#### GENERAL

All work must comply with state and local codes, based on the City of Steamboat Springs Community Development Code, the 2015 International Building Code, the International Plumbing Code, the International Mechanical Code, the Energy Conservation Code and the International Electric code. The contractor shall comply with all laws, ordinances, rules and regulations of any public authority bearing on the performance of the work, including O.S.H.A.

Location of the utilities (electrical, telephone, cable TV, gas, water, sewer) shall be verified before construction begins

All on site construction safety and construction means and methods are the responsibility of the contractor. There is no implication of the construction safety requirements or building methods contained in these drawings.

Actual site conditions may require that some of the components of the work should be done differently than shown on these drawinas. All dimensions and conditions to be verified by the contractor prior to construction. Verify changes with the designer and engineer.

These drawings represent a simplified builder's set of plans. Additional detailing may be required of the engineer during construction.

Any variation which requires a physical change from these plans must be brought to the attention of the designer and engineer in order to maintain the design intent of the project.

All work connected with this project by any trade involved shall be of the highest quality attainable in accordance with the professional practice of the trade.

#### <u>DIMENSIONS</u>

All interior and exterior dimensions are to face of stud or face of concrete, U.N.O.

All exterior walls are nominal 2x6 stud construction, U.N.O. All interior walls are nominal 2x4 stud construction, U.N.O.

Do not scale drawings

The water closet stool shall be located in a clear space of not less than 30" in width. The clear space in front of the water closet stool shall be not less than 21".

Crawl space access shall be provided w/ min. 18"x24" through the floor \$ min. 16"x24" through the wall.

Minimum clear ceiling height is 7'-6'' for habitable space \$ hallways \$ 6'-8'' for bathrooms, laundry rooms \$ stairs. Exceptions apply for sloped ceilings and basements per IBC 1003.2

If any discrepancies are found in these drawings notify engineer and/or designer immediately

#### STAIRWAYS:

Stairs shall have a minimum 48" clear width on stairs per Routt County resolution to IBC 1011.2. The surface of stairs shall be slip resistant. Minimum vertical headroom is 6'-8'' from the nosina. Maximum riser height is 7", and minimum tread depth is 11".

Landings shall be provided at the top and bottom of each stairway with a length no less than the width of the stairway served. Landings are not required at the top of interior stairs provided that a door does not swing over the stairs.

Handrails shall be provided on at least one side of each continuous stair flight with four or more risers, and shall be 42" tall, measured vertically from the sloped plane of the tread nosings. Handrails shall comply with section IBC Section 1014.

Open sides of stairways, landings, ramps, balconies and porches which are more than 30" above grade shall be protected by a guardrail. All guardrails must be 36" above finished floor and shall allow no more than a 4" diameter sphere to pass through any portion of the railing per IBC 1015.

Walls and ceilings of enclosed usable space under stairs requires 1/2" gypsum wallboard. The door to access such spaces need not be rated.

### ROOF ASSEMBLIES

ALL LOWER LEVEL SHALL BE FULLY ACCESSIBLE

Unvented roof assemblies shall comply with section IBC 1203.3 and shall be completely within the thermal envelope. The roof shall dry to the inside, thus Class I vapor retarder shall NOT be installed on the ceiling. If air-impermeable insulation is used, it shall be Class II vapor retarder, min. R-49, and be applied directly to the underside of sheathing. If air-permeable insulation is used in the cavity, it shall be min. R-19 applied to underside of sheathing \$ shall be accompanied by min. R-30 continuous rigid board insulation above the sheathing. Alternatively, R-30 air-impermeable insulation can be applied to the underside of sheathing, w/ min. R-19 air-permeable beneath.

Provide Grace lice and water shield, or equivalent product, from the edge of roof overhangs to the

Asphalt shingles shall comply with Chapter 15 \$ require double underlayment when applied on 2:12 to 4:12 roof pitches. Standing seam metal roofing shall have min.  $\frac{1}{2}$ :12 slope.

Attic access shall be provided if attic is more than 30" tall (measured from top of ceiling framing to underside of roof framing members for more than 30 sq. ft. Access shall have a rough-framed opening of min. 22"x30" with min. 30" clear headroom.

MECHANICAL/ENERGY SYSTEMS:

Mechanical equipment rooms must comply with IBC Chapter 13 \$ 14 \$ manufacturers instructions.

Appliances shall be installed with clearances from unprotected combustible materials per manufactures

Appliances with ignition sources located in garages or connected to garages with an opening shall be elevated such that the source of ignition is min. 18" above the garage floor per M1307.3

A level service space of min 30"x30" shall be provided on all sides of an appliance where access is

Appliances in rooms shall have a door access \$ min. 24" wide passageway or wide enough to remove largest appliance per M1305.1.2. Min. 30"x22" clear access or dimensions large enough to remove the largest appliance shall be provided to attics or crawlspaces per M1305.1.3 \$ M1305.1.4.

Appliances in attic spaces and crawlspaces where entry is made only for service of utilities, plastic foam insulation shall be protected against ignition with min. ½" gypsum board per IBC section 2603.4.1.6

### THERMAL ENVELOPE NOTES

THE BUILDING ENVELOPE SHALL BE DURABLY SEALED TO LIMIT INFILTRATION. THE SEALING METHODS BETWEEN DISSIMILAR MATERIALS SHALL ALLOW FOR DIFFERENTIAL EXPANSION AND CONTRACTION. THE FOLLOWING SHALL BE CAULKED, GASKETED, WEATHER-STRIPPED. OR OTHERWISE SEALED WITH A BARRIER MATERIAL, SUITABLE FILM, OR SOLID MATERIAL:

- 1. ALL JOINTS, SEAMS, AND PENETRATIONS
- 2. SITE-BUILT WINDOWS, DOORS, & SKYLIGHTS
- 3 OPENINGS BETWEEN WINDOW & DOOR ASSEMBLIES 4. UTILITY PENETRATIONS
- 5. DROPPED CEILINGS & CHASES ADJACENT TO THE THERMAL ENVELOPE
- 6. KNEE WALLS 7. WALLS & CEILING SEPARATING A GARAGE FROM
- CONDITIONED SPACES 8. BEHIND TUBS & SHOWERS OF EXTERIOR WALLS
- 9. BEHIND FIREPLACE INSERTS 10. ANY OTHER SOURCE OF INFILTRATION

ENVELOPE.

WINDOWS, SKYLIGHTS, & SLIDING DOORS SHALL HAVE AN AIR

INFILTRATION RATE OF NO MORE THAN 0.3 cfm PER SQUARE FOOT. SWINGING DOORS SHALL HAVE AN AIR INFILTRATION RATE OF NO MORE THAN 0.5 cfm PER SQUARE FOOT. RECESSED LUMINARIES INSTALLED IN THE BUILDING THERMAL

ENVELOPE SHALL BE SEALED TO LIMIT AIR LEAKAGE BETWEEN CONDITIONED & UNCONDITIONED SPACES BY BEING: IC RATED & LABELED WITH ENCLOSURES THAT ARE SEALED OR GASKETED TO PREVENT AIR LEAKAGE

TO THE CEILING CAVITY OR UNCONDITIONED SPACE

ABOVE GRADE FRAME WALLS, FLOORS, & CEILINGS NOT VENTILATED TO ALLOW MOISTURE TO ESCAPE SHALL BE PROTECTED WITH LATEX PAINT OR 6 MIL. POLY OVERLAPPED \$ TAPERED AT ALL JOINTS. THE VAPOR RETARDER SHALL BE INSTALLED ON THE WARM-IN-WINTER SIDE OF THE THERMAL

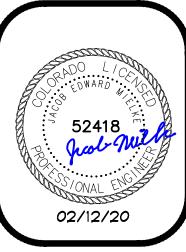
# SHEET SCHEDULE

| SHEET | <u>CONTENTS</u>                        |
|-------|--|
|       |  |
| A-0   | COVER SHEET & ARCHITECTURAL NOTES      |
| C-1   | SITE PLAN & VICINITY MAP               |
| A-1   | MAIN LEVEL \$ ROOF AS-BUILT/DEMO PLANS |
| A-2   | PROPOSED MAIN LEVEL PLAN               |
| A-3   | PROPOSED ROOF PLAN                     |
| A-4   | BUILDING ELEVATIONS                    |
| A-5   | ADA SPECIFICATIONS                     |
| S-1   | FOUNDATION PLAN \$ STRUCTURAL NOTES    |
| S-1.1 | FOUNDATION SECTIONS                    |
| S-2   | MAIN FLOOR FRAMING PLAN & SECTION      |
| S-3   | ROOF FRAMING PLAN & SECTIONS           |
| M0.0  | MECHANICAL INDEX, LEGEND AND NOTES     |
| M0.1  | MECHANICAL SCHEDULES                   |
| M0.2  | MECHANICAL SPECIFICATIONS              |
| мо.з  | MECHANICAL DIAGRAMS                    |
| M1.0  | MECHANICAL CRAWLSPACE PLAN             |
| M1.1  | MECHANICAL MAIN FLOOR PLAN             |
| P0.0  | PLUMBING INDEX, LEGEND, AND NOTES      |
| P1.1  | PLUMBING FLOOR PLANS                   |
| E-1.0 | ELECTRICAL SYMBOLS AND DIAGRAMS        |
| E-1.1 | ELECTRICAL SCHEDULES                   |
| E-2.0 | ELECTRICAL PLAN                        |
| E-3.0 | ELECTRICAL LIGHTING PLAN               |
| E-4.0 | ELECTRICAL SPECIFICATIONS              |

#### 2015 IBC CODE STUDY Re: 2015 IBC, 2015 IEBC, CITY OF S.S. COMMUNITY DEVELOPMENT CODE TYPE OF CONSTRUCTION/ REQUIRED USE \$ OCCUPANCY CLASSIFICATION (CH. 3) OCCUPANCY: B - BUSINESS AREAS & HEIGHTS (CH. 5 & 6) CONFERENCE ROOM IS 360 SQ. FT. - PER IBC SECTION 303.1.2 EXCEPTION 2. THIS ROOM IS LESS THAN 750 SQ. TYPE V-B, NON-SPRINKLERED FT. AND THEREFORE IS CLASSIFIED AS B OCCUPANCY ALLOWED BUILDING AREA PER IBC TABLE 506.2: ZONING: AF - AGRICULTURE AND FORESTRY B, 9,000 SQ. FT. NO. STORIES: 1 W/ CRAWLSPACE ALLOWED NUMBER OF STORIES PER IBC TABLE 504.4: (2) STORIES GROSS AREAS SPRINKLERS NOT REQUIRED PER IBC 903.2 GROSS AREAS (SQ. FT.): = 1656 FIRE RATED ASSEMBLIES (CH. 7) EXISTING AREA: ADDITION AREA: = 1597 NO FIRE SEPARATION/FIRE BARRIER REQUIRED OCCUPANT LOAD/EGRESS (CH. 10) TOTAL AREA: = <u>3253 TOTAL</u> PER IBC TABLE 1004.1.2: SIZE OF LOT: = 164.27 ACRES BUSINESS AREAS (100) GROSS CALCULATED OCCUPANT LOADS: 3253 SQ. FT. / 100 = 32 OCCUPANTS REQUIRED EXITS PER OCCUPANT LOADS (IBC, 1006.2.1): MIN. (1) EXIT FROM B, IST STORY & MAX. 49 OCCUPANTS & 75FT. TRAVEL ACCESSIBILITY (CH. 11)

|                   |  | (                          | COM                    | MER                        | CIAL                    | . EN                    | ERGY C                                 | ODE ST                                   | AND                     | ARD                      | S                          |                              |  |  |
|-------------------|--|----------------------------|------------------------|----------------------------|-------------------------|-------------------------|--|--|-------------------------|--------------------------|----------------------------|------------------------------|--|--|
|                   |  |                            |                        | Re:                        | 2015 Inte               | rnational i             | Energy Conservation                    | on Code Table C402                       | 2.1. <b>3</b> °         |                          |                            |                              |  |  |
|                   | OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS - R-VALUE METHOD   |                            |                        |                            |                         |                         |  |  |                         |                          |                            |                              |  |  |
|                   |  | <u>Roofs</u>               |                        | <u> Mails</u>              | Walls Above Grade       |                         |  | Walls Below Grade                        | <u>F</u> 1              | loors                    | Slab-on-Gro                | ade Floors                   | Opaque Doors                                 |  |
| Climate<br>Zone 7 | Zone 7 entirely above deck walldings other Mass Metal Metal Wood Framed & Other Wallding Framed & Othe |                            |                        |                            |                         |                         |  |  |                         |                          |                            |                              | Non-Swinging                                 |  |
| Group R           | R-35ci   | R-30 +<br>R-11LS           | R-49                   | R-15.2ci                   |                         | R-13 +<br>R-15.6ci      | R-13+R-7.5ci or<br>R-20+R-3.8ci        | R-10ci                                   | R-16.7ci                | R-30 <sup>f</sup>        | R-15 for<br>24in. below    | R-20 for<br>48in. below      | R-4.75                                       |  |
| All other         | 11 other R-35ci R-30 + R-49 R-15.2ci R-13 + R-13 + R-13+R-7.5ci or R-10ci R-15ci R-30 f R-15 for R-20 for R-4.75 R-11LS  |                            |                        |                            |                         |                         |  |  |                         |                          |                            |                              |  |  |
| ci = Conti        | nuous Insulatio  | n, NR = No                 | requiren               | nent, LS :                 | = Linear :              | System.                 |  |  | <u>.</u>                |                          | •                          |                              |  |  |
| а                 | Assembly des   | scriptions ca              | n be four              | d in ANSI                  | /ASHREA                 | /IESNA A                | opendix A                              |  |                         |                          |                            |                              |  |  |
| Ь                 | Where using t  | R-Value con                | npliance r             | nethod, a                  | thermal                 | spacer blo              | ock shall be provid                    | ded, otherwise use                       | the U-Fa                | ctor comp                | liance metho               | d in Table C                 | 402.1.4                                      |  |
| O                 | R-5.7ci is all<br>and 48 inches  | lowed to be<br>s on center | substitut<br>or less h | ed with co<br>norizontally | oncrete bl<br>, with un | ock walls<br>grouted co | complying with A<br>pres filled with m | STM C90, ungroute<br>aterials having a m | ed or part<br>naximum t | ially grout<br>hermal co | ed at 32 inconductivity of | hes or less o<br>0.44 Btu-in | on center vertically<br>/h-f <sup>2</sup> °F |  |
| d                 | Where heated   | l slabs are 1              | placed be              | low grade,                 | below gr                | rade walls              | shall comply wit                       | h the exterior insul                     | lation requ             | irements                 | for heated s               | labs.                        |  |  |
| e                 | "Mass Floors" shall include floors weighing not less than:  1. 35 pounds per square foot of surface area¼ or  2. 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.   |                            |                        |                            |                         |                         |  |  |                         |                          |                            |                              |  |  |
| f                 | Steel floor jo   | oist systems               | shall be               | insulated                  | to R-38.                |                         |  |  |                         |                          |                            |                              |  |  |

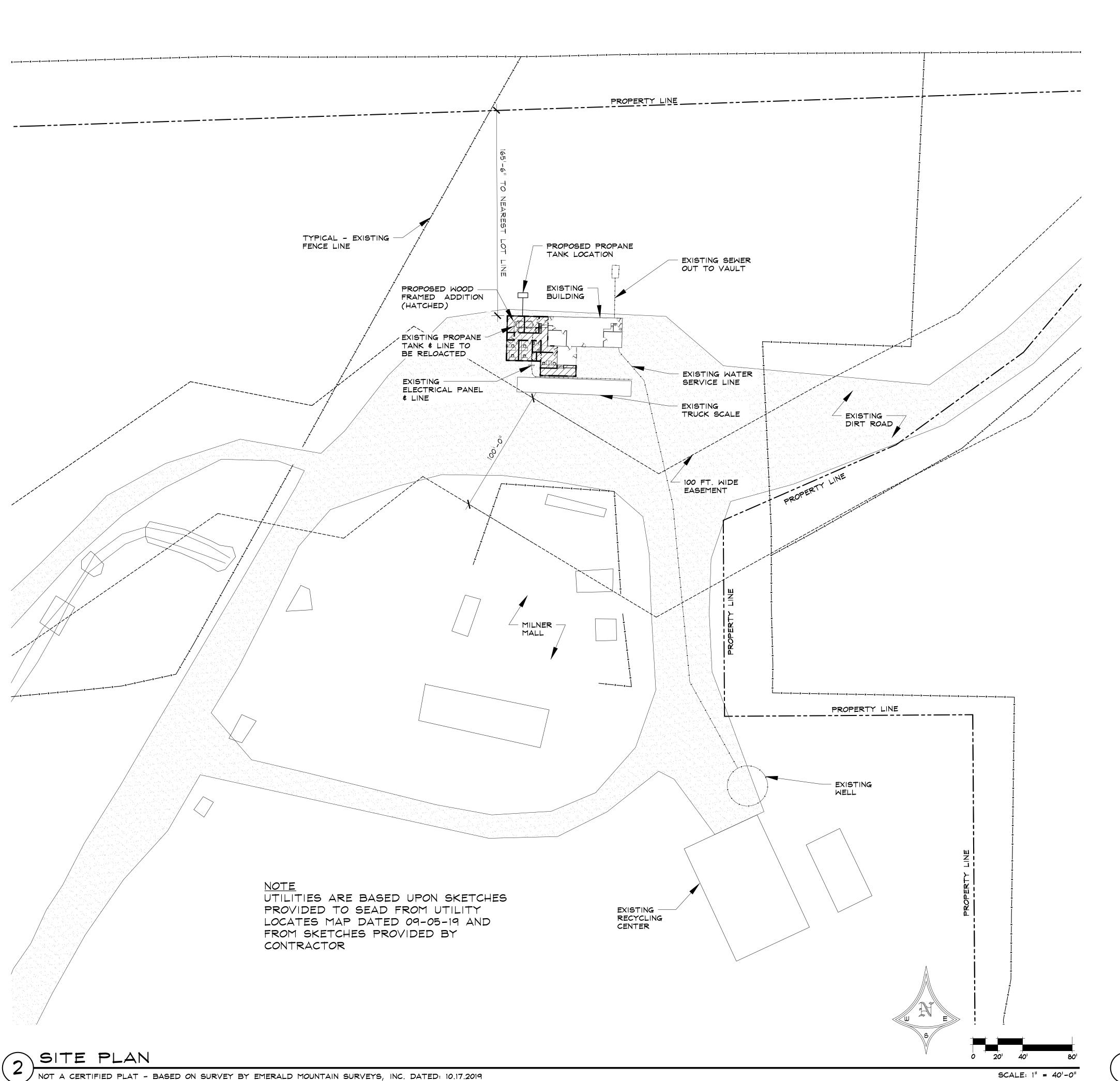




PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19 REVIEW SET 12 . 10 . 19 PERMIT SET 02 . 12 . 20

DRAWN BY: RPI REVIEWED BY: JEM PROJECT # 19052

COVER SHEET

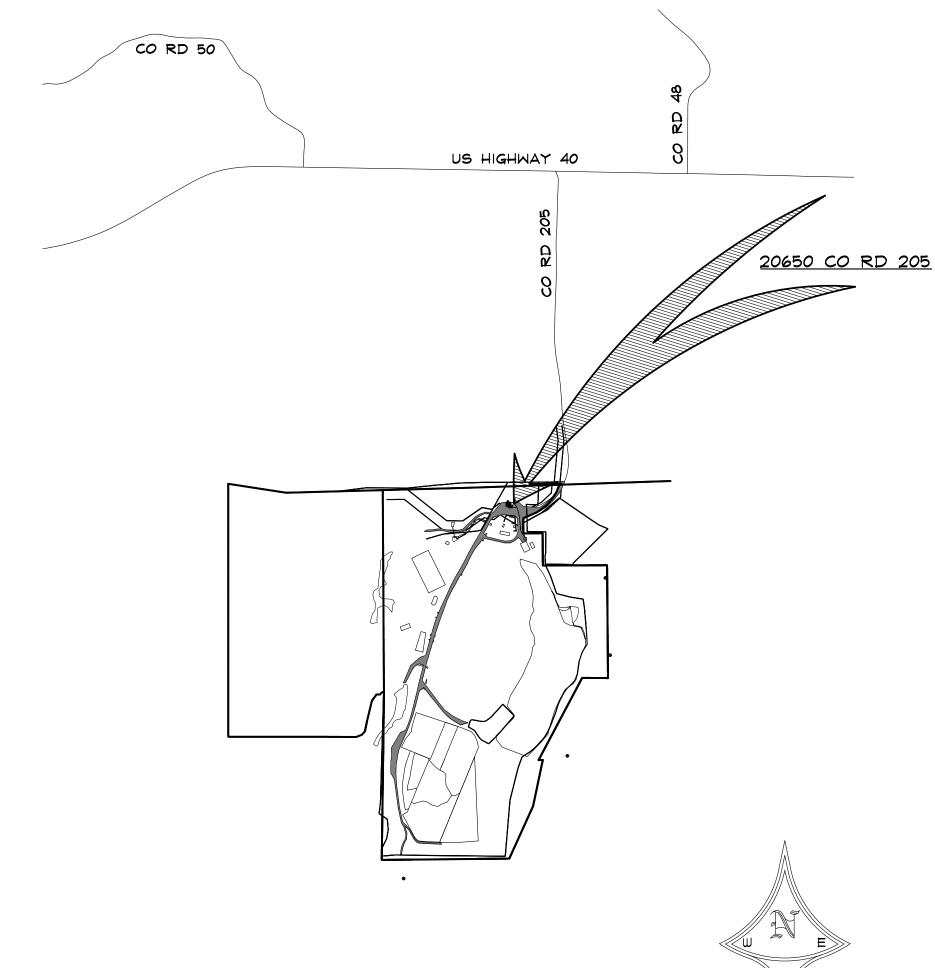






LEGAL DESCRIPTION

SECTIONS 16 \$ 21, T6N, R86W, ROUTT COUNTY, COLORADO

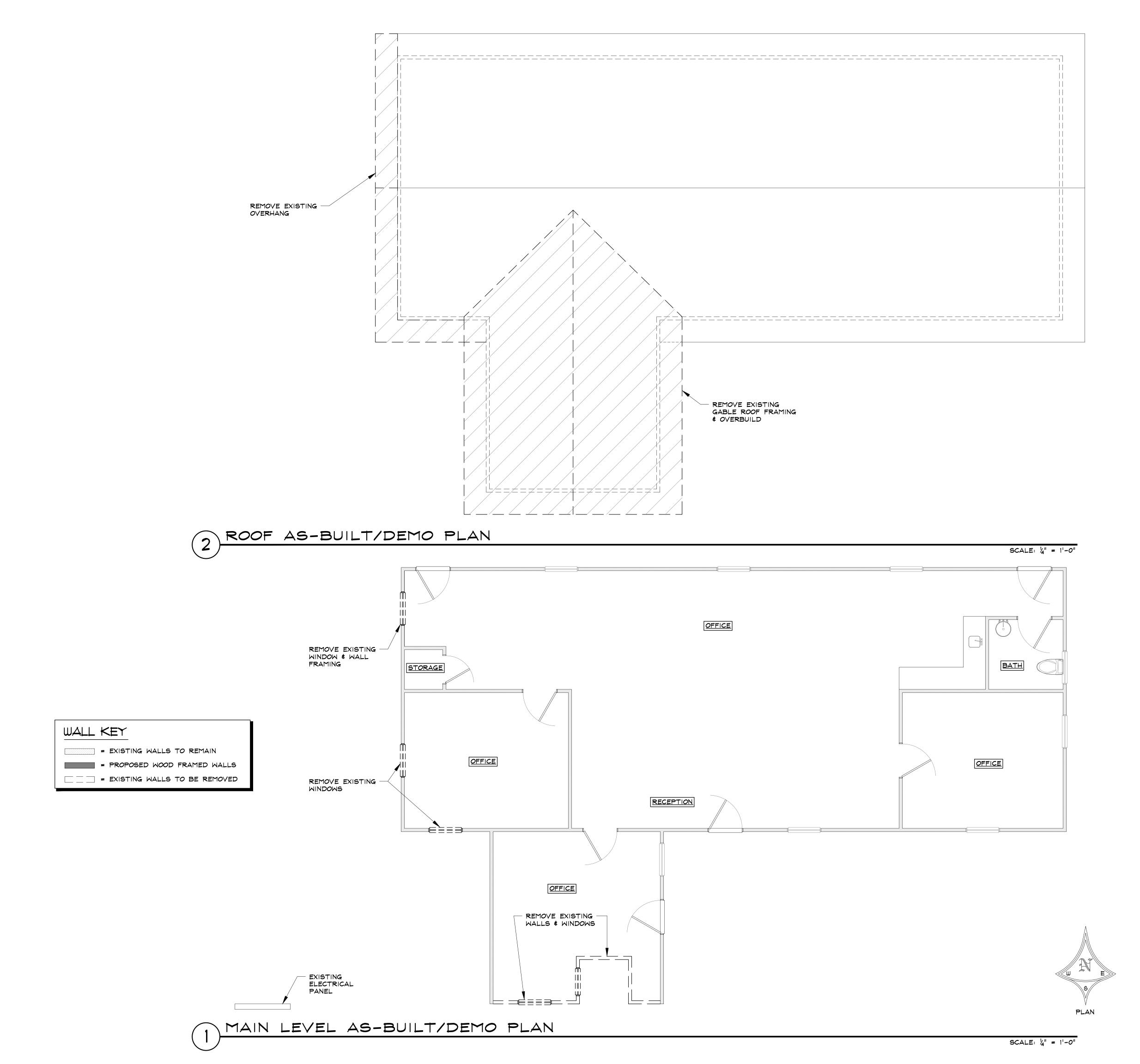


PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19 REVIEW SET 12 . 10 . 19 PERMIT SET 02 . 12 . 20

DRAWN BY: RPN REVIEWED BY: JET PROJECT # 19052 SITE & UTILITY PLAN, VICINITY MAP & CODE STUDY

SHEET 2 of 12

1" = 1000'









PRELIMINARY SET

06 . 26 . 19

DESIGN

DEVELOPMENT

08 . 09 . 19

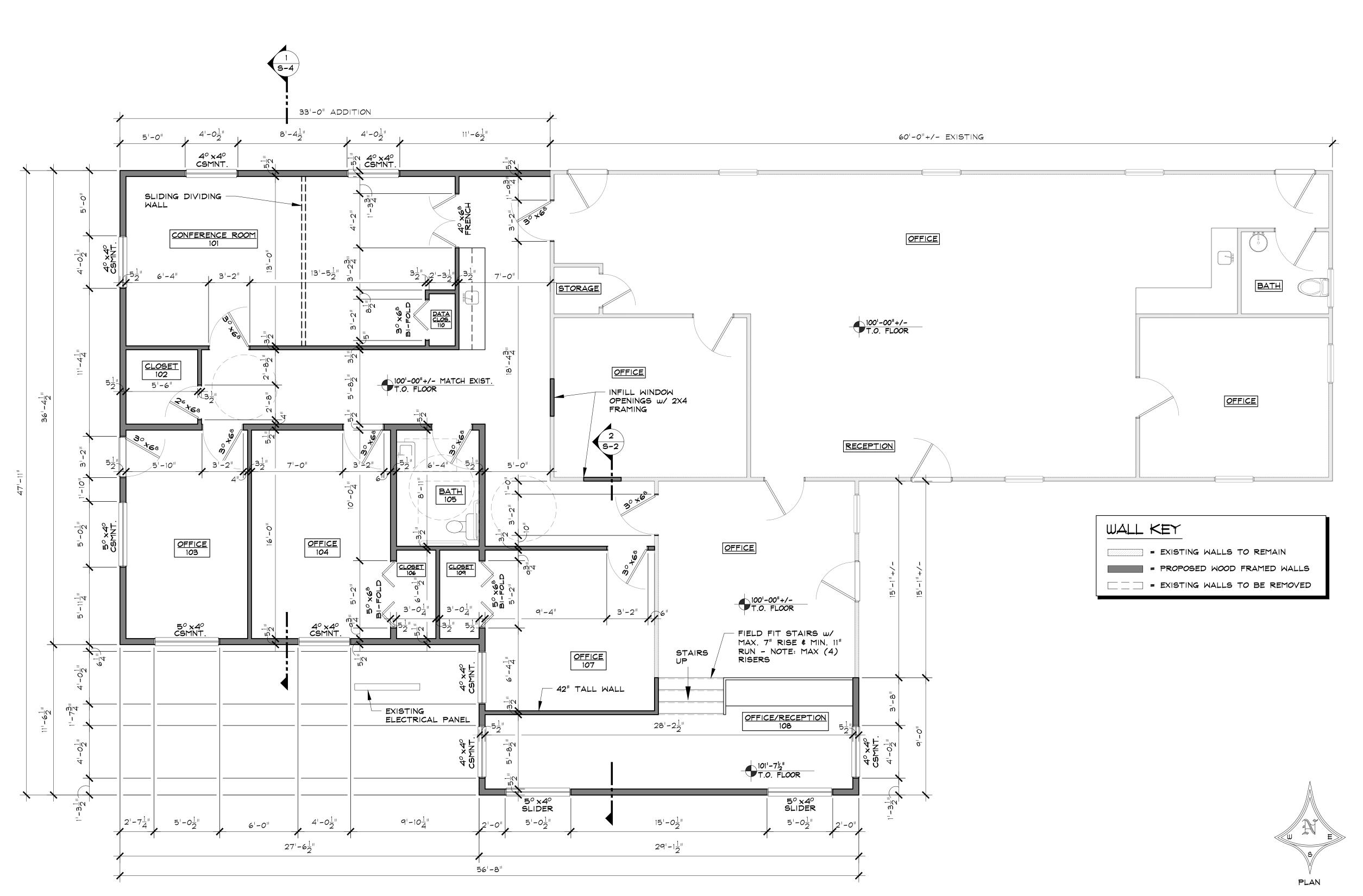
REVIEW SET

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

MAIN LEVEL \$ ROOF

12 . 10 . 19 PERMIT SET 02 . 12 . 20

MAIN LEVEL & ROOF AS-BUILT/DEMO PLAN



ENVIRO ADDITION

20650 CO Rd 205
MILNER, COLORADO
Steam

PRELIMINARY SE

TIME.

PRELIMINARY SET
06 . 26 . 19
DESIGN
DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19
PERMIT SET
02 . 12 . 20

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

PROJECT # 19052

PROPOSED MAIN
LEVEL PLAN



PROPOSED MAIN LEVEL PLAN

1597 SQ. FT. ADDITION

SCALE:  $\frac{1}{4}$ " = 1'-0"





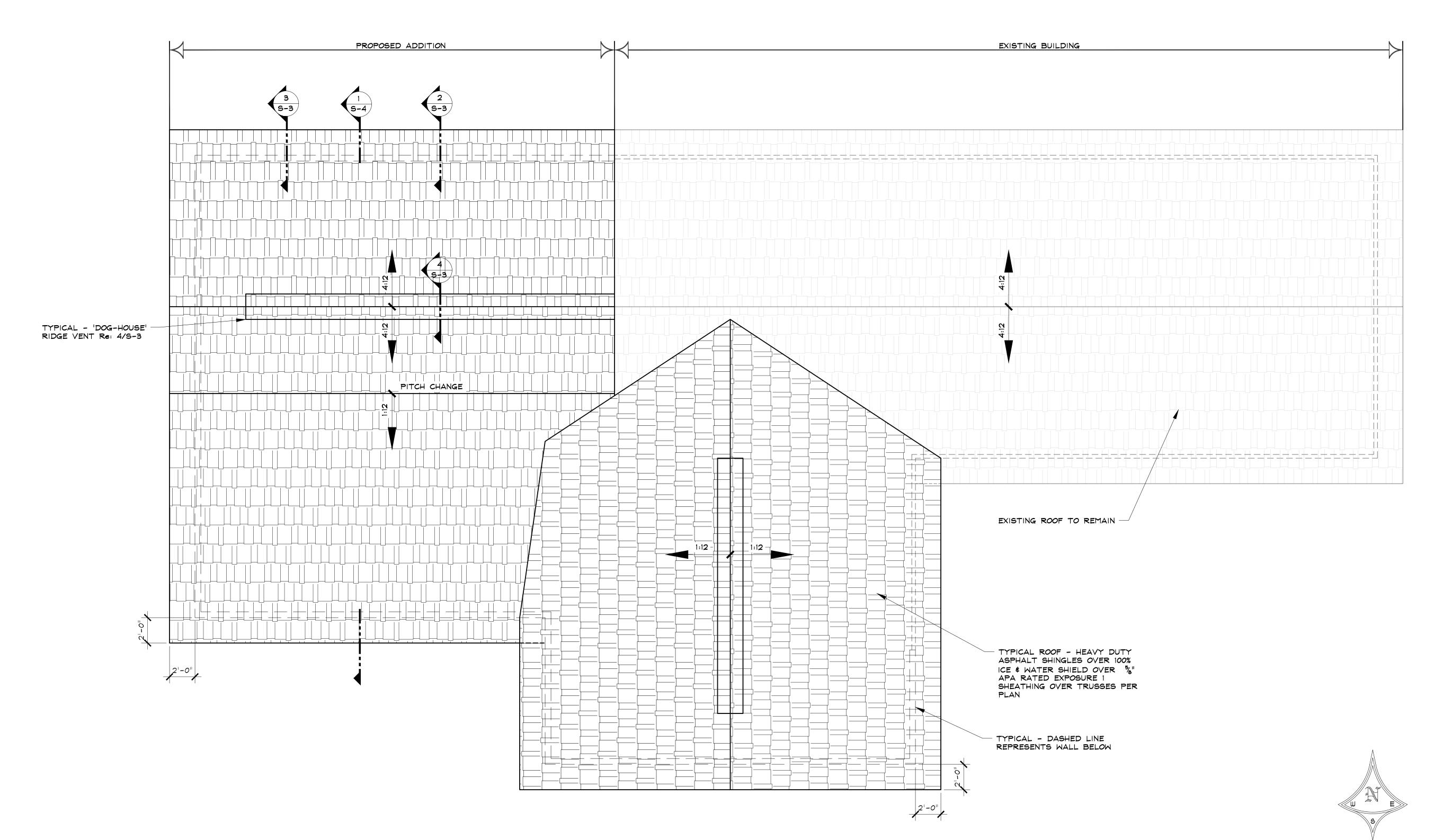
IN ENVIRO ADDITION

PRELIMINARY SET
06 . 26 . 19
DESIGN

DESIGN
DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19
PERMIT SET
02 . 12 . 20

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052
PROPOSED ROOF

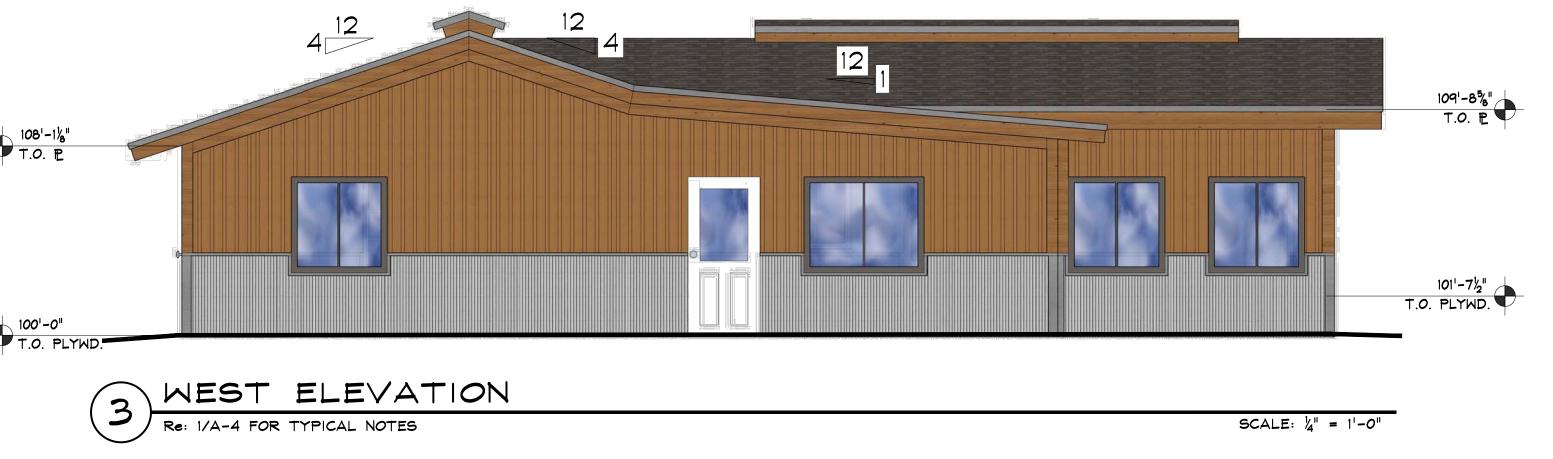
SHEET 5 of 12



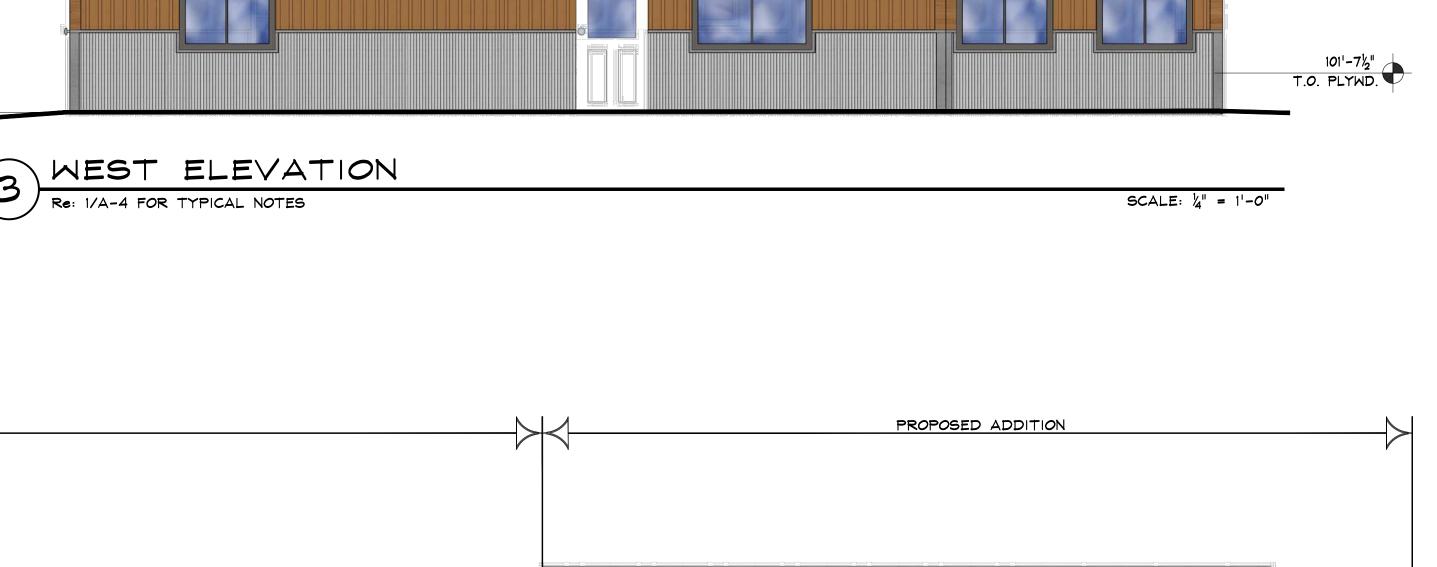
PLAN



ADDITION

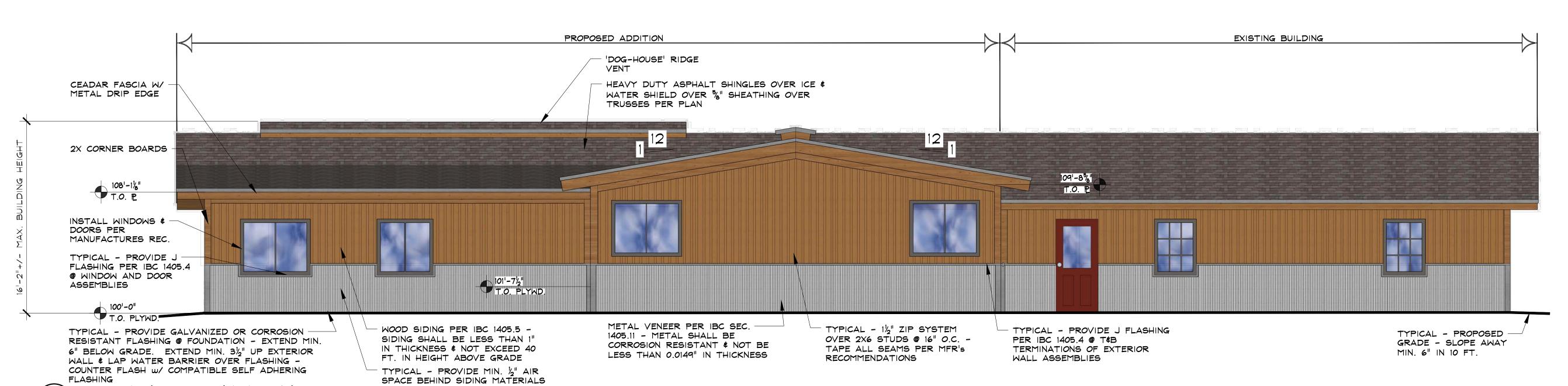


108'-1%" T.O. P 100'-0"
T.O. PLYWD!





NORTH ELEVATION SCALE:  $\frac{1}{4}$ " = 1'-0" Re: 1/A-4 FOR TYPICAL NOTES



08 . 09 . 19 REVIEW SET 12 . 10 . 19 PERMIT SET 02 . 12 . 20 DRAWN BY: RPM REVIEWED BY: JEM PROJECT # 19052 ELEVATIONS

ISSUE DATES

PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT

SHEET 6 of 12

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

FINAL DOOR & WINDOW SIZES TO BE DETERMINED BY OWNER & CONTRACTOR

SOUTH ELEVATION

NOTES THIS ELEVATION TYPICAL

NOTE:

EAST ELEVATION WILL REMAIN UNCHANGED

BETWEEN ALL OBSTRUCTIONS

-U-SHAPED KITCHENS SHALL HAVE MIN. 60" CLEARANCE BETWEEN ALL OBTRUSIONS

(EXCEPTION: SPACES THAT DO NOT CONTAIN A COOK TOP OR RANGE DO NOT NEED TO COMPLY WITH CLEARANCES)

DINING AND WORKING SURFACES SHALL BE MIN. 28" AND MAX. 34"

ABOVE THE FLOOR (EXCEPTION: SPACES THAT DO NOT CONTAIN A COOK TOP OR RANGE DO NOT NEED TO COMPLY WITH WORK SURFACE REQ.'s)

-AT LEAST 50% OF SHELVES & OPERABLE PARTS IN CABINETS & STORAGE: SHALL HAVE CLEAR FLOOR SPACE & BE WITHIN REACH RANGES

-ALL OPERABLE APPLIANCE CONTROLS SHALL BE PLACED WITHIN APPLIANCES: REACH RANGES - APPLIANCES OTHER THAN APPLIANCE DOORS AND DOOR LATCHING

DEVICES SHALL BE OPERABLE WITH ONE HAND, SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST

-"A CLEAR FLOOR SPACE, POSITIONED ADJACENT TO THE DISHWASHER: DISHWASHER DOOR SHALL BE PROVIDED. THE DISHWASHER DOOR IN THE OPEN POSITION SHALL NOT OBSTRUCT THE CLEAR FLOOR SPACE FOR THE DISHWASHER OR AN ADJACENT SINK" (ANSI, 804.6.3)

> -A CLEAR FLOOR SPACE SHALL BE POSITIONED FOR A PARALLEL APPROACH & THE CONTROLS SHALL LOCATED WHERE REACHING ACROSS BURNERS IS NOT REQUIRED.

-SIDE-HINGED & BOTTOM-HINGED DOORS SHALL HAVE A WORK SURFACE ADJACENT TO ONE SIDE OF THE DOOR - OVEN CONTROLS <u>OVEN:</u> SHALL BE LOCATED ON FRONT PANELS

### REFRIGERATOR/

COOKTOP:

- "COMBINATION REFRIGERATORS AND FREEZERS SHALL HAVE AT LEAST 50% OF THE FREEZER COMPARTMENT SHELVES, INCLUDING THE FREEZER: BOTTOM OF THE FREEZER, 54" MAX. ABOVE THE FLOOR WHEN THE SHELVES ARE INSTALLED AT THE MAXIMUM HEIGHTS POSSIBLE IN THE COMPARTMENT. A CLEAR FLOOR SPACE, POSITIONED FOR A PARALLEL APPROACH TO THE SPACE DEDICATED TO A REFRIGERATOR/FREEZER SHALL BE PROVIDED. THE CENTERLINE OF THE CLEAR FLOOR SPACE SHALL BE OFFSET 24" MAXIMUM FROM THE CENTERLINE OF THE DEDICATED SPACE" (ANSI, 804.6.6)

SCALE: NTS

### PUBLIC KITCHEN

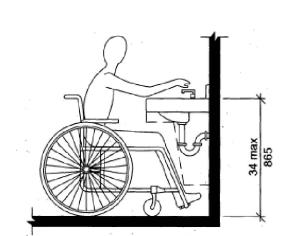
PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN REFER TO CLEAR FLOOR SPACE STANDARDS REFER TO KNEE \$ TOE CLEARANCE STANDARDS

11/<sub>2</sub> min Size of Grab Bars Spacing of Grab Bars

# GRAB BARS

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN REFER TO CLEAR FLOOR SPACE STANDARDS REFER TO KNEE \$ TOE CLEARANCE STANDARDS

SCALE: NTS

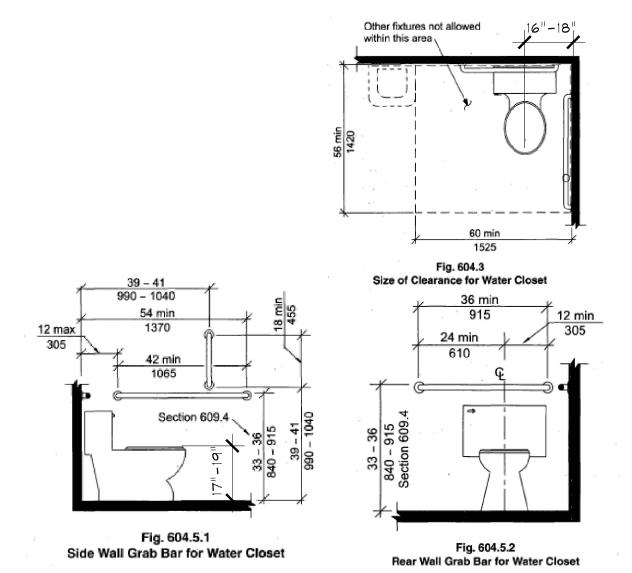


Height of Lavatories and Sinks

# PUBLIC LAVATORY

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN REFER TO CLEAR FLOOR SPACE STANDARDS REFER TO KNEE \$ TOE CLEARANCE STANDARDS NOTE: A PARALLEL APPROACH IS PERMITTED FOR KITCHEN SINKS WHERE A COOK TOP OR RANGE IS NOT PROVIDED

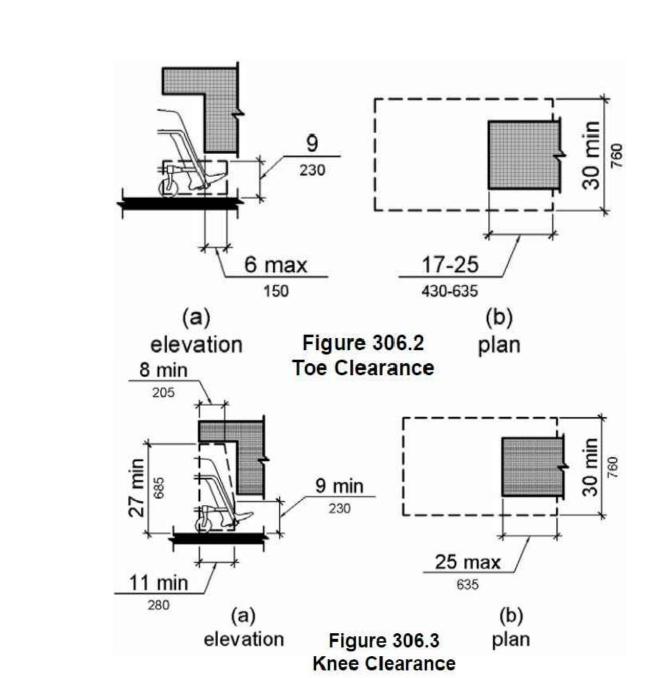
SCALE: NTS



# PUBLIC WATER CLOSET STANDARDS

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN

SCALE: NTS

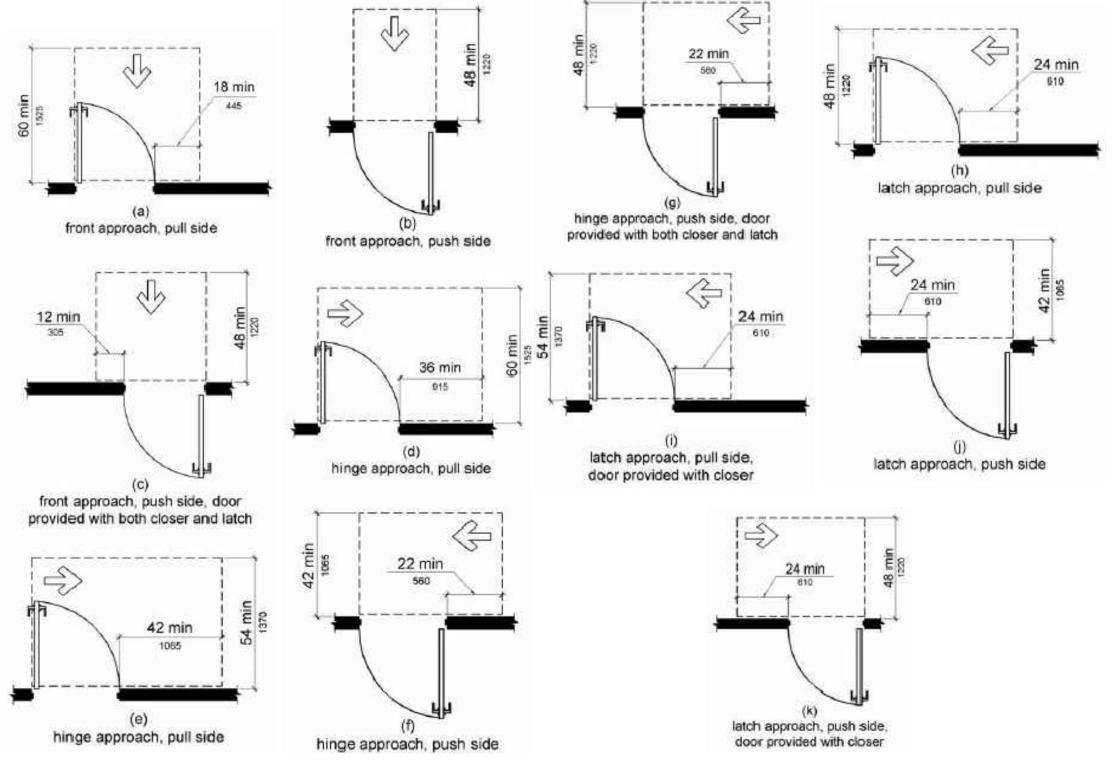


# KNEE # TOE CLEARANCE

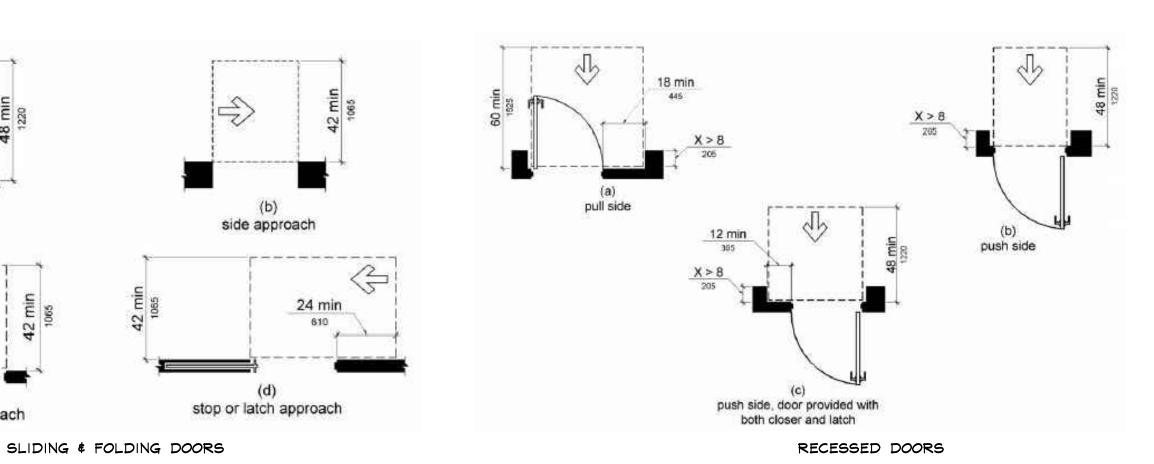
PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN REQUIRED WHEN SPACE BENEATH AN ELEMENT IS INCLUDED AS CLEAR FLOOR SPACE, CLEARANCE OR TURNING SPACE

CLEAR FLOOR SPACE PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN SCALE: NTS

**Position of Clear Floor Space** 



MANUAL SWINGING DOORS

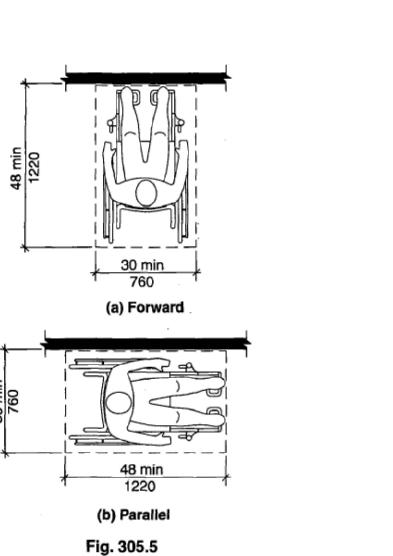


## TYPICAL ADA DOOR SWINGS

front approach

pocket or hinge approach

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN REFER TO CLEAR FLOOR SPACE STANDARDS REFER TO KNEE \$ TOE CLEARANCE STANDARDS MIN. CLEAR WIDTH OF DOOR OPENING IS 32" DOORS IN SERIES NEED MIN. 48" CLEAR PLUS WIDTH OF DOORS SWINGING INTO SPACE



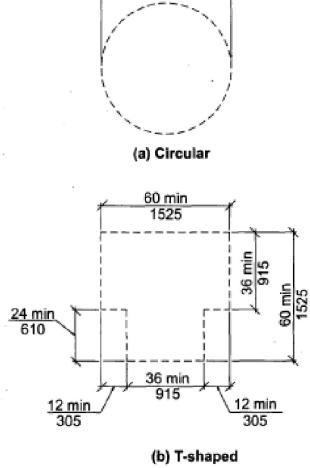


Fig. 304.3 Size of Turning Space

# TURNING SPACE SPACE

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN SPACES SHALL BE LOCATED ON SLOPE LESS THAN 1:48





SCALE: N.T.S.

PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19 REVIEW SET 12 . 10 . 19 PERMIT SET

02 . 12 . 20

DRAWN BY: RPI REVIEWED BY: JEN PROJECT # 19052 PUBLIC ADA SPECIFICATIONS

\$ STANDARDS SHEET 7 of 12

REACH RANGES

Fig. 308.3.1

**Unobstructed Side Reach** 

Fig. 308.2.2

**Obstructed High Forward Reach** 

PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN SCALE: NTS

Fig. 308.3.2 **Obstructed High Side Reach** 

Fig. 308.2.1

**Unobstructed Forward Reach** 

SCALE: NTS

SPACES SHALL BE LOCATED ON SLOPE LESS THAN 1:48

DOORS ARE PERMITTED TO SWING INTO TURING SPACES, U.N.O.

#### Applicable Codes and Standards:

- A. 2015 International Building Code (including all local adoptions)
- B 2015 International Residential code (including all local adoptions) C. City of Steamboat Springs Community Development Code
- D. "Minimum Design Loads for Buildings and Other Structures" ASCE 7-10

100 psf Ground, 70 psf Roof

- E. "Building Code Requirements for Structural Concrete" ACI318 F. "Steel Construction Manual" - AISC fourteenth edition
- G. "National Design Specification for Wood Construction" ANSI/AF&PA-NDS 2015
- B. Floors: 50 psf 120 mph, Exposure B D. Wind: E. Seismic Design: Category B, Soil Type D

### Foundation Criteria:

Design Live Loads:

A. Roofs:

- A. Design of continuous and individual footings is based on a maximum allowable soil bearing pressure of 2,000 psf dead load plus full live load and a minimum dead load of 500 psf placed on the natural undisturbed soils below frost depth. Refer to soils report
- No. 19-1048 by Western Slope Geotech, Inc. B. Per the soils report, expansive soils were encountered at proposed construction site. The owner is aware of the risks associated with expansive soils and has approved the use
- of the proposed foundation system. C. Site must be over excavated by a minimum of 3 feet and footings placed on structural backfill per the soils report.

Reinforced Concrete:

shall be broom finished.

- A. Structural concrete shall be Type 1, and have a minimum 28 day strength of 3,000 psi, Exterior concrete slabs shall be Type 1 and have a minimum 28 day strenath of 4,000 psi. All concrete shall have a min 6% (+/- 1.5%) entrained air for durability and a max. 4'' (+/- 1'') slump. The maximum aggregate size shall be 3/4''. Concrete shall not be placed on frozen ground and shall be protected from freezing for a minimum of 7 days. During cold weather the methods and specifications set forth in ACI 306R-88 shall
- be followed to prevent frost damage. B. All concrete work shall conform to the requirements of AC1318 and 301, latest edition.
- C. All exposed edges shall have a 3/4" chamfer. D. Reinforcing bars shall conform to ASTM spec. A615-79 and shall be Grade 60. E. At splices, lap bars a minimum of 38 diameters. At corners and intersections, make horizontal continuous or provide matching corner bars. Around openings in walls and slabs,
- provide (2) #5 bars extending a minimum of 2 feet beyond the edge of the opening. Continuous top bars in walls shall be spliced at mid-spane. Continuous bottom bars in walls shall be spliced at supports. F. Concrete cover shall conform to ACI 318-08, 7.7. Unless a areater cover is required, concrete cast against earth shall have 3in. min. cover, concrete exposed to earth or
- weather shall have 2in. min. cover for No. 6 bars \$ greater, \$ 1½in. min. cover for No. 5 bars \$ smaller. Concrete not exposed to weather shall have 3/11 min. cover for No. 11 bars \$ smaller.
- G. Welded wire fabric shall conform to ASTM 185 and shall be lapped one full mesh at splices and tied together.
- H. Concrete shall be adequately consolidated/vibrated during placement to ensure it is thoroughly placed around all reinforcing steel and embedded fixtures.
- I. Unless noted otherwise, slabs, footings and walls shall not have any horizontal 'cold joints. All construction joints shall be detailed or reviewed by the Engineer of Record. J. Interior concrete slab finish shall be steel trowel finished and exterior concrete slabs

33'-0" PROPOSED

- Structural Wood Framing:
- A. Unless noted otherwise, all 2" lumber shall be Douglas Fir S4S No. 2 and better. All solid timber beams and posts shall be DF-L No. 1 or better.
- B. Unless noted otherwise, minimum nailina shall be provided as specified in Table No. 2304.10.1, "Fastening Schedule", of the 2015 IBC or Table No. R602.3(1), "Fastening Schedule", of the 2015 IRC.
- C. Floor sheathing shall be APA rated with exterior glue and graded in accordance with APA standards. Panel identification and thickness shall be as noted on the drawings. Wall sheathing shall be  $1\frac{1}{2}$ " Zip R-6 R-Sheathing and shall be fastened with 0.131" shank nails with 3" edge spacing and 6" field spacing in accordance with the manufacturer's specifications, U.N.O. All wall fasteners shall have minimum 1½" penetration into the supporting framing members.
- D. Where light gauge framing anchors are shown or required, they shall be Simpson "Strong Tie" (or equal approved by ICBO). They shall be installed with the number and type of fasteners recommended by the manufacturer to develop the rated capacity.
- E. Laminated Veneer Lumber shall be of such stress grade to provide an allowable bending stress of 2,600 psi, allowable shear stress parallel to the glue line of 285 psi and a modulus of elasticity of 1,900,000 psi. F. Glue laminated timber shall be stress grade marked 24F-V4, unless noted otherwise
- G. Roof and floor trusses shall be designed by a Colorado Registered Professional Engineer to support the full live load and dead loads of the roof, ceiling, and any other superimposed loads. Calculations and shop drawings, including member sizes, lumber species, and grade and substantiating data for connector capacities and truss bearing, shall be submitted to the Architect or Engineer for review and approval prior to fabrication.
- H. Floor joists shall be plant fabricated I series with LVL or solid wood flanges and plywood or OSB webs, and shall carry ICBO approval for a complete section. Joists shall be designed to carry full live and dead loads of the roof(s), floor(s), and any superimposed loads.
- J. Roof overframing shall be 2x6 rafters @ 24" O.C. w/ 2x6 studs @ 24" O.C. to stack over rafters or purlins below.

### Structural Steel:

- A. Structural steel shall be detailed and fabricated in accordance with the latest version of the AISC Manual of Steel Construction.
- B. All bolts, including anchor bolts, shall conform to ASTM spec. A307
- C. Structural steel rolled W shapes shall be ASTM A50. Plates and angles, shall be ASTM A36. D. Expansion bolts called for on the drawings shall be Simpson "Weg-All", "Strong-Bolt 2" or approved wedge type anchors with the following minimum embedments: 3/4" diameter bolts – 3%", 5/8" diameter bolts -  $2\frac{3}{4}$ ", 1/2" diameter bolts -  $2\frac{1}{4}$ ".
- E. All epoxy shall be Simpson "Set-XP" and shall be installed per the "Anchorina and fastenina" Systems For Concrete and Masonry" Simpson catalog #C-SAS-2012 by a qualified personnel. F. Field welded connections must be inspected by the Engineer of Record
- G Fillet welds indicated on the plans shall be of E70xx electrodes and shall be the minimum size specified in the AISC Manual of Steel Construction, Table J2.4. H. All welds shall be performed by a certified welder.

#### Field Verification:

60'-0"+/- EXISTING

A. The contractor shall thoroughly inspect and survey the existing structure to verify dimensions, elevations, framing, etc., which may affect the work shown on the drawinas and report any variations or discrepancies to the Engineer.



02/12/20

ISSUE DATES PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19

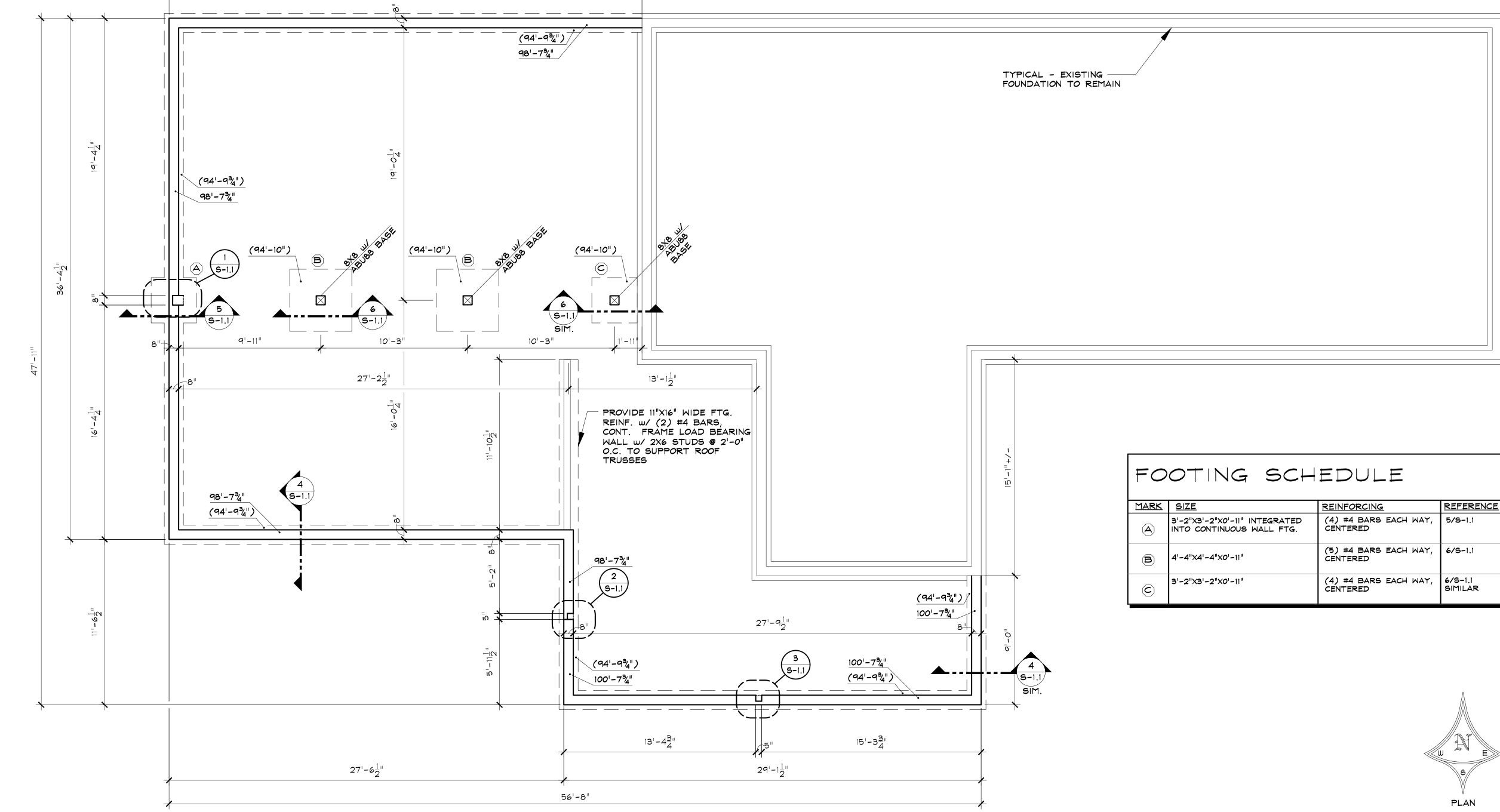
REVIEW SET 12 . 10 . 19 PERMIT SET 02 . 12 . 20

DRAWN BY: RP REVIEWED BY: JET PROJECT # 19052 FOUNDATION PLAN

# STRUCTURAL NOTES SHEET 8 of 12

SCALE:  $\frac{1}{4}$  = 1'-0"

STRUCTURE LEGEND ☐ = COLUMN BELOW = COLUMN ABOVE BEARING ■ = COLUMN CONTINUOUS ARROW THIS LEVEL = TYPICAL HEADER = CLOSURE WALL ] = HANGER → CLIP

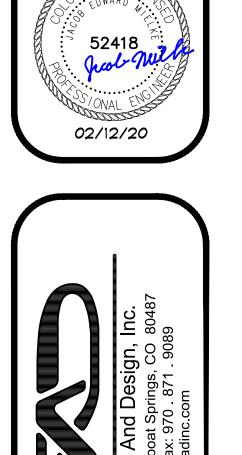


FOUNDATION PLAN

YPICAL - ELEVATION @ TOP OF CONCRETE WALL INDICATED THUS: ELEV /\* TYPICAL - ELEVATION @ TOP OF CONCRETE FOOTING INDICATED THUS: (ELEV)/

TYPICAL - COLUMNS THAT BEGIN THIS LEVEL ARE INDICATED ON PLAN





TYPICAL - PROVIDE LSL

RIM @ EXTERIOR WALL

8" THICK CONC. WALL

EA. WAY, CENTERED

TO FOOTINGS) OVER 4"

COMPACTED NATIVE FILL

OF FOOTING OVER

REINF. w/ (2) #4 BARS,

TOP \$ #4 BARS @ 18" O.C.

TYPICAL @ CRAWLSPACE - 6

MIL. VAPOR BARRIER (GLUED

GRAVEL BACKFILLED TO TOP

TYPICAL - 'OVER-EXCAVATE'

FOOTING ON STRUCTURAL BACKFILL PER SOILS REPORT

SCALE:  $\frac{3}{4}$ " = 1'-0"

FOOTING 'A' Re: 1/S-1

DROP T.O. CONC. FOR

BM POCKET w/ (4) 14"

LVL OVER TRTD. 2X4

Re: 5/S-1.1

T.O. BM

POCKET

(94'-9<sup>3</sup>/<sub>4</sub>")

T.O. FTG.

T.O. CONC.

98'-7¾"

BY MIN 3'-0" & PLACE

14" TJI 210 JOSTS

@ 16" O.C.

ISSUE DATES PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19 REVIEW SET 12 . 10 . 19

PERMIT SET 02 . 12 . 20 DRAWN BY: RPN REVIEWED BY: JEM

FOUNDATION

PROJECT # 19052

SECTIONS SHEET 9 of 12

14" TJI 210 JOISTS @ 16" O.C. - PROVIDE ROLL BLOCKING @ BM 100'-0"+/-MATCH EXISTING T.O. PLYWD. 98'-9¼" T.O. BM (4) 14" LVL BM CC7%-8 COLUMN CAP ABU88 BASE PROVIDE  $\frac{\pi}{2}$  BOLT IN EXPANSION ANCHOR 94'-10" T.O. FTG. 4'-4"X4'-4"X0'-11" FTG. 'B' REINF. w/ (5) #4 BARS EACH WAY, CENTERED TYPICAL - -'OVER-EXCAVATE' BY MIN 3'-0" \$ PLACE FOOTING ON STRUCTURAL BACKFILL PER SOILS REPORT

FOOTING 'B' SECTION

DROP T.O. CONC. FOR BM

POCKET W/ (2) 14" LVL OVER

TRTD. 2X4 Re: 5/S-1.1 SIMILAR

100'-73/4"

T.O. CONC.

SCALE:  $\frac{3}{4}$ " = 1'-0"

- 14" TJI 210 JOISTS @ 16" TYPICAL EXTERIOR WALL O.C. - PROVIDE ROLL Re: 4/S-1.1 BLOCKING @ BM 100'-0"+/- MATCH EXISTING T.O. PLYWD. TYPICAL - PROVIDE CONTINUOUS METAL -FLASHING - EXTEND MIN. 6" BELOW GRADE 98'-9¼" T.O. BM 98'-7<sup>3</sup>/<sub>4</sub>" T.O. WALL (4) 14" LVL BM 97'-5<sup>3</sup>/<sub>4</sub>" T.O. BM POCKET PROPOSED GRADE - SLOPE TYPICAL @ CRAWLSPACE - 6 AWAYFROM STRUCTURE MIN. 6" MIL. VAPOR BARRIER (GLUED IN FIRST 10 HORIZONTAL FEET TO FOOTINGS) OVER 4" GRAVEL BACKFILLED TO TOP OF FOOTING OVER TYPICAL PERIMETER DRAIN AND COMPACTED NATIVE FILL DRAIN BOARD Re: 4/5-1.1 94'-9<sup>3</sup>/<sub>4</sub>" T.O. FTG. 3'-2"X3'-2"X0'-11" FTG. 'A' REINF. w/ (4) #4 BARS EACH WAY, CENTERED TYPICAL - 'OVER-EXCAVATE' BY MIN 3'-0" & PLACE FOOTING ON STRUCTURAL BACKFILL PER SOILS REPORT

FOOTING 'A' SECTION

SCALE:  $\frac{3}{4}$ " = 1'-0"

98'-73/" T.O. CONC. (94'-9¾") DROP T.O. CONC. FOR BM POCKET  $\omega$ / (2) 14" T.O. FTG. LVL OVER TRTD. 2X4 Re: 5/S-1.1 SIMILAR T.O. BM POCKET 100'-7¾" T.O. CONC.

BEAM POCKET DETAIL

SCALE:  $\frac{3}{4}$ " = 1'-0"

BEAM POCKET DETAIL

TYPICAL PLATFORM FRAMED EXTERIOR WALL - 1/2" ZIP SYSTEM OVER 2X6 STUDS

@ 16" O.C. (FASTEN PANELS w/ 0.131" SHANK NAILS @ 3" EDGE SPACING \$ 6"

RECOMMENDATIONS. ALL FASTENERS SHALL HAVE MINIMUM 1½" PENETRATION

½"ФX10" GALV. ANCHOR BOLTS @ -

 $\hat{4}$ '-0" O.C. IN TREATED 2X6 PLATE

TYPICAL - PROVIDE CONTINUOUS METAL -

FLASHING - EXTEND MIN. 6" BELOW GRADE

98'-73/4" T.O. WALL

100'-0"+/- MATCH EXISTING T.O. PLYWD.

FIELD SPACING PER MFR'S

- DO NOT COUNTERSINK

PROPOSED GRADE - SLOPE

TYPICAL - PROVIDE ROLL -

OF ALL CONCRETE WALLS

AWAYFROM STRUCTURE MIN. 6"

IN FIRST 10 HORIZONTAL FEET

APPLIED OR SPRAY ON WATER

PROOFING \$ INSULATED DRAIN

BOARD FASTENED TO EXTERIOR

TYPICAL - #4 DOWELS X 2'-10" X

6" @ 18" O.C., ALT. BENDS IN FTG.

TYPICAL PERIMETER DRAIN - 4"\$

"/FT. TO DAYLIGHT - SURROUND

PERF. PVC PIPE, MIN. 6" BELOW

BOTTOM OF FOOTING - SLOPE

w/ 1 CU. FT./LIN FT. WASHED ROCK IN MIRAFI 140 N FABRIC ENVELOPE - REFER TO SOILS

TYPICAL FOOTING - 1'-4" X 11"

CONC. FTG. REINF. w/ (2) #4

TYPICAL WALL SECTION

REPORT

BARS, CONT.

94'-9¾" T.O. FTG.

INTO STUDS)

BEAM POCKET DETAIL  $SCALE: \frac{3}{4}" = 1'-0"$ 

97'-5¾"

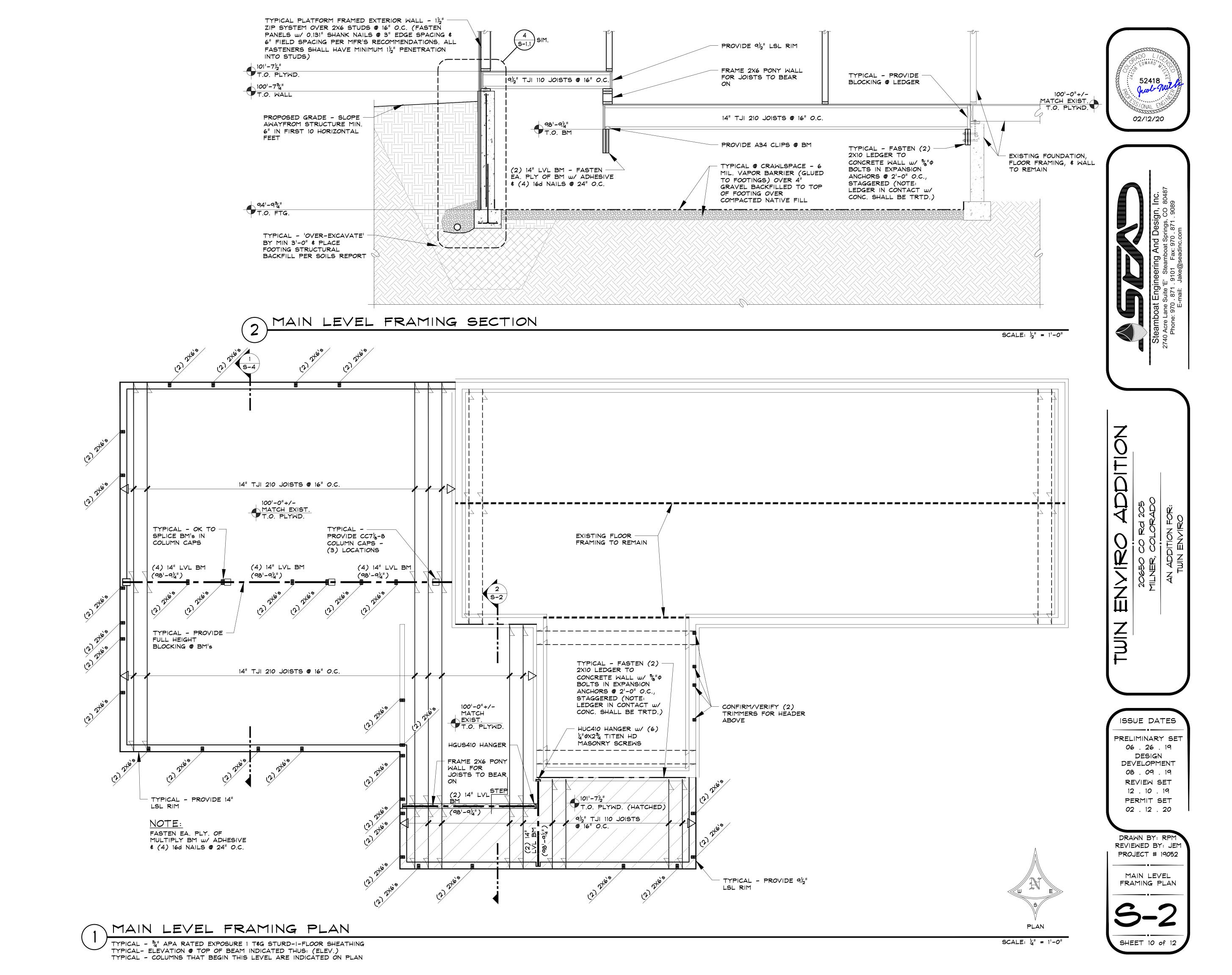
T.O. BM

POCKET

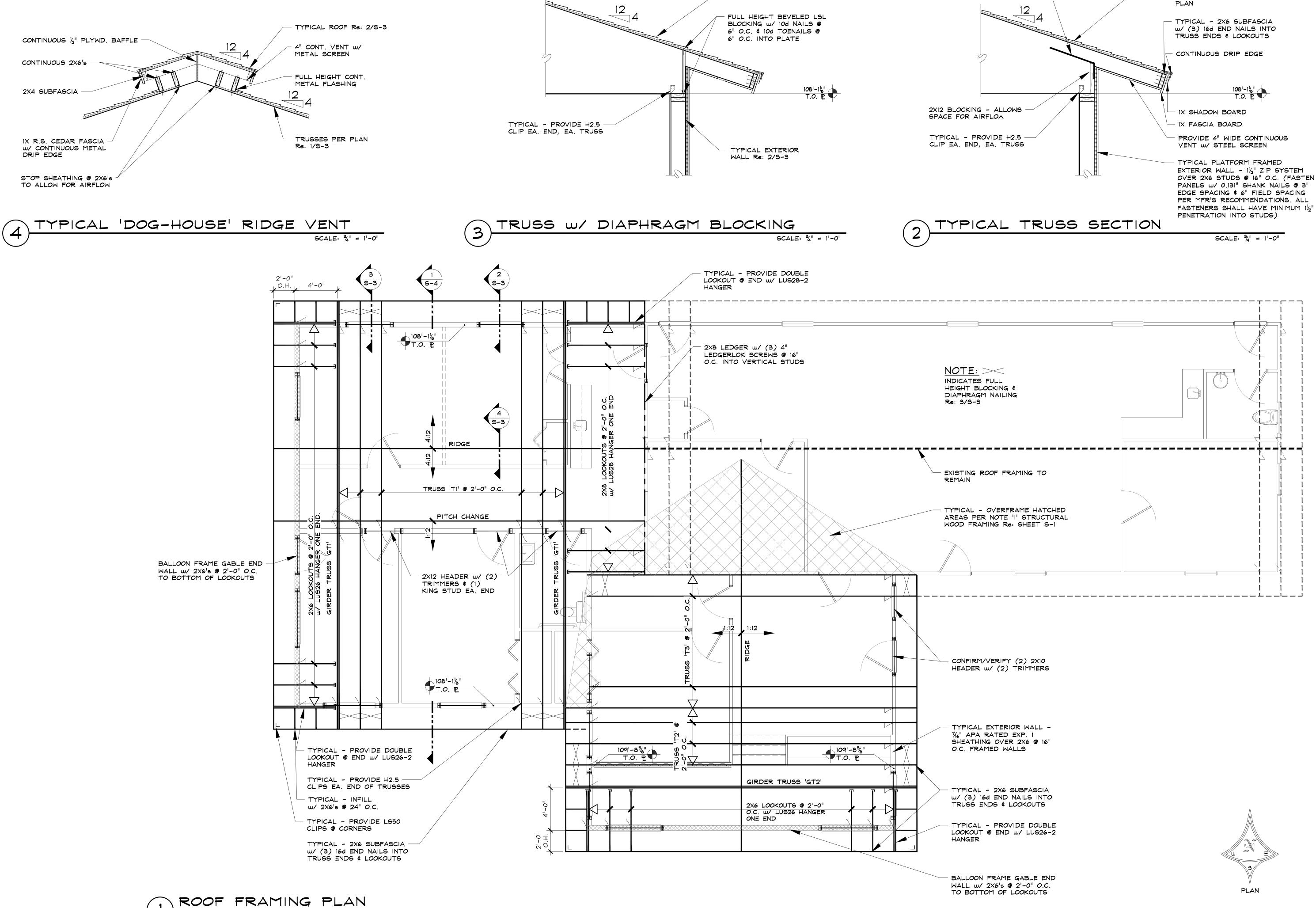
(94'-9<sup>3</sup>/<sub>4</sub>")

T.O. FTG.

SCALE:  $\frac{3}{4}$ " = 1'-0"



Z:\2019\19052\_Texter-Twin Enviro Addition\Drawings\Struc\19052\_5



52418

TYPICAL ROOF - HEAVY DUTY ASPHALT SHINGLES OVER 100%

ICE \$ WATER SHIELD OVER 3"

SHEATHING OVER TRUSSES PER

APA RATED EXPOSURE 1

TYPICAL - PROVIDE BAFFLES -

TO PREVENT INSULATION FROM BLOCKING AIR FLOW

TYPICAL ROOF Re: 2/S-3



PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19 REVIEW SET 12 . 10 . 19 PERMIT SET 02 . 12 . 20

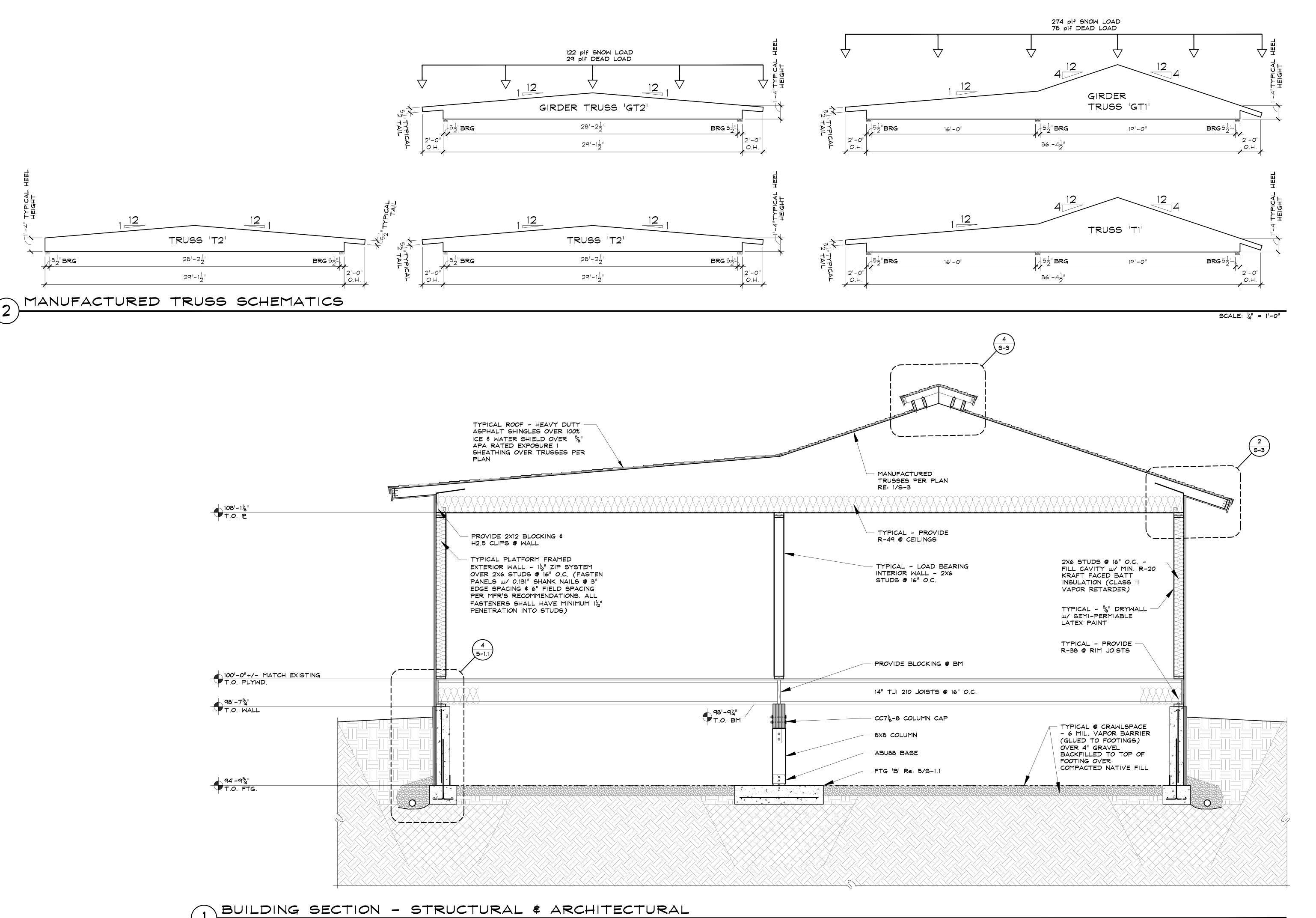
DRAWN BY: RPI REVIEWED BY: JEM PROJECT # 19052

ROOF FRAMING PLAN & SECTIONS

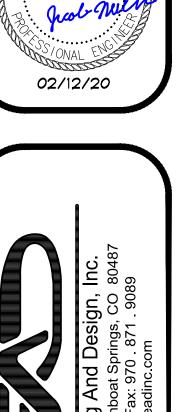


TYPICAL - 3" APA RATED EXPOSURE 1 40/20 SHEATHING TYPICAL - ELEVATION @ TOP OF BEAMS INDICATED THUS: (ELEV.) TYPICAL HEADER THIS PLAN - (2) 2X10's, w/ (2) TRIMMER \$ (1) KING STUD EA. END, U.N.O. Re: 2/S-4 FOR MANUFACTURED TRUSS SCHEMATICS

 $SCALE: \frac{1}{2} = \frac{1}{1 - 0}$ 







Steamboat Engineering And Design, Ir 2740 Acre Lane Suite 'E' Steamboat Springs, CO 8 Phone: 970 . 871 . 9101 Fax: 970 . 871 . 9089

TWIN ENVIRO ADDITION
20650 CO Rd 205
MILNER, COLORADO

PRELIMINARY SET

06 . 26 . 19

DESIGN

DEVELOPMENT

08 . 09 . 19

REVIEW SET

12 . 10 . 19

PERMIT SET

02 . 12 . 20

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

BUILDING SECTION

S-4

SHEET 12 of 12

SCALE:  $\frac{1}{2}$  = 1'-0"

### MECHANICAL GENERAL NOTES

- 1. DRAWINGS AND SPECIFICATIONS ARE COMPLIMENTARY. WHATEVER IS CALLED FOR IN EITHER IS BINDING AS THOUGH CALLED FOR IN BOTH.
- 2. ALL WORK SHALL CONFORM WITH ALL APPLICABLE BUILDINGS CODES, FIRE CODES, AND ALL AUTHORITIES HAVING JURISDICTION.
- 3. THE EQUIPMENT SPECIFIED ON THE DRAWINGS HAVE BEEN SELECTED AS THE BASIS OF DESIGN. THE USE OF REVIEWED OR SPECIFIED EQUALS SHALL BE COORDINATED BY THE CONTRACTOR FOR SPACE REQUIREMENTS, EQUIPMENT DIMENSIONS, AND PERFORMANCE.
- 4. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL DESIGN INTENT, ARRANGEMENT, AND GENERAL EXTENT OF SYSTEMS. DO NOT SCALE DRAWINGS NOR USE AS SHOP DRAWINGS. WHERE ALTERNATIVE ROUTING, OFFSETS, AND TRANSITIONS ARE REQUIRED FOR FIELD COORDINATION OF ALL OTHER TRADES, THIS CONTRACTOR SHALL FIELD COORDINATE WITH ALL OTHER TRADES, AND SHALL MAKE CHANGES WITHOUT ADDITIONAL COSTS.
- 5. CONTRACTOR SHALL CLOSELY COORDINATE NEW MECHANICAL WORK WITH ALL NEW AND EXISTING MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION, ARCHITECTURAL, AND STRUCTURAL MEMBERS. RELOCATE EXISTING MECHANICAL, PLUMBING AND FIRE PROTECTION WORK AS REQUIRED TO ACCOMMODATE ALL NEW WORK (ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, FIRE ALARM, LOW VOLTAGE, AV, ETC.
- 6. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION UNLESS SPECIFICALLY DIRECTED OTHERWISE.
- 7. COORDINATE ALL DIFFUSER AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, FIRE PROTECTION AND ELECTRICAL DRAWINGS.
- 8. INSTALL CONDENSATE DRAINS FOR ALL COOLING COILS WITH TRAP DEPTH EQUAL TO 1.5 TIMES THE UNIT'S TOTAL STATIC PRESSURE. DISCHARGE CONDENSATE TO FLOOR SINK/FLOOR DRAIN UNLESS NOTED OTHERWISE.
- ALL ROOF WORK SHALL BE PER THE ROOFING MANUFACTURE'S INSTALLATION INSTRUCTIONS TO MAINTAIN THE EXISTING ROOF WARRANTY.
- 10. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATION AND INSTALLING SLEEVES, INSERTS AND SUPPORTS AS REQUIRED FOR THIS SCOPE OF WORK AND/OR CORE DRILL REQUIREMENTS. COORDINATE WITH GENERAL CONTRACTOR AND STRUCTURAL ENGINEER AS
- 11. CONTRACTOR SHALL FIELD VERIFY ALL MECHANICAL ITEMS PRIOR TO SUBMITTING A BID.
- 12. PROVIDE ACCESS PANELS IN HARD CEILINGS FOR ACCESS TO ALL MECHANICAL EQUIPMENT, FIRE DAMPERS, FIRE/SMOKE DAMPERS, ISOLATION VALVES, ETC. THIS SHALL INCLUDE ALL NEW MECHANICAL ITEMS REQUIRING ACCESS.
- 13. PROVIDE REDLINE MARKUPS OF ANY FIELD CHANGES OR MODIFICATIONS ON THE CONSTRUCTION DOCUMENTS. REDLINE DRAWINGS SHALL BE REQUIRED WHETHER COORDINATION DRAWINGS ARE REQUIRED OR NOT.
- 14. THE MECHANICAL DIAGRAMS SHALL BE INCORPORATED INTO THE ASSOCIATED WORK AND PROVIDE GENERAL GUIDANCE AS TO THE INSTALLATION INTENT WHETHER REFERENCED TO OR NOT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY COMPONENTS FOR A COMPLETE INSTALLATION, AND INSURE THAT ALL INSTALLATIONS ARE IN ACCORDANCE WITH THE EQUIPMENT'S MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- 15. COORDINATE AND VERIFY ACTUAL APPROVED EQUIPMENT DIMENSIONS PRIOR TO POURING CONCRETE EQUIPMENT PADS.
- 16. WHERE PIPING AND/OR DUCTWORK IS TO BE REMOVED TO A POINT, IT SHALL BE CAPPED OFF AND PROTECTED (WHERE APPLICABLE) FOR CONNECTION TO NEW WORK. INSULATION ON EXISTING PIPING AND DUCTWORK SHALL BE REPAIRED EQUAL TO NEW CONDITION.
- 17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND PATCHING OF DAMAGED ARCHITECTURAL COMPONENTS TO REMAIN DURING THE REMOVAL OF THE DESIGNATED SYSTEMS. COORDINATE REPAIR WITH ARCHITECT.
- 18. THE OWNER RESERVES FIRST CHOICE TO KEEP EXISTING EQUIPMENT AND MATERIALS. COORDINATE WITH OWNER AND DELIVER DESIGNATED EQUIPMENT AND MATERIALS REMOVED UNDER THIS CONTRACT TO OWNERS DESIGNATED STORAGE AREA.
- 19. THE LOCATION AND CONDITION OF THE EXISTING PROPERTY AND MECHANICAL SYSTEMS WERE TAKEN FROM PREVIOUS CONSTRUCTION DRAWINGS, OBSERVED FIELD CONDITIONS, AND ASSUMED FIELD CONDITIONS. CERTAIN ASSUMPTIONS MAY BE MADE REGARDING EXISTING CONDITIONS BECAUSE THE ASSUMPTION MAY NOT BE VERIFIED WITHOUT DESTROYING THE EXISTING SPACE. CONTRACTOR SHALL VERIFY EXISTING SYSTEMS PRIOR TO SUBMITTING FINAL BIDS, FABRICATION, OR SUBMITTALS.

| AFUE ANNUAL FUEL UTIL EFFICIENCY  AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR  |                         | OLSINIE    | GEND MAY NOT BE USED ON THIS PRO | IECT    |                           |
|--|-------------------------|------------|----------------------------------|---------|---------------------------|
| AFF ABOVE FINISH FLO AFMS AIR FLOW MEASUR AFUE ANNUAL FUEL UTIL EFFICIENCY AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DRY BULB TEMPER DB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEME EER ENERGY EFFICIENCE   | ALL OTHIO               | OLO IIV LL | ABBREVIATIONS                    | 0201.   |                           |
| AFF ABOVE FINISH FLO AFMS AIR FLOW MEASUR AFUE ANNUAL FUEL UTIL EFFICIENCY AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DRY BULB TEMPER DB DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENC  |                         |            | ADDITEVIATIONS                   |         |                           |
| AFMS AIR FLOW MEASURE AFUE ANNUAL FUEL UTIL EFFICIENCY AHU (AH) AIR HANDLING UNIT AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE POWER BAS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CUBIC FEET PER M CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF PCU CONDENSING UNIT CV CONSTANT VOLUMY CWP CONDENSER WATE DB DRY BULB TEMPER BORY BULB TEMPER BULB TEMPER BORY BULB TEMPER BULB TE |                         | FLA        | FULL LOAD AMPS                   | Р       | PUMP                      |
| AFUE ANNUAL FUEL UTIL EFFICIENCY  AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PONBMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER H COMBINE  |                         | FPM        | FEET PER MINUTE                  | PCF     | POUND PER CUBIC FOOT      |
| AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER H CFM CUBIC FEET PER N CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENT   |                         | FPS        | FEET PER SECOND                  | PD      | PRESSURE DROP             |
| AHU (AH) AIR HANDLING UNI AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER H CFM CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DRY BULB TEMPER DB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY   |                         | =T         | FEET                             | PH      | PHASE                     |
| AP ACCESS PANEL BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DRY BULB TEMPER DB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EAT ENTERING AIR TEM EER ENERGY EFFICIENCY   |                         | GAL        | GALLONS                          | PPM     | PARTS PER MILLION         |
| BAS BUILDING AUTOMA BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER N CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY   |                         | GPH        | GALLONS PER HOUR                 | PRV     | PRESSURE REDUCING VALVE   |
| BOD BOTTOM OF DUCT BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER N CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY   |                         | GPM        | GALLONS PER MINUTE               | PSI     | POUND PER SQUARE INCH     |
| BOP BOTTOM OF PIPE BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER H CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE  |                         | HD         | HEAD                             | PSIA    | POUND PER SQUARE INCH ABS |
| BHP BRAKE HORSE PON BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER M CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF PCU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER DB DECIBEL DDC DIRECT DIGITAL CODN DOWN DP DIFFERENTIAL PREDS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEMEER  | M OF DUCT               | <b>⊣</b> P | HORSE POWER                      | PSIG    | POUND PER SQUARE INCH GAL |
| BMS BUILDING MANAGE BTU BRITISH THERMAL CFH CUBIC FEET PER H CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE   | M OF PIPE               | ℲR         | HOUR                             | RA      | RETURN AIR                |
| BTU BRITISH THERMAL CFH CUBIC FEET PER H CFM CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE  | HORSE POWER F           | ΗZ         | HERTZ                            | RH      | RELATIVE HUMIDITY         |
| CFH CUBIC FEET PER H CFM CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE  | NG MANAGEMENT SYSTEM    | N          | INCH                             | RPM     | REVOLUTIONS PER MINUTE    |
| CFM CUBIC FEET PER M CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE   | H THERMAL UNIT          | .E.        | INVERT ELEVATION                 | RTU     | ROOFTOP UNIT              |
| CO CARBON MONOXID CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY  | FEET PER HOUR           | <b>W</b>   | KILOWATT                         | SEER    | SEASONAL ENERGY EFFICIENC |
| CO2 CARBON DIOXIDE COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEME EER ENERGY EFFICIENCE   | FEET PER MINUTE         | <b>KWH</b> | KILOWATT-HOUR                    |         | RATIO                     |
| COP COEFFICIENT OF P CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEME EER ENERGY EFFICIENCE  | N MONOXIDE L            | _AT        | LEAVING AIR TEMPERATURE          | SA      | SUPPLY AIR                |
| CU CONDENSING UNIT CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCE  | N DIOXIDE L             | _BS        | POUNDS                           | SP      | STATIC PRESSURE           |
| CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEME EER ENERGY EFFICIENCE  | ICIENT OF PERFORMANCE L | _F         | LINEAR FEET                      | SQ FT   | SQUARE FEET               |
| CV CONSTANT VOLUM CWP CONDENSER WATE DB DRY BULB TEMPER dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEME EER ENERGY EFFICIENCE  | NSING UNIT L            | _WT        | LEAVING WATER TEMPERATURE        | TAB     | TESTING AND BALANCING     |
| DB DRY BULB TEMPER  dB DECIBEL  DDC DIRECT DIGITAL CO  DN DOWN  DP DIFFERENTIAL PRE  DS DUCT SUMP  DX DIRECT EXPANSION  (E) EXISTING  EA EXHAUST AIR  EAT ENTERING AIR TEM  EER ENERGY EFFICIENCE  | ANT VOLUME N            | MAT        | MIXED AIR TEMPERATURE            | TDH     | TOTAL DEVELOPED HEAD      |
| DB DRY BULB TEMPER  dB DECIBEL  DDC DIRECT DIGITAL CO  DN DOWN  DP DIFFERENTIAL PRE  DS DUCT SUMP  DX DIRECT EXPANSION  (E) EXISTING  EA EXHAUST AIR  EAT ENTERING AIR TEM  EER ENERGY EFFICIENCE  |                         | ИВН        | 1000 BRITISH THERMAL UNITS PER   | TEL     | TOTAL EQUIVALENT LENGTH   |
| dB DECIBEL DDC DIRECT DIGITAL CO DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEN EER ENERGY EFFICIENCE   | JLB TEMPERATURE         |            | HOUR                             | TSP     | TOTAL STATIC PRESSURE     |
| DDC DIRECT DIGITAL CO<br>DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEN EER ENERGY EFFICIENCE   |                         | MCA        | MINIMUM CIRCUIT AMPS             | TYP     | TYPICAL                   |
| DN DOWN DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEN EER ENERGY EFFICIENCE  |                         | MERV       | MINIMUM EFFICIENCY REPORTING     | UNO     | UNLESS NOTED OTHERWISE    |
| DP DIFFERENTIAL PRE DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEN EER ENERGY EFFICIENCY  |                         |            | VALUE                            | UV      | ULTRA VIOLET              |
| DS DUCT SUMP DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY  | ENTIAL PRESSURE N       | МОСР       | MAXIMUM OVER CURRENT             | V       | VOLT                      |
| DX DIRECT EXPANSION (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENCY   |                         |            | PROTECTION                       | VAV     | VARIABLE AIR VOLUME       |
| (E) EXISTING EA EXHAUST AIR EAT ENTERING AIR TEM EER ENERGY EFFICIENC  |                         | NΑ         | NOT APPLICABLE                   | VD      | VOLUME DAMPER (MANUAL)    |
| EA EXHAUST AIR EAT ENTERING AIR TEN EER ENERGY EFFICIEN  |                         | VC         | NORMALLY CLOSED                  | VFD     | VARIABLE FREQUENCY DRIVE  |
| EAT ENTERING AIR TEM<br>EER ENERGY EFFICIEN  |                         | NFPA       | NATIONAL FIRE PROTECTION         | VTR     | VENT THRU ROOF            |
| EER ENERGY EFFICIEN  | ING AIR TEMPERATURE     |            | ASSOCIATION                      | WB      | WET BULB TEMPERATURE      |
|  |                         | VIC        | NOT IN CONTRACT                  | WC      | WATER COLUMN              |
|  |                         | NO<br>OV   | NORMALLY OPEN                    | WPD     | WATER PRESSURE DROP       |
| ESP EXTERNAL STATIC  |                         | NPSHA      | NET POSITIVE SUCTION HEAD        | (N)     | NEW                       |
| ET EXPANSION TANK  |                         |            | AVAILABLE                        | (E)     | EXISTING                  |
|  |                         | NPSHR      | NET POSITIVE SUCTION HEAD        | (F)     | FUTURE                    |
| °F DEGREES FAHREN  |                         | 0          | REQUIRED                         | (REL)   | RELOCATED                 |
| FCU (FC) FAN COIL UNIT   |                         | AC         | OUTSIDE AIR                      | ( , , ) |                           |

| EQUIPM EQUIPM            | ENT DESIGNATION.                         | AX-XX-H      | TERMINAL UNIT TAG   |
|--------------------------|--|--------------|---|
| ← → EXISTIN              | G DUCTWORK / PIPING TO REMAIN            |              | REHEAT DESIGNATION<br>BOX DESIGNATION<br>AHU OR MAU DESIGNATION |
| 4/1/////// EXISTING      | G DUCTWORK / PIPING TO BE REMOVED.       | #            | WORK NOTE DESIGNATION.  |
|                          | SECTION REFERENCE NUMBER.                | #            | DEMOLITION NOTE DESIGNATION.                                    |
| NECK SIZE                | SECTION SHEET NUMBER                     | lacktriangle | POINT OF CONNECTION.<br>NEW TO EXISTING                         |
| DEVICE TYPE  A  8"Ø  200 | AID DEVICE DECIONATION                   | $\bigoplus$  | HUMIDITY SENSOR   |
| SLOT LENGTH — A 200      | AIR DEVICE DESIGNATION                   | $\bigcirc$   | TEMPERATURE SENSOR.   |
| A 4FL/8"@                | LINEAR SLOT DESIGNATION                  |              | TEMPERATURE TRANSMITTER   |
| AIRFLOW 200              |  | $\odot$      | CARBON MONIXIDE SENSOR.   |
| REB 200                  | REBALANCE EXISTING DIFFUSER              | <b>②</b>     | CARBON DIOXIDE SENSOR.  |
| REL                      |  | (AQ)         | INDOOR AIR QUALITY SENSOR.                                      |
| 200                      | RELOCATE AND REBALANCE EXISTING DIFFUSER | <b>(3)</b>   | OCCUPANCY SENSOR.   |

|             |                      |                             | -, -                                       |
|-------------|----------------------|-----------------------------|--|
| $\boxtimes$ | SUPPLY AIR DIFFUSER  |                             | DUCT TRANSITION                            |
|             | RETURN AIR GRILLE    | <b></b>                     | DUCT TRANSITION                            |
|             | EXHAUST AIR GRILLE   |                             | SQUARE TO ROUND DUCT TRANSITION            |
|             | LINEAR SLOT DIFFUSER |                             | AIRFLOW - SUPPLY                           |
| $\square$   |                      | <b>──</b> ∤ <del>──</del> ► | AIRFLOW - RETURN OR EXHAUST                |
|             | SUPPLY DUCT UP       | L                           | MANUAL VOLUME DAMPER                       |
|             | SUPPLY DUCT DOWN     | <b>⊚</b>                    | MANUAL VOLUME DAMPER WITH REMOTE OPERATION |
|             | RETURN DUCT UP       | <b></b>                     | COMBINATION FIRE/SMOKE DAMPER.             |
|             |                      | <b>-</b> [                  | FIRE DAMPER.                               |
|             | RETURN DUCT DOWN     | ®                           | SMOKE DAMPER.                              |
|             | EXHAUST DUCT UP      | M                           | MOTORIZED CONTROL DAMPER                   |
|             | EXHAUST DUCT DOWN    |                             |  |

SHEET METAL FITTINGS AND EQUIPMENT

|                | RETURN DUCT DOWN          | S SMC   | OKE DAMPER.                 |
|----------------|---------------------------|---|-----------------------------|
|                | EXHAUST DUCT UP           | M MO  | TORIZED CONTROL DAMPER      |
|                | EXHAUST DUCT DOWN         |   |                             |
|                | PIPING DES                | GIGNATIONS AND FIT                            | TINGS                       |
| ——HWS——        | HEATING WATER SUPPLY      | <b></b>                                       | ISOLATION VALVE             |
| — —HWR— —      | HEATING WATER RETURN      |   | CHECK VALVE                 |
| ——HRS——        | HEAT RECOVERY SUPPLY      | , ,   | GILOR VALVE                 |
| —HRR—          | HEAT RECOVERY RETURN      | <b></b>                                       | PLUG VALVE                  |
| ——CHWS——       | CHILLED WATER SUPPLY      | <b>5</b>                                      | DYNAMIC VALVE               |
| — — CHWR— —    | CHILLED WATER RETURN      | [M]   |                             |
| cws            | CONDENSER WATER SUPPLY    | <b>,</b> —  X -                               | TWO-WAY CONTROL VALVE       |
| — — CWR— —     | CONDENSER WATER RETURN    | <b>,</b>                                      | THREE-WAY CONTROL VALVE     |
| ——LPS——        | LOW PRESSURE STEAM        | <b>←</b>                                      | BALANCING VALVE             |
| ——LPR——        | STEAM (CONDENSATE) RETURN | , 2   | BALANGING VALVE             |
| ——RL——         | REFRIGERANT LIQUID        | <b>,</b> ———————————————————————————————————— | PRESSURE REDUCING VALVE     |
| ——RS——         | REFRIGERANT SUCTION       | <del>5      </del>                            | STRAINER                    |
| ——RHG——        | REFRIGERANT HOT GAS       | TP  |                             |
| ——CD——         | CONDENSATE DRAIN          | <u> </u>                                      | TEST PORT, UNION            |
| ——PCD——        | PUMPED CONDENSATE DRAIN   | П (   | Ω                           |
| ——RH——         | RADIANT HEATING           |   | THERMOMETER, PRESSURE GAUGE |
| ——SM——         | SNOWMELT                  | <b>,</b>                                      | 1 MAV                       |
| -              | ARROW IN LINE INDICATES   | , 7lr   | X                           |
|                | DIRECTION OF FLOW         | <del>} </del>                                 | WELL, MANUAL AIR VENT       |
| PIP            | ING NOTATION              | <b>一                                    </b>  | PIPE DOWN AND PIPE TEE DOWN |
|                |                           | <b>—</b>                                      | PIPE UP AND PIPE TEE UP     |
|                | E TYPE (XXX)———           | <b></b>                                       | PIPE CAP, BLIND FLANGE      |
| XXX = GPM OF F | FLOW FOR PIPING           | \$ <del></del>                                | PIPE ANCHOR,ALIGNMENT GUIDE |

|                 | MECHANICAL DRAWING INDEX           |                                 |  |  |
|-----------------|------------------------------------|---------------------------------|--|--|
|                 | ISSUED FOR PERMIT                  |                                 |  |  |
|                 | O ISSUED FOR REFERENCE ONLY        |                                 |  |  |
|                 |                                    | RMIT                            |  |  |
| SHEET<br>NUMBER | SHEET TITLE                        | ISSUED FOR PERMIT<br>01/16/2020 |  |  |
| M0.0            | MECHANICAL INDEX, LEGEND AND NOTES | •                               |  |  |
| M0.1            | MECHANICAL SCHEDULES               | •                               |  |  |
| M0.2            | MECHANICAL SPECIFICATIONS          | •                               |  |  |
| M0.3            | MECHANICAL DIAGRAMS                | •                               |  |  |
| M1.0            | CRAWLSPACE PLAN - MECHANICAL       | •                               |  |  |
| M1.1            | MAIN FLOOR PLAN - MECHANICAL       | •                               |  |  |
|                 | TOTAL:                             | 6                               |  |  |

|                              | DESIGN DATA  |                          |
|------------------------------|--|--------------------------|
| LOCATION:                    | MILNER, CO<br>ALTITUDE: 6730 FT<br>DENSITY RATIO: 0.781  |                          |
| ASHRAE<br>CLIMATE ZONE:      | 7  |                          |
| OUTDOOR CONDITIONS:          | SUMMER DESIGN DB = COINCIDENT WB = WINTER DESIGN DB =  | 88 °F<br>62 °F<br>-21 °F |
| INDOOR CONDITIONS:           | SUMMER DESIGN DB = WINTER DESIGN DB =  | 75 °F<br>70 °F           |
| CODES:                       | 2015 INTERNATIONAL BUILDING<br>2015 INTERNATIONAL MECHANI<br>2015 INTERNATIONAL PLUMBIN<br>2015 IECC<br>ALL APPLICABLE LOCAL AMEND | IICAL CODE<br>IG CODE    |
| VENTILATION:                 | PER ASHRAE 62.1 AND 2015 IMC   | C.                       |
| ENVELOPE<br>CHARACTERISTICS: | REFERENCE ARCHITECTURAL I  | PLANS.                   |





Steamboat Engineering And Design, In 2740 Acre Lane Suite 'E' Steamboat Springs, CO 80 Phone: 970 . 871 . 9089 E-mail: Jake@seadinc.com

TWIN ENVIRO ADDI-2065 CO ROAD 205 MILNER, COLORADO

ISSUE DATES

PRELIMINARY SET
06 . 26 . 19

DESIGN DEVELOPMENT
08 . 09 . 19

REVIEW SET

12 . 10 . 19

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

MECHANICAL
INDEX, LEGEND
AND NOTES

M0.0



**G2CE.COM**G2CE #2019092

| FAN S                | SCHEDU       | JLE           |             |             |                   |                |     |                |     |                                      |        |          |          |         |             |                        |    |       |             |      |
|----------------------|--------------|---------------|-------------|-------------|-------------------|----------------|-----|----------------|-----|--------------------------------------|--------|----------|----------|---------|-------------|------------------------|----|-------|-------------|------|
| TAG                  | MANUF.       | MODEL         | LOCATION    | SERVICE     | AIR QTY.<br>(CFM) | ESP<br>("W.C.) | FEG | FAN DATA  TYPE | RPM | MOUNT                                | DRIVE  | HP       | OTOR DAT |         | E-<br>POWER | SOUND<br>POWER<br>DATA |    | NOTES | ACCESSORIES | TAG  |
| EF-1                 | соок         | GC-1`28       | TOILET ROOM | TOILET ROOM | 70                | 0.125          | N/A | CENTRIFUGAL    | 750 | CEILING                              | DIRECT | 25 WATT  | 120/1    | N       | N           | 0.9                    | 20 | А     | 1, 2        | EF-1 |
|                      |              |               |             |             |                   |                |     |                |     |                                      |        |          |          |         |             |                        |    |       |             |      |
| NOTES:<br>A) INTERLO | OCK OPERATIO | N WITH LIGHTS | i.          |             |                   |                |     |                | 1 , | ORIES:<br>ORY PROVIDE<br>PEED CONTRO |        | NECT SWI | TCH MOUN | TED OUT | SIDE OF F   | AN HOUSIN              | G, |       |             |      |

| DIF     | FUSER            | GRILL        | E AND                      | REGIS  | TER SCHEDULE   |              |     |        |            |  |  |
|---------|------------------|--------------|----------------------------|--------|--|--------------|-----|--------|------------|--|--|
| TAG     | MANUF            | MODEL        | SYSTEM                     | SIZE   | DESCRIPTION  | CONSTRUCTION | OBD | FINISH | NOTES      |  |  |
| Α       | HART &<br>COOLEY | 411          | SUPPLY                     | VARIES | WELDED DIFFUSION VANES, MULTI-ANGLE FIN SETTING, FOOT-PERATED DIAL CONTROL   | STEEL        | Υ   | 1, 2   | A, B, C, D |  |  |
| В       | HART &<br>COOLEY | 265          | RETURN                     | VARIES | RIGID, SMOOTH SURFACE, 75% FREE AREA  STEEL N 1, 2 A, E  |              |     |        |            |  |  |
|         |                  |              |                            |        |  |              |     |        |            |  |  |
| 2) DIFF | ORY FINISH S     | IELD PAINTEI | FF WHITE,<br>D, COLOR TO E | BE.    | NOTES: A) SEE DRAWINGS FOR NECK SIZE AND AIR QUANTITY, B) PROVIDE FRAME COMPATIBLE WITH CEILING TYPE, C) REFERENCE ARCHITECTURAL PLANS FOR FINAL DIFFUSER LOCATIONS, D) PROVIDE SQUARE-TO-ROUND TRANSITION AT DIFFUSER CONNECTION AS REQUIRED. |              |     |        |            |  |  |

| FURI         | VACE /  | COOLING C                                | OIL SCH            | EDULE         |                |            |              |                     |              |                      |                    |           |      |       |            |
|--------------|---------|--|--------------------|---------------|----------------|------------|--------------|---------------------|--------------|----------------------|--------------------|-----------|------|-------|------------|
|              |         |  |                    |               | HE             | ATING      | COOLING COIL | A                   | IR QUANTITIE | S                    | ELEC.              | TRICAL DA | TA   |       |            |
| TAG          | MANUF.  | MODEL                                    | SERVICE            | CONFIGURATION | INPUT<br>(MBH) | EFFICIENCY |              | SUPPLY AIR<br>(CFM) | ESP ("WC)    | OUTSIDE AIR<br>(CFM) | VOLTAGE /<br>PHASE | MCA       | МОСР | (LBS) | NOTES      |
| F-1/<br>CC-1 | CARRIER | FUR: - 59SC5B040E14<br>COIL: - CAPMP2414 | CONFERENCE<br>ROOM | HORIZONTAL    | 40             | 95%        | 2.0          | 600                 | 0.5          | 130                  | 120/1              | 9.7       | 15   | 200   | 1, 2, 3, 4 |
| F-2/<br>CC-2 | CARRIER | FUR: -59SC5060E14<br>COIL: - CNPVP3614   | OFFICES            | HORIZONTAL    | 60             | 95%        | 3.0          | 1100                | 0.5          | 100                  | 120/1              | 9.8       | 15   | 225   | 1, 2, 3, 4 |
| NOTEC        |         |  |                    |               |                |            |              |                     |              |                      |                    |           |      |       |            |

NOTES:
1) PROVIDE WITH WALL MOUNTED 7-DAY PROGRAMMABLE THERMOSTAT,
2) PROVIDE WITH CONCENTRIC VENT KIT FOR DIRECT VENTING OF COMBUSTION AND FLUE, 3) PROVIDE CONDENSATE DRAIN PIPE TO NEAREST FLOOR DRAIN/FLOOR SINK, 4) FUEL - LP GAS. PROVIDE GAS CONVERSION COMPONENTS.

| SPLI | SPLIT CONDENSING UNIT SCHEDULE   |          |          |         |              |                |      |                    |      |      |       |         |  |  |
|------|--|----------|----------|---------|--------------|----------------|------|--------------------|------|------|-------|---------|--|--|
|      | NAME AND A LOCATION OF THE NOMINAL COOLING SEED NOMINAL COOLING WEIGHT NOTES |          |          |         |              |                |      |                    |      |      |       |         |  |  |
| TAG  | MANUF.   | MODEL    | LOCATION | SERVICE | AMBIENT TEMP | CAPACITY (MBH) | SEER | VOLTAGE /<br>PHASE | MCA  | MOCP | (LBS) | NOTES   |  |  |
| CU-1 | CARRIER  | 24ABB324 | GRADE    | CC-1    | 100 F        | 24.0           | 13   | 208/1              | 14.3 | 25   | 150   | 1, 2, 3 |  |  |
| CU-2 | CARRIER  | 24ABB336 | GRADE    | CC-2    | 100 F        | 36.0           | 13   | 208/1              | 18.1 | 30   | 175   | 1, 2, 3 |  |  |
|      |  |          |          |         |              |                |      |                    |      |      |       |         |  |  |

NOTES:

1) PROVIDE WITH INSULATED REFRIGERANT LINE SETS INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS,
2) HAIL GUARD,

3) LIQUID LINE SOLENOID VALVE AND SIGHT GLASS.





ENVIRO ADDITION
2065 CO ROAD 205
MILNER, COLORADO
AN ADDITION FOR:
TWIN ENVIRO

N N L

ISSUE DATES PRELIMINARY SET 06 . 26 . 19
DESIGN DEVELOPMENT
08 . 09 . 19 REVIEW SET 12 . 10 . 19

DRAWN BY: RPM REVIEWED BY: JEM PROJECT # 19052

MECHANICAL SCHEDULES

CONSULTING ENGINEERS, INC. 1039 MAIN STREET UNIT G
WINDSOR, CO 80550
(970) 460-7400
G2CE.COM
G2CE #2019092

### MECHANICAL DUCT SYSTEM NOTES

- DUCT SIZES AS INDICATED ON THE DRAWINGS ARE OUTSIDE SHEET METAL DIMENSIONS. WHERE DUCT LINER IS USED THE DUCTWORK DIMENSIONS ACCOMMODATE THE DUCT LINER.
- CONTRACTOR SHALL CONSTRUCT AND INSTALL DUCTWORK PER SMACNA STANDARDS.
- EXHAUST DUCTWORK CONNECTED TO COMMERCIAL OR RESIDENTIAL DRYERS SHALL HAVE A SMOOTH INTERIOR FINISH. DUCTS SHALL NOT BE JOINED WITH SCREWS OR SIMILAR FASTENERS THAT PROTRUDE INTO THE INSIDE OF THE DUCT.
- BRANCH DUCT CONNECTIONS TO DIFFUSERS SHALL BE THE SAME SIZE AS THE DIFFUSER NECK UNLESS NOTED OTHERWISE.
- SPIN-IN FITTINGS TO DIFFUSERS SHALL BE CONICAL TYPE (EXCEPT LOCATIONS WHERE LISTED DUCT HEIGHT DOES NOT ACCOMMODATE)
- DAMPERS: SINGLE BLADE TYPE VOLUME DAMPERS SHALL BE INSTALLED AT ALL DIFFUSER TAKEOFFS AND WHERE REQUIRED FOR PROPER BALANCING. HANDLE SHALL BE VISIBLE THROUGH INSULATION.
- REMOTE DAMPERS: PROVIDE A REMOTE DAMPER ACTUATOR FOR LOCATIONS WHERE DAMPERS ARE NOT ACCESSIBLE. WHERE REMOTE DAMPER ACTUATORS ARE PROVIDED, COORDINATE LOCATION OF REMOTE DAMPER ESCUTCHEON PLATE AND COVER WITH ARCHITECT.
- PROVIDE A MINIMUM 12" LONG RED RIBBON LOCATOR ON VOLUME DAMPER VALVE HANDLES.
- PROVIDE ACCESS DOOR IN DUCTWORK UPSTREAM OF EACH DUCT-MOUNTED COIL, HUMIDIFIER, SMOKE DETECTOR, AND COMBINATION FIRE/SMOKE DAMPER.
- 10. SPIRAL EXPOSED DUCTWORK SHALL BE GALVANIZED SHEET STEEL SPIRAL. PROVIDE MILL PHOSPHATIZED FINISH THAT IS FREE FROM VISUAL IMPERFECTIONS, INCLUDING PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DENTS AND DISCOLORATIONS, INCLUDING THOSE THAT WOULD IMPAIR PAINTING.
- . RECTANGULAR DUCT TURNS/ELBOWS: ALL 90 DEGREE ELBOWS SHALL BE LONG RADIUS ELBOWS OR SHALL HAVE TURNING VANES CONSISTING OF SINGLE BLADE DUCT VANES WITH 2-1/2 INCH BLADE SPACING.
- 2. INSULATED FLEXIBLE DUCT MAY BE USED FOR THE CONNECTION TO SUPPLY AIR OUTLETS/DIFFUSERS PROVIDED THE FLEXIBLE CONNECTION DOES NOT EXCEED 6 LINEAR FEET IN LENGTH. INSTALL DUCTS FULLY EXTENDED. DO NOT INSTALL IN THE COMPRESSED STATE OR USE EXCESS LENGTH.

| DUCT SCHEDULE  |                                   |                   |                                 |   |   |   |  |  |  |
|--|-----------------------------------|-------------------|---------------------------------|---|---|---|--|--|--|
|  | MATERIAL                          | PRESSURE<br>CLASS | MINIMUM<br>SMACNA SEAL<br>CLASS | SMACNA<br>LEAKAGE<br>CLASS FOR<br>RECT. | SMACNA<br>LEAKAGE<br>CLASS FOR<br>ROUND | DUCT SYSTEM NOTES                           |  |  |  |
|  |                                   | SUPPLY AND        | RETURN DUCTS                    |   |   |   |  |  |  |
| UPSTREAM AND DOWNSTREAM OF GALVANIZED FANS WITH LESS THAN 2" ESP STEEL |                                   | 4-INCH WG         | В                               | 24                                      | 12                                      | ALL EXTERIOR DUCTWORK<br>TO BE SEAL CLASS A |  |  |  |
|  |                                   | EXHAL             | IST DUCTS                       |   |   |   |  |  |  |
| UPSTREAM AND DOWNSTREAM OF FANS WITH LESS THAN 2" ESP                  | GALVANIZED<br>STEEL               | 2-INCH WG         | В                               | 24                                      | 12                                      |   |  |  |  |
| COMMERCIAL OR RESIDENTIAL<br>DRYER EXHAUST                             | STAINLESS<br>STEEL OR<br>ALUMINUM | -                 | -                               | -                                       | -                                       | #3  |  |  |  |

|   |                   | INSULATIO  | N SCHEDULE        |                      |                    |                       |
|---|-------------------|------------|-------------------|----------------------|--------------------|-----------------------|
|   | SYSTEM            | LINER/WRAP | THICKNESS<br>(IN) | DENSITY<br>(LBS/FT3) | MINIMUM<br>R-VALUE | NOTES                 |
| RECTANGULAR DUCTWORK UPSTREAM AND DOWNSTREAM OF           | SUPPLY            | LINER      | 1"                | 1.5                  | R-4.2              |                       |
| FURNACES  | RETURN            | LINER      | 1"                | 1.5                  | R-4.2              |                       |
| DUCTWORK IN UNCONDITIONED SPACE (VENTILATED ATTIC, BTWN   | SUPPLY            | WRAP       | 2"                | 0.75                 | R-6                | WITH FSK FACING       |
| ROOF, CRAWLSPACE AND INSULATED CEILING)                   | RETURN            | WRAP       | 2"                | 0.75                 | R-6                | WITH FSK FACING       |
| DUCTWORK IN UNVENTILATED ATTIC                            | SUPPLY            | WRAP       | 2"                | 0.75                 | R-6                | WITH FSK FACING       |
| (NO RA PLENUM)  | RETURN            | WRAP       | 2"                | 0.75                 | R-6                | WITH FSK FACING       |
| EXPOSED SPIRAL DUCT                                       | SUPPLY/<br>RETURN | NONE       | N/A               | N/A                  | N/A                | UNLESS NOTED ON PLANS |
| ALL OTHER SUPPLY DUCTWORK                                 | SUPPLY            | WRAP       | 1.5"              | 0.75                 | R-4.2              | WITH FSK FACING       |
| UNTREATED OUTSIDE AIR DUCT                                | SUPPLY            | WRAP       | 1.5"              | 0.75                 | R-4.2              | WITH FSK FACING       |
| (ENCLOSED)  | RETURN            | WRAP       | 1.5"              | 0.75                 | R-4.2              | WITH FSK FACING       |
| TRANSFER DUCTS (AT FULL HEIGHT WALLS, RETURN BOOTS, ETC.) | RETURN            | LINER      | 1"                | 1.5                  | R-4.2              |                       |
| ALL OTHER RETURN DUCTWORK WITHIN RA PLENUM                | RETURN            | NONE       | N/A               | N/A                  | N/A                |                       |
| ALL EXHAUST DUCTWORK                                      | EXHAUST           | NONE       | N/A               | N/A                  | N/A                |                       |

### MECHANICAL SPECIFICATIONS

- GENERAL
- 1.1 MECHANICAL GENERAL REQUIREMENTS:
- 1.1.1 PROVIDE ALL ITEMS FOR COMPLETE AND SUCCESSFUL OPERATION OF ALL MECHANICAL SYSTEMS.
- 1.1.2 DEMONSTRATE THE OPERATION OF ALL SYSTEMS FOR THE OWNER AT A TIME AS DIRECTED BY THE OWNER.
- 1.1.3 FIELD VERIFY ALL EXISTING CONDITIONS AND INCLUDE AN ALLOWANCE IN BID FOR REMOVAL AND/OR RELOCATION OF EXISTING PIPING, DUCTWORK, EQUIPMENT, ETC. AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING SYSTEMS TO ALL OTHER WORK. CONTRACTORS SHALL VERIFY OPERATIONAL CONDITION OF ALL EQUIPMENT LOCATED WITHIN THE AREA PRIOR TO BEGINNING WORK. THE CONTRACTORS SHALL PREPARE A LIST OF DEFICIENCIES FOR THE PROPERTY MANAGER/OWNER PRIOR TO THE START OF CONSTRUCTION. THIS LIST SHALL
- ALSO INCLUDE ANY ITEMS THAT WERE NOT OR COULD NOT BE VERIFIED. 1.1.4 REPLACE ANY WORK OR MATERIAL INSTALLED OR FURNISHED UNDER THIS CONTRACT WHICH DEVELOPS DEFECTS, EXCEPT FOR NORMAL WEAR, WITHIN ONE (1) YEAR AFTER CERTIFICATE OF COMPLETION IS SECURED. RETURN DEFECTIVE MATERIALS TO OWNER.
- 1.1.5 CONTRACTOR SHALL OBTAIN OWNER OR BUILDING MANAGEMENT APPROVAL BEFORE CUTTING ANY FLOOR PENETRATIONS
- 1.1.6 THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND/OR OWNER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.
- INSPECTION OF SITE:
- 1.2.1 PRIOR TO SUBMITTING BID, VISIT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.
- 1.3 MATERIAL AND WORKMANSHIP:
- 1.3.1 PROVIDE NEW MATERIAL, EQUIPMENT, AND APPARATUS UNDER THIS CONTRACT UNLESS OTHERWISE STATED HEREIN. OF BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE, AND FREE FROM ANY DEFECTS. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT NECESSARILY INTENDED TO DESIGNATE THE REQUIRED TRIM, WRITTEN DESCRIPTIONS OF THE TRIM GOVERN MODEL NUMBERS.
- 1.3.2 WORK PERFORMED UNDER THIS CONTRACT SHALL PROVIDE A NEAT AND "WORKMANLIKE" APPEARANCE WHEN COMPLETED, TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORKMANSHIP SHALL BE THE FINEST POSSIBLE BY EXPERIENCED MECHANICS. INSTALLATIONS SHALL COMPLY WITH APPLICABLE CODES AND LAWS.
- 1.3.3 THE COMPLETE INSTALLATION SHALL FUNCTION AS DESIGNED AND INTENDED WITH RESPECT TO EFFICIENCY, CAPACITY, NOISE LEVEL, ETC. ABNORMAL NOISE CAUSED BY RATTLING EQUIPMENT, PIPING, DUCTS, AIR DEVICES, AND SQUEAKS IN ROTATING COMPONENTS WILL NOT BE ACCEPTABLE. IN GENERAL MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY. LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTED
- 1.3.4 REMOVE FROM THE PREMISES WASTE MATERIAL PRESENT AS A RESULT OF WORK, INCLUDING CARTONS, CRATING, PAPER, STICKERS, AND/OR EXCAVATION MATERIAL NOT USED IN BACKFILLING, ETC. CLEAN EQUIPMENT INSTALLED UNDER THIS CONTRACT TO PRESENT A NEAT AND CLEAN INSTALLATION AT THE TERMINATION OF THE WORK.
- 1.3.5 REPAIR OR REPLACE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT TO THE SATISFACTION OF AUTHORITIES AND REGULATIONS HAVING JURISDICTION.
- 1.4 COORDINATION:
- 1.4.1 COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS THAT ARE BEING INSTALLED AND/OR EXISTING SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.
- 1.4.2 UNLESS OTHERWISE INDICATED, THE GENERAL CONTRACTOR WILL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. MECHANICAL CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH INFORMATION WHERE CHASES AND OPENINGS ARE REQUIRED, KEEP INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT, AND EXECUTE WORK IN A MANNER AS TO NOT INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.
- 1.4.3 FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. MECHANICAL CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING, AS VARIATIONS MAY OCCUR. MECHANICAL CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.
- 1.4.5 MECHANICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR DUCTWORK LAYOUT TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION. 1.5 ORDINANCES AND CODES:
- 1.5.1 WORK PERFORMED UNDER THIS CONTRACT SHALL, AT A MINIMUM, BE IN CONFORMANCE WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES HAVING JURISDICTION. EQUIPMENT FURNISHED AND ASSOCIATED INSTALLATION WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN STRICT COMPLIANCE WITH CURRENT APPLICABLE CODES ADOPTED BY THE LOCAL AHJ INCLUDING ANY AMENDMENTS AND STANDARDS AS SET FORTH BY THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), UNDERWRITERS LABORATORIES (UL), OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME), AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE), AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), AMERICAN SOCIETY OF TESTING MATERIALS (ASTM) AND OTHER NATIONAL STANDARDS AND CODES WHERE APPLICABLE. WHERE THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THEIR REFERENCED CODES, STANDARDS, ETC., THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE.
- 1.5.2 PROCURE AND PAY FOR PERMITS AND LICENSES REQUIRED FOR THE ACCOMPLISHMENT OF THE WORK HEREIN DESCRIBED. WHERE REQUIRED. OBTAIN, PAY FOR AND FURNISH CERTIFICATES OF INSPECTION TO OWNER. MECHANICAL CONTRACTOR WILL BE HELD RESPONSIBLE FOR VIOLATIONS OF THE LAW.
- 1.6 PROTECTION OF EQUIPMENT AND MATERIALS

- 1.6.1 STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE. COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT. PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND MECHANICAL CONTRACTOR IS OBLIGATED TO FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND AS APPROVED BY OWNER.
- 1.6.2 KEEP PREMISES ROOM CLEAN FROM FOREIGN MATERIAL CREATED DURING WORK PERFORMED UNDER THIS CONTRACT. PIPING, EQUIPMENT, ETC., SHALL HAVE A NEAT AND CLEAN APPEARANCE AT THE TERMINATION OF THE WORK.
- 1.6.3 PLUG OR CAP OPEN ENDS OF DUCTWORK AND PIPING SYSTEMS WHILE STORED OR INSTALLED DURING CONSTRUCTION WHEN NOT IN USE TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.
- 1.6.4 KEEP THE MANUFACTURER PROVIDED PROTECTIVE COVERINGS ON FLOOR DRAINS, FLOOR SINKS, AND TRENCH DRAINS DURING CONSTRUCTION. REMOVE COVERINGS AT THE TERMINATION OF THE WORK AND POLISH EXPOSED SURFACES.
- 1.7 OPERATION AND MAINTENANCE INSTRUCTIONS:
- 1.7.1 COLLECT AND COMPILE A COMPLETE BROCHURE OF FIXTURES, MATERIALS, AND EQUIPMENT FURNISHED AND INSTALLED ON THIS PROJECT. INCLUDE OPERATIONAL AND MAINTENANCE INSTRUCTIONS, MANUFACTURER'S CATALOG SHEETS, WIRING DIAGRAMS, PARTS LISTS, APPROVED SHOP DRAWINGS, AND DESCRIPTIVE LITERATURE FURNISHED BY THE MANUFACTURER. INCLUDE AN INSIDE COVER SHEET THAT LISTS THE PROJECT NAME, DATE, OWNER, ARCHITECT, ENGINEER, GENERAL CONTRACTOR, SUBCONTRACTOR, AND AN INDEX OF CONTENTS.
- 1.7.2 SUBMIT COPIES OF LITERATURE BOUND IN APPROVED BINDERS TO THE ARCHITECT AND OWNER AT THE TERMINATION OF THE WORK. PAPER CLIPS, STAPLES, RUBBER BANDS, AND MAILING ENVELOPES ARE NOT CONSIDERED APPROVED BINDERS. FINAL APPROVAL OF MECHANICAL AND PLUMBING SYSTEMS WILL BE WITHHELD UNTIL THIS EQUIPMENT BROCHURE IS DEEMED COMPLETE BY THE ARCHITECT, ENGINEER, AND OWNER.
- 1.8 WARRANTIES:
- 1.8.1 WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1.
- 1.8.2 WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.
- 1.8.3 PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ARCHITECT OR OWNER.
- 1.8.4 AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.
- 1.9 CUTTING AND PATCHING:
- 1.9.1 PERFORM CUTTING OF WALLS, FLOORS, CEILINGS, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. OBTAIN PERMISSION FROM THE ARCHITECT PRIOR TO CUTTING. DO NOT CUT OR DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. GENERAL CONTRACTOR SHALL PATCH WALLS, FLOORS. ETC. AS REQUIRED BY WORK UNDER THIS SECTION. PATCHING SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION. REPAIR AND REFINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.
- 1.10 ROUGH-IN:
- 1.10.1 COORDINATE WITHOUT DELAY ROUGHING-IN WITH GENERAL CONSTRUCTION. CONCEAL PIPING AND CONDUIT ROUGH-IN EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.
- 1.11 STRUCTURAL STEEL:
- 1.11.1 STRUCTURAL STEEL USED FOR PIPE SUPPORTS, EQUIPMENT SUPPORTS, ETC., SHALL BE NEW, CLEAN, AND CONFORM TO ASTM DESIGNATION A-36.
- 1.11.2 SUPPORT PLUMBING AND MECHANICAL EQUIPMENT AND PIPING FROM THE BUILDING STRUCTURE. DO NOT SUPPORT PLUMBING EQUIPMENT FROM CEILINGS, OTHER MECHANICAL OR ELECTRICAL COMPONENTS, AND OTHER NON-STRUCTURAL ELEMENTS.
- 1.12 ACCESS DOORS:
- 1.12.1 PROVIDE ACCESS DOORS IN CEILINGS AND WALLS WHERE INDICATED OR REQUIRED FOR ACCESS TO CONCEALED VALVES AND EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS; MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION, AND COLOR BEFORE ORDERING.
- 1.13 PENETRATIONS:
- 1.13.1 SEAL FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATER AND WEATHER TIGHT WITH APPROPRIATE NON-SHRINK, NON-HARDENING COMMERCIAL CONSTRUCTION SEALANT. SEALROOF PENETRATIONS WITH 4 POUND PER SQUARE FOOT LEAD FLASHING. PROVIDE A SLEEVE, AND SEAL NON-FIRE-RATED FLOOR AND WALL PENETRATIONS WITH FIBERGLASS PACKING AND SILICONE CAULK (FOR ACOUSTICAL INSULATION).
- 1.13.2 COORDINATE FIRE RATING REQUIREMENTS AND LOCATIONS WITH THE ARCHITECT. SEAL PENETRATIONS OF FIRE-RATED ASSEMBLIES WITH 3M # CP-25 FIRE BARRIER CAULK (PROVIDE THICKNESS AND METHOD AS REQUIRED AND RECOMMENDED BY MANUFACTURER) TO MAINTAIN THE FIRE RESISTANCE RATING OF FIRE-RATED ASSEMBLIES. 1.13.3 SEAL EXTERIOR WALL PENETRATIONS BELOW GRADE WITH CAST IRON WALL
- PIPES AND MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE/LINK SEAL, CALPICO, INC AND METRAFLEX. 1.13.4 PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER
- FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED. 1.13.5 PROVIDE SLEEVES FOR VERTICAL PIPE PASSING THROUGH SLAB ON GRADE. SLEEVES SHALL BE SCHEDULE 40 PVC PIPE, TWO NOMINAL PIPE SIZES LARGER
- THAN THE PIPE SERVED. SEAL WATER-TIGHT WITH SILICONE CAULK.
- 1. HEATING, VENTILATION, AND AIR CONDITIONING
- 2.1 AIR DISTRIBUTION:
- 2.1.1 PROVIDE ALL SHEET METAL DUCT SYSTEMS, CONNECTIONS, DAMPERS, HOUSINGS, SHEET METAL DOORS FOR THE COMPLETE SUPPLY, RETURN, AND EXHAUST SYSTEMS.
- 2.1.2 ALL DUCTWORK IDENTIFICATION AND INSTALLATION TO ADHERE TO SMACNA

- STANDARDS AND ALL GOVERNING CODES.
- 2.1.3 PROVIDE ACCESS DOORS IN DUCTWORK FOR OBSERVATION AND MAINTENANCE OF ALL DAMPERS, COILS, FIRE DAMPERS, ETC.
- 2.1.4 METAL AND GAUGE: UNLESS SPECIFIED OTHERWISE GALVANIZED IRON SHALL BE USED THROUGHOUT, FABRICATED AND INSTALLED SO THAT NO VIBRATING OR NOISE RESULTS. SHEET STEEL SHALL BE OF THE US STANDARD GAUGE AS RECOMMENDED IN THE LATEST EDITION OF SMACNA.
- 2.1.5 DUCT WORKMANSHIP: ALL DUCTWORK SHALL BE CONSTRUCTED AND ERECTED IN A WORKMANLIKE MANNER. DUCTS SHALL BE STRAIGHT AND SMOOTH ON THE INSIDE WITH NEATLY FINISHED JOINTS, AIRTIGHT, AND SHALL BE FREE FROM VIBRATION UNDER ALL CONDITIONS OF OPERATION. THE INTERNAL ENDS OF SLIP JOINTS SHALL BE MADE IN THE DIRECTION OF AIRFLOW. DUCTS SHALL BE SECURELY ATTACHED TO THE BUILDING CONSTRUCTION IN AN APPROVED MANNER.
- 2.1.6 DUCT TURNS: ALL 90 DEGREE ELBOWS UP TO 18 INCHES WIDE AND ALL 45 DEGREE ELBOWS SHALL HAVE AN INSIDE RADIUS OF NOT LESS THAN ONE HALF THE WIDTH OF THE DUCT. 90 DEGREE ELBOWS WITH TURNING VANES SHALL BE USED CONSISTING OF SINGLE BLADE DUCT VANES WITH 2.5 INCH BLADE
- SPACING. 2.1.7 DAMPERS: SINGLE BLADE TYPE VOLUME DAMPERS SHALL BE INSTALLED AT DIFFUSER TAKEOFFS, AND WHERE REQUIRED FOR PROPER BALANCING. HANDLE SHALL BE VISIBLE THROUGH INSULATION.
- 2.1.8 GRILLES, REGISTERS, AND DIFFUSERS: PROVIDE SUPPLY, RETURN, AND EXHAUST REGISTERS AND DIFFUSERS AS NOTED ON THE EQUIPMENT SCHEDULE FOR THE TYPE, SIZE, MATERIAL, AND FINISH.
- 2.1.7 FLEX DUCT SHALL BE OWENS-CORNING FOIL-BACK HIGH QUALITY U/L APPROVED. PLASTIC WRAPPED FLEX DUCT IS NOT ACCEPTABLE.
- 2.2 INSULATION:
- 2.2.1 ALLOWABLE MANUFACTURERS: JOHNS-MANVILLE CORP. MANSON INSULATION CO.
- OWENS-CORNING OR APPROVED EQUAL
- 2.2.1 DUCT INSULATION TO BE FIBERGLASS INSULATION, WITH VAPOR BARRIER, UL APPROVED, CLASS I AIR DUCT.
- INSULATION THICKNESSES. 2.2.3 ALL INSULATION SHALL MEET ALL CODE REQUIREMENTS AND FIRE AND SMOKE HAZARD RATINGS OF ASTM E-84, NATIONAL FIRE PROTECTION ASSOCIATION 225 AND UL 723, NOT EXCEEDING FLAME SPREAD 25 AND SMOKE DEVELOPED

2.2.2 SEE DUCT SYSTEM NOTES AND INSULATION SCHEDULE FOR LOCATIONS AND

- 50 RATINGS. 2.3 HVAC PIPING.
- 2.3.1 CONDENSATE EQUIPMENT DRAIN TO BE COPPER WATER TUBE, TYPE "L" HARD DRAWN, WROUGHT COPPER FITTINGS, SOLDER JOINTS, USING 95-S SOLDER.
- 2.3.2 PROVIDE DIELECTRIC ISOLATION AND/OR COUPLINGS AT ALL CONNECTIONS BETWEEN DISSIMILAR PIPING. 2.3.3 BALL VALVES:
- 2.3.3.1LESS THAN OR EQUAL TO 3-INCH BRONZE BODY, FULL PORT CHROME PLATED BRASS/BRONZE BALL, TEFLON SEATS AND STUFFING BOX RING. BLOWOUT
- PROOF STEM, LEVER HANDLE AND ADJUSTABLE BALANCING MEMORY STOPS, SOLDER OR THREADED ENDS. PROVIDE EXTENDED STEMS FOR INSULATED PIPING.
- 2.4 TESTING, ADJUSTING, AND BALANCING:
- 2.4.1 SUBMIT TEST REPORTS FOR TESTING, ADJUSTING, AND BALANCING.
- 2.4.2 TOTAL SYSTEM BALANCE SHALL BE PERFORMED IN ACCORDANCE WITH NEBB OR AABC PROCEDURAL STANDARDS. 2.4.3 BEFORE COMMENCING WORK, VERIFY THAT SYSTEMS ARE COMPLETE AND
- OPERABLE, WITH CLEAN FILTERS. 2.4.4 PROMPTLY REPORT ABNORMAL CONDITIONS IN MECHANICAL SYSTEMS OR
- CONDITIONS WHICH PREVENT SYSTEM BALANCE. 2.4.5 ADJUSTING AND BALANCING:
- 2.4.5.1 ADJUST AIR HANDLING SYSTEM TO WITHIN 10 PERCENT FROM INDICATED
- 2.4.5.2 RECORDED DATA SHALL REPRESENT MEASURED OR OBSERVED INITIAL CONDITION AND CONDITION AFTER BALANCING.
- 2.4.5.3PERMANENTLY MARK SETTINGS OF DAMPERS, AND OTHER ADJUSTMENT DEVICES ALLOWING SETTINGS TO BE RESTORED.
- 2.4.5.4LEAVE SYSTEMS IN PROPER WORKING ORDER, REPLACING BELT GUARDS, CLOSING ACCESSORY DOORS, CLOSING DOORS TO ELECTRICAL SWITCH BOXES, AND RESTORING THERMOSTATS TO SPECIFIED SETTINGS.
- 2.5 CONTROLS:
- 2.5.1 PROVIDE STAND ALONE PROGRAMMABLE CONTROL.
- 2.6 ELECTRICAL:
- 2.6.1 LOW VOLTAGE WIRING ALL PROVISIONS FOR LOW VOLTAGE WIRING SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR UNLESS CODES OR LABOR SITUATIONS DO NOT PERMIT. IF THE MECHANICAL CONTRACTOR CAN NOT PERFORM LOW VOLTAGE WIRING, THE MECHANICAL CONTRACTOR SHALL INFORM THE GENERAL CONTRACTOR, AS PART OF THE HVAC BID DOCUMENT, TO HAVE THE ELECTRICAL SUBCONTRACTOR INCLUDE THIS WORK IN THEIR BID.
- 2.6.2 POWER WIRING ALL ELECTRICAL POWER WIRING TO INCLUDE FINAL CONNECTIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR'S ELECTRICAL SUBCONTRACTOR.
- 2.7 GAS PIPING:
- 2.7.1 SCHEDULE 40 BLACK CARBON STEEL WITH MALLEABLE IRON THREADED FITTINGS. PROVIDE SHUT-OFF VALVE, DIRT LEG, AND UNION AT EACH ROOFTOP UNIT. PAINT ALL GAS PIPING EXPOSED TO WEATHER WITH ONE COAT OF PRIMER, AND TWO COATS OF RUST-PROOF PAINT. COLOR SHALL MATCH BUILDING COLORS. COORDINATE WITH OWNER'S CONSTRUCTION MANAGER
- 2.7.2 TREATED WOOD BLOCKING 6X6X12, 8'-0" OC MAX WITH GALVANIZED PIPE STRAP, 1 1/4" ZINC COATED LAG SCREWS, AND RUBBER WALKPAD ADHERED TO
- 2.8 MECHANICAL CONTRACTOR RESPONSIBILITIES:
- 2.8.1 AFTER COMPLETION OF THE WORK DESCRIBED IN THIS SPECIFICATION AND SHOWN ON THE DRAWINGS, THE MECHANICAL CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVING ALL LABELS AND STICKERS NOT CONTAINING OPERATION INSTRUCTION. MECHANICAL CONTRACTOR SHALL REMOVE CRATING DEBRIS, LEAVING THE INSTALLATION FINISHED AND READY FOR OPERATION, TO INCLUDING CLEAN FILTERS IN AIR HANDLING UNITS.



UNIT G WINDSOR, CO 80550 (970) 460-7400 G2CE.COM G2CE #2019092





AD OR 0 O

Ш

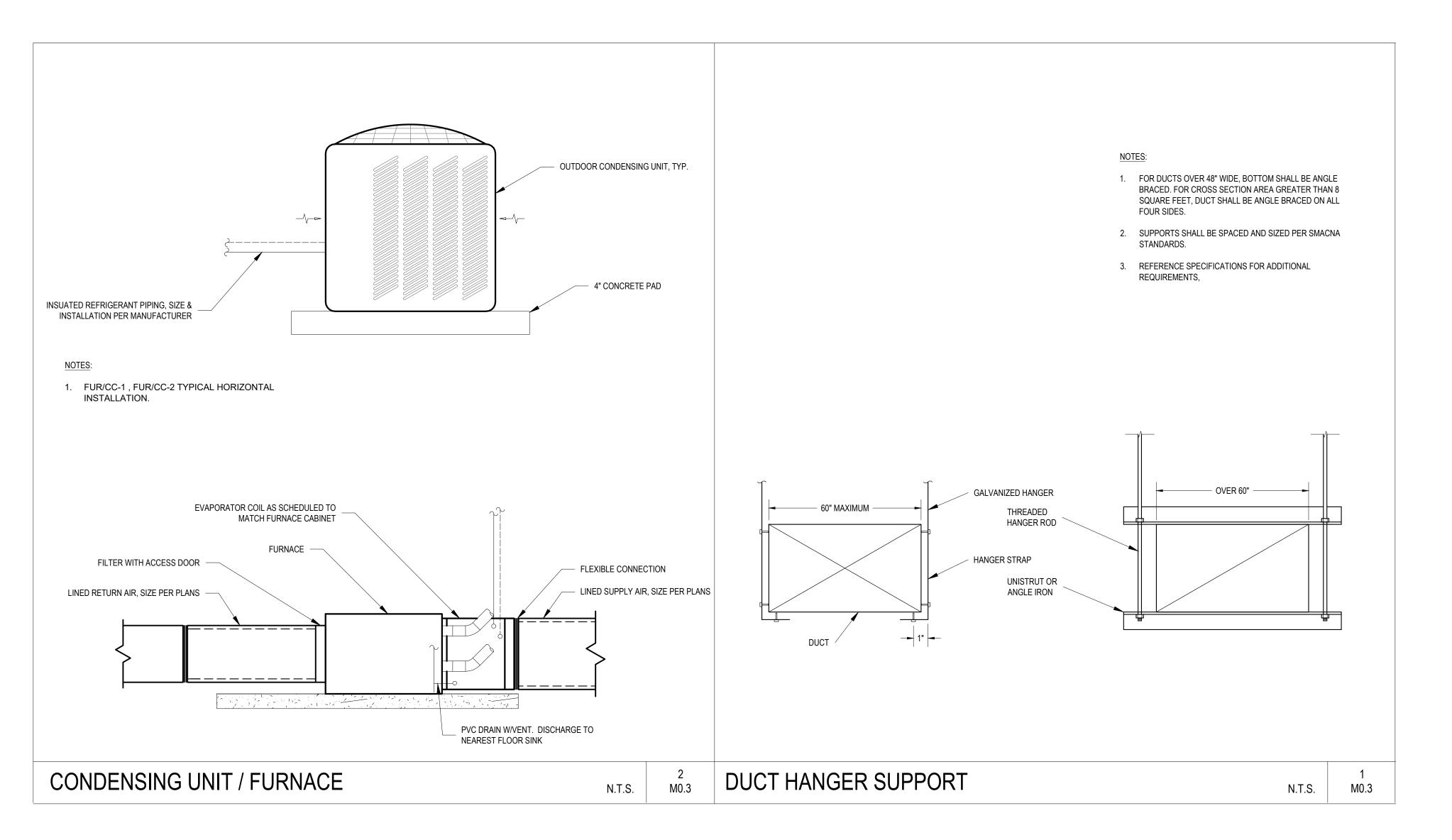
ISSUE DATES PRELIMINARY SET 06 . 26 . 19 DESIGN DEVELOPMENT 08 . 09 . 19

REVIEW SET

12 . 10 . 19

DRAWN BY: RPM REVIEWED BY: JEM PROJECT # 19052 MECHANICAL

SPECIFICATIONS







TWIN ENVIRO ADDITION
2065 CO ROAD 205
MILNER, COLORADO
AN ADDITION FOR:
TWIN ENVIRO

PRELIMINARY SET
06 . 26 . 19
DESIGN DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

MECHANICAL DIAGRAMS

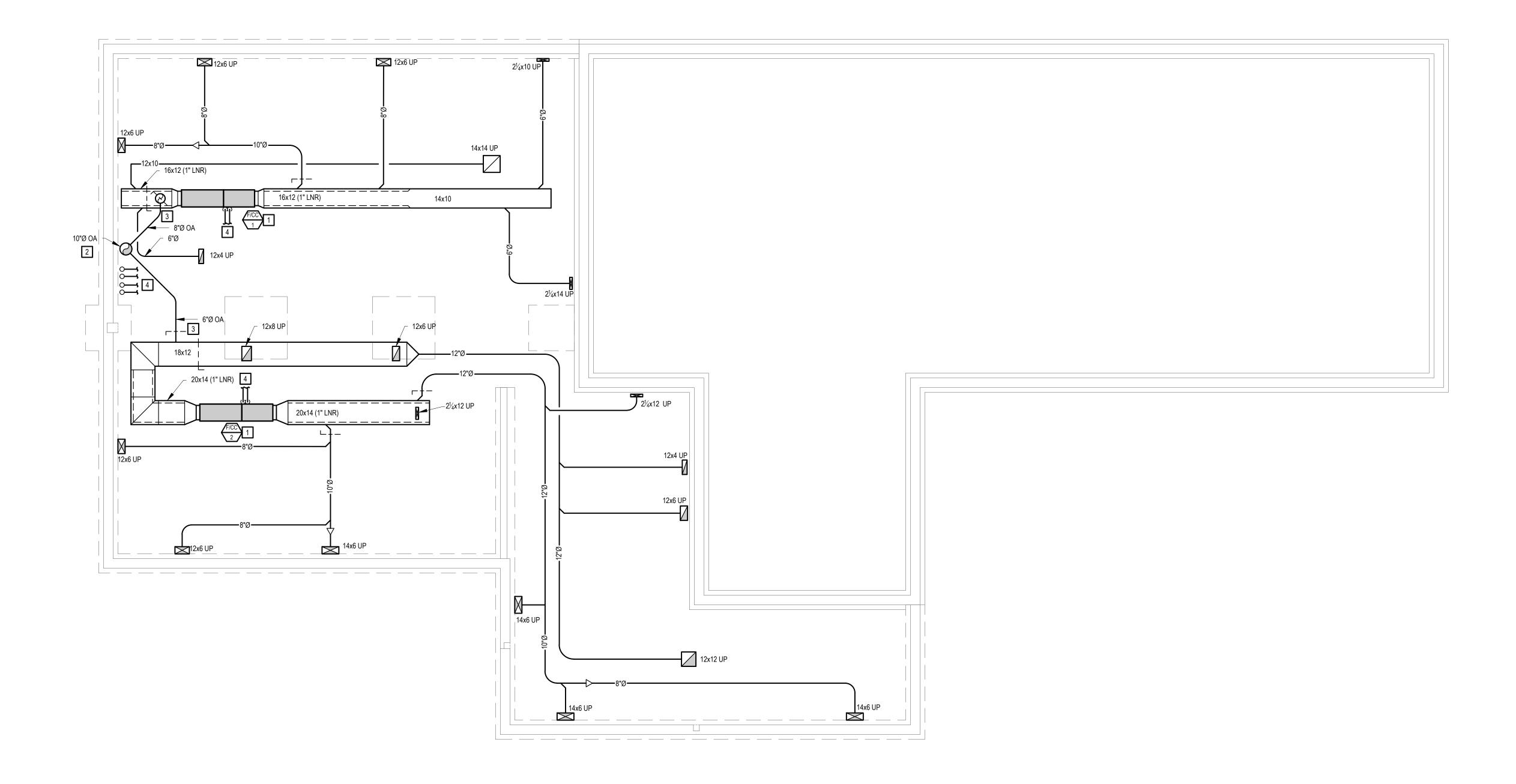
M0.3

CONSULTING ENGINEERS, INC.

1039 MAIN STREET UNIT G WINDSOR, CO 80550 (970) 460-7400 G2CE.COM G2CE #2019092

# WORK NOTES: #

- 1. INSTALL FURNACE IN THE HORIZONTAL POSITION PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE  $\frac{3}{4}$ " CONDENSATE DRAIN PIPE, ROUTE TO NEAREST FLOOR DRAIN. TYPICAL.
- 2. 10"Ø OA DUCT UP THROUGH FLOOR FROM CRAWLSPACE.
- 3. PROVIDE MANUAL BALANCING DAMPER IN OA DUCT AND BALANCE TO SCHEDULE CFM, REFER TO PROJECT DRAWING M0.1. TYPICAL.
- PROVIDE FURNACE INTAKE AND VENT PIPING. ROUTE FROM FURNACE, UP THROUGH FLOOR TO MAIN LEVEL. OFFSET PIPING AS REQUIRED. COORDINATE FINAL LOCATION WITH STRUCTURE AND ARCHITECT.









TWIN ENVIRO ADDITIO

PRELIMINARY SET
06 . 26 . 19
DESIGN DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052

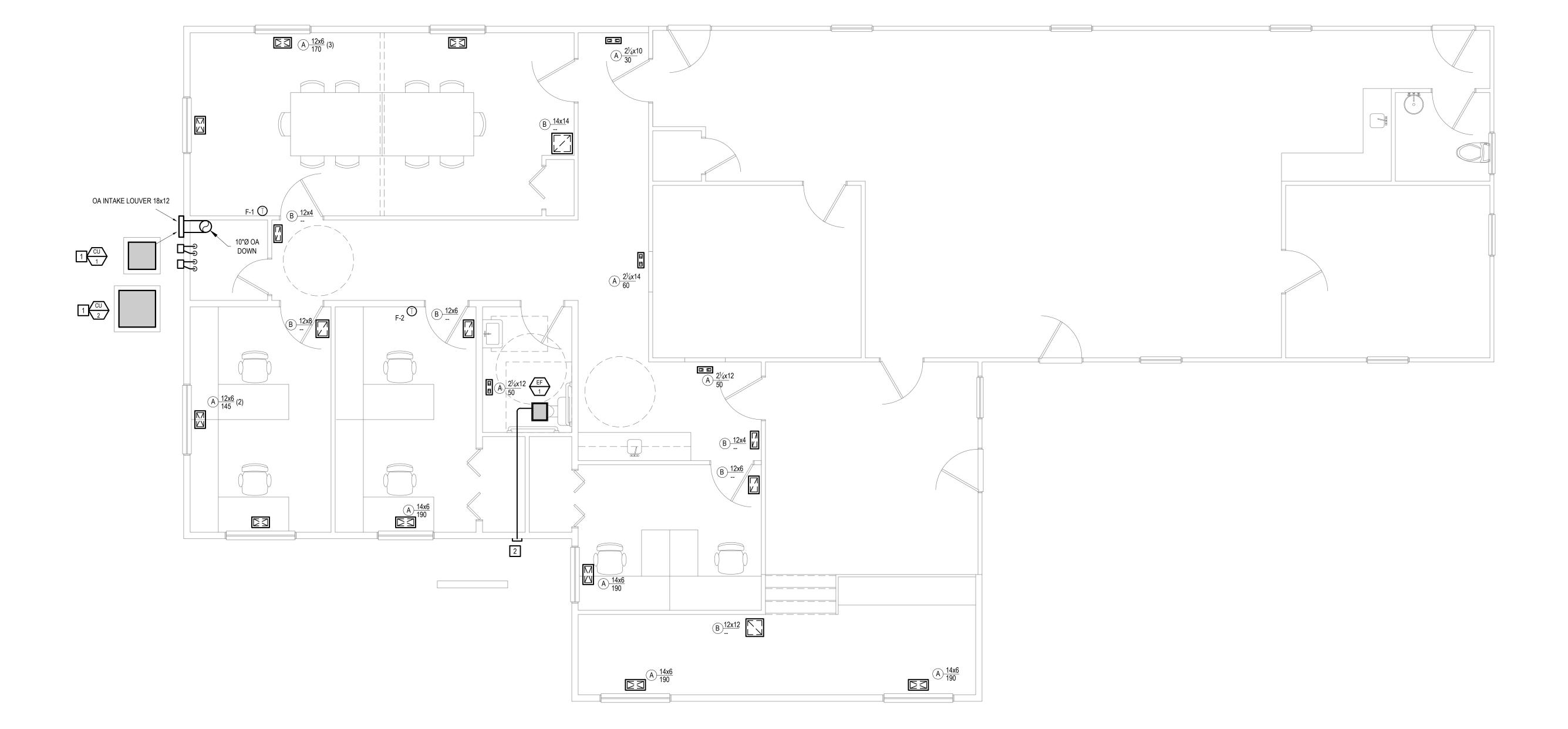
CRAWLSPACE
PLAN MECHANICAL

M1.0



# WORK NOTES: #

- INSTALL CONDENSING UNIT ON MINIMUM 4" CONCRETE HOUSEKEEPING PAD. EQUIPMENT AND PIPING INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE FINAL UNIT LOCATIONS WITH ARCHITECT/OWNER.
- 2. INSTALL CEILING MOUNTED EXHAUST FAN PER MANUFACTURER'S RECOMMENDATIONS.
  PROVIDE 6" Ø EA DUCT, ROUTE DUCT HORIZONTALLY THROUGH SIDEWALL TO MANUFACTURER'S APPROVED WALL CAP. COORDINATE FINAL DUCT ROUTE WITH STRUCTURE AND ARCHITECT.



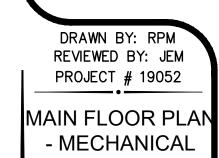






TWIN ENVIRO ADDITION
2065 CO ROAD 205
MILNER, COLORADO
AN ADDITION FOR:
TWIN ENVIRO

PRELIMINARY SET
06 . 26 . 19
DESIGN DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19



ENGINEERS, INC.

9 MAIN STREET
UNIT G
DSOR, CO 80550



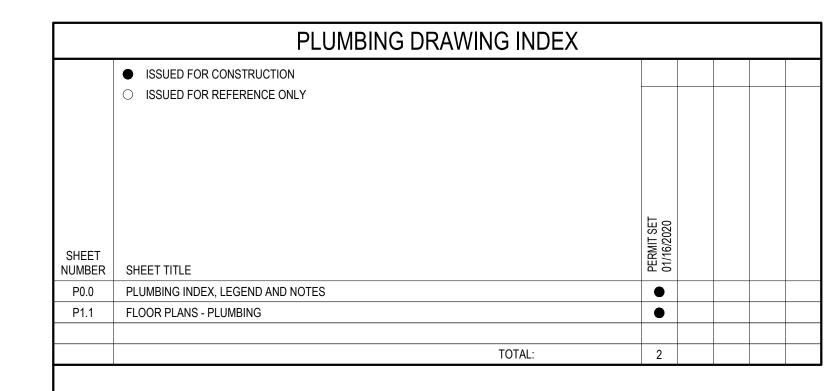
### PLUMBING GENERAL NOTES

- DRAWINGS AND SPECIFICATIONS ARE COMPLIMENTARY. WHATEVER IS CALLED FOR IN EITHER IS BINDING AS THOUGH CALLED FOR IN BOTH.
- 2. THE EQUIPMENT SPECIFIED ON THE DRAWINGS HAVE BEEN SELECTED AS THE BASIS OF DESIGN. THE USE OF REVIEWED OR SPECIFIED EQUALS SHALL BE COORDINATED BY THE CONTRACTOR FOR SPACE REQUIREMENTS, EQUIPMENT DIMENSIONS, AND PERFORMANCE.
- 3. ALL WORK SHALL CONFORM WITH ALL APPLICABLE BUILDINGS CODES, FIRE CODES, AND ALL AUTHORITIES HAVING JURISDICTION.
- 4. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL DESIGN INTENT, ARRANGEMENT, AND GENERAL EXTENT OF SYSTEMS. DO NOT SCALE DRAWINGS NOR USE AS SHOP DRAWINGS. WHERE ALTERNATIVE ROUTING, OFFSETS, AND TRANSITIONS ARE REQUIRED FOR FIELD COORDINATION OF ALL OTHER TRADES, THIS CONTRACTOR SHALL PROVIDE FIELD COORDINATION OF ALL OTHER TRADES, THIS CONTRACTOR SHALL MAKE CHANGES WITHOUT ADDITIONAL COSTS.
- 5. CONTRACTOR SHALL CLOSELY COORDINATE NEW PLUMBING WORK WITH ALL NEW AND EXISTING MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION, ARCHITECTURAL, AND STRUCTURAL MEMBERS. RELOCATE EXISTING MECHANICAL, PLUMBING AND FIRE PROTECTION WORK AS REQUIRED TO ACCOMMODATE ALL NEW WORK (ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, FIRE ALARM, LOW VOLTAGE, AV, ETC.
- 6. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATION AND INSTALLING SLEEVES, INSERTS AND SUPPORTS AS REQUIRED FOR THIS SCOPE OF WORK AND/OR CORE DRILL REQUIREMENTS. COORDINATE WITH GENERAL CONTRACTOR AND STRUCTURAL ENGINEER AS REQUIRED.
- 7. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION UNLESS SPECIFICALLY DIRECTED OTHERWISE.
- 8. THE PLUMBING DIAGRAMS SHALL BE INCORPORATED INTO THE ASSOCIATED WORK AND PROVIDE GENERAL GUIDANCE AS TO THE INSTALLATION INTENT WHETHER REFERENCED TO OR NOT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY COMPONENTS FOR A COMPLETE INSTALLATION, AND INSURE THAT ALL INSTALLATIONS ARE IN ACCORDANCE WITH THE EQUIPMENT'S MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- 9. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND INVERT ELEVATIONS OF ALL EXISTING UTILITIES AT THE SITE PRIOR TO THE INSTALLATION OF ANY PIPING SYSTEMS.
- 10.ALL SANITARY SEWER PIPING 3" AND LARGER SHALL SLOPE AT 1% OR 1/8" PER FOOT, UNLESS NOTED OTHERWISE. ALL SANITARY SEWER PIPING 2" AND SMALLER SHALL SLOPE AT 2% OR 1/4" PER FOOT.
- 11. ALL WALL AND FLOOR CLEAN OUTS, SERVING 4" AND SMALLER, SHALL BE THE SAME SIZE AS THE PIPING SYSTEM THEY SERVE. CLEAN OUTS SERVING 5" AND 6" PIPE SYSTEMS SHALL BE 4". CLEAN OUTS SERVING 8" PIPING SYSTEMS SHALL BE 6". CLEAN OUTS SERVING, 10" AND LARGER, SHALL BE 8".
- 12.ALL ROOF WORK SHALL BE PER THE ROOFING MANUFACTURE'S INSTALLATION INSTRUCTIONS TO MAINTAIN THE EXISTING ROOF WARRANTY.
- 13.PROVIDE TEMPERING VALVES FOR ALL LAVATORIES AND HAND WASHING SINKS. TEMPERING VALVES SHALL CONFORM WITH ASSE 1070 (POWERS MODEL LFG480 OR EQUIVALENT).
- 14.PROVIDE WATER HAMMER ARRESTERS AT ALL QUICK CLOSING VALVES WITH ISOLATION VALVE AND WITH ACCESS OR ACCESS PANEL.
- 15.PROVIDE ACCESS PANELS IN HARD CEILINGS AND WALLS FOR ACCESS TO ALL PLUMBING EQUIPMENT, ISOLATION VALVES, ETC. THIS SHALL INCLUDE ALL NEW AND EXISTING PLUMBING ITEMS REQUIRING ACCESS.
- 16.PROVIDE REDLINE MARKUPS OF ANY FIELD CHANGES OR MODIFICATIONS ON THE CONSTRUCTION DOCUMENTS. REDLINE DRAWINGS SHALL BE REQUIRED WHETHER COORDINATION DRAWINGS ARE REQUIRED OR NOT.
- 17.THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND PATCHING OF DAMAGED ARCHITECTURAL COMPONENTS TO REMAIN DURING THE REMOVAL OF THE DESIGNATED SYSTEMS. COORDINATE REPAIR WITH ARCHITECT.

| PLUMBING LEGEND   |   |  |   |   |  |  |  |  |
|---|---|--|---|---|--|--|--|--|
|   | ALL SYI   | MBOLS IN LE  | EGEND MAY NOT BE USED ON THIS PRO   | JECT.   |  |  |  |  |
|   |   |  | ABBREVIATIONS   |   |  |  |  |  |
| AD AFF AP BAS BOP BHS BTU CFM CP DN (E) EWT FPS FT FM GAL HD HD | ACCESS DOOR ABOVE FINISH FLOOR ACCESS PANEL BUILDING AUTOMATION SYSTEM BOTTOM OF PIPE BRAKE HORSE POWER BUILDING MANAGEMENT SYSTEM BRITISH THERMAL UNIT CUBIC FEET PER HOUR CUBIC FEET PER MINUTE CONDENSATE PUMP DOWN EXISTING EXPANSION TANK ENTERING WATER TEMPERATURE DEGREES FAHRENHEIT FULL LOAD AMPS FEET PER MINUTE FEET PER SECOND FEET FORCED MAIN GALLONS GALLONS PER HOUR GALLONS PER MINUTE HEAD | HR HZ IN I.E. KW KWH LBS LF LWT MBH MCA MOCP NA NC NFPA NIC NO NPSHA NPSHR P | HOUR HERTZ INCH INVERT ELEVATION KILOWATT KILOWATT-HOUR POUNDS LINEAR FEET LEAVING WATER TEMPERATURE 1000 BRITISH THERMAL UNITS PER HOUR MINIMUM CIRCUIT AMPS MAXIMUM OVER CURRENT PROTECTION NOT APPLICABLE NORMALLY CLOSED NATIONAL FIRE PROTECTION ASSOCIATION NOT IN CONTRACT NORMALLY OPEN NET POSITIVE SUCTION HEAD AVAILABLE NET POSITIVE SUCTION HEAD REQUIRED PUMP | PD PH PRV PSI PSIA PSIG RPM SQ FT TAB TDH TEL TYP UNO UV V VAV VD VFD VTR WC WH (N) (E) (F) (R) | PRESSURE DROP PHASE PRESSURE REDUCING VALVE POUND PER SQUARE INCH POUND PER SQUARE INCH ABS. POUND PER SQUARE INCH GAUGE REVOLUTIONS PER MINUTE SQUARE FEET TESTING AND BALANCING TOTAL DEVELOPED HEAD TOTAL EQUIVALENT LENGTH TYPICAL UNLESS NOTED OTHERWISE ULTRA VIOLET VOLT VARIABLE AIR VOLUME VOLUME DAMPER (MANUAL) VARIABLE FREQUENCY DRIVE VENT THRU ROOF WATER COLUMN WATER HEATER NEW EXISTING FUTURE RELOCATED |  |  |  |

#### SYMBOLS AND DESCRIPTIONS EQUIPMENT DESIGNATION. DOWNSPOUT (DS) CLEANOUT, WALL (WCO) $\leftarrow$ ---- $\rightarrow$ EXISTING PIPING TO REMAIN CLEANOUT, FINISH FLOOR (FCO) *⁴///////* EXISTING PIPING TO BE REMOVED. CLEANOUT, PLUG (CO) ## SECTION REFERENCE NUMBER. FLOOR SINK @-###/ SECTION SHEET NUMBER FLOOR DRAIN WORK NOTE DESIGNATION. FROST PROOF WALL HYDRANT DEMOLITION NOTE DESIGNATION. POINT OF CONNECTION. NEW TO EXISTING SPRINKLER HEAD ROOF DRAIN (RD), OVERFLOW ROOF DRAIN (ORD) FIXTURE SUPPORT (WALL CARRIER)

| PIPING DESIGNATIONS AND FITTINGS |  |  |                              |  |  |  |  |  |  |
|----------------------------------|--|--|------------------------------|--|--|--|--|--|--|
| —— CA ——                         | COMPRESSED AIR                               | <b></b>  | ISOLATION VALVE              |  |  |  |  |  |  |
| —— CW ——                         | DOMESTIC COLD WATER                          |  | CHECK VALVE                  |  |  |  |  |  |  |
| —— HW ——                         | DOMESTIC HOT WATER                           | , , ,  |                              |  |  |  |  |  |  |
| ——HWC——                          | DOMESTIC HOT WATER CIRCULATION               | <u> </u>                                       | PLUG VALVE                   |  |  |  |  |  |  |
| ——NP——                           | DOMESTIC NON-POTBALE WATER                   | <b>\$</b> ── <b> </b> �� <b> </b> ── <b>\$</b> | DYNAMIC VALVE                |  |  |  |  |  |  |
| ——scw——                          | DOMESTIC SOFT COLD WATER                     | M  | TWO WAY OON TOOL VALVE       |  |  |  |  |  |  |
| ——SHW——                          | DOMESTIC SOFT HOT WATER                      | <b>•</b>                                       | TWO-WAY CONTROL VALVE        |  |  |  |  |  |  |
|                                  | EXISTING DOMESTIC WATER                      | \$\$   | THREE-WAY CONTROL VALVE      |  |  |  |  |  |  |
|                                  | EXISTING SANITARY                            | <b>₩</b>                                       | BALANCING VALVE              |  |  |  |  |  |  |
| —— G ——                          | GAS PIPING                                   | 4  |                              |  |  |  |  |  |  |
| <del></del> SS                   | ABOVE GRADE SANITARY                         | <b></b>  | PRESSURE REDUCING VALVE      |  |  |  |  |  |  |
| <b></b> ss <b></b>               | BELOW GRADE SANITARY                         | <del>-     -  </del>                           | STRAINER                     |  |  |  |  |  |  |
| GSS                              | GREASE SANITARY                              | TP   |                              |  |  |  |  |  |  |
| — — CWV— —                       | SS - COMBINATION WASTE AND VENT              | <del>,   </del>                                | TEST PORT, UNION             |  |  |  |  |  |  |
| v                                | VENT   | ПО   |                              |  |  |  |  |  |  |
| cv                               | CIRCUIT VENT                                 | у Д  | THERMOMETER, PRESSURE GAUGE  |  |  |  |  |  |  |
| —— SD ——                         | STORM DRAIN PIPING ABOVE GRADE               | TD 1MAV  | ,                            |  |  |  |  |  |  |
| — —SD— —                         | STORM DRAIN PIPING BELOW GRADE               | بار کی ا                                       | WELL, MANUAL AIR VENT        |  |  |  |  |  |  |
| ——OSD——                          | OVERFLOW STORM DRAIN PIPING                  | ,,   | WELE, MANOAL AIR VENT        |  |  |  |  |  |  |
| PIPIN                            | G NOTATION                                   |  | PIPE DOWN AND PIPE TEE DOWN  |  |  |  |  |  |  |
|                                  |  | <b></b>  | PIPE UP AND PIPE TEE UP      |  |  |  |  |  |  |
| X" PIPE T                        | YPE (XXX)——                                  |  | PIPE CAP, BLIND FLANGE       |  |  |  |  |  |  |
|                                  | TS FOR WATER AND SANITARY PIPING             |  | I II L OAI , BLIND I LANGE   |  |  |  |  |  |  |
| XXX = GPM OF FLO                 | W FOR HWC PIPING<br>CTED LOAD FOR GAS PIPING | <u> </u>                                       | PIPE ANCHOR, ALIGNMENT GUIDE |  |  |  |  |  |  |
|                                  | REA IN SQFT. AND GPM FOR STORM PIPING        |  |                              |  |  |  |  |  |  |



|           | DESIGN DATA  |  |
|-----------|--|--|
| LOCATION: | MILNER, CO   |  |
| CODES:    | 2015 INTERNATIONAL BUILDING CODE 2015 INTERNATIONAL MECHANICAL CODE 2015 INTERNATIONAL PLUMBING CODE 2015 IECC ALL APPLICABLE LOCAL AMENDMENTS |  |

### PIPING SYSTEM NOTES

- ALL NEW COLD, HOT AND HOT WATER CIRC WATER PIPING SHALL BE TYPE "L" HARD DRAWN COPPER CONFIRMING TO LEAD-FREE STANDARDS WITH CAST BRONZE OR WROUGHT COPPER FITTINGS, SOLDER JOINT TYPE USING ONLY LEAD FREE SOLDER.
- 2. PROVIDE 1 1/2" FIBERGLASS INSULATION ON ALL HOT AND HOT WATER CIRC PIPING. CW PIPING DOES NOT REQUIRE INSULATION.
- 3. PIPE INSULATION SHALL BE SNAP-ON TYPE, FIBERGLASS PIPE INSULATION WITH WHITE SELF-SEALING FLAME RETARDANT VAPOR BARRIER JACKET. ALL VALVES AND FITTINGS SHALL BE INSULATED.
- 4. PROVIDE CALCIUM SILICATE INSERT AT ALL HANGER LOCATIONS. PROVIDE INSULATION SHIELDS AT ALL HANGERS WITH HANGERS LOCATED UNDER THE INSULATION AND NOT IN CONTACT WITH THE PIPING.
- 5. PROVIDE PIPE MARKERS AND FLOW ARROWS FOR ALL PIPING.
- 6. ALL BELOW GRADE SANITARY PIPING SHALL BE SCHEDULE 40 PVC. ABOVE GRADE SANITARY SEWER SHALL BE CAST IRON WITH NO-HUB FITTINGS
- 7. ABOVE GRADE GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON FITTINGS. BELOW GRADE GAS PIPING SHALL BE POLYETHENE PIPING WITH SOCKET FUSION FITTINGS.
- UPON THE COMPLETION OF THE DOMESTIC WATER SUPPLY SYSTEM PIPING SHALL BE TESTED AND PROVED AIR TIGHT UNDER A WATER PRESSURE TEST NOT LESS THAN THE WORKING PRESSURE OF THE SYSTEM, OR, FOR PIPING SYSTEMS EXCLUDING PLASTIC PIPE, BY AN AIR TEST OF NOT LESS THAN 50 PSIG. PIPING SHALL HOLD PRESSURE FOR A MINIMUM ONE (1) HOUR.





2065 CO ROAD 205 MILNER, COLORADO

ISSUE DATES

PRELIMINARY SET
06 . 26 . 19

DESIGN DEVELOPMENT
08 . 09 . 19

REVIEW SET

12 . 10 . 19

DRAWN BY: RPM
REVIEWED BY: JEM
PROJECT # 19052
PLUMBING INDEX
LEGEND AND
NOTES

P0.0

CONSULTING ENGINEERS, INC.

1039 MAIN STREET

UNIT G WINDSOR, CO 80550 (970) 460-7400 G2CE.COM G2CE #2019092

| PLUI           | MBING FIXTURE S       | SCHEDULE             |                                 |                        |  |                               |        |              |               |          |
|----------------|-----------------------|----------------------|---------------------------------|------------------------|--|-------------------------------|--------|--------------|---------------|----------|
|                |                       |                      |                                 |                        |  | C                             |        |              |               |          |
| TAG            | ITEM                  | MANUFACTURER         | MODEL                           | FINISH                 | DESCRIPTION  | WASTE                         | VENT   | HOT<br>WATER | COLD<br>WATER |          |
| <u>WC-1</u>    | WATER CLOSET          | AMERICAN<br>STANDARD | CADET 3483.001<br>AND 4142 TANK | WHITE                  | RIGHT HEIGHT PRESSURE ASSISTED FLUSH TANK, 1.1 GPF, ELONGATED BOWL, EVERCLEAN SURFACE, 12" ROUGH IN. MOUNTED TO A.D.A STANDARDS TOILET SEAT. AMERICAN STANDARD, MODEL 5321.110. COMMERCIAL HEAVY DUTY OPEN FRONT, WHITE, LESS COVER. | 3"                            | 2"     | N/A          | 1/2"          | 1        |
| 1.1            | LAVATORY - SINK       | AMERICAN<br>STANDARD | 9024.008EC                      | WHITE                  | WALL HUNG, 20x18 VITREOUS CHINA, EVERCLEAN FINISH, REAR OVERFLOW, 8" CENTERS   | 2"                            | 1-1/2" | 1/2"         | 1/2"          | 2 THRU 8 |
| L-1<br>LAVATOR | LAVATORY - FAUCET     | AMERICAN<br>STANDARD | 4800.372H                       | BRUSHED NICKEL         | WIDESPREAD LAVATORY FAUCET, LEAD FREE, RIGID SPOUT, WRIST BLADE HANDLES, ADA COMPLIANT.  | 2                             | 1-1/2  | 1/2          | 1/2           | 2 111100 |
| <u>S-1</u>     | SINK                  | ELKAY                | LRAD221960                      | S/S                    | LUSTERTONE STAINLESS STEEL 22"x19-1/2"x6", SINGLE BOWL, TOP MOUNT, 4 FAUCET HOLES  | 2"                            | 1-1/2" | 1/2"         | 1/2"          | 1        |
| <u>5-1</u>     | FAUCET                | DELTA                | 400LF-HDF                       | S/S                    | SINGLE LEVER HANDLE WITH SEPARATE SPRAY, 1.5 GPM, 45" HOSE AND SPRAY ATTACHEMNT.   | 2                             | 1-1/2  | 1/2          | 1/2           |          |
| <u>FD-1</u>    | FLOOR DRAIN           | SIOUX CHIEF          | 832-36PNQ                       | TBD                    | CAST IRON BODY, FLASHING COLLAR, NICKEL BRONZE STRAINER, ROUND FIXED GRATE. PROVIDE PRO-SET TRAP GUARD.  | 2" OR AS NOTED<br>ON DRAWINGS | 1-1/2" | N/A          | N/A           | -        |
| <u>WCO</u>     | WALL CLEANOUT         | SIOUX CHIEF          | 873                             | N/A                    | ROUND, FACE OF WALL COVER AND SCREW. IRON COVER.   | N/A                           | N/A    | N/A          | N/A           | _        |
| <u>FCO</u>     | FINISH FLOOR CLEANOUT | SIOUX CHIEF          | 851                             | NICKEL-BRONZE<br>COVER | CAST IRON WITH ROUND ADJUSTABLE TOP.   | 2"                            | N/A    | N/A          | N/A           | -        |

NOTES: 1) SHALL MEET ADA STANDARDS 2) ADA BARRIER FREE

7) 0.5 GPM AERATOR

4) ANGLE STOPS

3) TRUEBRO 102 INSULATION KIT FOR CW,HW, AND SS.

8) PROVIDE POWERS TEMPERING VALVE MODEL LFG480 (MIN OF 0.25 GPM FLOW) OR EQUIVALENT CERTIFIED TO ASSE 1070

5) INSTALL BLOCKING TO SUPPORT FAUCET 6) PROVIDE WALL CARRIER FOR FIXTURE

| WATER HEATER SCHEDULE |                 |                |             |                      |                      |                   |                 |          |       |                  |         |
|-----------------------|-----------------|----------------|-------------|----------------------|----------------------|-------------------|-----------------|----------|-------|------------------|---------|
| TAG                   | SERVICE         | MANUF.         | MODEL       | TANK SIZE<br>GALLONS | CAPACITY<br>GAL / HR | WATER INLET TEMP. | WATER<br>OUTLET | VOLTS/PH | E-PWR | WEIGHT<br>(LBS.) | ACCESS. |
| DWH-1                 | S-1             | BOSCH          | ES4         | 4                    | 6.8                  | 40                | 120             | 120/1    | N     | 55               | 1       |
| ACCESS.:              | 1) 125 PSIG PRE | ESSURE AND TEN | MPERATURE F | RELIEF VALVE         |                      |                   |                 |          |       |                  |         |



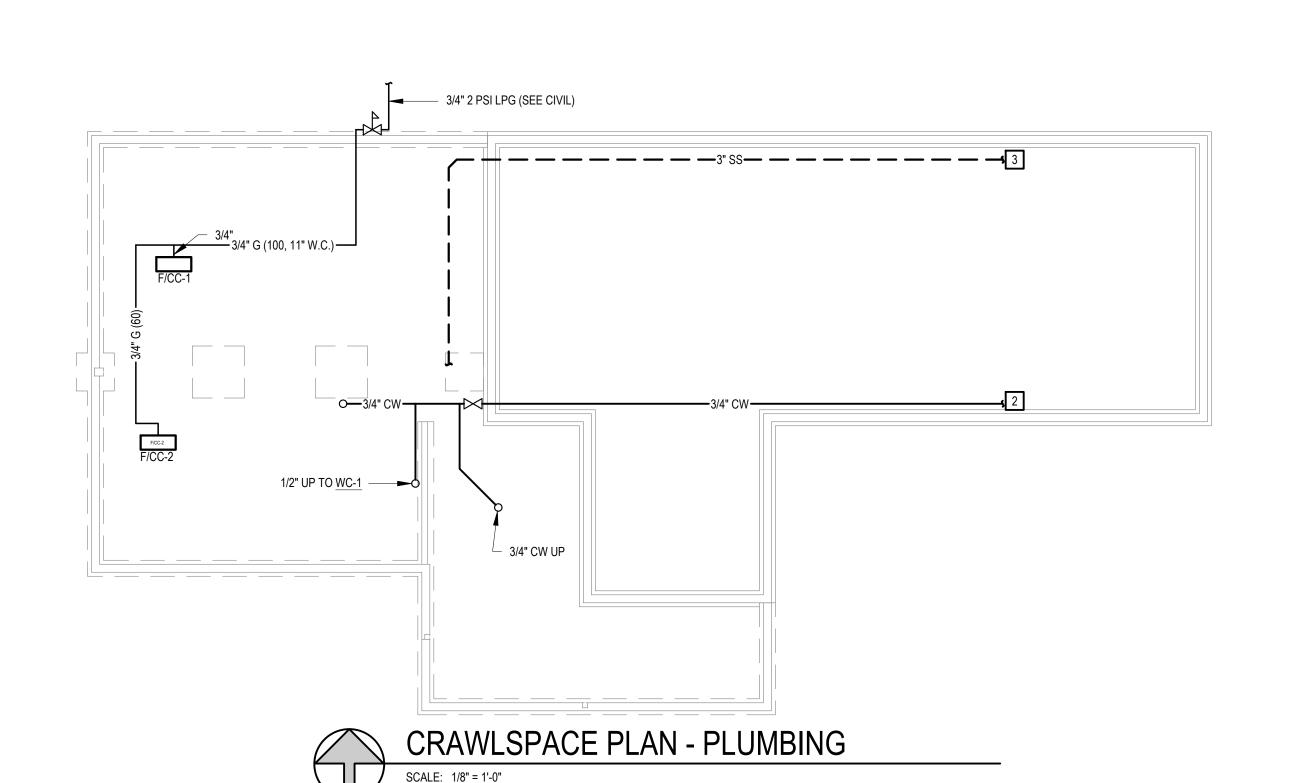


PRELIMINARY SET
06 . 26 . 19
DESIGN DEVELOPMENT
08 . 09 . 19
REVIEW SET
12 . 10 . 19

DRAWN BY: RPM REVIEWED BY: JEM PROJECT # 19052 FLOOR PLANS -

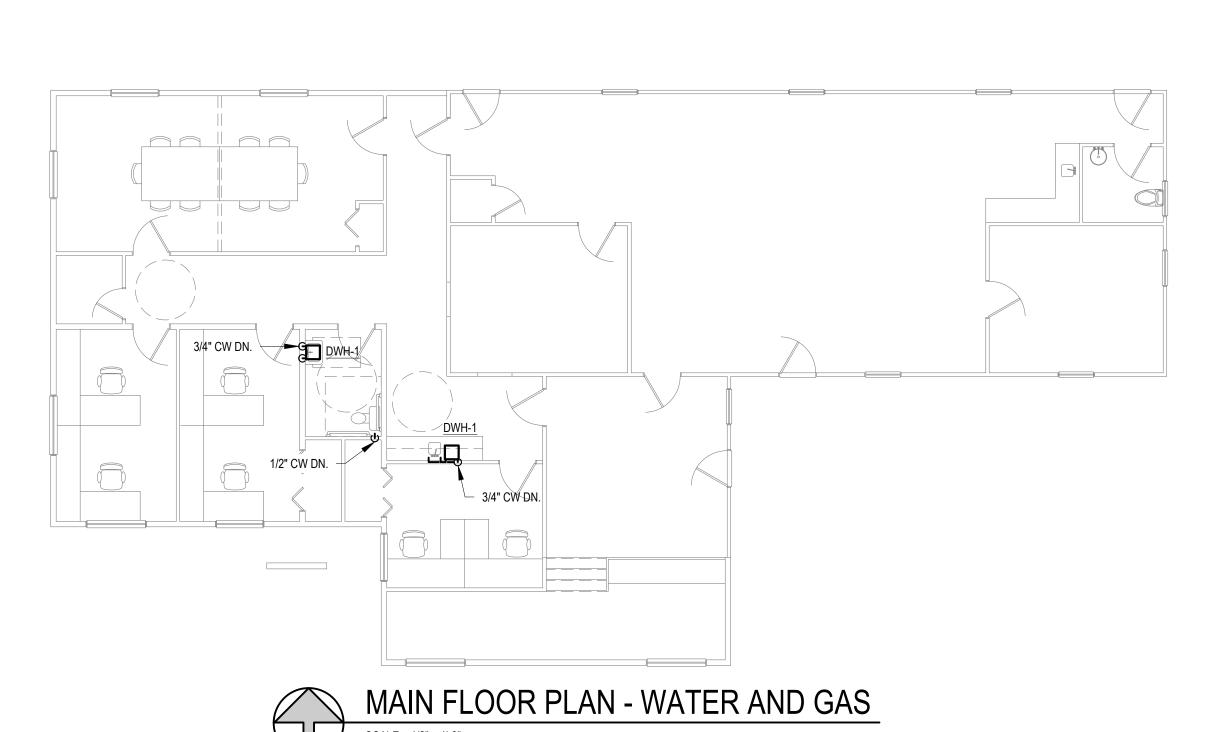
PLUMBING

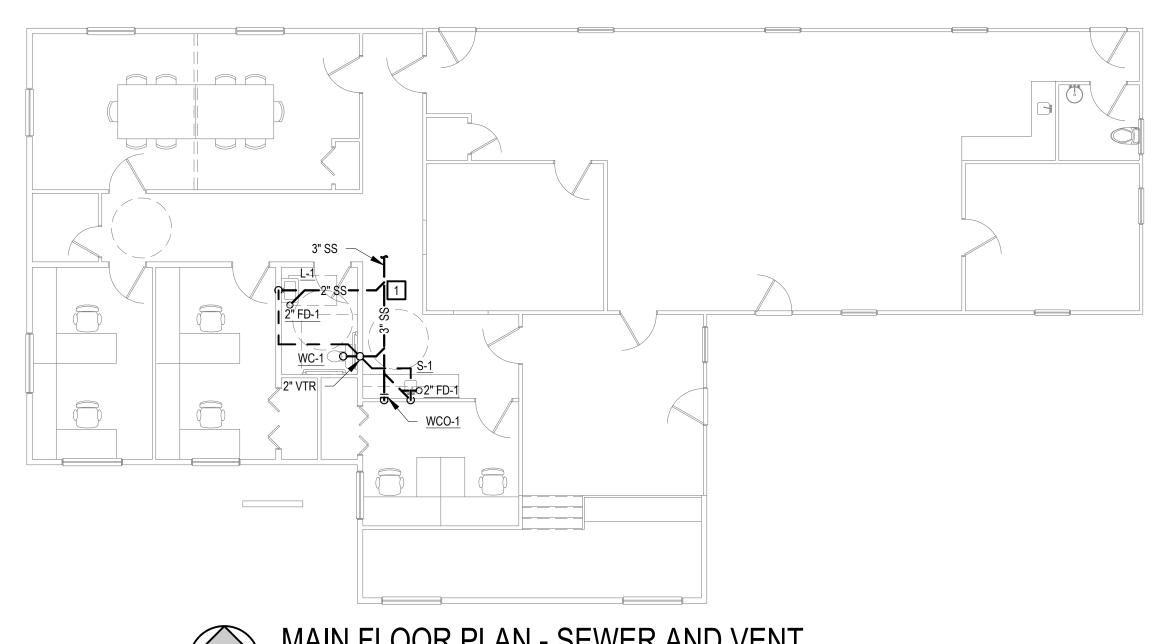
CONSULTING ENGINEERS, 1039 MAIN STREET UNIT G WINDSOR, CO 80550 (970) 460-7400 G2CE.COM G2CE #2019092





- 1. ROUTE CW AND SS PIPING IN CRAWLSPACE.
- 2. CONNECT NEW 3/4" CW TO EXISTING CW LINE.
- 3. CONNECT NEW 3" SS TO EXISTING SS LINE.







| SYMBOLS      | POWER SYMBOLS   | NOTES |
|--------------|---|-------|
| Ó            | MOTOR OUTLET  |       |
| ď            | FUSED DISCONNECT SWITCH SWITCH XX/XX/XX = AMP SWITCH/POLES/AMP FUSE       |       |
| <u>ا</u>     | HEAVY DUTY NON-FUSED DISCONNECT SWITCH<br>SWITCH XX/XX = AMP SWITCH/POLES |       |
| $\mathbb{M}$ | COMBINATION MOTOR STARTER   |       |
| $S_T$        | MANUAL MOTOR STARTER WITH THERMAL OVERLOAD                                |       |
| 0)           | STATIONARY - CIRCUIT BREAKER; RATING AS SHOWN ON PLANS                    |       |
| ~~-          | SWITCH AND FUSE; RATING AS SHOWN ON PLANS                                 |       |
| ا<br>ح       | SWITCH AND FUSE; RATING AS SHOWN ON PLANS                                 |       |
| Ю, О         | JUNCTION BOX  |       |
|              | SURFACE MOUNTED PANELBOARD OR TERMINAL CABINET                            |       |

| SYMBOLS  | FIRE ALARM DEVICE SYMBOLS   |
|----------|---|
| H        | SURFACE WALL FIRE ALARM MANUAL REPORTING STATION, MOUNTED AT +48" AFF.                      |
|          | SURFACE WALL FIRE ALARM AUDIO/VISUAL DEVICE, MTD. 9" BELOW CEILING, UNLESS NOTED OTHERWISE. |
| <b>®</b> | CEILING MOUNTED FIRE ALARM SMOKE DETECTOR / STROBE DEVICE.                                  |
| FACP     | FIRE ALARM CONTROL PANEL.   |
| FARA     | FIRE ALARM REMOTE ANNUNCIATOR PANEL.  |
| GRS      | GENERATOR REMOTE STATUS.  |
|          |   |

| SYMBOLS          | WIRING DEVICE SYMBOLS  |
|------------------|--|
| •                | 20A, 125V, DUPLEX RECEPTACLE OUTLET +18" UNLESS NOTED OTHERWISE  |
| •                | 20A, 125V, DUPLEX RECEPTACLE OUTLET, TOP HALF SWITCHED +18" UNO  |
| Ħ                | SURFACE 20A, 125V, DUPLEX RECEPTACLE OUTLET +18" UNLESS NOTED OTHERWISE  |
| •                | 20A, 125V, DOUBLE DUPLEX RECEPTACLE OUTLET +18" UNLESS NOTED OTHERWISE   |
| Ħ                | SURFACE 20A, 125V, DOUBLE DUPLEX RECEPTACLE OUTLET +18" UNO  |
| •                | SPECIAL PURPOSE RECEPTACLE OUTLET, +18" UNLESS NOTED OTHERWISE, NEMA CONFIGURATION AS NOTED ON PLANS                         |
| $ \ominus $      | SURFACE SPECIAL PURPOSE RECEPTACLE OUTLET, +18" UNLESS NOTED OTHERWISE, NEMA CONFIGURATION AS NOTED ON PLANS                 |
| •                | 20A, 125V, DEDICATED DUPLEX RECEPTACLE OUTLET +18" UON   |
| <b>€</b> GFI     | DUPLEX OUTLET WITH GROUND FAULT INTERRUPTER  |
| 0                | CEILING MOUNTED 20A, 125V, DUPLEX RECEPTACLE OUTLET  |
| <b>#</b>         | CEILING MOUNTED 20A, 125V, DOUBLE DUPLEX RECEPTACLE OUTLET   |
|                  | FLOOR MOUNTED DUPLEX CONVENIENCE/TELECOM OUTLET WITH BLANK STAINLESS STEEL COVER. COORDINATE TYPE AND FINISH WITH ARCHITECT. |
| \$               | SPST WALL SWITCH, LETTERS INDICATE THE NUMBER OF SWITCHES AND OUTLETS THEY CONTROL   |
| <b>\$</b> D      | DIMMER SWITCH  |
| \$ <sub>os</sub> | OCCUPANCY LIGHT CONTROL SWITCH; WALL MOUNTED   |

| SYMBOLS     | DESIGNATION SYMBOLS  | NOTES |
|-------------|--|-------|
| Aaa         | FIXTURE DESIGNATION  UPPER CASE LETTER INDICATES FIXTURE TYPE.  LOWER CASE LETTER INDICATES SWITCH LEG  NUMBER INDICATES CIRCUIT NUMBER (WHERE SHOWN). |       |
| <b>\$</b> a | LETTER INDICATES FIXTURES CONTROL (WHERE SHOWN)  |       |
| 22          | NUMBER INDICATES CIRCUIT NUMBER (WHERE SHOWN)  |       |

|    |  | _ | _ |
|----|--|---|---|
|    | GENERAL NOTES  |   |   |
| 4  | 1. ALL WORK SHOWN IS NEW, UNLESS NOTED OTHERWISE.                          |   | ŀ |
|    | 2. ALL WORK TO BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE, 2017 EDITION. |   | r |
| -1 | 7 CEAL ALL COMPUIT DENETRATIONS OF FLOORS AND FIRE DATED ASSEMBLIES TO     |   | t |

3. SEAL ALL CONDUIT PENETRATIONS OF FLOORS AND FIRE RATED ASSEMBLIES TO MAINTAIN FIRE RATING. 4. PROVIDE NEW TYPEWRITTEN DIRECTORIES REFLECTING WORK PERFORMED FOR ALL NEW PANELBOARDS IN THIS PROJECT.

5. PLANS ARE PREPARED WITH REQUIRED BRANCH CIRCUITS INDICATED BY CIRCUIT NUMBERS. PROVIDE AND INSTALL ALL CONDUITS, CONDUCTORS, BOXES, MISCELLANEOUS FITTINGS, ETC. FOR A COMPLETE AND OPERABLE SYSTEM (HOMERUN SHOWN). BRANCH CIRCUIT INSTALLATION SHALL COMPLY WITH SPECIFICATIONS AND N.E.C.

6. ALL NEUTRAL CONDUCTORS ON POWER BRANCH CIRCUITING ROUNDHOUSES TO BE #10 AWG UNLESS NOTED OTHERWISE.

# SHEET LIST

E-1.0 SYMBOL LIST AND SINGLE LINE DIAGRAM

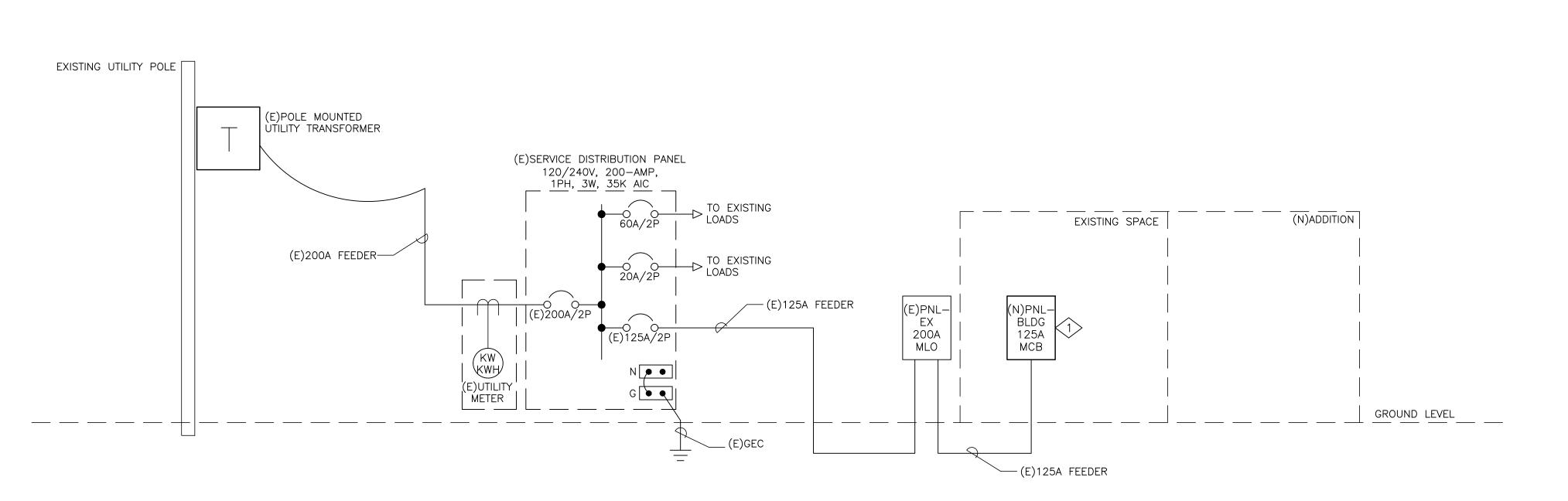
E-1.1 SCHEDULES

E-2.0 ELECTRICAL POWER AND SIGNAL PLAN

E-3.0 ELECTRICAL LIGHTING PLAN

E-4.0 SPECIFICATIONS

|        | ABBREVIATIONS                                  | NOTES |
|--------|--|-------|
| A, AMP | AMPERE   |       |
| AIC    | AMPERE INTERRUPTING CAPACITY                   |       |
| AF     | FRAME RATING IN AMPERES                        |       |
| AS     | SWITCH RATING IN AMPERES                       |       |
| AT     | TRIP RATING IN AMPERES                         |       |
| AWG    | AMERICAN WIRE GAUGE                            |       |
| С      | CONDUIT  |       |
| CKT    | CIRCUIT  |       |
| (E)    | EXISTING TO REMAIN                             |       |
| EC     | EMPTY CONDUIT                                  |       |
| ELEC   | ELECTRICAL                                     |       |
| EMT    | ELECTRO METALLIC TUBING                        |       |
| FA     | FIRE ALARM                                     |       |
| G, GND | GROUND   |       |
| HP     | HORSEPOWER                                     |       |
| MECH   | MECHANICAL                                     |       |
| MCB    | MAIN CIRCUIT BREAKER                           |       |
| (N)    | NEW EQUIPMENT OR DEVICE                        |       |
| NEC    | NATIONAL ELECTRIC CODE                         |       |
| NEMA   | NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION |       |
| NO     | NORMALLY OPEN                                  |       |
| NTS    | NOT TO SCALE                                   |       |
| ø, PH  | PHASE  |       |
| PNL    | PANEL  |       |
| PVC    | POLYVINYL CHLORIDE CONDUIT                     |       |
| PWR    | POWER  |       |
| RSC    | RIGID STEEL CONDUIT                            |       |
| TEL    | TELEPHONE                                      |       |
| TYP    | TYPICAL  |       |
| UON    | UNLESS OTHERWISE NOTED                         |       |
| ٧      | VOLT   |       |
| VA     | VOLT AMPERES                                   |       |
| W      | WATT   |       |
| (X)    | EXISTING TO BE DEMOLISHED                      |       |



### **GENERAL NOTES**

- 1. ALL WORK SHOWN IS EXISTING, UON.
- 2. ALL CONDUCTORS SHOWN ARE SIZED AS COPPER CONDUCTORS, UON.

### RISER NOTES

REPLACE EXISTING PANEL WITH NEW125-AMP PANEL WITH 42 BREAKER SPACES. SEE PANEL SCHEDULE FOR MORE INFORMATION.

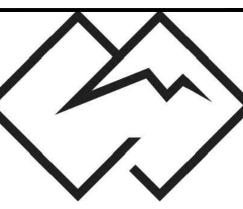


# TWIN ENVIRO **ADDITION**

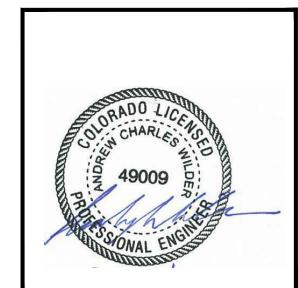
20650 CO Road 205 Milner, CO

# SEAD

2740 Acrew Lane, Suite E Steamboat Springs, CO



WILDER ENGINEERING LLC Andrew Wilder PE 1170 Blue Sage Drive Steamboat Springs, CO 80487 P: 970-819-7848 E: andy@wilder-eng.com



| Issue | By Date & Issue Description | Ву |
|-------|-----------------------------|----|
| _     | PERMIT SET - 1.27.20        | AW |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |

Scale: 24x36 NTS Description: SYMBOLS, DIAGRAMS Project Name: TWIN ENVIRO ADDITION Project Number: 2019072

Sheet No.

E-1.0

|         |      |                                   |        | L10  | GHTING FIXTU | IRE SCHED | ULE   |   |                   |
|---------|------|-----------------------------------|--------|------|--------------|-----------|-------|---|-------------------|
| SYMBOL  | ITEM | TYPE                              | SIZE   | LAM  | PS           | FIXTURE   | INPUT | CATALOG   | ALTERNATE CATALOG |
| STWIDOL | 11   | 11112                             | SIZL   | TYPE | COLOR        | VOLTAGE   | WATTS | NUMBER  | NUMBER            |
|         | F1   | SURFACE MOUNTED LED<br>STRIPLIGHT | 48"    | LED  | 3500K        | 120       | 39    | VISCOR LIGHTING<br>LBL-VL-48-LED-8-35K-045L-UNV   | APPROVED EQUAL    |
| 0       | F2   | 4" RECESSED LED DOWNLIGHT         | 4"     | LED  | 3000K        | 120       | 10    | LSI LIGHTING<br>LRD4-040LED-30-120-RT4R-HAZ-WB-WH | APPROVED EQUAL    |
| Q       | F3   | VANITY LED FIXTURE                | 15"    | LED  | 3000K        | 120       | 9     | ASL LIGHTING<br>DVD-FSN-LCU<br>9-3000K-L15        | APPROVED EQUAL    |
|         | F4   | UNDER CABINET LED FIXTRE          | 36"    | LED  | 3500K        | 120       | 21    | LSI LIGHTING<br>LXC2-36-LED-WW-24                 | APPROVED EQUAL    |
| \$      | X1   | LED EXIT SIGN                     | 8"x12" | LED  | NA           | 120       | 3     | LSI LIGHTING<br>EX-G-U-WB-WH                      | APPROVED EQUAL    |
| ₩       | X2   | EGRESS FIXTURE                    | 9"x4"  | LED  | NA           | 120       | 3     | LSI LIGHTING<br>EAR-LED-UNV-WHT                   | APPROVED EQUAL    |

### SCHEDULE NOTES

- 1. ALL LAMPS SHALL BE PROVIDED BY THE CONTRACTOR.
- 2. CONTRACTOR TO SUBMIT FIXTURE TYPES TO OWNER AND ENGINEER PRIOR TO PURCHASE AND INSTALLATION.

3 LIGHTING FIXTURE SCHEDULE

NTS

| SERVICE                |           |
|------------------------|-----------|
|                        |           |
|                        |           |
| HIGHEST Ø<br>11.35 KVA |           |
| 17.68 KVA              |           |
| 00.07.1014             |           |
| 29.03 KVA              |           |
|                        | 29.03 KVA |

| 2  | OVERALL | LOAD | SUMMARY |
|--|---------|------|---------|
| <i>←                                    </i> | NTS     |      |         |

| MOUN  | NTING  | SURF   | ACF    |          |        | P             | A      | N      | E      | L            | ΛT     | R      | Р      | ΝI     |        | 10 (        | 000   | A.I.C. | SYN |
|-------|--------|--------|--------|----------|--------|---------------|--------|--------|--------|--------------|--------|--------|--------|--------|--------|-------------|-------|--------|-----|
|       |        | VOLTS  |        | PHASE    |        | WII           |        | _ ,    |        |              | AIN    |        | 200    |        |        |             |       | BUS    |     |
| VC    | OLT AM | PS     |        |          | R      | L             | O      | В      | C      |              | C      | В      | O      | L      | R      |             | V     | OLT AM | PS  |
| ØA    | ØB     | ØС     | DESCE  | RIPTION  | E<br>C | T<br>G        | L<br>E | K<br>R | I<br>R |              | I<br>R | K<br>R | L<br>E | T<br>G | E<br>C | DESCRIPTION | ØA    | ØВ     | ØC  |
| 12921 |        |        | Shop I | Building |        |               | 2      | 125    | 1      | A            | 2      |        |        |        |        | Space       |       |        |     |
|       | 12827  |        |        | -        |        |               | 1      |        | 3      | В            | 4      |        |        |        |        | Space       |       |        |     |
| 1094  |        |        | Exi    | sting    |        |               | 2      | 60     | 5      | A            | 6      | 20     | 2      |        |        | Heater      | 365   |        |     |
|       | 1094   |        |        | -        |        |               | -      | -      | 7      | В            | 8      | -      | -      |        |        | I           |       | 365    |     |
| 109   |        |        | Re     | cept     | 2      |               | 1      | 20     | 9      | A            | 10     |        |        |        |        |             |       |        |     |
|       | 109    |        | Re     | cept     | 2      |               | 1      | 20     | 11     | В            | 12     |        |        |        |        |             |       |        |     |
| 109   |        |        | Re     | cept     | 2      |               | 1      | 20     | 13     | A            | 14     |        |        |        |        |             |       |        |     |
|       |        |        |        |          |        |               |        |        | 15     | В            | 16     |        |        |        |        |             |       |        |     |
|       |        |        |        |          |        |               |        |        | 17     | A            | 18     |        |        |        |        |             |       |        |     |
|       |        |        |        |          |        |               |        |        | 19     | В            | 20     |        |        |        |        |             |       |        |     |
| 14234 |        |        |        |          |        |               |        |        |        | A/LIN        | E      |        |        |        |        |             | 365   | 365    |     |
|       | 14599  |        |        |          |        |               |        | ØB=    | 14     |              | 2222   |        |        |        |        |             | ØC=   |        |     |
| CO    | NTINUC | US LOA | TI     | D T      | 101    | - <b>X</b> 7A | 96     | 61     |        | NON-<br>.00= |        |        | UOU    | S LC   | DADS   |             |       |        |     |
| 1488  | x1.25= | 1860   | ]      | RECEPTAC | LES    |               |        |        |        | . x(         |        |        | 01     |        |        | OTHER       | 17846 | x1.00  | 178 |
|       |        | TC     | TAL DI | ESIGN kV | 7 Δ =  | 2             | 9      |        | 7      | ОТА          | I D    | FSIC   | ZNI    | л т/п  | =20    | 122         |       |        |     |

| 240   | 420    | NOI TO |                 | ^      | ****   | . T    |        |        | M     |        |        | 40/    | - ^    |        |             |       | DIIC   | 200 / |
|-------|--------|--------|-----------------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|-------------|-------|--------|-------|
| 240   | /120   | VOLTS  | 1 PHASE         | 3      | WII    | KE.    |        |        | IVI   | AIN    |        | 125    | А      |        |             | 1     | BUS    | 200 / |
| VO    | OLT AM | PS     |                 | R      | L      | 0      | В      | C      |       | C      | В      | O      | L      | R      |             | VC    | OLT AM | PS    |
| ØA    | ØB     | ØС     | DESCRIPTION     | E<br>C | T<br>G | L<br>E | K<br>R | I<br>R |       | I<br>R | K<br>R | L<br>E | T<br>G | E<br>C | DESCRIPTION | ØA    | ØВ     | ØС    |
| 55    |        |        | Outlet          | 1      |        | 1      | 20     | 1      | A     | 2      | 20     | 1      |        | 1      | Outlet      | 55    |        |       |
|       | 207    |        | Heat/A/V Outlet | 1      |        | 1      | 20     | 3      | В     | 4      | 20     | 1      |        | 1      | Outlet      |       | 55     |       |
| 76    |        |        | Ltg             |        |        | 1      | 20     | 5      | A     | 6      |        |        |        |        | Space       |       |        |       |
|       | 12566  |        | Bldg Panel      |        |        | 2      | 125    | 7      | В     | 8      |        |        |        |        | Space       |       |        |       |
| 12736 |        |        | -               |        |        | -      | _      | 9      | A     | 10     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 11     | В     | 12     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 13     | Α     | 14     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 15     | В     | 16     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 17     | A     | 18     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 19     | В     | 20     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 21     | A     | 22     |        |        |        |        | Space       |       |        |       |
|       |        |        | Space           |        |        |        |        | 23     | В     | 24     |        |        |        |        | Space       |       |        |       |
|       | 12772  |        |                 |        |        |        |        |        | A/LIN | NE.    |        |        |        |        |             | 55    | 55     |       |
| ØA=   | 12921  |        |                 |        |        |        | ØB=    | 12     | 827   |        |        |        |        |        |             | ØC=   |        |       |
| CO    | NTINUC | US LOA |                 |        |        |        |        |        |       |        |        |        | UOU    | S LC   | DADS        |       |        |       |
| 1488  | x1.25= | 1860   | RECEPTA         | CLES   |        |        | 93     |        | x x   | 1.00=  |        | 33     | •      |        | OTHER       | 14927 | x1.00  | 1492  |

| MOUN | NTING   | SURF   | FACE            |        | P      | A      | N      | E      | L     | (N     | )B   | LC     | OG     | }      | 10,         | ,000  | A.I.C. | SYM   |
|------|---------|--------|-----------------|--------|--------|--------|--------|--------|-------|--------|------|--------|--------|--------|-------------|-------|--------|-------|
| 240  | /120    | VOLTS  | 1 PHASE         | 3      | WII    | RE     |        |        | M     | AIN    |      | 12     | 5 A    |        |             |       | BUS    | 200 A |
| VC   | OLT AM  | PS     |                 | R<br>E | L<br>T | O<br>L | B<br>K | C<br>I |       | C<br>I | В    | O<br>L | L<br>T | R<br>E |             | V     | OLT AM | IPS   |
| ØA   | ØВ      | ØС     | DESCRIPTION     | C      | G      | E      | R      | R      |       | R      | R    | E      | G      | C      | DESCRIPTION | ØA    | ØB     | ØС    |
| 547  |         |        | AC Unit         |        |        | 2      | 30     | 1      | A     | 2      | 30   | 2      |        |        | Unit Heater | 669   |        |       |
|      | 547     |        | -               |        |        | 1      | -      | 3      | В     | 4      | Τ    | Ι      |        |        | ı           |       | 669    |       |
| 304  |         |        | AC Control      |        |        | 2      | 20     | 5      | A     | 6      | 20   | 1      |        |        | Furnace     | 365   |        |       |
|      | 304     |        | -               |        |        | -      | -      | 7      | В     | 8      | 20   | 1      |        |        | HWH         |       | 365    |       |
| 365  |         |        | Ref             |        |        | 1      | 20     | 9      | A     | 10     | 20   | 1      |        | 3      | Recepts     | 164   |        |       |
|      | 274     |        | Kitchen Recepts | 5      |        | 1      | 20     | 11     | В     | 12     | 20   | 1      |        | 3      | Recepts     |       | 164    |       |
| 274  |         |        | Kitchen Recepts | 5      |        | 1      | 20     | 13     | A     | 14     | 20   | 1      |        | 6      | Recepts     | 328   |        |       |
|      | 109     |        | Bathroom        | 2      |        | 1      | 20     | 15     | В     | 16     | 20   | 1      |        | 4      | Recepts     |       | 219    |       |
| 185  |         |        | Crawl Ltg & Rec | 2      |        | 1      | 20     | 17     | A     | 18     | 20   | 1      |        | 6      | Recepts     | 328   |        |       |
|      | 328     |        | Recepts         | 6      |        | 1      | 20     | 19     | В     | 20     | 20   | 1      |        | 6      | Recepts     |       | 328    |       |
| 328  |         |        | Recepts         | 6      |        | 1      | 20     | 21     | A     | 22     | 20   | 1      |        | 4      | East Office | 219   |        |       |
|      | 228     |        | Ltg             |        |        | 1      | 20     | 23     | В     | 24     | 20   | 1      |        |        | Ltg         |       | 228    |       |
|      |         |        |                 |        |        |        |        | 25     | A     | 26     | 20   | 1      |        | 2      | (N)RECEPTS  | 360   |        |       |
|      | 500     |        | (N)DWH          |        |        | 1      | 20     | 27     | В     | 28     | 20   | 1      |        | 2      | (N)RECEPTS  |       | 360    |       |
| 25   |         |        | (N)EF           |        |        | 1      | 20     | 29     | A     | 30     | 20   | 1      |        |        | (N)LTG      | 880   |        |       |
|      | 1164    |        | (N)F-1          |        |        | 1      | 20     | 31     | В     | 32     | 20   | 1      |        | 6      | (N)RECEPTS  |       | 1080   |       |
| 1176 |         |        | (N)F-2          |        |        | 1      | 20     | 33     | A     | 34     | 20   | 1      |        | 6      | (N)RECEPTS  | 1080  |        |       |
|      | 1716    |        | (N)CU-1         |        |        | 2      | 30     | 35     | В     | 36     | 20   | 1      |        | 6      | (N)RECEPTS  |       | 1080   |       |
| 1716 |         |        | -1              |        |        | -      | 10     | 37     | A     | 38     | 20   | 1      |        | 6      | (N)RECEPTS  | 1080  |        |       |
|      | 2172    |        | (N)CU-2         |        |        | 2      | 30     | 39     | В     | 40     | 20   | 1      |        | 5      | (N)RECEPTS  |       | 900    |       |
| 2172 |         |        | -               |        |        | -      | -      | 41     | A     | 42     |      |        |        |        |             |       |        |       |
| 7092 | 7343    |        |                 |        |        |        |        | V      | A/LIN | JE     |      |        |        |        |             | 5473  | 5393   |       |
| Ø A= | 12566   |        |                 |        |        |        | ØB=    | 12     | 736   |        |      |        |        |        |             | ØC=   |        |       |
| CO   | NTINUC  | US LOA |                 |        |        |        |        |        |       |        |      |        | UOU    | JS LC  | DADS        |       |        |       |
|      |         |        |                 | UP T   | 0 10 1 | kVA    | 91     | 14     | X     | 1.00=  | 91   | 14     | _      |        |             |       |        |       |
| 1412 | x1.25 = | 1765   | RECEPTA         | CLES   |        |        |        |        |       |        |      |        |        |        | OTHER       | 14775 | x1.00  | 14775 |
|      |         |        |                 | REM    | AIN    | DER    |        |        | x     | 0.50=  |      |        |        |        |             |       |        |       |
|      |         | TC     | TAL DESIGN k    | VA=    | 2      | 6      |        | Γ      | OTA   | LD     | ESIC | GN .   | AM     | PS=    | 107         |       |        |       |

| 1          | PANEL | SCHEDULES |
|------------|-------|-----------|
| ' <i>ブ</i> | NTS   |           |

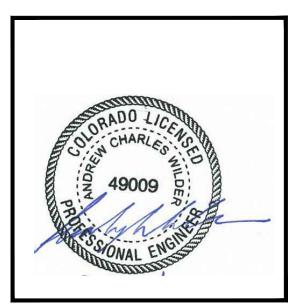
# TWIN ENVIRO ADDITION

20650 CO Road 205 Milner, CO

# SEAD

2740 Acrew Lane, Suite E Steamboat Springs, CO

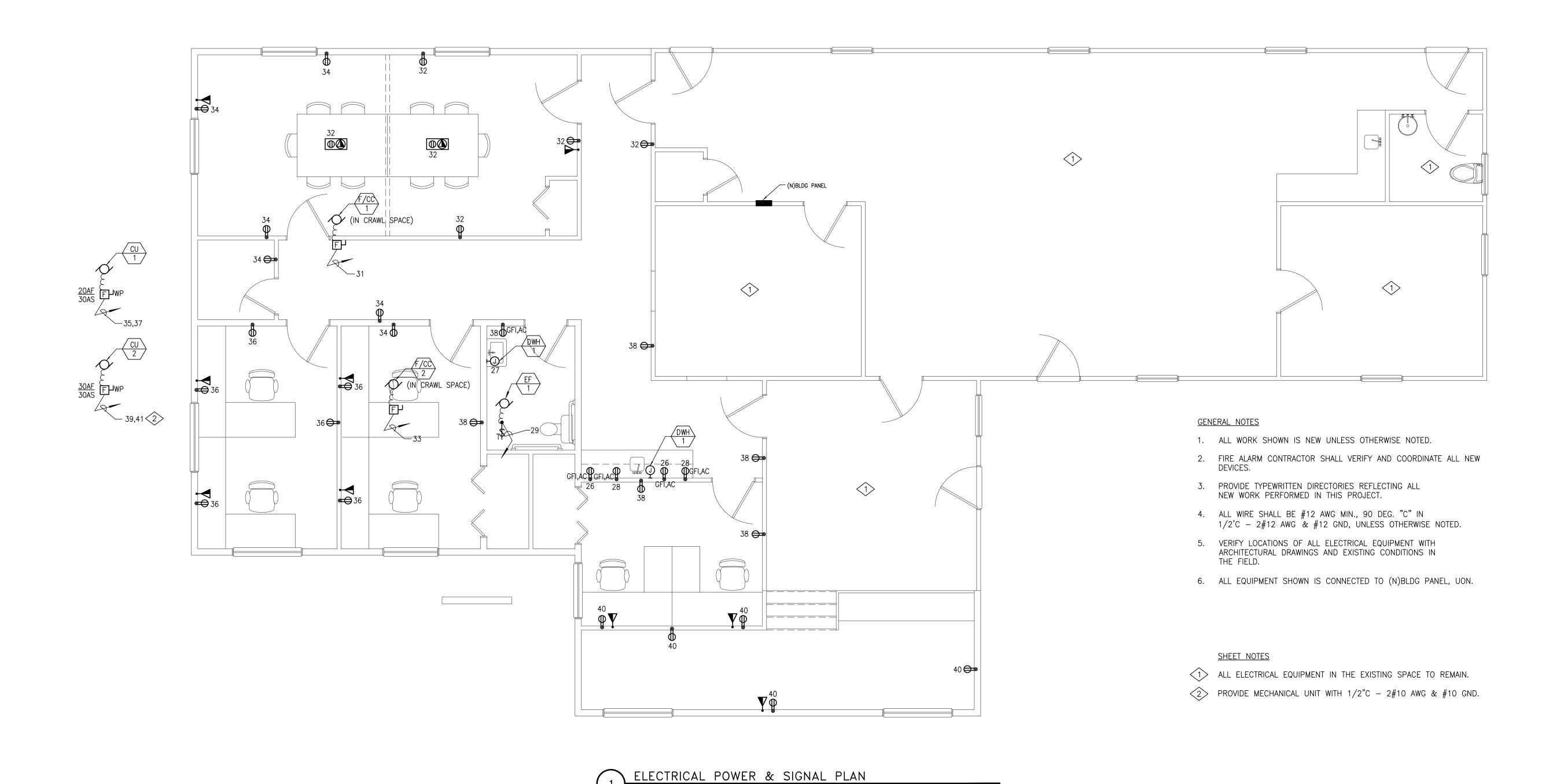




| Issue | By Date & Issue Description | Ву |
|-------|-----------------------------|----|
| ı     | PERMIT SET - 1.27.20        | AW |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |

| Scale:                             |
|------------------------------------|
| 24x36 NTS                          |
| Description: SCHEDULES             |
|                                    |
| Project Name: TWIN ENVIRO ADDITION |
|                                    |
| Project Number: 2019072            |
| •                                  |
|                                    |

E-1.1

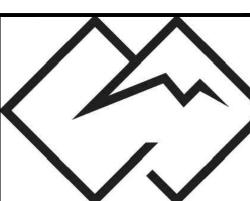


# TWIN ENVIRO ADDITION

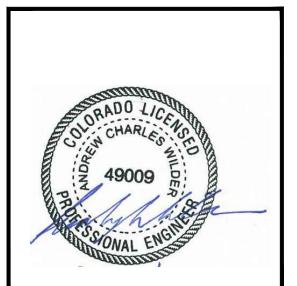
20650 CO Road 205 Milner, CO

# SEAD

2740 Acrew Lane, Suite E Steamboat Springs, CO



WILDER ENGINEERING LLC
Andrew Wilder PE
1170 Blue Sage Drive
Steamboat Springs, CO 80487
P: 970-819-7848
E: andy@wilder-eng.com



| Issue | By Date & Issue Description | Ву |
|-------|-----------------------------|----|
|       | PERMIT SET - 1.27.20        | AW |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |

24x36<u>1/4"=1'-0"</u>

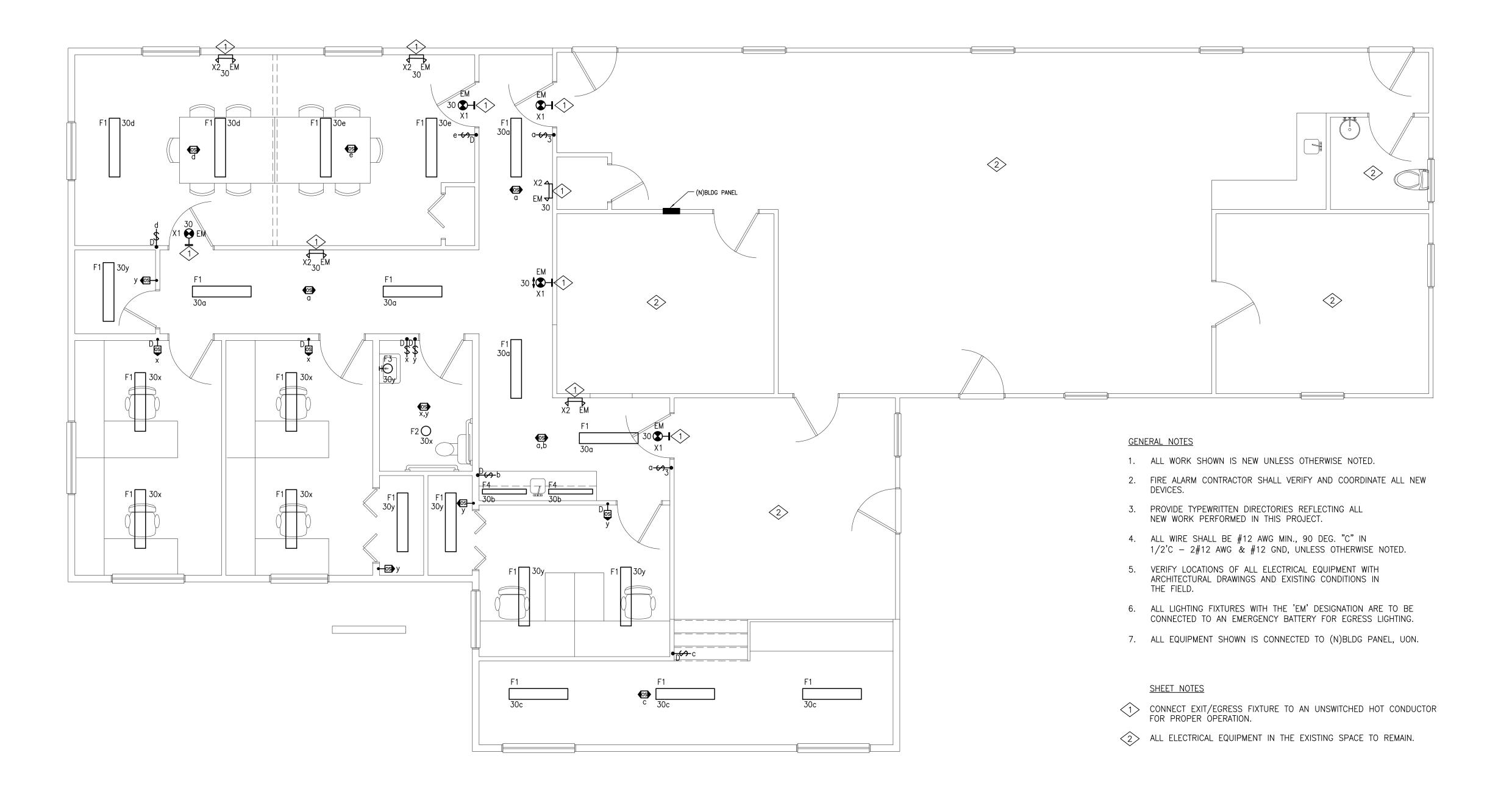
Description: ELECTRICAL PLAN

Project Name: TWIN ENVIRO ADDITION

Project Number: 2019072

Sheet No

E-2.0



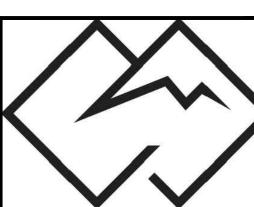
ELECTRICAL LIGHTING PLAN

TWIN ENVIRO ADDITION

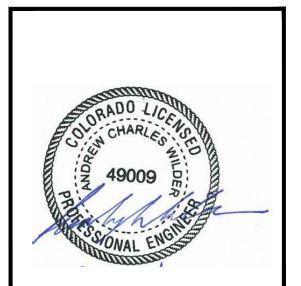
20650 CO Road 205 Milner, CO

SEAD

2740 Acrew Lane, Suite E Steamboat Springs, CO



WILDER ENGINEERING LLC
Andrew Wilder PE
1170 Blue Sage Drive
Steamboat Springs, CO 80487
P: 970-819-7848
E: andy@wilder-eng.com



| Issue | By Date & Issue Description | Ву |
|-------|-----------------------------|----|
| _     | PERMIT SET - 1.27.20        | AW |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |

Scale: 24x36 1/4"=1'-0"

Description: ELECTRICAL LIGHTING PLAN

Project Name: TWIN ENVIRO ADDITION

Project Number: 2019072

Sheet No.

E-3.0

### **SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS** 1) PART 1 GENERAL a) POWER AND CONTROL WIRING i) Provide power system conduit and wiring to mechanical equipment. Controls system conduit and wiring for mechanical systems is included under Division 15. "Power" wiring includes line voltage wiring from distribution apparatus to disconnecting means provided or installed under this section, and from such disconnecting means to motors, and to terminal boxes of 'package' equipment. "Controls" wiring includes wiring, regardless of voltage, which provides start-stop control for mechanical equipment and/or which is used to monitor functions of mechanical systems. Where line voltage wiring is extended from a local disconnecting means to relays, thermostats, by-pass timers, starter coils or the like, or from mechanical control panels or motor control centers to control devices, such extensions are considered "control" wiring. b) MOUNTING HEIGHTS i) Mounting heights and locations: verify the exact location of equipment with architect prior to installation. Wall mounted devices requiring operational access shall be mounted a minimum of 15 inches above finished floor to bottom of device and a maximum of 48 inches above finished floor to top of device. Visual alarms shall be mounted not less than 80 inches to the bottom or 96 inches to the top of the device. c) REGULATORY REQUIREMENTS i) Conform to: (1) NFPA-70 - National Electric Code. ii) Comply with the current applicable codes, ordinances, and regulations of the authority or authorities having jurisdiction, the Owner's insurance underwriter, and applicable base building standards. iii) When conflict exists between two or more governing codes, comply with the stricter requirement. iv) Obtain permits, and request inspections from authority having jurisdiction. d) PROJECT/SITE CONDITIONS i) Install Work in locations shown on Drawings, unless prevented by Project conditions. Coordinate installation of work in available space with work furnished under other Divisions. 2) PRODUCTS a) Where manufacturer's model or series numbers are specified or shown, these indicate generally acceptable types required. Furnish products which comply with all requirements, as specified or shown. b) When more than one unit of the same class of equipment is required, provide units produced by a single manufacturer. 3) TESTS a) Furnish test equipment, facilities, and technical personnel required to perform field tests. b) At completion of job, check voltage at several points of utilization on the system. Energize all loads installed. 4) CLEANING a) Clean all fixtures and equipment at the completion of the project. Wipe clean exposed lighting fixture reflectors and trim pieces with a non-abrasive cloth just prior to occupancy. 5) RECORD DRAWINGS a) Upon completion of the Work, deliver to Architect and up-to-date set of "as-built" record drawings on a reproducible medium including AutoCAD. 6) DEMOLITION a) Remove, relocate, and reroute existing electrical equipment to facilitate new construction or remodeling work. b) Examine the site to observe and note existing conditions prior to submitting a bid. c) Schedule demolition in advance. Schedule work to avoid disruption of normal operations. d) Reconnect circuits serving equipment required to remain in service to other panelboards, motor control centers, or other appropriate distribution equipment. Provide additional panelboards, motor control centers, or other appropriate distribution equipment where there is insufficient available capacity in remaining existing equipment for reconnection. e) Remove existing conduit and wire back to panelboard, motor control center, or other distribution source. f) Where a circuit is interrupted by removal of a device or fixture from that circuit, provide additional conduit and wire to restore service to the remaining devices and fixtures on that circuit. g) Electrical equipment to be removed that is in good working order shall be carefully removed and offered to the Owner. Items rejected by the Owner shall be removed from the project site and properly disposed of.

```
a) REFERENCES
  i) All equipment and installations shall meet or exceed minimum requirements of ADA, ANSI, ASTM, IEEE, IES, NEC, NEMA,
    NETA, NFPA, OSHA, SMACNA, UL, and the State Fire Marshal. Equipment shall be certified for use in the State of the
    project and shall meet the State energy code. Provide products and materials that are new, clean, free of defects, and
    free of damage and corrosion.
  b) PERFORMANCE REQUIREMENTS
  i) Provide support system for equipment and conduit, including wiring, with a minimum safety factor of 4. For empty
    conduits, include weight of 4 type XHHW wires of maximum permissible size.
  c) QUALITY ASSURANCE
  i) All equipment and installations shall meet or exceed minimum requirements of ADA, ANSI, ASTM, IEEE, IES, NEC, NEMA,
    NETA, NFPA, OSHA, SMACNA, UL, and the State Fire Marshal. Equipment shall be certified for use in the State of the
     project and shall meet the State energy code. Provide products and materials that are new, clean, free of defects, and
    free of damage and corrosion.
2) PART 2 PRODUCTS
  a) CONDUIT
  i) General
      (1) Exposed Dry and Damp Locations:
          (a)Use electrical metallic tubing.
       (2) Concealed Locations:
          (a)Furred, Ceiling Spaces and Stud Walls: Use electrical metallic tubing.
          (b) Connections to Lighting Fixtures in Accessible Ceilings: Use flexible conduit.
       (3) Equipment Connections:
          (a)Connections to Liquid-Handling Equipment in Dry Locations: Use liquid-tight flexible conduit.
       (4) Equipment for Dry Systems in Dry Locations: Use flexible conduit.
  ii) Electrical Metallic Tubing:
      (1) Continuous, seamless steel tubing, galvanized or sherardized on exterior, coated on interior with smooth hard
          finish of lacquer, varnish or enamel, with steel, set screw or compression type fittings. Provide concrete type
          fittings where required.
      (2) Use for general purpose feeders and branch circuits.
  iii)Flexible Steel Conduit:
      (1) Single strip, continuous, flexible interlocked double-wrapped steel, hot dip galvanized inside and out forming
          smooth internal wiring channel, with steel, compression type fittings.
      (2) Use in dry locations only, connections to lighting fixtures in suspended ceilings, connections to equipment
          installed above suspended ceilings, transformer connections, busway plug in units, and connections to equipment
          where vibration isolation is required, maximum length of 6 feet.
  iv)Liquid Tight Flexible Steel Conduit:
      (1) Same as flexible steel conduit except with tough, inert, watertight plastic outer jacket. Fittings shall be cast
         malleable iron body and gland nut, cadmium plated with one-piece brass grounding bushings threaded to interior
         of conduit. Spiral molded vinyl sealing ring between gland nut and bushing and nylon insulated throat.
      (2) Use same as flexible steel conduit in damp or wet locations and at motor connections.
  b) BUILDING WIRE AND CABLE
  i) Provide wire with a minimum insulating rating of 600 volts, except for wire used in low voltage (below 50 volts) control
    or signal systems. The use of teflon (multi-conductor) for low tension systems may be permitted for fire alarm, signal
    and communication systems (voice and data) as approved on shop drawings by engineers and where permitted by local
     codes and union practice.
      (1) Electrical grade, annealed copper, and fabricated in accordance with ASTM standards. Minimum size number
        12 AWG for branch circuits; number 14 AWG for control wiring.
      (2) Unless otherwise specified, all wires numbers 10 and smaller shall be solid.
      (3) All wires number 8 and larger shall be stranded in accordance with ASTM Class B stranding designations.
      (4) Control wires shall be stranded in accordance with ASTM Class B stranding designations.
       (5) Cables for low tension systems shall be multi-conductor, 16 gauge, color coded and insulated in armored cable
          assembly, with number of conductors as required.
       (6) All 600 volt wire and cables unless otherwise specified shall be single conductor suitable for use in wet and dry
  iii) Connectors
      (1) Make connections, splices, taps and joints with solderless devices, mechanically and electrically secure. Protect
          exposed wires and connecting devices with electrical tape or insulation to provide insulation values not less than
          on conductor.
  iv) Cables (No. 8 and Larger):
      (1) Use set screw or compression type connectors, taps and splices specifically designed for the particular
         connection. Insulate splice either by taping or by use of "Bakelite" covers designed to fit around splice.
  v) Branch Circuit Wires (Number 10 and Smaller): Use any of the following types of terminals and connecting devices:
      (1) Hand Applied: Coiled, tapered, spring wound devices with a conducting corrosion-resistant coating over the
          spring steel and a plastic cover and skirt providing full insulation for splice and wired ends. Screw connector on by
      (2) Tool Applied: Steel cap, with conduction and corrosion resistant metallic plating, open at both ends, fitted
         around the twisted ends of the wire and compressed or crimped by means of a special die designed for the
          purpose. Specifically fitted plastic or rubber insulating cover wrap over each connector.
  i) Pressed steel, galvanized or cadmium-plated, 4 inches minimum octagonal or square with galvanized cover or extension
    ring as required.
  ii) Back-to-back outlets in the same wall, or "through-wall" type boxes are not permitted. Provide 12 inch minimum
    spacing for outlets shown on opposite sides of a common wall. Provide acoustical potting compound on all outlet
  d) WIRING DEVICES
  i) Switches and Receptacles: Arrow Hart, Hubbell, Leviton, Pass & Seymour, or Slater.
  ii) Wall Dimmers: Lutron.
  iii) Occupancy Sensors: Mytech, Novitas, or Watt Stopper.
  iv)Floor Boxes and Fittings:
      (1) Poke through type: Wiremold Legrand.
      (2) Recessed flush floor box type: Steel City or Wiremold Legrand.
  v) Plugstrip: Wiremold.
  vi)Device and cover plate colors shall be as selected by Architect.
  e) SUPPORTS
  i) Support raceways on accepted types of wall brackets, specialty steel clips, or hangers, ceiling trapeze hangers, or
    malleable iron straps. Plumber's perforated straps are not permitted. Acceptable manufacturers' brackets or hangers
    are Kindorf, Elcan, Binkley, Multi-Frame, Power-Strut, or Unistrut. Do not suspend raceways or equipment from other
    raceways, steam, water, or other piping or ductwork, except as otherwise permitted. Provide independent and secure
     support methods.
  f) PANELBOARDS
  i) Acceptable Manufacturers: Cutler-Hammer/Westinghouse, General Electric, Siemens, or Square D/Groupe Schneider.
  ii) AIC Rating: Branch panelboards and overcurrent protection devices shall have a minimum short circuit rating of 10,000
    RMS symmetrical amperes minimum interrupting capacity (120/208V) or 14,000 RMS symmetrical amperes minimum
    interrupting capacity (277/480V).
  iii) AIC Rating: Distribution panelboards and overcurrent protection devices shall have a minimum short circuit rating of
    42,000 RMS symmetrical amperes minimum interrupting capacity (120/208V) or 200,000 RMS symmetrical amperes
    minimum interrupting capacity (277/480V).
```

iv) Enclosures: Corrosion resistant galvanized (zinc finished) sheet steel. Fronts shall be cold rolled steel, finish coated with

vi)Bus Bars: Silver plated aluminum or copper. Neutral bus shall be full size. Neutral bus shall be 200% rated when supplied from a double neutral feeder. Provide an equipment ground bus in each panelboard. In addition to the equipment ground bus, provide an isolated ground bus when supplied from a feeder which includes an isolated

ANSI 61 grey enamel over a rust inhibitor. Panel locks shall be keyed alike.

grounding conductor.

v) Doors: One piece bolt on front with a lockable hinged door over the overcurrent protection devices.

**SECTION 16100 - BASIC MATERIALS AND METHODS** 

1) PART 1 GENERAL

```
g) MOTOR STARTERS
  h) PULL LINE
3) PART 3 EXECUTION
  a) INSTALLATION
  i) Conduit
       (1) Install conduit in accordance with NECA "Standard of Installation".
      (2) Do not combine individual homeruns into common conduit.
       (3) Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
       (4) Arrange conduit to maintain headroom and present neat appearance.
       (5) Use conduit hubs to fasten conduit to cast boxes.
       (6) Provide insulated equipment ground conductor in flexible conduit.
       (7) Install conduit to preserve fire resistance rating of partitions and other elements.
       (8) Do not attach conduit to ceiling support wires.
  ii) Building Wire and Cable

    Use conductor not smaller than 12 AWG for power and lighting circuits.

      (2) Neatly train and lace wiring inside boxes, equipment, and panelboards.
       (3) Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
       (4) Use hardened and tempered steel, tin-plated or stainless steel Belleville washer with slightly larger tin-plated
         mild steel flat washer for aluminum lugs.
       (5) Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and
         smaller
      (1) Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment
         connections and compliance with regulatory requirements.
       (2) Install electrical boxes to maintain headroom and to present neat mechanical appearance.
       (3) Install boxes to preserve fire resistance rating of partitions and other elements; arrange boxes to meet
         regulatory requirements
       (4) Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices to each other.
       (5) Do not use through-walls boxes or install flush mounting boxes back-to-back in walls; provide minimum 6 inch
         separation. Provide minimum24 inches separation in acoustic rated walls.
       (6) Use stamped steel bridges in bar hanger assemblies to fasten flush mounting outlet box between studs.
      (7) Use adjustable steel channel fasteners for hung ceiling outlet box.
       (8) Do not fasten boxes to ceiling support wires.
       (9) Support steel metal boxes independently of conduit.
       (10) Use gang box where more than one device is mounted together, including floor boxes. Do not use sectional
      (11) Plaster Rings: Use for all concealed work; depth of rings as required to reach finished surfaces.
       (12) Coordinate trimming of openings for outlet boxes in partitions to achieve neat, closely-fitting openings.
      (13) Install knockout closure in unused box opening.
  iv) Wiring Devices
      (1) Install devices plumb, level, and rigidly in place.
       (2) Install switches 2 inches to 8 inches from trim on the strike side.
       (3) Install decorative plates on switch, receptacle, and blank outlets in finished areas. Use multi-gang plates for
         multiple devices.
       (4) Connect wiring devices by wrapping conductor around screw terminal.
  v) Supporting Devices
       (1) Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion
         anchors, beam clamps, steel ramset fasteners.
      (2) Use toggle bolts or hollow wall fasteners in plaster or gypsum board partitions and walls; sheet metal screws or
         spring steel bar retainer clips in sheet metal studs.
       (3) Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
       (4) Do not use powder-actuated anchors without specific permission.
       (5) Do not drill structural steel members without specific permission.
       (6) Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance.
         Use hexagon head bolts with spring lock washers under nuts.
  vi)Electrical Identification
      (1) Provide wire markers on each conductor in panelboard gutters, pull boxes, and at load connection. Identify
         with branch circuit for power and lighting circuits, and with control wire number as indicated on equipment
         manufacturer's shop drawings for control wiring. If more than one neutral conductor is present, mark each with
       (2) Color code all secondary branch circuit and feeder conductors as follows:
         (a)Four Wire, Three Phase, Grounded Wye System: For 120/208 volt systems, use one black, one red, one blue,
            one white (neutral). For 277/480 volt systems, use one brown, one orange, one yellow and one gray (neutral).
       (3) Use wire with insulation of required color. For sizes of wire, which may not be available in specified colors use
         self-adhesive wrap around, markers of solid colors to color code conductors.
       (4) Color code conductors at accessible locations.
       (5) Pull Rope Marking: Affix label identifying termination point at each end of pull rope.
  vii) Disconnect Switches
      (1) Install disconnect switches shown mounted on walls at +4'-6" to centerline of switch.
       (2) Install disconnect switches shown on or adjacent to equipment on field fabricated galvanized steel frames.
  viii) Panelboards
       (1) Provide filler plates for unused spaces in panelboards.
       (2) Provide typed circuit directory in plastic holder for each branch circuit panelboard.
  ix) Motor Starters
      (1) Install motor control equipment in accordance with manufacturer's instructions.
       (2) Select and install heater elements in motor starters to match installed motor characteristics.
  x) Pull Line: Provide in each empty conduit except sleeves and nipples; leave 8 inches of slack at each outlet.
  xi)Firestopping: Provide firestopping around all pipes, conduits, sleeves, etc., which pass through rated walls, partitions
  END OF SECTION
```

vii) Overcurrent Protection Devices: Molded case circuit breakers for branch panelboards and 120/208V rated distribution panels, and fusible switch units for 277/480V rated distribution panels. i) Acceptable Manufacturers: Eaton/Cutler-Hammer, General Electric, Siemens, or Square D/Groupe Schneider. ii) Manual Motor Starters iii)Fractional Horsepower Manual Starter: General-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, and toggle operator. iv) Voltage, Rating and Thermal Element: As required by motor controller. v) Enclosure: NEMA ICS 6; Type 1. i) 1/8 inch diameter braided yellow polypropylene.

2740 Acrew Lane, Suite E Steamboat Springs, CO

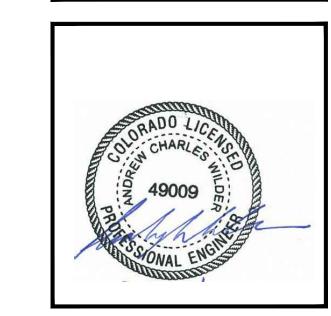
TWIN ENVIRO

**ADDITION** 

Milner, CO

20650 CO Road 205

WILDER ENGINEERING LLC Andrew Wilder PE 1170 Blue Sage Drive Steamboat Springs, CO 80487 P: 9/0-819-7848 E: andy@wilder-eng.com



| Issue | By Date & Issue Description | Ву |
|-------|-----------------------------|----|
| _     | PERMIT SET - 1.27.20        | AW |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       |                             |    |
|       | <u> </u>                    |    |

NTS 24x36\_ Description: SPECIFICATIONS Project Name: TWIN ENVIRO ADDITION

Project Number: 2019072