Petitioner Environmental Analysis

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

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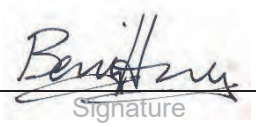
Prepared by: 

Signature

Benjamin Harvey

Printed Name

Approved by: 

Signature

Jared Ward, Project Manager

Printed Name

Table of Contents

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.

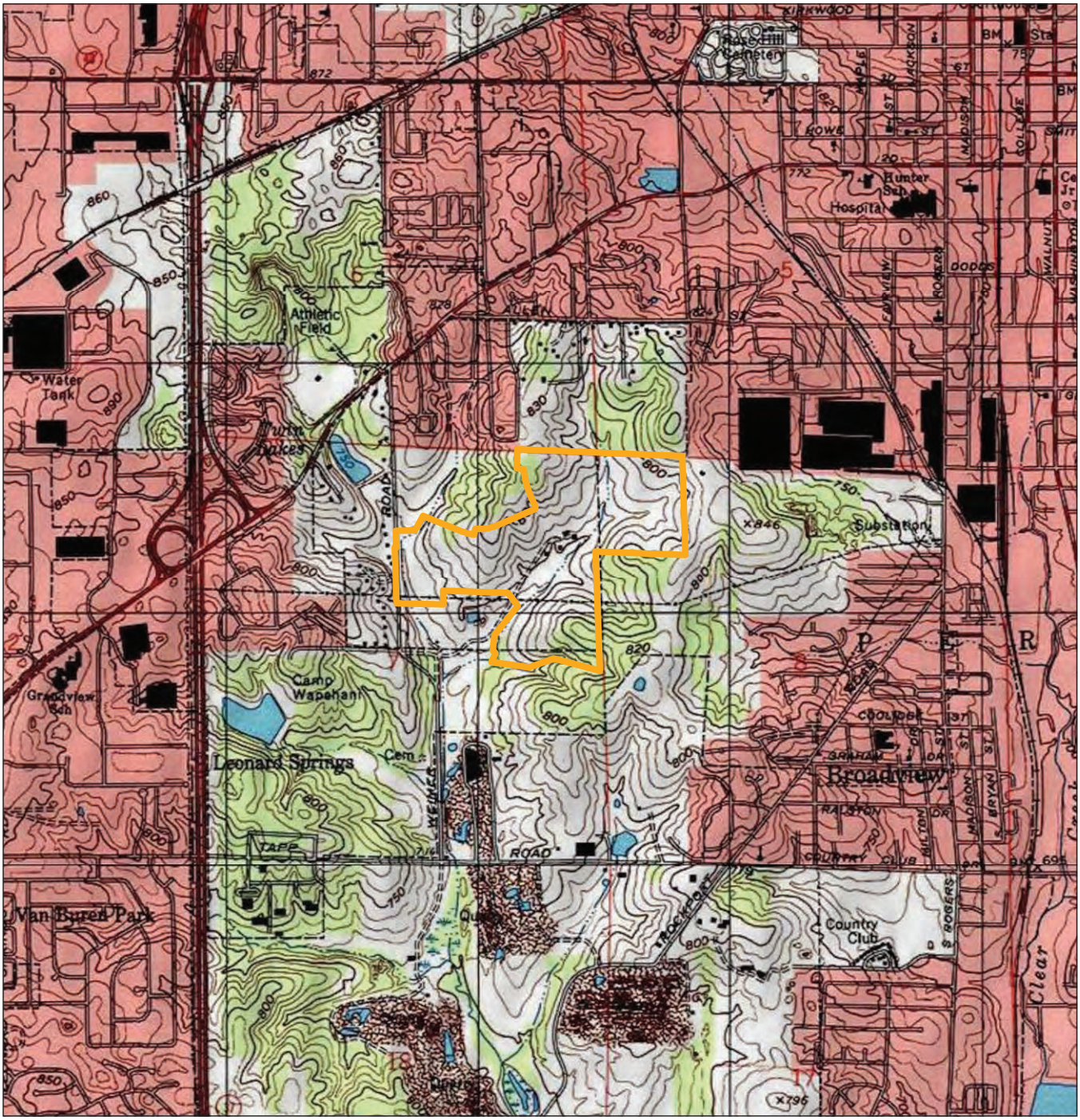
5.4 Tree and Forest Canopy

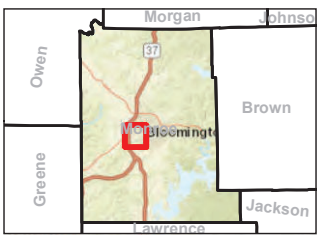
Large sections of tree canopy are located in contiguous stands, with the most mature forested stands occurring at the northwest, eastern, and southeastern Project area limits. There are limited stands of canopy scattered throughout the site as well, but these are generally of lesser quality or concentrated 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





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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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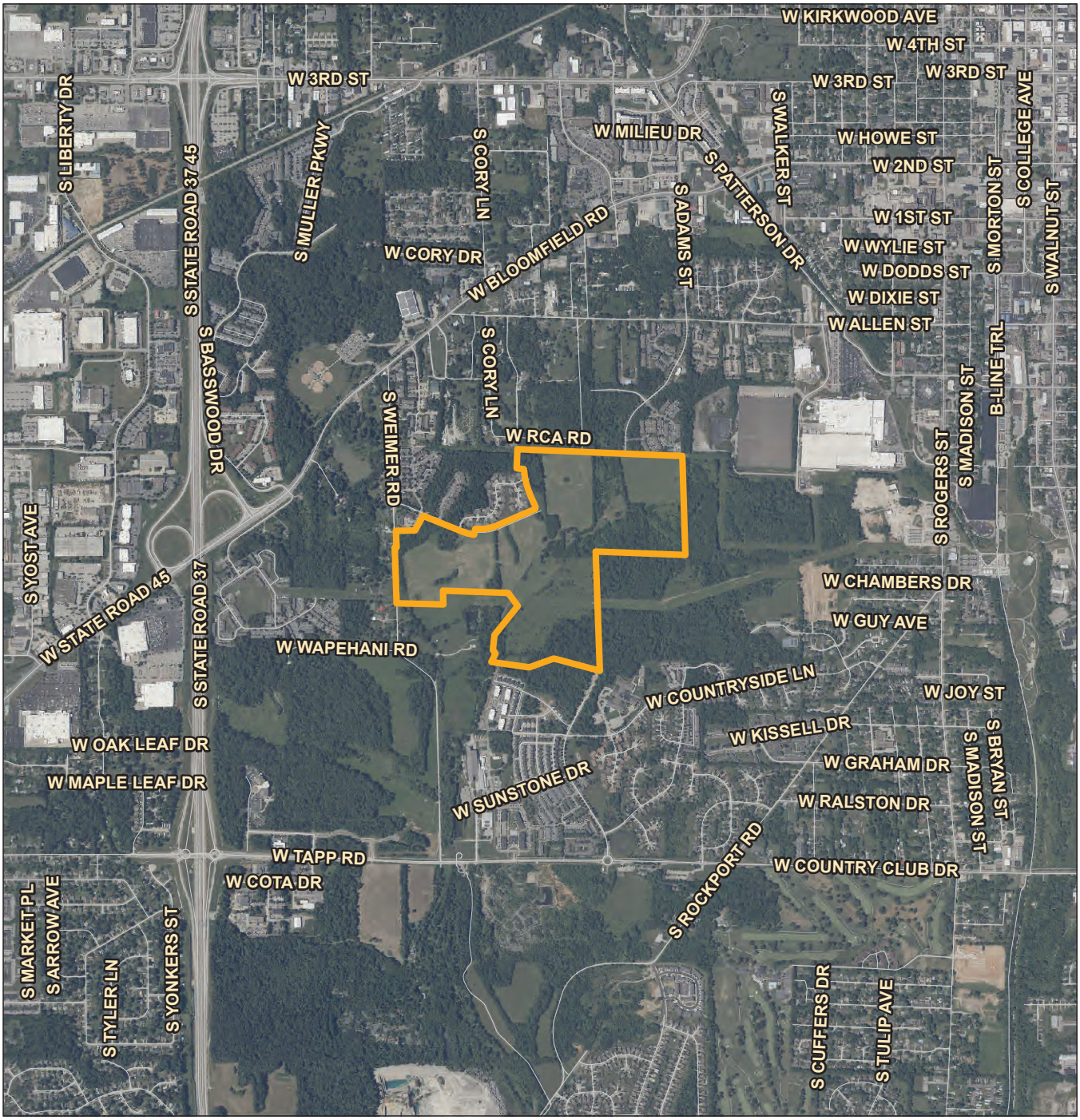

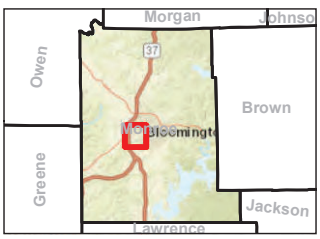

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Stantec

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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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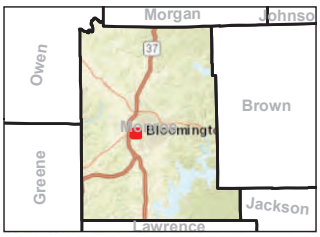

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- Delineated Stream
- Delineated Wetland
- Project Location

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Stantec

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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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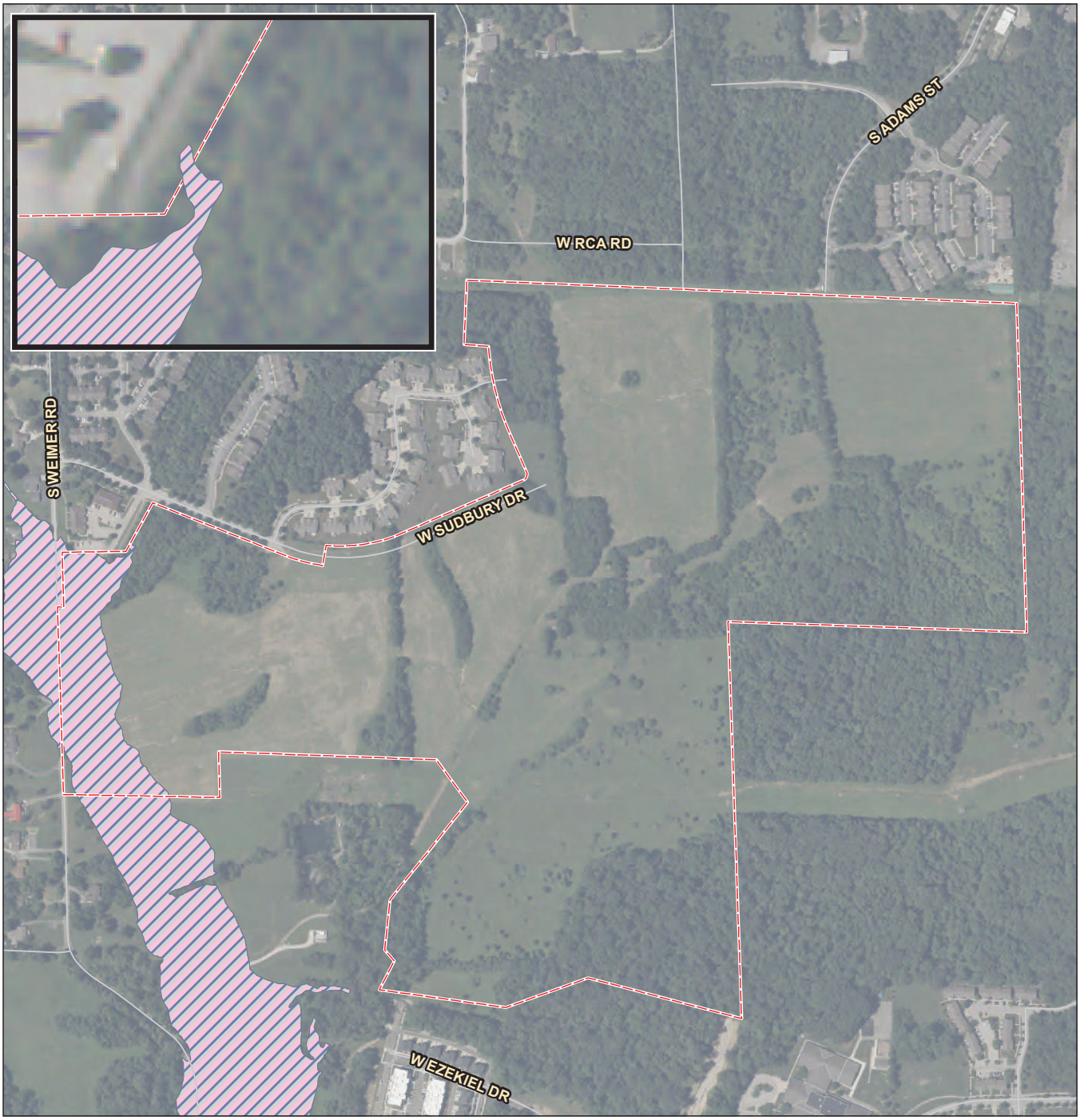

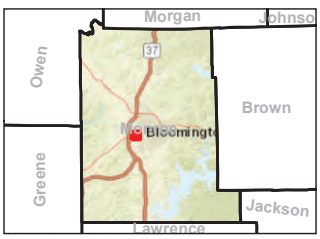

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Project Location

FEMA Flood Zone

Floodway

IDNR Best Available Flood Mapping

Zone

Floodway

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1:7,200

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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

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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

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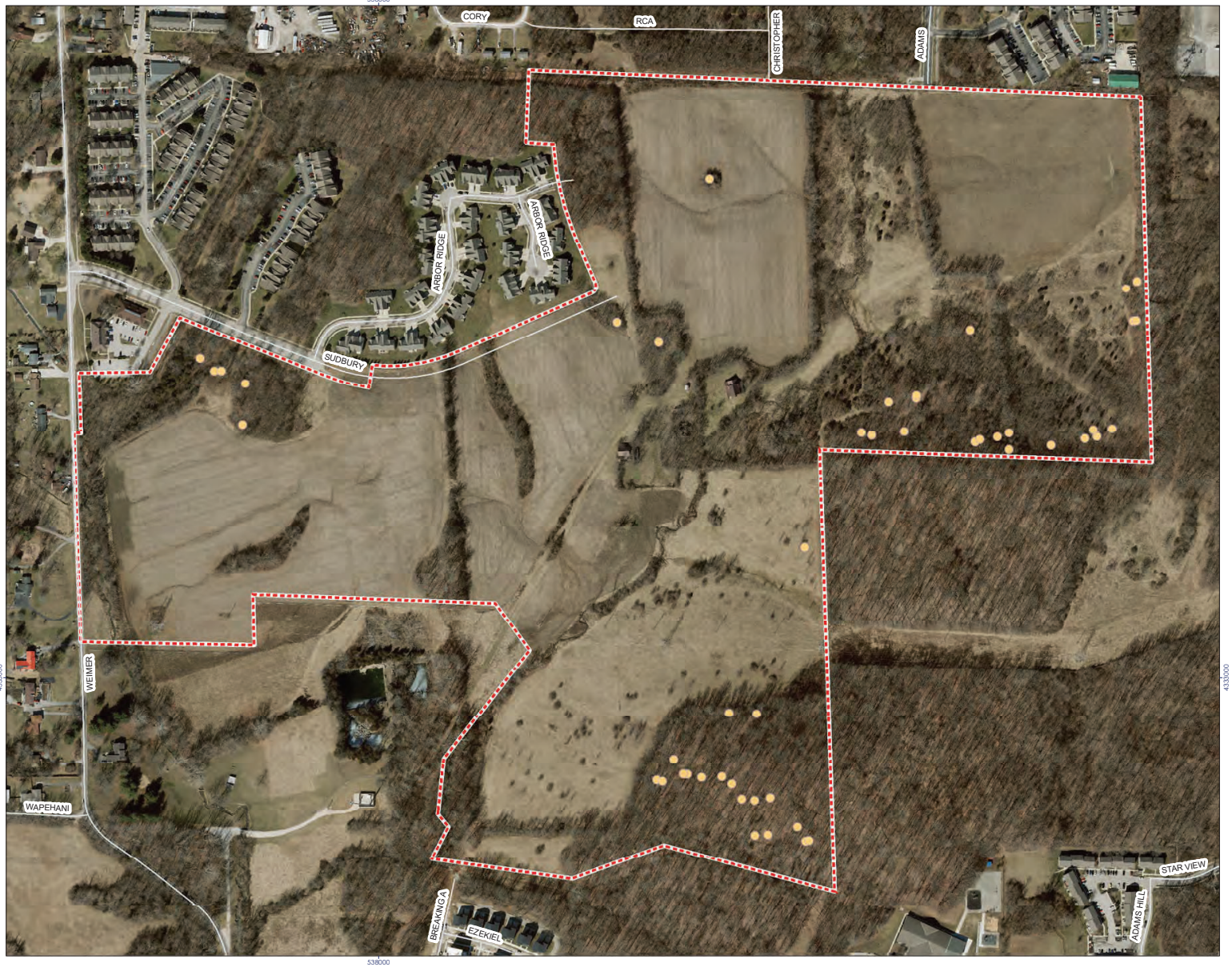

Figure No.
5

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

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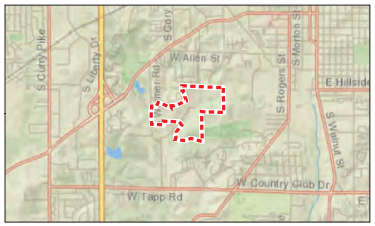

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Figure No.

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

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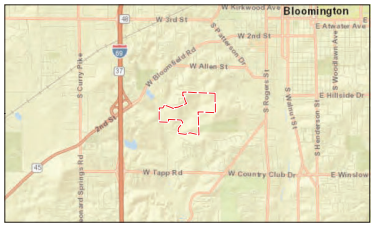
- Project Location
- Canopy Estimate = 27.43 acres



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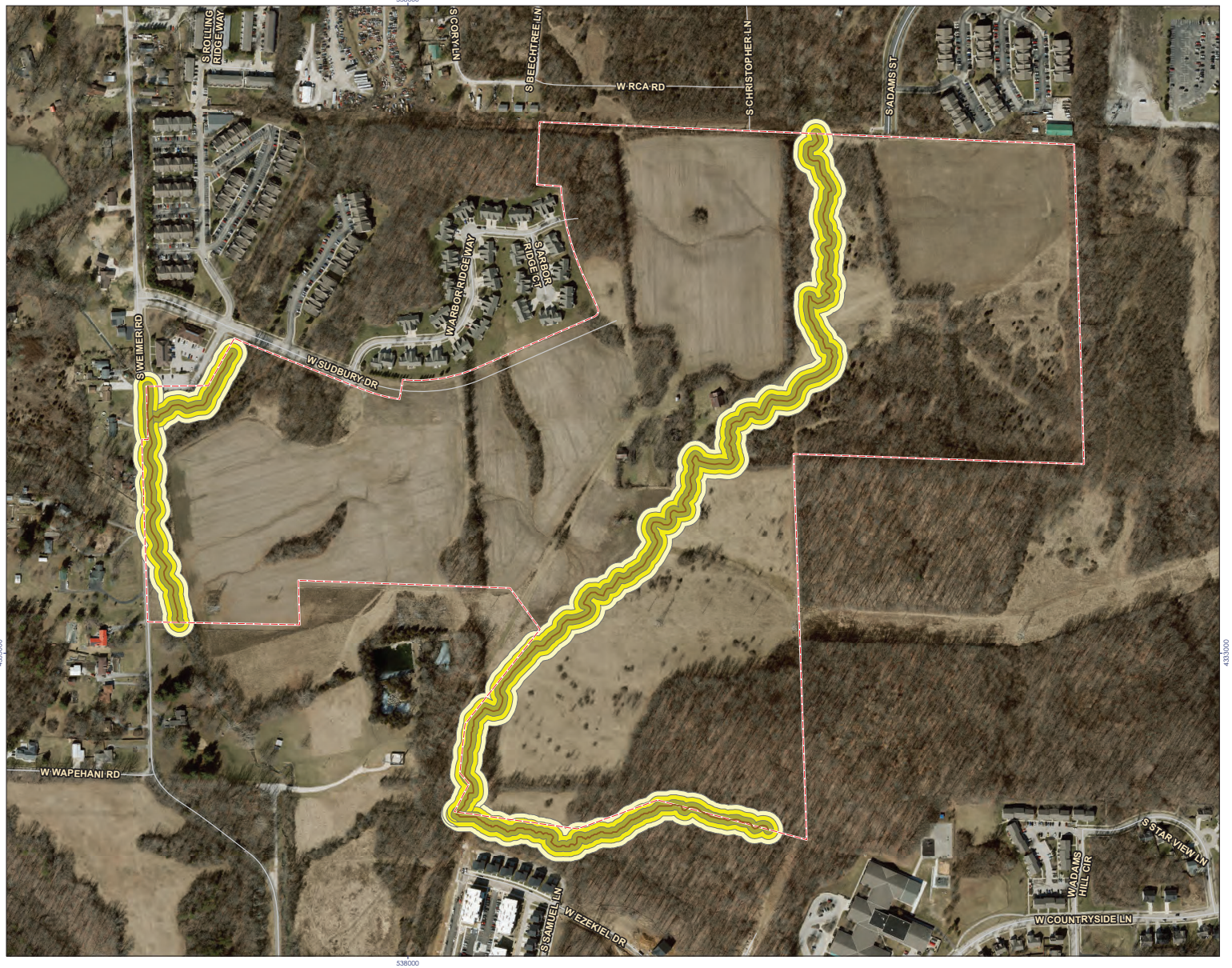

Figure No.
7

Title
Stream Buffer Zones

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

N

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(At original document size of 11x17)
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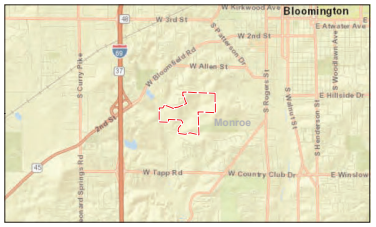
Legend
- Project Location
- Zone 1 Stream Buffer
- Zone 2 Stream Buffer
- Zone 3 Stream Buffer



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

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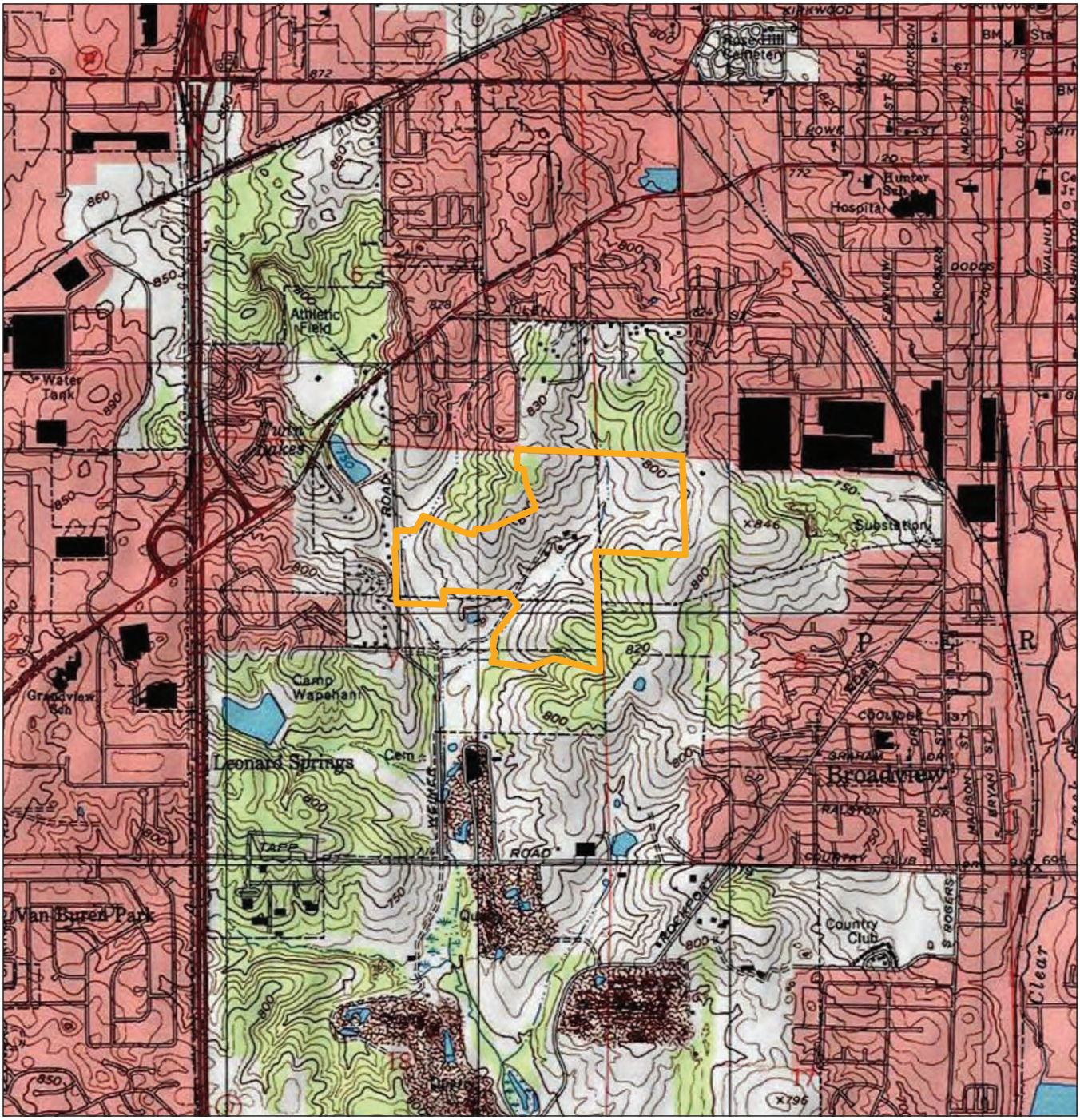
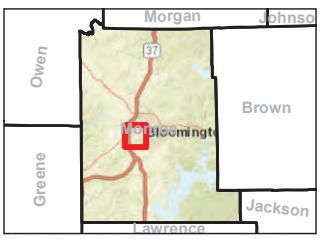
Appendix A - Figures





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

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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

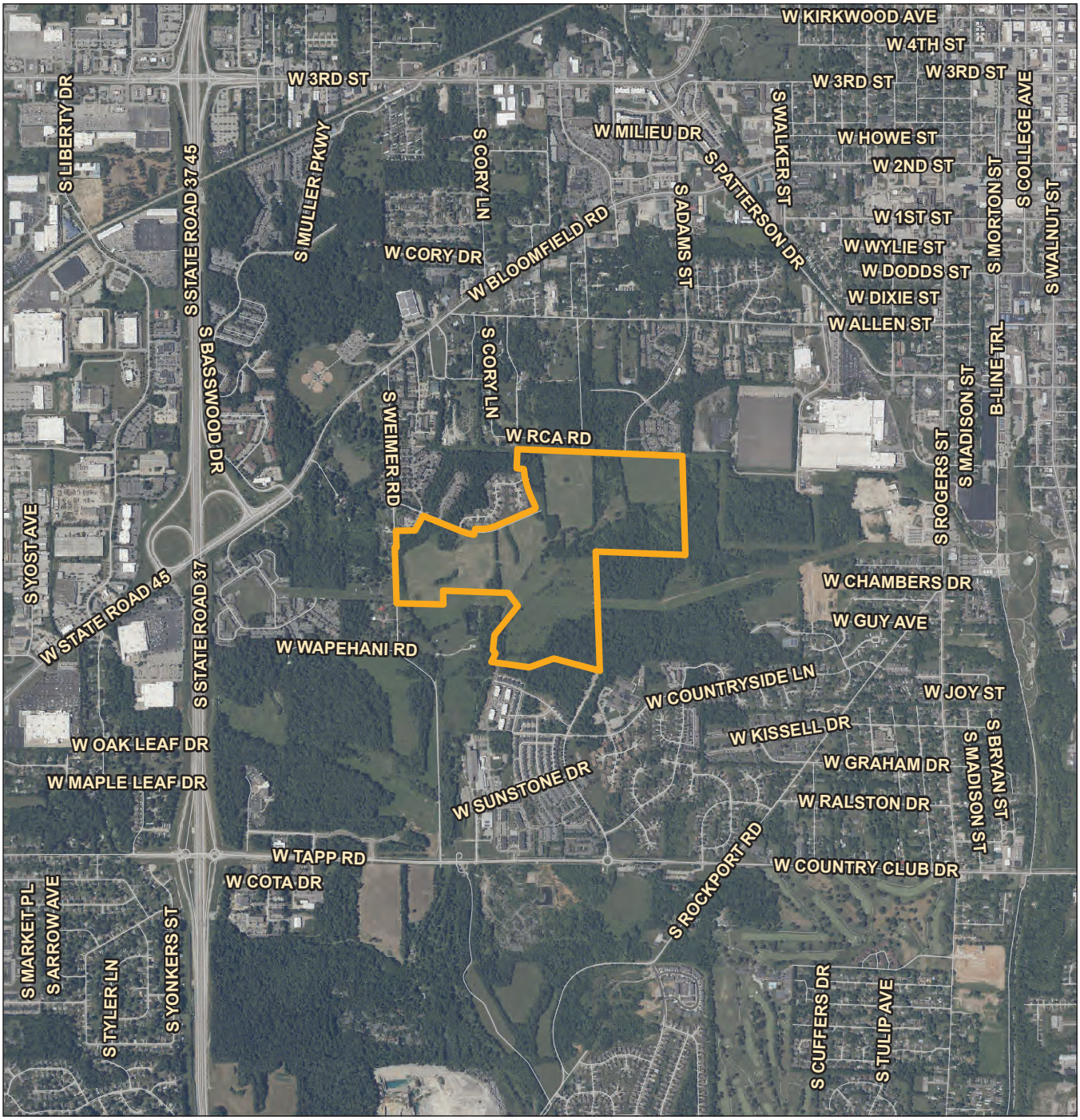
Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

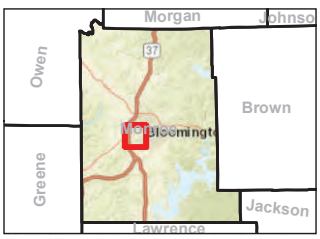
Proj No. 193806201

Figure No.
1

Title
Project Location

\\us0707-ppfss01\shared_projects\gis_projects\193806201\03_data\gis_cad\gis\mxds\DueDili\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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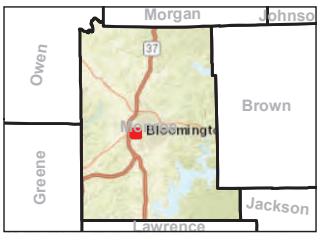


Legend

- 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

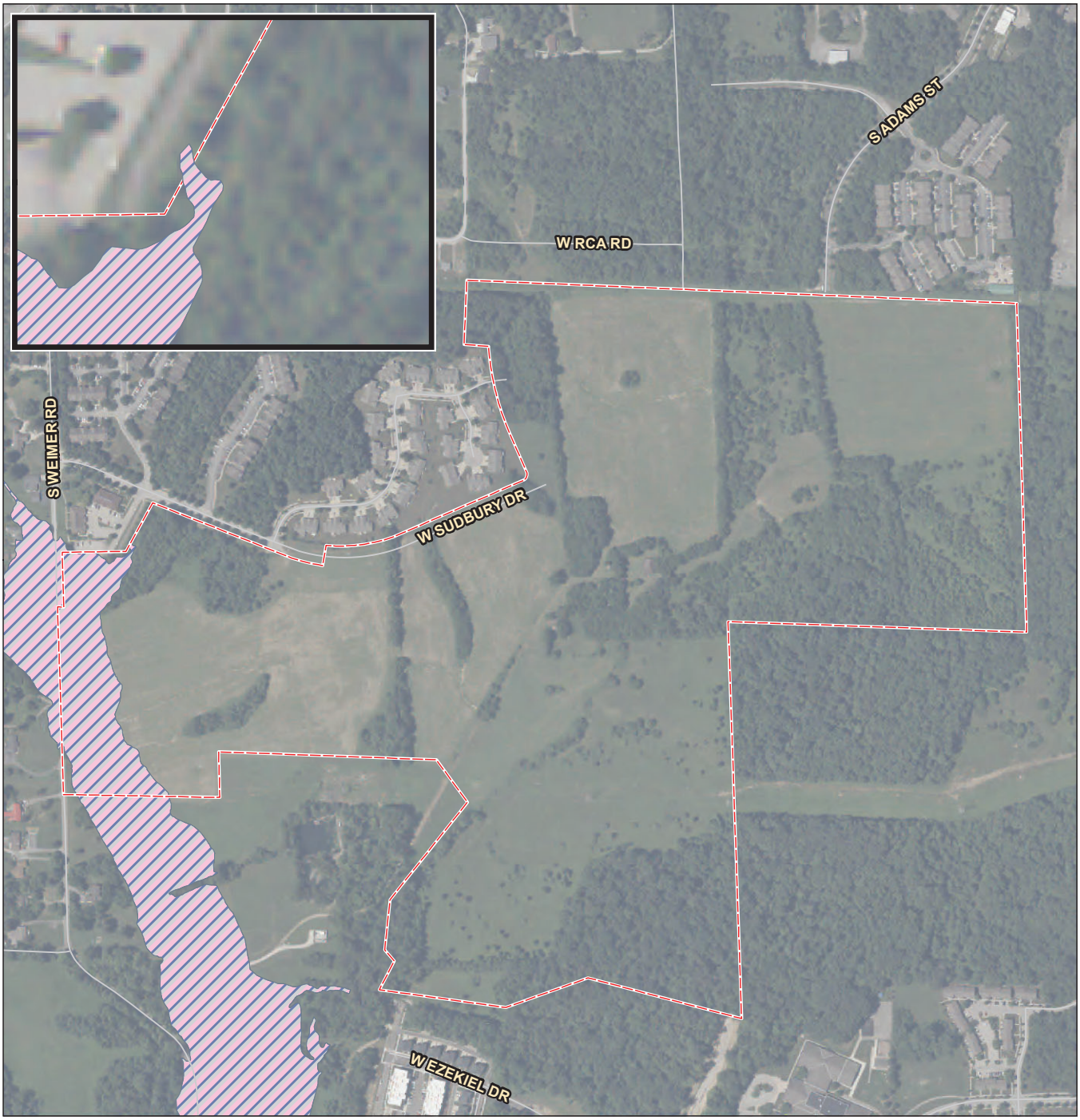
Client/Project
The Ridge Group, Inc.
Summit District - Bloomington
Environmental Constraints Analysis

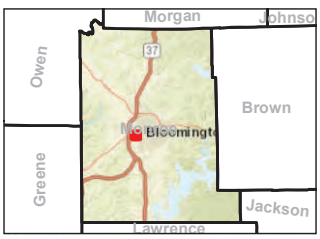
Proj No. 193806201

Figure No.
3

Title
Streams and Wetlands

\\us0707-ppfss01\shared_projects\gis_projects\193806201\03_data\gis_cad\gis\mxds\DueDill\F3_DelineatedFeatures_bwh.mxd Revised: 2023-06-19 By: bwharvey





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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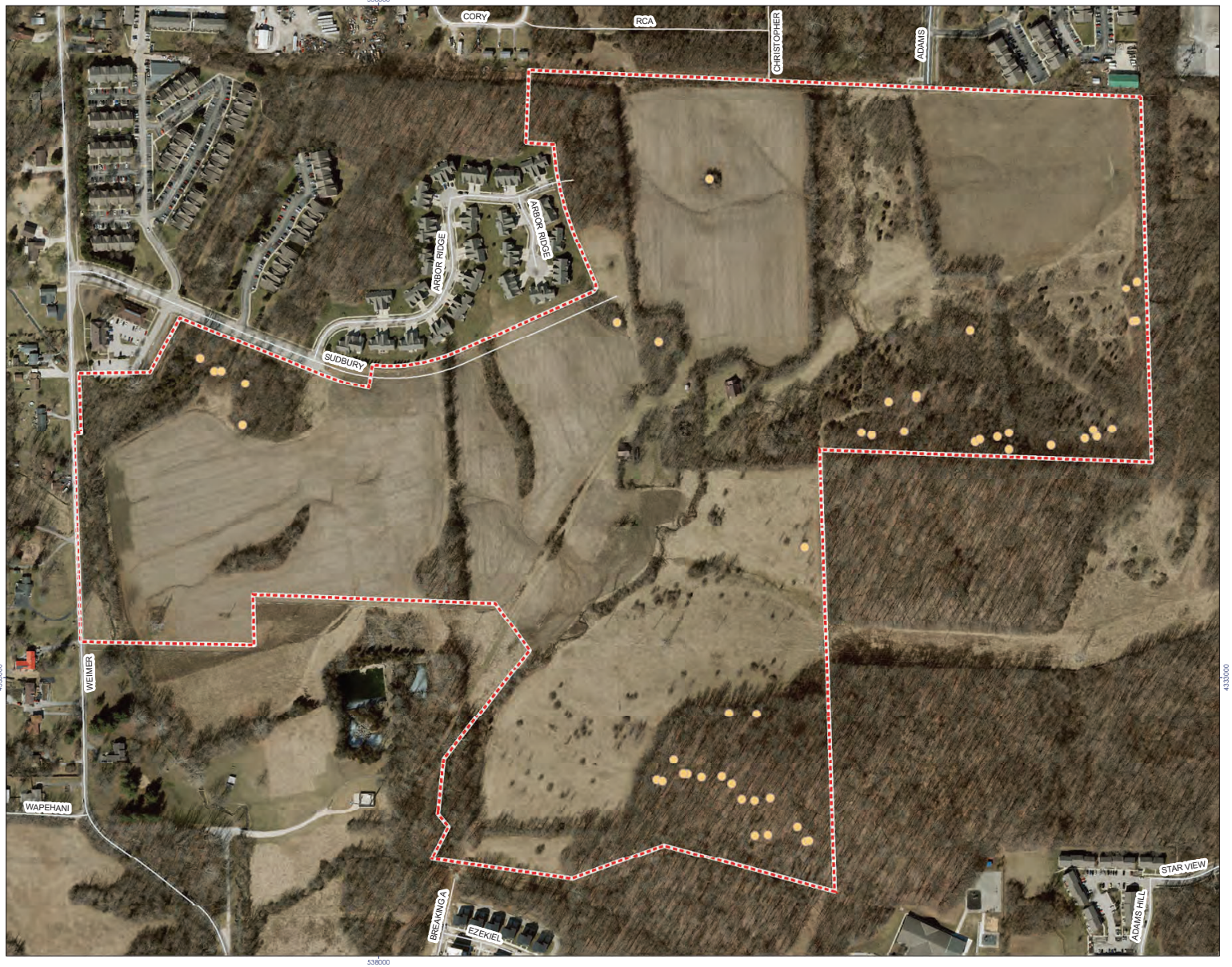


Figure No.
5

Title
Karst Data

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

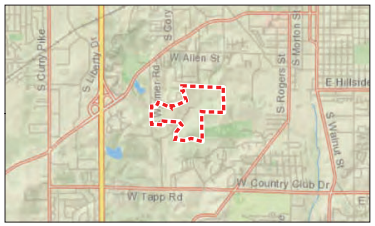
Project Location
Bloomington, IN

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

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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

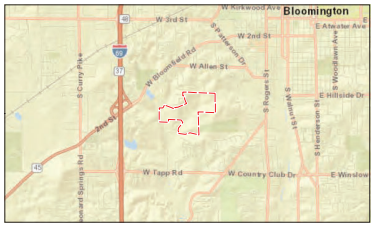
N

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

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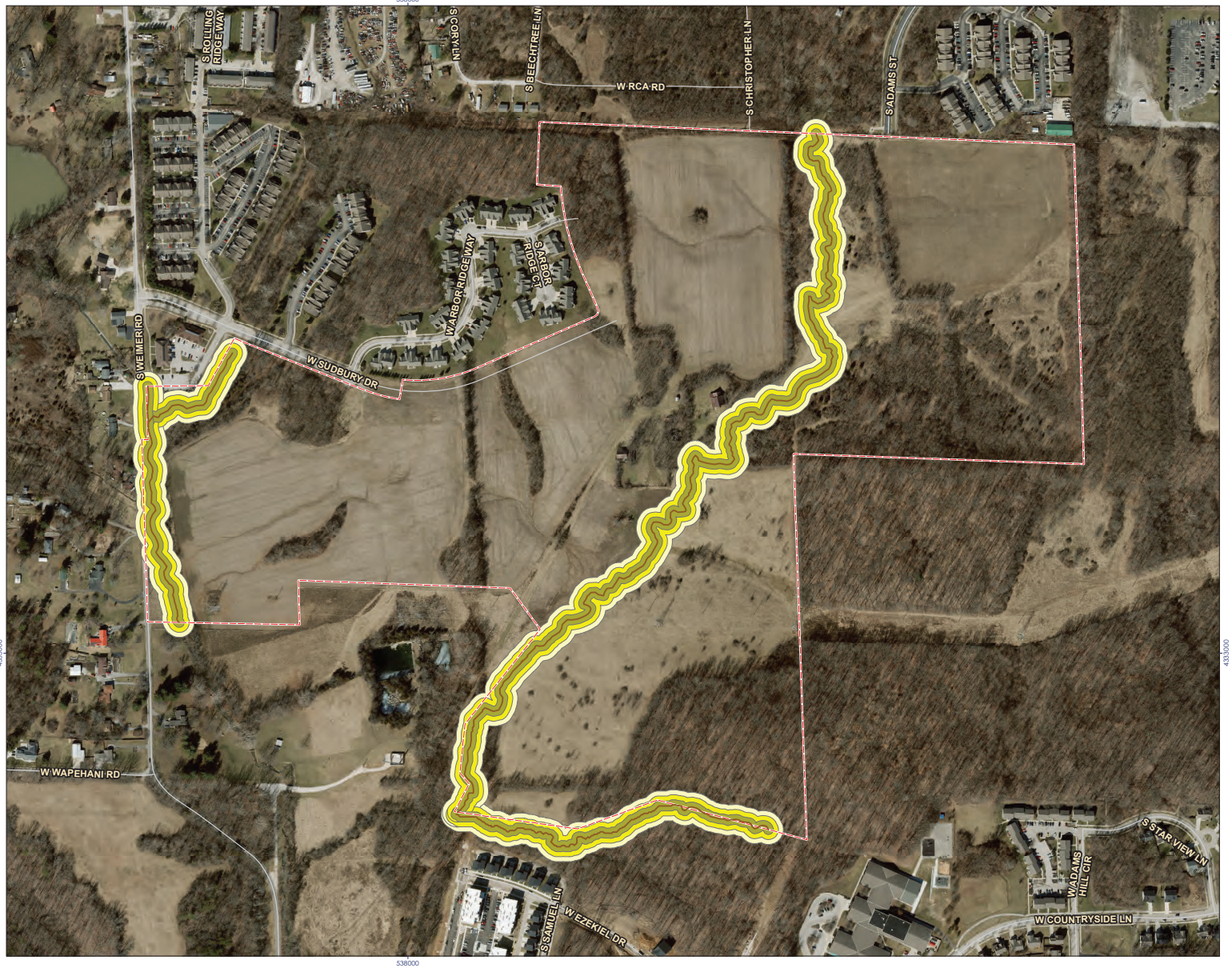


Figure No.
7

Title
Stream Buffer Zones

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

Proj No. 193806201

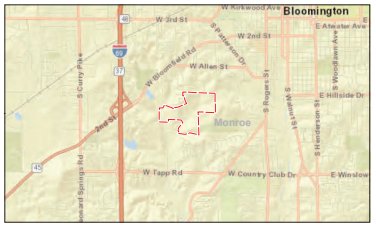
Project Location
T8N, R1W, S7-8
7.5' Quadrangle: Bloomington, Monroe County, IN

Prepared by SKL on 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

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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