

Planning Commission Staff Report

File # 9S22/SUB-000248-2022

**Public Hearing and Consideration of a Preliminary
Subdivision Plat for 23.95 Acres of Property at 4202 South
Riverboat Road, Taylorsville, Utah.**



Department of Community Development

Date:	July 20, 2022
Meeting Date:	July 26, 2022
Agenda Item:	Public Hearing and Consideration of a Preliminary Subdivision Plat for 23.95 Acres of Property at 4202 South Riverboat Road, Taylorsville, Utah.
Subject Property Address:	4202 S. Riverboat Road
Applicant:	John Buckel, Badiie Development
Applicant Agent:	Jason Boal, AICP & CFM, Snell & Wilmer
Author:	Jim Spung, AICP, Senior Planner
Parcel #:	21022260070000
Applicable Ordinances:	Including, but not limited to 13.15; 13.16; 13.21; 13.23; 13.29; and 13.30
Agenda Item #:	4

Attachments:

Exhibit A: Zoning Map

Exhibit B: General Plan Map

Exhibit C: Subject Property Aerial Image

Exhibit D: Subject Property Vicinity Map

Exhibit E: Proposed Preliminary Plat

Exhibit F: Sensitive Area Overlay Zone Map

Exhibit G: Wetland Delineation Study

Exhibit H: Geotechnical Study

Exhibit I: Proposed Development Site Plan

Exhibit J: City Review Comments – July 15, 2022

Summary:

Jason Boal, on behalf of Badiie Development, is requesting Planning Commission review and approval of a preliminary subdivision plat for 23.95 acres of property at 4202 South Riverboat Road, Taylorsville, Utah. The subject property has one means of ingress and egress via South Riverboat Road, which currently terminates as a stub street at the southern edge of the property. The proposed plat (Exhibit E) includes the addition of a cul-de-sac to provide a proper terminus to the existing public street.

The applicant has submitted a separate conditional use permit and site plan review application (File #5C22/CUP-000181-2022) with intentions to develop the subject property. That application is referenced in this report and will be discussed as a separate item on the July 26, 2022 Planning Commission meeting agenda.

Site Description

The subject property (parcel ID# 21022260070000) is approximately 23.95 acres of land adjacent to the Jordan River. The site is currently undeveloped, except for a high-voltage transmission powerline which runs north/south through the site along the western property line and the Jordan River Parkway Trail that runs generally in a north/south direction along the east boundary adjacent to the Jordan River. Salt Lake County-owned and -operated Meadow Brook Golf Course is adjacent to the property on the west.

Vehicle access to the subject property is from South Riverboat Road, which currently terminates as a dead-end street without a permanent turn-around. The site is primarily flat open land with mixed vegetation. The zoning map designation for the subject property is "Industrial (ID)." Surrounding zoning designations are as follows:

North	South	East	West
Millcreek City Jordan River	RM-12 (Maison's Landing apartments)	Jordan River Murray City Millcreek City	Open Space (OS) and Research and Development (RD)

There are several constraints affecting the property. These constraints include but are not limited to: flood hazards; wetlands; geological/geotechnical hazards; and existing easements. Each is briefly summarized below.

Flood Hazards

The subject property has a FEMA Special Flood Hazard Area (SFHA) of Zone AE with a floodway and is in the Jordan River meander corridor. The location of the property, river, and floodplains are shown in Exhibit F. The presence of these flood hazard designations subjects the property to the City's Floodplain Overlay Zone and Sensitive Area Overlay Zone. City Staff recommends that FEMA floodplain information be included on the plat.

Wetlands

Due to the subject property's FEMA floodplain designation and its proximity to the Jordan River, the applicant provided a wetlands study/report as part of the conditional use permit and site plan review, referenced earlier in this report, to identify potential impacts to existing wetland areas. The applicant secured a consultant, Bowen Collins & Associates, to prepare an "Aquatic Resources Delineation Report" to identify channel boundaries of the Jordan River and any potential wetlands (Exhibit G).

Aquatic resources were observed along the north and eastern edges of the project area where the project area boundary (based on parcel lines) crossed into the Jordan River and the wetland fringe along parts of its banks. City Staff recommends a plat note be included indicating that a wetland study is required prior to development of the property.

Geological/Geotechnical Hazards

The subject property is within a “High Liquefaction Area,” meaning there is a 50 percent probability of having an earthquake within a 100-year period that will be strong enough to cause liquefaction. Liquefaction takes place when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking, resulting in material that is ordinarily a solid (e.g., the ground) behaving like a liquid.

Due to this site condition, the applicant submitted a Geotechnical Study (Exhibit H) to evaluate the subsurface soil and groundwater conditions across the site. The results of this study inform appropriate foundation, earthwork, pavement, and geo-seismic recommendations for the design and construction of the proposed development. City Staff recommends a plat note indicating that a geotechnical study and groundwater investigation be required prior to development of the property.

Existing Easements

There are several existing easements on the property – the most notable of which is an overhead high-voltage transmission power corridor running north/south along the western portion of the property. Major water and sewer lines also run parallel to the power line easement as well as along the south property line and north/south along the east side of the site between the Jordan River Trail and the river.

The Jordan River Trail (i.e., Jordan River Parkway) runs parallel to the Jordan River and runs north/south along the eastern portion of the subject property. Portions of the Jordan River and nearly all of the Jordan River Parkway traversing the subject property are within the property boundaries.

For easy reference, the location and impact of all easements on the property will be noted and illustrated on the subdivision plat. A title report for all property within the boundary of the plat must be submitted to the City within 90 days of recording to ensure all relevant information is reflected on the plat.

Land Development Code Analysis

Public Parking and Amenity Areas

As mentioned in the “Summary” portion of this report, the applicant has submitted a separate conditional use permit and site plan review application (File #5C22/CUP-000181-2022) with intentions to develop the subject property. That application will be discussed as a separate item on the July 26, 2022 Planning Commission meeting agenda; however, there are overlapping and related items which affect both the site plan/CUP application and the subdivision application, as summarized below.

The development proposal includes a “public access parking area” with 12 vehicle parking spaces on the western edge of the property adjacent to the cul-de-sac intended to provide public parking for persons using the Jordan River Parkway trail (Exhibit I). There is also a public trail connecting the parking area to the existing Jordan River Parkway Trail as well as other public amenity areas on the site. City Staff recommends these areas be established and noted on the subdivision plat to memorialize the public’s right to access these designated portions of the subject property.

Roadway Design

As stated in the “site description” portion of this report, the subject property is within the Sensitive Area Overlay Zone, and is thereby subject to the standards in [Chapter 13.15](#) of the LDC. [Section 13.15.040\(B\)\(7\)](#) limits cul-de-sac length to 600 feet, unless the Planning Commission approves an alternative design, upon recommendation from the City Engineer. The proposed cul-de-sac would be approximately 2,134 feet from the next closest intersection, exceeding the 600-foot maximum. The City Engineer has recommended the Planning Commission approve this configuration as part of the subdivision plat, as no other viable alternative exists to terminate South Riverboat Road. There are few opportunities to improve connectivity to the site because the property is bounded by the Jordan River to the north and east and a Salt Lake County-owned golf course to the west.

City Department and Agency Review

This proposal is subject to the subdivision standards in the Taylorsville Land Development Code. This application has been distributed to City Departments and review authorities, and as of July 19, 2022, there are a number of outstanding review comments – most of which are minor in nature (see Exhibit J). The proposed preliminary plat is generally consistent with current zoning standards and the General Plan.

The Planning Commission is the preliminary subdivision review authority, pursuant to [Section 13.30.030\(D\)](#) of the LDC. City Staff and review authorities will continue to work with the applicant to address outstanding review comments. Construction and development activity on the subject property is not permitted until all applicable permits/approvals have been secured by the applicant. To ensure proper sequencing of approvals, the subdivision plat review must be completed prior to issuance of a development permit on the subject property.

Public Comment

On July 15, 2022, a public notice was mailed to all affected entities and property owners within 300 feet of the subject property. As of July 19, 2022, staff has not received public comment regarding this application.

Findings

1. The subject property is made up of one parcel (parcel ID 21022260070000) with a cumulative area of approximately 23.95 acres.
2. The subject property is in the Industrial (ID) zoning district.
3. The subject property is in the “Business Park” designation in the City’s General Plan.
4. John Buckel, Badiee Development, submitted an application for preliminary subdivision review on July 6, 2022.
5. The proposed subdivision includes the dedication of right-of-way to construct a cul-de-sac at the north terminus of South Riverboat Road, a public street.
6. [Section 13.15.040\(B\)\(7\)](#) of the LDC limits cul-de-sac length to 600 feet, unless otherwise approved by the Planning Commission, upon recommendation from the City Engineer.
7. The City Engineer recommends the Planning Commission approve the extended cul-de-sac length as part of the subdivision plat.
8. There are several existing easements on the property.
9. The subject property has a FEMA Special Flood Hazard Area (SFHA) of Zone AE with a floodway and is located in the Jordan River meander corridor.
10. The subject property is within a “High Liquefaction Area.”

11. The subject property is within the “Floodplain Overlay Zone” and is subject to the standards in [Chapter 13.16: Floodplain Overlay Zone](#), of the LDC.
12. The subject property is within the “Sensitive Area Overlay Zone,” and is subject to the standards in [Chapter 13.15: Sensitive Area Overlay Zone](#), of the LDC.
13. The applicant has submitted a separate conditional use permit and site plan review application (File #5C22/CUP-000181-2022) with intentions to develop the subject property.
14. The proposed conditional use permit and site plan review application (File #5C22/CUP-000181-2022) includes improvements that may require notations on the plat document.
15. The proposed application has been reviewed by City departments and review agencies and there are several minor review comments that must be addressed prior to final approval (see Exhibit J).
16. A title report for all property within the boundary of the plat must be submitted to the City within 90 days of recording to ensure all relevant information is reflected on the plat.
17. To ensure proper sequencing of approvals, the subdivision plat review must be completed prior to issuance of a development permit on the subject property.
18. On July 15, 2022, a public notice was mailed to all affected entities and property owners within 300 feet of the subject property. As of July 19, 2022, staff has not received public comment regarding this application.
19. The Planning Commission is the decision-making authority for preliminary subdivision plat review.

Conditions of Approval

City Staff recommends the following conditions of approval be required for this application:

1. The application comply with all applicable standards of the Land Development Code (LDC), City Ordinances, City Staff and review agency comments, and Planning Commission Conditions of Approval, prior to recording.
2. Any easements, exceptions, or other requirements limiting development on the property be noted on the plat, prior to recording with Salt Lake County.
3. In accordance with Section [13.15.040\(B\)\(7\)](#) of the LDC, the Planning Commission approves the extended cul-de-sac length, as illustrated in Exhibit E, and as approved by the City Engineer.
4. A current title report for all property within the boundary of the plat must be submitted to the City within 90 days of recording with Salt Lake County.
5. The subdivision plat be recorded with the Salt Lake County Recorder's Office, prior to issuance of a development permit on the subject property.

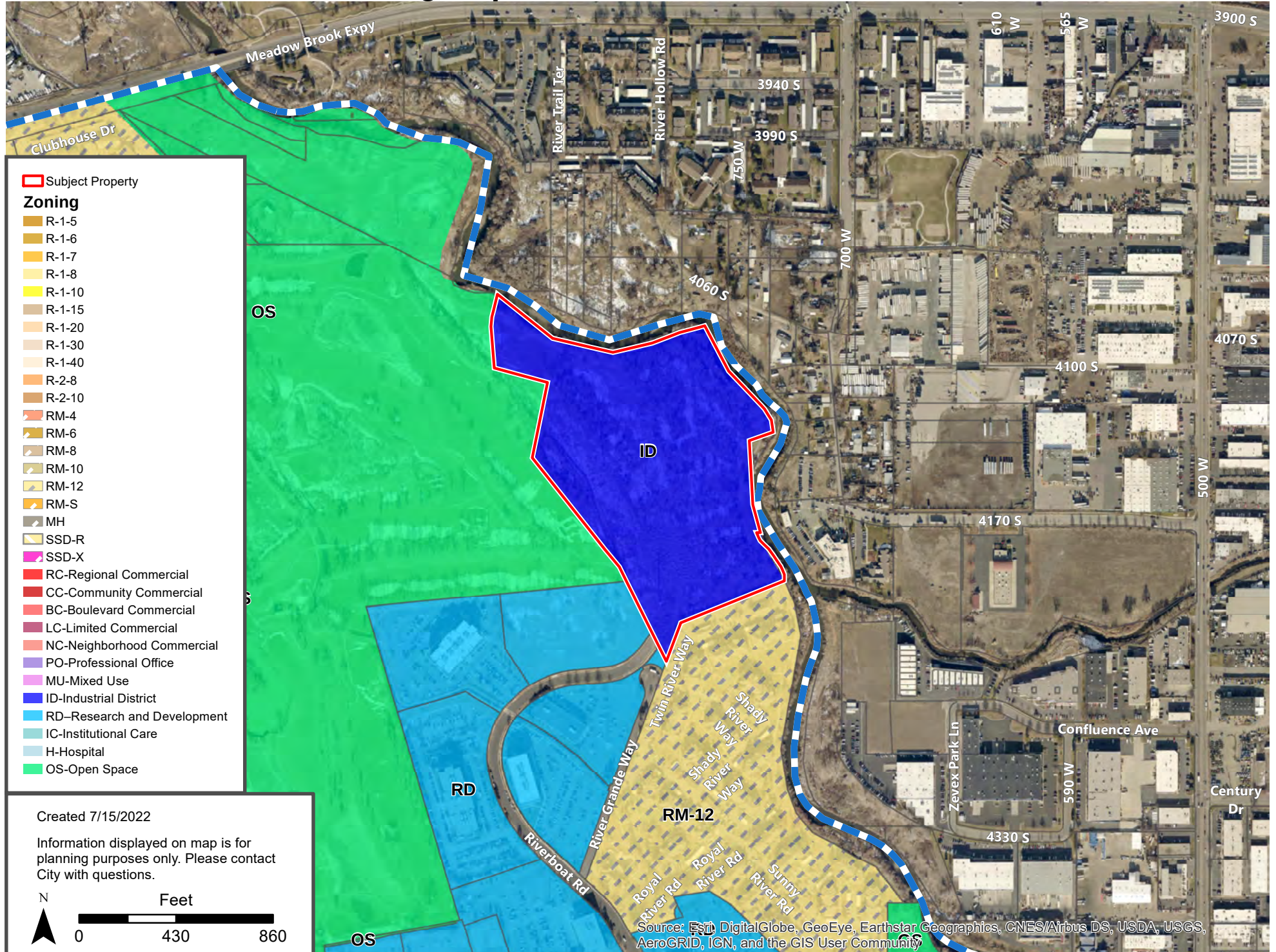
Staff Recommendation

Staff recommends the Planning Commission approve File #9S22/SUB-000248-2022, a preliminary subdivision plat for 23.95 acres of property at 4202 South Riverboat Road, Taylorsville, Utah, subject to the findings and conditions outlined in this Staff Report.

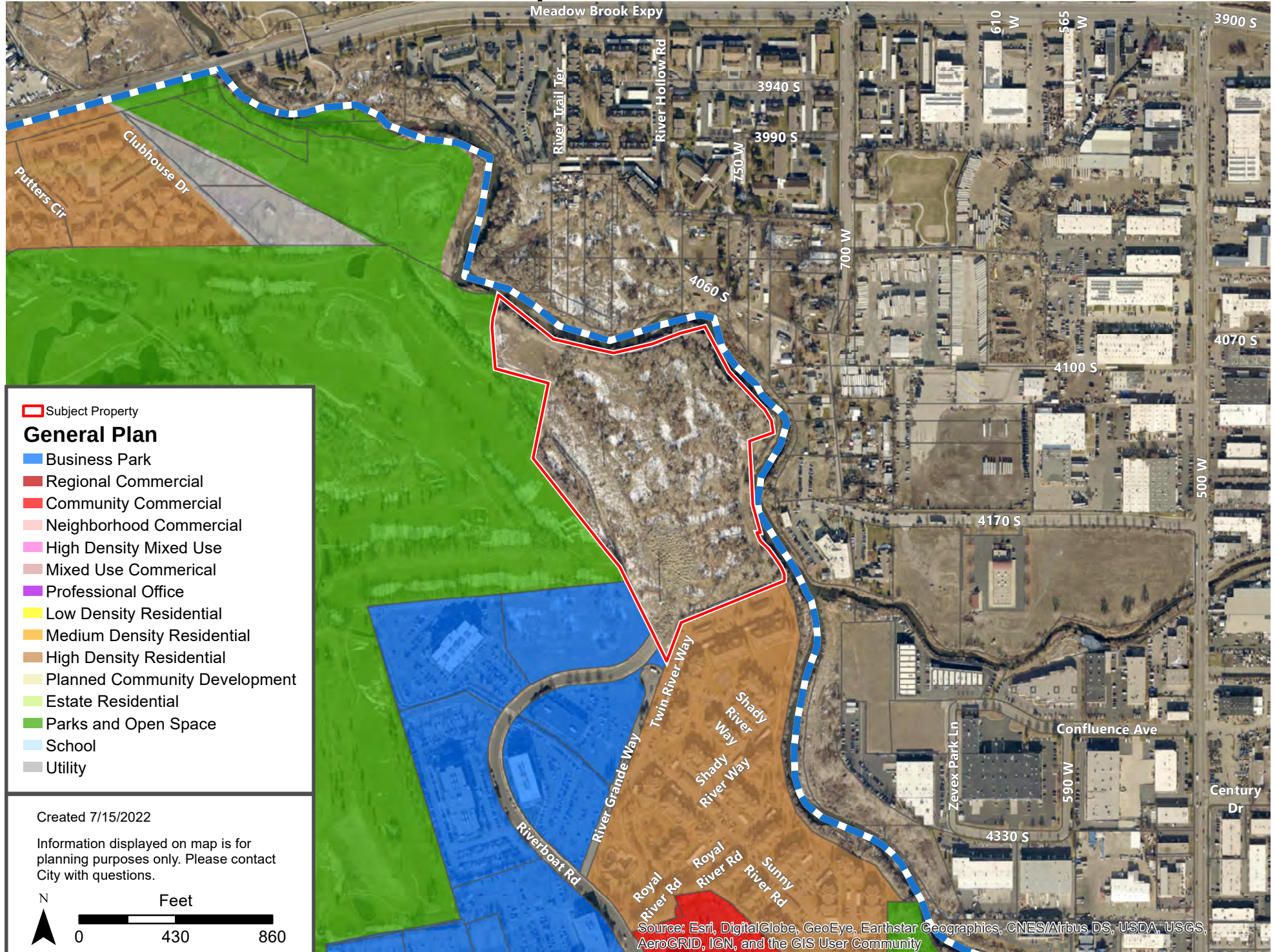
Recommended Motion

I move that we approve File #9S22/SUB-000248-2022, a preliminary subdivision plat for 23.95 acres of property at 4202 South Riverboat Road, Taylorsville, Utah, subject to the findings and conditions outlined in this Staff Report.

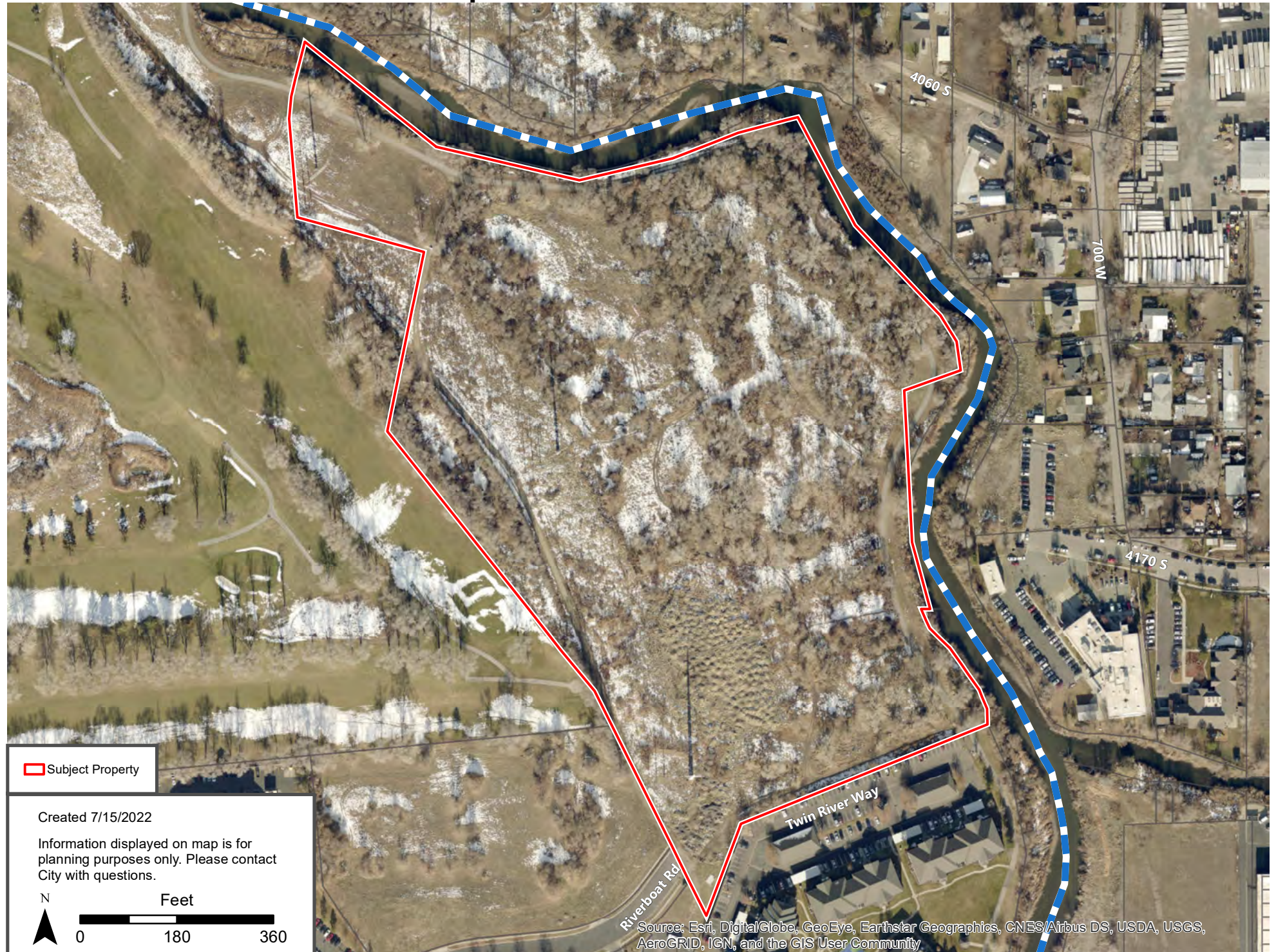
Zoning Map: 4202 South Riverboat Road



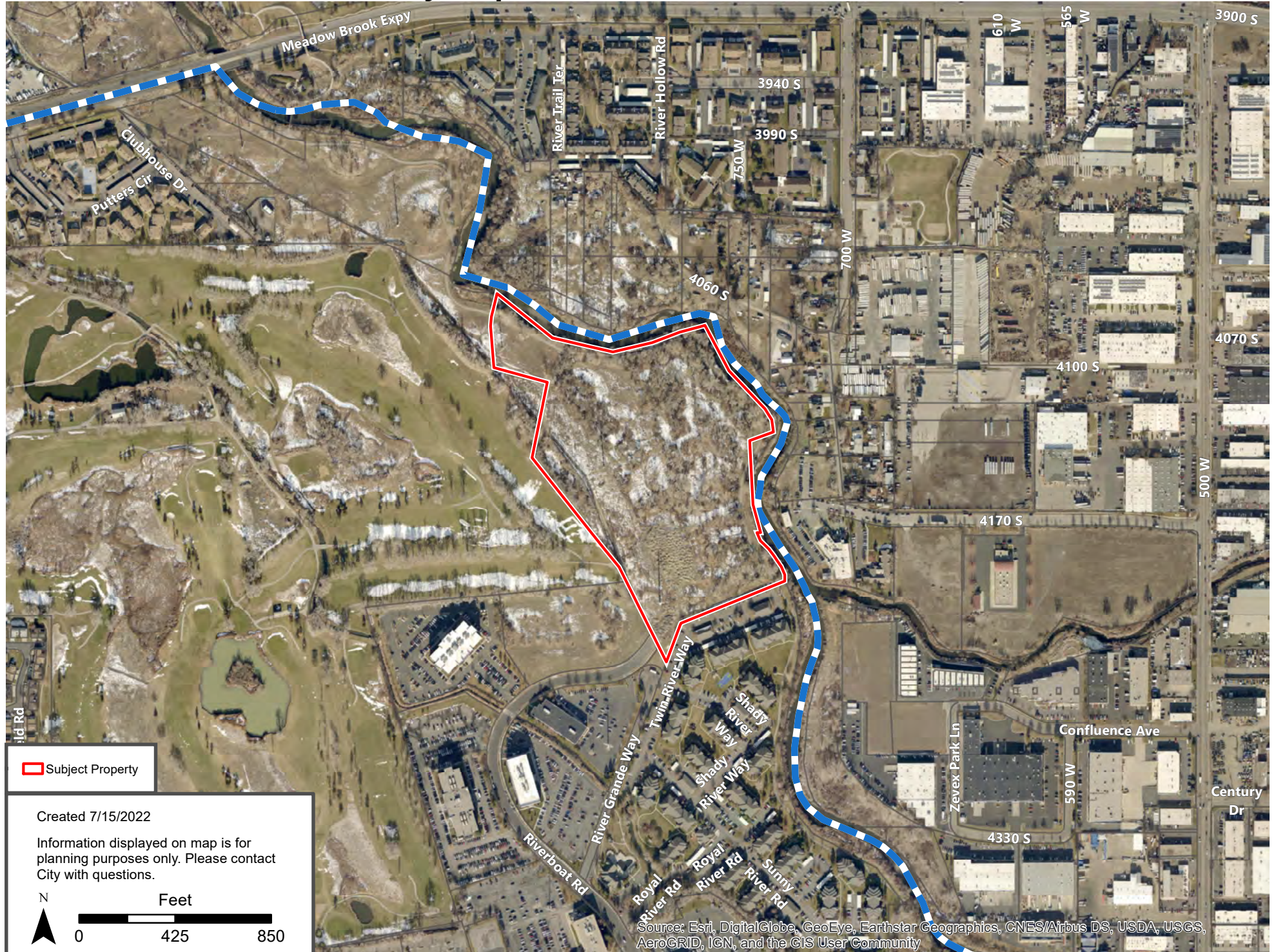
General Plan Map: 4202 South Riverboat Road



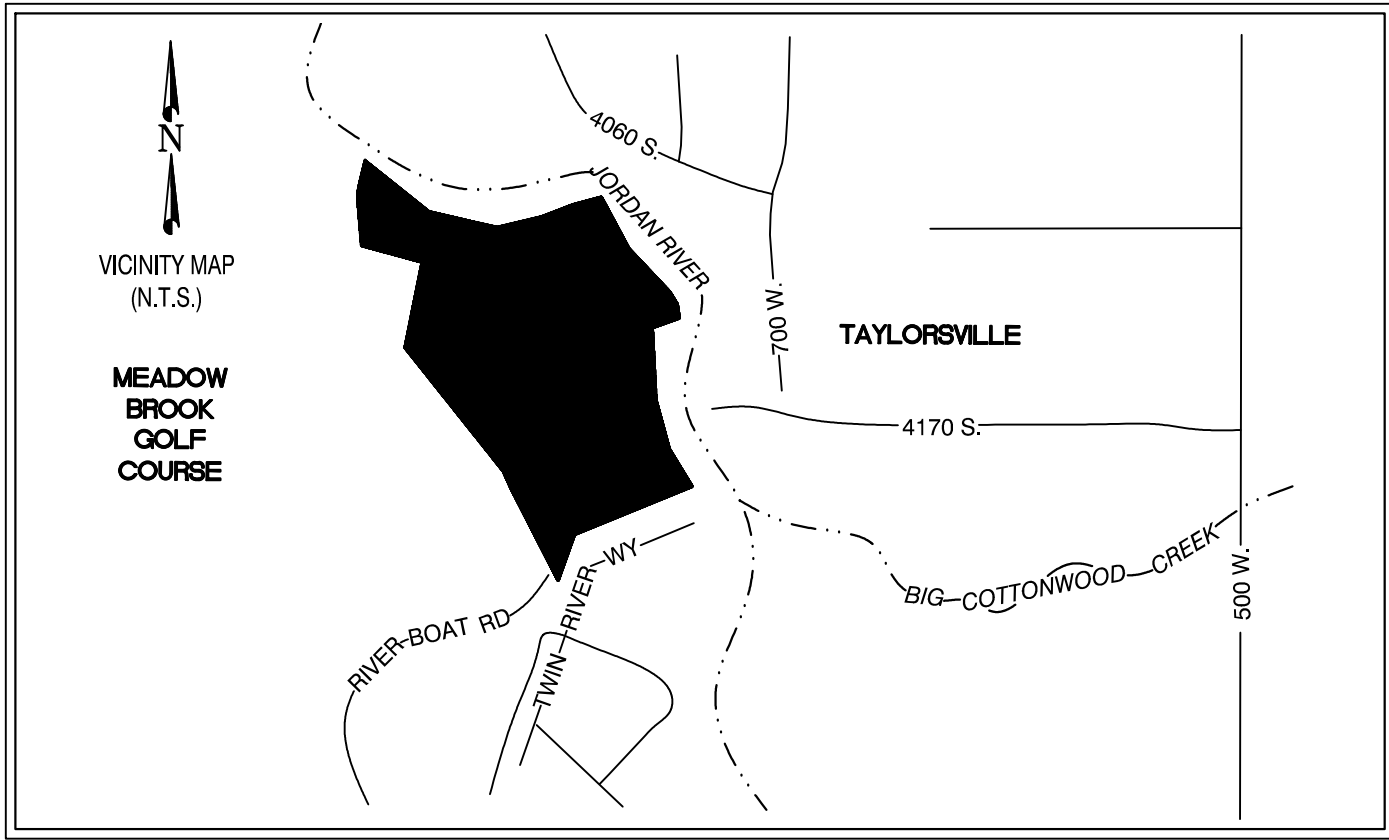
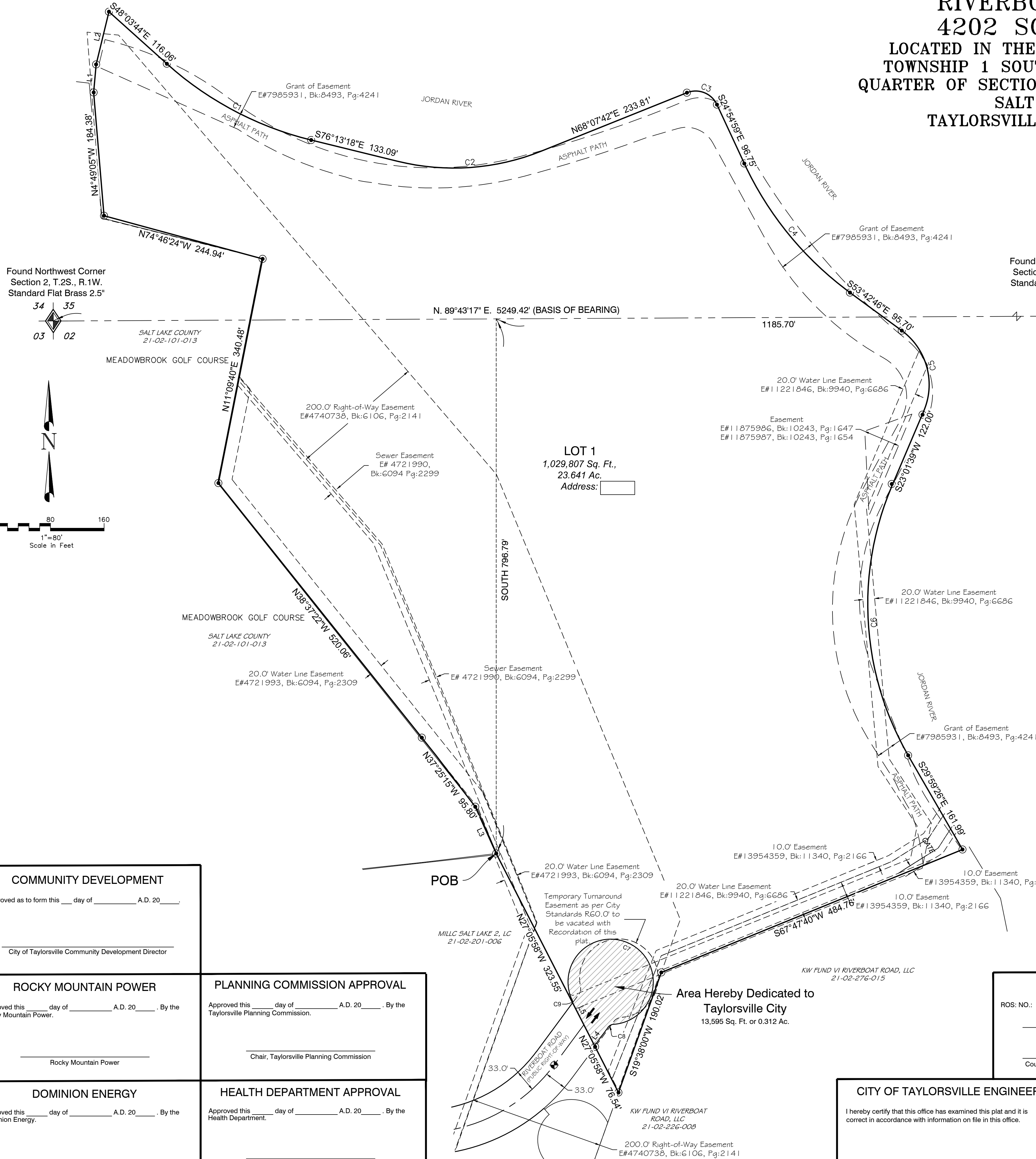
Site Map: 4202 South Riverboat Road



Vicinity Map: 4202 South Riverboat Road



RIVERBOAT ROAD SUBDIVISION
4202 SOUTH RIVERBOAT ROAD
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 35,
TOWNSHIP 1 SOUTH, RANGE 1 WEST, & THE NORTHEAST
QUARTER OF SECTION 2, TOWNSHIP 2 SOUTH, RANGE 1 WEST,
SALT LAKE BASE AND MERIDIAN
TAYLORSVILLE CITY, SALT LAKE COUNTY, UTAH



SURVEYOR'S CERTIFICATE

I, GARY CHRISTENSEN, do hereby certify that I am a Professional Land Surveyor in the State of Utah and that I hold License No. 5152617 in accordance with Title 58, Chapter 22, of the Professional Engineers and Land Surveyors Act; I further certify that by authority of the owners I have made a survey of the property described on this plat in accordance with 17-23-17, and have subdivided said property into lots and streets, together with easements, hereafter to be known as **RIVERBOAT ROAD SUBDIVISION** and that the same has been correctly surveyed and monumented on the ground as shown on this plat.

Signed this ____ day of _____, 20 ____



BOUNDARY DESCRIPTION

A parcel of land being a part of an entire tract of land described in that Special Warranty Deed recorded September 17, 2021 as Entry No. 1377653 in Book 11240, at Page 8013 in the Office of the Salt Lake County Recorder. Said parcel of land is located in the Southeast Quarter of Section 35, Township 1 South, Range 1 West, Salt Lake Base and Meridian and the Northeast Quarter of Section 2, Township 2 South, Range 1 West, Salt Lake Base and Meridian and is described as follows:

Beginning at the northeasterly corner of Lot 4, Sorenson Research Park Phase 2 recorded August 29, 1997 as Entry No. 6727986 in Book 97-8P, at Page 268 in the Office of said Recorder, which is 1185.70 feet S. 89°43'17" W. along the Section line and 796.79 feet South from the Northeast Corner of said Section 2; thence along an existing fence as described in that Warranty Deed conveyed to Salt Lake County recorded December 9, 1955 as Entry No. 1459946 in Book 1265, at Page 540 in the office of said Recorder the following five (5) courses: 1) N. 24°07'32" W. 76.35 feet; 2) N. 37°25'15" W. 95.80 feet (R=North 38°25'22" West 95.72 feet) feet; 3) N. 38°37'22" W. 520.06 feet (R=North 38°31'59" West 520.99 feet); 4) N. 11°09'40" E. 340.48 feet (R=North 11°21'58" East 340.58 feet); 5) N. 74°46'24" W. 244.94 feet; thence N. 04°49'05" W. 184.38 feet; thence N. 04°59'26" E. 41.96 feet; thence N. 13°40'03" E. 80.81 feet (R=105.3 feet) to the westerly bank of the Jordan River; thence along said westerly bank of the Jordan River the following thirteen (13) courses: 1) S. 48°03'44" E. 116.06 feet to a point of tangency with a 500.00 - foot radius curve to the left, concave northeasterly; 2) Southeasterly 245.74 feet along the arc of said curve, through a central angle of 28°09'34" (Chord bears S. 62°08'31" E. 243.27 feet); 3) S. 76°13'18" E. 133.09 feet to a point of tangency with a 350.00 - foot radius curve to the left, concave northerly; 4) Easterly 217.77 feet along the arc of said curve, through a central angle of 35°38'48" (Chord bears N. 85°57'12" E. 214.28 feet); 5) N. 85°07'42" E. 233.81 feet to a point of tangency with a 35.00 - foot radius curve to the right, concave southerly; 6) Easterly 53.12 feet along the arc of said curve, through a central angle of 86°57'18" (Chord bears S. 68°23'39" E. 48.16 feet); 7) S. 24°54'59" E. 96.75 feet to a point of tangency with a 500.00 - foot radius curve to the left, concave northeasterly; 8) Southeasterly 251.29 feet along the arc of said curve, through a central angle of 28°47'46" (Chord bears S. 39°18'53" E. 248.66 feet); 9) S. 53°42'46" E. 95.70 feet to a point of tangency with a 100.00 - foot radius curve to the right, concave westerly; 10) Southerly 133.94 feet along the arc of said curve, through a central angle of 76°44'25" (Chord bears S. 15°20'33" E. 124.15 feet); 11) S. 23°01'39" W. 122.00 feet to a point of tangency with a 450.00 - foot radius curve to the left, concave easterly; 12) Southerly 416.40 feet along the arc of said curve, through a central angle of 53°01'05" (Chord bears S. 03°28'54" E. 401.71 feet); 13) S. 28°59'26" E. 161.99 feet to a point on the southerly boundary line of said entire tract; thence along said southerly boundary line the following three (3) courses: 1) S. 67°47'40" W. 484.76 feet; 2) S. 19°38'00" W. 180.02 feet to a southeasterly extension of a northeasterly line of said Sorenson Research Park Phase 2; 3) N. 27°05'58" W. 76.54 feet along said extension to the southerly right of way line of Riverboat Road; thence N. 27°05'58" W. 323.55 feet along said northeasterly line of Sorenson Research Park Phase 2 to the Point of Beginning.

The above-described entire tract contains 1,043,402 sq. ft., in area or 23.953 ac. more or less. 1 Lot and Parcel to be dedicated to Taylorsville City.

OWNER'S DEDICATION

Know all men by these presents that the undersigned are the owners of the above described tract of land, and hereby cause the same to be divided into Lots, Parcel and Streets, together with easements as set forth to be hereafter known as:

RIVERBOAT ROAD SUBDIVISION

And do hereby dedicate for perpetual use of the public all roads and other areas shown on this plat as intended for public use. The undersigned owners also hereby convey to any and all public utility companies a perpetual, non-exclusive easement over the public utility easements shown on this plat, the same to be used for the installation, maintenance and iteration of utility lines and facilities. The undersigned owners also hereby convey any other easements and shown on this plat to the parties indicated and for the purposes shown hereon.

SRP HOLDINGS, LLC

By: _____

Print Name: _____

Title: _____

NOTARY ACKNOWLEDGMENT

State of Utah)
County of Salt Lake)

On this ____ day of _____, in the year 20 ____, before me, _____ a Notary Public, personally appeared _____ the _____ of SRP HOLDINGS, LLC proved on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to in the foregoing owner's dedication and consent regarding the **RIVERBOAT ROAD SUBDIVISION** and was signed by him/her on behalf of said SRP HOLDINGS, LLC and acknowledged that he/she/they executed the same.

Commission Number _____
My Commission Expires _____

Signature: _____

Print Name: _____

A Notary Public Commissioned in Utah

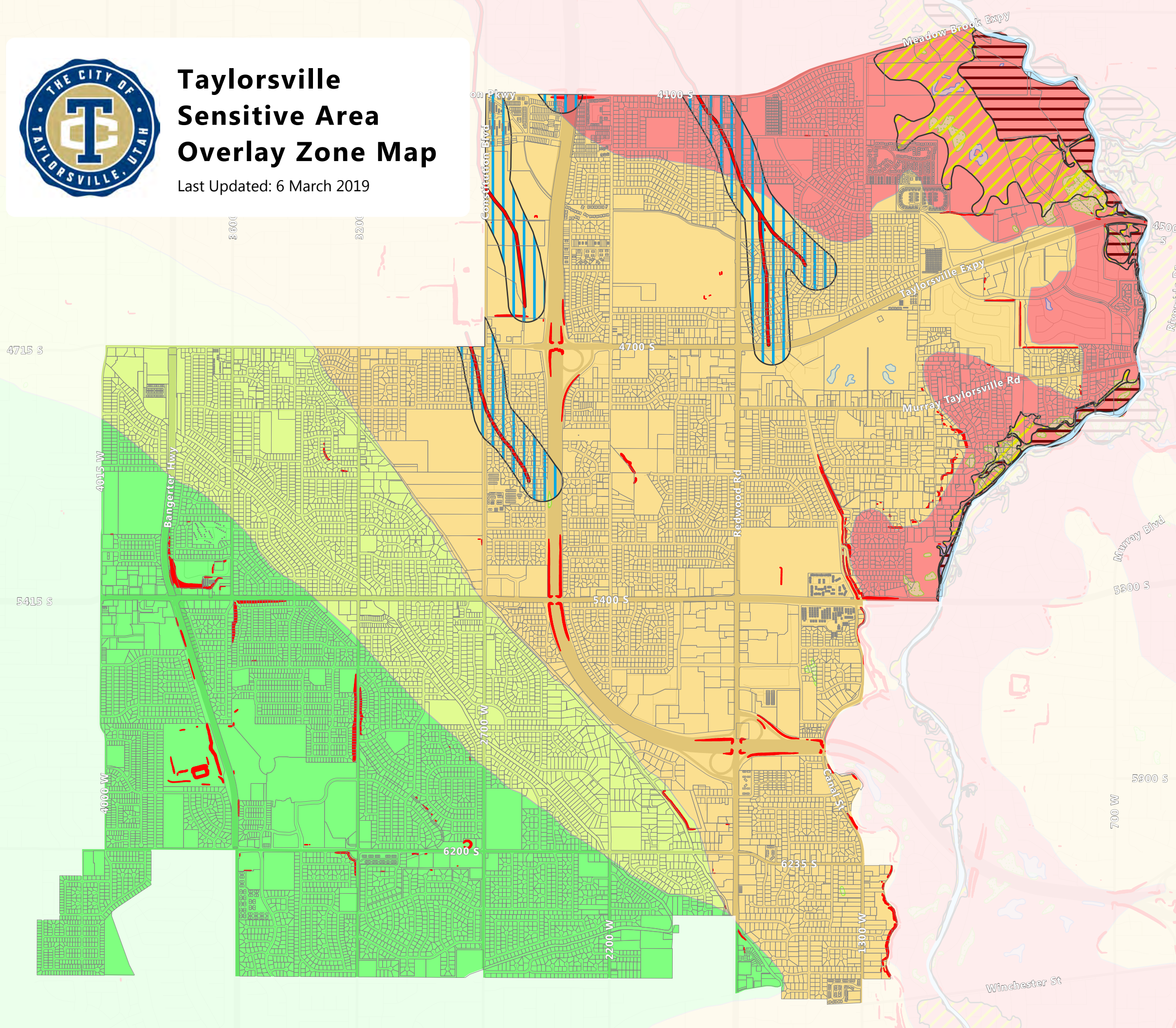
RIVERBOAT ROAD SUBDIVISON

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 35,
TOWNSHIP 1 SOUTH, RANGE 1 WEST, SALT LAKE BASE & MERIDIAN
TAYLORSVILLE CITY, SALT LAKE COUNTY, UTAH



Taylorsville Sensitive Area Overlay Zone Map

Last Updated: 6 March 2019



Faults

Quaternary Fault Lines

Fault Surface Damage

Potential Fault Surface Rupture

Liquefaction Potential

High

Moderate

Low

Very Low

Flood Zones

1% Annual Flood Hazard

0.2% Annual Flood Hazard

Floodway

Other Surface Water

Lakes and Ponds

Wetlands

National Wetland Inventory

Steep Slopes

Slopes Greater Than 30%

Data Sources

Faults	Utah Geological Survey
Fault Surface Damage	Salt Lake County
Liquefaction Potential	Utah Geological Survey
Flood Zones	FEMA
Other Surface Water	National Hydrology Dataset
Wetlands	US Fish & Wildlife Service, Utah Geological Survey
Steep Slopes	Smoothed Half-Meter DEM Based on Lidar Flown 2013-2014

Refer to Chapters 13.15 and 13.16 of the Taylorsville City Code for requirements associated with the areas shown here. Contact the Community Development Department for any questions or large-scale data.

Note: Data available from the Utah Geological Survey indicate no known landslides, debris falls, rock falls, or avalanches within the city boundaries.



TECHNICAL MEMORANDUM

TO: John Buckel, Badiiee Development

COPIES: Taylorsville City
Cameron Jenkins, Bowen Collins & Associates

FROM: Merissa Davis, Bowen Collins & Associates

DATE: February 24, 2022

SUBJECT: Wetland Evaluation - 4202 S. Riverboat Road, Taylorsville, UT

Introduction

Badiiee Development is preparing for the development of property on at 4202 S. Riverboat Road in Taylorsville, Utah. The property is adjacent to the Jordan River and the purpose of the evaluation and this memo is to identify any potential wetlands or waterways on the property that might be impacted by the proposed development.

Property Location & Details

The property is located in Taylorsville, Utah in Section 35, Township 1S, Range 1W and Section 2, Township 2 S, Range 1 W (See Site Location Figures, Appendix A). The area reviewed is approximately 24 acres and all of this area was visited as part of this analysis.

The property which has historically been mostly open space is located adjacent to the Jordan River and the paved Jordan River pathway, with significant overhead powerlines crossing the property. The Meadowbrook Golf Course lines the west property boundary, apartment buildings make up the south boundary, and the Jordan River makes up the east and north boundaries as it meanders downstream to the north. The average elevation is approximately 4,250 feet.

A review of the National Wetland Inventory (NWI) was completed to identify potential wetlands. Although the NWI does not always match current field conditions it can provide valuable insights into potential wetlands and water ways in or near the project area. According to the NWI, the only potential aquatic resource in the parcel boundary is the river except for a small overlap onto an emergent wetlands in the northwest corner of the property (See NWI Figure, Appendix B).

Site Visit Results

On July 29, 2021, Biologist and Environmental Scientist, Merissa Davis of Bowen Collins & Associates visited the property. The site visit took place in the afternoon and the weather conditions at the time sunny and clear. Much of the site is covered in cottonwood and Russian olive trees, but the utility corridor and other smaller areas remain open with native grasses and weeds (See Site Photos, Appendix C).

There were several sections of common reed grass also known as phragmites lining the river's edge. Depending on the high water mark of the river, these phragmites-dominated fringe areas would likely be considered wetlands (See Potential Wetlands Figure, Appendix D). Beyond the banks of the river there did not appear to be any wetlands present. Despite the presence of riparian trees which is common in a river corridor, upland plants dominate the area and there is no sign of hydrology beyond the river.

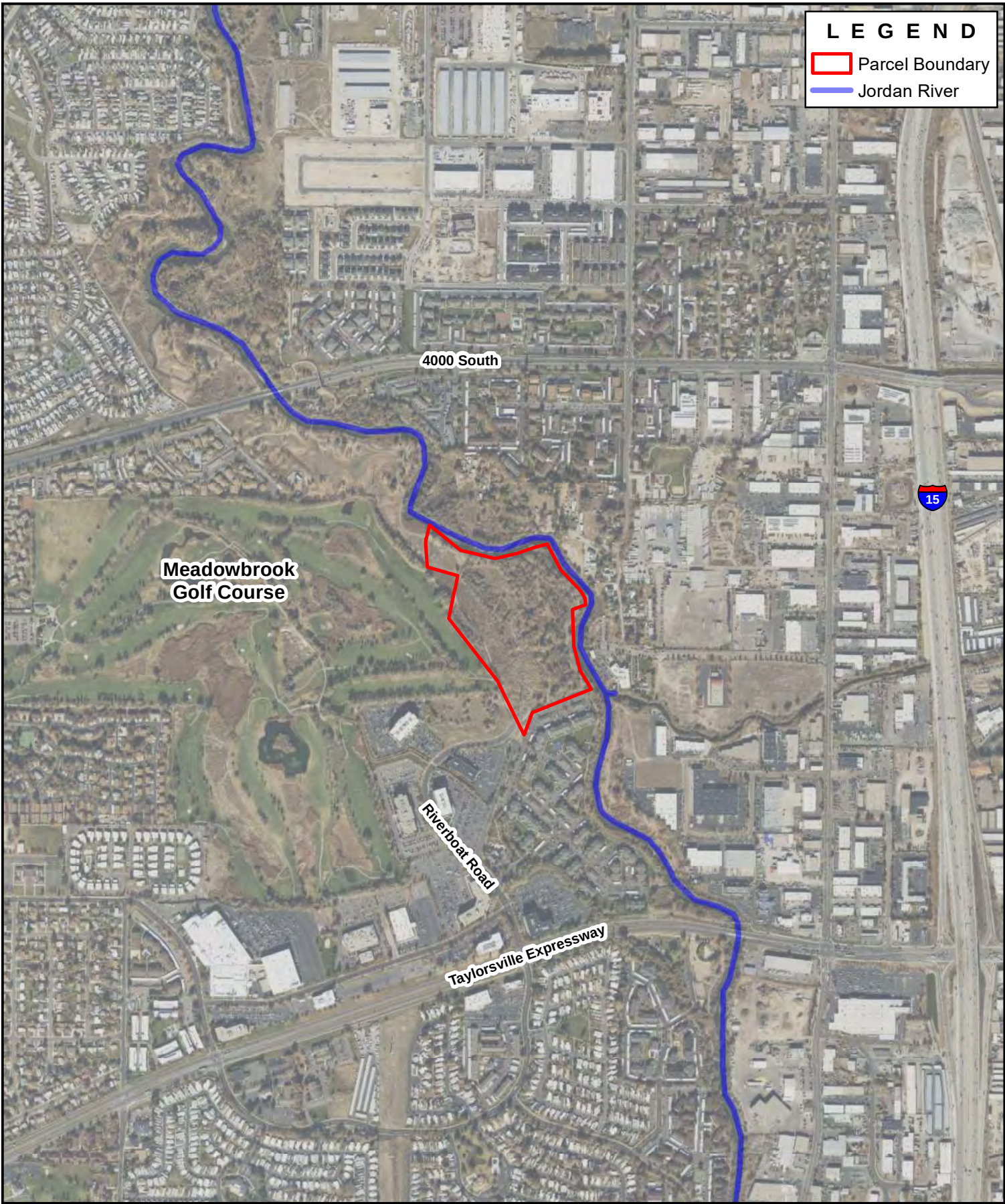
Since the plan for the proposed development is to avoid the river's edge and land disturbance is to be primarily west of the existing pathway, an official U.S Army Corps of Engineers wetland delineation was not performed. At this time, Ms. Davis does not see a need for one as there are no potential wetlands in the interior of the property.

Conclusion

Careful observation of the Riverboat Road property area shows no potential wetlands beyond the riverbank areas or west of the Jordan River Trail. The site design includes plans to construct warehouses and associated parking west of the trail only. It is the opinion of Ms. Davis that the development as proposed will not impact any wetlands, jurisdictional or otherwise.

Appendix A

Site Location Figures



SITE LOCATION

Badiee Development

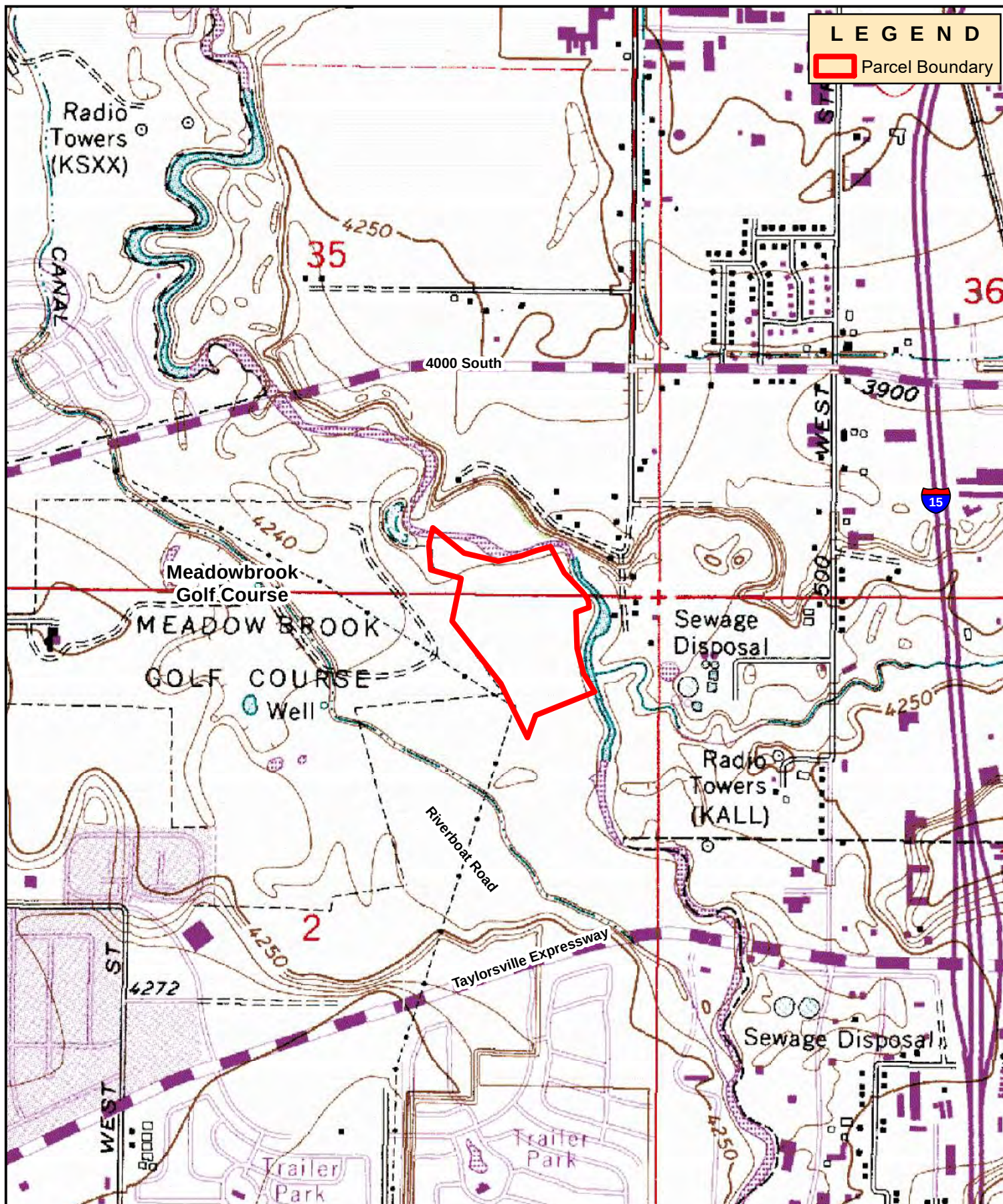
Riverboat Warehouse Development



SCALE:

0 500 1,000 Feet

FIGURE NO. **1A**



SITE LOCATION **(USGS Quad)**

Badiee Development

Riverboat Warehouse Development

NORTH:



SCALE:

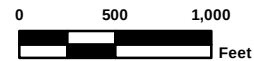


FIGURE NO.

1B

Appendix B

National Wetlands Inventory Figure



L E G E N D

- Parcel Boundary
- Pathway
- NWI Wetlands
 - Freshwater Emergent Wetland
 - Riverine

Appendix C

Site Photos

Riverboat Road Wetland Evaluation Photos



Photo Point 1 – Facing east across the river



Photo Point 2 – Facing southeast

Riverboat Road Wetland Evaluation Photos



Photo Point 3 – Facing east across the river



Photo Point 3 – Facing north towards the river

Riverboat Road Wetland Evaluation Photos



Photo Point 4- Facing north



Photo Point 4 – Facing east towards river

Riverboat Road Wetland Evaluation Photos



Photo Point 4 – Facing south



Photo Point 5 – Facing north

Riverboat Road Wetland Evaluation Photos

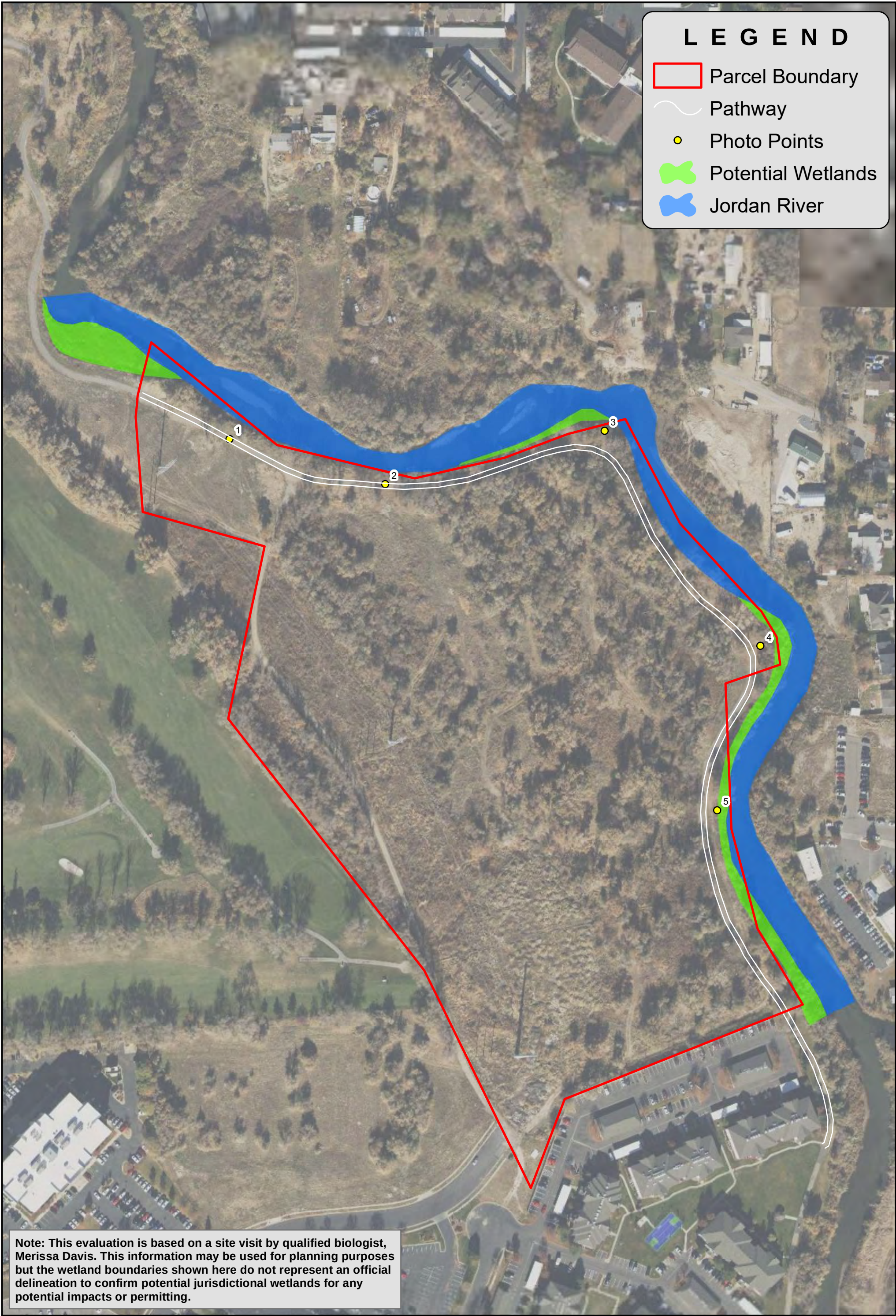


Photo Point 5 – Facing east towards river



Photo Point 5 – Facing south

Appendix D
Potential Wetlands Figure





**REPORT
GEOTECHNICAL STUDY
PROPOSED TAYLORSVILLE OFFICE/WAREHOUSE
DEVELOPMENT
4202 SOUTH RIVERSIDE ROAD
SALT LAKE CITY, UTAH**

Submitted To:

Badice Development
1261 Prospect Street, Suite 9
La Jolla, California 92037

Submitted By:

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

December 16, 2021

Job No. 3295-003-21

December 16, 2021
Job No. 3295-003-21

Mr. Ben Badiee and Mr. Scott Merry
Badiee Development
1261 Prospect Street, Suite 9
La Jolla, California 92037

Messrs. Badiee and Merry:

Re: Report
Geotechnical Study
Proposed Taylorsville Office/Warehouse Development
4202 South Riverside Road
Salt Lake City, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed Taylorsville Office/Warehouse Development to be located at 4202 South Riverside Road in Salt Lake City, Utah. The general location of the site with respect to existing roadways, as of 2021, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing proposed facilities, existing roadways, and the borings drilled in conjunction with this study is presented on Figure 2, Site Plan.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of the study were planned in discussions among Mr. Ben Badiee and Mr. Scott Merry of Badiee Development and Mr. Robert Gifford of GSH Geotechnical, Inc. (GSH).

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.
2. Provide appropriate foundation, earthwork, pavement, and geoseismic recommendations to be utilized in the design and construction of the proposed facilities.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the exploration, logging, and sampling of 27 borings.
2. A laboratory testing program.
3. An office program consisting of the correlation of available data, engineering analysis, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of the Professional Services Agreement No. 21-1069.rev1 dated November 5, 2021.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

The project is to consist of the construction of up to 5 (five) office/warehouse structures with footprints ranging from 10,000 to 129,068 square feet and associated pavements. The structures are anticipated to be 1 to 2 stories, constructed with tilt-up concrete construction, placed slab on grade, and supported upon conventional spread and continuous wall footings.

Maximum real column and wall loads are anticipated to be on the order of up to 220 kips and 5 to 6 kips per lineal foot, respectively. Real loads are defined as the total of all dead plus frequently applied (reduced) live loads.

Paved parking areas, light- and heavy-duty drive lanes, and loading/unloading areas are planned around the structures. Projected traffic in the parking areas is anticipated to consist of a light volume of automobiles and light trucks, occasional medium-weight trucks, and no heavyweight trucks. Proposed traffic in the light-duty drive lanes is anticipated to consist of a moderate volume of automobiles and light trucks, a light volume of medium-weight trucks, and occasional heavy-weight trucks. Projected traffic in the heavy-duty drive lanes and loading/unloading areas is

anticipated to consist of a moderate volume of automobiles, light trucks, and medium-weight trucks with a light volume of heavyweight trucks.

Site development will require some earthwork in the form of minor cutting and filling. At this time, we anticipate that maximum site grading cuts and fills, excluding utilities, will be on the order of 2 to 4 feet.

3. SITE INVESTIGATIONS

3.1 GENERAL

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. If such variations are noted during construction or if project development plans are changed, GSH must review the changes and amend our recommendations, if necessary.

Boring locations were established by estimating distances and angles from site landmarks. If increased accuracy is desired by the client, we recommend that the boring locations and elevations be surveyed.

3.2 FIELD PROGRAM

To define and evaluate the subsurface soil and groundwater conditions across the site, 27 borings were completed within the accessible areas. These borings were completed to depths ranging from 5 to 46 feet with a truck-mounted drill rig equipped with hollow-stem augers. The approximate locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications were supplemented by subsequent inspection and testing in our laboratory. Graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3AA, Boring Logs. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log (USCS).

A 3.25-inch outside diameter, 2.42-inch inside diameter (Dames & Moore) and a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) were utilized at select locations and depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

Following completion of exploration operations, 1.25-inch diameter slotted PVC pipe was installed in most of the borings to provide a means of monitoring the groundwater fluctuations. The borings were backfilled with auger cuttings.

3.3 LABORATORY TESTING

3.3.1 General

To provide data necessary for our engineering analysis, a laboratory testing program was performed. This program included moisture, density, partial gradation, Atterberg limits, consolidation, laboratory vane shear, and chemical tests. The following paragraphs describe the tests and summarize the test data.

3.3.2 Moisture and Density Tests

To provide index parameters and to correlate other test data, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring logs, Figures 3A through 3AA.

3.3.3 Partial Gradation Tests

To aid in classifying the granular soils, partial gradation tests were performed. Results of the tests are tabulated below and presented on the boring logs, Figures 3A through 3AA:

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve	Moisture Content Percent	Soil Classification
B-1	10.0	4.4	39.1	GP
B-2	7.5	6.9	25.0	SP/SM
B-2	10.0	1.9	29.6	SP
B-2	15.0	2.2	11.1	SP
B-3	10.0	2.1	23.5	SP
B-5	10.0	1.3	17.9	GP
B-6	2.5	23.4	11.8	SM
B-9	10.0	13.4	35.6	SM
B-10	10.0	2.3	26.3	SP
B-11	10.0	5.7	23.1	SP/SM
B-11	15.0	51.9	17.4	SM/SC*
B-12	15.0	2.9	26.8	SP
B-13	10.0	3.8	26.1	SP
B-17	10.0	4.5	26.1	SP

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve	Moisture Content Percent	Soil Classification
B-23	10.0	6.9	24.9	SP/SM
B-24	10.0	8.3	29.8	SP/SM
B-26	10.0	15.3	35.3	SM

* Sample contained layers of clay

3.3.4 Atterberg Limits Tests

To aid in classifying the soils, an Atterberg limits test was performed on samples of the fine-grained cohesive soils. Results of the tests are tabulated below and presented on the boring logs, Figures 3A through 3AA:

Boring No.	Depth (feet)	Liquid Limit (percent)	Plastic Limit (percent)	Plasticity Index (percent)	Soil Classification
B-11	25.0	44	20	24	CL
B-11	40.0	33	20	13	CL

3.3.5 Consolidation Tests

To provide data necessary for our settlement analysis, consolidation testing was performed on 3 representative samples of the natural fine-grained clay soils encountered at the site. The results of these tests indicate that the samples tested were low to moderately over-consolidated and will exhibit low to moderate strength and moderate to high compressibility characteristics under the anticipated loading. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

3.3.6 Laboratory Vane Shear Test

To determine the undrained shear strength of the clay soils encountered at the site, a laboratory vane shear test is currently being performed. The results of the test are maintained within our files and may be transmitted to you, upon your request.

3.3.7 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the near-surface soil encountered at the site. The results of the chemical tests are tabulated on the following page.

Boring No.	Depth (feet)	Soil Classification	pH	Total Water Soluble Sulfate (mg/kg-dry)
B-1	2.5	SM/SC (Fill)	8.52	477

4. SITE CONDITIONS

4.1 SURFACE

The site is located at 4202 South Riverside Road in Salt Lake City, Utah. The site is currently vacant/undeveloped brush/wooded land with asphalt bike paths on the western, northern, and eastern borders of the site. The overall topography of the site is relatively flat, grading down to the north with a total relief of approximately 2 to 4 feet. Site vegetation consists of various weeds and brush/grass with mature trees throughout as well as riparian vegetation bordering the Jordan River.

The site is bounded to the north by the Jordan River followed by similar vacant/undeveloped brush land followed by single- and multi-family residential structures; to the east by the Jordan River followed by residential and commercial structures; to the south by multi-family residential structures; and to the west by a recreational golf course along with similar vacant/undeveloped brush land as well as a commercial structure.

4.2 SUBSURFACE SOIL

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered within the borings conducted during this study. As previously noted, soil conditions may vary in unexplored locations.

The borings were completed to depths ranging from 5 to 46 feet. The soil conditions encountered in each of the borings, to the depths completed, were generally similar across the boring locations.

- Approximately 6 to 18 inches of topsoil was encountered in most of the borings. Topsoil thickness is frequently erratic and thicker zones of topsoil should be anticipated.
- Non-engineered fill soils were encountered in Borings B-1, B-3, B-17, and B-20 through B-26, to depths ranging from 2 to 8 feet beneath the existing ground surface. The non-engineered fill soils primarily consisted of clay with varying silt, sand, and gravel content as well as sand with varying clay, silt, and gravel content.
- Natural soils were encountered below the non-engineered fill or the ground surface in each boring except Borings B-20 through B-22. The natural soils consisted primarily of clay with varying silt and sand content as well as sand and gravel with varying clay and silt content.

The natural clay soils were very soft to stiff, slightly moist to saturated, gray and brown in color, and moderately over-consolidated. The natural clay soils are anticipated to exhibit moderate strength and compressibility characteristics under the anticipated loading.

The natural sand and gravel soils were very loose to medium dense, slightly moist to saturated, and varied in color (white, gray, light brown, brown, and dark brown). The natural sand soils are anticipated to exhibit moderately high strength and moderately low compressibility characteristics under the anticipated load range.

For a more descriptive interpretation of subsurface conditions, please refer to Figures 3A through 3AA, Boring Logs. The lines designating the interface between soil types on the boring logs generally represent approximate boundaries. In situ, the transition between soil types may be gradual.

4.3 GROUNDWATER

On November 26, 2021 (8 days following drilling), groundwater was measured within the PVC pipes installed as tabulated below:

Boring No.	Groundwater Depth (feet)
	November 26, 2021
B-1	6.2
B-2	5.5
B-3	6.4
B-4	6.6
B-5	5.4
B-6	7.0
B-9	6.9
B-10	8.9
B-11	3.1
B-12	6.1
B-13	4.7
B-14	5.7
B-17	6.8

Boring No.	Groundwater Depth (feet)
	November 26, 2021
B-20	11.5
B-24	10.9
B-25	12.0

Groundwater levels vary with changes in season and rainfall, construction activity, irrigation, snow melt, surface water run-off, and other site-specific factors.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The proposed structures may be supported upon conventional spread and continuous wall foundations supported upon suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspects at the site are:

1. The potentially liquefiable sand layers encountered in Borings B-1 through B-5, B-9 through B-13, B-17, and B-23 through B-26.
2. The existing non-engineered fills encountered at the site.
3. The relatively shallow depth to groundwater.

Very loose to medium dense, saturated sand layers were encountered in Borings B-1 through B-5, B-9 through B-13, B-17, and B-23 through B-26. Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. If needed, GSH can provide additional information and analysis, including a complete site-specific response analysis.

Our analysis indicates that a consistent shallow zone of potentially liquefiable sand soils is present across the site. Because of the lack of a thick surface layer of non-liquefiable soil and the thickness of the potentially liquefiable sands soils, our analysis indicates that ground rupture and possible lateral spread could occur as the result of liquefaction during the design seismic event.

To best mitigate the potentially liquefiable soil conditions, GSH recommends the installation of rammed-aggregate piers. Conventional spread and continuous wall foundations and footings may be supported by the rammed-aggregate piers.

Prior to proceeding with construction, removal of any existing debris, surface vegetation, root systems, topsoil, non-engineered fill, and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprints and 3 feet beyond rigid pavements and exterior flatwork areas will be required. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

Due to the developed nature of this site and the surrounding area, additional non-engineered fills may exist in unexplored areas of the site. Based on our experience, non-engineered fills are frequently erratic in composition and consistency. All surficial loose/disturbed soils and non-engineered fills must be removed below all footings, floor slabs, and rigid pavements. The in situ, non-engineered fills may remain below flexible pavements if free of any deleterious materials, of limited thickness, and if properly prepared, as discussed later in this report.

Some of the on-site non-engineered fill soils encountered were granular. On-site granular soils, including existing non-engineered fills, may be re-utilized as structural site grading fill if they meet the criteria for such, as stated later in this report.

Groundwater was measured as shallow as 3.1 feet below the ground surface. GSH recommends placing floor slabs no closer than 4 feet from the highest groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

Proof rolling of the natural clay subgrade must not be completed if cuts extend to within 1 foot of the groundwater surface. In areas where cuts are to extend to within 1 foot of the groundwater surface, stabilization must be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

Detailed discussions pertaining to earthwork, foundations, pavements, and the geoseismic setting of the site are presented in the following sections.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial site preparation will consist of the removal of any existing debris, non-engineered fills, surface vegetation, root systems, topsoil, and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprint and 3 feet

beyond rigid pavements and exterior flatwork areas. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

In situ, non-engineered fills may remain below flexible pavements if free of debris and deleterious materials, less than 3 feet in thickness, and if properly prepared. Proper preparation below pavements will consist of the scarification of the upper 12 inches below asphalt concrete (flexible pavement), followed by moisture preparation and re-compaction to the requirements of structural fill. Even with proper preparation, pavements established overlying non-engineered fills may encounter some long-term movements unless the non-engineered fills are completely removed.

It must be noted that from a handling and compaction standpoint, soils containing high amounts of fines (silts and clays) are inherently more difficult to rework and are very sensitive to changes in moisture content, requiring very close moisture control during placement and compaction. This will be very difficult, if not impossible, during wet and cold periods of the year. Additionally, the on-site soils are likely above optimum moisture content for compacting at present and would require some drying prior to re-compacting.

Subsequent to stripping and prior to the placement of floor slabs, foundations, structural site grading fills, exterior flatwork, and pavements, the exposed subgrade must be proof rolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or otherwise unsuitable soils are encountered beneath footings, they must be completely removed. If removal depth required is greater than 2 feet below footings, GSH must be notified to provide further recommendations. In pavement, floor slab, and outside flatwork areas, unsuitable natural soils should be removed to a maximum depth of 2 feet and replaced with compacted granular structural fill.

Subgrade preparation as described must be completed prior to placing overlying structural site grading fills.

Due to the relatively high groundwater, site grading cuts should be kept to a minimum. Cuts extending to within 1 foot of the groundwater elevation will likely disturb the natural clay soils and proof rolling must not be completed. Stabilization must be anticipated in areas where cuts are to extend to within 1 foot of the groundwater surface.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

GSH must be notified prior to the placement of structural site grading fills, floor slabs, footings, and pavements to verify that all loose/disturbed soils and non-engineered fills have been completely removed and/or properly prepared.

5.2.2 Temporary Excavations

Temporary excavations up to 8 feet deep in fine-grained cohesive soils, above or below the water table, may be constructed with sideslopes no steeper than one-half horizontal to one vertical (0.5H:1.0V). Excavations deeper than 8 feet are not anticipated at the site.

For granular (cohesionless) soils, construction excavations above the water table, not exceeding 4 feet, should be no steeper than one-half horizontal to one vertical (0.5H:1.0V). For excavations up to 8 feet, in granular soils and above the water table, the slopes should be no steeper than one horizontal to one vertical (1H:1V). Excavations encountering saturated cohesionless soils will be very difficult and will require very flat sideslopes and/or shoring, bracing, and dewatering.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

The static groundwater table was encountered as shallow as 3.1 feet below the existing surface and may be shallower with seasonal fluctuations. Consideration for dewatering of utility trenches, excavations for the removal of non-engineered fill, and other excavations below this level should be incorporated into the design and bidding process.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill is defined as all fill which will ultimately be subjected to structural loadings, such as imposed by footings, floor slabs, pavements, etc. Structural fill will be required as backfill over foundations and utilities, as site grading fill, and as replacement fill below footings. All structural fill must be free of surface vegetation, root systems, rubbish, topsoil, frozen soil, and other deleterious materials.

Structural site grading fill is defined as structural fill placed over relatively large open areas to raise the overall grade. For structural site grading fill, the maximum particle size shall not exceed 4 inches; although, occasional larger particles, not exceeding 8 inches in diameter, may be incorporated if placed randomly in a manner such that "honeycombing" does not occur and the desired degree of compaction can be achieved. The maximum particle size within structural fill placed within confined areas shall be restricted to 2 inches.

On-site soils, including existing non-engineered fills, may be re-utilized as structural site grading fill if they do not contain construction debris or deleterious material and meet the requirements of structural fill. Fine-grained soils will require very close moisture control and may be very difficult, if not impossible, to properly place and compact during wet and cold periods of the year.

Imported structural fill below foundations and floor slabs shall consist of a well graded sand and gravel mixture with less than 30 percent retained on the three-quarter-inch sieve and less than 20 percent passing the No. 200 Sieve (clays and silts).

To stabilize soft subgrade conditions (if encountered) or where structural fill is required to be placed closer than 2.0 feet above the water table at the time of construction, a mixture of coarse angular gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized. It may also help to utilize a stabilization fabric, such as Mirafi 600X or equivalent, placed on the natural ground if 1.5- to 2.0-inch gravel is used as stabilizing fill.

5.2.4 Fill Placement and Compaction

All structural fill shall be placed in lifts not exceeding 8 inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the AASHTO¹ T180 (ASTM² D1557) compaction criteria in accordance with the following table:

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond the perimeter of the structure	0 to 10	95
Site grading fills outside area defined above	0 to 5	90
Site grading fills outside area defined above	5 to 10	95
Utility trenches within structural areas	--	96
Road base	--	96

Structural fills greater than 10 feet thick are not anticipated at the site.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade shall be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation should consist of the removal of all loose or disturbed soils.

Coarse angular gravel and cobble mixtures (stabilizing fill), if utilized, shall be end dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the stabilizing fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment over the surface at least twice. Subsequent fill material placed over the coarse gravels and cobbles

¹ American Association of State Highway and Transportation Officials

² American Society for Testing and Materials

shall be adequately compacted so that the “fines” are “worked into” the voids in the underlying coarser gravels and cobbles. Where soil fill materials are to be placed directly over more than about 18 inches of clean gravel, a separation geofabric, such as Mirafi 140N or equivalent, is recommended to be placed between the gravel and subsequent soil fills.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (footings, floor slabs, flatwork, pavements, etc.) shall be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill shall be proof rolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proof rolling shall be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proof rolling, they shall be removed to a maximum depth of 2 feet below design finish grade and replaced with structural fill.

Many utility companies and City-County governments are now requiring that Type A-1a or A-1b (AASHTO Designation – granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways, the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T180 (ASTM D1557) method of compaction. GSH recommends that as the major utilities continue onto the site that these compaction specifications are followed.

Fine-grained soils, such as silts and clays, are not recommended for utility trench backfill in structural areas.

The static groundwater table was encountered as shallow as 3.1 feet below the existing surface and may be shallower with seasonal fluctuations. Dewatering of utility trenches and other excavations below this level should be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

5.3 GROUNDWATER

On November 26, 2021 (8 days following drilling), groundwater was measured within the PVC pipes installed as tabulated on the following page.

Boring No.	Groundwater Depth (feet)
	November 26, 2021
B-1	6.2
B-2	5.5
B-3	6.4
B-4	6.6
B-5	5.4
B-6	7.0
B-9	6.9
B-10	8.9
B-11	3.1
B-12	6.1
B-13	4.7
B-14	5.7
B-17	6.8
B-20	11.5
B-24	10.9
B-25	12.0

Based on the anticipated cuts necessary to reach design subgrades, we anticipate temporary and permanent dewatering will be necessary. Floor slabs must be placed a minimum of 4 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

The groundwater measurements presented are conditions at the time of the field exploration and may not be representative of other times or locations. Groundwater levels may vary seasonally and with precipitation, as well as other factors including irrigation. Evaluation of these factors is beyond the scope of this study. Groundwater levels may, therefore, be at shallower or deeper depths than those measured during this study, including during construction and over the life of the structure.

The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

5.4 FOUNDATIONS

5.4.1 General

Our analysis indicates that a consistent shallow zone of potentially liquefiable and soils is present across the site. Because of the lack of a thick surface layer of non-liquefiable soil and the thickness of the potentially liquefiable sand soils, our analysis indicates that ground rupture and possible lateral spread could occur as the result of liquefaction during the design seismic event.

To best mitigate the potentially liquefiable soil conditions, GSH recommends that the proposed structures be supported upon conventional spread and continuous wall foundations supported upon soil reinforcement methods such as a grid of rammed-aggregate piers.

5.4.2 Design Data

Rammed-aggregate piers soil reinforcement elements are constructed by drilling a 24- or 30-inch diameter hole and then building a bottom bulb of clean, open-graded stone using a beveled, high-energy tamper. The rammed-aggregate piers shaft is constructed on top of the bottom bulb using well graded highway base course stone placed in thin lifts (12 inches compacted thickness). The result is a reinforced zone of soil directly under footings that allows for the construction of shallow spread footings proportioned for a relatively high bearing pressure. Rammed-aggregate piers elements are spaced singly under continuous footings or in close groups to support concentrated column loads.

Rammed-aggregate piers soil reinforcement is a design/build element and must be designed and constructed by a licensed installer. The installer should provide layout and detailed design calculations sealed by a professional engineer licensed in the State of Utah. The design calculations should demonstrate that rammed-aggregate piers soil reinforcement is designed to control settlement to magnitudes within the criteria for this project.

For the design of conventional spread and continuous wall foundation constructed over rammed-aggregate piers elements, the following parameters are provided.

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 16 inches
Minimum Recommended Width for Isolated Spread Footings	- 30 inches
Bearing Capacity for Footings Overlying Rammed-Aggregate Piers	- Approximately 4,000 to 6,000 pounds per square foot*

* To be developed as design build by rammed-aggregate piers licensed installer.

The term “net bearing capacity” refers to the allowable pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.4.3 Installation

Foundations must be established directly upon the undisturbed tops of the pier systems. It is recommended that prior to installing rammed-aggregate piers, all site grading activities be completed.

Unsuitable soils shall be completely removed beneath footings. Under no circumstances shall the footings be installed overlying organics, deleterious materials, frozen soil, or within ponded water.

5.4.4 Settlements

Maximum settlements of foundations designed and installed over rammed-aggregate piers should be less than one-half inch. However, these estimates will be refined with the design of the system.

5.5 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the

supporting soils. In determining frictional resistance, a coefficient of friction of 0.35 may be utilized for the footing interface with the in situ natural clay soils and 0.40 for footing interface with natural granular soils or granular structural fill. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.6 FLOOR SLABS

Floor slabs may be established upon suitable natural subgrade soils or structural fill extending to suitable natural soils. Under no circumstances shall floor slabs be established directly over non-engineered fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water.

Additionally, GSH recommends that floor slabs be constructed a minimum of 4.0 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

To facilitate curing of the concrete and to provide a capillary moisture break, it is recommended that floor slabs be directly underlain by at least 4 inches of “free-draining” fill, such as “pea” gravel or three-quarters to one-inch minus clean gap-graded gravel.

Settlement of lightly loaded floor slabs designed according to previous recommendations (average uniform pressure of 200 pounds per square foot or less) is anticipated to be less than one-quarter of an inch.

5.7 PAVEMENTS

The natural clay soils and non-engineered fills will exhibit poor pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed (see Section 5.2.1, Site Preparation). Under no circumstances shall pavements be established over unprepared non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. With the subgrade soils and the projected traffic as discussed in Section 2, Proposed Construction, the following pavement sections are recommended.

Parking Areas

(Light Volume of Automobiles and Light Trucks,
 Occasional Medium-Weight Trucks,
 and No Heavyweight Trucks)
 [3 equivalent 18-kip axle loads per day]

Flexible Pavements: (Asphalt Concrete)

3.0 inches	Asphalt concrete
8.0 inches	Aggregate base
Over	Properly prepared fills, stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared fills and/or stabilized natural subgrade soils

Rigid Pavements: (Non-reinforced Concrete)

5.0 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base
Over	Properly prepared and stabilized natural subgrade soils and/or structural site grading fill extending to properly prepared and stabilized natural subgrade soils

Light-Duty Drive Lanes

(Moderate Volume of Automobiles and Light Trucks,
 Light Volume of Medium-Weight Trucks,
 and Occasional Heavyweight Trucks)
 [6 equivalent 18-kip axle loads per day]

Flexible Pavements: (Asphalt Concrete)

3.0 inches	Asphalt concrete
9.0 inches	Aggregate base
Over	Properly prepared fills, stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared fills and/or stabilized natural subgrade soils

Rigid Pavements: (Non-reinforced Concrete)

6.0 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base
Over	Properly prepared and stabilized natural subgrade soils and/or structural site grading fill extending to properly prepared and stabilized natural subgrade soils

Heavy-Duty Drive Lanes and Loading/Unloading Areas

(Moderate Volume of Automobiles, Light Trucks,
 and Medium-Weight Trucks,
 with a Light Volume of Heavyweight Trucks)
 [18 equivalent 18-kip axle loads per day]

Flexible Pavements: (Asphalt Concrete)

4.0 inches	Asphalt concrete
8.0 inches	Aggregate base
8.0 inches*	Aggregate subbase
Over	Properly prepared fills, stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared fills and/or stabilized natural subgrade soils

* Subbase may consist of granular site grading fills with a minimum California Bearing Ratio (CBR) of 30 percent.

Rigid Pavements: (Non-reinforced Concrete)

6.0 inches	Portland cement concrete (non-reinforced)
6.0 inches	Aggregate base
Over	Properly prepared and stabilized natural subgrade soils and/or structural site grading fill extending to properly prepared and stabilized natural subgrade soils

For dumpster pads, we recommend a pavement section consisting of 8.0 inches of Portland cement concrete, 12.0 inches of aggregate base, over properly prepared natural subgrade or site grading structural fills. Dumpster pads should not be constructed overlying non-engineered fills under any circumstances.

These above rigid pavement sections are for non-reinforced Portland cement concrete. Concrete should be designed in accordance with the American Concrete Institute (ACI) and joint details should conform to the Portland Cement Association (PCA) guidelines. The concrete should have a minimum 28-day unconfined compressive strength of 4,000 pounds per square inch and contain 6 percent $\pm$ 1 percent air-entrainment.

The crushed stone should conform to applicable sections of the current Utah Department of Transportation (UDOT) Standard Specifications. All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and UDOT. A GSH technician shall observe placement and perform density testing of the base course material and asphalt.

Please note that the recommended pavement section is based on estimated post-construction traffic loading. If the pavement is to be constructed and utilized by construction traffic, the above pavement section may prove insufficient for heavy truck traffic, such as concrete trucks or tractor-trailers used for construction delivery. Unexpected distress, reduced pavement life, and/or premature failure of the pavement section could result if subjected to heavy construction traffic and the owner should be made aware of this risk. If the estimated traffic loading stated herein is not correct, GSH must review actual pavement loading conditions to determine if revisions to these recommendations are warranted.

5.8 CEMENT TYPES

The laboratory tests indicate that the natural clay soils tested contain a moderate amount of water-soluble sulfates. Based on our test results, concrete in contact with the on-site soil will have a moderate potential for sulfate reaction (ACI 318, Table 4.3.1). To achieve the required protection against sulfate-related corrosion, we recommend a maximum water-to-cement ratio of 0.5 (by weight, normal weight aggregate concrete) and using Type II cement in concrete to obtain a minimum compressive strength of 4,000 pounds per square inch (psi). Details can be found in the above ACI reference and in the Portland Cement Association publication, "Design and Control of Concrete Admixtures."

5.9 GEOSEISMIC SETTING

5.9.1 General

Utah municipalities have adopted the International Building Code (IBC) 2018. The IBC 2018 code refers to ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7-16) determines the seismic hazard for a site based upon mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

5.9.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site. The nearest active mapped fault consists of the Taylorsville Fault of the West Valley Fault Zone, located about 1.1 miles to the southeast of the site.

5.9.3 Site Class

Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. If needed, GSH can provide additional information and analysis, including a complete site-specific response analysis.

5.9.4 Ground Motions

The IBC 2018 code is based on USGS mapping, which provides values of short and long period accelerations for average bedrock values for the Western United States and must be corrected for local soil conditions. The table on the following page summarizes the peak ground and short and long period accelerations for the MCE event and incorporates the appropriate soil amplification factor for a Site Class F –Soil Profile. Based on the site latitude and longitude (40.6818 degrees north and 111.9142 degrees west, respectively) and Risk Category I, the values for this site are tabulated below:

Spectral Acceleration Value, T	Bedrock Boundary [mapped values] (% g)	Site Coefficient	Site Class * [adjusted for site class effects] (% g)	Design Values* (% g)
Peak Ground Acceleration	*	$F_a = *$	*	*
0.2 Seconds (Short Period Acceleration)	$S_S = *$	$F_a = *$	$S_{MS} = *$	$S_{DS} = *$
1.0 Second (Long Period Acceleration)	$S_1 = *$	$F_v = *$	$S_{M1} = *$	$S_{D1} = *$

* See Section 5.9.3, Site Class.

5.9.5 Liquefaction

The site is located in an area that has been identified by the Utah Geological Survey (UGS) as being a “very high” liquefaction potential zone. Liquefaction is defined as the condition when

saturated, loose, granular soils lose their support capabilities because of excessive pore water pressure, which develops during a seismic event. Clayey soils, even if saturated, will generally not liquefy during a major seismic event.

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger³. Our calculations indicate the very loose to medium dense, saturated sand layers encountered in Borings B-1 through B-5, B-9 through B-13, B-17, and B-23 through B-26 could liquefy during the design seismic event. Calculated settlement associated with the liquefaction of each layer within the borings was less than 5.0 inches. Additionally, lateral spread and ground rupture are unlikely to occur.

Our analysis indicates that a consistent shallow zone of potentially liquefiable soils are present across the site. Because of the lack of a thick surface layer of non-liquefiable soil and the thickness of the potentially liquefiable sands soils, our analysis indicates that ground rupture and possible lateral spread could occur as the result of liquefaction during the design seismic event.

To best mitigate the potentially liquefiable soil conditions, GSH recommends that the proposed structures be supported upon conventional spread and continuous wall foundations supported upon soil reinforcement methods such as a grid of rammed-aggregate piers.

5.10 SITE VISITS

GSH must verify that all topsoil/disturbed soils and any other unsuitable soils have been removed, that non-engineered fills have been removed and/or properly prepared, and that suitable soils have been encountered prior to placing site grading fills, footings, slabs, and pavements. Additionally, GSH must observe fill placement and verify in-place moisture content and density of fill materials placed at the site.

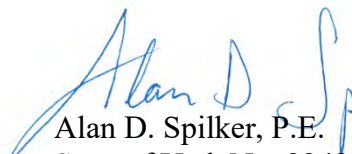
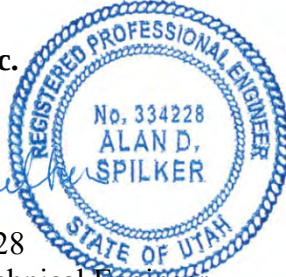
³ Idriss, I. M., and Boulanger, R. W. (2008), Soil liquefaction during earthquakes: Monograph MNO-12, Earthquake Engineering Research Institute, Oakland, CA, 261 pp.

6. CLOSURE

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 685-9190.

Respectfully submitted,

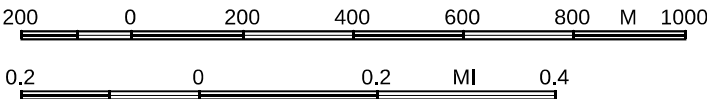
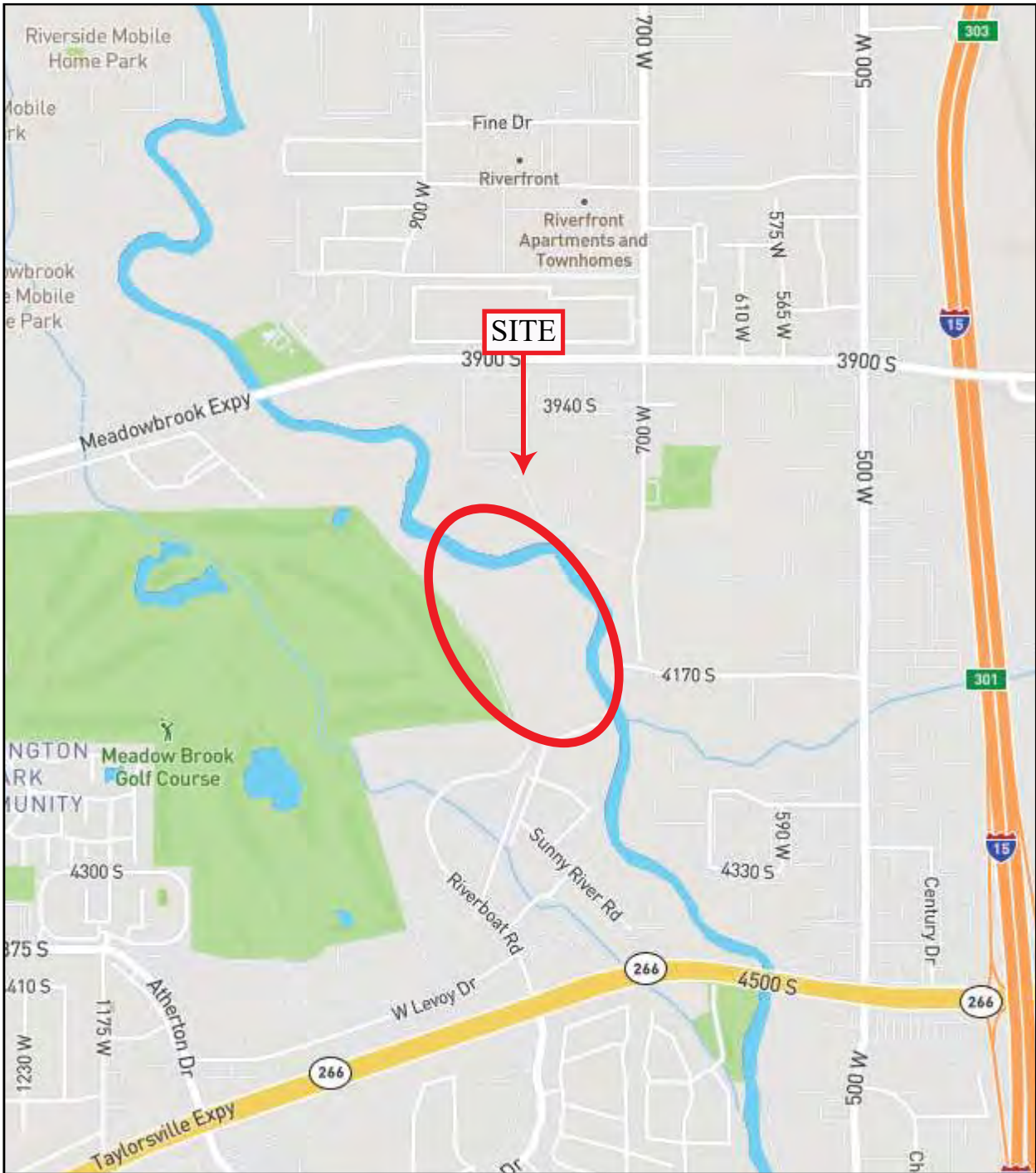
GSH Geotechnical, Inc.

A handwritten signature in blue ink that reads "Alan D. Spilker".
Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

ADS:jlh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3AA, Boring Logs
Figure 4, Key to Boring Log (USCS)

Addressee (email)



REFERENCE:
ALL TRAILS - NATIONAL GEOGRAPHIC TERRAIN
DATED 2021

FIGURE 1
VICINITY MAP
 GSH



REFERENCE:
ADAPTED FROM DRAWING ENTITLED
"4202 S. RIVERBOAT ROAD"
BY BADIEE DEVELOPMENT, DATED 11/2/2021



FIGURE 2
SITE PLAN





GSH

BORING LOG

Page: 1 of 1

BORING: B-1

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.2' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist loose
	SM/ SC FILL	SILTY FINE TO MEDIUM SAND, FILL with some clay and layers of silty clay up to 1/2" thick; major roots (topsoil) to 6"; dark brown		13							
	GP	FINE TO COARSE SANDY FINE GRAVEL with occasional roots; gray	5	16							moist loose
											saturated
		grades fine to coarse sandy fine gravel	10	7		39.1		4.4			
		End of Exploration at 11.5'. Installed 1.25" diameter slotted PVC pipe to 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A



GSH

BORING LOG

Page: 1 of 1

BORING: B-2

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 5.5' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist loose
	SP/SM	FINE TO COARSE SAND with some fine and coarse gravel and some silt; brown		18							
			5								saturated
				10		25		6.9			
	SP	FINE TO COARSE SAND with some fine and coarse gravel and trace silt; brown	10	3		29.6		1			saturated very loose
			15	6		11.1		2.2			
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B



GSH

BORING LOG

Page: 1 of 1

BORING: B-3

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.4' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist
	CL FILL	FINE TO MEDIUM SANDY CLAY, FILL with layers of silt; major roots (topsoil) to 6"; dark brown									
	SP/ SM	FINE TO MEDIUM SAND with some silt; brown		14							slightly moist loose
			5	14		22.6	89				moist
		grades fine to coarse sand with some silt; gray									saturated
	SP	FINE GRAVELLY FINE TO COARSE SAND gray/brown	10	4		23.5		2.1			saturated very loose
											4' heave
			15								
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C



GSH

BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.6' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; major roots (topsoil) to 8"; brown									moist medium stiff
		grades fine sandy clay		11							
	SM	SILTY FINE TO COARSE SAND brown	5								moist loose
				22							saturated
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND brown	10	11		27.3	89				saturated loose
		End of Exploration at 11.0'. Installed 1.25" diameter slotted PVC pipe to 11.0'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D



GSH

BORING LOG

Page: 1 of 1

BORING: B-5

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 5.4' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist loose
	SM	SILTY FINE TO COARSE SAND with layers of silty clay up to 1" thick; major roots (topsoil) to 6"; dark brown									slightly moist loose
	SP	FINE TO COARSE SAND with trace silt; brown/gray		17	⬇						slightly moist loose
		grades with occasional roots	5	12	⬇						saturated
	GP	FINE TO COARSE SANDY FINE GRAVEL gray									saturated medium dense
			10	10		17.9		1.3			
		End of Exploration at 11.5'. Installed 1.25" diameter slotted PVC pipe to 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E



GSH

BORING LOG

Page: 1 of 1

BORING: B-6

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 7.0' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist very loose
	SM	SILTY FINE TO MEDIUM SAND with major roots (topsoil) to 10"; layers of clay up to 1/2" thick; brown		6		11.8		23.4			
											moist loose
	SP	FINE TO COARSE SAND with fine and coarse gravel; gray	5								
				20							saturated
			10	23							
											medium dense
			15	35							
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3F



GSH

BORING LOG

Page: 1 of 1

BORING: B-7

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/16/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; brown									moist medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3G



GSH

BORING LOG

Page: 1 of 1

BORING: B-8

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/16/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; brown									moist medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3H



GSH

BORING LOG

Page: 1 of 1

BORING: B-9

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.9' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist stiff
	CL	FINE TO MEDIUM SANDY CLAY with major roots (topsoil) to 6"; brown		12							
			5	21							slightly moist loose
	SP	FINE TO COARSE SAND with trace silt; occasional roots; gray/brown									saturated
			10	5		35.6		13.4			saturated loose
	SM	SILTY FINE TO COARSE SAND brown									
		End of Exploration at 11.5'. Installed 1.25" diameter slotted PVC pipe to 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 31



GSH

BORING LOG

Page: 1 of 1

BORING: B-10

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/16/21

DATE FINISHED: 11/16/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: JH/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 8.9' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								moist very loose
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND brown		7		40.7	79				
	SM	SILTY FINE TO COARSE SAND with layers of silty clay up to 1/4" thick; brown	5								very moist very loose
				4		36.2	85				
	SP	FINE TO COARSE SAND with trace silt; gray	10								saturated very loose
				4		26.3		2.3			
		End of Exploration at 11.5'. Installed 1.25" diameter slotted PVC pipe to 11.5'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3J



GSH

BORING LOG

Page: 1 of 2

BORING: B-11

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/17/21

DATE FINISHED: 11/17/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: SS/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 3.1' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist loose
	SM	SILTY FINE TO COARSE SAND brown/light brown		7							saturated
		grades light brown/gray	5	9							saturated loose
	SP/ SM	FINE TO COARSE SAND with fine gravel and some silt; gray	10	4		23.1		5.7			saturated medium dense
	SM/ SC	SILTY FINE SAND with some clay and fine gravel; gray	15	12		17.4		51.9			saturated medium dense
		grades with layers of silty clay up to 6" thick									
	SP/ SM	FINE TO COARSE SAND with some silt; layers of silty clay up to 1" thick gray	20	23							saturated medium dense
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3K



BORING LOG

Page: 2 of 2

BORING: B-11

CLIENT: Badiee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/17/21

DATE FINISHED: 11/17/21

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25								saturated very soft
			0						44	24	
	CL	SILTY CLAY with trace fine sand; gray grades with some fine to coarse sand grades fine to medium sandy clay with silt									
			30	2							
			35	6							
			40	6					33	13	
			45	8							
		End of Exploration at 46.0'. Installed 1.25" diameter slotted PVC pipe to 46.0'.	50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3K
(continued)



GSH

BORING LOG

Page: 1 of 2

BORING: B-12

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/17/21

DATE FINISHED: 11/17/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: SS/AL

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.1' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								slightly moist soft
				3							
			5	1							saturated
		grades dark brown/gray									very soft
			10	0							very loose
		grades gray									3' heave
			15	8		26.8		2.9			saturated loose
			20	4							saturated soft
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3L



GSH

BORING LOG

Page: 2 of 2

BORING: B-12

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/17/21

DATE FINISHED: 11/17/21

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25								
		grades with some fine to medium sand		6							medium stiff
			30								
				17							stiff
		Refusal at 35.0' on flowing sands. Installed 1.25" diameter slotted PVC pipe to 35.0'.	35								17' heave
			40								
			45								
			50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3L
(continued)



GSH

BORING LOG

Page: 1 of 1

BORING: B-13

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 4.7' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry loose
	SP	FINE TO COARSE SAND with some fine and coarse gravel; white		16							
	CL	SILTY CLAY gray	5	11							saturated medium stiff
	SM	SILTY FINE TO MEDIUM SAND gray									saturated loose
	SP	FINE TO COARSE SAND with trace silt; gray									saturated loose
			10	8		26.1		3.8			
	SP/ SM	FINE TO COARSE SAND with some silt; gray	15	14							saturated loose
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3M



GSH

BORING LOG

Page: 1 of 1

BORING: B-14

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 4-1/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 5.7' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry loose
	SP	FINE TO MEDIUM SAND with trace silt; white		16		4	89				
			5								saturated
				13							
	CL	FINE TO MEDIUM SANDY CLAY with silt; dark gray	10	8							saturated medium stiff
	SM	SILTY FINE TO MEDIUM SAND gray	15	56							saturated medium dense
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3N



GSH

BORING LOG

Page: 1 of 1

BORING: B-15

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SP/ SM	FINE TO MEDIUM SAND with some silt; brown									dry loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 30



GSH

BORING LOG

Page: 1 of 1

BORING: B-16

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SP/ SM	FINE TO MEDIUM SAND with some silt; brown									dry loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3P



GSH

BORING LOG

Page: 1 of 1

BORING: B-17

CLIENT: Badi' Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.8' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry medium stiff
	CL FILL	FINE TO MEDIUM SANDY CLAY, FILL with silt; brown									
	SP	FINE TO COARSE SAND with trace silt; white		17							moist loose
			5	12		10.5	95				
											saturated
			10	15		26.1		4.5			
			15	41							medium dense
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3Q



GSH

BORING LOG

Page: 1 of 1

BORING: B-18

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM	SILTY FINE TO MEDIUM SAND brown									moist loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3R



GSH

BORING LOG

Page: 1 of 1

BORING: B-19

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM	SILTY FINE TO MEDIUM SAND brown									moist loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3S



GSH

BORING LOG

Page: 1 of 1

BORING: B-20

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 11.5' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry very stiff
	CL FILL	FINE TO COARSE SANDY CLAY, FILL with some fine and coarse gravel; red		39							
	SP/ SM	FINE TO MEDIUM SAND with some silt and trace clay; dark brown	5	32							slightly moist medium dense
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND brown									moist loose
			10	20		29.6	89				saturated
		End of Exploration at 11.5'. Installed 1.25" diameter slotted PVC pipe to 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3T



GSH

BORING LOG

Page: 1 of 1

BORING: B-21

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/ SC FILL	SILTY/CLAYEY FINE TO MEDIUM SAND, FILL black									dry loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3U



GSH

BORING LOG

Page: 1 of 1

BORING: B-22

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/ SC FILL	SILTY/CLAYEY FINE TO MEDIUM SAND, FILL black									slightly moist loose
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3V



GSH

BORING LOG

Page: 1 of 1

BORING: B-23

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 9.0' (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry medium dense
	SM/ SC FILL	SILTY/CLAYEY FINE TO COARSE SAND, FILL with some fine and coarse gravel; red									
				40							
	CL	SILTY CLAY black	5								
				13		32.1	81				
	SP/ SM	FINE TO COARSE SAND with some silt; gray	10	13		24.9		6.9			saturated loose
		End of Exploration at 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3W



GSH

BORING LOG

Page: 1 of 1

BORING: B-24

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 10.9' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry very stiff
	CL FILL	FINE TO COARSE SANDY CLAY, FILL with some fine and coarse gravel; black		49							
	SM/ SC FILL	SILTY/CLAYEY FINE TO COARSE SAND, FILL with trace fine and coarse gravel; odorous; black	5	33							slightly moist medium dense
	SP/ SM	FINE TO COARSE SAND with some silt and trace clay; gray									moist loose
			10	17		29.8		8.3			saturated
		grades with some fine gravel and trace silt; gray	15	19							
		End of Exploration at 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3X



GSH

BORING LOG

Page: 1 of 1

BORING: B-25

CLIENT: Badiie Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 12.0' (11/26/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/ SC FILL	SILTY/CLAYEY FINE TO COARSE SAND, FILL with fine and coarse gravel; gray		50							dry medium dense
	CL	FINE SANDY CLAY with some silt and fine to medium sand; odorous; black	5								moist stiff
				17		31.1	88				
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND gray	10	18							moist loose
		grades fine to coarse sand with some silt and trace fine gravel	15	20							saturated
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3Y



GSH

BORING LOG

Page: 1 of 1

BORING: B-26

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 9.0' (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								dry
	SM FILL	SILTY FINE TO COARSE SAND with trace clay and trace fine and coarse gravel; brown		8							very loose
			5	7							moist
	SM	SILTY FINE TO MEDIUM SAND with trace clay; gray									moist loose
			10	15		35.3	15.3				saturated
		End of Exploration at 11.5'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3Z



GSH

BORING LOG

Page: 1 of 1

BORING: B-27

CLIENT: Badi'ee Development

PROJECT NUMBER: 3295-003-21

PROJECT: Proposed Taylorsville Office/Warehouse Development

DATE STARTED: 11/18/21

DATE FINISHED: 11/18/21

LOCATION: 4202 South Riverside Road, Salt Lake City, Utah

GSH FIELD REP.: MB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: Not Encountered (11/18/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	FINE SANDY CLAY with some silt; gray									dry stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3AA

CLIENT: Badiie Development
 PROJECT: Proposed Taylorsville Office/Warehouse Development
 PROJECT NUMBER: 3295-003-21

KEY TO BORING LOG

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
-------------	------	-------------	-------------	------------	---------------	--------------	-------------------	---------------	------------------	------------------	---------

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

COLUMN DESCRIPTIONS

- ① **Water Level:** Depth to measured groundwater table. See symbol below.
- ② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.
- ③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency.
- ④ **Depth (ft.):** Depth in feet below the ground surface.
- ⑤ **Blow Count:** Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.
- ⑥ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.
- ⑦ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of
- ⑧ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.
- ⑨ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.
- ⑩ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.
- ⑪ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.
- ⑫ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION:

Weakly: Crumbles or breaks with handling or slight finger pressure.

Moderately: Crumbles or breaks with considerable finger pressure.

Strongly: Will not crumble or break with finger pressure.

MODIFIERS:

Trace
<5%

Some
5-12%

With
> 12%

MOISTURE CONTENT (FIELD TEST):

Dry: Absence of moisture, dusty, dry to the touch.

Moist: Damp but no visible water.

Saturated: Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS SYMBOLS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material is larger than No. 200 sieve size.	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve.	CLEAN GRAVELS (little or no fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)	GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	CLEAN SANDS (little or no fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)	SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
			SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	SILTS AND CLAYS Liquid Limit less than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS			PT	Peat, Humus, Swamp Soils with High Organic Contents

STRATIFICATION:

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"
Occasional: One or less per 6" of thickness	
Numerous: More than one per 6" of thickness	

TYPICAL SAMPLER GRAPHIC SYMBOLS

- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
-
-
- California Sampler
- Thin Wall

WATER SYMBOL

- Water Level

Note: Dual Symbols are used to indicate borderline soil classifications.

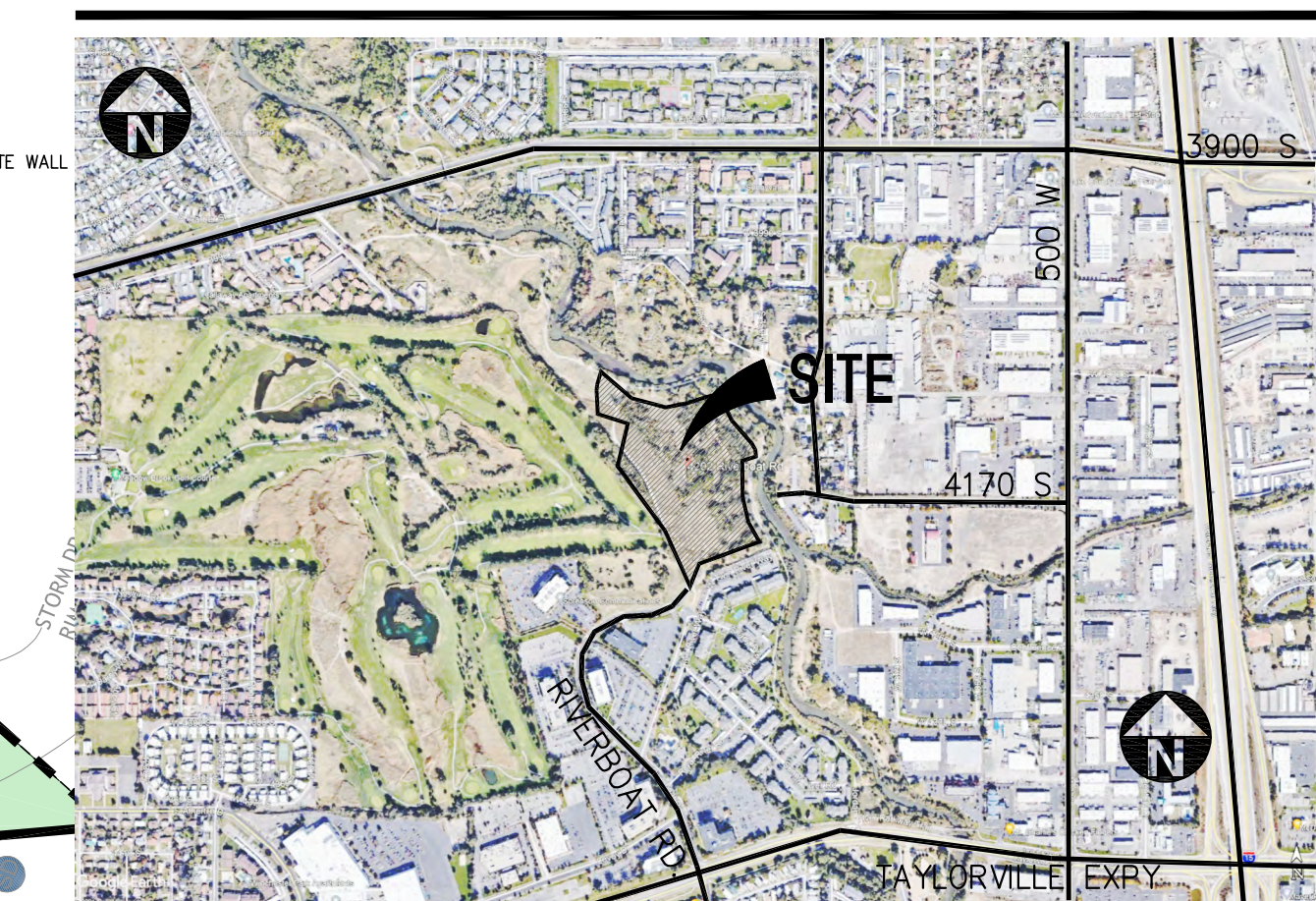
FIGURE 4



Tabulation

	<u>BLDG. 1</u>	<u>BLDG. 2</u>	<u>BLDG. 3</u>	<u>BLDG. 4</u>	<u>BLDG. 5</u>	<u>TOTAL</u>
<u>SITE AREA</u>						
In s.f.						1,063,122 s.f.
In acres						24.41 ac
<u>BUILDING AREA</u>						
Office	6,000	8,000	9,000	6,000	4,400	33,400 s.f.
Office (2nd Floor)	0	0	0	0	4,400	4,400 s.f.
Warehouse	60,332	82,524	104,726	19,480	0	267,062 s.f.
TOTAL	66,332	90,524	113,726	25,480	8,800	304,862 s.f.
						28.7%
<u>COVERAGE</u>						
<u>AUTO PARKING REQUIRED</u>						
Office: 5/1,000 s.f.	30	40	45	30	44	189 stalls
Whse: 1/1,000 s.f.	60	83	105	19	0	267 stalls
TOTAL	90	123	150	49	44	456 stalls
<u>AUTO PARKING PROVIDED</u>						
Standard (9' x 20')						420 stalls
ADA standard (9' x 20')						18 stalls
ADA Van (12' x 20')						18 stalls
TOTAL						456 stalls
<u>ZONING ORDINANCE FOR CITY</u>						
Zoning Designation - Industrial District (ID)						
<u>MAXIMUM BUILDING HEIGHT ALLOWED</u>						
Height - 80', 40' within 250' from R-1 or R-2 zone.						
<u>MAXIMUM FLOOR AREA RATIO</u>						
FAR - <i>to be verified</i>						
<u>LANDSCAPE REQUIREMENT</u>						
Percentage - <i>to be verified</i>						
<u>SETBACKS</u>						
	<u>Building</u>	<u>Landscape</u>				
	Front - 25'	15'				
	Side - 10'	5'				
	Rear - 30'	5'				

Aerial Map

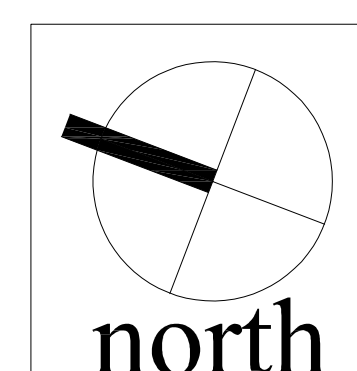


Legend

-
- Diagram illustrating the layout of a building with three potential office spaces and a drive-thru door:
- POTENTIAL OFFICE
 - POTENTIAL OFFICE WITH 2ND FLOOR
 - WAREHOUSE
 - ▼ DRIVE THRU DOOR

* SITE COMPLIES WITH 13.23.120(G) FOR LOCATIONS OF UTILITY ITEMS

Note: This is a conceptual plan. It is based on preliminary information which is not fully verified and may be incomplete. It is meant as a comparative aid in examining alternate development strategies and any quantities indicated are subject to revision as more reliable information becomes available.



1" = 60'

0 60 120 180

Conceptual Site Plan

4202 S. Riverboat Road

Taylorsville, Utah



18831 Bardeen Ave. - Ste. #100
Irvine, CA 92612
(949) 863-1770
www.hparchs.com



June 15, 2022 / Job #21599

Scheme 22

Jim Spung

From: Jim Spung
Sent: Friday, July 15, 2022 3:52 PM
To: John Buckel
Cc: Ben Badiie
Subject: File #9S22 - 4202 S. Riverboat Rd - Preliminary Subdivision Comments 07-15-2022

John,

This transmittal contains City and review agency comments for the proposed preliminary subdivision plat review at 4202 S. Riverboat Road in Taylorsville, Utah. Please contact the reviewer directly with any questions you have.

Taylorsville Engineering Department:

Reviewer: Ben White, City Engineer, bwhite@taylorsvilleut.gov, 801-293-8344

1. **DRAFT PLAT:** Remove address "4202 South Riverboat Road" from plat title.
2. **DRAFT PLAT:** Remove "asphalt path" notations.
3. **DRAFT PLAT:** Add easement line types to legend.
4. **DRAFT PLAT:** Update address for Lot 1 to "4202 South Riverboat Road."
5. **DRAFT PLAT:** Include the public access easement along the southern property line – granting access to the Jordan River Trail.
6. **DRAFT PLAT:** Correct curve for "C9" to be tangent and also consistent with "C8."
7. **DRAFT PLAT:** Update signature note for Taylorsville-Bennion Improvement District.
8. **DRAFT PLAT:** Include FEMA Floodplain information on the plat.
9. **DRAFT PLAT:** Include plat note indicating that a Wetland Study is required prior to development on the property.
10. **DRAFT PLAT:** Include plat note indicating that a Geotechnical Study is required prior development on the property.
11. **DRAFT PLAT:** Include plat note indicating that a Groundwater Investigation Study is required prior to development on the property.
12. **GENERAL:** Provide plan and profile sheets and construction details for the new public street improvements, including proposed street lighting.

Taylorsville Building Department:

Reviewer: Steve Porten, Building Official, sporten@taylorsvilleut.gov, 385-379-5495

13. No comments at this time.

Taylorsville-Bennion Improvement District:

Reviewer: Tammy North, District Engineer, tnorth@tbid.org, 801-968-9081

14. **DRAFT PLAT:** Identify all easements that will be required as part of the proposed development of this lot – LDC [Section 13.21.180](#).

Unified Fire Authority:

Reviewer: Tom Smolka, Fire Marshal, tsmolka@ufa-slco.org, 385-468-9088

15. No comments at this time.

Taylorsville Community Development Department:

Reviewer: Jim Spung, Senior Planner, jspung@taylorsvilleut.gov, 801-955-2092

16. **DRAFT PLAT:** Include reference to the "Sorenson Research Park Phase 2" subdivision, including the book and page number, on the adjacent properties along Riverboat Road.

17. **GENERAL:** A cul-de-sac in the sensitive area overlay zone shall not exceed six hundred feet (600') in length unless otherwise permitted by the planning commission upon recommendation from the city engineer. A cul-de-sac length is measured from its intersection with another street to the end of the cul-de-sac turnaround – LDC [Section 13.21.100\(I\)](#). This request is noted and will be presented to the Planning Commission as part of the preliminary plat review.
18. **GENERAL:** Let's discuss the preferred treatment of the existing Jordan River Trail. This area could be carved out as a separate parcel or remain a part of the larger lot and identified with notations on the plat. If the intent is to eventually deed this portion of the property to either the City or Salt Lake County, creating a separate parcel now would allow for an easy transition later. If you'd prefer that area remain a part of the larger lot and retain private ownership (as it currently is) that is another option. [Section 13.21.160](#) of the LDC addresses this – the City would like to discuss this with you (the owner/developer) prior to making any recommendations to the Planning Commission.
19. **GENERAL:** Submit a title report for all property within the boundary of the plat within 90 days of recording.

NEXT STEPS: Please upload revised plans/documents addressing the above comments to the online permit portal and email jspung@taylorsvilleut.gov letting me know that revised plans have been uploaded. Upon receipt of revised plans, staff will distribute for review. Additional comments/redlines will be provided to the applicant within approximately 2 weeks of the date of re-submittal.

Please reach out with any questions you may have. We are happy to coordinate a meeting and/or phone call to discuss/review the above comments, just let us know when your team would like to discuss.

Regards,

Jim Spung, AICP

Senior Planner



2600 W. Taylorsville Blvd.

Taylorsville, Utah 84129

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Website: www.taylorsvilleut.gov