TOWN OF JACKSON
PLANNING & BUILDING DEPARTMENT

TRANSMITTAL MEMO

Town of Jackson
- ☒ Public Works/Engineering
- ☒ Building
- ☐ Title Company
- ☒ Town Attorney
- ☒ Police

Joint Town/County
- ☒ Parks and Recreation
- ☒ Pathways
- ☒ Housing Department

Teton County
- ☐ Planning Division
- ☐ Engineer
- ☐ Surveyor- *Nelson*
- ☐ Assessor
- ☐ Clerk and Recorder
- ☐ Road and Levee

State of Wyoming
- ☐ Teton Conservation
- ☐ WYDOT
- ☐ TC School District #1
- ☐ Game and Fish
- ☐ DEQ

Federal Agencies
- ☐ Army Corp of Engineers

Utility Providers
- ☐ Qwest
- ☐ Lower Valley Energy
- ☐ Bresnan Communications

Special Districts
- ☒ START
- ☒ Jackson Hole Fire/EMS
- ☐ Irrigation Company

Date: November 4, 2019

Item #: P19-248

Planner: Paul Anthony

Phone: 733-0440 ext. 1303

Fax: 734-3563

Email: panthony@jacksonwy.gov

Owner:
Roseville Ventures II, LLC
4015 80th St
Kenosha, WI 53142

Applicant:
Nick Orthmann
4011 80th St
Kenosha, WI 53142

REQUESTS:

The applicant is submitting a request for a Development Plan for the property located at 165 & 185 N. Glenwood Street legally known as, LOTS 5-6, BLK. 6, JACKSON & LOTS 1-4, BLK. 6, JACKSON.

For questions, please call Paul Anthony at 733-0440, x1303 or email to the address shown below. Thank you.

Please respond by: **November 18, 2019 (Sufficiency)**
November 25, 2019 (with Comments)

RESPONSE: For Departments not using Trak-it, please send responses via email to:
tstolte@jacksonwy.gov

Development Plan Application
For
Glenwood and Gill Condominiums



Applicant:

BEAR DEVELOPMENT

Prepared by:

JORGENSEN
It's About People, Trust and Know How

Jorgensen, Inc.
Engineers, Land Surveyors, & Planners
1315 Highway 89 South, Suites 201 & 203 83001
P.O. Box 9550
Jackson, WY 83002
307.733.5150

Town of Jackson
Submittal Date: October 31th, 2019
Jorgensen, Inc. Project No. 18105
TOJ #P19-097

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SECTION 1 - PROJECT BACKGROUND, OVERVIEW, FINDINGS AND RESPONSE TO SUBMITTAL CHECKLIST

A. PROJECT BACKGROUND & HISTORY

The Glenwood Gill Condominium project located at 165-185 N. Glenwood Street consists of 29 fee simple condominium units. The site is currently owned by Roseville Ventures II, LLC an affiliate of Bear Development, LLC (Bear), the applicant. Bear has successfully completed several residential and commercial development projects across the United States. An affiliate of Bear was the former owner of the Painted Buffalo Inn from 2007 to 2017. S.R. Mills is a Principal in Bear and will be overseeing this project. The 185 site was acquired by Bear in 2012 and was colloquially known as the "hole-in-the-ground" before Bear completed the construction of an underground parking structure in 2014 in preparation for future development. The 165 site was acquired by Bear in 2016 and is currently occupied by a mix of residential and commercial uses. Demolishing Permit B19-0311 has been approved for all structures on the 165 site to the Town and completed the 90-day demolition stay. Over the past 18-months, Bear has completed initial feasibility studies, assembled the project team, and begun conversations with community stakeholders, and submitted a Sketch Plan. Bear and the project team have thoroughly reviewed the comments by Department Review and Staff and have compiled this Development Plan for submittal. We look forward to working with the Town to make this project a success.

B. OWNER & PROJECT TEAM INFORMATION

PROPERTY OWNERS & APPLICANTS:
Roseville Ventures II, LLC
C/O Bear Development, LLC
4011 80th Street
Kenosha, WI 53142
262-308-2656
Contact: Nick Orthmann
northmann@beardevelopment.com

ARCHITECT
Northworks Architects & Planners
185 E. Hansen Avenue
Jackson, Wyoming 83001
307-201-5324
Contact: Adam Janak
ajanak@nwks.com

ARCHITECTURAL CONSULTANT
Hawtin Jorgensen Architects
265 E Kelly Avenue
Jackson, Wyoming 83001
307-733-4364
Contact: Arne Jorgensen
ajorgensen@hawtinjorgensen.com

LAND PLANNING, SURVEYING & ENGINEERING
Jorgensen, Inc.
P.O. Box 9550
Jackson, Wyoming 83002
307-733-5150
Contact: Joe Lovett
jlovett@jorgeng.com

LAND PLANNING & LANDSCAPE ARCHITECTURE
Hershberger Design
560 S Glenwood Street
Jackson, Wyoming 83001
307-739-1001
Contact: Bonny Hershberger
bonny@hershbergerdesign.com

C. DEVELOPMENT PROPOSAL

The applicant proposes to build 29-fee simple condominium units on the 0.96-acre site located on the southwest corner of Glenwood Street and Gill Avenue. The site is zoned DC: Downtown Core. The project will include 18-units with short-term rental ability, 6-free market units and 5-workforce housing units provided through the Workforce Ownership program. The free market units will be provided through the Workforce Housing Floor Area Bonus (LDR Div. 7.8) program as detailed in the project program and the housing mitigation calculations included with this submittal in **Section 5**. All units are townhome style with individual entrances and no common hallways. The individual entrances are located along Glenwood Street, Gill Street and the central courtyard. The majority of the units will have a private entrance in the below grade parking structure as well.

The applicant will allow for some flexibility in the final floor plan for each purchaser, however the unit demising walls, footprint and overall square footages will not change. For example, a purchaser of a unit will have the option to choose from different layouts which may reduce the bedroom count from Three (3) bedrooms to Two (2) bedrooms. As such, the bedroom counts included in this submittal for purposes of housing mitigation calculations, exactions, and water

and sewer demands are assumed to be greatest possible number to ensure that all requirements are ultimately met or exceeded depending on final buildout of each unit.

Parking
There will be 48 parking stalls in the below grade parking structure providing parking at a ratio of 1.66 stalls per unit. Nineteen of the 48 stalls are tandem stalls that allow space for more than one vehicle. In addition to the 48 underground parking spaces, there are approximately 16 on street parking spaces that can also serve the project.

Access to the site is via N Glenwood Street, W Gill Street and the alleyway that spans from W Gill Street to W Deloney Avenue. The parking garage is accessed via the alleyway. The proposal includes paving the portion of the alleyway that borders the project site as well as a widening of the streetscape along Glenwood Street by approximately 2 feet 8 inches to 3 feet.

The Town of Jackson Land Development Regulations (LDRs) require 13 foot 6 inches (13'6") from back of curb to building façade for a trees in grates pedestrian frontage, however due to the existing foundation, Administrative Adjustment P19-099 has been approved to allow for a 13 foot 1 inch (13'1") measurement of the pedestrian streetscape on the west side of N Glenwood Street. This is achieved by relocating the existing curb line along Glenwood Street by approximately 2 feet 8 inches to 3 feet. The building on the 165 Glenwood portion of the site is aligned with the 185 Glenwood portion to maintain the 13' 1'' streetscape throughout the project. Along W Gill Avenue, similar existing conditions result in a streetscape of 10' 1'' due to the existing foundation, and Administrative Adjustment P19-098 has been approved to allow for this frontage.

D. FINDINGS FOR APPROVAL

I. 8.3.2.C. Development Plan - Findings for Approval

1. Is consistent with the desired future character described for the site in the Jackson/Teton County Comprehensive Plan.

Complies. The project falls within the Comprehensive Plan District 2: Town Commercial Core – 2.3 Downtown which is a transitional subarea and currently consists of a variety of retail, restaurant, office and other commercial activities, along with long-term residences and lodging in a variety of sizes and forms.

The goal of this subarea is intended to create ***"a vibrant mixed-use area by accommodating a variety of uses and amenities. The sub area will be the starting point for the development of a refined Lodging Overlay and a future discussion of the type and size of lodging desired. A key challenge will be to provide a balance***

between lodging and long-term residential housing…. Multifamily structures will be allowed if it properly addresses the street."

The Glenwood Gill Condominium project complies with direction provided by the comprehensive plan in this subarea because it provides that delicate balance between the commercial short-term rental use allowed within the Lodging Overlay and the long-term residential component desired as a mix of uses within this subarea.

The design of the building addresses the street as required by the DC Zone and the comprehensive plan for allowing multi-family structures. The building mass and scale will be uniform and consistent with nearby buildings such as the White Buffalo Club, Hotel Jackson, and the Timbers Residence Club. At three stories the project meets variety of two- and three-story variety in mixing with its two-story neighbor to the east (St. John Campus).

The project creates the attractive street wall desired by the subarea and with each unit being accessed from street, creates a vibrant and active pedestrian experience. Articulation and circulation into the courtyard and around the condominiums connects the site comprehensively to both Glenwood and Gill. Street trees, on street parking and pedestrian curb cut/ramps further enhance the pedestrian experience by providing an adequate buffer from traffic thus giving pedestrians a pleasant and safe walking environment. Furthermore, while on-street parking is available, on-site parking is predominantly provided underground in a parking garage and screened from view as desired by the subarea

The project is perfectly situated on the east edge of the Lodging Overlay near Miller Park and Flat Creek. While this project does not front Flat creek per se, it does provide connection to those fringe areas further west on Gill Avenue. It also provides the opportunity to be connected to the design and the desired pedestrian focus which makes it a perfect fit into the desired characteristics for Comprehensive Plan District 2: Town Commercial Core – 2.3

2. ***Achieves the standards and objective of the Natural Resource Overlay (NRO) and Scenic Resources Overlay (SRO), if applicable.***

Not Applicable. The project is not located within the Natural Resource Overlay (NRO) or the Scenic Resource Overlay (SRO), and this finding is therefore not applicable.

3. ***Does not have significant impact on public facilities and services, including transportation, potable water and wastewater facilities, parks, schools, police, fire, and EMS facilities.***

   Complies. The project will provide the required school and park exactions that are designed to ensure development offsets to the impact it has on these services. Public utilities and project utility connections will be designed to ensure that the project does not overburden TOJ utilities. Flow calculations are provided herein in **Section 4.** The project is within the town limits and is currently served by police, fire and EMT services. The development will not result in increased impacts on availability of these services. A traffic study is included with this submittal as well and significant impact is not projected.

4. ***Complies with the Town of Jackson Design Guidelines.***

   Complies. The project complies with the Town Design Guidelines. Prior to Sketch Plan submission, the project went through two informal reviews by the Town Design Review Committee and received formal approval from the Design Review Committee (DRC) during the Sketch Plan approval process. The design package in this Development Plan application is substantially similar to the design that was approved and will be subject to another formal review and approval by the DRC. Should the DRC identify any concerns during their review, the design team will address them at that time.

5. ***Complies with all relevant standards of these LDRs and other County Ordinances.***

   Complies. The project complies with all applicable Land Development Regulations. Specifically, the project complies with all dimensional limitations in the DC Zone as shown in the development program. One caveat is the dimension between the back of curb and the façade that comprises the pedestrian streetscape on the north side of the development along W Gill Avenue and again on the east side of the development on N Glenwood Street. Since the garage was built prior to the current regulations, and does not make sense to demolish such a substantial foundation, Administrative Adjustments P19-0098 and P19-099 have been approved to allow relief from the standards in order to comply with the LDRs in this portion of the project.

6. ***Is in substantial conformance with all standards or conditions of any prior applicable permits or approvals.***

   Complies. The project is in substantial conformance with all standards and prior permits.

E. PROPOSED DEVELOPMENT PROGRAM

I. Development Summary/Dimensional Limitations

Glenwood Gill Condominiums - Dimensional Limitations			
Zoning: Downtown Core (DC) 2.2.10			*Updated: 04.25.2019*
Requirements	**Required**	**Proposed**	**Comply/Not Comply**
Building Setbacks (Sec. 9.4.8)			
Street	0' - 5'	2'-8"	Complies
Side	0' - 5'	2'-10"	Complies
Rear	0' or 5'	5'-3"	Complies
3rd Floor	0' or 5'	2'-8"	Complies
Landscaping (Sec 5.5.)			
Landscape Surface Ratio	n/a	at BP	will comply
Plant Units	n/a	at BP	will comply
Street Facade (Sec. 9.4.11)			
% of Lot width Primary Street	80% (min)	94%	Complies
% of Lot width Secondary Street	80% (min)	87%	Complies
Building Height (Sec. 9.4.9)			
Height (max) if roof pitch < 5/12	42'	39'-8" max.	Complies
Stories (max)	3	3	Complies
Building Stepback (Sec. 9.4.12)			
Stepback for any 3rd story street facade or street façade over 30' (min)	10'	10'	Complies
Encroachment in stepback (max % of overall façade width)	60%	59%	Complies
Scale of Development - FAR (max)			
	1.3	1.29	Complies
Pedestrian Frontage[1]			
	flexible	trees in grates	Complies
Parking Type[2]			
	flexible	underground	Complies
Exterior Lighting (Sec. 5.3.1)			
Lumens per site (max)	3	at BP	Will Comply
All Fixtures	100,000	at BP	Will Comply
Unshielded Fixtures	5,500	at BP	Will Comply
Light Color	≤3000 Kelvin	at BP	Will Comply
Scenic Resource Overlay (SRO) (Sec. 5.3.2)	n/a	n/a	n/a

Allowed Uses			
Residential Use: Attached Single Family Unit (6.1.4.B)			
Permit	B	B	Complies
Individual Unit Max	8,000	4,124	Complies
Parking (min)	1.5/DU	1.65	Complies
Lodging: Short-term Rental Unit (6.1.5.C)			
Permit	B (LO)	B (LO)	Complies
Individual Unit Max	n/a	n/a	Complies
Parking (min)	1.5/DU	1.65	Complies
Total Parking	43.5	48 + on-street parking	Complies
1. Existing conditions preclude development from achieving the desired pedestrian frontage of the DC Zone; an Administrative Adjustment will accompany this application.			
2. On street parking is also available.			

II. Structure Location and Mass

1. Structure location can be found on the Proposed Site Plan (C2.0) found in **Section 3.**
2. Structure scale is shown in the schematic floor plans and elevations found in **Section 3.**

III. Building Design – Development Plan level designs with floor plans and elevations can be found in **Section 3.**

IV. Site Development/ Lot Coverage - Structure location can be found on the Proposed Site Plan (C2.0) found in **Section 3.**

F. PHASING PLAN

Each phase is detailed below and will be divided by the two sites at 165 & 185 Glenwood. Please note that the project complies with the LDRs as a whole and each phase complies with the LDRs when calculated individually.

I. Phase 1 - 185 Glenwood - Construction of Phase 1 is projected to start in the Spring of 2020. Construction will utilize the existing parking deck so earthwork should be minimal. A Demolition Permit has been submitted to the Town for the structures currently located on 165 Glenwood. While there is potential for overlap in timing between the construction on the 185 site and demolition on the 165 site, each process is being looked at individually and the final timing of each will be determined upon final Town approvals of their appropriate permits. Phase 1 will include:

- 12-units with short term rental ability
- 5-free market units

- 3-Workforce Ownership units

II. **Phase 2 - 165 Glenwood-** Phase 2 of the project will include the expansion of the underground parking deck and construction of an additional 9-townhomes. Phase 2 will include:

- 6-units with short term rental ability
- 1-free market unit
- 2-Workforce Ownership units

G. OPERATIONAL STANDARDS

Outside Storage	No outside storage is proposed
Refuse and Recycling	See site plan for refuse container location
Noise	Use will comply with regulations
Vibration	Use will comply with regulations
Electrical Disturbances	Use will comply with regulations
Fire and Explosive Hazards	Use will comply with regulations

SECTION 2 – ENGINEER'S REPORT

A. INTRODUCTION

This Engineer's Report is intended to provide the engineering basis for design and to discuss engineering related topics for the development of Lots 1-6, Block 6, Original Town Site, Jackson, Wyoming, currently known as 165 and 185 Glenwood Street. The proposed development includes 29 residential units which will include a number of deed restricted housing units, units that will support short terms rentals and non-short-term market units. Existing Town of Jackson road, water, sanitary sewer and storm sewer infrastructure will be used to service the development and electrical, gas and communication utilities are in place at or near the proposed development. The basic layout site plan attached in **Section 3** and the general engineering items are discussed here.

B. SETTING

The site located in the north part of the Town of Jackson and has seen various uses since before 1945. The northern portion of the lot, 185 Glenwood, was most recently slated for the development of a 33-unit condominium project in 2006 which lead to the excavation of a deep hole meant for underground parking and foundations. The project was halted due to economic conditions, leaving the hole open and incomplete. In 2012, Bear Development purchased the property and subsequently completed the concrete parking structure in 2014 as a means to stabilize the excavation and prepare the lot of unspecified future development. The southern portion of the site, 165 Glenwood currently has a mix of commercial and residential uses.

C. GRADING, EROSION CONTROL, DRAINAGE, & STORMWATER

Proposed conditions on site include underground parking beneath the whole site with street level conditions consisting of three building segments separated by a courtyard. Some of the condominium units will be accessed from the Glenwood or Gill Street frontage while others are accessed from the central courtyard. The courtyard will be accessed from the Gill Avenue sidewalk on the north end of the property by several steps and from the Glenwood Street sidewalk on the east side of the property by an ADA compliant sidewalk. Since the site is completely utilized by the structure and site improvements, stormwater will be collected into a central system, treated as appropriate and routed using a controlled release system to the town stormwater system at the stormwater manhole located in Glenwood Street, just south of the Glenwood/Gill intersection. Stormwater release rate will be determined using pre-development conditions as specified in the most current version of the Town of Jackson Land Development Regulations. Due spatial constraints, the difficulty of mechanical snow removal, and the probability of ice and snow buildup in the sheltered courtyard, the courtyard and rooftop decks will have snow melt systems that will drain to the stormwater system. A curb inlet may be added in the new section of curb to capture stormwater running down the gutter from the north and would be connected to the Town of Jackson Storm Sewer running along Glenwood.

D. SOILS AND SITE CONDITIONS

An original Geotechnical Investigation Report was produced by Womack and Associates (WAI) in the Fall of 2006 for 185 North Glenwood is attached herein in **Section 4**. Jorgensen Geotechnical conducted additional field work on 165 North Glenwood and produced a report than encompasses 165 North Glenwood and updated the previous WAI report for 185 North Glenwood in the winter of 2018. The reports identified the underlying as sandy and clayey gravels of the Cache Creek Alluvial Fan which are were deemed suitable for construction. Several young and potentially active faults have been mapped near the project site, most notably the East Gros Ventre Fault, faults on the east and west sides of the West Gros Ventre Butte, and the Teton Fault system along the base (east) of the Teton Range. Appropriate seismic coefficients should be used in the design of structures.

E. ROADS AND ACCESS

Access to the site is currently from Glenwood Street, Gill Avenue and the north-south alley west of the project site. The primary vehicular access to the project will be through the underground parking accessed through the alley however parallel parking will continue to exist on both the Glenwood and Gill frontages. The curb line along Glenwood Street will be moved 2 to 3 feet east to provide space for a buffer area with trees and a sidewalk. The angled parking across Glenwood street is proposed to be adjusted slightly (from a 60° angle to a 55° angle) to enable easier parking maneuvers while preserving the same number of parking spots and meeting the Town of Jackson street width minimums.

F. TRAFFIC

A Traffic Impact Study (TIS) was completed in 2006 by Jorgensen Associates for two developments that were being proposed at the time at Lots 1 through 4 and Lots 18 through 20, Block 6, Original Town Site, Jackson, Wyoming. The two developments were Club Lespri proposed by White Buffalo Development LLC located on the southeast corner of Gill Avenue and Milward Street (lots 18 through 20) and McCabe Corner proposed by The Eden Group located at 185 North Glenwood (lots 1 through 4). Club Lespri (aka White Buffalo) development consisted of a mixed-use private club with a dining room, lounge, wellness center, condominiums, and employee housing. The McCabe Corner development was proposed to consist of 33 condominiums. The Club Lespri was completed, but the McCabe corner development was never completed. The proposed BEAR development consists of 29 condominium units, four less than those proposed for the McCabe Corner development. For this reason, the original TIS remains valid.

The TIS indicated the two developments may add some delay to the Gill Avenue intersection with Glenwood and Millward Streets, however, the minor, additional delays should not significantly reduce the levels of service and therefore should not warrant any traffic mediation efforts. The completed Traffic Impact Study for this project is presented in a separate document titled “Traffic Impact Study for Club Lespri and McCabe Corner” and attached herein in **Section 4**.

G. PARKING

The development proposes the construction of 29 condominium units consisting of a mix of two- and three-bedroom units, with some available for short term rental. Both residential apartments and short-term rentals greater than 2 bedrooms require 1.5 parking spaces per units indicating 44 total required parking spots. The underground parking structure will provide 48 spots, exceeding the required parking.

H. PATHWAYS

According to the 2015 Community Streets plan, both Glenwood and Gill are designated as shared streets with no bicycle designation. The nearest, designated bike routes are Millward Street (1 block west of the project) and Mercill Avenue (1 block north of the project). Low speeds and traffic volume on the connecting streets provide safe access to both. Pedestrian improvements to both street frontages to provide the maximum space available based on the existing structure are proposed as part of this project. Glenwood Street will have a 5' hardscaped buffer area and a variable (6' minimum) sidewalk. Gill Avenue will have a 4' landscaped buffer area and variable (6' minimum sidewalk).

I. WATER

Water will be supplied by the Town of Jackson through the existing distribution system located within Glenwood Street. Connections to the TOJ system will require an encroachment permit and a coordinated effort with the TOJ Public Works Department to identify the appropriate water service tap location. Once the system is on the project property it will be owned and operated by the development and all maintenance will be the responsibility of the development. The project team will coordinate with the TOJ Engineering and Public Works Department for capacity fees, backflow protection, water meter size, domestic, irrigation, and fire suppression installation arrangements. Based on preliminary demand calculations and anticipated service size, a Permit to Construct from the Wyoming DEQ will likely be required. Based on research conducted in conjunction with the previous, 2006 development, it is expected that adequate capacity is available from the Glenwood Street water main. Coordination with the Town Engineer will be essential as water demand values are refined and the site infrastructure design advances. The project team will also coordinate with the Fire Department to ensure adequate fire protection measures are in place.

The maximum domestic water demand is estimated based on the building program bedroom count to be approximately 28,900 gallons per day with a peak hour flow of approximately 80 gallons per minute (Peak Factor 4). Water Demand was also calculated using the AWWA M22 method and estimated at 70 gpm based on fixture counts for the building improvements. The lower value of the M22 is likely due to the peak factor 4 being above average and the irrigation demand not included in the M22 calculation. A water model analysis with the above criteria was performed utilizing a 4-inch domestic service and estimates the pressure at the building under the maximum daily demand to be 62.3 psi at the building and 63.7 psi at the TOJ 8-inch main. The expected velocity in the 4-inch domestic service is 2.0 fps. The expected velocities in the 8-inch

main are expected to be 0.25 fps north of the connection and 0.7 fps south of the connection.

The fire suppression system demand is estimated to be 1560 gpm from Appendix B, Table 105.1 of the 2006 International Fire Code based on the proposed building area and Type III-B construction. A water model analysis with the above criteria was performed utilizing a dedicated 8-inch fire service and estimates the pressure at the building under the fire flow and maximum daily demand to be 50.5 psi and 52.7 psi at the TOJ 8-inch main. The expected velocity in the dedicated 8-inch fire service is 10.5 fps. The expected velocity in the existing 8-inch main line in North Glenwood Street are expected to be 7.1 fps north of the connection and 3.3 fps south of the connection. The project team will coordinate with the fire sprinkler designer as the project advances and coordinate with the Fire Department to ensure adequate fire protection measures and equipment are in place.

Based on the water model analysis, it is expected that adequate capacity is available from the existing TOJ water main without additional improvements to the system.

A water demand estimate analysis is included in **Section 4**. A more detailed infrastructure layout is included with the Development Plan Submittal.

J. WASTEWATER

Sanitary sewer will be connected to the existing Town of Jackson sewage collection lines within the alley west of the site and eventually be treated at the TOJ Wastewater Treatment Plant in South Park. The sewage collection lines internal to the project will be the responsibility of the development for operation and maintenance. Coordination between the building mechanical design and the TOJ Public Works Department will identify the appropriate service tap location. Preliminary expected wastewater flows and research conducted in conjunction with the previous, 2006 development, indicate that there is adequate capacity from the sewer line located in the alley. Continued coordination with the Town Engineer will be essential as wastewater flows are refined and the site infrastructure design advances.

A wastewater demand estimate analysis is included in **Section 4**. A more detailed infrastructure layout is included with the Development Plan Submittal.

K. CABLE UTILITIES AND GAS

Power and communication lines will enter the project via the alley west of the project. Lower Valley Energy and Cable Utility lines arrive at the site via buried and overhead utility lines at the lot corner between 165 and 185 North Glenwood in the western alley and are then directed underground to nearby vaults and pedestals. A single 2-inch gas main is located within the western alley with a service line running east-west beneath the southern portion of 165 N. Glenwood. Connections to gas, electrical and cable utilities will be made to the west wall of the building from the adjacent transformers and utility pedestals located on the east side of the alley.

L. SNOW STORAGE

Snow storage for this site is provided within the courtyard and along the east wall between the building and the property line. This space is not anticipated to be used since all exposed surfaces in the development will have snow melt systems. Melt water will be routed to the stormwater collection system.

M. GROUNDWATER, STREAMS, & RIVERS

There are no permanent streams or rivers on this parcel, with the nearest water feature being Flat Creek located approximately 700-ft northwest of the project site. Groundwater was encountered during the 2006 WAI investigation at an approximate depth of 25-ft below the ground surface (bgs). Groundwater monitoring was conducted by WAI in the spring of 2007, which showed groundwater levels remained fairly consistent at 25-ft bgs through the spring runoff. No groundwater was encountered during the Jorgensen Geotechnical fieldwork conducted in November of 2018. One groundwater monitoring well was installed to 30-ft bgs in one of the 2018 boreholes to facilitate groundwater monitoring during the 2019 spring runoff season.

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SECTION 3 – DEVELOPMENT PLAN DRAWINGS

- **PHASING PLAN**
- **ARCHITECTURAL PLANS**
- **CIVIL SITE PLANS**
- **LANDSCAPE PLANS**

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SECTION 4 – ENGINEERING DOCUMENTS

- **WATER AND SEWER DEMAND CALCULATIONS**
- **WATER MODEL**
- **GEOTECH REPORT**
- **TRAFFIC STUDY**

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SECTION 5 – SUPPORTING MATERIALS

- **HOUSING MITIGATION PLAN & CALCULATIONS**
- **PROJECTED PROGRAM**
- **SHORT TERM RENTAL LETTER**
- **LIVABILITY LETTER**
- **RESPONSE TO SKETCH PLAN COMMENTS**
- **COMP PLAN DISTRICT 2 – TOWN COMMERCIAL CORE**
- **PARK AND SCHOOL EXACTIONS**

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SECTION 6 – APPLICATION MATERIALS

- **DEVELOPMENT PLAN APPLICATION**
- **PREAPPLICATION CONFERENCE CHECKLIST**
- **DEED**
- **LETTER OF AUTHORIZATION**

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Shaw Wyoming
460 South Cache
Jackson, WY 83001
TEL: 303-733-8401

SHAW CONSTRUCTION
www.shawwyoming.com

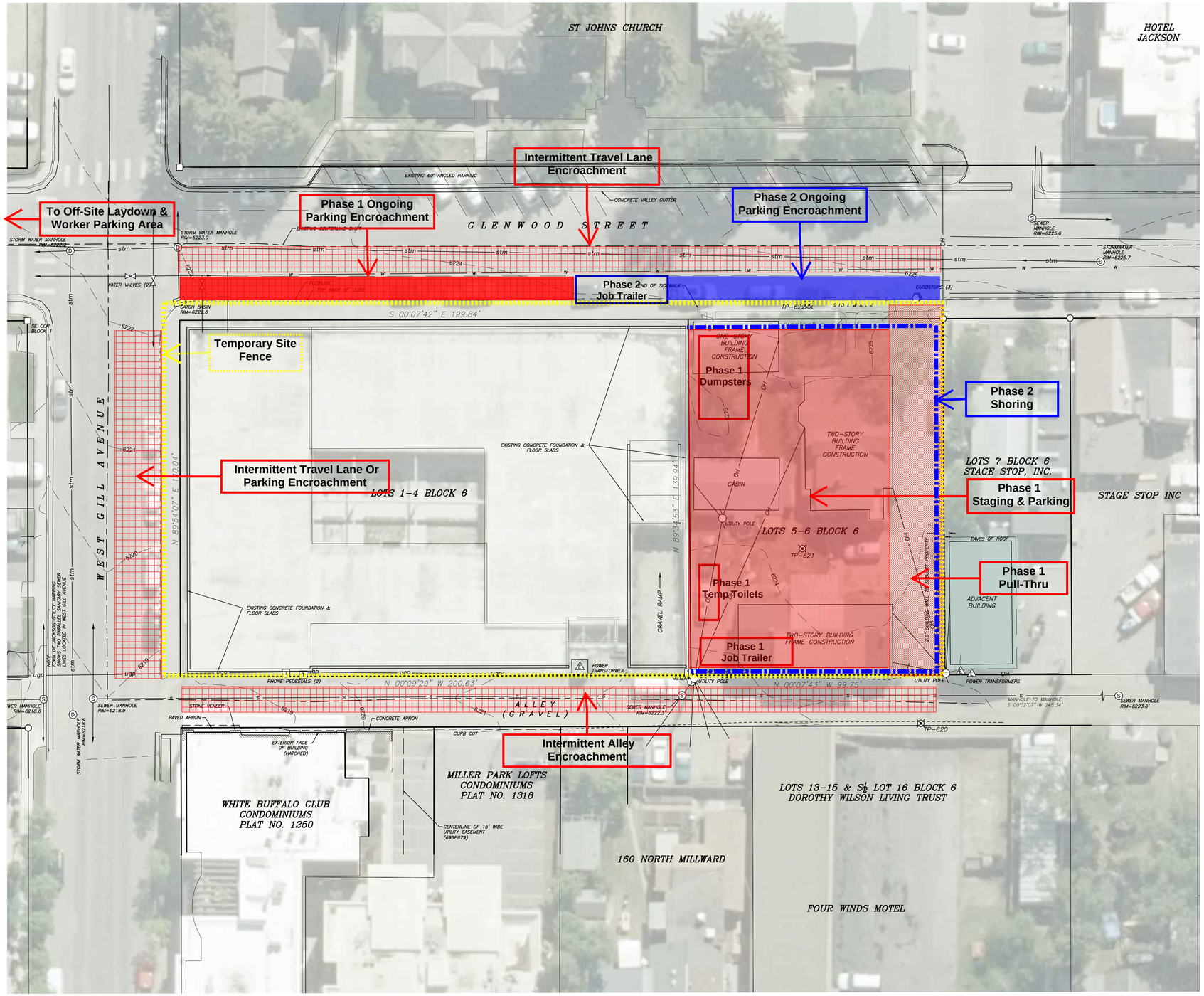
October 30, 2019

Phasing & General Staging Plan:
Site logistics and the associated logistics plans are separated into Phase 1 and Phase 2. Phase 1 covers modifications to existing foundation and new construction on the northern two thirds of the site (Lots 1-4, Block 6). Phase 2 will start with excavation of the new foundation on southern third of the site (Lots 5-6, Block 6) and continue through end of the project. Phase 1 will follow the abatement and demolition of the existing structures on Lots 5-6 and those lots will be used as a staging area during Phase 1. This Phase 1 staging area will house Shaw's job office trailer, material storage laydown, dumpsters, temporary toilet facilities, and limited worker parking. The existing parking garage will house additional material storage during Phase 1 and on a more limited basis during Phase 2.
Throughout the project an off-site laydown and worker parking area will be rented by Shaw. This laydown and parking area will likely be the lot at 345-375 N. Cache currently used for Shaw staging on Hidden Hollow.

Site Fencing & Access:
The entire site will be surrounded by temporary metal construction fence with fabric mesh, like the fence currently surrounding the existing foundation. The fence will be placed at the curb on the north and east boundaries of the property and near the property line on the south and west sides. Vehicular gates in fence will be placed at existing parking garage ramp and southern end of east and west property boundaries to allow delivery trucks to pull-through Phase 1 laydown area. Along Glenwood and Gill Streets, pedestrian traffic will be rerouted to opposite side of street with temporary signage at intersections and property boundaries. The inconvenience to pedestrian traffic will be minimal as these areas already lack proper sidewalks.

Parking, Street, & Alley Encroachments:
It is anticipated that site logistics will require portions of the adjacent street travel lanes, public alley, and parking spaces to be occupied by construction equipment or staging at different times during the project. The attached Staging Plan shows those areas that will be occupied on a continuous basis during each phase and those areas that will be occupied on an intermittent basis throughout the project. Shaw will coordinate with Town officials and adjacent property owns to minimize the impact of these encroachment activities and to assure all Town rules and permitting procedures are properly followed. The intermittent encroachments in the alley and to travel lanes on Glenwood and Gill will only be necessary during certain single-day activities such as pumping concrete, erecting steel, and placing roof trusses. Shaw anticipates such closures will only be required on approximately 20-30 days through out the project.

Shoring:
Shoring will not be required during Phase 1, but will be required as shown on plan for Phase 2 excavation. Method of shoring will be determined following finalization of new foundation's structural design. If soil nails or any other method requiring encroachment into Town's right of way is proposed, then an encroachment agreement will be applied for well in advance of excavation.



0 20 40 60

SCALE: 1 INCH = 20 FEET
THIS SCALE VALID ONLY FOR 24x36 PRINTS

LEGEND

- ☐ INDICATES A STEEL PIPE WITH A BRASS CAP INSCRIBED "PE&LS 578" FOUND THIS SURVEY
- ○ INDICATES A 5/8 INCH DIAMETER STEEL REBAR WITH AN ALUMINUM CAP INSCRIBED "PLS 3831" FOUND THIS SURVEY
- ⊠ INDICATES A PK-BRAND NAIL SET THIS SURVEY FOR ORIENTATION AND MAPPING PURPOSES
- SUBJECT PROPERTY LINE
- ADJACENT PROPERTY LINE
- CENTERLINE OF STREET
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF CONCRETE
- TOP BACK OF CURB
- FLOWLINE
- OH — OVERHEAD LINE
- S — SANITARY SEWER LINE
- BUILDING – SIDING
- BUILDING – EAVES OF ROOF

SURVEY NOTES:

ORIGINAL AND SUPPLEMENTARY TOPOGRAPHIC MAPPING WAS CONDUCTED BY ON SIGHT LAND SURVEYORS, INC USING THE ON SITE LAND SURVEYORS, INC. TETON COUNTY CONTROL NETWORK 2001 COORDINATE SYSTEM AND NGVD29 DATUM

– PRELIMINARY –
SUBJECT TO CORRECTION AND APPROVAL

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SHAW CONSTRUCTION

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	ISSUED DATE	ISSUED FOR
■	10.30.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

	Project No.
SHAW	Drawn By
SHAW	Checked By

Discipline Drawing No.

EXHIBIT

Drawing Name

CONSTRUCTION MANAGEMENT & STAGING PLAN

Glenwood Gill - FAR Calculations

UNIT F.A.R.		
SF	LEVEL	F.A.R.

A UNITS (X2)

404SF	00-BASEMENT	0.010
931SF	01-1ST FLOOR	0.022
910SF	02-2ND FLOOR	0.022
749SF	03-3RD FLOOR	0.018
2994SF	**TOTAL**	**0.072**

B UNITS (X2)

459SF	00-BASEMENT	0.011
929SF	01-1ST FLOOR	0.022
910SF	02-2ND FLOOR	0.022
747SF	03-3RD FLOOR	0.018
3045SF	**TOTAL**	**0.073**

C UNITS (X4)

390SF	00-BASEMENT	0.009
1006SF	01-1ST FLOOR	0.024
790SF	02-2ND FLOOR	0.019
882SF	03-3RD FLOOR	0.021
3068SF	**TOTAL**	**0.073**

C.1 UNITS (X2)

390SF	00-BASEMENT	0.009
1006SF	01-1ST FLOOR	0.024
849SF	02-2ND FLOOR	0.020
882SF	03-3RD FLOOR	0.021
3127SF	**TOTAL**	**0.075**

C.2 UNITS (X3)

390SF	00-BASEMENT	0.009
1006SF	01-1ST FLOOR	0.024
790SF	02-2ND FLOOR	0.019
1022SF	03-3RD FLOOR	0.024
3208SF	**TOTAL**	**0.077**

D UNITS (X1)

429SF	00-BASEMENT	0.010
1174SF	01-1ST FLOOR	0.028
934SF	02-2ND FLOOR	0.022
987SF	03-3RD FLOOR	0.024
3524SF	**TOTAL**	**0.084**

UNIT F.A.R.		
SF	LEVEL	F.A.R.

D.1 UNITS (X1)

429SF	00-BASEMENT	0.010
1174SF	01-1ST FLOOR	0.028
934SF	02-2ND FLOOR	0.022
987SF	03-3RD FLOOR	0.024
3524SF	**TOTAL**	**0.084**

E UNITS (X4)

371SF	00-BASEMENT	0.009
1002SF	01-1ST FLOOR	0.024
878SF	02-2ND FLOOR	0.021
1041SF	03-3RD FLOOR	0.025
3292SF	**TOTAL**	**0.079**

E.1 UNITS (X1)

371SF	00-BASEMENT	0.009
906SF	01-1ST FLOOR	0.022
769SF	02-2ND FLOOR	0.018
906SF	03-3RD FLOOR	0.022
2952SF	**TOTAL**	**0.071**

E.2 UNITS (X1)

287SF	00-BASEMENT	0.007
943SF	01-1ST FLOOR	0.023
780SF	02-2ND FLOOR	0.019
943SF	03-3RD FLOOR	0.023
2953SF	**TOTAL**	**0.071**

F UNITS (X2)

321SF	00-BASEMENT	0.008
950SF	01-1ST FLOOR	0.023
797SF	02-2ND FLOOR	0.019
946SF	03-3RD FLOOR	0.023
3014SF	**TOTAL**	**0.072**

G UNITS (X1)

505SF	00-BASEMENT	0.012
1297SF	01-1ST FLOOR	0.031
1122SF	02-2ND FLOOR	0.027
1173SF	03-3RD FLOOR	0.028
4097SF	**TOTAL**	**0.098**

UNIT F.A.R.		
SF	LEVEL	F.A.R.

H UNITS (X1)

437SF	00-BASEMENT	0.010
1397SF	01-1ST FLOOR	0.033
1205SF	02-2ND FLOOR	0.029
1137SF	03-3RD FLOOR	0.027
4176SF	**TOTAL**	**0.100**

I UNITS (X2)

122SF	00-BASEMENT	0.003
158SF	01-1ST FLOOR	0.004
968SF	02-2ND FLOOR	0.023
968SF	03-3RD FLOOR	0.023
2216SF	**TOTAL**	**0.053**

J UNITS (X1)

159SF	00-BASEMENT	0.004
673SF	01-1ST FLOOR	0.016
551SF	02-2ND FLOOR	0.013
680SF	03-3RD FLOOR	0.016
2063SF	**TOTAL**	**0.049**

J.1 UNITS (X1)

159SF	00-BASEMENT	0.004
819SF	01-1ST FLOOR	0.020
690SF	02-2ND FLOOR	0.017
818SF	03-3RD FLOOR	0.020
2486SF	**TOTAL**	**0.059**

COMMON AREAS

28152SF	00-BASEMENT	0.673
657SF	01-1ST FLOOR	0.016
0SF	02-2ND FLOOR	0.000
0SF	03-3RD FLOOR	0.000
28809SF	**TOTAL**	**0.689**

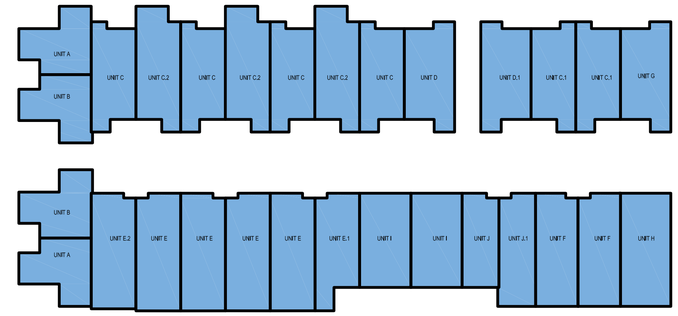
29 UNITS
48+ PARKING SPACE

UNIT FLOOR RATIO
TOTAL (W/ BSMT) = 118440SF
TOTAL (W/O BSMT) = 79906SF

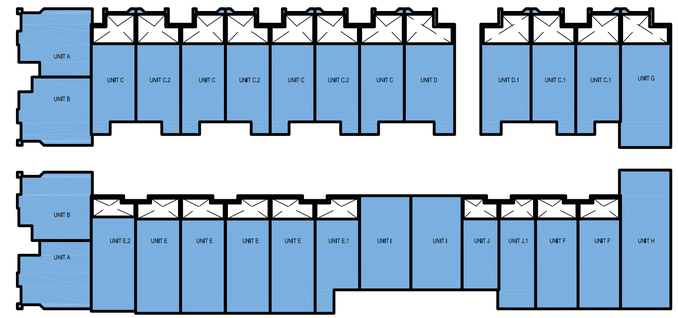
SITE AREA = 41,818 SF

UNIT FAR (W/ BSMT) = 2.832
UNIT FAR (W/O BSMT) = 1.911

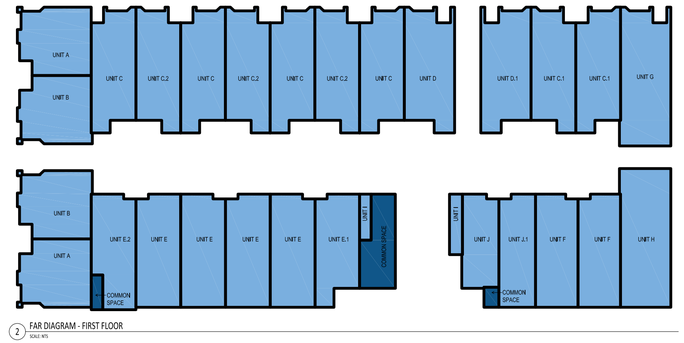
FLOOR AREA RATIO COUNTED AS FLOOR AREA PER FLOOR, MEASURE FROM EXT. FACE OF EXT. WALL TO CL OF INT. DEMISING WALL



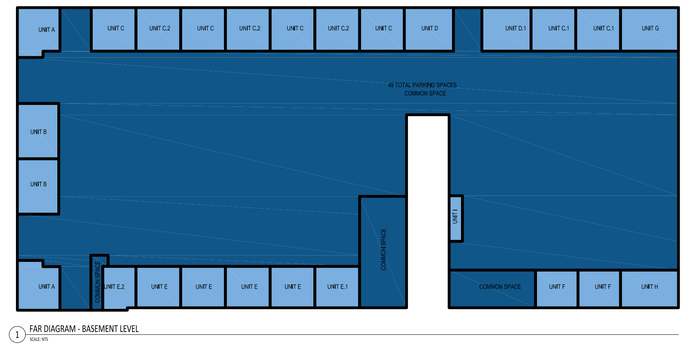
4 FAR DIAGRAM - THIRD FLOOR
SCALE: N'TS



3 FAR DIAGRAM - SECOND FLOOR
SCALE: N'TS



2 FAR DIAGRAM - FIRST FLOOR
SCALE: N'TS



PRIVATE SPACE

COMMON SPACE

1 FAR DIAGRAM - BASEMENT LEVEL
SCALE: N'TS

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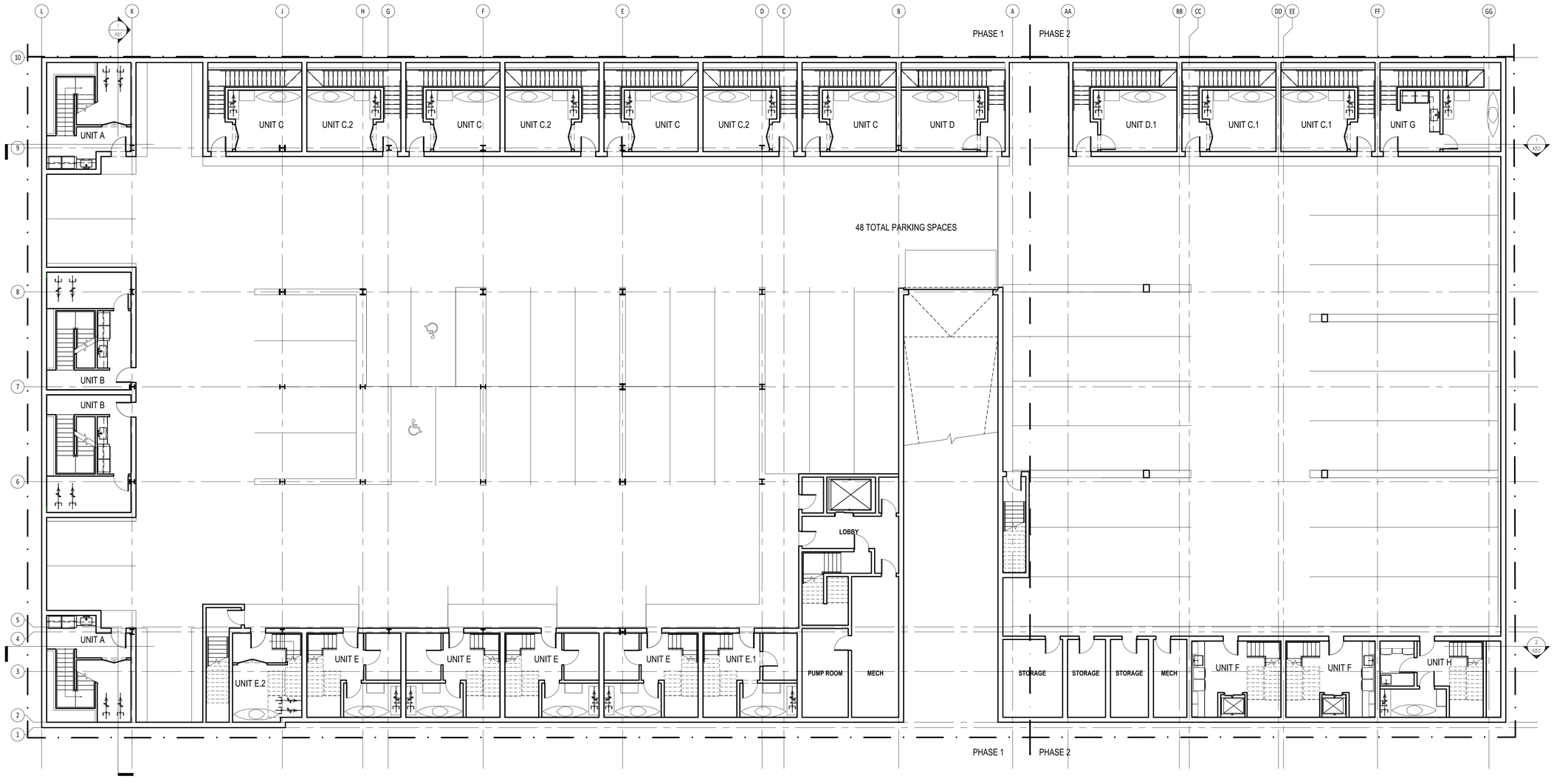
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: G	Drawing No.: 0.2

Drawing Name
FAR CALCULATIONS



X DRAWING TITLE
SCALE

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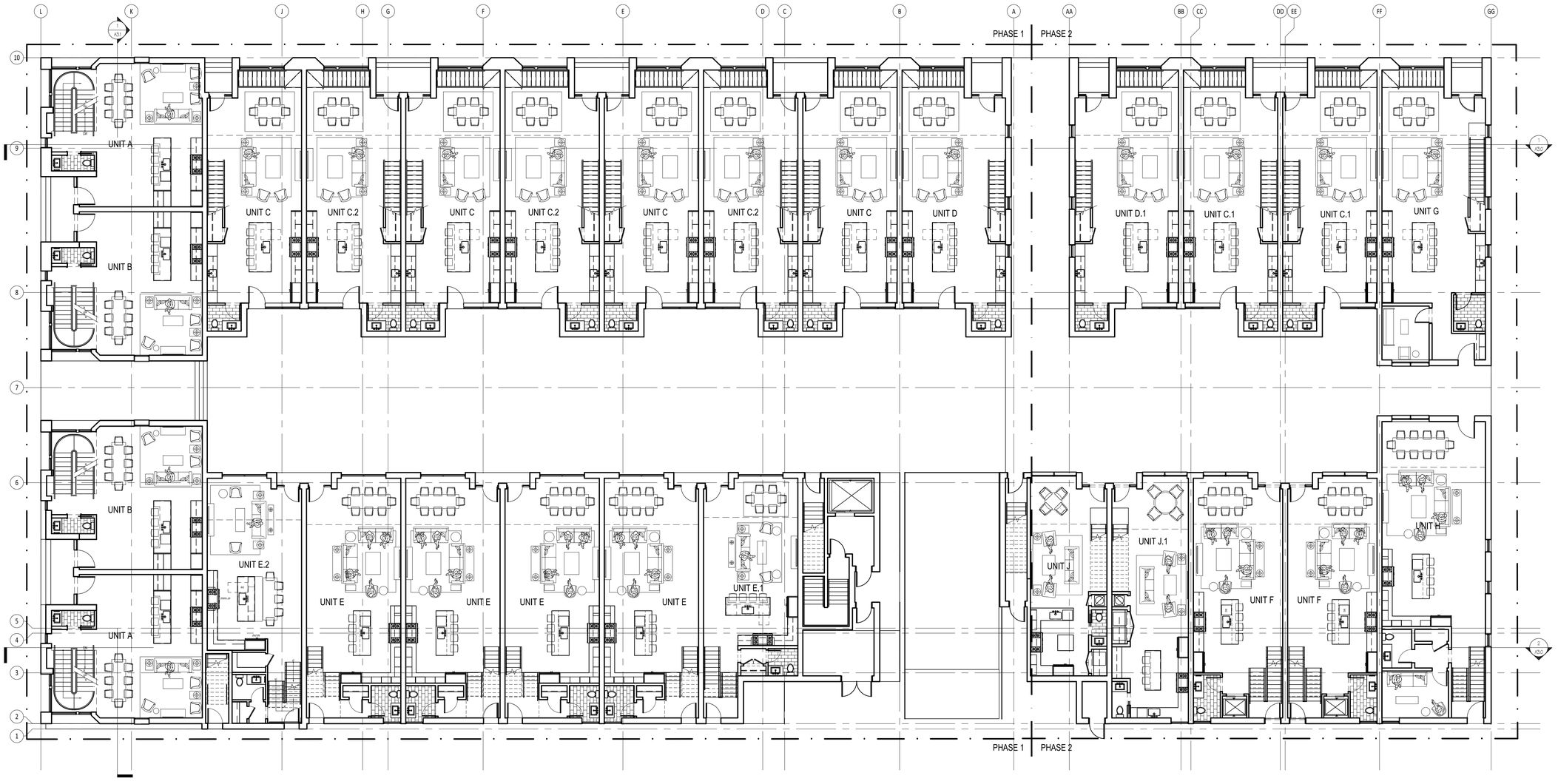
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.10

Drawing Name
CONSTRUCTION PLAN - GARAGE



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JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.11

Drawing Name
CONSTRUCTION PLAN - FIRST FLOOR



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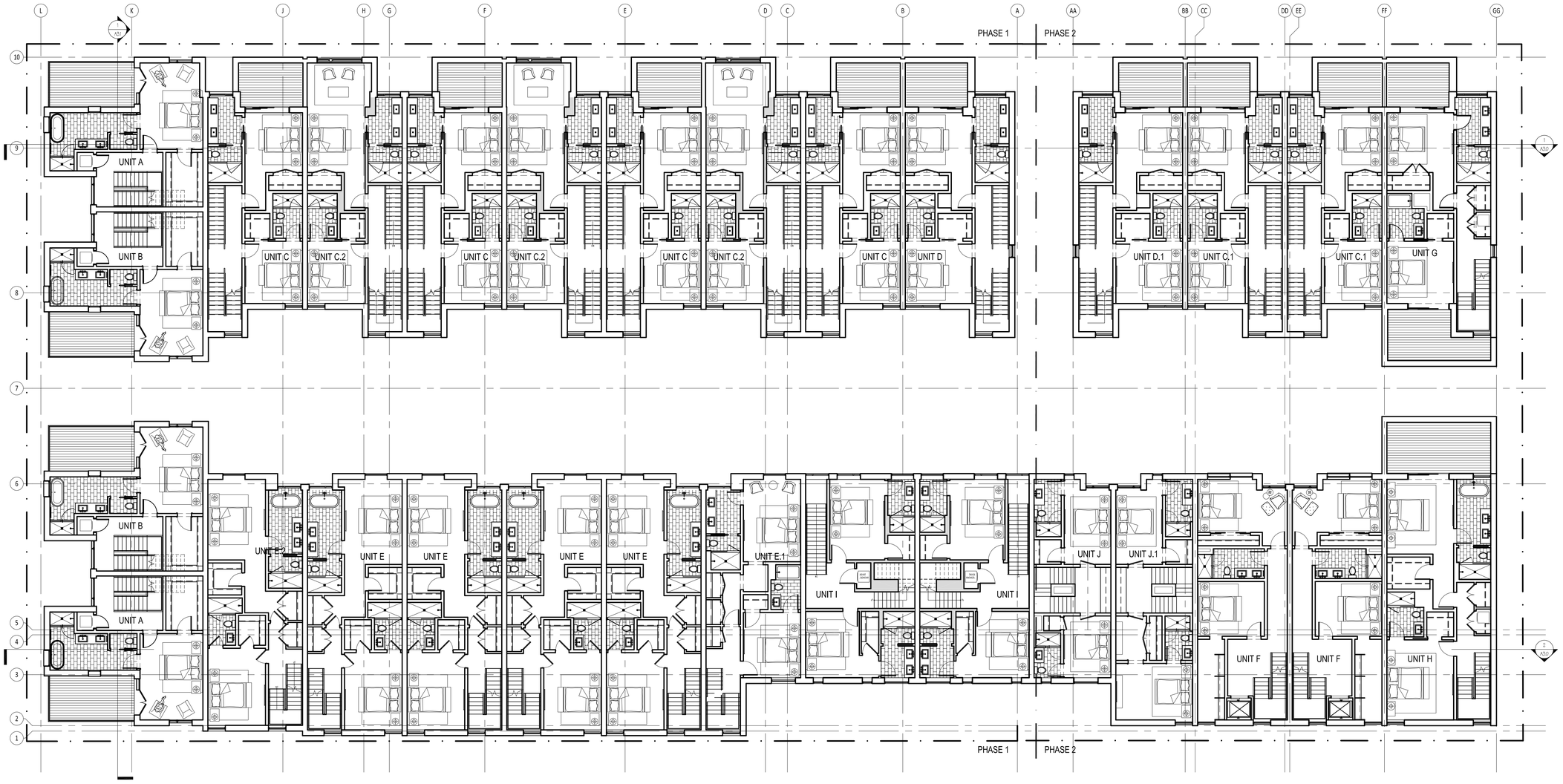
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.12

Drawing Name
CONSTRUCTION PLAN - SECOND FLOOR



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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
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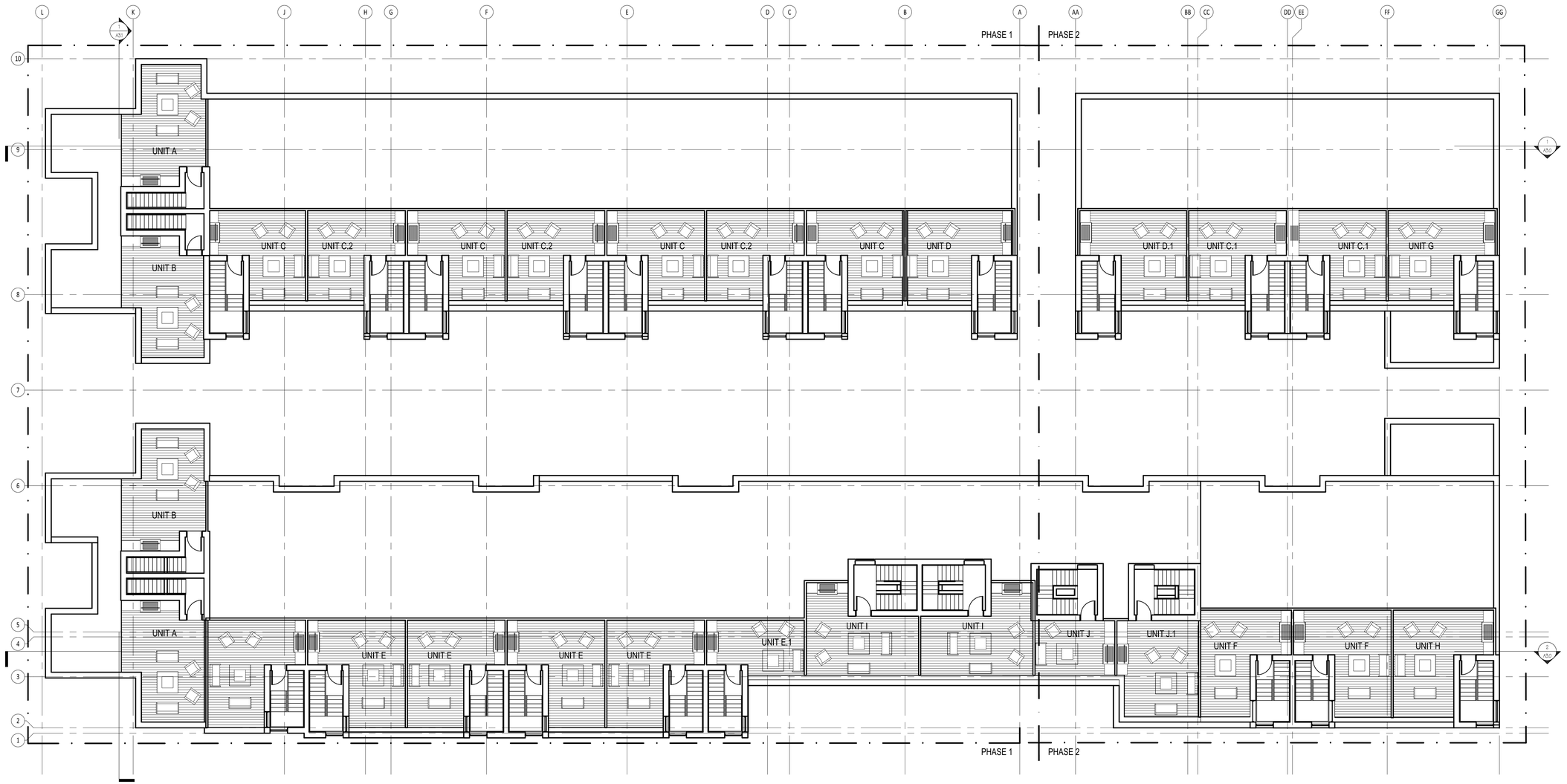
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.13

Drawing Name
CONSTRUCTION PLAN - THIRD FLOOR



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PROJECT

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JACKSON, WY 83001

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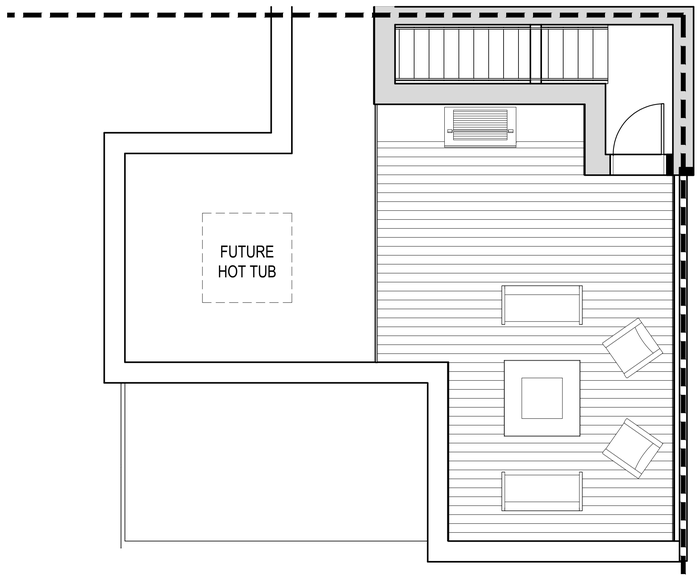
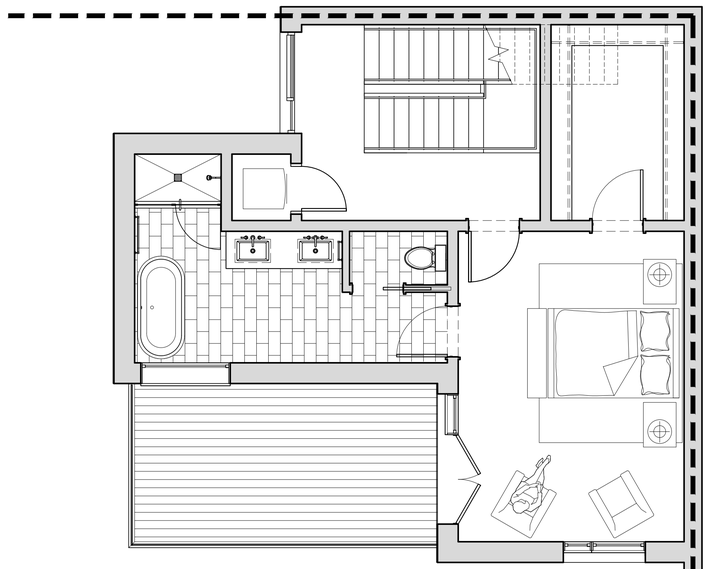
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.14

Drawing Name

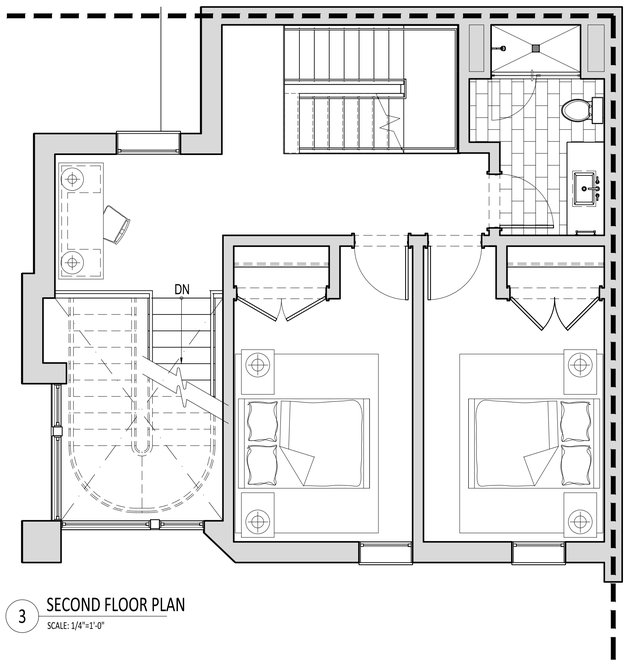
CONSTRUCTION PLAN - ROOF FLOOR



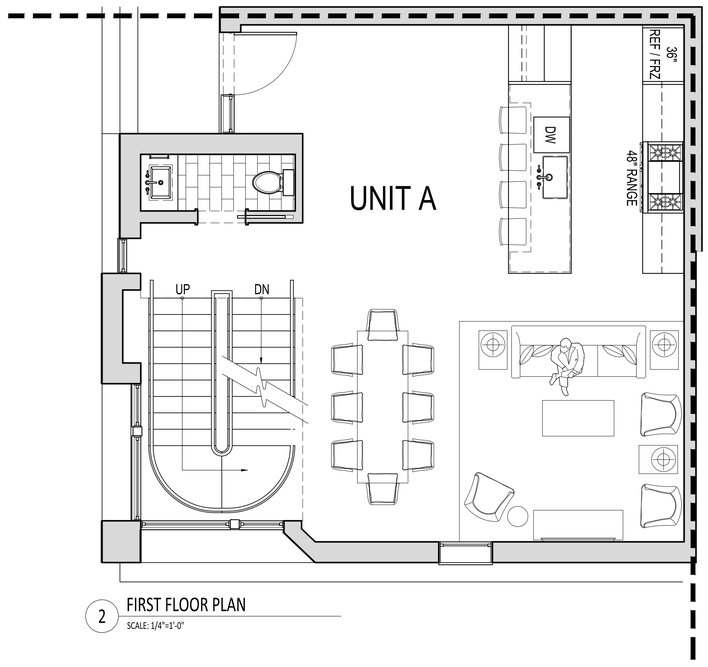
5 ROOF PLAN
SCALE: 1/4"=1'-0"



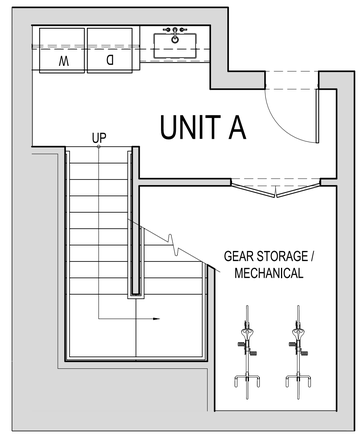
4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



1 BASEMENT PLAN
SCALE: 1/4"=1'-0"

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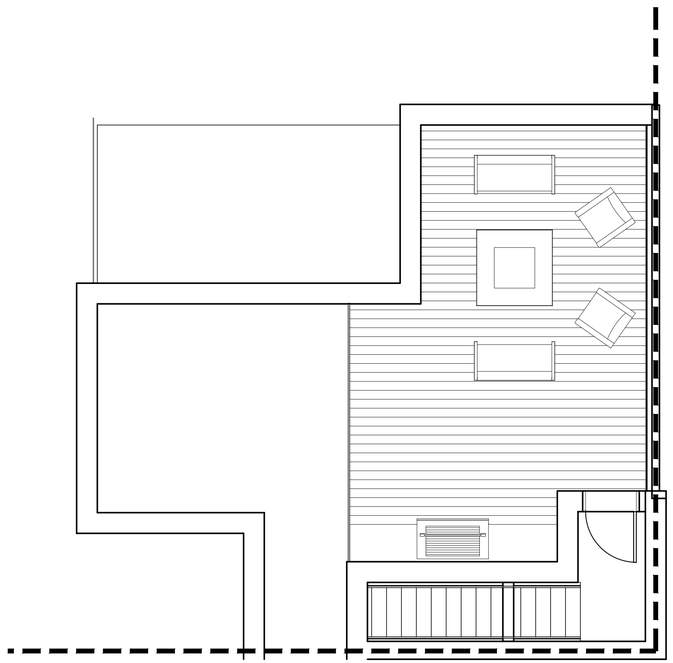
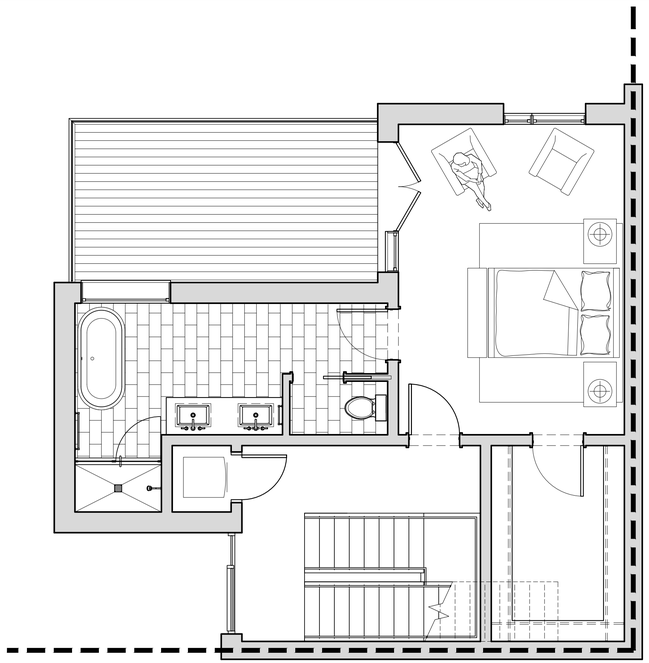
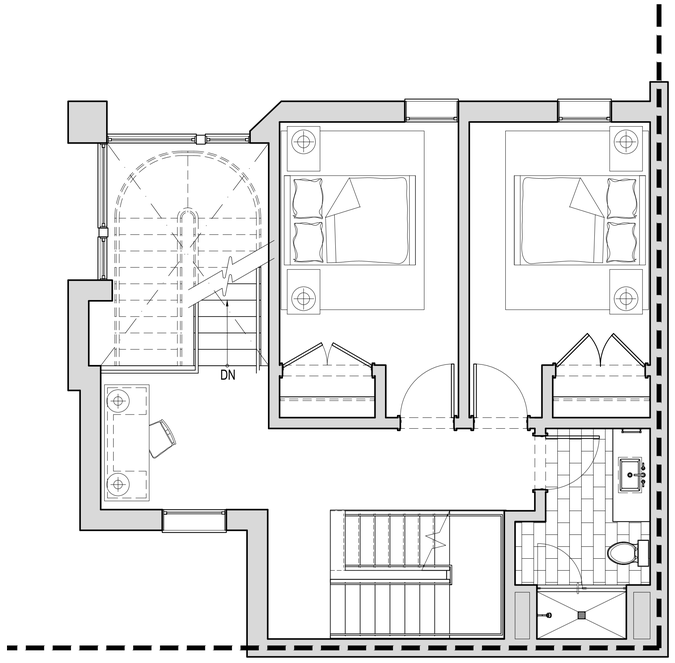
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

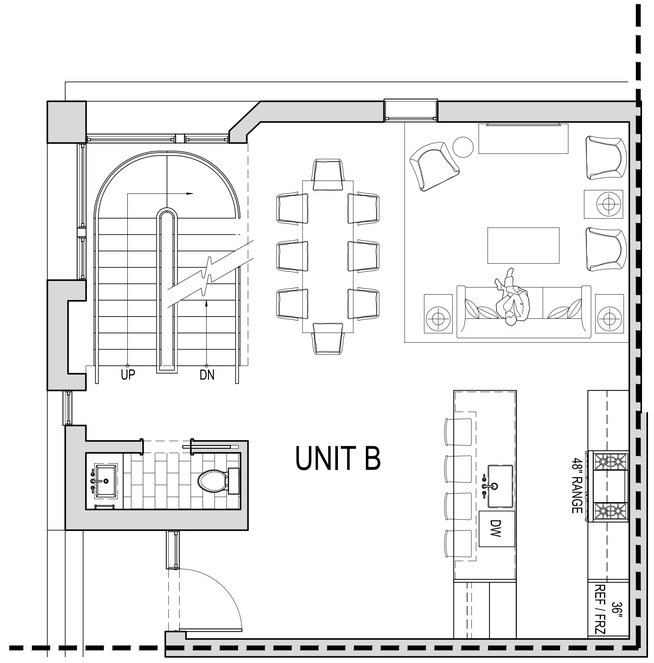
1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.20

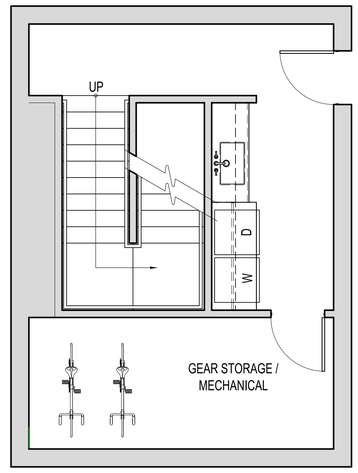
Drawing Name
UNIT PLANS - TYPE 'A'











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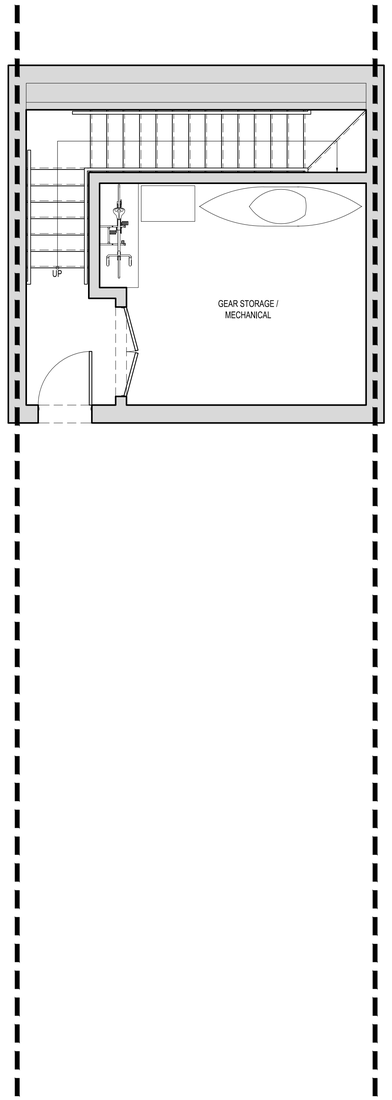
PROFESSIONAL SEAL

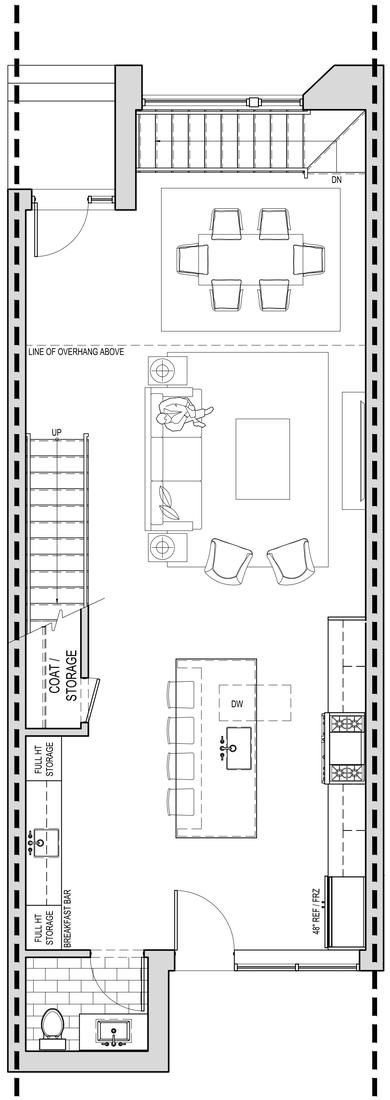
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.21

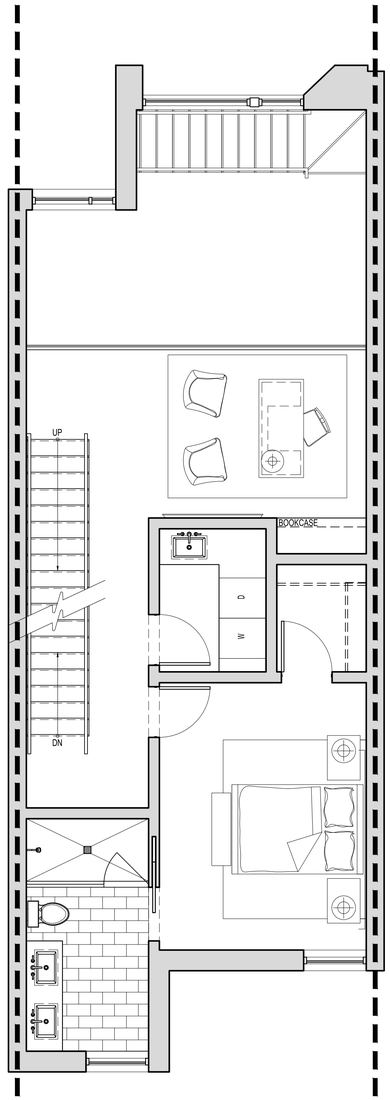
Drawing Name
UNIT PLANS - TYPE 'B'



1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
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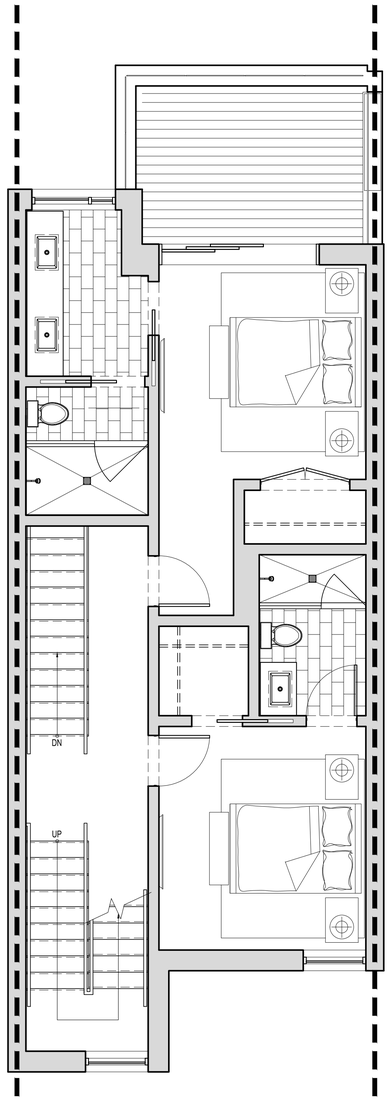
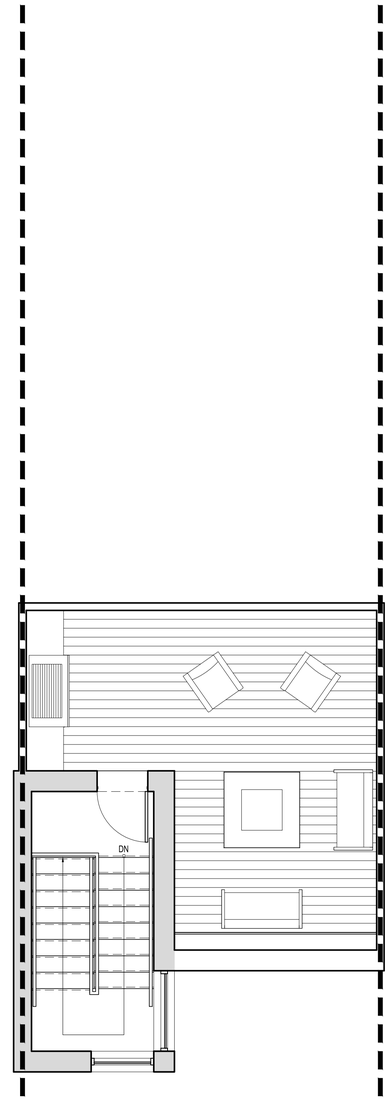


4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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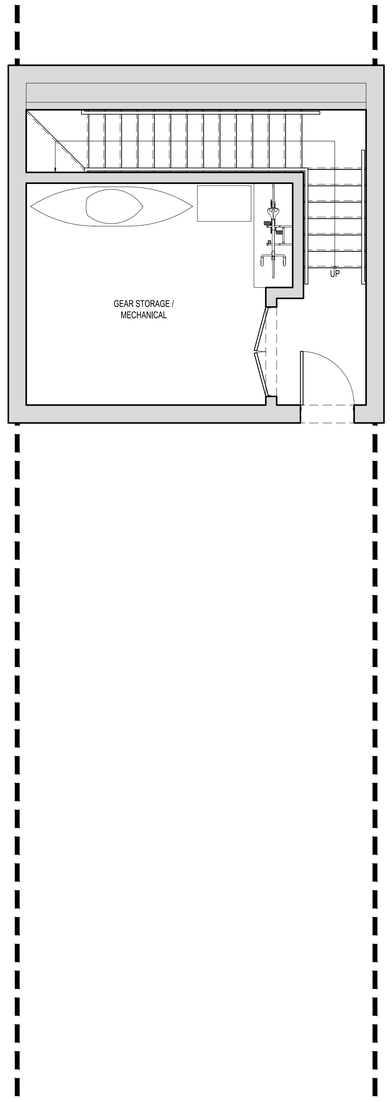
	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

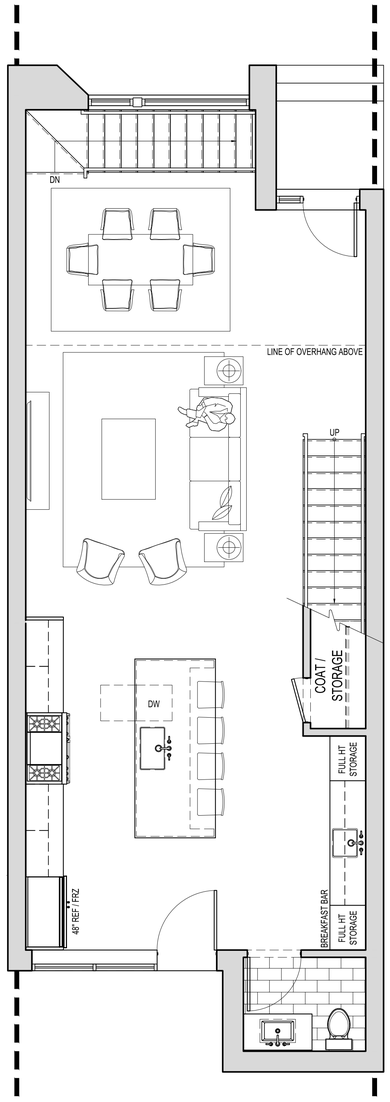
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.22

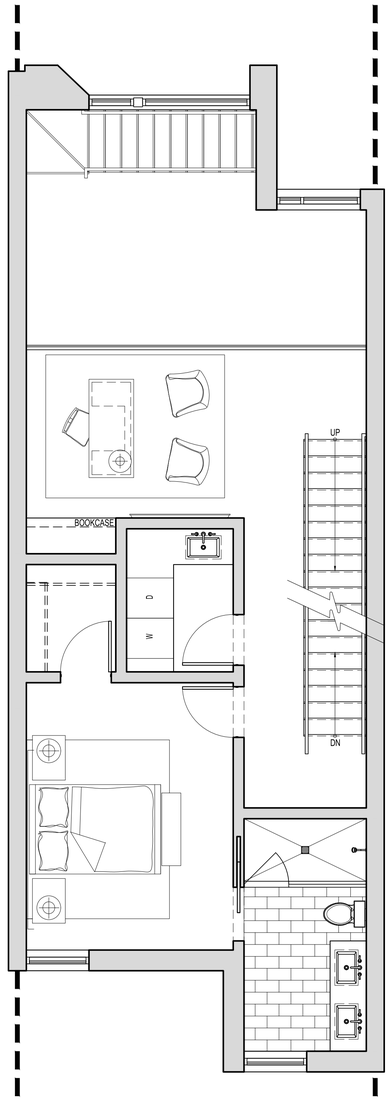
Drawing Name
UNIT PLANS - TYPE 'C'



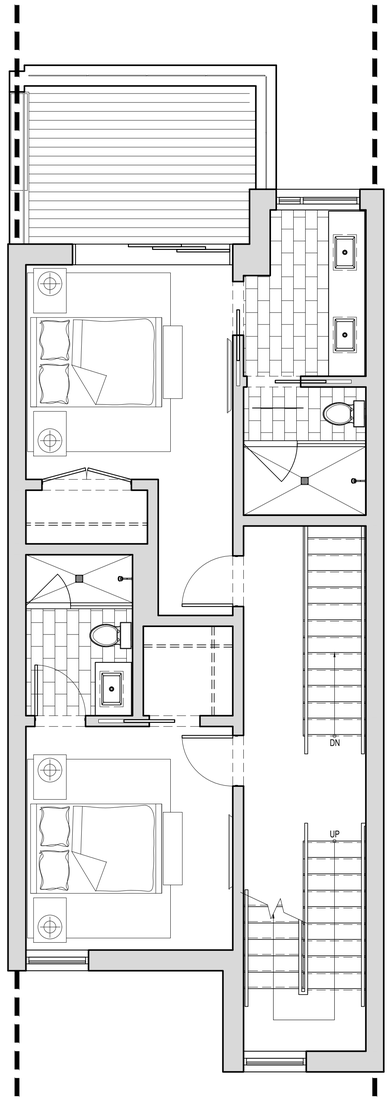
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



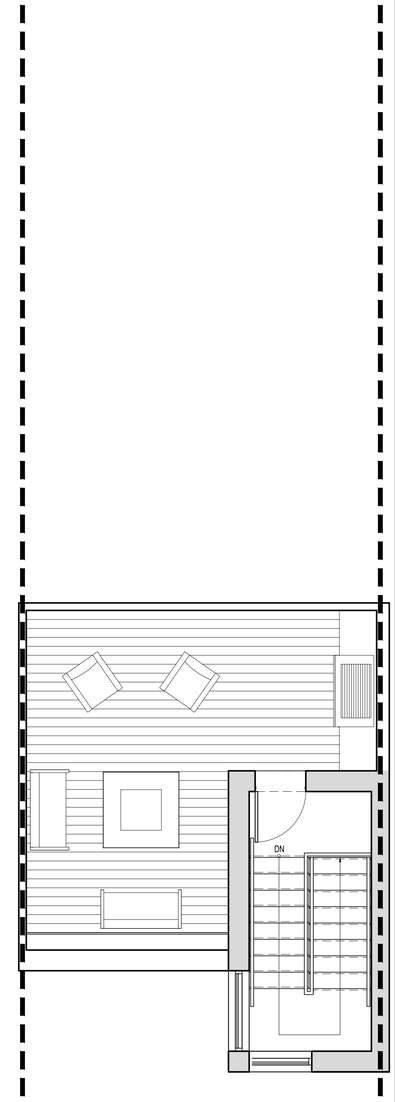
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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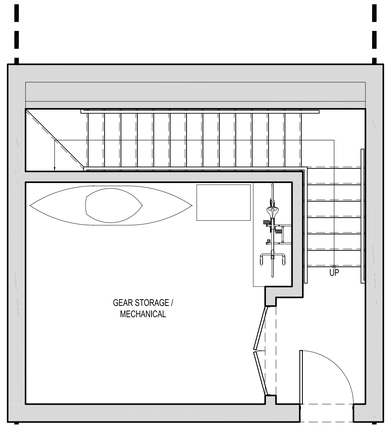
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

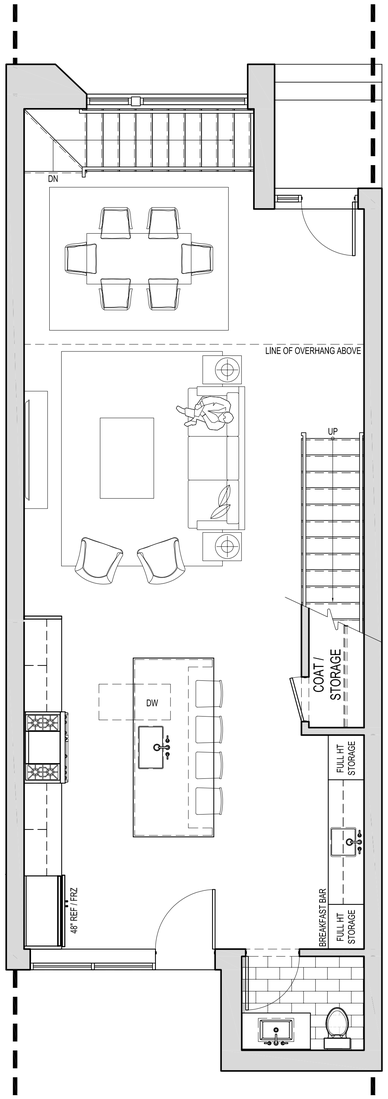
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.23

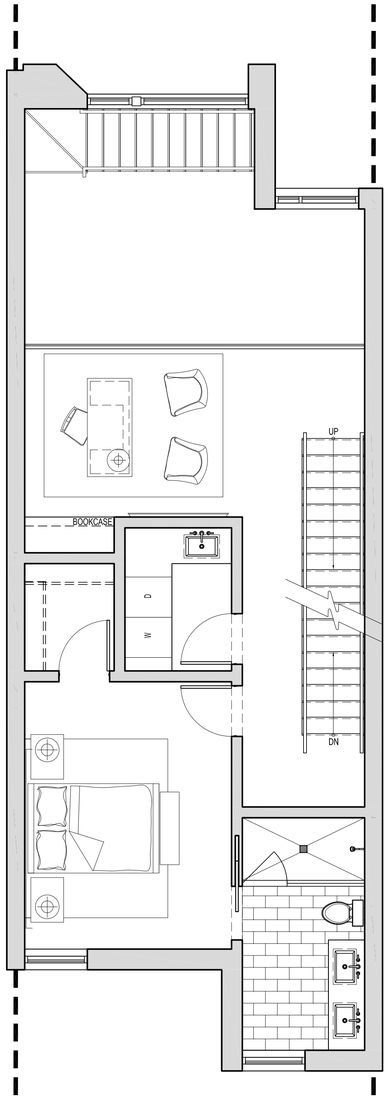
Drawing Name
UNIT PLANS - TYPE 'C.1'



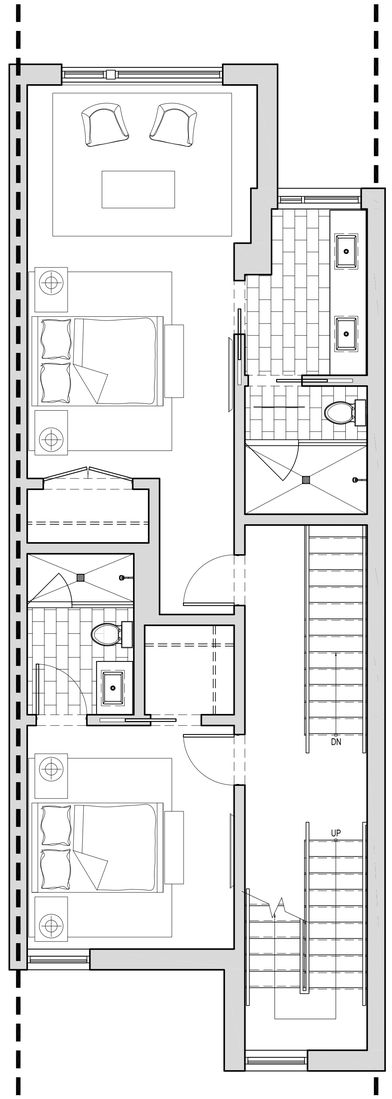
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



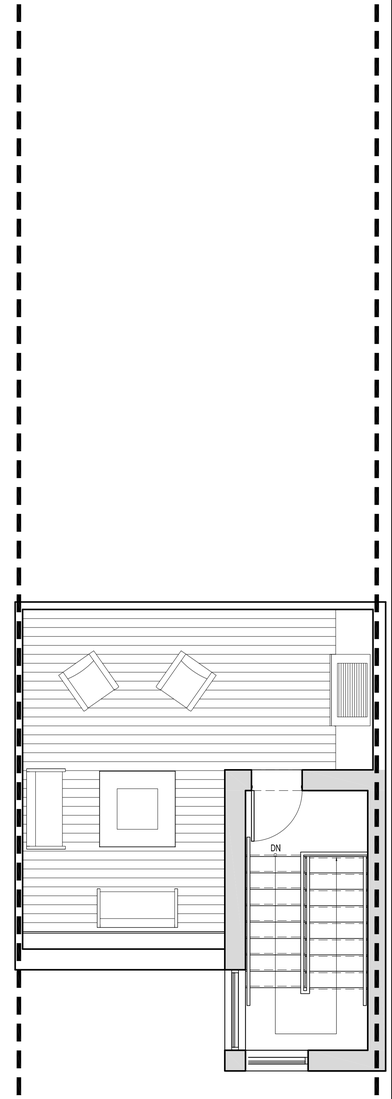
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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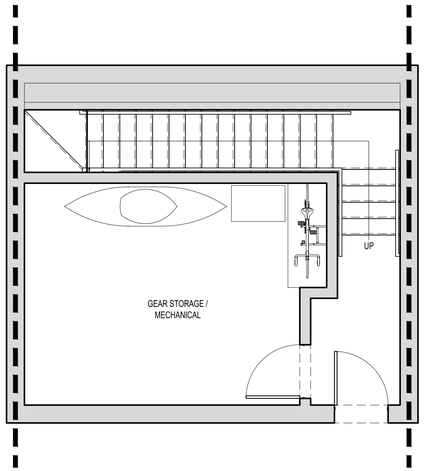
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

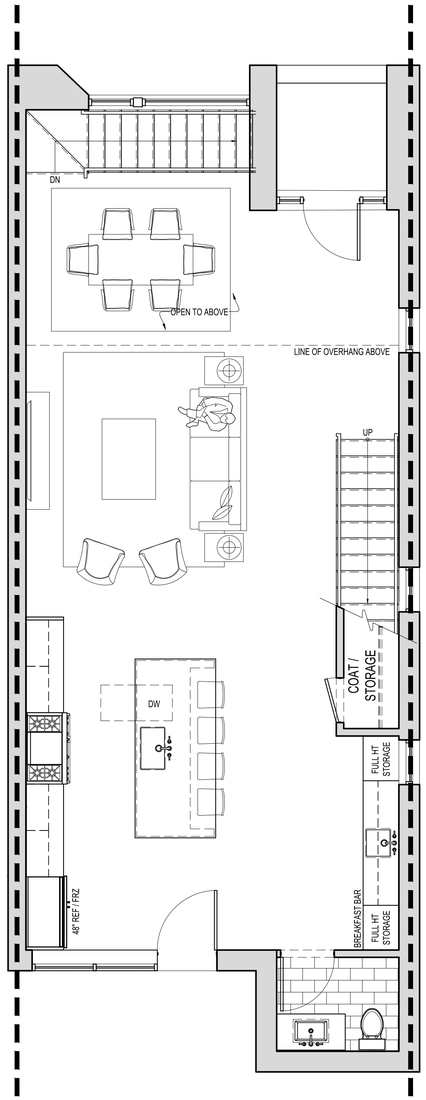
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.24

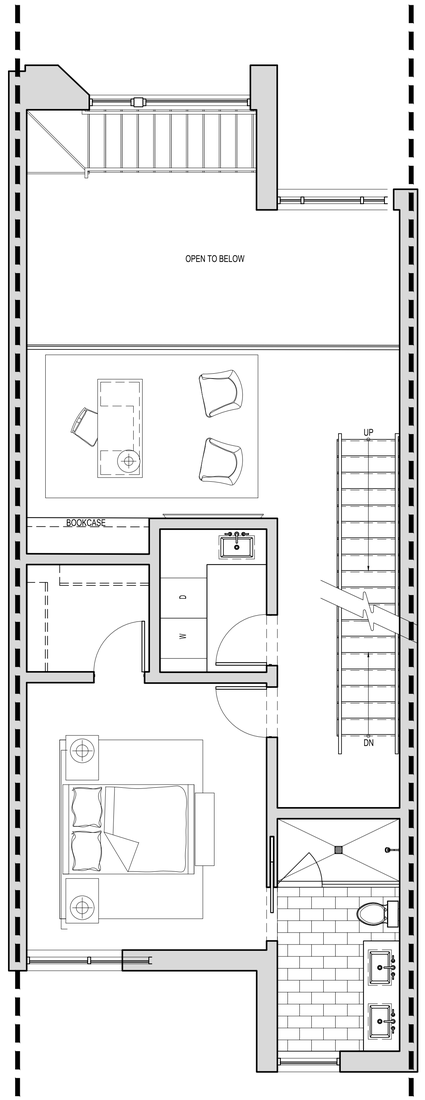
Drawing Name
UNIT PLANS - TYPE 'C.2'



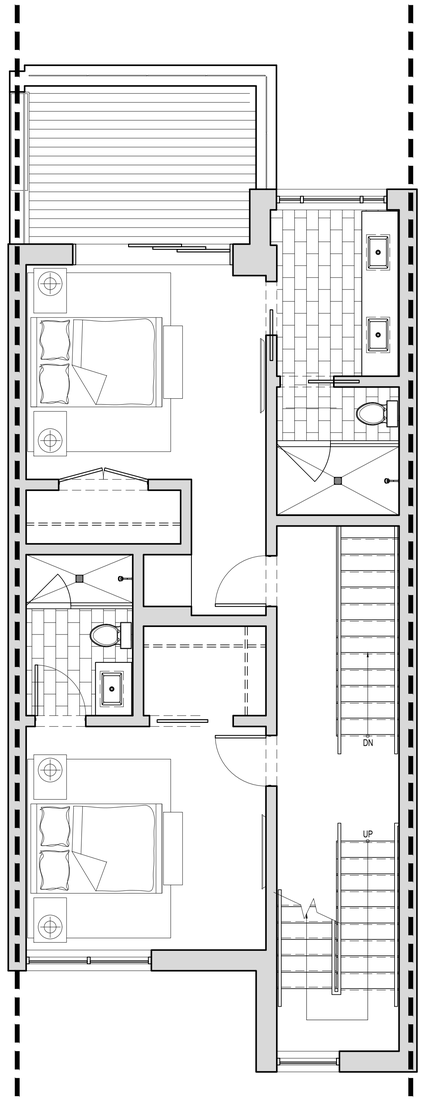
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



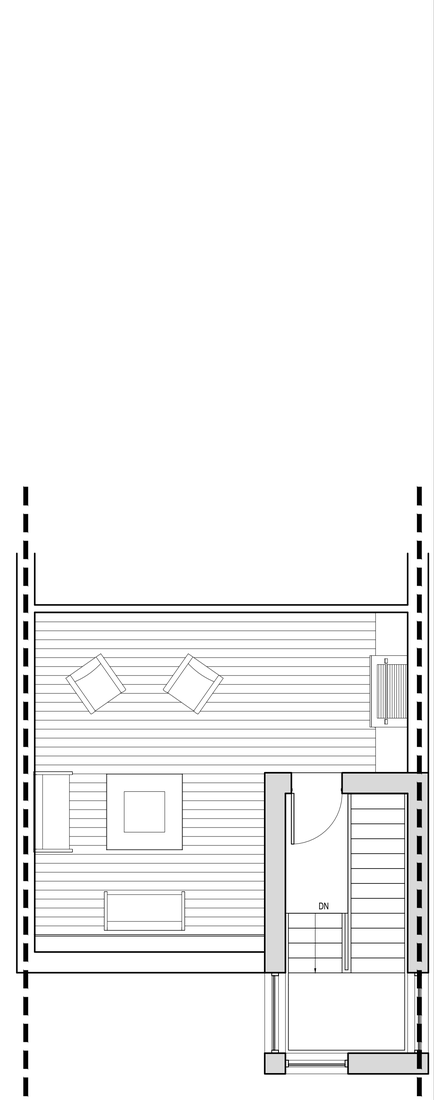
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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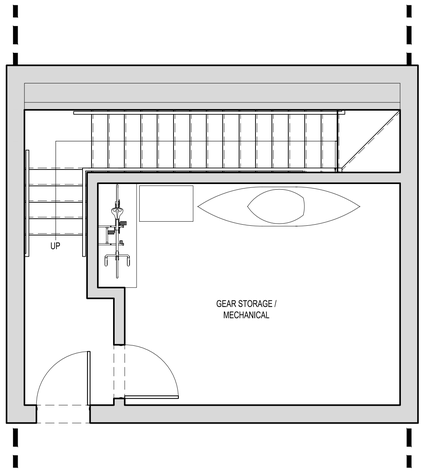
	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

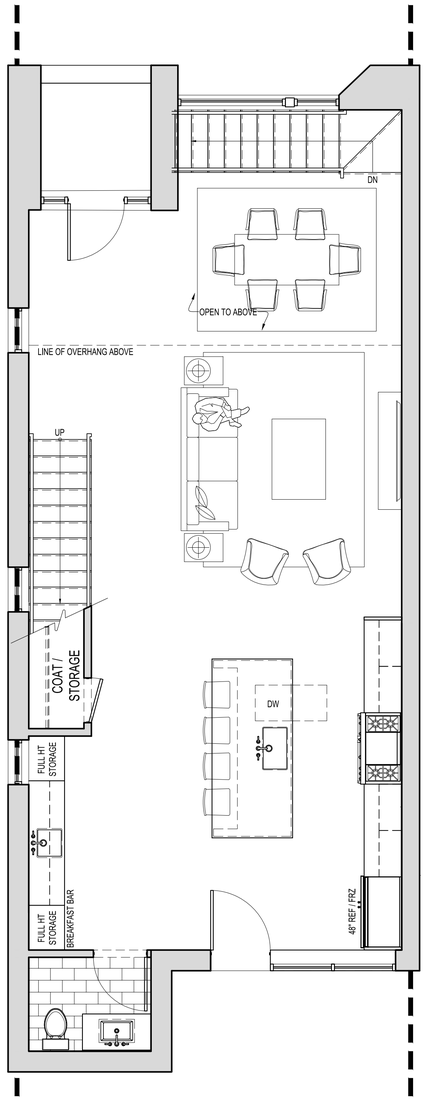
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.25

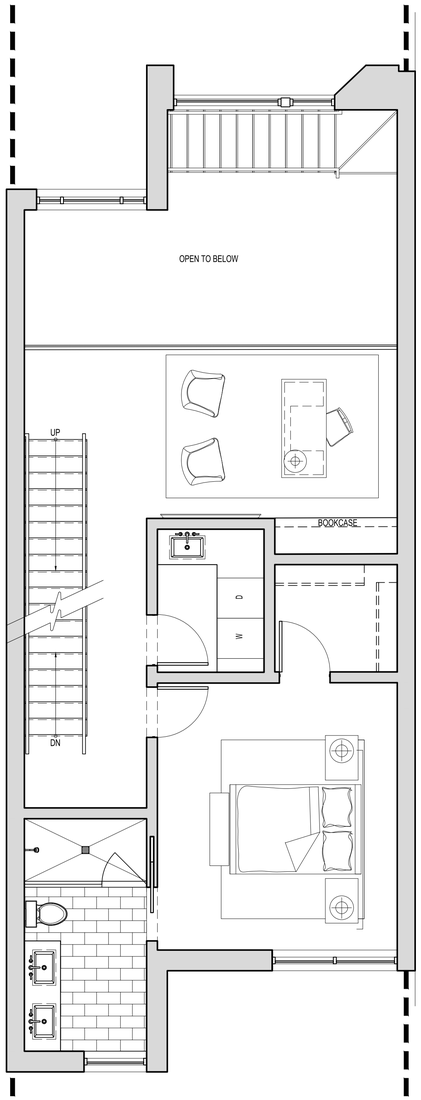
Drawing Name
UNIT PLANS - TYPE 'D'



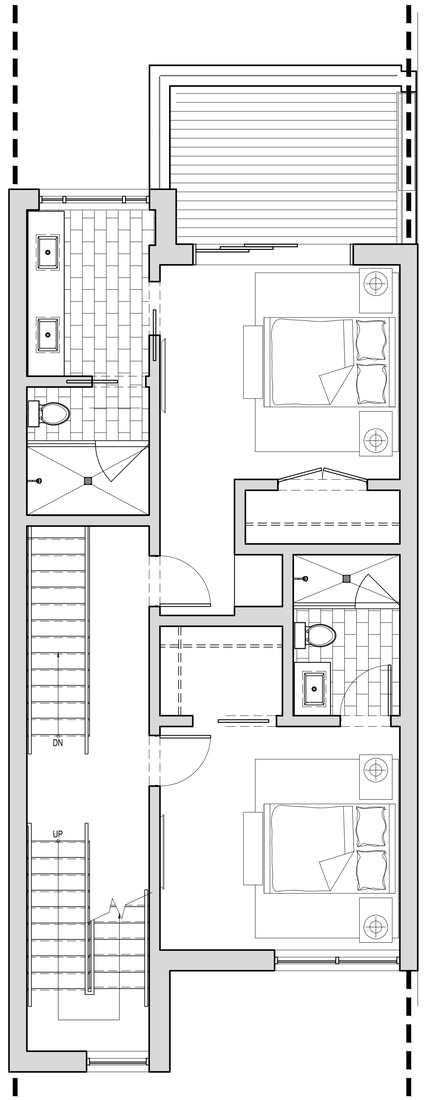
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



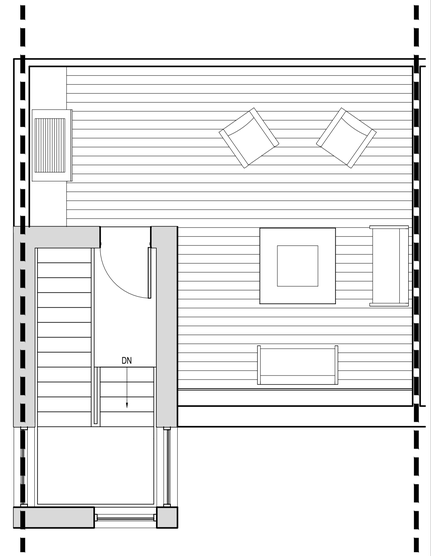
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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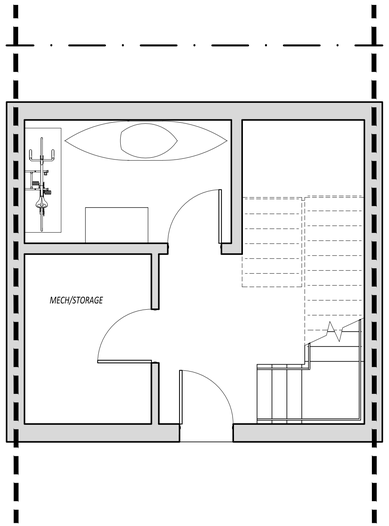
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

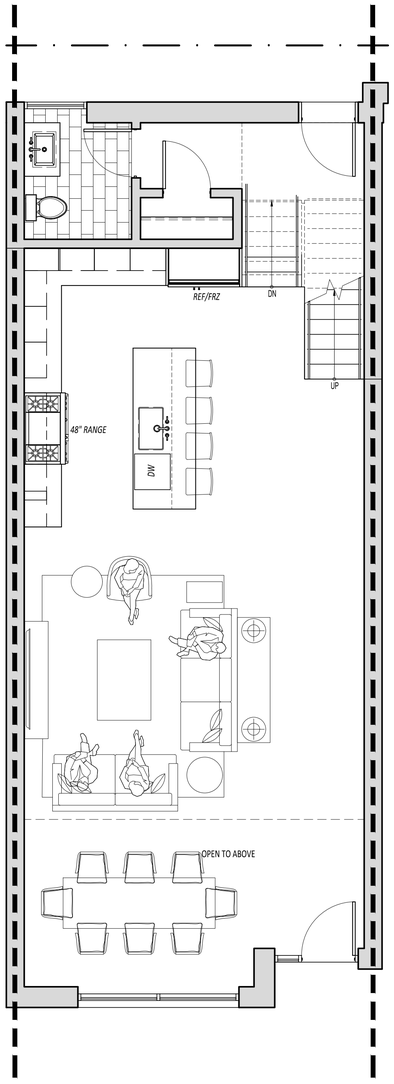
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.26

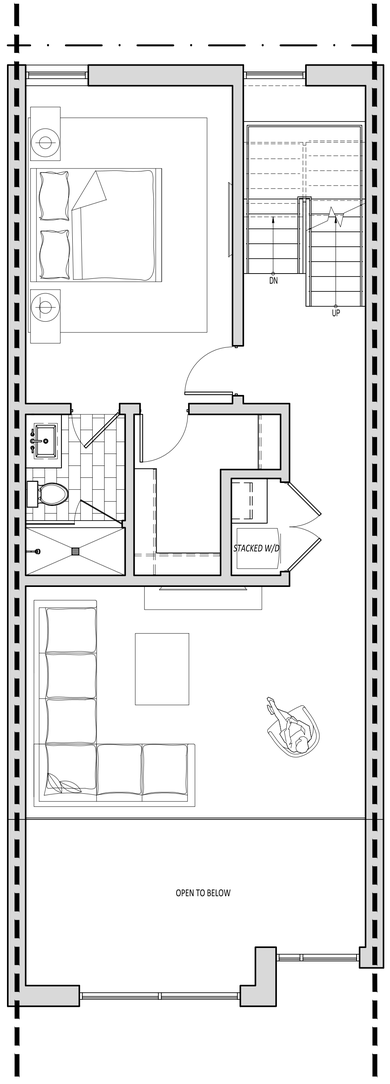
Drawing Name
UNIT PLANS - TYPE 'D.1'



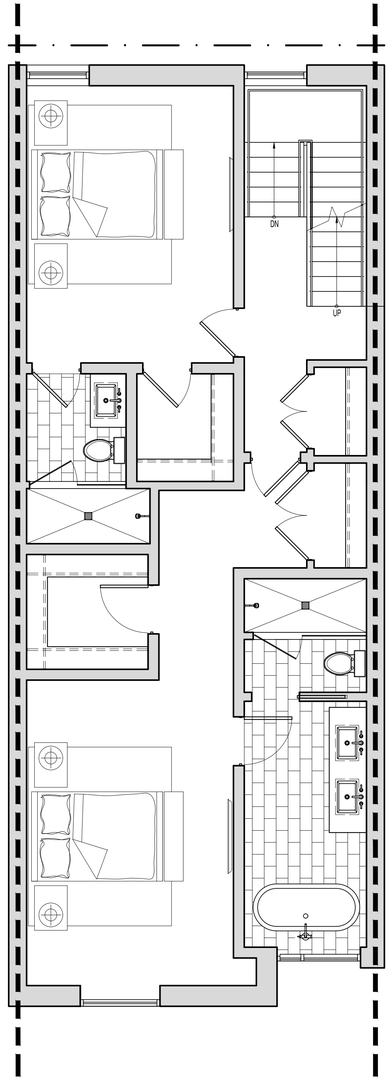
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



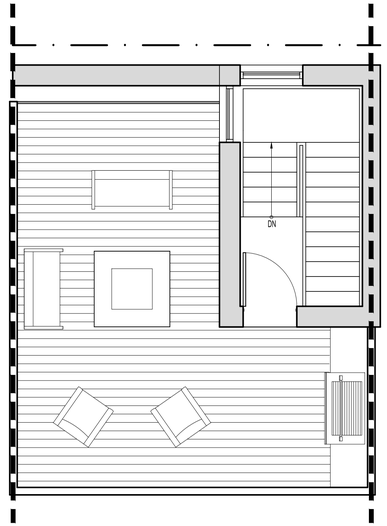
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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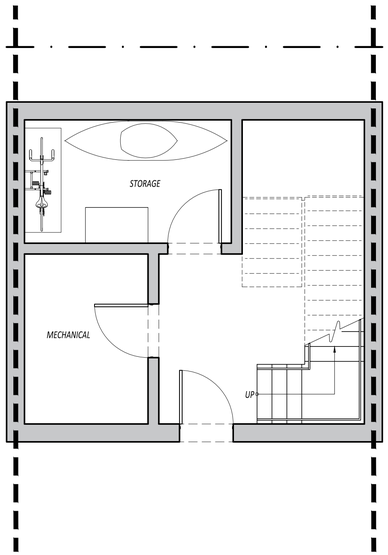
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

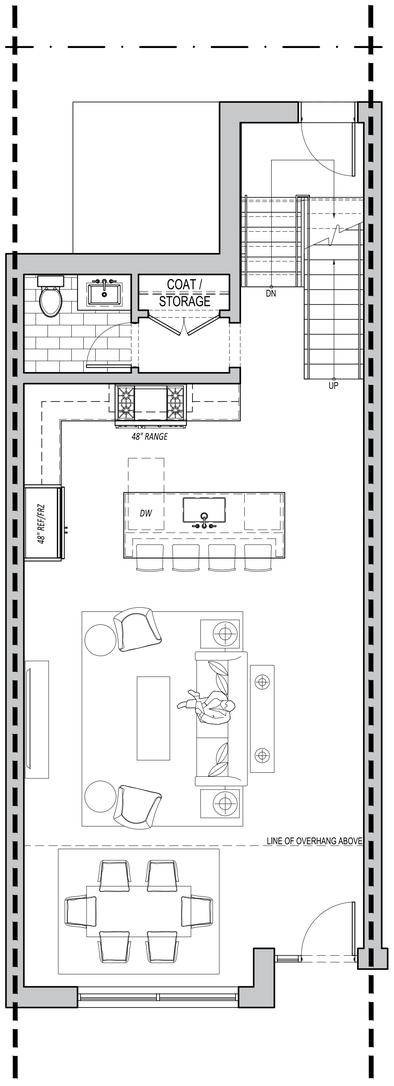
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.27

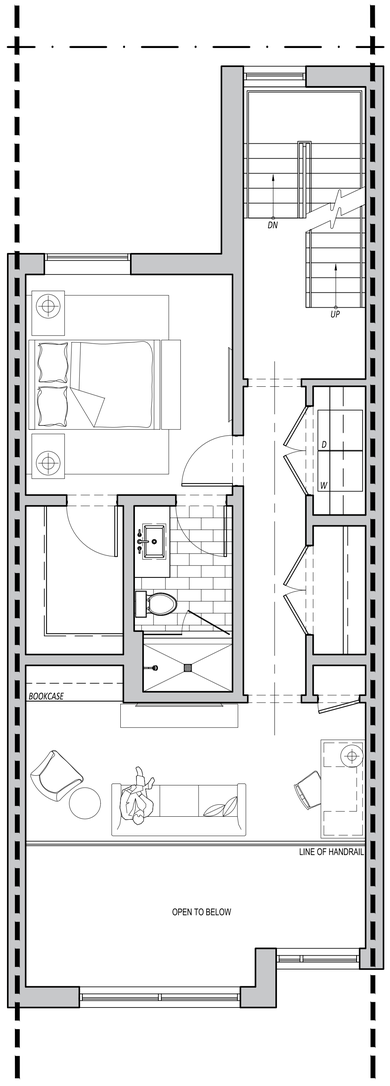
Drawing Name
UNIT PLANS - TYPE 'E'



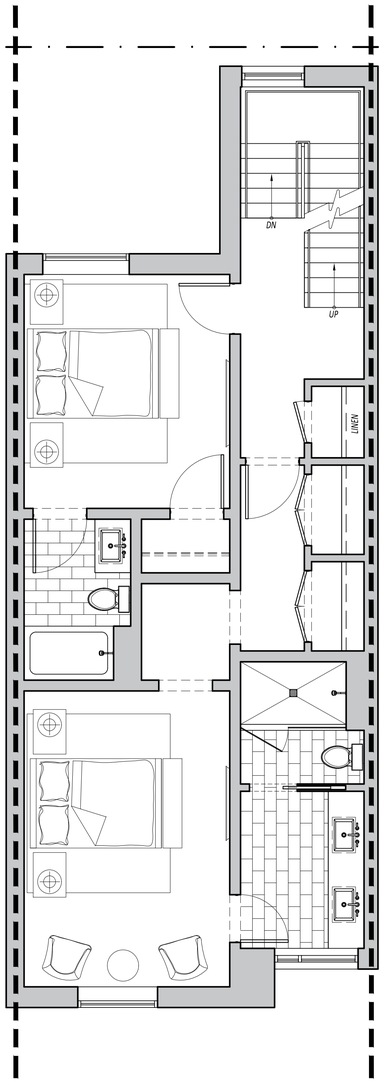
1 BASEMENT PLAN
SCALE: 1/4" = 1'-0"



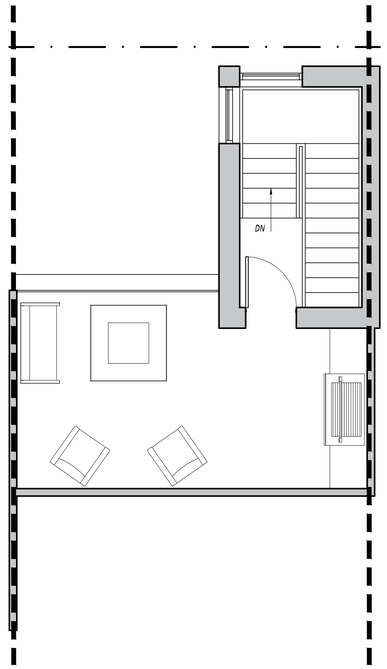
2 FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4" = 1'-0"



5 ROOF PLAN
SCALE: 1/4" = 1'-0"

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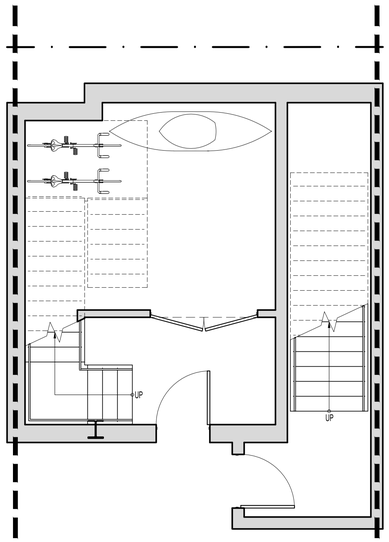
	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

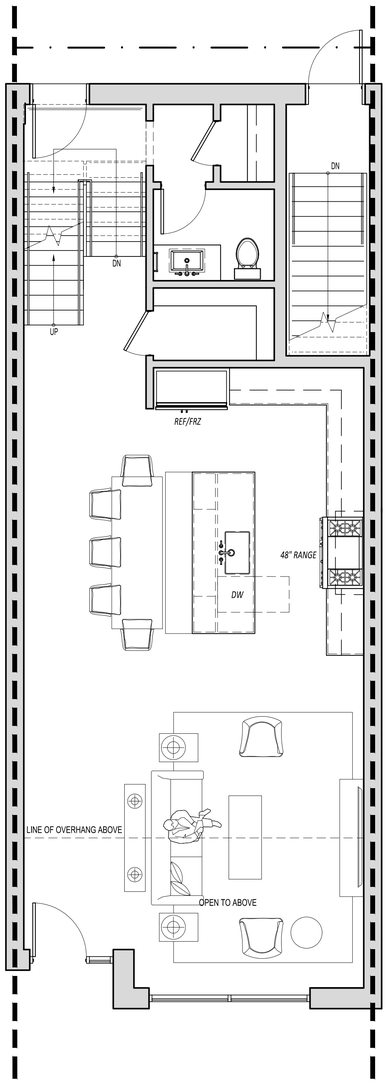
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.28

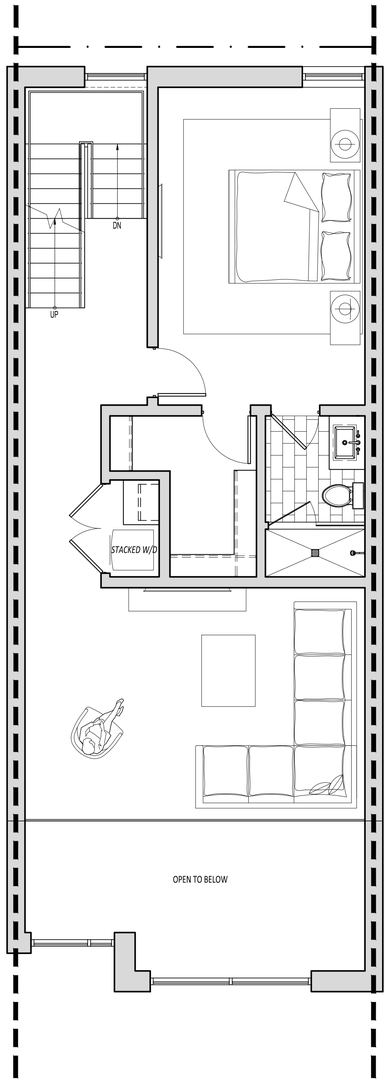
Drawing Name
UNIT PLANS - TYPE 'E.1'



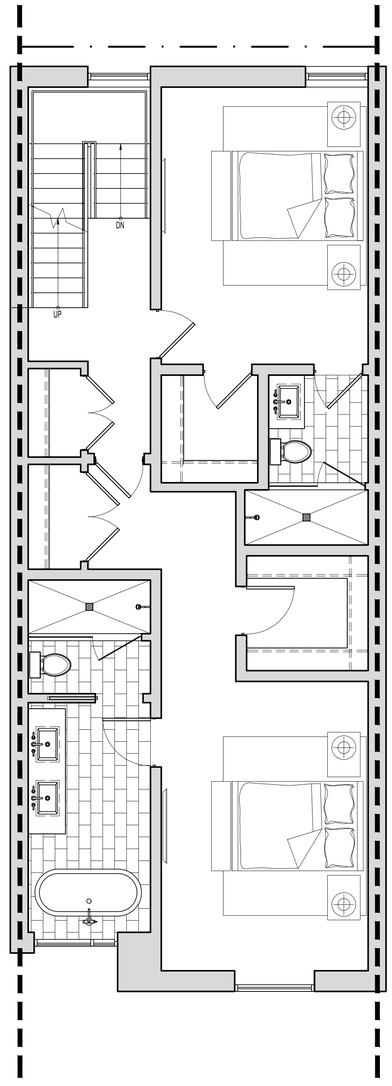
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



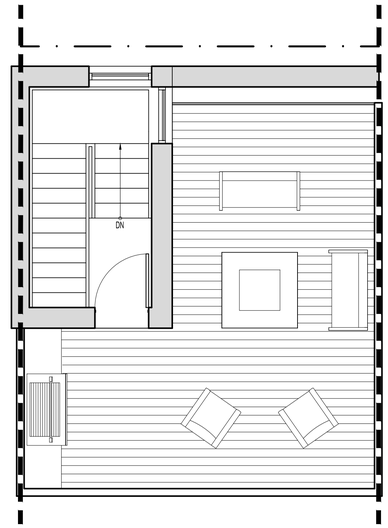
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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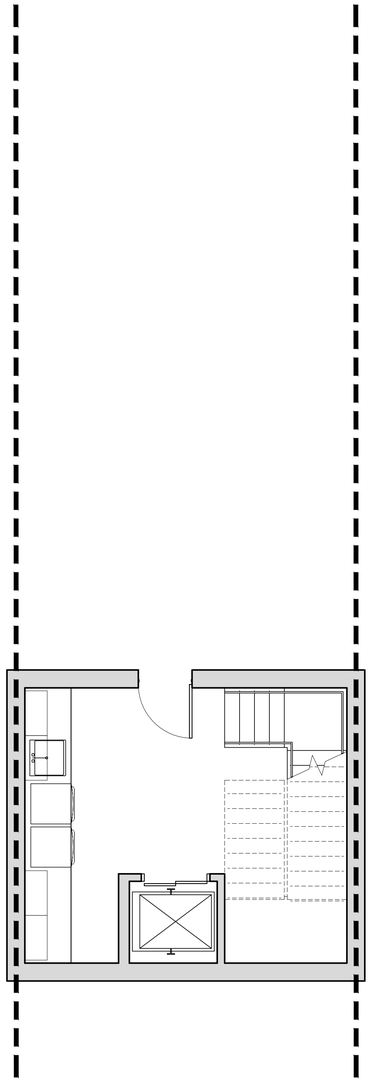
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

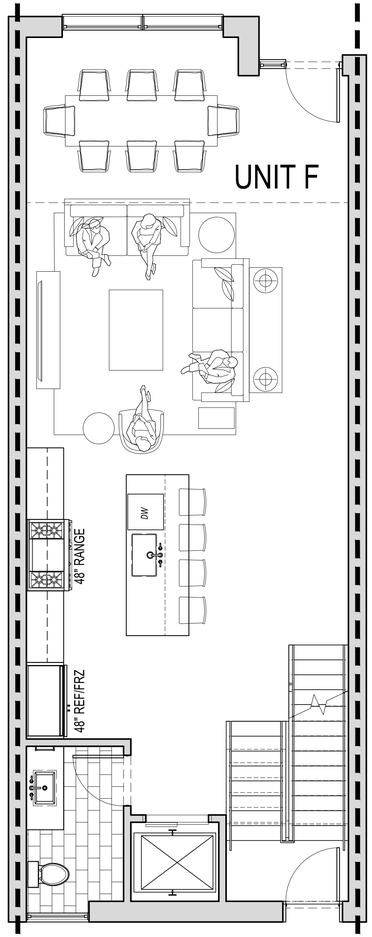
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.29

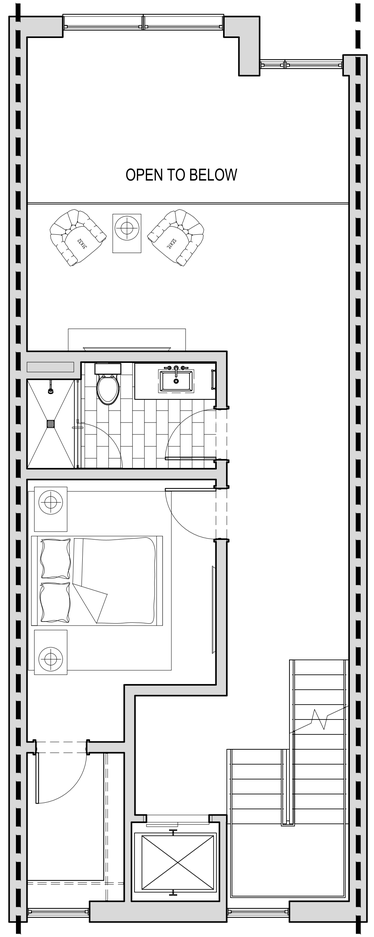
Drawing Name
UNIT PLANS - TYPE 'E.2'



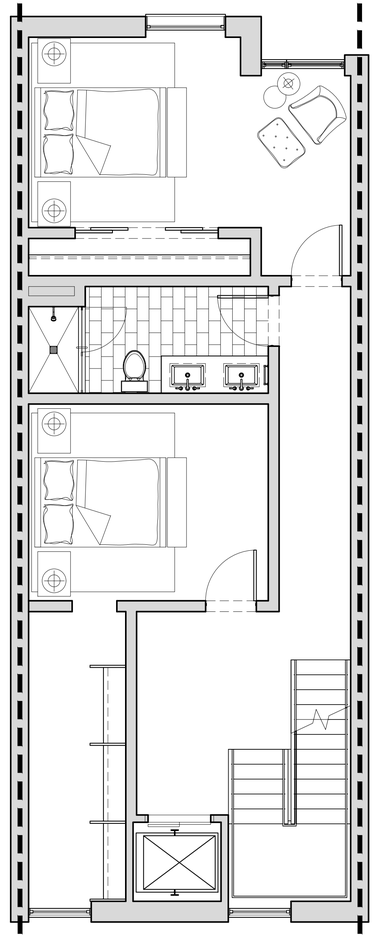
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



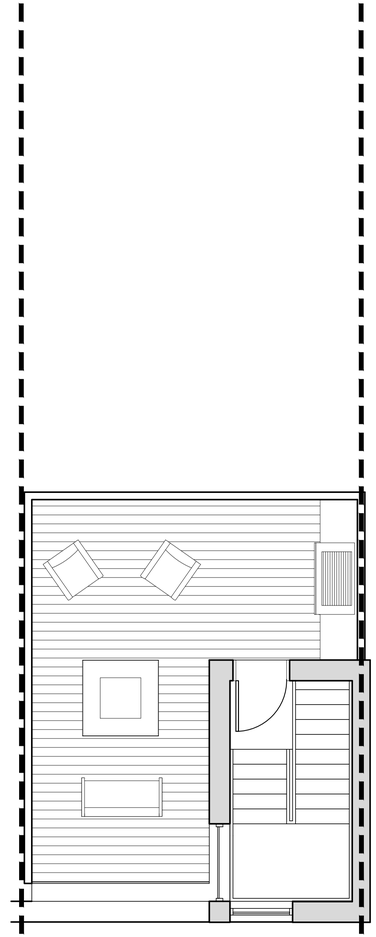
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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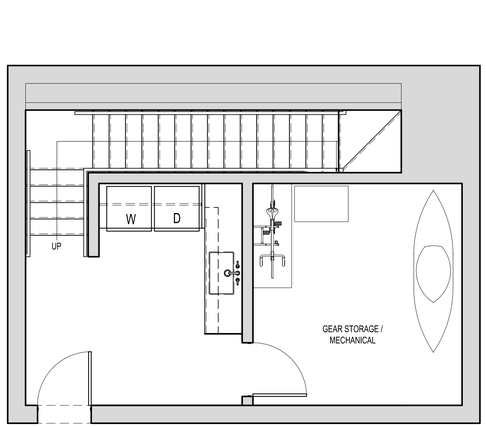
	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

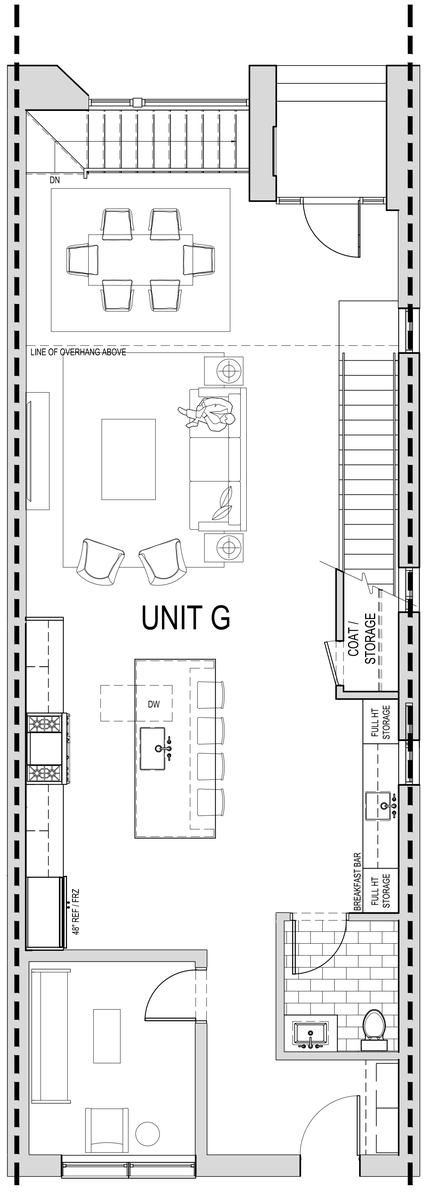
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.30

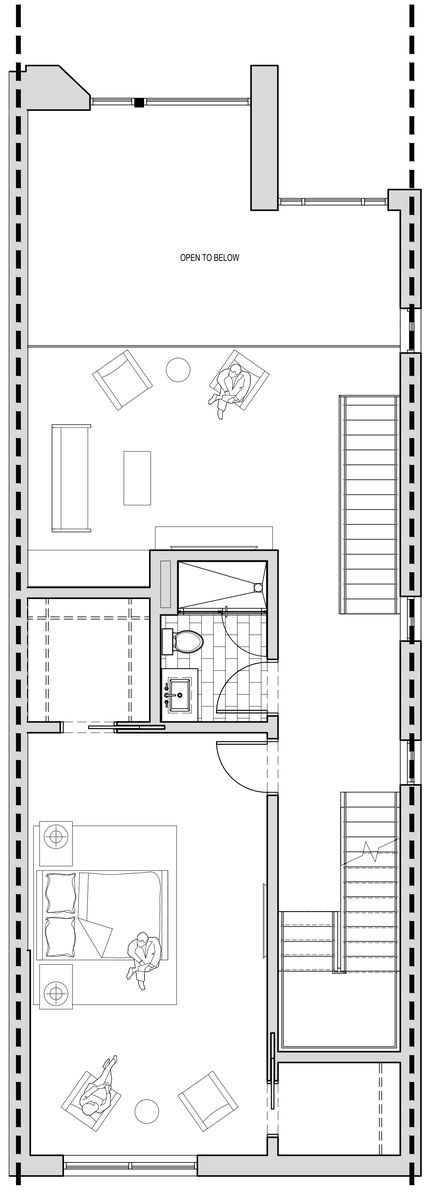
Drawing Name
UNIT PLANS - TYPE 'F'



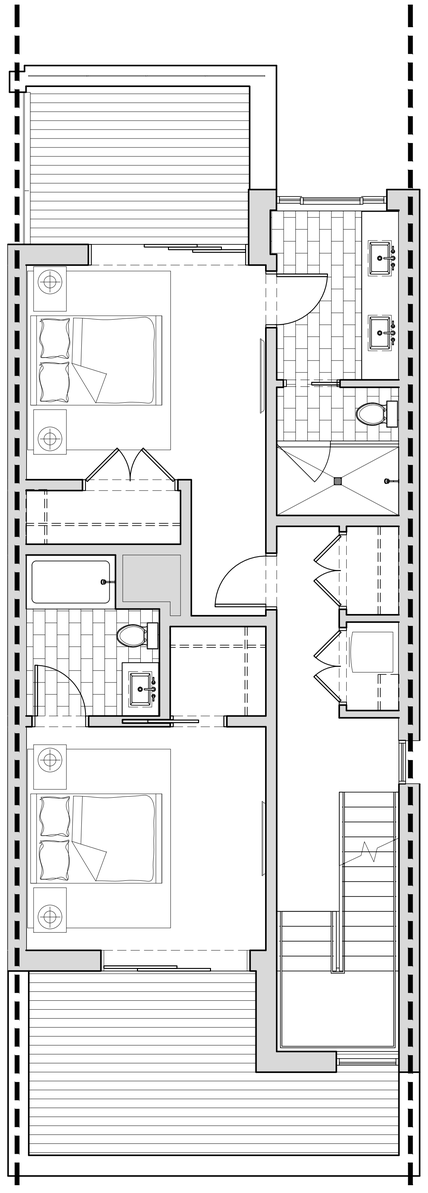
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



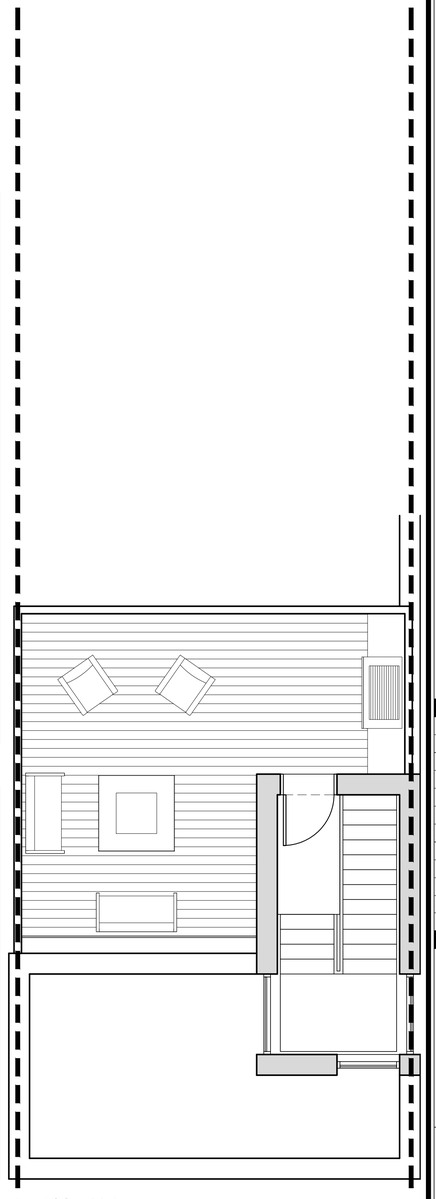
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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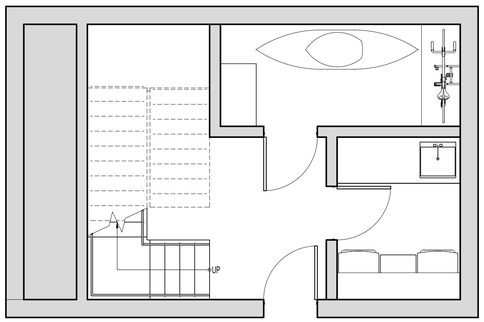
PROFESSIONAL SEAL

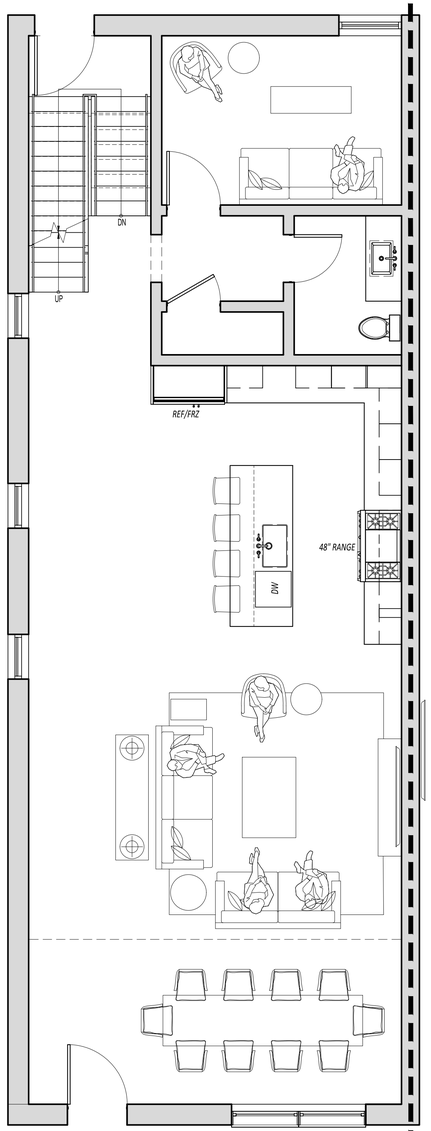
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	1.31

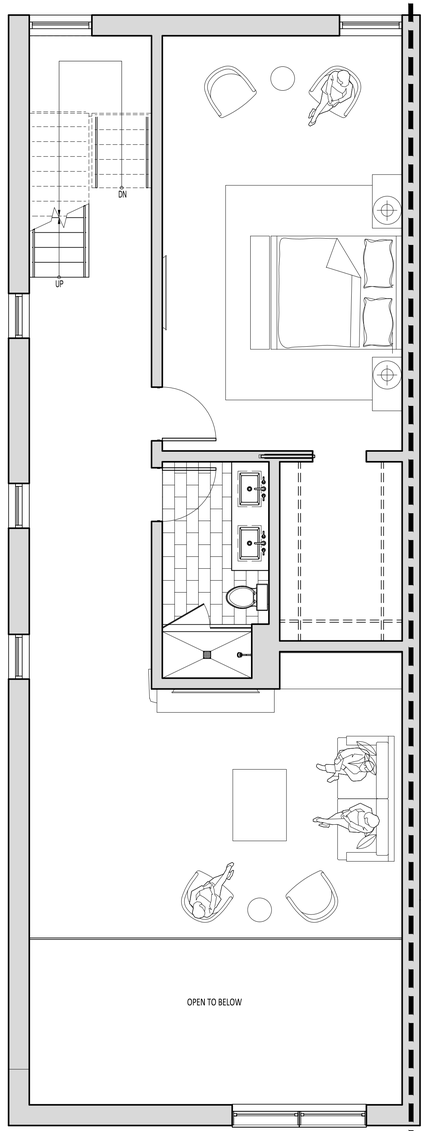
Drawing Name
UNIT PLANS - TYPE 'G'



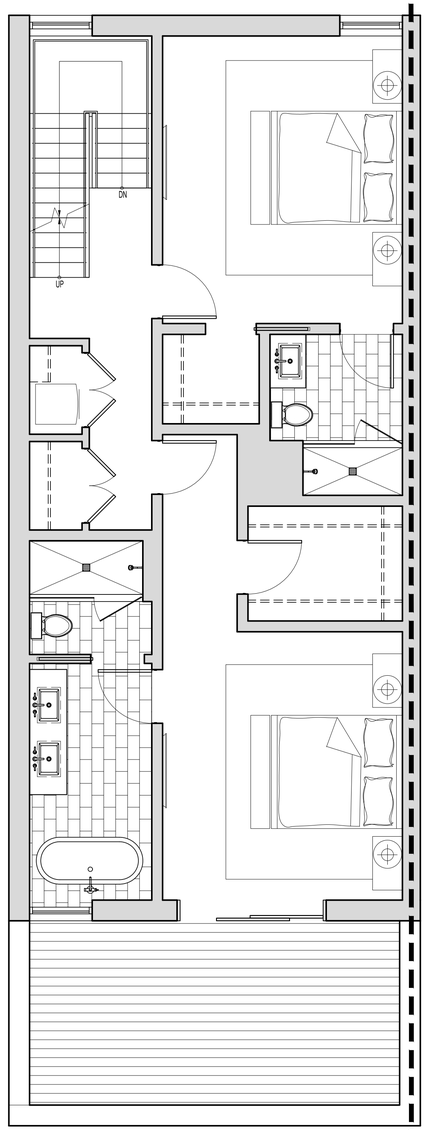
1 BASEMENT PLAN
SCALE: 1/4" = 1'-0"



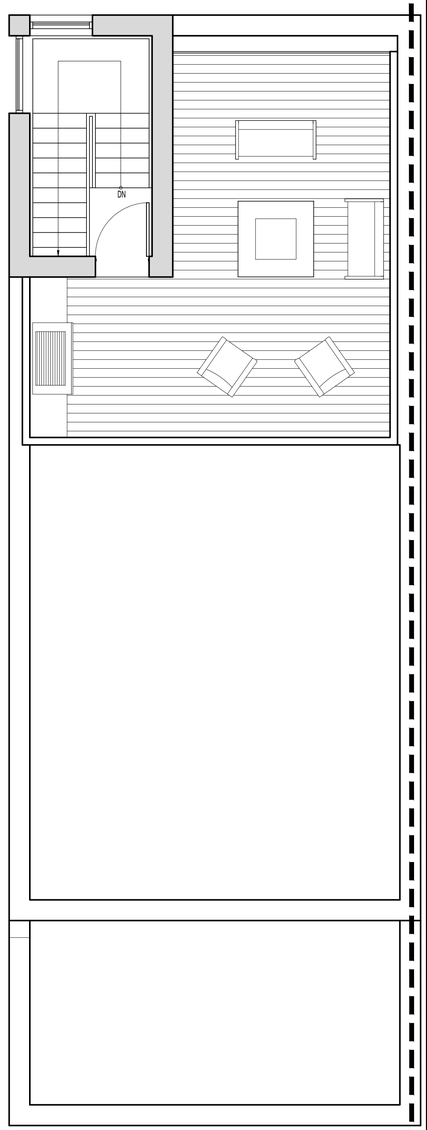
2 FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4" = 1'-0"



5 ROOF PLAN
SCALE: 1/4" = 1'-0"

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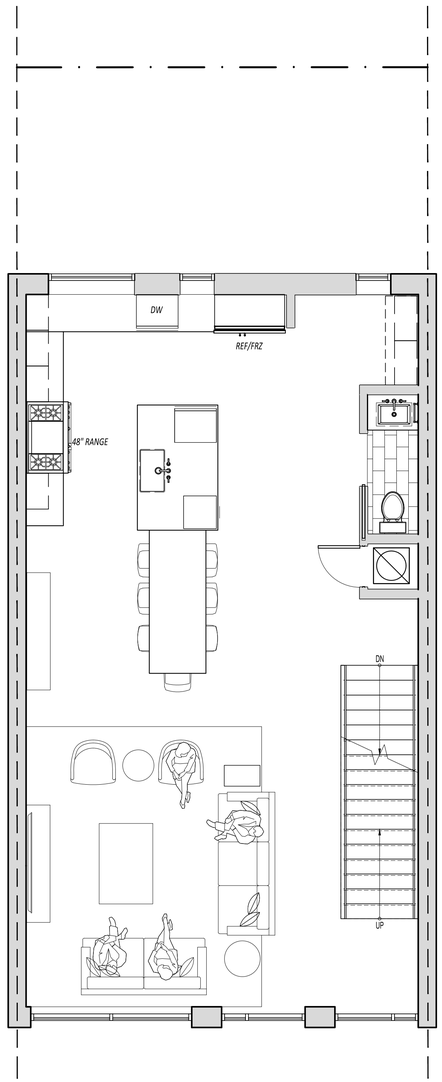
PROFESSIONAL SEAL

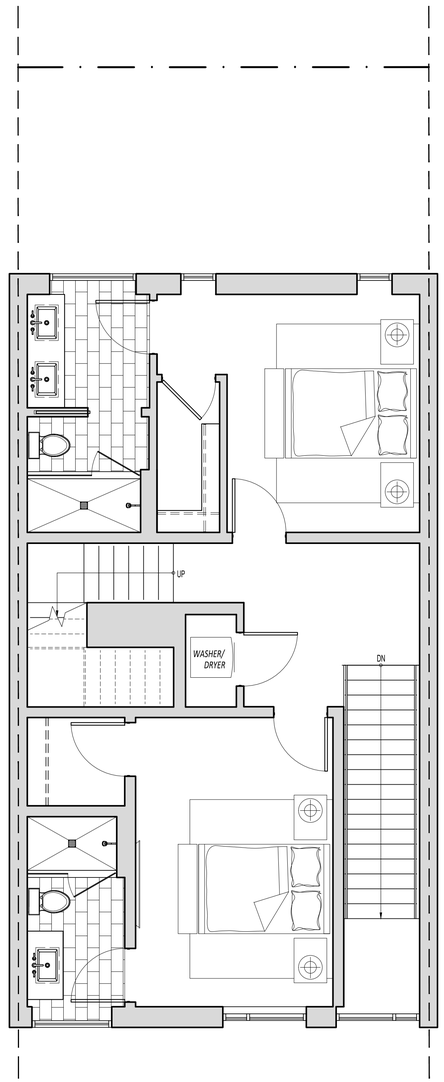
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.32

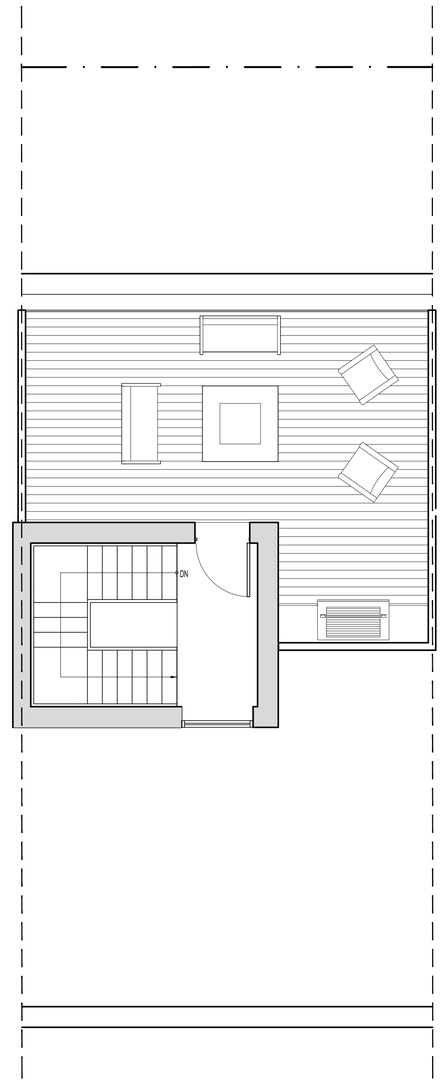
Drawing Name
UNIT PLANS - TYPE 'H'



1 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



2 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



3 ROOF PLAN
SCALE: 1/4"=1'-0"

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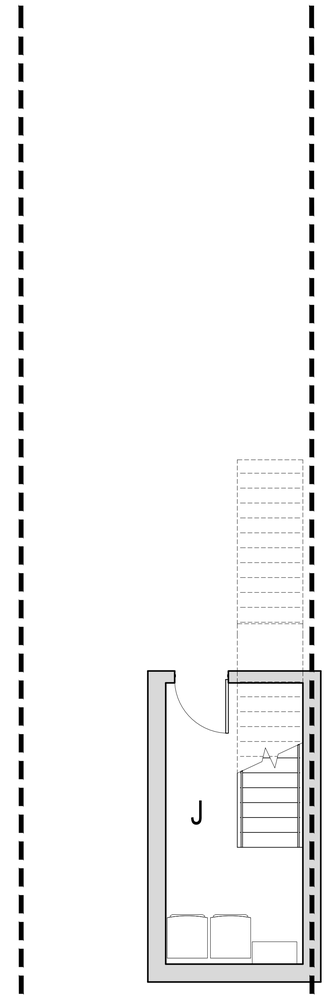
PROFESSIONAL SEAL

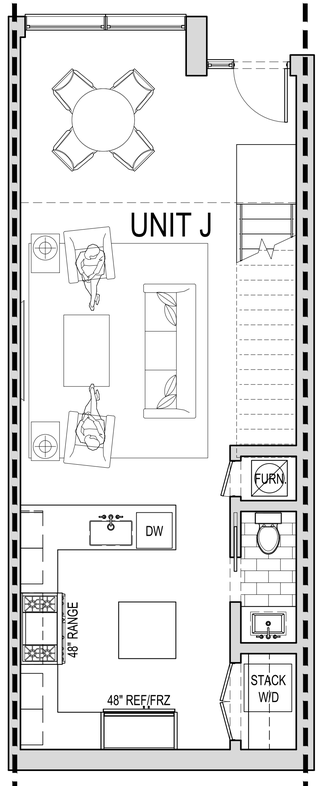
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.33

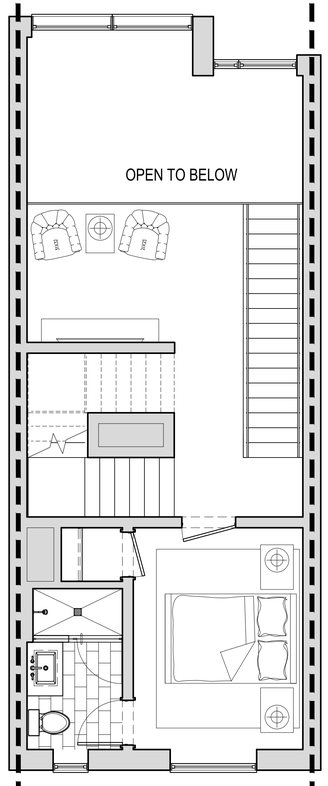
Drawing Name
UNIT PLANS - TYPE 'I'



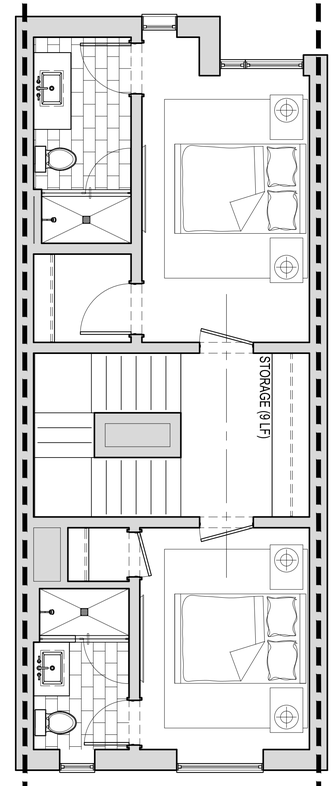
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



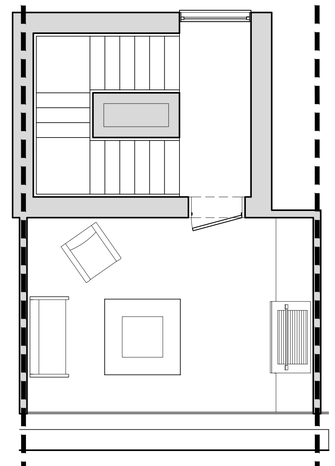
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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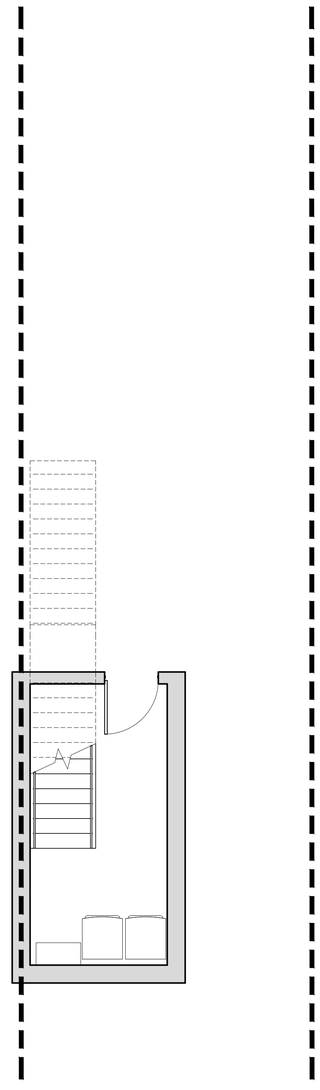
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

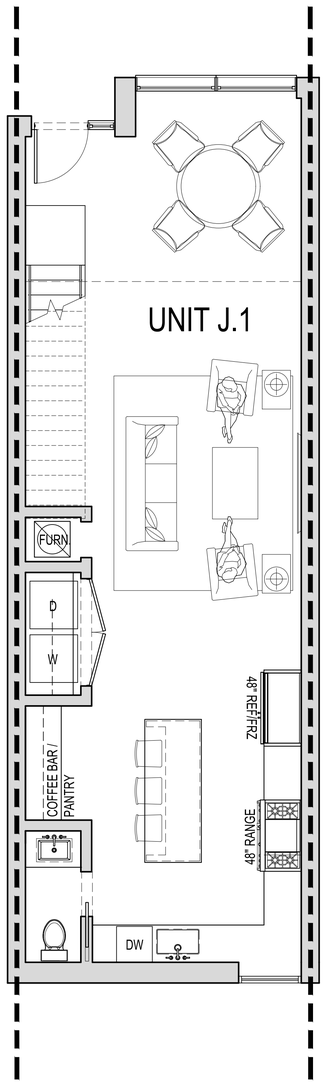
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.34

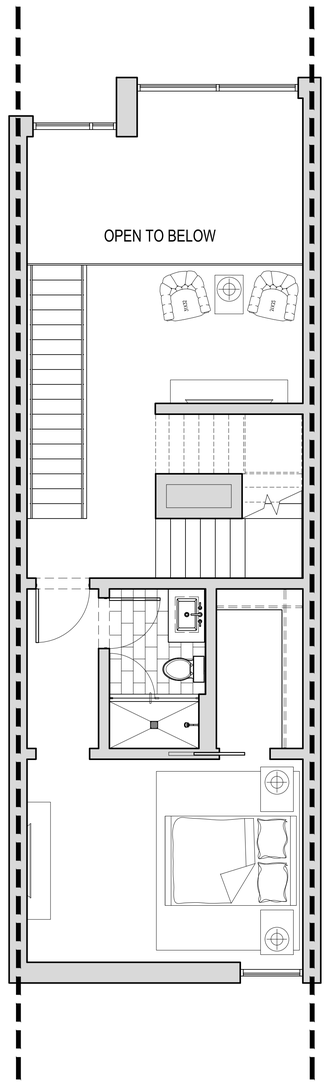
Drawing Name
UNIT PLANS - TYPE 'J'



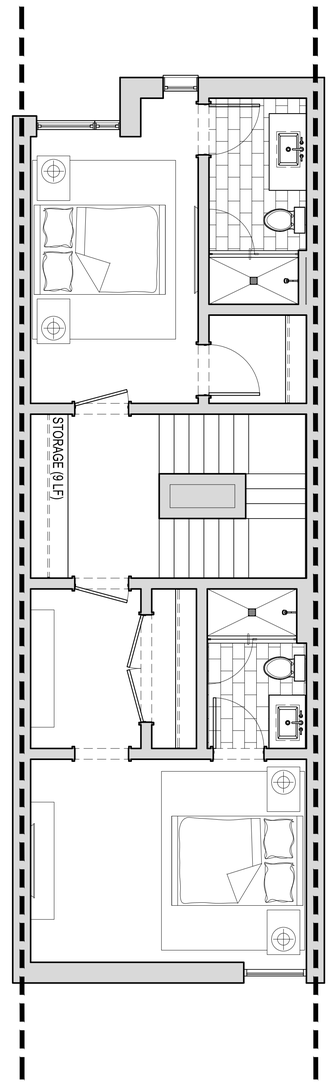
1 BASEMENT PLAN
SCALE: 1/4"=1'-0"



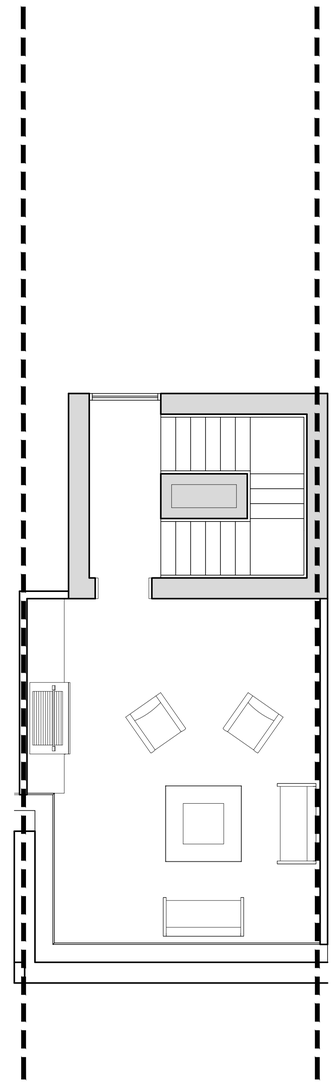
2 FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"



3 SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



4 THIRD FLOOR PLAN
SCALE: 1/4"=1'-0"



5 ROOF PLAN
SCALE: 1/4"=1'-0"

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■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.35

Drawing Name
UNIT PLANS - TYPE 'J.1'



1 EAST ELEVATION
SCALE: 3/32" = 1'-0"



2 WEST ELEVATION
SCALE: 3/32" = 1'-0"

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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 2.0

Drawing Name
EXTERIOR ELEVATIONS



1 EAST ELEVATION
SCALE: 1/8" = 1'-0"



2 WEST ELEVATION
SCALE: 1/8" = 1'-0"

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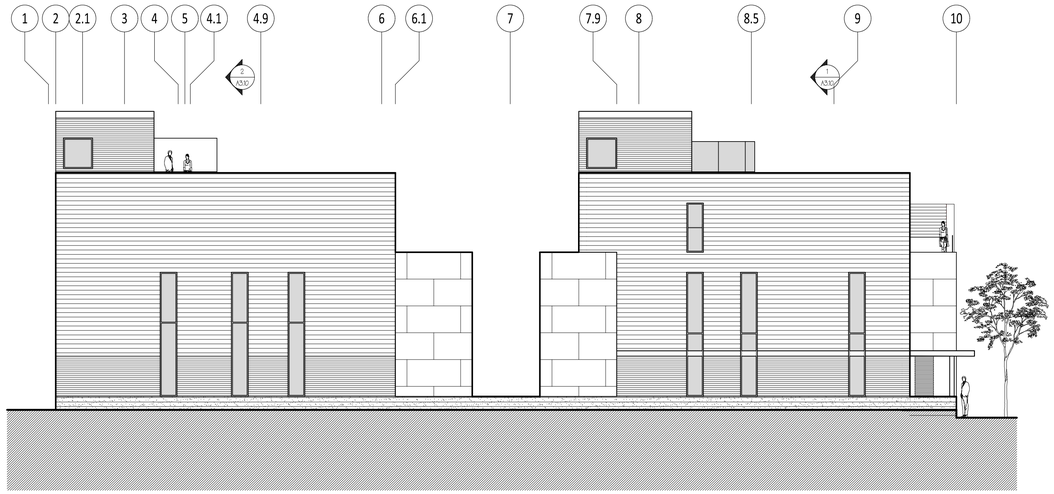
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL / RB	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	2.0R

Drawing Name
EXTERIOR ELEVATIONS



1 SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



2 NORTH ELEVATION
SCALE: 3/32" = 1'-0"

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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 2.1

Drawing Name
EXTERIOR ELEVATIONS



1 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



2 NORTH ELEVATION
SCALE: 1/8" = 1'-0"

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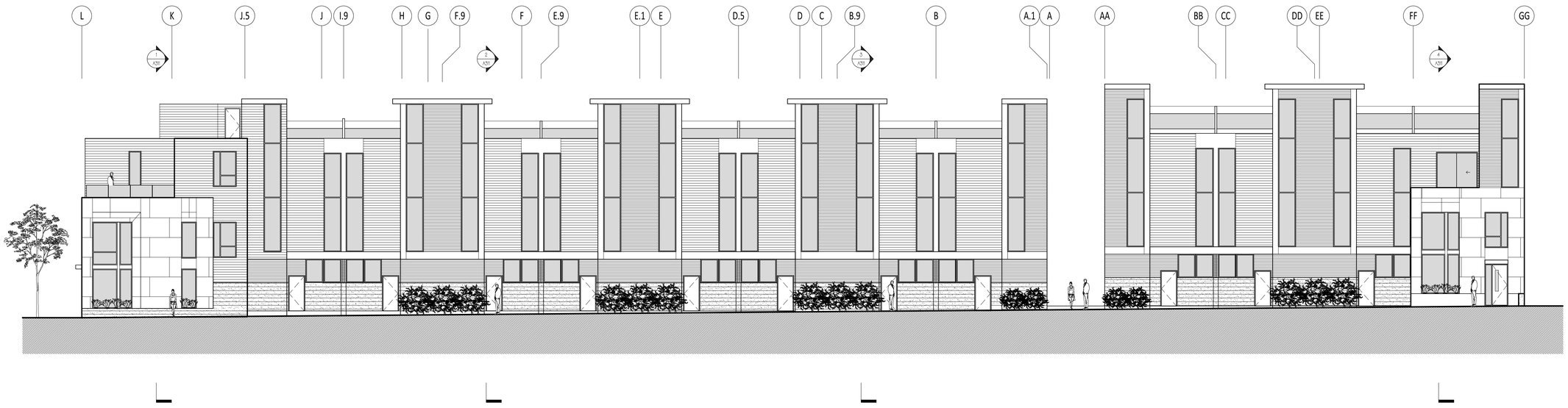
PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL / RB	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 2.1R

Drawing Name
EXTERIOR ELEVATIONS



1 EAST ELEVATION - COURTYARD
SCALE: 3/32" = 1'-0"



2 WEST ELEVATION - COURTYARD
SCALE: 3/32" = 1'-0"

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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 2.2

Drawing Name
EXTERIOR ELEVATIONS



1 EAST ELEVATION - COURTYARD
SCALE: 3/32" = 1'-0"



2 WEST ELEVATION - COURTYARD
SCALE: 3/32" = 1'-0"

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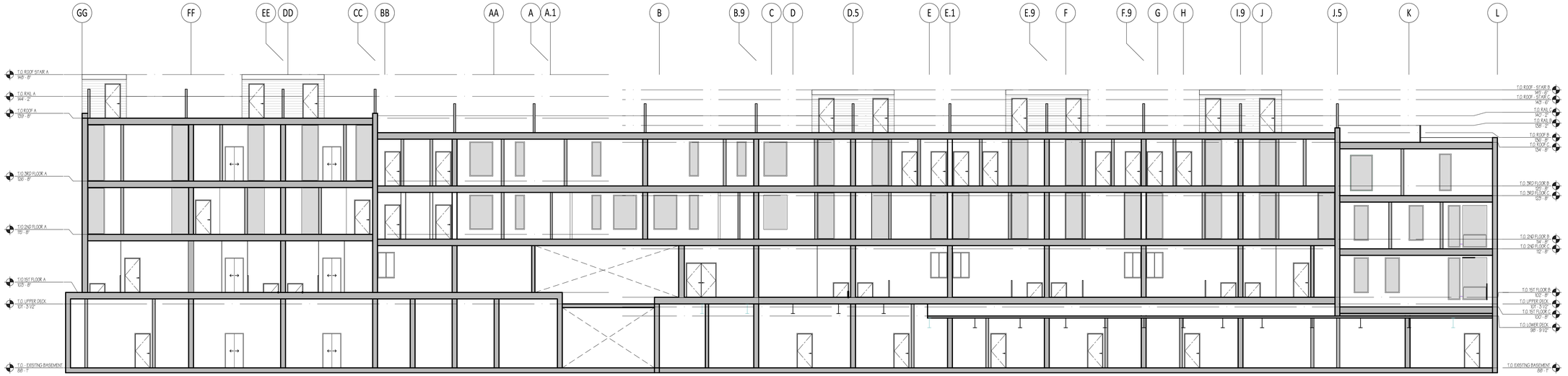
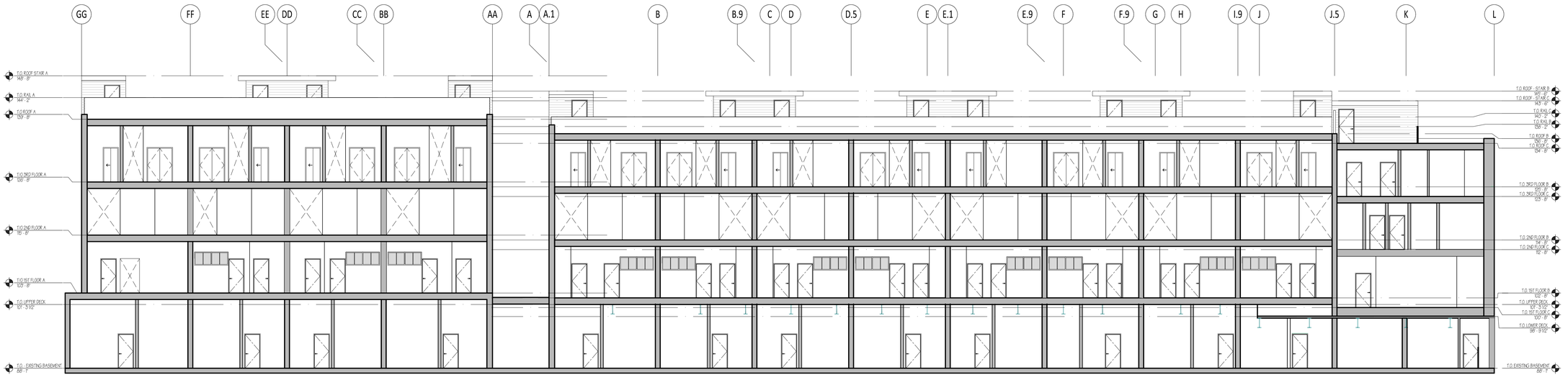
PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL / RB	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 2.2R

Drawing Name
EXTERIOR ELEVATIONS



2 NORTH/SOUTH BUILDING SECTION 2
SCALE: 3/32" = 1'-0"



1 NORTH/SOUTH BUILDING SECTION 1
SCALE: 3/32" = 1'-0"

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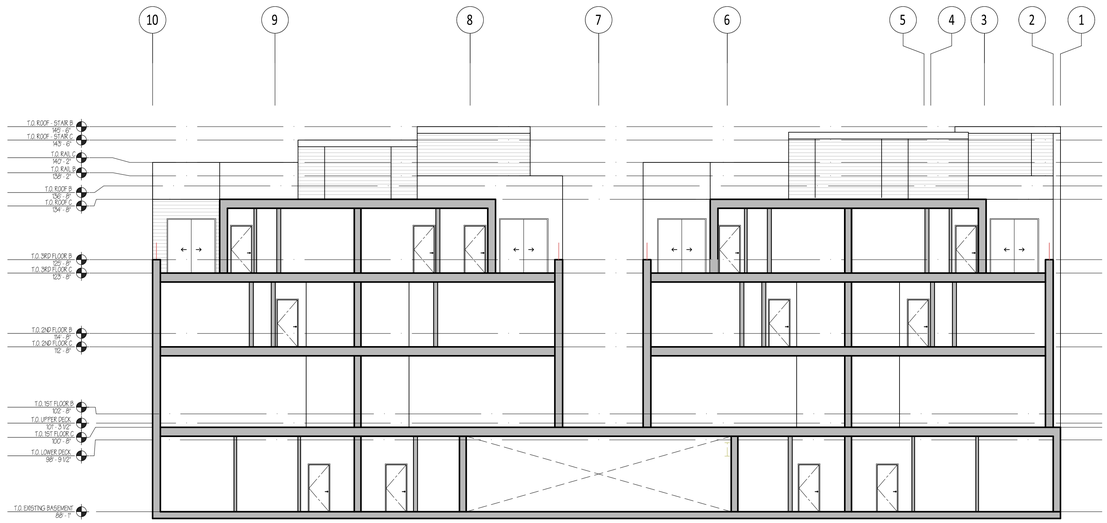
	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline	Drawing No.
A	3.0

Drawing Name
BUILDING SECTIONS



2 EAST/WEST BUILDING SECTION 1

SCALE: 3/32" = 1'-0"

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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 3.1

Drawing Name
BUILDING SECTIONS



PERSPECTIVE VIEW FROM SE CORNER



PERSPECTIVE VIEW FROM GLENWOOD ST

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PROFESSIONAL SEAL

PROJECT

GLENWOOD GILL

165 AND 185 GLENWOOD ST.

JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 9.0

Drawing Name

EXTERIOR RENDERINGS

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PERSPECTIVE VIEW FROM GILL ST

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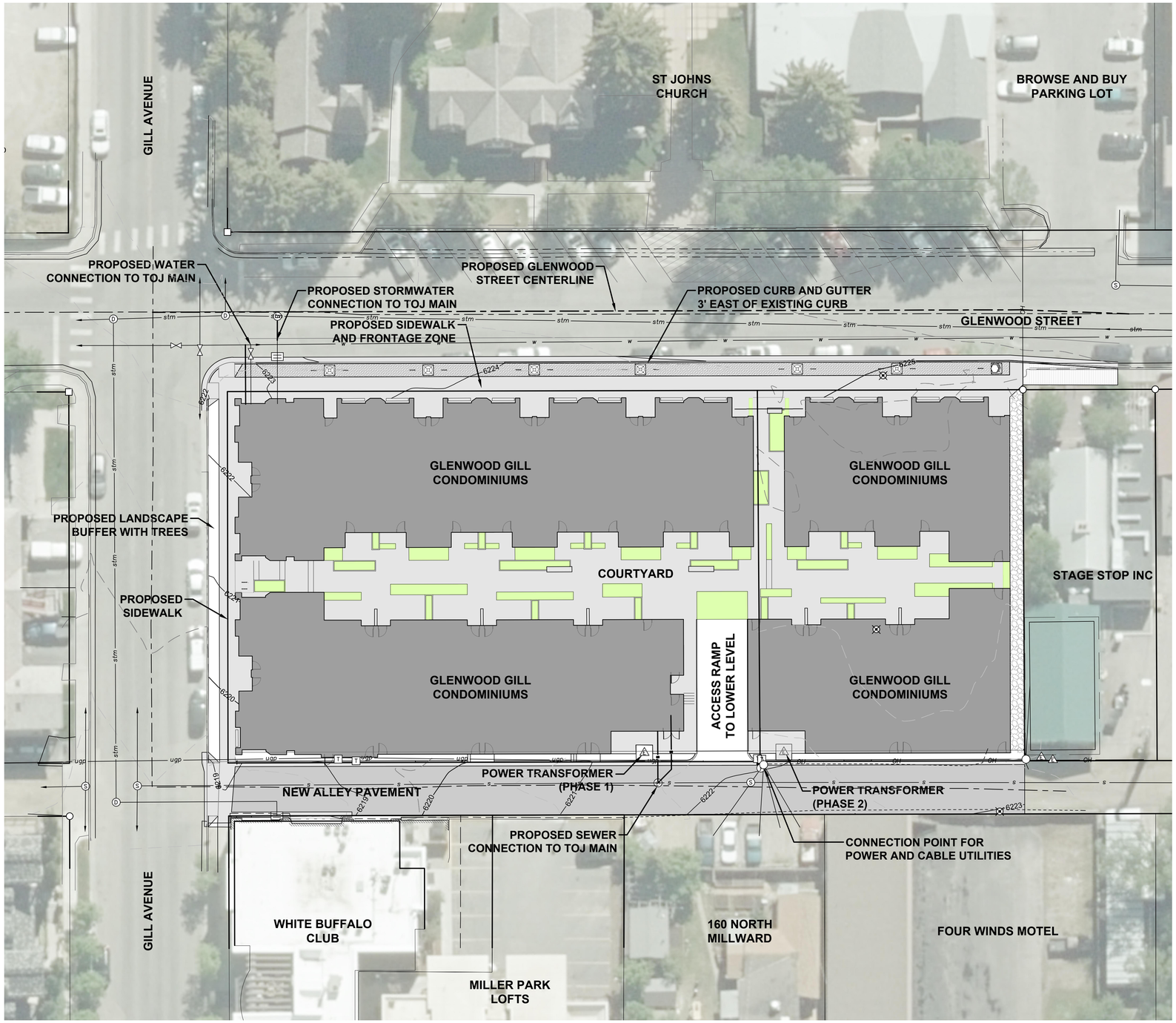
PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 9.1

Drawing Name
EXTERIOR RENDERINGS



0 20 40 60

SCALE: 1 INCH = 20 FEET
THIS SCALE VALID ONLY FOR 24x36 PRINTS

GENERAL CONSTRUCTION NOTES

1. ALL SITE WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF WYOMING PUBLIC WORKS STANDARD SPECIFICATIONS AND ARTICLE 4 OF THE TOWN OF JACKSON LAND DEVELOPMENT REGULATIONS.
2. EXISTING BASE MAPPING WAS PREPARED BY ON SITE LAND SURVEYORS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY NPDES STORMWATER PERMIT PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES.
4. CONTRACTOR SHALL CONSTRUCT EROSION CONTROL STRUCTURES PRIOR TO ANY EARTHWORK OR CONSTRUCTION. CONTROL STRUCTURES SHALL BE CONSTRUCTED AND MAINTAINED BY CONTRACTOR UNTIL VEGETATION IS REESTABLISHED IN DISTURBED AREAS.
5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND SHALL PROMPTLY NOTIFY THE ENGINEER OF ANY VARIATIONS OR DISCREPANCIES.
6. BURIED UTILITIES
   - 6.1. CONTRACTOR SHALL VERIFY LOCATION OF ALL BURIED AND OVERHEAD UTILITIES PRIOR TO ANY EXCAVATION IN THE VICINITY. UTILITY LOCATIONS SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND BASED ON THE BEST INFORMATION AVAILABLE TO THE ENGINEER. ENGINEER DOES NOT WARRANT THE ACCURACY NOR COMPLETENESS OF THE INFORMATION SHOWN FOR EXISTING UTILITIES.
   - 6.2. CONTRACTOR SHALL COORDINATE WITH THE PROJECT REPRESENTATIVE TO LOCATE AND AVOID DAMAGE TO ANY FUEL PUMPING FACILITIES, IRRIGATION FACILITIES, WATER UTILITIES, AND STATE MONITORING WELLS AND PIPING.
   - 6.3. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES PRIOR TO INSTALLING IMPROVEMENTS.
   - 6.4. CONTRACTOR SHALL NOTIFY WYOMING ONE CALL, 1-800-348-1030, A MINIMUM OF 48 HOURS PRIOR TO EXCAVATION FOR UTILITY LOCATES.
7. ALL EXCAVATION ACTIVITIES SHALL COMPLY WITH PERMIT REQUIREMENTS ISSUED FOR THE PROJECT. CONTRACTOR SHALL REVIEW AND BE RESPONSIBLE FOR PERMIT COMPLIANCE.
8. CONTRACTOR TO CONFIRM STOCKPILE AND STAGING LOCATIONS WITH THE OWNER.
9. CONTRACTOR TO LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
10. FILL MATERIAL SHALL BE SUITABLE ON-SITE OR IMPORTED MATERIAL WITH ROCKS NO LARGER THAN 6 INCHES IN DIAMETER. LARGER MATERIAL MAY BE PLACED ONLY WHEN AUTHORIZED BY THE ENGINEER.
11. CRUSHED GRAVEL BASE COURSE MATERIAL SHALL BE GRADING H. BASE COURSE SHALL BE MECHANICALLY COMPACTED TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 (AASHTO T-180 - MODIFIED PROCTOR DENSITY).
12. DESTRUCTION AND DAMAGE TO TREES AND OTHER NATURAL VEGETATION SHALL BE MINIMIZED AND ALL DISTURBED SURFACES SHALL BE RESEEDED AS SOON AS PRACTICAL IN ACCORDANCE TO THE REVEGETATION SPECIFICATIONS.
13. STRIP AND SALVAGE TOPSOIL FROM ALL EXCAVATED AREAS.
14. WEEDS SHALL BE CONTROLLED BY SPRAYING, LIMITING DISTURBANCE AREA, OR OTHER MEANS PRIOR TO REVEGETATION AND AFTER REVEGETATION IS COMPLETE.
15. FUGITIVE DUST WILL BE CONTROLLED BY WATERING DURING DRY PERIODS OR AS REQUIRED BY ENGINEER.
16. ALL EXCAVATED MATERIALS SHALL BE STOCKPILED AND PROCESSED ON-SITE ONLY AT LOCATIONS AS DESIGNATED ON THE PLANS.
17. TOPS OF CUT AND FILL SLOPES SHALL BE ROUNDED TO AVOID RAVELING AND EROSION.
18. CUT AND FILL SLOPES SHALL NOT EXCEED 2:1.

WATER AND SEWER UTILITY NOTES

1. WATER AND SEWER INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY, WATER QUALITY DIVISION RULES AND REGULATIONS AND THE TOWN OF JACKSON STANDARDS FOR CONSTRUCTION.
2. CONTRACTOR SHALL NOTIFY THE TOWN OF JACKSON PUBLIC WORKS DEPARTMENT AT PHONE NUMBER (307) 733-3079, PRIOR TO START OF CONSTRUCTION AND PRIOR TO EACH WATER AND SEWER TEST.
3. CONTRACTOR SHALL MAINTAIN WATER AND SEWER SLOPES CONSISTENT WITH THE PLANS. ABRUPT ELEVATION CHANGES ARE NOT PERMITTED AND MAY REQUIRE ADDITIONAL AIR RELEASE VALVES OR BLOW-OFFS AT THE CONTRACTORS EXPENSE.
4. TYPE A TRENCH BACKFILL SHALL APPLY TO ALL PAVED SURFACES AND AROUND ALL APPURTENANCES INCLUDING VALVES, FIRE HYDRANTS AND MANHOLES. TYPE B TRENCH BACKFILL SHALL APPLY TO NON-TRAVELED AREAS. SEE SPECIFICATION WPWSS 02225.
5. CONTINUOUS RIGID TYPE B PIPELINE INSULATION SHALL BE PROVIDED AS SHOWN ON THE TYPICAL TRENCH DETAIL, UNDER ALL TRAVELED AREAS AND AT ALL LOCATIONS WHERE DEPTH OF COVER IS LESS THAN 5 FEET FOR SEWER MAINS AND SERVICES; LESS THAN 7 FEET FOR SEWER FORCE MAINS, WATER MAINS AND SERVICES OR AS SHOWN ON THE PLANS.
6. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL SEPARATION BETWEEN WATER PIPES AND SEWER PIPES/MANHOLES, MEASURED EDGE TO EDGE. MAINTAIN A MINIMUM OF 18 INCHES VERTICAL SEPARATION AT WATER-SEWER PIPE CROSSINGS. WHERE SEWER PIPE CROSSES ABOVE WATER PIPE, SPECIAL CONSTRUCTION IS REQUIRED. SEE TYPICAL DETAILS.
7. WATER SERVICE LINES 4" AND LARGER SHALL BE DUCTILE IRON PIPE, OR APPROVED EQUAL. FITTINGS FOR WATER MAINS SHALL BE DUCTILE IRON, CONFORMING TO AWWA C110 OR C153. MINIMUM DEPTH OF BURY FOR ALL WATER LINES SHALL BE 7'.
8. SANITARY SEWER LINES AND FITTINGS SHALL BE SCHEDULE 40 PVC AND CONFORM TO ASTM D-3034, OR APPROVED EQUAL.

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SUBJECT TO CORRECTION AND APPROVAL

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■	10.25.2019	DEVELOPMENT PLAN REVIEW

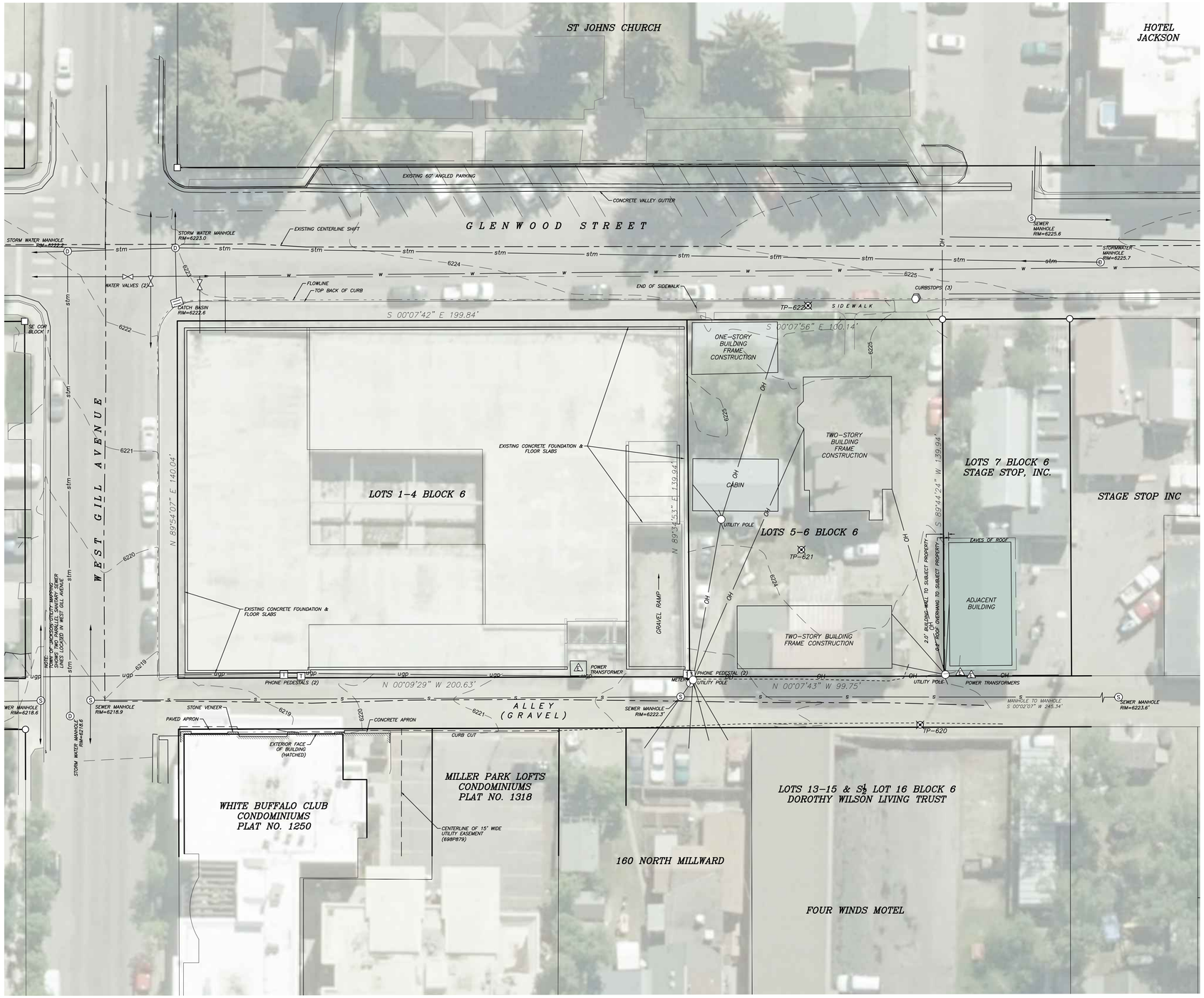
PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

18105	Project No.
JL	Drawn By
AJ	Checked By

Discipline Drawing No.
C 1.0

Drawing Name
SITE OVERVIEW



0 20 40 60

SCALE: 1 INCH = 20 FEET
THIS SCALE VALID ONLY FOR 28x36 PRINTS

LEGEND

- ☐ INDICATES A STEEL PIPE WITH A BRASS CAP INSCRIBED "PE&LS 578" FOUND THIS SURVEY
- ○ INDICATES A 5/8 INCH DIAMETER STEEL REBAR WITH AN ALUMINUM CAP INSCRIBED "PLS 3831" FOUND THIS SURVEY
- ⊠ INDICATES A PK-BRAND NAIL SET THIS SURVEY FOR ORIENTATION AND MAPPING PURPOSES
- SUBJECT PROPERTY LINE
- ADJACENT PROPERTY LINE
- CENTERLINE OF STREET
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF CONCRETE
- TOP BACK OF CURB
- FLOWLINE
- OH — OVERHEAD LINE
- s — SANITARY SEWER LINE
- BUILDING - SIDING
- BUILDING - EAVES OF ROOF

SURVEY NOTES:

ORIGINAL AND SUPPLEMENTARY TOPOGRAPHIC MAPPING WAS CONDUCTED BY ON SIGHT LAND SURVEYORS, INC USING THE ON SITE LAND SURVEYORS, INC. TETON COUNTY CONTROL NETWORK 2001 COORDINATE SYSTEM AND NGVD29 DATUM

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18105	Project No.
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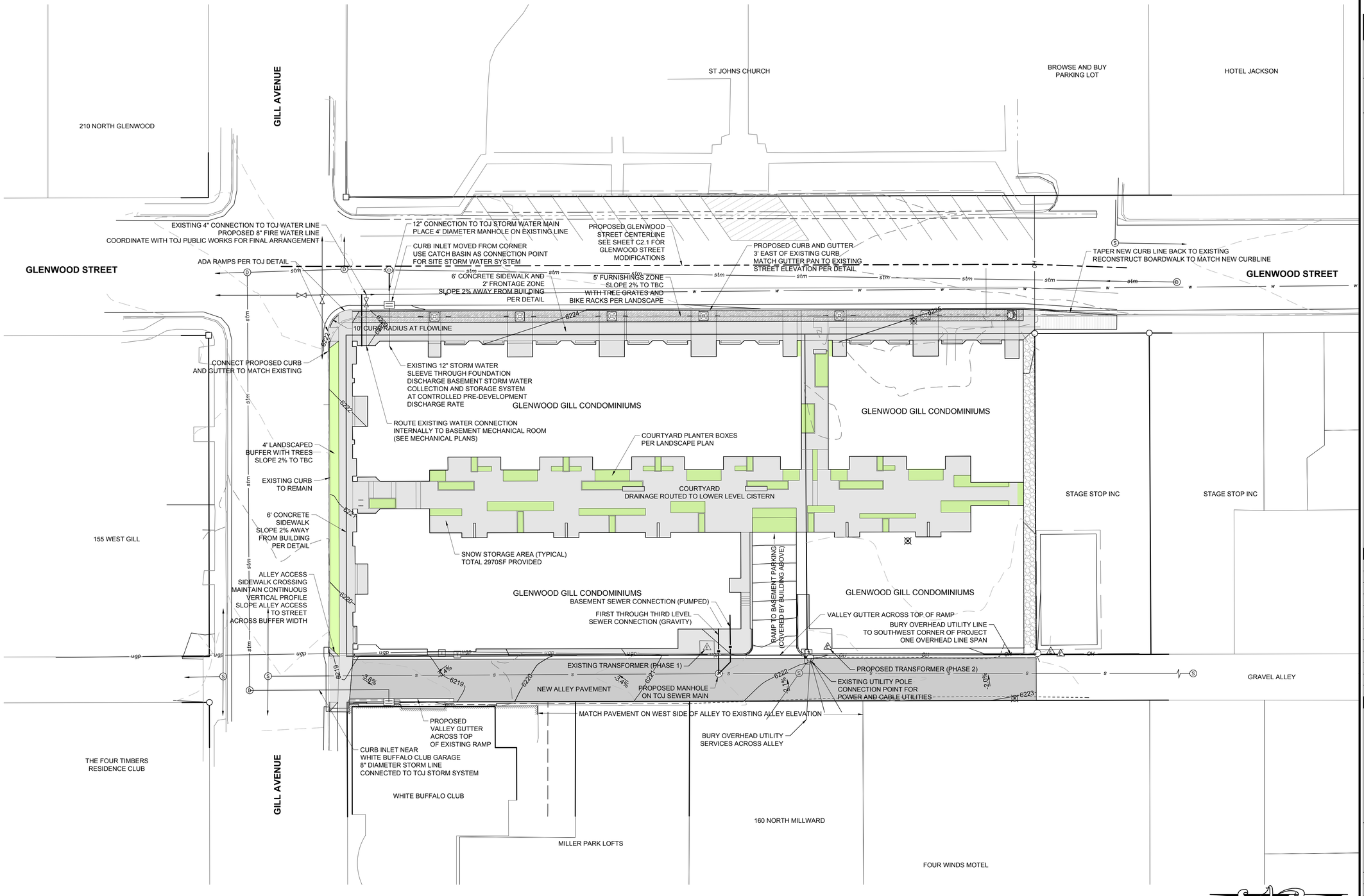
AJ	Checked By

Discipline Drawing No.
C 1.1

Drawing Name
EXISTING CONDITIONS



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SCALE: 1 INCH = 20 FEET
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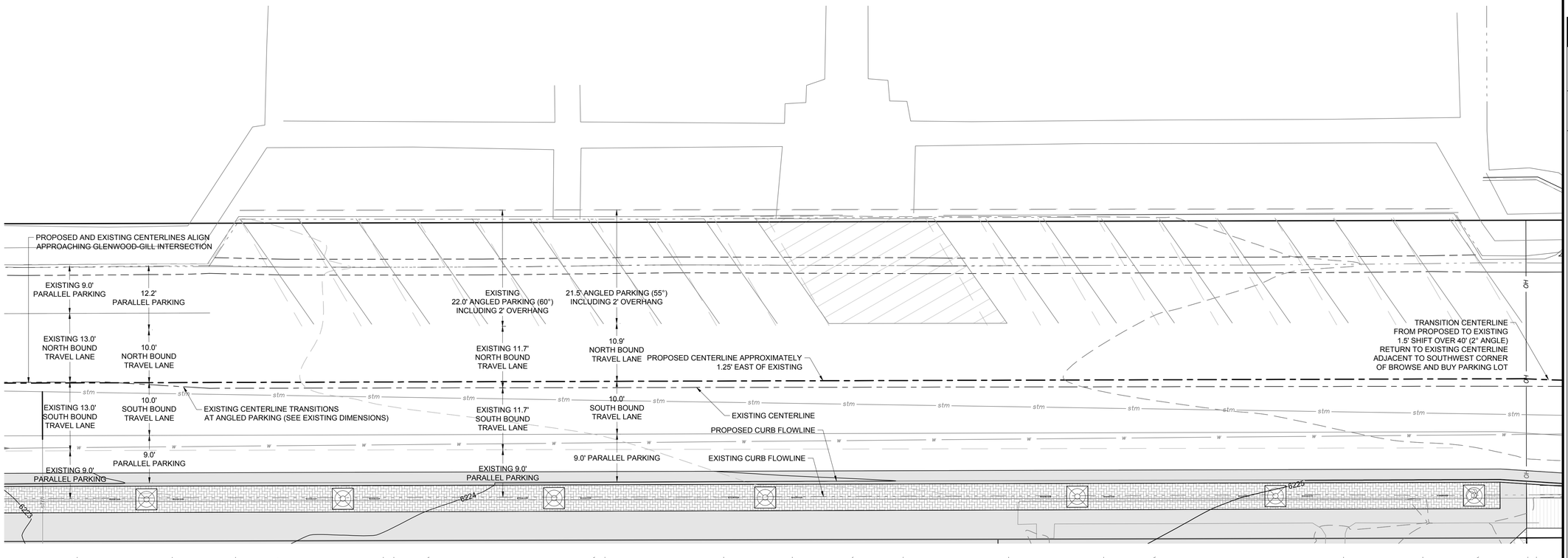
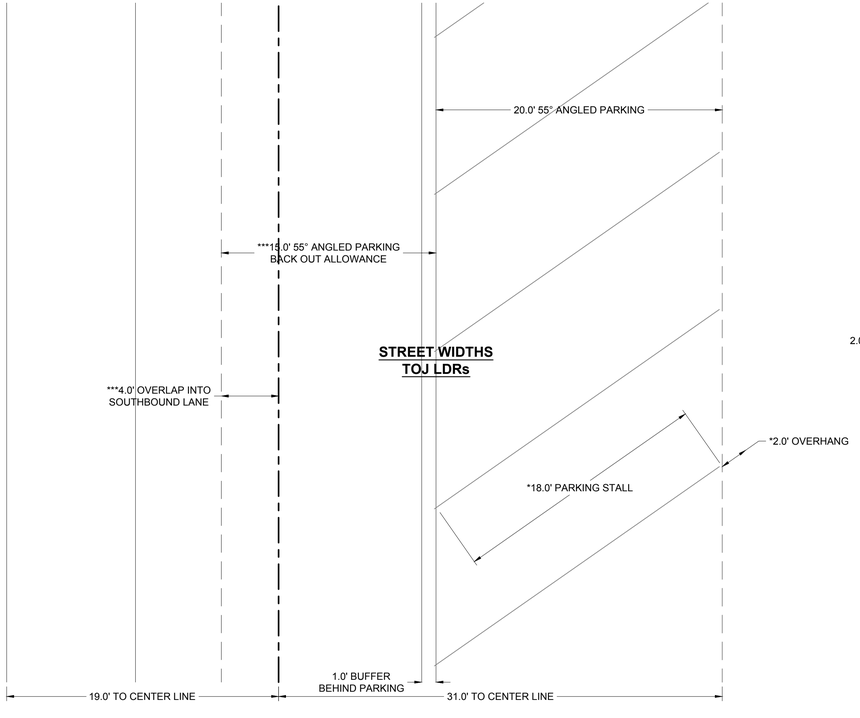
JACKSON, WY 83001

18105	Project No.
JL	Drawn By
AJ	Checked By

Discipline Drawing No.
C 2.0

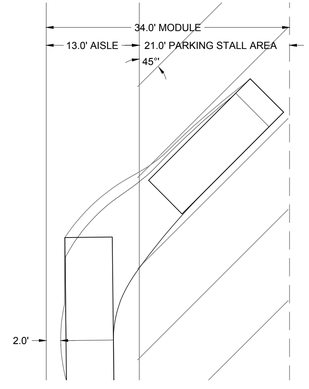
Drawing Name
SITE PLAN



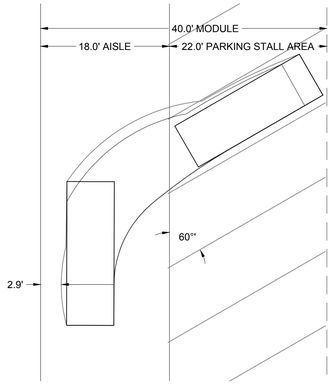


STREET WIDTHS
TOJ LDRs

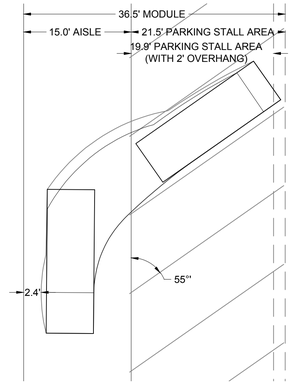
STREET WIDTHS



45° PARKING MODULE



60° PARKING MODULE



55° PARKING MODULE

DIMENSIONS FOR 55° PARKING MODULE ARE DERIVED FROM THE MINIMUM SPACE REQUIRED FOR A 20' DESIGN VEHICLE TO BACK OUT OF A 20' LONG, 55° ANGLED PARKING STALL WITH A 2'-3' MARGIN ON THE LEFT SIDE OF THE VEHICLE WHEN IT IS ALIGNED WITH THE ROAD.

DIMENSIONS OF 45° AND 60° MODULES ARE FROM TOWN OF JACKSON LDRs. AUTOTURN ANALYSIS USING SAME VEHICLE IS SHOWN FOR COMPARISON.

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0 10 20 30
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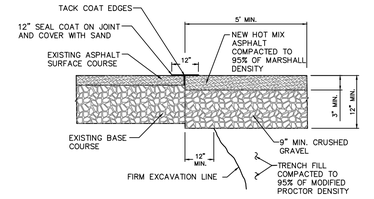
AJ	Checked By

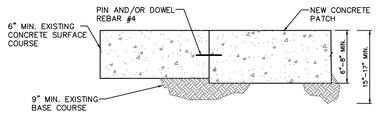
Discipline Drawing No.
C 2.1

Drawing Name
GLENWOOD STREET IMPROVEMENTS



BITUMINOUS MATERIAL SHALL MEET THE APPLICABLE REQUIREMENTS OF SECTION 02545 BITUMINOUS MATERIALS OF WYOMING PUBLIC WORKS STANDARDS AND SPECIFICATIONS

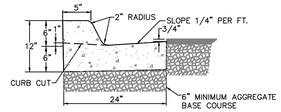
ASPHALT PATCH REPAIR DETAIL



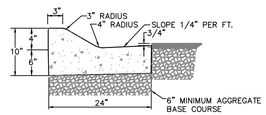
CONCRETE PATCH REPAIR DETAIL

NOTES:
1. REPLACEMENT ASPHALT THICKNESS SHALL BE 1" GREATER THAN EXISTING AND NO LESS THAN 3" MINIMUM.
2. ASPHALT SHALL BE PLACED IN TWO (2) LIFTS, EACH NO LESS THAN 1½" IN THICKNESS, AND COMPACTED TO 95% OF MARSHALL DENSITY.
3. PORTLAND CEMENT CONCRETE PAVEMENT SHALL MEET APPLICABLE REQUIREMENTS OF SECTION 02520, 02776 AND 03304 AS DIRECTED BY TOWN PUBLIC WORKS DEPARTMENT.

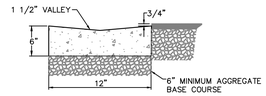
1 C3.1 PATCH REPAIR DETAIL
NTS



VERTICAL CURB



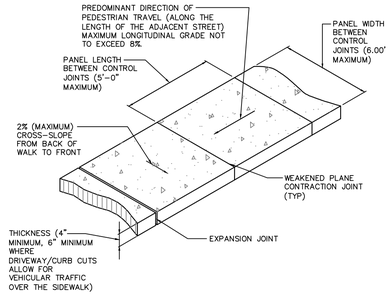
ROLL CURB



RIBBON CURB

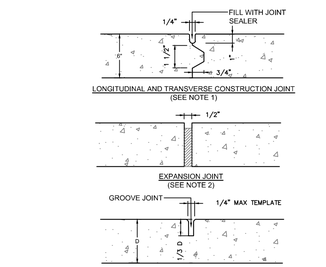
NOTES:
1. CURBS SHALL CONFORM TO WPWSS SECTION 02525, EXCEPT THAT PORTLAND CEMENT CONCRETE SHALL BE FIBERMESH-REINFORCED CLASS 4000 CONCRETE CONFORMING WITH WPWSS SECTION 03304, PART 2.07.
2. AGGREGATE BASE COURSE SHALL BE SIX INCH MINIMUM THICKNESS, CONFORM TO WPWSS SECTION 02190, PART 2.03, GRADING H, AND BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.
3. REMOVAL AND REPLACEMENT OF CURB SHALL TAKE PLACE IN FULL PANELS.
4. VERTICAL CURB SHALL BE USED IN PREFERENCE TO ROLL CURB.

2 C3.1 CURB SECTION DETAIL
NTS



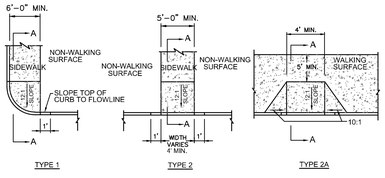
NOTES:
1. SIDEWALK SHALL CONFORM TO ALL APPLICABLE ADA STANDARD REQUIREMENTS SIDEWALKS SHALL CONFORM TO WPWSS SECTION 02776, EXCEPT THAT PORTLAND CEMENT CONCRETE SHALL BE FIBERMESH-REINFORCED CLASS 4000 CONCRETE CONFORMING WITH WPWSS SECTION 03304, PART 2.07.
2. EXPANSION JOINTS SHALL BE PLACED IN SIDEWALK AT THE SAME LOCATIONS AS THOSE IN CURB AND GUTTER WHEN SIDEWALK IS ADJACENT TO CURB. (PER WPWSS SECTION 03251, PART 3.04 SPACING SHALL NOT EXCEED 32'-0" ON CENTER.)
3. FOR SIDEWALKS GREATER THAN SIX FEET IN WIDTH, A LONGITUDINAL CONTROL JOINT SHALL BE INSTALLED AT THE CENTER OF THE WALK.
4. REMOVAL AND REPLACEMENT OF SIDEWALK SHALL TAKE PLACE IN FULL PANELS.
5. AGGREGATE BASE COURSE SHALL BE FOUR INCH MINIMUM THICKNESS, CONFORM TO WPWSS SECTION 02190, PART 2.03, GRADING H, AND BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.

3 C3.1 CONCRETE SIDEWALK
NTS



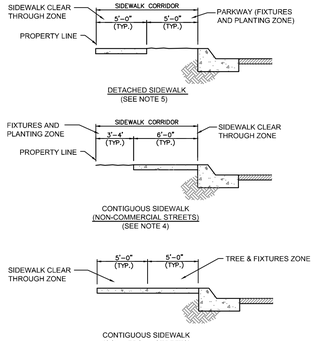
NOTE:
1. KEYWAY FORMED BY FASTENING METAL KEY TO FORM.
2. ½" PREMOLDED NON-EXTRUDING EXPANSION JOINT MATERIAL TO MEET AASHTO M-59. EXPANSION MATERIAL SHALL BE INSTALLED WHEN ABUTTING EXISTING CONCRETE OR FIXED STRUCTURES SUCH AS INLETS AND DRIVEWAYS, AND EVERY 300' ON LONG STRAIGHT CONCRETE STRETCHES.
3. FORM WITH TEMPLATE OR SAWCUT JOINTS. IF SAWCUT JOINTS ARE USED, THEY SHALL BEGIN AS SOON AS CONCRETE IS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE UNCONTROLLED CRACKING OCCURS. MINIMUM DISTANCE BETWEEN JOINTS IS 5'.
4. JOINT LAYOUT FOR CONCRETE STREETS IS TO BE SUBMITTED TO THE TOWN ENGINEER FOR APPROVAL.

4 C3.1 PAVING & CONCRETE JOINT
NTS



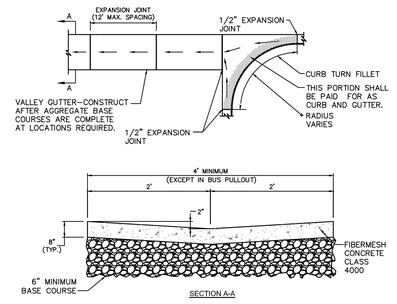
NOTES:
1. SIDEWALKS SHALL CONFORM TO ALL APPLICABLE ADA STANDARD REQUIREMENTS.
2. LIP AT GUTTER TO BE NO MORE THAN ¼" HIGH.
3. CONCRETE TO BE A BROOM FINISH.
4. ALL PEDESTRIAN RAMPS SHALL INCLUDE PLACEMENT OF CAST IRON TRUNCATED DOME DETECTION PANELS IN A BRICK RED COLOR. (PANELS SHALL BE PROVIDED BY TOJ.)

5 C3.1 PEDESTRIAN RAMP DETAILS
NTS



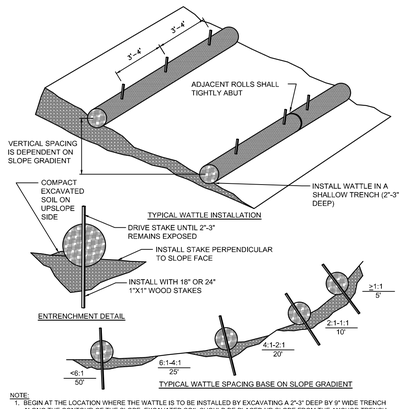
NOTES:
1. SIDEWALKS SHALL CONFORM TO ALL APPLICABLE ADA STANDARD REQUIREMENTS
2. SIDEWALK CONSTRUCTION SHALL BE PER TOWN STANDARDS
3. WITHIN THE TOWN'S BOARDWALK DISTRICT, BOARDWALK (RATHER THAN SIDEWALK) SHALL BE INSTALLED.
4. MINIMUM CLEARANCE AROUND ALL OBSTRUCTIONS SHALL BE 5'-0".
5. ON NON-COMMERCIAL STREETS DETACHED SIDEWALK SHALL BE THE PREFERRED OPTION.
6. IN ORDER TO MAINTAIN THE CLEAR THROUGH ZONE, THE FIXTURES ZONE SHALL BE WHERE FIRE HYDRANTS, UTILITY POLES, GUY WIRES, PULL BOXES, NEWSPAPER BOXES, PHONE BOOTHS, AND OTHER SUCH OBSTRUCTIONS ARE LOCATED.

6 C3.1 SIDEWALK CORRIDOR
NTS



NOTES:
1. VALLEY GUTTERS AND CURB TURN FILLETS SHALL CONFORM TO WPWSS SECTION 02528, EXCEPT THAT PORTLAND CEMENT CONCRETE SHALL BE FIBERMESH CLASS 4000 CONCRETE CONFORMING WITH WPWSS SECTION 03304, PART 2.08.
2. AGGREGATE BASE COURSE SHALL BE SIX INCH MINIMUM THICKNESS, CONFORM TO WPWSS SECTION 02190, PART 2.03, GRADING H, AND BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.
3. REMOVAL AND REPLACEMENT OF VALLEY GUTTER SHALL TAKE PLACE IN FULL PANELS.
4. CURB AND GUTTER SECTION SHALL BE POURED SEPARATE OF VALLEY PAN AS WELL AS PEDESTRIAN RAMP AND/OR SIDEWALK.

7 C3.1 VALLEY GUTTER & CURB TURN FILLET
NTS



NOTE:
1. BEGIN AT THE LOCATION WHERE THE WATTLE IS TO BE INSTALLED BY EXCAVATING A 2"-3" DEEP BY 9" WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UP-SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE WATTLE IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE WATTLE ON THE UPHILL SIDE. ADJACENT WATTLES SHOULD TIGHTLY ABUT.
3. SECURE THE WATTLE WITH 18"-24" STAKES EVERY 3'-4' AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE LEAVING AT LEAST 2"-3" OF STAKE EXTENDING ABOVE THE WATTLE. STAKES SHOULD BE DRIVEN PERPENDICULAR TO SLOPE FACE.
4. EROSION CONTROL PLAN AND LOCATION OF STRAW WATTLES SHALL BE APPROVED BY THE TOJ PUBLIC WORKS DEPARTMENT.

8 C3.1 STRAW WATTLE DETAIL
NTS

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	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

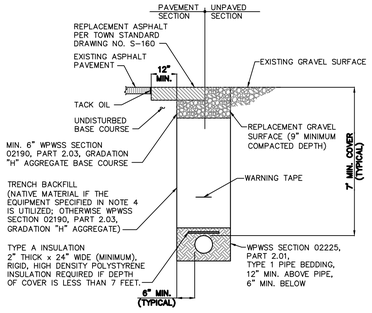
PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

18105	Project No.
JL	Drawn By
AJ	Checked By

Discipline C
Drawing No. 3.0

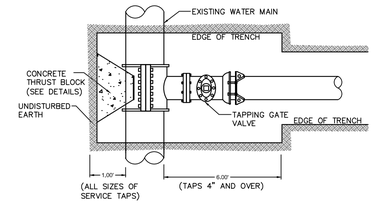
Drawing Name
PEDESTRIAN DETAILS



NOTES:

1. TRENCH BACKFILL BELOW THE SURFACE SHALL MEET THE FOLLOWING CRITERIA:
   - 95% MODIFIED PROCTOR DENSITY WITHIN STREET AND ALLEY RIGHTS-OF-WAY.
   - 90% MODIFIED PROCTOR DENSITY OUTSIDE STREET AND ALLEY RIGHTS-OF-WAY.
2. COMPACTION OF TRENCH BACKFILL SHALL BE CARRIED OUT WITH A HOE-PACK OR A SHEEPSFOOT ROLLER ON A BACK-HOE ARM.
3. PIPE BEDDING SHALL BE PLACED IN 6" LIFTS AND THOROUGHLY COMPACTED TO PROVIDE UNIFORM PIPE SUPPORT.
4. ALL TRENCH EXCAVATION SHALL CONFORM TO WYOMING OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (WYOSHA) REGULATIONS.
5. FOR WATER MAINS 8" OR LARGER IN DIAMETER, PIPE MATERIAL SHALL BE DUCTILE IRON, CLASS 50, OR APPROVED SUBSTITUTE.
6. FOR WATER MAINS 6" OR SMALLER IN DIAMETER, PIPE MATERIAL SHALL BE DUCTILE IRON, CLASS 52, OR APPROVED SUBSTITUTE.

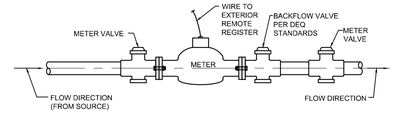
1 / C3.2 WATER & SEWER TRENCH
NTS



NOTES:

1. THE TOWN SHALL COMPLETE THE TAPPING OF THE MAIN. NO OTHER PERSONS SHALL COMPLETE TAP WITHOUT CONSENT OF TOWN. ALL OTHER WATER MAIN WORK SHALL BE THE RESPONSIBILITY OF THE OWNER.
2. TRENCH WILL BE EXCAVATED TO MEET ALL WYOSHA STANDARDS PRIOR TO TAPPING.

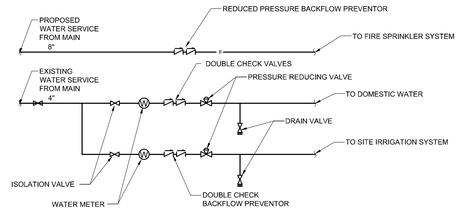
2 / C3.2 WATER MAIN TAPPING
NTS



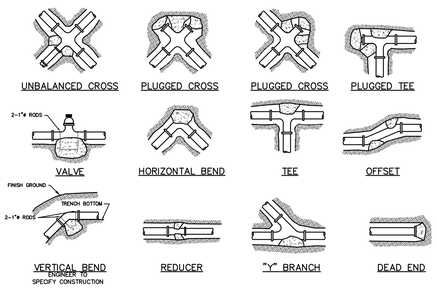
NOTES:

1. SERVICE PIPE MATERIAL SHALL MEET ADOPTED PLUMBING CODE REQUIREMENTS.
2. METER SHALL BE INSTALLED IN HORIZONTAL ALIGNMENT ONLY.
3. CONNECTIONS WITHIN THE ASSEMBLY SHALL BE THREADED OR BOLTED FLANGED, AS APPROPRIATE.

3 / C3.2 WATER METER INSTALLATION
NTS



4 / C3.2 WATER SERVICE FIRE ENTRY DETAIL
NTS

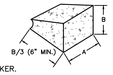


MINIMUM DIMENSIONS FOR THRUST BLOCKING

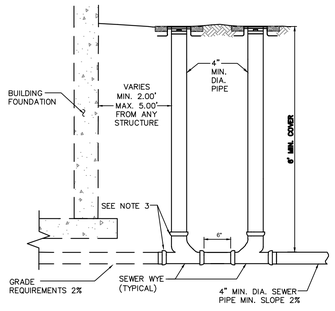
FITTING SIZE	TEES & PLUGS		90° BENDS		45° BENDS & WYES		REDUCERS & 22 1/2° BENDS		11 1/4° BENDS	
	A	B	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"	0'-6"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-0"	1'-10"	1'-7"	1'-9"	0'-10"	1'-0"	0'-6"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"	1'-0"	1'-0"
10"	3'-4"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"	1'-6"	1'-0"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-6"	3'-3"	2'-7"	2'-3"	2'-0"	1'-0"
14"	5'-3"	3'-10"	6'-6"	4'-11"	4'-9"	3'-5"	3'-5"	2'-5"	2'-0"	1'-6"
20"	5'-0"	5'-0"	6'-0"	6'-0"	5'-0"	4'-0"	3'-6"	3'-0"	3'-0"	2'-0"
24"	6'-0"	6'-0"	7'-0"	7'-0"	5'-0"	5'-0"	4'-6"	3'-0"	3'-0"	3'-0"
30"	7'-6"	7'-6"	8'-0"	8'-0"	6'-3"	6'-3"	4'-9"	4'-6"	3'-3"	3'-3"

NOTES:

1. SIZE OF BLOCK SHALL BE A MINIMUM OF 6" THICK.
2. ALL BLOCKING SHALL BEAR AGAINST UNDISTURBED MATERIAL.
3. FITTINGS SHALL BE SEPARATED FROM THRUST BLOCK WITH AN APPROVED BOND BREAKER.
4. DESIGN IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING CAPACITY.



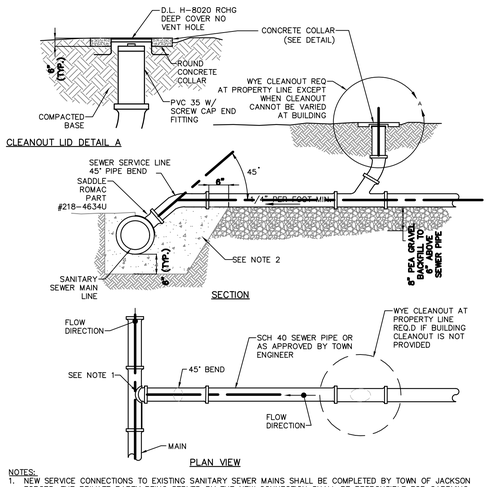
5 / C3.2 THRUST BLOCK DETAIL
NTS



NOTES:

1. INSPECTION: PRIOR TO BACKFILL SECURE ACCEPTANCE BY THE TOWN PUBLIC WORKS DEPARTMENT FOR ALL PIPE, FITTINGS, COUPLINGS AND GRADE.
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER TOWN PUBLIC WORKS DEPARTMENT STANDARD SPECIFICATIONS AND AS SHOWN WITHIN THE TRENCH DETAIL.
3. ALL PVC FITTINGS SHALL MEET ASTM D.3034 SPECIFICATIONS, AND SHALL ALSO MEET ASTM D.312 SPECIFICATIONS FOR RUBBER GASKETED BELL AND SPIGOT TYPE WITH INTEGRAL BELL.

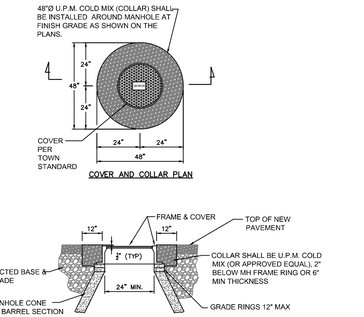
6 / C3.2 SEWER CLEANOUT DETAIL
NTS



NOTES:

1. NEW SERVICE CONNECTIONS TO EXISTING SANITARY SEWER MAINS SHALL BE COMPLETED BY TOWN OF JACKSON FORCES. THE PRIVATE PARTY BEING SERVED BY THE NEW CONNECTION SHALL BE RESPONSIBLE FOR CARRYING OUT BACKFILL OPERATIONS.
2. BACKFILL OPERATIONS AT NEW SERVICES CONNECTED TO EXISTING SANITARY SEWER MAINS SHALL UTILIZE CEMENT TREATED FILL ("FLOWABLE FILL") CONFORMING TO WPWSS SECTION 02225, PART 2.01B AT THE POINT OF CONNECTION.

7 / C3.2 SERVICE CONNECTION TO EXISTING SEWER MAIN DETAIL
NTS



NOTES:

1. ADJUST MANHOLE UPWARD WITH ADJUSTING RINGS UNDER FRAME. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER HEIGHT. SLOPE MANHOLE RING AS REQUIRED TO MATCH STREET GRADE AND CROSS SLOPE. MAKE FINAL MANHOLE ADJUSTMENT AFTER PAVING AND BEFORE SEAL COATING.
2. IF MANHOLE IS WITHIN UNPAVED AREA USE TAPERED COLLAR. SEE TOWN SANIATRY SEWER DETAIL SS-110.

8 / C3.2 MANHOLE ADJUSTMENT DETAIL
NTS

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	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

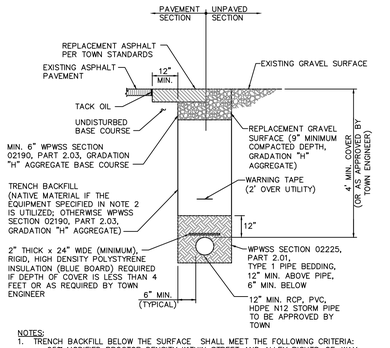
PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

18105	Project No.
JL	Drawn By
AJ	Checked By

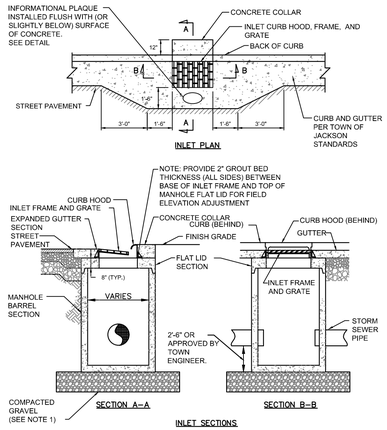
Discipline Drawing No.
C 3.1

Drawing Name
WATER & SEWER DETAILS



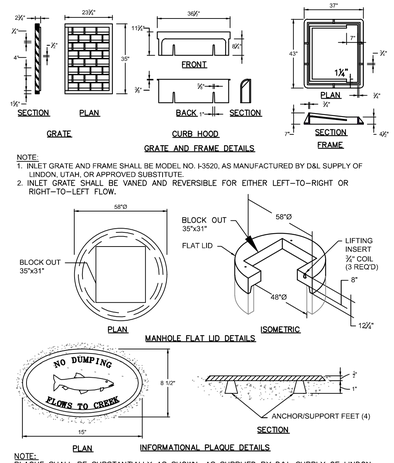
NOTES:
1. TRENCH BACKFILL BELOW THE SURFACE SHALL MEET THE FOLLOWING CRITERIA:
   – 95% MODIFIED PROCTOR DENSITY WITHIN STREET AND ALLEY RIGHTS–OF–WAY.
   – 90% MODIFIED PROCTOR DENSITY OUTSIDE STREET AND ALLEY RIGHTS–OF–WAY.
2. COMPACTION OF NATIVE TRENCH BACKFILL, WITH ALL ROCK LARGER THAN 6" REMOVED, SHALL BE CARRIED OUT IN 2' LIFTS WITH A HOE–PACK OR A VIBRATORY SHEEPS FOOT ROLLER (COMPACTION METHOD AND EQUIPMENT SHALL BE REVIEWED AND APPROVED BY TOWN ENGINEER PRIOR TO BACKFILLING).
3. PIPE BEDDING SHALL BE PLACED IN 6" LIFTS AND THOROUGHLY COMPACTED WITH A JUMPING JACK TO PROVIDE UNIFORM PIPE SUPPORT.
4. UNLESS OTHERWISE DIRECTED, ALL BASE COURSE AND GRAVEL SURFACE REPLACEMENT SHALL BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.
5. ALL TRENCH EXCAVATION SHALL CONFORM TO WYOMING OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (WOSHA) REGULATIONS.

1 / C3.3 STORM SEWER TRENCH
NTS



NOTES:
1. GRAVEL SHALL BE EIGHT INCH MINIMUM THICKNESS, CONFORM TO WPWSS SECTION 02190, PART 2.03, GRADING H, AND BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.

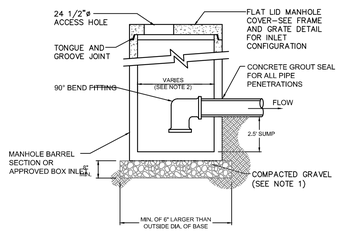
2 / C3.3 CURB INLET DETAIL
NTS 1 OF 2



NOTE:
1. INLET GRATE AND FRAME SHALL BE MODEL NO. I-3520, AS MANUFACTURED BY D&L SUPPLY OF LINDON, UTAH, OR APPROVED SUBSTITUTE.
2. INLET GRATE SHALL BE VANED AND REVERSIBLE FOR EITHER LEFT–TO–RIGHT OR RIGHT–TO–LEFT FLOW.

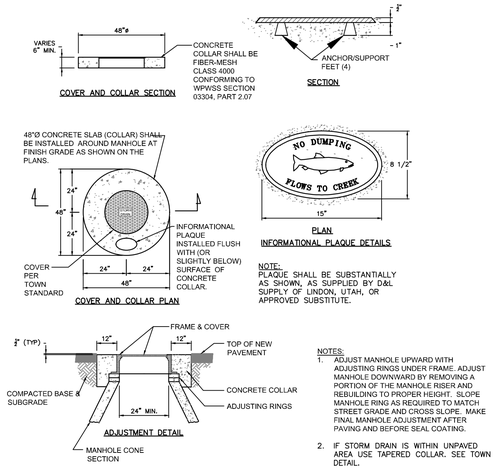
NOTE:
PLAQUE SHALL BE SUBSTANTIALLY AS SHOWN, AS SUPPLIED BY D&L SUPPLY OF LINDON, UTAH, OR APPROVED SUBSTITUTE.

3 / C3.3 CURB INLET DETAIL
NTS 2 OF 2



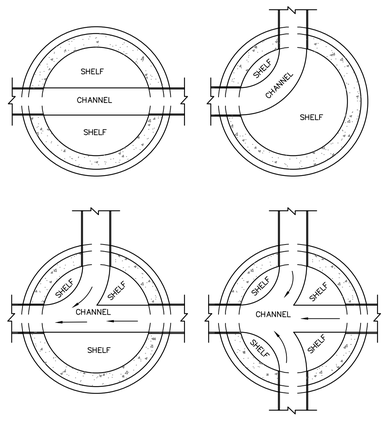
NOTES:
1. GRAVEL SHALL BE EIGHT INCH MINIMUM THICKNESS, CONFORM TO WPWSS SECTION 02190, PART 2.03, GRADING H, AND BE INSTALLED PER WPWSS SECTION 02231, PART 3.03.
2. ALL DIMENSIONS TO BE APPROVED BY THE TOWN PUBLIC WORKS DEPARTMENT.
3. MANHOLE COVER SHALL BE DESIGNED FOR H20S LOADING.
4. SEE DETAIL FOR CAST IRON FRAME AND COVER.
5. SEE ADJUSTMENT AND COLLAR DETAIL.

4 / C3.3 CATCH BASIN INLET DETAIL
NTS



NOTES:
1. ADJUST MANHOLE UPWARD WITH ADJUSTING RINGS UNDER FRAME. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER HEIGHT. SLOPE MANHOLE RING AS REQUIRED TO MATCH STREET GRADE AND CROSS SLOPE. MAKE FINAL MANHOLE ADJUSTMENT AFTER PAVING AND BEFORE SEAL COATING.
2. IF STORM DRAIN IS WITHIN UNPAVED AREA USE TAPERED COLLAR. SEE TOWN DETAIL.

5 / C3.3 STORM DRAIN MANHOLE COLLAR AND PLAQUE DETAILS
NTS



NOTES:
1. SLOPE ALL SHELVES TO CHANNEL AT 1" PER FOOT.
2. SEE PLAN–PROFILE SHEETS FOR SLOPE OF CHANNEL.

6 / C3.3 MANHOLE CHANNEL DETAILS
NTS

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PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

18105	Project No.
JL	Drawn By
AJ	Checked By

Discipline Drawing No.
C 3.2

Drawing Name
STORMWATER DETAILS



GLENWOOD GILL CONDOMINIUMS

165 AND 185 GLENWOOD STREET
JACKSON, WYOMING 83001

LEGEND

- (A) Parallel Parking
- (B) Pavers with Trees in Grates (Per TOJ Std.)
- (C) Pedestrian Sidewalk
- (D) Bike Racks
- (E) Courtyard Circulation
- (F) Private Courtyard
- (G) Raised Planter w/ Trees
- (H) Raised Planters w/ Ornamental Grasses/ Perennials
- (I) Trash
- (J) Entrance to Units from Gill and Glenwood
- (K) Access to Underground Parking Garage
- (L) Existing Diagonal Parking
- (M) Benches
- (N) Trees in Lawn
- (O) Cobble
- (P) Asphalt Paving

HERSHBERGER DESIGN
Landscape Architecture · Environmental Planning · Urban Design
560 South Glenwood P.O. Box 1648 Jackson, Wyoming 83001 T:307.739.1001 F:307.734.8322

Issue Date:

· 10.31.2019 FDP SUBMISSION

Drawing Title:

SITE RENDERING

Drawing Number:

L0.1

Scale:

0 8 16 32 48 64 80
1"=16'

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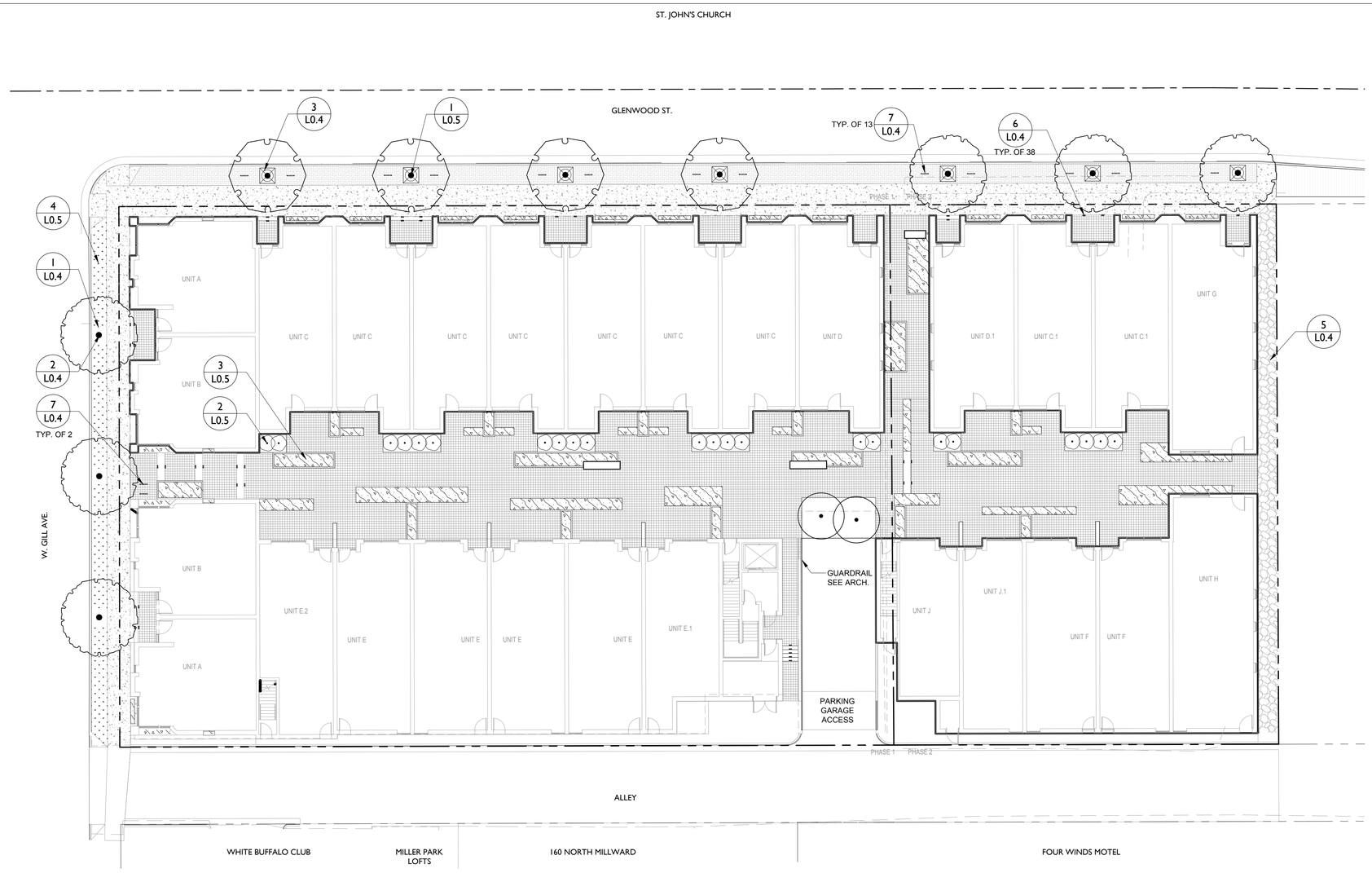

DETAIL REPORT

NUMBER	TITLE
1/L0.4	STEEL EDGER
2/L0.4	TREE PLANTER DIMENSIONS
3/L0.4	TREE WELL WITH GRATE
4/L0.4	ROOT BARRIER
5/L0.4	COBBLE MULCH
6/L0.4	STEP LIGHT
7/L0.4	BIKE RACK
1/L0.5	DECIDUOUS TREE PLANTING
2/L0.5	SHRUB PLANTING
3/L0.5	ORNAMENTAL GRASS PLANTING
4/L0.5	GRASS SOD

GLENWOOD GILL CONDOMINIUMS

165 AND 185 GLENWOOD STREET
JACKSON, WYOMING 83001

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- ROAD CENTERLINE
- PROPOSED CURB
- CONCRETE SIDEWALK
- COURTYARD PAVEMENT
- PAVERS
- RAISED PLANTER (METAL OR CONCRETE)
- TREE GRATE (PER TOJ STANDARD)
- BIKE RACK (INVERTED 'U' STYLE)

PLANT SCHEDULE

TREES	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
	Fraxinus pennsylvanica `Patmore` `Patmore` Ash	3" Cal.	B&B	4
	Populus tremuloides Quaking Aspen	3" Cal.	B&B	2
	Ulmus americana 'New Horizon' New Horizon American Elm	3" Cal.	B&B	6
SHRUBS	**BOTANICAL NAME / COMMON NAME**	**CONT**	**SIZE**	**QTY**
	Spiraea betulifolia 'Tor Gold' / Glow Girl Birchleaf Spirea	5 Gal.		22
GROUND COVERS	**BOTANICAL NAME / COMMON NAME**	**CONT**	**SPACING**	**QTY**
	Ornamental Grasses - Species TBD	1 Gal.	24" O.C.	400

GENERAL NOTES

ZONING DISTRICT: DC (DOWNTOWN CORE)
Plant Unit Requirement: N/A per 2.2 & 2.2.2
Landscape Surface Requirement: N/A
Pedestrian Frontage Proposed:
Glenwood Street: *Trees in Grates*
Gill Avenue: *Trees in Lawn*

BICYCLE PARKING PROPOSED: 30
VEHICLE PARKING PROPOSED: SEE CIVIL/ARCH
TRASH: SEE ARCH.

PLANTING & IRRIGATION NOTES

1. Refer to Civil Engineer's utility and grading plans. If site conditions vary from what is shown, contact the Landscape Architect and Civil Engineer for direction before proceeding.
2. Verify locations and timing of site improvements installed under other sections. If any part of the work cannot be completed due to site conditions, contact the Landscape Architect for direction before proceeding.
3. Excavation near underground utilities shall be done carefully and, if necessary, by hand. The Contractor is fully responsible for this work and any disruption to utilities or damage to the site and/or improvements shall be repaired immediately at no expense to the Owner.
4. Obtain approval of finish grading from Landscape Architect prior to installing any plant material. The finish grades of planting areas and lawns shall be 1½" below adjacent edging or paving. Confirm mulch depth and whether lawns are to be seed or sod.
5. Confirm all plant counts and square footages. Quantities shown are provided as Owner information only. If quantities indicated in the plant list differ from symbols shown on the plans, then the plans shall govern the plant count.
6. Contractor to verify suitability of native or imported topsoil. Suitable topsoil shall be free of roots, plants, sod, stones greater than ½" in any dimension, clay lumps, and other extraneous materials detrimental to plant growth.
7. For areas to receive sod or seed and/or to produce planting soil for areas indicated on details, amend suitable topsoil with organic compost to a ratio of 1 part compost to 4 parts topsoil by volume.
8. Compost shall be organic, well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.0; moisture content 35 to 55 percent by weight, with organic matter content 50 to 60 percent of dry weight with 16-16-8 nutrient composition. If compost is not 16-16-8 composition, add commercial fertilizer in necessary quantities to meet 16-16-8 nutrient composition. Source: Glacier Gold Compost or approved equal.
9. Contractor to supplement existing native surface topsoil as necessary. Obtain supplemental topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep. Do not obtain from agricultural lands, bogs, or marshes.
10. Compost mulch shall be organic, well-composted, stable, and weed-free organic matter, pH range of 5.5-8.0; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not to exceed 0.5 percent inert contaminants and free of substances toxic to planting, organic matter content 50 to 60 percent of dry weight. Source: Glacier Gold Compost or approved equal.
11. The Landscape Architect shall review all plant materials at the source or nursery or by photographs provided by Contractor prior to shipment. The Landscape Architect reserves the right to reject any unacceptable plant material either at the source or when delivered to the project site.
12. Carefully align and space plant materials as indicated in these notes, drawings, and details. The final location of plant materials is to be approved by the Landscape Architect on site prior to installation. The Contractor is responsible for staking or marking the location of all plant materials on site for review by the Landscape Architect. The Landscape Architect reserves the right to adjust the exact locations of plants on site.
13. All plants shall be planted at the same level with relation to finish grade as they were grown in the field or nursery.
14. No pruning of existing or newly planted trees or shrubs shall be allowed without the direction and approval of the Landscape Architect.
15. For ball & burlap trees, remove burlap from top ⅓ of rootball and entire wire basket as tree pits are backfilled.
16. All installed trees shall be staked. The Landscape Architect shall review and reserves the right to reject the method and/or installation of tree staking and guying systems prior to acceptance.
17. During construction and prior to final acceptance, Contractor shall observe the project site for the growth of noxious weeds. Contractor shall report the growth of noxious weeds to the Teton County Weed and Pest District Office. Contractor and Owner shall implement a weed control program to control noxious weeds.

LANDSCAPE PLANT COST ESTIMATE

All landscaping will comply with Div. 5.5 of Town of Jackson LDR's. The landscape bond amount is based off of the following cost estimate:

PLANTS	SIZE	UNIT COST	QTY	TOTAL
Patmore Ash	3" Cal	$400	4	$1,600.00
Quaking Aspen	3" Cal	$400	2	$800.00
New Horizon Elm	3" Cal	$400	6	$2,400.00
Glow Girl Birchleaf Spirea	5 Gal	$55	22	$1,210.00
Ornamental Grasses	1 Gal	$12	400	$4,800.00
		TOTAL LANDSCAPE COST ESTIMATE		$10,810
IRRIGATION				
Estimated Cost to Irrigate				$5,000
TOTAL COST OF PLANTS + IRRIGATION				$15,810
TOTAL COST x 125% FOR BOND AMOUNT				**$19,762.50**

SITE LIGHTING SCHEDULE

SYMBOL	MODEL	QTY	LIGHT COLOR
	BEGA LED RECESSED WALL LUMINAIRES SHIELDED W/ LOUVERS MODEL 22 196 K27 (COLOR/FINISH TBD)	38	2700k

NOTES:
1. Light symbols are not to scale.
2. See Architecture and Electrical drawings for all circuitry/control/conduit, etc. and ALL exterior lighting associated with the building.

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DANNY HERSHBERGER LA-0033C STATE OF WYOMING

Drawing Title:

PLANTING & EXTERIOR SITE LIGHTING PLAN

Drawing Number:

L0.2

Scale:

0 8 16 32 48 64 80
1"=16'

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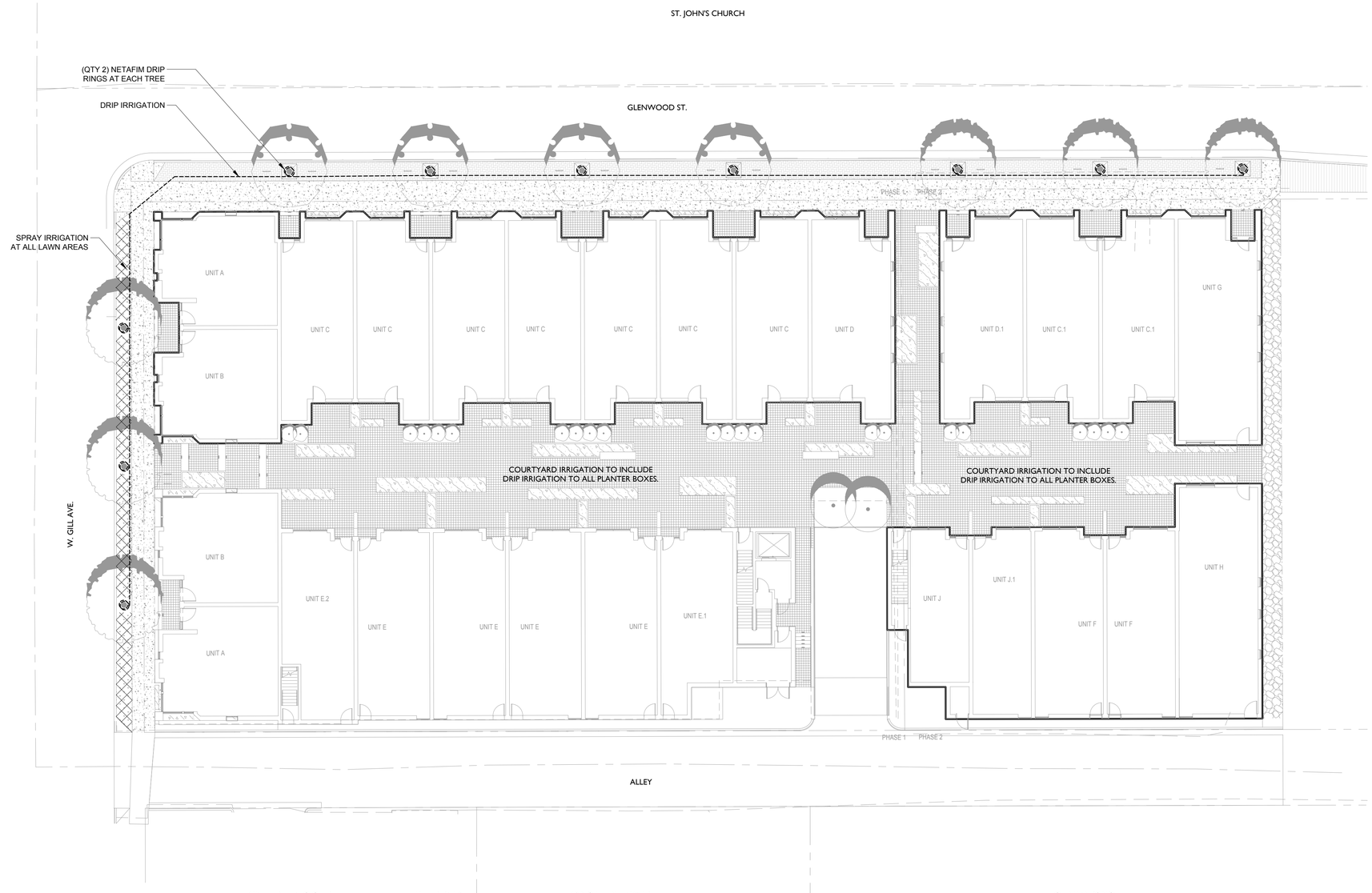

IRRIGATION NOTES

1. All plant material shall be irrigated by a pressurized subsurface irrigation system with automatic controller. All trees, shrubs, and perennials shall be drip irrigated and all turf areas shall be irrigated with a spray system. Irrigation system shall be design-build by Contractor based on the specifications identified on this irrigation intent plan. Contractor shall provide an irrigation shop-drawing for review by Landscape Architect before proceeding. Contractor shall demonstrate full system coverage prior to acceptance and before plant material installation. Contractor shall provide a reproducible as-built drawing of installed irrigation system at conclusion of project.
2. The irrigation system shall be operational prior to plant installation or temporary irrigation measures shall be provided in the interim. The method of temporary irrigation shall be approved by the Landscape Architect prior to plant material installation.
3. All irrigation within Right of Way to be installed per Teton County/Jackson Parks & Recreation specifications.
4. Irrigation Main Line shall be HDPE DR-11, size TBD by contractor based on required GPM and pressure.
5. Irrigation controller shall be located in the mechanical room of the building. Exact location to be determined in coordination with architect, mechanical engineer and landscape architect.
6. Point of irrigation connection and backflow preventer location to be determined in coordination with architect, mechanical engineer and landscape architect. Backflow Preventer specification TBD by landscape contractor and plumber and shall be installed by a licensed plumber and meet Teton County / Jackson Parks & Recreation specifications. If backflow preventer is located in an exterior location, an appropriate enclosure (Hot-Box or similar) shall be provided.
7. Irrigation sleeving shall be PVC Class 160 pipe.
8. Irrigation lateral lines shall be #100 NSF.
9. Irrigation spray heads within the lawn area along Gill Avenue shall be Rainbird #1804 Pop-Up Spray Heads.
10. Qty (2) Netafim drip rings shall be installed at each tree location shown on the plans.
11. Irrigation valves shall be Rain Bird EFB-CO Series valves for all spray zones and Rain Bird XCZ-100-PRF for all drip zones. Utilize a two-wire decoder system for all irrigation valves. All Irrigation valves for irrigation associated with the streetscapes along Glenwood and Gill (including drip and spray zones) shall be installed in the grass area along Gill Avenue. Coordinate exact locations with Landscape Architect prior to installation.
12. Install a manual drain valve at the termination of the mainline at all dead ends. Manual drain valve shall be set in a 10" round valve box and shall allow a $\frac{3}{4}$" globe valve to be opened to allow the water in the pressurized mainline to be blown out (after water supply is shut off) through the manual drain valve. Following the main line being blown out, each lateral and drip zone can then be winterized.

GLENWOOD GILL CONDOMINIUMS

165 AND 185 GLENWOOD STREET
JACKSON, WYOMING 83001

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- ROAD CENTERLINE
- PROPOSED CURB
- CONCRETE SIDEWALK
- COURTYARD PAVEMENT
- PAVERS
- RAISED PLANTER (METAL OR CONCRETE)
- TREE GRATE (PER TOJ STANDARD)
- BIKE RACK (INVERTED 'U' STYLE)

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Drawing Title:

IRRIGATION PLAN

Drawing Number:

L0.3

Scale:

0 8 16 32 48 64 80
1"=16'

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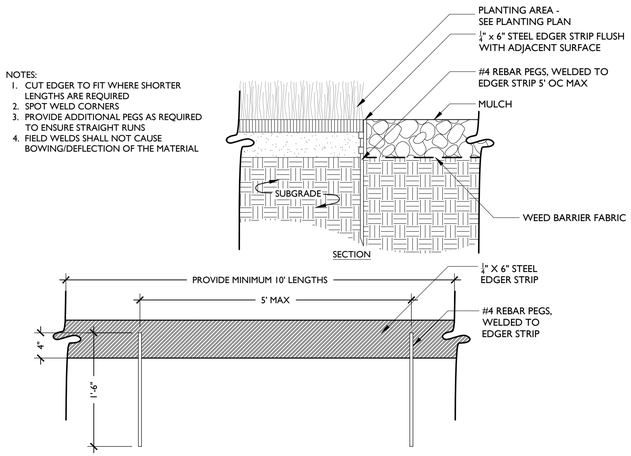
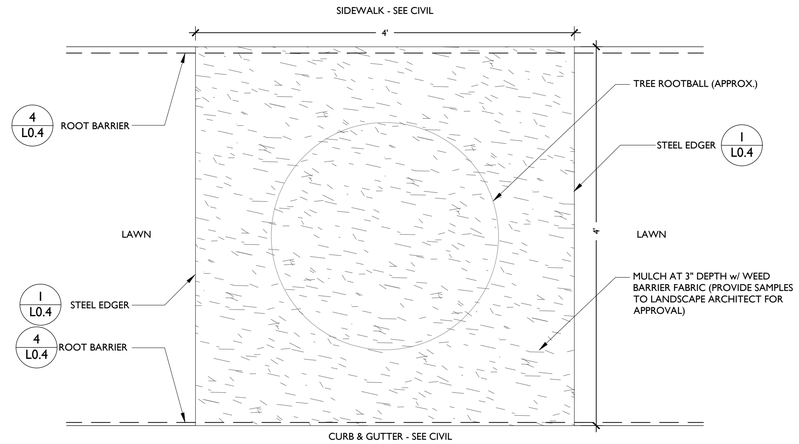


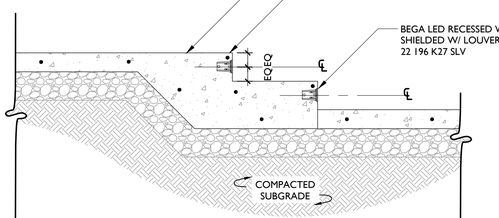
1 STEEL EDGER

1" = 1'-0"



2 TREE PLANTER DIMENSIONS

1" = 1'-0"

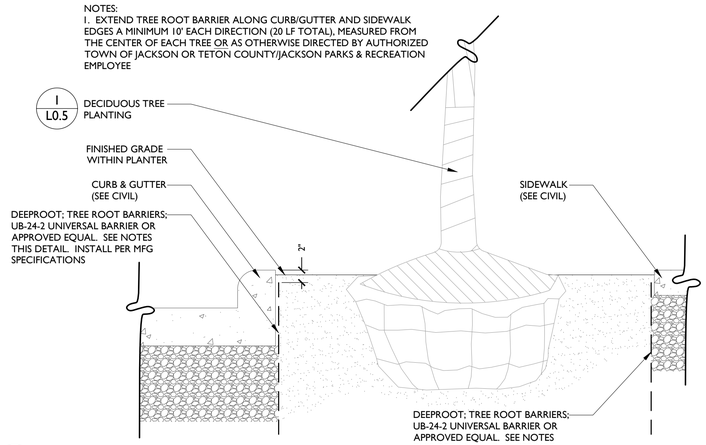


NOTE

1. TREE GRATE SHALL BE 4' SQUARE FAN, MADE OF GREY IRON WITH A RAW NATURAL FINISH, MANUFACTURED BY URBAN ACCESSORIES, OR APPROVED EQUAL. SEE MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION.
2. TREE GRATE FRAME SHALL BE 4' SQUARE TYPE "P", PEDESTRIAN DUTY, MANUFACTURED BY URBAN ACCESSORIES, OR APPROVED EQUAL. SEE MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION.
3. CONCRETE TREE WELL AND TREE FRAME GRATE SHALL BE SQUARE AND CENTERED WITHIN THE 5' BUFFER ZONE. FORMS FOR THE TREE WELL SHALL BE SET AFTER COMPLETION OF THE CURB AND GUTTER AND SIDEWALK.

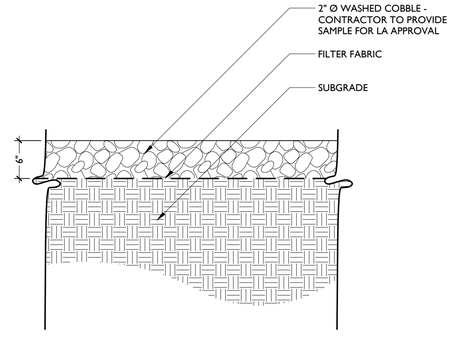
3 TREE WELL WITH GRATE

NOT TO SCALE



4 ROOT BARRIER

1" = 1'-0"

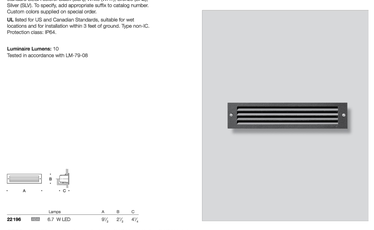


5 COBBLE MULCH

1" = 1'-0"

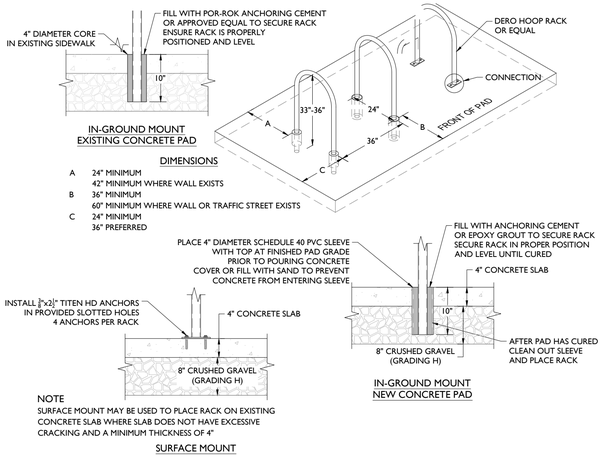
6 STEP LIGHT

3/4" = 1'-0"



7 BIKE RACK

NOT TO SCALE



GLENWOOD GILL CONDOMINIUMS

165 AND 185 GLENWOOD STREET
JACKSON, WYOMING 83001

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Drawing Title:

LANDSCAPE DETAILS

Drawing Number:

L0.4

Scale:

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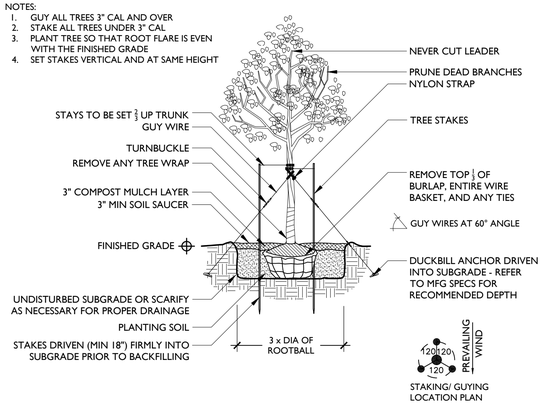
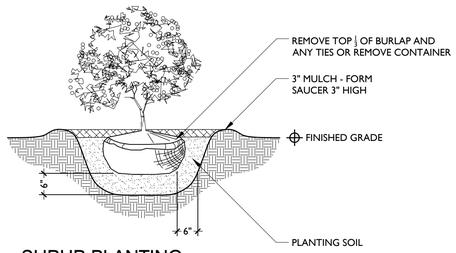
NOTES:
1. GUY ALL TREES 3" CAL AND OVER
2. STAKE ALL TREES UNDER 3" CAL
3. PLANT TREE SO THAT ROOT FLARE IS EVEN WITH THE FINISHED GRADE
4. SET STAKES VERTICAL AND AT SAME HEIGHT



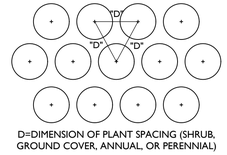
1 DECIDUOUS TREE PLANTING

1/4" = 1'-0"

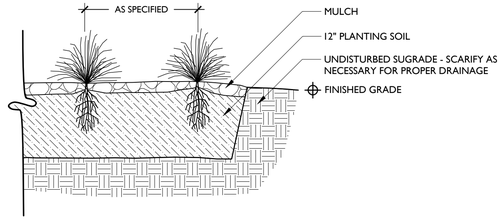


2 SHRUB PLANTING

1/2" = 1'-0"

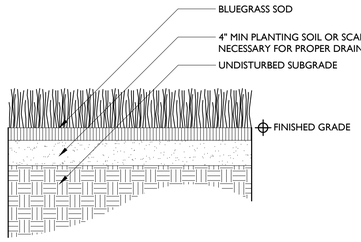


D=DIMENSION OF PLANT SPACING (SHRUB, GROUND COVER, ANNUAL, OR PERENNIAL)



3 ORNAMENTAL GRASS PLANTING

1" = 1'-0"



4 GRASS SOD

1" = 1'-0"

GLENWOOD GILL CONDOMINIUMS

165 AND 185 GLENWOOD STREET
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Drawing Title:

LANDSCAPE DETAILS

Drawing Number:

L0.5

Scale:

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PO Box 9550
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307.733.5150

BY: JK
Date: 10.23.2019

Average Day Occupancy Rate [1]	50%
Max Day Factor [1], MDF	2.72
Peak Hour Factor [2], PHF	4

WATER DEMAND						
	a		b	c=a*b	d=MDF*c	e=d/1440 * PHF
	Quantity	Unit	Average gpd/unit	Average TOTAL, gpd	Maximum TOTAL, gpd	PEAK HOUR, gpm
Condo, 2 Bedroom	2	Bedroom	125	500	1360	3.8
Condo, 3 Bedroom	27	Bedroom	125	10125	27540	76.5
			Subtotal Housing	10,625	28,900	80.3

FIRE SUPPRESSION						
Total Building Size	Building Type	Required Pressure [4]	Required Duration [4]	Total Fire Flow [4]	Sprinkler Reduction [5]	Adjusted Fire Flow [5]
(SF)	(IBC)	(psi)	(hours)	(gpm)	(%)	(gpm)
120,000	IV	20	4	6250	75%	1563

Note:

[1] Based on daily rates from the WYDEQ CH 12, Section 8

[2] Peak Hour Factor based on busiest hour occuring during the busiest quarter of the day.

[3] IFC - Appendix B, Table B105.1, Type III-B

[4] IFC - Appendix B, Section B105.2, 75% reduction for automatic sprinkler systems, minimum 1500 gpm

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BY: JK
Date: 10.23.2019

Bear Development					
WATER DEMAND - M22 FIXTURE CALCULATION					
	Fixture	**No. Units**	**Fixtures per Unit[2]**	**Fixture Value[1]**	**Fixture Value**
H	Lavatory Sink	1	6	1.5	9
	Shower	1	1	2.5	3
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4
F	Lavatory Sink	2	4	1.5	12
	Bath Tub	2	3	8	48
	Toilet	2	3	6	36
	Kitchen Sink	2	1	1.8	4
	Dishwasher	2	1	1.3	3
	Laundry (washer)	2	2	3	12
	Utility Sink	2	1	4	8
E1	Lavatory Sink	1	5	1.5	8
	Shower	1	1	2.5	3
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4
E	Lavatory Sink	4	5	1.5	30
	Shower	4	4	2.5	40
	Bath Tub	4	3	8	96
	Toilet	4	1	6	24
	Kitchen Sink	4	1	1.8	7
	Dishwasher	4	1	1.3	5
	Laundry (washer)	4	2	3	24
	Utility Sink	4	1	4	16

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Bear Development					
WATER DEMAND - M22 FIXTURE CALCULATION					
	Fixture	**No. Units**	**Fixtures per Unit[2]**	**Fixture Value[1]**	**Fixture Value**
E2	Lavatory Sink	1	5	1.5	8
	Bath Tub	1	3	8	24
	Shower	1	1	2.5	3
	Toilet	1	4	6	24
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	0	4	0
A	Lavatory Sink	2	4	1.5	12
	Shower	2	1	2.5	5
	Toilet	2	3	6	36
	Bath Tub	2	3	8	48
	Kitchen Sink	2	1	1.8	4
	Dishwasher	2	1	1.3	3
	Laundry (washer)	2	2	3	12
	Utility Sink	2	1	4	8
B	Lavatory Sink	2	4	1.5	12
	Shower	2	1	2.5	5
	Bath Tub	2	2	8	32
	Toilet	2	3	6	36
	Kitchen Sink	2	1	1.8	4
	Dishwasher	2	1	1.3	3
	Laundry (washer)	2	2	3	12
	Utility Sink	2	1	4	8
C	Lavatory Sink	7	5	1.5	53
	Shower	7	1	2.5	18
	Bath Tub	7	3	8	168
	Toilet	7	4	6	168
	Kitchen Sink	7	2	1.8	25
	Dishwasher	7	1	1.3	9
	Laundry (washer)	7	2	3	42
	Utility Sink	7	1	4	28
D	Lavatory Sink	1	5	1.5	8
	Shower	1	1	2.5	3
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	2	1.8	4
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4

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Bear Development					
WATER DEMAND - M22 FIXTURE CALCULATION					
	Fixture	**No. Units**	**Fixtures per Unit[2]**	**Fixture Value[1]**	**Fixture Value**
D1	Lavatory Sink	1	5	1.5	8
	Shower	1	1	2.5	3
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	2	1.8	4
	Dishwasher	1	2	1.3	3
	Laundry (washer)	1	1	3	3
	Utility Sink	1	1	4	4
C1	Lavatory Sink	2	5	1.5	15
	Shower	2	1	2.5	5
	Bath Tub	2	3	8	48
	Toilet	2	4	6	48
	Kitchen Sink	2	2	1.8	7
	Dishwasher	2	1	1.3	3
	Laundry (washer)	2	2	3	12
	Utility Sink	2	1	4	8
G	Lavatory Sink	1	5	1.5	8
	Shower	1	1	2.5	3
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	2	1.8	4
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4
J1	Lavatory Sink	1	4	1.5	6
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4
J	Lavatory Sink	1	5	1.5	8
	Bath Tub	1	3	8	24
	Toilet	1	4	6	24
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	2	3	6
	Utility Sink	1	1	4	4

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Bear Development					
WATER DEMAND - M22 FIXTURE CALCULATION					
	Fixture	**No. Units**	**Fixtures per Unit[2]**	**Fixture Value[1]**	**Fixture Value**
I	Lavatory Sink	1	3	1.5	5
	Bath Tub	1	2	8	16
	Toilet	1	3	6	18
	Kitchen Sink	1	1	1.8	2
	Dishwasher	1	1	1.3	1
	Laundry (washer)	1	1	3	3
	Utility Sink	1	0	4	0

TOTAL FIXTURE VALUE	1,867
Probable Water Flow Demand (AWWA M22 - Figure 4-3)	70
Design Pressure Adjustment Factor (AWWA M22 - 60 psi)	1.00
Adjusted Probable Demand (gpm)[3]	**70**

Note:

[1] Fixture Value based on AWWA M22

[2] Fixture count based 10.25.2019 program

[3] Domestic use only, no irrigation

JORGENSEN ASSOCIATES, PC
PO Box 9550
Jackson, WY 83002
307.733.5150

BY: JK
Date: 10.23.2019

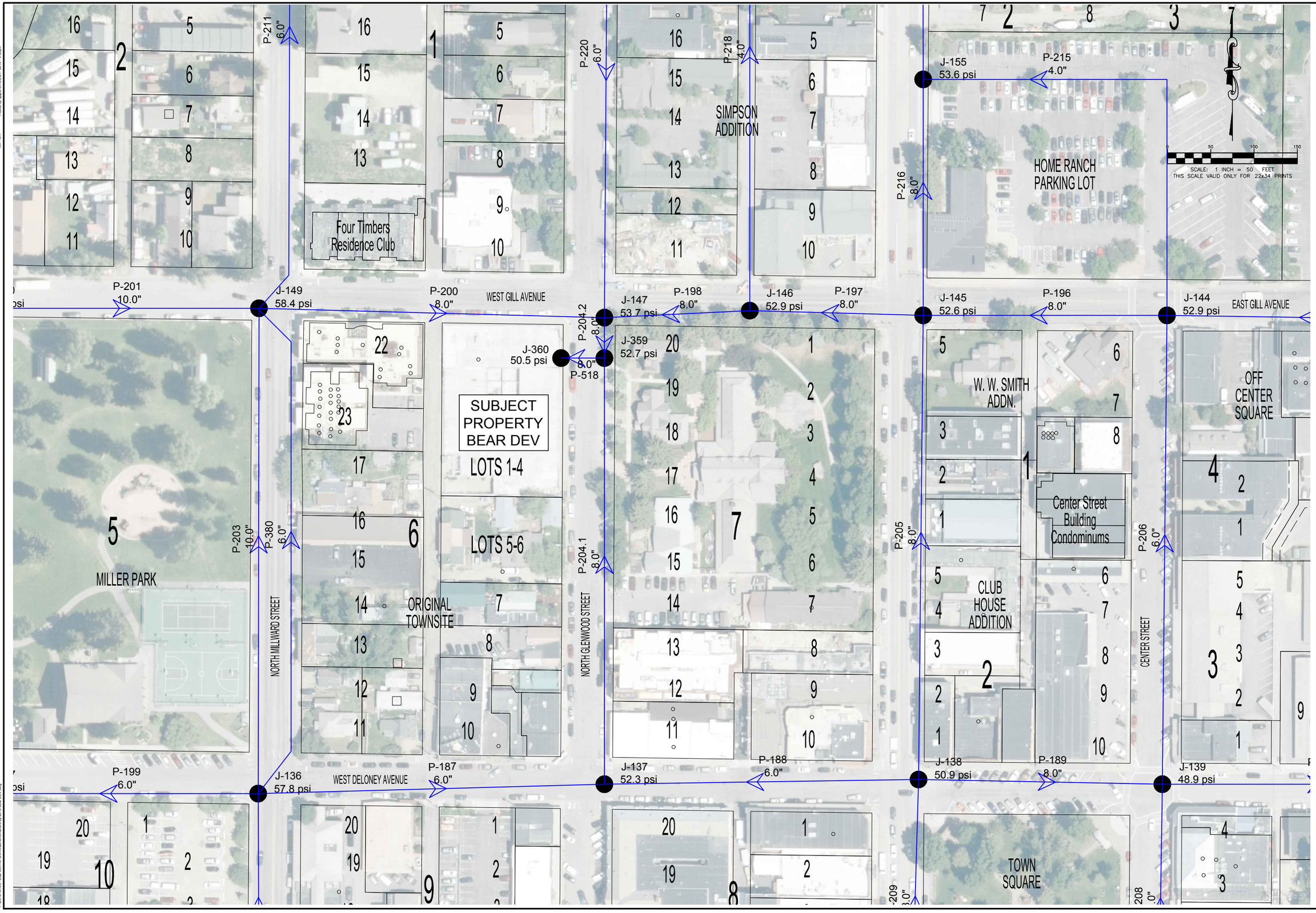
Average Daily Flow	60%
Peak Hour Factor	4

SANITARY SEWER DEMAND							
Unit Type			No. of Units[2]	Max Flow per Bedroom, gpd[1]	Average TOTAL, gpd	Maximum TOTAL, gpd	PEAK HOUR, gpm
H	3	Bedroom	1	150	270	450	1.3
F	3	Bedroom	2	150	540	900	2.5
E1	3	Bedroom	1	150	270	450	1.3
E	3	Bedroom	5	150	1350	2250	6.3
A	3	Bedroom	2	150	540	900	2.5
B	3	Bedroom	2	150	540	900	2.5
C	3	Bedroom	7	150	1890	3150	8.8
D	3	Bedroom	1	150	270	450	1.3
D1	3	Bedroom	1	150	270	450	1.3
C1	3	Bedroom	2	150	540	900	2.5
G	3	Bedroom	1	150	270	450	1.3
J1	3	Bedroom	1	150	270	450	1.3
J	3	Bedroom	1	150	270	450	1.3
I	2	Bedroom	2	150	360	600	1.7
TOTAL SANITARY SEWER DEMAND					7,650	12,750	35

Notes:

[1] *Based on daily flow rates from the WYDEQ CH 11, Part B, Table 1*

[2] *Bedroom count shown based on Development Plan Review, 10.25.2019*



JORGENSEN
JACKSON, WYOMING
307.733.5150
www.jorgensenassociates.com

PROJECT TITLE:
GLENWOOD GILL CONDOMINIUMS
LOT 1-6 BLOCK 6, JACKSON
185 NORTH GLENWOOD
JACKSON, WYOMING

SHEET TITLE:
WATER MODEL ANALYSIS

DRAFTED BY:	AJ
REVIEWED BY:	JL
PLAN VERSION	DATE
TOJ MODEL	10/25/2019

PROJECT NUMBER
18105

SHEET
1 of 1

JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

November 30, 2018

Nick Orthmann
Bear Development, LLC
4011 80th Street
Kenosha, WI 53142

RE: GEOTECHNICAL INVESTIGATION REPORT, 165 AND 185 NORTH GLENWOOD STREET, JACKSON, WYOMING (PROJECT NO: 18105)

Dear Mr. Orthmann,

We are pleased to present this report of our geotechnical investigation for the proposed development at 165 and 185 N. Glenwood St. in Jackson, Wyoming. This report encompasses 165 N. Glenwood and updates the previous report for 185 N. Glenwood which was prepared by Womack & Associates (WAI) and issued to the Eden Group in November of 2006. The report describes site conditions observed during the investigations and presents engineering analyses and recommendations for the proposed new structure.

In summary, the recent subsurface exploration encountered essentially the same material as was observed in 2006 and engineering recommendations generally remain the same. Engineering analyses depending upon seismic parameters, which have changed since 2006, have been updated in this report, as well as references to the current version of the building code (IBC, 2015; ASCE 7-10).

Groundwater monitoring is strongly recommended during the spring run-off season of 2019 to verify site groundwater levels will not impact the proposed construction.

If you have any questions about this report, or if we may provide other services to you, please contact us. As the project progresses, we will be available to answer questions for you.

Respectfully submitted,

JORGENSEN GEOTECHNICAL

Reviewed by:

Colter H. Lane, P.E.
Geotechnical Project Engineer

Ray Womack, P.E., P.G.
Senior Geotechnical Engineer & Geologist

Cc: Arne Jorgensen, Hawtin-Jorgensen

Geotechnical Investigation Report
165 and 185 North Glenwood Street
Jackson, Wyoming

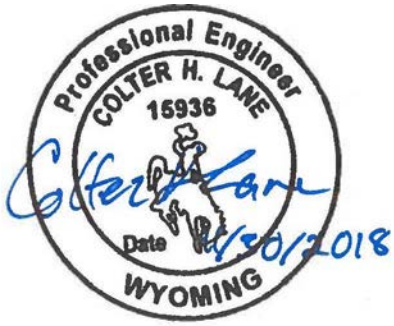
Prepared for:

Nick Orthmann
Bear Development, LLC
4011 80th Street
Kenosha, WI 53142

Prepared by:

JORGENSEN GEOTECHNICAL, LLC

PO Box 9550
Jackson, WY 83002



November 30,2018

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Appendix B: 2018 Borehole Logs
Appendix C: USGS Seismic Design Maps Summary and Detailed Reports

1.0 INTRODUCTION

As authorized by Mr. Nick Orthmann of Bear Development, LLC, Jorgensen Geotechnical conducted a geotechnical investigation for the proposed development at 165 and 185 N. Glenwood Street in Jackson, Wyoming (Figure 1). The site is located in the Town of Jackson on the corner of North Glenwood Street and Gill St., about 750-ft east of the toe of East Gros Ventre Butte. Womack & Associates (WAI) previously conducted a geotechnical site investigation and prepared a geotechnical report for 185 N. Glenwood Street in October of 2006. The 2006 WAI report can be found in Appendix A of this report. The purposes of the additional field work conducted in November of 2018 were to verify soil and groundwater conditions at 165 N. Glenwood street are similar to those discovered at 185 N. Glenwood street in September of 2006, evaluate soil-engineering properties, and to provide recommendations for foundation construction.

2.0 PROPOSED CONSTRUCTION

It is our understanding the proposed structure will consist of an underground parking garage beneath a multi-story structure spanning both 165 and 185 N. Glenwood Street. Development of 185 N. Glenwood Street began between 2007 and 2009, but was never completed. Existing facilities include an underground parking garage and ramp at 185 N. Glenwood capped with a concrete slab. It is our understanding the walls of the parking structure were supported using soil nails, several of which extend into 165 N. Glenwood.

The southern portion of the project site located at 165 N. Glenwood Street is currently occupied by four separate structures, all of which will be demolished prior to construction of the proposed structure. Mr. Arne Jorgensen with Hawtin-Jorgensen Architects indicated the proposed building will be an extension of the existing structure at 185 N. Glenwood Street consisting of an underground parking garage with footings placed approximately 12 feet below the existing ground surface.

3.0 INVESTIGATION PROCEDURES

3.1 Environmental Assessment

A Phase I environmental assessment was completed by on September 6, 2006, for 185 N. Glenwood St. and consisted of a review of records provided by the Town of Jackson, Wyoming, Department of Environmental Quality (WDEQ), and the Environmental Protection Agency (EPA). The result of this assessment indicated that, while several surrounding areas are locally contaminated with hydrocarbons, the property was not associated with any current or historic environmental hazards.

3.2 Subsurface Investigation

The original field investigation conducted on September 14th and 15th, 2006, consisted of a preliminary site reconnaissance and a drilling and sampling program of three exploratory boreholes at 185 N. Glenwood, shown as BH-1 through BH-3 in Figure 2. The 2018 update

included two boreholes at 165 N. Glenwood, shown as JG-18-1 and JG-18-2 as shown in Figure 2. All five of the boreholes were drilled to depths ranging from 27 to 33 feet below the ground surface (bgs) in order to observe subgrade soil and groundwater conditions. One standpipe piezometer consisting of a two-inch, 20-slot PVC pipe completed with an eight-inch flush-mount surface vault was installed to 30-feet bgs in JG-18-1 during the November, 2018 site investigation. Descriptive logs of the boreholes can be found in Appendix B.

ProSonic Drilling provided contract drilling services for the 2006 investigation. The sonic drill rig had an interior diameter of 4" and returned continuous samples throughout the entire borehole depth during drilling. For Standard Penetration Tests (SPT), the sonic rig was equipped with a 140 lb. chain-drive hammer with a reported efficiency of 60%.

The 2018 drilling program was performed using a hollow-stem auger mounted on a Simco 2800HS drill rig. SPTs were performed at 2.5-ft intervals and samples were collected using a split spoon sampler driven by a rope and cathead pulley system dropping a 140-lb hammer 30-inches per blow. Blow counts (i.e., the number of blows to advance the sampler 6-inches) were recorded during each test, and adjusted to a hammer efficiency of 60% and overburden pressure of one atmosphere, as suggested by Youd and Idriss (1997) and Fang (1991), to obtain standard adjusted $(N_1)_{60}$ values in blows per foot (bpf).

The $(N_1)_{60}$ corrections account for differences in sampler size and configuration, hammer efficiency, overburden pressure, and other variables. It is very important to use the $(N_1)_{60}$ values for consideration of rock and soil strength rather than the field N-values. There is often significant variability between the two sets of blow counts.

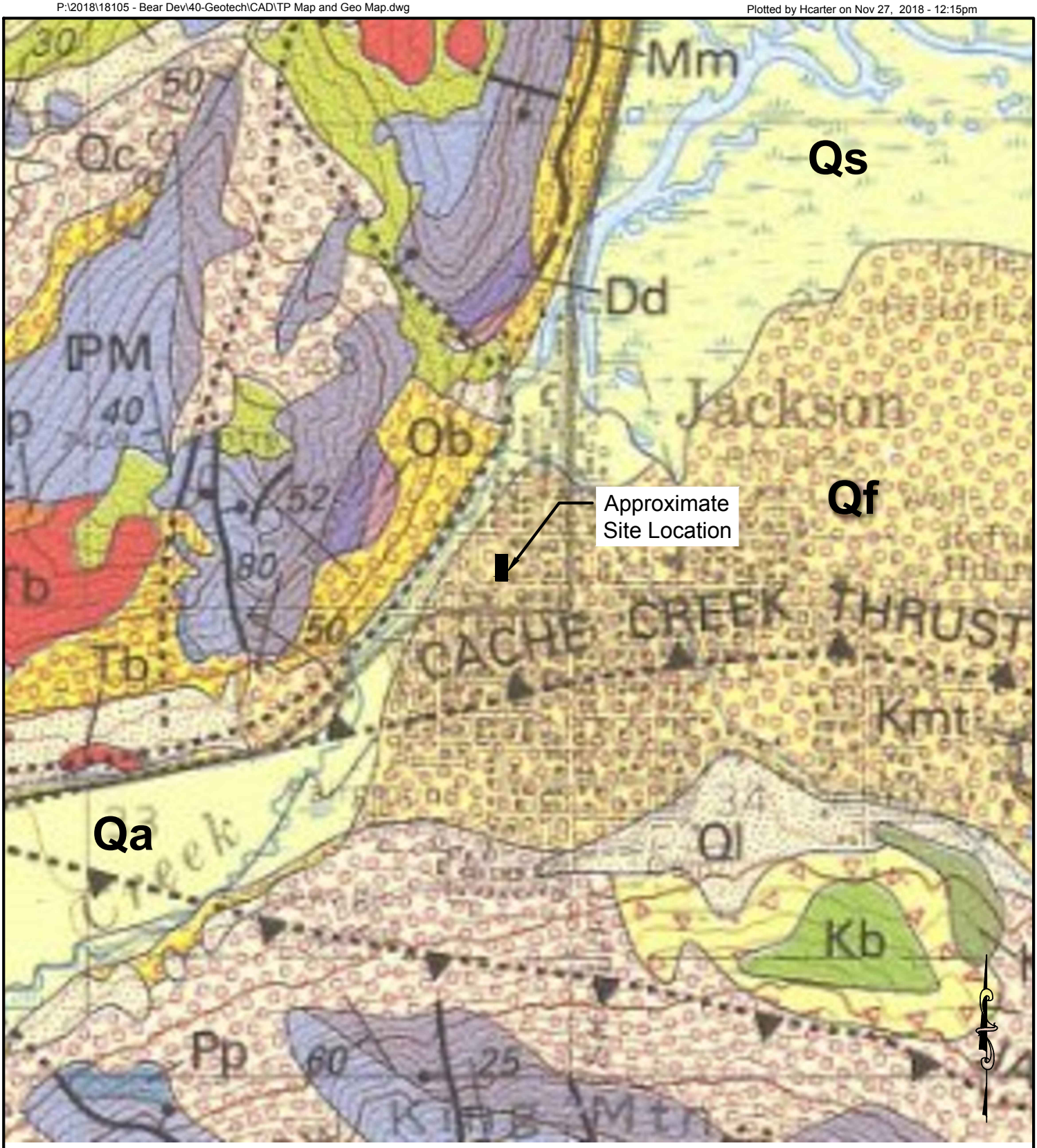
Soil types, consistencies, and relative moisture contents were observed and documented by a Jorgensen Geotechnical engineer during the 2018 investigation and a WAI engineer during the 2006 investigation. Site conditions and actual soil conditions may differ from those presented in the borehole logs. The approximate borehole locations are shown in Figure 2 and detailed borehole logs are presented graphically in Appendix B.

3.3 Laboratory Analysis

Given the stony character of soils encountered at the site, no laboratory testing was performed.

3.4 Report Preparation

This report describes the observed geologic and geotechnical site conditions and includes a site location and geologic map. Boreholes are presented graphically in Appendix B. This report provides engineering analysis and recommendations for the construction of foundation elements, drainage, and shoring elements.



From Love et al., 1992, Geologic map of Grand Teton National Park, Teton County, Wyoming

Map Symbols: Qf - Alluvial Fan Qs - Swamp Deposits
Qa - Alluvium - Gravel, Sand, and Flood-Plain Deposits

DRAFTED BY: HC REVIEWED BY: CHL PROJECT NUMBER 18105	SHEET TITLE: Figure 1 Site Location and Geologic Map	PROJECT TITLE: Geotechnical Site Investigation 165 N. Glenwood - Bear Dev. Jackson, Wyoming	JORGENSEN Geotechnical, LLC 307-733-5150 www.jorgeng.com



DRAFTED BY:	HC
REVIEWED BY:	CHL
PROJECT NUMBER	18105

SHEET TITLE:
Figure 2
Borehole Location Map

PROJECT TITLE:
Geotechnical Site Investigation
165 N. Glenwood - Bear Dev.
Jackson, Wyoming

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Geotechnical, LLC
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4.0 SITE CONDITIONS

4.1 Description

The project site is in the north part of the Town of Jackson, on the southwest corner of the intersection between North Glenwood Street and West Gill Avenue. The site is about one block east of Flat Creek and one block south and west of Cache Creek. The site is currently occupied by several structures. The northern portion of the site on 185 N. Glenwood Street is occupied by a partially completed underground parking garage, while the southern portion of the site on 165 N. Glenwood is currently occupied by four separate structures. The site is relatively level to very gently sloping to the northwest toward Flat Creek. Elevation at the site is about 6,210 feet above sea level.

4.2 Geology

A geologic map of the Grand Teton National Park (Figure 1), which encompasses the town of Jackson and the project site, was published by Love, et al, in 1992. The map shows the location of surficial deposits, bedrock units, and geologic structures (i.e., faults and folds). As depicted on the map, the project site is within the Cache Creek alluvial fan deposits (Qf) consisting of water-laid gravel, sand, silt, and clay with the finer grained deposits becoming more abundant at the distal ends of the fans (i.e., far from the mouth of the canyon), and stonier deposits at the proximal (i.e., near the mouth of the canyon) end of the fans. Soils encountered in the boreholes are consistent with the mapped geology and generally consist of sandy and clayey gravels. The alluvial fan is presumably underlain at depth by Tertiary and Paleozoic aged bedrock. Bedrock was not encountered in the boreholes and is expected to be very deep.

Numerous Quaternary aged (relatively young and potentially active) faults have been mapped in the Jackson area (Love et al, 1992; USGS, 2006), notably the East Gros Ventre fault, faults on the east and west side of West Gros Ventre Butte, and the Teton fault system along the east side (base) of the Teton Range. The surface trace of the Teton fault is located approximately 6 miles west of the project site. The mapped trace of the East Gros Ventre fault lies along the eastern base of East Gros Ventre Butte (Figure 1). This feature is mainly concealed beneath late Pleistocene to Holocene alluvium (Machette et al, 2001).

Two east-west trending buried fault segments, the Cache Creek thrust fault and the Jackson thrust fault, are mapped south of the project site (dotted lines with black triangles on Figure 1). The fault segments appear to be truncated by the north-south trending Teton fault system, and offset only the older geologic units (i.e., the Paleozoic and Tertiary aged rocks). These fault traces do not appear to offset the younger geologic units and therefore are inferred to be relatively old and inactive structures.

4.3 Soils

Similar soil conditions were encountered in all of the boreholes drilled for this investigation. Borehole BH-1 (2006) was drilled to a depth of 27 feet near the northeast corner of 185 N. Glenwood. Boreholes BH-2 and -3 at 185 N. Glenwood were drilled to depths of 27 and 28 feet in the northwest corner and southeastern corner of the lot, respectively. Borehole JG-18-1

(2018) was drilled to a depth of 31.5-ft near the northwest corner of 165 N. Glenwood, and JG-2 was drilled to a depth of 33-ft near the southwest corner. All borehole locations are shown on Figure 2.

The site is underlain by stratified alluvial fan deposits consisting primarily of medium dense to very dense sandy and clayey gravel/cobble. About 4-ft of very loose sandy silt fill was encountered at the ground surface in borehole JG-18-1 and JG-18-2. As indicated by the 2006 report (Appendix A) and borehole logs in Appendix B, most of the site is underlain by sandy gravel and cobble alluvial fan deposits. Based on field estimates, the stony alluvial fan soils consist of about 20-30% sand and 70-80% 5-inch minus subrounded gravel and cobbles. Adjusted blow count $(N_1)_{60}$ values in the stony alluvial fan are typically in the range of 20 to more than 50 bpf.

Thin beds of gravelly clay were encountered below about 25-ft in some borings. These thin, lenticular beds of clayey gravels are unlikely to affect foundation performance. Boring JG-18-2 encountered medium stiff massive clay from 29-ft bgs down to total depth of the boring at 33-ft. The adjusted blow count in this clay was 8 bpf, which indicates a soft to medium stiff consistency. However, assuming the foundations for the proposed structure are placed at approximately 12-ft bgs, the clay is too deep to affect foundation design. This clay may represent a remnant of the glacial lake beds that formerly occupied the valley or a fine-grained deposit near the distal (downstream) end of the alluvial fan.

4.4 Groundwater

Groundwater was encountered in boreholes BH-1 and BH-2 (WAI, 2006) in September of 2006 at approximately 25-ft below the ground surface. Groundwater monitoring at borehole BH-2 was conducted through the spring 2007, which indicated groundwater levels remain at approximately 25-ft bgs for a large portion of the year. Measured groundwater levels at the site did not appear to respond to flow levels in Flat and Cache Creeks. Groundwater was not encountered down to 33-ft bgs at 165 N. Glenwood at the time of drilling in October 2018, though the investigation occurred during what is typically considered a dry time of year. We strongly recommend groundwater monitoring in MW-1 (JG-18-1) during the spring of 2019. Construction methods used for parking areas below grade will be informed by groundwater monitoring data from MW-1 and BH-2. Recommendations for construction in areas of high groundwater are presented in Section 6.1.

4.5 Earthquakes and Ground Shaking

Jackson Hole is located within the Intermountain Seismic Belt, a zone of seismicity that extends from southern Utah through eastern Idaho, western Wyoming, and western Montana (Smith and Arabasz, 1991). The Teton fault along the eastern margin of the Teton Range about 6 miles northwest of the project site is considered an important structural element of the Intermountain Seismic Belt. Predicted recurrence intervals for maximum credible earthquakes have passed for most of the fault systems capable of generating magnitude 7.5 events in western Wyoming (Case, 1997), implying that the risk of major earthquakes may be high.

Ground motion accelerations should be derived for the project site in accordance with the general procedure defined in the International Building Code (IBC). The IBC references ASCE 7-10 to determine the ground motion accelerations. Based on subsurface soils and geologic maps, the site is classified as a Site Class D ("Stiff Soils"). For your convenience, USGS Seismic Design Maps Summary and Detailed Reports were produced assuming a risk category of I/II/III and are attached in Appendix C. These reports present design ground motion for structural design. The site's seismic hazard results in a Seismic Design Category D.

The site is in an area of moderate seismic activity. The current peak horizontal acceleration (PGA) with 10% probability of exceedance in 50-years is approximately 0.20g, according to the USGS National Seismic Hazard Maps (2014). This has been applied in this report for analysis of seismic lateral loading on retaining walls; see Section 5.3.

The provisions of the IBC are intended to provide uniform levels of performance for structures, depending on their occupancy and use and the risk inherent to their failure. The approach adopted in the IBC is intended to provide a uniform margin of safety against collapse at the *design* ground motion. The *design* earthquake ground motion is selected at a ground shaking level that is 2/3 of the *maximum considered earthquake* (MCE) ground motion, which has a likelihood of exceedance of 2 percent in 50 years (a return period of about 2,500 years). The owner should be aware that the IBC is not intended to prevent damage or loss of function during a major earthquake; it is intended to reduce the risk of loss of life. Structural design should follow the level of risk tolerable to the owner.

4.6 Geological and Geotechnical Hazards

4.6.1 Liquefaction Potential

Loose, saturated sands and silty sands, and in some cases silts and gravels, may liquefy when exposed to seismic shaking. Liquefaction has been most prevalent in areas where loose saturated sands occur within about 30 feet or less of the ground surface, but in some instances, liquefaction has been reported in saturated deposits up to 60 feet deep (EERI, 1994).

The boreholes drilled to a depth of about 33 feet encountered sandy gravel and cobbles under the site that appear to be too stony and dense to liquefy in a seismic event. It is possible that liquefiable materials occur at greater depths. At this flat-lying location, liquefaction could potentially cause minor differential settlement. However, there appears to be little risk of "lateral spreading", which is a major slope movement that is a common source of catastrophic failure during earthquakes.

4.6.2 Geological Hazards

The owner should be aware that in the event of a large magnitude earthquake, there are several geologic hazards that could potentially cause damage to structures (Smith et al, 1993). Potential hazards at this site might include strong ground shaking and ground cracking. Although the risk of surface rupture along an un-mapped fault trace exists, the risk is very small.

5.0 ENGINEERING ANALYSIS

5.1 Settlement

Foundation footings shall be placed on stony Cache Creek alluvial fan material. Significant consolidation (e.g., total settlement of 1-inch and differential settlement of 0.5-inches) of the dense to very dense, sandy and clayey gravels and cobbles observed in the boreholes is not anticipated. Removal of loose topsoil and fill material from the upper 2-4 feet is necessary, but is expected for the basement excavation. Removal of the loose fill shall extend to exterior footings including those for awnings, porches, and hardscapes.

5.2 Bearing Capacity

Bearing capacity of soil refers to its ability to resist shear failure under load. The bearing capacity of the stony alluvial fan deposits was estimated using Meyerhof's bearing capacity equation for strip footings (Bowles, 1996). Soil properties were estimated based on visual soil classification. The average unit weight of the soil is estimated to be about 125 pcf, and the friction angle is estimated to be about 36 degrees (Pit Slope Manual, 1982; Huang, 1983). The foundation footings are assumed to be 16 inches wide, placed on the sandy gravel and cobble alluvial fan. Assuming continuous 16-inch strip footings, an allowable bearing capacity for the stony alluvial material is estimated to be about 5,000 psf.

These values assume footings will be placed directly on the stony alluvial fan or approved engineered fill. Jorgensen should be contacted prior to the placement of structural fill or foundation elements to observe whether or not the excavation has reached competent stony alluvial fan or approved stony fill.

5.3 Lateral Pressures

Lateral pressures were calculated using methods suggested by Bowles (1996). Lateral pressures were calculated for at-rest, active, and passive conditions assuming level backfill, and are presented in Table 5-1. These values assume stony site material will be used as exterior backfill. We have assumed an estimated internal friction angle of 36° and a unit weight of 125 pounds per cubic foot (pcf) based on visual classification of the soils.

Table 5-1: Lateral Pressure Parameters for Native Stony Alluvial Fan Soils

Condition	Coefficient of Earth Pressure	γK (equivalent fluid pressure)
Static Conditions		
Level Backfill	K_o = 0.41	52 pcf
	K_a = 0.26	32 pcf
	K_p = 3.85	481 pcf
Earthquake Conditions		
Level Backfill	K_{ae} = 0.32	39 pcf
	K_{pe} = 3.65	456 pcf

5.3.1 Active Pressures

For lateral pressure design of retaining walls, which are allowed to deflect and develop an active soil wedge, the calculated equivalent fluid pressure (γK_a) is about 32 pcf assuming a horizontal ground surface behind the retaining wall. This pressure distribution would be equivalent to a force of approximately $16H^2$ pounds per horizontal foot of wall acting at one-third the wall height (H) above the base.

Lateral pressures on retaining walls from earthquakes were estimated using the Mononobe-Okabe equations (Bowles, 1996; Duncan et al, 1990). Because the maximum acceleration occurs only briefly during an earthquake, it is common practice when designing dams and other earth structures to reduce the design acceleration to ½ of the maximum design acceleration (Hynes-Griffin and Franklin, 1984). Thus, we have calculated seismic lateral pressures using a horizontal acceleration k_h of .10g (1/2 of k_h max) per the USGS (2014).

Research has indicated that lateral pressures due to earthquakes are non-hydrostatic in distribution, and the resultant acts above the lower third-point of the wall (Bakeer, et al, 1990). Accordingly, active soil pressures have been divided into two components that act at different wall heights. The static force acts at the lower third-point, as discussed above. The resultant force from seismic lateral pressures is applied at 60% of the wall height above the base with a magnitude equal to the difference between the seismic and static active pressures; i.e., $½(\gamma k_{ae}-\gamma k_a)H^2$ or $3.5H^2$.

5.3.2 Passive Pressures

For passive pressures, an equivalent fluid pressure (γK_p) of about 481 pcf was estimated for static conditions and 456 pcf for seismic conditions. Passive pressure design should neglect the loose fill and soil located within the frost zone.

5.3.3 At-Rest Pressures

For lateral pressure design of foundation walls, which are restrained and not allowed to deflect, the calculated at rest earth pressure (γK_o) is about 52 pcf, assuming a horizontal ground surface behind the foundation wall. Use the at-rest pressure or the active pressure under seismic conditions for foundation wall design, whichever is greater.

5.4 Soil Friction

Terzaghi, et al (1996) suggests the use of the internal strength of the soil for the friction angle along a concrete base in granular soils, with a maximum value of 30°. Accordingly, a friction value of 0.58, which is the tangent of 30°, is suggested if foundation elements are founded on the native stony alluvial fan or an approved structural fill. The friction value may be combined with the passive pressure to resist horizontal loads.

5.5 Shoring

It is our understanding the proposed basement footings may be more than 10 feet below ground surface. Shoring will likely be required around the perimeter of the new building.

Recommended shoring alternatives include H-pile walls and soil nails. When a building design has been selected, this office should be involved in selection of shoring techniques. It is our understanding the foundation walls for 185 N. Glenwood Street are supported by tie-backs or soil nails. It is assumed the soil nails were designed and installed using the soil nail parameters presented in Section 5.5.2 of the 2006 WAI report (Appendix A). Based on conversations with the Architect, it is our understanding the existing underground parking garage will be extended to the south onto 165 N. Glenwood Street using the same design and construction techniques. Therefore, selection and design of the shoring system for 165 N. Glenwood Street should mimic the performance of the original shoring system. Test data from the original construction is expected to represent the most accurate information for anchor or nail performance.

In light of the existing shoring system, the southern wall of the partially completed underground parking garage on 185 North Glenwood street contains several soil nails extending to the south onto 165 N. Glenwood street. Construction of the proposed construction must take into consideration the effect of removing these anchors and ensure the proposed excavation will not damage the existing structure.

6.0 RECOMMENDATIONS

6.1 Foundations

In our opinion, the sandy gravel and cobble alluvial fan soils below a depth of about 2 to 3 feet will provide adequate support for anticipated foundation loads of the proposed structure. Excavation for the foundation footings should remove the upper 2 to 3 feet of finer-grained soil and fill, exposing the top of the underlying gravel and cobbles. Foundation footings may be placed directly on the stony alluvial fan. Given the depth and stiff character of the two clay layers encountered we believe that over-excavation will not be necessary.

All footings should be placed below the frost line, including exterior footings for awnings and porches. The building code for Teton County requires that footings be placed at a minimum depth of 34 inches below finished grade, with a minimum foundation exposure of 6 inches above finished grade.

To further reduce the risk from potential settlement, any material loosened during the excavation process shall be compacted to a non-yielding state prior to placement of the concrete footings. A vibrating, smooth-drum roller compactor or “whacker” may be used to densify the coarse-grained soils. If the groundwater level is above the bottom of the footing excavation, compaction may not be feasible.

Because of the possibility of relatively shallow groundwater conditions at the site, a full-basement or below grade parking structure may be vulnerable to seepage. If the owner and architect plan to construct the building with a full-basement or underground parking, we strongly recommend a foundation system that is fully waterproofed unless groundwater monitoring in spring 2019 indicates otherwise. The foundation footings, stem walls, and floor slab should be constructed as a monolithic unit to eliminate joints and completely wrapped

with a waterproof membrane system. If necessary, adequate foundation reinforcement should be used to counteract buoyant forces that may be exerted on the floor slab.

Relying on a dewatering system to mitigate seepage into the lower levels of the building is not recommended. Mechanical means of dewatering may be problematical because of the high permeability of the stony soils and the anticipated large quantities of water that would need to be displaced. In addition, dewatering systems typically have high installation costs, long-term operation and maintenance expenses, and reliability and water discharge issues.

During foundation construction, shallow groundwater may be encountered. Dewatering to reduce water levels may be required during foundation construction. At this point we do not consider it necessary to specify dewatering procedures during construction. Pumping may be required and discharge of water may be problematical at this site. Adequate planning is important to address proper discharge of the water. These issues will not be of concern if groundwater does not rise significantly from its current level.

A Structural engineer should review the plans to check that adequate support is provided to the foundation systems. Minor settlement of footings, foundation walls, and floor slabs may result in small fractures in the concrete walls, concrete floor slabs, and sheetrock. These occurrences are normal and should not be a cause for concern.

6.2 Site Preparation

At the start of construction, the site should be cleared and stripped of topsoil, fine grained soils, and organic debris. No brush, roots, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or site-derived engineered fill. All exposed subgrade surfaces should be free of mounds and depressions which could prevent uniform compaction. If unexpected fills or obstructions are encountered during site clearing or excavation, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

If fine-grained soils are observed at foundation depth, they should be removed and replaced with an approved engineered fill, such as pit-run or select site soils. During excavation for the foundation system, removal of large cobbles and boulders may disturb and loosen the surrounding material. All disturbed areas should be compacted with a smooth-drum vibratory roller, in vibratory mode with a minimum of three passes, prior to placement of structural fill and/or footing construction. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed and approved by Jorgensen.

<u>All excavations and foundation subgrades should be observed by a representative of Jorgensen prior to fill or concrete placement, especially if questionable materials are exposed.</u> Notice shall be provided at a minimum of 24 hours before the requested observation.

6.3 Foundation Drains

Foundation drains were recommended in Section 6.4 of the 2006 WAI Report, though it is unknown if foundation drains were installed during the construction of the existing underground parking garage. Foundation drains for the proposed addition to the existing underground parking garage should mimic the existing foundation drain in order to obtain a single, harmonious system. This issue may be revisited following groundwater monitoring and final design.

6.4 Excavation and Cut Slope Stability

OSHA regulations (29CFR1926) appear to classify site soils as Type C. For planning and design purposes, simple cut slopes should be no steeper than 1.5H:1V in the stony alluvial fan. These are recommendations based on observations made at the time of the investigation. The contractor shall be responsible for adherence to OSHA and other safety regulations by observing soil and groundwater conditions at the time of construction.

Simple cut slopes may not be possible in all or most of the site. Site constraints such as adjacent buildings, utilities, and roads are likely to require shoring to support excavation for basement foundations. Selection and design of an appropriate shoring system is beyond the scope of this report, but may be provided upon request.

6.5 Final Backfilling and Grading

Properly compacted backfill will reduce settlement of the soil against foundation walls and beneath exterior concrete slabs. Exterior backfill around the building should consist of site materials placed in lifts no greater than 9 inches loose thickness and compacted. Existing site material may be used for exterior and utility trench backfill.

Structural fill should be used beneath exterior slabs-on-grade. Utility trenches should also be backfilled in lifts and compacted. Final grading should provide protection from frost. Do not over compact exterior backfills against “green” foundation walls.

Prior to placement of structural fill for the foundation subgrade or exterior slabs-on-grade, the site should be cleared and grubbed. No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or structural fill.

6.6 Compaction of Engineered fill

If engineered fill is used to achieve final grades below footings, the fill may consist of select stony site material or imported pit-run fill placed in horizontal lifts no greater than 12 inches loose thickness, as indicated by Table 6-1. Larger cobbles (> 4” diameter) should not be used as structural backfill, except as specified in Table 6-1.

Table 6-1: Compaction Parameters for Stony Fill

Compactor Type	Lift Thickness	Maximum Particle Size	Minimum Number of Passes
5-ton vibratory	12 inches	9-inch*	3
1.5-ton vibratory	9 inches	6-inch	5
Hand-held	4 inches	4-inch	5

* Occasional clasts to 12-inch are permitted, if encountered, but should not be nested (placed against one another).

Stony fill will compact into a dense, strong, well-draining structural fill, and strict moisture control is usually not required. Compaction testing with a nuclear density gauge is usually problematic due to the presence of large stones. Therefore, we recommend compacting stony fills using a method specification, which may be established as follows:

- The contractor will place fill in loose lifts no greater than specified in Table 6-1 for whichever class of compactor is used.
- Fill will be compacted with the *minimum* number of passes specified in Table 6-1. The actual number of passes should be determined by observing compaction after each pass to determine if the surface is non-yielding. If the fill surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.
- Once the number of passes is determined, this **method** (unique to the material type, compactor, lift thickness, and number of passes) may be continued for the rest of the project as long as fill material properties and subgrade soil conditions remain the same.

It is important to establish a method specification as early in the construction as possible and apply it consistently for the entirety of the building pad construction. JG should observe lift thickness, number of passes, and equipment used during compaction. Additional guidance on construction observations may be found in Section 6.12.

Exterior backfills should be placed as early as possible. However, do not over-compact exterior backfills against “green” foundation walls. Utility trenches should also be backfilled in lifts and compacted. Stony soils will require a vibrating smooth-drum roller or vibratory plate (i.e., hoe-pack or “jumping jack”) for compaction.

6.7 Final Grading

Properly compacted backfill and site drainage are important for protecting basements and foundation elements from water infiltration. Final grading should provide positive drainage of at least 0.5 foot in the first 10 feet (5%) away from the structure. Adequate gutters are strongly recommended. Roof runoff should be discharged at least 3 feet away from the building or exterior slabs. Swales or other moisture collection points should be avoided if possible within 10 feet of the foundation or retaining walls. Drainage swales should slope a minimum of 2%.

6.8 Interior Slabs-on-Grade

The recommendations in this section apply only if the basement has not been fully waterproofed and is within 5 feet of the seasonal water table. The interior floor slab should be at least 4 inches thick, and any slabs bearing vehicles should be at least 6 inches thick. Minor floor cracking of slab-on-grade construction is difficult if not impossible to prevent. Such cracking is normal and should be expected to occur with time. Buildings are almost never free of cracks, and cracking is caused by many factors other than soil movement, such as concrete shrinkage, normal activities, and daily and seasonal variability in temperature and humidity.

The following suggestions are recommended for standard slab-on-grade construction. An impermeable layer (usually plastic) is suggested beneath the slab, underlain by 4 inches of clean drain gravel that will act as a capillary break to reduce dampness. Two options are available to reduce the tendency for the concrete to crack as it dries. Three articles from the American Concrete Institute (ACI) that discuss these options are located in Appendix C of the 2006 WAI Report.

1. A blotter layer may be placed under the slab. In the past, loose sand has been used for this purpose, but is no longer recommended. A cover of 4 inches of trimmable, compactible, granular material may be placed over the sheeting to receive the concrete slab. This material usually consists of “crusher run material”, which varies in size from about 1.5-inch down to rock dust. Alternatively, 3 inches of fine graded material such as crusher fines or manufactured sand may be used.

2. The blotter layer may be eliminated if the concrete is reinforced properly. The article entitled “Controlling Curling and Cracking in Floors to Receive Coverings” provides a discussion of proper floor slab reinforcement. If the contractor needs additional guidance on reinforcement, a structural engineer should provide it.

The Teton County Building Department also requires a ventilation system for slab-on-grade construction in inhabited buildings. A ventilation system is not required for a deep basement or parking garage below the groundwater level.

6.9 Exterior Slabs-on-Grade

Exterior slabs (sidewalks, patios, driveways, etc.) typically sustain the greatest damage. Cracking is almost impossible to avoid, and freeze-thaw adds to the difficulty caused by soil consolidation. The fine-grained topsoil, silt, and clay fill material near existing ground surface could potentially cause severe frost or settlement damage. The following suggestions may reduce differential movement of exterior slabs.

Exterior concrete slabs should be at least 4 inches thick, 6 inches if supporting vehicles. Exterior slabs should not be tied to foundation walls. Any movement of exterior slabs may be transmitted to the foundation walls, resulting in damage. Posts for patios or other exterior columns should not bear on exterior slabs. If the slabs settle or rise, the movement can be

transmitted to the post, resulting in damage to the structure.

Exterior slabs placed on fine-grained soils may be very susceptible to frost heave, and any exterior flat work placed on these soils may perform poorly. Performance of the slabs may be improved by placement of at least 6 inches, preferably 12 inches, of gravel beneath the slab. Expansion joints are recommended in all concrete flatwork.

6.10 Ventilation and Radon

Evaluation of radon was beyond the scope of work; local codes should be followed and specialty contractors employed, if necessary. A capillary break layer (Section 6.8) may be necessary to accommodate a radon vent pipe. Teton County Building Code requires that slabs below living spaces be ventilated and sealed. Ventilation should also be provided for areas under crawl spaces. The building contractor is ultimately responsible for following local building codes.

6.11 Reinforcing, Utilities Testing, and Concrete Considerations

Footings, slabs, and foundation walls should be reinforced to resist differential movement. We strongly recommend consultation with a structural engineer to specify adequate reinforcement. Exterior concrete should contain 5% to 7% entrained air. We recommend pressure testing of water and sewer lines before backfilling.

6.12 Observation during Construction

Recommendations in this report are contingent upon our involvement. If any unexpected soils or conditions are revealed during construction, this office should be notified immediately to observe the conditions and make any necessary modifications. All excavations and foundation subgrades should be observed by a representative of JG prior to fill or concrete placement, especially if questionable materials are exposed. Notice shall be provided at a minimum of 24 hours before the requested observation.

We are able to provide the most value observing site conditions at the following times:

1. Upon completion of site preparation to verify stony alluvial fan soils or stony fill have been reached and prepared in accordance with Section 6.2.
2. During the placement of the beginning lifts of engineered fill, if required, to observe compaction (i.e., develop a method specification, see Section 6.6: and
3. Once the site has been prepared to the bottom of footing elevation to witness a proof roll with the compactor.

7.0 LIMITATIONS

This report has been prepared based on a limited amount of data. Actual site conditions may vary. This report, including engineering analysis, recommendations, figures, and design details are exclusive to the referenced site. Under no circumstances shall the figures be separated from the text and used independently. This report is not a stand-alone document and shall always be accompanied by the original 2006 WAI report found in appendix A of this report. Recommendations in this report are not applicable to other construction sites. These services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar conditions. No other warranty is made or implied.

8.0 REFERENCES

American Concrete Institute, 1997, Guide for Concrete Floor and Slab Construction: ACI 302.1R-96.

ASCE, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE/SEI Standard 7-10.

Bakeer, R.M., S.K. Bhatia, and I. Ishibashi, 1990, Dynamic Earth Pressure with Various Gravity Wall Movements *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen, ed.): ASCE Geotechnical Special Publication 25, p. 887-899.

Bowles, J.E., 1996, Foundation Analysis and Design, 5th Ed.: McGraw-Hill.

Case, J.C., 1997, Earthquakes and Active Faults in Wyoming; Wyoming State Geological Survey, Preliminary Hazards Report 97-2.

Fang, H.Y., 1991, Foundation Engineering Handbook, 2nd Ed.: Chapman & Hall, New York.

Gilbert, J.D., Ostenaa, D., and Wood, C., 1983, Seismotectonic study of Jackson Lake Dam and Reservoir: U.S. Bureau of Reclamation Seismotectonic Report 83-8, Minidoka Project, Idaho-Wyoming, 123P.

Holland, J.A., and W. Walker, 1998, Controlling Curling and Cracking in Floors to Receive Coverings: Concrete Construction, Publication Number C980603.

Hynes-Griffin, M.E., and Franklin, A.G., 1984, Rationalizing the Seismic Coefficient Method: U.S. Army Corps of Engineers, Waterways Experiment Station, Miscellaneous Paper GL-84-13.

International Building Code, 2015.

Love, J.D., 2003, Geologic map of the Jackson Quadrangle, Teton County, WY: Wyoming State Geological Survey, J. David Love Map Series LMS 9, scale 1:24,000.

Love, J.D. and Albee, H.F., 1972, Geologic Map of the Jackson Quadrangle, Teton County, Wyoming; U.S. Geological Survey, Geological Investigation Series Map I-769-A, Scale 1:24,000.

Love, J.D., Reed, J.C., and Christiansen, A.C., 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming: Geologic Investigation Series Map I-2031, Scale 1:62,500.

Machette, M.N., K.L. Pierce, J.P. McCalpin, K.M. Haller, and R.L. Dart, 2001, Map and Data for Quaternary Faults and Folds in Wyoming: USGS OFR 01-461.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Yuehua, Rezaeian, Sanaz, Harmsen, S.C., Boyd, O.S., Field, Ned, Chen, Rui, Rukstales, K.S., Luco, Nico, Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 update of the United States national seismic hazard maps: U.S. Geological Survey Open-File Report 2014–1091.

Smith, R.B. and Arabasz, W.J., 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D.B., Engdahl, E.R., Zoback, M.L., and Blackwell, D.D., editors, Neotectonics of North America: Geological Society of America, Decade Map Volume 1, p. 185-228.

Suprenant, B.A., and W.R. Malisch, 1999, Don’t Use Loose Sand under Concrete Slabs: Concrete Construction, Publication Number C99C0223.

U.S. Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed November 28, 2018, from USGS web site: http//earthquake.usgs.gov/hazards/qfaults/

U.S. Geological Survey Earthquake Hazards Program, 2014, Unified Hazard Tool, accessed November 28, 2018, https://earthquake.usgs.gov/hazards/interactive/index.php

Whitman, R.V., 1990, Seismic Design and Behavior of Gravity Retaining Walls *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen ed): ASCE Geotechnical Special Publication 25, p. 817-842.

Youd, T.L., and I.M. Idriss, 1997, Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils: Technical Report NCEER-97-0022.

APPENDIX A

185 N. Glenwood Geotechnical Report
(WAI, 2006)

GEOTECHNICAL INVESTIGATION REPORT
MCCABE PROPERTY
185 NORTH GLENWOOD STREET
JACKSON, WYOMING

Prepared for:

Rick Benson
Eden Group
3395 North Pines Way
Wilson, WY 83014

Prepared by:

Womack & Associates, Inc.
P.O. Box 12650
Jackson, Wyoming

October 17, 2006

WOMACK & ASSOCIATES, INC.
P.O. Box 12650 • Jackson, WY 83002 • Office (307) 733-7209
Fax (307) 733-8005 • Cell (307) 690-4033

• Geotechnical Engineering • Geology

October 17, 2006

Rick Benson
Eden Group
3395 North Pines Way
Wilson, Wyoming 83014

RE: GEOTECHNICAL INVESTIGATION REPORT, MCCABE PROPERTY PROJECT, JACKSON, WYOMING

Dear Rick:

We are pleased to present this report on our geotechnical investigation for the proposed development at the McCabe Property in Jackson, Wyoming. Two copies are enclosed. The report describes site conditions and presents engineering analyses and recommendations.

If you have any questions about this report, or if we may provide other services to you, please contact us. As the project progresses, we will be available to answer questions for you.

Respectfully submitted,

WOMACK & ASSOCIATES, INC.

Ray Womack 10-17-06

Ray Womack, P.E., P.G.

Enclosure: Reports

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1.0 INTRODUCTION

As authorized by Rick Benson of the Eden Group, Womack and Associates, Inc. conducted a geotechnical investigation for the proposed housing development at the McCabe Property in Jackson, Wyoming. The site is located in the Town of Jackson on the corner of North Glenwood Street and Gill St., just east of East Gros Ventre Butte. The purposes were to investigate soil and groundwater conditions, evaluate soil-engineering properties, and to provide recommendations for foundation construction.

2.0 PROPOSED CONSTRUCTION

Plans for the site include demolition of the existing multi-story office and printing complex and construction of a multi-story housing development with an underground parking structure.

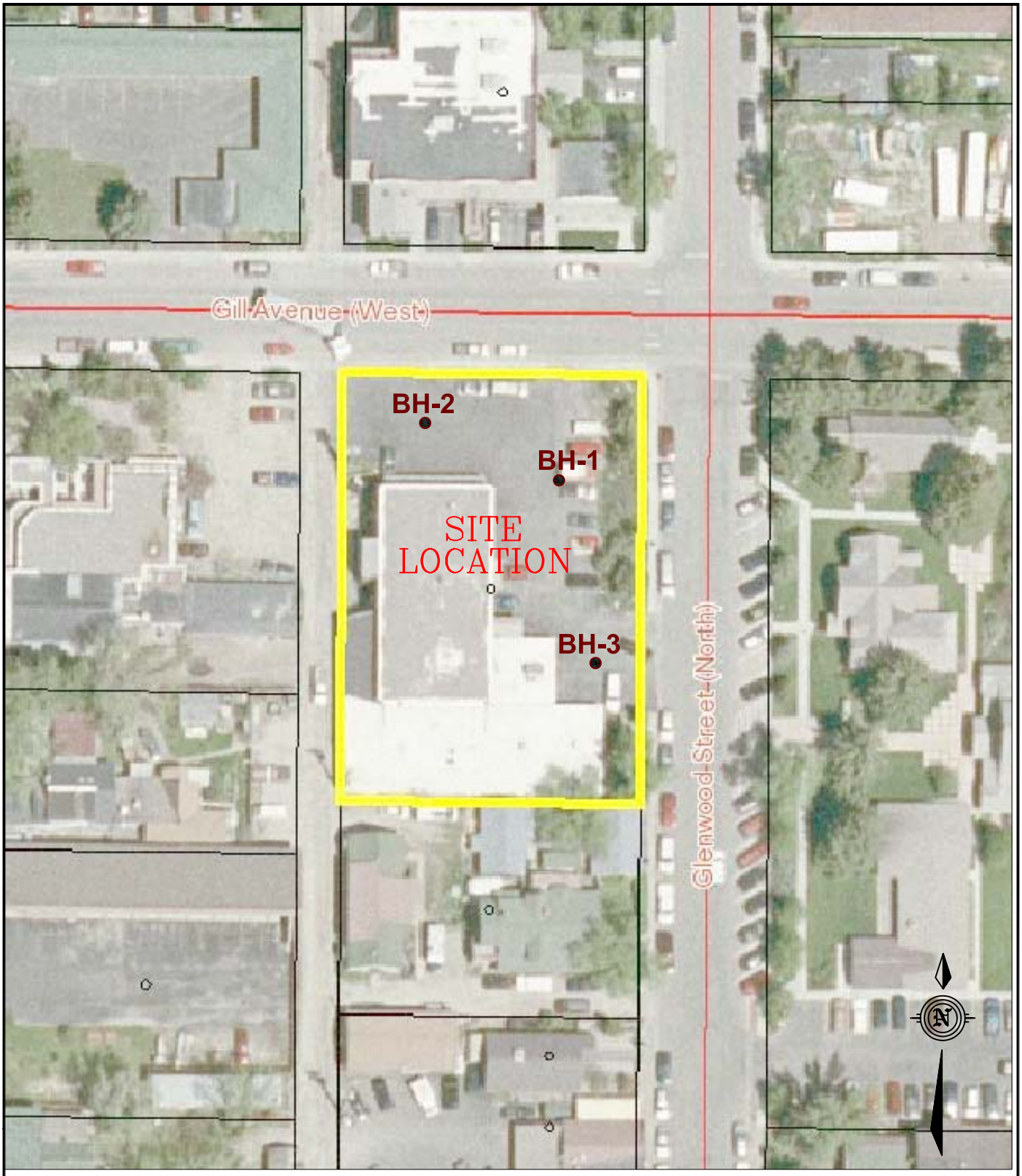
3.0 INVESTIGATION PROCEDURES

3.1 Field Investigation

The field investigation conducted on September 14th and 15th, 2006, consisted of preliminary site reconnaissance and drilling and sampling of three exploratory boreholes. The boreholes were drilled to depths of about 25 to 30 feet in order to observe subgrade soil and groundwater conditions. Borehole locations are shown in Figure 1. Descriptive logs of the boreholes are in Appendix A.

ProSonic Drilling provided contract drilling services. The sonic drill rig had an interior diameter of 4" and returned continuous samples through the entire borehole depth. The sonic rig was equipped with a 140 lb. chain-drive hammer with a reported efficiency of 60%

Standard Penetration Tests (SPT) were performed using methods consistent with ASTM D 1586. The sample intervals were varied as judged appropriate by the engineering geologist. A 1 3/8-inch split-spoon sampler without liners was used for soil sampling. A 140-pound hammer dropped 30 inches was used to drive the split- barrel sampler, and the blows required to drive the sampler 18 inches were recorded in 6-inch increments. The blows for the final 12 inches were recorded as the unadjusted field "N-value", measured in blows per foot (bpf). Field N-values are presented on the logs in Appendix A. Field values should not be used for design purposes without correction.



APPROXIMATE
SCALE: 1" = 50'

Geotechnical Investigation Report McCabe Property 185 North Glenwood St. Jackson, Wyoming	Site Location Map	FIGURE 1

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The industry standard sampling procedure is the Standard Penetration Test (SPT). The standard split-spoon sample has an outside diameter (o.d.) of 2 inches and inside diameter (i.d.) of 1.375-inch (or 1.5-inch if liners are not installed). Field N-values were corrected to $(N_1)_{60}$ using procedures suggested by Youd, et al (2001). Corrected $(N_1)_{60}$ values are in Appendix B.

The corrections account for differences in sampler size and configuration, hammer efficiency, overburden pressure, and other variables. The $(N_1)_{60}$ values represent SPT values adjusted to a standard of one atmosphere of overburden pressure and hammer efficiency of 60%. It is very important to use the $(N_1)_{60}$ values for consideration of rock and soil strength rather than the field N-values. There is often significant variability between the two sets of blow counts.

Soil types, consistencies, and stratigraphic thicknesses were observed and documented by an Engineering Geologist. Field conditions were described for all soil types observed and representative samples were obtained from critical soil horizons. General topography and site conditions were observed by the geologist in order to place the boreholes in representative locations. Note that site conditions may be variable and actual soil conditions may differ from those represented in the borehole logs.

3.2 Laboratory Analysis

Given the coarse character of soils encountered at the site, no laboratory testing was performed.

3.3 Previous Investigations

A Phase I environmental assessment was completed by Womack & Associates on September 6, 2006 for the McCabe property and consisted of a review of records provided by the Town of Jackson, Wyoming Department of Environmental Quality (WDEQ), and the Environmental Protection Agency (EPA). The result of this assessment indicates that, while several surrounding areas are locally contaminated with hydrocarbons, the McCabe property is not associated with any current or historic environmental hazards.

3.4 Report Preparation

The report presents the site soil and groundwater conditions, borehole and monitoring well logs, location maps, engineering analyses, and recommendations to support design of the foundation elements.

4.0 SITE CONDITIONS

4.1 Description

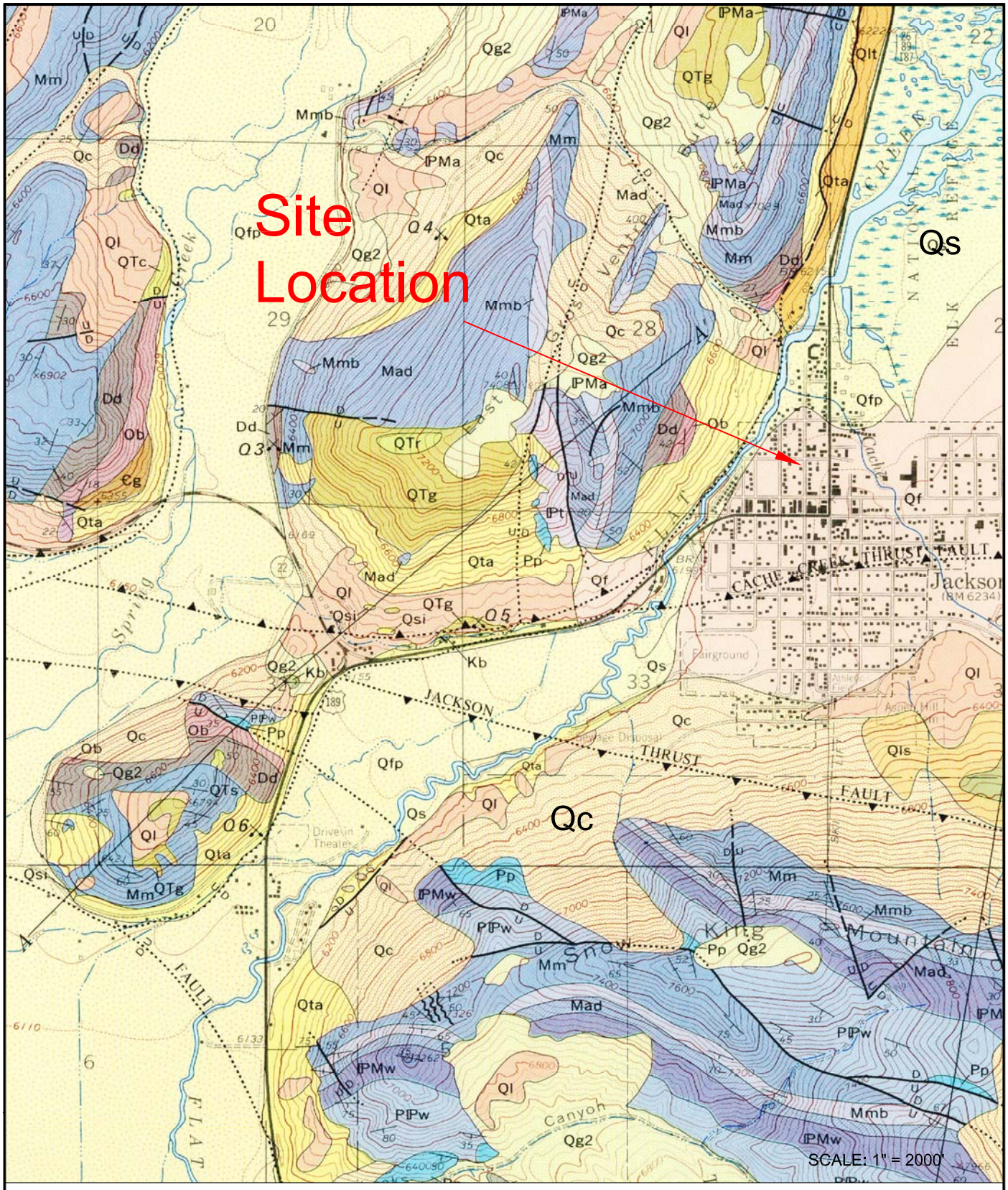
The project site is in the north part of the Town of Jackson, on the southwest corner of the intersection between Glenwood Street and Gill Street. The site is at the base of East Gros Ventre Butte about 1 block east of Flat Creek and 1 block south and west of Cache Creek. Currently, the southwest portion of the site is occupied by a building housing Grand Teton Lithography and several apartments. The north and east portions of the site are covered with asphalt paving and an unpaved (gravel) alley borders the west side of the parcel. Preliminary plans are to demolish the existing building and construct a new building for the Jackson Hole Community Housing Trust. As currently planned, the new structure will be a multi-story building with an underground parking garage. The site is relatively level to very gently sloping to the northwest toward Flat Creek. Elevation at the site is about 6,210 feet above sea level. At the time of our investigation, no demolition, site grading, excavation, or construction activity had been initiated for the new building.

4.2 Geology

A geologic map of the Grand Teton National Park (Figure 2), which encompasses the town of Jackson and the project site, was published by Love, et al, in 1992. The map shows the location of surficial deposits, bedrock units, and geologic structures (i.e., faults and folds). As depicted on the map, the project site is covered by Holocene to Quaternary aged alluvial fan deposits (Qf), although the material encountered in the boreholes drilled for this investigation is interpreted as alluvium (Qa) consisting of clay, silt, sand and gravel stream channel deposits. The alluvium is presumably underlain at depth by Tertiary and Paleozoic aged bedrock. Bedrock was not encountered in the boreholes, and depth to bedrock is unknown.

Numerous Quaternary aged (relatively young and potentially active) faults have been mapped in the Jackson area (Case, 1997, Machette et al, 2001), notably the East Gros Ventre fault, faults on the west side of West Gros Ventre Butte, and the Teton fault system along the east side (base) of the Teton Range. The surface trace of the Teton fault is located approximately 6 miles west of the project site. The mapped trace of the East Gros Ventre fault lies along the eastern base of East Gros Ventre Butte (Figure 2). This feature is mainly concealed beneath late Pleistocene to Holocene alluvium (Machette et al, 2001).

Two east-west trending buried fault segments, the Cache Creek thrust fault and the Jackson thrust fault, are mapped south of the project site (dotted lines with black triangles on Figure 2). The fault segments appear to be truncated by the north-south trending Teton fault system, and offset only the older geologic units (i.e., the Paleozoic and Tertiary aged rocks). These fault traces do not appear to offset the younger geologic units and therefore are inferred to be relatively old and inactive structures.



Map Symbols: Qa - Alluvium | Qf - Alluvial Fan Deposits | Qs - Swamp Deposits
Qc - Colluvium | Ql - Loess Deposits | Qt - Talus Deposits

From Love et al, 1992, Geologic Map of Grand Teton National Park, USGS I-2031

Geotechnical Investigation Report McCabe Property 185 North Glenwood Jackson, Wyoming	GEOLOGIC MAP	FIGURE 2

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4.3 Soils

Similar soil conditions were encountered in all of the boreholes drilled for this investigation. Borehole BH-1 was drilled to a depth of about 27 feet near the northeast corner of the site. Boreholes BH-2 and -3 were drilled to depths of about 27 and 28 feet in the lot's northwest corner and southeastern corner, respectively. A fourth borehole was planned for the alley on the lot's western side but was not drilled due to utility conflicts.

The site is underlain by stratified stream deposits consisting of fine-grained and coarse-grained alluvium. Some non-engineered fill was also encountered in the uppermost portion of the boreholes. As indicated by the borehole logs in Appendix A, most of the site is underlain by coarse sandy gravel and cobble alluvium. Based on field estimates, the coarse-grained alluvium consists of about 20-30% sand with the remainder of 5-inch minus subrounded gravel and cobbles. Adjusted blow count $(N_1)_{60}$ values in the coarse-grained alluvium are typically in the range of 20 to 50 bpf.

Two fine-grained deposits were encountered. The first was a 1 foot thick layer in borehole BH-2 at a depth of 24 feet. The deposit is very stiff, embedded with 1-inch minus angular weathered rock fragments, and appears to be an ancient landslide deposit from nearby West Gros Ventre Butte. This layer appears to lens out, as we did not encounter it in any of our other borings. The second fine-grained layer consisted of 10% sand, 30% subrounded 1-inch minus gravel, and 60% clay. This 1.4 foot thick layer was encountered at a depth of 25 feet below the ground surface in borehole BH-3. Given the sand and gravel content of this clay layer, we believe it is significantly different from the clay layer encountered in borehole BH-2 and likely lenses out as well. These thin, lenticular clays are unlikely to affect foundation performance

4.4 Groundwater

Groundwater was encountered in boreholes BH-1 and BH-2. At the time of our investigation in mid-September 2006, groundwater level varied from about 24.5 to 25.5 feet below the ground surface. Our site investigation was performed during what is typically considered the lowest time of year for groundwater levels. Groundwater levels at the site fluctuate in response to seasonal precipitation, long-term precipitation trends and flow levels in Flat and Cache Creeks.

Construction methods used for parking areas below grade will be informed by groundwater monitoring data from the well at borehole BH-2 through spring 2007. Recommendations for construction in areas of high groundwater are presented in Section 6.0

4.5 Earthquakes and Ground Shaking

Jackson Hole is located within the Intermountain Seismic Belt, a zone of seismicity that extends from southern Utah through eastern Idaho, western Wyoming, and western Montana (Smith and Arabasz, 1991). The Teton fault along the eastern margin of the Teton Range about 6 miles west of the project site is considered an important structural element of the Intermountain Seismic Belt. Predicted recurrence intervals for maximum credible earthquakes have passed for most of the fault systems capable of generating magnitude 7.5 events in western Wyoming (Case, 1997), implying that the risk of major earthquakes may be high.

Gilbert et al (1983) estimated that an earthquake of approximately magnitude M_s 6.5 might be anticipated along the Teton fault about once in 500 years, which is consistent with the design earthquake specified by the IBC (2006). Historically, no significant earthquake epicenters have been associated with the Teton fault, although earthquakes occurred in Jackson Hole along other faults during the last century. Research by Smith and others (1993), suggests that the southern portion of the Teton fault may have stored sufficient energy to produce a magnitude M_s = ~7.2+ earthquake. However, Machette, et al (2001), do not classify the Teton Fault as an active fault south of Phillips Canyon, and estimate that slip rates along the southern portion of the south end of the active fault (north of Phillips Canyon) and along fault splays in Phillips Canyon are less than 0.2 mm/yr (i.e., very low).

The recurrence interval for a magnitude 7.5 event on the Teton fault is estimated to be in the range 700 to 2,000 years (Case, 1997; Machette et al, 2001). To put this recurrence interval into perspective, an earthquake with a 10% chance of occurrence in 250 years (commonly used for design of major dams and sensitive structures) has an average recurrence interval of about 2,500 years. Such an event would cause shaking typical of the *maximum considered earthquake* (MCE). The owner should be aware that, although the *design* ground motion is consistent with the 2006 Internation Building Code (IBC) for the site, much larger earthquakes are possible, although the risk is smaller.

Site ground motion accelerations and a design response spectrum were derived in accordance with the general procedure defined in the 2006 International Building Code (IBC). The provisions of the 2006 IBC are intended to provide uniform levels of performance for structures, depending on their occupancy and use and the risk inherent to their failure.

The approach adopted in the 2006 IBC is intended to provide a uniform margin of safety against collapse at the *design* ground motion. The *design* earthquake ground motion is selected at a ground shaking level that is 2/3 of the *maximum considered earthquake* (MCE) ground motion. The MCE ground motion is defined with a uniform likelihood of exceedance of 2 percent in 50 years (a return period of about 2,500 years). The Site Ground Motion and Design Response Spectrum for the 2000 IBC is presented in Figure 3.

Earthquake Loads – Site Ground Motion and Design Response Spectrum 2000 International Building Code (IBC)*

Approximate Site Location: **Latitude = 43º 28'59" Longitude = 110º45'43"**

Mapped Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters: (Tables 1615 1-10)

Short Period (S_s) = **1.107**

1-Sec Period (S_1) = **0.400**

Site Class Definition:

D - Stiff Soil Profile – Site Class Definitions (Tables 1615.1.1)

Site Coefficients and Adjusted MCE Spectral Response Acceleration Parameters: [Equations 16-16 and 16-17 and Tables 1615.1.2(1) and 1615.1.2(2)]

S_{MS} = **1.173**

S_{M1} = **0.640**

F_a = **1.06** *interpolated from table

F_V = **1.60** *interpolated from table

Design Spectral Response Acceleration Parameters: [Equations 16-18 and 16-19]

S_{DS} = **0.782**

S_{D1} = **0.427**

*2006 International Building Code, Chapter 16, Section 1615 - Earthquake Loads – Site Ground Motion.

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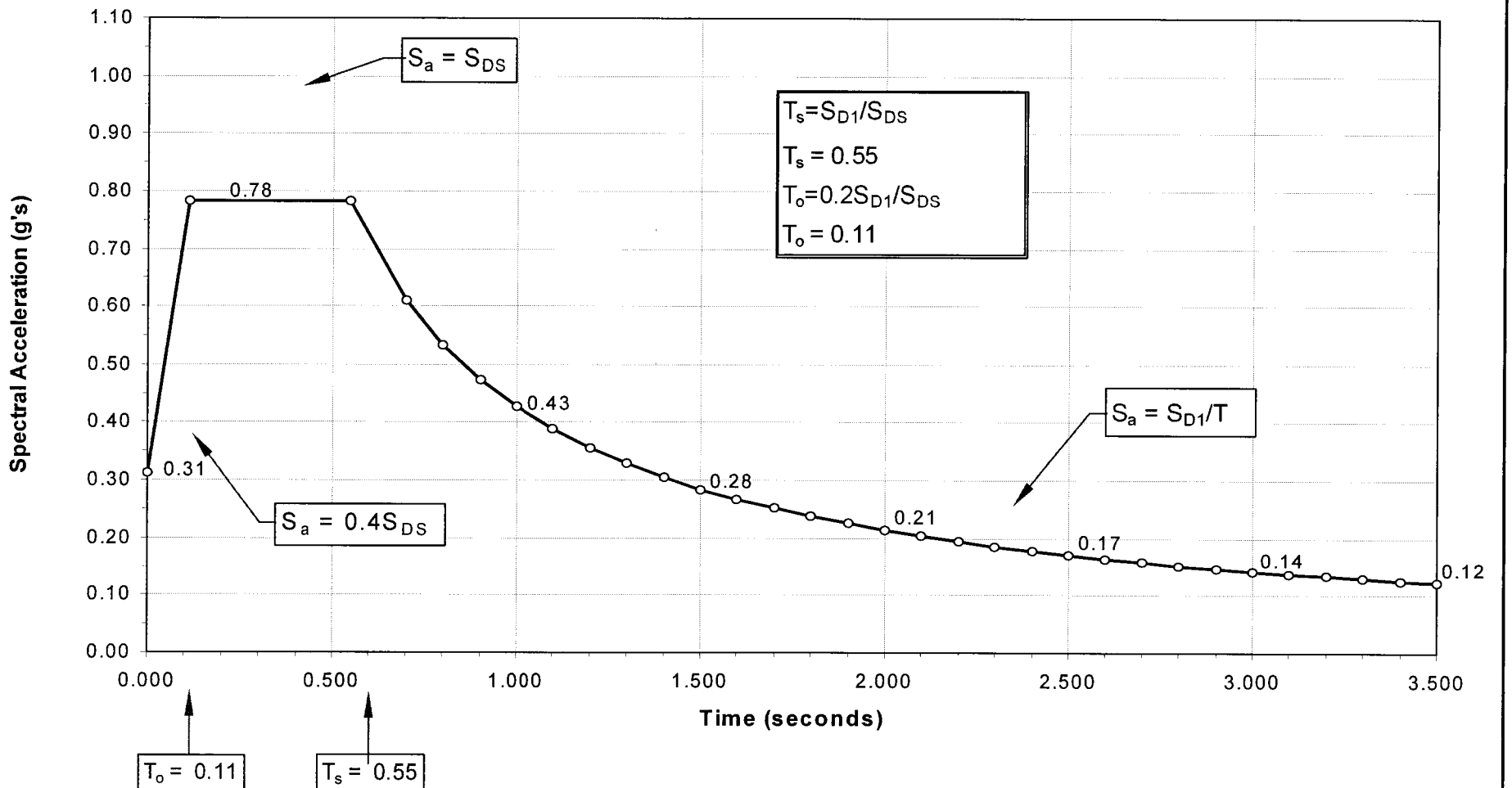
Design Response Spectrum (2006 IBC) - Site Class D
McCabe Property, North Glenwood Street, Jackson, Wyoming



	Geotechnical Investigation Report McCabe Property 1185 North Glenwood Jackson, Wyoming	DESIGN RESPONSE SPECTRUM

FIGURE 3

4.6 Liquefaction Potential

Loose, saturated sands and silty sands, and in some cases silts and gravels, may liquefy when exposed to seismic shaking. Liquefaction has been most prevalent in areas where loose saturated sand occurs within about 30 feet or less of the ground surface, but in some instances, liquefaction has been reported in saturated deposits up to 60 feet deep (EERI, 1994).

The boreholes drilled to a depth of about 27 feet encountered sandy gravel and cobbles under the site that appear to be too coarse and dense to liquefy in a seismic event. It is possible that liquefiable materials occur at greater depths. At this flat-lying location, liquefaction could potentially cause damaging differential settlement. However, there appears to be little risk of "lateral spreading", which is a major slope movement that is a common source of catastrophic failure during earthquakes.

4.7 Geologic Hazards

The owner should be aware that in the event of a large magnitude earthquake, there are several geologic hazards that could potentially cause damage to structures (Smith et al, 1993). Potential hazards at this site might include strong ground shaking, ground cracking, surface rupture along an un-mapped fault trace, and liquefaction (Section 4.6).

5.0 ENGINEERING ANALYSIS

5.1 Settlement

Foundation footings may be placed on the coarse-grained sandy gravel and cobbles. Significant consolidation of the dense coarse-grained gravel and cobble alluvium observed in the boreholes is not anticipated. Removal of topsoil and fill material from the upper 2-3 feet is necessary.

5.2 Bearing Capacity

Bearing capacity of soil refers to its ability to resist shear failure under load. The bearing capacity of the coarse-grained alluvial deposits was estimated using Meyerhof's bearing capacity equation for strip footings (Bowles, 1996). Soil properties were estimated based on visual soil classification. The average unit weight of the soil is estimated to be about 125 pcf, and the friction angle is estimated to be about 36 degrees (Pit Slope Manual, 1982; Huang, 1983). The foundation footings are assumed to be 16 inches wide, placed on the sandy gravel and cobble alluvium. Assuming continuous 16-inch strip footings, an allowable bearing capacity for the coarse-grained alluvial material is estimated to be about 5,000 psf for full dead and 50% live

load. If full dead and full live loads are considered, bearing capacity is estimated at 8,000 psf.

5.3 Lateral Pressures

Lateral pressures against foundation and retaining walls can be estimated using several methods, and there is no overwhelming consensus favoring any one technique. We have used what we believe to be reasonably conservative values that can be justified from normal practice and the technical literature. The main variables are assumptions regarding seismic forces, wall friction, and surcharge pressures created by slopes. As discussed above, the Jackson Hole area is potentially susceptible to ground shaking from earthquakes. A maximum horizontal seismic acceleration k_h in bedrock of 0.22g has been selected for this site (USGS, 2002). Lateral pressures have been calculated assuming horizontal backslope conditions. Table 5-1 summarizes lateral pressure parameters applicable to the site.

TABLE 5-1: Lateral Pressure Parameters

Condition	Coefficient of Earth Pressure	γK (equivalent fluid pressure)
Static Conditions		
Level Backfill	$K_o = 0.40$	55 pcf
	$K_a = 0.27$	35 pcf
	$K_p = 3.69$	480 pcf
Earthquake Conditions		
Level Backfill	$K_{ae} = 0.33$	43 pcf
Level Backfill	$K_{pe} = 3.49$	454 pcf

5.3.1 Active Pressures

For lateral pressure design of retaining walls, which are allowed to deflect and develop an active soil wedge, the calculated equivalent fluid pressure (γK_a) is about 35 pcf (pounds per cubic foot), assuming a horizontal ground surface behind the retaining wall. This pressure distribution would be equivalent to a force of approximately $18H^2$ pounds per horizontal foot of wall acting at one-third the wall height (H) above the base.

Research has indicated that lateral pressures due to earthquakes are non-hydrostatic in distribution, and the resultant acts above the lower third-point of the wall (Bakeer, et al, 1990). Accordingly, active soil pressures have been divided into two components that act at different wall heights. The static force acts at the lower third-point, as discussed above. The Mononobe-Okabe equations are often used to estimate dynamic forces against retaining walls. Although there is considerable debate about the theoretical applicability of these equations to rigid walls, they have been used for many years for seismic design and the performance record of

underground walls during earthquakes has generally been good. The Mononobe-Okabe equations were applied using half the maximum horizontal acceleration (Bowles, 1996; Whitman, 1990). This force would be in addition to static active earth pressure, equivalent to $4H^2$ pounds per horizontal foot of wall applied at 50% of the wall height above the base.

5.3.2 Passive Pressures

For passive pressures, an equivalent fluid pressure (γK_p) of about 480 pcf was estimated for static conditions and about 454 pcf for seismic conditions. Passive earth pressures were calculated using the Coulomb and Mononobe-Okabe equations, respectively (Bowles, 1996).

5.3.3 At-Rest Pressures

For lateral pressure design of foundation walls, which are restrained and not allowed to deflect, the calculated at rest earth pressure (γK_o) is about 55 pcf, assuming a horizontal ground surface behind the foundation wall. Use the at-rest pressure or the active pressure under seismic conditions for foundation wall design, whichever is greater.

5.4 Soil Friction

Terzaghi, et al (1996) suggests use of 30 degrees for the maximum friction angle along a concrete base in granular soils. Accordingly, a friction value of 0.58, which is the tangent of 30 degrees, is suggested. The friction value may be combined with the passive pressure to resist horizontal loads.

5.5 Shoring

It is our understanding that the basement footings may be more than 10 feet below ground surface. Shoring may be required adjacent to buildings and along the streets adjacent to the new building.

5.5.1 Shoring Alternatives

Shoring recommendations and alternatives include H-pile walls and soil nails. When a building design has been selected, this office should be involved in selection of shoring techniques, if necessary. Previous H-pile wall designs in this area have proven most effective when combined with tiebacks. This office is capable of designing the H-pile wall portion of the shoring, while design and construction of soil nail shoring elements is normally performed by specialized design/build contractors with assistance from our Geotechnical Engineer.

5.5.2 Soil Nail Design Parameters

We assume the soil nail design will be prepared by a specialized design-build contractor. The following parameters are recommended for design:

Unit weight: γ = 135 pcf
Friction angle: φ' = 36 degrees
Unit ultimate bond stress = 20 psi
K_a = 0.27
γK_a = 35 pcf
At least two sacrificial soil nails should be placed and tested to failure. During production, at least 3 soil nails should be tested to design loads.

6.0 RECOMMENDATIONS

6.1 Foundations

In our opinion, the coarse-grained sandy gravel and cobble alluvium below a depth of about 2 to 3 feet will provide adequate support for anticipated foundation loads of the proposed structure. Minor cracks in the foundation walls, floors, and sheetrock are normal and should not be a cause for concern. Excavation for the foundation footings should remove the upper 2 to 3 feet of finer-grained soil and fill, exposing the top of the underlying gravel and cobbles. Foundation footings may be placed directly on the coarse-grained alluvium. Given the depth and stiff character of the two clay layers encountered we believe that overexcavation will not be necessary.

To further reduce the risk from potential settlement, the owner may choose to compact the surface of the native alluvium prior to pouring the concrete footings. A vibrating, smooth-drum roller compactor or "whacker" may be used to densify the coarse-grained soils. If the groundwater level is above the bottom of the footing excavation, compaction may not be feasible.

Because of the possibility of relatively shallow groundwater conditions at the site, a full-basement or below grade parking structure may be vulnerable to seepage. If the owner and architect plan to construct the building with a full-basement or underground parking, we strongly recommend a foundation system that is fully waterproofed unless groundwater monitoring in spring 2007 indicates otherwise. The foundation footings, stem walls, and floor slab should be constructed as a monolithic unit to eliminate joints and completely wrapped with a waterproof membrane system. If necessary, adequate foundation reinforcement should be used to counteract buoyant forces that may be exerted on the floor slab.

Relying on a dewatering system to mitigate seepage into the lower levels of the building is not recommended. Mechanical means of dewatering may be problematical because of the high permeability of the coarse-grained alluvium and the anticipated large quantities of water that would need to be displaced. In addition, dewatering systems typically have high installation cost, long-term operation and maintenance expense, and reliability and water discharge issues.

During foundation construction, shallow groundwater may be encountered. Pumping to reduce water levels may be required during foundation construction. At this point we do not consider it

necessary to specify dewatering procedures during construction. Pumping may be required and discharge of water may be problematical at this site. Adequate planning is important to address proper discharge of the water. These issues will not be of concern if groundwater does not rise significantly from its current level.

A Structural engineer should review the plans to check that adequate support is provided to the foundation systems. Minor settlement of footings, foundation walls, and floor slabs may result in small fractures in the concrete walls, concrete floor slabs, and sheetrock. These occurrences are normal and should not be a cause for concern.

6.2 Final Grading and Backfilling

Properly compacted backfill will reduce settlement of the soil against foundation walls and beneath exterior concrete slabs. Exterior backfill around the building should consist of site materials placed in lifts no greater than 9 inches loose thickness and compacted. Existing site material may be used for exterior and utility trench backfill:

Structural fill should be used beneath exterior slabs-on-grade. Utility trenches should also be backfilled in lifts and compacted. Final grading should provide protection from frost. Do not overcompact exterior backfills against "green" foundation walls.

Prior to placement of structural fill for the foundation subgrade or exterior slabs-on-grade, the site should be cleared and grubbed. No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or structural fill.

6.3 Site Grading and Preparation

Properly compacted backfill and good site drainage are extremely important. Structural fill should consist of imported granular fill placed in lifts no greater than 9 inches loose thickness and compacted using the methods specification described below.

Pre-roll the surface to compact materials that have been disturbed during excavation with **five passes** (5 ton static weight) of a 5-ton vibratory roller. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.

Alluvial gravel and cobbles are relatively easy to compact, and due to the coarse granular nature of the materials, nuclear density testing can yield variable compaction results. Place coarse granular fill in lifts and compact using the methods specification described below. If the methods specification is consistently applied, density testing is not required. Gravel will

compact into a dense, strong, well-drained structural fill, and tight moisture control is usually not required.

Granular fill should be placed in a maximum loose lift thickness of 9-inches. Material should be compacted using a smooth drum or padfoot vibratory roller (vibratory mode). A minimum of **five passes** (5 ton static weight) of a vibratory roller should be applied to each lift. The actual number of passes should be determined by observing the compaction after each pass to determine if the surface is non-yielding. If the fill surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed. Fill should be placed in horizontal lifts.

All footings should be placed below the frost line. The building code for Teton County requires that footings be placed at a minimum depth of 36 inches from finished grade, with a minimum foundation exposure of 6 inches above finished grade.

Structural fill should be used beneath exterior slabs-on-grade. Do not overcompact exterior backfills against "green" foundation walls. Cohesive materials should be used in the upper 2 feet of the exterior backfill to provide a lower permeability cap.

Prior to placement of structural fill for exterior slabs-on-grade, the site should be cleared. No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or structural fill.

Final grading should provide positive drainage of at least 1 foot in the first 12 feet away from the structure unless the surface is paved. Adequate gutters or other roof runoff measures are strongly recommended. Roof runoff should be discharged at least 3 feet away from the building or exterior slabs.

OSHA regulations (29CFR1926) appear to classify the soil at the site as Type C based on the granular nature of the alluvial soil. Therefore, temporary cut slopes should be no steeper than 1.5H:1V for excavations less than 20 feet in height. A trench box may be used if necessary to reduce trench excavation during utility installation. The contractor shall be responsible for adherence to OSHA and other safety regulations.

6.4 Foundation Drainage

Foundation footing drains are not required for a building with a deep waterproof basement. Foundation footing drains are recommended if the basement is not waterproofed and is within 5 feet of seasonal groundwater highs.
building avoids shallow groundwater. Footing drains will reduce the potential for seepage from perched water.

Two drainage alternatives are illustrated on Figure 4. The least expensive technique would probably be a prefabricated composite drain. The composite drain consists of an open wick layer laminated to filter fabric to reduce infiltration of soil. The exterior (upslope side) of the wall is waterproofed, and the drain is laid against the waterproofing layer. The excavation is backfilled with compacted site material, as discussed in Section 6.3, and the drain is covered by at least 2 feet of compacted site soil, sloped to drain (minimum 10%). The composite drain is wrapped around a perforated drain pipe at footing level. The drain pipe may slope at a minimum of 0.5%, and drain to a sump.

An alternative technique would involve placement of clean angular drain gravel between the foundation wall and the edge of the excavation. The gravel backfill is wrapped in filter fabric and a drain pipe is place at the bottom of the trench. At least 2 feet of compacted backfill (sloped to drain) is placed above the gravel envelope. The advantage of this technique is that the gravel backfill can usually be placed without compaction, reducing backfill cost and difficulty.

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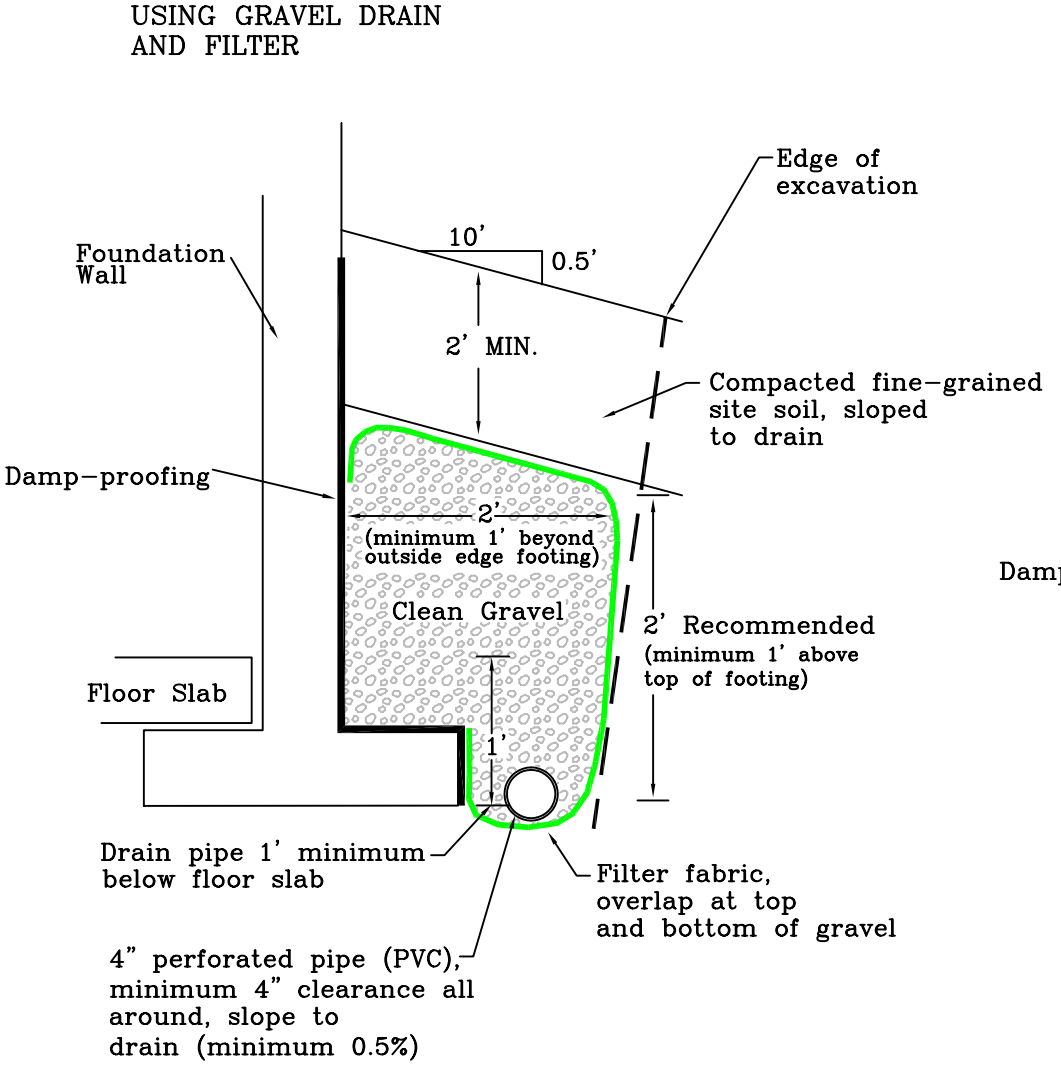
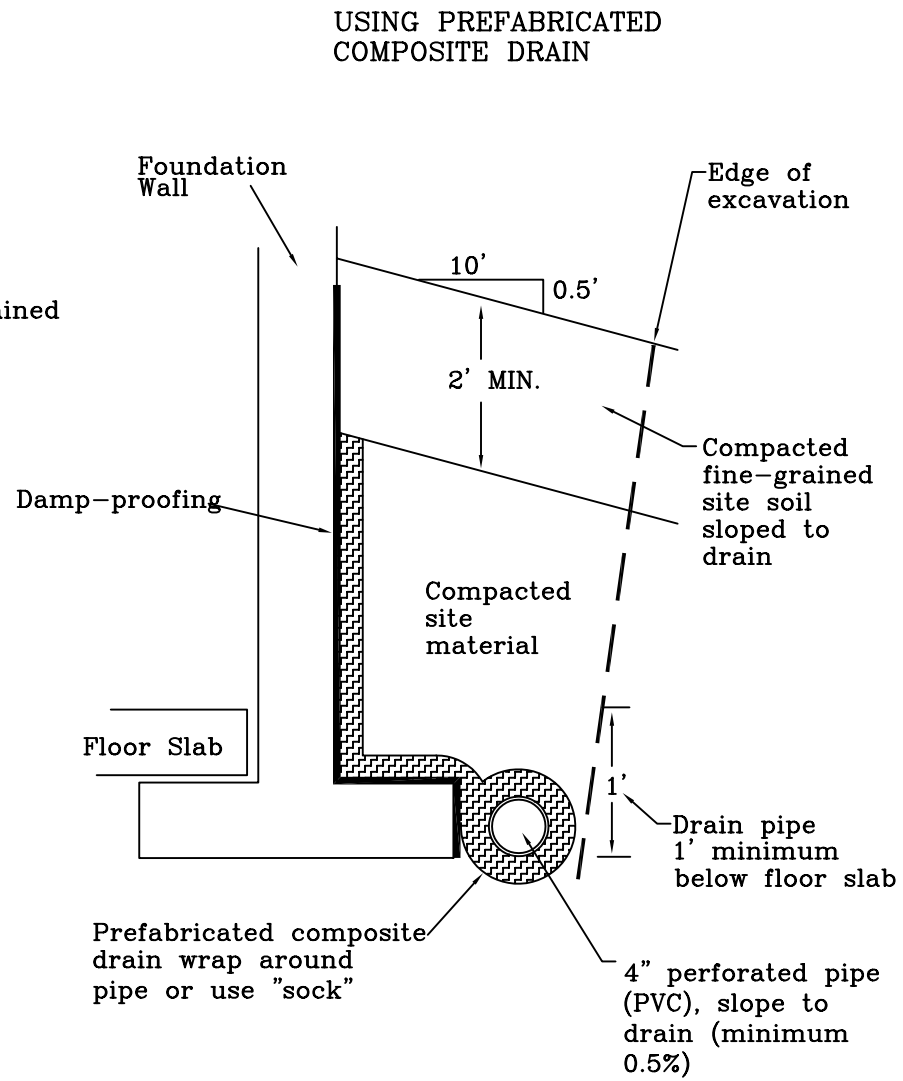




Geotechnical Investigation Report McCabe Property 185 North Glenwood Jackson, Wyoming	Foundation Drainage Alternatives	FIGURE 4

WOMACK AND ASSOCIATES, INC.

6.5 Interior Slabs-on-Grade

The recommendations in this section apply only if the basement has not been fully waterproofed and is within 5 feet of the seasonal water table. The interior floor slab should be at least 4 inches thick, and any slabs bearing vehicles should be at least 6 inches thick. Minor floor cracking of slab-on-grade construction is difficult if not impossible to prevent. Such cracking is normal and should be expected to occur with time. Buildings are almost never free of cracks, and cracking is caused by many factors other than soil movement, such as concrete shrinkage, normal activities, and daily and seasonal variability in temperature and humidity.

The following suggestions are recommended for standard slab-on-grade construction. An impermeable layer (usually plastic) is suggested beneath the slab, underlain by 4 inches of clean drain gravel that will act as a capillary break to reduce dampness (Figure 5). Two options are available to reduce the tendency for the concrete to crack as it dries. Three articles from the American Concrete Institute (ACI) that discuss these options are appended.

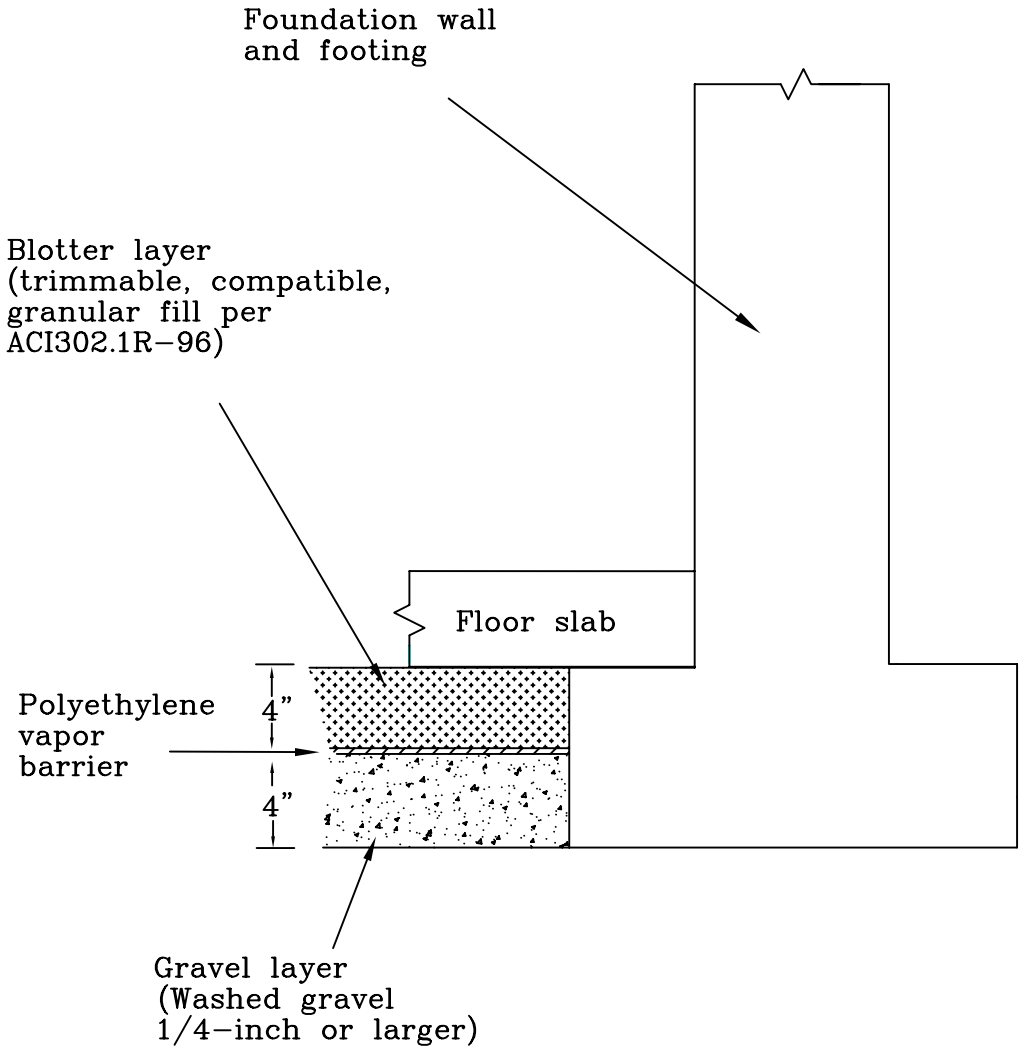
1. A blotter layer may be placed under the slab. In the past, loose sand has been used for this purpose, but is no longer recommended. A cover of 4 inches of trimmable, compactible, granular material may be placed over the sheeting to receive the concrete slab. This material usually consists of "crusher run material", which varies in size from about 1.5-inch down to rock dust. Alternatively, 3 inches of fine graded material such as crusher fines or manufactured sand may be used.

2. The blotter layer may be eliminated if the concrete is reinforced properly. The attached article entitled "Controlling Curling and Cracking in Floors to Receive Coverings" provides a discussion of proper floor slab reinforcement. If the contractor needs additional guidance on reinforcement, a structural engineer should provide it.

The Teton County Building Department also requires a ventilation system similar to that shown in Figure 5 for slab-on-grade construction in inhabited buildings. A ventilation system is not required for a deep basement or parking garage below the groundwater level.

6.6 Exterior Slabs-on-Grade

Exterior slabs (sidewalks, patios, driveways, etc.) typically sustain the greatest damage. Cracking is almost impossible to avoid, and freeze-thaw adds to the difficulty caused by soil consolidation. The fine-grained alluvium, topsoil, silt and clay fill material could potentially cause severe frost or settlement damage. The following suggestions may reduce differential movement of exterior slabs.



Schematic Drawing
Not to Scale

Geotechnical Investigation Report McCabe Property 185 North Glenwood Jackson, Wyoming	Interior Slab-on-Grade Detail	FIGURE 5

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WOMACK AND ASSOCIATES, INC.

Exterior concrete slabs should be at least 4 inches thick, 6 inches if supporting vehicles. Exterior slabs should not be tied to foundation walls. Any movement of exterior slabs may be transmitted to the foundation walls, resulting in damage. Posts for patios or other exterior columns should not bear on exterior slabs. If the slabs settle or rise, the movement can be transmitted to the post, resulting in damage to the structure.

Exterior slabs placed on fine-grained soils may be very susceptible to frost heave, and any exterior flat work placed on these soils may perform poorly. Performance of the slabs may be improved by placement of at least 6 inches, preferably 12 inches, of gravel beneath the slab. Expansion joints are recommended in all concrete flatwork.

6.7 Ventilation and Radon

Teton County Building Code requires that slabs below living spaces be ventilated and sealed. Ventilation should also be provided for areas under crawl spaces. Examination of the site for potential radon levels was beyond the scope of this report. If the owner wishes to pursue this matter, we can recommend appropriate contractors.

6.8 Reinforcing, Concrete Considerations, and Utilities Testing

Footings, slabs, and foundation walls should be reinforced to resist differential movement. We strongly recommend consultation with a structural engineer to specify adequate reinforcement. Exterior concrete should contain 5% to 7% entrained air. We recommend pressure testing of water and sewer lines before backfilling.

6.9 Observation during Construction

A representative of this office should observe construction of any foundation or drainage elements recommended in this report. Site grading, foundation excavations, and soil compaction should be observed be a representative of this office. If any suspicious soils or conditions are revealed during construction, this office should be notified immediately to survey the conditions and make necessary modifications.

7.0 LIMITATIONS

This report has been prepared based on a limited amount of data. Actual site conditions may vary. This report, including engineering analysis, recommendations, figures, and design details are exclusive to the referenced site. Under no circumstances shall the figures be separated from the text and used independently. Recommendations in this report are not applicable to other construction sites. These services have been performed in a manner consistent with the level of

care and skill ordinarily exercised by members of the profession currently practicing in this area under similar conditions. No other warranty is made or implied.

This report, including engineering analysis, recommendations, figures, and design details are exclusive to the referenced site. Under no circumstances shall the figures be separated from the text and used independently. Recommendations in this report are not applicable to other construction sites.

8.0 REFERENCES

American Association of State Highway and Transportation Officials, AASHTO Guide for Design of Pavement Structures 1993, Washington, D.C., 1993.

American Concrete Institute, 1997, Guide for Concrete Floor and Slab Construction: ACI 302.1R-96.

Bakeer, R.M., S.K. Bhatia, and I. Ishibashi, 1990, Dynamic Earth Pressure with Various Gravity Wall Movements *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen,ed): ASCE Geotechnical Special Publication 25, p. 887-899.

Bowles, J.E., 1996, Foundation Analysis and Design, 5th Ed.: McGraw-Hill.

Case, J.C., 1997, Earthquakes and Active Faults in Wyoming; Wyoming State Geological Survey, Preliminary Hazards Report 97-2.

Dames and Moore (URS), May 2000, Jackson LAUST Remedial Action Plan, Volume I 0f III, prepared for the Wyoming Department of Environmental Quality.

Earthquake Engineering research Institute (EERI), 1994, Earthquake Basics -- Liquefaction: Earthquake Basics Brief No. 1., EERI, Oakland California, 8p.

GeoScience and Engineering, Inc, 1998, Jackson LAUST Subsurface Investigation Report, Project CFB 0290-D, prepared to the Wyoming Department of Environmental Quality.

Gilbert, J.D., Ostenaa, D., and Wood, C., 1983, Seismotectonic study of Jackson Lake Dam and Reservoir: U.S. Bureau of Reclamation Seismotectonic Report 83-8, Minidoka Project, Idaho-Wyoming, 123P.

Holland, J.A., and W. Walker, 1998, Controlling Curling and Cracking in Floors to Receive Coverings: Concrete Construction, Publication Number C980603.

Huang, Y.H., 1983, Stability Analysis of Earth Slopes: Van Norstrand Reinhold Company, New York.

Hynes, M.E., and Franklin, A.G., 1984, Rationalizing the Seismic Coefficient Method: U.S. Army Corps of Engineers, Waterways Experiment Station, Miscellaneous Paper GL-84-13.

International Building Code, 2000, International Code Council, Inc, Chapter 16, Section 1615 Earthquake Loads – Site Ground Motion.

Love, J.D., and Albee, H.F., 1972, Geologic Map of the Jackson Quadrangle, Teton County, Wyoming: USGS Map I-769-A.

Love, J.D., Reed, J.C., and Cristiansen, A.C., 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming: Geologic Investigation Series Map I-2031, Scale 1:62,500.

Machette, N.M., Pierce, K.L., McCalpin, J.P., Haller, K.M., and Dart, R.L., 2001, Map and Data for Quaternary faults and folds in Wyoming, United States Geological Survey, Open-File Report 01-461.

Makdisi, F.I., and Seed, H.B.,1977, A Simplified Procedure for Estimating Earthquake-Induced Deformations in Dams and Embankments: Report UCB/EERC-77/19, U. California, Berkeley.

National Center For Earthquake Engineering Research (NCEER), 1997, Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils, Youd and Idriss eds.; Technical Report NCEER-97-0022, State University of New York at Buffalo.

Pit Slope Manual, 1982, Chapter 9, Waste Embankments; Canada Centre for Mineral and Energy Technology, CANMET Report 77-01.

Seed, H.B., and Idriss, I.M., 1982, Ground Motions and Soil Liquefaction During Earthquakes: Monograph Series, EERI, Oakland, California.

Seed, H.B., and Idriss, I.M., 1981, Evaluation of liquefaction Potential of sand deposits based on observations of performance in previous earthquakes: ASCE Insitu Testing To Evaluate Liquefaction Susceptibility, Preprint 81-544.

Smith, R.B. and Arabasz, W.J., 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D.B., Engdahl, E.R., Zoback, M.L., and Blackwell, D.D., editors, Neotectonics of North America: Geological Society of America, Decade Map Volume 1, p. 185-228.

Smith, R.B., Byrd, J.O.D., and Susong, D.D., 1993, The Teton fault, Wyoming: Seismotectonics, Quaternary History, and Earthquake Hazards, in Snoke, Q.W., Steidtmann, J.R., and Roberts, S.M., editors, Geology of Wyoming; Geological Survey of Wyoming Memoir No. 5, p. 628-667.

Suprenant, B.A., and W.R. Malisch, 1998, Where to Place the Vapor Retarder: Concrete Construction, Publication Number C980427.

Suprenant, B.A., and W.R. Malisch, 1999, Don't Use Loose Sand under Concrete Slabs: Concrete Construction, Publication Number C99C0223.

Terzaghi, K., Peck, R.B., and Mesri, G., 1996, Soil Mechanics in Engineering Practice, Third Edition, John Wiley & Sons, Inc., New York, New York.

Uniform Building Code, 1997, Division IV Earthquake Design: ICBO, p. 2-9 to 2-22.

U.S.Geological Survey National Seismic Hazard Mapping Project, June of 1996, Peak Acceleration (%g) with 10% Probability of Exceedance in 50 Years, Internet Address – http://geohazards.cr.usgs.gov

Whitman, R.V., 1990, Seismic Design and Behavior of Gravity Retaining Walls *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen ed): ASCE Geotechnical Special Publication 25, p. 817-842.

Womack & Associates, September 2006, McCabe Property Phase I Environmental Report. 4 pp.

Youd, T.L., et al, 2001, Liquefaction Resistance of Soils, Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils; Journal of Geotechnical and Geoenvironmental Engineering, Vol. 127, No. 10, October 2001.

APPENDIX A

BOREHOLE AND MONITORING WELL LOGS

WOMACK & ASSOCIATES, INC.
Geotechnical Engineering
Geology

P.O. Box 12650
Jackson, WY 83002
Telephone: (307) 733-7209
Fax: (307) 733-8005

TEST HOLE LOG

PROJECT NAME: McCabe Property, corner of Gill and Glenwood	DATE: 9/14/06
PROJECT LOCATION: Jackson, Wyoming	HOLE NO.: BH-1
TEST HOLE LOCATION: Northeast corner of lot	

ELEVATION G.S. (ft.):	TOTAL DEPTH (ft.): 27	GROUNDWATER LEVEL (ft.): 25.5	MEASURED FROM: Surface
DRILL TYPE: Sonic	HAMMER:	DRILL CO: ProSonic	DRILLER: Gabriel	LOGGED BY: cro

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1–27								0.0-2.0ft FILL: Moist, dark brown, loose, massive, sandy GRAVEL, clasts subangular to 3" diameter 2.0-3.5ft FILL: Moist, dark brown to black, loose, massive, sandy (20%), angular GRAVEL to 2" diameter 3.5-8.0ft ALLUVIUM: Slightly moist, brown, dense, massive, SAND (60%), and fine grained to coarse subangular GRAVEL to 2" diameter 8.0-13.0ft ALLUVIUM: Slightly moist, light brown to tan, dense, massive, sandy (30%) subrounded GRAVEL (40%) and COBBLE (30%) to 5" diameter 13.0-14.0ft ALLUVIUM: Slightly moist, reddish brown, dense, soft, massive, clayey (<10%), sandy (30%) GRAVEL and COBBLE to 4" diameter 14.0-17.0ft ALLUVIUM: Slightly moist, tan/reddish brown, dense, massive, sandy (30%), GRAVEL and COBBLE to 6" diameter 1/3 of which are severely weathered 17.0-18.0ft ALLUVIUM: Slightly moist, white, dense, massive, silty sandy GRAVEL and COBBLE to 2" diameter 18.0-21.0ft ALLUVIUM: Moist, reddish brown, dense, massive, sandy (20%) GRAVEL and sandstone COBBLE to 2" diameter 21.0-22.0ft ALLUVIUM: Moist, tan, dense, massive, fine SAND (80%), medium gravel 22.0-25.5ft ALLUVIUM: Moist, light brown, dense, massive, medium to coarse sand (30%), GRAVEL and COBBLE (60%) to 3" diameter 25.5-27.0ft ALLUVIUM: As above, wet Groundwater level at 25.5' on 9/20/06.					

TEST_HOLE_LOG2 REVISED MCCABE0906.GPJ WOMACK.GDT 10/18/06

WOMACK & ASSOCIATES, INC.
Geotechnical Engineering
Geology

P.O. Box 12650
Jackson, WY 83002
Telephone: (307) 733-7209
Fax: (307) 733-8005

TEST HOLE LOG

PROJECT NAME: McCabe Property, corner of Gill and Glenwood	DATE: 9/15/06
PROJECT LOCATION: Jackson, Wyoming	HOLE NO.: BH-2
TEST HOLE LOCATION: Northwest corner of lot	

ELEVATION G.S. (ft.):	TOTAL DEPTH (ft.): 27	GROUNDWATER LEVEL (ft.): 24.5	MEASURED FROM: Surface
DRILL TYPE: Sonic	HAMMER:	DRILL CO: ProSonic	DRILLER: Gabriel	LOGGED BY: cro

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION / COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1–2								0.0-2.0ft FILL: Moist, dark brown, medium stiff, silty sandy angular GRAVEL to 2" diameter					
2–3								2.0-2.6ft ALLUVIUM: Slightly moist, light brown, dense, massive, sandy GRAVEL with subrounded COBBLES to 4" diameter					
3–5								2.6-4.7ft ALLUVIUM: Slightly moist, light brown, massive, dense, coarse sand (20%), fine grained GRAVEL (40%) and subrounded COBBLE (40%)					
5–7								4.7-7.0ft ALLUVIUM: Slightly moist, light brown, dense, coarse sand (20%), fine grained GRAVEL (40%) and subrounded COBBLE (40%)					
7–13								7.0-13.0ft ALLUVIUM: Slightly moist, light brown, massive, dense, sandy (20%) GRAVEL (60%) and cobbles (20%) to 4" diameter					
13–14								13.0-14.0ft ALLUVIUM: Moist, brown, massive, dense, soft, clayey (5%), coarse sandy (20%), GRAVEL and subrounded COBBLE to 4" diameter					
14–17								14.0-17.0ft ALLUVIUM: Slightly moist, tan, massive, dense, silty sandy GRAVEL and COBBLES to 3" diameter					
17–18			19,22,19	21	80			17.0-18.5ft ALLUVIUM: Moist, light brown to brown, massive, firm, clayey coarse sandy GRAVEL with abundant 1" angular rock fragments					
18–20								18.5-20.3ft ALLUVIUM: Moist, brown, massive, dense, clayey coarse sandy GRAVEL 1" to 2" diameter					
20–23								20.3-23.0ft ALLUVIUM: Slightly moist, reddish brown, massive, dense, SAND (40%), subrounded GRAVEL to 2" diameter					
23–24		D1				3		23.0-24.0ft ALLUVIUM: Moist, brown, massive, dense, gravelly (20%) medium to coarse SAND					
24–26								24.0-25.0ft COLLUVIUM: Moist, brown with highly weathered rock fragments purple, green and red, massive, stiff to very stiff, CLAY					
26–27		U1						25.0-27.0ft ALLUVIUM: Wet, brown, massive, dense, silty coarse SAND and fine GRAVEL					
27–31								Groundwater level at 24.5' on 9/20/06. Completion: 4" PVC slotted pipe 17-27', 4" PVC solid pipe to surface, sand backfill 12-27', bentonite					

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Geotechnical Engineering
Geology

P.O. Box 12650
Jackson, WY 83002
Telephone: (307) 733-7209
Fax: (307) 733-8005

TEST HOLE LOG

PROJECT NAME: McCabe Property, corner of Gill and Glenwood

DATE: 9/15/06

PROJECT LOCATION: Jackson, Wyoming

HOLE NO.: BH-2

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
33								12' to surface, 6" steel flush mount cover at surface.					
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Fax: (307) 733-8005

TEST HOLE LOG

PROJECT NAME: McCabe Property, corner of Gill and Glenwood	DATE: 9/15/06
PROJECT LOCATION: Jackson, Wyoming	HOLE NO.: BH-3
TEST HOLE LOCATION: East side of lot	

ELEVATION G.S. (ft.):	TOTAL DEPTH (ft.): 28.5	GROUNDWATER LEVEL (ft.): NA	MEASURED FROM: Surface
DRILL TYPE: Sonic	HAMMER:	DRILL CO: ProSonic	DRILLER: Gabriel	LOGGED BY: cro

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1–6								0.0-1.0ft FILL: Moist, dark brown, loose to soft, clayey sandy GRAVEL and subangular COBBLE to 2" diameter 1.0-7.0ft ALLUVIUM: Slightly moist, light brown, dense, massive, sandy GRAVEL and subrounded COBBLE to 4" diameter					
7–8		D1	29,38,34	25	80			7.0-8.5ft ALLUVIUM: Slightly moist, tan to white, medium dense, massive, sandy (10%),					
9–16								8.5-17.0ft ALLUVIUM: Slightly moist, tan, dense, massive, sandy (20%) GRAVEL with cobbles to 4" diameter					
17–18		D2	32,29,28	30	100			17.0-18.5ft ALLUVIUM: Slightly moist, tan to brown, massive, dense, sandy (10%) GRAVEL, with angular clasts to 1" diameter					
19–24								18.5-25.0ft As above					
25–26								25.0-26.4ft ALLUVIUM: Moist to wet, brown, massive, stiff, sandy (10%), subrounded gravel to 1" diameter (30%), CLAY					
27–28		D3	23,34,44	53				26.4-27.0ft ALLUVIUM: Moist, brown, massive, dense, silty sandy medium GRAVEL					
29–31								27.0-28.5ft ALLUVIUM: Moist, brown, massive, dense, silty sandy GRAVEL					

APPENDIX B

SPT BLOW COUNT ADJUSTMENTS

McCabe Property 6-Oct-06
N1(60) CALCULATION

BH #	DEPTH	N(BL/FT)*	RS**	ER	UNIT WT	AV WT	AVDEP	SWL	OB'	CN	CS	CROD	ORIGIN	TYPE	(N1)60
BH-2	17-18.5	38	1	1	135	135	18	24.5	1.22	0.91	1.00	0.6	Qc	SaGravel	21
BH-3	7-8.5	68	1	1	135	135	8	29	0.54	1.36	1	0.2667	Qc	SaGravel	25
	17-18.5	56	1	1	135	135	18	29	1.22	0.91	1.00	0.6	Qc	SaGravel	30
	27-28.5	78	1	1	135	135	28	29	1.89	0.73	1	0.9333	Qc	SaGravel	53

APPENDIX C

CONCRETE SLAB AND DRAINAGE PUBLICATIONS

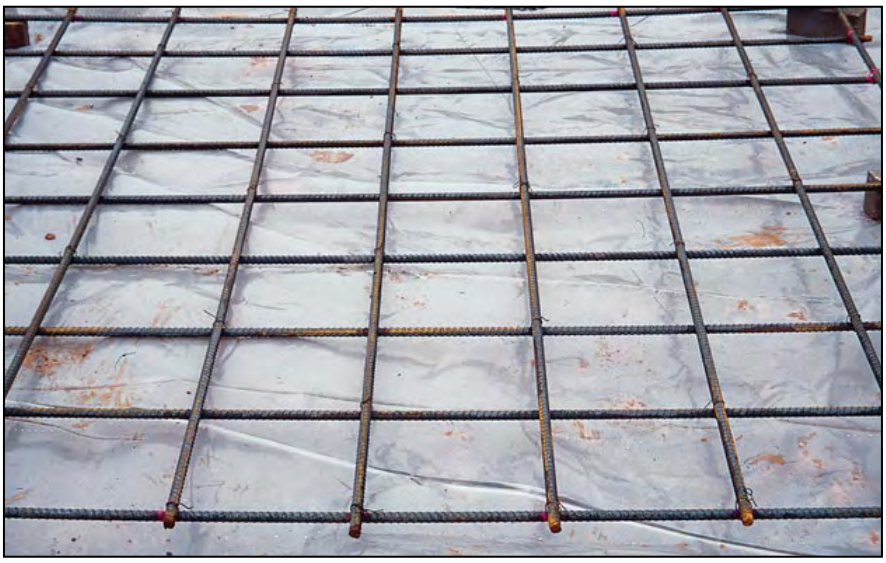
Controlling curling and cracking in floors to receive coverings

Do you worry about excessive cracking or curling in concrete floor slabs placed directly on a vapor retarder? Here are some hints on using reinforcing steel to minimize these defects and avoid floor-covering failures.

By Jerry A. Holland and Wayne Walker

Because of an increasing number of moisture-related floor-covering failures in the past several years, some designers now recommend eliminating the granular blotter layer that's often used between the concrete and the vapor retarder or vapor barrier. Though a blotter layer offers several advantages, it can hold water from many possible sources and cause problems if the floor will receive moisture-sensitive coverings such as sheet vinyl, rubber, wood or similar materials (see reference).

Many designers, however, are reluctant to place concrete directly on a vapor retarder because they fear the floor slab will curl or crack excessively. These defects also can cause floor-covering failures that, in some cases, require remedial work after the building is in service. However, with the correct positioning and amount of reinforcing steel, both curling and cracking can be controlled.



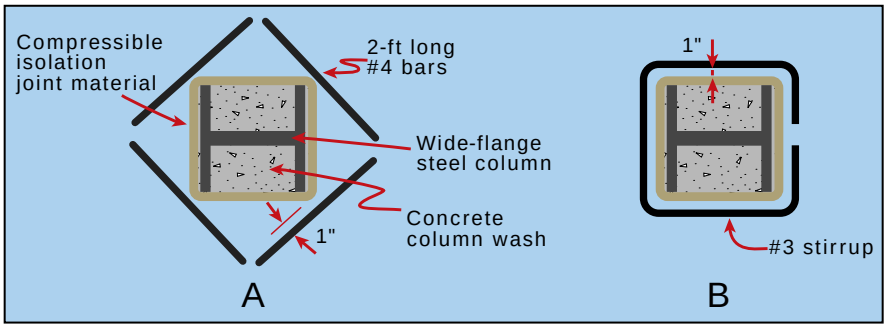
Rebar in concrete slabs placed directly on a vapor retarder help to control slab curling and cracking. Use supported deformed bars no smaller than #4, and space the bars far enough apart so workers can step between them.

Positioning is key

Cracks in a slab-on-grade floor surface are wider at the top than at the bottom. For the best crack control, then, you want the reinforcing steel to be as close to the surface as possible. And you must be able to control the location of the steel so it doesn't change during floor construction. Because of this, I prefer to use supported deformed bars no smaller than #4 instead of light-gauge mesh. Smaller-diameter bars are too limber, requiring too many bar supports, and light-gauge mesh is difficult to keep in the correct location.

For a 5-inch-thick floor slab, I prefer to use #4 bars near the top with 1 inch of clear cover, or #5 bars with 1½ inches of clear cover. For #5 bars, greater cover depth is needed to control plastic settlement cracking over the bar.

Typically, I specify #4 bars spaced 18 inches on center both ways. This amount of steel holds crack faces together tightly enough for nonrigid floor coverings by maintaining aggregate interlock and significantly reducing slab curling. In some instances, closer spacing or larger-diameter bars may be needed. Constructability becomes an issue when bar spacing is so close that workers



Eliminate the normal isolation-joint box outs at wide-flange steel columns by wrapping the column with compressible material and using 2-foot lengths of #4 bars (A) to control cracking at the reentrant corners. To speed up steel placement at the columns, have the rebar supplier fabricate continuous #3 stirrups that workers can easily bend open to fit around the column (B). In either case, the steel should be positioned with a top-and-side clear cover of 1 inch.

can't step into openings between bars. Then larger-diameter bars may be the better choice.

Eliminate joints

Because the reinforcing steel limits crack width, I prefer to eliminate contraction joints and the traditional diamond-shaped isolation joints at columns when floors will receive a covering. I suggest wrapping wide-flange steel columns for the full floor depth with ⅛- to ¼-inch-thick compressible isolation-joint material. For floors receiving coverings that won't tolerate wide cracks, such as ceramic tile, I also suggest placing four 2-foot-long #4 bars near the floor surface, with a top-and-side clear cover of 1 inch to control reentrant-corner cracking (Fig. A). As an alternative, the rebar supplier can fabricate #3 bars as a continuous stirrup that can easily be bent open so the ironworker can fit it around the column (Fig. B). This speeds placement of the steel when there are many columns to be treated. The stirrups also should have a 1-inch top-and-side clear cover.

Carpeting or other floor coverings can tolerate larger crack widths in the concrete subfloor without noticeable distress. When these coverings are used, crack-control measures at columns may not be needed. Simply wrap the columns to isolate them from the slab.

Construction considerations

Some designers use an upper and lower layer of reinforcing steel in the slab to control cracking at both the top and bottom. However, bottom-crack width doesn't affect floor-covering performance. And some of the advantages of these double layers of rebar are offset by placement difficulties; workers spreading the concrete have trouble stepping around the rebar and may displace it during concrete placement.

If the concrete is tailgated or struck off by a self-propelled laser-guided screed, ironworkers can lay out a single layer of steel on the vapor retarder and chair it up as concrete placement and strike-off proceeds. To prevent damage to the vapor retarder, workers can lay down thin sheets of plywood or several folds of plastic sheeting beneath the tires of the concrete truck or the screed. These materials are then moved back as the pour proceeds. The same procedure will help prevent damage to the vapor retarder if motorized buggies are used to place the concrete.

If the concrete is placed by pump or conveyor, all the steel can be chaired up before the pour begins, provided there's enough space between the rebar for workers' feet. If control of crack width requires rebar spacings of a foot or less both ways, I sometimes require placement of a heavy-gauge welded-wire fabric (4x4-inch spacing of 4-gauge wire) on top of the bars. Workers can easily walk on this mesh without sinking into the concrete or twisting their ankles. The closely spaced mesh wires improve crack control, and the material cost is about the same because you can reduce the rebar diameter and maintain about the same steel cross-sectional area.

Weighing the costs

Although controlling curling and cracking by using rebar in the way I've described increases project costs by requiring more than the normal amount of steel, part of this cost increase is offset by savings in other areas. You eliminate the costs associated with overexcavation to accommodate the blotter-layer thickness and for purchasing, placing and compacting the granular material used for the layer. You also save money because workers don't have to cut contraction joints and fill them with a sealant. Nor do they have to form and strip column box outs and place the in-fill concrete later.

Use of a blotter layer is still a viable alternative for controlling curling and cracking. But if the floor will receive a moisture-sensitive floor covering and the blotter layer picks up excessive moisture before, during or after floor construction, a flooring failure is likely. The cost of correcting the failure almost always will be much higher than the cost of using more reinforcing steel.

Jerry A. Holland is structural engineering consultant and Wayne Walker is senior structural engineer for Lockwood Greene Engineers Inc., Atlanta. Holland has more than 30 years of experience and Walker has 20 years of experience designing and troubleshooting concrete slabs on grade.

Reference

Bruce A. Suprenant and Ward R. Malisch, "Where to Locate the Vapor Retarder," *Concrete Construction,* May 1998, pp. 427-433.

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Where to place the vapor retarder

For slabs on grade, should the vapor retarder be located under a granular layer or directly under the concrete? Here are the pros and cons of each location.

By Bruce A. Suprenant and Ward R. Malisch

In the real estate industry, location is everything. The importance of location also applies to a hotly debated topic in the concrete industry—where to place the vapor retarder (or vapor barrier) for slabs on grade. Some specifiers require concrete to be placed directly on the vapor retarder, and others require placement of a granular blotter layer between the concrete and the vapor retarder. Advocates of each option argue that their preference results in a better concrete slab.

Like all engineering decisions, the location of a vapor retarder often is a compromise between minimizing water-vapor movement through the slab and providing the desired short- and long-term concrete properties. However, specifiers must consider the benefits and liabilities of the choice they make.

The case for a granular layer

Finishers prefer concrete placed on a granular base because the base absorbs mix water, shortens the bleeding period and allows floating to start earlier. Australian researchers noted that 4½-inch-slump concrete placed on a granular base lost its bleedwater sheen about two hours faster than the same concrete placed directly on a vapor barrier (Ref. 1).

Base conditions also affect concrete stiffening. In tests performed by The Aberdeen Group, 2½-inch-slump concrete was used for two 4x4-foot, 4-inch-thick slabs. One slab was placed directly on a vapor retarder and the other on a crushed-stone base. Technicians periodically set a steel-shot-filled rubber boot weighing 75 pounds on the surface and measured the footprint indentation (Fig. 1). Concrete on the stone base had stiffened enough after 90 minutes to allow a ¼-inch footprint



Figure 1. Concrete is generally considered to be ready for floating when finishers leave a ¼-inch-deep footprint in the surface. Using a boot filled with steel shot (inset) to produce footprints, we found that 2½-inch-slump concrete placed on a stone base was ready for floating about 45 minutes earlier than the same concrete placed directly on a vapor retarder.

indentation, an indication that floating could begin. Concrete placed directly on the vapor retarder required 45 more minutes of stiffening time before it was ready for floating.

Specifiers who require a granular blotter layer cite additional benefits, saying there is less chance of :

- Puncturing the vapor retarder
- Surface blistering or delaminations caused by an extended bleeding period
- Settlement cracking over reinforcing steel
- Slab curling during drying
- Cracking caused by plastic or drying shrinkage

Many specifiers recommend a 3- or 4-inch-thick layer of trimmable, compactible, self-draining granular fill for the blotter layer. Although concrete sand is sometimes recommended, it doesn't provide a stable working platform. Concrete placement and workers walking on the sand can disturb the surface enough to cause irregular floor thickness and create sand lenses in the concrete.

The case for placing concrete on a vapor retarder

Floor-covering contractors prefer to install their products on concrete slabs that are placed directly on a vapor retarder. If the vapor retarder effectively reduces moisture inflow from external sources, only water in the concrete pores must exit the slab. They believe the often-required vapor-emission rate of 3 pounds/1,000 square feet/24 hours is achieved faster under these conditions. They also believe the uncovered vapor retarder acts as a slip sheet, reducing slab restraint and thus reducing random cracking.

Placing concrete directly on a vapor retarder also eliminates a potential water reservoir that's created when using a blotter layer. Because more subgrade soil must be removed to accommodate the additional 3- to 4-inch-thick blotter layer, the layer is more likely to be placed below finished-grade level, thus increasing the chance of its holding water.

Specifiers who require concrete to be placed directly on the vapor retarder cite these additional advantages:

- Reduced costs because of less excavation and no need for additional granular material
- Better curing of the slab bottom, since the vapor retarder minimizes moisture loss
- Less chance of floor moisture problems caused by water being trapped in the granular layer
- Less radon-gas infiltration

These specifiers recommend using a low water-cement-ratio concrete and water-reducing admixtures to reduce bleeding, shrinkage and curling of concrete placed directly on the vapor retarder. They believe the higher-quality concrete and better curing reduces cracking and produces a better floor.

Table 1. Amount of water in granular layer per 1,000 square feet of floor*

Layer thickness	Water absorbed	Water in voids	Total water
2 in.	220 lbs	2,080 lbs	2,300 lbs
3 in.	330 lbs	3,120 lbs	3,450 lbs
4 in.	440 lbs	4,160 lbs	4,600 lbs

*Well-graded, compactible granular-base material with assumed density of 130 pounds per cubic foot, 1% absorption capacity and 20% voids. A 7% to 8% moisture content would normally be needed to achieve the compaction density typically required.

Granular layer as a water reservoir

When a low-permeability floor covering will be installed on a concrete floor, special care is needed during construction to control moisture content of the subgrade, subbase or granular layer (if used over the vapor retarder). It's best to place the floor after the building is enclosed and the roof is watertight. On many projects, however, this isn't possible, and the granular layer can become a water reservoir.

Water sources and access points. To provide unrestricted floor access for construction activities such as tilt-up panel forming and casting, columns sometimes aren't erected and column blockouts aren't filled until months after floor placement. But rainwater can enter column blockouts that are left open. It can also penetrate joints and cracks, utility penetrations or open closure strips, and increase the moisture content of the subgrade, capillary break or granular layer.

Excessive sprinkling of a granular layer before concrete placement can create a moisture reservoir that will delay drying of the concrete floor. ACI 302.1R-96 (Ref. 2) recommends that the base be dry at the time of concreting unless severe drying conditions exist.

Wet-curing methods such as ponding or continuous sprinkling allow water to enter joints, cracks and other openings, again contributing to a higher than necessary moisture content beneath the floor slab.

Water from construction operations on a newly placed slab also can increase the granular-layer moisture content by entering joints, cracks or slab openings. Such operations include joint sawing, abrasive wet blasting or wet grinding, which may be needed to achieve a flatter floor profile. Sometimes power washing is used to clean debris or other contaminants from the floor.

Most slabs are constructed using a strip-placement sequence that leaves the granular layer exposed to rainwater in uncompleted portions of

the slab. Rollings (Ref. 3) determined that a tile-floor failure was caused by rainwater accumulating in a 3-inch-thick sand layer placed between a 5-inch-thick concrete slab and a polyethylene vapor retarder. One portion of the slab had been left uncompleted for an extended period, exposing the sand layer to prolonged rain and turning it into a reservoir of trapped water.

Water capacity of the granular layer. Table 1 shows the maximum amount of water that can be held in a layer of well-graded, compactible granular-base-course material of various thicknesses. If the floor concrete contained 250 pounds of mix water per cubic yard, 1,000 square feet of 6-inch-thick floor would contain 4,630 pounds of mix water. As shown in Table 1, a 4-inch-thick granular layer under the floor can contain about the same amount of water. And if sand or other high-void-content granular materials are used, the water capacity is much higher.

If the 250 pounds of mix water are used in concrete with a water-cement ratio of 0.50, about 100 pounds of the water will be free water that must evaporate as the floor dries (Ref. 4). Thus a 6-inch-thick, 1,000-square-foot floor slab would hold 1,850 pounds of free (evaporable) water.

Based on Brewer's work (Ref. 5), it would take about 82 days, or roughly three months, for enough free water to evaporate and produce a water-vapor emission rate of 3 lbs/1,000 sf/24 hours. A saturated 2-inch-thick granular layer would need to lose as much water as the concrete. And the water in the layer must move through the concrete. Thus it's likely that a 2-inch-thick saturated, well-graded granular layer could double the time required for the slab vapor-emission rate to reach 3 lbs/1,000 sf/ 24 hrs. It could even prevent the slab from ever reaching that emission rate.

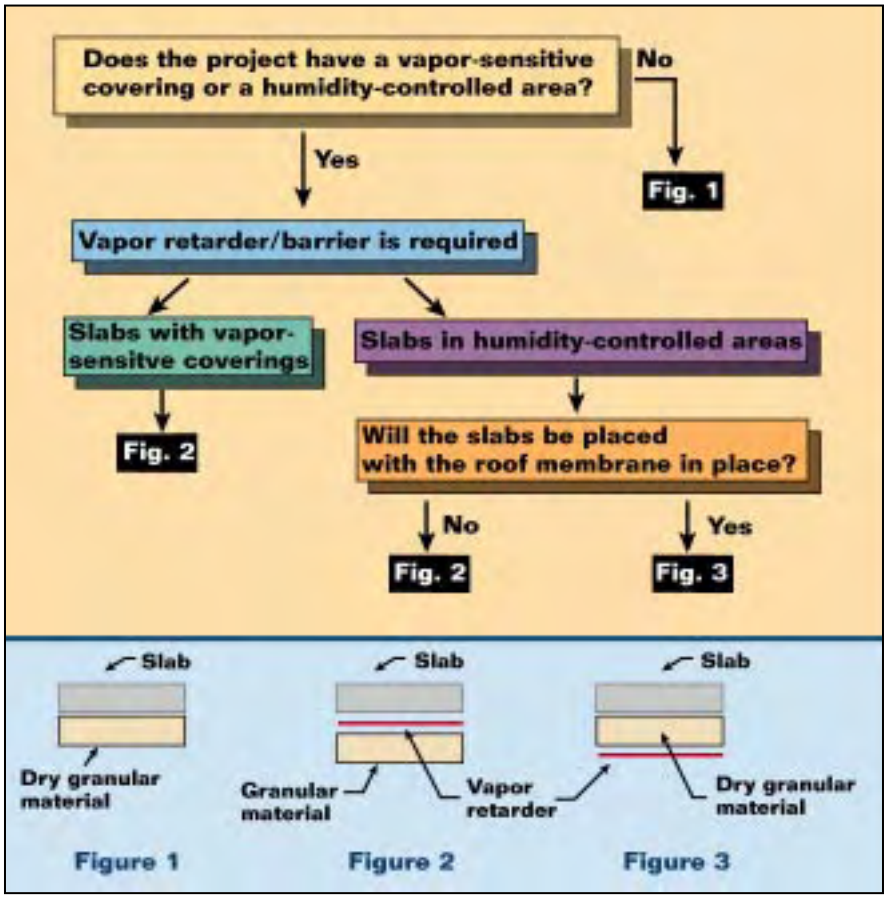

Figure 2. This flow chart helps designers decide if a vapor retarder or barrier is needed and where it should be placed.

Weighing the alternatives

Consulting engineers Jerry Holland and Wayne Walker, Lockwood-Greene Engineers, Atlanta, have developed a flow chart to help designers decide if a vapor retarder is required and, if so, where to place it (Fig. 2).

The chart gives designers the following three options based on the floor's in-service environment and the presence or absence of a vapor-sensitive floor covering:

- Use no vapor retarder
- Use a vapor retarder directly below the slab
- Sandwich a granular layer between the vapor retarder and the slab

ACI Committee 360 is considering inclusion of the flow chart in ACI 360R, *Design of Slabs on Grade*. Because curling is a major concern when concrete is placed directly on the vapor retarder or barrier, notes in the flow chart will provide suggested design options for minimizing curling effects.

Establishing responsibility for moisture-related floor problems

Consider the following scenario based on a concrete subcontractor's actual experience. The subcontractor places and finishes a concrete floor. Flatness and levelness measurements show specification compliance, and test reports indicate the 28-day compressive strength is acceptable. He leaves the job and submits his bill.

Two months later, he's called back by the general contractor. Rainwater has penetrated the slab, which has curled. The floor-covering contractor is concerned about high water-vapor emission rates, and the general contractor worries that the required slab drying time will delay project completion.

The concrete subcontractor is being held responsible for:

- Curling, even though floor flatness met specifications when measured within 72 hours after concrete placement as required by ACI 117-90, *Standard Specification for Tolerances for Concrete Construction and Materials*
- Protecting the slab from external moisture, even though he has completed all the concrete work and is no longer at the site
- Water-vapor emissions from the slab, even though the general contractor followed specification requirements by placing a granular layer over a vapor retarder
- Delays in completion of the project due to these problems

Sound familiar? On this project, the floor contractor returned at his own expense to grind the slabs and minimize curl. Luckily, he was able to convince the design team that the other issues were not his responsibility.

All of these issues should be resolved with the general contractor, design team and owner *before* the slab is placed. Concrete subcontractors should be held responsible for flatness and levelness within the time frame designated by ACI tolerance standards, but not longer. General contractors should be responsible for protecting the slab from external moisture. Only they can coordinate and direct the services of the roofer, excavator and other subcontractors who can help to minimize moisture infiltration. And, unlike the concrete subcontractor, the general is on the project from start to finish.

Concrete subcontractors need to resolve these issues at prepour planning meetings. If they don't, they had better be prepared for the phone call telling them they're responsible for fixing problems caused by rainwater infiltration. To avoid that call, add the items discussed here to your prepour conference checklist.

Editor's note

Discussions, pro and con, for differing vapor-retarder installation options are also given in ASTM E 1643, *Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.*

References

1. T. Anderson and H. Roper, "Influence of an Impervious Membrane Beneath Concrete Slabs on Grade," Concrete Symposium, Brisbane, Australia, 1977, p. 51.

2. ACI 302.1R-96, *Guide for Concrete Floor and Slab Construction*, American Concrete Institute, Farmington Hills, Mich., February 1997.

3. Raymond S. Rollings, "Retail-Grocery — Floor Failure," *Journal of the Performance of Constructed Facilities,* American Society of Civil Engineers, Reston, Va., May 1995.

4. Herman G. Protze, III, "Construction of Concrete Slabs-On-Grade: Moisture Emission Problems," *Solving Moisture-Related Problems with Slabs-On-Grade,* Seminar 24-63, World of Concrete 1997.

5. Bruce A. Suprenant, "Moisture Movement through Concrete Slabs," *Concrete Construction*, November 1997, pp. 879-885.

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Don't use loose sand under concrete slabs

A thin, loose sand layer reduces subgrade support, which can lead to increased slab cracking and poor joint performance

By Bruce A. Suprenant and Ward R. Malisch

Over the past five years, we've received phone calls from contractors who had built floors under which the specifier required a thin sand layer, with no compaction requirement for the sand. The contractors had been called back to repair cracks and joints 6 to 24 months after the slab was placed. The cracks didn't appear to be caused by drying shrinkage, and the joints were showing more than normal deterioration. The problems occurred primarily in slabs subjected to forklift traffic.

The contractors were being held responsible for the repair costs, and they asked, "Is it possible that the sand layer reduces subgrade or subbase support, causing cracking and poor joint performance, especially under repeated loading such as forklift traffic?"



Figure 1. A technician applies load to a compacted soil specimen in a CBR mold. Specimens were loaded with and without sand layers to determine the effect of differing sand-layer thicknesses.

Table 1 Soil sample properties

Soil sample	Dry density (pcf)/moisture content (%)			Compaction test (standard Proctor)	Soil
	No sand	1-in. sand	2-in. sand	Density/moisture	classification
1A	100.1/19.2	99.8/19.6	100.6/19.0	104.9 pcf/19.5%	SC: A-6(5)
1B	100.1/19.7	99.7/19.8	99.8/19.6		
2A	109.5/14.5	109.5/14.5	109.8/14.4	115.0 pcf/14.7%	SC: A-6(3)
2B	109.3/14.6	109.5/14.6	109.4/14.7		
3A	125.4/8.9	125.1/9.1	125.7/9.1	131.9 pcf/9.1%	SC: A-2-4(0)
3B	125.2/9.0	125.1/9.2	125.3/9.0		

The soil is a sand with silty clay and a trace of gravel. The SC is a sand-plastic fines soil classification based on the Unified Soil Classification System. The A-soil classification system is based on the AASHTO soil classification system.

We developed a testing program to gather data that could help answer this question.

Testing subgrade support

To assess the effect of a thin, loose sand layer on subgrade support, we performed duplicate California Bearing Ratio tests (see "What's a CBR Test") using three soil samples with varying dry densities. Each test specimen was tested with no sand, a 1-inch sand layer and a 2-inch sand layer. In addition, we placed 1- and 2-inch sand layers over a steel base and tested that combination to show how the sand would affect subgrade support over a very stiff base.

To start the test, a technician placed the soil into a 6-inch-diameter cylinder mold and compacted it. After compaction, he removed the top extension collar and trimmed the soil to a 4½-inch height. He then inverted the mold and added a 10-pound surcharge weight to the top surface. Consisting of steel discs with holes in the center to accom-

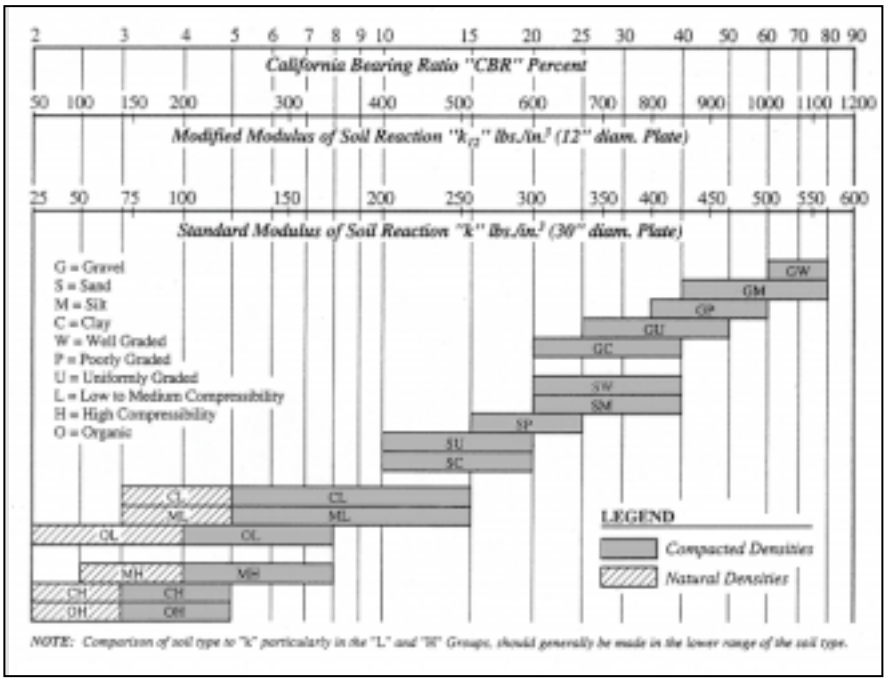

Figure 2. Interrelationships of CBR, k-values and soil classification (from Ref. 2).

Table 2 Effect of a sand layer on measured CBR

Soil sample	CBR value, % No sand	1-in. sand	2-in. sand
1A	4.0	2.6	1.0
1B	4.0	3.1	2.1
Average	4.0	2.9	1.6
% of no-sand value	100	73	40
2A	8.1	6.3	4.9
2B	8.0	5.6	3.9
Average	8.1	6.0	4.4
% of no-sand value	100	74	54
3A	11.4	4.6	2.5
3B	11.5	4.8	2.6
Average	11.5	4.7	2.6
% of no-sand value	100	41	23
Steel base - A	100*	5.2	2.5
Steel base - B	100	4.9	2.6
Average	100	5.1	2.6
% of no-sand value	100	5.1	2.6

** Not tested; maximum CBR is 100.*

What's a CBR test?

The California Bearing Ratio test, described in ASTM D 1883 (Ref. 1), is a penetration test commonly used to evaluate the potential strength of subgrade, subbase and base course material. To perform the test, a technician uses a cylindrical piston with a 3-square-inch cross section to penetrate the soil at a rate of 0.05 inch per minute. At each 0.1 inch penetration up to 0.5 inch, the technician records the stress needed to push the piston into the soil. The CBR value is the ratio of this stress at different penetration levels to the bearing value of a standard crushed rock. In most cases, CBR decreases as the penetration increases, so the ratio at 0.1-inch penetration is used as the recorded CBR value. Sometimes designers use this value to choose an appropriate slab thickness for anticipated loadings.

modate the piston, the surcharge weight is nearly equivalent to that of a 4½-inch-thick concrete slab. At this point in the test, it's possible to include a four-day wet soaking period. However, we omitted this step since we weren't interested in the CBR of a wet subgrade.

The soil specimen contained in the mold and loaded by the surcharge weights was placed in a testing machine (Fig. 1) that applied load to the piston. A technician measured load and piston penetration distances and used the resulting stress-vs.-penetration curve to compute the CBR values.

To measure the sand-layer effect, the technician placed loose concrete sand in the mold to completely and uniformly cover the compacted subgrade to a depth of 1 or 2 inches. For the steel base used to simulate a stiff base, the technician placed loose

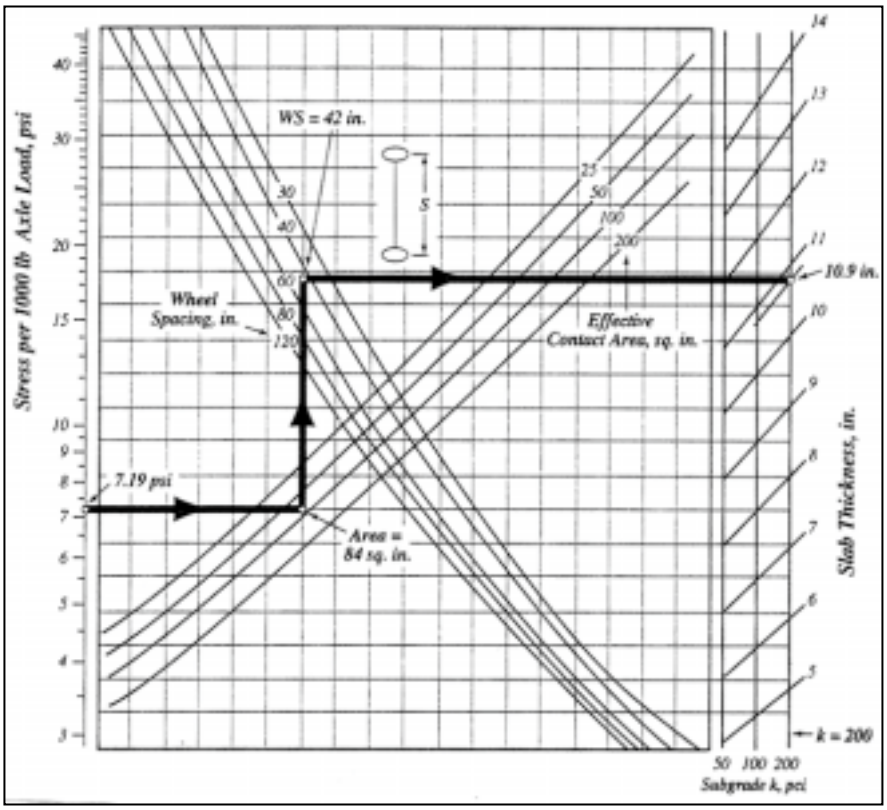

Figure 3. The example in this chart shows that decreasing the k-value from 200 to 50 increases the required slab thickness about an inch. For lighter loadings that yield a thinner slab, the same k-value reduction would still increase thickness about an inch.

Table 3 Effect of sand layer on k-values*

Soil sample	No sand	1-in. sand	2-in. sand
1A	100	50	10**
1B	100	75	25
Average	100	63	18**
% of no-sand value	100	63	18
2A	175	145	125
2B	175	135	100
Average	175	140	113
% of no-sand value	100	80	64
3A	210	125	50
3B	210	125	50
Average	210	125	50
% of no-sand value	100	60	24
Steel base - A	650**	125	50
Steel base - B	650	125	50
Average	650	125	50
% of no-sand value	100	19	8

**The k-value is a modulus of soil reaction in lbs/in.³ for a 30-inch-diameter plate and was estimated using the CBR values shown in Table 2.*

*** Off the chart. In Figure 2, minimum k-value is 25 and maximum is 600. Since a CBR of 100 is possible, a k-value of 650 was estimated.*

sand over the base and added the surcharge weights before applying load to the piston.

The density and moisture content of the compacted specimens also were determined. A comparison of standard Proctor dry-density values shown in Table 1 with the dry densities of the soil samples, also given in the table, shows that all the CBR specimens reached about 95% compaction. Great care was exercised in making sure that the compacted density for a set of specimens was essentially the same. Thus, any measured changes in CBR value would be the result of the presence of a sand layer and not a change in specimen density.

For all the soil samples tested, CBR values decreased dramatically when a thin layer of loose sand was placed over the compacted sample

(Table 2). The decrease was especially large for the sand layer placed over the steel base. For soil sample No. 1 (lowest density), the 1-inch and 2-inch sand layers decreased CBR values to 73% and 40% of the original values, respectively. For sample No. 3 (highest density), the CBR decreases were to 41% and 23% of the original values.

The CBR values for sand layers placed over a steel base provided an interesting comparison. Percentage loss in CBR was very high, but the raw CBR values appear to show that the highest-density soil provided almost as stiff a base as the steel when a sand layer was added. The CBR values for the lowest-density soil with a sand layer are lower, which is understandable given the weaker subgrade support. The CBR values for soil sample No. 2 don't follow this pattern, and we don't know whether this was the result of soil or sand variability or the variability of the test itself. The steel-base values do seem to indicate that if a designer uses a sand layer, the maximum CBR values he could reasonably expect to attain are about 5 and 2.5 for a 1- or 2-inch-thick layer, respectively.

Slab design: Using loose sand requires more concrete

CBR values are sometimes used by floor designers to estimate the modulus of soil reaction (lbs/in.^{3}), or k-value. Using Figure 2, we converted the CBR values from our study to k-values, as shown in Table 3. The k-values are used in slab-thickness design charts to represent the support of the underlying subgrade-subbase combination.

Figure 3 is a design chart from the Portland Cement Association's commonly used slab-on-grade design method. As Table 3 shows, the estimated k-value for soil sample No. 3 decreased from 210 to 50 when a 2-inch sand layer was used. The example problem shown on the chart illustrates the effect of this decrease. For a k of 200, the design slab thickness is about 11 inches, but for a k of 50 it increases to 12 inches (see Reference 3 for the complete example). For lighter loadings that yield thinner slabs, required thickness would still increase by about an inch for a k-value decrease from 200 to 50. For soil sample No. 1, the average k-value with a 2-inch sand layer is 18, which is lower than the lowest value (50) on the design chart.

What's the significance of an extra inch of concrete floor thickness? A value-engineering audit for a floor design sometimes results in slab-thickness decreases as small as ½ inch. Increasing the thickness of a 100,000-square-foot warehouse floor slab by 1 inch would cost about $20,000. The cost of the extra concrete (more than 300 cubic yards) would be about equal to what the concrete floor contractor would be paid for placing and finishing.

What happens if the concrete slab is designed without considering the effect of the sand layer? Based on the design charts and other information (Refs. 2 and 3) for the example shown in Figure 3, the use of a loose sand layer that decreases the k-value from 200 to 50 would result in:

- A flexural stress increase of 25%
- A safety factor decrease from 2.0

Reasons to avoid using sand

There are many reasons for not placing a sand layer under a concrete slab (Ref. 1). These include difficulty in:

- Maintaining a flat, level sand surface during concrete placement
- Maintaining the specified reinforcing steel or dowel basket elevation due to sinking chair supports
- Producing a uniform slab thickness due to shifting sand displaced by concrete

In addition, one engineer (Ref. 2) has linked a sand layer to poor joint performance. He found that under forklift traffic, shifting sand beneath the joint resulted in reduced load-transfer efficiency across the joint. This was especially true at joints where aggregate interlock was the only means of load transfer.

ACI 302.1R-96 (Ref. 3) also discourages the use of a sand layer: "Base material should be a compactible, easy-to-trim, granular fill that will remain stable and support construction traffic. The use of so-called cushion sand or clean sand with uniform particle size, such as concrete sand meeting ASTM C 33, will not be adequate. This type of sand will be difficult, if not impossible, to compact and maintain until concrete placement is complete."

In revising its "Concrete In Practice" series, the National Ready Mixed Concrete Association is eliminating references to a sand layer and using ACI 302 terminology for base material. But specifiers still call for sand cushions, and some articles and publications still suggest using a sand layer under a concrete slab (Refs. 4 and 5).

References

1. Carl Bimel, "No Sand, Please," *The Construction Specifier,* June 1995, p. 26.

2. William J. Brickey, "Try Crushed Stone Under Slabs-on-Grade," The *Construction Specifier*, July 1990, p. 9.

3. ACI 302.1R-96, "Guide for Concrete Floor and Slab Construction," American Concrete Institute, Farmington Hills, Mich., 1996, p. 16.

4. "Concrete Slab Surface Defects: Causes, Prevention, Repair," Portland Cement Association, Skokie, Ill., 1987, pp. 4, 7, 10.

5. Gregory Dobson, "Concrete Floor Slabs: Recognizing Problems Before They Happen," *Concrete International*, June 1995, p. 46.

to 1.6

- An actual flexural stress that exceeds the fatigue limit, meaning that floor failure would now be determined by load repetitions rather than maximum load
- Failure at 14,000 load repetitions, though the floor was designed for an unlimited number of load repetitions

When specifiers require contractors to place concrete over a sand layer, the contractors don't know if the designer has increased the slab thickness to account for the weaker sand-layer support shown by our data. If the slab thickness wasn't increased, more later-age cracking and poorer joint performance may result, especially for slabs subjected to heavy construction loads, such as cranes or concrete trucks.

There are many good reasons for not using a sand layer under a concrete slab (see sidebar). If specifications call for a sand layer, contractors should discuss the implications with the architect and engineer before the project begins, and request that the sand layer be replaced with a compactible stone base. Based on our data, repair costs for slabs placed on thicker sand layers shouldn't necessarily be borne by the contractor.

References

1. ASTM D 1883-92 "Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils," ASTM, West Conshohocken, Pa., 1992.

2. Boyd C. Ringo and Robert B. Andersen, *Designing Floor Slabs on Grade,* 2nd ed., The Aberdeen Group, 1996.

3. ACI 360R-92, "Design of Slabs on Grade," American Concrete Institute, Farmington Hills, Mich., 1997.

Acknowledgment

All of the laboratory work for this investigation was carried out by Blair G. Peterson, senior engineering technician, CTC-Geotek, Denver. We appreciate Blair's conscientious attention to detail while conducting the tests.

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APPENDIX B

2018 Borehole Logs

Jorgensen Geotechnical
Jackson, WY 83001
Telephone: 307-733-5150
Fax: 307-733-5187

TEST HOLE LOG

PROJECT NAME: 165 North Glenwood - Bear Development	DATE: 11/08/2018
PROJECT LOCATION: Jackson, Wyoming	HOLE NO.: JG-18-1/MW-1
TEST HOLE LOCATION: See Site Map	

ELEVATION G.S. (ft.):	TOTAL DEPTH (ft.): 31.5	GROUNDWATER LEVEL (ft.): N/A	MEASURED FROM: G.S
DRILL TYPE: Simco 2800HS	HAMMER: Rope and Cathead	DRILL CO: LK Drilling	DRILLER: Steve	LOGGED BY: hc

DEPTH (ft.)	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION / COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1							0.0-4.5ft SILT with sand - [FILL]					
2												
3	D1	4,3,1	2	27%			2.5ft SILT with sand: Dry to slightly moist, reddish to light brown, very loose, intact, 70-75% silt, 25-30% sand, occasional subrounded gravel to 3/4" in diameter, stone in shoe [FILL]					
4												
5	D2	2,3,3	6	20%			4.5-14.5ft Clayey GRAVEL with sand - [ALLUVIAL FAN] 5.0ft Clayey GRAVEL with sand: Slightly moist, brown to dark brown, loose, intact, 35-40% clay, 60-65% fine gravel and sand, occasional subrounded and subangular pinkish to light brown gravel to 1" in diameter, stone in shoe, no HCL reaction on stones [ALLUVIAL FAN/FILL]					
6												
7												
8	D3	3,7,20	24	40%			7.5ft Clayey GRAVEL with sand: Dry to slightly moist, light brown to greyish brown, medium dense, intact, shattered 55-60% subangular gravel, sand matrix with 5-10% clay, matrix reaction to HCL, stone in shoe [ALLUVIAL FAN]					
9												
10	D4	23,22,25	29	60%			10.0ft Clayey GRAVEL with sand: Dry, white rock dust from gravel/cobble, brown to dark brown matrix, dense, intact, dark grey and white shattered gravel/cobble, clayey matrix with sand and fine gravel, occasional orange gravel [ALLUVIAL FAN]					
11												
12												
13	D5	22,18,42	53	73%			12.5ft Clayey GRAVEL with sand: As above, very dense - split spoon bouncing during sampling					
14												
15							14.5-17.0ft GRAVEL - [ALLUVIAL FAN]					
16	D6	31,35,50 for 4"	50+	30%			15.0ft GRAVEL: Dry, white rock dust from gravel/cobble, very dense, intact, dark grey and white gravel/cobble, very little dark brown matrix clay and sand [ALLUVIAL FAN]					
17												
18	D7	15,50 for 5"	50+	42%			17.0-31.5ft Clayey GRAVEL with sand - [ALLUVIAL FAN] 17.5ft Clayey GRAVEL with sand: Moist, brown, very dense, intact, 25-30% clay, 25-30% sand, 35-40% subrounded gravel to 1/2 inch in diameter, appears to be matrix of above material [ALLUVIAL FAN]					
19												

TEST HOLE LOG JORGENSEN GEO 20181108_HC LOGS.GPJ JORGENSEN GEO 08-2015.GDT 11/27/18

Jorgensen Geotechnical
Jackson, WY 83001
Telephone: 307-733-5150
Fax: 307-733-5187

TEST HOLE LOG

PROJECT NAME: 165 North Glenwood - Bear Development | DATE: 11/08/2018

PROJECT LOCATION: Jackson, Wyoming | HOLE NO.: JG-18-1/MW-1

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION / COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
21		D8	20,27,13	22	73%			20.0ft Clayey GRAVEL with sand: Slightly moist to moist, brown, medium dense, intact, 25-30% silt and clay, 20-25% sand, 50-55% subrounded and rounded white, pink, and yellowish brown intact and shattered gravels [ALLUVIAL FAN]					
22													
23		D9	31,46,50 for 4"	50+	31%			22.5ft Clayey GRAVEL with sand: As above, very dense					
24													
25		D10	50 for 3"	50+	62%			25.0ft NO RECOVERY					
26													
27													
28													
29													
30		D12	13,22,26	37	80%			30.0ft Clayey GRAVEL with sand: Moist to very moist, brown, dense, intact, 20-25% clay, 30-35% sand, 35-40% subrounded to subangular dark and light grey shattered and intact gravels [ALLUVIAL FAN]					
31													
32								Notes: Stopped at request Monitoring well installed to 30 feet bgs 15 feet of 2' slotted pvc with 15 feet of solid 2' pvs Backfilled with silica sand to 15 feet bgs Backfilled with cutting to 5 feet bgs Capped with 5 feet of bentonite chips Covered with 8-inch flush mount vault					
33													
34													
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40													
41													
42													
43													

TEST HOLE LOG JORGENSEN GEO 20181108_HC LOGS.GPJ JORGENSEN GEO 08-2015.GDT 11/27/18

Jorgensen Geotechnical
Jackson, WY 83001
Telephone: 307-733-5150
Fax: 307-733-5187

TEST HOLE LOG

PROJECT NAME: 165 North Glenwood - Bear Development	DATE: 10/10/2018
PROJECT LOCATION: Jackson, Wyoming	HOLE NO.: JG-18-2
TEST HOLE LOCATION: See Site Map	

ELEVATION G.S. (ft.):	TOTAL DEPTH (ft.): 33	GROUNDWATER LEVEL (ft.): N/A	MEASURED FROM: G.S
DRILL TYPE: Simco 2800HS	HAMMER: Rope and Cathead	DRILL CO: LK Drilling	DRILLER: Steve	LOGGED BY: hc

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION / COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1								0.0-4.5ft Silty GRAVEL with sand - FILL					
2													
3		D1	5,14,18	35	37%			2.5ft Silty GRAVEL with sand: Dry to slightly moist, light to tannish brown, dense, intact, 55-60% shattered gravels, sandy matrix with some light brown subrounded intact gravels, stone in shoe [FILL]					
4								4.5-29.5ft Clayey GRAVEL with sand - ALLUVIAL FAN					
5								5.0ft Clayey GRAVEL with sand: Dry, light to yellowish brown, medium dense, intact, 80-85% shattered light brown and yellowish brown gravels, 5-10% clay, 10-15 sand, stone in shoe [ALLUVIAL FAN]					
6		D2	43,15,13	26	60%								
7													
8		D3	15,21,23	40	80%			7.5ft Clayey GRAVEL with sand: Moist, light to dark brown, dense, intact, 60-65% shattered and intact subrounded dark grey, light brown, and yellowish brown gravels, 35-4% dark brown sandy clay matrix [ALLUVIAL FAN]					
9													
10		D4	25,43,41	69	80%			10.0ft Clayey GRAVEL with sand: As above - Very dense					
11													
12													
13		D5	18,14,7	12	80%			12.5ft Clayey GRAVEL with sand: Very moist, brown to dark brown, medium dense, intact, 40-45% brown sandy matrix with clay, 55-60% intact rounded and subrounded gravels [ALLUVIAL FAN]					
14													
15								15.0ft Clayey GRAVEL with sand: As above - Dense with slightly more shattered gravels					
16		D6	22,18,30	40	87%								
17													
18		D7	13,20,32	42	87%			17.5ft Clayey GRAVEL with sand: Very moist, brown to dark brown, medium dense, intact, 40-45% brown sandy matrix with clay, 55-60% intact and shattered, yellow and orange, rounded and subrounded gravels [ALLUVIAL FAN]					
19													

TEST HOLE LOG JORGENSEN GEO 20181108_HC LOGS.GPJ JORGENSEN GEO 08-2015.GDT 11/27/18

Jorgensen Geotechnical
Jackson, WY 83001
Telephone: 307-733-5150
Fax: 307-733-5187

TEST HOLE LOG

PROJECT NAME: 165 North Glenwood - Bear Development | DATE: 10/10/2018

PROJECT LOCATION: Jackson, Wyoming | HOLE NO.: JG-18-2

DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION / COMMENTS:	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
21		D8	12,17,22	33	60%			20.0ft Clayey GRAVEL with sand: As above - With large shattered stone in bottom 0.4 feet of sample					
22													
23		D9	17,28,30	47	87%			22.5ft Clayey GRAVEL with sand: Moist, brown, dense, intact, 35-40% clay matrix with some ~5% sand, 60-65% shattered and intact, subangular to rounded red, yellow, white, and dark grey gravels [ALLUVIAL FAN]					
24													
25		D10	28,40,18	28	73%			25.0ft Clayey GRAVEL with sand: Moist, greyish brown to brownm, medium dense, intact, shattered orangish and grey gravels with sand matrix ~10-15% clay [ALLUVIAL FAN]					
26													
27													
28		D11	47,50 for 5.5"	50+	53%			27.5ft Clayey GRAVEL with sand: As above - Very dense					
29													
30		D12	10,4,7	8	93%			29.5-33.0ft Lean CLAY - ALLUVIAL FAN 30.0ft Moist, greyish to orangish brown, medium stiff, massive, clay with trace sand [ALLUVIAL FAN]					
31													
32		U1			100%			NOTES: Stopped at request No groundwater encountered at time of investigation Backfilled with cuttings					
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													

TEST HOLE LOG JORGENSEN GEO 20181108_HC LOGS.GPJ JORGENSEN GEO 08-2015.GDT 11/27/18

APPENDIX C

USGS Seismic Design Maps
Summary and Detailed Reports

USGS Design Maps Summary Report

User–Specified Input

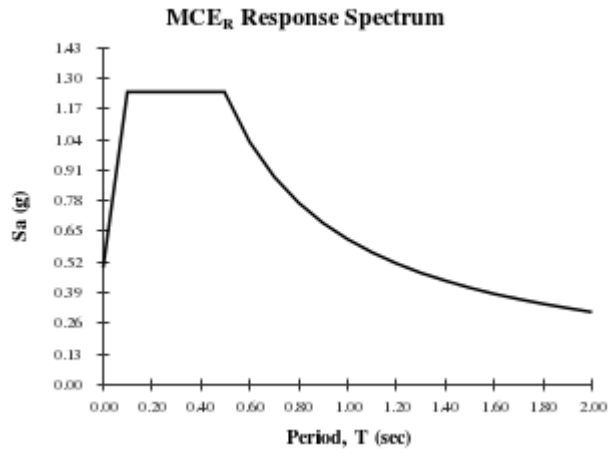
Report Title	Bear Development Tue November 27, 2018 22:38:42 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	43.4815°N, 110.7641°W
Site Soil Classification	Site Class D – “Stiff Soil”
Risk Category	I/II/III

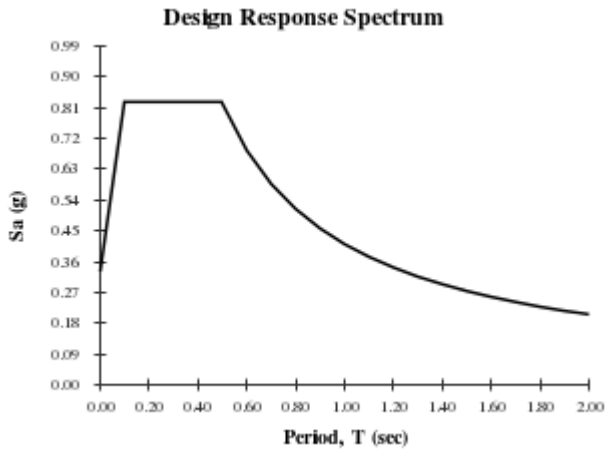


USGS–Provided Output

S_S =	1.232 g	S_{MS} =	1.241 g	S_{DS} =	0.827 g
S_1 =	0.373 g	S_{M1} =	0.617 g	S_{D1} =	0.411 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.





Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

USGS Design Maps Detailed Report

2012/2015 International Building Code (43.4815°N, 110.7641°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 1613.3.1 — Mapped acceleration parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2012/2015 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.3.3.

From Figure 1613.3.1(1) [1] S_S = 1.232 g

From Figure 1613.3.1(2) [2] S_1 = 0.373 g

Section 1613.3.2 — Site class definitions

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Section 1613.

2010 ASCE-7 Standard – Table 20.3-1
SITE CLASS DEFINITIONS

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content w ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT F_a

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.232 g, F_a = 1.007

TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT F_v

Site Class	Mapped Spectral Response Acceleration at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.373 g, F_v = 1.654

Equation (16-37):	$S_{MS} = F_a S_S = 1.007 \times 1.232 = 1.241$ g

Equation (16-38):	$S_{M1} = F_v S_1 = 1.654 \times 0.373 = 0.617$ g

Section 1613.3.4 — Design spectral response acceleration parameters

Equation (16-39):	$S_{DS} = ⅔ S_{MS} = ⅔ \times 1.241 = 0.827$ g

Equation (16-40):	$S_{D1} = ⅔ S_{M1} = ⅔ \times 0.617 = 0.411$ g

Section 1613.3.5 — Determination of seismic design category

TABLE 1613.3.5(1)
SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.827 g, Seismic Design Category = D

TABLE 1613.3.5(2)
SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.411 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 1613.3.5(1) or 1613.3.5(2)" = D

Note: See Section 1613.3.5.1 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 1613.3.1(1)*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(1).pdf
2. *Figure 1613.3.1(2)*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(2).pdf

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Traffic Impact Study for Club Lespri and McCabe Corner
Gill Avenue, Jackson, Wyoming

Prepared by: Jorgensen Associates, P.C.
Nicholas A. Fiore, P.E.
Project No.: 06151.01 & 07016.00
Date: March 7, 2007
Revised: September 12, 2007

I. INTRODUCTION

Two developments are currently being proposed for the south side of Gill Avenue between Glenwood Street and Millward Street in Jackson, Wyoming. These two projects will result in the complete redevelopment this Gill Avenue frontage. This report is a study of the potential traffic impacts resulting from the construction of the two proposed developments. These developments will be neighbors and use the same alley for access. Both developments will be presented together in this report in an effort to examine the greatest impacts.

The McCabe Corner development is being proposed by The Eden Group of Wilson, WY. It is comprised of four town lots at the southwest corner of the Gill Avenue and Glenwood Street intersection. The site is better described as Lots 1 through 4, Block 6, Original Town Site, Jackson, Wyoming. The proposed development will consist of approximately 33 condominiums. Residential parking will be provided on site in and accessed via the alley between Glenwood Street and Millward Street.

Club Lespri is being proposed and developed by White Buffalo Development, LLC of Park City, Utah. The site is comprised of three lots at the southeast corner of the Gill Avenue and Millward Street intersection, better described as Lots 18 through 20, Block 6, Original Town Site, Jackson, Wyoming. The Club Lespri development will be limited to the east half of Lot 19 and the whole of Lot 20. The development will be a mixed-use private club consisting of a dinning room and lounge, wellness center, condominiums, and employee housing. Parking for the condominiums and employee housing will be accessed through the alley off Gill Avenue between Glenwood Street and Millward Street; the same alley used to access the McCabe Corner development.

The purpose of this study is to analyze the impacts to the traffic and safety of the surrounding Jackson, Wyoming roadway network as a result of the construction of these two developments. This report will identify and discuss any upgrades to the study area that may be necessary due to the impacts of the development.

All data, calculations, and worksheets can be found in the Appendix of this report.

II. EXISTING LAND USE AND TRANSPORTATION SYSTEM

Existing Land Uses

The McCabe Corner site consists of four town lots at the southwest corner of the Gill Avenue and Glenwood Street intersection. These lots are home to a mix of land uses including office space and apartments. The footprints of these land uses encompass approximately forty percent (40%) of the four lots total square footage. The remainder of the lot area contains walkways, landscaping, and parking lot.

Club Lespri will cover approximately one and a half town lots at the southeast corner of the Gill Avenue and Millward Street intersection. It will be located on all of Lot 20 and the east half of Lot 19. Currently these areas are a mix of landscaping and parking.

Existing Roadways

The two projects are separated by a north-south alley and are bordered on three sides by Town of Jackson Streets: Glenwood Street on the east, Gill Avenue on the north, and Millward Street on the west.

The Glenwood Street/Gill Avenue intersection is a two-way stop-controlled intersection with the Glenwood Street legs being controlled. Glenwood Street is stop-controlled at Delony Avenue one block south of Gill Avenue and is one-way to the north south of Delony Avenue. Two and half blocks north of Gill Avenue, Glenwood Street dead-ends.

The Milward Street/Gill Avenue intersection is a two-way stop-controlled intersection with the Gill Avenue legs being controlled. Two blocks south of Gill Avenue the Millward Street intersection with Broadway (State Highway 89) is signal-controlled. One block north of Gill Avenue, Millward Street intersects Mercill Avenue and access to North Cache Street (State Highway 89). Millward Street and Mercill Avenue combine to provide the truck route around the Town Square area of downtown Jackson.

Gill Avenue's eastern terminus is at Willow Street near the Teton County Recreation Center. It's western terminus is essentially at its intersection with Jackson Street. Gill Avenue is signal-controlled with North Cache Street and stop-controlled at Millward Street, a two–way stop controlled intersection.

All roadway segments in this area of Town have on-street parking and multiple access points. All roadway sections bordering the subject projects have sidewalks and striped crosswalks. Some sidewalk segments are missing from neighboring streets. Bicycles share the roads in the project area with other vehicles.

Existing Traffic

The existing traffic conditions presented herein are a combination of Chapter 8 Transportation of the Jackson/Teton County Comprehensive Plan, and 2002 Summer Traffic Counts conducted in Jackson.

Chapter 8 presents a summer Average Daily Traffic (ADT) volume of 9,000 vehicles per day (vpd) on Millward Street in the project area in 1996 (page 8-9). Chapter 8 also predicts a summer 2020 ADT of 13,000 vpd with the Chapter's implementation (page 8-23). This is a compounded average growth rate of approximately 1.54%. Interpolation of these numbers results in a 2007 summer ADT of approximately 10,650 vpd on Millward Street.

Traffic counts conducted in 2002 for the Town of Jackson show a summer ADT of 4172 vpd on Gill Avenue west of Glenwood Street. Applying the same compounded average growth rate of 1.54% to this volume yields a 2007 summer ADT of approximately 4,500 for Gill Avenue.

III. PROPOSED CONDITIONS

The proposed McCabe Corner and Club Lespri developments will redevelop approximately five and a half town lots into a mix of land uses.

The McCabe Corner development is comprised of four town lots at the southwest corner of the Gill Avenue and Glenwood Street intersection. The proposed development will consist of approximately 33 condominiums with 70% used as short term rentals and 30% used as long term residential units. Parking will be provided on site in and accessed via the alley between Glenwood Street and Millward Street.

Club Lespri is to be developed on one and a half town lots at the southeast corner of Gill Avenue and Millward Street. It will be a mixed-use private club consisting of a dinning room and lounge, wellness center, condominiums, and employee housing. While owned by individuals, the condominiums will act like short term rentals. Parking for the condominiums and employee housing will be accessed through the alley off Gill Avenue between Glenwood Street and Millward Street; the same alley used to access the McCabe Corner development.

Background Traffic

Background traffic refers to the current existing traffic and the future traffic that is anticipated without the proposed development. For this study the background traffic was calculated using information contained in Chapter 8 Transportation of the Jackson/Teton County Comprehensive Plan.

As stated above, Chapter 8 demonstrates a compounded average growth rate of 1.54% in the area of the proposed projects. This rate is applied to the 2002 summer ADT for Gill Avenue to predict the 2020 summer ADT for Gill Avenue.

Chapter 8 provides a prediction for the 2020 summer ADT on Millward Street.

Table 1 shows the summer ADT projections for Gill Avenue and Millward Street.

TABLE 1
SUMMER ADT VOLUMES

	1996	2002	2007	2020
Millward Street	9000		10652	13000
Gill Avenue		4172	4504	5497

Millward Street: 1996 and 2020 ADT provided by Chapter 8
2007 ADT calculated using 1.54% CAGR
Gill Avenue: 2002 ADT provided by TOJ counts
2007 and 2020 ADT calculated using 1.54% CAGR

Trip Generation

The proposed ADT volumes generated by the developments are estimated using *ITE Trip Generation, 7th Edition*. This manual provides trip generation rates for a myriad of land uses and is considered the standard for trip generation calculations in the traffic professions. For McCabe Corner 70% of the condominiums will operate as short term rentals. Those units are analyzed as ITE Land Use 311, All Suites Hotel. The remaining 30% are analyzed as Land Use 230, Residential Condominium/Townhouse. Club Lespri's Land Uses include Apartment (220), All Suites Hotel (311), Health/Fitness Club (492), and Quality Restaurant (931).

Trip generation spreadsheets are included in the appendix of this report. They show the equations used as well as the calculated volumes. Table 2 summarizes the ADT generated by the proposed developments on a weekday.

TABLE 2
TRIP GENERATION

Land Use	***ITE Code***	***Variable***	***Value***	***Weekday ADT***
Club Lespri				
Apartment	220	Dwelling Units	4	8
All Suites Hotel	311	Rooms	10	45
Health/Fitness Club	492	1000 sq. ft.	2.8	92
Quality Restaurant	931	Seats	53	152
McCabe Corner				
Residential Condominium/Townhouse	230	Dwelling Units	10	49
All Suites Hotel	311	Rooms	23	104
Total Trips Generated				**449**

These are the raw volumes calculated from *ITE Trip Generation, 7th Edition*. The Club Lespri condominiums are analyzed as an All Suites Hotel because that is the ITE Land Use that best fits the anticipated use of the condominiums. They will be owned by individuals as vacation properties and rented to vacationers when not in use by the owners.

The actual ADT generated by these developments will be significantly lower those presented in Table 2. The mix-use, private club nature of Club Lespri will greatly aid in trip reduction. Visitors staying in the condominiums will have the wellness center and restaurant on site to

reduce the need travel elsewhere. The apartments are for employees of the club so they will not commute. Shared trips are likely between the wellness canter and the restaurant. The downtown location of the development is sure to reduce the trips it generates. A 10% trip generation reduction could be expected because of the above mentioned reasons.

McCabe Corner should also generate fewer trips than reported in Table 2. The downtown location of this development is the key to its lower trip generation. The owners of the condominiums will most likely live in them, and the downtown location is likely to be a very attractive feature. The project site is one block from North Cache Street and all its amenities such as shops and restaurants. It is about two blocks from the Town Square, one block from Miller Park, and three blocks from the Teton County Recreation Center. Additionally there is a wide variety and high number of businesses and entertainment venues within just five blocks of the McCabe Corner site. Residents of McCabe Corner are very likely to work in the downtown area and take advantage of their proximity to the other downtown amenities. This proximity to downtown will also be very appealing to users of the short term rentals. All occupants of McCabe Corner are likely walk to many of their destinations rather than drive. The overall trip reduction for McCabe Corner could be as much as 20% due to its location alone. Additional trip generation reductions are usually made from the removal of existing land uses on a redevelopment site. No such reductions have been made.

Trip Distribution

The trips generated by the developments will spread out amongst the surrounding roadway network. The McCabe Corner trips will access Gill Avenue by way of the alley west of the project. The condominium and employee housing trips of Club Lespri will access the development via the same alley. Additional Club Lespri trips will terminate in the surrounding on street parking. The heaviest distribution routes for both developments will most likely be along Gill Avenue to and from the traffic signal at North Cache Street and along Millward Street to and from the traffic signal at Broadway. This report assumes half of the McCabe Corner traffic will use the North Cache intersection and half will use Millward Street. This report also assumes that one third of the Club Lespri traffic will utilize the traffic signal at Gill Avenue and North Cache Street and two thirds will be associated with Millward Street. These assumptions are fairly conservative as there are a number are route for traffic in the downtown's roadway grid.

Table 3 indicates the total generated trip distribution among Gill Avenue east of Glenwood Street and Millward Street.

TABLE 3
TOTAL TRIP DISTRIBUTION

	McCabe Corner	Club Lespri
Millward Street	76	199
Gill Avenue	76	98

Table 4 shows the trip distribution for the reduced volume of trip based on the reduction percentages mentioned above.

TABLE 4
REDUCED TRIP DISTRIBUTION

	McCabe Corner	Club Lespri
Millward Street	61	179
Gill Avenue	61	88

Total Traffic

Adding the developments trip generations to the background traffic calculates the total traffic that may occur with the implementation of these projects. Combining the volumes for 2007 and 2020 with the reduced distribution volumes in Table 4 yields the total traffic volumes in Table 5.

TABLE 5
TOTAL TRAFFIC

	2007	2020
Millward Street	10892	13240
Gill Avenue	4653	5646

IV. TRAFFIC ANALYSIS

The background ADT for 2020 actually incorporates much the traffic generated by these two developments. The intent of Chapter 8 was to understand the future transportation demands in Jackson and Teton County. Growth and redevelopment in downtown Jackson was part of that analysis. As such, the volumes reported in Table 4 and Table 5 should be considered conservative.

The construction of these two developments will add some delay to the Gill Avenue intersections with Glenwood Street and Millward Street. These intersections, however, currently operate at a high level of service. The minor, additional delays should not significantly reduce levels of service and therefore should not warrant any traffic mediation efforts.

In the worst case scenario, the Town of Jackson roadway network should be able to accommodate the addition of potentially 389 vehicles per day. With the grid network of streets, divers will disperse themselves with routes that work best for their destinations. Additional congestion in the area of McCabe Corner and Club Lespri will not be caused solely by these developments. Rather, traffic congestion in this area, much like the whole of downtown Jackson, will be caused by growth of the entire Jackson Hole region. Presenting solutions to area wide traffic concerns is beyond the scope of this report.

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Traffic Impact Study for Club Lespri and McCabe Corner
Gill Avenue, Jackson, Wyoming

APPENDIX

P.O. Box 9550 - 270 E. Simpson Ave. - Jackson, WY 83002 - Phone: 307.733.5150 - Fax: 307.733.5187
E-mail: ja@jorgensenassociates.com

Club Lespri

Millward Street & Gill Avenue
Jackson, Wyoming

RESIDENTIAL LAND USES

ITE Land Use Category: **Apartment**
ITE Land Use Code: **220**
Independent Variable: Dwelling Units
Value: 4

				Directional Distribution			
Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Entering*	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = 2.00(X)	8	50%	50%	4	4
ADT	Saturday	T = 2.84(X)	11	50%	50%	6	6
ADT	Sunday	T = 3.21(X)	13	50%	50%	6	6
A.M. Pk Hr Adjacent Street	Weekday	T = 0.1(X)	0	20%	80%	0	0
P.M. Pk Hr Adjacent Street	Weekday	T = 0.1(X)	0	65%	35%	0	0

Low end of Range of Rates because Dwelling Units are Employee Housing and located downtown.

LODGING LAND USES

Condo Units will be short term rentals and are expected to have Trip Gen rates similar to a hotel.

ITE Land Use Category: All Suites Hotel
ITE Land Use Code: **311**
Independent Variable: Rooms
Value: 10

				Directional Distribution			
Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Entering*	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = 4.49(X)	45	50%	50%	22	22
ADT (Hotel: 310)	Saturday	T = 6.35(X)	64	50%	50%	32	32
ADT (Hotel: 310)	Sunday	T = 4.01(X)	40	50%	50%	20	20
A.M. Pk Hr Adjacent Street	Weekday	T = 0.28(X)	3	55%	45%	2	1
P.M. Pk Hr Adjacent Street	Weekday	T = 0.32(X)	3	45%	55%	1	2

Low end of Range of Rates because Units are located downtown.

RECREATIONAL LAND USES

ITE Land Use Category: **Health/Fitness Club**
ITE Land Use Code: **492**
Independent Variable: 1000 sq. ft.
Value: 2.8

				Directional Distribution			
Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Entering*	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = 32.93(X)	92	50%	50%	46	46
ADT	Saturday	T = 20.87(X)	58	50%	50%	29	29
ADT	Sunday	T = 26.73(X)	75	50%	50%	37	37
A.M. Pk Hr Adjacent Street	Weekday	T = 0.3(X)	1	42%	58%	0	0
P.M. Pk Hr Adjacent Street	Weekday	T = 3.20(X)	9	67%	33%	6	3

Low end of Range of Rates because wellness center is a private club located downtown

DINING LAND USES

ITE Land Use Category: **Quality Restaurant**
ITE Land Use Code: **931**
Independent Variable: Seats
Value: 53

				Directional Distribution			
Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Entering*	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = 2.86(X)	152	50%	50%	76	76
ADT	Saturday	T = 2.81(X)	149	50%	50%	74	74
ADT	Sunday	T = 2.15(X)	114	50%	50%	57	57
A.M. Pk Hr Adjacent Street	Weekday	T = 0.03(X)	2	55%	45%	1	1
P.M. Pk Hr Adjacent Street	Weekday	T = 0.26(X)	14	67%	33%	9	5

Average Rate because restaurant is a private club located downtown

McCabe Corner

Glenwood Street & Gill Avenue
Jackson, Wyoming

RESIDENTIAL LAND USES

Total Market Units	33	
Short Term:	70%	23
Long Term:	30%	10
Affordable Units:	3	

ITE Land Use Category: **Residential Condominium/Townhouse**
ITE Land Use Code: **230**
Independent Variable: Dwelling Units
Value: 10

Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Directional Distribution*			
				Entering	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = (1.83 + 3.09)*(X)	49	50%	50%	24	24
ADT	Saturday	T = (1.17 + 3.10)*(X)	42	50%	50%	21	21
ADT	Sunday	T = (1.36 + 2.71)*(X)	40	50%	50%	20	20
A.M. Pk Hr Adjacent Street	Weekday	T = (0.15 + 0.69)*(X)	8	17%	83%	1	7
P.M. Pk Hr Adjacent Street	Weekday	T = (0.18 + 0.75)*(X)	9	67%	33%	6	3

Low end of Range of Rates plus one standard deviation because Units are located downtown.

Short term rentals and are expected to have Trip Gen rates similar to a hotel.

ITE Land Use Category: **All Suites Hotel**
ITE Land Use Code: **311**
Independent Variable: Rooms
Value: 23

Analysis Period		*Average Rate or Equation*	*Calc'd Trips*	*Directional Distribution*			
				Entering	*Exiting*	*Entering*	*Exiting*
ADT	Weekday	T = 4.49(X)	104	50%	50%	52	52
ADT (Hotel: 310)	Saturday	T = 6.35(X)	147	50%	50%	73	73
ADT (Hotel: 310)	Sunday	T = 4.01(X)	93	50%	50%	46	46
A.M. Pk Hr Adjacent Street	Weekday	T = 0.28(X)	6	55%	45%	4	3
P.M. Pk Hr Adjacent Street	Weekday	T = 0.32(X)	7	45%	55%	3	4

Low end of Range of Rates because Units are located downtown.

Club Lespri & McCabe Corner

Gill Avenue
Jackson, Wyoming

TRIP GENERATION SUMMARY

Peak Hour Summary

Land Use	*ITE Code*	*Variable*	*Value*	*AM*		*PM*	
				Entering	*Exiting*	*Entering*	*Exiting*
Club Lespri							
Apartment	220	Dwelling Units	4	0.1	0.3	0.3	0.1
All Suites Hotel	311	Rooms	10	1.5	1.3	1.4	1.8
Health/Fitness Club	492	1000 sq. ft.	2.8	0.4	0.5	6.0	3.0
Quality Restaurant	931	Seats	53	0.9	0.7	9.2	4.5
McCabe Corner							
Residential Condominium/Townhouse	230	Dwelling Units	9.9	1.4	6.9	6.2	3.0
All Suites Hotel	311	Rooms	23.1	3.6	2.9	3.3	4.1
Total Trips Generated				**8**	**13**	**26**	**17**

Weekday ADT Summary

Land Use	*ITE Code*	*Variable*	*Value*	*Weekday ADT*
Club Lespri				
Apartment	220	Dwelling Units	4	8
All Suites Hotel	311	Rooms	10	45
Health/Fitness Club	492	1000 sq. ft.	2.8	92
Quality Restaurant	931	Seats	53	152
McCabe Corner				
Residential Condominium/Townhouse	230	Dwelling Units	10	49
All Suites Hotel	311	Rooms	23	104
Total Trips Generated				**449**

Club Lespri & McCabe Corner

Gill Avenue
Jackson, Wyoming

BACKGROUND TRAFFIC GROWTH

Millward Street

Chapter 8		TIS Projection	
Year	**ADT**	**Year**	**ADT**
1996	9000	2007	10652
2020	13000		
CARG	1.54%		

Gill Avenue

TOJ Counts		TIS Projection	
Year	**ADT**	**Year**	**ADT**
2002	4172	2007	4504
		2020	5497

Summer ADT

	1996	2002	2007	2020
Millward Street	9000		10652	13000
Gill Avenue		4172	4504	5497

Distribution Rates

	McCabe	Lespri
Millward Street	50%	67%
Gill Avenue	50%	33%

Full Trip Distribution

	McCabe	Lespri	Total
Millward Street	76	199	275
Gill Avenue	76	98	174

Reduced Trip Distribution

	McCabe	Lespri	Total
Millward Street	61	179	240
Gill Avenue	61	88	149

Total Trips

	2007	2020
Millward Street	10892	13240
Gill Avenue	4653	5646

Housing Mitigation Plan

Below is the Applicability analysis and support for the attached Calculation required in a Housing Mitigation Plan. Because the calculation yields a requirement less than zero, no other required contents of the Housing Mitigation Plan are applicable.

Existing Development (Applicability, Sec. 6.3.2.)

Pursuant to Section 6.3.2.A.1. of the Town LDRs the development that can be credited as existing is the development that existed on the site as of December 18, 1995 or was built or permitted since that date.

185 N. Glenwood

On December 18, 1995 this portion of the site was the Jackson Hole Guide. The Guide included:

7,930 sf	Newsroom
6,160 sf	Pressroom
5,200 sf	4-2 bedroom apartments, 2-1bedroom apartments

These floor areas and uses were established in McCabe Corner PMD Final Development Plan. There has not been another use of the site since.

For the purpose of calculating credit for existing development, the newsroom is treated as an office use and the pressroom as a light industrial use. The newsroom is where the reporters, editors, publishers had their office space. The pressroom is where the paper was printed and distributed. This use distinction is consistent with the calculation of the housing requirements for the current Jackson Hole News and Guide building (reference building permits B01-032 and B03-017).

The apartments are not considered existing per Section 6.3.2.A.1.a and are therefore not included in the calculation of existing development.

165 N. Glenwood

On December 18, 1995 this portion of the site was a mix of uses.

1,455 sf	Teton Cycleworks – the 660 sf building on Glenwood was the retail area, the 795 sf building (including basement) behind it was the shop area for the store
2,539 sf	JH Mountain Guides – includes half of the ground floor and the basement, which was used as storage, of the main building
1,699 sf	3 apartments in the main building, 1 on the ground floor and 2 on the second floor
2,680 sf	4-2 bedroom apartments in the back building

The floor area numbers are Assessor data. The retail space has housed other retail and service businesses, but has never had an approved change of use. The main building no longer houses the JH Mountain Guides, but has never had an approved change of use.

The Teton Cycleworks space is treated as retail/service in the existing development calculation. The JH Mountain Guide space is Outfitter/Tour Operator use, which is an independent calculation that is described in more detail in the next section of this support documentation. The apartments are not considered existing per Section 6.3.2.A.1.a and are therefore not included in the calculation of existing development.

Outfitter/Tour Operator Independent Calculation

JH Mountain Guides is, and was in 1995, a dual seasonal outfitter/tour operator, offering guided backcountry experiences in both summer and winter (climbing, hiking, backpacking, skiing). As such, the below independent calculation focused on outfitter/tour operator spaces with dual seasonal or year-round operations. It is not applicable to a truly seasonal use that does not support employees year-round.

The housing requirement for any use is the result of 3 types of employee generation – construction employees to build the space, operational employees who work out of the space, and first responders who protect the space. The calculation for an outfitter/tour operator is provided below in the same format as it is calculated for other uses in the calculator provided online. Numbers in blue are the values proposed pursuant to 6.3.3.B.3. All other values are pursuant to the 2013 Nexus Study, or are the function of the calculation stated in 6.3.3.B.2.

Construction

The generation of construction employees depends on whether the space is finished or unfinished as it takes more construction employees to finish a space. The assumption in this independent calculation is that an outfitter/tour operator space will be a combination of finished space to interface with the customer and unfished space to store gear. Therefore, the construction employee generation was assumed to be halfway between the finished an unfinished number. This method was also used in the 2013 Nexus Study with regard to Institutional space. Otherwise, the standard career length, income, and household characteristics of a construction worker were used to calculate the housing requirement attributable to construction worker generation.

Outfitter/Tour Operator Calculation		
Construction		
	employees per 1,000 sf	0.927
	sf per room	
	Length of Construction Career	30
	employees per 1,000 sf/room	0.031
	employees per unit	1.774
	employees who can afford	28.87%
	units per 1,000 sf/room	0.012
Operations		
	employees per 1,000 sf/room	6.756
	employees per unit	1.678
	Employees who can afford	28.18%
	units per 1,000 sf/room	2.892
Fire/EMS		
	Fire/EMS employees per 1000 sf	0.00100
	employees per unit	1.797
	employees who can afford	25.56%
	Fire/EMS units per 1000 sf	0.00042
Law Enforcement		
	Law employees per 1000 sf	0.00301
	employees per unit	1.797
	employees who can afford	27.09%
	Law units per 1000 sf	0.00122
Total		
	Employees per 1000 sf/room	6.791
	units per 1,000 sf/room	2.906
	Town Yearround mitigation "rate"	55%
	Town Reduction factor	0.75
	Town Required units per 1,000 sf	**2.189**

Operations

To determine the operational employee generation per square foot and the income characteristics of outfitter/tour operator employees, 3 local uses were surveyed. The results are below. The average employee generation per 1,000 sf is included directly.

To calculate the employees per unit and employees who can afford housing, the income characteristics of the employees were matched to the income characteristics of employees in other sectors. The best match from the 2013 Nexus Study were institutional employees, so the employees per unit and employees who can afford factors for

institutional uses were applied to outfitter/tour operator use. For reference, the institutional affordability factors are middle of the road compared to other uses and very nearly equal to the average. It should be noted that the ability to afford factors have far less impact than the employee generation in determining the requirement from any sector – adjusting from the middle to the highest or lowest affordability factors would only change the calculated requirement by 0.03 units per 1,000 square feet.

	Exum	Mad River/ Scenic Safari	Brushbuck Tours	Average
Floor Area	2,820 sf	4,176 sf	1,300 sf	
Year-round Employees	14	35	9	
Employees/1,000 sf	4.965	8.381	6.923	6.756
Average Salary		$56,796	$64,000	$60,400

Notes:

- In the case of Exum and Mad River/Scenic Safari year-round employees is a dual seasonal calculation representative of employment in the season with fewer employees.
- The Exum and Mad River/Scenic Safari information was gathered from staff or ex-staff.
- The Brushbuck information represents the year-round employee information from CUP file P17-102, except that the payroll information was supplemented with an assumption of tip income as well. The tip assumption was based on the tip information gathered for Mad River/Scenic Safari employees.

First Responders

All of the standard employee generation, income, and household characteristics for a nonresidential use were used to calculate the housing requirement attributable to first responder generation.

Result

The final step in the calculation is to utilize the general reduction factor applied to all commercial uses that was colloquially approved as applying a 55% mitigation rate instead of a 73% mitigation rate.

The result, a housing mitigation rate far greater than any other use, is simply explained by the logic that it does not take much floor area to launch a lot of tours into the field. As a result, an outfitter/tour operator can employ a lot of guides and other staff with little need for floor area. However, there is still a link to floor area for staging and storage so floor area can still be used to determine the calculation.

Housing Mitigation Plan

updated 7/20/18

Development of a new house, hotel, or commercial space generates the need for employees. The construction workforce builds the space, the commercial workforce or residential service workforce works in the space, and first responders are needed to protect the space. Only about 27% of the employees generated by development can afford housing in the community, but the community's "community first" character goal is that 65% of employees live locally. To bridge this affordability gap, each development is required to include affordable workforce housing proportional to the employees it generates. These housing mitigation requirements are established in Division 6.3 of the Land Development Regulations. The following worksheet is intended to assist in the calculation of the housing required for a project, but does not amend the actual standards.

Step 1: Location

Town of Jackson

The applicable regulations vary by jurisdiction please identify the location of your project.

Step 2: Existing Development

Housing is only required for new development. Please describe the existing use of the site so that it can be credited from the housing requirement. Enter each exsiting use in its own row, add rows if needed. If a building has multiple units with the same use, describe each unit in its own row, do not add the size of all units that have the same use. (For example: if a duplex is composed of a 2,300 sf attached unit and a 1,700 sf attahced unit put each unit in its own row do not put in 4,000 sf of attached single-family.) If a single unit type (e.g. apartment floor plan, or commercial tennant space) is replicated multiple times use the "Use Quantity" column to avoid adding multiple rows. See Section 6.3.2 of the LDRs for specifics on the applicability of the affordable workforce housing standards and Section 6.3.3 for specifics on calculation of the requirement.

Existing Use	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	**Housing Required**
Office	0.000493*sf		7930	1	**3.913**
Light Industry	0.000246*sf		6160	1	**1.514**
Retail	0.000431*sf		1455	1	**0.627**
Outfitter/Tour Operator	0.002189*sf - independent calculation		2539	1	**5.558**
					?
				Total Existing Credit	11.611

Step 3: Proposed Development

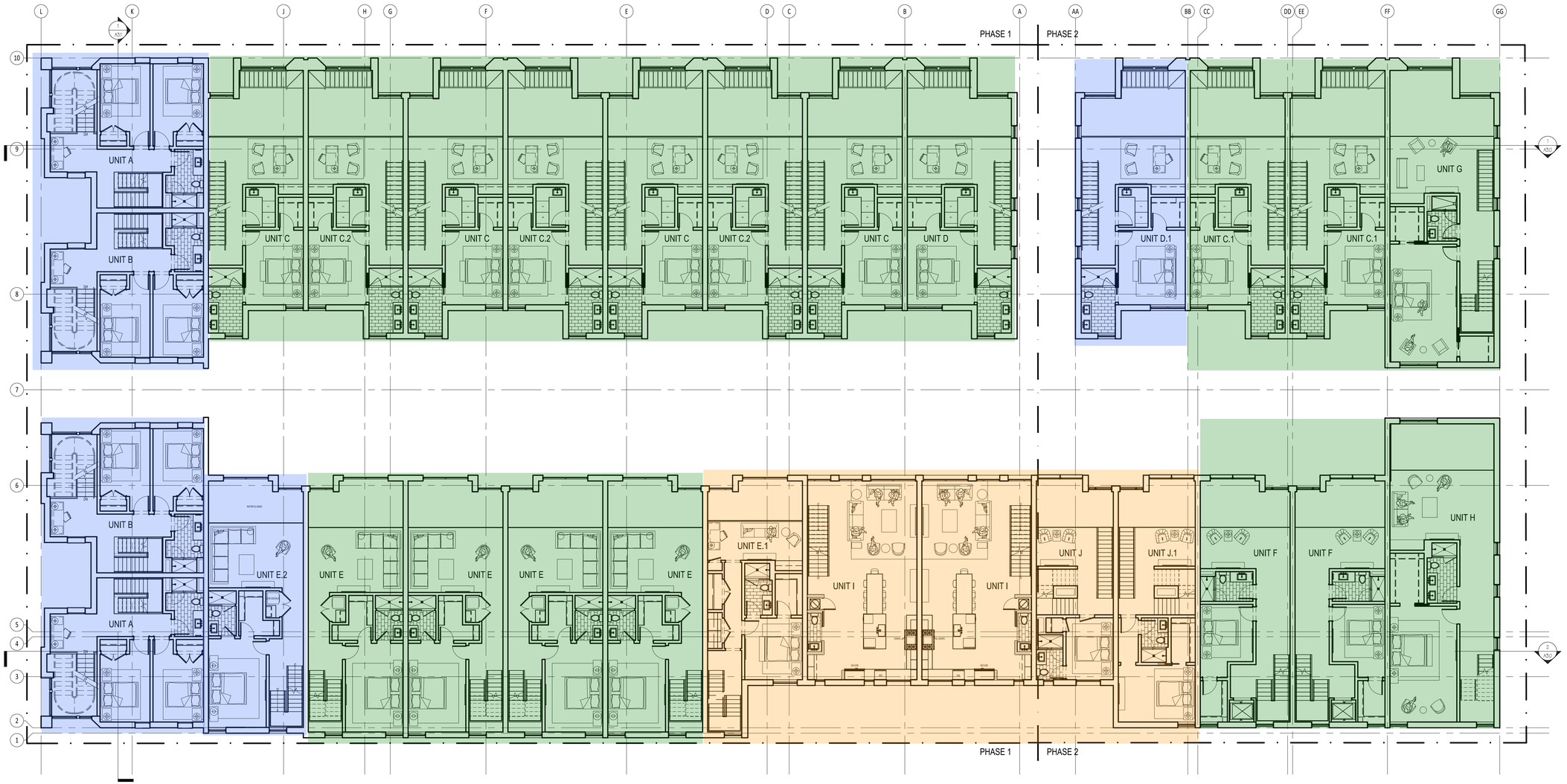
Please describe the proposed use of the site to determine if affordable workforce housing is required as part of the development. Describe the end result of the proposed development not the net. (For example: in the case of an addition do not enter the square footage of the addition, enter the size of the unit upon completion of the addition.)

Proposed Use	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	**Housing Required**
Workorce Housing Bonus Unit	exempt	3	2,989	1	**0.000**
Workorce Housing Bonus Unit	exempt	3	2,989	1	**0.000**
Workorce Housing Bonus Unit	exempt	3	3,084	1	**0.000**
Workorce Housing Bonus Unit	exempt	3	3,084	1	**0.000**
Short-Term Rental Unit	0.204*bedrooms	3	3,070	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,210	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,070	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,210	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,070	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,210	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,070	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,447	1	**0.613**
Workorce Housing Bonus Unit	exempt	3	3,116	1	**0.000**
Short-Term Rental Unit	0.204*bedrooms	3	3,298	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,298	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,298	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,298	1	**0.613**
Workforce Housing Unit	exempt	3	2,937	1	**0.000**
Workforce Housing Unit	exempt	2	2,088	1	**0.000**
Workforce Housing Unit	exempt	2	2,088	1	**0.000**
Workorce Housing Bonus Unit	exempt	3	3,447	1	**0.000**
Short-Term Rental Unit	0.204*bedrooms	3	3,051	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,051	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	4	3,946	1	**0.817**
Short-Term Rental Unit	0.204*bedrooms	4	4,189	1	**0.817**
Short-Term Rental Unit	0.204*bedrooms	3	3,017	1	**0.613**
Short-Term Rental Unit	0.204*bedrooms	3	3,017	1	**0.613**
Workforce Housing Unit	exempt	3	2,484	1	**0.000**
Workforce Housing Unit	exempt	3	2,053	1	**0.000**
				Total	11.440

Affordable Workforce Housing Required: -0.170 units

Fee-in-Lieu Amount: $ -

SHORT-TERM RENTAL UNIT
WORKFORCE HOUSING BONUS OWNERSHIP UNIT
WORKFORCE HOUSING OWNERSHIP UNIT



NORTHWORKS
CHICAGO | JACKSON HOLE | SAN FRANCISCO | PHILADELPHIA
1512 N. Throop Street Chicago, Illinois 60642
T 312-440-9850 F 312-440-9851 www.nwks.com

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NOT FOR CONSTRUCTION / FOR COORDINATION ONLY

	ISSUED DATE	ISSUED FOR
■	10.25.2019	DEVELOPMENT PLAN REVIEW

PROFESSIONAL SEAL

PROJECT
GLENWOOD GILL
165 AND 185 GLENWOOD ST.
JACKSON, WY 83001

1928	Project No.
KL/RB/JB/EY	Drawn By
EAD	Checked By
Discipline: A	Drawing No.: 1.12

Drawing Name
CONSTRUCTION PLAN - SECOND FLOOR

165-185 Glenwood
Unit Information

Unit	Phase	Unit Type	Bedrooms	Basement	First Floor	Second Floor	Third Floor	Total Habitable SF	Above Grade FAR
A1- Glenwood	Phase 1	Workforce Housing Bonus Unit	3 Br	403	929	910	747	2,989	2,586
A2- Alley	Phase 1	Workforce Housing Bonus Unit	3 Br	403	929	910	747	2,989	2,586
B1- Glenwood	Phase 1	Workforce Housing Bonus Unit	3 Br	459	935	937	753	3,084	2,625
B2- Alley	Phase 1	Workforce Housing Bonus Unit	3 Br	459	935	937	753	3,084	2,625
C- Glenwood Balcony	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	882	3,070	2,680
C.2- Glenwood	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	1,022	3,210	2,820
C- Glenwood Balcony	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	882	3,070	2,680
C.2- Glenwood	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	1,022	3,210	2,820
C- Glenwood Balcony	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	882	3,070	2,680
C.2- Glenwood	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	1,022	3,210	2,820
C- Glenwood Balcony	Phase 1	Short-Term Rental Unit	3 Br	390	1,006	792	882	3,070	2,680
D- Glenwood	Phase 1	Short-Term Rental Unit	3 Br	429	1,131	892	995	3,447	3,018
E.2- Alley Far North	Phase 1	Workforce Housing Bonus Unit	3 Br	287	942	868	1,019	3,116	2,829
E- Alley Middle	Phase 1	Short-Term Rental Unit	3 Br	371	1,003	883	1,041	3,298	2,927
E- Alley Middle	Phase 1	Short-Term Rental Unit	3 Br	371	1,003	883	1,041	3,298	2,927
E- Alley Middle	Phase 1	Short-Term Rental Unit	3 Br	371	1,003	883	1,041	3,298	2,927
E- Alley Middle	Phase 1	Short-Term Rental Unit	3 Br	371	1,003	883	1,041	3,298	2,927
E.1- Alley Far South	Phase 1	Workforce Housing Unit	3 Br	371	899	752	915	2,937	2,566
I- Alley	Phase 1	Workforce Housing Unit	2 Br	-	158	965	965	2,088	2,088
I- Alley	Phase 1	Workforce Housing Unit	2 Br	-	158	965	965	2,088	2,088
D.1- Glenwood	Phase 2	Workforce Housing Bonus Unit	3 Br	429	1,131	892	995	3,447	3,018
C.1- Glenwood	Phase 2	Short-Term Rental Unit	3 Br	390	1,006	773	882	3,051	2,661
C.1- Glenwood	Phase 2	Short-Term Rental Unit	3 Br	390	1,006	773	882	3,051	2,661
G1- Glenwood Den	Phase 2	Short-Term Rental Unit	4 Br	505	1,342	1,104	995	3,946	3,441
H1- Alley Den	Phase 2	Short-Term Rental Unit	4 Br	437	1,402	1,211	1,139	4,189	3,752
F- Alley	Phase 2	Short-Term Rental Unit	3 Br	321	949	797	950	3,017	2,696
F- Alley	Phase 2	Short-Term Rental Unit	3 Br	321	949	797	950	3,017	2,696
J.1- Alley	Phase 2	Workforce Housing Unit	3 Br	146	819	695	824	2,484	2,338
J- Alley	Phase 2	Workforce Housing Unit	3 Br	146	675	552	680	2,053	1,907
				10,110	27,349	24,806	26,914	89,179	79,069

	Phase 1 Only (185 Glenwood)	Phase 2 Only (165 Glenwood)	Phase 1 & Phase 2 Combined
Site Acreage	0.64	0.32	0.96
Site Square Footage	27,878	13,939	41,818
Base FAR	1.30	1.30	1.30
Base Square Footage Allowed	36,242	18,121	54,363
Market Residential- Base	-	-	-
Maket- Short Term Rental- Base	33,906	17,907	51,813
Common Area- Base	658	50	708
Total Base Square Footage	34,564	17,957	52,521
Base FAR	1.240	1.288	1.256
Market Residential- 2:1 Bonus	13,251	3,018	16,269
Workforce Residential- 2:1 Voluntary	6,742	4,245	10,987
Total 2:1 Square Footage	19,993	7,263	27,256
2:1 Ratio	1.965	0.711	1.481

**No affordable housing required per Housing Mitigation Plan*

Project Program- 165 & 185 Glenwood

	Basement	First Floor	Second Floor	Third Floor	Total Habitable SF	Total Above Grade Floor Area
Common Area	-	708	-	-	-	708
Affordable Housing Unit	-	-	-	-	-	-
Workforce Housing Unit	663	2,709	3,929	4,349	11,650	10,987
Workforce Housing Bonus Unit	2,440	5,801	5,454	5,014	18,709	16,269
Attached Single-Family Unit (Unrestricted)	-	-	-	-	-	-
Short-Term Rental Unit	7,007	18,839	15,423	17,551	58,820	51,813
Total Floor Area	10,110	28,057	24,806	26,914	89,179	79,777

Site Size (Acres)	0.96
Site Size (SF)	41,818
Floor Area- Above Grade	79,777
Floor Area Ratio	1.91
Downtown Core (DC) Maximum FAR	1.30
Adjusted Floor Area (remove Workforce Housing & Workforce Housing Bonus Units)	52,521
Adjusted FAR	**1.256**

Project Program- Phase 1 (185 Glenwood)

	Basement	First Floor	Second Floor	Third Floor	Total Habitable SF	Total Above Grade Floor Area
Common Area	-	658	-	-	-	658
Affordable Housing Unit	-	-	-	-	-	-
Workforce Housing Unit	371	1,215	2,682	2,845	7,113	6,742
Workforce Housing Bonus Unit	2,011	4,670	4,562	4,019	15,262	13,251
Attached Single-Family Unit (Unrestricted)	-	-	-	-	-	-
Short-Term Rental Unit	4,643	12,185	9,968	11,753	38,549	33,906
Total Floor Area	7,025	18,728	17,212	18,617	60,924	54,557

Site Size (Acres)	0.64
Site Size (SF)	27,878
Floor Area- Above Grade	54,557
Floor Area Ratio	1.96
Downtown Core (DC) Maximum FAR	1.30
Adjusted Floor Area (remove Workforce Housing & Workforce Housing Bonus Units)	34,564
Adjusted FAR	**1.240**

Project Program- Phase 2 (165 Glenwood)

	Basement	First Floor	Second Floor	Third Floor	Total Habitable SF	Total Above Grade Floor Area
Common Area	-	50	-	-	-	50
Affordable Housing Unit	-	-	-	-	-	-
Workforce Housing Unit	292	1,494	1,247	1,504	4,537	4,245
Workforce Housing Bonus Unit	429	1,131	892	995	3,447	3,018
Attached Single-Family Unit (Unrestricted)	-	-	-	-	-	-
Short-Term Rental Unit	2,364	6,654	5,455	5,798	20,271	17,907
Total Floor Area	3,085	9,329	7,594	8,297	28,255	25,220

Site Size (Acres)	0.32
Site Size (SF)	13,939
Floor Area- Above Grade	25,220
Floor Area Ratio	1.81
Downtown Core (DC) Maximum FAR	1.30
Adjusted Floor Area (remove Workforce Housing & Workforce Housing Bonus Units)	17,957
Adjusted FAR	**1.288**

October 30, 2019

Paul Anthony
Principal Planner
Town of Jackson
150 E Pearl Avenue
Jackson, WY 83001

RE: Short-Term & Long-Term Rental Units

Dear Mr. Anthony,

The Sketch Plan & Administrative Adjustment approval letter included a request that as part of the Development Plan Application we clarify how we plan to ensure that long-term residential units are not used for short-term rental use. The project includes 18-short-term rental units, 5-workforce housing ownership units and 6-workforce housing ownership bonus units. In order to ensure that units that are not designated for short-term rental are not rented on a short-term basis we have/will take several steps including:

- Clearly identifying how units are classified within this Development Plan submittal
- Ensuring that potential purchasers are aware of Town regulations regarding short-term rentals
- Making sure that the homeowner's association and management company is aware of the short-term rental regulations and the unit classifications within this development
- Working with the town on any other reasonable measures throughout the development process

Should you have further questions or need further clarification we would be more than happy to discuss this topic.

Sincerely,

Nick Orthmann
Project Manager
Bear Development, LLC

BEAR DEVELOPMENT

October 25, 2019

Stacy Stoker
Housing Manager
Jackson/Teton County Affordable Housing Department
320 S. King Street
Jackson, WY 83001

RE: 165-185 North Glenwood Street Livability Standards Questionnaire

Dear Ms. Stoker,

We are in receipt of the Livability Standards Questionnaire required by the Housing Department for the five Workforce Ownership units included in the project. At the time of this Development Plan application to the Town, we do not have enough information to complete the questionnaire. However, our design team has reviewed the Livability Standards and are planning accordingly. The questionnaires will be completed and sent to you for review prior to finalizing our building plans. If you have any questions, please feel free to reach out at any time.

Sincerely,



Nick Orthmann
Project Manager
Bear Development, LLC

Glenwood Gill Condominiums
Sketch Plan Review Responses

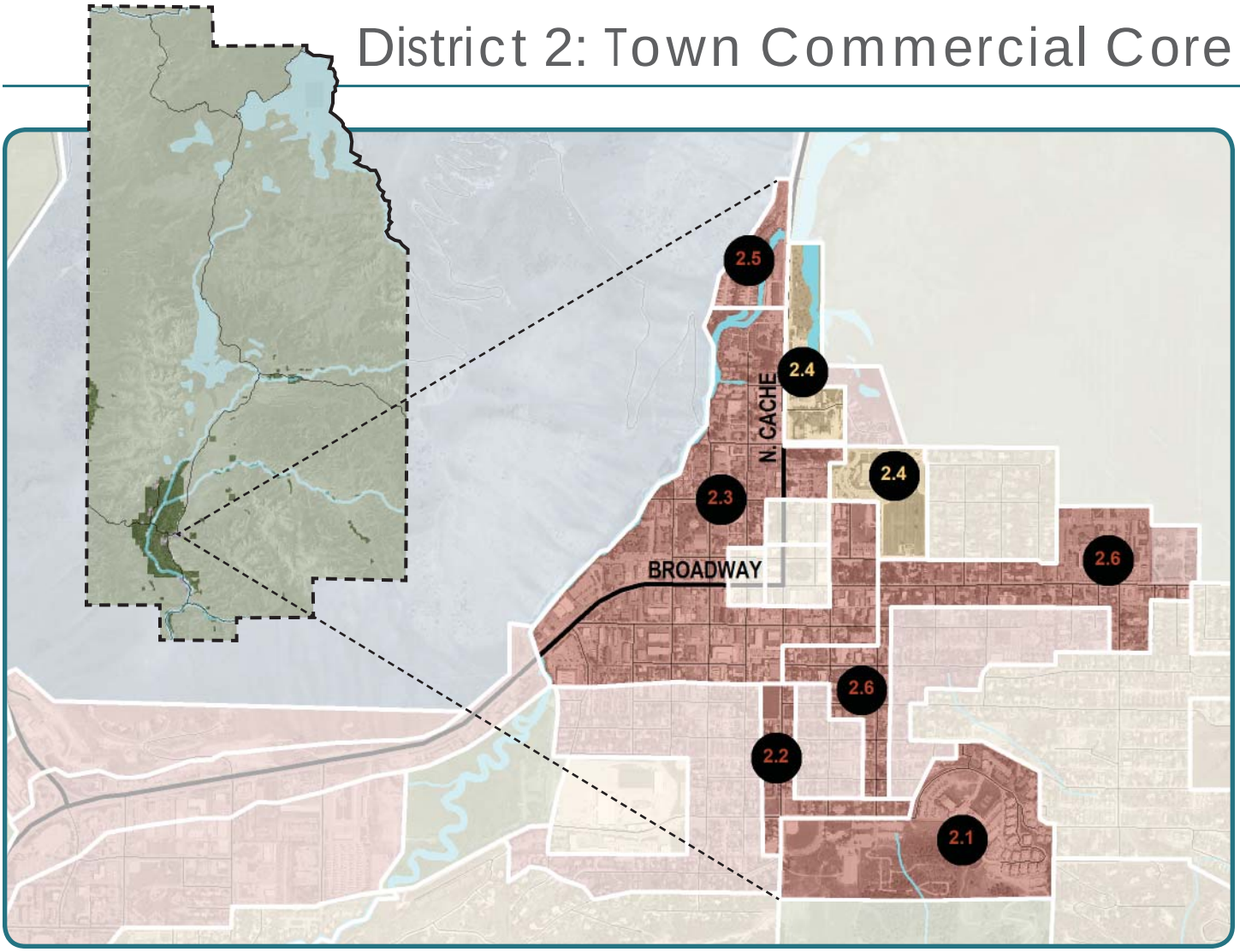
Number	Department	*Comment*	Response
1	Engineering	*The proposed relocation of the curb shall not impact the existing use of the east side parking spaces.*	Parking space modification (angle change from 60 to 50 degrees and resulting roadway dimensions is addressed on C2.1
2	Engineering	*The proposed relocation of the curb shall not impact the alignment of travel lanes through the intersection of Glenwood and Mercill.*	Glenwood Street centerline alignment returns to existing at the north end of angled parking. Centerline is unchanged at Glenwood-Gill intersection
3	Engineering	*This approval is for C2.1 Option 1 with no curb extensions or bulb outs. Corner design for the curb will need to be coordinate to provide drainage, meet the design standards of the Community Streets Plan.*	'Bulb out option removed', existing drain moved out of crosswalk
4	Engineering	*SHEET C2.1 Option 3: Proposed southeast corner bulb out will not be allowed and if chosen, design would need to go back and rework the curb from the end of the existing curb extension.*	'bulb out' removed from design
5	Engineering	*Stormwater inlet at corner shall be relocated to accommodate drainage and not interfere with the pedestrian ramps.*	Storm drain moved south, out of crosswalk
6	Engineering	*The proposed curb shift does not appear to impact the traffic and parking on the east side of the road and shifts use of the right of way from a large travel lane to the buffer zone.*	See analysis on C2.1
7	Engineering	*The proposed 4-feet buffer zone on West Gill Avenue likely will not accommodate trees in pavers. On other projects the council has requested that a landscaped buffer be considered, and this may be a more appropriate streetscape on this street and may provide some relief of all the hard surfaces.*	Gill buffer changed to landscaped
8	Engineering	*Sheet C2.0 and C2.1: When considering the bulb out options, radii and bus/truck turning paths should be shown to check with the 2015 Community Streets plan.*	'bulb out' removed from design
9	Engineering	*Sheet C2.0 and C2.1: It is not clear if there is a proposed shift in the existing centerline of Glenwood. Existing and proposed centerlines from north to south through the intersection should be shown and any changes dimensioned.*	See existing and proposed street dimensions on C2.1
10	Engineering	*Sheet C2.1: Currently redevelopment of the curb and sidewalks at this intersection are not contemplated in the Town's CIP.*	All curb changes not directly associated with this project removed. Project plans to construct proposed relocated curb on west side of Glenwood adjacent to project
11	Engineering	*Sheet C2.1: Measurements from aerial images indicate that the angle parking along the east side of North Glenwood are 60-degree parking spaces and not the 45-degree spaces shown. Clarify if the design is intended to change the angle of parking on the east side of the road, and if so, indicate how many parking spaces will be lost.*	Spaces to be adjusted to 55-degree angle, no spots will be lost. See turning analysis on C2.1

12	Engineering	*Clarify if duplicate documents are included in the application, it appears that the digital forms has multiple copies. A single set of documents should be provided to facilitate reviews and prevent conflicting designs or review omissions. It will also make the application smaller.*	Duplicates not included
13	Planning	*Paving the alley will require coordination with drainage on adjacent properties and at the sidewalk. Additional, stormwater infrastructure may be requireed to facilitate the drainage across the sidewalk. The parking garage for the White Buffalo club has had issues flooding but also has such a low clearance they do not have room for curbs. Grades out to the sidewalk are very flat as well. Coordination with the White Buffalo Club will be essential to a successful alley grading project*	Adjacent properties were surveyed. Proposed grades of alley where it connects to adjacent parking are unchanged.
14	Engineering	*Grades of adjacent properties, especially along the alley and at Gill Ave., shall be surveyed and shown with elevations on the plans.*	Adjacent properties were surveyed. Proposed grades of alley where it connects to adjacent parking are unchanged.
15	Engineering	*A construction-staging plan and narrative shall be submitted for review. Discussion of proposed shoring for the excavation should be included. Soil nails encroaching into the Town's right-of-way will require an encroachment agreement and may be subject to a soil nail removal fee.*	Construction staging plan to be provided by Contractor, See attached.
16	Engineering	*A detailed potable water system plan shall be provided on the plans consistent with the LDR's. The plan shall show the calculations for domestic and fire water demands. This plan shall include backflow device and meter locations.*	An existing 4" diameter service is installed on the Glenwood water line. The project will require this for domestic water and an additional 8" connection for fire. Existing tap may be used or abandoned in favor of single, 8" tap. Final arrangement to be coordinated with TOJ public works. See detail on C3.2.
17	Engineering	*A water system analysis indicating the required fire flow demands and the impacts to the Town's existing system shall be required.*	Domestic and fire water demands and effects of fire flow on TOJ water system provided in Engineers' report
18	Engineering	*A preliminary irrigation system design (if applicable) with backflow system plan shall be provided on the plans consistent with the LDR's.*	Irrigation system design by Landscape architect. See Detail on C3.2 for irrigation connection to water system.
19	Engineering	*A detailed sanitary sewer system plan shall be provided on the plans consistent with the LDR's. The plan shall show the calculations for sewer flowrates.*	Sanitary sewer connection shown on C2.0. Interior sewer line routing by MEP. Sewer flowrates provided in engineer's report.
20	Engineering	*Information concerning the additional wastewater flows to be delivered to the Town's system shall be required. In addition, this information shall include a review of downstream impacts created from the additional flows being delivered.*	Sewer flowrates provided in engineer's report.

21	Engineering	*A preliminary stormwater management plan for the site shall be provided on the plans consistent withthe LDR's.*	Connection to TOJ stormwater system provided on C2.0. Internal routing to be provided by MEP. Discharge strategy consistent with LDR's provided in Engineer's report.
22	Engineering	*A complete grading and erosion control plan shall be provided on the plans consistent with the LDR's.*	A complete grading and erosion control plan consistent with LDRs will be provided as part of the building permit package
23	Engineering	*Site contours, spot elevations, grades, (existing and proposed) shall be provided on the plans beyond all property boundaries per the LDR's to ensure the development's integration into the surrounding public and private property.*	Contours and notes indicating connection to adjacent development provided. Spot elevation and detailed grades will be provided as part of the building permit package.
24	Engineering	*A parking and access plan per the LDR's shall be required. The dimensions of the parking spaces and drive lanes, including turning movements (both ingress and egress), shall be clearly shown on the plans for review.*	Changes to surface street geometry beyond those detail on sheet C2.1 are not part of this project. Dimensioned basement parking garage plan with turning movements will be provided as part of the building permit package.
25	Engineering	*A pedestrian corridor plan within the right of way shall be provided for review. This shall include all dimensions and elevations in relation to existing curb and future development together with ADA compliance. Show all running and cross slopes as well as grade breaks. The buffer/landscaping strip is not to accommodate grade changes across the property and should provide grades that are traversable and do not interfere with snow plowing*	ADA compliant Glenwood Street sidewalk, Gill Avenue Sidewalk, intersection ramps and connection to existing sidewalk adjacent to project provided on C2.0. Spot elevation will be provided as part of the building permit package.
26	Engineering	*Show Radius dimensions on all proposed curb returns within the right-of-way.*	Curb radius consistent with community streets plan provided on C2.0
27	Engineering	*If awnings or canopies are proposed within the right-of-way, dimensional and drainage information shall be included on the plans. Encroachment Agreements are required for portions of the structure that encroach into the right-of-way.*	No awnings or canopies encroach into the right-of-way
28	Engineering	*All work to be completed within the Town's right-of-way shall be specifically addressed.*	No portions of structure encroach into the right-of-way
29	Engineering	*All onsite power and cable utilities shall be shown as underground and location(s) of transformers and other communication pedestals indicated*	Points of connection addressed on C2.0. No new overhead lines proposed, 1 span and several services of existing overhead utilities will be buried.
30	Engineering	*Snow storage areas for the site shall be indicated on the plans. A large area is proposed for snow melt. In the current economy and energy market this is a solution. However, other large scale snow melt systems have been installed within the Town and for various reasons, repair, cost of operations, etc. they are no longer used. Include discussion for alternatives to the snow melt in the event it no longer functions or iseconomically feasible.*	Areas useable for snow storage provided on C2.0

31	Engineering	*Include the Town's standard list of building permit conditions on the plans. Contact Engineering for more information.*	Provided on C1.0
32	Fire Marshal	*The most current edition of the International Fire Code (IFC) and the 2017 edition of the National Electric Code (NEC) shall be used for building design.*	The project will comply with the requirements of the current applicable codes as noted. All comments shall be inluded and accounted for in the permit drawings to be issued.
33	Joint Housing Dept.	*The applicant is proposing 5 Workforce housing units. These units must be in compliance with the Livability Standards in the Housing Rules and Regulations. The Livability Standards Questionnaire shall be completed by the applicant and submitted to the Housing Department. The questionnaire can be obtained from the Housing Department. The Housing Department will review to ensure the units comply. A copy of the Livability Standards are available from the Housing Department and can be found on the Housing Department website*	All workforce housing standards will omply with the Livable Standards in the Housing Rules and Regulations. The questionsaire will be completed and submitted for review outlining compliance.
34	Parks & Rec	*Landscape plan and tree proposals look good. Plans reference 'pavers with trees in grates (per TOJ standards)'. Would request that the tree boxes and grates are consistent with the ones on North Cache St. We need to establish consistent design and implementation of boxes and grates throughout the town. The design of these boxes hold up better in the winter and require less long term maintenance. I have not seen specifications on these boxes from the Town but in discussions with Public Works and Staff the ones on North Cache streetscape are the preferred design.*	See updated plan submitted in the DPR submission for review.
35	Planning	*Street lights should be considered for the project. The White Buffalo Club has lights mixed in with their street trees. Other exterior lighting on the structure may be acceptable as well.*	See civil and landsape plans.

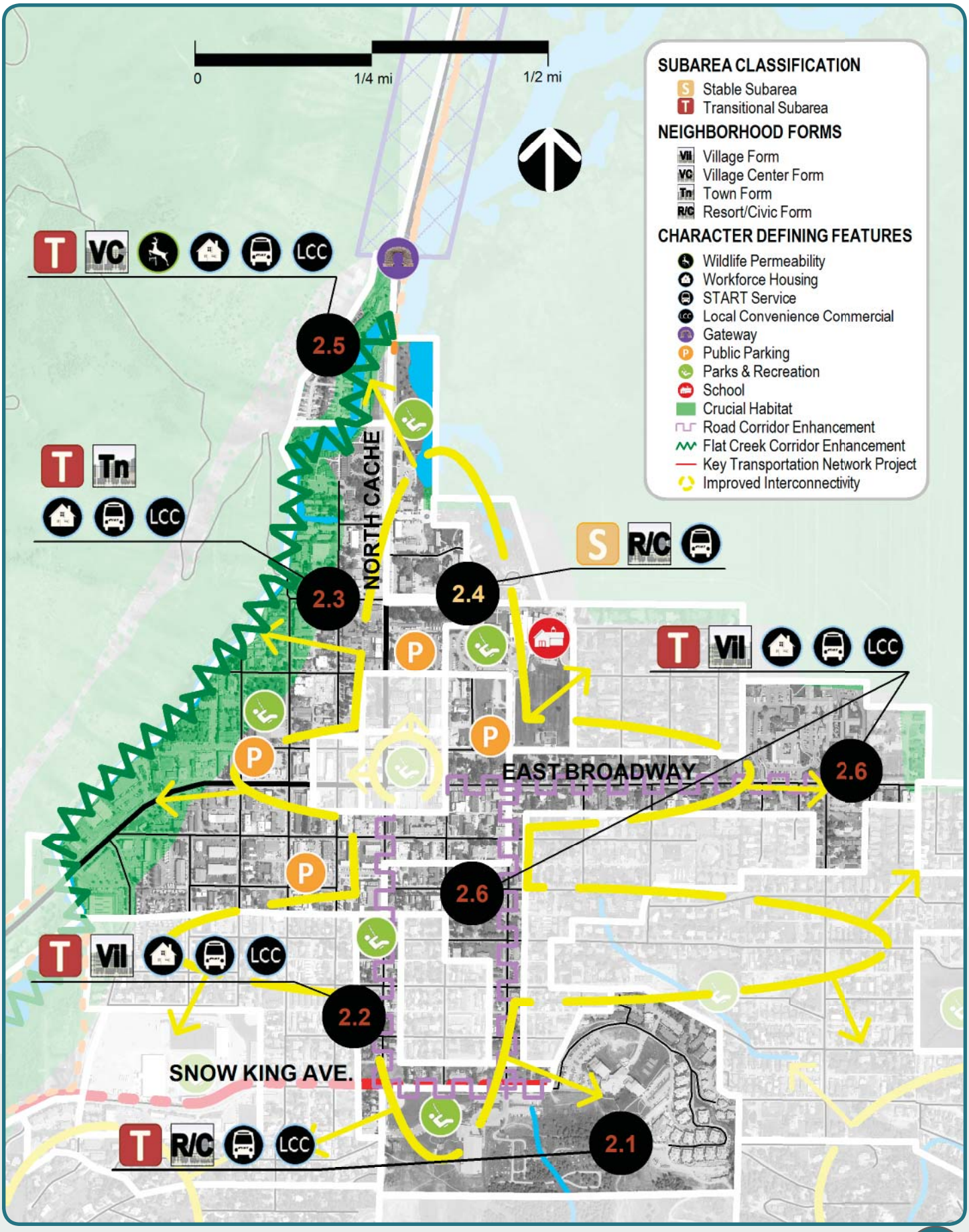
District 2: Town Commercial Core



Complete Neighborhood + Rural Area Chart

	DEFINITION	EXST.	FUTURE	
COMPLETE NEIGHBORHOOD	Defined Character/High Quality Design	○	●	2-3 stories, vibrant pedestrian mixed use, street wall
	Public Utilities	●	●	Water, sewer, storm sewer
	Quality Public Space	●	●	Miller Park, Phil Baux Park, Snow King, Center for the Arts
	Variety of Housing Types	◐	●	Duplex, condominiums, apartments, multifamily
	Walkable Schools, Commercial + Recreation	●	●	Post Office, START, Limited convenience commercial, school, parks, pathways
	Connection by Complete Streets	◐	●	Alternative transportation a priority
RURAL	Viable Wildlife Habitat + Connectivity	○	◐	Flat Creek enhancements
	Natural Scenic Vistas	○	○	
	Agricultural + Undeveloped Open Space	○	○	
	Abundance of Landscape over Built Form	○	○	
	Limited, Detached, Single family Res. Development	○	○	
	Minimal Nonresidential Development	○	○	

Legend: ● *Generally Present;* ◐ *Partially Present;* ○ *Generally absent*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SUBAREA CLASSIFICATION
Stable Subarea
Transitional Subarea
NEIGHBORHOOD FORMS
Village Form
Village Center Form
Town Form
Resort/Civic Form
CHARACTER DEFINING FEATURES
Wildlife Permeability
Workforce Housing
START Service
Local Convenience Commercial
Gateway
Public Parking
Parks & Recreation
School
Crucial Habitat
Road Corridor Enhancement
Flat Creek Corridor Enhancement
Key Transportation Network Project
Improved Interconnectivity
NORTH CACHE
EAST BROADWAY
SNOW KING AVE.
2.1
2.2
2.3
2.4
2.5
2.6
2.6

Existing + Future Desired Characteristics

The Town Commercial Core is the economic hub of Teton County. The district contains a significant amount of the community's commercial uses, employment opportunities and lodging capacity. The future goal is to create a vibrant pedestrian-oriented mixed use district with a variety of non-residential and residential uses. A key component of achieving this goal will be to have visitors and residents visit the area more often and stay longer by increasing the availability of lodging and residential units and creating a vibrant Retail Shopping District.

Our community will strive to find creative solutions to develop the district into a year-round economic hub, by maintaining high lodging occupancy and sales tax collections during the shoulder seasons (April-May and October-November). Finding the correct balance of non-residential, non-profit and residential uses will be key to ensuring that the district remains economically and socially viable. In addition, it will be important to provide opportunities for local entrepreneurs and businesses that choose to locate in the community for our lifestyle.

The district is anchored by two primary economic and community centers, each with their own unique identity and role - Snow King Resort (Subarea 2.1) and Downtown (Subarea 2.3). A key goal of the district will be to better connect these subareas in order for each to benefit from the other's vitality, complementary uses, and activities while supporting the overall success of the district as the center for our tourist based economy.

Historically, buildings have been one, two or three stories, oriented both to the street and to large parking areas provided onsite. New buildings should be pulled to the street, creating an attractive street wall with parking located predominantly underground or out of sight. In the future the district should be defined by strategically located public parking lots and on street parking. This will create a welcoming pedestrian experience where visitors and residents park once and enjoy a variety of uses and community events on foot. Flat Creek is the significant natural feature of this district. Future enhancements and redevelopment should seek to incorporate Flat Creek as a recreational and ecological amenity for the entire community. An important goal of the district will also be the enhancement of the northern gateway into Town at the Flat Creek bridge consistent with Policy 4.4.b.

The existing gridded network of streets and alleys create connectivity and redundancy for both pedestrians and the automobile and should be maintained. Future improvements to the district's streetscape to create inviting public spaces and accommodate a wide array of complete street amenities will be essential to achieving a vibrant mixed use district. Public reinvestment in this district will be encouraged in order to create great public spaces and amenities for residents and visitors alike.

Policy Objectives

Common Value 1: Ecosystem Stewardship	N/A
Common Value 2: Growth Management	4.1.b: Emphasize a variety of housing types, including deed-restricted housing 4.1.d: Maintain Jackson as the economic center of the region 4.2.c: Create vibrant walkable mixed use subareas 4.2.d: Create a Downtown Retail Shopping District 4.2.f: Maintain lodging as a key component in the downtown 4.4.b: Enhance Jackson gateways 4.4.d: Enhance natural features in the built environment
Common Value 3: Quality of Life	5.2.d: Encourage deed-restricted rental units 6.2.b: Support businesses located in the community because of our lifestyle 6.2.c: Encourage local entrepreneurial opportunities 6.3.a: Ensure year-round economic viability 7.1.c: Increase the capacity for use of alternative transportation modes

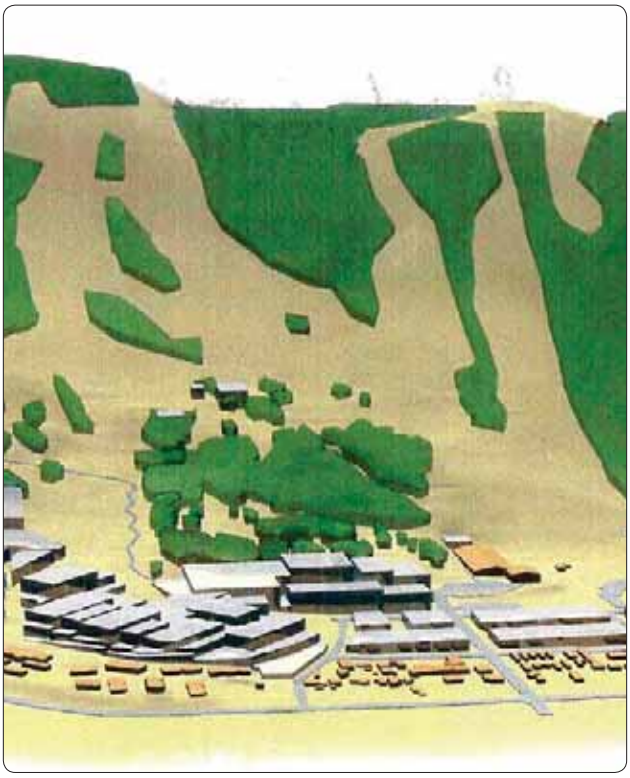
Character Defining Features

2.1: Snow King Resort



Resort/ Civic Form

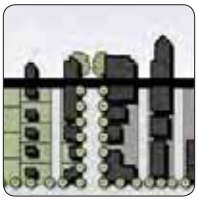
This TRANSITIONAL Subarea is currently subject to the Snow King Resort Master Plan. The plan seeks to create a vibrant mixed use resort complex, including a multi-faceted conference/convention center and community facility that contributes to the economy of Downtown and also serves as a permeable border between the Town and Snow King Mountain. The resort has long been an integral part of the community, playing the role of the "Town Hill", providing a host of winter and summer recreational amenities.



In the future, the subarea will complement Downtown (Subarea 2.3) lodging and tourist amenities. Lodging will be provided in a variety of types and forms from hotel rooms to condominiums, in order to support the local tourism-based economy. The size and scale of structures will often be larger than those typically allowed in other subareas of Town, as resorts typically require a larger critical mass necessary to support visitor functions. Though buildings will tend to be larger than in other districts, the subarea will maintain an abundance of open space in relation to the built environment as a key to a successful resort experience.

Consistent with the master plan, Snow King Avenue will be developed into a mixed use corridor that includes a variety of commercial uses while still serving as a major transportation corridor in the community. Along with this it will be important to create a more visible and attractive base area along Snow King Avenue to attract residents and visitors to the many amenities and recreational opportunities found there.

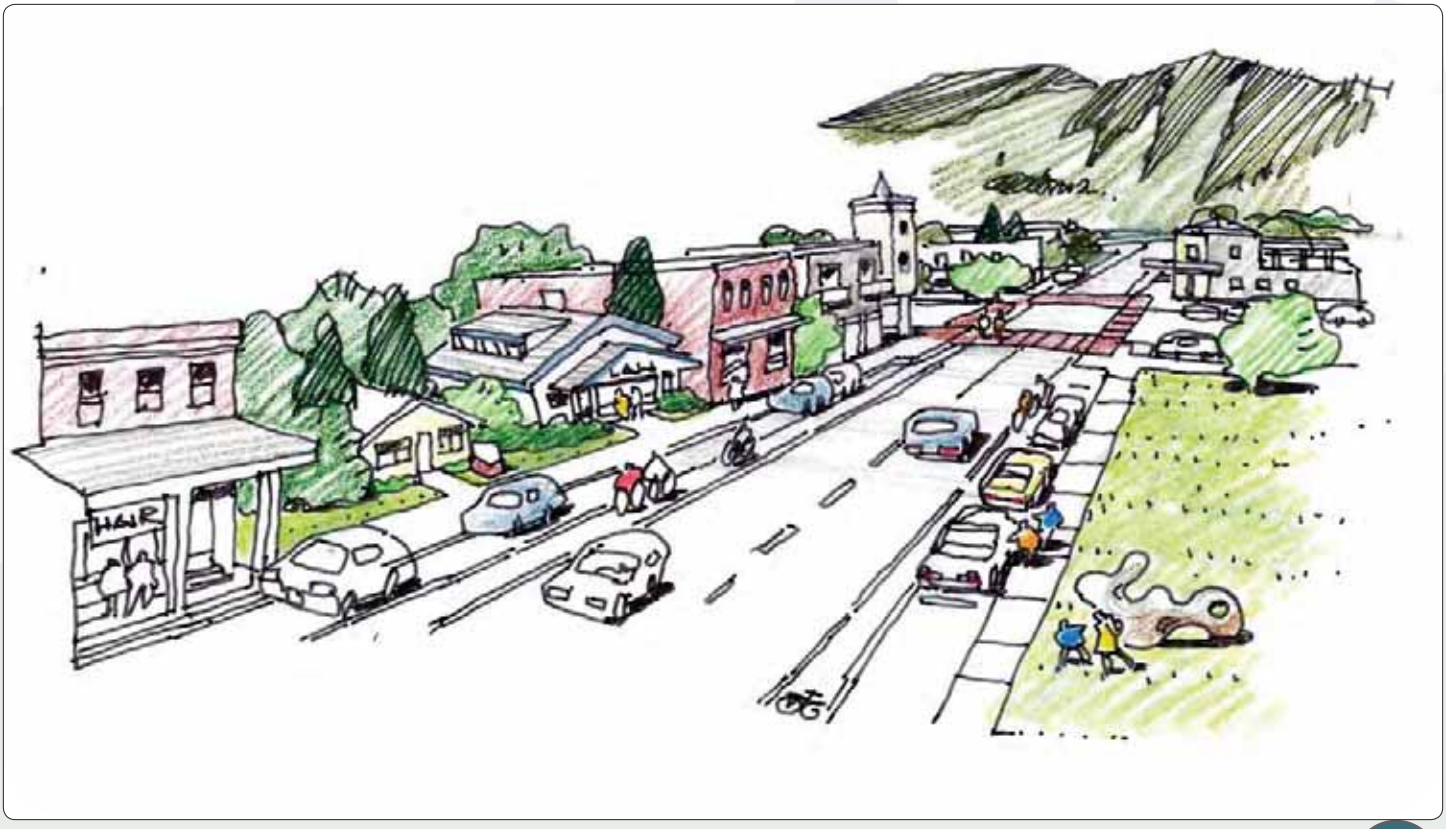
2.2: Snow King and South Cache Corridors



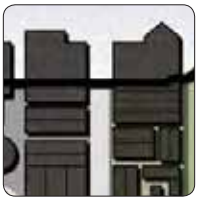
Village Form

This TRANSITIONAL Subarea is envisioned as a pedestrian-oriented mixed use corridor comprised of mixed use and/or multifamily residential structures. The goal of the corridor will be to provide an attractive pedestrian link between Snow King Resort (Subarea 2.1) and Downtown (Subarea 2.3). The corridor is anchored by the Center for the Arts, the community hub for cultural events and activities and other public spaces, including the Center for the Arts Park, Phil Baux Park and the Snow King base area.

The goal of this subarea will be to provide an attractive pedestrian link between Downtown, Snow King and the many under-utilized public spaces in the area. In order to achieve this, ground-level uses should add vitality and street life that support the Center for the Arts and attract residents and visitors to the subarea. Upper floors should provide residential uses, designed to promote workforce housing. Buildings should be two stories in height and front the street. Particular care and attention will be necessary to ensure a successful integration between this mixed use subarea and the adjacent Core Residential (Subarea 3.2). Particular attention will need to be given to the location of buildings, parking, types of uses, and intensity of uses to ensure a successful transition.



2.3: Downtown



Town Form

This large, mixed use, TRANSITIONAL Subarea currently consists of a variety of retail, restaurant, office and other commercial activities, along with long-term residences and lodging in a variety of building sizes and forms. Downtown is the center of civic, cultural, economic and social activity for our community as well as the center of the visitor experience, as a significant amount of lodging is located here. The existing character and built form is varied and inconsistent.



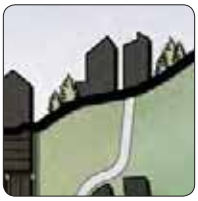
The goal of this subarea is to create a vibrant mixed use area by accommodating a variety of uses and amenities. The subarea will be the starting point for the development of a refined Lodging Overlay boundary and future discussion of the type and size of lodging desired. A key challenge will be to provide a balance between lodging and long-term residential housing. Future structures will be predominantly mixed use, while multifamily structures will be allowed if it properly addresses the street. Commercial uses that create an active and engaging pedestrian experience will be predominantly located on the first and second floors of buildings. Examples of these uses include restaurants, bars, a variety of retail shops and commercial amusement. Furthermore, as portions of the subarea will be located within a future Downtown Retail Shopping District, uses such as office, residential and lodging will be predominantly located on upper floors.



A goal of this subarea will be to create a consistent building size and form. In the future, a variety of two to three story buildings are desired. Buildings should be located to create an attractive street wall and take advantage of good urban design principles including massing, articulation and the provision of public space. The pedestrian realm will be of great importance in this mixed use subarea, and emphasis should be placed on adding improvements focusing on the pedestrian experience. Parking should continue to be provided predominately in public lots and on street to create a vibrant, walkable area that is oriented to the pedestrian. On-site parking should be predominantly underground or screened from view. Future redevelopment should enhance the Flat Creek corridor for recreational and ecological purposes. Buildings should front onto the creek to provide opportunities for interaction and enjoyment of this community resource.

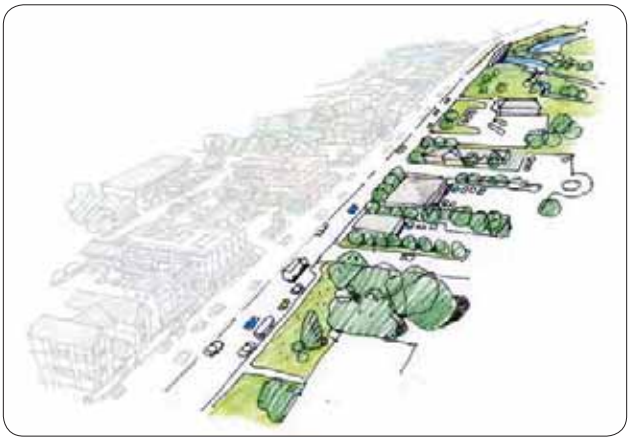


2.4: Public/Civic Campus

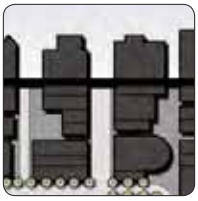


Resort/ Civic Form

This STABLE Subarea is defined by institutional facilities such as the Davey Jackson Elementary School, the Teton County/Jackson Recreation Center, and the various State and Federal Agencies along North Cache Street. This area will continue to provide these essential public services in a central location consistent with the sustainability and community service policies of the Plan. In the event that lands within this subarea are conveyed into private ownership, any development of non-public uses could require this subarea to be amended.

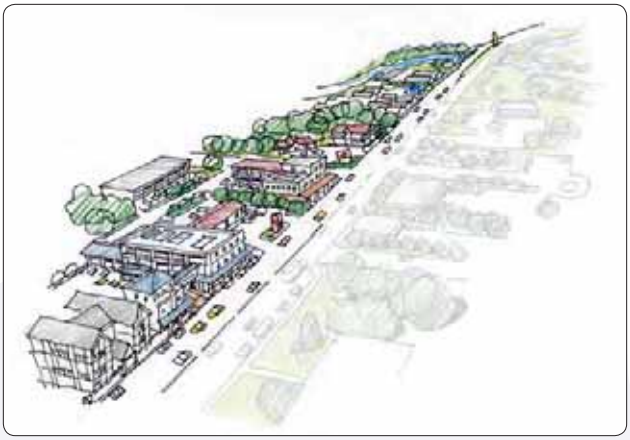


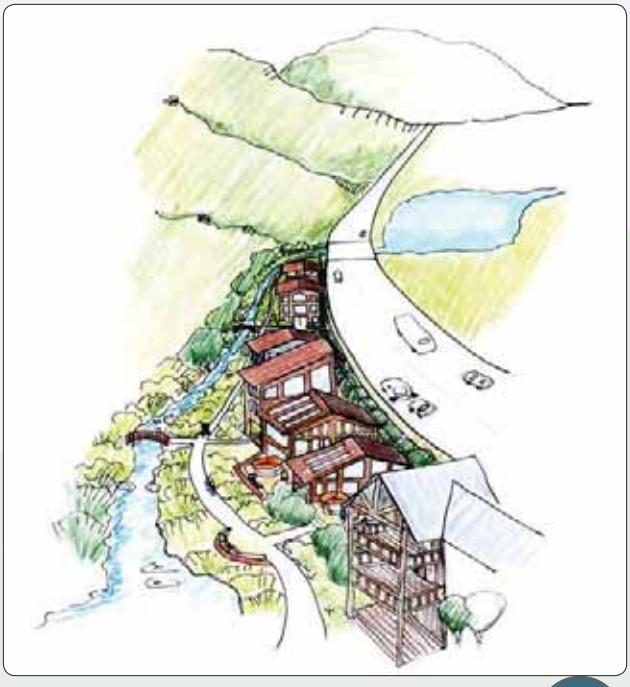
2.5: North Cache Gateway



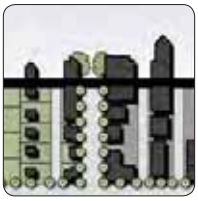
Village Center Form

This mixed use, TRANSITIONAL Subarea will be characterized as a key gateway into the Town from the National Parks and the airport to the north. Flat Creek enhancement is of great importance here, and redevelopment should seek to promote Flat Creek as a recreational and ecological amenity. The existing mix of non-residential and residential uses, including workforce housing, are appropriate. The redevelopment of these uses should take the form of two and three story buildings that address North Cache Street and the Flat Creek corridor, with an emphasis on providing workforce housing. Future structures will be predominantly mixed use, while multifamily will be allowed if it properly addresses the street. Building designs should incorporate techniques to mitigate height such as stepping back upper floors from the streetscape.





2.6: Mixed Use Office and Residential



Village Form



This TRANSITIONAL Subarea is envisioned to be a pedestrian-oriented mixed use area comprised of mixed use office or multifamily residential structures. The subarea currently contains a variety of single family residential, multifamily residential, office and institutional uses such as St. John's Hospital, the National Elk Refuge Headquarters and Town and County administrative facilities. The future development pattern should locate buildings toward the street predominantly two stories in height. Parking should be minimized and screened from the view of the public right of way. Office, residential and local convenience commercial should be located on the first level with residential above and behind. Some limited local convenience commercial is desirable to serve the surrounding residential areas with the goal of reducing trips outside the neighborhood. The existing institutional uses shall remain as anchors to the local economy that provide many jobs and services to the community. The bulk, scale and intensity of the St. John's campus has always been and will continue to be of a higher intensity than the surrounding mixed use and residential neighborhoods. Particular care and attention will be necessary to ensure a successful integration between this mixed use subarea and the adjacent Core Residential (Subarea 3.2). Particular attention will need to be given to the location of buildings, parking, types of uses, and intensity of uses to ensure a successful transition.

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Why Illustrate Our Vision?

Realizing our Vision requires proactively planning for what we want - rural open spaces and high quality Complete Neighborhoods - by identifying where we want them and what we want them to look like. Our Vision is that development be designed to enhance our community character and located in suitable areas in order to preserve and protect the ecosystem and western, rural character. The Illustration of Our Vision defines the type of preservation or development in each area of the community that will allow us to realize our Vision. In areas suitable for development, the Illustration of Our Vision describes how we will protect the character we love while ensuring that development enhances our Quality of Life. In all other areas, the Illustration of Our Vision describes how we will preserve and enhance wildlife habitat, wildlife connectivity, scenic vistas, and open space.

Defining desired character for all areas of the community provides predictability in planning and development, which has been absent in the past. Incremental, site-specific determinations of policy applicability that are emotionally, politically and legally tied to a specific development plan are no longer the community's growth management principle. The Illustration of Our Vision bridges the gap between our Vision and the development of an individual site so that all community members can understand how an individual preservation or development project should contribute to the achievement of our Vision. The Illustration of Our Vision will inform land development regulations that ensure no policy of this Plan is forgotten and that all policies are implemented within the proper context.

The Illustration of Our Vision also provides accountability and measurability. By defining the existing and desired character of each area of the community, we can quantify our progress toward achieving our Common Values of Community Character. With this information we can determine what policies and strategies are appropriate in which locations. The Illustration of Our Vision will enable the rigorous analysis needed to continually adapt our implementation strategies to ensure that preservation and development occur in the desired amount, location and type.

How is the Vision Illustrated?

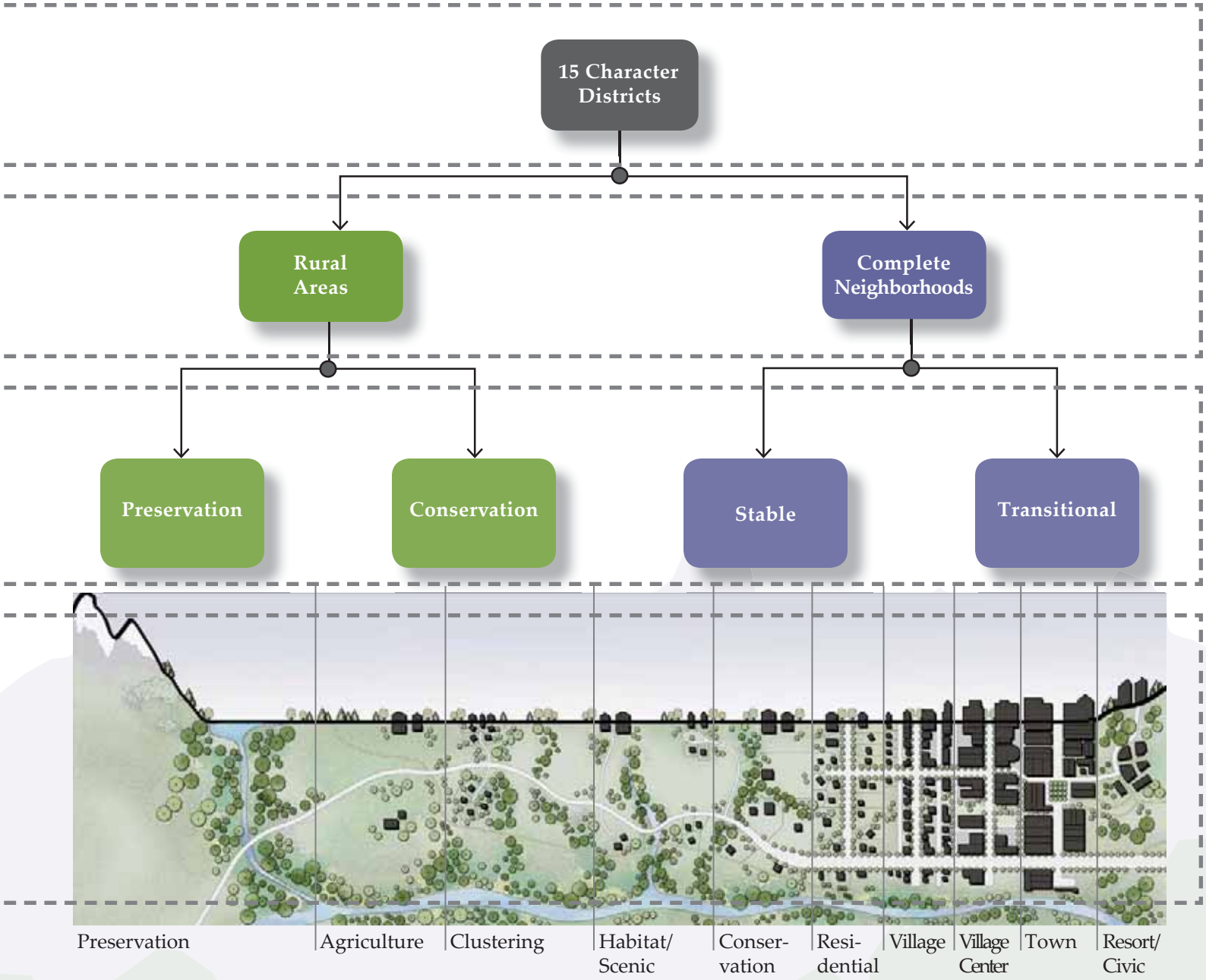
The Illustration of Our Vision depicts the policies of the community's three Common Values of Community Character through four levels of character classification.

At the highest level, the private lands of the community are divided into Character Districts – areas with common natural, visual, cultural and physical attributes, shared values and social interaction. Character District boundaries are based on a layering of the best available quantitative and qualitative data for each of the three Common Values of Community Character (Ecosystem Stewardship, Growth Management, Quality of Life) in order to identify areas that share similar characteristics (see Appendix B Framework Maps).

While our community's 15 Character Districts share Common Values, each has a unique identity, based upon the presence or absence of specific characteristics, each Character District is classified as either a Rural Area focused on ecosystem stewardship or a Complete Neighborhood focused on enhancing Quality of Life. The map on pages IV-4 and IV-5 shows the Character District boundaries, defines Complete Neighborhood and Rural Area characteristics and identifies the classification of each Character District.

At the next level, each Character District is divided into subareas. Each subarea is categorized as Stable, Transitional, Preservation or Conservation based upon the existing character of the subarea and the desired future character for the entire Character District. Stable and Transitional Subareas are the most suitable locations for people to live, work and play. Subareas focused on Ecosystem Stewardship are designated as Preservation or Conservation. The map on pages IV-6 and IV-7 shows the subareas and defines the subarea classifications.

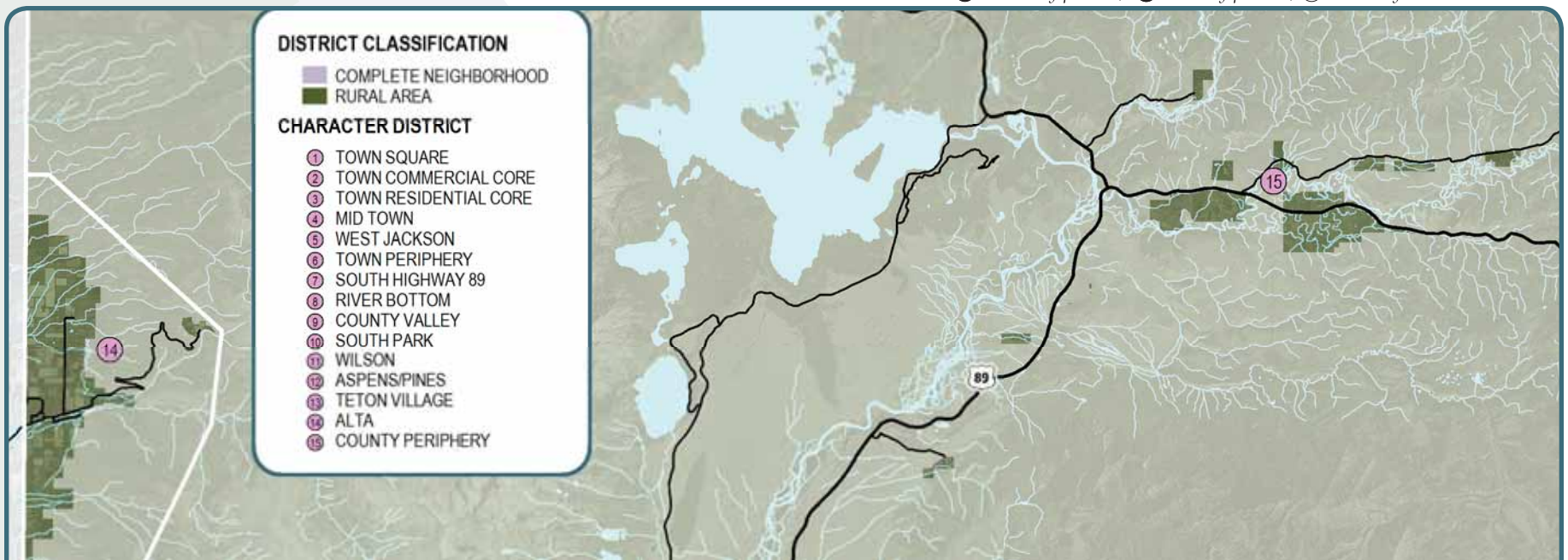
Finally, for each subarea, Character Defining Features are described to ensure the desired character is illustrated. The Character Defining Features provide the greatest level of site specific detail; however the characteristics are still conceptual and will inform specific regulations, incentives and programs. The characteristics valued by the community within a subarea are mapped, described and illustrated. On pages IV-8 and IV-9 is a legend that describes the symbols and graphics used on the Character Defining Features Maps. An appropriate Neighborhood Form(s) is also identified for each subarea. A Neighborhood Form identifies the general pattern and intensity of development that meets the desired character. On pages IV-10 and IV-11 is a transect that depicts the continuum of Neighborhood Forms that make up our community and shows the relationship between the various patterns and intensities.

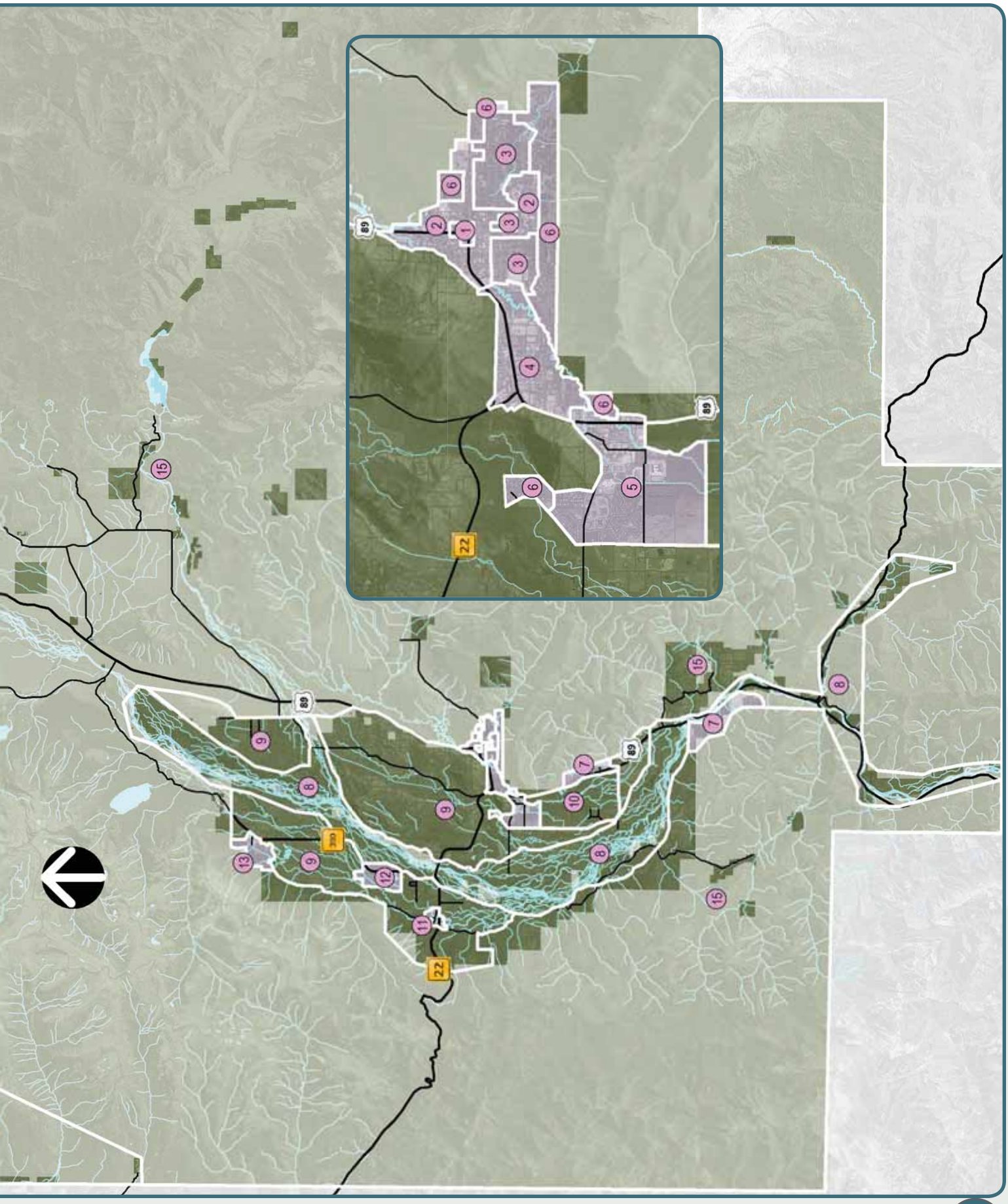

15 Character Districts
Rural Areas
Complete Neighborhoods
Preservation
Conservation
Stable
Transitional
Preservation
Agriculture
Clustering
Habitat/ Scenic
Conser- vation
Resi- dential
Village
Village Center
Town
Resort/ Civic

Complete Neighborhoods + Rural Areas

		Character Districts														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Complete neighborhoods characteristics:	Defined character and high-quality design	●										◒	◒	●		
	Public utilities (water, sewer, and storm sewer)	●	●	●	●	●	●	◒	◒	◒	●	◒	●	●		
	Quality public spaces	●	●	●	●	●	◒		◒		◒	●	●	●	◒	
	A variety of housing types		●	●	●	●		◒				◒	◒	●		
	Schools, childcare, commercial, recreation, and other amenities within walking distance (1/4 to 1/2 mile) of residences	●	●	◒	◒	◒						●		◒		
	Connection by complete streets that are safe for all modes of travel	◒	◒	◒	◒	◒						◒				
Rural areas characteristics:	Viable wildlife habitat and connections between wildlife habitat			◒	◒	◒	◒	●	●	◒	◒	◒	◒		◒	●
	Natural scenic vistas				◒			◒	◒	●	●			●	◒	◒
	Agricultural and undeveloped open space				◒		◒	◒	◒	●	●		◒	◒	●	◒
	Abundance of landscape over built form						◒	◒	●	●	◒	◒	◒		●	●
	Limited, detached single family residential development						◒	◒	●	●	●				●	●
	Minimal additional nonresidential development			◒			●		●	●	●				●	●

● *Generally present;* ◒ *Partially present;* ○ *Generally absent*

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Stable, Transitional, Preservation + Conservation Subareas

Stable Subarea

- Subareas in which no change to the existing character is necessary
- Development will be infill that maintains the existing identity or vitality
- The subarea may benefit from strategic infill or development of non-existing Complete Neighborhood amenities

Transitional Subarea

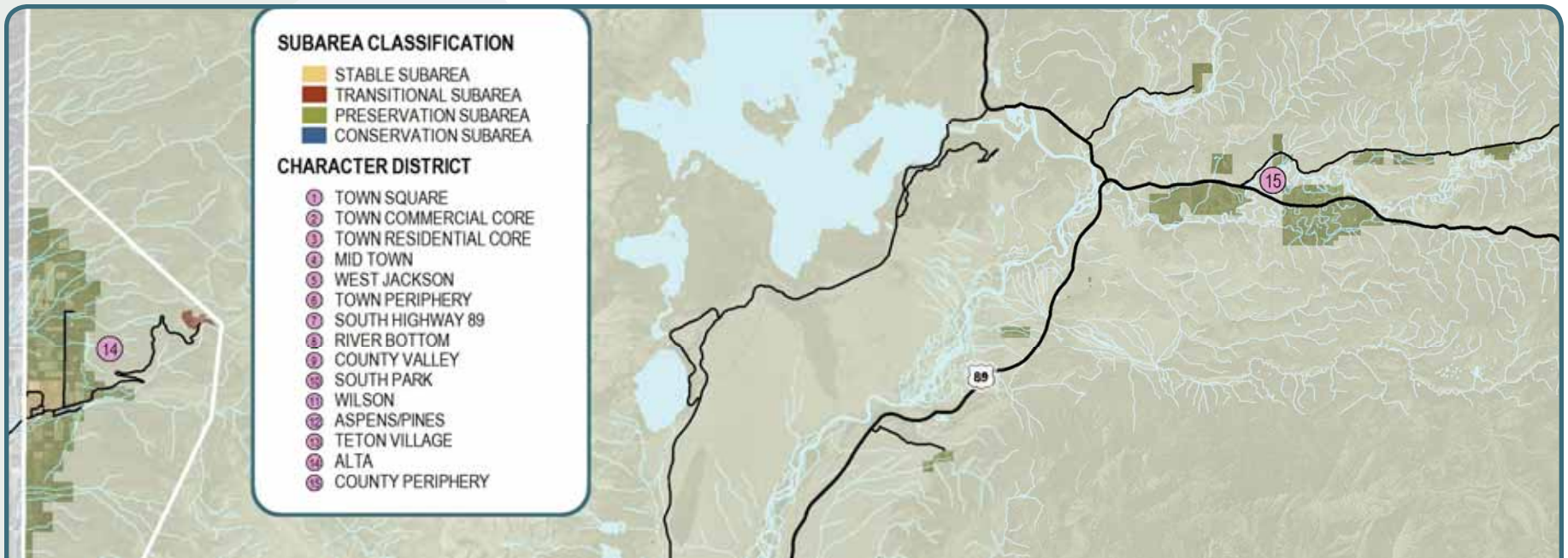
- Subareas where most of the community would agree that development/ redevelopment or a change in character would be beneficial
- Subareas that would benefit from reinvestment and revitalization
- Goals for development include improving access to jobs, housing and services and reducing reliance on single-occupancy trips

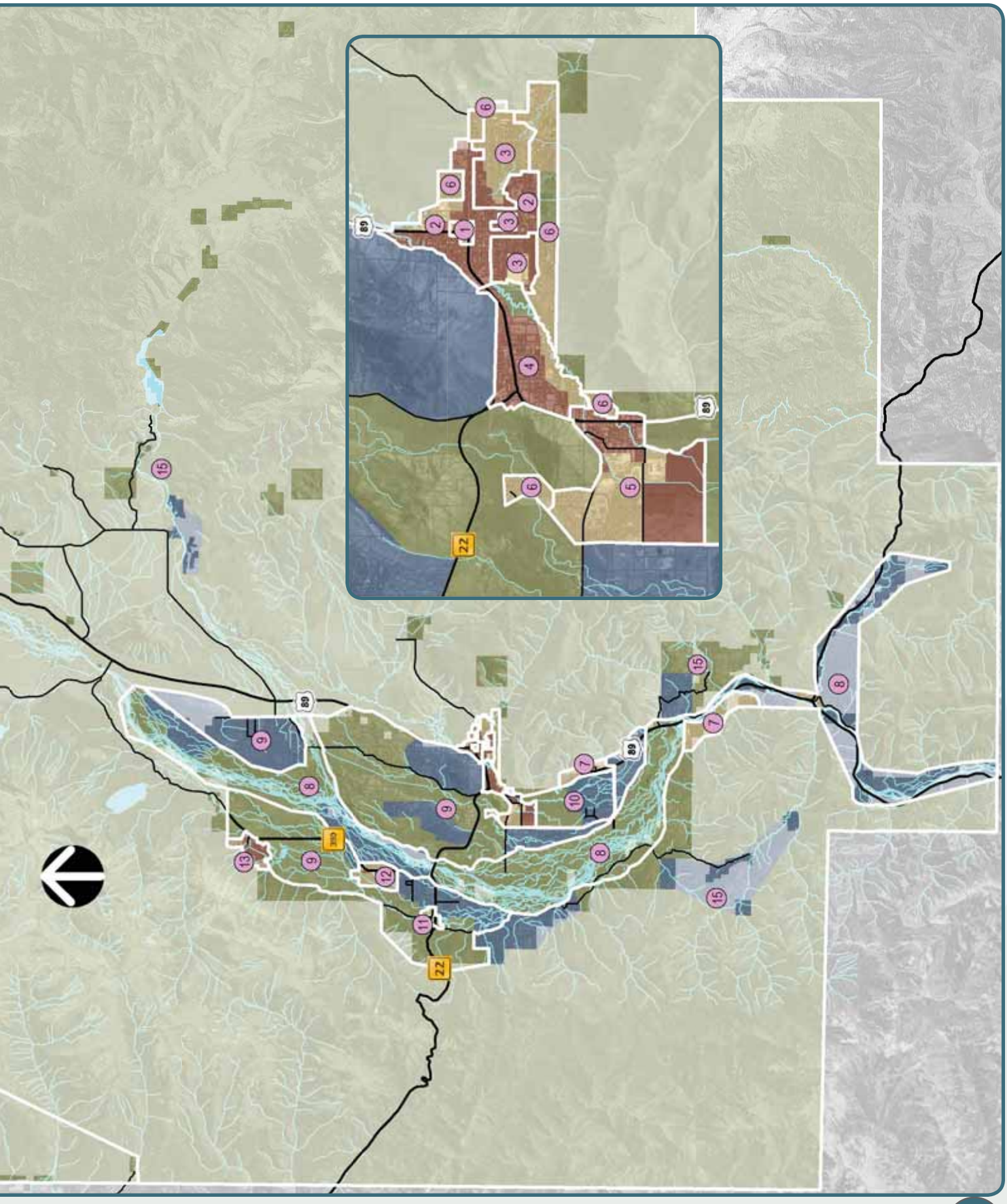
Preservation Subarea

- Subareas in which no change to the existing undeveloped character of the scenic resources and wildlife habitat is necessary
- Additional amenities and infrastructure are inappropriate
- May benefit from some clustered residential development that improves the overall preservation of open space

Conservation Subarea

- Areas of existing development and platted neighborhoods with high wildlife values, where development/ redevelopment should focus on improved conservation
- Areas that benefit from an increase in open space, scenic resources, and habitat enhancement
- Goals include balancing existing development with improved wildlife permeability and scenic enhancements.

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15

Character Defining Features - Map Symbols

The Character Defining Features Maps depict the characteristics that define each district and subarea. Below is a list of symbols and map attributes that are used on the maps. Characteristics that are locational are shown on the map using colored symbols or map attributes. Other characteristics depicted using black symbols, apply generally to a subarea, but are not location specific. All mapped features are illustrative of the character of an area and do not imply desired regulatory boundaries or specific locations for certain attributes.

Common Value 1 – Ecosystem Stewardship



Wildlife Permeability: Design for wildlife permeability should be a characteristic of the subarea.



Agriculture: Agricultural use should be characteristic of the subarea.



Wildlife Highway Crossing: Wildlife-vehicle collision mitigation emphasis site as identified by the Western Transportation Institute and Montana State University College of Engineering in 2012.



Crucial Habitat: Bald eagle, trumpeter swan, mule deer, elk, and/or moose crucial winter habitat; mule deer and/or elk migration corridor; and/or bald eagle and trumpeter swan nesting area; and/or cutthroat trout spawning area as identified by the Conservation Research Center of Teton Science Schools in 2008.



Scenic Corridor/Vista: Scenic highway corridors and vistas as identified on 1994 Community Issues Maps.

Common Value 2 – Growth Management



Gateway: A gateway into the community.



Public Parking: Existing parking provided by the Town of Jackson.



Road Corridor Enhancement: A roadway corridor that will be characterized in the future by enhanced pedestrian and commercial vitality.



Creek Corridor Enhancement: A creek within a Complete Neighborhood that will be characterized in the future by enhanced recreational opportunities and ecological value.

Common Value 3 – Quality of Life



Workforce Housing: Housing occupied by the workforce should be a characteristic of the subarea.



START Service: START service should be a characteristic of the subarea.



Local Convenience Commercial: Local convenience commercial should be located within the subarea.



Industrial: Light industrial and heavy retail use should occur in the subarea.



Parks and Recreation: Existing parks and recreation facilities.



School: Existing schools.

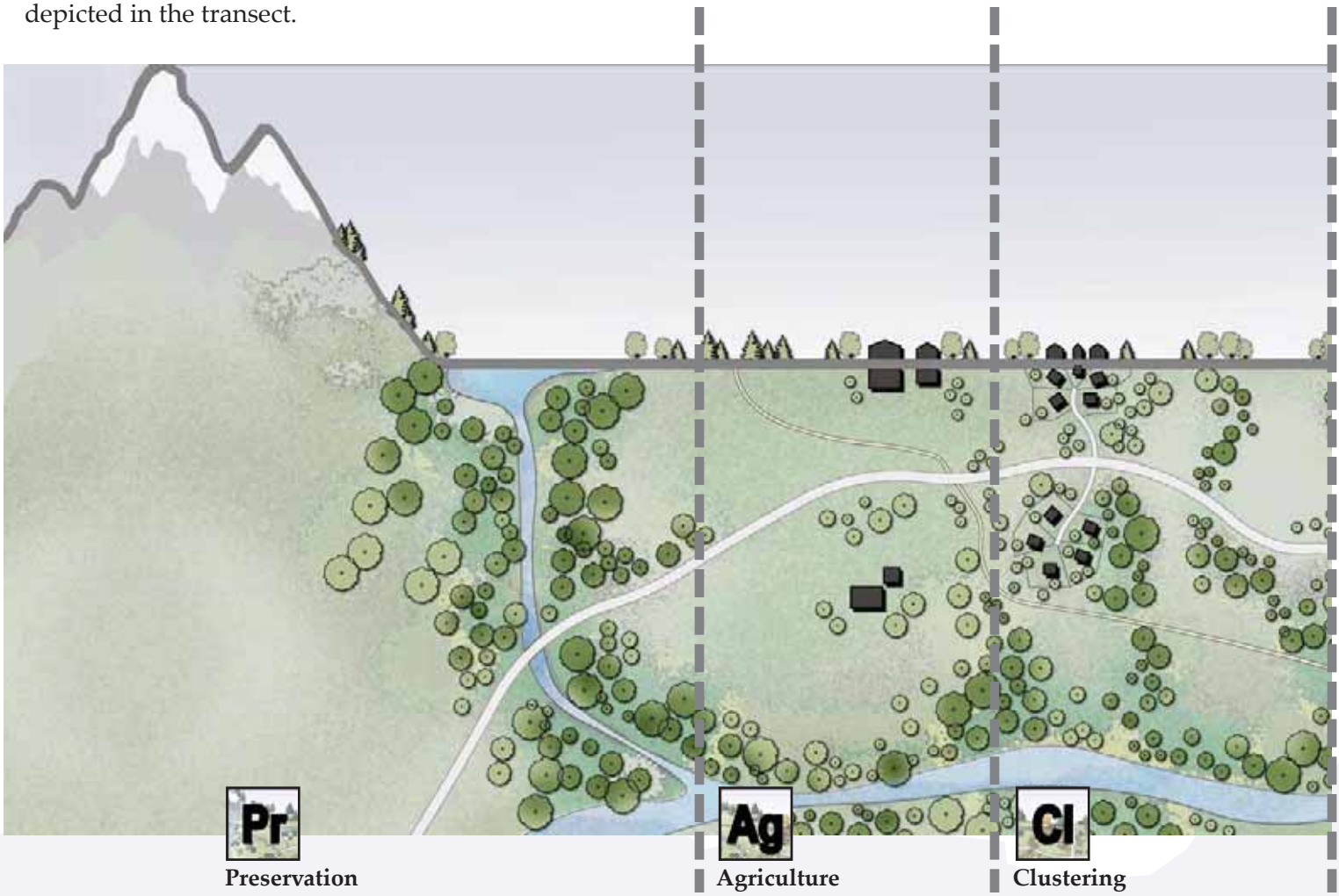
Key Transportation Network Project: Transportation network projects identified in Policy 7.2.d.

Existing/Proposed Pathways: Existing and proposed pathways identified in the Pathways Master Plan (2007).

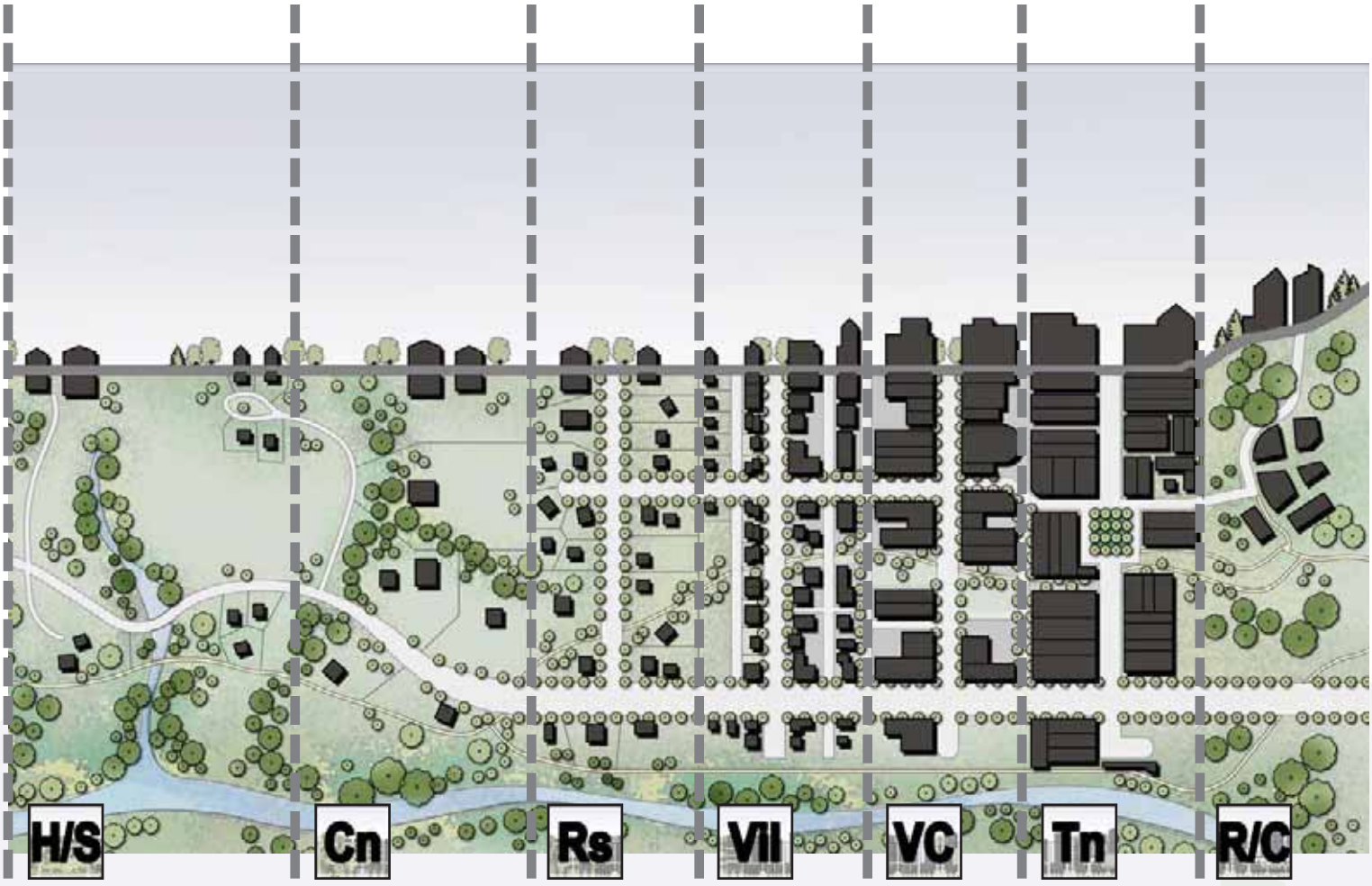
Improved Interconnectivity: An area that will be characterized in the future by increased interconnectivity.

Character Defining Features - Neighborhood Form Continuum

A Neighborhood Form identifies the general pattern and intensity of development representative of a certain character. One or more Neighborhood Forms are associated with each subarea. Below is a transect that depicts the continuum of Neighborhood Forms that make up our community and shows the relationship between the various patterns and intensities that define our character. The table below the transect describes characteristic acreages, heights, uses, and special considerations for each Neighborhood Form. These general characteristics are not prescriptive and are only meant to help describe the general pattern and intensity depicted in the transect.



	Preservation	Agriculture	Clustering
Acres	n/a	70+	35+
Height	n/a	n/a	2 story
Use	Preservation	Residential, Conservation	Residential, Conservation
Special Considerations	Preserved open space, wildlife habitat	Agricultural exemptions + incentives, scale of historic agricultural compounds	Improved wildlife habitat, open space and scenic protection with respect for private property rights, integrated transportation planning, scale of historic agricultural compounds



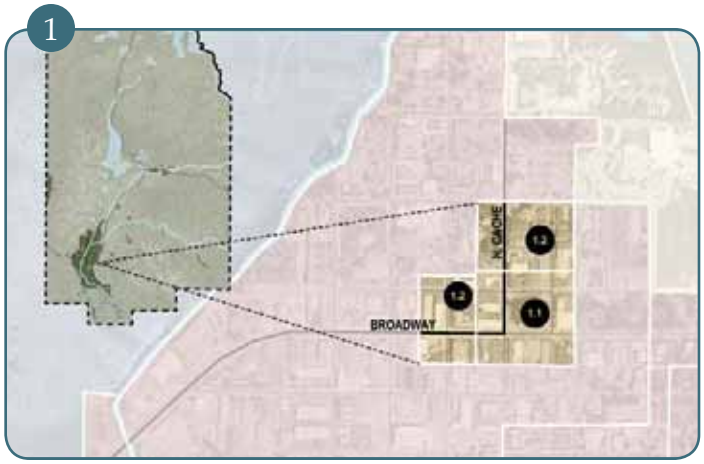
Habitat/Scenic	Conservation	Residential	Village	Village Center	Town	Resort/Civic
+/- 35	1-5	± 1	n/a	n/a	n/a	n/a
2 story	2 story	2 story	2 story	2-3 story	2-3 story	n/a
Residential, Conservation	Residential	Residential	Residential, Local Convenience Commercial, Civic	Residential, Commercial, Industrial, Civic	Residential, Commercial, Civic	Resort, Civic
Design for wildlife and/ or scenery, scale of historic agricultural compounds	Design for wildlife and/or scenery, predominance of landscape over built form	Design for wildlife and/ or scenery, predominance of landscape over built form	Variety of housing types, complete streets, workforce housing	Mixed use, pedestrian oriented, complete streets, workforce housing	Pedestrian oriented, public spaces, complete streets, workforce housing, employment center	Master Planned, more intense development, public, semi-public facilities

What Does the Illustration of the Vision Address?

Our community's Vision is illustrated in 15 Character Districts. Each Character District has unique issues, opportunities and objectives. Each Character District contributes to the overall implementation of the Comprehensive Plan and will ensure that preservation and development occur in the desired amount, location and type throughout the community.

Each Character District is composed of 6 parts:

1. The Vicinity Map identifies the district boundaries and the size of the district in relation to the entire community. It also depicts the boundaries of the district subareas and their Stable, Transitional, Preservation, or Conservation classification.



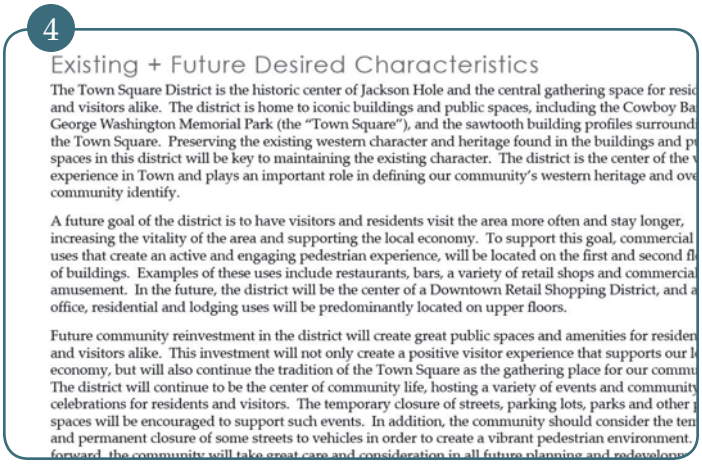
2. The Character Defining Features Map depicts the characteristics that define each district and subarea. Characteristics are described through mapping or shown symbolically. Mapped features are illustrative of the character of an area and do not imply desired regulatory boundaries or specific locations of attributes. A complete list of symbols used on the maps can be found on pages IV-8 and IV-9.



3. The Complete Neighborhood/Rural Area Table indicates whether the district currently has the characteristics of a Complete Neighborhood or a Rural Area. It also indicates whether those characteristics will be maintained or enhanced in the future. This table serves to explain the classification of the district and identify the district's broad focus, basic issues, and opportunities.



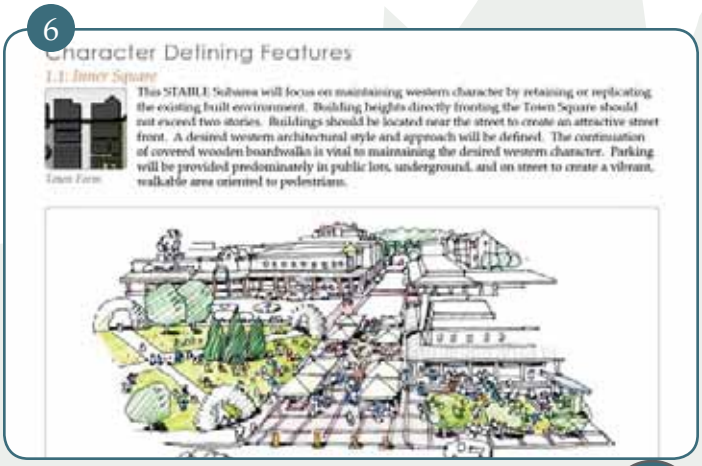
4. Existing + Future Characteristics describe in words the existing and future character of the district, focusing on the elements of character that should be preserved or enhanced. This section provides the overall goals and vision for the district.



5. The Policy Objectives are policies from the Common Values of Community Character chapters of the Comprehensive Plan that are particularly relevant and should be implemented in the district. There may be other policies that apply to the district, but these are the key objectives to be met in the district in order for the community to achieve our Vision.



6. The Character Defining Features describe each subarea through text, Neighborhood Forms, and photos and/or drawings. The focus of the description is the character priorities that will allow for the desired character of the district, and consequently the community Vision, to be achieved. The Neighborhood Form(s) depict the general pattern and intensity of development that meets the desired character; while the illustrations and/or photos provide a more detailed illustration of the desired built form. The entire continuum of Neighborhood Forms can be found on pages IV-8 and IV-9.



TOWN OF JACKSON
LAND DEVELOPMENT REGULATIONS
DIVISION 7.5.2 - PARK EXACTIONS
DATE: 10/25/2019

CASH-IN-LIEU OF LAND DEDICATION: SECTION 49660

1. PROJECT NAME: Glenwood Gill Condominiums

2. LOCATION: 165-185 N Glenwood Street

3. PROJECT NUMBER: P18-083

4. CALCULATE PROPOSED PROJECT POPULATION:

UNIT TYPE	# OF UNITS	X	PERSONS HOUSED PER UNIT	PROJECTED POPULATION
STUDIO			1.25	
1 BEDROOM			1.75	
2 BEDROOM	2		2.25	4.50
3 BEDROOM	25		3.00	75.00
4 BEDROOM	2		3.75	7.50
5 BEDROOM			4.50	
EACH ADDITIONAL BEDROOM			0.50	
DORMITORY			1 per 150 sf of net habitable area	
TOTAL				87.00

5. CALCULATE REQUIRED PARK ACREAGE:

87.00 TOTAL PROJECTED POPULATION X 9 ACRES / 1000 RESIDENTS = 0.7830 REQUIRED ACRES

6. CALCULATE CASH-IN-LIEU:

0.7830 REQUIRED ACRES X $100,000 (VALUE OF LAND) = $ 78,300 CASH-IN-LIEU

7. FOR INFORMATION ON PROVIDING AN INDEPENDENT CALCULATION, SEE LDR SECTION 7.5.2 OPTION FOR INDEPENDENT CALCULATION OF DEDICATION STANDARDS

TOWN OF JACKSON
LAND DEVELOPMENT REGULATIONS
DIVISION 7.5.3 - SCHOOL EXACTIONS
DATE: 10/25/2019

CASH-IN-LIEU OF LAND DEDICATION: SECTION 49770

1. PROJECT NAME: Glenwood Gill Condominiums

2. LOCATION: 165-185 N Glenwood Street

3. PROJECT NUMBER: P18-083

4. CALCULATE REQUIRED DEDICATION OF LAND:

LAND DEDICATION REQUIREMENT	X	# OF UNITS	=	LAND DEDICATION
		165-185 N Glenwood Street		
.O2O ACRES PER UNIT SINGLE & TWO-FAMILY				
.015 ACRES PER UNIT MULTI-FAMILY		29		0.4350

5. CALCULATE CASH IN-LIEU:

0.4350 LAND DEDICATION STANDARD X $100,000 (VALUE OF LAND) = $ 78,300 CASH-IN-LIEU

6. FOR INFORMATION ON PROVIDING AN INDEPENDENT CALCULATION, SEE LDR SECTION 7.5.3 OPTION FOR INDEPENDENT CALCULATION OF DEDICATION STANDARDS

PLANNING PERMIT APPLICATION
Planning & Building Department

150 E Pearl Ave.
P.O. Box 1687
Jackson, WY 83001

ph: (307) 733-0440
www.townofjackson.com

For Office Use Only

Fees Paid_____ Date & Time Received _____

Application #s _____ _____ _____

Please note: *Applications received after 3 PM will be processed the next business day.*

PROJECT.

Name/Description: Glenwood Gill Condominiums

Physical Address: 165 &185 N. Glenwood, Jackson, WY

Lot, Subdivision: 1-6, Blk 6 PIDN: 22-41-16-28-4-10-001 & 004

PROPERTY OWNER.

Name: Roseville Ventures II, LLC Phone: _____

Mailing Address: 4015 80th Street, Kenosha, WI ZIP: 53142

E-mail: _____

APPLICANT/AGENT.

Name: Mr. Nick Orthmann Phone: 262-842-0656

Mailing Address: 4011 80th Street, Kenosha, WI ZIP: 53142

E-mail: northmann@beardevelopment.com

DESIGNATED PRIMARY CONTACT.

_____Property Owner X Applicant/Agent

TYPE OF APPLICATION. *Please check all that apply; review the type of application at www.townofjackson/200/Planning*

Use Permit

_____Basic Use

_____Conditional Use

_____Special Use

Relief from the LDRs

_____Administrative Adjustment

_____Variance

_____Beneficial Use Determination

_____Appeal of an Admin. Decision

Physical Development

_____Sketch Plan

X Development Plan

_____Design Review

Subdivision/Development Option

_____Subdivision Plat

_____Boundary Adjustment (replat)

_____Boundary Adjustment (no plat)

_____Development Option Plan

Interpretations

_____Formal Interpretation

_____Zoning Compliance Verification

Amendments to the LDRs

_____LDR Text Amendment

_____Map Amendment

Miscellaneous

_____**Other:** _____

_____Environmental Analysis

PRE-SUBMITTAL STEPS. *To see if pre-submittal steps apply to you, go to www.townofjackson.com/200/Planning and select the relevant application type for requirements. Please submit all required pre-submittal steps with application.*

Pre-application Conference #: P18-083 Environmental Analysis #: _____

Original Permit #: _____ Date of Neighborhood Meeting: 4/11/19

SUBMITTAL REQUIREMENTS. *Please ensure all submittal requirements are included. The Planning Department will not hold or process incomplete applications. Partial or incomplete applications will be returned to the applicant. Go to www.townofjackson.com/200/Planning and select the relevant application type for submittal requirements.*

Have you attached the following?

X **Application Fee.** Fees are cumulative. Go to www.townofjackson.com/200/Planning and select the relevant application type for the fees.

X **Notarized Letter of Authorization.** A notarized letter of consent from the landowner is required if the applicant is not the owner, or if an agent is applying on behalf of the landowner. Please see the Letter of Authorization template at www.townofjackson.com/DocumentCenter/View/102/Town-Fee-Schedule-PDF.

X **Response to Submittal Requirements.** The submittal requirements can be found on the TOJ website for the specific application. If a pre-application conference is required, the submittal requirements will be provided to applicant at the conference. The submittal requirements are at www.townofjackson.com/200/Planning under the relevant application type.

Note: Information provided by the applicant or other review agencies during the planning process may identify other requirements that were not evident at the time of application submittal or a Pre-Application Conference, if held. Staff may request additional materials during review as needed to determine compliance with the LDRs.

Under penalty of perjury, I hereby certify that I have read this application and associated checklists and state that, to the best of my knowledge, all information submitted in this request is true and correct. I agree to comply with all county and state laws relating to the subject matter of this application, and hereby authorize representatives of Teton County to enter upon the above-mentioned property during normal business hours, after making a reasonable effort to contact the owner/applicant prior to entering.

Signature of Property Owner or Authorized Applicant/Agent — Date: 10/30/2019

Nick Orthmann, Bear Development, LLC — Name Printed

Project Manager — Title

PRE-APPLICATION CONFERENCE SUMMARY

Planning & Development Department
Planning Division

150 E Pearl Ave. | ph: (307) 733-o440
P.O. Box 687 | fax: (307) 734-3563
Jackson, WY 83001 | www.townofjackson.com

This Summary will be prepared by Planning Staff. The applicant, or the applicant's agent, shall receive a copy of this summary for their reference in submitting a sufficient application.

Staff may request additional materials during review as needed to determine compliance with the LDRs.

PRE-APPLICATION MEETING GENERAL INFORMATION.

PAP#: P18-083

Date of Conference: 5/15/18

Planning Staff: Paul Anthony, Alex Norton

PROJECT.

Name/Description: Preapplication for Glenwood Gill Condos Phase 1

Physical Address: 165 and 185 Glenwood Street

Lot, Subdivision _____ PIDN: _____

Zoning District(s): DC

Overlay(s): Lodging

STAKEHOLDERS.

Applicant: S.R. Mills, Bear Development

Owner: Roseville Ventures II LLC

Agent: Arne Jorgensen

REQUIRED APPLICATIONS. *This project will require the following applications:*

Application	Reason	Fee
Sketch Plan Phase 1	Proposal is for greater then 39,000 sf	$2,500
Development Plan Phase 1	Proposal is for greater then 39,000 sf	N/A
Design Review Committee	Commercial/Mixed-use projects go to DRC	N/A
Final Plat	To allow proposed condominiums	

MEETING ATTENDEES:

Name	Company	Phone/Email
Arne Jorgensen	Hawtin Jorgensen	
S.R. Mills (via phone)	Bear Development	

Paul Anthony	Town Principal Planner	
Alex Norton	County/Town Jointy Planner	

TIMELINES. *This table is intended to provide general information regarding the review process and timing of decisions. See Article 8 for a complete explanation of the review process.*

The following timelines are generally applicable:

Application Types:	Sufficiency	Decision-Maker	Timeline
Sketch Plan	14 days	Council	150 days from sufficiency
Development Plan	14 days	Council	150 days from sufficiency

Checklist Key.

√ ***Required****. Applicant must demonstrate compliance with this requirement.*

N/A ***Not Applicable****. Review requirement is not applicable to this project.*

General Information

Requirement		Notes
√	**Planning Permit Application.** The application should list all pertinent permits (use, physical development, interpretation, relief from the LDRs, Development Option/Subdivisions, Amendments to the LDRs) for which you are applying.	
√	**Notarized Letter of Authorization.** See "Permit and Applications" section on Planning Department website for copy of form.	
√	**Application Fees.** Fees are cumulative. Applications for multiple types of permits, or for multiple permits of the same type, require multiple fees. See the currently adopted Fee Schedule in the Administrative Manual for more information.	
√	**Review fees.** The applicant is responsible for paying any review fees and expenses from consulting services necessitated by the review of the application by the County Surveyor, Town Engineer, Title Company and any other required consultant. Such fees shall be paid prior to approval of the permit.	
√	**Mailed Notice fee.** See Section 8.2.14.C.2 for notice requirements. If mailed notices are required, the applicant is responsible for paying for any mailing in excess of 25 notices.	
√	**Digital Format.** All applications submitted to the Town Planning Department must be submitted in digital format.	

V	**Response to Submittal Checklist.** All applications require response to applicable review standards. For applications where a pre-application conference is required, applicable standards are identified below. If a pre-application conference is optional, see the submittal checklist for the relevant application type, established in the Administrative Manual.
N/A	**Title Report.** A title report, title certificate or record document guarantee prepared within the last six months that includes evidence of ownership and all encumbrances on the subject property. Copies of the documents referenced in the report should not be submitted unless requested by the planner during review.
V	**Narrative description of the proposed development.** Describe in detail the existing condition of the property and the proposed development, use, or subdivision for which you are seeking approval.
V	**Findings for approval.** Include in your narrative a response to the findings for approval found in LDR Div 8.5, as applicable.
V	**Proposed Development Program.** Provide a table that summarizes the the projects compliance with the primary development standards (setbacks, heights, FAR, LSR, etc.). An example is found in the Administrative Manual.
V	**Site Plan.** Provide a detailed site plan of the proposed project. A list of minimum standards for a site plan are established in the Administrative Manual.
V	**Floor Plans.** Include floor plans for any existing buildings that will be occupied by a proposed use. If changes to existing buildings are proposed, indicate those on the floor plans.
N/A	**Neighborhood Meeting Summary.** See Section 8.2.3 for Neighborhood Meeting requirements.
V	**Posted Notice.** See Section 8.2.14.C.4 for Posted Notice requirements for all public hearings.

ARTICLES 2 (COMPLETE NEIGHBORHOODS), 3 (RURAL AREA ZONES), and 4 (SPECIAL PURPOSE ZONES).

Applicable Zone: _____

Applicable LDR Section: _____

PHYSICAL DEVELOPMENT. *Please see Subsection B in applicable Zone District for specific standards.*

Requirement		Notes
V	**Structure Location and Mass** (setbacks, height, FAR, etc.)	
N/A	**Maximum Scale of Development** (individual building size)	
V	**Design Review** (Design Guidelines and Design Review Committee)	
V	**Site Development** (Driveway and Access limits)	
V	**Landscaping** (see Div. 5.5 for more information)	
V	**Fencing** (see Sec. 5.1.2 for more information)	

N/A **Environmental Standards (see Div. 5.1 and 5.2 for more information)**

- Natural Resource Buffers
- Irrigation Ditch Setback
- Natural Resource Overlay Standards

√ **Scenic Standards (see Div. 5.3 for more information)**

- Exterior Lighting
- Scenic Resource Overlay (SRO) Standards

√ **Natural Hazards to Avoid (see Div. 5.4 for more information)**

- Steep Slopes
- Areas of Unstable Soils
- Fault Areas
- Floodplains
- Wildland Urban Interface

N/A **Signs (see Div. 5.6 for more information)**

√ **Grading, Erosion Control, Stormwater (see Div. 5.7 for more information)**

- Grading
- Erosion Control
- Stormwater Management

USE STANDARDS. *Please see Subsection C in applicable Zone District for specific standards.*

Requirement	**Notes**
√ **Allowed Uses** (see Div. 6.1 for more information)	
√ **Parking** (see Div. 6.2 for more information)	
√ **Employee Housing** (see Div. 6.3 for more information)	
N/A **Maximum Scale of Use**	
√ **Operational Standards (see Div. 6.4 for more information)**	

- Outside Storage
- Refuse and Recycling
- Noise
- Vibration
- Electrical Disturbances
- Fire and Explosive Hazards
- Heat and Humidity
- Radioactivity

DEVELOPMENT OPTIONS. *Please see Subsection D in applicable Zone District for specific standards.*

Requirement	**Notes**

√ **Allowed Subdivision and Development Options** (see Div. 7.1 and 7.2 for more information)

√ **Residential Subdivision Requirements** (see Div. 7.4 and 7.5 for more information)

- Affordable Housing
- School and Parks Exactions

√ **Infrastructure (see Div. 7.6 and 7.7 for more information)**

- Transportation Facilities
- Required Utilities

OTHER APPLICABLE LDR STANDARDS

Requirement **Notes:**

N/A **Division 1.9, Nonconformities**

1.9.2 Nonconforming Physical Development
1.9.3 Nonconforming Uses
1.9.4 Nonconforming Development Options and Subdivisions
1.9.5 Nonconforming Signs

N/A **Division 7.3, Open Space Standards**

7.3.3 Configuration and Location of Required Open Space
7.3.4 Use of Open Space
7.3.5 Physical Development Permitted in Open Space
7.3.6 Record of Restriction
7.3.7 Ownership of Open Space

ADDITIONAL COMMENTS

- We will need to discuss the impact that the proposed affordable housing mitigation requirements would have on the project. In short, after the moratorium is over, the project would be mitigated at the proposed new 'Short-term Rental' rate rather than the current residential long-term rate, which will likely be an increase in mitigation.
- Staff encourages the applicant to make sure that there are regular entrances to the residential/short-term units along the Glenwood and Gill frontages. The narrative commits to this goal but without doors shown on the plans it remains unclear where such entrances would be located.
- While there appears to be adequate parking, we should discuss how the parking will be allocated will be allocated.
- We will need to confirm what the final sidewalk cross-section/width will be given existing conditions.

PLAN REVIEW COMMITTEE. *The Plan Review Committee consists of the following listed agencies. Planning Staff will transmit pertinent portions of the application to each agency.* ***Other agencies and individuals not checked off on this list may be added to the PRC if necessary.***

Agency **Required for:**

√ Building Official

√ Town Attorney

√ Town Engineer

_____ Title Company – for subdivision plat

_____ County Surveyor – for subdivision plat

- ***v*** Jackson Hole Fire EMS
- ***v*** Housing Authority
- _____ Integrated Solid Waste & Recycling
- _____ National Park Service
- _____ Parks and Recreation Department
- ***v*** Pathways Coordinator
- _____ Public and Environmental Health
- ***v*** Police Department
- _____ Teton Conservation District
- _____ Teton County School District
- _____ Teton County (required when subdividing land within one mile of the Teton County)
- _____ U.S. Forest Service (if adjacent to or accessing through forest service lands)
- _____ Wyoming Department of Environmemtal Quality
- _____ Wyoming Department of Game & Fish
- _____ Other

Project Plan Review History

PLANNING

Project Number	P18-083	**Applied**	3/19/2018	STOL
Project Name	Pre-App Devel Plan 165 & 185 Glennwood	**Approved**		
Type	PREAPPLICATION	**Closed**		
Subtype	DEVELOPMENT PLAN	**Expired**		
Status	STAFF REVIEW	**Status**		

Applicant **Owner** ROSEVILLE VENTURES II, LLC

Site Address	City	State	Zip
165 & 185 N GLENWOOD STREET	JACKSON	WY	83001

Subdivision	Parcel No	General Plan
JACKSON ORIGINAL-TOWNSITE	22411628410004	

Type of Review / Contact / Notes	Status	Dates: Sent	Due	Received	Remarks
Building Jim Green	NO COMMENT	3/19/2018	4/9/2018		
Fire Kathy Clay	APPROVED W/CONDITI	3/19/2018	4/9/2018	3/26/2018	Notes will change bldg cost

Type of Review	Status	Dates			
Contact		Sent	Due	Received	Remarks
Notes					

MEMO
FIRE REVIEW

TO: Paul Anthony, Principal Planner
Tiffany Stolte, Office Manager

FROM: Kathy Clay, Fire Marshal

DATE: March 26, 2018

SUBJECT: Pre-Application Review/Bear Development
165, 185 N. Glenwood Street
P18-083

This office has received the request for a pre-application review at the above location. The most current edition of the International Fire Code (IFC) and the 2017 edition of the National Electric Code (NEC) shall be used for building design.

PLEASE TAKE SPECIAL NOTE OF ALL ***STARRED*** ITEMS.

Comments include, but are not limited to:

General Requirements
1. *****Fire apparatus access is not attainable. All buildings shall be sprinklered per NFPA 13 to accommodate inadequate fire department access. (2015 IFC 503.1.1)
2. Visible address numbers, a minimum of 4 inches in height and 0.5 inch stroke width, shall be installed on all structures. (IFC 505.1)
3. Portable fire extinguishers shall be placed in accordance with code requirements. (IFC 906).
4. Interior finishes shall meet fire code requirements. (IFC Chapter 8)
5. Means of egress shall meet fire code requirements. (IFC Chapter 10)
6. The means of egress, including exit discharge, shall be illuminated at all times building space served by means of egress is occupied. (IFC 1008.1)
7. Illumination shall be provided in the means of egress in accordance with (1008.2). Under emergency power, means of egress illumination shall comply with (1008.3).
8. Any hazardous material storage shall meet fire code requirement. (IFC Chapter 27)
9. Should any fuel-fired appliances be installed, requirements for carbon monoxide detection shall be followed. (IFC 908.7)
10. Final fire inspection shall be required before certificate of occupancy is released.
11. ****Plans submitted to Fire Department for review shall consist of one set of paper plans and one set of electronic plans (CD, thumb drive, or PDF format).

Emergency Responder Radio Coverage1. *****Where required, new building shall have approved radio coverage for emergency responders whthin the building base upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. (IFC 510)

Sprinklers
1. ****As determined by the Building Official, the structure will have an automatic fire sprinkler system in accordance with appropriate NFPA standard for the occupancy type. (IFC 903.2.7) Due to inadequate fire department access, NFPA 13 standards shall be required.
2. Fire Department Connection (FDC) location shall be determined by the AHJ and noted in the fire sprinkler plan review.
3. Knox Box shall be installed in an approved location at each structure having a fire sprinkler system. (IFC 506.1)
4. Water main shall be installed in accordance to NFPA 13 and NFPA 24 to provide for proper clearances, seismic requirements, flushing and hydro testing. (IFC 901.4.1)
5. Fire flow requirements shall meet Appendix B of the International Fire Code.
6. ****Pitot water flow test is required on all new fire sprinkler installations for NFPA 13R and NFPA 13 systems. Plans will not be approved without certified test. (NFPA 291)
7. Horn/strobe shall be installed above the fire department connection. (IFC 912.2.2.1)

Type of Review / Contact	Status	Dates: Sent	Due	Received	Remarks

Notes

8. ****Room which houses fire sprinkler riser shall be no less than 5’ x 7’ in dimension and shall be accessible from outside grade. (IFC 903.2.11.1.1)
9. Concealed spaces within NFPA 13 protected structures having combustible materials shall comply with the requirements and may require additional protection. (IFC 903.3)
10. Exterior overhangs exceeding 4 feet shall be protected using fire sprinklers when combustible construction is used (NFPA 13).
11. Exterior egress stairways built of combustible construction shall be protected with fire sprinklers (NFPA 13).
12. Roof top occupancy appears to be present and shall be reviewed for proper protection.

Alarms

13. Building shall have a complete alarm system per NFPA 72. A full set of fire alarm plans from a fire alarm contractor shall be submitted with all calculations and cut sheets of all equipment.
(IFC Chapter 9)
14. Tactile appliances shall be installed where needed to notify occupants unable to see or hear emergency alarms, per most current edition of NFPA 72.
15. Audible appliances provided for the sleeping areas to awaken occupants shall produce a low frequency alarm signal per most current edition of NFPA 72.
16. Any structure with Group R occupancy shall have required carbon monoxide detection as required. (IFC 915.1)

Elevator

17. Elevator shall comply with ASME A17.1 with Phase I and Phase II of elevator emergency operations; subject to recall if required. (IFC Section 607)

Please feel free to contact me if you have any further questions at kclay@tetoncountywy.gov or at 307-733-4732.

Legal A Cohen-Davis	APPROVED	3/19/2018	4/9/2018	4/9/2018	
Parks and Rec Steve Ashworth	NO COMMENT	3/19/2018	4/9/2018		
Pathways Brian Schilling	NO COMMENT	3/19/2018	4/9/2018		
Planning Paul Anthony	NO COMMENT	3/19/2018	4/9/2018		
Police Todd Smith (3/21/2018 3:13 PM STOL)	APPROVED W/CONDITI	3/19/2018	4/9/2018	3/21/2018	

I am sure we will have questions going forward as the project takes on a more formalized plan. Good to see more parking compared to some other recent projects.

Thanks,
Todd

Public Works Brian Lenz	NO COMMENT	3/19/2018	4/9/2018		

Type of Review / Contact / Notes	Status	Dates: Sent	Dates: Due	Dates: Received	Remarks
START Darren Brugmann	NO COMMENT	3/19/2018	4/9/2018		
TC Housing Authority Stacy Stoker (3/20/2018 12:23 PM SAS) The applicant must submit a complete Housing Mitigation Plan to be reviewed at the initial review of the free market portion of the development plan.	APPROVED	3/19/2018	4/9/2018	3/20/2018	See Notes

WTE
WYOMING TITLE & ESCROW
A MOTHER LODE COMPANY

Released	✓
Indexed	✓
Abstracted	
Scanned	

WARRANTY DEED

Cony Corporation, a Wyoming corporation, GRANTOR, of Teton County, Wyoming, for and in consideration of TEN DOLLARS ($10.00) and other good and valuable consideration, in hand paid, receipt of which is hereby acknowledged, and pursuant to an I.R.C. § 1031 tax deferred exchange for benefit of Grantee, CONVEYS and WARRANTS to Roseville Ventures II, LLC, a Wisconsin limited liability company, GRANTEE whose address is 4011 80th Street, Kenosha, WI 53142, the following described real estate, situate in the County of Teton, State of Wyoming, hereby waiving and releasing all rights under and by virtue of the homestead exemption laws of the State of Wyoming, to-wit:

Lots 5 and 6 of Block 6 of the Original Townsite of Jackson, Teton County, Wyoming, according to that plat recorded in the office of the Teton County Clerk on July 18, 1901 as Plat No. 100.

PIN: 22-41-16-28-4-10-004

Together with and including all improvements thereon and all appurtenances and hereditaments thereunto belonging. Subject to all covenants, conditions, restrictions, easements, reservations, and rights-of-way of record.

WITNESS our hands this 28 day of December, 2016.

GRANTOR: CONY CORPORATION
GRANTEE: ROSEVILLE VENTURES II LLC
Doc 0919653 bk 937 pg 746-746 Filed At 14:34 ON 12/28/16
Sherry L. Daigle Teton County Clerk fees: 12.00
By Mary Smith Deputy

Cony Corporation, a Wyoming corporation:

Andrew Evans Carson, President/Director

James A. Roscoe, Secretary/Director

STATE OF WYOMING)
)
COUNTY OF TETON)

The foregoing instrument was acknowledged before me this 28 day of December, 2016 by Andrew Evans Carson as President/Director and James A. Roscoe as Secretary/Director of Cony Corporation, a Wyoming corporation.

WITNESS my hand and official seal.

Notary Public
My Commission Expires: _____

LIZ JORGENSON - NOTARY PUBLIC
COUNTY OF TETON STATE OF WYOMING
My Commission Expires November 9, 2020

JACKSON HOLE
TITLE & ESCROW
307.733.3153

GRANTOR: 185 N GLENWOOD LLC
GRANTEE: ROSEVILLE VENTURES II LLC
Doc 0919715 bk 937 pg 909-909 Filed At 13:39 ON 12/29/16
Sherry L. Daigle Teton County Clerk fees: 12.00
By Mary Smith Deputy

Space Above This Line for Recorder's Use Only

WARRANTY DEED

Released	
Indexed	✓
Abstracted	✓
Scanned	

File No.: **614163JAC (mgm)**

185 N. Glenwood, LLC, a Wyoming limited liability company, GRANTOR(S), for Ten Dollars ($10.00) and other good and valuable consideration in hand paid, receipt of which is hereby acknowledged, CONVEY(S) AND WARRANT(S) to

Roseville Ventures II, LLC, a Wisconsin limited liability company, GRANTEE(S),

whose mailing address is 4015 80th Street, Kenosha Wisconsin 53142, the following described real estate, situated in the County of **Teton,** State of **Wyoming,** hereby releasing and waiving all rights under and by virtue of the Homestead Exemption Laws of the State of Wyoming, to-wit:

Lots 1, 2, 3 and 4 of Block 6 of the Original Townsite of Jackson, Teton County, Wyoming, according to that plat recorded in the Office of the Teton County Clerk on July 18, 1901 as Plat Number 100.

State Identification Number 22-41-16-28-4-10-001

Including and together with all and singular the tenements, hereditaments, appurtenances and improvements thereon or thereunto belonging, but subject to taxes, reservations, covenants, encroachments, conditions, restrictions, rights-of-way and easements of record.

WITNESS the due execution and delivery of this Warranty Deed
this 23rd day of December, 2016.

185 N. Glenwood, LLC, a Wyoming limited liability company

By: TNG 22, LLC, Its Sole Member

By: _____
Name: Raymond C. Leffler
Title: Sole Member

State of Wisconsin
County of Kenosha

This instrument was acknowledged before me on this 23rd day of December, 2016 by Raymond C. Leffler as Sole Member of TNG 22, LLC, as Sole Member of 185 N. Glenwood, LLC, a Wyoming limited liability company.

STATE OF WISCONSIN NOTARY PUBLIC KRISTY L. BOYLE

_____
Notary Public
My Commission Expires: June 24, 2018

LETTER OF AUTHORIZATION

Roseville Ventures II, LLC ,"Owner" whose address is: 4015 80th Street, Kenosha, WI, 53142

(NAME OF ALL INDIVIDUALS OR ENTITY OWNING THE PROPERTY)

Roseville Ventures II, LLC , as the owner of property more specifically legally described as: Lots 1-6, Blk 6, Original Town of Jackson, Plat 100

(If too lengthy, attach description)

HEREBY AUTHORIZES Bear Development, LLC & Jorgensen Associates as agent to represent and act for Owner in making application for and receiving and accepting on Owners behalf, any permits or other action by the Town of Jackson, or the Town of Jackson Planning, Building, Engineering and/or Environmental Health Departments relating to the modification, development, planning or replatting, improvement, use or occupancy of land in the Town of Jackson. Owner agrees that Owner is or shall be deemed conclusively to be fully aware of and to have authorized and/or made any and all representations or promises contained in said application or any Owner information in support thereof, and shall be deemed to be aware of and to have authorized any subsequent revisions, corrections or modifications to such materials. Owner acknowledges and agrees that Owner shall be bound and shall abide by the written terms or conditions of issuance of any such named representative, whether actually delivered to Owner or not. Owner agrees that no modification, development, platting or replatting, improvement, occupancy or use of any structure or land involved in the application shall take place until approved by the appropriate official of the Town of Jackson, in accordance with applicable codes and regulations. Owner agrees to pay any fines and be liable for any other penalties arising out of the failure to comply with the terms of any permit or arising out of any violation of the applicable laws, codes or regulations applicable to the action sought to be permitted by the application authorized herein.

Under penalty of perjury, the undersigned swears that the foregoing is true and, if signing on behalf of a corporation, partnership, limited liability company or other entity, the undersigned swears that this authorization is given with the appropriate approval of such entity, if required.

OWNER:

(SIGNATURE) (SIGNATURE OF CO-OWNER)

Title: Member

(if signed by officer, partner or member of corporation, LLC (secretary or corporate owner) partnership or other non-individual Owner)

STATE OF Wisconsin)
)SS.
COUNTY OF Kenosha)

The foregoing instrument was acknowledged before me by Stephen R Mills this 5 day of April, 2019.

WITNESS my hand and official seal.

Sarah E Bell (Seal)

(Notary Public)

My commission expires: 5/10/22

SARAH E. BELL
Notary Public
State of Wisconsin