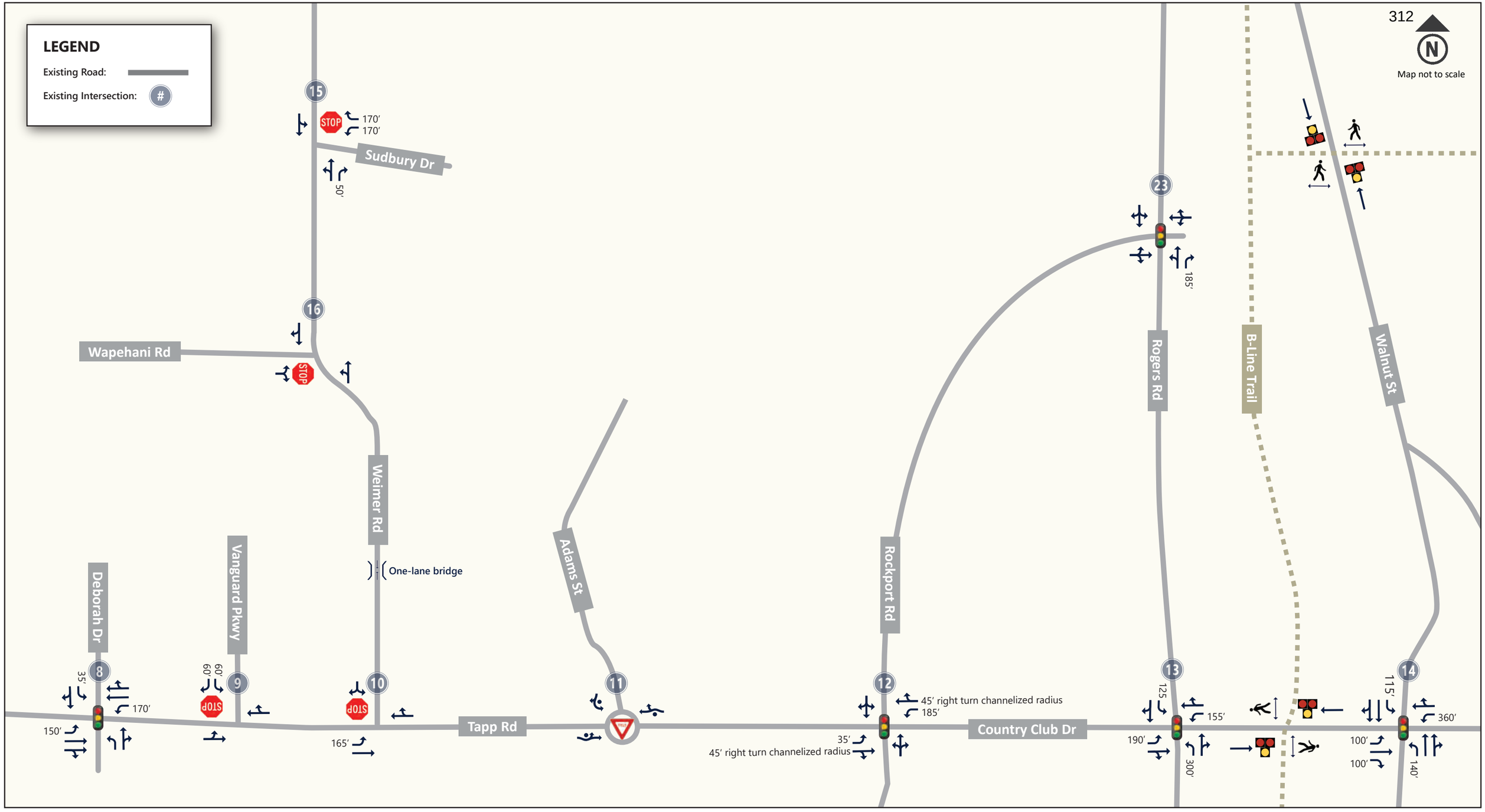

Figure 3: Existing Intersection Geometries: Tapp Road / Country Club Drive / Winslow Road, Weimer Road, Rockport Road, Rogers Street, and Walnut Street

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LEGEND

- Existing Road:
- Proposed Road:
- Future Realignment:
- Future Connection:
- Proposed Intersection: #

N

Map not to scale

Allen St
Adams St
Strong Dr
Patterson Dr
Bloomfield Rd
Weimer Rd
Sudbury Dr
Rogers Rd
Walnut St
Wapehani Rd
Vanguard Pkwy
Deborah Dr
Tapp Rd
Adams St
Rockport Rd
Country Club Dr

24 Sudbury Drive and Shasta Meadows Access

25 Sudbury Drive, Whitney Glen Access/Everest Center Access 1

26 Sudbury Drive and Adams Street

27 Sudbury Drive and Sandia Place Access 1

28 Sudbury Drive, Sandia Place Access 2/ Everest Center Access 2

29 Sudbury Drive and Denali Woods Aceess

One-lane bridge

STOP

Figure 4: Proposed Intersection & Future Weimer Road Re-alignment

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

2.6. Non-Motorized and Transit Access

Figure 5 shows the existing sidewalks, paths, and transit stops in the study area. This map was labeled using the City's Transportation Plan, OpenStreetMap (OSM), and satellite imagery as guides. It shows where sidewalks and off-street trails currently exist. It also shows streets which have lower volumes of vehicular traffic and are therefore generally safer for pedestrians with or without sidewalks. The figure also shows the approximate location of the proposed roadway connections for the development. The development will provide sidewalks or multi-use paths on either side of the proposed roads which will provide access in and out of the site.

There are various transit stops that are connected to the area by sidewalk, however the closest stop is approximately a mile walk from the site. Access could be improved by providing additional sidewalks or paths between the site and surrounding neighborhoods. Also, Bloomington Transit has shown interest in eventually running a bus on the proposed Adams Street from Tapp to 2nd Street.

There are various off-street trails near the proposed development, such as the Clear Creek Trail, the B-Line Trail, and the B-Link Trail. The Clear Creek Trail will be well connected to the proposed development via sidewalks. The B-Line Trail is connected to the proposed development via sidewalks; however, the most direct route on city streets from the site to the trail requires traveling north to Allen Street before heading east to access the trail. Access to the B-Line Trail could be improved by building an off-street trail to the east of the site which crosses Rogers Street at a midblock crossing between Hillside Drive Street and Rockport Road. This connection would also improve access to Rogers Street bus stops. Potential midblock crossing treatments should be further evaluated to determine the right approach for this location.

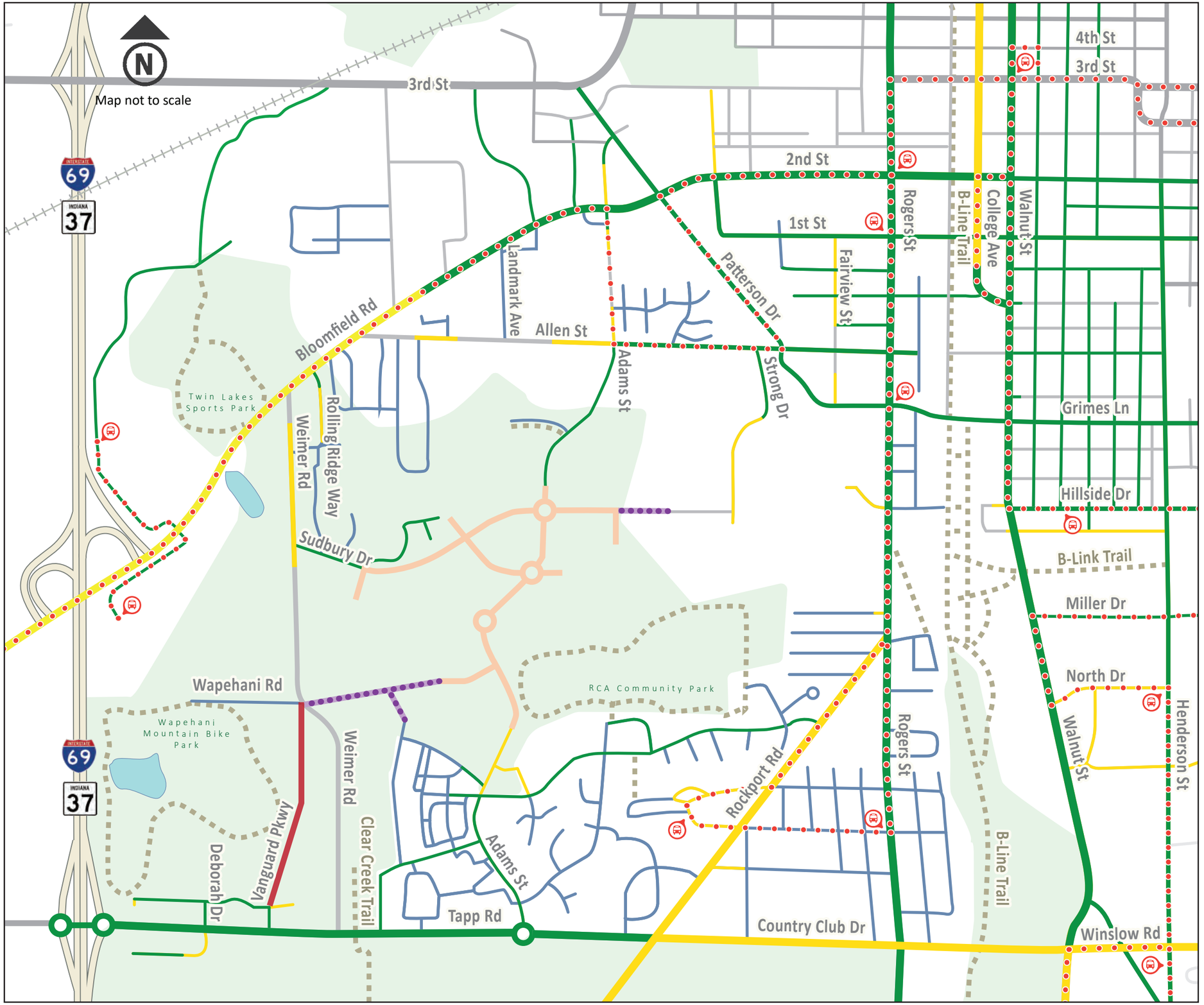

Figure 5: Sidewalk, Path, and Transit Map

LEGEND

- Sidewalk on Both Sides:
- Partial Sidewalk:
- No Sidewalk:
- Low Volume Road:
- Bike/Pedestrian Trail:
- Bus Route:
- Bus Stop:
- Proposed Roads:
- Future Realignment:
- Future Connection:

Note: The proposed roads and future realignment are assumed to have sidewalk on both sides of the roadway

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

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3.0 Traffic Forecast

3.1. Existing Traffic Data

Turning movement traffic volumes, including truck percentages and peak hour factors, were obtained for all existing intersections. The counts were taken by GHA in October of 2023 on a typical weekday for four hours from 7:00 AM to 9:00 AM and 3:30 PM to 5:30 PM. Two peak hours were included in the analysis. The actual peak hour data at each intersection was used for a conservative analysis. **Table 1** shows the actual peak hours at each intersection. The existing traffic volume data are included in **Appendix B.**

Table 1: Intersection Peak Hours

Intersection	AM Peak	PM Peak
1. Bloomfield Road & Recreation Center Drive	7:45 AM - 8:45 AM	4:30 PM - 5:30 PM
2. Bloomfield Road & Weimer Road	7:45 AM - 8:45 AM	4:30 PM - 5:30 PM
3. Bloomfield Road & Rolling Ridge Way	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
4. Bloomfield Road & Allen Street	7:45 AM - 8:45 AM	4:30 PM - 5:30 PM
5. Bloomfield Road & Landmark Avenue	8:00 AM – 9:00 AM	4:15 PM - 5:15 PM
6. Bloomfield Road/2nd Street & Adams Street	8:00 AM – 9:00 AM	4:00 PM - 5:00 PM
7. 2nd Street & Patterson Drive	8:00 AM – 9:00 AM	4:15 PM - 5:15 PM
8. Tapp Road & Deborah Drive	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
9. Tapp Road & Vanguard Parkway	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
10. Tapp Road & Weimer Road	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
11. Tapp Road & Adams Street	7:30 AM - 8:30 AM	4:00 PM - 5:00 PM
12. Tapp Road/Country Club Drive & Rockport Road	7:45 AM - 8:45 AM	4:15 PM - 5:15 PM
13. Country Club Drive & Rogers Street	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
14. Country Club Drive/Winslow Road & Walnut Street	7:15 AM - 8:15 AM	4:30 PM - 5:30 PM
15. Weimer Road & Sudbury Drive	8:00 AM - 9:00 AM	3:45 PM - 4:45 PM
16. Weimer Road & Wapehani Road	7:45 AM - 8:45 AM	4:30 PM - 5:30 PM
17. Allen Street & Adams Street	7:15 AM - 8:15 AM	4:30 PM - 5:30 PM
18. Allen Street & Strong Drive	7:30 AM - 8:30 AM	4:15 PM - 5:15 PM
19. Patterson Drive & Allen Street	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
20. Patterson Drive & Fairview Street	7:15 AM - 8:15 AM	4:30 PM - 5:30 PM
21. Patterson Drive & Rogers Street	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM
22. Walnut Street & Grimes Lane	8:00 AM - 9:00 AM	4:30 PM - 5:30 PM
23. Rogers Street & Rockport Road	7:30 AM - 8:30 AM	4:30 PM - 5:30 PM

3.2. Background Traffic

The background growth rate was used to increase the existing traffic volumes at a flat rate per year to create background volumes for the opening day and full build year scenarios. Background volume represents anticipated growth in traffic independent of the proposed development's construction. The growth rate was based on historic trends in the area shown in the Indiana Department of Transportation's Traffic Count Database System[4] and a comparison of the existing traffic data to historic traffic data found in Bloomington's Synchro Model. EMCS also reviewed the City's comprehensive plan[5] to identify areas for future growth that could contribute to background growth within the area. The proposed growth rate is **0.5%/year** to represent a realistic but conservative estimate of growth in the area.

3.2.1. Proposed Roadway Connections Traffic Adjustments

Once the prosed roadway connections are complete, existing traffic will be free to reroute onto Adams Street or Sudbury Street. Because traffic count volumes do not yet exist on these proposed roadways, an adjustment was made to account for rerouting which reduced some trips from the surrounding roadways. This adjustment was done in PTV Vistro 2022 using the entering and exiting volumes at Sudbury Drive, and Adams Street. It was assumed that only 25% of trips that could reroute would do so. The proposed roadway connections traffic adjustments were applied to both the opening day and the full build year scenarios. See **Figure 6** and **Figure 7** for the adjusted volumes.

3.3. Trip Generation

The site plan and schedule of completion were provided by TRG. The quantity of single-family housing (ITE Code 210), multifamily housing (ITE Code 221) and ground-floor commercial (ITE Code 821) and the anticipated construction timeline is shown in **Table 2**. For the purposes of this study, the development was analyzed at two points in time: opening day (2029), when all of zones 1, 2, and part of zones 3 & 4 will be complete; and full build year (2034), when all zones will be complete. These quantities were used to calculate the Base Vehicle Trip Generation. See **Appendix B** for full trip generation and development phasing discussion.

Table 2: Land uses and construction timeline

Zone	Neighborhood	Single-Family Units	Multifamily Units	Ground-Floor Commercial	Construction Start Year	Construction Finish Year
1	Shasta Meadows	275	275	–	2025	2028
2	Denali Woods	250	250	–	2025	2029
3	Everest Center	0	1700	65,000 sf	2027	2034
4	Sandia Place	110	990	–	2028	2032
5	Whitney Glen	200	200	–	2033	2034

Ground-floor commercial space is measured in square feet.

LEGEND

Existing Road:

Proposed Road:

Future Connection:

Existing Intersection: #

Proposed Intersection: #

AM Adjustment (PM Adjustment): ### (###)

Map not to scale

Landmark Ave
Bloomfield Rd
Allen St
Patterson Dr
2nd St
1st St
Fairview St
Rogers St
College Ave
Walnut St
Weimer Rd
Rolling Ridge Way
Adams St
Strong Dr
Grimes Ln

Sudbury Drive and Adams Street

Sudbury Drive and Sandia Place Access 1

Figure 6: Connection Adjustments - Bloomfield Road, Allen Street, Patterson Drive

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

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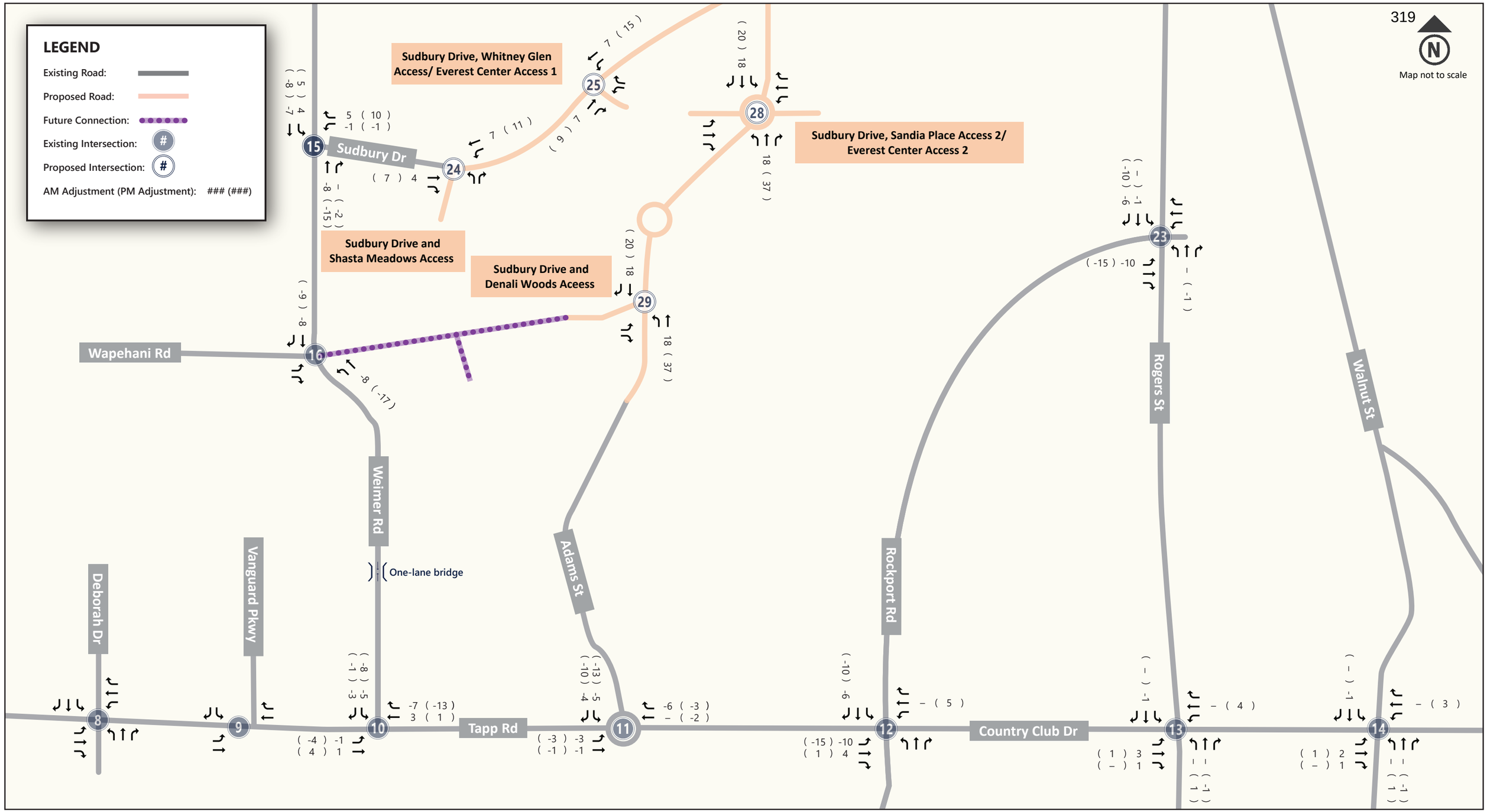

Figure 7: Connection Adjustments - Tapp Road, Sudbury Drive, Rogers Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

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3.4. Internal Capture & Mode Split Adjustments

Because there will be commercial and residential uses within the same development, it can be expected that some trips will occur without using external roadways. This is called internal capture. Adjustments were made based on the ITE Trip Generation Handbook, 3rd Edition[6] to determine internal capture and vehicle occupancy.

Additionally, some entering or exiting residents or customers will likely choose to enter or exit the development using transit or non-motorized transport. This is called external mode split. A conservative assumption of 5% was made for non-motorized and transit trips. Pass-by trips were not included because the number of pass-by trips would be minimal and would be expected to be internal pass-by trips rather than external. **Table 3** contains a summary of adjusted generated trips during both peak hours. A more detailed discussion of the mode split and internal capture process as well as the full calculation of trips can be found in **Appendix B.**

Table 3: Trip Generation

Zone #	Development Phase	ITE Code	Size	Unit	AM Peak Total	AM Peak Enter	AM Peak Exit	PM Peak Total	PM Peak Enter	PM Peak Exit
	Opening Day Base Total	210 & 221	550	DU	296	74	222	365	228	137
1	Internal and Mode Split Reduction				17	4	13	25	16	9
	Opening Day New External Total	**210 & 221**	**550**	DU	**279**	**70**	**209**	**340**	**212**	**128**
	Opening Day Base Total	210 & 221	500	DU	269	67	202	333	208	125
2	Internal and Mode Split Reduction				15	4	11	23	15	8
	Opening Day New External Total	**210 & 221**	**500**	**DU**	**254**	**63**	**191**	**310**	**193**	**117**
	Opening Day Base Total	221 & 821	510 / 20	DU / 1000 SF	248	71	177	303	172	131
3	Internal and Mode Split Reduction				19	8	11	37	16	21
	Opening Day New External Total	**221 & 821**	**510 / 20**	**DU / 1000 SF**	**229**	**63**	**166**	**266**	**156**	**110**
	Full Build Year Base Total	221 & 821	1190 / 45	DU / 1000 SF	590	166	424	698	398	300
3	Internal and Mode Split Reduction				47	18	29	93	43	50
	Additional Full Build Year New External Total	**221 & 821**	**1190 / 45**	**DU / 1000 SF**	**543**	**148**	**395**	**605**	**355**	**250**
	Opening Day Base Total	210 & 221	276	DU	121	29	92	127	78	49
4	Internal and Mode Split Reduction				7	2	5	8	5	3
	Opening Day New External Total	**210 & 221**	**276**	**DU**	**114**	**27**	**87**	**119**	**73**	**46**
	Full Build Year Base Total	210 & 221	824	DU	377	88	289	372	229	143
4	Internal and Mode Split Reduction				23	6	17	32	21	11
	Additional Full Build Year New External Total	**210 & 221**	**824**	**DU**	**354**	**82**	**272**	**340**	**208**	**132**
	Full Build Year Base Total	210 & 221	400	DU	216	53	163	269	168	101
5	Internal and Mode Split Reduction				13	3	10	23	16	7
	Full Build Year New External Total	**210 & 221**	**400**	**DU**	**203**	**50**	**153**	**246**	**152**	**94**
	Opening Day	210, 221, & 821	1836 / 20	DU / 1000 SF	876	223	653	1035	634	401
1,2,3,4,5	Full Build Year	210, 221, & 821	2414 / 45	DU / 1000 SF	1100	280	820	1191	715	476
	Total New Trips	210, 221, & 821	4250 / 65	DU / 1000 SF	1976	503	1473	2226	1349	877

3.5. Trip Assignment and Distribution

Existing traffic patterns, census data, roadway characteristics, and existing and future land use data were considered when developing the overall trip distribution. EMCS coordinated with the City, and ultimately distribution percentages were agreed upon in December 2023. **Figure 8** shows the overall distribution percentages used in the analysis. The documentation for the development of the distribution percentages can be found in **Appendix B**.

To develop turning movement traffic volumes from the proposed development, the generated trips were then assigned to the study intersections using the software program PTV Vistro 2022. The site-generated trips and assignment percentages at each intersection are shown in **Appendix B.**

Figure 8: Assignment & Distribution Percentages

3.6. Scenario Traffic Volumes

Future vehicular traffic volumes to be generated by the proposed facilities were added to the background traffic volumes and proposed roadway connection adjustments to obtain the opening day and full build year traffic turning movement volumes. Note that traffic has been shifted for the Weimer Road realignment in **Scenarios 3** and **4** from Tapp Road & Weimer Road to Tapp Road & Vanguard Parkway. See **Section 2.5** for more details. The resulting turning movement volumes for all scenarios and peak hours are shown in **Appendix B** and in **Section 4.0**.

4.0 Traffic Analysis

4.1. Capacity Analysis

A capacity analysis was performed for all study intersections and scenarios. The capacity analysis was performed using SIDRA (Version 9.0) with the SIDRA standard capacity model for roundabouts (intersections 11, 26, and 28) and using Synchro 11 with the *HCM 6th Edition*[2] methodology for all other intersections.

The standard parameter for measuring traffic operating conditions is level-of-service (LOS). The LOS ranges from A-F with each indicating driving operations from best to worst. Each letter represents a range of the average delay per vehicle. The *HCM 6th Edition* provides LOS criteria for signalized and unsignalized intersections. These criteria are shown in **Table 4**. Roundabouts used the same LOS criteria as signalized intersections. An **LOS D or better** was assumed as the minimum level of service for the overall intersection based on guidance from the HCM and on standard industry practice. In addition, all approaches were evaluated to have a volume-to-capacity ratio (v/c) less than 1. However some communities choose to adopt a lower threshold for LOS based on community concerns for competing vehicle, pedestrian, and other road users.

Per the *HCM 6TH Edition*, at two-way stop-controlled intersections, LOS is not defined for the major-street approaches or for the overall intersection, as major-street through vehicles are assumed to experience no delay.

Capacity analysis result printouts are included in **Appendix C**. Queuing results are in **Appendix E**.

Table 4: Level of Service - Unsignalized Intersection Control Delay and Signalized Intersection Control Delay

LOS	Signalized Intersection Control Delay (sec/veh)
A	<10
B	>10 and <20
C	>20 and <35
D	>35 and <55
E	>55 and <80
F	>80

Note: Signalized delay criteria also used for roundabouts.

LOS	Unsignalized Intersection Control Delay (sec/veh)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The capacity analysis was performed for the AM and PM peak hours for the following scenarios:

- Scenario 1: Existing Year 2023 volumes
- Scenario 2: Opening Day background 2029 volumes + Phase 1 site generated trips
- Scenario 3: Full Build Year background 2034 volumes + Phase 1 site generated trips
- Scenario 4: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips
- Scenario 4A: Full Build Year background 2034 volumes + Phases 1 and 2 site generated trips + proposed improvements

Scenario	**1**	**2**	**3**	**4**	**4A**
Existing Year 2023 Volumes	X				
Opening Day Background 2029 Volumes		X			
Full Build Year Background 2034 Volumes			X	X	X
Site-generated Trips – Phase 1		X	X	X	X
Site-generated Trips – Phase 2				X	X
Proposed Roadway Connections		X	X	X	X
Potential Weimer Realignment			X	X	X
Proposed Improvements					X

4.2. Scenario 1: Existing Year 2023 Volumes Capacity Analysis

Table 5 summarizes capacity results for Scenario 1 with the following inputs:

- Existing signal timings provided by the City
- Existing roadway geometry (see **Section 2.2**)
- Existing Year 2023 traffic volumes (see **Figure 9** and **Figure 10**)

Table 5: Intersection LOS and Delay (sec/veh) Results – Scenario 1

Scenario 1: Existing Year 2023	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
1. Bloomfield Road & Recreation Center Drive (AM Peak)*	A (8.9)	–	n/a	B (12.9)	–
1. Bloomfield Road & Recreation Center Drive (PM Peak)*	B (10.5)	–	n/a	A (0)	–
2. Bloomfield Road & Weimer Road (AM Peak)*	–	A (9.9)	C (19.9)	n/a	–
2. Bloomfield Road & Weimer Road (PM Peak)*	–	A (9.6)	C (20.4)	n/a	–
3. Bloomfield Road & Rolling Ridge Way (AM Peak)	B (11.5)	A (5.0)	D (50.5)	D (47.7)	**B (12.5)**
3. Bloomfield Road & Rolling Ridge Way (PM Peak)	B (11.3)	B (17.4)	D (47.8)	D (47.8)	**B (17.3)**
4. Bloomfield Road & Allen Street (AM Peak)*†	A (0)	B (11.6)	C (20.1)	A (9.8)	–
4. Bloomfield Road & Allen Street (PM Peak)*†	B (10.8)	A (9.4)	E (42.9)	C (21.7)	–
5. Bloomfield Road & Landmark Avenue (AM Peak)	A (5.4)	A (3.2)	D (41.3)	D (45.3)	**B (10.4)**
5. Bloomfield Road & Landmark Avenue (PM Peak)	A (6.0)	A (2.6)	D (38.7)	F (103.5)	**C (27.9)**
6. Bloomfield Road/2nd Street & Adams Street (AM Peak)	A (0.8)	A (0.6)	D (49.6)	D (45.2)	**A (5.5)**
6. Bloomfield Road/2nd Street & Adams Street (PM Peak)	A (0.7)	A (1.2)	D (48.4)	D (44.3)	**A (7.4)**
7. 2nd Street & Patterson Drive (AM Peak)‡	A (1.7)	A (1.1)	D (49.5)	D (37.0)	**C (22.4)**
7. 2nd Street & Patterson Drive (PM Peak)‡	A (2.0)	A (4.9)	E (56.3)	C (31.8)	**C (22.3)**
8. Tapp Road & Deborah Drive (AM Peak)	B (11.8)	B (10.9)	B (19.2)	B (19.2)	**B (11.6)**
8. Tapp Road & Deborah Drive (PM Peak)	B (13.5)	B (13.4)	B (19.4)	C (20.6)	**B (14.1)**
9. Tapp Road & Vanguard Parkway (AM Peak)*	A (9.3)	–	n/a	B (14.2)	–
9. Tapp Road & Vanguard Parkway (PM Peak)*	A (9.5)	–	n/a	D (34.5)	–
10. Tapp Road & Weimer Road (AM Peak)*	A (9.4)	–	n/a	D (28.3)	–
10. Tapp Road & Weimer Road (PM Peak)*	A (9.7)	–	n/a	F (50.5)	–
11. Tapp Road & Adams Street (AM Peak)	A (2.8)	A (2.4)	n/a	A (4.4)	**A (2.8)**
11. Tapp Road & Adams Street (PM Peak)	A (3.5)	A (2.6)	n/a	A (5.5)	**A (3.4)**
12. Tapp Road/Country Club Drive & Rockport Road (AM Peak)§	B (11.7)	B (17.0)	B (18.8)	B (15.8)	**B (15.3)**
12. Tapp Road/Country Club Drive & Rockport Road (PM Peak)§	B (13.7)	B (16.5)	C (21.1)	C (23.3)	**B (16.7)**

Scenario 1: Existing Year 2023	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
13. Country Club Drive & Rogers Street (AM Peak)	C (29.8)	C (24.1)	D (36.9)	C (26.5)	**C (29.8)**
13. Country Club Drive & Rogers Street (PM Peak)	C (32.7)	D (45.0)	C (33.2)	D (37.9)	**D (37.8)**
14. Country Club Drive/Winslow Road & Walnut Street (AM Peak)	C (21.9)	D (53.5)	C (28.0)	C (23.7)	**C (30.3)**
14. Country Club Drive/Winslow Road & Walnut Street (PM Peak)	C (29.5)	D (41.0)	C (32.4)	D (36.1)	**C (34.9)**
15. Weimer Road & Sudbury Drive (AM Peak)*	n/a	A (8.7)	–	A (7.3)	**–**
15. Weimer Road & Sudbury Drive (PM Peak)*	n/a	A (9)	–	A (7.4)	**–**
16. Weimer Road & Wapehani Road (AM Peak)*	A (9)	n/a	A (7.3)	–	**–**
16. Weimer Road & Wapehani Road (PM Peak)*	A (8.7)	n/a	A (7.3)	–	**–**
17. Allen Street & Adams Street (AM Peak)	A (8.6)	A (7.5)	A (7.9)	A (8.3)	**A (8.3)**
17. Allen Street & Adams Street (PM Peak)	A (9.9)	A (8.4)	A (8.3)	A (9.1)	**A (9.2)**
18. Allen Street & Strong Drive (AM Peak)*	A (7.3)	A (8.2)	B (11.3)	B (11.7)	**–**
18. Allen Street & Strong Drive (PM Peak)*	A (0)	A (7.8)	B (11.5)	B (12.2)	**–**
19. Patterson Drive & Allen Street (AM Peak)‖	D (38.9)	C (29.2)	A (7.2)	A (6.7)	**B (15.1)**
19. Patterson Drive & Allen Street (PM Peak)‖	D (42.4)	C (32.2)	A (0.9)	A (7.7)	**B (14.9)**
20. Patterson Drive & Fairview Street (AM Peak)¶	A (5.8)	A (0.7)	D (36.1)	D (40.7)	**A (4.1)**
20. Patterson Drive & Fairview Street (PM Peak)¶	A (8.7)	A (0.7)	D (38.2)	D (42.8)	**A (8.4)**
21. Patterson Drive & Rogers Street (AM Peak)	A (8.9)	C (29.3)	D (44.0)	C (27.0)	**C (29.8)**
21. Patterson Drive & Rogers Street (PM Peak)	B (10.3)	C (31.8)	D (36.6)	D (51.2)	**C (31.8)**
22. Walnut Street & Grimes Lane (AM Peak)	C (24.9)	C (27.4)	C (27.8)	C (28.0)	**C (27.3)**
22. Walnut Street & Grimes Lane (PM Peak)	E (64.4)	D (36.0)	C (21.2)	C (32.2)	**D (35.3)**
23. Rogers Street & Rockport Road (AM Peak)#	A (9.8)	A (7.4)	A (8.8)	A (7.8)	**A (8.8)**
23. Rogers Street & Rockport Road (PM Peak)#	B (16.2)	B (12.6)	A (6.3)	B (14.2)	**B (12.8)**

*For two-way stop control (TWSC), major street results are shown for left-turning movements.

†At this intersection, Allen Street was considered northbound.

‡At this intersection, Patterson Drive was considered northbound/southbound.

§At this intersection, Rockport Road was considered northbound/southbound.

‖At this intersection, Patterson Drive was considered northbound/southbound.

¶At this intersection, Patterson Drive was considered eastbound/westbound.

#At this intersection, Rockport Road was considered eastbound/westbound.

Note: n/a means the approach does not exist.

Figure 9: Turning Movements Scenario 1: Bloomfield Road / 2nd Street, Allen Street, and Patterson Street

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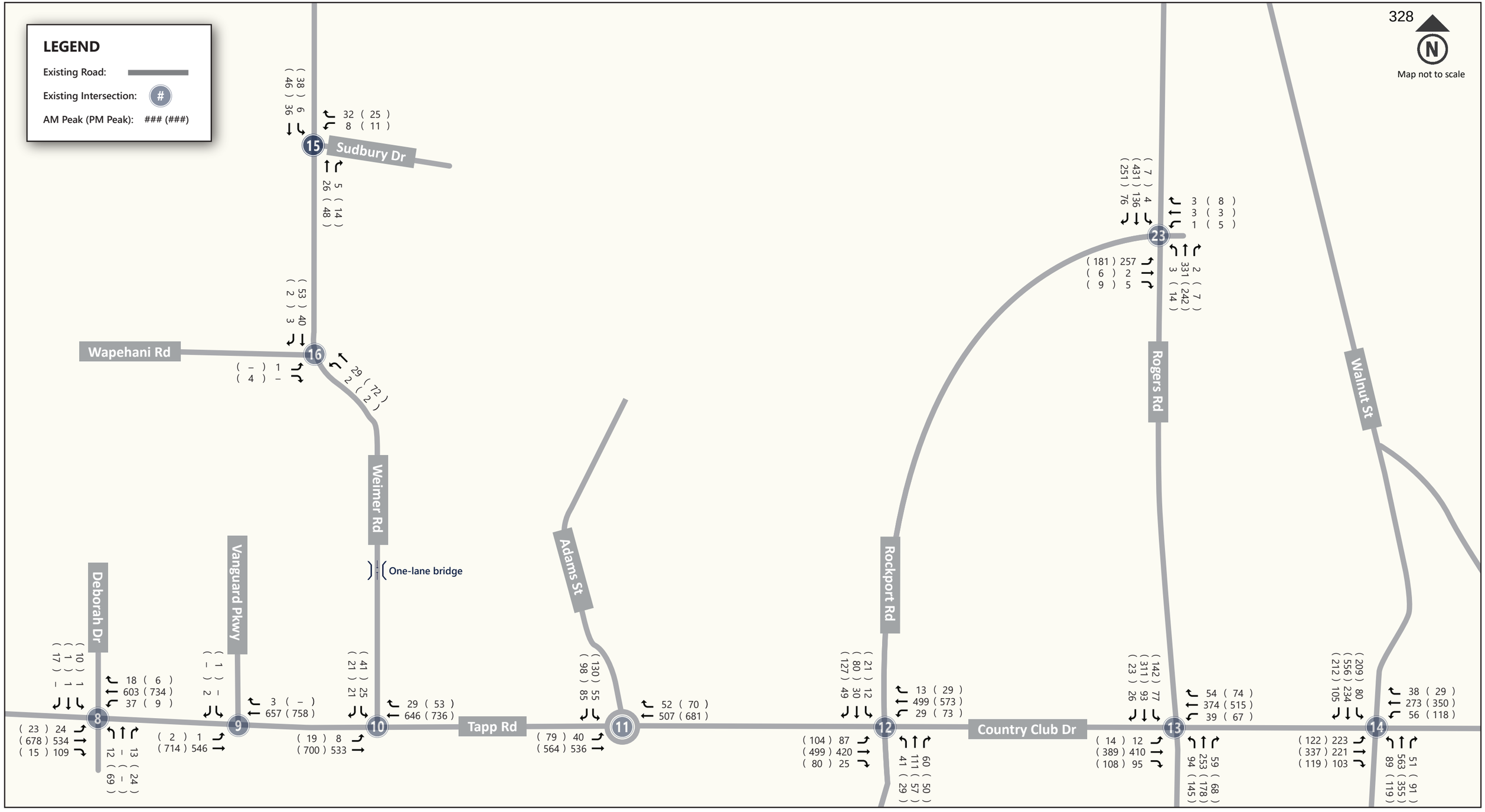

Figure 10: Turning Movements Scenario 1: Tapp Road / Country Club Drive / Winslow Road, Weimer Road, Rockport Road, Rogers Street, and Walnut Street

4.3. Scenario 2: Opening Day Background 2029 Volumes + Site Generated Trips Due to Phase 1 of the Proposed Developments Capacity Analysis

Table 6 summarizes capacity results for Scenario 2 with the following inputs:

- Existing intersection geometry (see **Section 2.2**)
- Proposed roadway connections and adjustments (see **Sections 2.4** and **3.2.1**)
- Existing signal timings provided by the City
- Opening day background 2029 volumes + site generated trips due to Phase 1 of the proposed development (see **Figure 11** and **Figure 12**)

Table 6: Intersection LOS and Delay (Sec/veh) Results – Scenario 2

Scenario 2: Opening Day 2029 - Phase 1	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
1. Bloomfield Road & Recreation Center Drive (AM Peak)*	A (9.5)	–	n/a	B (14.8)	–
1. Bloomfield Road & Recreation Center Drive (PM Peak)*	B (11)	–	n/a	A (0)	–
2. Bloomfield Road & Weimer Road (AM Peak)*	–	B (10.4)	F (88.6)	n/a	–
2. Bloomfield Road & Weimer Road (PM Peak)*	–	B (10.8)	F (107.7)	n/a	–
3. Bloomfield Road & Rolling Ridge Way (AM Peak)	B (13.8)	A (5.2)	D (50.6)	D (47.7)	**B (13.9)**
3. Bloomfield Road & Rolling Ridge Way (PM Peak)	B (12.5)	C (22.2)	D (47.9)	D (48.0)	**C (20.3)**
4. Bloomfield Road & Allen Street (AM Peak)*†	A (0)	B (13)	C (22.6)	B (10)	–
4. Bloomfield Road & Allen Street (PM Peak)*†	B (11.3)	A (9.6)	F (53.1)	C (24.5)	–
5. Bloomfield Road & Landmark Avenue (AM Peak)	A (6.1)	A (3.7)	D (40.7)	D (44.9)	**B (10.4)**
5. Bloomfield Road & Landmark Avenue (PM Peak)	A (6.2)	A (3.0)	D (38.7)	F (112.1)	**C (28.9)**
6. Bloomfield Road/2nd Street & Adams Street (AM Peak)	A (1.4)	A (0.8)	D (48.1)	D (38.5)	**B (10.3)**
6. Bloomfield Road/2nd Street & Adams Street (PM Peak)	A (1.2)	A (1.5)	D (49.0)	D (39.7)	**B (10.9)**
7. 2nd Street & Patterson Drive (AM Peak)‡	A (2.5)	A (1.1)	D (51.2)	D (36.9)	**C (21.2)**
7. 2nd Street & Patterson Drive (PM Peak)‡	A (1.9)	A (7.4)	E (59.5)	C (32.9)	**C (22.6)**
8. Tapp Road & Deborah Drive (AM Peak)	B (11.9)	B (11.5)	B (19.9)	B (19.9)	**B (11.9)**
8. Tapp Road & Deborah Drive (PM Peak)	B (14.0)	B (13.7)	C (20.7)	C (22.0)	**B (14.5)**
9. Tapp Road & Vanguard Parkway (AM Peak)*	A (10)	–	n/a	C (16.4)	–
9. Tapp Road & Vanguard Parkway (PM Peak)*	A (9.9)	–	n/a	E (46.9)	–
10. Tapp Road & Weimer Road (AM Peak)*	B (10.1)	–	n/a	F (94.9)	–
10. Tapp Road & Weimer Road (PM Peak)*	B (10.5)	–	n/a	F (>180)	–

Scenario 2: Opening Day 2029 - Phase 1	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
11. Tapp Road & Adams Street (AM Peak)	A (3.8)	A (2.6)	n/a	A (5.3)	**A (3.6)**
11. Tapp Road & Adams Street (PM Peak)	A (4.5)	A (3.9)	n/a	A (6.3)	**A (4.5)**
12. Tapp Road/Country Club Drive & Rockport Road (AM Peak)§	B (16.6)	C (21.5)	B (19.8)	B (16.4)	**B (18.9)**
12. Tapp Road/Country Club Drive & Rockport Road (PM Peak)§	B (17.5)	C (27.2)	C (21.2)	C (23.4)	**C (22.6)**
13. Country Club Drive & Rogers Street (AM Peak)	D (42.2)	C (25.8)	D (42.0)	C (29.2)	**D (36.0)**
13. Country Club Drive & Rogers Street (PM Peak)	D (42.8)	F (84.0)	D (36.5)	D (41.0)	**D (54.7)**
14. Country Club Drive/Winslow Road & Walnut Street (AM Peak)	C (24.1)	E (65.1)	C (29.0)	C (24.7)	**C (33.6)**
14. Country Club Drive/Winslow Road & Walnut Street (PM Peak)	C (33.3)	D (50.8)	C (33.2)	D (39.8)	**D (39.4)**
15. Weimer Road & Sudbury Drive (AM Peak)*	n/a	B (10)	–	A (7.5)	**–**
15. Weimer Road & Sudbury Drive (PM Peak)*	n/a	B (11.4)	–	A (8)	**–**
16. Weimer Road & Wapehani Road (AM Peak)*	A (9.6)	n/a	A (7.5)	–	**–**
16. Weimer Road & Wapehani Road (PM Peak)*	A (8.9)	n/a	A (7.4)	–	**–**
17. Allen Street & Adams Street (AM Peak)	B (10.3)	A (9.1)	B (10.8)	A (9.3)	**B (10.2)**
17. Allen Street & Adams Street (PM Peak)	B (13.6)	B (12.3)	B (11.5)	B (13.1)	**B (12.7)**
18. Allen Street & Strong Drive (AM Peak)*	A (7.4)	A (8.5)	B (12.4)	B (13.1)	**–**
18. Allen Street & Strong Drive (PM Peak)*	A (0)	A (8)	B (12.9)	B (14)	**–**
19. Patterson Drive & Allen Street (AM Peak)‖	D (37.7)	C (25.6)	C (22.4)	A (9.3)	**C (23.3)**
19. Patterson Drive & Allen Street (PM Peak)‖	D (43.2)	C (29.4)	A (1.4)	A (9.4)	**B (16.2)**
20. Patterson Drive & Fairview Street (AM Peak)¶	A (6.4)	A (0.8)	D (36.1)	D (40.7)	**A (4.4)**
20. Patterson Drive & Fairview Street (PM Peak)¶	A (9.3)	A (0.7)	D (38.2)	D (42.8)	**A (8.4)**
21. Patterson Drive & Rogers Street (AM Peak)	B (11.9)	C (32.4)	D (46.3)	C (26.5)	**C (31.2)**
21. Patterson Drive & Rogers Street (PM Peak)	B (13.1)	D (35.9)	D (36.7)	E (57.0)	**C (34.9)**
22. Walnut Street & Grimes Lane (AM Peak)	C (22.3)	C (27.8)	C (32.3)	C (28.8)	**C (29.3)**
22. Walnut Street & Grimes Lane (PM Peak)	E (69.1)	D (37.1)	C (24.9)	D (38.3)	**D (39.8)**
23. Rogers Street & Rockport Road (AM Peak)#	A (10.0)	A (7.4)	A (9.1)	A (8.0)	**A (9.1)**
23. Rogers Street & Rockport Road (PM Peak)#	B (16.6)	B (12.9)	A (6.3)	B (15.2)	**B (13.5)**
24. Sudbury Drive & Shasta Meadows Access (AM Peak)	–	A (7.4)	B (11.2)	n/a	**–**
24. Sudbury Drive & Shasta Meadows Access (PM Peak)	–	A (7.9)	B (11.9)	n/a	**–**

Scenario 2: Opening Day 2029 - Phase 1	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (AM Peak)	A (0)	A (7.4)	A (9.5)	A (0)	–
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (PM Peak)	A (0)	A (7.5)	A (9.9)	A (0)	–
26. Sudbury Drive & Adams Street (AM Peak)	A (4.9)	A (3)	A (2.9)	A (2.3)	**A (3.2)**
26. Sudbury Drive & Adams Street (PM Peak)	A (4.2)	A (2.7)	A (2.9)	A (2.3)	**A (2.9)**
27. Sudbury Drive & Sandia Place Access 1 (AM Peak)	–	A (0)	A (8.7)	n/a	–
27. Sudbury Drive & Sandia Place Access 1 (PM Peak)	–	A (0)	A (8.7)	n/a	–
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (AM Peak)	A (3.8)	A (5.2)	A (2.4)	A (2.2)	**A (3.1)**
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (PM Peak)	A (4.1)	A (5.1)	A (3.1)	A (2.4)	**A (3.1)**
29. Adams Street & Denali Woods Access (AM Peak)	B (11.3)	n/a	A (7.6)	–	–
29. Adams Street & Denali Woods Access (PM Peak)	B (12.2)	n/a	A (7.8)	–	–

*For two-way stop control (TWSC), major street results are shown for left-turning movements.

†At this intersection, Allen Street was considered northbound.

‡At this intersection, Patterson Drive was considered northbound/southbound.

§At this intersection, Rockport Road was considered northbound/southbound.

||At this intersection, Patterson Drive was considered northbound/southbound.

¶At this intersection, Patterson Drive was considered eastbound/westbound.

#At this intersection, Rockport Road was considered eastbound/westbound.

Note: n/a means the approach does not exist.

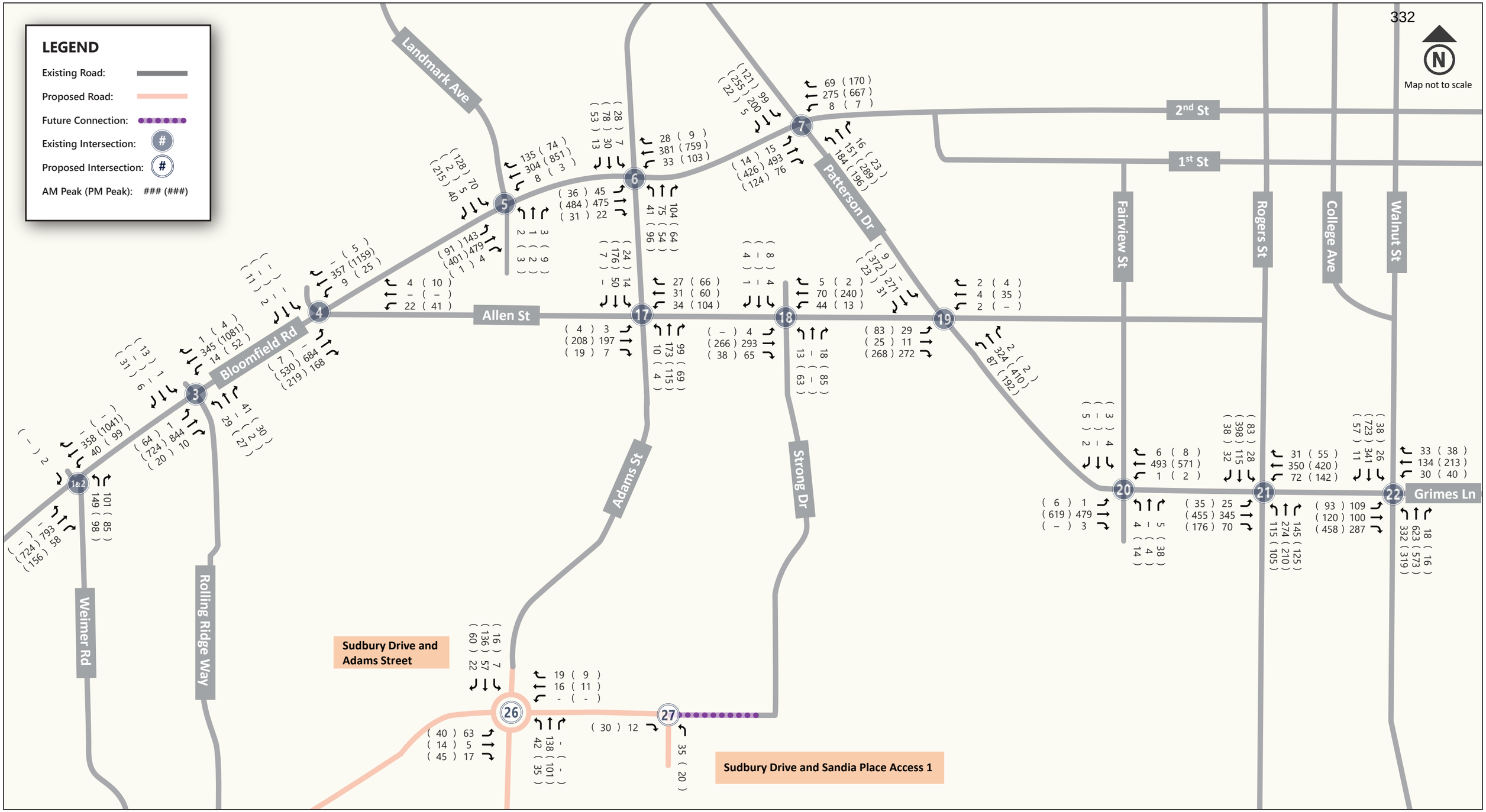

Figure 11: Turning Movements Scenario 2: Bloomfield Road / 2nd Street, Allen Street, and Patterson Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

emcs

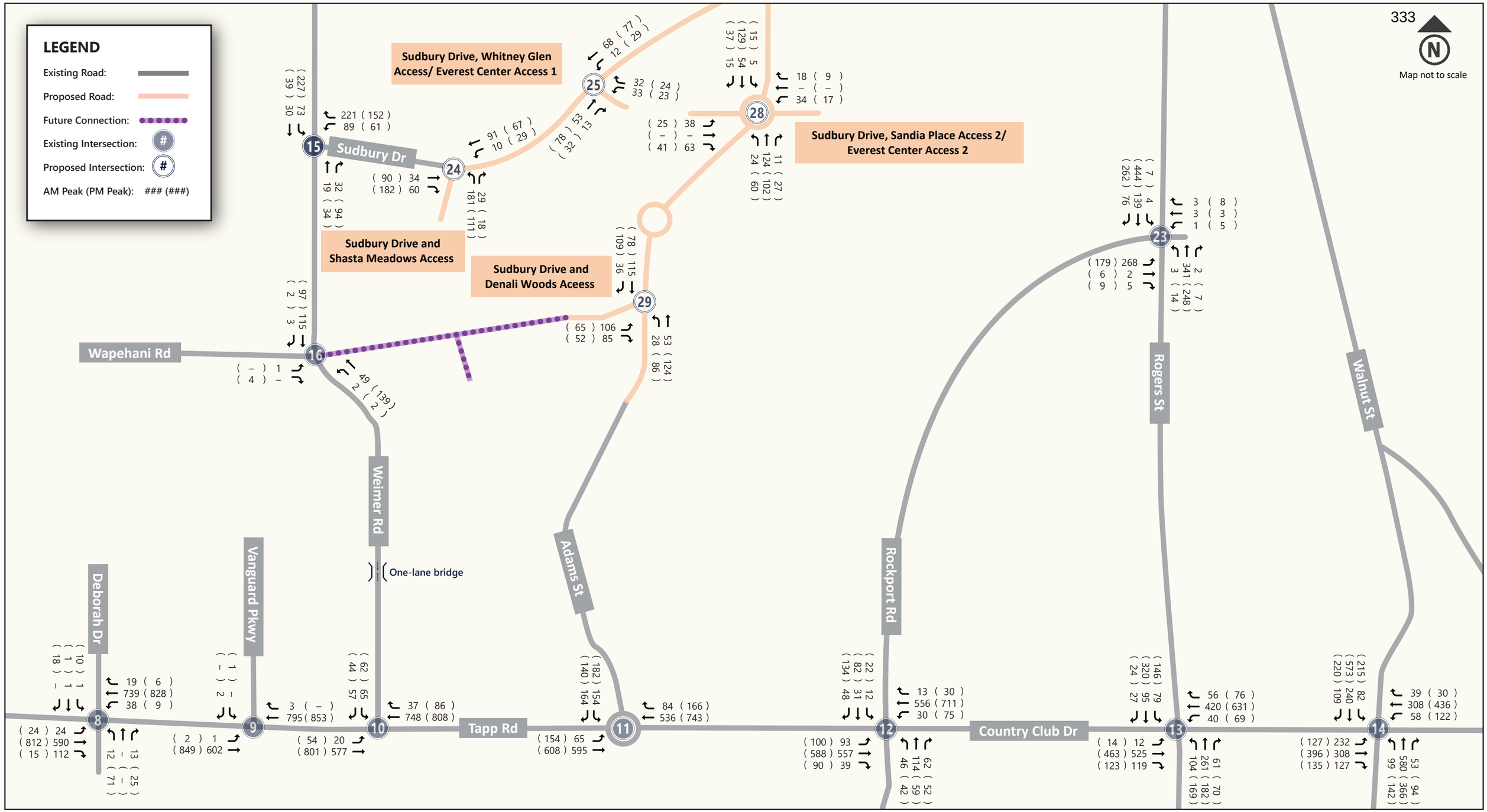

Figure 12: Turning Movements Scenario 2: Tapp Road / Country Club Drive / Winslow Road, Weimer Road, Rockport Road, Rogers Street, and Walnut Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

4.4. Scenario 3: Full Build Year Background 2034 Volumes+ Site Generated Trips Due to Phase 1 of the Proposed Developments Capacity Analysis

Table 7 summarizes capacity results for Scenario 3 with the following inputs:

- Existing signal timings provided by the City
- Existing intersection geometry (see **Section 2.2**)
- Proposed roadway connections (see **Sections 2.4** and **3.2.1**)
- Weimer Road realignment (see **Section 3.6**)
- Full build year background 2034 volumes + site generated trips due to Phase 1 of the proposed development (see **Figure 13** and **Figure 14**)

Table 7: Intersection LOS and Delay (sec/veh) Results – Scenario 3

Scenario 3: Full Build Year 2034 - Background	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
1. Bloomfield Road & Recreation Center Drive (AM Peak)*	A (9.6)	–	n/a	C (15)	–
1. Bloomfield Road & Recreation Center Drive (PM Peak)*	B (11.2)	–	n/a	A (0)	–
2. Bloomfield Road & Weimer Road (AM Peak)*	–	B (10.5)	F (97.4)	n/a	–
2. Bloomfield Road & Weimer Road (PM Peak)*	–	B (10.9)	F (120.9)	n/a	–
3. Bloomfield Road & Rolling Ridge Way (AM Peak)	B (14.7)	A (5.3)	D (50.7)	D (47.7)	**B (14.6)**
3. Bloomfield Road & Rolling Ridge Way (PM Peak)	B (13.0)	C (24.1)	D (48.0)	D (48.2)	**C (21.5)**
4. Bloomfield Road & Allen Street (AM Peak)*†	A (0)	B (13.3)	C (23.7)	B (10)	–
4. Bloomfield Road & Allen Street (PM Peak)*†	B (11.5)	A (9.7)	F (59.3)	D (25.9)	–
5. Bloomfield Road & Landmark Avenue (AM Peak)	A (6.5)	A (4.0)	D (40.2)	D (44.4)	**B (10.7)**
5. Bloomfield Road & Landmark Avenue (PM Peak)	A (6.3)	A (3.3)	D (38.7)	F (118.5)	**C (30.5)**
6. Bloomfield Road/2nd Street & Adams Street (AM Peak)	A (1.4)	A (0.9)	D (48.2)	D (38.4)	**B (10.2)**
6. Bloomfield Road/2nd Street & Adams Street (PM Peak)	A (1.3)	A (1.6)	D (49.1)	D (39.5)	**B (10.8)**
7. 2nd Street & Patterson Drive (AM Peak)‡	A (2.6)	A (1.4)	D (53.3)	D (36.7)	**C (21.8)**
7. 2nd Street & Patterson Drive (PM Peak)‡	A (2.3)	A (8.9)	E (60.2)	C (32.7)	**C (23.3)**
8. Tapp Road & Deborah Drive (AM Peak)	B (12.1)	B (11.7)	B (20.0)	C (20.1)	**B (12.1)**
8. Tapp Road & Deborah Drive (PM Peak)	B (14.1)	B (13.8)	C (21.0)	C (22.2)	**B (14.7)**
9. Tapp Road & Vanguard Parkway (AM Peak)*	B (10.2)	–	n/a	F (56)	–
9. Tapp Road & Vanguard Parkway (PM Peak)*	B (10.6)	–	n/a	F (130.5)	–
10. Tapp Road & Weimer Road (AM Peak)*	A (0)	–	n/a	A (0)	–
10. Tapp Road & Weimer Road (PM Peak)*	A (0)	–	n/a	A (0)	–

Scenario 3: Full Build Year 2034 - Background	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
11. Tapp Road & Adams Street (AM Peak)	A (3.8)	A (2.6)	n/a	A (5.4)	**A (3.7)**
11. Tapp Road & Adams Street (PM Peak)	A (4.7)	A (4.2)	n/a	A (6.5)	**A (4.8)**
12. Tapp Road/Country Club Drive & Rockport Road (AM Peak)§	B (17.2)	C (23.2)	C (20.1)	B (16.6)	**B (19.8)**
12. Tapp Road/Country Club Drive & Rockport Road (PM Peak)§	B (18.3)	C (30.2)	C (21.2)	C (23.4)	**C (24.2)**
13. Country Club Drive & Rogers Street (AM Peak)	D (45.7)	C (26.9)	D (43.0)	C (29.4)	**D (37.8)**
13. Country Club Drive & Rogers Street (PM Peak)	D (45.4)	F (96.9)	D (37.9)	D (41.8)	**E (60.1)**
14. Country Club Drive/Winslow Road & Walnut Street (AM Peak)	C (25.0)	E (70.1)	C (29.9)	C (25.1)	**D (35.2)**
14. Country Club Drive/Winslow Road & Walnut Street (PM Peak)	C (34.1)	D (52.4)	C (33.9)	D (41.5)	**D (40.7)**
15. Weimer Road & Sudbury Drive (AM Peak)*	n/a	B (10)	–	A (7.5)	**–**
15. Weimer Road & Sudbury Drive (PM Peak)*	n/a	B (11.5)	–	A (8)	**–**
16. Weimer Road & Wapehani Road (AM Peak)*	A (9.6)	n/a	A (7.5)	–	**–**
16. Weimer Road & Wapehani Road (PM Peak)*	A (8.9)	n/a	A (7.4)	–	**–**
17. Allen Street & Adams Street (AM Peak)	B (10.4)	A (9.1)	B (10.9)	A (9.3)	**B (10.3)**
17. Allen Street & Adams Street (PM Peak)	B (13.9)	B (12.5)	B (11.6)	B (13.2)	**B (12.9)**
18. Allen Street & Strong Drive (AM Peak)*	A (7.4)	A (8.5)	B (12.6)	B (13.2)	**–**
18. Allen Street & Strong Drive (PM Peak)*	A (0)	A (8)	B (13.1)	B (14.4)	**–**
19. Patterson Drive & Allen Street (AM Peak)‖	D (37.8)	C (25.4)	C (22.8)	A (9.6)	**C (23.5)**
19. Patterson Drive & Allen Street (PM Peak)‖	D (43.3)	C (29.1)	A (1.5)	A (9.6)	**B (16.3)**
20. Patterson Drive & Fairview Street (AM Peak)¶	A (6.5)	A (0.8)	D (36.1)	D (40.7)	**A (4.5)**
20. Patterson Drive & Fairview Street (PM Peak)¶	A (9.5)	A (0.7)	D (38.2)	D (42.8)	**A (8.5)**
21. Patterson Drive & Rogers Street (AM Peak)	B (12.2)	C (32.5)	D (49.6)	C (26.5)	**C (32.5)**
21. Patterson Drive & Rogers Street (PM Peak)	B (13.5)	D (36.3)	D (37.6)	E (60.5)	**D (36.1)**
22. Walnut Street & Grimes Lane (AM Peak)	C (22.8)	C (28.0)	C (34.3)	C (29.0)	**C (30.4)**
22. Walnut Street & Grimes Lane (PM Peak)	E (72.5)	D (37.5)	C (26.3)	D (40.3)	**D (41.7)**
23. Rogers Street & Rockport Road (AM Peak)#	B (10.1)	A (7.5)	A (9.3)	A (8.2)	**A (9.2)**
23. Rogers Street & Rockport Road (PM Peak)#	B (17.0)	B (13.2)	A (6.4)	B (16.8)	**B (14.5)**
24. Sudbury Drive & Shasta Meadows Access (AM Peak)	–	A (7.4)	B (11.2)	n/a	**–**
24. Sudbury Drive & Shasta Meadows Access (PM Peak)	–	A (7.9)	B (11.9)	n/a	**–**

Scenario 3: Full Build Year 2034 - Background	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (AM Peak)	A (0)	A (7.4)	A (9.5)	A (0)	–
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (PM Peak)	A (0)	A (7.5)	A (9.9)	A (0)	–
26. Sudbury Drive & Adams Street (AM Peak)	A (4.9)	A (3)	A (2.9)	A (2.3)	**A (3.2)**
26. Sudbury Drive & Adams Street (PM Peak)	A (4.2)	A (2.7)	A (2.9)	A (2.3)	**A (2.9)**
27. Sudbury Drive & Sandia Place Access 1 (AM Peak)	–	A (0)	A (8.7)	n/a	–
27. Sudbury Drive & Sandia Place Access 1 (PM Peak)	–	A (0)	A (8.7)	n/a	–
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (AM Peak)	A (3.8)	A (5.2)	A (2.4)	A (2.2)	**A (3.1)**
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (PM Peak)	A (4.1)	A (5.1)	A (3.1)	A (2.4)	**A (3.1)**
29. Adams Street & Denali Woods Access (AM Peak)	B (11.3)	n/a	A (7.6)	–	–
29. Adams Street & Denali Woods Access (PM Peak)	B (12.2)	n/a	A (7.8)	–	–

*For two-way stop control (TWSC), major street results are shown for left-turning movements.

†At this intersection, Allen Street was considered northbound.

‡At this intersection, Patterson Drive was considered northbound/southbound.

§At this intersection, Rockport Road was considered northbound/southbound.

||At this intersection, Patterson Drive was considered northbound/southbound.

¶At this intersection, Patterson Drive was considered eastbound/westbound.

#At this intersection, Rockport Road was considered eastbound/westbound.

Note: n/a means the approach does not exist.

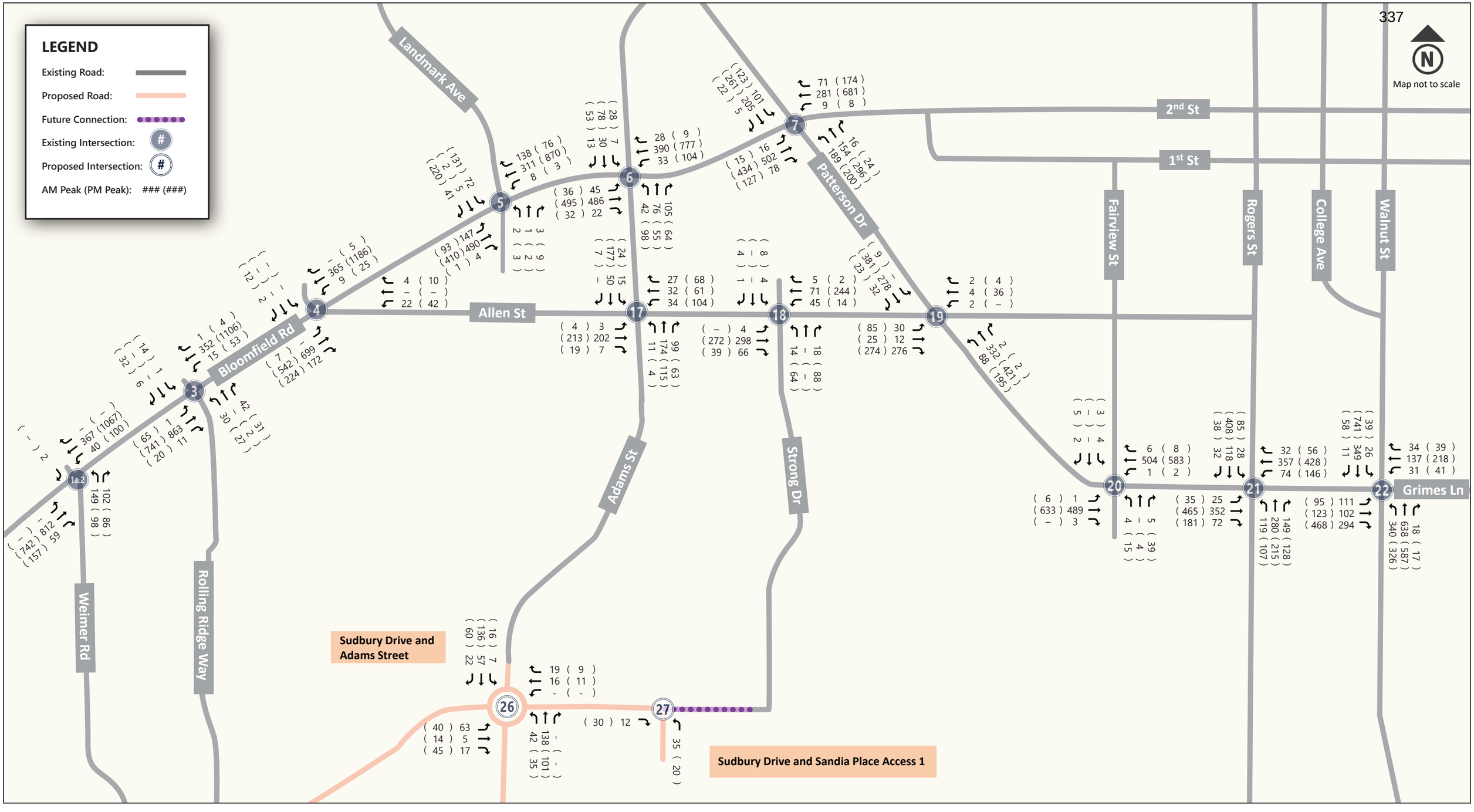

Figure 13: Turning Movements Scenario 3: Bloomfield Road / 2nd Street, Allen Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

Map not to scale

LEGEND

- Existing Road:
- Proposed Road:
- Future Realignment:
- Future Connection:
- Existing Intersection: #
- Proposed Intersection: #
- AM Peak (PM Peak): ### (###)
- Realigned Volume: ### (###)

Note: Weimer Road assumed to be realigned to Vanguard Parkway before this scenario. Intersection 10's volume transferred to Intersection 9. This drawing is conceptual only.

Sudbury Drive, Whitney Glen Access/ Everest Center Access 1

Sudbury Drive, Sandia Place Access 2/ Everest Center Access 2

Sudbury Drive and Shasta Meadows Access

Sudbury Drive and Denali Woods Aceess

Sudbury Dr

Wapehani Rd

Deborah Dr

Vanguard Pkwy

Weimer Rd

One-lane bridge

Adams St

Rockport Rd

Tapp Rd

Country Club Dr

Rogers St

Walnut St

Figure 14: Turning Movements Scenario 3: Tapp Road / Country Club Drive / Winslow Road, Weimer Road, Rockport Road, Rogers Street, and Walnut Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

4.5. Scenario 4: Full Build Year Background 2034 Volumes + Site Generated Trips due to Phases 1 & 2 of the Proposed Development Capacity Analysis

Table 8 summarizes capacity results for Scenario 4 with the following inputs:

- Existing intersection geometry (see **Section 2.2**)
- Proposed roadway connections (see **Sections 2.4** and **3.2.1**)
- Weimer Road realignment (see **Section 3.6**)
- Existing signal timings provided by the City
- Full build year background 2034 volumes + site generated trips due to Phases 1 & 2 (see **Figure 15** and **Figure 16**)

Table 8: Intersection LOS and Delay (sec/veh) Results – Scenario 4

Scenario 4: Full Build Year 2034 - Phases 1 & 2	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
1. Bloomfield Road & Recreation Center Drive (AM Peak)*	B (10.4)	–	n/a	C (18)	–
1. Bloomfield Road & Recreation Center Drive (PM Peak)*	B (11.7)	–	n/a	A (0)	–
2. Bloomfield Road & Weimer Road (AM Peak)*	–	B (10.9)	F (>180)	n/a	–
2. Bloomfield Road & Weimer Road (PM Peak)*	–	B (11.9)	F (>180)	n/a	–
3. Bloomfield Road & Rolling Ridge Way (AM Peak)	B (15.0)	A (5.3)	D (50.7)	D (47.7)	**B (14.8)**
3. Bloomfield Road & Rolling Ridge Way (PM Peak)	B (13.1)	C (24.6)	D (48.0)	D (48.2)	**C (21.8)**
4. Bloomfield Road & Allen Street (AM Peak)*†	A (0)	B (13.5)	C (23.8)	B (10.1)	–
4. Bloomfield Road & Allen Street (PM Peak)*†	B (11.5)	A (9.8)	F (60.2)	D (26.1)	–
5. Bloomfield Road & Landmark Avenue (AM Peak)	A (6.5)	A (4.0)	D (40.2)	D (44.4)	**B (10.7)**
5. Bloomfield Road & Landmark Avenue (PM Peak)	A (6.3)	A (3.0)	D (38.7)	F (118.5)	**C (30.4)**
6. Bloomfield Road/2nd Street & Adams Street (AM Peak)	A (2.1)	A (1.2)	F (93.6)	C (31.9)	**C (27.8)**
6. Bloomfield Road/2nd Street & Adams Street (PM Peak)	A (1.7)	A (1.3)	F (89.3)	D (37.9)	**C (20.6)**
7. 2nd Street & Patterson Drive (AM Peak)‡	A (4.2)	A (1.6)	D (53.0)	D (36.7)	**C (20.7)**
7. 2nd Street & Patterson Drive (PM Peak)‡	A (2.9)	B (18.5)	E (60.1)	C (32.7)	**C (25.8)**
8. Tapp Road & Deborah Drive (AM Peak)	B (12.0)	B (12.8)	C (21.1)	C (21.2)	**B (12.6)**
8. Tapp Road & Deborah Drive (PM Peak)	B (14.7)	B (13.9)	C (22.5)	C (23.8)	**B (15.1)**
9. Tapp Road & Vanguard Parkway (AM Peak)*	B (11)	–	n/a	F (89.9)	–
9. Tapp Road & Vanguard Parkway (PM Peak)*	B (11.3)	–	n/a	F (>180)	–
10. Tapp Road & Weimer Road (AM Peak)*	A (0)	–	n/a	A (0)	–
10. Tapp Road & Weimer Road (PM Peak)*	A (0)	–	n/a	A (0)	–

Scenario 4: Full Build Year 2034 - Phases 1 & 2	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
11. Tapp Road & Adams Street (AM Peak)	A (8.2)	A (3)	n/a	A (9.2)	**A (6.8)**
11. Tapp Road & Adams Street (PM Peak)	A (8.7)	C (21.5)	n/a	A (9.7)	**B (14.5)**
12. Tapp Road/Country Club Drive & Rockport Road (AM Peak)§	D (40.2)	C (31.4)	C (20.7)	B (17.0)	**C (32.8)**
12. Tapp Road/Country Club Drive & Rockport Road (PM Peak)§	C (24.7)	E (70.7)	C (21.6)	C (23.4)	**D (44.4)**
13. Country Club Drive & Rogers Street (AM Peak)	F (101.6)	C (29.2)	D (43.1)	C (30.0)	**E (59.5)**
13. Country Club Drive & Rogers Street (PM Peak)	E (72.2)	F (149.0)	D (42.5)	D (42.3)	**F (87.0)**
14. Country Club Drive/Winslow Road & Walnut Street (AM Peak)	C (24.1)	F (91.8)	C (30.1)	C (25.6)	**D (39.2)**
14. Country Club Drive/Winslow Road & Walnut Street (PM Peak)	D (41.0)	E (76.3)	C (34.6)	D (44.7)	**D (49.1)**
15. Weimer Road & Sudbury Drive (AM Peak)*	n/a	B (11.6)	–	A (7.6)	**–**
15. Weimer Road & Sudbury Drive (PM Peak)*	n/a	C (16.3)	–	A (8.6)	**–**
16. Weimer Road & Wapehani Road (AM Peak)*	A (9.9)	n/a	A (7.5)	–	**–**
16. Weimer Road & Wapehani Road (PM Peak)*	A (9)	n/a	A (7.5)	–	**–**
17. Allen Street & Adams Street (AM Peak)	B (14.7)	B (12.9)	F (65)	B (12.8)	**E (42.6)**
17. Allen Street & Adams Street (PM Peak)	E (44)	F (60.4)	F (80.8)	F (125.5)	**F (81.7)**
18. Allen Street & Strong Drive (AM Peak)*	A (7.4)	A (9)	B (14.9)	C (16)	**–**
18. Allen Street & Strong Drive (PM Peak)*	A (0)	A (8.3)	C (16.3)	C (18.6)	**–**
19. Patterson Drive & Allen Street (AM Peak)‖	D (40.7)	C (21.7)	C (28.6)	B (13.9)	**C (29.3)**
19. Patterson Drive & Allen Street (PM Peak)‖	D (46.6)	C (25.9)	A (3.7)	B (11.9)	**B (19.0)**
20. Patterson Drive & Fairview Street (AM Peak)¶	A (7.5)	A (0.8)	D (36.1)	D (40.7)	**A (5.1)**
20. Patterson Drive & Fairview Street (PM Peak)¶	B (10.5)	A (0.7)	D (38.2)	D (42.8)	**A (8.5)**
21. Patterson Drive & Rogers Street (AM Peak)	B (15.6)	C (34.8)	D (49.6)	C (26.8)	**C (32.8)**
21. Patterson Drive & Rogers Street (PM Peak)	B (15.5)	D (35.7)	D (38.0)	F (82.0)	**D (41.3)**
22. Walnut Street & Grimes Lane (AM Peak)	C (24.7)	C (28.2)	D (38.6)	C (29.2)	**C (32.9)**
22. Walnut Street & Grimes Lane (PM Peak)	E (76.1)	D (38.1)	C (33.7)	E (62.5)	**D (52.2)**
23. Rogers Street & Rockport Road (AM Peak)#	B (10.1)	A (7.5)	A (9.3)	A (8.2)	**A (9.2)**
23. Rogers Street & Rockport Road (PM Peak)#	B (17.0)	B (13.2)	A (6.4)	B (16.8)	**B (14.5)**
24. Sudbury Drive & Shasta Meadows Access (AM Peak)	–	A (7.6)	C (15.5)	n/a	**–**
24. Sudbury Drive & Shasta Meadows Access (PM Peak)	–	A (8.5)	C (16.9)	n/a	**–**

Scenario 4: Full Build Year 2034 - Phases 1 & 2	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (AM Peak)	A (7.6)	A (7.5)	B (14)	B (14.6)	–
25. Sudbury Drive & Whitney Glen Access/Everest Center Access 1 (PM Peak)	A (7.8)	A (8)	C (17.8)	C (18.8)	–
26. Sudbury Drive & Adams Street (AM Peak)	A (5.5)	A (4.4)	A (3.9)	A (3)	**A (4.2)**
26. Sudbury Drive & Adams Street (PM Peak)	A (5.7)	A (3.6)	A (4.1)	A (3.2)	**A (4)**
27. Sudbury Drive & Sandia Place Access 1 (AM Peak)	–	A (0)	A (9.4)	n/a	–
27. Sudbury Drive & Sandia Place Access 1 (PM Peak)	–	A (0)	A (9.2)	n/a	–
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (AM Peak)	A (5)	A (6.2)	A (3.8)	A (3.4)	**A (4.7)**
28. Adams Street & Sandia Place Access 2/Everest Center Access 2 (PM Peak)	A (5)	A (6.3)	A (4.6)	A (4.2)	**A (4.7)**
29. Adams Street & Denali Woods Access (AM Peak)	C (19.1)	n/a	A (8.4)	–	–
29. Adams Street & Denali Woods Access (PM Peak)	C (20.3)	n/a	A (8.4)	–	–

*For two-way stop control (TWSC), major street results are shown for left-turning movements.

†At this intersection, Allen Street was considered northbound.

‡At this intersection, Patterson Drive was considered northbound/southbound.

§At this intersection, Rockport Road was considered northbound/southbound.

||At this intersection, Patterson Drive was considered northbound/southbound.

¶At this intersection, Patterson Drive was considered eastbound/westbound.

#At this intersection, Rockport Road was considered eastbound/westbound.

Note: n/a means the approach does not exist.

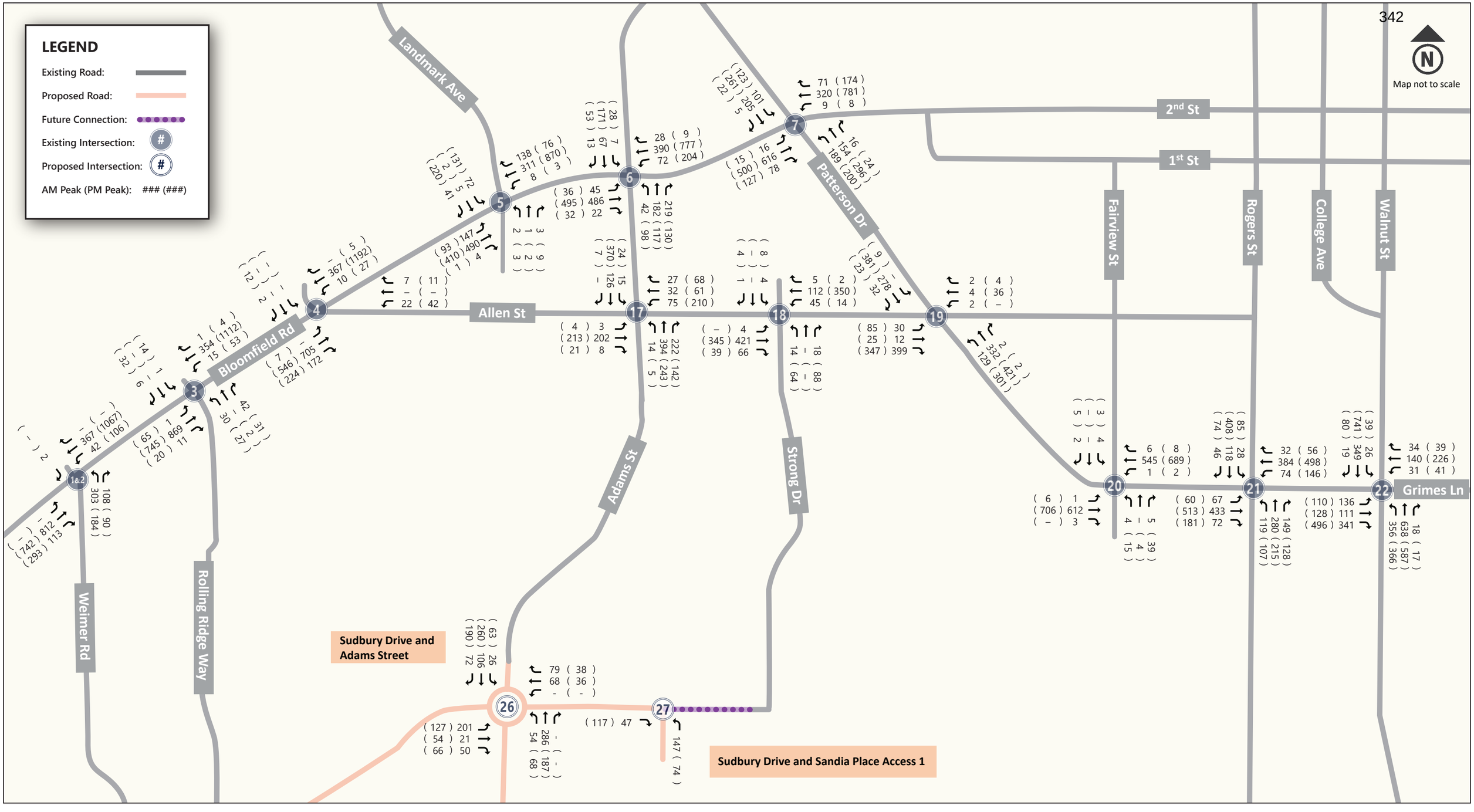

Figure 15: Turning Movements Scenario 4: Bloomfield Road / 2nd Street, Allen Street, and Patterson Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

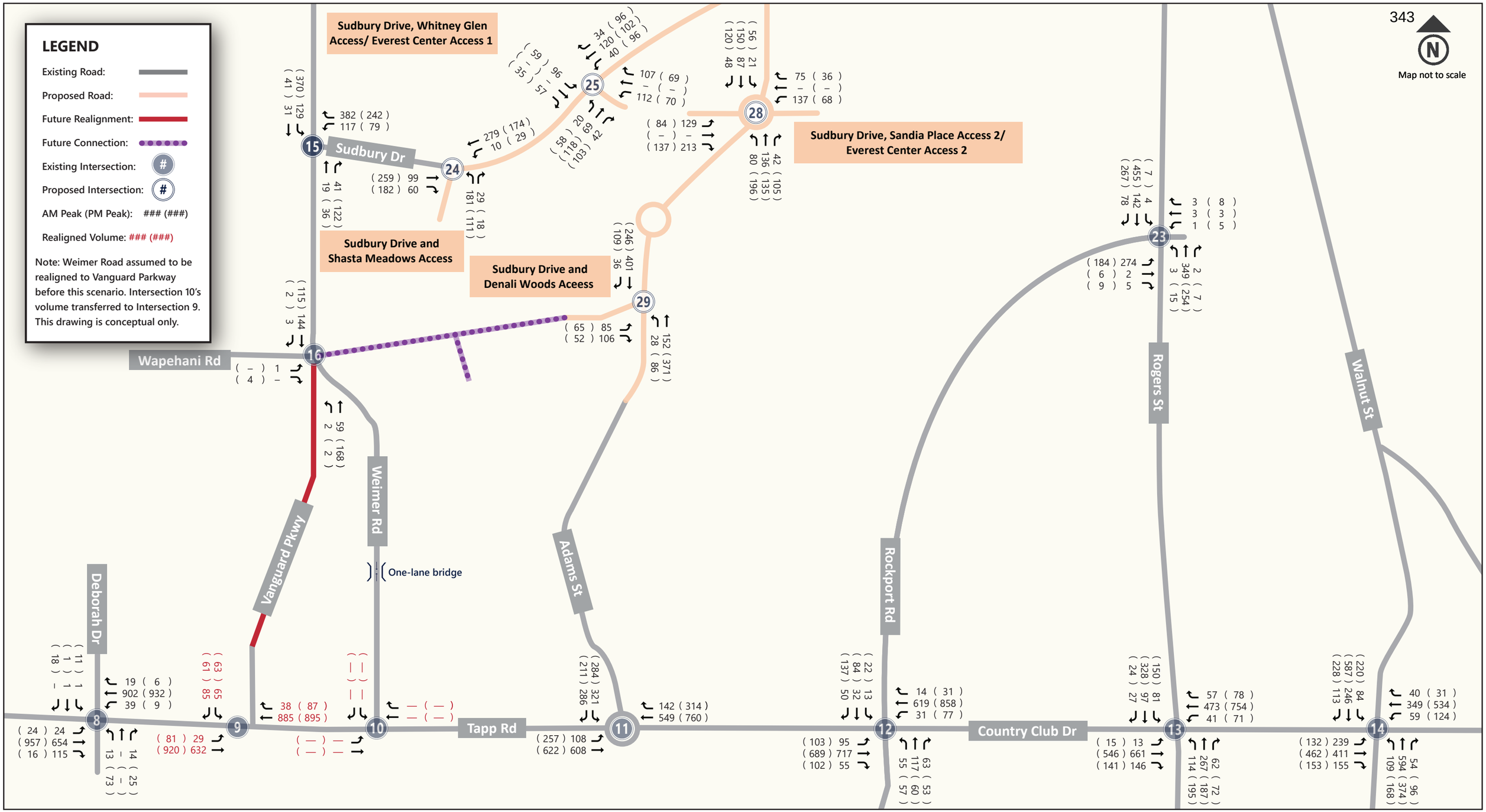

Figure 16: Turning Movements Scenario 4: Tapp Road / Country Club Drive / Winslow Road, Weimer Road, Rockport Road, Rogers Street, and Walnut Street

Disclaimer: Refer to Appendix A for the detailed internal network. The internal network is proposed to be a grid-like network. For the purposes of this study, the internal network was simplified down to 6 key internal intersections (Intersections 24-29). Traffic was not assigned to "Future Connections."

4.6. Turn Lane Warrant Analysis

Turn lane warrants were analyzed for the proposed development access points that are two-way stop-controlled intersections (TWSC). The following section discusses more.

4.6.1. Right-turn Lane Warrant

The *Indiana Design Manual* (*IDM*)[7] states that a right-turn lane should be installed at an unsignalized intersection on a 2-lane urban or rural highway which satisfies the criteria shown in **Figure 17**. This applies to both Bloomfield Road and to Tapp Road/Country Club Drive/Winslow Road. It also states that a right-turn lane should be considered at an intersection where a capacity analysis determines that a right-turn lane is necessary to meet the level-of-service criteria. It also states that a right-turn lane should be considered for uniformity of intersection design along the highway if other intersections have right-turn lanes.

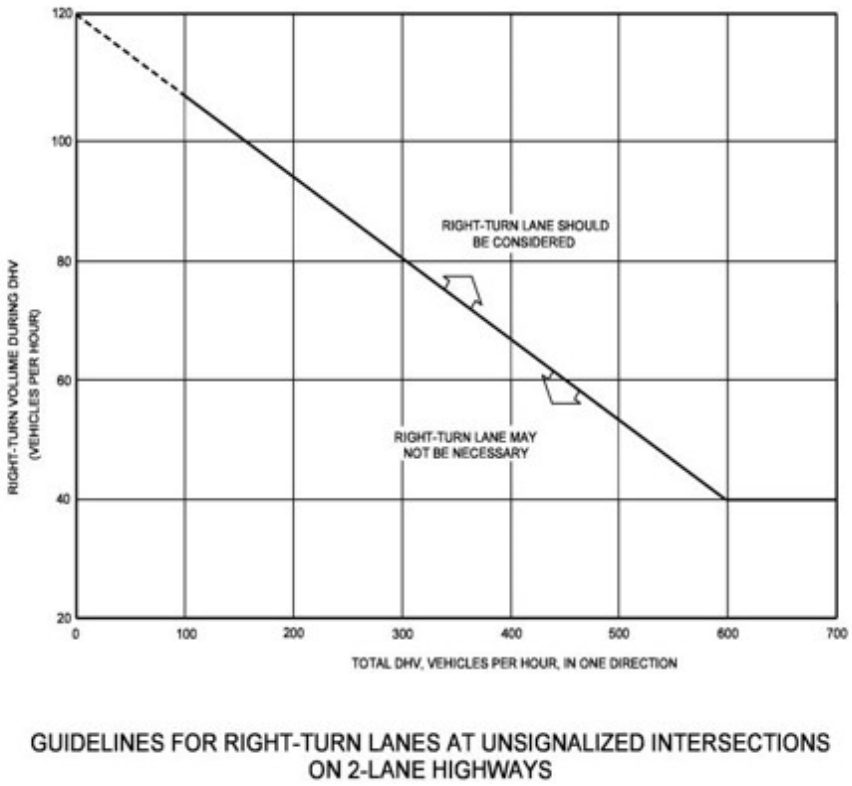

Figure 17: Guidelines for Right-Turn Lanes on 2-Lane Highways

4.6.2. Left-turn Lane Warrant

The *IDM*[5] states that a left-turn lane should be constructed at an unsignalized intersection on a 2-lane urban or rural highway which satisfies the criteria shown in **Figure 18**. It also states that a left-turn lane should be considered at an intersection where a capacity analysis determines a left-turn lane is necessary to meet the level-of-service criteria.

Tapp Road operates at a speed of 30 mph which is not shown in the figure below. Since the operating speed of 30 mph is not shown in **Figure 18** the advancing volumes were interpolated.

A summary of all turn lane warrants can be found in **Table 9**. The full turn lane analysis can be found in **Appendix D**.

Operating Speed (mph)	Opposing Volume (veh/h)	Advancing Volume (veh/h)			
		5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
40	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
	100	720	515	390	340
50	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
	100	615	445	335	295
60	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215
	100	505	370	275	240

VOLUME GUIDELINES FOR LEFT-TURN LANE ON TWO-LANE HIGHWAY

Figure 18: Guidelines for Left-Turn Lanes

Table 9: Turn Lane Warrant Summary

		Approach	Right-Turn Lane	Warranted Scenarios	Approach	Left-Turn Lane	Warranted Scenarios
Bloomfield Road & Weimer Road	AM Peak	East-bound	MET	Scenarios 2-4	West-bound	N/A	—
	PM Peak	East-bound	MET	Scenarios 2-4	West-bound	N/A	—
Tapp Road & Vanguard	AM Peak	West-bound	NOT MET	—	East-bound	MET	Scenarios 1-4
	PM Peak	West-bound	MET	Scenarios 3-4*	East-bound	MET	Scenarios 1-4
Weimer Road & Sudbury Drive	AM Peak	North-bound	N/A	—	South-bound	NOT MET	—
	PM Peak	North-bound	N/A	—	South-bound	MET	Scenario 4
Bloomfield Road & Allen Street	AM Peak	East-bound	MET	Scenarios 1-4	West-bound	N/A	—
	PM Peak	East-bound	MET	Scenarios 1-4	West-bound	N/A	—

Notes:
All the evaluated approaches were major approaches to two-way stop-controlled intersections.
N/A means the warrant was not evaluated because a turn lane already exists.
* Warrant MET in 3-4 because of Weimer Road realignment.

4.7. Proposed Improvements

To achieve acceptable LOS at all study intersections, improvements were identified for the full build scenario. Proposed improvements were analyzed and documented as Scenario 4A. The needed improvements are summarized in are summarized in **Table 11**, and described in **Section 4.7.1**. The capacity analysis results for the improved intersections. Full reports are available in **Appendix C**.

Table 10: Needed Improvements – By Development Phase

Existing Year 2023 — Without Development

Intersection	Improvement
4. Bloomfield Road & Allen Street	Install EB Right- & NB Left-Turn Lanes
5. Bloomfield Road & Landmark Avenue	Adjust Signal Timings
13. Country Club Drive & Rogers Street	Adjust Signal Timings, Install WB Right-Turn Lane

Opening Day 2029 — With Phase 1 (1836 Units)

Intersection	Improvement
2. Bloomfield Road & Weimer Road	Install Traffic Signal, Install NB Right-Turn Lane
9. Tapp Road & Vanguard Parkway*	Install Left-Turn Acceleration Lane

*Only recommended provided Weimer Road is realigned to Vanguard Parkway

Full Build Year 2034 — With Phase 1 (1836 Units)

Intersection	Improvement
22. Walnut Street & Grimes Lane	Adjust Signal Timings

Full Build Year 2034 — With Phases 1 & 2 (2414 Additional Units)

Intersection	Improvement
6. Bloomfield Road/2nd Street & Adams Street	Adjust Signal Timings
12. Tapp Road/Country Club Drive & Rockport Road	Adjust Signal Timings
14. Country Club Drive/Winslow Road & Walnut Street	Adjust Signal Timings
17. Allen Street & Adams Street	Install Turn Lanes on All Approaches
21. Patterson Drive & Rogers Street	Adjust Signal Timings

4.7.1. Proposed Improvement Descriptions

Bloomfield Road & Recreation Center Drive / Weimer Road– This intersection can be improved by installing a traffic signal and a northbound right-turn lane. The available data showed that a signal may be warranted in Scenarios 2-4 based on a preliminary peak hour volume warrant. Ideally, Recreation Center Drive should align with Weimer Road.

Bloomfield Road & Allen Street– Operations at this intersection will improve if an exclusive northbound left-turn lane and an exclusive eastbound right-turn lane are added to the existing lane configuration. However, it will still operate below the acceptable level of service during the PM peak hour of all scenarios. The available data showed that a signal would likely not be warranted in any scenario.

Bloomfield Road & Landmark Street– This intersection can be improved by adjusting the traffic signal timings to give more time to the northbound and southbound phases.

Bloomfield Road/2nd Street & Adams Street– This intersection can be improved by adjusting the traffic signal timings to give more time to the northbound and southbound phases.

Tapp Road & Vanguard Parkway– This intersection can be improved by adding an exclusive eastbound left-turn lane and by allowing the southbound left-turning movement to make a two-stage turn. This could be accomplished by building a left-turn acceleration lane. In addition, the available data showed that a signal would likely not be warranted in any scenario. A roundabout would operate well at this location, however, since the adjacent intersections are signalized, a roundabout would not be the most ideal configuration.

Tapp Road/Country Club Drive & Rockport Road– This intersection can be improved by adjusting the traffic signal timings to give more time to the westbound through phase.

Country Club Drive & Rogers Street–The westbound right-turn movement at this intersection has a volume-to-capacity ratio (v/c) >1 in the PM peak hour of Scenario 1, and the level of service is below acceptable levels during both peak hours of Scenario 4. Field observations and turn movement count videos showed that the whole westbound approach is affected, with queues spilling back to Walnut Street during every cycle for at least 15 minutes in the PM peak hour. Because the westbound approach is currently at or above capacity, the demand may not be fully reflected in the existing turn movement counts. The level of service and the delay can be improved by coordinating this intersection with Country Club Drive/Winslow Road & Walnut Street, by adjusting the traffic signal timings to give the westbound phase more time, and by adding a westbound right-turn lane.

Country Club Drive/Winslow Road & Walnut Street– This intersection can be improved by coordinating Country Club Drive & Rogers Street to match this intersection and by adjusting the traffic signal timings to give the westbound through phase more time.

Allen Street & Adams Street– This intersection can be improved by adding an exclusive northbound right-turn lane, an exclusive westbound left-turn lane, an exclusive southbound left-turn lane, and exclusive eastbound right-turn lane. However, with all turn lanes added it will still operate below the acceptable level of service. Alternatively, a future connection to Strong Drive would improve this intersection to an acceptable level of service. A signal or a roundabout at this intersection would also improve it to an acceptable level of service.

Patterson Drive & Rogers Street– This intersection can be improved by adjusting the traffic signal timings to give the southbound through phase more time.

Walnut Street & Grimes Lane– This intersection can be improved by adjusting the traffic signal timings to give the eastbound through phase more time.

Table 11: Intersection LOS and Delay (sec/veh) Results – Scenario 4A Potential Improvements

Scenario 4A: Full Build Year 2034 - Phases 1 & 2 - Improvements	Eastbound	Westbound	Northbound	Southbound	Overall Intersection
2. Bloomfield Road & Weimer Road (AM Peak)	B (17.0)	B (11.4)	D (40.5)	n/a	**C (21.3)**
2. Bloomfield Road & Weimer Road (PM Peak)	A (7.2)	B (10.8)	D (47.5)	n/a	**B (13.8)**
4. Bloomfield Road & Allen Street (AM Peak)*†	A (0)	B (13.5)	C (19.1)	B (10.1)	–
4. Bloomfield Road & Allen Street (PM Peak)*†	B (11.5)	A (9.8)	F (51.9)	D (26.1)	–
5. Bloomfield Road & Landmark Avenue (AM Peak)	A (3.7)	A (0.3)	D (46.4)	D (49.5)	**A (8.7)**
5. Bloomfield Road & Landmark Avenue (PM Peak)	A (8.4)	A (3.6)	C (34.5)	D (54.6)	**B (16.7)**
6. Bloomfield Road/2nd Street & Adams Street (AM Peak)	A (2.8)	A (2.0)	D (45.1)	D (27.1)	**C (15.1)**
6. Bloomfield Road/2nd Street & Adams Street (PM Peak)	A (1.9)	B (2.0)	E (50.2)	C (32.9)	**C (13.8)**
9. Tapp Road & Vanguard Parkway (AM Peak)*	B (11)	–	n/a	D (27.4)	–
9. Tapp Road & Vanguard Parkway (PM Peak)*	B (11.3)	–	n/a	D (30.6)	–
12. Tapp Road/Country Club Drive & Rockport Road (AM Peak)§	D (40.2)	C (31.4)	C (20.7)	B (17.0)	**C (32.8)**
12. Tapp Road/Country Club Drive & Rockport Road (PM Peak)§	B (16.2)	A (3.3)	D (45.4)	D (48.8)	**B (16.3)**
13. Country Club Drive & Rogers Street (AM Peak)	D (49.6)	C (21.4)	E (70.0)	D (39.8)	**D (46.2)**
13. Country Club Drive & Rogers Street (PM Peak)	C (23.9)	D (51.4)	E (72.5)	D (47.5)	**D (47.3)**
14. Country Club Drive/Winslow Road & Walnut Street (AM Peak)	B (17.8)	D (54.8)	D (36.6)	C (28.8)	**C (32.9)**
14. Country Club Drive/Winslow Road & Walnut Street (PM Peak)	D (36.9)	E (63.2)	D (38.5)	D (49.4)	**D (47.6)**
17. Allen Street & Adams Street (AM Peak)	C (15.1)	B (11.7)	C (21.3)	B (12.1)	**C (17.8)**
17. Allen Street & Adams Street (PM Peak)	D (28.3)	C (20.9)	C (21.7)	F (65.2)	**E (35.6)**
21. Patterson Drive & Rogers Street (AM Peak)	B (15.6)	C (34.8)	D (49.6)	C (26.8)	**C (32.8)**
21. Patterson Drive & Rogers Street (PM Peak)	B (16.1)	D (41.3)	D (39.8)	E (62.8)	**D (39.0)**
22. Walnut Street & Grimes Lane (AM Peak)	C (24.7)	C (28.2)	D (38.6)	C (29.2)	**C (32.9)**
22. Walnut Street & Grimes Lane (PM Peak)	E (65.1)	D (35.7)	D (40.7)	E (64.3)	**D (52.7)**

*For two-way stop control (TWSC), major street results are shown for left-turning movements.

†At this intersection, Allen Street was considered northbound.

§At this intersection, Rockport Road was considered northbound/southbound.

Note: n/a means the approach does not exist.

5.0 Findings & Recommendations

All six proposed internal intersections operate at or above acceptable levels of service during both peak hours of all scenarios with the proposed lane configurations. The following existing intersections operate at or above acceptable levels of service during both peak hours of all scenarios and do **not** need improvements:

- Bloomfield Road & Rolling Ridge Way
- 2nd Street & Patterson Drive
- Tapp Road & Deborah Drive
- Tapp Road & Adams Street
- Weimer Road & Sudbury Drive
- Weimer Road & Wapehani Road
- Allen Street & Strong Drive
- Patterson Drive & Allen Street
- Patterson Drive & Fairview Street
- Rogers Street & Rockport Road

The following existing intersections need improvements:

Bloomfield Road & Recreation Center Drive / Weimer Road– The northbound approach to this intersection operates below the acceptable level of service during both peak hours of Scenarios 2, 3, & 4, starting on opening day 2029 with approximately 45% of units constructed. A traffic signal may be warranted based on available data and a preliminary peak hour volume warrant once the development is approximately 45% constructed. The installation of a new **traffic signal** and the addition of a northbound **right-turn lane** are recommended. If a traffic signal is constructed, it is recommended that Weimer Road and the Recreation Center Drive align and that the signal is coordinated with others along Bloomfield.

Bloomfield Road & Allen Street– The Allen Street approach to this intersection operates below acceptable levels of service during the PM peak hour of all scenarios. Adding an exclusive **left-turn lane** to the Allen Street approach and an exclusive **right-turn lane** to the Bloomfield Road eastbound approach are recommended. With these improvements the Allen Street approach will still be below the acceptable level of service during the PM peak hour. However, the available data showed that a traffic signal would likely not be warranted in any scenario. If the demand increases significantly above what is expected in this study, a signal warrant should be evaluated.

Bloomfield Road & Landmark Street– The southbound approach to this intersection operates below acceptable levels of service in the PM peak hour during all scenarios. **Optimized signal timings** are recommended.

Bloomfield Road/2nd Street & Adams Street– This intersection operates below acceptable levels of service during both peak hours of Scenario 4 when 100% of units are constructed and with the current signal timings. **Optimized signal timings** are recommended.

Tapp Road & Vanguard Parkway– This intersection operates below acceptable levels of service during both peak hours of Scenarios 3 and 4, starting in 2034 with no more than 45% of units built and with the volume from the Weimer Road realignment. Building a **left-turn acceleration lane** for the southbound left-turning movement could improve operations by allowing left-turning vehicles to make a two-stage turn if necessary. Adding an exclusive eastbound **left-turn lane** is also recommended. These improvements should be implemented concurrently with the realignment. The available data showed that a traffic signal would likely not be warranted in any scenario. However, the installation of a traffic signal or a roundabout would improve operations at this intersection. Volumes at this intersection should be monitored and reanalyzed when the Weimer Road realignment project is constructed.

Tapp Road & Weimer Road– The southbound approach to this intersection operates below acceptable levels of service during the PM peak hour of Scenario 1 (existing 2023), and both peak hours of Scenario 2 (2029 with 45% of units constructed). However, since Weimer Road is expected be realigned to Vanguard Parkway before Scenarios 3 and 4, **no additional improvements** at the intersection with Tapp Road are recommended.

Tapp Road/Country Club Drive & Rockport Road– The eastbound through movement has a volume-to-capacity ratio (v/c) >1 in Scenario 4, when 100% of units are built. **Optimized signal timings** are recommended.

Country Club Drive & Rogers Street– The westbound right-turning movement at this intersection has a volume-to-capacity ratio (v/c) >1 in the PM peak hour of Scenario 1 (existing 2023), and the level of service is below acceptable levels during both peak hours of Scenario 4 (2034 with 100% of units constructed). **Optimized signal timings**, coordination with Country Club Drive/Winslow Road & Walnut Street, and an exclusive westbound **right-turn lane** are recommended. After implementation of optimized traffic signal timings, this intersection should be observed for increased volume due to latent demand and signal timings should be adjusted accordingly.

Country Club Drive/Winslow Road & Walnut Street– The westbound approach to this intersection operates below the acceptable level of service in the PM peak hour during all scenarios. **Optimized signal timings** and coordinating signal timings with Country Club Drive & Rogers Street are recommended.

Allen Street & Adams Street– This intersection operates below the acceptable level of service in both peaks of Scenario 4 when 100% of units are constructed. Building an exclusive northbound **right-turn lane**, an exclusive westbound **left-turn lane**, an exclusive southbound **left-turn lane**, and exclusive eastbound **right-turn lane** are recommended. With these improvements it will still operate below the acceptable level of service during the PM peak hour. Alternatively, a future connection to Strong Drive would improve this intersection to an acceptable level of service. A signal or a roundabout at this intersection would also improve it to an acceptable level of service.

Patterson Drive & Rogers Street– The southbound approach of this intersection operates below the acceptable level of service in the PM peak hour during Scenario 4 when 100% of units are constructed. **Optimized signal timings** are recommended.

Walnut Street & Grimes Lane– The eastbound through and right-turning movements at this intersection have a volume-to-capacity ratio (v/c) >1 in Scenarios 3 and 4, starting in 2034 with at least 45% of units constructed. **Optimized signal timings** are recommended.

References

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