Midway City Council
16 August 2022
Regular Meeting

Bonner Meadows /
Preliminary Approval

Midway

CITY COUNCIL MEETING STAFF REPORT

DATE OF MEETING:	August 16, 2022
NAME OF PROJECT:	Bonner Meadows
NAME OF APPLICANT:	Colton Chronister
OWNER OF RECORD:	Johnsons Landing LLC
AGENDA ITEM:	Preliminary Approval
LOCATION OF ITEM:	100 East 100 South
ZONING DESIGNATION:	R-1-9

ITEM: 9

Colton Chronister, agent for Johnsons Landing LLC, is requesting preliminary approval of Bonner Meadows. The proposal is for an 18-lot subdivision on 5.99 acres in the R-1-9 zone. The property is located at approximately 100 East 100 South.

BACKGROUND:

This request is for preliminary approval of Bonner Meadows, a large-scale subdivision on 5.99 acres that will contain 18 lots. Most of the proposed lots in the subdivision will obtain frontage along new roads built within the subdivision (100 South and 180 East) and four lots will front the existing 100 East. The property is in the R-1-9 zones which allows single-family dwellings and duplex dwellings (duplex lots require more frontage, acreage, and water rights than single-family lots). None of the lots qualify as duplex lots.

This R-1-9 zone does not require open space, so no open space has been included in the proposal. The parcel is located close to Main Street where many services are located. It is also close to the Midway Elementary School and a church. The property has historically been used for agriculture. The sidewalks in the development are 5' wide and park strips are 8' wide. The new sidewalks will greatly help the movement of pedestrians, especially the school children in the area. Children currently use 200 East to access school which does not have a sidewalk. With the proposed development, children will now be able to use the new 5' sidewalks which will allow a safer walk to school. The developer has included an 8' trail that will run from the end of the cul-de-sac to 185 South, which will become school property.

The General plan describes the R-1-9 zone as the following:

> *The R-1-9 zone (9,000 sf lot) provides a residential environment within the City which is characterized by smaller lots and somewhat denser residential environment than is characteristic of the R-1-11 Zone. Nevertheless, this zone is characterized by spacious yards and other residential amenities adequate to maintain desirable residential conditions. The principal uses permitted in this zone shall be one and two-family dwellings and certain other public facilities needed to promote and maintain stable residential neighborhoods. This zone should be planned with an emphasis on walkability.*

This item was continued from the May 3, 2022, City Council meeting. The City Council continued the item for three reasons. First, the City Council had passed three pending ordinances that could have impacted the proposal. The pending ordinances were for six months and are now nearing their term. Two of the three ordinances have now been adopted (PUDs and standard subdivisions) and the third (moderate income housing), because of recent changes to State law, is now not applicable. Therefore, regarding the first reason for the continuance, the applicant is now able to proceed in pursuing approval of the subdivision application. Second, the City Council asked that more information is provided regarding safety issues. Staff has asked the applicant to provide a safety plan to present to the City Council. The applicant will present a plan in the City Council meeting for the Council to consider. Lastly, the continuance motion required the applicant to work with the school district to receive input regarding any safety issues. It is staff's understanding that this input will be part of the safety plan presentation.

LAND USE SUMMARY:

- 5.99-acres
- R-1-9 zoning
- Proposal contains eighteen single family building lots (no duplex lots)

- Access to lots is provided by 100 East and new roads 100 South and 180 East
- There are no known sensitive lands on the property
- The lots will connect to the Midway Sanitation District sewer, Midway City's culinary water line, and Midway Irrigation Company's secondary waterline

ANALYSIS:

Access/Roads – Access will be from 100 South, 100 East and 180 East. The proposed 100 South will access 200 East north of lot 17 of the Timpanogos View Estates where the City owns a 60' wide area that was deeded to the City for a future road when the Timpanogos View Estates plat was recorded in August of 1973.

The new cul-de-sac complies with the maximum cul-de-sac length of 1,300' and maximum lot count on a cul-de-sac of eleven.

The applicant will be required to improve all existing roads abutting the development to match to a city standard half width.

Frontage – The land use code requires that all lots to meet the minimum frontage requirements for the zone. The R-1-9 zone requires 90' of frontage for detached single family lots (non-duplex lots) but allows a reduction of frontage down to 60' if 75% of the frontage is contained within the bulb of a cul-de-sac. All lots appear to meet these requirements.

Single-family dwellings – Only single-family dwellings will be allowed on the eighteen lots, even though the R-1-9 zone does allow for both attached and detached duplexes. Duplexes are not allowed because the lots do not comply with the minimum code requirements for duplexes which includes additional water for a second culinary connection, adequate frontage, and minimum lot sizes. A note should be included on the plat advising future lot owners of the limitation.

Sidewalks and connectivity – The developer will install 5' sidewalks throughout the development and along existing street frontages that are contiguous with the development. The new sidewalks will greatly help the movement of pedestrians, especially school children, in the area. Many children use 200 East to access the school which does not have sidewalk. Now children will be able to use the new 5' sidewalks in the proposal which will allow a safer walk to school. The developer has included an 8' asphalt trail that will run from the end of the cul-de-sac to 185 South, which will become school property.

City and School District agreement of 185 South – The City and the Wasatch School District agreed to a property exchange in 2017 that allowed for the construction of Michie Lane (300 South). The agreement was that the school district would deed Michie Lane to the City to allow for construction of the road if the City, at a future date, would deed 185 South to the school district. The catalyst for deeding 185 South was determined to be when 100 South is built which, is part of the proposed Bonner Meadows subdivision. Basically, the City agreed to vacate one road if two new roads were in service. The deeding of 185 to the school district will allow the school to have flexibility regarding future plans for Midway Elementary and its surrounding property. Once 100 South is built and deeded to the City then the City will need to follow the process, as outlined in the State code, to vacate the road and then deed it to the school district.

Geotechnical Study – A Geotechnical Study has been submitted to the City and has been reviewed by Horrocks Engineers (see attached).

Sensitive Lands – The applicant has submitted and environmental assessment and has not identified any sensitive lands that are part of the proposed development (see attached).

Culinary Water Connection – The lots will connect to existing city culinary water lines located in the area.

Sewer Connection – The lots will connect to existing Midway Sanitation District sewer lines located in the area.

Fire Flow - A fire hydrant will need to be located within 500' of any future dwellings, measured by the route of a fire hose from the fire hydrant to the future home site.

Secondary Water Connection – The lots will connect to Midway Irrigation Company's secondary water system which is already servicing the property. Secondary water meters are required for each lateral. The applicant has submitted a will-serve letter from the Midway Irrigation Company (see attached).

Traffic study – A traffic study is required for this proposal since there are more than 15 lots proposed which the applicant has submitted (see attached).

100 East construction – One of the main routes to access Midway Elementary is 100 East. Buses, vehicles carrying students, and pedestrians and students all access the school along this route. Staff feels it is very important that construction for 100 East takes place in the summer before school begins for safety concerns. The other roads in the subdivision (100 South and 180 East) do not present the same safety issues that 100 East presents since they are new roads and therefore should not have the same construction timing restriction. It is recommended that a condition of approval is that any construction on 100 East takes place before school starts in the fall.

- The sidewalks crossing the property and connecting to neighboring roads and existing sidewalks will benefit the community by allowing safe pedestrian access.

- Any failure to submit a proposed final plan and final approval submittal package within one year of the approval of the Preliminary Plan by the City Council shall terminate all proceedings and render the Preliminary Plan null and void.

ALTERNATIVE ACTIONS:

1. Approval. This action can be taken if the City Council finds that conditions placed on the approval can resolve any outstanding issues.

    a. Accept staff report
    b. List accepted findings
    c. Place condition(s)

2. Continuance. This action can be taken if the City Council finds that there are unresolved issues.

    a. Accept staff report
    b. List accepted findings
    c. Reasons for continuance
        i. Unresolved issues that must be addressed
    d. Date when the item will be heard again

3. Denial. This action can be taken if the City Council finds that the request does not meet the intent of the ordinance.

    a. Accept staff report
    b. List accepted findings
    c. Reasons for denial

PROPOSED CONDITIONS:

1. Any construction on 100 East and 185 South takes place in the summer break when school is not in session.

HORROCKS
ENGINEERS

728 West 100 South
Heber, UT 84032
435-654-2226
www.horrocks.com

April 12, 2022

Midway City
Attn: Michael Henke
75 North 100 West
Midway, Utah 84049

Subject: Bonner Meadows – Preliminary Review

Dear Michael:

Horrocks Engineers recently reviewed the above development plans for Preliminary Approval. The proposed development is located between the blocks of 100 South and 185 South and 100 East and 200 East. The entire development is 5.99 acres and contains 18 lots. The following comments should be addressed.

General Comments

- The roads, culinary water, and storm drain systems within this development will be public infrastructure and maintained by Midway City.

Water

- The proposed development will be served from the Gerber Mahogany pressure zone.
- The proposed development will connect to the existing 12" culinary water line in 100 East and the existing 8" culinary water line in 200 East.
- 8" water lines will be installed within the development. The proposed culinary water system will provide adequate fire flows.
- The development will need to install an 8" water line in 100 East from 100 South to 185 South.

Roads

- A new road is proposed to be installed on 100 South from 100 East to 200 East. All new roads will have a cross section of 26' of asphalt, modified curb & gutter, an 8' park-strips and 5' sidewalks.
- Due to the roadway dedication on Michie Lane, Midway City will be dedicating 185 South from 100 East to the eastern property line of the Midway Elementary to the Wasatch School District.

Storm Drain

- The storm water within the proposed development will be public and will be collected and dispersed through the use of catch basins, sumps, and retention basins.
- For maintenance a utility easement within 185 South needs to be provided to maintain access to the storm drain pond and sumps.

Irrigation

- The proposed development will connect to an existing irrigation in 100 East and 200 East and install services with meters according to Midway Irrigation Company

728 West 100 South
Heber, UT 84032
435-654-2226
www.horrocks.com

standards.

- There is an existing drainage ditch that will need to be piped through the subdivision. Work with Mike Kohler for location and pipe material allowed.

Trails

- There will be an 8' trail connecting the cul-de-sac to 185 South.

Please feel free to call our office with any questions.

Sincerely,
HORROCKS ENGINEERS

Wesley Johnson, P. .
Midway City Enginee

cc: Berg Engineering

Midway City Corporation

Midway

75 North 100 West
P.O. Box 277
Midway, Utah 84049

Phone: 435-654-3223
Fax: 435-654-4120

midwaycityut.org

Bonner Meadows Preliminary Approval

August 8, 2022

Michael Henke Midway City Planning Director,

I have reviewed the plans for Bonner Meadows for compliance with the 2018 International Fire Code (2018 IFC). I have no fire code concerns with these preliminary plans that have already been approved by the Midway City Planning Commission and are now awaiting preliminary approval from the Midway City Council.

I will perform a final approval fire review of the Bonner Meadow plans prior to final approval.

Tex R. Couch CBO/MCP
Midway City Building Official/Fire Marshal
75 West 100 North
Midway, Utah 84049
tcouch@midwaycityut.org
(435)654-3223 Ext. 107

Exhibits

Exhibit A – Location Maps

Exhibit B – Proposed Preliminary Plans

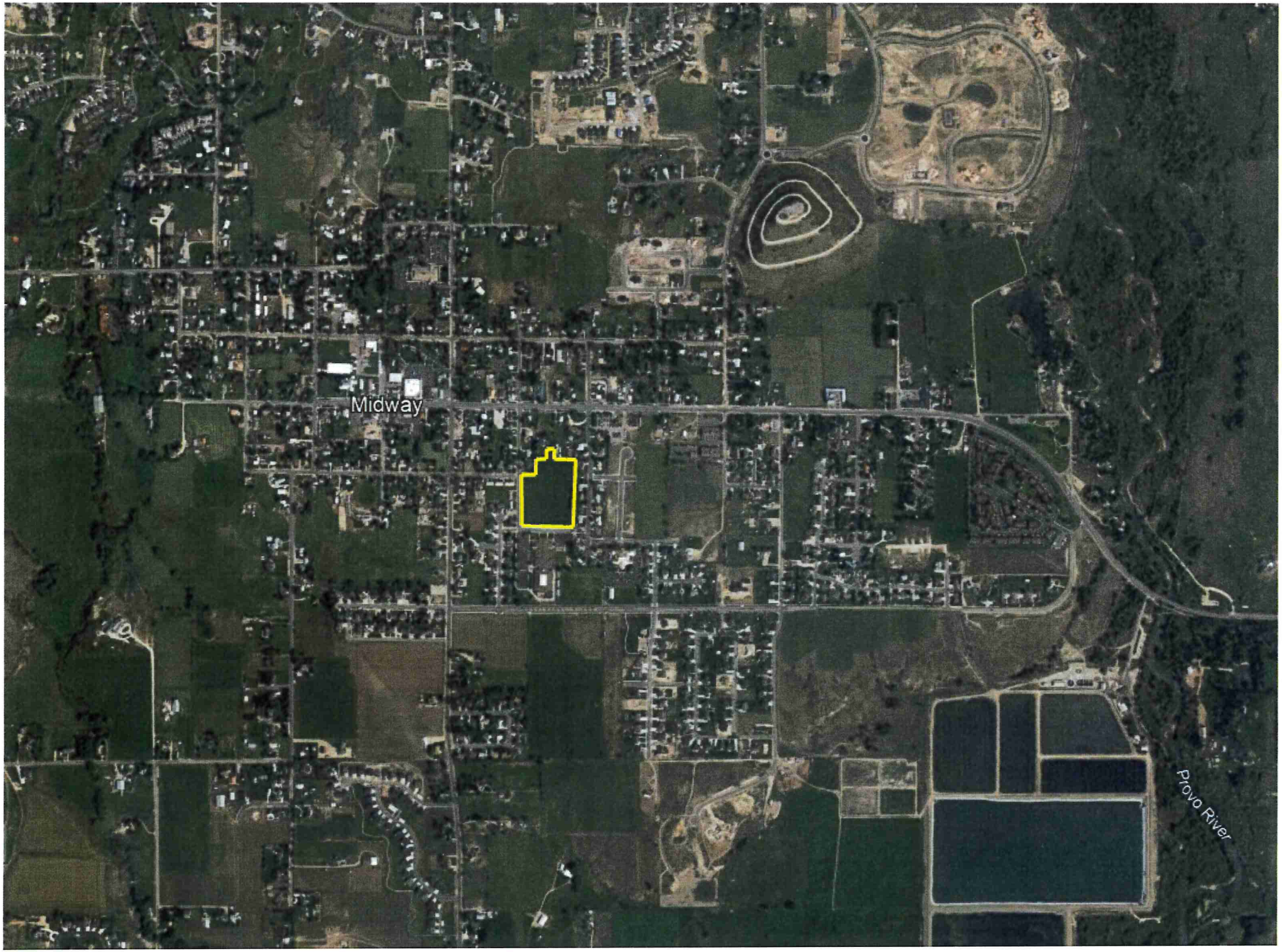
Exhibit C – Midway Irrigation Company Will Serve Letter

Exhibit D – Environmental Assessment Review

Exhibit E – Trip Generation Study

Exhibit F – Geotechnical Study

Exhibit A


Midway
Provo River


610 ft

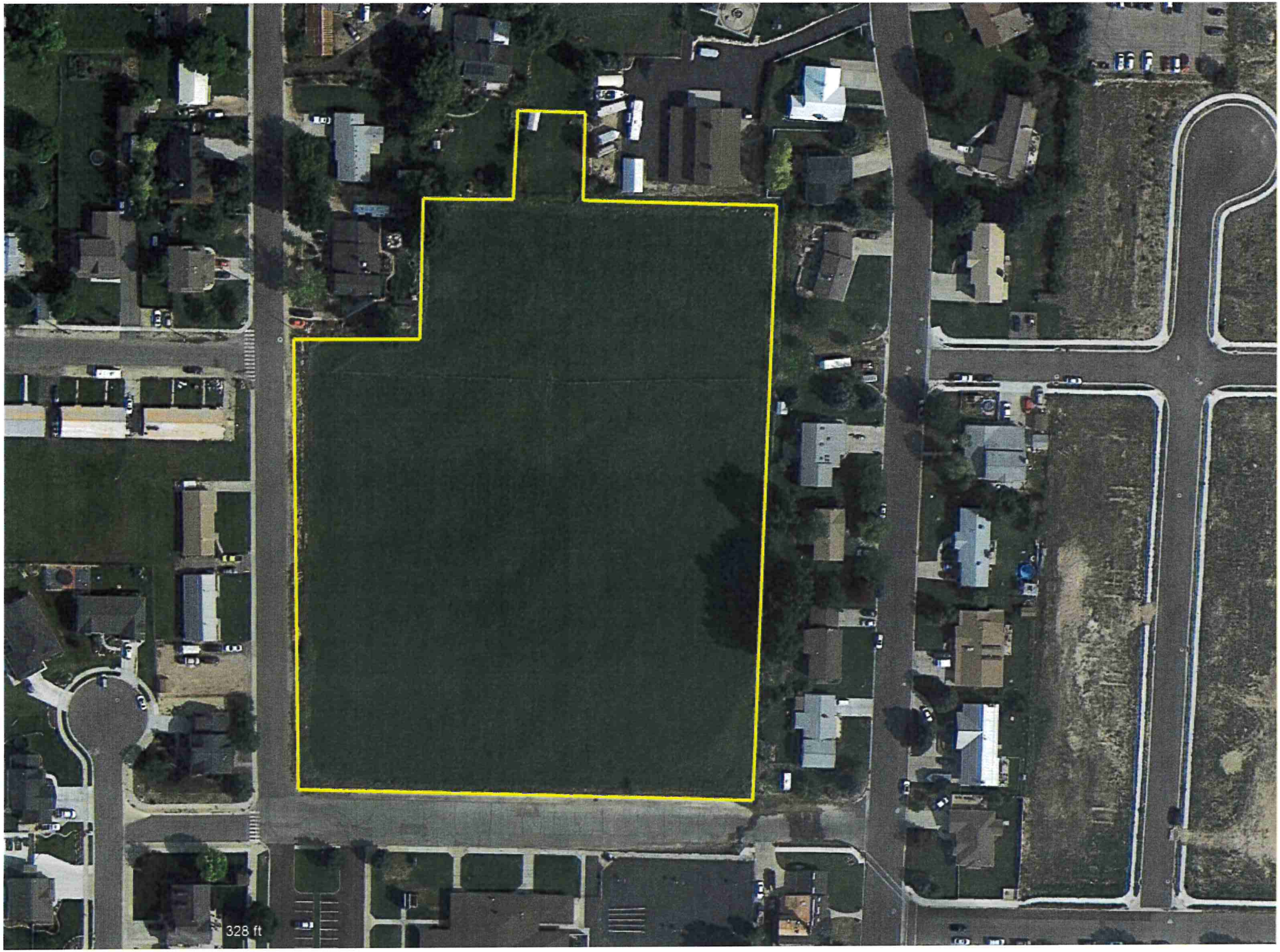
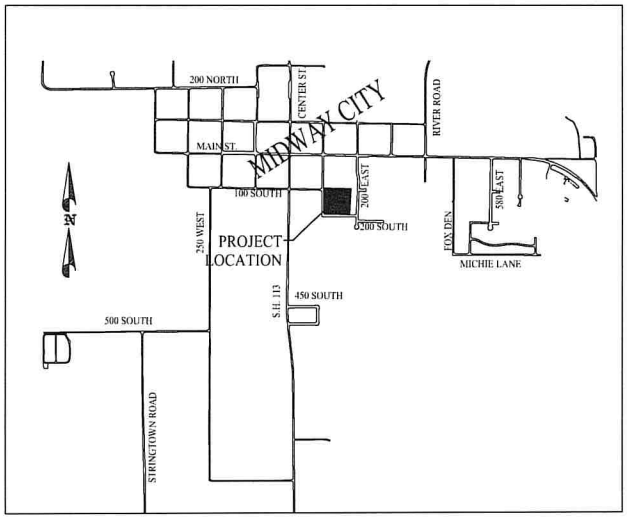

328 ft

Exhibit B

BONNER MEADOWS

PRELIMINARY PLANS



MIDWAY CITY
VICINITY MAP

SHEET INDEX

BONNER MEADOWS PRELIMINARY PLANS - 9 MARCH 2022

C.W. URBAN
BONNER MEADOWS
COVER SHEET

BERG ENGINEERING
380 E Main St. Suite 204
Midway, Ut 84049
ph 435.657.9749

DESIGN BY: PDB	DATE: 09 MAR 2022	SHEET
DRAWN BY: PDB	REV:	0

BOUNDARY DESCRIPTION

BEGINNING AT A POINT WHICH IS EAST 511.90 FEET AND NORTH 752.39 FEET FROM THE SOUTHWEST QUARTER CORNER OF SECTION 35, TOWNSHIP 3 SOUTH, RANGE 4 EAST, SALT LAKE BASE AND MERIDIAN;

THENCE NORTH 00°05'57" EAST 440.20 FEET;
THENCE SOUTH 89°07'04" EAST 462.47 FEET;
THENCE SOUTH 02°14'09" WEST 460.00 FEET;
THENCE NORTH 88°27'53" WEST 430.78 FEET;
THENCE ALONG THE ARC OF A 15.00 FOOT RADIUS CURVE TO THE LEFT 23.19 FEET (CENTRAL ANGLE OF 88°33'50" AND CHORD OF NORTH 44°10'58" WEST 20.95 FEET) TO THE POINT OF BEGINNING.

CONTAINING: 4.77 ACRES

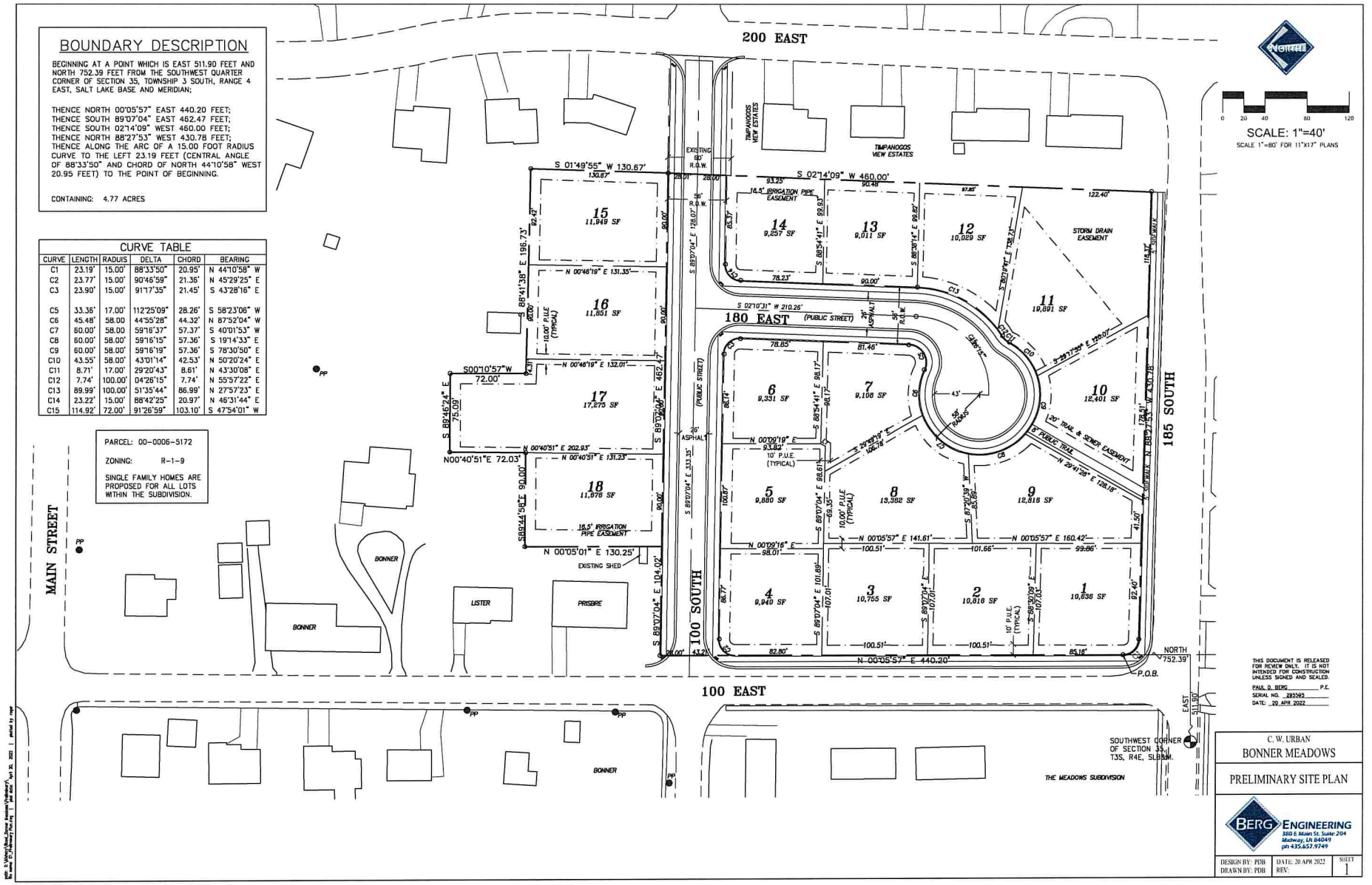
CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	CHORD	BEARING
C1	23.19'	15.00'	88°33'50"	20.95'	N 44°10'58" W
C2	23.77'	15.00'	90°46'59"	21.36'	N 45°29'25" E
C3	23.90'	15.00'	91°17'35"	21.45'	S 43°28'16" E
C5	33.36'	17.00'	112°25'09"	28.26'	S 58°23'06" W
C6	45.48'	58.00	44°55'28"	44.32'	N 87°52'04" W
C7	60.00'	58.00	59°16'37"	57.37'	S 40°01'53" W
C8	60.00'	58.00'	59°16'15"	57.36'	S 19°14'33" E
C9	60.00'	58.00'	59°16'19"	57.36'	S 78°30'50" E
C10	43.55'	58.00'	43°01'14"	42.53'	N 50°20'24" E
C11	8.71'	17.00'	29°20'43"	8.61'	N 43°30'08" E
C12	7.74'	100.00'	04°26'15"	7.74'	N 55°57'22" E
C13	89.99'	100.00'	51°35'44"	86.99'	N 27°57'23" E
C14	23.22'	15.00'	88°42'25"	20.97'	N 46°31'44" E
C15	114.92'	72.00'	91°26'59"	103.10'	S 47°54'01" W

PARCEL: 00-0006-5172

ZONING: R-1-9

SINGLE FAMILY HOMES ARE PROPOSED FOR ALL LOTS WITHIN THE SUBDIVISION.



SCALE: 1"=40'
SCALE 1"=80' FOR 11"X17" PLANS

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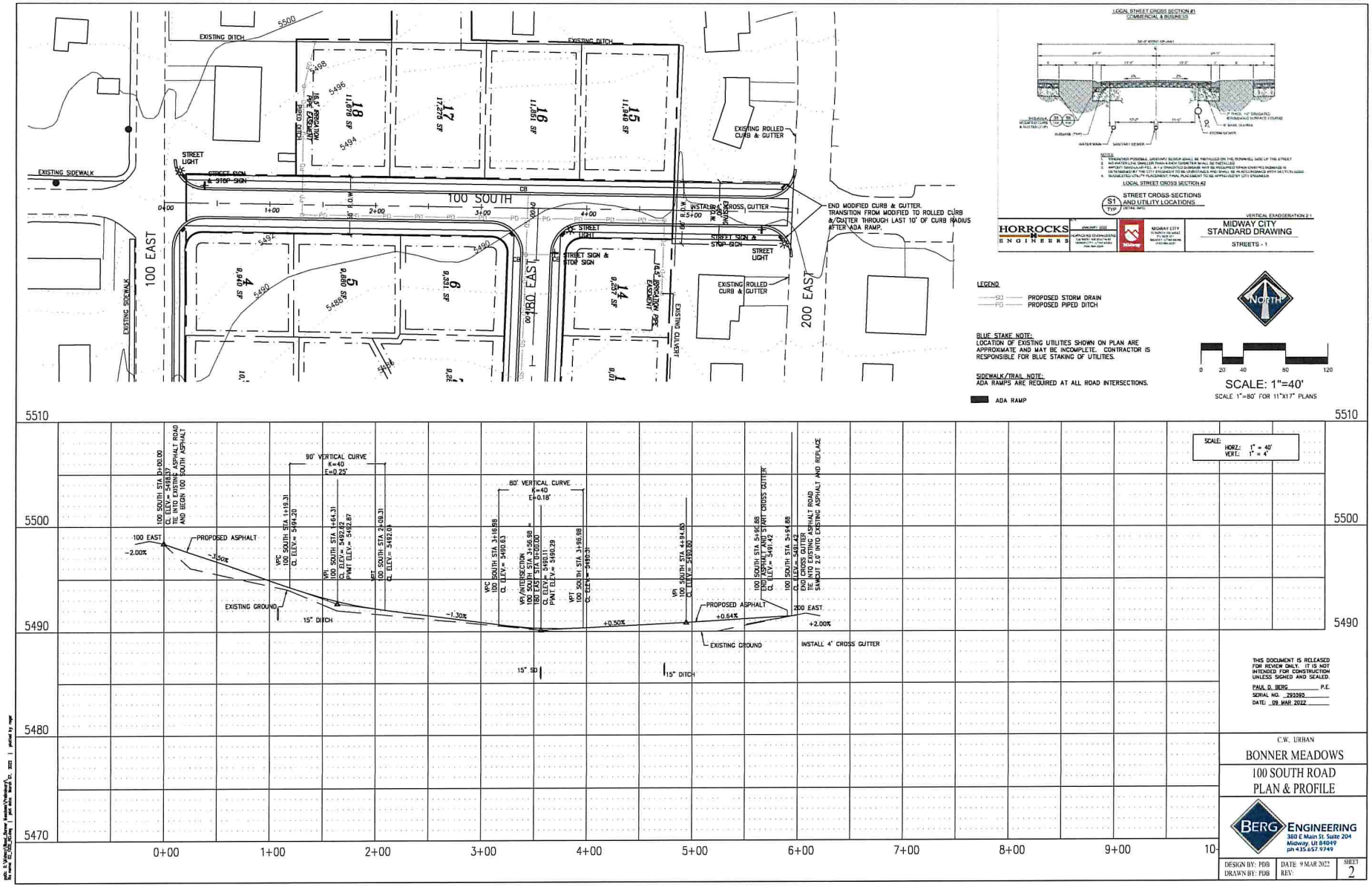
PAUL D. BERG P.E.
SERIAL NO. 285585
DATE: 20 APR 2022

C. W. URBAN
BONNER MEADOWS
PRELIMINARY SITE PLAN

BERG ENGINEERING
380 E Main St. Suite 204
Midway, UT 84049
ph 435.657.9749

DESIGN BY: PDB
DRAWN BY: PDB
DATE: 20 APR 2022
REV:
SHEET 1



SCALE:
HORZ.: 1" = 40'
VERT.: 1" = 4'

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PAUL D. BERG P.E.
SERIAL NO. 293393
DATE: 09 MAR 2022

C.W. URBAN

BONNER MEADOWS

100 SOUTH ROAD
PLAN & PROFILE

BERG ENGINEERING
380 E Main St. Suite 204
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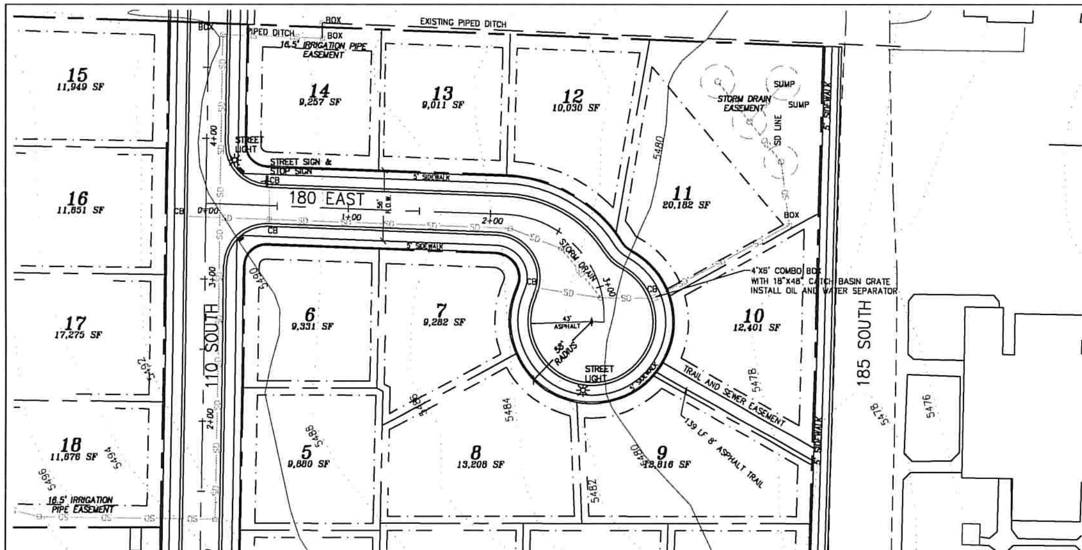
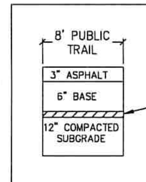
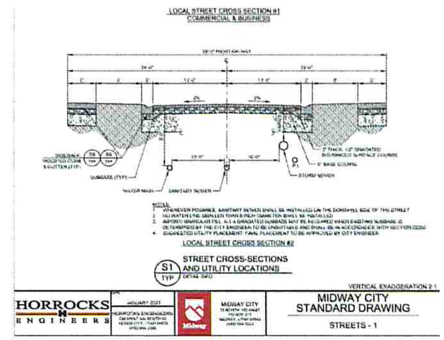
ph 435.657.9749

DESIGN BY: PDB
DRAWN BY: PDB
DATE: 9 MAR 2022
REV:
SHEET 2





TRAIL CROSS SECTION



LEGEND

- SD — PROPOSED STORM DRAIN
- PD — PROPOSED PIPED DITCH

BLUE STAKE NOTE:
LOCATION OF EXISTING UTILITIES SHOWN ON PLAN ARE APPROXIMATE AND MAY BE INCOMPLETE. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKING OF UTILITIES.

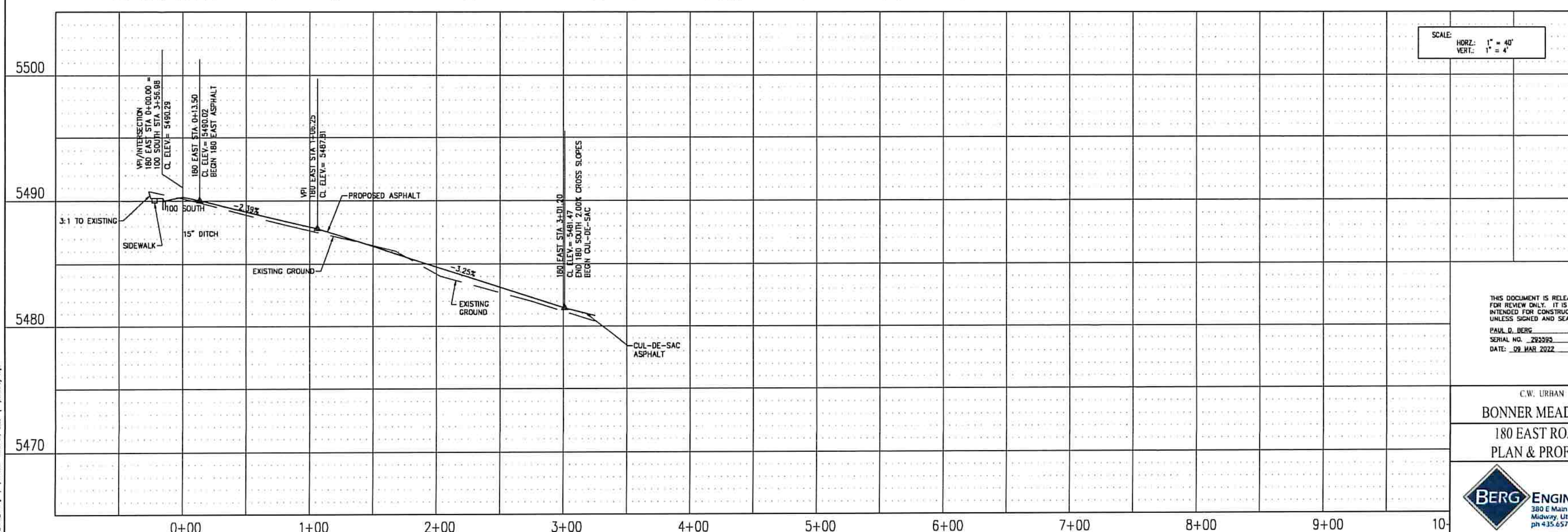
SIDEWALK/TRAIL NOTE:
ADA RAMPS ARE REQUIRED AT ALL ROAD INTERSECTIONS.

ADA RAMP

0 20 40 80 120

SCALE: 1"=40'

SCALE 1"=80' FOR 11"X17" PLANS



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PAUL D. BERG P.E.
SERIAL NO. 293595
DATE: 09 MAR 2022

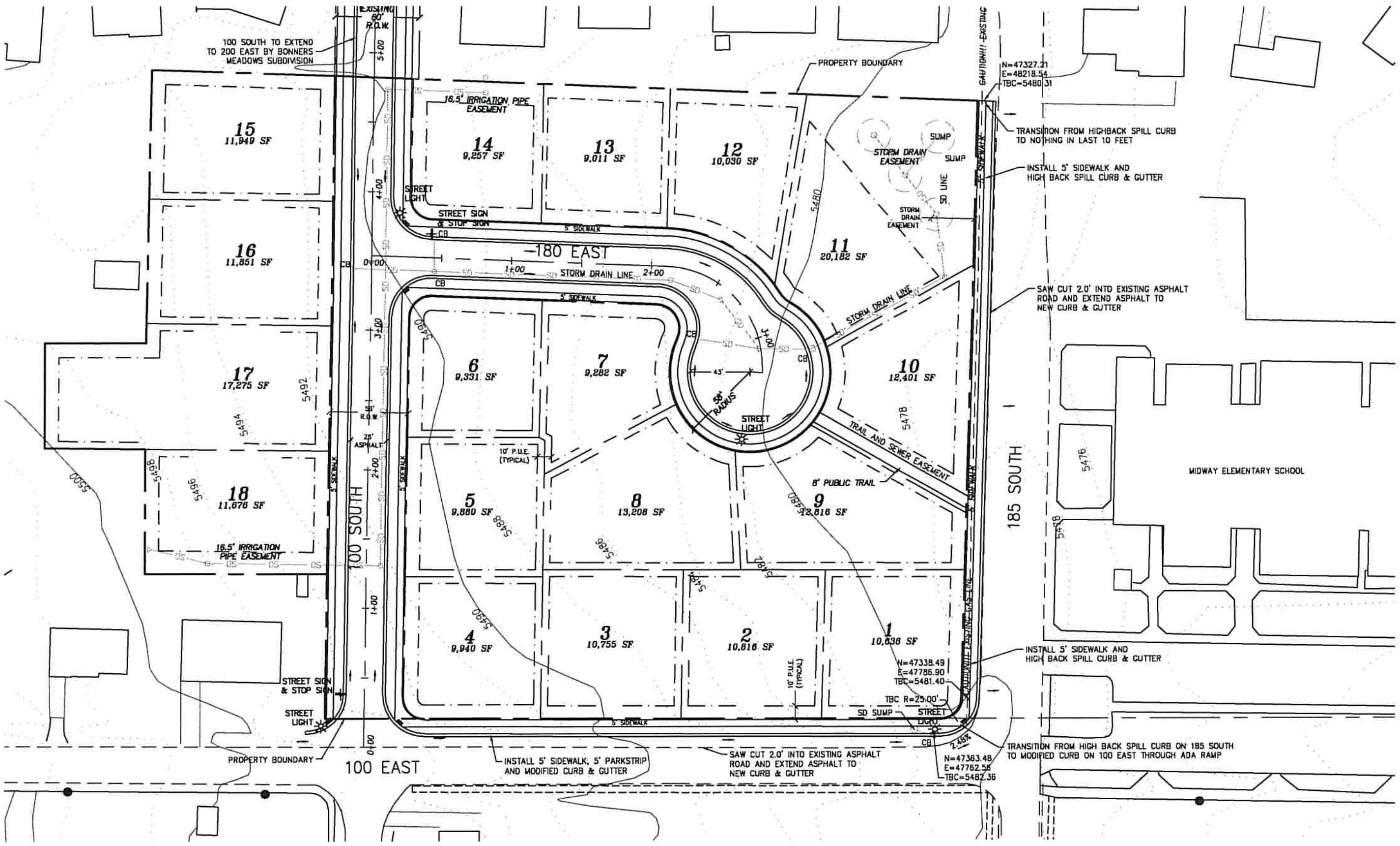
C.W. URBAN

BONNER MEADOWS

180 EAST ROAD
PLAN & PROFILE

BERG ENGINEERING
380 E Main St. Suite 204
Midway, Ut 84049
ph 435.657.9749

DESIGN BY: PDB	DATE: 9 MAR 2022	SHEET
DRAWN BY: PDB	REV:	3



SCALE: 1"=40'

SCALE 1"=80' FOR 11"X17" PLANS

LEGEND

SD — PROPOSED STORM DRAIN

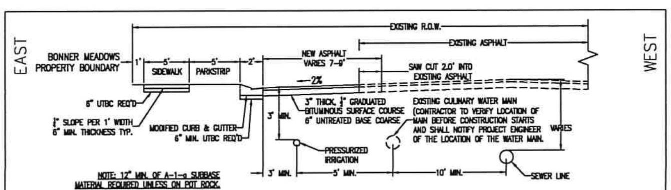
PD — PROPOSED PIPED DITCH

CONSTRUCTION NOTES:

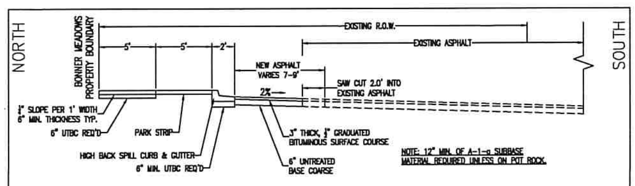
1. LOCATION OF EXISTING UTILITIES SHOWN ON PLAN ARE APPROXIMATE AND MAY BE INCOMPLETE. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKING OF UTILITIES.
2. CONTRACTOR IS RESPONSIBLE TO COORDINATE CONSTRUCTION OF 100 EAST AND 185 SOUTH WITH MIDWAY CITY, MIDWAY ELEMENTARY SCHOOL, AND WASATCH SCHOOL DISTRICT BUS DEPARTMENT. 100 EAST AND 185 SOUTH SHALL NOT BE CLOSED OR HAVE TRAFFIC RESTRICTIONS WITHOUT THE APPROVAL OF THESE ENTITIES.

SIDEWALK NOTE:
ADA RAMPS ARE REQUIRED AT ALL ROAD INTERSECTIONS.

ADA RAMP



100 EAST ROAD SECTION



185 SOUTH ROAD SECTION

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PAUL D. BERG P.E.
SERIAL NO. 295595
DATE: 09 MAR 2022

C.W. URBAN

BONNER MEADOWS

100 EAST AND 185 SOUTH ROAD WIDENING PLAN

BERG ENGINEERING
380 E Main St. Suite 204
Midway, Ut 84049
ph 435.657.9749

DESIGN BY: PDB DRAWN BY: PDB	DATE: 9 MAR 2022 REV:	SHEET 4

SANITARY SEWER SYSTEM NOTES:
1. ALL SEWER CONSTRUCTION TO BE TO MIDWAY SANITATION DISTRICT STANDARDS INCLUDING THE FOLLOWING:
   - ALL SEWER CLEANOUTS SHALL HAVE METAL LIDS
   - ALL SEWER MAIN LINES AND LATERAL SHALL BE INSTALLED WITH TRACER WIRE.
2. ALL LOTS SHALL HAVE A 4 INCH SEWER LATERAL.

CULINARY WATER SYSTEM NOTES:
1. ALL CULINARY WATER CONSTRUCTION TO MEET MIDWAY CITY STANDARDS.
2. ALL UNITS SHALL HAVE A 1" WATER SERVICE WITH A 1" METER.

PRESSURIZED IRRIGATION SYSTEM NOTES:
1. ALL PRESSURIZED IRRIGATION CONSTRUCTION TO MEET MIDWAY IRRIGATION COMPANY STANDARDS.
2. ALL PRESSURIZED IRRIGATION LINES SHALL BE C-900 PURPLE PIPE.
3. A 1" PRESSURIZED IRRIGATION SERVICE IS TO BE PROVIDED TO EACH LOT. ADJACENT LOTS MAY SHARE A 1-1/2" SERVICE THAT IS SPLIT INTO TWO 1" SERVICES AT THE PROPERTY LINE.

ALL SERVICES TO LOTS SHALL BE INSTALLED TO THE LIMIT OF PUBLIC UTILITY EASEMENT.

CONSTRUCTION NOTES:
1. LOCATION OF EXISTING UTILITIES SHOWN ON PLAN ARE APPROXIMATE AND MAY BE INCOMPLETE. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKING OF UTILITIES.
2. CONTRACTOR IS RESPONSIBLE TO COORDINATE CONSTRUCTION OF 100 EAST AND 185 SOUTH WITH MIDWAY CITY, MIDWAY ELEMENTARY SCHOOL, AND WASATCH SCHOOL DISTRICT BUS DEPARTMENT. 100 EAST AND 185 SOUTH SHALL NOT BE CLOSED OR HAVE TRAFFIC RESTRICTIONS WITHOUT THE APPROVAL OF THESE ENTITIES.

WATER METER, FIRE HYDRANT, AND P.I. BOX LOCATION NOTE:
1. ℄ OF WATER METERS TO BE 2.0' BEHIND CURB AND GUTTER.
2. ℄ OF P.I. BOXES TO BE 1.0' BEHIND STREET R.O.W. LINE.
3. LOCATION OF FIRE HYDRANT TO BE PER MIDWAY CITY STANDARD CONSTRUCTION DETAILS 2018.

NORTH

SCALE: 1"=40'
SCALE 1"=80' FOR 11"X17" PLANS

LEGEND
W — WATER
EXW — EXISTING WATER
SD — STORM DRAIN
EXSD — EXISTING STORM DRAIN
PI — PRESSURIZED IRRIGATION
EXPI — EXISTING PRESSURIZED IRRIGATION
SS — SEWER
EXSS — EXISTING SANITARY SEWER
PD — PIPED DITCH

THIS DOCUMENT IS RELEASED FOR REVIEW ONLY. IT IS NOT INTENDED FOR CONSTRUCTION UNLESS SIGNED AND SEALED.
PAUL D. BERG P.E.
SERIAL NO. 295595
DATE: 09 MAR 2022

C.W. URBAN
BONNER MEADOWS
PRELIMINARY UTILITY PLAN

BERG ENGINEERING
380 E Main St. Suite 204
Midway, Ut 84049
ph 435.657.9749

DESIGN BY: PDB
DRAWN BY: PDB
DATE: 9 MAR 2022
REV:
SHEET 5

SCALE: 1"=40'

SCALE 1"=80' FOR 11"X17" PLANS

Table 1 - 100 Year Storm Peak Runoff and Volume within Subdivision

Time Period (min)	Rainfall Intensity (in / hr)	Area (acres)	Developed Runoff Coefficient	Peak Runoff Rate (cfs)	Total Runoff Volume (cf)
15	4.09	6.15	0.40	10.04	9,033
30	2.76	6.15	0.40	6.79	12,221
60	1.71	6.15	0.40	4.21	15,144
120	0.96	6.15	0.40	2.36	17,004
180	0.65	6.15	0.40	1.60	17,269
360	0.35	6.15	0.40	0.86	18,598
720	0.21	6.15	0.40	0.52	22,317
1440	0.13	6.15	0.40	0.32	27,631

Table 2 - Retention Pond Design Calculations for 100 Year Storm

Time Period (min)	Total Runoff Volume (cf)	Soil Percolation Rate (inch / hour)	4-7' Sump Volume (cf)	Percolation from Sump (cf)	Storage Needed in Pond (cf)	Storage Needed in Pond (acre-ft)	
15	9,033	2.0	5,432	126	3,475	0.08	
30	12,221	2.0	5,432	252	6,537	0.15	
60	15,144	2.0	5,432	504	9,208	0.21	
120	17,004	2.0	5,432	1,008	10,564	0.24	
180	17,269	2.0	5,432	1,512	10,325	0.24	
360	18,598	2.0	5,432	3,024	10,142	0.23	
720	**22,317**	**2.0**	**5,432**	**6,048**	**10,837**	**0.25**	Required
1440	27,831	2.0	5,432	12,096	10,103	0.23	

Table 3 - Retention Pond Storage Volume

Elevation	Pond Depth (ft)	Pond Area (sf)	Pond Volume (cf)	Pond Volume (acre-ft)	
5475.00	0.50	1,834	0	0.00	
5476.00	1.00	2,994	2,414	0.06	
5477.00	2.00	4,357	6,090	0.14	
5478.00	3.00	5,884	11,210	0.26	**Contains 100 year storm**
5479.00	4.00	7,567	17,936	0.41	**Contains +1' of freeboard**

Notes:
Soil percolation rate of 2.0 inches per hour for Heber Valley Soils Survey.
An 7' sump has a volume of 1,358 cf and percolation rate through the sump of 0.035.

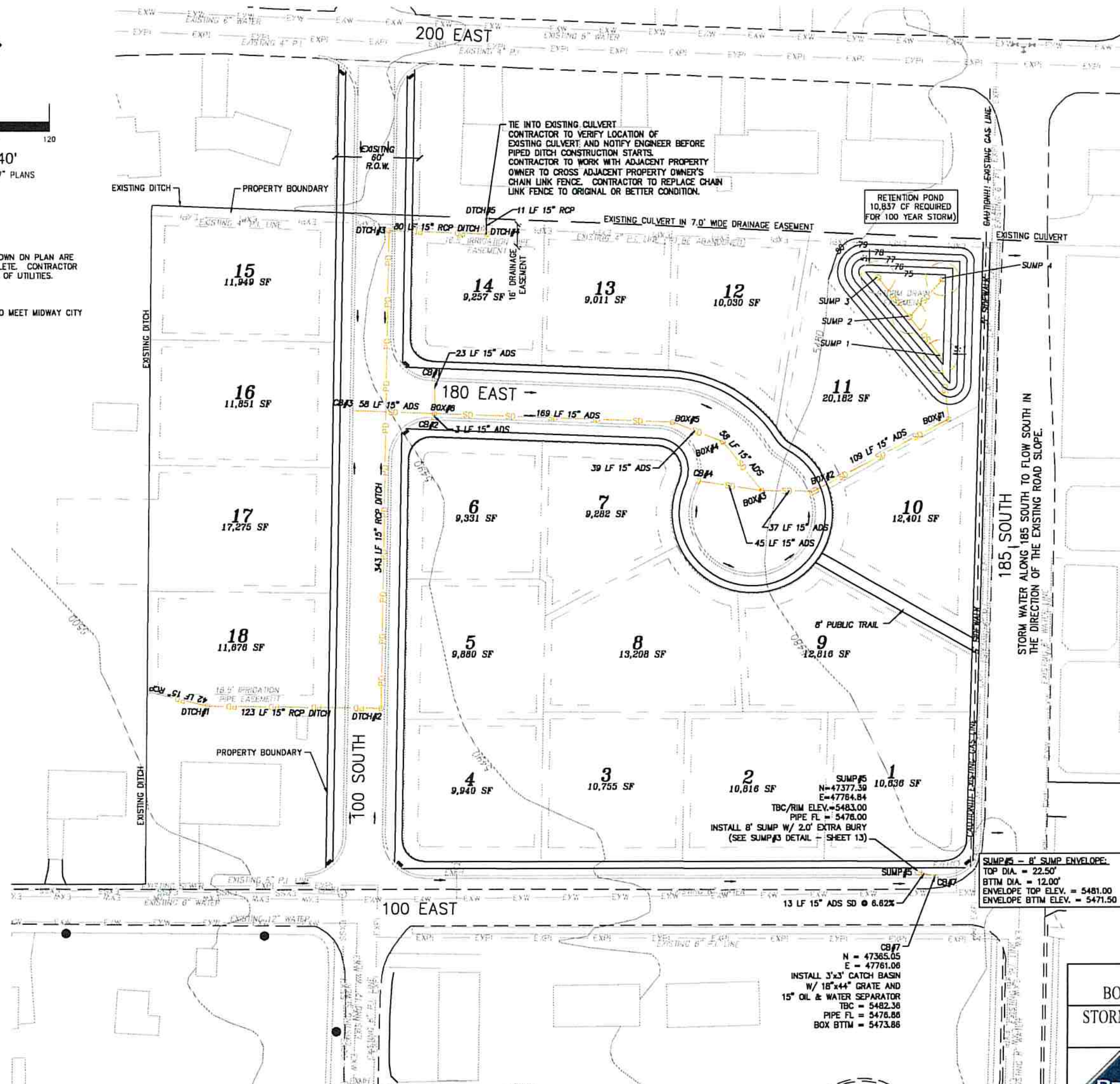
BLUE STAKE NOTE:
1. LOCATION OF EXISTING UTILITIES SHOWN ON PLAN ARE APPROXIMATE AND MAY BE INCOMPLETE. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKING OF UTILITIES.

STORM DRAIN SYSTEM NOTE:
1. ALL STORM DRAIN CONSTRUCTION TO MEET MIDWAY CITY STANDARDS.

A 7' SUMP HAS A VOLUME OF 715 CF AND PERCOLATION RATE THROUGH THE SUMP OF 0.021.

LEGEND

W	WATER
EXW	EXISTING WATER
SD	STORM DRAIN
EXSD	EXISTING STORM DRAIN
PI	PRESSURIZED IRRIGATION
EXPI	EXISTING PRESSURIZED IRRIGATION
SS	SEWER
EXSS	EXISTING SANITARY SEWER
PD	PIPED DITCH



THIS DOCUMENT IS RELEASED FOR REVIEW ONLY. IT IS NOT INTENDED FOR CONSTRUCTION UNLESS SIGNED AND SEALED.

PAUL D. BERG P.E.
SERIAL NO. 295595
DATE: 09 MAR 2022

C.W. URBAN

BONNER MEADOWS

STORM DRAIN AND PIPED DITCH PLAN

BERG ENGINEERING
380 E Main St. Suite 204
Midway, Ut 84049
ph 435.657.9749

DESIGN BY: PDB	DATE: 9 MAR 2022	SHEET
DRAWN BY: PDB	REV:	6

Exhibit C

Midway Irrigation Company Will Serve Letter.
April 22, 2022

Project Name: Bonner Landing
Address: 100 South and 150 East , Midway, Utah.

Name of Developer:

Parcel Size: 5.98 Acres

Present Land Use:

Amount of Irrigated Land 5.98 Acres

Amount of Non-Irrigated Land: 0.0 Acre

Scope of the proposed project:

Number of ERUs: 18

Amount of Irrigated Land: 4.33 Acres

Amount of Non-Irrigated Land:
Home sites, Roads & Trails– 1.65 Acres
Historic Non-Irrigated- 0.0 Acres

Water Requirement:

Culinary Quality Number of Acre Feet: 14.40 Acre Feet

Irrigation Quality Number of Acre Feet: 8.59 Acre Feet

Water Rights Available to the project: X.XX Shares of Midway Company Stock

Project Water Allocation:

Culinary Water Provider: Midway City
Water Rights Required: 14.40 ac. ft.

Infrastructure Requirements:

Secondary Water Provider: Midway Irrigation Company.

Water Rights required: 8.59 acre-feet

Project Approval Required Conditions:

1. Transfer 14.40 acre-feet of Midway Irrigation Water Right to Midway City for culinary water requirements.
2. Transfer 8.59 acre-feet of Midway Irrigation Water Right to Midway City for secondary irrigation water requirements.
3. Developers will be required to connect to Midway Irrigation Company Main Line under the condition that it is completed under the direction of the Company's Manager and in accordance with the company's construction guide line and policies.
4. Developers must install secondary water meters on each lot. The installation must be in accordance with the company's construction guide line and policies.
5. The final plat will not be approved or signed until all conditions are met.

Steve Farrell, President
Midway Irrigation Company

Exhibit D

Bonner Meadows Subdivision
Environmental Assessment Review

A. Soils, Erosion Potential and Geologic Hazards
The Soil Survey of Heber Valley identifies the Spaa series soil as the only soil type for the Bonners Landing site. From this investigation it was determined that no soils on site have a high erosion potential or are considered hazardous. Additional soils information can be found in the geotechnical report for the property. The soils characteristics for the Spaa series soil are:

Spaa, (SpB) - The Spaa series consists of well-drained, shallow soils. This soil is mainly on terraces with 2 to 5 percent slopes. Runoff is slow and the hazard of erosion is slight. The water table is generally found greater than 5 feet from the surface. Bedrock or potrock is typically encounter between 6 - 20 inches below the surface. The AASHTO classification for this soil type is A-6. Midway City standards require 12 inches of subgrade material for roads built on this soil type unless the road subgrade is on potrock.

The Geologic Map of the Heber Quadrangle, Wasatch and Summit Counties, Utah, prepared by Calvin S. Bromfield, Arthur A. Baker, and Max D. Crittenden Jr. shows that there are no geologic hazards on-site.

B. Disposition of Existing Vegetation and Establishment of New Vegetation
The area proposed for home sites is presently a hay field with a some existing trees along the north and west property lines. Landscaping will be the responsibility of the individual lot owners. It is anticipated that trees, shrubs, flowers and grass will be established around each home. The existing trees along the north and west property line should not be disturbed.

C. Reseeding of Cuts and Fills
The layout of 100 South, and 180 East as shown on the Preliminary Plan will result in cuts and fills within the development that are less than 18 inches. These minor cuts and fills will be incorporated into the landscaping of the lots within the subdivision.

D. Prevention of Weeds and Debris
The owner of each lot will be responsible for the prevention of weeds and debris. The developer will control weeds and debris on-site until the lots are sold.

E. Culinary Water Supply
This development will connect to the Midway City culinary water system at the existing 12 inch water line located at the intersection of 100 South and 100 East and to the existing 6 inch water line located in 200 East. Lots 1 through 4 will be served off of the existing 6 inch line 100 East. This proposed plan will loop the existing lines in 100 East and 200 East. Please see the preliminary utility plan for additional information concerning the location of the water lines and water services to each lot.

F. Sanitary Sewer System
Sewer from the subdivision will be discharged into the Midway Sanitation District's sewer collection system. An 8 inch sewer will be extended in 185 South from the existing 8 inch sewer line in the Meadows Subdivision. Please see the preliminary utility plan for the subdivision for additional information concerning the location of the proposed sewer lines and sewer laterals to each lot.

G. Disposal of Solid and Liquid Wastes
Solid waste will be disposed of by pickup services provided by the Wasatch County Solid Waste Disposal Special Service District on a monthly fee basis. The District will provide 90 gallon containers for each residential unit. Liquid wastes will be disposed of by the Midway Sanitation District sanitary sewer system.

H. Flood Hazards and Wetlands
The Flood Hazard Boundary Map prepared by the Federal Emergency Management Agency show that no areas within the proposed development have been identified as being prone to flooding during a 100 year storm event.

No wetlands have been identified on the site.

I. Sensitive Lands
The property does not contain any sensitive lands such as wetlands, stream corridors, hillsides, ridgelines or critical wildlife habitat.

J. Storm Water Runoff
Storm water runoff will be collected and retained onsite. A retention pond will be located in a storm drain easement on Lot 11. The retention pond will hold the 100 year storm runoff event. Please see the preliminary storm drain plan for additional information concerning the developments storm drain system, retention pond and storm water runoff calculations.

Exhibit E

MEMORANDUM

Date: May 3, 2022

To: C.W. Urban

From: Hales Engineering

Subject: Midway Bonner Meadows Trip Generation Study

UT22-2189

Introduction

This memorandum discusses the trip generation study and level of service analysis completed for the proposed housing development in Midway, Utah. A vicinity map of the proposed development is shown in Figure 1.

Figure 1: Vicinity map of the proposed development in Midway, Utah

Background

The proposed development is located north of Midway Elementary School, between 100 East and 200 East in Midway, Utah. The project includes 18 single-family homes. A site plan for the proposed development is included in Appendix A.

Traffic Volumes

Weekday morning (7:00 to 9:00 a.m.) peak period traffic counts were performed at the 100 South / 100 East intersection. This time period was chosen based on previous counts on 100 East, which show that traffic volumes are higher in the morning due to the school traffic. The counts were performed on Tuesday, April 26, 2022. The morning peak hour was determined to be between 8:00 and 9:00 a.m. Detailed count data are included in Appendix B.

Hales Engineering made seasonal adjustments to the observed traffic volumes. Monthly traffic volume data were obtained from a nearby UDOT automatic traffic recorder (ATR) on S.R 40 (ATR #509). In recent years, traffic volumes in April have been equal to approximately 89% of average traffic volumes. The observed traffic volumes were adjusted accordingly to determine average turning movement counts at the study intersection.

Figure 2 shows the existing morning peak hour volumes as well as intersection geometry at the study intersection.

Figure 2: Existing (2022) Background Morning Peak Hour Traffic Volumes

Trip Generation

Trip generation for the development was calculated using trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation (11th Edition, 2021)*. Trip generation for the proposed project is included in Table 1.

As shown in Table 1, it is anticipated that the proposed development will generate approximately 210 trips on an average weekday, including 16 trips during the morning peak hour, and 20 trips during the evening peak hour.

Table 1: Trip Generation

Trip Generation Midway - Bonner Meadows								
Land Use[1]	# of Units	Unit Type	Trip Generation			New Trips		
			Total	% In	% Out	In	Out	Total
Weekday Daily								
Single-Family Detached Housing (210)	18	DU	210	50%	50%	105	105	210
TOTAL			**210**			**105**	**105**	**210**
AM Peak Hour								
Single-Family Detached Housing (210)	18	DU	16	26%	74%	4	12	16
TOTAL			**16**			**4**	**12**	**16**
PM Peak Hour								
Single-Family Detached Housing (210)	18	DU	20	63%	37%	13	7	20
TOTAL			**20**			**13**	**7**	**20**

1. Land Use Code from the Institute of Transportation Engineers (ITE) *Trip Generation*, 11th Edition, 2021.
SOURCE: Hales Engineering, May 2022

Trip Distribution and Assignment

Project traffic is assigned to the roadway network based on the type of trip and the proximity of project access points to major streets, high population densities, and regional trip attractions. Existing travel patterns observed during data collection also provide helpful guidance to establishing these distribution percentages, especially near the site. The resulting distribution of project generated trips during the peak hour is shown in Table 2.

Table 2: Trip Distribution

Direction	% To/From Project
North	40%
South	10%
East	20%
West	30%

These trip distribution assumptions were used to assign the morning peak hour generated traffic at the study intersections to create trip assignment for the proposed development. Trip assignment for the development is shown in Figure 3.Trips in the east direction are anticipated to enter and exit at the 100 South / 200 East intersection. This intersection was not included in this study and is not included in the trip assignment shown in Figure 3.

Plus Project Conditions

Hales Engineering added the project trips to the existing morning peak hour traffic volumes to predict turning movement volumes for plus project conditions. Plus project peak hour turning movement volumes are shown in Figure 4.

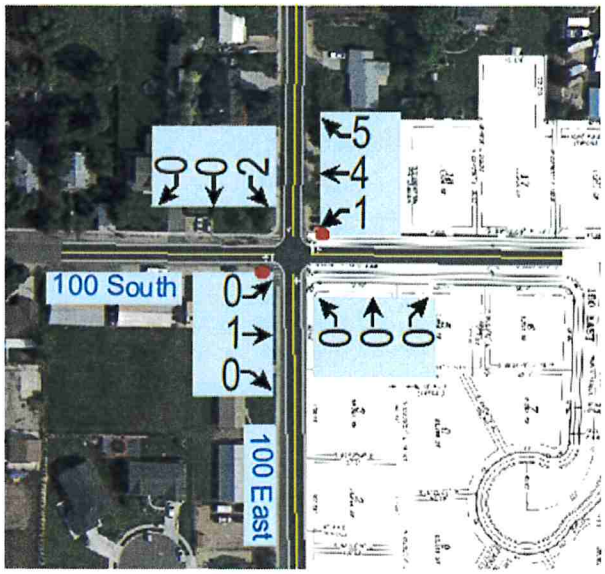


Figure 3: Trip Assignment for Morning Peak Hour

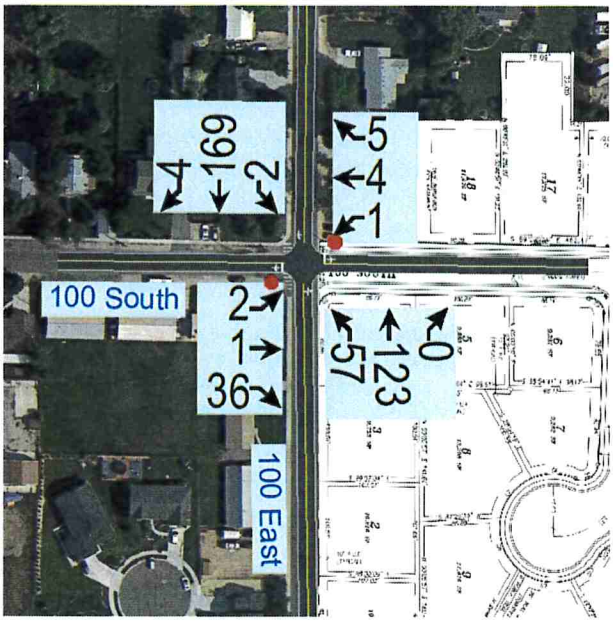


Figure 4: Existing (2022) Plus Project Morning Peak Hour Traffic Volumes

Level of Service Analysis

Hales Engineering determined that the studied intersection is anticipated to operate at an acceptable level of service during the morning peak hour with and without project trips added, as shown in Table 3.

Table 3: Morning Peak Hour LOS for Background & Plus Project Scenarios

Intersection & Scenario		Level of Service		
Description	Control	Movement[1]	Aver. Delay (Sec. / Veh.)	LOS[2]
100 South / 100 East (Background)	EB Stop	EBL	9.6	a
100 South / 100 East (Plus Project)	EB/WB Stop	EBL	11.6	b

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for all other unsignalized intersections.

Source: Hales Engineering, May 2022

Conclusions

The findings of this study are as follows:

- The proposed development includes 18 single-family detached houses.
- It is anticipated that the proposed project will generate approximately 210 trips on an average weekday, including 16 trips during the morning peak hour, and 20 trips during the evening peak hour.
- The 100 South / 100 East intersection currently operates at an acceptable level of service and is anticipated to operate at an acceptable level of service with the added project trips during the morning peak hour.

If you have any questions regarding this memorandum, please contact us at 801.766.4343.

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APPENDIX A

Site Plan

1220 North 500 West, Ste. 202 Lehi, UT 84043 p 801.766.4343
www.halesengineering.com

BOUNDARY DESCRIPTION

BEGINNING AT A POINT WHICH IS EAST 511.90 FEET AND NORTH 752.39 FEET FROM THE SOUTHWEST QUARTER CORNER OF SECTION 35, TOWNSHIP 3 SOUTH, RANGE 4 EAST, SALT LAKE BASE AND MERIDIAN;

THENCE NORTH 00°05'57" EAST 440.30 FEET;
THENCE SOUTH 89°07'04" EAST 462.47 FEET;
THENCE SOUTH 02°14'09" WEST 460.00 FEET;
THENCE NORTH 88°27'53" WEST 430.78 FEET;
THENCE ALONG THE ARC OF A 15.00 FOOT RADIUS CURVE TO THE LEFT 23.19 FEET (CENTRAL ANGLE OF 88°33'50" AND CHORD OF NORTH 44°10'58" WEST 20.95 FEET) TO THE POINT OF BEGINNING.

CONTAINING: 4.77 ACRES

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	CHORD	BEARING
C1	23.19'	15.00'	88°33'50"	20.95'	N 44°10'58" W
C2	23.77'	15.00'	90°46'59"	21.36'	N 45°29'25" E
C3	23.90'	15.00'	91°17'35"	21.45'	S 43°28'15" E
C5	33.36'	17.00'	112°25'09"	28.26'	S 56°23'06" W
C6	48.76'	58.00	48°09'54"	47.33'	N 69°20'17" W
C7	56.73'	58.00	56°02'12"	54.49'	S 35°24'40" W
C8	60.00'	58.00	59°16'15"	57.36'	S 19°14'33" E
C9	60.00'	58.00'	59°16'19"	57.36'	S 78°30'50" E
C10	43.55'	58.00'	43°01'14"	42.53'	N 50°20'24" E
C11	8.71'	17.00'	29°20'43"	8.61'	N 43°30'08" E
C12	7.73'	100.00'	04°25'54"	7.73'	N 85°57'33" E
C13	60.00'	100.00'	51°24'04"	7.73'	N 27°57'34" E
C14	23.22'	15.00'	88°42'25"	20.97'	N 46°31'44" E
C15	114.92'	72.00'	91°26'59"	103.10'	S 47°54'01" W

PARCEL: 00-0006-5172
ZONING: R-1-9
SINGLE FAMILY HOMES ARE PROPOSED FOR ALL LOTS WITHIN THE SUBDIVISION.

200 EAST
180 EAST (PUBLIC STREET)
100 SOUTH (PUBLIC STREET)
185 SOUTH
MAIN STREET
100 EAST
TIMPANOGOS VIEW ESTATES
THE MEADOWS SUBDIVISION
BONNER
LISTER
PISSIRE
EXISTING SHED
SOUTHWEST CORNER OF SECTION 35, T3S, R4E, SLB&M.
NORTH 752.39'
EAST 511.90'
P.O.B.

Scale 1" = 40'
SCALE 1"=80' FOR 11"X17" PLANS

2022 CONCEPT PLAN NOTES:
1. THE MIDWAY CITY MORITORIUM IS EXPECTED TO END ON FEBRUARY 17, 2022.
2. THE CURRENT MIDWAY CITY ROAD STANDARD CALLS FOR 30' OF ASPHALT. THE PROPOSED NEW STANDARD IS 28'. THE ROAD WIDTH WILL BE UPDATED WITH THE PRELIMINARY SUBDIVISION APPLICATION ONCE THE NEW STANDARD HAS BEEN CHANGED. THE RIGHT-OF-WAY WILL LIKELY REMAIN 66'.

RYAN D. BERG, P.E.
SERIAL NO. 333163
DATE 1/3/2022

C.W. URBAN
BONNER MEADOWS
CONCEPT PLAN 2022

BERG ENGINEERING
RESOURCE GROUP, P.C.
1996 E Main St, Suite 204,
Midway, UT 84049
ph. (435) 657-9749

DESIGN BY: RDB | DATE: 2 FEB 2022 | SHEET
DRAWN BY: RDB | REV:

HALES ENGINEERING
innovative transportation solutions

APPENDIX B

Count Data

1220 North 500 West, Ste. 202 Lehi, UT 84043 p 801.766.4343
www.halesengineering.com

TrafficCounts

2364 North 1450 East
Lehi, UT 84043
801.636.0891

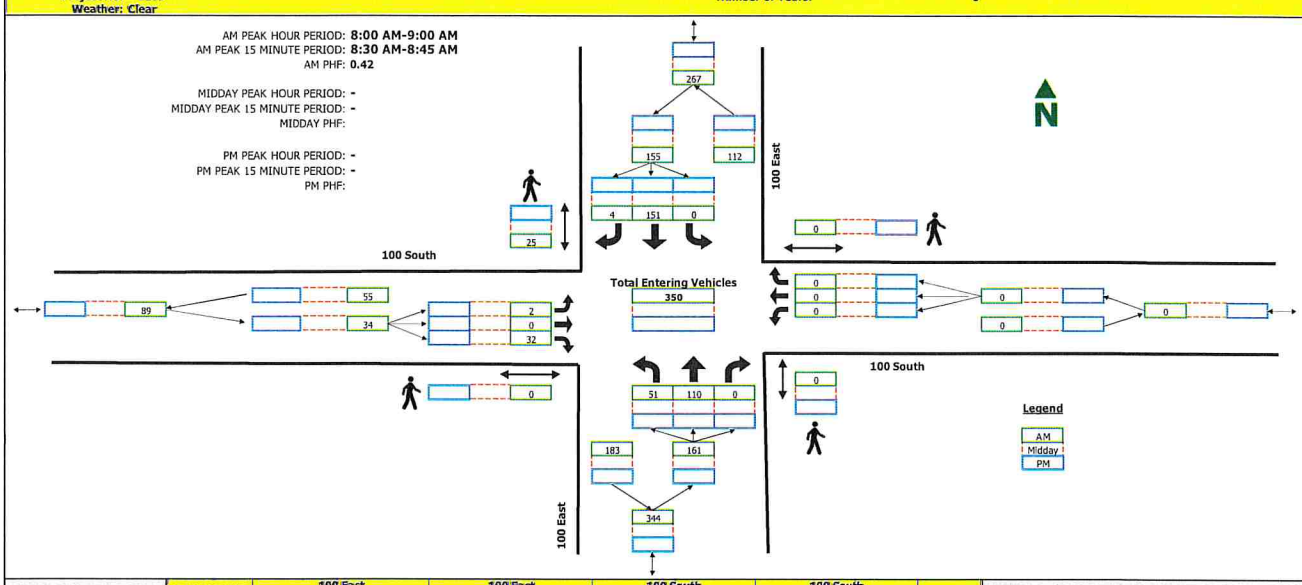
Intersection Turning Movement Summary

Intersection:	100 East / 100 South	**Date:**	4-26-22, Tue
North/South:	100 East	**Day of Week Adjustment:**	100.0%
East/West:	100 South	**Month of Year Adjustment:**	100.0%
Jurisdiction:	Midway	**Adjustment Station #:**	0
Project Title:	Bonner Meadows TGS	**Growth Rate:**	0.0%
Project No:	2189	**Number of Years:**	0
Weather:	Clear		

AM PEAK HOUR PERIOD: **8:00 AM-9:00 AM**
AM PEAK 15 MINUTE PERIOD: **8:30 AM-8:45 AM**
AM PHF: **0.42**

MIDDAY PEAK HOUR PERIOD: -
MIDDAY PEAK 15 MINUTE PERIOD: -
MIDDAY PHF:

PM PEAK HOUR PERIOD: -
PM PEAK 15 MINUTE PERIOD: -
PM PHF:



RAW COUNT SUMMARIES	100 East Northbound				100 East Southbound				100 South Eastbound				100 South Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00 - 7:15	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
7:15 - 7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 - 7:45	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	4
7:45 - 8:00	0	2	0	0	0	9	0	0	0	0	0	0	0	0	0	0	11
8:00 - 8:15	2	9	0	0	0	16	0	5	0	0	1	0	0	0	0	0	28
8:15 - 8:30	6	12	0	0	0	43	0	7	1	0	4	0	0	0	0	0	66
8:30 - 8:45	35	64	0	0	0	81	4	7	0	0	22	0	0	0	0	0	206
8:45 - 9:00	8	25	0	0	0	11	0	6	1	0	5	0	0	0	0	0	50

MIDDAY PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00 - 16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 - 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 - 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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APPENDIX C

LOS and Queueing Results

1220 North 500 West, Ste. 202 Lehi, UT 84043 p 801.766.4343
www.halesengineering.com

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SimTraffic LOS Report

Project: Midway - Bonner Meadows
Analysis Period: *Existing (2022) Background*
Time Period: *Morning Peak Hour* **Project #:** *UT22-2189*

Intersection: 100 East & 100 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NB	L	57	56	98	2.9	*A*
	T	123	124	101	0.9	*A*
	Subtotal	180	180	100	1.5	*A*
SB	T	169	164	97	0.4	*A*
	R	4	6	150	0.4	*A*
	Subtotal	173	170	98	0.4	*A*
EB	***L***	***2***	***2***	***100***	***9.6***	***A***
	R	36	38	106	5.3	*A*
	Subtotal	38	40	105	5.5	*A*
Total		390	390	100	1.4	*A*

SimTraffic Queueing Report
Project: Midway - Bonner Meadows
Analysis: Existing (2022) Background
Time Period: Morning Peak Hour
95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

HALES ENGINEERING
innovative transportation solutions

Project #: UT22-2189

Intersection	NB	SB	EB
	LT	TR	LR
01: 100 East & 100 South	75		75

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Midway - Bonner Meadows
Analysis Period: *Existing (2022) Plus Project*
Time Period: *Morning Peak Hour* **Project #:** *UT22-2189*

Intersection: 100 East & 100 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NB	L	57	58	101	2.6	*A*
	T	123	116	95	0.8	*A*
	Subtotal	180	174	97	1.4	*A*
SB	L	2	1	50	2.1	*A*
	T	169	166	98	0.4	*A*
	R	4	3	75	0.4	*A*
	Subtotal	175	170	97	0.4	*A*
EB	***L***	***2***	***2***	***100***	***11.6***	***B***
	T	1	1	100	5.6	*A*
	R	36	36	101	4.9	*A*
	Subtotal	39	39	100	5.3	*A*
WB	L	1	0	0		
	T	4	4	100	6.5	*A*
	R	5	6	120	3.6	*A*
	Subtotal	10	10	100	4.8	*A*
Total		404	393	97	1.4	*A*

SimTraffic Queueing Report
Project: Midway - Bonner Meadows
Analysis: Existing (2022) Plus Project
Time Period: Morning Peak Hour
95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

HALES ENGINEERING
innovative transportation solutions

Project #: UT22-2189

Intersection	NB	SB	EB	WB
	LTR	LTR	LTR	LTR
01: 100 East & 100 South	75		75	50

Exhibit F

Y2 Geotechnical, P.C.
Geotechnical & Environmental Services

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GEOTECHNICAL STUDY
BONNER SUBDIVISION
100 SOUTH 100 EAST
MIDWAY, UTAH

Prepared By:

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July 27, 2006

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Y^2 JOB NUMBER: 06G-101

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Y² JOB NUMBER: 06G-101

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LABORATORY RESULTS

1.0 INTRODUCTION

This report presents the results of the geotechnical investigations for the proposed subdivision to be located at approximately 100 South 100 East in Midway, Utah. The general location of the site, with respect to existing roadways, is shown on Figure No. 1, *Vicinity Map*, at the end of this report.

This investigation was done to assist in evaluating the subsurface conditions and engineering characteristics of the foundation soils, strength of tufa deposits, and in developing our opinions and recommendations concerning appropriate foundation types, floor slabs, and pavements. This report presents the results of our geotechnical investigation including field exploration, laboratory testing, engineering analysis, and our opinions and recommendations. Data from the study is summarized on Figures 3 thru 7 and in the Laboratory Results.

2.0 PROPOSED CONSTRUCTION

We understand that the proposed development will consist of a single family residential subdivision. It is anticipated that these buildings will be single to multi-story slab on grade structures. We estimate that the maximum loads for the proposed structures will not exceed 6 kips per linear foot for bearing walls, 50 kips for columns, and 150 to 200 pounds per square foot for floor slabs. If structural loads are significantly greater than those discussed herein or if the project is substantially different than described above, our office should be notified so that we may review our recommendations, and if necessary, make modifications.

In addition to the structures described above it is anticipated that utilities will be constructed to service the buildings, that exterior concrete flatwork will be placed in the form of curb and gutter, and sidewalks, and that asphalt concrete paved roads will be constructed.

3.0 CONCLUSIONS

The following is a brief summary of our findings and conclusions:

1. The subject site is suitable for the proposed construction provided the recommendations presented in this report are followed.

2. Based upon the 5 boreholes drilled for this investigation, this site is covered with 18 inches of topsoil. The native soils below the topsoil generally consists of areas of a medium dense silty sand (SM) and bedrock tufa deposits of varying strength overlying a silty sand with clay (SM). Groundwater was encountered in all boreholes at depths of 10 to 14.5 feet below existing site grade.

3. Due to the risk of excessive differential settlement between the weathered tuffa bedrock and the silt and clay soils we recommend that footings be constructed on a single bearing type of material. If at least 18 inches of a similar bearing material exist below all footings on a building, or at least 6 inches of the tuffa bedrock, the footings may be constructed on the exposed native soils. If dissimilar materials are encountered within a single building, all footings should be constructed on at least 18 inches of properly placed and compacted structural fill.

4. Conventional strip and spread footings are recommended for supporting the proposed structures. Footings founded either on the undisturbed native soils, or on properly placed and compacted structural fill extending to the undisturbed native soils as indicated above, may be designed using a maximum bearing capacity of 2,000 psf. More detailed information pertaining to the construction of foundations is provided in Section 10.0, Foundations of this report.

5. Residential pavements should consist of 3 inches of asphalt and 8 inches of untreated aggregate base placed directly on the native subgrade. Additional pavement recommendations are stated in Section 14.0 of this report.

4.0 SITE CONDITIONS

The site is a near rectangular parcel of land consisting of approximately 6 acres. The subject property has an overall grade downward to the south at 1 to 3 percent. The entire site was vegetated with alfalfa and actively being irrigated and cultivated. An unlined irrigation ditch was observed running along the northern lot line, and an inactive ditch extends east-west across the bottom third of the site.

The site is bound to the north and east by existing residential structures, to the west by 100 East and residential subdivisions, and to the south by 200 South and an LDS Church.

5.0 FIELD INVESTIGATION

The field investigation consisted of drilling 5 boreholes to depths between 15 and 18 feet below current site grades at the approximate locations shown on Figure 2, at the end of this report. The soils encountered at the site were continuously logged by a qualified member of our geotechnical staff. Due to the nature of the native soils and investigation type, only disturbed samples were obtained and returned to our laboratory for testing.

6.0 LABORATORY TESTING

The samples obtained during the field investigation were sealed and returned to our laboratory where samples were selected for laboratory testing. Laboratory tests included natural moisture determinations and grain size distribution analyses. The results of these tests are shown at the end of this report.

Samples from the second investigation will be retained in our laboratory for 30 days following the date of this report at which time they will be disposed of unless a written request for additional holding time is received prior to the disposal date.

7.0 SUBSURFACE CONDITIONS

Based upon the 5 boreholes drilled for this investigation, this site is covered with 18 inches of topsoil. The native soils below the topsoil generally consists of areas of a medium dense silty sand (SM) and bedrock tufa deposits of varying strength overlying a silty sand with clay (SM). Groundwater was encountered in all boreholes at depths of 10 to 14.5 feet below existing site grade.

Graphical representations of the soil conditions encountered are shown on the Borehole Logs, Figures 3 thru 7. The stratification lines shown on the logs represent the approximate boundaries between soil units; the actual transition may be gradual.

8.0 SITE GRADING

8.1 General Site Grading

Prior to construction unsuitable soils and vegetation should be removed from below areas which will ultimately support structural loads. This includes areas below foundations, floor slabs, exterior concrete flatwork, and asphaltic concrete paved roads. Unsuitable soils consist of topsoil, organic soils, undocumented fill, soft, loose or disturbed native soils, and any other deleterious materials. Topsoil was encountered to a maximum depth of 18 inches at the borehole locations. The topsoil, any uncontrolled fill, and any other unsuitable soils should be completely removed.

8.2 Excavations

Due to the nature of the soils at this site temporary construction slopes for excavations into the native soils less than five feet in depth may be near vertical. Excavations deeper than five feet should be sloped at 0.5:1.0 (horizontal:vertical). If unstable conditions or groundwater seepage are encountered, flatter slopes or shoring and bracing may be required. It is our understanding that all utility trenches in this subdivision will be installed at depths of 7 to 12 feet below current site grade. Excavation through the tufa will have to be preformed using either jackhammer or rock saw to depths desired. All excavations should meet applicable OSHA[1] Health and Safety Standards for type C soils.

[1] Occupational Safety and Health Administration

8.3 Structural Fill

If fill is needed, all fill placed below the buildings, pavements, and concrete flatwork should be compacted structural fill. All other fills should be considered as backfill. All structural fill should meet the requirements of the agency under which approval will be granted. Unless a more restrictive criteria is given, Structural fill, below any buildings, should consist of the native gravel soils or weathered bedrock less than 6 inches in size or imported structural material. Structural fill below pavements and concrete flatwork may consist of all native silt soils or imported structural material. The native silt and clay soils contain too many fines for use at structural fill below buildings and should not be used. Imported structural fill material should consist of well-graded sandy gravels with a maximum particle size of 3 inches and 5 to 15 percent fines (materials passing the No. 200 sieve). The liquid limit of the fines should not exceed 35 and the plasticity index should be below 15. Clean gravel ranging from pea gravel to 6 inches with less than 5 percent fines and sand combined may alternatively be used as structural fill. All fill soils should be free from topsoils, highly organic material, frozen soil, and other deleterious materials.

8.4 Backfill

The native soils may be used as backfill in utility trenches and against outside foundation walls. Backfill, not under structural elements, should be placed in lift heights suitable to the compaction equipment used and compacted to at least 90 percent of the maximum dry density (ASTM D-1557).

8.5 Fill Placement and Compaction

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness of 6 inches for hand operated equipment, 8 inches for most "trench compactors", and 12 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to least the percentages of the maximum dry density indicated in Table 1 below, as determined by ASTM D-1557:

TABLE 1: STRUCTURAL FILL COMPACTION

Structural fill	Percent of Maximum Dry Density
Below foundations, flatwork, and pavements:	95%
For fills thicker than 6 feet:	98%
In landscape areas not supporting structural loads:	90%

Generally, placing and compacting fill at a moisture content within 2% of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. The further the moisture content is from the optimum, the more difficult it will generally be to achieve the required compaction.

We recommend that fill be tested frequently during placement. Early testing is recommended to demonstrate that placement and compaction methods are achieving the required compaction for the entire depth of fill. It is the contractor's responsibility to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

Clean gravel fill used as structural fill may be placed in loose lifts up to 2 feet thick. The gravel will need to be compacted with at least 4 passes of a heavy vibratory plate or slow moving vibratory smooth drum compactor. Typically, the gravel will settle 2 to 3 inches when properly compacted. Gravel compaction should be verified by either an engineer from Y^2 Geotechnical or a materials testing technician trained in proper gravel placement techniques.

8.6 Stabilization

The native soils at the site may be susceptible to rutting and pumping. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the

ground surface by using lighter equipment and/or partial loads, by working in dry times of the year, or by providing a working surface for equipment.

The soil in any obvious soft spots should be removed and replaced with granular material. If rutting occurs traffic should be stopped in the area of concern and the soil should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up, or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 18 inches. Depending on the amount of unstable soil, removal and replacement to a greater depth may be required.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of six inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. The more angular and coarse the material, the thinner the lift that will be required. We recommend that the fines content (percent passing the no. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plastic index less than 15.

Using a geosynthetic fabric such as Mirafi 600x, or an approved equivalent, will also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should be placed over the fabric in compacted lifts. . Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC CONSIDERATIONS

9.1 Faulting

Based on published data, no active faults are known to traverse the site and no faulting was indicated during our field investigation. The nearest known active fault is the Wasatch Fault located about 15 mile west of the property[2].

9.2 Seismic Design Criteria

The residential structures should be designed in accordance with IRC building code. Based on section R301.2.2 of the IRC this site is classified as a Seismic Design Category D_2.

9.3 Liquefaction

Liquefaction is a phenomenon where soils lose their intergranular strength due to an increase of pore pressures during a dynamic event such as an earthquake. The potential for liquefaction is based on several factors, including 1) the grain size distribution of the soil, 2) the plasticity of the fine fraction of the soil (material passing the No. 200 sieve), 3) relative density of the soil, 4) earthquake strength (magnitude) and duration, and 5) overburden pressures. In addition, the soils must be near saturation for liquefaction to occur.

Due to the type of subsurface investigation conducted for this project, we are unable to perform a liquefaction analysis for this site. However, due to the very strong to extremely strong nature of the native tuffa bedrock encountered below the site, the potential for liquefaction occurring on this site is very low, and the risk to structures on this site from liquefaction induced settlement is negligible.

---

[2] Hecker, Suzanne, Utah Geologic Survey, "Quaternary Faults and Fold, Utah Bulletin 127, 1993

10.0 FOUNDATIONS

10.1 Footing Design

The native soils at this site are capable of supporting the proposed structures if the recommendations presented in this report are followed. The recommendations presented below should be utilized during design and construction of this project:

1. Due to the risk of excessive differential settlement between the weathered tuffa bedrock and the silt and clay soils we recommend that footings be constructed on a single bearing type of material. If at least 18 inches of a similar bearing material exist below all footings on a building, or at least 6 inches of the tuffa bedrock, the footings may be constructed on the exposed native soils. If dissimilar materials are encountered, within a single building, all footings should be constructed on at least 18 inches of properly placed and compacted structural fill.

2. Conventional strip and spread footings are recommended for supporting the proposed structures. Footings founded either on the undisturbed native soils, or on properly placed and compacted structural fill extending to the undisturbed native soils as indicated above may be designed using a maximum bearing capacity of 2,000 psf. A one-third increase is allowed for short term transient loads such as wind and seismic events. Footings should be uniformly loaded.

3. Continuous and spot footings should have minimum widths of 20 and 36 inches, respectively.

4. Exterior footings should be placed below frost depth which is determined by local building codes. Generally 36 inches is adequate in this area. Interior footings, not subject to frost, should extend at least 18 inches below the lowest adjacent final grade.

5. Foundation walls on continuous footings should be well reinforced both top and bottom. We suggest a minimum amount of steel equivalent to that required for a simply supported span of 12 feet.

6. Footing excavations should be observed by the geotechnical engineer prior to placement of structural fill and construction of footings to evaluate whether suitable bearing soils have been exposed and verify that excavation bottoms are free of loose or disturbed soils.

10.2 Estimated Settlement

If footings are designed and constructed in accordance with the recommendations presented above, the risk of total settlement exceeding 1 inch and differential settlement exceeding 0.5 inch for a 25-foot span will be low. Additional settlement should be expected during a strong seismic event.

11.0 LATERAL EARTH PRESSURES

Resistance to lateral loads (including those due to wind or seismic loads) on foundations may be achieved by frictional resistance between the foundations and underlying soils, and by passive earth pressures of backfill soils placed against the sides of foundations. Retaining walls and below grade walls acting as soil retaining structures and should be designed to resist pressures induced by the backfill soils.

The lateral pressures imposed on a retaining structure are dependant on the rigidity of the structure and its ability to resist rotation. Retaining walls which are free to rotate at least 0.2 percent of the wall height, develop an active lateral soil pressure condition. Structures that are not allowed to rotate or move laterally, develop an at-rest lateral earth pressure condition. Lateral pressures applied to structures may be computed by multiplying the vertical depth of backfill material by the appropriate equivalent fluid density. Any surcharge loads in excess of the soil weight applied to the backfill should be multiplied by the appropriate lateral pressure coefficient and added to the soil pressure. The lateral pressures presented in Table 2, *Lateral Earth Pressures* below, are based on drained, horizontally placed soils as backfill material. For computing lateral forces we recommend the following equivalent fluid densities:

TABLE 2: LATERAL EARTH PRESSURES

Condition	Static Lateral Pressure Coefficient	Static Equivalent Fluid Pressure (pcf)
Active	0.33	40
At-Rest	0.50	60
Passive	3.00	360

The friction acting along the base of foundations may be computed by using a coefficient of friction of 0.35 for contact with the native soils. These values may be increased by one-third for transient wind and seismic loads.

The values presented above are based on drained conditions and are ultimate, therefore, an appropriate factor of safety (minimum of 2.0) should be applied to these values for design purposes.

12.0 FLOOR SLABS

The native soils below floor slabs should be proof rolled and a minimum 4 inch thick layer of free-draining gravel or imported structural fill should be placed immediately below the floor slab to help distribute floor loads, break the rise of capillary water, and aid in the concrete curing process. For slab design, we recommend a modulus of subgrade reaction of 200 psi/in be used. To help control normal shrinkage and stress cracking, the floor slabs should have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints and frequent crack control joints.

Special precautions should be taken during placement and curing of concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking,

spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and columns.

13.0 SUBSURFACE DRAINAGE

It is our understanding that all structures in this subdivision will be slab on grade, with no basements extending more than 18 inches below the existing site grade. If basements do extend more than 18 inches below the existing site grade, a subsurface drainage system may need to be incorporated. Y^2 Geotechnical, P.C. would be happy to provide drainage recommendations upon request.

14.0 SURFACE DRAINAGE

Wetting of the foundation soils may cause some degree of volume change within the soil and should be prevented after construction. We recommend that the following precautions be taken at this site:

1. The ground surface should be graded to drain away from the structures in all directions. We recommend a minimum fall of 6 inches in the first 10 feet;

2. Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits;

3. Sprinkler heads, should be aimed away and kept at least 12 inches from foundation walls;

4. Provide adequate compaction of foundation backfill i.e. a minimum of 90% of ASTM D-1557. Water consolidation methods should not be used;

5. Other precautions which may become evident during design and construction should be taken.

15.0 PAVEMENT SECTION DESIGN

We understand that a flexible pavement is desired for the roads within this development. Unless a more stringent local code is required, we recommend new pavement sections placed directly on the undisturbed native silt soils consist of 3 inches of asphaltic concrete over 8 inches of untreated aggregate road base. The pavement design recommendations were developed using visual and

Variations from the conditions portrayed in the boreholes often occur which are sometimes sufficient to require modifications in the design. If during construction, conditions are found to be different than those presented in this report, please advise us so that the appropriate modifications can be made. An experienced geotechnical engineer or technician should observe fill placement and conduct testing as required to confirm the use of proper structural fill materials and placement procedures.

The geotechnical investigation as presented in this report was conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in the area. This report is valid only for the location and project described in the report. The conclusions presented are based on the data provided, observations, and conditions that existed at the time of the field exploration. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts or reports.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
Y^2 GEOTECHNICAL, P.C.
Not Official Unless Stamped and Dated

Torrey J. Copfer
Project Engineering Geologist

Reviewed by,

R. Jay Yahne, P.E.
Principal Geotechnical Engineer

3 copies sent

Y² GEOTECHNICAL, P.C.

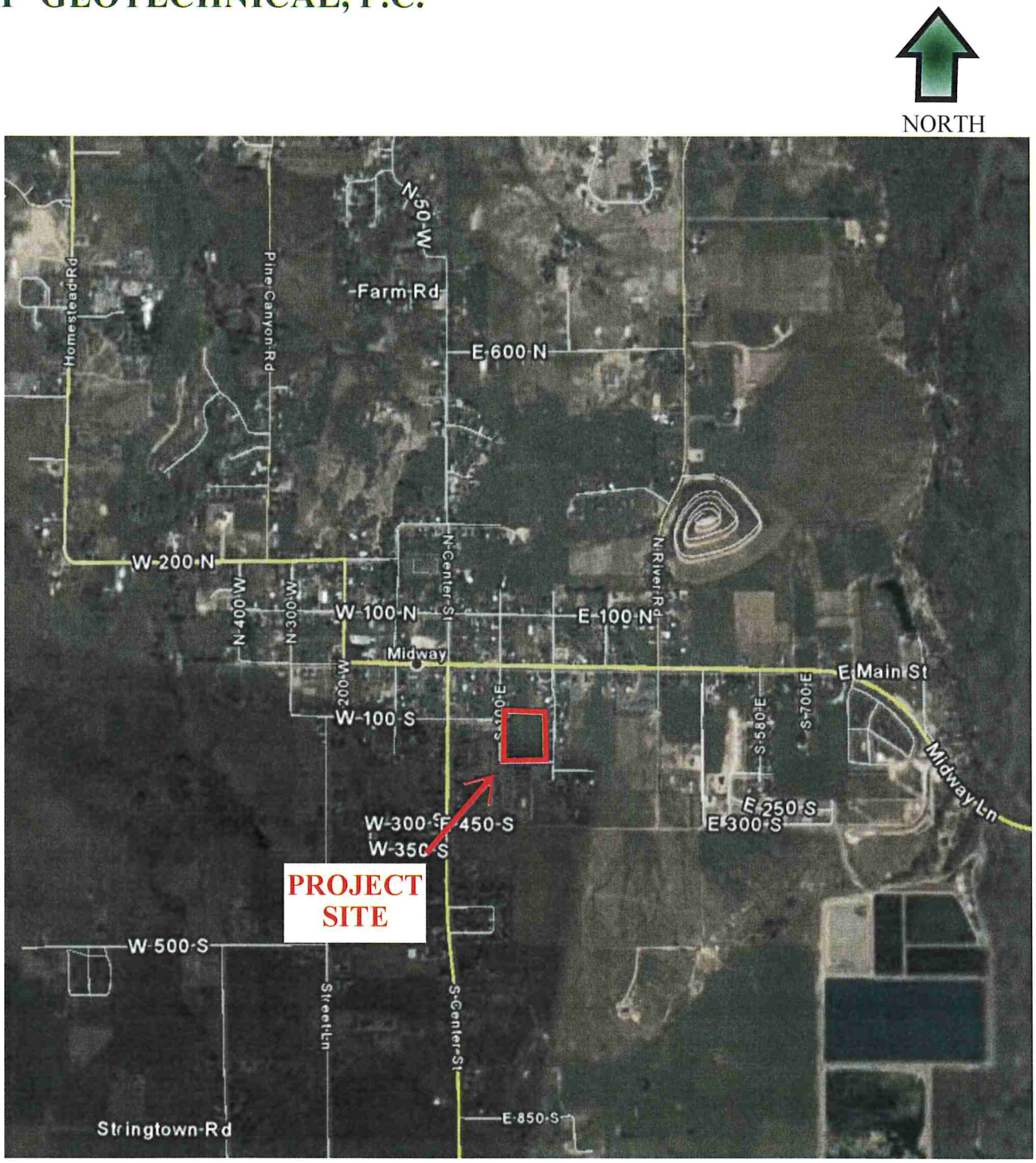

Figure 1: VICINITY MAP

GEOTECHNICAL STUDY
Bonner Subdivision
Midway, Wasatch County, Utah

Y² Job No. 06G-101

Y² GEOTECHNICAL, P.C.

NORTH

Figure 2: BOREHOLE LOCATIONS

GEOTECHNICAL STUDY
Bonner Subdivision
Midway, Wasatch County, Utah

Y² Job No. 06G-101

Project No. 06G-101	**LOG OF BOREHOLE NO. B-1**	Figure 3

PROJECT	CLIENT
Bonner Subdivision	**Jeff Donovan**
LOCATION **100 South 100 East Midway, UT**	Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
			18" Topsoil - Sandy silt, organic, moist, brown.						
			Silty Sand (SM) - medium dense, slightly moist, light brown.						
				7.9	NP	NP	9.4	68.8	21.8
5			Tufa (BEDROCK) - strong, dry, light brown.						
			Tufa (BEDROCK) - moderately strong, dry, light brown.						
			Tufa (BEDROCK) - very strong, dry, light brown.						
10			▽ Silty Sand (SM) - with occasional clay seams, medium dense, wet, light brown to grey.						
15			End of borehole at 15 feet.						

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Geotechnical & Environmental Services

WATER LEVELS					
▽	11 07/14/06	STARTED	7/14/06	FINISHED	7/14/06
		DRILL CO.	Miller Drilling	DRILL RIG	Cyclone
		DRILL TYPE	Reverse Circulation		
		LOGGED BY	Melissa Copfer		

LOG OF BOREHOLE/TEST PIT 06G-101 BONNER SUBDIVISION GINT.GPJ Y2 GEOTECH.GDT 7/27/06

Project No. 06G-101

LOG OF BOREHOLE NO. B-2

Figure 4

PROJECT: **Bonner Subdivision**

CLIENT: **Jeff Donovan**

LOCATION: **100 South 100 East, Midway, UT**

Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
			18" Topsoil - Sandy silt, organic, moist, brown.						
			Silty Sand (SM) - medium dense, slightly moist, light brown.	8.4	NP	NP	11.3	70.1	18.6
			Tufa (BEDROCK) - extremely strong, dry, light brown.						
5			Silty Sand (SM) - medium dense, slightly moist, light brown.						
			Tufa (BEDROCK) - moderately strong, dry, light brown.						
			Silty Sand (SM) - with occasional clay seams, medium dense, moist, light brown.						
10			Tufa (BEDROCK) - moderately strong, dry, light brown.						
			Tufa (BEDROCK) - extremely strong, dry, light brown.						
			▽ Silty Sand (SM) - with occasional clay seams, medium dense, wet, light brown.						
15			End of borehole at 15 feet.						

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS					
▽ 13 07/14/06	STARTED	7/14/06	FINISHED	7/14/06
	DRILL CO.	Miller Drilling	DRILL RIG	Cyclone
	DRILL TYPE	Reverse Circulation		
	LOGGED BY	Melissa Copfer		

LOG OF BOREHOLE/TEST PIT 06G-101 BONNER SUBDIVISION GINT.GPJ Y2 GEOTECH.GDT 7/27/06

Project No. 06G-101	**LOG OF BOREHOLE NO. B-3**	Figure 5

PROJECT	CLIENT
Bonner Subdivision	**Jeff Donovan**
LOCATION **100 South 100 East Midway, UT**	Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
			18" Topsoil - Sandy silt, organic, moist, brown.						
			Silty Sand (SM) - medium dense, slightly moist, light brown.	6.3	NP	NP	7.4	74.4	18.2
5			Tufa (BEDROCK) - strong, dry, light brown.						
10			Silty Sand (SM) - medium dense, slightly moist, light brown.						
			Tufa (BEDROCK) - extremely strong, dry, light brown.						
			Silty Sand (SM) - with occasional clay seams, medium dense, moist, light brown.						
			Tufa (BEDROCK) - moderately strong, dry, light brown.						
15			Silty Sand (SM) - with occasional clay seams, medium dense, wet, light brown.						
			Extremely strong Tufa below 18 feet. End of borehole at 18 feet.						

Grab Sample

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS					
▽ 14.5 07/14/06	STARTED	7/14/06	FINISHED	7/14/06
	DRILL CO.	Miller Drilling	DRILL RIG	Cyclone
	DRILL TYPE	Reverse Circulation		
	LOGGED BY	Melissa Copfer		

LOG OF BOREHOLE/TEST PIT 06G-101 BONNER SUBDIVISION GINT.GPJ Y2 GEOTECH.GDT 7/27/06

Project No. 06G-101	LOG OF BOREHOLE NO. B-4	Figure 6

PROJECT	CLIENT
Bonner Subdivision	Jeff Donovan
LOCATION 100 South 100 East Midway, UT	Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
			18" Topsoil - Sandy silt, organic, moist, brown.						
			Silty Sand (SM) - medium dense, slightly moist, light brown.						
			Tufa (BEDROCK) - extremely strong, dry, light brown.						
5			Silty Sand (SM) - medium dense, slightly moist, light brown.						
10			▽ Wet below 10 feet.						
			Tufa (BEDROCK) - moderately strong, dry, light brown.						
			Tufa (BEDROCK) - weak, dry, light brown.						
				20.1	NP	NP	0.7	53.2	46.1
15			Silty Sand (SM) - with occasional clay seams, medium dense, wet, light brown to grey.						
			Extremely strong Tufa below 15 feet.						
			End of borehole at 15 feet.						

LOG OF BOREHOLE/TEST PIT 06G-101 BONNER SUBDIVISION GINT.GPJ Y2 GEOTECH.GDT 7/27/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS					
▽	10 07/14/06	STARTED	7/14/06	FINISHED	7/14/06
		DRILL CO.	Miller Drilling	DRILL RIG	Cyclone
		DRILL TYPE	Reverse Circulation		
		LOGGED BY	Melissa Copfer		

Project No. 06G-101	LOG OF BOREHOLE NO. B-5	Figure 7

PROJECT	CLIENT
Bonner Subdivision	Jeff Donovan
LOCATION 100 South 100 East Midway, UT	Surface Elev.:

Grab Sample

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION
			18" Topsoil - Sandy silt, organic, moist, brown.
			Silty Sand (SM) - medium dense, slightly moist, light brown.
			Tufa (BEDROCK) - extremely strong, dry, light brown.
			Silty Sand (SM) - medium dense, moist, light brown.
5			Tufa (BEDROCK) - moderately strong to weak, dry, light brown.
10			Tufa (BEDROCK) - extremely strong, dry, light brown.
			Tufa (BEDROCK) - strong, dry, light brown.
			Silty Sand (SM) - with occasional clay seams, medium dense, wet, light brown to grey.
15			Extremely strong Tufa below 18 feet. End of borehole at 18 feet.

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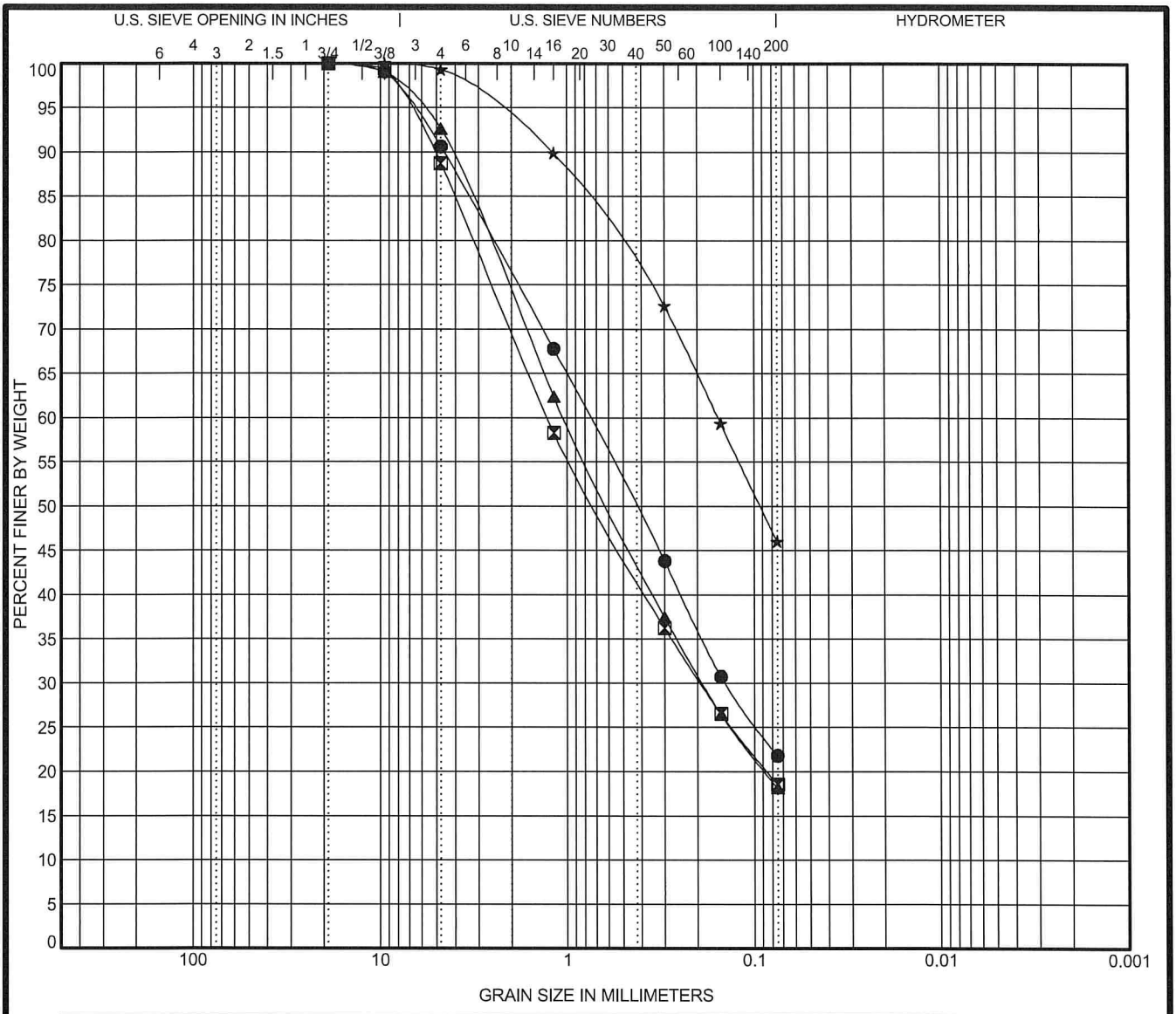
WATER LEVELS					
▽ 14 07/14/06	STARTED	7/14/06	FINISHED	7/14/06
	DRILL CO.	Miller Drilling	DRILL RIG	Cyclone
	DRILL TYPE	Reverse Circulation		
	LOGGED BY	Melissa Copfer		

LOG OF BOREHOLE/TEST PIT 06G-101 BONNER SUBDIVISION GINT.GPJ Y2.GEOTECH.GDT 7/27/06



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-1	4.0	SILTY SAND(SM)	NP	NP	NP		
⊠	B-2	2.0	SILTY SAND(SM)	NP	NP	NP		
▲	B-3	3.0	SILTY SAND(SM)	NP	NP	NP		
★	B-4	14.0	SILTY SAND(SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1	4.0	19	0.76	0.14		9.4	68.8	21.8	
⊠	B-2	2.0	19	1.27	0.19		11.3	70.2	18.6	
▲	B-3	3.0	19	1.03	0.19		7.4	74.5	18.2	
★	B-4	14.0	9.5	0.15			0.7	53.3	46.1	

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GRAIN SIZE DISTRIBUTION

Project: Bonner Subdivision

Location: 100 South 100 East Midway, UT

Number: 06G-101

US GRAIN SIZE 06G-101 BONNER SUBDIVISION GINT.GPJ Y2 GEOTECH.GDT 7/27/06

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	4.0	NP	NP	NP	19	22	SM	7.9			
B-2	2.0	NP	NP	NP	19	19	SM	8.4			
B-3	3.0	NP	NP	NP	19	18	SM	6.3			
B-4	14.0	NP	NP	NP	9.5	46	SM	20.1			

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Summary of Laboratory Results

Project: Bonner Subdivision

Location: 100 South 100 East Midway, UT

Number: 06G-101