PLANNING PERMIT APPLICATION

Planning & Building Department
Planning Division

150 E Pearl Ave.
P.O. Box 1687
Jackson, WY 83001

ph: (307) 733-0440
fax: (307) 734-3563
www.townofjackson.com

For Office Use Only

Fees Paid_____

Check # _____ Credit Card_____ Cash_____

Application #s _____ _____ _____

PROJECT.

Name/Description: 1225 Gregory

Physical Address: 1225 Gregory Lane, Jackson, WY

Lot, Subdivision: _____ PIDN: _____

OWNER.

Name: Hoke & Co Phone: 307.739.8133

Mailing Address: Po Box 130, Wilson, WY ZIP: 83014

E-mail: _____

APPLICANT/AGENT.

Name: Larry K. Berlin Phone: 307.733.5697

Mailing Address: Po Box 4119, Jackson, WY ZIP: 83001

E-mail: larryb@berlinarchitects.com

DESIGNATED PRIMARY CONTACT.

_____Owner X Applicant/Agent

TYPE OF APPLICATION. *Please check all that apply; see Fee Schedule for applicable fees.*

Use Permit

_____Basic Use

_____Conditional Use

_____Special Use

Physical Development

_____Sketch Plan

X Development Plan

X Full GEC permit application is also included.

Interpretations

_____Formal Interpretation

_____Zoning Compliance Verification

Relief from the LDRs

_____Administrative Adjustment

_____Variance

_____Beneficial Use Determination

_____Appeal of an Admin. Decision

Development Option/Subdivision

_____Development Option Plan

_____Subdivision Plat

_____Boundary Adjustment (replat)

_____Boundary Adjustment (no plat)

Amendments to the LDRs

_____LDR Text Amendment

_____Zoning Map Amendment

_____Planned Unit Development

PRE-SUBMITTAL STEPS. *Pre-submittal steps, such as a pre-application conference, environmental analysis, or neighborhood meeting, are required before application submittal for some application types. See Section 8.1.5, Summary of Procedures, for requirements applicable to your application package. If a pre-submittal step is required, please provide the information below. If you need assistance locating the project number or other information related to a pre-submittal step, contact the Planning Department.* ***If this application is amending a previous approval, indicate the original permit number.***

Pre-application Conference #: P15-052 Environmental Analysis #: _____

Original Permit #: _____ Date of Neighborhood Meeting: 6.27.2015 11am

SUBMITTAL REQUIREMENTS. *Twelve (12) hard copies and one (1) digital copy of the application package (this form, plus all applicable attachments) should be submitted to the Planning Department.. 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.*

Have you attached the following?

YES **Application Fee.** 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.

YES **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. If the owner is a partnership or corporation, proof that the owner can sign on behalf of the partnership or corporation is also required. Please see the Letter of Authorization template in the Administrative Manual for a sample.

YES **Response to Submittal Checklist.** All applications require response to applicable review standards. These standards are outlined on the Submittal Checklists for each application type. If a pre-application conference is held, the Submittal Checklists will be provided at the conference. If no pre-application conference is required, please see the Administrative Manual for the applicable Checklists. The checklist is intended as a reference to assist you in submitting a sufficient application; submitting a copy of the checklist itself is not required.

FORMAT.

The main component of any application is demonstration of compliance with all applicable Land Development Regulations (LDRs) and Resolutions. The submittal checklists are intended to identify applicable LDR standards and to outline the information that must be submitted to sufficiently address compliance with those standards.

For some submittal components, minimum standards and formatting requirements have been established. Those are referenced on the checklists where applicable. For all other submittal components, the applicant may choose to make use of narrative statements, maps, drawings, plans and specifications, tables and/or calculations to best demonstrate compliance with a particular standard.

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.

Larry K. Berlin — 9/9/15

Signature of Owner or Authorized Applicant/Agent — Date

Larry K. Berlin — Principal Architect

Name Printed — Title

BERLIN
ARCHITECTS

1225 GREGORY LANE - **Development Plan Application**

Project Narrative

Two new light industrial buildings are proposed which are intended to be available for tenant lease. All existing building improvements on site are removed via separate demolition permit under way. The buildings are proposed to be steel structural frame with metal siding. The north building will be 8040sf. The south building will be 8040sf plus the ancillary mezzanine space of 1515sf or 9515sf together. This total meets the FAR limitation of 17,596.77sf. 30 parking spaces are proposed, including 2 van accessible spaces. The proposed project will meet height requirements, setbacks, and all other requirements of the Town of Jackson Land Development Regulations. Building tenants are not yet known.

Response to Submittal Checklist

Findings for Approval:

1. The proposed project **is consistent with the desired future character described for the site in the Jackson/Teton County Comprehensive Plan**, specifically addressed by Section 5.2: Gregory Lane Area. The project supports the community goal of maintaining and promoting light industry uses to support the local economy and intensifies the current development pattern by offering larger structures that reinforce the desired use pattern over what has previously existed on site.
2. Not Applicable
3. The proposed project **does not have a significant impact on the public facilities and services, including transportation, potable water and wastewater facilities, parks, schools, police, fire and EMS facilities.** The new project offers upgraded on-site infrastructure to meet current development standards. The project will offer a more controlled and predictable environment, that is more in keeping with the surrounding light industrial uses than was the former site use and will therefore be more harmonious with its surroundings as it relates to infrastructure and service needs.
4. The proposed project **complies with all relevant standards of these LDR's and other Town Ordinances as can be determined by the level of detail of a Deveopment Plan.** The project will meet all dimensional limitations set forth in the LDR's and does not propose any deviations or variances from such.
5. The proposed project **is in substantial conformance with all standards or conditions of any prior applicable permits or approvals.** The project has been through pre-application conference and Sketch Plan approval as required. There are no other permits in effect. Demolition permits to be handled separately.

BOX 4119
JACKSON, WY 83001

307-733-5697
FAX 307-733-5761
berlinarchitects.com

Response to Submittal Checklist

In accordance with the pre-application submittal checklist from the Town of Jackson 6.16.2015 Memorandum, we offer the following narrative response to compliance with planning department and LDR requirements.

1. Drawing C6 indicates the internal area of the site for construction and material stock piling. A Construction Security Fence will be installed around the perimeter throughout construction.
2. Regarding Pedestrian Corridor planning, it is our general understanding that the surrounding environment doesn't currently offer any realistic plan for connectivity. Focusing on internal circulation on site, pedestrians will be able to move freely across the parking area between vehicles and entry points without restriction.
3. The Potable Water System connects to the town service. See sheet C2 for specific details.
4. The Sanitary Sewer System connects to the town service. See sheet C2 for specific details.
5. The Utility Service Plans indicate accommodation for infrastructure that refers to mechanical plans for future connection of required irrigation system. Specific irrigation design forthcoming at building permit stage with landscape design.
6. Stormwater Management is addressed on drawings C6 & C7. Stormwater calculations are also provided.
7. A complete Grading and Erosion Control Plan is addressed within the Civil drawing submittal set.
8. Site Contours area provided on drawings C1 and C2.
9. The Parking and Access plan is addressed on drawing C8.
10. All work to be completed within the Town's right-of-way is addressed throughout the drawings and specifications
11. All onsite power is indicated to be underground and transformer locations are shown. See drawing C2.
12. Snow storage area is indicated on drawing C8.
13. Demolition Permits are to be handled separately by owner/contractor.

LETTER OF AUTHORIZATION

HORE & Co., "Owner" whose address is: Box 130 Wilson, Wy. 83014

(NAME OF ALL INDIVIDUALS OR ENTITY OWNING THE PROPERTY)

, as the owner of property more specifically legally described as: 1225 GREGORY LANE JACKSON, Wy. 83014

(If too lengthy, attach description)

HEREBY AUTHORIZES LARRY K. BERLIN 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: MANAGING MEMBER

(if signed by officer, partner or member of corporation, LLC (secretary or corporate owner) partnership or other non-individual Owner)

STATE OF Wyoming)
)SS.
COUNTY OF Teton)

The foregoing instrument was acknowledged before me by Heidi K. Huseby this 18 day of May, 2005.

WITNESS my hand and official seal.

(Seal)

(Notary Public)

My commission expires:

HEIDI K. HUSEBY NOTARY PUBLIC TETON COUNTY, WYOMING

EXISTING SITE

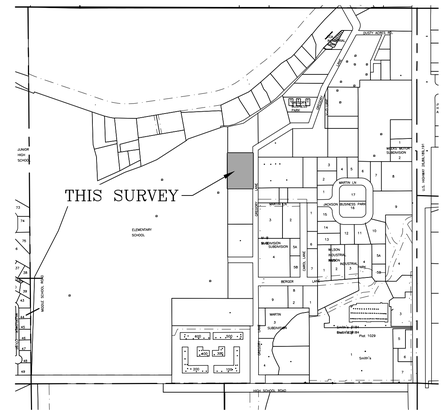
SCALE: 1"=20' (24X36)

0 20 40

N E

DRAWING INDEX

DWG NO.	DESCRIPTION
C1	EXISTING SITE
C2	UTILITY PLAN
C3	SEWER SERVICE PLAN AND PROFILE
C4	WATER SERVICE PLAN AND PROFILE
C5	CIVIL UTILITY DETAILS
C6	GRADING PLAN
C7	CIVIL DETAILS
C8	PARKING PLAN



VICINITY MAP
NE 1/4 SECTION 6
T41N, R116W
TOWN OF JACKSON
TETON COUNTY WY

LEGEND

- = PROPERTY BOUNDARY LINE
- = SETBACK LINE
- = EDGE OF PAVEMENT
- = CENTERLINE OF ROAD
- = SANITARY SEWER LINE
- = 18"ø SANITARY SEWER MAIN
- = SEWER SERVICE LINE
- = WATER LINE (FROM TOJ GIS INFORMATION)
- = WATER SERVICE
- = BURIED FIBER OPTIC
- = BURIED GAS
- = BURIED POWER
- = WELL
- = WATER VALVE
- = FIRE HYDRANT
- = DECIDUOUS TREE
- = SANITARY SEWER CLEANOUT
- = CABLE TV PEDESTAL
- = TELEPHONE PEDESTAL
- = ELECTRIC TRANSFORMER
- ELEVATIONS ARE BASED ON NGVD29

CONSTRUCTION SPECIFICATIONS

ALL WORK SHALL BE DONE IN ACCORDANCE WITH WYOMING PUBLIC WORKS STANDARD SPECIFICATIONS (WPWSS) 2001 EDITION. SPECIAL PROVISIONS AMENDING, SUPPLEMENTING AND CLARIFYING THE ABOVE-REFERENCED SPECIFICATIONS ARE AS FOLLOWS:

SECTION 02220 – TRENCH EXCAVATION

3.15.A.3 TRENCH EXCAVATION SHALL BE TYPE 1 IN THE SITE AREA. ALL TRENCH EXCAVATION IN TOWN STREETS SHALL BE TYPE 2.

SECTION 02225 – TRENCH BACKFILL

3.01.A.3 TYPE A TRENCH BACKFILL SHALL BE USED UNDER ALL EXISTING AND PROPOSED ROADWAYS AND PARKING AREAS. TYPE B BACKFILL SHALL BE USED IN ALL AREAS NOT RECEIVING TYPE A BACKFILL.

3.01.B.1 TYPE A TRENCH BACKFILL SHALL BE PLACED IN MAXIMUM 8-INCH LIFTS AND COMPACTED TO 95% OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D1557 (MODIFIED PROCTOR).

SECTION 02665 – WATER DISTRIBUTION AND TRANSMISSION SYSTEMS

2.01.A PIPE SHALL BE CLASS 50 CEMENT MORTAR-LINED DUCTILE IRON, MECHANICAL OR PUSH-ON JOINT, CONFORMING TO AWWA C-151.

2.01.B.1 PIPE FITTINGS SHALL BE CAST-IRON OR DUCTILE IRON CONFORMING TO AWWA C-110. TAPPING SLEEVES SHALL BE TYPE 622 AS MANUFACTURED BY ROCKWELL INTERNATIONAL, OR EQUAL.

2.01.F GATE VALVES SHALL BE RESILIENT-SEATED GATE VALVES CONFORMING TO AWWA C-509.

2.01.G ALL BURIED VALVES SHALL BE FURNISHED WITH VALVE BOXES SET TO THE FINISHED GRADE.

3.01.E THRUST BLOCKS SHALL BE INSTALLED AT ALL BENDS AND FITTINGS UNLESS JOINTS ARE MECHANICALLY RESTRAINED. THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH AND THE CONCRETE SHALL NOT COVER ANY JOINTS. THRUST BLOCKS SHALL BE SIZED IN ACCORDANCE WITH WPWSS STANDARDS. ALL WATERLINE SHALL HAVE A MINIMUM OF 7 FT. COVER, OR SHALL BE INSULATED AS SHOWN ON THE DRAWINGS.

SECTION 02670 – HYDROSTATIC TESTING

3.02.A.1 WATERLINES SHALL BE SUBJECT TO PRESSURE AND LEAKAGE TESTS. TEST PRESSURE SHALL BE 125 PSI.

SECTION 02675 – DISINFECTION

3.02.B WATERLINES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651-686. CHLORINE SHALL BE APPLIED BY THE CONTINUOUS FEED METHOD. CHLORINATED WATER SHALL NOT BE DISCHARGED TO STORM SEWER OR WHERE IT WILL FLOW INTO FLAT CREEK.

SECTION 02700 – SANITARY SEWER SYSTEMS

2.01.A ALL SEWER PIPE SHALL BE PVC, SDR35 WITH PUSH-ON JOINTS, CONFORMING TO ASTM D-3034.

3.02.A MANHOLE COVERS SHALL BE PROVIDED WITH A 5/8"ø LIFT HOLE.

3.03.A MINIMUM PIPE DIAMETER FOR SEWER SERVICES SHALL BE 4-INCH. SEWER SERVICES SHALL BE INSTALLED AT A MINIMUM SLOPE OF 2.0%.

3.04.C LEAKAGE TEST. NEW SEWERLINES, MANHOLES AND SERVICES SHALL BE TESTED FOR LEAKAGE. THE MAXIMUM ALLOWABLE INFILTRATION / EXFILTRATION IS 50 GALLONS PER DAY PER MILE PER INCH OF PIPE DIAMETER. TOWN OF JACKSON PERSONNEL SHALL WITNESS ALL PERFORMANCE TESTING.

SECTION 02726 – CONCRETE SIDEWALKS,DRIVEWAY APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISC. NEW CONSTRUCTION

2.01.A REINFORCING STEEL IN VALLEY GUTTER SHALL BE #3 REBAR @ 12" O.C. EACH WAY.

3.08.A PRE-FORMED EXPANSION JOINTS SHALL BE INSTALLED AT THE ENDS OF THE VALLEY GUTTER AND @ 50' SPACING.

3.08.B CONTRACTION JOINTS SHALL BE PROVIDED BETWEEN EXPANSION JOINTS AT 10' INTERVALS.

NOTES:

1. CONTRACTOR SHALL DIG TEST PITS PRIOR TO CONSTRUCTION, AS NECESSARY, TO VERIFY EXISTING PIPELINE LOCATIONS AND ELEVATIONS.
2. INSTALL ISOLATION VALVE AND DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE ON FIRE SPRINKLER SUPPLY LINE INSIDE BUILDING, AND AN ISOLATION VALVE WITH SINGLE CHECK BACKFLOW PREVENTION DEVICE ON DOMESTIC SERVICE CONNECTION INSIDE BUILDING. BACKFLOW PREVENTION DEVICES SHALL CONFORM TO AWWA MANUAL OF PRACTICE M-14 REQUIREMENTS.
3. WATER METERS AND BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED ON ALL DOMESTIC SERVICE CONNECTIONS IN ACCORDANCE WITH TOWN OF JACKSON STANDARDS.
4. CONTRACTOR SHALL EMPLOY A SURVEYOR LICENSED IN THE STATE OF WYOMING TO PROVIDE STAKING FOR THE PROPOSED IMPROVEMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY SWPPP REQUIREMENTS FOR CONSTRUCTION STORMWATER RUNOFF AND WYPDES REQUIREMENTS FOR ANY NECESSARY TEMPORARY DEWATERING.
6. INSTALL UTILITIES IN ACCORDANCE WITH UTILITY COMPANY OR MUNICIPALITY'S REQUIREMENTS. CONTRACTOR TO COORDINATE INSTALLATION WITH UTILITY COMPANIES AND THE TOWN OF JACKSON PUBLIC WORKS.
7. STRIPPED MATERIAL SHALL BE STOCKPILED ONSITE, CUT MATERIAL WILL BE PLACED DIRECTLY INTO FILL AREAS OR STOCKPILED. DUST CONTROL MUST BE ACCOMPLISHED BY WATERING STOCKPILES AND DRY SOILS. CONTRACTOR MUST PREVENT TRACKING OF SOIL ONTO PUBLIC AND PRIVATE ROADS AND TO SWEEP ROADS AS REQUIRED.
8. EROSION CONTROL DEVICES SHALL BE INSTALLED & MAINTAINED BY CONTRACTOR DURING CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL THE SITE HAS REVEGETATED SUFFICIENTLY TO PREVENT EROSION RESULTING FROM STORMWATER RUNOFF.
9. FINAL LANDSCAPING AND SEEDING SHALL COMPLY WITH THE TOWN OF JACKSON STANDARDS AND FINAL LANDSCAPING PLANS. SEEDING, AND OR PLACEMENT OF SOD, SHALL TAKE PLACE ONCE GRADING ACTIVITIES ARE COMPLETED AND THE TOPSOIL IS REDISTRIBUTED OVER THE FINISHED SLOPES. SEEDED AREAS SHALL INCLUDE MULCH. SEEDING SHALL TAKE PLACE IN THE SPRING BEFORE MAY 15 OR IN THE FALL AFTER OCTOBER 15. AREAS THAT DO NOT 'TAKE' SHALL BE RESEEDED.
10. CONTRACTOR MUST HAVE A WEED CONTROL PLAN PREPARED BY TETON COUNTY WEED AND PEST OR OTHER WEED SPECIALIST AND IMPLEMENT THE PLAN THROUGHOUT CONSTRUCTION.
11. CONSTRUCTION EQUIPEMENT SHALL BE PARKED WITHIN THE LOT BOUNDARY.
11. LAND DISTURBING ACTIVITIES SHALL BEGIN IN EARLY SPRING OF 2016 AND WILL BE COMPLETED LATE FALL 2016.

FINAL DEVELOPMENT PLANS

		REV.
DATE	8/02/2015	9/9/2015
SURVEYED		
ENGINEERED	ne	
DRAWN	dd	
CHECKED		
APPROVED		

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

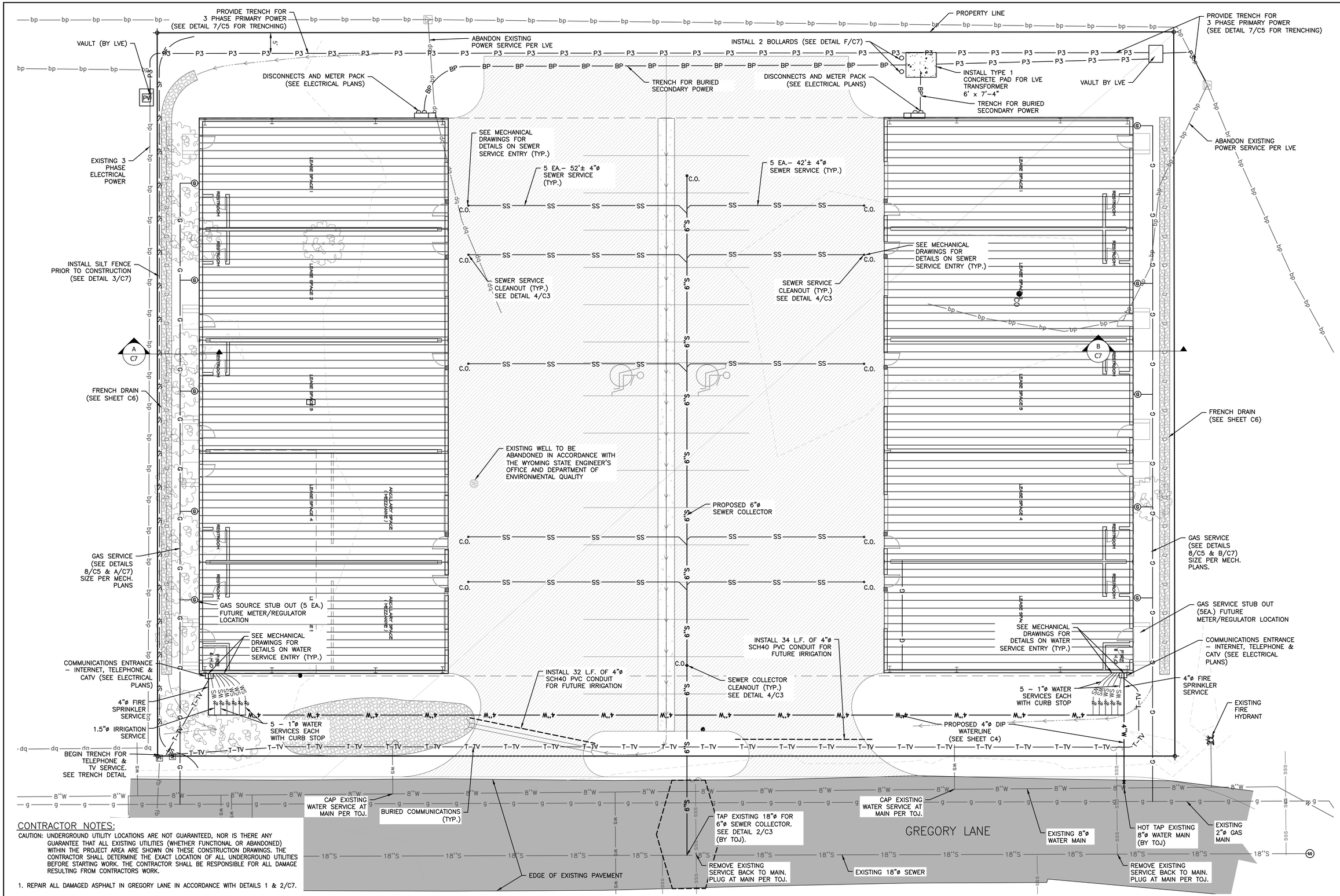
DRAWING TITLE
Civil Design
Existing Site

JOB TITLE
Berlin Architects
Property Redevelopment
1225 Gregory Lane

DRAWING NO C1

JOB NO 15-140-01

S:\Proj2015\140-01 1225 Gregory Lane Surveying & Civil Engineering \1\Drawings\Existing Site.dwg <Existing Site> - Sep 09 2015 02:04:49 pm PLOTTED BY: hbpatrick DWG FORMAT: 19.1



CONTRACTOR NOTES:

CAUTION: UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED, NOR IS THERE ANY GUARANTEE THAT ALL EXISTING UTILITIES (WHETHER FUNCTIONAL OR ABANDONED) WITHIN THE PROJECT AREA ARE SHOWN ON THESE CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE STARTING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM CONTRACTORS WORK.

1. REPAIR ALL DAMAGED ASPHALT IN GREGORY LANE IN ACCORDANCE WITH DETAILS 1 & 2/C7.
2. COMPLETE ALL UTILITY WORK IN ACCORDANCE WITH THE TOWN OF JACKSON (TOJ) AND UTILITY PROVIDERS REQUIREMENTS.
3. EXISTING BURIED WATER AND SEWER MAIN AND SERVICE LOCATIONS ARE PER TOJ RECORDS. POTHOLE TO FIELD LOCATE SERVICES FOR ABANDONMENT.

UTILITY PLAN

SCALE: 1"=10' (24X36)

0 10 20

FINAL DEVELOPMENT PLANS

REV.	
9/9/2015	

DATE	8/02/2015
SURVEYED	
ENGINEERED	ne
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CHECKED	
APPROVED	

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

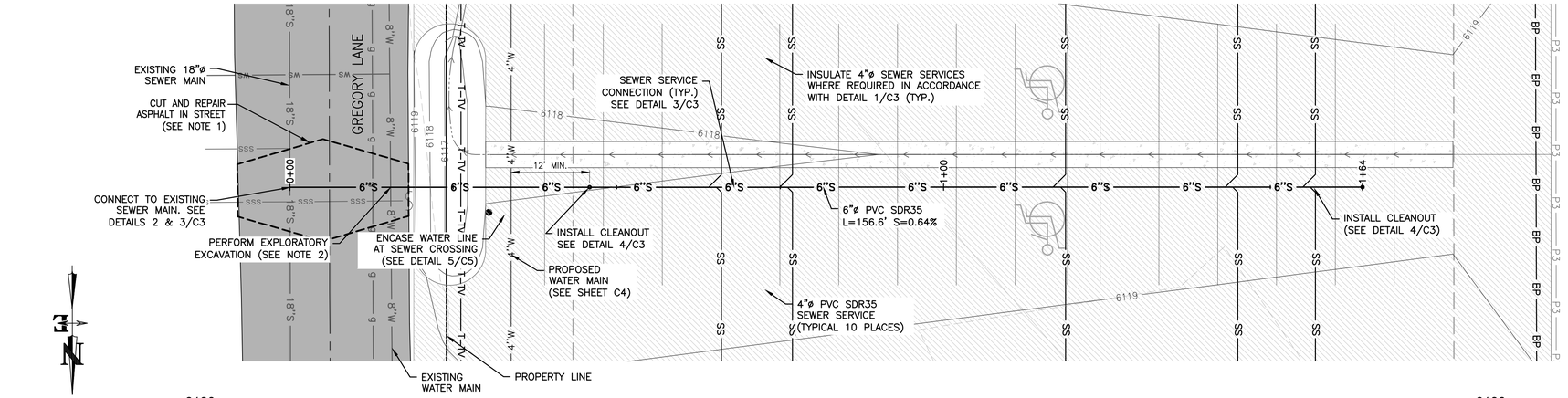
DRAWING TITLE
Civil Design
Utility Plan

JOB TITLE
Berlin Architects
Property Redevelopment
1225 Gregory Lane

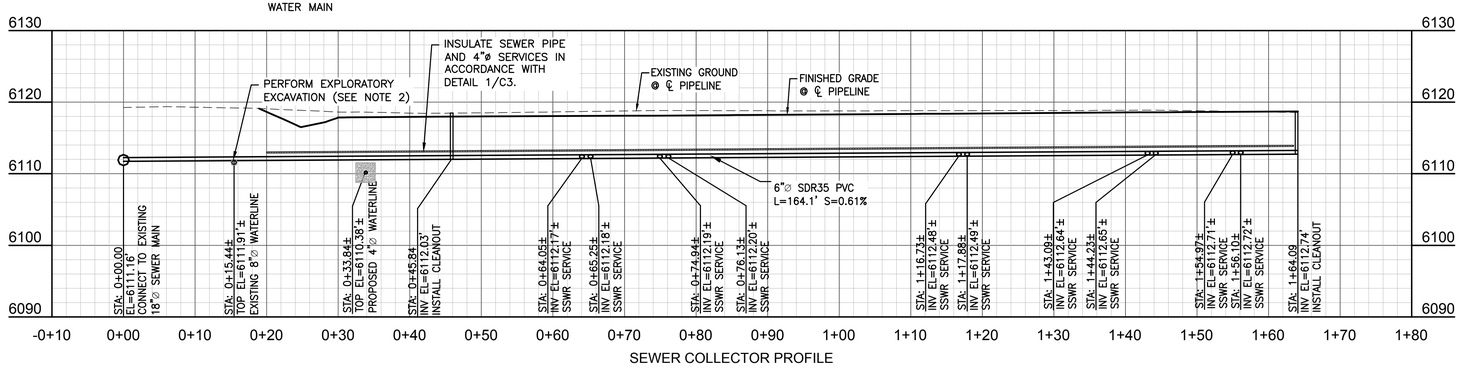
DRAWING NO C2

JOB NO 15-140-01

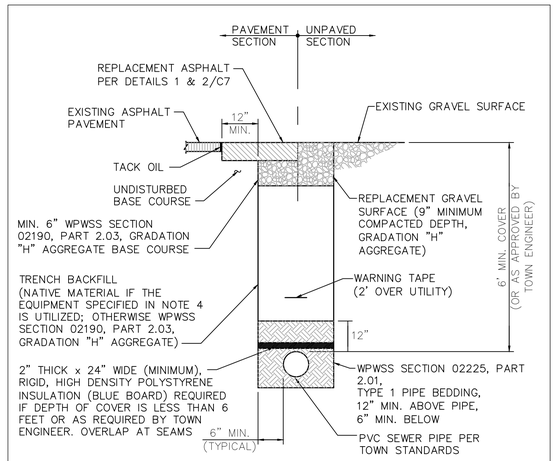
S:\Proj2015\140-01 (1225 Gregory Lane Surveying & Civil Engineering)\Drawings\Utility Plan\dwg Utility Plan - Sep 09 2015 12:37:52 pm PLOTTED BY: Hopstrick DWG FORMAT: 19.1



NOTES:
1. EXCAVATE AND BACKFILL SEWER LINES ACCORDING TO DETAIL 1/C3.
2. THE VERTICAL PROFILE OF THE PROPOSED SEWER MAY CHANGE DEPENDING ON THE LOCATION OF EXISTING WATER UTILITIES. PRIOR TO CONSTRUCTION OF THE SEWER AND WATER LINE SERVICES, CONTRACTOR SHALL UTILIZE EXPLORATORY EXCAVATION AT LOCATIONS SHOWN IN PLAN TO DETERMINE ACTUAL VERTICAL AND HORIZONTAL LOCATION OF EXISTING WATER UTILITIES. CONTRACTOR SHALL CONSULT WITH ENGINEER IF THERE ARE VERTICAL CONFLICTS. COMPLY WITH DETAILS 5/C5 & 6/C5 REGARDING WATER/SEWER SEPARATION AND ENCASEMENT.
3. CUT AND REPAIR ASPHALT WITHIN GREGORY LANE IN ACCORDANCE WITH DETAILS 1 & 2/C7.

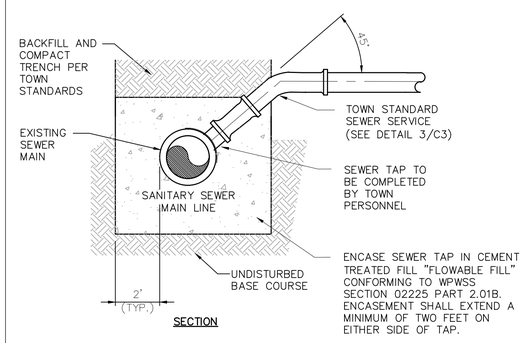


SEWER COLLECTOR PROFILE



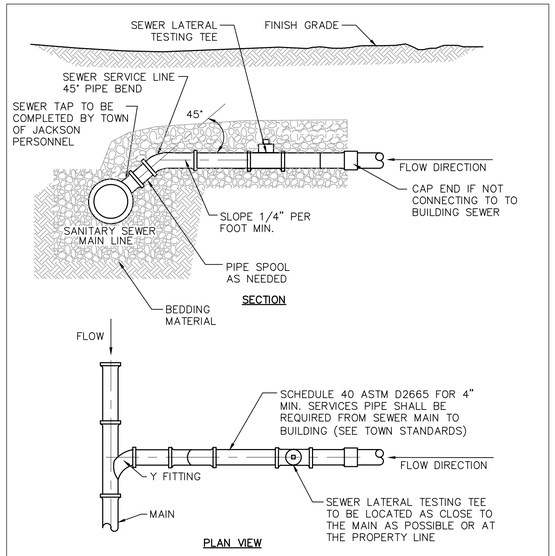
NOTES:
1. TRENCH BACKFILL BELOW THE SURFACE SHALL MEET THE FOLLOWING CRITERIA:
   - 95% MODIFIED PROCTOR DENSITY WITHIN STREET AND ALLEY RIGHTS-OF-WAY.
   - 90% MODIFIED PROCTOR DENSITY OUTSIDE STREET AND ALLEY RIGHTS-OF-WAY.
2. COMPACTION OF NATIVE TRENCH BACKFILL, WITH ALL ROCK LARGER THAN 6" REMOVED, 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 SEWER MAIN & SERVICE TRENCH DETAIL — SS-100 DATE: 1/10/13 SCALE: NTS



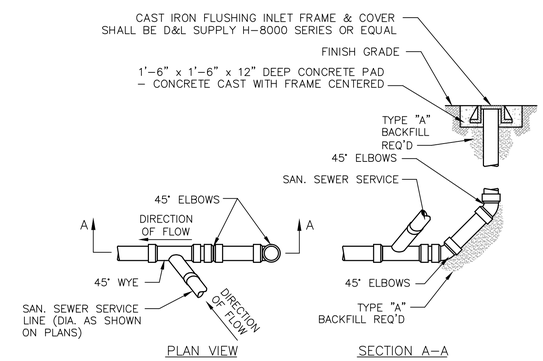
NOTES:
1. THE TOWN WILL PERFORM TAP AT THE EXPENSE OF THE OWNER. ALL OTHER WORK SHALL BE PERFORMED BY THE OWNERS/CONTRACTOR.
2. THE TOWN SHALL PERFORM TAP ONLY WITHIN TRENCHES WHICH MEET OR EXCEED THE STANDARDS SET BY OSHA. THE TOWN RESERVES THE RIGHT TO REQUIRE ADDITIONAL TRENCH EXCAVATIONS BE COMPLETED SHOULD IT BE DETERMINED BY TOWN PERSONNEL THAT THE TRENCH IS NOT IN COMPLIANCE WITH OSHA STANDARDS.

2 / C3 SEWER MAIN TAPPING — SS-115 DATE: SCALE:



NOTES:
1. NEW SERVICE CONNECTIONS TO EXISTING SANITARY SEWER MAINS SHALL BE COMPLETED BY TOWN OF JACKSON. 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 BE COMPACTED PER TOWN STANDARDS.
3. CLEANOUT TO BE PROVIDED ADJACENT TO HOUSE, EVERY 100' OF SERVICE LINE, AND AT ALL BENDS.

3 / C3 SANITARY SEWER SERVICE LINE — SS-111 DATE: 1/14/13 SCALE: NTS



NOTE: CLEANOUT SHALL HAVE THE SAME DIAMETER AS SEWER LINE.

4 / C3 CLEANOUT

FINAL DEVELOPMENT PLANS

DATE	8/02/2015	REV. 9/9/2015
SURVEYED		
ENGINEERED	ne	
DRAWN	dd	
CHECKED		
APPROVED		

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

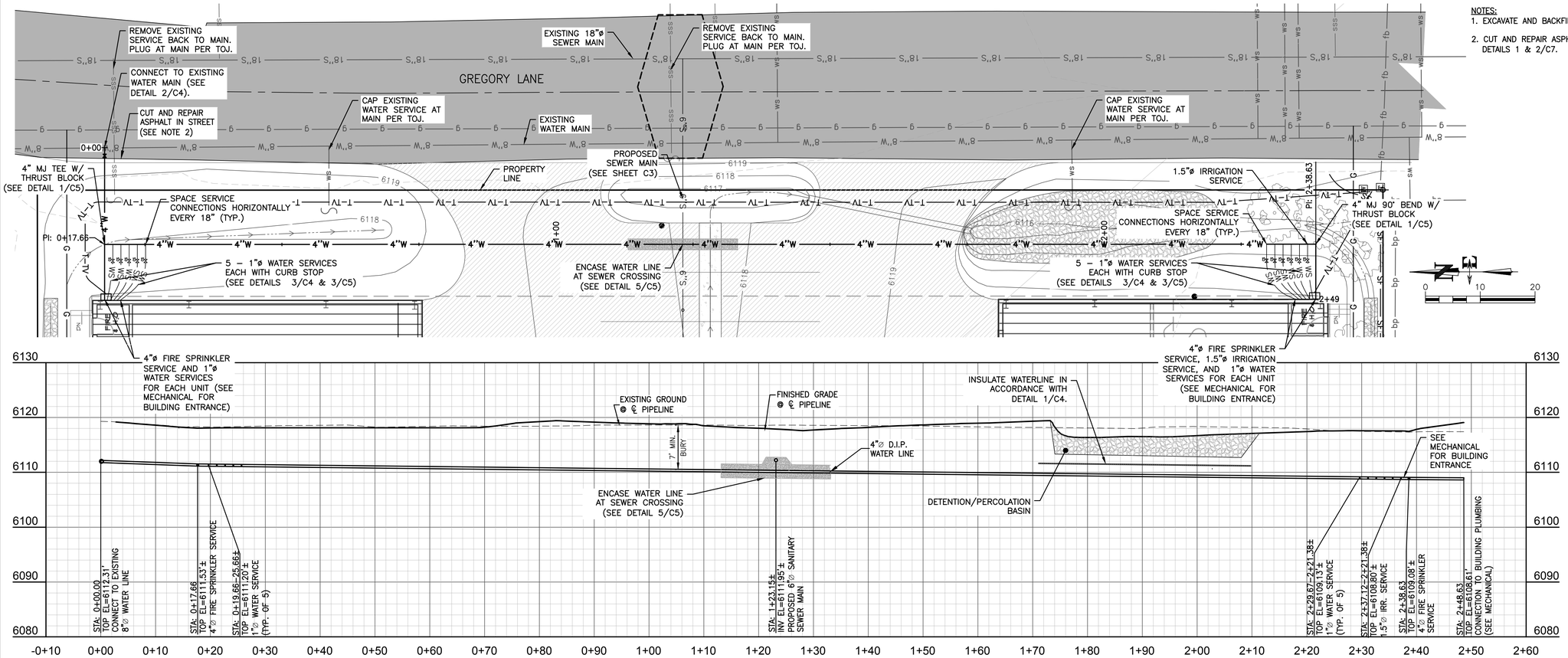
DRAWING TITLE: Civil Design — Sewer Service Plan and Profile

JOB TITLE: Berlin Architects — Property Redevelopment — 1225 Gregory Lane

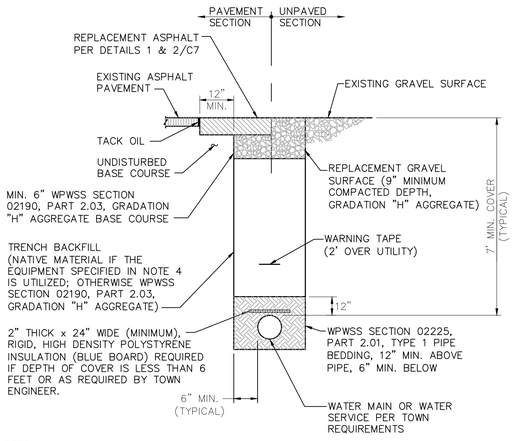
DRAWING NO: C3

JOB NO: 15-140-01

S:\Proj2015\140-01 1225 Gregory Lane Surveying & Civil Engineering \\Drawings\Utility Planning \Sewer Service Plan and Profile\ - Sep 09 2015 12:38:00 pm PLOTTED BY: kdpatrick DWG FORMAT: 191



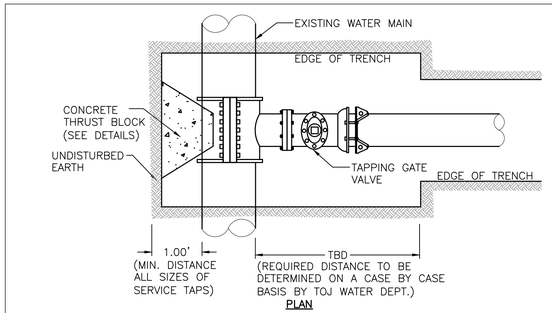
NOTES:
1. EXCAVATE AND BACKFILL ALL WATER LINES ACCORDING TO DETAIL 1/C4.
2. CUT AND REPAIR ASPHALT WITHIN GREGORY LANE IN ACCORDANCE WITH DETAILS 1 & 2/C7.

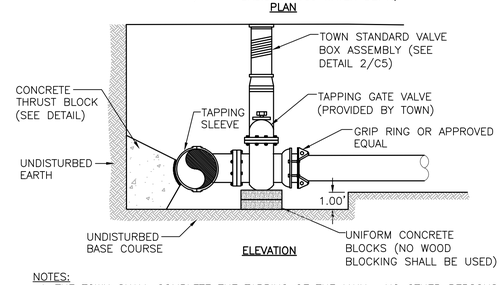


NOTES:
1. TRENCH BACKFILL BELOW THE SURFACE SHALL MEET THE FOLLOWING CRITERIA:
   – 95% MODIFIED PROCTOR DENSITY WITHIN STREET AND ALLEY RIGHTS–OF–WAY.
   – 90% MODIFIED PROCTOR DENSITY OUTSIDE STREET AND ALLEY RIGHTS–OF–WAY.
2. COMPACTION OF NATIVE TRENCH BACKFILL, WITH ALL ROCK LARGER THAN 6" REMOVED, 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 (WYOSHA) REGULATIONS.

1 / C4 WATER MAIN AND SERVICE LINE TRENCH

W–100 DATE: 1/14/13 SCALE: NTS



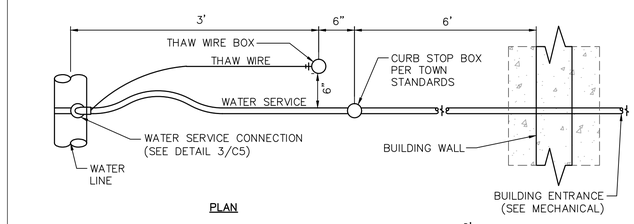


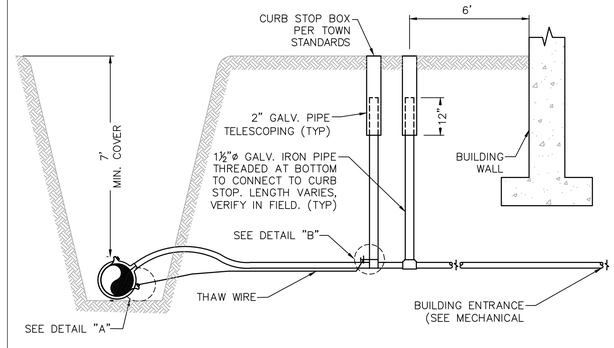
NOTES:
1. THE TOWN SHALL COMPLETE THE TAPPING OF THE MAIN. NO OTHER PERSONS SHALL COMPLETE TAP WITHOUT CONSENT OF TOWN. ALL OTHER WATER MAIN WORK SHALL BE THE RESPONSIBILITY OF THE OWNER.
2. TRENCH WILL BE EXCAVATED TO MEET ALL WYOSHA STANDARDS PRIOR TO TAPPING.
3. EXCAVATION OF TAPPING LOCATION SHALL BE APPROVED BY TOJ WATER DEPARTMENT PRIOR TO TAPPING.

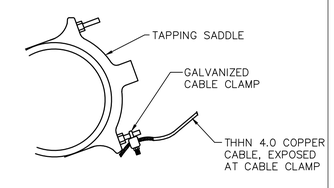
2 / C4 WATER MAIN TAPPING DETAIL

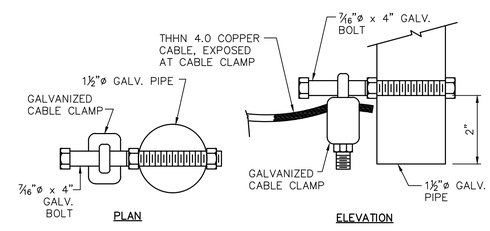
W–118 DATE:

SCALE:









NOTES:
1. THAW WIRE TO BE INSTALLED ON ALL NEW AND EXISTING WATER SERVICES IN THE TOWN OF JACKSON.

3 / C4 SERVICE CONNECTION THAW WIRE (3/4" & 1" METERS)

FINAL DEVELOPMENT PLANS

REV.	9/9/2015
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APPROVED	

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733–2087

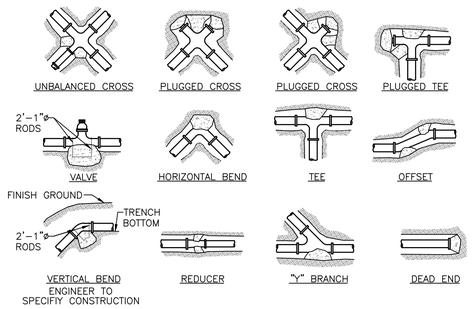
DRAWING TITLE
Civil Design
Water Service Plan and Profile

JOB TITLE
Berlin Architects
Property Redevelopment
1225 Gregory Lane

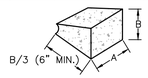
DRAWING NO C4

JOB NO 15–140–01

S:\Proj2015\140-01 (1225 Gregory Lane Surveying & Civil Engineering)\Drawings\Utility Plan\dwg (Water Service Plan and Profile) - Sep 09 2015 12:38:11 pm PLOTTED BY: kipatrick DWG FORMAT: 151



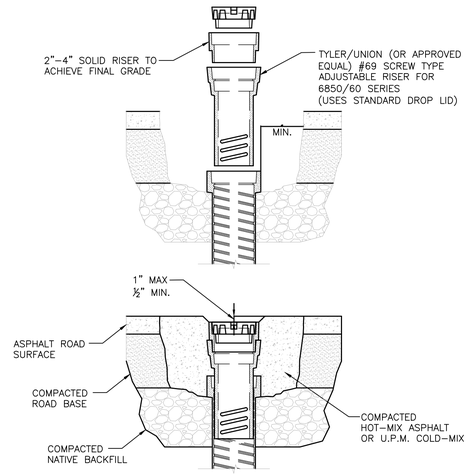
MINIMUM DIMENSIONS FOR THRUST BLOCKING										
FITTING SIZE	TEES & PLUGS		90° BENDS		45° BENDS & WYES		REDUCERS & 22 1/2° BENDS		11 1/4° BENDS	
	A	B	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"	0'-6"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"	1'-0"	0'-6"
8"	2'-8"	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'-8"	3'-3"	2'-7"	2'-3"	2'-0"	1'-0"
14"	5'-5"	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 BLOCKS SHALL BE A MINIMUM OF 6" THICK.
2. ALL BLOCKING SHALL BEAR AGAINST UNDISTURBED MATERIAL.
3. DESIGN IS BASED ON 150 PSI MAIN PRESSURE AND 2000 PSF SOIL BEARING CAPACITY.
4. 4 MIL POLYETHELENE PLASTIC BOND BREAKER SHALL BE PROVIDED BETWEEN THRUST BLOCK AND WATER PIPE.

1/C5 THRUST BLOCK DETAILS

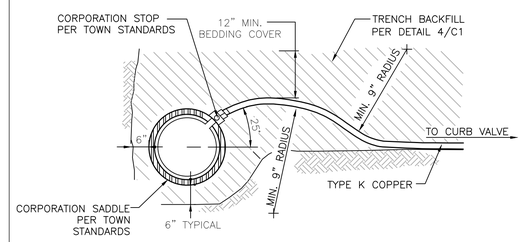
W-111 DATE: 1/16/13 SCALE: NTS



NOTES:
1. ADJUST WATER VALVES UPWARD OR DOWNWARD AS REQUIRED. FINAL ADJUSTMENT SHALL BE MADE AFTER PAVING AND BEFORE SEAL COATING.
2. THE TOWN SHALL INSPECT THE VERTICAL ALIGNMENT PRIOR TO AND POST BACKFILLING.
3. MUD PLUGS ARE REQUIRED TO BE PLACED IN ALL VALVE BOXES.

2/C5 WATER VALVE COLLAR ASSEMBLY

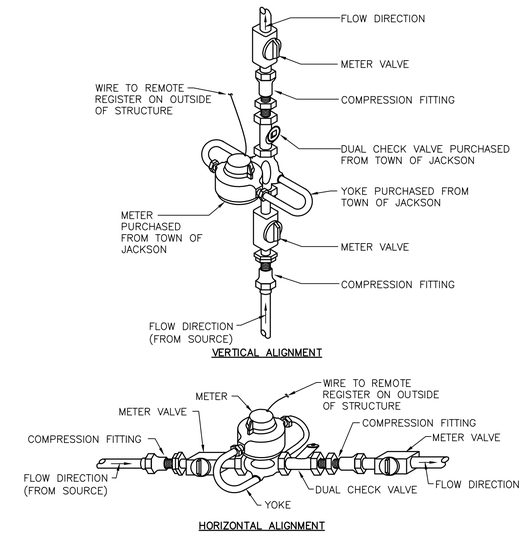
W-106 DATE: 1/16/13 SCALE: NTS



DETAIL OF A PROPERLY INSTALLED CORPORATION STOP, SHOWING GOOSENECK IN SERVICE PIPE.

3/C5 SERVICE LINE CONNECTION

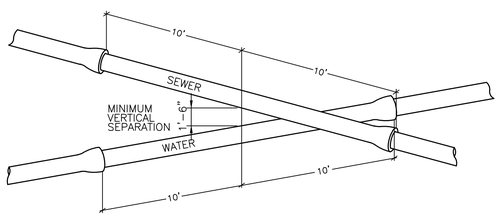
W-102 DATE: 1/15/13 SCALE: NTS



NOTES:
1. SERVICE PIPE MATERIAL SHALL MEET ADOPTED PLUMBING CODE REQUIREMENTS.
2. METER SHALL BE INSTALLED WITH THE METER FACING UP.
3. METER SHALL BE PURCHASED FROM AND SUPPLIED BY THE TOWN OF JACKSON.

4/C5 WATER METER INSTERIOR INSTALLATION (3/4" & 1" METERS)

W-112 DATE: 1/17/07 SCALE: NTS

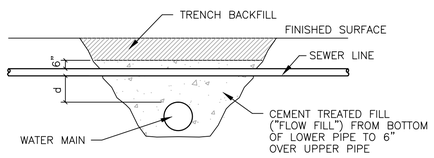


1. WHERE VERTICAL SEPARATION IS LESS THAN 1'-6", AS SHOWN ABOVE, WATER LINES AND SEWER LINES SHALL BE AT LEAST 10' APART HORIZONTALLY.
2. MINIMUM VERTICAL SEPARATION, AS SHOWN ABOVE, WHERE PIPES CROSS SHALL BE 1'-6" AND SEWER LINE JOINTS SHALL BE CENTERED AS SHOWN TO PROVIDE A MINIMUM OF 10' HORIZONTAL SEPARATION.
3. THE UPPER PIPE SHALL BE SPECIALLY SUPPORTED BY A CONDUIT CASING, EMBEDDED IN CONCRETE ACCORDING TO DETAIL 6/C5, OR BOTH PIPES SHALL BE PRESSURE RATED.
4. WHERE HORIZONTAL OR VERTICAL SEPARATION MINIMUMS CAN NOT BE MAINTAINED, EITHER PIPE SHALL BE SLEEVED THROUGH A CONDUIT PIPE OR EMBEDDED IN CONCRETE.

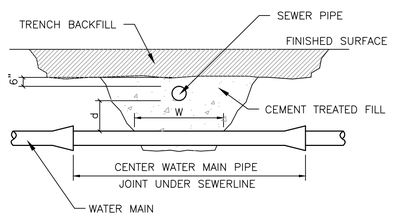
*REF: WDEQ-WQRR CHAPT. XII SECT. 13.g.i.

5/C5 SEWER & WATER PIPE CROSSING DETAIL

SCALE: NTS



TRENCH X-SECTION



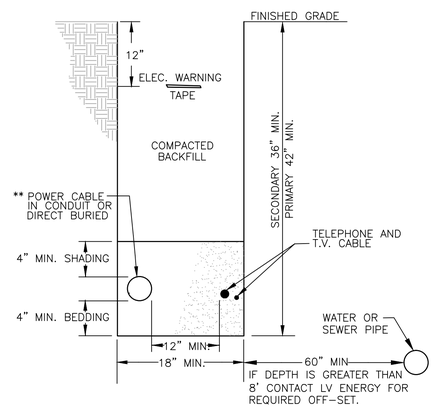
W=2d + 1 FOOT

TRENCH PROFILE

DETAIL FOR CEMENT TREATED FILL AT WATER MAIN / SEWER LINE CROSSING WHENEVER SEWER LINE IS ABOVE WATER MAIN.

6/C5 PIPE ENCASEMENT DETAIL

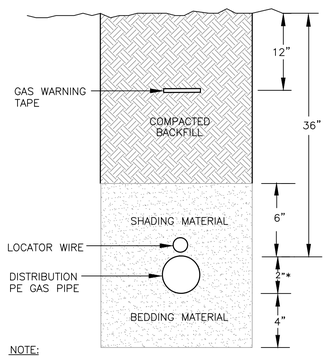
SCALE: NTS



NOTES:
1. WHEN ELECTRICAL CONDUCTORS CROSS OVER OR UNDER WATER AND/OR GAS PIPES THERE SHALL BE A MINIMUM OF 12" VERTICAL SEPARATION. IN ADDITION, THE ELECTRICAL CONDUCTORS SHALL BE PROTECTED WITH NOT LESS THAN 48" OF SUITABLE PVC OR RIGID STEEL CONDUIT WITH NO LESS THAN 24" ON EITHER SIDE OF THE CROSSING.
2. CONSUMER INSTALLED CONDUIT MUST BE INSPECTED BY LV ENERGY PRIOR TO BACKFILLING. IF NOT INSPECTED, TRENCH MAY BE REJECTED.
3. ALL TRENCHES ARE TO BE INSPECTED PRIOR TO BACKFILLING.
4. BEDDING AND SHADING MATERIAL MUST BE SMOOTH, FREE OF ROCKS, AND MUST BE ABLE TO SIFT THROUGH A 1/4" SCREEN (SAND RECOMMENDED).

7/C5 ELECTRIC TRENCH DETAIL

SCALE: NTS



NOTE:
BEDDING & SHADING MATERIAL SHALL BE SMOOTH, FREE OF ROCKS AND MUST BE ABLE TO SIFT THROUGH A 1/4" SCREEN (SAND RECOMMENDED)

* GAS PIPE DIAMETER WILL VARY

8/C5 NATURAL GAS TRENCH DETAIL

SCALE: NTS

FINAL DEVELOPMENT PLANS

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P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

DRAWING TITLE: Civil Design
Civil Utility Details

JOB TITLE: Berlin Architects
Property Redevelopment
1225 Gregory Lane

DRAWING NO: C5

JOB NO: 15-140-01

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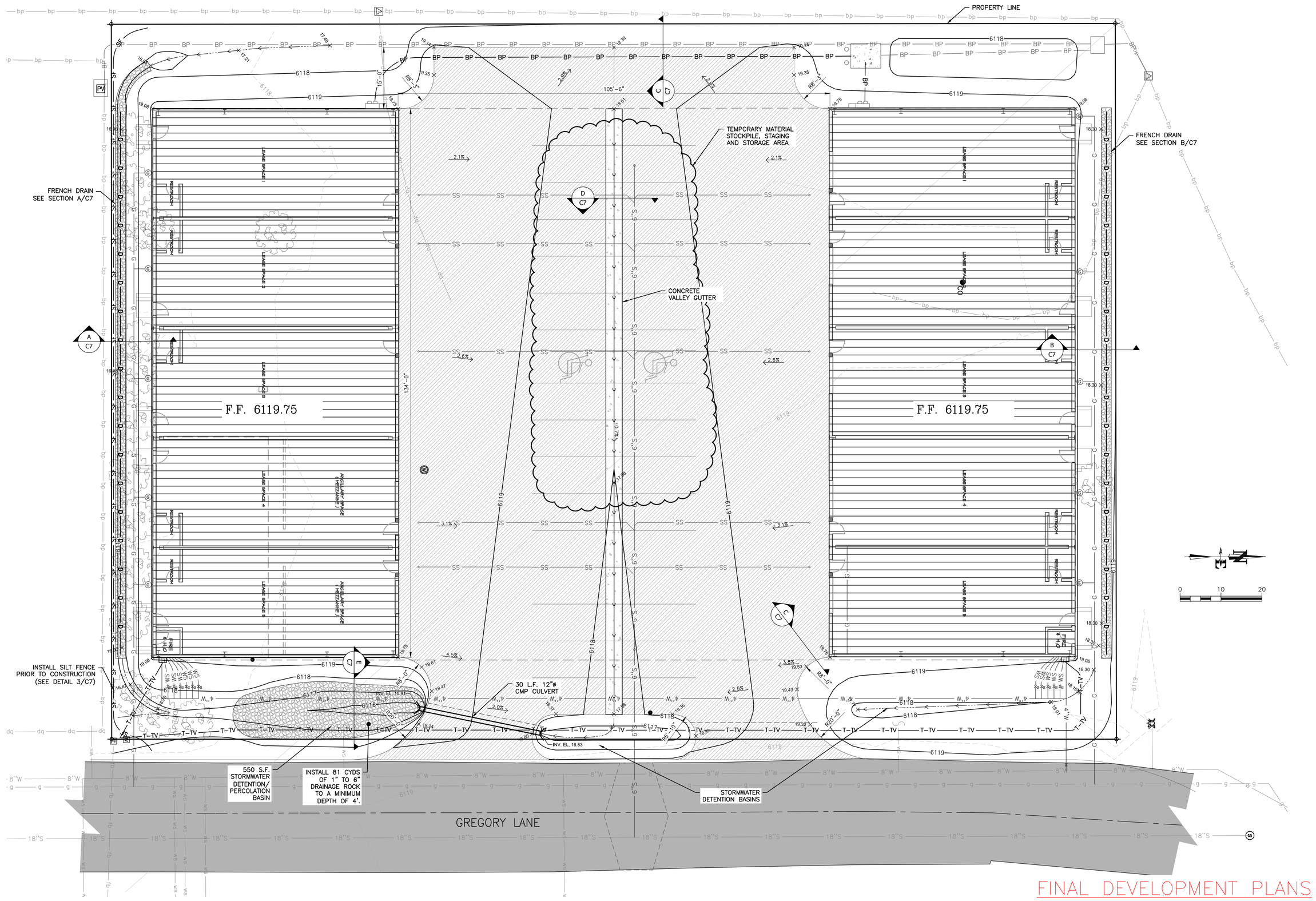

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DRAWING TITLE
Civil Design
Grading Plan

JOB TITLE
Berlin Architects
Property Redevelopment
1225 Gregory Lane

DRAWING NO C8

JOB NO 15-140-01

FINAL DEVELOPMENT PLANS

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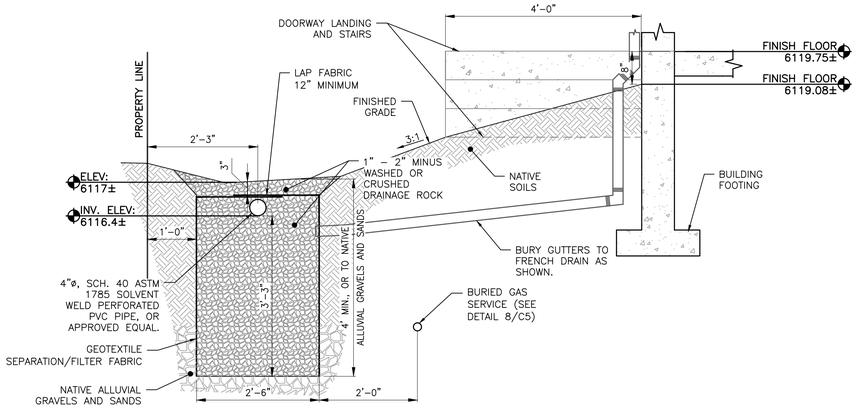
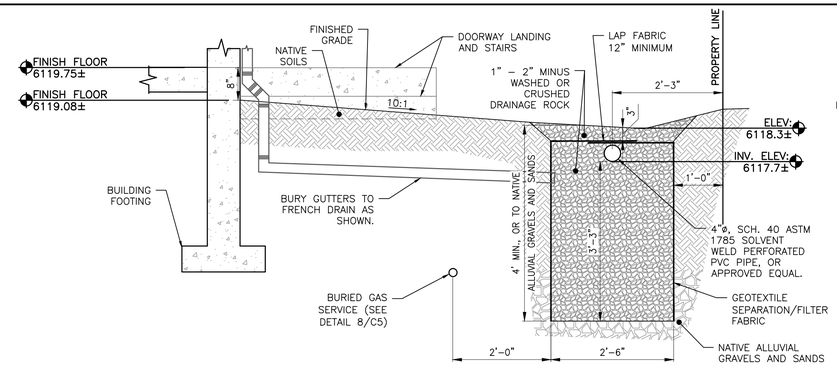


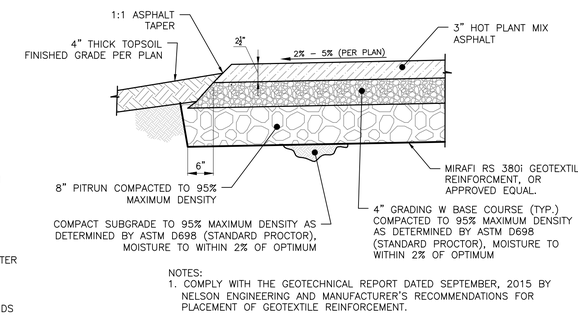
A / C7 FRENCH DRAIN SECTION A

SCALE: NTS



B / C7 FRENCH DRAIN SECTION B

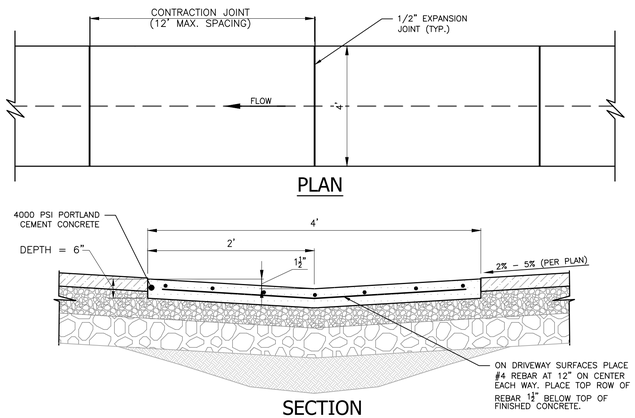
SCALE: NTS



NOTES:
1. COMPLY WITH THE GEOTECHNICAL REPORT DATED SEPTEMBER, 2015 BY NELSON ENGINEERING AND MANUFACTURER'S RECOMMENDATIONS FOR PLACEMENT OF GEOTEXTILE REINFORCEMENT.

C / C7 PAVING SECTION C

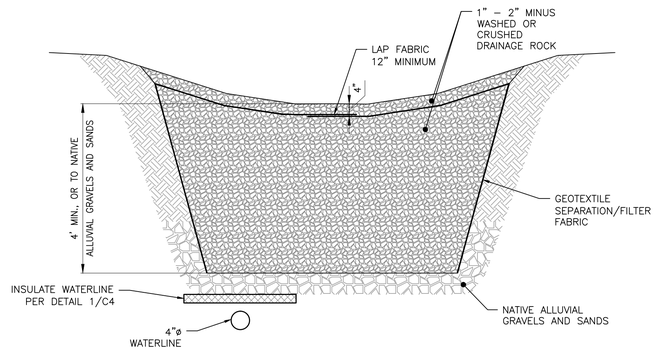
SCALE: NTS



NOTES:
1. CONSTRUCT VALLEY GUTTER AFTER AGGREGATE BASE COURSES ARE COMPLETE AT LOCATIONS REQUIRED. INSTALL ASPHALT, BASE COURSE AND SUB-BASE PER SECTION C/C7.

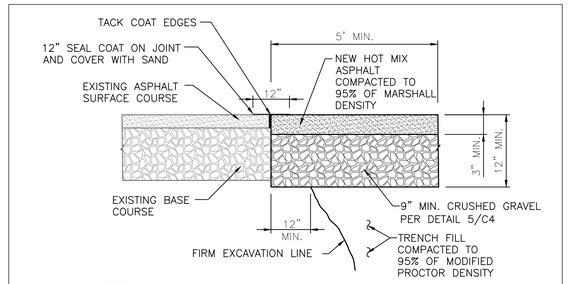
D / C7 VALLEY GUTTER AND CURB TURN FILLET

SCALE: NTS



E / C7 DETENTION/PERCOLATION BASIN DETAIL

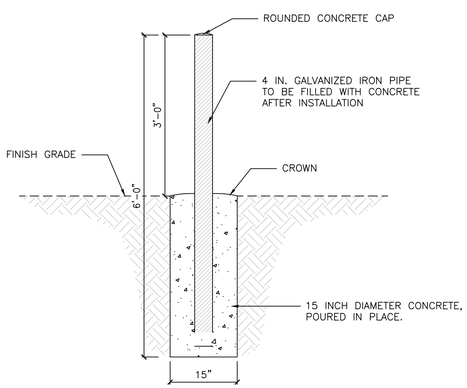
SCALE: NTS



NOTES:
1. BITUMINOUS MATERIAL SHALL MEET THE APPLICABLE REQUIREMENTS OF SECTION 02545 BITUMINOUS MATERIALS OF WYOMING PUBLIC WORKS STANDARDS AND SPECIFICATIONS
2. REPLACEMENT ASPHALT THICKNESS SHALL BE 1" GREATER THAN EXISTING AND NO LESS THAN 3" MINIMUM.
3. ASPHALT SHALL BE PLACED IN TWO (2) LIFTS, EACH NO LESS THAN 1½" IN THICKNESS, AND COMPACTED TO 95% OF MARSHALL DENSITY.

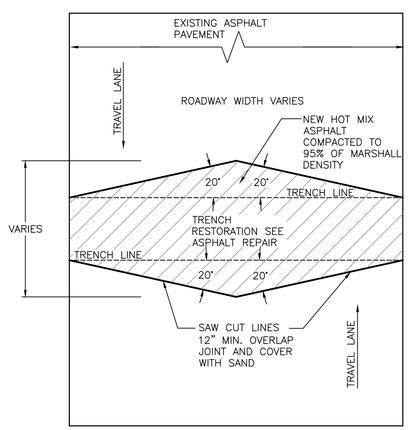
1 / C7 ASPHALT PATCH REPAIR SECTION

ST-118 DATE: 12/5/12 SCALE: NTS



F / C7 BOLLARD

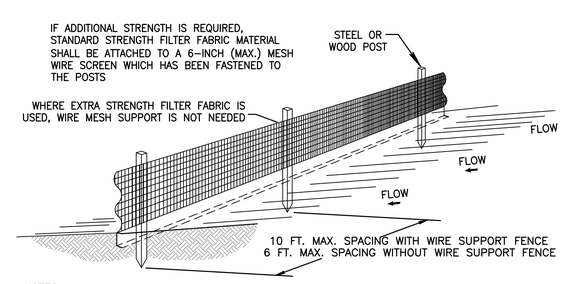
SCALE: NTS

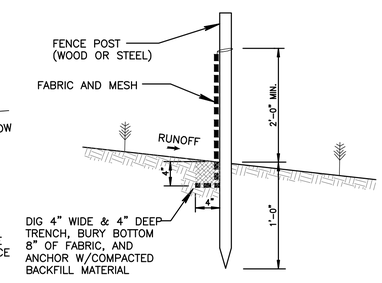


NOTES:
1. 20' DIAMOND PATCH TO BE CONSTRUCTED WHEN REQUIRED BY PUBLIC WORKS DEPARTMENT.
2. PLACEMENT OF ASPHALT SHALL BE 1" GREATER THAN EXISTING AND NO LESS THAN 3" MIN. ALSO SEE THE ASPHALT PATCH REPAIR DETAIL 1/C7.
3. HOT MIX ASPHALT SHALL MEET THE APPLICABLE REQUIREMENTS OF WYOMING PUBLIC WORKS STANDARDS AND SPECIFICATIONS FOR BITUMINOUS MATERIALS.
4. ALTERNATIVE HOURGLASS LAYOUT MAY BE USED UPON APPROVAL BY TOWN.

2 / C7 TRENCH RESTORATION DETAIL

ST-117 DATE: 12/5/12 SCALE: NTS





SILT FENCE SECTION

NOTES:
1. THE HEIGHT OF A SILT FENCE SHALL NOT EXCEED 36 INCHES (90 CM).
2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS.
3. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET (3 M) APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 12 INCHES (30 CM). WHEN EXTRA STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL NOT EXCEED 6 FEET (1.8 M).
4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES (10 CM) WIDE AND 4 INCHES (10 CM) DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER.
5. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH (25 MM) LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 2 INCHES (5 CM) AND SHALL NOT EXTEND MORE THAN 36 INCHES (90 CM) ABOVE THE ORIGINAL GROUND SURFACE.
6. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 8 INCHES (20 CM) OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES (90 CM) ABOVE THE ORIGIONAL GROUND SURFACE.
7. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.
8. FABRIC AND INSTALLATION TECHNIQUES TO BE APPROVED BY ENGINEER.

3 / C7 SILT FENCE INSTALLATION DETAIL

FINAL DEVELOPMENT PLANS

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DRAWING TITLE: Civil Design
Civil Details

JOB TITLE: Berlin Architects
Property Redevelopment
1225 Gregory Lane

DRAWING NO: C7

JOB NO: 15-140-01

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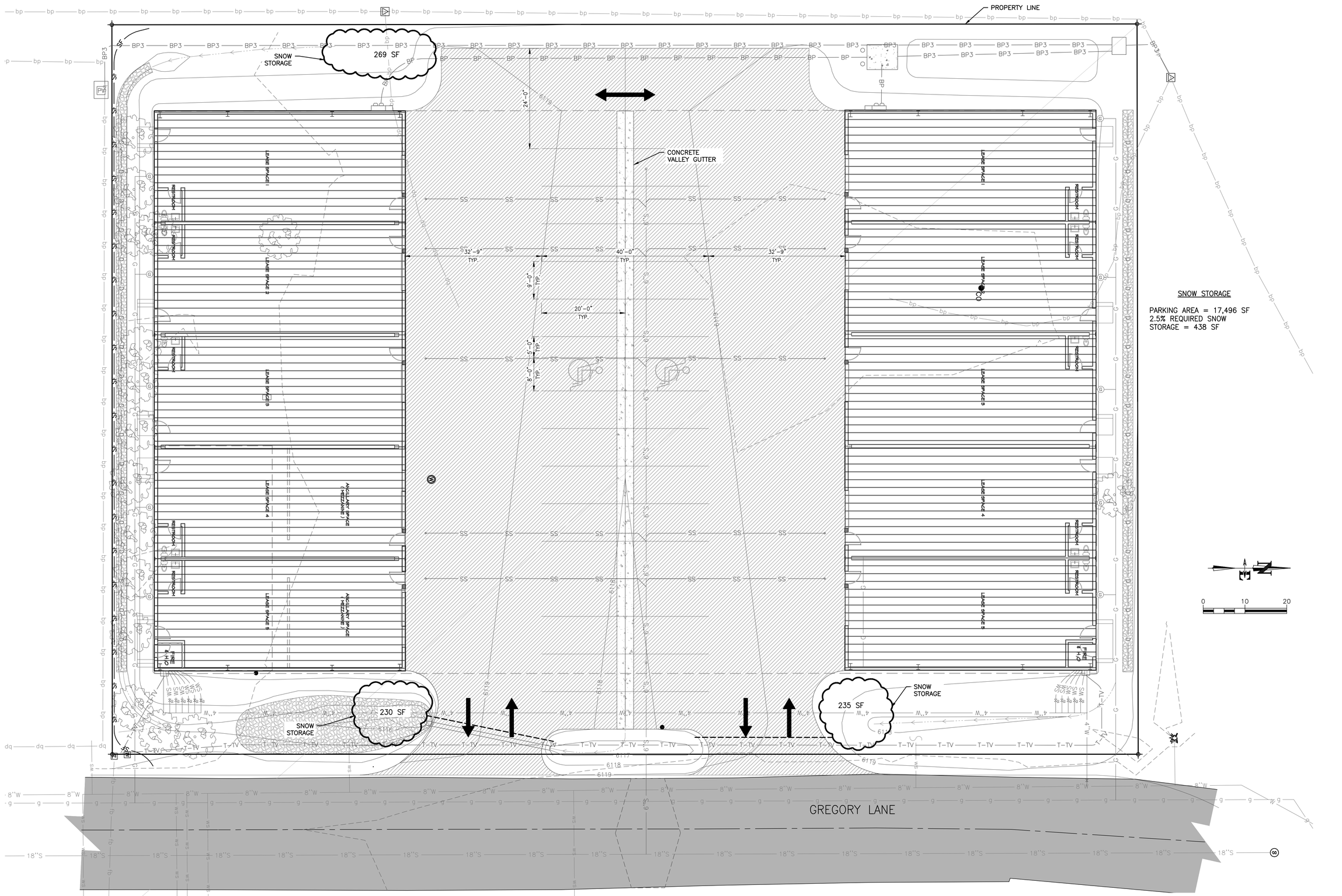

SNOW STORAGE

PARKING AREA = 17,496 SF
2.5% REQUIRED SNOW
STORAGE = 438 SF

FINAL DEVELOPMENT PLANS

		REV.
DATE	8/02/2015	9/9/2015
SURVEYED	ne	
ENGINEERED	dd	
DRAWN		
CHECKED		
APPROVED		

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

DRAWING TITLE
Civil Design
Parking Plan

JOB TITLE
Berlin Architects
Property Redevelopment
1225 Gregory Lane

DRAWING NO C8

JOB NO 15-140-01

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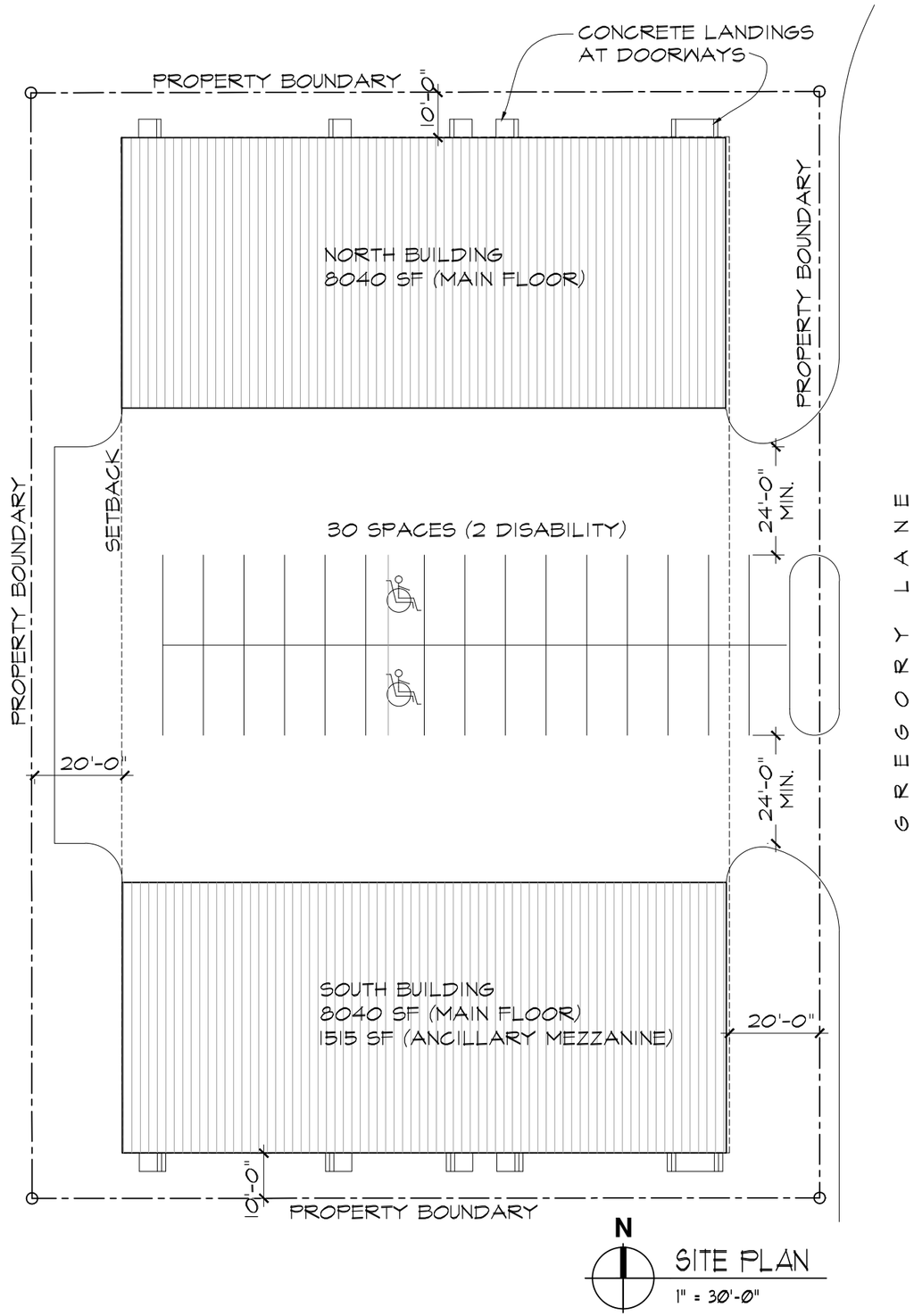
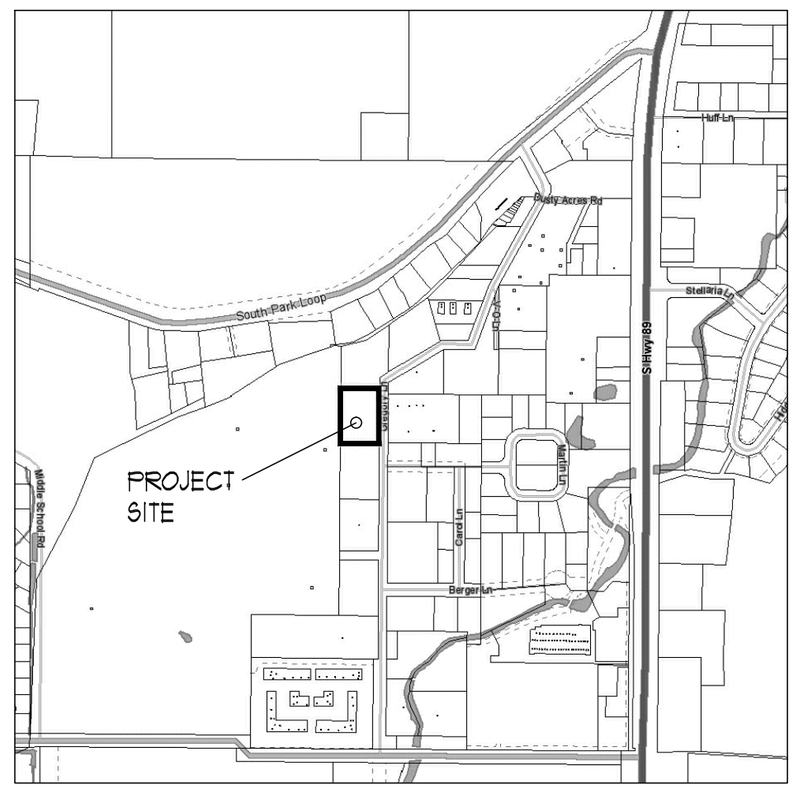


SITE PLAN
1" = 30'-0"

DEVELOPMENT STATISTICS

	ALLOWED	PROPOSED
ZONING:	BUSINESS PARK - TOWN OF JACKSON	-
USE:	LIGHT INDUSTRY	-
SITE AREA:	42,918.95 SF (.98 ACRES)	-
SETBACKS:	FRONT & REAR = 20' SIDE = 10'	AS REQUIRED
FAR RATIO:	.41 (17,596 SF MAX.)	17,595 SF
MIN LSR:	.15 (6,437 SF MIN.)	9106 SF
MAX HEIGHT:	35 FT. & MAX 2 STORIES	25 FT. & 1 STORY
PARKING:	18 SPACES MIN. (1 / 1000 SF) 1 DISABILITY SPACE REQUIRED	30 TOTAL (2 DISABILITY)



VICINITY MAP

NOT TO SCALE

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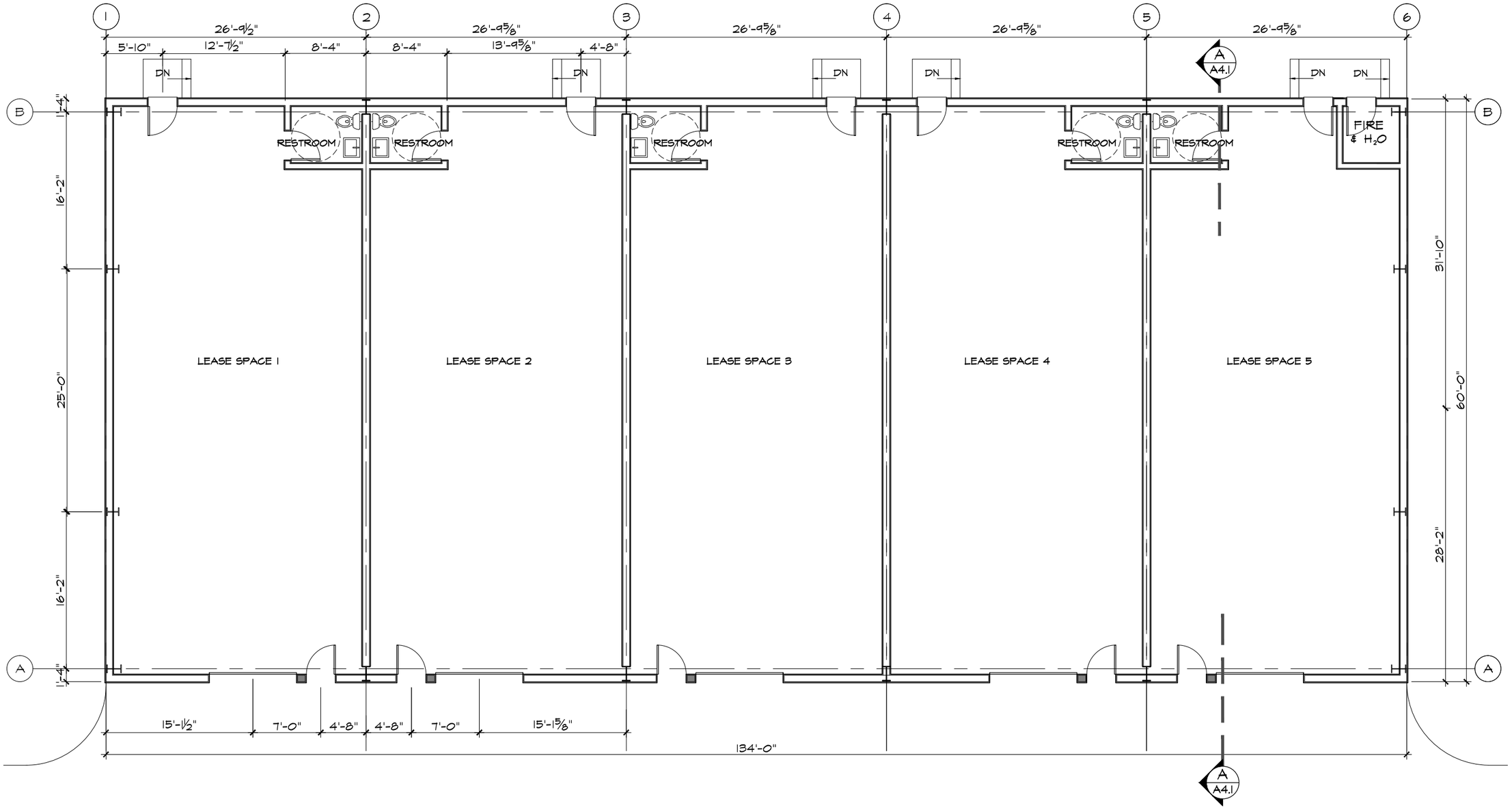
GREGORY LANE, JACKSON, WYOMING

DATE:
SEP 9, 2015
REVISIONS:

A1.1

SITE PLAN



NORTH BLDG. - MAIN LEVEL PLAN

3/32" = 1'-0"

SOUTH BUILDING SIMILAR

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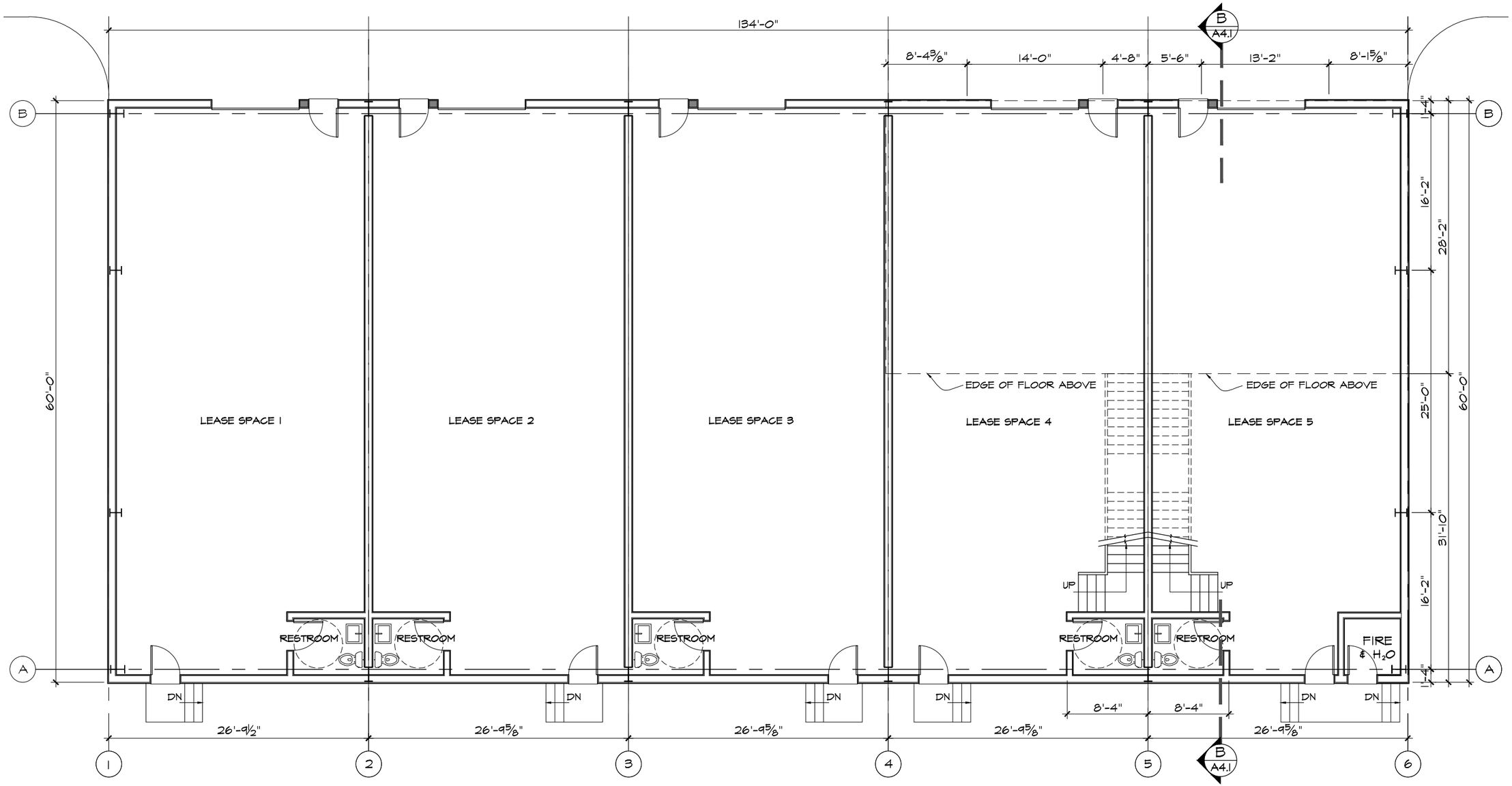
DATE:
SEP 9, 2015

REVISIONS:

A2.1

NORTH BLDG.
MAIN LEVEL
FLOOR PLAN



SOUTH BLDG. - MAIN LEVEL PLAN

3/32" = 1'-0"

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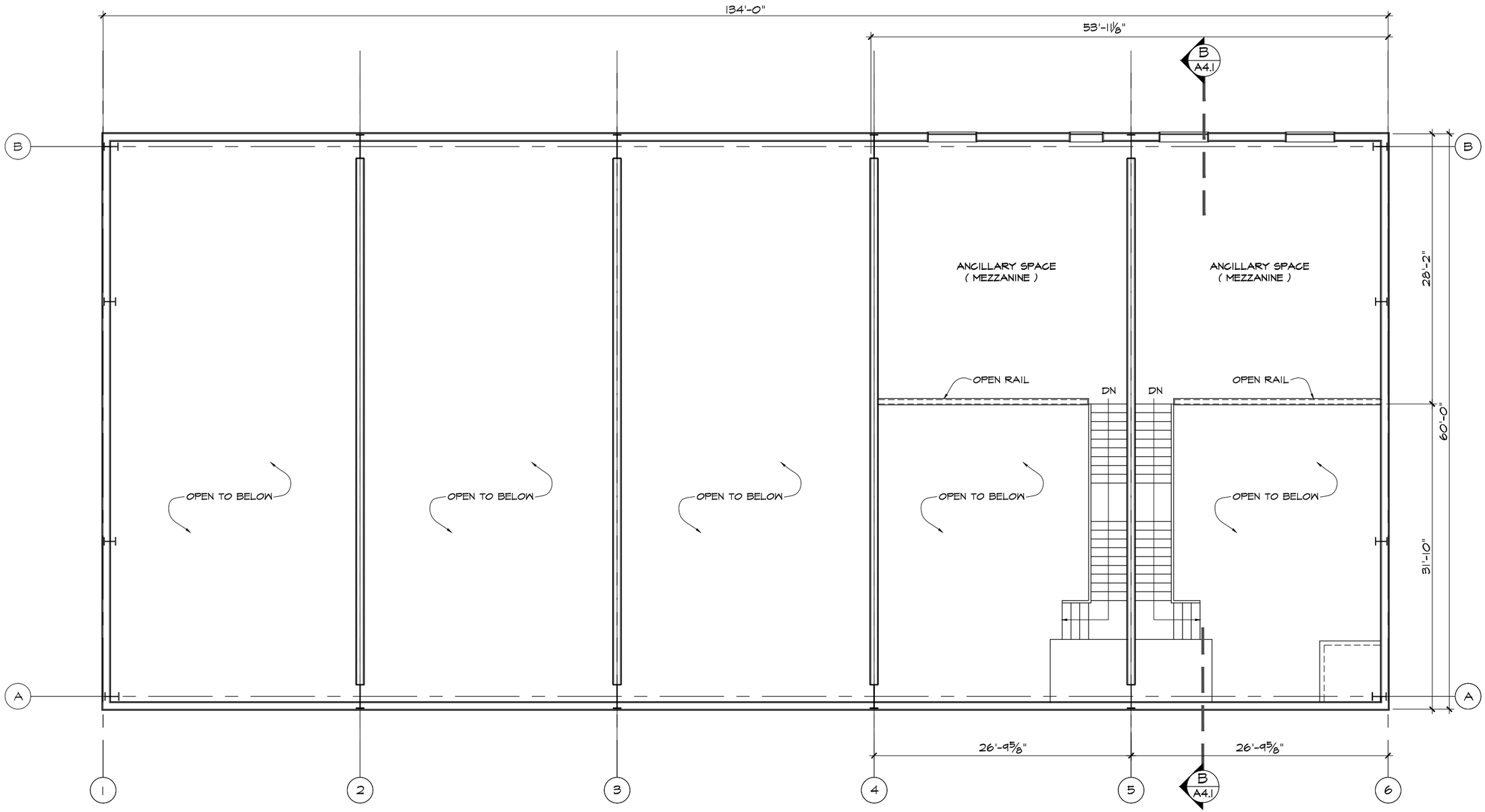
DATE:
SEP 9, 2015

REVISIONS:

A2.2

SOUTH BLDG.
MAIN LEVEL
FLOOR PLAN



SOUTH BLDG. - MEZZANINE PLAN

3/32" = 1'-0"

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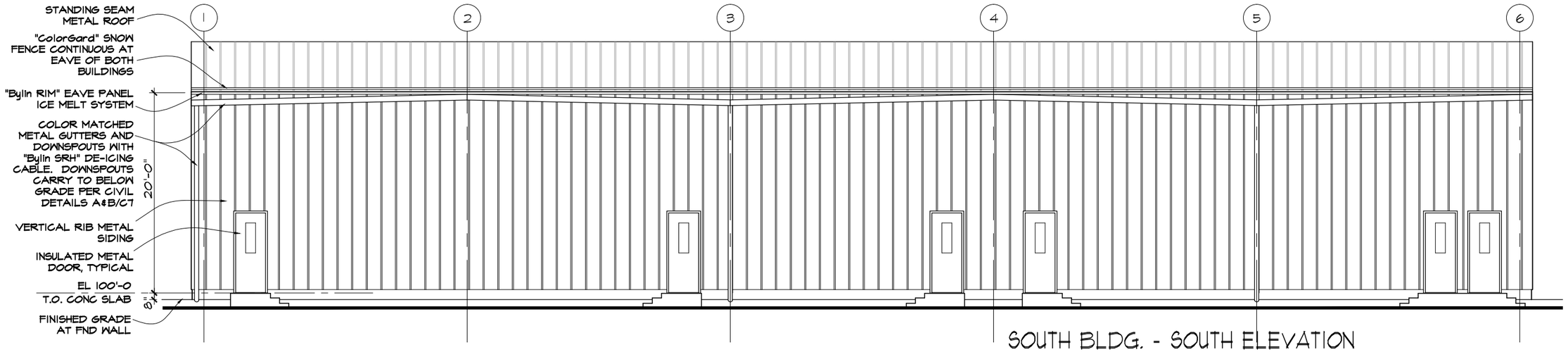
DATE:
SEP 9, 2015

REVISIONS:

A2.3

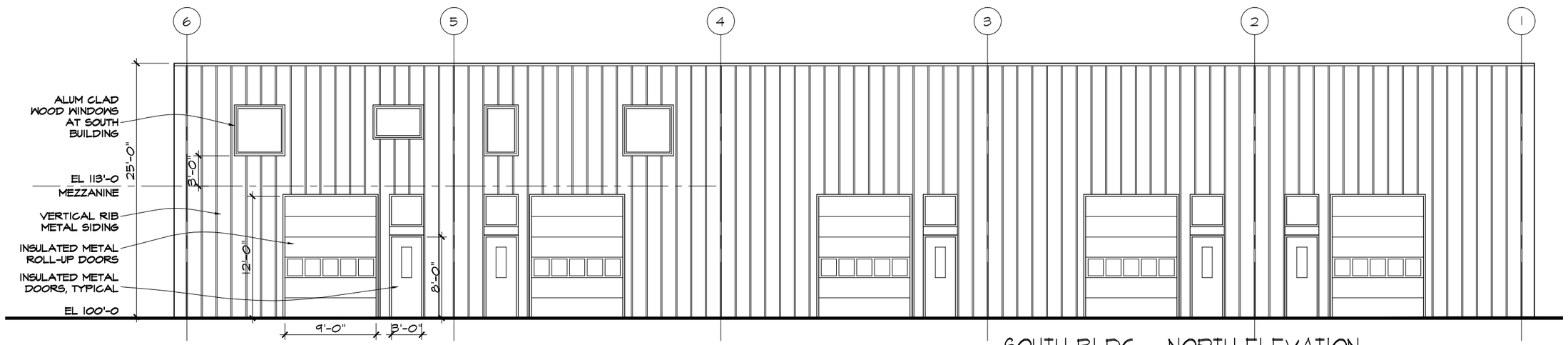
NORTH BLDG.

MEZZANINE FLOOR PLAN



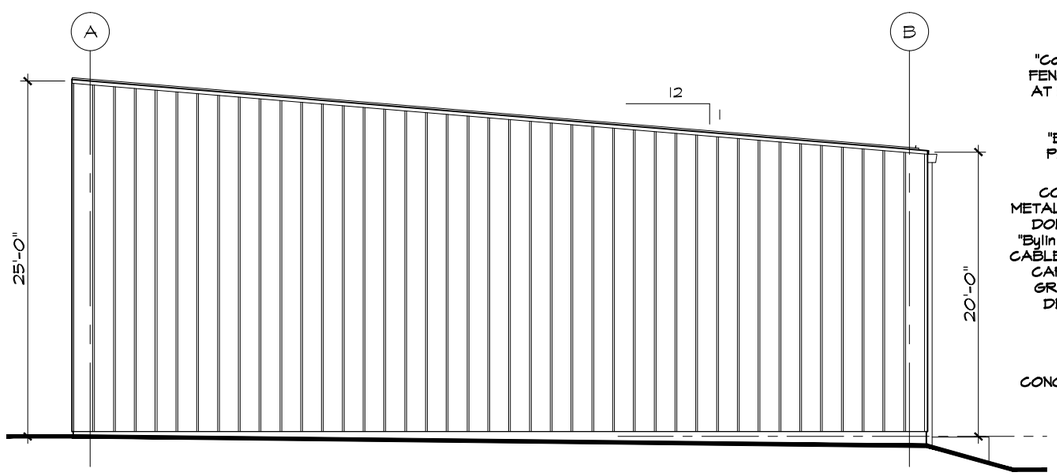
SOUTH BLDG. - SOUTH ELEVATION

3/32" = 1'-0"



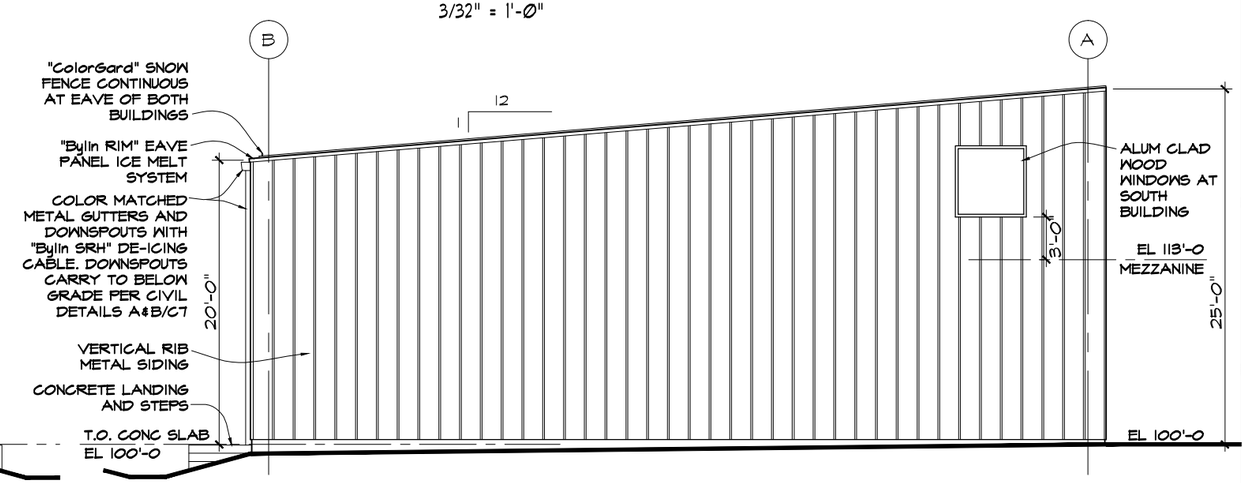
SOUTH BLDG. - NORTH ELEVATION

3/32" = 1'-0"



SOUTH BLDG. - WEST ELEVATION

3/32" = 1'-0"



SOUTH BLDG. - EAST ELEVATION

3/32" = 1'-0"

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SEP 9, 2015

REVISIONS:

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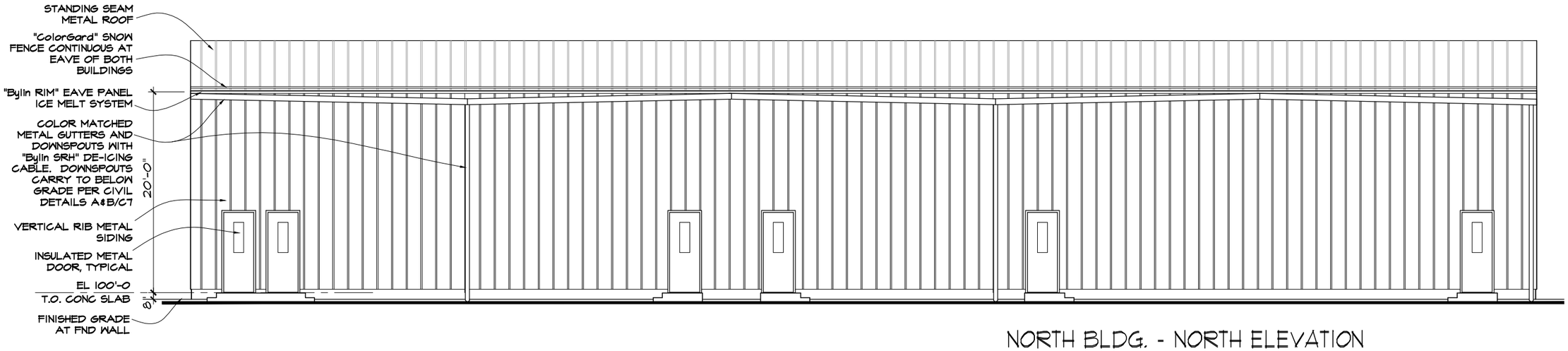
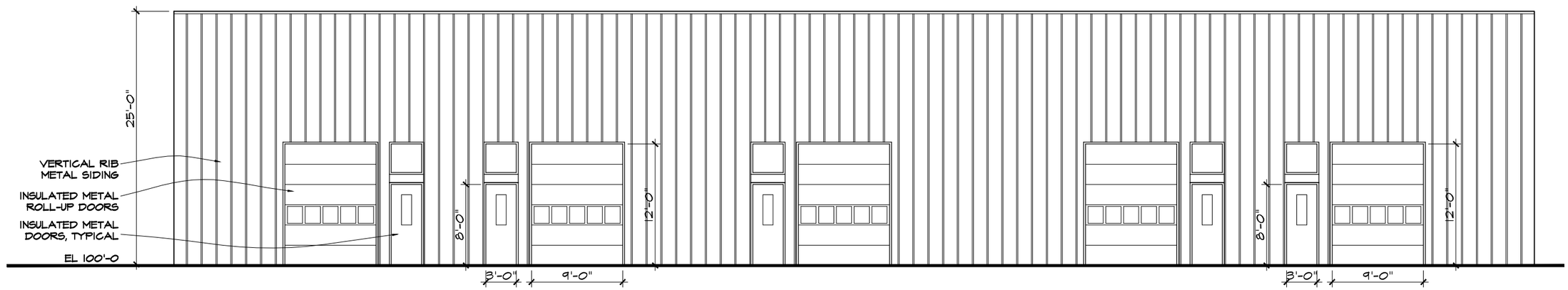
SOUTH BLDG.
ELEVATIONS



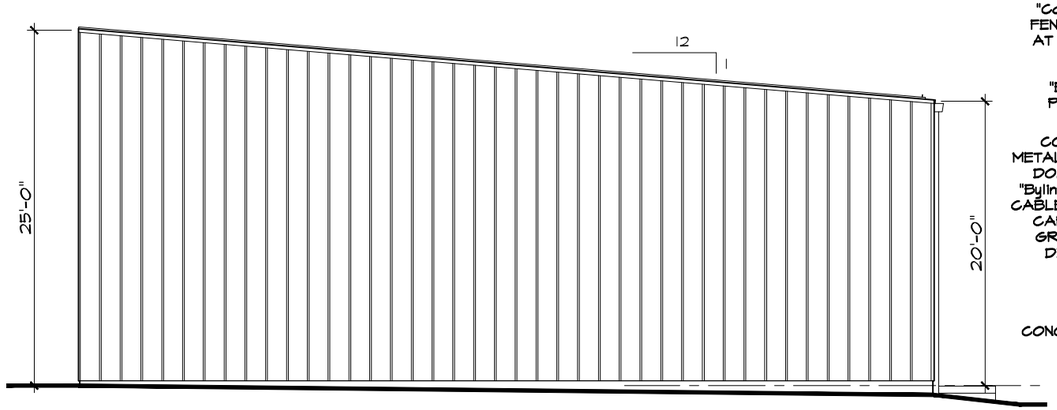
NORTH BLDG. - NORTH ELEVATION

3/32" = 1'-0"



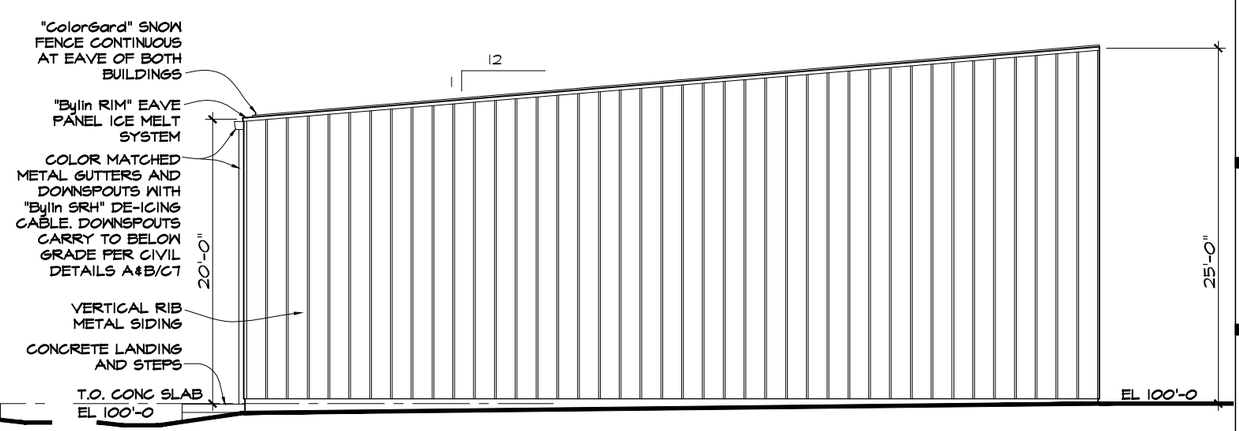
NORTH BLDG. - SOUTH ELEVATION

3/32" = 1'-0"



NORTH BLDG. - EAST ELEVATION

3/32" = 1'-0"



NORTH BLDG. - WEST ELEVATION

3/32" = 1'-0"

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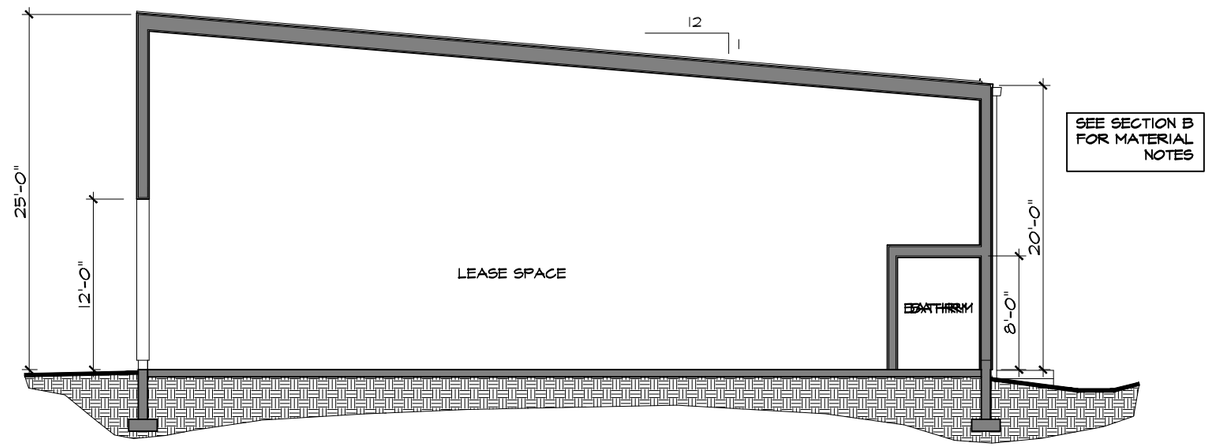
REVISIONS:

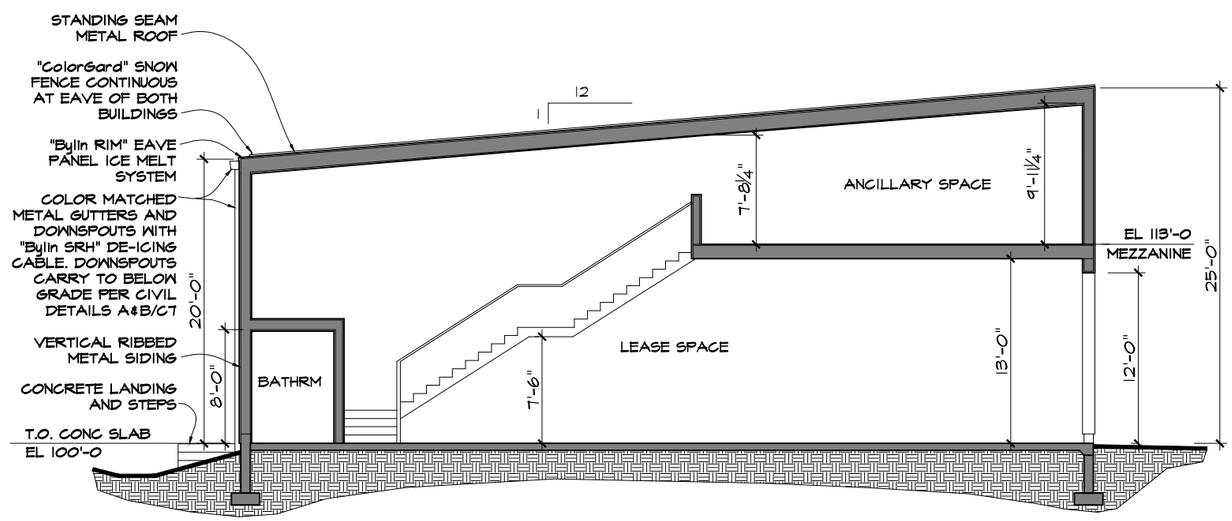
A3.2

NORTH BLDG.
ELEVATIONS



NORTH BLDG. - SECTION A

3/32" = 1'-0"



SOUTH BLDG. - SECTION B

3/32" = 1'-0"

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SEP 9, 2015

REVISIONS:

A4.1

SECTIONS

ROOF RUNOFF & DETENTION

Objective: Determine maximum volume based runoff from proposed buildings and size french drain to both capture and infiltrate all runnoff during estabished TOJ 100-yr storm at the storm duration resulting in the net maximum volume (volume of runoff minus infiltrated volume) required for detianment. Computations below are for one building (north or south).

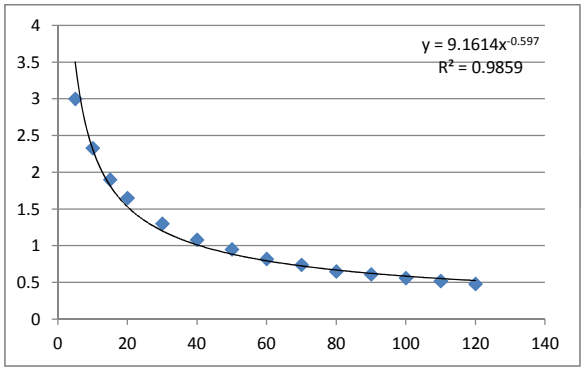
ROOF CALCULATIONS		
ROOF AREA - ONE ROOF (FT^2)	8080	
C-VALUE =	0.9	
S =	8%	
L (ft) =	60	
t_c (min) =	1.38	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

LAWN CALCULATIONS		
LAWN AREA (FT^2)	1520	
C-VALUE =	0.3	
S =	3.00%	
L (ft) =	2	
t_c (min) =	1.41	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

Total Time of Conc., Tc =	**2.79**	**min**
Composite C_c =	**0.81**	
Total Area, A_t =	**9600**	**ft^2**

TABLE 4920.B
JACKSON IDF* CURVE DATA - 100-YR STORM EVENT

DURATION, T_d (min)	INTENSITY, I (in/hr)
5	3
10	2.33
15	1.9
20	1.65
30	1.3
40	1.08
50	0.95
60	0.82
70	0.74
80	0.65
90	0.61
100	0.56
110	0.52
120	0.48



Maximum Flow Rate, Q_f (cfs) = 0.89 cfs at tc = 2.79

$Q_f = C_c*I*A_t/(43200)$

where,

Composite Cc =	0.81		
Intensity, I =	4.97	in/hr at T_d =	2.79
Total Area, At =	9600	ft^2	

Size French Drain to Capture and Infiltrate Roof Runnoff

(1) DURATION, T_d (min)	(2) INTENSITY, I (in/hr)	(3) Flow Rate, Qf (cfs)	(4) Volume of Runoff, Vf (ft^3)	(5) Volume Infiltrated by French Drain over Storm Duration, V_i(ft^3)	(6) Volume to Detain, V_d (ft^3)	
5	3	0.54	161	7.0	154.0	
10	2.33	0.42	250	14.0	236.1	
15	1.9	0.34	306	20.9	285.0	
20	1.65	0.30	354	27.9	326.3	
30	1.3	0.23	419	41.9	376.7	
40	1.08	0.19	464	55.8	407.8	
50	0.95	0.17	510	69.8	440.0	**Maximum Volume to Detain**
60	0.82	0.15	528	83.8	444.3	
70	0.74	0.13	556	97.7	458.3	
80	0.65	0.12	558	111.7	446.5	
90	0.61	0.11	589	125.6	463.6	
100	0.56	0.10	601	139.6	461.5	
110	0.52	0.09	614	153.5	460.4	
120	0.48	0.09	618	167.5	450.7	

Equations (Note: Some parameters are provided below under "French Drain Sizing".

Column 1	Same as TABLE 4920.B
Column 2	Same as TABLE 4920.B
Column 3	$Q_f = C_c*I*A_t/(43200)$
Column 4	$V_f = Q_f*T_d*60$
Column 5	$V_i = A_e*P_r*T_d$ (see below for Ae & Pr)
Column 6	$V_d = V_f-V_i$

French Drain Sizing

French Drain Length	**134**	**ft**			
French Drain Width	**2.5**	**ft**			
French Drain Depth	**4**	**ft**			
French Drain Area	335	ft^2			
French Drain Effect Area (include side wall), A_e	335	ft^2 (Note: Effective wall depth is assumed to be a conservative 2' based on soil profiles provided in the geotech report.)			
Perc Rate	20	min./inch - actual perc rate based on test conducted by Nelson is 6.5 min./inch resulting in a factor of safety of 3			
Perc Rate, P_r	0.0042	ft/min			
Infiltration Rate for given Basin Area	0.023	cfs			
% Void Space	35%				
Volume of Washed Rock Req'd (Max. Vd / % Void Space)	**1257**	**cu. ft**	**or**	**47**	**cu. yrds.**
Volume of Washed Rock Provided	**1340**	**cu. ft**	**or**	**50**	**cu. yrds.**
Storage Safety Factor	**1.1**				

Note: Factor of safety based on perc rate is 3. Actual factor of safety is likely higher since the hydrostatic head of pooled water within the infilatration basin is not accounted for. Safety factor for detaining volumetric runoff is 1.3.

PRE-DEVELOPMENT

ROOF CALCULATIONS		
ROOF AREA (FT^2)=	7970	
C-VALUE =	0.9	
S =	25%	
L (ft) =	30	
t_c (min) =	0.67	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

DRIVEWAY CALCULATIONS		
DRIVEWAY AREA (FT^2)=	16000	
C-VALUE =	0.9	
S =	0.68%	
L (ft) =	295	
t_c (min) =	7.02	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

LAWN CALCULATIONS		
LAWN AREA (FT^2)	18920	
C-VALUE =	0.3	
S =	0.68%	
L (ft) =	100	
t_c (min) =	16.36	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

Total Time of Conc., Tc =	**24.06**	**min**
Composite C_c =	**0.64**	
Total Area, A_t =	**42890**	**ft^2**

TABLE 4920.B
JACKSON IDF* CURVE DATA - 100-YR STORM EVENT

DURATION, T_d (min)	INTENSITY, I (in/hr)
5	3
10	2.33
15	1.9
20	1.65
30	1.3
40	1.08
50	0.95
60	0.82
70	0.74
80	0.65
90	0.61
100	0.56
110	0.52
120	0.48

Initial Flow Rate, Q_i (cfs) =	**0.95**	**cfs at tc =**	**24.06**

$Q_i = C_c*I*A_t/(43200)$

where,

Composite Cc =	0.64		
Intensity, I =	1.45	in/hr at T_d =	24.06
Total Area, At =	42890	ft^2	

POST-DEVELOPMENT

ROOF CALCULATIONS			
ROOF AREA (FT^2)	16,160	Roof 1	8080
C-VALUE =	0.9	Roof 2	8080
S =	8%		
L (ft) =	60		
t_c (min) =	1.38		tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

*Note: Runoff from the roof has been fully detained according to previous calculations, therefore, quantities above for future buildings are not included in the computations below.

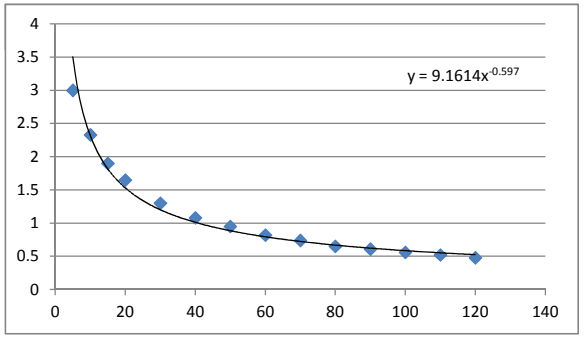
DRIVEWAY CALCULATIONS		
DRIVEWAY AREA (FT^2)=	17,308	
C-VALUE =	0.9	
S =	1.00%	
L (ft) =	200	
t_c (min) =	5.09	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

LAWN CALCULATIONS		
LAWN AREA (FT^2)	9,422	
C-VALUE =	0.3	
S =	0.70%	
L (ft) =	200	
t_c (min) =	22.94	tc = 1.8(1.1 - C)L^.5/S^0.3333, (Corps of Eng. Eqn.)

Total Time of Conc., Tc =	**28.03**	**min**
Composite C_c =	**0.69**	
Total Area, A_t =	**26,730**	**ft^2**

TABLE 4920.B
JACKSON IDF* CURVE DATA - 100-YR STORM EVENT

DURATION, T_d (min)	INTENSITY, I (in/hr)
5	3
10	2.33
15	1.9
20	1.65
30	1.3
40	1.08
50	0.95
60	0.82
70	0.74
80	0.65
90	0.61
100	0.56
110	0.52
120	0.48



Post Flow Rate, Q_f (cfs) =	**0.53**	**cfs at tc =**	**28.03**

$Q_f = C_c*I*A_t/(43200)$

where,

Composite Cc =	0.69		
Intensity, I =	1.25	in/hr at T_d =	28.03
Total Area, At =	26,730	ft^2	

Peak Volume at Storm Duration for Pre-Post Development

(1) DURATION, T_d (min)	(2) INTENSITY, I (in/hr)	(3) Pre Development Flow Rate, Qi (cfs)	(4) Pre Development Volume of Runoff, Vi (ft^3)	(5) Post Development Flow Rate, Qf (cfs)	(6) Post Development Volume of Runoff, Vf (ft^3)	(7) Pre and Post Dev. Diff., Vd (ft^3)	(8) Volume Infiltrated by Perc. Bed over Storm Duration, V_{inf} (ft^3)	(9) Total Volume Storage + Infiltration Ability V_T (ft^3)	(10) Volume Not Detained (V_T-V_f in ft^3)
5	3	1.89	568	1.28	383	-184.3	13.4	1242.4	All Stored
10	2.33	1.47	882	0.99	596	-286.2	26.8	1255.8	All Stored
15	1.9	1.20	1079	0.81	728	-350.1	40.2	1269.2	All Stored
20	1.65	1.04	1249	0.70	844	-405.4	53.7	1282.7	All Stored
30	1.3	0.82	1476	0.55	997	-479.1	80.5	1309.5	All Stored
40	1.08	0.68	1635	0.46	1104	-530.7	107.3	1336.3	All Stored
50	0.95	0.60	1798	0.40	1214	-583.5	134.1	1363.1	All Stored
60	0.82	0.52	1862	0.35	1258	-604.4	161.0	1390.0	All Stored
70	0.74	0.47	1960	0.32	1324	-636.4	187.8	1416.8	All Stored
80	0.65	0.41	1968	0.28	1329	-638.8	214.6	1443.6	All Stored
90	0.61	0.38	2078	0.26	1403	-674.4	241.4	1470.4	All Stored
100	0.56	0.35	2119	0.24	1431	-688.0	268.3	1497.3	All Stored
110	0.52	0.33	2165	0.22	1462	-702.7	295.1	1524.1	All Stored
120	0.48	0.30	2180	0.20	1472	-707.6	321.9	1550.9	All Stored

Equations (Note: Some parameters are provided below under "Detention Basin Storage Volume."

Column 1	Same as TABLE 4920.B
Column 2	Same as TABLE 4920.B
Column 3	$Q_i = C_c*I*A_t/(43200)$
Column 4	$V_i = Q_i*T_d*60$
Column 5	$Q_f = C_c*I*A_t/(43200)$
Column 6	$V_f = Q_f*T_d*60$
Column 7	$V_d = V_f - V_i$
Column 8	Vinf = Ae*Pr*Td (see below for Ae & Pr)
Column 9	$V_T = V_B + V_{inf}$

Detention Basin Storage Volume

North Basin	26	CYDS	
Middle Basin	4	CYDS	
South Basin	41.5	CYDS (includes 35% void space between rock)	
Total (V_B)	**1229**	**(ft^3)**	assume just south and middle basins are utilized

Perc. Bed Sizing

Perc Bed Area	**550**	**ft**			
Perc Bed Depth	**4**	**ft**			
French Drain Volume	2200	ft^3			
Perc. Bed Effective Area (include side wall), A_e	644	ft^2 (Note: Effective wall depth is assumed to be a conservative 2' based on soil profiles provided in the geotech report.)			
Perc Rate	20	min./inch - actual perc rate based on test conducted by Nelson is 6.5 min./inch resulting in a factor of safety of 3			
Perc Rate, P_r	0.0042	ft/min			
Infiltration Rate for given Basin Area	0.045	cfs			
% Void Space	35%				
Volume of Washed Rock Provided	**2200**	**cu. ft**	**or**	**81**	**cu. yrds.**

A comparison of both pre and post runnoff volumes (see table above) demonstrate that post runoff volumes are now less than pre runoff volumes. Results are a reflection of the fact that runoff from the proposed buildings will be fully detained as described in previous calculations. Although additional runoff detainment/storage is not required, it is felt that providing additional detention basins for capturing and percolating parking/driveway runnoff would better fit the overall drainage plan. Drainage basins and the percolation basin shown adjacent to Gregory Lane are designed to detain/percolate all water for 100-yr storms with 120-minute storm durations or less (see column 10 in table above). Note: Factor of safety based on percolation rate used and actual percolation rate is 3. Actual factor of safety is likely higher since the hydrostatic head of pooled water within the infilatration basin is not accounted for.

Project:	1225 Gregory Lane	Date:	8/20/2015
Job Number:	15-140-02	Tested By:	AP
Location:	Drainage Gallery Locations		

PTH-North				
Perc Trench Depth BGS (in)		49	Perc Hole Depth (in.)	12
Interval (min.)	**D @ t 0 (inches)**	**D @ t 1 (inches)**	**Drop (in)**	**Rate (Min/in)**
10	**49 3/8**	**51 7/8**	**2 4/8**	**4.00**
10	**50**	**52 3/8**	**2 3/8**	**4.21**
10	**49 4/8**	**52**	**2 4/8**	**4.00**
10	**50**	**52 3/8**	**2 3/8**	**4.21**
				Average Min/in
				4.11

PTH-South				
Perc Trench Depth BGS (in)		38	Perc Hole Depth (in.)	12
Interval (min.)	**D @ t 0 (inches)**	**D @ t 1 (inches)**	**Drop (in)**	**Rate (Min/in)**
10	**38**	**39 1/8**	**1 1/8**	**8.89**
10	**38 4/8**	**39 4/8**	**1**	**10.00**
10	**38**	**39 2/8**	**1 2/8**	**8.00**
10	**37 6/8**	**38 7/8**	**1 1/8**	**8.89**
				Average Min/in
				8.96

Average Infiltration between North and South Potholes	**6.53**

GEOTECHNICAL INVESTIGATION

COMMERCIAL DEVELOPMENT
1225 GREGORY LANE
JACKSON, WYOMING

PREPARED
FOR
HOKE & CO., LLC
WILSON, WYOMING

PREPARED
BY
NELSON ENGINEERING
JACKSON, WYOMING

SEPTEMBER 2015
Project No. 15-140-02

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GENERAL AND PROJECT DESCRIPTION

A geotechnical investigation was performed at 1225 Gregory Lane in Jackson, Wyoming to ascertain subsurface conditions and provide geotechnical recommendations for a proposed commercial redevelopment project. Project plans prepared by Berlin Architects include two structures, associated driveways, parking areas, and utilities. Proposed structures are nearly identical multi-unit buildings with one having a partial second story. Structures will be supported by shallow spread footings with a slab-on-grade. Geotechnical recommendations contained herein are a based project plans prepared by Berlin Architects as presented at the time of the report.

Scope of Services

The scope of services for this investigation was to provide geotechnical recommendations for the proposed structures and improvements based on a subsurface investigation and soils laboratory testing. Percolation testing was conducted in two locations at the site to obtain soil infiltration rates for storm drain infiltration appurtenance results. The results of the subsurface investigation were utilized in an engineering analysis for foundation and retaining wall recommendations. Laboratory tests were not conducted for the alluvial gravel and cobble deposits at the site. Slope stability analysis was not deemed necessary due to topography. .

The engineering analysis and resulting recommendations in this report are based on typical loads for the type of structures envisioned in the conceptual design. In the final design phase of the project, it is critical that structural loads are properly communicated to the geotechnical engineer to verify that the imposed loading conditions on the proposed foundation configuration will not cause excessive settlement, exceed the bearing capacity of the site soils, or exceed the seismic loading capacity of the foundation elements. Lateral earth pressure recommendations are not included in this report due to the planned slab-on-grade construction; it is critical that any future basement or retaining wall designs are reviewed and approved by this office. For this report, it is assumed that foundation elements would not be subjected to unusual loading conditions such as eccentric loads. Unusual load conditions can induce settlement or reduce the bearing capacity of foundation elements.

SITE CONDITIONS

Description

The project is located on a 1.01 acre nearly flat lot within the Town of Jackson. Currently the project site is occupied by a former veterinary clinic including paved areas, a barn, and a log cabin style office/clinic. The site is bounded on the north, south, and east by developed commercial lots and on the west by the High School Recreation Complex. Access is provided by Gregory Lane to the east. Flat Creek flows from north to south approximately 1000 feet south/southeast the property and the Leeks irrigation ditch flows from northeast to southwest approximately 250 feet north of the property.

Geologic and Soil Mapping
The area's surface geology is mapped on the USGS "Geologic Map of the Jackson Quadrangle, Teton County, Wyoming," Love, J.D., 2003. Mapped deposits are described as "Qfp-Flood-Plain Deposits-Sand, silt, clay, and minor lenses of gravel."

The USDA-NRCS Web-based Soil Survey of Teton County has mapped the Tineman gravelly loam within the property. Tineman gravelly loam soils are characterized as located on 0 to 3 percent slopes and formed of gravelly glaciofluvial deposits. The soil is described as very deep, somewhat poorly drained, and composed of gravelly loam, very gravelly sandy loam, and very gravelly sand with a depth to water table of 36 to 48 inches.

Seismic Hazard
Jackson Hole and the project site are located within the Intermountain Seismic Belt, a zone extending from southern Utah through eastern Idaho and western Montana, and encompassing western Wyoming and the Teton Range (Smith and Arabasz, 1991). The "Map of Quaternary Faults and Folds in Wyoming" (Machette et al, 2001) shows the following active faults near the project site: the Teton Fault, Philips Canyon Faults, East Gros Ventre Faults, Cache Creek Thrust Fault, Jackson Thrust Fault, and secondary faults in the Jackson Hole Valley. In particular, the Teton Fault is thought to be capable of producing major earthquakes of a magnitude of six or greater. The portion of the Teton Fault mapped as active in the Quaternary is approximately 6.7 miles northwest of the site. Multiple minor earthquakes with epicenters near the site have occurred in recent years (USGS Earthquake Database).

SITE INVESTIGATIONS

Field Investigations
On August 20, 2015, six test pits were excavated within and near the planned development. Percolation test trenches were excavated adjacent to TP-4 and TP-6. Test pit locations are shown on the **Test Pit Location Drawing in the Appendix**. Test pits were located approximately with a Trimble GPS unit. Test pit locations and depths were selected to determine subsurface conditions within the proposed structures. All test pits were backfilled with excavated material after logging was completed.

Fish Creek Excavation of Jackson, Wyoming, excavated the test pits with a John Deere 310SJ backhoe. Andy Pruett, a Professional Geologist at Nelson Engineering, logged the test pits and directed the sampling. Soils were classified in the field and logged by the geologist. The soil classifications, moisture conditions, and presence of organic or other notable features were recorded in the field logs. Bulk samples were sealed in plastic bags and transported to our laboratory for testing and further classification. Groundwater observations were made at the time of the excavation based on field observations of soil moisture conditions. Field observations are presented on the test pit logs in the Appendix.

The stratification lines shown on the test pit logs represent the approximate boundary between soil types. The actual in-situ transition may be either gradual or abrupt. Due to the nature and depositional characteristics of natural soils and fills, care should be taken in interpolating subsurface conditions beyond the location of the test pits. Soil conditions can

change rapidly in both the lateral and vertical directions. Groundwater conditions shown on the logs are only for the dates indicated.

The subsurface conditions were interpreted from the described test pits at the site. The soil properties inferred from the field assessments supported by our experience formed the basis for developing our conclusions and recommendations.

The soil samples stored in our laboratory will be discarded after 30 days from the date this report is submitted unless we receive a specific request to retain them.

SUBSURFACE CONDITIONS

Soil Profiles

Similar soil profiles were observed in all of the test pits. Existing site surfacing was encountered in all of the test pits except TP-4. Surfacing included asphalt and crushed base and crushed gravel fill in TP-1 and TP-2 and 4-inches of crushed base over native fine grained soils in TP-3, TP-5, and TP-6. Surficial soils in TP-4 and the uppermost native soils in all pits were fine grained silt or sandy silt/silty sand deposits with occasional gravels to depths of 2 to 3 feet. Silty sand/sandy silt soils were encountered to a depth of 4 feet in the percolation test trench adjacent to TP-6. These surficial native soils were moist to dry with very stiff to hard consistencies corresponding to pocket penetrometer readings of greater than 2.5 tons per square foot (TSF). Below the surficial deposits in all test pits and to the bottom of the each test pit, soils were dense to very dense dry brown alluvial deposits composed of gravel with sand and cobbles. Approximately 65 to 75 percent of these soils are composed of sub-angular to round gravels and cobbles up to 12-inches maximum dimension. Minor to major caving of test pit walls was observed throughout test pit excavations.

Groundwater

Groundwater was encountered between 11.3 to 12.3 feet depth in TP-2, TP-3, and TP-6 at the time of excavation. Monitoring wells were installed in TP-4 and TP-6 to allow for long-term monitoring if desired. Peak groundwater elevations typically occur from late May through July with seasonal peaks caused by higher flows in nearby streams and irrigation ditches. Seasonal fluctuations of several feet may occur with higher peaks during flood years.

ENGINEERING ANALYSIS AND RECOMMENDATIONS

General

Two structures supported by shallow spread footings with slab-on-grade floors are planned. Buildings occupy the northern and southern portions of the lot with a central paved parking and entrance area between them. For this analysis, it was assumed that slabs and pavements will be subject to light commercial loads (i.e. semi-trucks, forklifts and heavy stationary loads) during its service life. Recommendations presented in this section emphasize design and construction concerns in soils influenced by shallow footings and below slab-on-grade and pavement sections.

Seismic Design Parameters
The 2012 International Building Code (IBC) designates site class per ASCE 7 Chapter 20. Data obtained in this investigation is not sufficient to determine soil parameters as required by ASCE 7; therefore the IBC directs that seismic coefficients and design spectra shall be determined using Site Class D and Latitude of 43.462° and Longitude of -110.798°.

Groundwater
The planned slab-on-grade flooring is not expected to be impacted by groundwater. We recommend utilizing measured groundwater elevations in the monitoring wells during spring runoff in 2016 if excavation and construction of footings is scheduled for the summer months during high groundwater. Conservative estimates where groundwater elevations equate with the proposed footing depths were used in bearing capacity calculations.

Conventional Spread Footings
Structures can be supported by conventional shallow spread footings bearing at 3.0 to 4.0 feet below existing ground surface on dense gravel and cobble alluvium deposits. Assuming seasonal high groundwater conditions, spread footings shall have an allowable maximum bearing capacity of **4000 psf**. Where silt/silty sand/sandy silt soils and fine grained sand lenses are found at bottom of footing elevation, these soils shall be removed until competent cobble and gravel alluvium is revealed. Structural fill shall be placed as necessary to achieve footing grade. Existing subgrade shall be scarified and compacted to a depth of **8 inches** to 95% of maximum density per ASTM D698 (Standard Proctor) beneath all footing and fills below footings. The net allowable soil pressure includes dead load plus maximum live load. The above analysis assumes **a maximum width of 4.0 feet** for continuous footings and a maximum dimension of **8 feet for isolated footings**. Construction of large footing sizes can lead to increased settlement as the bearing pressure bulb can extend deeper into the soil profile resulting in settlement of greater than that specified. The net allowable soil pressure includes dead load plus maximum live load. These calculations assume a minimum depth of burial of the footing of **42 inches** and that a maximum total settlement of **0.5 inches** be tolerated on any one footing and the maximum differential settlement between footings that can be tolerated is **0.5 inches**.

Bearing capacity values and settlement shall be checked for each combination of load to determine whether settlement or bearing capacity will control the response of the footing. Foundation elements supporting large concentrated loads should be analyzed on an individual basis to determine settlement and bearing characteristics**.** Other foundation parameters are as noted below:

1. A one-third increase in allowable bearing capacity may be used for short duration loads such as wind or seismic.

2. Lateral loads may be resisted by friction between the footing base and supporting soil and lateral bearing pressure against the sides of the footings. Design parameters recommended are a **coefficient of friction of 0.38 at the footing base**, lateral passive bearing pressure of **350 psf per foot of depth.**

3. Backfill against shallow foundations and stem walls shall conform to the **FOUNDATION BACKFILL DETAIL** drawing in the Appendix. In no case shall material greater than 6 inches in diameter bear directly on or against foundation elements. Placing oversized material against rigid surfaces can damage the structure and interferes with proper compaction.

Any soil type encountered at the bottom of footing excavations other than the ones described above should be analyzed by Nelson Engineering. Isolated boulders at footing grade should be excavated and removed unless approved by Nelson Engineering. Any excessively loose material or soft spots encountered in the footing subgrade will require over-excavation and backfilling with structural fill. All footings shall be suitably reinforced to make them as rigid as possible.

Interior Slabs-On-Grade

In interior slab areas, **a minimum of 16 inch thickness** of the surface soils shall be excavated and removed. Interior slabs shall be founded upon the following section from top to bottom:

1) A leveling course mat **6 inches** in thickness composed of a **¾-inch minus** free draining material (WYDOT Grade W or equivalent) compacted to a minimum of 95% of maximum density as determined by ASTM D 1557,
2) **12 inches** of structural fill, compacted to a minimum of 95% of maximum density as determined by ASTM D 1557,
3) A nonwoven, polypropylene geotextile (Geotex 250ST, or approved equivalent) between compacted subgrade and structural fill,
4) Compact native subgrade to a minimum depth of **8 inches** to a minimum of 95% of maximum density as determined by ASTM D 698.

Any fill required to increase the elevation of slabs should meet the requirements for structural fill. **Where Nelson Engineering determines subgrade is composed of competent site soils or fills, the structural fill and geotextile requirements may be omitted**

All slabs should be a **minimum of 6 inches** thick unless otherwise directed by the Structural Engineer. A subgrade modulus of **300 pounds per cubic inch** should be use with the recommended interior slab section provided above. A moisture retardant barrier can be placed beneath all floor slabs to minimize potential ground moisture effects on floor coverings and to minimize the potential for radon infiltration. Testing for the presence of radon has not been conducted at this location. If desired, placing ASTM C33 size 5 aggregate for the granular mat beneath slabs can enhance radon remediation.

Concrete slab-on-grade control joints should be saw-cut as early as possible. Nelson Engineering recommends the use of a soft cut system, which allows saw cutting as soon as the concrete can support foot traffic. Successful crack control is dependent upon proper joint spacing. Control joints should be placed in accordance with current Portland Cement Concrete Paving Association guidelines.

Sidewalks and Exterior Slabs

Sidewalks and exterior concrete slabs for foot traffic shall be placed upon the following section:

1) A leveling course mat **4 inches** in thickness composed of a **¾-inch minus** free draining material (WYDOT Grade W or equivalent) compacted to a minimum of 95% of maximum density as determined by ASTM D 1557,
2) **10 inches** of structural fill, compacted to a minimum of 95% of maximum density as determined by ASTM D 698,
3) Scarify and compact the native subgrade to a minimum depth of **8 inches,** compacted to a minimum of 95% of maximum density as determined by ASTM D 698.

All fill material **within 2 feet** of the slabs must be compacted to a minimum 95% of the maximum density as determined by ASTM D698. Proper drainage is essential for satisfactory sidewalk and exterior slab performance.

Parking Lot Recommendations

Recommended road and parking lot sections are given in the table below. Areas of thick surficial deposits and buried fine-grained soils are present across the site. Primarily, the parking lot will be placed on surficial silts with 2 to 3 foot thickness overlying competent gravels. **Proper drainage is essential for satisfactory road and parking area performance.** Asphalt thickness given is based on conservative estimates of traffic loading as no traffic study has been performed.

Pavement Section Components	Section Thickness
Asphaltic Concrete Surface	2” – 3”
¾ inches Minus Crushed Aggregate	6”
Structural Fill*	8”
Geotextile Reinforcement	Mirafi RS 380i , or Approved Equivalent^
Compacted Subgrade	Surficial 8 inches of native soil scarified and compacted to 95% of max. as determined by ASTM D698.

*Structural fill thickness may be reduced if approved by Nelson Engineering when native subgrade composed of dense gravels and cobbles is encountered within 10 inches of the bottom of crush grade.

^The critical difference between geotextile reinforcement beneath the parking lot and interior slab-on -grade is the high water flow capability.

CONSTRUCTION CONSIDERATIONS

Earthwork and Site Grading

Excavation work and heavy equipment access will be difficult when surficial soils are wet and soft. A protracted period of wet conditions can be expected during and after seasonal snowmelt. Placement of gravel surfacing and/or free-draining native material supported by geotextiles will be required to create stable surfaces for machines and equipment to access the construction site. General recommendations for earthwork suitability, placement, and compaction procedures are provided below:

- Within the building footprints and areas to be paved, all organic material, deleterious undocumented fill, and debris should be stripped and removed. Loose and disturbed native soils should be scarified, moisture-conditioned, and compacted. Finish surfaces shall be sloped away from foundations.

- Fill materials shall not be placed, spread, or compacted while the ground is frozen or during unfavorable weather conditions. Fill materials should be at the proper moisture content prior to compaction and should contain no frozen soil.

- Vibratory compaction equipment is **not recommended** for compaction of native, fine-grained subgrades beneath structural fills, pavements or geotextiles. Vibratory compaction equipment will enhance the upward mobility of moisture within the soil. Static weight pressure (tracks of bulldozer or non-vibratory smooth drum rollers) or kneading action (sheepsfoot roller) compaction should be used.

- Fine-grained, sandy silt and silty sand soils will be encountered throughout the excavations. These soils will exhibit undesirable engineering properties when wetted. **Every effort shall be made to ensure that moisture from rainfall and groundwater does not infiltrate foundation bearing, slab, and roadway subgrade soils during the entire construction period until backfilling is complete.** Measures to prevent moisture infiltration may include the placement of tarps or membranes; maintain grading during construction to drain storm water from exposed excavations during precipitation and snowmelt events, and others. In the event that moisture has been allowed to infiltrate subgrade or bearing soils, excavation and backfill operations should cease and not resume until Nelson Engineering approves the moisture and density conditions of the soils.

- **Structural Fill** shall consist of imported or onsite materials (USCS classification GW or GP) with the following characteristics: 6-inch maximum particle size with no more than 40% oversize (greater than ¾") and no more than 5% fines passing the #200 sieve.

  Structural fill shall be placed in layers of not **more than 8 inches in thickness**. Each layer of structural fill should be moisture conditioned to within 2% of

optimum moisture content and compacted to a minimum density of 95% of the maximum dry density as determined by ASTM Designation D 698. The maximum density of material containing more than 30% oversize (greater than ¾" diameter) cannot be determined by use of the ASTM Designation D 698. In this case, a field maximum density may be determined by a test strip method. The material shall be compacted at or near optimum moisture content and a field density test shall be taken after each pass of the compaction equipment. This sequence shall continue until the maximum field density is achieved. This maximum field density shall be used for subsequent field compaction tests. Enough density tests should be taken to monitor proper compaction.

- Safety of construction personnel including safe trenches and excavations are the responsibility of the contractor. Excavations for retaining walls and foundations shall conform to the applicable OSHA and Wyoming safety standards. Excavations and utility trenches shall be laid back to safe slopes or properly shored. Excavations and shoring operations shall be conducted in accordance with the most recent versions of the OSHA Construction Standards for Excavations, Part 1926, Subpart P and Wyoming Public Works Standard Specifications. Excavations for utilities shall be shored if the proper slope cannot be maintained.

- During earthwork phases of the project, a representative of Nelson Engineering shall be present to observe exposed native soils and fill materials for suitability and consistency. A documented testing program should be conducted to determine that soil compaction is in accordance with requirements.

- Backfill placed against structures (i.e., pipes and walls) shall be of a character and in a manner that will not damage that structure. In no case shall material greater than 6 inches in diameter bear directly on or against these structures. Placing oversized material against rigid surfaces can damage the structure and interferes with proper compaction.

GENERAL COMMENTS

The structural engineer and other project designers shall review this report. When project plans and specifications are complete, a consultation with this office should be arranged to ensure compliance with this report. Additional or supplementary recommendations with regards to foundations and earthwork may be required at this time. Monitoring and testing shall be performed to verify that suitable materials are used for structural fills and backfills, and that fills are properly placed and compacted. Concrete testing and special inspection shall be performed prior to and during placement of all concrete to ensure concrete and reinforcing steel bar comply with project plans and specifications.

WARRANTY AND LIMITING CONDITIONS

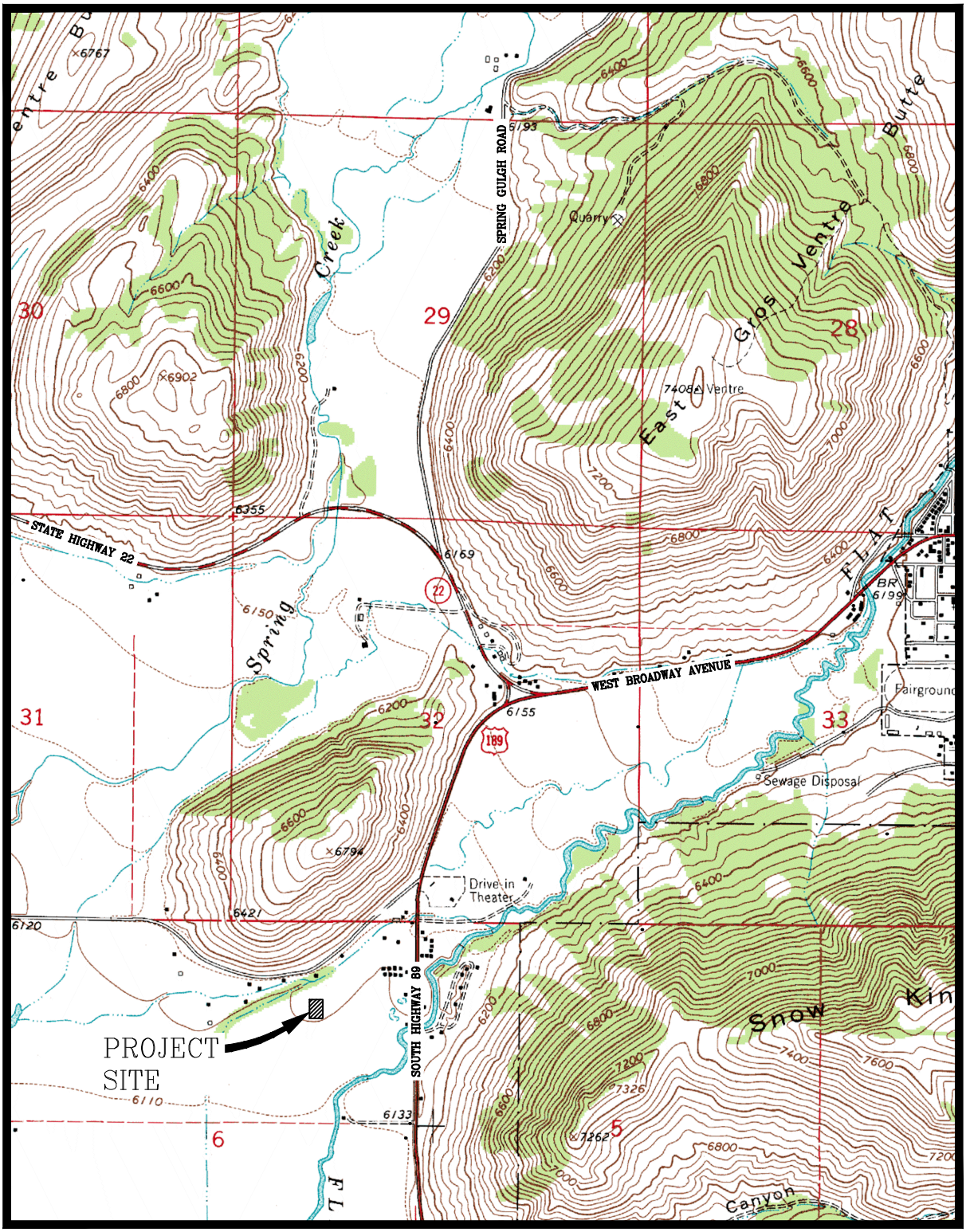
The field observations and research reported herein are considered sufficient in detail and scope to form a reasonable basis for the purposes cited above. Nelson Engineering warrants that the findings and conclusions contained herein have been promulgated in accordance with generally accepted professional engineering practice in the fields of

foundation engineering, soil mechanics, and engineering geology, only for the site described in this report. No other warranties are implied or expressed.

These engineering methods have been developed to provide the client with information regarding apparent or potential engineering conditions relating to the subject property within the scope cited above and are limited to the conditions observed at the time of the site visit and research. There is a distinct possibility that conditions may exist which could not be identified within the scope of the investigation or which were not apparent during the site investigation. The report is also limited to the information available at the time it was prepared. In the event additional information is provided to Nelson Engineering following this report, it will be forwarded to the client in the form received for evaluation by the client. This report was prepared for use by Hoke & Co., LLC in Wilson, Wyoming ("Client") and the conclusions and recommendations presented in this report are based on the agreed-upon scope of work outlined in the report and the contract for professional services between Client and Nelson Engineering ("Consultant"). Use or misuse of this report, or reliance upon the findings hereof by any parties other than the Client, is at their own risk. Neither the Client nor Consultant may make any representation of warranty to such other parties as to the accuracy or completeness of this report or the suitability of its use by such other parties for any purpose whatsoever, known or unknown, to the Client or Consultant. Neither Hoke and Co., LLC nor Nelson Engineering shall have any liability to, or indemnifies or holds harmless third parties for any losses incurred, by the actual or purported use or misuse of this report. No other warranties are implied or expressed.

APPENDIX

DRAWINGS



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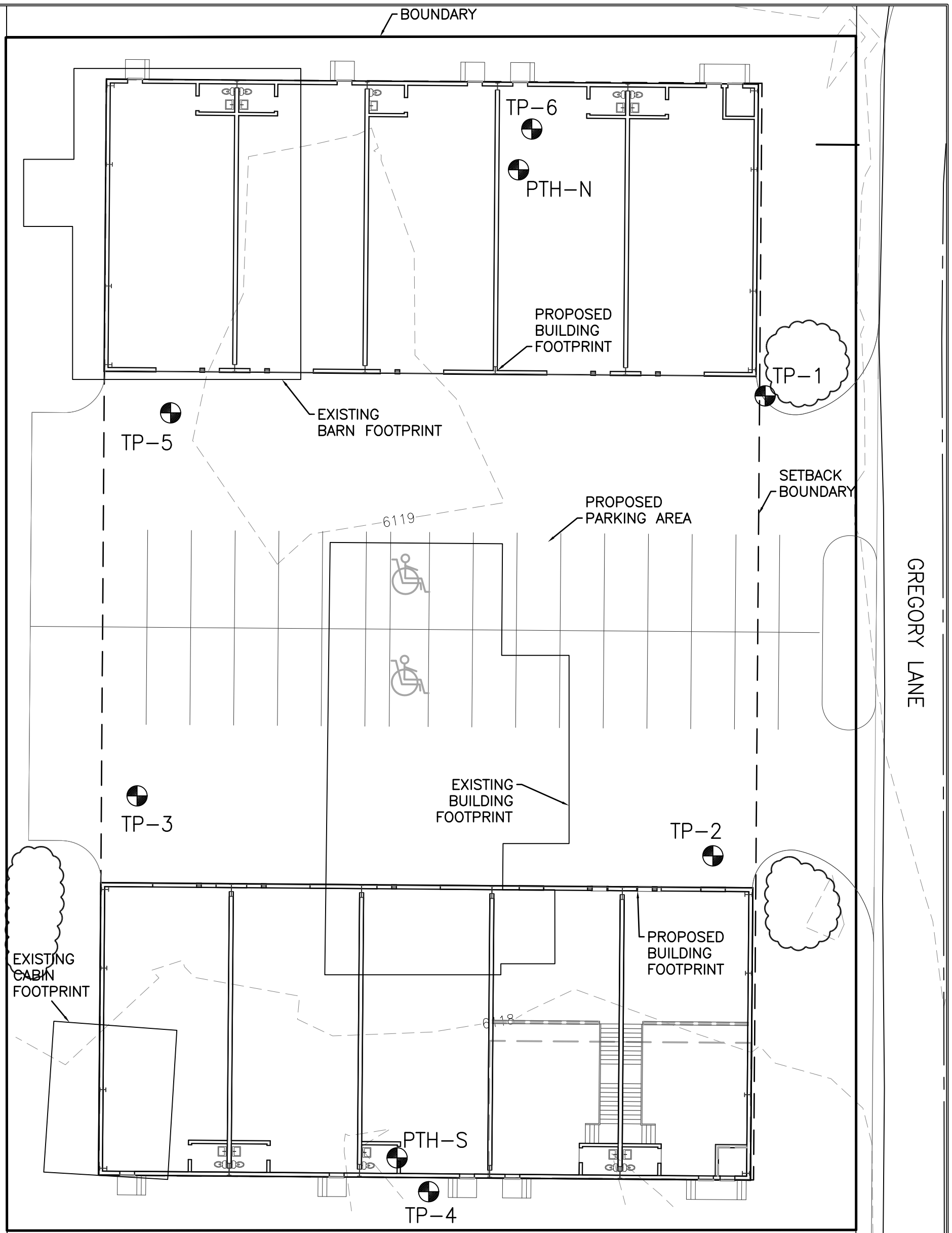
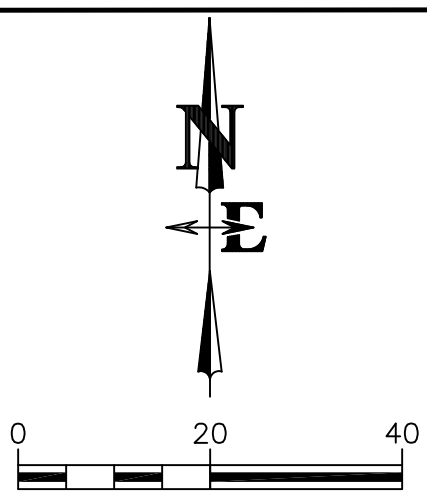
VICINITY MAP

SCALE: 1"=2000'

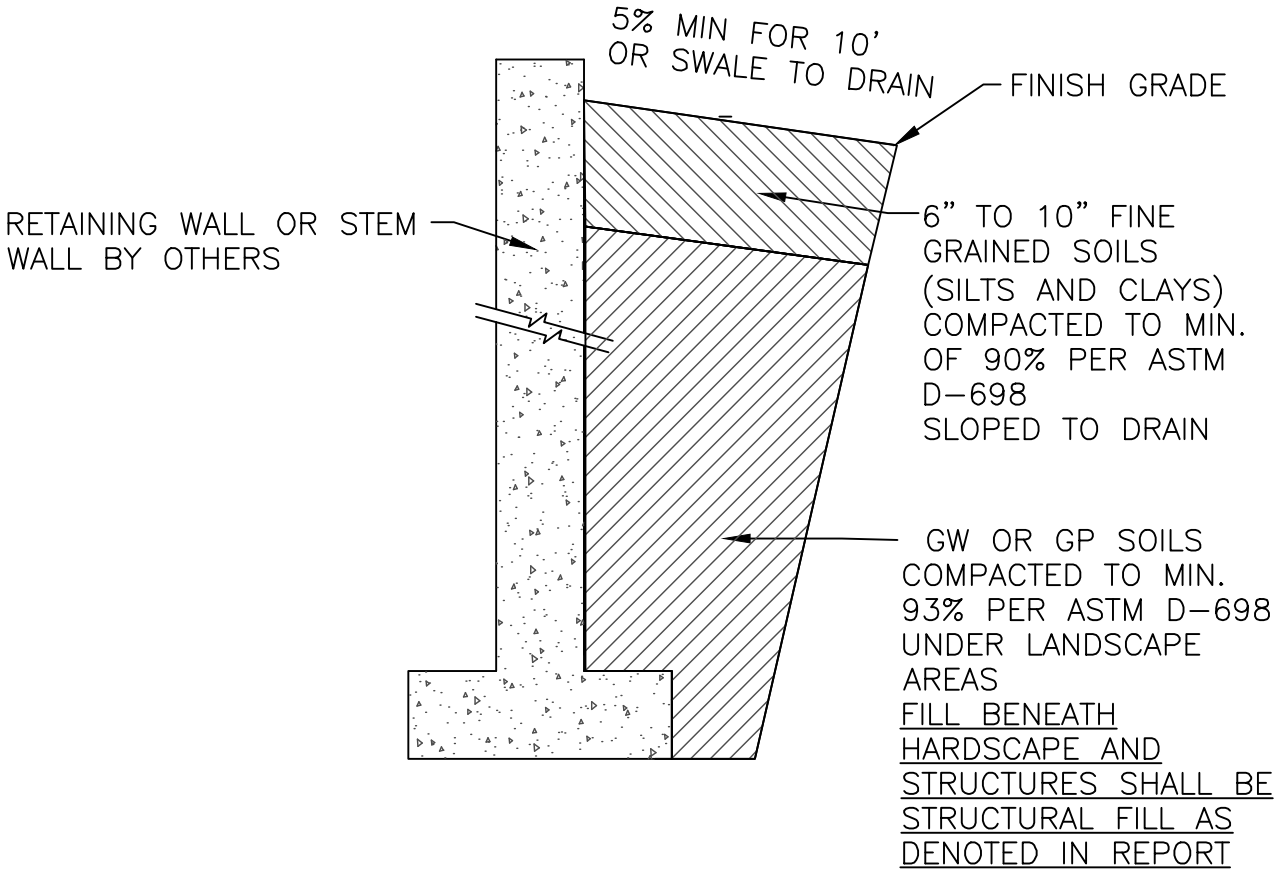
DRAWING NO	TITLE				
1	SITE VICINITY MAP 1225 GREGORY LANE GEOTECHNICAL INVESTIGATION	NELSON ENGINEERING P.O. BOX 1599, JACKSON WYOMING (307) 733-2087	DATE	9/1/2015	REV.
JOB NO			SURVEYED	N/A	
15-140-02			DRAWN	AP	
			CHECKED	PG	
			APPROVED	PG	





BUILDING FOOTPRINT PER SITE PLAN BY BERLIN ARCHITECTS. SITE SURVEY BY NELSON ENGINEERING. TEST PITS LOCATED USING TRIMBLE GPS UNIT ±10-FEET ACCURACY

DRAWING NO	JOB TITLE	DRAWING TITLE				
2	1225 GREGORY LANE GEOTECHNICAL INVESTIGATION	TEST PIT LOCATION MAP	NELSON ENGINEERING P.O. BOX 1599, JACKSON WYOMING (307) 733-2087	DATE	9/1/2015	REV.
JOB NO 15-140-02				SURVEYED	NE	
				DRAWN	AP	
				CHECKED	PG	
				APPROVED	PG	



FOUNDATION BACKFILL (TYPICAL)

NOT TO SCALE

S:\PROJ\2006\123-01 (PAINTED BUFFALO)\GEOTECH\FBBACKFILL.DWG (BXIL_P) NOV 28 2006 07:53:41 AM PLOTTED BY: GTR

DRAWING NO	TITLE				
3	GREGORY LANE COMMERICIAL FOUNDATION BACKFILL DETAIL	NELSON ENGINEERING P.O. BOX 1599, JACKSON WYOMING (307) 733-2087	DATE	9 9 15	REV.
JOB NO 15-140-02-01			SURVEYED		
			DRAWN	PG	
			CHECKED	PG	
			APPROVED	PG	

TEST PIT LOGS

GEOTECHNICAL GENERAL NOTES

CORRECTED SPT: Standard Penetration Test values corrected to 60% of the theoretical free-fall hammer energy corrected for overburden pressure the current edition of AASHTO Bridge Design Specifictions.

DRILLING, SAMPLING, AND SOIL PROPERTIES ABBREVIATIONS AND SYMBOLS

N: Standard Penetration Test
U_c: Unconfined compressive strength, Pounds/ft^2 (PSF)
Pp: Pocket Penetrometer values, Ton/ft^2 (TSF)
FILGC: Fragments indicate gravels and cobbles larger than split spoon diameter.
w: Water content, %
LL: Liquid limit, %
PI: Plasticity index, %
gd: In-situ dry density, lbs/ft^3 (PCF)
: Ground water level
SS: Split-Spoon Sample
ST: Shelby Tube Sampler
CS: Cylindrical Brass Lined Sample

Monitoring Well, diagonal hatching indicates screen and sand packed interval

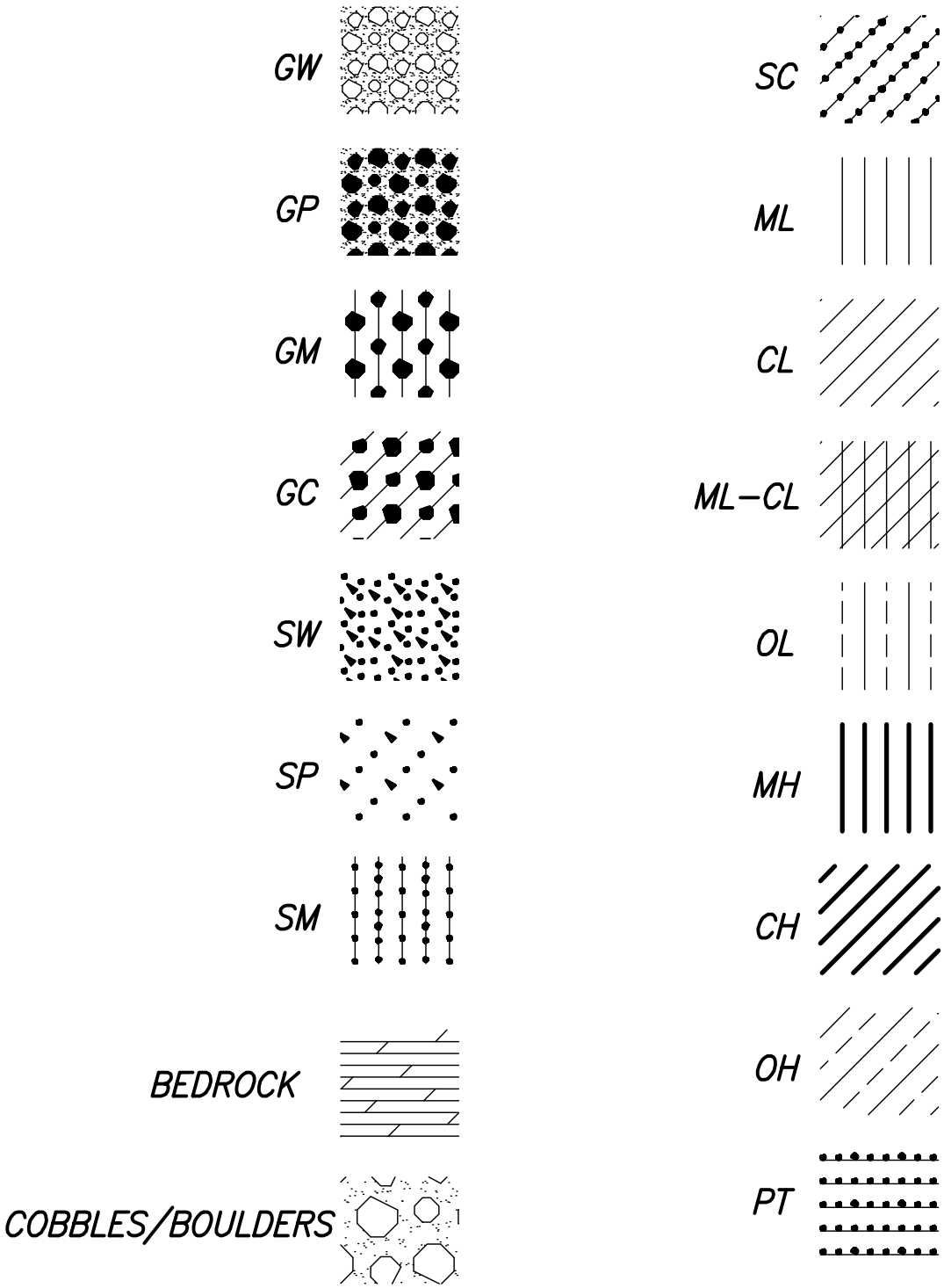
SOIL RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Non-Cohesive Soils	SPT	Cohesive Soils	Pp-(tons/ft^2)
Very Loose	0 - 4	Very Soft	0 - 0.25
Loose	4 - 10	Soft	0.25 - 0.50
Slightly Compact	8 - 15	Medium Stiff	0.50 - 1.00
Medium Dense	10 - 30	Stiff	1.00 - 2.00
Dense	30 - 50	Very Stiff	2.00 - 4.00
Very Dense	50+	Hard	4.00+

PARTICLE SIZE

Boulders:	12 in.+	**Coarse Sand:**	5 mm(#4)-2 mm(#10)	**Silts and Clays:** **<#200**
Cobbles:	12 in.-3in.	**Medium Sand:**	2 mm(#10)-0.4mm(#40)	
Gravel:	3in.-5mm(#4)	**Fine Sand:**	0.4mm(#40)-0.075mm(#200)	

SOIL GRAPHICS

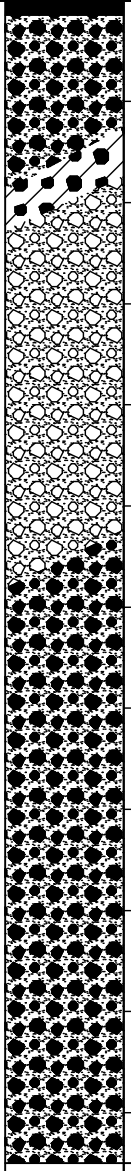


NOTE: ANGLED DEMARCATIONS ON THE LOGS INDICATE APPROXIMATE OR POORLY DEFINED BOUNDARIES BETWEEN SOIL TYPES.

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 1** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	

This log is part of a report prepared by Nelson Engineering for this project and should be read with the report. This summary applies only at the location of the test pit and at the time of the excavation. Subsurface conditions may differ at other locations and may change at this location with passage of time. The data presented is a simplification of actual conditions encountered.



WELL LOG	GRAPHICS LOG	DEPTH (FT)	SAMPLES UNDISTURBED	SAMPLES BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
						0"–2" DETERIORATED ASPHALT					*NORTHEAST PORTION OF LOT WITHIN DETERIORATED ASPHALT DRIVEWAY*
		1				*2"–18" MOIST LT BROWN CRUSHED GRAVEL WITH SILT, MINOR SAND, AND COBBLES UP TO 8" MAXIMUM DIMENSION, ANGULAR CLASTS, IMPORTED FILL, DENSE*					
						1.5'–2.0' MOIST DK BROWN CLAYEY GRAVEL WITH SAND, ROUND TO SUB–ROUND CLASTS					
		2				*2.0'–5.5' MOIST TO DRY BROWN WELL GRADED GRAVEL WITH SAND AND MINOR COBBLES UP TO 6" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, ~70% GRAVELS, ~30% SAND*					*EASY DIGGING BELOW ASPHALT TO 5.5'*
		3									
		4									
		5				*FROM 5'–5.5', LENS OF CLEAN 1" GRAVELS ON EAST SIDE OF TEST PIT*					
						5.5'–BOP SAME AS ABOVE, POORLY GRADED, ABUNDANT COBBLES UP TO 10" MAXIMUM DIMENSION, FINE GRAINED SAND, DENSE TO VERY DENSE					*MINOR CAVING OF ALLUVIAL GRAVELS AND COBBLES*
		6									
		7									*MODERATELY HARD DIGGING IN GRAVELS AND COBBLES FROM 5.5'–BOP*
		8									
		9									
		10									
		11									
						BOP=11.5'					
		12				*NO GROUNDWATER ENCOUNTERED*					
		13									
		14									
		15									

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JACKSON, WY

JOB NO. 15–140–02

PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 2** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	

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WELL LOG	GRAPHICS LOG	DEPTH (FT)	SAMPLES: UNDISTURBED	SAMPLES: BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
						0"–2" ASPHALT					*SOUTHEAST PORTION OF LOT WITHIN ASPHALT DRIVEWAY*
						2"–6" 1"–MINUS CRUSHED BASE					
		1				*6"–18" MOIST LT BROWN CRUSHED GRAVEL WITH SILT, MINOR SAND, AND COBBLES UP TO 12" MAXIMUM DIMENSION, ANGULAR CLASTS, IMPORTED FILL, DENSE*					
		2				*1.5'–3.0' MOIST DK BROWN/BROWN SILTY SAND/SANDY SILT WITH OCCASIONAL ROOTS, PP=2.5–3.5 TSF, VERY STIFF*					*EASY DIGGING BELOW ASPHALT TO 8.0'*
		3				*3.0'–BOP MOIST TO DRY BROWN POORLY GRADED GRAVEL WITH SAND AND COBBLES UP TO 10" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, FINE GRAINED SAND, ~65% GRAVELS AND COBBLES, ~35% SAND*					
		4									
		5		X	*TP2–1 5'–6'*	*OCCASIONAL SAND LENSES NO GREATER THAN 6" THICKNESS THROUGHOUT*					*MINOR CAVING OF ALLUVIAL GRAVELS AND COBBLES*
		6									
		7									
		8				*FROM 8'–BOP ABUNDANT LARGER COBBLES*					
		9									*MODERATELY HARD DIGGING IN GRAVELS AND COBBLES FROM 8.0'–BOP*
		10									
		11									
▼		12				*GROUNDWATER ENCOUNTERED AT 11.9' DURING EXCAVATION*					
		13				*BOP=13.0'*					
		14									
		15									

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JOB NO. 15–140–02

PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 3** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	

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WELL LOG	GRAPHICS LOG	DEPTH (FT)	SAMPLES UNDISTURBED	SAMPLES BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
						0"–4" 3/4"–MINUS CRUSHED BASE GROUND SURFACE					*GRAVEL DRIVEWAY WEST OF FORMER VETERINARY CLINIC*
		1		X	*TP3–1 0.5'–1.5'*	*4"–3.0' MOIST TO DRY BROWN SANDY SILT WITH OCCASIONAL FINE GRAVELS, PP>4.0 TSF, HARD*					
		2									*EASY DIGGING THROUGHOUT TEST PIT*
		3				*3.0'–BOP MOIST TO DRY BROWN POORLY GRADED GRAVEL WITH SAND AND COBBLES UP TO 12" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, FINE GRAINED SAND, ~70% GRAVELS AND COBBLES, ~30% SAND*					
		4									
		5									*MODERATE CAVING OF ALLUVIAL GRAVELS AND COBBLES*
		6									
		7									
		8									
		9									
		10									
		11									
▼		12				*GROUNDWATER ENCOUNTERED AT 12.3' DURING EXCAVATION*					
		13									
						BOP=13.5'					
		14									
		15									

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JOB NO. 15–140–02

PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 4** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	

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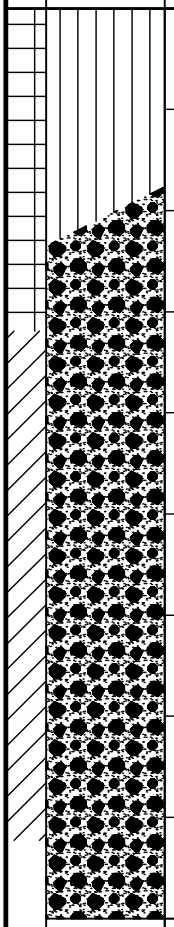

WELL LOG	GRAPHICS LOG	DEPTH (FT)	SAMPLES: UNDISTURBED	SAMPLES: BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
						0'–2.0' DRY DK BROWN SILT TOPSOIL WITH ABUNDANT WILLOW ROOTS, BLOCKY STRUCTURE, PP>4.0 TSF, HARD					*GRASSY PARKING AREA WITH WILLOWS ALONG SOUTH PROPERTY LINE*
		1									
		2				*2.0'–BOP DRY BROWN POORLY GRADED GRAVEL WITH SAND AND COBBLES UP TO 8" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, FINE GRAINED SAND, ~75% GRAVELS AND COBBLES, ~25% SAND*					*EASY DIGGING THROUGHOUT TEST PIT*
		3				*WILLOW ROOTS TO 5'*					
		4									
		5									*MINOR CAVING OF ALLUVIAL GRAVELS AND COBBLES*
		6									
		7									
		8									
		9				*BOP=9.0'*					
						NO GROUNDWATER ENCOUNTERED					
		10				*MONITORING WELL INSTALLED*					
						LOP=10' 1.5" DIAMETER PVC					
						SLOTS EVERY 6" FROM 3.25'–8.25'					
		11				*STICKUP=1.75'*					
		12									
		13									
		14									
		15									

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PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 5** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	

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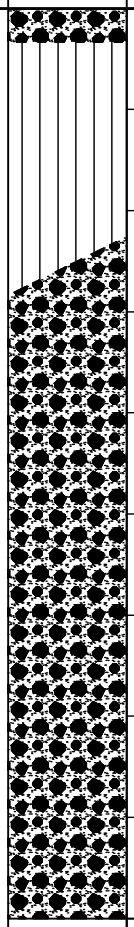

WELL LOG	GRAPHICS LOG	DEPTH (FT)	SAMPLES UNDISTURBED	SAMPLES BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
						0"–4" 3/4"–MINUS CRUSHED BASE GROUND SURFACE					*GRAVEL DRIVEWAY BETWEEN FORMER VETERINARY CLINIC AND BARN*
						4"–2.5' MOIST TO DRY BROWN SILTY SAND/SANDY SILT WITH OCCASIONAL FINE GRAVELS, PP>4.0 TSF, HARD					
		1									
		2									*EASY DIGGING THROUGHOUT TEST PIT*
						2.5'–BOP MOIST BROWN POORLY GRADED GRAVEL WITH SAND AND COBBLES UP TO 6" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, FINE GRAINED SAND, ~70% GRAVELS AND COBBLES, ~30% SAND					
		3									
		4									
		5									*MAJOR CAVING OF ALLUVIAL GRAVELS AND COBBLES*
		6									
		7									
		8									
		9				*BOP=9.0'*					
						NO GROUNDWATER ENCOUNTERED					
		10									
		11									
		12									
		13									
		14									
		15									

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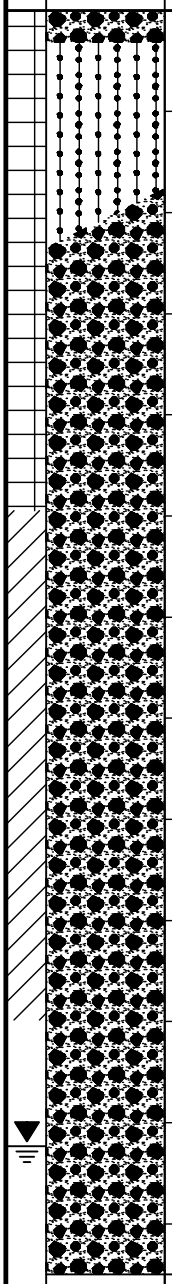
PROJECT NAME: **1225 GREGORY LANE**	**TEST PIT No. 6** PAGE: **1**
DATE STARTED / FINISHED: **8/20/2015**	OPERATOR: **FISH CREEK EXCAVATION**
LOGGED BY: **PRUETT**	EXCAVATOR TYPE: **JD 310 SJ BACKHOE**
BOREHOLE LOCATION/ELEVATION: **SEE TEST PIT LOCATION MAP**	



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DEPTH (FT)	SAMPLES: UNDISTURBED	SAMPLES: BULK	SAMPLE ID	MATERIAL DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	DRY DENSITY (PCF)	MOISTURE (%)	REMARKS
				0"–4" 3/4"–MINUS CRUSHED BASE GROUND SURFACE					GRAVEL PARKING AREA WITH ONE WILLOW TREE ALONG NORTH PROPERTY LINE
1				4"–2.0' MOIST TO DRY BROWN SILTY SAND/SANDY SILT WITH OCCASIONAL FINE GRAVELS, MINOR WILLOW ROOTS, PP>4.0 TSF, HARD					
2				2.0'–BOP DRY BROWN POORLY GRADED GRAVEL WITH SAND AND COBBLES UP TO 12" MAXIMUM DIMENSION, DENSE TO VERY DENSE, ROUND TO SUB–ROUND CLASTS, FINE GRAINED SAND, ~70% GRAVELS AND COBBLES, ~30% SAND					EASY DIGGING TO 2'
3									
4									
5									EASY TO MODERATELY HARD DIGGING FROM 2'–BOP IN ALLUVIAL GRAVELS AND COBBLES
6									
7									MINOR TO MODERATE CAVING OF ALLUVIAL GRAVELS AND COBBLES
8									
9									
10									
11				GROUNDWATER ENCOUNTERED AT 11.3' DURING EXCAVATION					
12									
				BOP=12.5'					
13				MONITORING WELL INSTALLED LOP=10' 1.5" DIAMETER PVC SLOTS EVERY 6" FROM 5.0'–10.0' STICKUP=0'					
14									
15									

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