



HIGHLAND CITY PLANNING COMMISSION AGENDA

Tuesday, January 23, 2024

Highland City Council Chambers, 5400 West Civic Center Drive, Highland Utah 84003

VIRTUAL PARTICIPATION

 YouTube Live: <http://bit.ly/HC-youtube>

 Email comments prior to meeting: planningcommission@highlandcity.org

7:00 PM REGULAR SESSION

Call to Order – Chair Audrey Moore

Invocation – Commissioner Debra Maughan

Pledge of Allegiance – Commissioner Tracy Hill

1. UNSCHEDULED PUBLIC APPEARANCES

Please limit comments to three minutes per person. Please state your name.

2. CONSENT ITEMS

Items on the consent agenda are of a routine nature or have been previously studied by the Planning Commission. They are intended to be acted upon in one motion. Commissioners may pull items from consent if they would like them considered separately.

a. Approval of Meeting Minutes *General City Management - Jay Baughman, Assistant City Administrator / Community Development Director*
Planning Commission Meeting – December 19, 2023

3. PUBLIC HEARING: PRELIMINARY PLAT - FOXWOOD ESTATES *Land Use (Administrative) - Jay Baughman, Assistant City Administrator/Community Development Director*

The Planning Commission will hold a public hearing to consider a request by the developers for preliminary plat approval of a 20-lot subdivision in the R-1-40 Zone located at 10630 North 6400 West. The Planning Commission will take appropriate action.

4. PLANNING COMMISSION AND STAFF COMMUNICATION ITEMS

The Planning Commission may discuss and receive updates on City events, projects, and issues from the Planning Commissioners and city staff. Topics discussed will be informational only. No final action will be taken on communication items.

a. Future Meetings

- February 6, City Council, 7:00 pm, City Hall
- February 20, City Council, 7:00 pm, City Hall
- February 27, Planning Commission, 7:00 pm, City Hall

Legislative: An action of a legislative body to adopt laws or policies.

Administrative: An action reviewing an application for compliance with adopted laws and policies.

ADJOURNMENT

In accordance with Americans with Disabilities Act, Highland City will make reasonable accommodations to participate in the meeting. Requests for assistance can be made by contacting the City Recorder at (801) 772-4505 at least three days in advance of the meeting.

ELECTRONIC PARTICIPATION

Members of the Planning Commission may participate electronically during this meeting.

CERTIFICATE OF POSTING

I, Stephannie Cottle, City Recorder, certify that the foregoing agenda was posted at the principal office of the public body, on the Utah State website (<http://pmn.utah.gov>), and on Highland City's website (www.hIGHLANDCITY.ORG).

Please note the order of agenda items are subject to change in order to accommodate the needs of the Planning Commission, staff and the public.

Posted and dated this agenda on the 18th day of January, 2024

Stephannie Cottle, CMC, City Recorder

THE PUBLIC IS INVITED TO PARTICIPATE IN ALL PLANNING COMMISSION MEETINGS.



HIGHLAND CITY

HIGHLAND CITY PLANNING COMMISSION MINUTES

Tuesday, December 19, 2023

Highland City Council Chambers, 5400 West Civic Center Drive, Highland Utah 84003

Waiting Formal Approval

VIRTUAL PARTICIPATION

YouTube Live: <http://bit.ly/HC-youtube>

Email comments prior to meeting: planningcommission@highlandcity.org

7:00 PM REGULAR SESSION

Call to Order – Vice Chair Christopher Howden

Invocation – Commissioner Claude Jones

Pledge of Allegiance – Commissioner Christopher Howden

The meeting was called to order by Commissioner Christopher Howden as a regular session at 7:08 pm. The meeting agenda was posted on the *Utah State Public Meeting Website* at least 24 hours prior to the meeting. The prayer was offered by Commissioner Claude Jones and those in attendance were led in the Pledge of Allegiance by Commissioner Christopher Howden.

PRESIDING: Commissioner Christopher Howden

COMMISSIONERS

PRESENT: Jerry Abbott, Tracy Hill, Christopher Howden, Claude Jones, Debra Maughan, and Trent Thayn

CITY STAFF PRESENT: City Administrator Erin Wells, Assistant City Administrator /Community Development Director Jay Baughman, City Attorney Rob Patterson, City Engineer Andy Spencer, City Recorder Stephannie Cottle

OTHERS PRESENT: N/A

1. UNSCHEDULED PUBLIC APPEARANCES

Please limit comments to three minutes per person. Please state your name.

Commissioner Jones mentioned that every streetlight around his area was out and requested that they be fixed. He said there were no identifying numbers on the light posts. Mr. Spencer suggested that they speak after the meeting regarding details in order to get them fixed.

2. CONSENT ITEMS

Items on the consent agenda are of a routine nature or have been previously studied by the Planning Commission. They are intended to be acted upon in one motion. Commissioners may pull items from consent if they would like them considered separately.

a. **Approval of Meeting Minutes** *General City Management - Jay Baughman, Assistant City Administrator / Community Development Director*
Planning Commission Meeting – November 28, 2023

Commissioner Trent Thayn moved to approve the minutes from the November 28, 2023 Planning Commission Meeting. Commissioner Jerry Abbott seconded the motion.

The vote was recorded as follows:

Commissioner Jerry Abbott	Yes
Commissioner Tracy Hill	Yes
Commissioner Christopher Howden	Yes
Commissioner Claude Jones	Yes
Commissioner Debra Maughan	Yes
Commissioner Audrey Moore	Absent
Commissioner Trent Thayn	Yes

The motion carried 6:0

3. PUBLIC HEARING: DEVELOPMENT CODE CHANGES *Land Use (Administrative) Rob Patterson, City Attorney*

The Planning Commission will hold a public hearing to consider amendments to multiple sections of the City's Development Code, including changes to subdivisions review procedures, subdivision requirements and standards, the powers and duties of Planning Commission and staff, and the creation of a new administrative board.

Mr. Patterson explained that the proposed code changes updated how the city processed subdivisions based on the new state law. He said it also updated city standards. Mr. Patterson summarized the proposed changes including renumbered, renamed, and cleaned up duplicate items. It also changed the planning commission powers and duties. He explained that the new code created the Development Administration Board (DAB) that determined final plat approval for minor subdivisions. He explained the new state law process and mentioned that city application forms would also be updated to reflect the new process. He explained that the city had up to 15 business days to review a preliminary plat and 20 business days to review a final plat for single family, two-family, and townhome subdivisions.

Commissioner Abbott asked how the application was determined complete. Mr. Patterson explained that city staff would review applications as quickly as possible; hopefully within three to five business days. If the application was not complete, a written response would be sent to the applicant listing items still needed. If a complete application was submitted, the 15 days started the date it was submitted.

Mr. Patterson explained that the review length for other types of plats and subdivision improvement plats for other subdivisions was defined in state code as "reasonable". After some discussion, the planning commission agreed to leave the wording as "reasonable" rather than defining a specific time limit. Commissioner Howden

wondered what happened if the city requested changes or missed something that needed to be different. Mr. Patterson talked about different scenarios and how the city and applicant had a responsibility to respond to comments in a timely manner.

Mr. Patterson said final plat reviews would go to DAB. He explained that he updated the development requirement expiration timeframes in order to make them more consistent. He said subdivision bonds increased to 120%, overall. He mentioned that the proposed amendment included a clarification that plat notes were covenants enforced by the city. He said he updated subdivision improvements to include current requirements for curb/gutter/sidewalk, roads, sewer, culinary, PI, drainage, streetlights, etc. He said the updated code changed the rear and side easements to be municipal easements instead of public utility easements (PUE's). Mr. Spencer explained that many cities had completely gone away from side and rear PUE's, but he didn't think Highland was ready to entirely do away with them. In general, most of the side and rear PUE's were unused and he was trying to make it a little more expeditious for Highland to be the only entity to act in regard to PUE's.

Mr. Patterson explained that the driveway standards and ditch requirements were updated. He talked about changes to the street chart and standards. Mr. Spencer said the chart regarding cul-de-sacs wasn't very clear and asked the planning commission if they were okay with it being removed. A new cul-de-sac section could be added with drawings. The commissioners discussed the usefulness of the chart and a low-impact street definition.

Mr. Spencer discussed cul-de-sacs and if the city wanted to limit fill. He said there weren't really regulations regarding fill and cul-de-sacs. He explained that each resident need to hold water on their own lot; can't increase the flow onto someone else's yard. He said they had to drain outward from the bulb to the road. He said staff could propose a limit but wondered if the commissioners had an opinion about a maximum fill height for cul-de-sacs. The commission discussed different options regarding fill heights. They discussed effects of natural grade, curb, and finish grade. Commissioner Abbott thought "alternate public owned drainage path" was needed at a minimum. Commissioner agreed. They talked about the option of establishing a limit of four feet then requiring legislative approval if higher. Commissioner Maughan didn't like having options for higher fill allowances without specific approval.

Vice Chair Christopher Howden opened the public hearing at 8:24 PM and asked for public comment. Hearing none, he closed the public hearing at 8:24 PM and asked for additional comment.

The commissioners had additional discussion regarding the cul-de-sac standards and fill heights. They discussed fill heights of two to five feet, walkout basements, how it depended on the property, and how it might affect neighbors.

Commissioner Trent Thayn MOVED that the Planning Commission recommend approval of the proposed amendments to the Highland City Development Code with the following changes:

- *Changes to the street chart, as recommended by staff*
- *Changes to cul-de-sac grading and drainage standards, as recommended by staff with a maximum fill of 4' feet*

Commissioner Christopher Howden SECONDED the motion.

The vote was recorded as follows:

<i>Commissioner Jerry Abbott</i>	<i>Yes</i>
<i>Commissioner Tracy Hill</i>	<i>Yes</i>
<i>Commissioner Christopher Howden</i>	<i>Yes</i>

<i>Commissioner Claude Jones</i>	<i>Yes</i>
<i>Commissioner Debra Maughan</i>	<i>No</i>
<i>Commissioner Audrey Moore</i>	<i>Absent</i>
<i>Commissioner Trent Thayn</i>	<i>Yes</i>

The motion carried 5:1

4. PUBLIC HEARING: DESIGN CRITERIA FOR PUBLIC IMPROVEMENTS

UPDATE *Land Use (Administrative) Jay Baughman, Assistant City Administrator / Community Development Director*

The Planning Commission will hold a public hearing to consider updating the Highland City Design Criteria Manual and Standard Drawings, which consists of revised subdivision infrastructure improvement standards and specifications, including but not limited to standard road cross-sections, road alignment and connectivity requirements, and utility lines and facility standards.

Mr. Spencer explained that the changes brought city code in agreement with State law.

Commissioner Abbott talked about not being able to ride on an uneven street near the mayor's house. He said it was similar to reverse speed bumps and held water. Mr. Spencer talked about utility construction and testing utility laterals. He suggested that the city treat each lateral as a fresh trench which would require a test. He said it could be added to the code.

Vice Chair Christopher Howden opened the public hearing at 8:56 PM and asked for public comment. Hearing none, he closed the public hearing at 8:56 PM.

Commissioner Howden mentioned that he did not like current setbacks and would like to discuss them at a later time. He talked about setbacks that inadvertently ended up being 10 feet away from the property line.

Commissioner Jerry Abbott MOVED that the Planning Commission recommend approval of the proposed updates to the Highland City Design Criteria Manual and Standard Drawings with the following changes:

- *A drawing be added to the standard drawings for cul-de-sacs indicating a maximum fill at the highest portion of cul-de-sacs be to 4 feet and providing for an alternate publicly owned drainage path in cases where maximum fill limits cul-de-sac placement.*
- *All lateral trenches in roads be tested.*

Commissioner Brenda Maughan SECONDED the motion.

The vote was recorded as follows:

<i>Commissioner Jerry Abbott</i>	<i>Yes</i>
<i>Commissioner Tracy Hill</i>	<i>Yes</i>
<i>Commissioner Christopher Howden</i>	<i>Yes</i>
<i>Commissioner Claude Jones</i>	<i>Yes</i>
<i>Commissioner Debra Maughan</i>	<i>Yes</i>
<i>Commissioner Audrey Moore</i>	<i>Absent</i>
<i>Commissioner Trent Thayn</i>	<i>Yes</i>

The motion carried 6:0

ADJOURNMENT

Commissioner Christopher Howden MOVED to adjourn the meeting.

Commissioner Jerry Abbott SECONDED the motion.

All were in favor.

The meeting ended at 9:02 pm.

I, Stephannie Cottle, Highland City Recorder, hereby certify that the foregoing minutes represent a true, accurate and complete record of the meeting held on December 19, 2023. The document constitutes the official minutes for the Highland City Planning Commission Meeting.



PLANNING COMMISSION AGENDA

REPORT ITEM #1

DATE: January 17, 2024
TO: Planning Commission
FROM: Jay Baughman, Assistant City Administrator / Community Development Director
SUBJECT: PUBLIC HEARING: Preliminary Plat – Foxwood Estates, Millhaven Homes
TYPE: LAND USE (ADMINISTRATIVE)

PURPOSE:

The Planning Commission will hold a public hearing to consider a request by Millhaven Homes for approval of a preliminary plat for a 20-lot subdivision in the R-1-40 Zone located generally at 10630 North 6400 West, in Highland. The Planning Commission will take appropriate action.

STAFF RECOMMENDATION:

Staff recommends the Planning Commission hold a public hearing, accept the findings, and **APPROVE** the proposed preliminary plat with the following stipulations:

1. The final plat shall be in substantial conformance with the preliminary plat received January 11, 2024.
2. All public improvements shall be installed as required by the City Engineer.
3. Final subdivision improvement plans shall meet all requirements as determined by the City Engineer.
4. Sewer slopes must be revised, applicant shall provide more slope on the furthest north streets (to increase velocity where minimum flow is happening), and a flatter slope in the trunk lines. Final sewer slopes to be approved by the City Engineer.
5. The applicant has indicated to staff they would like to update percolation tests and calculations used to determine the required number of storm drainage inlets and sumps. Revised calculations and placement shall be approved by the City Engineer, otherwise final plans shall substantially conform in number and placement as indicated on the preliminary plans.
6. The low point shown in street grading between lots 14 and 15 shall be eliminated to allow all street grading to overflow blocked inlets without causing localized flooding, otherwise a dedicated surface overflow path shall be provided to the wash.
7. A dedicated overflow corridor is required for any cul-de-sac that drains to the bulb, a surface drainage corridor to the wash is an acceptable mitigation until such time as the trail can be installed to provide a surface overflow path. Applicant shall also verify that the future trail can be graded to allow for this drainage.
8. All drainage runoff not directed to the public street must be contained on each lot without draining to the adjacent lot or property. A note shall be added to the final plat for each lot stating this requirement and detailing any lot specific provisions required to accomplish this objective.

9. Final plat and subdivision improvement plans to conform to stipulations and conditions outlined in staff sensitive lands memorandum.
10. Parcel A shall be dedicated to Highland City.
11. Irrigation piping plans and associated easements shall be approved by Lehi Irrigation Company. Easements for water conveyance within the wash and the piping leading to the wash shall be dedicated to both Lehi Irrigation Company and Highland City.
12. Trees along trail park strip shall be of a variety and shall be spaced according to City forester recommendations and requirements. Trees, rock mulch for xeriscape and a sprinkler system shall be installed along trail corridors that will be owned by the City. Fencing compliant with City ordinance shall be installed along the trail corridor between lot 7 and 8. Fencing along the trail corridor behind lot 8 along 6400 West shall be placed to have 5-foot behind the trail to match the standard City fence ordinance for placement of fences adjacent to sidewalks.
13. A theme-wall fence shall be placed along 6400 West.
14. Final plat and subdivision improvement plans to conform to final review comments and review responses dated Dec 21, 2023/Jan 5, 2024, except as superseded by above stipulations.

BACKGROUND:

The property is approximately 21.5 acres and is zoned R-1-40. The square footage allows for a 20-lot subdivision in the R-1-40 Zone.

Pursuant to the City's new subdivision ordinance, adopted on January 16, 2024, the Planning Commission is the land use authority that approves preliminary plats. There will be no City Council review or approval of the proposed plat. Final plats will be reviewed and approved by the City's Development Administration Board. This will be the only public hearing regarding this subdivision.

SUMMARY OF THE REQUEST:

1. The applicant is requesting preliminary plat approval of twenty (20) single-family residential lots located at approximately 10630 North 6400 West.
2. The lot sizes meet the requirements of the R-1-40 Zone by having only five (5) lots that are less than 30,000 square feet.
3. Road and utility access to the site will be from 6400 W, 6480 W, and Joseph Lane; however, it shall stipulate on the plat that lots 3, 4, 7, and 8 will not be permitted drive access from 6400 W.

CITIZEN PARTICIPATION:

Notice of the public hearing to be held at the Planning Commission meeting was sent to all residents within 500' of the subject property. Notice of this public hearing was also posted on the state and city websites on January 11, 2024. At the time of this report writing, staff has received no public comment.

STAFF REVIEW:

Zoning

- The property is designated as Low-Density Residential in the General Plan Land Use Map. It is zoned R-1-40.
- The properties directly north, south, east, and west of the proposed project are zoned

R-1-40. The proposed subdivision is compatible with the surrounding uses.

Density

- The subdivision consists of 21.5 acres. With R-1-40 density requirements, the developer is allowed 20 lots.
- The lot sizes meet the requirements of the R-1-40 Zone by having only five (5) lots that are less than 30,000 square feet.

Access and Utilities

- Road and utility access to the site will be from 6400 W, 6480 W, and Joseph Lane; however, it has been discussed with the applicant and shall be stipulated on the plat that lots 3, 4, 7, and 8 will not be permitted drive access from 6400 W.
- The City's general plan and active transportation plan show a trail connection between the Town Center Trail and the Murdock Canal Trails. The applicant is providing this trail connection. The trail extends south from the NE corner of the subdivision along 6400 W, connects between lots 7 and 8, continues adjacent to the streets within the new subdivision, until terminating at SW corner of subdivision at the City-owned trail corridor. Where the trail is adjacent to a street, the trail will replace the sidewalk (but not park strip) and will remain 10 feet wide. A theme wall or other appropriate buffer will be installed by the applicant along the trail along the Horseshoe Bend "A" subdivision boundary. Theme walls and other fencing, per city code, will also be required 6400 West and along trails.
- Existing ditch to be buried/realigned per irrigation company standards. Applicant will obtain irrigation company approval of ditch modification.
- Preliminary subdivision improvement plans show adequate utility service and connectivity from existing mains. No new lift stations or other unusual utility facilities are required or proposed. Existing but unused culinary and PI lines for lines from 6800 West, no longer useful to the City, will be abandoned.

FINDINGS:

With the proposed stipulations, the preliminary plat meets the following findings:

- The preliminary plat is consistent with the General Plan and the afore mentioned Active Transportation Plan.
- The preliminary plat is compliant with R-1-40 Zoning requirements.
- The proposed subdivision meets applicable requirements in the Highland City Design Criteria for Public Improvements.
- Each of the six findings required for a variance regarding the "slope setback" under HDC 8-105(2) are satisfied and have been met, pursuant to the staff sensitive lands memorandum and the applicant's slope setback reduction request. The slope setback is reduced to the 1.5/1 daylight, 12' buildable limit from the top of slope, or 15' to outermost edge of footings (whichever is greater), described in the Geotechnical Engineering Study, CMT Technical Services, November 28, 2023.
- The preliminary plat conforms to the requirements of the sensitive lands regulations and requirements.

FISCAL IMPACT:

This action will not have a financial impact on this fiscal year's budget expenditures.

MOTION TO APPROVE:

I move that the Planning Commission accept the findings and **APPROVE** the preliminary plat for the Foxwood Estates subdivision subject to the stipulations recommended by Staff.

ATTACHMENTS:

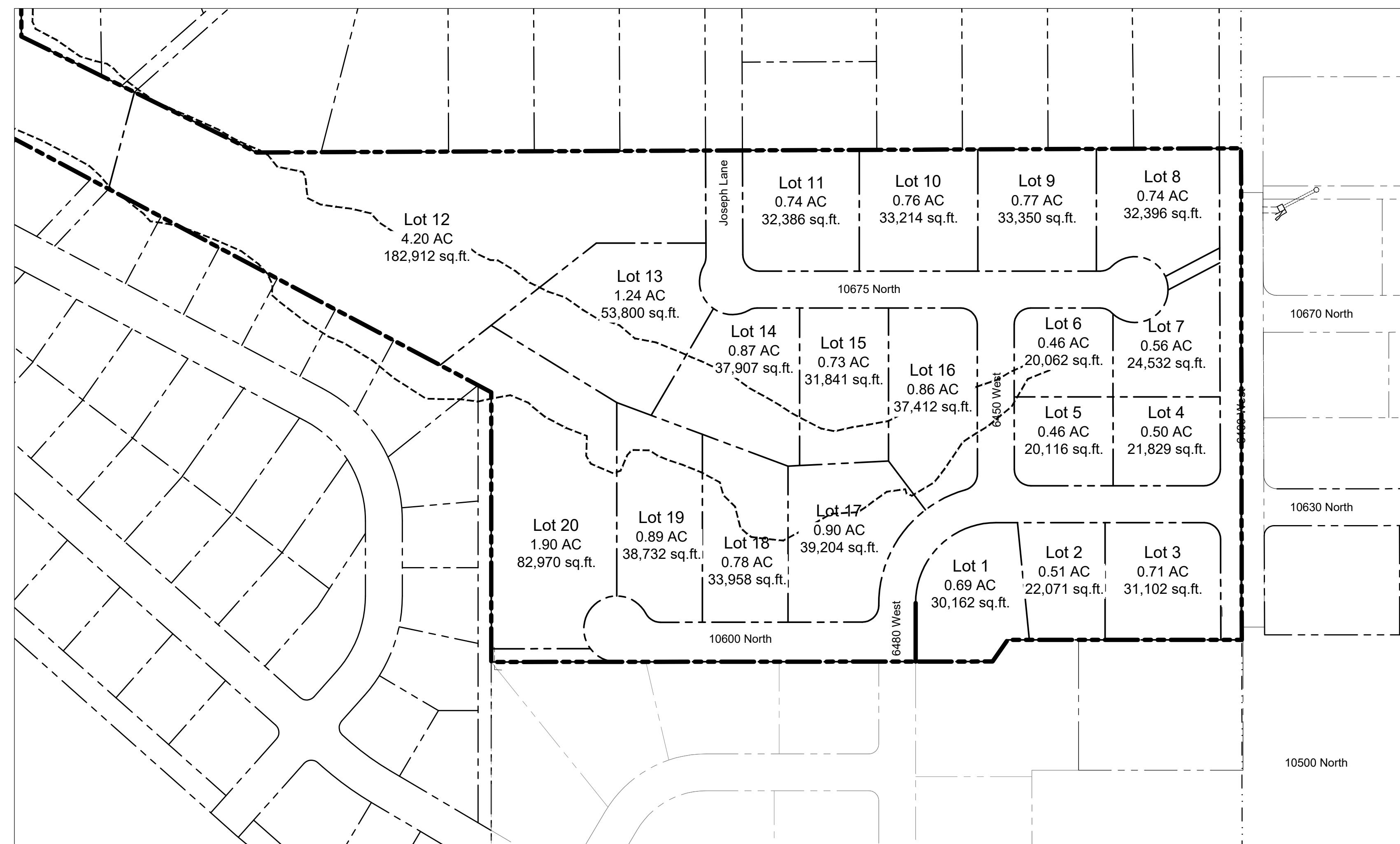
1. Proposed Preliminary Plat and subdivision improvement plans
2. Staff sensitive lands memorandum
3. Review Comments Dec 21, 2023/Jan 5, 2024
4. Geotechnical Engineering Study, CMT Technical Services, November 28, 2023
5. Slope Analysis

Foxwood Estates

Highland, Utah

Legend

Symbol	Description
~~~~~	Proposed 8" Sanitary Sewer Main
=====	Existing Sanitary Sewer Main (size noted on plan)
~~~~~	Proposed Culinary Water Main (size noted on plan)
=====	Existing Culinary Water Main (size noted on plan)
~~~~~	Existing Storm Drain pipe (size noted on plan)
=====	Proposed Storm Drain pipe (size noted on plan)
-----	Cable TV utility lines
-----	Existing Power lines
-----	New underground Power lines
-----	Outside Boundary line
-----	Existing surface improvements
-----	Existing Sidewalk
-----	Proposed Sidewalk
-----	Existing Contour Elevation
-----	Finish Contour Elevation
-----	Finish Spot Elevation
-----	Drainage Flow Direction
-----	Water Meter (size noted on plan)
-----	Culinary Water Valve
-----	Fire Hydrant
-----	Sanitary Sewer Manhole
-----	Storm Drain Manhole
-----	Storm Drain Box
top of asphalt	
top of sidewalk	
back of top of curb	
back of top of sidewalk	
Sanitary Sewer Manhole	
Storm Drain Manhole	
Water Valve	
Gas valve	
Water Meter	
edge of existing asphalt	
Public Utility Easement	
4503	4503
4503.00	
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SDMH	
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GV	
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eo	
PUE	



## NOTES:

1. The fire protection items (fire hydrant, water mains, access roads, etc.) shown on this site plan are preliminary only. Detailed fire protection plans shall be submitted with the building plans. Plan review by the Fire Prevention Bureau shall be completed prior to the issuance of a building permit. The plan review by the Fire Prevention Bureau may identify additional fire protection requirements mandated by the International Fire Code. Fire hydrant foot valves shall be installed at the connection point with the fire hydrant.
2. All landscaped areas shall have an automatic, underground sprinkling system with a back-flow device to the building. Back-flow devices shall be installed and tested in accordance with the City Code. Water meters shall be located at the back of sidewalk or curb in an area that is accessible for reading and servicing. Water meters shall not be located within areas enclosed with fences or within 10 feet (10') of any existing or proposed structure.
3. If required by the City Code or by the applicant's permit for Industrial Wastewater Discharge, a sampling manhole and fat and oil separator/grease trap shall be installed I.A.W. City standards and specifications.
4. All signage shall comply with the requirements of the City Code.
5. All utilities, including water and sewer laterals, water and sewer mains, storm water drains, storm water sumps, sewer manholes, water valves, etc., shall not be located under covered parking areas and shall be installed according to the City Code.
6. All roof drainage shall be routed through on-site storm water management facilities.
7. At the time of construction, the City of may determine based on professional experience and judgment and at its sole discretion, the need for the Owner/Developer to pay for, remove, and replace any existing substandard improvements such as curbs, gutters, sidewalks, drive approaches, driveways, decorative concrete, wheelchair ramps, etc., or any unused drive approaches.
8. All construction shall conform to the City of construction standards and specifications unless the improvement is within the UDOT right-of-way, in which case the construction shall conform to UDOT construction standards and specifications.

## TOTAL OUTSIDE BOUNDARY

Commencing at a point located North 0004'58" West along the Section line 1326.45 feet from the Southeast corner of Section 34, Township 4 South, Range 1 East, Salt Lake Base and Meridian, thence South 89°54'37" West 208.08 feet; thence South 6.12 feet; thence West 147.30 feet; thence South 34°49'00" West 40.07 feet; thence South 89°56'57" West along an existing fence line 761.21 feet; thence along the Canterbury North G Subdivision Boundary as follows: North 00°00'22" East 409.80, North 62°00'00" West 936.99 feet, North 46°26'00" West 197.69 feet; thence North 59°30'00" East 297.49 feet; thence along the Victor View Subdivision Boundary as follows: South 180.37 feet, South 63°30'00" East 398.26 feet, South 89°59'59" East 1496.91 feet; thence South 00°04'58" East along said Section line 740.09 feet to the point of beginning.

AREA = 1,083,011 square feet or 24.86 acres

## PARCEL 1

Commencing at a point located North 0004'58" West along the Section line 1320.01 feet and West 355.39 feet from the Southeast corner of Section 34, Township 4 South, Range 1 East, Salt Lake Base and Meridian; thence South 89°54'37" West 208.08 feet; thence South 6.12 feet; thence West 147.30 feet; thence North 34°49'00" West 40.07 feet; thence South 89°56'57" West along an existing fence line 761.21 feet; thence along the Canterbury North G Subdivision Boundary as follows: North 00°00'22" East 409.80, North 62°00'00" West 936.99 feet, North 46°26'00" West 197.69 feet; thence North 59°30'00" East 297.49 feet; thence along the Victor View Subdivision Boundary as follows: South 180.37 feet, South 63°30'00" East 398.26 feet, South 89°59'59" East 1496.91 feet; thence South 00°04'58" East along said Section line 740.09 feet to the point of beginning.

AREA = 470,706 square feet or 10.81 acres

## PARCEL 2

Commencing at a point located North 0004'58" West along the Section line 1326.45 feet from the Southeast corner of Section 34, Township 4 South, Range 1 East, Salt Lake Base and Meridian; thence South 89°54'37" West 208.08 feet; thence South 6.12 feet; thence West 147.30 feet; thence North 46°26'00" West 409.45 feet; thence North 63°31'56" West 978.26 feet; thence South 89°59'59" East along Victor View Subdivision 1496.91 feet; thence South 00°04'58" East along said Section line 740.09 feet to the point of beginning.

AREA = 612,305 square feet or 14.05 acres

	Square Footage	Acreage	Percent of total
Total Area	1,079,130	24.77	100
Ravine Area	304,133	6.98	28
Net Lot Area	774,997	17.79	72
Minimum Lot size	20,000	0.46	0

## Tabulation Table

Said described property is located within an area having a Zone Designation "X" (Areas of Minimal Flood Hazard) by the Secretary of Housing and Urban Development, on Flood Insurance Rate Map 49049C0162, with a date of identification of 6-19-2020, in Utah County, State of Utah, which is the current Flood Insurance Rate Map for the community in which said property is situated. A small portion of the westerly side of Lot 12 is located within a Zone AE floodmap boundary. The AE boundary does not affect any of the proposed lots.

## Planning Department

5400 W Civic Center Drive  
Highland, UT 84003  
phone (801)772-4506  
fax (801)756-6903

## Public Works Department

5400 W Civic Center Drive  
Highland, UT 84003  
phone (801)772-4515  
fax (801)756-6903

## Public Safety

5582 West Parkway West Drive  
Non-emergency (801)763-5365  
Emergency 911

Utah County Animal Shelter 801-785-3442

## Engineering

Engineer: Andy Spencer  
5400 W Civic Center Drive  
Highland, UT 84003  
Phone (801) 772-4508  
Fax (801) 756-6903  
aspencer@highlandcity.org

## Building Inspection

5400 W Civic Center Drive  
Highland, UT 84003  
Phone (801) 772-4516  
Fax (801) 756-6903  
Building Official - Jason Nelson  
jnelson@highlandcity.org

## Gas

Dominion Energy  
1640 North Mountain Springs Parkway  
Springville, Utah 84663  
Phone (801) 853-6585

## Electricity

Rocky Mountain Power  
70 North 200 East  
American Fork, Utah 84003  
Phone (801) 756-1220  
Fax (801) 756-1274  
Mark Steele

## Telephone

Centurylink  
75 East 100 North  
Provo, Utah 84606  
Phone (801) 356-7050  
Cell (801) 473-3385  
Kasey Lunt

## Cable T.V.

Comcast Cable Communications, Inc.  
1350 East Miller Avenue  
Salt Lake City, Utah 84106  
Phone (801) 485-0500  
Fax (801) 487-1887

## Developer:

Millhaven Homes  
272 West 200 North, Suite 100  
Lindon, Utah 84042  
(801)443-6540  
todd@millhavendevlopment.com

## Engineer:

Dudley and Associates, Inc.  
353 East 1200 South  
Orem, Utah 84058  
801-224-1252

## Site Data:

Zone = R1-40  
(All surrounding properties lie within a R1-40 Zone).

Total Area = 1,079,130 sq.ft. or 24.77 Acres  
Total number of Lots = 20

## Sheet Index

1.0	Cover Sheet
1.1	General Notes
1.2	Demolition Plan
2.0	Site Plan
3.0	Utility Plan
4.0	Grading and Drainage Plan
5.0, 5.1, 5.2	Detail Sheets

#### UTILITY GENERAL NOTES

1. All installation and materials shall, at a minimum, conform to the current City standards, specifications, and drawings.
2. The contractor shall obtain a permit for utility construction at least 48 hours prior to construction.
3. Contractor shall coordinate with all utility companies for installation requirements and specifications.
4. All necessary inspections and/or certifications required by codes and/or utility service companies shall be performed prior to announced building possession and the final connection of service.
5. The contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans are based on records of the various utility companies, and where possible, measurements taken in the field. The information is not to be relied on as being exact or complete. The contractor must call the appropriate utility companies at least 48 hours before any excavation to request exact field location of utilities. It shall be the responsibility of the contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plans.
6. Underground utilities shall be installed, inspected and approved before backfilling.
7. Contractor shall notify the necessary City inspectors 72 hours before connecting to any existing utility.
8. All fill material is to be in place and compacted before installation of proposed utilities.
9. Existing utility shall be verified in field prior to installation of any new lines, any discrepancies found are to be communicated to the design engineer prior to installation.
10. All ductile and gray iron fittings shall be manufactured in accordance with the following AWWA standards: C-104 cement mortar lining, C-110 gray-iron and ductile iron joints. All fittings shall be seal coated with bituminous material. All fitting shall be 250 PSI minimum pressure rating.
11. Manholes shall be precast conforming to ASTM C-478. Concrete bases shall be poured in place or precast.
12. All utility pipes shall be bedded and backfilled in accordance with the detail drawings and site work specifications.
13. Tops of existing manholes shall be raised as necessary to be flush with proposed pavement elevations. Any existing manholes in unpaved areas shall be 6 inches above finished ground elevations with water tight lids.
14. All concrete for encasements shall have a minimum 28 day compression strength of 4000 PSI.
15. Site work contractor shall be responsible for all improvements to with 5 ft. of proposed building unless specified otherwise. Site work contractor shall coordinate with building contractor on all utility building entrance locations.
16. In the event of a vertical conflict between waterlines, sanitary lines, storm lines and gas lines (existing and proposed), the sanitary line shall be ductile iron pipe with mechanical joints at least 10 feet on both sides of crossing, the waterline shall have mechanical joints with appropriate thrust blocking as required to provide a minimum of 18-inch clearance meeting requirements of ANSI A21.10 or ANSI 21.11 (AWWA C-151) (CLASS 50).
17. Drawings do not purport to show all existing utilities. It is the responsibility of the contractor to verify all existing utilities by means of 'blue stakes', 'pot-holing', and/or excavation.
18. Contractor shall verify utility locations prior to subsurface work for light poles (boring etc.) and similar structures.
19. See notice requirement under general project notes.
20. The general contractor shall ensure that all sub-contractors have installed utilities in accordance with the specifications and design (line, grade, no sags, etc.) prior to scheduling close-out meetings with the city.
21. All utilities shall be pre-tested prior to the city witnessing the test to ensure that said utilities will pass during city witness of testing.

#### SURVEY CONTROL NOTE:

The contractor or surveyor shall be responsible for following the National Society of Professional Surveyors (NSPS) model standards for any surveying or construction layout to be completed using Dudley & Associates ALTA Survey or Dudley & Associates construction improvement plans. Prior to proceeding with construction staking, the surveyor shall be responsible for verifying horizontal and vertical control from the survey monuments and for verifying any additional control points shown provided by Dudley & Associates. The surveyor shall also use the benchmarks as shown on the plan, and verify them against no less than three existing hard improvement elevations included on these plans or on electronic data provided by Dudley & Associates. If any discrepancies are encountered, the surveyor shall immediately notify the engineer and resolve the discrepancies before proceeding with any construction staking.

#### PRIVATE ENGINEER'S NOTICE TO CONTRACTORS

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property, that this requirement shall apply continuously and not be limited to normal working hours; and that the contractor shall defend, indemnify, and hold the owner and the engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting for liability arising from the sole negligence of the owner or the engineer.

#### SANITARY SEWER GENERAL NOTES

1. See this sheet for general project notes.
2. All sanitary sewer construction shall be in conformance with the standards and specifications.
3. All gravity sanitary sewer lines shall be in conformance with the standards and specifications.
4. Sanitary sewer lines shall be SDR-35 PVC. Sewer line construction and materials shall conform to ASTM standards and specifications.
5. Rim elevations shown are approximate only and are not to be taken as final elevation. Pipeline contractor shall use precast concrete adjustments rings, grout, and steel shims to adjust the manhole frame to the required final grade in conformance with the standard specifications. All frames shall be adjusted to final grade prior to the final lift of asphalt.
6. All sanitary sewer main testing shall be accordance with the city standards and specifications. Copies of all test results shall be provided to the engineer, the owner, and the governing authority prior to the start of the warranty period.
7. Compaction of all trenches within the project site must be attained and compaction results submitted to the Public Works Department.
8. The contractor is responsible for protecting all existing structures and improvements during installation of sanitary sewer line.
9. The contractor is responsible for the following:
  - (A) Obtaining all required permits from the city or regulatory authorities at the contractor's cost including permits required for work within the public right-of-way.
  - (B) Restoration of any existing improvements including (but not limited to) fences, sod, landscaping, pavement, sprinkler systems.
  - (C) Verification and protection of all existing utilities within the limits of construction.
  - (D) Providing as-built drawings to the City and engineer.
  - (E) All permitting, development, location, connecting and inspection.
  - (F) Verifying all standard details conform to the current standards and specifications.
  - (G) For obtaining and understanding all city, county, and state standards and specifications pertaining to the construction of sanitary sewer improvements.
  - (H) Reference architectural plans for all connections to building services and verify locations as shown.
10. The contractor shall provide all materials necessary for construction or installation of all proposed improvements shown.
11. The contractor shall pothole the existing sewer main and provide an as-built elevation of the main to the engineer prior to any new construction.
12. Sanitary sewer pipes shall be bedded in accordance with standards.

#### STORM DRAIN GENERAL NOTES

1. The contractor shall be responsible for the following:
  - (A) Obtaining all required permits from the city or regulatory authorities at the contractor's cost including permits required for work within the public right-of-way.
  - (B) Restoration of any existing improvements including (but not limited to) fences, sod, landscaping, pavement, sprinkler systems.
  - (C) Verification and protection of all existing utilities within the limits of construction.
  - (D) Providing as-built drawings to the city and engineer.
  - (E) All permitting, development, location, connection and inspection.
  - (F) Scheduling all required inspections.
2. All storm drain construction shall be in conformance with standards, specifications, and plans.
3. Distances for storm drains are the horizontal distances from center of manhole or inlet to center of manhole or inlet. Therefore, distances shown on plans are approximate and could vary due to vertical alignment.
4. Rim elevations shown are approximate only and are not to be taken as final elevation. Pipeline contractor shall use precast concrete adjustments rings, grout, and steel shims to adjust the manhole frame to the required final grade in conformance with standards, specifications and plans. All frames shall be adjusted to final grade prior to the final lift of asphalt.
5. Compaction of all trenches within the project site must be attained and compaction results submitted to the engineer prior to final acceptance.
6. Storm drain pipes entering structures shall be grouted to assure connection at structure is watertight.
7. All storm drain manholes in paved areas shall be flush with pavement and shall have traffic bearing lids. Manholes in unpaved areas shall be 6" above finished grade. All storm drain lids shall be labeled "storm drain".
8. Contractors shall verify horizontal and vertical location of all existing storm drain structures, pipes, and all utilities prior to construction. Any discrepancies are to be reported to the design engineer prior to construction.
9. Storm drains shall be bedded in accordance with the City standards.

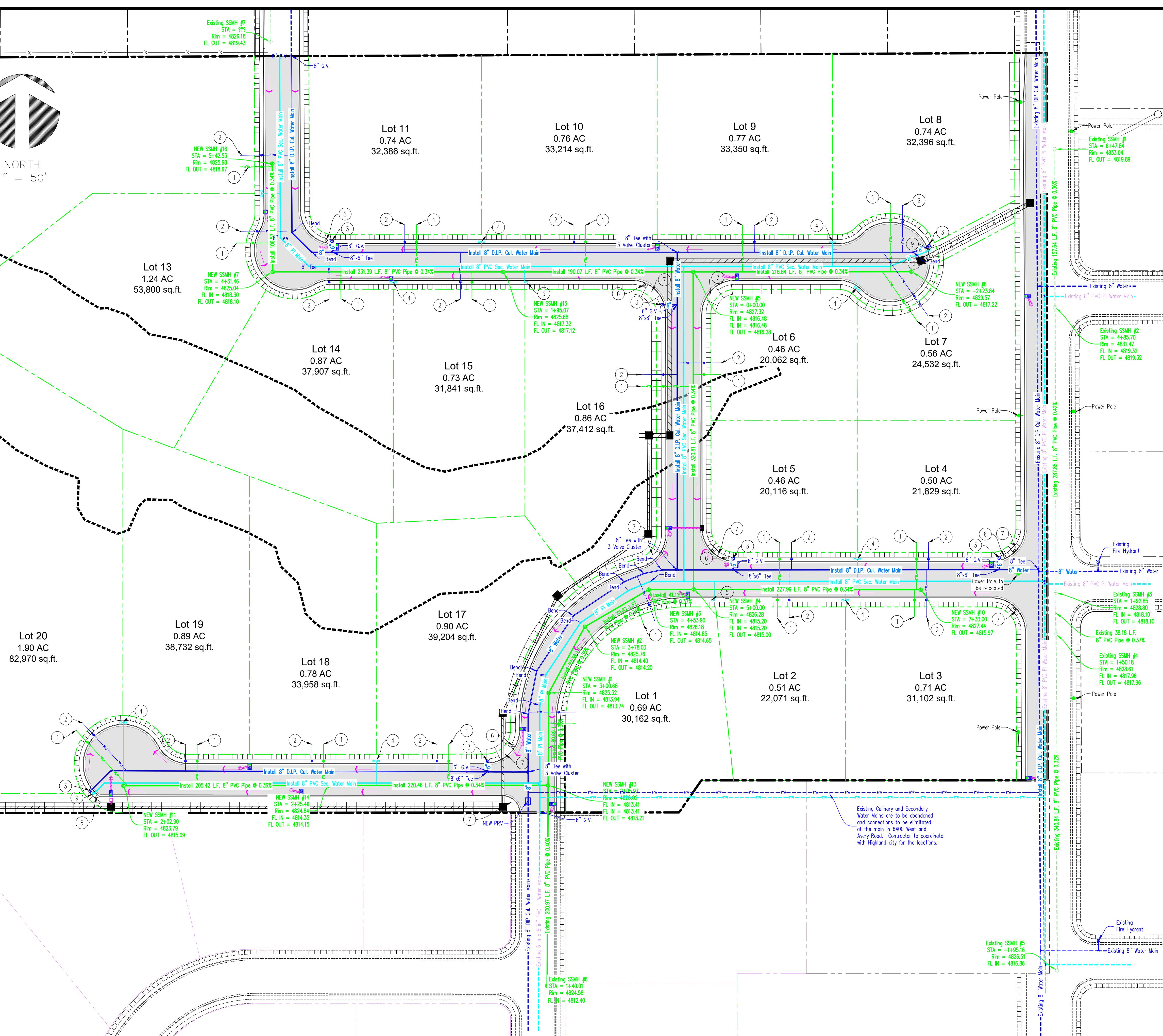
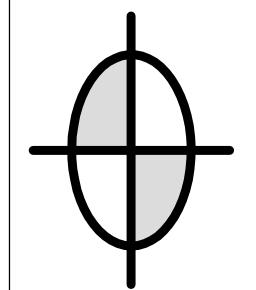
#### GRADING PLAN GENERAL NOTES

1. Contours shown are for finished surface paving, sidewalk, slab, or ground adjustment to sub-grade is the contractor's responsibility.
2. All disturbed areas that are un-surfaced or are not designated as landscape areas are to be seeded, fertilized, and watered until a healthy stand of grass is obtained.
3. If during the overall grading process, conditions are encountered which could indicate an unidentified situation is present, the soils engineer shall be contacted for recommendations.
4. Unless otherwise shown, no proposed slope shall exceed three (3) horizontal to one (1) vertical. All sloped areas must be protected from erosion.
5. If stripped materials consisting of vegetation and organic materials are stockpiled on the site, topsoil may be placed to a height of five feet. Silt fence shall be placed around the base of the stockpile and the stockpile shall be seeded with native seed mix immediately after stripping operations are complete.
6. On-site materials suitable for fill beneath drives and asphalt areas beyond 5' (five) of the building shall be compacted in accordance with guidelines presented in the soils report.
7. Spot elevations shall take precedence over contours and slopes shown. The contractor shall notify the engineer of the spot elevations that do not appear to be consistent with the contours and slopes. Spot elevations and specific profile design shall be used for setting elevations of curb, gutter and utilities.
8. Benchmark verification: Contractor shall use benchmarks and datums shown hereon to set project benchmark(s), by running level loop between at least two benchmarks, and shall provide survey notes of such to project engineer prior to commencing construction.
9. All utility manholes, valve covers, cleanouts, vaults, boxes, etc.) shall be adjusted to final grade prior to the final lift of asphalt.
10. All earth moving and placement operations shall be in conformance with the recommendations identified in the soils report. The contractor shall have a signed and sealed copy of the soils report on the site at all times.
11. The contours shown in the detention/retention pond area represent final grade. The top 6 inches of material in the detention/retention pond and berm areas shall be top soil as specified in the project standards.
12. Grades within asphalt areas shall be constructed to within 0.10 feet of the design grade. However, the contractor shall maintain positive drainage in all pavement areas and along all curbs. All curbs shall be built in accordance to the plan. Curbs or pavement areas which do not provide proper drainage must be removed and replaced at the contractor's expense.
13. Spot elevations represent flow line or top of asphalt unless otherwise noted.
14. The contractor is responsible for providing his own estimate of earthwork quantities.
15. All landscaped islands shall have a crown of topsoil prior to landscaping. Refer to landscape plan for specifications.
16. Where new curb and gutter is being constructed adjacent to existing asphalt or concrete pavement, the following shall apply: Prior to placement of any concrete, the contractor shall have a licensed surveyor verify the grade and cross slope of the curb and gutter forms. The contractor shall submit the slopes and grades to the engineer immediately of any section which does not conform to the design or typical cross section. The contractor shall be solely responsible for curb and gutter pours without the approval of the engineer.
17. The earthwork for all building foundations and slabs shall be in accordance with architectural building plans and specifications.
18. Pre-cast structures may be used at contractor's option.
19. Existing drainage structures to be inspected and repaired as needed, and existing pipes to be cleaned out to remove dirt and debris.
20. Existing grade contour intervals shown at 1 foot intervals unless otherwise noted on the plan.
21. Proposed grade contour intervals shown at 1 foot intervals unless otherwise noted on the plan.
22. If any existing structures to remain are damaged during construction, it shall be the contractor's responsibility to repair and/or replace the existing structure as necessary to return it to existing conditions or better.
23. The contractor shall adhere to all terms & conditions as outlined in the general permit for storm water discharge associated with construction activities.
24. Contractor shall adjust and/or cut existing pavement as necessary to assure a smooth fit and continuous grade.
25. Contractor shall assure positive drainage away from buildings for all natural and paved areas.
26. Topographical information taken from a topographic survey by (Dudley & Associates). If contractor does not accept existing topography as shown on the plans, without exception, he shall have made, at his expense, a topographic survey by a registered land surveyor and submit it to the owner for review.
27. All unsurfaced areas disturbed by grading operation shall receive 4 inches of topsoil. Contractor shall apply stabilization fabric to all slopes 3H:1V or steeper. Contractor shall place sod or hydroseed to disturbed areas in accordance with city/county specifications and maintain until a healthy stand of grass is obtained.
28. Construction shall comply with all applicable governing codes and be constructed to same.
29. Contractor is responsible for verifying all utilities and notifying the appropriate utility company prior to beginning construction.
30. Site work shall meet or exceed site specifications.
31. All concrete to have a minimum 28 day compression strength of 4000 PSI.
32. All drainage from the subject site is to be contained on-site. No water shall be allowed to flow onto adjacent properties without drainage easements in place.
33. The Landscape contractor is to refer to the grading and drainage plan for the placement of drainage swales and LID facilities and ensure the design is maintained.

#### GENERAL NOTES

1. All materials, workmanship, and construction of site improvements shall meet or exceed specifications set forth in the City Public Works Department, Regulations and applicable state and federal regulations (including ADA guidelines). Where there is a conflict between these plans and the specifications, or any applicable standards, the higher quality standard shall apply. All work with public R.O.W. or easements shall be inspected and approved by the City Public Works Inspector and/or UDOT where applicable. Inspection services and construction certification to be provided by engineer of record.
2. The contractor is specifically cautioned that the location and/or elevation of existing utilities, as shown on these plans, is based on records of the various utility companies and where possible, measurements taken in the field, the information is not to be relied upon as being exact or complete. The contractor must call the local utility location center at least 48 hours before any excavation to request exact field locations of the utilities. Prior to construction, the contractor shall verify pertinent locations and elevations, especially at the connection points and at potential utility conflicts. It shall be the responsibility of the contractor to relocate all existing utilities that conflict with the proposed improvements shown on these plans.
3. The contractor shall be responsible for obtaining all necessary permits from all applicable agencies. The contractor shall notify the City Public Works Inspector at least 48 hours prior to the start of any earth disturbing activity, or construction on any and all public improvements.
4. The contractor shall coordinate with City and all utility companies involved with regard to relocations or adjustments of existing utilities during construction and to assure that the work is accomplished in a timely fashion and with a minimum disruption of service. The contractor shall be responsible for contacting all parties affected by any disruption of any utility service.
5. The contractor shall have one (1) signed copy of the approved plans, one (1) copy of the appropriated standards and specifications, and a copy of any permits and extension agreements needed for the job, on-site at all times.
6. The contractor shall be responsible for all aspects of safety including, but not limited to, excavation, trenching, shoring, traffic control and security.
7. If during the construction process, conditions are encountered by the contractor, his subcontractors, or other affected parties which could indicate a situation that is not identified in the plans or specifications, the contractor shall contact the engineer immediately.
8. All references to any published standards shall refer to the latest revision of said standard, unless specifically stated otherwise.
9. The contractor shall submit a traffic control plan in accordance with the manual on uniform traffic control devices to the appropriate right-of-way authority (city, county or state) for approval, prior to any construction activities within, or affecting the right-of-way. The contractor shall be responsible for providing any and all traffic control devices as may be required by the construction activities.
10. The contractor is responsible for providing all labor and materials necessary for the completion of the intended improvements shown on these drawings or designated to be provided, installed, constructed, removed and relocated unless specifically noted otherwise.
11. The contractor shall be responsible for keeping roadways free and clear of all construction debris and dirt tracked from the site.
12. The contractor shall be responsible for recording as-built information on a set of record drawings kept at the construction site, and available to the City Public Works Inspector at all times.
13. Dimensions for layout and construction are not to be scaled from any drawing. If pertinent dimensions are not shown, contact the consultant engineer for clarification and annotate the dimension on the as-built record drawings.
14. All structural erosion control measures shall be installed, at the limits of construction, prior to any other ground-disturbing activity. All erosion control measures shall be maintained in good repair by the contractor, until such time as the entire disturbed areas are stabilized with hard surface or landscaping.
15. The contractor shall sequence installation of utilities in such a manner as to minimize potential utility conflicts, in general, storm sewer and sanitary sewer should be constructed prior to installation of water lines and dry utilities.
16. All work within the public right-of-way is subject to the jurisdiction of the City Engineering Department Standard Details Specifications and Utah Department of Transportation Standard Details and Specifications.
17. The contractor shall submit a phasing plan for all work in all public roads and R.O.W.'s to the City before beginning any work on these streets. Contractor shall begin work only after City approves the phasing plan, and a preconstruction meeting is held between the city, the engineer and the contractor.
18. All operations conducted on the premises, including the warming up, repair, arrival, departure, or running of trucks, earthmoving equipment, construction equipment and any other associated equipment shall be limited to the period between 7:00 a.m. and 10:00 p.m. everyday, unless otherwise approved by the city.
19. It is the responsibility of the contractor to coordinate all utility relocations consistent with the contractor's schedule for this project. Whether shown or not shown as it relates to the construction activities contemplated in these plans.
20. Contractor shall be responsible for obtaining all temporary power and water to the site, paying all fees excluding top fees and system development fees, referring to the geotechnical report prepared by (EarthTec Testing and Engineering P.C.)
21. In general, limits of site work are up to (and excluding) constructing sidewalks.





KEYED NOTES:

NEW 4" sewer lateral with cleanout stubbed 10' beyond the back of sidewalk. (City Standard # SS-01)

NEW 1" water service lateral with 1" water meter stubbed 10' beyond the back of sidewalk. (City Standard # DW-01).

NEW Fire Hydrant assembly. (City Standard # DW-03)

Double irrigation lateral with boxes, stubbed 3' beyond the back of sidewalk. (City Standard # PI-01)

Single irrigation lateral with box, stubbed 3' beyond the back of sidewalk. (City Standard # PI-02)

Proposed Residential street light (PER CITY STANDARDS).

ADA RAMP (PER CITY STANDARDS)

STREET/YIELD SIGN/STOP SIGN (PER CITY STANDARDS)

Secondary Water Main blow-off valve. (PER CITY STANDARDS)

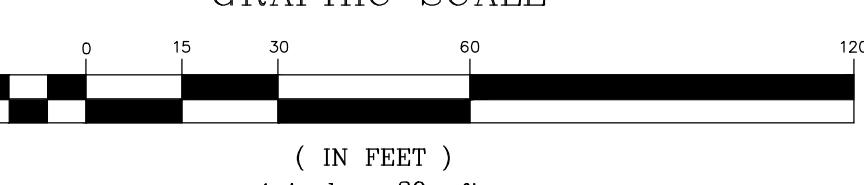
bury water mains less than 12" in diameter are to be C350

secondary water main are to be C900 PVC Pipe.

Information from plans and markings has been combined with field evidence of existing utilities to develop a view of those underground utilities. However lacking excavation, Blue Staking, etc. the location of underground features cannot be accurately, safely and reliably depicted. Where additional or more detailed information is required, the client is advised that excavation may be necessary.

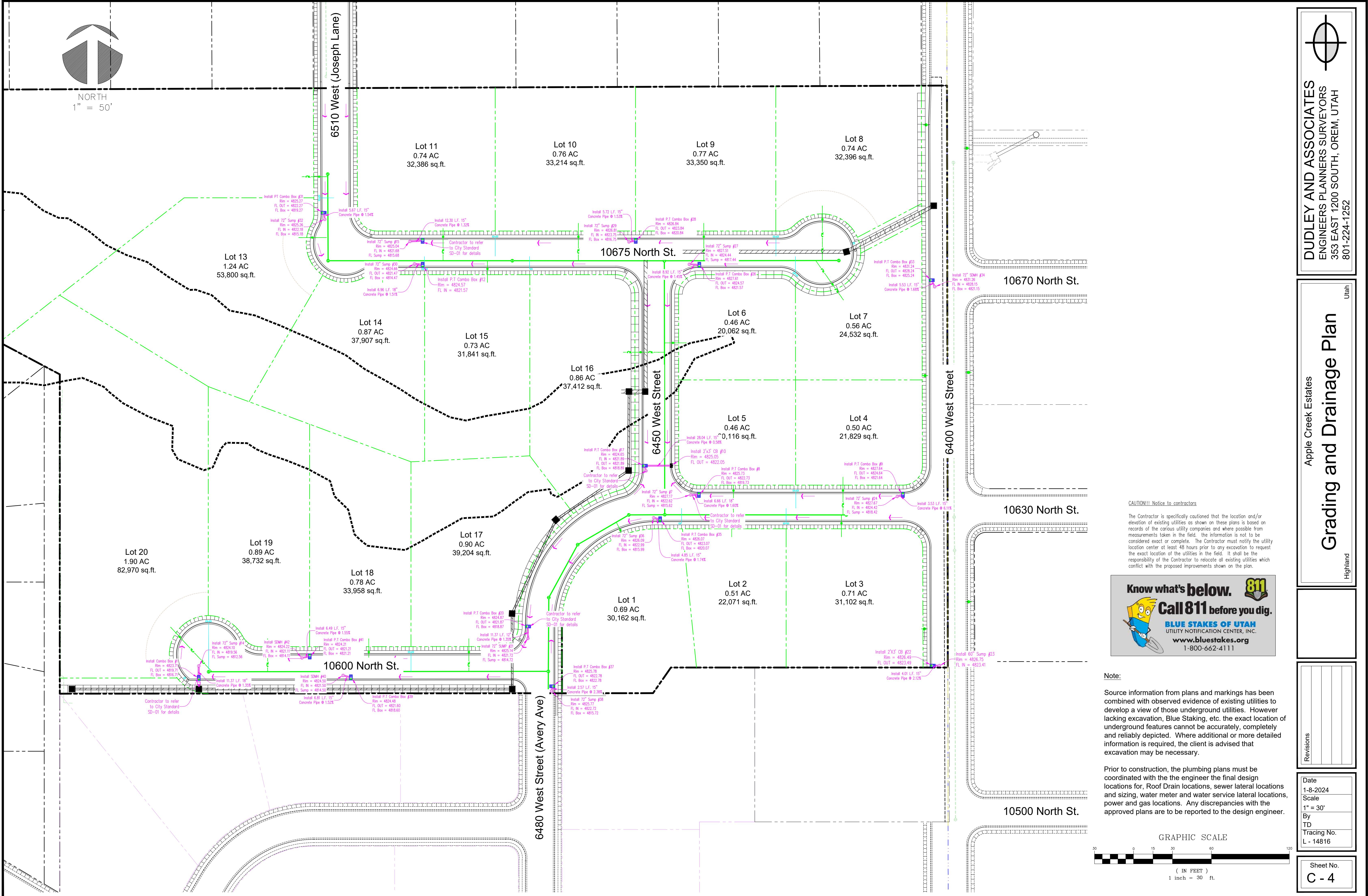
construction, the contractor is to coordinate the utility size, and condition for connection. Any discrepancies are reported to the design engineer.

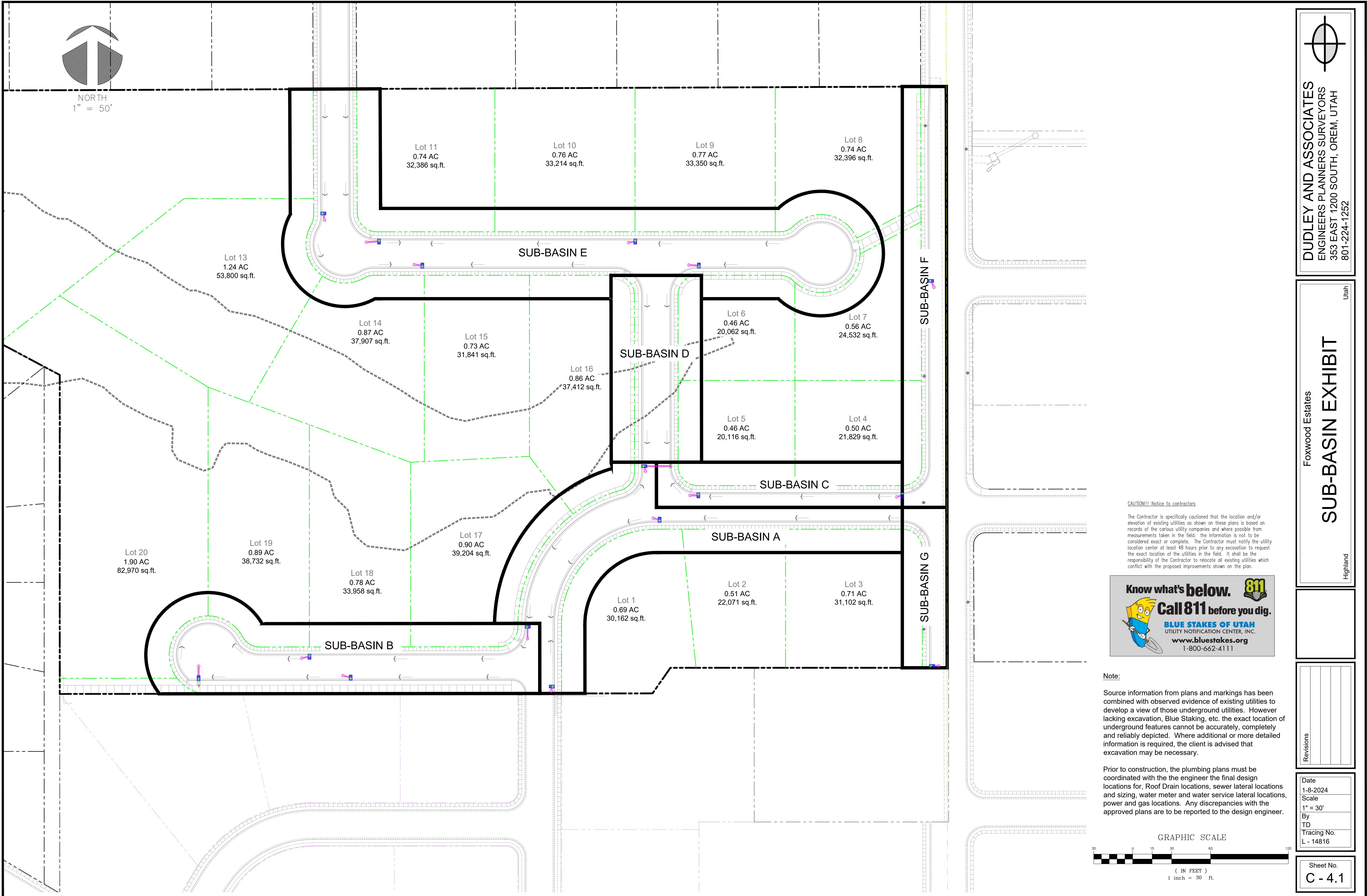
### GRAPHIC SCALE

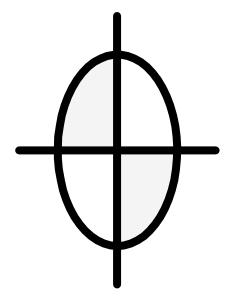


tractor is specifically cautioned that the location and/or of existing utilities as shown on these plans is based on of the carious utility companies and where possible from ments taken in the field. the information is not to be ed exact or complete. The Contractor must notify the utility center at least 48 hours prior to any excavation to request exact location of the utilities in the field. It shall be the ability of the Contractor to relocate all existing utilities which with the proposed improvements shown on the plan.









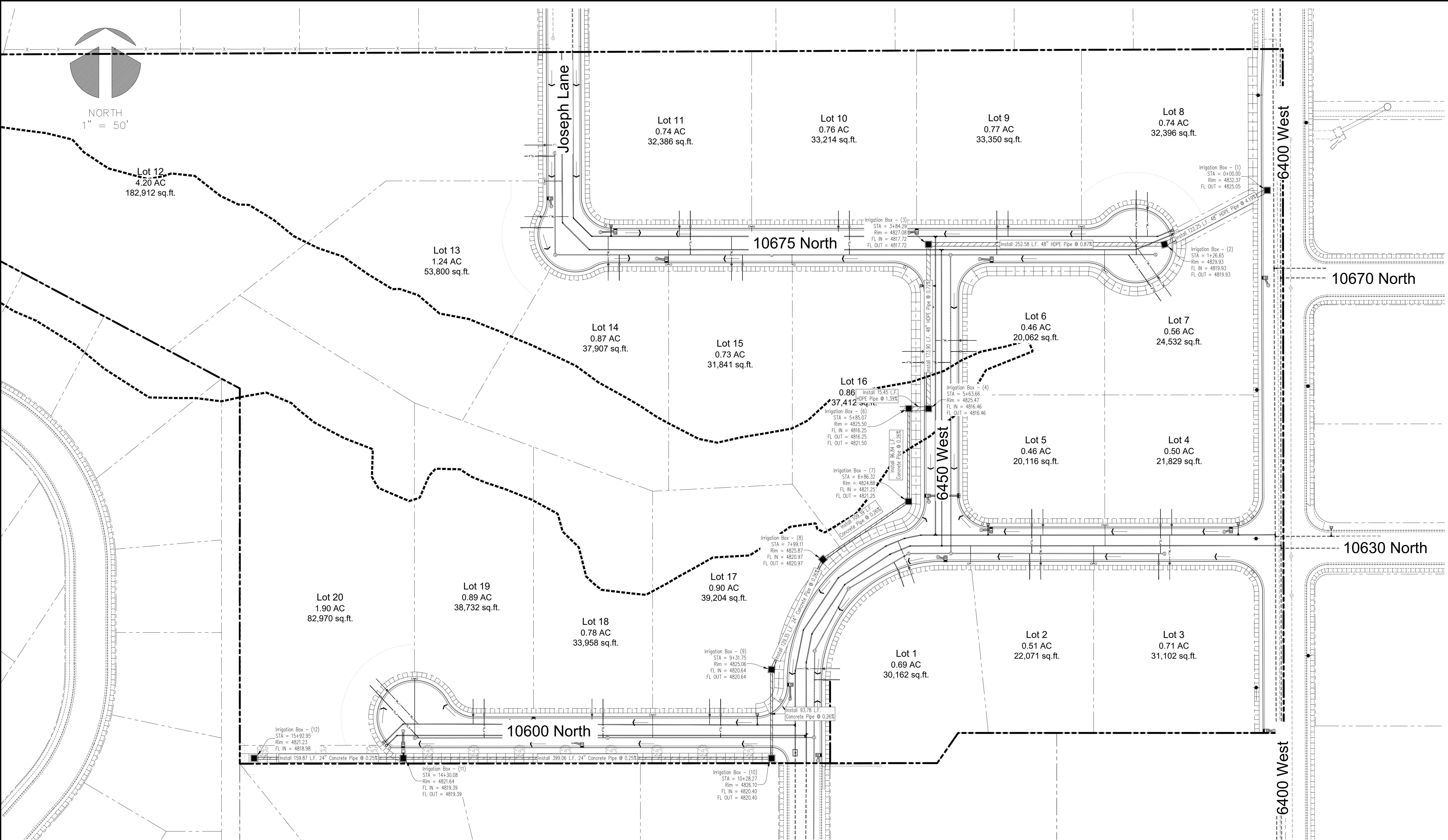
**DUDLEY AND ASSOCIATES**  
ENGINEERS PLANNERS SURVEYORS  
353 EAST 1200 SOUTH, OREM, UTAH  
801-224-1252

**IRRIGATION PIPE PLAN**

Highland

Foxwood Estates

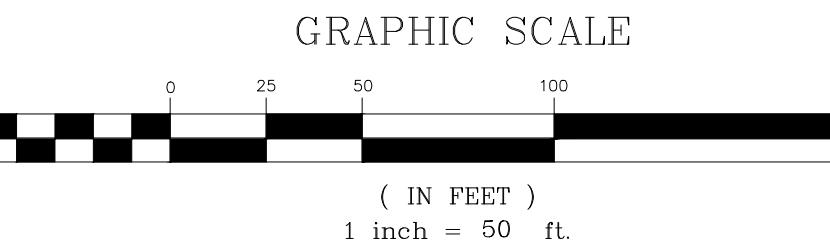
Utah



**Note:**

Source information from plans and markings has been combined with observed evidence of existing utilities to develop a view of those underground utilities. However lacking excavation, Blue Staking, etc. the exact location of underground features cannot be accurately, completely and reliably depicted. Where additional or more detailed information is required, the client is advised that excavation may be necessary.

Prior to construction, the plumbing plans must be coordinated with the engineer the final design locations for, Roof Drain locations, sewer lateral locations and sizing, water meter and water service lateral locations, power and gas locations. Any discrepancies with the approved plans are to be reported to the design engineer.

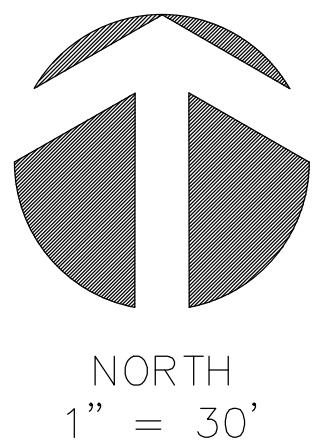


CAUTION!!! Notice to contractors

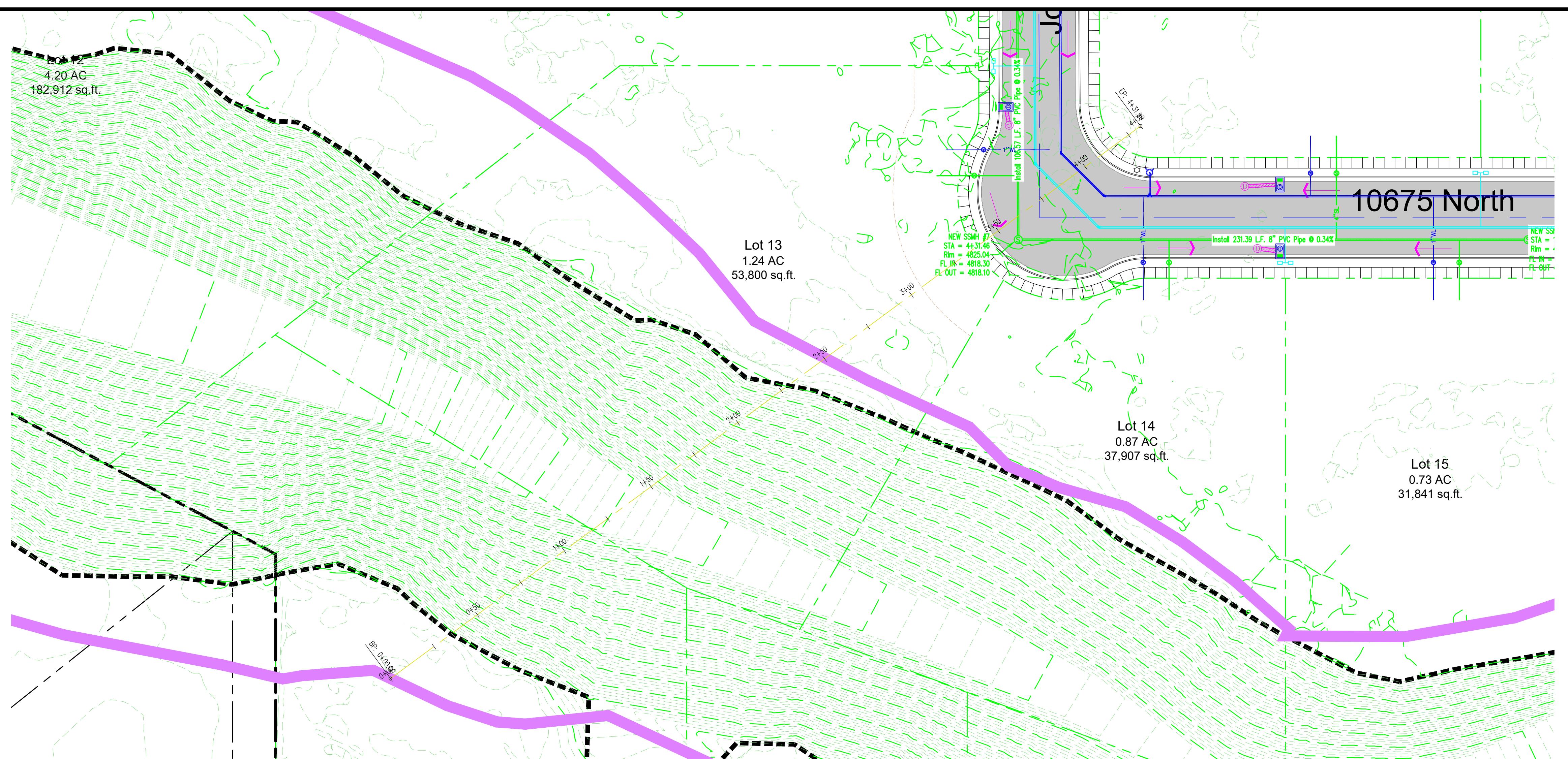
The Contractor is specifically cautioned that the location and/or elevation of existing utilities shown on these plans is based on records of the various utility companies and where possible from measurements taken in the field, the information used to be considered exact or complete. The Contractor must notify the utility location center at least 48 hours prior to any excavation to request the exact location of the utilities in the field. It shall be the responsibility of the Contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plan.

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1-5-2024  
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Sheet No.  
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NORTH  
1" = 30'



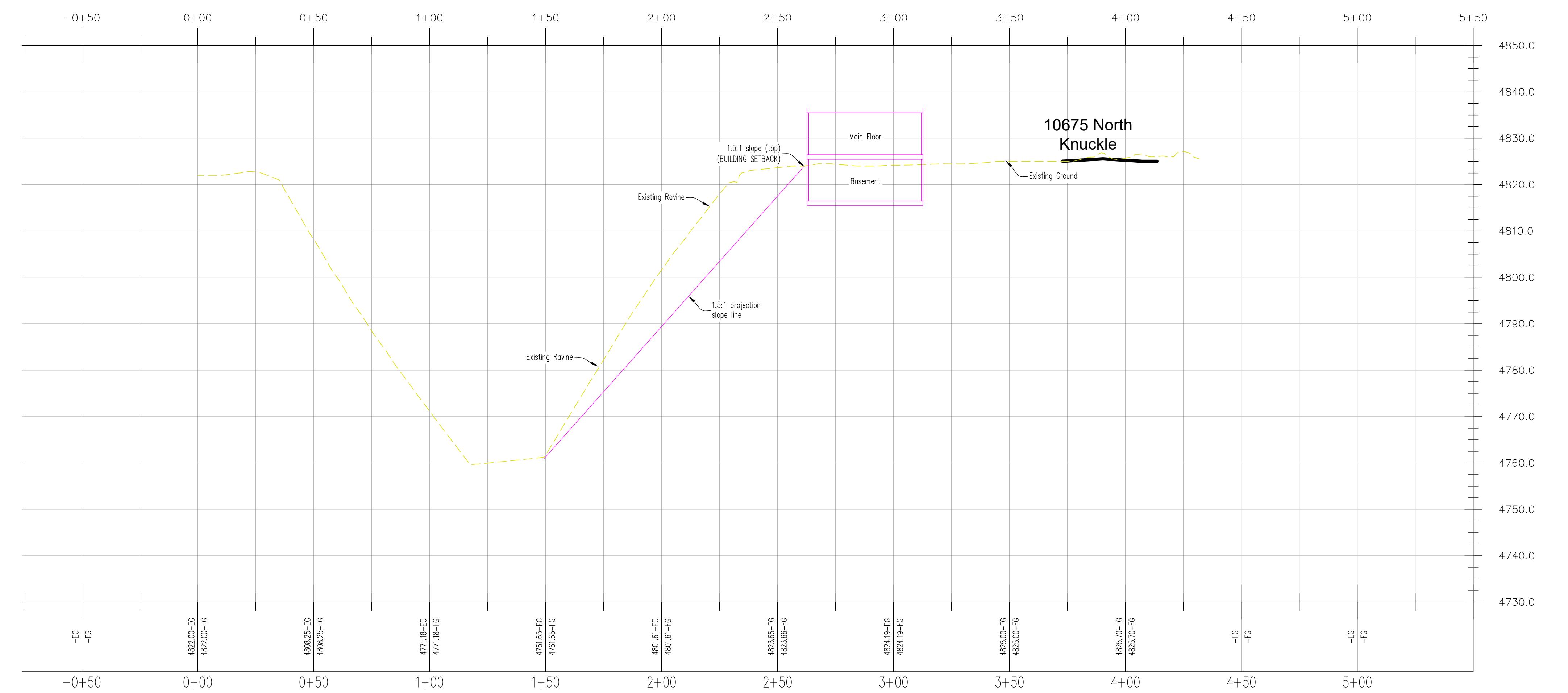
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353 EAST 1200 SOUTH, OREM, UTAH  
801-224-1252

**FOXWOOD Estates - Lot 13**

Utah

Cross Section

Highland



GRAPHIC SCALE  
( IN FEET )  
1 inch = 30 ft

CAUTION!! Notice to contractors

The Contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies and where possible from measurements taken in the field. The information is not to be considered exact or complete. The Contractor must notify the utility location center at least 48 hours prior to any excavation to request the exact location of the utilities in the field. It shall be the responsibility of the Contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plan.

**Know what's below. 811**  
Call 811 before you dig.  
BLUE STAKES OF UTAH  
UTILITY NOTIFICATION CENTER, INC.  
[www.bluestakes.org](http://www.bluestakes.org)  
1-800-662-4111

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5400 West Civic Center Drive ~ Suite 1  
Highland, UT 84003  
Phone 772-4515 Fax 756-6903  
Planning and Zoning/Public Works

## Memorandum

**To:** Planning Commission

**From:** Jay Baughman, Zoning Administrator  
Andy Spencer, Public Works Director/City Engineer

**Date:** 1/17/2024

**Subject:** Foxwood Estates Sensitive Lands Issues

**Finding:**

Foxwood Estates meets the qualifications for sensitive lands per City code 8-104 due to the natural wash that traverses the property.

**Supporting Data:**

Per a slope analysis (attached) provided by the applicant, the property contains slopes as steep as 50%. A 50% slope is one foot vertical for every two feet horizontal.

**Code Requirement:**

Per 8-105.2, the development plan must incorporate a 50-foot slope setback from the slopes as identified within the wash and comply with slope disturbance and grading regulations.

**Applicant Request:**

Applicant has requested that the Planning Commission, acting as the land use authority for the R1-40 zone, make a finding that their proposal and plan "mitigate the impacts of development activity on the sensitive lands" (HCC 8-104 4.b); thereby modifying the 50-foot slope setback required by the ordinance. The applicant has provided a geotechnical report indicating that the native soils can be considered stable if the loading is placed further from the slope than a 1-foot vertical for every 1 ½-foot horizontal slope (66.7% slope).

Applicant proposes to fill the easterly portion of the wash. It has been represented by the applicant that the wash in these areas is limited to less than 8-foot of fill.

**Staff Evaluation:**

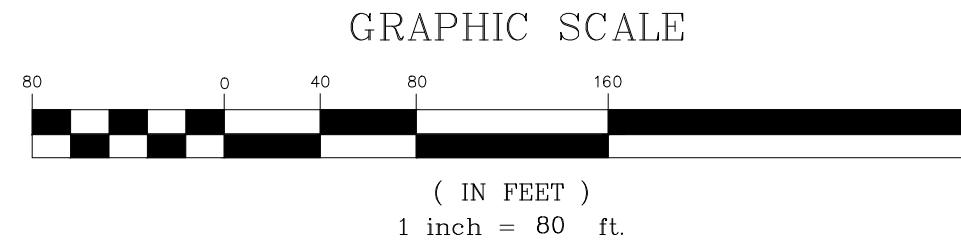
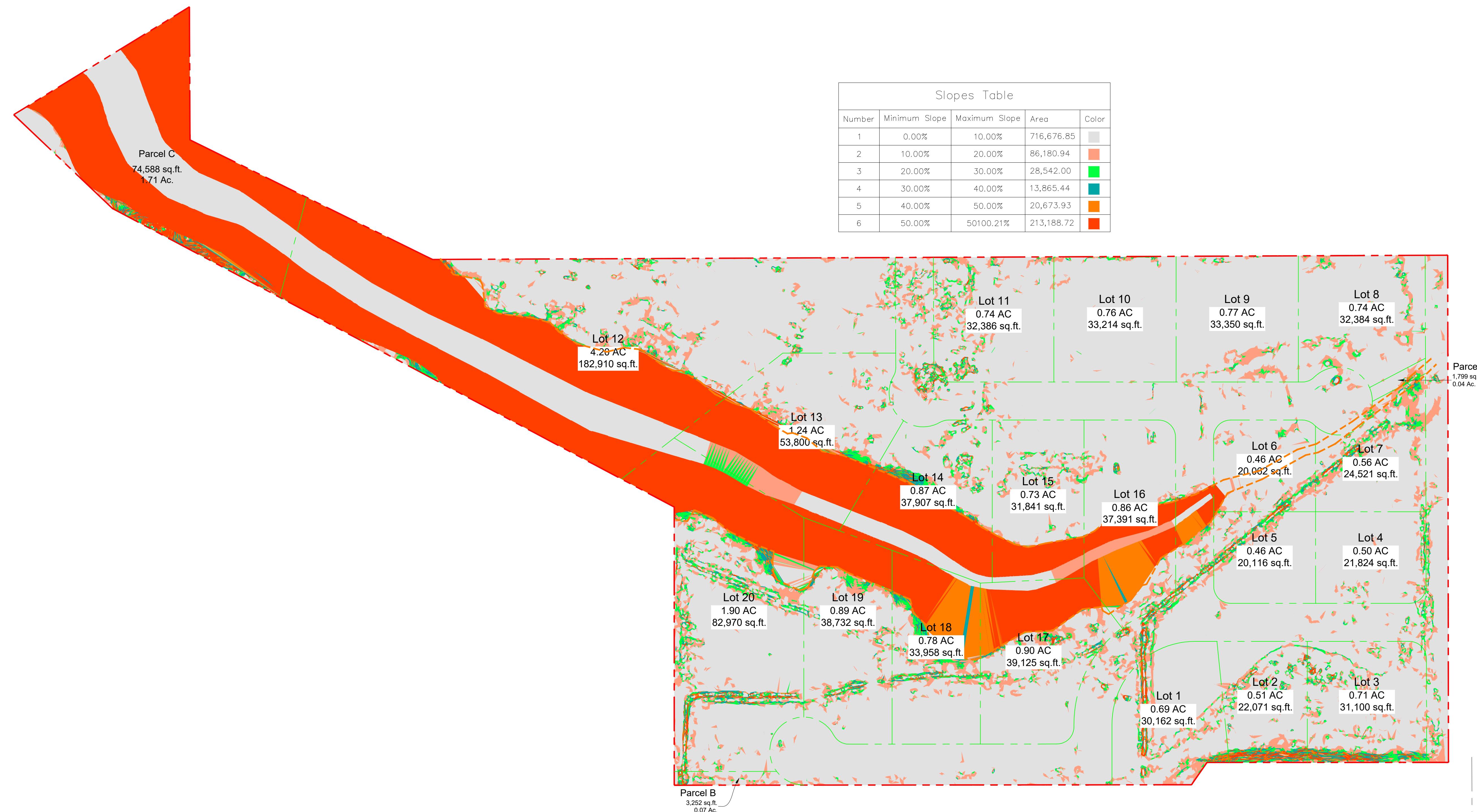
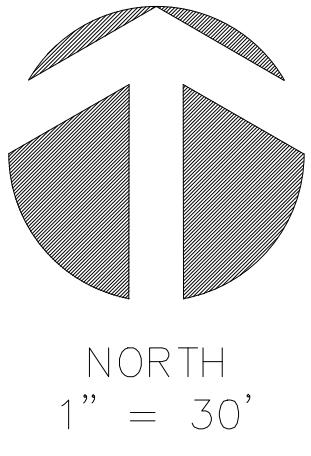
The applicant has offered as evidence of the slope stability, the number of homes that have been built on the south side of the wash in the Canterbury subdivision. Based upon the geotechnical engineers' findings, staff does not oppose the applicants request, provided the suggested stipulations be incorporated into the requirements for approval and into the final subdivision

construction plans and home construction. The data provided by the applicant, including a drainage report (Roger Dudley PE, October 2023), geotechnical engineering study that contained a soil investigation report (CMT Technical Services, November 28, 2023), and a slope analysis (Dudley and Associates, November 8, 2023), and the mitigation and impact reduction efforts proposed by the applicant appear to satisfy the 6 conditions necessary to grant a variance to the slope setback per HCC 8-105(2)(a) - (f).

The proposed fill of the wash complies with City sensitive lands regulations provided the applicant provides verification for the maximum lot fill of 8-feet.

**Suggested Stipulations:**

- A supplemental geotechnical report be provided in which the geotechnical engineer of record includes in the report the final cross-section and recommended slope setback for each lot that will allow construction adjacent to the wash or channel that is within the property. The geotechnical engineer's memo shall concur in writing with the representations and findings of the civil set and platted lot restrictions.
- The lot specific slope setback restrictions shall be established as if the soil loading occurs at the surface elevation of the lot.
- A grading plan shall be provided that stipulates the finished lot elevation adjacent to the wash/channel. The finished elevations of these areas shall be included on the recorded plat.
- A note shall be added to the recorded plat that prohibits structures of any kind within the slope setback area.
- The recorded plat shall clearly annotate all buildable areas.
- The recorded plat shall indicate that the owners of lots along or adjacent to the wash/channel shall be prohibited from defoliating the natural vegetative material for slope stability purposes.
- Vegetation, drainage provisions, and provisions associated and limiting water on the slopes as indicated in the geotechnical report will be mandated and noted on the recorded subdivision plat.
- A site-specific evaluation of each lot adjacent to the wash at the time of building footing excavation and footing preparation shall be completed by the geotechnical engineer of record.
- The geotechnical engineer of record shall certify the fill placed in the wash/channel within lots 5, 6, 7, 8, 16, and the public roadway corridor. A note be added to the recorded plat indicating to owners of those lots that portions of the lot contain a filled natural wash area.
- Applicant shall provide grading validation (cross-sections) of the wash in the lots which are filled to ensure that fill is less than 8-foot as limited in the sensitive land ordinance. (HCC 8-107 1.)
- All provisions of the sensitive land ordinance shall be met in final submittals prior to final plat approval, recording, or construction.
- The final, approved geotechnical report and any supplementals shall be recorded at the office of the Utah County Recorder, and the recording information provided on the recorded subdivision plat to ensure that its findings can be located for lot construction and future reference.
- So long as other recommended stipulations are followed, 50' Slope setback may be reduced to 1.5/1 slope daylight, 12' buildable limit from top of slope, or 15' to the outermost edge of the footings, whichever is more restrictive.



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353 EAST 1200 SOUTH, OREM, UTAH  
801-224-1252

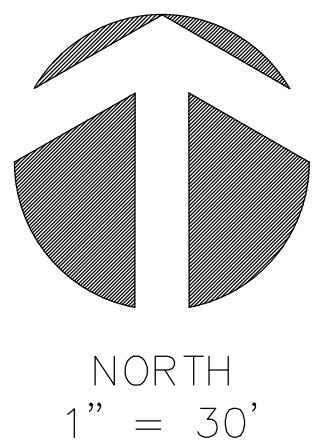
**SLOPE ANALYSIS**

FOXWOOD ESTATES

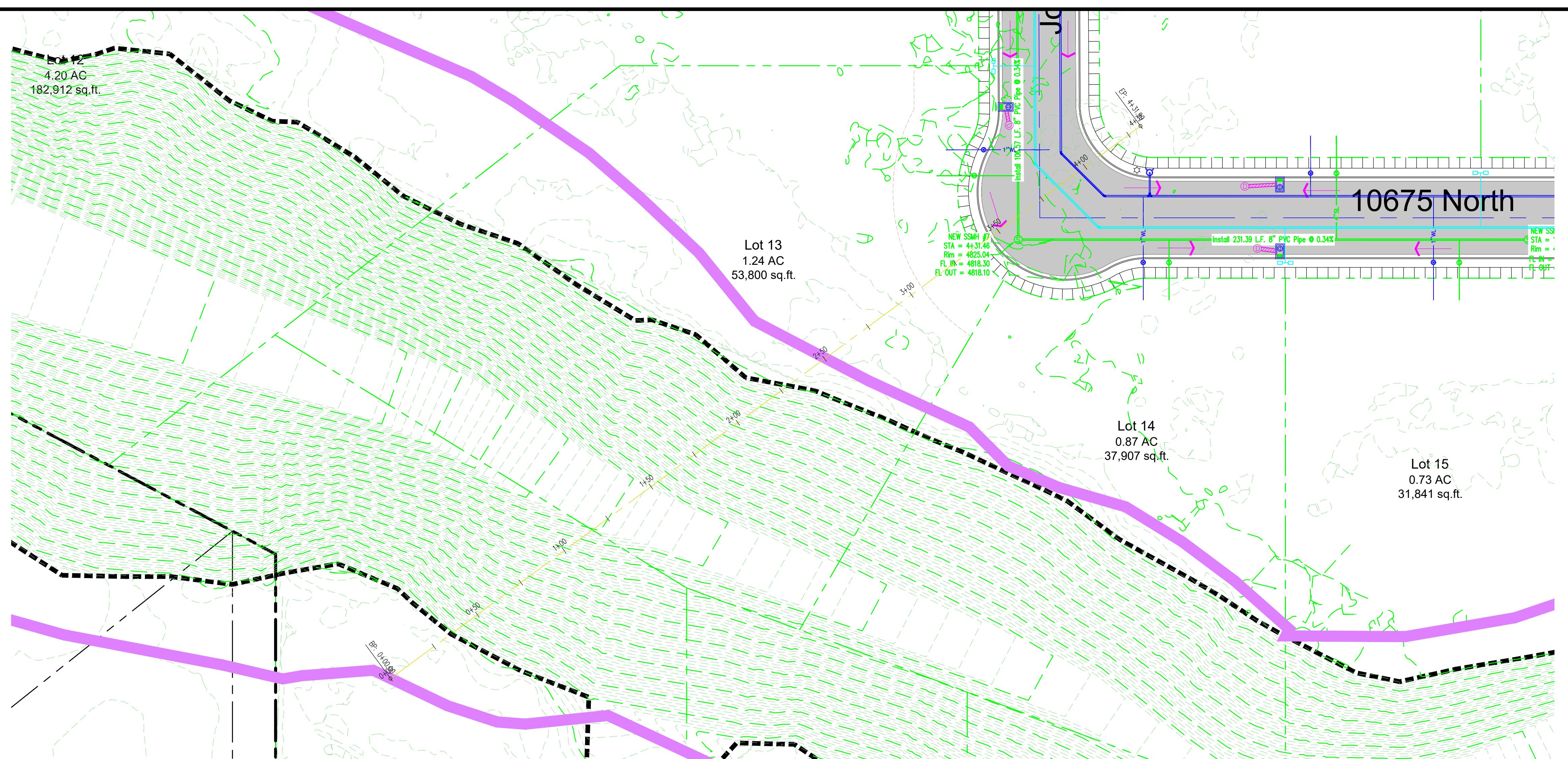
HIGHLAND

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SL - 1



NORTH  
1" = 30'



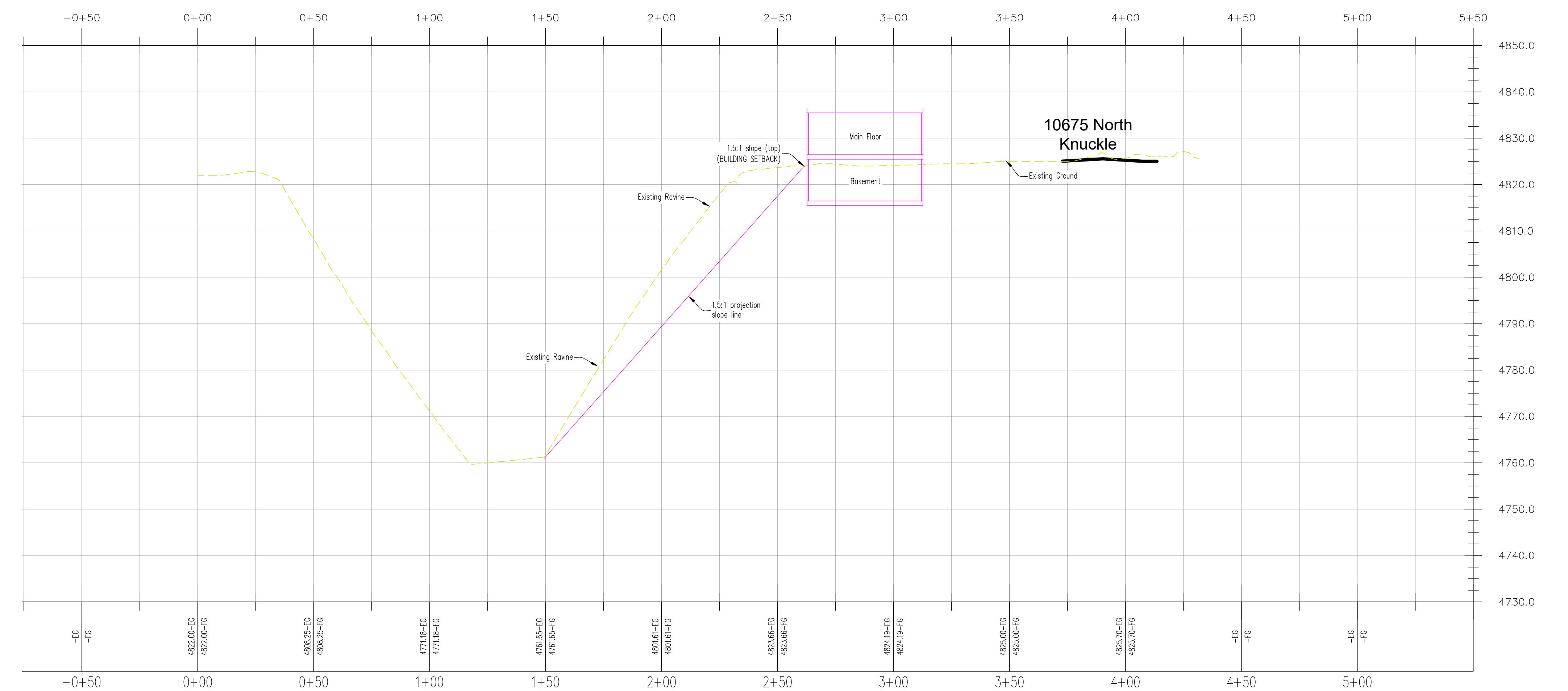
DUDLEY AND ASSOCIATES  
ENGINEERS PLANNERS SURVEYORS  
353 EAST 1200 SOUTH, OREM, UTAH  
801-224-1252

**FOXWOOD Estates - Lot 13**

Utah

Cross Section

Highland



GRAPHIC SCALE  
( IN FEET )  
1 inch = 30 ft.

CAUTION!! Notice to contractors

The Contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies and where possible from measurements taken in the field. The information is not to be considered exact or complete. The Contractor must notify the utility location center at least 48 hours prior to any excavation to request the exact location of the utilities in the field. It shall be the responsibility of the Contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plan.

**Know what's below. 811**  
Call 811 before you dig.  
BLUE STAKES OF UTAH  
UTILITY NOTIFICATION CENTER, INC.  
[www.bluestakes.org](http://www.bluestakes.org)  
1-800-662-4111

Date  
1-9-2024  
Scale  
1" = 20'  
By  
TD  
Tracing No.  
L -

Sheet No.  
**P - 1**



**REVIEW COMMENTS  
FOXWOOD ESTATES – 1ST PRELIM REVIEW  
21-DEC-2023  
RESPONSES 1-5-2024**

**General:**

1. The plan set we received is still named Apple Creek Estates. Please include the new name on future plan sets.  
**Response: This has been addressed and all titles show Foxwood Estates.**
2. Some of the notes on the plan set are hard to read. Please adjust pen table so all notes plot correctly.  
**Response: This has been addressed and notes are more legible.**

**Preliminary Plat/Lots:**

3. Frontages are unclear in lots 8 and 13, making it difficult to determine compliance with HDC 3-4103 130' frontage requirement. Confirm that Lot 20 has 130' frontage at front setback line.  
**Response: Frontage is on Lots 8,13 and 20 is shown and complies with the city code.**
4. Correct the alignment of Parcel A and B to the Highland City Sewer line and Lehi City water line easement(s) where they cross the hollow.  
**Response: This has been changed to follow the existing sewer line. Highland City will own the property with the sewer line.**

**Preliminary Plat/Trail:**

5. Preliminary landscaping/hardscaping proposal and plans for trail required, with dimensions.  
**Response: This has been provided. It is proposed to have hardscape along the trail. We have added trees every 50' O.C. along 10600 North Street.**
6. Replacement of 5' sidewalk required by street cross-section with 10' trail is fine, but park strip is still required. Trail width must be in addition to normal



sidewalk/park strip requirement, so trail areas require both 10' trail and 4' park strip.

**Response:** This has been provided. Along 10600 North, a 6' park strip has been shown with trees to give the property owners south of the road more of a buffer.

7. For trail adjacent to Horseshoe Bend "A", a 6' high theme wall along property boundary is required per HDC 3-612(4). Altogether, the trail adjacent to Horseshoe Bend requires a 10' trail, 4' park strip, and theme wall width. City is open to alternative designs or proposals that consolidate and reduce trail, park strip, and buffer width requirements (ex. Vegetation/hedge screening) if the proposal meets buffer requirements and provides better trail and irrigation easement design and use.

**Response:** The property owners in Horseshoe Bend already have fences. The existing fences/walls will remain if they meet code for a 6" theme wall. The developer will coordinate with the adjacent property owners, if not, and replace the existing fence.

### **Ditch**

8. UCA 73-1-15.5. Ditch proposed to be piped/relocated. Applicant to obtain ditch owner's approval of all modifications in writing per state code.

**Response:** This process and coordination has been started and we will get approval through Lehi Irrigation Company. The irrigation company has given us direction on how to pipe the ditches.

### **Sensitive Lands/Slopes:**

9. HDC 8-105(1)(a). No development (homes/accessory structures/etc.) permitted on slopes greater than 25%. No variance is permitted from this requirement. City will require plat note/recordation reflecting this limitation with final plat.

**Response:** A NOTE HAS BEEN ADDED TO THE PLANS.

10. HDC 8-105(2) No development (homes/accessory structures/etc.) permitted within slope setback area (50' map distance from slopes greater than 40%). Slope analysis indicates lots 13-20 are subject to slope setback for entirety of rear of



## HIGHLAND CITY

lots, and lots 5-6 have minor impacts from slope setbacks. Slope setback areas are not marked on plat/plans. Per HDC 5-8-104, lots created must be developable and capable of being built on. Please delineate 50' slope setback from 40%+ slopes for lots 5-6 and lots 13-20 to ensure lots are developable with slope setback in addition to typical lot setbacks. If a variance to the slope setback is requested, please comply with comment 11.

**Response:** We are asking for an exemption from this requirement based on the recommendations found in the geotechnical report. The geotechnical engineer has shown that all structures should be set outside of a 1.5H:1V slope from the ravine. We have shown this buildable area on the plans.

We would also like to point out the existing homes that currently are built well within this requirement and have not had any issues. The homes along Canterbury Drive do not meet City Code and have been there over 20 years.

11. HDC 8-105(2) Planning Commission may approve variance and reduction of 50' slope setback if applicant satisfies 6 conditions. Applicant must designate areas in which all construction activity must be contained as limits of disturbance for each building, site, lot, or parcel. If variance and reduction of 50' slope setback is being requested for any lot, please document request by providing statement/narrative requesting variance and explaining justification for variance addressing 6 conditions under City code, proposed limits of disturbance on plat for each lot, and cross-section of slope for each lot on which variance is sought demonstrating proposed slope and adjusted setback.

**Response:** See the attached narrative **“Slope Setback Reduction Request”** at the end of this response sheet (pages 9-10).

12. HDC 8-105(7). Land being exposed/ altered requires revegetation and quality topsoil retained and reused. CMT Geotech report indicates top layer of soil may be required to be removed. Please address topsoil retention and possibility of reuse as part of revegetation. May be addressed with landscaping/revegetation plan described below.



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**Response:** All construction activities will be away from the slope. The existing slope and vegetation within the ravine will remain in its natural state. During construction a silt fence will be installed all the way along the top of the ravine to protect it from erosion. These silt fences will not be removed until landscaping is complete. A note will be added to the construction plans that if any slope is disturbed, it will be revegetated per the geotechnical recommendations.

13.10. HDC 8-105(7), plat application. Preliminary landscaping/revegetation plan for altered slopes is required. Final revegetation plan may be deferred to final plat stage, after slope setbacks and slope alteration plans are settled. Please provide a preliminary landscaping/revegetation plan for slopes.

**Response:** All construction activities will be away from the slope. The existing slope and vegetation within the ravine will remain in its natural state. During construction a silt fence will be installed all the way along the top of the ravine to protect it from erosion. These silt fences will not be removed until landscaping is complete. A note will be added to the construction plans that if any slope is disturbed, it will be revegetated per the geotechnical recommendations.

14. City will require plat note requiring conformance to recommendations of geotech report, as may be supplemented/amended per these comments, and recordation of report.

**Response:** Note will be placed on the Final Plat.

### **Drainage Report:**

15. City design standards require that sumps, open channels, flood hazards and points of discharge shall be sized for the 100-year storm event. Please make corrections to the drainage calculations and report.

**Response:** This has been updated.

16. City design standards require the design infiltration rate be equal to the observed infiltration rate to be divided by 4. Please make corrections to the drainage calculations and report.



## HIGHLAND CITY

**Response:** The infiltration rate is 3.75 min/in, as shown in the soils report. With a factor of 4, the infiltration rate used in the calculations is 15 min/in.

17. 10600 North grades toward the west. Any cul-de-sac grading to the bulb has typically not been allowed in Highland due to flooding risk. However, the City has accepted this situation if a dedication/ROW is provided to the city with a flow path to an adjacent drainage or ROW. It appears the best option would be a drainage path between Lots 19 & 20 if this scenario is identified as an alternative to revising the grading of the street. Additional coordination with the City will be required. The City Engineer must give approval.

**Response:** In large storm event where the sumps are overwhelmed and the storm water in the cul-de-sac tops the curb, we have proposed an overflow box with grate leading to the irrigation pipe. This will allow for a discharge point that will protect the homes from flooding. We have proposed this to the irrigation company and will provide documentation from the irrigation company at final.

18. Please provide calculations to show how and where all drainage is going, including to the wash. Lots that do not have access to the wash must drain to the right of way, with their respective areas included in the calculations.

**Response:** The fronts of yards have been included in the drainage calculation with driveways sloping to the road. The percolation rates in this area are high enough that back yards will retain water onsite and percolate into the ground. This is historically what has happened in Highland and what is being proposed. Lots will retain their own water.

### **Geotechnical Investigation**

19. It is noted that test pits encountered refusal from 7 to 7.5 feet. Please provide additional information of the 'refusal' encountered. This will need to be understood when constructing home footings and foundations. If this is some type of hardened layer of soil/rock that is impervious, the drainage report may need to be revised. Provide additional information on the soil material found. It



## HIGHLAND CITY

may be necessary to provide test pits with larger excavating equipment to depths where basements and sump floors will be found.

**Response: See Geotechnical Engineer response:**

The “refusal” encountered in 6 of the 8 test pits at 7 to 7.5 ft depths was within naturally dense to very dense sandy/gravelly soils with cobbles. We used a small excavator to dig the test pits and when such conditions are encountered, it becomes difficult to dig deeper without creating a much wider test pit (which we try to avoid if possible). A larger backhoe probably could have excavated deeper, but we don’t know that going in. In any case, we know we have good soils at and a little below those refusal depths. Let me know if you have any questions. Thanks,  
Bill

**Bill Turner, P.E.**  
Senior Geotechnical Engineer | Utah County Manager  
*Geotechnical Division*



**E** [Bill.Turner@cmttechnicalservices.com](mailto:Bill.Turner@cmttechnicalservices.com)  
**M** 801.870.6731  
**W** [www.cmttechnicalservices.com](http://www.cmttechnicalservices.com)

**CONFIDENTIALITY NOTE:**

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20. It is also noted that collapsible soils were found on the small site. Please incorporate the requirements of the investigation into road construction and overall construction.

**Response:** This is typical for the area. The home excavations will be well below these soils. The road construction requirements will be addressed with plan and profiles in construction drawings. All road construction will follow Highland Standards and follow the Engineer’s recommendations.

21. Section 11 provides for a pavement section that is more conservative than the City’s standard. Coordination between the City standard and investigation recommendations will be required for final civil design.

**Response:** We will provide a pavement section that is adequate for the site, even if it is more conservative than the city standard. Will coordinate this at construction drawing phase.



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## **Utility Plan**

22. Within the City's Master Planning for Drinking Water, Pressure Reducing Valves (PRVs) have been identified. At the south location between the new development and Avery Road a PRV is planned. Provide a PRV station at this location. It may be necessary to revise locations of utilities. It is the City's intent to reimburse the Developer for the cost of the PRV. The PRV mechanical and vault design details will be provided by the City for incorporation in the final plans.

**Response:** A PRV location has been shown. Further details will be provided with final construction documents.

23. At the point of connection for the drinking water and pressurized irrigation line in Avery Road the existing gate valves for the line running from 6800 West will require abandonment. The PI and DW lines from 6800 West will also need to be detached from the main and abandoned. Additional coordination with the City for final civil design will be required on this item.

**Response:** The exact location was not found by survey. We have shown the approximate location of the water mains with a note to be abandoned and disconnected at the main. Further investigation and termination with coordination with the City.

24. Slopes shown for sewer mains must not be less than 0.5% unless approved by City (Design Criteria 3.02.B).

**Response:** This is what is shown in Design Criteria 3.02B:

“The minimum sewer pipe shall be eight-inch (8”) diameter and shall be designed at a grade no flatter than that, which is specified in the table below.

8-inch sewer lines 0.0033 foot/foot

10-inch sewer lines 0.0025 foot/foot

State Code for an 8” Main is 0.33%. We are proposing 0.33% due to the depth and length of sewer main proposed. This is a difficult area to sewer.



25. Culinary water lines must be class 350 DIP.

**Response: Changed.**

26. Confirm fire hydrant spacing meets Design Criteria 4.02.B.

**Response: This plan conforms to the spacing requirements**

27. Storm Drain sump ID is 72" (5.02.E). Please correct on plans and calcs.

**Response: All sumps have been updated to 72" diameter.**

28. Pressurized irrigation line is not shown or labeled in 6400 W. where the future connection will be hot tapped. Please show all connecting lines.

**Response: PI lines have been labeled and connecting lines shown. Further details will come with final construction plans.**

29. Storm Drain inlet spacing is to be determined by spread and velocity requirements as indicated in the Design Requirements (5.07.C). Please provide calculations to show this.

**Response: This plan shows 16 sumps for a 20-lot subdivision. There is not a place in Highland that has more sumps per linear foot of roadway. The roads are designed at minimum slope and will not exceed the spread or velocity.**

If you have any questions about these review comments, please call Rob Patterson at (801) 220-5910 for planning related comments and Nate Mecham at (801) 473-7017 for engineering and public works related comments.



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## **Slope Setback Reduction Request FOXWOOD ESTATES**

We are requesting a reduction to the slope setback in section 8-105 Geologic Hazards and Slope Regulations. We feel that this requirement is excessive due to the conditions we have with this development. The geotechnical engineer has shown that all structures should be set outside of a 1.5H:1V slope from the bottom of the ravine. We have shown this buildable area on the plans. There are existing homes that were built over 20-year ago on the same ravine that are within the 1.5:1V slope from the bottom and they have not had any issues. Please see our response to the 6 conditions within the ordinance.

1. Building areas in the slope setback do not create excessive cut or fill slopes; minimal retaining walls to limit disturbance and meet grade may be required by the Planning Commission subject to the other regulations of this section;

**All proposed construction will be on the flat above the ravine. It is proposed to keep all excavation and structures outside of the 1.5H:1V slope from the bottom of the ravine per the geotechnical engineer's recommendations. This will not create ANY cuts or fill slopes, just a standard excavated hole for a home like any flat subdivision.**

2. The applicant designates areas in which all construction activity must be contained as limits of disturbance for each building, site, lot, or parcel. The limits of disturbance around any structure within the slope setback shall be limited to the minimal area necessary to excavate and backfill the foundation. Decks and patios in the area of the slope setback shall not extend more than fifteen feet (15') beyond the foundation walls or the established limit of disturbance, whichever is greater;

**The buildable areas have been established and shown on the plat.**

3. No additional erosion, land subsidence, avalanche, or other geologic hazard is created or exacerbated;

**All construction activities will be away from the slope. The existing slope will remain in its natural state.**

4. The proposed development results in an improved organization of units through vegetation avoidance, minimization of changes to the viewshed from public areas, and reduction of site disturbance;

**All construction activities will be away from the slope. The existing slope and vegetation within the ravine will remain in its natural state.**



## HIGHLAND CITY

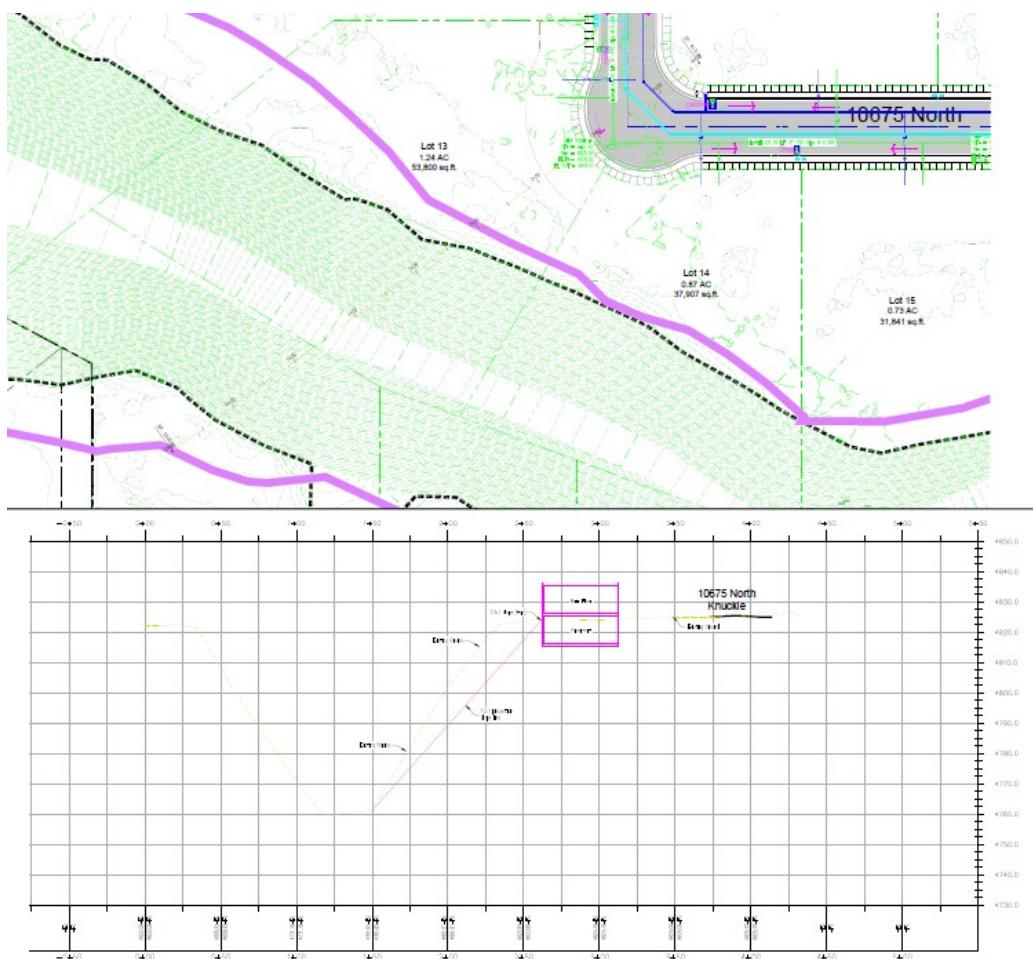
5. The applicant proposes appropriate revegetation and other mitigation efforts to reduce the impact on sensitive lands; and

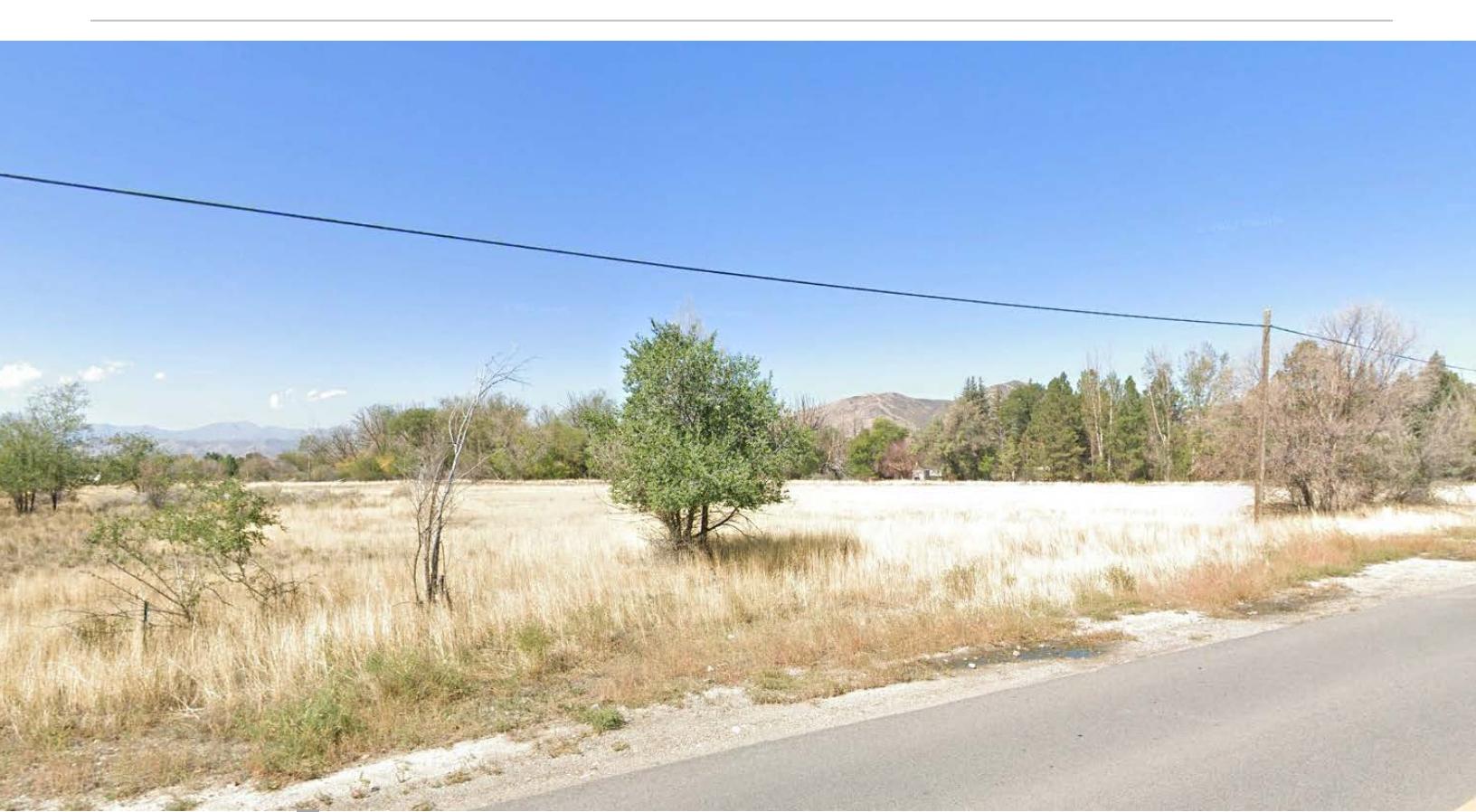
All construction activities will be away from the slope. The existing slope and vegetation within the ravine will remain in its natural state. During construction a silt fence will be installed all the way along the top of the ravine to protect it from erosion. These silt fences will not be removed until landscaping is complete.

6. No development or other disturbance is allowed beyond the maximum area available for development, as approved by the City Engineer and Zoning Administrator under Section 8-104(3).

Construction will be limited to the area approved by the City Engineer and Zoning Administrator.

### Typical section of Lot along ravine





**GEOTECHNICAL  
ENGINEERING STUDY**

**Foxwood Estates**

10635 North 6400 West  
Highland, Utah

**CMT PROJECT NO. 21033**

FOR:

**Millhaven Development**  
272 West 200 North, Suite 100  
Lindon, Utah 84042

November 28, 2023

ENGINEERING • GEOTECHNICAL • ENVIRONMENTAL (ESA I & II) •  
MATERIALS TESTING • SPECIAL INSPECTIONS •  
ORGANIC CHEMISTRY • PAVEMENT  
DESIGN • GEOLOGY

November 28, 2023

Mr. Todd Trane, P.E.  
Millhaven Development  
272 West 200 North, Suite 100  
Lindon, Utah 84042

Subject: Geotechnical Engineering Study  
Foxwood Estates  
10635 North 6400 West  
Highland, Utah  
CMT Project No. 21033

Mr. Trane:

Submitted herewith is the report of our geotechnical engineering study for the subject site. This report contains the results of our findings and an engineering interpretation of the results with respect to the available project characteristics. It also contains recommendations to aid in the design and construction of the earth related phases of this project.

On October 4, 2023, a CMT Technical Services (CMT) staff professional was on-site and supervised the excavation of 8 test pits extending to depths of about 7 to 8.5 feet below the existing ground surface. We obtained soil samples during the field operations that we subsequently transported to our laboratory for further testing and observation.

Conventional spread and/or continuous footings may be utilized to support the proposed structures, provided the recommendations in this report are followed. This report presents detailed discussions of design and construction criteria for this site.

We appreciate the opportunity to work with you at this stage of the project. CMT offers a full range of Geotechnical Engineering, Geological, Material Testing, Special Inspection services, and Phase I and II Environmental Site Assessments. With offices throughout Utah, Idaho, Arizona, Colorado and Texas, our staff is capable of efficiently serving your project needs. If we can be of further assistance or if you have any questions regarding this project, please do not hesitate to contact us at 801-492-4132.

Sincerely,  
**CMT Technical Services**



William G. Turner, P.E., M. ASCE  
Senior Geotechnical Engineer

Reviewed by:



Jeffrey J. Egbert, P.E., LEED A.P., M. ASCE  
Senior Geotechnical Engineer

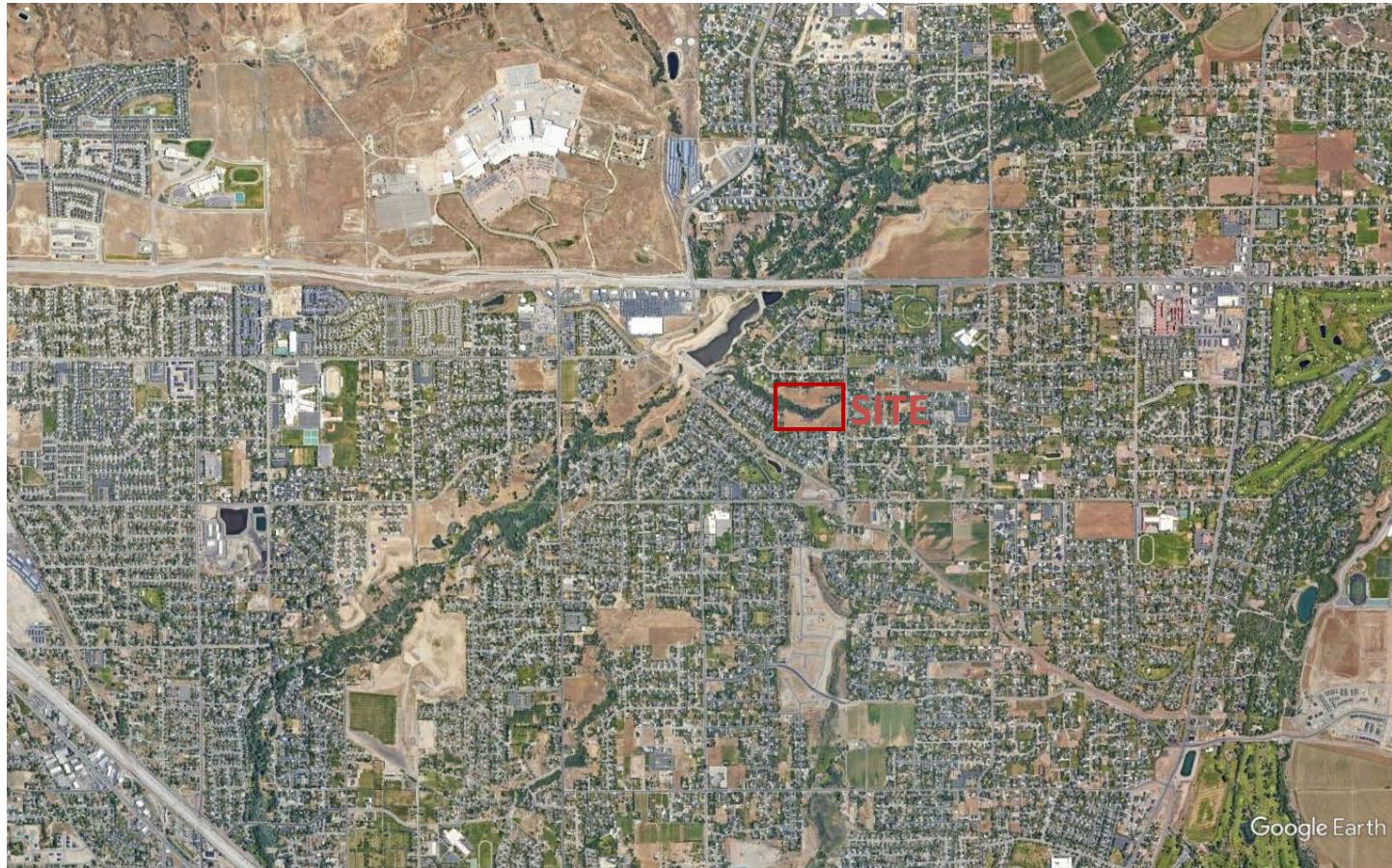
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## 1.0 INTRODUCTION

### 1.1 General

CMT Technical Services (CMT) was retained to conduct a geotechnical subsurface study for the proposed development of approximately 21.5 acres as a residential subdivision. The parcel is situated on the west side of 6400 West Street at about 10635 South in Highland, Utah, as shown in the **Vicinity Map** below.



**VICINITY MAP**

### 1.2 Objectives, Scope and Authorization

The objectives and scope of our study were planned in discussions between Mr. Todd Trane of Millcreek Development, and Mr. Bill Turner of CMT. In general, the objectives of this study were to define and evaluate the subsurface soil and groundwater conditions at the site, and provide appropriate foundation, earthwork, pavement and seismic recommendations to be utilized in the design and construction of the proposed development.

In accomplishing these objectives, our scope of work included performing field exploration, which consisted of the excavating/logging/sampling of 8 test pits, performing an infiltration test, performing laboratory testing on

representative samples of the subsurface soils collected in the test pits, and conducting an office program, which consisted of correlating available data, performing engineering analyses, and preparing this summary report. This scope of work was authorized by returning a signed copy of our proposal dated September 19, 2023, and executed on September 20, 2023.

### **1.3 Description of Proposed Construction**

We understand that single family residences will be constructed at the site, which will likely have two levels of wood frame construction above grade and a single level of reinforced concrete below grade (basements). We project that maximum loads for the residences will be on the order of 4,000 pounds per lineal foot for walls, 50,000 pounds for columns, and relatively light floor slab loads having an average uniform loading not exceeding 100 pounds per square foot. If the loading conditions are different than we have projected, please notify us so that any appropriate modifications to our conclusions and recommendations contained herein can be made.

We also understand that residential streets will be constructed as part of the development and will be paved using asphalt surfacing. Traffic is projected to consist of a light volume of automobiles and pickup trucks, up to five daily medium-weight delivery trucks, a weekly garbage truck, and an occasional fire truck.

Site development will require some earthwork in the form of minor cutting and filling. A site grading plan was not available at the time of this report, but we project that maximum cuts and fills may be on the order of 2 to  $10\pm$  feet. If deeper cuts or fills are planned, CMT should be notified to provide additional recommendations, if needed.

### **1.4 Executive Summary**

Proposed residences can be supported upon conventional spread and continuous wall foundations. The most significant geotechnical aspects regarding site development include the following:

1. Up to 12 inches of topsoil blankets the site, which will require removal beneath structures, exterior flatwork and pavements;
2. Subsurface soils encountered below the topsoil consisted of SILT (ML) overlying SAND (SM, SP-SM, SP) and GRAVEL (GP-GM, GP), while groundwater was not encountered to the maximum depth explored of 8.5 feet below the existing ground surface.
3. The upper layer of Sandy SILT (ML) is hydro-collapsible, as confirmed by consolidation/collapse tests that indicated these soils have a collapse potential of 6% to 8.5%; and
4. Foundations and floor slabs may be placed on suitable (non-collapsible), undisturbed natural sand/gravel soils or on properly placed and compacted structural fill extending to suitable, undisturbed natural soils.

CMT must assess that topsoil, undocumented fills, potentially collapsible soils, debris, disturbed or unsuitable soils have been removed and that suitable soils have been encountered prior to placing site grading fills, footings, slabs, and pavements.

In the following sections, detailed discussions pertaining to the site are provided, including subsurface descriptions, geologic/seismic setting, earthwork, foundations, lateral resistance, lateral pressure, floor slabs, and pavements.

## 2.0 FIELD EXPLORATION

### **2.1 General**

In order to define and evaluate the subsurface soil and groundwater conditions, 8 test pits were excavated with a backhoe at the site to depths of approximately 7 to 8.5 feet below the existing ground surface. Locations of the test pits are shown on ***Figure 1, Site Plan***, included in the Appendix. Excavation refusal was encountered at depths of 7 to 7.5 feet within test pits TP-1 through TP-6. The field exploration was performed under the supervision of an experienced member of our geotechnical staff.

Representative soil samples were collected by obtaining disturbed "grab" samples and cutting relatively undisturbed "block" samples from within each test pit. The samples were placed in sealed plastic bags prior to transport to the laboratory.

The subsurface soils encountered in the test pits were classified in the field based upon visual and textural examination, logged and described in general accordance with ASTM¹ D-2488. These field classifications were supplemented by subsequent examination and testing of select samples in our laboratory. Graphical representations of the subsurface conditions encountered are presented on each individual Test Pit Log, ***Figures 2 through 9***, included in the Appendix. A Key to Symbols defining the terms and symbols used on the logs, is provided as ***Figure 10*** in the Appendix.

Upon completion of logging and sampling, the test pits were backfilled with the excavated soils. When backfilling, minimal to no effort was made to compact the backfill and no compaction testing was performed. Thus, the test pit backfill is considered undocumented fill and settlement of the backfill in the test pits over time should be anticipated.

### **2.2 Infiltration Testing**

We also performed infiltration testing subsequent to our field exploration at the location shown on ***Figure 1*** (close to TP-1) at a depth of about 5 feet below the existing ground surface. The testing consisted of creating and filling a small hole at that depth with water, and measuring the rate of water drop within the small hole over a certain time period (i.e. 10 minutes). We repeated this process multiple times until subsequent readings were the same. The results of this test indicate that the sandy gravel (GP-GM) soils at this site have an infiltration rate of approximately 3.75 minutes per inch. Note that this rate could increase (become slower) over time due to siltation, thus we recommend an appropriate factor of safety be applied for design.

---

¹American Society for Testing and Materials

### 3.0 LABORATORY TESTING

Selected samples of the subsurface soils were subjected to various laboratory tests to assess pertinent engineering properties, as follows:

1. Moisture Content, ASTM D-2216, Percent moisture representative of field conditions
2. Dry Density, ASTM D-2937, Dry unit weight representing field conditions
3. Atterberg Limits, ASTM D-4318, Plasticity and workability
4. Gradation Analysis, ASTM D-1140/C-117, Grain Size Analysis
5. One Dimension Consolidation, ASTM D-2435, Consolidation properties
6. Direct Shear Test, ASTM D-3080, Shear strength parameters

To provide data necessary for our settlement analyses, a consolidation test was performed on each of 2 representative samples of the surficial silt soils encountered across the site. Based upon data obtained from the consolidation testing, the upper layer of silt soils at this site are moderately over-consolidated, moderately compressible under additional loading, and have a collapse potential of approximately 6% to 8.5% at a load of 1,000 psf when water was added (see the **Lab Summary Table** below). Detailed results of the tests are maintained within our files and can be transmitted to you, if so desired.

A direct shear test was performed on a representative sample of the gravelly sand soils. Due to the granular nature of the soil, the sample was screened through a No. 4 sieve and the portion passing that sieve was used for the direct shear test, thus the direct shear test results will likely be lower in strength than the field sample. During the direct shear test, the sample was loaded and evenly consolidated within the test ring, and saturated immediately after the load was applied. The sample was then sheared horizontally while measuring the shearing force and horizontal and vertical displacements. This process was repeated twice while increasing the normal load imposed on the sample. Detailed results of the test are included on the attached **Figure 11**.

Laboratory test results are presented on the test pit logs (**Figures 2 through 9**) and in the following **Lab Summary Table**:

**LAB SUMMARY TABLE**

TEST PIT	DEPTH (feet)	SOIL CLASS	SAMPLE TYPE	MOISTURE CONTENT(%)	DRY DENSITY (pcf)	GRADATION			ATTERBERG LIMITS			COLLAPSE (-)/ EXPANSION(+)
						GRAV.	SAND	FINES	LL	PL	PI	
TP-1	2.5	SP	Bag	1		13	85	2				
TP-2	2	ML	Block	3	100					NP	NP	-8.5%
TP-3	6	GP	Bag	1		74	23	3				
TP-4	3	SP-SM	Bag	1		23	69	8				
TP-5	3	SM	Block	4		10	47	43				
TP-6	2.5	ML	Block	4	100					NP	NP	-6.0%
TP-7	3	SP-SM	Block	2		46	47	7				
TP-8	7	GP	Bag	2		64	32	4				

## 4.0 GEOLOGIC & SEISMIC CONDITIONS

### 4.1 Geologic Setting

The subject site is located in the northern portion of Utah Valley in north-central Utah and ranges in elevation from approximately 4,826 to 4,836 feet above sea level. Utah Valley is bounded by the Wasatch Mountains to the east and the Oquirrh Mountains to the west. Utah Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province, and was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. Utah Valley is also located within the Intermountain Seismic Belt, a zone of ongoing tectonism and seismic activity extending from southwestern Montana to southwestern Utah. The active (evidence of movement in the last 10,000 years) Wasatch Fault Zone is part of the Intermountain Seismic Belt and extends from southeastern Idaho to central Utah along the western base of the Wasatch Mountain Range.

Much of northwestern Utah, including the valley in which the subject site is located, was also previously covered by the Pleistocene age Lake Bonneville. The Great Salt Lake, located to the north-west of the site, is a remnant of this ancient freshwater lake. Lake Bonneville reached a high-stand elevation of approximately between 5,160 and 5,200 feet above sea level about 18,500 and 17,400 years ago. Approximately 17,400 years ago, the lake breached its basin in southeastern Idaho and dropped relatively fast, by almost 300 feet, as water drained into the Snake River. Following this catastrophic release, the lake level continued to drop slowly over time, primarily driven by drier climatic conditions, until reaching the current level of the Great Salt Lake. Shoreline terraces formed at the high-stand elevation of the lake and several subsequent lower lake levels are visible in places on the mountain slopes surrounding the valley. Much of the sediment within Utah Valley was deposited as lacustrine sediments during both the transgressive (rise) and regressive (fall) phases of Lake Bonneville and in older pre-Bonneville lakes that previously occupied the basin.

The geology of the Lehi, Utah 7.5-minute Quadrangle, which includes the location of the subject site, has been mapped by Biek². The surficial geology at the subject site and adjacent properties is mapped as “Alluvial deposits related to the Provo phase of the Bonneville Lake cycle” (Map Unit **Qalp**) and as “Lacustrine silt and clay” (Map Unit **Qlmb**) both dated to be Upper Pleistocene. A small area near the southeast corner of the site is mapped as “Stream deposits” (Map Unit **Qal₁**) dated as Holocene. Following are the descriptions of these deposits:

Unit **Qalp** is described as “Moderately to well-sorted sand, silt, and pebble gravel deposited principally in river channels; coarsens upgradient and includes boulder-size clasts in the upper reaches of Dry Creek; locally includes veneer of fine-grained eolian sand and silt, and may include loess veneer; ... generally 5 to 20 feet (2-6 m) thick.”

Unit **Qlmb** is described as “Calcareous silt (marl) with minor clay and fine-grained sand; typically laminated but weathers to appear thick bedded; locally concealed by loess veneer; Qlmb deposited below Bonneville

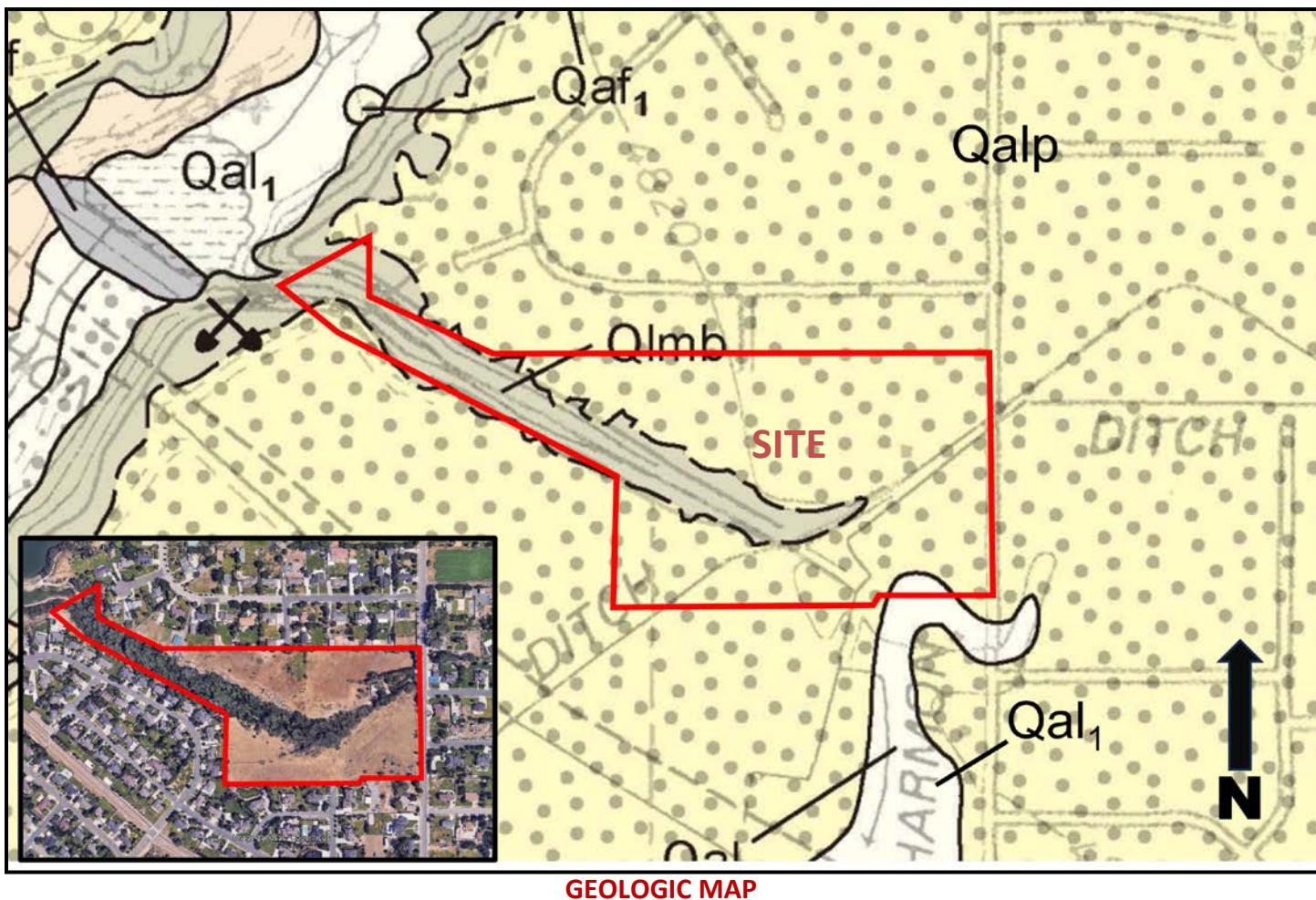
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² Biek, R.F., 2005, Geologic Map of the Lehi Quadrangle and Part of the Timpanogos Cave Quadrangle, Salt Lake and Utah Counties, Utah; Utah Geological Survey, Map 210, Scale 1:24,000. [https://ugspub.nr.utah.gov/publications/geologicmaps/7-5quadrangles/M-210_Lehi.pdf](https://ugspub.nr.utah.gov/publications/geologicmaps/7-5quadrangles/M-210_Lehi.pdf)

shoreline and Qlmp deposited below the Provo shoreline; grades upslope into lacustrine sand and silt; exposed thickness less than about 40 feet (12 m)."

Unit **Qal₁** is described as "Moderately to well-sorted sand, silt, clay, and pebble to boulder gravel in river channels and flood plains; locally includes small alluvial-fan and colluvial deposits, and minor terraces up to 10 feet (3 m) above current base level; mapped principally along the larger streams in the quadrangle, including American Fork River and Dry Creek; generally, 0 to 20 feet (0-6 m) thick."

No fill has been mapped at the location of the site on the geologic map. Refer to the **Geologic Map**, shown below.



#### 4.2 Faulting

No surface fault traces are shown on the referenced geologic map crossing or projecting toward the subject site. The nearest mapped active (Holocene) fault trace is the Provo segment of the Wasatch fault located about 1.6 miles east of the site. Seismic design issues are addressed in **Section 4.3** below.

## **4.3 Seismicity**

### **4.3.1 Site Class**

Utah has adopted the International Building Code (IBC) 2021, which determines the seismic hazard for a site based upon 2014 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). For site class definitions, IBC 2021 Section 1613.2.2 refers to Chapter 20, Site Classification Procedure for Seismic Design, of ASCE³ 7-16, which stipulates that the average values of shear wave velocity, blow count and/or shear strength within the upper 100 feet (30 meters) be utilized to determine seismic site class. Based on average shear wave velocity data within the upper 30 meters ( $V_{S,30}$ ) published by McDonald and Ashland⁴, the subject site is located within unit description Q02, which has a log-mean  $V_{S,30}$  of 281 meters per second (919 feet per second). Thus, it is our opinion the site best fits Site Class D – Stiff Soil Profile (with data), which we recommend for seismic structural design.

### **4.3.2 Seismic Design Category**

The 2014 USGS mapping utilized by the IBC provides values of peak ground, short period and long period spectral accelerations for the Site Class B/C boundary and the Risk-Targeted Maximum Considered Earthquake (MCE_R). This Site Class B/C boundary represents average bedrock values for the Western United States and must be corrected for local soil conditions. The Seismic Design Categories in the International Residential Code (IRC 2018 Table R301.2.2.1.1) are based upon the Site Class as addressed in the previous section. For Site Class D (with data) at site grid coordinates of 40.4255 degrees north latitude and -111.8137 degrees west longitude,  $S_{Ds}$  is 0.897 and the **Seismic Design Category** is D₂.

## **4.4 Other Geologic Hazards**

The site is not located on an active alluvial fan or an observed or mapped rock fall hazard area, and it is not at risk from debris flow or landslide hazards⁵. The site is not located within a known or mapped stream flooding zone⁶.

# **5.0 SITE CONDITIONS**

## **5.1 Surface Conditions**

At the time the test pits were excavated the site consisted of an existing home with some landscaping and small outbuildings or pen/corral structures, surrounded by fields vegetated with some grasses and weeds and numerous trees. A ravine starts within the eastern part of the property, traversing through the central portion

³American Society of Civil Engineers

⁴ McDonald, G.N. and Ashland, F.X., 2008, "Earthquake Site-Conditions Map for the Wasatch Front Urban Corridor, Utah," Utah Geological Survey Special Study 125, 41 pp.

⁵Utah Geologic Hazards, <https://geology.utah.gov/apps/hazards/>.

⁶Federal Emergency Management Agency: <https://msc.fema.gov/portal/search?AddressQuery=-111.813859%2C40.425679>

of the site and becoming deeper toward the west-northwest; this ravine is heavily vegetated with bushes and trees. Based upon aerial photos dating back to 1993 that are readily available on the internet, the existing home and outbuildings/small structures were present at that time, and it appears that relatively little has changed since then but that portions of the site were likely used for agriculture. Overall, the site is relatively flat, with a slight slope downward to the west, except for the ravine. The site is bordered on the north and south by existing residences, on the east by 6400 West Street, and on the west by 200 West Street (see **Vicinity Map** in **Section 1.1** above).

## **5.2 Subsurface Soils**

At the locations of the test pits, we encountered approximately 6 to 12 inches of topsoil at the surface. We observed natural soils beneath the topsoil soils, consisting of Sandy SILT (ML) overlying Gravelly to Silty SAND (SP, SP-SM, SM) and Sandy GRAVEL with varying silt content (GP, GP-GM), extending to the maximum depth penetrated of approximately 8.5 feet.

The silt soils were dry to slightly moist, brown in color, and estimated to be stiff in consistency. They also exhibited moderate over consolidation and strength characteristics, as well as a high potential (6% to 8.5%) for collapse when wetted.

The natural gravel and sand soils were dry to slightly moist, brown to grayish brown/brownish gray in color, and estimated to be medium dense to very dense. They will also exhibit moderately high strength and low compressibility characteristics.

For a more descriptive interpretation of subsurface conditions, please refer to the test pit logs, **Figures 2 through 9**, which graphically represent the subsurface conditions encountered. The lines designating the interface between soil types on the logs generally represent approximate boundaries - in situ, the transition between soil types may be gradual.

## **5.3 Groundwater**

We did not encounter groundwater at the time of our field explorations within the maximum depth explored of about 8.5 feet below the existing ground surface. We do not anticipate that groundwater will affect the proposed construction.

Groundwater levels can fluctuate seasonally. Numerous other factors such as heavy precipitation, irrigation of neighboring land, and other unforeseen factors, may also influence ground water elevations at the site. The detailed evaluation of these and other factors, which may be responsible for ground water fluctuations, is beyond the scope of this study.

## **5.4 Site Subsurface Variations**

Based on the results of the subsurface explorations and our experience, variations in the continuity and nature of subsurface conditions should be anticipated. Due to the heterogeneous characteristics of natural soils, care

should be taken in interpolating or extrapolating subsurface conditions between or beyond the exploratory locations.

Also, after completing the logging and sampling, the test pits were backfilled with the excavated soils but minimal to no effort was made to compact these soils. Thus, the test pit backfill is considered undocumented fill and settlement of the backfill in the test pits over time should be anticipated.

## 6.0 SITE PREPARATION AND GRADING

### 6.1 General

All deleterious materials should be stripped from the site prior to commencement of construction activities. This includes loose and disturbed soils, topsoil, vegetation, etc. Based upon the conditions observed in the test pits there is topsoil on the surface of the site which we estimated to be about 6 to 12 inches in thickness. When stripping and grubbing, topsoil should be distinguished by the apparent organic content and not solely by color; thus we estimate that topsoil stripping will need to include the upper 4 to 6 inches. However, given the past agricultural uses of the site, the upper 12 to 15 inches may have been disturbed during farming.

During our field explorations, we observed possible fill soils along the crest of the ravine. We recommend that any undocumented fill be removed prior to placing site grading and/or structural fill.

The upper 2 to 4 feet of silt soils are also potentially collapsible, and may remain in pavement areas if:

1. They are properly prepared/partially replaced as outlined below;
2. No more than 3 feet of subsequent overlying site grading fills are installed above any remaining sequence of potentially collapsible soils;
3. Any planned subsurface detention systems are installed well away and down gradient from nearby structures, and preferably below any remaining sequence of potentially collapsible clay soils; and
4. Adequate site drainage is maintained to reduce the potential for subsurface soil saturation.
5. The owner accepts the risk that some settlement of pavement areas could occur if the underlying potentially collapsible soils become wetted, which could result in minor to significant maintenance.

Proper preparation of potentially collapsible soils in pavement areas shall consist of removing the upper 24 inches, scarifying to a minimum depth of 8 inches and compacting the soils in place. The exposed subgrade must then be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or loose soils are encountered, they must be removed (up to a maximum depth of 2 feet) and replaced with structural fill. The removed soils may then be placed and compacted to the appropriate moisture content and density as indicated below in **Section 6.4**.

The site should be observed by a CMT geotechnical engineer to assess that suitable natural soils have been exposed and any deleterious materials, loose and/or disturbed soils have been removed, prior to placing site grading fills, footings, slabs, and pavements.

Fill placed over large areas to raise overall site grades can induce settlements in the underlying natural soils. If more than 3 feet of site grading fill is anticipated over the natural ground surface, we should be notified to assess potential settlements and provide additional recommendations as needed. These recommendations may include placement of the site grading fill far in advance to allow potential settlements to occur prior to construction.

## **6.2 Temporary Excavations**

Excavations deeper than 8 feet are not anticipated at the site. Groundwater was not encountered within the depths explored, about 7 to 8.5 feet at the time of our field explorations, and thus is not anticipated to affect excavations.

The natural soils encountered at this site predominantly consisted of non-plastic silt and sand/gravel. For these soils (cohesionless), temporary construction excavations not exceeding 4 feet in depth should be no steeper than one-half horizontal to one vertical (0.5H:1V). For excavations up to 8 feet and above groundwater, side slopes should be no steeper than one horizontal to one vertical (1H:1V). Excavations encountering saturated cohesionless soils will be very difficult to maintain and will require very flat side slopes and/or shoring, bracing and dewatering.

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. All excavations should be made following OSHA safety guidelines.

## **6.3 Fill Material**

Following are our recommendations for the various fill types we anticipate will be used at this site:

FILL MATERIAL TYPE	DESCRIPTION   RECOMMENDED SPECIFICATION
Structural Fill	Placed below structures, flatwork and pavement. Well-graded sand/gravel mixture, with maximum particle size of 4 inches, a minimum 70% passing 3/4-inch sieve, a maximum 20% passing the No. 200 sieve, and a maximum Plasticity Index of 10.
Site Grading Fill	Placed over larger areas to raise the site grade. Sandy to gravelly soil, with a maximum particle size of 6 inches, a minimum 70% passing 3/4-inch sieve, a maximum 50% passing No. 200 sieve, and a maximum Plasticity Index of 15.
Non-Structural Fill	Placed below non-structural areas, such as landscaping. On-site soils or imported soils, with a maximum particle size of 8 inches, including silt/clay soils not containing excessive amounts of degradable/organic material (see discussion below).
Stabilization Fill	Placed to stabilize soft areas prior to placing structural fill and/or site grading fill. Coarse angular gravels and cobbles 1 inch to 8 inches in size. May also use 1.5-inch to 2.0-inch gravel placed on stabilization fabric, such as Mirafi RS280i, or equivalent (see <b>Section 6.6</b> ).

Most of the on-site sand and gravel soils appear suitable for use as structural fill, if processed to meet the requirements given above, and may also be used in site grading fill and non-structural fill situations.

On-site silt soils are not suitable for use as structural fill or site grading fill but may be used as non-structural fill. Note that these silt soils are moisture-sensitive, which means they are inherently more difficult to work with in proper moisture conditioning (they 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.

All fill material should be approved by a CMT geotechnical engineer prior to placement.

## **6.4 Fill Placement and Compaction**

The various types of compaction equipment available have their limitations as to the maximum lift thickness that can be compacted. For example, hand operated equipment is limited to lifts of about 4 inches and most “trench compactors” have a maximum, consistent compaction depth of about 6 inches. Large rollers, depending on soil and moisture conditions, can achieve compaction at 8 to 12 inches. The full thickness of each lift should be compacted to at least the following percentages of the maximum dry density as determined by ASTM D-1557 (or AASHTO⁷ T-180) in accordance with the following recommendations:

LOCATION	TOTAL FILL THICKNESS (FEET)	MINIMUM PERCENTAGE OF MAXIMUM DRY DENSITY
Beneath an area extending at least 4 feet beyond the perimeter of structures, and below flatwork and pavement (applies to structural fill and site grading fill) extending at least 2 feet beyond the perimeter	0 to 5	95
	5 to 10	98
Site grading fill outside area defined above	0 to 5	92
	5 to 10	95
Utility trenches within structural areas	--	96
Roadbase and subbase	-	96
Non-structural fill	0 to 5	90
	5 to 10	92

Structural fills greater than 10 feet thick are not anticipated at the site. For best compaction results, we recommend that the moisture content for structural fill/backfill be within 2% of optimum. Field density tests should be performed on each lift as necessary to verify that proper compaction is being achieved.

## **6.5 Utility Trenches**

For the bedding zone around the utility, we recommend utilizing sand bedding fill material that meets current APWA⁸ requirements.

⁷ American Association of State Highway and Transportation Officials

⁸ American Public Works Association

Above the bedding zone, we recommend that utility trench backfill have a minimum 20% fines, to reduce permeability (refer to **Section 6.3** above). In addition, utilities should be installed as close to the bottom of the potentially collapsible soils as reasonably possible.

Most utility companies and local governments are requiring Type A-1a or A-1b (AASHTO Designation) soils (sand/gravel soils with limited fines) be used as backfill over utilities within public rights of way, and the backfill be compacted over the full depth above the bedding zone to at least 96% of the maximum dry density as determined by AASHTO T-180 (ASTM D-1557). The natural sand and gravel soils at this site may meet these specifications.

Where the utility does not underlie structurally loaded facilities and public rights of way, natural soils may be utilized as trench backfill above the bedding layer, provided they are properly moisture conditioned and compacted to the minimum requirements stated above in **Section 6.4**.

## **6.6 Stabilization**

The natural silt soils at this site will likely be susceptible to rutting and pumping. The likelihood of disturbance or rutting and/or pumping of the existing natural soils is a function of the load applied to the surface, as well as the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the surface by using lighter equipment and/or partial loads, by working in drier times of the year, or by providing a working surface for the equipment. Rubber-tired equipment particularly, because of high pressures, promotes instability in moist/wet, soft soils.

If rutting or pumping occurs, traffic should be stopped and the disturbed soils should be removed and replaced with stabilization material. Typically, a minimum of 18 inches of the disturbed soils must be removed to be effective. However, deeper removal is sometimes required.

To stabilize soft subgrade conditions (if encountered), a mixture of coarse, clean, angular gravels and cobbles and/or 1.5- to 2.0-inch clean gravel should be utilized, as indicated above in **Section 6.3**. Often the amount of gravelly material can be reduced with the use of a geotextile fabric such as Mirafi RS280i or equivalent. Its use will also help avoid mixing of the subgrade soils with the gravelly material. After excavating the soft/disturbed soils, the fabric should be spread across the bottom of the excavation and up the sides a minimum of 18 inches. Otherwise, it should be placed in accordance with the manufacturer's recommendation, including proper overlaps. The gravel material can then be placed over the fabric in compacted lifts as described above.

## **6.7 Slope Stability**

The properties of the sandy soils observed at the site were obtained via a direct shear test as presented above in Section 3.0 (also see attached **Figure 11**). Gravelly soils are anticipated to have higher strength parameters. We also anticipate that the soils within the ravine will be similar to those encountered in the test pits. Accordingly, we used the following parameters in the slope stability analyses:

Material	Internal Friction Angle (degrees)	Apparent Cohesion (psf)	Saturated Unit Weight (pcf)
On-Site Sand/Gravel	38	50	130

For the seismic analysis, a modified peak horizontal ground acceleration (PGAM) of  $0.669g$  was obtained after adjusting for Site Class D (see **Section 4.3.2** above). The pseudostatic coefficient for the global seismic stability analysis was obtained using the Bray and Travasarou⁹ method for a slope height of 20 feet and a potential deformation of 4 inches, which resulted in a pseudostatic value of 0.224.

Using these input parameters, we evaluated the global stability of the existing slope within the ravine traversing through the site using limit equilibrium (Simplified Bishop) methods via the computer program *SLIDE2* (version 9.0). The configuration we analyzed consisted of the approximate 20-foot high ravine slope inclined at approximately 1.5H:1V (Horizontal:Vertical). Typically, the required minimum factors of safety are 1.5 for static conditions and 1.0 for seismic (pseudostatic) conditions. The results of our analyses indicate that such a slope will meet both these requirements provided our recommendations are followed. The slope stability data are included as **Figures 12 and 13**, attached.

To reduce the potential for erosion of 1.5H:1V slopes, we recommend the slope face be vegetated as soon as possible after construction is completed (or leaving the existing slope face as is). An anchored vegetative mat will be required to establish new vegetation. Grading should be included for the site that will not allow surface water to freely flow over slope faces. Landscape watering of the slope should be minimized as much as possible, and charged sprinkler lines should not be placed on slope faces.

## 7.0 FOUNDATION RECOMMENDATIONS

The following recommendations have been developed on the basis of the previously described project characteristics, including the maximum loads discussed in **Section 1.3**, the subsurface conditions observed in the field and the laboratory test data, and standard geotechnical engineering practice.

### 7.1 Foundation Recommendations

Based on our geotechnical engineering analyses, the proposed residences may be supported upon conventional spread and/or continuous wall foundations placed on suitable (non-collapsible), undisturbed natural sand/gravel soils and/or on structural fill extending to suitable natural soils. This will require extending excavations to depths of at least 2 to 4 feet to remove the upper layer of potentially collapsible sandy silt. Footings may then be designed using a net bearing pressure of 2,500 psf, provided footing bottoms are placed a minimum distance of 5 feet from the ravine slope face. The term "net bearing pressure" refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade, thus the weight of the footing and backfill to lowest adjacent final grade need not be considered. The allowable bearing pressure may be increased by 1/3 for temporary loads such as wind and seismic forces.

⁹ Bray, J.D., & Travasarou, T., "Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation," *Journal of Geotechnical & Geoenvironmental Engineering*, ASCE, September 2009, p 1336-1340.

We also recommend the following:

1. Exterior footings subject to frost should be placed at least 30 inches below final grade.
2. Interior footings not subject to frost should be placed at least 16 inches below grade.
3. Continuous footing widths should be maintained at a minimum of 18 inches.
4. Spot footings should be a minimum of 24 inches wide.

## **7.2 Installation**

Under no circumstances shall foundations be placed directly on potentially collapsible soils, on undocumented fill, topsoil with organics, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. Where footings would otherwise be placed on potentially collapsible soils, we recommend the collapsible soils be completely removed or over-excavated a minimum 36 inches, whichever is less, and replaced with properly compacted structural fill.

Deep, large roots may be encountered where trees and larger bushes are located or were previously located at the site; such large roots should be removed. If other unsuitable soils are encountered, they must be completely removed and replaced with properly compacted structural fill. Excavation bottoms should be examined by a CMT geotechnical engineer to confirm that suitable bearing soils have been exposed.

All structural fill should meet the requirements for such, and should be placed and compacted in accordance with **Section 6** above. The width of structural replacement fill below footings should be equal to the width of the footing plus 1 foot for each foot of fill thickness. For instance, if the footing width is 2 feet and the structural fill depth beneath the footing is 2 feet, the fill replacement width should be 4 feet, centered beneath the footing.

The minimum thickness of structural fill below footings should be equivalent to one-third the thickness of structural fill below any other portion of the foundations. For example, if the maximum depth of structural fill is 6 feet, all footings for the new structure should be underlain by a minimum 2 feet of structural fill.

## **7.3 Estimated Settlement**

Foundations designed and constructed in accordance with our recommendations could experience some settlement, but we anticipate that total settlements of footings founded as recommended above will not exceed 1 inch, with differential settlements on the order of 0.5 inches over a distance of 25 feet. We expect approximately 50% of the total settlement to initially take place during construction.

## **7.4 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 0.45 for natural sand/gravel soils and structural fill, may be utilized for design. Passive resistance provided by properly placed and compacted structural fill above the water table

may be considered equivalent to a fluid with a density of 425 pcf. A combination of passive earth resistance and friction may be utilized if the passive resistance component of the total is divided by 1.5.

## 8.0 LATERAL EARTH PRESSURES

We project that basement walls up to 8 feet tall will be constructed at this site. The lateral earth pressure values given below anticipate that existing on-site sand/gravel soils will be used as backfill material, placed and compacted in accordance with the recommendations presented herein. If other soil types will be used as backfill, we should be notified so that appropriate modifications to these values can be provided, as needed.

The lateral pressures imposed upon subgrade facilities will depend upon the relative rigidity and movement of the backfilled structure. Following are the recommended lateral pressure values, which also assume that the soil surface behind the wall is horizontal and that the backfill within 3 feet of the wall will be compacted with hand-operated compacting equipment.

CONDITION	STATIC (psf/ft)*	SEISMIC (psf/ft)**
<b>Active Pressure</b> (wall is allowed to yield, i.e. move away from the soil, with a minimum 0.001H movement/rotation at the top of the wall, where "H" is the total height of the wall)	35	34
<b>At-Rest Pressure</b> (wall is not allowed to yield)	55	N/A
<b>Passive Pressure</b> (wall moves into the soil)	425	230

*Equivalent Fluid Pressure (applied at 1/3 Height of Wall)

**Equivalent Fluid Pressure (added to static and applied at 1/3 Height of Wall)

## 9.0 FLOOR SLABS

Floor slabs may be established upon suitable (non-collapsible), undisturbed, natural sand/gravel soils and/or on structural fill extending to suitable natural soils (same as for foundations). Under no circumstances shall floor slabs be established directly on potentially collapsible soils, or any topsoil, undocumented fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. This will require removing the upper layer of potentially collapsible silt, which we observed to be about 2 to 4 feet thick in our explorations.

In order to facilitate curing of the concrete, we recommend that floor slabs be directly underlain by at least 4 inches of "free-draining" fill, such as "pea" gravel or 3/4-inch to 1-inch minus, clean, gap-graded gravel. To help control normal shrinkage and stress cracking, the floor slabs should have the following features:

1. Adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints;
2. Frequent crack control joints; and
3. Non-rigid attachment of the slabs to foundation walls and bearing slabs.

## 10.0 DRAINAGE RECOMMENDATIONS

### 10.1 Surface Drainage

The near-surface silt soils are potentially collapsible when subjected to water, thus it is very important to the long-term performance of foundations and floor slabs that water not be allowed to collect near the foundation walls and infiltrate into the underlying soils. We recommend the following:

1. All areas around each residence should be sloped to provide drainage away from the foundations. We recommend a minimum slope of 6 inches in the first 10 feet away from the structure. This slope should be maintained throughout the lifetime of the structure.
2. All roof drainage should be collected in rain gutters with downspouts designed to discharge at least 10 feet from the foundation walls or well beyond the backfill limits, whichever is greater.
3. Adequate compaction of the foundation backfill should be provided. We suggest a minimum of 90% of the maximum laboratory density as determined by ASTM D-1557. Water consolidation methods should not be used under any circumstances.
4. Landscape sprinklers should be aimed away, and maintained a distance of at least 4 feet, from the foundation walls. The sprinkling systems should be designed with proper drainage and be well-maintained. Over watering should be avoided.
5. Other precautions that may become evident during construction.

### 10.2 Foundation Subdrains

Groundwater was not encountered at this site to the maximum depth explored of 8.5 feet below the existing ground surface. In addition, the soils encountered at potential basement depths primarily consisted of sand/gravel (SP, SP-SM, SM, GP and GP-GM), which are Group 1 soils per IRC¹⁰ 2021. Thus, it is our opinion that perimeter foundation subdrains are not needed for this site.

## 11.0 PAVEMENTS

All pavement areas must be prepared as discussed above in **Section 6.1**. Under no circumstances shall pavements be established over topsoil, undocumented fills (if encountered), loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water.

We anticipate the natural silt soils will exhibit poor pavement support characteristics when saturated or nearly saturated. Based on our laboratory testing experience with similar soils, our pavement design utilized a California Bearing Ratio (CBR) of 3 for the natural silt soils. Given the projected traffic as discussed above in

¹⁰ International Residential Code

**Section 1.3**, the following pavement sections are recommended for approximately 4 ESAL's (18-kip equivalent single-axle loads) per day:

MATERIAL	PAVEMENT SECTION THICKNESS (inches)	
Asphalt	3	3
Road-Base	10	6
Subbase	0	6
Total Thickness	13	15

Untreated base course (UTBC) should conform to city specifications, or to 1-inch-minus UDOT specifications for A-1-a/NP, and have a minimum CBR value of 70%. Material meeting our specification for structural fill can be used for subbase, as long as the fines content (percent passing No. 200 sieve) does not exceed 15%. Roadbase and subbase material should be compacted as recommended above in **Section 6.4**. Asphalt material generally should conform to APWA requirements, having a  $\frac{1}{2}$ -inch maximum aggregate size, a 75-gyration Superpave mix containing no more than 15% of recycled asphalt (RAP) and a PG58-28 binder.

## 12.0 QUALITY CONTROL

We recommend that CMT be retained as part of a comprehensive quality control testing and observation program. With CMT on-site we can help facilitate implementation of our recommendations and address, in a timely manner, any subsurface conditions encountered which vary from those described in this report. Without such a program CMT cannot be responsible for application of our recommendations to subsurface conditions which may vary from those described herein. This program may include, but not necessarily be limited to, the following:

### 12.1 Field Observations

Observations should be completed during all phases of construction such as site preparation, foundation excavation, structural fill placement and concrete placement.

### 12.2 Fill Compaction

Compaction testing by CMT is required for all structural supporting fill materials. Maximum Dry Density (Modified Proctor, ASTM D-1557) tests should be requested by the contractor immediately after delivery of any fill materials. The maximum density information should then be used for field density tests on each lift as necessary to ensure that the required compaction is being achieved.

### 12.3 Excavations

All excavation procedures and processes should be observed by a geotechnical engineer from CMT or their representative. In addition, for the recommendations in this report to be valid, all backfill and structural fill

placed in trenches and all pavements should be density tested by CMT. We recommend that freshly mixed concrete be tested by CMT in accordance with ASTM designations.

## 13.0 LIMITATIONS

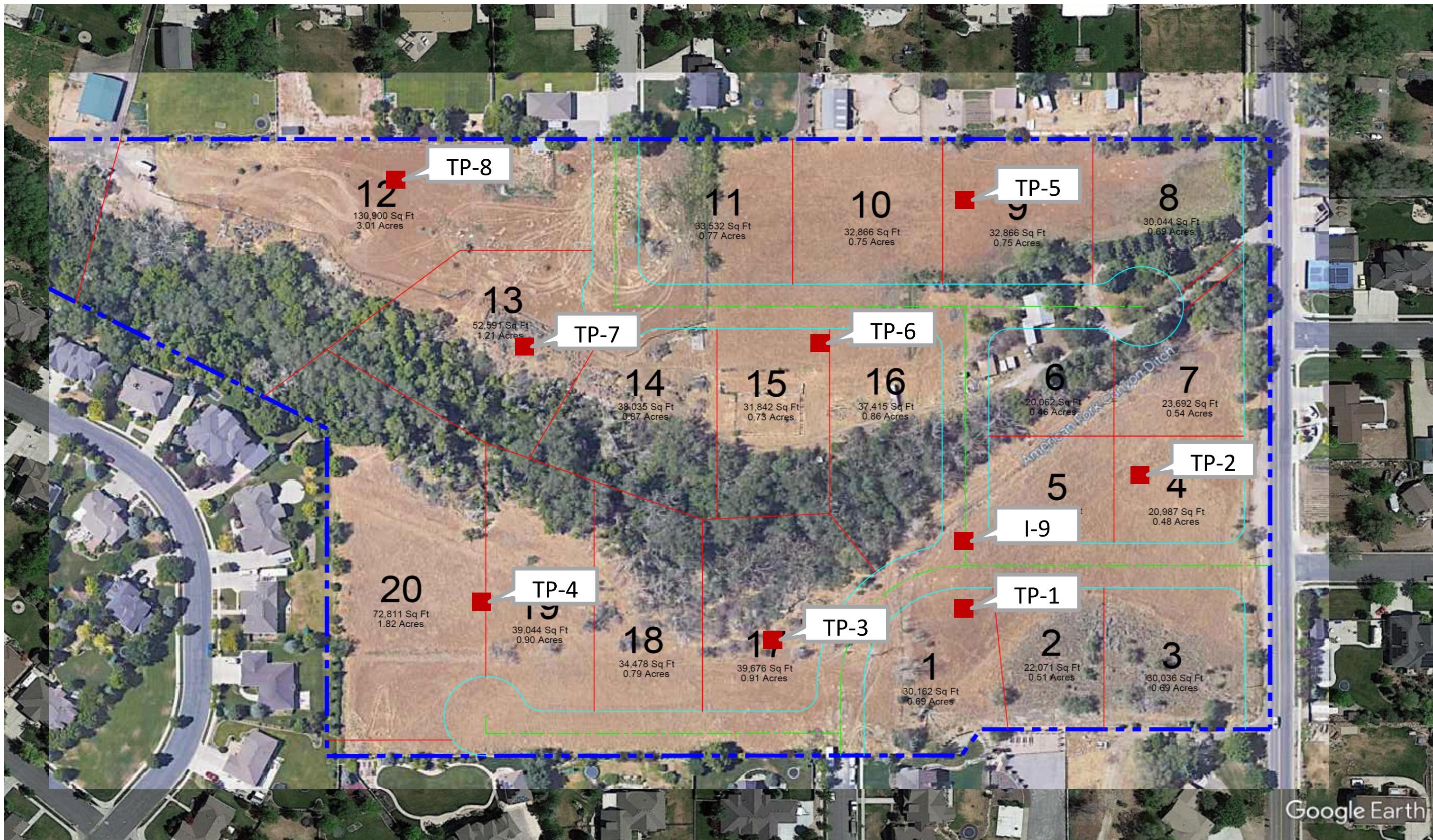
The recommendations provided herein were developed by evaluating the information obtained from the subsurface explorations and soils encountered therein. The exploration logs reflect the subsurface conditions only at the specific location at the particular time designated on the logs. Soil and ground water conditions may differ from conditions encountered at the actual exploration locations. The nature and extent of any variation in the explorations may not become evident until during the course of construction. If variations do appear, it may become necessary to re-evaluate the recommendations of this report after we have observed the variation.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance or if you have any questions regarding this project, please do not hesitate to contact us at (801) 492-4132. To schedule materials testing, please call (801) 381-5141.

# APPENDIX

SUPPORTING  
DOCUMENTATION



# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-1

Total Depth: 7.5'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation		Atterberg		
							Gravel %	Sand %	Fines %	LL	PL
0		Topsoil; darker brown sandy clay with gravel and roots									
1		Brown Sandy SILT (ML), trace gravel, some roots, rootholes and calcification slightly moist, stiff (estimated)									
2		Light Gray SAND (SP), some gravel and calcification, trace silt dry, dense (estimated)									
3		Brown Sandy GRAVEL with silt (GP-GM) slightly moist, very dense (estimated)		1	1		13	85	2		
4				2							
5											
6											
7				3							
8		REFUSAL AT 7.5'									
9											
10											
11											
12											
13											
14											

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.42488°, -111.81301°

Surface Elev. (approx): Not Given

**CMT TECHNICAL SERVICES**

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Page: 1 of 1

Figure:

2

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-2

Total Depth: 7.5'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description		Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation	Atterberg				
								Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; dark brown sandy clay with some gravel and roots											
1		Brown Sandy SILT (ML), trace gravel, some thin roots, rootholes and calcification											
2					4	3	100						NP
3		Light Gray SAND (SP), some gravel, cobbles and calcification, trace silt slightly moist, dense (estimated)											
4					5								
5													
6		Brown Sandy GRAVEL with silt (GP-GM) slightly moist, very dense (estimated)											
7					6								
8		REFUSAL AT 7.5'											
9													
10													
11													
12													
13													
14													

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.42533°, -111.81225°

Surface Elev. (approx): Not Given

**CMT** TECHNICAL  
SERVICES

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Page: 1 of 1

Figure:

3

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

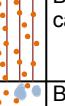
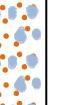
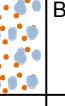
TP-3

Total Depth: 7.5'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation			Atterberg		
							Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; dark brown to brown sand with clay, gravel and major roots										
1		Brown Sandy SILT (ML), trace gravel, some thin roots, rootholes and calcification dry, stiff (estimated)		7								
2		Brown Sandy GRAVEL (GP), trace silt, some roots slightly moist, very dense (estimated)										
3		brownish gray 12" thick sand lense at 3.5'		8								
4				9								
5												
6												
7		Brownish Gray Gravelly SAND with silt (SP-SM), some cobbles slightly moist, very dense (estimated)		10	1		74	23	3			
8		REFUSAL AT 7.5'										
9												
10												
11												
12												
13												
14												

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.4248°, -111.81382°

Surface Elev. (approx): Not Given

**CMT TECHNICAL SERVICES**

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Page: 1 of 1

Figure:

4

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-4

Total Depth: 7.5'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation	Atterberg				
							Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; darker brown sand with clay and some gravel and roots										
1		Brown Sandy SILT (ML), trace gravel, some thin roots, rootholes and calcification dry, stiff (estimated)		11								
2												
3		Brown Gravelly SAND with silt (SP-SM) dry, medium dense (estimated)		12	1	23	69	8				
4												
5												
6		Light Gray Sandy GRAVEL with silt (GP-GM), some cobbles slightly moist, very dense (estimated)		13								
7												
8		REFUSAL AT 7.5'		14								
9												
10												
11												
12												
13												
14												

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.42487°, -111.81507°

Surface Elev. (approx): Not Given

**CMT TECHNICAL SERVICES**

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Figure:

5

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-5

Total Depth: 7'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation	Atterberg				
							Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; darker brown sand with clay and roots Brown Sandy SILT (ML), trace gravel, some roots, rootholes and calcification dry, stiff (estimated)										
1				15								
2												
3		Light Brown to Yellow Silty SAND (SM), some gravel and cobbles, roots and calcification slightly moist, dense (estimated)		16	4		10	47	43			
4				17								
5												
6		Light Brown to Yellow Silty SAND with gravel (SM), some cobbles and calcification slightly moist, dense (estimated)		18								
7		REFUSAL AT 7.0'										
8												
9												
10												
11												
12												
13												
14												

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.4263°, -111.81301°

Surface Elev. (approx): Not Given

**CMT TECHNICAL SERVICES**

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Page: 1 of 1

Figure:

6

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-6

Total Depth: 7'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description		Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation	Atterberg				
								Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; darker brown clay with sand and roots											
1		Brown Sandy SILT (ML), trace gravel, some roots, rootholes and calcification slightly moist, stiff (estimated)			19								
2		grades lighter brown											
3					20	4	100					NP	NP
4		Light Brown Gravelly SAND with silt (SP-SM), some roots and calcification slightly moist, dense (estimated)											
5					21								
6		Grayish Brown Sandy GRAVEL with silt (GP-GM) slightly moist, very dense (estimated)											
7		REFUSAL AT 7.0'			22								
8													
9													
10													
11													
12													
13													
14													

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.42576°, -111.81361°

Surface Elev. (approx): Not Given

**CMT** TECHNICAL  
SERVICES

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Figure:

7

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-7

Total Depth: 8.5'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation		Atterberg		
							Gravel %	Sand %	Fines %	LL	PL
0		Topsoil; darker brown sandy clay with roots									
1		Brown Sandy SILT (ML), trace gravel, some roots, rootholes and calcification dry, stiff (estimated)		23							
2		Brown Gravelly SAND with silt (SP-SM), some roots, rootholes and calcification dry, medium dense (estimated)									
3				24	2		46	47	7		
4											
5		Light Brown to Whitish Sandy SILT (ML), some rootholes and calcification slightly moist, very stiff (estimated)		25							
6											
7		Light Brownish Gray Silty SAND (SM), some gravel and calcification slightly moist, medium dense (estimated)		26							
8		END AT 8.5'									
9											
10											
11											
12											
13											
14											

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.4258°, -111.81494°

Surface Elev. (approx): Not Given

**CMT TECHNICAL SERVICES**

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Figure:

8

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Test Pit Log

TP-8

Total Depth: 8'

Water Depth: (see Remarks)

Date: 10/4/23

Job #: 21033

Depth (ft)	GRAPHIC LOG	Soil Description		Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gradation	Atterberg				
								Gravel %	Sand %	Fines %	LL	PL	PI
0		Topsoil; darker brown sandy clay with roots											
1		Brown Sandy SILT (ML), trace gravel, some roots, rootholes and calcification dry, stiff (estimated)			27								
2		Brown Gravelly SAND with silt (SP-SM) dry, medium dense (estimated)											
3		Brownish Gray Sandy GRAVEL (GP), trace silt dry, very dense (estimated)			28								
4					29								
5					30	2	64	32	4				
6		grades with some cobbles											
7													
8		END AT 8'											
9													
10													
11													
12													
13													
14													

Remarks: Groundwater not encountered during excavation.

Coordinates: 40.42638°, -111.81548°

Surface Elev. (approx): Not Given

**CMT** TECHNICAL  
SERVICES

Equipment: Mini Excavator

Excavated By: CMT Technical Services

Logged By: Carolina Olivera

Page: 1 of 1

Figure:

9

# Foxwood Estates

About 10635 North 6400 West, Highland, Utah

## Key to Symbols

Date: 10/4/23

Job #: 21033

①	②	③	④	⑤	⑥	⑦	Gradation	Atterberg				
Depth (ft)	GRAPHIC LOG	Soil Description	Sample Type	Sample #	Moisture (%)	Dry Density(pcf)	Gravel %	Sand %	Fines %	LL	PL	PI

### COLUMN DESCRIPTIONS

① **Depth (ft.):** Depth (feet) below the ground surface (including groundwater depth - see below right).

② **Graphic Log:** Graphic depicting type of soil encountered (see ② below).

③ **Soil Description:** Description of soils, including Unified Soil Classification Symbol (see below).

④ **Sample Type:** Type of soil sample collected; sampler symbols are explained below-right.

⑤ **Sample #:** Consecutive numbering of soil samples collected during field exploration.

⑥ **Moisture (%):** Water content of soil sample measured in laboratory (percentage of dry weight).

⑦ **Dry Density (pcf):** The dry density of a soil measured in laboratory (pounds per cubic foot).

⑧ **Gradation:** Percentages of Gravel, Sand and Fines (Silt/Clay), obtained from lab test results of soil passing the No. 4 and No. 200 sieves.

⑨ **Atterberg:** Individual descriptions of Atterberg Tests are as follows:

**LL = Liquid Limit (%)**: Water content at which a soil changes from plastic to liquid behavior.

**PL = Plastic Limit (%)**: Water content at which a soil changes from liquid to plastic behavior.

**PI = Plasticity Index (%)**: Range of water content at which a soil exhibits plastic properties (= Liquid Limit - Plastic Limit).

STRATIFICATION		MODIFIERS	MOISTURE CONTENT
Description	Thickness	Trace	Dry: Absence of moisture, dusty, dry to the touch.
Seam	Up to 1/2 inch	<5%	Moist: Damp / moist to the touch, but no visible water.
Lense	Up to 12 inches	Some	Wet: Visible water, usually soil below groundwater.
Layer	Greater than 12 in.	With	
Occasional	1 or less per foot	> 12%	
Frequent	More than 1 per foot		

### UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS SYMBOLS	②	TYPICAL DESCRIPTIONS		
COARSE-GRAINED SOILS  More than 50% of material is larger than No. 200 sieve size.	GRAVELS  The coarse fraction retained on No. 4 sieve.	CLEAN GRAVELS (< 5% fines)	GW		Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines		
		GRAVELS WITH FINES (≥ 12% fines)	GP		Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines		
		CLEAN SANDS (< 5% fines)	GM		Silty Gravels, Gravel-Sand-Silt Mixtures		
		GC	GC		Clayey Gravels, Gravel-Sand-Clay Mixtures		
		SANDS The coarse fraction passing through No. 4 sieve.	SW		Well-Graded Sands, Gravelly Sands, Little or No Fines		
	SANDS WITH FINES (≥ 12% fines)	SP	SP		Poorly-Graded Sands, Gravelly Sands, Little or No Fines		
		SM	SM		Silty Sands, Sand-Silt Mixtures		
		SC	SC		Clayey Sands, Sand-Clay Mixtures		
		SILTS AND CLAYS Liquid Limit less than 50%	ML		Inorganic Silts and Sandy Silts with No Plasticity 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		
			MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils		
			CH		Inorganic Clays of High Plasticity, Fat Clays		
FINE-GRAINED SOILS  More than 50% of material is smaller than No. 200 sieve size.			OH		Organic Silts and Organic Clays of Medium to High Plasticity		
HIGHLY ORGANIC SOILS			Peat, Soils with High Organic Contents				

Note: Dual Symbols are used to indicate borderline soil classifications (i.e. GP-GM, SC-SM, etc.).

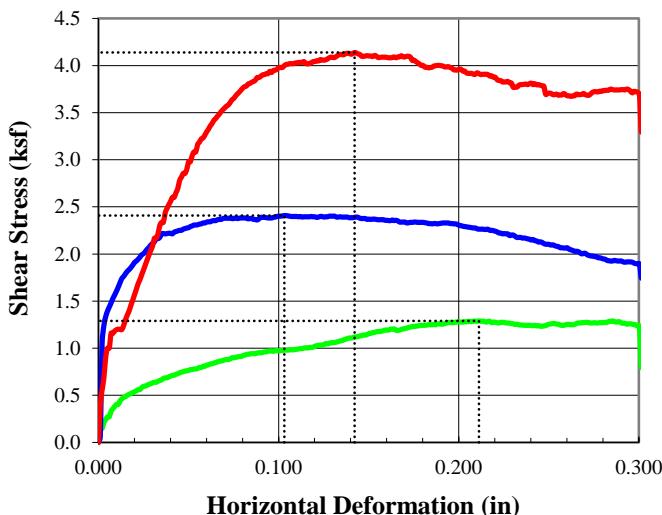
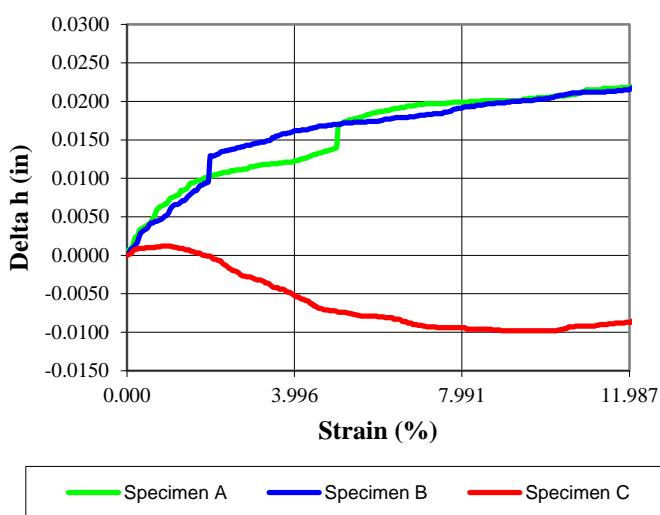
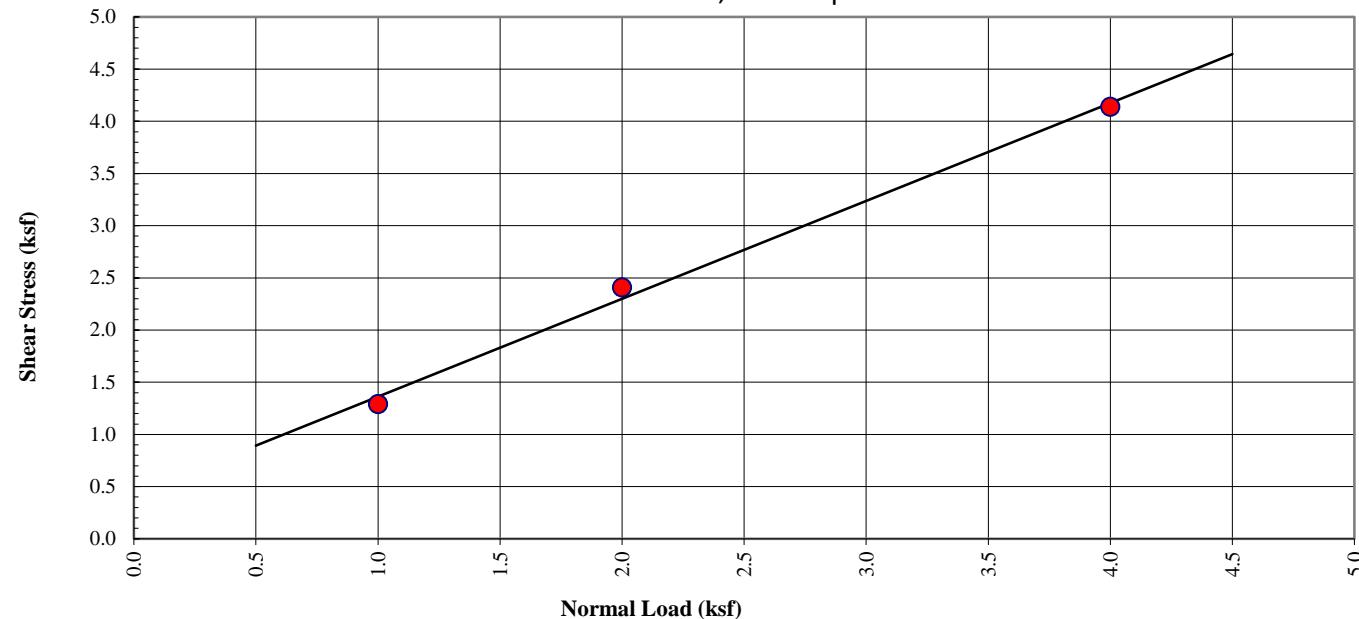
- The results of laboratory tests on the samples collected are shown on the logs at the respective sample depths.
- The subsurface conditions represented on the logs are for the locations specified. Caution should be exercised if interpolating between or extrapolating beyond the exploration locations.
- The information presented on each log is subject to the limitations, conclusions, and recommendations presented in this report.

Figure:

10

# Direct Shear Test (ASTM D3080)

Peak:  $\Phi = 43.2^\circ$ ,  $c = 424 \text{ psf}$



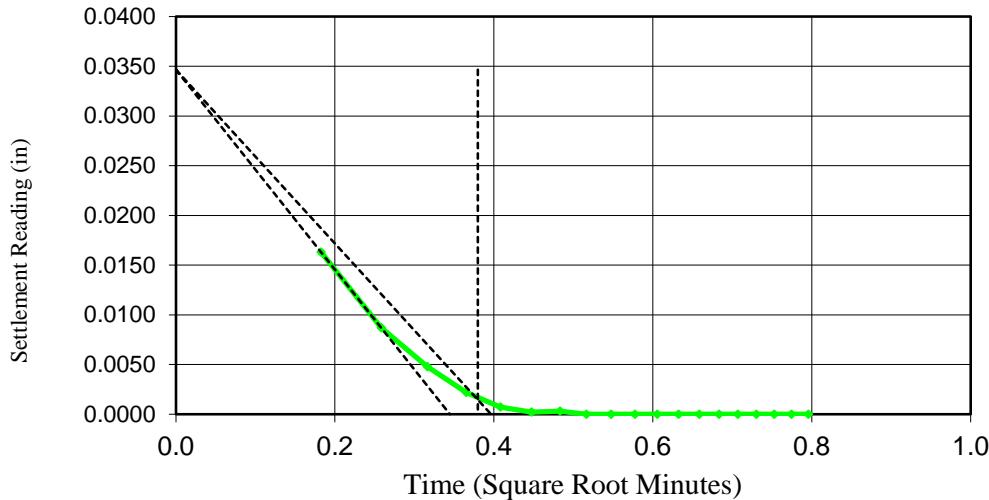
Initial	Specimen		
	A	B	C
Moisture (%)	8.00	8.00	8.00
Dry Density (pcf)	110.00	110.00	110.00
Void Ratio	0.50	0.50	0.50
Saturation (%)	42.13	42.13	42.13
Diameter (in)	2.42	2.42	2.42
Height (in)	1.00	1.00	1.00

Final	Specimen		
	A	B	C
Moisture (%)	15.33	15.33	15.33
Dry Density (pcf)	112.18	110.67	112.32
Void Ratio	0.47	0.49	0.47
Saturation (%)	85.7	82.2	86.0
Diameter (in)	2.42	2.42	2.42
Height (in)	1.00	1.00	1.00
Normal Load (ksf)	1.00	2.00	4.00
Shear Stress (ksf)@Peak	1.29	2.41	4.14
Peak Strain (%)	8.72	4.26	5.87
Rate (in/min)	0.0033	0.0033	0.0033
Peak Deformation (in.)	0.211	0.103	0.142

Sample Information		
Test Pit Number:	TP-4	
Sample Number:	-	
Depth:	3 ft	
Sample Type:	Remolded	
Description:	Gravelly Sand w/silt (SP-SM)	
Test Type:	Consolidated - Drained	

# Direct Shear Test (ASTM D3080)

Consolidation Graph Specimen A



$$\sqrt{t_{90}} = 0.38$$

$$t_{90} = 0.1 \text{ min.}$$

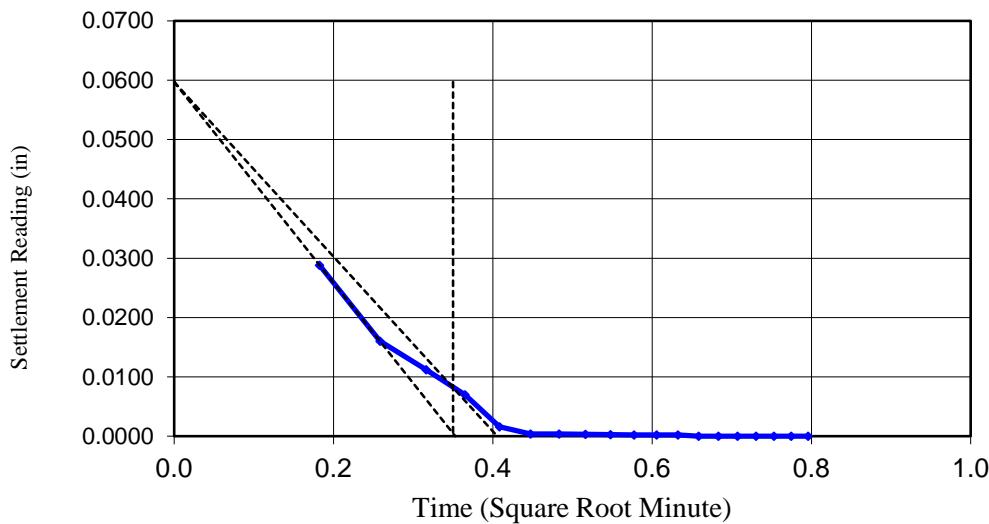
$$t_f = 50 t_{90} / 4.28 = 1.7 \text{ min.}$$

$$\max d_r = 0.5 / t_f = 0.2964 \text{ in./min.}$$

$$\text{selected } d_r = 0.0033 \text{ in./min.}$$

condition = Drained

Consolidation Graph Specimen B



$$\sqrt{t_{90}} = 0.35$$

$$t_{90} = 0.1 \text{ min.}$$

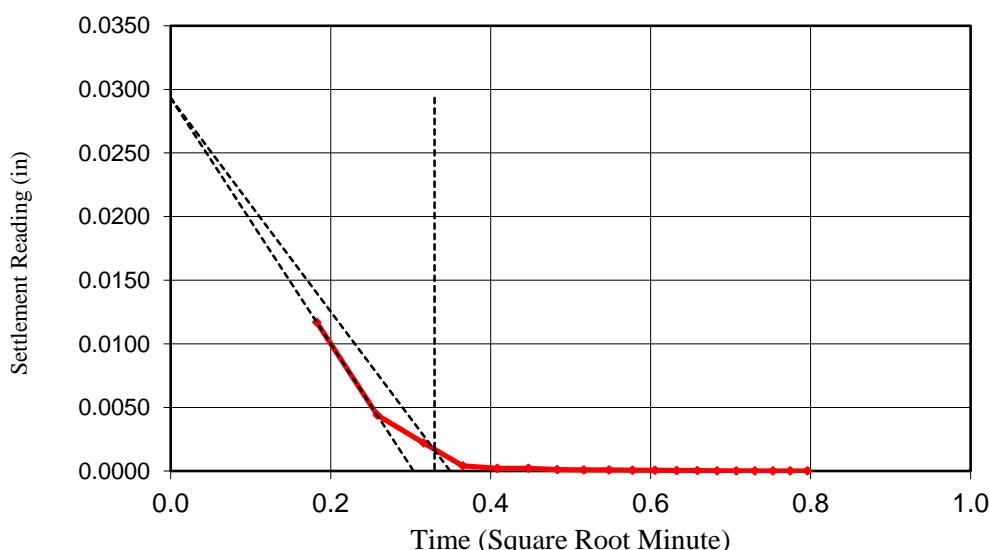
$$t_f = 50 t_{90} / 4.28 = 1.4 \text{ min.}$$

$$\max d_r = 0.5 / t_f = 0.3494 \text{ in./min.}$$

$$\text{selected } d_r = 0.0033 \text{ in./min.}$$

condition = Drained

Consolidation Graph Specimen C



$$\sqrt{t_{90}} = 0.33$$

$$t_{90} = 0.1 \text{ min.}$$

$$t_f = 50 t_{90} / 4.28 = 1.3 \text{ min.}$$

$$\max d_r = 0.5 / t_f = 0.3930 \text{ in./min.}$$

$$\text{selected } d_r = 0.0033 \text{ in./min.}$$

condition = Drained

Foxwood Estates

About 10635 North 6400 West, Highland, Utah

**CMT** TECHNICAL  
SERVICES

Lab Data

Date: 9-Nov-23  
Job #: 21033

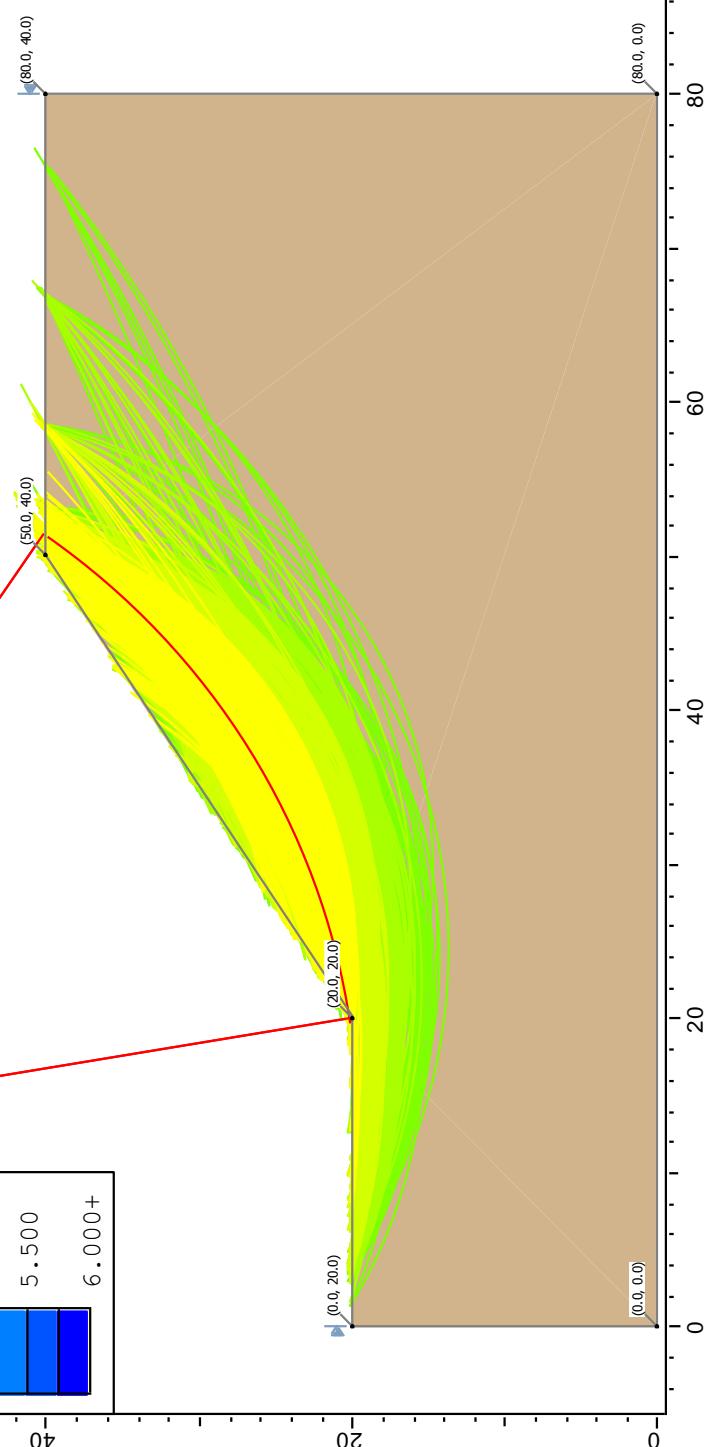
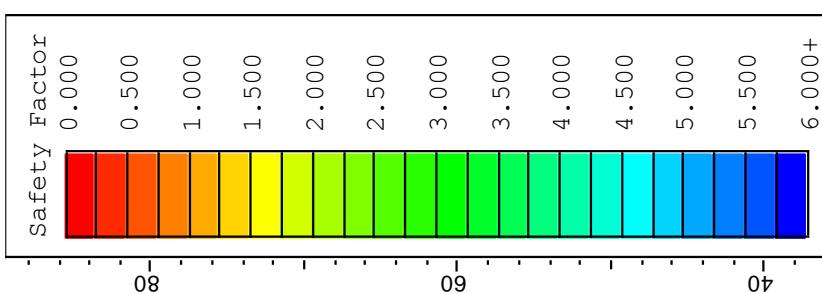
Figure:

**11B**

# Stability Results - Static

Material Name	Color	Unit Weight (lbs/ft ³ )	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Sand/ Gravel		130	Mohr-Coulomb	50	38	None	0

**1.565**



Foxwood Estates

About 10635 North 6400 West, Highland, Utah

**CMT** TECHNICAL  
SERVICES

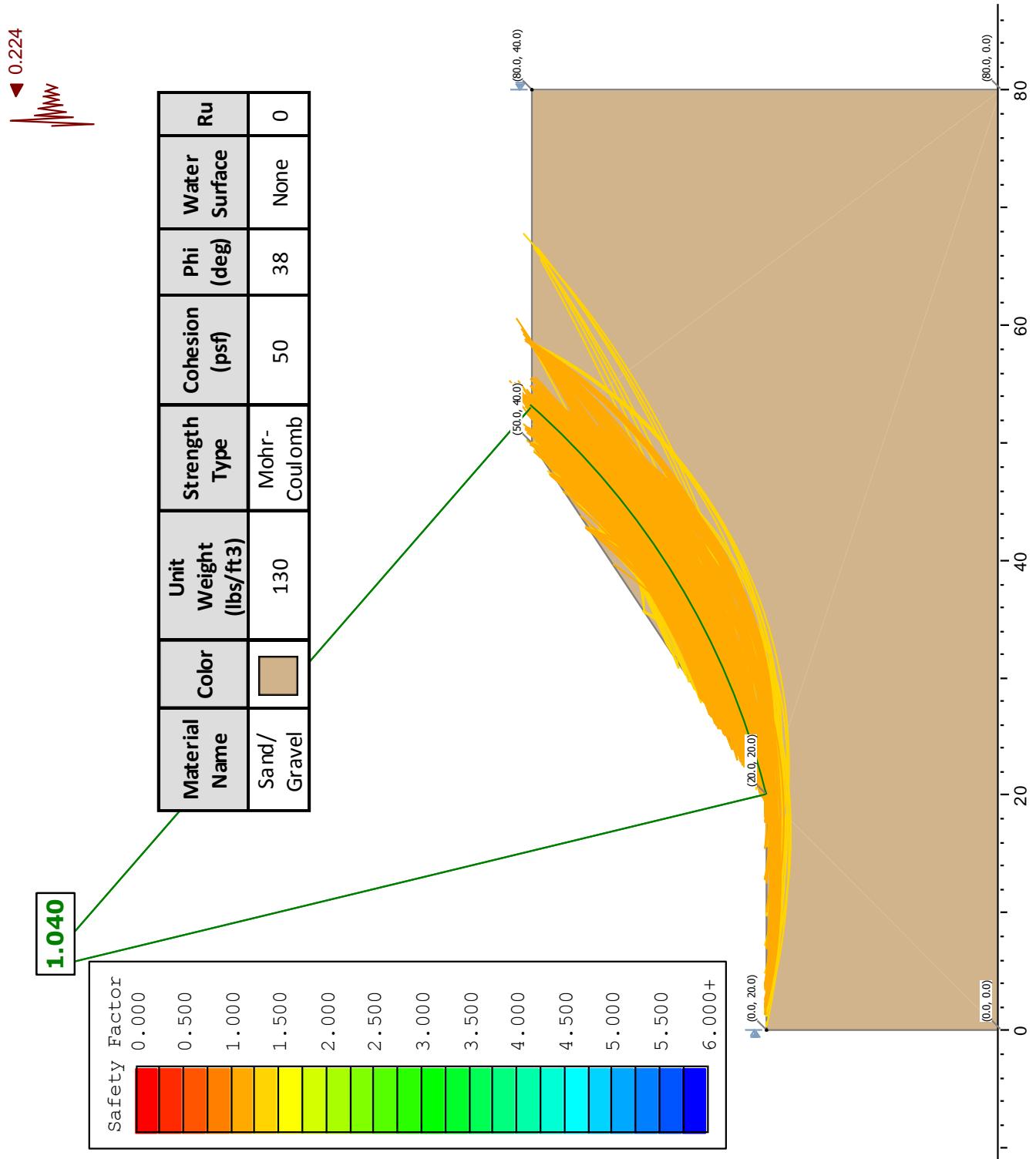
Results

Date	28-Nov-23
Job No.	21033

Figure

12

# Stability Results - Seismic



Foxwood Estates

About 10635 North 6400 West, Highland, Utah

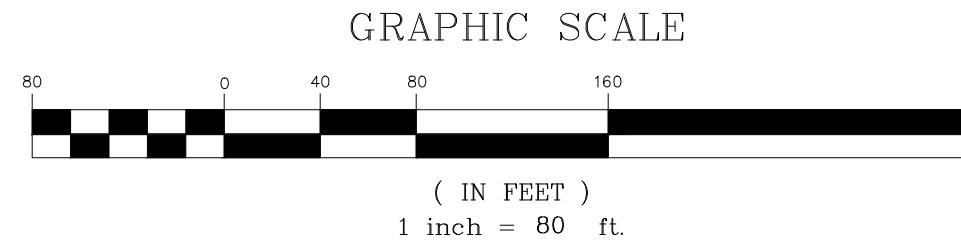
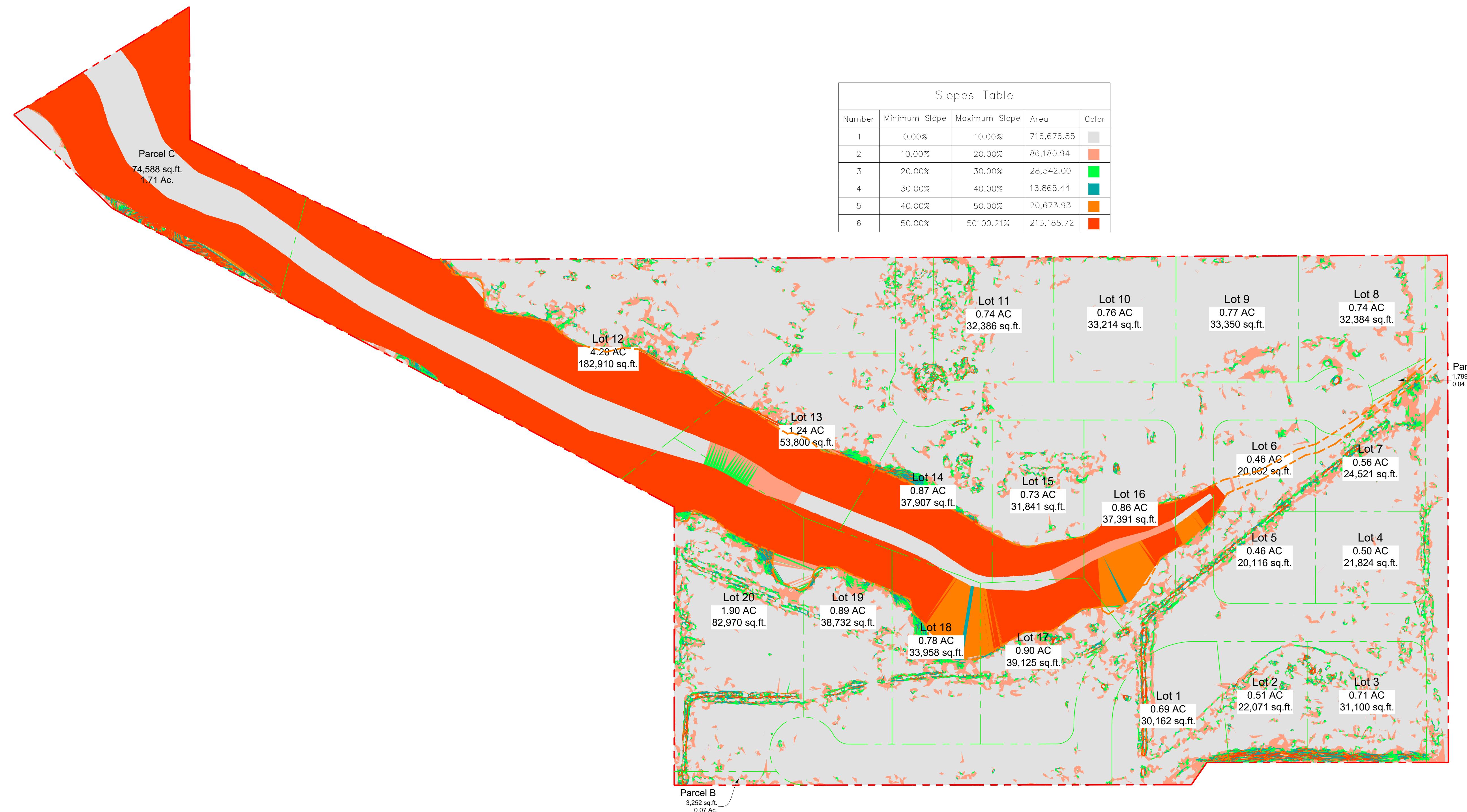
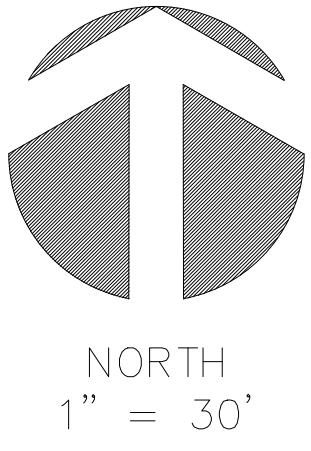
**CMT** TECHNICAL  
SERVICES

Results

Date	28-Nov-23
Job No.	21033

Figure

13



DUDLEY AND ASSOCIATES  
ENGINEERS PLANNERS SURVEYORS  
353 EAST 1200 SOUTH, OREM, UTAH  
801-224-1252

FOXWOOD ESTATES  
SLOPE ANALYSIS

Utah

HIGHLAND

Date  
11-8-2023  
Scale  
1" = 80'  
By  
TD  
Tracing No.  
L - 14816

Sheet No.  
SL - 1