NTUA Headquarters Complex Office Building

Fort Defiance, Arizona
Dyron Murphy Architects Project No. 2015.05

ADDENDUM No. 1

October 27, 2016

This addendum forms part of the Contract Documents and modifies the Bid Documents dated, October 6, 2016, as noted below. All Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

INFORMATION TO BIDDERS:

1. ~~The Pre-Bid Meeting and Sign-In-Sheet are attached herein.~~

2. The geotechnical engineering report dated May 6, 2015, "Navajo Tribal Utility Authority Headquarters Complex" submitted by Geomat Inc. is attached herein. The report is solely for reference information and evaluation purposes.

3. The Storm Water Pollution Prevention Plan (SWPPP) has been prepared by the civil engineer and will be provided to the selected contractor. The selected contractor will be responsible for submitting the Notice of Intent (NOI) to the required agency and complying with all requirements.

4. The Revit models and files (architectural, structural, mechanical, electrical) for the project are available to bidders solely for reference and convenience only. Bidders who would like to use the Revit models for the noted purpose, will need to fill out and sign the attached "DMA BIM Model Transfer Agreement" and return to DMA via email. Upon receiving the signed document, DMA will email a link to each bidder for access to the Revit files.

DRAWING + SPECIFICATION CLARIFICATIONS:

ARCHITECTURAL:
1. Sheet A001: Added enlarged plan, A2/A001, with revised main entry drive with added dimensions, signage and pavement markings. Refer to revised sheet A001 (Addendum No. 01) attached herein.

2. Sheet A005: Mechanical Equipment Enclosure South Elevation, E5/A005, the overall wall elevation from the finish floor to be 118'-0" to match elevation shown on E3/A005.

3. Sheet A101c: Sink in Conference Room 1 (1106) to be relocated along north wall and within casework. Refer to C3/A405 for correct location shown. Sink location to be revised and updated on sheet P101c.

4. Specification Section 32 3100 Steel Ornamental Fence System and Gates:
   - 2.01, B. 2 Materials for pickets shall be 3/4-inch square x 14 ga tubing. The rails shall be steel channel, 1.5" x 1.4375" x 14ga. Picket holes in the rail shall be spaced 4.675" on center for standard picket space.

STRUCTURAL:
1. Refer to structural addendum included herein.
   - Revised sheet: S601.

MECHANICAL:

1. Refer to mechanical and plumbing addendum included herein.
    - Revised sheets: M003, M101, M101a, M101b, M101c, M102, M102a, M102b, M102c, P305.

ELECTRICAL:

1. Refer to electrical addendum included herein.
    - Revised specification section: 26 2416 Panelboards.
    - Revised sheets: E001, E103a, E103b, E103c, E104a, E104b, E104c, E501, E604.

END OF ADDENDUM NO.1

Oscar Tovar, Project Manager
Dyron Murphy Architects, P.C

Attachments:

1. ~~Pre-Bid Meeting Agenda and Sign-In Sheet.~~
2. DMA BIM Model Transfer Agreement
3. Geotechnical Engineering Report (dated May 6, 2015).
4. Architectural Sheet A001.
5. Structural addendum: Sheet S601.
6. Mechanical addendum: Sheets: M003, M101, M101a, M101b, M101c, M102, M102a, M102b, M102c, P305.
7. Electrical addendum: Specification Section 26 2416 Panelboards + Sheets: E001, E103a, E103b, E103c, E104a, E104b, E104c, E501, E604.

NTUA HQ COMPLEX-OFFICE BUILDING
PRE-BID MEETING AGENDA

OCTOBER 20, 2016
10:00 AM
NTUA-DEPUTY GENERAL MANAGER'S OFFICE

1. INTRODUCTIONS
   - Dyron Murphy Architects, P.C.
   - Navajo Tribal Utility Authority (NTUA)

2. PROJECT INFORMATION AND SCOPE
   - Selected General Contractors-not an open bid to Contractors.
   - The work includes the construction of a two story (approximately 71,000 square foot) administration office building.
   - Site work includes utilities and site development including sidewalks and associated site work including drainage improvements.
   - Off-site improvements include new highway acceleration and deceleration lanes.
   - Two (2) Bid Alternates as noted in the Bid Submittal Form.
     - Alternate 01-Kitchen/Cafeteria including all equipment.
     - Alternate 02-Fitness Center.
   - Two (2) Bid Allowances as noted in the Bid Submittal Form. These are NOT to be included as part of the Base Bid.
     - Allowance 01-Walking Trails: $110,000.00
     - Allowance 02-Hogan: $80,000.00
   - Value Engineering Items-Bidders to provide a list of suggested value engineering items to be reviewed and considered by the Owner in the amount of approximately $1,000,000.
   - Bidding documents (CD) provided by NTUA. Contractor is responsible for printing hard copies required during bidding and construction.
   - Bid documents dated October 6, 2016.
   - Building Permit-not required. However, fire protection shop drawings are to be coordinated and submitted to Navajo Nation Fire Chief. Other permits required are the responsibility of the contractor.
   - Taxes: Navajo Tribal Taxes are applicable.
   - Navajo Preference in Employment Act.
   - USDA RUS Forms are to be used and apply due to funding.
   - Funding and spending/billing of funds.

3. BID SUBMITTAL, DEADLINES AND DELIVERY DATE
   - Sealed bids will be accepted until **November 15, 2016; 2:00 PM local time** at the office of the Purchasing Department, Avis Jimm.
   - No bids will be accepted after specified time.
   - Owner will not open bids at this time and will notify selected contractor on future date.
   - Owner reserves the right to waive irregularities and reject any and all bids.

- Submission of technical inquiries and questions shall be submitted in writing to Dyron Murphy Architects by close of business 5:00 PM (local time), seven (7) calendar days prior to the date of receipt of bids; November 8, 2016.
- Inquiries and questions shall be submitted by email to:
    - otovar@dm-architects.com
- Substitutions will be reviewed only 15 days after date of Agreement (01 6000) with the selected bidder.
- Addendums-None issued at this time.
- Project completion timeframe: 15 months (455 calendar days) from date of Notice to Proceed.
- Start of construction shall be coordinated with NTUA. It is currently anticipated to start construction until March 2017.

4. QUESTIONS/COMMENTS

5. SITE VISIT

BIM MODEL TRANSFER AGREEMENT

An Agreement Between Dyron Murphy Architects, P.C.,
the Project Team, and the Bidder/Contractor for Transfer of
Building Information Modeling (BIM) Data through a Digital Medium

Date: October 27, 2016

PROJECT TEAM

ARCHITECT
DYRON MURPHY ARCHITECTS, P.C.
4505 MONTBEL PL, NE
ALBUQUERQUE, NM 87107

CIVIL ENGINEERS
BOHANNAN HUSTON
7500 JEFFERSON ST. NE
ALBUQUERQUE, NM 87109

STRUCTURAL ENGINEERS
CHAVEZ-GRIEVES CONSULTING ENGINEERS
4700 LINCOLN RD, NE SUITE 102
ALBUQUERQUE NM 87109

FOODSERVICE
BLACKSTONE DESIGN STUDIO
2077 N. ZARAGOZA RD, SUITE 200
EL PASO, TX 79938

MECHANICAL/PLUMBING ENGINEER
ARSED ENGINEERING GROUP
4700 LINCOLN RD, NE
ALBUQUERQUE, NM 87109

ELECTRICAL ENGINEER
AEDI
5101 COORS BLVD, NW, SUITE F
ALBUQUERQUE, NM 87120

LANDSCAPE
COSTELLO KENNEDY LANDSCAPE
526 THIRD ST, SUITE 1A
SAN RAFAEL, CA 94901

PROJECT OWNER:
NAVAJO TRIBAL UTILITY AUTHORITY
P.O. BOX 170
FORT DEFIANCE, ARIZONA 86504

Location: Fort Defiance, Arizona
Architect's Project No.: 2015.05

BIDDER/CONTRACTOR:

Project Name: NTUA HEADQUARTERS COMPLEX OFFICE BUILDING

The BIM Model noted is provided solely as a convenience and shall NOT, under any circumstance, be considered as "Contract Documents", as "Construction Documents", or as any type of certified document. All documents considered "Contract Documents", "Construction Documents", or any type of a certified document shall be hard copy and shall be accompanied by a professional's stamp and signature. The hard copy shall be referred to and shall govern in the event of any inconsistency between the hard copy and the BIM Model. The information contained in the BIM Model may not be used in lieu of obtaining information by other means required by other agreements, including those with the Project Owner, such as by survey or other procedures or sources, and any conclusions or information obtained or derived from such BIM Model or other digital files will be at the user's sole risk. By providing information in this format, Dyron Murphy Architects, P.C., makes no representations, whether express or implied, whether the user's means, methods, techniques, sequences, or procedures are adequate, appropriate, or approved, and whether the use of the information contained in the BIM Model is appropriate.

Dyron Murphy Architects, P.C., will provide the following BIM Model for the convenience of the contractor.

NTUA HEADQUARTERS COMPLEX OFFICE BUILDING
100% CONSTRUCTION DOCUMENTS (dated October 6, 2016)

BIM Model was prepared on the following:

Software: Autodesk Revit Version: 2015

Contractor shall pay Dyron Murphy Architects, P.C. a service fee of $0.00

TERMS AND CONDITIONS

1. The delivery of the BIM Model is in digital format and is for the benefit of the Client for whom the design services have been performed. Nothing in this transfer shall be construed to provide any right of the Contractor to rely on the BIM Model provided or that the use of the BIM Model implies the review and approval by the design professional of any drawing based on the information.

2. Dyron Murphy Architects, P.C. and the Project Team, makes no representation as to the compatibility of the BIM Model with any hardware or software.

3. Since the information set forth in the BIM Model can be modified unintentionally or otherwise, Dyron Murphy Architects, P.C. and/or the Project Team, reserves the right to remove all insignia of its ownership and/or involvement from each digital display.

4. All information added by the Contractor, which represents a proposed change to the original design, shall be clearly identified by flagging or other distinctive presentation.

5. All information on the BIM Model shall be considered instruments of service of Dyron Murphy Architects, P.C. and the Project Team and shall not be used for other projects, for additions to this project, or for completion of this project by others. The BIM Model shall remain the property of Dyron Murphy Architects, P.C. and the Project Team and in no case shall the transfer of this data be considered a sale.

6. The Contractor is advised to check all BIM Model families for viruses before loading the model. The Contractor is fully responsible for intercepting and disabling viruses, if any, that may be inadvertently transmitted within a BIM Model family and hereby agrees to indemnify and hold Dyron Murphy Architects, P.C. and the Project Team harmless from and against all claims of any type or nature asserted by Contractor or any third party as a result of viruses inadvertently transmitted within the BIM Model.

7. Dyron Murphy Architects, P.C. and the Project Team, make no representation regarding the accuracy, completeness, or permanence of the BIM Model, nor for its merchantability or fitness for a particular purpose. Addenda information or revisions made after the date indicated on the BIM Model may not have been incorporated. In the event of a conflict between Dyron Murphy Architects, P.C. and the Project Team's sealed contract drawings and the BIM Model, the sealed contract drawings shall govern. It is the Contractor's responsibility to determine if any conflicts exist. The BIM Model shall not be considered to be Contract Documents as defined by the General Conditions of the Contract for Construction.

8. The use of the BIM Model as prepared by the Dyron Murphy Architects, P.C. and the Project Team, shall not in any way negate the Contractor's responsibility for coordination with other trades or for the proper checking and coordination of dimensions, details, member sizes and gauge, and quantities of materials as required to facilitate complete and accurate fabrication and erection.

9. The Contractor shall, to the fullest extent permitted by law, indemnify, defend and hold harmless Dyron Murphy Architects, P.C. and the Project Team and any sub-consultants thereof, from any and all claims, damages, losses, expenses, penalties and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the BIM Model by the Contractor, or by third party recipients of the BIM Model from the Contractor.

10. Dyron Murphy Architects, P.C. and the Project Team believe that no licensing or copyright fees are due to others on account of the transfer of the BIM Model, but to the extent any are, the Contractor will pay the appropriate fees and hold Dyron Murphy Architects, P.C. and the Project Team harmless from such claims as may arise.

11. Any purchase order number provided by the Contractor is for Contractor's accounting purposes only. Contractor's purchase order terms and conditions are void and are not a part of this agreement.

12. Payment of the service fee is due in full upon transfer of the BIM Model. The Contractor's signature below binds the Contractor to pay Dyron Murphy Architects, P.C., the agreed upon service fee and authorizes Dyron Murphy Architects, P.C., to invoice the Contractor for services rendered.

13. This agreement shall be governed by the laws of the State of New Mexico and Arizona.

AUTHORIZED ACCEPTANCE

By Architect of Record (AR): Dyron Murphy Architects, P.C.	by Contractor:
Signature	Signature
Name: Oscar Tovar Title: Senior Project Manager Date: October 27, 2016	Name: Title: Date:

GEOTECHNICAL ENGINEERING REPORT
NAVAJO TRIBAL UTILITY AUTHORITY
HEADQUARTERS COMPLEX
MCKINLEY COUNTY, NEW MEXICO

Submitted To:

Dyron V. Murphy, RA
Dyron Murphy Architects, P.C.
4505 Montbel Place, N.E.
Albuquerque, New Mexico 87107

Submitted By:

GEOMAT Inc.
915 Malta Avenue
Farmington, New Mexico 87401

May 6, 2015
GEOMAT Project 152-2229

GEOMAT INC.
915 Malta Avenue ◆ Farmington, NM 87401 ◆ Tel (505) 327-7928 ◆ Fax (505) 326-5721

May 6, 2015

Dyron V. Murphy, RA
Dyron Murphy Architects, P.C.
4505 Montbel Place, N.E.
Albuquerque, New Mexico 87107

RE: Geotechnical Engineering Study
Navajo Tribal Utility Authority Headquarters Complex
McKinley County, New Mexico
GEOMAT Project No. 152-2229

GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the Navajo Tribal Utility Authority (NTUA) Headquarters complex to be located in McKinley County, New Mexico northeast of Fort Defiance, Arizona. This study was performed in general accordance with our Proposal No. 102-11-08 Rev 2, dated December 2, 2011.

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached. Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, the proposed buildings could be supported on shallow spread footings bearing on engineered fill. Slab on grade floors may be utilized for the interior floor systems. Other design and construction details, based upon geotechnical conditions, are presented in the report.

We have appreciated being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report, please contact us.

Sincerely yours,
GEOMAT Inc.

MATTHEW J. CRAMER NEW MEXICO 18700 5/6/15 PROFESSIONAL ENGINEER

Tyler Compton, E.I.T.
Staff Professional

Matthew J. Cramer, P.E.
Vice President, Geostructural Engineer

Copies to: Addressee (1)

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GEOTECHNICAL ENGINEERING REPORT
NAVAJO TRIBAL UTILITY AUTHORITY
HEADQUARTERS COMPLEX
MCKINLEY COUNTY, NEW MEXICO
GEOMAT PROJECT NO. 152-2229

INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the Navajo Tribal Utility Authority (NTUA) Headquarters Complex to be located in McKinley County, New Mexico northeast of Fort Defiance, Arizona, as shown on the Site Plan in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations about:

- subsurface soil conditions
- groundwater conditions
- lateral soil pressures
- earthwork
- foundation design and construction
- slab design and construction
- parking lot pavement design
- drainage

The opinions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures, and our understanding of the proposed project as stated below.

PROPOSED CONSTRUCTION

We understand the complex consists of a number of structures including a two-story main headquarters building of steel construction. We assume structural loads for this building will be on the order of 3 klf for walls. We understand that column loads will generally be 200 kips but may reach a maximum of 250 kips at some isolated column locations. We understand that in addition to the main headquarters building, the project includes a single-story steel framed training center, a future free-standing single story commercial building, and a single-story clubhouse building. We assume structural loads for the single story buildings will be on the order of 1 klf for walls and 75 to 100 kips for columns. A housing development will be included north of the main headquarters, consisting of wood framed single family houses, two-story

apartments, and duplexes. Also included are the associated parking lots and drive lanes for the facilities, and a water tank that will be located in the northeast corner of the site. We understand the water tank is anticipated to hold between 180,000 and 250,000 gallons of water, but the final dimensions have not been determined. Additionally, a detention pond is planned to be located in the northwest corner, southeast corner, or both corners of the site. We anticipate that no basements or other below-grade structures are planned. Because of the topography of the site, earthwork cuts and/or fills on the order of 5 feet may be necessary to achieve final grade for any one structure.

SITE EXPLORATION

Our scope of services performed for this project included a site reconnaissance by a staff engineer, a subsurface exploration program, laboratory testing and engineering analyses.

Field Exploration:

Subsurface conditions at the site were explored on April 13 through 15, 2015 by drilling 22 exploratory borings at the approximate locations shown on the Site Plan in Appendix A. Borings B-5 through B-9 were drilled to depths of approximately 20 to 40 feet below existing ground surface (bgs) within the footprint of the main headquarters building. Borings B-1, B-10, B-11, B-13, and B-15 were drilled to depths of approximately 15 feet bgs within the footprints of ancillary structures. Boring B-14 was drilled to a depth of approximately 15 feet bgs at the location of the water tank. Borings B-17, B-18, B-19, and B-20 were drilled to depths of approximately 10 to 15 feet bgs within the area of the housing development. Borings B-2, B-3, B-4, B-12, and B-16 were drilled to depths of approximately 5 feet bgs in parking and drive lane areas. Borings B-21 and B-22 were drilled to depths of approximately 5 feet bgs in the area of planned or proposed detention ponds.

The borings were advanced using a CME-45 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem auger. The borings were continuously monitored by an engineer from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each boring.

Soil samples were obtained from the borings using a combination of standard 2-inch O.D. split spoon and 3-inch O.D. modified California ring barrel samplers. The samplers were driven using a 140-pound hammer falling 30 inches. The standard penetration resistance was determined by recording the number of hammer blows required to advance the sampler in six-inch increments. Representative bulk samples of subsurface materials were also obtained.

Groundwater evaluations were made in each boring at the time of site exploration. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A. Boring logs were prepared and are presented in Appendix A.

Laboratory Testing:

Samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the field descriptions were confirmed or modified as necessary, and laboratory tests were performed to evaluate the engineering properties of the subsurface materials.

SITE CONDITIONS

The site of the NTUA Headquarters is located approximately 1,500 feet north of the intersection of Indian Route 12 and Indian Route 7. The site is bound on the east by Indian Route 12 and the west by the New Mexico/Arizona border. The Tséhootsooí Medical Center and associated housing is located along the west boundary of the site. An existing photovoltaic array is located in the southwest corner of the site. A grouping of approximately a half a dozen utility poles sits towards the middle of the site as an existing training ground for NTUA. The ground surface across the site generally sloped down to the northwest, with the highest area at the northeast corner and low points at the northwest and south edges. A drainage heads southwest across the south edge of the site. The site was vegetated by a sparse to moderate growth of grass and brush. No evidence of prior structural development was noted at the site. The following photograph depicts the site at the time of our exploration.

Drill Rig at Boring B-21
View to the Northwest

SUBSURFACE CONDITIONS

Soil Conditions:

As presented on the Boring Logs in Appendix A, we encountered silty sand soils in all of the borings except boring B-21 and B-22. The silty sand soils were generally very loose to medium dense and slightly damp to damp. The silty sand soils extended the total depth explored in borings B-1, B-2, B-3, B-4, B-5, B-8, B-10, B-12, B-14, B-15, B-16, and B-18.

Below the silty sand soils in borings B-6, B-7, B-9, B-13, B-17, and B-20, we encountered clayey sand soils. The clayey sand soils were generally loose to medium dense and slightly damp to damp. The clayey sand soils extended to the total depth explored in all of the borings except B-6.

In borings B-6 and B-19, we encountered fat clay soils beneath the sandy soils. The fat clay soils were generally medium stiff to hard and damp.

In boring B-11, we encountered very loose to loose and slightly damp to damp silty sand soils to the total depth explored except for a thin, damp lean clay layer between approximately 1.5 and 2.5 feet bgs.

In borings B-21 and B-22, we encountered damp sandy lean clay soils to depths of 3.5 and 5 feet bgs (total depth), respectively. Beneath the clay soils in boring B-22, we encountered slightly damp silty clayey sand soils to the total depth explored (5 feet bgs).

Groundwater Conditions:

Groundwater was not encountered in the borings to the depths explored. Groundwater elevations can fluctuate over time depending upon precipitation, irrigation, runoff and infiltration of surface water. We do not have any information regarding the historical fluctuation of the groundwater level in this vicinity.

Laboratory Test Results:

Laboratory analyses of samples tested indicate the silty sand soils have non-plastic fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 15 to 21 percent. In-place dry densities of the silty sand soils ranged from approximately 89 to 105 pounds per cubic foot (pcf), with natural moisture contents between approximately 2 and 7 percent.

A representative sample of the silty clayey sand soils had a fines content of 36 percent and a plasticity index of 7.
A representative sample of the clay soils had a fines content of 58 percent and a plasticity index of 39.

Laboratory consolidation/expansion testing was performed on undisturbed ring samples of the subgrade soils beneath selected buildings. Results of these tests indicate that the sandy soils undergo slight to moderate compression when subjected to anticipated foundation stresses at the existing moisture contents. When subjected to increased moisture conditions at these stresses, they undergo slight to significant additional compression.

Results of all laboratory tests are presented in Appendix B.

OPINIONS AND RECOMMENDATIONS

Geotechnical Considerations:

The site is considered suitable for the proposed buildings based on the geotechnical conditions encountered and tested for this report. To reduce the potential for settlement and provide more uniform and higher allowable bearing pressures, the footings should bear on engineered fills.

Foundation recommendations are based on our understanding of the type of structures to be built and the results of our field subsurface exploration and laboratory testing. If there are any significant deviations from the assumed floor elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

Foundations:

Spread Footings:

Main Headquarters:

The main headquarters building could be founded on conventional shallow spread footings bearing on engineered fill. The engineered fill should be provided for a depth below the footing of at least the width of wall footings and one-half the width of column footings, but not less than four and one-half (4.5) feet for either case. The engineered fill should extend beyond the edges of the footings for a distance of one-half the depth of engineered fill below the footings, but not less than two and one-half (2.5) feet. If the entire building area is excavated for the engineered fill placement, the engineered fill should extend at least five (5.0) feet beyond the perimeter of the building.

Single Story Buildings, Residences, and Ancillary Structures

The single story buildings, residences, and ancillary structures could be founded on conventional shallow spread footings bearing on engineered fill. These structures include the training center, clubhouse, future commercial building, and housing development structures. The engineered fill should be provided for a depth below the footing of at least the width of wall footings and one-half the width of column footings, but not less than three (3.0) feet for either case. The engineered fill should extend beyond the edges of the footings for a distance of one-half the depth of engineered fill below the footings, but not less than one and one-half (1.5) feet. If the entire building area is excavated for the engineered fill placement, the engineered fill should extend at least five (5.0) feet beyond the perimeter of the building.

Materials and compaction criteria for the engineered fill should be as recommended in the **Earthwork** section of this report. Adequate drainage should be provided to prevent the supporting soils from undergoing significant moisture changes.

The recommended design bearing capacities and footing depths are presented in the following table.

Footing Depth[1] (ft)	Allowable Bearing Pressure (psf)	Bearing Soil
2.5[2]	**2,500**	**Engineered Fill**
3.0	**3,000**	**Engineered Fill**

[1]Footing depth referenced below lowest adjacent finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

[2]Minimum footing depth for frost protection.

Total and differential settlements resulting from the assumed structural loads are estimated to be on the order of ½ inch or less. Proper drainage should be provided in the final design and during construction and areas adjacent to the structure should be designed to prevent water from ponding or accumulating next to the structure.

Total and differential settlements should not exceed predicted values, provided that:

- Foundations are constructed as recommended, and
- Essentially no changes occur in water contents of foundation soils.

For foundations adjacent to descending slopes, a minimum horizontal setback of five (5) feet should be maintained between the foundation base and slope face. In addition, the setback should be such that an imaginary line extending downward at 45 degrees from the nearest foundation edge does not intersect the slope.
Footings and foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement.

Foundation excavations should be observed by GEOMAT. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Structural Slab Foundation:

Water Tank:

A structural reinforced slab foundation bearing on engineered fill is expected to be used to support the water tank. However, the tank capacity and size were not available prior to our mobilization for the field exploration. The final design dimensions and capacity of the tank will determine if a structural slab foundation is appropriate and the depth of engineered fill required beneath the footing. Additionally, because of the large loads associated with the water tank structure, a supplementary field exploration performed to a greater depth may be required. We should be contacted for further recommendations once the size and capacity are determined.

Site Classification:

Based on the subsurface conditions encountered in the borings, we estimate that Site Class D is appropriate for the site according to Table 1613.5.2 of the 2009 International Building Code. This parameter was estimated based on extrapolation of data beyond the deepest depth explored, using methods allowed by the code. Actual shear wave velocity testing/analysis and/or exploration to a depth of 100 feet were not performed as part of our scope of services for this project.

Lateral Earth Pressures:

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

- **Active:**
  Granular soil backfill (on-site sand).....35 psf/ft
  Undisturbed subsoil .....30 psf/ft

- **Passive:**
  Shallow foundation walls .....250 psf/ft
  Shallow column footings.....…….....350 psf/ft

- **Coefficient of base friction**: 0.40
  The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- **At rest:**
  Granular soil backfill (on-site sand).....50 psf/ft
  Undisturbed subsoil.....60 psf/ft

Fill against grade beams and retaining walls should be compacted to densities specified in **Earthwork**. Medium to high plasticity clay soils should not be used as backfill against retaining walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressures that could result in wall movement.

Floor Slab Design and Construction:

The floor slabs should be placed on a minimum of two (2.0) feet of compacted soil (including the base course). On-site or imported soils with low expansive potentials should be used in fills that will support the floor slabs. Some differential movement of a slab-on-grade floor system is possible if the subgrade soils become elevated in moisture content. Such movements are considered within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the **Earthwork** section of this report.

For structural design of concrete slabs-on-grade, a modulus of subgrade reaction of 250 pounds per cubic inch (pci) may be used for floors supported on compacted engineered fill.

Additional floor slab design and construction recommendations are as follows:

- Control joints should be provided in slabs to control the location and extent of cracking. Joint spacing should be designed by the structural engineer.

- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.

- In areas subjected to normal loading, a minimum 4-inch layer of clean-graded gravel, aggregate base course should be placed beneath interior slabs. For heavy loading, re-evaluation of slab and/or base course thickness may be required.

- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

- If moisture sensitive floor coverings are used on interior slabs, consideration should be given to the use of membranes to help reduce the potential for vapor rise through the slab.

Subgrade preparation and moisture control recommendations provided in this report help to reduce soil related problems that may result in distress of concrete floor slabs on grade. However, concrete drying shrinkage, temperature induced volume change and curling can create cracking and distress in the concrete slab on grade. To reduce distress from these causes, properly proportioned concrete mixes with adequate curing and proper joint spacing must be provided. These options should be discussed with the project Architect/Engineer.

Corrosivity:

Corrosivity tests were performed on two representative samples of the sandy soils to evaluate their potential to corrode buried concrete and/or metal. The samples were tested for pH, electrical resistivity, and soluble sulfates and chlorides. Results of these tests are presented in Appendix B.

Corrosion of Concrete:

The soluble sulfate contents of the samples tested were below the reporting limits of the test, which is characterized as negligible sulfate exposure according to American Concrete Institute Building Code 318, Table 4.3.1. For this level of sulfate exposure, ACI 318 recommends no

restrictions on cement type or maximum water-cementitious material ratio. Additionally, it recommends the use of concrete with a minimum 28-day compressive strength of 2,500 psi. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the Portland Cement Association (PCA) and the American Concrete Institute (ACI).

Corrosion of Metals:

Corrosion of buried ferrous metals can occur when electrical current flows from the metal into the soil. As the resistivity of the soil decreases, the flow of electrical current increases, increasing the potential for corrosion. A commonly accepted correlation between soil resistivity and corrosion of ferrous metals is shown in the following table.

Resistivity (ohm-cm)	Corrosivity
0 to 1,000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
>10,000	Mildly Corrosive

The samples tested had resistivities ranging from 6,030 ohm-cm to 7,460 ohm-cm. Based on these laboratory results and the table above, the on-site soils would be characterized as moderately corrosive toward ferrous metals. The potential for corrosion should be taken into account during the design process.

Pavement Design and Construction:

We are presenting options for both flexible (asphalt) and rigid (concrete) pavement sections. We are also presenting a heavy-duty rigid pavement section for areas that will be subjected to heavy, sustained, concentrated loads, such as dumpster and truck loading areas.

Design of pavements for the project has been based on the procedures outlined in the *AASHTO Guide for Design of Pavement Structures* by the American Association of State Highway and Transportation Officials (AASHTO), and on the *Guide for the Design and Construction of Concrete Parking Lots* by the American Concrete Institute (ACI 330).

The recommended pavement sections are based on the results of our field and laboratory testing and the estimated traffic volumes for the new development provided by Bohannan Huston Inc. We understand the estimated average daily traffic for the access roads in the proposed development is 1641 vehicles per day, with trucks comprising 5 percent of the total traffic.

The recommended pavement sections are presented in the tables below.

Recommended Pavement Sections for Access Roads and Parking Areas			
Option	**Hot Mix Asphalt** (inches)	**Aggregate Base Course** (inches)	**Portland Cement Concrete** (inches)
Asphalt	3.0	6.0	--
Concrete	--	--	5.0

Recommended Heavy Duty Pavement Section	
Portland Cement Concrete (inches)	**Aggregate Base Course** (inches)
6.0	--

Construction Recommendations for Flexible Pavements:

To identify areas containing soft soils that will be paved, we recommend those areas be proof-rolled under the observation of a representative of GEOMAT. The proof-rolling should be conducted utilizing a fully loaded, single axle water truck with a minimum 2,000 gallon capacity or other vehicle that will provide an equivalent weight on the subgrade. The proof-rolling should consist of driving the truck across all the areas to be paved at a slow speed (less than 5 mph) and observing any deflections or distress caused to the subgrade. Areas that show distress should be repaired by removing and replacing the soft material with suitable fill.

Aggregate base course should conform to Section 303 of the NMDOT specifications for Type I Base Course.

Aggregate base course should be placed in lifts not exceeding six inches and should be compacted to a minimum of 95% Standard Proctor density (ASTM D-698), within a moisture content range of 4 percent below, to 2 percent above optimum. In any areas where base course thickness exceeds 6 inches, the material should be placed and compacted in two or more lifts of equal thickness.

If the hot-mix asphalt is placed in more than one mat, the surface of each underlying mat should be treated with a tack coat immediately prior to placement of the subsequent mat of hot-mix asphalt.

Asphalt concrete should be obtained from an engineer-approved mix design prepared in accordance with NMDOT specifications. The hot-mix paving should be placed and compacted in accordance with NMDOT specifications.

Construction Recommendations for Rigid Pavements:

To identify areas containing soft soils that will be paved, we recommend those areas be proof-rolled under the observation of a representative of GEOMAT. The proof-rolling should be conducted utilizing a fully loaded, single axle water truck with a minimum 2,000 gallon capacity or other vehicle that will provide an equivalent weight on the subgrade. The proof-rolling should consist of driving the truck across all the areas to be paved at a slow speed (less than 5 mph) and observing any deflections or distress caused to the subgrade. Areas that show distress should be repaired by removing and replacing the soft material with suitable fill.

Concrete should be placed directly on the prepared subgrade. Reinforcing steel is not required or recommended for rigid pavement sections. Concrete used for pavement sections should have a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). Contraction joints should be provided to control the extent and location of cracking due to tensile stresses. The maximum recommended joint spacing is 10 feet.

General Pavement Considerations:

The performance of the recommended pavement sections can be enhanced by minimizing excess moisture that can reach the subgrade soils. The following recommendations should be considered at minimum:

- Site grading at a minimum 2% grade away from the pavements;
- Compaction of any utility trenches to the same criteria as the pavement subgrade.

The recommended pavement sections are considered minimal sections based on the anticipated traffic volumes and the subgrade conditions encountered during our exploration. They are expected to perform adequately when used in conjunction with preventive maintenance and good drainage. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment.

Percolation Test Results:

Soil percolation testing was performed to provide information to assess the feasibility regarding the design of detention ponds at the site. One percolation test was performed at boring B-21 (percolation test PT-1), and a second test at boring B-22 (percolation test PT-2).

The percolation tests were performed using the falling head method in holes that were approximately eight inches in diameter and approximately five feet below existing ground surface. The sides and bottom of the test holes were scarified and any remaining loose soil was removed from the hole. A layer of clean gravel was placed in the bottom of each hole to help reduce disturbance of the native soil surface during the introduction of water into the holes. The test holes were filled with 36 inches of clear water and allowed to presoak for approximately four hours prior to testing. The soils in boring B-22 drained relatively quickly, and water was intermittently added to maintain a head in the test hole during pre-soaking. The soils in boring B-21 did not drain quickly, and water was left in the test hole to presoak overnight.

After the presoaking, the water level was adjusted to approximately 24 inches above the bottom of each test hole and test trials were performed to establish a stabilized percolation rate. Each test trial was performed by measuring and recording the vertical drop in the water level at 10 minute intervals. This process was repeated until a stabilized percolation rate was indicated. The test results are presented in the table below:

STABILIZED PERCOLATION TEST RESULTS

Test Number	Test Depth* (Feet)	Pre-Soak Date	Test Date	Percolation Rate (Minutes Per Inch)
PT-1	5.0	4/13/2015	4/14/2015	**40**
PT-2	5.0	4/13/2015	4/13/2015	**9**

* Approximate depth measured to bottom of test hole from adjacent existing grade

These rates should be expected to become slower after construction as the ponds “silt in”. Periodic maintenance should be utilized to maintain the design percolation rates for the ponds. Note, percolation rates will differ if final grades vary from the existing grades at the time of our field test.

Slopes:

Assuming fill specifications, compaction requirements, and recommended setbacks provided in this report are followed, cut and fill slopes as steep as to 2.5:1 (horizontal:vertical) should be stable. Depending upon specific project conditions, adequate factors of safety against slope failure may be available for steeper configurations. However, such a determination would require additional analysis.

Earthwork:

General Considerations:

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Although underground facilities such as foundations, septic tanks, cesspools, basements and irrigation systems were not encountered during site reconnaissance, such features could exist and might be encountered during construction.

Site Clearing:

1. Strip and remove all existing pavement, fill, debris and other deleterious materials from the proposed building area. Any existing structures should be completely removed from below any building, including foundation elements and any associated development such as underground utilities, septic tanks, etc. All exposed surfaces below footings and slabs should be free of mounds and depressions which could prevent uniform compaction.

2. If unexpected fills or underground facilities are encountered during site clearing, we should be contacted for further recommendations. All excavations should be observed by GEOMAT prior to backfill placement.

3. Stripped materials consisting of vegetation and organic materials should be removed from the site, or used to re-vegetate exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

4. Sloping areas steeper than 5:1 (horizontal:vertical) should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

5. All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of eight inches, conditioned to near optimum moisture content, and compacted to at least 95% of standard proctor (ASTM D698).

Excavation:

1. We present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on our boring data. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction. Based on our subsurface evaluation it appears that shallow excavations in soils at the site will be possible using standard excavation equipment.

2. On-site soils may pump or become unstable or unworkable at high water contents, especially for excavations near the water table. Dewatering may be necessary to achieve a stable excavation. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Slab Subgrade Preparation:

1. After site clearing is complete, the existing soil below the building area should be prepared as recommended in the **Floor Slab Design and Construction** and **Site Clearing** sections of this report. Soils should be removed to provide at least a two (2.0) foot thickness of compacted soil and base course below the floor slab.

2. A minimum 4-inch layer of aggregate base course should be placed beneath floor slabs on grade.

Foundation Preparation:

Footings should bear on engineered fill as recommended in the **Foundations** section of this report. All loose and/or disturbed soils should either be compacted or removed from the bottoms of footing excavations prior to placement of reinforcing steel and/or concrete.

Fill Materials:

1. Based on the results of gradation and plasticity index, the onsite sandy soils are expected to be suitable for use as structural fill. However, at the time of construction, materials excavated with the intention for use as structural fill should be tested for compliance with all recommended structural fill specifications, including remolded swell potential. In addition, any clay soils or other deleterious materials should be removed from the fill soils prior to placement and compaction. Periodic quality control testing should be performed during construction to verify that the materials, or blends thereof, meet the recommendations for structural fill presented in the Fill Materials section of this report.

2. Native or imported soils with low expansive potentials could be used as fill material for the following:

   - general site grading
   - foundation areas
   - interior floor slab areas
   - foundation backfill
   - exterior slab areas
   - pavement areas

2. Select granular materials should be used as backfill behind walls that retain earth.

3. On site or imported soils to be used in structural fills should conform to the following:

Gradation	**Percent finer by weight (ASTM C136)**
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	50 Max
Liquid Limit	35 Max
Plasticity Index	15 Max
Maximum expansive potential (%)*	1.5

* Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 144-psf surcharge and submerged.

4. Aggregate base should conform to Section 303 of 2014 NMDOT specifications for Type I Base Course.

Placement and Compaction:

1. Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

2. Un-compacted fill lifts should not exceed 10 inches loose thickness.

3. Materials should be compacted to the following:

Material	**Minimum Percent (ASTM D698)**
Subgrade soils beneath fill areas	95
On site or imported soil fills:	
Beneath footings, slabs on grade and pavements	95
Aggregate base beneath slabs and pavements	95
Miscellaneous backfill	90

4. On-site and imported soils should be compacted at moisture contents near optimum.

Compliance:

Recommendations for slabs-on-grade and foundation elements supported on compacted fills depend upon compliance with **Earthwork** recommendations. To assess compliance, observation and testing should be performed by GEOMAT.

Drainage:

Surface Drainage:

1. Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Planters and other surface features that could retain water in areas adjacent to the building or pavements should be sealed or eliminated.

2. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

3. Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving.

4. Sprinkler systems should not be within 5 feet of foundation walls. Irrigated landscaping adjacent to the foundation system should be minimized or eliminated.

Subsurface Drainage:

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed adjacent to walls which retain earth. A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration.

GENERAL COMMENTS

It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that grading and foundation recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during excavation, grading, foundation, and construction phases of the work. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present and is considered a necessary part of continuing geotechnical engineering services for the project. Construction testing, including field and laboratory evaluation of fill, backfill, pavement materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

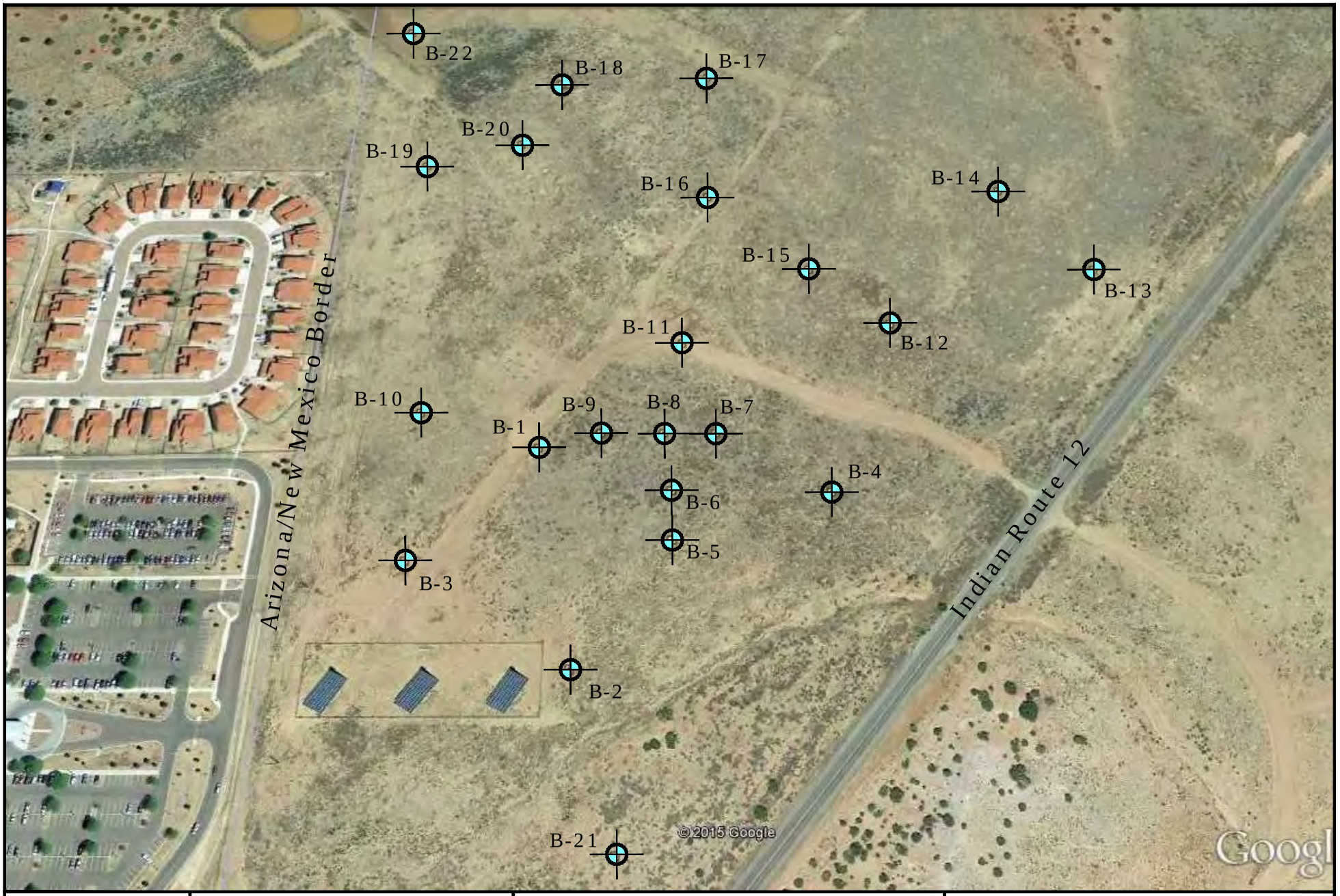
The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction equipment and techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed any geologic hazards that may exist on or near the site.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off site), or other factors may change over time and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify GEOMAT in writing of such intended use. Based on the intended use of the report, GEOMAT may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements, by the Client or anyone else, will release GEOMAT from any liability resulting from the use of this report by an unauthorized party.

Appendix A



Approximate Not to Scale	SITE PLAN Boring Locations (approximate) GEOMAT Project No. 152-2229 Date of Exploration: April 13-15, 2015	PROJECT NTUA Headquarters McKinley County, New Mexico

GEOMAT INC

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-1

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk, Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
									1	SILTY SAND, brown-red, fine-grained, loose, damp
									2	
				2-3-3	A SS 18				3	
									4	tan-red, slightly damp
95.6			1.6	2-5-5	MC 18				5	
									6	very loose
									7	
									8	
							SM		9	
									10	
				4-4-4	SS 18				11	loose
									12	
									13	
									14	
									15	
				4-6-7	SS 18				16	medium dense
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-2

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
	21	NP			A		SM		1 2 3 4 5	SILTY SAND, brown-red, fine-grained, damp tan, slightly damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-3

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
					A				1 2 3 4 5	SILTY SAND, brown-red, fine-grained, damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-4

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
					A		SM		1 2 3 4 5	SILTY SAND, brown-red, fine-grained, damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-5

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results										
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose, damp
									2	
				1-3-6	MC 18				3	
									4	
				2-2-3	SS 18				5	slightly damp
									6	loose
									7	
									8	
									9	
101.3			2.4	6-10-11	MC 18		SM		10	
									11	
									12	
									13	
									14	
				3-5-5	SS 18				15	
									16	
									17	
									18	
									19	
				4-4-4	SS 18				20	
									21	
									22	Total Depth 21.5 feet
									23	
									24	
									25	

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Borehole B-6

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results											
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
	15	NP		1-2-2	SS 18				1 2 3 4 5	SILTY SAND, brown-red, fine-grained, very loose to loose, damp slightly damp
94.9			4.1	2-4-3	MC 18				6 7 8 9	very loose
				2-1-2	SS 18		SM		10 11 12 13 14	
99.6			2.8	5-5-6	MC 18				15 16 17 18 19	very loose to loose
				5-5-5	SS 18				20 21 22	fine- to medium-grained, loose
							SC		23 24	CLAYEY SAND, red-brown, fine-grained, damp
				8-15-28	MC 18		CH		25 26 27	SANDY FAT CLAY, red-brown, very stiff, damp FAT CLAY, brown-green
				4-5-7	SS 18		CH		28 29 30 31 32 33	w/ interlayered clayey sand, stiff
				5-8-11	SS 18		CH		34 35 36 37 38	SANDY FAT CLAY very stiff red-brown
				11-24-50/5"	MC 17		CH		39 40 41	FAT CLAY hard
									42 43 44 45	Total Depth 41.4 feet

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Borehole B-7

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
									1	SILTY SAND, brown-red, fine-grained, very loose to loose, damp
									2	
				2-2-2	SS 18				3	
									4	slightly damp
95.9			2.3	3-5-6	MC 18				5	
									6	
									7	
									8	
									9	
				3-2-2	SS 18				10	
									11	
									12	
							SM		13	
									14	
				3-2-3	SS 18				15	
									16	loose
									17	
									18	
									19	
				8-9-11	MC 18				20	
									21	
									22	
									23	
									24	
				4-5-5	SS 18				25	
									26	loose to medium dense
									27	CLAYEY SAND, brown-red, fine-grained, medium dense, slightly damp
									28	
									29	
							SC		30	
				5-6-7	SS 18				31	
									32	Total Depth 31.5 feet
									33	
									34	
									35	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-8

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
									1	SILTY SAND, brown-red, fine-grained, loose, damp
									2	
				5-7-8	MC 18				3	
									4	
				3-4-3	SS 18				5	slightly damp
									6	
									7	
									8	
									9	
101.3			4.1	5-7-7	MC 18		SM		10	
									11	
									12	
									13	
									14	
				3-2-3	SS 18				15	
									16	
									17	
									18	
									19	
				4-4-4	SS 18				20	
									21	
									22	Total Depth 21.5 feet
									23	
									24	
									25	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-9

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, loose, damp
				2-2-3	SS 18				2	
									3	
									4	
97.5			4.8	4-5-8	MC 18				5	slightly damp
									6	
									7	
									8	
									9	
				3-3-4	SS 18				10	
									11	
							SM		12	
									13	
									14	
				7-10-13	MC 18				15	
									16	
									17	
									18	
									19	w/ trace gravel, fine- to coarse-grained
				7-6-5	SS 18				20	
									21	medium dense
									22	fine-grained
									23	
									24	
				5-6-8	SS 18				25	CLAYEY SAND, brown-green, fine-grained, medium dense, slightly damp
									26	
									27	
							SC		28	
									29	
									30	
				6-7-9	SS 18				31	
									32	Total Depth 31.5 feet
									33	
									34	
									35	

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Borehole B-10

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose to loose, damp
									2	
				2-2-2	SS 18				3	
									4	slightly damp
				4-7-8	MC 18				5	loose
									6	
									7	
									8	
							SM		9	
									10	
				3-2-3	SS 18				11	w/ trace gravel
									12	
									13	
									14	
									15	
				3-2-3	SS 18				16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

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Borehole B-11

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
							SM		1	SILTY SAND, brown-red, fine-grained, damp
							CL		2	LEAN CLAY, dark brown, damp
88.7			5.3	3-4-5	A MC 18				3	SILTY SAND, brown-red, fine-grained, very loose, damp
									4	
										slightly damp
				5-5-4	SS 18				5	loose
									6	
									7	
									8	
									9	
							SM		10	
101.7			2.4	6-9-9	MC 18				11	
									12	
									13	
									14	
									15	
				3-3-3	SS 18				16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

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Borehole B-12

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
	16	NP			A		SM		1 2 3 4 5	SILTY SAND, brown-red, fine-grained, damp to slightly damp
									6 7	Total Depth 5 feet

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Borehole B-13

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/15/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose, damp
									2	
				2-2-3	MC 18				3	
									4	
				2-1-2	SS 18				5	fine- to medium-grained slightly damp
									6	
									7	fine-grained
							SM		8	
									9	
99.2			4.1	11-10-9	MC 18				10	loose
									11	
									12	
									13	
									14	
				3-3-4	SS 18				15	
									16	
							SC			CLAYEY SAND, brown, fine-grained, loose, damp
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-14

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk, Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/15/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose, damp
									2	
				1-1-2	A SS 18				3	
									4	
95.7			3.2	4-4-6	MC 18				5	
									6	
									7	slightly damp
									8	
							SM		9	
									10	
				2-3-3	SS 18				11	loose
									12	
									13	
									14	
									15	
96.6			3.1	7-7-8	MC 18				16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-15

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/15/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, loose, damp
									2	
				3-3-6	SS 18				3	
									4	slightly damp
101.0			3.1	6-8-9	MC 18				5	
									6	
									7	
									8	
							SM		9	
									10	
				2-3-2	SS 18				11	
									12	
									13	
									14	
									15	
105.4			5.7	3-4-8	MC 18				16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-16

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
					A		SM		1 2 3 4 5	SILTY SAND, brown-red, fine-grained, slightly damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-17

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, loose, damp
									2	
				3-3-4	SS 18				3	
									4	slightly damp
97.3			3.6	5-8-8	MC 18		SM		5	
									6	
									7	
									8	
									9	
				5-5-6	SS 18				10	CLAYEY SAND, brown-green, fine-grained, medium-dense, damp
									11	
									12	
							SC		13	
									14	
				5-8-10	MC 18				15	loose
									16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-18

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose to loose, damp
									2	
99.9			1.8	3-4-7	MC 18				3	
									4	slightly damp
				5-5-5	SS 18		SM		5	loose to medium dense
									6	
									7	
									8	
									9	
				4-5-5	SS 18				10	tan-yellow
									11	
									12	Total Depth 11.5 feet
									13	
									14	
									15	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-19

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
99.7			6.7	2-3-6	MC 18				1	SILTY SAND, brown-red, fine-grained, very loose, damp
									2	
									3	
									4	slightly damp
				2-2-1	SS 18		SM		5	
									6	
									7	
									8	
									9	
				2-2-4	SS 18				10	
	58	39					CH		11	SANDY FAT CLAY, dark brown-red, medium stiff, damp
									12	Total Depth 11.5 feet
									13	
									14	
									15	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-20

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/14/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: None

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
									1	SILTY SAND, brown-red, fine-grained, very loose, damp
									2	
				2-1-2	SS 18				3	
									4	
95.7			2.5	3-3-3	MC 18				5	
									6	
							SM		7	
									8	
									9	
				3-4-6	MC 18				10	
									11	
									12	
									13	
									14	
									15	CLAYEY SAND, brown-green, fine-grained, loose, slightly damp
				2-2-3	SS 18		SC		16	
									17	Total Depth 16.5 feet
									18	
									19	
									20	

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-21

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: Percolation test hole PT-1

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
					A		CL		1 2 3 4 5	SANDY LEAN CLAY, red-brown, damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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Borehole B-22

Project Name: NTUA Headquarters
Project Number: 152-2229
Client: Dyron Murphy Architects
Site Location: McKinley County, New Mexico
Rig Type: CME-45
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk sample from auger cuttings
Hammer Weight: N/A
Hammer Fall: N/A

Date Drilled: 4/13/2015
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: TC
Remarks: Percolation test hole PT-2

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Recovery	USCS	Soil Symbol	Depth (ft)	Soil Description
					A		CL		1 2 3	SANDY LEAN CLAY, dark brown, damp
	36	7			A		SC-SM		4 5	SILTY, CLAYEY SAND, tan-yellow, slightly damp
									6 7	Total Depth 5 feet

A = Auger Cuttings MC = Modified California (Ring Sample) SS = Split Spoon CS = 5 ft Continuous Barrel Sampler bgs = below ground surface

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UNIFIED SOIL CLASSIFICATION SYSTEM					CONSISTENCY OR RELATIVE DENSITY CRITERIA		
Major Divisions			Group Symbols	Typical Names			
Coarse-Grained Soils More than 50% retained on No. 200 sieve	**Gravels** 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Standard Penetration Test Density of Granular Soils		
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetration Resistance, N (blows/ft.)	Relative Density	
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures	0-4	Very Loose	
			GC	Clayey gravels, gravel-sand-clay mixtures	5-10	Loose	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	11-30	Medium Dense	
			SP	Poorly graded sands and gravelly sands, little or no fines	31-50	Dense	
		Sands with Fines	SM	Silty sands, sand-silt mixtures	>50	Very Dense	
			SC	Clayey sands, sand-clay mixtures	Standard Penetration Test Density of Granular Soils		
Fine-Grained Soils 50% or more passes No. 200 sieve	**Silts and Clays** Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	<2	Very Soft	<0.25
			OL	Organic silts and organic silty clays of low plasticity	2-4	Soft	0.25-0.50
	Silts and Clays Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	4-8	Firm	0.50-1.00
			CH	Inorganic clays of high plasticity, fat clays	8-15	Stiff	1.00-2.00
			OH	Organic clays of medium to high plasticity	15-30	Very Stiff	2.00-4.00
Highly Organic Soils			PT	Peat, mucic & other highly organic soils	>30	Hard	>4.0

U.S. Standard Sieve Sizes

>12"	12"	3"	3/4"	#4	#10	#40	#200

Boulders	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS	
Dry	Absence of moist, dusty, dry to the touch
Slightly Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content, will moisten the hand
Very Moist	Above optimum moisture content
Wet	Visible free water, below water table

MATERIAL QUANTITY	
trace	0-5%
few	5-10%
little	10-25%
some	25-45%
mostly	50-100%

OTHER SYMBOLS	
R	Ring Sample
S	SPT Sample
B	Bulk Sample
▼	Ground Water

BASIC LOG FORMAT:

Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

EXAMPLE:

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST DRILLING EQUIPMENT & PROCEDURES

Description of Subsurface Exploration Methods

Drilling Equipment – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

Sampling Procedures - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2" outside diameter, 1 3/8" inside diameter, samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" outside diameter samplers lined with 2.42" inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. "Undisturbed" sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

Boring Records - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

Appendix B

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	ATTERBERG LIMITS			SIEVE ANALYSIS, CUMULATIVE PERCENT PASSING									R-VALUE	CLASSIFICATION
			LL	PL	PI	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200		
2414	B-2	0 - 4	NLL	NPL	NP									21	55	Silty **SAND (SM)**
2413	B-6	2.5	NLL	NPL	NP	100	100	100	100	99	98	95	68	15		Silty **SAND (SM)**
2415	B-12	0 - 5	NLL	NPL	NP									16	55	Silty **SAND (SM)**
2416	B-19	10.0	56	17	39									58		Sandy fat **CLAY (CH)**
2417	B-22	3.5 - 5	24	17	7									36		Silty, clayey **SAND (SC-SM)**

GEOMAT INC.

SUMMARY OF SOIL TESTS

Project	NTUA Headquarters
Job No.	152-2229
Location	McKinley County, New Mexico
Date of Exploration	April 13 - 15, 2015

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	ASTM D698		MOISTURE CONT. (%)	DENSITY		ATTERBERG LIMITS			SWELL (%)	CONSOL TEST	% PASS #200 SIEVE	CLASSIFICATION
			Density	Moisture		WET (pcf)	DRY (pcf)	LL	PL	PI				
2403	B-1	5			1.6	97.2	95.6							Silty **SAND (SM)**
2404	B-5	10			2.4	103.8	101.3							Silty **SAND (SM)**
2395	B-6	5			4.1	98.8	94.9					Attached		Silty **SAND (SM)**
2405	B-6	15			2.8	102.4	99.6							Silty **SAND (SM)**
2406	B-7	5			2.3	98.1	95.9							Silty **SAND (SM)**
2396	B-8	10			4.1	105.5	101.3					Attached		Silty **SAND (SM)**
2407	B-9	5			4.8	102.2	97.5							Silty **SAND (SM)**
2397	B-11	2.5			5.3	93.4	88.7					Attached		Silty **SAND (SM)**
2408	B-11	10			2.4	104.2	101.7							Silty **SAND (SM)**
2398	B-13	10			4.1	103.3	99.2					Attached		Silty **SAND (SM)**
2399	B-14	5			3.2	98.8	95.7					Attached		Silty **SAND (SM)**
2409	B-14	15			3.1	99.6	96.6							Silty **SAND (SM)**
2400	B-15	5			3.1	104.1	101.0					Attached		Silty **SAND (SM)**
2410	B-15	15			5.7	111.4	105.4							Silty **SAND (SM)**
2401	B-17	5			3.6	100.8	97.3					Attached		Silty **SAND (SM)**
2411	B-18	2.5			1.8	101.7	99.9							Silty **SAND (SM)**
2402	B-19	2.5			6.7	106.4	99.7					Attached		Silty **SAND (SM)**
2412	B-20	5			2.5	98.1	95.7							Silty **SAND (SM)**

GEOMAT INC.

SUMMARY OF SOIL TESTS

Project	NTUA Headquarters
Job No.	152-2229
Location	McKinley County, New Mexico
Date of Exploration	April 13 - 15, 2015

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	pH	Resistivity (Ohm-cm)	Chloride		Sulfate		CLASSIFICATION
					mg/kg	% by weight	mg/kg	% by weight	
2418	B-9	2.5	8.44	6030	ND	ND	ND	ND	Silty **SAND (SM)**
2419	B-18	5	8.37	7460	ND	ND	13.6	0.001	Silty **SAND (SM)**

ND = not detected at or above the reporting limit

GEOMAT INC.

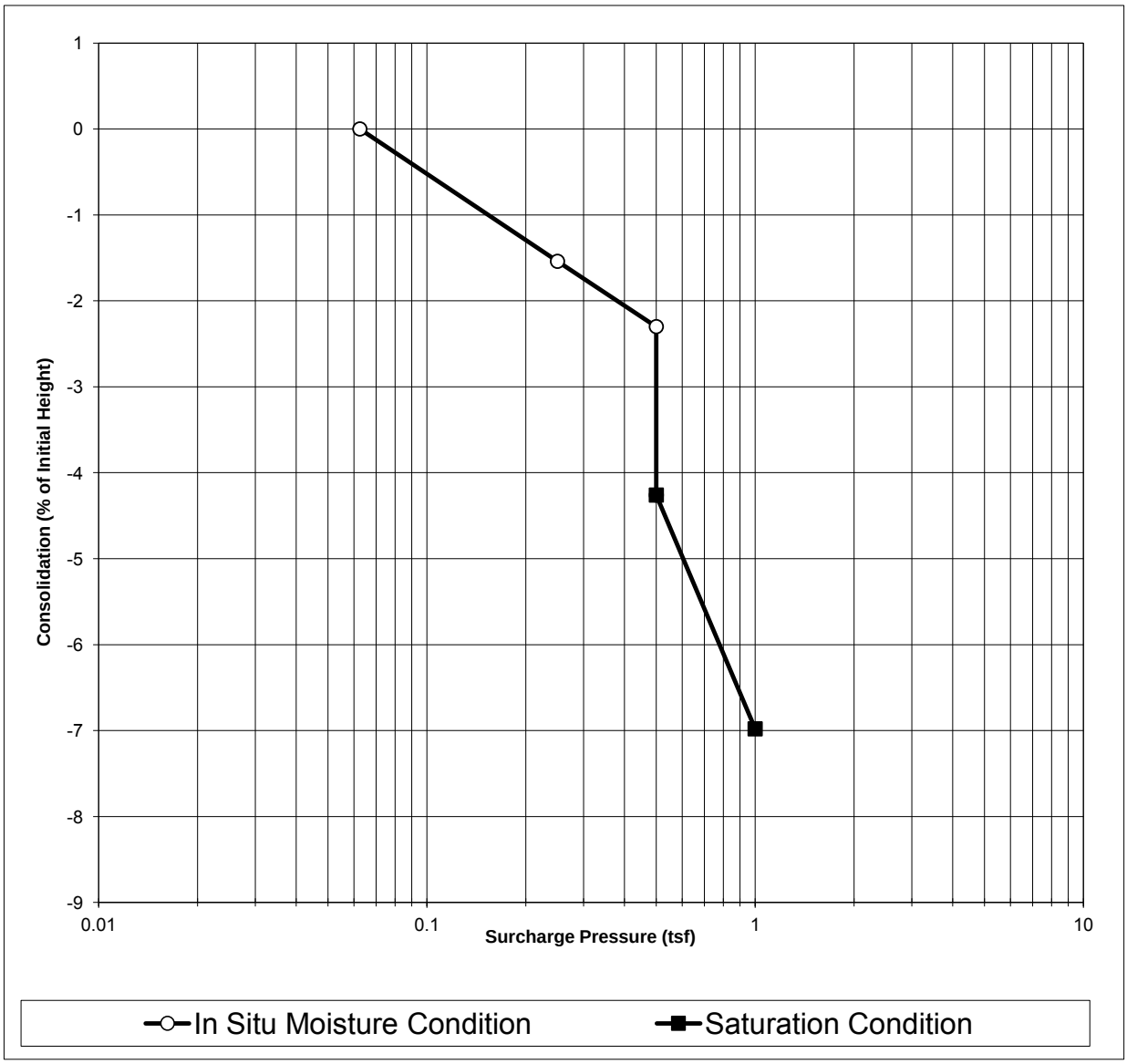
SUMMARY OF SOIL TESTS

Project	NTUA Headquarters
Job No.	152-2229
Location	McKinley County, New Mexico
Date of Exploration	April 13 - 15, 2015

PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2395
SAMPLE SOURCE:	B-6 @ 5'	**DATE SAMPLED:**	4/14/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

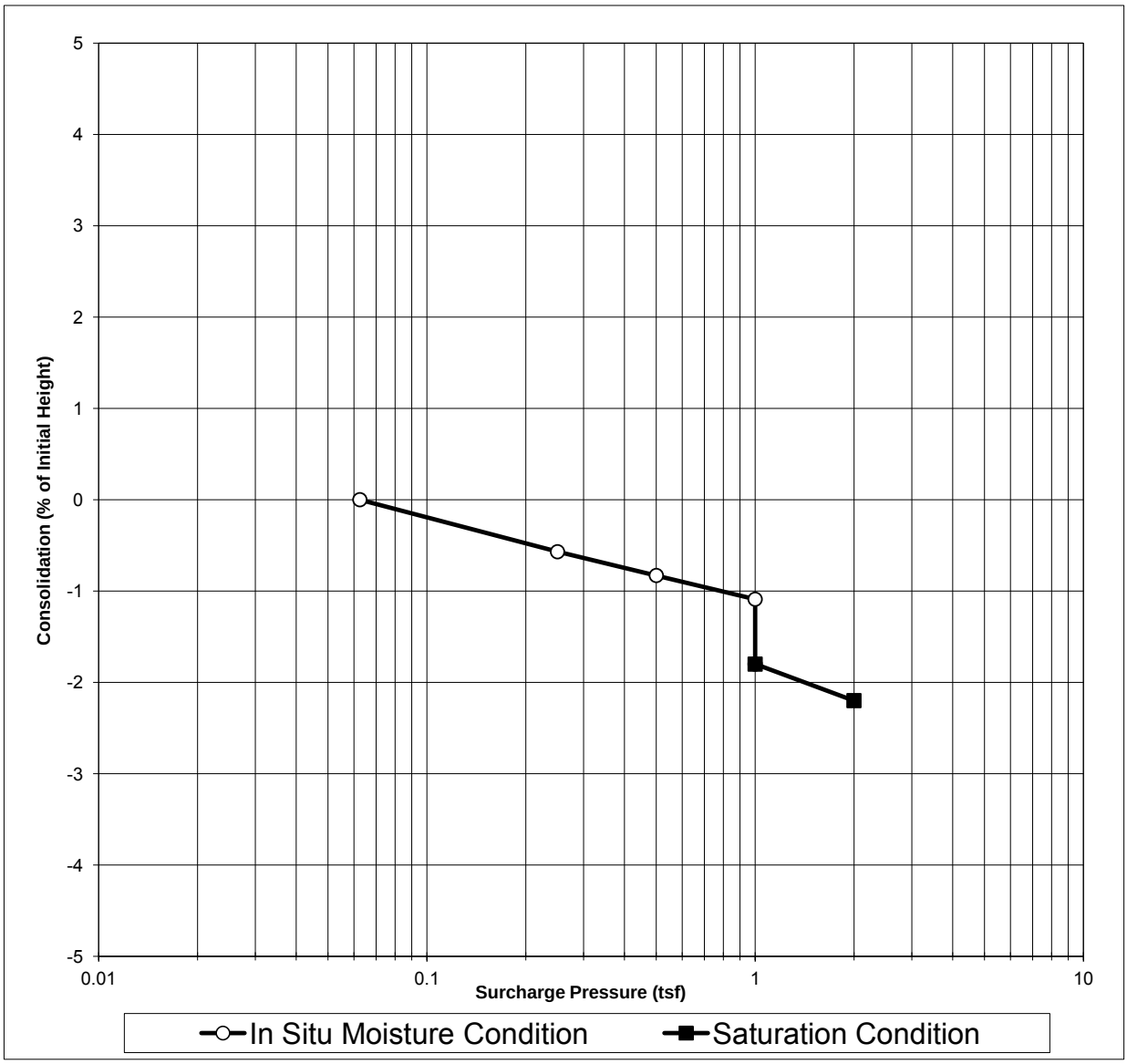
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.28
INITIAL MOISTURE CONTENT	4.1%	FINAL MOISTURE CONTENT	22.1%
INITIAL DRY DENSITY(pcf)	94.9	FINAL DRY DENSITY(pcf)	101.5
INITIAL DEGREE OF SATURATION	11%	FINAL DEGREE OF SATURATION	70%
INITIAL VOID RATIO	0.75	FINAL VOID RATIO	0.63
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2396
SAMPLE SOURCE:	B-8 @ 10'	**DATE SAMPLED:**	4/14/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

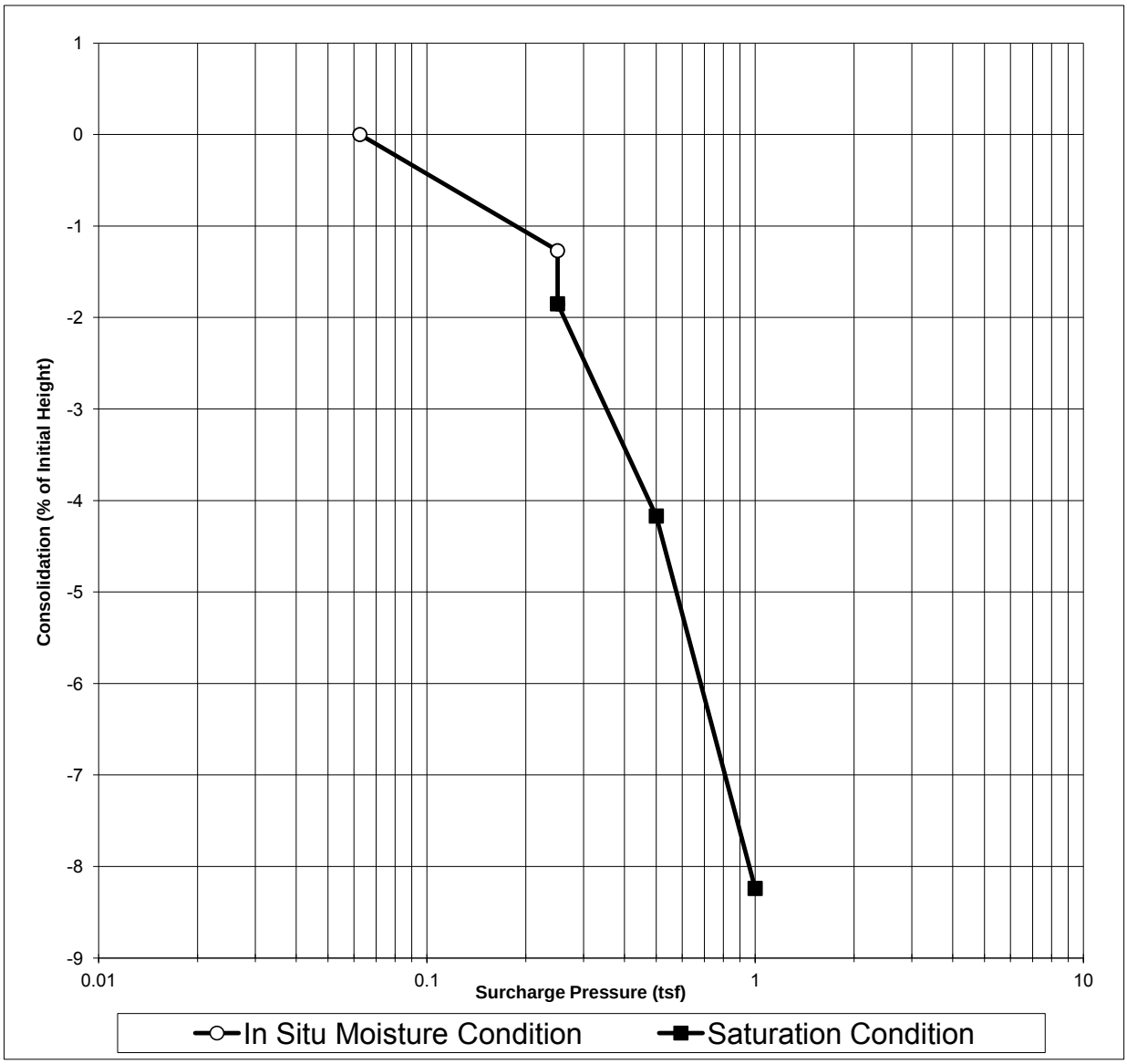
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.50
INITIAL MOISTURE CONTENT	4.1%	FINAL MOISTURE CONTENT	19.6%
INITIAL DRY DENSITY(pcf)	101.3	FINAL DRY DENSITY(pcf)	103.1
INITIAL DEGREE OF SATURATION	13%	FINAL DEGREE OF SATURATION	64%
INITIAL VOID RATIO	0.64	FINAL VOID RATIO	0.60
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	1 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2397
SAMPLE SOURCE:	B-11 @ 2.5'	**DATE SAMPLED:**	4/14/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

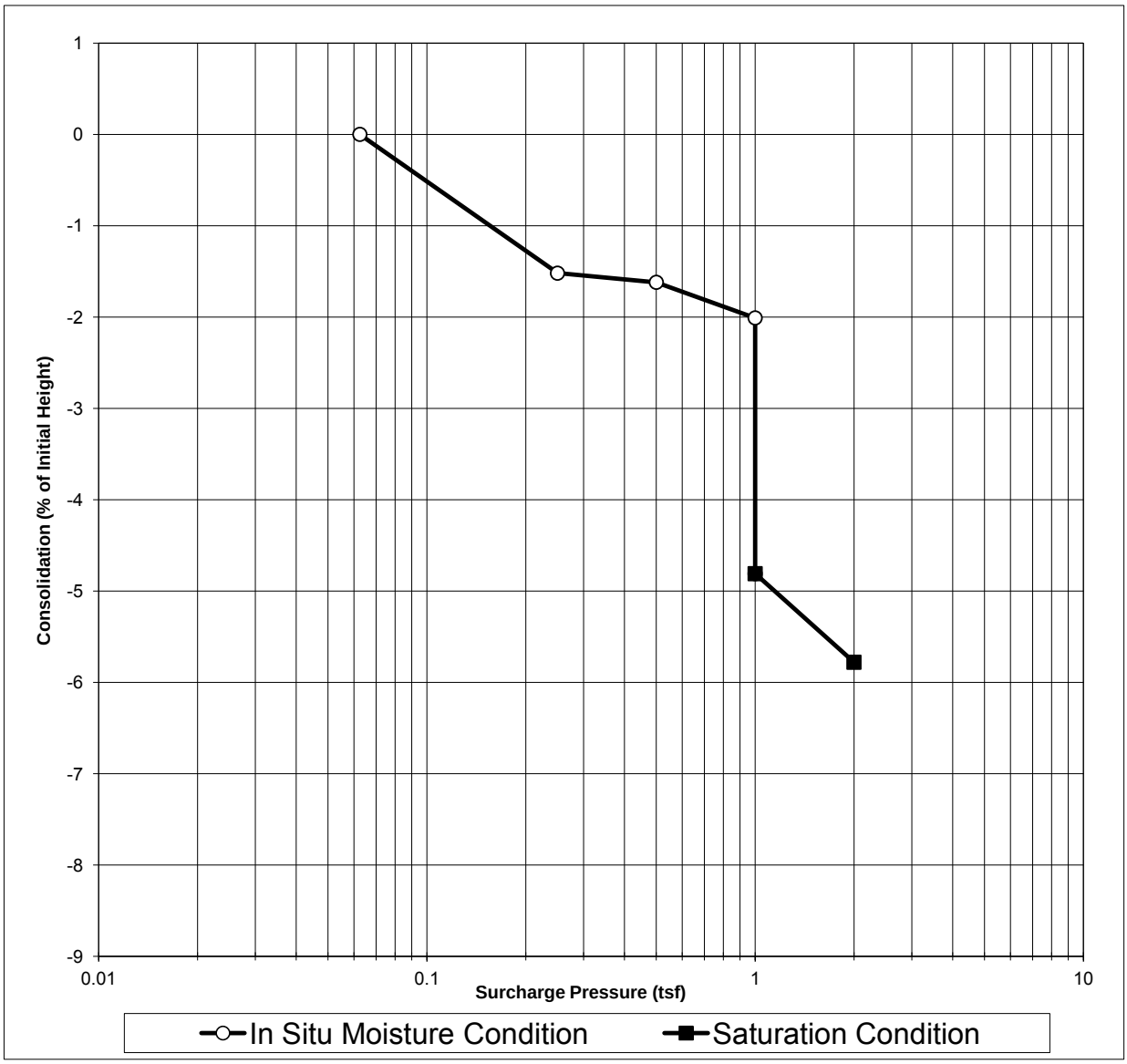
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.22
INITIAL MOISTURE CONTENT	5.3%	FINAL MOISTURE CONTENT	26.5%
INITIAL DRY DENSITY(pcf)	88.7	FINAL DRY DENSITY(pcf)	96.2
INITIAL DEGREE OF SATURATION	13%	FINAL DEGREE OF SATURATION	76%
INITIAL VOID RATIO	0.87	FINAL VOID RATIO	0.72
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2398
SAMPLE SOURCE:	B-13 @ 10'	**DATE SAMPLED:**	4/15/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

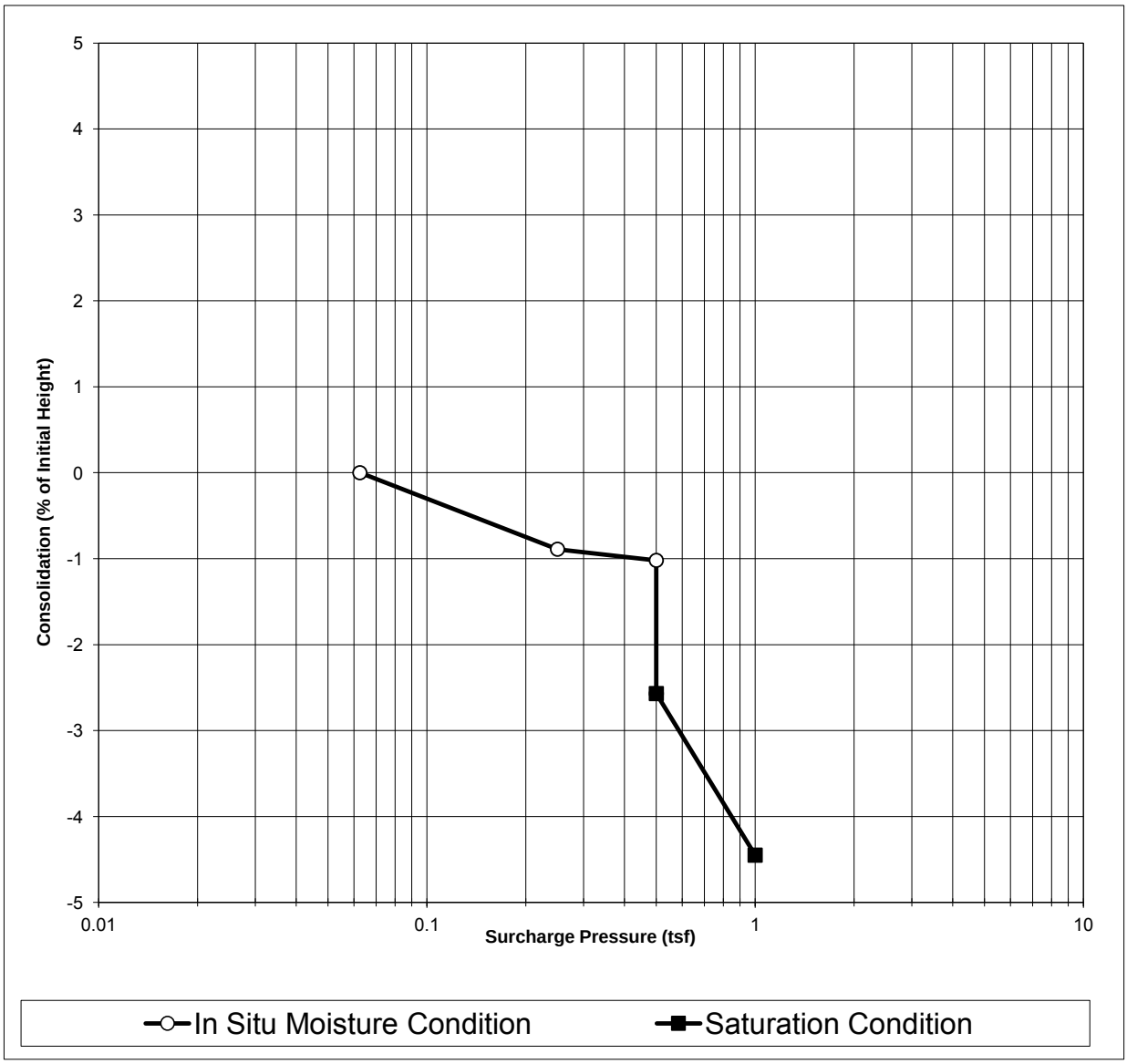
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.34
INITIAL MOISTURE CONTENT	4.1%	FINAL MOISTURE CONTENT	19.2%
INITIAL DRY DENSITY(pcf)	99.2	FINAL DRY DENSITY(pcf)	104.7
INITIAL DEGREE OF SATURATION	12%	FINAL DEGREE OF SATURATION	65%
INITIAL VOID RATIO	0.68	FINAL VOID RATIO	0.58
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	1 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2399
SAMPLE SOURCE:	B-14 @ 5'	**DATE SAMPLED:**	4/15/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

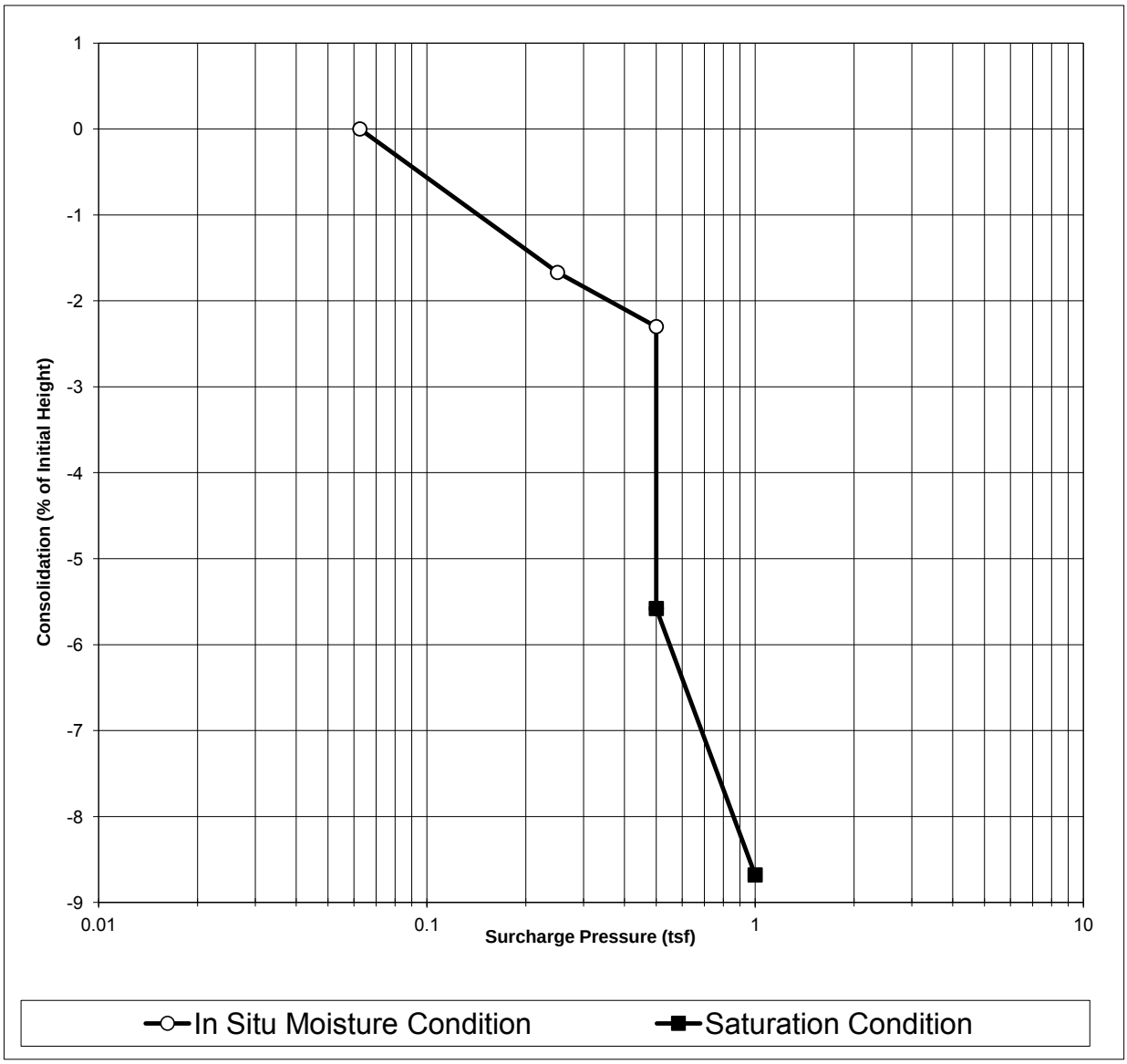
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.40
INITIAL MOISTURE CONTENT	3.2%	FINAL MOISTURE CONTENT	21.8%
INITIAL DRY DENSITY(pcf)	95.7	FINAL DRY DENSITY(pcf)	99.6
INITIAL DEGREE OF SATURATION	9%	FINAL DEGREE OF SATURATION	67%
INITIAL VOID RATIO	0.74	FINAL VOID RATIO	0.66
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2400
SAMPLE SOURCE:	B-15 @ 5'	**DATE SAMPLED:**	4/15/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

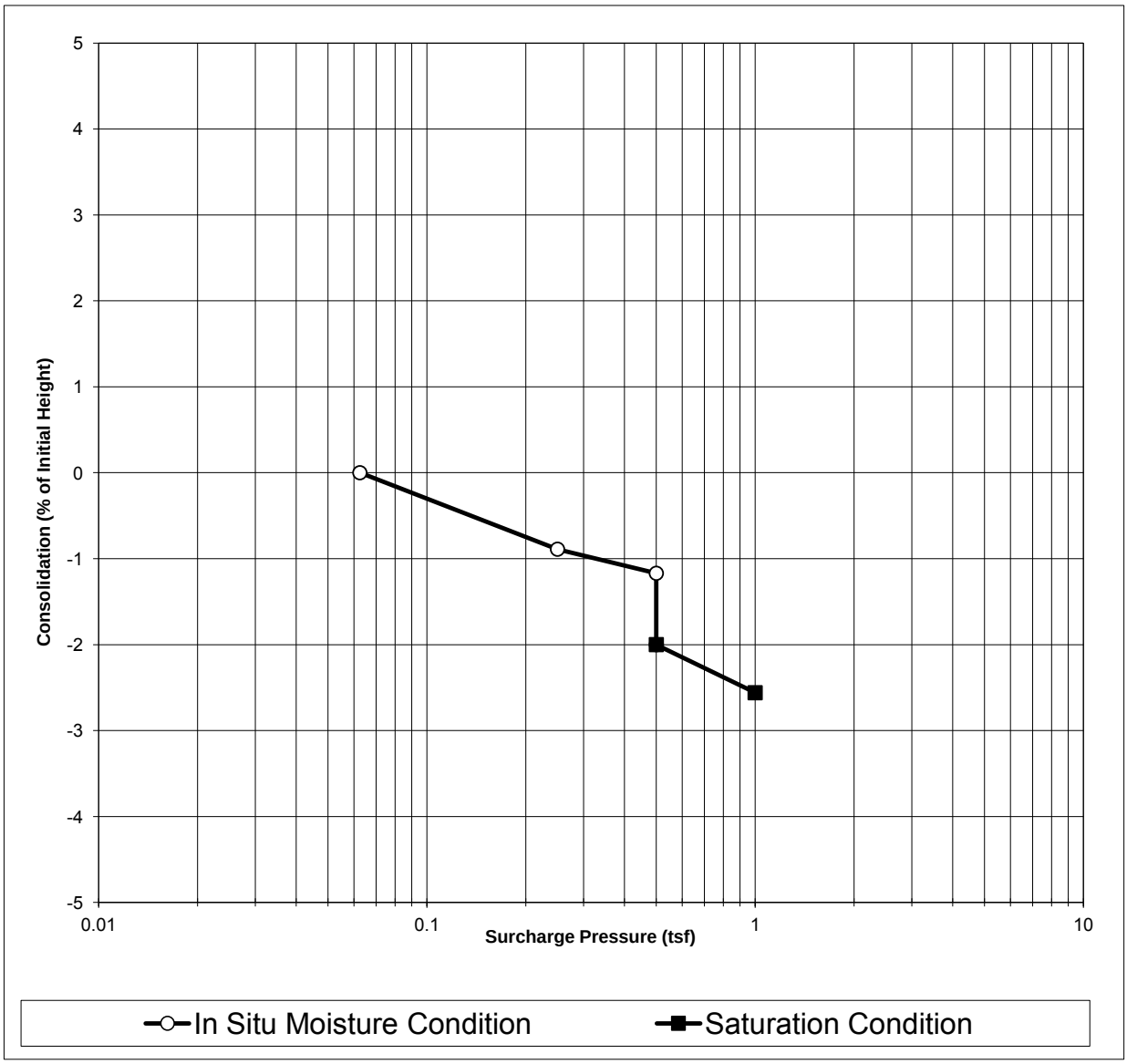
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.20
INITIAL MOISTURE CONTENT	3.1%	FINAL MOISTURE CONTENT	18.8%
INITIAL DRY DENSITY(pcf)	101.0	FINAL DRY DENSITY(pcf)	110.1
INITIAL DEGREE OF SATURATION	10%	FINAL DEGREE OF SATURATION	70%
INITIAL VOID RATIO	0.65	FINAL VOID RATIO	0.50
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2401
SAMPLE SOURCE:	B-17 @ 5'	**DATE SAMPLED:**	4/13/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

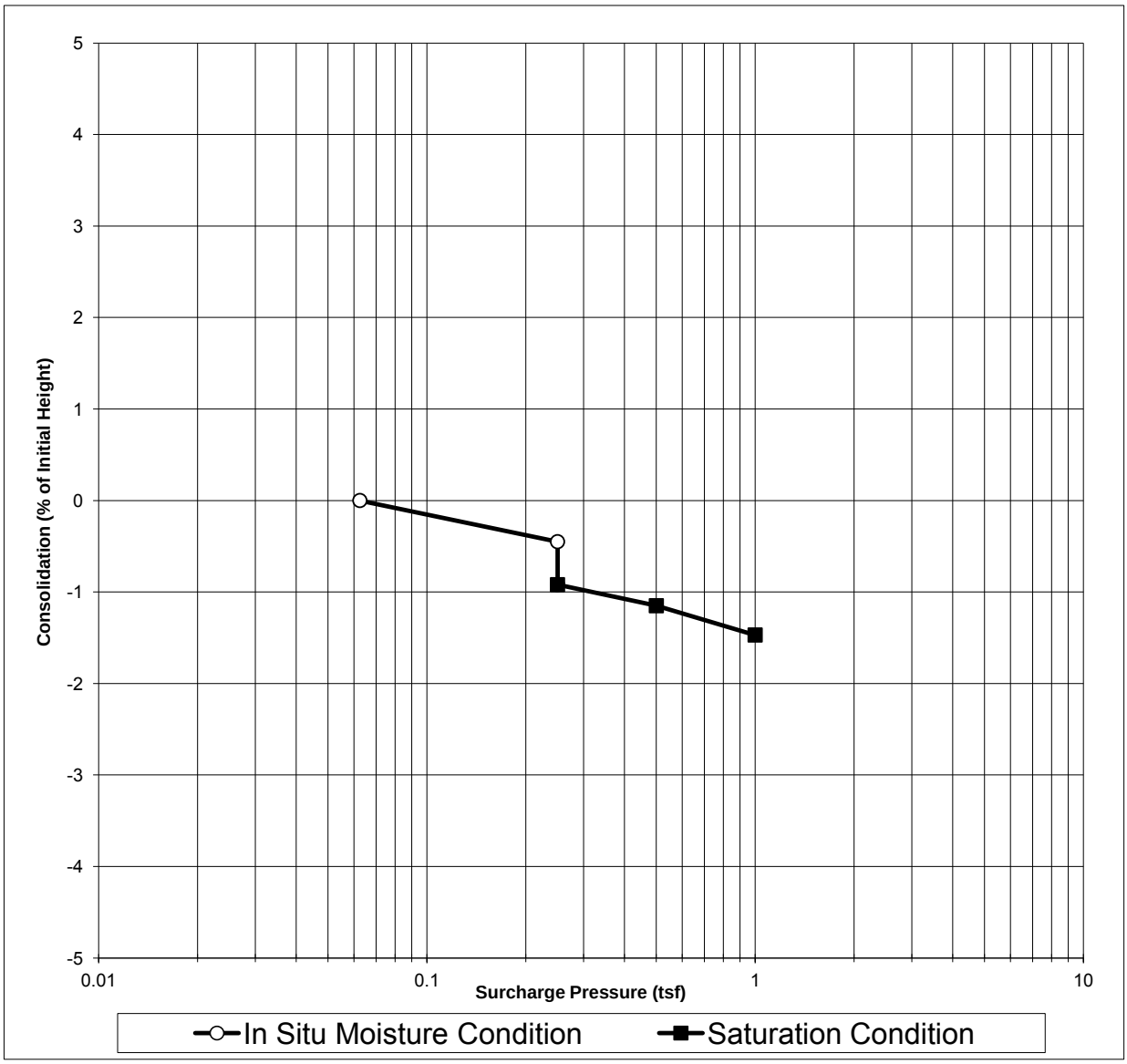
INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.49
INITIAL MOISTURE CONTENT	3.6%	FINAL MOISTURE CONTENT	20.4%
INITIAL DRY DENSITY(pcf)	97.3	FINAL DRY DENSITY(pcf)	99.3
INITIAL DEGREE OF SATURATION	10%	FINAL DEGREE OF SATURATION	62%
INITIAL VOID RATIO	0.71	FINAL VOID RATIO	0.67
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf



PROJECT:	NTUA Headquarters	**JOB NO:**	152-2229
CLIENT:	Dyron Murphy Architecture	**WORK ORDER NO:**	NA
MATERIAL:	Silty Sand (SM)	**LAB NO:**	2402
SAMPLE SOURCE:	B-19 @ 2.5'	**DATE SAMPLED:**	4/13/2015
SAMPLE PREP.:	In Situ	**SAMPLED BY:**	TC

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.54
INITIAL MOISTURE CONTENT	6.7%	FINAL MOISTURE CONTENT	18.7%
INITIAL DRY DENSITY(pcf)	99.7	FINAL DRY DENSITY(pcf)	100.7
INITIAL DEGREE OF SATURATION	20%	FINAL DEGREE OF SATURATION	58%
INITIAL VOID RATIO	0.67	FINAL VOID RATIO	0.64
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



LABORATORY TESTING PROCEDURES

Consolidation Tests: One-dimensional consolidation tests are performed using "Floating-ring" type consolidometers. The test samples are approximately 2.5 inches in diameter and 1.0 inch high and are usually obtained from test borings using the dynamically-driven ring samplers. Test procedures are generally as outlined in ASTM D2435. Loads are applied in several increments to the upper surface of the test specimen and the resulting deformations are recorded at selected time intervals for each increment. Samples are normally loaded in the in-situ moisture conditions to loads which approximate the stresses which will be experienced by the soils after the project is completed. Samples are usually then submerged to determine the effect of increased moisture contents on the soils. Each load increment is applied until compression/expansion of the sample is essentially complete (normally movements of less than 0.0003 inches/hour). Porous stones are placed on the top and bottom surfaces of the samples to facilitate introduction of the moisture.

Expansion Tests: Tests are performed on either undisturbed or recompacted samples to evaluate the expansive potential of the soils. The test samples are approximately 2.5 inches in diameter and 1.0 inch high. Recompacted samples are typically remolded to densities and moisture contents that will simulate field compaction conditions. Surcharge loads normally simulate those which will be experienced by the soils in the field. Surcharge loads are maintained until the expansion is essentially complete.

Atterberg Limits/Maximum Density/Optimum Moisture Tests: These tests are performed in accordance with the prescribed ASTM test procedures.

Appendix C

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
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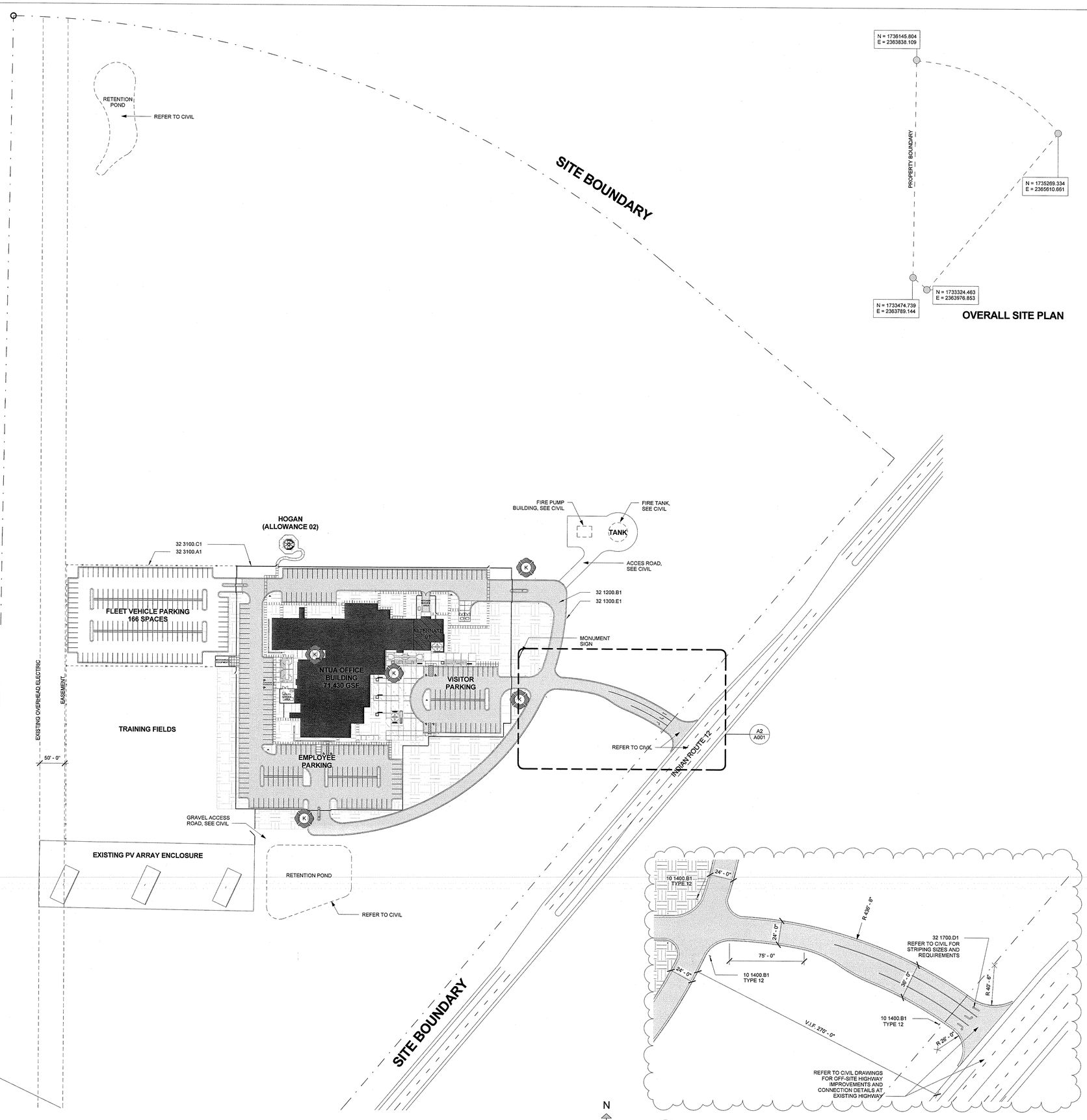


A6 **OVERALL SITE PLAN**
1" = 80'-0"

A2 **MAIN ENTRY DRIVE**
1" = 40'-0"

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

GENERAL NOTES

A. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS AND EXISTING UTILITIES AND IS RESPONSIBLE FOR REMOVALS AS REQUIRED TO COMPLETE THE WORK. CONTRACTOR SHALL NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES.
B. CONTRACTOR TO PROMOTE SAFETY MEASURES TO PROTECT PEDESTRIANS, VEHICLES AND ALL EXISTING CONSTRUCTION TO REMAIN.
C. CONTRACTOR TO COORDINATE WITH THE OWNER FOR ALLOWABLE STAGING AREAS DURING CONSTRUCTION.
D. FIELD VERIFY ALL EXISTING UTILITIES AND COORDINATE WITH THE SCOPE OF WORK SHOWN ON DRAWINGS.
E. "REMOVE" IN ALL NOTES MEANS TO REMOVE THE EXISTING ITEM AND ALL ASSOCIATED COMPONENTS, AND PROPERLY DISPOSE OF OFF SITE.
F. CONTRACTOR SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES.
G. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
H. ALL SIDEWALKS ARE 5'-0" BY 5'-0" FROM EDGE TO EDGE UNLESS OTHERWISE NOTED.
I. SEE SHEET A005 FOR SITE DETAILS.
J. COORDINATE LOCATION OF TRASH AND RECYCLING BINS WITH ARCHITECT.
K. REFER TO CIVIL DRAWINGS FOR ADDITIONAL SITE INFORMATION.
L. REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPING PLANS.

KEYNOTE LEGEND

10 1400.B1	EXTERIOR SIGNAGE
32 1200.B1	ASPHALT PAVING
32 1300.E1	CONCRETE CURB AND GUTTER
32 1700.D1	PAVEMENT MARKING
32 3100.A1	CHAIN LINK FENCE
32 3100.C1	STEEL FENCE

ALTERNATES

ALTERNATE 01:

BASE BID: PROVIDE GRADING AND DRAINAGE AND LANDSCAPING AT AREA SHOWN WHERE KITCHEN/CAFETERIA ARE PROPOSED TO BE LOCATED AND AT LOCATION SHOWN.

ALTERNATE BID: PROVIDE KITCHEN AND CAFETERIA AT LOCATION SHOWN ON DRAWINGS. PROVIDE KITCHEN EQUIPMENT AND ALL REQUIRED MECHANICAL, PLUMBING AND ELECTRICAL SYSTEMS AS NOTED ON DRAWINGS AND AS SPECIFIED. PERIMETER FENCING, VEHICLE SWING GATE AND SWINGING MAN GATE AROUND KITCHEN SERVICE ENTRY IS TO BE PROVIDED AS SHOWN AND AS SPECIFIED.

ALTERNATE 02:

BASE BID: PROVIDE ROOF AREA AND SYSTEMS AT LOCATION SHOWN. STRUCTURE TO BE INCLUDED AS SHOWN AND NOTED TO RECEIVE A POTENTIAL FUTURE FITNESS CENTER ADDITION.

ALTERNATE BID: PROVIDE FITNESS CENTER ON SECOND FLOOR AT LOCATION NOTED. EQUIPMENT IS NOT INCLUDED AS PART OF THE SCOPE AND WILL BE OWNER PROVIDED.

ALLOWANCES

ALLOWANCE 01:
PROVIDE A BID ALLOWANCE FOR WALKING TRAILS THROUGHOUT THE SITE AS SHOWN ON LANDSCAPE DRAWINGS. REFER TO PROJECT MANUAL FOR ADDITIONAL INFORMATION.

ALLOWANCE 02:
PROVIDE A BID ALLOWANCE FOR A HOGAN STRUCTURE AS SHOWN ON ARCHITECTURAL AND STRUCTURAL DRAWINGS. REFER TO PROJECT MANUAL FOR ADDITIONAL INFORMATION.

DYRON MURPHY ARCHITECTS, P.C.

4505 Montbel Place NE, Albuquerque, New Mexico 87107

REGISTERED ARCHITECT 33970 DYRON V. MURPHY ARIZONA, U.S.A.
9.27.16
EXPIRES 9/30/17

ARCHITECT

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AG/MG	OT

RVT FILE
C:\Revit Locals\NTUA HQ- SITE MODEL_oscar.rvt

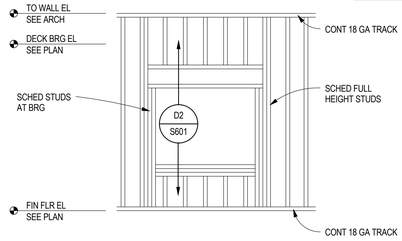
Sheet Title: **OVERALL SITE PLAN**

Sheet Number

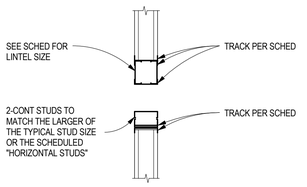
A001

Sequence of

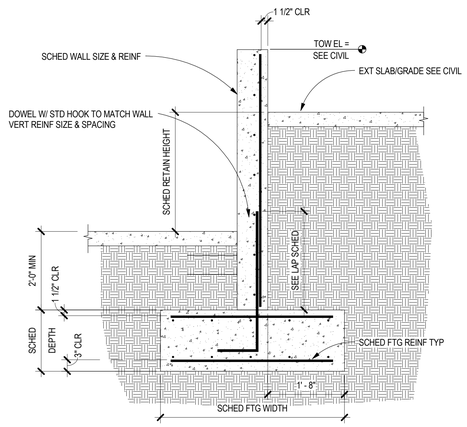
LIGHTGAGE LINTEL SCHEDULE					
SPAN	STUDS IN LINTEL	STUDS AT BEARING	FULL HEIGHT STUDS	HORIZONTAL STUDS	TRACK
0'-0" - 4'-0"	2- 600S162-43	1- 600S162-43	2- 600S162-43	-----	600T125-43
4'-1" - 8'-0"	2- 600S162-54	1- 600S162-43	2- 600S162-68	-----	600T125-43
8'-1" - 12'-0"	3- 800S162-68	2- 600S162-43	2- 600S200-68	1- 600S162-43	600T125-43
12'-1" - 16'-0"	3- 1000S162-68	2- 600S162-54	2- 600S200-97	2- 600S162-97	600T125-68



D3 COLD FORMED LINTEL ELEV
SCALE: 12" = 1'-0"

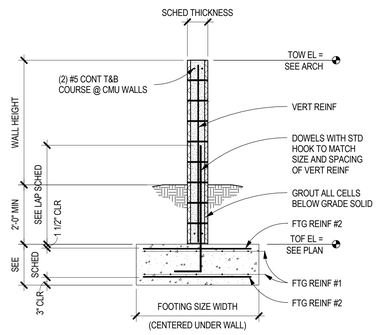


D2 COLD-FORMED LINTEL SECTION
SCALE: 3/4" = 1'-0"



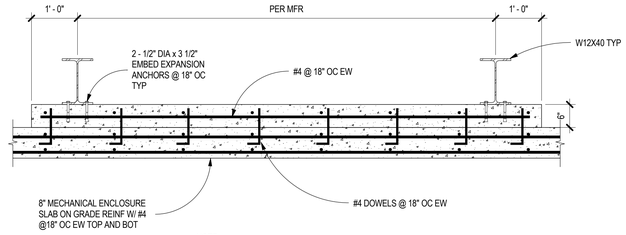
CONCRETE SITE WALL SCHEDULE				
MAX RETAIN HEIGHT	WALL THICKNESS	WALL REINFORCEMENT	FOOTING SIZE	FOOTING REINF
4'-0"	8"	#5@ 24" VERT & #5 @ 12" HORIZ	4'-0"W x 1'-6"D	#5@ 12" TOP & BOT TRANS & (3) #5 CONT TOP & BOT
6'-0"	8"	#5@ 12" VERT & #5 @ 12" HORIZ	5'-0"W x 1'-6"D	#6@ 12" TOP & BOT TRANS & (4) #5 CONT TOP & BOT

B6 TYPICAL CONCRETE SITE WALL
SCALE: 3/4" = 1'-0"



SITE WALL SCHEDULE (NON-RETAINING)							
WALL HEIGHT, FT	THICKNESS	FOOTING SIZE		FOOTING REINFORCING		WALL REINFORCING	
		WIDTH	DEPTH	REINF #1 T&B	REINF #2 T&B	HORIZ REINF	VERT REINF
0'-0"- 6'-0"	8"	4'-0"	1'-0"	5-#4 CONT	4# @ 18" OC TRANS	STD LADDER @ ALT COURSES	#4 @ 16" OC
6'-1"- 10'-0"	8"	6'-0"	1'-8"	5-#5 CONT	5# @ 18" OC TRANS	STD LADDER @ ALT COURSES	#6 @ 16" OC
10'-1"- 18'-0"	12"	6'-6"	1'-8"	6-#5 CONT	5# @ 18" OC TRANS	STD LADDER @ ALT COURSES	#7 @ 16" OC EF

A6 TYPICAL CMU SITE WALL
SCALE: 1/2" = 1'-0"



NOTE:
- GROUND PREP TO MATCH BUILDING SOG PREP
- VERIFY STEEL BEAM SIZES W/ DIMENSION REQUIREMENTS PER MANUFACTURER

B5 MECHANICAL ENCLOSURE EQUIPMENT PAD
SCALE: 3/4" = 1'-0"

REQUIRED LAP SPLICES				
REINFORCEMENT TYPE	#6 AND SMALLER (#db)	#7 AND LARGER (#db)	MINIMUM LENGTH (IN)	COMMENTS
CONTINUOUS WALL FOOTINGS AND STEMWALLS	30	30	18	
RETAINING WALL AND BASEMENT WALL VERTICAL REINFORCING	57	72	12	
RETAINING WALL AND BASEMENT WALL HORITONTAL REINFORCING	57	72	12	
CONCRETE COLUMNS NOT SUPPORTING LATERAL FORCES	30	30	12	
CONCRETE COLUMNS SUPPORTING LATERAL FORCES	57	72	12	
TOP FLEXURAL REINFORCEMENT, INCLUDING BEAMS, GRADE BEAMS, ELEVATED SLABS, AND COMBINED COLUMN FOOTINGS AT BRACED FRAMES/MOMENT FRAMES	57	72	12	
BOTTOM FLEXURAL REINFORCEMENT, INCLUDING BEAMS, GRADE BEAMS, ELEVATED SLABS, AND COMBINED COLUMN FOOTINGS AT BRACED FRAMES/MOMENT FRAMES	44	55	12	
SLABS ON GRADE	30	30	12	
MINIMUM EMBEDMENT OF STANDARD HOOKS INTO CONCRETE BASE	16	16	6	INCREASE LENGTH FOR #11 BARS AND LARGER BY A FACTOR OF 1.4
ALL REBAR LAPS IN CMU EXCEPT WHERE NOTED AS EXTENDED LAPS	48	48	12	
EXTENDED LAPS IN CMU (WHERE SPECIFIED IN DETAILS)	72	72	12	

WALL FOOTING SCHEDULE					
	SIZE		REINFORCING	REINFORCING	
MARK	WIDTH	DEPTH	BOT TRANS REINF	BOT LONGITUDINAL REINF	REMARKS
WF1	2' - 0"	1' - 0"	#4 @ 18" OC	3- #4 CONT	

WALL SCHEDULE				
		REINFORCING		
WALL MARK	WALL	VERTICAL	HORIZONTAL	REMARKS
W1	8" CONC	#4 @ 18" OC	#4 @ 12" OC	

SPOT FOOTING SCHEDULE					
	SIZE				
MARK	WIDTH	LENGTH	DEPTH	REINFORCING	REMARKS
F4	4' - 0"	4' - 0"	1' - 0"	5 - #5 EA WAY BOT	STD HOOK @ ENDS OF EVERY BAR
F5	5' - 0"	5' - 0"	1' - 0"	5 - #5 EA WAY BOT	STD HOOK @ ENDS OF EVERY BAR
F6	6' - 0"	6' - 0"	1' - 0"	6 - #6 EA WAY BOT	STD HOOK @ ENDS OF EVERY BAR
F7	7' - 0"	7' - 0"	1' - 6"	7 - #6 EA WAY BOT	
F8	8' - 0"	8' - 0"	1' - 6"	7 - #7 EA WAY BOT	
F9	9' - 0"	9' - 0"	1' - 6"	7 - #7 EA WAY BOT	
FE1	10' - 6"	12' - 7"	1' - 6"	12 - #6 EA WAY TOP & BOT	

COMBINED FOOTING SCHEDULE					
MARK	WIDTH	DEPTH	EXTENSION PAST COLUMN	LONG REINF	TRANS REINF
CF1	7'-0"	2'-0"	5'-0"	6-#7 T&B	#4@48" OC TOP #7@12" OC BOT

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

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505-344-4080 www.cg-engrs.com

DYRON MURPHY ARCHITECTS, P.C.
4505 Montbel Place NE, Albuquerque, New Mexico 87107

REGISTERED PROFESSIONAL ENGINEER
NEW MEXICO
51807
NATHAN MENSAH
10/5/16
ARIZONA U.S.A.
Expires 12/31/16
ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10-25-16	ADDENDUM 01

PROJECT NUMBER | DRAWN BY: Author | PROJ MGR: Designer

RVT FILE
C:\Users\kbaiett\Documents\M97-118 NTUA HQ STRUCT 2015_kbaiett@cg-engrs.com.rvt

Sheet Title: SCHEDULES AND DETAILS

Sheet Number

S601

Sequence of

ArSed Engineering Group, LLC.

Date: October 27, 2016

Project: NTUA-HQ COMPLEX OFFICE BUILDING
Fort Defiance, Arizona

AEG Project #: 15037

From: Brian Arnold, P.E.

Re: ADDENDA #01
- Mechanical & Plumbing Revisions to ISSUE FOR CONSTRUCTION Documents

This Addendum revises the documents for the Issue For Construction (IFC) documentation, issued October 06, 2016. This Addendum modifies portions of the original IFC documents as noted below, and forms a part of the IFC documents. All other items included in the original IFC documents remain in effect for this Project.

DOCUMENT:	DESCRIPTION:
Drawing M003 MECHANICAL EQUIPMENT SCHEDULES	- ADDS: Water-side Economizer to be included with Water-Source-Heat-Pump (WSHP'S) Units: Sizes: 2ton, 2.5ton, 3ton, 3.5ton, 4ton, 5ton and 6ton.
Drawing M101 MECHANICAL OVERALL 1st FLOOR HVAC PLAN	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M101a MECHANICAL 1st FLOOR HVAC PLAN – QUADRANT A	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M101b MECHANICAL 1st FLOOR HVAC PLAN – QUADRANT B	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M101c MECHANICAL 1st FLOOR HVAC PLAN – QUADRANT C	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.

Drawing M102 MECHANICAL OVERALL 2nd FLOOR HVAC PLAN	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M102a MECHANICAL 2nd FLOOR HVAC PLAN – QUADRANT A	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M102b MECHANICAL 2nd FLOOR HVAC PLAN – QUADRANT B	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities.
Drawing M102c MECHANICAL 2nd FLOOR HVAC PLAN – QUADRANT C	- REVISES: Outdoor Air Ventilation ductwork sizes & cfm capacities. Supply Air ductwork and Diffuser locations in Board Room.
Drawing P305 PLUMBING WASTE & VENT RISER ISOMETRICS	- ENTIRE SHEET IS ADDED TO CONTRACT DOCUMENTS

If there are any questions or comments related to this information, do not hesitate to contact our office.

END OF MECHANICAL & PLUMBING ADDENDA #01 ITEMS

WATER SOURCE HEAT PUMP SCHEDULE

Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)	External static press (in h2o)	Total static press (in h2o)	WATER Fluid flow rate (gpm)	WATER Fluid PD (ft h2o)	COOLING CAPACITY Net total cooling cpcty (mbh)	Net sens cooling cpcty (mbh)	Clg EAT db °F	Clg EAT wb °F	Clg LAT db °F	Clg LAT wb °F	Clg EWT °F	Clg LWT °F	HEATING CAPACITY Net htg cpcty (mbh)	Heat of rjctn (mbh)	Heat of absrpn (mbh)	Htg EAT °F	Htg LAT °F	Htg EWT °F	Htg LWT °F	EFFICIENECY EER @ AHRI (EER)	COP @ AHRI (COP)	ELECTRICAL Clg power (kW)	Htg power (kW)	Blowr power (kW)	Compressor power (kW)	Unit voltage	Min circuit ampacity (A)	Total FLA (A)	Max overload protection (A)	GENERAL Refrig charge (HFC-410A) - ckt 1 (lb)	ASHRAE 90.1
EXHF0067	1/2 ton	235	0.35	0.4	1.5	2.9	7.0	6.3	80.0	62.0	49.5	49.4	84.0	96.1	48.50	9.05	6.26	68.0	108.5	55.0	46.70	15.0	4.9	0.58	0.62	0.05	0.63	265/60/1	3.5	2.9	15	1.6	Yes
EXHF0097	3/4 ton	315	0.4	0.47	1.8	2.8	8.3	7.6	80.0	62.0	52.3	51.8	84.0	95.9	9.65	10.68	7.30	68.0	103.3	55.0	46.89	14.9	5.4	0.68	0.69	0.08	0.75	265/60/1	4.1	3.4	15	1.6	Yes
EXHF0127	1 ton	415	0.4	0.5	2.4	2.9	10.8	9.9	80.0	62.0	52.9	52.0	84.0	95.5	12.64	13.81	9.45	68.0	102.8	55.0	47.13	15.5	5.2	0.86	0.94	0.1	0.93	265/60/1	7.0	5.7	15	1.8	Yes
EXHF0157	1 1/4 ton	525	0.4	0.53	3.0	4.2	13.3	12.0	80.0	62.0	53.6	52.3	84.0	95.4	15.99	17.04	11.84	68.0	103.2	55.0	47.11	15.3	4.8	1.08	1.22	0.13	1.18	265/60/1	8.9	7.3	15	1.8	Yes
EXHF0187	1 1/2 ton	625	0.4	0.5	3.6	3.2	17.1	15.5	80.0	62.0	51.6	51.4	84.0	95.9	20.27	21.40	15.32	68.0	105.2	55.0	46.49	16.7	5.1	1.23	1.45	0.15	1.35	265/60/1	10.9	9.0	15	2.8	Yes
EXHF0247	2 ton	835	0.4	0.54	4.8	4.7	21.2	18.9	80.0	62.0	54.0	52.3	84.0	95.2	25.28	26.94	18.91	68.0	102.8	55.0	47.12	16.0	4.8	1.64	1.88	0.28	1.87	265/60/1	12.4	10.1	20	3.2	Yes
EXHF0307	2 1/2 ton	1,045	0.4	0.57	6.0	7.0	27.6	25.1	80.0	62.0	52.4	51.8	84.0	95.4	31.52	34.29	24.18	68.0	102.7	55.0	46.94	16.8	5.4	1.94	2.16	0.36	2.21	265/60/1	16.4	13.7	25	3.3	Yes
EXHF0364	3 ton	1,250	0.5	0.71	7.2	4.2	31.6	28.5	80.0	62.0	53.9	52.3	84.0	95.0	39.33	39.70	29.85	68.0	104.0	55.0	46.71	17.0	5.4	2.34	2.79	0.51	2.72	460/60/3	10.5	9.1	15	4.4	Yes
EXHF0424	3 1/2 ton	1,460	0.5	0.68	8.4	6.0	37.4	33.7	80.0	62.0	53.5	52.2	84.0	95.2	46.53	47.18	35.61	68.0	104.6	55.0	46.52	16.8	5.3	2.84	3.2	0.58	3.28	460/60/3	11.3	9.8	15	5.1	Yes
EXHF0484	4 ton	1,650	0.5	0.72	9.6	6.3	42.5	38.3	80.0	62.0	53.7	52.3	84.0	95.3	52.12	54.02	39.70	68.0	103.8	55.0	46.73	16.1	5.3	3.33	3.65	0.71	3.8	460/60/3	12.0	10.5	15	5.2	Yes
EXHF0604	5 ton	1,870	0.5	0.75	12.0	5.5	52.0	45.6	80.0	62.0	52.0	51.2	84.0	95.1	68.40	66.86	50.35	68.0	110.0	55.0	46.61	15.0	4.9	4.29	5.33	0.99	5.1	460/60/3	16.7	14.7	20	7.1	Yes
EXHF0704	6 ton	2,300	0.5	0.79	14.1	5.6	62.5	56.4	80.0	62.0	51.8	51.5	84.0	94.5	71.08	75.63	55.19	68.0	103.5	55.0	47.33	15.5	4.5	3.82	4.67	0.21	4.79	460/60/3	18.1	15.7	25	7.6	Yes

AREA "A" WSHP's

Level 1

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpA101	EXHF0187	1 1/2 ton	625
hpA102	EXHF0604	5 ton	1,870
hpA103	EXHF0187	1 1/2 ton	625
hpA104	EXHF0424	3 1/2 ton	1,460
hpA105	EXHF0157	1 1/4 ton	525
hpA106	EXHF0247	2 ton	835
hpA107	EXHF0604	5 ton	1,870
hpA108	EXHF0247	2 ton	835
hpA109	EXHF0127	1 ton	415
hpA110	EXHF0307	2 1/2 ton	1,045
hpA111	EXHF0247	2 ton	835
hpA112	EXHF0364	3 ton	1,250
hpA113	EXHF0247	2 ton	835
hpA114	EXHF0704	6 ton	2,300
hpA115	EXHF0067	1/2 ton	235
hpA116	EXHF0187	1 1/2 ton	625
hpA117	EXHF0364	3 ton	1,250
hpA118	EXHF0247	2 ton	835
hpA119	EXHF0247	2 ton	835
hpA120	EXHF0364	3 ton	1,250
hpA121	EXHF0157	1 1/4 ton	525
hpA122	EXHF0187	1 1/2 ton	625
hpA123	EXHF0127	1 ton	415
hpA124	EXHF0307	2 1/2 ton	1,045
hpA125	EXHF0247	2 ton	835

Level 2

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpA201	EXHF0704	6 ton	2,300
hpA202	EXHF0157	1 1/4 ton	525
hpA203	EXHF0307	2 1/2 ton	1,045
hpA204	EXHF0187	1 1/2 ton	625
hpA205	EXHF0127	1 ton	415
hpA206	EXHF0187	1 1/2 ton	625
hpA207	EXHF0424	3 1/2 ton	1,460
hpA208	EXHF0247	2 ton	835
hpA209	EXHF0247	2 ton	835
hpA210	EXHF0187	1 1/2 ton	625
hpA211	EXHF0364	3 ton	1,250
hpA212	EXHF0307	2 1/2 ton	1,045
hpA213	EXHF0247	2 ton	835
hpA214	EXHF0247	2 ton	835
hpA215	EXHF0484	4 ton	1,650
hpA216	EXHF0307	2 1/2 ton	1,045
hpA217	EXHF0307	2 1/2 ton	1,045
hpA218	EXHF0307	2 1/2 ton	1,045

ADD ALT 02: (Level 2)

hpA219	EXHF0247	2 ton	835
hpA220	EXHF0604	5 ton	1,870
hpA221	EXHF0424	3 1/2 ton	1,460
hpA222	EXHF0307	2 1/2 ton	1,045

AREA "B" WSHP's

Level 1

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpB101	EXHF0307	2 1/2 ton	1,045
hpB102	EXHF0704	6 ton	2,300
hpB103	EXHF0604	5 ton	1,870

Level 2

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpB201	EXHF0364	3 ton	1,250
hpB202	EXHF0364	3 ton	1,250
hpB203	EXHF0127	1 ton	415
hpB204	EXHF0187	1 1/2 ton	625

ADD ALT 01: (Level 1)

hpB104	EXHF0364	3 ton	1,250
hpB105	EXHF0364	3 ton	1,250
hpB106	EXHF0364	3 ton	1,250

AREA "C" WSHP's

Level 1

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpC101	EXHF0097	3/4 ton	315
hpC102	EXHF0157	1 1/4 ton	525
hpC103	EXHF0247	2 ton	835
hpC104	EXHF0704	6 ton	2,300
hpC105	EXHF0307	2 1/2 ton	1,045
hpC106	EXHF0157	1 1/4 ton	525
hpC107	EXHF0127	1 ton	415
hpC108	EXHF0157	1 1/4 ton	525
hpC109	EXHF0127	1 ton	415
hpC110	EXHF0247	2 ton	835
hpC111	EXHF0484	4 ton	1,650
hpC112	EXHF0127	1 ton	415
hpC113	EXHF0424	3 1/2 ton	1,460
hpC114	EXHF0127	1 ton	415
hpC115	EXHF0127	1 ton	415
hpC116	EXHF0364	3 ton	1,250
hpC117	EXHF0187	1 1/2 ton	625
hpC118	EXHF0127	1 ton	415
hpC119	EXHF0364	3 ton	1,250
hpc120	EXHF0127	1 ton	415
hpC121	EXHF0067	1/2 ton	235
hpC122	EXHF0307	2 1/2 ton	1,045
hpC123	EXHF0307	2 1/2 ton	1,045

Level 2

Equip Tag	Trane (mfgr) Model Number	Nominal capacity	Design airflow (cfm)
hpC201	EXHF0127	1 ton	415
hpC202	EXHF0247	2 ton	835
hpC203	EXHF0484	4 ton	1,650
hpC204	EXHF0127	1 ton	415
hpC205	EXHF0247	2 ton	835
hpC206	EXHF0247	2 ton	835
hpC207	EXHF0247	2 ton	835
hpC208	EXHF0307	2 1/2 ton	1,045
hpC209	EXHF0187	1 1/2 ton	625
hpC210	EXHF0704	6 ton	2,300
hpC211	EXHF0247	2 ton	835
hpC212	EXHF0307	2 1/2 ton	1,045
hpC213	EXHF0157	1 1/4 ton	525
hpC214	EXHF0247	2 ton	835
hpC215	EXHF0424	3 1/2 ton	1,460
hpC216	EXHF0187	1 1/2 ton	625
hpC217	EXHF0187	1 1/2 ton	625
hpC218	EXHF0484	4 ton	1,650
hpC219	EXHF0097	3/4 ton	315

MISCELLANEOUS ITEMS TO BE FURNISHED BY MECHANICAL CONTRACTOR :

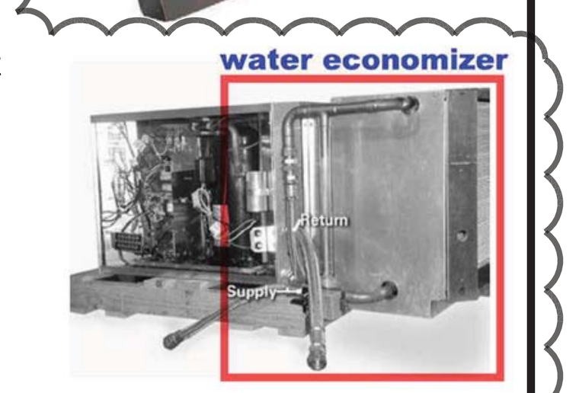
- ☒ HIGH EFFICIENCY HORIZONTAL
- ☒ COPPER HEAT EXCHANGER
- ☒ SEE PLANS FOR AIR DISCHARGE CONFIGURATION
- ☒ EXTENDED TEMPERATURE RANGE PACKAGE
- ☒ 24V CONTROLS
- ☒ REFRIGERANT: R-410A
- ☒ 2" FILTERS MERV 8
- ☐ SMOKE DETECTOR
- ☒ ENHANCED SOUND ATTENUATION PACKAGE
- ☐ STANDARD PIPING CONFIGURATION
- ☐ DIGITAL MANUAL & AUTO CHANGEOVER 7 DAY PROGRAMMABLE; 3-HEAT/2-COOL, DDC THERMOSTAT
- ☒ CONDENSATE PUMP PROVIDED WITH EACH UNIT
- ☒ ECM SUPPLY FAN MOTOR
- ☒ INTERFACE WITH BUILDING AUTOMATION SYSTEM: BACnet PROTOCOL
- ☒ PROVIDE AND INSTALL PRE-MANUFACTURED HOSE PIPING KITS AS MANUFACTURED BY HAYS FLUID CONTROLS, "3-SERIES". HOSE KITS TO INCLUDE:
  - ISOLATION VALVE(S): BALL VALVE, BOTH SUPPLY AND RETURN.
  - STRAINER.
  - AUTOMATIC FLOW CONTROL VALVE, ("MESURFLO"), ON RETURN LINE.
  - SOLENOID VALVE: 24V, ATC VALVE ON RETURN LINE.

  LINE SIZE PER THE FOLLOWING SCHEDULE:

FLOW:	LINE SIZE:
UP TO 7.5GPM:	3/4"
7.6 GPM TO 12.0GPM:	1.0"
12.1 GPM TO 20.0GPM:	1-1/4"

NOTE: FOR ALL 2ton, 2.5ton, 3ton, 3.5ton, 4ton, 5ton, 6ton WSHP's SPECIFIED:

1. PROVIDE AND INSTALL A WATER-SIDE ECONOMIZER.
   a. WATERSIDE ECONOMIZER HAS THE ABILITY TO TAKE ADVANTAGE OF ANY LOOP CONDITION THAT RESULTS IN COOL WATER TEMPERATURES. A PRIME EXAMPLE WOULD BE DURING FALL, WINTER AND SPRING WHEN COOLING TOWERS HAVE MORE CAPACITY THAN REQUIRED AND CAN BE CONTROLLED TO LOWER TEMPERATURES FOR ECONOMIZER SUPPORT.
   b. IN THIS SYSTEM, THE PERIMETER UNITS EXTRACT HEAT FROM THE BUILDING LOOP WHILE IN THE HEATING MODE, FORCING THE BUILDING LOOP TEMPERATURE TO DECREASE.
2. THE WATERSIDE ECONOMIZING PACKAGE SHALL BE AN EXTERNAL UNIT ACCESSORY, PRE-PIPED AND PRE-WIRED READY FOR TURN-KEY INSTALLATION TO THE UNIT.
   a. THE WATER-SIDE ECONOMIZER WILL BE FIELD INSTALLED ON THE RETURN AIR INLET SIDE OF THE WSHP UNIT.
3. THE ECONOMIZING COIL SHALL BE DESIGNED TO PERFORM WITH THE WSHP AT UNIT MEASURED FLOW RATE OF 80.6°F DB/66.2°F WB WITH 45°F EWT.
4. ALL HYDRONIC COILS SHALL BE OF 5/8" COPPER AND ALUMINUM PLATE FIN COMBINATION. ALL COILS SHALL BE PROOF AND LEAK TESTED FROM THE MANUFACTURER.THE PROOF TEST SHALL BE PERFORMED AT 1.5 TIMES THE MAXIMUM OPERATING PRESSURE AND THE LEAK TEST AT THE MAXIMUM OPERATING PRESSURE.
5. A DUAL SLOPED NON CORROSIVE DRAIN PAN SHALL BE EASILY ACCESSIBLE AND CLEANABLE FOR THE HYDRONIC ECONOMIZING COIL.
6. AN ELECTRONIC TWO-POSITION, 3-WAY VALVE SHALL METER WATER FLOW TO THE ECONOMIZING COIL DURING THE ECONOMIZING MODE. IT SHALL BE FACTORY SET TO ENERGIZE THE ECONOMIZING MODE AT 55°F, WHILE SIMULTANEOUSLY HALTING MECHANICAL OPERATION OF THE COMPRESSOR.
7. HANGING BRACKETS WITH RUBBER ISOLATION SHALL BE PROVIDED FOR THE HORIZONTAL VERSION OF THE ECONOMIZING COIL OPTION.THE BRACKET DESIGN SHALL BE THE SAME THROUGHOUT THE EQUIPMENT.



NOTE:
UNITS SELECTED AT 6,500 FT. ELEVATION

NOTE: DISCONNECTS BY ELECTRICAL CONTRACTOR.

PLATE AND FRAME HEAT EXCHANGER SCHEDULE:

SYM	TACO (mfgr) MODEL NO:	TYPE	SVC	TOTAL HEAT EXCH (mbh)	HEAT TRNSFR AREA (ft2)	LMTD (°F)	HOT SIDE EWT (°F)	HOT SIDE LWT (°F)	HOT SIDE FLOW RATE (gpm)	HOT SIDE PRESS. DROP (psi)	COLD SIDE EWT (°F)	COLD SIDE LWT (°F)	COLD SIDE FLOW RATE (gpm)	COLD SIDE PRESS. DROP (psi)
HX-01	PF82-129-4	PLATE & FRAME	COND. WATER	3,155	1,108	1.37	95.0	85.0	550	8.5	83.0	93.0	680	15.2

HEAT PUMP WATER CIRCULATING PUMP SCHEDULE

SYMBOL	MANUFACTURER	MODEL	TYPE	SYSTEM	GPM	HEAD FT.	IMPELLER DIA.	SUCTION x DISCHARGE	EFF.	RPM	HP	ELECTRICAL V/PH/HZ
HPWP-01	TACO	CI4009	CLOSE COUPLED BASE MOUNTED	HEAT PUMP CIRCULATING WATER	550	75	9.25	5.0"x4.0"	79.0%	1750	15.0	460/3/60
HPWP-02	TACO	CI4009	CLOSE COUPLED BASE MOUNTED	HEAT PUMP CIRCULATING WATER	550	75	9.25	5.0"x4.0"	79.0%	1750	15.0	460/3/60

MISCELLANEOUS ITEMS TO BE FURNISHED BY MECHANICAL CONTRACTOR:

- ☒ CLOSE COUPLED
- ☒ BASE MOUNTED
- ☐ SPLIT CASE
- ☐ COUPLING GUARD
- ☒ BRONZE FITTED
- ☒ 175 PSI WORKING PRESSURE
- ☐ NON OVER LOADING SELECTION
- ☒ INTERNAL SELF FLUSHING MECHANICAL SEAL
- ☐ REPLACEABLE GREASEABLE BALL BEARINGS
- ☒ ODP PREMIUM EFFICIENCY MOTOR

COOLING TOWER CIRCULATING PUMP SCHEDULE

SYMBOL	MANUFACTURER	MODEL	TYPE	SYSTEM	GPM	HEAD FT.	IMPELLER DIA.	SUCTION x DISCHARGE	EFF.	RPM	HP	ELECTRICAL V/PH/HZ
CTP-01	TACO	CI4011	CLOSE COUPLED BASE MOUNTED	COOLING TOWER CIRCULATING WATER	680	95	11.0"	5.0"x4.0"	81.0%	1750	25.0	460/3/60
CTP-02	TACO	CI4011	CLOSE COUPLED BASE MOUNTED	COOLING TOWER CIRCULATING WATER	680	95	11.0"	5.0"x4.0"	81.0%	1750	25.0	460/3/60

MISCELLANEOUS ITEMS TO BE FURNISHED BY MECHANICAL CONTRACTOR:

- ☒ CLOSE COUPLED
- ☒ BASE MOUNTED
- ☐ SPLIT CASE
- ☐ COUPLING GUARD
- ☒ BRONZE FITTED
- ☒ 175 PSI WORKING PRESSURE
- ☐ NON OVER LOADING SELECTION
- ☒ INTERNAL SELF FLUSHING MECHANICAL SEAL
- ☐ REPLACEABLE GREASEABLE BALL BEARINGS
- ☒ ODP PREMIUM EFFICIENCY MOTOR

TRIPLE DUTY VALVE SCHEDULE

SYMBOL	MANUFACTURER (OR APPROVED EQUAL)	MODEL	SIZE	FLOW GPM	SYSTEM	COMMENTS
TDV-01	TACO	MPV030-5	5.0"	550	HEAT PUMP CIRCULATING WATER	2.37 PSI PRESSURE DROP MISCELLANEOUS: Flanged connections.
TDV-02	TACO	MPV030-5	5.0"	550	HEAT PUMP CIRCULATING WATER	
TDV-03	TACO	MPV030-5	5.0"	680	COOLING TOWER CIRCULATING WATER	
TDV-04	TACO	MPV030-5	5.0"	680	COOLING TOWER CIRCULATING WATER	

SUCTION DIFFUSER SCHEDULE

SYMBOL	MANUFACTURER (OR APPROVED EQUAL)	MODEL	SIZE	FLOW GPM	SYSTEM	COMMENTS
SD-01	TACO	SD060040-6	6.0"x5.0"	550	HEAT PUMP CIRCULATING WATER	1.62 PSI PRESSURE DROP MISCELLANEOUS: Flanged connections Furnish with start-up screen.
SD-02	TACO	SD060040-6	6.0"x5.0"	550	HEAT PUMP CIRCULATING WATER	
SD-03	TACO	SD060040-6	6.0"x5.0"	680	COOLING TOWER CIRCULATING WATER	
SD-04	TACO	SD060040-6	6.0"x5.0"	680	COOLING TOWER CIRCULATING WATER	

AIR SEPARATOR SCHEDULE

SYMBOL	MANUFACTURER (OR APPROVED EQUAL)	MODEL	SERVICE	FLOW GPM	PIPE CONN.	PROVIDE WITH:
AS-01	TACO	4906A	HEAT PUMP CIRCULATING WATER	550	6 in	STRAINER, ASME, BRACKET SUPPORTS METRAFLEX MODEL MV15A 3/4" AUTO AIR VENT
AS-02	TACO	4906A	COOLING TOWER CIRCULATING WATER	680	6 in	

EXPANSION TANK SCHEDULE

SYMBOL	MANUFACTURER (OR APPROVED EQUAL)	MODEL	SERVICE	DIMENSIONS (IN) DIA.	DIMENSIONS (IN) HEIGHT	VOLUME (GAL) TANK	ACCEPT. (GAL) TANK	MOUNTING	TYPE
EXT-01	TACO	CBX254-125	HEAT PUMP CIRCULATING WATER	24"	40"	68	34	VERTICAL	DIAPHRAGM
EXT-02	TACO	CBX254-125	COOLING TOWER CIRCULATING WATER	24"	40"	68	34	VERTICAL	DIAPHRAGM

REMARKS:
CONSTRUCTED PER ASME SECTION VII, DIV.1; MAX OPERATING TEMPERATURE: 240°F; MIN. OPERATING TEMP: 40°F

VARIABLE FREQUENCY DRIVE SCHEDULE

SYMBOL	SERVICE	MFG'R	MODEL	HP	VOLTAGE	PROVIDE WITH:
VFD-01	HEAT PUMP CIRCULATING WATER	TACO/SCHNEIDER ELECTRIC SQUARE D	DSJ4YOBD	15.0	460/3/60	NEMA 1 VFD with 3 contactor bypass, LCD text keypad, Reduced harmonic technology (line reactor), overcurrent circuit breaker, 0-20mA speed reference.
VFD-02	HEAT PUMP CIRCULATING WATER	TACO/SCHNEIDER ELECTRIC SQUARE D	DSJ4YOBD	15.0	460/3/60	
VFD-03	COOLING TOWER CIRCULATING WATER	TACO/SCHNEIDER ELECTRIC SQUARE D	DSJ4YOBD	25.0	460/3/60	
VFD-04	COOLING TOWER CIRCULATING WATER	TACO/SCHNEIDER ELECTRIC SQUARE D	DSJ4YOBD	25.0	460/3/60	

MISCELLANEOUS ITEMS TO BE FURNISHED BY MECHANICAL CONTRACTOR:

- ☒ NEMA 1 ENCLOSURE
- ☒ 4-20mA INPUT SIGNAL
- ☒ VERTICAL ENCLOSURE
- ☒
- ☒ MAIN AND DRIVE FUSES
- ☒ LINE REACTOR
- ☒ COMMUNICATION CARD WITH BAS: COMPATIBLE WITH BACNET BAS PROTOCOL

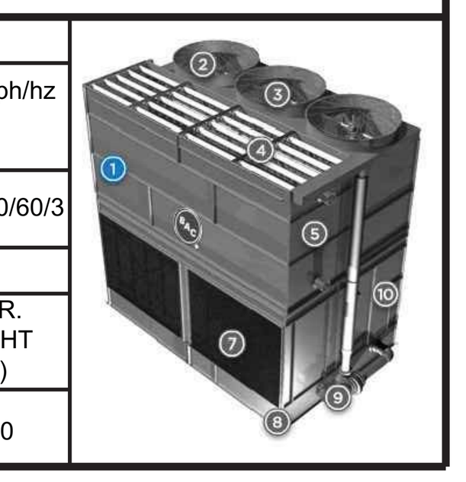
COOLING TOWER (FLUID COOLER) SCHEDULE:

SYM	BALTIMORE AIR COIL (mfgr) MODEL NO:	AMBIENT (wb °F)	HEAT REJECTION (mbh)	WATER FLUID FLOW (gpm)	EWT (°F)	LWT (°F)	PRESS DROP (psi)	SPRAY FLOW (gpm)	ELECTRICAL FAN MTR (hp)	PUMP MTR (hp)	BASIN HEATER (kW)	v/ph/hz
CT-01	FXV-1212C-16D-K	68	3,150	680	93	83	13.8	859	10	7.5	12	460/60/3

PROVIDE COOLING TOWER WITH:

- CORROSION RESISTANT CONSTRUCTION
- PAN BASIN HEATER
- CLEANABLE COIL
- LOW SOUND FAN

PHYSICAL DIMENSIONS L x W x H (ft)	OPER. WEIGHT (lbs)
12'x12'x16'-6"	23,840



HEATING HOT WATER BOILER SCHEDULE:

1. BOILER PRODUCT
   a. Raypak XTherm™ condensing water-tube hydronic boiler(s)
   b. The boiler(s) shall be fired with gas at a rated input of BTU/hr.
   c. The boiler(s) shall be CSA tested and certified with a minimum thermal efficiency of 96 percent at full fire (99% at part load).
   d. The boiler(s) shall be ASME inspected and stamped and National Board registered for 160 PSIG maximum allowable working pressure and 250ºF maximum allowable temperature, complete with a Manufacturer's Data Report.
   e. The boiler(s) shall have a floor loading of 131 lbs. /square foot or less.
2. QUALITY ASSURANCE
   a. Regulatory Requirements
      - ANSI Z21.13/CSA 4.9
      - Local and national air quality regulations for low NOx (0-20 PPM NOx emissions) boilers
   b. Certifications
      - CSA
      - ASME H Stamp and National Board Listed - Primary Heat Exchanger
      - ASME U Stamp and National Board Listed - Secondary Heat Exchanger
      - ISO 9001
3. HEAT EXCHANGER WARRANTY
   a. Limited five-year warranty (copper) from date of installation
   b. Limited twenty-five-year thermal shock warranty
   c. Limited ten-year closed-system heat exchanger warranty
   d. Limited ten-year secondary heat exchanger warranty
4. PRIMARY HEAT EXCHANGER
   a. The primary heat exchanger shall be of a single-bank, vertical multi-pass design and shall completely enclose the combustion chamber for maximum efficiency. The tubes shall be set vertically and shall be rolled into a powder-coated, ASME boiler quality, carbon steel tube sheet.
   b. The primary heat exchanger shall be sealed to 160 PSIG rated cast iron headers with silicone "O" rings, having a temperature rating over 500°F (bronze headers optional).
   c. The low water volume primary heat exchanger shall be explosion-proof on the water side and shall carry a twenty-five-year warranty against thermal shock.
   d. The headers shall be secured to the tube sheet by stud bolts with flange nuts to permit inspection and maintenance without removal of external piping connections. A heavy gauge stainless steel slotted wrap shall ensure proper combustion gas flow across the copper-finned tubes.
   e. The flue connection, combustion air opening, gas connection, water connections, electrical
   f. connections and condensate drain shall be located on the rear.
   g. The primary heat exchanger shall have accessible boiler drain valves with hose bibs to drain the water section of the primary heat exchanger.
5. SECONDARY HEAT EXCHANGER
   a. The secondary heat exchanger shall be a single-bank, multi-pass design constructed of stainless steel and bears the ASME U stamp.
   b. The boiler(s) shall be capable of operating at inlet water temperatures as low as 50°F.
6. CONDENSATE DRAIN
   a. The boiler(s) will feature a condensate drain switch which will shut down the boiler(s) if the condensate drain is blocked.
7. BURNERS
   a. The combustion chamber shall be of the sealed combustion type employing the Raypak high temperature FeCrAloy woven mesh burner, mounted in a vertical orientation.
   b. The burner must be capable of firing at both a complete blue flame with maximum gas and air input as well as firing infrared when gas and air are reduced. The burner must be capable of firing at 100% of rated input when supplied with 4.0" WC of inlet gas pressure, so as to maintain service under heavy demand conditions; no exceptions.
   c. The burner shall use a combustion air blower to precisely control the fuel/air mixture for maximum efficiency throughout the entire range of modulation. The combustion air blower shall operate for a pre-purge period before burner ignition and a post-purge period after burner operation to clear the combustion chamber.
   d. The blower shall infinitely vary its output in response to a 4-20 mA signal supplied directly from the PID modulating temperature controller, thereby electronically and precisely adjusting the volume of air and gas supplied for combustion. Minimum fire shall be 25 percent of rated input.
8. PILOT CONTROL SYSTEM
   a. The boiler(s) shall be equipped with a 100 percent safety shutdown.
   b. The ignition shall be Hot Surface Ignition type with full flame rectification by remote sensing separate from the ignition source, with a three-try-for-ignition sequence, to ensure consistent operation.
   c. The igniter will be located to the side of the heat exchanger to protect the device from condensation during start-up.
   d. The ignition control module shall include an LED that indicates six (6) individual diagnostic flash codes.
   e. An external viewing port shall be provided, permitting visual observation of burner operation.
9. GAS TRAIN
   a. The boiler(s) shall have a firing/leak test valve and pressure test valve as required by CSD-1.
   b. The boiler(s) shall have dual-seated main gas valve.
   c. Gas control trains shall have a redundant safety shut-off feature, main gas regulation, shut-off cock and plugged pressure tapping to meet the requirements of ANSI Z21.13/CSA 4.9.
10. BOILER CONTROL
    a. The following safety controls shall be provided:
       - High limit control with manual reset
       - Flow switch, mounted and wired
       - PSIG ASME pressure relief valve, piped by the installer to an approved drain
       - Temperature and pressure gauge (shipped loose)
       - The boiler(s) shall be equipped with a PID modulating temperature controller with LCD display that incorporates an adjustable energy-saving pump control relay and freeze protection and is factory mounted and wired to improve system efficiency; three water sensors included.
       - Firing Mode: Provide electronic modulating control of the gas input to the boiler.
11. BOILER DIAGNOSTICS
    a. Provide external LED panel displaying the following boiler status/faults:
       - Power on - Green
       - Call for heat - Amber
       - Burner firing - Blue
       - Service - Red
    b. Provide internal circuit board indicating the following safety faults by a 2 line, 20 character, LCD display:
       - System status
       - Condensate blockage
       - Manual reset high limit
       - Auto reset high limit
       - Low water cut-off
       - Blocked vent
       - Low gas pressure switch
       - High gas pressure switch
       - Controller alarm
       - Flow switch
       - Air pressure
       - Factory option
       - External interlock
       - Cold Water Start/Cold Water Run
       - Ignition lock-out
12. COMBUSTION CHAMBER:
    a. The combustion chamber wrapper shall be insulated to reduce standby radiation losses, reducing jacket losses and increasing unit efficiency.
13. CABINET
    a. The corrosion-resistant galvanized-steel jackets shall be finished with a baked-on epoxy powder coat, which is suitable for outdoor installation, applied prior to assembly for complete coverage, and shall incorporate louvers in the outer panels to divert air past heated surfaces.
    b. The boiler(s), if located on a combustible floor, shall not require a separate combustible floor base.
    c. The boiler(s) shall connect both the combustion air and flue products through the back of the unit.
    d. The boiler shall have as standard an internal, combustion air filter rated to MERV 8 (>95% arrestance).
14. BOILER PUMP
    a. The boiler(s) shall be equipped with a factory-packaged pump system.
    b. Cold Water Protection System
       - The boiler(s) shall be configured with a cold water protection automatic proportional bypass system that ensures the boiler will experience inlet temperatures in excess of 120ºF in less than 7 minutes to avoid damaging condensation.
       - The cold water protection system shall be configured with two variable-speed pumps that are controlled by a system-matched PID control that injects the correct amount of cold water directly into the boiler loop to maintain the required minimum inlet temperature. The PID controller temperature sensor shall be located in the inlet header of the boiler.
15. BOILER OPERATING CONTROLS
    a. The boiler(s) shall feature a modulating digital controller with selectable outdoor reset mode option, mounted and wired.
    b. System sensor and optional air temperature sensor shall be shipped loose for field installation by installing contractor. Inlet/Outlet sensors are factory-installed.
16. DIRECT VENT
    a. The boiler(s) shall meet safety standards for direct vent equipment as noted by the 2006 Uniform Mechanical Code, section 1107.6, and ASHRAE 15-1994, section 8.13.6.
17. SOURCE QUALITY CONTROL
    a. The boiler(s) shall be completely assembled, wired, and fire-tested prior to shipment from the factory.
    b. The boiler(s) shall be furnished with the sales order, ASME Manufacturer's Data Report(s), inspection sheet, wiring diagram, rating plate and Installation and Operating Manual.

SYMBOL	LOCATION	MFGR	MODEL	MBH INPUT @ S.L.	MBH OUTPUT @ ALT.	WATER EWT °F	WATER LWT °F	FLUE	INTAKE	ELECTRICAL V/PH/HZ	BLOWER & CONTROLS	BOILER PUMP HP	BOILER PUMP
B-01	MECH ROOM [1064]	RAYPAK: XTHERM	H7-2005	1,999	1,650	140	170	8"Ø	8"Ø	120/1/60	18 AMPS	1.0	17 AMPS

NOTE: SEPARATE POWER SUPPLY FOR BOILER AND PUMP REQUIRED

MISCELLANEOUS ITEMS TO BE FURNISHED WITH EQUIPMENT BY MECHANICAL CONTRACTOR:

- ☒ AGA LISTED
- ☒ PACKAGED, FACTORY CONTROLS
- ☒ MODULATING GAS VALVE
- ☒ 96% EFFICIENCY
- ☒ CONDENSING TYPE BOILER
- ☒ CAT IV VENTING: VERTICAL VENT AND INTAKE KIT:
  - AL29-4C VENT MATERIAL
  - GALVANIZED STEEL INTAKE
- ☒ TEN YEAR WARRANTY
- ☒ FLAME SAFEGUARD
- ☒ ASME RELIEF VALVE
- ☒ HI LIMIT CONTROL
- ☒ LOW AIR PRESSURE SWITCH
- ☒ WATER FLOW SWITCH
- ☒ TEMP & PRESSURE GAUGES
- ☒ TEMPERATURE CONTROL
- ☒ 2-ACID NEUTRALIZATION KITS: 1-FOR BOILER; 1-FOR FLUE VENT
- ☒ STANDARD GAS TRAIN
- ☒ ADJUSTABLE INLET AIR SHUTTER
- ☒ DIAGNOSTIC ANNUCIATOR
- ☒ HOT SURFACE IGNITION/5:1 TURNDOWN
- ☒ COPPER FIN-TUBE HEAT EXCHANGER
- ☒ PUMP RELAY CONTACTS
- ☒ INTERFACE WITH DDC CONTROLS
- ☒ BRONZE FITTED CIRCULATING PUMP: FACTORY MOUNTED AND WIRED

ENERGY RECOVERY VENTILATOR SCHEDULE
ROOFTOP MOUNTED, VERTICAL SUPPLY AND RETURN

SYMBOL	GREENHECK mfgr (O.A.E): MODEL #:	OUTDOOR AIR SIDE (OUTSIDE AIR INTO BUILDING) AIR FLOW (cfm)	EXT. PRESS. (in w.c.)	INDOOR AIR SIDE (EXHAUST AIR FROM BUILDING) AIR FLOW (cfm)	EXT. PRESS. (in w.c.)	PERFORMANCE EFFECTIVENESS (%) SUMMER (TOTAL)	WINTER (TOTAL)	ELECTRICAL BLOWER MOTOR (hp) SPLY	EXH	DRIVE	V/PH/HZ	MCA (A)	MOCP (A)	PHYSICAL LxWxH (in)	WGHT (lbs)
ERV-A101	PVe-35-SC	2,760	0.75	2,485	0.60	55	65	5.0	3.0	BELT	460/3/60	10.7	15.0	98x104x56	1,800
ERV-A201	PVe-35-SC	2,160	0.75	1,950	0.60	55	65	3.0	3.0	BELT	460/3/60	10.7	15.0	98x80x56	1,800
ERV-B101	PVe-45-SC	1,920	0.75	1,730	0.60	55	65	3.0	1.5	BELT	460/3/60	10.7	15.0	98x104x56	2,000
ERV-B201	ECV-10-VG	720	0.75	650	0.60	55	65	1.0	0.5	BELT	460/3/60	16.9	20.0	98x30x56	650
ERV-C101	PVe-35-SC	2,200	0.75	1,980	0.60	55	65	3.0	3.0	BELT	460/3/60	10.7	15.0	98x80x56	2,000
ERV-C201	PVe-35-SC	2,225	0.75	1,980	0.60	55	65	3.0	3.0	BELT	460/3/60	16.9	20.0	98x80x56	2,000

MISCELLANEOUS ITEMS TO BE FURNISHED BY MECHANICAL CONTRACTOR :

- ☒ FUSED DISCONNECT SWITCH
- ☒ UL LISTED
- ☒ TWO (2) BELT-DRIVE BLOWERS W/ ADJ SHEAVES
- ☒ PREMIUM EFFICIENCY MOTORS
- ☐ FACTORY SUPPLIED & MOUNTED VFD'S - OA & EA AIRSTREAMS
- ☒ MOTOR STARTERS
- ☐ TIMED EXHAUST FROST PROTECTION
- ☒ SMOKE DETECTORS
- ☒ OUTSIDE AIR AND EXHAUST AIR DAMPERS-MOTORIZED
- ☒ REQUIRED RELAYS AND SWITCHES
- ☒ FILTER MAINTENANCE INDICATOR SWITCH
- ☒ 2" PLEATED FILTERS: MERV 8
- ☒ FLEXIBLE DUCT CONNECTIONS
- ☒ SINGLE-POINT POWER CONNECTION AND A SINGLE-POINT 24 VAC CONTACTOR CONTROL CONNECTION
- ☒ FACTORY CONTROLS
- ☒ INTERFACE w/ BACnet DDC CONTROLS

NOTE:
ERV'S SELECTED AT 6,500 FT. ELEVATION

ELECTRIC UNIT HEATER SCHEDULE

TAG	SERVICE	MFG'R	MODEL	HEATING CAPACITY	WATTS	FAN WATTS	VOLTAGE
EUH-101	MECH ROOM [MECH1]	QMARK	MW UH7504	25,600	7,500	6	240V/1PH/60HZ

- ☒ LOW VOLT. TRANSFORMER
- ☒ LOW VOLT. HEATING THERMOSTAT
- ☒ WALL BRACKET

UL APPROVED UNIT HEATER WITH GALVANIZED STEEL CABINET AND EPOXY PAINT FINISH, TUBULAR HEATING ELEMENTS AND ADJUSTABLE AIRFLOW LOUVERS. THE BALL BEARING MOTOR SHALL BE TOTALLY ENCLOSED, WITH INTERNAL THERMAL PROTECTION. PROPELLER SHALL BE OF STEEL, DIRECT DRIVE, AND STATICALLY BALANCED. UNITS SHALL HAVE CONTACTORS, TRANSFORMERS, WALL MOUNTED THERMOSTAT, WALL BRACKET, ETC. FOR A COMPLETE SINGLE POINT CONNECTION.

NOTE: ALL LINE VOLTAGE WIRING BY ELECTRICAL CONTRACTOR

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OCTOBER 6, 2016

ArSed Engineering Group, LLC.
4700 Lincoln Road, NE Suite 101 Albuquerque, NM 87109 505.761.3100

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4505 Montbel Place NE, Albuquerque, New Mexico 87107

BRIAN ARNOLD
NEW MEXICO
14466
REGISTERED PROFESSIONAL ENGINEER
10/06/16
ENGINEER

Revision Schedule

Revision Number	Revision Date	Revision Description
1	10/27/16	ADD.01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	WOOD	BA

RVT FILE

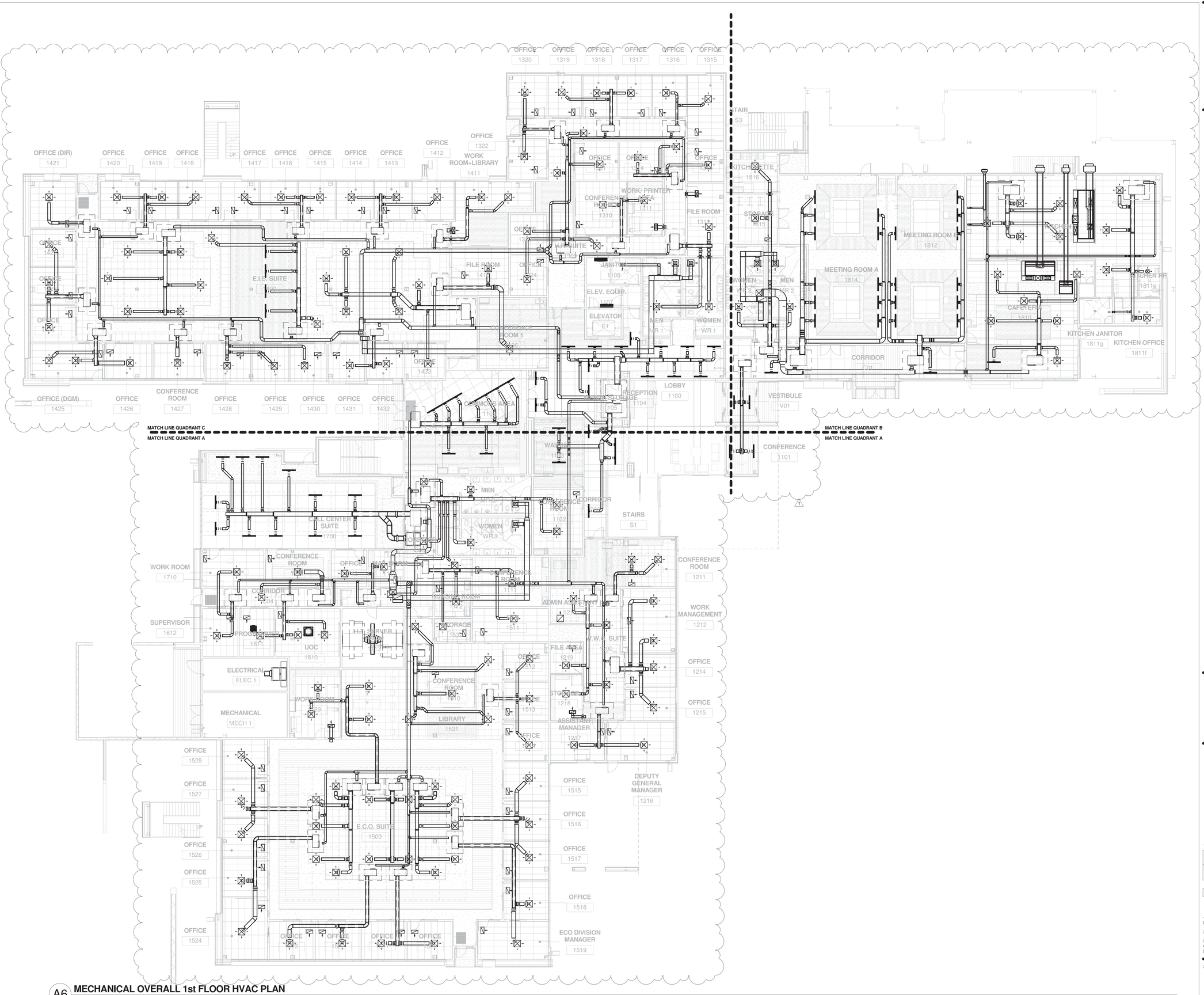
Sheet Title
MECHANICAL: EQUIPMENT SCHEDULES

Sheet Number
M003

Sequence of

E D C B A

6 5 4 3 2 1



A6 **MECHANICAL OVERALL 1st FLOOR HVAC PLAN**
3/32" = 1'-0"

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10/06/16
ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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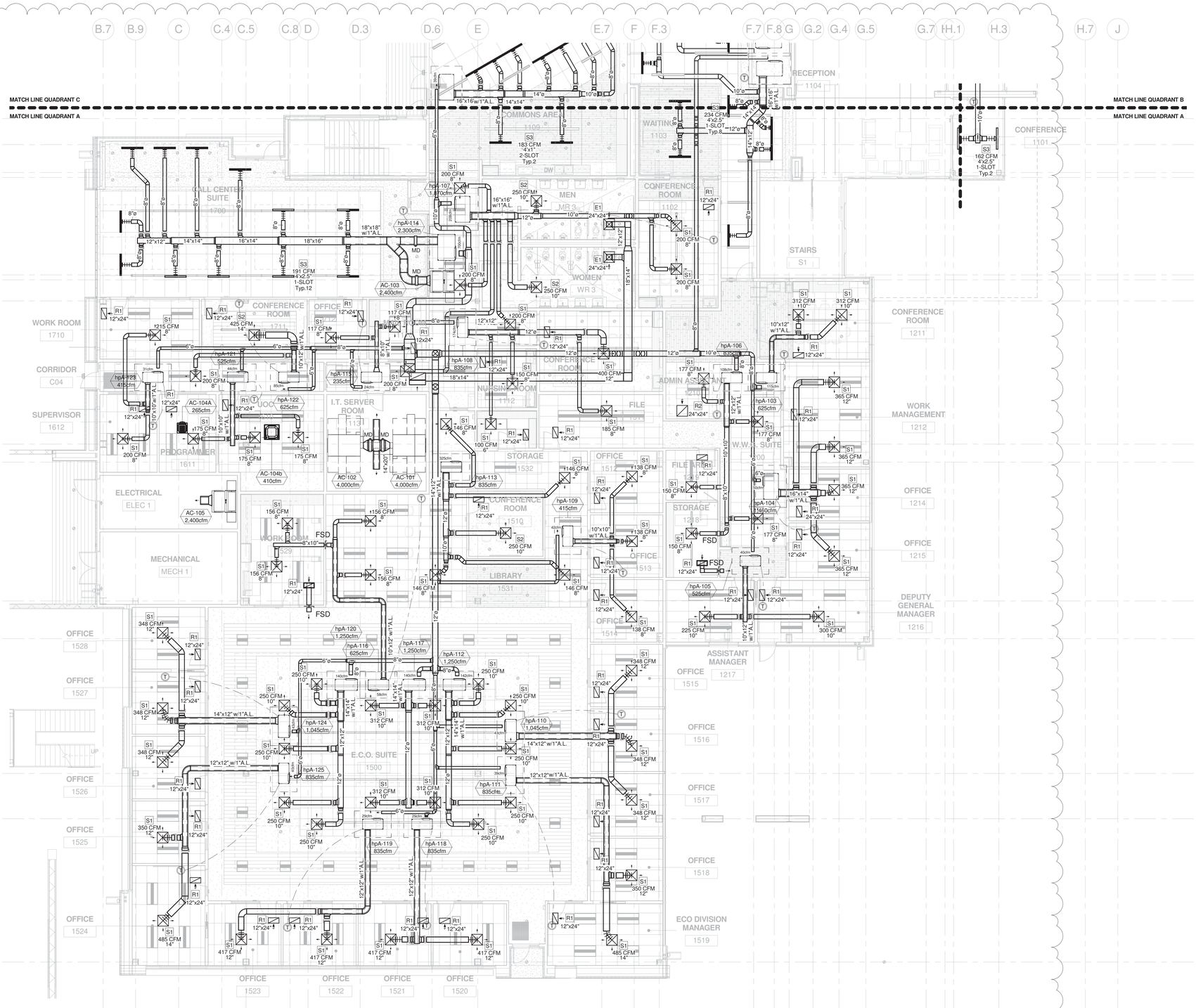
Sheet Title
MECHANICAL OVERALL 1st FLOOR HVAC PLAN

Sheet Number
M101
Sequence of



A5 **MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT A**
1/8" = 1'-0"

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1	10/27/16	ADD. 01

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2015.05	DMT	BA

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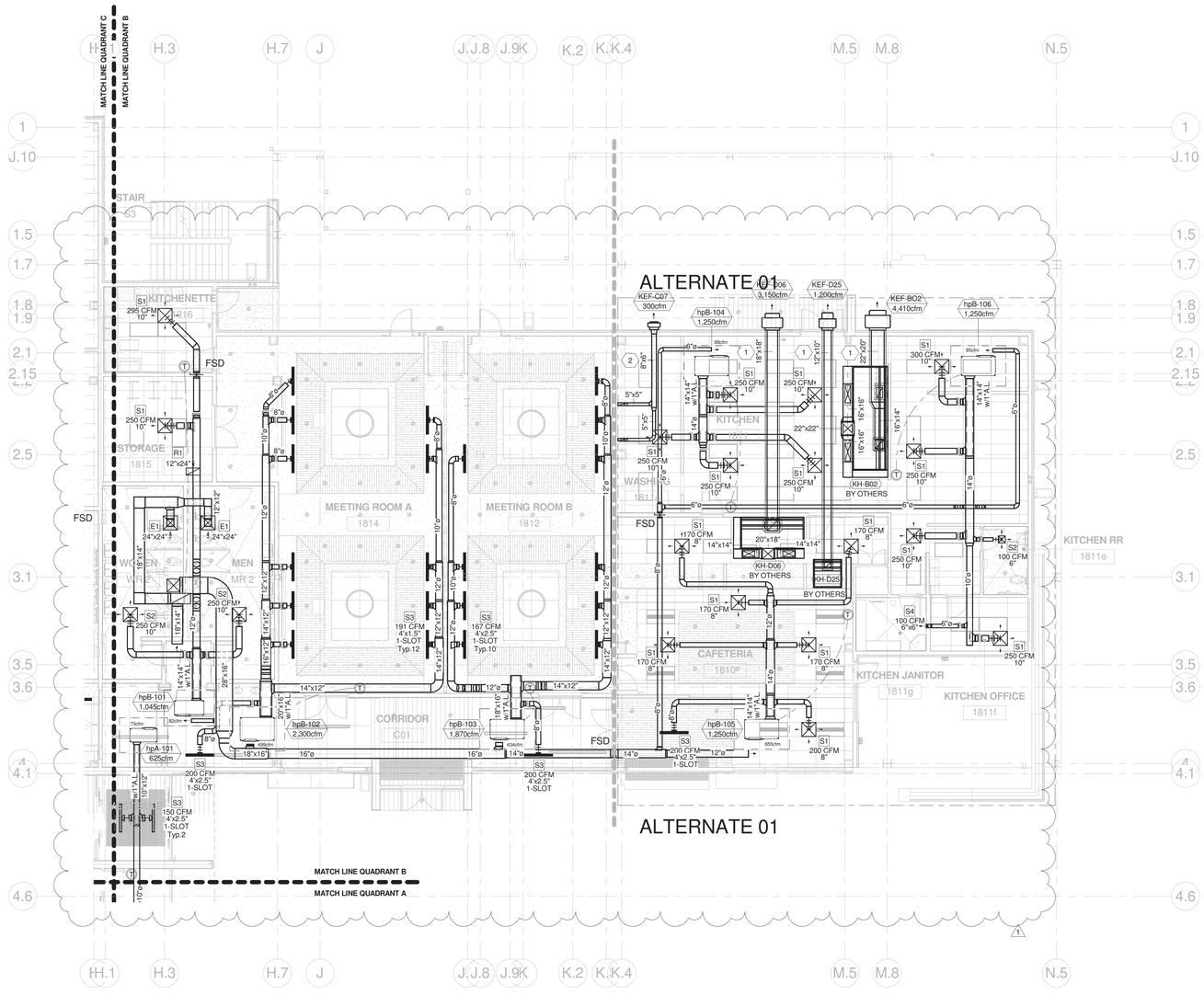
Sheet Title
MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT A

Sheet Number
M101a
Sequence of



A4 **MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT B**
1/8" = 1'-0"

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KEYED NOTES:

1. GREASE EXHAUST DUCT: INSTALL BETWEEN GREASE HOOD (KEH-xxx) AND KITCHEN EXHAUST FAN (KEF-xxx).
   a. DUCTWORK IS 16GA, ALL WELDED CONSTRUCTION, SLOPE AT 1/4"-PER-FOOT TOWARDS HOOD EXHAUST OPENING.
   b. INSTALL DUCT CLEANING ACCESS DOORS AT 5'-0" O.C. IN HORIZONTAL SECTIONS OF GREASE DUCTWORK.
   c. GREASE DUCT ASSEMBLY WILL BE WRAPPED WITH TWO (2) LAYERS OF 1-1/2" THICK FIRETEMP DUCTWRAP. FOLLOW ALL MANUFACTURERS INSTALLATION INSTRUCTIONS TO MAINTAIN U.L. LISTING.

2. DISHWASHER EXHAUST DUCT: INSTALL BETWEEN DISHWASHER AND EXHAUST FAN (KEF-C07).
   a. DUCTWORK IS 16GA, ALL WELDED CONSTRUCTION, SLOPE AT 1/4"-PER-FOOT TOWARDS HOOD EXHAUST OPENING.

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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Sheet Title
MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT B

Sheet Number
M101b

Sequence of

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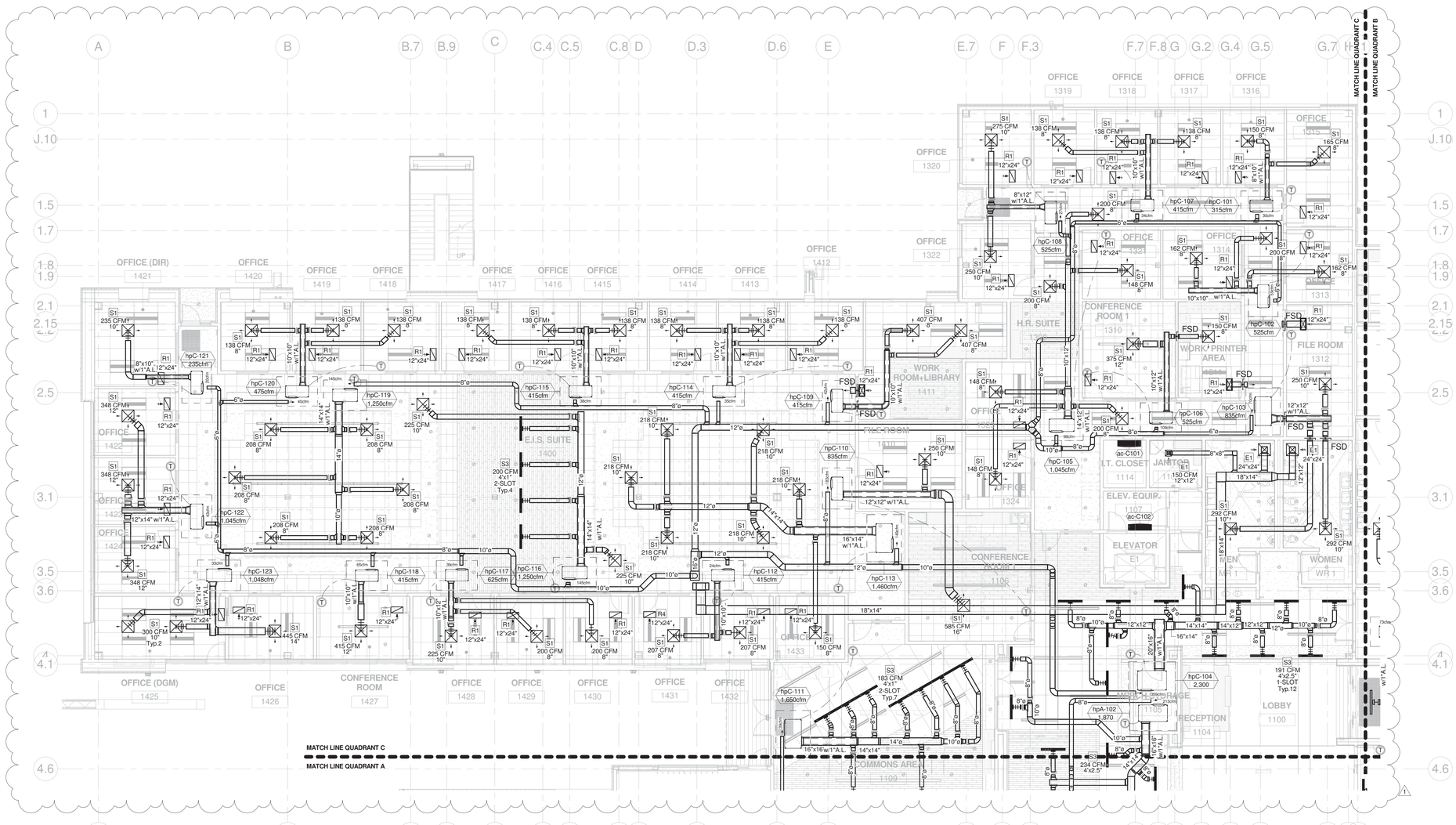

A5 **MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT C**
1/8" = 1'-0"

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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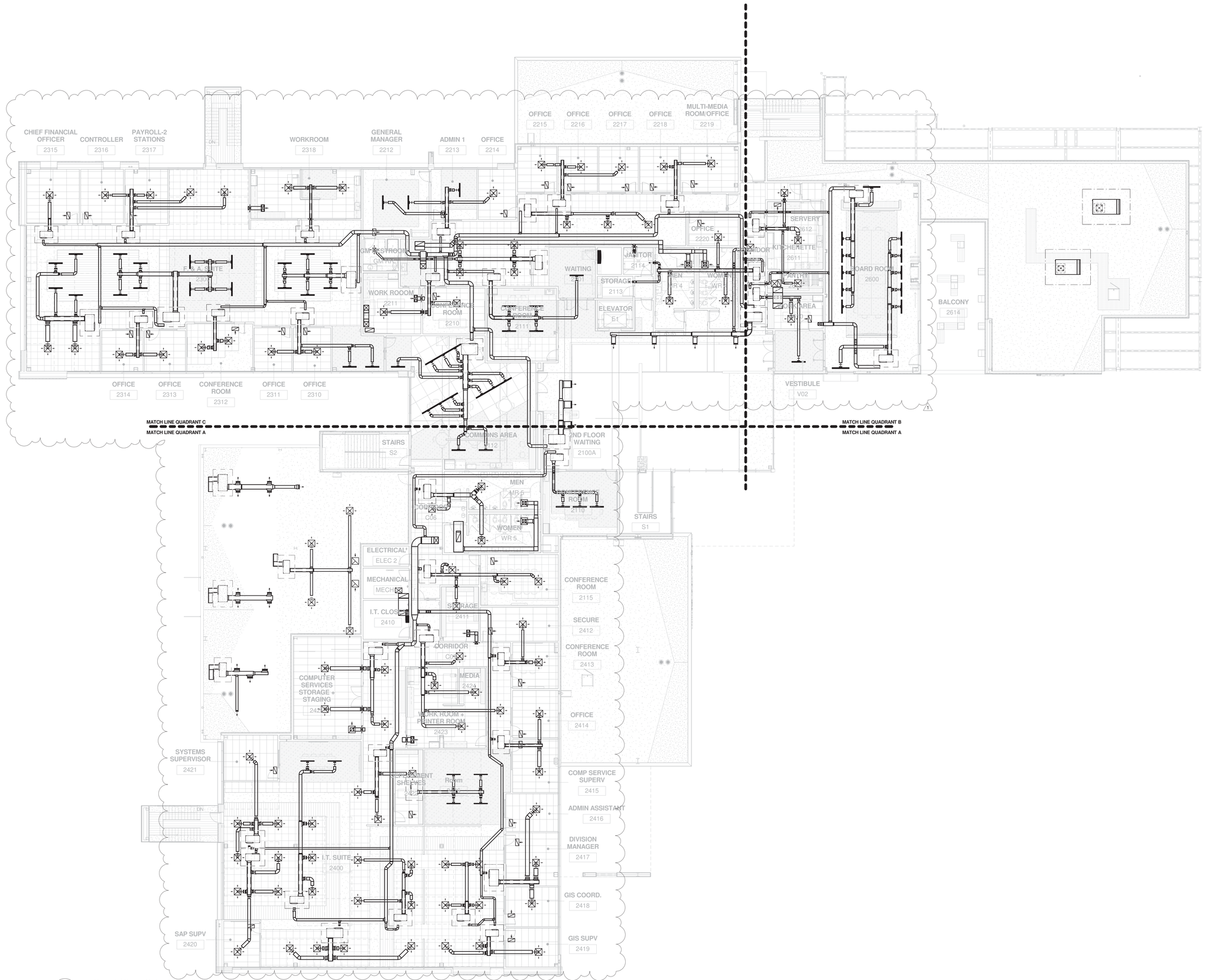
Sheet Title
MECHANICAL 1st FLOOR HVAC PLAN - QUADRANT C

Sheet Number
M101c
Sequence of



A6 **MECHANICAL OVERALL 2nd FLOOR HVAC PLAN**
3/32" = 1'-0"

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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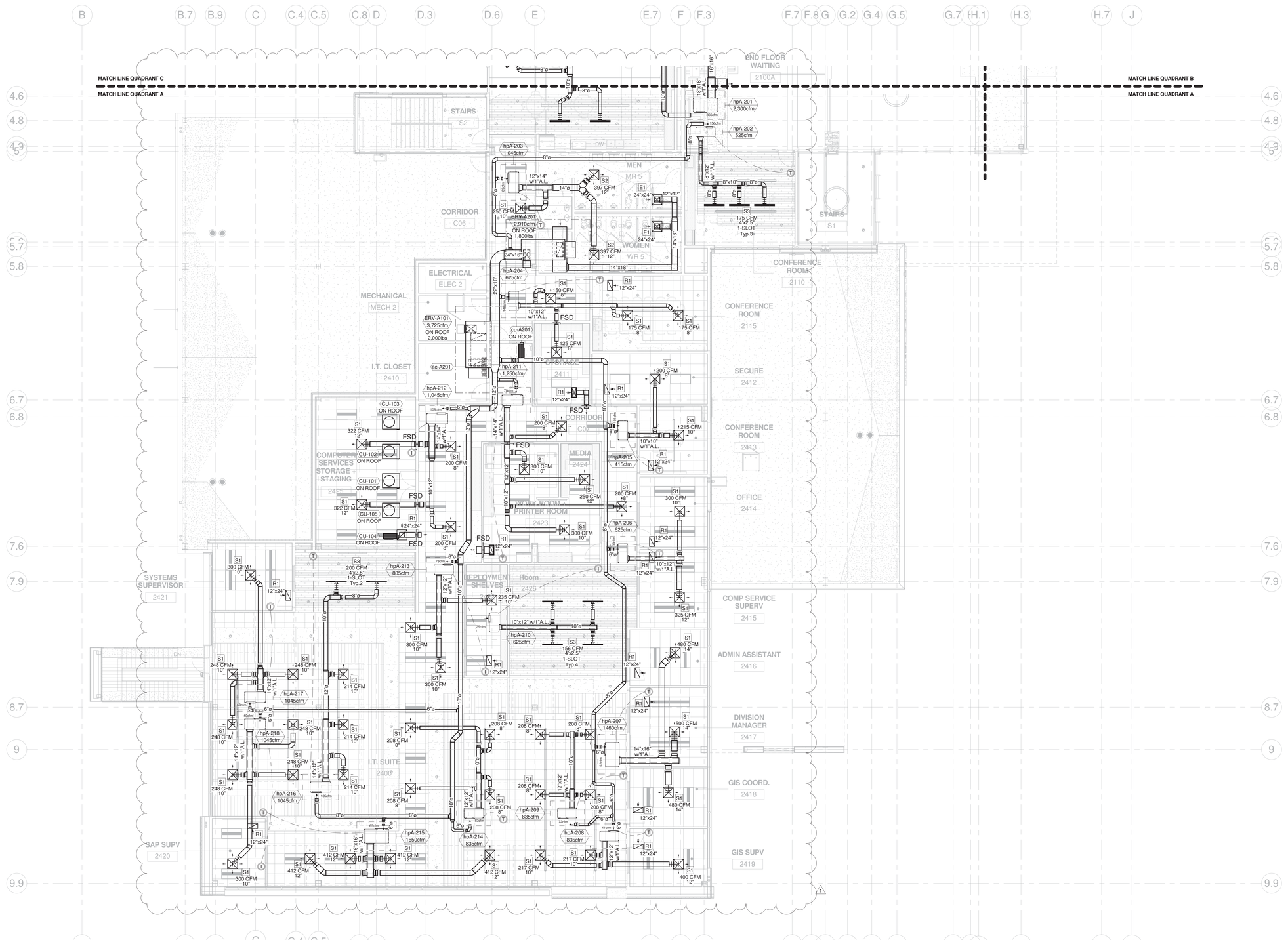
Sheet Title
MECHANICAL OVERALL 2nd FLOOR HVAC PLAN

Sheet Number
M102
Sequence of



A5 **MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT A**
1/8" = 1'-0"

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Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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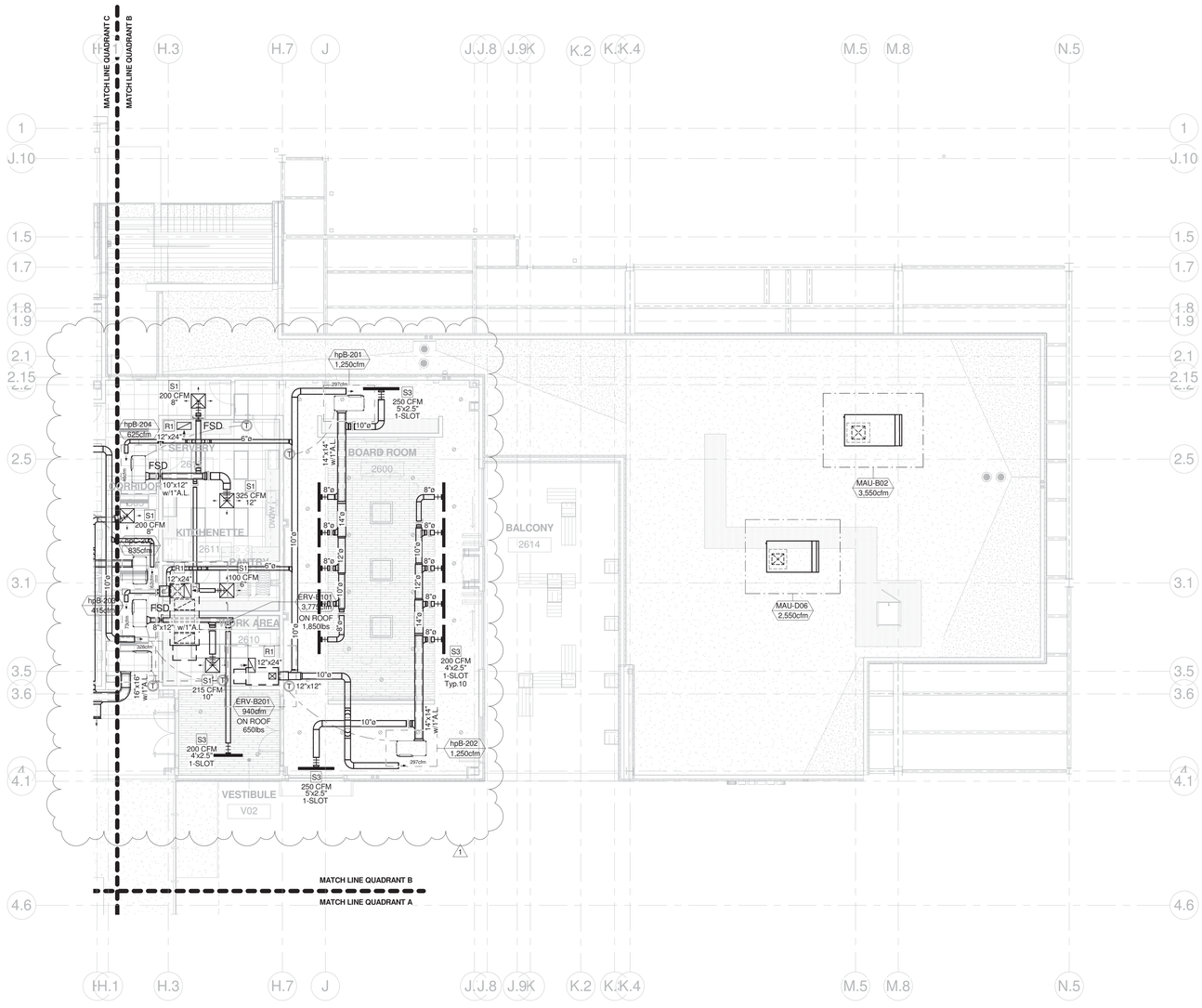
Sheet Title
MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT A

Sheet Number
M102a
Sequence of



2 MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT B

1/8" = 1'-0"

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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Sheet Title
MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT B

Sheet Number
M102b
Sequence of

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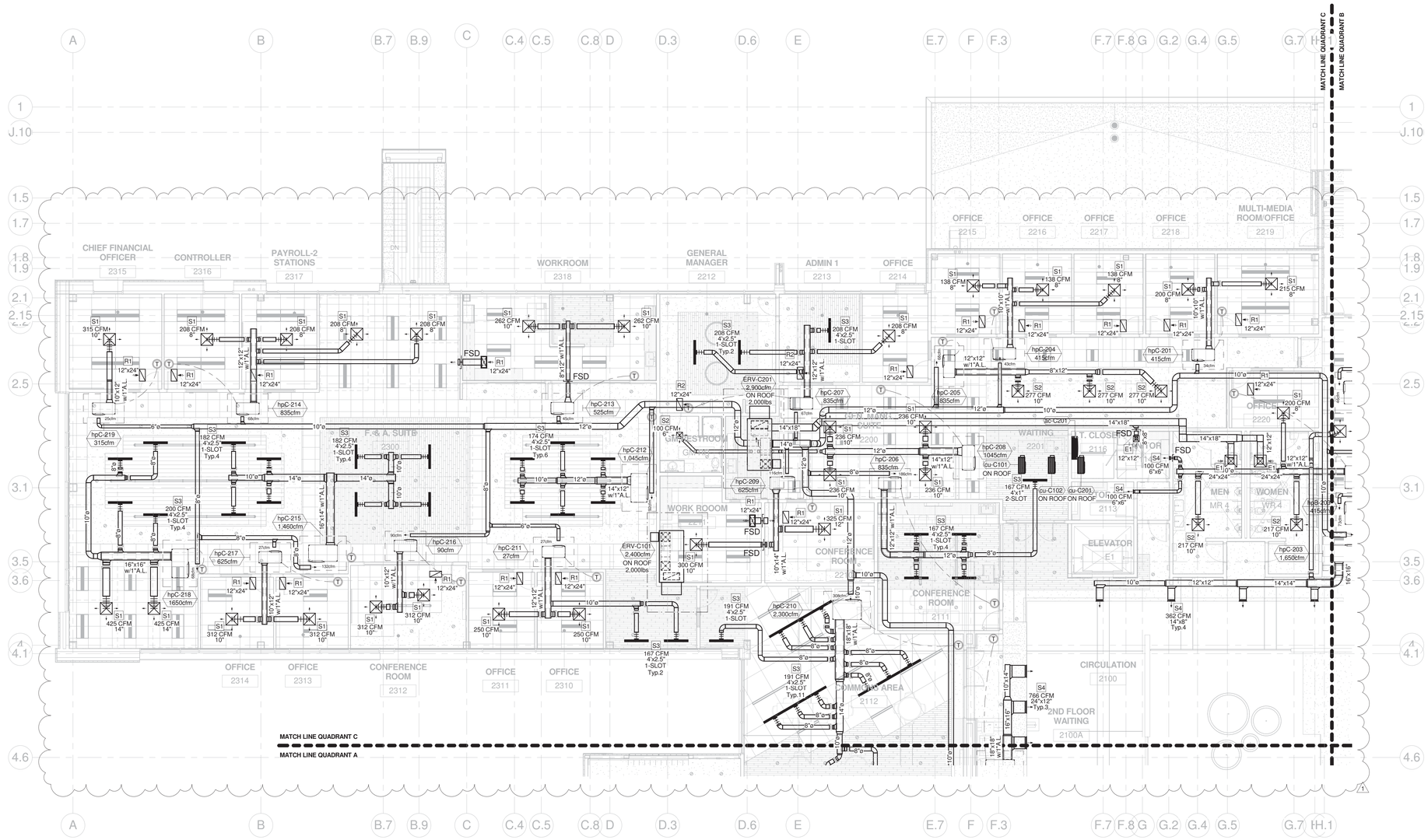
OCTOBER 6, 2016



A5 **MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT C**
1/8" = 1'-0"

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10/06/16
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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	DMT	BA

RVT FILE
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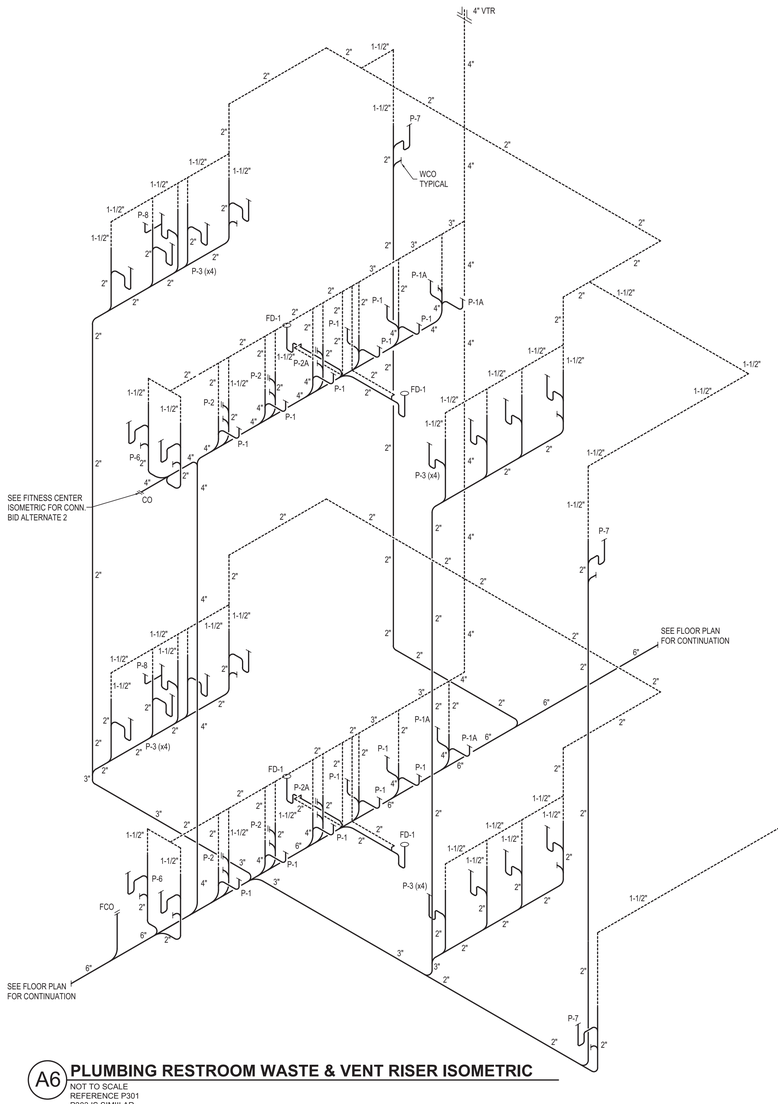
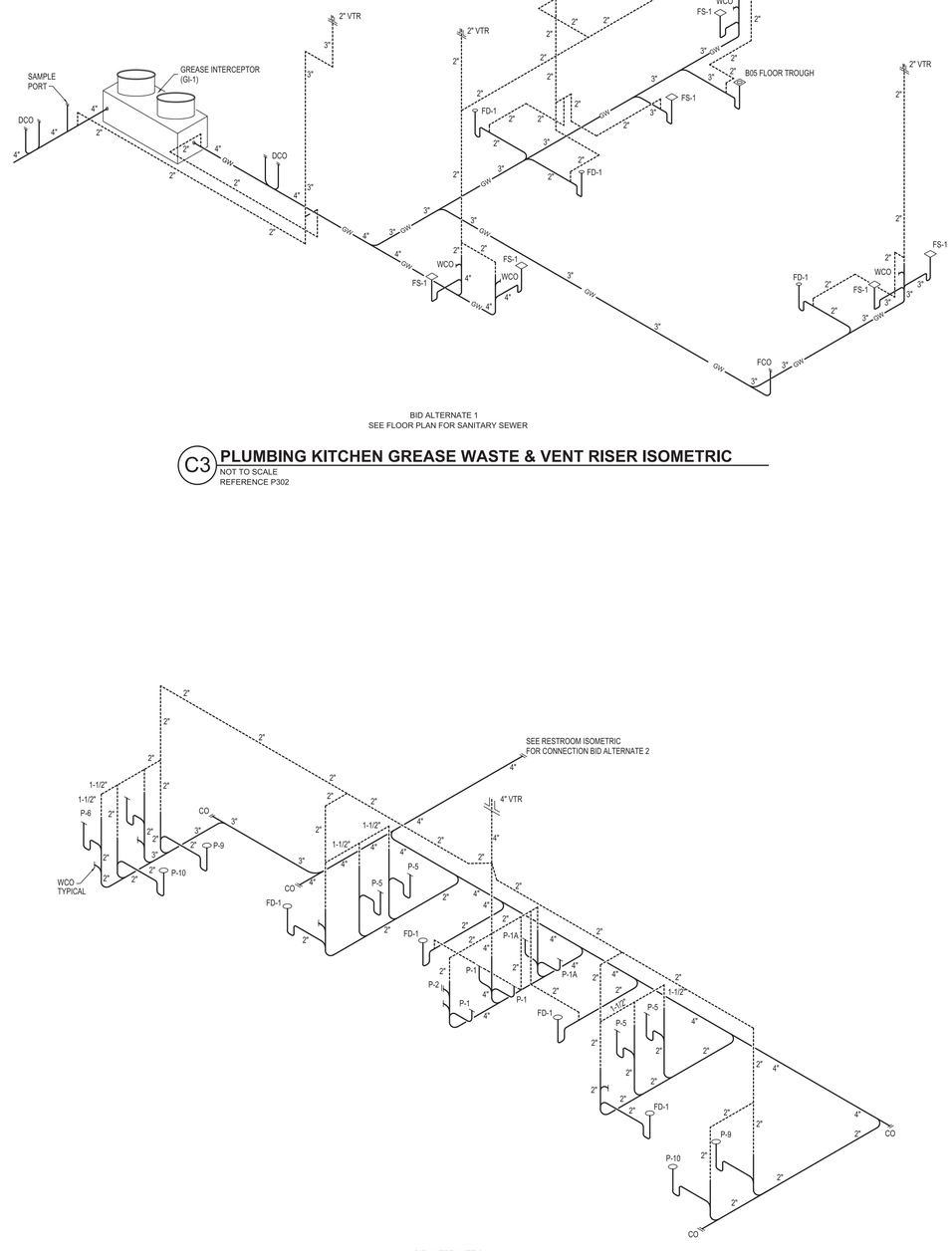
Sheet Title
MECHANICAL 2nd FLOOR HVAC PLAN - QUADRANT C

Sheet Number
M102c
Sequence of



A6 **PLUMBING RESTROOM WASTE & VENT RISER ISOMETRIC**

NOT TO SCALE
REFERENCE P301
P303 IS SIMIILAR



BID ALTERNATE 1
SEE FLOOR PLAN FOR SANITARY SEWER

C3 **PLUMBING KITCHEN GREASE WASTE & VENT RISER ISOMETRIC**

NOT TO SCALE
REFERENCE P302

BID ALTERNATE 2

A3 **PLUMBING FITNESS CENTER WASTE & VENT RISER ISOMETRIC**

NOT TO SCALE
REFERENCE P304

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10/06/16
ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	HRM	BA

RVT FILE

Sheet Title
PLUMBING WASTE & VENT RISER ISOMETRICS

Sheet Number
P305
Sequence of

Allied Engineering
and Design Inc.

5101 Coors Blvd. NW
Suite "F"
Albuquerque, New Mexico 87120
(505)262-1766
(505)255-0466 fax

October 26, 2016

DYRON MURPHY ARCHITECTS, P.C.
4505 Montbel Place NE
Albuquerque, NM 87107

ATTN: OSCAR TOVAR,
ASSOC. AIA, SR. PROJECT MANAGER

RE: NTUA HQ COMPLEX OFFICE BUILDING
ADDENDUM #1
AEDI #50-15

Dear Mr. Tovar:

The following electrical items need to be included in an Addendum for the above referenced project:

1. Sheet E001: Refer to attached Sketch SKA-E001, for Addendum items.

2. Sheets E103a, E103b and E103c: See revised sheets for Addendum items.

3. Sheets E104a, E104b and E104c: See revised sheets for Addendum items.

4. Sheet 601: Add speaker symbol and description as follows:

CEILING MOUNTED SPEAKER FOR TELEPHONE SYSTEM INTERCOM. PROVIDE CRESTRON SAROS_ICE4T-W-T SPEAKER FOR LAY-IN CEILINGS; PROVIDEBACKBOX FOR HARD CEILINGS. EXTEND 16/2 PLENUM RATED WIRING AS REQUIRED BETWEEN SPEAKERS AND HOMERUNS TO NEAREST I.I. CLOSET.

Add Intercom description as follows:

- Crestron Saros_ICE4T-W-T speaker WHITE, for lay-in tile ceiling with backbox for hard ceilings.
- Provide Crown DCi(N) series amps as required (1 per 40 speakers) in I.T. Closets as required. Connect to telephone system modules (by Telephone System Supplier) to deliver audio for amplifiers
- 16/2 plenum rated cabling for speakers
- All connections and wiring between amplifiers and telephone system modules as required

5. Add Fixture Type “S” to Fixture Schedule. Fixture “S” to read:
“LITHONIA” #2GTL 4 48L SWL MVOLT EZ1 LP835 N100

6. Sheet 602: Panel “EML” Change to 600A MLO.

7. Sheet 603:

   a. Panel “1PB”. All three sections are to be labelled “1PB”.

   b. Panel “KP”. All three sections are to be labelled “KP”.

   c. Panel “2LA”. All three sections are to be labelled “2LA”.

   d. Panel “2PA”. Circuits 56 thru 84 to be 20A1P SPARES.

8. Sheet 604: See attached stamped drawing.

9. Replace Specification Section **26 2416 - PANELBOARDS**, with the attached revised specification.

This concludes the electrical items for this addendum. If you have any questions, please contact the undersigned.

Sincerely,

ALLIED ENGINEERING AND DESIGN INC.

By:

Dennis M. Scarcell, Jr.
Vice President, Proj. Manager

SECTION 26 2416

PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Service entrance and metering.

B. Enclosed switches.

C. Grounding.

D. Panelboards.

E. Fuses.

1.02 SYSTEM DESCRIPTION

Electric Service System: 120/208V, 3 phase, 4 wire.

1.03 SUBMITTALS

A. Shop Drawings: Indicate relevant information on panelboards.

B. Product Data: Provide data on enclosed switches and circuit breakers, fuses and circuit breakers.

C. Operating and Maintenance Instructions:

1. Panelboards: Submit NEMA PB 2.1.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of Utility Company.

B. Contractor shall be responsible for final coordination with utility companies regarding new electrical service. Verify exact requirements prior to rough-in. There shall be no extra costs to the owner for contractor's failure to coordinate utility requirements.

PART 2 PRODUCTS

2.01 METERING EQUIPMENT - Per Utility Specification

2.02 ENCLOSED SWITCHES

A. Manufacturers:

1. Eaton

2. Engineer approved equal.

B. Enclosed Switch Assemblies: NEMA KS 1; Type General Duty.

Fuse clips: Designed to accommodate Class R fuses.

C. Enclosures: NEMA KS 1; Type as indicated on Drawings.

2.03 FUSES

A. Manufacturers:

1. Bussman

2. Gould

B. Fuses 600 Amperes and Less: Dual element, current limiting, time delay, one-time fuse, 250 volt, UL Class RK 1.

2.04 GROUNDING MATERIALS

A. Ground Rods: Copper-encased steel, 5/8 inch diameter, minimum length 10 feet.

B. Clamps: Bronze.

2.05 PANELBOARDS

A. Manufacturers:

1. Eaton.
2. Engineer approved equal

B. Load Centers: Circuit breaker load center.
1. Enclosure: As scheduled on the drawings.
2. Provide flush or surface box, with door, and with pull ring and latch on door.
3. Provide panelboards with bus ratings as scheduled on Drawings.
4. Do not use tandem circuit breakers.
5. Voltage: 120208 volts, three phase.
6. Minimum Integrated Equipment Rating: 10,000 amperes rms symmetrical.

C. Accessories: Provide circuit breaker accessories as indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Examine surfaces. Verify details and dimensions are as required.

B. Schedule site meeting with Utility to insure proper coordination. Notify architect in writing 7 days prior to meeting.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Install proper fuses in each fused switch.

C. Verify grounding and bonding to NFPA 70.
1. Supplementary Grounding Electrode: Use driven ground rod on exterior of building in main service equipment area.
2. Provide separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.
3. Use 6 AWG minimum size, copper conductor to bond communications system grounding conductor to nearest effectively grounded metallic water pipe.

D. Install loadcenters to NEMA PB 1.1.

3.03 FIELD QUALITY CONTROL

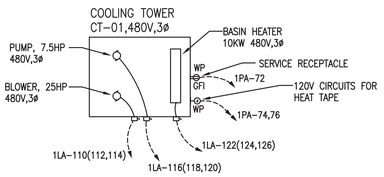
A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point by passing minimum current of 10 amperes DC and measuring voltage drop. Maximum resistance: 10 ohms.

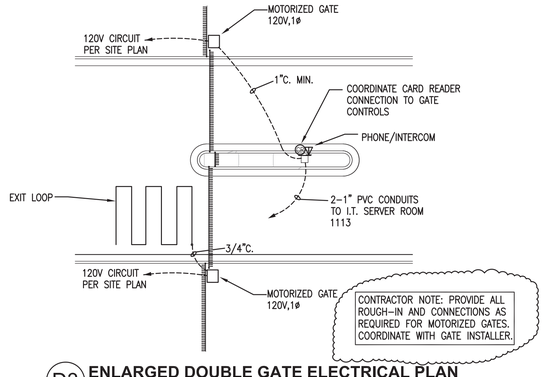
3.04 CLEANING

A. Clean equipment finishes to remove paint and concrete spatters.

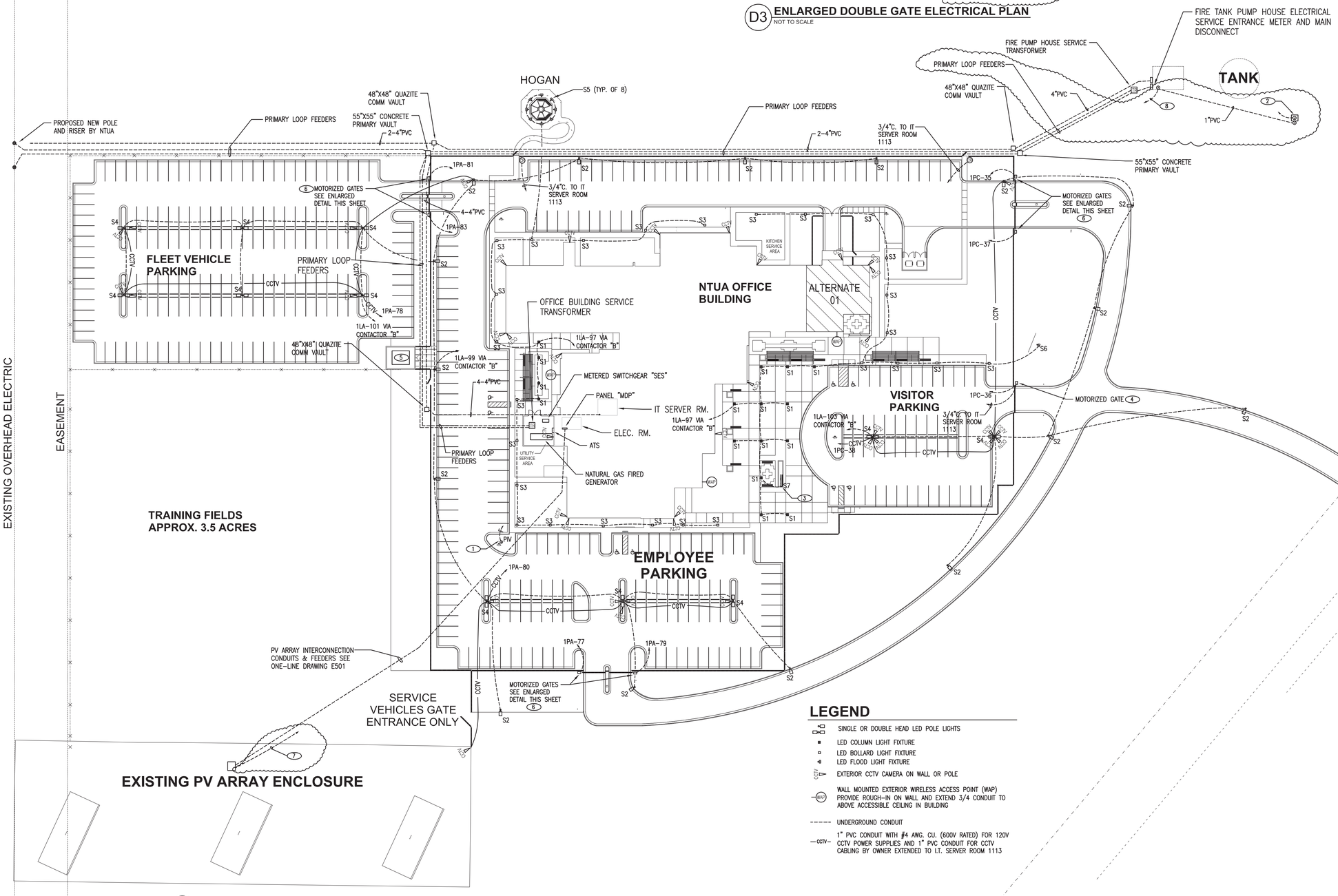
END OF SECTION



E5 **ENLARGED COOLING TOWER ELECTRICAL PLAN**
NOT TO SCALE



D3 **ENLARGED DOUBLE GATE ELECTRICAL PLAN**
NOT TO SCALE



A6 **OVERALL ELECTRICAL SITE PLAN**
1"=40'

LEGEND

- SINGLE OR DOUBLE HEAD LED POLE LIGHTS
- LED COLUMN LIGHT FIXTURE
- LED BOLLARD LIGHT FIXTURE
- LED FLOOD LIGHT FIXTURE
- EXTERIOR CCTV CAMERA ON WALL OR POLE
- WAP — WALL MOUNTED EXTERIOR WIRELESS ACCESS POINT (WAP) PROVIDE ROUGH-IN ON WALL AND EXTEND 3/4 CONDUIT TO ABOVE ACCESSIBLE CEILING IN BUILDING
- UNDERGROUND CONDUIT
- —CCTV— 1" PVC CONDUIT WITH #4 AWG. CU. (600V RATED) FOR 120V CCTV POWER SUPPLIES AND 1" PVC CONDUIT FOR CCTV CABLING BY OWNER EXTENDED TO I.T. SERVER ROOM 1113

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

GENERAL NOTES:

1. COORDINATE NEW ELECTRICAL SERVICE WITH NTUA REQUIREMENTS, PROVIDE ROUGH-IN AS REQUIRED.
2. ALL ELECTRICAL TO MEET NATIONAL STATE AND LOCAL CODES.
3. ALL ELECTRICAL DEVICES TO BE U.L. LISTED FOR INTENDED USE.
4. ALL GROUNDING TO MEET THE REQUIREMENTS OF ARTICLE 250 OF THE 2014 NEC AND NTUA STANDARDS.
5. ALL CONDUITS TO BE BURIED PER NEC TABLE 300.5.
6. ALL PRIMARY CONDUIT, CABLING AND PULLBOXES TO BE BY NTUA, CONTRACTOR TO PROVIDE ALL TRENCHING, BACKFILLING, HOLES FOR PULLBOXES, ETC. FOR INSTALLATION OF PRIMARY BY NTUA.
7. ALL TELECOM SERVICE CONDUIT, CABLING AND PULLBOXES TO BE BY NTUA, CONTRACTOR TO PROVIDE ALL TRENCHING, BACKFILLING, HOLES FOR PULLBOXES, ETC. FOR INSTALLATION OF TELECOM BY NTUA.
8. CONTRACTOR TO COMPLY WITH 2014 NTUA UNDERGROUND STANDARDS AND 2014 NEC FOR ALL UNDERGROUND CONDUITS.

KEYED NOTES:

1. PROVIDE CONNECTION TO PIV AS REQUIRED. EXTEND 3/4" CONDUIT TO FA PANEL AND CONNECT.
2. PROVIDE 120V CIRCUIT AS REQUIRED FOR CONNECTION TO HEAT TAPE IN HOT BOX. COORDINATE EXACT LOCATION WITH CIVIL DRAWINGS. CIRCUIT FED FROM FIRE PUMP HOUSE PANEL.
3. FURNISH AND INSTALL J-BOX RECESSED IN CONCRETE WALL SUITABLE SIZE FOR TYPE "S7" FIXTURE DRIVER. PROVIDE LOW VOLTAGE WIRING IN CONDUIT AS REQUIRED TO TYPE "S7" FIXTURE AND CONNECT.
4. PROVIDE CONNECTION TO VISITOR PARKING MOTORIZED GATE AS REQUIRED. EXTEND 1" CONDUIT TO I.T. SERVICE ROOM 1113 FOR CONTROL WIRING. COORDINATE CONTROL OF GATE WITH NTUA I.T. DEPARTMENT.
5. REFER TO ENLARGED PLAN THIS SHEET FOR ELECTRICAL CONNECTIONS TO COOLING TOWER.
6. REFER TO ENLARGED PLAN THIS SHEET FOR ELECTRICAL AND CONTROL CONNECTIONS EMPLOYEE DOUBLE GATES.
7. EXTEND 1" CONDUIT FROM PV SYSTEM TO I.T. SERVER ROOM 1113.
8. EXTEND 1" CONDUIT TO FIRE ALARM PANEL IN MAIN BUILDING FOR MONITORING OF SYSTEM.

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDi	DJS

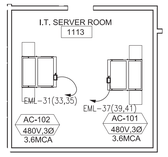
RVT FILE

Sheet Title: **OVERALL ELECTRICAL SITE PLAN**

Sheet Number

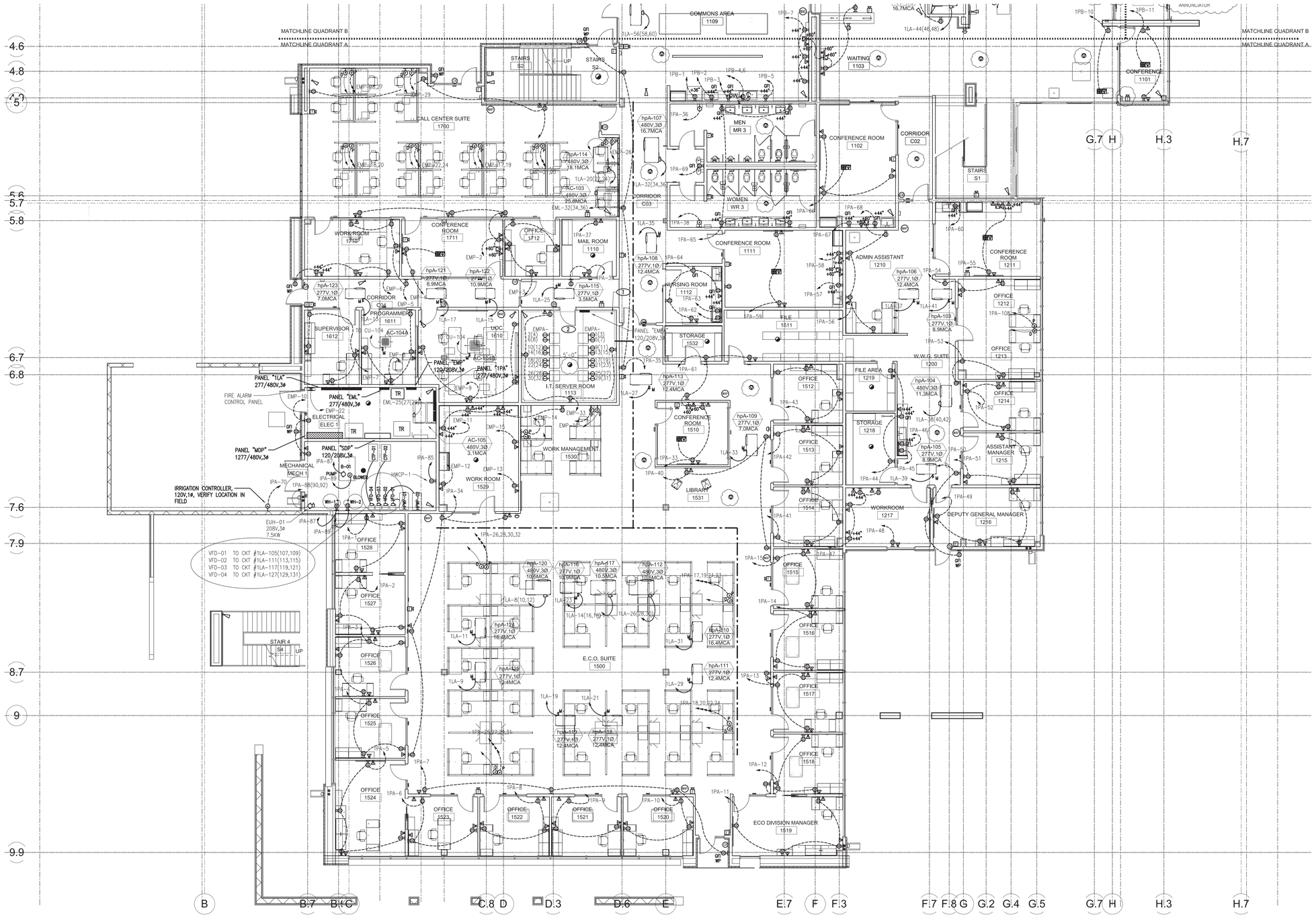
E001

Sequence of



E6 1st Floor SERVER ROOM ELECTRICAL MECHANICAL PLAN

1/8" = 1'-0"



A6 1st FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT A

1/8" = 1'-0"

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

GENERAL NOTES:

1. ALL BRANCH CIRCUIT WIRING TO BE #12 THHN/THWN CU. AND ALL CONDUIT TO BE 1/2" EMT MINIMUM UNLESS NOTED OTHERWISE.
2. ALL ELECTRICAL TO MEET NATIONAL STATE AND LOCAL CODES.
3. ALL ELECTRICAL DEVICES TO BE U.L. LISTED FOR INTENDED USE.
4. ALL GROUNDING OF DEVICES TO MEET THE REQUIREMENTS OF ARTICLE 250 OF THE 2014 NEC.
5. ALL FIRE ALARM DEVICES TO BE CONNECTED VIA CONDUIT. EXTEND WIRING AS REQUIRED. NO PLENUM RATED CABLING.
6. PROVIDE 120V (RECEPTACLE) AT ALL HEAT PUMPS FOR CONDENSATE PUMPS. INSTALL ABOVE ACCESS CEILING. UTILIZE CIRCUIT 1PA-71,73,75. 10 HEAT PUMPS PER CIRCUIT MAX.
7. CONTRACTOR TO PROVIDE ALL SLEEVES THRU WALLS AS REQUIRED FOR SPECIAL SYSTEMS AND NETWORK CABLING. PROVIDE FIRE RATED SLEEVES WHERE REQUIRED.
8. CONTRACTOR TO PROVIDE ROUGH-IN J-BOXES AND/OR CONDUITS WITH PULLSTRINGS AS REQUIRED FOR CCTV CAMERAS, WAP'S, ETC. MINIMUM CONDUIT SIZE TO BE 3/4". VERIFY REQUIREMENTS WITH NTUA I.T. DEPT.
9. AC & SPLIT SYSTEM INDOOR UNITS TO HAVE CONDENSATE PUMPS CONNECTED TO A RECEPTACLE AND CIRCUITED TO EMP-24.

KEYED NOTES:

1. PROVIDE TELEPHONE BOARD GROUND BAR (TBG) WITH #6 CU GROUND TO NEAREST PANEL.
2. FURNISH AND INSTALL (8) 4-POST DATA RACKS AS SHOWN. EXTEND #6 CU GROUND FROM RACKS TO TBG. PROVIDE 18" LADDER RACK AS SHOWN ALONG WALLS AND ABOVE RACK, SUPPORT FROM STRUCTURE. PROVIDE (2) 30A, 208V, 1Ø, TWISTLOCK RECEPTACLES AT EACH RACK AS SHOWN. MOUNT RECEPTACLES ON SIDE OF LADDER RACK ABOVE EACH 4-POST RACK. PROVIDE PATCH PANELS AS REQUIRED TO TERMINATE NETWORK SYSTEM CABLES ON THIS FLOOR.

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1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
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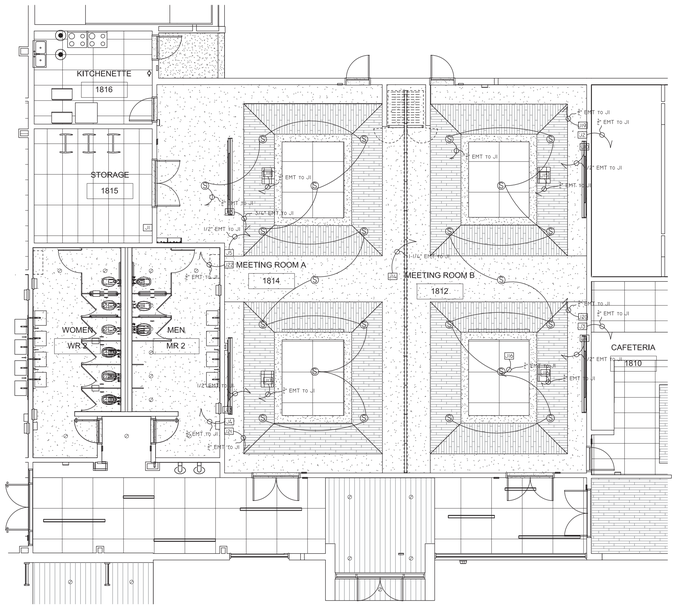
RVT FILE

Sheet Title: 1st FLOOR POWER AND SS. PLAN- OFFICE BUILDING QUADRANT A

Sheet Number

E103a

Sequence of



D6 **1st FLOOR MEETING ROOMS AV PLAN**
1/8" = 1'-0"

A/V SYSTEM ROUGH-IN REQUIREMENTS

J1 12"X12" RECESSED J-BOX INTO WALL BEHIND EQUIPMENT RACK. CENTER AT 48".

J2-J5 4X8 EXTRA DEEP WITH 4-GANG MUD RING, UP 44".

J10-J13 SCREEN CONTROL RELAY, PROVIDED BY AV CONTRACTOR. MOUNTED ABOVE CEILING.

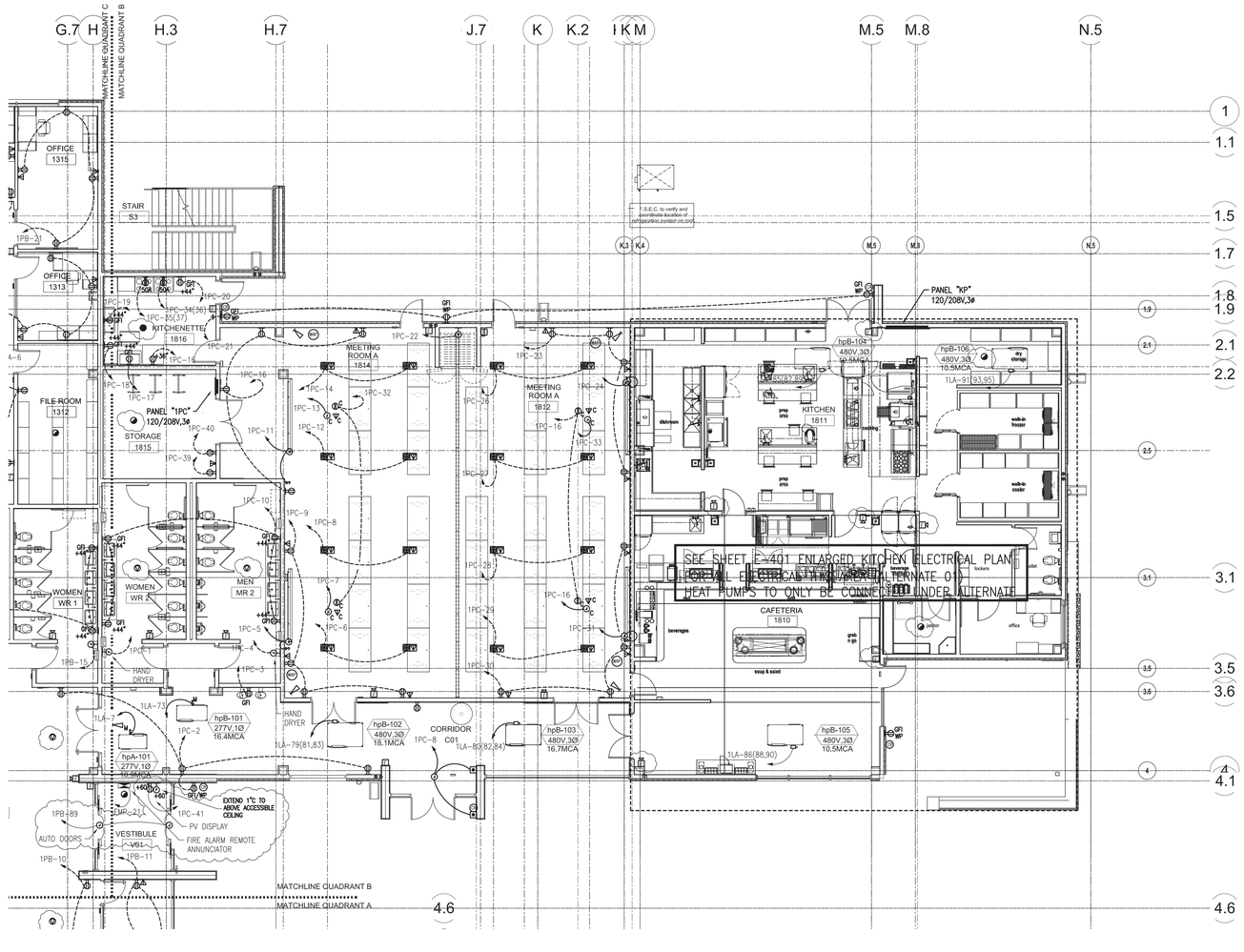
J14 4SQ J-BOX ABOVE CEILING.

J15-J18 4SQ J-BOX AT PROJECTOR LIFT IN CEILING.

J19-J22 4SQ EXTRA DEEP J-BOX WITH 2-GANG MUD RING, UP 44".

A/V SYSTEM EQUIPMENT SCHEDULE

Manufacturer	Model	Qty	Description
Crestron	CP3	1	Control Processor
Crestron	TSW750	4	7.5" Touchscreen
Crestron	DSP-1280	1	12x8 Audio DSP
Crestron	AMP-2210HT	1	2x210W amplifier
Crestron	Saros IC6T	23	Ceiling Speaker
Crestron	SPKA-NCTP-IC610	3	New construction speaker template 10 pack
Crestron	DM-MD8x8-RPS	1	Digital media 8x8 chassis
Crestron	DMC-4K-C-DSP-HDCP2	4	HDBaseT input card
Crestron	DMC-4K-HD-DSP-HDCP2	4	HDMI input card
Crestron	DMC-4K-CO-HD-HDCP2	2	2 channel HDBaseT output card
Crestron	DMC-4K-HDO	2	2 channel HDMI output card with Audio
Crestron	DM-TX-4K-100-C-1G	4	Wall plate 4K HDBaseT transmitter
Crestron	DM-RMC-4K-SCALER-C DM-CBL-ULTRA-NP-	4	4K Digital Media receiver
Crestron	SP1000	A/R	Digital Media Cable
Middle Atlantic	DWR-18-26	1	Wall mount equipment rack
Middle Atlantic	VFD-26	1	Vented front door for rack
Middle Atlantic	Rack Accessories	A/R	Drawers, power distribution, blanks, cable management
Shure	QLXD124/85	2	Dual Transmitter Lav and Handheld Wireless microphone system
Custom	Audio input plates	4	Microphone and line level input plates



A4 **1st FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT B**
1/8" = 1'-0"

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

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6. PROVIDE 120V (RECEPTACLE) AT ALL HEAT PUMPS FOR CONDENSATE PUMPS. INSTALL ABOVE ACCESS CEILING. UTILIZE CIRCUIT 2PA-55 & 2PA-57.
7. CONTRACTOR TO PROVIDE ALL SLEEVES THRU WALLS AS REQUIRED FOR SPECIAL SYSTEMS AND NETWORK CABLING. PROVIDE FIRE RATED SLEEVES WHERE REQUIRED.
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10-C-12
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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

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2015.05	AEDI	DJS

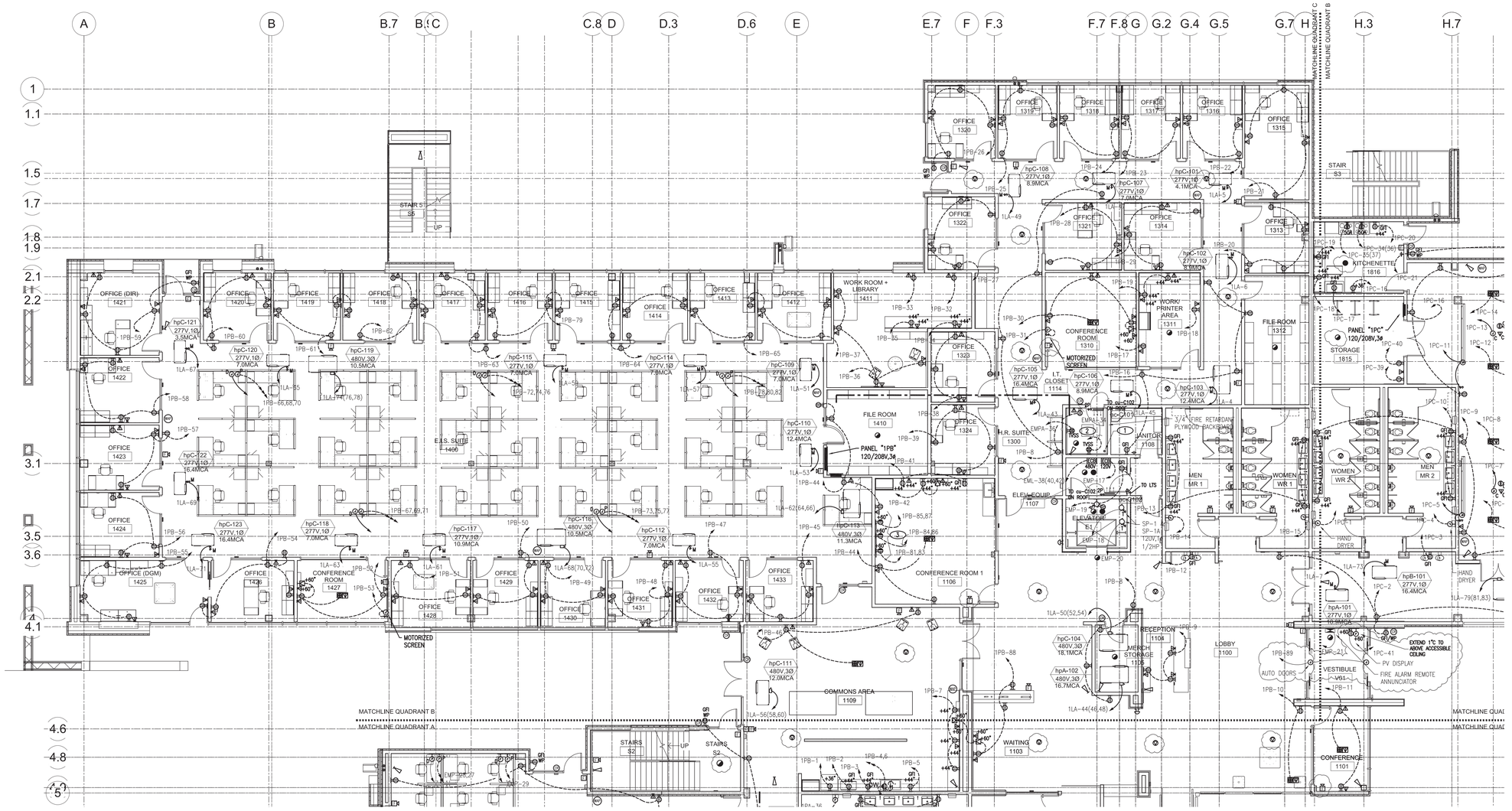
RVT FILE

Sheet Title: **1st FLOOR POWER AND SS. PLAN- OFFICE BUILDING QUADRANT B**

Sheet Number

E103b

Sequence of



A4 **1st FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT C**
1/8" = 1'-0"

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

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1. PROVIDE TELEPHONE BOARD GROUND BAR (TBG) WITH #6 CU GROUND TO NEAREST PANEL.
2. FURNISH AND INSTALL 4-POST DATA RACK WITH PATCH PANELS AS REQUIRED FOR CONNECTION OF NETWORK CABLING THIS AREA. EXTEND #6 CU GROUND FROM RACK TO TBG. PROVIDE 18" LADDER RACK FROM ALL FOUR WALLS ABOVE RACK, SUPPORT FROM STRUCTURE.
3. FURNISH AND INSTALL (1) RECEPTACLE AND (1) 2-GANG BOX WITH SINGLE GANG MUD RING BEHIND EACH VIDEO MONITOR (TYPICAL OF 6). EXTEND 1"C FROM EACH 2-GANG BOX TO I.T. CLOSET 1114 FOR VIDEO CABLES. COORDINATE INSTALLATION WITH I.T. DEPARTMENT.

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ARIZONA CERTIFICATE 44247 DAVID M. GONZALES 10-C-C REGISTERED PROFESSIONAL ENGINEER

ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDi	DJS

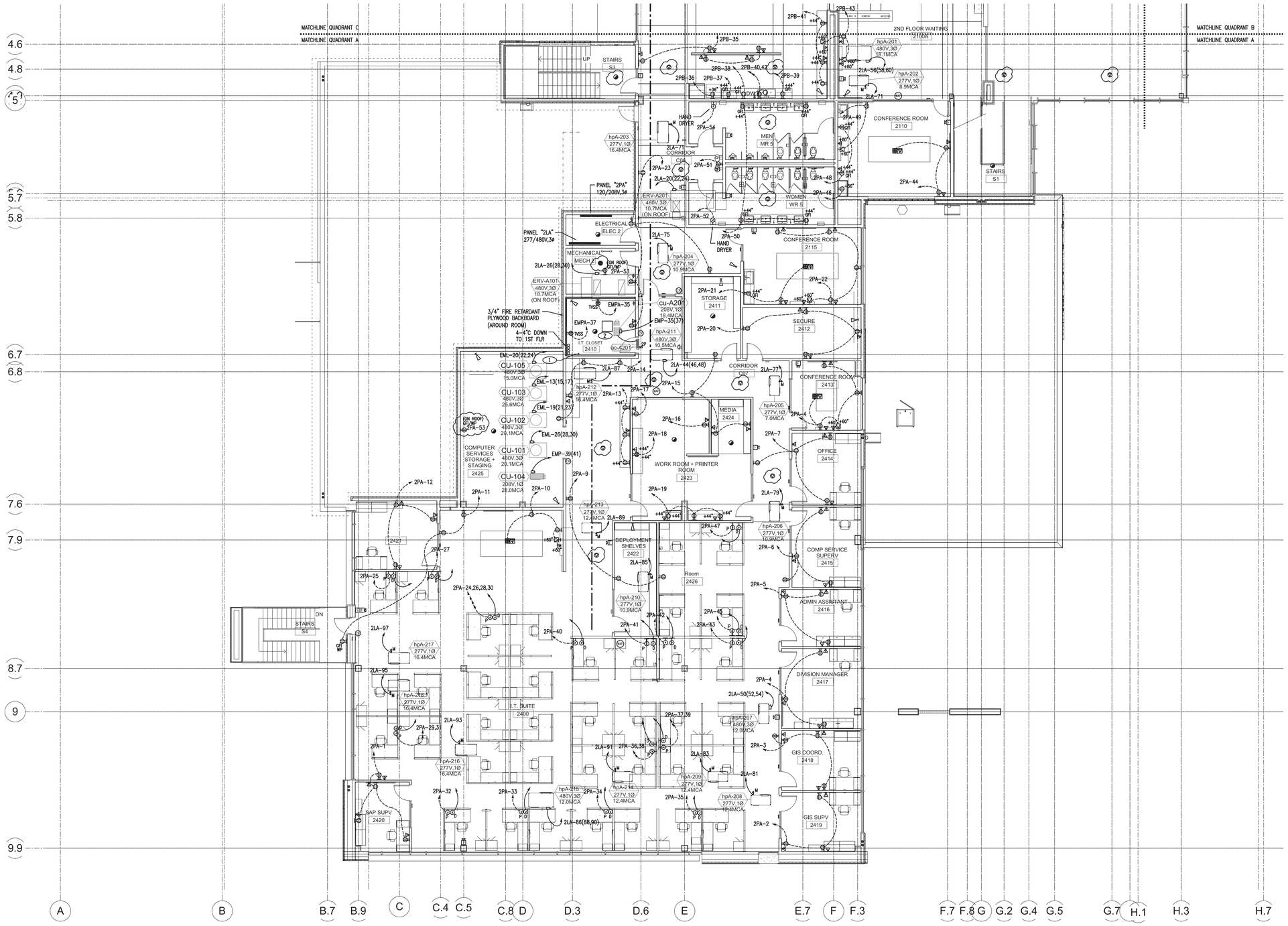
RVT FILE

Sheet Title: **1st FLOOR POWER AND SS. PLAN- OFFICE BUILDING QUADRANT C**

Sheet Number

E103c

Sequence of



A6 **2nd FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT A**
1/8" = 1'-0"

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

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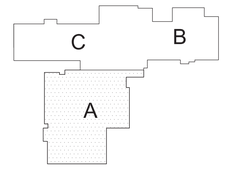

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ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDI	DJS

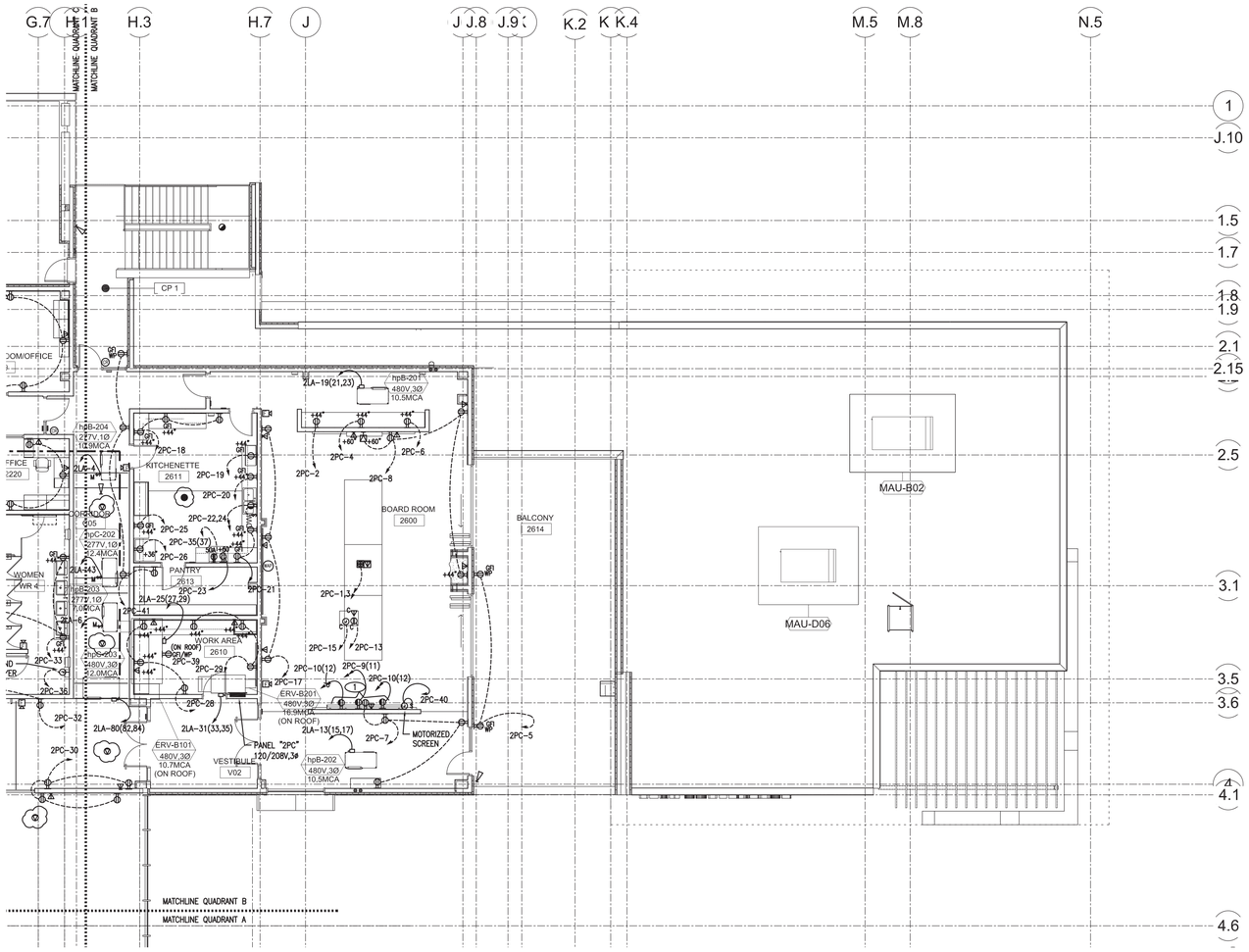
RVT FILE

Sheet Title: **2nd FLOOR POWER AND SS PLAN- OFFICE BUILDING QUADRANT A**

Sheet Number

E104a

Sequence of



A4 **2nd FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT B**
1/8" = 1'-0"

0 4' 8' 16'

N

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

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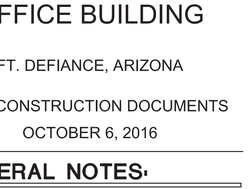

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REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 14247
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10-6-16
NEW MEXICO U.S.A.

ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDi	DJS

RVT FILE

Sheet Title: **2nd FLOOR POWER AND SS PLAN- OFFICE BUILDING QUADRANT B**

Sheet Number

E104b

Sequence of

E
D
C
B
A

6 5 4 3 2 1

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OFFICE BUILDING

FT. DEFIANCE, ARIZONA

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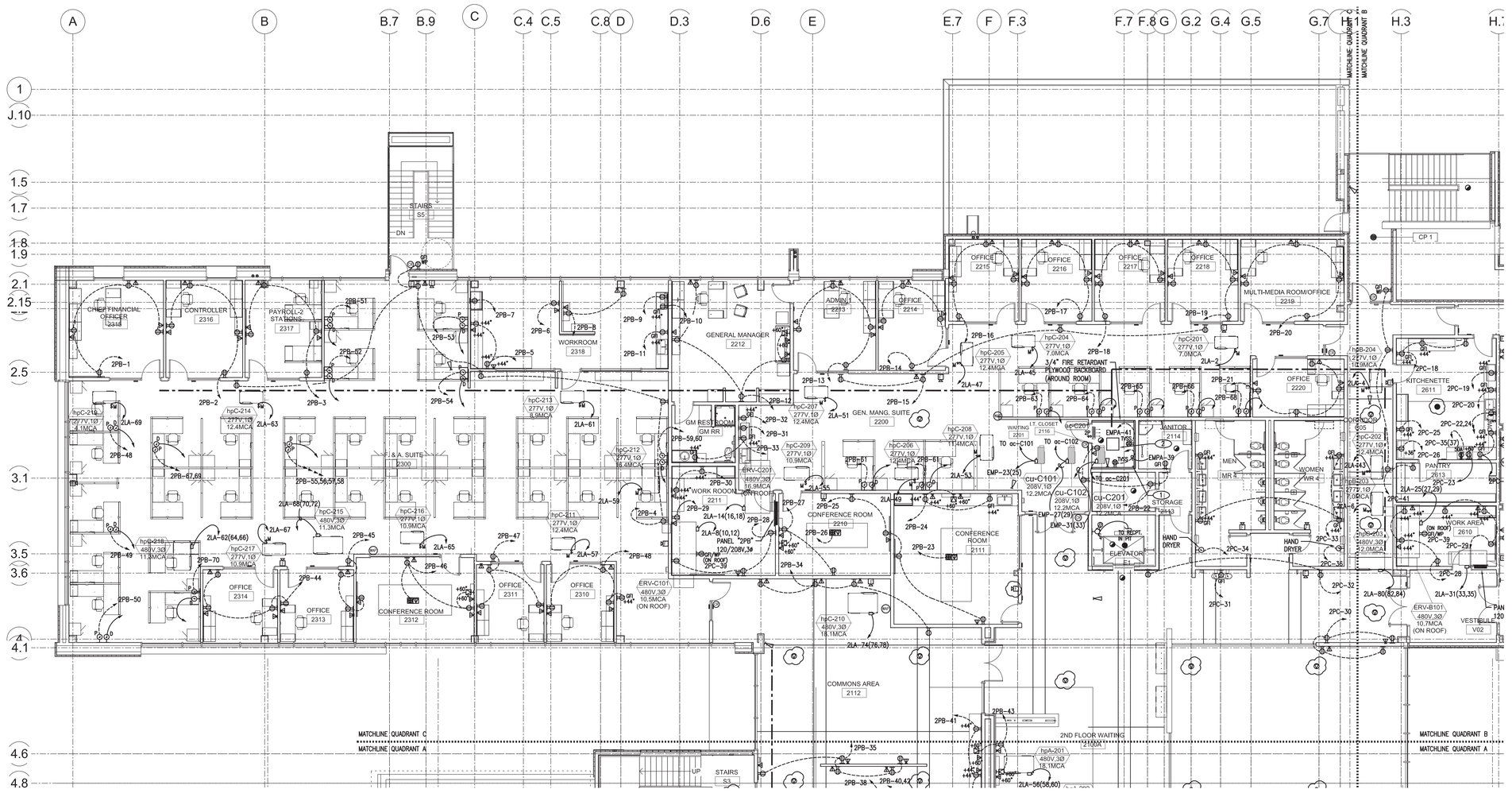
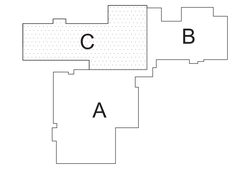


A4 **2nd FLOOR POWER AND SPECIAL SYSTEMS PLAN- OFFICE BUILDING QUADRANT C**
1/8" = 1'-0"

0 4' 8' 16'

N



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CERTIFICATE NUMBER 44247 DAVID M. GONZALES 10-6-16 NEW MEXICO

ENGINEER

Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDi	DJS

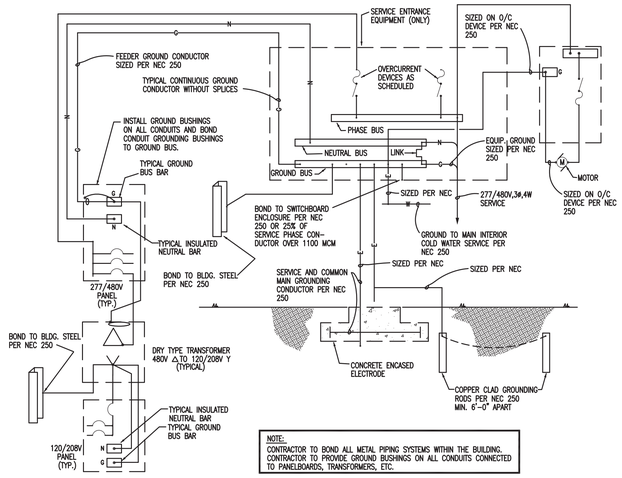
RVT FILE

Sheet Title: **2nd FLOOR POWER AND SS PLAN- OFFICE BUILDING QUADRANT C**

Sheet Number

E104c

Sequence of



TYPICAL BUS GROUNDING DETAIL

N.T.S.

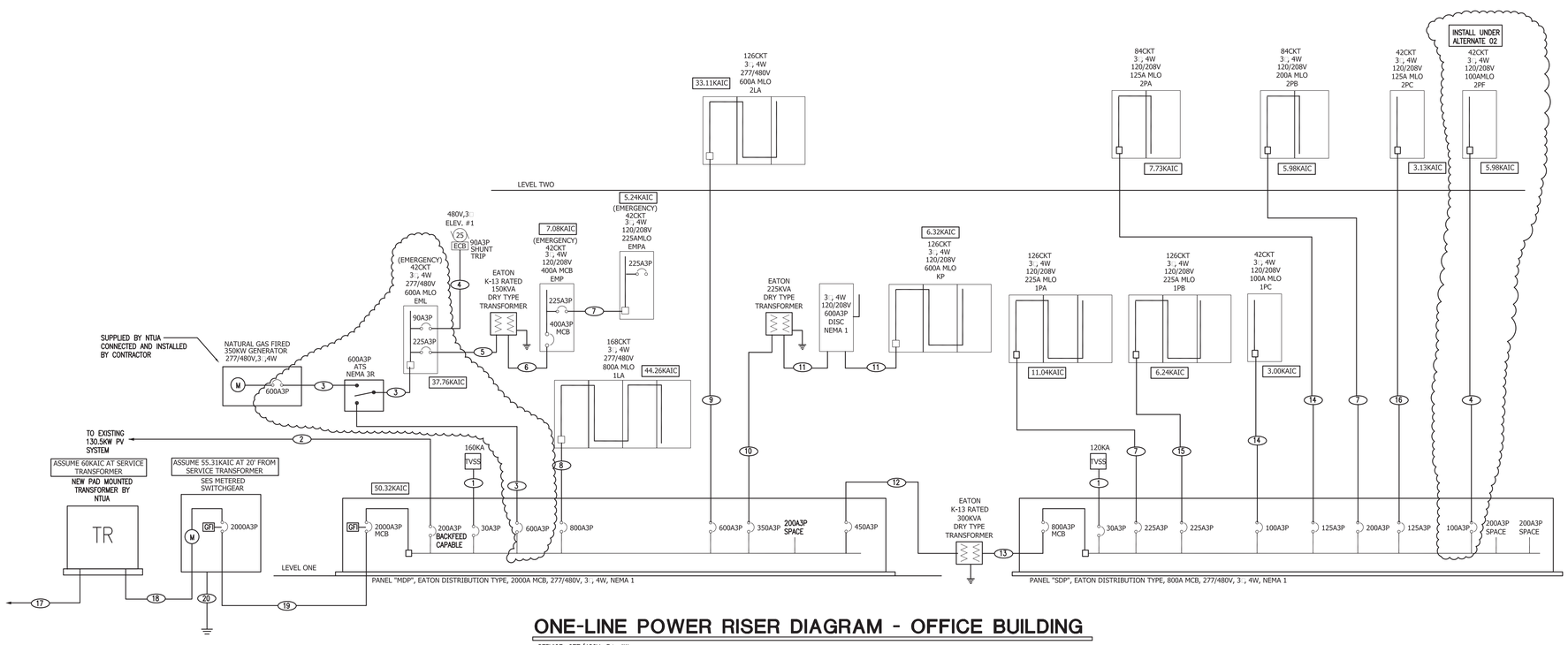
SERVICE CALCULATION FOR "SES" AND "MDP"							
LOCATION	LIGHTING	RECEPTACLES	HVAC	MOTOR	MISC.	EQUIPMENT	ELEC. HT
PANEL "1LA"	44930	–	294508	116508	–	–	10000
PANEL "2LA"	8800	57900	95110	–	500	–	–
PANEL "1PA"	–	62504	–	4200	–	13524	7500
PANEL "1PB"	–	75300	–	–	500	3600	–
PANEL "1PC"	–	25700	–	–	–	11428	–
PANEL "2PA"	–	48100	–	–	–	3600	–
PANEL "2PB"	–	65100	–	–	–	–	–
PANEL "2PC"	–	30806	–	–	–	14100	–
PANEL "2PF"	–	3900	–	–	–	19500	–
PANEL "EML"	13500	14100	112248	41550	3352	110640	–
PANEL "KP"	3900	10600	15360	–	2920	143880	–
CONNECTED LOAD	71130VA	394010VA	517226VA	162258VA	7272VA	320272VA	17500VA
DEMAND LOAD	(88912VA)	(157005VA)	(517226VA)	(175662VA)	(7272VA)	(320272VA)	(21875VA)

TOTAL CONNECTED LOAD = 1489668VA = 1792A @ 277/480V, 3Ø, 4W
TOTAL ESTIMATED DEMAND = 1288224VA= 1550A @ 277/480V, 3Ø, 4W

SERVICE TO BE SIZED AT 2000A, 277/480V, 3Ø,4W

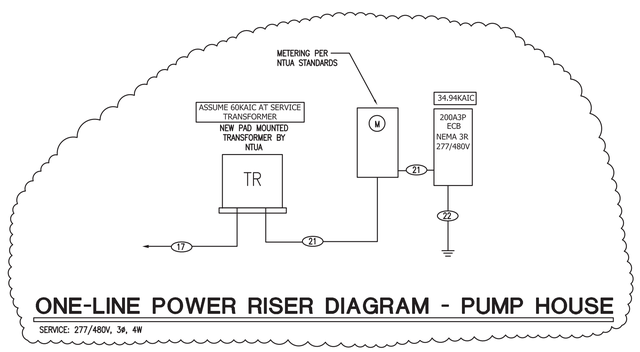
ONE-LINE KEYED NOTES:

1. 3/4"C.–4#10(CU,THWN)+1#10(CU,THWN)GND.
2. 3"C.–4#350KCMIL(CU,THWN)+1#1(CU,THWN)GND.
3. 2 RUNS OF 3"C. EACH WITH 4#350(CU,THWN)+1#1(CU,THWN)GND.
4. 2"C.–3#2(CU,THWN)+1#8(CU,THWN)GND.
5. 2.5"C.–3#4/0(CU,THWN)+1#4(CU,THWN)GND.
6. 2 RUNS OF 2"C. EACH WITH 4#3/0(CU,THWN)+1#2(CU,THWN)GND.
7. 2.5"C.–3#4/0(CU,THWN)+1#4(CU,THWN)GND.
8. 2 RUNS OF 4"C. EACH 4#600KCMIL(CU,THWN)+1#1/0(CU,THWN)GND.
9. 2 RUNS OF 3"C. EACH 4#350KCMIL(CU,THWN)+1#1(CU,THWN)GND.
10. 3"C.–3#500KCMIL(CU,THWN)+1#3(CU,THWN)GND.
11. 2 RUNS OF 3.5"C. EACH 4#500KCMIL(CU,THWN)+1#3/0(CU,THWN)GND.
12. 2 RUNS OF 2.5"C EACH 3#4/0(CU,THWN)+1#2(CU,THWN)GND.
13. 3 RUNS OF 3"C EACH 4#300KCMIL(CU,THWN)+1#2/0(CU,THWN)GND.
14. 2"C.–4#1/0(CU,THWN)+1#4(CU,THWN)GND.
15. 3"C.–4#250KCMIL(CU,THWN)+1#3(CU,THWN)GND.
16. 2"C.–4#1/0(CU,THWN)+1#4(CU,THWN)GND.
17. PRIMARY BY NTUA, COORDINATE ROUGH-IN AND TRENCHING REQUIREMENTS.
18. 5 RUNS OF 4"C EACH 4#600KCMIL(CU,THWN).
19. 5 RUNS OF 4"C EACH 4#600KCMIL(CU,THWN)+1#250KCMIL(CU,,THWN)GND.
20. #3/0(CU,BARE) PER ARTICLE 205 OF THE NEC AND NTUA STANDARDS.
21. 2"C.–4#3/0(CU,THWN).
22. #4(CU,BARE) PER ARTICLE 205 OF THE NEC AND NTUA STANDARDS.



ONE-LINE POWER RISER DIAGRAM - OFFICE BUILDING

SERVICE: 277/480V, 3Ø, 4W



ONE-LINE POWER RISER DIAGRAM - PUMP HOUSE

SERVICE: 277/480V, 3Ø, 4W

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS
OCTOBER 6, 2016

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDI	DJS

RVT FILE

Sheet Title: ONE-LINE, GROUNDING DETAIL AND LOAD CALCULATIONS

Sheet Number: E501

Sequence of

PANEL: "2PA" VOLTAGE: 120/208V,3ø,4W MAINS LUGS: 125A MOUNTING: SURFACE

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
RECEPTACLES	20A1P	800	1	1600			2	800	20A1P	RECEPTACLES
.		800	3		1600		4	800		.
.		600	5			1600	6	800		.
.		800	7	1800			8	1000		.
.		600	9		1200		10	600		.
.		600	11			1400	12	800		.
.		600	13	1400			14	800		.
.		800	15		2300		16	1500		.
.		1500	17			3000	18	1500		.
.		600	19	1400			20	800		.
.		800	21		1800		22	800		.
.		1000	23			2000	24	1000		J-BOX FURNITURE
J-BOX FURNITURE		1000	25	2000			26	1000		.
.		1000	27		2000		28	1000		.
.		1000	29			2000	30	1000		.
.		1000	31	2000			32	1000		.
.		1000	33		2000		34	1000		.
.		1000	35			2000	36	1000		.
.		1000	37	2000			38	1000		.
.		1000	39		2000		40	1000		.
.		1000	41			2000	42	1000		.
				TOTAL (VA):	12200	11900	14000			

PANEL: "2PA"
(SECTION 2)

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
J-BOX FURNITURE	20A/1P	1000	43	1600			44	600	20A/1P	RECEPTACLES
.		1000	45		2500		46	1500		.
.		1000	47			2000	48	1000		.
RECEPTACLES		400	49	1200			50	800		.
.		1500	51		3300		52	1800		J-BOX HAND DRYER
.		200	53			2000	54	1800		J-BOX HAND DRYER
CONDENSATE PUMPS		1000	55	1000			56	.		.
.			57				58	.		.
.			59				60	.		.
.			61				62	.		.
.			63				64	.		.
.			65				66	.		.
.			67				68	.		.
.			69				70	.		.
.			71				74	.		.
.			73				74	.		.
.			75				76	.		.
.			77				78	.		.
.			79				80	.		.
.			81				82	.		.
.			83				84	.		.
				TOTAL (VA):	3800	5800	4000			

LOAD CALCULATION:

LOAD	CONNECTED	DEMAND
RECEPTACLES	48100	29050
EQUIPMENT	3600	3600
TOTAL	51700VA	32650VA

32650VA = 91A @ 120/208V,3ø,4W PANEL TO BE SIZED AT 125A

SOLID COPPER BUS
DOUBLE LATCH DOOR-IN-DOOR CONSTRUCTION
COPPER GROUND BUS

ALL GROUND CONDUCTORS TO BE SIZED PER NEC TABLE 250.122. IF BRANCH CIRCUITS ARE UPSIZED DUE TO DISTANCE AND VOLTAGE DROP, GROUND CONDUCTORS SHALL BE UPSIZED ACCORDINGLY.

PANEL: "2PB" VOLTAGE: 120/208V,3ø,4W MAINS LUGS: 200A MOUNTING: SURFACE

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
RECEPTACLES	20A1P	800	1	1600			2	800	20A1P	RECEPTACLES
.		800	3		1800		4	1000		.
.		400	5			1900	6	1500		.
.		1500	7	1900			8	400		.
.		1500	9		2000		10	500		.
.		500	11			1300	12	800		.
.		600	13	1200			14	600		.
.		800	15		1600		16	800		.
.		800	17			1600	18	800		.
.		800	19	1600			20	800		.
.		800	21		1600		22	800		.
.		800	23			1800	24	1000		.
.		800	25	1400			26	600		.
.		600	27		1400		28	600		.
.		1500	29			2500	30	1000		.
.		1500	31	3300			32	1800		.
.		400	33		1200		34	800		.
.		1000	35			2500	36	1500		.
.		1800	37	2300			38	500		.
.		500	39		2200		40	1700		.
.		600	41			2100	42	1500		.
				TOTAL (VA):	13300	11100	13700			

PANEL: "2PB"
(SECTION 2)

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
RECEPTACLES	20A/1P	600	43	1400			44	800	20A/1P	RECEPTACLES
.		800	45		1800		46	1000		.
.		800	47			1800	48	1000		.
J-BOX FURNITURE		1000	49	2000			50	1000		.
.		1000	51		2000		52	1000		.
.		1000	53			2000	54	1000		.
.		1000	55	2000			56	1000		.
.		1000	57		2000		58	1000		.
.		1000	59			2000	60	1000		.
.		1000	61	2000			62	1000		.
.		1000	63		2000		64	1000		.
.		1000	65			2000	66	1000		.
.		1000	67	2000			68	1000		.
.		1000	69		2000		70	1000		.
SPARE		.	71				72	.		SPARE
.		.	73				74	.		.
.		.	75				76	.		.
.		.	77				78	.		.
.		.	79				80	.		.
.		.	81				82	.		.
.		.	83				84	.		.
				TOTAL (VA):	9400	9800	7800			

LOAD CALCULATION:

LOAD	CONNECTED	DEMAND
RECEPTACLES	65100	37550
TOTAL	65100VA	37550VA

37550VA = 104A @ 120/208V,3ø,4W PANEL TO BE SIZED AT 200A

SOLID COPPER BUS
DOUBLE LATCH DOOR-IN-DOOR CONSTRUCTION
COPPER GROUND BUS

ALL GROUND CONDUCTORS TO BE SIZED PER NEC TABLE 250.122. IF BRANCH CIRCUITS ARE UPSIZED DUE TO DISTANCE AND VOLTAGE DROP, GROUND CONDUCTORS SHALL BE UPSIZED ACCORDINGLY.

PANEL: "2PC" VOLTAGE: 120/208V,3ø,4W MAINS LUGS: 125A MOUNTING: SURFACE

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
RECEPTACLES	20A1P	1000	1	2000			2	1000	20A1P	RECEPTACLES
.		1000	3		2000		4	1000		.
.		400	5			1400	6	1000		.
.		800	7	1600			8	800		.
.		1000	9		2000		10	1000		.
.		1000	11			2000	12	1000		.
.		500	13	1500			14	1000		.
.		500	15		1500		16	1000		.
.		600	17			1200	18	600		.
.		1800	19	2800			20	1000		.
.		1000	21		2500		22	1500		.
.		500	23			1800	24	1200		.
.		500	25	2000			26	1500		.
.		800	27		1400		28	600		.
.		600	29			1400	30	800		.
.		1000	31	1400			32	400		.
.		800	33		2300		34	1500		HAND DRYER
RANGE	50A	5000	35			6500	36	1500		HAND DRYER
	2P	5000	37	6000			38	1000		RECEPTACLES CONDENSATE PUMPS
RECEPTACLES	20A/1P	200	39		800		40	500		MOTORIZED SCREEN
RECEPTACLES	20A/1P	800	41			800	42	.		SPARE
				TOTAL (VA):	17300	12500	15100			

LOAD CALCULATION:

LOAD	CONNECTED	DEMAND
RECEPTACLES	30806	20403
EQUIPMENT	14100	14100
TOTAL	44906VA	34503VA

34503VA = 95A @ 120/208V,3ø,4W PANEL TO BE SIZED AT 125A

SOLID COPPER BUS
DOUBLE LATCH DOOR-IN-DOOR CONSTRUCTION
COPPER GROUND BUS

ALL GROUND CONDUCTORS TO BE SIZED PER NEC TABLE 250.122. IF BRANCH CIRCUITS ARE UPSIZED DUE TO DISTANCE AND VOLTAGE DROP, GROUND CONDUCTORS SHALL BE UPSIZED ACCORDINGLY.

PANEL: "2PF" VOLTAGE: 120/208V,3ø,4W MAINS LUGS: 100A MOUNTING: SURFACE
ALTERNATE #2

DESCRIPTION	BKR	LOAD (VA)	CCT NO	LOAD (VA) øA	LOAD (VA) øB	LOAD (VA) øC	CCT NO	LOAD (VA)	BKR	DESCRIPTION
RECEPTACLES	20A1P	400	1	800			2	400	20A1P	RECEPTACLES
.		1500	3		2300		4	800		.
.		800	5			1800	6	1000		.
.		1000	7	2000			8	1000		.
.		1000	9		2000		10	1000		.
.		1500	11			3000	12	1500		.
.		1500	13	3000			14	1500		.
.		1500	15		3000		16	1500		.
.		1500	17			3000	18	1500		.
.		1500	19	3000			20	1500		.
.		1500	21		1500		22	.		SPARE
SPARE		.	23				24	.		.
.		.	25				26	.		.
.		.	27				28	.		.
.		.	29				30	.		.
.		.	31				32	.		.
.		.	33				34	.		.
.		.	35				36	.		.
.		.	37				38	.		.
.		.	39				40	.		.
.		.	41				42	.		.
				TOTAL (VA):	8800	6800	7800			

LOAD CALCULATION:

LOAD	CONNECTED	DEMAND
RECEPTACLES	3900	3900
EQUIPMENT	19500	19500
TOTAL	23400VA	23400VA

23400VA = 65A @ 120/208V,3ø,4W PANEL TO BE SIZED AT 100A

SOLID COPPER BUS
DOUBLE LATCH DOOR-IN-DOOR CONSTRUCTION
COPPER GROUND BUS

ALL GROUND CONDUCTORS TO BE SIZED PER NEC TABLE 250.122. IF BRANCH CIRCUITS ARE UPSIZED DUE TO DISTANCE AND VOLTAGE DROP, GROUND CONDUCTORS SHALL BE UPSIZED ACCORDINGLY.

NTUA HQ COMPLEX OFFICE BUILDING

FT. DEFIANCE, ARIZONA

100% CONSTRUCTION DOCUMENTS

OCTOBER 6, 2016

GENERAL NOTES:

1. ALL BRANCH CIRCUIT WIRING TO BE #12 THHN/THWN CU. AND ALL CONDUIT TO BE 1/2" EMT MINIMUM UNLESS NOTED OTHERWISE.
2. ALL ELECTRICAL TO MEET NATIONAL STATE AND LOCAL CODES.
3. ALL ELECTRICAL DEVICES TO BE U.L. LISTED FOR INTENDED USE.
4. ALL GROUNDING OF DEVICES TO MEET THE REQUIREMENTS OF ARTICLE 250 OF THE 2014 NEC.

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Revision Schedule		
Revision Number	Revision Date	Revision Description
1	10/27/16	ADD. 01

PROJECT NUMBER	DRAWN BY	PROJ MGR
2015.05	AEDi	DJS

RVT FILE

Sheet Title: PANEL SCHEDULES

Sheet Number

E604

Sequence of