



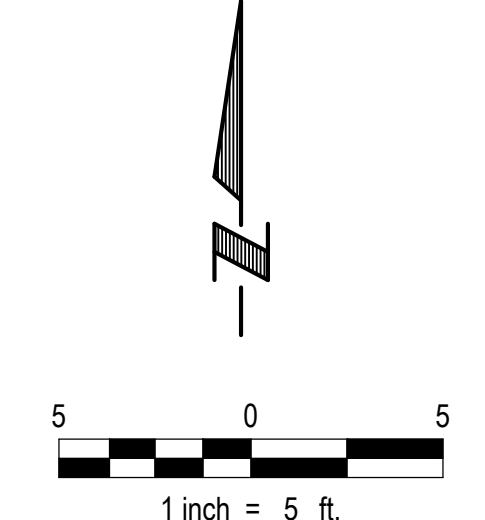






**NO REMOVAL NOTES**

- RN 1 Sawcut and Remove P.C.C. Pavement
- RN 2 Sawcut and Remove P.C.C. Sidewalk
- RN 3 Remove Existing Sanitary Sewer Cleanout (Field Verify)
- RN 4 Remove 53' Existing Sanitary Sewer
- RN 5 Remove Gas Service, Coordinate with M.U.D. and See Mechanical Plans
- RN 6 Remove Underground Power Line, Approximate Location, Coordinate the limits of removal with OPPD (Field Verify)
- RN 7 Remove Handicap Parking Sign
- RN 8 Remove Existing Wood Deck, Staircase, and Footings
- RN 9 Remove Existing Air Conditioning Units - See Mechanical Plans
- RN 10 Existing Transformer to Remain
- RN 11 Existing Communication Riser to Remain
- RN 12 Existing Power Panel to Remain - See Electrical Plans
- RN 13 Existing Underground Power to Remain, Approximate Location (Field Verify)
- RN 14 Existing Sanitary Sewer to Remain
- RN 15 Existing Gas Line to Remain
- RN 16 Existing Gas Meter to Remain
- RN 17 Existing Air Conditioning Unit to Remain
- RN 18 Existing Building to Remain
- RN 19 Existing "No Parking Fire Lane" Sign to Remain
- RN 20 Existing Sidewalk to Remain
- RN 21 Existing Pavement to Remain



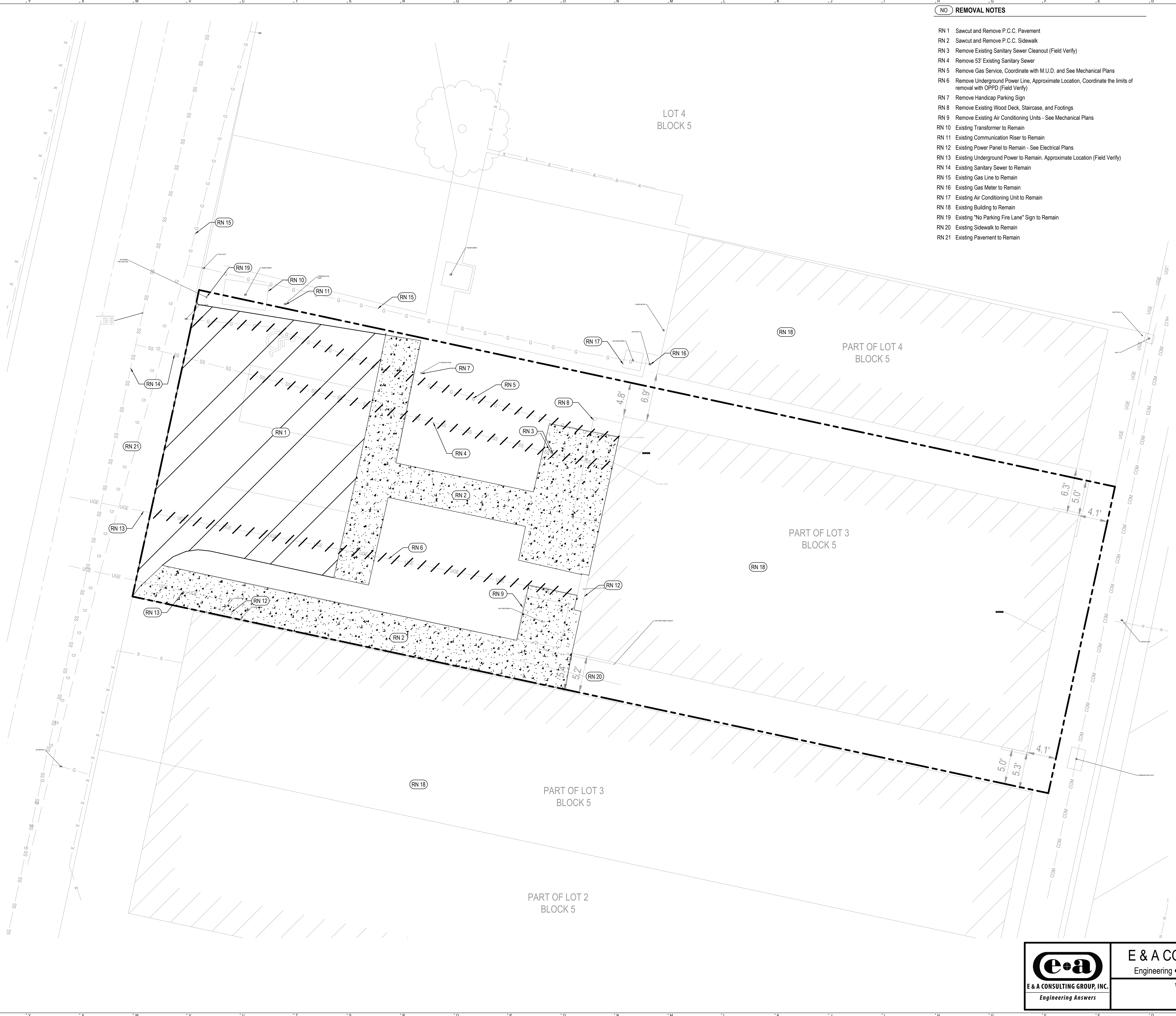
**LEGEND**

- Remove P.C.C. Pavement
- Remove P.C.C. Sidewalk
- Remove Sanitary Sewer Pipe (Field Verify)
- Remove Gas Line (Field Verify)
- Remove Underground Power (Field Verify)

|                       |         |
|-----------------------|---------|
| DATE                  |         |
| NO. ISSUED FOR        |         |
| DATE                  | 3.30.24 |
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 2044 Haskell Street # 100  
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PRIM BEAUTY PARLOUR SALOON

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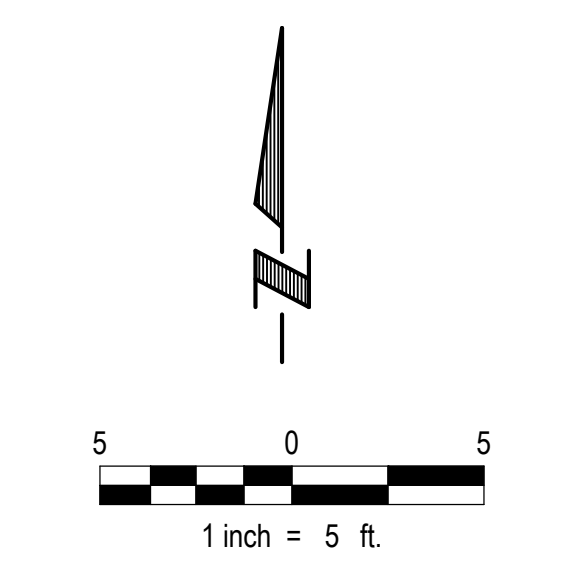
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**REMOVAL PLAN**

PROJECT NO. PROJECT #  
 REVIEWED:  
 SHEET NO.

**C2.1**





LEGEND  
 6" PCC Pavement  
 4" PCC Sidewalk

- 1 BUILD NOTES - LAYOUT**
- 1 4" PCC Sidewalk
  - 2 6" PCC Pavement
  - 3 Structural Stoop - See Architectural Plans
  - 4 4" PCC Pedestrian Ramp, See Detail on Sheet C5.1
  - 5 Existing Pavement
  - 6 Existing Transformer
  - 7 Wall Mounted Equipment - See Building Mechanical / Electrical Plans
  - 8 Existing Communication Riser
  - 9 Existing Power Panel
  - 10 Existing Fire Hydrant.
  - 11 Existing Sidewalk
  - 12 Raised Exterior Landing and Steps - See Architectural Plans

- NOTE:**
1. See Removal Plan for Utility Locations.
  2. The building addition has water service from the existing building.
  3. The building addition has sanitary service from the existing sewer line.

|                       |         |
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PROJECT NAME  
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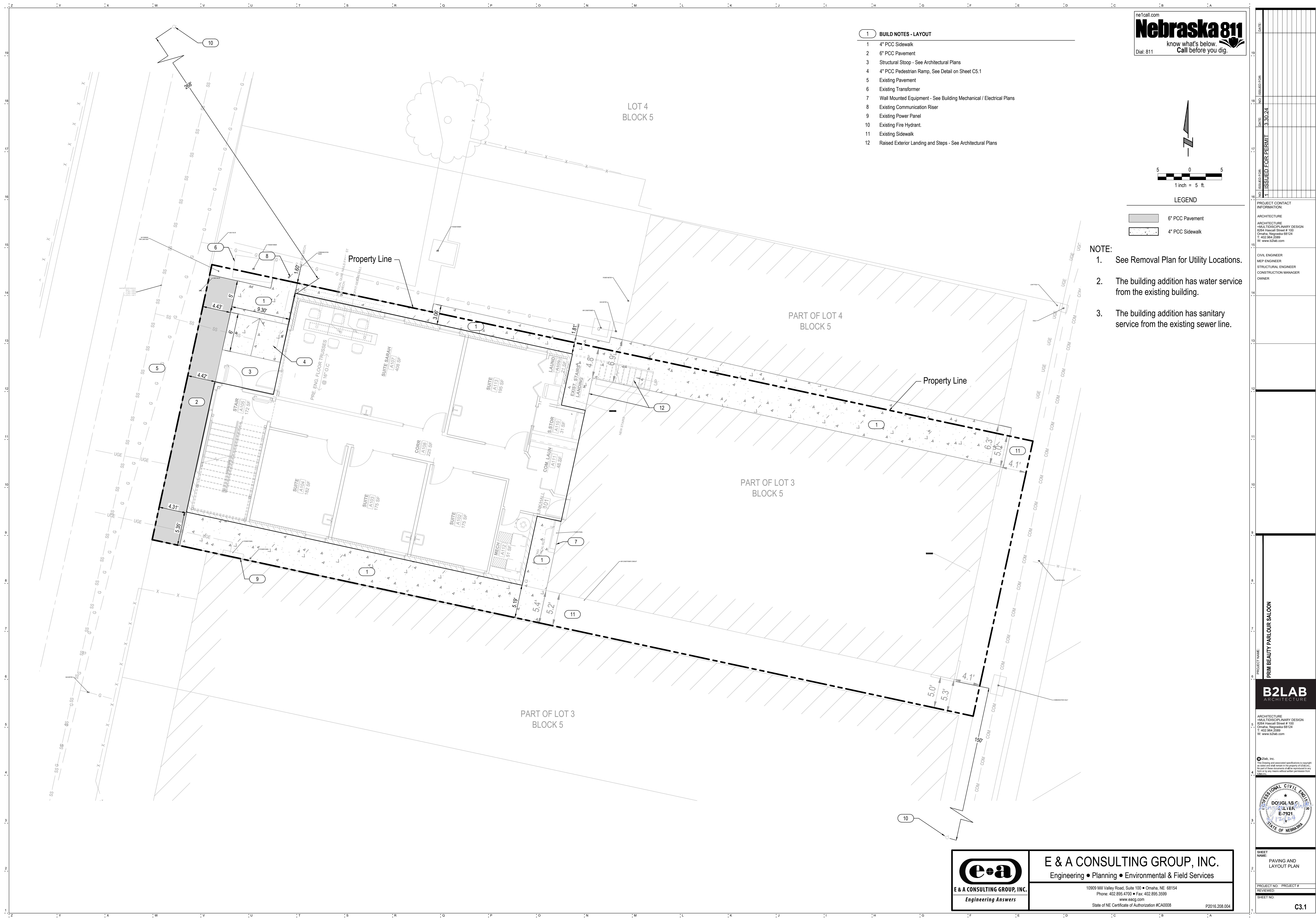
SHEET NAME  
 PAVING AND LAYOUT PLAN

PROJECT NO. PROJECT #  
 REVIEWED

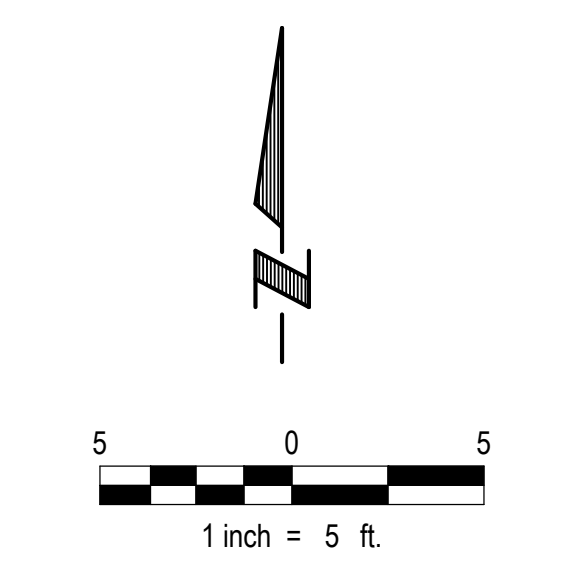
SHEET NO.  
**C3.1**

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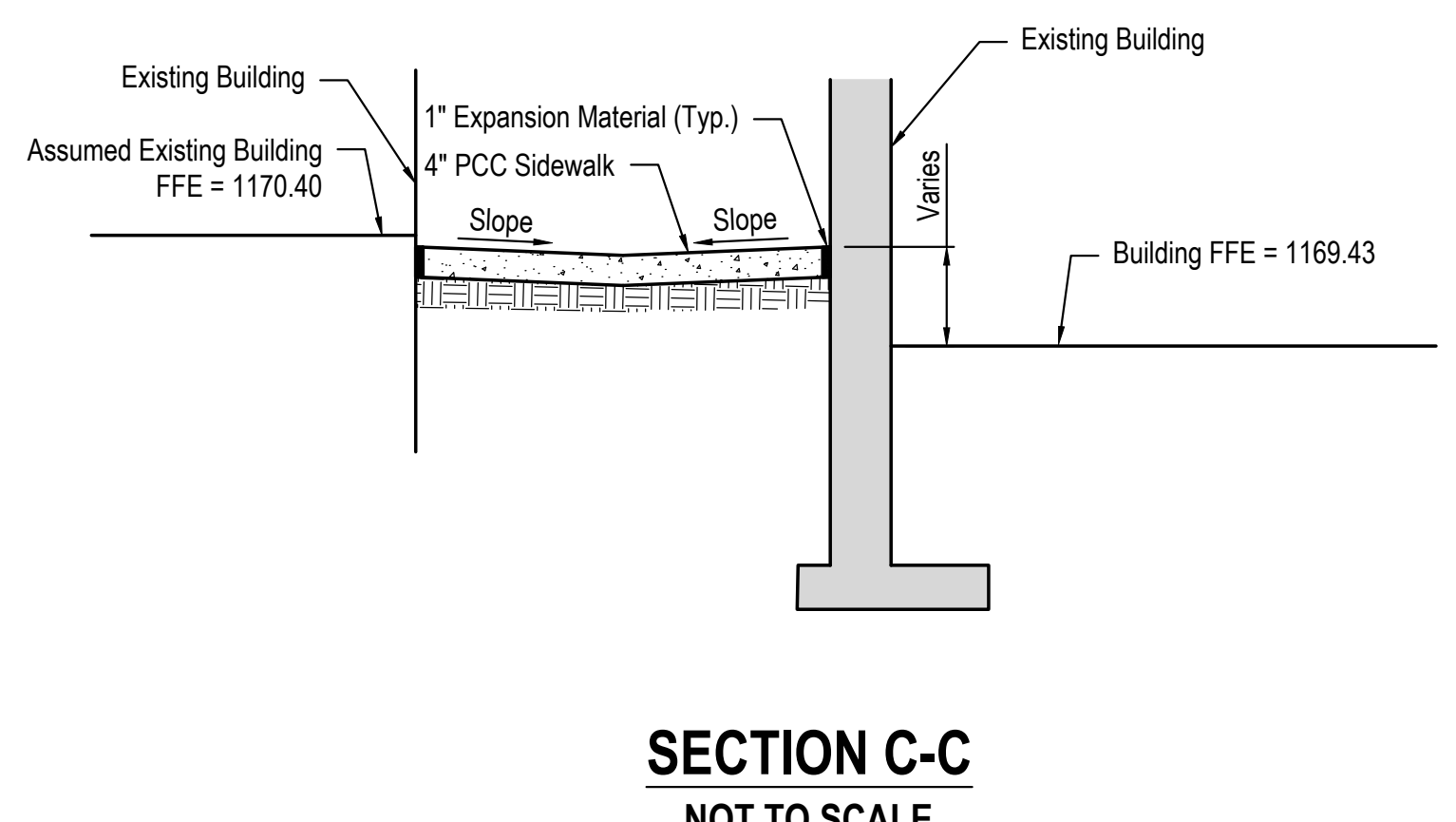
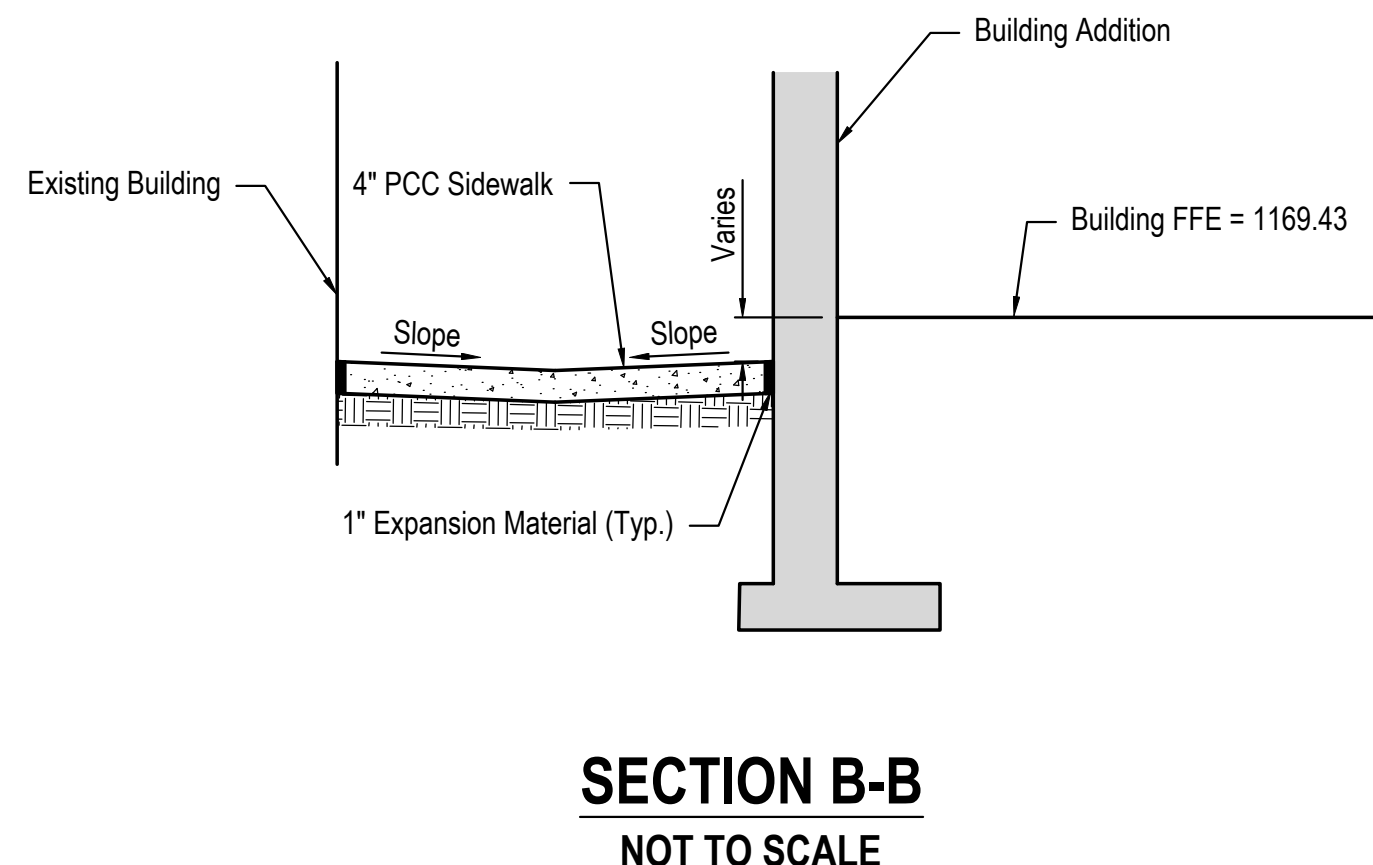
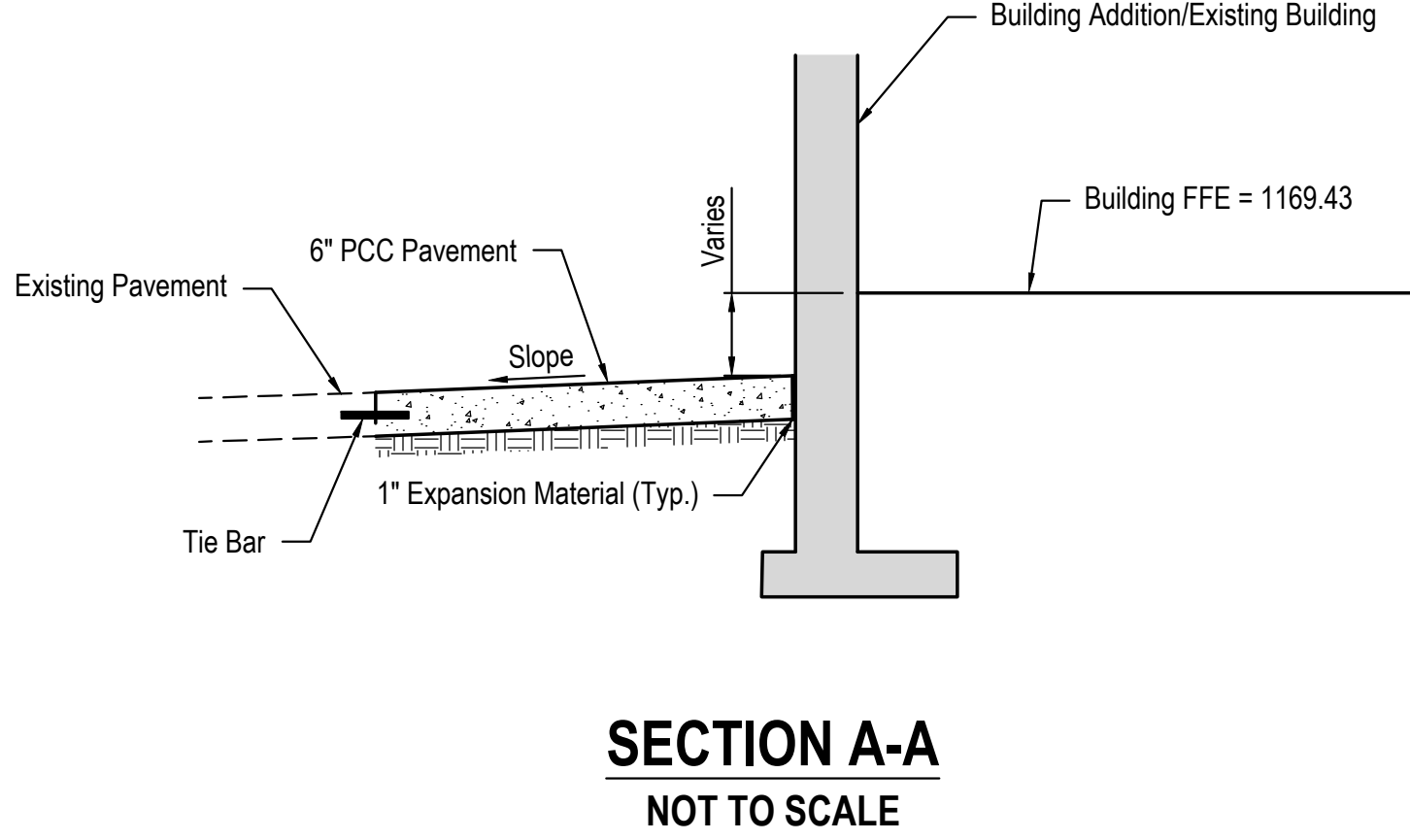
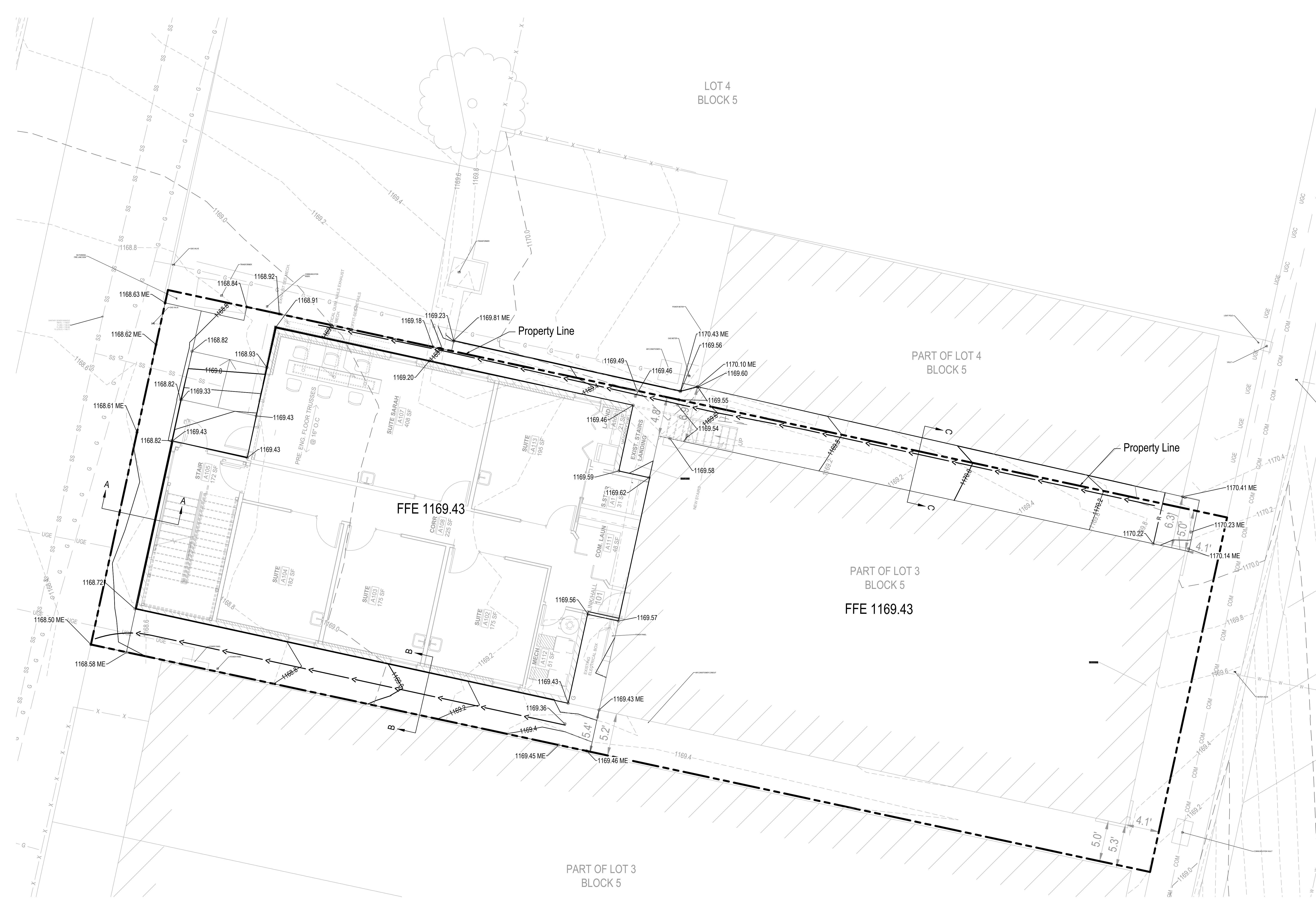




**LEGEND**

|  |  |
|--|--|
|  | Proposed Spot Elevation                  |
|  | Proposed Spot Elevation (Match Existing) |
|  | Proposed Contour                         |
|  | Existing Contour                         |
|  | Ridge Line                               |
|  | Inverted Crown                           |

- GENERAL GRADING NOTES**
1. Topsoil and vegetation shall be stripped to a depth of 4" in areas to be graded.
  2. Topsoil obtained from stripping operations shall be stockpiled in an approved location and re-spread on areas finish graded to receive topsoil.
  3. All fill and backfill shall be placed in lifts of 8" or less in loose thickness.
  4. All fill areas shall be placed and compacted as structural fill. Areas to receive fill shall be scarified to a minimum depth of 8" and proof rolled prior to receiving fill. Slopes steeper than 5H:1V shall be benched before placing fill. The standard specifications shall govern the grading and site preparation with the exception that structural fill shall be compacted to a minimum of 95% of the maximum dry density (ASTM D-698, Standard Proctor) at a moisture content between -3% and +4% of optimum.
  5. For PCC Pavements, the upper 12" of subgrade shall be compacted to a minimum of 95% of the maximum dry density (ASTM D-698, Standard Proctor) at a moisture content between -3% and +4% of optimum. Subgrade preparation shall extend a minimum of 2 feet beyond the back of curb.
  6. For Sidewalks, the upper 6" of subgrade shall be compacted to a minimum of 95% of the maximum dry density (ASTM D-698, Standard Proctor) at a moisture content between -3% and +4% of optimum. Sidewalk subgrades shall extend at least 6" laterally beyond the edge of the new sidewalk.
  7. Imported Material, if required, shall be free of organic matter and debris, and shall be a inorganic silt or lean clay having a Plasticity Index less than 20 and a Liquid Limit less than 45. Borrow material shall not contain any foreign material with a dimension greater than 3".
  8. Any excess material shall be disposed of off-site at a location determined by the contractor.
  9. Unless noted, all spot elevations shown are top of slab or gutter.



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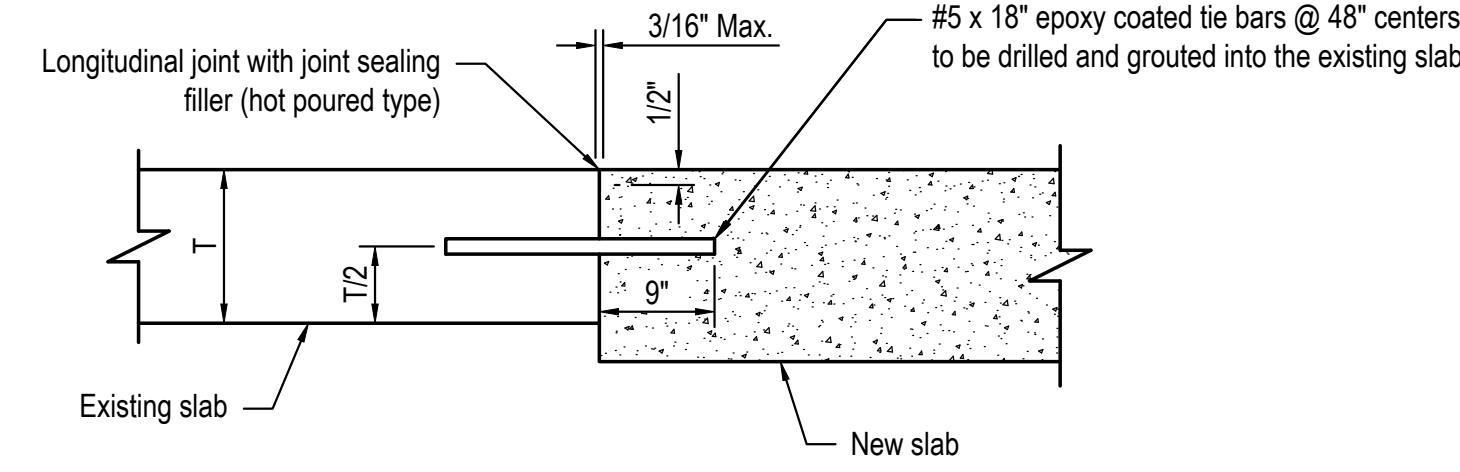
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|--|------------------------------|------------------------------|--|
| PROJECT NAME:<br><b>PRIM BEAUTY PARLOUR SALOON</b> | PROJECT NUMBER:<br>PROJECT # | SHEET NUMBER:<br><b>C4.1</b> | PROJECT CONTACT INFORMATION:<br>ARCHITECTURE:<br>MULTI-DISCIPLINARY DESIGN<br>2024 Hecaval Street # 100<br>Omaha, Nebraska 68124<br>T: 402.964.2889<br>W: www.b2lab.com<br>CIVIL ENGINEER:<br>MEP ENGINEER:<br>STRUCTURAL ENGINEER:<br>CONSTRUCTION MANAGER:<br>OWNER: |
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**GENERAL SITE CONSTRUCTION NOTES**

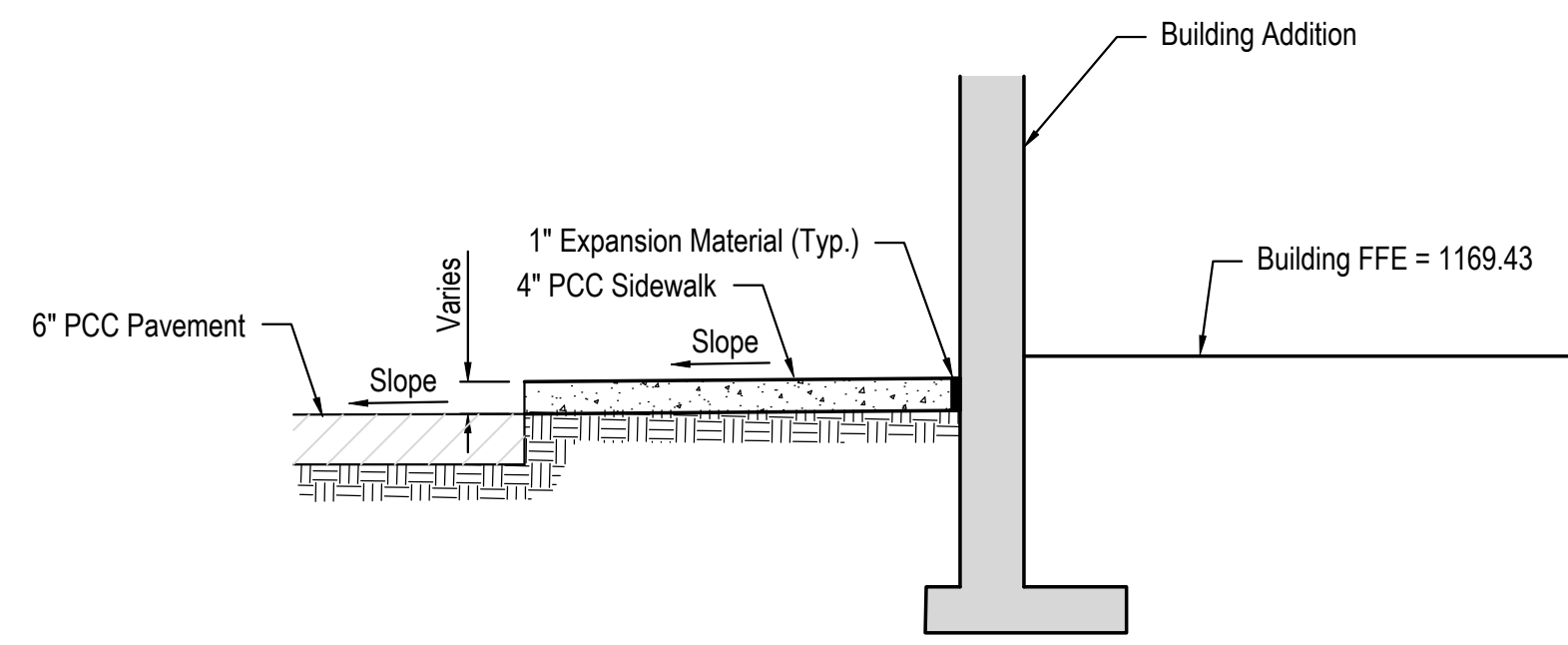
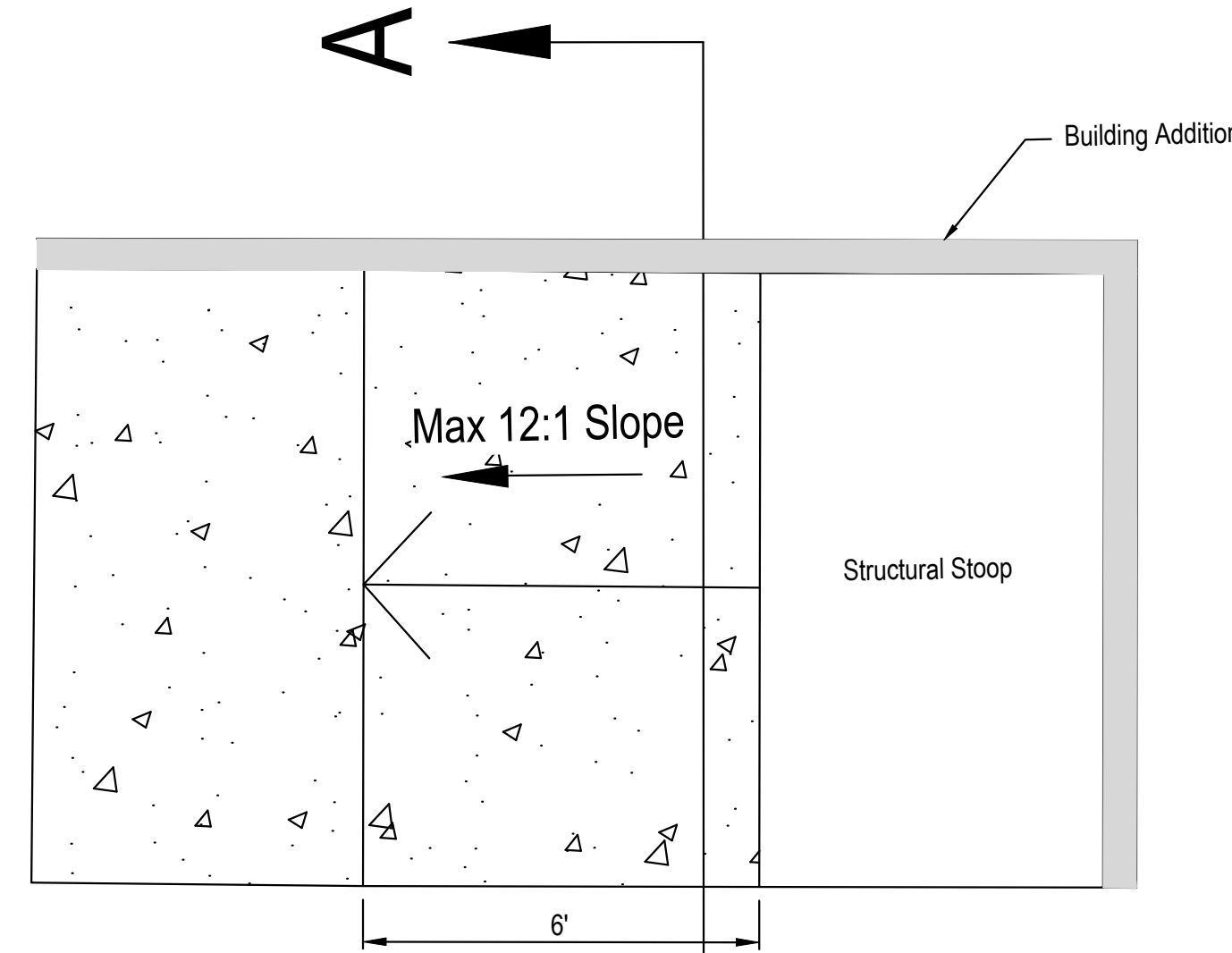
- The City of Omaha Standard Specifications for Public Works Construction, 2020 Edition and any current revisions or amendments thereto and the Special Provisions for this Project shall apply and the Contractor shall perform in accord therewith.
- The Contractor shall check with the Owner for City approval of the project before starting work.
- Utilities are shown as a convenience for the Contractor. The locations of all aerial and underground utility facilities may not be indicated in these plans. Underground utilities, whether indicated or not, will be located and flagged by the utility companies at the Contractor's request. No excavation will be permitted in the area of the underground utilities until all facilities have been located and identified to the satisfaction of all parties and then only with extreme care to avoid any possibility of damages to the facilities.
- The final estimate will not be processed until the Contractor has satisfactorily cleaned and flushed the pavement slab of all rubbish, excess material, mud and debris, and all parts of the work area have been left in a neat and presentable manner.
- Erosion control improvements shall be constructed on this site, including inlet protection, silt fencing and a construction entrance. The Contractor shall be responsible for prompt reconstruction of any erosion control improvements disturbed by his operations. All disturbed erosion control improvements shall be fully reconstructed at the end of each working day prior to leaving the site. Separate payment will not be made for reconstruction of any erosion control improvements. Positive drainage in all work areas shall be maintained in the condition the construction site was in prior to Contractors arrival.
- The Portland Cement Concrete for the pavement slab shall be "1.65", in accord with the Standard Specifications.
- Portland Cement Concrete mix design for sidewalks shall be City of Omaha Type "1.6" or "SG65" mix.
- Non-colored concrete pavement shall be cured using a white pigmented liquid membrane-forming curing compound that has been approved by the State of Nebraska Department of Roads. The minimum rate of application shall be 200 sq. ft. per gal. if a mechanical-powered sprayer is used and 100 sq. ft. per gal. if a hand powered sprayer is used.
- Water reducing admixtures shall be added to all hand-placed and finished concrete.
- A diamond edge saw blade shall be used for cutting all required contraction and longitudinal pavement joints.
- Concrete pavement shall be jointed in maximum 12.5' x 15' panels and shall be kept as square as possible. Joints shall be perpendicular to edges and radiuses, and shall not form angles less than 45 degrees or over 225 degrees.
- 6' sidewalk shall be jointed in 6'x6' panels, 5' sidewalk shall be jointed in 5'x5' panels, 4' sidewalk shall be jointed in 4'x4' panels.
- The (Solid Wall) sanitary sewer pipe may be ABS (SDR 23.5), PVC (SDR 23.5), or VCP.
- Backfill soils in utility trenches, around foundations, basement walls, and retaining walls shall be compacted to a minimum of 95% of the maximum dry density (ASTM D-698, Standard Proctor) at a moisture content between -3% and +4%. Lift thickness shall be appropriately matched to the type of compaction equipment used.
- Standard Plates are available from the City of Omaha Public Works Department, 1819 Farnam St., Suite 600, Omaha NE, 68183, PH 402.444.5220. Plates may also be downloaded via the internet from the City of Omaha Web Site at: <http://www.ci.omaha.ne.us/publicworks/standardplatelist.htm>
- Structural retaining walls exceeding 6 feet in height shall be designed by a professional engineer licensed in the State of Nebraska.
- Any retaining walls exceeding 4' in height will require a separate building permit.
- The following Standard Plates on file at the City of Omaha Public Works Department shall govern:

| ITEMS  | STANDARD PLATE | REVISION DATE |
|--|----------------|---------------|
| Concrete Pavement Joint Details              | 501-01         | 2/11/2019     |
| Concrete Curbs                               | 502-01         | 2/11/2019     |
| Concrete Pavement Widening and Miscellaneous | 501-02         | 2/11/2019     |
| Concrete Driveway (2 Sheets)                 | 501-12-1       | 11/21/2019    |
| Sidewalk Construction                        | 503-01         | 11/21/2019    |
| Sidewalk Location                            | 503-02         | 11/21/2019    |
| Concrete Collar                              | 700-01         | 2/11/2019     |
| Sewer Tap                                    | 700-02         | 2/11/2019     |



NOTE:  
Tie bars are to be installed as called out in the plans.

**TIE BAR DETAIL**  
NOT TO SCALE



**SECTION A-A**  
NOT TO SCALE

**PEDESTRIAN RAMP DETAIL**  
NOT TO SCALE

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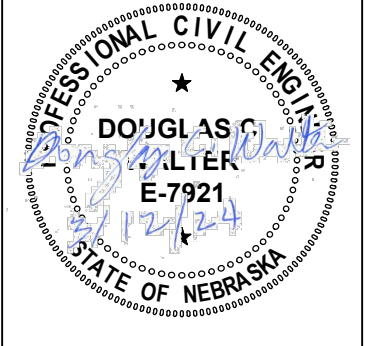
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PROJECT NAME  
**PRIM BEAUTY PARLOUR SALOON**

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|                         |                           |
|-------------------------|---------------------------|
| SHEET NAME:             | GENERAL NOTES AND DETAILS |
| PROJECT NO. / PROJECT # |                           |
| REVIEWED:               |                           |
| SHEET NO.:              | <b>C5.1</b>               |

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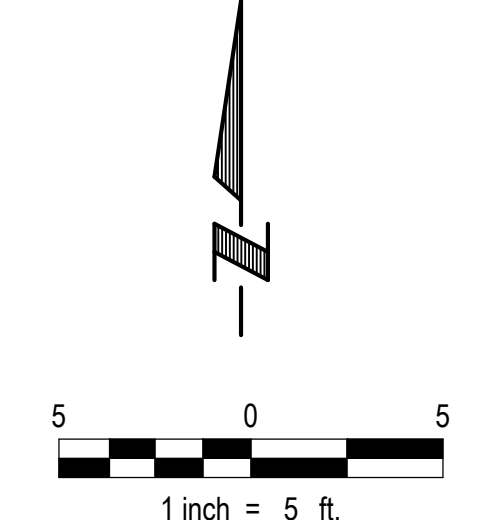


**STORM WATER POLLUTION PREVENTION PLAN GENERAL NOTES**

1. Project procedures and materials shall conform to the following publication and any additions thereto: Omaha Regional Stormwater Design Manual and the SWPPP Map Preparation Guide. The aforementioned publications can be found at: <https://omahastormwater.org>.
2. OPERATORS/CONTRACTORS shall comply with noise and dust control ordinances.
3. OPERATORS/CONTRACTORS shall locate existing utilities prior to the start of work. (One Call 811).
4. Barricades shall conform to Omaha Public Works "Barricading Standards, Specifications, Methods & Materials", and/or the "Manual on Uniform Traffic Control Devices".
5. OPERATORS/CONTRACTORS shall be responsible for compliance with OSHA Regulations.
6. OPERATORS/CONTRACTORS shall conform with the applicant that governmental approvals have been received prior to the start of work.
7. The APPLICANT and INSPECTOR shall comply with government regulations to minimize the potential for erosion and pollution.
8. OPERATORS/CONTRACTORS shall perform construction activities as directed by the applicant, inspector, and government regulators to minimize the potential for erosion and pollution.
9. Each OPERATOR/CONTRACTOR shall monitor silt fencing and other Best Management Practices (BMPs), within their areas of responsibility, and install additional BMPs as necessary and as directed by the INSPECTOR.
10. Each OPERATOR/CONTRACTOR shall periodically remove accumulated sediment from temporary sediment traps, temporary sediment basins, behind silt fences, and other erosion control measures that store sediment, within their areas of responsibility, if necessary and as directed by the INSPECTOR.
11. Each OPERATOR/CONTRACTOR shall build stabilized construction entrances, within their areas of responsibility and as defined within the SWPPP. Each OPERATOR/CONTRACTOR shall monitor and maintain stabilized construction entrances within their areas of responsibility as needed or as directed by the INSPECTOR. OPERATORS/CONTRACTORS shall not use any other access to the site or allow others to use alternate access points.
12. Each OPERATOR/CONTRACTOR shall maintain and perform preventative maintenance on each best management practice (BMP), within their areas of responsibility, to ensure their function. The Inspector shall ensure preventative maintenance is being performed.
13. BMPs shall be kept in working order. Each OPERATOR/CONTRACTOR shall repair any defects or damages, within their areas of responsibility, at or before the end of each working day or as directed by the Inspector.
14. BMPs may not be removed without INSPECTOR and applicable governmental approval.
15. Each OPERATOR/CONTRACTOR shall be responsible for adhering to BMPs within their areas of responsibility.
16. In the event of a release of oil or hazardous substance, OPERATORS/CONTRACTORS shall comply with the requirements of the Nebraska Department of Environmental Quality for Notification, Containment, Investigation, Remedial Action and Disposal.

**STORM WATER POLLUTION PREVENTION PLAN GENERAL NOTES**

17. The APPLICANT, INSPECTOR and CONTRACTORS/OPERATORS shall ensure temporary diversion dikes and temporary fill diversions are constructed as shown within the SWPPP And as necessary to properly control pollutant discharge. Temporary diversion dikes and temporary fill diversions shall be installed at the end of each working day, prior to all rain events, and as directed by the Inspector.
18. The APPLICANT, INSPECTOR, and/or OPERATORS/CONTRACTORS shall allow government regulators access to the site for inspections at any time, at the implementing agency's discretion.
19. The APPLICANT, INSPECTOR and CONTRACTORS/OPERATORS must initiate stabilization measures, such as temporary seeding, permanent seeding, and/or mulching, as soon as possible on portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after construction activity on that portion of the site where work has ceased. Temporary seeding (9.5.19), Permanent seeding (9.5.20), and mulching (9.5.22) BMP's Presented within the Omaha Regional Stormwater Design Manual shall be adhered to at all times. This publication can be found at: <https://omahastormwater.org>.
20. For dust control, the APPLICANT, INSPECTOR AND CONTRACTORS/OPERATORS may use the following measures, singularly or in combination: establish temporary seeding, establish permanent seeding, mulch in areas subject to little or no construction traffic, irrigate stripped areas and/or haul roads; reduce vehicular speed on haul roads; or other options as directed by the inspector. Furthermore, the dust control (9.5.16) BMP presented within the Omaha Regional Stormwater Design Manual shall be adhered to at all times.
21. The APPLICANT, INSPECTOR and CONTRACTORS/OPERATORS shall ensure sediment transported onto public streets is removed as needed, prior to rain events and, at a minimum, at the end of each working day. Sediment shall be shoveled and/or swept from the street and disposed of in a manner that prevents stormwater contamination. Furthermore, the street cleaning/sweeping (9.6.5) BMP presented within the Omaha Regional Stormwater Design Manual shall be adhered to at all times.
22. The APPLICANT, INSPECTOR and CONTRACTORS/OPERATORS shall adhere to all good housekeeping bmp's presented within the Omaha Regional Stormwater Design Manual. Good housekeeping BMP's focus on keeping the work site clean and orderly while handling materials and waste in a manner that eliminates the potential for pollutant runoff. Good housekeeping BMP's such as Sanitary Waste Management (9.6.2), Solid Waste Management (9.6.3), Material Delivery & Storage (9.6.4), Street Cleaning/Sweeping (9.6.5), and Vehicle & Equipment Fueling (9.6.6) shall be addressed when applicable.
23. To better inform all concerned parties about the existence of the SWPPP, the APPLICANT, INSPECTOR and CONTRACTORS/OPERATORS shall ensure an easily visible and legible sign be prominently posted at conspicuous locations near site entry points. Signs must be in conformance with the SWPPP Notification Sign (9.6.7) presented within the Omaha Regional Stormwater Design Manual.
24. The SWPPP documents (e.g., NDEE-NPDES, SWPPP-SM, SWPPP-N, ETC.) are essential and a requirement in one part is binding as though occurring in all. The documents describe and provide the complete SWPPP. The APPLICANT, INSPECTOR and/or CONTRACTORS/OPERATORS may not take advantage of any SWPPP errors or omissions. The INSPECTOR shall notify the APPLICANT, DESIGNER and CONTRACTORS/OPERATORS promptly of any omissions or errors within one business day of discovery. The APPLICANT shall instruct the DESIGNER to make any corrections necessary to fulfill the overall intent of the SWPPP documents (e.g., Grading Permit Modification Form). In the case of a discrepancy between parts of the SWPPP documents, the most stringent requirement shall rule.

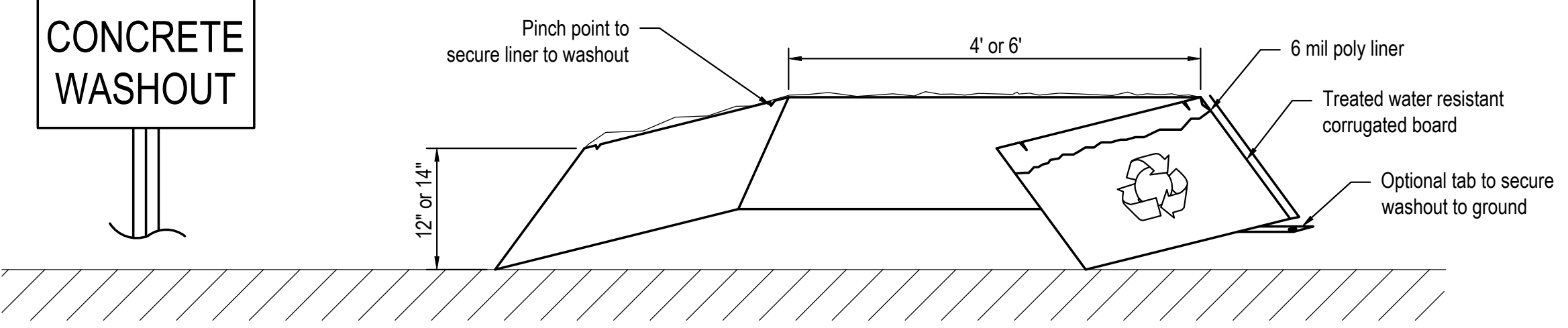
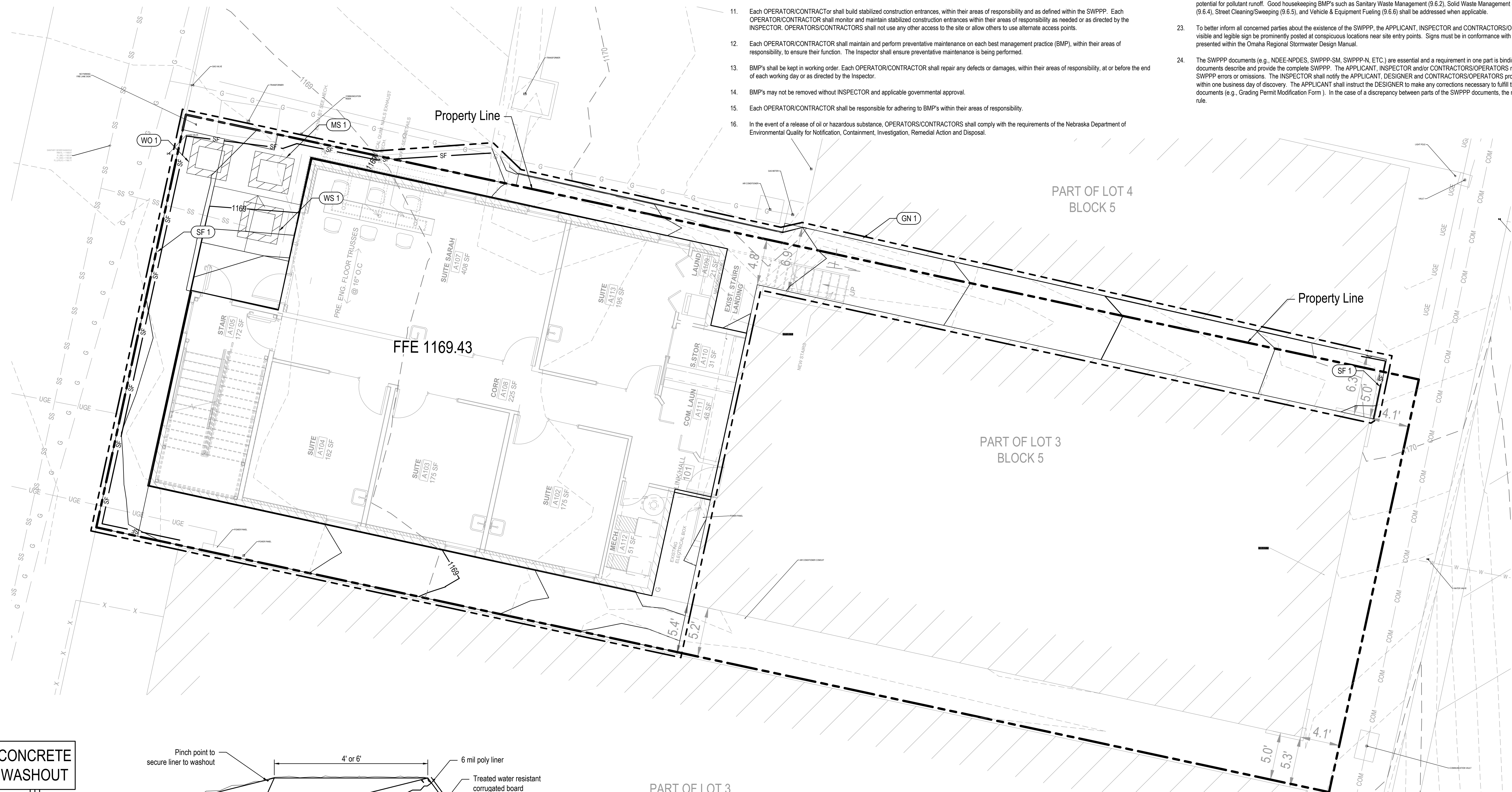


**LEGEND**

- Power Pole
- Guy Wire
- Light Pole
- Fire Hydrant
- Utility Valve (Water)
- Curb Inlet
- Manhole
- Fence Line
- Gas Line
- Water Line
- Power Line (Overhead)
- Silt Fence
- Existing Contours
- Proposed Contours
- Limits of Construction

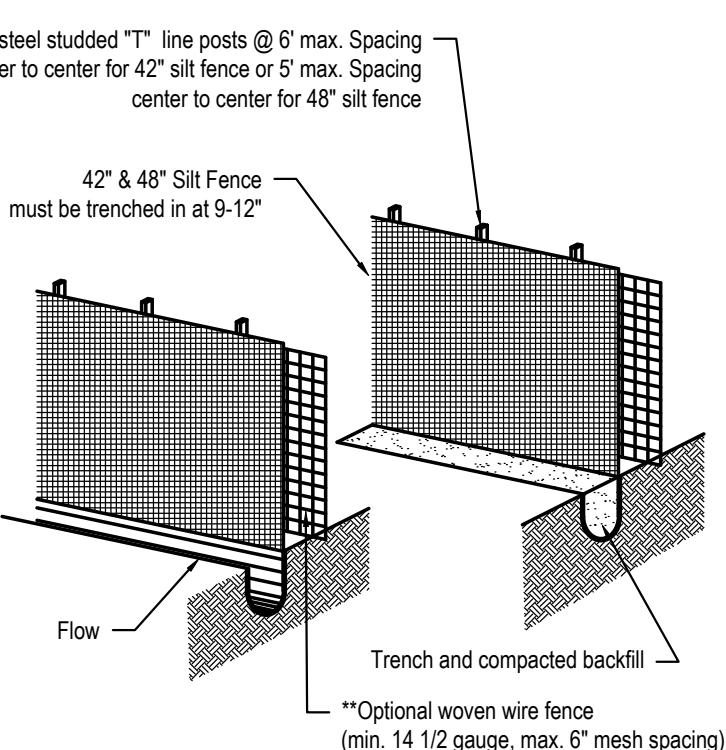
**NO GRADING & EROSION CONTROL REFERENCE NOTES**

- CONSTRUCT SILT FENCE - See Detail This Sheet**  
 SF X Silt Fence
- GENERAL**
- GN 1 Limits of Construction
  - MS 1 Proposed Material Storage Area. Alternate location shall be approved by the Inspector. Storage area shall conform to Section 9.6.4 of the ORSDM.
  - WS 1 Proposed Waste Storage Area. Alternate location shall be approved by the Inspector. Storage area shall conform to Section 9.6.2 and 9.6.3 of the ORSDM.
  - WO 1 Proposed Concrete Washout Facility. Alternate location shall be approved by the Inspector. Washout facility shall conform to Section 9.6.8 of the ORSDM.



- NOTES:**
1. The concrete washout area shall be installed prior to any concrete placement on this project. Install washout area on a level surface. Use Disposable Concrete Washout or approved equal conforming to Section 9.6.8 of the Omaha Regional Stormwater Design Manual.
  2. Signs shall be placed as necessary to clearly indicate the location of the concrete washout.
  3. The concrete washout area will be replaced as necessary to maintain capacity for waste concrete and other liquid waste.
  4. Washout residue shall be removed from the site and disposed of at an approved waste site.
  5. Do not mix excess amounts of fresh concrete or cement on-site.
  6. Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
  7. Do not dump excess concrete in non-designated dumping areas.
  8. Locate washout area at least 50' (15 meters) from storm drains, open ditches, or waterbodies.
  9. Wash out wastes into the Outpact Washout as shown where the concrete can set, be broken up, and then disposed of properly.

**CONCRETE WASHOUT**  
NOT TO SCALE



**SILT FENCE**  
NOT TO SCALE

- NOTES:**
1. Acceptable silt fence specifications: AOS (#20 - 50 Sieve), Water Flow Rate (50 gpm sq. ft. = 125 gpm sq. ft.), Tensile Strength (Grab) - (Min. 120 Warp or greater and Elongation (5-25%).
  2. On each new run of silt fence spray paint the beginning of the run with O-30 and spray paint the end with the date of installation and LP of the run.
  3. Silt fence should be securely fastened to each steel support post or to woven wire which is in turn attached to the steel fence posts. A minimum of 3 ties are required for each post. To be located in the top 12\"/>
  - 4. Steel posts which support the silt fence shall be installed on a slight angle toward the anticipated runoff source. (Incline all posts 20\"/>
  - 5. Silt fence shall be trenched in with a silt fence plow so that the down-slope face of the trench is flat and perpendicular to the line of flow.
  - 6. Silt fence shall be removed when it has served its usefulness so as not to block or impede storm flow or drainage.
  - 7. Sediment trapped by this practice shall be uniformly distributed on the source area prior to topling.

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**STORMWATER POLLUTION PREVENTION PLAN**

PROJECT NO. PROJECT #  
 SHEET NO. SHEET #

10909 Mill Valley Road, Suite 100 • Omaha, NE 68154  
 Phone: 402.895.4700 • Fax: 402.895.3599  
 www.eacg.com  
 State of NE Certificate of Authorization #CA0008 P2016.208.004

PROJECT NAME: PRIM BEAUTY PARLOUR SALOON

PROJECT NUMBER: 2024

DATE: 3.30.24

ISSUED FOR: PERMIT

PROJECT CONTACT INFORMATION:

ARCHITECTURE: B2LAB ARCHITECTURE  
 2024 Heacock Street # 100  
 Omaha, Nebraska 68124  
 T: 402.964.2889  
 W: www.b2lab.com

CIVIL ENGINEER: DOUGLAS J. LIEFER  
 MEP ENGINEER: DOUGLAS J. LIEFER  
 STRUCTURAL ENGINEER: DOUGLAS J. LIEFER  
 CONSTRUCTION MANAGER: DOUGLAS J. LIEFER  
 OWNER: PRIM BEAUTY PARLOUR SALOON

STATE OF NEBRASKA  
 PROFESSIONAL CIVIL ENGINEER  
 DOUGLAS J. LIEFER  
 E-7921

SHEET NAME: STORMWATER POLLUTION PREVENTION PLAN

SHEET NO.: C6.1

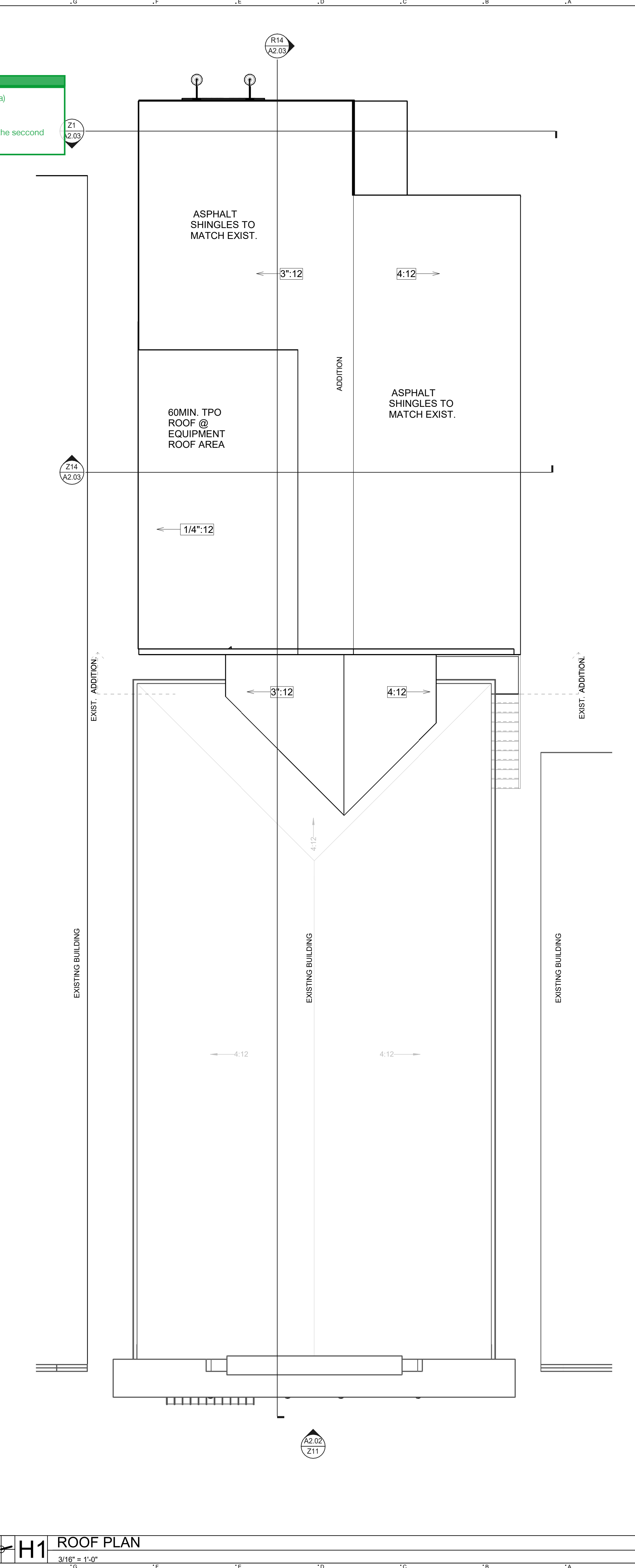
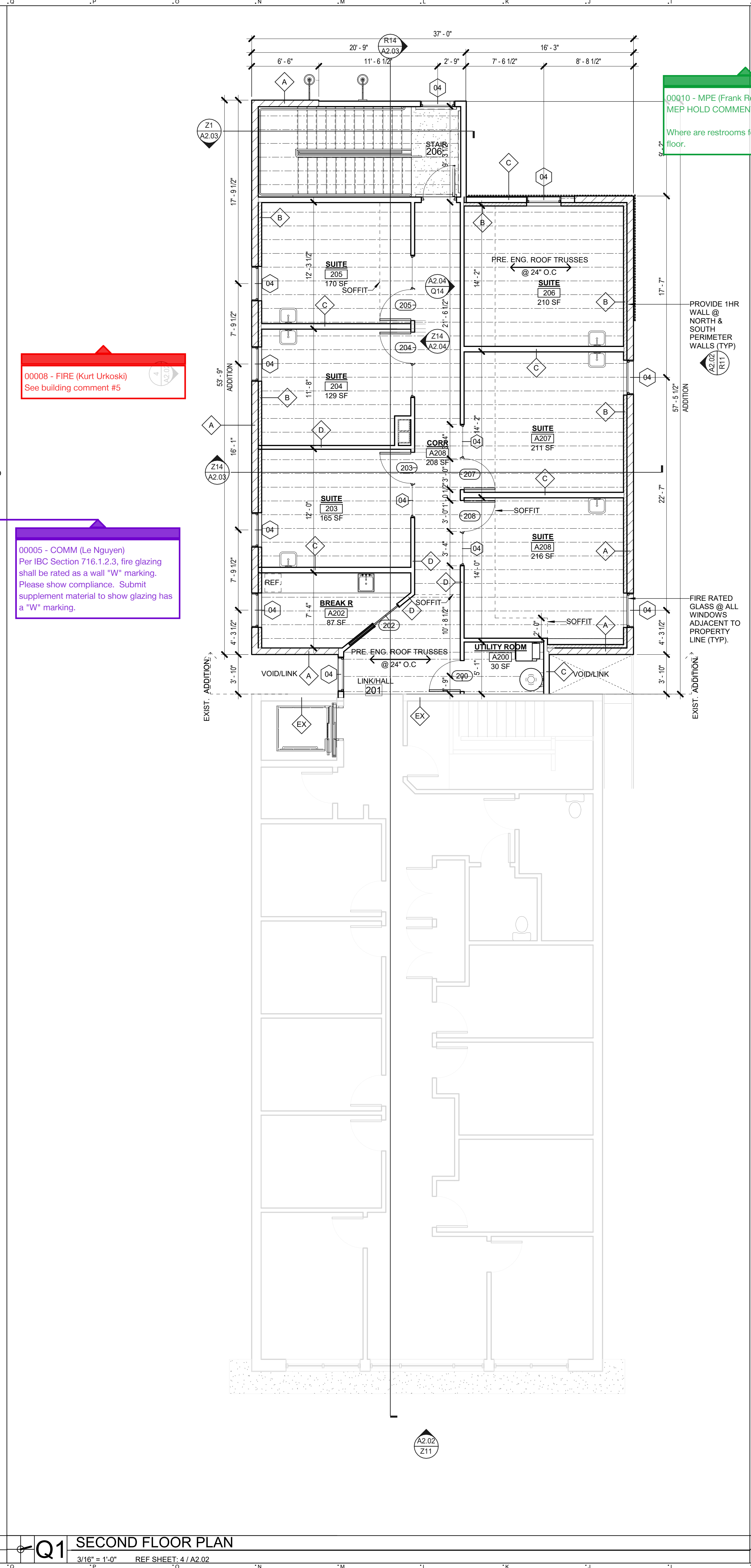
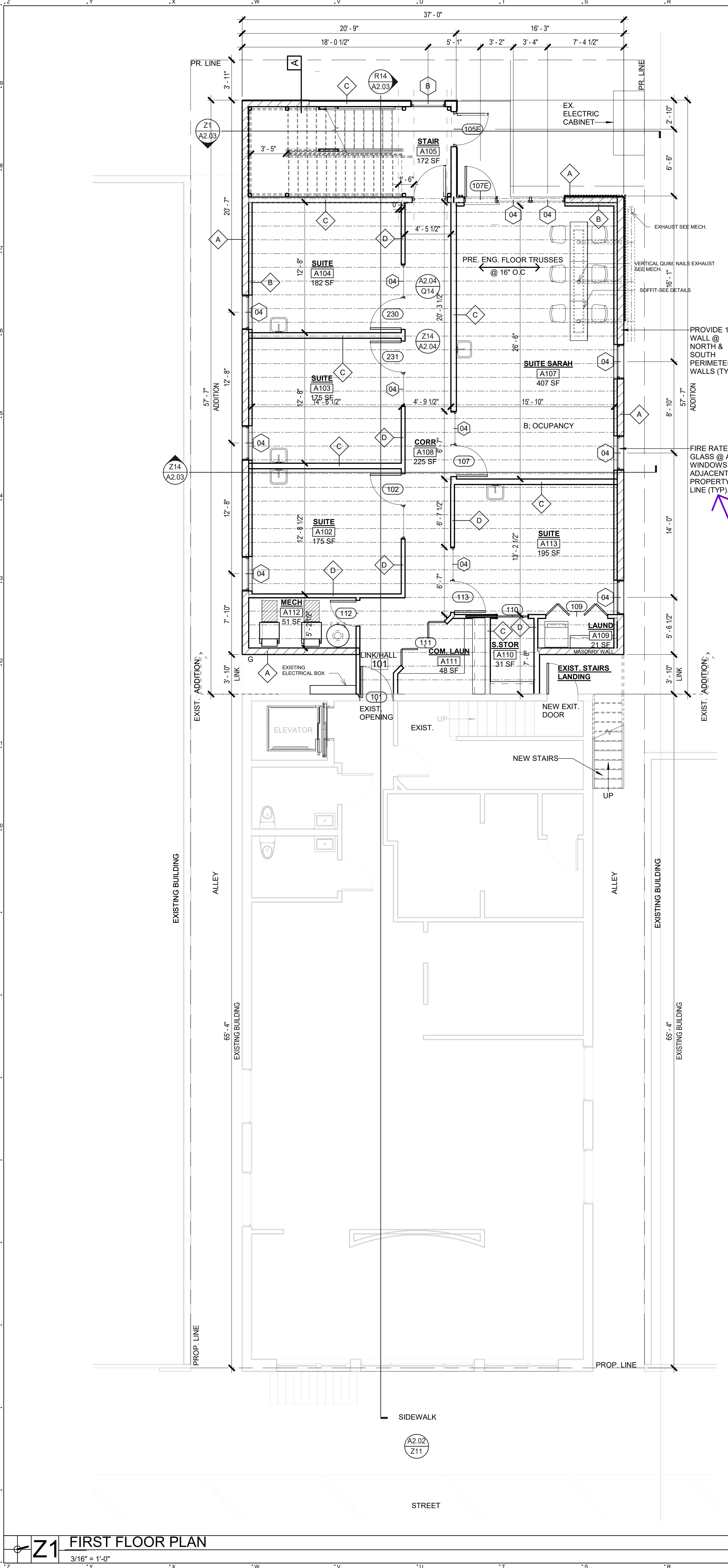


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| DATE                         |                           |
| NO. ISSUED FOR               |                           |
| DATE                         | 3/3/24                    |
| NO. ISSUED FOR PERMIT        |                           |
| PROJECT CONTACT INFORMATION: |                           |
| ARCHITECTURE                 |                           |
| ARCHITECTURE                 | MULTIDISCIPLINARY DESIGN  |
|                              | 6204 Harwood Street # 100 |
|                              | Omaha, Nebraska 68124     |
|                              | T: 402.964.2089           |
|                              | W: www.b2lab.com          |
| CIVIL ENGINEER               |                           |
| MEP ENGINEER                 |                           |
| STRUCTURAL ENGINEER          |                           |
| CONSTRUCTION MANAGER         |                           |
| OWNER                        |                           |
| PROJECT NAME                 | PRIM BEAUTY PARLOUR SALON |
| ARCHITECT                    |                           |
| ARCHITECT                    | BRADLEY & BROOKS          |
|                              | A-4944                    |
|                              | STATE OF NEBRASKA         |
| 03/30/24                     |                           |
| SHEET NAME                   | FIRST-SECOND-ROOF PLANS   |
| PROJECT NO. PROJECT #        |                           |
| REVIEWED                     |                           |
| SHEET NO.                    | A2.01                     |

00010 - MPE (Frank Reida)  
MEP HOLD COMMENT:  
Where are restrooms for the second floor.

00008 - FIRE (Kurt Urkoski)  
See building comment #5

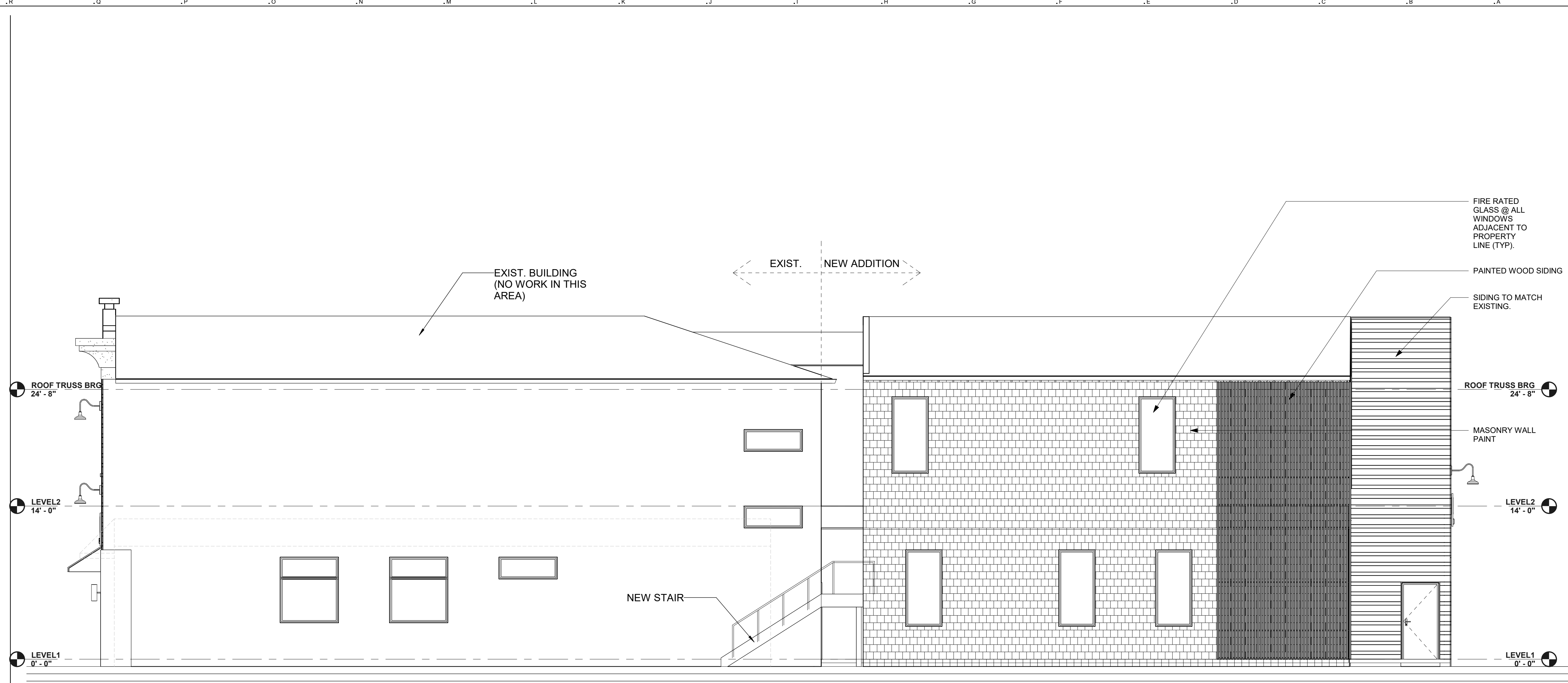
00005 - COMM (Le Nguyen)  
Per IBC Section 716.1.2.3, fire glazing shall be rated as a wall "W" marking. Please show compliance. Submit supplement material to show glazing has a "W" marking.



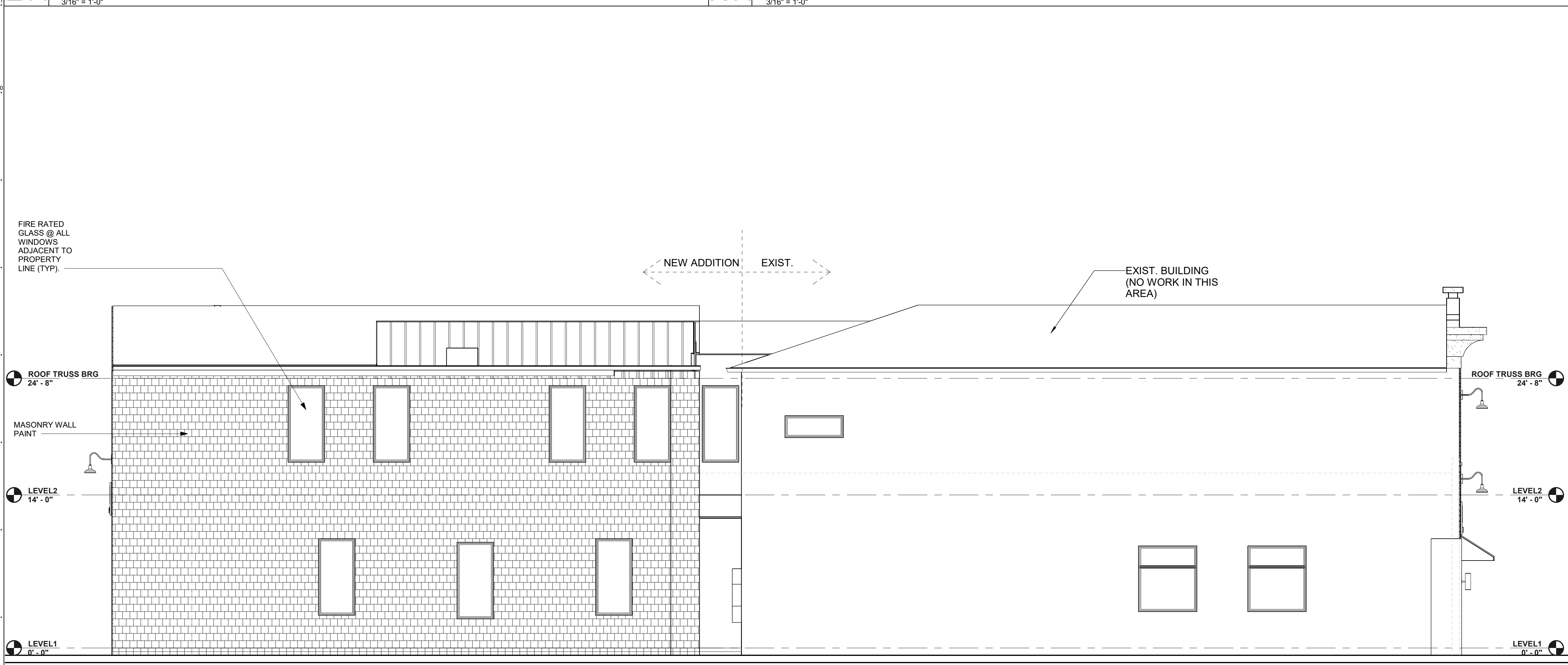




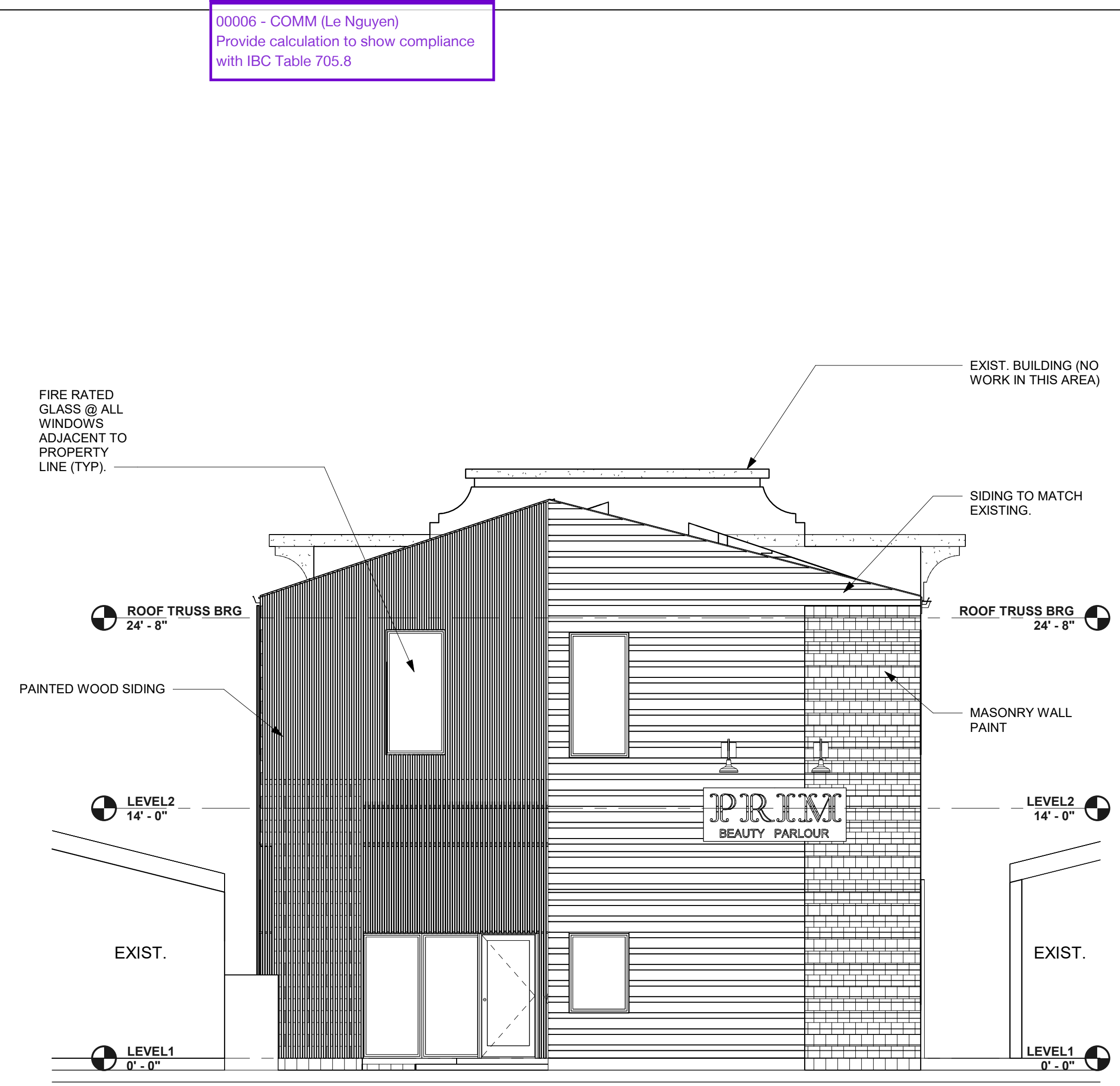
**Z11** EAST SIDE ELEVATION  
3/16" = 1'-0"



**R11** NORTH SIDE ELEVATION  
3/16" = 1'-0"



**4** SOUTH SIDE ELEVATION  
3/16" = 1'-0"



**H1** WEST SIDE ELEVATION  
3/16" = 1'-0"

00006 - COMM (Le Nguyen)  
Provide calculation to show compliance with IBC Table 705.8

|                   |        |
|-------------------|--------|
| DATE              |        |
| NO. ISSUED FOR    |        |
| DATE              | 3/3/24 |
| NO. ISSUED FOR    |        |
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| NO. ISSUED FOR    | 1      |

PROJECT CONTACT INFORMATION:  
 ARCHITECTURE  
 MULTI-DISCIPLINARY DESIGN  
 6204 Harwood Street # 100  
 Omaha, Nebraska 68124  
 T: 402.964.2089  
 W: www.b2lab.com

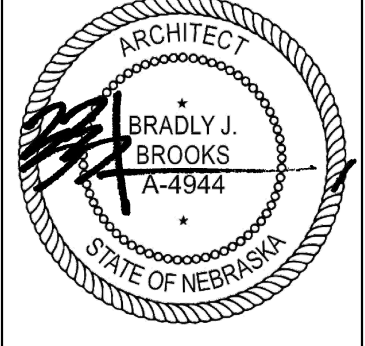
CIVIL ENGINEER  
 MEP ENGINEER  
 STRUCTURAL ENGINEER  
 CONSTRUCTION MANAGER  
 OWNER

PROJECT NAME  
**PRIM BEAUTY PARLOUR SALON**

**B2LAB**  
 ARCHITECTURE

ARCHITECTURE  
 MULTI-DISCIPLINARY DESIGN  
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03/30/24

SHEET NAME:  
**EXTERIOR ELEVATIONS**

PROJECT NO. PROJECT #  
 REVIEWED  
 SHEET NO.  
**A2.02**

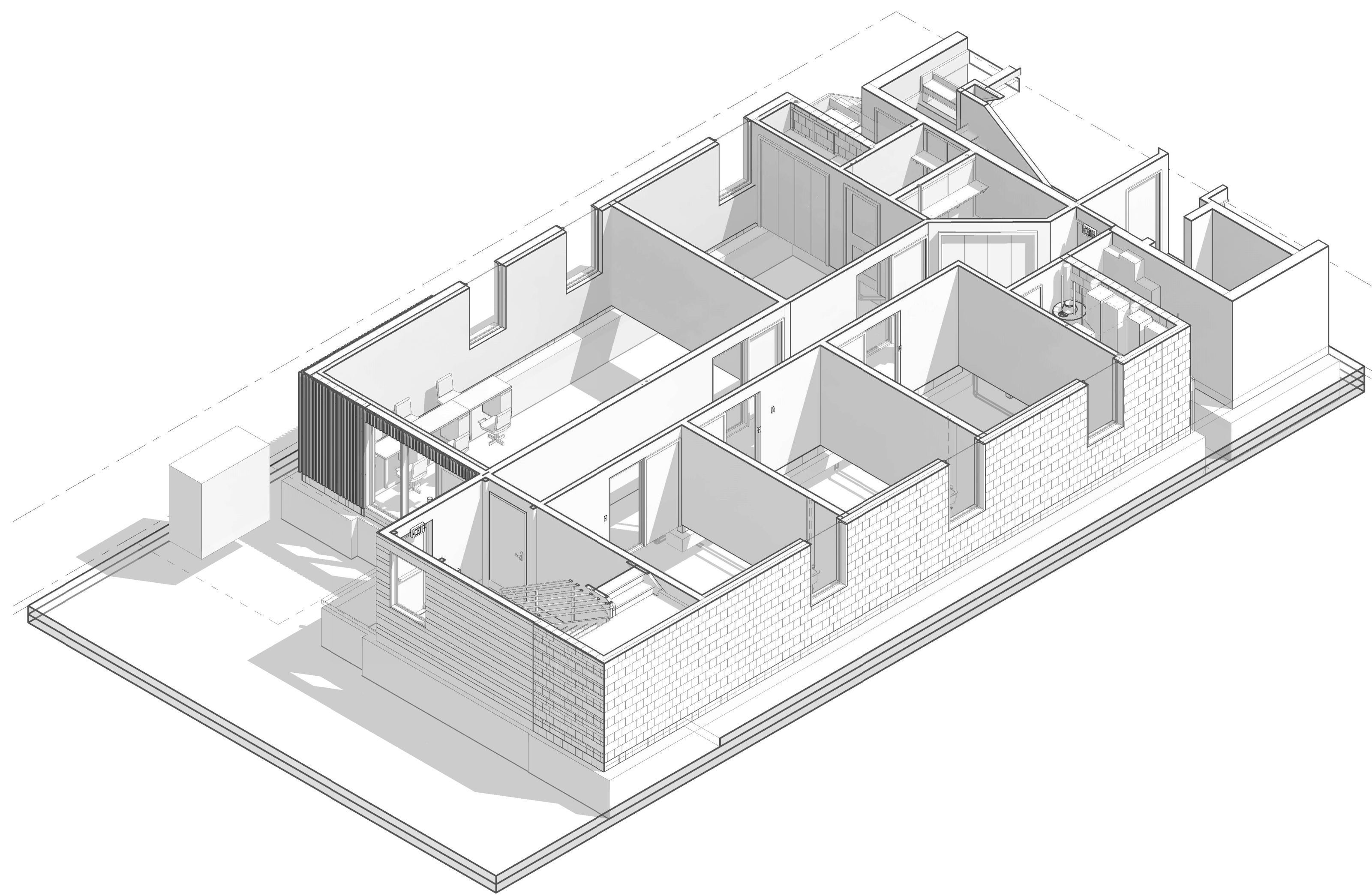




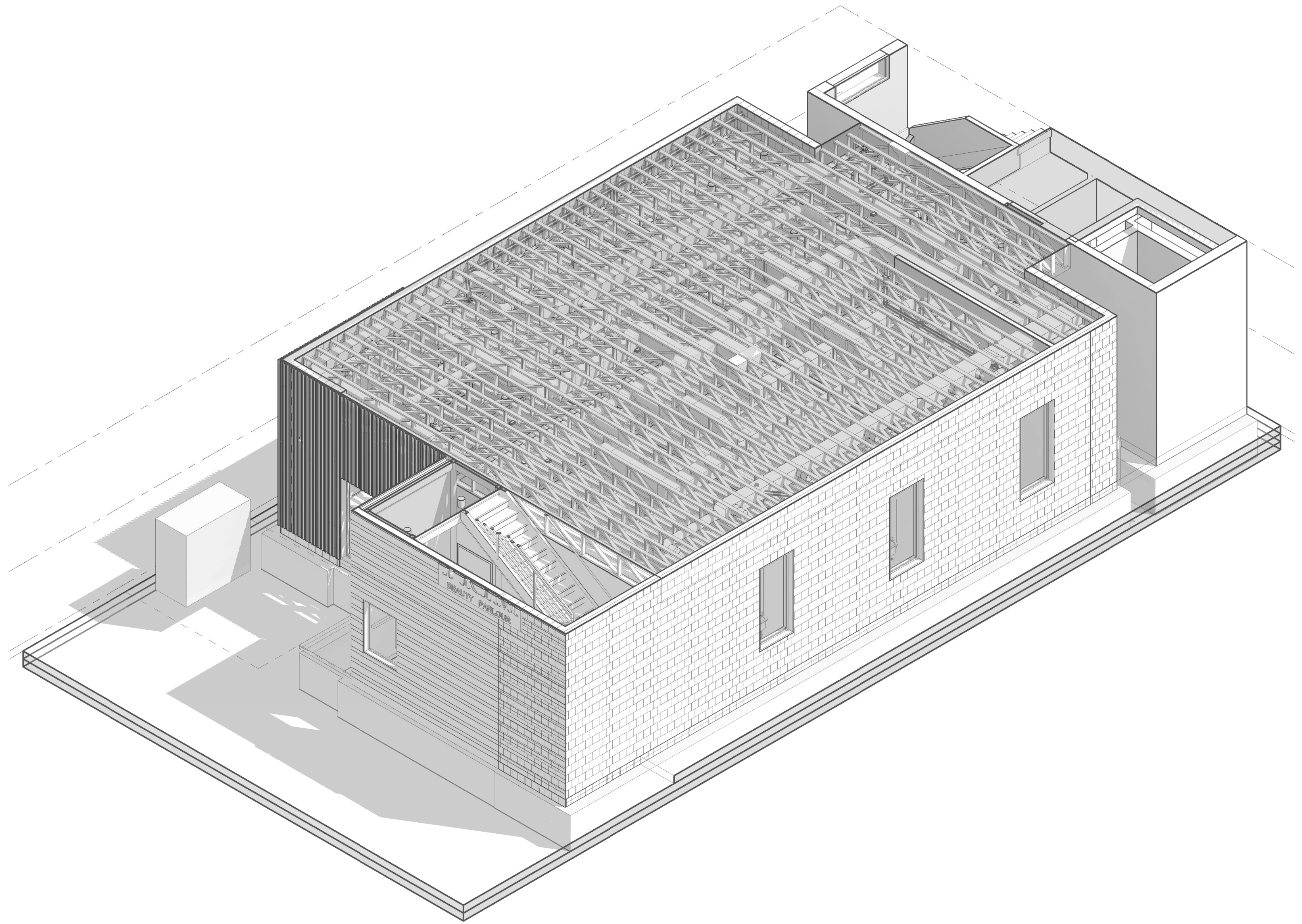




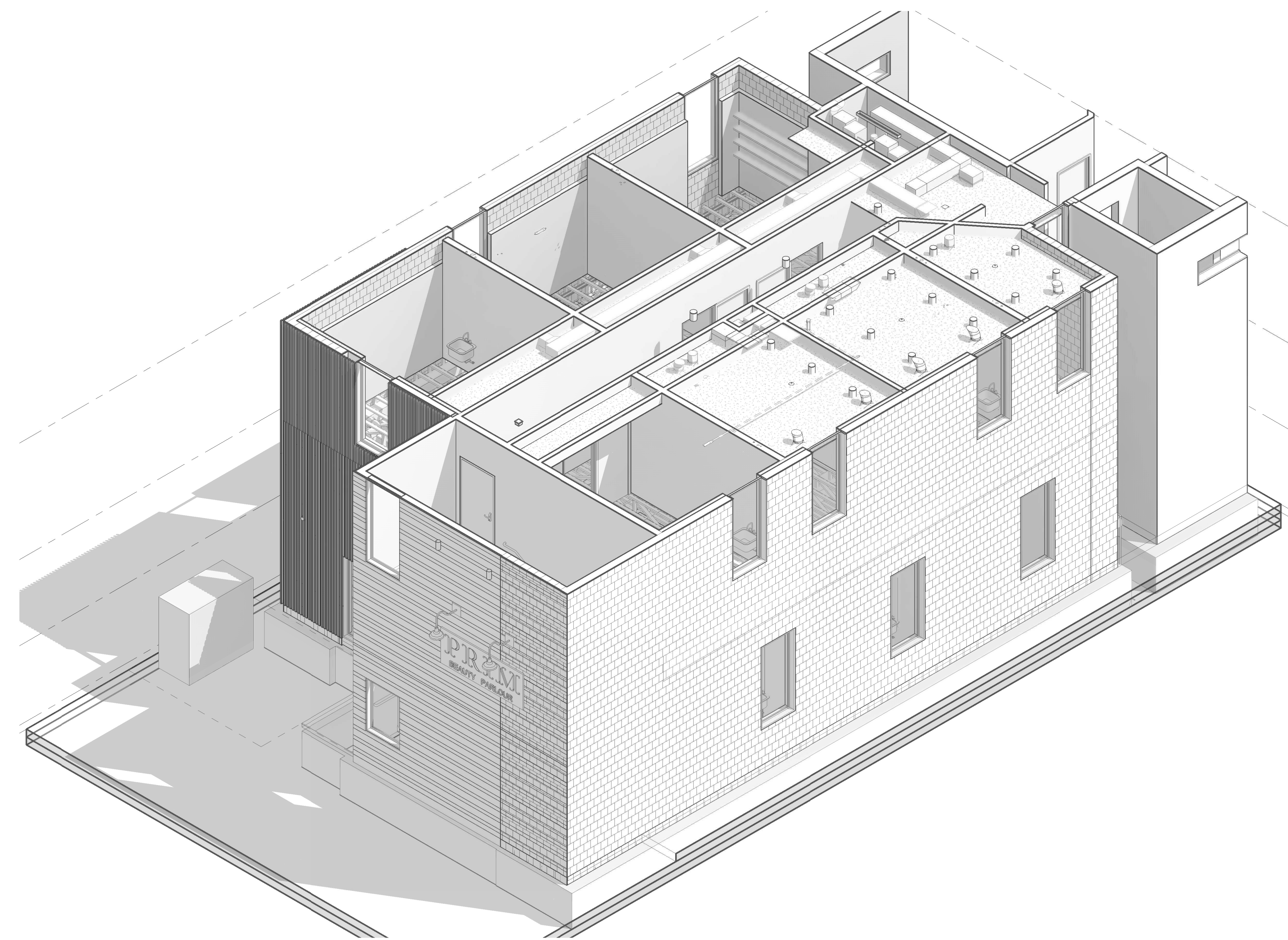




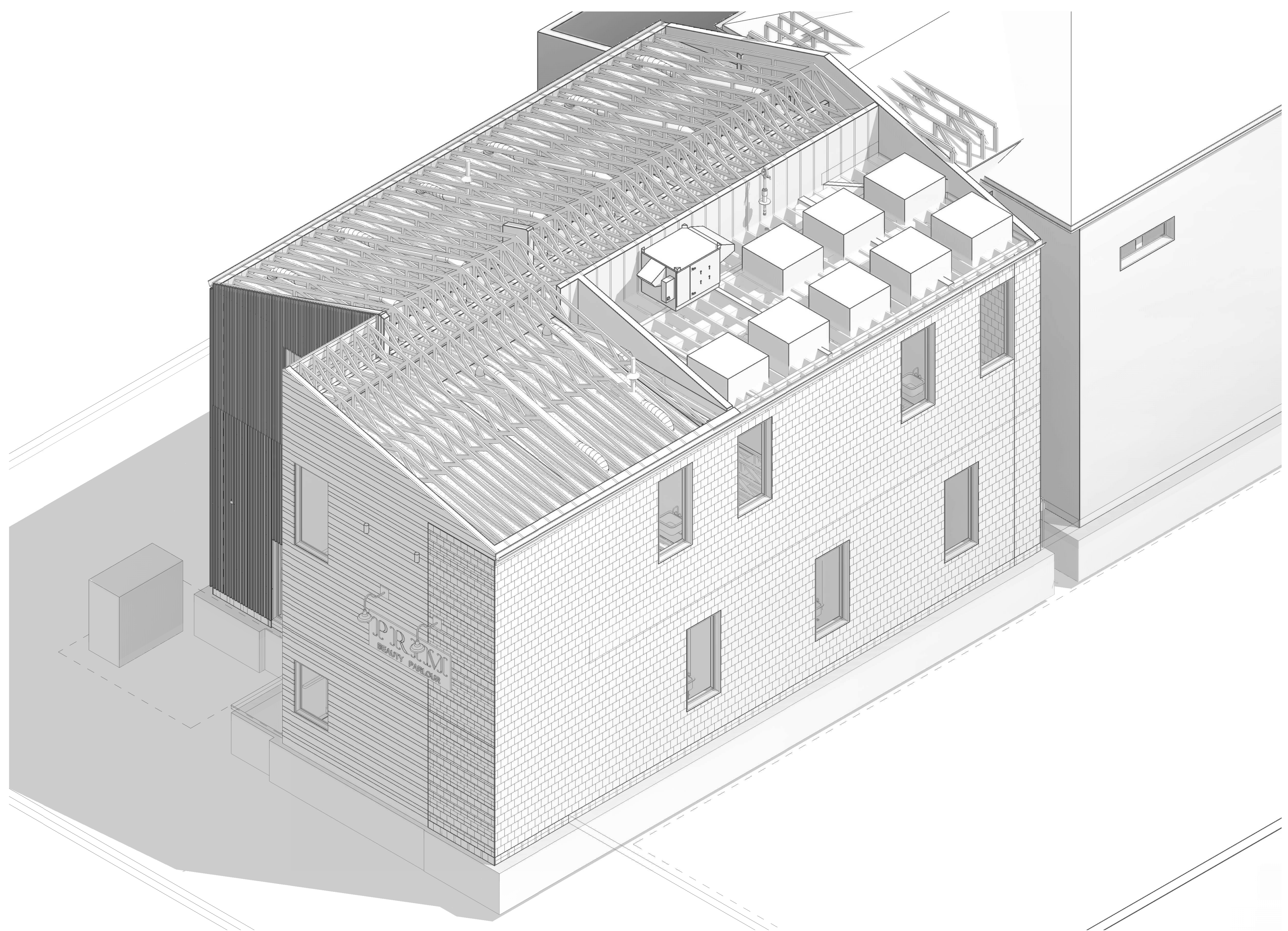
Z11 ISOMETRIC VIEW 1



M11 ISOMETRIC VIEW 2



Z1 ISOMETRIC VIEW 3



M1 ISOMETRIC VIEW 4

|            |         |
|------------|---------|
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| NO         |         |
| ISSUED FOR |         |
| NO         | 1       |
| ISSUED FOR |         |

PROJECT CONTACT INFORMATION:  
 ARCHITECTURE  
 MULTI-DISCIPLINARY DESIGN  
 6204 Haskell Street # 100  
 Omaha, Nebraska 68124  
 T: 402.964.2089  
 W: www.b2lab.com

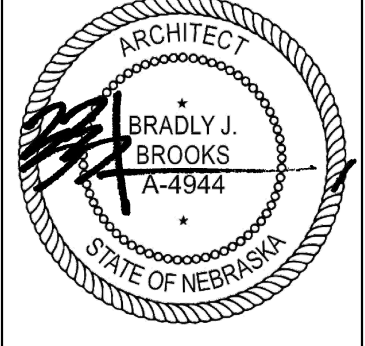
CIVIL ENGINEER  
 MEP ENGINEER  
 STRUCTURAL ENGINEER  
 CONSTRUCTION MANAGER  
 OWNER

PROJECT NAME  
 PRIM BEAUTY PARLOUR SALON

**B2LAB**  
 ARCHITECTURE

ARCHITECTURE  
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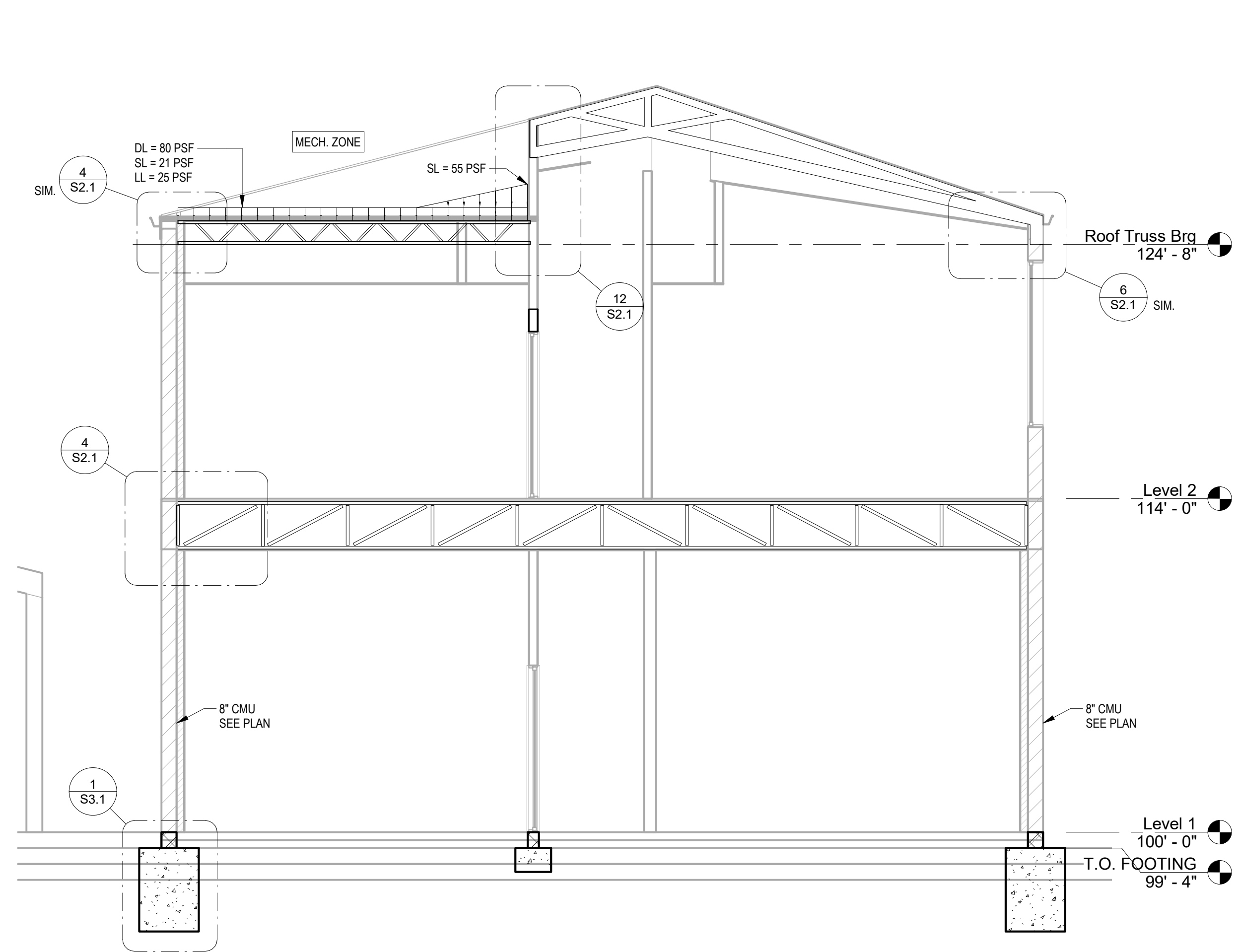
SHEET NAME:  
 ISOMETRIC VIEWS

PROJECT NO. PROJECT #  
 REVIEWED:  
 SHEET NO.



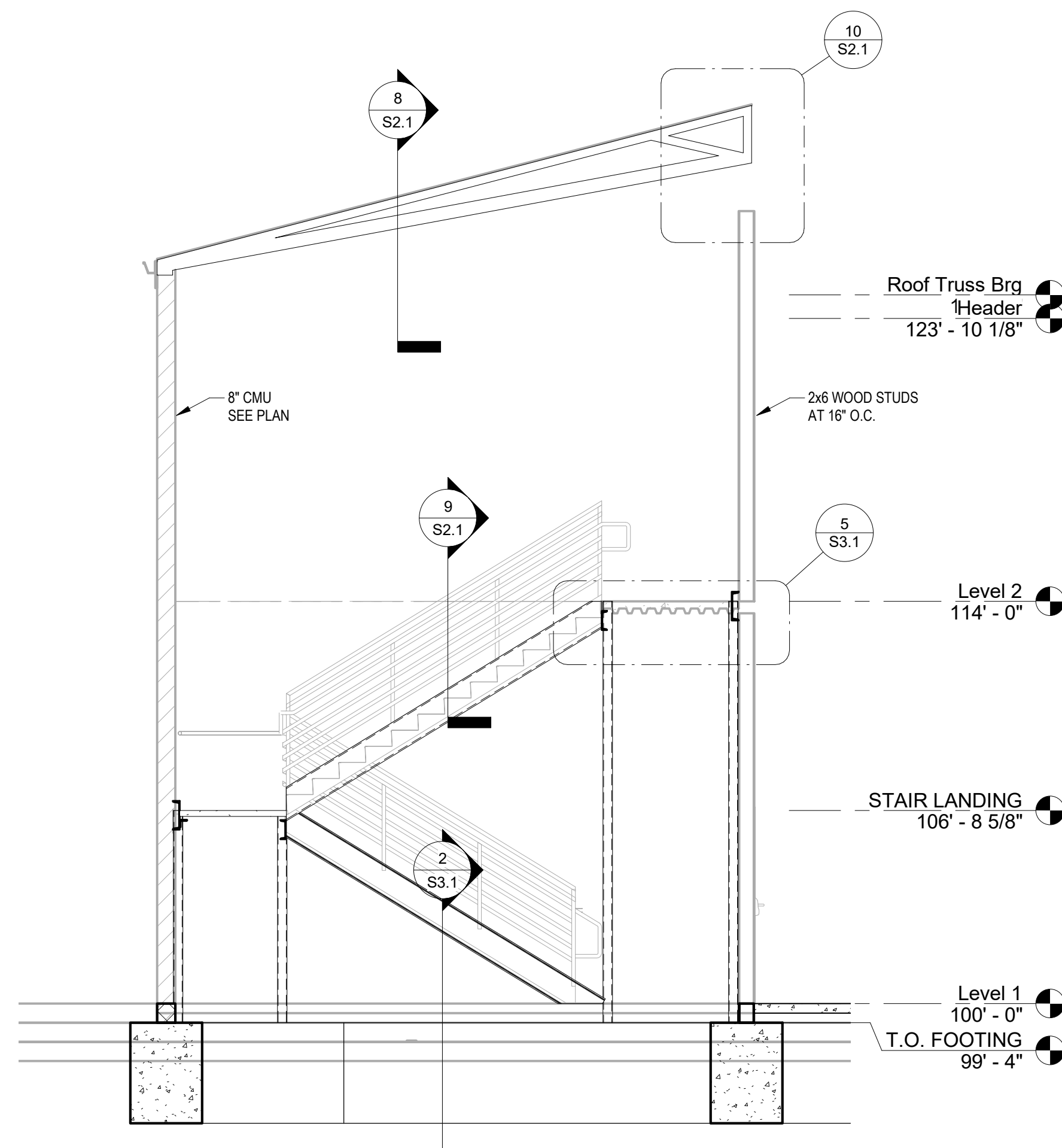






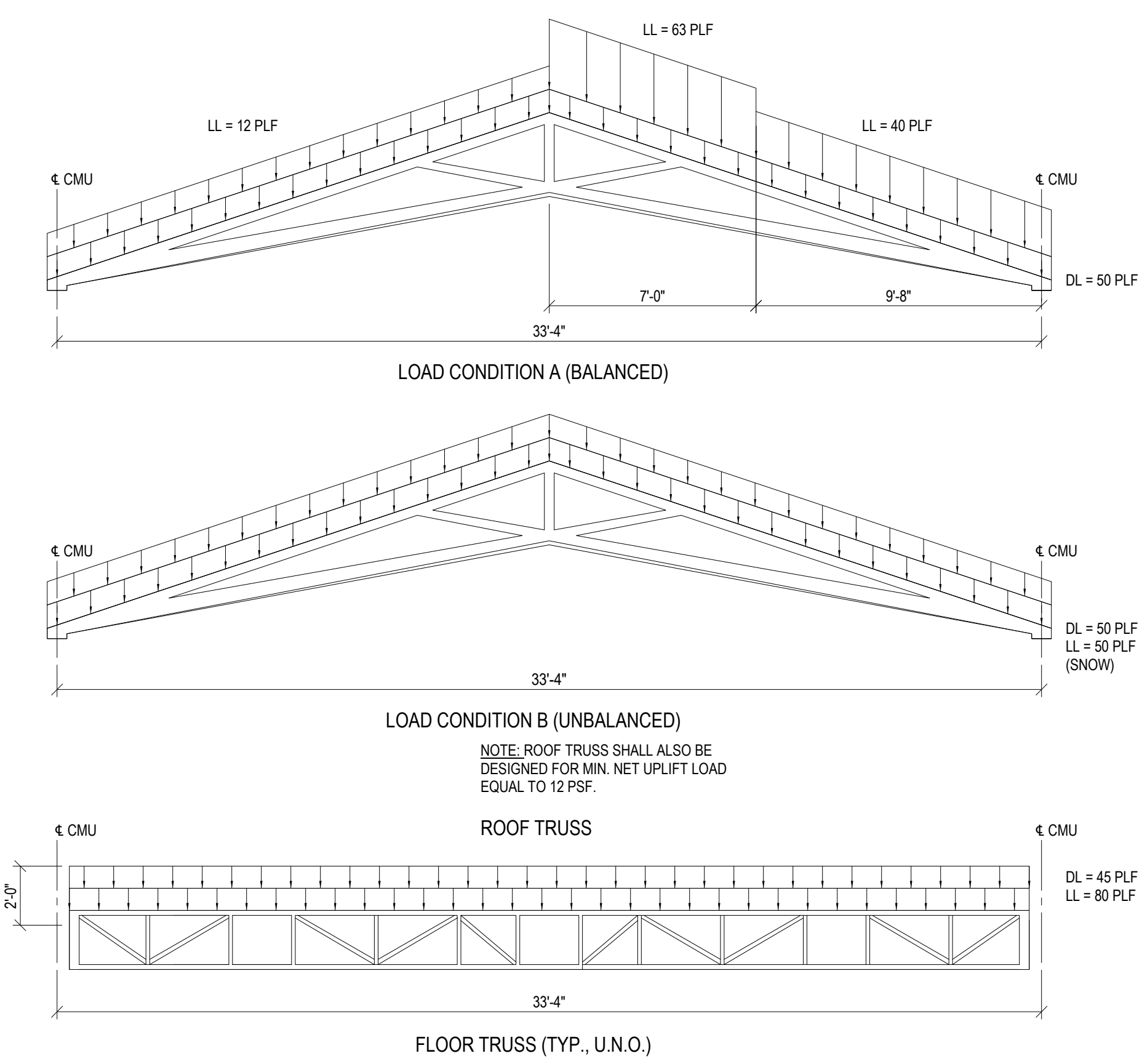
1 BUILDING SECTION

1/4" = 1'-0"



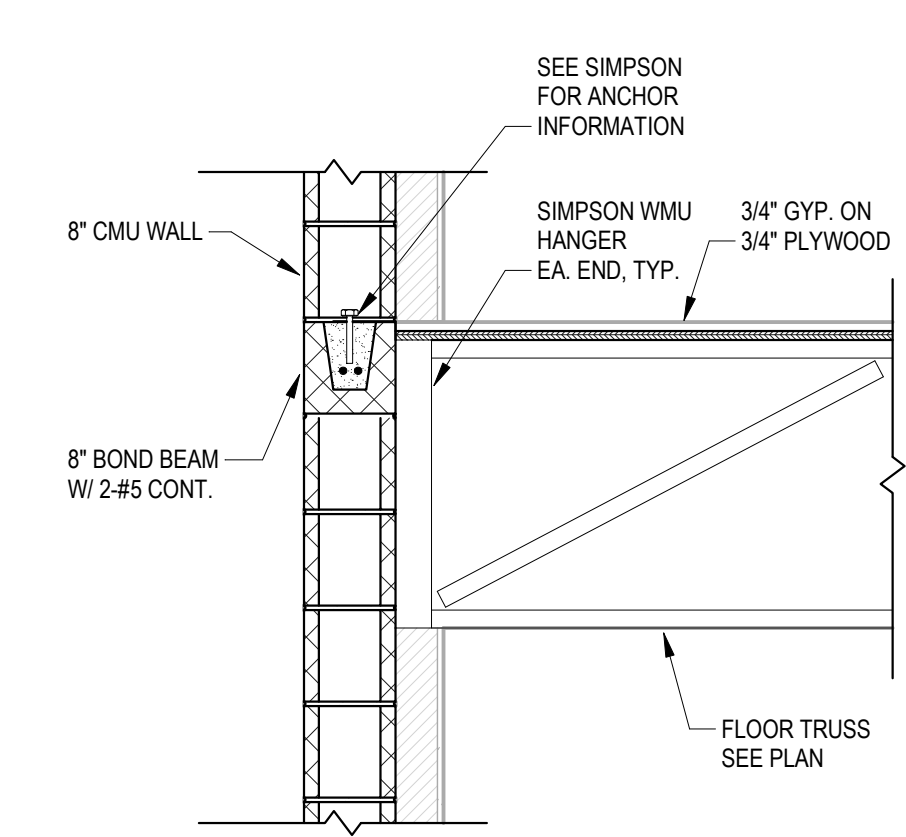
2 STAIR SECTION

1/4" = 1'-0"



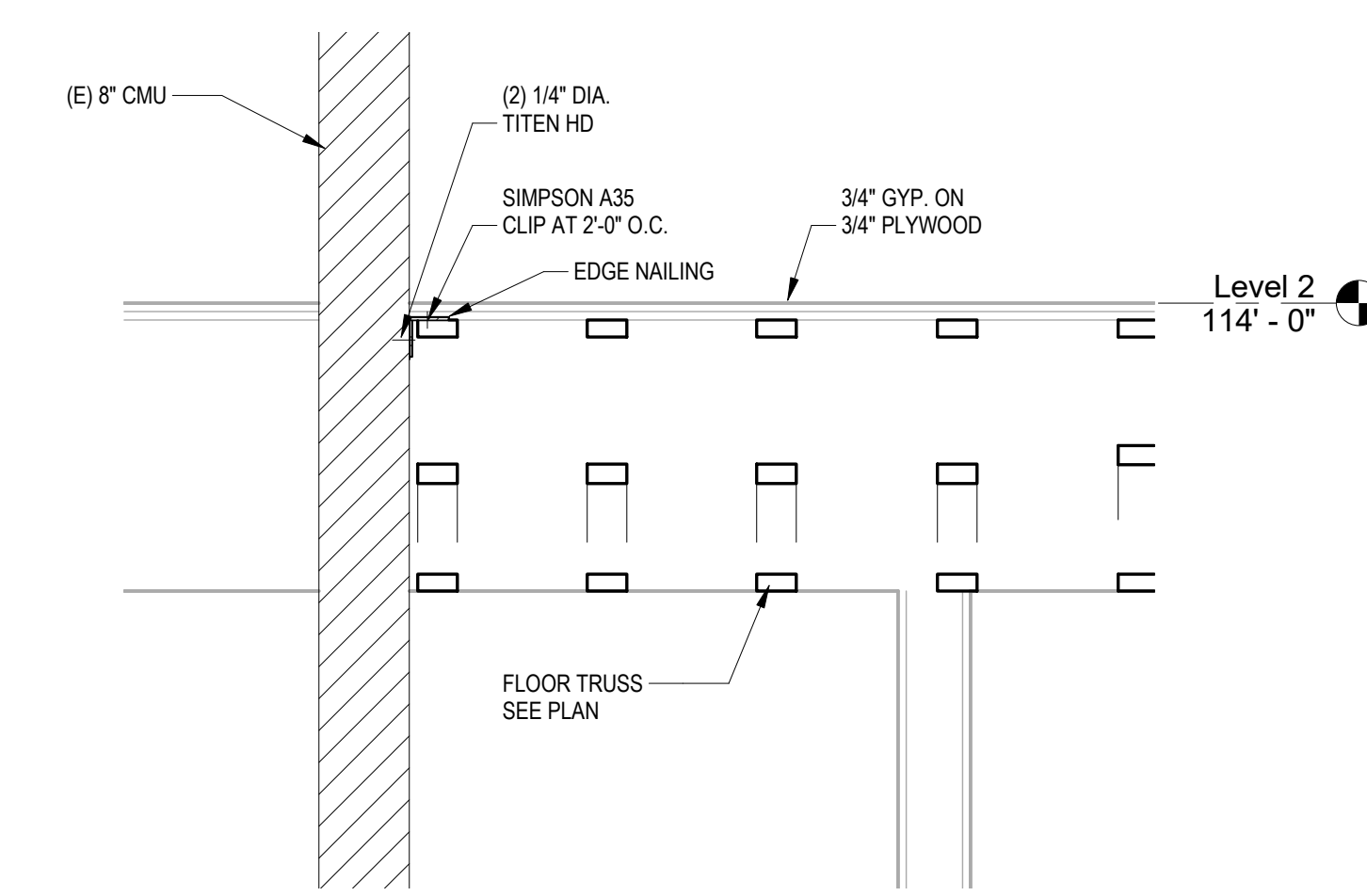
3 TRUSS LOADING DIAGRAM

1/4" = 1'-0"



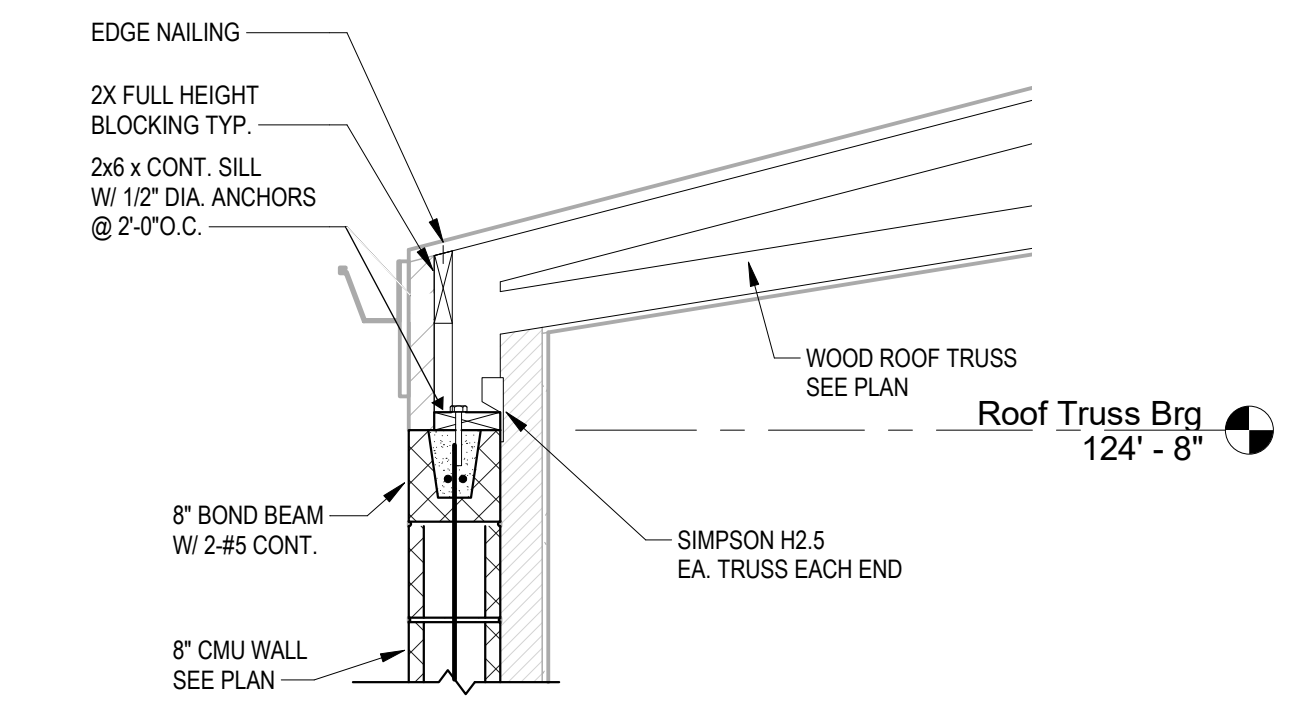
4 FRAMING SECTION LEVEL 2

3/4" = 1'-0"



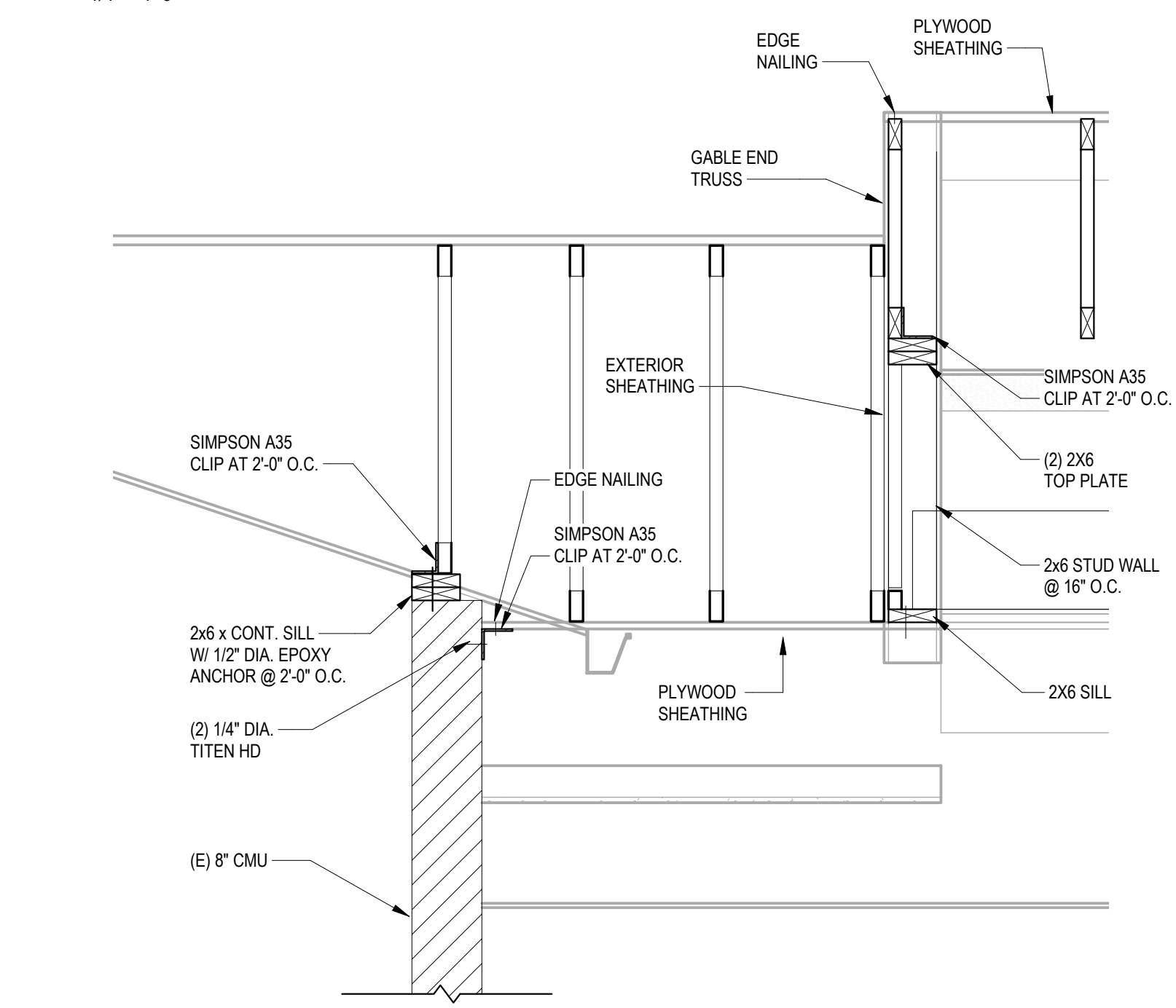
5 FRAMING SECTION

3/4" = 1'-0"



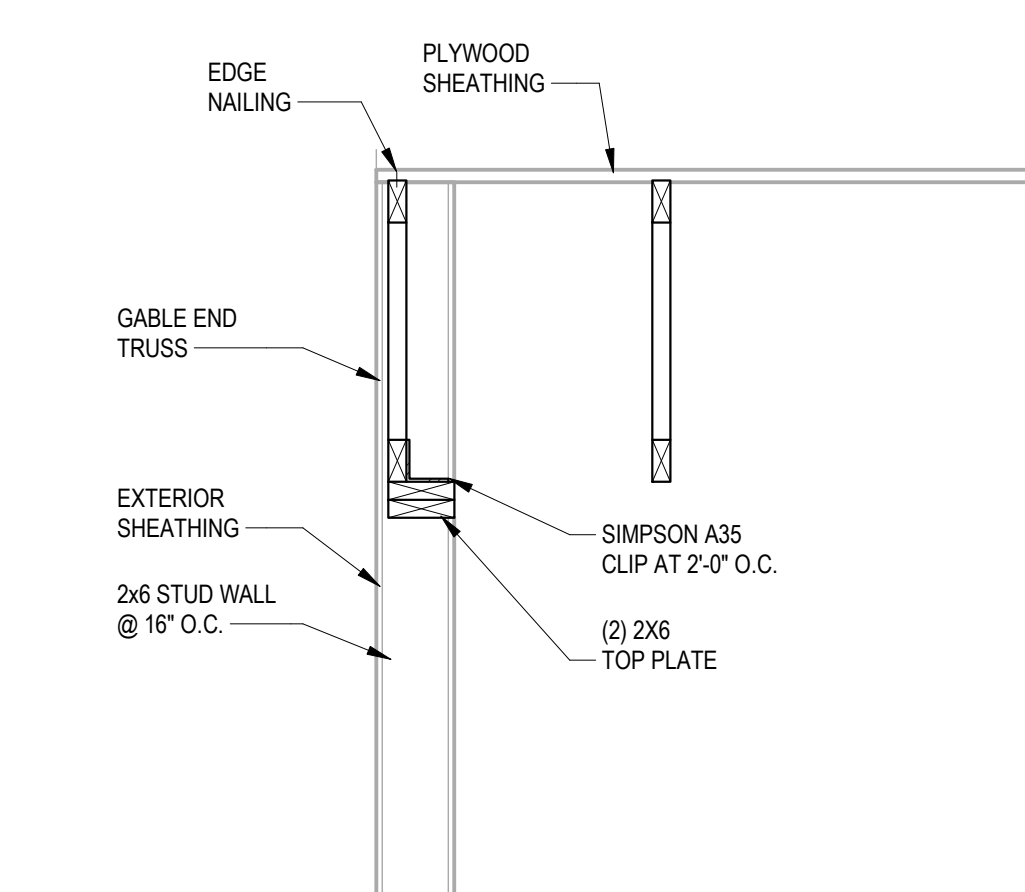
6 TRUSS BEARING DETAIL

3/4" = 1'-0"



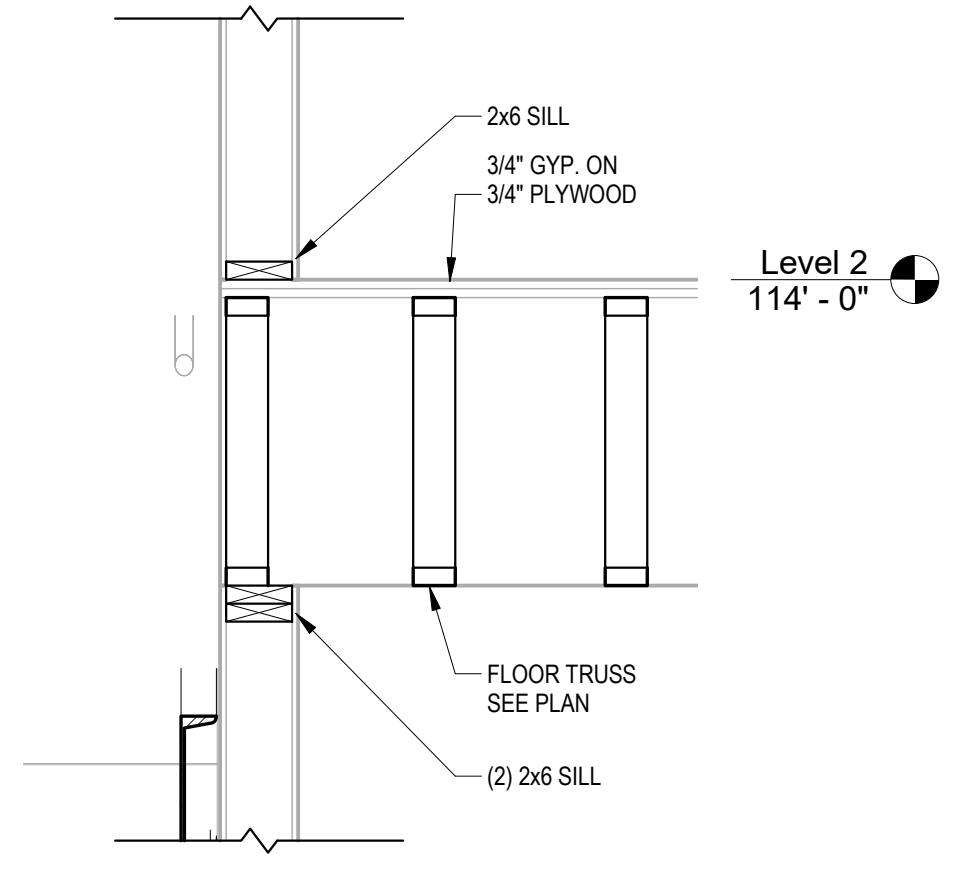
7 FRAMING SECTION

3/4" = 1'-0"



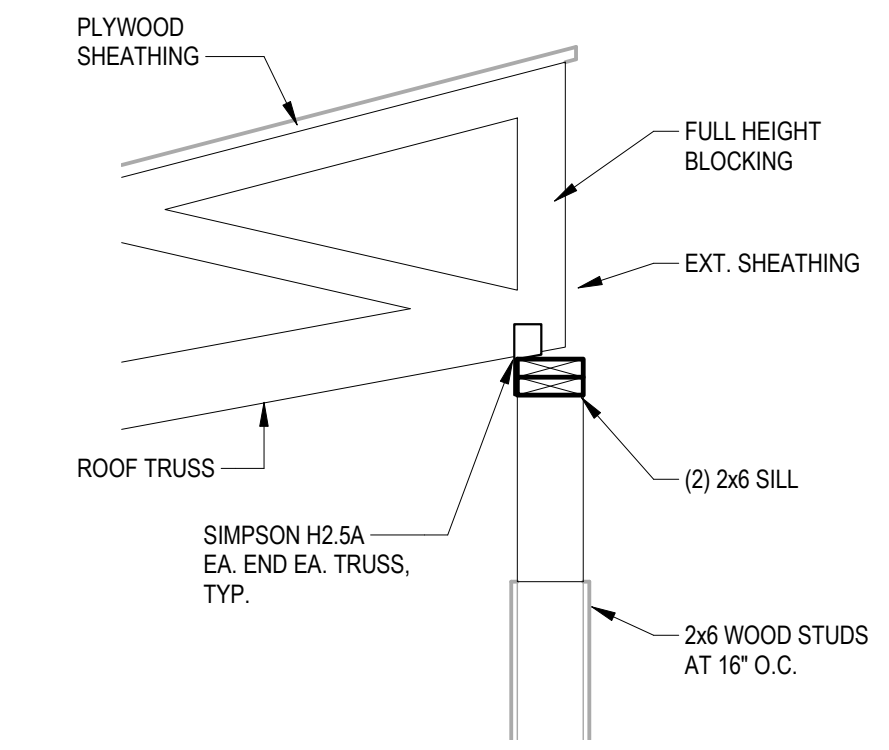
8 FRAMING SECTION

3/4" = 1'-0"



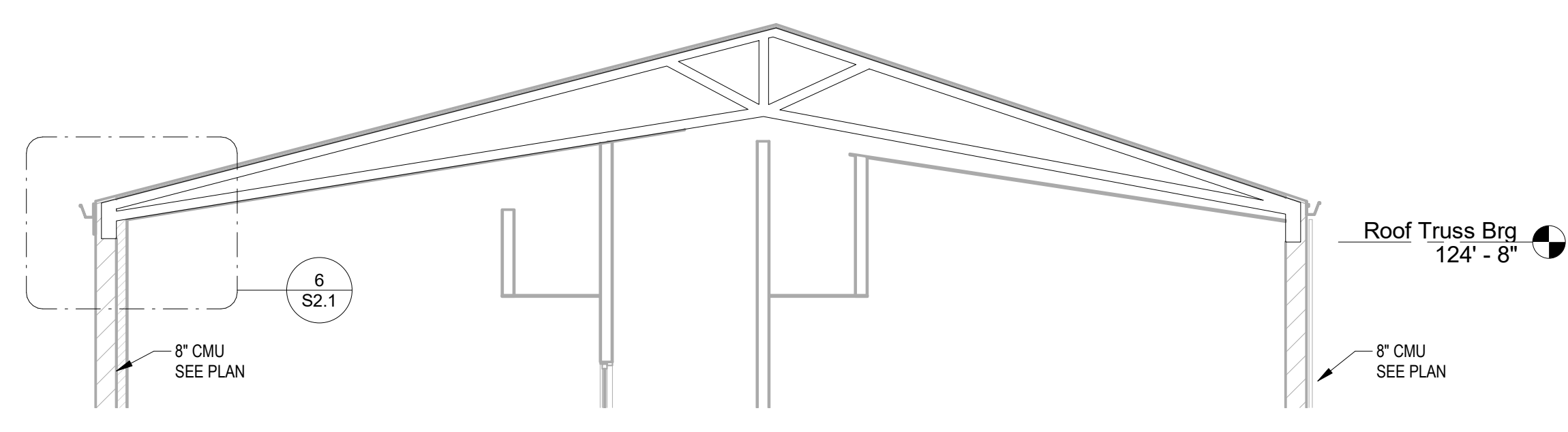
9 STAIR SECTION

3/4" = 1'-0"



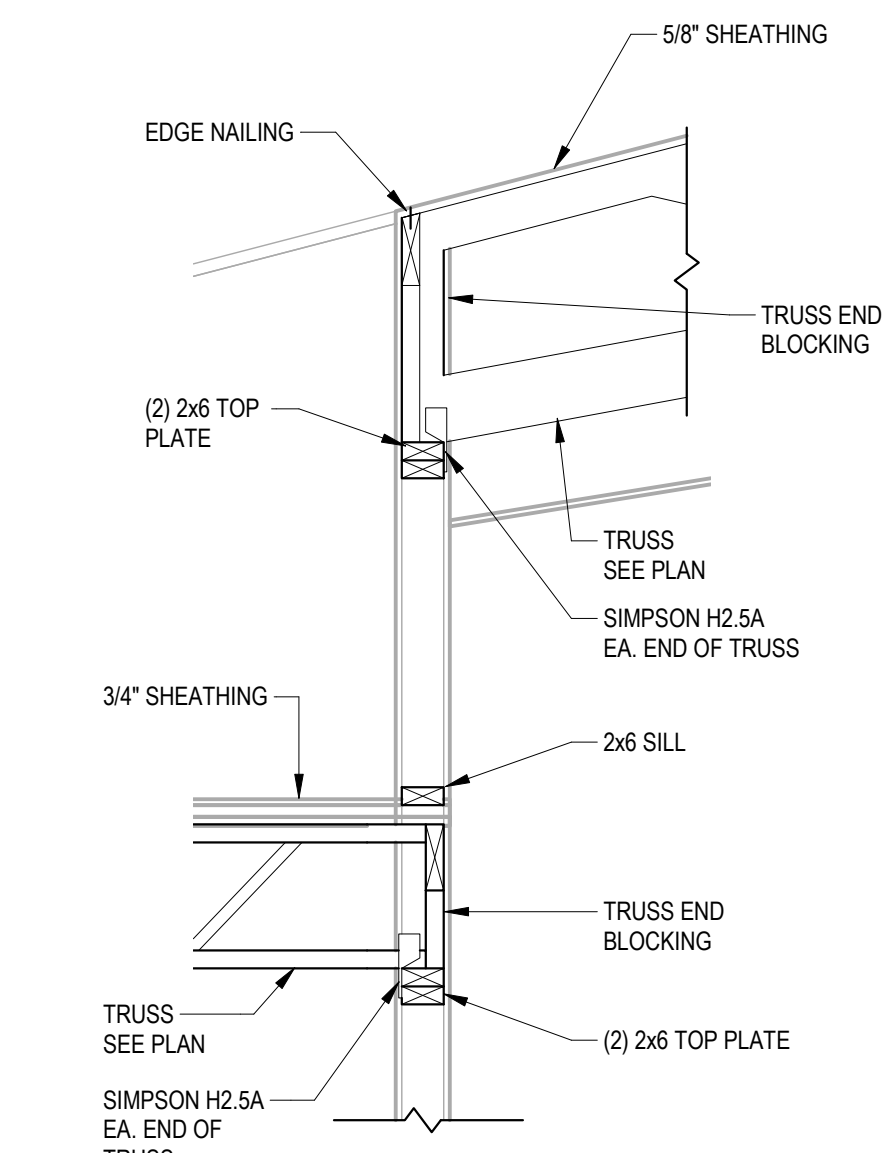
10 TRUSS BEARING DETAIL

3/4" = 1'-0"



11 FRAMING SECTION

1/4" = 1'-0"



12 TRUSS BEARING DETAIL

3/4" = 1'-0"

**PERFORMANCE Engineering**  
 1831 East Street, Suite 104 - Omaha, NE 68164  
 (402) 343-3960 Fax: (402) 343-3961  
 399 Perry St., Suite 204A - Castle Rock, CO 80104  
 (303) 721-3322  
 PE # : 2205936

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| NO. ISSUED FOR              |                   |
| DATE                        | 3.30.24           |
| NO. ISSUED FOR PERMIT       |                   |
| CONSULTANTS:                |                   |
| PROJECT NAME                |                   |
| LAB                         | <b>B2</b>         |
| ARCHITECTURE                | ARCHITECTURE      |
| DATE                        | 03/30/24          |
| PROFESSIONAL CIVIL ENGINEER |                   |
| STATE OF NEBRASKA           |                   |
| SHEET NAME                  | BUILDING SECTIONS |
| PROJECT NO.                 | 22018             |
| REVIEWED                    |                   |
| SHEET NO.                   | S2.1              |



**GENERAL STRUCTURAL NOTES:**

- A. DESIGN DATA:**
- DESIGN CODE: IBC 2018
- CONCRETE 28 DAY STRENGTH:  $f_c = 4,000$  PSI
- MISCELLANEOUS ROLLED SECTIONS AND PLATES (ANGLES, CHANNELS, PLATES, ETC.): ASTM A36
- PLAIN BOLTS AND ANCHORS: ASTM F1554 GR. 36
- HEADED SHEAR STUDS: ASTM A108
- REINFORCING STEEL: ASTM A615  $f_y = 60,000$  PSI
- WELDED WIRE FABRIC: ASTM A186
- CONCRETE MASONRY UNITS (ASTM C90 NORMAL WEIGHT/1,900 PSI UNIT STRENGTH):  $f_m = 1,500$  PSI
- MORTAR TYPE M OR S GROUT 28 DAY STRENGTH:  $f_c = 2,000$  PSI
- ALLOWABLE SOIL BEARING CAPACITY DESIGN LOADS: 1500 PSF (ASSUMED)
- GRAVITY LOADS:  
FLOORS:  $D_L = 20$  PSF,  $L_L = 60$  PSF  
ROOFS:  $D_L = 20$  PSF  
 $L_L$  BASED ON GROUND SNOW LOAD OF 30 PSF (CE = 1.0, CT = 1.0, AND I = 1.0)\*\*
- \*\*INCREASE LIVE LOAD FOR SNOW DRIFTING AS REQUIRED IN CONFORMANCE WITH THE AMERICAN SOCIETY OF CIVIL ENGINEERS ANS/ASCE 7-15.
- WIND LOADING CRITERIA (2018 IBC)  
BASE WIND SPEED (3 SECOND GUST)  $V = 115$  MPH  
BUILDING CATEGORY I  
IMPORTANCE FACTOR  $I_W = 1.0$   
EXPOSURE CATEGORY B

- B. FOUNDATION WORK:**
- SOIL CONDITIONS SHALL BE REVIEWED BY GEOTECHNICAL ENGINEER PRIOR TO FOUNDATION CONSTRUCTION TO CONFIRM MINIMUM ALLOWABLE BEARING PRESSURE OF 1,500 PSF. GEOTECHNICAL SHALL ALSO IDENTIFY ANY OVERCAVATION AND RECOMPACTION REQUIREMENTS.
  - SUBSOILS SUPPORTING OR IN DIRECT CONTACT WITH FOOTINGS, SLABS ON GRADE, OR OTHER FOUNDATION ELEMENTS SHALL BE PROTECTED AGAINST FREEZING CONDITIONS THAT COULD CAUSE MOVEMENT OR OTHER DETRIMENTAL EFFECT TO THE STRUCTURE AS A WHOLE OR TO ANY OF ITS COMPONENT PARTS.
  - WHEN WORKING NEAR EXISTING AND/OR NEW CONSTRUCTION, THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION SO AS NOT TO UNDERMINE, DISTURB, DAMAGE OR, IN ANY WAY, CAUSE UNDESIRABLE MOVEMENT, CRACKING, AND/OR SETTLEMENT OF THE ADJACENT CONSTRUCTION.
  - ALL SLABS ON GRADE SHALL BEAR ON UNDISTURBED VIRGIN SOIL OR PROPERLY COMPACTED BACKFILL/GRANULAR FILL. ANY UNACCEPTABLE UNDISTURBED VIRGIN SOIL OR BACKFILL/GRANULAR FILL, AS DETERMINED BY THE OWNER'S GEOTECHNICAL ENGINEER, SHALL BE REMOVED AND REPLACED AS REQUIRED BY THE GEOTECHNICAL ENGINEER.
  - CONTRACTOR SHALL COORDINATE FOOTING ELEVATIONS WITH FINAL GRADING PLAN TO PROVIDE A MINIMUM OF 42" OF GRADE ABOVE THE BOTTOM OF ALL FOOTINGS FOR FROST PROTECTION.

- C. CONCRETE:**
- FOR REINFORCEMENT DEVELOPMENT LENGTH AND SPLICE LENGTH SEE TYPICAL REINFORCEMENT TABLE ON THIS SHEET.
  - PROVIDE CORNER BARS IN WALLS AND FOOTINGS THE SAME SIZE AND NUMBER AS THE CONTINUOUS REINFORCING.
  - REINFORCING IN FOOTINGS SHALL BE ACCURATELY PLACED BEFORE PLACING CONCRETE. DO NOT FLOAT REINFORCING INTO FOOTINGS
  - CONCRETE SHALL BE REGULAR WEIGHT (14 PCF) WITH TYPE I CEMENT, POTABLE WATER, AND AGGREGATES CONFORMING TO REQUIREMENTS OF NEBRASKA DEPARTMENT OF ROADS FOR 47-B CONCRETE, UNLESS NOTED OTHERWISE. CONCRETE SHALL CONFORM TO ACI 301-10.
  - MECHANICALLY VIBRATE CONCRETE, EXCEPT THAT SLABS ON GRADE NEED BE VIBRATED ONLY AROUND UNDERFLOOR DUCTS AND OTHER ITEMS EMBEDDED IN THE SLAB.
  - DO NOT PLACE PIPES, DUCTS, OR CHASES IN STRUCTURAL CONCRETE WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER, SEE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATIONS.
  - CONSTRUCT FORMWORK SO CONCRETE MEMBERS AND STRUCTURES ARE OF SIZE, SHAPE, ALIGNMENT, ELEVATION, AND POSITION INDICATED, WITHIN TOLERANCE LIMITS OF ACI 117.
  - FINISH CONCRETE SLABS-ON-GRADE PER THE FOLLOWING CRITERIA ACCORDING TO ASTM E 1155. COMPLY WITH ACI 302.1R RECOMMENDATIONS FOR SCREEDING, RESTRAIGHTENING, AND FINISHING OPERATIONS FOR CONCRETE SURFACES. DO NOT WET CONCRETE SURFACES.
  - CONTROL JOINTS IN SLAB-ON-GRADE SHALL BE PLACED AT COLUMN LINE INTERSECTIONS AND AS NECESSARY TO NOT EXCEED A SPACING OF 36 TIMES THE SLAB THICKNESS. MAXIMUM ASPECT RATIO SHALL BE 1.5 TO 1.0 UNLESS NOTED OTHERWISE.
  - THICKEN SLABS ON GRADE UNDER NON-LOAD BEARING MASONRY WALLS TO 8-INCHES AND REINFORCE WITH 2-#4 CONTINUOUS.
  - ALL CONSTRUCTION JOINTS IN CONCRETE WALLS SHALL HAVE A 2' X 4' CONTINUOUS KEYWAY. ALL CONSTRUCTION JOINTS, EXCEPT THOSE DETAILED, SHALL HAVE ARCHITECT/ENGINEER APPROVAL. SEE SPECIFICATIONS FOR OTHER CONSTRUCTION JOINT REQUIREMENTS.
  - ALL REINFORCING STEEL SHALL BE DEFORMED NEW BILLETS BARS (#615, GRADE 60), BENT COLD, AND DETAILED, FABRICATED, AND HELD IN PLACE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" (ACI 315 LATEST EDITION) EXCEPT AS OTHERWISE DETAILED OR SPECIFIED.
  - THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT, UNLESS NOTED OTHERWISE:  
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"  
CONCRETE EXPOSED TO EARTH OR WEATHER: 2"  
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND, SLABS AND WALLS: 1", BEAMS AND COLUMNS: 2"
  - UNLESS NOTED OTHERWISE, SLABS ON GRADE SHALL BE 4" CONCRETE REINFORCED WITH 6 X 6 W/ 4 X W/ 4 WELDED WIRE FABRIC OR 4" GRANULAR FILL WITH VAPOR BARRIER. UPON APPROVAL OF ENGINEER, WELDED WIRE FABRIC MAY BE REPLACED WITH SYNTHETIC MICRO-FIBER AT A DOSAGE RATE OF 1.50 LBS/CY. MICRO FIBERS SHALL BE COMPRISED OF MICROFILAMENT POLYPROPYLENE FIBERS MEETING ASTM C1116, TYPE III. MICROFIBER PRODUCT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO PLACING CONCRETE FOR SLABS ON GRADE.
  - ALL REINFORCING IN SLABS AND WALLS SHALL BE CONTINUOUS UNLESS DETAILED OTHERWISE AND LAP SPLICED ONLY IN REGIONS OF LOW STRESS. ALL BARS SHALL HAVE A STANDARD HOOK WHERE A HOOK IS SHOWN, UNLESS DETAILED OTHERWISE.

- D. MASONRY:**
- FURNISH AND CONSTRUCT MASONRY IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS FOR MASONRY CONSTRUCTION (ACI 530.1-15/ASCE 6-15/TMS 602-15).
  - LAY MASONRY UNITS IN RUNNING BOND.
  - MAXIMUM GROUT LIFT WITHOUT CLEANOUTS SHALL BE 4' 0" IN BLOCK WALLS AND 8" GROUTED TWO WYTHE WALLS.
  - 8" WALLS PROVIDE CONTINUOUS FULL HEIGHT VERTICAL REINFORCING IN CENTER OF GROUT AT CENTER OF WALL. TYPICAL REINFORCING SHALL BE 1 #5 AT 40 INCHES ON CENTER AND 1 #5 AT CORNERS, INTERSECTIONS, WALL ENDS, DOOR AND WINDOW JAMBS, AND SIDE OF EXPANSION OR CONTROL JOINTS UNLESS NOTED OTHERWISE.
  - GROUT CELLS FULL AT ALL EXPANSION ANCHOR LOCATIONS.
  - PROVIDE LADDER TYPE #9 JOINT REINFORCING AT 16" ON CENTER VERTICAL SPACING IN ALL CONCRETE MASONRY AND UNLESS NOTED OTHERWISE.
  - SPLICE MASONRY WALL REINFORCING 48 BAR DIAMETERS.
  - SPLICE PLACE BOND BEAM REINFORCING AT MASONRY CONTROL/EXPANSION JOINTS AS SHOWN ON MASONRY JOINT DETAIL ON THIS SHEET.
  - PROVIDE CONTINUOUS BOND BEAMS AT ALL BEAM BEARING ELEVATIONS AND AT THE TOP OF ALL WALLS.
  - PROVIDE CONTINUOUS WIRE LATH GROUT BARRIERS BELOW BOND BEAMS.
  - PROVIDE LINTELS OVER ALL OPENINGS AND RECESSES IN MASONRY WALLS. EXTERIOR LINTELS SHALL BE GALVANIZED, UNLESS NOTED OTHERWISE.
  - FOR ALL OPENINGS NOT OTHERWISE DETAILED OR SCHEDULED, MINIMUM LINTELS SHALL BE FOR EACH 4 INCH OF MASONRY WIDTH 1 L 3 1/2 X 3 1/2 X 1/4 FOR SPANS UP TO 4' 0", 1 L 4 X 3 1/2 X 1/4 FOR SPANS UP TO 6' 0" AND 1 L 5 X 3 1/2 X 5/16 FOR SPANS UP TO 8' 0". FOR SPANS LESS THAN 2' 0" PROVIDE A 5/16" PLATE.
  - ALL LINTELS SHALL HAVE A MINIMUM BEARING OF 8 INCHES EACH END.

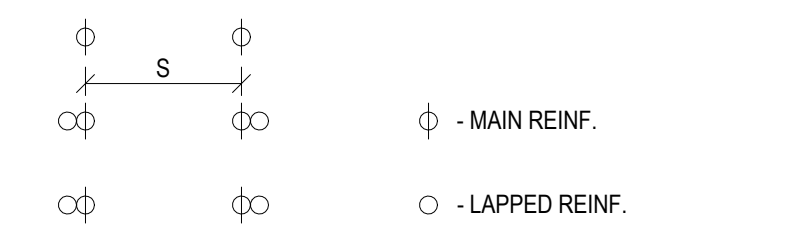
- E. STEEL:**
- STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS AND OSHA REGULATION 29 CFR PART 1926.
  - ALL STEEL LINTELS BEARING ON MASONRY SHALL HAVE A MINIMUM OF 8" OF BEARING. PROVIDE THE BEAMS WITH BEARING PLATES AND WALL ANCHORS UNLESS NOTED OTHERWISE. PROVIDE A MINIMUM OF 4 COURSES OF BRICK OR SOLID CONCRETE MASONRY FOR BEAM BEARING.
  - ALL EXTERIOR EXPOSED STEEL SHALL BE GALVANIZED.
  - COMPLY WITH AMERICAN WELDING SOCIETY STANDARDS. ALL WELDERS SHALL HAVE VALID CERTIFICATES AND HAVE CURRENT EXPERIENCE IN TYPE OF WELD CALLED FOR.
  - WELDING ELECTRODES SHALL BE E70 FOR ALL STEEL, UNLESS NOTED OTHERWISE.
- F. STRUCTURAL LUMBER AND WOOD TRUSSES:**
- WOOD CONSTRUCTION AND DESIGN SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION (ANSI / AF&PA NDS-2012).
  - WOOD BLOCKING SHALL BE USED AT ALL PLYWOOD ROOF SEAMS.
  - 5/8 INCH ROOF SYSTEM SHALL BE FASTENED TO SUPPORTING MEMBER WITH 10D NAILS AT 4 INCH ON CENTER ALONG ALL EDGES AND 3 INCHES ON CENTER ALONG MASONRY AND EXTERIOR WALLS.
  - SUPPLY ALL NECESSARY HEADERS, BLOCKING, HANGERS, FASTENERS, AND MISCELLANEOUS ACCESSORIES TO PROVIDE A COMPLETE WOOD ROOF FRAMING SYSTEM.
  - STRUCTURAL LUMBER SHALL BE NO.2 AND BETTER DOUGLAS-FIR LARCH FOR WALLS AND HEADERS.
  - DOUBLE STUDS AT ALL OPENINGS IN STUD WALL SYSTEM INCLUDING HEADS, SILLS, AND JAMBS.
  - WOOD FRAME CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF TABLE 2304.9.1 OF THE 2000 IBC.
  - METAL PLATE CONNECTED WOOD TRUSSES SHALL BE DESIGNED IN ACCORDANCE WITH THE GUIDELINES PROVIDED IN THE LATEST EDITION OF THE WTC4 HANDBOOK AND ANS/ITP 1, THE MOST STRINGENT REQUIREMENTS GOVERNING.
  - ROOF FRAMING LAYOUTS ARE PROVIDED TO ILLUSTRATE CONDITIONS FOR CONSTRUCTION AND DO NOT NECESSARILY INDICATE SPECIFIC QUANTITIES OF MATERIALS OR COMPONENTS REQUIRED FOR CONSTRUCTION.
  - TYPICAL BEARING WALL FRAMING SHALL BE 2X6 (SEE ARCHITECTURAL) AT 16 INCHES ON CENTER WITH HORIZONTAL BLOCKING SPACED AT NO MORE THAN 4' 0" ON CENTER VERTICALLY.

- G. INSPECTIONS:**
- IN ACCORDANCE WITH 2018 IBC SECTION 1705, AS NOTED BELOW, TESTING AND INSPECTION SHALL BE BY AN INDEPENDENT TESTING/INSPECTION FIRM UNDER THE SUPERVISION OF A LICENSED ENGINEER EMPLOYED BY THAT FIRM. THIS ENGINEER SHALL BE DEEMED THE DESIGNATED ENGINEER OF RECORD FOR SPECIAL INSPECTIONS PERFORMED BY HIS FIRM OR HIS CONSULTANTS. INSPECTORS SHALL BE ICBO CERTIFIED AND APPROVED BY THE BUILDING OFFICIAL.
  - THE DESIGNATED ENGINEER OF RECORD FOR SPECIAL INSPECTIONS SHALL BE RESPONSIBLE FOR DEFINING THE ACTIVITIES OF THE INSPECTORS, FOR CERTIFYING THE QUALIFICATIONS OF THE INSPECTORS WITH THE BUILDING OFFICIAL AND TO ATTEND THE PRE-CONSTRUCTION MEETING TO DEFINE THEIR SCOPE OF SERVICES AND THE TESTING OR TEST PROCEDURES THAT ARE REQUIRED AS OUTLINED IN THE INTERNATIONAL BUILDING CODE.
  - SPECIAL INSPECTION IS TO BE PROVIDED IN ADDITION THE INSPECTIONS CONDUCTED BY THE LOCAL DEPARTMENT OF BUILDING SAFETY AND SHALL NOT BE CONSTRUED TO RELIEVE THE OWNER OR HIS AUTHORIZED AGENT FROM REQUESTING THE PERIODIC AND CALLED INSPECTIONS REQUIRED BY SECTION 1705 OF THE INTERNATIONAL BUILDING CODE.
  - SPECIAL INSPECTIONS REQUIRED INCLUDE, BUT MAY NOT BE LIMITED TO, THE FOLLOWING:
    - CONCRETE PER TABLE 1705.3 AND SECTION 1705.3 WITH ALL APPLICABLE EXCEPTIONS.
    - ANCHOR BOLTS INSTALLED IN CONCRETE: PER TABLE 1705.3.
    - REINFORCING PER TABLE 1705.3 AND EXCEPTION FOR CONCRETE REQUIRING SPECIAL INSPECTION.
    - WELDING: PER SECTION 1705.2.
    - STRUCTURAL MASONRY: PER SECTION 1705.4.
    - GRADING, EXCAVATION AND FILLING: PER SECTION 1705.6. SEE GEOTECHNICAL REPORT.
    - EXPANSION BOLT, SCREW ANCHOR AND ADHESIVE ANCHOR INSTALLATION TO VERIFY INSTALLATION IN ACCORDANCE WITH ICBO REPORTS NOTED PREVIOUSLY OR APPROVED EQUAL.

- H. OTHER:**
- UNLESS NOTED OTHERWISE, EXPANSION ANCHORS SHALL BE HLTI KWIK BOLT 3 EXPANSION ANCHORS OR APPROVED EQUAL, ADHESIVE (EPOXY) ANCHORS SHALL CONSIST OF HLTI STANDARD HAS-E RODS WITH THE HIT-HY 200 ADHESIVE SYSTEM OR APPROVED EQUAL. INSTALL ANCHOR PER MANUFACTURER'S REQUIREMENTS.
  - VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO STARTING WORK. NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES.
  - VERIFY IN FIELD ALL EXISTING CONDITIONS SHOWN ON DRAWINGS.
  - ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR MECHANICAL, ELECTRICAL, AND PLUMBING WITH APPROPRIATE TRADES. PROVIDE ALL TEMPORARY BRACING, SHORING, GUYING, OR OTHER MEANS TO AVOID EXCESSIVE STRESSES AND TO HOLD STRUCTURAL ELEMENTS IN PLACE DURING CONSTRUCTION.
  - ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE STAMP (AND SIGNATURE) OF AN ENGINEER REGISTERED IN NEBRASKA.

**TYPICAL REINFORCING NOTES:**

- REINFORCING BAR DEVELOPMENT AND LAP SPLICE LENGTH SHALL BE AS SHOWN IN THIS TABLES UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- THE LENGTHS SHOWN IN THE TABLES ARE BASED ON THE FOLLOWING: CONCRETE COVERAGE AND REINFORCING CENTER TO CENTER (C-C) SPACING: BEAMS OR COLUMNS: COVER (EQUAL OR MORE) 1.0d (BAR DIAMETER) CENTER TO CENTER SPACING (EQUAL OR MORE) 2.0d. ALL OTHERS: COVER (EQUAL OR MORE) 1.0d CENTER TO CENTER SPACING (EQUAL OR MORE) 3.0d.
- TOP BARS ARE DEFINED AS HORIZONTAL REINFORCEMENT SUCH THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
- DEVELOPMENT AND SPLICE LENGTH SHOWN SHALL NOT APPLY IF ANY OF THE FOLLOWING CONDITIONS OCCUR:
  - $f_c < 4,000$  PSI
  - $f_y > 60,000$  PSI
  - THE COVER OR C-C BAR SPACING IS NOT AS LISTED ABOVE
  - THE REINFORCING STEEL IS EPOXY COATED
  - LIGHT WEIGHT CONCRETE IS USED.
- CENTER TO CENTER SPACING (S) IS DEFINED AS BELOW:

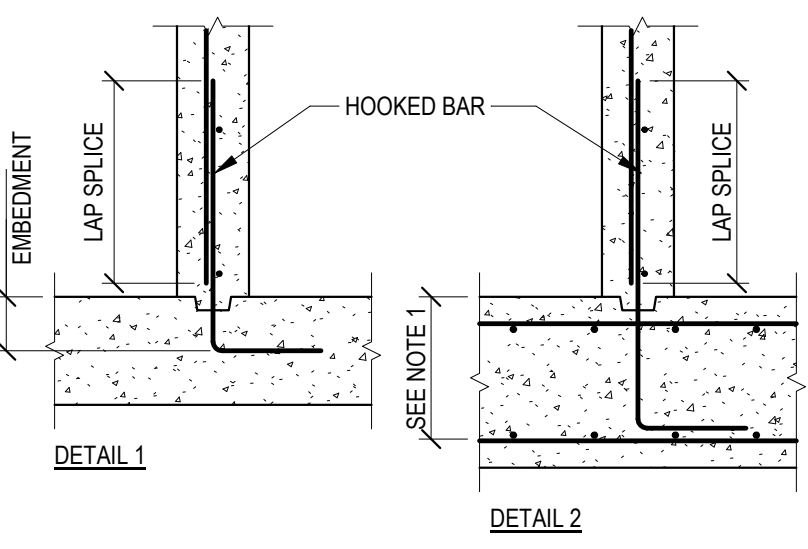


**REINFORCING DEVELOPMENT AND SPLICES**  
 $f_c = 4,000$  PSI

| BAR SIZE | DEVELOPMENT LENGTH |        | SPLICE LENGTH |        |
|----------|--------------------|--------|---------------|--------|
|          | OTHER              | TOP    | OTHER         | TOP    |
| #3       | 1'-3"              | 1'-7"  | 1'-7"         | 2'-0"  |
| #4       | 1'-7"              | 2'-1"  | 2'-1"         | 2'-8"  |
| #5       | 2'-0"              | 2'-7"  | 2'-7"         | 3'-4"  |
| #6       | 2'-5"              | 3'-1"  | 3'-1"         | 4'-0"  |
| #7       | 3'-4"              | 4'-6"  | 4'-6"         | 5'-10" |
| #8       | 4'-0"              | 5'-2"  | 5'-2"         | 6'-8"  |
| #9       | 4'-6"              | 5'-10" | 5'-10"        | 7'-7"  |
| #10      | 5'-1"              | 6'-7"  | 6'-7"         | 8'-6"  |
| #11      | 5'-7"              | 7'-3"  | 7'-3"         | 9'-5"  |

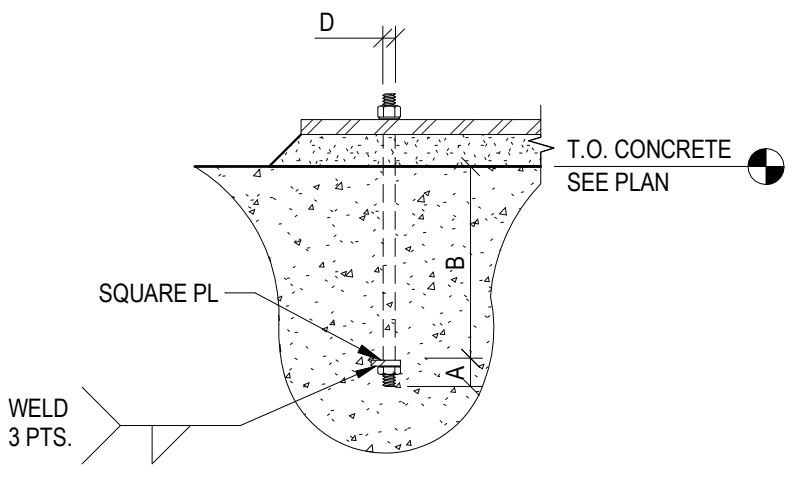
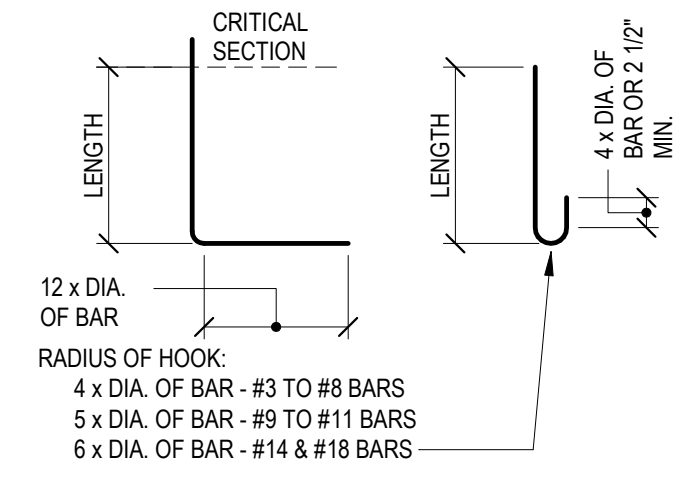
**DEVELOPMENT LENGTH NOTES:**

- WHERE DRAWINGS ARE DETAILED SIMILAR TO DETAIL 2, EXTEND THE EMBEDMENT LENGTH SUCH THAT THE HOOKED BAR CONTACTS THE LAYER OF MAIN REINFORCING SHOWN.
- EMBEDMENT LENGTHS IN CHART ARE TYPICAL EXCEPT AS NOTED IN DETAIL 2, OR AS INDICATED ON DRAWINGS.



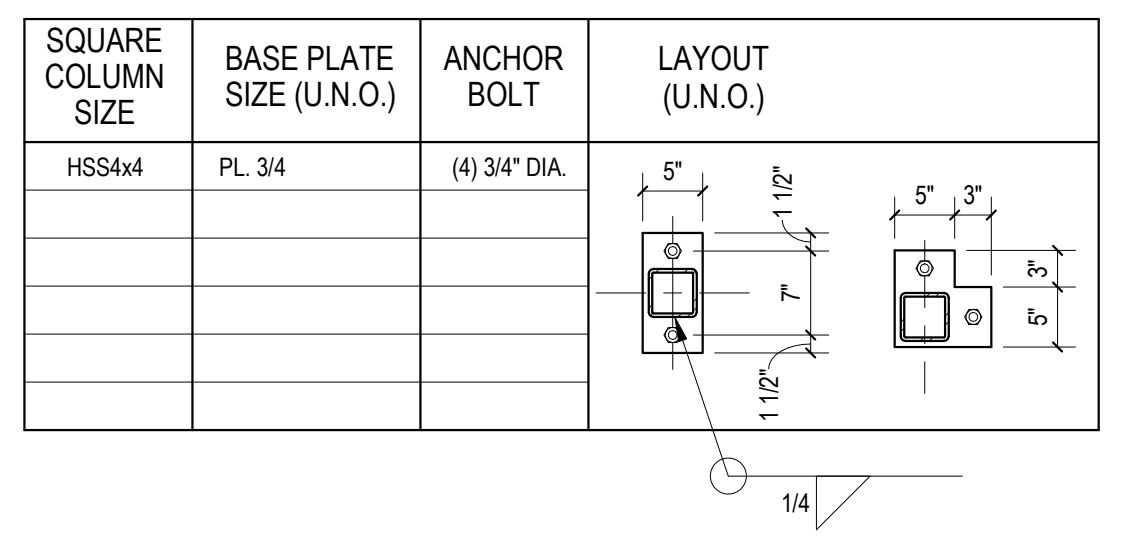
**HOOKED BAR DEVELOPMENT LENGTHS**  
 $f_c = 4,000$  PSI

| BAR SIZE | LENGTH OR MINIMUM EMBEDMENT |
|----------|-----------------------------|
| #3       | 7"                          |
| #4       | 10"                         |
| #5       | 1'-0"                       |
| #6       | 1'-3"                       |
| #7       | 1'-5"                       |
| #8       | 1'-7"                       |
| #9       | 1'-10"                      |
| #10      | 2'-0"                       |
| #11      | 2'-3"                       |

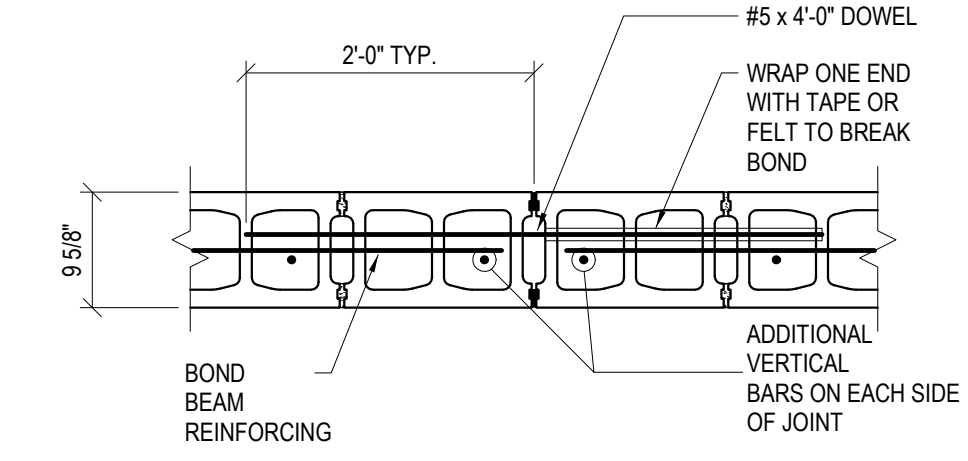


**ANCHOR BOLT SCHEDULE**

| D    | A  | B  | SQUARE PLATE |
|------|----|----|--------------|
| 1/2" | 1" | 6" | ---          |
| 5/8" | 2" | 8" | ---          |
| 3/4" | 2" | 8" | PL 12x3 SQ.  |



**1 BASE PLATE AND ANCHOR BOLT SCHEDULE**  
3/4" = 1'-0"

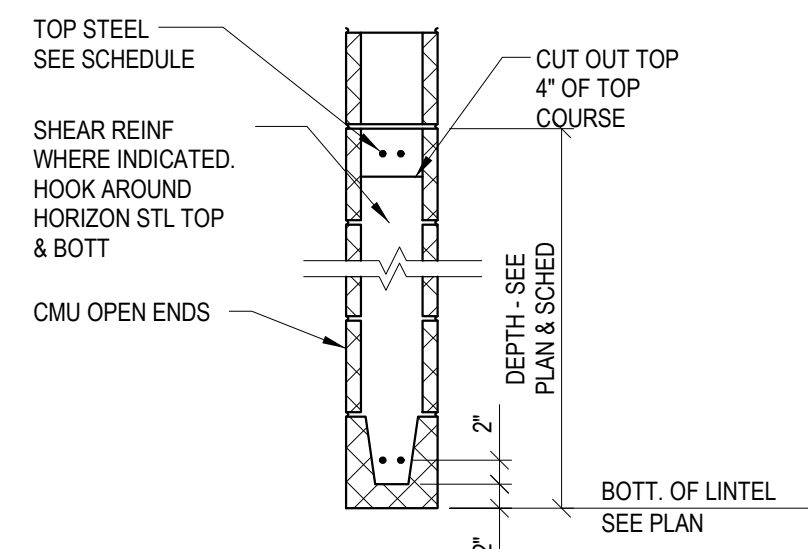


**2 MASONRY CONTROL JOINT DETAIL**  
3/4" = 1'-0"

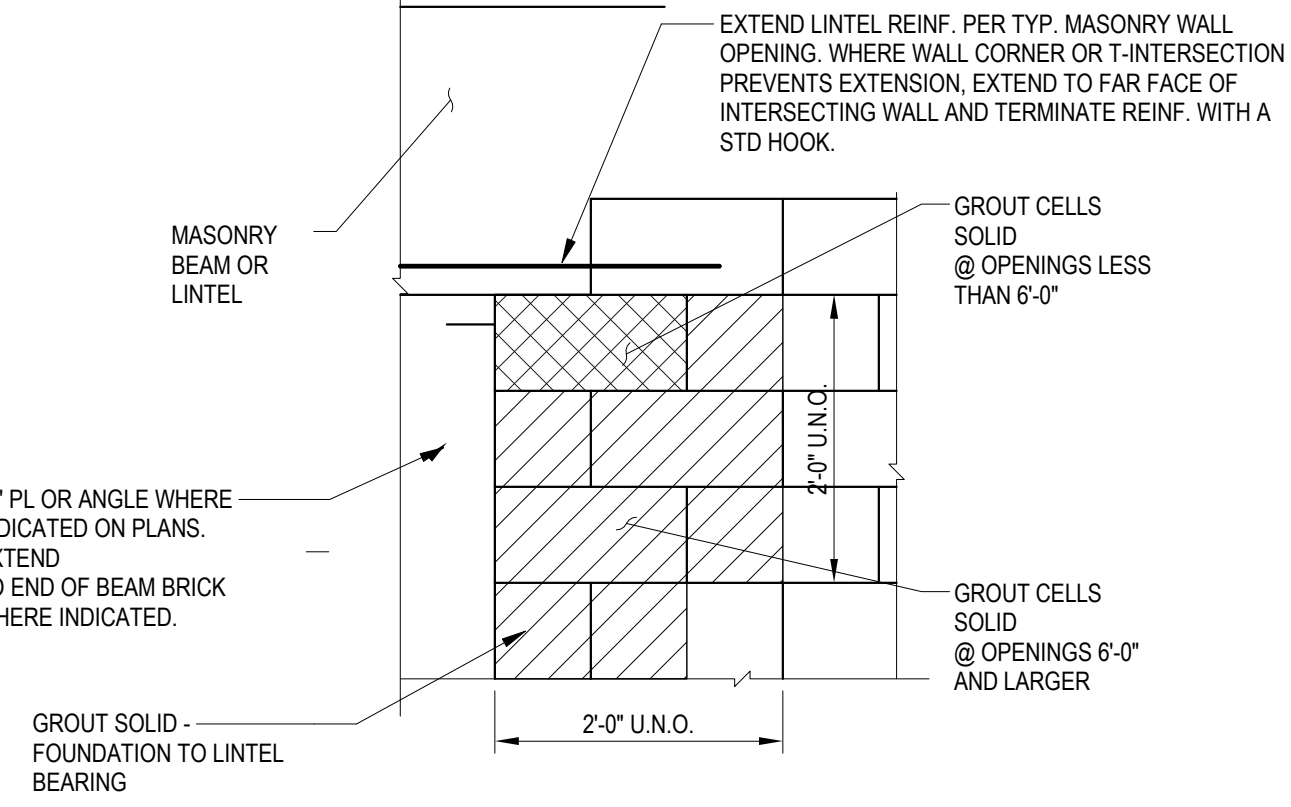
**MASONRY LINTEL SCHEDULE**

| MARK | DEPTH | BOND BM REINF. | SHEAR REINF. | REMARKS |
|------|-------|----------------|--------------|---------|
| ML-1 | 1'-4" | 2-#5 TOP & BOT | -            | 8"      |

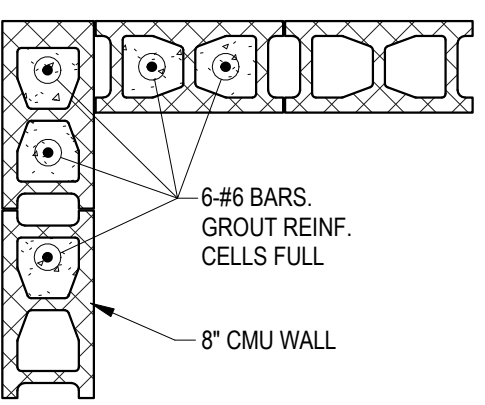
- NOTE:**
- USE LINTEL ML-2 AT ALL OPENINGS LESS THAN 4'-0" WIDE UNLESS NOTED OTHERWISE.
  - BOND BEAM REINFORCING SHALL BE CONTINUOUS WITHOUT SPLICES.



**4 TYP. MASONRY BEAM/ LINTEL**  
3/4" = 1'-0"



**3 TYP. MASONRY BM/ LINTEL BEARING**  
3/4" = 1'-0"



**5 TYP. MASONRY WALL CORNER REINF.**  
3/4" = 1'-0"

- NOTES:**
- PROVIDE SHORING UNDER BEAM FOR A MIN OF 7 DAYS AFTER GROUTING.
  - MONOLITHICALLY GROUT BOND BEAM AND ALL CELLS SOLID. GROUTING SHALL HAVE NO VERTICAL OR HORIZONTAL COLD JOINTS FULL HEIGHT AND LENGTH OF LINTEL INCLUDING END BEARINGS.
  - MECHANICALLY VIBRATE GROUT.
  - SEE TYPICAL MASONRY BEAM/LINTEL BEARING DETAIL FOR BEARING.
  - HORIZONTAL REINFORCEMENT SHALL NOT BE SPLICED.

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| DATE    | NO. | ISSUED FOR        |
|---------|-----|-------------------|
| 3/30/24 | 1   | ISSUED FOR PERMIT |

CONSULTANTS:

| NO. | ISSUED FOR        |
|-----|-------------------|
| 1   | ISSUED FOR PERMIT |

PROJECT NAME

| PROJECT NAME |
|--------------|
| B2 LAB       |

**B2 LAB**

ARCHITECTURE:  
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PROFESSIONAL CIVIL ENGINEER  
STATE OF NEBRASKA  
E-1602  
03/30/24

SHEET NAME: GENERAL STRUCTURAL NOTES AND DETAILS

PROJECT NO: 22-018

REVIEWED:

SHEET NO: S3.0







# ELECTRICAL LEGEND

THIS IS A MASTER SYMBOLS LIST. ALL SYMBOLS, ABBREVIATIONS, ETC. MAY NOT NECESSARILY BE USED ON ALL DRAWINGS

## ONE LINE AND RISER

|  |   |
|--|---|
|  | PANEL   |
|  | CURRENT TRANSFORMER, RATED AS SPECIFIED OR REQUIRED   |
|  | MOTOR: HORSEPOWER AS INDICATED ON PLANS OR DIAGRAMS   |
|  | SURGE PROTECTION DEVICE   |
|  | GROUND CONNECTION   |
|  | CIRCUIT BREAKER, RATING AS SHOWN. L SIG DENOTES ELECTRONIC TRIP UNIT WITH ADJUSTABLE SETTINGS FOR: L= LONG TIME TRIP DELAY, S= SHORT TIME TRIP DELAY, I= INSTANTANEOUS, G= GROUND FAULT |
|  | SWITCH, RATING AS SHOWN   |
|  | FUSE, FUSE AMPACITY AND TYPE AS SHOWN   |
|  | UTILITY METER (AS REQUIRED BY UTILITY)  |
|  | SAFETY SWITCH, NON-FUSED, 240V, U.N.O.  |
|  | FUSED DISCONNECT  |
|  | COMBINATION STARTER/DISCONNECT (SIZE AS INDICATED)  |
|  | TRANSFORMER, TYPE AND RATING AS SHOWN   |
|  | CONDUIT CONNECTION  |
|  | CIRCUIT BREAKER WITH GROUND FAULT PROTECTION  |
|  | FUSE WITH GROUND FAULT PROTECTION   |
|  | AUTOMATIC TRANSFER SWITCH   |
|  | GROUND CONNECTION WITH TEST WELL  |
|  | GROUND ROD  |
|  | POLE MOUNTED UTILITY TRANSFORMER  |
|  | ENGINE GENERATOR  |
|  | SHUNT TRIP  |
|  | SHORT CIRCUIT TAG DESIGNATION   |
|  | FEEDER TAG DESIGNATION  |

## CONDUIT DESIGNATIONS

|  |   |
|--|---|
|  | PANEL NAME - CIRCUIT NUMBER<br>BRANCH CIRCUITS HOMERUN USE NUMBER 12 AWG WIRE, UNLESS OTHERWISE NOTED. ALL CIRCUITS SHALL CONTAIN A GROUND AND NEUTRAL CONDUCTOR, UNLESS NOTED OTHERWISE. CONTRACTOR SHALL PROVIDE MULTI-WIRE CIRCUIT HANDLE TIES AS FINAL FIELD INSTALLED WIRING REQUIRES. |
|  | PANEL NAME - CIRCUIT NUMBER<br>HOME RUNS SHALL USE #12 AWG WIRE UNO.  |
|  | CONDUIT AND WIRE CONCEALED, 3/4" UNLESS OTHERWISE NOTED, CONDUIT USED FOR SWITCH LEGS, AND CONDUIT USED FOR CONTROL WIRING  |
|  | CONDUIT AND WIRE EMBEDDED IN CONCRETE OR BELOW GRADE  |
|  | CONDUIT TURNING DOWN  |
|  | CONDUIT TURNING UP  |
|  | CONDUIT CONTINUATION  |
|  | CONDUIT CAPPED FOR FUTURE USE   |

## POWER

|  |  |
|--|--|
|  | PANELBOARD, ELECTRICAL DISTRIBUTION PANEL, OR LOAD CENTER SURFACE MOUNTED  |
|  | PANELBOARD, ELECTRICAL DISTRIBUTION PANEL, OR LOAD CENTER RECESS MOUNTED   |
| <b>SUBSCRIPTS ADJACENT DEVICES INDICATE THE FOLLOWING:</b> |  |
| G = GFCI   | WP = WEATHER PROOF   |
| T = TAMPER RESISTANT                                       | H = HOSPITAL GRADE   |
| AC = MOUNT 6" ABOVE COUNTER OR BACKSPLASH                  | UC = MOUNT 12" UNDER COUNTER   |
| USB = DEVICE WITH USB CHARGING PORT                        |  |
|  | 20 AMP, 125V, NEMA 5-20R SIMPLEX RECEPTACLE  |
|  | 20 AMP, 125V, NEMA 5-20R DUPLEX RECEPTACLE   |
|  | 20 AMP, 125V, NEMA 5-20R QUAD RECEPTACLE   |
|  | 20 AMP, 125V, NEMA 5-20R, RED, EMERGENCY, DUPLEX RECEPTACLE, UNLESS OTHERWISE NOTED  |
|  | 20 AMP, 125V, NEMA 5-20R, RED, EMERGENCY, QUAD RECEPTACLE, UNLESS OTHERWISE NOTED  |
|  | 20 AMP, 125V, SPLIT CIRCUIT DUPLEX RECEPTACLE CONNECTED TO NORMAL POWER WITH THE TOP RECEPTACLE CONTROLLED THROUGH RELAY AND THE BOTTOM RECEPTACLE UNCONTROLLED. RECEPTACLE SHALL BE FACTORY MARKED IN ACCORDANCE TO NEC 408.6(E). THE CONTROLLED RECEPTACLE MARKING SHALL BE PRINTED ON THE FACE OF THE RECEPTACLE TO DIFFERENTIATE THE CONTROLLED RECEPTACLE FROM THE OTHER RECEPTABLES.           |
|  | 20 AMP, 125V, SPLIT CIRCUIT DUPLEX RECEPTACLE CONNECTED TO NORMAL POWER WITH LEFT DUPLEX RECEPTACLE CONTROLLED THROUGH RELAY AND THE RIGHT DUPLEX RECEPTACLE UNCONTROLLED. RECEPTACLE SHALL BE FACTORY MARKED IN ACCORDANCE TO NEC 408.6(E). THE CONTROLLED RECEPTACLE MARKING SHALL BE PRINTED ON THE FACE OF THE RECEPTACLE TO DIFFERENTIATE THE CONTROLLED RECEPTACLE FROM THE OTHER RECEPTABLES. |
|  | 20 AMP, 125V, NEMA 5-20R DUPLEX FLOOR RECEPTACLE, 3/4" CONDUIT RUN CONCEALED IN FLOOR SLAB   |
|  | 20 AMP, 125V, NEMA 5-20R CEILING FLOOR RECEPTACLE, 3/4" CONDUIT CONCEALED IN FLOOR SLAB  |
|  | 20 AMP, 125V, NEMA 5-20R QUAD FLOOR RECEPTACLE, 3/4" CONDUIT CONCEALED IN FLOOR SLAB   |
|  | 20 AMP, 125V, NEMA 5-20R QUAD CEILING RECEPTACLE, 3/4" CONDUIT CONCEALED IN FLOOR SLAB   |
|  | JUNCTION BOX, WALL MOUNTED   |
|  | JUNCTION BOX, FLOOR MOUNTED  |
|  | JUNCTION BOX, CEILING MOUNTED  |
|  | SPECIAL RECEPTACLE, FLOOR MOUNTED, CONFIGURATION AS NOTED ON PLAN  |
|  | SPECIAL RECEPTACLE, WALL MOUNTED, CONFIGURATION AS NOTED ON PLAN   |
|  | SPECIAL RECEPTACLE, CEILING MOUNTED, CONFIGURATION AS NOTED ON PLAN  |
|  | POWER (SERVICE) POLE   |
|  | FURNITURE FEED RECEPTACLE, FLOOR MOUNTED, CONFIGURATION AS NOTED ON PLAN   |
|  | POWER POKE THRU CONNECTION, FLOOR MOUNTED, CONFIGURATION AS NOTED ON PLAN  |
|  | FURNITURE FEED RECEPTACLE, WALL MOUNTED, CONFIGURATION AS NOTED ON PLAN  |
|  | PLUGMOLD, REFER TO DRAWING FOR LENGTHS   |
|  | SAFETY SWITCH, NON-FUSED, 240V, U.N.O.   |
|  | FUSED DISCONNECT   |
|  | COMBINATION STARTER/DISCONNECT (SIZE AS INDICATED)   |
|  | COMBINATION DISCONNECT, WITH RECEPTACLE, REFER TO DRAWING FOR SIZE   |
|  | PHOTOCELL  |
|  | EMERGENCY POWER OFF (EPO) BUTTON   |
|  | ADA DOOR OPENER  |
|  | SELF-REGULATING HEATED CABLE - LENGTH AS SHOWN IN DRAWINGS. REFERENCE ELECTRICAL/PLUMBING PLANS FOR SPECIFICATION OF COMPLETE HEAT-TRACE SYSTEM. ARROW DENOTES DIRECTION   |

## LIGHTING

|  |   |
|--|---|
| <b>NOTE:</b> UPPER CASE LETTER DENOTES LUMINAIRE TYPE. LOWER CASE LETTER ADJACENT TO LUMINAIRE INDICATES SWITCH THAT CONTROLS LUMINAIRE. MOUNTING IS NOTED ON LUMINAIRE SCHEDULE |   |
|  | NORMAL POWER (NO SHADING)   |
|  | LIFE SAFETY / EMERGENCY POWER (SOLID SHADING)   |
|  | CRITICAL POWER (CROSS-HATCH SHADING)  |
|  | RECESSED LUMINAIRE  |
|  | SURFACE LUMINAIRE   |
|  | WALL MOUNTED LUMINAIRE  |
|  | LINEAR PENDANT LUMINAIRE  |
|  | PENDANT LUMINAIRE   |
|  | STRIP TYPE LUMINAIRE, LENGTHS AS NOTED ON LUMINAIRE SCHEDULE  |
|  | SURFACE MOUNTED DOWNLIGHT   |
|  | RECESSED MOUNTED DOWNLIGHT  |
|  | WALL MOUNTED LUMINAIRE  |
|  | WALL WASH LUMINAIRE   |
|  | RECESSED STEP LIGHT LUMINAIRE   |
|  | TRACK LUMINAIRE   |
|  | CEILING MOUNTED EXIT SIGN, PROVIDE DIRECTIONAL CHEVRONS AS REQUIRED   |
|  | EMERGENCY BATTERY LUMINAIRE (2 HEAD) 84" AFF, UNLESS OTHERWISE NOTED  |
|  | EMERGENCY BATTERY LUMINAIRE (2 HEAD) WITH MOUNTED EXIT SIGN PROVIDE DIRECTIONAL CHEVRONS AS REQUIRED MOUNT AT 84" AFF, UNLESS OTHERWISE NOTED   |
|  | WALL MOUNTED EXIT SIGN, PROVIDE DIRECTIONAL CHEVRONS AS REQUIRED  |
|  | SINGLE POLE MOUNTED, EXTERIOR LUMINAIRE   |
|  | DOUBLE POLE MOUNTED, EXTERIOR LUMINAIRE   |
|  | QUAD POLE MOUNTED, EXTERIOR LUMINAIRE   |
|  | BOLLARD LUMINAIRE   |
|  | CEILING FAN   |
|  | SINGLE POLE SWITCH (SWITCH LOWER CASE LETTER INDICATES DEVICE CONTROL)<br>3= THREE WAY SWITCH      4= FOUR WAY SWITCH<br>K= KEYSwitch              D= DIMMER SWITCH<br>T= MOTOR THERMAL OVERLOAD SWITCH      T= TIMER<br>HOA= HAND-OFF-AUTOMATIC              P= PILOT LIGHT<br>OS= OCCUPANCY SENSOR              VS= VACANCY SENSOR<br>LVD= LOW VOLTAGE DIMMER              M= MOTOR SPEED CONTROL |
|  | LOW VOLTAGE LIGHTING CONTROL DEVICE, REFERENCE SCHEDULE   |
|  | CEILING MOUNTED SENSOR; VS= VACANCY, OS= OCCUPANCY, DL= DAYLIGHT  |
|  | WALL MOUNTED SENSOR; VS= VACANCY, OS= OCCUPANCY, DL= DAYLIGHT   |

## MISCELLANEOUS

|  |                                 |
|--|---------------------------------|
|  | KEY NOTE DESIGNATION            |
|  | KEY NOTE DESIGNATION            |
|  | REVISION NUMBER DESIGNATION     |
|  | NEW TO EXISTING CONNECTION      |
|  | DEMO TO EXISTING CONNECTION     |
|  | SPECIALTY EQUIPMENT (BY OTHERS) |

## FIRE ALARM

|  |   |
|--|---|
|  | FIRE ALARM CONTROL PANEL                                  |
|  | FIRE ALARM REMOTE ANNUNCIATOR PANEL                       |
|  | FIRE ALARM CONTROL PANEL                                  |
|  | BACKUP FIRE ALARM CONTROL PANEL                           |
|  | HVAC FIRE ALARM CONTROL PANEL                             |
|  | VOICE EVACUATION FIRE ALARM CONTROL PANEL                 |
|  | FIRE ALARM SMOKE CONTROL PANEL                            |
|  | FIRE ALARM NOTIFICATION CIRCUIT PANEL                     |
|  | FIRE ALARM MASTER 2-WAY CONTROL PANEL                     |
|  | FIRE ALARM AMPLIFIER RACK PANEL                           |
|  | FIRE ALARM MICROPHONE PANEL                               |
|  | SMOKE DETECTOR, ADDRESSABLE PHOTO ELECTRIC                |
|  | SMOKE DETECTOR, EARLY WARNING LASER DETECTION             |
|  | CARBON MONOXIDE DETECTOR                                  |
|  | FLAME DETECTOR  |
|  | HEAT DETECTOR   |
|  | GAS DETECTOR  |
|  | DUCT SMOKE DETECTOR, ADDRESSABLE PHOTO ELECTRIC           |
|  | FIRE ADA ALARM STROBE MOUNTED                             |
|  | FIRE ADA ALARM HORN                                       |
|  | FIRE ALARM AUDIBLE AND ADA STROBE LIGHT                   |
|  | FIRE ADA ALARM SPEAKER                                    |
|  | FIRE ALARM SPEAKER AND ADA STROBE LIGHT                   |
|  | FIRE ADA ALARM STROBE CEILING MOUNTED                     |
|  | FIRE ADA ALARM HORN CEILING MOUNTED                       |
|  | FIRE ALARM AUDIBLE AND ADA STROBE LIGHT CEILING MOUNTED   |
|  | FIRE ADA ALARM SPEAKER CEILING MOUNTED                    |
|  | FIRE ALARM SPEAKER AND ADA STROBE LIGHT CEILING MOUNTED   |
|  | FIRE ALARM MANUAL PULL STATION, ADDRESSABLE DOUBLE ACTION |
|  | MAGNETIC DOOR HOLDER                                      |
|  | FIRE ALARM FLOW SWITCH                                    |
|  | FIRE ALARM TAMPER SWITCH                                  |
|  | FIRE ALARM CONTROL MODULE (W/ INPUT/OUTPUT MODULE)        |
|  | DUCT DETECTOR REMOTE INDICATOR ALARM AND TEST             |
|  | TWO WAY COMMUNICATION MASTER STATION                      |
|  | TWO WAY CALL STATION                                      |

## STD. MOUNTING HEIGHTS U.N.O.

|   |  |
|---|--|
| ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER MOUNTING HEIGHTS INDICATED ON ELECTRICAL DRAWINGS. DIMENSION TO CENTERLINE UNO. |  |
| RECEPTACLES   | 18"  |
| RECEPTACLES IN EQUIPMENT ROOMS  | 48"  |
| RECEPTACLES (EXTERIOR)  | 24"  |
| RECEPTACLES (GARAGES)   | 24"  |
| ALARMS, SWITCHES AND CONTROLS   | 48"  |
| SAFETY SWITCHES   | 48"  |
| ADA DOOR OPENER   | 48"  |
| STARTERS  | 48"  |
| PANELS (TOP)  | 72"  |
| FIRE ALARM PULL STATIONS (HANDLE)   | 44"  |
| STROBES   | 96" OR 6" BELOW CEILING, WHICHEVER IS LOWER                      |
| FIRE ALARM BELLS (EXTERIOR)   | 12'-0"   |
| FIRE ALARM CONTROL PANELS (TOP)   | 48"  |
| ANNUNCIATION PANELS   | 48"  |
| REMOTE INDICATING LIGHTS (EQUIPMENT ROOMS)  | 48"  |
| REMOTE INDICATING LIGHTS (FINISHED AREAS)   | CEILING  |
| EXIT SIGNS (WALL MOUNTED BOTTOM)  | 6" ABOVE DOOR  |
| MAXIMUM HEIGHT OF OPERABLE COMPONENTS   | 48" TO TOP   |
| PHOTOCELLS  | 12'-0"   |
| A   | AMPS, AIR (COMPRESSED)   |
| AC  | ABOVE COUNTER  |
| AF  | FUSE RATING  |
| AMCL  | ABOVE FINISHED CEILING   |
| ANEA  | AREA FOR EVACUATION ASSISTANCE                                   |
| AFB   | ABOVE FINISHED FLOOR   |
| AFG   | ABOVE FINISHED FLOOR   |
| AIC   | AMPERE INTERRUPTING CURRENT                                      |
| AL  | ALUMINUM   |
| ATS   | AUTOMATIC TRANSFER SWITCH  |
| AWG   | AMERICAN WIRE GAUGE  |
| AV  | AUDIO VISUAL   |
| BFF   | BELOW FINISHED FLOOR   |
| BKR   | BREAKER  |
| BOS   | BOTTOM OF STRUCTURE  |
| BS  | BRITISH THERMAL UNIT   |
| C   | CONDUIT  |
| CATV  | CABLE TELEVISION SYSTEM  |
| CCTV  | CLOSED CIRCUIT TELEVISION  |
| CKT   | CIRCUIT  |
| CLG   | CEILING  |
| CM  | COFFEE MAKER   |
| CT  | CURRENT TRANSFORMER  |
| CC  | COPPER, CONDENSING UNIT  |
| CW  | CLOTHES WASHER   |
| (D)   | DEMOLISHED   |
| DN  | DOWN   |
| DPDT  | DOUBLE POLE, DOUBLE THROW  |
| DPST  | DOUBLE POLE, SINGLE THROW  |
| DW  | DISHWASHER   |
| (E)   | EXISTING   |
| ECD   | ELECTRIC CLOTHES DRYER   |
| ENCL  | ENCLOSURE  |
| EPO   | EMERGENCY POWER OFF  |
| ETR   | EXISTING TO REMAIN   |
| ETW   | ELECTRIC WATER COOLER  |
| FBO   | FURNISHED BY OTHERS  |
| FF  | FINISHED FLOOR   |
| FHG   | FIRE HOSE CABINET  |
| FLA   | FULL LOAD AMPS   |
| FLR   | FLOOR  |
| FRZR  | FREEZER  |
| FNR   | FULL VOLTAGE, NON REVERSING                                      |
| GD  | GARBAGE DISPOSAL   |
| GI  | GROUND FAULT CIRCUIT INTERRUPTER (PERSONAL PROTECTION ON DEVICE) |
| GFP   | GROUND FAULT PROTECTED FROM UPSTREAM                             |
| GR  | GROUND FLOOR RELAY   |
| GND   | GROUND   |
| HOA   | HAND OFF AUTOMATIC   |
| HP  | HORSEPOWER   |
| HPS   | HIGH PRESSURE SODIUM   |
| HTG   | HEATING  |
| HTR   | HEATER   |
| ISCA  | AVAILABLE SHORT-CIRCUIT CURRENT (AMPS)                           |
| IG  | ISOLATED GROUND  |
| KCML  | 1000 CIRCULAR MILS   |
| KV  | KILOVOLT   |
| KVA   | KILOVOLT AMPS  |
| KVAR  | KILOVOLT AMPS REACTIVE   |
| KW  | KILOWATT   |
| KWH   | KILOWATT HOUR  |
| LED   | LIGHT EMITTING DIODE   |
| LEF   | LINEAR FEET  |
| LR  | LOCKED ROTOR AMPS  |
| MATV  | MASTER ANTENNA TELEVISION SYSTEM                                 |
| MCA   | MINIMUM CIRCUIT AMPACITY   |
| MCB   | MAIN CIRCUIT BREAKER   |
| MCC   | MOTOR CONTROL CENTER   |
| MD  | MOTORIZED DAMPER   |
| MIP   | MAIN DISTRIBUTION PANEL  |
| MFP   | MULTI-FUNCTION PRINTER   |
| MFR   | MANUFACTURER   |
| MH  | MANHOLE  |
| MSB   | MAIN SWITCHBOARD   |
| MTD   | MOUNTED  |
| MW  | MICROWAVE  |
| (N)   | NEW  |
| NA  | NOT APPLICABLE   |
| NC  | NOT IN CONTRACT  |
| NO, N/C   | NORMALLY OPEN, NORMALLY CLOSED                                   |
| NL  | NIGHT LIGHT  |
| OC  | ON CENTER  |
| OV  | OVEN   |
| PDU   | POWER DISTRIBUTION UNIT  |
| PH  | PHASE  |
| PI  | PROJECTOR  |
| PLOT  | PLOTTER  |
| PNL   | PANEL  |
| PRINT   | PRINTER (SMALL)  |
| PT  | POTENTIAL TRANSFORMER  |
| QTY   | QUANTITY   |
| (R)   | RELOCATED  |
| RA  | RANGE  |
| RANGE   | RANGE/STOVE  |
| REF   | REFLECTED CEILING PLAN   |
| REF   | REFRIGERATOR   |
| RH  | RELATIVE HUMIDITY  |
| RPM   | REVOLUTIONS PER MINUTE   |
| SA  | SUPPLY AIR   |
| SD  | SMOKE DETECTOR   |
| SI  | SQUARE FEET  |
| SPDT  | SINGLE POLE, DOUBLE THROW  |
| SPST  | SINGLE POLE, SINGLE THROW  |
| SP  | STATIC PRESSURE  |
| SWBD  | SWITCHBOARD  |
| TL  | TWISTLOCK  |
| TV  | TELEVISION   |
| TYP   | TYPICAL  |
| UF  | UNDERFLOOR   |
| UG  | UNDERGROUND  |
| US  | UNDER SLAB   |
| UL  | UNDERWRITERS LABORATORIES, INC.                                  |
| UNO   | UNLESS NOTED OTHERWISE   |
| UPS   | UNINTERRUPTIBLE POWER SUPPLY                                     |
| USB   | RECEPTACLE W/ INTEGRATED USB PORT                                |
| V   | VOLTAGE  |
| VAC   | VOLTS ALTERNATING CURRENT, VACUUM                                |
| VM  | VENDING MACHINE  |
| W   | WATTS  |
| W   | WITH   |
| W/O   | WITHOUT  |
| WP  | WEATHERPROOF   |
| W   | WATERIGHT, WEIGHT  |
| XFMR  | TRANSFORMER  |
| XP  | EXPLOSION PROOF  |

## ABBREVIATIONS

|      |  |
|------|--|
| A    | AMPS, AIR (COMPRESSED)   |
| AC   | ABOVE COUNTER  |
| AF   | FUSE RATING  |
| AMCL | ABOVE FINISHED CEILING   |
| ANEA | AREA FOR EVACUATION ASSISTANCE                                   |
| AFB  | ABOVE FINISHED FLOOR   |
| AFG  | ABOVE FINISHED FLOOR   |
| AIC  | AMPERE INTERRUPTING CURRENT                                      |
| AL   | ALUMINUM   |
| ATS  | AUTOMATIC TRANSFER SWITCH  |
| AWG  | AMERICAN WIRE GAUGE  |
| AV   | AUDIO VISUAL   |
| BFF  | BELOW FINISHED FLOOR   |
| BKR  | BREAKER  |
| BOS  | BOTTOM OF STRUCTURE  |
| BS   | BRITISH THERMAL UNIT   |
| C    | CONDUIT  |
| CATV | CABLE TELEVISION SYSTEM  |
| CCTV | CLOSED CIRCUIT TELEVISION  |
| CKT  | CIRCUIT  |
| CLG  | CEILING  |
| CM   | COFFEE MAKER   |
| CT   | CURRENT TRANSFORMER  |
| CC   | COPPER, CONDENSING UNIT  |
| CW   | CLOTHES WASHER   |
| (D)  | DEMOLISHED   |
| DN   | DOWN   |
| DPDT | DOUBLE POLE, DOUBLE THROW  |
| DPST | DOUBLE POLE, SINGLE THROW  |
| DW   | DISHWASHER   |
| (E)  | EXISTING   |
| ECD  | ELECTRIC CLOTHES DRYER   |
| ENCL | ENCLOSURE  |
| EPO  | EMERGENCY POWER OFF  |
| ETR  | EXISTING TO REMAIN   |
| ETW  | ELECTRIC WATER COOLER  |
| FBO  | FURNISHED BY OTHERS  |
| FF   | FINISHED FLOOR   |
| FHG  | FIRE HOSE CABINET  |
| FLA  | FULL LOAD AMPS   |
| FLR  | FLOOR  |
| FRZR | FREEZER  |
| FNR  | FULL VOLTAGE, NON REVERSING                                      |
| GD   | GARBAGE DISPOSAL   |
| GI   | GROUND FAULT CIRCUIT INTERRUPTER (PERSONAL PROTECTION ON DEVICE) |
| GFP  | GROUND FAULT PROTECTED FROM UPSTREAM                             |
| GR   | GROUND FLOOR RELAY   |
| GND  | GROUND   |
| HOA  | HAND OFF AUTOMATIC   |
| HP   | HORSEPOWER   |
| HPS  | HIGH PRESSURE SODIUM   |
| HTG  | HEATING  |
| HTR  | HEATER   |
| ISCA | AVAILABLE SHORT-CIRCUIT CURRENT (AMPS)                           |
| IG   | ISOLATED GROUND  |
| KCML | 1000 CIRCULAR MILS   |
| KV   | KILOVOLT   |
| KVA  | KILOVOLT AMPS  |
| KVAR | KILOVOLT AMPS REACTIVE   |
| KW   | KILOWATT   |
| KWH  | KILOWATT HOUR  |
| LED  | LIGHT EMITTING DIODE   |
| LEF  | LINEAR FEET  |
| LR   | LOCKED ROTOR AMPS  |
| MATV | MASTER ANTENNA TELEVISION SYSTEM                                 |
| MCA  | MINIMUM CIRCUIT AMPACITY   |
| MCB  | MAIN CIRCUIT BREAKER   |
| MCC  | MOTOR CONTROL CENTER   |
| MD   | MOTORIZED DAMPER   |
| MIP  | MAIN DISTRIBUTION PANEL  |
| MFP  | MULTI-FUNCTION PRINTER   |
| MFR  | MANUFACTURER   |
| MH   | MANHOLE  |
| MSB  | MAIN SWITCHBOARD   |
| MTD  | MOUNTED  |
| MW   | MICROWAVE  |

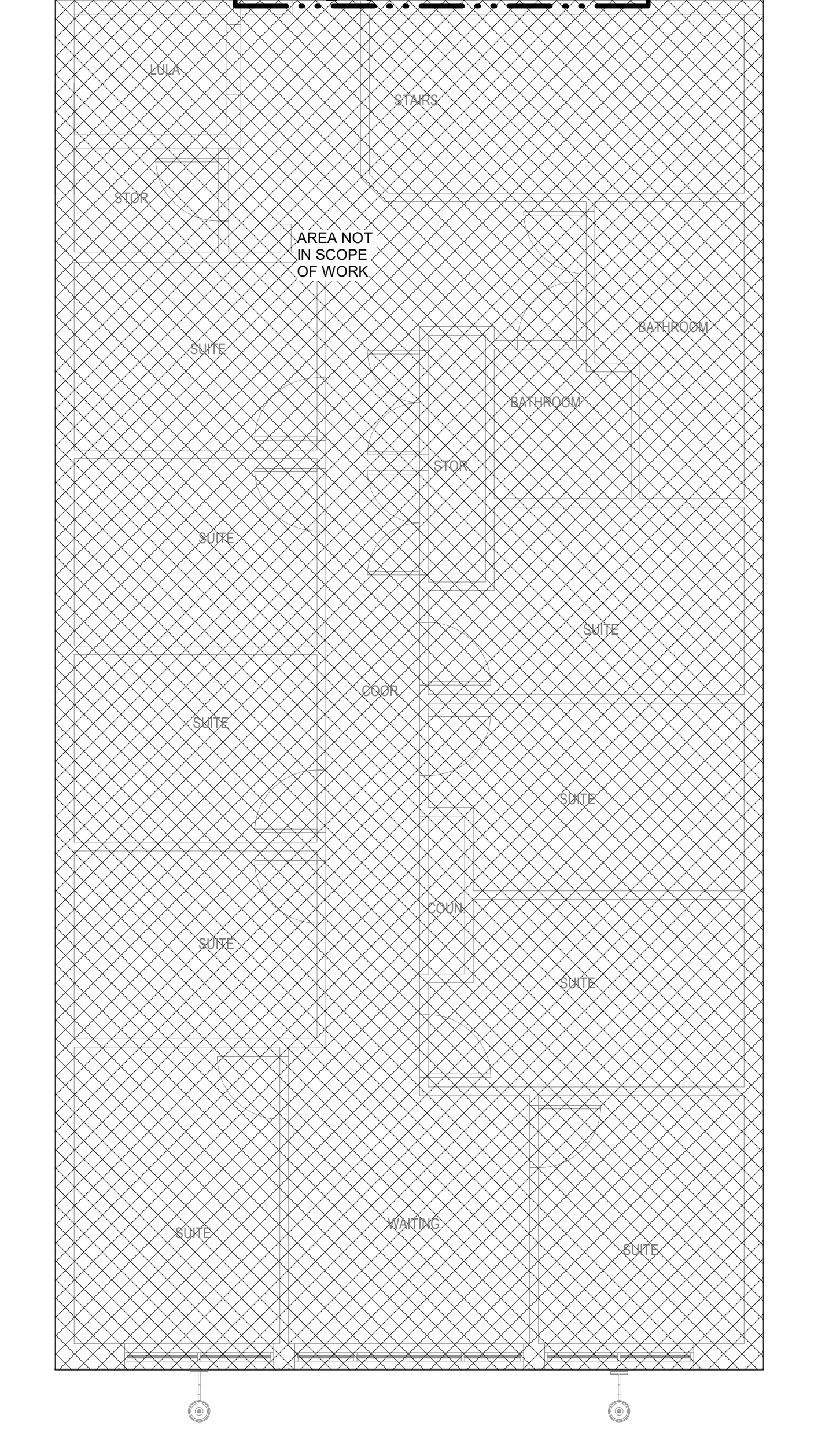
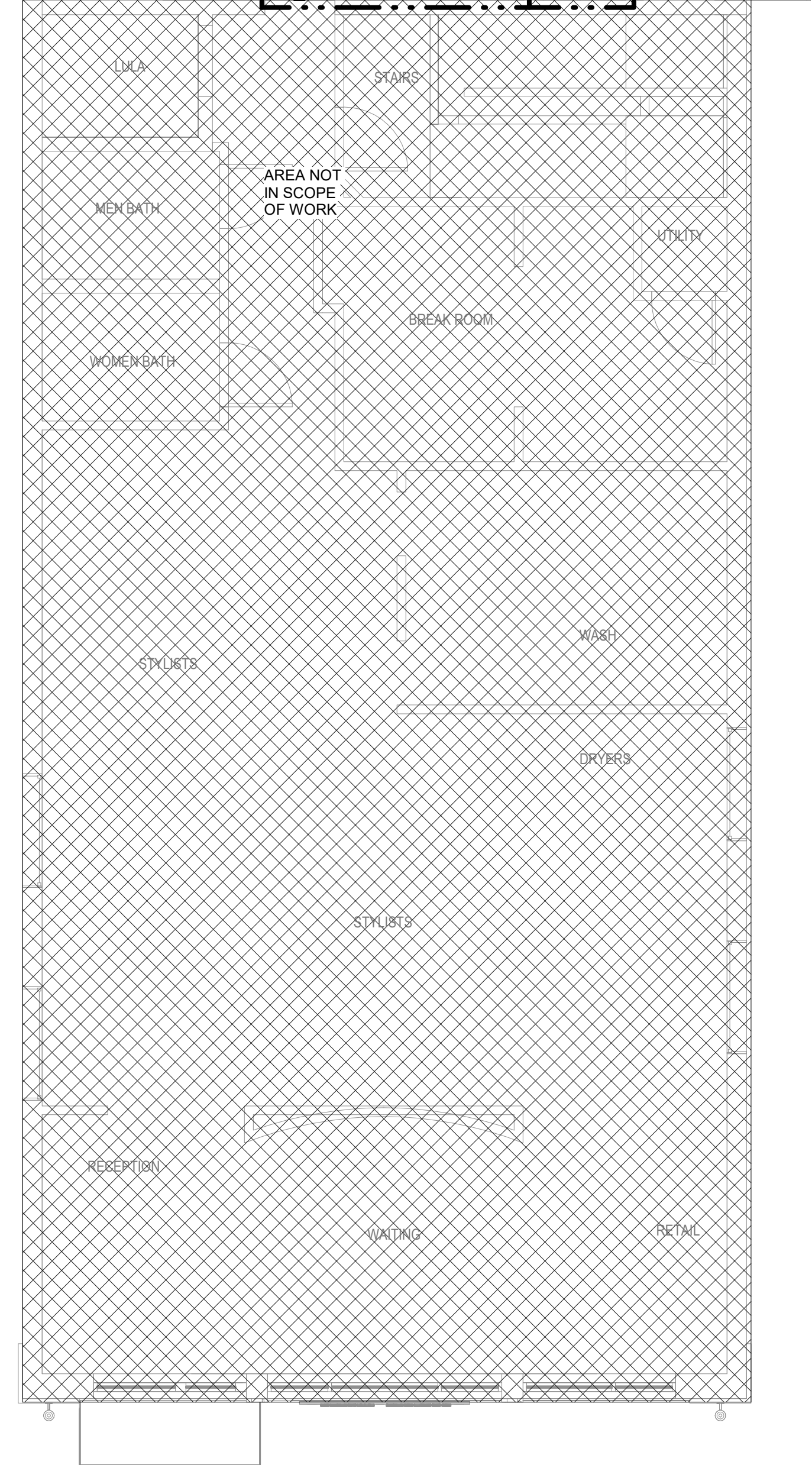
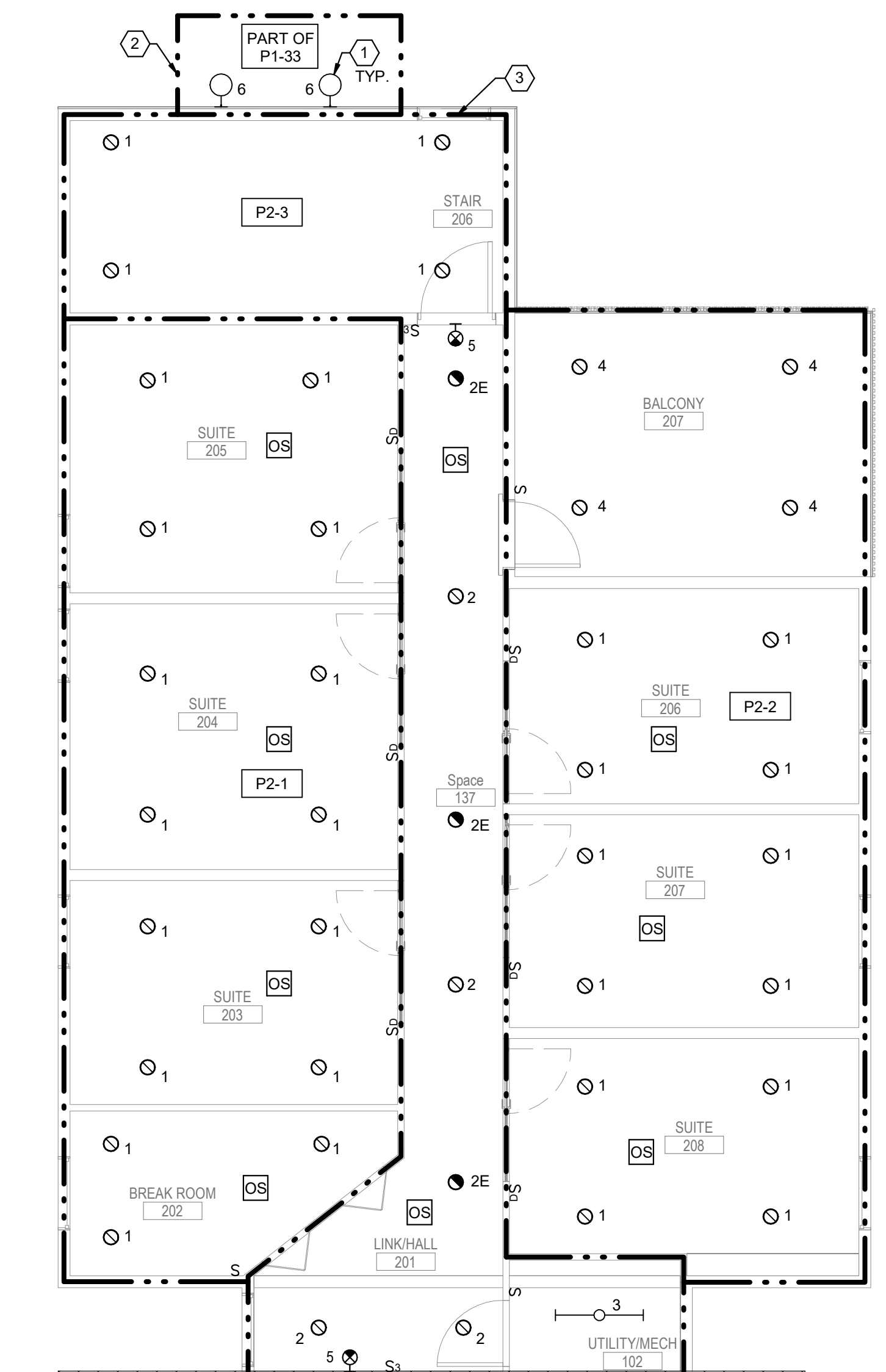
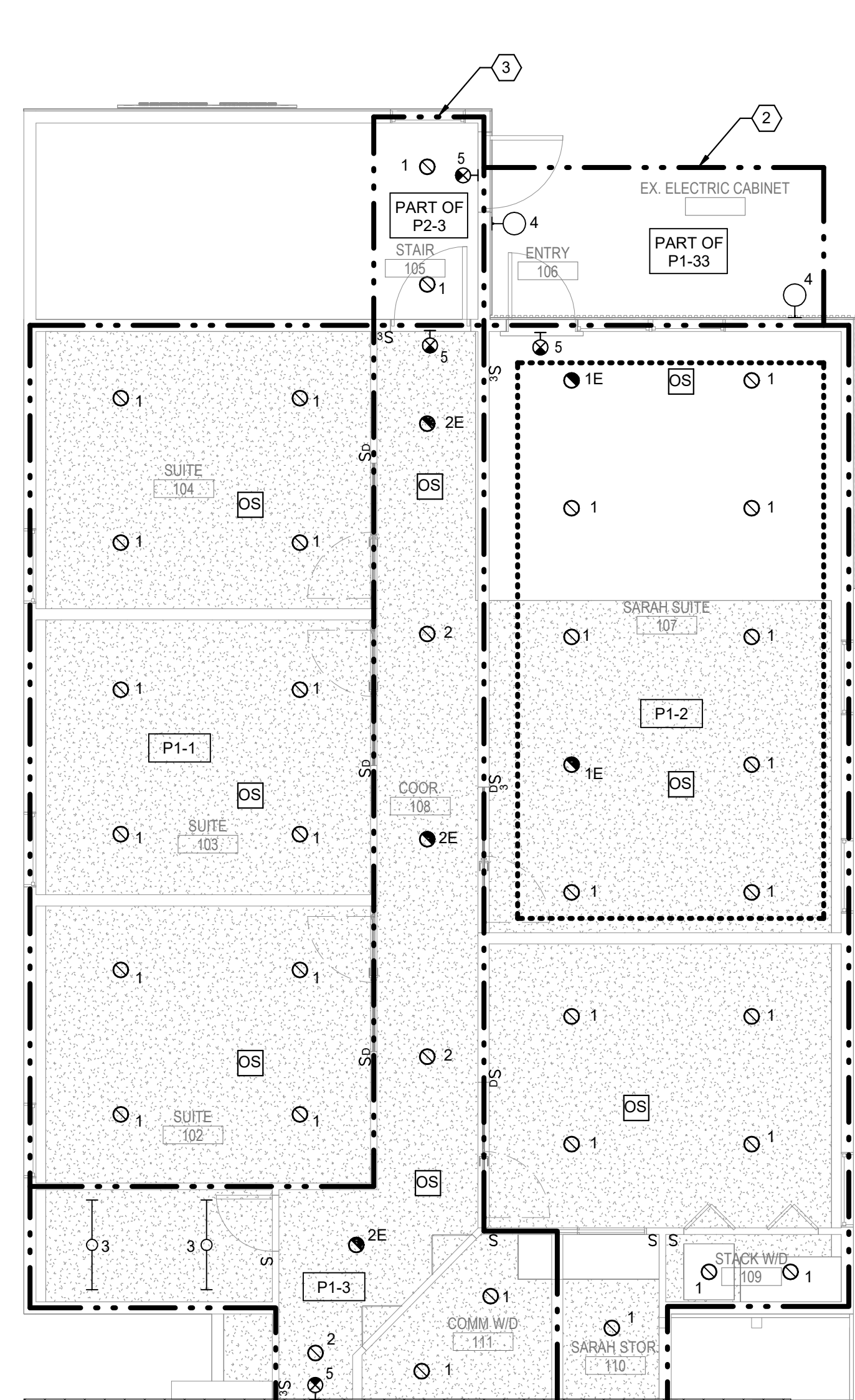






**GENERAL NOTES** (THIS SHEET)  
1. REFER TO SHEET E001 FOR SYMBOLS LEGEND AND ADDITIONAL GENERAL NOTES.

**KEY NOTES** (THIS SHEET)  
1. COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS.  
2. ROUTE EXTERIOR LIGHTING CIRCUIT THROUGH PHOTOCELL.  
3. STAIR TOWER LIGHTING CIRCUIT TO REMAIN ENERGIZED 24HRS A DAY.



**1** FIRST FLOOR LIGHTING & FIRE ALARM PLAN  
SCALE: 3/16" = 1'-0"

**2** SECOND FLOOR LIGHTING & FIRE ALARM PLAN  
SCALE: 3/16" = 1'-0"

**ALTERATION SHADING LEGEND**  
[Shaded Box] AREA NOT WITHIN ALTERATION SCOPE. DEVICES IN SPACES OUTSIDE OF THE SCOPE THE ALTERATION SCOPE ARE EXISTING TO REMAIN UNLESS NOTED OTHERWISE, AND ARE SHOWN FOR REFERENCE ONLY.

|              |                     |
|--------------|---------------------|
| DATE         |                     |
| NO.          |                     |
| ISSUED FOR   |                     |
| DATE         | 3.30.24             |
| NO.          |                     |
| ISSUED FOR   | 1 ISSUED FOR PERMIT |
| CONSULTANTS: |                     |

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**

**B2**  
LAB

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REGISTERED ELECTRICAL ENGINEER  
STATE OF QUEENSLAND  
E11515

DATE: 03/30/24

SHEET NAME:  
LIGHTING PLANS

PROJECT NO.: PROJECT #

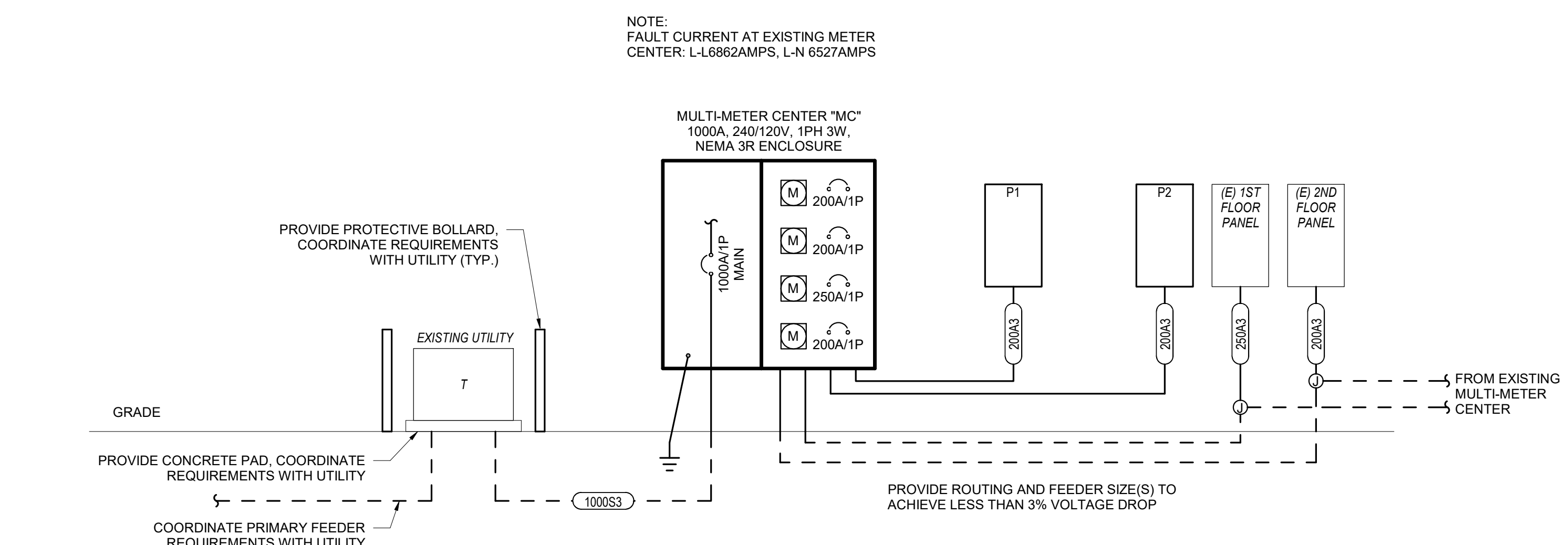
REVIEWED:

SHEET NO.:  
**E201**

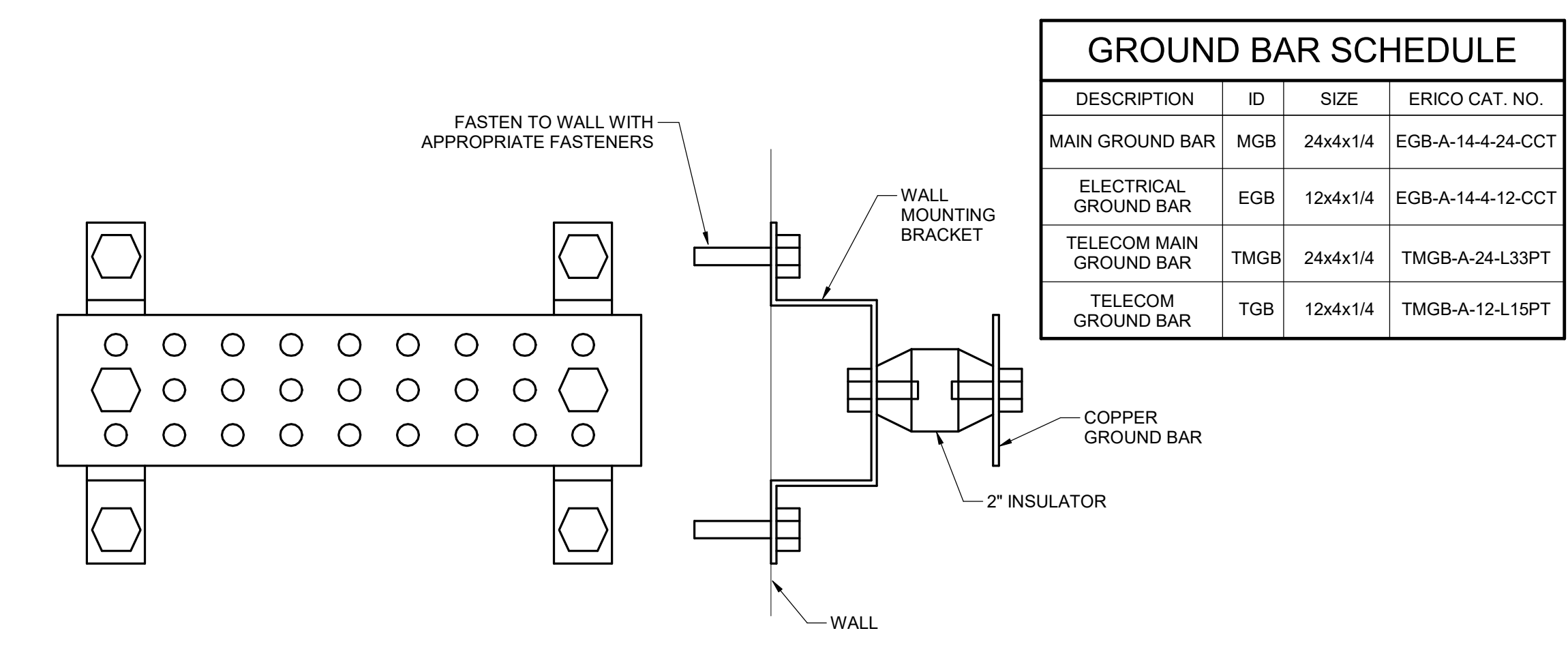


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| 1   | ISSUED FOR PERMIT | 3.30.24 |

CONSULTANTS:

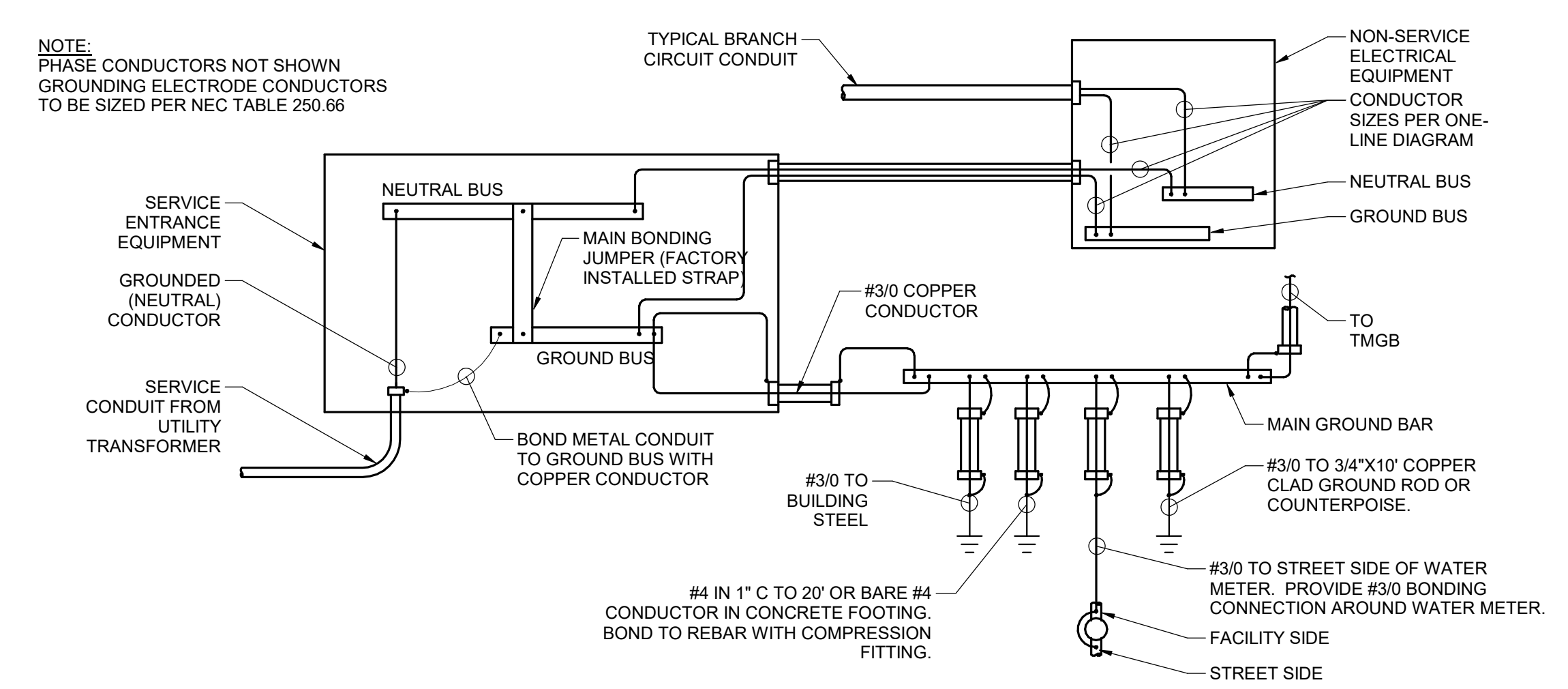


**1 ELECTRICAL RISER DIAGRAM**  
SCALE: NONE



| GROUND BAR SCHEDULE     |      |          |                   |
|-------------------------|------|----------|-------------------|
| DESCRIPTION             | ID   | SIZE     | ERICO CAT. NO.    |
| MAIN GROUND BAR         | MGB  | 24x4x1/4 | EGB-A-14.4-24-CCT |
| ELECTRICAL GROUND BAR   | EGB  | 12x4x1/4 | EGB-A-14.4-12-CCT |
| TELECOM MAIN GROUND BAR | TMGB | 24x4x1/4 | TMGB-A-24-L33PT   |
| TELECOM GROUND BAR      | TGB  | 12x4x1/4 | TMGB-A-12-L15PT   |

**2 GROUND BAR**  
SCALE: NONE



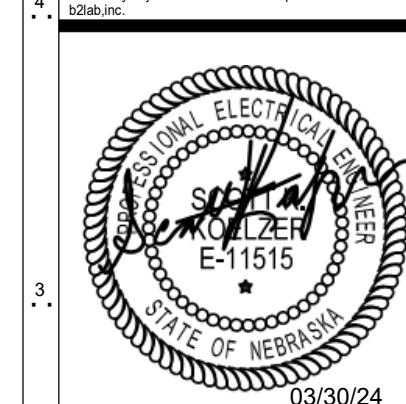
**3 SERVICE ENTRANCE GROUNDING**  
SCALE: NONE

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**



ARCHITECTURE  
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03/30/24

SHEET NAME:  
ELECTRICAL DETAILS

PROJECT NO. PROJECT #  
REVIEWED:  
SHEET NO.:

**E301**



### MECHANICAL / ELECTRICAL COORDINATION SCHEDULE

ABBREVIATIONS:

|                |   |                          |             |
|----------------|---|--------------------------|-------------|
| A AMPS         | C COMBINATION STARTER AND SAFETY SWITCH | EC ELECTRICAL CONTRACTOR | N1 NEMA 1   |
| ENCL ENCLOSURE | CB CIRCUIT BREAKER                      | MC MECHANICAL CONTRACTOR | NSR NEMA 3R |
| HP HORSEPOWER  | I INTEGRAL WITH EQUIPMENT               |                          | NAX NEMA 4X |
| KW KILOWATTS   | S SWITCH                                |                          |             |
| PH PHASE       | SF SWITCH AND FUSIST                    |                          |             |
| V VOLTAGE      | SS SAFETY SWITCH                        | NF NON-FUSED             |             |
| W WATTS        | VFD VARIABLE FREQUENCY DRIVE            |                          |             |
|                | CP CONTROL PANEL                        |                          |             |

| MARK  | EQUIPMENT DESCRIPTION | LOAD     | ELECTRICAL SYSTEM |    |      |                          | DISCONNECT      |              |              |                | CONTROLLER |              |      |      | REMARKS |
|-------|-----------------------|----------|-------------------|----|------|--------------------------|-----------------|--------------|--------------|----------------|------------|--------------|------|------|---------|
|       |                       |          | V                 | PH | KAIC | FEEDER OR BRANCH CIRCUIT | PANEL - CIRCUIT | FURNISHED BY | INSTALLED BY | RATINGS (AMPS) | ENCL       | INSTALLED BY | TYPE | ENCL |         |
| F-1   | GAS FURNANCE          | 13.4 A   | 120               | 1  | 4    | 20A2                     | P1              | EC/EC        | S            | 20             | N1         | MC/I         | -    | -    |         |
| F-2   | GAS FURNANCE          | 9.8 A    | 120               | 1  | 4    | 20A2                     | P1              | EC/EC        | S            | 20             | N1         | MC/I         | -    | -    |         |
| F-3   | GAS FURNANCE          | 9.8 A    | 120               | 1  | 3    | 20A2                     | P2              | EC/EC        | S            | 20             | N1         | MC/I         | -    | -    |         |
| F-4   | GAS FURNANCE          | 9.8 A    | 120               | 1  | 3    | 20A2                     | P2              | EC/EC        | S            | 20             | N1         | MC/I         | -    | -    |         |
| CU-1  | CONDENSING UNIT       | 23.6 MCA | 240               | 1  | 4    | 40A2                     | P1              | EC/EC        | SS           | 30             | NSR        | MC/MC        | -    | -    |         |
| CU-2  | CONDENSING UNIT       | 16.8 MCA | 240               | 1  | 3    | 30A2                     | P1              | EC/EC        | SS           | 30             | NSR        | MC/MC        | -    | -    |         |
| CU-3  | CONDENSING UNIT       | 16.8 MCA | 240               | 1  | 4    | 30A2                     | P2              | EC/EC        | SS           | 30             | NSR        | MC/MC        | -    | -    |         |
| CU-4  | CONDENSING UNIT       | 16.8 MCA | 240               | 1  | 4    | 30A2                     | P2              | EC/EC        | SS           | 30             | NSR        | MC/MC        | -    | -    |         |
| EUH-1 | ELECTRIC UNIT HEATER  | 3 KW     | 240               | 1  | 2    | 20A2                     | P2              | MC/I         | -            | -              | -          | MC/I         | -    | -    |         |
| ERV-1 | ENERGY RECOVER UNIT   | 18.4 MCA | 240               | 1  | 3    | 30A2                     | P2              | MC/MC        | -            | -              | -          | MC/MC        | -    | -    |         |
| CP-1  | RECIRCULATION PUMP    | 1.5 A    | 120               | 1  | 4    | 20A2                     | P1              | EC/EC        | S            | 20             | N1         | MC/I         | -    | -    |         |

GENERAL NOTES:

a VERIFY/COORDINATE RATINGS FOR EQUIPMENT SUPPLIED BY THE SELECTED MANUFACTURER. WHERE RATINGS ARE OTHER THAN AS REQUIRED FOR SPECIFIED UNIT, DISCONNECTS, MOTOR STARTERS, OVERCURRENT DEVICES AND RELATED REVISIONS SHALL BE PROVIDED ACCORDINGLY. THE CONTRACTOR THAT FURNISHES EQUIPMENT WITH RATINGS OTHER THAN AS NOTED SHALL BE RESPONSIBLE FOR COORDINATION AND COSTS FOR REVISIONS TO ACCOMMODATE SELECTED EQUIPMENT.

b FRACTIONAL HORSEPOWER SINGLE PHASE MOTORS SHALL BE PROVIDED WITH INTEGRAL OVERLOAD PROTECTION.

c DISCONNECTS SHALL BE FUSIBLE UNLESS NOTED OTHERWISE.

d ELECTRICAL CONTRACTOR SHALL PROVIDE CIRCUIT TO EQUIPMENT AS INDICATED.

e LOCATE DISCONNECT AT EQUIPMENT PER NEC UNLESS NOTED OTHERWISE.

f EQUIPMENT IDS THAT END IN "X" INDICATE THERE ARE MULTIPLE UNITS THAT ARE IDENTICAL AND PROVIDED ON THE PROJECT. SEE PLANS FOR THE UNIQUE SEQUENTIAL DESIGNATION.

### RESPONSIBILITY MATRIX

| SYSTEM           | SCOPE DESCRIPTION                             | SPECIFICATION DIVISION | DESIGNED BY | FURNISHED BY | INSTALLED BY | REMARKS |
|------------------|---|------------------------|-------------|--------------|--------------|---------|
| POWER / LIGHTING | ROUGH-INS AND PATHWAYS                        | 26                     | BP          | GC           | GC           |         |
|                  | CABLING                                       |                        | BP          | GC           | GC           |         |
|                  | DEVICES                                       |                        | BP          | GC           | GC           |         |
|                  | ROUGH-INS AND PATHWAYS                        |                        | BP          | GC           | GC           |         |
| COMMUNICATIONS   | CABLING (FIBER OPTIC, ETHERNET, PATCH CABLES) | 27                     | BP          | OWNER        | OWNER        |         |
|                  | DATA HARDWARE (JACKS, PLATES, PATCH PANELS)   |                        | BP          | OWNER        | OWNER        |         |
|                  | WIRELESS ACCESS POINTS                        |                        | BP          | OWNER        | OWNER        |         |
|                  | ACTIVE ELECTRONICS (SWITCHES, ROUTERS, UPS)   |                        | BP          | OWNER        | OWNER        |         |
|                  | TESTING                                       |                        | BP          | GC           | GC           |         |
|                  |   |                        |             |              |              |         |

### LUMINAIRE SCHEDULE

| TAG | DESCRIPTION   | MANUFACTURER OR APPROVED EQUIVALENT | CATOLOG NUMBER OR APPROVED EQUIVALENT  | SOURCE INFO |        |       |     | INPUT VA | VOLTAGE | REMARKS |
|-----|---|-------------------------------------|--|-------------|--------|-------|-----|----------|---------|---------|
|     |   |                                     |  | TYPE        | LUMENS | COLOR | CRI |          |         |         |
| 1   | RECESSED 6" LED DOWNLIGHT                             | GOTHAM                              | EV06 35/25 AR LS WD MVOLT EZ1          | LED         | 2500LM | 3500K | 85  | 30W      | 120     |         |
| 1E  | RECESSED 6" LED DOWNLIGHT WITH EMERGENCY BATTERY PACK | GOTHAM                              | EV06 35/25 AR LS WD MVOLT EZ1 EL       | LED         | 2500LM | 3500K | 85  | 30W      | 120     |         |
| 2   | RECESSED 6" LED DOWNLIGHT                             | GOTHAM                              | EV06 35/15 AR LS WD MVOLT EZ1          | LED         | 2500LM | 3500K | 85  | 17W      | 120     |         |
| 2E  | RECESSED 6" LED DOWNLIGHT WITH EMERGENCY BATTERY PACK | GOTHAM                              | EV06 35/15 AR LS WD MVOLT EZ1 EL       | LED         | 2500LM | 3500K | 85  | 17W      | 120     |         |
| 3   | 48" LED INDUSTRIAL STRIP                              | LITHONIA                            | ZL1F L48 3000LM MDD MVOLT 35K 80CRI WH | LED         | 3000LM | 3500K | 80  | 20W      | 120     |         |
| 4   | EXTERIOR WALL SCONCE                                  | LITHONIA                            | OLLWU LED P1 40K MVOLT DDB             | LED         | 947LM  | 3500K | 80  | 14W      | 120     |         |
| 5   | EXIT SIGN   | LITHONIA                            | LQM S W 3 R 120/277 ELN                | LED         | -      | -     | -   | 5W       | 120     |         |
| 6   | EXTERIOR WALL BARN LIGHT                              | BARN LIGHT                          | BLE-G-WHS16-15-G22-LED27-3000K         | LED         | 2000LM | 3000K | 80  | 17W      | 120     |         |

GENERAL NOTES:

a SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR LUMINAIRES.

b CONTRACTOR TO VERIFY LUMINAIRE CATALOG NUMBER AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING.

c LISTED ALTERNATE MANUFACTURERS ARE PERMITTED TO BID AN EQUIVALENT LUMINAIRE WHICH COMPLIES WITH THE PRODUCT REQUIREMENTS IDENTIFIED IN THIS SCHEDULE AND THE SPECIFICATIONS WITHOUT SUBMITTING A PRIOR APPROVAL REQUEST. ALTERNATE LUMINAIRES WILL BE REVIEWED DURING THE SUBMITTAL PROCESS AND THE MANUFACTURER WILL BE RESPONSIBLE TO PROVIDE A LUMINAIRE WHICH MEETS THE PRODUCT REQUIREMENTS. WHERE AN ALTERNATE MANUFACTURER IS NOT LISTED, A PRIOR APPROVAL REQUEST MUST BE SUBMITTED IN ACCORDANCE WITH THE SPECIFICATIONS IN ORDER TO BID THAT MANUFACTURER'S PRODUCT.

d PROVIDE VIBRATION DAMPER IN POLE FIXTURES GREATER THAN 10".

e GALVANIZE THE INTERIOR AND EXTERIOR OF POLES. PRIME AND PAINT EXTERIOR WITH A MINIMUM OF 3 MILS OF TGIC POWDER.

f REMOVE PLASTIC WRAP FROM POLES ONCE RECEIVED ON SITE. STORE POLES OUT OF STANDING WATER OR VEGETATION.

### SHORT CIRCUIT SCHEDULE

PROJECT NAME: Prim Beauty Parlour PROJECT NO: 725.012 BY: TTL

| DESCRIPTION               | LENGTH/ PRIMARY VOLTAGE | VOLTAGE/ SECONDARY VOLTAGE | WIRE SIZE/ XFMRM KVA RATING | WIRE MATERIAL/ TRANSFORMER (C OR A) T-XFMRM | CONDUIT (S OR N) | VOLTAGE CLASS (V) | WIRES (S OR T) | C OR Z VALUE | # OF PARALLEL RUNS | Isc AVAILABLE UPSTREAM | f           | M      | (sc Fault) | X0  |
|---------------------------|-------------------------|----------------------------|-----------------------------|---|------------------|-------------------|----------------|--------------|--------------------|------------------------|-------------|--------|------------|-----|
|                           |                         |                            |                             |   |                  |                   |                |              |                    |                        |             |        |            |     |
| X0 UTILITY COMPANY        |                         |                            |                             |   |                  |                   |                |              |                    |                        |             |        |            | X0  |
| X1 SERVICE XFMR(INFINITE) | 15000                   | 240                        | 225                         | T   | N                | 600               | S              | 1.2          | 1                  | 99,999,999             | 138564.0632 | 0.0000 | 45,105     | X1  |
| X2 MC                     | 50                      | 240                        | 500                         | C   | N                | 600               | S              | 26706        | 1                  | 45,105                 | 0.6094      | 0.6213 | 28,025     | X2  |
| X3 F1                     | 75                      | 240                        | 3X                          | C   | N                | 600               | S              | 13923        | 1                  | 28,025                 | 1.0895      | 0.4796 | 13,412     | X3  |
| X4 P2                     | 60                      | 240                        | 3X                          | C   | N                | 600               | S              | 13923        | 1                  | 13,412                 | 0.4171      | 0.7056 | 9,464      | X4  |
| X5 F-1                    | 10                      | 120                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 13,412                 | 3.1376      | 0.2417 | 3,242      | X5  |
| X6 F-2                    | 10                      | 120                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 13,412                 | 3.1376      | 0.2417 | 3,242      | X6  |
| X7 F-3                    | 10                      | 120                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 9,464                  | 2.2141      | 0.3111 | 2,945      | X7  |
| X8 F-4                    | 10                      | 120                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 9,464                  | 2.2141      | 0.3111 | 2,945      | X8  |
| X9 CU-1                   | 40                      | 240                        | 8                           | C   | N                | 600               | S              | 1558         | 1                  | 13,412                 | 2.4851      | 0.2869 | 3,648      | X9  |
| X10 CU-2                  | 40                      | 240                        | 10                          | C   | N                | 600               | S              | 981          | 1                  | 13,412                 | 3.9468      | 0.2022 | 2,711      | X10 |
| X11 CU-3                  | 30                      | 240                        | 10                          | C   | N                | 600               | S              | 981          | 1                  | 9,464                  | 2.0888      | 0.3237 | 3,064      | X11 |
| X12 CU-4                  | 30                      | 240                        | 10                          | C   | N                | 600               | S              | 981          | 1                  | 9,464                  | 2.0888      | 0.3237 | 3,064      | X12 |
| X13 EUH-1                 | 65                      | 240                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 9,464                  | 7.1957      | 0.1220 | 1,155      | X13 |
| X14 ERV-1                 | 50                      | 240                        | 10                          | C   | N                | 600               | S              | 981          | 1                  | 9,464                  | 3.4813      | 0.2231 | 2,112      | X14 |
| X15 CP-1                  | 10                      | 120                        | 12                          | C   | N                | 600               | S              | 617          | 1                  | 13,412                 | 3.1376      | 0.2417 | 3,242      | X15 |

### FEEDER SCHEDULE

| MARK                     | CONDUCTORS AND CONDUIT                |
|--------------------------|---------------------------------------|
| COPPER                   |                                       |
| 20A2                     | (2) #12, (1) #12 GND IN 1/2" C        |
| 30A2                     | (2) #10, (1) #10 GND IN 1/2" C        |
| 40A2                     | (2) #8, (1) #10 GND IN 3/4" C         |
| 50A2                     | (2) #6, (1) #10 GND IN 3/4" C         |
| 60A2                     | (2) #6, (1) #10 GND IN 3/4" C         |
| 3 WIRE PLUS GROUND       |                                       |
| 20A3                     | (3) #12, (1) #12 GND IN 1/2" C        |
| 30A3                     | (3) #10, (1) #10 GND IN 3/4" C        |
| 40A3                     | (3) #8, (1) #10 GND IN 3/4" C         |
| 50A3                     | (3) #6, (1) #10 GND IN 1" C           |
| 60A3                     | (3) #6, (1) #10 GND IN 1" C           |
| 70A3                     | (3) #4, (1) #8 GND IN 1 1/4" C        |
| 80A3                     | (3) #3, (1) #8 GND IN 1 1/4" C        |
| 90A3                     | (3) #3, (1) #8 GND IN 1 1/4" C        |
| 100A3                    | (3) #2, (1) #8 GND IN 1 1/4" C        |
| 125A3                    | (3) #1, (1) #8 GND IN 1 1/2" C        |
| 150A3                    | (3) #2, (1) #6 GND IN 2" C            |
| 200A3                    | (3) #3, (1) #6 GND IN 2" C            |
| 225A3                    | (3) #4, (1) #4 GND IN 2" C            |
| 250A3                    | (3) 250KCMIL, (1) #4 GND IN 2 1/2" C  |
| 300A3                    | (3) 300KCMIL, (1) #4 GND IN 2 1/2" C  |
| 350A3                    | (3) 400KCMIL, (1) #3 GND IN 3" C      |
| 400A3                    | (3) 500KCMIL, (1) #3 GND IN 3" C      |
| 4 WIRE PLUS GROUND       |                                       |
| 20A4                     | (4) #12, (1) #12 GND IN 1/2" C        |
| 30A4                     | (4) #10, (1) #10 GND IN 3/4" C        |
| 40A4                     | (4) #8, (1) #10 GND IN 1" C           |
| 50A4                     | (4) #6, (1) #10 GND IN 1" C           |
| 60A4                     | (4) #6, (1) #10 GND IN 1" C           |
| 70A4                     | (4) #4, (1) #8 GND IN 1 1/4" C        |
| 80A4                     | (4) #3, (1) #8 GND IN 1 1/4" C        |
| 90A4                     | (4) #3, (1) #8 GND IN 1 1/4" C        |
| 100A4                    | (4) #2, (1) #8 GND IN 1 1/2" C        |
| 125A4                    | (4) #1, (1) #6 GND IN 2" C            |
| 150A4                    | (4) #1, (1) #6 GND IN 2" C            |
| 175A4                    | (4) #2, (1) #6 GND IN 2" C            |
| 200A4                    | (4) #3, (1) #6 GND IN 2" C            |
| 225A4                    | (4) #4, (1) #4 GND IN 2 1/2" C        |
| 250A4                    | (4) 250 KCMIL, (1) #4 GND IN 2 1/2" C |
| 300A4                    | (4) 300 KCMIL, (1) #4 GND IN 3" C     |
| 350A4                    | (4) 400 KCMIL, (1) #3 GND IN 3" C     |
| 400A4                    | (4) 500 KCMIL, (1) #3 GND IN 4" C     |
| MOTOR 3 WIRE PLUS GROUND |                                       |
| 5M                       | (3) #8, (1) #8 GND IN 1" C            |
| 7M                       | (3) #6, (1) #8 GND IN 1 1/4" C        |
| 9M                       | (3) #4, (1) #8 GND IN 1 1/4" C        |
| 11M                      | (3) #4, (1) #8 GND IN 1 1/4" C        |
| 13M                      | (3) #3, (1) #6 GND IN 1 1/4" C        |
| 15M                      | (3) #2, (1) #6 GND IN 1 1/4" C        |
| 17M                      | (3) #1, (1) #6 GND IN 1 1/2" C        |
| 19M                      | (3) #1, (1) #4 GND IN 1 1/2" C        |
| 21M                      | (3) #1, (1) #4 GND IN 1 1/2" C        |
| 23M                      | (3) #2, (1) #4 GND IN 2" C            |

### PANEL P1

SURFACE MOUNTED

| LOAD TYPE | C/ NC | DESCRIPTION                 | LOAD VA | REMARKS | O/C  | CKT # | PH | CKT # | O/C  | REMARKS | LOAD VA | DESCRIPTION             | C/ NC | LOAD TYPE |
|-----------|-------|-----------------------------|---------|---------|------|-------|----|-------|------|---------|---------|-------------------------|-------|-----------|
| LIGHTING  | NC    | LTG: 1ST FLOOR SALON        | 1500    |         | 20/1 | 1     | A  | 2     | 20/1 |         | 1500    | LTG: 1ST FLOOR SALON    | NC    | LIGHTING  |
| LIGHTING  | NC    | LTG: 1ST FLOOR COMMON AREAS | 1500    |         | 20/1 | 3     | B  | 4     | 20/1 |         |         | SPARE                   |       |           |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 5     | A  | 6     | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 7     | B  | 8     | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 9     | A  | 10    | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 11    | B  | 12    | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 13    | A  | 14    | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 15    | B  | 16    | 20/1 |         | 1000    | 1ST FLOOR SALON RECEPTS | NC    | RECEPT    |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 17    | A  | 18    | 20/1 |         | 1000    | 1ST FLOOR SALON WASHER  | NC    | EQUIP     |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 19    | B  | 20    | 30/2 |         | 1000    | 1ST FLOOR SALON DRYER   | NC    | EQUIP     |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 21    | A  | 22    | -    |         | 1000    | -                       | NC    | EQUIP     |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 23    | B  | 24    | 20/1 |         | 1000    | 1ST FLOOR SALON WASHER  | NC    | EQUIP     |
| RECEPT    | NC    | 1ST FLOOR SALON RECEPTS     | 1000    |         | 20/1 | 25    | A  | 26    | 30/2 |         | 1000    | 1ST FLOOR SALON DRYER   | NC    | EQUIP     |
| EQUIP     | NC    | FURNACE F-1                 | 1608    |         | 15/1 | 27    | B  | 28    | -    |         | 1500    | -                       | NC    | EQUIP     |
| EQUIP     | NC    | FURNACE F-2                 | 1176    |         | 15/1 | 29    | A  | 30    | 40/2 |         | 2832    | CONDENSING UNIT CU-1    | NC    | EQUIP     |
| EQUIP     | NC    | 1ST FLOOR HOOD              | 1000    |         | 20/1 | 31    | B  | 32    | -    |         | 2832    | -                       | NC    | EQUIP     |
| LIGHTING  | C     | EXTRIOR LIGHTING            | 500     |         | 20/1 | 33    | A  | 34    | 29/2 |         | 2016    | CONDENSING UNIT CU-2    | NC    | EQUIP     |
|           |       | SPARE                       |         |         | 20/1 | 35    | B  | 36    | -    |         | 2016    | -                       | NC    | EQUIP     |
|           |       | SPARE                       |         |         | 20/1 | 37    | A  | 38    | -    |         |         | -                       |       |           |
|           |       | SPACE                       |         |         | 20/1 | 39    | B  | 40    |      |         |         |                         |       |           |



| DATE    | ISSUED FOR        | NO. |
|---------|-------------------|-----|
| 3/30/24 | ISSUED FOR PERMIT | 1   |

CONSULTANTS:

**SECTION 260100 - COMMON REQUIREMENTS FOR ELECTRICAL**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes general requirements for electrical systems and shall apply to all phases of the work specified, indicated on the drawings and included in this contract. All systems shall be complete and fully functional.
- B. Section includes basic material and methods to complement division 26, 27, and 28 unless noted otherwise.

**1.2 WARRANTIES**

- A. Warranty materials, workmanship and equipment against defects for a period of one year after date of substantial completion.
- B. Specific equipment may require a longer warranty. Warranty equipment for longer period of time listed in the contract documents.
- C. Repair or replace at no cost to the owner any items which prove defective during the warranty period.
- D. The contractor agrees to void or allow subcontractors to void any warranty regarding products installed as a part of this project.

**1.3 QUESTIONS OF INTERPRETATION DURING BIDDING PHASE**

- A. If questions arise during the bidding process regarding the meaning of any portion of the contract comment, the prospective bidder shall submit the questions to the Architect/Engineer for clarification prior to date of last addendum.
- B. Interpretation or clarification of the contract documents will be published by addenda.
- C. Verbal interpretation or explanations not issued in the addenda shall not be considered part of the contract documents.
- D. Where conflicts exist between the contract documents or between the contract documents and adopted codes the contractor shall bid the more expensive method and products.
- E. The Architect/Engineer shall be the sole judge regarding interpretations of conflicts.

**1.4 CONTRACT DOCUMENT DISCREPANCIES**

- A. If any conflicts or ambiguities appear in the contract documents, request clarification from the Architect/Engineer before proceeding with work.
- B. If the contractor fails to report or request clarification of contract documents discrepancies or ambiguities, no excuse will be entertained for failure to perform work to the satisfaction of the Architect/Engineer.

**1.5 DEFINITIONS**

- A. The following definitions shall apply throughout the contract documents.
  1. Architect/Engineer: Architect or Engineer
  2. Code: Applicable national, state and local codes
  3. Mechanical: Plumbing, HVAC, & fire protection work required by the Contract Documents
  4. Electrical: Electrical and fire alarm work required by the Contract Documents
  5. Contractor: Any Contractor performing work required by the Contract Documents
  6. Indicated: Noted, scheduled or specified
  7. Selected: Selected by the Architect/Engineer.
  8. Provide: Furnish, install, connect and tested complete and ready for use
  9. Furnish: Supply and deliver to the site ready for installation
  10. Install: Install complete, per Contract Documents and manufacturer's requirements.
  11. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furled spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unoccupied spaces, crawl spaces, and tunnels.
  12. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
  13. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
  14. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
  15. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

**1.6 CODES**

- A. The work shall be performed by persons skilled in the trade involved and shall be done in a manner consistent with normal industry standards.
- B. The work shall conform to all applicable section of currently adopted editions of the following codes, standards, and specifications.
  1. International Building Code (IBC)
  2. International Fire Code (IFC)
  3. International Energy Conservation Code (IECC)
  4. Safety and Health Regulations for Construction
  5. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards
  6. National Electrical Code (NEC)
  7. National Electrical Safety Code (NESC)
  8. National Fire Protection Association (NFPA)
  9. Life Safety Code (NFPA 101)
  10. Factory Mutual Global Engineering (FMG)
  11. Underwriters' Laboratories, Inc. (UL)
  12. National Electrical Safety Code (NESC)
  13. National Electrical Manufacturers Association (NEMA)
  14. Institute of Electrical and Electronics Engineers (IEEE)
  15. Insulated Power Cable Engineers Association (IPCEA)
  16. Electronic Industries Association (EIA)
  17. Telecommunications Industry Association (TIA)
  18. Building Industry Consulting Service International (BICSI)
  19. Owners written design standards
  20. Applicable national, state and local codes
- C. Where conflicts exist between code and contract documents, the code shall have precedence when more stringent than the contract documents

**1.7 PERMITS**

- A. The contractor shall obtain all permits required to perform the work indicated in the contract documents.
- B. The contractor shall call for, obtain and pay for any and all inspections and re-inspections required for the work indicated in the contract documents.
- C. Contractor shall coordinate with the local utility and follow local rules and regulations. Contractor shall pay for fees and services used prior to final completion.

**1.8 MATERIALS AND EQUIPMENT MANUFACTURERS**

- A. Options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced on previous construction projects.
- B. Materials and equipment shall be provided in accordance with the following:
  1. Primary design products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality.
  2. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications.
  3. Provide primary design products unless substitutions are made in accordance with the following paragraphs.
  4. Acceptable equivalent substitutions: acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
    - a. The product shall be manufactured by one of the acceptable manufacturers listed in the project manual, drawings or addenda.
    - b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance, and physical characteristics.
    - c. The contractor providing the substitution shall bear the total cost of change due to substitutions. These costs may include additional compensation to the Architect/Engineer for redesign and evaluation services, increased cost of work by the owner or other contractors, and similar considerations.
  5. Performance Requirements: Where the contract documents list performance requirements or describe a product or assembly generally, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
  6. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.
- C. Prior approvals will be reviewed for acceptability of manufacturer being proposed. Inclusion of product manufacturer is not in any way a replacement for the required shop drawings. Nor is it a guarantee that product submitted will be deemed an acceptable product. Provide products that meet or exceed the requirements of the contract documents.

**1.9 QUALITY ASSURANCE**

- A. Conform to the requirements of NFPA 70.
- B. Products listed and classified by Underwriters Laboratories or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.10 COORDINATION**

- A. Coordinate arrangement, mounting and support of electrical equipment;
  1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  3. To allow right of way for piping and conduit installed at required slope.
  4. To allow proper access to all equipment requiring access.
- B. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
- C. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- E. Coordinate electrical service connections to components furnished by utility companies.
- F. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
- G. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- H. Provide offsets and elevation changes in conduit and cable trays as required to complete the layout and coordination process.

**1.11 STRUCTURAL COORDINATION**

- A. In cases where the Contractor determines that superimposed loads such as suspended or floor mounted equipment exist which exceed design loads indicated on structural documents, the Contractor shall submit load data to Architect/Engineer for review prior to proceeding with work.
- B. Distribute the maximum load hung from any structural member over the member's tributary area in a way that the design superimposed dead loads listed in structural documents are not exceeded. The Contractor shall coordinate the loads and provide additional support or distribution framing as required achieving the allowable load distribution.
- C. Connections of systems designed by Contractor's engineer such as, but not limited to mechanical, electrical, plumbing loads are assumed to impose vertical or horizontal loads on the base building structural members without generating torsion in the supporting structural members. Contractor is responsible for furnishing and installing all supplementary bracing members as required to prevent torsion on the base building structure.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Unless otherwise specified, all materials and equipment shall be new, unused and undamaged.

**2.2 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS**

- A. When materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details and requirements and provide connection and assessors required for proper installation.

**2.3 SLEEVES**

- A. Interior sleeves Steel Pipe, ASTM A53, Type E Grade B, Schedule 40, galvanized with plain square ends and deburred.
- B. Sleeves in building envelope: Modular design, with interlocking rubber links, metal plates, and fasteners for a continuous compressible rubber seal with in the annular space between the pipe and sleeve. Fasteners and plates shall be stainless steel.

**2.4 CONCRETE BASES**

- A. Bases shall be constructed of concrete with a 28 day compressive strength of 3000 psi.
- B. Interior bases shall be 3-5 inches above surrounding floor finish.
- C. Exterior bases shall be 5-5 inches above surrounding grade unless noted otherwise.
- D. Provide 6 x 6 10/10 welded wire fabric located in the center of each base unless noted or required otherwise.

**2.5 EXCAVATION AND BACKFILL**

- A. Provide clean backfill free of rocks and debris. Compact backfill in layers of not more than 6".
- B. Restore project site to original condition.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. Fabrication, erection, and installation of the complete electrical system shall be done by qualified personnel, experienced in such work and shall proceed in an orderly manner so as not to hold up the progress of the project.
- B. Check areas and surfaces where electrical equipment or materials are to be installed and report any unsatisfactory conditions before starting work.
- C. Commencement of work signifies the Contractor's acceptance of the conditions as fit and proper for the execution of the electrical work.
- D. Install equipment and systems in accordance with manufacturer's instructions, requirements, or recommendations.
- E. Comply with NECA 1.
- F. Use EMT, IMC, or RMC for mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- G. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- H. Equipment: Install to facilitate service, maintenance and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- I. Electronic Equipment: Give right of way to piping systems requiring slope.
- J. Materials and Components: Install level, plumb, parallel, and perpendicular to building elements.

**3.2 DELIVERY AND STORAGE OF MATERIALS**

- A. Make provisions for the delivery and safe storage of materials. Make the required arrangements with other contractors for the introduction into the building of equipment too large to pass through finished openings.
- B. Materials shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected.
- C. Adequately protect supplies and equipment during cold weather.
- D. Protect items subject to cold weather damage by covering, insulating, or storing in a heated space.
- E. Off load poles and other items which may be damaged by chains or cables with appropriate hoisting materials. Protect items so not to damage during offloading.

**3.3 COORDINATION OF WORK**

- A. Plan work so it proceeds with a minimum of interference with other trades.
- B. Inform the General Contractor of all openings required in the building construction for the installation of the electrical work.
- C. Cooperate with other contractors in furnishing material and information, in proper sequence, for the correct location of sleeves, inserts, foundations, wiring, etc.
- D. Make provisions for special frames, openings, and sleeves as required.
- E. The Electrical Contractor shall pay for extra cutting and patching made necessary by his failure to properly direct such work at the correct time.

**3.4 LAYOUT OF WORK**

- A. Carefully lay out work in advance of installation using data and measurements from the site, the appropriate architectural and structural drawings, and shop drawings.
- B. Confirm code required clearances.
- C. Do not infinge upon space required for operation, maintenance, or clearance for items installed by other contractors.
- D. Prior to installation of any work, make certain the location does not conflict with other items in or near the same location.
- E. If the layouts so prepared indicate that the required conditions cannot be met in the space provided, inform the Architect/Engineer prior to installation and request clarification.
- F. Failure to properly coordinate and lay out work will require correction by the Contractor at the Contractor's expense.

**3.5 DATA AND MEASUREMENTS**

- A. Mechanical and electrical drawings are diagrammatic or schematic. Do not scale drawings.
- B. The data given herein and on the drawings is as accurate as could be secured; absolute accuracy is not guaranteed.
- C. Obtain exact locations, measurements, levels, etc., at the site and adapt their work to actual conditions.
- D. Examine the general construction, mechanical, electrical, and other applicable drawings and the Specifications.
- E. Utilize only architectural drawings, structural drawings, and site measurements in calculations.
- F. Layout and coordinate work prior to installation to provide clearances for operation, maintenance and codes. Verify non-interference with other work.
- G. Locate outlets and devices mounted on finished surfaces with regard to paneling, furring, trim, etc.
- H. Install outlets and devices with vertical edges of plates plumb.
- I. Install boxes or plaster rings such that the front edges extend to the finished surface of the wall, ceiling or floor without projecting beyond the surface.
- J. Install receptacles, switches, etc., on wood trim, cases, or other fixtures symmetrically and, where necessary, install with the long dimension of the plate horizontal.
- K. Coordinate locations of outlets and devices with other contractors so as not to destroy the aesthetic effect of the surface in which the outlets and devices are mounted. Coordinate the locations of electrical items with work furnished by other trades to avoid interference.
- L. Heights of outlets are measured from finished floor to centerline of device.
- M. Adjust heights as necessary to clear wall-mounted cabinets, fin tube convectors, unit heaters, etc.

- N. Mounting heights shall be in compliance with ADA requirements.
- O. When devices are installed in masonry walls, adjust mounting heights to correspond to block coursing. Do not mount outlets below 15 inches or switches above 46 inches.

**3.6 PROTECTION OF APPARATUS**

- A. Take necessary precautions to properly protect apparatus, fixtures, appliances, material, equipment, and installations from damage.
- B. Failure to provide such protection to the satisfaction of the Architect/Engineer shall be sufficient cause for the rejection of any single piece(s) of material, apparatus, equipment, etc., concerned.

**3.7 SLEEVE INSTALLATION**

- A. Coordinate sleeve selection and application with selection of and application of fireproofing.
- B. Concrete Slabs and walls: Install sleeves during erection of slabs and walls. Sleeves are not required for core drilled holes.
- C. Sleeves thru walls shall be flash on both sides.
- D. Sleeves thru floors shall extend 2 inches above finished floor.
- E. Sleeves thru roofs shall be sealed with boot type flashing and coordinated with roofing materials.

**3.8 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to maintain fire resistance rating of the assembly.
- B. Where walls are installed above ceilings: Seal all penetrations in walls made by electrical items.

**3.9 EXCAVATION**

- A. Perform excavation of every description and of whatever substances encountered, to the depths required or indicated on the drawings, in accordance with OSHA.
- B. During excavation, deposit material suitable for backfill in an orderly manner a sufficient distance from the excavation banks to avoid overloading and to prevent slides or cave-ins.
- C. Dispose of material unsuitable for backfill as directed by the Architect/Engineer.
- D. Grade as necessary to prevent surface water from flowing into trenches or other excavations, and remove any water accumulating therein by pumping or by other acceptable method.
- E. Fill any excess excavation below the levels indicated for structures or raceways with sand, gravel or concrete.
  1. Unsuitable Materials.
  2. Where the bottom of the trench is found to be unstable or to include ashes, cinders, any types of refuse, vegetable or other organic material, or large pieces of fragments of inorganic material, which in the judgment of the Architect/Engineer should be removed, excavate and remove such unsuitable material to a minimum depth of 12 inches below the conduit.
  3. Backfill the trench with selected bedding material and compact to provide uniform and continuous bearing for the conduit.
  4. Dispose of the unsuitable material.

**3.10 BACKFILL**

- A. Do not backfill until required inspections are made and tests are performed for the specific utility.
- B. Backfill with the excavated materials specified for backfilling, consisting of earth, loam, sandy clay, sand and gravel or other materials, free from large clods of earth or stones.
- C. Do not use broken concrete as backfill materials.
- D. Do not backfill in freezing weather or with frozen material.
- E. Adjust the moisture content of the backfill material if required for proper compaction.
- F. Reopen any trenches improperly backfilled, or where settlement occurs, to the depth required for proper compaction, refill and compact to specified density.
- G. Compact backfill for structures to the specified density.
- H. During the backfilling of each exterior underground conduit system, install continuous underground type plastic line markers.
- I. Deposit suitable backfill material around the conduit in 6-inch layers and thoroughly compact by hand, machine tamper, or other suitable equipment.
- J. Backfill to at least 90 percent of maximum density at optimum moisture content determined by ASTM D698 until the conduit has a minimum cover of 2 feet.
- K. The moisture content of the soil at time of compaction shall be not more than 3 percent above or 3 percent below the optimum.
- L. Be careful not to disturb the conduit.
- M. Carry backfilling on simultaneously on both sides of the conduit to eliminate the possibility of lateral displacement.
- N. Prepare backfilled areas to receiving seeding.

**3.11 TEMPORARY POWER AND LIGHTING**

- A. Provide temporary power and lighting throughout the construction period for the use by all trades, contractors and sub-contractors.
- B. Temporary facilities shall be installed in compliance with applicable codes and in compliance with OSHA requirements.
- C. Cost of temporary power used during construction, including the cost of setting and removing temporary service, shall be paid by the contractor.

**END OF SECTION 260100**

**SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  1. Conductors and cables rated 2000 V and less.
  2. Bunchings, splices, and terminations rated 2000 V and less.

**PART 2 - PRODUCTS**

**2.1 CONDUCTORS AND CABLES**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable used in VFC circuits.
- D. Conductors: Copper, complying with NEMA WC 70/ICEA S-95-658.
  1. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2.

**2.2 CONNECTORS AND SPLICES**

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**PART 3 - EXECUTION**

**3.1 CONDUCTOR MATERIAL APPLICATIONS**

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper; Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

**3.2 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable pipes, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

**3.3 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

**END OF SECTION 260519**

**SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  1. Metal conduits, tubing, and fittings.
  2. Surface raceways.
  3. Boxes, enclosures, and cabinets.

**PART 2 - PRODUCTS**

**2.1 METAL CONDUITS, TUBING, AND FITTINGS**

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. IMC: Comply with ANSI C80.6 and UL 1242.
- C. EMT: Comply with ANSI C80.3 and UL 797.
- D. FMC: Comply with UL 1 zinc-coated steel
- E. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
  2. Fittings for EMT:
    - a. Material: Steel
    - b. Type: Setscrew or compression.
  3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting fitting joints.

**2.2 METAL WIREWAYS AND AUXILIARY GUTTERS**

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
  1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

**2.3 SURFACE RACEWAYS**

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5.

**2.4 BOXES, ENCLOSURES, AND CABINETS**

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaires weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- F. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep) Gangable boxes are prohibited.

**PART 3 - EXECUTION**

**3.1 RACEWAY APPLICATION**

- A. Indoors: Apply raceway products as specified below unless otherwise indicated.
  1. Exposed, Not Subject to Physical Damage: EMT.
  2. Exposed, Not Subject to Severe Physical Damage: EMT
  3. Concealed in Ceilings and Interior Walls and Partitions: EMT
  4. Connection to Vibrating Equipment (including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  5. Damp or Wet Locations: IMC.
  6. Boxes and Enclosures: NEMA 250, Type 1.
  7. Minimum Raceway Size: 1/2-inch (16-mm) trade size.
  8. Conduit Fittings: Compatible with raceways and suitable for use and location.
    1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
    2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
    3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
  9. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
  10. Install surface raceways only where indicated on Drawings.

**3.2 INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Arrange raceways to keep a minimum of 2 inches (50 mm) of curved portions of bends are not visible above finished slab.
- D. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- F. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- G. Raceways Embedded in Slabs:
  1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
  2. Arrange raceways to cross building expansion joints at right angles with approved fittings.
  3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
  4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- H. Stub-ups to Above Recessed Ceilings:
  1. Use EMT, IMC, or RMC for raceways.
  2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow sub-panel manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of



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CONSULTANTS:

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  1. Time switches.
  2. Photoelectric switches.
  3. Simultaneous daylight-harvesting switching and dimming controls.
  4. Indoor occupancy and vacancy sensors.
  5. Switchbox-mounted occupancy sensors.
  6. Digital timer light switches.
  7. High-bay occupancy sensors.
  8. Extreme temperature occupancy sensors.
  9. Outdoor motion sensors.
  10. Lighting contactors.
  11. Emergency shunt relays.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  1. Show installation details for the following:
    - a. Occupancy sensors.
    - b. Vacancy sensors.
    - c. Distributed lighting control systems
  2. Interconnection diagrams showing field-installed wiring.
  3. Include diagrams for power, signal, and control wiring.
  4. Floor plans created by manufacturer indicating location and type of device at each location. Manufacturer shall provide additional devices and components as required by space.

1.4 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Inappropriate control of lights in space. Devices which do not operate when space is occupied or operating when space is unoccupied.
    - b. Faulty operation of lighting control devices.
  2. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.
  1. Listed and labeled as defined in NFPA 70 and marked for intended location and application.
  2. Contact Configuration: as required for load controlled.
  3. Contact Rating: 30-A inductive or resistive, 240-V ac Retain one of eight "Programs" subparagraphs below.
  4. Programs: Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.
  5. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program.
  6. Astronomic Time: All channels.
  7. Automatic daylight savings time changeover option.
  8. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Description: Solid state, with DPST dry contacts rated for 1800 VA, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.
  1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  2. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lux), with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.
  3. Time Delay: Fifteen-second minimum, to prevent false operation.
  4. Surge Protection: Metal-oxide varistor.
  5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.
  6. Failure Mode: Luminaire stays ON.

2.3 INDOOR OCCUPANCY AND VACANCY SENSORS

- A. General Requirements for Sensors:
  1. Passive infrared, Ultrasonic, or Dual technology as manufacturer determines best suits the space.
  2. Ceiling sensors shall have separate power pack with auxiliary contact for HVAC interlock.
  3. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox.
  1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application; and shall comply with California Title 24.
  2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
  3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
  4. Switch Rating: Not less than 800-VA ballast or LED load at 120 V, 1200-VA ballast or LED load at 277 V, and 800-W incandescent.
  5. Color: Match device color.
  6. Faceplate: Match color and type of switch coverplates
- B. Description: Combination digital timer and conventional switch lighting control unit. Switchbox-mounted, backlit LCD display, with adjustable time interval not to exceed 2 hours.
  1. Rated 960 W at 120-V ac for tungsten lighting, 10 A at 120-V ac for tungsten lighting, 10 A at 277-V ac for ballast or LED, and 1/4 horsepower at 120-V ac.
  2. Voltage: [Match the circuit voltage] [Dual voltage - 120 and 277 V].
  3. Color: Match device color.
  4. Faceplate: Match color and type of switch coverplates

2.5 LIGHTING CONTACTORS

- A. Description: Electrically operated and mechanically held unless noted otherwise, combination-type lighting contactors.
  1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
  2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
  3. Enclosure: Comply with NEMA 250.
  4. Provide with control and pilot devices.

2.6 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 CONTACTOR INSTALLATION

- A. Comply with NECA 1.

3.4 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical System."
  1. Identify controlled circuits in lighting contactors.
  2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
  2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Lighting control devices will be considered defective if they do not pass tests and inspections.

END OF SECTION 260923

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  1. Lighting and appliance branch-circuit panelboards.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
  1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
  2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
  1. Include dimensions plans, elevations, sections, and details.
  2. Detail bus configuration, current, and voltage ratings.
  3. Short-circuit current rating of panelboards and overcurrent protective devices.
  4. Include evidence of NRTL listing for SPD as installed in panelboard.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.
- D. Enclosures:
  1. Rated for environmental conditions at installed location.
    - a. Indoor Dry and Clean Locations: NEMA 250, Type 1
    - 2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
  3. Finishes:
    - a. Panels and Trim: Steel factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    - b. Back Boxes: Galvanized steel.
    - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
- E. Phase, Neutral, and Ground Buses:
  1. Material: Tin-plated aluminum.
    - a. Plating shall run entire length of bus.
    - b. Bus shall be fully rated the entire length.
  2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
  3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
  4. Full-Size Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
- F. Conductor Connectors: Suitable for use with conductor material and sizes.
  1. Material: Tin-plated aluminum.
- G. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Panelboards: NEMA PB 1, distribution type.
- B. Doors: Secured with vault-type latch with tumbler lock, keyed alike.
  1. For doors more than 36 inches high, provide two latches, keyed alike.
- C. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.
- E. Branch Overcurrent Protective Devices: Fused switches.

2.3 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
  1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
  1. Comply with NECA 1.
- B. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- C. Mount panelboard cabinet plumb and rigid without distortion of box.
- D. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- E. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- F. Install filler plates in unused spaces.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  1. Straight-blade convenience receptacles.
  2. GFCI receptacles.
  3. Toggle switches.
  4. Wall plates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application. Back and side wired using pressure plates. Stub or push-in connections are not acceptable.
- B. Comply with NFPA 70.
- C. Devices for Owner-Furnished Equipment:
  1. Receptacles: Match plug configurations.
- D. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STRAIGHT-BLADE RECEPTACLES

- A. Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

2.3 GFCI RECEPTACLES

- A. General Description:
  1. 125 V, 20 A, straight blade, non-feed-through type.
  2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
  3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

2.4 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:

2.5 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  1. Plate-Securing Screws: Metal with head color to match plate finish.
  2. Material for Finished Spaces: 0.035-inch (1-mm) thick, satin-finished, Type 302 stainless steel
  3. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled in use protection
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant in use die-cast aluminum with lockable cover.

2.6 FINISHES

- A. Device Color: Gray
  1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: Stainless steel

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes.
  2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  3. Provide 6" of conductor in each outlet box.
- D. Device Installation:
  1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  3. Use a torque screwdriver when a torque is recommended or required by manufacturer.
  4. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtail for device connections.
  5. Tighten unused terminal screws on the device.
  6. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
  1. Install ground pin of vertically mounted receptacles up and on horizontally mounted receptacles to the right
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- H. GFCI Receptacles: Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

END OF SECTION 262726

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1.1 SUMMARY

- A. Section Includes:
  1. Fusible switches.
  2. Nonfusible switches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and accessories.
- B. Shop Drawings: For enclosed switches and circuit breakers.
  1. Include plans, elevations, sections, details, and attachments to other work.
  2. Include wiring diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with NFPA 70.

2.2 FUSIBLE SWITCHES

- A. Type HD, Heavy Duty:
  1. Single throw.
  2. Poles an ampacity as indicated on drawings.
  3. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses.
  4. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- B. Accessories:
  1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being ground and bonded; labeled for copper and aluminum neutral conductors.

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings:
  1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  2. Outdoor Locations: NEMA 250, Type 3R >.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install fuses in fusible devices.
- C. Comply with NFPA 70 and NECA 1.

END OF SECTION 262816

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  1. Interior solid-state luminaires that use LED technology.
  2. Lighting fixture supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, arranged by designation.
- B. Shop Drawings: For nonstandard or custom luminaires.
  1. Include plans, elevations, sections, and mounting and attachment details.
  2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  3. Include diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - B. Recessed Fixtures: Comply with NEMA LE 4.
  - C. Minimum CRI of 80.
  - D. Internal driver.
- 2.2 MATERIALS
- A. Metal Parts:
    1. Free of burrs and sharp corners and edges.
    2. Sheet metal components shall be steel unless otherwise indicated.
    3. Form and support to prevent warping and sagging
  - B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Supports: Sized and rated for luminaire weight.
- D. Flush-Mounted Luminaire Support: Secured to outlet box.
- E. Ceiling-Mounted Luminaire Support:
  1. Ceiling mount with two 5/32-inch (4-mm) diameter aircraft cable supports with adjustable length for mounting height indicated on drawings.
- F. Suspended Luminaire Support:
  1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swaying.
  2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
  3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and for suspension for each unit length of luminaire chassis, including one at each end.
  4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- G. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and return to normal.
  3. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

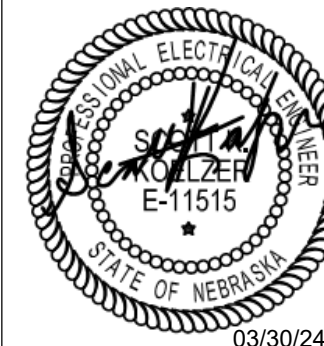
END OF SECTION 265119

PROJECT NAME:  
BEAUTY PARLOUR NEW  
BUILDING ADDITION



ARCHITECTURE  
AND INTERIOR DESIGN  
2024 Hazel Street # 204  
Chicago, Illinois 60624  
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SHEET NAME:  
ELECTRICAL  
SPECIFICATIONS

PROJECT NO.: PROJECT #  
REVIEWED:  
SHEET NO.:



| NO. | ISSUED FOR        | DATE    |
|-----|-------------------|---------|
| 1   | ISSUED FOR PERMIT | 3/30/24 |

CONSULTANTS:

**DIVISION 27 - COMMUNICATIONS**

**SECTION 27 05 00  
COMMON WORK RESULTS FOR COMMUNICATIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. The purpose of this section is to provide general guidelines, required standards and documentation, and other considerations related to the Division 27 in its entirety. This section will be referred to in subsequent sections for this division and others.

**1.02 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01, Division 07, and Division 08 Specification Sections, apply to this Section.  
B. Drawings and provisions of the Contract including Division 26 Electrical.

**1.03 SUBMITTALS AND SHOP DRAWINGS**

A. Refer to Division 1 and the General Provisions of the Contract for exact submittal procedures.  
B. Work shall not proceed without OWNER and Technology Consultant approval of all submitted items.  
C. Shop drawings shall be submitted in advance of construction so as to cause no delay in other Contractors' work. Shop drawings shall be submitted at such time to allow the Engineer reasonable time to review shop drawings to make necessary corrections.  
D. It will be assumed that the Contractor has examined the shop drawings and equipment brochures prior to submission and that materials and equipment depicted will readily fit into the construction. Contractor shall also review all completed work related to materials or equipment depicted to ensure that it has been properly installed.  
E. No materials or equipment subject to prior review by the Engineer shall be fabricated or installed by the Contractor, without such review and approval. The Engineer's review of such drawings and brochures shall not relieve the Contractor of responsibility for deviations from the requirements of the drawings and specifications unless he has notified the Engineer in writing.  
F. The Division 27 Contractor shall provide, without exception prior to material acquisition and installation, multiple copies of the following items, quantity as required by the General Contractor or Construction Manager, as applicable. Specific requirements shall be listed and described within each Division 27 section. Failure to submit required items shall disqualify the bidder.  
1. Product Data Sheets (Catalog Cuts)  
2. Backbone/Riser/Cabling Diagrams  
G. The Division 27 Contractor shall provide Coordination Drawings for review, without exception prior to material acquisition and installation for approval to the Construction Manager. Coordination Drawings shall consist of floor plans and building sections, drawn to scale. Include scaled Cable Tray/Runway layout and relationships between components and adjacent structural and mechanical elements. Show the following:  
1. Vertical and horizontal offsets and transitions.  
2. Clearances for access above and to the side of Cable Tray/Runways.  
3. Vertical elevation of Cable Tray/Runways above floor or bottom of ceiling structure.

H. Provide throughout installation:  
1. Material samples, if requested by the Architect, Technology Consultant, General Contractor, or Construction Manager.  
2. Periodic field quality control reports.  
3. Periodic cable test reports.

I. Provide prior to completion:  
1. Draft cable administration drawings, as requested to assist OWNER in the planning process. Drawings will be requested prior to final documentation and as Xerox reproductions of handwritten field copies.  
J. Provide at completion of each construction/testing phase or area, as defined by the General Contractor or Construction Manager.

1. Cable test and certification reports; summary hard copy or full test results on compact disc or USB drive when requested by the General Contractor or Construction Manager, OWNER Networking & Telecommunications, or the Technology Consultant. Reports shall be submitted to the requesting party within thirty (30) working days of completion for each phase.  
2. One (1) full size set of final drawings of the actual installation for the Division 27 systems. Drawings shall be given as D or E size originals and on disc or USB drive in AutoCAD format.  
K. Provide after the installation is complete:  
1. One (1) full size set of record drawings of the actual installation for the Division 27 systems. Drawings shall be given as D or E size originals and on disc or USB drive in AutoCAD format.

L. Provide after the installation is complete and two (2) weeks before final acceptance, three (3) bound sets of O&M (Operating and Maintenance) Manuals formatted as defined by Division 1 and within Section 27 00 00. In addition to the specific requirements contained within each Division 27 sub-section, each copy of the O&M Manual shall include, at minimum, items listed as follows:  
1. One (1) copy of each approved submittal.  
2. Cable test and certification reports; summary hard copy and full test results on disc or USB drive, and the results of re-tests are to be documented and submitted in both hard copy and ASCII format on a CD-ROM disc.  
3. Handwritten test reports shall not be accepted.  
4. All actions required to correct failed tests shall be documented to include the cable identifier, tests that were failed, and actions performed to correct the problem.

3. Instruction manuals including equipment and cable schedules, operating instructions, and manufacturer's instructions.  
4. Manufacturer Warranty Certificate.  
5. Warranty contacts including but not limited to: names and telephone numbers (office and mobile).

**1.04 CODE AND STANDARDS**

A. All work shall be in compliance with all applicable codes and regulations. Nothing contained within these Specifications shall be misconstrued to permit work not in conformance with the most stringent of applicable codes and standards. It is assumed that bidders have access to, and specific knowledge of, these reference materials in order to ensure conformity with them.  
B. Refer to Division 1 - Reference Standards and General Conditions of the Contract

**1.05 COORDINATION WITH OTHER TRADES**

A. Coordinate layout of work with other trades. Make minor adjustments in location required for coordination. Locations of structural systems, heating work and plumbing lines shall take preference over locations of conduit lines where conflict occurs. Structural systems, heating work, and plumbing lines shall not interfere with or otherwise impede the routing of communication cabling with cable tray, raceways, or other pathways dedicated to communications. All potential issues shall be brought to the attention of the General Contractor or Construction Manager immediately, before proceeding with installation.  
B. Other than minor adjustments shall be submitted to the General Contractor or Construction Manager for approval before proceeding with the work.  
C. Coordinate locations, arrangement, mounting, and support of all communications provisions with Division 26.  
1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.  
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.  
3. To allow right of way for piping and conduit installed at required slope.  
4. So that connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.  
D. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.  
E. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 and Section 26.  
F. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08.  
G. The location of TO(s) and WAO(s) shown on the Drawings is approximate, and the General Contractor or Construction Manager shall have the right to relocate any TO(s) or WAO(s) before they are installed without additional cost.

**1.06 BASIC DEFINITIONS**

A. General:  
1. RCDD: Registered Communications Distribution Designer.  
2. BICSI: Building Industry Consulting Service International.  
3. LAN: Local area network.  
4. EMI: Electromagnetic interference.  
5. EP: Entrance facility.  
6. ER: Equipment room.  
7. TR: Telecommunications room.  
8. Access Provider: An operator that provides a circuit path or facility between the service provider and user. An access provider can also be a service provider.  
9. Service Provider: The operator of a telecommunications transmission service delivered through access provider facilities.  
B. Cable, Connectors, and Connecting Blocks:  
1. UTP: Unshielded (unshielded) twisted pair.  
2. FTP: Shielded twisted pair.  
3. F/FTP: Overall foil screened cable with foil screened twisted pair.

4. FUTP: Overall foil screened cable with unshielded twisted pair.  
5. S/FTP: Overall braid screened cable with foil screened twisted pair.  
6. S/UTP: Overall braid screened cable with unshielded twisted pairs.  
7. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.  
8. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.  
9. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.  
10. IDC: Insulation displacement connector.  
11. Jack: Also commonly called an "outlet," it is the fixed, female connector.  
12. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.  
C. Grounding:  
1. BCT: Bonding conductor for telecommunications.  
2. TGB: Telecommunications grounding busbar.  
3. TMGB: Telecommunications main grounding busbar.

**PART 2 PRODUCTS**

**2.01 WARRANTY**

A. Provide warranties as required by subsequent sections of this division. Documents verifying the duration, included services and maintenance, and the contractor's ability to provide the warranted installation and service, as demonstrated by firestopping manufacturer based on testing and field experience.

**2.02 FIRESTOPPING**

A. Approved Manufacturers:  
1. 3M Fire Protection Products  
2. Dow Corning  
3. Hill Construction Chemicals, Inc.  
4. The RectorSeal Corporation  
B. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of application and service, as demonstrated by firestopping manufacturer based on testing and field experience.  
C. Provide components for each firestopping system that are needed to install fill materials and to comply with Paragraph 1.4. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:  
1. Permanent forming/damming/backing materials including the following:  
a. Semi-refractory fiber (mineral wool) insulation.  
b. Ceramic fiber.  
c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.  
d. Fire-rated formboard.  
2. Joint fillers for joint sealants.  
3. Temporary forming materials  
4. Substrate primers.  
5. Collars.  
6. Steel sleeves.  
D. Permanent forming/damming/backing materials including the following:  
1. Semi-refractory fiber (mineral wool) insulation.  
2. Ceramic fiber.  
3. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.  
4. Fire-rated formboard.  
5. Joint fillers for joint sealants.  
6. Temporary forming materials  
7. Substrate primers.  
8. Collars.  
9. Steel sleeves.

**PART 3 EXECUTION**

**3.01 FIELD CONDITIONS**

A. Examine all elements intended for Communications. Check pathways, raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, installation hazards or impediments, and other conditions affecting installation. Verify that all work required in the field is adequately described within the plans. Proceed with installation only after unsatisfactory conditions and discrepancies have been brought to the attention of the General Contractor or Construction Manager and corrected.  
B. Unless otherwise noted, the footings for cabling and materials shown on the Project Drawings are based upon available plant records, architectural drawings, or the Engineer's route and pathway assumptions. The Contractor shall be required to perform field surveys and measurements, prior to ordering materials.

**3.02 COMMON INSTALLATION REQUIREMENTS**

A. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall mounting items.  
B. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.  
C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.  
D. Right of Way: Give to piping systems installed at a required slope.  
E. The Contractor shall contact Owner before the commencement of work and shall coordinate with Owner personnel and all other trades. Commencement of work shall be coordinated through the General Contractor or Construction Manager.

**SECTION 27 05 00**

**GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS**

**GENERAL**

**1.01 SUMMARY**

A. The purpose of this section is to provide direction on the grounding and bonding requirements for systems covered by this division. This section will be referred to in subsequent sections of this division and others.  
B. Section Includes:  
1. Grounding conductors.  
2. Grounding connectors.  
3. Grounding busbars.  
4. Grounding rods.  
5. Grounding labeling.  
C. Rack and Cabinet Grounding Busbars: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-607-C. Predrilling shall be with holes for use with lugs specified in this Section.  
1. Cabinet-Mounted Busbar: Terminal block, with stainless-steel or copper-plated hardware for attachment to the cabinet.  
2. Rack-Mounted Horizontal Busbar: Designed for mounting in 19 inch equipment racks. Include a copper spigot bar for transitioning to an adjoining rack, and stainless-steel or copper-plated hardware for attachment to the rack.  
3. Rack-Mounted Vertical Busbar: 72 inch long, with stainless-steel hardware for attachment to the rack.

**1.02 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.03 SUBMITTALS**

A. ACTION SUBMITTALS  
1. Product Data: For each type of product.  
2. Shop Drawings: For communications equipment room signal reference grid. Include plans, elevations, sections, details, and attachments to other work.  
B. INFORMATIONAL SUBMITTALS  
1. As-Built Data: Plans showing as-built locations of grounding and bonding infrastructure, including the following:  
a. Ground rods.  
b. Ground and roof rings.  
c. BCT, TMGB, TGBs, and routing of their bonding conductors.  
2. Field quality-control reports.  
C. CLOSEOUT SUBMITTALS  
1. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

**1.04 QUALITY ASSURANCE**

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.  
1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician, who shall be present at all times when Work of this Section is performed at Project site.  
2. Field Inspector: Currently registered by BICSI as a designer RCDD to perform the on-site inspection.

**PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.  
B. Comply with UL 467 for grounding and bonding materials and equipment.  
C. Comply with TIA-607-C.

**2.02 CONDUCTORS**

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:  
1. Harger Lightning & Grounding  
2. Panduit Corp.  
3. TE Connectivity Ltd.  
B. Comply with UL UL 486A-486B.  
C. Conductors: Install solid conductor for No. 8 AWG and smaller and stranded conductors for No. 6 AWG and larger unless otherwise indicated.  
1. The bonding conductors between the TGB and structural steel of steel-frame buildings shall not be smaller than No. 6 AWG.  
2. The bonding conductors between the TMGB and structural steel of steel-frame buildings shall not be smaller than No. 6 AWG.

smaller than No. 6 AWG.

**D. Underground Grounding Conductors:**

1. Install bare copper conductor, No. 2 AWG minimum.  
E. Grounding Electrode System:  
1. The BCT between the TMGB and the ac service equipment ground shall not be smaller than No. 1/0 AWG.  
F. Crossed Conductors: Stranded copper wire, green or green with yellow stripe insulation, insulated for 600 V, and complying with UL 83.  
1. Ground wire for custom-length equipment ground jumpers shall be No. 6 AWG, 19-strand, UL-listed, Type THHN wire.  
2. If cable tray contains electrical power conductors, then NFPA 70, Article 392 "Cable Trays" governs, and the minimum equipment grounding conductor size is No. 4 AWG.  
3. Cable Tray Equipment Grounding Wire: No. 6 AWG.  
G. Bare Copper Conductors:  
1. Solid Conductors: ASTM B3.  
2. Stranded Conductors: ASTM B8.  
3. Tinned Conductors: ASTM B33.  
4. Sizes and types of conductors in the three subparagraphs below are typical examples. 28-kcmil (14.2-28, mm) bonding cable in "Bonding Cable" Subparagraph is slightly larger than No. 6 AWG.  
a. Bonding Cable: 28 kcmils, 14 strands of No. 17 AWG conductor, and 1/4 inch in diameter.  
b. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.  
c. Bonding Jumper: Tinned copper tape, braided conductors terminated with two-hole copper ferrules, 1-5/8 inches wide and 1/16 inch thick.

**2.03 CONNECTORS**

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:  
1. Chateaufort Products, Inc.  
2. Harger Lightning & Grounding.  
B. Terminations and Connections: TIA-232  
1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.  
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.  
3. Connections to Ground Rods at Test Wells: Bolted connectors.  
4. Connections to Structural Steel: Welded connectors.  
C. Inaccessible connectors listed for the purpose. Listed by an NRTL as complying with NFPA 70 for specific types, sizes, and combinations of conductors and other items connected. Comply with UL 486A-486B.  
D. Compression Wire Connectors: Crimp-and-compress connectors that bond to the conductor when the connector is compressed around the conductor. Comply with UL 467.  
1. Electroplated inner copper, C and H shaped.  
E. Signal Reference Grid Connectors: Combination of compression wire connectors, access floor grounding clamps, bronze U-bolt grounding clamps, and copper split-bolt connectors, designed for the purpose.  
F. Busbar Connectors: Cast silicon bronze, solderless compression-type, mechanical connector, with a long barrel and two holes spaced on 5/8- or 1-inch centers for a two-bolt connection to the busbar.  
G. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

**2.04 JUMPERS**

A. Cable Tray Grounding Jumper:  
1. Not smaller than No. 6 AWG and not longer than 12 inches. If jumper is a wire, it shall have a crimped grounding lug with two holes and long barrel for two crimps. If jumper is a flexible braid, it shall have a one-hole ferrule. Attach with grounding screw or connector provided by cable tray manufacturer.  
2. Not smaller than No. 10 AWG and not longer than 12 inches. If jumper is a wire, it shall have a crimped grounding lug with one hole and standard barrel for one crimp. If jumper is a flexible braid, it shall have a one- or two-hole ferrule. Attach with grounding screw or connector provided by cable tray manufacturer.

**2.05 GROUNDING BUSBARS**

A. TMGB: Predrilled, wall-mounted, rectangular bars of hard-drawn solid copper, 1/4 by 4 inches in cross-section, length as indicated on Drawings. The busbar shall be NRTL listed as used as TMGB and shall comply with TIA-607-C.  
1. Predrilling shall be with holes for use with lugs specified in this Section.  
2. In "Mounting Hardware" Subparagraph below, the minimum required clearance is 2 inches (50 mm). 4 inches (100 mm) is typical in the industry. Indicate busbar length on Drawings.  
3. Mounting Hardware: Stand-off brackets that provide a 4-inch clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.  
4. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.  
B. TGB: Predrilled rectangular bars of hard-drawn solid copper, 1/4 by 2 inches in cross-section, length as indicated on Drawings. The busbar shall be for wall mounting, shall be NRTL listed as complying with UL 467, and shall comply with TIA-607-C.  
1. Predrilling shall be with holes for use with lugs specified in this Section.  
2. Mounting Hardware: Stand-off brackets that provide at least a 2-inch clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.  
3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.  
C. Rack and Cabinet Grounding Busbars: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-607-C. Predrilling shall be with holes for use with lugs specified in this Section.  
1. Cabinet-Mounted Busbar: Terminal block, with stainless-steel or copper-plated hardware for attachment to the cabinet.  
2. Rack-Mounted Horizontal Busbar: Designed for mounting in 19 inch equipment racks. Include a copper spigot bar for transitioning to an adjoining rack, and stainless-steel or copper-plated hardware for attachment to the rack.  
3. Rack-Mounted Vertical Busbar: 72 inch long, with stainless-steel hardware for attachment to the rack.

**2.06 GROUND RODS**

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet in diameter.

**EXECUTION**

**3.01 EXAMINATION**

A. Examine the ac grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of the electrical system.  
B. Inspect the test results of the ac grounding system measured at the point of BCT connection.  
C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.  
D. Proceed with connection of the BCT only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

A. Bonding shall include the ac utility power service entrance, the communications cable entrance, and the grounding electrode system. The bonding of these elements shall form a loop so that each element is connected to at least two others.  
B. Comply with NECA 1.  
C. Comply with TIA-607-C.  
D. Grounding and Bonding Conductors:  
1. Install in the straightest and shortest route between the origination and termination point, and no longer than required. The bend radius shall not be smaller than eight times the diameter of the conductor. No one bend may exceed 90 degrees.  
2. Install without splices.  
3. Support at not more than 36-inch intervals.  
4. Install grounding and bonding conductors in 3/4-inch PVC conduit until conduit enters a telecommunications room. The grounding and bonding conductor pathway through a plenum shall be in EMT. Conductors shall not be installed in EMT unless otherwise indicated.  
E. Cable Basket and Trays:  
1. Ground cable trays according to NFPA 70 unless additional grounding is specified.  
2. Cable trays shall be bonded together with splice plates listed for grounding purposes or with listed bonding jumpers.  
3. Cable trays with single-conductor power conductors shall be bonded together with a grounding conductor run in the tray along with the power conductors and bonded to the tray at 72-inch intervals. The grounding conductor shall be sized according to NFPA 70, Article 250.122, "Size of Equipment Grounding Conductors," and Article 392, "Cable Trays."  
4. When using epoxy- or powder-coat painted cable trays as a grounding conductor, completely remove coating at all splice contact points or ground connector attachment. After completing splice-to-grounding bolt attachment, repair the coated surfaces with coating materials recommended by cable tray manufacturer.  
5. Bond cable trays to power source for cables contained within with bonding conductors sized according to NFPA 70, Article 250.122, "Size of Equipment Grounding Conductors."  
F. Grounding Busbars:  
1. Indicate locations of grounding busbars on Drawings. Install busbars horizontally, on insulated spacers 2 inches minimum from wall, 12 inches above finished floor unless otherwise indicated.

2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.  
G. Conduit Chase Pipes:  
1. Furnish and install 4" EMT conduit "Chase Pipes" within the TR and other information transport system spaces where communications cabling must pass through suspended ceiling tiles en route to point of cabling termination.  
2. Chase Pipes shall be securely mounted to the wall above Cable Runway segments using slotted unistrut and 4" pipe clamps. Reamed and bush pipes at both ends prior to cabling rough-in.

**H. Connections:**

1. Bond metallic equipment in a telecommunications equipment room to the grounding busbar in that room, using equipment grounding conductors not smaller than No. 6 AWG.  
2. Stacking of conductors under a single bolt is not permitted when connecting to busbars.  
3. Assemble the wire connector to the conductor, complying with manufacturer's written instructions and as follows:  
a. Use crimping tool and the die specific to the connector.  
b. Pre-twist the conductor.  
c. Apply an antioxidant compound to all bolted and compression connections.  
4. Primary Protector: Bond to the TMGB with insulated bonding conductor.  
5. Interconnections: Interconnect all TGBs with the TMGB with the telecommunications backbone conductor. If more than one TMGB is installed, interconnect TMGBs using the grounding equalizer conductor. The telecommunications backbone conductor and grounding equalizer conductor size shall not be less than 2 kcmil/linear foot of conductor length, up to a maximum size of No. 3/0 AWG unless otherwise indicated.  
6. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install top-mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 2 AWG bonding conductors.  
7. Structural Steel: Where the structural steel of a steel frame building is readily accessible within the room or space, bond each TGB and TMGB to the vertical steel of the building frame.  
8. Electrical Power Panels: Where an electrical panelboard for telecommunications equipment is located in the same room or space, bond each TGB to the ground bar of the panelboard.  
9. Shielded Cable: Bond the shield of shielded cable to the TGB in communications rooms and spaces. Comply with TIA-568-1 and TIA-568-C-2 when grounding shielded balanced twisted-pair cables.  
10. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with NFPA 70; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to the bonding requirements in this Section.  
11. Access Floors: Bond all metal parts of access floors to the TGB.  
12. Equipment Room Signal Reference Grid: Provide a low-impedance path between telecommunications cabinets, equipment racks, and the reference grid, using No. 6 AWG bonding conductors.  
a. Install the conductors in grid pattern on 4-foot centers, allowing bonding of one pedestal from each access floor tile.  
b. Bond the TGB of the equipment room to the reference grid at two or more locations.  
c. Bond all conduits and piping entering the equipment room to the TGB at the perimeter of the room.  
13. Towers and Antennas:  
a. Ground Ring: Buried at least 30 inches below grade and at least 24 inches from the base of the tower or mounting.  
b. Bond each tower base and metallic frame of a dish to the ground ring, buried at least 18 inches below grade.  
c. Bond the ground ring and antenna grounds to the equipment room TMGB or TGB, buried at least 30 inches below grade.  
d. Bond metallic fences within 6 feet of towers and antennas to the ground ring, buried at least 18 inches below grade.  
e. Special Requirements for Roof-Mounted Towers:  
1) Bond tower base steel, the TGB in the equipment room, and antenna support guys to the roof ring.  
2) Connect roof ring to the perimeter conductors of the lightning protection system.  
14. Waveguides and Coaxial Cable:  
a. Bond cable shields at the point of entry into the building to the TGB and to the cable entrance plate, using No. 2 AWG bonding conductors.  
b. Bond coaxial cable surge arrester to the ground or roof ring using bonding conductor size recommended by surge-arrester manufacturer.

**1. GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS**

1. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.  
2. Comply with IEEE C2 grounding requirements.  
3. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches extends above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, non-shrink grout.  
4. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect grounding conductors to cable armor and cable shields according to written instructions by manufacturer of splicing and latching kits.

**3.03 FIELD QUALITY CONTROL**

A. Perform tests and inspections.  
B. Tests and Inspections:  
1. Inspect physical and mechanical conditions. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.  
2. Test the bonding connections of the system using an ac earth ground-resistance test set, taking two-point bonding measurements in each telecommunications equipment room containing a TMGB and a TGB and using the process recommended by BICSI TDMM. Conduct tests with the facility in operation.  
a. Measure the resistance between the busbar and the nearest available grounding electrode. The maximum acceptable value of this bonding resistance is 100 milliohms.  
3. Test for ground loop currents using a digital clamp-on ammeter, with a full-scale of not more than 10 A, displaying current in increments of 0.01 A at an accuracy of plus/minus 2.0 percent.  
a. With the grounding infrastructure completed and the communications system electronics operating, measure the current in every conductor connected to the TMGB and in each TGB. Maximum acceptable ac current level is 1 A.  
C. Excessive Ground Resistance: If resistance to ground at the BCT exceeds 5 ohms, notify Architect promptly and include recommendations to reduce ground resistance.  
D. Grounding system will be considered defective if it does not pass tests and inspections.  
E. Prepare test and inspection reports.

**END OF SECTION 27 05 26**

**SECTION 27 10 00**

**STRUCTURED CABLING**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. The purpose of this section is to provide direction for the products and installation practices for the structured cabling system, including horizontal cabling, fiber optic and copper backbone cabling, and unbalanced cabling.  
B. Section Includes:  
1. Category 6 twisted pair cable.  
2. Twisted pair cable hardware, including plugs, jacks, patch panels, and cross-connects.  
3. Source quality control requirements for twisted pair cable.  
4. 9/125 micrometer single-mode, outside plant optical fiber cable (OS2).  
5. Optical fiber cable connecting hardware, patch panels, and cross-connects.

**1.02 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.  
B. Related Requirements:

**1.03 COPPER HORIZONTAL CABLING DESCRIPTION**

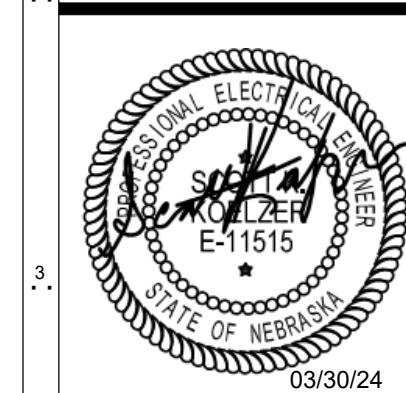
A. Horizontal cable cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1" in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.  
1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.  
2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.  
3. Bridged taps and splices shall not be installed in the horizontal cabling.

PROJECT NAME:  
**BEAUTY PARLOUR NEW  
BUILDING ADDITION**

**B2**  
LAB

ARCHITECTURAL  
AND TECHNICAL DRAWING DESIGN  
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03/30/24

SHEET NAME:  
**ELECTRICAL  
SPECIFICATIONS**

PROJECT NO: PROJECT #  
REVIEWED:  
SHEET NO:

**E503**



| NO. | ISSUED FOR        | DATE    |
|-----|-------------------|---------|
| 1   | ISSUED FOR PERMIT | 3.30.24 |

- B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the equipment outlets to the station equipment.
- C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.
- 1.04 OPTICAL FIBER BACKBONE CABLING DESCRIPTION**
- A. Optical fiber backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

- 1.05 SUBMITTALS**
- A. ACTION SUBMITTALS
- Product Data: For each type of product.
  - Shop Drawings: Reviewed and stamped by RCDD.
    - System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
    - Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment, including the following:
      - Telecommunications rooms plans and elevations.
      - Telecommunications pathways.
      - Telecommunications system access points.
      - Telecommunications grounding system.
      - Telecommunications conductor drop locations.
      - Typical telecommunications details.
      - Mechanical, electrical, and plumbing systems.
      - Cross-connects.
      - Patch panels.
      - Patch cords.
      - Cross-Connects and Patch Panels: Detail mounting assemblies and show elevations and physical relationship between the installed components.
    - Twisted pair cable testing plan.
- B. MAINTENANCE MATERIAL SUBMITTALS
- Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    - Connecting Blocks: One of each type.
    - Faceplates: One of each type.
    - Jacks: One of each type.
    - Patch-Panel Units: One of each type.
    - Plugs: One of each type.
- C. QUALITY ASSURANCE
- Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
    - Installation Supervisor: Installation shall be under the direct supervision of BICSI Technician or Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
    - Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.

- PART 2 PRODUCTS**
- 2.01 PERFORMANCE REQUIREMENTS**
- A. HORIZONTAL CABLING
- General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
  - Telecommunications Pathways and Spaces: Comply with TIA-569-D.
  - Grounding: Comply with TIA-607-C.
- B. FIBER BACKBONE CABLING
- General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
  - Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - Flame-Spread Index: 25 or less.
    - Smoke-Developed Index: 50 or less.
  - Telecommunications Pathways and Spaces: Comply with TIA-569-D.
  - Grounding: Comply with TIA-607-C.

- 2.02 GENERAL CABLE CHARACTERISTICS**
- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
  - Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed plenum communications raceway.
  - Communications, Plenum Rated: Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed according to NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."
  - Communications, Non-plenum: Type CMR complying with UL 1666.
  - Communications, Non-plenum: Type CMP or Type CMR in listed plenum or riser communications raceway.
  - Communications, Non-plenum: Type CMP or Type CMR in metallic conduit installed according to NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - Flame-Spread Index: 25 or less.
  - Smoke-Developed Index: 50 or less.
- C. RoHS compliant.

- 2.03 HORIZONTAL CABLE AND CONDUCTORS**
- A. CATEGORY 6 TWISTED PAIR CABLE
- Description: Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
  - Approved Manufacturers:
    - Superior Essex
    - Hitachi Cable America (HCA)
    - Hubbell Premise
    - Panduit
  - Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
  - Conductors: 100-ohm, 23 AWG solid copper.
  - Shielding/Screening: Unshielded twisted pairs (UTP), Shielded twisted pairs (FTP), Screened twisted pairs (S/FTP), and Screened and shielded twisted pairs (S/STP).
  - Cable Rating: Plenum.
  - Jacket: Blue thermoplastic.

- 2.04 FIBER OPTIC BACKBONE CABLE AND CONDUCTORS**
- A. 125 MICROMETER SINGLE-MODE, OUTSIDE PLANT OPTICAL FIBER CABLE (OS2)
- Description: Single mode, 125-micrometer, 6 and 12 fibers, single loose tube, optical fiber cable.
  - Approved Manufacturers:
    - Superior Essex
    - Hitachi Cable America (HCA)
    - Corning
  - Standards:
    - Comply with TIA-492CAAB for detailed specifications.
    - Comply with TIA-568-C.3 for performance specifications.
    - Comply with ICEA S-37-640 for mechanical properties.
    - Maximum Attenuation: 0.5 dB/km at 1310 nm; 0.5 dB/km at 1550 nm.
  - Jacket:
    - Jacket Color: Black.
    - Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
    - Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

- 2.05 CONNECTORS**
- A. BALANCED TWISTED PAIR CABLE HARDWARE
- Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
  - Approved Manufacturers:
    - Leviton
    - Hubbell Premise
    - Panduit
  - General Requirements for Twisted Pair Cable Hardware:
    - Comply with the performance requirements of Category 5e, Category 6, and Category 6a.
    - Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
    - Cables shall be terminated with connecting hardware of same category or higher.
    - Jacks and Jack Assemblies:

- Female, eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
  - Designed to snap-in to a patch panel or faceplate.
  - Standard: Comply with TIA-568-C.2.
  - Marked to indicate transmission performance.
5. Plugs and Plug Assemblies:
- Male, eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
  - Standard: Comply with TIA-568-C.2.
  - Marked to indicate transmission performance.
6. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.
- B. OPTICAL FIBER CABLE HARDWARE**
- Approved Manufacturers:
    - APF
    - Hubbell Premise
    - Panduit
    - Corning
  - Standards:
    - Comply with Fiber Optic Connector Interchangeability Standard (FOCIS) specifications of the TIA-604 series.
    - Comply with TIA-568-C.3.
  - Connector Type/Type LC complying with TIA-604-10-B connectors.
  - Plugs and Plug Assemblies:
    - Male: color-coded modular telecommunications connector designed for termination of a single optical fiber cable.
    - Insertion loss not more than 0.75 dB.
    - Marked to indicate transmission performance.
  - Jacks and Jack Assemblies:
    - Female: quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of a single optical fiber cable.
    - Insertion loss not more than 0.75 dB.
    - Marked to indicate transmission performance.
    - Designed to snap-in to a patch panel or faceplate.

- 2.06 PATCHING AND CROSS CONNECTIONS**
- A. COPPER
- Approved Manufacturers:
    - Hubbell Premise
    - Ortronics
    - Panduit
    - Corning
  - Patch Cords: Factory-made, dual-fiber cables in 1-meter lengths.
- B. FIBER
- Approved Manufacturers:
    - Hubbell Premise
    - Ortronics
    - Panduit
    - Corning
  - Patch Cords: Factory-made, dual-fiber cables in 1-meter lengths.

- 2.07 PATCH PANELS AND CONNECTING BLOCKS**
- A. COPPER PANELS AND CONNECTING BLOCKS
- Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
    - Approved Manufacturers:
      - Leviton
      - Hubbell Premise
      - Panduit
    - Features:
      - Universal T568A and T568B wiring labels.
      - Labeling areas adjacent to conductors.
      - Replaceable connectors.
      - Ports: 24 or 48.
      - Rack units: 1 or 2.
    - Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
    - Number of Jacks per Field: One for each four-pair conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.
  - Connecting Blocks:
    - 110-style IDC for Category 6.
    - Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.
  - Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
    - Number of Terminals per Field: One for each conductor in assigned cables.
- B. FIBER PANELS
- Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
  - Approved Manufacturers:
    - Hubbell Premise
    - Ortronics
    - Panduit
    - Corning
  - Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

- 2.08 WORKSTATIONS**
- A. Faceplate:
  - One, Two, or Four port, vertical single gang faceplates designed to mount to single gang wall boxes.
  - For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
    - Flush mounting jacks, positioning the cord at a 45-degree angle.

- PART 3 EXECUTION**
- 3.01 WIRING METHODS**
- A. Wiring Method: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, attics, and gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.
  - Install plenum cable in environmental air spaces, including plenum ceilings.
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

- 3.02 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES**
- A. Comply with NECA 1 and NECA/BICSI 568.
- B. General Requirements for Cabling:
  - Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
  - Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
  - Install 110-style IDC termination hardware unless otherwise indicated.
  - Do not twist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
  - Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
  - MUTOA shall not be used as a cross-connect point.
  - Consolidation points may be used only for making a direct connection to equipment outlets:
    - Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
    - Locate consolidation points for twisted-pair cables at least 49 feet (15 m) from communications equipment room.
  - Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
  - Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
  - Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.

- Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
  - In the communications equipment room, install a 10-foot long service loop on each end of cable.
  - Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.
- C. Open-Cable Installation:
  - Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  - Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8-inches above ceilings by cable supports not more than 60-inches apart.
  - Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
  - Cold cable 10-foot long not less than 12-inches in diameter above each feed point.
- D. Installation of Cable Routed Exposed under Raised Floors:
  - Install plenum-rated cable only.
  - Install cabling after the flooring system has been installed in raised floor areas.
  - Cold cable 10-foot long not less than 12-inches in diameter below each feed point.
- E. Group connecting hardware for cables into separate logical fields.
- F. Separation from EMI Sources:
  - Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
  - Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
    - Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inch.
    - Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inch.
    - Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inch.
  - Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
    - Electrical Equipment Rating Less Than 2 kVA: A minimum of 2 1/2 inch.
    - Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inch.
    - Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inch.
  - Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
    - Electrical Equipment Rating Less Than 2 kVA: No requirement.
    - Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inch.
    - Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inch.
  - Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inch.
  - Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inch.

- 3.03 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES**
- A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.
- B. General Requirements for Optical Fiber Cabling Installation:
  - Comply with TIA-568-C.1 and TIA-568-C.3.
  - Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
  - Terminate all cables; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
  - Cables may not be spliced. Secure and support cables at intervals not exceeding 30-inches and not more than 6-inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
  - Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
  - Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  - Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
  - In the communications equipment room, provide a 10-foot long service loop on each end of cable.
  - Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
  - Cable may be terminated on connecting hardware that is rack or cabinet mounted.
- C. Open-Cable Installation:
  - Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  - Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
  - Cold cable 10-foot long not less than 12-inches in diameter and the minimum fiber cable bend radius specified by the manufacturer above each feed point.
- D. Installation of Cable Routed Exposed under Raised Floors:
  - Install plenum-rated cable only.
  - Install cabling after the flooring system has been installed in raised floor areas.
  - Cold cable 15-foot long not less than 12-inches in diameter and the minimum fiber cable bend radius specified by the manufacturer below each feed point.
- E. Group connecting hardware for cables into separate logical fields.

- 3.04 CABLE INSTALLATION IN TRAY**
- A. Install cables only when each cable tray run has been completed and inspected.
- B. Fasten cables on horizontal runs with cable clamps or cable ties according to NECA/VE 2. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.
- C. Fasten cables on vertical runs to cable trays every 18-inches.
- D. Fasten and support cables that pass from one cable tray to another or drop from cable trays to equipment enclosures. Fasten cables to the cable tray at the point of exit and support cables independent of the enclosure. The cable length between cable trays or between cable tray and enclosure shall be no more than 72-inches.
- E. Tie MI cables down every 36 inches where required to provide a 2-hour fire rating and every 72-inches otherwise.
- F. In existing construction, remove inactive or dead cables from cable trays.
- G. Protect installed cable trays and cables.
- H. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials and shall remain in place until the risk of damage is over.

- 3.05 FIELD QUALITY CONTROL AND TESTING**
- A. COPPER
- Perform tests and inspections.
    - Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
    - Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
    - Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
    - Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
  - Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.
  - Remove and replace cabling where test results indicate that they do not comply with specified requirements.
  - End-to-end cabling will be considered defective if it does not pass tests and inspections.
    - Prepare test and inspection reports.
- B. FIBER
- Perform tests and inspections.
    - Factory test optical fiber cables according to TIA-526-14-B and TIA-568-C.3.
    - Factory test pre-terminated optical fiber cable assemblies according to TIA-526-14-B and TIA-568-C.3.
    - Cable will be considered defective if it does not pass tests and inspections.
  - Tests and Inspections:
    - Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
    - Visually inspect cable placement, cable termination, grounding and bonding, equipment and

- patch cords, and labeling of all components.
- Optical Fiber Cable Tests:
  - Test instruments shall meet or exceed applicable requirements in TIA-568-C.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
  - Link End-to-End Attenuation Tests:
    - Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than those calculated according to equation in TIA-568-C.1.
- Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- Remove and replace cabling where test results indicate that it does not comply with specified requirements.
- End-to-end cabling will be considered defective if it does not pass tests and inspections.
- Prepare test and inspection reports.

END OF SECTION 27 10 00

CONSULTANTS:

| NO. | ISSUED FOR        | DATE    |
|-----|-------------------|---------|
| 1   | ISSUED FOR PERMIT | 3.30.24 |

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**

ARCHITECTURE:  
**B2**  
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03/30/24

SHEET NAME:  
**ELECTRICAL SPECIFICATIONS**

PROJECT NO.: PROJECT #  
REVIEWED:  
SHEET NO.:

**E504**



# MECHANICAL LEGEND

NOTE: THIS IS A MASTER SYMBOLS LIST. ALL SYMBOLS, ABBREVIATIONS, ETC. MAY NOT NECESSARILY BE USED ON ALL DRAWINGS.

## PIPING

### HYDRONIC

|          |                          |
|----------|--------------------------|
| — HWS —  | HEATING HOT WATER SUPPLY |
| — HWR —  | HEATING HOT WATER RETURN |
| — CWS —  | CHILLED WATER SUPPLY     |
| — CWR —  | CHILLED WATER RETURN     |
| — HCS —  | HOT/CHILLED WATER SUPPLY |
| — HCR —  | HOT/CHILLED WATER RETURN |
| — CS —   | CONDENSER WATER SUPPLY   |
| — CR —   | CONDENSER WATER RETURN   |
| — HPWS — | HEAT PUMP WATER SUPPLY   |
| — HPWR — | HEAT PUMP WATER RETURN   |
| — CD —   | CONDENSATE DRAIN         |
| — RL —   | REFRIGERANT LIQUID       |
| — RG —   | REFRIGERANT HOT GAS      |
| — RS —   | REFRIGERANT SUCTION      |

### STEAM

|         |                            |
|---------|----------------------------|
| — HPS — | HIGH PRESSURE STEAM        |
| — HPC — | HIGH PRESSURE CONDENSATE   |
| — MPS — | MEDIUM PRESSURE STEAM      |
| — MPC — | MEDIUM PRESSURE CONDENSATE |
| — LPS — | LOW PRESSURE STEAM         |
| — LPC — | LOW PRESSURE CONDENSATE    |
| — PCR — | PUMPED CONDENSATE RETURN   |

### MISCELLANEOUS

|         |                         |
|---------|-------------------------|
| — SMS — | SNOW MELT WATER SUPPLY  |
| — SMR — | SNOW MELT WATER RETURN  |
| — FOS — | FUEL OIL SUPPLY         |
| — FOR — | FUEL OIL RETURN         |
| — FOV — | FUEL OIL VENT           |
| — LPG — | LIQUEFIED PETROLEUM GAS |
| — G —   | NATURAL GAS             |

### DIRECT DIGITAL CONTROLS

|  |  |
|--|--|
|  | TEMPERATURE SENSOR WITH THERMOWELL     |
|  | DUCT MOUNTED TEMPERATURE SENSOR        |
|  | LOW LIMIT TEMPERATURE SENSOR           |
|  | DIFFERENTIAL PRESSURE SENSOR           |
|  | DIFFERENTIAL PRESSURE TRANSMITTER      |
|  | HILO DIFFERENTIAL PRESSURE TRANSMITTER |
|  | AIR FLOW STATION                       |
|  | CHILLED WATER COOLING COIL             |
|  | HOT WATER HEATING COIL                 |
|  | DX COOLING COIL                        |

## VALVES / SYMBOLS

|  |                                       |
|--|---------------------------------------|
|  | DIRECTION OF FLOW IN PIPING           |
|  | TWO WAY CONTROL VALVE                 |
|  | THREE WAY CONTROL VALVE               |
|  | BUTTERFLY VALVE                       |
|  | GLOBE VALVE                           |
|  | BALANCING VALVE                       |
|  | SOLENOID VALVE                        |
|  | CONTROL VALVE                         |
|  | THERMOSTATIC MIXING VALVE             |
|  | TRIPLE DUTY VALVE WITH PRESSURE PORTS |
|  | CHECK VALVE                           |
|  | STRAINER                              |
|  | STRAINER WITH BLOWOFF                 |
|  | RELIEF/SAFETY VALVE                   |
|  | PRESSURE REDUCING VALVE               |
|  | VACUUM BREAKER                        |
|  | VENTURI                               |
|  | GAS COCK                              |
|  | SIGHT GLASS                           |
|  | BALL VALVE                            |
|  |                                       |
|  | THERMOSTATIC TRAP                     |
|  | F&T TRAP                              |
|  | GATE VALVE                            |
|  | PRESSURE GAUGE                        |
|  | PRESSURE GAUGE WITH PIGTAIL           |
|  | THERMOMETER, THERMOMETER W/ TEST WELL |
|  | UNION                                 |
|  | FLANGE CONNECTION                     |
|  | PIPING ELBOW UP                       |
|  | PIPING ELBOW DOWN                     |
|  | PIPING TEE UP                         |
|  | PIPING TEE DOWN                       |
|  | PIPING CAP                            |
|  | GAUGE COCK                            |
|  | WATER HAMMER ARRESTOR                 |
|  | PIPING REDUCER                        |
|  | PRESSURE REGULATING VALVE             |
|  | FLEXIBLE CONNECTOR                    |
|  | AUTOMATIC AIR VENT                    |
|  | MANUAL AIR VENT                       |
|  | PIPE ANCHOR / ROOF PIPING SUPPORT     |
|  | EXPANSION JOINT                       |
|  | PIPE GUIDE                            |
|  | PRESSURE SWITCH                       |
|  | TEMPERATURE SENSOR                    |
|  | DIFFERENTIAL PRESSURE SENSOR          |

## HVAC

|  |   |
|--|---|
|  | LINEAR SLOT DIFFUSER                                      |
|  | INSULATED FLEXIBLE DUCT (MAXIMUM 6'-0\"/>                 |
|  | BRANCH DUCT WITH 45° TAP AND MANUAL VOLUME DAMPER         |
|  | BRANCH DUCT WITH CONICAL FITTING AND MANUAL VOLUME DAMPER |
|  | ELBOW WITH TURNING VANES                                  |
|  | SUPPLY OR OUTSIDE AIR DUCT UP                             |
|  | SUPPLY OR OUTSIDE AIR DUCT DOWN                           |
|  | RETURN OR TRANSFER AIR DUCT UP                            |
|  | RETURN OR TRANSFER AIR DUCT DOWN                          |
|  | EXHAUST AIR DUCT UP                                       |
|  | EXHAUST AIR DUCT DOWN                                     |
|  | TYPE, NECK SIZE, CFM AT SUPPLY DIFFUSER OR REGISTER       |
|  | TYPE, THROAT SIZE, CFM AT RETURN GRILLE OR REGISTER       |
|  | TYPE, SIZE AT EXHAUST GRILLE OR REGISTER                  |
|  | MANUAL VOLUME DAMPER                                      |
|  | SQUARE TO ROUND TRANSITION                                |

### SENSORS:

|     |  |    |                 |
|-----|--|----|-----------------|
| T   | TEMPERATURE                            | H  | HUMIDISTAT      |
| CO  | CARBON DIOXIDE                         | CO | CARBON MONOXIDE |
| DP  | DIFFERENTIAL PRESSURE                  | NO | NITROGEN OXIDE  |
| TH  | COMBINATION TEMPERATURE/HUMIDISTAT     |    |                 |
| TIC | COMBINATION TEMPERATURE/CARBON DIOXIDE |    |                 |

### MISCELLANEOUS

|  |  |
|--|--|
|  | SECTION CUT:<br>UPPER NUMBER INDICATED DRAWING NUMBER<br>LOWER NUMBER INDICATES SHEET NUMBER     |
|  | CONNECTION POINT OF NEW WORK TO EXISTING   |
|  | CONNECTION POINT OF DEMOLITION TO EXISTING   |
|  | DETAIL REFERENCE:<br>UPPER NUMBER INDICATES DETAIL NUMBER<br>LOWER NUMBER INDICATES SHEET NUMBER |
|  | RISER DESIGNATION  |
|  | NOTE REFERENCE SYMBOL  |
|  | EXISTING LINEWORK  |
|  | DEMOLITION LINEWORK  |
|  | NEW LINEWORK   |

## ABBREVIATIONS

|       |                                     |
|-------|-------------------------------------|
| A/C   | AIR CONDITIONING                    |
| AFF   | ABOVE FINISHED FLOOR                |
| AHU   | AIR HANDLING UNIT                   |
| BOD   | BOTTOM OF DUCT                      |
| BOP   | BOTTOM OF PIPE                      |
| BOS   | BOTTOM OF STRUCTURE                 |
| BTU   | BRITISH THERMAL UNIT                |
| CH    | CHILLER                             |
| CFM   | CUBIC FEET PER MINUTE               |
| CRAC  | COMPUTER ROOM AIR CONDITIONING UNIT |
| CRCU  | COMPUTER ROOM CONDENSING UNIT       |
| CT    | COOLING TOWER                       |
| CU    | CONDENSING UNIT                     |
| CUH   | CABINET UNIT HEATER                 |
| (D)   | DEMOLISHED                          |
| DB    | DRY BULB                            |
| DDC   | DIRECT DIGITAL CONTROL              |
| DN    | DOWN                                |
| DX    | DIRECT EXPANSION                    |
| (E)   | EXISTING TO REMAIN                  |
| EA    | EXHAUST AIR                         |
| EAT   | ENTERING AIR TEMPERATURE            |
| EDB   | ENTERING DRY BULB                   |
| EF    | EXHAUST FAN                         |
| ERV   | ENERGY RECOVERY VENTILATOR          |
| EWB   | ENTERING WET BULB                   |
| EWT   | ENTERING WATER TEMPERATURE          |
| FCU   | FAN COIL UNIT                       |
| FD    | FIRE DAMPER                         |
| FSD   | FIRE/SMOKE DAMPER                   |
| GPM   | GALLONS PER MINUTE                  |
| HD    | HEAD                                |
| HP    | HORSEPOWER, HEAT PUMP               |
| HOA   | HAND OFF AUTOMATIC                  |
| HRV   | HEAT RECOVERY VENTILATOR            |
| HSTAT | HUMIDISTAT                          |
| HTG   | HEATING                             |
| IN WC | INCHES OF WATER COLUMN              |
| LAT   | LEAVING AIR TEMPERATURE             |
| LRA   | LOCKED ROTOR AMPS                   |
| LWT   | LEAVING WATER TEMPERATURE           |
| MAU   | MAKE UP AIR UNIT                    |
| MBH   | 1000 BTU PER HOUR                   |
| MCA   | MINIMUM CIRCUIT AMPACITY            |
| MFR   | MANUFACTURER                        |
| MMBH  | 1,000,000 BTU PER HOUR              |
| (N)   | NEW                                 |
| N/A   | NOT APPLICABLE                      |
| NC    | NOISE CRITERIA, NORMALLY CLOSED     |
| NO    | NORMALLY OPEN                       |
| OA    | OUTSIDE AIR                         |
| PHØ   | PHASE                               |
| PRV   | PRESSURE REDUCING VALVE             |
| (R)   | RELOCATED EXISTING                  |
| RA    | RETURN AIR                          |
| RH    | RELATIVE HUMIDITY                   |
| RLA   | RUNNING LOAD AMPS                   |
| RPM   | REVOLUTIONS PER MINUTE              |
| RTU   | ROOF TOP UNIT                       |
| SA    | SUPPLY AIR                          |
| SD    | SMOKE DAMPER                        |
| SF    | SQUARE FEET, SUPPLY FAN             |
| SP    | STATIC PRESSURE                     |
| SS    | STAINLESS STEEL                     |
| ST    | SOUND TRAP, STEAM TRAP              |
| STM   | STEAM                               |
| TA    | TRANSFER AIR OPENING                |
| TD    | TRANSFER DUCT                       |
| TDH   | TOTAL DYNAMIC HEAD                  |
| TSTAT | THERMOSTAT                          |
| TYP   | TYPICAL                             |
| UH    | UNIT HEATER                         |
| VAC   | VACUUM                              |
| VAV   | VARIABLE AIR VOLUME                 |
| W     | WITH                                |
| W/O   | WITHOUT                             |
| WB    | WET BULB                            |
| WC    | WATER COLUMN                        |
| WPD   | WATER PRESSURE DROP                 |

## MTG. HEIGHTS U.N.O.

|                         |         |
|-------------------------|---------|
| THERMOSTATS (USER ADJ.) | 48" AFF |
| CONTROLS (CENTERLINE)   | 48" AFF |

# MECHANICAL SPECIFICATIONS

### HVAC SPECIFICATIONS

CODE COMPLIANCE AND STANDARDS:  
LOCAL MECHANICAL CODE, SMACNA, NFPA

DUCTWORK:  
GALVANIZED SHEET METAL, ASTM A572  
COATING DESIGNATION G90  
INSTALL TURNING VANES IN ALL SQUARE ELBOWS.

DUCT INSULATION INTERIOR:  
1-1/2" 3/4 LB DENSITY FLEXIBLE FIBERGLASS WRAP ASTM C553 TYPE II CLASS F-1.

DUCT INSULATION JACKET INTERIOR:  
SCRM FOIL FACED VAPOR BARRIER, ASTM C921 TYPE I.

DUCT INSULATION EXTERIOR:  
RIGID GLASS FIBER BOARD, ASTM C612  
CLASS 2, SEMI-RIGID JACKETED BOARD,  
12 PCF DENSITY

DUCT INSULATION JACKET EXTERIOR:  
ALUMINUM, ASTM B209, 3003 ALLOY  
H-14 TEMPER

FIRE HAZARD CLASSIFICATION FOR INSULATING MATERIALS:  
FLAME SPREAD 25 OR LESS, SMOKE RATING 50 OR LESS.

ADHESIVE & FASTENERS:  
COMPLY WITH NFPA 90A AND INDUSTRY STANDARD.

DUCT CONSTRUCTION & INSTALLATION:  
CONSTRUCT IN ACCORDANCE TO LATEST EDITION OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS".

FLEXIBLE DUCTWORK:  
INSULATED PRESSURE RATING SUITABLE FOR APPLICATION.

BALANCING:  
MANUAL OUTDOOR AIR AND RETURN AIR DAMPERS

REFRIGERANT PIPING SPECIFICATIONS

CODE COMPLIANCE AND STANDARDS:  
ANSI B31.5, ASME CODE FOR PRESSURE PIPING - REFRIGERANT PIPING  
ANSIASHRAE STANDARD 15: SAFETY CODE FOR MECHANICAL REFRIGERATION

PIPING MATERIAL:  
COPPER TUBING, ASTM B 280, TYPE ACR, OR ASTM B 88, TYPE L, HARD-DRAWN STRAIGHT LENGTHS, AND SOFT-ANNEALED COILS, SEAMLESS COPPER TUBING.

FITTINGS:  
WROUGHT-COPPER FITTINGS: ANSI B16.22, STREAMLINED PATTERN

JOINING MATERIALS:  
BRAZING FILLER METALS: AWS A5.8, CLASSIFICATION BAG-1 (SILVER)

INSULATE SUCTION LINES WITH 3/4" FLEXIBLE ELASTOMERIC INSULATION.

PIPING INSTALLATION  
INSTALL IN ACCORDANCE WITH ASHRAE STANDARD 15 - "THE SAFETY CODE FOR MECHANICAL REFRIGERATION"

INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS.

INSTALL PIPING FREE OF SAGS AND BENDS.

SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.

INSTALL PIPING AS SHORT AND DIRECT AS POSSIBLE, WITH A MINIMUM NUMBER OF JOINTS, ELBOWS, AND FITTINGS. INSTALL VALVES AND SPECIALTIES IN ACCESSIBLE LOCATIONS TO ALLOW FOR SERVICE AND INSPECTION.

INSTALL PIPE SLEEVES AT PENETRATIONS IN EXTERIOR WALLS AND FLOOR ASSEMBLIES.

INSTALL SLEEVES THROUGH FLOORS, WALLS, OR CEILINGS, SIZED TO PERMIT INSTALLATION OF FULL-THICKNESS INSULATION.

SLOPE REFRIGERANT PIPING AS FOLLOWS:

INSTALL HORIZONTAL HOT-GAS DISCHARGE PIPING WITH A UNIFORM SLOPE DOWNWARD AWAY FROM COMPRESSOR.

INSTALL HORIZONTAL SUCTION LINES WITH A UNIFORM SLOPE DOWNWARD TO COMPRESSOR.

LIQUID LINES MAY BE INSTALLED LEVEL.

PIPE JOINT CONSTRUCTION  
REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS.

REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.

SOLDERED JOINTS: CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK."

BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," CHAPTER "PIPE AND TUBE."

HANGERS AND SUPPORTS  
INSTALL THE FOLLOWING PIPE ATTACHMENTS:

ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL RUNS LESS THAN 20 FEET LONG.

ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL RUNS 20 FEET OR LONGER.

COPPER-CLAD HANGERS AND SUPPORTS FOR HANGERS AND SUPPORTS IN DIRECT CONTACT WITH COPPER PIPE.

INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:

NPS 1/2: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.  
NPS 3/8: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.  
NPS 1: MAXIMUM SPAN, 72 INCHES; MINIMUM ROD SIZE, 1/4 INCH.  
NPS 1-1/4: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.  
NPS 1-1/2: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.

# MECHANICAL GENERAL NOTES

- THE PLANS ARE, TO A GREAT EXTENT, DIAGRAMMATIC IN NATURE. DRAWING SCALES SHOULD BE VERIFIED FROM DIMENSIONS ON ARCH. PLANS. THE INFORMATION PRESENTED IS AS EXACT AS COULD BE SECURED. THE CONTRACTOR SHALL OBTAIN EXACT LOCATION, MEASUREMENTS, LEVELS, ETC. AT THE SITE AND SHALL SATISFACTORILY ADAPT THE WORK TO THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO SUBMITTING A BID TO COVER THE CONDITIONS AT THE SITE INFORMING THEMSELVES OF ALL DETAILS.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, LAWS, ACTS AND ORDINANCES, AND ALL AUTHORITIES HAVING JURISDICTION.
- THE COMPLETED INSTALLATION SHALL BE IN ACCORDANCE WITH ALL ENGINEERING REQUIREMENTS, THE OWNER'S DESIGN CRITERIA, UTILITY COMPANY REQUIREMENTS, APPLICABLE INDUSTRY STANDARDS OF GOOD PRACTICE AND SAFETY, AND THE MANUFACTURER'S STRICTEST RECOMMENDATIONS FOR EQUIPMENT AND PRODUCT APPLICATION AND INSTALLATION.
- RECORD DRAWINGS - PREPARE AND SUBMIT TO THE OWNER RECORD DRAWINGS INDICATING THE EXACT LOCATION OF ALL EQUIPMENT INCLUDING THE EQUIPMENT'S "AS INSTALLED" SIZE(S), MANUFACTURER, MODEL NUMBERS, AND PERFORMANCE RATINGS.
- SUPPORTS - EQUIPMENT, PIPING, DUCTWORK OR ANY OTHER ACCESSORY SHALL NOT BE SUPPORTED FROM OTHER PIPING, DUCTWORK, METAL ROOF DECK, LATERAL BRACING BRIDGING, OR CONDUIT. ITEMS SHALL ONLY BE SUPPORTED FROM BUILDING STRUCTURE.
- COORDINATE EXACT LOCATION OF ALL DUCTWORK, AIR TERMINAL UNITS, PIPING, ETC., WITH STRUCTURAL, ARCHITECTURAL, ELECTRICAL, AND OTHER MECHANICAL SYSTEMS.
- WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, INSTALL MECHANICAL SERVICE AND OVERHEAD EQUIPMENT TO PROVIDE MAXIMUM HEADROOM POSSIBLE. EQUIPMENT MUST BE SERVICEABLE FROM A PORTABLE 8FT LADDER.
- ALL DUCTWORK, PIPING, AND TEMPERATURE CONTROL CONDUIT TO VIBRATING EQUIPMENT SHALL HAVE FLEXIBLE CONNECTORS.
- COORDINATE ALL ROOF AND CHASE PENETRATIONS WITH STRUCTURAL DRAWINGS AND ROOF INSTALLER.
- OWNER TO HAVE CHOICE SALVAGE OF ALL PLUMBING FIXTURES AND MECHANICAL EQUIPMENT WHICH ARE PLANNED TO BE REMOVED BY CONTRACTOR. EQUIPMENT NOT SALVAGED BY OWNER SHALL BE REMOVED FROM SITE AND PROPERLY DISPOSED OF BY THE CONTRACTOR.
- BEFORE REMOVAL OF ANY MECHANICAL EQUIPMENT, CONTRACTOR SHALL RECOVER REFRIGERANT IN A PROPERLY LABELED D.O.T. APPROVED REFRILLABLE CYLINDER TO MEET E.P.A. STANDARDS. RECOVERED REFRIGERANT MUST BE CHEMICALLY ANALYZED AND REPROCESSED OR DISPOSED OF PER E.P.A. REQUIREMENTS, SECTION 608 OF THE CLEAN AIR ACT AND A.R.I. STANDARD 700.
- THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK.
- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
- CONCRETE HOUSEKEEPING PADS TO SUIT MECHANICAL EQUIPMENT SHALL BE SIZED AND LOCATED BY THE MECHANICAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE 4 INCHES. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 4 INCHES ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE SIZE AND LOCATION OF CONCRETE HOUSEKEEPING PADS WITH GENERAL CONTRACTOR.
- PROVIDE MINIMUM 36" ACCESS CLEARANCE TO ALL FAN POWERED BOX AND VAV BOX MAINTENANCE PANELS.
- CONTRACTOR TO COORDINATE DUCTWORK WITH FIRE RATED WALLS AND FLOORS SHOWN ON ARCHITECTURAL DRAWINGS, MAINTAINING NECESSARY RATING OF WALLS. CONTRACTOR IS RESPONSIBLE FOR ALL CONNECTIONS TO SMOKE-FIRE DAMPERS.
- ALL SA DUCT BRANCH TAKE-OFFS TO DIFFUSER TO BE SAME SIZE AS DIFFUSER NECK UNLESS OTHERWISE NOTED.
- ALL INLET DUCT SIZES OF VARIABLE AIR VOLUME OR FAN-POWERED BOX UNITS SHALL BE AS PER BOX SCHEDULE ON MECHANICAL SCHEDULE.
- ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- PROVIDE MIN. OF 5'-0" OF DUCT FROM ROOM TERMINAL UNITS TO FIRST DIFFUSER TAKE-OFFS.
- CONTRACTOR SHALL COORDINATE LOCATION OF ALL DIFFUSERS AND GRILLES WITH STRUCTURAL, ELECTRICAL, AND ARCHITECTURAL REFLECTED CEILING PLANS.
- PROVIDE SIZES AND NUMBER OF REFRIGERANT LINES ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- BEFORE INSTALLATION, EQUIPMENT CONTRACTOR SHALL VERIFY THAT COILS CAN BE REMOVED WITHOUT INTERFERENCE. CONTRACTOR SHALL PROVIDE ADEQUATE ACCESS AND COIL REMOVAL SPACE FOR ALL EQUIPMENT.
- ACCESS PANELS ARE REQUIRED (MIN. 18"x18") FOR ACCESS TO EVERY VALVE, DAMPER, AIR TERMINAL UNIT, AND CONTROL SENSOR IF NOT OTHERWISE ACCESSIBLE.

## MECHANICAL SHEET INDEX

|      |                                     |
|------|-------------------------------------|
| M001 | MECHANICAL LEGEND AND GENERAL NOTES |
| M101 | MECHANICAL PLANS                    |
| M401 | MECHANICAL SCHEDULES AND DETAILS    |

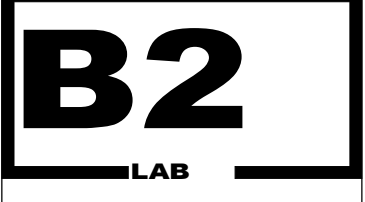
### CODES AND STANDARDS

- THE COMPLETED INSTALLATION SHALL BE IN ACCORDANCE WITH:
- 2012 INTERNATIONAL BUILDING CODE & LOCAL AMENDMENTS
  - 2018 INTERNATIONAL RESIDENTIAL CODE & LOCAL AMENDMENTS
  - 2012 INTERNATIONAL MECHANICAL CODE & LOCAL AMENDMENTS
  - 2017 NATIONAL ELECTRICAL CODE & LOCAL AMENDMENTS
  - 2012 INTERNATIONAL FIRE CODE & LOCAL AMENDMENTS
  - 2000 LIFE SAFETY CODE & LOCAL AMENDMENTS
  - 2015 OMAHA PLUMBING CODE & LOCAL AMENDMENTS
  - OMAHA MUNICIPAL CODE
  - ACCESSIBILITY CODE 2012 IBC (INCLUDING ICC/ANSI A117.1-2009)
  - INTERNATIONAL FUEL GAS CODE & LOCAL AMENDMENTS
  - APPLICABLE NFPA NATIONAL FIRE CODE STANDARDS
  - APPLICABLE FEDERAL, STATE CODES, LAWS, ACTS AND ORDINANCES
  - AUTHORITIES HAVING JURISDICTION
  - ALL UTILITY COMPANY REQUIREMENTS
  - APPLICABLE INDUSTRY STANDARDS OF GOOD PRACTICE AND SAFETY
  - THE MANUFACTURER'S STRICTEST RECOMMENDATIONS FOR EQUIPMENT, PRODUCT APPLICATION & INSTALLATION

|                   |         |
|-------------------|---------|
| DATE              |         |
| NO. ISSUED/FROM   |         |
| DATE              | 3.30.24 |
| NO. ISSUED/FROM   |         |
| ISSUED FOR PERMIT |         |
| DATE              |         |
| NO. ISSUED/FROM   |         |

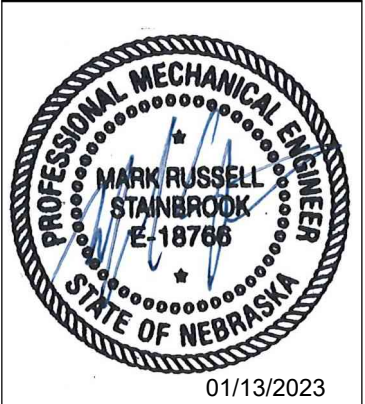
CONSULTANTS:

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**



ARCHITECTURE:  
MARK RUSSELL STANBROOK  
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SHEET NAME:  
MECHANICAL LEGEND AND GENERAL NOTES

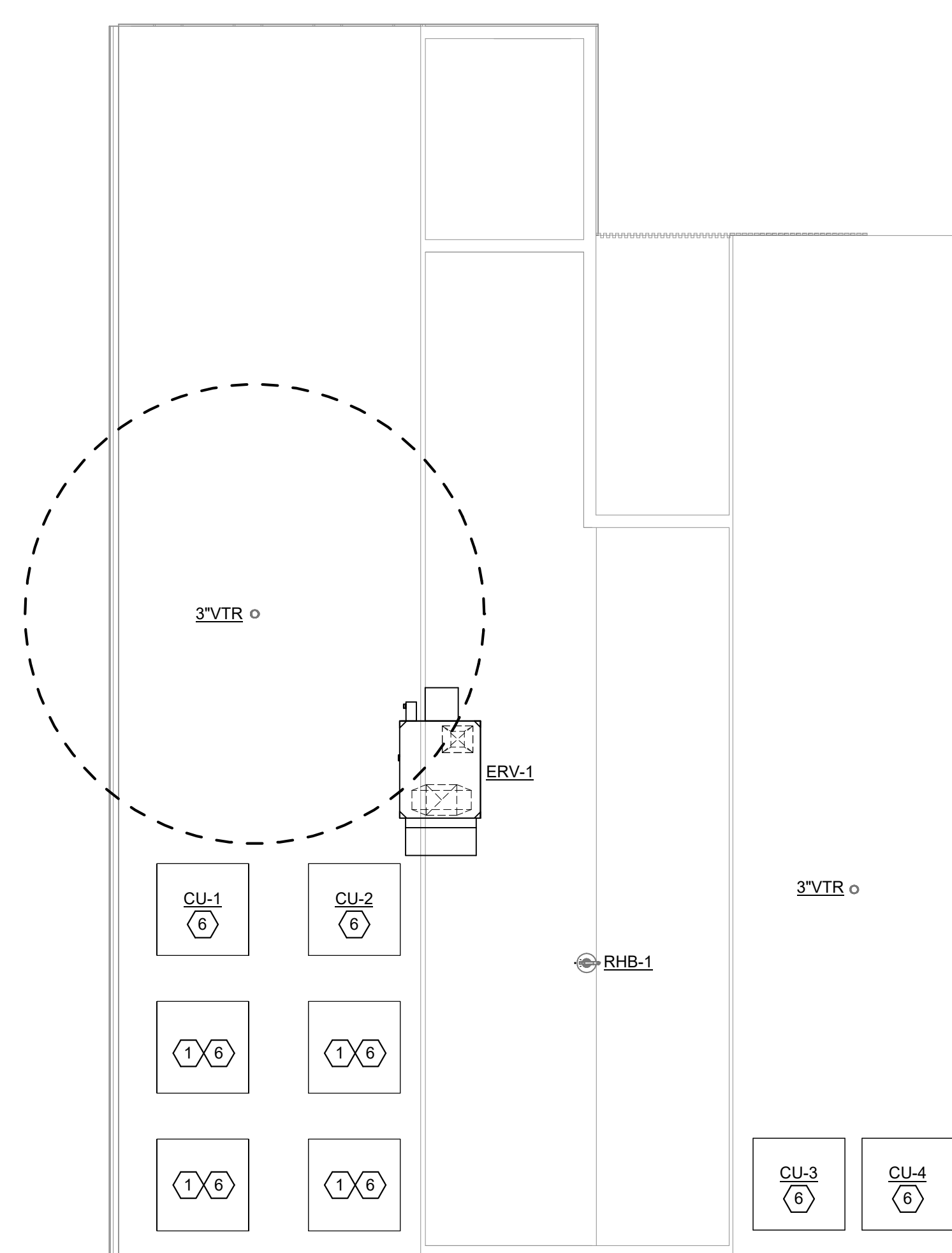
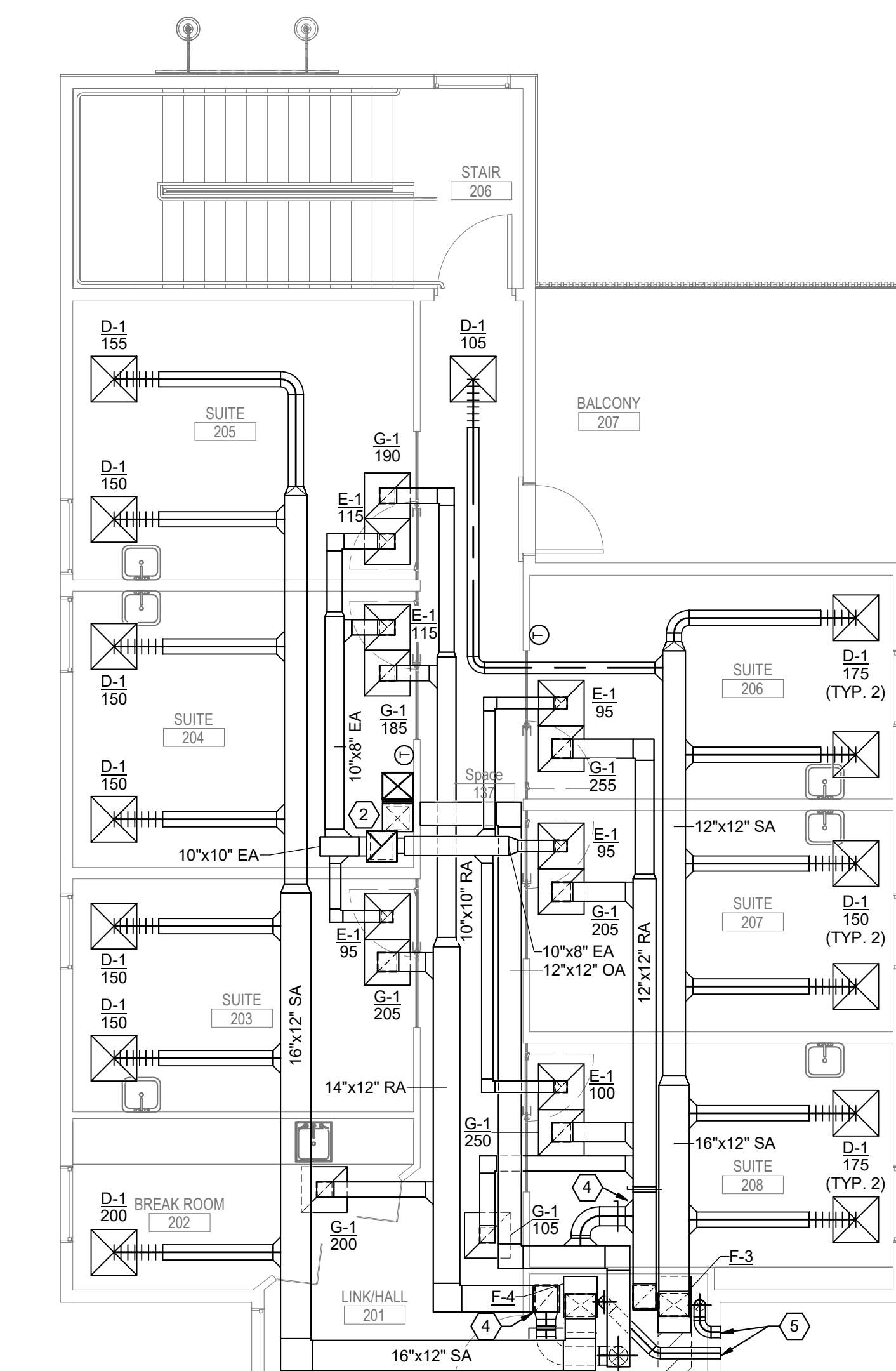
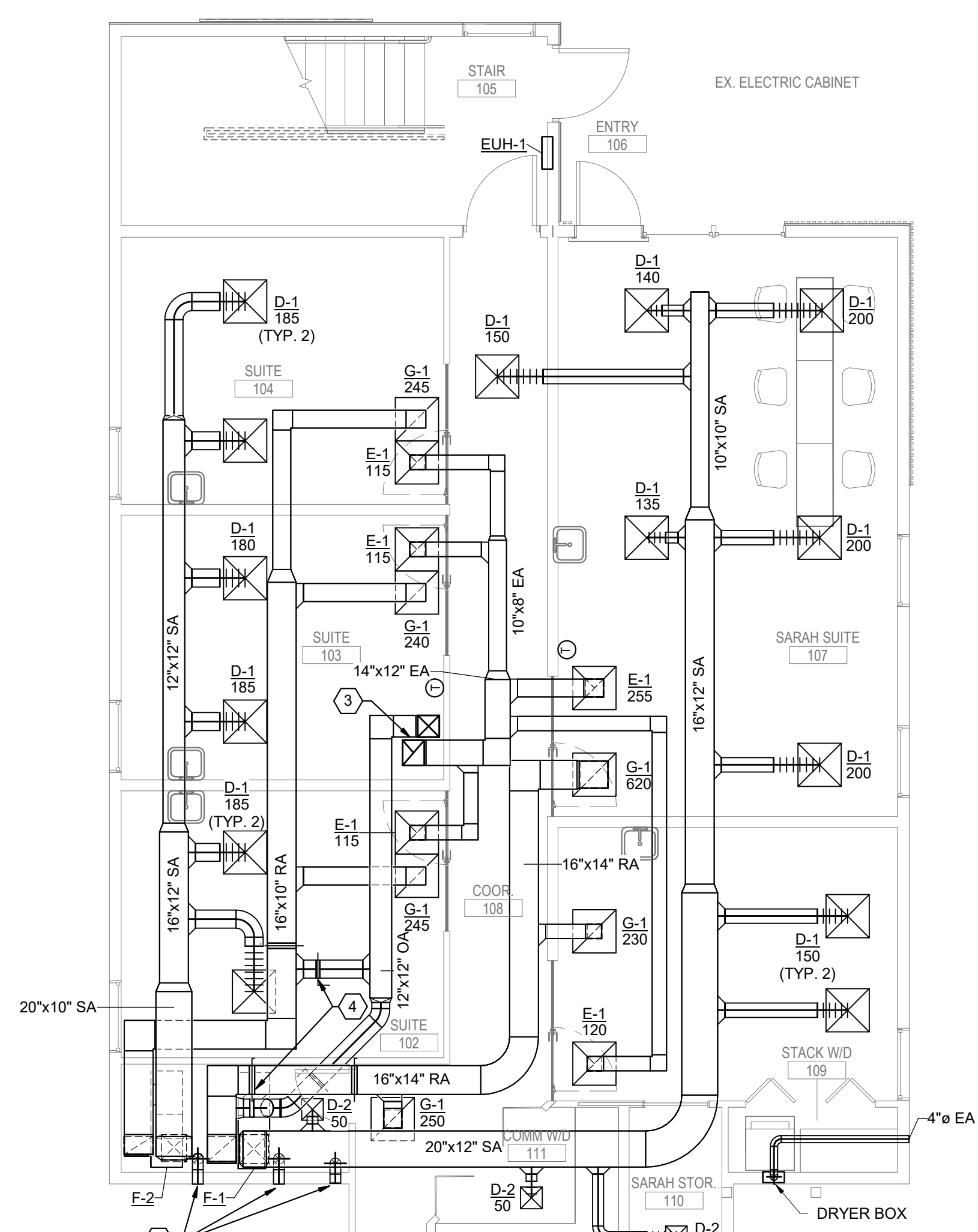
PROJECT NO.: PROJECT #  
REVIEWED:  
SHEET NO.: **M001**



00009 - MPE (Frank Reida)  
HVAC to meet IMC 2012 or ASHRAE 62.1

- GENERAL NOTES** (THIS SHEET)
- REFER TO SHEET M001 FOR SYMBOLS LEGEND AND ADDITIONAL GENERAL NOTES.
  - DRYER EXHAUST: INSTALL 4" x 26 GAUGE GALVANIZED STEEL DRYER VENT THROUGH WALL WITH 4" OPENING DAMPER AT WALL CAP OR PRIMEX SV28NS SOFFIT VENT. COLOR BY ARCHITECT. R-19 BATT INSULATION DRAPED OVER DRYER VENT IN FLOOR CEILING ASSEMBLY. TYPICAL. ROUTE DRYER EXHAUST DUCT AS NEEDED TO SATISFY DRYER MANUFACTURER'S MAXIMUM LENGTH REQUIREMENT. PROVIDE LABEL IN LAUNDRY ROOM WITH LIST OF DRYER VENT LENGTHS AND BELOWS. MAINTAIN A MINIMUM 3' DISTANCE FROM OPERABLE OPENINGS.
  - DRYER BOX: PROVIDE PRODUCT MODEL DBX-1000-M DRYER VENT BOX. SLOPE VENT TO OUTSIDE WALL. IN RATED WALLS INSTALL PER MANUFACTURER'S INSTRUCTIONS FOR RATED WALLS OR PROVIDE FIRE WRAP. INSTALL ON WARM SIDE OF INSULATION.
  - INSULATED SUPPLY DUCT WITH 1-1/2 INCHES OF FLEXIBLE FIBERGLASS DUCT INSULATION. INSULATE RETURN DUCT FROM 5 FEET UP STREAM OF BACKDRAFT TO CONNECTION TO FURNACE WITH 2 INCHES OF FLEXIBLE FIBERGLASS DUCT INSULATION. INSULATE OUTSIDE AIR DUCT WITH 2 INCHES OF FLEXIBLE FIBERGLASS DUCT INSULATION.

- KEY NOTES** (THIS SHEET)
- EXISTING CONDENSING UNIT TO BE RELOCATED TO ROOF.
  - 16"x16" EA AND 16"x14" OA UP TO ERV-1. 14"x12" EA AND 12"x12" OA DOWN.
  - 14"x12" EA AND 12"x12" OA UP.
  - PROVIDE BALANCING DAMPER ON OA NEAR CONNECTION TO RETURN. PROVIDE BALANCING DAMPER AND ADJUSTABLE BACKDRAFT DAMPER IN RETURN ABOVE OA CONNECTION. BALANCING DAMPERS MUST BE INSTALLED IN AN ACCESSIBLE LOCATION.
  - CONCENTRIC VENT THROUGH WALL PER MANUFACTURER'S RECOMMENDATIONS.
  - COORDINATE FALL PROTECTION BARRIER WITH ARCHITECT.



1 FIRST FLOOR MECHANICAL PLAN

2 SECOND FLOOR MECHANICAL PLAN

3 MECHANICAL ROOF PLAN

| NO. | ISSUED FOR        | DATE    |
|-----|-------------------|---------|
| 1   | ISSUED FOR PERMIT | 3.30.24 |

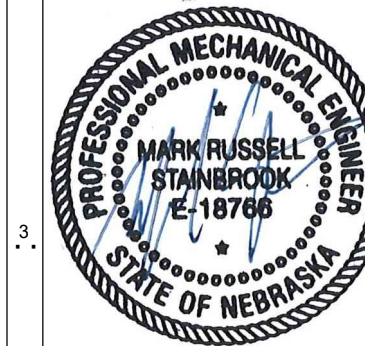
CONSULTANTS:

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**



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01/13/2023

SHEET NAME:  
MECHANICAL PLANS

PROJECT NO. PROJECT #  
REVIEWED:  
SHEET NO.:

M101



### GAS FURNACE SCHEDULE

| MARK | MANUFACTURER & MODEL OR EQUAL | SERVES       | LOCATION | FAN INFORMATION |                 |            | COOLING COIL         |                          | HEATING                   |                          |                           | ELECTRICAL DATA    |          |                    |             | SIZE L x W x H | NOTES          |             |
|------|-------------------------------|--------------|----------|-----------------|-----------------|------------|----------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------|----------|--------------------|-------------|----------------|----------------|-------------|
|      |                               |              |          | CFM             | OUTDOOR AIR CFM | E.S.P. "WG | TOTAL CAPACITY (MBH) | MIN INPUT CAPACITY (MBH) | MIN OUTPUT CAPACITY (MBH) | MAX INPUT CAPACITY (MBH) | MAX OUTPUT CAPACITY (MBH) | MINIMUM EFFICIENCY | MOTOR HP | MAXIMUM INPUT AMPS | MOPD (AMPS) |                |                | VOLTS/PH/Hz |
| F-1  | CARRIER 59TPB8060V17-14       | FIRST FLOOR  | MECH 112 | 1475            | 410             | 0.5        | 3.5                  | 39                       | 38                        | 60                       | 58                        | 96%                | 3/4      | 13.4               | 15          | 120/1/60       | 29.5"x17.5x35" | 1.2,3,4,5   |
| F-2  | CARRIER 59TPB8040V17-12       | FIRST FLOOR  | MECH 112 | 1105            | 340             | 0.5        | 2.5                  | 26                       | 25                        | 40                       | 39                        | 96%                | 1/2      | 9.8                | 15          | 120/1/60       | 29.5"x17.5x35" | 1.2,3,4,5   |
| F-3  | CARRIER 59TPB8040V17-12       | SECOND FLOOR | MECH 102 | 1105            | 315             | 0.5        | 2.5                  | 26                       | 25                        | 40                       | 39                        | 96%                | 1/2      | 9.8                | 15          | 120/1/60       | 29.5"x17.5x35" | 1.2,3,4,5   |
| F-4  | CARRIER 59TPB8040V17-12       | SECOND FLOOR | MECH 102 | 1105            | 350             | 0.5        | 2.5                  | 26                       | 25                        | 40                       | 39                        | 96%                | 1/2      | 9.8                | 15          | 120/1/60       | 29.5"x17.5x35" | 1.2,3,4,5   |

- NOTES:**
1. PROVIDE WITH DISPOSABLE FILTER, REFRIGERANT, COMBUSTION AIR, AND VENT PIPING PER MANUFACTURERS RECOMMENDATIONS.
  2. PROVIDE WITH SECONDARY CONDENSATE DRAIN AND OVERFLOW SHUT DOWN.
  3. PROVIDE ACID NEUTRALIZATION KITS WITH EACH FURNACE FOR THEIR FLUE PIPES.
  4. PROVIDE WITH SEVEN DAY PROGRAMABLE THERMOSTAT
  5. REFERENCE SHORT CIRCUIT SCHEDULE ON ELECTRICAL DRAWINGS FOR SHORT CIRCUIT RATING.

### ENERGY RECOVERY UNIT SCHEDULE

| MARK  | MANUFACTURER & MODEL | LOCATION | SUPPLY FAN |            | EXHAUST FAN |            | ELECTRICAL DATA |          | SUMMER CONDITIONS |                       | WINTER CONDITIONS |                   | TOTAL EFFECTIVENESS | WEIGHT (LBS) | NOTES  |                   |             |
|-------|----------------------|----------|------------|------------|-------------|------------|-----------------|----------|-------------------|-----------------------|-------------------|-------------------|---------------------|--------------|--------|-------------------|-------------|
|       |                      |          | AIR CFM    | E.S.P. "WG | AIR CFM     | E.S.P. "WG | MCA AMP         | MOPD AMP | VOLTS/PH/Hz       | COOLING CAP TOT (MBH) | SUPPLY TEMP DB/WB | HEATING CAP (MBH) |                     |              |        | SUPPLY TEMP DB/WB |             |
| ERV-1 | RENEWAIRE HETXJRTV   | ROOF     | 1415       | 0.4        | 1415        | 0.4        | 18.4            | 25       | 240/1/60          | 13.7                  | 80.5/69.1         | 50.10%            | 28.1                | 47.8/37.8    | 69.80% | 689               | 1.2,3,4,5,6 |

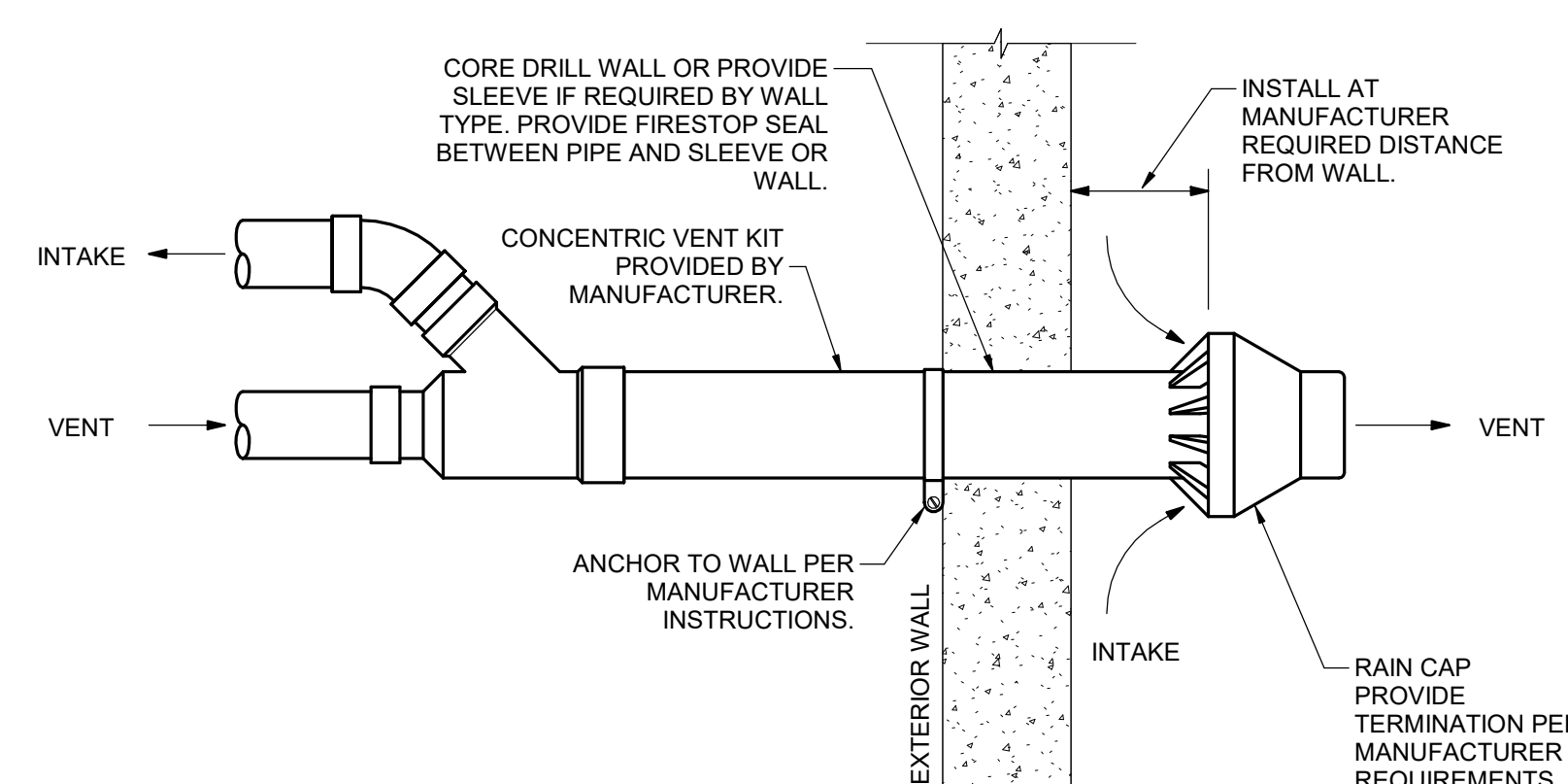
- NOTES:**
1. PROVIDE WITH MERV-8 FILTERS FOR BOTH AIR STREAMS, VFDs FOR MOTORS, STANDARD CONTROLS AND SHAFT GROUNDING KIT.
  2. PROVIDE WITH MOTOR STARTERS/NON-FUSED DISCONNECT AND 24 VOLT RELAY PACKAGE
  3. UNITS SELECTED AT OUTSIDE AIR TEMPERATURES OF SUMMER: 94/75 DB/WB WINTER: -6.1/7.4 DB/WB AND RETURN AIR TEMPERATURES OF SUMMER 75/52.3 DB/WB SUMMER AND 70/51.1 DB/WB WINTER
  4. PROVIDE WITH WALL MOUNTED TIME CLOCK IN MECH ROOM 102.
  5. PROVIDE WITH INSULATED 18" ROOF CURB. COORDINATE WITH ROOF STRUCTURE.
  6. REFERENCE SHORT CIRCUIT SCHEDULE ON ELECTRICAL DRAWINGS FOR SHORT CIRCUIT RATING.

### AIR OUTLET AND INLET SCHEDULE

| MARK       | MANUF. & MODEL | TYPE  | MODULE SIZE, IN | NECK SIZE (W X H OR DIA), IN | MAX AIRFLOW CFM | MATERIAL | FINISH | OPPOSED BLADE DAMPER | BORDER                          | PERFORMANCE |              | NOTES |
|------------|----------------|---|-----------------|------------------------------|-----------------|----------|--------|----------------------|---------------------------------|-------------|--------------|-------|
|            |                |   |                 |                              |                 |          |        |                      |                                 | MAX. NC     | MAX. SPD, IN |       |
| D-1        | TITUS TMS      | LOUVERED SQUARE CEILING DIFFUSER<br>4-WAY THROW | 24 X 24         | 6                            | 140             | STEEL    | WHITE  | YES                  | LAY-IN OR SURFACE<br>(REF: RCP) | 30          | 0.10         | 1     |
|            |                |   |                 |                              | 250             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 380             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 500             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 600             |          |        |                      |                                 | 30          | 0.10         |       |
| D-2        | TITUS TMS      | LOUVERED SQUARE CEILING DIFFUSER<br>4-WAY THROW | 12 X 12         | 6                            | 155             | STEEL    | WHITE  | YES                  | LAY-IN OR SURFACE<br>(REF: RCP) | 30          | 0.10         | 1     |
|            |                |   |                 |                              | 220             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 300             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 450             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 600             |          |        |                      |                                 | 30          | 0.10         |       |
| G-1<br>E-1 | TITUS PAR      | PERFORATED LAY-IN<br>RETURN / EXHAUST           | 24 X 24         | 6 X 6                        | 100             | STEEL    | WHITE  | YES                  | LAY-IN OR SURFACE<br>(REF: RCP) | 30          | 0.10         |       |
|            |                |   |                 |                              | 200             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 300             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 450             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 650             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 1100            |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 1500            |          |        |                      |                                 | 30          | 0.10         |       |
| G-2<br>E-2 | TITUS PAR      | PERFORATED LAY-IN<br>RETURN / EXHAUST           | 12 X 12         | 6                            | 100             | STEEL    | WHITE  | YES                  | LAY-IN OR SURFACE<br>(REF: RCP) | 30          | 0.10         |       |
|            |                |   |                 |                              | 125             |          |        |                      |                                 | 30          | 0.10         |       |
|            |                |   |                 |                              | 360             |          |        |                      |                                 | 30          | 0.10         |       |

- NOTES:**
- GEN BORDER TYPES SHALL BE COMPATIBLE WITH ARCHITECTURAL CEILING TYPE FOR THE ROOM IN WHICH THE AIR DEVICE IS LOCATED. CONTRACTOR TO CONFIRM BORDER TYPE PRIOR TO ORDERING.
1. PROVIDE WITH INSULATED BACK PAN.
- GEN EQUIVALENT MANUFACTURERS ARE KRUEGER, PRICE, CARNES, ANEMOSTAT, NAILOR.

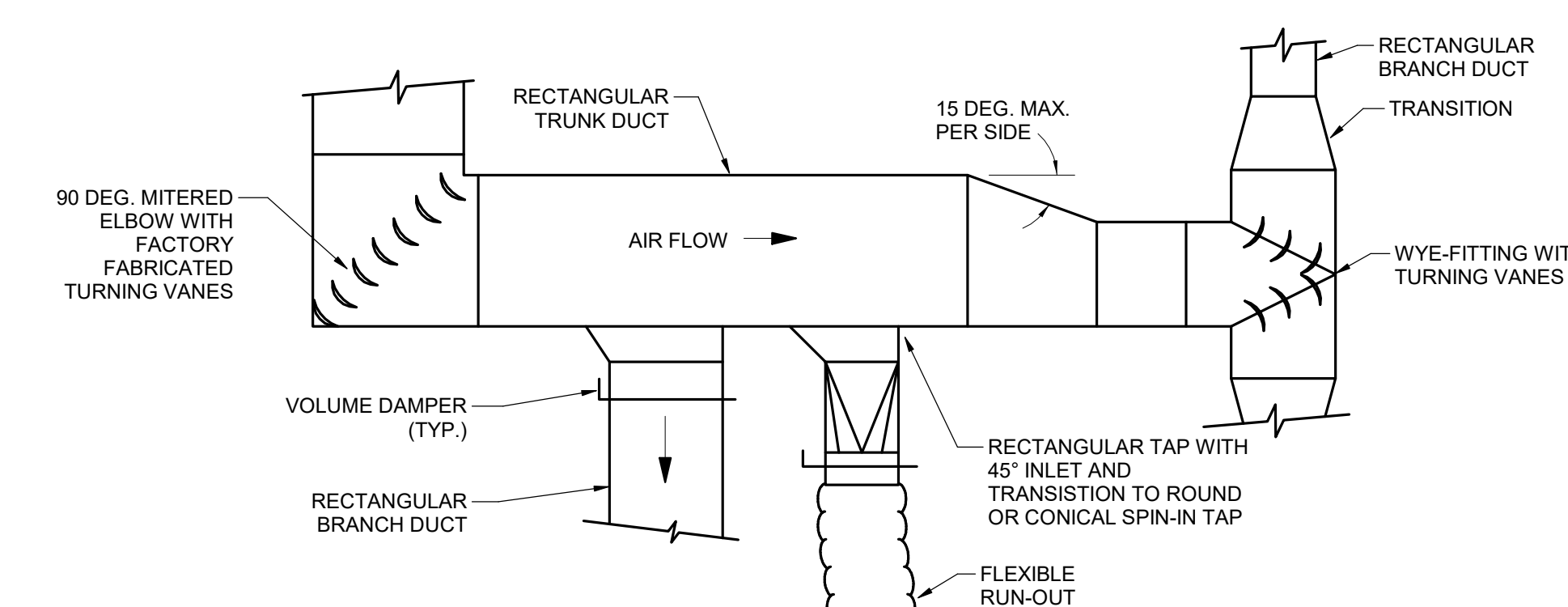
1/11/2023 16:08



- NOTE:**
1. INSTALL CONCENTRIC VENT KIT PER MANUFACTURER'S REQUIREMENTS
  2. WHEN INSTALLING MULTIPLE VENT KITS PROVIDE MANUFACTURER REQUIRED MINIMUM CLEARANCE BETWEEN TERMINATIONS.
  3. ORIENTATION OF EXHAUST FLUE PIPING AND COMBUSTION INTAKE PIPING SHOWN MAY BE INSTALLED AT ANY ANGLE TO FIT INSTALLATION.

### 1 CONCENTRIC VENT - WALL

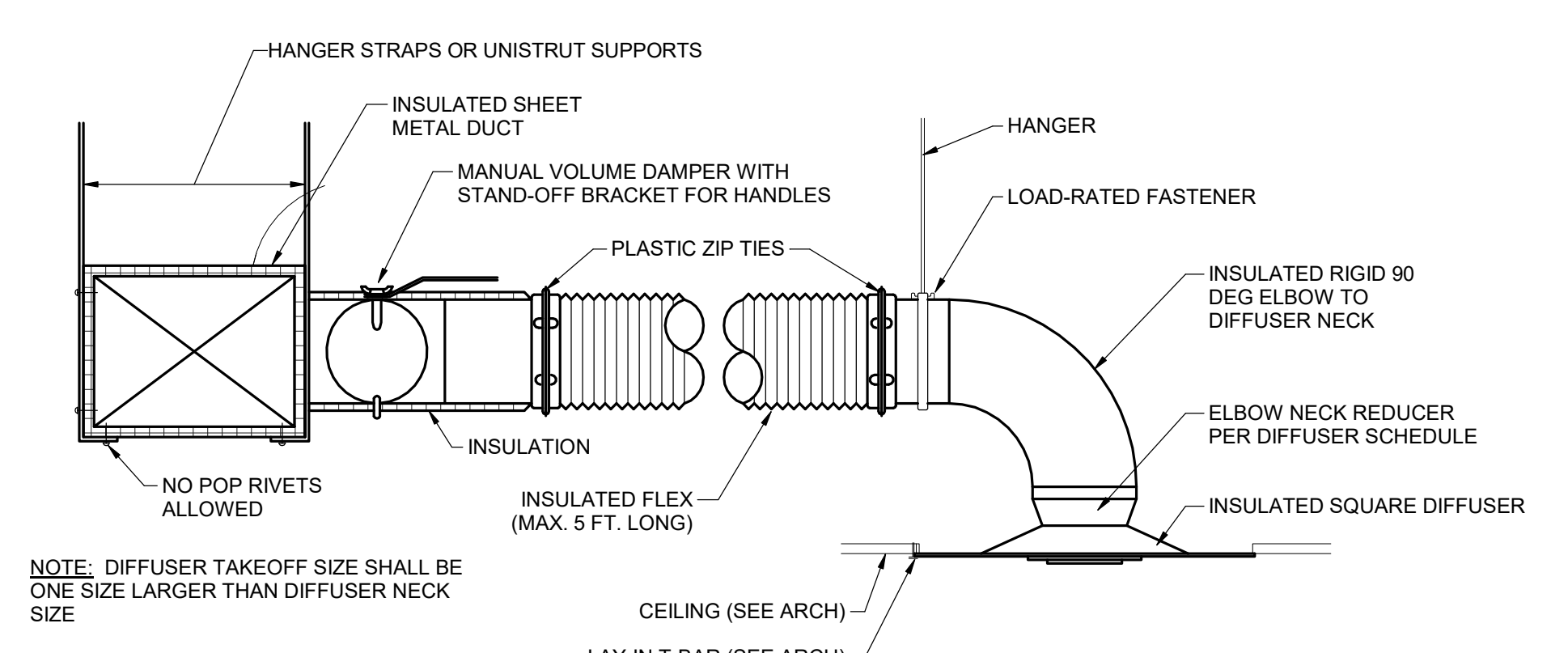
SCALE: NONE



- NOTE:**
- ALL DUCTWORK SHALL BE SEALED IN ACCORDANCE WITH SMACNA FOR SEAL CLASS A. SEE SPEC FOR INSULATION REQUIREMENTS

### 2 LOW PRESSURE DUCT CONNECTION

SCALE: NONE



### 3 DIFFUSER/DUCT CONNECTION

SCALE: NONE

### AIR COOLED CONDENSING UNIT SCHEDULE

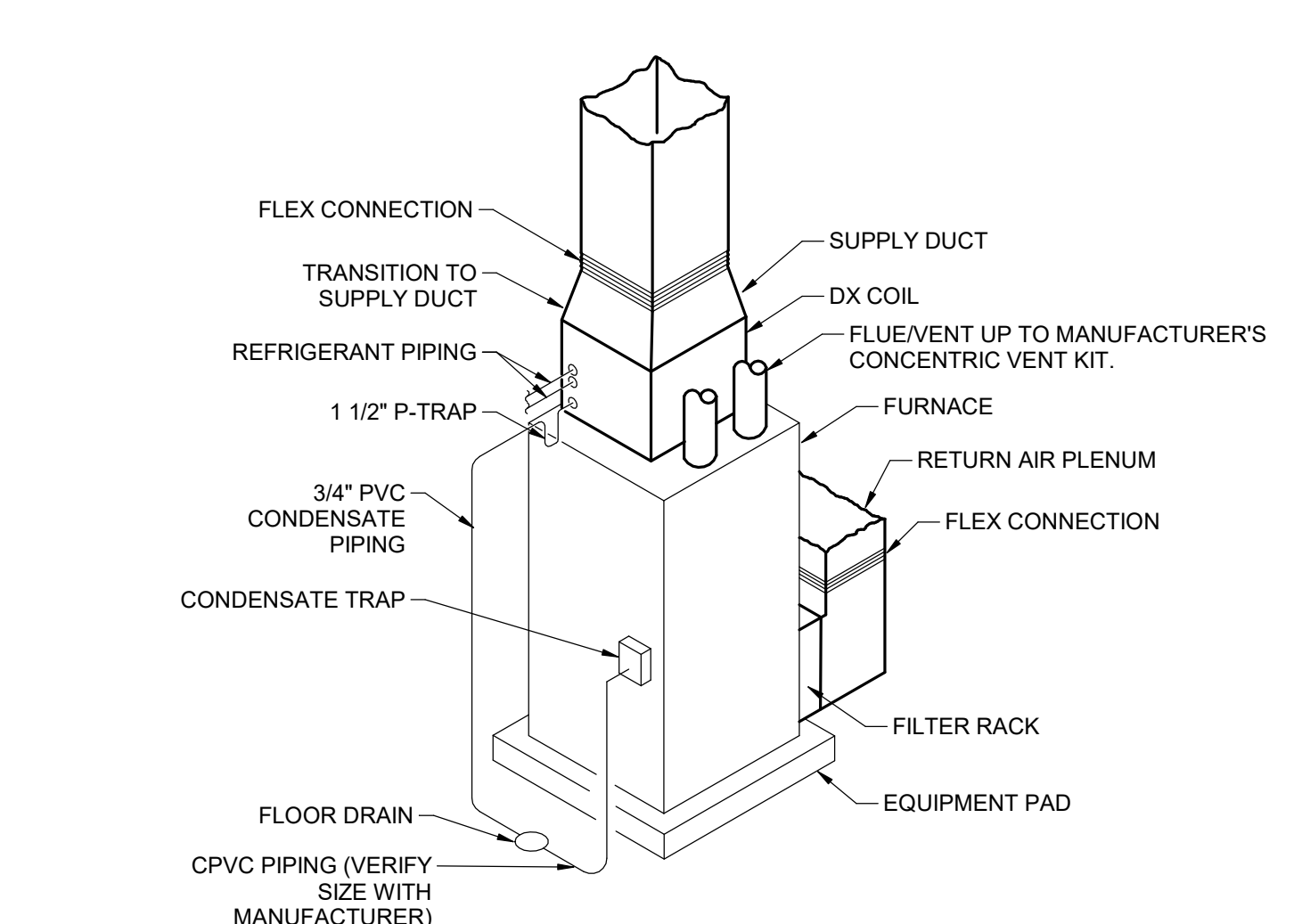
| MARK | MANUFACTURER & MODEL OR EQUAL | SERVES | LOCATION | DIMENSIONS L X W X H  | WEIGHT (LBS) | FULL LOAD CAP. (MBH) | MIN SEER | REFRIGERANT | CONDENSING TEMP. (F) | MCA  | MOPD | VOLTS/PH/Hz | NOTES |
|------|-------------------------------|--------|----------|-----------------------|--------------|----------------------|----------|-------------|----------------------|------|------|-------------|-------|
| CU-1 | CARRIER 24ABC642              | F-1    | ROOF     | 35"X35"X39.125"       | 213          | 42                   | 16       | R-410A      | 95                   | 23.6 | 40   | 240/1/60    | 1.2   |
| CU-2 | CARRIER 24ABC630              | F-2    | ROOF     | 31.25"X31.25"X32.375" | 188          | 30                   | 16.5     | R-410A      | 95                   | 16.8 | 25   | 240/1/60    | 1.2   |
| CU-3 | CARRIER 24ABC630              | F-3    | ROOF     | 31.25"X31.25"X32.375" | 188          | 30                   | 16.5     | R-410A      | 95                   | 16.8 | 25   | 240/1/60    | 1.2   |
| CU-4 | CARRIER 24ABC630              | F-4    | ROOF     | 31.25"X31.25"X32.375" | 188          | 30                   | 16.5     | R-410A      | 95                   | 16.8 | 25   | 240/1/60    | 1.2   |

- NOTES:**
1. PROVIDE WITH LOW AMBIENT KIT, CRANKCASE HEATER, HAIL GUARD, ANCHOR TO ELEVATED EQUIPMENT STAND, AND REFRIGERANT PIPING PER MANUFACTURERS RECOMMENDATIONS. INSTALL LEVEL.
  2. REFERENCE SHORT CIRCUIT SCHEDULE ON ELECTRICAL DRAWINGS FOR SHORT CIRCUIT RATING.

### ELECTRIC UNIT HEATER SCHEDULE

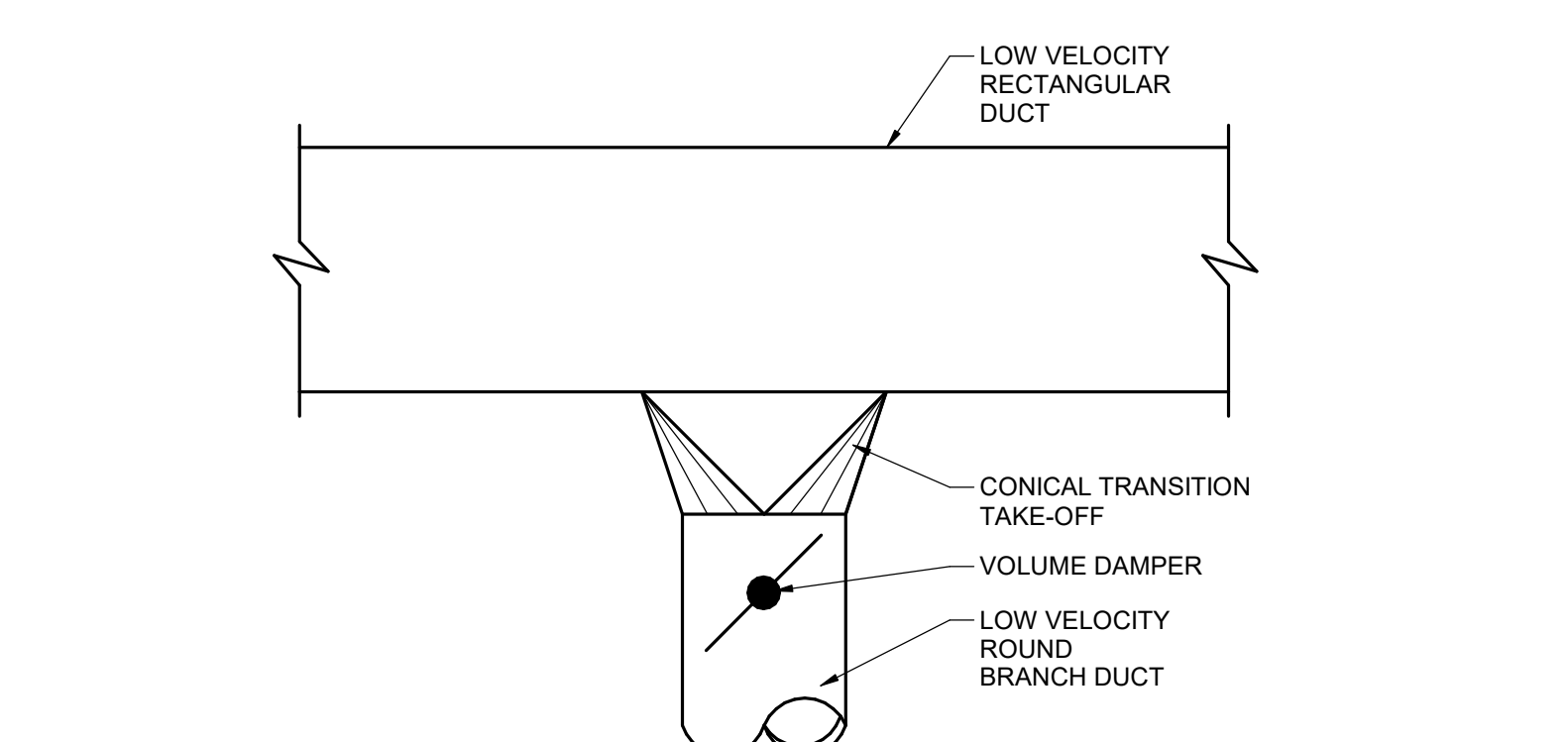
| MARK  | MANUFACTURER & MODEL OR EQUAL | LOCATION  | KW | FAN INFORMATION CFM | E.S.P. | NOTES         |
|-------|-------------------------------|-----------|----|---------------------|--------|---------------|
| EUH-1 | QMARK CWH6407F                | STAIRWELL | 3  | 100                 | -      | 240/1/60<br>1 |

- NOTES:**
1. REFERENCE SHORT CIRCUIT SCHEDULE ON ELECTRICAL DRAWINGS FOR SHORT CIRCUIT RATING.



### 4 CONDENSING FURNACE

SCALE: NONE



### 5 ROUND FROM RECTANGULAR TAKE-OFF

SCALE: NONE

DATE: 3.30.24  
NO. ISSUED FOR: 1  
ISSUED FOR PERMIT: 1  
CONSULTANTS:

PROJECT NAME: BEAUTY PARLOUR NEW BUILDING ADDITION

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01/13/2023

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STATE OF WISCONSIN  
OFFICE OF WEAPONS

SHEET NAME: MECHANICAL SCHEDULES AND DETAILS  
PROJECT NO: PROJECT #  
REVIEWED:  
SHEET NO: M401



## PLUMBING LEGEND

NOTE: THIS IS A MASTER SYMBOLS LIST. ALL SYMBOLS, ABBREVIATIONS, ETC. MAY NOT NECESSARILY BE USED ON ALL DRAWINGS

### PIPING

|  |                                   |
|--|-----------------------------------|
|  | DOMESTIC COLD WATER               |
|  | DOMESTIC HOT WATER                |
|  | DOMESTIC HOT WATER RECIRC.        |
|  | 140°F DOMESTIC HOT WATER          |
|  | 140°F DOMESTIC HOT WATER RECIRC.  |
|  | PRIMARY STORM DRAIN               |
|  | SECONDARY STORM DRAIN             |
|  | SANITARY PUMPED DISCHARGE         |
|  | SANITARY WASTE                    |
|  | CONDENSATE DRAIN                  |
|  | SANITARY VENT                     |
|  | GREASE WASTE                      |
|  | ACID WASTE                        |
|  | ACID VENT                         |
|  | LIQUEFIED PETROLEUM GAS (PROPANE) |
|  | NATURAL GAS                       |
|  | COMPRESSED AIR                    |
|  | FIRE SUPPRESSION                  |

### MISCELLANEOUS

|  |  |
|--|--|
|  | SECTION CUT:<br>UPPER NUMBER INDICATES DRAWING NUMBER<br>LOWER NUMBER INDICATES SHEET NUMBER     |
|  | CONNECTION POINT OF NEW WORK TO EXISTING   |
|  | CONNECTION POINT OF DEMOLITION TO EXISTING   |
|  | DETAIL REFERENCE:<br>UPPER NUMBER INDICATES DETAIL NUMBER<br>LOWER NUMBER INDICATES SHEET NUMBER |
|  | RISER DESIGNATION  |
|  | NOTE REFERENCE SYMBOL  |
|  | EXISTING LINEWORK  |
|  | DEMOLITION LINEWORK  |
|  | NEW LINEWORK   |

### GAS AND VACUUM PIPING

|  |                                      |
|--|--------------------------------------|
|  | MEDICAL AIR                          |
|  | DENTAL AIR                           |
|  | LABORATORY AIR                       |
|  | OXYGEN                               |
|  | NITROUS OXIDE                        |
|  | ORAL EVACUATION                      |
|  | MEDICAL-SURGICAL VACUUM              |
|  | WASTE ANESTHESIA GAS DISPOSAL (WAGD) |
|  | COMBINATION MEDICAL VACUUM AND WAGD  |
|  | CARBON DIOXIDE                       |
|  | NITROGEN                             |
|  | INSTRUMENT AIR                       |
|  | MEDICAL AIR COMPRESSOR INTAKE        |
|  | VACUUM PUMP EXHAUST                  |

### GAS AND VACUUM VALVES / SYMBOLS

|  |  |
|--|--|
|  | ZONE VALVE BOX                             |
|  | ALARM PANEL (REFERENCE SCHEDULES FOR TYPE) |
|  | WALL MOUNTED MEDICAL AIR OUTLET            |
|  | WALL MOUNTED OXYGEN OUTLET                 |
|  | WALL MOUNTED INSTRUMENT AIR OUTLET         |
|  | WALL MOUNTED MEDICAL-SURGICAL VACUUM INLET |
|  | WALL MOUNTED DENTAL AIR OUTLET             |
|  | WALL MOUNTED CARBON DIOXIDE OUTLET         |
|  | WALL MOUNTED NITROUS OXIDE AIR OUTLET      |
|  | WALL MOUNTED WAGD INLET                    |

### VALVES / SYMBOLS

|  |   |
|--|---|
|  | DIRECTION OF FLOW IN PIPING   |
|  | TWO WAY CONTROL VALVE   |
|  | THREE WAY CONTROL VALVE   |
|  | BUTTERFLY VALVE   |
|  | GLOBE VALVE   |
|  | BALANCING VALVE   |
|  | SOLENOID VALVE  |
|  | CONTROL VALVE   |
|  | THERMOSTATIC MIXING VALVE   |
|  | TRIPLE DUTY VALVE WITH PRESSURE PORTS   |
|  | CHECK VALVE   |
|  | STRAINER  |
|  | STRAINER WITH BLOWOFF   |
|  | RELIEF/SAFETY VALVE   |
|  | PRESSURE REDUCING VALVE   |
|  | VACUUM BREAKER  |
|  | VENTURI   |
|  | GAS COCK  |
|  | SIGHT GLASS   |
|  | BALL VALVE  |
|  | 3/4\"/>   |
|  | F&T TRAP  |
|  | GATE VALVE  |
|  | PRESSURE GAUGE  |
|  | PRESSURE GAUGE WITH PIGTAIL   |
|  | THERMOMETER, THERMOMETER W/ TEST WELL   |
|  | PRESSURE/TEMPERATURE PORT   |
|  | UNION   |
|  | FLANGE CONNECTION   |
|  | PIPING ELBOW UP   |
|  | PIPING ELBOW DOWN   |
|  | PIPING TEE UP   |
|  | PIPING TEE DOWN   |
|  | PIPING CAP  |
|  | GAUGE COCK  |
|  | WATER HAMMER ARRESTOR   |
|  | PIPING REDUCER  |
|  | PRESSURE REGULATING VALVE   |
|  | FLEXIBLE CONNECTOR  |
|  | AUTOMATIC AIR VENT  |
|  | MANUAL AIR VENT   |
|  | PIPE ANCHOR / ROOF PIPING SUPPORT   |
|  | EXPANSION JOINT   |
|  | PIPE GUIDE  |
|  | VENT THRU ROOF  |
|  | FLOOR SINK, SIZE AND TYPE   |
|  | FLOOR DRAIN, SIZE AND TYPE  |
|  | ROOF DRAIN, SIZE AND TYPE   |
|  | HOSE BIBB / WALL HYDRANT  |
|  | LINE CLEANOUT / WALL CLEANOUT   |
|  | FLOOR CLEANOUT  |
|  | GRADE CLEANOUT  |
|  | SELF-REGULATING HEATED CABLE - LENGTH AS SHOWN IN DRAWINGS. REFERENCE ELECTRICAL PLANS FOR SPECIFICATION OF COMPLETE HEAT-TRACE SYSTEM. ARROW DENOTES DIRECTION |

### ABBREVIATIONS

|          |                            |
|----------|----------------------------|
| AAV      | AIR ADMITTANCE VALVE       |
| AD       | AREA DRAIN                 |
| AFF      | ABOVE FINISHED FLOOR       |
| AV       | ACID VENT                  |
| AW       | ACID WASTE                 |
| BF       | BOTTLE FILLER              |
| BFP      | BACKFLOW PREVENTER         |
| BHP      | BRAKE HORSEPOWER           |
| BP       | BOOSTER PUMP               |
| BT       | BATH TUB                   |
| BTU      | BRITISH THERMAL UNIT       |
| CB       | CATCH BASIN                |
| CD       | CONDENSATE DRAIN           |
| CO       | CLEANOUT                   |
| CP       | CIRCULATION PUMP           |
| CW       | COLD WATER                 |
| DEG.     | DEGREES                    |
| DDC      | DIRECT DIGITAL CONTROL     |
| DF       | DRINKING FOUNTAIN          |
| DN       | DOWN                       |
| DSN      | DOWNSPOUT NOZZLE           |
| DT       | DILUTION TANK              |
| DW       | DIRECT WASTE               |
| (E)      | EXISTING TO REMAIN         |
| EEW      | EMERGENCY EYE WASH         |
| ES       | EMERGENCY SHOWER           |
| ESP      | EXTERNAL STATIC PRESSURE   |
| ELEVATOR | ELEVATOR SUMP PUMP         |
| EWC      | ELECTRIC WATER COOLER      |
| EWT      | ENTERING WATER TEMPERATURE |
| FCO      | FLOOR CLEANOUT             |
| FD       | FLOOR DRAIN                |
| FFE      | FINISHED FLOOR ELEVATION   |
| FHC      | FIRE HOSE CABINET          |
| FPM      | FEET PER MINUTE            |
| FS       | FLOOR SINK                 |
| G        | NATURAL GAS                |
| GCO      | GRADE CLEANOUT             |
| GD       | GARBAGE DISPOSAL           |
| GPM      | GALLONS PER MINUTE         |
| GT       | GAS TURRET                 |
| GV       | GAS VALVE                  |
| GWH      | GAS WATER HEATER           |
| HB       | HOSE BIBB                  |
| HD       | HEAD                       |
| HP       | HORSEPOWER                 |
| HW       | HOT WATER                  |
| HWC      | HOT WATER CIRCULATION      |
| HX       | HEAT EXCHANGER             |
| HZ       | HERTZ                      |
| IE       | INVERT ELEVATION           |
| IMB      | ICE MAKER BOX              |
| INWC     | INCHES OF WATER COLUMN     |
| IW       | INDIRECT WASTE             |
| KW       | KILOWATT                   |
| L        | LAVATORY                   |
| LBS      | POUNDS                     |
| LPG      | LIQUEFIED PETROLEUM GAS    |
| LS       | LAUNDRY SINK               |
| LWT      | LEAVING WATER TEMPERATURE  |
| MBH      | 1000 BTU PER HOUR          |
| MFR      | MANUFACTURER               |
| MH       | MANHOLE                    |
| MSB      | MOP SINK BASIN             |
| (N)      | NEW                        |
| NZ       | NITROGEN                   |
| N/A      | NOT APPLICABLE             |
| NC       | NORMALLY CLOSED            |
| NO       | NORMALLY OPEN              |
| O2       | OXYGEN                     |
| OD       | OVERFLOW DRAIN             |
| PH.Ø     | PHASE                      |
| PV       | POST INDICATOR VALVE       |
| PRV      | PRESSURE REDUCING VALVE    |
| PT       | PLASTER TRAP               |
| QTY      | QUANTITY                   |
| (R)      | RELOCATED EXISTING         |
| RC       | REFRIGERANT CHARGE         |
| RD       | ROOF DRAIN                 |
| RPM      | REVOLUTIONS PER MINUTE     |
| S        | SINK                       |
| SA       | SHOCK ARRESTOR             |
| SAN      | SANITARY                   |
| SE       | SEWAGE EJECTOR             |
| SF       | SQUARE FEET                |
| SH       | SHOWER                     |
| SP       | SUMP PUMP                  |
| ST       | STORM, STORAGE TANK        |
| TD       | TRENCH DRAIN               |
| TDH      | TOTAL DYNAMIC HEAD         |
| TEA      | THERMAL EXPANSION ABSORBER |
| TG       | TRAP GUARD                 |
| TMV      | THERMOSTATIC MIXING VALVE  |
| TP       | TRAP PRIMER                |
| TSP      | TOTAL STATIC PRESSURE      |
| TW       | TEPID WATER                |
| U        | URINAL                     |
| UF       | UNDERFLOOR                 |
| UIS      | UNDERGROUND                |
| UIS      | UNDERSLAB                  |
| V        | VENT                       |
| VAC      | VACUUM                     |
| VTR      | VENT THROUGH ROOF          |
| WB       | WASHER BOX                 |
| WC       | WATER COLUMN, WATER CLOSET |
| WCO      | WALL CLEANOUT              |
| WH       | WALL HYDRANT               |

## PLUMBING SPECIFICATIONS

**PLUMBING SPECIFICATION**

**CODE COMPLIANCE:**  
LOCAL PLUMBING CODE, UL, ASSOCIATED FACTORY MUTUAL RESEARCH.

**CW AND HW PIPING:**  
TYPE L COPPER TUBE ASTM B88 WITH WROUGHT COPPER 95-5 TIN-ANTIMONY SOLDER - JOINT FITTINGS ANSIB16.22.

**ABOVE GRADE WASTE AND VENT:**  
PVC PLASTIC PIPE, SCHEDULE 40  
FITTINGS FOR WASTE AND VENT:  
PVC SOCKET FITTINGS AND SOLVENT-CEMENTED JOINTS.

**BELOW GRADE WASTE & VENT (UNDERGROUND):**  
PVC PLASTIC PIPE, SCHEDULE 40  
FITTINGS FOR WASTE AND VENT:  
PVC SOCKET FITTINGS AND SOLVENT-CEMENTED JOINTS.  
PVC PIPING SHALL NOT BE USED AT STEAM FLOOR DRAINS.

**SUPPLY PIPING AND CONDENSATE DRAIN PIPING INSULATION:**  
FIBERGLASS, PREFORMED RIGID PIPE INSULATION, ASTM C547, CLASS I JACKETED. CD, CW, HW AND HWC ARE TO BE INSULATED. CW AND CD PIPING SHALL BE PROVIDED WITH VAPOR BARRIER JACKET. FIRE HAZARD CLASSIFICATION OF FLAME SPREAD 25 OR LESS, SMOKE DEVELOPED 50 OR LESS. COLD WATER TO BE 1/2" THICK. HOT WATER AND HOT WATER RECIRCULATION TO BE 1" THICK.

**CW AND HW VALVES:**  
TWO OR THREE PIECE BRONZE BODY WITH CHROME PLATED BALL, TEFLON OR TFE SEAT RATED FOR 400 WOG PRESSURE.

**SUPPORT AND EXPANSION:**  
PROVIDE ACCEPTABLE SUPPORTING DEVICES FOR ALL PIPING. ALLOW FOR PIPE EXPANSION.

**TESTING AND FILLING:**  
AFTER INSTALLATION IS COMPLETE, PRESSURE TEST NEW DOMESTIC WASTE, VENT, CW AND HW SYSTEMS PER LOCAL PLUMBING CODE. ISOLATE AND CHLORINATE ALL NEW DOMESTIC WATER PIPING PRIOR TO USE.

**FIRE SPRINKLER PIPING**

NFPA STANDARD

PROVIDE FIRE SPRINKLER DRAWINGS THAT HAVE APPROVED BY AHJ.

**FIRE SPRINKLER PIPING - WET**

BLACK STEEL, SCHEDULE-10:  
WELDED JOINTS.  
MECHANICAL COUPLING JOINTS:  
MECHANICAL LOCKING (PUSH-ON) TYPE, 2" AND LARGER.

BLACK STEEL, SCHEDULE-40:  
WELDED JOINTS.  
MECHANICAL JOINTS:  
CUT OR ROLLED GROOVE TYPE, MECHANICAL LOCKING (PUSH-ON) TYPE, 1 1/2" AND SMALLER.

**PIPING AND SPRINKLER APPLICATIONS BY ROOM TYPES:**

**ELECTRICAL ROOMS/CLOSETS:**  
SPRINKLER STYLES: UPRIGHT, PENDANT, OR HORIZONTAL SIDEWALL (STANDARD OR EXTENDED COVERAGE).  
PROVIDE SPRINKLER GUARDS.

**FINISHED ROOMS (ROOMS WITH CEILING):**  
SPRINKLER STYLES:  
RECESSED CONCEALED PENDANT, CUSTOM COVER COLOR SELECTED BY ARCHITECT.  
HORIZONTAL SIDEWALL, STANDARD OR EXTENDED COVERAGE.

**WHERE CEILING EXISTS IN AREA SUBJECT TO FREEZING, COMPLY WITH REQUIREMENTS FOR AREAS SUBJECT TO FREEZING.**

LOCATE SPRINKLERS TO COORDINATE WITH CEILING LAYOUT.

LOCATE SPRINKLERS CENTERED IN CEILING TILE. IF SUCH LOCATION MAKES ADDED SPRINKLERS NECESSARY, PROVIDE ADDED SPRINKLERS AS REQUIRED TO MEET CODE.

**MECHANICAL EQUIPMENT ROOMS:**  
SPRINKLER STYLES: UPRIGHT, PENDANT, OR HORIZONTAL SIDEWALL (STANDARD OR EXTENDED COVERAGE).  
PROVIDE SPRINKLER GUARDS.

**GAS PIPING SPECIFICATION**

**STEEL PIPE:**  
ASTM A 53, TYPE E ELECTRIC-RESISTANCE WELDED OR TYPES, SEAMLESS, GRADE B, SCHEDULE 40, BLACK.

**PIPE FITTINGS:**  
MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, CLASS 150, STANDARD PATTERN, WITH THREADS CONFORMING TO ASME B1.20.1.

**UNIONS:** ASME B16.39, CLASS 150, BLACK MALLEABLE IRON; FEMALE PATTERN; BRASS-TO-IRON SEAT, GROUND JOINT.

**STEEL FITTINGS:** ASME B16.9, WROUGHT STEEL, BUTT-WELDING TYPE; AND ASME B16.11, FORGED STEEL 90A

**PAINT:**  
PAINT ALL EXTERIOR GAS PIPING.

## PLUMBING GENERAL NOTES

- THE PLANS ARE, TO A GREAT EXTENT, DIAGRAMMATIC IN NATURE. DRAWING SCALES SHOULD BE VERIFIED FROM DIMENSIONS ON ARCH. PLANS. THE INFORMATION PRESENTED IS AS EXACT AS COULD BE SECURED. THE CONTRACTOR SHALL OBTAIN EXACT LOCATION, MEASUREMENTS, LEVELS, ETC. AT THE SITE AND SHALL SATISFACTORILY ADAPT THE WORK TO THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO SUBMITTING A BID TO COVER THE CONDITIONS AT THE SITE INFORMING THEMSELVES OF ALL DETAILS.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, LAWS, ACTS AND ORDINANCES, AND ALL AUTHORITIES HAVING JURISDICTION.
- THE COMPLETED INSTALLATION SHALL BE IN ACCORDANCE WITH ALL ENGINEERING REQUIREMENTS, THE OWNER'S DESIGN CRITERIA, UTILITY COMPANY REQUIREMENTS, APPLICABLE INDUSTRY STANDARDS OF GOOD PRACTICE AND SAFETY, AND THE MANUFACTURER'S STRICTEST RECOMMENDATIONS FOR EQUIPMENT AND PRODUCT APPLICATION AND INSTALLATION.
- RECORD DRAWINGS - PREPARE AND SUBMIT TO THE OWNER RECORD DRAWINGS INDICATING THE EXACT LOCATION OF ALL EQUIPMENT INCLUDING THE EQUIPMENT'S "AS INSTALLED" SIZE(S), MANUFACTURER, MODEL NUMBERS, AND PERFORMANCE RATINGS.
- SUPPORTS - EQUIPMENT, PIPING, OR ANY OTHER ACCESSORY SHALL NOT BE SUPPORTED FROM OTHER PIPING, DUCTWORK, METAL ROOF DECK, LATERAL BRACING BRIDGING, OR CONDUIT. ITEMS SHALL ONLY BE SUPPORTED FROM BUILDING STRUCTURE.
- COORDINATE EXACT LOCATION OF ALL PIPING AND EQUIPMENT WITH STRUCTURAL, ARCHITECTURAL, ELECTRICAL, AND OTHER MECHANICAL SYSTEMS.
- WHERE MOUNTING HEIGHTS ARE NOT DETAILED OR DIMENSIONED, INSTALL MECHANICAL SERVICES AND OVERHEAD EQUIPMENT TO PROVIDE THE MAXIMUM HEADROOM POSSIBLE.
- ALL PIPING TO VIBRATING EQUIPMENT SHALL HAVE FLEXIBLE CONNECTORS.
- COORDINATE ALL ROOF AND CHASE PENETRATIONS WITH STRUCTURAL DRAWINGS AND ROOF INSTALLER.
- OWNER TO HAVE CHOICE SALVAGE OF ALL PLUMBING FIXTURES AND EQUIPMENT WHICH ARE PLANNED TO BE REMOVED BY CONTRACTOR. EQUIPMENT NOT SALVAGED BY OWNER SHALL BE REMOVED FROM SITE AND PROPERLY DISPOSED OF BY THE CONTRACTOR.
- BEFORE REMOVAL OF ANY MECHANICAL EQUIPMENT, CONTRACTOR SHALL RECOVER USED REFRIGERANT IN A PROPERLY LABELED D.O.T. APPROVED REFILLABLE CYLINDER TO MEET E.P.A. STANDARDS. RECOVERED REFRIGERANT MUST BE CHEMICALLY ANALYZED AND REPROCESSED OR DISPOSED OF PER E.P.A. REQUIREMENTS, SECTION 608 OF THE CLEAN AIR ACT AND A.R.I. STANDARD 700.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK.
- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
- CONCRETE HOUSEKEEPING PADS TO SUIT MECHANICAL EQUIPMENT SHALL BE SIZED AND LOCATED BY THE MECHANICAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE 4 INCHES. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 4 INCHES ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE SIZES AND LOCATIONS OF CONCRETE HOUSEKEEPING PADS WITH THE GENERAL CONTRACTOR.
- ACCESS PANELS ARE REQUIRED MIN. 18"X18" UNLESS NOTED OTHERWISE IN SPECIFICATIONS FOR ACCESS TO EVERY VALVE AND CONTROL SENSOR IF NOT OTHERWISE ACCESSIBLE. ACCESS PANEL SHALL BE APPROVED BY ARCHITECT/ENGINEER. COORDINATE PANEL LOCATIONS WITH THE ARCHITECT PRIOR TO INSTALLATION.
- PROVIDE SHUTOFF VALVES IN ALL DOMESTIC WATER PIPING SYSTEM BRANCHES IN WHICH BRANCH PIPING SERVES TWO OR MORE FIXTURES.
- ROUTE ALL PIPING PARALLEL TO BUILDING WALLS, STRUCTURE AND FEATURES, AS HIGH AS POSSIBLE, AND OFFSET AS NECESSARY TO AVOID STRUCTURAL MEMBERS, MECHANICAL EQUIPMENT AND THE LIKE.
- REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHTS OF STANDARD AND ACCESSIBLE PLUMBING FIXTURES.
- SLOPE ALL SANITARY WASTE PIPE SIZES 3" AND UNDER AT 1/4" PER FOOT (2.08%) MINIMUM, UNLESS NOTED OTHERWISE.
- SLOPE ALL SANITARY WASTE PIPE SIZES 4" AND ABOVE AT 1/8" PER FOOT (1.04%) MINIMUM, UNLESS NOTED OTHERWISE.
- SLOPE ALL STORM AND OVERFLOW STORM PIPING AT 1/8" PER FOOT (1.04%) MINIMUM, UNLESS NOTED OTHERWISE.
- SLOPE ALL CONDENSATE DRAINAGE PIPING AT 1/8" PER FOOT (1.04%) MINIMUM, UNLESS NOTED OTHERWISE.

## PLUMBING SHEET INDEX

|      |                                   |
|------|-----------------------------------|
| P001 | PLUMBING LEGEND AND GENERAL NOTES |
| P101 | WATER AND GAS PLANS               |
| P201 | SANITARY PLANS                    |
| P301 | PLUMBING DETAILS                  |
| P401 | PLUMBING SCHEDULES AND RISERS     |

### CODES AND STANDARDS

- THE COMPLETED INSTALLATION SHALL BE IN ACCORDANCE WITH:
- 2012 INTERNATIONAL BUILDING CODE & LOCAL AMENDMENTS
  - 2018 INTERNATIONAL RESIDENTIAL CODE & LOCAL AMENDMENTS
  - 2012 INTERNATIONAL MECHANICAL CODE & LOCAL AMENDMENTS
  - 2017 NATIONAL ELECTRICAL CODE & LOCAL AMENDMENTS
  - 2012 INTERNATIONAL FIRE CODE & LOCAL AMENDMENTS
  - 2000 LIFE SAFETY CODE & LOCAL AMENDMENTS
  - 2015 OMAHA PLUMBING CODE & LOCAL AMENDMENTS
  - OMAHA MUNICIPAL CODE
  - ACCESSIBILITY CODE 2012 IBC (INCLUDING ICC/ANSI A117.1-2009)
  - INTERNATIONAL FUEL GAS CODE & LOCAL AMENDMENTS
  - APPLICABLE FEDERAL, STATE CODES, LAWS, ACTS AND ORDINANCES
  - AUTHORITIES HAVING JURISDICTION
  - ALL UTILITY COMPANY REQUIREMENTS
  - APPLICABLE INDUSTRY STANDARDS OF GOOD PRACTICE AND SAFETY
  - THE MANUFACTURER'S STRICTEST RECOMMENDATIONS FOR EQUIPMENT, PRODUCT APPLICATION & INSTALLATION.

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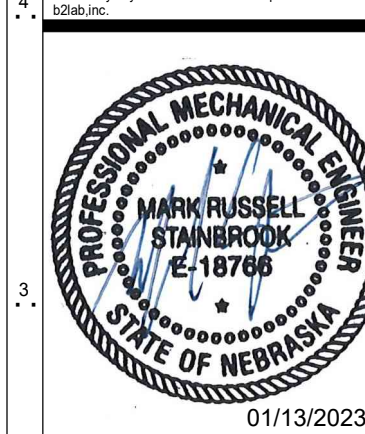
CONSULTANTS:

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**



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01/13/2023

SHEET NAME:  
PLUMBING LEGEND AND GENERAL NOTES

PROJECT NO.: PROJECT #  
REVIEWED:  
SHEET NO.:



**GENERAL NOTES** (THIS SHEET)

- REFER TO SHEET P001 FOR SYMBOLS LEGEND AND ADDITIONAL GENERAL NOTES.
- REFER TO PLUMBING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION AND FIXTURE CONNECTION SIZES.
- COORDINATE ROUTING OF PLUMBING SYSTEMS WITH ALL OTHER TRADES.
- MOUNT ALL VALVES IN ACCESSIBLE LOCATIONS.
- PIPING DROPS TO FIXTURES ON EXTERIOR WALLS SHALL BE ROUTED ON WARM SIDE OF INSULATION TO PROTECT FROM FREEZING.
- FIELD COORDINATE CONNECTION REQUIREMENTS FOR ALL EQUIPMENT, EITHER FURNISHED OR PROVIDED BY OTHERS.

**KEY NOTES** (THIS SHEET)

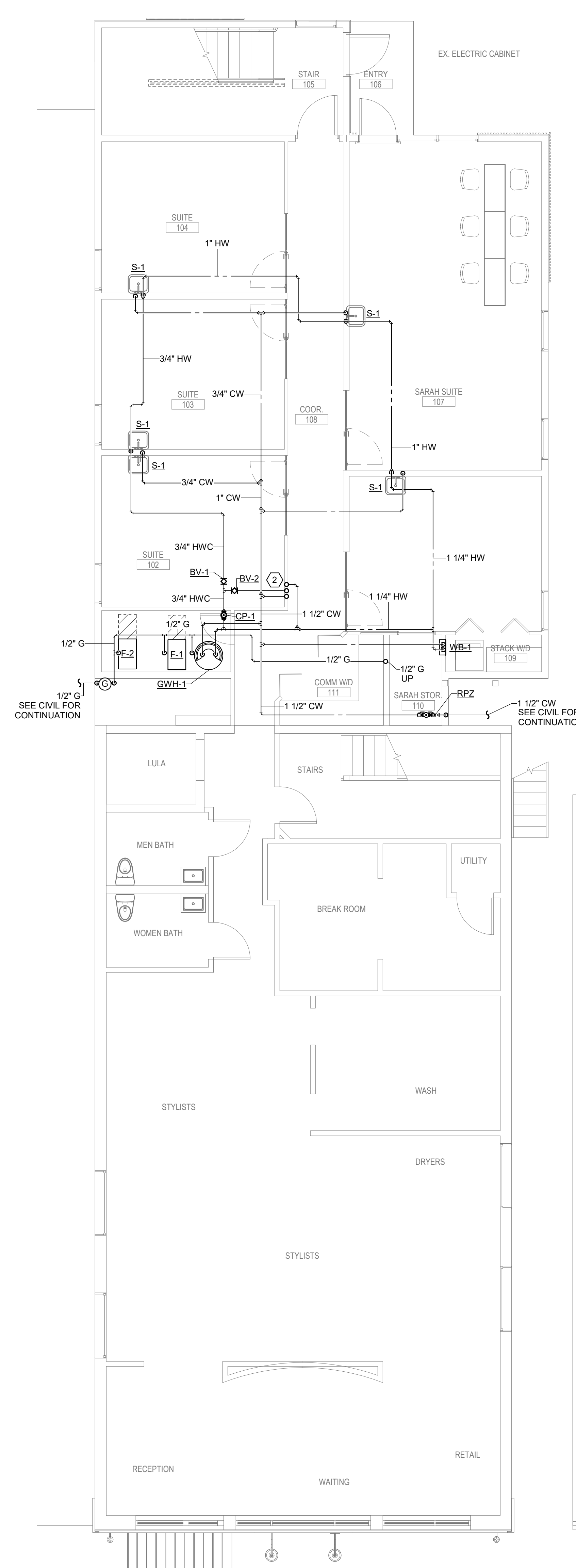
- NOT USED.
- 1-1/4" HW, 1-1/4" CW, 3/4" HWC UP.
- 1-1/4" HW, 1-1/4" CW, 3/4" HWC DN.

**FIRE SUPPRESSION SPRINKLER SYSTEM NOTES** (THIS SHEET)

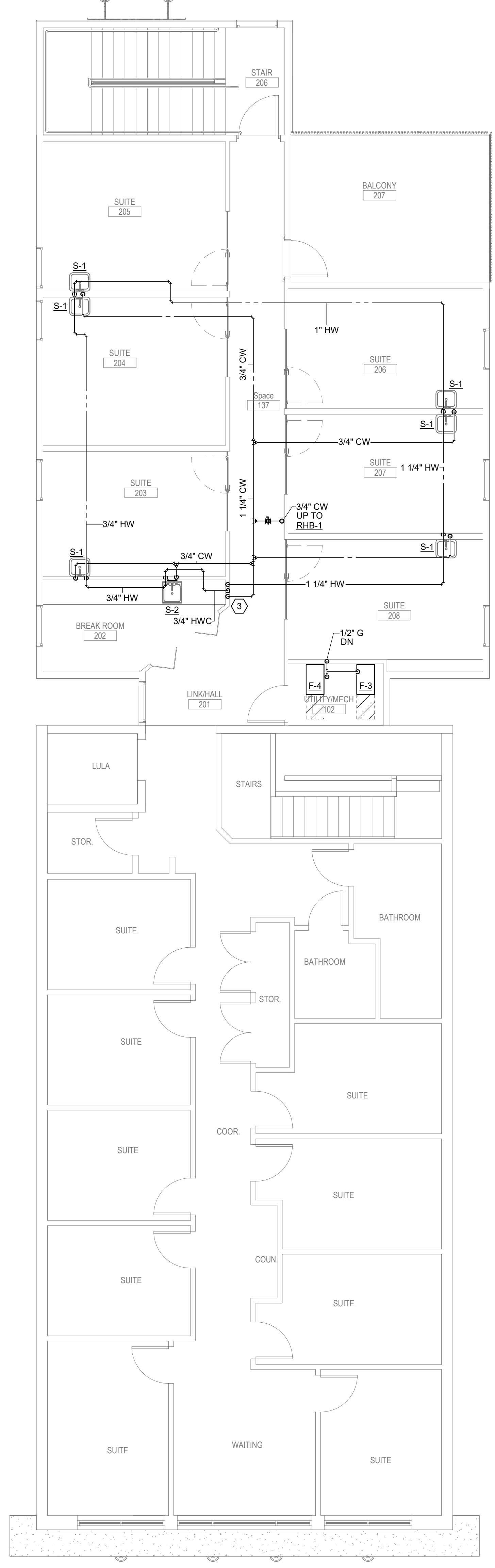
- CONTRACTOR SHALL DESIGN AND INSTALL FIRE SUPPRESSION SPRINKLER SYSTEM TO COVER ENTIRE BUILDING PER NFPA 13.
- CONTRACTOR SHALL PROVIDE HYDRAULIC CALCULATIONS, PIPING LAYOUT DRAWINGS, AND SHOP DRAWINGS TO AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO START OF WORK.
- COORDINATE PIPING AND LOCATION OF SPRINKLER HEADS WITH MEP AND OTHER WORKS.
- ATTACHED CANOPIES AND OVERHANGS SHALL BE PROTECTED WITH DRY PIPE/DRY SPRINKLER HEADS PER NFPA 13.
- PROVIDE FIRE DEPARTMENT CONNECTION AT LOCATION COORDINATED WITH LOCAL FIRE DEPARTMENT.

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| DATE       |                   |
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CONSULTANTS:



**1 FIRST FLOOR DOMESTIC PLAN**  
SCALE: 3/16" = 1'-0"  
0 3 5 11



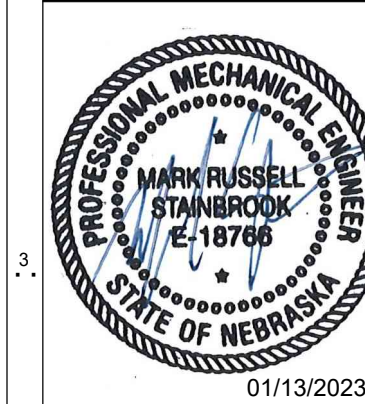
**2 SECOND FLOOR DOMESTIC PLAN**  
SCALE: 3/16" = 1'-0"  
0 3 5 11

PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**



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01/13/2023  
SHEET NAME:  
WATER AND GAS PLANS  
PROJECT NO.: PROJECT #  
REVIEWED:  
SHEET NO.:  
**P101**



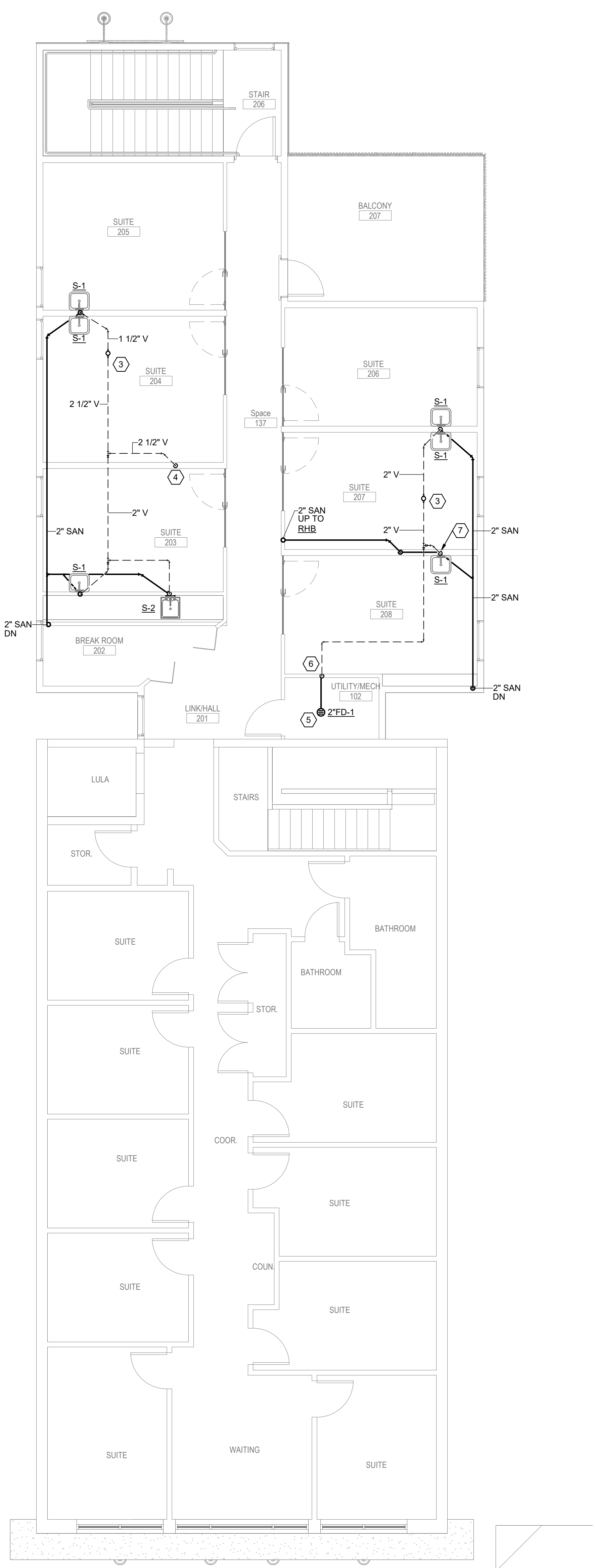
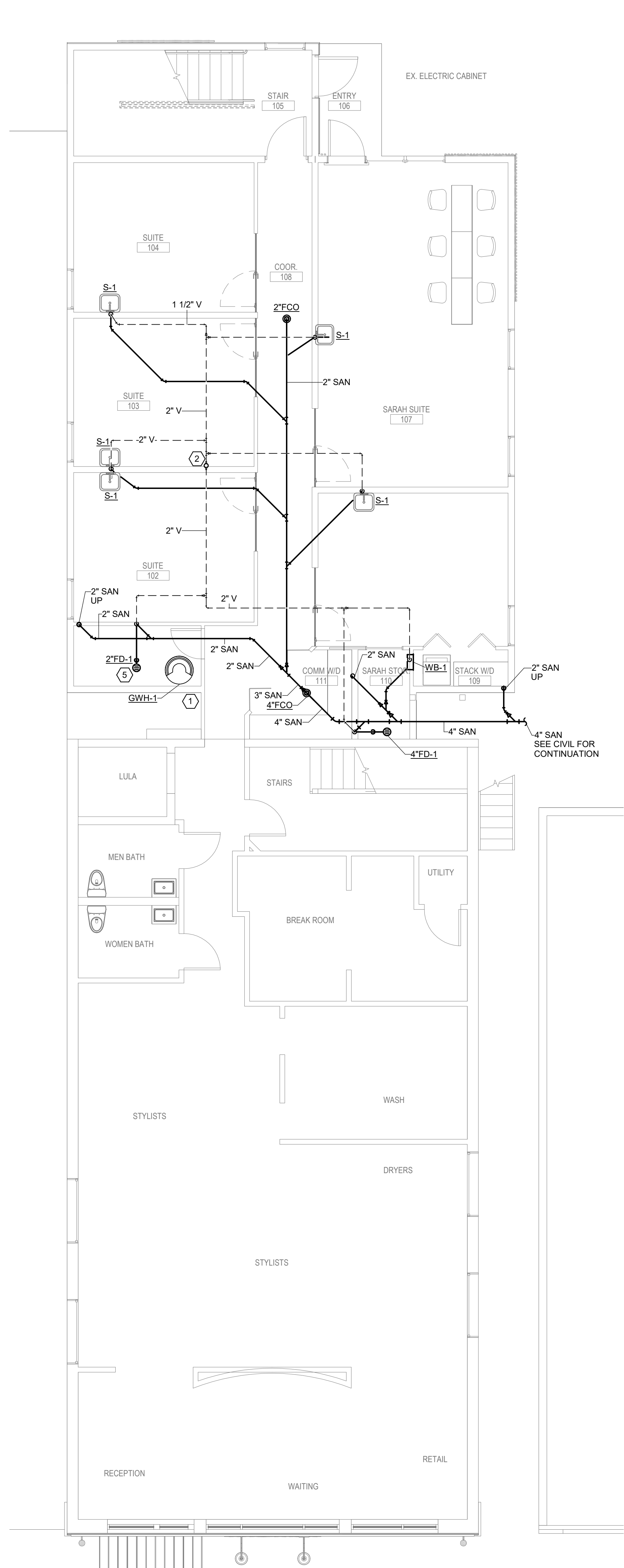
| GENERAL NOTES (THIS SHEET) |   |
|----------------------------|---|
| 1.                         | REFER TO SHEET P001 FOR SYMBOLS LEGEND AND ADDITIONAL GENERAL NOTES.  |
| 2.                         | REFER TO PLUMBING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION AND FIXTURE CONNECTION SIZES.                     |
| 3.                         | COORDINATE ROUTING OF PLUMBING SYSTEMS WITH ALL OTHER TRADES.   |
| 4.                         | MOUNT ALL VALVES IN ACCESSIBLE LOCATIONS.   |
| 5.                         | PIPING DROPS TO FIXTURES ON EXTERIOR WALLS SHALL BE ROUTED ON WARM SIDE OF INSULATION TO PROTECT FROM FREEZING. |
| 6.                         | FIELD COORDINATE CONNECTION REQUIREMENTS FOR ALL EQUIPMENT, EITHER FURNISHED OR PROVIDED BY OTHERS.             |

| KEY NOTES (THIS SHEET) |  |
|------------------------|--|
| 1.                     | CONCENTRIC VENT THROUGH WALL PER MANUFACTURER'S RECOMMENDATIONS. |
| 2.                     | 2-1/2" VENT UP   |
| 3.                     | 3" VENT UP TO 3" VTR.  |
| 4.                     | 2-1/2" VENT DOWN   |
| 5.                     | ROUTE 3/4" PVC CONDENSATE DRAIN FROM FURNACES TO FLOOR DRAIN.    |
| 6.                     | 2" SAN DOWN  |
| 7.                     | CONNECT DRAIN PIPE FROM RHB TO SINK TAIL PIECE.                  |

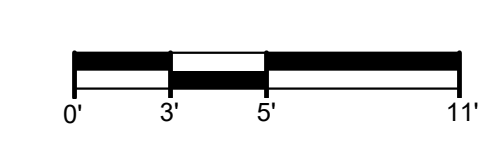
| FIRE SUPPRESSION SPRINKLER SYSTEM NOTES (THIS SHEET) |   |
|--|---|
| 1.   | CONTRACTOR SHALL DESIGN AND INSTALL FIRE SUPPRESSION SPRINKLER SYSTEM TO COVER ENTIRE BUILDING PER NFPA 13.   |
| 2.   | CONTRACTOR SHALL PROVIDE HYDRAULIC CALCULATIONS, PIPING LAYOUT DRAWINGS, AND SHOP DRAWINGS TO AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL PRIOR TO START OF WORK. |
| 3.   | COORDINATE PIPING AND LOCATION OF SPRINKLER HEADS WITH MEP AND OTHER WORKS.   |
| 4.   | ATTACHED CANOPIES AND OVERHANGS SHALL BE PROTECTED WITH DRY PIPE/DRY SPRINKLER HEADS PER NFPA 13.   |
| 5.   | PROVIDE FIRE DEPARTMENT CONNECTION AT LOCATION COORDINATED WITH LOCAL FIRE DEPARTMENT.  |

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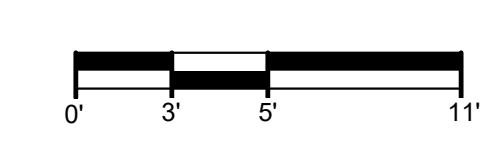
| CONSULTANTS: |
|--------------|
|              |



**1** FIRST FLOOR SANITARY PLAN  
SCALE: 3/16" = 1'-0"



**2** SECOND FLOOR SANITARY PLAN  
SCALE: 3/16" = 1'-0"



PROJECT NAME:  
**BEAUTY PARLOUR NEW BUILDING ADDITION**

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PROFESSIONAL MECHANICAL ENGINEER  
MARK RUSSELL STANBRUCK  
#18796  
STATE OF NEBRASKA

01/13/2023

SHEET NAME:  
SANITARY PLANS

PROJECT NO. PROJECT #  
REVIEWED:  
SHEET NO. **P201**







