Contract Routing Form

ROUTING: Routine printed on: 04/24/2019

Contract between: C.D. SMITH CONSTRUCTION INC
and Dept. or Division: Engineering Division
Name/Phone Number:

Project: Nakoosa Trail Fleet/Fire/Radio Shop Facility

Contract No.: 7528 File No.: 55133
Enactment No.: RES-19-00292 Enactment Date: 04/22/2019
Dollar Amount: 27,686,000.00

(Please DATE before routing)

Signatures Required	Date Received	Date Signed
City Clerk	4/25/2019	4/25/2019
Director of Civil Rights	4/25/2019	4.29.19 FJ
Risk Manager	4.29.19	4.29.19 mcr
Finance Director	4.29.19	4/29/19 mcr
City Attorney	469 4.29.2019	4.30.2019
Mayor	4.30.19	4-30-2019

Please return signed Contracts to the City Clerk's Office
Room 103, City-County Building for filing.

Original + 2 Copies

04/24/2019 10:39:24 enjls - Jim Whitney 266-4563

Dis Rights: OK / (N/A) / Problem - Hold
Prev Wage: (AA) / Agency / No
Contract Value: 27,686,000
AA Plan: Approved
Amendment / Addendum # N/A
Type: POS / Dvlp / Sbdv / Gov't / Grant / (PW) / Goal / Loan / Agrmt

City of Madison

City of Madison
Madison, WI 53703
www.cityofmadison.com

Legislation Details (With Text)

File #:	55133	**Version:** 1	**Name:**	Awarding Public Works Contract No. 7528, Nakoosa Trail Fleet/Fire/Radio Shop Facility.
Type:	Resolution		**Status:**	Passed
File created:	3/21/2019		**In control:**	Engineering Division
On agenda:	4/16/2019		**Final action:**	4/16/2019
Enactment date:	4/22/2019		**Enactment #:**	RES-19-00292

Title: Awarding Public Works Contract No. 7528, Nakoosa Trail Fleet/Fire/Radio Shop Facility. (15th AD)

Sponsors: BOARD OF PUBLIC WORKS

Indexes:

Code sections:

Attachments: 1. Contract 7528.pdf

Date	Ver.	Action By	Action	Result
4/16/2019	1	COMMON COUNCIL	Adopt Under Suspension of Rules 2.04, 2.05, 2.24, and 2.25	Pass
4/3/2019	1	BOARD OF PUBLIC WORKS	RECOMMEND TO COUNCIL TO ADOPT UNDER SUSPENSION OF RULES 2.04, 2.05, 2.24, & 2.25 - REPORT OF OFFICER	Pass
3/21/2019	1	Engineering Division	Refer	

The proposed resolution awards the contract for the construction phase of the Fleet Relocation facility project for the Fleet, Fire, Radio Shop space at Nakoosa Trail at a total cost of $29,900,880. Funding is provided in the 2019 adopted capital budget for this contract amount with General Fund supported GO Borrowing. In addition to this contract for construction, the total cost for completing the project is anticipated to be $30,351,075 as seen detailed in legistar file #55256.
Awarding Public Works Contract No. 7528, Nakoosa Trail Fleet/Fire/Radio Shop Facility. (15th AD)
BE IT RESOLVED, that the following low bids for miscellaneous improvements be accepted and that the Mayor and City Clerk be and are hereby authorized and directed to enter into a contract with the low bidder contained herein, subject to the Contractor's compliance with Section 39.02 of the Madison General Ordinances concerning compliance with the Affirmative Action provisions **and subject to the Contractor's compliance with Section 33.07 of the Madison General Ordinances regarding Best Value Contracting:**

BE IT FURTHER RESOLVED, that the funds be encumbered to cover the cost of the projects contained herein.

See attached document (Contract No. 7528) for itemization of bids.

SDR

PROJECT	CONTRACTOR	AMOUNT OF BID

CONTRACT NO. 7528
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY
(BASE BID ONLY)

C.D. SMITH CONSTRUCTION, INC $27,686,000.00

Acct. No. 10305-41-140: 53310 (90924)	$27,686,000.00
Contingency 8%±	2,214,880.00
GRAND TOTAL	$29,900,880.00

Jurisdiction: Wisconsin

Demographics

Company Name: Federal Insurance Company
SBS Company Number: 54218647
Domicile Type: Foreign
NAIC Group Number: 626 - Chubb Ltd Grp
Merger Flag: No

NAIC CoCode: 20281
State of Domicile: Indiana
Organization Type: Stock

Short Name:
FEIN: 13-1963496
Country of Domicile: United States
Date of Incorporation: 02/15/1901

Address

Business Address
1 AMERICAN SQ
202 N ILLINOIS ST STE 2600
INDIANAPOLIS, IN 46282
United States

Mailing Address
202B HALLS MILL RD
WHITEHOUSE STATION, NJ 08889
United States

Statutory Home Office Address
1 AMERICAN SQ
202 N ILLINOIS ST STE 2600
INDIANAPOLIS, IN 46282
United States

Main Administrative Office Address
202B HALLS MILL RD
WHITEHOUSE STATION, NJ 08889
United States

Phone, Email, Website

Phone

Type	Number
Business Primary Phone	(215) 640-2069
Business Primary Phone	(215) 640-4555

Email
No results found.

Website
No results found.

Company Type

Company Type: Property and Casualty
Status: Active
Effective Date: 10/30/1990
Issue Date: 01/01/1903
Articles of Incorporation Received: No

Status Reason:
Legacy State ID: 110713
Approval Date:
Article No:

Status Date: 01/01/1903
File Date:
COA Number:

Appointments

Show 10 entries — Showing **1** to **2** of **6881** entries — gant

Licensee Name	License Number	NPN	License Type	Line of Authority	Appointment Date	Effective Date	Expiration Date
SARAH GANTNER	6529244	6529244	Intermediary (Agent) Individual	Casualty	03/26/2019	03/26/2019	03/15/2020
SARAH GANTNER	6529244	6529244	Intermediary (Agent) Individual	Property	03/26/2019	03/26/2019	03/15/2020

First Previous 1 Next Last

Line Of Business

Show 10 entries — Showing **1** to **10** of **11** entries — Filter

Line of Business	Citation Type	Effective Date
Aircraft	Aircraft	01/01/1903
Automobile	Automobile	01/01/1903
Credit Insurance	Credit Insurance	01/01/1903
Disability Insurance	Disability Insurance	01/01/1903
Fidelity Insurance	Fidelity Insurance	01/01/1903
Workers Compensation Insurance	Workers Compensation Insurance	01/01/1903
Liability and Incidental Medical Expense Insurance (other than automobile)	Liability and Incidental Medical Expense Insurance (other than automobile)	01/01/1903
Miscellaneous	Miscellaneous	01/01/1903
Ocean Marine Insurance	Ocean Marine Insurance	01/01/1903
Surety Insurance	Surety Insurance	01/01/1903

First Previous 1 2 Next Last

Contact

Contact Type	Preferred Name	Name	E-mail	Phone	Address

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Company Merger

No results found.

Name Change History

Previous Name	New Name	Effective Date
	Federal Insurance Company	

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$27,686,000.00
CONTRACTOR'S OFFICE COPY

BID OF **C.D. SMITH CONSTRUCTION, INC.**

2019

PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS

FOR

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY

CONTRACT NO. 7528

PROJECT NO. 10305

MUNIS NO. 10305

IN

MADISON, DANE COUNTY, WISCONSIN

AWARDED BY THE COMMON COUNCIL
MADISON, WISCONSIN ON **APRIL 16, 2019**

CITY ENGINEERING DIVISION
1600 EMIL STREET
MADISON, WISCONSIN 53713

https://bidexpress.com/login

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

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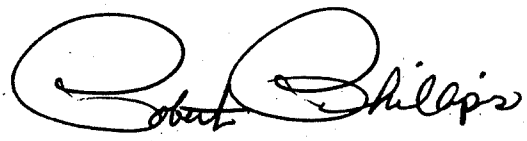
SECTION H: AGREEMENT H-1

SECTION I: PAYMENT AND PERFORMANCE BOND I-1

EXHIBITS FOR BIDDING PURPOSES:
Exhibit A – Plans Dated February 7, 2019
Exhibit B – Specifications Volume 1 Dated February 7, 2019
Exhibit C – Specifications Volume 2 Dated February 7, 2019
Exhibit D – Specifications Volume 3 Dated February 7, 2019
Exhibit E – Specifications Volume 4 Dated February 7, 2019

This Proposal, and Agreement have
been prepared by:

CITY ENGINEERING DIVISION
CITY OF MADISON
MADISON, DANE COUNTY, WISCONSIN



Robert F. Phillips, P.E., City Engineer

RFP: jw

SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION
CITY OF MADISON, WISCONSIN

A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO.:	7528
SBE GOAL	9%
BID BOND	5%
PRE BID (CONTRACTORS) MEETING (10:30AM-12:00PM)	Thursday, February 28, 2019
BIDDER QUESTIONS, CLARIFICATIONS AND REQUESTS FOR SUBSTITUTIONS	Thursday, March 7, 2019
SBE PRE BID MEETING (1:00 P.M.)	Friday, March 8, 2019
PREQUALIFICATION APPLICATION DUE (2:00 P.M.)	Thursday, March 14, 2019
BID SUBMISSION (2:00 P.M.)	Thursday, March 21, 2019
BID OPEN (2:30 P.M.)	Thursday, March 21, 2019
PUBLISHED IN WSJ	February 7, 14, 21, 28 & March 7,14

PRE-BID (CONTRACTORS): A pre-bid meeting will be conducted on Thursday February 28, 2018 from 10:30am-12:00pm and all bidding contractors are encouraged to attend. This will be an opportunity for bidding contractors to ask questions regarding the project. Please meet at the Engineering Operations Facility located at 1600 Emil Street in the training conference room.

BIDDER QUESTIONS, CLARIFICATIONS, AND REQUESTS FOR SUBSTITUTIONS:
If needed, Stantec and/or the City Construction Manager (CCM) shall publish addenda to respond to any questions, clarifications, or requests for substitutions.

- Any questions or requests for clarifications regarding plans and specifications shall be submitted directly to Stantec and the CCM. Responses that change the contract scope and/or schedule will be published by Architecture Inc. and/or the CCM in the form of a bidding addendum.
- Requests for substitutions shall be done according to Specification 01 25 13 Product Substitution Procedures and other specifications as necessary. Use the form at the end of the specification. Contractors are cautioned to review all specifications and note whether substitutions for specific products will be allowed or not.
- See the contract contact information at the end of Section D-Special Provisions for contact information. All questions and/or substitution requests shall be sent via email, reference Nakoosa Trail Fleet/Fire/Radio Shop Facility – City Contract No. 7528.
- **The deadline for receiving all questions, clarifications, and requests for substitutions shall be as indicated in the schedule table above.**

SBE PRE BID MEETING: Representatives of the Affirmative Action Department will be present to discuss the Small Business Enterprise requirements at 1600 Emil Street, Madison Wisconsin.

PREQUALIFICATION APPLICATION: Forms are available on our website, www.cityofmadison.com/business/pw/forms.cfm. If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

BIDS TO BE SUBMITTED by hand to 1600 EMIL ST., MADISON, WI 53713 or online at www.bidexpress.com.

THE BID OPENING is at 1600 EMIL ST., MADISON, WI 53713.

STANDARD SPECIFICATIONS

The City of Madison's Standard Specifications for Public Works Construction - 2019 Edition, as supplemented and amended from time to time, forms a part of these contract documents as if attached hereto.

These standard specifications are available on the City of Madison Public Works website, www.cityofmadison.com/Business/PW/specs.cfm.

The Contractor shall review these Specifications prior to preparation of proposals for the work to be done under this contract, with specific attention to Article 102, "BIDDING REQUIREMENTS AND CONDITIONS" and Article 103, "AWARD AND EXECUTION OF THE CONTRACT." For the convenience of the bidder, below are highlights of three subsections of the specifications.

SECTION 102.1: PRE-QUALIFICATION OF BIDDERS

In accordance with Wisconsin State Statutes 66.0901 (2) and (3), all bidders must submit to the Board of Public Works proof of responsibility on forms furnished by the City. The City requires that all bidders be qualified on a biennial basis.

Bidders must present satisfactory evidence that they have been regularly engaged in the type of work specified herein and they are fully prepared with necessary capital, materials, machinery and supervisory personnel to conduct the work to be contracted for to the satisfaction of the City. All bidders must be pre-qualified by the Board of Public Works for the type of construction on which they are bidding prior to the opening of the bid.

In accordance with Section 39.02(9)(a)l. of the General Ordinances, all bidders shall submit in writing to the Affirmative Action Division Manager of the City of Madison, a Certificate of Compliance or an Affirmative Action Plan at the same time or prior to the submission of the proof of responsibility forms.

The bidder shall be disqualified if the bidder fails to or refuses to, prior to opening of the bid, submit a Certificate of compliance, Affirmative Action Plan or Affirmative Action Data Update, as applicable, as defined by Section 39.02 of the General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

SECTION 102.4 PROPOSAL

No bid will be accepted that does not contain an adequate or reasonable price for each and every item named in the Schedule of Unit Prices.

A lump sum bid for the work in accordance with the plans and specifications is required. The lump sum bid must be the same as the total amounts bid for the various items and it shall be inserted in the space provided.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. The plans, specifications and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership shall be signed by a member/partner or by a duly authorized agent thereof. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized registered agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. The required signatures shall in all cases appear in the space provided thereof on the proposal.

Each proposal shall be placed, together with the proposal guaranty, in a sealed envelope, so marked as to indicate name of project, the contract number or option to which it applies, and the name and address of the Contractor or submitted electronically through Bid Express (www.bidexpress.com). Proposals will

be accepted at the location, the time and the date designated in the advertisement. Proposals received after the time and date designated will be returned to the bidder unopened.

SECTION 102.5: BID DEPOSIT (PROPOSAL GUARANTY)

All bids, sealed or electronic, must be accompanied with a Bid Bond (City of Madison form) equal to at least 5% of the bid or a Certificate of Annual/Biennial Bid Bond or certified check, payable to the City Treasurer. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

MINOR DISCREPENCIES

Bidder is responsible for submitting all forms necessary for the City to determine compliance with State and City bidding requirements. Nothwithstanding any language to the contrary contained herein, the City may exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion or performance of the contract.

Bidders for this Contract(s) must be Pre-Qualified for at least one of the following type(s) of construction denoted by an ☒

Building Demolition

101 ☐ Asbestos Removal
120 ☐ House Mover
110 ☐ Building Demolition

Street, Utility and Site Construction

201 ☐ Asphalt Paving
205 ☐ Blasting
210 ☐ Boring/Pipe Jacking
215 ☐ Concrete Paving
220 ☐ Con. Sidewalk/Curb & Gutter/Misc. Flat Work
221 ☐ Concrete Bases and Other Concrete Work
222 ☐ Concrete Removal
225 ☐ Dredging
230 ☐ Fencing
235 ☐ Fiber Optic Cable/Conduit Installation
240 ☐ Grading and Earthwork
241 ☐ Horizontal Saw Cutting of Sidewalk
242 ☐ Infrared Seamless Patching
245 ☐ Landscaping, Maintenance
246 ☐ Ecological Restoration
250 ☐ Landscaping, Site and Street
251 ☐ Parking Ramp Maintenance
252 ☐ Pavement Marking
255 ☐ Pavement Sealcoating and Crack Sealing
260 ☐ Petroleum Above/Below Ground Storage Tank Removal/Installation
262 ☐ Playground Installer
265 ☐ Retaining Walls, Precast Modular Units
270 ☐ Retaining Walls, Reinforced Concrete
275 ☐ Sanitary, Storm Sewer and Water Main Construction
276 ☐ Sawcutting
280 ☐ Sewer Lateral Drain Cleaning/Internal TV Insp.
285 ☐ Sewer Lining
290 ☐ Sewer Pipe Bursting
295 ☐ Soil Borings
300 ☐ Soil Nailing
305 ☐ Storm & Sanitary Sewer Laterals & Water Svc.
310 ☐ Street Construction
315 ☐ Street Lighting
318 ☐ Tennis Court Resurfacing
320 ☐ Traffic Signals
325 ☐ Traffic Signing & Marking
332 ☐ Tree pruning/removal
333 ☐ Tree, pesticide treatment of
335 ☐ Trucking
340 ☐ Utility Transmission Lines including Natural Gas, Electrical & Communications
399 ☐ Other_____

Bridge Construction

501 ☐ Bridge Construction and/or Repair

Building Construction

401 ☐ Floor Covering (including carpet, ceramic tile installation, rubber, VCT
402 ☐ Building Automation Systems
403 ☐ Concrete
404 ☐ Doors and Windows
405 ☐ Electrical - Power, Lighting & Communications
410 ☐ Elevator - Lifts
412 ☐ Fire Suppression
413 ☐ Furnishings - Furniture and Window Treatments
415 ☐ General Building Construction, Equal or Less than $250,000
420 ☐ General Building Construction, $250,000 to $1,500,000
425 ☒ General Building Construction, Over $1,500,000
428 ☐ Glass and/or Glazing
429 ☐ Hazardous Material Removal
430 ☐ Heating, Ventilating and Air Conditioning (HVAC)
433 ☐ Insulation - Thermal
435 ☐ Masonry/Tuck pointing
437 ☐ Metals
440 ☐ Painting and Wallcovering
445 ☐ Plumbing
450 ☐ Pump Repair
455 ☐ Pump Systems
460 ☐ Roofing and Moisture Protection
464 ☐ Tower Crane Operator
461 ☐ Solar Photovoltaic/Hot Water Systems
465 ☐ Soil/Groundwater Remediation
466 ☐ Warning Sirens
470 ☐ Water Supply Elevated Tanks
475 ☐ Water Supply Wells
480 ☐ Wood, Plastics & Composites - Structural & Architectural
499 ☐ Other_____

State of Wisconsin Certifications

1 ☐ Class 5 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for quarries, open pits and road cuts.
2 ☐ Class 6 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for trenches, site excavations, basements, underwater demolition, underground excavations, or structures 15 feet or less in height.
3 ☐ Class 7 Blaster - Blasting Operations and Activities for structures greater than 15 ' in height, bridges, towers, and any of the objects or purposes listed as "Class 5 Blaster or Class 6 Blaster".
4 ☐ Petroleum Above/Below Ground Storage Tank Removal and Installation (Attach copies of State Certifications.)
5 ☐ Hazardous Material Removal (Contractor to be certified for asbestos and lead abatement per the Wisconsin Department of Health Services, Asbestos and Lead Section (A&LS).) See the following link for application: www.dhs.wisconsin.gov/Asbestos/Cert. State of Wisconsin Performance of Asbestos Abatement Certificate must be attached.
6 ☐ Certification number as a Certified Arborist or Certified Tree Worker as administered by the International Society of Arboriculture
7 ☐ Pesticide application (Certification for Commercial Applicator For Hire with the certification in the category of turf and landscape (3.0) and possess a current license issued by the DATCP)
8 ☐ State of Wisconsin Master Plumbers License.

SECTION B: PROPOSAL

Please refer to the Bid Express Website at https://bidexpress.com look up contract number and go to Section B: Proposal Page

You can access all City of Madison bid solicitations for FREE at www.bidexpress.com

Click on the "Register for Free" button and follow the instructions to register your company and yourself. You will be asked for a payment subscription preference, since you may wish to bid online someday. Simply choose the method to pay on a 'per bid' basis. This requires no payment until / unless you actually bid online. You can also choose the monthly subscription plan at this time. You will, however, be asked to provide payment information. Remember, you can change your preference at anytime. You will then be able to complete your free registration and have full access to the site. Your free access does not require completion of the 'Digital ID' process, so you will have instant access for viewing and downloading. To be prepared in case you ever do wish to bid online, you may wish to establish your digital ID also, since you cannot bid without a Digital ID.

If you have any problems with the free registration process, you can call the bidexpress help team, toll free at 1-888-352-2439 (option 1, option1).

SECTION C: SMALL BUSINESS ENTERPRISE

Instructions to Bidders
City of Madison
SBE Program Information

2 Small Business Enterprise (SBE) Program Information

2.1 Policy and Goal

The City of Madison reaffirms its policy of nondiscrimination in the conduct of City business by maintaining a procurement process which remains open to all who have the potential and ability to sell goods and services to the City. It is the policy of the City of Madison to allow Small Business Enterprises (SBE) maximum feasible opportunity to participate in City of Madison contracting. The bidder acknowledges that its bid has been submitted in accordance with the SBE program and is for the public's protection and welfare.

Please refer to the "ADVERTISEMENT FOR BIDS" for the goal for the utilization of SBEs on this project. SBEs may participate as subcontractors, vendors and/or suppliers, which provide a commercially useful function. The dollar value for SBE suppliers or 'materials only' vendors shall be discounted to 60% for purposes of meeting SBE goals.

A bidder which achieves or exceeds the SBE goal will be in compliance with the SBE requirements of this project. In the event that the bidder is unable to achieve the SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Failure to either achieve the goal or demonstrate a good faith effort to do so will be grounds for the bidder being deemed a non-responsible contractor ineligible for award of this contract.

A bidder may count towards its attainment of the SBE goal only those expenditures to SBEs that perform a commercially useful function. For purposes of evaluating a bidder's responsiveness to the attainment of the SBE goal, the contract participation by an SBE is based on the percentage of the total base bid proposed by the Contractor. The total base bid price is inclusive of all addenda.

Work performed by an SBE firm in a particular transaction can be counted toward the goal only if it involves a commercially useful function. That is, in light of industry practices and other relevant considerations, does the SBE firm have a necessary and useful role in the transaction, of a kind for which there is a market outside the context of the SBE Program, or is the firm's role a superfluous step added in an attempt to obtain credit towards goals? If, in the judgment of the Affirmative Action Division, the SBE firm will not perform a commercially useful function in the transaction, no credit towards goals will be awarded.

The question of whether a firm is performing a commercially useful function is completely separate from the question of whether the firm is an eligible SBE. A firm is eligible if it meets the definitional criteria and ownership and control requirements, as set forth in the City of Madison's SBE Program.

If the City of Madison determines that the SBE firm is performing a commercially useful function, then the City of Madison must then decide what that function is. If the commercially useful function is that of an SBE vendor / supplier that regularly transacts business with the respective product, then the City of Madison will count 60% of the value of the product supplied toward SBE goals.

To be counted, the SBE vendor / supplier must be engaged in selling the product in question to the public. This is important in distinguishing an SBE vendor / supplier, which has a regular trade with a variety of customers, from a firm which performs supplier-like functions on an ad hoc basis or for only one or two contractors with whom it has a special relationship.

A supplier of bulk goods may qualify as an eligible SBE vendor / supplier if it either maintains an inventory or owns or operates distribution equipment. With respect to the distribution equipment; e.g., a fleet of trucks, the term "operates" is intended to cover a situation in which the supplier leases the equipment on a regular basis for its entire business. It is not intended to cover a situation in which the firm simply provides drivers for trucks owned or leased by another party; e.g., a prime contractor, or leases such a party's trucks on an ad hoc basis for a specific job.

If the commercially useful function being performed is not that of a qualified SBE vendor / supplier, but rather that of delivery of products, obtaining bonding or insurance, procurement of personnel, acting as a broker or manufacturer's representative in the procurement of supplies, facilities, or materials, etc., only the fees or commissions will apply towards the goal.

For example, a business that simply transfers title of a product from manufacturer to ultimate purchaser; e. g., a sales representative who re-invoices a steel product from the steel company to the Contractor, or a firm that puts a product into a container for delivery would not be considered a qualified SBE vendor / supplier. The Contractor would not receive credit based on a percentage of the cost of the product for working with such firms.

Concerning the use of services that help the Contractor obtain needed supplies, personnel, materials or equipment to perform a contract: only the fee received by the service provider will be counted toward the goal. For example, use of a SBE sales representative or distributor for a steel company, if performing a commercially useful function at all, would entitle the Contractor receiving the steel to count only the fee paid to the representative or distributor toward the goal. This provision would also govern fees for professional and other services obtained expressly and solely to perform work relating to a specific contract.

Concerning transportation or delivery services: if an SBE trucking company picks up a product from a manufacturer or a qualified vendor / supplier and delivers the product to the Contractor, the commercially useful function it is performing is not that of a supplier, but simply that of a transporter of goods. Unless the trucking company is itself the manufacturer or a qualified vendor / supplier in the product, credit cannot be given based on a percentage of the cost of the product. Rather, credit would be allowed for the cost of the transportation service.

The City is aware that the rule's language does not explicitly mention every kind of business that may contribute work on this project. In administering these programs, the City would, on a case-by-case basis, determine the appropriate counting formula to apply in a particular situation.

2.2 Contract Compliance

Questions concerning the SBE Program shall be directed to the Contract Compliance Officer of the City of Madison Department of Civil Rights, Affirmative Action Division, 210 Martin Luther King, Jr. Blvd., Room 523, Madison, WI 53703; telephone (608) 266-4910.

2.3 Certification of SBE by City of Madison

The Affirmative Action Division maintains a directory of SBEs which are currently certified as such by the City of Madison. Contact the Contract Compliance Officer as indicated in Section 2.2 to receive a copy of the SBE Directory or you may access the SBE Directory online at www.cityofmadison.com/dcr/aaTBDir.cfm.

All contractors, subcontractors, vendors and suppliers seeking SBE status must complete and submit the **Targeted Business Certification Application** to the City of Madison Affirmative Action Division by the time and date established for receipt of bids. A copy of the Targeted Business Certification Application is available by contacting the Contract Compliance Officer at the address and telephone indicated in Section 2.2 or you may access the Targeted Business Certification Application online at www.cityofmadison.com/dcr/aaTBDir.cfm. Submittal of the Targeted Business Certification Application by the time specified does not guarantee that the applicant will be certified as a SBE eligible to be utilized towards meeting the SBE goal for this project.

2.4 Small Business Enterprise Compliance Report

2.4.1 Good Faith Efforts

Bidders shall take all necessary affirmative steps to assure that SBEs are utilized when possible and that the established SBE goal for this project is achieved. A contractor who self performs a portion of the work, and is pre-qualified to perform that category of work, may subcontract that portion of the work, but shall not be required to do so. When a bidder is unable to achieve the established SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Such a good faith effort should include the following:

2.4.1.1 Attendance at the pre-bid meeting.

2.4.1.2 Using the City of Madison's directory of certified SBEs to identify SBEs from which to solicit bids.

2.4.1.3 Assuring that SBEs are solicited whenever they are potential sources.

2.4.1.4 Referring prospective SBEs to the City of Madison Affirmative Action Division for certification.

2.4.1.5 Dividing total project requirements into smaller tasks and/or quantities, where economically feasible, to permit maximum feasible SBE participation.

2.4.1.6 Establishing delivery schedules, where requirements permit, which will encourage participation by SBEs.

2.4.1.7 Providing SBEs with specific information regarding the work to be performed.

2.4.1.8 Contacting SBEs in advance of the deadline to allow such businesses sufficient time to prepare a bid.

2.4.1.9 Utilizing the bid of a qualified and competent SBE when the bid of such a business is deemed reasonable (i.e. 5% above the lowest bidder), although not necessarily low.

2.4.1.10 Contacting SBEs which submit a bid, to inquire about the details of the bid and confirm that the scope of the work was interpreted as intended.

2.4.1.11 Completion of Cover Page (page C-6), Summary Sheet (page C-7) and SBE Contact Reports (pages C-8 and C9) if applicable.

2.4.2 Reporting SBE Utilization and Good Faith Efforts

The Small Business Enterprise Compliance Report is to be submitted by the bidder with the bid: This report is due by the specified bid closing time and date. Bids submitted without a completed SBE Compliance Report as outlined below may be deemed non-responsible and the bidder ineligible for award of this contract. Nothwithstanding any language to the contrary contained herein, the City may exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion, performance of the contract, or percentage of SBE utilization.

2.4.2.1 If the Bidder meets or exceeds the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.1.1 **Cover Page,** Page C-6; and
2.4.2.1.2 **Summary Sheet,** C-7.

2.4.2.2 If the bidder does not meet the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.2.1 **Cover Page,** Page C-6;
2.4.2.2.2 **Summary Sheet,** C-7; and
2.4.2.2.3 **SBE Contact Report,** C-8 and C-9. (A separate Contact Report must be completed for each applicable SBE which is not utilized.)

2.5 Appeal Procedure

A bidder which does not achieve the established goal and is found non-responsible for failure to demonstrate a good faith effort to achieve such goal and subsequently denied eligibility for award of contract may appeal that decision to the Small Business Enterprises Appeals Committee. All appeals shall be made in writing, and shall be delivered to and received by the City Engineer no later than 4:30 PM on the third business day following the bidder's receipt of the written notification of ineligibility by the Affirmative Action Division Manager. Postmark not acceptable. The notice of appeal shall state the basis for the appeal of the decision of the Affirmative Action Division Manager. The Appeal shall take place in accordance with Madison General Ordinance 33.54.

2.6 SBE Requirements After Award of the Contract

The successful bidder shall identify SBE subcontractors, suppliers and vendors on the subcontractor list in accordance with the specifications. The Contractor shall submit a detailed explanation of any variances between the listing of SBE subcontractors, vendors and/or suppliers on the subcontractor list and the Contractor's SBE Compliance Report for SBE participation.

No change in SBE subcontractors, vendors and/or suppliers from those SBEs indicated in the SBE Compliance Report will be allowed without prior approval from the Engineer and the Affirmative Action Division. The contractor shall submit in writing to the City of Madison Affirmative Action Division a request to change any SBE citing specific reasons which necessitate such a change. The Affirmative Action Division will use a general test of reasonableness in approving or rejecting the contractor's request for change. If the request is approved, the Contractor will make every effort to utilize another SBE if available.

The City will monitor the project to ensure that the actual percentage commitment to SBE firms is carried out.

2.7 SBE Definition and Eligibility Guidelines

A Small Business Enterprise is a business concern awarded certification by the City of Madison. For the purposes of this program a Small Business Enterprise is defined as:

A. An independent business operated under a single management. The business may not be a subsidiary of any other business and the stock or ownership may not be held by any individual or any business operating in the same or a similar field. In determining whether an entity qualifies as a SBE, the City shall consider all factors relevant to being an independent business including, but not limited to, the date the business was established, adequacy of its resources for the work in which it proposes to involve itself, the degree to which financial, equipment leasing and other relationships exist with other ineligible firms in the same or similar lines of work. SBE owner(s) shall enjoy the customary incidents of ownership and shall share in the risks and profits commensurate with their enjoyment interests, as demonstrated by an examination of the substance rather than form or arrangements that may be reflected in its ownership documents.

B. A business that has averaged no more than $4.0 million in annual gross receipts over the prior three year period and the principal owner(s) do not have a personal net worth in excess of $1.32 million.

Firm and/or individuals that submit fraudulent documents/testimony may be barred from doing business with the City and/or forfeit existing contracts.

SBE certification is valid for one (1) year unless revoked.

SECTION D: SPECIAL PROVISIONS

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

It is the intent of these Special Provisions to set forth the final contractual intent as to the matter involved and shall prevail over the Standard Specifications and plans whenever in conflict therewith. In order that comparisons between the Special Provisions can be readily made, the numbering system for the Special Provisions is equivalent to that of the Specifications.

Whenever in these Specifications the term "Standard Specifications" appears, it shall be taken to refer to the City of Madison Standard Specifications for Public Works Construction and Supplements thereto.

ARTICLE 102.9: BIDDER'S UNDERSTANDING

Tax Exempt Status. Effective with all contracts executed after January 1, 2016, the sales price from the sale, storage, use or other consumption of tangible personal property that is used in conjunction with a public works improvement for a tax exempt entity (including the City of Madison), is exempt from State sales tax. Said property must become a component of the project owned by the tax exempt entity and includes: any building; shelter; parking lot; parking garage; athletic field; storm sewer; water supply system; or sewerage and waste water treatment facility, but does not include a highway, street or road.

The contractor shall ensure that the exemption for sales and use tax available under Wis. Stat. Sec.77.54(9m) applies where available. The contractor shall provide all necessary documentation as required by the State of Wisconsin and the City of Madison to comply with this exemption.

See link to Wisconsin Department of Revenue Tax Bulletin, January 2016, Number 192 and 2015 Wis. Act 126 for additional information.

Contractors wishing to sub contract with a non-union Small Business Enterprise (SBE) may encourage the non-union SBE subcontractor to consider entering into a Project Labor Agreement with the subject union specific to the Metro Transit – Service Lane Addition – Phase 1, to enable the General Contractor to count the participation of the non-union SBE for SBE Goal achievement. Interested SBE Subcontractors may contact the Executive Director, Building and Construction Trades Council of South Central Wisconsin at btrades@sbcglobal.net or at (608) 256-3161 to discuss entering into such an agreement.

SECTION 102.11: BEST VALUE CONTRACTING

This Contract shall be considered a Best Value Contract if the Contractor's bid is equal to or greater than $62,500 for a single trade contract; or equal to or greater than $306,000 for a multi-trade contract pursuant to MGO 33.07(7).

ARTICLE 103 AWARD AND EXECUTION OF THE CONTRACT

The awarded Contractor shall completely execute the signing of all contract documents and submit them to City Engineering (Attn: Alane Boutelle, 1600 Emil Street, Madison, WI 53703) prior to **12:00pm on Thursday, May 2, 2019**. Delays by the Contractor in submitting the required completed contract documents will not adjust the project completion date. Payment and Performance Bonds shall be dated no sooner than **Wednesday, May 1, 2019**.

The bidder must completely fill in the base bid and the alternate(s). After the initial bid advertisement and prior to bid opening the City will establish a Construction Budget Dollar Value. If any responsible bidder submits a base bid plus alternate one (1) plus alternate (2) that is below the Construction Budget Dollar Value, the City will award the contract based on the base bid plus alternate one (1) plus alternate (2). If no responsible bidder submits a base bid plus alternate one (1) plus alternate two (2) that is below the Construction Budget Dollar Value, the City will award the contract based on the base bid plus alternate one (1). If no responsible bidder submits a base bid plus alternate one (1) that is below the Construction Budget Dollar Value, the City will award the contract based on the base bid only. The City shall have the

right to proceed or not proceed with alternate one (1) or alternate (2) regardless of how the bid was awarded. The City shall have the right to reject all bids regardless of the value of the bids submitted.

This contract is for construction and site development for a new 1-story vehicle maintenance and repair facility for Fleet Services, Fire Maintenance, and the Radio Shop facility, located at 4151 Nakoosa Trail in Madison, Wisconsin. The fleet services spaces will have light duty repair bays and heavy duty repair bays for fleet and fire vehicles and equipment. The radio shop spaces will have installation bays and running repair bays for installation and repairs of vehicle communications systems. The area of this project is approximately 104,910 square feet of building area with approximately 13,074 square of mezzanine space.

The scope of work includes the furnishing of all labor, materials, equipment, tools, and other services necessary to complete the work in accordance with the intent of this contract. The Contractor shall use properly functioning equipment capable of performing the tasks required. The Contractor shall furnish workers who perform quality work and who are experienced and knowledgeable in the work proposed.

SECTION 104.1 LANDS FOR WORK

No tobacco product use is allowed on the Lands for Work.

SECTION 104.2 INTENT AND COORDINATION OF CONTRACT DOCUMENTS

The contract documents are complimentary of each other and consist of all of the following:

- The City Standard Specifications for Public Works Construction, 2019 Edition
- These Special Provisions including all plans and specifications as noted by the exhibits listed below.
- All Addenda to the bidding documents.

EXHIBITS FOR BIDDING PURPOSES:
Exhibit A – Plans Dated February 7, 2019
Exhibit B – Specifications Volume 1 Dated February 7, 2019
Exhibit C – Specifications Volume 2 Dated February 7, 2019
Exhibit D – Specifications Volume 3 Dated February 7, 2019
Exhibit E – Specifications Volume 4 Dated February 7, 2019

SECTION 105.5 INSPECTION OF WORK

The Contractor shall coordinate directly with any and all regulatory agencies having jurisdiction over the licensing, permitting, and inspection of work as described in the construction documents.

All Contractors shall be familiar with Specification 01 45 16 – Field Quality Control Procedures regarding City of Madison policies and procedures for Quality Assurance and Quality Control.

SECTION 105.6 CONTRACTORS RESPONSIBILITY FOR WORK

The Contractor shall not take advantage of any discrepancy in the plans or specifications. This shall include but not be limited to apparent errors, omissions, and interpretations involving codes, regulations, and standards.

Any Contractor who identifies such a discrepancy during the bidding process shall notify Stantec Architecture Inc., the City Project Manager (CPM), and the City Construction Manager (CCM) of the discrepancy prior to the "Questions and Clarifications Deadline" as noted in Section A of the bid documents.

Any Contractor who identifies such a discrepancy after the bidding process and/or after contract signing shall immediately notify Mead & Hunt, the CPM, and the CCM in writing and request clarification on how to proceed. See Specification 01 26 13 – Request for Information (RFI).

SECTION 105.7 CONTRACT DOCUMENTS

The General Contractor is responsible for reproducing all construction documents necessary to complete the Work at their own cost. This shall include plans, specifications, and addenda for the General Contractor and all Sub-contractors. The Contractor shall keep one copy of all drawings and Specifications on the project site, in good order, available to the Project Designers and all City representatives.

SECTION 105.9 SURVEYS, POINTS, AND INSTRUCTIONS

The General Contractor is responsible for providing all survey, benchmarks, points, and elevations required for this project.

SECTION 105.12 COOPERATION BY THE CONTRACTOR

Any Work outside the specified Lands for Work will need to be coordinated with CPM/CCM for City of Madison Engineering.

- Provide an anticipated work schedule including number of people, type of access, equipment, and duration. Schedule shall be supplied at least five (5) working days prior to the date access will be required.
- All tools, equipment, and materials shall be mobile and shall be moved back to within the Lands for Work at the end of each work day or otherwise coordinated with Metro Transit.
- All adjacent spaces will be hermetically sealed to minimize dust and debris from entering adjacent spaces. Any common areas including but limited to drive aisles, hallways, and roof access (if utilized) shall be cleaned of dust and debris at the end of each work day

All excessive noisy activities will need to be coordinated and scheduled with the CPM/CCM for City of Madison Engineering.

The General Contractor shall be responsible for the sequencing of the project.

The Contractor shall review all other specifications within the construction documents and Additional Reference Documents for other requirements and coordination of work associated with this contract.

SECTION 107.2 PROTECTION AND RESTORATION OF PROPERTY

The Contractor shall be responsible for the protection and restoration of all new and existing work according to Specification 01 76 00 – PROTECTING INSTALLED CONSTRUCTION.

SECTION 107.4(e) OTHER INSURANCE

Riggers Insurance

The Contractor shall purchase and maintain insurance when/if materials are lifted over the 100 S. Baldwin Street property. See SECTION 104.1 LANDS FOR WORK for details.

SECTION 108.2 PERMITS AND LICENSING

See 01 31 46 Permits.

The Contractor is responsible for obtaining and paying for all required permits.

The Contractor shall be responsible for any fines issued due to non-compliance with the project permits.

SECTION 109.7 TIME OF COMPLETION

Work shall only begin after the contract is completely executed and the start work letter is received. It is anticipated that the start work letter shall be issued on or about May 10, 2019.

The Contract to be complete in 489 (Four-Hundred-Eighty-Nine) Calendar Days.

The Contractor shall review Specifications 01 29 76 Progress Payment Procedures and 01 77 00 Closeout Procedures and be completely familiar with the progress payment milestones and definitions related to construction closeout and contract closeout. **SECTION 109.9 LIQUIDATED DAMAGES** The

fixed, agreed upon, liquidated damages for failure to complete all work within the Contract Time, shall be calculated in accordance with Article 109 of Standard Specifications, per working day.

NON STANDARD BID ITEMS

BID ITEM 90000 – BASE BID
DESCRIPTION: The BASE BID shall include the complete installation of all building, mechanical, site, and utility components; the accepted testing, and commissioning of all systems; and the completion, and turn-in of all deliverables as outlined in the plans and specifications.

(excluding Alternate 1 and Alternate 2)

METHOD OF MEASUREMENT: The BASE BID shall be measured as Lump Sum of the required construction and installations described in the plans and specifications. Partial Payments shall be requested as indicated in Specifications 01 29 73-Schedule of Values and 01 29 76- Progress Payment Procedures.

BASIS OF PAYMENT: The BASE BID shall be paid at the contract unit price. Partial payments shall be reviewed and authorized as described in the above referenced specifications.

BID ITEM 90001 – ALTERNATE 1
DESCRIPTION: ALTERNATE NO. 1: Provide all work to construct the East Storage Building with approximately 2,010 square feet.

BID ITEM 90002 – ALTERNATE 2
DESCRIPTION: ALTERNATE NO. 2: Provide all work to furnish and install the roof mounted solar electric photovoltaic (PV) system.

METHOD OF MEASUREMENT: The ALTERNATE NO. 1 and No. 2 shall be measured as Lump Sum of the required construction and installations described in the plans and specifications. Partial Payments shall be requested as indicated in Specifications 01 29 73-Schedule of Values and 01 29 76-Progress Payment Procedures.

BASIS OF PAYMENT: The ALTERNATE NO. 1 and No. 2 shall be paid at the contract unit price. Partial payments shall be reviewed and authorized as described in the above referenced specifications.

POINTS OF CONTACT

We ask all Contractors with questions and concerns regarding the bidding documents shall contact the Project Architect by e-mail so we may properly log, track, and respond to all issues. Please reference Nakoosa Trail Fleet/Fire/Radio Shop Facility, Contract # 7528.

The Project Architect for this contract is:

Stantec Architecture, Inc.
Ken Anderson, Architect
PH: (571)290-7680
Email: ken,j,anderson@stantec.com

The Project Manager for City Engineering, Facilities Management for contract is:

Jim Whitney, AIA
City of Madison
PH: (608)266-4563
Email: jwhitney@cityofmadison.com

The Construction Manager for City Engineering, Facilities Management for this contract is:

Dave Schaller
City of Madison
PH: (608)243-5891
Email: dschaller@cityofmadison.com

Department of Public Works
Engineering Division
Robert F. Phillips, P.E., City Engineer
City-County Building, Room 115
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
Phone: (608) 266-4751 | Fax: (608) 264-9275
engineering@cityofmadison.com
cityofmadison.com/engineering

Deputy City Engineer
Gregory T. Fries , P.E.
Deputy Division Manager
Kathleen M. Cryan
Principal Engineer 2
Christopher J. Petykowski, P.E.
John S. Fahrney , P.E.
Principal Engineer 1
Christina M. Bachmann, P.E.
Mark D. Moder, P.E.
Janet Schmidt, P.E.
Facilities & Sustainability
Jeanne E. Hoffman, Manager
Bryan Cooper, Principal Architect
Mapping Section Manager
Eric T. Pederson, P.S.
Financial Manager
Steven B. Danner-Rivers

March 1, 2019

NOTICE OF ADDENDUM
ADDENDUM NO. 1

CONTRACT NO. 7528, PROJECT NO. 10305
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

This addendum consists of the following documents:

1. **GENERAL CONTRACT CONDITIONS**
   No Change.

2. **GENERAL QUESTIONS AND ANSWERS**
   No Change.

3. **ACCEPTABLE EQUIVALENTS**
   No Change.

4. **SPECIFICATIONS**
   A. **REPLACED** in its entirety Volume 2: Divisions 02-14. (In Bid Express this appears as Exhibit C – Specification Vol 2 as updated by Addendum 1}

   B. **MODIFIED** Volume 1 – 4 SECTION 00 01 10 TABLE OF CONTENTS for the following:
      a. Deleted:
         i. 03 35 16.13 CONCRETE FLOOR CURING SEALING HARDENING DENSIFYING COMPOUNDS
         ii. 07 16 16 CRYSTALLINE WATERPROOFING
         iii. 07 61 00 SHEET METAL
         iv. 08 14 16 FLUSH WOOD DOORS
         v. 08 37 24 OVERHEAD ROLLING SLAT DOORS
         vi. 09 51 33 ACOUSTICAL METAL PAN CEILINGS

vii. 09 67 23.23 COMMERCIAL RESINOUS FLOORING
viii. 23 72 00 Air -to-Air Energy Recovery Equipment
ix. 27 21 33 Wireless Access Points (wap)
x. 27 32 43 Radio Communications Equipment
xi. 27 35 00 Call Management
xii. 27 41 23 Audio Visual Accessories (polycom)
xiii. 28 13 00 Access Control System (keyscan)
xiv. 28 20 00 Electronic Surveillance

b. Added:
   i. 06 16 16.13 SOLID SURFACE
   ii. Under City of Madison Engineering Divisions Standard Detail Drawing, CONDUIT PLACEMENT DETAILS FOR COMMERCIAL DRIVE APPROACHES 6.09

C. **MODIFIED** 21 90 00 WATER BASED FIRE PROTECTION SYSTEMS to delete the following:
   a. Part 1.3.B Dry-Pipe Sprinkler System
   b. Part 2.4.D Dry Pipe Valves
   c. Part 2.4.E Riser-Pipe Mounted Compressor
   d. Part 3.6.B

D. **MODIFIED** 23 05 48 VIBRATION CONTROLS FOR HVAC to remove bracket symbols.

E. **MODIFIED** 23 07 13 DUCT INSULATION to add Flexible Elastomeric Insulation product data.

F. **MODIFED** 23 21 16 HYDRONIC PIPING SPECIALTIES to add Flexible-Hose Packless Expansion Joints product data

G. **MODIFIED** 23 31 13 METAL DUCTS to remove bracket symbols.

H. **REMOVED** 23 72 00 AIR -TO-AIR ENERGY RECOVERY EQUIPMENT.

I. **MODIFIED** 23 73 13 MODULAR INDOOR CENTRAL-STATION AIR HANDLING UNIT to add Heat wheel product data for AHU-E1.

J. **MODIFIED** 26 05 00 COMMON WORK RESULTS FOR ELECTRICAL to remove bracket symbols.

K. **MODIFIED** 26 33 23.11 CENTRAL BATTERY EQUPIMENT FOR EMERGENCY LIGHTING to remove bracket symbols.

L. **REMOVED** 27 21 33 WIRELESS ACCESS POINTS (WAP) (Owner furnished item).

M. **REMOVED** 27 32 43 RADIO COMMUNICATIONS EQUIPMENT (Owner furnished item).

N. **REMOVED** 27 35 00 CALL MANAGEMENT

O. **REMOVED** 27 41 23 AUDIO VISUAL ACCESSORIES

P. **REMOVE**D 27 41 33 AUDIO VISUAL CONFERENCING (POLYCOM)

Q. **REMOVED** 28 13 00 ACCESS CONTROL SYSTEM (KEYSCAN){REFER TO 28 10 00}

R. **REMOVED** 28 20 00 ELECTRONIC SURVEILLANCE

S. **MODIFIED** 32 31 13 CHAIN LINK FENCES AND GATES to remove bracket symbols in paragraph 3.3 for an unselected option.

T. **MODIFIED** 32 31 19 DECORATIVE METAL FENCES AND GATES to remove swing gate operator.

5. **DRAWINGS**
   No Change.

6. **PROPOSAL**
   No Change.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at:

https://www.bidexpress.com/

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

Sincerely,



Robert F. Phillips, P.E., City Engineer

Cc: Greg Fries, Kathy Cryan

SECTION 21 90 00

WATER BASED FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. Standard-Pressure Sprinkler Piping: Fire suppression system piping designed to operate at working pressure of 175 psig (1200 kPa) maximum.

B. Fire Protection Engineer (FPE): For the purposes of these specifications, the FPE shall have one of the following qualifications:

1. The FPE shall be a registered Professional Engineer (PE), who has passed the National Council of Examiners for Engineering and Surveys (NCEE) written examination in fire protection engineering. OR
2. The FPE shall be a registered Professional Engineer who is regularly engaged in the design of fire protection systems. OR
3. The FPE shall have Level III or Level IV NICET certification for water-based fire protection systems layout, plus a minimum of 5 years of work experience in fire protection engineering.

C. NFPA: National Fire Protection Association

1.3 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

~~B. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air. A dry valve separates the piping from a water supply. Sprinklers open when heat melts a fusible link or destroys a frangible device. Compressed air discharges immediately from sprinklers when they are opened. The reduced air pressure allows the dry valve to open. When the dry valve opens, water travels to the open sprinklers and then discharges from the open sprinklers. Hydraulic and electric sensors send alarms when water flows~~

1.4 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.

01ADD

B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a FPE, using performance requirements and design criteria indicated.

1. Available fire-hydrant flow test records indicate the following conditions:

a. Date: 2008
b. Static Pressure: 91 psi
c. Measured Flow: 3690 gpm
d. Residual Pressure: 46 psi

2. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
3. Specific sprinkler design parameters shall be per drawings and per NFPA 13 and per FM Global Property Loss Prevention Data Sheets.
4. Maximum Protection Area per Sprinkler: Per UL listing.
5. Contractor shall run a current test to verify pressures and flows.

C. Sprinkler system design shall be approved by authorities having jurisdiction.

1.5 SUBMITTALS

A. For each item indicated, to be submitted prior to start of construction.

B. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified FPE responsible for their preparation.

D. Design documents shall include the features indicated in NFPA 13, which include but are not limited to:

1. Piping layout, including risers.
2. Valve and sprinkler locations.
3. Drains and drain outlet locations.
4. Hydraulically most remote area and sprinkler density.
5. Hydraulic node locations.
6. Hydraulic calculations for hydraulically most remote area, including pressures at hydraulic nodes and each sprinkler.
7. Installation details.
8. Flow and tamper switch locations.

E. Fire-Hydrant Flow Test Report: Report shall contain data including, but not limited to:

1. Full name of person who performed the test.
2. Full name of persons who witnessed the test.
3. Date of the test.
4. Static pressure.
5. Flow rate, and corresponding residual pressure when stated flow rate occurred.
6. Sketch indicating site location of hydrants used for test.
7. FPE shall witness or perform the flow test. Flow tests not witnessed or performed by the FPE shall not be used.

F. Qualification Data: For qualified Installer and FPE.

G. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable. Contractor shall submit plans to AHJ for review per AHJ requirements.

1.6 CLOSEOUT SUBMITTALS

A. For each item indicated, to be submitted within 30 days of substantial completion of construction. All submittals shall be delivered to Owner 30 days prior to proposed scheduled final acceptance of system.

B. Welding certificates, if field welding was performed.

C. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

D. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

E. Record Drawings: Submit drawings showing sprinkler system as installed. Drawings shall include, but are not limited to, all features included in the Delegated-Design Submittal.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."

D. ASCE/SEI 7, "Minimum Design Loads for Buildings and Other Structures."

1.8 COORDINATION

A. Coordinate layout and installation of sprinkler systems with other construction, including but not limited to light fixtures, HVAC equipment, and partition assemblies.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS

A. Schedule 40, Black-Steel Pipe: ASTM A 53/A 53M, Schedule 40.

B. Thinwall Black-Steel Pipe: Will not be acceptable.

C. Schedule 10, Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, Schedule 10, plain end.

D. Ferrous fittings per NFPA 13.

E. Listed ferrous, rubber-gasketed pipe fittings per NFPA 13.

F. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Anvil International, Inc.
   b. Tyco Fire & Building Products LP.
   c. Victaulic Company.

2. Pressure Rating: 300 psig (2070 kPa) minimum.
3. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

G. Steel Pressure-Seal Fittings: UL 213, FM-approved, 175-psig (1200-kPa) pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Victaulic Company.

2.3 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. Valves shall be UL listed and FM approved.
2. Minimum Pressure Rating: 175 psig (1200 kPa).

B. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Conbraco Industries, Inc.; Apollo Valves.
   b. Hammond Valve.
   c. Milwaukee Valve Company.
   d. NIBCO INC.

2. Watts; a Watts Water Technologies company. Description:

   a. Standard: MSS SP-110.
   b. CWP Rating: 300 psig (2070 kPa).
   c. Body Design: Two piece.
   d. Body Material: Bronze or Ductile Iron.
   e. Stem: Bronze.
   f. Ball: Chrome plated brass.
   g. Port: Full.
   h. Seats: PTFE or TFE.

C. Iron Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Anvil International.
   b. Milwaukee Valve Company.
   c. NIBCO INC.

d. Tyco Fire & Building Products LP.
e. Victaulic Company.

2. Standard: UL 1091.
3. Pressure Rating: 175 psig (1200 kPa).
4. Body Material: Cast or ductile iron.
5. End Connections: Lug or Grooved.

D. Check Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Tyco Fire & Building Products LP.
e. Victaulic Company.
f. Viking Corporation.
g. Watts; a Watts Water Technologies company.

2. Standard: UL 312.
3. Pressure Rating: 300 psig (2070 kPa).
4. Type: Swing check.
5. Body Material: Cast iron.
6. End Connections: Flanged or grooved.

E. Bronze OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Milwaukee Valve Company.
b. NIBCO INC.

2. Standard: UL 262.
3. Pressure Rating: 175 psig (1200 kPa).
4. Body Material: Bronze.
5. End Connections: Threaded.

F. Iron OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Tyco Fire & Building Products LP.
e. Watts; a Watts Water Technologies company.

2. Standard: UL 262.
3. Pressure Rating: 300 psig (2070 kPa).
4. Body Material: Cast or ductile iron.
5. End Connections: Flanged or grooved.

G. Indicating-Type Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Tyco Fire & Building Products LP.
e. Victaulic Company.

2. Standard: UL 1091.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Valves NPS 2 (DN 50) and Smaller:

a. Valve Type: Ball or butterfly.
b. Body Material: Bronze.
c. End Connections: Threaded.

5. Valves NPS 2-1/2 (DN 65) and Larger:

a. Valve Type: Butterfly.
b. Body Material: Cast or ductile iron.
c. End Connections: Flanged, grooved, or wafer.

6. Valve Operation: Integral supervisory switch.

2.4 SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:

a. Standard-Pressure Piping Specialty Valves: 175 psig (1200 kPa) minimum.

3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Double-Check, Backflow-Prevention Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Conbraco Industries, Inc.
b. FEBCO.
c. Watts; a Watts Water Technologies company.
d. Zurn Industries, LLC.

2. Standard: ASSE 1015.
3. Body Material: Lead free bronze for NPS 2 (DN 50) and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved or stainless steel for NPS 2-1/2 (DN 65) and larger.
4. Accessories: Ball valves with threaded ends on inlet and outlet of NPS 2 (DN 50) and smaller; OS&Y gate valves with flanged ends on inlet and outlet of NPS 2-1/2 (DN 65) and larger.

C. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Reliable Automatic Sprinkler Co., Inc. (The).
b. Tyco Fire & Building Products LP.

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2. Standard: UL 1726.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Type: Automatic draining, ball check.

~~D. Dry Pipe Valves:~~

~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~

~~a. Reliable Automatic Sprinkler Co., Inc. (The).~~
~~b. Tyco Fire & Building Products LP.~~
~~c. Victaulic Company.~~
~~d. Viking Corporation.~~

~~2. Standard: UL 260~~
~~3. Design: Differential-pressure type.~~
~~4. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.~~

~~E. Riser-Pipe Mounted Air Compressor:~~

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Gast Manufacturing Inc.
   b. General Air Products, Inc.
   c. Viking Corporation.
2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Motor Horsepower: Fractional.
4. Power: 120-V ac, 60 Hz, single phase.

F.

2.5 FIRE-DEPARTMENT CONNECTIONS

A. Exposed-Type, Fire-Department Connection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Elkhart Brass Mfg. Co., Inc.
   b. Guardian Fire Equipment, Inc.
   c. Potter Roemer.
   d. Tyco Fire & Building Products LP.
2. Standard: UL 405.
3. Type: Exposed, projecting, for wall mounting.
4. Pressure Rating: 175 psig (1200 kPa) minimum.
5. Body Material: Corrosion-resistant metal.
6. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
7. Caps: Brass, lugged type, with gasket and chain.
8. Escutcheon Plate: Round, brass, wall type.
9. Outlet: Back, with pipe threads.
10. Number of Inlets: Two.
11. Escutcheon Plate Marking: Similar to "AUTO SPKR."
12. Finish: Polished brass or bronze.

2.6 SPRINKLER SPECIALTY PIPE FITTINGS

A. Flow Detection and Sprinkler Inspector's Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Reliable Automatic Sprinkler Co., Inc. (The).
   b. Tyco Fire & Building Products LP.
   c. Victaulic Company.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

B. Flexible, Sprinkler Hose Fittings:

1. Tyco Fire & Building Products LP.
2. Victaulic Company.
3. Viking Corporation.
4. Standard: UL 1474.
5. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
6. Pressure Rating: 175 psig (1200 kPa) minimum.
7. Size: Same as connected piping, for sprinkler.

C. Fire-rated pipe penetration assembly:

1. Listed for the application.

2.7 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Reliable Automatic Sprinkler Co., Inc. (The).
2. Tyco Fire & Building Products LP.
3. Victaulic Company.
4. Viking Corporation.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig (1200 kPa) minimum.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Characteristics: Quick response, standard coverage, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

D. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

E. Sprinkler Guards: Wire cage with fastening device for attaching to sprinkler.

2.8 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Electrically Operated Alarm Bell:

1. Standard: UL 464.
2. Type: Vibrating, metal alarm bell.
3. Finish: Red-enamel factory finish, suitable for outdoor use.

C. Water-Flow Indicators:

1. Standard: UL 346.
2. Water-Flow Detector: Electrically supervised with tamperproof cover.
3. Type: Paddle operated.
4. Pressure Rating: 250 psig (1725 kPa).
5. Design Installation: Horizontal or vertical.

D. Pressure Switches:

1. Standard: UL 346.
2. Type: Electrically supervised water-flow switch with retard feature.
3. Design Operation: Rising pressure signals water flow.

E. Valve Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Design: Signals that controlled valve is in other than fully open position.

2.9 PRESSURE GAGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Trerice, H. O. Co.
2. Weiss Instruments, Inc.
3. Winters Instruments - U.S.

B. Standard: UL 393.

C. Dial Size: 3-1/2- to 4-1/2-inch (90- to 115-mm) diameter.

D. Pressure Gage Range: 0 to 250 psig (0 to 1725 kPa) minimum.

E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

A. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping.

3.3 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

G. Install sprinkler piping with drains for complete system drainage.

H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

J. Install alarm devices in piping systems.

K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

L. Fill wet-type sprinkler system piping with water.

M. Install sleeves and escutcheons for piping penetrations of walls, ceilings, and floors.

N. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

3.4 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.

1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

K. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

1. Route main drain to exterior. Route auxiliary drains to floor drains or exterior.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

D. Specialty Valves:

1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.

3.6 SPRINKLER INSTALLATION

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~~A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.~~

~~B. Install dry type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet type sprinklers in areas subject to freezing.~~

~~C. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.~~

3.7 FIRE-DEPARTMENT CONNECTION INSTALLATION

A. Install wall-type, fire-department connections.

B. Install automatic (ball drip) drain valve at each check valve for fire-department connection.

3.8 IDENTIFICATION

A. Paint all exterior piping. Apply exterior paint per requirements listed in Division 9.

B. Paint interior piping where exposed in finished rooms. Paint pipe to match the room background color as viewed from the center of the room. Apply paint per requirements listed in Division 9.

C. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

D. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26.

E. Install tags with unique identifier numbers on the following components:

1. Piping flexible connections.
2. Valves.
3. Backflow prevention devices.
4. Inspector's test fittings.
5. Alarm devices, including electrical devices.
6. Components not listed above but may potentially require servicing.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.
6. Verify that equipment hose threads are same as local fire-department equipment.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report test results promptly and in writing to AHJ.

3.10 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.12 PIPING SCHEDULE

A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and threaded joints or grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.

C. Standard-pressure, wet-pipe sprinkler system, NPS 2 (DN 50) and smaller, shall be one of the following:

1. Schedule 40, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Schedule 40, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. Schedule 40, black-steel pipe with plain ends; steel welding fittings; and welded joints.

D. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 (DN 65) and larger, shall be one of the following:

1. Schedule 40, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Schedule 40, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. Schedule 40, black-steel pipe with plain ends; steel welding fittings; and welded joints.
6. Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
7. Schedule 10, black-steel pipe with plain ends; welding fittings; and welded joints.

3.13 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Finished spaces: Concealed or recessed pendent sprinklers, factory painted white, with escutcheons.
2. Unfinished spaces: Rough bronze.
3. Wall Mounting: Sidewall sprinklers.
4. ~~Spaces Subject to Freezing: Upright dry sprinklers unless indicated otherwise.~~

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B. ~~Use sprinklers with temperature ratings higher than expected ambient temperatures. In a~~reas with skylights, use sprinklers with 175 F minimum temperature rating.

C. Use sprinklers with identical temperature ratings throughout compartments.

D. Use sprinklers with identical thermal sensitivities throughout compartments.

END OF SECTION 21 90 00

SECTION 23 05 48

VIBRATION CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device type required.

B. Shop Drawings:

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For each vibration isolation device.

1. Include design calculations for selecting vibration isolators and for designing vibration isolation bases.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show coordination of vibration isolation device installation for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.

B. Qualification Data: For testing agency.

C. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 PERFORMANCE REQUIREMENTS

1.6 VIBRATION CONTROL DESIGN CRITERIA

A. Isolate all motor driven and reciprocating mechanical equipment unless otherwise noted, from building structure, and from systems which they serve, to prevent equipment vibrations from being transmitted to structure. Unless specifically indicated, follow ASHRAE Application Handbook - Sound and Vibration Control, latest edition or manufacturer's recommendations for isolation selection.

B. Select and locate isolators to produce uniform loading and deflection. Use minimum of four isolators to support each piece of equipment.

C. Select vibration isolation devices based on lowest operating speed.

D. Vibration Criteria:

E. All rotating equipment shall operate at speeds less than 80% of their true critical speed. Unless otherwise required, equipment shall be balanced according to the recommendations given in the following schedules.

1. Vertical vibration of rotating equipment shall not be greater than levels indicated. Vibration shall be measured on equipment or steel-frame equipment base when equipment is mounted on its vibration isolation mounts. If equipment has inertia base, allowable vibration level is reduced by ratio of equipment weight alone to equipment weight plus inertia base weight.

Equipment Speed RPM	Maximum Allowable Vibration Displacement Peak-to-Peak (mil)
Under 600	4
600 to 1000	3
1000 or 2000	2
over 2000	1

2. Following field installation, each fan over 5 HP shall be balanced in accordance with the following schedule:

   a. Centrifugal fans - 25 mil/sec, rms

3. Final in-field balance shall be measured with each fan over 5 HP installed on springs specified for unit. Fans shall be loaded with design static pressure. Measurement shall be carried out in vertical axis at each corner of frame supporting fan/motor assembly.

PART 2 - PRODUCTS

2.1 ELASTOMERIC ISOLATION PADS (TYPE 1)

A. Elastomeric Isolation Pads

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Ace Mountings Co., Inc.
   b. California Dynamics Corporation.
   c. Isolation Technology, Inc.
   d. Kinetics Noise Control, Inc.
   e. Mason Industries, Inc.
   f. Vibration Eliminator Co., Inc.
   g. Vibration Isolation.
   h. Vibration Mountings & Controls, Inc.

2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
3. Size: Factory or field cut to match requirements of supported equipment.
4. Pad Material: Oil and water resistant with elastomeric properties.
5. Surface Pattern: Ribbed pattern.
6. Infused nonwoven cotton or synthetic fibers.
7. Load-bearing metal plates adhered to pads.
8. Sandwich-Core Material: Resilient and elastomeric

a. Surface Pattern: Ribbed pattern.
b. Infused nonwoven cotton or synthetic fibers.

2.2 ELASTOMERIC ISOLATION MOUNTS (TYPE 2)

A. Double-Deflection, Elastomeric Isolation Mounts:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ace Mountings Co., Inc.
b. California Dynamics Corporation.
c. Isolation Technology, Inc.
d. Kinetics Noise Control, Inc.
e. Mason Industries, Inc.
f. Vibration Eliminator Co., Inc.
g. Vibration Isolation.
h. Vibration Mountings & Controls, Inc.

2. Mounting Plates:

a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.

3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.3 OPEN-SPRING ISOLATORS (TYPE 3)

A. Freestanding, Laterally Stable, Open-Spring Isolators:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ace Mountings Co., Inc.
b. California Dynamics Corporation.
c. Isolation Technology, Inc.
d. Kinetics Noise Control, Inc.
e. Mason Industries, Inc.
f. Vibration Eliminator Co., Inc.
g. Vibration Isolation.
h. Vibration Mountings & Controls, Inc.

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Baseplates: Factory-drilled steel plate for bolting to structure with an elastomeric isolator pad attached to the underside. Baseplates shall limit floor load to 500 psig.
7. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

2.4 HOUSED-SPRING ISOLATORS (TYPE 4)

A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ace Mountings Co., Inc.
    b. California Dynamics Corporation.
    c. Isolation Technology, Inc.
    d. Kinetics Noise Control, Inc.
    e. Mason Industries, Inc.
    f. Vibration Eliminator Co., Inc.
    g. Vibration Isolation.
    h. Vibration Mountings & Controls, Inc.

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.

    a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
    b. Top housing with attachment and leveling bolt, threaded mounting holes and internal leveling device and elastomeric pad.

2.5 PIPE-RISER RESILIENT SUPPORT

A. Description: All-directional, acoustical pipe anchor consisting of two steel tubes separated by a minimum 1/2-inch-thick neoprene.

1. Vertical-Limit Stops: Steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions.
2. Maximum Load Per Support: 500 psig on isolation material providing equal isolation in all directions.

2.6 RESILIENT PIPE GUIDES

A. Description: Telescopic arrangement of two steel tubes or post and sleeve arrangement separated by a minimum 1/2-inch-thick neoprene.

1. Factory-Set Height Guide with Shear Pin: Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.7 ELASTOMERIC HANGERS (TYPE H2)

A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods: Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ace Mountings Co., Inc.
    b. California Dynamics Corporation.
    c. Isolation Technology, Inc.
    d. Kinetics Noise Control, Inc.
    e. Mason Industries, Inc.
    f. Vibration Eliminator Co., Inc.
    g. Vibration Mountings & Controls, Inc.

2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
3. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

2.8 SPRING HANGERS (TYPE H3)

A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ace Mountings Co., Inc.
    b. California Dynamics Corporation.
    c. Kinetics Noise Control, Inc.
    d. Mason Industries, Inc.
    e. Vibration Eliminator Co., Inc.
    f. Vibration Isolation.
    g. Vibration Mountings & Controls, Inc.

2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

2.9 VIBRATION ISOLATION EQUIPMENT BASES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. California Dynamics Corporation.
2. Kinetics Noise Control.
3. Mason Industries, Inc.
4. Vibration Eliminator Co., Inc.
5. Vibration Isolation.
6. Vibration Mountings & Controls, Inc.

B. Steel Rails (Type B1): Factory-fabricated, welded, structural-steel rails.

1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide rails.

    a. Include supports for suction and discharge elbows for pumps.

2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Rails shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

C. Steel Bases (Type B2): Factory-fabricated, welded, structural-steel bases and rails.

1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.

    a. Include supports for suction and discharge elbows for pumps.

2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

D. Concrete Inertia Base (Type B3): Factory-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete.

1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.

    a. Include supports for suction and discharge elbows for pumps.

2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 VIBRATION CONTROL DEVICE INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

3.3 VIBRATION ISOLATION EQUIPMENT BASES INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

3.4 VIBRATION ISOLATION SCHEDULE

A. Air-Cooled Condensing Units (Exterior)

1. Base: Type B1
2. Isolator: Type 4, 1.5 inches deflection

B. Air-Cooled Condensing Units (Indoor)

1. Base: Type 1
2. Isolator: None

C. Unit Heaters

1. Base: None
2. Isolation: Type H2, 0.75 inches deflection

D. Exhaust Fans

1. Base: None
2. Isolation: Type H3, 0.75 inches deflection

E. Pumps HWP-1, HWP-2, HWP-3 and HWP-4

1. Base: Type B3
2. Isolator: Type 3, 1.75 inches deflection

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SECTION 230713
DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. LEED Submittals:

C. Product Data for Credit IEQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. See drawing schedule(s) for insulation material specifications.

G. Flexible Elastomeric Insulation: Flexible closed cell, minimum nominal density of 5.5 lbs. per cu. ft., thermal conductivity of not more than 0.27 at 75 degrees F, minimum compressive strength of 4.5 psi at 25% deformation, maximum water vapor permeability of 0.17 perm inch, maximum water absorption of 6% by weight, rated for service range of -20 degrees F to 220 degrees F on piping and 180 degrees F where adhered to equipment. Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials. Provide white embossed laminated self-adhered EPDM jacketing of a minimum of 6 mils.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Armacell LLC; AP ArmaTuff or ArmaTuff SA.
   b. K-Flex USA; Clad Jacketing Clad®WT.
   c. Aeroflex USA, Inc.; Aerocel Face Sheet

H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II with factory-applied FSK jacket. Minimum nominal density of 0.75 lbs. per cu. ft., and thermal conductivity of not more than 0.30 at 75 degrees F mean temperature, rated for maximum service temperature of 250 degrees F. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

01ADD

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. CertainTeed Corp.; SoftTouch Duct Wrap.

b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.

I. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ with nominal density of 3 lbs. per cu. ft., and thermal conductivity of not more than 0.23 at 75 degrees F mean temperature, 0.25 at 125 degrees F, 0.27 at 150 degrees F, 0.29 at 200 degrees F, 0.32 at 250 degrees F, minimum compressive strength of 25 PSF at 10% deformation, rated for maximum service temperature of 450 degrees F. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ownens Corning: Thermafiber VersaBoard
b. Fibrex Insulations Inc.; FBX.
c. Johns Manville; 800 Series Spin-Glas.
d. Knauf Insulation; Insulation Board.
e. Manson Insulation Inc.; AK Board.
f. Owens Corning; Fiberglas 700 Series.

2. Insulating contractor shall use 6 or 8 per cu. Ft. mineral-fiber board when using with field applied self-adhesive indoor/outdoor Jacket. Install per manufacturer's guidelines for appropriate type of self-adhesive indoor/outdoor jacket. See drawing schedule(s) for insulation material specifications.

J. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ or FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Corp.; CrimpWrap.
b. Johns Manville; MicroFlex.
c. Knauf Insulation; Pipe and Tank Insulation.
d. Manson Insulation Inc.; AK Flex.
e. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
b. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
b. Eagle Bridges - Marathon Industries; 501.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
b. Eagle Bridges - Marathon Industries; 570.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
b. Vimasco Corporation; 713 and 714.

2. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.Eagle Bridges - Marathon Industries; 405.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
c. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. See drawing schedule for field-applied jacket material specifications

C. Self-Adhesive Indoor/Outdoor Jacket: Matt White, 40 or 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross laminated polyethylene film covered with stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following

   a. Venture Cadd, FlexClad-400 is a 40 mil.
   b. Polyguard Products, Inc.; Alumaguard® Lite Cool Wrap™.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. ABI, Ideal Tape Division; 428 AWF ASJ.

b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 491 AWF FSK.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
c. Compac Corporation; 110 and 111.
d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

2.9 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or; 0.015 inch thick, 1/2 inch wide with wing seal
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) AGM Industries, Inc.; CWP-1.
      2) GEMCO; CD.
      3) Midwest Fasteners, Inc.; CD.
      4) Nelson Stud Welding; TPA, TPC, and TPS.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) AGM Industries, Inc.; CHP-1.
      2) GEMCO; Cupped Head Weld Pin.
      3) Midwest Fasteners, Inc.; Cupped Head.
      4) Nelson Stud Welding; CHP.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
      2) GEMCO; Perforated Base.
      3) Midwest Fasteners, Inc.; Spindle.

   b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030-inch-thick by 2 inches square.
   c. Spindle: Copper- or zinc-coated, low-carbon steel fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) GEMCO; Nylon Hangers.
2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.

b. Baseplate: Perforated, nylon sheet, 0.030-inch-thick by 1-1/2 inches in diameter.
c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

5. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel or stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) AGM Industries, Inc.; RC-150.
2) GEMCO; R-150.
3) Midwest Fasteners, Inc.; WA-150.
4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

2.10 CORNER ANGLES

A. Stainless-Steel Corner Angles: 0.024 inch-thick, minimum 1 by 1-inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.
    b. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
    c. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. Exposed Ductwork: Locate insulation and cover seams in least visible locations.

P. All duct insulation shall be continuous through walls, ceiling or floor openings and through sleeves except where firestop or firesafing materials are required. Vapor retarding jacket shall be maintained continuous through all penetrations.

Q. Provide a continuous unbroken moisture vapor retarding jacket on insulation applied to systems noted below. Attachments to cold surfaces shall be insulated and vapor sealed to prevent condensation.

R. Provide a complete vapor retarding jacket for insulation on the following systems:

1. Insulated Duct.
2. Ductwork with a surface temperature below 65 degrees F.

S. Duct silencers for insulated supply ductwork shall be insulated on all four sides similar with materials.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Section 078413 "Penetration Firestopping" and fire-resistive joint sealers.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Apply full cover coat of adhesive to surface to be insulated, insulation and edge butt joints. Place insulation with edge joints firmly butted pressing to surface for full adhesion. Seal seams and joints vapor tight.

1. For Supply, Return, and Exhaust Duct, provide two layers of insulation with offset joints required in both directions. Provide vapor retarding mastic per sealant portion of specification.
2. See Drawing Schedule.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not over compress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not over compress insulation during installation.

e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where Self-Adhesive Interior/Outdoor Jacket are indicated, install per manufacturer's guidelines. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

1. Provide a protective covering of self-adhering jacket (SAJ) meeting 25/50 Flame Spread/Smoke Rating for the following ductwork:

a. Interior insulated ductwork within 10' of floor, catwalks and mezzanines areas.

B. Install according to manufacturer's recommendations. Cut allowing minimum 4" overlap on ends and 6" on longitudinal joints. Align parallel to surface. Remove release paper and press flat to surface to avoid wrinkles. Rub entire surface with plastic squeegee for full adhesion and sealing at joint overlaps. On exterior applications, provide a bead of compatible caulk along exposed edges.

C. Piping with self-adhering (SAJ) jackets shall have butt joints wrapped with 2 layers of vapor retarding tape. Vapor retarding tape shall be compatible with the jacket material used.

3.8 FINISHES

A. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

B. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Engineer.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation: See Drawing Schedule.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.11 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

1. Refer to Schedule on Drawings.

3.12 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

1. Refer to Schedule on Drawings.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. See drawing schedule for items requiring indoor field-applied jacketing.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. See drawing schedule for items requiring outdoor field-applied jacketing.

3.15 FIELD QUALITY CONTROL

A. Any discovered deviation from the specified materials and methods shall be considered cause for spot-check dismantling of Work to be performed during the preceding day's work. If further deviations are so discovered, the day's Work proceeding that day may be requested to be checked. All dismantling and reinstallation shall be performed at no additional cost to the Contract.

END OF SECTION 23 07 13

SECTION 23 21 16

HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Valves: Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
2. Air-control devices.
3. Hydronic specialties.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.

B. Delegated-Design Submittal: For each flexible-hose packless expansion joints, provide anchor and alignment guide as required to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and swing connections.
2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure, if required.
3. Alignment Guide Details: Detail field assembly and attachment to building structure.
4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each flexible-hose packless expansion joint.

1.4 QUALITY ASSURANCE

A. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

1. Hot-Water Heating Piping: 150 psig at 200 deg F.

2. Makeup-Water Piping: 80 psig at 150 deg F.
3. Condensate-Drain Piping: 150 deg F.
4. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

2.2 VALVES

A. Gate, Globe, Check, Ball, and Butterfly Valves: Comply with requirements specified in Section 230523 "General-Duty Valves for HVAC Piping."

B. Automatic Temperature-Control Valves, Actuators, and Sensors: Comply with requirements specified in Section 230900 "Instrumentation and Control for HVAC."

C. Bronze, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Armstrong Pumps, Inc.
   b. Bell & Gossett Domestic Pump.
   c. Flow Design Inc.
   d. Gerand Engineering Co.
   e. Griswold Controls.
   f. Nexus Valve, Inc.
   g. Tour & Andersson; available through Victaulic Company.

2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig.
10. Maximum Operating Temperature: 250 deg F.

D. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Armstrong Pumps, Inc.
   b. Bell & Gossett Domestic Pump.
   c. Flow Design Inc.
   d. Gerand Engineering Co.
   e. Griswold Controls.
   f. Nexus Valve, Inc.
   g. Tour & Andersson.

2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.
6. Seat: PTFE.
7. End Connections: Flanged or grooved.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.

10. CWP Rating: Minimum 125 psig.
11. Maximum Operating Temperature: 250 deg F.

E. Diaphragm-Operated, Pressure-Reducing Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. AMTROL, Inc.
    b. Armstrong Pumps, Inc.
    c. Bell & Gossett Domestic Pump.
    d. Spence Engineering Company, Inc.
    e. Watts Regulator Co.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Low inlet-pressure check valve.
8. Inlet Strainer: stainless; removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating and capacity factory set and field adjustable.

F. Diaphragm-Operated Safety Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. AMTROL, Inc.
    b. Armstrong Pumps, Inc.
    c. Bell & Gossett Domestic Pump.
    d. Spence Engineering Company, Inc.
    e. Watts Regulator Co.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: stainless steel; removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

2.3 AIR-CONTROL DEVICES

A. Manual Air Vents:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. AMTROL, Inc.

b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump Model 4V
d. Eaton/Dole Model 9, 9B, or 14A.
e. Nexus Valve, Inc.

2. Body: Bronze.
3. Internal Parts: Nonferrous.
4. Operator: Screwdriver or thumbscrew.
5. Inlet Connection: NPS 1/2.
6. Discharge Connection: NPS 1/8.
7. CWP Rating: 125 psig.
8. Maximum Operating Temperature: 220 deg F.

B. Automatic Air Vents:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AMTROL, Inc.
b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump.
d. Nexus Valve, Inc.

2. Body: Bronze or cast iron.
3. Internal Parts: Nonferrous.
4. Operator: Noncorrosive metal float.
5. Inlet Connection: NPS 1/2.
6. Discharge Connection: NPS 1/4.
7. CWP Rating: 125 psig.
8. Maximum Operating Temperature: 220 deg F.
9. Designed to vent air automatically with float principle without allowing air to enter the system.

C. Bladder-Type Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amtrol/Thrush
b. Armstrong Pumps, Inc.
c. Bell & Gossett Domestic Pump.
d. John Wood,
e. Taco, Inc.
f. Wessel

2. Tank: Welded steel, rated for 125-psig (860-kPa) working pressure and 375 deg F maximum operating temperature. Factory test after taps are fabricated and supports installed and are labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
3. Bladder: Securely sealed into tank to separate air charge from system water to maintain required expansion capacity.
4. Provide a precharged with air to the initial fill pressure indicated on the drawings, butyl replaceable bladder suitable for propylene glycol and furnished with a tank drain connection, system connection, base for vertical installation, prime coated, size/capacity as indicated on the drawings.
5. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.
6. Tank and bladder construction must allow field replacement of the bladder on its failure.
7. Provide bladder rupture indicator with air valve release.

D. Coalescing-Type Air and Dirt Separators:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Spirotherm VDT.
   b. Wessel: WVA Series.

2. Tank: Fabricated steel tank; ASME constructed and stamped for 125-psig (862-kPa) working pressure and 270 deg F (130 deg C) maximum operating temperature.
3. Coalescing Medium: Copper or Stainless steel.
4. Air Vent: Threaded to the top of the separator.
5. Inline Inlet and Outlet Connections: Threaded for NPS 2 (DN 50) and smaller; Class 150 flanged connections for NPS 2-1/2 (DN 65) and larger.
6. Blowdown Connection: Threaded to the bottom of the separator.
7. Size: Match system flow capacity and with pipe size as schedules on drainings. In no case shall entering velocity exceed 10 feet per second.

2.4 HYDRONIC PIPING SPECIALTIES

A. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: Stainless-steel, 20-mesh strainer, or perforated stainless-steel basket.
4. CWP Rating: 125 psig
5. Manufacturers: Armstrong, Hoffman, Illinois, Keckley, Metraflex, Mueller Steam, or Sarco.

B. Spherical, Rubber, Flexible Connectors:

1. Body: Fiber-reinforced rubber body.
2. End Connections: Steel flanges drilled to align with Classes 150 and 300 steel flanges.
3. Performance: Capable of misalignment.
4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

01ADD

2.5 PACKLESS EXPANSION JOINTS

A. Flexible-Hose Packless Expansion Joints:

1. Basis-of-Design Product: The design is based on the following:

   a. Flex-Hose Co., Inc. (Tri-Flex Loop)

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Mason Industries, Inc.
   b. Metraflex Company (The).

3. Description: Manufactured assembly with inlet and outlet elbow fittings and two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose.

   a. Product shall absorb and compensate multi-plane pipe movements.
   b. Designed for pressure testing to 1.5 times their maximum rated working pressure and a minimum 4:1 (burst to working) safety factor.
   c. Provide hanger assembly kit shall be used to support flexible-hose.

d. Flexible pipe loop shall be capable for multi-plane movements (X, Y, and Z), plus rotation about those axes simultaneously as well as reduce piping stress.

4. Flexible Hose: Corrugated-metal inner hoses and braided outer sheaths.
5. Expansion Joints for Copper Tubing NPS 2 and Smaller: Copper-alloy fittings with solder-joint end connections.

a. Bronze hoses and single-braid bronze sheaths with 450 psig at 70 deg F and 340 psig at 450 deg F ratings.

6. Expansion Joints for Steel Piping NPS 2-1/2 to NPS 6: Carbon-steel fittings with weld end connections.

a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 200 psig at 70 deg F and 145 psig at 600 deg F ratings.

PART 3 - EXECUTION

01ADD

3.1 VALVE APPLICATIONS

A. Install shut off-duty valves at each branch connection to supply mains and at supply connection to each piece of equipment.

B. Install calibrated-orifice, balancing valves at each branch connection to return main.

C. Install calibrated-orifice, balancing valves in the return pipe of each heating terminal.

D. Install check valves at each pump discharge and elsewhere as required to control flow direction.

E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.

F. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

3.2 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Install manual vents at heat-transfer coils and elsewhere as required for air venting.

C. Install piping from boiler air outlet, or air separator to expansion tank with a 2 percent upward slope toward tank.

D. Install in-line air separators in pump suction. Install drain valve on air separators NPS 2 and larger.

E. Install expansion tanks on the floor. Vent air from hydronic system and ensure that tank is properly charged with air to suit system's project requirements.

3.3 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

3.4 COALESCING-TYPE AIR AND DIRT SEPARATORS:

A. Install coalescing type air and dirt separator for the hot water heating and solar heating systems.

3.5 EXPANSION-JOINT INSTALLATION

A. Install flexible-hose packless pipe loop expansion joints of sizes matching sizes of piping in which they are installed.

B. Install flexible-hose packless pipe loop expansion joints per manufacturer's guidelines per delegated design submittal for anchors and guides installation requirements.

C. Install grooved-joint expansion joints to grooved-end steel piping

3.6 PIPE LOOP AND SWING CONNECTION INSTALLATION

A. Install pipe loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature.

B. Connect risers and branch connections to mains with at least five pipe fittings including tee in main.

C. Connect risers and branch connections to terminal units with at least four pipe fittings including tee in riser.

D. Connect mains and branch connections to terminal units with at least four pipe fittings including tee in main.

END OF SECTION 23 21 16

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Delegated Process Duct Design: Duct construction for process room ducts, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with the process duct schedule on the drawings, SMACNA's latest version of "Round Industrial Duct Construction Standards", and SMACNA's latest version of "Rectangular industrial Duct Construction Standards ".

1. Exception: Weld penetration shall be 100% for all process duct welds.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Indicated duct sizes are inside clear dimensions.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.

B. LEED Submittals:

1. Product Data for Prerequisite IEQ 1: Documentation indicating that duct systems comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."
2. Product Data for Prerequisite EA 2: Documentation indicating that duct systems comply with ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
3. Leakage Test Report for Prerequisite EA 2: Documentation of work performed for compliance with ASHRAE/IESNA 90.1, Section 6.4.4.2.2 - "Duct Leakage Tests."
4. Duct-Cleaning Test Report for Prerequisite IEQ 1: Documentation of work performed for compliance with ASHRAE 62.1, Section 7.2.4 - "Ventilation System Start-up."
5. Product Data for Credit IEQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content.

C. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.

3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

D. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

D. Construct all ductwork to be free from vibration, chatter, objectionable pulsations and leakage under specified operating conditions. Objectionable conditions shall be corrected to the satisfaction of the Owner, at no cost to the Contract.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Duct Joints for Stainless Steel Ducts:

1. All sizes: Welded longitudinal seam joint construction.

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Duct Joints for Stainless Steel Ducts:

1. All sizes: Welded longitudinal seam joint construction.

2.3 SHEET METAL MATERIALS

A. See drawing schedule for sheet metal material requirements

B. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

C. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

D. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

E. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

F. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

G. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

H. Tie Rods: Galvanized steel, 1/4-inchminimum diameter for lengths 36 inches or less; 3/8-inchminimum diameter for lengths longer than 36 inches.

I. Provide paint grip type ductwork where ductwork is exposed and indicated to be painted.

J. Double-Tee Pan Ductwork: Where indicated on drawings, enclose the space between two double-tee stems with minimum 20 gauge, No. 4 finish. 1" thick insulated galvanized steel panels. Every 5'-0" o.c., there shall be a 1½" x 20 ga. standing seam joint.

1. See double-tee stem enclosure detail on drawings.
2. Insulation shall be polyisocyanurate or polystyrene

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

a. CertainTeed Corporation; Insulation Group.
b. Johns Manville.
c. Knauf Insulation.
d. Owens Corning.

2. Maximum Thermal Conductivity:

1) Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
2) Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.

3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
4. Solvent or Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Aeroflex USA Inc.
   b. Armacell LLC.
   c. Rubatex International, LLC

2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

   a. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

D. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

   a. Fan discharges.
   b. Intervals of lined duct preceding unlined duct.
   c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

2. Tape Width: 3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.

2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

H. Wet Areas: Sealant: Equal to clear G.E. Silicone Series 1200 caulk.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

I. All hangers and supports shall be smooth stainless steel in wet areas. Stainless steel type shall match ductwork being supported.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

1. Where ductwork passes through walls, floors, or ceilings of finished rooms, provide stainless steel flange around penetration.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

M. Ductwork sleeves shall be formed with galvanized steel.

N. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

O. At ends of ducts not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering until time connections to be completed.

P. Sizing Variation: Round ducts may be installed in place of rectangular ducts and rectangular ducts may be installed in place of round ducts using equivalency tables from ASHRAE or SMACNA. No variation of duct configuration or sizes permitted except by written permission from Engineer.

Q. Drain Pockets:

1. Provide form drain pocket in outdoor air, dishwasher exhaust, any duct carrying high-moisture air, and humidifier sections with deep seal traps.
2. Connect to drainage system.

R. Provide expanded take-offs for branch duct connections or 45 degree entry fittings. Square edge 90 degree take-off fittings or straight taps will not be accepted

S. Size Change:

1. Increase and decrease duct sizes gradually, not exceeding 20 degrees divergence and 30 degrees convergence from connecting upstream duct surface, unless otherwise noted on drawings.
2. Maximum divergence upstream of equipment to be 20 degrees and maximum convergence downstream to be 30 degrees.

T. Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.

1. Where ductwork passes through walls, floors, or ceilings of finished process rooms, provide stainless steel flange around penetration.

U. Install duct to pitch as indicated on the drawings.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. See drawing schedule for duct sealing requirements.

B. Install duct to pitch toward outside air intakes and drain to outside of building. Solder or seal seams to form watertight joints.

C. Fabricate seams and joints liquid-tight with continuous exterior welds or gasketed, bolted flanged connections in following locations:

1. Kitchen or other high-grease content.
2. Dishwasher or other high-moisture content.
3. Shower rooms.
4. Lower 6 inches of horizontal outdoor air ducts.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

    a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 25 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

D. Duct system will be considered defective if it does not pass tests and inspections.

3.8 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.9 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.10 DUCT SCHEDULE

A. See drawing schedule for duct pressure, seal and leakage class, and elbow configuration.

B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts:

    a. Exposed to Airstream: Match duct material.
    b. Not Exposed to Airstream: Match duct material.

3. Aluminum Ducts: Aluminum.

C. Liner:

1. Supply Air Ducts: Fibrous glass, Type I or Flexible elastomeric, 1 inch thickness thick.
2. Transfer Ducts: Fibrous glass, Type I or Flexible elastomeric, 1inch thickness thick.

D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

   a. Velocity 1000 fpm or Lower:

      1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      2) Mitered Type RE 4 without vanes.

   b. Velocity 1000 to 1500 fpm:

      1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

   c. Velocity 1500 fpm or Higher:

      1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

   a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

      1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
      2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
      3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
      4) Radius-to Diameter Ratio: 1.5.

   b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.

c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or Welded.

E. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

   a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Spin in.

2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.

   a. Velocity 1000 fpm or Lower: 90-degree tap.
   b. Velocity 1000 to 1500 fpm: Conical tap.
   c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

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SECTION 23 73 13

MODULAR INDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes modular indoor central-station air-handling units.

1.3 ACTION SUBMITTALS

A. Product Data: For each air-handling unit indicated.

1. Unit dimensions, weight and splits.
2. Casing construction details including floor structure, internal structure, panel construction, wall-floor joint construction, wall-roof joint construction, insulation material and thickness, drain locations, method of pipe penetration and sealing, and any other field assembly details.
3. Fans:
    a. For variable volume applications, indicate all operating points on fan curves including data to indicate effect of capacity control devices on flow, pressure, and horsepower.
    b. Certified fan-performance curves with system operating conditions indicated.
    c. Fan construction and accessories.
    d. Certified fan-sound power ratings.
4. Certified coil-performance ratings with system operating conditions indicated.
5. Motor ratings, electrical characteristics, and motor and fan accessories.
6. Wiring Diagrams: Power, signal, and control wiring, clearly indicating factory installed and field installed wiring.
7. Material gages and finishes.
8. Split System Condensing Units per Section 236200 "Packaged Compressor and Condenser Units".
9. Dampers, including housings, linkages, and operators per Section 230900 "Instrumentation and Control for HVAC".
10. Airflow measuring stations (AFMS) per Section 230900 "Instrumentation and Control for HVAC".
11. Filters with performance characteristics.
12. All other included accessories.
13. For AHU-E1 unit: Cooling coil trap detail in accordance with the unit details, verifying the trap will clear the floor with a 6" unit support such as a concrete pad or curb. The unit base shall be high enough to ensure the trap clears the mezzanine floor.

B. Field Quality-Control Test Reports: From manufacturer.

C. If Manufacturer cannot provide any of the items or options listed within this specification it must be noted as an exception on the bid.

D. LEED SUBMITTALS:

1. Product Data for Prerequisite IEQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain air-handling units through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NFPA 70.

E. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

F. ARI Certification: Air-handling units and their components shall be factory tested according to ARI 430, "Central-Station Air-Handling Units," and shall be listed and labeled by ARI.

G. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

H. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

I. If units are supplied as separate components, each section shall have mating flanges for bolted assembly. All necessary closed-cell gasketing, caulking, nuts and bolts shall be provided. After final installation leakage from units shall not exceed ½ percent of total air volume handled at 1.5 times scheduled static pressure.

1.5 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations for packaged compressors and condensers units.

B. Coordinate sizes and locations of structural-steel support members, if any, with actual equipment provided.

C. Deliver, store, protect and handle units to site under the supervision of the Owner and per Manufacturer's recommendations. Refer to Manufacturer's Installation, Operation and Maintenance Instructions Manual for proper installation procedures. Manufacturer is not responsible for any damage done to the units caused by poor rigging or installation operation.

D. Furnish and install fabricated modular indoor central-station air handling units where shown on the drawings and/or as scheduled. Provide units with design features as specified within this specification. The units shall be provided and installed in strict accordance with the specifications. All units shall be complete with all components and accessories as specified. Any exceptions must be clearly defined. The Contractor shall be responsible for any additional expenses that may occur due to any exception made.

E. Coordinate location of refrigerant piping and electrical rough-ins.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set for each custom make-up and air-handling unit for supply/exhaust airstreams.
2. Gaskets: One set for each access door.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design is based on the following:

1. Daikin/McQuay International.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Addison Corporation
2. Greenheck Fan Corporation.
3. Nortek/CES Group: Ventrol, Venmar, Temtrol, and Governair.
4. JCI/YORK International Corporation.
5. Valent

2.2 MODULAR INDOOR UNITS

A. Units shall be modular indoor factory assembled and consist of casing, fans, motor and drive assembly, coils, plenums, filters, condensate pans, drain pans, control devices, and accessories.

B. Units may be shipped in sections, ready for field assembly. Assembly shall consist only of joining adjacent sections together. The unit manufacturer shall provide the necessary gasketing, caulking, nuts and bolts required for assembly. The manufacturer shall have assembled the units at factory prior to shipment to make sure the sections fit properly together and that the leakage from the units will not exceed ½ percent of the total volume handled at 1.5 times the scheduled static pressure of the supply air fan within unit.

C. Under 55°F supply air temperature and design conditions on the exterior of the unit of 91°F dry bulb and 74°F wet bulb, condensation shall not form on the casing exterior. The AHU manufacturer shall provide tested casing thermal performance for the scheduled supply air temperature plotted on a psychrometric chart. The design condition on the exterior of the unit shall also be plotted on the chart. If tested casing thermal data is not available, AHU manufacturer shall provide, in writing, a guarantee against condensation forming on the unit exterior at the stated design conditions above. The guarantee shall note that the AHU manufacturer will cover all expenses associated with modifying or replacing units should external condensate form on them.

2.3 UNIT CASINGS

A. General Fabrication Requirements for Casings:

1. Forming: Form walls, roofs, and floors with at least two breaks at each joint.
2. Casing Joints: Sheet metal screws or pop rivets.
3. Sealing: Seal all joints with water-resistant sealant.
4. Factory Finish for Steel and Galvanized-Steel Casings: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on enamel finish, consisting of prime coat and thermosetting topcoat. Architect to select color from one standard manufacturer's color charts. Each section to be labeled

for identification, with arrows showing direction of air flow. Corrosion resistant exterior paint finish shall withstand 1,000 hours of salt spray as per ASTM B-117

5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

B. Casing Insulation and Adhesive:

1. Materials: ASTM C 1071, Type II.
2. Location and Application: Encased between outside and inside sheetmetal casing.

C. Wall/Roof Construction

1. Construct walls and roof from 2-inch-thick double wall panel assemblies. Panels shall be injected with polyisocyanurate or urethane, or polyurethane foam insulation and shall have a minimum thermal conductivity (R) of at least 12.5. The outer shell shall be constructed of solid G90 galvanized steel with baked enamel finish. The inner liner shall be constructed of solid G90 galvanized steel. Panels shall be gasketed with permanently applied bulb-type gaskets and able to be removed without affecting the integrity of casing structure.
2. Outside Casing: Galvanized steel, minimum 0.0336-inch-thick, 22 gauge.
3. Inside Casing: Galvanized steel, solid, minimum 0.0336-inch-thick, 22 gauge.
4. Perforated liner to be used for supply/return air plenums for sound attenuation.

D. Floor Construction

1. Construct floors from 2-inch-thick double wall panel assemblies. Panels shall be injected with polyisocyanurate or urethane, or polyurethane foam insulation and shall have a minimum thermal conductivity (R) of at least 12.5. The outer shell shall be constructed of solid G90 galvanized steel with baked enamel finish. The inner liner shall be constructed of solid G90 galvanized steel. Panels shall be gasketed with permanently applied bulb-type gaskets.
2. A full perimeter base rail shall be installed at each air handling unit. The base rail shall be constructed from a minimum of 16-gauge G90 galvanized steel and shall be at least 8" high. Panels shall be able to be removed without affecting the integrity of casing structure.
3. Floor Plate: Galvanized steel, minimum 0.0336-inch-thick, 22 gauge.

E. Inspection and Access Panels and Access Doors:

1. Panel and Door Fabrication: Formed and reinforced, double-wall and insulated panels of same materials and thicknesses as casing.
2. Inspection and Access Panels:
   a. Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against air-pressure differential.
   b. Gasket: Neoprene, applied around entire perimeters of panel frames.
   c. Size: Large enough to allow inspection and maintenance of air-handling unit's internal components.
3. Access Doors:
   a. Hinges: A minimum of two ball-bearing hinges or stainless-steel piano hinge and two wedge-lever-type latches, operable from inside and outside. Arrange doors to be opened against air-pressure differential.
   b. Gasket: Neoprene, applied around entire perimeters of panel frames.
   c. Size: At least 24 inches wide by full height of unit casing up to a maximum height of 72 inches.
4. Locations and Applications:
   a. Fan Section: Doors.
   b. Access Section: Doors.

c. Coil Section: Inspection and access panel.
d. Upstream and downstream of every Damper Section: Doors.
e. Filter Section: Doors large enough to allow periodic removal and installation of filters.
f. Mixing Section: Doors.
g. Doors shall always open against pressure

5. Removable panels:

a. Removable panel shall be provided in each coil section to allow for removal of fan and coil(s). Panels shall be insulated double wall type of same materials as unit walls.

F. Condensate Drain Pans:

1. Fabricated with two percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and to direct water toward drain connection.

a. Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
b. Depth: A minimum of 2 inches deep.

2. Double-wall, stainless-steel sheet with space between walls filled with foam insulation and moisture-tight seal.
3. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
4. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

G. Air-Handling-Unit Mounting Frame: Formed galvanized-steel channel or structural channel supports, designed for low deflection, welded with integral lifting lugs.

2.4 FAN, DRIVE, AND MOTOR SECTION

A. Fan Plenum Manufacturers: Twin City MPQN, Comefri, PennBarry ESA, Greenheck HPA, New York Blower FA, Huntair or approved equal.

B. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.

1. Shafts: Designed for continuous operation at maximum-rated fan speed and motor horsepower, and with field-adjustable alignment.

a. Turned, ground, and polished hot-rolled steel with keyway. Ship with a protective coating of lubricating oil.
b. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

C. Direct Drive Fans. direct driven, arrangement 4 plenum fan constructed per AMCA requirements for the duty specified, (Class I, II or III).

D. Plenum Fan Housings: Steel frame and panel; fabricated without fan scroll and volute housing.

1. Plug Fan (PF) SWSI Minimum Class II Fans: single width single inlet as indicated on the Drawings. Fan wheel has a minimum of 12 blades made from extruded aluminum as a hollow airfoil in shape, and welded to the center and wheel side plates. The fan Inlet cone is made from spun aluminum material. Fan wheel shall be keyed to the shaft.
2. Fans shall be both dynamically and statically balanced. Dynamic fan wheel balancing shall be conducted from 16 Hz to 105 Hz to identify and eliminate critical speeds to ensure stable operation through the entire

operating range. Each individual fan/motor assembly shall be dynamically balanced to meet AMCA standard 204-96, category BV-5, to meet or exceed Grade 2.5 residual unbalance.

3. Fans shall be rated in accordance with AMCA 210 for performance and AMCA 300 for sound.
4. Fan motors are premium efficiency and compatible for inverter duty per Section 230513 "Common Motor Requirements for HVAC Equipment."
5. Fan motors shall have permanently sealed non-greasable bearings.

E. ECM Fan Manufacturers: Ebm-papst Company K3G series or approved equal.

1. Provide ECM, motorized multi-blade backward-curved, single impeller fan(s). Fan assembly shall include fan, fan base, and a high efficiency permanent magnet ECM direct drive motor and shall be dynamically balanced by the fan manufacturer.
2. Motor control panel shall come with a low voltage terminal strip and shall include terminals for Fan ON/OFF, 0-10V control signal, and fan fault.
3. Motor control panel shall come equipped with a fused disconnect.
4. Fan section shall come equipped with a motor control panel mounted on the fan section. Both line voltage and low voltage wiring shall be done by the factory. Each fan shall have an isolation switch.
5. Motor shall be brushless DC type with a permanent magnet rotor.
6. Inverter shall be integral to the motor and come as an assembly from the fan manufacturer.

F. Each fan and motor combination shall be capable of delivering 110% of air quantity scheduled at the scheduled static pressure.

G. Internal Vibration Isolation: Fans shall be factory mounted with manufacturer's standard vibration isolation mounting devices having a minimum static deflection of 2 inches.

H. Motor: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor to be furnished by unit manufacturer.
2. Motors to be totally-enclosed fan-cooled (TEFC), 460V/ 60 cycles/, 3 phase, with Class F insulation.
3. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
4. Motors shall meet most current version of USA EPACT.
5. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.15.
6. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
7. Mount unit-mounted disconnect switches on exterior of unit for ECM motors.
8. Fan motors shall have permanently sealed non-greasable bearings.
9. Provide motor ground rings as specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

I. Motor furnished with fan shall not operate into motor service factor in any case. Drive efficiency shall be considered in motor selection according to motor manufacturer's published recommendation, or according to AMCA Publication 203, Appendix L.

J. If unit(s) submitted have larger motor power requirements than scheduled in the drawings, the contractor shall be responsible for any additional electrical system upgrade costs.

K. Variable Frequency Drives:

1. Variable Frequency Drives are specified in Section 230514 "Variable Frequency Drives" and Section 230900 "Instrumentation and Control for HVAC". Variable Frequency Drives are to be furnished by Temperature Control Contractor and installed by Electrical Contractor.

2.5 SPLIT CONDENSING UNIT (AHU-E1)

A. Refer to Section 236200 "Packaged Compressor and Condenser Units".

2.6 COIL SECTION

A. General Requirements for Coil Section:

1. Comply with ARI 410.
2. Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
3. Coils shall not act as structural component of unit.

B. Cooling coils shall be sized and arranged to prevent moisture carryover. Cooling coils shall be sized for the maximum face velocity indicated on the drawings. If two or more coils are stacked in the unit, intermediate drain channels shall be installed between coils to drain condensate to the main drain pans without flooding the lower coils or passing condensate through the airstream of the lower coil. Provide stainless steel racks for AHU-E1 unit coils.

C. Air handling unit coils mounted in casing shall be accessible for removal from either side of unit casing without disturbing adjacent sections.

D. Entire coil frame, headers and U-bends shall be enclosed within air handling unit casing. Extend coil piping connections, air vent and drain connections to exterior of casing.

E. Support coils along entire length within casing and pitch coil for proper drainage.

F. Blank off space between coil frames and air handling unit casing.

G. Support coils along their entire length within the cabinet and pitch for proper drainage.
1. Coil selection shall account for a water side fouling factor of 0.0001 hr-ft2-°F/Btu for water systems, 0.0001 for glycol systems with non-ferrous tubes, and 0.0002 for glycol systems with ferrous tubes.

H. Refer to Section 238216.11 "Hydronic Air Coils" and Section 238216.13 "Refrigerant Air Coils". Provide hot gas reheat coil for air-handling unit AHU-E1.

2.7 AIR FILTRATION SECTION

A. General Requirements for Air Filtration Section:

1. Comply with NFPA 90A.
2. Provide minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
3. Provide filter holding frames arranged for flat or angular orientation, with access doors on one service side of unit. Filters shall be removable from one side or lifted out from access plenum.
4. Filter box section may be furnished by air handling unit manufacturer in accordance with specification requirements of section 234100.
5. Filter Gauges: Provide Dwyer 2000 (photohelic) magnehelic gauges accurate to ±2% of full range for each filter bank.
6. Filters shall be removable without the use of tools.
7. All filter framing and support materials shall be stainless steel.
8. Provide static pressure tips that are arranged to prevent damage to the filter elements during replacement. Provide minimum 2" gap between final and prefilters for static pressure probes.

B. Refer to Section 234100 "Particulate Air Filtration"

C. Heat Wheels (AHU-E1):

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. AirXChange . Inc.
   b. NovelAire Technologies

2. Unit shall contain a factory mounted and tested energy recovery wheel. The energy recovery wheel shall be mounted in a rigid frame containing the wheel drive motor, drive belt, wheel seals and bearings. Frame shall slide out for service and removal from the cabinet.
3. Casing:

   a. Steel, with manufacturer's standard paint coating.
   b. Integral purge section limiting carryover of exhaust air to between 0.05 percent at 1.6-inch wg and 0.20 percent at 4-inch wg differential pressure.
   c. Casing seals on periphery of rotor, on duct divider, and on purge section.
   d. Support rotor on grease-lubricated ball bearings with extended grease fittings. Mount horizontal motors on tapered roller bearing.

4. Wheel shall be provided with removable energy transfer matrix. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless steel or aluminum and shall be self-supporting without matrix segments in place. Segments shall be removable without the use of tools to facilitate maintenance and cleaning.
5. Total energy recovery wheels shall be coated with silica gel desiccant permanently bonded by a process without the use of binders or adhesives, which may degrade desiccant performance. The substrate shall be lightweight polymer and shall not degrade nor require additional coatings for application in marine or coastal environments. Coated segments shall be washable with detergent or alkaline coil cleaner and water. Desiccant shall not dissolve nor deliquesce in the presence of water or high humidity.
6. Drive: Fractional horsepower motor and gear reducer, with speed changed by variable frequency controller, and self-adjusting multilink belt around outside of rotor.
7. Controls:

   a. Starting relay, factory mounted and wired, and manual motor starter for field wiring.
   b. Variable frequency controller, factory mounted and wired, permitting input of field connected 4-20 mA or 1-10-V control signal.
   c. Pilot-Light Indicator: Display rotor rotation and speed.
   d. Speed Settings: Adjustable settings for maximum and minimum rotor speed limits.

2.8 CONTROL DAMPERS

A. Control dampers are specified in Section 230900 "Instrumentation and Control for HVAC". Refer to Section 230900 for damper to be furnished and installed by Temperature Control Contractor.

2.9 AIRFLOW MEASURING STATION

A. The outside air damper and airflow measuring station (AFMS) are specified in Section 230900 "Instrumentation and Control for HVAC". Refer to Section 230900 for outside air damper and air flow measuring station to be furnished by Temperature Control Contractor and installed by Mechanical Contractor.

2.10 FAN INLET AIR FLOW STATIONS

A. For fans that are specified or scheduled to have fan inlet air flow station, provide a piezometer ring air flow station mounted on the fan inlet bell housing. Pressure tubes from the piezometer ring shall be extended to a termination

plate labeled with the high and low pressure connections. Provide an initial flow rate coefficient that will be adjusted by the balancing contractor for measured flow reading.

B. Piezometer ring air flow station shall measure static pressure drop through the fan inlet cone to provide an overall air flow measurement to within +/- 5% accuracy.

C. Differential pressure transducers for measuring the velocity pressure for air flow measurement shall be supplied under Section 230900 and be mounted in the temperature control panel.

2.11 SOURCE QUALITY CONTROL

A. Fan Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Fans shall bear AMCA-certified sound ratings seal.

B. Fan Performance Rating: Factory test fan performance for airflow, pressure, power, air density, rotation speed, and efficiency. Rate performance according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating."

C. Water Coils: Factory tested to 300 psig according to ARI 410 and ASHRAE 33.

D. Refrigerant Coils: Factory tested to 450 psig according to ARI 410 and ASHRAE 33.

2.12 LEAKAGE RATE

A. Leakage rate shall not exceed 1% of the total system air quantity when subjected to +/- 5" static pressure.

2.13 ELECTRICAL AND LIGHTS

A. Provide a marine grade LED light and GFI receptacle in all fan sections and marine LED grade light in all access sections on units as well as a switch located on the exterior of the fan section to control the lights.

B. All lights and receptacles shall be wired from the factory to a separate junction box located on the exterior of the air handling unit. The lights and receptacles must remain on if the air handling unit fans disconnects are switched off.

2.14 CAPACITIES AND CHARACTERISTICS:

A. Refer to Schedule on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-handling unit installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for hydronic, refrigeration and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install all air handling units and accessories as indicated on drawings and/or as scheduled and according to manufacturer's installation instructions.

B. Equipment Mounting:

1. Comply with requirements for vibration isolation devices specified in Section 230548 "Vibration Controls for HVAC."

C. Arrange installation of units to provide access space around air-handling units for service and maintenance.

D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with new, clean filters.

E. Install filter-gage, static-pressure taps upstream and downstream of filters. Mount filter gages on outside of filter housing or filter plenum in accessible position. Provide filter gages on filter banks, installed with separate static-pressure taps upstream and downstream of filters.

F. Install units on flat surface level within 1/8" and of sufficient strength to support the units.

G. Comb out damaged coil fins where bent or crushed before covering elements with enclosures.

H. Mount units at proper height above floor so that proper trap depth is provided in condensate drain.

3.3 CONNECTIONS

A. Comply with requirements for piping specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to air-handling unit to allow service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate and other drain pans using NPS 1-1/4 inch if not detailed on the drawings. Pipe drains from drain pans to nearest floor drain or hub drain; use ASTM B 88, Type L, drawn-temper copper water tubing with soldered joints, same size as condensate drain connection. Construct deep trap at connection to drain pan and install cleanouts at changes in direction. Mount units at proper height above floor/mezzanine so that proper trap depth is provided in condensate drain.

E. Hot Water Piping: Comply with applicable requirements in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Install shutoff valve and union or flange at each coil supply connection. Install balancing valve and union or flange at each coil return connection.

F. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping."

G. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories." Drawings indicate general arrangement of ducts and duct accessories.

1. Ensure that metal bands of connectors are parallel with minimum one-inch flex between ductwork and fan while running.
2. Where inlet and outlet ductwork at any fan is changed from that shown on the drawings, provide any motor, drive, and/or wiring changes required due to increased static pressure or baffling necessary to

prevent uneven airflow or improve mixing. In all cases obtain Approval before proceeding with changes to ductwork.

H. Electrical: Comply with applicable requirements in Division 26.

I. Ground equipment according to Division 26.

J. Where inlet and outlet ductwork at any fan is changed from that shown on drawings, submit scaled layout of the change and system effect factor calculations, indicating increased static pressure requirement as described in AMCA Publication 201. The Contractor shall be responsible for any motor, drive, and/or wiring changes required as result of duct configuration changes at fan.

K. If a water coil has multiple inlet and outlet connections, provide a shutoff valve, pressure port, flexible connector, and union at each inlet connection and provide a balance valve, pressure port, thermometer, flexible connector, and union at each outlet connection

3.4 CASING PENETRATIONS

A. Install sealing collars to the interior and exterior of each penetration to prevent air leakage where coil piping, air vents, drain piping, and electrical conduits penetrate unit casing. Silicone sealants and duct sealants are not acceptable to seal pipe penetrations of the unit casing.

B. Duct sealant and/or gaskets as indicated in specification section 233113 may be utilized to seal duct connections to the unit casing. Silicone sealants are not acceptable.

3.5 LEAKAGE TEST

A. Field test all modular air handling units.

B. Seal all openings and dampers at the air handling unit to the pressure class listed below before performing the test. A minimal amount of ductwork may be connected to the air handling unit in order to seal off large openings. The ductwork must meet or exceed the larger of the ductwork pressure class or the air handling unit pressure requirement.

C. Test draw through air handling units at -5" static pressure. The contractor and/or the unit manufacturer may brace the access doors in positive sections of the air handling unit to meet the testing requirements.

D. If excessive air leakage is found locate leaks, repair in the area of the leak, seal, and retest. Leakage rate shall not exceed more that 1% of the total system air quantity when subjected to +/- 5" static pressure.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Leak Test: After installation, fill water and hydronic coils with water, and test coils and connections for leaks.
2. Charge refrigerant coils with refrigerant and test for leaks.
3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Return air and outdoor air damper blades shall be positioned to force these air streams against each other to maximize air mixing and minimize air stratification.
6. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Air-handling unit or components will be considered defective if unit or components do not pass tests and inspections.

D. Prepare test and inspection reports.

3.7 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that shipping, blocking, and bracing are removed.
3. Verify that unit is secure on mountings and supporting devices and that connections to piping, ducts, and electrical systems are complete. Verify that proper thermal-overload protection is installed in motors, controllers, and switches.
4. Verify proper motor rotation direction, free fan wheel rotation, and smooth bearing operations.
5. Verify fan isolators have proper deflection.
6. Verify that outdoor-air and return-air mixing dampers open and close, and maintain minimum outdoor-air setting.
7. Comb coil fins for parallel orientation.
8. Install new, clean filters.
9. Verify that manual and automatic volume control and dampers in connected duct systems are in fully open position.

B. Starting procedures for air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm.
2. Measure and record motor electrical values for voltage and amperage.
3. Manually operate dampers from fully closed to fully open position and record fan performance.

3.8 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.

3.9 CLEANING

A. Clean units internally, on completion of installation, according to manufacturer's written instructions. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face.

B. After completing system installation and testing, adjusting, and balancing units and air-distribution systems, clean filter housings and install new filters.

3.10 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION 23 73 13

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to all Sections of divisions 26, 27, and 28.

1.2 DESCRIPTION

A. Work to be performed under the sections of Divisions 26, 27, and 28 includes all labor, materials, and equipment required to install complete electrical systems as described in these specifications and as shown on the drawings. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections.

B. Before submitting a bid, the Contractor shall examine the drawings and specifications, visit the work site, and be informed of local conditions, all federal, state and local ordinances, regulations and all other pertinent items which may affect cost, schedule, and completion of this project.

C. Drawings accompanying these specifications are a part of these specifications. Drawings are intended to show general arrangement, design, and extent of work and are diagrammatic. Drawings are not intended to show exact locations except where dimensions are shown. Any substantial differences existing between drawings and conditions in the field shall be submitted to the Engineer for consideration before proceeding with work. Electrical work is shown on plans using standard industry symbols.

D. Before ordering materials or doing work, the Contractor shall verify all measurements pertaining to work scope and assume installation responsibility for complete and fully functional electrical systems.

E. The electrical work included in all other divisions of this specification and related documents is the responsibility of the contractor performing the division 26, 27, and 28 work unless specifically noted otherwise.

1.3 REFERENCED STANDARDS

A. Abbreviations of standards organizations referenced in this and other sections are as follows:

1.	ANSI	American National Standards Institute
2.	ASTM	American Society for Testing and Materials
3.	EPA	Environmental Protection Agency
4.	ETL	Electrical Testing Laboratories, Inc.
5.	IBC	International Building Code
6.	IEEE	Institute of Electrical and Electronics Engineers
7.	IES	Illuminating Engineering Society
8.	ISA	Instrument Society of America
9.	NBS	National Bureau of Standards
10.	NEC	National Electric Code
11.	NECA	National Electrical Contractors Association

12.	NEMA	National Electrical Manufacturers Association
13.	NESC	National Electrical Safety Code
14.	NFPA	National Fire Protection Association
15.	UL	Underwriters Laboratories Inc.

1.4 QUALITY ASSURANCE

A. Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

B. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space and for obtaining the performance from the system into which these items are placed.

C. All materials shall be listed by and shall bear the label of an approved electrical testing laboratory. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, subject to approval by the Engineer, shall apply and such items shall bear those labels. Where one of the approved electrical testing laboratories has an applicable system listing and label, the entire system shall be so labeled. The Contractor shall not modify new equipment in such a way as to nullify the Testing Laboratories label. All equipment and materials shall be used or installed in accordance with any instruction included in the listing by the laboratory.

1.5 DEFINITIONS

A. Activation: Nomenclature used by some manufacturers for a service fitting.

B. ARC: Aluminum rigid conduit.

C. ATS: Acceptance Testing Specifications.

D. BACnet: A networking communication protocol that complies with ASHRAE 135.

E. BAS: Building automation system.

F. BF: Ballast factor.

G. CCT: Correlated color temperature.

H. CE: Conformite Europeene (European Compliance).

I. CPT: Control power transformer.

J. CRI: Color-rendering index.

K. CV: Coefficient of variation; a statistical measure of the weighted average of all relevant illumination values for the playing area, expressed as the ratio of the standard deviation for all illuminance values to the mean illuminance value.

L. Data Bus: Two wires used to communicate with bus connected devices.

M. Delegated-Design Submittals: Documents, including drawings, calculations, and material and product specifications prepared as a responsibility of Contractor to obtain acceptance by Owner and authorities having jurisdiction.

N. Device: A collective term for DALI-compliant bus connected devices, including fluorescent ballasts, incandescent fixtures, manual switches, switching relays, and similar. Sometimes also known as "slave unit."

O. ETFE: Ethylene tetrafluoroethylene.

P. EMI: Electromagnetic interference.

Q. EMT: Electrical metallic tubing.

R. Ethernet: Local area network based on IEEE 802.3 standards.

S. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T. Fade Override: The ability to temporarily set fade times to zero for all lighting scenes.

U. Fade Rate: The time it takes each zone to arrive at the next scene, dependent on the degree of change in lighting level.

V. Fade Time: The time it takes all zones to fade from one lighting scene to another, with all zones arriving at the next scene at the same time.

W. FEP: Fluorinated ethylene propylene.

X. Firmware: Software (programs or data) that has been written onto read-only memory (ROM). Firmware is a combination of software and hardware. Storage media with ROMs that have data or programs recorded on them are firmware.

Y. FMG: Factory Mutual Group

Z. GFCI: Ground-Fault Circuit Interrupter.

AA. GRC: Galvanized rigid steel conduit.

BB. Group: A set of devices that respond at the same time to messages on the data bus.

CC. HTML: Hypertext markup language.

DD. IBC: International Building Code.

EE. ICC-ES: ICC-Evaluation Service.

FF. IGBT: Insulated-gate bipolar transistor.

GG. Illuminance: The metric most commonly used to evaluate lighting systems. It is the density of luminous flux, or flow of light, reaching a surface divided by the area of that surface.

HH. Horizontal Illuminance: Measurement in foot-candles, on a horizontal surface 36 inches above ground unless otherwise indicated.

II. Target Illuminance: Average maintained illuminance level, calculated by multiplying initial illuminance by LLF.

JJ. Vertical Illuminance: Measurement in foot-candles, in **two** directions on a vertical surface, at an elevation coinciding with plane height of horizontal measurements.

KK. IMC: Intermediate metal conduit.

LL. Inominal: Nominal discharge current.

MM. Interruptible: As used in the Section Text, an off-line, passive-standby or line-interactive, inverter-only unit, with an intentional interruption of power to the load until an internal transfer switch picks up and transfers the load to the unit's inverter and internal battery source on loss of the "normal" source, and then retransfers to the "normal" source when it is restored. Transfer time can be "slow" (up to approximately 1 second) or "fast" (2-4 ms or 40-50 ms, depending on manufacturer).

NN. I/O: Input/output.

OO. IP: Internet protocol.

PP. IP Code: Required ingress protection to comply with IEC 60529.

QQ. IR: Infrared.

RR. Jacket: A continuous nonmetallic outer covering for conductors or cables.

SS. KY Pulse: A term used by the metering industry to describe a method of measuring consumption of electricity that is based on a relay changing status in response to the rotation of the disk in the meter.

TT. LAN: Local area network; sometimes plural as "LANs."

UU. LC: Lighting Certified.

VV. LCD: Liquid crystal display.

WW. LED: Light-emitting diode.

XX. Legally Required: As used in this Section, it shall have the same meaning as used in NFPA 70.

YY. LER: Luminaire efficacy rating.

ZZ. Light Trespass: Light spill into areas and properties outside the playing areas, which is either annoying or unwanted.

AAA. LLD: Lamp lumen depreciation, which is the decrease in lamp output as the lamp ages.

BBB. LLF: Light loss factor, which is the product of all factors that contribute to light loss in the system.

CCC. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.

DDD. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or remote-control, signaling and power-limited circuits.

EEE. LP: Liquid petroleum.

FFF. Lumen: Measured output of lamp and luminaire, or both.

GGG. Luminaire: Complete lighting fixture, including ballast housing if integral.

HHH. Maximum Power Point Tracking (MPPT) Control: MPPT software control of inverter in a renewable

energy system allows the ac output power to be proportional to the dc input voltage.

III. MCC: Motor-control center.

JJJ. MCCB: Molded-case circuit breaker.

KKK. MCOV: Maximum continuous operating voltage.

LLL. MCP: Motor-circuit protector.

MMM. Modbus TCP/IP: An open protocol for exchange of process data.

NNN. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.

OOO. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.

PPP. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.

QQQ. MPPT: Maximum power point tracking.

RRR. Maximum Power Point Tracking (MPPT) Control: MPPT software control of inverter in a renewable energy system allows the ac output power to be proportional to the dc input voltage.

SSS. NC: Normally closed.

TTT. NETA ATS: Acceptance Testing Specification.

UUU. NiCd: Nickel cadmium.

VVV. NO: Normally open.

WWW. OCPD: Overcurrent protective device.

XXX. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

YYY. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

ZZZ. OSHPD: Office of Statewide Health Planning and Development for the State of California.

AAAA. PC: Personal computer; sometimes plural as "PCs."

BBBB. PCC: Point of common coupling.

CCCC. PID: Control action, proportional plus integral plus derivative.

DDDD. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

EEEE. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

FFFF. Pole: Luminaire support structure, including tower used for large area illumination.

GGGG. Power Line Carrier: Use of radio-frequency energy to transmit information over transmission lines whose primary purpose is the transmission of power.

HHHH. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

IIII. PT: Potential transformer.

JJJJ. PTC: USA standard conditions for PV.

KKKK. PV: Photovoltaic.

LLLL. PWM: Pulse-width modulated.

MMMM. RFI: Radio-frequency interference.

NNNN. RMC: Rigid metal conduit.

OOOO. rms: Root-mean-square value of alternating voltage, which is the square root of the mean value of the square of the voltage values during a complete cycle.

PPPP. RS-232: A TIA standard for asynchronous serial data communications between terminal devices.

QQQQ. RS-485: A serial network protocol, similar to RS-232, complying with TIA-485-A

RRRR. Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity.

SSSS. SCR: Silicon-controlled rectifier.

TTTT. SCCR: Short-circuit current rating.

UUUU. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

VVVV. Sheath: A continuous metallic covering for conductors or cables.

WWWW. SPD: Surge protective device.

XXXX. SPDT: Single pole, double throw.

YYYY. Standard: Same definition as "Pole" above.

ZZZZ. STC: Standard Test Conditions defined in IEC 61215.

AAAAA. SVR: Suppressed voltage rating.

BBBBB. TCP/IP: Transport control protocol/Internet protocol incorporated into Microsoft Windows.

CCCCC. TDD: Total demand (harmonic current) distortion (also listed as "THD" in catalog data by manufacturers).

DDDDD. THD: Total harmonic distortion.

EEEEE. THD(V): Total harmonic voltage demand.

FFFFF. Tip-Speed Ratio (TSR): The ratio between the wind speed and the speed of the tips of the wind turbine blades. The tip speed of a turbine is calculated by manufacturer based on rated wind speed. The radius of the rotor's swept area is multiplied by two times Pi (3.1415) and divided by the rated time to complete one complete rotation.

GGGGG. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

HHHHH. TVSS: Transient voltage surge suppressor.

IIIII. UG: Uniformity gradient; the rate of change of illuminance on the playing field, expressed as a ratio between the illuminances of adjacent measuring points on a uniform grid.

JJJJJ. Uninterruptible: As used in the Section Text, an on-line, double-conversion (rectifier/inverter) unit, with no interruption of power to the load on interruption and restoration of the "normal" source.

KKKKK. UPS: Uninterrupted power supply.

LLLLL. UTP: Unshielded twisted pair.

MMMMM. VFC: Variable-frequency motor controller.

NNNNN. VFD – Variable frequency drive or motor controller.

OOOOO. VPN: Virtual private network.

PPPPP. VPR: Voltage protection rating.

QQQQQ. VRLA: Valve-regulated lead acid.

RRRRR. WAN: Wide area network.

SSSSS. Zone: A fixture or group of fixtures controlled simultaneously as a single entity. Also known as a "channel."

1.6 REGULATORY REQUIREMENTS

A. All work and materials are to conform in every detail to applicable rules and requirements of local codes and regulations, the National Electrical Code (NFPA 70), other applicable National Fire Protection Association codes, and current manufacturing standards (including NEMA) and any additional local modifications enacted by the Local Authority Having Jurisdiction. Contractor shall be responsible to verify what if any local modifications are in place or enacted by the Local Authority Having Jurisdiction.

B. All work shall be installed in accordance with NECA standards of installation.

C. All work shall conform where applicable to the Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA), Part 1910, "Occupational Safety and Health Standards." This shall include any local or state modifications enacted by the Authority having Jurisdiction.

1.7 OMISSIONS

A. No later than ten (10) days before bid opening, the Contractor shall call to the attention of the Engineer any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

1.8 SUBMITTALS

A. Refer to Division 01 for Submittal requirements.

B. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name or number, as indicated in the contract documents. Failure to do this may result in the submittal(s) being returned to the Contractor for correction and resubmission. Failing to follow these instructions does not relieve the Contractor from the requirement of meeting the project schedule.

C. On request, the Contractor shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc. to clarify intent of construction or operations.

D. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.

E. The submittals must be approved before fabrication.

1.9 PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of work to meet Project conditions, including changes to work specified in other Sections. Obtain written permission of Engineer before proceeding.

C. Tools, materials, and equipment shall be confined to areas designated by the Construction Manager.

1.10 WORK SEQUENCE AND SCHEDULING

A. See the General Conditions of the Contract, Scheduling and Coordination of Work, and Time for Completion of the Project, and General Requirements, Mutual Responsibility for additional requirements.

1.11 WORK BY OTHER TRADES

A. Every attempt has been made to indicate in this trade's specifications and drawings all work required of this Contractor. However, there may be additional specific paragraphs in other trade specifications and addenda, and additional notes on drawings for other trades which pertain to this Trade's work, and thus those additional requirements are hereby made a part of these specifications and drawings.

B. Electrical details on drawings for equipment to be provided by others is based on preliminary design data only. This Contractor shall lay out the electrical work and shall be responsible for its correctness to match equipment actually provided by others.

1.12 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Refer to Division 1, General Requirements, Operating and Maintenance Instructions for additional requirements.

1.13 TRAINING

A. Instruct Owner's personnel in the proper operation and maintenance of systems and equipment provided as part of this project; video record all training sessions. Use the Operating and Maintenance manuals during this instruction. Demonstrate startup and shutdown procedures for all equipment. All training to be during normal working hours.

B. The requirement for recording training sessions may be deleted on some projects but not the requirement for the training itself.

C. Refer to other sections in Divisions 26, 27, and 28 for specific section and equipment training requirements.

1.14 RECORD DRAWINGS

A. A set of prints shall be kept at the job site upon which all changes and deviations from the original design are to be recorded daily. All changes shall be clearly marked. These drawings shall indicate as a minimum, all changes made to the drawings, changes in circuiting, equipment location, accurate locations of embedded conduit, and all other significant changes and deviations from the original design.

B. The daily record of changes shall be the responsibility of the Contractor's field representative. No arbitrary mark-ups will be permitted.

C. At the completion of the project, the Contractor shall submit the marked-up record drawings to the Owner prior to request for final payment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Reference applicable sections within Divisions 26, 27, and 28.

PART 3 - EXECUTION

3.1 WORK INCLUDED

A. The scope of work shall include all work, including all labor, materials and equipment, testing required to install a complete electrical system as indicated in the project Manual. The Project Manual consists of the bidding documents, the contract, specifications, contract drawings and all subsequent addenda and modifications. The contractor shall furnish and install all necessary materials, apparatus and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.

B. All work items shown on the drawings is within the scope of work and shall be provided as indicated. Only items that are clearly indicated as being provided by others or under a separate contract shall be out of scope.

C. In general, the specifications indicate the requirements and quality for products required and the executions for those products. Only items that are clearly indicated as being provided by others or under a separate contract shall be out of scope.

D. If there is any discrepancy between the drawings and the specifications, it is the contractor's responsibility to notify the Engineer for resolution, prior to procuring equipment or starting work.

E. Coordinate and verify all equipment being supplied by equipment supplier and other trades. Verify equipment size, motor HP, dimensions, locations, etc. as all are subject to change.

F. Contractor shall verify all door swings and the location of all cabinets, diffusers, HVAC, plumping, process and building equipment before installing electrical equipment, fixtures, outlets and conduit.

G. The Contractor shall provide all plywood backboards and supports for all electrical equipment as indicated on the drawings and as required or specified.

H. All permits and inspection fees required to complete the work shall be paid for by the Contractor unless noted otherwise.

I. All electrical equipment and fixtures shall be installed in complete accordance with the manufacturers' recommendations.

J. Contractor shall provide all motor connections as shown on the drawings and as specified herein.

3.2 CONCRETE

A. All concrete work required for the proper installation of electrical equipment including transformer, switchgear and motor control center pads and other equipment pads shall be provided by the Contractor and shall conform to specifications in Division 3.

3.3 SITE WORK

A. The Contractor shall provide excavation and backfill for all electrical underground work as indicated on the drawings and as required. The Contractor shall perform this work and provide compaction as specified in Division 2. Finish grading and final restoration shall be by the General Contractor.

3.4 BUILDING ACCESS

A. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.

3.5 EQUIPMENT ACCESS

A. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the General Contractor, making sure that access is available for all equipment and specialties. Where access is required in plaster or drywall walls or ceilings, furnish the access doors to the General Contractor and reimburse the General Contractor for installation of those access doors.

3.6 COORDINATION

A. The Contractor shall cooperate with other trades in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical work to better fit the general installation, such work shall be done at no extra cost, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.

B. The Contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to, light fixtures, panelboards, devices, etc. and recessed or semi-recessed heating units installed in/on architectural surfaces.

C. Coordinate all work with other trades prior to installation. Any installed work that is not coordinated and that interferes with another trades work shall be removed or relocated at the installing contractor's expense.

3.7 HOUSEKEEPING AND CLEAN UP

A. Refer to Division 1, General Requirements, and Cleaning for additional requirements.

B. The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, the Contractor shall remove all tools, excess material and equipment, etc., from the site.

END OF SECTION 26 05 00

SECTION 26 33 23.11

CENTRAL BATTERY EQUIPMENT FOR EMERGENCY LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following central battery and power conversion equipment rated 600 V and less for emergency lighting:

1. Uninterruptible (UPS-type) central battery equipment.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and rating of central battery equipment unit.

1. Include features, performance, electrical ratings, operating characteristics, shipping and operating weights, shipping splits, and furnished options, specialties, and accessories.

B. Shop Drawings: For each type and rating of central battery equipment unit.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, ventilation requirements, method of field assembly, components, and location and size of each field connection.
3. Include system one-line diagram, internal and interconnecting wiring; and diagrams for power, signal, and control wiring.
4. Include elevation, details, and legends of control and indication displays.
5. Include -circuit current (withstand) rating of unit.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Floor plans, drawn to scale, showing dimensioned layout, required working clearances, and required area above and around central battery equipment. Show central battery equipment layout and relationships between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate field measurements.

B. Qualification Data: For testing agency.

C. Product Certificates: For each type of central battery equipment.

D. Source quality-control reports.

E. Field quality-control reports.

F. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For central battery equipment to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Manufacturer's written instructions for testing central battery equipment.
b. Manufacturer's written instructions for testing, adjusting, and reprogramming microprocessor control modules.
c. Manufacturer's written instructions for selecting and setting field-adjustable controls and status and alarm points

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

1. Fuses: One for every 10 of each type and rating, but no fewer than 2 of each type.
2. Cabinet Ventilation Filters: One complete set.
3. Circuit Board: One spare circuit board for each critical circuit.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in fully enclosed vehicles.

B. Store equipment in spaces having environments controlled within manufacturers' written instructions for ambient temperature and humidity conditions for non-operating equipment.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Less than 0 deg F or exceeding 104 deg F, with an average value exceeding 95 deg F over a 24-hour period.
2. Ambient Storage Temperature: Not less than minus 4 deg F and not exceeding 140 deg F.
3. Humidity: More than 95 percent (condensing).
4. Altitude: Exceeding 3300 feet.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for central battery equipment, including clearances between central battery equipment and adjacent surfaces and other items.

1.10 COORDINATION

A. Coordinate sizes and locations of concrete bases. Cast anchor-bolt inserts into bases.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace central battery equipment that fails in materials or workmanship within specified warranty period. Special warranty, applying to batteries only, applies to materials only, on a prorated basis, for period specified.

1. Warranty Period: Include the following warranty periods, from date of Substantial Completion:

a. Central Battery Equipment (excluding Batteries): Two year(s).
b. Standard VRLA Batteries:

1) Full Warranty: One year(s).
2) Pro Rata: Nine years.

PART 2 - PRODUCTS

2.1 UNINTERRUPTIBLE (UPS-TYPE) CENTRAL BATTERY EQUIPMENT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Cooper Industries, Inc.
2. Dual-Lite.
3. Lithonia Lighting; Acuity Brands Lighting, Inc.

B. General Requirements for Central Battery Equipment:

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. NRTL Compliance: Fabricate and label central battery equipment to comply with UL 924.
3. Comply with the IBC, NFPA 70, and NFPA 101.
4. Comply with NEMA PE 1.

C. Performance Requirements for UPS-Type Central Battery Equipment:

1. Type: On-line, double conversion.
2. Continuously provide uninterrupted ac power to connected emergency electrical lighting system.
3. Automatic Operation:

a. Normal Conditions: Supply the load with ac power flowing from normal ac power input terminals, through rectifier and inverter, with battery connected in parallel with rectifier output.
b. Abnormal Supply Conditions: If normal ac supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, battery supplies constant, regulated, inverter ac power output to the load without switching or disturbance.
c. If normal power fails, battery continues to supply regulated ac power through the inverter to the load without switching or disturbance.
d. When power is restored at normal supply terminals of system, controls automatically synchronize inverter with the external source before transferring the load. Rectifier then supplies power to the load through the inverter and simultaneously recharges battery.
e. If battery becomes discharged and normal supply is available, rectifier charges battery. When battery is fully charged, rectifier automatically shifts to float-charge mode.
f. If any element in the rectifier/inverter string fails and power is available at normal supply terminals of system, static transfer switch transfers the load to normal ac supply circuit without disturbance or interruption of supply.

g. If a fault occurs in system supplied by the inverter output, and current flows in excess of the overload rating of the inverter, static transfer switch operates to bypass fault current to normal ac supply circuit for fault clearing.
h. When fault has cleared, static transfer switch returns the load to inverter output.
i. If battery is disconnected, inverter continues to supply power to the load with no degradation of its regulation of voltage and frequency of output bus.

4. Manual Operation:

a. Turning inverter off causes static transfer switch to transfer the load directly to normal ac supply circuit without disturbance or interruption.
b. Turning inverter on causes static transfer switch to transfer the load to inverter.

D. Unit Operating Requirements:

1. Input AC Voltage Tolerance: Plus 10 and minus 15 percent of central battery equipment input voltage rating.
2. Input Frequency Tolerance: Plus or minus 3 percent of central battery equipment frequency rating.
3. Synchronizing Slew Rate: 1 Hz per second, maximum.
4. Minimum Off-Line Efficiency: 95 percent at 60 Hz, full load.
5. Minimum Displacement Primary-Side Power Factor: 98 percent under any load or operating condition.
6. Ambient Temperature Rating (Other Than Batteries): Not less than 68 deg F and not exceeding 86 deg F.
7. Ambient Storage Temperature Rating (Other Than Batteries): Not less than minus 4 deg F and not exceeding 158 deg F
8. Ambient Temperature Rating (Batteries): Not less than 32 deg F and not exceeding 104 deg F.
9. Ambient Storage Temperature Rating (Batteries): Not less than 0 deg F and not exceeding 104 deg F
10. Humidity Rating: Less than 95 percent (noncondensing).
11. Altitude Rating: Not exceeding 3300 feet.
12. Off-Line Overload Capability: 1.1 times the base load current for 60 seconds; minimum of 1.8 times the base load current for three seconds.

E. Inverter and Controls Logic: Microprocessor based, isolated from all power circuits; provides complete self-diagnostics, periodic automatic testing and reporting; with alarms.

F. Controls and Indication:

1. Status Indication: Door-mounted, labeled LED indicators or digital screen displaying the following conditions:

a. Normal power available.
b. Status of system.
c. Battery charging status.
d. On battery power.
e. System fault.
f. External fault.

2. Panel-Mounted Operator Station: Manufacturer's standard front-accessible, sealed keypad and plain-English language digital display; allows complete programming, program copying, operating, monitoring, and diagnostic capability.

a. Keypad: In addition to required programming and control keys, include the following:

1) Keys for METER, CONTROL, PROGRAM, and CLEAR modes.
2) Security Access: Provide electronic security access to controls through identification and password with at least two levels of access: View only; and view, operate, and service.
3) Control Authority: Supports at least three conditions: Off, local manual control at unit and local automatic control at unit.

b. Digital Display: Plain-English language messages on a digital display; provide the following historical logging information and displays:

1) Real-time clock with current time and date.
2) Tests and Events Logs: Record and store up to 25 tests and events:

a) Dates.
b) Times.
c) Durations.
d) Output voltage and currents.

3) Alarm Logs: Record and store up to 50 alarms:

a) Dates.
b) Times.
c) Alarm type.

4) Metering Functions: Display central battery equipment metering parameters including, but not limited to, the following:

a) Input and output voltage (V ac) and output current (A ac).
b) Battery voltage (V dc) and current (A ac).
c) Fault or alarming status (code).
d) Power output (VA).
e) Inverter load (W).
f) Ambient temperature (deg F).
g) System run time (cumulative days).
h) Inverter run time (cumulative minutes).

5) Alarm Functions: Digital display mounted flush in unit door and connected to display central battery equipment parameters including, but not limited to, the following:

a) High/low battery charge voltage.
b) High/low input voltage.
c) Battery nearing low-voltage condition.
d) Battery low voltage.
e) High ambient temperature.
f) Inverter fault.
g) Output fault.
h) Output overload.

3. Remote Signal Interfaces:

a. Remote Indication Interface: A minimum of one programmable (Form C) dry-circuit relay output(s) (120-V ac, 2 A) for remote indication of the following:

1) Fault or status indication.
2) On bypass.
3) Low battery.

b. Communications Interface: Factory-installed hardware and software to enable a remote PC to monitor and display status and alarms.

1) Network Communications Ports: Ethernet and RS-232.

2) Compliance with ASHRAE 135: Controllers shall support serial MS/TP and Ethernet IP communications, and shall be able to communicate directly via DDC system for HVAC RS-485 serial networks and Ethernet 10Base-T networks as a native device.

G. Self-Protection and Reliability Features:

1. Input transient protection by means of surge suppressors to provide protection against damage from supply voltage surges as defined in IEEE C62.45, Category B and C.
2. Integral, programmable, self-diagnostic and self-test circuitry; with alarms and logging.
3. Battery deep-discharge and self-discharge protection; with alarms.
4. Battery self-test circuitry; with alarms and logging.

H. Integral Input Disconnecting Means and OCPD: Thermal-magnetic circuit breaker, complying with UL 489.

1. Integrated Equipment Minimum Short-Circuit Current (Withstand) Rating: 65 kA.

I. Rectifier:

1. Description: Solid state, with the following operational features:

a. Automatically convert incoming ac voltage to regulated dc bus voltage, with less than 2 percent rms ripple voltage with inverter fully loaded and batteries disconnected.
b. Rectified Efficiency: Not less than 97 percent.

J. Inverter:

1. Description: Solid-state, high-frequency, PWM type, with the following operational features:

a. Automatically regulate output voltage to within plus or minus 3 percent, for all load ranges and for maximum 25 percent step-load changes; regulation may increase to 8 percent for 100 percent step-load changes, with recovery within 3 cycles.
b. Automatically regulate output frequency to within plus or minus 0.05 Hz, from no load to full load, at unity power factor, over the operating range of battery voltage.
c. Inverter Overload Capability: 115 percent for 10 minutes; 150 percent surge for 10 seconds.
d. Brownout Protection: Produces rated power without draining batteries when input voltage is down to 75 percent of normal.
e. Load Power Factor: 0.5 lead to 0.5 lag.

K. Battery Charger:

1. Description: Solid state, variable rate, temperature compensated; automatically maintains batteries in fully charged condition when normal power is available.
2. Maximum Battery Recharge Time from Fully Discharged State: 24 hours.
3. Low-voltage disconnect circuit reduces battery discharge during extended power outages, monitors battery voltage, and disconnects inverter when battery voltage drops to no less than 85.7 percent of nominal voltage.

L. Batteries:

1. Description: Standard VRLA batteries.

a. Capable of sustaining full-capacity output of inverter unit for minimum of 90 minutes.

2. Battery Disconnect and OCPD: Manufacturer's standard.

M. Maintenance Bypass Systems:

1. Maintenance Bypass Mode: Internal; manual operation only; bypasses central battery equipment power circuits (inverter and static transfer switch); requires local operator selection at central battery equipment. Transfer and retransfer shall be make-before-break, without disrupting power to the load or causing system instabilities.

N. Integral Output Disconnecting Means and OCPD:

1. Single-Output OCPD: As scheduled on Drawings; manufacturer's standard ratings based on unit output ratings.

2.2 ENCLOSURES

A. Central Battery Equipment Enclosures: NEMA 250, to comply with environmental conditions at installed location.

1. Dry and Clean Indoor Locations: Type 1 steel cabinets with access to components through hinged doors with flush tumbler lock and latch.
2. Finish: Manufacturer's standard baked-enamel finish over corrosion-resistant prime treatment.

2.3 OPTIONAL AND ACCESSORY FEATURES

A. Factory-Installed Options and Accessories:
1. Audible alarm with silencer switch.

2.4 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate central battery equipment fabricator's quality-control and testing methods.

B. Testing: Test and inspect central battery equipment according to UL 924.

C. Factory Tests: Test and inspect assembled central battery equipment, by a qualified testing agency, according to UL 924. Affix standards organization's label. Include the following:

1. Functional test and demonstration of all functions, controls, indicators, sensors, and protective devices.
2. Full-load test.
3. Transient-load response test.
4. Overload test.
5. Power failure test.

D. Central battery equipment will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store central battery equipment according to NECA 411.

B. Examine areas, surfaces, and substrates to receive central battery equipment, with Installer present, for compliance with requirements for installation tolerances, structural support, ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment will be installed, before installation begins.

C. Examine equipment before installation. Reject equipment that is wet, moisture damaged, or mold damaged.

D. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate layout and installation of central battery equipment with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install central battery equipment and accessories according to NECA 411.

C. Floor-Mounted Central Battery Equipment: Install central battery equipment on 4-inch nominal-thickness concrete base. Comply with requirements for concrete base specified in Section 033000 "Cast-in-Place Concrete."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

E. Comply with NECA 1.

F. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

G. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 CONNECTIONS

A. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams unless otherwise indicated.

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

1. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping systems as indicated; comply with NFPA 70.

C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 CONTROL WIRING INSTALLATION

A. Install wiring between central battery equipment and remote devices. Comply with requirements in Section 260523 "Control-Voltage Electrical Power Cables."

B. Bundle, train, and support wiring in enclosures.

3.5 IDENTIFICATION

A. Identify central battery equipment, components, and control wiring. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label central battery equipment with engraved nameplates.
3. Label each separate cabinet, for multicabinet units.
4. Label each enclosure-mounted control and pilot device.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

D. Acceptance Testing Preparation:

1. Inspect and Test Each Component:

a. Inspect wiring, components, connections, and equipment installations. Test and adjust components and equipment.
b. Test insulation resistance for all external branch circuit, feeder, control, and alarm wiring connected to central battery equipment element and component.
c. Test continuity of each circuit.

E. Tests and Inspections:

1. Inspect central battery equipment, wiring, components, connections, and equipment installation. Test and adjust components and equipment.
2. Test insulation resistance for all external branch circuit, feeder, control, and alarm wiring connected to central battery equipment element and component.
3. Test continuity of each circuit.
4. Verify that input voltages and frequencies at central battery equipment locations are within voltage and frequency limits specified in Part 2. If outside this range, notify Architect before closing input OCPDs.
5. Perform each visual and mechanical inspection and electrical test stated in manufacturer's written instructions and in NETA Acceptance Testing Specification, including specifically those for batteries, battery chargers, and UPS, regardless of the type of central battery equipment provided. Certify compliance with test parameters.
6. Perform a load-duration test at rated voltage and rated output current to verify the correct functional operation of the unit under full-load stable operating conditions for the minimum time limits required by UL 924. Monitor and record ambient temperature and temperatures within the unit.
7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Central battery equipment will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies central battery equipment and describes all test results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.7 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.8 ADJUSTING

A. Program microprocessors for required operational sequences, status indications, alarms, event recording, and display features. Clear events memory after final acceptance testing and prior to Substantial Completion.

B. Set field-adjustable switches, auxiliary relays, and other adjustable parts.

C. Adjust the trip settings of thermal-magnetic circuit breakers with adjustable, instantaneous-trip elements; install fuses if not factory installed.

D. Set the automatic system test parameters.

3.9 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until controllers are ready to be energized and placed into service.

B. Replace central battery equipment whose interiors have been exposed to water or other liquids prior to Substantial Completion.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain central battery equipment, and to use and reprogram microprocessor-based control, monitoring, and display functions.

END OF SECTION 26 33 23.11

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Chain-link fences - CLF-1:
      a. Fabric:
         1) Steel wire with metallic coating with polymer color coat.
      b. Framework:
         1) Post Material:
            a) Heavy-industrial-strength Group IA or IC round steel pipe posts.
         2) Horizontal Members:
            a) Top rails.
            b) Bottom rails.
         3) Brace rails.
         4) Coating:
            a) Metallic coating and polymer color coat.
   2. Fittings.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for cast-in-place concrete post footings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
   2. Review sequence of operation for each type of gate operator.
   3. Review coordination of interlocked equipment specified in this Section and elsewhere.
   4. Review required testing, inspecting, and certifying procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Fence and gate posts, rails, and fittings.
      b. Chain-link fabric, reinforcements, and attachments.
      c. Accessories: .

B. Shop Drawings: For each type of fence and gate assembly.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include accessories, hardware, gate operation, and operational clearances.

C. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:

1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.6 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure to comply with performance requirements.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:

1. Steel Wire for Fabric:
   a. Wire Diameter: 0.192 inch.
   b. Mesh Size: 2 inches.
   c. Metallic Coating: Any of following:
      1) Aluminum-Coated Fabric: ASTM A 491, Type I, 0.30 oz./sq. ft..
      2) Zinc-Coated Fabric: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied before weaving.
      3) Zn-5-Al-MM Aluminum-Mischmetal-Coated Fabric: ASTM F 1345, Type III, Class 1, 0.60 oz./sq. ft..
   d. Polymer-Coating: Applied per ASTM F 668, Class 1 or Class 2a over metallic coated steel wire specified above.
      1) Color: Black, according to ASTM F 934.
2. Selvage: Knuckled at both selvages.

2.2 FENCE FRAMEWORK

A. Heavy-Industrial-Strength Posts and Rails, Group IA or IC: ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:

1. Fence Height: 72 inches.
2. Material: Group IA, round steel pipe, Schedule 40 or Group IC, round steel pipe, electric-resistance-welded pipe.
   a. Line Post: 1.9 inches in diameter.
   b. End, Corner, and Pull Posts: 2.375 inches in diameter.
   c. Horizontal Framework Members: Provide following rails according to ASTM F 1043.
      1) Top Rails: 1.66 inches in diameter.
      2) Bottom Rails: 1.66 inches in diameter.
   d. Brace Rails: ASTM F 1043, 1.66 inches in diameter.

B. Coatings:

1. Metallic Coating for Steel Framework: Any of following:
   a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating according to ASTM A 653/A 653M.

b. Type B: Zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
c. External, Type B: Zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- thick, zinc-pigmented coating.
d. Type C: Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.

2. Polymer Coating: Apply over metallic coating specified above.
   a. Color: Black, according to ASTM F 934.

2.3 FITTINGS

A. Provide fittings according to ASTM F 626.
B. Post Caps: Provide for each post.
   1. Provide line post caps with loop to receive tension wire or top rail.
C. Rail and Brace Rail Ends: For each gate, corner, pull, and end post.
D. Rail Fittings: Provide the following:
   1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
   2. Rail Clamps: Line and corner boulevard clamps for connecting rails to posts.
E. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
   1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
      a. Hot-Dip Galvanized Steel: 0.106-inch- diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
F. Finish:
   1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.
      a. Apply polymer color coating over metallic coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a certified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
   1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
   1. Install fencing on established boundary lines inside property line.
B. Post Setting:
   1. Posts Set in Concrete Footings: Set posts in concrete at indicated spacing into firm, undisturbed soil.
      a. Excavation: Drill or hand-excavate holes for posts. Excavate holes to a diameter of not less than 4 times posts size and a depth of not less than 24 inchesplus 3 inchesfor each footor fraction of a footthat fence height exceeds 4 feet.
      b. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete.

c. Extend posts to within 6 inchesof specified excavation depth, but not closer than 3 inchesto bottom of concrete.

d. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

1) Concealed Concrete: Place top of concrete 2 inches below grade as indicated on Drawings to allow covering with surface material.

C. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of as indicated on Drawings. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

D. Line Posts: Space line posts uniformly at 96 inches o.c.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

G. Bottom Rails: Secure to posts with fittings.

H. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

J. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.4 FIELD QUALITY CONTROL

A. test reports.

3.5 ADJUSTING

A. Lubricate hardware and other moving parts.

END OF SECTION 32 31 13

SECTION 32 31 19

DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Decorative metallic-coated-steel tubular picket fences, prefabricated.
2. Swing gates.
3. Horizontal-slide gates.
4. Gate operators, including controls.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for concrete bases for gate operators, drives, and controls and post concrete fill.
2. Section 28 13 00 "Access Control" for access control devices installed at gates and provided as part of a security system.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.

1. Include diagrams for power, signal, and control wiring.

C. Samples: For each fence material and for each color specified.

1. Provide Samples 12 inches in length for linear materials.
2. Provide Samples 12 inches square for sheet or plate materials.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For gate operators to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.1 DECORATIVE METALLIC-COATED-STEEL TUBULAR PICKET FENCES, PREFABRICATED

A. Decorative Metallic-Coated-Steel Tubular Picket Fences: Comply with ASTM F 2408 for industrial application (class) unless otherwise indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Ameristar Fence; Montage Commercial, Majestic series or comparable product by one of the following:

a. BetaFence USA LLC.
b. Fortress Iron.
c. Hill & Smith Inc.
d. Iron Eagle Industries, Inc.

e. Iron World Manufacturing, LLC.

B. Posts:

1. End and Corner Posts: Square tubes 2-1/2 by 2-1/2 inches formed from14 ga, metallic-coated steel sheet or formed from 14 ga thickness steel sheet and hot-dip galvanized after fabrication.
2. Posts at Swing Gate Openings: Square steel tubing 4 by 4 inches with 11 ga. wall thickness, hot-dip galvanized.
3. Posts at Horizontal-Slide Gate Openings up to 12 Feet: Square steel tubing 4 by 4 inches with 11 ga. wall thickness, hot-dip galvanized.
4. Posts at Horizontal-Slide Gate Openings Wider Than 12 Feet: Square steel tubing 4 by 4 inches with 11 ga. wall thickness, hot-dip galvanized.

C. Post Caps: UV-resistant plastic.

D. Rails: Square tubes.

1. Size: 2 inches x 4 inches notched and plated for V-Track Wheels .
2. Metal and Thickness: 0.079-inch nominal-thickness, metallic-coated steel sheet or 0.075-inch nominal-thickness, uncoated steel sheet, hot-dip galvanized after fabrication.

E. Pickets: Square tubes.

1. Terminate tops of pickets at top rail for flush top appearance.
2. Picket Spacing: 4 inches clear, maximum.

F. Fasteners: Manufacturer's standard concealed fastening system.

G. Fasteners: Manufacturer's standard tamperproof, corrosion-resistant, color-coated fasteners matching fence components with resilient polymer washers.

H. Metallic-Coated Steel Sheet: Galvanized-steel sheet or aluminum-zinc, alloy-coated steel sheet.

I. Interior surface of tubes formed from uncoated steel sheet shall be hot-dip zinc coated same as exterior .

J. Galvanizing: For components indicated to be galvanized and for which galvanized coating is not specified in ASTM F 2408, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.

K. Finish: Organic coating complying with requirements in ASTM F 2408.

2.2 SWING GATES

A. Gate Configuration: As indicated.

B. Gate Frame Height: As indicated.

C. Gate Opening Width: As indicated.

D. Automated vehicular gates shall comply with ASTM F 2200, Class IV.

E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubes 2-1/2 by 2-1/2 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet or formed from 014 ga. thickness steel sheet and hot-dip galvanized after fabrication.

F. Steel Frames and Bracing: Fabricate members from square steel tubing 2-1/2 by 2-1/2 inches with14 ga. wall thickness. Hot-dip galvanize frames after fabrication.

G. Frame Corner Construction: Welded.

H. Additional Rails: Provide as indicated, complying with requirements for fence rails.

I. Infill: Comply with requirements for adjacent fence.

J. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.

1. Treillage: Provide iron castings of pattern indicated between each pair of pickets. Finish as specified for adjacent fence.

K. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet wide. Provide center gate stops and cane bolts for pairs of gates. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

L. Spring Hinges: BHMA A156.17, Grade 1, suitable for exterior use.

M. Hinges: BHMA A156.1, Grade 1, suitable for exterior use.

N. Rim Locks: BHMA A156.5, Grade 1, suitable for exterior use.

1. Material: Cast, forged, or extruded brass or bronze.
2. Mounting Plate: Configuration necessary for mounting locks. Fabricate from 1/8-inch- thick, steel plate; galvanized.

O. Electric Strikes: BHMA A156.31, Grade 1, of configuration required for use with lock specified, fail-safe, and suitable for exterior use.

1. Mounting Plate: Configuration necessary for mounting electric strikes. Fabricate from 1/8-inch- thick, steel plate; galvanized.
2. Mounting: Mortise into post.

P. Exit Hardware: BHMA A156.3, Grade 1, Type 1 (rim exit device), with push pad actuating bar, suitable for exterior use.

Q. Cane Bolts: Provide for inactive leaf of pairs of gates. Fabricated from 3/4-inch- diameter, round steel bars, hot-dip galvanized after fabrication. Finish to match gates. Provide galvanized-steel pipe strikes to receive cane bolts in both open and closed positions.

R. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.

S. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.

T. Metallic-Coated-Steel Finish: High-performance coating.

U. Steel Finish: High-performance coating.

V. Aluminum Finish: Baked enamel or powder coating.

2.3 HORIZONTAL-SLIDE GATES

A. Gate Configuration: As indicated.

1. Type: Cantilever slide, with internal roller assemblies.

B. Gate Frame Height: As indicated.

C. Gate Opening Width: As indicated.

D. Automated vehicular gates shall comply with ASTM F 2200, Class IV.

E. Galvanized-Steel Frames and Bracing: Fabricate members from square tubing.

1. Frame Members: Square tubes 2-1/2 by 2-1/2 inches formed from 14 ga. nominal-thickness, metallic-coated steel sheet or formed from 14 ga. nominal-thickness steel sheet and hot-dip galvanized after fabrication.
2. Bracing Members: Square tubes 2-1/2 by 2-1/2 inches formed from 14 ga. nominal-thickness, metallic-coated steel sheet or formed from 14 ga. nominal-thickness steel sheet and hot-dip galvanized after fabrication.

F. Steel Frames and Bracing: Fabricate members from square tubing. Hot-dip galvanize frames after fabrication.

1. Frame Members: Steel tubing 2-1/2 by 2-1/2 inches with 14 ga. wall thickness.
2. Bracing Members: Steel tubing 2-1/2 by 2-1/2 inches with 14 ga. wall thickness.

G. Frame Corner Construction:

1. Welded frame and 5/16-inch- diameter, adjustable truss rods for panels 5 feet wide or wider.

H. Additional Rails: Provide as indicated, complying with requirements for fence rails.

I. Infill: Comply with requirements for adjacent fence.

J. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.

1. Treillage: Provide iron castings of pattern indicated between each pair of pickets. Finish as specified for adjacent fence.

K. Hardware: Latches permitting operation from both sides of gate, roller assemblies and stops fabricated from galvanized steel. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

L. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.

M. Galvanizing: For items other than hardware that are indicated to be galvanized, hot-dip galvanize to comply with ASTM A 123/A 123M. For hardware items, hot-dip galvanize to comply with ASTM A 153/A 153M.

N. Metallic-Coated-Steel Finish: High-performance coating.

O. Steel Finish: High-performance coating.

P. Aluminum Finish: Baked enamel or powder coating.

2.4 GATE OPERATORS

A. Gate Operators:

1. Basis-of-Design Product: Subject to compliance with requirements, see below for product information:

   a. DoorKing, Inc., 9235 Vehicular Slide Gate Operator

B. Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.

1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
2. Provide operator with UL-approved components.
3. Provide electronic components with built-in troubleshooting diagnostic feature.
4. Provide unit designed and wired for both right-hand/left-hand opening, permitting universal installation.

C. Comply with NFPA 70.

D. UL Standard: Manufacturer and label gate operators to comply with UL 325.

E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators on gates that must provide emergency access.

F. Motor Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, within installed environment, with indicated operating sequence, and without exceeding nameplate rating or considering service factor. Comply with NEMA MG 1 and the following:

1. Voltage: 208-220 V.
2. Horsepower: Not less than 3hp.
3. Enclosure: Manufacturer's standard.
4. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
6. Phase: One.

G. Gate Operators: Post mounted and as follows:

1. Mechanical Slide Gate Operators:

   a. Duty: Heavy duty, commercial/industrial.
   b. Gate Speed: Minimum 4 Ft/Sec.
   c. Maximum Gate Weight: 3000 lb.
   d. Frequency of Use: 60 cycles per hour.
   e. Operating Type: Roller chain, with manual release.
   f. Drive Type: Enclosed worm gear and chain-and-sprocket reducers, roller-chain drive.
   g. Drive Type: V-belt and chain-and-sprocket reducers, roller-chain drive.
   h. Thermostatically controlled heater kit.

H. Remote Controls: Electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 enclosure for pedestal mounting, and with space for additional optional equipment. Provide the following remote-control device(s):

1. Card Reader: Functions only when authorized card is presented. Programmable, multiple -code system, permitting four different access time periods.

   a. Reader Type: Touch plate.
   b. Features: Capable of monitoring and auditing gate activity.

2. Radio Control: Digital system consisting of code-compatible universal receiver for each gate, located where indicated, with remote antenna with coaxial cable and mounting brackets designed to operate gates. Provide two programmable transmitter(s) with multiple-code capability permitting validating or voiding of not less than 1000 codes per channel configured for the following functions:

   a. Transmitters: Three button operated, with open and close function.
   b. Channel Settings: Two independent channel settings controlling separate receivers for operating more than one gate from each transmitter.

I. Vehicle Loop Detector: System includes automatic closing timer with adjustable time delay , timer cutoff switch, and loop detector designed to hold gate open until traffic clears. System includes electronic detector with adjustable detection patterns, adjustable sensitivity and frequency settings, and panel indicator light designed to detect presence or transit of a vehicle over an embedded loop of wire and to emit a signal activating the gate operator. System includes number of loops consisting of multiple strands of wire, number of turns, loop size, and method of placement, as recommended in writing by detection system manufacturer for function indicated, at location shown on Drawings.

J. Vehicle Presence Detector: System includes automatic closing timer with adjustable time delay, timer cutoff switch, and presence detector designed to hold gate open until traffic clears. System includes retroreflective detector with adjustable detection zone pattern and sensitivity, designed to detect the presence or transit of a vehicle in gate pathway when infrared beam in zone pattern is interrupted, and to emit a signal activating the gate operator.

K. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:

1. Action: Reverse gate in both opening and closing cycles, and hold until clear of obstruction.
2. Action: Stop gate in opening cycle and reverse gate in closing cycle, and hold until clear of obstruction.
3. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
4. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated, in locations as follows. Connect to control circuit using gate edge transmitter and operator receiver system.
    a. Along entire gate leaf leading edge.
    b. Along entire gate leaf trailing edge.
    c. Across entire gate leaf bottom edge.
    d. Along entire length of gate posts.
    e. Along entire length of gate guide posts.
    f. Where indicated on Drawings.
5. Photoelectric/Infrared Sensor System: Designed to detect an obstruction in gate's path when infrared beam in the zone pattern is interrupted.

L. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.

M. Emergency Release Mechanism: Quick-disconnect release of operator drive system of the following type, permitting manual operation if operator fails. Design system so control-circuit power is disconnected during manual operation.

1. Type: Integral fail-safe release, allowing gate to be pushed open without mechanical devices, keys, cranks, or special knowledge.

N. Operating Features:

1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features with capability for monitoring and auditing gate activity. Provide unit that is isolated from voltage spikes and surges.
2. System Integration: With controlling circuit board capable of accepting any type of input from external devices.
3. Master/Slave Capability: Control stations designed and wired for gate pair operation.
4. Automatic Closing Timer: With adjustable time delay before closing and timer cutoff switch.
5. Open Override Circuit: Designed to override closing commands.
6. Reversal Time Delay: Designed to protect gate system from shock load on reversal in both directions.
7. Maximum Run Timer: Designed to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
8. Clock Timer: 24-hour programmable for regular events.

O. Accessories:

1. Warning Module: Visual, strobe-light alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving; compliant with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
2. Battery Backup System: Battery-powered drive and access-control system, independent of primary drive system:

a. Fail-Safe: Gate opens and remains open until power is restored.
b. Fail-Secure: Gate cycles on battery power, then fail-safe when battery is discharged.

3. External electric-powered magnetic lock with delay timer allowing time for lock to release before gate operates.
4. Fire box.
5. Fire strobe sensor.
6. Instructional, Safety, and Warning Labels and Signs: Manufacturer's standard for components and features specified.
7. Equipment Bases/Pads: Precast concrete, depth not less than 12 inches, dimensioned and reinforced according to gate operator component manufacturer's written instructions and as indicated on Drawings.

2.5 STEEL AND IRON

A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
C. Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
D. Uncoated Steel Sheet: Hot-rolled steel sheet, ASTM A 1011/A 1011M, Structural Steel, Grade 45.
E. Metallic Coated Steel Sheet:
   1. Galvanized-Steel Sheet: ASTM A 653/A 653M, structural quality, Grade 50, with G90 coating.
   2. Aluminum-Zinc, Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, with AZ60 coating.
F. Castings: Either gray or malleable iron unless otherwise indicated.
   1. Gray Iron: ASTM A 48/A 48M, Class 30.
   2. Malleable Iron: ASTM A 47/A 47M.

2.6 COATING MATERIALS

A. Shop Primers for Steel: Provide primers that comply with Section 09 91 13 "Exterior Painting."
B. Shop Primer for Steel: Manufacturer's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
C. Epoxy Zinc-Rich Primer for Uncoated Steel: Complying with MPI #20 and compatible with coating specified to be applied over it.
D. Epoxy Primer for Galvanized Steel: Epoxy primer recommended in writing by topcoat manufacturer.
E. Epoxy Intermediate Coat for Uncoated Steel: Complying with MPI #77 and compatible with primer and topcoat.
F. Intermediate Coat for Uncoated Steel: Epoxy or polyurethane intermediate recommended in writing by primer and topcoat manufacturer.
G. Polyurethane Intermediate Coat and Topcoat: Complying with MPI #72 and compatible with undercoat.

2.7 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
   1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for strength and compatibility in fabricated items.
B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Section 03 30 00 "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi, 3-inch slump, and 1-inch maximum aggregate size or dry, packaged, normal-weight concrete mix complying with ASTM C 387/C 387M mixed with potable water according to manufacturer's written instructions.
C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M and specifically recommended by manufacturer for exterior applications.

2.8 METALLIC-COATED-STEEL FINISHES

A. Galvanized Finish: Clean welds, mechanical connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

B. Surface Preparation: Clean surfaces with nonhpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a zinc-phosphate conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

C. Powder Coating: Immediately after cleaning and pretreating, apply TGIC polyester powder-coat finish, with a minimum dry film thickness of 2 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

D. Powder Coating: Immediately after cleaning and pretreating, apply two-coat finish consisting of zinc-rich epoxy prime coat and TGIC polyester topcoat, with a minimum dry film thickness of 2 mils for topcoat. Comply with coating manufacturer's written instructions to achieve a minimum total dry film thickness of 4 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range.
2. Comply with surface finish testing requirements in ASTM F 2408 except change corrosion-resistance requirement to 3000 hours without failure.

E. High-Performance Coating: Apply epoxy primer, polyurethane intermediate coat, and polyurethane topcoat to prepared surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.

1. Match approved Samples for color, texture, and coverage. Remove and refinish, or recoat work that does not comply with specified requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

1. Construction layout and field engineering are specified in Section 01 73 00 "Execution."

3.3 DECORATIVE FENCE INSTALLATION

A. Install fences according to manufacturer's written instructions.
B. Post Setting:

1. Space posts uniformly at spacing indicated on Drawings.
2. Posts Set in Concrete Footings: Set posts in concrete fill into firm, undisturbed soil.

a. Excavation: Drill or hand-excavate holes for posts. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 24 inches plus 3 inches for each foot or fraction of a foot that fence height exceeds 4 feet.
b. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete.
c. Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.
d. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

1) Concealed Concrete: Top 2 inches below grade as indicated on Drawings to allow covering with surface material. Slope top surface of concrete to drain water away from post.

3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 GATE OPERATOR INSTALLATION

A. General: Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.

B. Excavation for Concrete Bases: Hand-excavate holes for bases in firm, undisturbed soil to dimensions and depths and at locations as required by gate operator component manufacturer's written instructions and as indicated.

C. Concrete Bases: Cast-in-place or precast concrete, depth not less than 12 inches, dimensioned and reinforced according to gate operator component manufacturer's written instructions and as indicated on Drawings.

D. Vehicle Loop Detector System: Cut grooves in pavement and bury and seal wire loop according to manufacturer's written instructions. Connect to equipment operated by detector.

E. Comply with NFPA 70 and manufacturer's written instructions for grounding of electric-powered motors, controls, and other devices.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: a qualified testing agency to perform tests and inspections.

1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance not less than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.
2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
3. Report: Prepare test reports of grounding resistance at each test location certified by a testing agency. Include observations of weather and other phenomena that may affect test results.

3.7 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Automatic Gate Operators: Energize circuits to electrical equipment and devices. Adjust operators, controls, safety devices, alarms, and limit switches.

1. Hydraulic Operators: Purge operating system, adjust pressure and fluid levels, and check for leaks.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls, alarms, and safeties. Replace damaged and malfunctioning controls and equipment.

C. Lubricate hardware, gate operators, and other moving parts.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates.

END OF SECTION 32 31 19

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March 5, 2019

NOTICE OF ADDENDUM
ADDENDUM NO. 2

CONTRACT NO. 7528, PROJECT NO. 10305
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

This addendum consists of the following documents:

- **Existing Cub Food Foundation As-Builts dated 9-8-86:**
  - **Sheet 1 PARTIAL PLAN (NORTH-EAST CORNER)**
  - **Sheet 2 PARTIAL PLAN (NORTH-WEST CORNER)**
  - **Sheet 3 PARTIAL PLAN (SOUTH HALF)**
  - **Sheet 4 EXT. RAMP & DOCK @ H-10**
- **Reponses to Bidders Questions in Section 2**
- **Drawings changes as detailed in Section 5**

1. **GENERAL CONTRACT CONDITIONS**
   No Change

2. **GENERAL QUESTIONS AND ANSWERS**
   A1: Clarify what type of fence is required in each area for site fence, dumpster enclosure gates, tool box storage room.
   Q1: Refer to AS-001 Site Plan. Decorative metal fence is located along the north edge of the property on Nakoosa Trail and along the western edge of the service yard below the fuel tank wall. Decorative fence is located on the eastern edge of the property and stops at the Storage Building if add alternate is accepted or stops where angle starts. Chain link fence is located along the southern edge and southeast angle of the service yard. Tool Box Storage Room is a chain link with gate as detailed. Dumpster gate as detailed on Sheet A-534.

A2: Can XPS (extruded polystyrene) board insulation be substituted for MPS (molded polystyrene)?
Q2: MPS cannot be substituted for XPS.

A3: What material are the borrowed-lites on this job?
Q3: Borrowed-lites are aluminum frame storefront.

3. **ACCEPTABLE EQUIVALENTS**
   A. 07 26 16 BELOW-GRADE VAPOR RETARDERS: Inteplast Barrier-Bac VB-350 (16 mil) Vapor Barrier by Inteplast Group (www.Barrier-Bac.com) is an acceptable product that may be incorporated into the Work.

4. **SPECIFICATIONS**
   No Change

5. **DRAWINGS**
   A. **MODIFIED** G-001 COVER SHEET to update overall building & site rendering.

   B. **MODIFIED** G-003 CODE AND LIFE SAFETY INFORMATION to shift locations of Fire Extinguishers.

   C. **MODIFIED** C-100 OVERALL SITE PLAN to include grading at the western detention basin and removal of the western end of the modular block retaining wall along Nakoosa Trail.

   D. **MODIFIED** C-101 SITE PLAN to include grading at the western detention basin, removal of a portion of the western end of the modular block retaining wall and revision to elevations along Nakoosa Trail, labeling of contours on the drawing, and an addition to the Legend.

   E. **MODIFIED** C-102 SITE PLAN to include modular block retaining wall elevations along Nakoosa Trail, the length and elevation of the field stone retaining wall, labeling of contours on the drawing, and an addition to the Legend.

   F. **MODIFIED** C 105 UTILITY PLAN to include Key Note 13 and the location of the 2-inch PVC conduit under the commercial driveway approach.

   G. **MODIFIED** C-106 UTILITY PLAN to included Key Note 7 and the location of the 2-inch PVC conduit under the commercial driveway approach.

   H. **MODIFIED** C-112 DEMOLITION PLAN to include General Note 2.

   I. **MODIFIED** C-113 STANDARD DETAILS to include detail L.

   J. **MODIFIED** L-201 LANDSCAPING PLAN to included grading at the western detention basin and removal of a portion of the western end of the modular block retaining wall along Nakoosa Trail.

K. **MODIFIED** AS-002 002 to add dimension for the length of the perforated metal screen in drawing A1

L. **MODIFIED** A-104 LEVEL 1 FLOOR PLAN AREA A to:
   a. Add Key Note for Radiant Flooring Manifold Mounting Box location
   b. Reviser fire extinguisher from wall mount to recess to comply with ADA requirements.
   c. Revised thickness of partition to 6" metal stud at Break Room and Key room to accommodate fire extinguisher depth
   d. Add note to identify free standing copier. Copier NIC.
   e. Remove N.I.C. from locker notes in the Men's and Women's Locker Rooms

M. **MODIFIED** A-105 LEVEL 1 FLOOR PLAN B to add key note for radiant flooring manifold mounting box location and to revised fire extinguisher from wall mount to recess to comply with ADA requirements.

N. **MODIFED** A-106 LEVEL 1 FLOOR PLAN C to add key note for radiant flooring manifold mounting box location and to revised fire extinguisher from wall mount to comply with ADA requirements

O. **MODIFED** A-107 LEVEL FLOOR PLAN D to add key note for radiant flooring manifold mounting box location and to revised fire extinguisher from wall mount to comply with ADA requirements

P. **MODIFIED** A-108 LEVEL FLOOR PLAN E to:
   a. Add key note for radiant flooring manifold mounting box location
   b. Reviser fire extinguisher from wall mount to recess to comply with ADA requirements.
   c. Moved ladder location to accommodate relocation of mechanical equipment on mezzanine.
   d. Revise bollard location to accommodate revise mechanical equipment layout.
   e. Add dimension for bollard location from building.

Q. **MODIFIED** A-114 MEZZANINE FLOOR PLAN AREA B to revised ladder location and railing accommodate revised location of mechanical equipment on mezzanine.

R. **MODIFIED** A-132 LEVEL AREA A REFLECTED CEILING PLAN to add annotation to represent location of roller shades.

S. **MODIFIED** A-136 LEVEL 1 AREA E REFLECTED CEILING PLAN added annotation to represent location of roller shades. Also, add annotation for line of canopy and lighting on canopy.

T. **MODIFIED** A-200 EXTERIOR FINISH SCHEDULE remove MP-6 from schedule.

U. **MODIFIED** A-201 BUILDING ELEVATIONS Drawing K1 to add material key note for the perforated metal screen near entry.

V. **MODIFIED** A-202 BUILDING ELEVATIONS to remove section marker for drawing legibility/clarity.

W. **MODIFIED** A-310 N/S WALL SECTIONS to update bottom of wall section to reflect actual insulation in precast walls per manufacture discussions.

X. **MODIFIED** A-311 N/S WALL SECTIONS for the following:
   a. To update bottom of wall section to extend insulation past SOG to top of footing and to coordinate with structural detail.
   b. To add detail callout to wall section A1and A6 for louver head and sill condition
   c. To add detail callout to wall section A10 for translucent wall system sill detail.

Y. **MODIFIED** A-312 N/S WALL SECTIONS to update bottom of wall section to extend insulation past SOG to top of footing and to coordinate with structural detail.

Z. **MODIFIED** A-313 E/W WALL SECTIONS to update bottom of wall section to extend insulation past SOG to top of footing and to coordinate with structural detail.

AA. **MODIFIED** A-401 ENLARGED PLANS to remove "N.I.C." from locker note in both Men and Women's Restroom/Locker Room and add section callout that references the locker room details on sheet A-743

BB. **MODIFIED** A-501 PARTTION TYPES to add note to clarify metal framing size to Partition Type M004 and remove note about metal framing size to Partition Type M001.

CC. **MODIFIED** A-503 BL WINDOW ELEVATIONS to revise BL-19 to simplify and reduce size of glazing, add linework to represent radiant floor mounting box, revise glazing types on all BL drawings, and remove glazing type schedule.

DD. **MODIFED** A-504 AF WINDOW ELEVATIONS to removed Section marker to improve legibility/clarity at detail G1, clipped view for drawing clarity at detail L1, and removed glazing type schedule.

EE. **MODIFED** A-510 CANOPY DETAILS detail A11 to revised detail structural framing to be delegated design by cold- form metal framing engineer per specification.

FF. **MODIFED** A-511 EXTERIOR DETAILS Updated bottom of wall section to reflect actual insulation in precast walls per manufacture discussions, revised soffit to be sloped to match roof line in detail H13,

GG. **MODIFIED** A-512 EXTERIOR DETAILS to:
   a. Updated bottom of wall section to reflect actual insulation in precast walls per manufacture discussions.
   b. Revised soffit to be sloped to match roof line in detail A1 and J12
   c. Revised detail J7 to include structural outrigger
   d. Revised A1 drawing title to inform all that this detail is for the secondary

building and that it is to be for bid alternate no. 1.
e. Added detail G1
f. Revised G7 drawing title

HH. **MODIFIED** A-532 AF DOOR DETAILS to add aluminum frame sliding door jamb detail A9 and head and sill detail A14

II. **MODIFIED** A-541 EXTERIOR AF WINDOW DETAILS Detail K10 to remove note about FCB and rigid insulation and to add detail K1.

JJ. **MODIFIED** A-601 DOOR SCHEDULE to remove two rows of glazing in overhead section door elevation drawing and to add information regarding door #1015A to the door schedule.

KK. **MODIFIED** A-602 LOUVER SCHEDULE & DETAILS to:
a. Remove louvers not in project from louver schedule,
b. Add detail H5 to illustrate louver sill connection to metal stud wall assembly
c. Revise detail K5 to illustrate metal stud wall with metal panel wall system attached
d. Revised detail K14 to illustrate metal panel wall system attached to precast wall assembly
e. Revised detail H10 to illustrate precast wall assembly

LL. **MODIFIED** A-700 INTERIORS FINISH SCHEDULE & LEGENDS to delete CS-1 in Floor Schedule, add RES-1 in Floor Schedule, and revise CS-1 to SC-1 in the Room Finish Schedule.

MM. **MODIFIED** A-701 OVERALL LEVEL 1 FINISH PLAN to revise Finish Legend graphic to SC-1 in lieu of deleted CS-1 and add RES-1. Wash Bay and Chassis Wash Bay graphic has been modified to reflect RES-1. LIGHT DUTY, HEAVY DUTY, AND RADIO SHOP MAINTENANCE Bays have been revised to SC-1 in lieu of CS-1.

NN. **MODIFIED** A-741 INT. ARCH DETAILS Detail A1 to remove steel plate attached to wall finish for FEC 1.

OO. **MODIFIED** A-743 INT LOCKER AND RR DETAILS to remove locker base with metal studs, added locker detail A14 for lockers used in Men and Women's Restroom/Locker rooms in Radio Comm Area.

PP. **MODIFIED** S-001 STRUCTURAL NOTES to revise Structural Design Criteria as and revise Masonry Notes as indicated in attached drawing.

QQ. **MODIFIED** S-010 LATERAL FORCES RESISTING SYSTEMS PLAN to revise SWP09 as and add Masonry Shear Walls as indicated in attached drawing.

RR. **MODIFIED** S-101A FOUNDATION PLAN AREA A to revise foundations as indicated in attached drawings.

SS. **MODIFIED** S-101B FOUNDATION PLAN AREA B to shift Grid R north 1-inch, revise grid dimensions as indicated, and revise foundations as indicated.

TT. **MODIFIED** S-101C FOUNDATION PLAN AREA C to revise foundation as indicated.

UU. **MODIFIED** S-101D FOUNDATION PLAN AREA D to revise foundation as indicated.

VV. **MODIFIED** S-101E FOUNDATION PLAN AREA E to revise foundation as indicated.

WW. **MODIFIED** S-111A FLATWORK PLAN AREA A to revise concrete slabs as indicated.

XX. **MODIFIED** S-111B FLATWORK PLAN AREA B to:
- a. Shift Grid R north 1-inch and revise grid dimensions as indicated,
- b. Revise concrete slabs as indicated
- c. Add equipment pads as indicated.

YY. **MODIFIED** S-111C FLATWORK PLAN AREA C to revise concrete slabs as indicated and add equipment pads as indicated.

ZZ. **MODIFIED** S-111D FLATWORK PLAN ARA D to revise concrete slabs as indicated and add equipment pads as indicated.

AAA. **MODIFIED** S-111E FLATWORK PLAN AREA E to revise concrete slabs as indicated.

BBB. **MODIFIED** S-131A LEVEL 1 STRUCTURAL FLOOR PLAN AREA A to add masonry control joints as indicated and revise Structural Floor Plan General Note 13 as indicated.

CCC. **MODIFIED** S-131B LEVEL 1 STRUCTURAL FLOOR PLAN AREA B to:
- a. Shift Grid R north 1-inch and revise grid dimensions as indicated
- b. Add Keyed Note 3.306 as indicated
- c. Revise Structural Floor Plan General Note 13 as indicated.

DDD. **MODIFIED** S-131C LEVEL 1 STRUCTURAL FLOOR PLAN AREA C to revise Structural Floor Plan General Note 13 as indicated.

EEE. **MODIFIED** S-131D LEVEL 1 STRUCURAL FLOOR PLAN AREA D to:
- a. Add masonry shear walls SW12B as indicated.
- b. Add masonry control joints as indicated.
- c. Revise Structural Floor Plan General Note 13 as indicated.

FFF. **MODIFIED** S-131E LEVEL 1 STRUCTURAL FLOOR PLAN E to revise Structural Floor Plan General Note 13 as indicated.

GGG. **MODIFIED** S-132A MEZZANINE STRUTURAL FLOOR PLAN AREA A to add masonry control joints as indicated and to revise Structural Floor Plan General Note 13 as indicated.

HHH. **MODIFIED** S-132B MEZZANINE STRUCTURAL FLOOR PLAN AREA B to:
a. Shift Grid R north 1-inch
b. Revise grid dimensions as indicated.
c. Revise Structural Floor Plan General Note 13 as indicated.

III. **MODIFIED** S-132D MEZZANINE STRUTURAL FLOOR PLAN D to:
a. Add mezzanine deck connection detail cuts as indicated.
b. Add masonry control joints as indicated.
c. Revise Structural Floor Plan General Note 13 as indicated.

JJJ. **MODIFIED** S-132E MEZZANINE STRUTURAL FLOOR PLAN E to add masonry control joints as indicate and to revise Structural Floor Plan General Note 13 as indicated.

KKK. **MODIFIED** S-142A MEZZANINE STRUCTURAL FLOOR PLAN AREA A to revise grid dimensions as indicated.

LLL. **MODIFIED** S-142B MEZZANINE STRUCTURAL FLOOR PLAN AREA B to shift Grid R north 1-inch and revise grid dimensions as indicated.

MMM. **MODIFIED** S-142D MEZZANINE STRUCTURAL FLOOR PLAN AREA D to add mezzanine deck connection detail cuts as indicated.

NNN. **MODIFIED** S-151B LOW ROOF FRAMING PLAN AREA B to shift Grid R north 1-inch and revise grid dimensions as indicated.

OOO. **MODIFIED** S-152A HIGH ROOF FRAMING PLAN AREA A to revise outrigger spacing as indicated and add Joist Extension Low Eave detail cut as indicated.

PPP. **MODIFIED** S-152B HIGH ROOF FRAMING PLAN AREA B to:
a. Shift Grid R north 1-inch and revise grid dimensions as indicated.
b. Revise girder elevations as indicated.
c. Add Joist Extension Low Eave detail cut as indicated.
d. Add Keyed Note 3.618 as indicated.

QQQ. **MODIFIED** S-152C HIGH ROOF FRAMING PLAN AREA C to:
a. Revise five joist sizes as indicated.
b. Add three solar panel roof frames as indicted.
c. Add two lines of 600S137-118 atop joists nested in roof deck as indicated.
d. Add Joist Extension Low Eave detail cut as indicated.

RRR. **MODIFIED** S-152D HIGH ROOF FRAMING PLAN AREAD D to add two lines of 600S137-118 atop joists nested in roof deck as indicated and to add Joist Extension Low Eave detail cut as indicated.

SSS. **MODIFIED** S-152E HIGH ROOF FRAMING PLAN AREA E to add Joist Extension Low Eave detail cut as indicated.

TTT. **MODIFIED** S-241 STRUCTURAL FRAMING ELEVATIONS to revise frame member spacing as indicated in Elevation 1 and 2.

UUU. **MODIFIED** S-401 MISCHELLANEOUS FOUNDATION PLANS:

a. Enlarged Flatwork Plan 2: Add slab elevation and edge angle note as indicated.
b. Enlarged Foundation Plan 3: Add plan view as indicated.
c. Enlarged Foundation Plan 4: Add plan view as indicated.
d. Add Keyed Notes as indicated.

VVV. **MODIFIED** S-451 MISCHELLANEOUS FOUNDATION PLANS:

a. Enlarged High Roof Framing Plan 2: Add two lines of 600S137-118 atop joists nested in roof deck as indicated.
b. Enlarged Low Roof Framing Plan 5: Extend plan view north to Grid A as indicated.
c. Add Keyed Note 3.603 as indicated.

WWW. **MODIFIED** S-501 FOUNDATOIN DETAILS:

a. Detail 7: Revise grade beams as indicated.
b. Detail 11: Remove sand bed from under slab and locate radiant heating tubing into the slab as indicated.
c. Detail 13: Remove sand bed from under slab and locate radiant heating tubing into the slab as indicated.

XXX. **MODIFIED** S-502 FOUNDATION DETAILS 1: Revise piers, walls, and base plates as indicated.

YYY. **MODIFIED** S-503 FOUNDATON DETAIL Foundation Elevation 1: Revise T.O. Footing elevation as indicated.

ZZZ. **ADDED** S-504 FOUNDATION DETAIL to add new sheet of grade beam pier details.

AAAA. **MODIFIED** S-511 FLATWORK DETAILS:

a. Detail 1: SLB05: Remove reinforcing steel from slab and fine-graded granular material as indicated.
    - SLB06: Add new slab type as indicated.
    - SLB06H: (Previously SLB05H) Remove sand bed and vapor barrier, move radiant heating system into slab, and thicken slab by 1-inch as indicated.
    - SLB07H: (Previously SLB06H) Remove sand bed and vapor barrier, move radiant heating system into slab, and thicken slab by 1-inch as indicated.
    - SLB08: Remove reinforcing steel from slab and fine-graded granular material as indicated.
    - SLB09H: (Previously SLB08H) Remove sand bed and vapor barrier, move radiant heating system into slab, and thicken slab by 1-inch as indicated.
b. Detail 2: Remove reinforcing steel from slab as indicated.
c. Detail 3: Remove reinforcing steel from slab as indicated.
d. Detail 4: Remove reinforcing steel from slab as indicated.
e. Detail 5: Remove sand bed from under slab and locate radiant heating tubing

into the slab as indicated.
f. Detail 6: Remove sand bed from under slab and locate radiant heating tubing into the slab as indicated.
g. Detail 7: Remove sand bed from under slab and locate radiant heating tubing into the slab as indicated.
h. Detail 8: Remove reinforcing steel from slab as indicated.
i. Detail 17: Remove reinforcing steel from slab as indicated.

BBBB. **MODIFIED** S-521 STRUCTURAL WALL DETAILS:
a. Detail 1: Remove structural wall types SW08C and SW12C as indicated.
b. Detail 7: Remove reinforcing steel from slab and locate radiant heating tubing into the slab as indicated.

CCCC. **MODIFIED** S-531 STRUCTURAL FRAMING DETAILS
a. Detail 22: Add Precast to Joist Extension Connection detail as indicated.

DDDD. **ADD** S-532 STRUCTURAL FRAMING DETAILS

EEEE. **MODIFIED** S-542 STRUCTURAL FRAMING DETAILS:
a. Detail 11 through 17: New mezzanine deck attachment details added as indicated.

FFFF. **MODIFIED** S-543 STRUCTURAL FRAMING DETAILS:
a. Detail 6: New joist loading detail added as indicated.
b. Plan detail 7: New Solar Panel Framing Plan detail added as indicated. xliv.

GGGG. **MODIFIED** S-552 STRUCTURAL ROOF FRAMING DETAILS:
a. Detail 1: Revise to girder bearing on top of column as indicated.
b. Detail 2: Revise to girder bearing on top of column as indicated.
c. Detail 3: Revise to LL4x3 1/2x3/8 to read to 2L4x3 1/2x3/8 as indicated.
d. Detail 15: Revise to girder bearing on top of column as indicated.
e. Detail 16: Revise to girder bearing on top of column as indicated.

HHHH. **MODIFIED** S-601 STRUCTURAL SCHEDULES:
a. Concrete Spread Footing Schedule: Revise as indicated.
b. Concrete Pier Schedule and Remarks: Revise as indicated.
c. Structural Column Schedule – Area A: Revise as indicated.
d. Structural Column Schedule – Area B: Revise as indicated.
e. Structural Column Schedule – Area C and D: Revise as indicated.
f. Structural Column Schedule Remarks: Add remark 2 as indicated. xlvi.

IIII. **MODIFIED** S-602 STRUCTURAL SCHEDULE DETAILS
a. Detail 2: Revise Welded Washer schedule to include 1 1/2" diameter anchor rod washer information as indicated.
b. Detail 4: Revise base plate as indicated.
c. Detail 5: Add new base plate detail as indicated.
d. Detail 9: Revise grid number 39 to 3.9 as indicated.

e. Detail 11: Add new base plate detail as indicated.
f. Detail 12: Add new base plate detail as indicated.

JJJJ. **MODIFIED** M-101E LEVEL 1 FLOOR PLAN – HVAC – AREA E to revise ductwork air distribution for AHU-E1 as indicated on M-111E.

KKKK. **MODIFIED** M-131E LEVEL 1 FLOOR PLAN – PIPING – AREA E to revise piping distribution as indicated on M-131E and added ACCU-E3 and refrigerant line set.

LLLL. **MODIFIED** M-301 ENLARGED MECHANICAL PLAN – MEZZANINE – AREA A to delete VFD-14 as indicated on M-301.

MMMM. **MODIFIED** M-308 ENLARGED MECHANICAL PLAN AND SECTIONS – MEZZANINE – AREA E to revise detail 1, 2 and 3 for AHU-E1 as indicated on M-308.

NNNN. **MODIFIED** M-501 MECHANICAL DETAILS to revise details as indicated on sheet M-501.

OOOO. **MODIFIED** M-601 MECHANICAL SCHEDULES:

a. Revised HVAC DUCT INSULATION SCHEDULE
   - Revised INSULATION TYPE D3
   - Revised JACKETING TYPE J8
   - Added REMARK (2).
b. Revised AIR FLOW MEASURING STATION (AFMS) SCHEDULE.
   - Renumbered all AFMS-E1- as indicated on sheet M-601.
   - Revised AFMS-E1-5 as indicated on sheet M-601.
   - Added AFMS-E1-8 as indicated on sheet M-601.

PPPP. **MODIFIED** M-602 MECHANICAL SCHEDULES:

a. Revise MODULAR INDOOR – AIR HANDLING UNIT (AHU) SCHEDULE as shown on sheet M-602.
b. Revised AIR FILTER (AF) SCHEDULE as shown on sheet M-602.
c. Revised HEATING/COOLING COIL (HC/CC) SCHEDULE as shown on sheet M-602.
d. Revised CUSTOM AIR HANDLING UNIT (AHU) SCHEDULE as shown on sheet M-602.

QQQQ. **MODIFIED** M-603 MECHANICAL SCHEDULE:

a. Revised EXHAUST FAN (EF) AND SUPPLY FAN (SF) SCHEDULE as shown in sheet M-603.
b. Revised VARIABLE FREQUENCY DRIVE (VFD) SCHEDULE as shown on sheet M-603
c. Revised SOUND ATTENUATING DEVICE (SAD) SCHEDULE
   - Deleted silencer SAD-E1 as shown on sheet M-603.
   - Revised silencer SAD-E2 data as shown on sheet M-603.

RRRR. **MODIFIED** M-604 MECHANICAL SCHEDULE to delete ERV-1 and STATIC-PLATE, ENTHALPY AIR-TO-AIR HEAT EXCHANDGER (ERV) SCHEDULE on sheet M-604.

SSSS. **MODIFIED** M-605 MECHANICAL SCHEDULE:

a. Revise AIR COOLED CONDENSING UNIT (ACCU) SCHEDULE.
   - Revise ACCU-A1, ACCU-D2 and ACCU-D3 as shown on sheet M-605
   - Revise ACCU-E1 as shown on sheet M-605.
   - Added ACCU-E3 as shown on sheet M-605.
   - Revised REMARK (4) and added REMARK (5).

TTTT. **MODIFIED** M-701MECHANCAL AIR FLOW DIAGRAM to revise AHU-E1 air flow diagram 3/M-701 as indicated on sheet M-701.

UUUU. **MODIFIED** M-801 (attached) to revise AHU-A1- Mechanical Controls for detail 1 as indicated on sheet M-801.

VVVV. **MODIFIED** M-803 MECHANCIAL CONTROLS to revise AHU-E1 - Mechanical Controls for detail 1 as indicated on sheet M-803.

WWWW. **MODIFIED** F-001 FIRE PROTECTION SYMBOLS, ABBREVIATIONS, NOTES AND DETAILS to removed Dry Pipe System from Detail 2.

XXXX. **MODIFIED** F-101B LEVEL 1 FLOOR PLAN – FIRE PROTECTION – AREA B to remove Dry Pipe from plan.

YYYY. **MODIFIED** E-135 LEVEL 1 FLOOR PLAN AREA E – POWER:

a. Add electrical equipment connection for ACCU-E3.
b. Revise Generator Notes as indicated.
c. Revise circuiting for ACCU-E1.

ZZZZ. **MODIFIED** E-136 MEZZANINE FLOOR PLANS – POWER:

a. Add EF-E1-4 and Wheel on Detail 1.
b. Revise VFD locations on Detail 1.
c. Delete ERV-1 on Detail 1.
d. Delete VFD associated with SF-A2-1 on Detail 2.

AAAAA. **MODIFIED** E-605 SCHEDULES:

a. Add ACCU-E3 and EF-E1-4
b. Revise information in ACCU-E1, SF-A2-1, SF-E1-3
c. Delete ERV-1

BBBBB. **MODIFIED** E-607 SCHEDULES to revise 1HB-38,40,42 to 'SPARE'.

CCCCC. **MODIFIED** E-609 SCHEDULES to revise Panel 1XHB.

DDDDD. **MODIFIED** T-011 TECHNOLOGY SYSTEMS SITE PLAN – WEST to add Technology Systems General Notes 4 and 5 and revise Keyed Notes 9.601 and 9.602.

EEEEE. **MODIFIED** T-012 TECHNOLOGY SYSTEMS SITE PLAN – EAST to add Technology Systems

General Notes 4 and 5, and revise Keyed Note 9.609

FFFFF. **MODIFIED** T-100 OVERALL BUILDING PLAN
- a. Add Pathways General Notes 2 and 3
- b. Revise Keyed Note in Light Duty Maintenance Bay to 9.341
- c. Revise Keyed Notes 9.601, 9.602 and 9.609

GGGGG. **MODIFIED** T-101 LEVEL 1 – FLOOR PLAN A – COMMUNICATIONS to revise cable tray pathway location as shown on T-111 and add Communications General Note 2

HHHHH. **MODIFIED** T-102 LEVEL 1 – FLOOR PLAN B – COMMUNICATIONS to revise Keyed Note in Light Duty Maintenance bay to 9.341and to add Communications General note 2

IIIII. **MODIFIED** T-103 - LEVEL 1 – FLOOR PLAN C– COMMUNICATIONS to revise mounting height of telecommunications outlet outside of common work area 1086 to 3'-10" above finished floor.

JJJJJ. **MODIFIED** T-105 LEVEL 1 – FLOOR PLAN E – COMMUNICATIONS:
- a. Add Keyed Notes 9.713 and 9.714 to call box outlet and camera outlet, respectively, as shown on sheet T-105
- b. Revise location of call box outlet and camera outlet as shown on T-105
- c. Add Communications General Note 2

KKKKK. **MODIFIED** T-106 MEZZANINE FLOOR PLANS – COMMUNICATIONS to revise location of equipment outlet and wall phone outlet on parts mezzanine 2001

LLLLL. **MODIFIED** T-125 LEVEL 1 – FLOOR PLANAREA B – SECURITY to revise camera location as shown on T-105

MMMMM. **MODIFIED** T-141 LEVEL 1 FLOOR PLAN AREA A AUDIO/VISUAL to add (1) recessed speaker in corridor 1028 and to revise type of (2) recessed speakers to pendant speakers in corridor 1028

NNNNN. **MODIFIED** T-142 LEVEL 1 FLOOR PLAN AREA B AUDIO/VISUAL to revise mounting height of horn type speakers in light duty maintenance bay 1055.

OOOOO. **MODIFIED** T-143 LEVEL 1 FLOOR PLAN AREA C AUDIO/VISUAL to add Keyed Note 9.906 and to revise mounting height of horn type speakers in heavy vehicle repair bays 1084

PPPPP. **MODIFIED** T-501 DETAILS to revise mounting height of keypad as shown on detail 8 on sheet T-501

QQQQQ. **MODIFIED** T-502 DETAILS:
- a. Revise mounting height of telecommunications outlets in unfinished spaces as shown in detail 3 on sheet T-502
- b. Revise mounting height of telecommunications outlets in finished spaces as shown in detail 3 on sheet T-502

6. **PROPOSAL**
   No Change

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at:

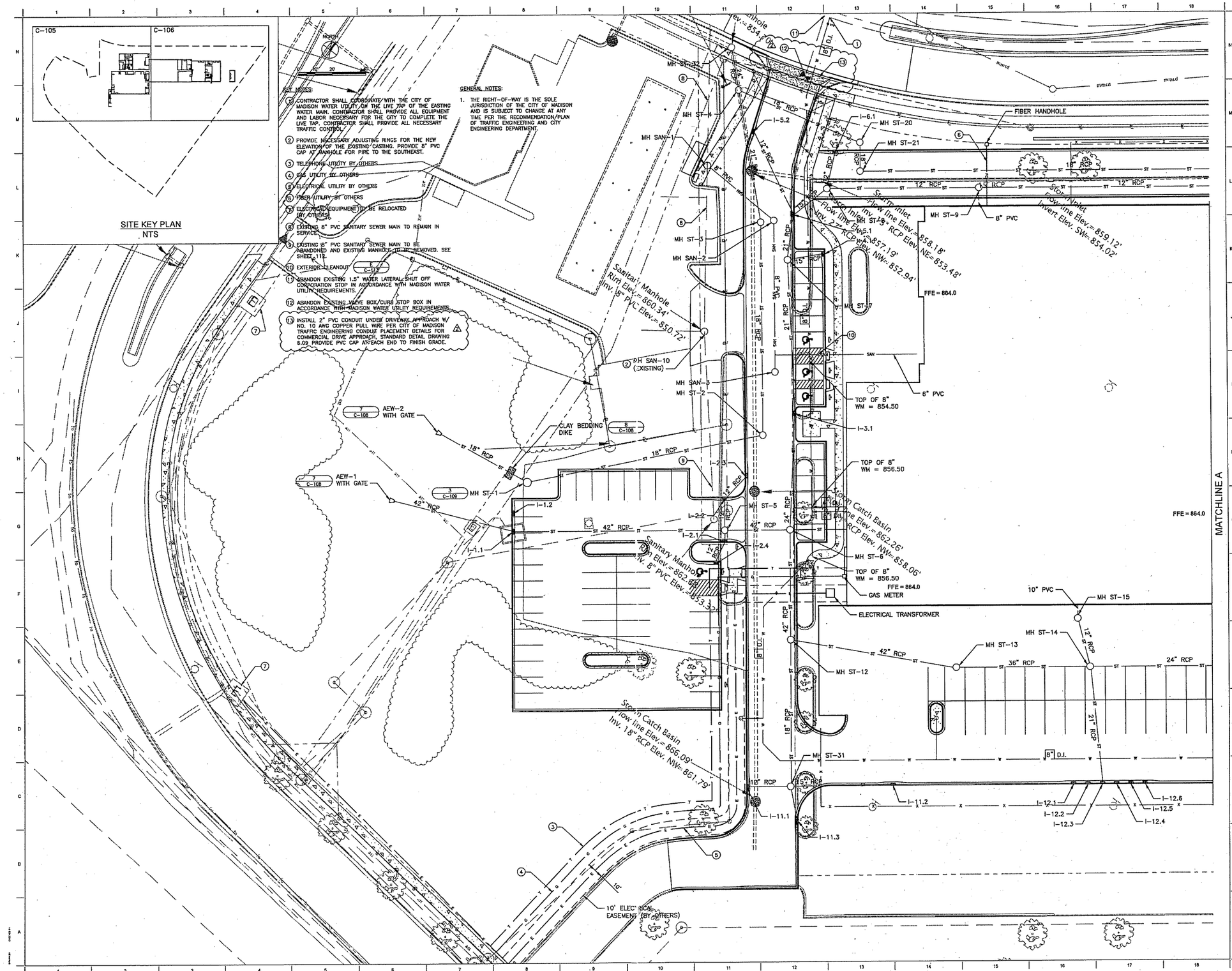
https://www.bidexpress.com/

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

Sincerely,

Robert F. Phillips, P.E., City Engineer

Cc: Greg Fries, Kathy Cryan



RNL
1600 WILSON BLVD.
SUITE 550
ARLINGTON, VA 22209
571 290 7679 t

Addendum #2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/1/19

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PROJECT No: 3766.03

AREA 1
UTILITY PLAN

C-105

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ADDENDUM 2

RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

MATCHLINE A

EAST WET DETENTION BASIN
C-108 C-109

GENERAL NOTES:

1. ALL CURB AND GUTTER SHALL BE TYPE 'G' CURB AND GUTTER UNLESS OTHERWISE NOTED. REFER TO MADISON STANDARD CONCRETE CURB AND GUTTER, STANDARD DETAIL DRAWING 3.08.
2. REFER TO DETAIL K/C-113 FOR CURB AND GUTTER DIMENSIONS AT ALL STORM SEWER INLETS.
3. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.

KEY NOTES:

1. 18" TAPERED CURB HEAD
2. 30" CURB AND GUTTER
3. PROVIDE FIELD STONE RETAINING WALL AS NECESSARY (A) REFER TO STANDARD DETAIL DRAWING 2.06.
4. VISION TRIANGLE
5. RUBBER PARKING CURBS (TYP. OF 14)
6. MODULAR RETAINING WALL (A C-113)
7. CURB DETAIL AT STORM SEWER INLETS (K C-113) (TYP. OF ALL)
8. FENCE 6 FOOT HEIGHT (SEE ARCHITECTURAL DRAWINGS)

LEGEND:

- MOUNTABLE CURB AND GUTTER (M C-113)
- NEW ASPHALT PAVEMENT (B C-113) (L C-113)
- NEW CONCRETE SIDEWALK (C C-113)
- CONCRETE PAVEMENT (N C-113)
- TW = TOP OF WALL (A)
- BW = WALL AT FINISHED GRADE

SITE KEY PLAN
NTS

NORTH
0 10 20 40

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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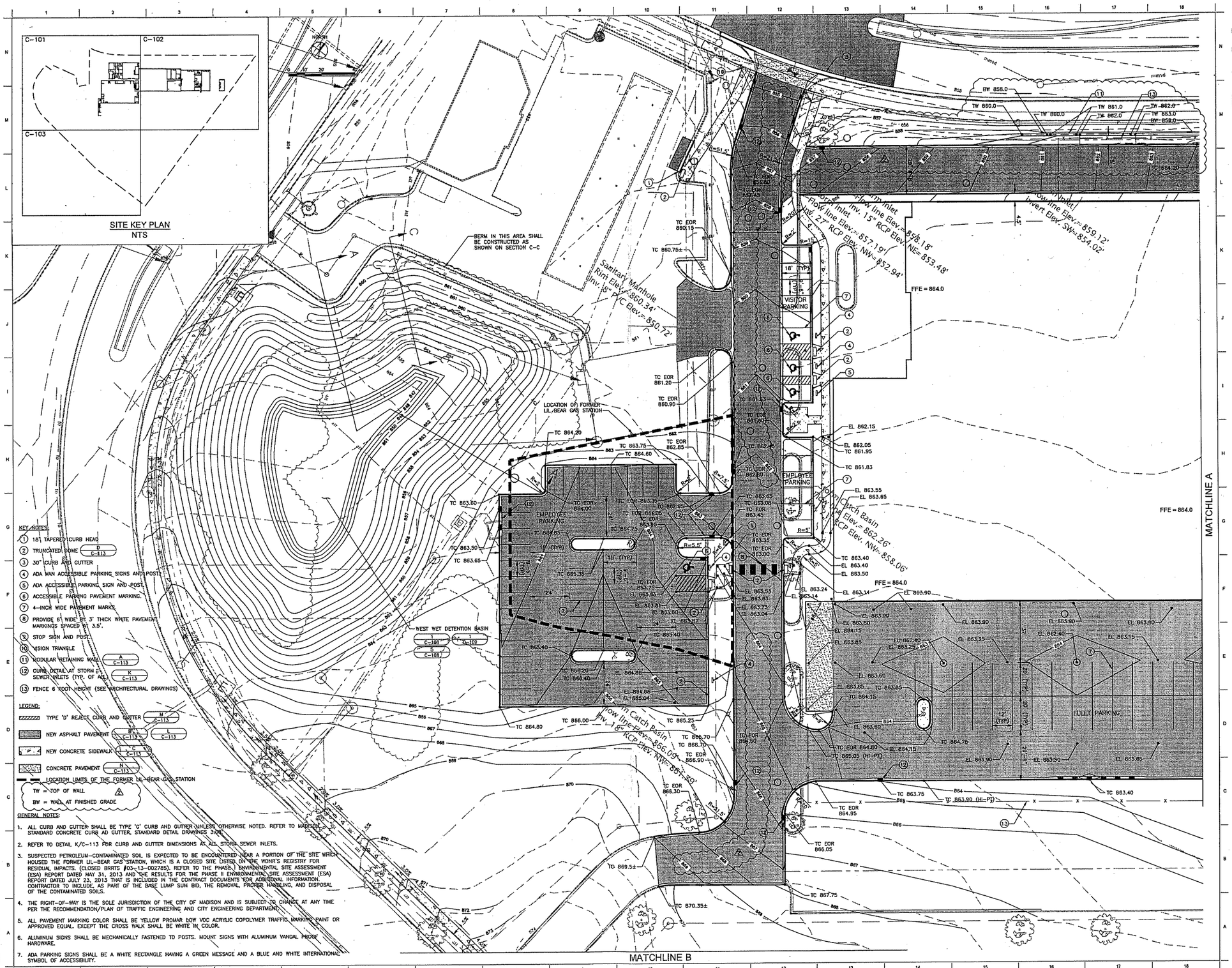
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PROJECT No. 376003

AREA 1
SITE PLAN

C-102

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KEY NOTES:

1. 18' TAPERED CURB HEAD
2. TRUNCATED DOME (D C-113)
3. 30" CURB AND GUTTER
4. ADA VAN ACCESSIBLE PARKING SIGNS AND POST.
5. ADA ACCESSIBLE PARKING SIGN AND POST.
6. ACCESSIBLE PARKING PAVEMENT MARKING.
7. 4-INCH WIDE PAVEMENT MARKS.
8. PROVIDE 6' WIDE BY 3' THICK WHITE PAVEMENT MARKINGS SPACED AT 3.5'.
9. STOP SIGN AND POST.
10. VISION TRIANGLE
11. MODULAR RETAINING WALL (A C-113)
12. CURB DETAIL AT STORM SEWER INLETS (TYP. OF ALL) (K C-113)
13. FENCE 6' FOOT HEIGHT (SEE ARCHITECTURAL DRAWINGS)

LEGEND:

- TYPE 'D' REJECT CURB AND GUTTER (M C-113)
- NEW ASPHALT PAVEMENT (B C-113, L C-113)
- NEW CONCRETE SIDEWALK (C C-113)
- CONCRETE PAVEMENT (N C-113)
- LOCATION LIMITS OF THE FORMER LIL'BEAR GAS STATION
- TW = TOP OF WALL
- BW = WALL AT FINISHED GRADE

GENERAL NOTES:

1. ALL CURB AND GUTTER SHALL BE TYPE 'G' CURB AND GUTTER UNLESS OTHERWISE NOTED. REFER TO MADISON STANDARD CONCRETE CURB AD GUTTER, STANDARD DETAIL DRAWINGS 3.06.
2. REFER TO DETAIL K/C-113 FOR CURB AND GUTTER DIMENSIONS AT ALL STORM SEWER INLETS.
3. SUSPECTED PETROLEUM-CONTAMINATED SOIL IS EXPECTED TO BE ENCOUNTERED NEAR A PORTION OF THE SITE WHICH HOUSED THE FORMER LIL'BEAR GAS STATION, WHICH IS A CLOSED SITE LISTED ON THE WDNR'S REGISTRY FOR RESIDUAL IMPACTS. (CLOSED BRRTS #03-13-002785). REFER TO THE PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA) REPORT DATED MAY 31, 2013 AND THE RESULTS FOR THE PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA) REPORT DATED JULY 23, 2013 THAT IS INCLUDED IN THE CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION. CONTRACTOR TO INCLUDE, AS PART OF THE BASE LUMP SUM BID, THE REMOVAL, PROPER HANDLING, AND DISPOSAL OF THE CONTAMINATED SOILS.
4. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.
5. ALL PAVEMENT MARKING COLOR SHALL BE YELLOW PROMAR LOW VOC ACRYLIC COPOLYMER TRAFFIC MARKING PAINT OR APPROVED EQUAL. EXCEPT THE CROSS WALK SHALL BE WHITE IN COLOR.
6. ALUMINUM SIGNS SHALL BE MECHANICALLY FASTENED TO POSTS. MOUNT SIGNS WITH ALUMINUM VANDAL PROOF HARDWARE.
7. ADA PARKING SIGNS SHALL BE A WHITE RECTANGLE HAVING A GREEN MESSAGE AND A BLUE AND WHITE INTERNATIONAL SYMBOL OF ACCESSIBILITY.

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SUITE 350
ARLINGTON, VA 22209
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ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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2	ADDENDUM NO. 2	3/5/19
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PROJECT No: 376603

AREA 1
SITE PLAN

C-101

NAKOOSA TRAIL

MODULAR BLOCK RETAINING WALL A C-113

FLEET PARKING

EMPLOYEE PARKING

EMPLOYEE PARKING

STORAGE BUILDING

FIELD STONE RETAINING WALL

COMMERCIAL AVE

KEY NOTES:

1. CONTRACTOR SHALL MAINTAIN ACCESS TO CP MART GAS STATION WITH TEMPORARY ASPHALT SURFACE DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH THE CITY OF MADISON ON TIMES AND DURATION OF NO ACCESS TO THE CP MART GAS STATION BASE ON CONSTRUCTION ACTIVITIES IN THIS AREA. CONTRACTOR SHALL INCLUDE TEMPORARY CLOSURE OF THE DRIVE TO THE CP MART GAS STATION IN THEIR CONSTRUCTION SCHEDULE.

A C-113 MODULAR BLOCK RETAINING WALL

NORTH

0 20' 40' 80'

ADDENDUM 2

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1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

SD SUBMISSION

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PROJECT No. 376603

AREA 1
OVERALL SITE PLAN

C-100

Plumbing Fixtures

Ground Floor

Classification	Occupancy	Description	Actual Area	Number of Occupants	Water Closets (Flush Valve) Male	Water Closets (Flush Valve) Female	Lavatories Male	Lavatories Female	Showers	Drinking Fountains (Wall Mounted) Per Floor	SF	Service Sink
Assembly	A-3	Workroom	7,332	83	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 2	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 2	1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80 1	1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80 1	1 per 150 1	1 per 1000 0.91		
Storage	S-1	Storage	91,820	100	1 per 100 1	1 per 100 1	1.0	1 per 100 1	1.0	1.0	1 per 1,000	0.30	Note 1
Hazard	H-4	Paint Booth											
Assembly	A-3	Lobbies, Conference Room, Waiting Areas, Restrooms, Bar Lobby, Fit Function Areas	1,256	72	1 per 125 1	0.29 0	1 per 65 1	0.21 0	1 per 200 1	0.36 0	0.15 0	1 per 100 1	0.24
Subtotals					1.83		2.93		1.36	1.36			1.25
Required Total			99,408	155	4		6		4	4			3
Provided					3		5		4	4			3

Note:
1. Mop sink required only one service sink if all occupancies have access to the service sink on the floor.

BUILDING CODE DATA

AUTHORITY HAVING JURISDICTION

CITY OF MADISON, WISCONSIN

APPLICABLE CODES

INTERNATIONAL BUILDING CODE, 2015 EDITION
INTERNATIONAL PLUMBING CODE, 2015 EDITION
INTERNATIONAL MECHANICAL CODE, 2015 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE, 2015 EDITION
INTERNATIONAL FIRE CODE, 2015 EDITION
INTERNATIONAL FUEL GAS CODE, 2015 EDITION
ICC/ANSI A117.1-2009 AMERICAN NATIONAL STANDARD

BUILDING USE CLASSIFICATIONS

MOTOR VEHICLE REPAIR
GROUP S-1 (STORAGE)
GROUP B (BUSINESS)
GROUP H-4 (HIGH HAZARD)
NO SEPARATION REQUIREMENTS BETWEEN S-1 AND B (IBC TABLE 508.4)
1 HOUR SEPARATION BETWEEN S-1 AND H-4 WITH AUTOMATIC SPRINKLER SYSTEM (IBC TABLE 508.4)
NO SEPARATION REQUIREMENT BETWEEN ACCESSORY OCCUPANCIES AND MAIN OCCUPANCY WITH AUTOMATIC SPRINKLER SYSTEM (IBC 508.4)
GROUP H-4 OCCUPANCIES SHALL BE SEPARATED FROM ALL OCCUPANCIES IN ACCORDANCE WITH SECTION 508.4

SPRINKLERING

AUTOMATIC SPRINKLER SYSTEM THROUGHOUT (SECTION 903 AND NFPA 13)
PORTABLE FIRE EXTINGUISHERS COMPLYING WITH SECTION 906 SHALL BE PROVIDED FOR SPRAYING AREAS IN ACCORDANCE WITH REQUIREMENTS FOR AN EXTRA (HIGH) HAZARD OCCUPANCY (CFC 1504.4.1)
SEPERATE SPRINKLER PLAN & PERMIT WILL BE SUBMITTED SEPARATELY BY CONTRACTOR

BUILDING HEIGHT

ALLOWED: 75 FEET/3 STORIES (IBC 504.3 WITH AUTOMATIC SPRINKLER SYSTEM INCREASE)
PROPOSED: 1 STORY WITH MEZZANINE

BUILDING AREA

ALLOWED: 17,500 SF (IBC TABLE 503.2)
AREA INCREASE (SECTION 506.1)
Aa= [At + [At x I] + [At x Ia]
Aa= [17,500 + [17500 x 0.75] + [17500 x 3]
Aa= 83,125 SF - ALLOWABLE (PER FLOOR)

PROPOSED: 81,820 (1ST FLOOR) + 20,826 (1ST FLOOR) + 13,290 (MEZZANINE) + 2,010 (STORAGE BLDG.) = 117,946 GROSS SQUARE FOOTAGE

TYPE OF CONSTRUCTION

TYPE II - B - NON-COMBUSTIBLE MATERIALS (IBC 602)

FIRE RESISTANCE RATINGS TABLE (TABLE 601)

ELEMENT	MATERIAL	RATING
PRIMARY STRUCTRAL FRAME	NONCOMBUSTIBLE	0-HR
EXTERIOR BEARING WALLS	NONCOMBUSTIBLE	0-HR
INTERIOR BEARING WALLS	NONCOMBUSTIBLE	0-HR
EXTERIOR NONBEARING WALLS AND PARTIONS	SEE TABLE 602	
INTERIOR NONBEARING WALLS AND PARTITIONS	NONCOMBUSTIBLE	0-HR
FLOOR CONSTRUCTION AND SECONDARY MEMBERS	NONCOMBUSTIBLE	0-HR
ROOF CONSTRUCTION AND SECONDARY MEMBERS	NONCOMBUSTIBLE	0-HR

FIRE RESISTIVE REQUIREMENTS FOR EXTERIOR BEARING WALLS (TABLE 602)

FIRE SEPARATION DISTANCE = X (FEET)	TYPE OF CONSTRUCTION	OCCUPANCY (S-1)
X < 5'	ALL	2 HOUR
5' < = X < 10'	II-B	1 HOUR
10' < = X < 30'	II-B	0 HOUR
X > = 30'	II-B	0 HOUR

PROVIDING SEPARATION GREATER THAN 30', ALL LOCATIONS

PROTECTED OPENING

PER IBC TABLE 704.10 - BUILDINGS WHOSE EXTERIOR BEARING WALL, EXTERIOR NO-BEARING WALL AND EXTERNAL STRUCTURAL FRAME ARE NOT REQUIRED TO BE FIRE-RESISTANCE RATED BY TABLE 601 OR 602 SHALL BE PERMITTED TO HAVE UNLIMITED UNPROTECTED OPENINGS.

OCCUPANT LOADS (IBC 1004) FOR PROJECT AREAS

	NAME	OCC	AREA	RATIO	TOTAL
LEVEL 1	OFFICE	B	19,231 S.F.	100 SF/OCC	193 OCC
	CONFERENCE	B	638 S.F.	15 SF/OCC	43 OCC
	STORAGE	S-1	1,484 S.F.	300 SF/OCC	5 OCC
	TRAINING	B	770 S.F.	20 SF/OCC	39 OCC
	CONFERENCE	A-3	2,705 S.F.	15 SF/OCC	181 OCC
	BREAK	A-3	1,422 S.F.	15 SF/OCC	95 OCC
LEVEL 1 TOTAL					556 OCC
PROJECT TOTAL					1,389 OCC

EGRESS WIDTH

THE MINIMUM WIDTH FOR EGRESS COMPONENTS IN A BUILDING EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IS 0.3 INCHES FOR STAIRWAYS (1005.3.1) AND 0.2 INCHES FOR OTHER EGRESS COMPONENTS (1005.3.2).
36" WIDE EXIT DOORS PROVIDE A 33" CLEAR EXIT WIDTH WHICH CAN ACCOMMODATE 330.2 = 165 OCCUPANT LOAD
EGRESS DOOR WIDTH REQUIRED = 114 OCC X 0.2 = 22.8, MIN REQUIRED = 33"
EGRESS DOOR WIDTH PROVIDED = 5 SINGLE LEAF DOORS AND 1 DOUBLE LEAF DOOR FOR 231"

STAIR WIDTH

MINIMUM STAIR WIDTH = NOT LESS THAN 44", EXCEPT SERVING AN OCCUPANT LOAD OF LESS THAN 50 SHALL HAVE A WIDTH OF NOT LESS THAN 36" (1011.2, EXCEPTION 1)
STAIRWAY WIDTH PROVIDED = 48"

COMMON PATH OF TRAVEL

MAXIMUM COMMON PATH OF TRAVEL = 100' FOR USE GROUP B AND S.
MAXIMUM COMMON PATH OF TRAVEL = 75' FOR USE GROUP H-4.

EXIT ACCESS

MAXIMUM EXIT ACCESS TRAVEL DISTANCE ALLOWED = 250'

CORRIDORS

PER IBC TABLE 1020.1, CORRIDORS IN GROUP S OCCUPANCIES SERVING GREATER THAN 30 OCCUPANTS WITH A SPRINKLER SYSTEM ARE NOT REQUIRED TO BE FIRE-RESISTIVE RATED
MINIMUM CORRIDOR WIDTH = NOT LESS THAN 44" MINIMUM ALLOWABLE DEAD END CORRIDOR = 50' (IBC 1020.4, EXCEPTION 2)
CORRIDOR WIDTH PROVIDED = 4'-8", NO DEAD END CORRIDORS

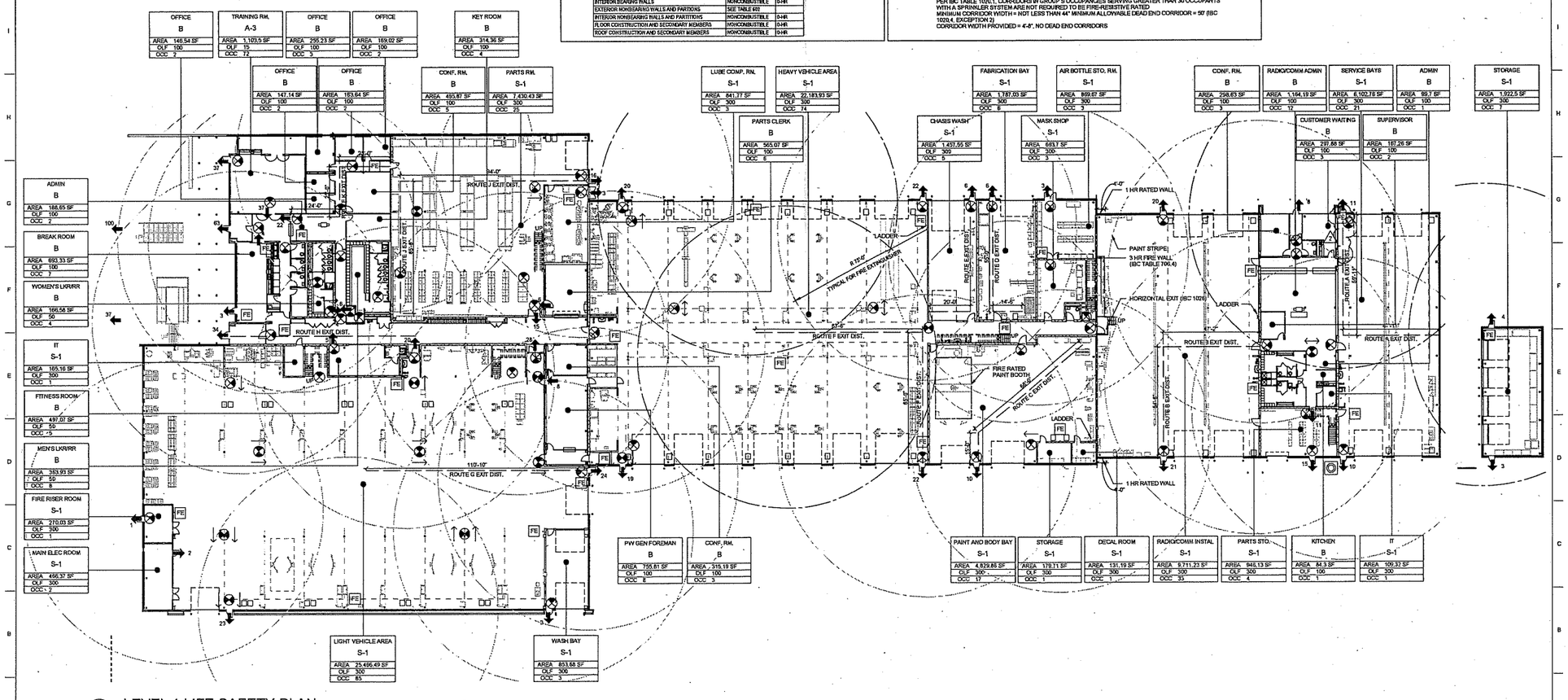
CODE LEGEND

- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER
- 3 HOUR FIRE BARRIER
- 4 HOUR FIRE BARRIER
- ROUTE A EXIT DIST. — TRAVEL PATH TO EXIT
- EXTINGUISHER ROUTE — TRAVEL PATH TO EXTINGUISHER
- MAX. BLDG DIAG — BUILDING DIAGONAL

ASSEMBLY A-3 — OCCUPANCY CLASSIFICATION
AREA 928 SF — AREA
OLF 15 — OCCUPANCY LOAD FACTOR
OCC 36 — NUMBER OF OCCUPANTS

EGRESS ACCESS & COMMON PATH OF TRAVEL

CODE TRAVEL NAME	CODE DISTANCES
ROUTE A EXIT DIST.	127'-10"
ROUTE B EXIT DIST.	123'-5"
ROUTE C EXIT DIST.	82'-4"
ROUTE D EXIT DIST.	89'-6"
ROUTE E EXIT DIST.	75'-0"
ROUTE F EXIT DIST.	148'-6"
ROUTE G EXIT DIST.	110'-6"
ROUTE H EXIT DIST.	90'-1"
ROUTE J EXIT DIST.	159'-6"
ROUTE K EXIT DIST.	74'-6"
ROUTE L EXIT DIST.	133'-0"
ROUTE M EXIT DIST.	186'-0"
ROUTE N EXIT DIST.	207'-0"
ROUTE P EXIT DIST.	141'-7"
ROUTE Q EXIT DIST.	135'-7"
CPDT 1	91'-6"
CPDT 2	59'-7"



A1 LEVEL 1 LIFE SAFETY PLAN
3/64" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 293 7679 t

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2015
	ISSUE FOR BID	02/01/2015
	DSPS RESPONSE 1	01/04/2015
	ISSUE FOR PERMIT	01/01/2015

PROJECT No: 37 6003

CODE AND LIFE SAFETY INFORMATION

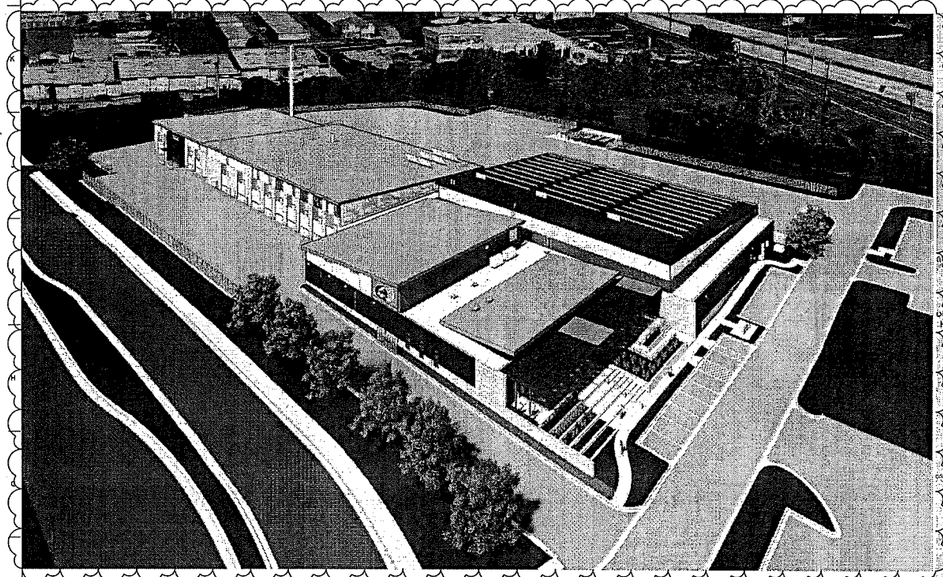
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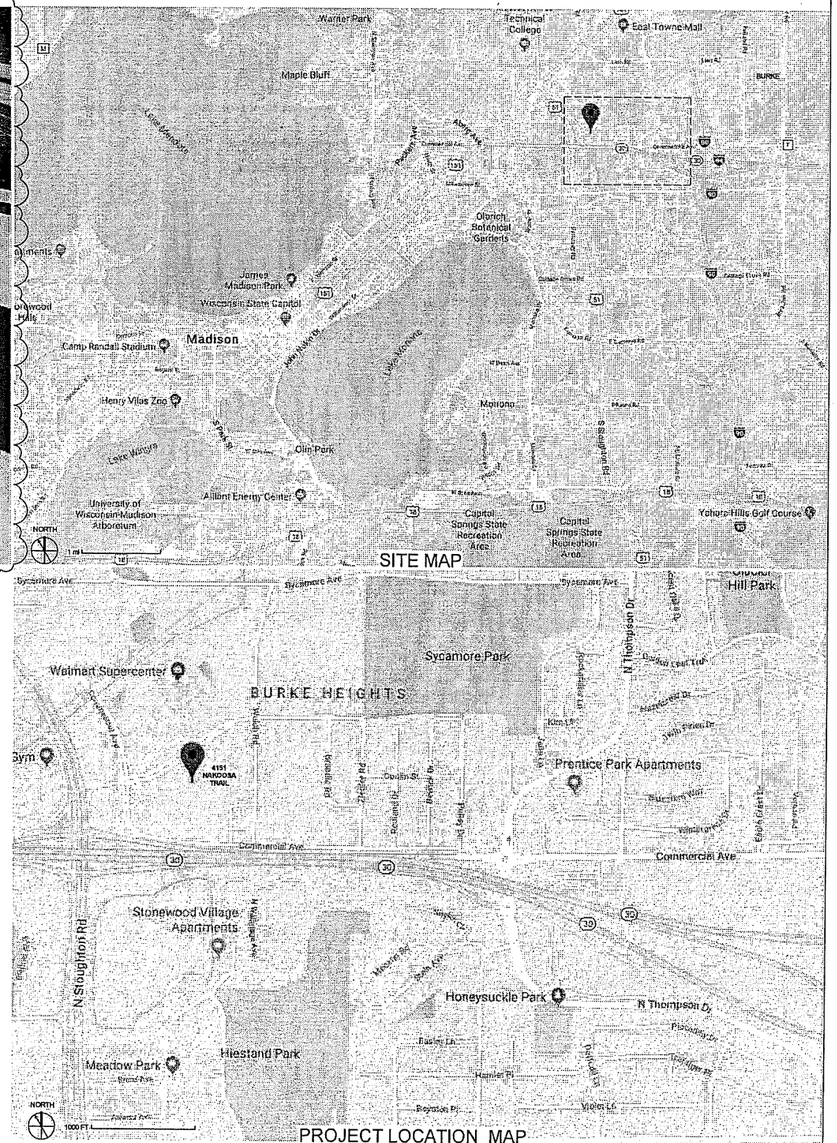
CITY OF MADISON
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

CONTRACT NO.: 7528
MUNIS NO.: 10305

ISSUE FOR BID
FEBRUARY 7, 2019





JAMES WHITNEY
JWHITNEY@CITYOFMADISON.COM
200 N FIRST STREET
MADISON,WISCONSIN 53704

ARCHITECTURE
STANTEC
1600 WILSON BOULEVARD
SUITE 360
ARLINGTON, VA, 22209
P 571.290.7679

EQUIPMENT
HDR
17725 KATY FREEWAY
SUITE 102
HOUSTON, TEXAS 77094
P 832.327.6006

STRUCTURE
MEAD & HUNT
2440 DEMING WAY
MIDDLETON, WI 53562-1562
P 608.273.6380

MEP / FIRE PROTECTION
MEAD & HUNT
2440 DEMING WAY
MIDDLETON, WI 53562-1562
P 608.273.6380

CIVIL / LANDSCAPE
STRAND ASSOCIATES, INC.
910 W. WINGRA DRIVE
MADISON, WI 53715
P: 608.251.4843

COST ESTIMATING
MIDDLETON CONSTRUCTION CONSULTANTS
330 E KILBOURN AVE
SUITE 562, MILWAUKEE, WI 53202
P 414.716.4400

PUBLIC IMPROVEMENT PROJECT APPROVED:	PUBLIC IMPROVEMENT DESIGN APPROVED BY:
RES – ___ - ____	_____
FILE ID _____	CITY ENGINEER
DATE _____	_____
BY THE COMMON COUNCIL OF MADISON, WI	DATE

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 297 7679 t

CIVIL AND LANDSCAPE
WISCONSIN PATRICK J. FRANK E-25548 MADISON WI PROFESSIONAL ENGINEER
Reviewed for conformance with L-24 title 2/7/19

ARCHITECTURAL AND EQUIPMENT
WISCONSIN KENNETH J. ANDERSON A-111743 McLEAN VA REGISTERED ARCHITECT
2/8/19

STRUCTURAL
WISCONSIN DAVID K. COCKRUM E-37122 MILWAUKEE WI PROFESSIONAL ENGINEER
2/7/19

MECHANICAL
WISCONSIN DANIEL J. GREEN E-33528 MADISON WI PROFESSIONAL ENGINEER
2/7/19

PLUMBING
WISCONSIN ROBERT M. MUTSCH E-39741-E WEST ALLIS WI PROFESSIONAL ENGINEER
02/07/2019

ELECTRICAL
WISCONSIN JOHN R. HUDOOK E-39800-006 MILWAUKEE WI PROFESSIONAL ENGINEER
2/7/19

PLACE SIGNED SEALS IN SQUARES ABOVE

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

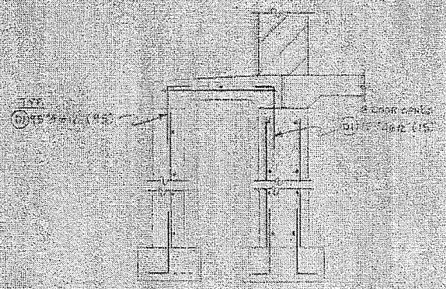
PROJECT No: 370923

COVER SHEET

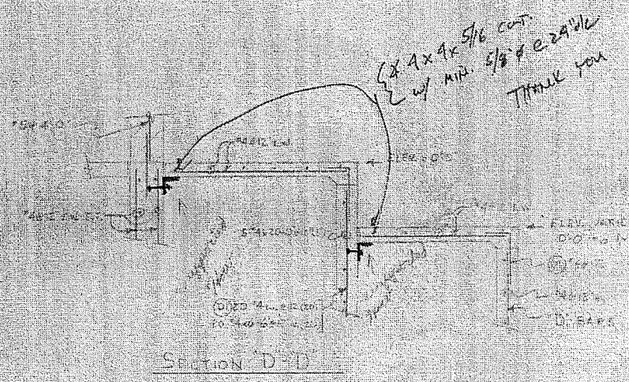
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ADDENDUM 2

ADDENDUM 2



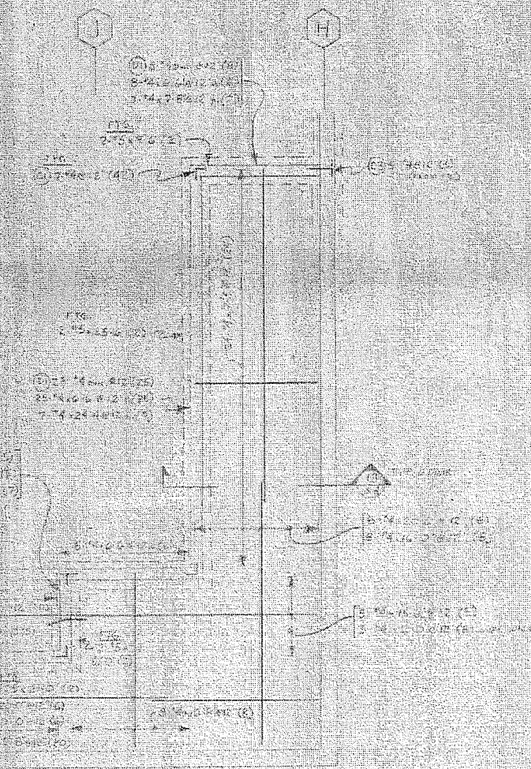
SECTION

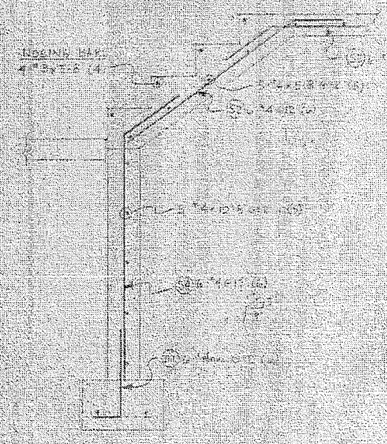


SECTION D-D

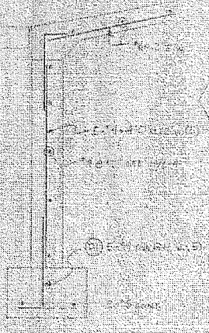


D" BARS





SECTION (F)



SECTION (E)

BENDING DETAILS

MARK	SIZE	LENGTH	DETAIL
D1	4	25'	19 L's
C1	4	30'	
C3	4	38'	
S2	4	54'	
S4	4	60'	

EXT. RAMP + DOCK @ D10

Wisconsin WIRE & STEEL INC.
4220 N. 124th ST. BROOKFIELD, WIS. 414-781-4000 ZIP 53005

PROJECT: CUB FOODS
NORTHERN TRAILS (EAST) MADISON, WISC.
CONTRACTOR: KRAEMER BROS.
ARCHITECT: FLANNERY
DRAWN BY: JR DATE: 3-9-95
REVISED:
SHEET: 4

24" DIA. LAP	ALL REINFORCING STEEL TO MEET ASTM SPECIFICATION 60
48" DIA. LAP	

ADDENDUM 2

BENDING DETAILS			
MARK	SIZE	LENGTH	DETAIL
D1	4	25	90° L 8"
D2	5	210	90° L 24"
D3	5	43	90° L 24"
D4	5	41	90° L 24"
Z	5	32	135° F 48"
T1	3	34	90° 10"
C1	4	30	90° F 24"
C2	4	20	90° 3"

PARTIAL PLAN (SOUTH HALF)

Wisconsin WIRE & STEEL INC.
4320 N. 124th ST. BROOKFIELD, WIS.
414-781-4400 ZIP 53005

PROJECT CUB FOODS
MADISON TRAIL & COMMERCIAL AVE. (EAST) MADISON, WISC.
CONTRACTOR MEATHER BROS.
ARCHITECT PLANNERS
DRAWN BY J.S. DATE 4-4-94 SHEET
APPVD

24 DIA LAP
ALL REINFORCING STEEL TO MEET ASTM SPECIFICATION

ADDEN... 2

BENDING DETAILS			
MARK	SIZE	LENGTH	DETAIL
D1	4	2'-5"	18" L.P.
D2	5	2'-10"	18" L.P.
D3	6	4'-3"	24" L.P.
Z1	5	3'-2"	24"
T1	3	3'-1"	12"
S1	4	4'-0"	12"
S2	4	5'-4"	24"
S3	4	4'-6"	12" L.P.
C1	4	2'-0"	1" L.P.

SECTION (18/S4)

SIDE WALL

(D1) 4 "S" BARS @ 1'-0" (4)
(Z1) 4 "S" BARS @ 1'-0" (4)
(S3) 4 "S" BARS @ 1'-0" (4)

'A' BARS	'B' BARS
2'-0" x 1'-0"	2'-0" x 1'-0"
3'-4" (1)	3'-0" (1)
3'-8" (1)	4'-5" (1)
4'-0" (1)	5'-0" (1)
4'-4" (1)	6'-3" (1)
4'-8" (1)	6'-9" (1)
5'-0" (1)	7'-0" (1)
5'-4" (1)	7'-6" (1)

TYP. TYPE 'A' (20 THIS)

TYP. TYPE 'C' (15 THIS)

PARTIAL PLAN

SECTION (18/S4)

PARTIAL PLAN (NORTH WEST CORNER)

DIA. LAP	
#3	1'-0"
#4	1'-4"
#5	1'-8"
#6	2'-0"
#7	2'-4"
#8	2'-8"

ALL REINFORCING STEEL TO MEET ASTM SPECIFICATION A615

Wisconsin WIRE & STEEL, INC.
4133 N. 124th ST. BROOKFIELD, WIS. ZIP 53005
414-781-4490

PROJECT: CUB FOODS
KENOSHA, WISCONSIN
COMMERCIAL WORK
CONTRACTOR: KRAEMER BROS.
ARCHITECT:
DRAWN BY: J.B. DATE: 9-8-95
CHECKED:
SHEET 2

ADDENDUM 2

"C" BARS
50 KSI #2 (1/4") ϕ STIRRUPS

2.0 (C)	2'-11 (6)	3'-10 (6)	4'-8 (6)	5'-7 (6)
2.1 (C)	3'-0 (6)	3'-11 (6)	4'-7 (6)	5'-8 (6)
2.2 (C)	3'-1 (6)	4'-0 (6)	4'-11 (6)	5'-9 (6)
2.3 (C)	3'-2 (6)	4'-1 (6)	5'-0 (6)	5'-10 (6)
2.4 (C)	3'-3 (6)	4'-2 (6)	5'-1 (6)	5'-11 (6)
2.5 (C)	3'-4 (6)	4'-3 (6)	5'-2 (6)	6'-1 (6)
2.6 (C)	3'-5 (6)	4'-4 (6)	5'-3 (6)	6'-2 (6)
2.6 (C)	3'-6 (6)	4'-5 (6)	5'-4 (6)	6'-3 (6)
2.7 (C)	3'-8 (6)	4'-6 (6)	5'-5 (6)	6'-4 (6)
2.8 (C)	3'-9 (6)	4'-7 (6)	5'-6 (6)	6'-5 (6)

BENDING DETAILS

MARK	SIZE	LENGTH	DETAIL
L1	4	38	
L2	4	40	
D1	4	25	
D2	5	210	
C1	4	20	
C1A	4	20	
C1B	4	20	

WALL ELEVATION "A"
(LOOKING SOUTH)

ELEVATION "B"
(LOOKING EAST)

SECTION (B)

SECTION (A)

SECTION (C)

SECTION (D)

SECTION (E)

SECTION (F)

PARTIAL PLAN

NORTH

PLANMARK
ENGINEERING + CONSTRUCTION
- ☐ NO EXCEPTION TAKEN
- ☐ MAKE CORRECTIONS NOTED
- ☐ REVISE & RESUBMIT
- ☐ SUBMIT SPECIFIED ITEM
- ☐ REJECTED

DATE 9/17/86 BY JAA

THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR CORRECTNESS OF DIMENSIONS, QUANTITIES, AND SIZES, OR FOR PROPER DESIGN OF DETAILS. NOR IS THIS AN APPROVAL OF DEVIATIONS FROM CONTRACT DRAWING OR SPECIFICATIONS.

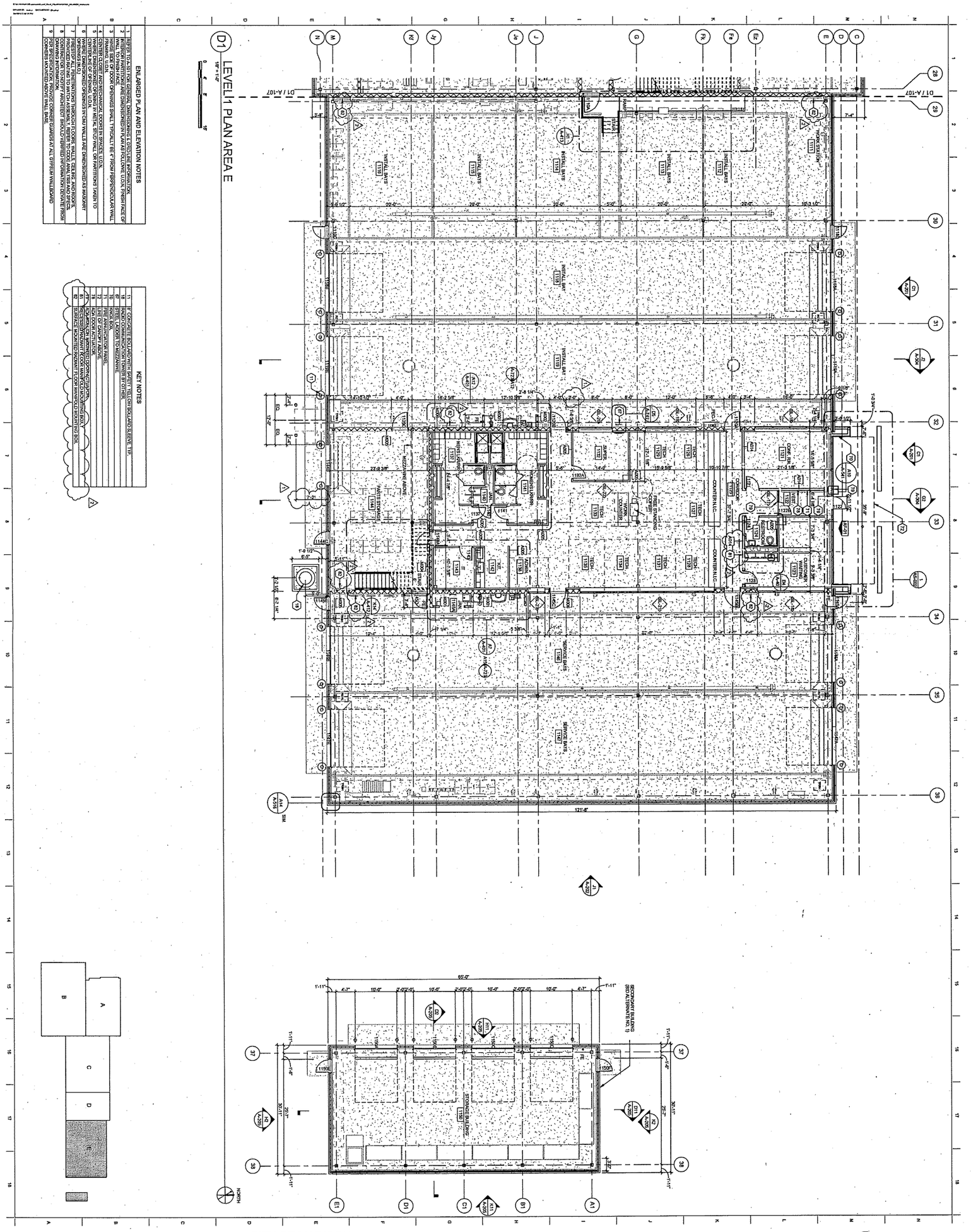
APPROVED ☐
REVIEWED ☒
KRAEMER BROS., INC.
By J. Ax
Date 9-11-86

#4 DIA. LAP	ALL REINFORCING STEEL TO MEET ASTM SPECIFICATION	
#5 DIA. LAP		

PARTIAL PLAN (NORTH-EAST CORNER)

Wisconsin WIRE & STEEL INC.
4320 N. 124th ST. BROOKFIELD, WIS. 414-781-6600 ZIP 53005

PROJECT: NEW SHOP ADDITION
LOCATION: [illegible]
CONTRACTOR: KRAEMER BROS.
ARCHITECT-ENGINEER:
DRAWN BY: [illegible] DATE: 9-9-86
REVISED:
SHEET 7

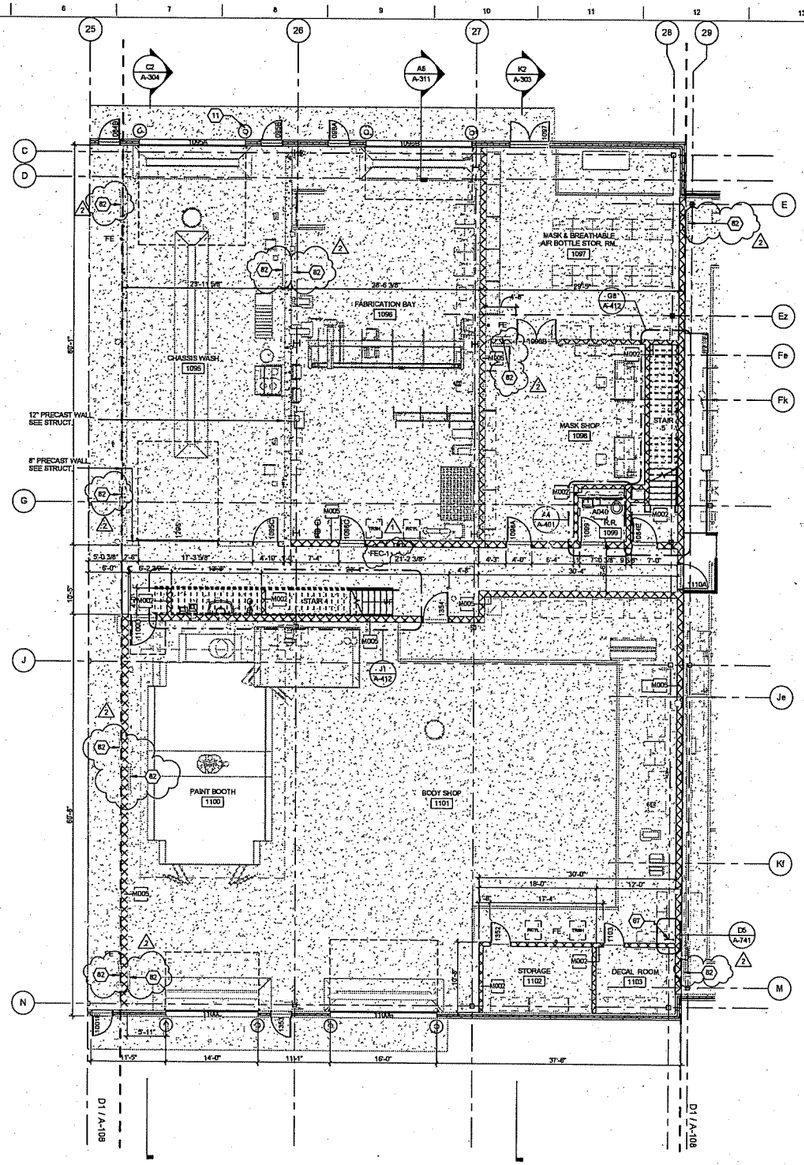


CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

A-108
LEVEL 1 FLOOR PLAN
AREA E

ADDENDUM 2



D1 LEVEL 1 PLAN AREA D

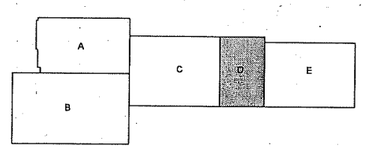
1/8" = 1'-0"

0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N. FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES, U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (M.O.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS. PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES	
11	8" CONCRETE BOLLARD WITH SAFETY YELLOW BOLLARD SLEEVE TYP.
67	STEEL LADDER TO MEZZANINE
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX.



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ARLINGTON, VA 22209
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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	DSPS RESPONSE 1	01/08/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No. 376603

LEVEL 1 FLOOR PLAN
AREA D

A-107

Addendum 2

D1 LEVEL 1 PLAN AREA C

1/8" = 1'-0"

0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
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8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
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KEY NOTES	
11	6" CONCRETE BOLLARD WITH SAFETY YELLOW BOLLARD SLEEVE, TYP.
73	TRENCH DRAIN, TYP.
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX, TYP.

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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 376603

LEVEL 1 FLOOR PLAN
AREA C

A-106

ADDENDUM 2

ADDENDUM 2

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7879 t

D1 / A-104

D1 / A-104

TIRE SHOP 1053
PORT. EQUIP. STORAGE 1036
STAIR 1033
FITNESS ROOM 1038
SHOWER 1032
COMMON WORK AREA 1039
STAIR 3 1034
CONF. RM. 1041
MEZZANINE ABOVE
6" METAL STUD WALL
PUBLIC WORKS GEN. FOREMAN 1042
TIRE STORAGE 1044
LIGHT VEHICLE REPAIR BAY 1 1045
LIGHT VEHICLE REPAIR BAY 2 1046
LIGHT VEHICLE REPAIR BAY 3 1047
LIGHT VEHICLE REPAIR BAY 4 1048
LIGHT VEHICLE REPAIR BAY 5 1049
LIGHT VEHICLE REPAIR BAY 6 1050
LIGHT VEHICLE REPAIR BAY 7 1051
LIGHT VEHICLE REPAIR BAY 8 1052
FLAT SURFACE
TOOL CRIB 1040
CHECK-IN COUNTER 1043
SLOPE 1/4" PER FOOT MIN. TYP.
LIGHT DUTY MAINTENANCE BAY 1095
FIRE RISER ROOM 1054
LIGHT VEHICLE REPAIR BAY 9 1057
LIGHT VEHICLE REPAIR BAY 10 1058
LIGHT VEHICLE REPAIR BAY 11 1059
LIGHT VEHICLE REPAIR BAY 12 1060
LIGHT VEHICLE REPAIR BAY 13 1061
LIGHT VEHICLE REPAIR BAY 14 1062
LIGHT VEHICLE REPAIR BAY 15 1063
LIGHT VEHICLE REPAIR BAY 16 1064
8" PRECAST WALL SEE STRUCT.
WASH BAY 1065
MAIN ELEC. ROOM 1059
TRANSFORMER
SLOPE 1/4" PER FOOT MIN. TYP. OVER HEAD DOORS
225'-11 5/8"
199'-3"

D1 LEVEL 1 PLAN AREA B

1/8" = 1'-0"

0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N. FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (M.O.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS, PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES	
36	EV CHARGING STATION, OWNERS TO SELECT THE UNIT.
73	TRENCH DRAIN, TYP.
81	RECESSED RADIANT FLOOR MANIFOLD MOUNTING BOX.
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX.

A
B
C
D
E

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No. 3768003

LEVEL 1 FLOOR PLAN
AREA B

A-105

Addendum 2

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 297 7670 t

D1 LEVEL 1 PLAN AREA A
1/8" = 1'-0"
0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N. FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING. U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES, U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (M.O.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS, PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES	
66	LINE OF MEZZANINE ABOVE.
70	KNOX BOX.
71	FIRE ANNUNCIATOR PANEL.
73	TRENCH DRAIN, TYP.
78	ADA DOOR ACTUATOR.
79	ADA MOUNTED DOOR ACTUATOR
81	RECESSED RADIANT FLOOR MANIFOLD MOUNTING BOX.
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX.

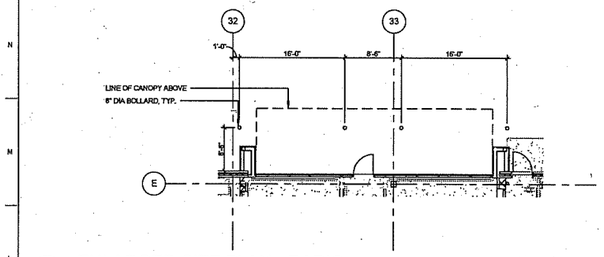
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

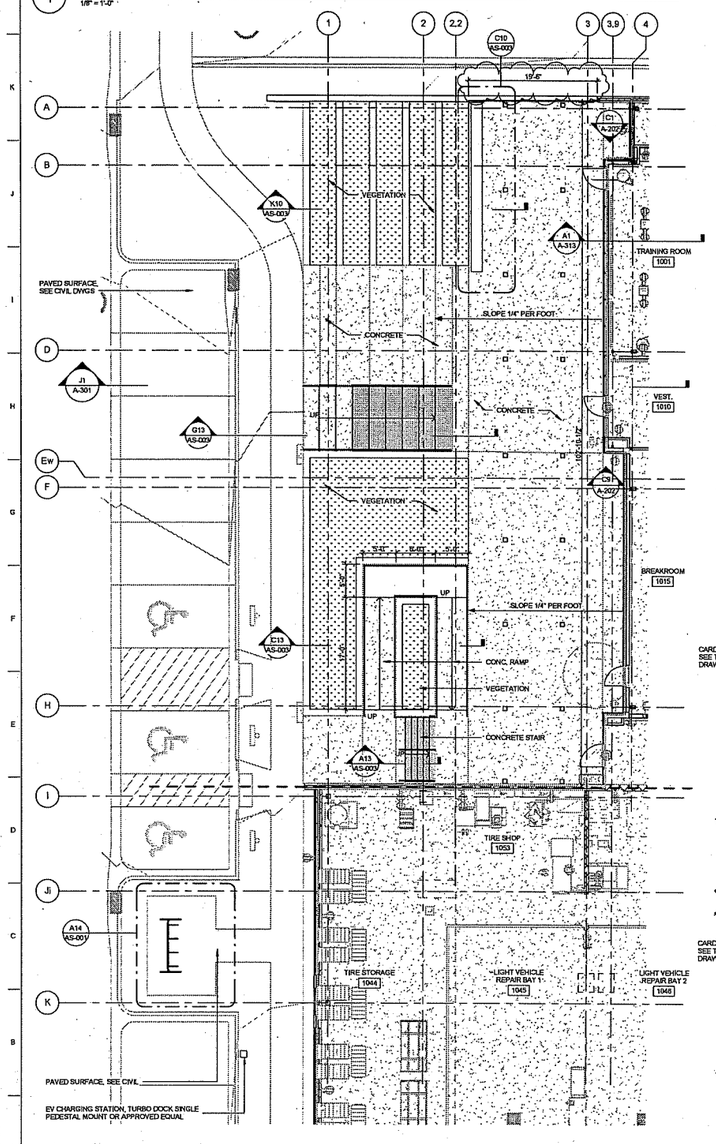
PROJECT No 376805

LEVEL 1 FLOOR PLAN
AREA A

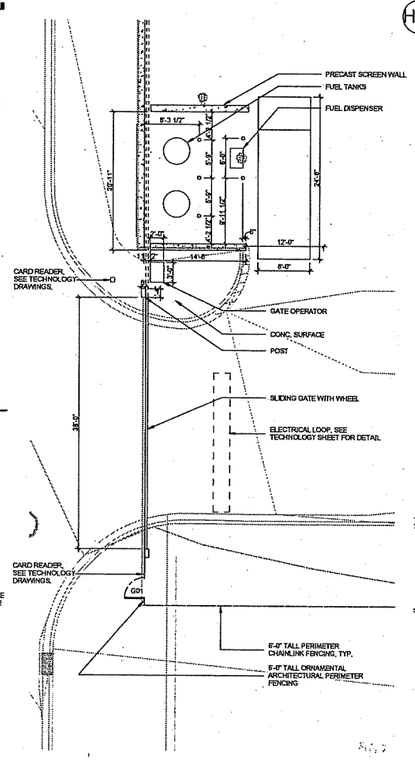
A-104



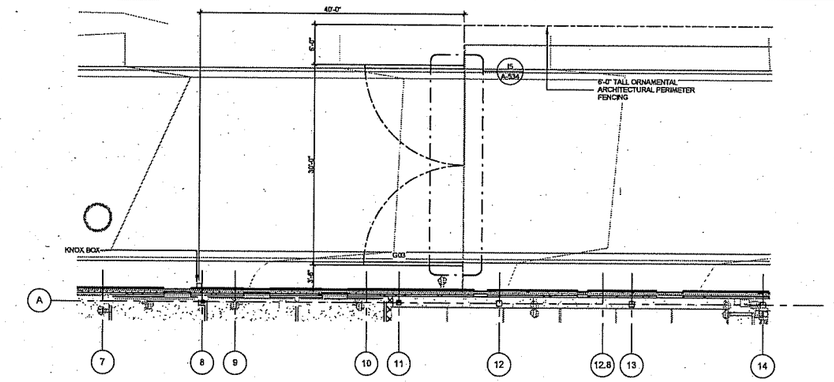
1 ENLARGED SITE PLAN - RADIO
1/8" = 1'-0"



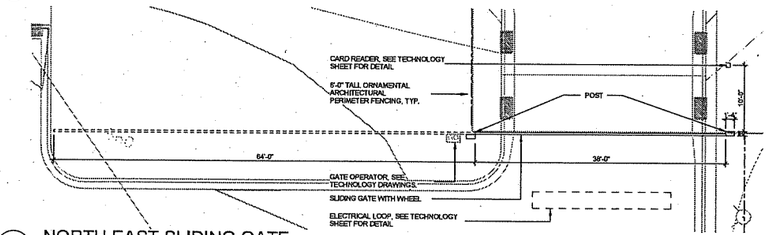
A1 ENLARGED FRONT ENTRY
1/8" = 1'-0"



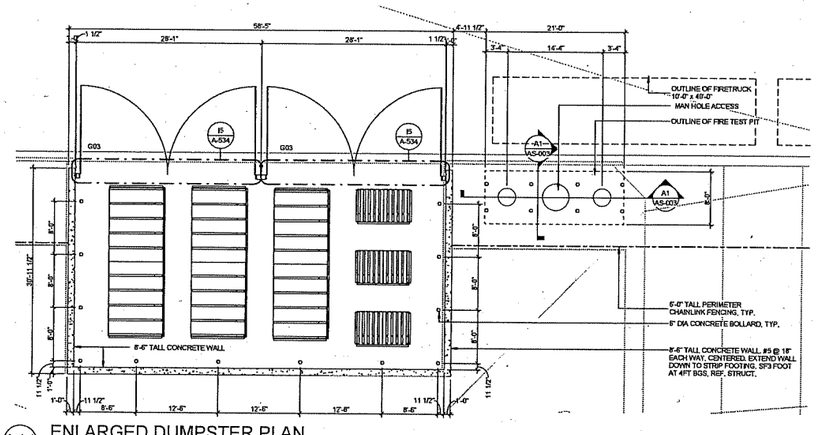
A7 FUELING AREA
1/8" = 1'-0"



K11 NORTH ENTRY GATE
1/8" = 1'-0"



H11 NORTH EAST SLIDING GATE
1/8" = 1'-0"



A11 ENLARGED DUMPSTER PLAN
1/8" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 280 7979 t

ADDENDUM 2

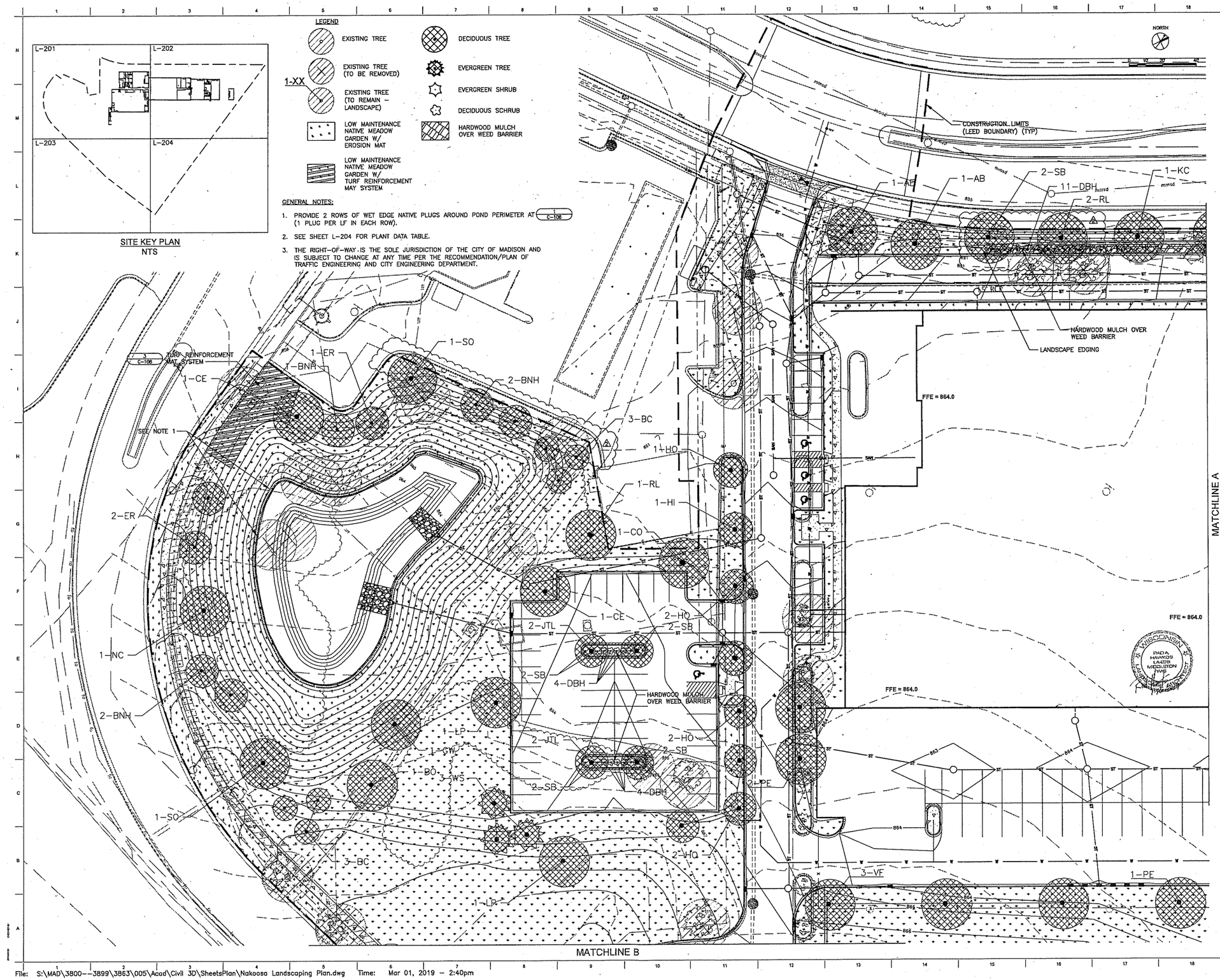
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/31/2019

PROJECT No: 376903

ENLARGED SITE PLAN

AS-002



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RNL
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

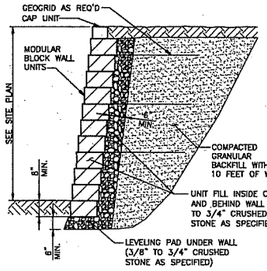
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No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/07/19

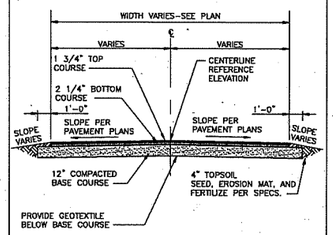
PROJECT No. 375003

AREA 1
LANDSCAPING PLAN

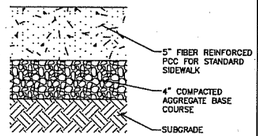
L-201



A C-113 MODULAR RETAINING WALL
NO SCALE



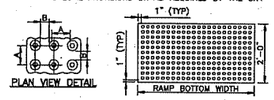
B C-113 NEW APSHALT PAVEMENT SECTION
NO SCALE



NOTES:
1. PROVIDE CONTROL JOINTS AT APPROXIMATELY 15 FT. ON CENTER
2. PROVIDE CONSTRUCTION JOINTS AS REQUIRED

C C-113 CONCRETE SIDEWALK
NO SCALE

NOTE: MATERIALS AND METHOD OF CONSTRUCTION FOR TRUNCATED DOMES SHALL BE SPECIFIED IN SPECIAL PROVISIONS OR AS REQUIRED BY THE CITY

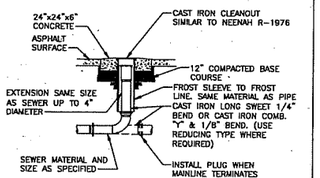


PLAN VIEW DETAIL

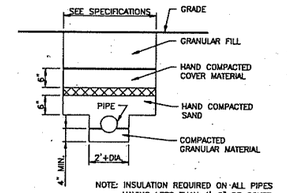
	MIN.	MAX.
A	1.6"	2.4"
B	0.65"	1.5"
C	*	*
D	0.9"	1.4"

* THE C DIMENSION IS 50% TO 65% OF THE D DIMENSION

B C-113 TRUNCATED DOMES
NO SCALE



E C-113 EXTERIOR CLEANOUT DETAIL
NO SCALE



NOTE: INSULATION REQUIRED ON ALL PIPES HAVING LESS THAN 4'-0" OF COVER.

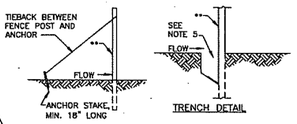
F C-113 UNDERGROUND PIPE INSULATION
NO SCALE

NOTES:
1. DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.
2. WHEN POSSIBLE THE SILT FENCE SHALL BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.
3. CROSS BRACE WITH 2"x4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
4. MINIMUM 14 GAGE WIRE REQUIRED, FOLD FABRIC 3" OVER THE WIRE AND STAPLE OR PLACE WIRE RINGS ON 12" C-C.
5. EXCAVATE TRENCH A MINIMUM OF 4" WIDE AND 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC, FOLD MATERIAL TO FIT TRENCH AND BACKFILL AND COMPACT TRENCH WITH EXCAVATED SOIL.
6. WIRE SUPPORT FENCE SHALL BE 14 GAGE MINIMUM WOVEN WIRE WITH A MAXIMUM MESH SPACING OF 6". SECURE TOP OF GEOTEXTILE FABRIC TO TOP OF FENCE WITH STAPLES OR WIRE RINGS AT 12" C TO C.
7. GEOTEXTILE FABRIC SHALL BE REINFORCED WITH AN INDUSTRIAL POLYPROPYLENE NETTING WITH A MAXIMUM MESH SPACING OF 1/4" OR EQUAL. A HEAVY DUTY NYLON TOP SUPPORT CORD OR EQUIVALENT IS REQUIRED.
8. STEEL POSTS SHALL BE STUDDED "TEE" OR "U" TYPE WITH A MINIMUM WEIGHT OF 1.2 LBS/LINEAR FOOT WITHOUT ANCHORS, OR ANCHORS SUFFICIENT TO RESIST POST MOVEMENT ARE REQUIRED. WOOD POSTS SHALL BE A MINIMUM SIZE OF 4" DIAMETER, OR 2 1/2"x3 1/2", EXCEPT WOOD POSTS FOR GEOTEXTILE FABRIC REINFORCED WITH NETTING SHALL BE A MINIMUM SIZE OF 1 1/8"x1 1/8" OAK OR HICKORY.
9. ALTERNATES "A" AND "B" ARE EQUAL AND EITHER MAY BE USED.

* 20' FOR NORMAL 10' DITCH
** GEOTEXTILE FABRIC SIDE

SILT FENCE AT MEDIAN SURFACE DRAINS

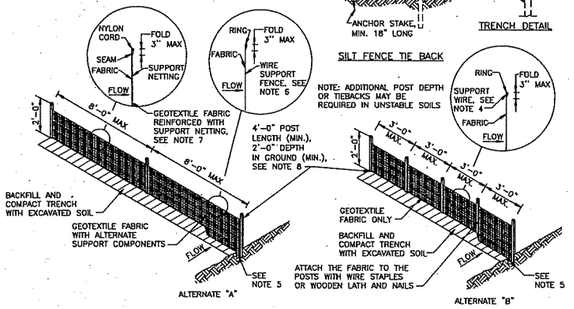
TYPICAL APPLICATIONS OF SILT FENCE



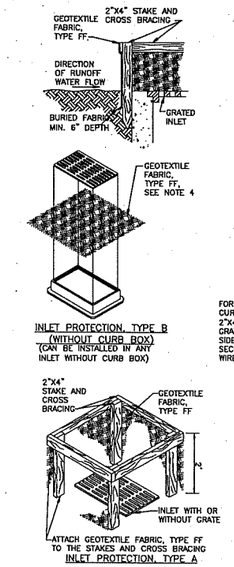
TRENCH DETAIL

SILT FENCE TIE BACK

NOTE: ADDITIONAL POST DEPTH OR TIEBACKS MAY BE REQUIRED IN UNSTABLE SOILS

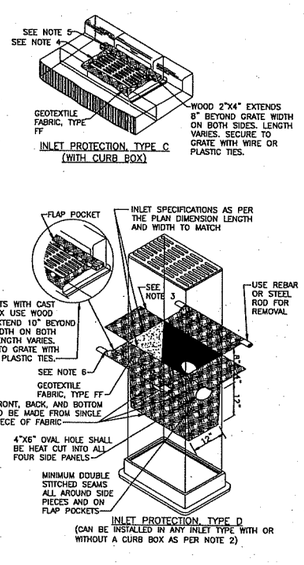


C C-113 SILT FENCE
NO SCALE



INLET PROTECTION, TYPE B (WITHOUT CURB BOX)
(CAN BE INSTALLED IN ANY INLET WITHOUT CURB BOX)

INLET PROTECTION, TYPE A

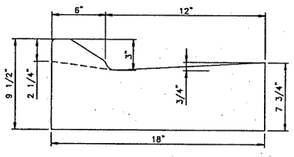


INLET PROTECTION, TYPE C (WITH CURB BOX)

INLET PROTECTION, TYPE D
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE 2)

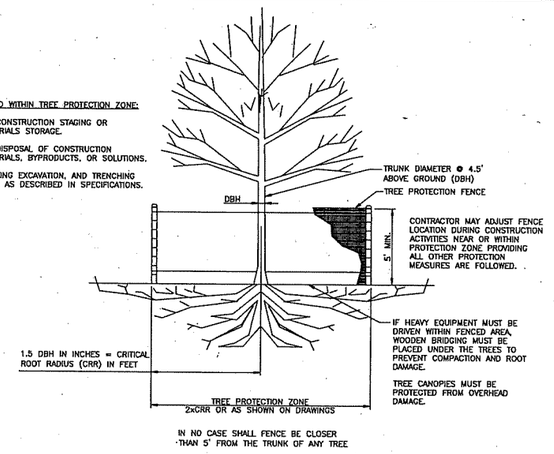
NOTES:
1. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.
2. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET, ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.
3. FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
4. FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.
6. FOR TYPES B AND C, TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE. THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.
7. FOR TYPE D, DO NOT INSTALL INLET PROTECTION TYPE D INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.
TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.
THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY, THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES, TO ACHIEVE THE 3" CLEARANCE.

INLET PROTECTION
TYPE A, B, C, AND D
H C-113 NO SCALE

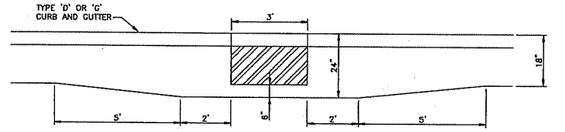


M C-113 MOUNTABLE CURB AND GUTTER SECTION
NO SCALE

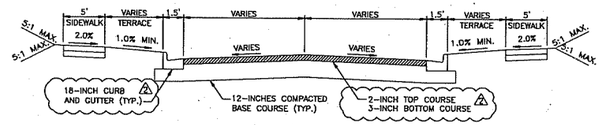
PROHIBITED WITHIN TREE PROTECTION ZONE:
1. NO CONSTRUCTION STAGING OR MATERIALS STORAGE.
2. NO DISPOSAL OF CONSTRUCTION MATERIALS, BYPRODUCTS, OR SOLUTIONS.
3. GRADING EXCAVATION, AND TRENCHING ONLY AS DESCRIBED IN SPECIFICATIONS.



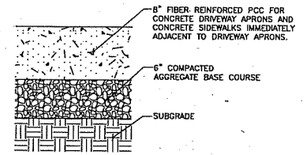
I C-113 TREE PROTECTION DETAIL
NO SCALE



K C-113 CURB DETAIL AT STORM SEWER INLETS
NO SCALE



L C-113 STREET TYPICAL SECTION
NO SCALE



N C-113 CONCRETE PAVEMENT
NO SCALE

RNL
1600 WILSON BLVD.
SUITE 1000
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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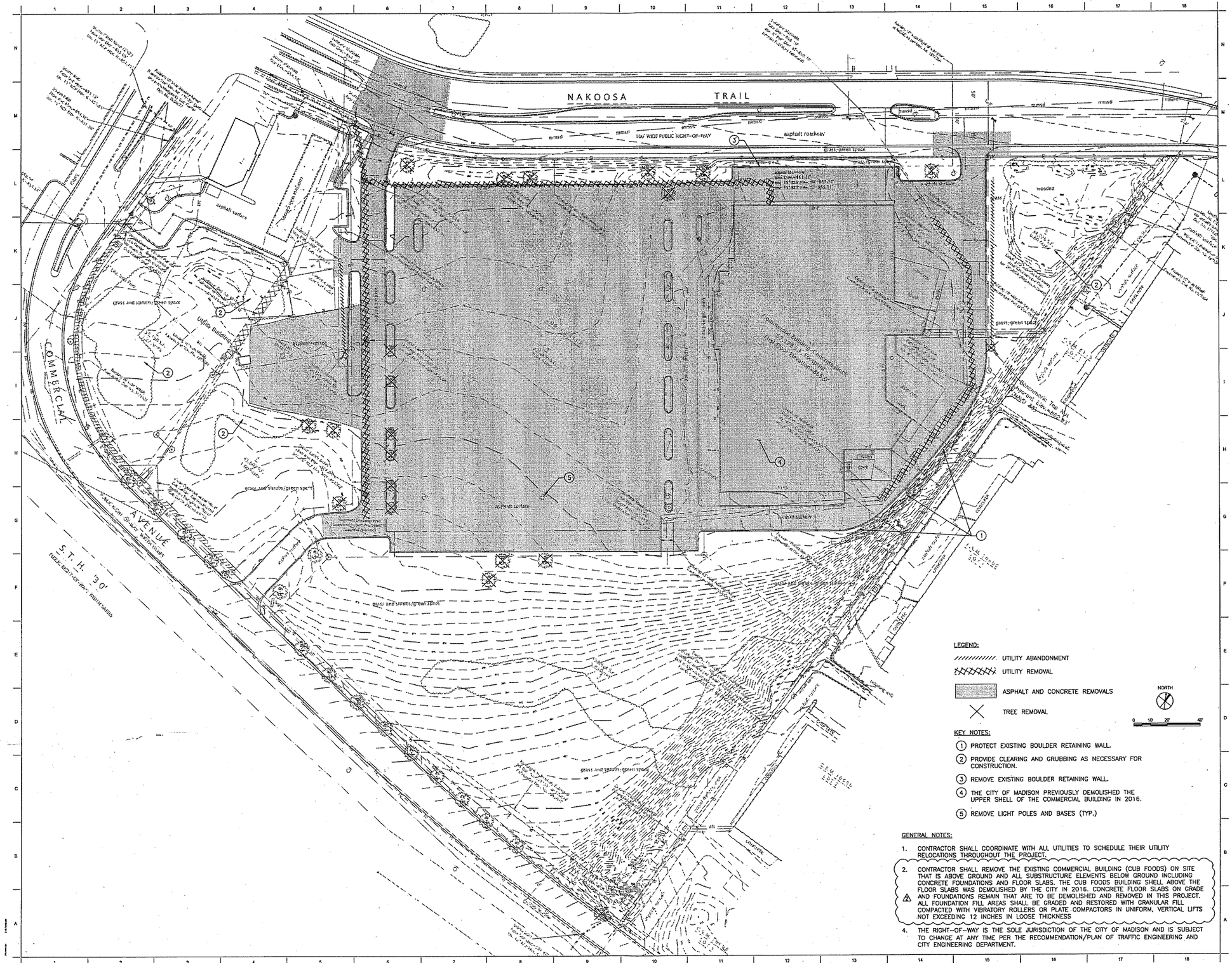
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PROJECT No: 376003

STANDARD DETAILS

C-113



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ADDENDUM 2

RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 1679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/2/19

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PROJECT No: 376603

DEMOLITION PLAN

C-112

ADDENDUM 2

RNL
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SUITE 360
ARLINGTON, VA 22209
571 290 7079 t

GENERAL NOTES:

1. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.

KEY NOTES:

1. PROVIDE CONNECTION TO EXISTING WATER MAIN. VERIFY PIPE SIZE, MATERIAL AND ELEVATION.
2. PROVIDE NECESSARY ADJUSTING RINGS FOR THE NEW ELEVATIONS OF THE EXISTING CASTING.
3. FIELD VERIFY AND REPLACE AS NECESSARY AN EXISTING SANITARY SEWER MANHOLE BARREL SECTION FOR THE NEW ELEVATION OF THE EXISTING CASTING.
4. PROVIDE WATER MAIN PIPE CONNECTION TO EXISTING SANITARY SEWER MANHOLE.
5. EXISTING 8" PVC SANITARY SEWER MAIN TO REMAIN IN SERVICE.
6. EXISTING 8" PVC SANITARY SEWER MAIN TO BE REMOVED, SEE SHEET C-112.
7. INSTALL 2" PVC CONDUIT UNDER DRIVEWAY APPROACH W/ NO. 10 AWG COPPER PULL WIRE PER CITY OF MADISON TRAFFIC ENGINEERING CONDUIT PLACEMENT DETAILS FOR COMMERCIAL DRIVE APPROACH, STANDARD DETAIL DRAWING 6.09 PROVIDE PVC CAP AT EACH END TO FINISH GRADE.

MATCHLINE A

MH SAN-9 (EXISTING)
MH ST-10
MH ST-22
MH ST-23
MH ST-11
FFE = 864.0
8" PVC
Storm Manhole
Rim Elev.=863.11'
Inv. 15" RCP Elev. SW=857.71'
Inv. 15" RCP Elev. SE=858.11'
15" RCP
12" RCP
I-7.5
I-7.3
I-7.4
I-7.1
I-7.2
MH SAN-4
MH SAN-5
8" PVC
AEW-3 WITH GATE
AEW-4 WITH GATE
CLAY BEDDING DIKE
MH ST-24
AEW-5 WITH GATE
AEW-6 WITH GATE
Sanitary Manhole
Rim Elev.=859.12'
Inv. 8" PVC Elev. NW= 851.57'
Inv. 8" PVC Elev. SE= 851.67'
30" RCP
I-8.1
I-8.2
MH ST-25
FFE = 861.5
FFE = 860.30
10" PVC
MH ST-26
MH ST-27
Sanitary Manhole
Rim Elev.= 859.97'
Inv. 8" PVC Elev. NW= 852.82'
Inv. 8" PVC Elev. S= 852.32'
MH SAN-6
MH ST-17
MH ST-19
MH ST-18
MH ST-16
I-9.1
24" RCP
21" RCP
18" RCP
MH ST-30
MH ST-29
MH ST-28
I-10.3
I-10.1
I-10.2
Sanitary Manhole
Rim Elev.= 861.50'
Inv. 8" PVC Elev. N= 854.50'
Inv. 8" PVC Elev. SE= 854.75
MH SAN-8 (EXISTING)
MH SAN-7 (EXISTING)
Storm Manhole
Rim Elev.=857.21'
Inv. 15" RCP Elev. NE= 857.17'
Inv. 15" RCP Elev. SE= 857.37'
FFE = 864.0
FFE = 861.5

NORTH
0 10' 20' 40'

SITE KEY PLAN
NTS
C-105
C-106

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

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PROJECT No: 376603

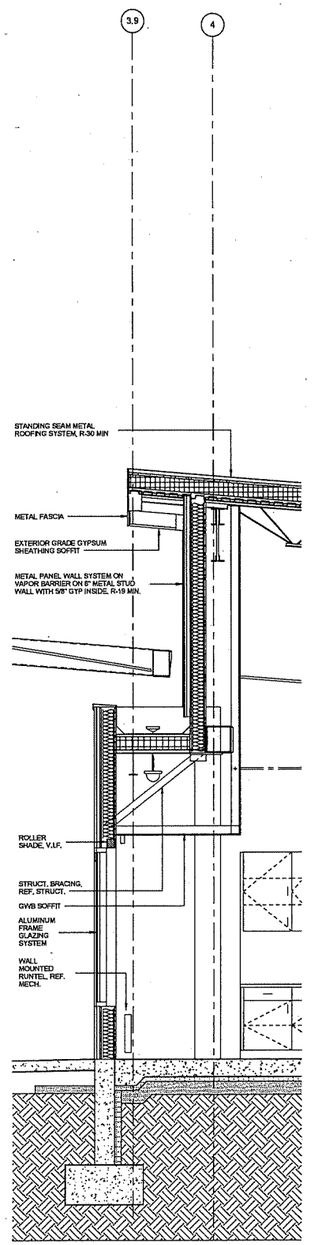
AREA 1
UTILITY PLAN

C-106

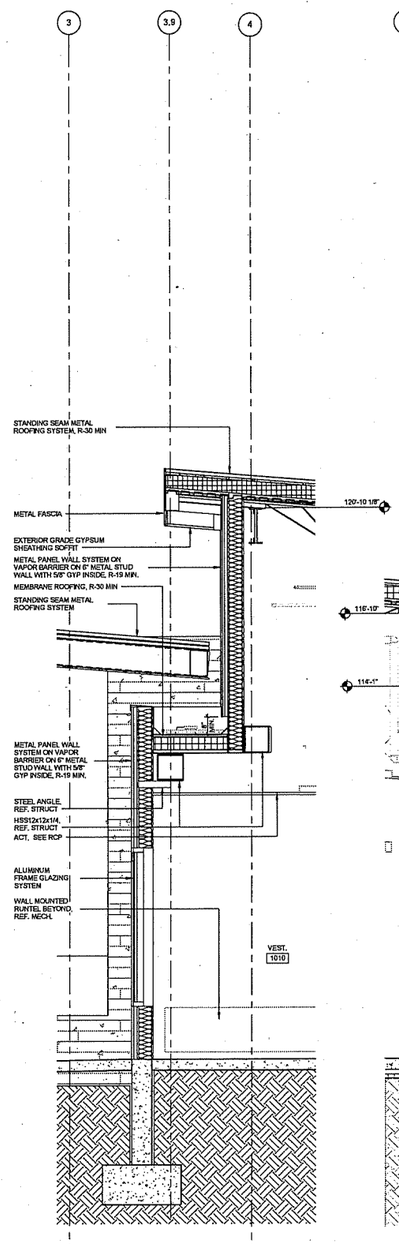
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571 280 7670 t.

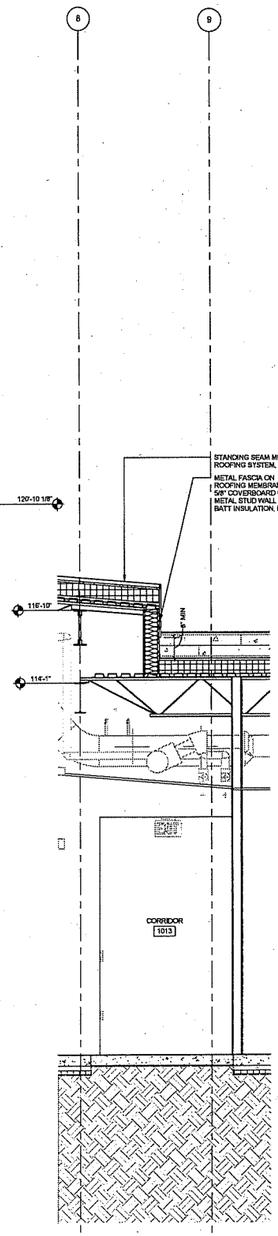
Add. Dwg 2



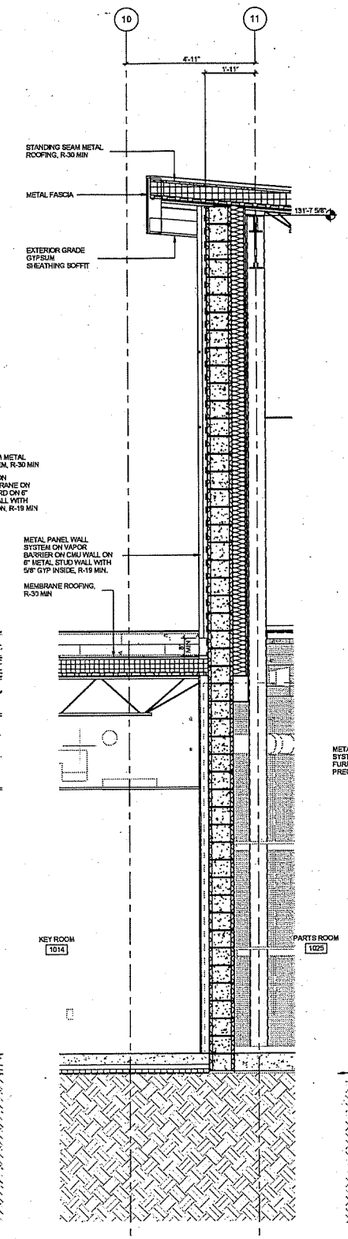
A1 Section @ TRAINING ROOM
1/2" = 1'-0"



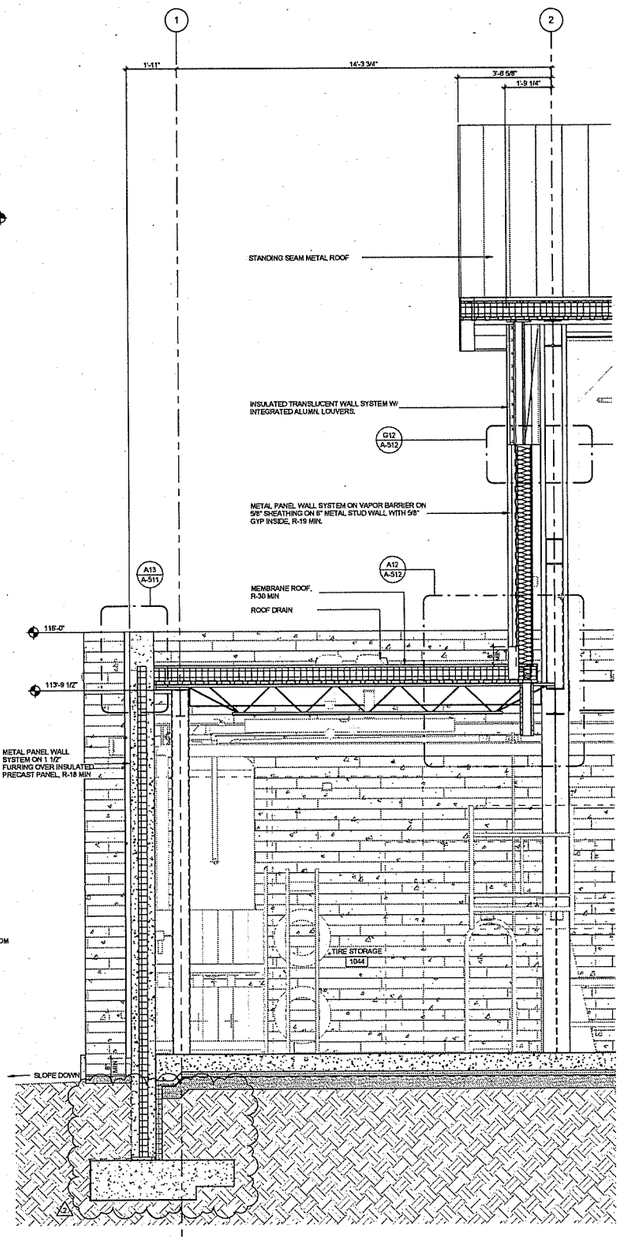
A4 SECTION @ ADMIN 22
1/2" = 1'-0"



A7 SECTION AT ADMIN
1/2" = 1'-0"



A10 SECTION @ ADMIN & PARTS
1/2" = 1'-0"



A13 SECTION @ LIGHT MAINT.
1/2" = 1'-0"

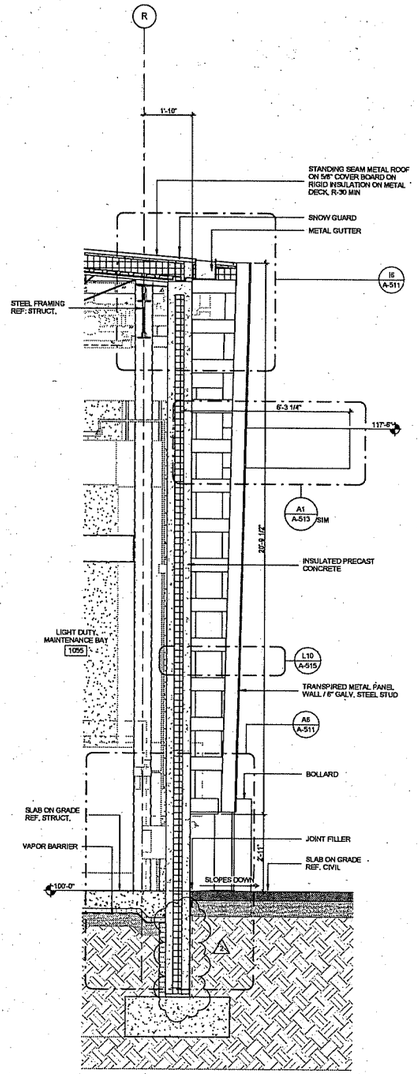
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

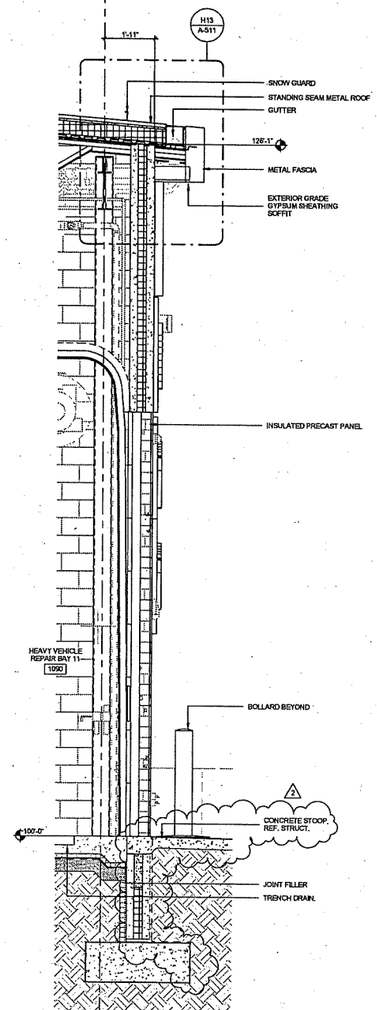
PROJECT No. 376603

E/W WALL SECTIONS

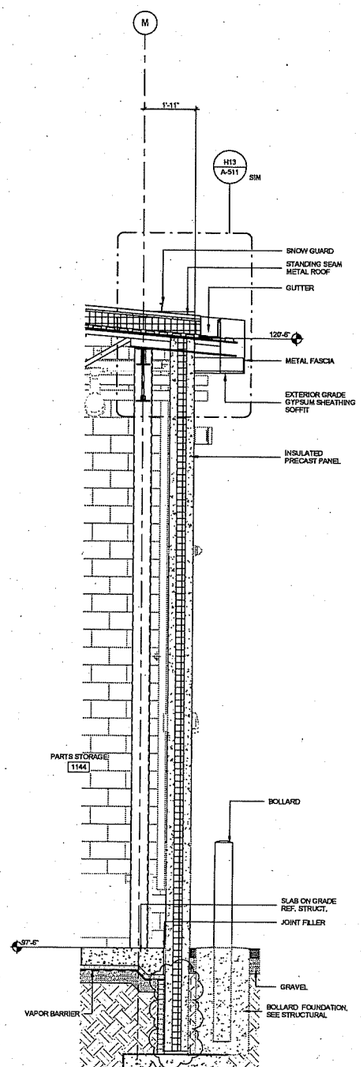
A-313



A6 WALL SECTION @ LIGHT MAINTENANCE
1/2" = 1'-0"



A10 SOUTH WALL SECTION @ HEAVY DUTY
1/2" = 1'-0"



A15 SOUTH WALL SECTION @ RADIO
1/2" = 1'-0"

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ADDENDUM 2

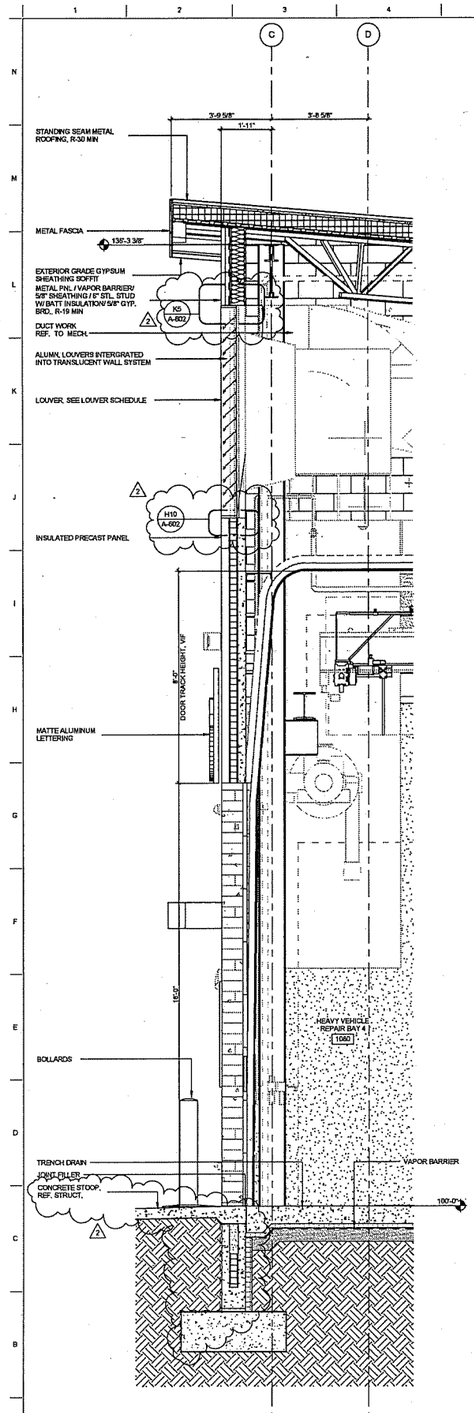
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

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2	ADDENDUN 2	05/03/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

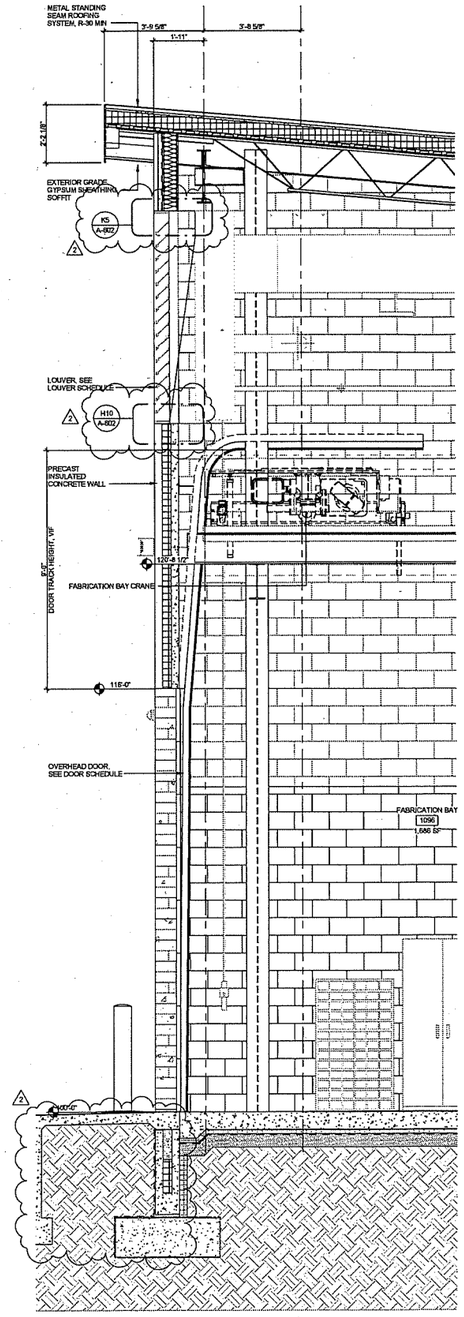
PROJECT No: 378803

N/S WALL SECTIONS

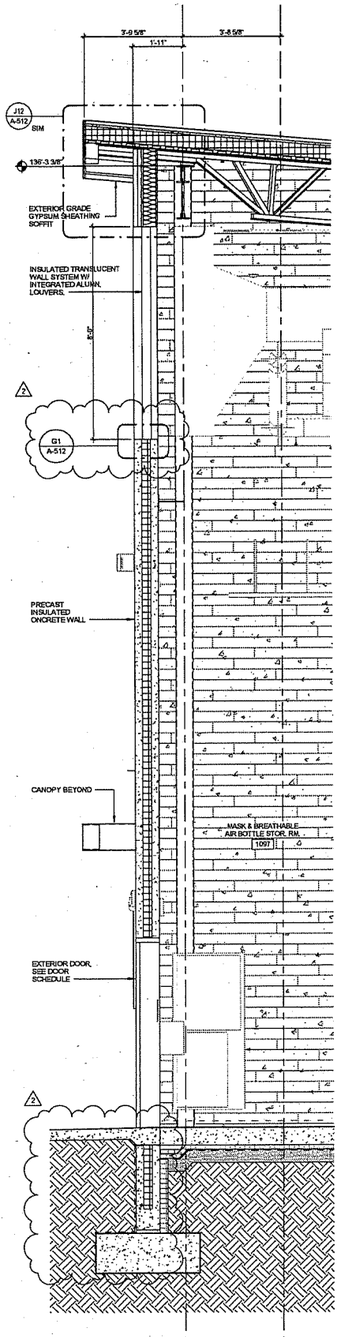
A-312



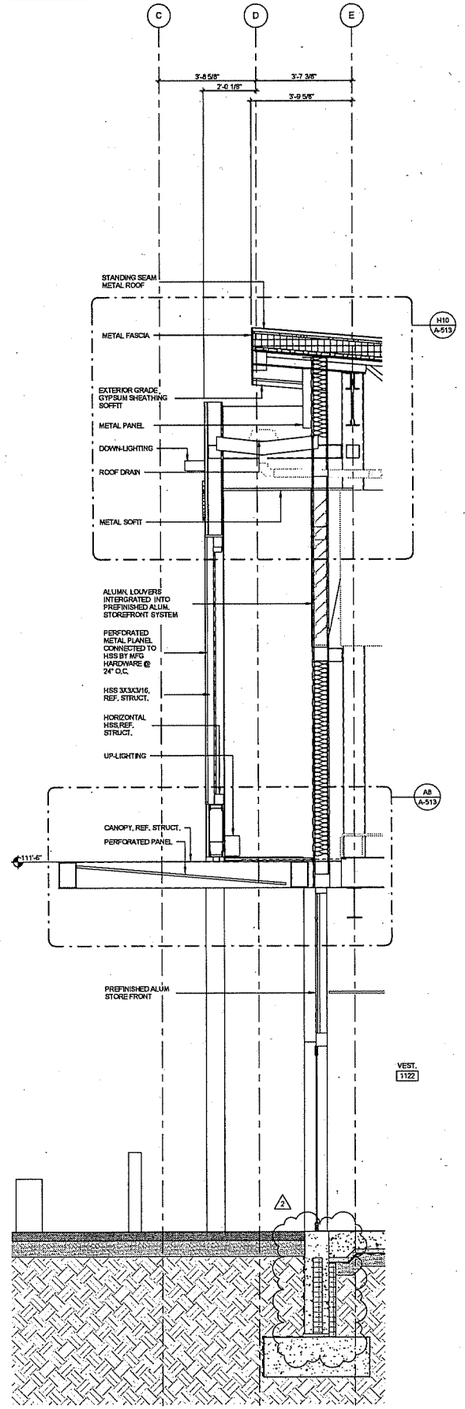
A1 NORTH WALL SECTION @ HEAVY DUTY
1/2" = 1'-0"



A6 WALL SECTION AT FABRICATION BAY
1/2" = 1'-0"



A10 SECTION AT BREATHABLE TANK STO
1/2" = 1'-0"



A14 NORTH WALL SECTION @ RADIO
1/2" = 1'-0"

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1609 WILSON BLVD.
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ADDEN. NO 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

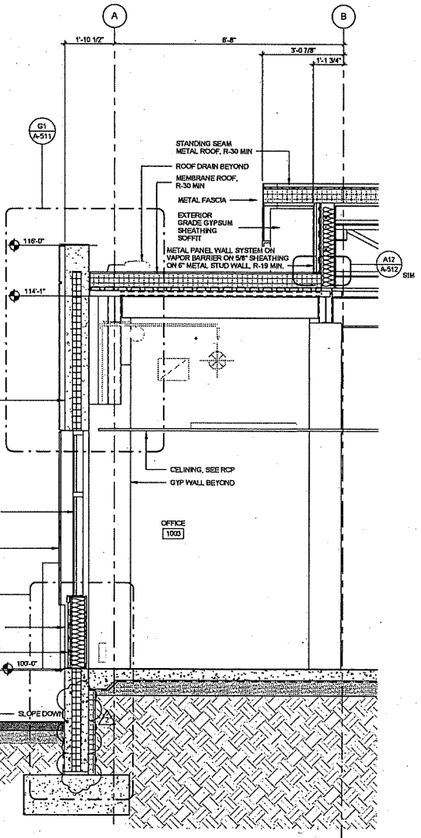
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	DSPS RESPONSE 1	01/24/2019
	ISSUE FOR PERMIT	01/10/2019

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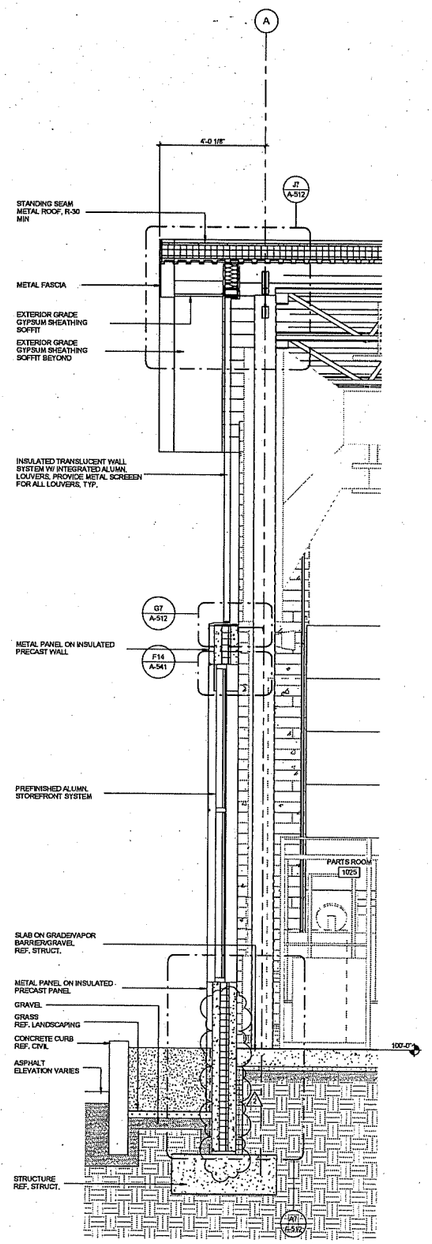
PROJECT No: 376803

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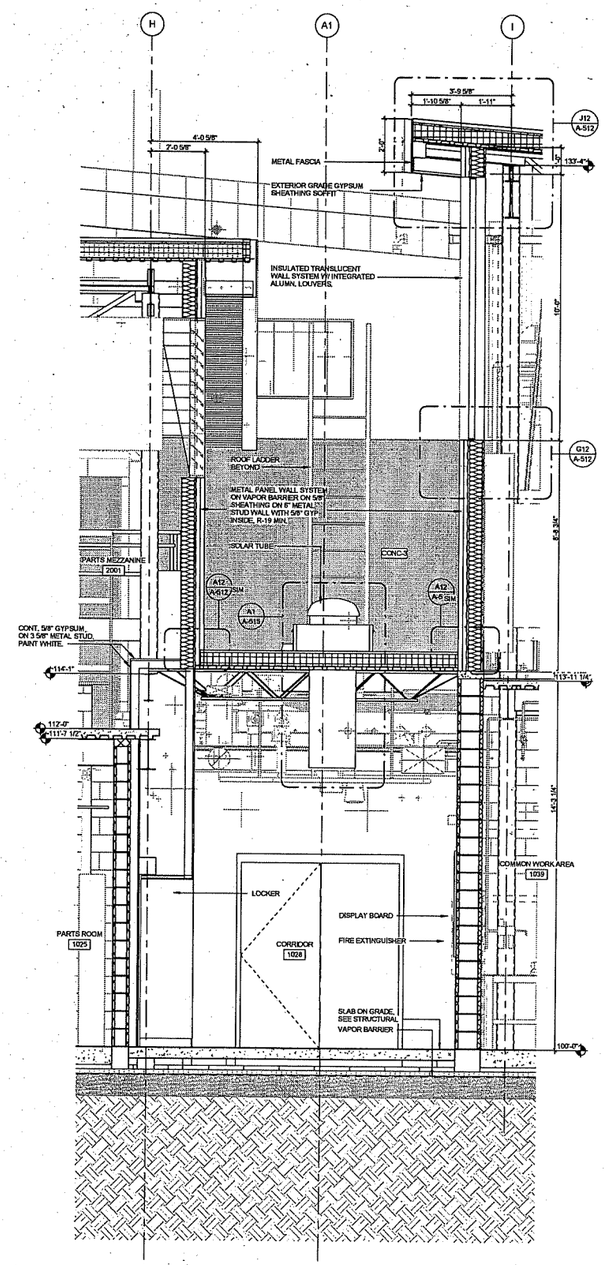
A-311



A1 SECTION @ OFFICE WINDOW
1/2" = 1'-0"



A7 NORTH WALL SECTION @ PARTS ROOM
1/2" = 1'-0"



A12 NORTH WALL SECTION @ LIGHT MAINTENANCE
1/2" = 1'-0"

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ADDENDUM 2

CITY OF MADISON
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FACILITIY
AREA: 117,946 GROSS SF
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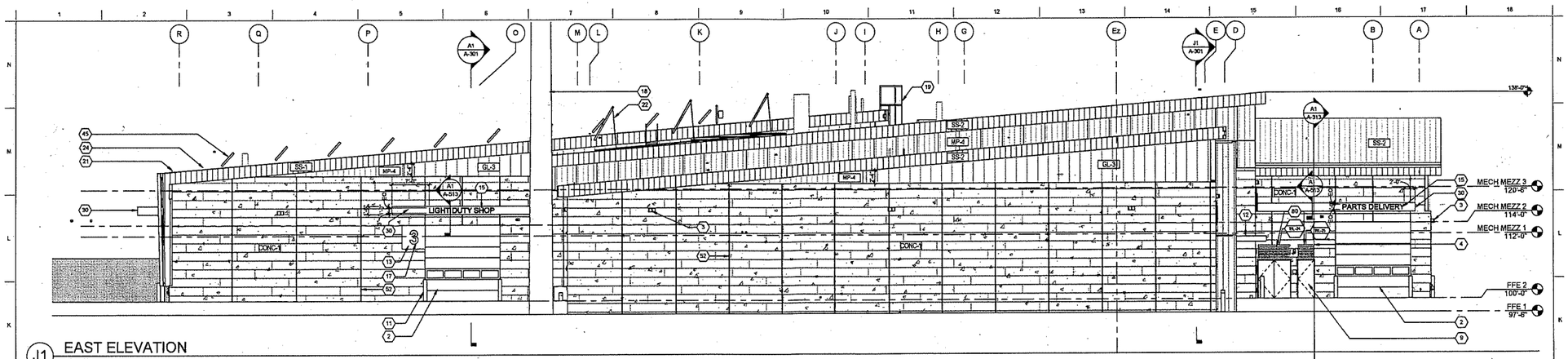
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2	ADDENDUM 2	03/05/2019
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	ISSUE FOR PERMIT	01/11/2019

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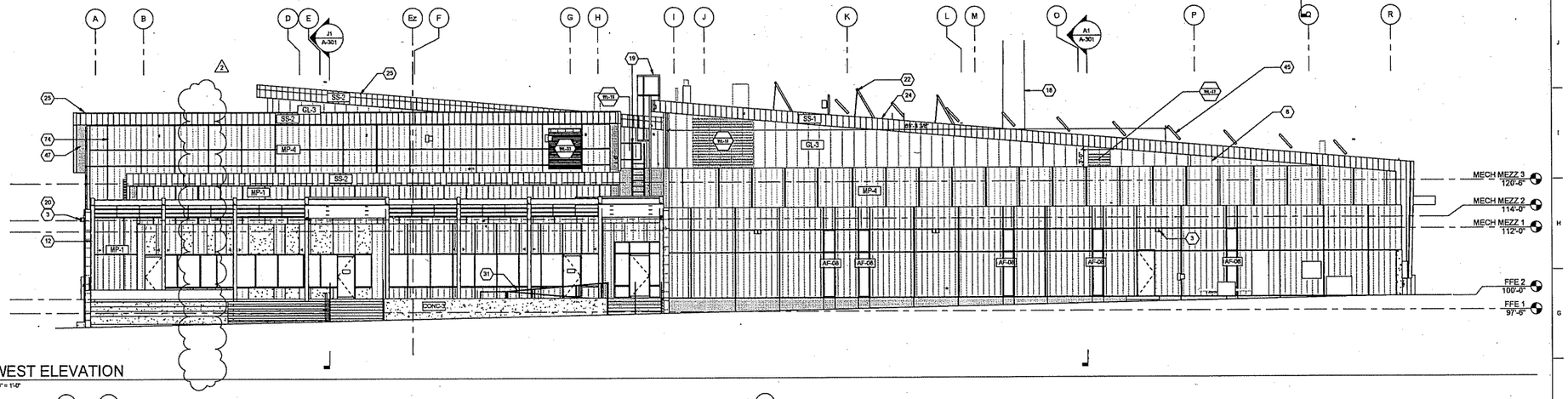
PROJECT No. 376003

N/S WALL SECTIONS

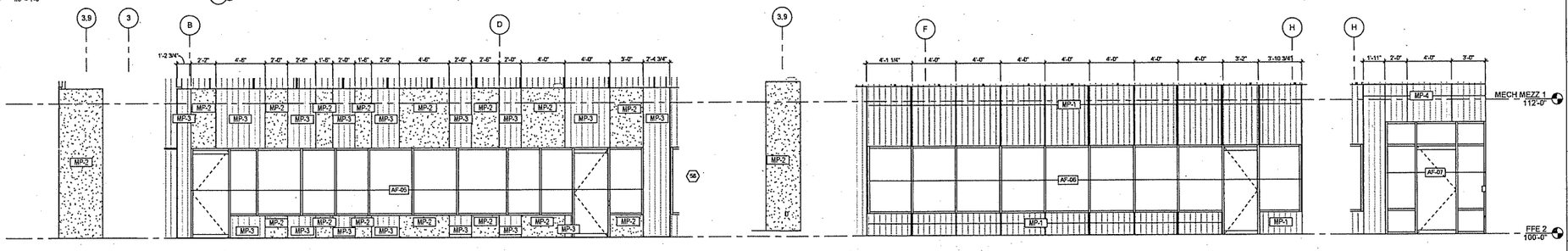
A-310



J1 EAST ELEVATION
1/8" = 1'-0"



D1 WEST ELEVATION
1/8" = 1'-0"



C1 NRTH ENTRY ELEV 1/4" = 1'-0"

C3 ENLARGED WEST ELEVATION AT ENTRY 1/4" = 1'-0"

C9 STH ENTRY ELEV 1/4" = 1'-0"

C11 ENLARGED WEST ELEVATION AT ENTRY1 1/4" = 1'-0"

C16 ENLRGD WST ELEV ENTRY 2 1/4" = 1'-0"

ENLARGED ELEVATION NOTES	
1	REFER TO G-001 FOR PROJECT GENERAL NOTES, REFERENCE AND MATERIAL SYMBOLS, AND ABBREVATIONS USED ON THIS DRAWING.
2	REFER TO THE ARCHITECTURAL GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL NOTES WHICH MAY BE APPLICABLE TO THE WORK SHOWN ON THIS SHEET.
3	REFER TO AND COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4	REFER TO SITE SCHEDULE, ARCHITECTURAL GENERAL NOTES FOR SITE SIGNAGE AND SITE SIGNAGE LOCATION ON SHEET AS-005.
5	SEE SHEET A-200 FOR ADDITIONAL EXTERIOR FINISH INFORMATION AND SCHEDULE.
6	FOR ALUMINUM FRAMED (AF) WINDOW AND GLAZING TYPES, REFER TO SHEETS A-503 AND A-504.

KEY NOTES	
2	INSULATED STEEL SECTIONAL OVERHEAD DOOR WITH VISION AND PLASTIC GLAZING PANELS. TYP.
3	LIGHT FIXTURE, REFER TO ELECTRICAL DRAWINGS.
4	MECHANICAL LOUVER, TYP. REFER TO MECHANICAL DRAWINGS.
8	(MP-4) METAL WALL PANEL, SEE EXTERIOR FINISH SCHEDULE ON A-200.
9	(PT-1) HOLLOW METAL DOOR AND FRAME, TYP.
11	8" CONCRETE BOLLARD WITH BASE(T) YELLOW BOLLARD SLEEVE, TYP.
12	(PT-1) PAINTED STEEL STRUCTURE CANOPY.
13	(PT-3) PAINTED STEEL PLATE WITH APPLIED STEEL LETTERING, TYP.
15	MATTE ALUMINUM LETTERS 1'-0" HEIGHT, TYP.
17	MATTE ALUMINUM LETTERS 3'-0" HEIGHT, TYP..
18	RADIO COMMUNICATION TOWER BY OTHER.
19	ROOF LADDER WITH METAL CAGE, TYP.
21	SNOWGAURD, TYP.
22	SOLAR HOT WATER PANEL SYSTEM, REFER TO MECHANICAL DRAWINGS.
24	(SS-1) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
25	(SS-2) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
30	METAL PANEL CANOPY WITH MEMBRANE ROOFING.
31	PAINTED/FINISHED METAL PIPE HANDRAIL/GUARDRAIL, TYP.
45	SOLAR PANEL, TYP. SEE ELECTRICAL. (ALTERNATE BID NUMBER 2).

KEY NOTES CONT.	
47	(PERFORATED METAL SOFFIT TO MATCH SS-2, SEE EXTERIOR FINISH SCHEDULE ON A-200.
52	3/4" INSULATED PRECAST PANEL JOINT, TYP.
74	1/2" REVEAL IN METAL PANEL, TYP.
80	PROVIDE BIRD-SCREEN ON EXTERIOR SIDE OF LOUVER.

MATERIAL GRAPHIC LEGEND	
YXL-X	LOUVER TYPE, SEE SHEET A-002
AF-X	(AF) ALUMINUM FRAME, SEE SHEET A-503 - A-504
XXX-X	EXTERIOR FINISH, SEE SHEET A-200
PT-X	PAINTS AND COATINGS, SEE SHEET A-200
BL-X	BORROWED LITE TYPE, SEE SHEET A503 - A-504
XXX	KEYNOTE

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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

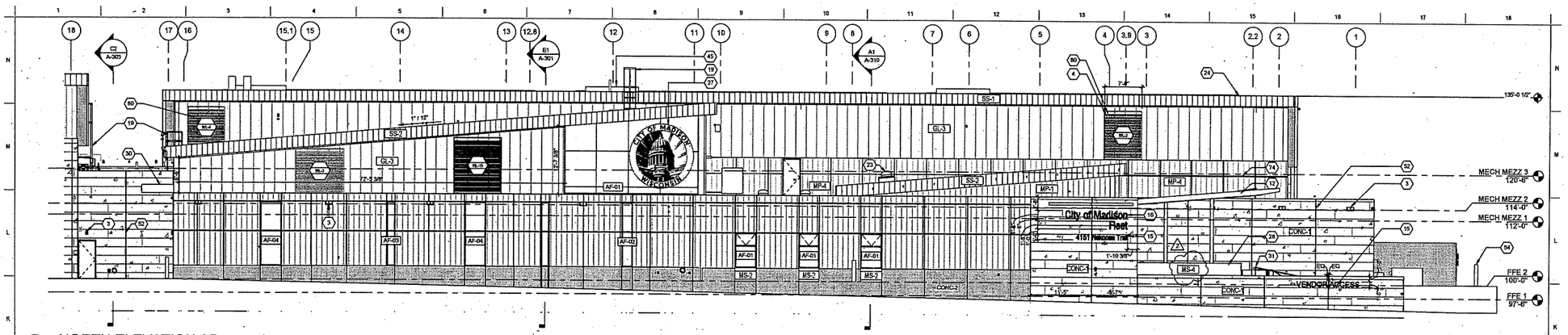
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2	ADDENDUM 2	03/07/2019
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PROJECT No. 376603

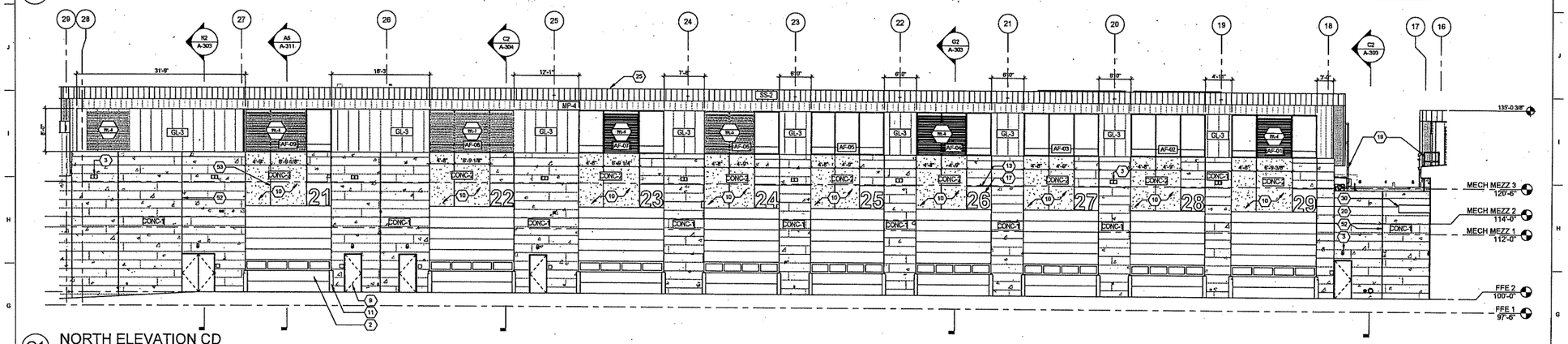
BUILDING ELEVATIONS

A-202

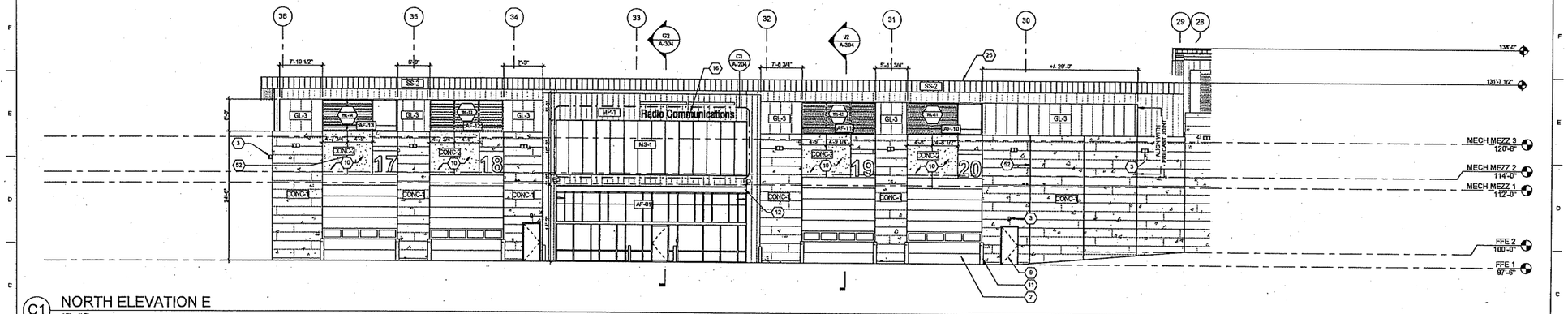
ADD UM 2



K1 NORTH ELEVATION AB
1/8" = 1'-0"



G1 NORTH ELEVATION CD
1/8" = 1'-0"



C1 NORTH ELEVATION E
1/8" = 1'-0"

ENLARGED ELEVATION NOTES	
1	REFER TO G-001 FOR PROJECT GENERAL NOTES, REFERENCE AND MATERIAL SYMBOLS, AND ABBREVIATIONS USED ON THIS DRAWING.
2	REFER TO THE ARCHITECTURAL GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL NOTES WHICH MAY BE APPLICABLE TO THE WORK SHOWN ON THIS SHEET.
3	REFER TO AND COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4	REFER TO SITE SCHEDULE, ARCHITECTURAL GENERAL NOTES FOR SITE SIGNAGE AND SITE SIGNAGE LOCATION ON SHEET AS-003.
5	SEE SHEET A-200 FOR ADDITIONAL EXTERIOR FINISH INFORMATION AND SCHEDULE.
6	FOR ALUMINUM FRAMED (AF) WINDOW AND GLAZING TYPES, REFER TO SHEETS A-503 AND A-504.

KEY NOTES	
2	INSULATED STEEL SECTIONAL OVERHEAD DOOR WITH VISION AND PLASTIC GLAZING PANELS, TYP.
3	LIGHT FIXTURE, REFER TO ELECTRICAL DRAWINGS.
4	MECHANICAL LOUVER, TYP. REFER TO MECHANICAL DRAWINGS.
9	(PT-1) HOLLOW METAL DOOR AND FRAME, TYP.
10	(PT-2) PAINTED INSULATED PRECAST WALL PANELS WITH SMOOTH TEXTURE. SEE EXTERIOR FINISH SCHEDULE ON A-200.
11	6" CONCRETE BOLLARD WITH SAFETY YELLOW BOLLARD SLEEVE, TYP.
12	(PT-1) PAINTED STEEL STRUCTURE CANOPY
13	(PT-3) PAINTED STEEL PLATE WITH APPLIED STEEL LETTERING, TYP.
15	MATTE ALUMINUM LETTERS 1'-0" HEIGHT, TYP.
16	MATTE ALUMINUM LETTERS 1'-6" HEIGHT, TYP.
17	MATTE ALUMINUM LETTERS 3'-0" HEIGHT, TYP.
19	ROOF LADDER WITH METAL CAGE, TYP.
23	SCULATURE, TYP.
24	(SS-1) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
25	(SS-2) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
27	VINYL APPLIED GRAPHIC.
28	PERFORATED METAL SCREEN WITH PAINTED SUBSTRUCTURE TO MATCH MS-1.
30	METAL PANEL CANOPY WITH MEMBRANE ROOFING.

KEY NOTES CONT.	
31	PREFINISHED METAL PIPE HANDRAIL/GUARDRAIL, TYP.
45	SOLAR PANEL, TYP. SEE ELECTRICAL (ALTERNATE BID NUMBER 2).
52	3/4" INSULATED PRECAST PANEL JOINT, TYP.
53	1/2" INSULATED PRECAST PANEL REVEAL, TYP.
54	BIKE RACK ON PAVED SURFACE, SEE AS-002.
74	1/2" REVEAL IN METAL PANEL, TYP.
80	PROVIDE BIRD-SCREEN ON EXTERIOR SIDE OF LOUVER.

MATERIAL GRAPHIC LEGEND	
WL-X	LOUVER TYPE, SEE SHEET A-502
AF-X	(AF) ALUMINUM FRAME, SEE SHEET A-503 - A-504
XXX-X	EXTERIOR FINISH, SEE SHEET A-200
PT-X	PAINTS AND COATINGS, SEE SHEET A-200
BL-X	BORROWED LITE TYPE, SEE SHEET A503 - A-504
XXX	KEYNOTE

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4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/01/2019
	ISSUE FOR BID	03/07/2019
	DSPS RESPONSE 1	01/01/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 3760003

BUILDING ELEVATIONS

A-201

ADDENDUM 2

EXTERIOR FINISH SCHEDULE

CONC-1 PRECAST CONCRETE PANEL
MFG: - SPANCRETEE
COLOR: NATURAL CONCRETE COLOR
FINISH: -
DESCRIPTION: BOARD FORM CONCRETE TEXTURE

CONC-2 PRECAST INSULATED CONCRETE PANEL
MFG: DUNN EDWARDS
COLOR: DE6229 CALICO ROCK
FINISH: PAINTED
DESCRIPTION: SMOOTH TEXTURE FINISH AND 3/4" DEEP x 1/2" WIDE REVEALS ON EXTERIOR FACE.

CONC-3 CAST-IN-PLACE CONCRETE
MFG:
COLOR: NATURAL CONCRETE COLOR
FINISH: SAND
DESCRIPTION:

MP-1 RAINSCREEN METAL WALL PANEL
MFG: CENTRIA
STYLE: IW-10A 22 GUAGE OPTIMAL ALUMINUM
COLOR: DURANAR XL COATINGS, COPPER CANYON, #32MN86997P
FINISH: SMOOTH (NON-EMBOSSED)
DESCRIPTION: 12" PANEL WIDTH TYPICAL

MP-2 RAINSCREEN METAL WALL PANEL
MFG: CENTRIA
STYLE: IW-10A 22 GUAGE OPTIMAL ALUMINUM
COLOR: DURANAR COATINGS, DILL WEED, #5MG85755
FINISH: SMOOTH (NON-EMBOSSED)
DESCRIPTION: 12" PANEL WIDTH TYPICAL

MP-3 RAINSCREEN METAL WALL PANEL
MFG: CENTRIA
STYLE: IW-10A 22 GUAGE OPTIMAL ALUMINUM
COLOR: DURANAR COATINGS, URBAN MIST GREEN, #5MG86920
FINISH: SMOOTH (NON-EMBOSSED)
DESCRIPTION: 12" PANEL WIDTH TYPICAL

MP-4 RAINSCREEN METAL WALL PANEL
MFG: CENTRIA
STYLE: IW-10A 22 GUAGE OPTIMAL ALUMINUM
COLOR: VALSPAR PRISMATIC: SLATE GREY, #181
FINISH: SMOOTH (NON-EMBOSSED)
DESCRIPTION: 12" PANEL WIDTH TYPICAL

MP-5 TRANSPIRED SOLAR COLLECTOR
MFG: SOLAR WALL
COLOR: CHARCOAL SW56072
DESCRIPTION: SOLAR ABSORPTIVITY 0.71

△2

MR-1 MEMBRANE ROOFING
MFG: FIRESTONE
STYLE:
COLOR: WHITE
FINISH:
DESCRIPTION: EPDM

MS-1 PERFORATED METAL SCREEN
MFG: PARASOLEIL
STYLE: LEMON DROP
FINISH: UMBRIA
DESCRIPTION: 1/8" THICK PANEL, 2'-8" WIDTH x 10'-0" LENGTH, 50% OPENNESS

MS-2 PERFORATED METAL SCREEN
MFG: PARASOLEIL
STYLE: LEMON DROP
FINISH: UMBRIA
DESCRIPTION: 1/8" THICK PANEL, 2'-8" WIDTH x 4'-0" LENGTH, 18% OPENNESS

MS-3 PERFORATED METAL SCREEN
MFG: PARASOLEIL
STYLE: LEMON DROP
FINISH: UMBRIA
DESCRIPTION: 1/4" THICK PANEL, 4'-0" WIDTH x 8'-0" LENGTH, 18% OPENNESS

MS-4 PERFORATED METAL SCREEN
MFG: PARASOLEIL
STYLE: LEMON DROP
FINISH: UMBRIA
DESCRIPTION: 1/8" THICK PANEL, SEE DRAWINGS FOR SIZE, 18% OPENNESS

SS-1 STANDING SEAM METAL ROOF
MFG: BERRIDGE
STYLE:
FINISH AND COLOR: TO MATCH TRANSPIRED METAL WALL
DESCRIPTION:

SS-2 STANDING SEAM METAL ROOF
MFG: BERRIDGE
STYLE: -
FINISH: KYNAR FINISH, ACRYLIC-COATED GLAVALUME
DESCRIPTION:

WWM-1 WELDED WIRE MESH, 2" x 2"
COLOR: GALVANIZED
FINISH: GALVANIZED
DESCRIPTION: NON-CLIMBABLE

WWM-2 WELDED WIRE MESH, 4" x 4"
COLOR: GALVANIZED
FINISH: GALVANIZED
DESCRIPTION: NON-CLIMBABLE

PAINTS AND COATINGS

PT-1 HIGH PERFORMANCE FIELD PAINT
CONDITION: EXTERIOR (HM FRAMES, METAL PANELS, AS NOTED) (INUL, PCC, TYP.)
MFG: DUNN EDWARDS
COLOR: DET611 IRON C

PT-2 HIGH PERFORMANCE FIELD PAINT
CONDITION: EXTERIOR (SMOOTH TEXTURED INSUL, PCC, TYP.)
MFG: DUNN EDWARDS
COLOR: DE6229 - CALLCO ROCK

PT-3 HIGH PERFORMANCE FIELD PAINT
CONDITION: EXTERIOR (STEEL PLATES, TYP.)
MFG: SHERWIN WILLIAMS
COLOR: COPPER POT SW7709

PT-4 HIGH PERFORMANCE FIELD PAINT
CONDITION: EXTERIOR (BOLLARDS, TYP.)
MFG: -
COLOR: HEX COLOR CODE #FF6700

PT-5 MANUFACTURED PREFINISH PAINT
CONDITION: EXTERIOR (ALUMINUM FRAMES, TYP.)
MFG: KAWNEER
COLOR: NO. 18 CHAMPAGNE

PT-6 MANUFACTURED APPLIED PAINT
CONDITION: EXTERIOR (OVERHEAD SECTIONAL DOOR, TYP.)
MFG: OVERHEAD DOOR CO.
COLOR: GRAY

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CITY OF MADISON
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FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/22/2019
	ISSUE FOR PERMIT	01/11/2019

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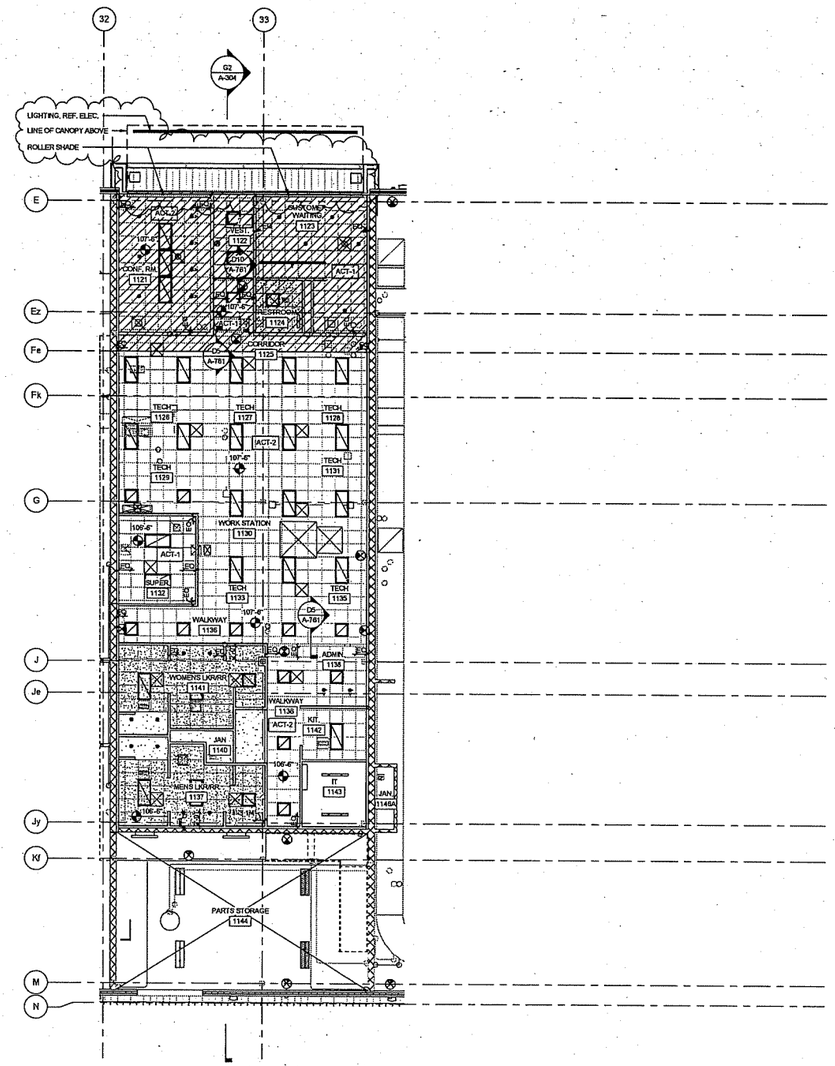
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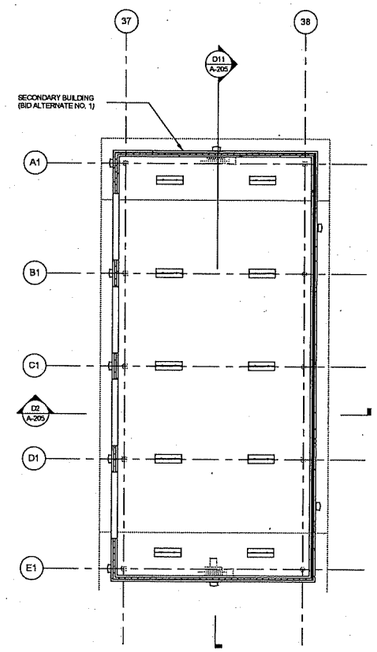
EXTERIOR FINISH SCHEDULE

A-200

ADDENDUM 2

ADDENDUM 2





D1 LEVEL 1 AREA E REFLECTED CEILING PLAN

1/8" = 1'-0"

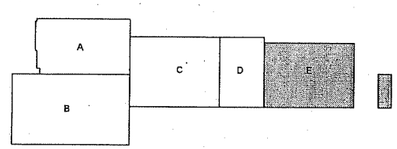
0 4' 8' 16'

NORTH

REFLECTED CEILING PLAN NOTES	
1	PRIOR TO STARTING WORK, THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS ON SITE AND NOTIFY ARCHITECT OF ANY DISCREPANCIES IN WRITING.
2	LIGHTS ARE SHOWN FOR REFERENCE ONLY. RE: ARCHITECTURAL LIGHTING AND ELECTRICAL DRAWINGS FOR SPECIFICATION INFORMATION. NEW LIGHTING LOCATIONS TAKE PRECEDENCE OVER ALL OTHER CEILING AND PLENUM MOUNTED ITEMS. G.C. SHALL COORDINATE ANY DISCREPANCIES WITH ARCHITECT PRIOR TO INSTALLATION.
3	INSTALL SPRINKLER HEADS AND DOWNLIGHTS AT CENTER OF 2X2 PORTION OF ACOUSTICAL CEILING TILE, U.N.O. CONTRACTOR SHALL MARK ALL LIGHT FIXTURE LOCATIONS AND OBTAIN REVIEW FROM ARCHITECT IN THE FIELD PRIOR TO INSTALLATION.
4	PROVIDE CEILING MANUFACTURER'S STANDARD PROFILE WALL MOLDING AT ALL AREAS WHERE ACOUSTICAL CEILING SYSTEMS ABUT PARTITIONS, SOFFITS OR HEADERS.
5	SOUND MASKING SYSTEM TO BE PROVIDED BY OTHERS. GC SHALL COORDINATE INSTALLATION AND INTERFACE WITH VENDOR SUPPLIED COMPONENTS AS REQUIRED.
6	REFER TO ELECTRICAL DRAWINGS FOR LIGHT SWITCH LOCATIONS.
7	CONTRACTOR SHALL MARK ALL ACCESS PANEL LOCATIONS AND OBTAIN REVIEW FROM ARCHITECT AND BUILDING OWNER IN THE FIELD PRIOR TO INSTALLATION. ACCESS PANELS TO MATCH ADJACENT FINISH.
8	ALL GYPSUM BOARD CEILINGS TO BE PAINTED P-1 FLAT SHEEN, U.N.O.
9	ALL ACOUSTICAL CEILING GRIDS TO BE CENTERED IN THE ROOM, U.N.O.
10	ALL REGISTERS, DIFFUSERS, EXIT LIGHTS, AND SMOKE DETECTORS TO BE CENTERED IN PANEL, U.N.O.
11	PROVIDE EQUAL DISTANCE BETWEEN LIGHTINGS U.N.O. GC TO NOTIFY ARCHITECTS WITH ANY DISCREPANCY.
12	LOCATE A GROUP OF LIGHTINGS IN THE MIDDLE OF ASSOCIATED SPACE OR CEILING MATERIAL.

CEILING MATERIAL LEGEND

- ACT-1
- ACT-2
- ACT-3
- GB-1
- OPEN TO STRUCTURE ABOVE
- SPRAY FOAM INSULATION TO UNDERSIDE OF MTL DECK
- GB-2



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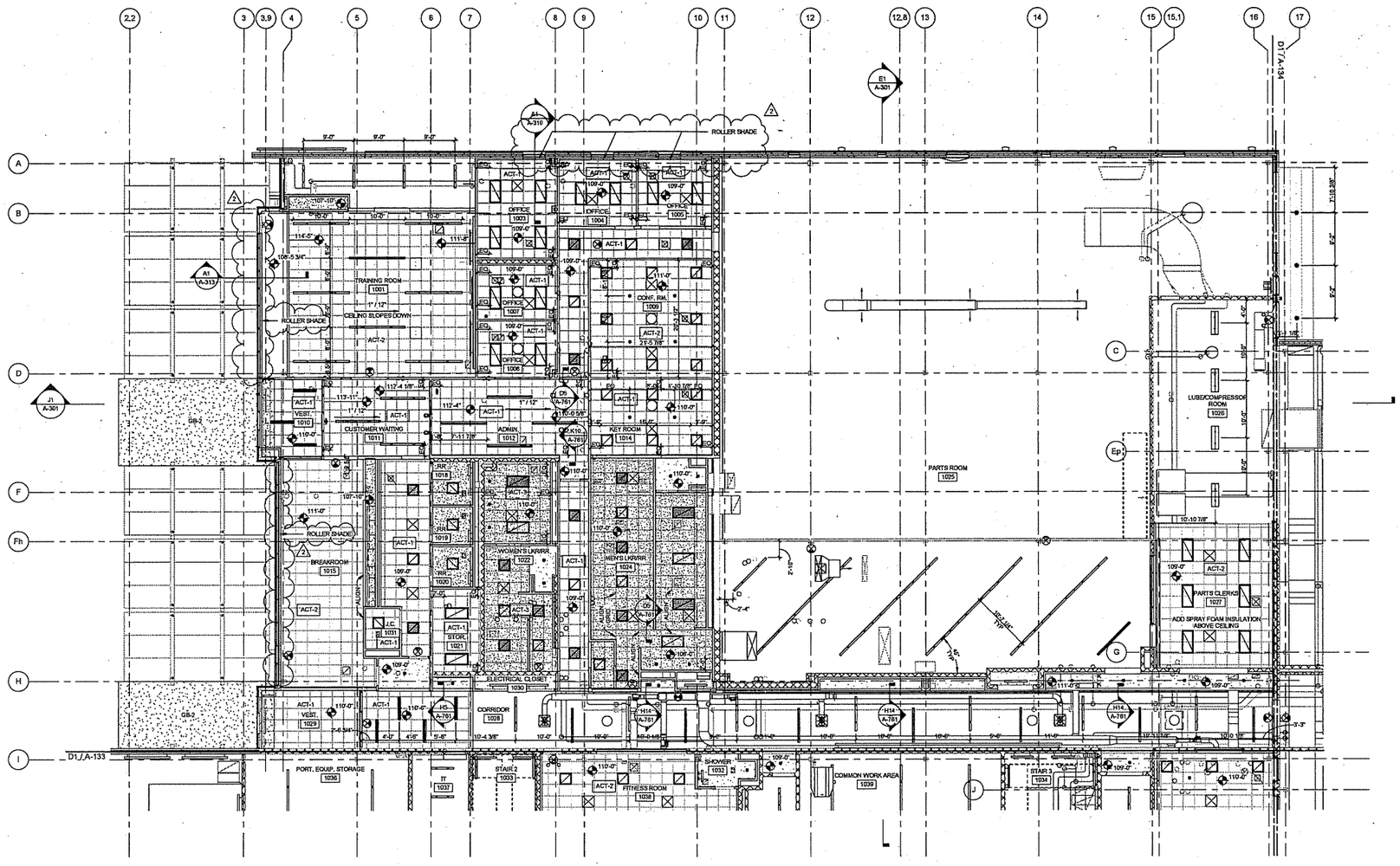
PROJECT No: 378609

LEVEL 1 AREA E REFLECTED CEILING PLAN

A-136

ADDENDUM 2

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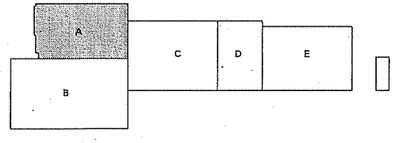
D1 LEVEL 1 AREA A REFLECTED CEILING PLAN
1/8" = 1'-0"

NORTH

REFLECTED CEILING PLAN NOTES	
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CEILING MATERIAL LEGEND

ACT-1	OPEN TO STRUCTURE ABOVE
ACT-2	SPRAY FOAM INSULATION TO UNDERSIDE OF MTL DECK
ACT-3	
GS-1	GS-2



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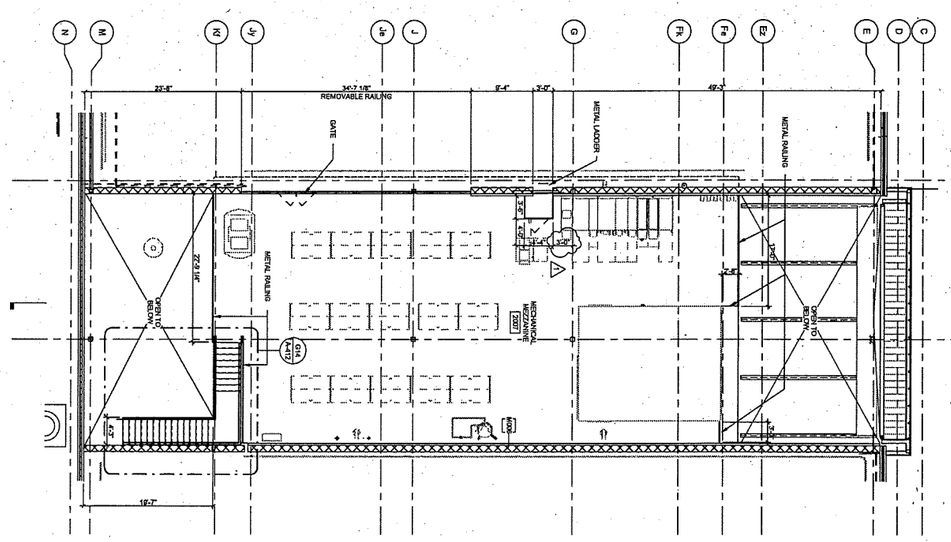
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2	ADDENDUM 2	03/05/2019
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PROJECT No. 37/6603

LEVEL 1 AREA A
REFLECTED CEILING
PLAN

A-132



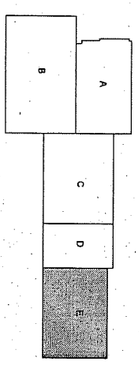
D1 RADIO/COMM MEZZANINE

1/8" = 1'-0"

ENLARGED PLAN AND ELEVATION NOTES

1	REFER TO FLOOR PLAN FOR ADDITIONAL DIMENSION INFORMATION
2	INTERIOR PARTITIONS ARE DIMENSIONED TO FACE OF FINISH, U.O.N. FINISH FACE OF CONCRETE OR CMU WALLS
3	HOSE BIBS OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	ALL DOORS ARE MECHANICALLY LOCKED IN SPACE, U.O.N.
5	WHERE CONCRETE FILLED BOLLARDS ARE REQUIRED AT METAL STUD WALL OR PARTITIONS TRY TO ALIGN BOLLARD WITH STUD
6	WHERE DIMENSIONED OPENINGS AT CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS, U.O.N.
7	PROVIDE FIRE RESISTANT PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS. PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	ARCHITECT SHOULD BE NOTIFIED IF CONDITIONS DIFFER FROM DRAWING INFORMATION
9	ALL EXPOSED CORNERS OF CONCRETE MASONRY UNITS SHALL BE BULLNOSED

KEY NOTES



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No.	REVISIONS/SUBMISSION	DATE
1	ISSUED FOR BID	10/07/2021
2	ADDENDUM 2	10/22/2021

PROJECT No: 319503

MEZZANINE FLOOR PLAN AREA E

A-114

ADDENDUM 2

DOOR AND FRAME SCHEDULE

NO	HW SET #	DOOR SIZE W	DOOR SIZE H	DOOR T	DOOR TYPE	DOOR MATL.	DOOR FINISH	DOOR GLASS	FRAME TYPE	FRAME MATL.	FRAME FINISH	FRAME GLASS	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	FIRE RATING	Notes
1001A	001	6'-4"	7'-10"			ALUM	PREFINISH			ALUM	PREFINISH	–	K1/A-532	H1/A-532	E1/A-532		9
1001B	002	3'-2"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532	E4/A-532		
1001E	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1002	006	6'-0"	7'-2"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-532	H1/A-532			9
1003	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1004	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1005	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1007	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1008	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1009	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1010	006	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532	E4/A-532		AUTOMATIC
1011	009	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532			AUTOMATIC
1012	010	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T		HM	PAINT	–	K1/A-531 SIM	K4/A-531 SIM			
1013	011	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1014	012	3'-0"	7'-0"	1 3/4"	N	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1015A	MFC	6'-0"	8'-0"	1 3/4"	GLASS	ALUM	PAINT	GL-02T	MFC	ALUM	PREFINISH	–	A14/A532	K6/A-532	A14/A532		FRITTED FILM APPLIED TO GLASS
1015B	013	2'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532			
1015C	014	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1017	010	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1018	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1019	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1020	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1021	016	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1023	017	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1025A	018	6'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1025B	019	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F5	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		AUTOMATIC
1025C	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1026B	021	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1026C		6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F6	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1027	022	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			9
1028	009	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532			
1029	008	3'-8"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K6/A-532			
1030A	024	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1030B	024	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1031	016	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1032	025	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1037	026	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1038A	027	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1041A	028	3'-0"	7'-0"	1 3/4"	N	HM	PAINT	GL-02T	F2	HM	PAINT	–	D1/A-531	D4/A-531			
1041B	027	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1042A	029	3'-0"	7'-2"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1043A	029	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1043B	022	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1043C	030	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1043D	031	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1054A	032	3'-0"	6'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1054B	033	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531		90 MIN	
1055A	034	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1055B	035	6'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1055C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1055D	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1055E	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1056	036	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531		90 MIN	
1057	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1065A	037	3'-0"	7'-0"	1 3/4"	NL	HM	PAINT		F1	HM	PAINT	–	D1/A-531	D4/A-531			
1065B	020	14'-0"	14'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K6/A-533		G6/A-533		
1065C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1065D	020	14'-0"	14'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1065B	038	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531		90 MIN	
1077	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1078	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1079	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1080	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1081	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1082	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1083	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1084A	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1084B	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1084C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		AUTOMATIC
1084D	039	6'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1084E	040	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1065	041	3'-2 1/4"	7'-0"	2"	GD2	HM	WWM	–	FABRICATED	HM	PT-2	–	F16/A-534	K14/A-534	D1/A-534		
1087	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1088	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1089	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1090	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1091	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1092	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1093	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1095A	020	16'-0"	16'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1095B	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1055C	042	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1096A	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1096B	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1096C	043	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1096E	024	5'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1096D	041	26'-8"	8'-0"	1 3/4"	GD3	HM	WWM	–	FABRICATED	HM	PT-2	–	G6/A-534	J5/A-534	J5/A-534		
1096Q	044	3'-0"	6'-8"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1096R	041	28'-8"	8'-0"	1 3/4"	GD1	HM	WWM	–	FABRICATED	HM	PT-2	–	J5/A-534	J5/A-534	J5/A-534		
1097	045	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1098A	022	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1098B	045	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1099	047	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			9
1100B	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL		–	K1/A-533	K11/A-533	G6/A-533		
1100C	020	14'-0"	12'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1100D	042	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1103	027	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1119A	048	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531		3HR	MAX 100 SQ IN. DOOR VISION PANEL
1119C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1119A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1119B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1119D	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1119A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1119B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1120A	030	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1120B	011	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1120C	011	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1121	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1122	008	2'-11 1/2"	7'-0"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K1/A-532	K6/A-532			AUTOMATIC
1122B	009	2'-11 1/4"	7'-1 3/4"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K1/A-532	K6/A-532			AUTOMATIC
1123	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1124	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1132A		3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1132D	041	36'-0"	8'-0"	1 3/4"	GD3	HM	WWM	–	FABRICATED	HM	PT-2	–	J5/A-534	J5/A-534	J5/A-534		
1137	049	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1140	050	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM		–	K1/A-531	K4/A-531			9
1141	051	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1143	012	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1144A	027	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1144B	020	16'-0"	16'-0"	2"	ECSD	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1144C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1145A	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1145B	030	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1145C	011	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G1/A-531	G1/A-531			
1145D	011	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1145E	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1145A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1146B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1147A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1147B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150A	020	16'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150B	020	16'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150C	020	16'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150D	020	16'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150E	052	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1150F	052	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1296	020	12'-0"	12'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K6/A-533		G6/A-533		
1352	027	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1353	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1354	027	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1355	052	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–					
1357	020	12'-0"	3'-10"	2"	CSD	MFC	PREFINISH		MFC	HM	PREFINISH	–					
1368	044	3'-0"	6'-8"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1369	044	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			

DOOR AND HARDWARE NOTES

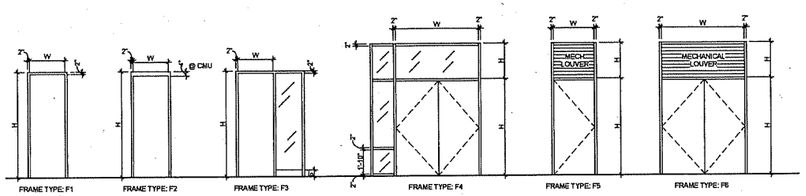
1. ALL DOOR FRAMES TO MATCH BUILDING STANDARDS, TO BE PAINTED TO MATCH ADJACENT WALL U.N.O.
3. ALL EXISTING DOORS AND DOOR FRAMES TO REMAIN AT BASE BUILDING CORE ROOMS U.N.O.
4. ALL NEW DOORS TO RECEIVE HARDWARE, LEVERSET TO MATCH BASE BUILDING STANDARD. ALL HARDWARE TO BE ADA COMPLIANT AND UL RATED.
5. SECURITY VENDOR TO COORDINATE CARD READER ACCESS WITH BUILDING APPROVED SYSTEM AND TENANT REQUIREMENTS. REFER TO SCHEDULE AND CONSTRUCTION PLANS FOR INTENDED LOCATIONS OF CARD READERS. MOUNT CARD READERS 44" AFF TO CENTERLINE OF DEVICE, TYP. TOP OF CARD READER SHALL NOT BE MOUNTED ABOVE 48" AFF.
6. SECURITY VENDOR SHALL OBTAIN A SEPARATE ACCESS CONTROL PERMIT FROM THE BUILDING DEPARTMENT PRIOR TO INSTALLATION OF ANY ACCESS CONTROL DEVICES OR EQUIPMENT.
7. WHERE INDICATED PROVIDE COAT HOOKS, MOUNT ON WALL BEHIND DOOR AT CENTERLINE OF DOOR, 60" AFF, TYP.
8. KICK PLATES SHALL BE 8" HIGH, STAINLESS STEEL TO MATCH BASE BUILDING FINISH AND SHALL BE APPLIED TO KICK SIDE OF DOOR U.N.O.
9. ALL LOCKSETS SHALL BE KEYED TO THE BUILDING MASTER. COORDINATE REQUIREMENTS WITH TENANT AND BUILDING OWNER.
10. VERIFY IN FIELD FOR TRACK HEIGHT & LIFT CLEARANCE OF ALL OVERHEAD DOORS TO AVOID ANY BUILDING COMPONENTS INCLUDING STRUCTURES, EQUIPMENTS,MECHANICAL, ETC.

REMARKS LEGEND

1	ADA OPERATOR
2	INSULATED
4	3" TRACK
5	HIGH LIFT DOOR
6	CARD READER
7	PANIC DEVICE
8	ELECTRIC LATCH RETRACTION PANIC DEVICE
9	1" UNDERCUT DOORS

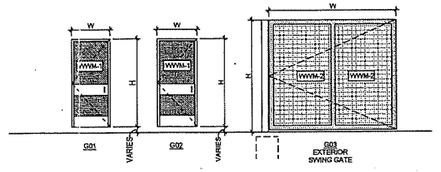
ABBREVIATIONS

ADA	AMERICANS WITH DISABILITIES ACT (ACCESSIBILITY)
ALUM	ALUMINUM
CLR	CLEAR OPENING
CR	CARD READER
EXIST	EXISTING
G	GLASS
HM	HOLLOW METAL
MFC	MANUFACTURER
MO	MASONRY OPENING
OH	OVERHEAD DOOR
PERF MTL	PERFORATED METAL
PH	PANIC HARDWARE
PR	PAIR OF DOORS
RO	ROUGH OPENING
STL	STEEL
VF	VERIFY IN FIELD



FRAME TYPES (common)

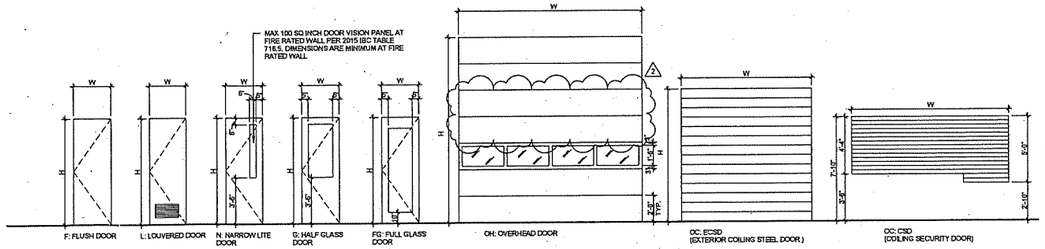
1/4" = 1'-0"



GATE TYPES (common)

REFER TO A-534 FOR DETAILS

1/4" = 1'-0"



DOOR TYPES (common)

1/4" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571.290.7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

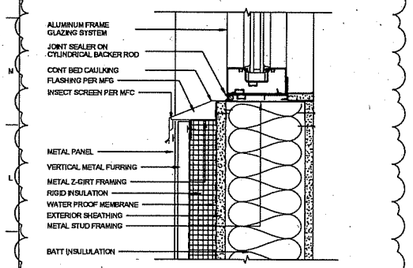
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	01/02/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/07/2019

PROJECT No: 376903

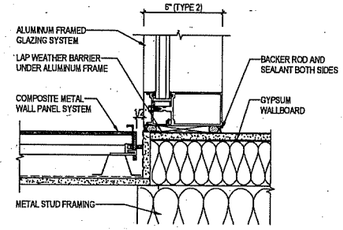
DOOR SCHEDULE

A-601

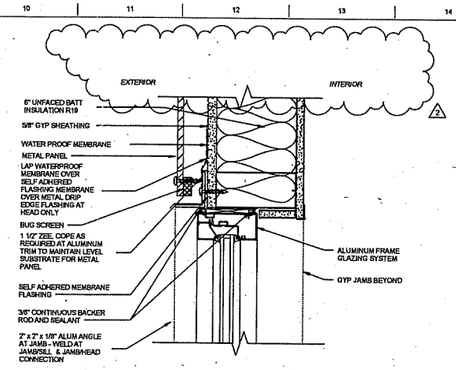
AR. NDUMA



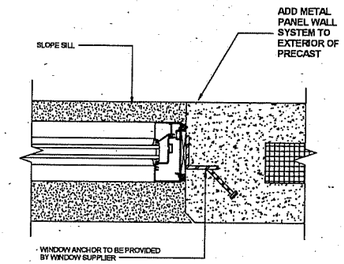
K1 AF SILL DETAIL AT MTL PANEL WALL
3" = 1'-0"



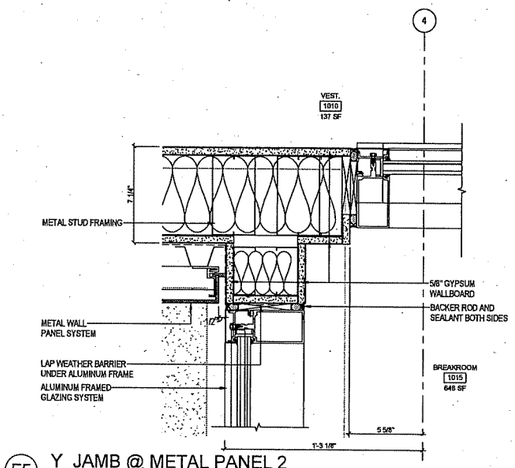
K5 Y JAMB @ METAL PANEL
3" = 1'-0"



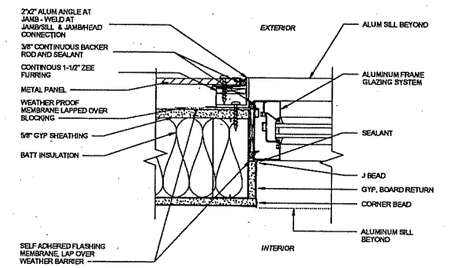
K10 STOREFRONT HEAD MTL PANEL
3" = 1'-0"



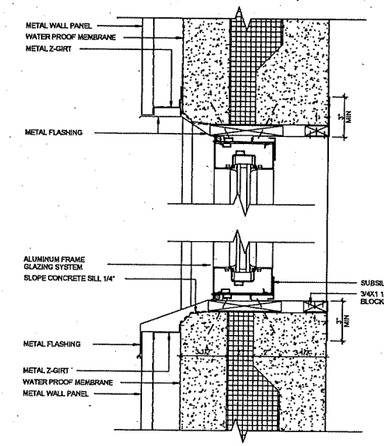
K14 STOREFRONT HEAD AND SILL
3" = 1'-0"



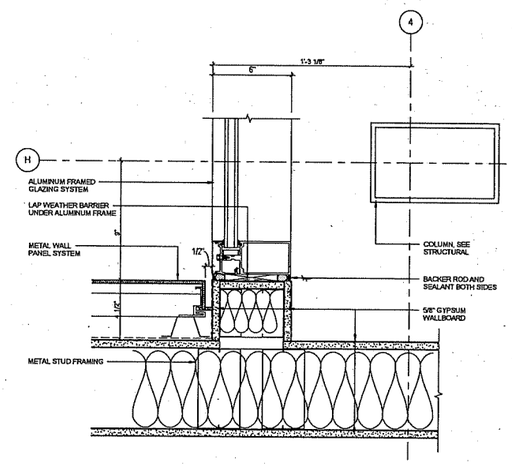
F5 Y JAMB @ METAL PANEL 2
3" = 1'-0"



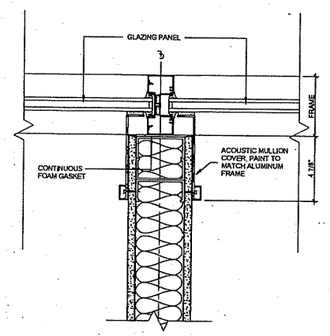
F10 WINDOW JAMB MTL PANEL
3" = 1'-0"



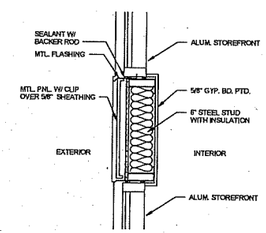
F14 STOREFRONT HEAD AND SILL
3" = 1'-0"



A4 Y JAMB @ METAL PANEL
3" = 1'-0"



A10 MULLION JAMB @ PARTITION
3" = 1'-0"



A14 Y_HM FRAME JAMB @ CMU/GYP
1" = 1'-0"

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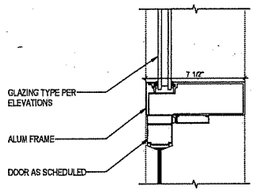
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FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/11/2019

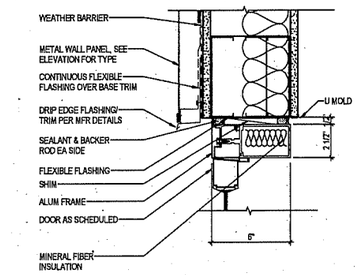
PROJECT No: 376609

EXTERIOR AF WINDOW DETAILS

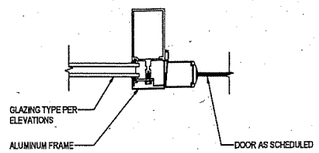
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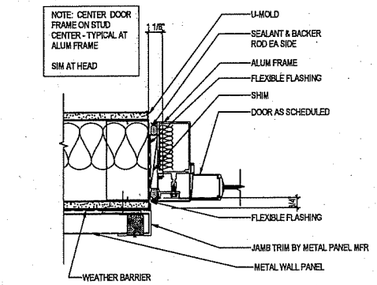
K1 ALUM FRAME HEAD
3" = 1'-0"



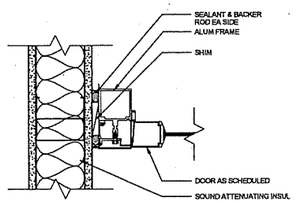
K4 ALUM FRAME HEAD @ MP
3" = 1'-0"



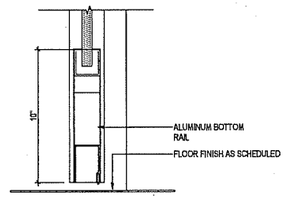
K8 ALUM FRAME JAMB
3" = 1'-0"



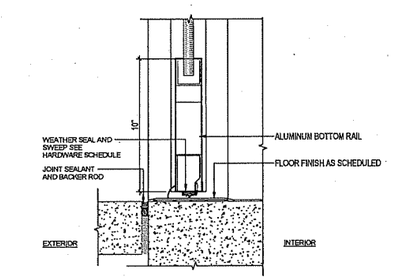
K13 ALUM FRAME JAMB @ MP
3" = 1'-0"



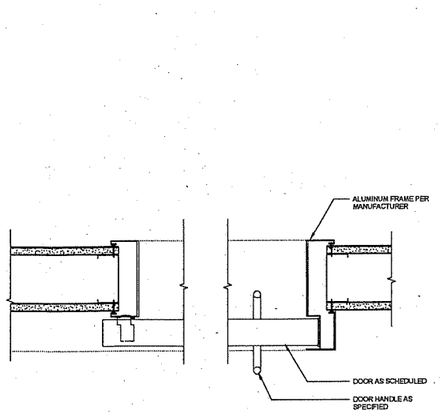
H1 ALUM FRAME JAMB AT GYP
3" = 1'-0"



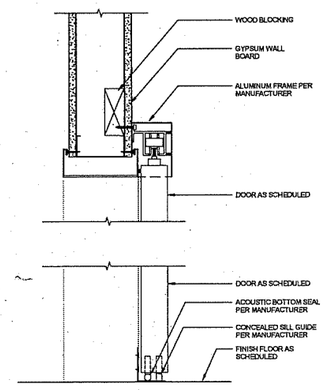
E1 ALUM FRAME SILL
3" = 1'-0"



E4 ALUM FRAME SILL @ CONCRETE
3" = 1'-0"



A9 SLIDING ALUM FRAME JAMB DETAIL
3" = 1'-0"



A14 SLIDING ALUM FRAME HEAD AND SILL DETAIL
3" = 1'-0"

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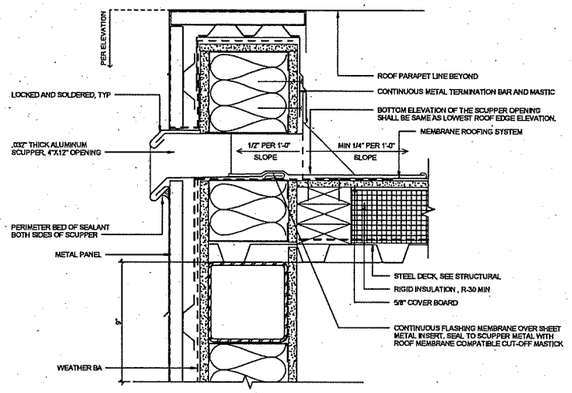
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
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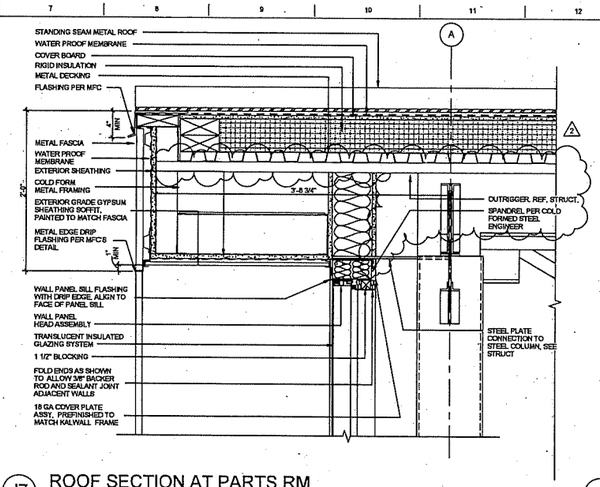
PROJECT No: 376603

AF DOOR DETAILS

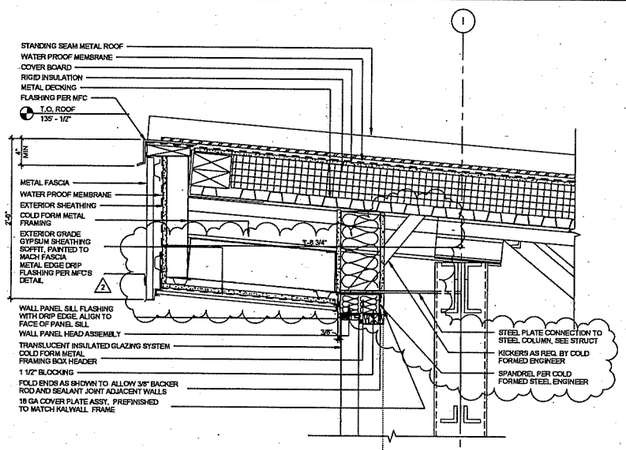
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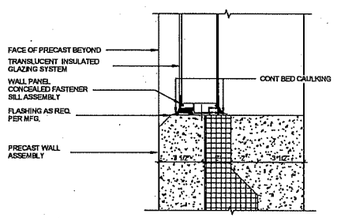
J1 TYP SCUPPER DETAIL
3" = 1'-0"



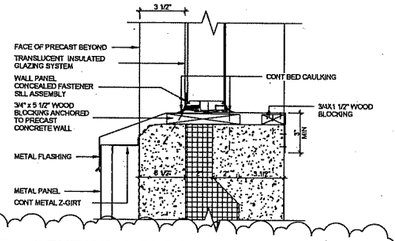
J7 ROOF SECTION AT PARTS RM
1 1/2" = 1'-0"



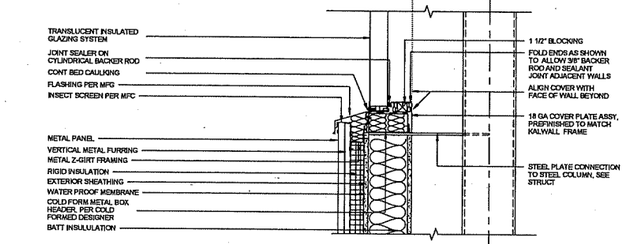
J12 TOP - NORTH WALL AT LIGHT DUTY MAINTENANCE
1 1/2" = 1'-0"



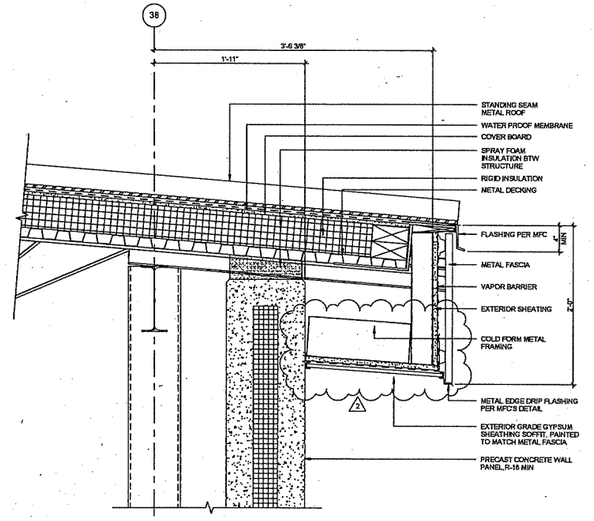
G1 TRANSLUCENT WALL SILL DETAIL AT PC
3" = 1'-0"



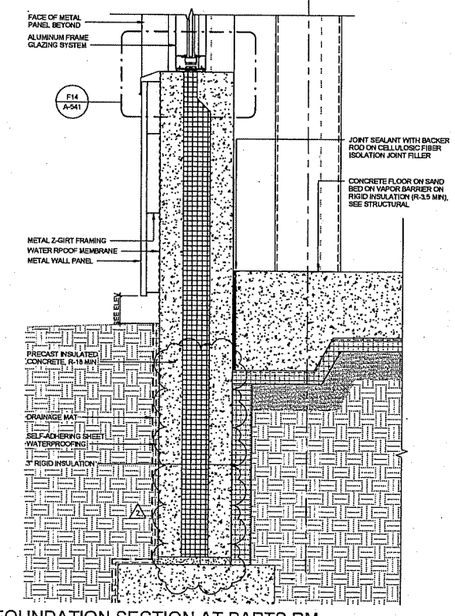
G7 TRANSLUCENT WALL SILL DETAIL @ MTL PANEL
3" = 1'-0"



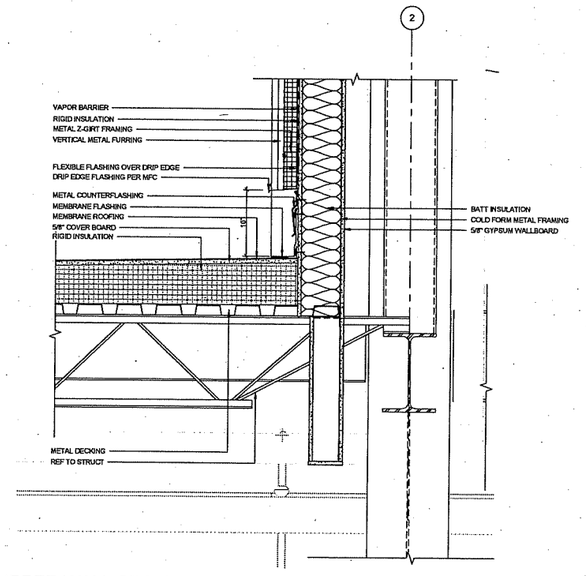
G12 SILL DETAIL AT KALWALL
1 1/2" = 1'-0"



A1 SECONDARY BLDG ROOF DETAIL - BID ALT NO. 1
1 1/2" = 1'-0"



A7 WALL FOUNDATION SECTION AT PARTS RM
1 1/2" = 1'-0"



A12 UPPER WALL SECTION AT LIGHT DUTY MAINT.
1 1/2" = 1'-0"

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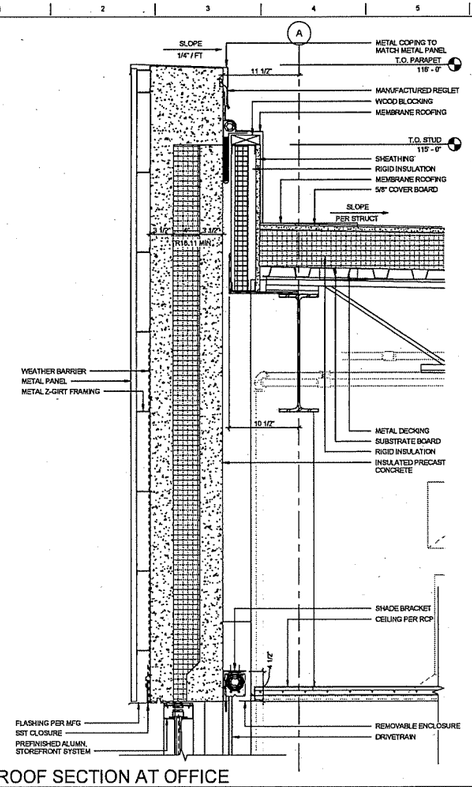
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FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
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2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

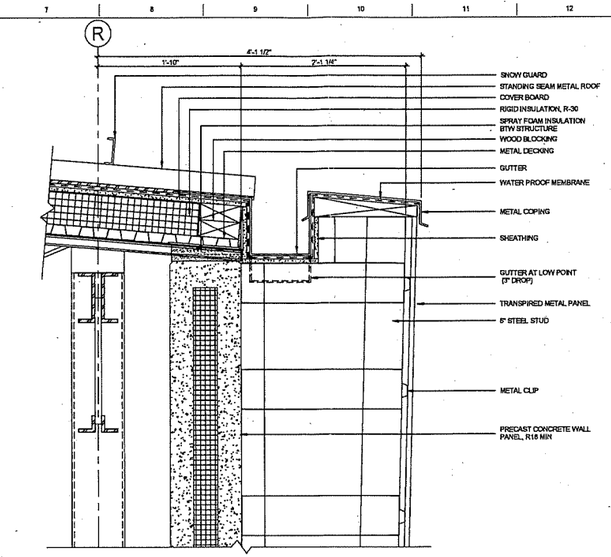
PROJECT No: 376003

EXTERIOR DETAILS

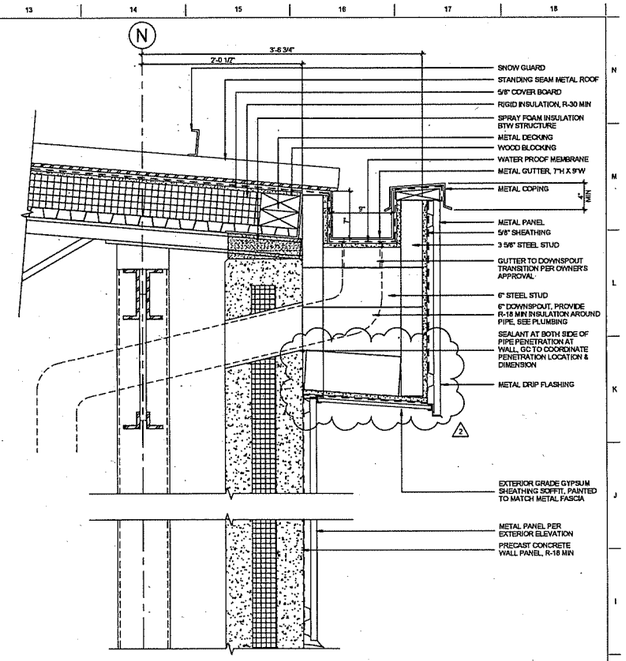
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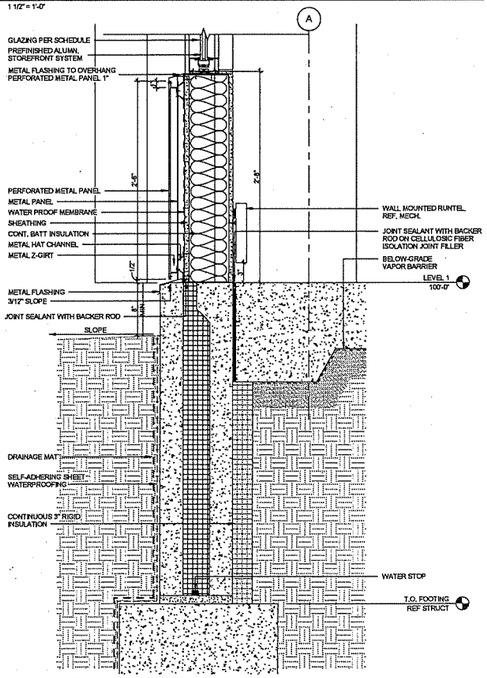
G1 ROOF SECTION AT OFFICE
1 1/2" = 1'-0"



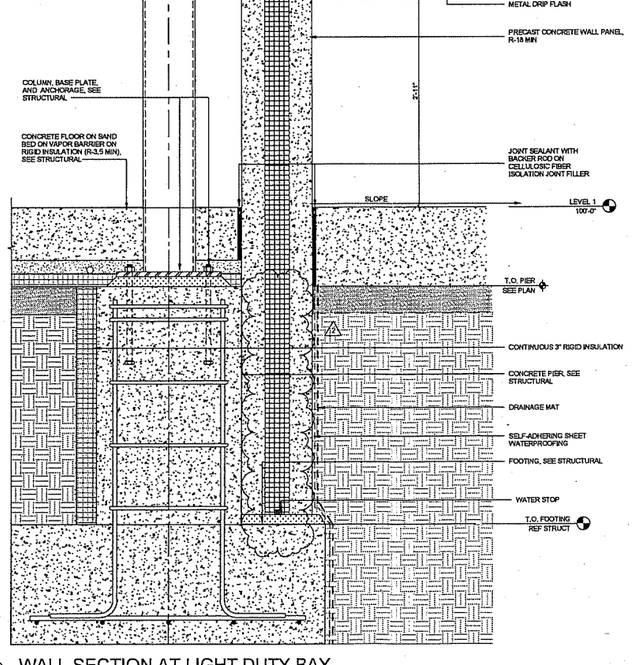
I6 ROOF EAVE AT LIGHT DUTY AREA
1 1/2" = 1'-0"



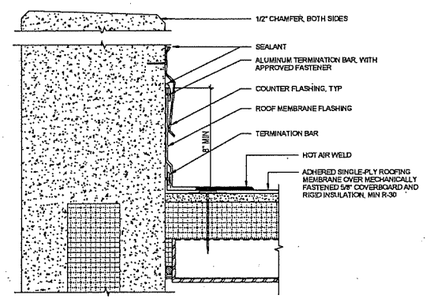
H13 ROOF EAVE
1 1/2" = 1'-0"



A1 WALL SECTION AT OFFICE
1 1/2" = 1'-0"



A6 WALL SECTION AT LIGHT DUTY BAY
1 1/2" = 1'-0"



A13 WALL FLASHING AT INSULATED PRECAST
3" = 1'-0"

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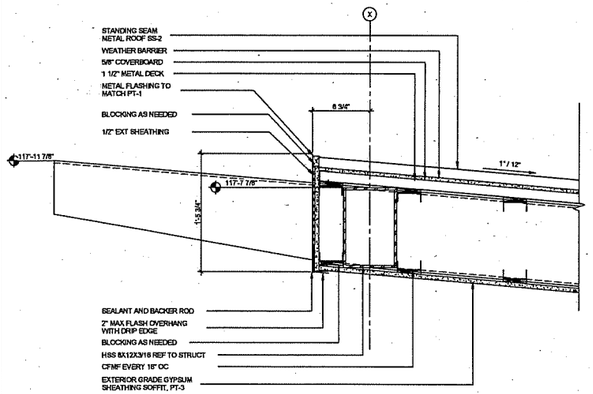
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 376003

EXTERIOR DETAILS

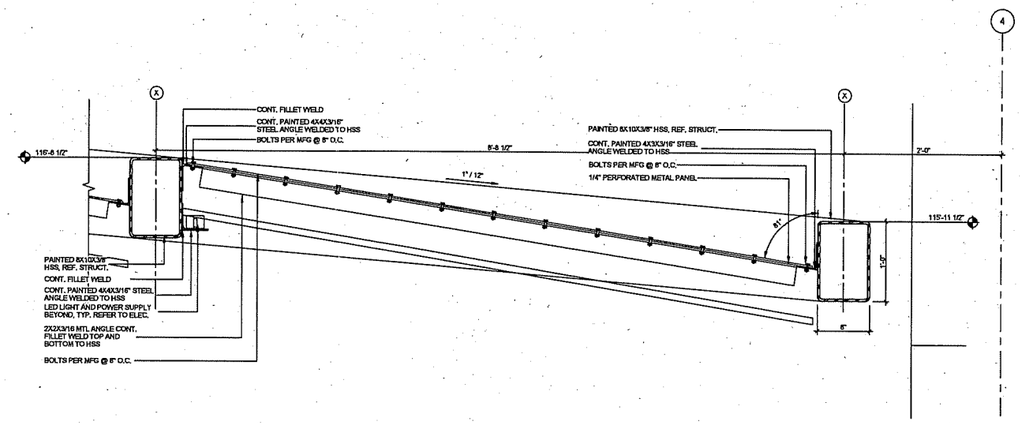
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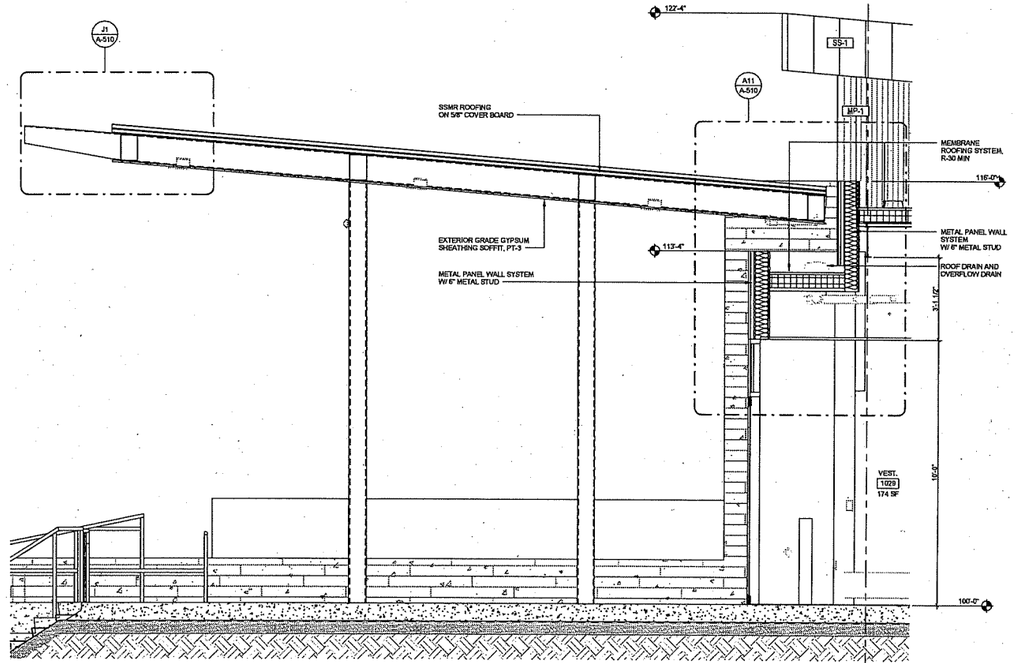
J1 ENTRY PLAZA CANOPY SOLID - FRONT

1 1/2" = 1'-0"



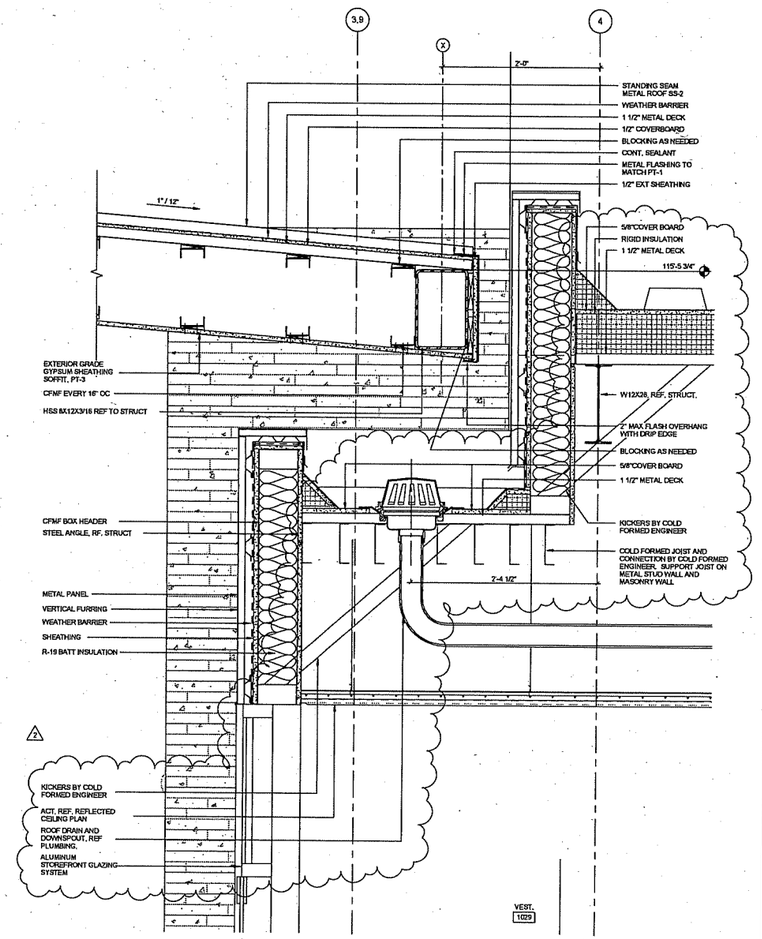
J7 ENTRY PLAZA CANOPY PERF-BACK

1 1/2" = 1'-0"



A1 ENTRY PLAZA CANOPY SECTION

1/2" = 1'-0"



A11 ENTRY PLAZA CANOPY SECTION - Callout 1

1 1/2" = 1'-0"

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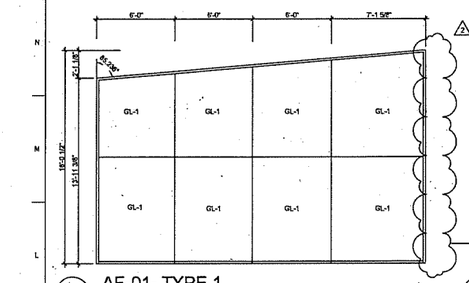
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No	REVISIONS/SUBMISSION	DATE
2	ADDENDUN 2	05/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

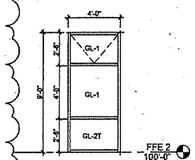
PROJECT No: 376003

CANOPY DETAILS

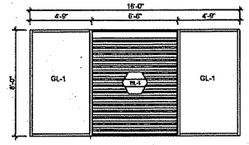
A-510



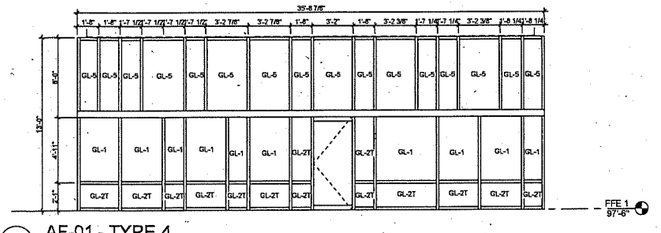
L1 AF-01- TYPE 1
1/4" = 1'-0"



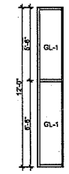
L8 AF-01- TYPE 2
1/4" = 1'-0"



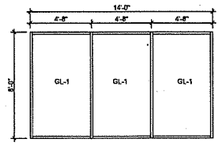
L7 AF-01-TYPE 3
1/4" = 1'-0"



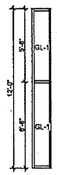
L9 AF-01 - TYPE 4
1/4" = 1'-0"



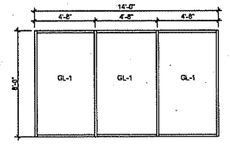
L16 AF-02-TYPE 2
1/4" = 1'-0"



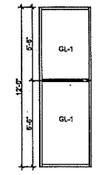
I1 AF-02-TYPE 3
1/4" = 1'-0"



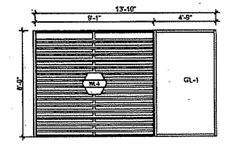
I8 AF-03-TYPE 2
1/4" = 1'-0"



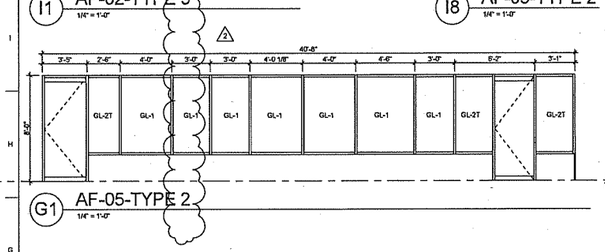
I7 AF-03-TYPE 3
1/4" = 1'-0"



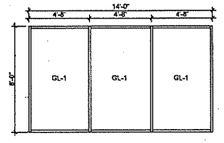
I9 AF-04-TYPE 2
1/4" = 1'-0"



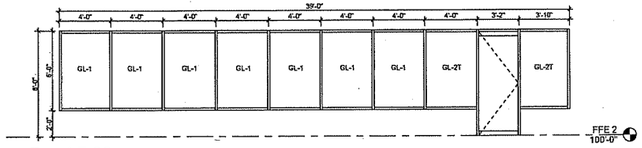
I12 AF-04-TYPE 3
1/4" = 1'-0"



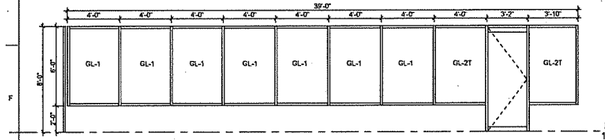
G1 AF-05-TYPE 2
1/4" = 1'-0"



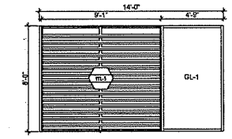
G7 AF-05-TYPE 3
1/4" = 1'-0"



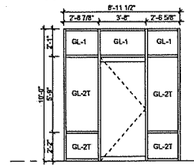
G9 AF-06
1/4" = 1'-0"



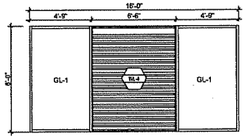
E1 AF-06-TYPE 2
1/4" = 1'-0"



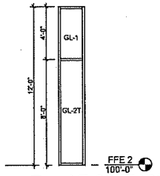
E7 AF-06-TYPE 3
1/4" = 1'-0"



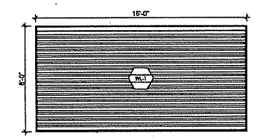
E9 AF-07-TYPE 2
1/4" = 1'-0"



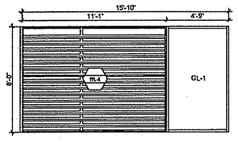
E11 AF-07-TYPE 3
1/4" = 1'-0"



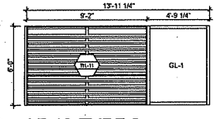
E14 AF-08-TYPE 2
1/4" = 1'-0"



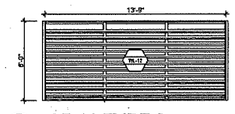
E16 AF-08-TYPE 3
1/4" = 1'-0"



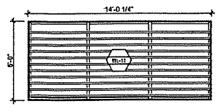
C1 AF-09-TYPE 3
1/4" = 1'-0"



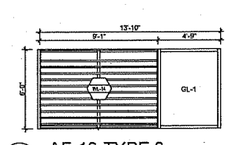
C3 AF-10-TYPE 3
1/4" = 1'-0"



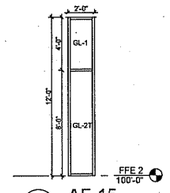
C7 AF-11-TYPE 3
1/4" = 1'-0"



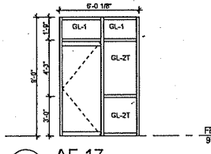
C9 AF-12-TYPE 3
1/4" = 1'-0"



C12 AF-13-TYPE 3
1/4" = 1'-0"



C14 AF-15
1/4" = 1'-0"



C16 AF-17
1/4" = 1'-0"

ALUMINUM FRAMING NOTES	
1	ALL GLAZING TO BE GL-1 U.N.O.
2	ALL GLAZING WITHIN 18" OF FLOOR AND EITHER SIDE OF DOOR SHALL BE TEMPERED, GL-2T U.N.O.
3	DIMENSIONS ARE FROM OUTSIDE EDGE OF FRAME TO CENTERLINE OF MULLION U.N.O.
4	ALL SILL HEIGHTS ARE TAKEN FROM FINISH FLOOR LEVEL U.N.O.
5	ALL FRAMES TO BE PREFINISHED PT-5, U.N.O.
6	FOR ALL COLD FORMED STEEL FRAMING, PROVIDE DESIGN AS REQUIRED IN SPECIFICATIONS.
7	ALL EXTERIOR ALUMINUM WINDOW FRAME ASSEMBLIES AT CONDITIONED SPACES TO HAVE THERMAL BREAK.
8	REFER TO A-541 AND 542 FOR ALUMINUM FRAME DETAILS.
10	REFER TO ENLARGED RCP PLANS FOR LOCATIONS OF ROLLER SHADES.

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 296 7679 t.

ADDEN 1 2

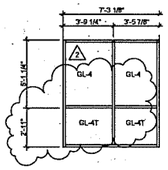
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/07/2019

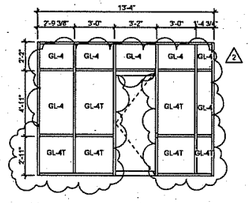
PROJECT No: 376903

AF WINDOW ELEVATIONS

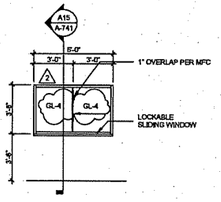
A-504



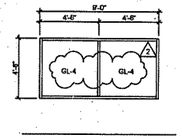
L1 BL-02
1/4" = 1'-0"



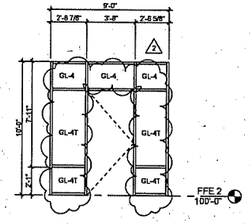
L4 BL-03
1/4" = 1'-0"



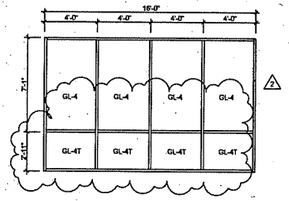
L8 BL-04
1/4" = 1'-0"



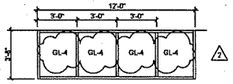
L10 BL-07
1/4" = 1'-0"



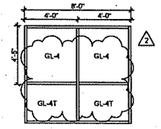
9 BL-09
1/4" = 1'-0"



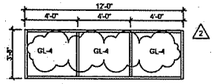
10 BL-10
1/4" = 1'-0"



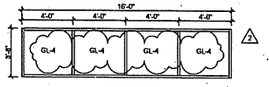
J1 BL-11
1/4" = 1'-0"



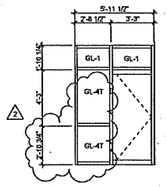
J4 BL-12
1/4" = 1'-0"



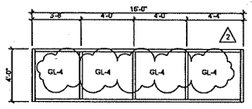
J7 BL-13
1/4" = 1'-0"



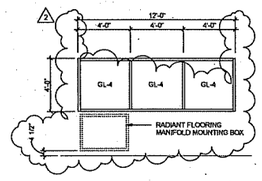
J10 BL-14
1/4" = 1'-0"



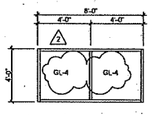
F1 BL-17
1/4" = 1'-0"



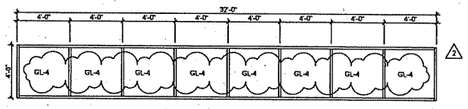
F4 BL - 18
1/4" = 1'-0"



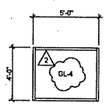
C1 BL-19
1/4" = 1'-0"



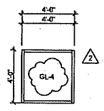
C4 BL-20
1/4" = 1'-0"



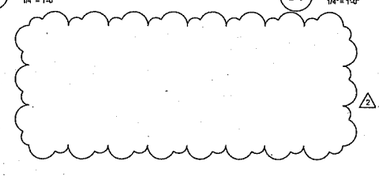
C7 BL-21
1/4" = 1'-0"



C13 BL-22
1/4" = 1'-0"



C16 BL-23
1/4" = 1'-0"



C4 BL-20
1/4" = 1'-0"

ALUMINUM FRAMING NOTES	
1	ALL GLAZING TO BE GL-1 U.N.O.
2	ALL GLAZING WITHIN 18" OF FLOOR AND EITHER SIDE OF DOOR SHALL BE TEMPERED, GL-2T U.N.O.
3	DIMENSIONS ARE FROM OUTSIDE EDGE OF FRAME TO CENTERLINE OF MULLION U.N.O.
4	ALL SILL HEIGHTS ARE TAKEN FROM FINISH FLOOR LEVEL U.N.O.
5	ALL FRAMES TO BE PREFINISHED PT-5, U.N.O.
6	FOR ALL COLD FORMED STEEL FRAMING, PROVIDE DESIGN AS REQUIRED IN SPECIFICATIONS.
7	ALL EXTERIOR ALUMINUM WINDOW FRAME ASSEMBLIES AT CONDITIONED SPACES TO HAVE THERMAL BREAK.
8	REFER TO A-541 AND 542 FOR ALUMINUM FRAME DETAILS.
10	REFER TO ENLARGED RCP PLANS FOR LOCATIONS OF ROLLER SHADES.

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 260 7979 t

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/02/2019

The Contractor shall verify and be responsible for all dimensions and conditions on the job. Stantec shall be notified of any variations from the dimensions and conditions shown on these drawings. Written dimensions take precedence over scaled dimensions. Do not scale drawings.

PROJECT No: 376029

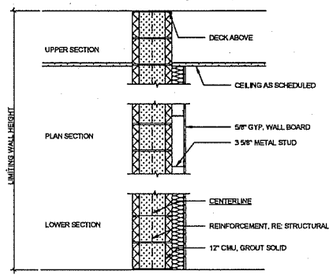
BL WINDOW ELEVATIONS

A-503

ADDE 1m 2

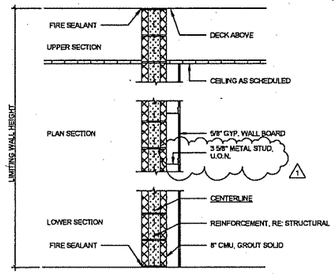
PARTITION LEGEND

- 1 HOUR
- 2 HOUR
- 3 HOUR
- 4 HOUR
- SMOKE
- DEMISING



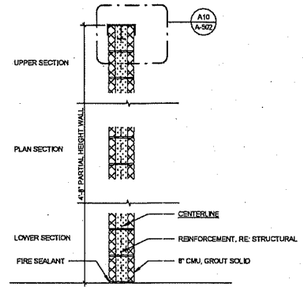
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

H1 PARTITION TYPE M006
3/4" = 1'-0"



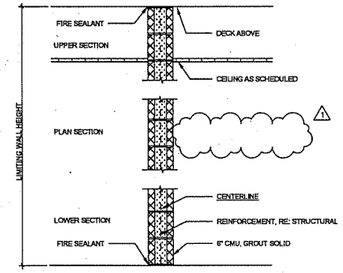
FIRE RATING:	1 HR
UL DESIGN:	U905
STC RATING:	
SOUND TEST NO.:	

H4 PARTITION TYPE M004
3/4" = 1'-0"



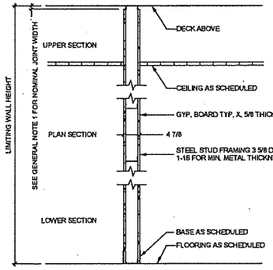
FIRE RATING:	N/A
UL DESIGN:	N/A
STC RATING:	
SOUND TEST NO.:	

H8 PARTITION TYPE M002
3/4" = 1'-0"



FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

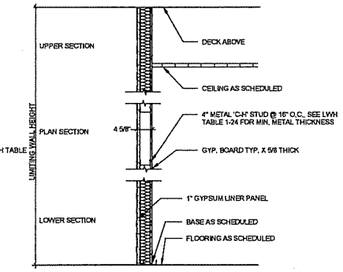
1 PARTITION TYPE M001
3/4" = 1'-0"



FIRE RATING:	1 HOUR
UL DESIGN	495
STC RATING:	56
SOUND TEST NO.:	NBC-S44 FOR WALL ASSEMBLY 0. SLSS397 NRC-TL 92 418

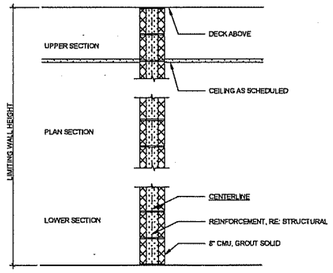
1,38,039,1,0,1016,0,1,1.00

E1 PARTITION TYPE R002
3/4" = 1'-0"



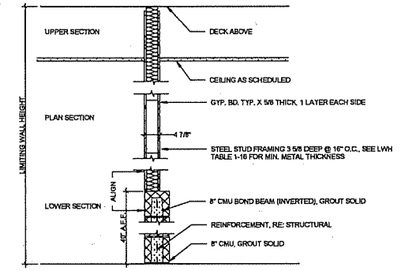
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

E4 PARTITION TYPE A043
3/4" = 1'-0"



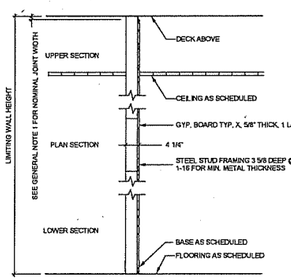
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

E8 PARTITION TYPE A042, R070
3/4" = 1'-0"



FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

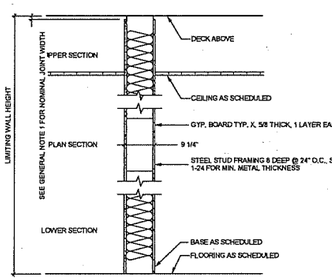
E12 PARTITION TYPE A041
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN	NA
STC RATING:	NA
SOUND TEST NO.:	NA

0,38,039,1,0,1016,0,1,1.00

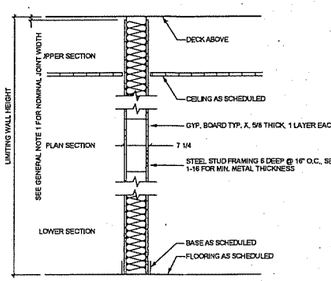
A1 PARTITION TYPE A040
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN:	NA
STC RATING:	1
SOUND TEST NO.:	NA

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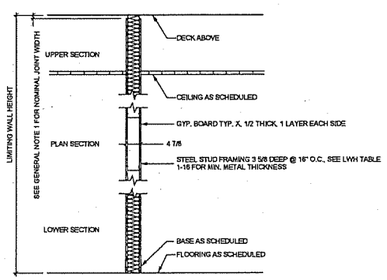
A4 PARTITION TYPE A036
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN	NA
STC RATING:	51
SOUND TEST NO.:	ALA-TL69-266

0,51,058,1,0,1016,0,1,1.00

A8 PARTITION TYPE A014
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN	NA
STC RATING:	NA
SOUND TEST NO.:	NA

0,38,039,1,0,1016,0,1,1.00

A12 PARTITION TYPE A005
3/4" = 1'-0"

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ARCHITECTURE

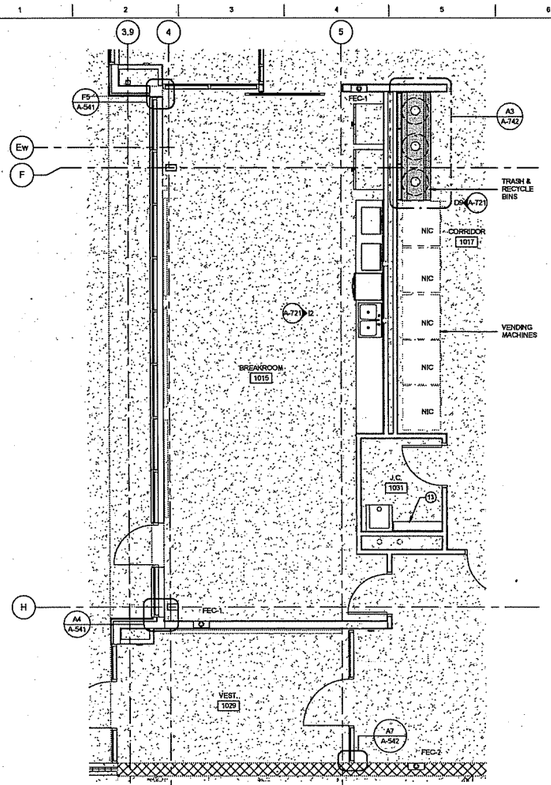
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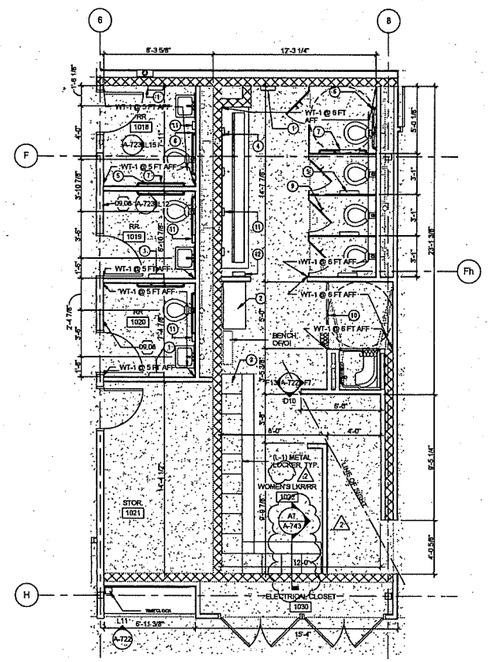
PROJECT No. 376603

PARTITION TYPES

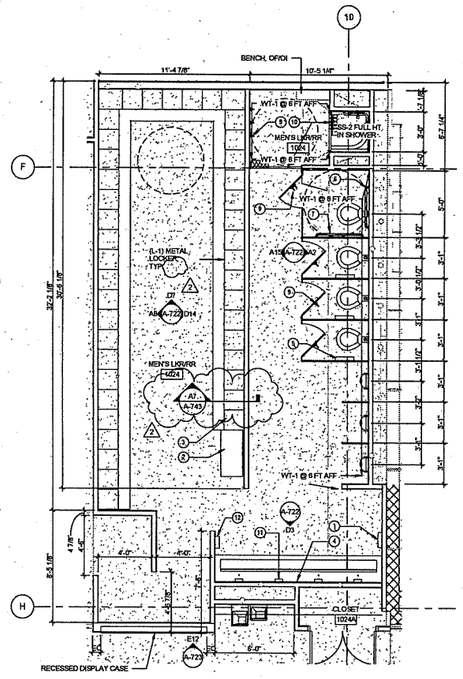
A-501



G1 BREAKROOM ENLARGED PLAN
1/4" = 1'-0"



H7 WOMEN'S LOCKER ROOM
1/4" = 1'-0"



H12 MEN'S LOCKER ROOM
1/4" = 1'-0"

KEY NOTES

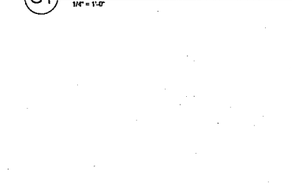
09.06	

GENERAL NOTES

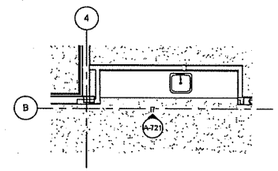
1. PROVIDE 1/8" PER FOOT MINIMUM SLOPE TO ALL FLOOR DRAIN WITHIN MIN 2' OF FLOOR DRAIN, TYP FOR ALL BATH ROOM & SHOWER. SEE DETAIL C14/A-751 FOR SHOWER DRAIN DETAIL.
2. PROVIDE LINEAR FLOOR DRAIN AT ALL SHOWERS.

RESTROOM(S) ACCESORIES

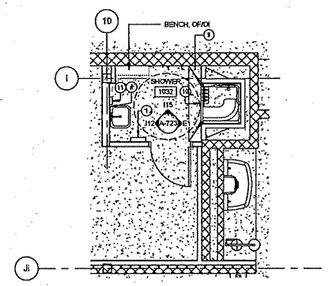
1	ELECTRIC DRYER WITH STAINLESS STEEL COVER
2	ACCESSIBLE FLOOR MOUNTED BENCH
3	PERSONAL STORAGE LOCKER - SINGLE DOOR W/BENCH DRAWER, SEE A-743 FOR LOCKER DETAIL
4	MIRROR
5	TOILET TISSUE & SEAT COVER DISPENSER
6	GRAB BAR - 18"
7	GRAB BAR - 42"
9	COAT HOOK
10	SHOWER CURTAIN AND ROD
11	VERTICAL SURFACE MOUNTED SOAP DISPENSER
12	SURFACE MOUNTED PAPER TOWEL DISPENSER
13	UTILITY SHELF WITH MOP/BROOM HOLDER
14	VERTICAL GRAB BAR - 18"



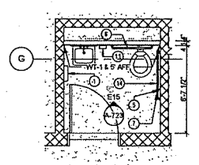
D4 RADIO BATHROOM
1/4" = 1'-0"



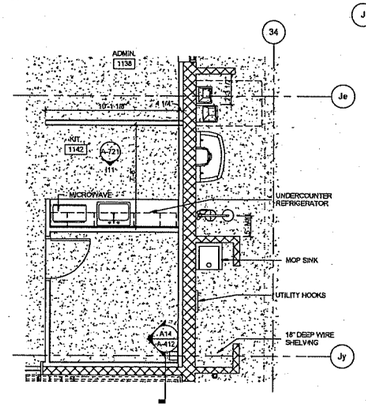
D7 TRAINING ROOM NORTH ELEVATION
1/4" = 1'-0"



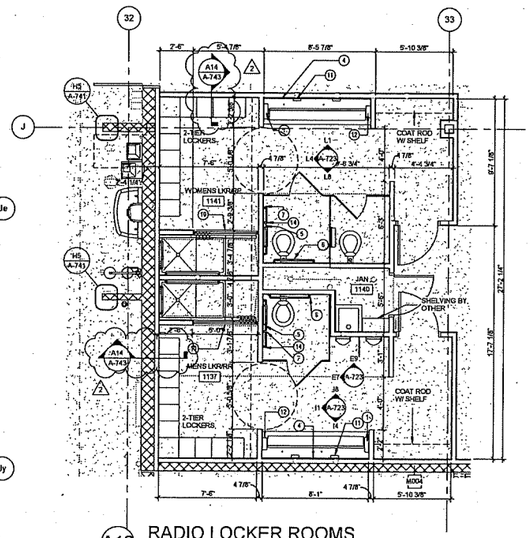
A1 FITNESS RM SHWR
1/4" = 1'-0"



A4 HEAVY VEHICLE BATHROOM
1/4" = 1'-0"



A7 RADIO KITCHENETTE
1/4" = 1'-0"



A12 RADIO LOCKER ROOMS
1/4" = 1'-0"

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ADDENDUM 2

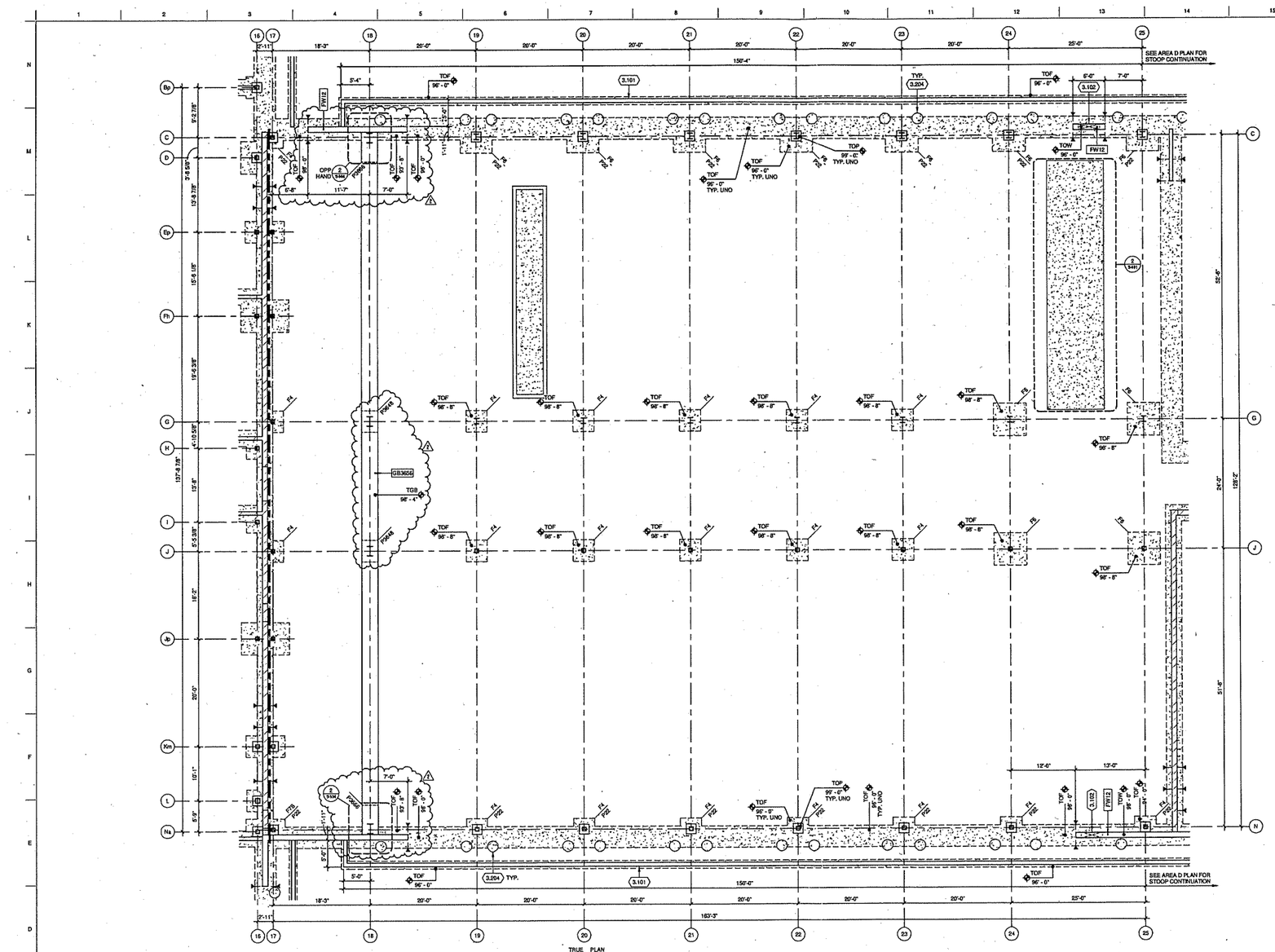
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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

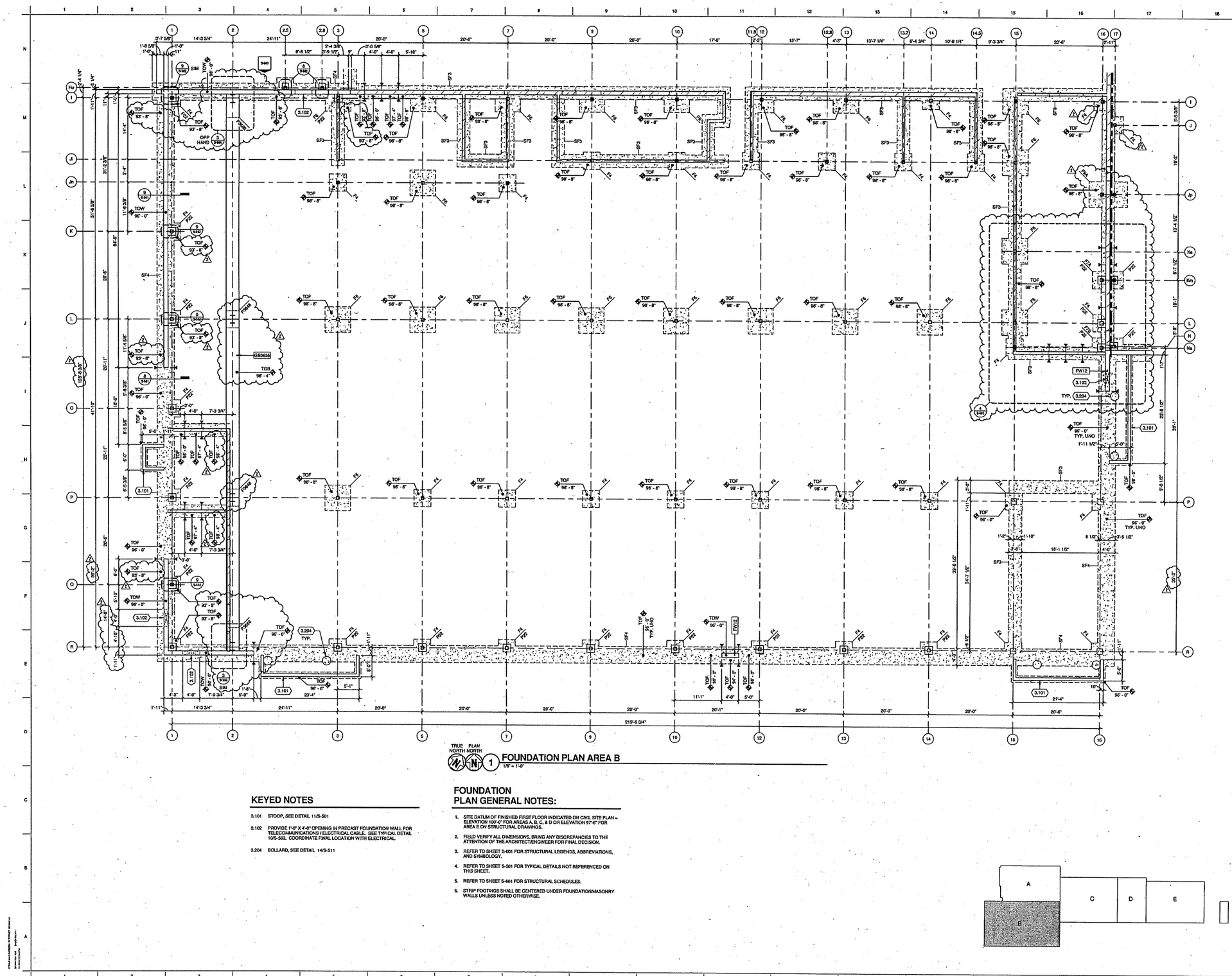
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PROJECT No: 378603

ENLARGED PLANS

A-401


SEE AREA D PLAN FOR STOOP CONTINUATION
3.101
3.204
3.102
FW12
FW18
GB3656
TOF 96' - 8"
TOF 96' - 0"
TOF 95' - 0" TYP. UNO
TOF 99' - 0" TYP. UNO
TOW 96' - 0"
TGB 96' - 4"
OPP HAND
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
F13
F14
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F40



TRUE NORTH / PLAN NORTH

1 FOUNDATION PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.

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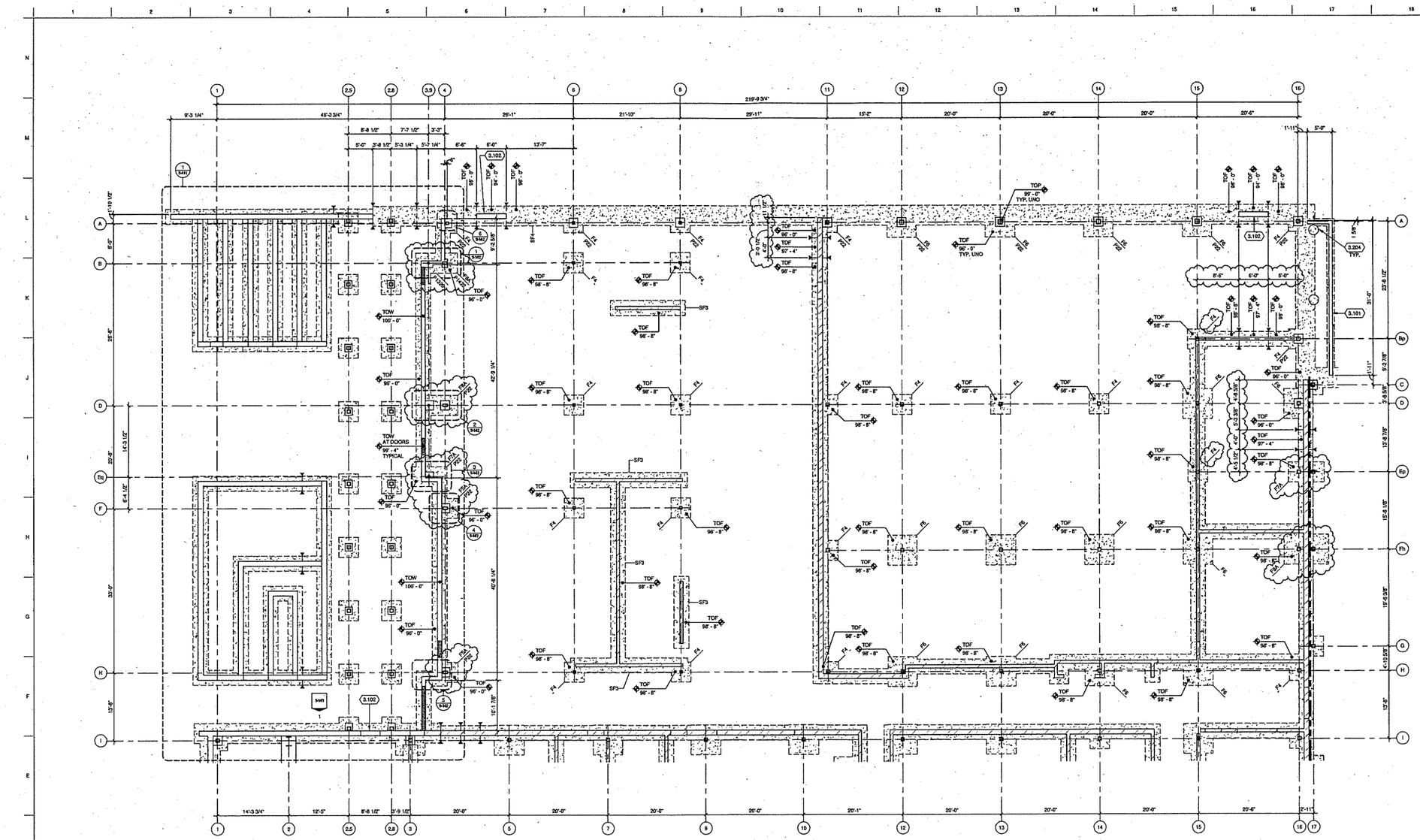
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PROJECT No: 1903500-160264.01

FOUNDATION PLAN AREA B

S-101B

ADDENDUM 2



TRUE NORTH PLAN NORTH

1 FOUNDATION PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

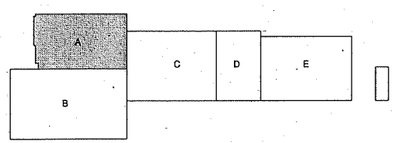
3.101 STOOP, SEE DETAIL 11/S-501

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.



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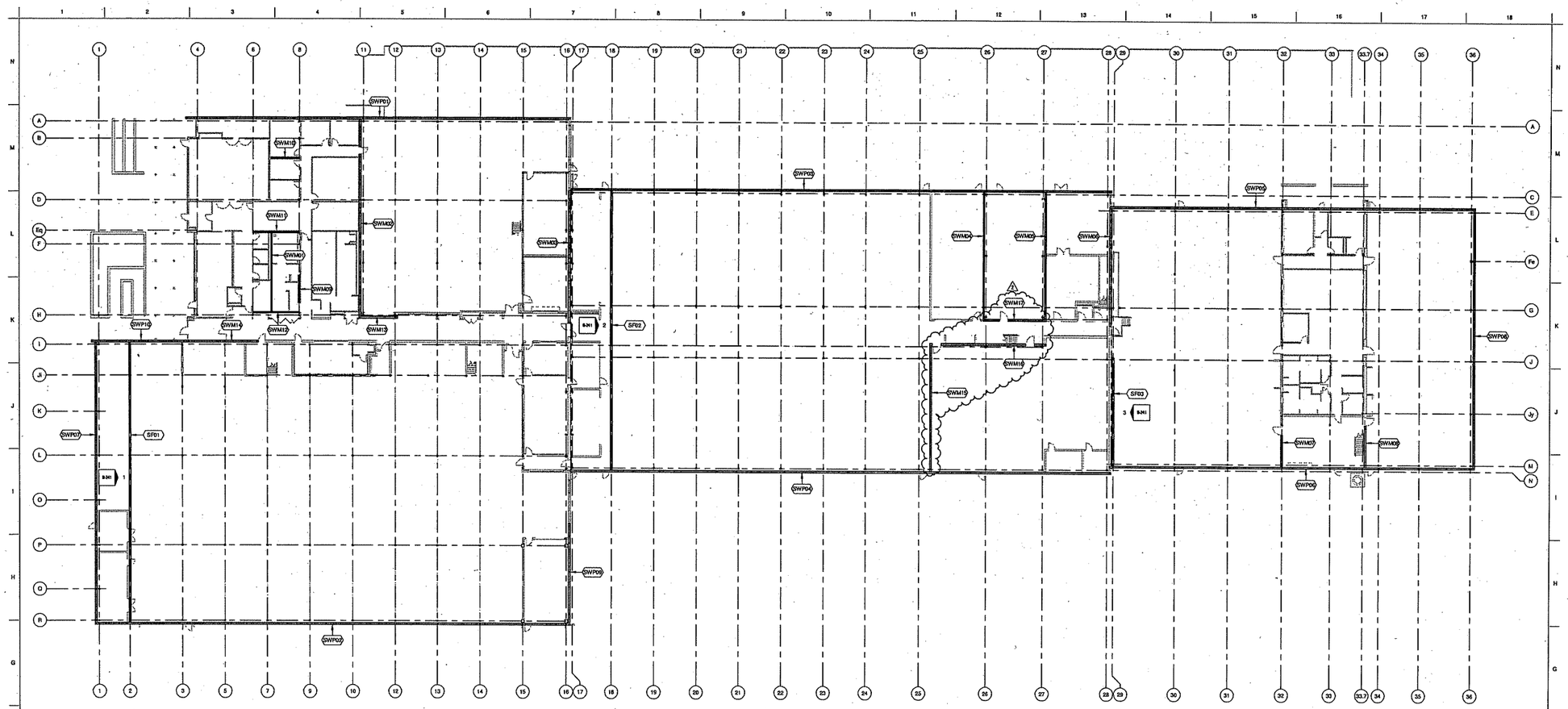
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PROJECT No: 1303500-160264.01

FOUNDATION PLAN AREA A

S-101A

At. 3DUM 3



LATERAL FORCE RESISTING SYSTEMS GENERAL NOTES:

1. SHEAR WALL PRECAST LOADS ARE SHOWN AS STRENGTH LEVEL.
2. SHEAR FRAMES HAVE GRADE BEAM FOUNDATIONS. NO PENETRATIONS OR NOTCHES ARE ALLOWED IN GRADE BEAMS.
3. SHEAR WALL PRECAST LOADS SHALL BE APPLIED AT THE TOP OF THE SHEAR WALL.

SHEAR WALLS - PRECAST

SWP01	PRECAST SHEAR WALL V = 28.4K
SWP02	PRECAST SHEAR WALL V = 40.7K
SWP03	PRECAST SHEAR WALL V = 45.K
SWP04	PRECAST SHEAR WALL V = 45.K
SWP05	PRECAST SHEAR WALL V = 43.5K
SWP06	PRECAST SHEAR WALL V = 43.5K
SWP07	PRECAST SHEAR WALL V = 1.9K
SWP08	PRECAST SHEAR WALL V = 17.6K
SWP09	PRECAST SHEAR WALL V = 76.3K SEGMENTS OF THE PRECAST WALL SHALL BE CONNECTED TO TRANSFER HORIZONTAL AND VERTICAL SHEAR.
SWP10	PRECAST SHEAR WALL V = 42.6K

SHEAR FRAMES

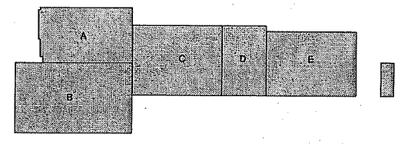
SF01	TRUSSED SWAY FRAME
SF02	TRUSSED SWAY FRAME
SF03	STEEL X-BRACE

SHEAR WALLS - MASONRY

SWM01	CMU SHEAR WALL
SWM02	CMU SHEAR WALL
SWM03	CMU SHEAR WALL
SWM04	CMU SHEAR WALL
SWM05	CMU SHEAR WALL
SWM06	CMU SHEAR WALL
SWM07	CMU SHEAR WALL
SWM08	CMU SHEAR WALL
SWM09	CMU SHEAR WALL
SWM10	CMU SHEAR WALL
SWM11	CMU SHEAR WALL
SWM12	CMU SHEAR WALL
SWM13	CMU SHEAR WALL
SWM14	CMU SHEAR WALL
SWM15	CMU SHEAR WALL
SWM16	CMU SHEAR WALL
SWM17	CMU SHEAR WALL

TRUE NORTH PLAN NORTH

1 LATERAL FORCE RESISTING SYSTEMS PLAN
1" = 20'-0"



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PROJECT No: 1303300-160264.01

LATERAL FORCE RESISTING SYSTEMS PLAN

S-010

ADDENDUM 2

STRUCTURAL DESIGN CRITERIA

1. GOVERNING CODE: WISCONSIN COMMERCIAL BUILDING CODE OCCUPANCY II (IBC 2015)

2. FLOOR LIVE LOAD (1603.1.1)

MEZZANINE LIVE LOAD:	200 PSF
MEZZANINE COLLATERAL LOAD	15 PSF
AREA D MEZZANINE M27-M28 LIVE LOAD	133 PSF

3. ROOF LIVE LOAD (1603.1.2)

UNREDUCIBLE ROOF LIVE LOAD:	21 PSF
ROOF COLLATERAL LOAD	L = 14 PSF
PHOTOVOLTAIC LOAD	L = 4 PSF

4. ROOF SNOW LOAD (1603.1.3)

GROUND SNOW LOAD:	PG = 50 PSF
SNOW EXPOSURE FACTOR:	CE = 1.0
SNOW LOAD IMPORTANCE FACTOR:	IS = 1.0
TYPICAL THERMAL FACTOR:	CT = 1.0
TYPICAL FLAT-ROOF SNOW LOAD:	PF = 21 PSF
TYPICAL SLOPED-ROOF SNOW LOAD:	PS = 21 PSF
CANOPY AND STORAGE BUILDING	CT = 1.2
CANOPY AND STORAGE BUILDING	PF = 25 PSF
CANOPY AND STORAGE BUILDING	PS = 25 PSF

5. WIND DESIGN DATA (1603.1.4)

BASIC WIND SPEED (3-SECOND GUST):	V = 115 MPH
WIND IMPORTANCE FACTOR:	IW = 1.0
WIND EXPOSURE:	C
ENCLOSURE, AREA A & B	ENCLOSED
ENCLOSURE, AREA C, D, E AND STORAGE	PARTIALLY ENCLOSED

A

6. EARTHQUAKE DESIGN DATA (1603.1.5)

OCCUPANCY CATEGORY:	II
IMPORTANCE FACTOR:	IE = 1.0
MAPPED, MCE, 5% DAMPED, SPECTRAL ACCELERATIONS:	
AT SHORT PERIODS:	SS = .08 G
AT A PERIOD OF 1 SECOND:	S1 = .05 G
SITE CLASS:	D
DESIGN EARTHQUAKE SPECTRAL ACCELERATIONS	
AT SHORT PERIODS:	SDS = .09 G
AT A PERIOD OF 1 SECOND:	SD1 = .07 G
SEISMIC DESIGN CATEGORY:	SDC = B

7. GEOTECHICAL DESIGN DATA (1603.1.6)

NET ALLOWABLE SOIL BEARING PRESSURE =4000 PSF
PER CGC GEOTECHNICAL REPORT. PROJECT: C16051-5, DATED AUGUST 4, 2016

8. FLOOD DESIGN DATA (1603.1.7)
BUILDING IS NOT LOCATED IN A FLOOD HAZARD AREA. THEREFORE FLOOD DESIGN DATA IS NOT REQUIRED.

9. SPECIAL LOADS (1603.1.8)

(2) FIVE TON CRANES CLASS B.

SNOW DRIFTING IS INCLUDED IN THE DESIGN OF THE JOIST AND OTHER FRAMING SHOWN ON ROOF PLANS.

ASSUMED ROOF DEAD LOAD	D = 13 PSF
ASSUMED MEZZANINE DEAD LOAD	D = 27 PSF

GENERAL NOTES

G-1. FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO START OF CONSTRUCTION - RESOLVE ANY DISCREPANCY WITH ARCHITECT/ENGINEER.

DO NOT SCALE DRAWINGS!!!!

G-2. FOR CLARITY, ALL EXTERIOR SLABS AND SIDEWALKS MAY NOT BE SHOWN. FOR EXACT DIMENSIONS, LOCATIONS, JOINTS AND SCORE LINES, SEE ARCHITECTURAL AND/OR CIVIL DRAWINGS.

G-3. VERIFY ALL SIZES, WEIGHTS AND LOCATIONS OF MECHANICAL AND ELECTRICAL EQUIPMENT, ROOF PENETRATIONS, DUCTS, ETC. WITH MECHANICAL AND ELECTRICAL CONTRACTORS AND FIELD CONDITIONS.

G-4. DETAILS MARKED "TYPICAL" MAY OR MAY NOT BE CUT ON PLANS, BUT SHALL APPLY UNLESS NOTED OTHERWISE.

G-5. STRUCTURAL SYSTEM IS DESIGNED TO WORK AS A COMPLETED SYSTEM. ANY SHORING OR BRACING NECESSARY DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

G-6. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING PLANS FOR SLEEVES, INSERTS, ETC. NOT SHOWN ON STRUCTURAL PLANS.

G-7. NO PIPES OR SLEEVES FOR MECHANICAL TRADES SHALL PASS THROUGH STRUCTURAL MEMBERS WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER.

G-8. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SITE SAFETY AND ALL ACCIDENTS WHICH RESULT IN DEATH, PERSONAL INJURY, OR DAMAGE TO PROPERTY ARISING OUT OF OR IN CONNECTION WITH THE PERFORMANCE OF THE WORK.

EARTHWORK NOTES

EW-1. SEE GEOTECHNICAL REPORT AND SPECIFICATIONS FOR DEFINITION OF MATERIALS AND COMPACTION REQUIREMENTS.

EW-2. U.N.O., THE CONTRACTOR SHALL RETAIN AN INDEPENDENT, QUALIFIED GEOTECHNICAL ENGINEERING FIRM/TESTING AGENCY TO IDENTIFY AREAS OF POOR SOILS, TO MONITOR PROPER SUBGRADE PREPARATIONS AND TO OVERSEE AND TEST THE PLACEMENT OF COMPACTED FILL MATERIAL.

EW-3. ALL SUBTERRANEAN STRUCTURES, UTILITIES, PIPING, ETC. IN THE AREA OF EXCAVATIONS TO BE LOCATED AND MARKED BY CONTRACTOR PRIOR TO EARTH REMOVAL WORK. CONTRACTOR TO MAINTAIN MARKERS UNTIL EXCAVATION ACTIVITIES HAVE CEASED. IF UNDERGROUND UTILITY CONFLICTS ARE DISCOVERED BEFORE OR ENCOUNTERED DURING EXCAVATION, NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.

EW-4. BEFORE PLACING FOOTINGS, FOUNDATIONS OR SLAB-ON-GRADE, THE SUB-GRADE SHALL BE PREPARED AND INSPECTED AS REQUIRED BY THE SPECIFICATIONS.

EW-5. WHERE STRUCTURES DERIVE SUPPORT FROM FILL-SUPPORTED FOUNDATIONS AND AT SLAB-ON-GRADE, FILL SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D-698), UNLESS NOTED OTHERWISE.

EW-6. NO FILL SHALL BE PLACED OVER FROZEN, MUDDY, OR OTHER DELETERIOUS MATERIAL. NO FILL SHALL BE PLACED OVER A PREVIOUS LIFT THAT HAS NOT BEEN ADEQUATELY COMPACTED PER SPECIFICATIONS.

EW-7. BACKFILL AGAINST FOUNDATION WALLS SHALL BE PLACED EVENLY ON ALL SIDES IN ORDER TO ACHIEVE GENERALLY BALANCED LOADINGS.

FOUNDATION NOTES

F-1. ALL COLUMN FOOTINGS ARE TO BE CENTERED UNDER COLUMN CENTERLINES, UNLESS NOTED OR DETAILED OTHERWISE.

F-2. THE FOUNDATION CONTRACTOR SHALL FULLY REVIEW UNDER-GROUND PLUMBING DRAWINGS AND SHALL COORDINATE WITH THE UNDER-GROUND PLUMBING CONTRACTOR TO DEPRESS FOOTINGS AND PROVIDE PIPE SLEEVES THROUGH FOUNDATION WALLS AS NECESSARY TO ACCOMMODATE PLUMBING LINES OR TRAPS WHICH PENETRATE CONCRETE FOOTINGS OR FOUNDATIONS.

F-3. PROVIDE PVC SLEEVES THROUGH FOUNDATION WALLS/FOOTINGS FOR PIPE, CONDUIT, AND CABLE PENETRATIONS, INCLUDING ELECTRICAL GROUNDING SYSTEM CABLES. SEE APPROPRIATE DRAWINGS FOR LOCATIONS/SIZES. PLACE SLEEVES IN LOCATIONS TO AVOID DISPLACING REINFORCING STEEL.

F-4. FOOTING SUBGRADES SHALL BE CLEAN AND FREE OF DEBRIS, STANDING WATER, AND LOOSE SOIL.

F-5. REFER TO ELECTRICAL DRAWING SITE LIGHTING FOR POLE BASES. SUPPLIED AND INSTALLED BY GENERAL CONTRACTOR.

F-6. COORDINATE WITH ARCHITECTURAL AND CIVIL DRAWINGS FOR MISCELLANEOUS FOUNDATIONS NOT SHOWN ON STRUCTURAL DRAWINGS.

F-8. COORDINATE GROUNDING REQUIREMENTS FOR FOUNDATION/FOOTING REINFORCING STEEL WITH ELECTRICAL DRAWINGS. COORDINATE INSTALLATION OF GROUNDING WIRES/EQUIPMENT WITH ELECTRICAL CONTRACTOR PRIOR TO CASTING CONCRETE.

MASONRY NOTES

MATERIAL PROPERTIES (U.N.O.)

COMPRESSIVE STRENGTH	- f'm = 2000 PSI
MASONRY REINFORCEMENT	- Fy = 60 KSI (A615 GR 60)
MORTAR	- TYPE S (ASTM C270)
GROUT AT 28-DAYS	- 2500 PSI (ASTM C476)

M-1. ALL MASONRY WALLS ARE TO HAVE 9 GAUGE HORIZONTAL JOINT REINFORCEMENT WHICH DOES NOT EXCEED 16 INCHES ON CENTER VERTICALLY.

M-2. ALL LAPS SHALL BE 50 BAR DIAMETERS U.N.O.

M-3. HOLLOW MASONRY UNITS SHALL BE LAID WITH FULL HEAD JOINTS AND FULL BED JOINTS OF THE FACE SHELLS AND UNDER WEBS WHERE THE ADJACENT CELLS ARE TO BE FILLED WITH GROUT AND AT THE BOTTOM COURSE.

M-4. GROUT SOLID ALL JAMBS IN ALL MASONRY WALLS FULL HEIGHT TO UNDERSIDE OF LINTEL. EXTEND GROUTED JAMB FROM FACE OF MASONRY OPENING AT LEAST 24" (A MINIMUM OF 3 CELLS). AT OTHER BEAM BEARING LOCATIONS, GROUT SOLID A MINIMUM 24"x24" AREA BENEATH THE BEARING PLATE, U.N.O.

M-5. PROVIDE CORNER SPLICE BARS FOR ALL BOND BEAMS OCCURRING AT CORNERS OR WALL INTERSECTIONS. SPLICE BAR TO BE THE SAME SIZE AS BARS IN THE BOND BEAM.

M-6. WHERE MASONRY IS APPLIED ADJACENT TO STEEL MEMBERS (BEAMS AND COLUMNS) PROVIDE ANCHORING DEVICES PER SPECIFICATIONS.

M-7. REFER TO ARCHITECTURAL PLANS AND DOOR/FRAME SCHEDULES FOR LINTEL ROUGH OPENING LOCATIONS, SIZES, AND ELEVATIONS.

M-8. USE SLEEVE TYPE EXPANSION ANCHORS IN NON-STRUCTURAL CMU WALL PARTITIONS, UNLESS NOTED OTHERWISE.

M-9. ALL CMU WALLS SHALL BE REINFORCED WITH A MINIMUM #5 VERTICAL BAR AT 48" O.C. WITH THAT CMU CORE GROUTED AND HORIZONTAL JOINT REINFORCEMENT AT 16" O.C. THE BOTTOM TWO COURSES SHALL BE GROUTED SOLID. PROVIDE A CONTINUOUS BOND BEAM AT TOP OF WALL WITH (2) #5 BARS CONTINUOUS. GROUT BOND BEAM SOLID.
PROVIDE #5 DOWEL AT 48" O.C., INTO FOOTINGS.

A

M-10. REFER TO STRUCTURAL AND/OR ARCHITECTURAL DRAWINGS FOR CONTROL JOINT LOCATIONS. WHERE CMU CONTROL JOINT LOCATIONS ARE NOT INDICATED, SUBMIT CMU CONTROL JOINT LAYOUT FOLLOWING NCMA TEK 12-2B TO THE ENGINEER FOR APPROVAL.

M-11. NOT USED

M-12. PROVIDE HOT AND COLD WEATHER PROCEDURES AND TEMPORARY MOISTURE PROTECTION IN ACCORDANCE WITH ACI RECOMMENDATIONS AND PROJECT SPECIFICATIONS.

M-13. MASONRY SHALL BE PLACED IN ONE-HALF RUNNING BOND UNLESS NOTED OTHERWISE.

CONCRETE & REINFORCING STEEL NOTES

MATERIAL PROPERTIES (U.N.O.)

COMPRESSIVE STRENGTH	- f'c = 4 KSI
CONCRETE REINFORCEMENT	- Fy = 60 KSI (A615 GR 60)

CR-1. PROVIDE ONE (1) HOOKED REINFORCING BAR IN CONCRETE FOOTING TO SERVE AS A "CONCRETE ENCASED ELECTRODE" IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE. COORDINATE WITH ELECTRICAL CONTRACTOR FOR EXACT LOCATION. HOOKED REINFORCING BAR SHALL CONFORM TO THE FOLLOWINGS:
A. UNCOATED, LOW-ALLOY STEEL, CONFORMING TO ASTM A706.
B. BAR SIZE NUMBER = 4.
C. HOOKED AT ONE END ONLY.
D. MINIMUM HORIZONTAL LENGTH OF REINFORCING BAR ENCASED IN CONCRETE FOOTING SHALL BE 20'-0" AS DEFINED IN NEC, ARTICLE 250.
E. MINIMUM VERTICAL PROJECTION OF REINFORCING BAR ABOVE CONCRETE SLAB SHALL BE 6'-0".
F. MINIMUM COVER ALL AROUND REINFORCING BAR SHALL BE 2".

CR-2. ALL BAR LAPS SHALL CONFORM TO ACI 318 CLASS "B" SPLICE CRITERIA. USE TOP BAR LAP LENGTHS FOR TOP BARS IN SLABS AND BEAMS OVER 14" DEEP. MINIMUM BAR LAPS AS FOLLOWS U.N.O.:

FOR EPOXY COATED BARS, PROVIDE 1.5 TIMES THE INDICATED LAP LENGTH. FOR TOP BARS PROVIDE 1.3 TIMES THE INDICATED LAP LENGTH.

CR-3. LAP LENGTH SHALL BE SPECIFICALLY NOTED ON SHOP DRAWINGS WHERE MORE THAN ONE BAR MAKES UP A CONTINUOUS STRING.

CR-4. HORIZONTAL BARS SHALL BE DETAILED TO SHOW THE DISTANCE FROM AT LEAST ONE END OF THE BAR TO THE NEAREST BUILDING GRID LINE OR WALL.

CR-5. REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 315.

CR-6. ALL REINFORCEMENT BARS SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST CRSI MANUAL OF STANDARD PRACTICE AND SHALL BE CLEAN FREE OF GREASE AND SCALLY RUST.

CR-7. CONTINUOUS TOP AND BOTTOM BARS, WHEN SHOWN IN TRANSVERSE SECTION ONLY, SHALL BE LAPPED AS FOLLOWS:

TOP BARS NEAR MID-SPANS; BOTTOM BARS DIRECTLY OVER SUPPORTS, UNLESS NOTED OTHERWISE.

CR-8. HOOK HORIZONTAL WALL AND BEAM REINFORCING BARS AT DISCONTINUOUS ENDS, TYPICAL U.N.O. EXTEND REINFORCEMENT TO FAR FACE OF PIERS/PEDESTALS AND/OR COLUMNS U.N.O.

CR-9. PROVIDE HOT/COLD WEATHER PROCEDURES AND PROTECTION IN ACCORDANCE WITH ACI RECOMMENDATIONS AND PROJECT SPECIFICATIONS.

CR-10. CONCRETE REINFORCEMENT PROTECTION/CLEAR COVER, U.N.O.:

FOOTINGS:	
BOTTOM & SIDES	3"
TOP	2"
WALLS:	
EXTERIOR EXPOSURE	2"
INTERIOR EXPOSURE	1"
BEAMS/COLUMNS:	
OVER TIES OR STIRRUPS	1 1/2"
ELEVATED SLABS:	1"

CR-11. PROVIDE ADDITIONAL #4 BARS AT 4'-0" LONG 1" BELOW TOP OF SLAB AT 45° TO ALL REENTRANT CORNERS,OPENINGS IN CONCRETE SLABS AND AS INDICATED ON DRAWINGS.

CR-12. EXTEND ALL PIER STEEL TO PROVIDE STD. HOOK UNDER FOOTING REINFORCEMENT, UNLESS NOTED OTHERWISE.

CR-13. ALL CONCRETE DESIGN AND CONSTRUCTION SHALL CONFORM WITH THE LOCAL BUILDING CODE REQUIREMENTS AND THOSE OF THE FOLLOWING STANDARDS (LATEST EDITION):

"ACI 318, BUILDING CODE REQUIREMENTS FOR REINFORCED CONC."
"ACI 315, DETAILS AND DETAILING OF CONCRETE REINFORCEMENT"
"ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BLDGS."
"ACI 207, RECOMMENDED PRACTICE FOR CONCRETE FORM WORK"

CR-14. SEE SECTION 033000 OF SPECIFICATIONS FOR INFORMATION REGARDING CONCRETE MIX DESIGN, TESTING, MATERIALS, AND ADMIXTURES.

CR-15. ALUMINUM CONDUIT IS NOT PERMITTED TO BE EMBEDDED IN CONCRETE.

CR-16. PROVIDE FOOTING DOWELS TO MATCH VERTICAL WALL REINFORCING. WITH STANDARD HOOKS EMBEDDED A MINIMUM OF 9" INTO FOOTING.

PRECAST CONCRETE NOTES

PC-1. PRECAST CONCRETE SUPPLIER SHALL BE RESPONSIBLE FOR DESIGN OF PRECAST ELEMENTS AND CONNECTIONS TO CARRY ALL DESIGN LOADS (VERTICAL AND LATERAL) TO THE FOUNDATIONS.

PC-2. REFER TO GENERAL NOTES AND DRAWINGS FOR SUPERIMPOSED LOADS USED IN DESIGN.

PC-3. ESTIMATED PRECAST WEIGHTS USED IN DESIGN:

DOUBLE-TEES:	
32" DEEP	= 74PSF
42 1/2" DEEP	= 87PSF
PLANK:	
6" HOLLOW-CORE	= 63PSF
12" HOLLOW-CORE	= 90PSF

PC-4. WHERE CONCRETE TOPPINGS ARE CALLED FOR, THE TOPPING THICKNESS INDICATED REPRESENTS THE MINIMUM THICKNESS REQUIRED THROUGHOUT THE LENGTH OF THE SUPPORTING PRECAST ELEMENT. FOR THOSE ELEMENTS THAT ARE CAMBERED, THE TOPPING SLAB SHALL VARY IN THICKNESS SO AS TO MAINTAIN A LEVEL SURFACE.

THE MINIMUM REQUIRED TOPPING SLAB THICKNESS SHALL BE PROVIDED AT THE MAXIMUM CAMBER LOCATION OF THE SUPPORTING PRECAST ELEMENT. THE TOPPING SLAB THICKNESS SHALL INCREASE AS REQUIRED TOWARDS THE BEARINGS TO MAINTAIN A LEVEL SURFACE AND TO ACCOMODATE THE CAMBER PROFILE OF THE SUPPORTING PRECAST ELEMENT.

THE DESIGN OF THE SUPPORTING PRECAST ELEMENT SHALL INCORPORATE THE VARIABLE THICKNESS AND WEIGHT OF THE CONCRETE TOPPING SLAB.

PC-5. PRECAST SLABS SHALL HAVE THAT PART OF THE TOTAL DEFLECTION OCCURRING AFTER ATTACHMENT OF THE NON STRUCTURAL ELEMENTS (SUM OF THE LONGTIME DEFLECTION DUE TO ANY ADDITIONAL LIVE LOAD) LIMITED TO L/480.

PC-6. ALL STEEL SHAPES AND PLATES SHALL COMPLY WITH ASTM A36. THE WELDING OF ALL STEEL IS TO BE WITH E70XX ELECTRODES.

PC-7. ALL EMBEDDED PLATES, CONNECTIONS, AND INSERTS EXPOSED TO WEATHER ARE TO BE GALVANIZED PER ASTM A153. ALL OTHER CONNECTIONS ARE TO BE COATED WITH A RUST INHIBITIVE PRIMER. ALL FIELD WELDED AND SCRATCHED CONNECTIONS ARE TO BE TOUCHED UP AFTER FINAL CONNECTION HAS BEEN COMPLETED. ALL GALVANIZED CONNECTIONS ARE TO BE REPAIRED WITH A COLD GALVANIZING COMPOUND.

PC-8. PROVIDE EMBEDDED PLATES FOR ATTACHMENT OF MECHANICAL EQUIPMENT WHERE REQUIRED. VERIFY EQUIPMENT WEIGHTS, LOCATIONS, AND ATTACHMENT REQUIREMENTS WITH THE MECHANICAL CONTRACTOR.

PC-9. ALL HEADERS REQUIRED AT SLAB OPENINGS ARE TO BE DESIGNED AND FURNISHED BY THE PRECAST SLAB SUPPLIER. VERIFY SIZE AND LOCATION OF ALL INDICATED OPENINGS WITH THE MECHANICAL CONTRACTOR. REFER TO MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR HOLES SMALLER THAN 10" SQUARE OR ROUND.

PC-10. ALL HOLES IN SLABS WHICH HAVE NOT BEEN CAST IN BY THE MANUFACTURER ARE TO BE FIELD CUT BY THE TRADES REQUIRING THEM, USING ONLY POWER SAWS OR CORE DRILLS. FIELD CUTS WHICH VARY IN SIZE AND/OR LOCATION FROM THOSE INDICATED ON PRECAST SHOP DRAWINGS SHALL BE APPROVED BY THE PRECAST SUPPLIER PRIOR TO CUTTING.

PC-11. DRAWINGS SHOW GENERAL REQUIREMENTS FOR BEARING AND ANCHORAGE. THE PRECAST SUPPLIER SHALL PROVIDE ADDITIONAL MATERIAL, ACCESSORIES AND WORK NECESSARY TO ACCOMMODATE ALL SPECIFIC JOB, SPAN AND LOADING REQUIREMENTS.

PC-12. ALL EMBEDDED PLATES AND CONNECTIONS SHOWN ARE MINIMUM REQUIREMENTS. THE PRECAST SUPPLIER SHALL VERIFY BY ANALYSIS THAT PLATE SIZES AND SPACING ARE ADEQUATE TO TRANSFER THE DESIGN LOADS INDICATED. ALL PRECAST CONNECTIONS SHALL BE DESIGNED USING THE CODE REQUIRED LOAD FACTORS. THE MINIMUM WELD SIZE SHALL BE 3/16", AND THE MINIMUM LENGTH OF WELD SHALL BE 4".

PC-13. TYPICAL EXTERIOR PRECAST LAYUP EQUALS 3.5" CONCRETE, 4" INSULATION, 3.5" CONCRETE.

STRUCTURAL STEEL NOTES

MATERIAL PROPERTIES (U.N.O.)

W-SHAPES	- Fy = 50 KSI (A992 OR A572 Gr 50)
C-SHAPES & ANGLES	- Fy = 36 KSI (A36)
PLATES & BARS	- Fy = 36 KSI (A36)
RECTANGULAR HSS	- Fy = 46 KSI (A500 Gr B)
ROUND HSS	- Fy = 42 KSI (A500 Gr B)
PIPE	- Fy = 35 KSI (A53 Gr B)
RODS	- Fy = 36 KSI (A36)

S-1. STEEL BEAMS WITH RESIDUAL CAMBER RESULTING FROM MILL FABRICATION OR ROLLING SHALL BE SHOP FABRICATED AND ERECTED SUCH THAT THIS RESIDUAL CAMBER COUNTERACTS GRAVITY LOAD DEFLECTION.

S-2. U.N.O., ALL BOLTED CONNECTIONS SHALL UTILIZE 3/4 INCH DIAMETER A325 BOLTS TIGHTENED TO THE SNUG-TIGHT CONDITION. THE SNUG-TIGHT CONDITION IS DEFINED BY THE RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".

S-3. ALL ANCHOR RODS ARE TO BE 3/4 INCH DIAMETER F1554 51 GR. 55 THREADED RODS UNLESS NOTED OTHERWISE. TWO 1/2 INCH DIAMETER ANCHOR BOLTS SHALL BE PROVIDED AT ALL BEAM AND LINTEL BEARINGS ON CONCRETE OR MASONRY.

S-4. BEAM AND LINTEL PLATES SHALL BE FULLY GROUTED WITH A MINIMUM 1/2" NON-SHRINK GROUT.

S-5. ALL WELDING OF NEW STEEL IS TO BE WITH E70XX ELECTRODES, UNLESS NOTED OTHERWISE. WELDING SHALL BE IN ACCORDANCE WITH THE LATEST AWS SPECIFICATIONS BY CERTIFIED WELDERS.

S-6. WHEN FIELD WELDING TO EXISTING STEEL, ADJUST WELDING PROCEDURES AS REQUIRED TO BE COMPATIBLE WITH THE NEW AND EXISTING STEEL.

S-7. STEEL CONNECTIONS NOT DETAILED ON THE PLANS ARE TO BE THE FABRICATOR'S STANDARD AND ARE TO BE SELECTED AND DESIGNED IN ACCORDANCE WITH AISC ASD SPECIFICATIONS, TYPE 2 FRAMING CONNECTIONS, FOR THE REACTIONS INDICATED.

MINIMUM NO. BOLTS PER CONNECTION
n = 2 FOR MEMBERS 10 INCHES DEEP OR LESS
n = 3 FOR MEMBERS 12, 14, OR 15 INCHES DEEP
n = 4 FOR MEMBERS 16 OR 18 INCHES DEEP
n = 5 FOR MEMBERS 21 OR 24 INCHES DEEP
n = 6 FOR MEMBERS 27 OR 30 INCHES DEEP
n = 8 FOR MEMBERS 33 OR 36 INCHES DEEP

S-8. UNLESS NOTED OTHERWISE, THE MINIMUM CONNECTION PLATE/ANGLE THICKNESS SHALL BE 5/16". THE MINIMUM WELD 1/4", AND THE MINIMUM DESIGN LOAD ON ANY CONNECTION 10 KIPS STRENGTH LEVEL.

S-9. ALL CONNECTIONS TO PIPE AND TUBE COLUMNS SHALL BE THROUGH PLATE CONNECTIONS UNLESS OTHERWISE INDICATED.

S-10. THE CONTRACTOR SHALL FURNISH AND INSTALL MISCELLANEOUS STEEL (CURBS, HANGERS, BRACING, ETC.) AS INDICATED AND AS NECESSARY PER ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

S-11. ALL EXTERIOR STEEL SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A123.

S-12. WELDING TO, OR CUTTING OR GRINDING ON CRANE RUNWAY BEAMS AND BRACKETS IS NOT ALLOWED.

S-13. CHANGE SHOP WELDS TO FIELD WELDS WERE NECESSARY FOR FIT UP.

S-14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA TOLERANCES AND REQUIREMENTS.

STEEL BAR JOISTS

MATERIAL PROPERTIES (U.N.O)
COMPLY WITH SJI'S "SPECIFICATIONS" FOR WEB AND STEEL-ANGLE CHORD MEMBERS.

J-1. BAR JOISTS SHALL BE DESIGNED TO RESIST FORCES INDICATED ON DRAWINGS AND SPECIFICATIONS.

J-2. PLACE LOADS AT PANEL POINTS OR WELD ADDITIONAL DOUBLE ANGLE MEMBERS ONE EACH SIDE FROM POINT OF CONCENTRATED LOAD TO THE NEAREST PANEL POINT ON THE OPPOSITE CHORD.

J-3. ALL FIELD MODIFICATIONS OR REPAIRS TO THE JOIST, OR JOIST GIRDERS, SHALL BE APPROVED BY THE JOIST MANUFACTURER IN WRITING. THIS LETTER SHALL BE FORWARDED TO THE ENGINEER FOR REVIEW.

J-4. CUTTING AND DRILLING OF JOISTS IS NOT PERMITTED.

J-5. ALL BRIDGING SHALL BE EQUALLY SPACED, UNLESS NOTED OTHERWISE, BY JOIST MANUFACTURER.

J-6. CONTRACTOR(S) SHALL PROVIDE MEANS FOR ADEQUATE DISTRIBUTION OF CONSTRUCTION LOADS SO THAT CARRYING CAPACITY OF ANY BAR JOIST, JOIST GIRDER, OR OTHER STRUCTURAL MEMBER IS NOT EXCEEDED.

J-7. JOIST SHALL BE CONSIDERED AS UNSTABLE DURING ERECTION. UNDER NO CIRCUMSTANCES ARE CONSTRUCTION LOADS OF ANY DESCRIPTION TO BE PLACED ON UNBRIDGED JOISTS.

J-8. WHERE X-BRIDGING INTERFERES WITH MECHANICAL PIPING OR DUCTWORK, UTILIZE HORIZONTAL BRIDGING AS DIRECTED BY JOIST MANUFACTURER.

J-9. ALL BRIDGING SHALL BE PER SJI AND AS REQUIRED FOR DESIGN LOADS.

J-10. PROVIDE JOIST WITH UPLIFT CAPACITY OF 10 PSF, SERVICE LEVEL.

J-11. A = SERVICE LEVEL AXIAL LOAD.
PROVIDE JOIST TOP CHORD WITH AXIAL CAPACITY TO RESIST.
A2 = MINIMUM JOIST TOP CHORD CROSS SECTIONAL AREA = .67 IN²

J-12. ALL JOIST AND JOIST GIRDERS ON COLUMN LINES SHALL BE DESIGNED FOR A 5 KIP TOP CHORD AXIAL FORCE

J-13. ON HIGH ROOFS JOIST MAY BE SHIFTED UP TO 6 INCHES. ANY JOIST SPACE MAY NOT INCREASE MORE THAN 6 INCHES AND NEVER MORE THAN 6'-0" MAXIMUM. THIS APPLIES TO HIGH ROOFS ONLY. MAINTAIN JOISTS ALIGNED WITH COLUMNS.

METAL DECK

MD-1. BUTTON PUNCHING ROOF DECK IS NOT PERMITTED. REFERENCE DRAWINGS FOR ROOF DECK ATTACHMENT REQUIREMENTS. STRUCTURAL DIAPHRAGM ACTION IS PROVIDED BY THE ROOF DECK AND ITS ATTACHMENT.

MD-2. UNLESS NOTED OTHERWISE, ALL MISCELLANEOUS OPENINGS IN METAL ROOF DECK ARE TO BE FRAMED BY 5x3x5/16" ANGLES. LONG LEG OF ANGLES SHALL BE VERTICAL. ANGLES SHALL BE WELDED TO THE TOP CHORD/FLANGE OF ROOF FRAMING AND EACH OTHER.

MD-3. UNLESS NOTED OTHERWISE, METAL DECKING SHALL BE CONTINUOUS OVER 3 SPANS AND HAVE JOINTS OVER SUPPORTING MEMBERS.

MD-4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POUR STOPS AT EDGES OF METAL DECK PER SDI POUR STOP SELECTION TABLE/RECOMMENDATIONS OR BENT PLATE POUR STOPS AS REQUIRED TO FORM THE SLAB EDGE.

STRUCTURAL TESTING AND INSPECTION

TI-1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT ALL STRUCTURAL WORK FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY STRUCTURAL INSPECTION PROVIDED BY OTHERS DOES NOT RELIEVE THE CONTRACTOR OF THIS RESPONSIBILITY. ANY STRUCTURAL DEVIATIONS FROM THE CONTRACT DOCUMENTS THAT ARE FOUND AT A LATER DATE AND ARE DECLARED TO BE SIGNIFICANT BY THE STRUCTURAL ENGINEER SHALL BE CORRECTED BY THE CONTRACTOR WITHOUT COST OR ANY DELAY TO THE PROJECT SCHEDULE.

TI-2. THE CONTRACTOR SHALL RETAIN AN INDEPENDENT TESTING AGENCY TO PROVIDE FIELD AND LAB TESTING OF CONSTRUCTION MATERIALS AND TO PROVIDE CONSTRUCTION INSPECTIONS. THE CONSTRUCTION INSPECTION SHALL BE DONE BY QUALIFIED INSPECTORS THAT ARE SATISFACTORY TO THE ARCHITECT AND ENGINEER.

TI-3. THE CONTRACTOR SHALL PROVIDE THE TESTING AND INSPECTING AGENCY ACCESS TO ALL PLACES WHERE THE WORK IS BEING PERFORMED. A MINIMUM OF 24 HOURS NOTIFICATION SHALL BE GIVEN TO THE TESTING AGENCY AND ARCHITECT/ENGINEER PRIOR TO THE COMMENCEMENT OF WORK REQUIRING TESTING OR INSPECTION.

TI-4. THE TESTING AGENCY IS NOT AUTHORIZED TO DIRECT OR APPROVE ANY CHANGES FROM THE CONTRACT DOCUMENTS. IF THE CONTRACTOR WISHES TO DEVIATE FROM THE TESTING AGENCY'S INTERPRETATION OF THE CONTRACT DOCUMENTS, HE MAY DO SO DIRECTLY WITH THE ARCHITECT OR STRUCTURAL ENGINEER.

TI-5. THE TESTING AGENCY IS NOT AUTHORIZED TO STOP OR DELAY THE WORK. IF THE CONTRACTOR ELECTS TO CONTINUE WITH A CERTAIN PORTION OF WORK AFTER BEING NOTIFIED BY THE TESTING AGENCY THAT SUCH WORK IS NOT IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR DOES SO AT THEIR OWN RISK AND MAY BE REQUIRED TO CORRECT THE WORK AT A LATER DATE.

TI-6. THE TESTING AND INSPECTING AGENCY IS NOT INSPECTING FOR O.S.H.A. COMPLIANCE OR REQUIRED TO INSPECT TEMPORARY CONSTRUCTION, SUCH AS TEMPORARY BRACING. TEMPORARY CONSTRUCTION IS THE CONTRACTOR'S SOLE RESPONSIBILITY.

TI-8. TESTING AND INSPECTION IS NOT REQUIRED FOR WORK PERFORMED AT AN OFF-SITE FABRICATION SHOP, UNLESS SPECIFICALLY NOTED OR SPECIFIED OTHERWISE.

TI-9. THE TESTING AND INSPECTING AGENCY SHALL ISSUE ONGOING REPORTS OF INSPECTIONS AND TESTS TO THE CONTRACTOR, ENGINEER, AND ARCHITECT OF RECORD. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN IF UNCORRECTED, TO THE ENGINEER AND ARCHITECT OF RECORD.

TI-10. INSPECTION AGENCY SHALL INSPECT FOR CONFORMANCE TO SPECIFIED REQUIREMENTS FOR PROTECTING NEW CONCRETE AND MASONRY FROM THE ADVERSE EFFECTS OF WEATHER, HEATING EQUIPMENT AND OTHER POTENTIALLY HARMFUL CONDITIONS.

TI-11. CONSTRUCTION TESTING AND INSPECTION BY THE TESTING AND INSPECTING AGENCY IS REQUIRED AS FOLLOWS:

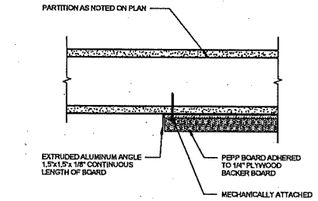
A. CONCRETE TESTING PER THE SPECIFICATIONS.

B. CONCRETE INSPECTION SHALL INCLUDE THE PLACEMENT OF REINFORCEMENT. REINFORCING BAR SIZES, SPACING, TIES, LAPS, AND COVER.

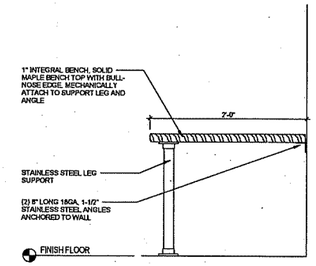
C. MASONRY TESTING PER THE BUILDING CODE.

D. MASONRY INSPECTION SHALL INCLUDE THE PLACEMENT OF REINFORCEMENT. REINFORCING BAR SIZES, SPACING, AND LAPS.

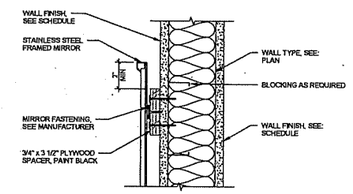
E. FIELD BOLTING INSPECTIONS SHALL INCLUDE VISUAL INSPECTION OF ALL THE CONNECTIONS RELATED TO STRUCTURAL STEEL. THE SIZE, TYPE, AND QU



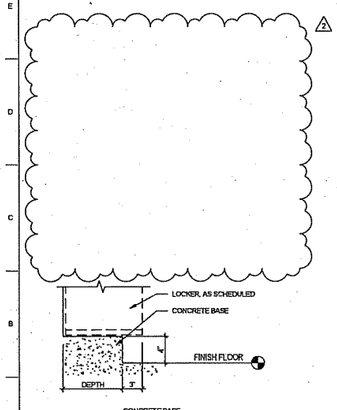
H15 TACKABLE WALL SURFACE
3" = 1'-0"



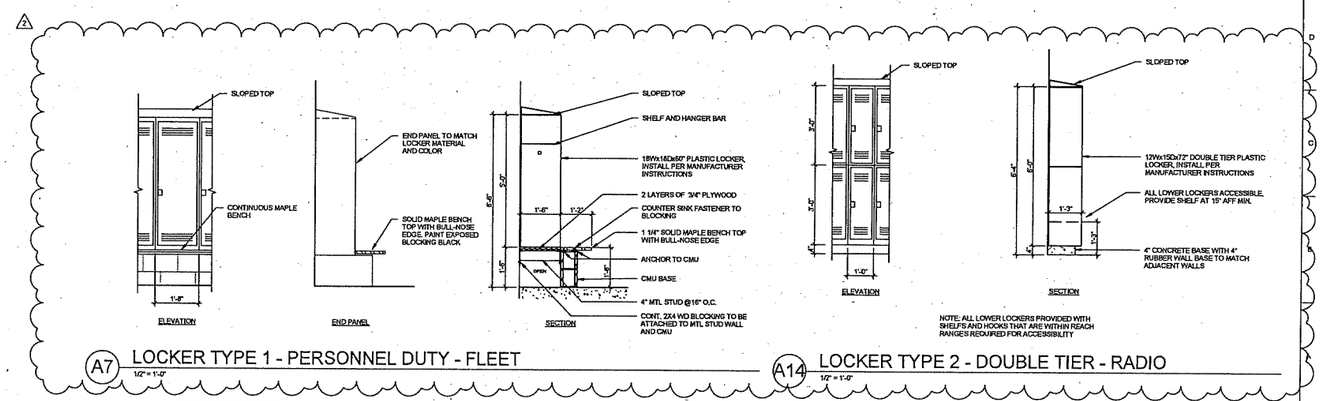
E7 LOCKER ADA BENCH DETAIL
1 1/2" = 1'-0"



E15 MIRROR-CONCEALED SPACER
3" = 1'-0"



A1 LOCKER BASE DETAILS
1 1/2" = 1'-0"



A7 LOCKER TYPE 1 - PERSONNEL DUTY - FLEET
1/2" = 1'-0"

A14 LOCKER TYPE 2 - DOUBLE TIER - RADIO
1/2" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 297 7979 T

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

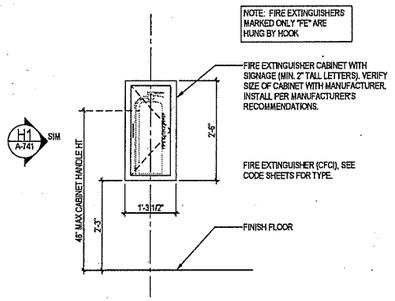
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	01/03/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376803

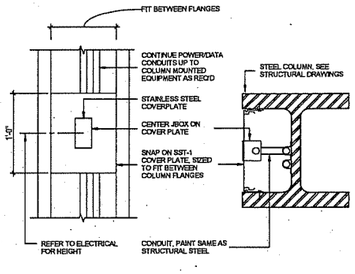
INT LOCKER AND RR DETAILS

A-743

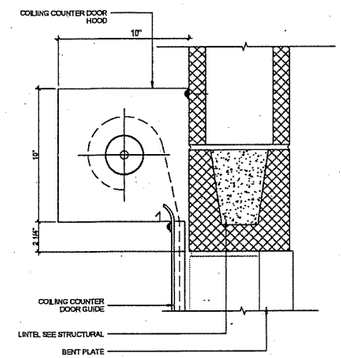
ADDENDUM 2



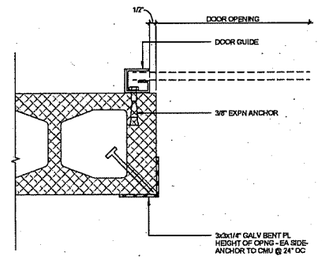
K1 FEC-2 - FIRE EXTINGUISHER CABINET FRONT ELEVATION
3/4" = 1'-0"



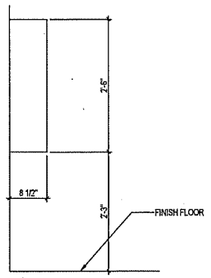
K5 RACEWAY AT COLUMN
1 1/2" = 1'-0"



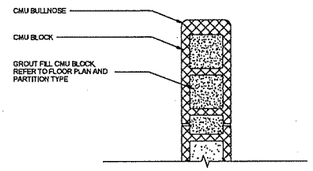
K9 COILING COUNTER DOOR HEAD
3" = 1'-0"



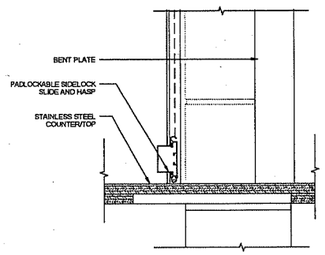
K15 OHC SHUTTER JAMB AT CMU
3" = 1'-0"



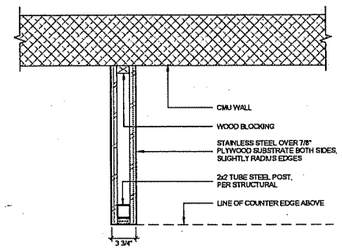
H1 FEC-2 - FIRE EXTINGUISHER CABINET SIDE ELEVATION
1" = 1'-0"



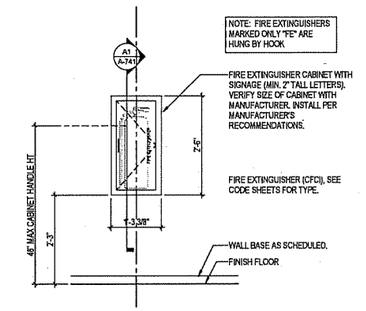
H5 CMU BULLNOSE
1 1/2" = 1'-0"



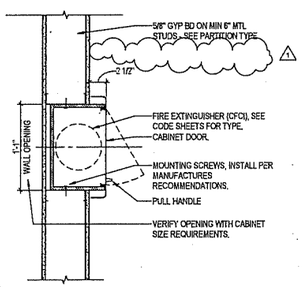
H9 OHC SHUTTER AT COUNTER
3" = 1'-0"



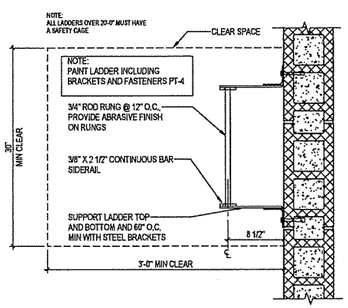
H15 PARTS ISSUE WINDOW PLAN DETAIL
1 1/2" = 1'-0"



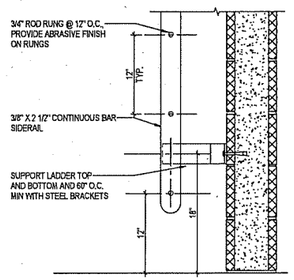
D1 FEC-1 - FIRE EXTINGUISHER CABINET
3/4" = 1'-0"



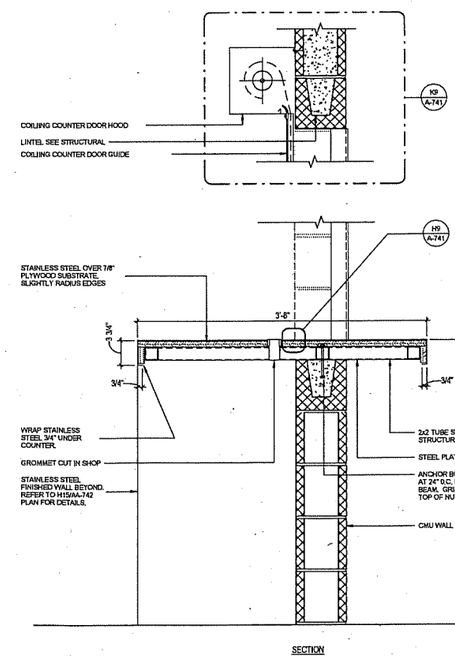
FEC-1
A1 FIRE EXTINGUISHER CABINET
1 1/2" = 1'-0"



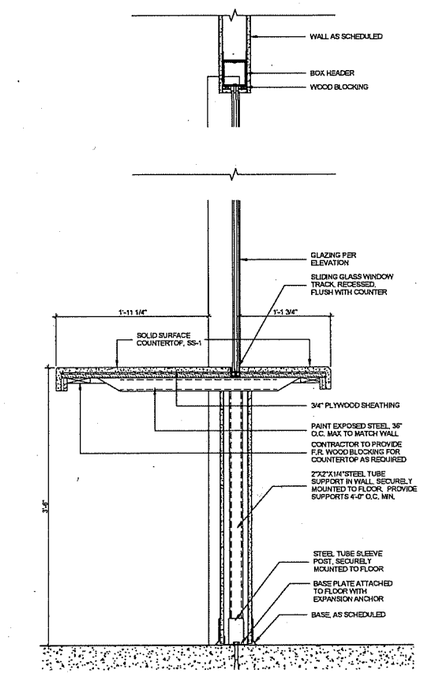
D5 MEZZANINE ACCESS LADDER ON CMU
1 1/2" = 1'-0"



A5 MEZZANINE LADDER - BOTTOM
1 1/2" = 1'-0"



A9 PARTS COUNTER
1 1/2" = 1'-0"



A15 SLIDING CHECK-IN WINDOW
1 1/2" = 1'-0"

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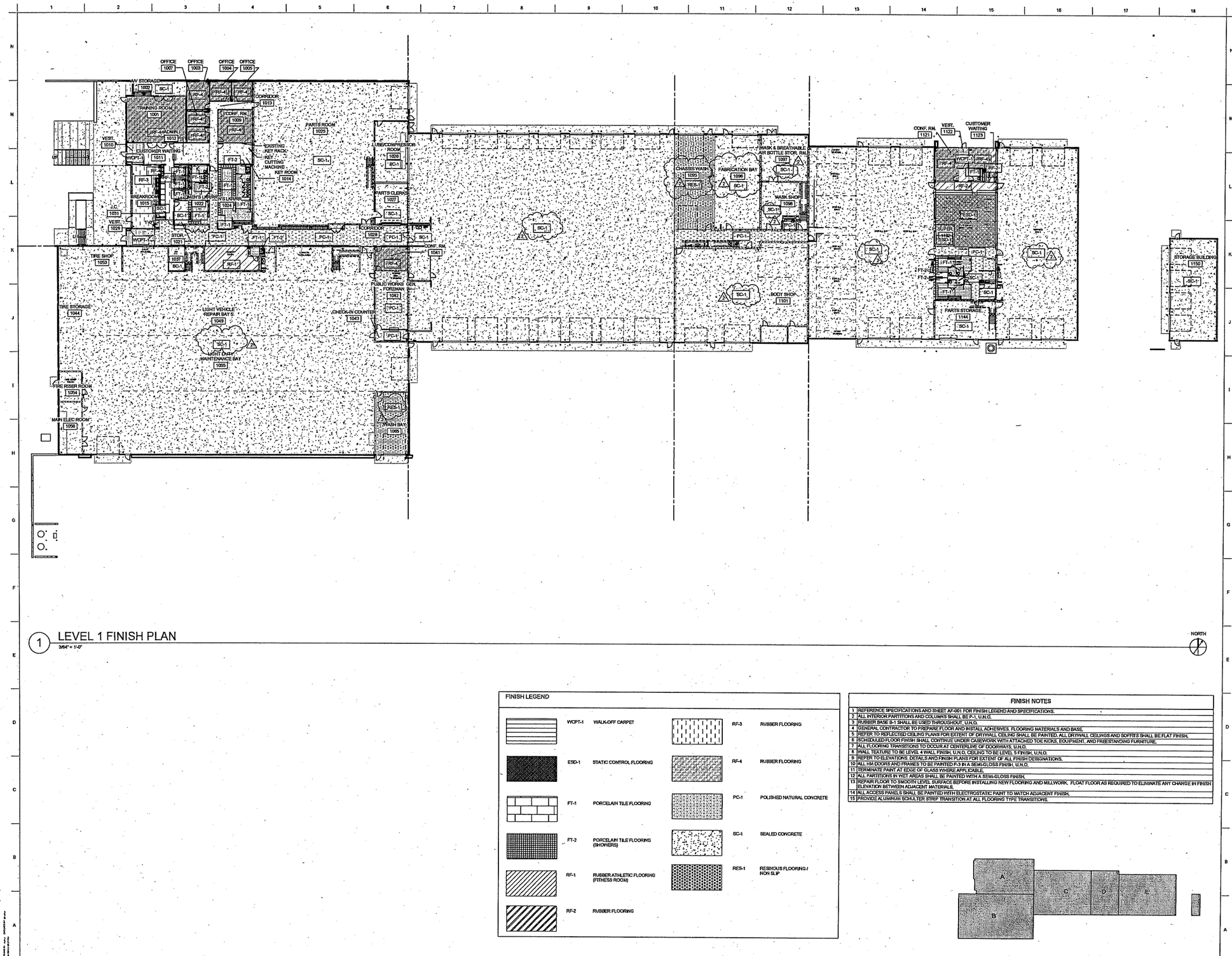
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 376003

INT ARCH DETAILS

A-741

Addi 1 and 2



1 LEVEL 1 FINISH PLAN

3/64" = 1'-0"

NORTH

FINISH LEGEND

WCPT-1	WALK-OFF CARPET	RF-3	RUBBER FLOORING
ESD-1	STATIC CONTROL FLOORING	RF-4	RUBBER FLOORING
FT-1	PORCELAIN TILE FLOORING	PC-1	POLISHED NATURAL CONCRETE
FT-2	PORCELAIN TILE FLOORING (SHOWERS)	SC-1	SEALED CONCRETE
RF-1	RUBBER ATHLETIC FLOORING (FITNESS ROOM)	RES-1	RESINOUS FLOORING / NON SLIP
RF-2	RUBBER FLOORING		

FINISH NOTES

1	REFERENCE SPECIFICATIONS AND SHEET AF-001 FOR FINISH LEGEND AND SPECIFICATIONS.
2	ALL INTERIOR PARTITIONS AND COLUMNS SHALL BE P-1, U.N.O.
3	RUBBER BASE B-1 SHALL BE USED THROUGHOUT, U.N.O.
4	GENERAL CONTRACTOR TO PREPARE FLOOR AND INSTALL ADHESIVES, FLOORING MATERIALS AND BASE.
5	REFER TO REFLECTED CEILING PLANS FOR EXTENT OF DRYWALL CEILING SHALL BE PAINTED. ALL DRYWALL CEILINGS AND SOFFITS SHALL BE FLAT FINISH.
6	SCHEDULED FLOOR FINISH SHALL CONTINUE UNDER CASEWORK WITH ATTACHED TOE KICKS, EQUIPMENT, AND FREESTANDING FURNITURE.
7	ALL FLOORING TRANSITIONS TO OCCUR AT CENTERLINE OF DOORWAYS, U.N.O.
8	WALL TEXTURE TO BE LEVEL 4 WALL FINISH, U.N.O. CEILING TO BE LEVEL 5 FINISH, U.N.O.
9	REFER TO ELEVATIONS, DETAILS AND FINISH PLANS FOR EXTENT OF ALL FINISH DESIGNATIONS.
10	ALL HM DOORS AND FRAMES TO BE PAINTED P-3 IN A SEMI-GLOSS FINISH, U.N.O.
11	TERMINATE PAINT AT EDGE OF GLASS WHERE APPLICABLE.
12	ALL PARTITIONS IN WET AREAS SHALL BE PAINTED WITH A SEMI-GLOSS FINISH.
13	REPAIR FLOOR TO SMOOTH LEVEL SURFACE BEFORE INSTALLING NEW FLOORING AND MILLWORK. FLOAT FLOOR AS REQUIRED TO ELIMINATE ANY CHANGE IN FINISH ELEVATION BETWEEN ADJACENT MATERIALS.
14	ALL ACCESS PANELS SHALL BE PAINTED WITH ELECTROSTATIC PAINT TO MATCH ADJACENT FINISH.
15	PROVIDE ALUMINUM SCHLUTER STRIP TRANSITION AT ALL FLOORING TYPE TRANSITIONS.

Stantec

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No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376603

OVERALL LEVEL 1 FINISH PLAN

A-701

ADDENDUM 2

ROOM FINISH SCHEDULE

Level	NO	NAME	FLOOR FINISH	FLOOR BASE	WALLS NORTH FINISH	WALLS SOUTH FINISH	WALLS EAST FINISH	WALLS WEST FINISH	CEILING FINISH	CEILING SUBSTRATE
Not Placed										
Not Placed	158	MEZZANINE								
Not Placed	1099	RESTROOM								
Not Placed	1139	JANITOR								
Not Placed	1140	SHOWER								
Not Placed	1140	SHOWER								
Not Placed	1151	MECH & IT								
Not Placed	1152	Room								
MAIN LEVEL										
MAIN LEVEL	1001	TRAINING ROOM	RF-4	B-1	P-1	P-1	P-1	P-5	ACT-2	
MAIN LEVEL	1002	A/V STORAGE	SC-1	B-1	P-1	P-1	P-1	P-1	OTS	
MAIN LEVEL	1003	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1004	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1005	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1007	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1008	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1009	CONF. RM.	RF-4	B-1	P-5	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1010	VEST.	WCPT-1	B-1 @ GYP.BD.	–	P-1	–	–	ACT-1	
MAIN LEVEL	1011	CUSTOMER WAITING	RF-3	B-1	P-1	P-1	–	P-1	ACT-1	
MAIN LEVEL	1012	ADMIN.	RF-3	B-1	P-1	P-1	P-1	–	ACT-1	
MAIN LEVEL	1013	CORRIDOR	RF-3	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1014	KEY ROOM	RF-3	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1015	BREAKROOM	RF-3/RF-4	B-1	P-4	P-1	–	–	ACT-2	
MAIN LEVEL	1017	CORRIDOR	RF-3	B-1	–	–	P-4	P-1	ACT-1	
MAIN LEVEL	1018	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1019	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1020	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1021	STOR.	SC-1	B-1	–	P-1	–	P-1	ACT-1	
MAIN LEVEL	1022	WOMEN'S LKRRR	FT-1	B-2					ACT-3	
MAIN LEVEL	1023	CORRIDOR	PC-1	B-1	–	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1024	MEN'S LKRRR	FT-1	B-2					ACT-3	
MAIN LEVEL	1024A	CLOSET	SC-1	B-1					GB-1	
MAIN LEVEL	1025	PARTS ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1025A	PARTS RECEIVING	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1026	LUBE/COMPRESSOR ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1027	PARTS CLERKS	SC-1	B-1	–	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1028	CORRIDOR	PC-1	B-1	–	–	–	–	ACT-1	
MAIN LEVEL	1029	VEST.	WCPT-1	B-1 @ GYP.BD.	–	P-1	–	–	ACT-1	
MAIN LEVEL	1030	ELECTRICAL CLOSET	SC-1	B-1					GB-1	
MAIN LEVEL	1031	J.C.	SC-1	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1032	SHOWER	FT-1/FT-2	B-2/B-3					GB-1	
MAIN LEVEL	1033	STAIR 2	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1034	STAIR 3	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1036	PORT. EQUIP. STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1037	IT	SC-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1038	FITNESS ROOM	RF-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1039	COMMON WORK AREA	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1040	TOOL CRIB	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1041	CONF. RM.	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1042	PUBLIC WORKS SER. FOREMAN	PC-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1043	CHECK-IN COUNTER	PC-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1044	TIRE STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1045	LIGHT VEHICLE REPAIR BAY 1	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1048	LIGHT VEHICLE REPAIR BAY 2	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1047	LIGHT VEHICLE REPAIR BAY 3	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1048	LIGHT VEHICLE REPAIR BAY 4	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1049	LIGHT VEHICLE REPAIR BAY 5	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1050	LIGHT VEHICLE REPAIR BAY 6	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1051	LIGHT VEHICLE REPAIR BAY 7	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1052	LIGHT VEHICLE REPAIR BAY 8	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1053	TIRE SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1054	FIRE RISER ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1055	LIGHT DUTY MAINTENANCE BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1056	MAIN ELEC ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1057	LIGHT VEHICLE REPAIR BAY 9	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1058	LIGHT VEHICLE REPAIR BAY 10	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1059	LIGHT VEHICLE REPAIR BAY 11	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1060	LIGHT VEHICLE REPAIR BAY 12	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1061	LIGHT VEHICLE REPAIR BAY 13	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1062	LIGHT VEHICLE REPAIR BAY 14	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1063	LIGHT VEHICLE REPAIR BAY 15	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1064	LIGHT VEHICLE REPAIR BAY 16	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1065	WASH BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1069	FUEL TANK	SC-1	–	–	–	–	–	–	
MAIN LEVEL	1075	PORTABLE STORAGE EQUIPMENT	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1076	TIRE SHOP/ STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1077	HEAVY VEHICLE REPAIR BAY 1	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1078	HEAVY VEHICLE REPAIR BAY 2	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1079	HEAVY VEHICLE REPAIR BAY 3	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1080	HEAVY VEHICLE BAY 4 REPAIR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1081	HEAVY VEHICLE BAY 5 REPAIR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1082	HEAVY VEHICLE REPAIR BAY 6	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1083	FIRE REPAIR BAY 7	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1084	HEAVY VEHICLE REPAIR BAYS	PC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1085	TOOL BOX STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1086	COMMON WORK AREA	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1087	HEAVY VEHICLE BAY 8 REPAIR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1088	HEAVY VEHICLE BAY 9 REPAIR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1089	HEAVY VEHICLE BAY 10 REPAIR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1090	HEAVY VEHICLE REPAIR BAY 11	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1091	HEAVY VEHICLE REPAIR BAY 12	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1092	FIRE REPAIR BAY 13	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1093	FIRE REPAIR BAY 14	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1095	CHASSIS WASH	RES-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1096	FABRICATION BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1097	MASK & BREATHABLE AIR BOTTLE STOR. RM.	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1098	MASK SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1099	R.R.	PC-1	B-2					ACT-3	
MAIN LEVEL	1100	PAINT BOOTH	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1101	BODY SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1102	STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1103	DECAL ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1110	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1111	WORK STATION	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1112	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1113	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1114	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1115	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1116	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1117	WORK STATION	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1118	INSTALL BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1119	INSTALL BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1120	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1121	CONF. RM.	RF-4	B-1	P-1	–	–	P-1	ACT-2	
MAIN LEVEL	1122	VEST.	WCPT-1	B-1 @ GYP.BD.	–	–	P-1	P-1	ACT-1	
MAIN LEVEL	1123	CUSTOMER WAITING	RF-3/RF-4	B-1	P-1	–	P-1	P-1	ACT-1	
MAIN LEVEL	1124	RESTROOM	FT-1	B-2					ACT-3	
MAIN LEVEL	1125	CORRIDOR	RF-2	B-1	–	–	–	–	ACT-1	
MAIN LEVEL	1126	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1127	TECH	ESD-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1128	TECH	ESD-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1129	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1130	WORK STATION	ESD-1	B-1	–	–	–	–	ACT-2	

ROOM FINISH SCHEDULE

Level	NO	NAME	FLOOR FINISH	FLOOR BASE	WALLS NORTH FINISH	WALLS SOUTH FINISH	WALLS EAST FINISH	WALLS WEST FINISH	CEILING FINISH	CEILING SUBSTRATE
MAIN LEVEL	1131	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1132	SUPER.	ESD-1	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1133	TECH	ESD-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1134	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1135	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1136	WALKWAY	PC-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1137	MENS LKRRR	FT-1/FT-2	B-2/B-3					ACT-3	
MAIN LEVEL	1138	ADMIN.	PC-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1140	JAN.	SC-1	B-1	P-1	P-1	P-1	P-1	GB-1	
MAIN LEVEL	1141	WOMEN'S LKRRR	FT-1/FT-2	B-2/B-3					ACT-3	
MAIN LEVEL	1142	KIT.	PC-1	B-1		P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1143	IT	SC-1	B-1	P-1	P-1	P-1	P-1		
MAIN LEVEL	1144	PARTS STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1145	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1146	SERVICE BAYS	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1145A	JAN.	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1147	SERVICE BAYS	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1148	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1150	STORAGE BUILDING	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE RADIO LEVEL										
MEZZANINE RADIO LEVEL	2007	MECHANICAL MEZZANINE	SC-1	B-1	–	–	P-1	P-1	OTS	
MEZZANINE MAIN LEVEL										
MEZZANINE MAIN LEVEL	2001	PARTS MEZZANINE	SC-1	B-1						
MEZZANINE MAIN LEVEL	2002	LIGHT DUTY MEZZANINE	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2003	MECHANICAL MEZZANINE	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2004	IT	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2006	MECH MEZZANINE								
MECH MEZZ 3										
MECH MEZZ 3	2005	MECHANICAL MEZZANINE	SC-1	B-1						

GENERAL NOTES

1. CEILING HEIGHT INDICATED ON RCP SHEETS

GENERAL FINISHES

MARKER BOARD							
MARKER BOARD	MB-1	CLARIDGE	MARKER BOARD	CLARIGOE	ANODIZED ALUM TRIM	WHITE	TBD
PAINT							
PAINT	P-1	SHERWIN WILLIAMS		FIELD PAINT	LATEX EGGSHELL	SW 7663 MOMORAL SILVER	
PAINT	P-2	SHERWIN WILLIAMS		BAYS/WASH FIELD PAINT/CEILING PAINT	SEE SPECS	SW 7005 PURE WHITE	
PAINT	P-3	SHERWIN WILLIAMS		HOLLOW METAL DOORS/FRAMES PAINT	LATEX EGGSHELL	SW 7074 SOFTWARE	
PAINT	P-4	SHERWIN WILLIAMS		ACCENT PAINT	LATEX EGGSHELL	SW 6774 FRESHWATER	
PAINT	P-5	SHERWIN WILLIAMS		ACCENT PAINT	LATEX EGGSHELL	SW 6495 GREAT FALLS	
PLASTIC LAMINATE							
PLASTIC LAMINATE	PL-1	WILSONART	PLASTIC LAMINATE		MATTE	MUSHROOM 5013K-19	SEE SPECIFICATION
PLASTIC LAMINATE	PL-2	WILSONART	PLASTIC LAMINATE		MATTE/LINEARITY	SATIN STAINLESS 4830K-18	SEE SPECIFICATION / AEON SCRATCH RESISTANCE
ROLLER SHADE							
ROLLER SHADE	RS-1	MECHOSHADE	ROLLER SHADES	MANUAL SHADES / E OR ELECTRIC	ANODIZED ALUMINUM	TBD	SEE SPECIFICATION
SOLID SURFACE							
SOLID SURFACE	SS-1	DALTILE	SOLID SURFACE, ONE QUARTZ SURFACES	QUARTZ	POLISHED	SIMPLY WHITE N076	3 CM SLAB
SOLID SURFACE	SS-2	CORIAN TERRA COLLECTION	SOLID SURFACE	SOLID SURFACE	SATIN	DOVE	
TILE							
TILE	WT-1	CROSSVILLE	PORCELAIN WALL TILE	WALL TILE	SATIN	COLOR: LEADEN RET07 UPS ; RETRO ACTIVE 2.0	6" X 12" / INSTALL 1/3 JOINT; GROUT; CUSTOM BUILDING PRODUCTS, COLOR: 335 WINTER GRAY
TILE	WT-2	CROSSVILLE	PORCELAIN WALL TILE	WALL TILE	SATIN	FLORIM USA, SERIES: LAYERS, COLOR: SEDIMENT	2" X 2" MOSAIC / INSTALL HORIZONTAL RUNNING BOND; GROUT: CUSTOM BUILDING PRODUCTS, COLOR:335 WINTER GRAY
TILE	WT-3	DALTILE	GLASS WALL TILE	GLASS WALL TILE	GLOSSY	CW01 ICE WHITE ; COLOR WAVE	2" X 12" / INSTALL STRAIGHT STACK, GROUT: CUSTOM BUILDING PRODUCTS, COLOR: 381 BRIGHT WHITE
WALL BASE							
WALL BASE	B-1	JOHNSONITE	RUBBER WALL BASE	WALL BASE		TAM GATEWAY WG	4" H ROLL GOODS
WALL BASE	B-2	CROSSVILLE	WALL TILE	COVE BASE	SATIN	COLOR: LEADEN RET07 UPS ; RETRO ACTIVE 2.0	6" X 12" COVE
WALL BASE	B-3	CROSSVILLE	WALL TILE	COVE BASE	SATIN	FLORIM USA, SERIES: LAYERS, COLOR: SEDIMENT	2" X 2" MOSAIC

FLOOR MATERIALS

Asphalt							
ESD-1	JULIE INDUSTRIES, INC	STATIC SMART DISCOVERY ECO	LEVEL 3 MOHSD SERIES CARPET TILE		GALILEO	24" x 24"	INSTALLATION PER MANUF.
FT-1	DALTILE	FLOOR TILE	PORCELAIN FLOOR TILE - TORNEON TN9912241P6	MATTE	TN99 COAL	12" X 24"	INSTALLATION 1/3 OFF JOINT GROUT: CUSTOM BUILDING PRODUCTS 335 WINTER GRAY
FT-2	CROSSVILLE	FLOOR TILE	PORCELAIN FLOOR TILE - FLORIM USA SERIES: LAYERS	UNPOLISHED- MATTE V3		2" X 2" MOSAIC MESH-MOUNTED	GROUT: CUSTOM BUILDING PRODUCTS 335 WINTER GRAY
Paint - Safety Yellow			PT-6				
RC-1	RETROPLATE SYSTEM	POLISHED CONCRETE	POLISHED NATURAL CONCRETE	800 GRIT			
RES-1	SEE SPECS	RESINOUS FLOORING	RESINOUS FLOORING / NON SLIP	MATTE, NON-SLIP			
RST-1	JOHNSONITE	RUBBER STAIR TREADS	RUBBER STAIR TREADS		LB9 RAINSTORM	24" X 24" SQUARE EDGE TILES	
RF-2	NORA SYSTEMS, INC	NORAMENT GRANO	RUBBER FLOORING TILE		5320 SASSAFRAS	39.53" X 39.53", 3.5 MM THICKNESS	
RF-3	NORA SYSTEMS, INC	NORAMENT GRANO	RUBBER FLOORING TILE		5303 FRANKINCENSE	39.53" X 39.53", 3.5 MM THICKNESS	
RF-4	NORA SYSTEMS, INC	NORAMENT GRANO	RUBBER FLOORING TILE		5304 BLACK PEPPER	39.53" X 39.53", 3.5 MM THICKNESS	
SC-1	SEE SPECS	SEALED CONCRETE					
Site - Planting			Landscaped Area				
Stone (2)							
WCPT-1	MOHAWK GROUP	STEP UP II	WALKOFF CARPET		955 COBALT	24" x 24"	INSTALLATION VERTICAL ASHLAR

CEILING MATERIALS

ACT-1	ARMSTRONG	ULTIMA - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 95113 ACOUSTICAL PANEL CEILINGS
ACT-2	ARMSTRONG	OPTIMA - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 95113 ACOUSTICAL PANEL CEILINGS
ACT-3	ARMSTRONG	ULTIMA HEALTH ZONE - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 95113 ACOUSTICAL PANEL CEILINGS
NS-3 Lemon						

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571 280 7978 t

CITY OF MADISON
NAKOOSA TRAIL
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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
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	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/01/2019

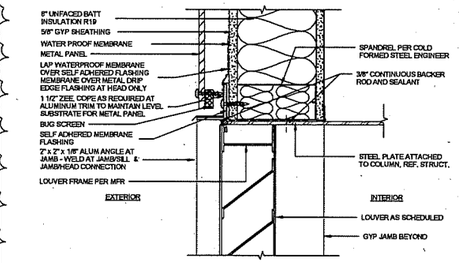
PROJECT No: 375603

INTERIORS FINISH SCHEDULE & LEGENDS

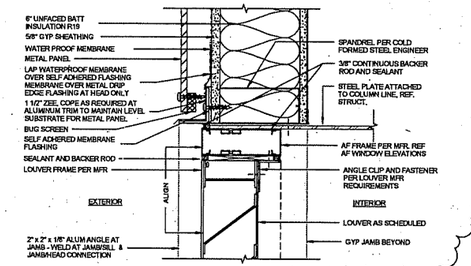
A-700

AT ADDM 2

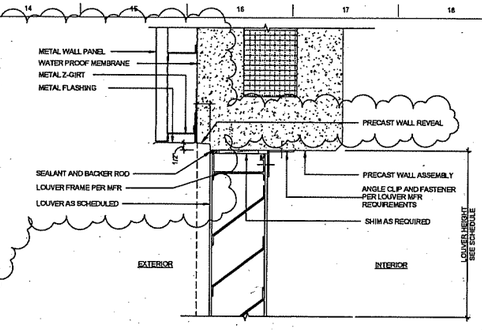
LOUVER SCHEDULE				
Mark	No.	Type Mark	Type	Size
WL-2	2	MAU-B1 EA	EA MAU-B1	84" W x 108" H
WL-3	3	MAU-C1 OA	OA MAU-C1	108" W x 99" H
WL-4	4	MAU-B2 EA	EA MAU-B2	84" W x 108" H
WL-5	5	MAU-C2 EA	EA MAU-C2	109" W x 96" H
WL-6	6	CNG HVM	CNG EF HVM	76" W x 96" H
WL-7	7	MAU-C2 OA	OA MAU-C2	192" W x 96" H
WL-8	8	MAU-D1 EA	EA MAU-D1	133" W x 90" H
WL-9	9	MAU-D1 OA	OA MAU-D1	96" W x 96" H
WL-11	11	CNG RADIO INSTALL	CNG EF Radio Install	110" W x 72" H
WL-12	12	MAU-E1-1 EA	EA MAU-E1-1	185" W x 72" H
WL-13	13	MAU-E1-2 EA	EA MAU-E1-2	188" W x 72" H
WL-14	14	CNG RADIO SERVICE	CNG EF Radio Service	109" W x 72" H
WL-15	15	MAU-C1 EA	EA MAU-C1	108" W x 120" H
WL-16	16	MAU-B1 OA	OA MAU-B1	132" W x 115" H
WL-17	17	VE-LVM	VE-LVM	48" W x 36" H
WL-18	18	VE-HVM-S	VE-HVM-S	54" W x 36" H
WL-19	19	VE-HVM-N	VE-HVM-N	54" W x 36" H
WL-21	21	MAU-B2 OA	OA MAU-B2	216" W x 84" H
WL-24	24	EA LUBE	EA LUBE	72" W x 32" H
WL-25	25	EA PARTS	EA PARTS	36" W x 32" H
WL-26	26	OA PAINT	OA Paint Booth	168" W x 54" H
WL-30	30	AHU-A2 OA	OA AHU-A2	66" W x 36" H
WL-31	31	AHU-A1 OA	OA AHU-A1	90" W x 72" H
WL-32	32	MAU-E1_AHU-E1 OA	OA MAU-E1_AHU-E1	417" W x 72" H
WL-33	33	AHU-A1 EA_RA	EA_RA AHU-A1	60" W x 72" H



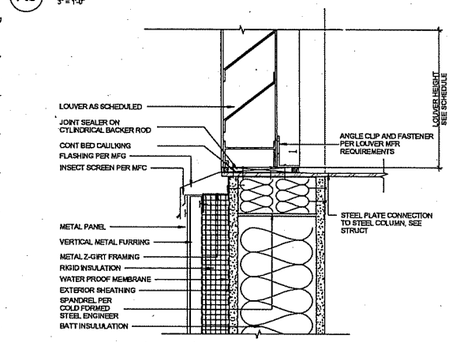
K5 LOUVER HEAD AT MTL PANEL WALL
3" = 1'-0"



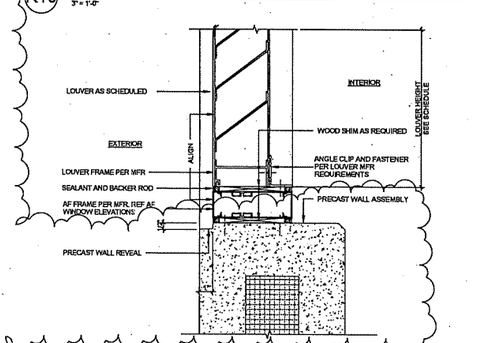
K10 LOUVER HEAD IN AF GLAZING
3" = 1'-0"



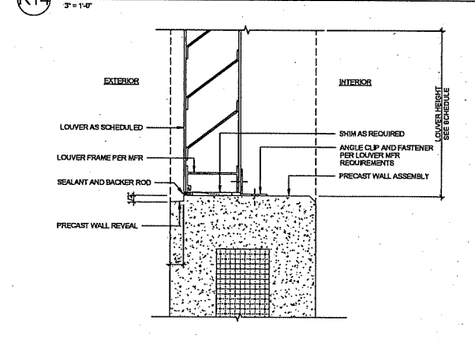
K14 LOUVER HEAD AT PRECAST
3" = 1'-0"



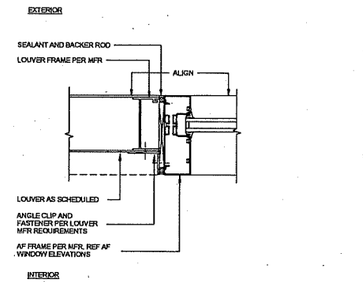
H5 LOUVER SILL DETAIL AT MTL PANEL WALL
3" = 1'-0"



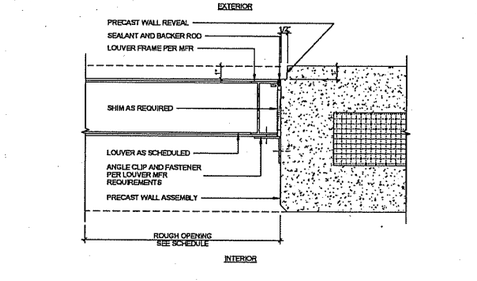
H10 LOUVER SILL AT IN AF GLAZING
3" = 1'-0"



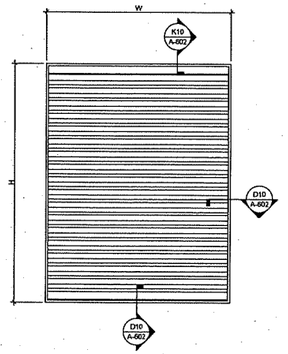
H14 LOUVER SILL AT PRECAST
3" = 1'-0"



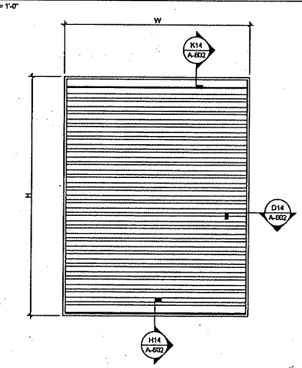
D10 LOUVER JAMB IN AF GLAZING
3" = 1'-0"



D14 LOUVER JAMB AT PRECAST
3" = 1'-0"



A10 TYP LOUVER IN AF GLAZING
1/2" = 1'-0"



A14 TYP LOUVER AT PRECAST
1/2" = 1'-0"

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1600 WILSON BLVD.
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571 280 7979 t

ADDENDUM 2

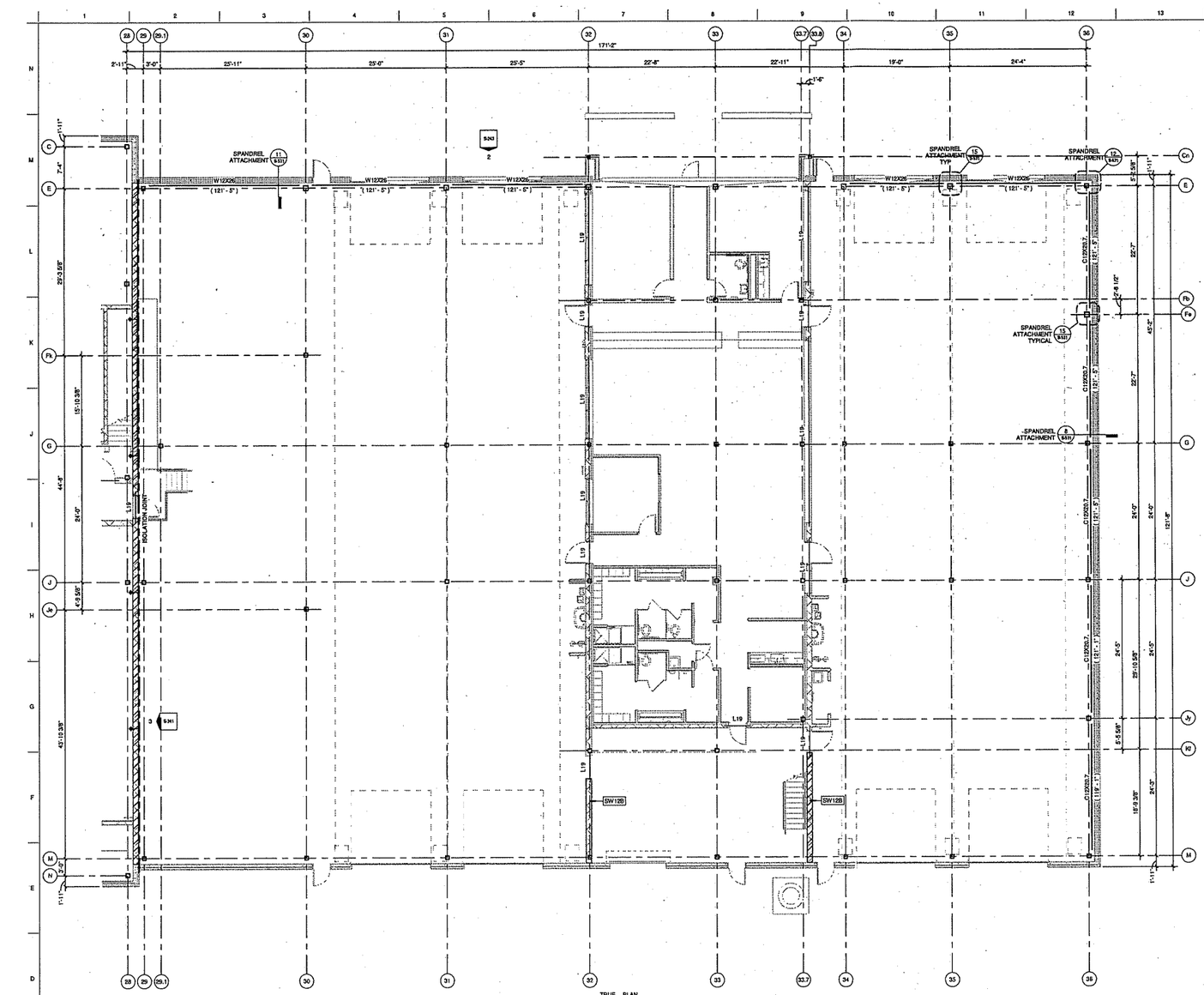
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FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 376803

LOUVER SCHEDULE & DETAILS

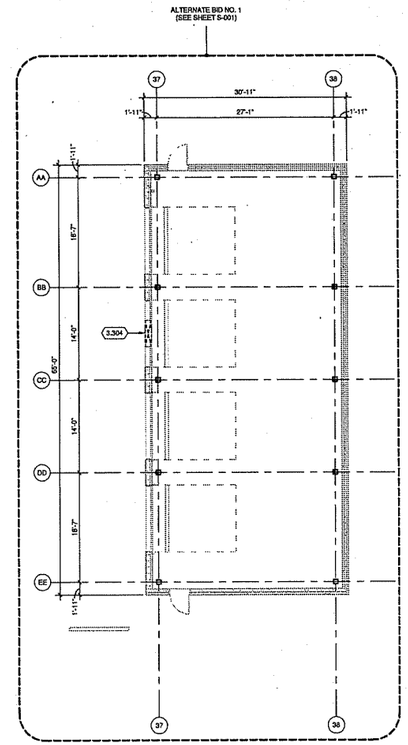
A-602



TRUE NORTH PLAN NORTH

1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA E

1/8" = 1'-0"

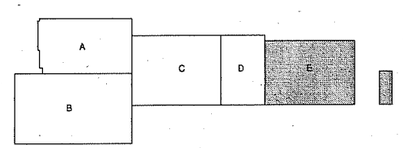


KEYED NOTES

3.304 PRECAST SUPPLIER PROVIDE 1'-0" HIGH X 4'-0 WIDE OPENING IN PRECAST WALL PANEL BELOW FLOOR LEVEL FOR ELECTRICAL/TECHNOLOGY CONDUIT BANK. COORDINATE EXACT SIZE AND LOCATION WITH ELECTRICAL/TECHNOLOGY.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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phone: 608-273-6380
meadhunt.com

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FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

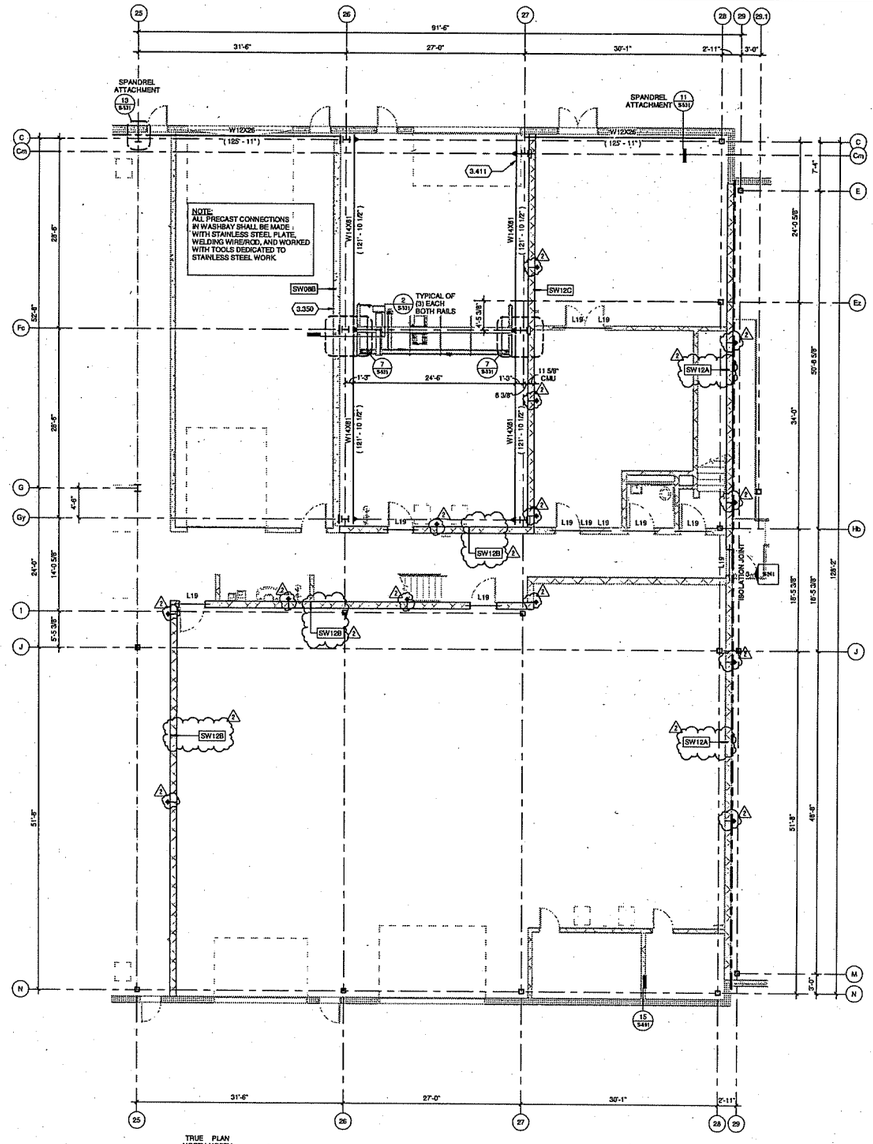
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-160264.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA E

S-131E

ADDE. NO 2



LEVEL 1 STRUCTURAL FLOOR PLAN AREA D

1/8" = 1'-0"

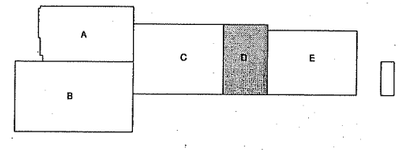
KEYED NOTES

3.350 PRECAST WALL FROM ELEVATION 99'-4" TO ELEVATION 119'-6". MASONRY WALL SW08 FROM TOP OF PRECAST PLANK AT ELEVATION 120'-6" TO ROOF DECK.

3.411 OVERHEAD DOOR WILL TURN BACK ABOVE CRANE ENVELOPE. COORDINATE CRANE STOP LOCATION TO ENSURE CRANE DOES NOT HIT ANY PART OF THE DOOR ASSEMBLY. DOOR MUST BE ALLOWED TO OPEN AND CLOSE WITHOUT ANY CONTACT TO CRANE.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

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7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ⊕ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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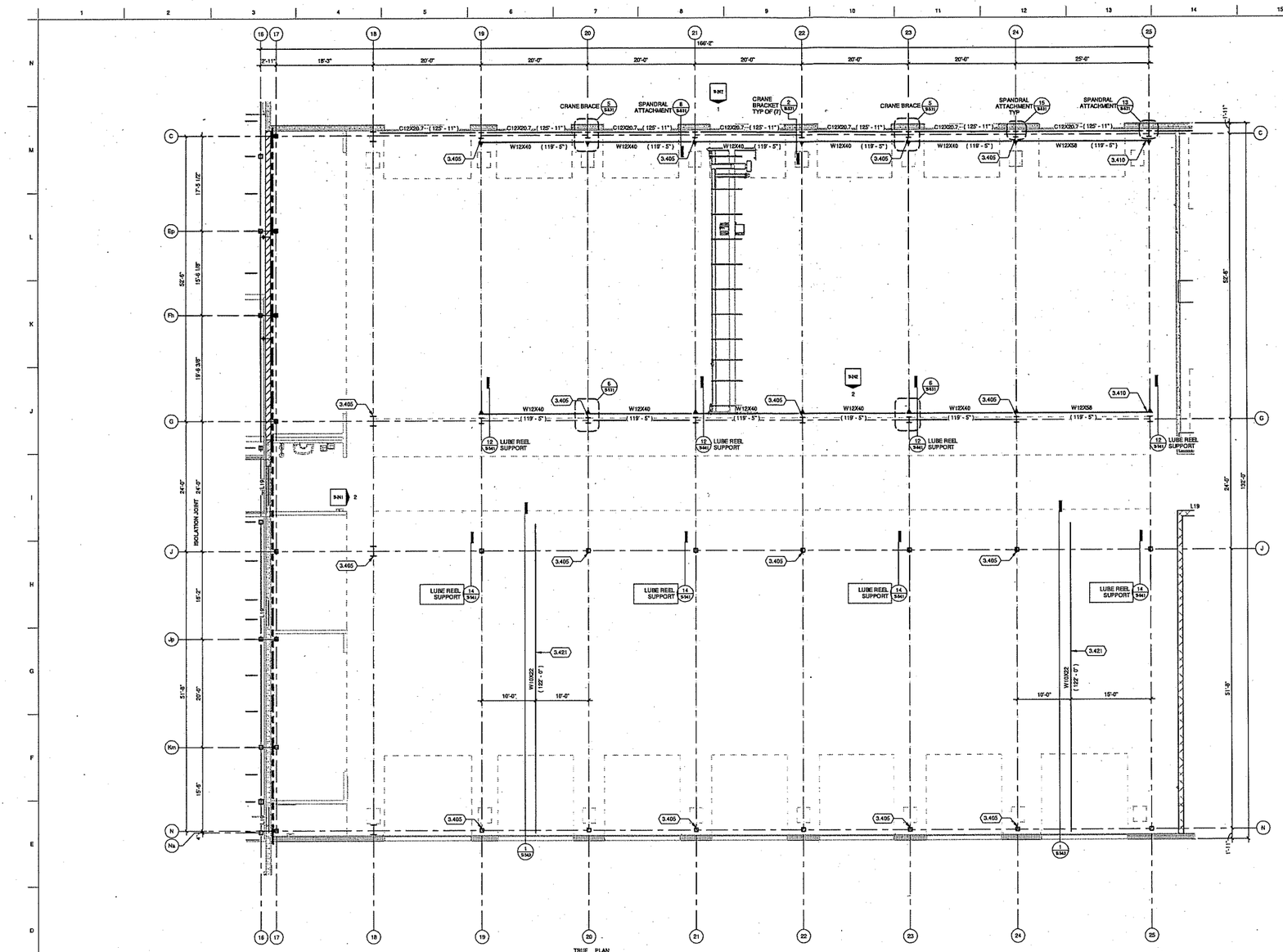
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PROJECT No: 1303500-160264.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA D

S-131D



TRUE NORTH PLAN NORTH

1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA C

1/8" = 1'-0"

KEYED NOTES

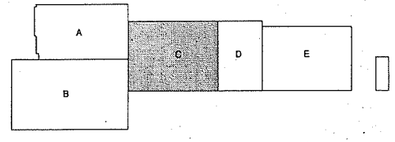
3.405 PROVIDE 3/8" THICK PLATE WELDED TO COLUMN FOR SUPPORT OF EXHAUST HOSE. COORDINATE SIZE OF PLATE AND HOLE PATTERN WITH EQUIPMENT SUPPLIED. (SEE DETAIL 2/G-501)

3.410 COORDINATE CRANE STOP WITH MECHANICAL TO ENSURE CRANE DOES NOT HIT DUCTWORK.

3.421 FALL PROTECTION SUPPORT BEAM, SEE DETAIL 1/S-543.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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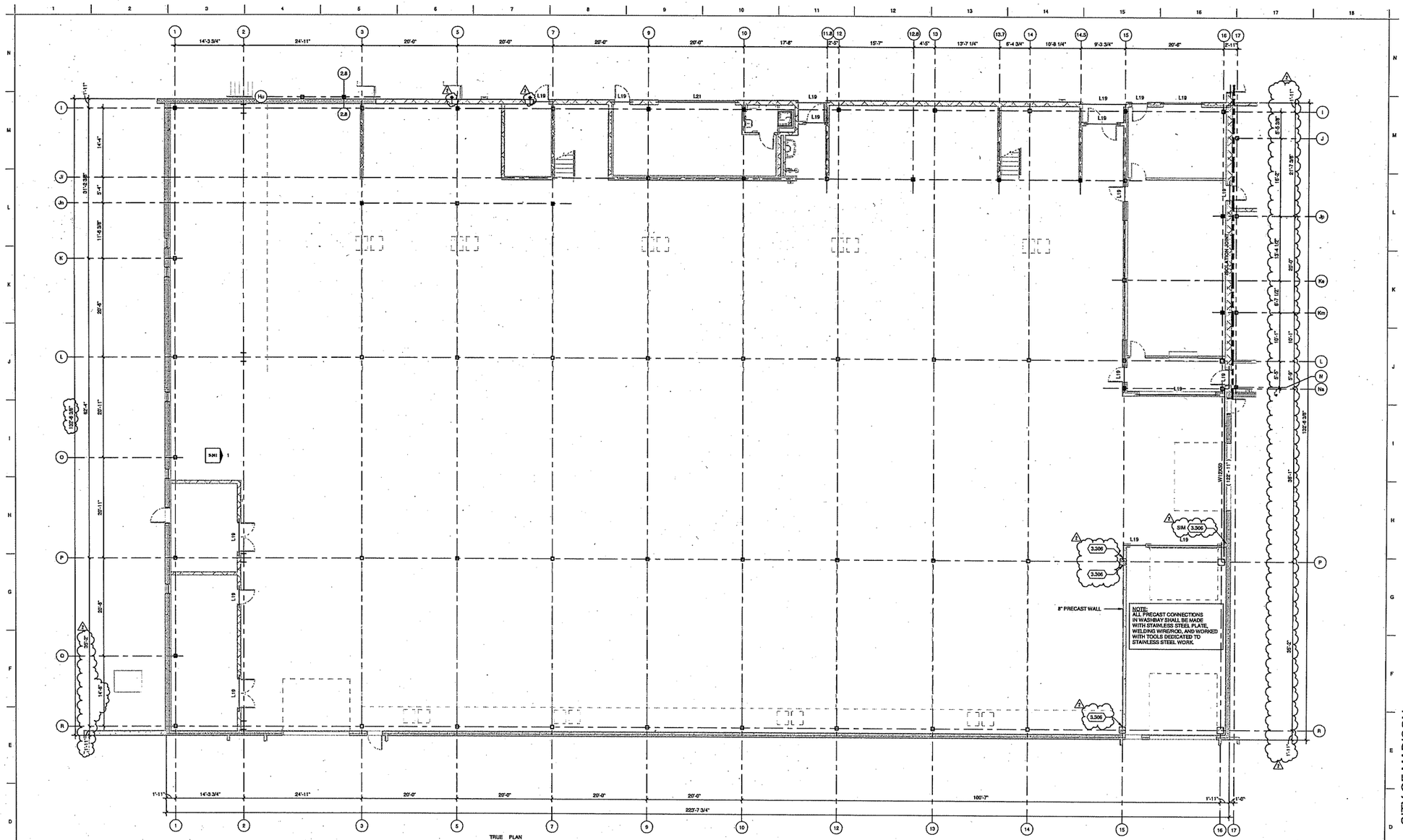
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PROJECT No: 1303500-160064.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA C

S-131C

ADD. NUM 2



LEVEL 1 STRUCTURAL FLOOR PLAN AREA B

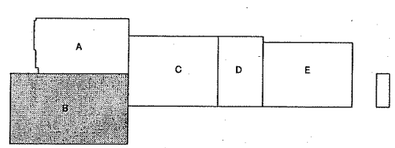
1/8" = 1'-0"

KEYED NOTES

3.306 CONNECTION OF PRECAST WALL TO PRECAST COLUMN BY PRECAST DESIGNER.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
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14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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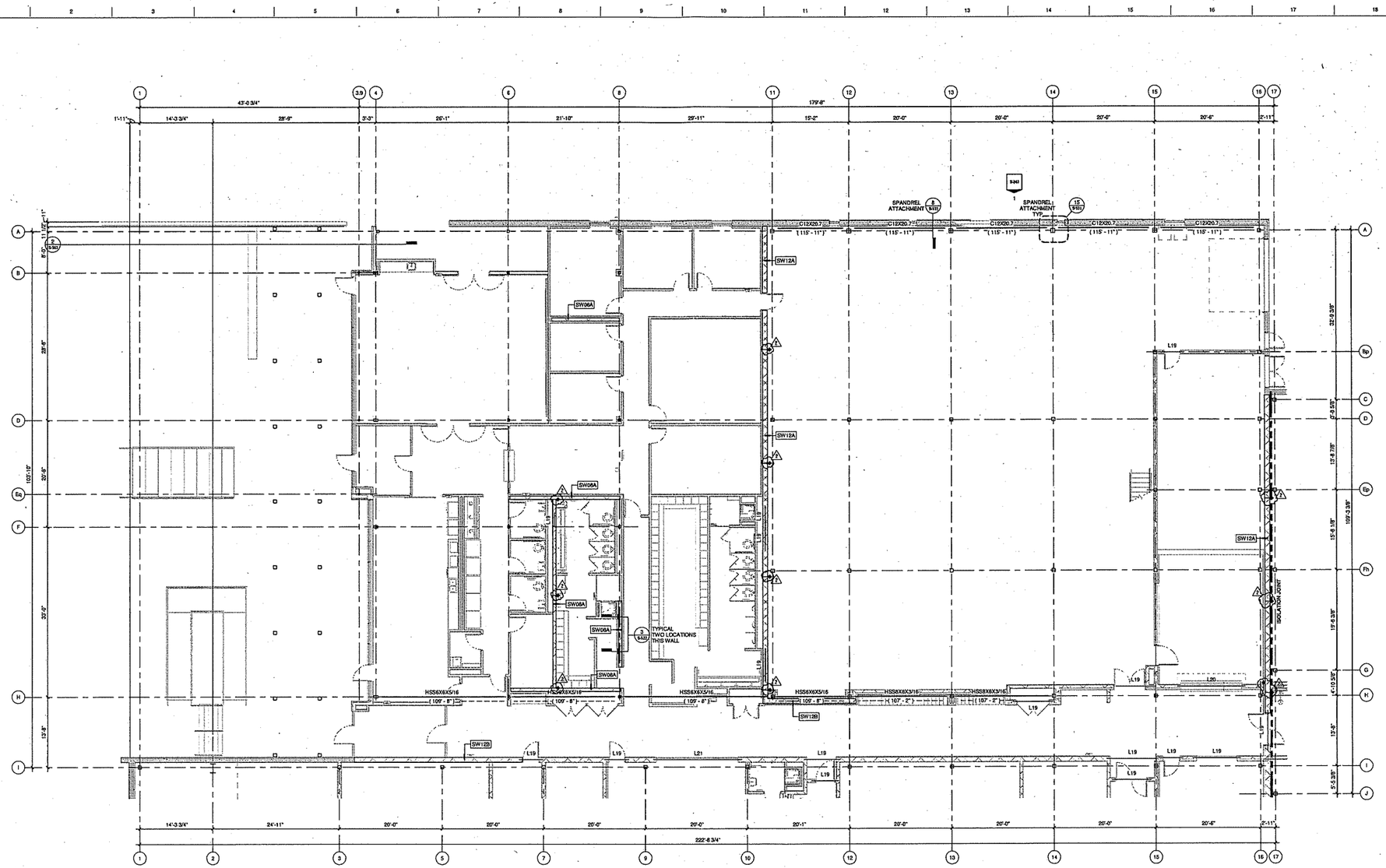
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LEVEL 1 STRUCTURAL FLOOR PLAN AREA B

S-131B



TRUE NORTH PLAN NORTH

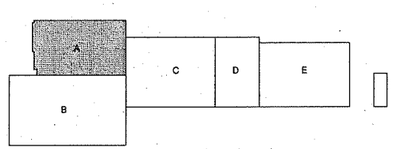
1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
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14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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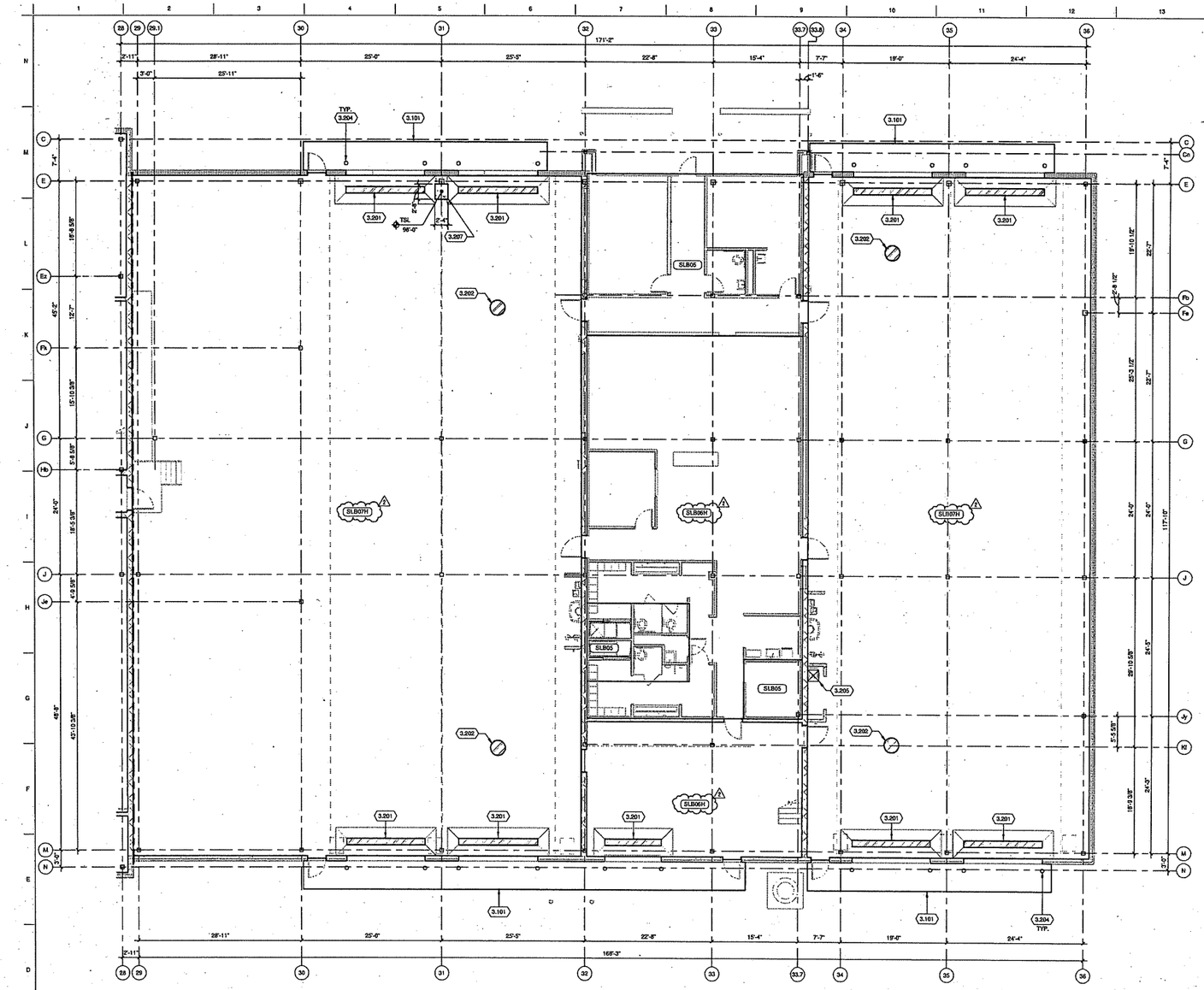
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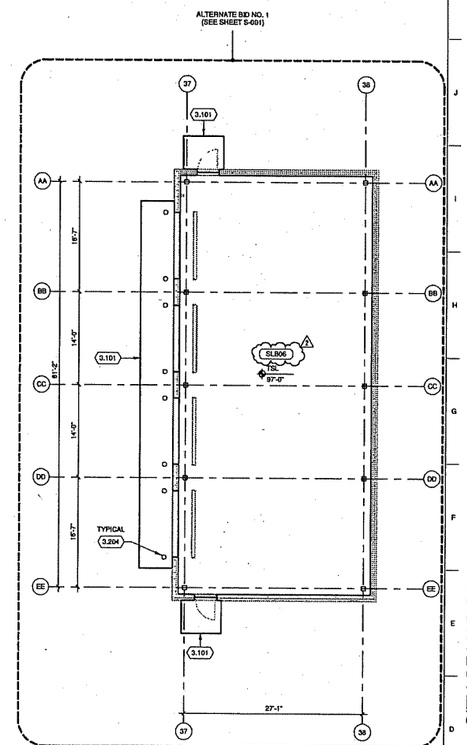
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LEVEL 1 STRUCTURAL FLOOR PLAN AREA A

S-131A

ADDENDUM 2





TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA E

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

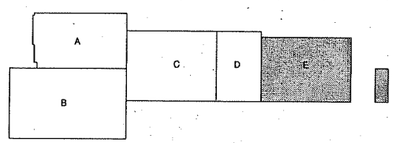
3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-0" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.207 GROUND LEVEL EQUIPMENT PAD, SIMILAR TO DETAIL 8/S-511, ANCHOR PAD TO MAIN SLAB ON ONE SIDE OF CONTROL JOINT ONLY. INSTALL TWO LAYERS OF TAR PAPER BETWEEN MAIN SLAB AND PAD. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-511 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO DETAIL 1/S-511 FOR STRUCTURAL SLAB TYPES.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES= = =INDICATE (2) ADDITIONAL #4 BARS (5'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.



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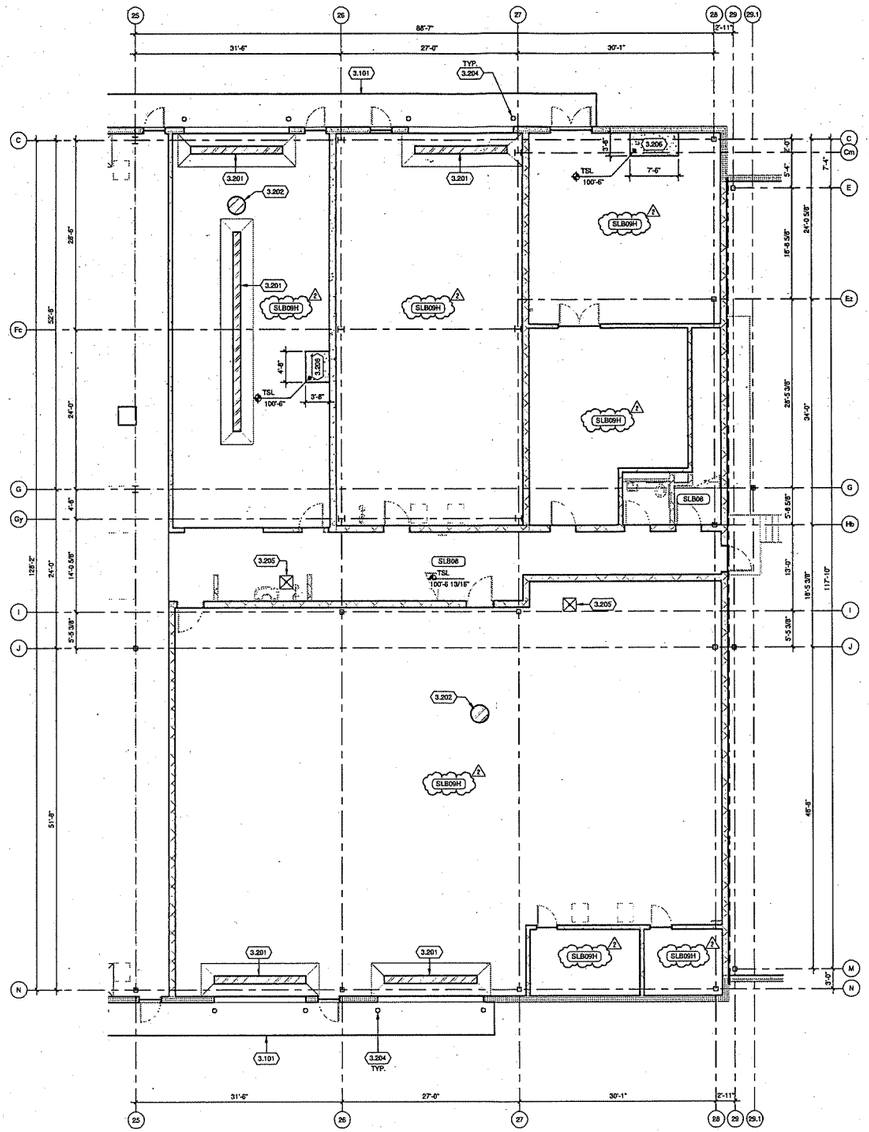
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FLATWORK PLAN AREA E

S-111E



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA D

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

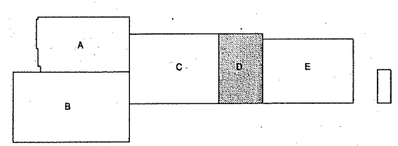
3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-0" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN R/M ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD. SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES= = =INDICATE (2) ADDITIONAL #4 BARS (2'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.



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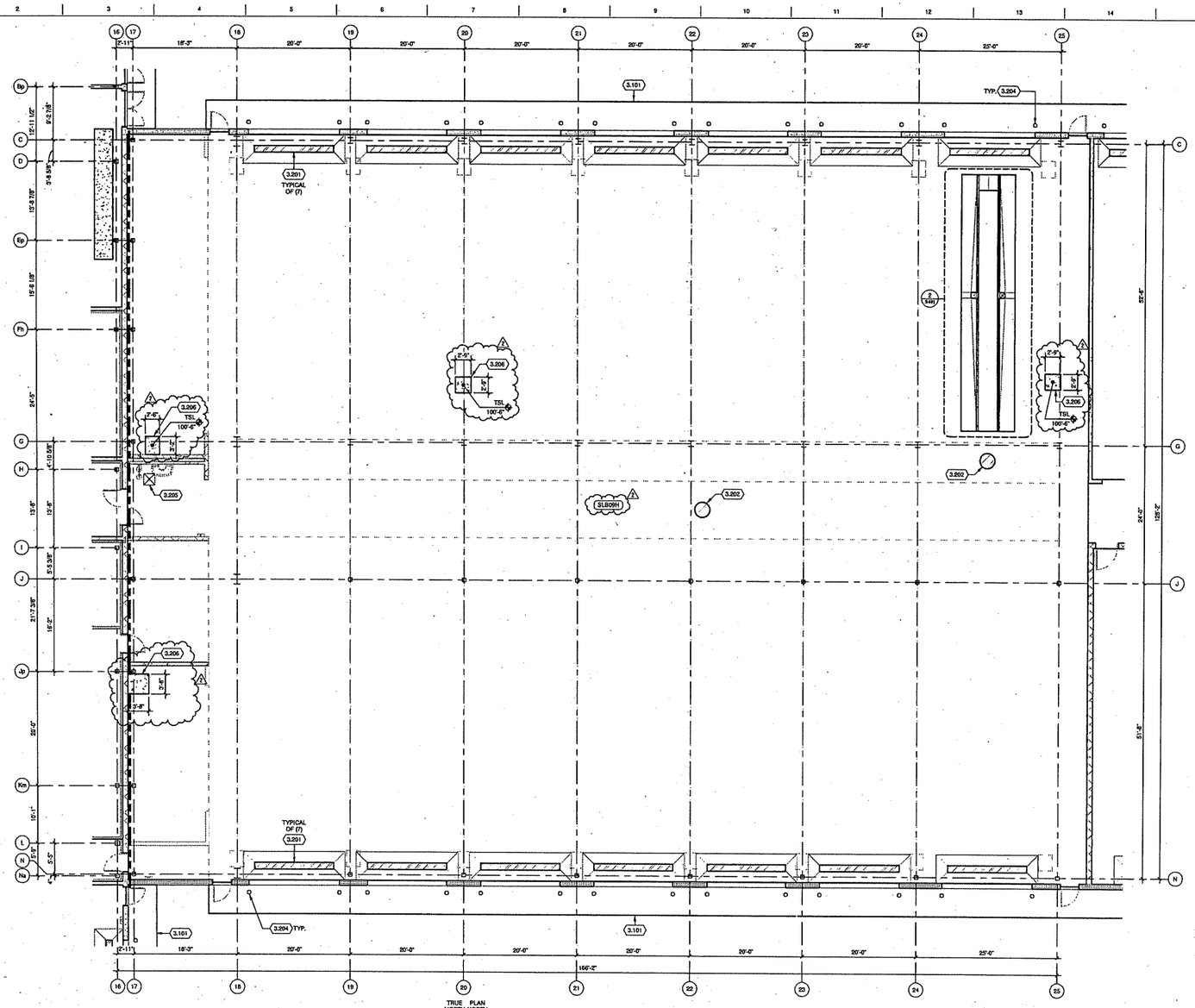
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FLATWORK PLAN AREA D

S-111D

ADDENDUM 2

ADDENDUM 2



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA C

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

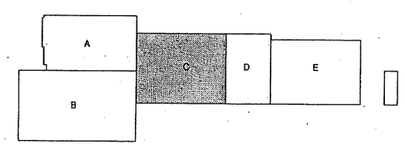
3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-6" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES= = =INDICATE (2) ADDITIONAL #4 BARS (5'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.



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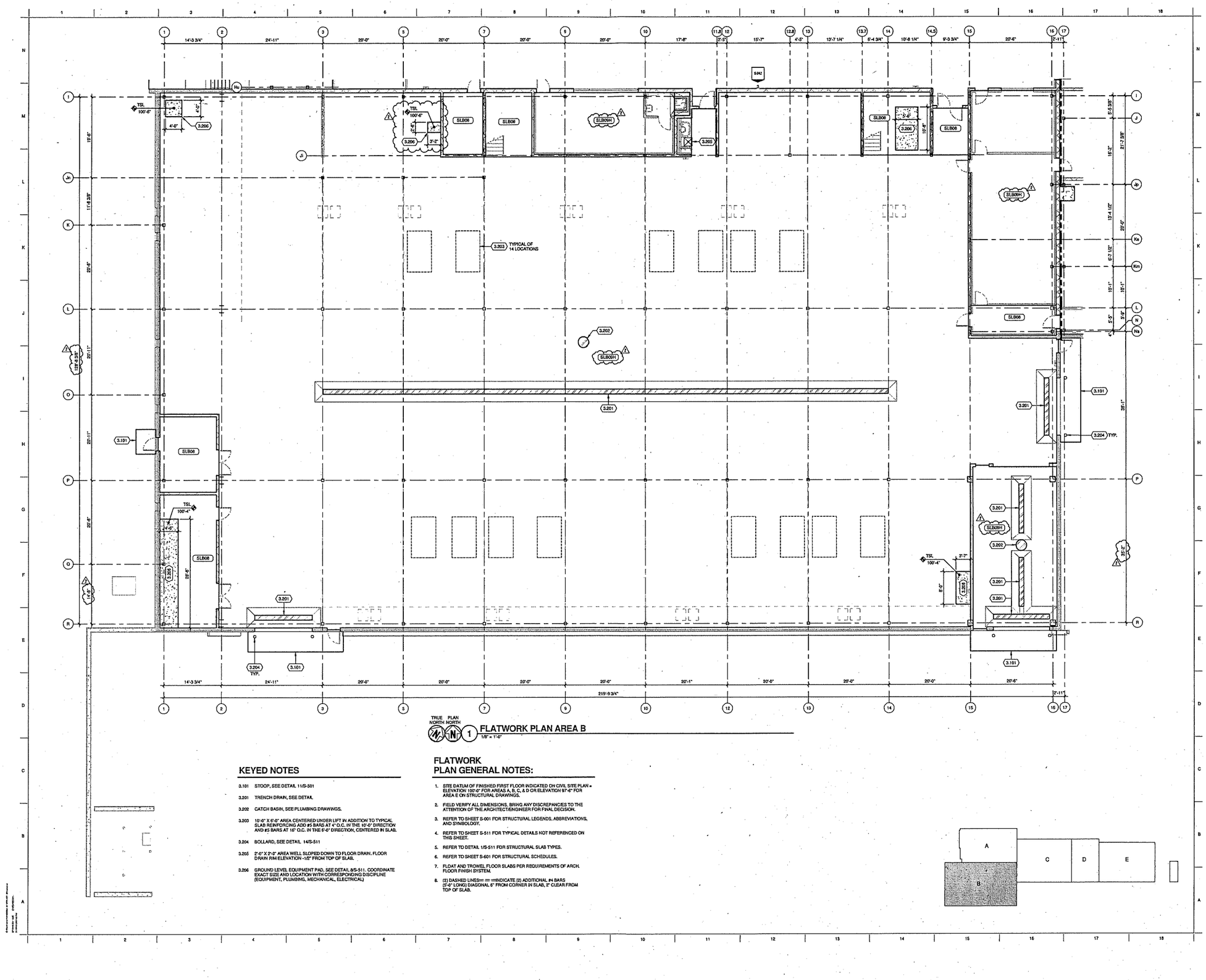
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PROJECT No: 13003500-160264.01

FLATWORK PLAN AREA C

S-111C



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL.

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

3.203 10'-6" X 6'-0" AREA CENTERED UNDER LIFT IN ADDITION TO TYPICAL SLAB REINFORCING ADD #5 BARS AT 4" O.C. IN THE 10'-0" DIRECTION AND #5 BARS AT 16" O.C. IN THE 6'-0" DIRECTION, CENTERED IN SLAB.

3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-0" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-511 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO DETAIL 1/S-511 FOR STRUCTURAL SLAB TYPES.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES== == ==INDICATE (2) ADDITIONAL #4 BARS (5'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.

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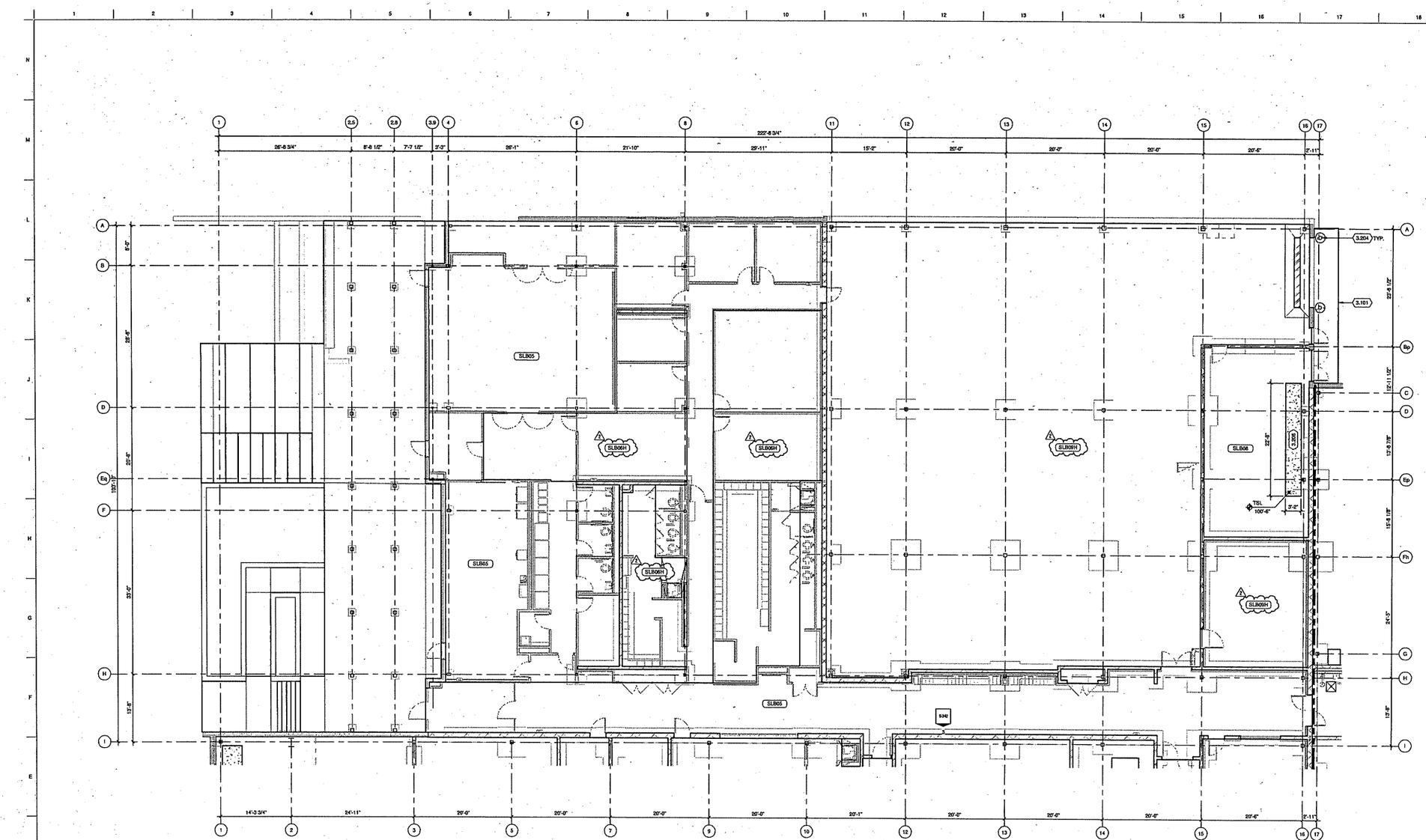
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PROJECT No: 13003500-160204.01

FLATWORK PLAN AREA B

S-111B



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA A
1/8" = 1'-0"

KEYED NOTES

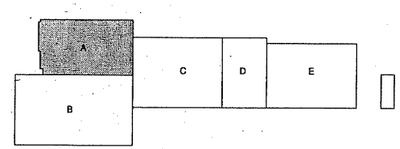
3.101 STOOP, SEE DETAIL 11/S-501

3.204 BOLLARD, SEE DETAIL 14/S-511

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-511 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO DETAIL 1/S-511 FOR STRUCTURAL SLAB TYPES.
6. REFER TO SHEET S-501 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES= = =INDICATE (2) ADDITIONAL #4 BARS (2'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.



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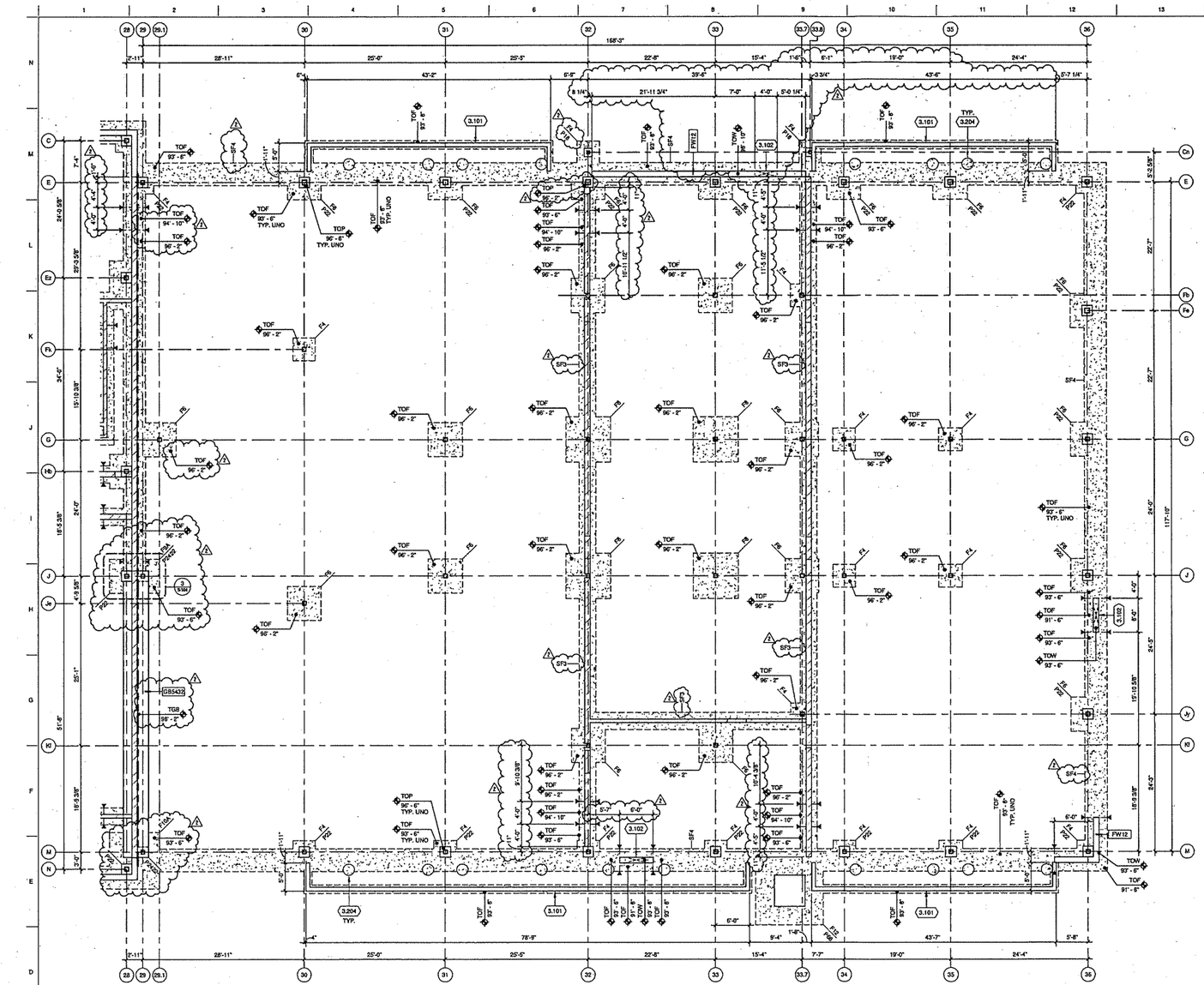
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PROJECT No: 1303500-160264.01

FLATWORK PLAN AREA A

S-111A

ADDENDUM 2



TRUE NORTH PLAN NORTH

1 FOUNDATION PLAN AREA E

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

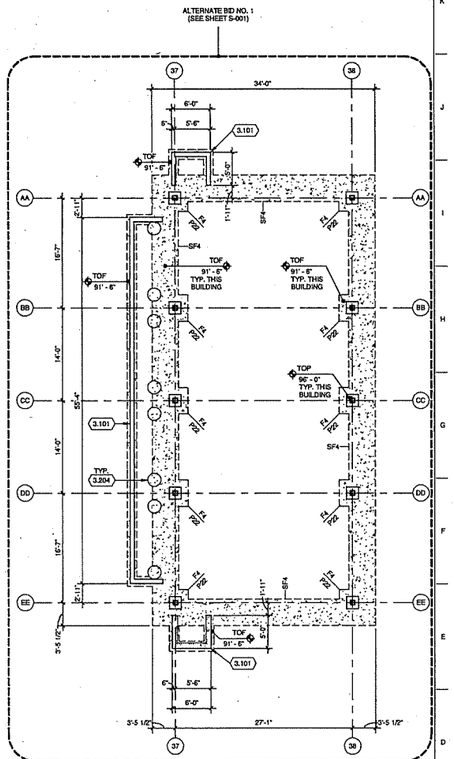
3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

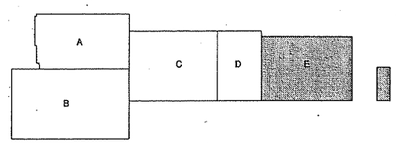
3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.

ALTERNATE BID NO. 1
(SEE SHEET S-001)





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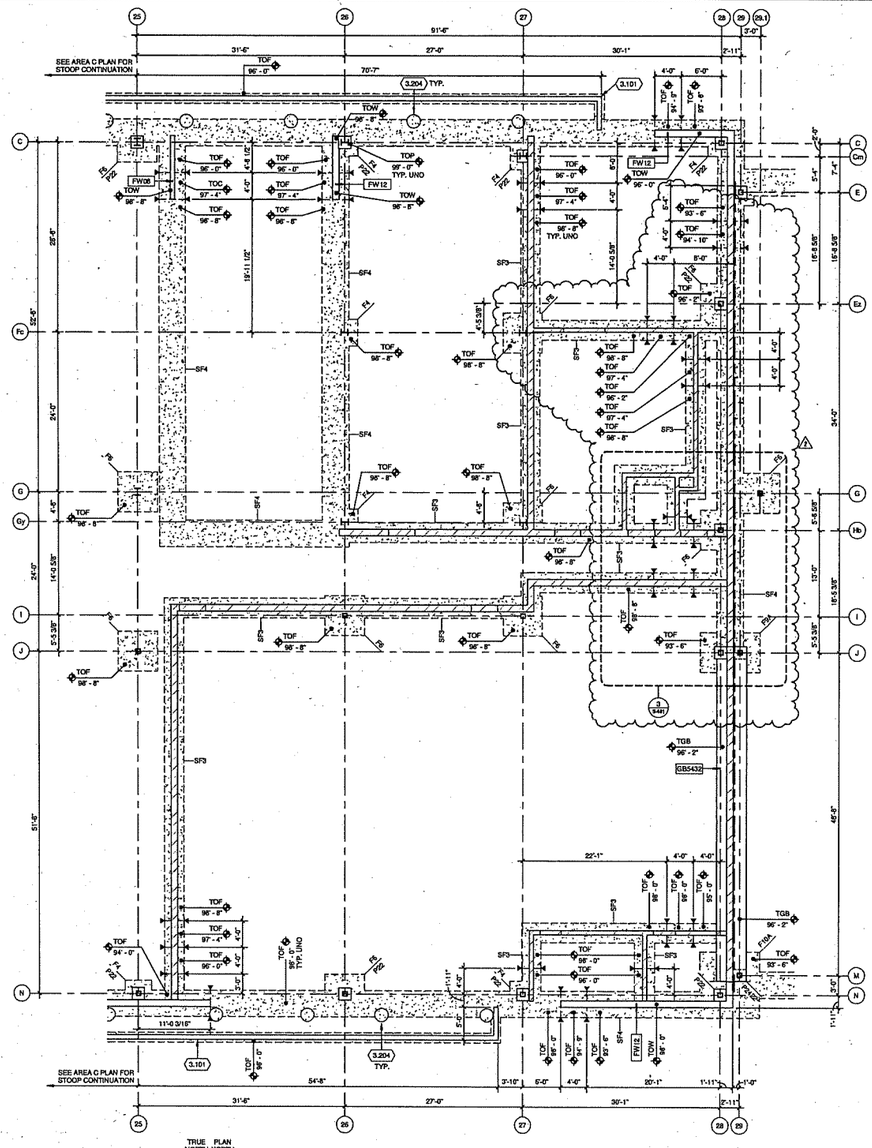
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FOUNDATION PLAN AREA E

S-101E



1 FOUNDATION PLAN AREA D

1/8" = 1'-0"

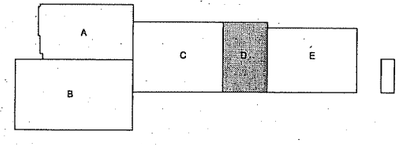
KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.



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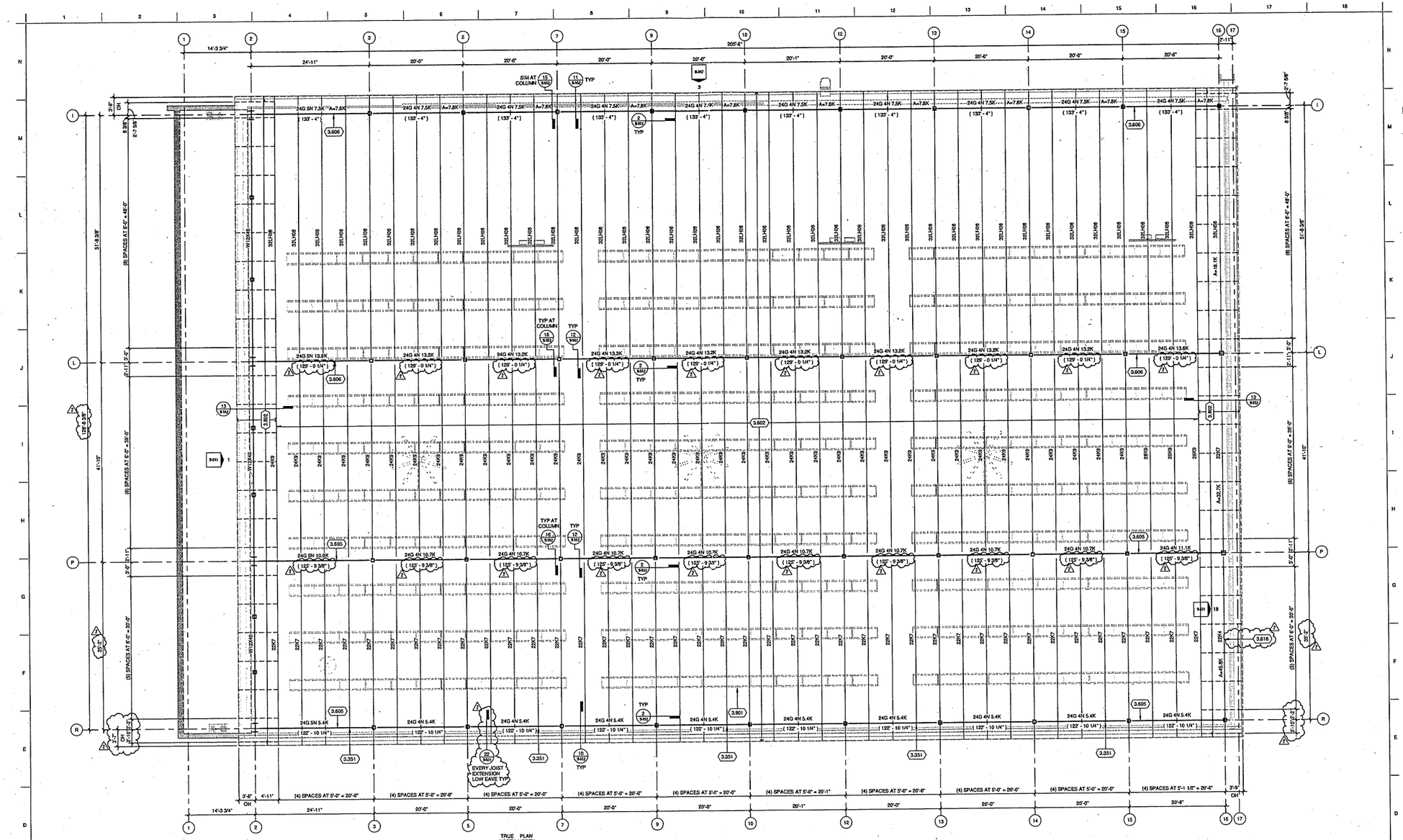
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FOUNDATION PLAN AREA D

S-101D

ADDENDUM 2

ADDEND. 2



TRUE NORTH PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA B
1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (36/7-3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.618 DESIGN TOP AND BOTTOM CHORD FOR FULL AXIAL FORCE.

3.901 ALTERNATE BID NO. 2 INCLUDES THE ADDITION OF SOLAR PHOTOVOTAIC PANELS (SEE SHEET S-001). CONSIDERATION NEEDS TO BE GIVEN TO ADDED STRUCTURAL FRAMING LOADS.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-004 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K3 AT 5'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.25K3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R3. MINIMUM S=1.67SN3, MINIMUM I = 2.09IN4.

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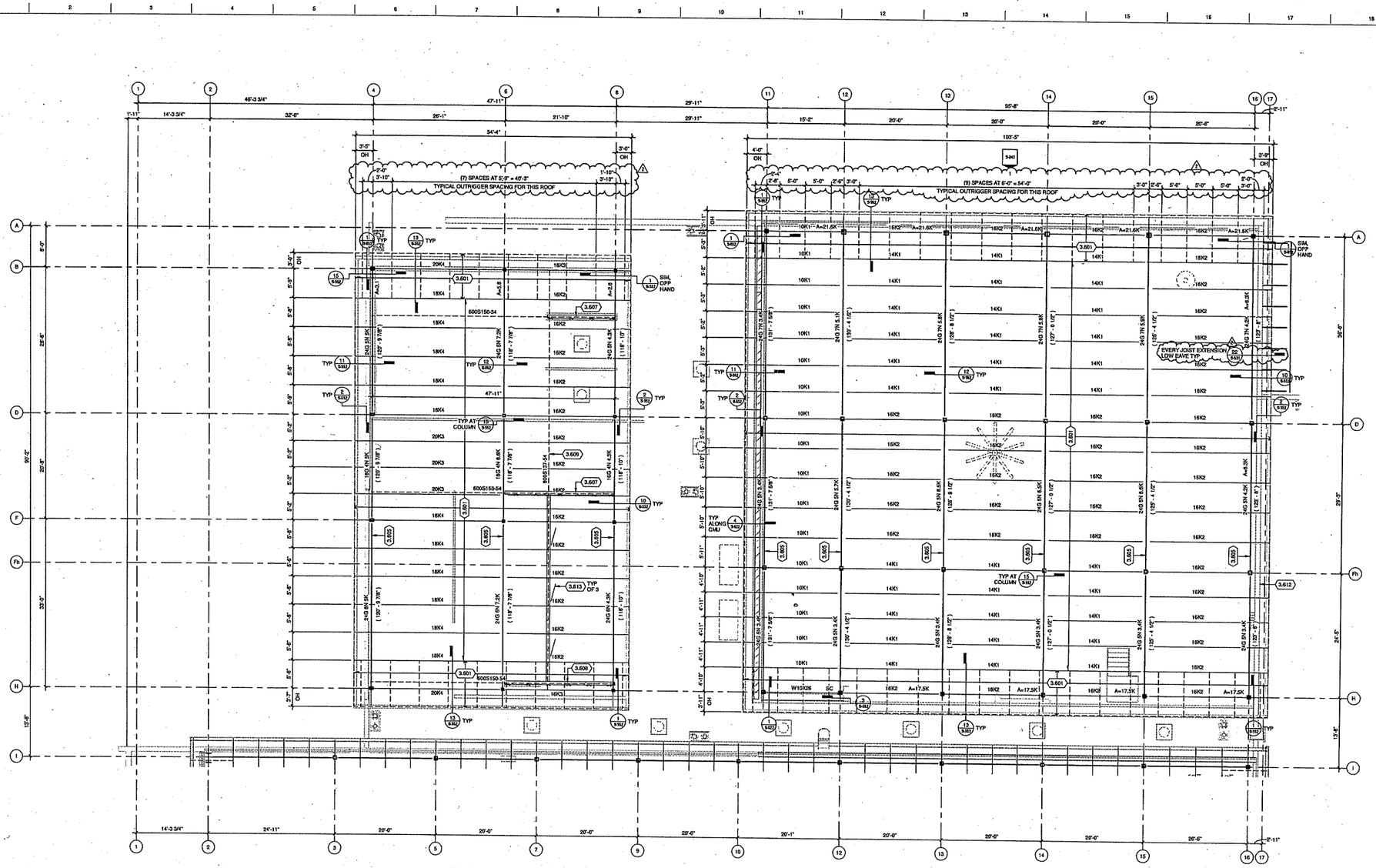
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PROJECT No: 1303500-150264.01

HIGH ROOF FRAMING PLAN AREA B

S-152B



TRUE NORTH / PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA A
1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (36/4-3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.607 600S150-54 STRUT WITH (10) #12 SCREWS PER SPLICE. FASTEN STRUTS TO ROOF DECK WITH #12 SCREWS AT 12" O.C. SEE DETAIL 6/S-522 FOR ATTACHMENT TO MASONRY WALL BELOW.

3.608 600S150-54 STRUT WITH TOES TURNED UP INTO DECK FLUTES. SPLICE STRUTS WITH 600T150-54 SPLINT SPLICE AND (10) #12 SCREWS INTO EACH 600S. FASTEN STRUTS TO ROOF DECK WITH #12 SCREWS AT 12" O.C. SEE DETAIL 8/S-522 FOR SIMILAR ATTACHMENT TO MASONRY WALL BELOW.

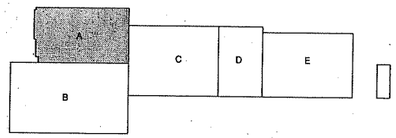
3.609 600S137-18 STRUT ON TOP OF JOISTS, BELOW ROOF DECK, NESTED INTO ROOF DECK FLUTES. FASTEN STRUT TO ROOF DECK WITH #10 SCREWS AT 12" O.C.

3.612 CMU WALL ATTACHMENT TO DECK SIMILAR TO DETAIL 4/S-522. BENT PLATES (14) TO BE PLACED ALONG THE LENGTH OF THE CMU WALL BETWEEN JOIST.

3.613 SEE DETAIL 8/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.9K3 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.29N3, MINIMUM I = 1.35N4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.573N3, MINIMUM I = 2.091N4.



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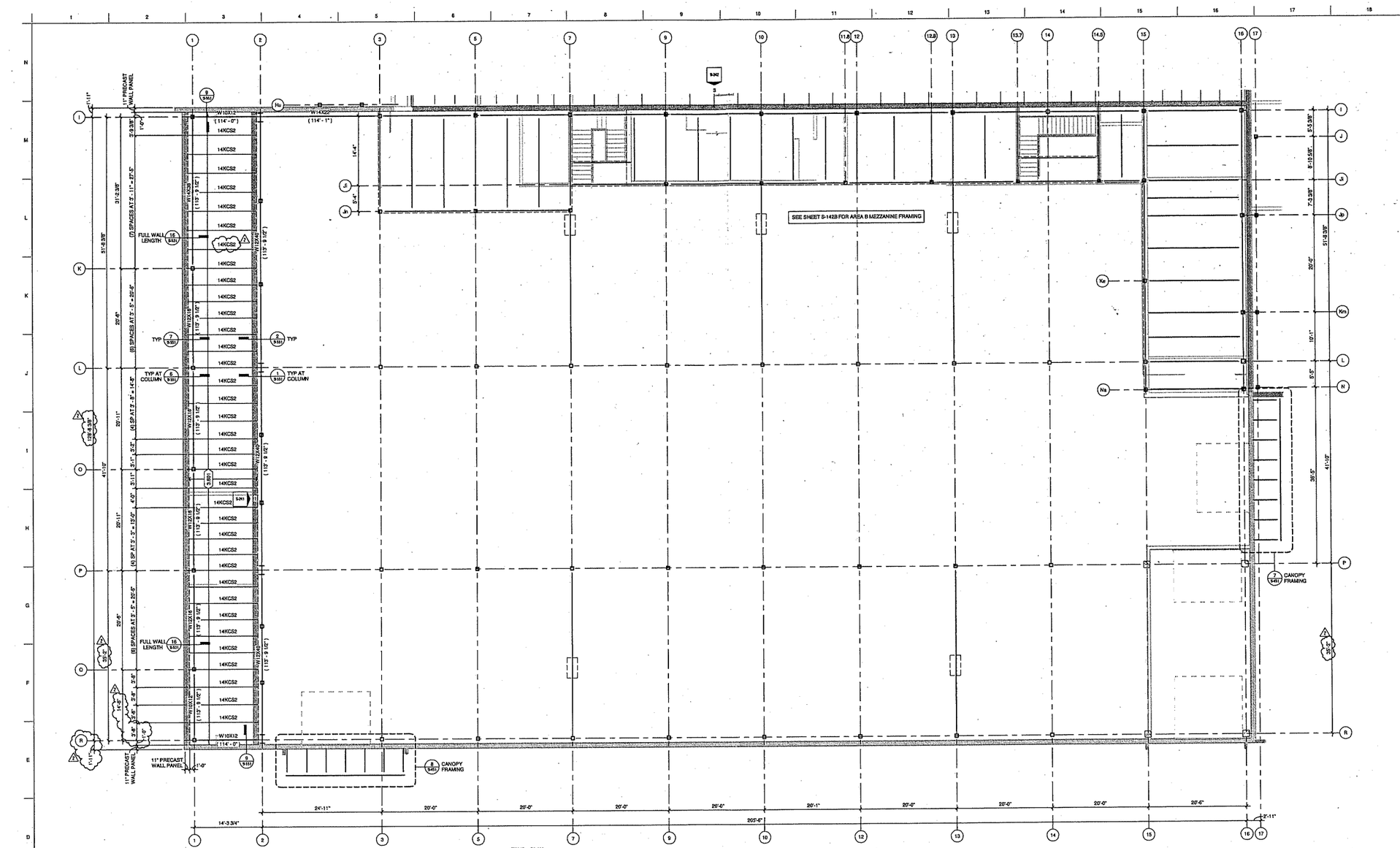
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HIGH ROOF FRAMING PLAN AREA A

S-152A

ADDENDUM 2



TRUE NORTH PLAN NORTH

1 LOW ROOF FRAMING PLAN AREA B

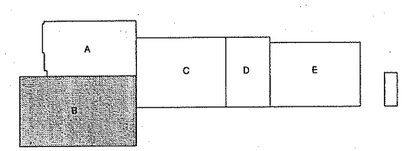
1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (3/24-3)

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"; "KCS" SERIES - MIN. 2 1/2"; "LH" SERIES - MIN. 4"; "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K3 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.2IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.



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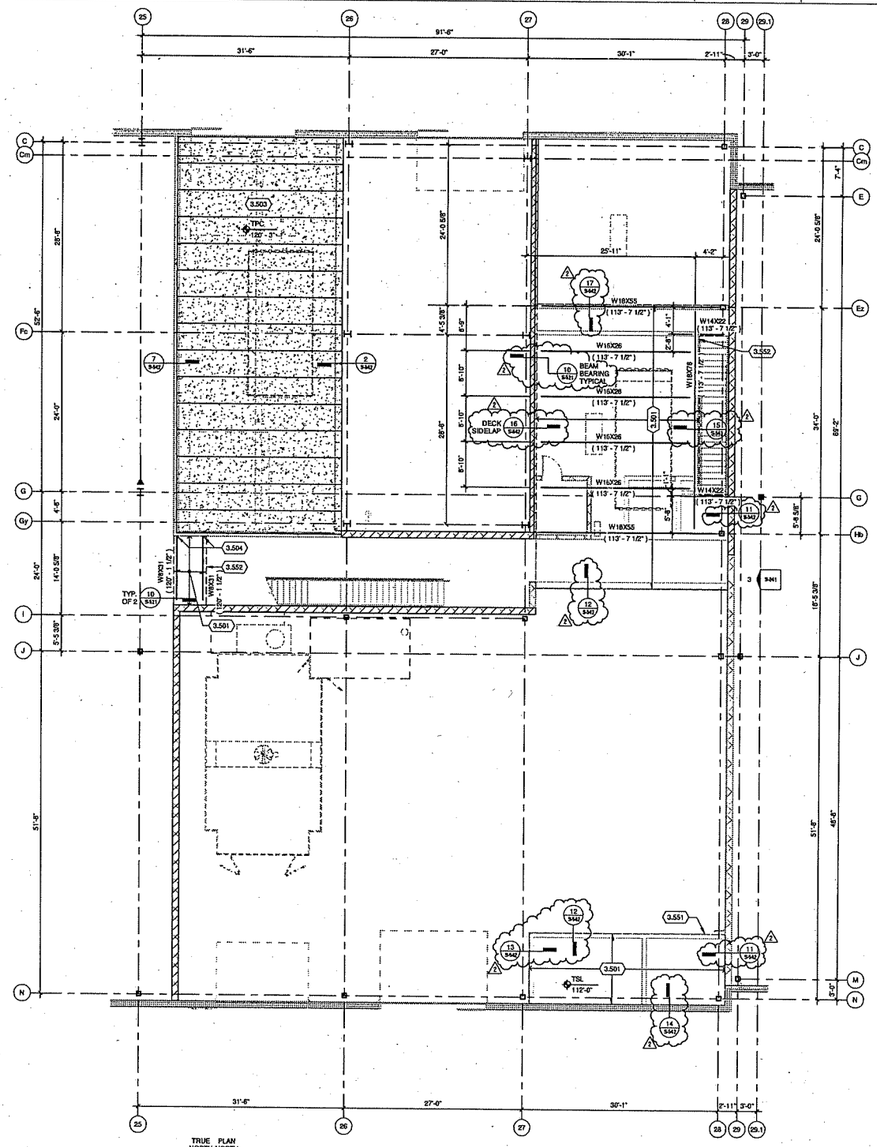
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PROJECT No: 1303500-160264.01

LOW ROOF FRAMING PLAN
AREA B

S-151B

ADDEN-2



TRUE NORTH PLAN NORTH

1 MEZZANINE FRAMING PLAN AREA D

1/8" = 1'-0"

KEYED NOTES

3.501 MEZZANINE DECK WILL BE CONSTRUCTED WITH CONCRETE ON COMPOSITE, 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK FOR A 4 1/2" TOTAL THICKNESS.

3.503 12" HOLLOW CORE PLANK WITH GROUTED KEYWAYS AND 3" TOPPING. PRECAST DIAPHRAGM SHEAR V = ___K. PRECAST SUPPLIER TO DESIGN AND SUPPLY SUPPORT FOR HOLLOW CORE PLANK ON PRECAST WALL PANEL.

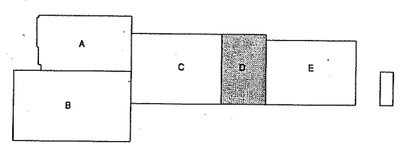
3.504 EMBED ATTACHMENT PLATE SHALL BE PROVIDED IN PRECAST WALL PANEL. CONNECT BEAM TO EMBED PLATE PER DETAIL 1/S-541.

3.551 POST SIGN ON GUARDRAIL: "MEZZANINE LIVE LOAD = 135 PSF"

3.552 POST SIGN ON GUARDRAIL: "MEZZANINE LIVE LOAD = 200 PSF"

FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-501 FOR STRUCTURAL SCHEDULES.
6. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
7. ALL MEZZANINE BEAMS REQUIRE 3/4" DIAMETER X 3 1/2" LONG SHEAR STUDS SPACED AT 12" O.C. ALONG LENGTH.



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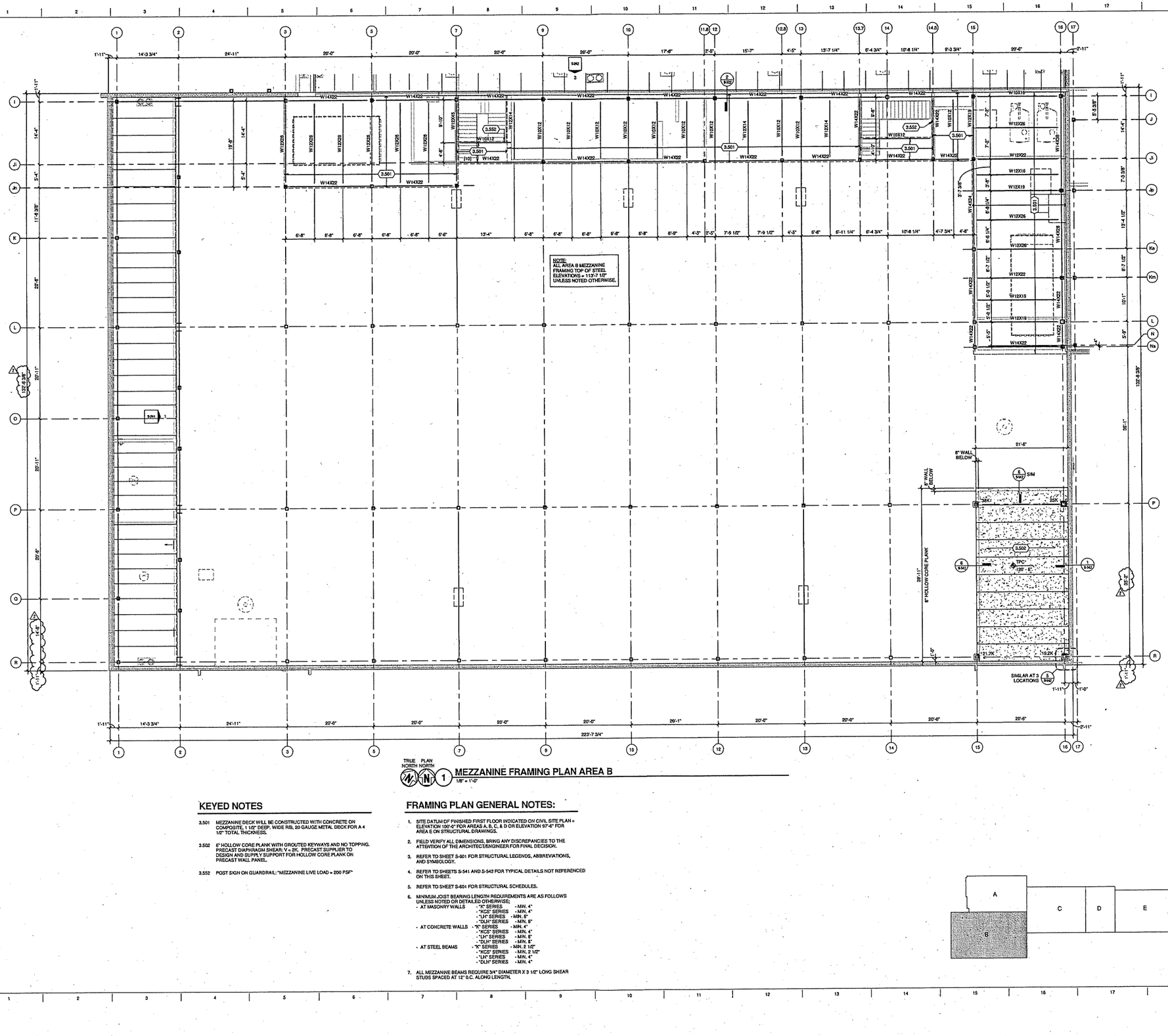
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PROJECT No: 13003500-160264.01

MEZZANINE FRAMING PLAN AREA D

S-142D



TRUE NORTH / PLAN NORTH

1 MEZZANINE FRAMING PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

3.501 MEZZANINE DECK WILL BE CONSTRUCTED WITH CONCRETE ON COMPOSITE, 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK FOR A 4 1/2" TOTAL THICKNESS.

3.502 6" HOLLOW CORE PLANK WITH GROUTED KEYWAYS AND NO TOPPING. PRECAST DIAPHRAGM SHEAR V = 25. PRECAST SUPPLIER TO DESIGN AND SUPPLY SUPPORT FOR HOLLOW CORE PLANK ON PRECAST WALL PANEL.

3.552 POST SIGN ON GUARDRAIL: "MEZZANINE LIVE LOAD = 200 PSF"

FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 8"
     - "DLH" SERIES - MIN. 8"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
7. ALL MEZZANINE BEAMS REQUIRE 3/4" DIAMETER X 3 1/2" LONG SHEAR STUDS SPACED AT 12" O.C. ALONG LENGTH.

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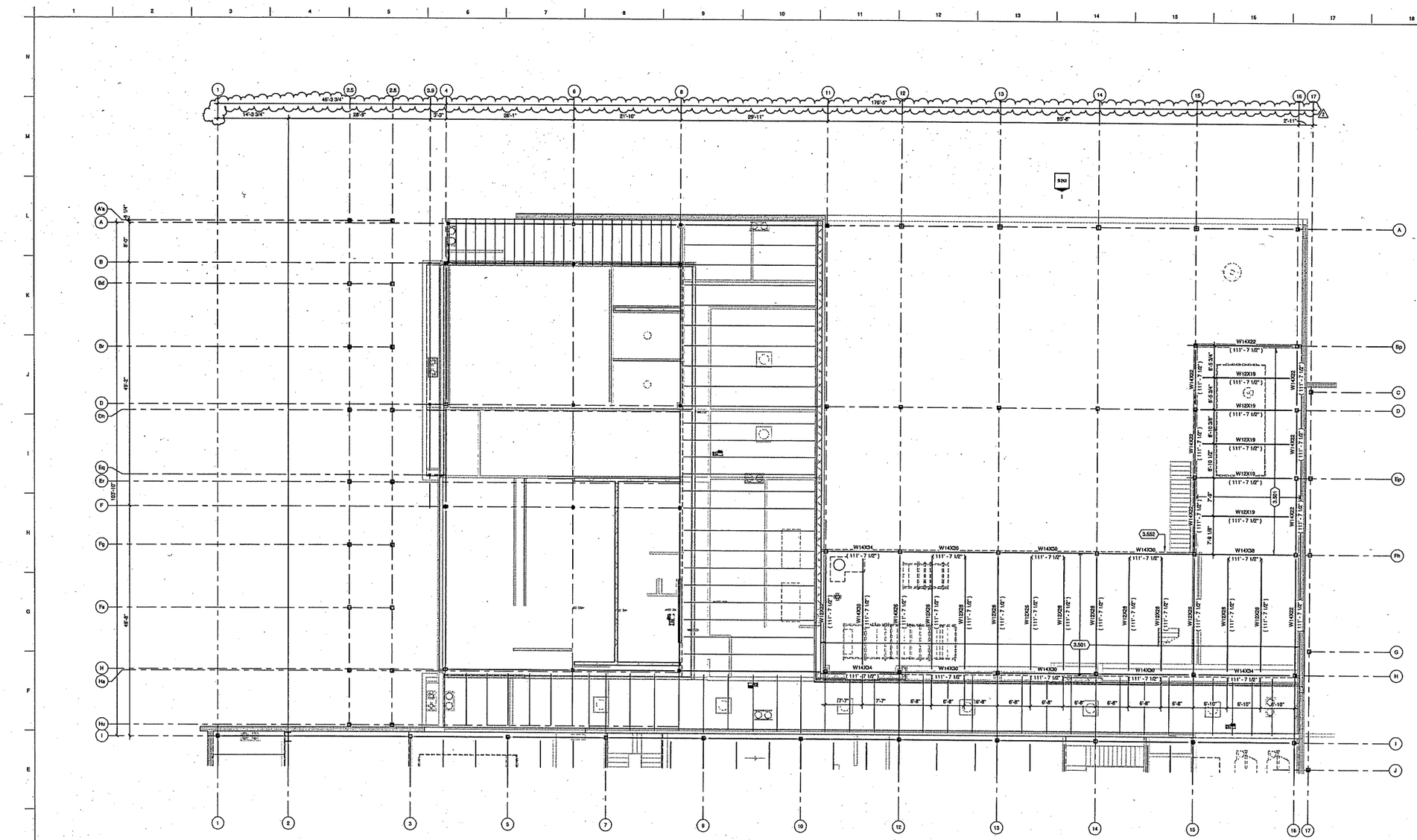
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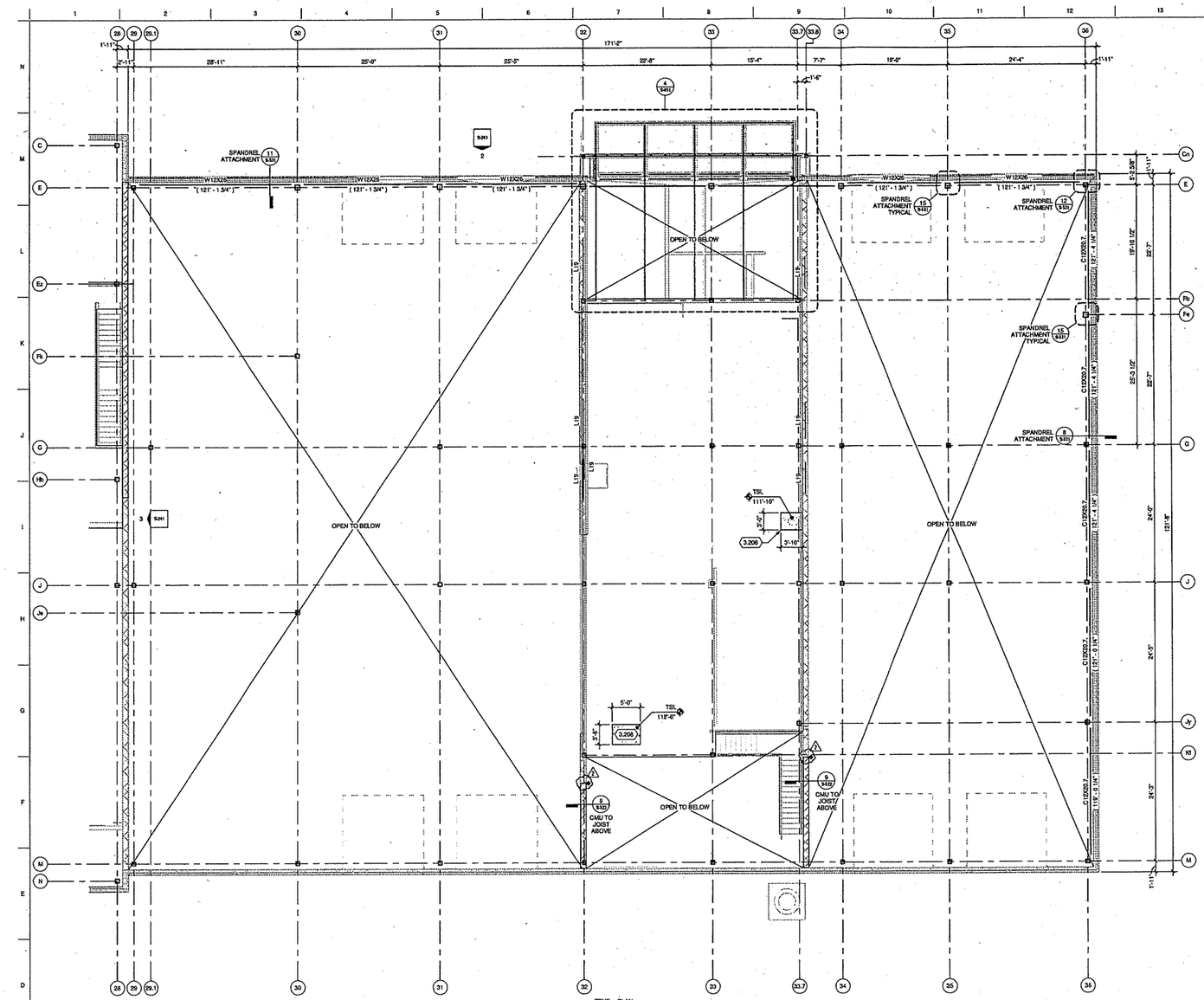
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MEZZANINE FRAMING PLAN AREA B

S-142B

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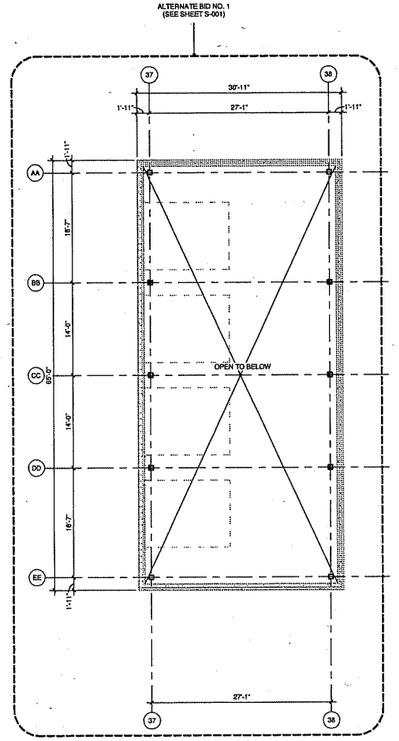

W14X22
W12X19
W14X38
W14X30
W12X26
3.501
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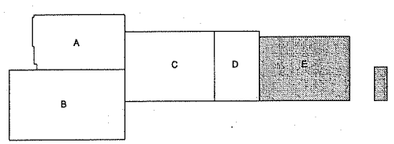


TRUE NORTH / PLAN NORTH

1 MEZZANINE STRUCURAL FLOOR PLAN AREA E

1/8" = 1'-0"





KEYED NOTES

3.206 MEZZANINE LEVEL EQUIPMENT PAD, SEE DETAIL 10/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.

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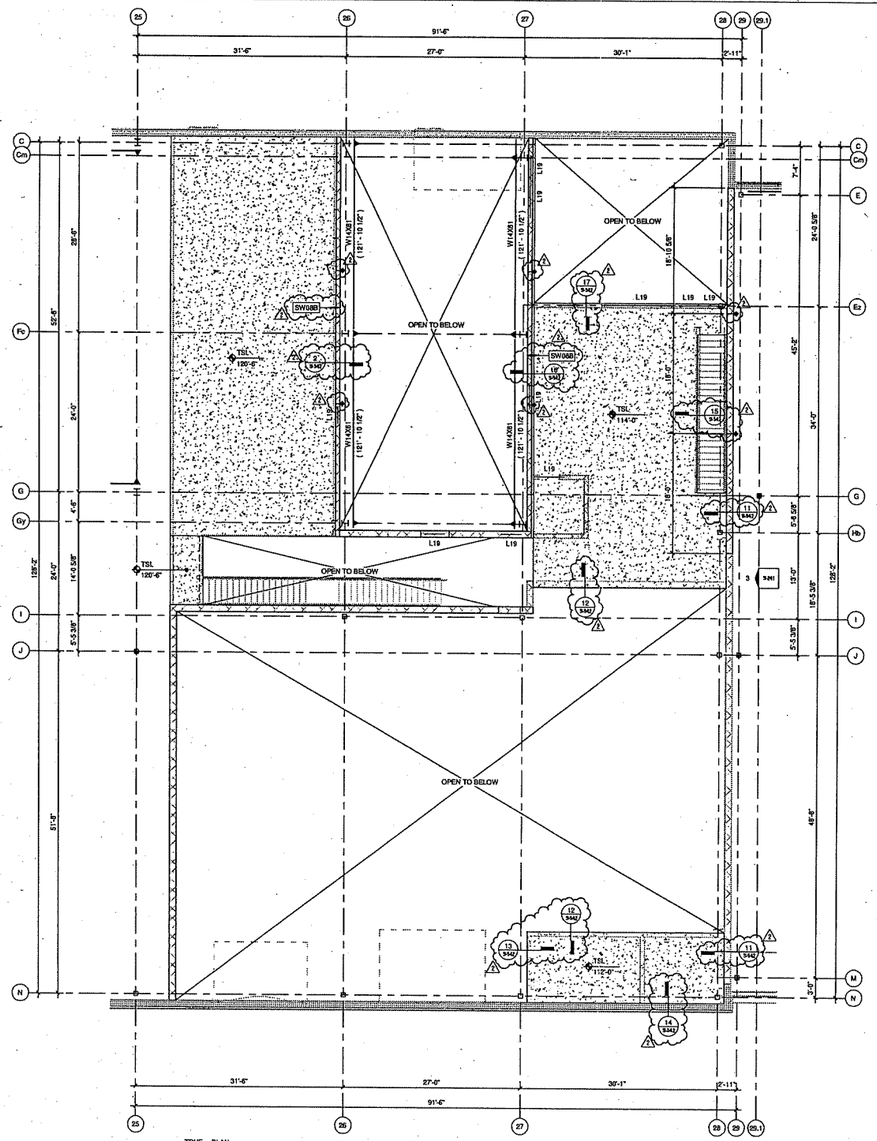
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PROJECT No: 1303300-190264.01

MEZZANINE STRUCTURAL FLOOR PLAN AREA E

S-132E

ADDEN 2 JM 2



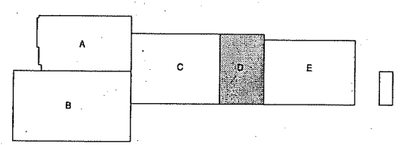
TRUE NORTH PLAN NORTH

1 MEZZANINE STRUCTURAL FLOOR PLAN AREA D
1/8" = 1'-0"

KEYED NOTES

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-501 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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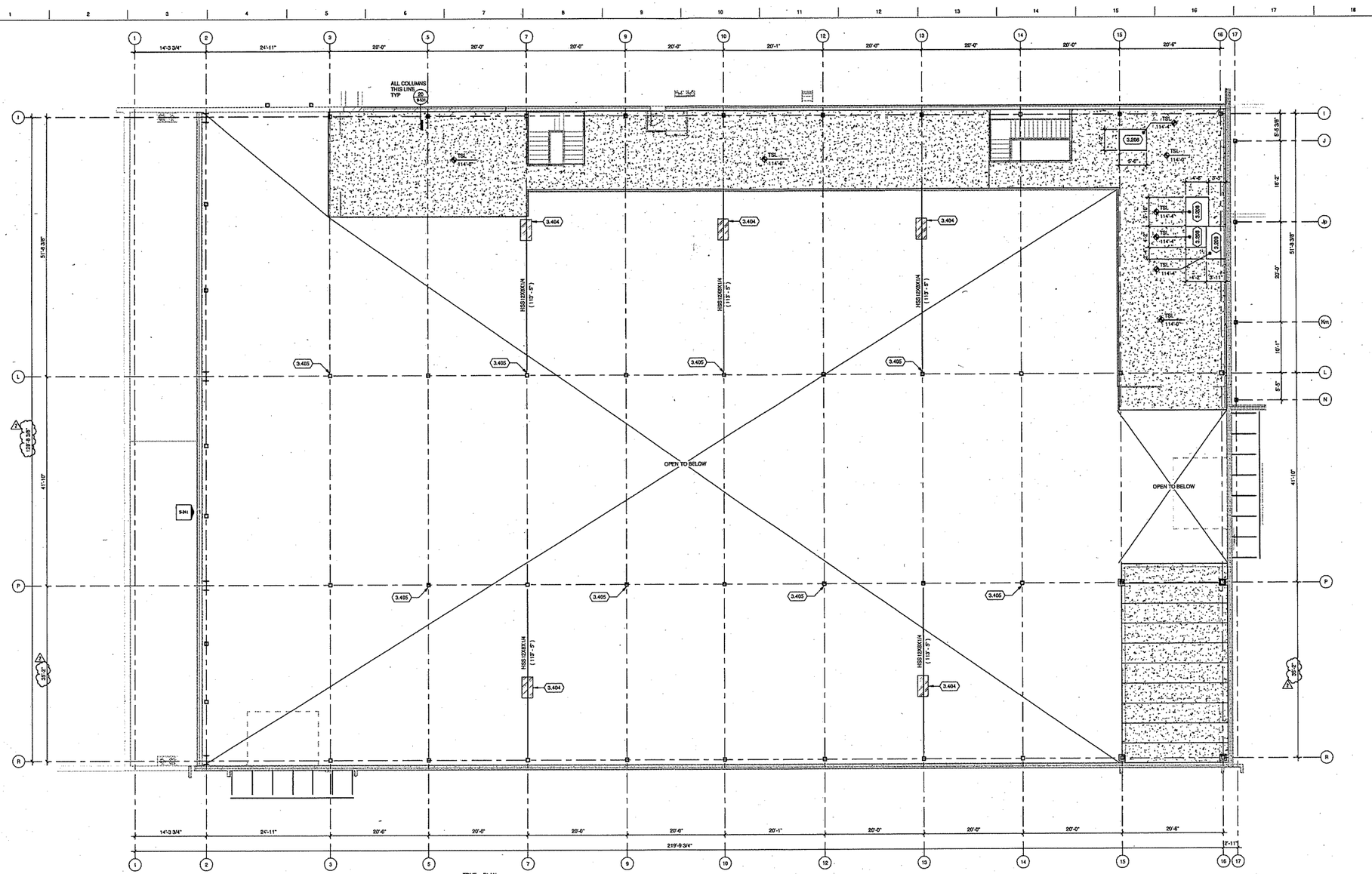
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PROJECT No. 1303500-160054.01

MEZZANINE STRUCTURAL FLOOR PLAN AREA D

S-132D



TRUE NORTH PLAN NORTH

1 MEZZANINE STRUCTURAL FLOOR PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

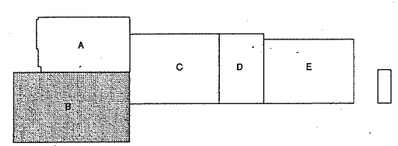
3.208 MEZZANINE LEVEL EQUIPMENT PAD, SEE DETAIL 10/S-511; COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

3.404 PROVIDE 3/8" THICK PLATE WELDED TO HSS BEAM FOR SUPPORT OF LUBE REEL. COORDINATE SIZE OF PLATE AND HOLE PATTERN WITH EQUIPMENT SUPPLIED.

3.405 PROVIDE 3/8" THICK PLATE WELDED TO COLUMN FOR SUPPORT OF EXHAUST HOSE. COORDINATE SIZE OF PLATE AND HOLE PATTERN WITH EQUIPMENT SUPPLIED. (SEE DETAIL 2/O-501)

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
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5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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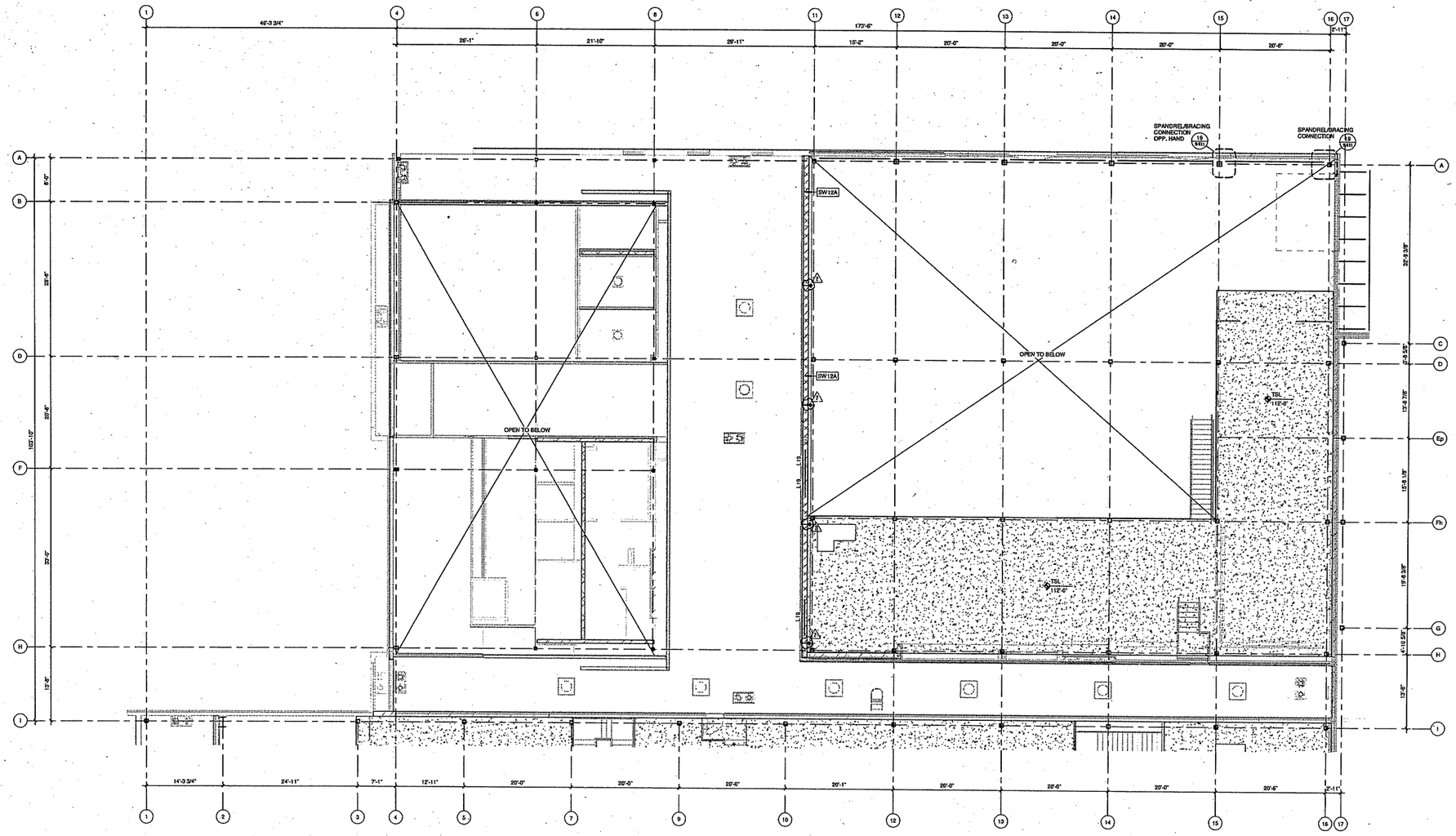
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MEZZANINE STRUCTURAL FLOOR PLAN AREA B

S-132B

Addendum 2



TRUE NORTH PLAN NORTH

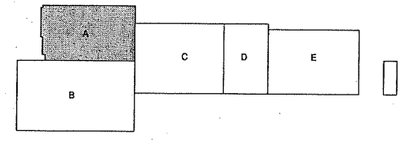
1 MEZZANINE STRUCTURAL FLOOR PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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ADDENDUM 2

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FACILITY

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ISSUE FOR BID

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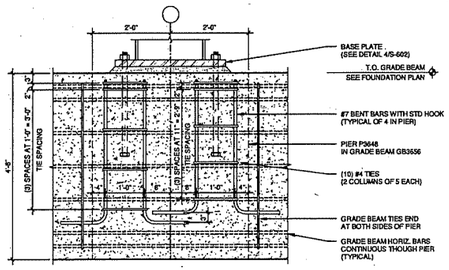
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2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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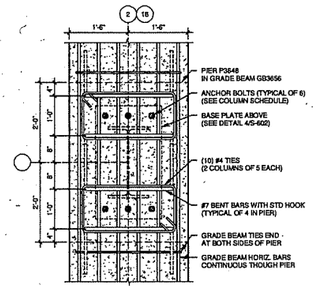
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MEZZANINE STRUCTURAL FLOOR PLAN AREA A

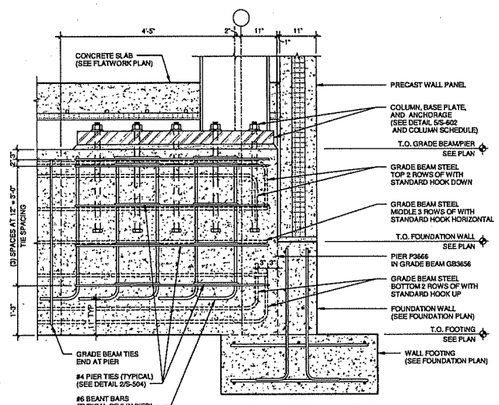
S-132A



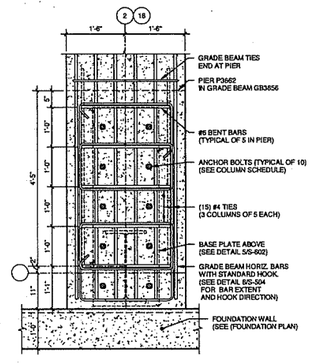
5 PIER P3648 SECTION
3/4" = 1'-0"



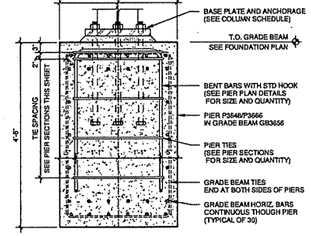
1 PIER P3648 PLAN
3/4" = 1'-0"



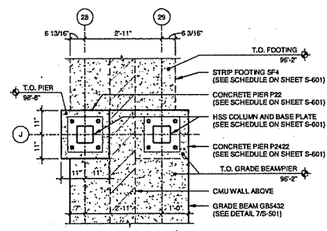
6 PIER P3666 SECTION
3/4" = 1'-0"



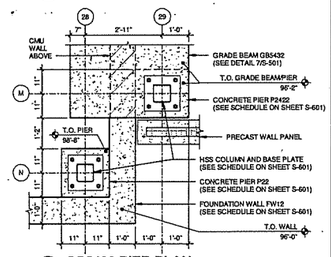
2 PIER P3666 PLAN
3/4" = 1'-0"



7 PIER P3648/P3666 SECTION
3/4" = 1'-0"



3 GB5432 PIER PLAN
1/2" = 1'-0"



4 GB5432 PIER PLAN
1/2" = 1'-0"

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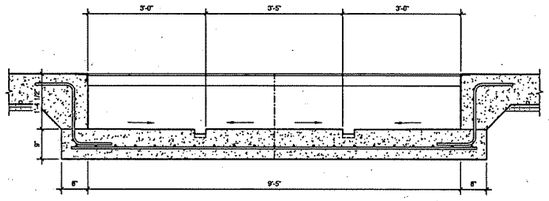
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	ISSUE FOR BID	02/07/2019

PROJECT No: 13033500-160254.01

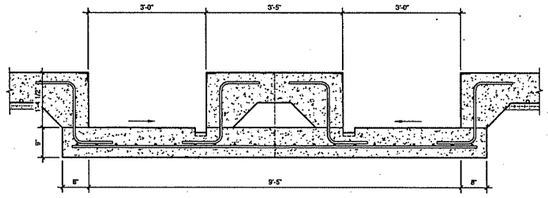
FOUNDATION DETAILS

S-504

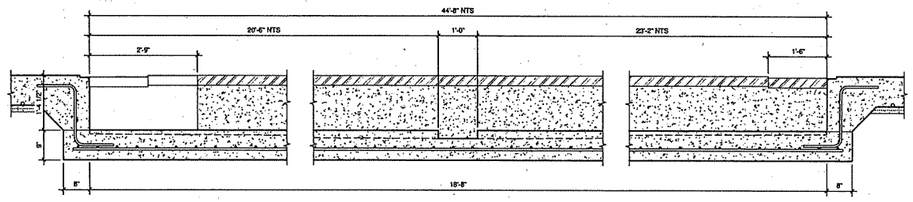
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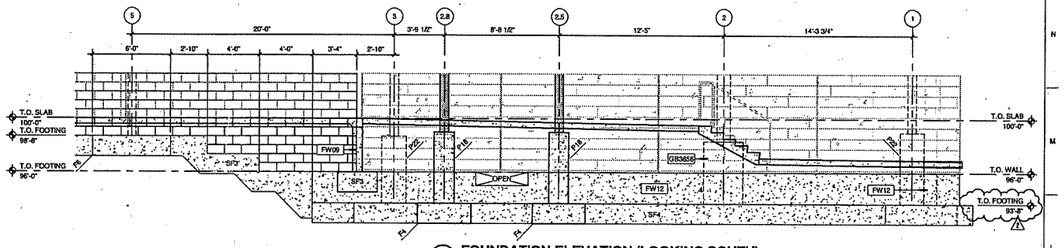
6 FOUNDATION SECTION AT LIFT
3/4" = 1'-0"



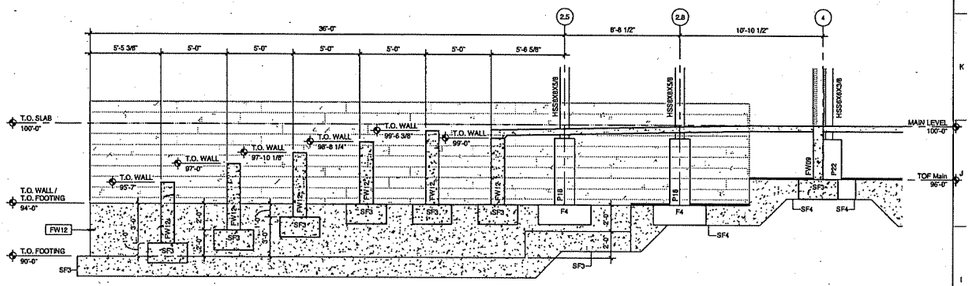
7 FOUNDATION SECTION AT LIFT
3/4" = 1'-0"



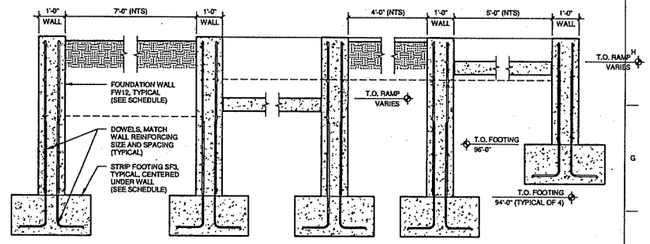
8 FOUNDATION SECTION AT LIFT
3/4" = 1'-0"



1 FOUNDATION ELEVATION (LOOKING SOUTH)
1/4" = 1'-0"



2 FOUNDATION SECTION
1/4" = 1'-0"



3 FOUNDATION SECTION AT RAMP
1/2" = 1'-0"

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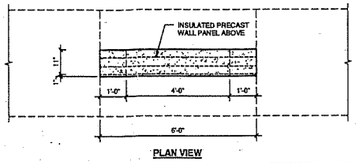
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PROJECT No: 1303500-160264.01

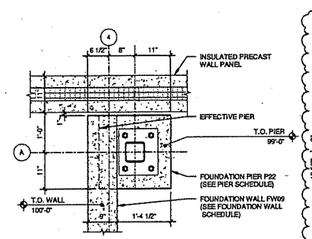
FOUNDATION DETAILS

S-503

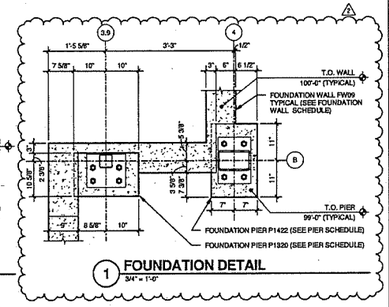
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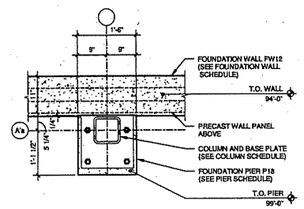
10 FOUNDATION DETAIL
1/2" = 1'-0"



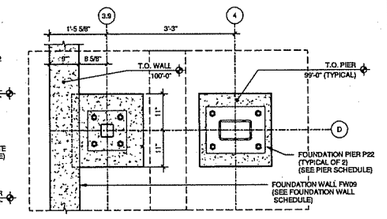
6 FOUNDATION DETAIL
3/4" = 1'-0"



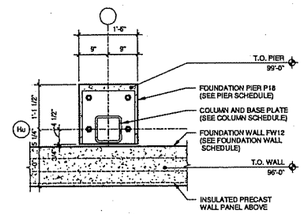
1 FOUNDATION DETAIL
3/4" = 1'-0"



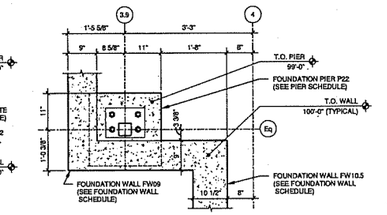
7 FOUNDATION DETAIL
3/4" = 1'-0"



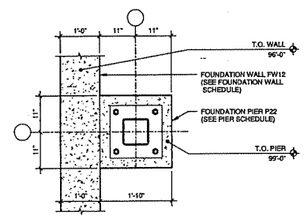
2 FOUNDATION DETAIL
3/4" = 1'-0"



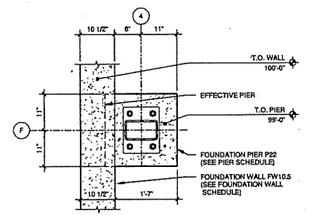
8 FOUNDATION DETAIL
3/4" = 1'-0"



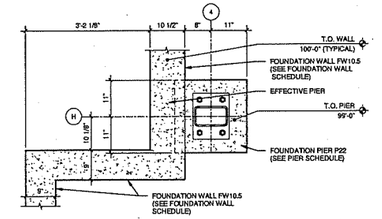
3 FOUNDATION DETAIL
3/4" = 1'-0"



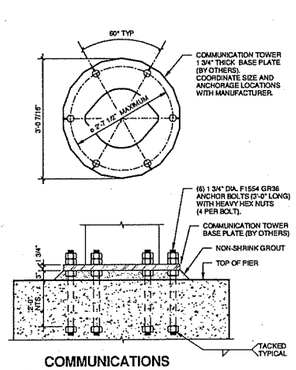
9 FOUNDATION DETAIL
3/4" = 1'-0"



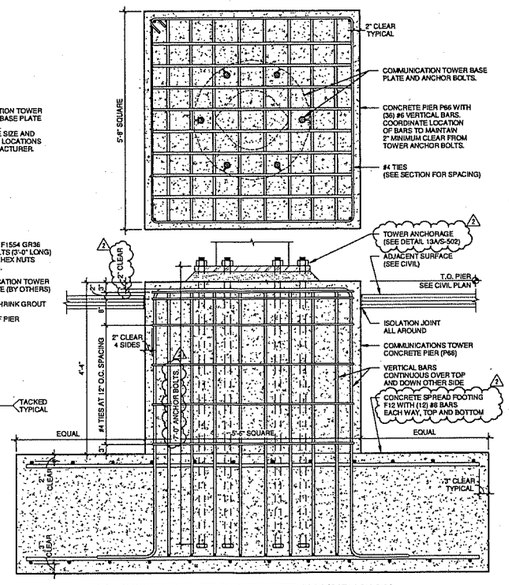
4 FOUNDATION DETAIL
3/4" = 1'-0"



5 FOUNDATION DETAIL
3/4" = 1'-0"



COMMUNICATIONS TOWER ANCHORAGE
13A 3/4" = 1'-0"



13 COMMUNICATIONS TOWER FOUNDATION
3/4" = 1'-0"

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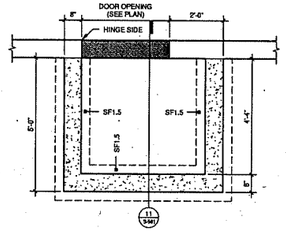
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	ISSUE FOR BID	02/07/2019
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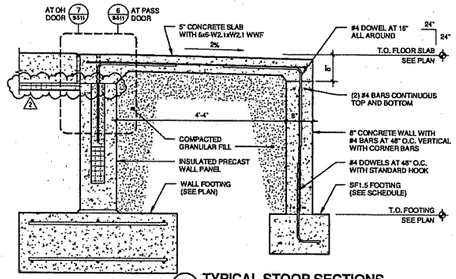
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FOUNDATION DETAILS

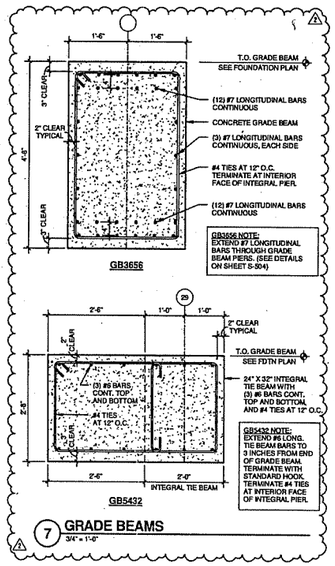
S-502



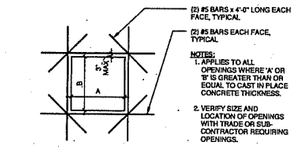
10 TYPICAL STOOP PLAN VIEW
1/2" = 1'-0"



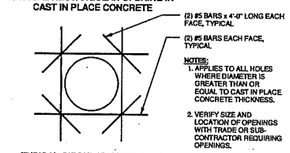
11 TYPICAL STOOP SECTIONS
3/4" = 1'-0"



7 GRADE BEAMS
3/4" = 1'-0"

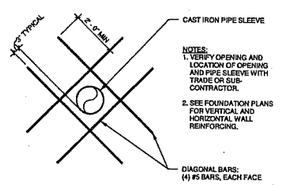


TYPICAL RECTANGULAR OPENING IN CAST IN PLACE CONCRETE

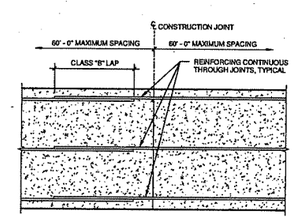


TYPICAL CIRCULAR OPENING IN CAST IN PLACE CONCRETE

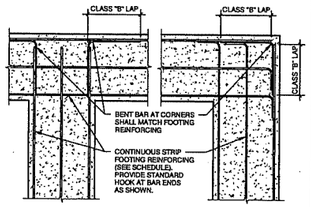
5 TYPICAL CONCRETE PENETRATION REINFORCEMENT
NO SCALE



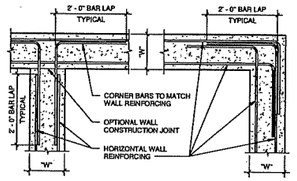
6 FOUNDATION WALL PENETRATION
NO SCALE



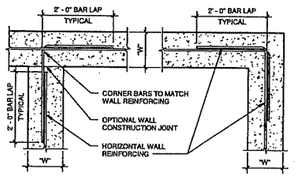
1 TYPICAL FOOTING CONSTRUCTION JOINT
NO SCALE



2 TYPICAL FOOTING INTERSECTIONS
NO SCALE



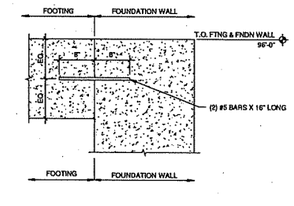
REINFORCEMENT EACH FACE



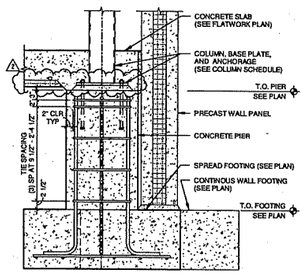
REINFORCEMENT CENTERED

NOTES:
1. VERTICAL REINFORCING NOT SHOWN FOR CLARITY.
2. FOUNDATION WALL LEDGE NOT SHOWN FOR CLARITY.
3. "W" = FOUNDATION WALL WIDTH.

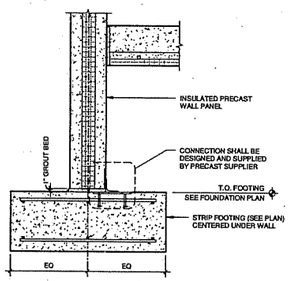
3 TYPICAL FOUNDATION WALL INTERSECTIONS
NO SCALE



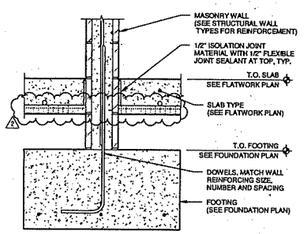
15 FOUNDATION WALL AT FOOTING
1" = 1'-0"



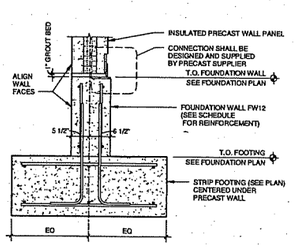
12 TYPICAL PIER SECTION
3/4" = 1'-0"



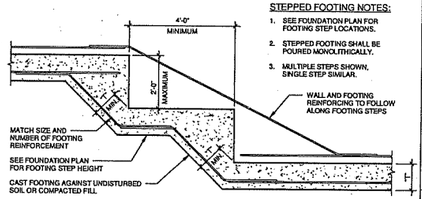
8 PRECAST WALL AT FOOTING
3/4" = 1'-0"



TYPICAL INTERIOR CMU WALL FOOTING
13 1" = 1'-0"



9 PRECAST WALL AT DROPPED FOOTING
3/4" = 1'-0"



4 TYPICAL STEPPED FOOTING
NO SCALE

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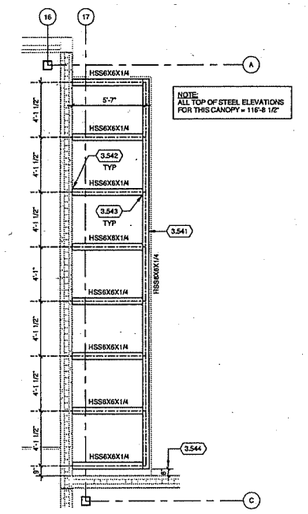
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FOUNDATION DETAILS

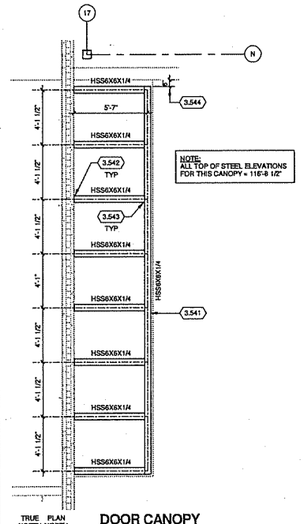
S-501



TRUE PLAN NORTH NORTH 6

DOOR CANOPY FRAMING PLAN - AREA A

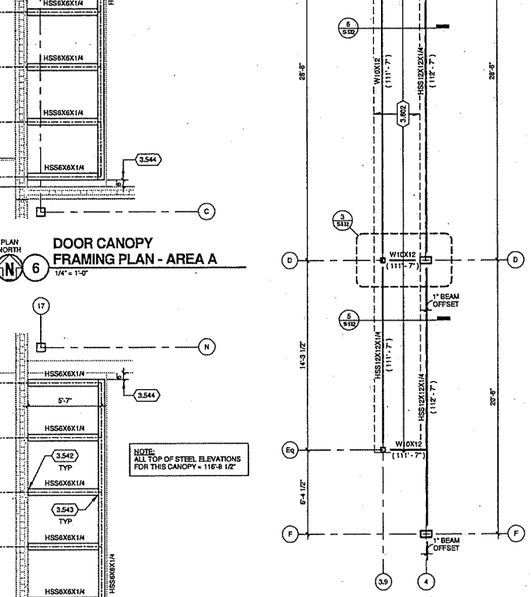
1/4" = 1'-0"



TRUE PLAN NORTH NORTH 7

DOOR CANOPY FRAMING PLAN - AREA B

1/4" = 1'-0"



TRUE PLAN NORTH NORTH 5

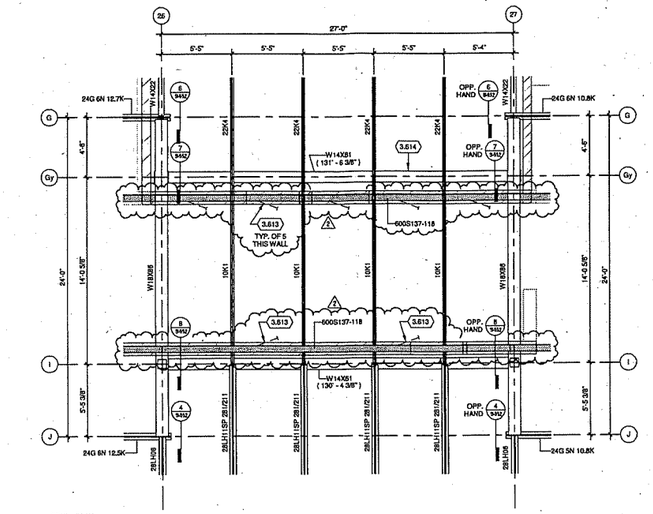
PARTIAL ENLARGED LOW ROOF FRAMING PLAN AREA A

1/4" = 1'-0"

TRUE PLAN NORTH NORTH 8

DOOR CANOPY FRAMING PLAN - AREA B

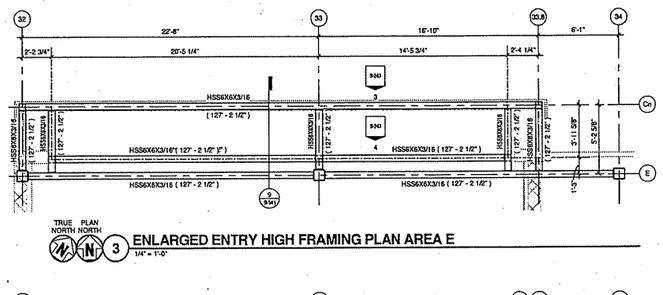
1/4" = 1'-0"



TRUE PLAN NORTH NORTH 2

ENLARGED HIGH ROOF FRAMING PLAN AREA D

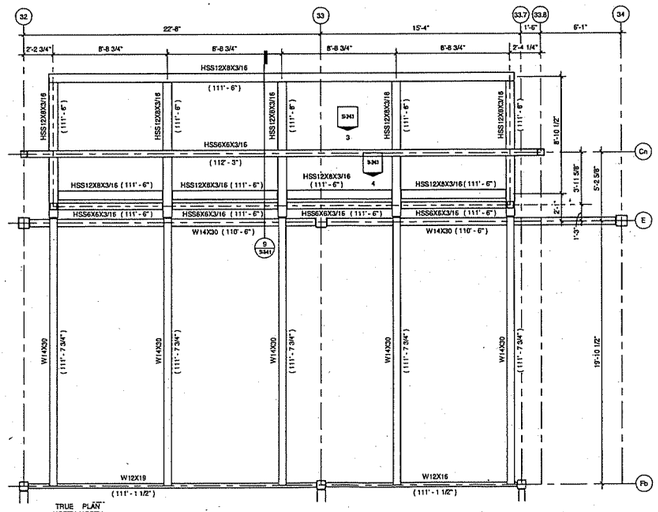
1/4" = 1'-0"



TRUE PLAN NORTH NORTH 3

ENLARGED ENTRY HIGH FRAMING PLAN AREA E

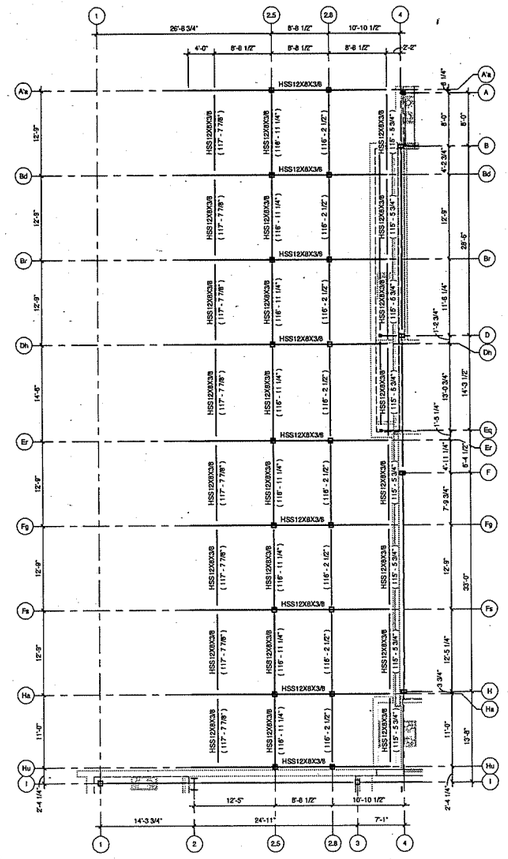
1/4" = 1'-0"



TRUE PLAN NORTH NORTH 4

ENLARGED ENTRY CANOPY LOW FRAMING PLAN AREA E

1/4" = 1'-0"



TRUE PLAN NORTH NORTH 1

CANOPY ROOF FRAMING PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

3.541 CAP EACH END OF HSS HEADER BEAM.

3.542 WELD ALL AROUND TO EMBED PLATE IN PRECAST WALL. LOAD TO PRECAST AT EACH OUTRIGGER (Vx2.5K, Mx-104"K)

3.543 WELD OUTRIGGER ALL AROUND TO HSS HEADER BEAM.

3.544 NO CONNECTION ALLOWED FROM CANOPY TO AREA C. MAINTAIN 6 INCH GAP BETWEEN CANOPY STRUCTURE AND AREA C STRUCTURE.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 5" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (36/7-3)

3.613 SEE DETAIL 6/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

3.614 PROVIDE BENT PLATE DECK SUPPORT FULL LENGTH OF THIS BEAM/JOIST GIRDER, SIMILAR TO DETAIL 17/S-552 EXCEPT ATTACH WITH #10 SCREWS AT 6" O.C.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5KIJ AT 5'-0" O.C. SPACING MAXIMUM. MINIMUM Sx=1.2IN3, MINIMUM I = 1.2IN4.
10. JOIST EXTENSIONS ARE Rb. MINIMUM Sx=1.672IN3, MINIMUM I = 2.091IN4.

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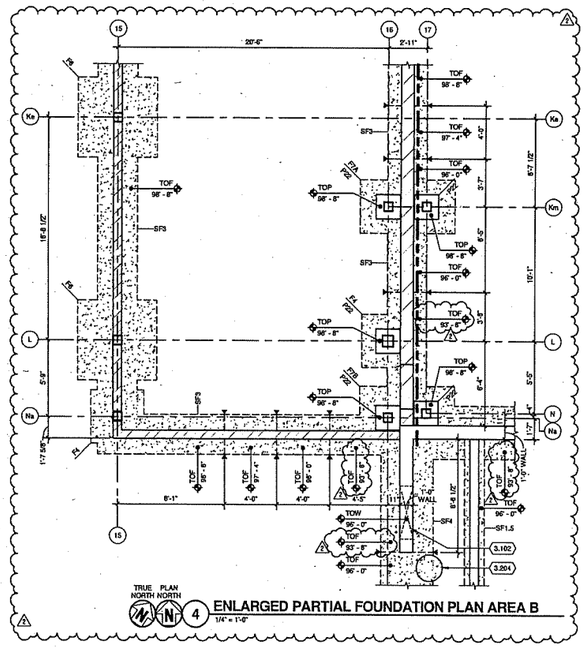
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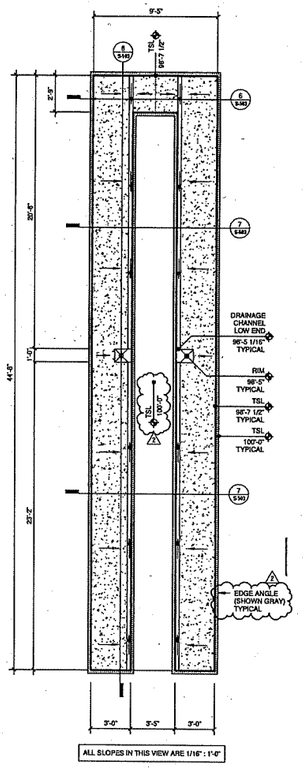
MISCELLANEOUS FRAMING PLANS

S-451

A2 SUM2

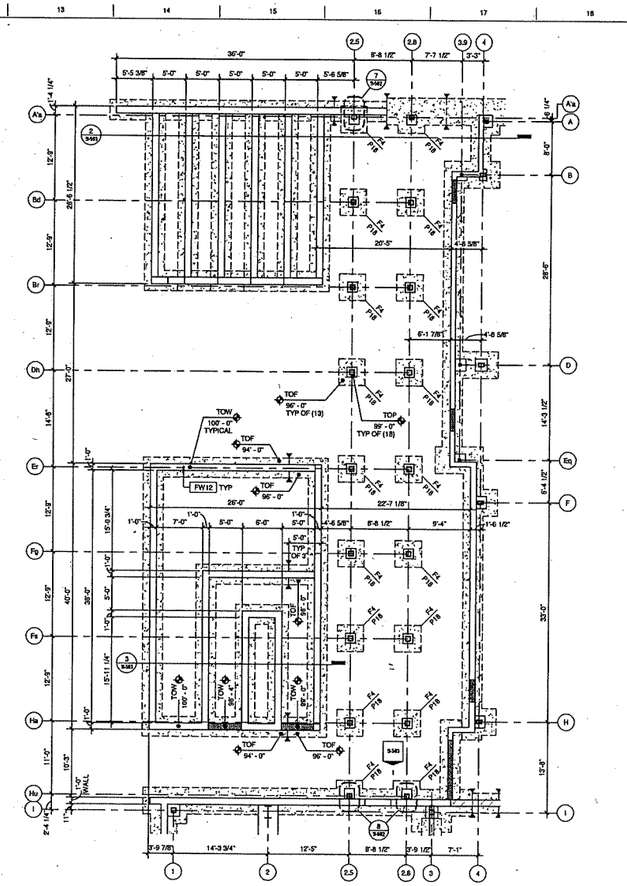


TRUE NORTH PLAN NORTH 4 **ENLARGED PARTIAL FOUNDATION PLAN AREA B**
1/4" = 1'-0"

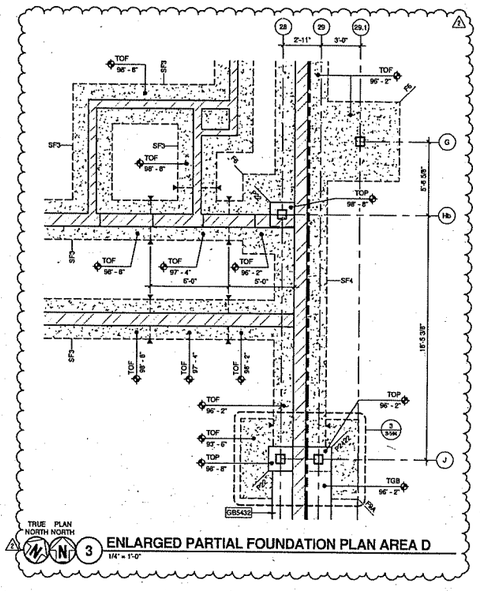


ALL SLOPES IN THIS VIEW ARE 1/16" : 1'-0"

TRUE NORTH PLAN NORTH 2 **ENLARGED FLATWORK PLAN AREA C**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 1 **PARTIAL FOUNDATION PLAN**
1/8" = 1'-0"



TRUE NORTH PLAN NORTH 3 **ENLARGED PARTIAL FOUNDATION PLAN AREA D**
1/4" = 1'-0"

KEYED NOTES

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-0" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.

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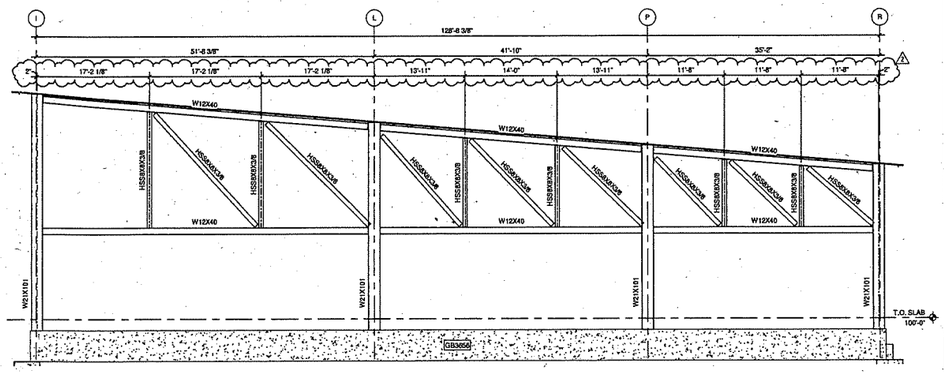
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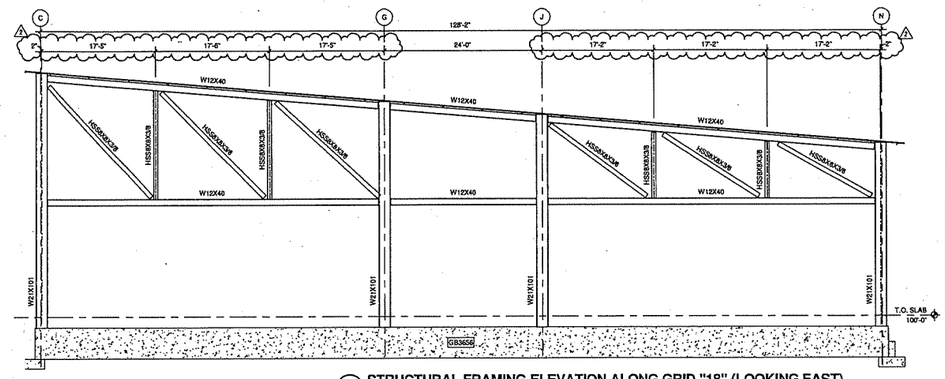
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MISCELLANEOUS FOUNDATION PLANS

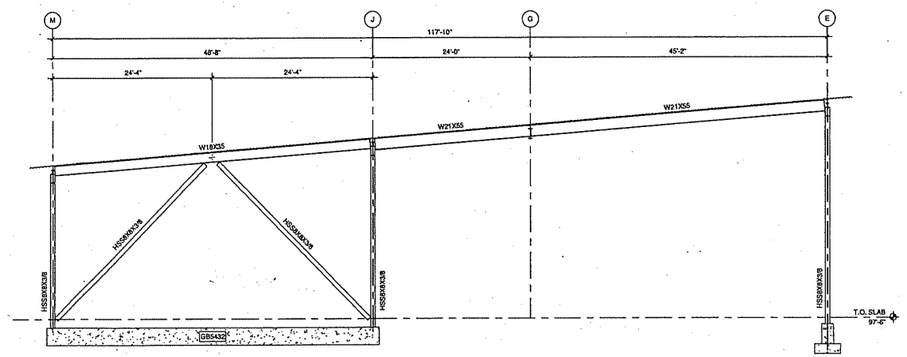
S-401



1 STRUCTURAL FRAMING ELEVATION ALONG GRID "2" (LOOKING EAST)
1/8" = 1'-0"



2 STRUCTURAL FRAMING ELEVATION ALONG GRID "18" (LOOKING EAST)
1/8" = 1'-0"



3 STRUCTURAL FRAMING ELEVATION ALONG GRID "29" (LOOKING WEST)
1/8" = 1'-0"

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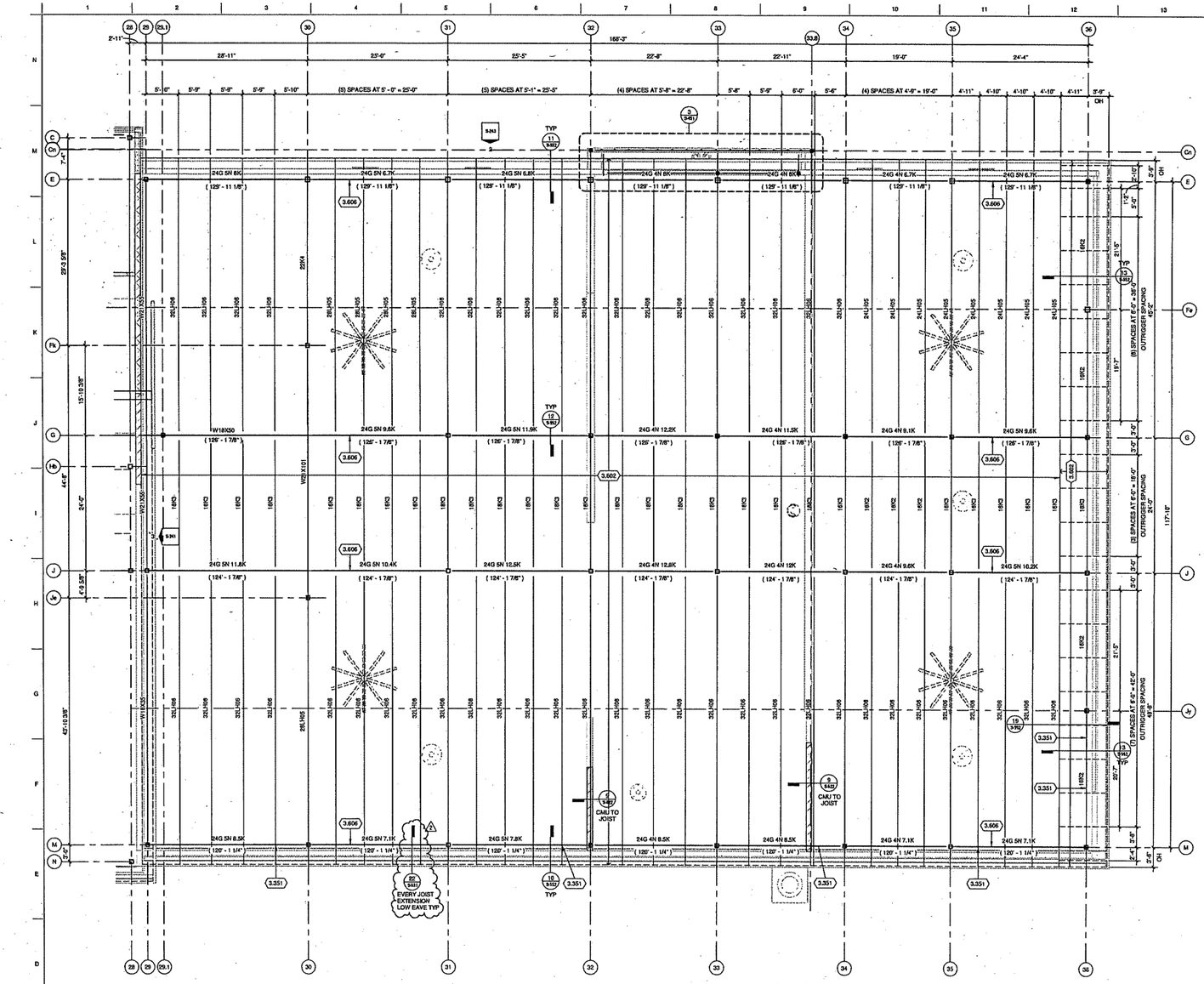
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STRUCTURAL FRAMING ELEVATIONS

S-241

1 ADDENDUM 2



TRUE NORTH PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA E

1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (3/07-3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"; "KCS" SERIES - MIN. 2 1/2"; "LH" SERIES - MIN. 4"; "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.9K3 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.23K3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.672IN3, MINIMUM I = 2.091IN4.

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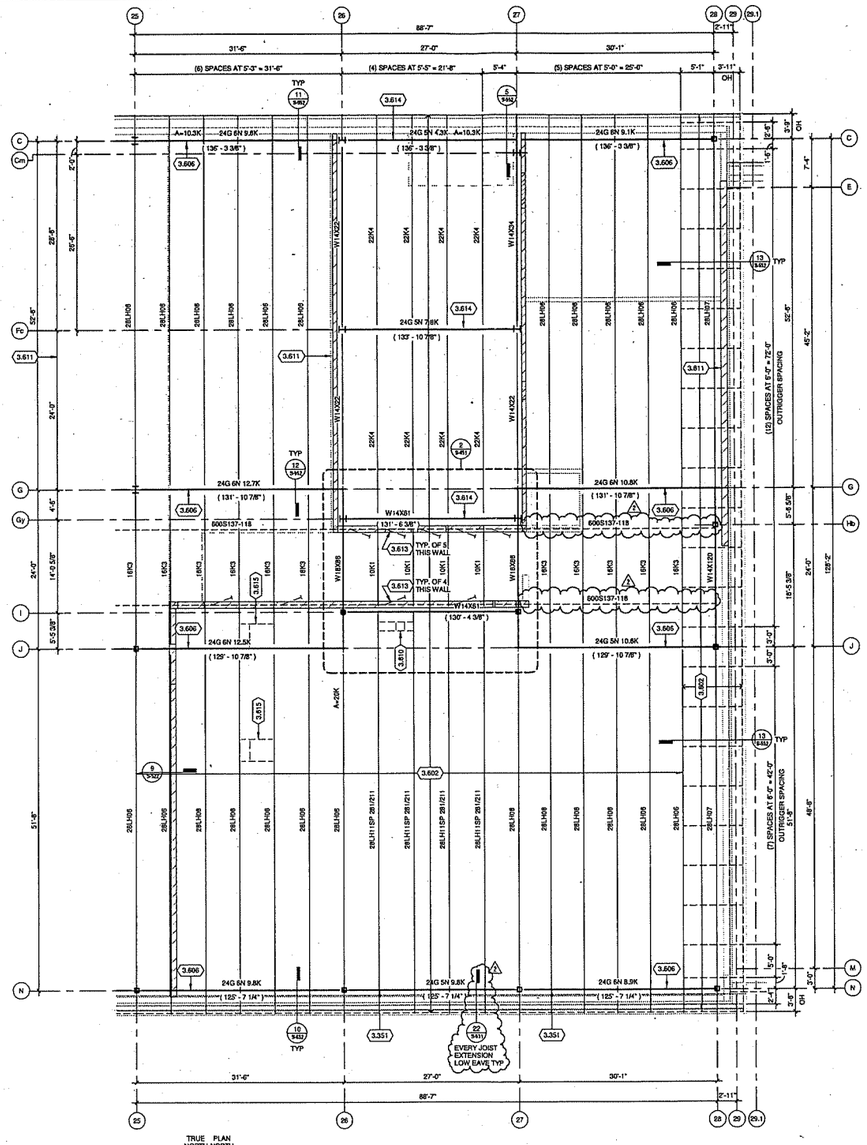
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HIGH ROOF FRAMING PLAN AREA E

S-152E



TRUE NORTH / PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA D

1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #16 SCREWS PER SPAN IN SIDELAPS, (3/4/7-3)

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.610 TYPICAL FRAMING FOR ROOF OPENING, SEE DETAIL 15/S-551.

3.611 CMU WALL ATTACHMENT TO BEAM OR JOIST, SEE DETAIL 5/S-522. BENT PLATE CONTINUOUS ALONG THE LENGTH OF CMU WALL.

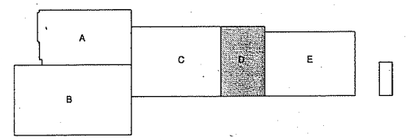
3.613 SEE DETAIL 9/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

3.614 PROVIDE BENT PLATE DECK SUPPORT FULL LENGTH OF THIS BEAM/JOIST GIRDER. SIMILAR TO DETAIL 17/S-552 EXCEPT ATTACH WITH #10 SCREWS AT 6" O.C.

3.615 AT PAINT BOOTH EXHAUST AND MIXING ROOM EXHAUST PROVIDE TYPICAL FRAMED ROOF OPENING (SEE DETAIL 15/S-551) PLUS (4) 3/16x8x1'-0" BENT PLATES TO CREATE A FLAT, LEVEL SURFACE TO SUPPORT DUCT FLANGE. FIELD WELD BENT PLATES TO FRAMED OPENING. FIELD WELD FLANGE TO BENT PLATES.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K9 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.29IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE K9. MINIMUM S=1.67IN3, MINIMUM I = 2.09IN4.



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FACILITY

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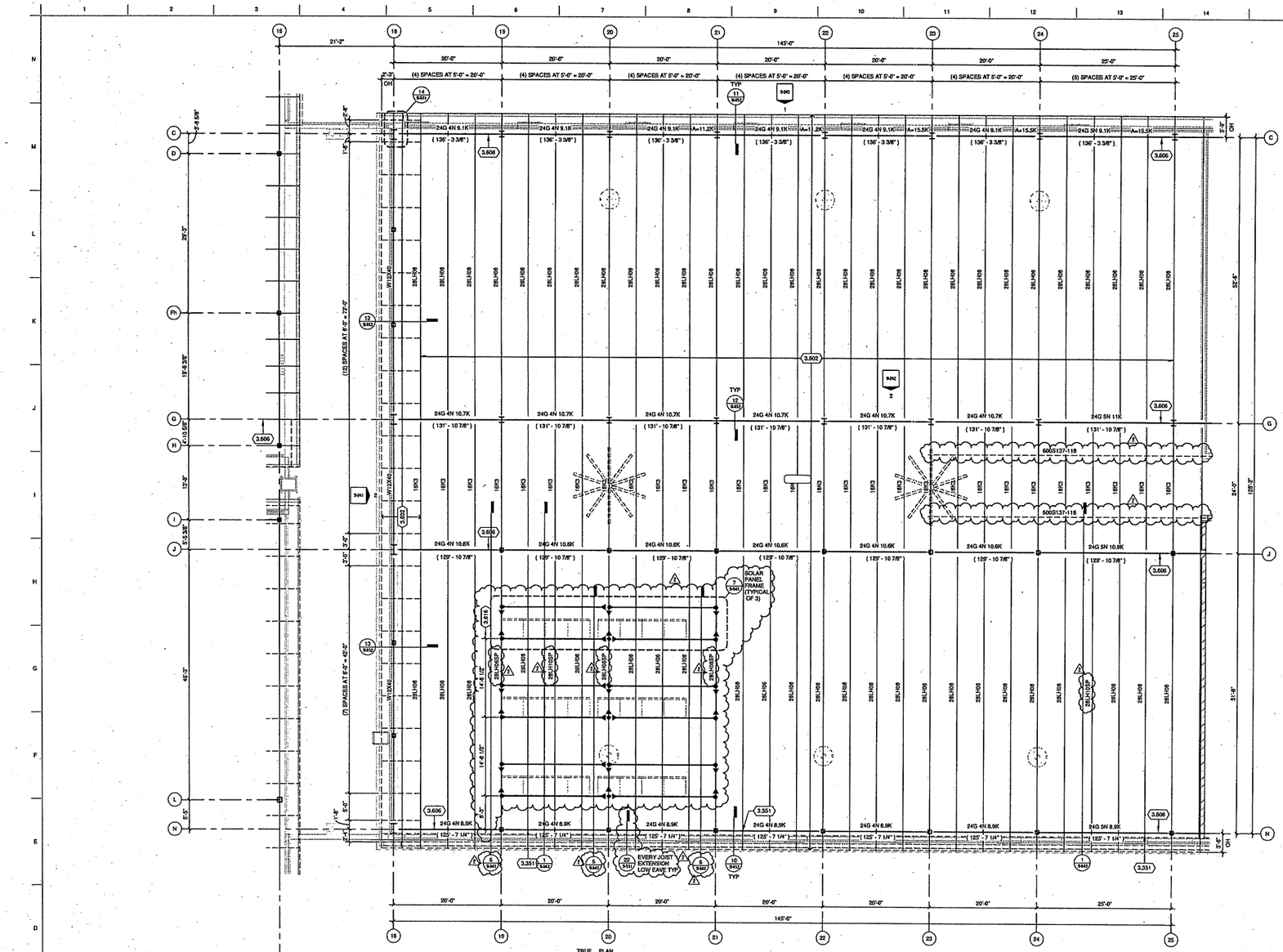
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PROJECT No: 1303500-160264.01

HIGH ROOF FRAMING PLAN AREA D

S-152D

Add Dum 2



HIGH ROOF FRAMING PLAN AREA C

1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

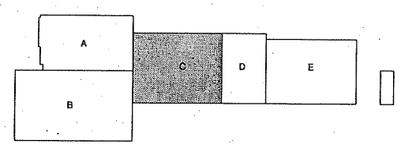
3.502 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (3/6/7-3)

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.616 VERIFY EXACT LOCATION AND SPACING OF FRAMES WITH MECHANICAL.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-004 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.9K3 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.29IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.



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PROJECT No: 1303300-160254.01

HIGH ROOF FRAMING PLAN AREA C

S-152C

GENERAL HVAC NOTES:

1. INLET DUCT SIZE TO AIR TERMINAL DEVICES SHALL BE SAME AS INLET SIZE UNLESS OTHERWISE NOTED. IF RUNOUT TO AIR TERMINAL BOX IS GREATER THAN 6 FEET IN LENGTH, SIZE RUNOUT ONE EVEN INCREMENT SIZE LARGER (MINIMUM 2" LARGER) UNLESS OTHERWISE NOTED TO WITHIN 3 FEET OF BOX BEFORE REDUCING TO BOX INLET SIZE.
2. DUCTWORK DOWNSTREAM OF AIR TERMINAL BOXES TO BE INTERNALLY LINED FOR A MINIMUM OF 6'-0" FOR SOUND ATTENUATION. OUTLET DUCT SIZES TO MATCH AIR TERMINAL BOX OUTLET UNLESS NOTED OTHERWISE.
3. PROVIDE MANUAL BALANCE DAMPER AT EACH DIFFUSER, GRILLE OR BRANCH TAKE-OFF IN ALL SUPPLY, RETURN AND EXHAUST DUCTWORK EXCEPT KITCHEN GREASE EXHAUST DUCT. LOCATE BALANCE DAMPER AS CLOSE TO BRANCH TAKE-OFF AS POSSIBLE.
4. DUCT SIZE TO DIFFUSERS, REGISTERS, AND GRILLES SHALL BE SAME AS NECK SIZE UNLESS NOTED OR DETAILED OTHERWISE.
5. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH REFLECTED CEILING PLAN.
6. PROVIDE FLEXIBLE DUCTWORK FOR FINAL CONNECTIONS TO SUPPLY AIR DIFFUSERS UNLESS NOTED OTHERWISE ON DRAWINGS OR IN SPECIFICATIONS. FLEXIBLE DUCT SIZE SHALL BE SAME AS NECK SIZE OF DIFFUSER AND SHALL NOT EXCEED 5 FEET IN LENGTH.

KEYED NOTES

7.102 OED OPENING WITH BIRDSCREEN. BOTTOM OF DUCT 18" AFF.

7.105 COORDINATE LOCATION OF FAN WITH VEHICLE EXHAUST RAIL SUPPORTS.

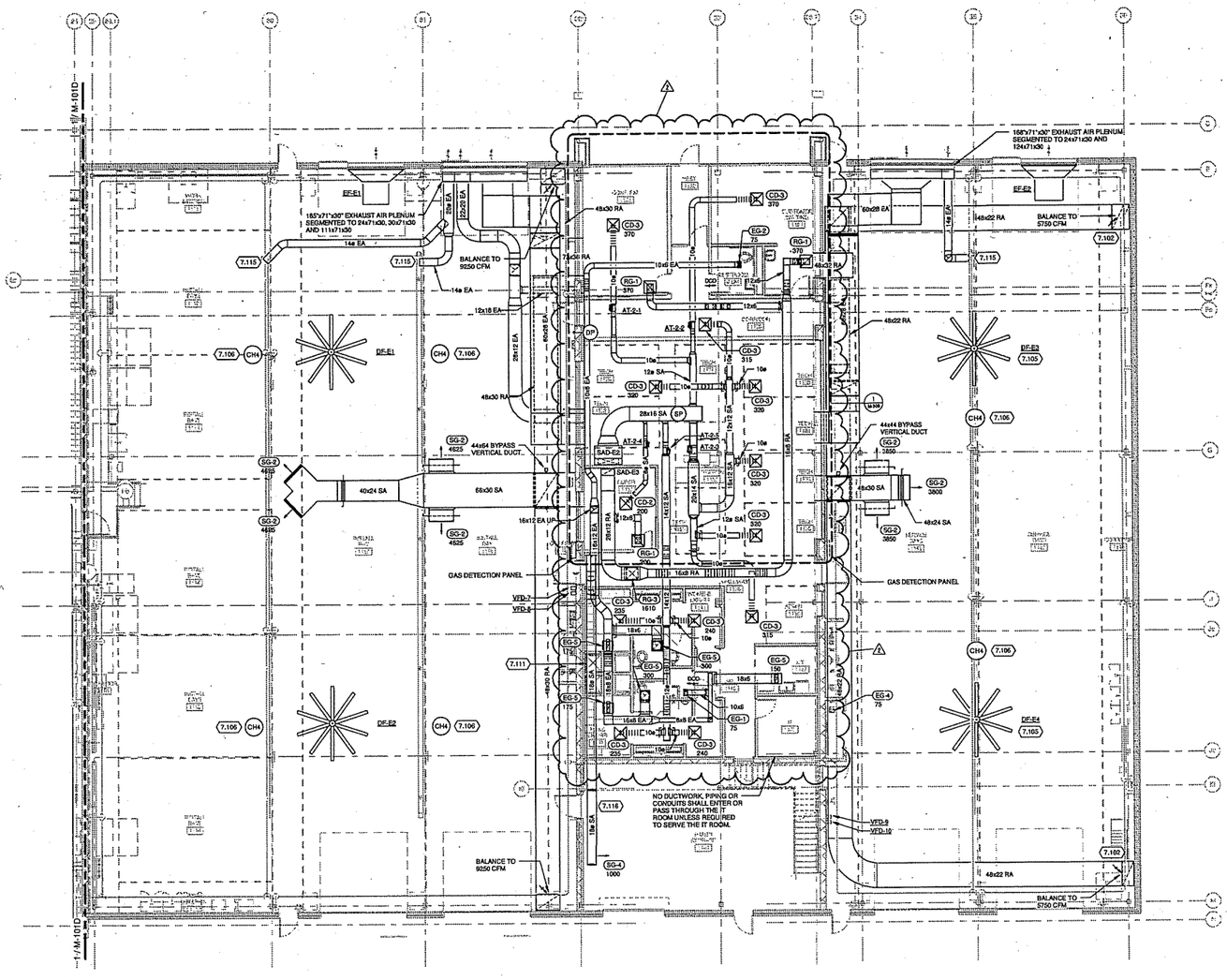
7.106 CNG (METHANE) SENSORS LOCATED ON THE UNDERSIDE OF ROOF STRUCTURE AND DOWN 18" OFF THE METAL DECK.

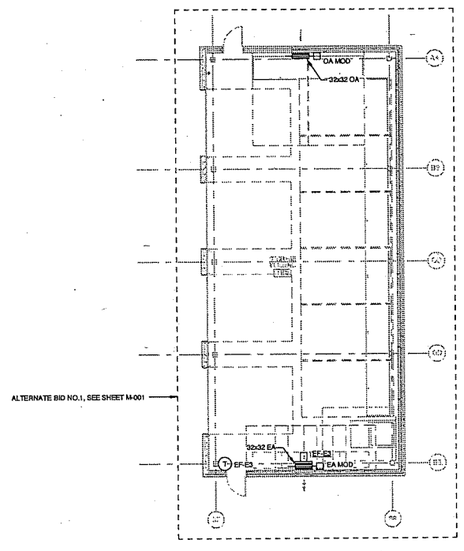
7.111 SUPPLY DUCT ROUTED ON MEZZANINE LEVEL.

7.115 14" EXHAUST FROM VEHICLE EXHAUST RAIL FAN. VERIFY WITH EQUIPMENT PROVIDER CONNECTION SIZES, QUANTITY AND LOCATIONS.

7.116 ROUTE DUCT TIGHT TO STRUCTURE.

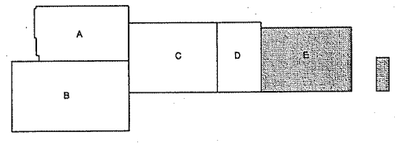
7.121 26X12 RA UP





TRUE NORTH PLAN NORTH

1 LEVEL 1 FLOOR PLAN - HVAC - AREA E
1/8" = 1'-0"



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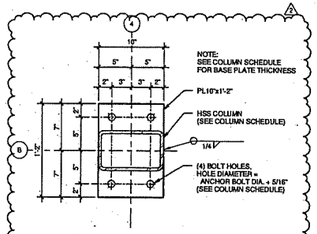
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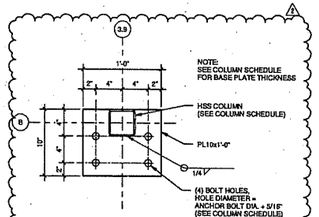
LEVEL 1 FLOOR PLAN - HVAC - AREA E

M-101E

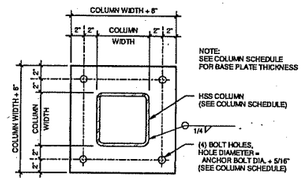
ADDE 2M2



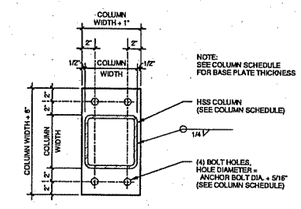
11 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



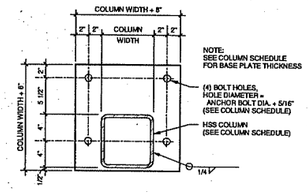
12 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



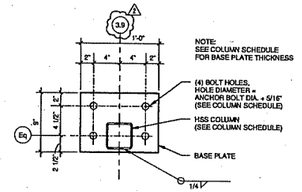
6 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



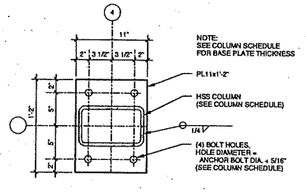
7 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



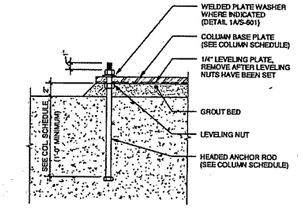
8 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



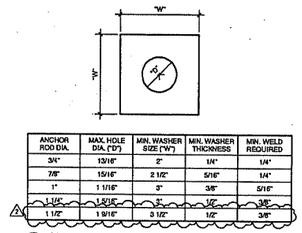
9 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"



10 HSS COLUMN BASE PLATE
1 1/2" = 1'-0"

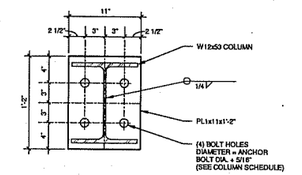


1 BASE PLATE ANCHORAGE
1 1/2" = 1'-0"

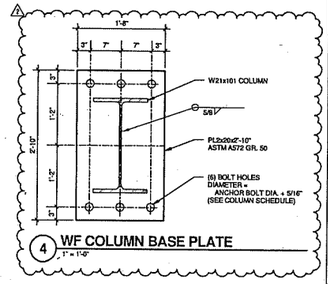


ANCHOR ROD DIA.	MAX. HOLE DIA. ("D")	MIN. WASHER SIZE ("W")	MIN. WASHER THICKNESS	MIN. WELD REQUIRED
3/4"	13/16"	2"	1/4"	1/4"
7/8"	15/16"	2 1/2"	5/16"	1/4"
1"	1 1/16"	3"	3/8"	5/16"
1 1/4"	1 5/16"	3"	1/2"	3/8"
1 1/2"	1 9/16"	3 1/2"	1/2"	3/8"

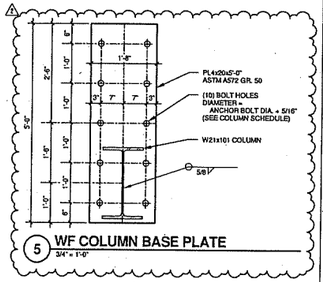
2 WELDED WASHER
6" = 1'-0"



3 WF COLUMN BASE PLATE
1 1/2" = 1'-0"



4 WF COLUMN BASE PLATE
1" = 1'-0"



5 WF COLUMN BASE PLATE
3/4" = 1'-0"

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PROJECT No: 1303500-160264.01

STRUCTURAL SCHEDULE DETAILS

S-602

STRUCTURAL COLUMN SCHEDULE - AREA A

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
A'a-2.5	HSS8X8X5/8	S/S-602	1"	(4) 1" DIA / 18" EMBED	
A'a-2.8	HSS8X4X5/8	S/S-602	1"	(4) 1" DIA / 18" EMBED	
A-4(0'-6")	HSS6X6X3/8	7/S-602			
A-6	HSS8X6X3/8	6/S-602			
A-8	HSS8X6X3/8	6/S-602			
A-11	HSS8X8X3/8	6/S-602			
A-12	HSS10X10X3/8	6/S-602			
A-13	HSS10X10X3/8	6/S-602			
A-14	HSS10X10X3/8	6/S-602			
A-15	HSS10X10X3/8	6/S-602			
A-16	HSS8X8X3/8	6/S-602			
B-3.9	HSS4X4X1/4	12/S-602			
B-4	HSS10X6X1/2	10/S-602			
B-6	HSS6X6X3/8	6/S-602			
B-8	HSS6X6X3/8	6/S-602			
Be-2.5	HSS6X6X5/8	6/S-602			
Bd-2.8	HSS8X8X5/8	6/S-602			
Bp-15	HSS8X8X3/8				
Bp-16	HSS8X8X3/8	7/S-602			
B-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Br-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
D-3.9	HSS4X4X1/4	6/S-602			
D-4	HSS10X6X1/2	6/S-602			
D-6	HSS6X6X3/8	6/S-602			
D-8	HSS8X6X3/8	6/S-602			
D-11	HSS8X8X3/8	6/S-602			
D-12	HSS8X8X3/8	6/S-602			
D-13	HSS8X8X3/8	6/S-602			
D-14	HSS8X8X3/8	6/S-602			
D-15	HSS8X8X3/8	7/S-602			
D-16	HSS8X8X3/8	6/S-602			
Dh-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Dh-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Ep-15	HSS8X8X3/8	7/S-602			
Ep-16	HSS8X8X3/8	6/S-602			
Eq-3.9	HSS4X4X1/4	9/S-602			
Er-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Er-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
F-4	HSS10X6X1/2	10/S-602			
F-6	HSS6X6X3/8	6/S-602			
F-8	HSS8X6X3/8	6/S-602			
Fp-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fp-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fh-11	HSS8X8X3/8	6/S-602			
Fh-12	HSS8X8X3/8	6/S-602			
Fh-13	HSS8X8X3/8	6/S-602			
Fh-14	HSS8X8X3/8	6/S-602			
Fh-15	HSS8X8X3/8	7/S-602			
Fh-16	HSS8X8X3/8	6/S-602			
Fs-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fs-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
H-4	HSS10X6X1/2	10/S-602			
H-6	HSS6X6X3/8	6/S-602			
H-8	HSS6X6X3/8	6/S-602			
H-11	HSS8X8X3/8	7/S-602			
H-12	HSS8X8X3/8				
H-13	HSS8X8X3/8	6/S-602			
H-14	HSS8X8X3/8				
H-15	HSS8X8X3/8	6/S-602			
H-16	HSS8X8X3/8	6/S-602			
Ha-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Ha-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Hu-2.5	HSS8X8X5/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	
Hu-2.8	HSS8X8X5/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	

STRUCTURAL COLUMN SCHEDULE - AREA B

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
I-1	HSS8X8X3/8	6/S-602			
I-2	W21X101	6/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
I-3	HSS8X8X3/8	7/S-602			
I-5	HSS8X8X3/8	6/S-602			
I-7	HSS8X8X3/8	7/S-602			
I-9	HSS8X8X3/8	6/S-602			
I-10	HSS8X8X3/8	6/S-602			
I-12	HSS8X8X3/8	6/S-602			
I-13	HSS8X8X3/8	6/S-602			
I-14	HSS8X8X3/8	6/S-602			
I-15	HSS8X8X3/8	7/S-602			
I-16	HSS8X8X3/8	6/S-602			
Ji-9	HSS8X8X3/8	7/S-602			
Ji-10	HSS8X8X3/8	7/S-602			
Ji-11.8	HSS8X8X3/8	7/S-602			
Ji-12.8	HSS8X8X3/8	7/S-602			
Ji-13.7	HSS8X8X3/8	7/S-602			
Ji-14.5	HSS8X8X3/8	7/S-602			
Ji-15	HSS8X8X3/8	7/S-602			
Jn-3	HSS8X8X3/8	6/S-602			
Jn-5	HSS8X8X3/8	6/S-602			
Jn-7	HSS8X8X3/8	6/S-602			
Jp-16	HSS8X8X3/8	6/S-602			
Kr-1	HSS8X8X3/8	9/S-602			
Kn-15	HSS8X8X3/8	7/S-602			
Kn-16	HSS8X8X3/8	6/S-602			
L-1	HSS8X8X3/8	6/S-602			
L-2	W21X101	4/S-602	2"	(8) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
L-3	HSS8X8X3/8	6/S-602			
L-5	HSS8X8X3/8	6/S-602			
L-7	HSS8X8X3/8	6/S-602			
L-9	HSS8X8X3/8	6/S-602			
L-10	HSS8X8X3/8	6/S-602			
L-12	HSS8X8X3/8	6/S-602			
L-13	HSS8X8X3/8	6/S-602			
L-14	HSS8X8X3/8	6/S-602			
L-15	HSS8X8X3/8	7/S-602			
L-16	HSS10X10X3/8	6/S-602			
Na-15	HSS8X8X3/8	7/S-602			
Na-16	HSS8X8X3/8	6/S-602			
O-1	HSS8X8X3/8	6/S-602			
P-1	HSS8X8X3/8	6/S-602			
P-2	W21X101	4/S-602	2"	(8) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
P-3	HSS8X8X3/8	6/S-602			
P-5	HSS8X8X3/8	6/S-602			
P-7	HSS8X8X3/8	6/S-602			
P-9	HSS8X8X3/8	6/S-602			
P-10	HSS8X8X3/8	6/S-602			
P-12	HSS8X8X3/8	6/S-602			
P-13	HSS8X8X3/8	6/S-602			
P-14	HSS8X8X3/8	6/S-602			
P-15	16"x16"				SEE REMARK 1
P-15	HSS8X8X3/8	6/S-602			
P-16	16"x16"				SEE REMARK 1
P-16	HSS10X10X3/8	6/S-602			
O-1	HSS8X8X3/8	6/S-602			
R-1	HSS8X8X3/8	6/S-602			
R-2	W21X101	4/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
R-3	HSS8X8X3/8	6/S-602			
R-5	HSS8X8X3/8	6/S-602			
R-7	HSS8X8X3/8	6/S-602			
R-9	HSS8X8X3/8	6/S-602			
R-10	HSS8X8X3/8	6/S-602			
R-12	HSS8X8X3/8	6/S-602			
R-13	HSS8X8X3/8	6/S-602			
R-14	HSS8X8X3/8	6/S-602			
R-15	16"x16"				SEE REMARK 1
R-15	HSS8X8X3/8	7/S-602			
R-16	16"x16"				SEE REMARK 1
R-16	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE - AREAS C AND D

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
C-17	HSS8X8X3/8	6/S-602			
C-18	W21X101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
C-19	W12X53	3/S-602			
C-20	W12X53	3/S-602			
C-21	W12X53	3/S-602			
C-22	W12X53	3/S-602			
C-23	W12X53	3/S-602			
C-24	W12X53	3/S-602			
C-25	W12X53	3/S-602			
C-26	W12X53	3/S-602			
C-28	HSS8X8X3/8	6/S-602			
Cm-27	W12X53	3/S-602			
Ep-17	HSS8X8X3/8	6/S-602			
Ea-28	HSS8X8X3/8	6/S-602			
Fc-26	W12X53	3/S-602			
Fc-27	W12X53	3/S-602			
Fh-17	HSS8X8X3/8	6/S-602			
G-17	HSS8X8X3/8	6/S-602			
G-18	W21X101	4/S-602	2"	(8) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
G-19	W12X53	3/S-602			
G-20	W12X53	3/S-602			
G-21	W12X53	3/S-602			
G-22	W12X53	3/S-602			
G-23	W12X53	3/S-602			
G-24	W12X53	3/S-602			
G-25	W12X53	3/S-602			
Gy-26	W12X53	3/S-602			
Gy-27	W12X53	3/S-602			
Hb-28	HSS8X8X3/8				
I-26	HSS8X8X3/8	7/S-602			
I-27	HSS8X8X3/8	7/S-602			
J-17	HSS8X8X3/8	6/S-602			
J-18	W21X101	4/S-602	2"	(8) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
J-19	HSS8X8X3/8	6/S-602			
J-20	HSS8X8X3/8	6/S-602			
J-21	HSS8X8X3/8	6/S-602			
J-22	HSS8X8X3/8	6/S-602			
J-23	HSS8X8X3/8	6/S-602			
J-24	HSS8X8X3/8	6/S-602			
J-25	HSS8X8X3/8	6/S-602			
J-28	HSS8X8X3/8	6/S-602			
Jp-17	HSS8X8X3/8	6/S-602			
Kn-17	HSS8X8X3/8	6/S-602			
N-17	HSS8X8X3/8	6/S-602			
N-18	W3IX101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
N-19	HSS8X8X3/8	6/S-602			
N-20	HSS8X8X3/8	6/S-602			
N-21	HSS8X8X3/8	6/S-602			
N-22	HSS8X8X3/8	6/S-602			
N-23	HSS8X8X3/8	6/S-602			
N-24	HSS8X8X3/8	6/S-602			
N-25	HSS8X8X3/8	6/S-602			
N-26	HSS8X8X3/8	6/S-602			
N-27	HSS8X8X3/8	6/S-602			
N-28	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE - AREA E

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
AA-37	HSS8X8X3/8	6/S-602			
AA-38	HSS8X8X3/8	6/S-602			
BB-37	HSS8X8X3/8	6/S-602			
BB-38	HSS8X8X3/8	6/S-602			
CC-37	HSS8X8X3/8	6/S-602			
CC-38	HSS8X8X3/8	6/S-602			
Cn-32	HSS6X6X3/16	6/S-602			
Cn-33.8	HSS6X6X3/16	7/S-602			
DD-37	HSS8X8X3/8	6/S-602			
DD-38	HSS8X8X3/8	6/S-602			
E-29	HSS8X8X3/8	6/S-602			
E-30	HSS10X10X3/8	6/S-602			
E-31	HSS10X10X3/8	6/S-602			
E-32	HSS10X10X3/8	6/S-602			
E-33	HSS10X10X3/8	6/S-602			
E-34	HSS10X10X3/8	9/S-602			
E-35	HSS10X10X3/8	6/S-602			
E-36	HSS8X8X3/8	6/S-602			
EE-37	HSS8X8X3/8	6/S-602			
EE-38	HSS8X8X3/8	6/S-602			
Fb-32	HSS8X8X3/8	6/S-602			
Fb-33	HSS8X8X3/8	6/S-602			
Fb-33.7	HSS6X6X3/8	7/S-602			
Fe-35	HSS10X10X3/8	6/S-602			
Fk-30	HSS8X8X3/8	6/S-602			
G-29.1	HSS8X8X3/8	6/S-602			
G-31	HSS8X8X3/8	6/S-602			
G-32	HSS8X8X3/8	6/S-602			
G-33	HSS8X8X3/8	6/S-602			
G-33.7	HSS8X8X3/8	7/S-602			
G-34	HSS8X8X3/8	6/S-602			
G-35	HSS8X8X3/8	6/S-602			
G-36	HSS8X8X3/8	6/S-602			
J-29	HSS8X8X3/8	6/S-602			
J-31	HSS8X8X3/8	6/S-602			
J-32	HSS8X8X3/8	6/S-602			
J-33	HSS8X8X3/8	6/S-602			
J-33.7	HSS8X8X3/8	7/S-602			
J-34	HSS8X8X3/8	6/S-602			
J-35	HSS8X8X3/8	6/S-602			
J-36	HSS8X8X3/8	6/S-602			
Je-30	HSS8X8X3/8	6/S-602			
Jy-33.7	HSS8X8X3/8	7/S-602			
Jy-36	HSS8X8X3/8	6/S-602			
Kf-32	HSS8X8X3/8	6/S-602			
Kf-33	HSS8X8X3/8	6/S-602			
M-29	HSS8X8X3/8	6/S-602			
M-30	HSS8X8X3/8	6/S-602			
M-31	HSS8X8X3/8	6/S-602			
M-32	HSS8X8X3/8	6/S-602			
M-33	HSS8X8X3/8	6/S-602			
M-34	HSS8X8X3/8	6/S-602			
M-35	HSS8X8X3/8	6/S-602			
M-36	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE GENERAL NOTES

1.
2.
3.

STRUCTURAL COLUMN SCHEDULE REMARKS

1. PRECAST COLUMN. PRECAST SUPPLIER TO DESIGN COLUMN FOR FOR AXIAL LOAD GIVEN ON PLAN.
2. ANCHORS SHALL BE HEAVY HEX HEAD ASTM F1554 GR.36. USE WELDED WASHERS PER DETAIL 2/S-602.

CONCRETE STRIP FOOTING SCHEDULE

MARK	SIZE WIDTH "W"	SIZE HEIGHT "H"	TOP REINFORCEMENT LONG.	TOP REINFORCEMENT TRANS.	BOTTOM REINFORCEMENT LONG.	BOTTOM REINFORCEMENT TRANS.	REMARKS
SF1.5	1'-6"	1'-0"			(2) #5		
SF3	3'-0"	1'-0"			(3) #5 BARS		
SF4	4'-0"	1'-0"	(3) #6 BARS	#6 BARS AT 18" O.C.	(3) #6 BARS	#6 BARS AT 18" O.C.	

CONCRETE STRIP FOOTING SCHEDULE NOTES

1. SEE NOTE SHEET S-001 FOR BEARING SOILS PREPARATION REQUIREMENTS.
2. SEE 1/S-501 FOR TYPICAL FOOTING INTERSECTION REINFORCING.
3. EMBED DOWELS INTO FOOTING, 3" CLEAR COVER FROM BOTTOM OF FOOTING.
4. EXCEPT WHERE SPECIFICALLY NOTED, TYPE "A" FOOTING DOWELS SHALL BE TIED IN PLACE PRIOR TO CONCRETE PLACEMENT.

CONCRETE SPREAD FOOTING SCHEDULE

MARK	SIZE WIDTH	SIZE LENGTH	SIZE THICKNESS	BOTTOM REINFORCEMENT LONG.	BOTTOM REINFORCEMENT TRANS.	TOP REINFORCEMENT LONG.	TOP REINFORCEMENT TRANS.	REMARKS
F4	4'-0"	4'-0"	1'-6"	(6) #5 BARS	(6) #5 BARS	-	-	
F5A	4'-0"	5'-6"	1'-6"	(6) #5 BARS	(7) #5 BARS	-	-	
F5	5'-0"	5'-0"	1'-6"	(8) #5 BARS	(8) #5 BARS	-	-	
F7A	4'-0"	7'-0"	2'-0"	(6) #6 BARS	(9) #6 BARS	(6) #6 BARS	(9) #6 BARS	
F7B	4'-3"	7'-3"	2'-0"	(6) #6 BARS	(9) #6 BARS	(6) #6 BARS	(9) #6 BARS	
F8	8'-0"	8'-0"	2'-0"	(10) #6 BARS	(10) #6 BARS	-	-	
F8A	4'-0"	8'-0"	2'-0"	(5) #6 BARS	(10) #6 BARS	(5) #6 BARS	(10) #6 BARS	
F9A	6'-0"	9'-6"	2'-0"	(9) #6 BARS	(11) #6 BARS	(9) #6 BARS	(11) #6 BARS	
F10A	9'-0"	10'-6"	2'-6"	(11) #7 BARS	(11) #7 BARS	(11) #7 BARS	(11) #7 BARS	
F12	12'-0"	12'-0"	3'-0"	(12) #8 BARS	(12) #8 BARS	(12) #8 BARS	(12) #8 BARS	REMARK 1

CONCRETE SPREAD FOOTING SCHEDULE GENERAL NOTES

1. SEE NOTE SHEET S-001 FOR BEARING SOILS PREPARATION REQUIREMENTS.
2. -

CONCRETE SPREAD FOOTING SCHEDULE REMARKS

1. COMMUNICATIONS TOWER FOOTING, SEE DETAIL 13/S-502.
2. -

FOUNDATION WALL SCHEDULE

MARK	WIDTH	REINFORCEMENT HORIZONTAL	REINFORCEMENT VERTICAL	REMARKS
FW08	8'-8"	#5 BARS AT 18" O.C. CENTERED	#5 BARS AT 18" O.C. CENTERED	
FW09	9'-9"	#5 BARS AT 18" O.C. EACH FACE	#5 BARS AT 18" O.C. EACH FACE	
FW10.5	0'-10 1/2"	#5 BARS AT 18" O.C. EACH FACE	#5 BARS AT 18" O.C. EACH FACE	
FW12	1'-0"	#5 BARS AT 18" O.C. EACH FACE	#5 BARS AT 18" O.C. EACH FACE	

CONCRETE PIER SCHEDULE

MARK	SIZE	VERTICAL REINFORCEMENT	TIES TYPE	TIES # AND SPACING	REMARKS
P18	18" X 18"	(8) #6 BARS	B	#3 AT 12"	
P22	22" X 22"	(8) #7 BARS	B	#3 AT 12"	
P66	66" X 66"	-	-	-	SEE REMARK 1
P1320	13" X 20"	(6) #7 BARS	D	#3 AT 12"	
P1422	14" X 22"	(6) #7 BARS	D	#3 AT 12"	
P2422	24" X 22"	(8) #6 BARS	B	#3 AT 12"	
P3648	36" X 48"	-	-	-	SEE REMARK 2
P3666	36" X 66"	-	-	-	SEE REMARK 3

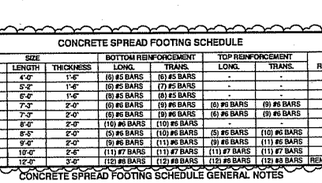
CONCRETE PIER SCHEDULE GENERAL NOTES

1. SEE FOUNDATION PLANS FOR TOP OF PIER ELEVATIONS.
2. REFERENCE TYPICAL TIE DETAILS FOR CROSS-TIE REQUIREMENTS.
3. WHEN PIERS ARE INTEGRAL WITH WALLS, PIER DIMENSIONS ARE INDICATED FOR THE PURPOSE OF DIMENSIONING PIER TIES. SETTING VERTICAL REINFORCING, DEFINING EXTENT OF TOP OF PIER RECESS OR PROJECTION FROM TOP OF WALL. CENTER PIER REINFORCING CAGE BELOW COLUMN AND ORIENT LONG DIMENSION OF PIER WITH AXIS OF WALL UNLESS NOTED OR DETAILED OTHERWISE. CONTINUE WALL REINFORCING THROUGH PIERS WITH LAPS AS REQUIRED.
4. SEE DETAIL 10/S-501 FOR TYPICAL PIER CONSTRUCTION.

CONCRETE PIER SCHEDULE REMARKS

1. COMMUNICATIONS TOWER PIER, SEE DETAIL 13/S-502.
2. PIER IN GRADE BEAM GB3656, SEE DETAILS 1/S-504, 5/S-504, AND 7/S-504.
3. PIER IN GRADE BEAM GB3656, SEE DETAILS 2/S-504, 6/S-504, AND 7/S-504.

TYPICAL TIE DETAILS



LINTEL SCHEDULE

MARK	DESCRIPTION	BEARING	DETAIL	REMARKS
L19	1 COURSE BOND BEAM WITH (2) #5 AT BOTTOM	4" E.E.		NO BOTTOM PLATE
L20	2 COURSE BOND BEAM WITH (2) #5 AT BOTTOM	4" E.E.		NO BOTTOM PLATE
L21	3 COURSE BOND BEAM WITH (2) #4 AT TOP AND BOTTOM	8" E.E.		NO BOTTOM PLATE

LINTEL SCHEDULE GENERAL NOTES

1. ALL LINTELS SHALL HAVE 1/4" THICK BOTTOM PLATE TO MATCH WIDTH OF WALL MINUS 1/4" EACH SIDE U.N.O.
2.
3.

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 I

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

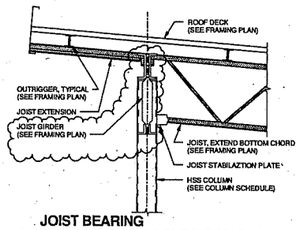
No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	03/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 13035O0-160284.01

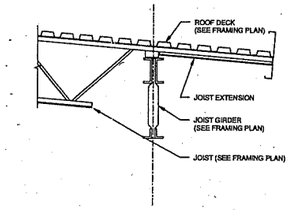
STRUCTURAL SCHEDULES

S-601

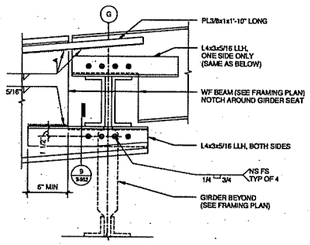
ADDEN. #2



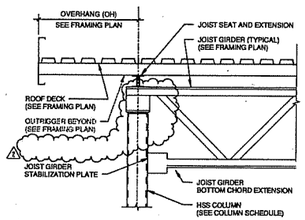
15 JOIST BEARING ON GIRDER AT CORNER COLUMN
3/4" = 1'-0"



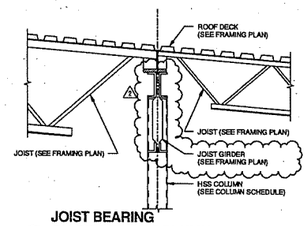
10 JOIST BEARING AT GIRDER
3/4" = 1'-0"



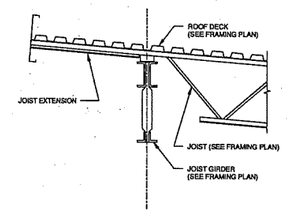
6 WF BEAM BEARING AT WF COLUMN
1 1/2" = 1'-0"



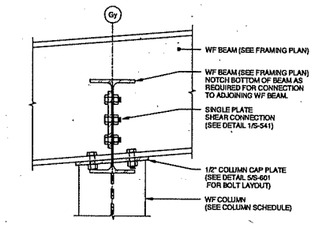
1 GIRDER AT CORNER COLUMN
3/4" = 1'-0"



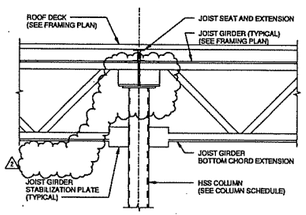
16 JOIST BEARING ON GIRDER AT COLUMN
3/4" = 1'-0"



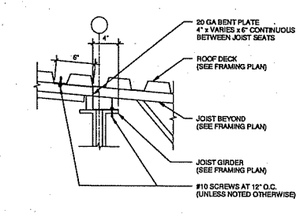
11 JOIST BEARING AT GIRDER
3/4" = 1'-0"



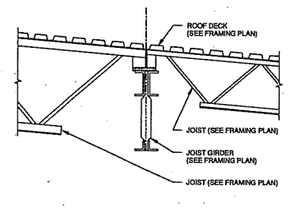
7 WF BEAM TO COLUMN CONNECTION
1 1/2" = 1'-0"



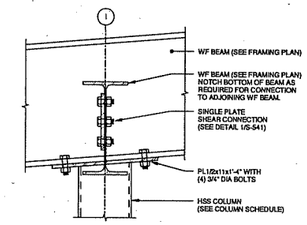
2 GIRDER AT SIDE COLUMN
3/4" = 1'-0"



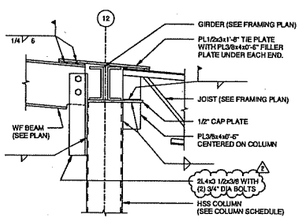
17 GIRDER EAVE CONDITION TYPICAL
1 1/2" = 1'-0"



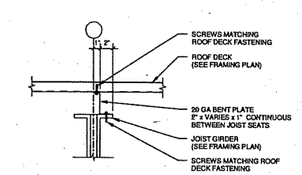
12 JOIST BEARING AT GIRDER
3/4" = 1'-0"



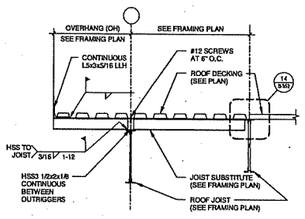
8 WF BEAM TO COLUMN CONNECTION
1 1/2" = 1'-0"



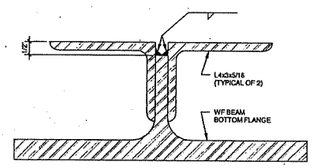
3 FRAMING CONNECTION
1" = 1'-0"



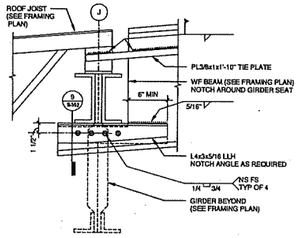
18 GIRDER AT RAKES CONDITION TYP
1 1/2" = 1'-0"



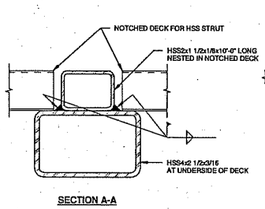
13 OUTRIGGER SECTION
3/4" = 1'-0"



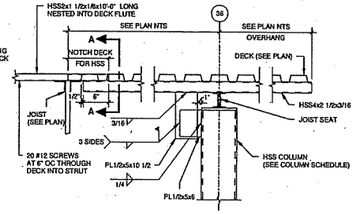
9 GIRDER SUPPORT BRACKET
6" = 1'-0"



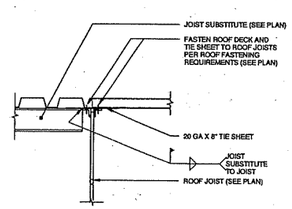
4 ROOF FRAMING CONNECTION
1 1/2" = 1'-0"



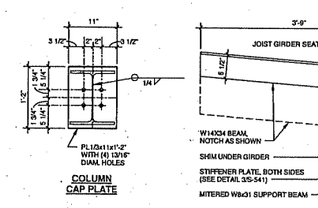
SECTION A-A



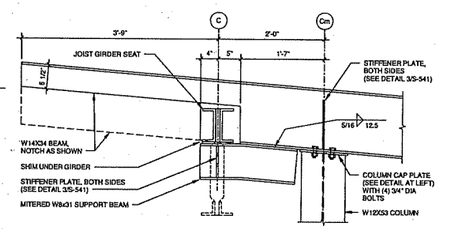
19 COLUMN TO DECK CONNECTION
1" = 1'-0"



14 JOIST SUBSTITUTE AT JOIST
1 1/2" = 1'-0"



COLUMN CAP PLATE



5 CANTILEVERED ROOF BEAM
1" = 1'-0"

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ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

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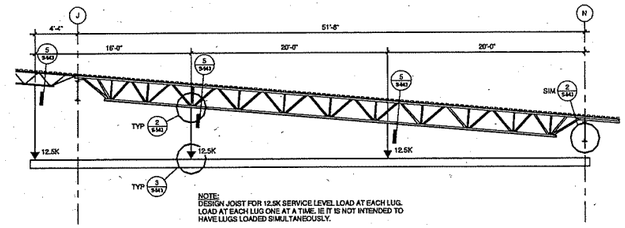
NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
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	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

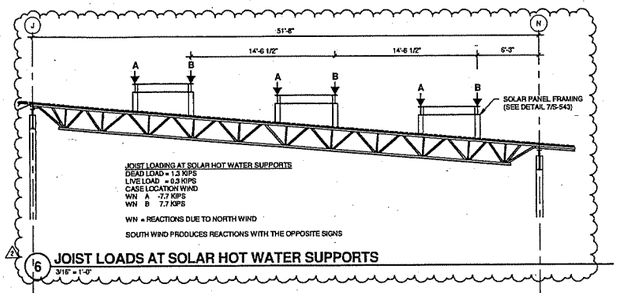
PROJECT No: 1303500-160264.01

STRUCTURAL ROOF FRAMING DETAILS

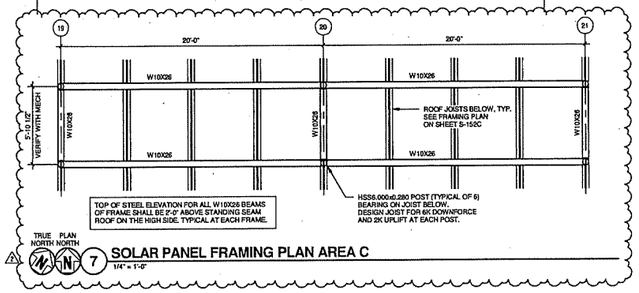
S-552



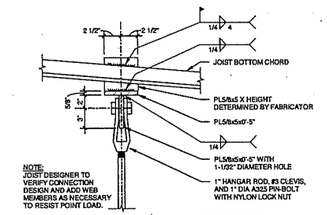
1 JOIST LOADS FOR FALL PROTECTION SUPPORT FRAMING
3/16" = 1'-0"



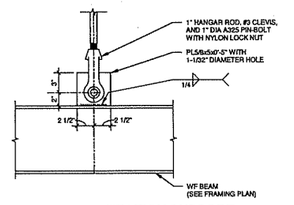
6 JOIST LOADS AT SOLAR HOT WATER SUPPORTS
3/16" = 1'-0"



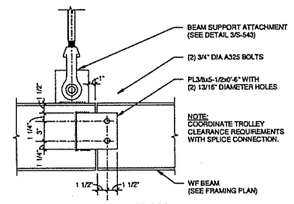
7 SOLAR PANEL FRAMING PLAN AREA C
1/4" = 1'-0"



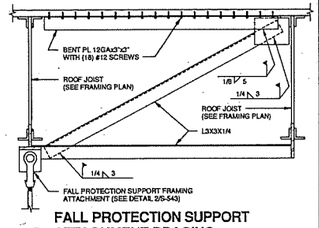
2 FALL PROTECTION SUPPORT ATTACHMENT AT JOIST
1 1/2" = 1'-0"



3 FALL PROTECTION SUPPORT ATTACHMENT AT BEAM
1 1/2" = 1'-0"



4 FALL PROTECTION SUPPORT BEAM SPLICE
1 1/2" = 1'-0"



5 FALL PROTECTION SUPPORT ATTACHMENT BRACING
1" = 1'-0"

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No	REVISION/SUBMISSION	DATE
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	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

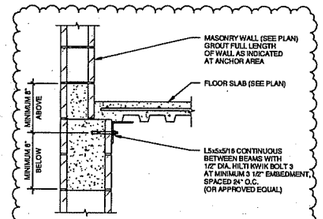
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PROJECT No: 13035500-160854.01

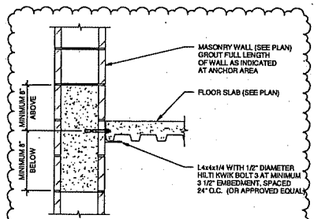
STRUCTURAL FRAMING DETAILS

S-543

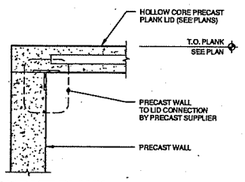
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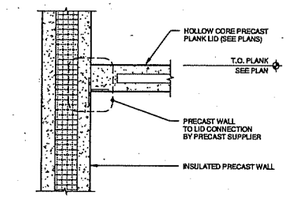
16 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



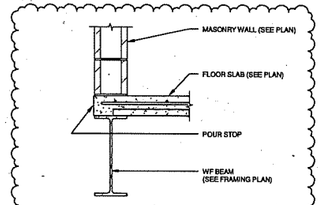
11 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



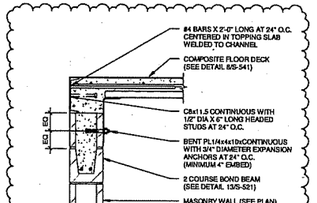
PRECAST PLANK BEARING ON PRECAST WALL
6 1" = 1'-0"
SIMILAR AT SIDELAP



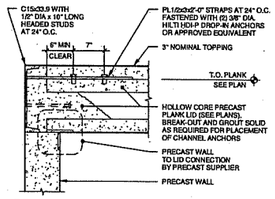
PRECAST PLANK BEARING ON PRECAST WALL
1 1" = 1'-0"
SIMILAR AT SIDELAP



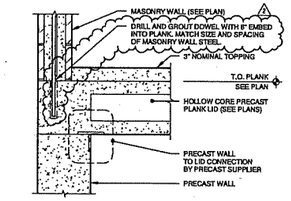
17 DECK BEARING AT WF BEAM
1" = 1'-0"



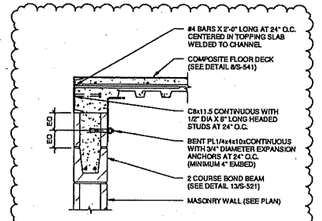
12 DECK BEARING AT MASONRY WALL
1" = 1'-0"



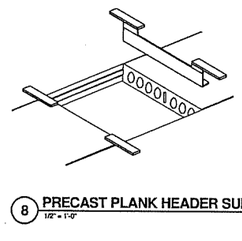
PRECAST PLANK BEARING ON PRECAST WALL
7 1" = 1'-0"
SIMILAR AT SIDELAP



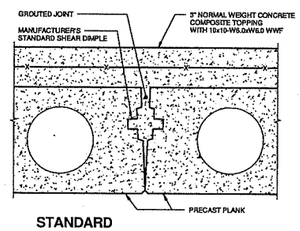
PRECAST PLANK BEARING ON PRECAST WALL
2 1" = 1'-0"
SIMILAR AT SIDELAP



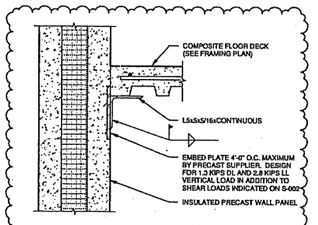
13 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



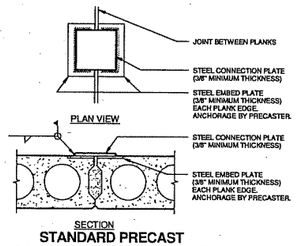
PRECAST PLANK HEADER SUPPORT
8 1/2" = 1'-0"



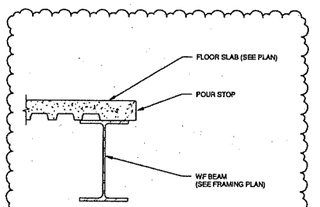
STANDARD PRECAST PLANK SHEAR DIMPLE
3 3" = 1'-0"



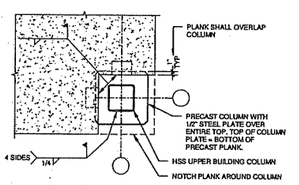
14 DECK SIDELAP AT PRECAST WALL
1 1/2" = 1'-0"



STANDARD PRECAST SHEAR DIMPLE WITH WELD PLATES
4 1 1/2" = 1'-0"



15 DECK SIDELAP AT WF BEAM
1" = 1'-0"



PRECAST PLANK TO PRECAST COLUMN ATTACHMENT
5 3/4" = 1'-0"

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ADDENDUM 2

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FLEET/FIRE/RADIO SHOP
FACILITY

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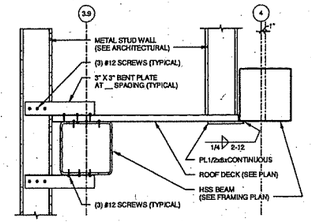
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No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

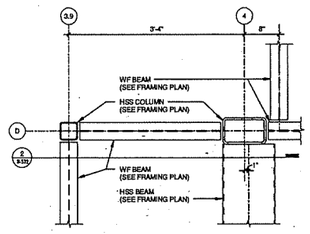
PROJECT No: 13003500-160264.01

STRUCTURAL FRAMING DETAILS

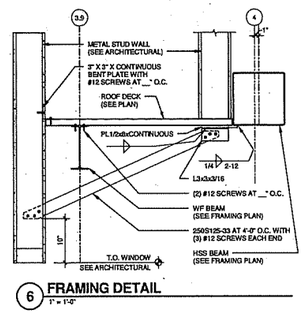
S-542



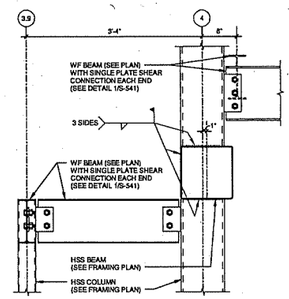
5 **FRAMING DETAIL**
1" = 1'-0"



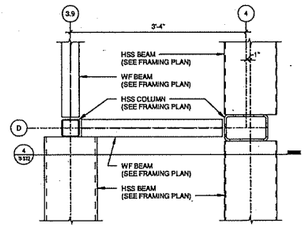
1 **FRAMING PLAN DETAIL**
1" = 1'-0"



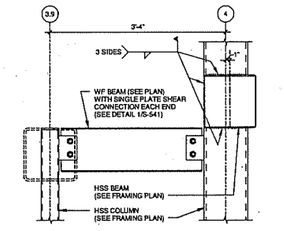
6 **FRAMING DETAIL**
1" = 1'-0"



2 **FRAMING DETAIL**
1" = 1'-0"



3 **FRAMING PLAN DETAIL**
1" = 1'-0"



4 **FRAMING DETAIL**
1" = 1'-0"

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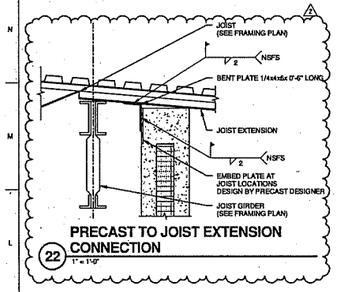
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	ISSUE FOR BID	02/07/2019

PROJECT No: 1303500-160264.01

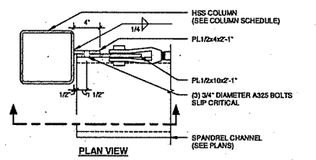
STRUCTURAL FRAMING DETAILS

S-532

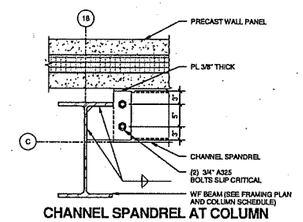
ADDENDUM 2



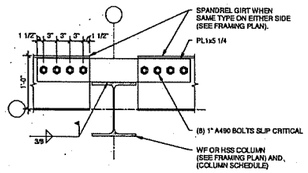
22 PRECAST TO JOIST EXTENSION CONNECTION
1" = 1'-0"



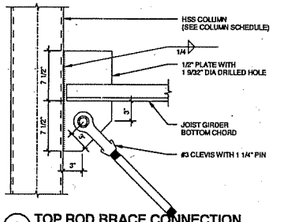
19 SPANDREL CHANNEL AT BRACE PLATE
1 1/2" = 1'-0"



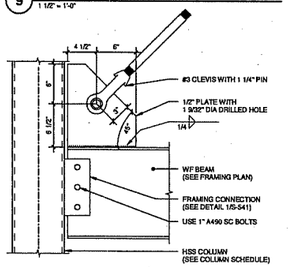
14 CHANNEL SPANDREL AT COLUMN CONNECTION
1" = 1'-0"



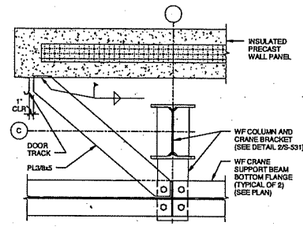
15 SPANDREL AT COLUMN CONNECTION
1" = 1'-0"



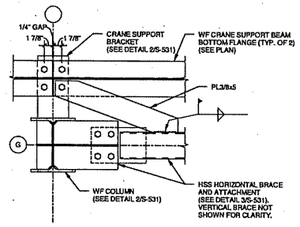
9 TOP ROD BRACE CONNECTION
1 1/2" = 1'-0"



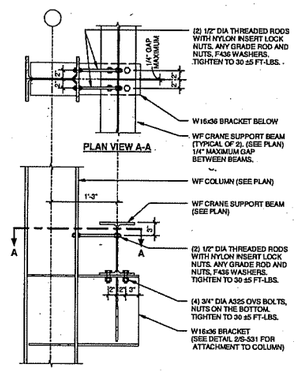
10 BOTTOM ROD BRACE CONNECTION
1 1/2" = 1'-0"



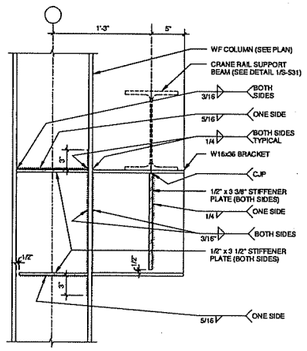
5 HORIZ CRANE BRACE TO PRECAST
1" = 1'-0"



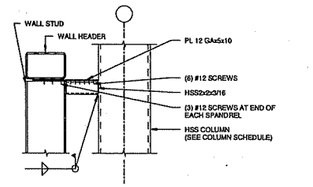
6 HORIZ CRANE BRACE TO HSS BEAM
1" = 1'-0"



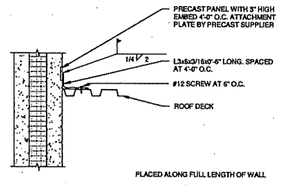
1 CRANE RAIL SUPPORT FRAMING
1" = 1'-0"



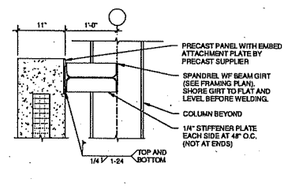
2 CRANE RAIL BRACKET ATTACHMENT
1 1/2" = 1'-0"



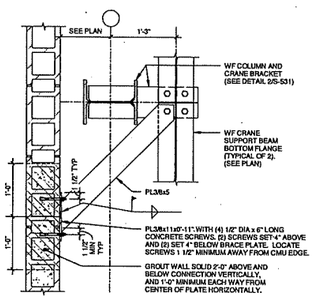
20 SPANDREL TO COLUMN CONNECTION
1 1/2" = 1'-0"



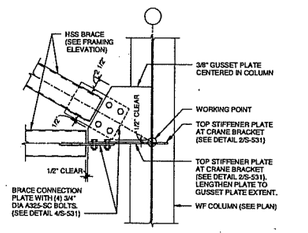
16 PRECAST TO DECK CONNECTION
1" = 1'-0"



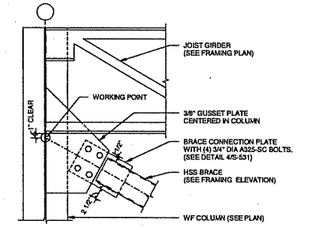
11 WF SPANDREL ATTACHMENT
1" = 1'-0"



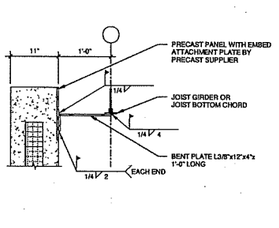
7 HORIZ CRANE BRACE TO CMU
1" = 1'-0"



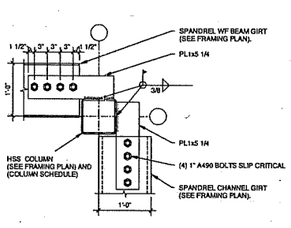
3 BOTTOM CRANE BRACE CONNECTION
1" = 1'-0"



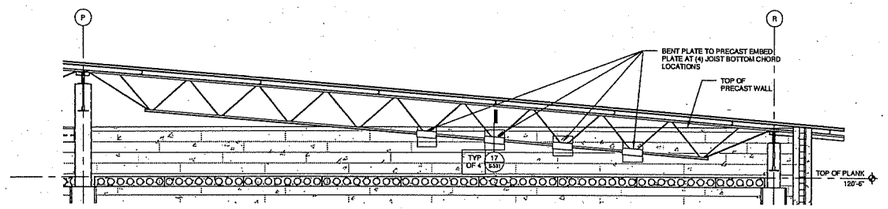
21 TOP CRANE BRACE CONNECTION
1" = 1'-0"



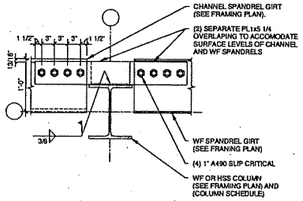
17 PRECAST TO JOIST CONNECTION
1" = 1'-0"



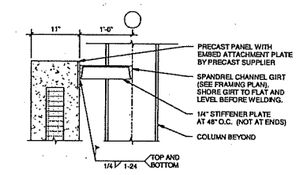
12 SPANDREL AT CORNER HSS COLUMN
1" = 1'-0"



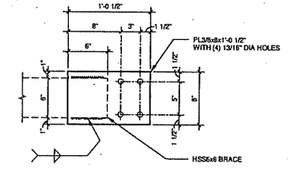
18 STRUCTURAL FRAMING ELEVATION ALONG GRID "16" (LOOKING EAST)
3/8" = 1'-0"



13 SPANDREL (2 TYPES) CONNECTION
1" = 1'-0"



8 CHANNEL SPANDREL ATTACHEMNT
1" = 1'-0"



4 CRANE BRACE CONNECTION PLATE
1 1/2" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 250 7979 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

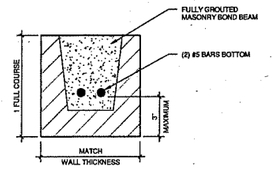
NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

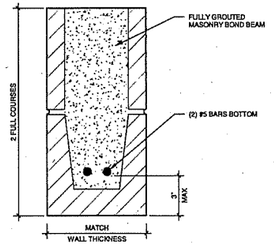
PROJECT No: 1303500-160264.01

STRUCTURAL FRAMING DETAILS

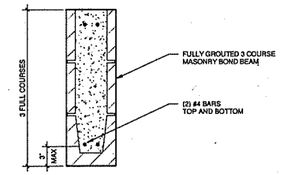
S-531



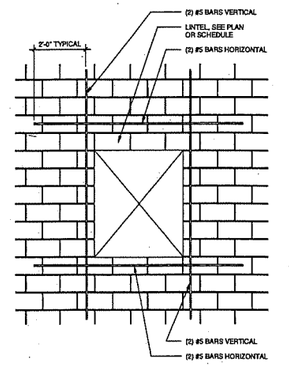
12 BOND BEAM LINTEL L19
3" = 1'-0"



13 BOND BEAM LINTEL L20
3" = 1'-0"

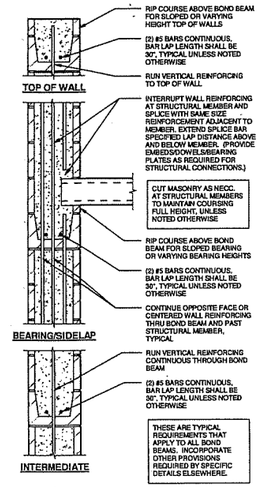


14 BOND BEAM LINTEL L21
1 1/2" = 1'-0"

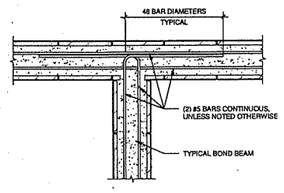


NOTE:
IN ADDITION TO OPENINGS SHOWN ON THE DRAWINGS, MASONRY AND STEEL WORK SHALL INCLUDE PROVIDING MASONRY WALL OPENINGS AND ASSOCIATED LINTELS REQUIRED FOR MECHANICAL/ELECTRICAL EQUIPMENT (OTHER THAN INDIVIDUAL PIPE PENETRATIONS FIELD DRILLED BY THE APPROPRIATE TRADES DURING THEIR WORK), INCLUDING COORDINATING WITH OTHER TRADES, GENERAL CONTRACTOR, ARCHITECT/ENGINEER, AND FINAL MECHANICAL AND ELECTRICAL DRAWINGS TO VERIFY EXACT SIZES AND LOCATIONS OF ALL SUCH OPENINGS AS WORK PROGRESSES. FINAL SIZES MAY NOT BE AVAILABLE UNTIL EQUIPMENT SHOP DRAWINGS ARE RECEIVED FROM SUCCESSFUL BIDDERS. ALL PARTIES SHOULD BE PREPARED TO PLAN AND COOPERATE ACCORDINGLY TO AVOID UNNECESSARY DELAYS IN THE WORK.

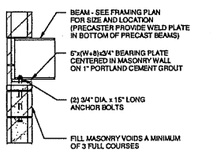
9 TYPICAL MASONRY OPENING REINFORCEMENT
1/2" = 1'-0"



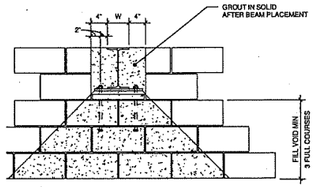
5 TYPICAL MASONRY BOND BEAM
1" = 1'-0"



6 TYPICAL MASONRY BOND BEAM INTERSECTION
3/4" = 1'-0"



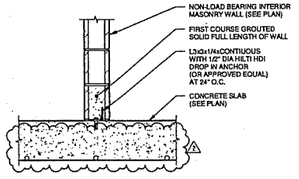
SECTION



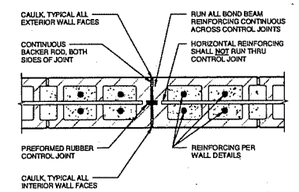
ELEVATION

SIMILAR AT TUBE BEAMS AND PRECAST BEAMS

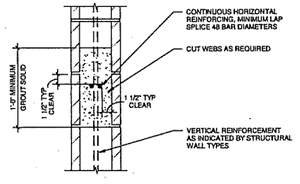
10 STEEL BEAM BEARING ON MASONRY
3/4" = 1'-0"



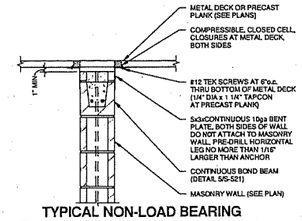
7 TYPICAL NON-LOAD BEARING MASONRY WALL BASE CONNECTION
1" = 1'-0"



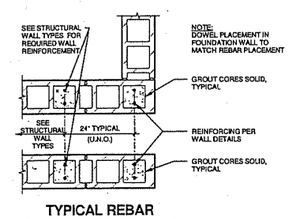
3 TYPICAL MASONRY CONTROL JOINT
1 1/2" = 1'-0"



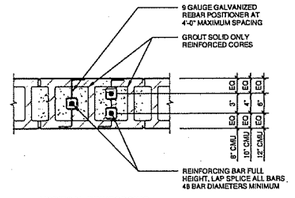
HORIZONTAL REINFORCING



8 TYPICAL NON-LOAD BEARING MASONRY WALL TOP CONNECTION
1" = 1'-0"

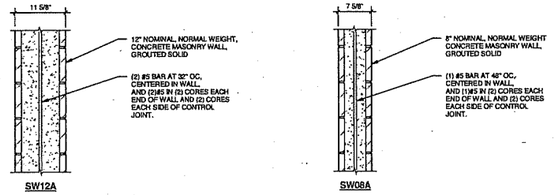


4 TYPICAL REBAR PLACEMENT IN MASONRY WALL
1" = 1'-0"



VERTICAL REINFORCING

2 TYPICAL BAR PLACEMENT IN MASONRY CORE
1 1/2" = 1'-0"



1 STRUCTURAL WALL TYPES
1" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 699 7878 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

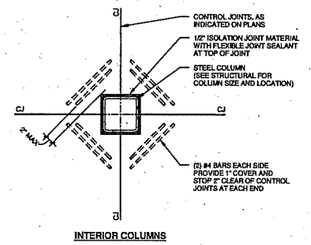
NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

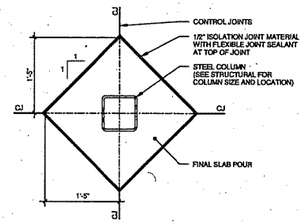
PROJECT No: 1303500-160264.01

STRUCTURAL WALL DETAILS

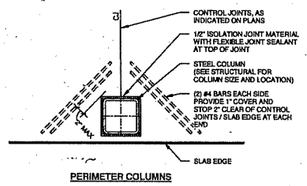
S-521



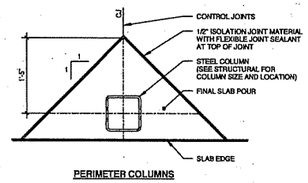
INTERIOR COLUMNS



INTERIOR COLUMNS

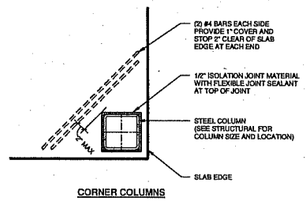


PERIMETER COLUMNS



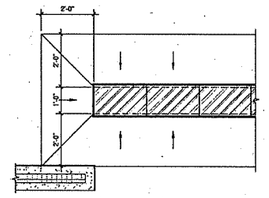
PERIMETER COLUMNS

12 SLAB JOINTS AT ISOLATED COLUMN
1" = 1'-0"

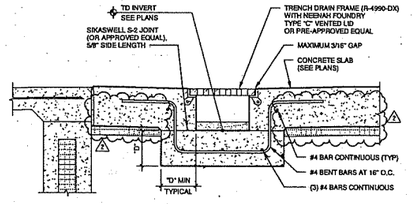


CORNER COLUMNS

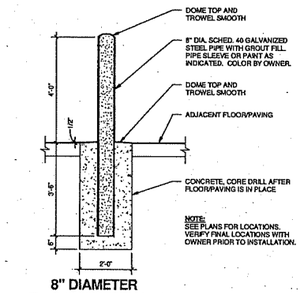
15 SLAB JOINTS AT ISOLATED COLUMN
1" = 1'-0"



16 CONCRETE TRENCH DRAIN
1/2" = 1'-0"

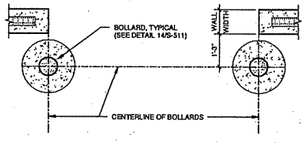


17 CONCRETE TRENCH DRAIN SECTION
1" = 1'-0"

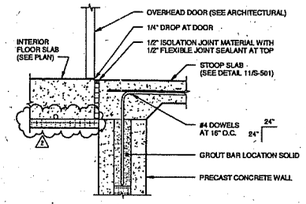


NOTE:
SEE PLANS FOR LOCATIONS. VERIFY FINAL LOCATIONS WITH OWNER PRIOR TO INSTALLATION.

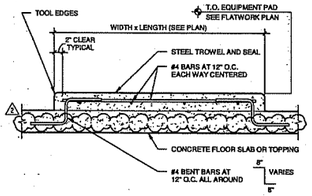
8" DIAMETER GALVANIZED BOLLARD POST
14 1/2" = 1'-0"



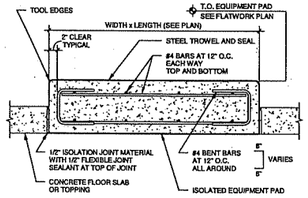
13 BOLLARD LOCATION PLAN
NO SCALE



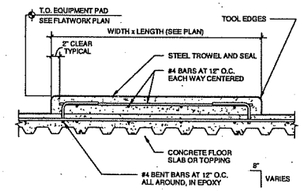
7 STOOP SLAB AT OVERHEAD DOOR
1" = 1'-0"



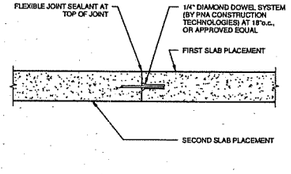
8 GROUND LEVEL EQUIPMENT PADS
NO SCALE



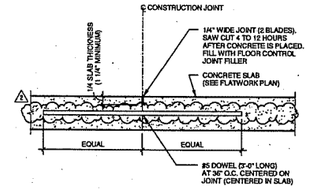
9 ISOLATED EQUIPMENT PADS
NO SCALE



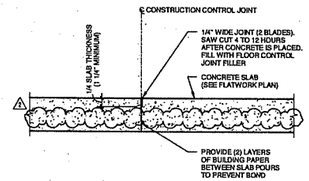
10 MEZZANINE EQUIPMENT PADS
1" = 1'-0"



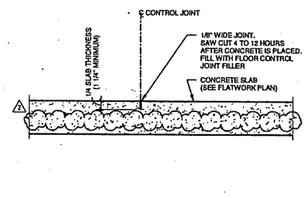
11 CONCRETE SLAB DOWELED JOINT
1 1/2" = 1'-0"



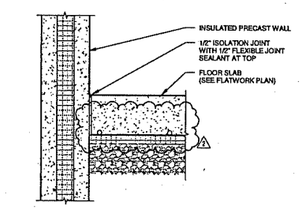
2 CONCRETE SLAB CONSTRUCTION JOINT (TYPICAL)
NO SCALE



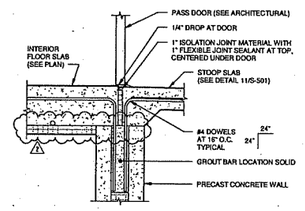
3 CONCRETE SLAB CONSTRUCTION CONTROL JOINT "CCJ" (TYPICAL)
NO SCALE



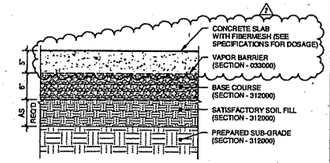
4 CONCRETE SLAB CONTROL JOINT "CJ" (TYPICAL)
NO SCALE



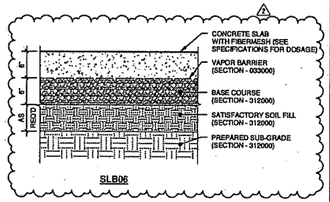
5 SLAB AT PRECAST WALL
NO SCALE



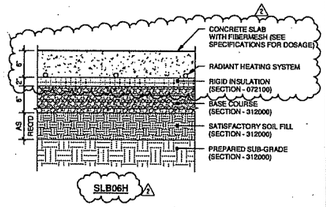
6 STOOP SLAB AT PASS DOOR
1" = 1'-0"



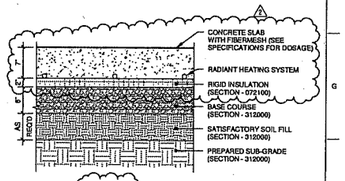
SLB05



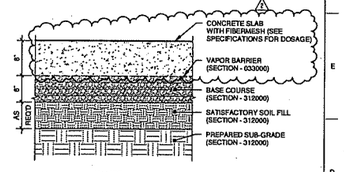
SLB06



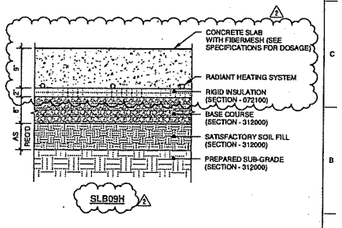
SLB06H



SLB07H



SLB08



SLB09H

1 STRUCTURAL SLAB TYPES
1" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 300
ARLINGTON, VA 22209
571 280 7979 1

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY
4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714
ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

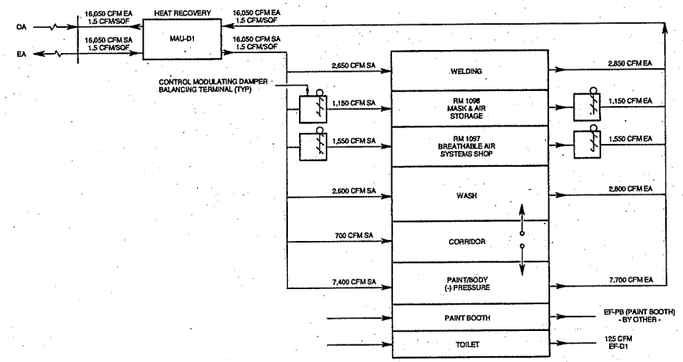
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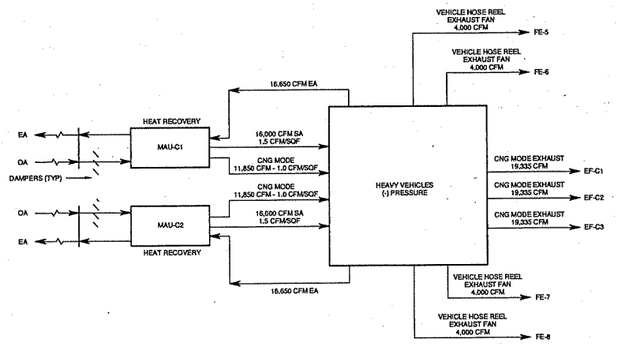
FLATWORK DETAILS

S-511

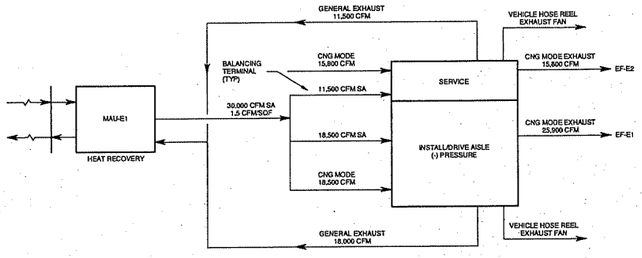
ADDENDUM 2



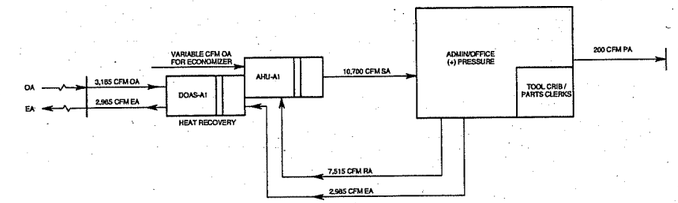
5 WELDING, WASH, PAINT AND BODY AIRFLOW DIAGRAM
NO SCALE



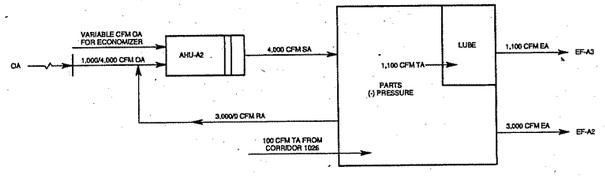
6 HEAVY VEHICLE MAINTENANCE AIRFLOW DIAGRAM
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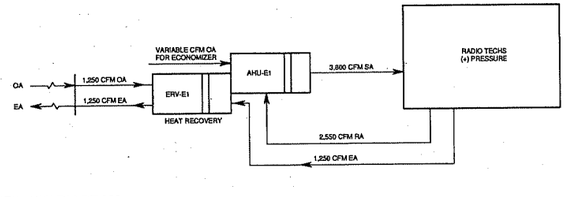
7 RADIO INSTALL - RADIO SERVICE AIRFLOW DIAGRAM
NO SCALE



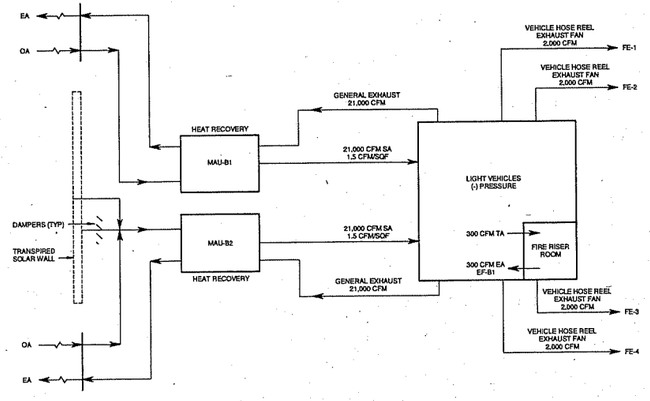
1 ADMIN/OFFICE AIRFLOW DIAGRAM
NO SCALE



2 PARTS ROOM AIRFLOW DIAGRAM
NO SCALE



3 RADIO TECHS AIRFLOW DIAGRAM
NO SCALE



4 LIGHT VEHICLE MAINTENANCE AIRFLOW DIAGRAM
NO SCALE

Stantec
1600 WILSON BLVD.
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ARLINGTON, VA 22209
571 280 7679 I

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2440 Deming Way
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CITY OF MADISON
NAKOOSA TRAIL
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MECHANICAL AIR FLOW DIAGRAMS

M-701

MECHANICAL PIPING & VALVE SCHEDULE

SYSTEM MARK	SERVICE	ROOM TYPE	PIPING SIZE (IN)	PIPING: MATERIAL TYPE	PIPING: WALL THICKNESS	PIPING: ASME PIPING STD	PIPING: ASME PIPING GRADE	PIPING: ASME PIPING TYPE	PIPING: PRESS. CLASS	PIPING: FITTING TYPE	PIPING: ENDS	PIPING: JOINT TYPE	VALVE: TYPE	VALVE: CHECK VALVES	VALVE: PRESS. CLASS	VALVE: CONNECTION TYPE	VALVE: BODY MATERIAL	VALVE: TRIM MATERIAL	VALVE EQUAL TO: [MANUFACTURER, MODEL]	REMARKS
G	NATURAL GAS - LOW PRESSURE (2 PSIG OR <)	OUTDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	MI	PLAIN	TH	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
			2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
		INDOORS	1/2 TO 2	BS	SCH 40	A 53	B	E or S	150#	MI	PLAIN	TH	2BV	-	125#	THREADED	BRONZE	BRONZE	APOLLO, 77-100	PAINT PIPE
			2 1/2 OR MORE	BS	SCH 40	A 53	B	E or S	150#	WS	BEVELED	BW	PV	-	125#	FLANGED	IRON	IRON	XOMOX TUFFLINE	PAINT PIPE
HWS/R	HEATING WATER SUPPLY/RETURN	ALL AREAS	3/4 TO 2	Cu	L	B 88	-	-	-	WCu	PLAIN	SD	2BV	SWING	125#	THREADED	BRONZE	SS	APOLLO 70-100/200 SERIES	-
-	-		2 1/2 OR MORE	BS	SCH 40	A 53	A or B	E or S	150#	WS,WC,FS	BEVELED	BW	1BV	SWING	125#	FLANGED	DUCTILE	SS	AMERICAN VALVE BALL VALVE	-
RWS/R	RADIANT HEATING WATER SUPPLY/RETURN	ALL AREAS	3/4 TO 2	Cu	L	B 88	-	-	-	WCu	PLAIN	SD	2BV	SWING	125#	THREADED	BRONZE	SS	APOLLO 70-100/200 SERIES	-
-	-		2 1/2 OR MORE	BS	SCH 40	A 53	A or B	E or S	150#	WS,WC,FS	BEVELED	BW	1BV	SWING	125#	FLANGED	DUCTILE	SS	AMERICAN VALVE BALL VALVE	-
SWS/R	SOLAR HEATING WATER SUPPLY/RETURN	ALL AREAS	3/4 TO 2	Cu	L	B 88	-	-	-	WCu	PLAIN	SD	2BV	SWING	125#	THREADED	BRONZE	SS	APOLLO 70-100/200 SERIES	-
-	-		2 1/2 OR MORE	BS	SCH 40	A 53	A or B	E or S	150#	WS,WC,FS	BEVELED	BW	1BV	SWING	125#	FLANGED	DUCTILE	SS	AMERICAN VALVE BALL VALVE	-
CD	HVAC CONDENSATE DRAIN	ALL AREAS	3/4 TO 2	CU	L	B 306	-	-	-	WCu	PLAIN	SD	-	-	-	-	-	-	-	-
MWS	MAKE UP WATER	ALL AREAS	3/4 TO 2	CU	L	B 88	-	-	-	WCu	PLAIN	SD	2BV	SWING	125#	THREADED	BRONZE	SS	APOLLO 70-100/200 SERIES	-
RL/RS/HG	REFRIGERANT	ALL AREAS	ALL SIZES	CU	ACR	B 280	-	-	-	WCu	PLAIN	SD or BZ	-	-	-	-	-	-	-	-

MATERIAL TYPE		JOINT TYPE	
BS	BLACK STEEL	BW	BUTT WELD
SS	STAINLESS STEEL	SW	SOCKET WELD
GS	GALVANIZED STEEL	TH	THREADED
PE	POLYETHYLENE	FL	FLANGED
CU	COPPER	SF	SOCKET FUSION
PVC	PVC	BF	BUTT FUSION
		SD	SOLDERED
		BZ	BRAZED
		SV	SOLVENT WELD

FITTING TYPE			
CI	CAST IRON (THREADED) (ASME B16.4 FOR IRON, ASME A 351 FOR SS) (FLANGED) (ASME B16.1)	WC	WROUGHT CAST (FLANGES, ASME B16.5)
MI	MALLEABLE IRON (THREADED) (ASME B16.3)	FS	FORGED STEEL (FLANGES, ASME B16.5)
WS	WROUGHT STEEL (ASTM A 234 FOR STEEL, ASTM A 403 FOR SS)	PS	PVC SOCKET
PE	POLYETHYLENE (ASTM D 2683 (SOCKET) OR ASTM D 3261 (BUTT))	WCu	WROUGHT COPPER (ASME B 16.22)
WW	WELDED WROUGHT STEEL (ASTM A 774 FOR SS)		

ASME PIPING TYPE	
S	SEAMLESS
E	ELECTRIC RESISTANCE WELDED
F	FURNACE BUTT WELDED

VALVE TYPE	
1BV	ONE PIECE FULL PORT BALL VALVE
2BV	TWO PIECE FULL PORT BALL VALVE
3BV	THREE PIECE FULL PORT BALL VALVE
SBV	STEEL BODY BALL VALVE
NGV	NON-RISING STEM GATE VALVE
RGV	RISING STEM GATE VALVE
OGV	OSY GATE VALVE
BFV	BUTTERFLY VALVE
PV	PLUG VALVE

PIPING SYSTEM JOINING MATERIALS

1. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.
2. PIPE FLANGE GASKETS: ASME B16.21, NONMETALLIC, FLAT, ASBESTOS-FREE, 1/8IN MAXIMUM THICKNESS UNLESS SPECIFIED OTHERWISE.
   A. FULL-FACE TYPE: FOR FLAT-FACE, CLASS 125, CAST-IRON AND CAST-BRONZE FLANGES.
   B. NARROW-FACE TYPE: FOR RAISED-FACE, CLASS 250, CAST-IRON AND STEEL FLANGES.
3. FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL, UNLESS OTHERWISE INDICATED.
4. PLASTIC, PIPE-FLANGE GASKET, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER, UNLESS OTHERWISE INDICATED.
5. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.
6. GENERAL DUTY BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS UNLESS OTHERWISE INDICATED.
7. REFRIGERANT PIPING BRAZING FILLER METALS: AWS A5.8, BAG1, SILVER ALLOY UNLESS OTHERWISE INDICATED.
8. WELDING FILLER METALS: AWS D10.12 FOR WELDING MATERIALS APPROPRIATE FOR WALL THICKNESS AND CHEMICAL ANALYSIS OF STEEL PIPE.

REMARKS:

(1) FITTING MATERIAL SHALL MATCH PIPING MATERIAL (EXCEPTION: MI FITTINGS SHALL BE USED FOR BS PIPING WHERE INDICATED).
(2) PRESS. CLASS LISTED IS MIN. REQUIRED. PROVIDE GREATER PRESS. CLASS VALVE AND PIPE SYSTEM IF PRESS. CLASS INDICATED IS NOT AVAILABLE FOR GIVEN VALVE AND PIPE TYPE.
(3) FLANGES SHALL BE RAISED FACE WITH SPOT FACED BOLT HOLES.

FAN COIL UNIT (FCU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	AIR FLOW (CFM): SUPPLY	AIR FLOW (CFM): OUTDOOR	(2) ESP (IN WC)	FAN MOTOR: POWER (HP)	FAN MOTOR: VOLTS / PH	COOLING CAPACITY: EAT (°F): DB	EAT (°F): WB	CAPACITY (MBH): TOTAL	CAPACITY (MBH): SENS.	MEDIA TYPE	ROWS	SST (°F)	SUPERHEAT (°F)	HEATING CAPACITY: EAT (°F)	CAPACITY (MBH)	MEDIA TYPE	MEDIA FLOW RATE: (GPM)	MEDIA FLOW RATE: (LB/H)	EWT (°F)	LWT (°F)	(KW)	STAGES	VOLTS/PH	ACCESSORIES	WEIGHT (LB)	LOCATION	REMARKS
FCU-B1	ENVIRO-TEC, HPP14	CAB	1,200	0	0.65	(2) 1/4	115 / 1	75.0	63.0	34.2	26.7	R-410A	4	45	10	70	46.1	30% PG	4.5	-	140	120	-	-	-		218	1055	(1)(2)
FCU-D1	AAON, H3-ARB	CAB	600	0	0.5	1.1	460 / 3	81.1	71.7	37.6	18.6	R-410A	6	45	10	55	23.9	ELC	-	-	-	-	7	SCR	460 / 3	1	428	1097	(2)(3)(4)
FCU-D2	AAON, H3-ARB	CAB	600	0	0.5	1.1	460 / 3	81.1	71.7	37.6	18.6	R-410A	6	45	10	55	23.9	ELC	-	-	-	-	7	SCR	460 / 3	1	428	1098	(2)(3)(4)

TYPE			
V	VERTICAL	R	RECESSSED
H	HORIZONTAL	AT	ANGLE TOP
LP	LOW PROFILE	SR	SEMI-RECESSED
CON	CONCEALED	CAB	CABINET
DU	DUCTED		

ACCESSORIES			
1	DISCONNECT SWITCH	6	FRESH AIR DAMPER
2	TAMPER PROOF ACCESS DOOR FASTENERS	7	FRESH AIR WALL BOX
3	LEVELING FEET	8	FACTORY MOUNTED PIPING PACKAGE
4	SUB-BASE (FOR SPECIFIED MOUNTING HEIGHT)	9	MANUAL THREE SPEED FAN CONTROL SWITCH
5	FALSE BACK	10	1/2" WIRE MESH SCREEN ON INLET & OUTLET

REMARKS:

(1) HEATING COIL SELECTION FOR 30% PG PROPYLENE GLYCOL.
(2) PROVIDE DIRECT DRIVE FANS WITH ECM MOTOR.
(3) PROVIDE MODULATING HOT GAS REHEAT (MHGR).
(4) SINGLE POINT POWER NON-FUSED DISCONNECT.

RADIANT FLOOR HEATING ZONE (RZ) SCHEDULE

ZONE	MANIFOLD	ZONE TUBE SIZE (IN)	TUBE DISTANCE ON CENTER (IN)	WATER TEMP DROP (°F)	TOTAL ZONE AREA (FT²)	UNIT HEATING LOAD (BTUH/SF)	TOTAL ZONE LOAD (MBH)	MAXIMUM LOOP LENGTH (FT)	NUMBER OF LOOPS/FLOW PER LOOP (GPM)	TOTAL ZONE FLOW (GPM)	TOTAL LOOP HEAD PRESSURE (FT H20)	ASSOCIATED PUMP	REMARKS
A1	-	5/8	12	15	252	24.2	6.098		1	0.8	3.3	HWP-3/4	(1)
A2/A8	M-1	5/8	12	15	1000	24.2	24.2		4	3.6	10.5	HWP-3/4	
A3	-	5/8	12	15	300	24.2	7.26		1	1	5.2	HWP-3/4	(1)
A4	-	5/8	12	15	133	24.2	3.219		1	0.4	0.6	HWP-3/4	(1)
A5	-	5/8	12	15	139	24.2	3.146		1	0.4	0.6	HWP-3/4	(1)
A6	-	5/8	12	15	433	24.2	10.479		1	1.4	12.4	HWP-3/4	(1)
A7	-	5/8	12	15	287	24.2	6.945		1	0.9	4.2	HWP-3/4	(1)
A9	M-2	5/8	12	15	1232	24.2	29.814		4	4.3	14	HWP-3/4	
A10	M-3/4	5/8	12	15	6088	24.2	147.33		13	19.5	10.2	HWP-3/4	
A11	M-5	5/8	12	15	526	24.2	12.729		2	1.7	6.5	HWP-3/4	
B1	M-6	5/8	12	15	6275	24.2	151.855		11	20.7	18.3	HWP-3/4	
B2	M-7	5/8	12	15	6386	24.2	154.541		10	20.2	10.2	HWP-3/4	
B3	M-8	5/8	12	15	995	24.2	24.079		3	3.3	14	HWP-3/4	
B4	M-9	5/8	12	15	502	24.2	12.148		2	1.6	5.3	HWP-3/4	
B5	M-10	5/8	12	15	4383	24.2	106.069		11	14.4	10.2	HWP-3/4	
B6	M-11	5/8	12	15	5068	24.2	122.646		10	16.2	5.9	HWP-3/4	
B7	M-12	5/8	12	15	2352	24.2	56.918		8	7.7	9.9	HWP-3/4	
B8	M-13	5/8	12	15	1046	24.2	25.313		4	3.4	8.6	HWP-3/4	
C1	M-14	5/8	12	15	826	24.2	19.844		3	2.8	8.6	HWP-3/4	
C2	M-15	5/8	12	15	4709	24.2	113.958		10	14.9	7	HWP-3/4	
C3	M-16	5/8	12	15	4698	24.2	113.692		10	15.1	7.2	HWP-3/4	
C4	M-17	5/8	12	15	773	24.2	18.707		3	2.2	7.3	HWP-3/4	
C5	M-18	5/8	12	15	828	24.2	20.038		3	2.3	6.1	HWP-3/4	
C6	M-19	5/8	12	15	4656	24.2	112.675		10	15.2	5.1	HWP-3/4	
C7	M-20	5/8	12	15	4286	24.2	112.675		10	15.1	6.2	HWP-3/4	
C8	M-21	5/8	12	15	794	24.2	21.175		3	2.8	7.7	HWP-3/4	
D1	M-22	5/8	12	15	1266	24.2	33.632		5	4.6	6	HWP-3/4	
D2	M-23	5/8	12	15	1735	24.2	41.987		5	5.5	6	HWP-3/4	
D3	M-24	5/8	12	15	840	24.2	20.328		3	2.8	7.7	HWP-3/4	
D4	M-25	5/8	12	15	626	24.2	15.149		2	2	9	HWP-3/4	
D5	M-26	5/8	12	15	4184	24.2	101.253		9	12.8	10.5	HWP-3/4	
D6	M-27	5/8	12	15	838	24.2	20.28		3	2.8	7.7	HWP-3/4	
E1	M-28	5/8	12	15	879	24.2	21.272		3	3	9.9	HWP-3/4	
E2	M-29	5/8	12	15	3660	24.2	93.412		8	12.3	4.4	HWP-3/4	
E3	M-30	5/8	12	15	3964	24.2	95.929		8	12.8	4.7	HWP-3/4	
E4	M-31	5/8	12	15	880	24.2	21.296		3	3	9.9	HWP-3/4	
E5	M-32	5/8	12	15	2048	24.2	49.562		8	7.1	7.7	HWP-3/4	
E6	M-33	5/8	12	15	354	24.2	8.567		2	1.2	4.1	HWP-3/4	
E7	M-34	5/8	12	15	912	24.2	22.07		3	3.2	9.9	HWP-3/4	
E8	M-35	5/8	12	15	2972	24.2	71.922		9	9.4	4.3	HWP-3/4	
E9	M-36	5/8	12	15	2972	24.2	71.922		9	9.3	4.2	HWP-3/4	

REMARKS:

(1) RADIANT ZONE WILL BE SUPPLIED FROM MAIN SUPPLY/RETURN LOOP UTILIZING INDIVIDUAL CONTROL VALVE

DUCTLESS SPLIT AIR CONDITIONER (ACU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	AIR FLOW (CFM): SUPPLY	AIR FLOW (CFM): OUTDOOR	COOLING: TYPE	COOLING: MIN. SEER	COOLING: EAT (°F): DB	EAT (°F): WB	CAPACITY (TON): TOTAL	CAPACITY (TON): SENS.	ELECTRICAL (1): VOLTS / PH	MCA	FLA (A)	HEATER (KW)	UNIT DIMENSIONS (IN): LENGTH	HEIGHT	DEPTH	ACCESSORIES	MOUNTING TYPE	MTG. HEIGHT (FT)	ASSOCIATED CONDENSING UNIT	WEIGHT (LB)	LOCATION	REMARKS
ACU-B1	DAIKIN, FTX36NVJU	915	2811	DX	15.9	80	67	3.0	3.0	208 / 1	19.8	0.37	-	48	14	11		WALL		ACCU-B2	38	RM 1037	
ACU-D1	DAIKIN, FTKB12AXVJU	360	730	DX	17	80	67	1.0	1.0	208 / 1	7.7	0.19	-	35	12	9		WALL		ACCU-D1	20	MEZZ	
ACU-E1	DAIKIN, FTKB24AXVJU	555	1796	DX	17	80	67	2.0	2.0	208 / 1	13.2	0.24	-	46	13	10		WALL		ACCU-E2	31	RM 1143	

REMARKS:

(1) SINGLE POINT ELECTRICAL CONNECTION AT OUTDOOR UNIT.

AIR COOLED CONDENSING UNIT (ACCU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	NOM. CAP. (TON)	MIN. EER	REF. TYPE	SST (°F)	AMB. AIR TEMP. (°F): MINIMUM	AMB. AIR TEMP. (°F): MAXIMUM	COMPRESSORS (1): QTY.	COMPRESSORS (1): TYPE	ELECTRICAL: VOLTS	PHASE	MCA	MOCP (A)	ELECTRICAL: SCCR	(2) MAX. SOUND (DBA)	MATCHING EQUIPMENT COOLING COIL	WEIGHT (LB)	LOCATION	REMARKS
ACCU-A1	DAIKIN, RCS15F180D	15	12.3	R-410A	46.5	45	95	1	SCR	460	3	35	45	5 K	-	AHU-A1	1143	ROOF	14.8 KW (5)
ACCU-A2	DAIKIN, RCS15F188D	12	13.0	R-410A	47.0	45	95	1	SCR	460	3	30	40	5 K	-	AHU-A1	1141	ROOF	14.8 kW
ACCU-B1	DAIKIN, DX13SA0363	3	11.0	R-410A	45.0	65	115	1	SCR	208	3	14	20	-	74	FCU-B1	200	GRADE	2-STAGE
ACCU-B2	DAIKIN, RX36NMVJU	3	9.1	R-410A	45.0	45	115	1	ROT	208	1	19.8	20	-	59	ACU-B1	135	MEZZ	1-STAGE (2)
ACCU-D1	DAIKIN, RKB12AXVJU (1)	1	8.5	R-410A	45.0	45	115	1	ROT	208	1	8	15	-	48	ACU-D1	60	MEZZ	1-STAGE
ACCU-D2	AAON, H3-ARB, CFA-003	3	14.1	R-410A	45.0	35	95	1	DSCR	460	3	11	15	-	-	FCU-D1	430	MEZZ	(4)(5)
ACCU-D3	AAON, H3-ARB, CFA-003	3	14.1	R-410A	45.0	35	95	1	DSCR	460	3	11	15	-	-	FCU-D2	430	MEZZ	(4)(5)
ACCU-E1	AAON, CFA-005	6	13.4	R-410A	45.0	45	95	1	DSCR	460	3	12	15	-	-	AHU-E1	462	GRADE	(3)(4)(5)
ACCU-E2	DAIKIN, RKB24AXVJU	1	10.0	R-410A	45.0	45	115	1	ROT	208	1	13	20	-	51	ACU-E2	99	MEZZ	1-STAGE
ACCU-E3	AAON, CFA-006	6	13.4	R-410A	45.0	45	95	1	DSCR	460	3	12	15	-	-	AHU-E1	462	GRADE	(3)(4)

COMPRESSOR TYPE	
RCP	RECIPROCATING
ROT	ROTARY SWING TYPE, HERMETICALLY
SCR	SCROLL
DSCR	DIGITAL SCROLL
SCW	SCREW

REMARKS:

(1) MANUFACTURER SHALL SIZE REFRIGERANT PIPING, VALVES, AND ACCESSORIES FOR PROPER OPERATION OF SYSTEM.
(2) PER ARI STANDARD 320 "SOUND RATING OF LARGE OUTDOOR REFRIGERATING AND AIR-CONDITIONING EQUIPMENT".
(3) CONTRACTOR TO PROVIDE A 16 GAUGE COVER OVER UNIT FOR SNOW AND ICE FALLING PROTECTION.
(4) PROVIDE ECM CONDENSER FAN HEAD PRESSURE CONTROL.
(5) PROVIDE MODULATING HOT GAS REHEAT TO SEPARATE DX REHEAT COIL.

BOOSTER COIL (BC) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	DUCT SIZE TYPE	MAX. AIR FLOW (CFM)	MIN. AIR FLOW (CFM)	MAX PD (IN WC)	COIL: FACE VEL. (FPM)	FACE AREA (FT²)	ROWS	(FPI)	CAPACITY (MBH): TOTAL	SENS.	EAT (°F): DB	LAT (°F): DB	MEDIA: TYPE	FLOWRATE (GPM)	PRESSURE: ENTER (PSI)	DROP (FT)	EWT (°F)	LWT (°F)	EQUIPMENT SERVED	LOCATION	REMARKS
BC-A1	GREENHECK	12x18	845	120	0.25	563	1.5	1	8	-	3.0	55.0	77.7	WATER	0.3	-	5	120	100	AHU-A1	AREA A	(1)
BC-A2	GREENHECK	9X12	400	80	0.25	500	1.8	1	8	-	1.7	55.0	75.4	WATER	0.2	-	5	120	100	AHU-A1	AREA A	(2)
BC-A3	GREENHECK	6x12	265	60	0.25	530	0.5	1	8	-	1.0	55.0	79.1	WATER	0.1	-	5	120	100	AHU-A1	AREA A	(3)
BC-A4	GREENHECK	12x18	710	110	0.25	475	1.5	1	8	-	3.0	55.0	77.7	WATER	0.3	-	5	120	100	AHU-A1	AREA A	(4)
BC-A5	GREENHECK	18x24	1,690	1,690	0.25	553	3.0	2	10	-	4.6	55.0	81.5	WATER	4.8	-	5	120	100	AHU-A1	AREA A	(5)
BC-A6	GREENHECK	12x18	945	945	0.30	630	1.5	2	10	-	5.8	55.0	80.2	WATER	2.6	-	5	120	100	AHU-A1	AREA A	(6)

REMARKS:

(1) SERVES AIR TERMINAL UNIT AT-1-11.
(2) SERVES AIR TERMINAL UNIT AT-1-12.
(3) SERVES AIR TERMINAL UNITS AT-1-13 AND AT-1-17.
(4) SERVIES AIR TERMINAL UNITS AT-1-16 AND AT-1-18.
(5) SERVES AIR TERMINAL UNIT AT-1-7.
(6) SERVES AIR TERMINAL UNIT AT-1-9.

Stantec
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SUITE 350
ARLINGTON, VA 22209
571 280 7679 t

Mead & Hunt
Mead & Hunt, Inc.
6501 Watts Road, Suite 202
Madison, WI 53719
phone: 608-273-6380
meadhunt.com

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-160264.01

MECHANICAL SCHEDULES

M-605

STORAGE TANK (ST) SCHEDULE

MARK	EQUIPMENT TYPE	DESCRIPTION	REMARKS
ST-1	STORAGE TANK	HUBBELL CEMENT LINED STORAGE TANK, 800 GALLONS.	(1)

REMARKS:
(1) TANK TO BE INSULATED AND WRAPPED WITH PROTECTIVE JACKETING

EXPANSION TANK (ET) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	SYSTEM	TANK VOL. (GAL)	MIN. ACCEPTANCE VOL. (GAL) (MAX.)	DIMENSIONS (IN) DIA.	LENGTH	SYSTEM CONN.	AIR CHARGE PRESS. (PSI)	WEIGHT (LB) EMPTY	OPER.	LOCATION	REMARKS
ET-A1	AMTROL, 35-LBC	SOLAR/DOMESTIC	10	10	10	37	1	12	67	151	MEZZ	
ET-B1	AMTROL, 600-L	SOLAR HOT WATER	158	158	30	64	1 1/2	30	439	1771	MEZZ	(1)
ET-B2	AMTROL, 600-L	RADIANT/HYDRONIC	158	158	30	64	1 1/2	12	439	1771	MEZZ	
ET-B3	AMTROL, 600-L	RADIANT/HYDRONIC	158	158	30	64	1 1/2	12	439	1771	MEZZ	

(1)(2) PIPE INSULATION SCHEDULE

SERVICE TYPE	SIZE (IN)	ALL EXCEPT, VEHICLE-MEZZANINE... TYPE	THICKNESS (IN)	JACKET	VEHICLE- MEZZANINE REPAIR AREAS TYPE	THICKNESS (IN)	JACKET	REMARKS	EXTERIOR / WASHDOWN AREAS (3) TYPE	THICKNESS (IN)	JACKET
HYDRONIC - SOLAR HEATING	1 1/2 AND SMALLER	I1	1	J1	I6	1	J1	-	I6	2	J3
	2 AND LARGER	I1	1 1/2	J1	I6	1 1/2	J1	-	I6	3	J3
HYDRONIC - HEATING / RADIANT SYSTEMS	1 1/2 AND SMALLER	I1	1	J1	I6	1	J1	-	I6	2	J3
	2 AND LARGER	I1	1 1/2	J1	I6	1 1/2	J1	-	I6	3	J3
REFRIGERANT LIQUID	ALL SIZES	I4	1	-	I6	1	J3	-	I6	1	J3
REFRIGERANT SUCTION	ALL SIZES	I4	1	-	I6	1	J3	-	I6	1	J3
CC - CONDENSATE DRAIN	ALL SIZES	I2	1	J1	I2	1	-	-	-	-	-

INSULATION TYPE (2)

I1	MINERAL FIBER, PREFORMED, IAW ASTM C 547 TYPE 1 GRADE A, WITH FACTORY-APPLIED JACKET.
I2	CALCIUM SILICATE, IAW ASTM C 533 TYPE 1 (8)
I3	CELLULAR GLASS, IAW ASTM C 552 TYPE 2 GRADE 1 OR 2, WITH SEALED JOINTS.
I4	ELASTOMERIC, CLOSED CELL, ASTM C 534 TYPE 1 GRADE 1 OR 2 OR 3, ASTM E 84 FLAME/SMOKE INDICES LESS THAN 25/50 (8)
I5	POLYISOCYANURATE, ASTM C 591 TYPE 1 OR 2 OR 3 OR 4 OR 5 OR 6 GRADE 1 OR 2, ASTM E 84 FLAME INDEX LESS THAN 25 (8)
I6	EXTRUDED POLYSTYRENE, ASTM C 578 TYPE 13, ASTM E 84 FLAME INDEX LESS THAN 25 (8)

JACKET TYPE

J1	ALL SERVICE JACKET, IAW ASTM C 1136 TYPE 1 (9)
J2	PVC, ASTM D 1784 CLASS 16354-C, 0.020" THICKNESS, WHITE COLOR.
J3	ALUMINUM, ASTM B 209, ALLOY 3003 OR 3005 OR 3105 OR 5005, TEMPER H-14, 0.016" THICKNESS, EMBOSSED, WITH MOISTURE BARRIER.
J4	STAINLESS STEEL, ASTM A 167 OR ASTM A 240, ALLOY 304 OR 316, 0.016" THICKNESS, SMOOTH, WITH MOISTURE BARRIER.

REMARKS:
(1) SEE GENERAL SCHEDULE NOTES.
(2) ON FITTINGS, VALVES, AND PIPING SPECIALTIES, USE INSULATION TYPE, INSULATION THICKNESS, AND JACKET TYPE SAME AS PIPE IAW EQUIVALENT ASTM STANDARD.
(3) WASHDOWN AREAS: WASH BAY ROOM 1065 AND CHASSIS WASH ROOM 1095.

GLYCOL FILL TANK (GFT) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TANK CAPACITY (GAL)	FLOWRATE (GPM)	HEAD PRESS. (PSI)	PRESSURE SWITCH IN/OUT (PSI)	PRESSURE RELIEF (PSI)	SYSTEM CONNECTION SIZE...	GEAR PUMP (HP)	VOLTS / PH	SYSTEM	WEIGHT (LBS)	LOCATION	REMARKS
GFT-B1	ARMSTRONG, GLA-S-HP-1	53	-	-	-	-	1/2 NPT	-	115 / 1	HWB	145	AREA B	(1)
GFT-B2	ARMSTRONG OR EQUIVALENT	53	-	-	-	-	1/2 NPT	-	115 / 1	SOLAR	145	AREA B	(2)

REMARKS:
(1) 35% PROPYLENE GLYCOL SOLUTION. MAXIMUM TEMPERATURE 140 DEGREE F. FOR POLYPROPLENE HOLDING TANK.
(2) 50% PROPYLENE GLYCOL SOLUTION. SOLAR COLLECTOR TEMPERATURE RANGE 250-300+ DEGREE F FOR STEEL VESSEL HOLDING TANK.

DIRT & AIR SEPARATOR (AS) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	FLOW RATE (GPM)	FLOW RATE MAX. or NOM.	MAX. PD (FT)	PIPE CONNECTION SIZE (IN)	PIPE CONNECTION THD. or FLG.	SYSTEM	WEIGHT (LB)	AREA	LOCATION	REMARKS
AS-A1	SPIROTHERM, VJR-1C-125HT	TAN	15	15	-	1-1/4	THD	WATER	3.5	B	MEZZ	(1)
AS-B1	SPIROTHERM, VJR-1C-100HT	TAN	4	10	-	1	THD	GWS/R	3.5	B	MEZZ	(1)
AS-B2	SPIROTHERM, VHT600	A & D	655	900	5	6	FLG	HWS/R	505	B	MEZZ	

TYPE	
ASC	AIR SCOOP
TAN	TANGENTIAL
A & D	AIR & DIRT SEPARATOR

REMARKS:
(1) JUNIOR SERIES SOLAR MAXIMUM TEMPERATURE IS 350 °F FOR MICROBUBBLE SEPARATOR.

FINNED TUBE CONVECTOR (FTC) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	(7) TOTAL CAP. (BTU/FT)	EAT (°F)	MEDIA TYPE	EWT (°F)	LWT (°F)	MEDIA FLOW RATE (GPM)	MAX. PD (FT)	FLAT PANELS SIZE (IN)	FINS/FT	NO. OF ROWS	LENGTH (IN)	(2) (5) (6) CABINET SIZE (IN) DEPTH	LENGTH	HEIGHT	MTG. TYPE	(1) MTG. HEIGHT (IN)	LOCATION	REMARKS
FTC-1	RUNTAL, R2F-3	520	65	30% PG	140	120	0.6	5	3/4	-	3	144	3	144	8 5/8	F	3	RM 1003	
FTC-2	RUNTAL, RF-3	340	65	30% PG	140	120	0.4	5	3/4	-	3	148	1 5/8	148	8 5/8	F	3	RM 1004	
FTC-3	RUNTAL, RF-3	340	65	30% PG	140	120	0.5	5	3/4	-	3	144	1 5/8	144	8 5/8	F	3	RM 1005	
FTC-4	RUNTAL, R2F-6	1045	65	30% PG	140	120	2.3	5	3/4	-	6	84x3	3	252	17 1/4	W	3	RM 1001	(3)(4)
FTC-5	RUNTAL, R2F-6	1045	65	30% PG	140	120	2.2	5	3/4	-	6	88x3	3	264	17 1/4	W	3	RM 1015	(3)(4)
FTC-6	RUNTAL, R2F-7	1160	65	30% PG	140	120	1.2	5	3/4	-	7	114	3	114	20 1/4	W	3	RM 1010	
FTC-7	RUNTAL, R2F-4	760	65	30% PG	140	120	1.1	5	3/4	-	4	168	3	168	11 1/2	W	3	RM 1029	
FTC-8	RUNTAL, R2F-5	935	65	30% PG	140	120	1.1	5	3/4	-	5	132	3	132	14 3/8	W	3	RM 1122	
FTC-9	RUNTAL, R2F-4	730	65	30% PG	140	120	1.0	5	3/4	-	4	154	3	154	11 1/2	F	3	RM 1121	
FTC-10	RUNTAL, R2F-4	730	65	30% PG	140	120	1.1	5	3/4	-	4	186	3	186	11 1/2	F	3	RM 1123	
FTC-11	RUNTAL, RF-2	265	65	30% PG	140	120	0.8	5	3/4	-	2	120x3	1 5/8	360	5 3/4	W	60	RM 1002	(3)(4)
FTC-12	RUNTAL, RF-5	520	65	30% PG	140	120	0.3	5	3/4	-	5	192	1 5/8	192	14 3/8	F	3	RM 1043	

MOUNTING TYPE	
W	WALL
F	FLOOR

REMARKS:
(1) MOUNTING HEIGHT IS TO BOTTOM OF RADIANT FLAT PANEL.
(2) CABINET LENGTH AS SHOWN ON PLANS FOR FLAT PANEL RADIATOR. PROVIDE ALL REQUIRED ACCESSORIES FOR CONTINUOUS APPEARANCE.
(3) PROVIDE 3/4" PIPING CONNECTIONS.
(4) CABINET LENGTH REFLECTS THE OVERALL TOTAL LENGTH. PROVIDE THREE INDIVIDUAL FLAT PANEL SECTIONS AS SHOWN ON PLANS.
(5) PROVIDE FULL CENTER TRIMS, FULL END CAPS, AND PERFORATED TOP GRILLE AS NEEDED FOR INSTALLATION.
(6) COLOR TO BE SELECTED BY ARCHITECTS.
(7) PERFORMANCE IS BASED ON 130°F AWT & 30% PG.

HOT WATER BOILER (HWB) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	INPUT (MBH) MAX.	INPUT (MBH) MIN.	OUTPUT (MBH) MAX.	OUTPUT (MBH) MIN.	(1) MIN. EFF. (%)	FUEL	FLUID	FLUID FLOW (GPM) MIN.	FLUID FLOW (GPM) DESIGN	FLUID FLOW (GPM) MAX.	(2) FLUID TEMP. (°F) IN	OUT	(2) PD (FT)	ELECTRICAL (VOLTS / PH)	ELECTRICAL (FLA)	ELECTRICAL (MOCP)	ACCESSORIES	WEIGHT (LB) EMPTY	OPER.	LOCATION	REMARKS
HWB-1	LOCHINVAR, CREST FB*5000	SS	5,000	400	4,800	600	93	NG	30% PG	75	325	600	110	140	7.6	460 / 3	6.3	15	1,2,3	4,101	5,900	AREA B	(2), (3)
HWB-2	LOCHINVAR, CREST FB*5000	SS	5,000	400	4,800	600	93	NG	30% PG	75	325	600	110	140	7.6	460 / 3	6.3	15	1,2,3	4,101	5,900	AREA B	

TYPE		FUEL		FLUID		ACCESSORIES	
CI	CAST IRON	NG	NATURAL GAS	WTR	WATER	1	VIBRATION ISOLATION CUBES
CU	COPPER FIN TUBE	LPG	PROPANE	XX% EG	XX% ETHYLENE GLYCOL	2	CONDENSATE LIQUID DRAINER
FT	FIRE TUBE	EL	ELECTRIC	XX% PG	XX% PROPYLENE GLYCOL	3	WATER PIPE FLEXIBLE CONNECTORS
PU	PULSE					4	VENT/COMB. AIR PIPE FLEXIBLE CONNECTORS
SS	316L STAINLESS STEEL, CONDENSING					5	SCREENED INLET
WT	WATER TUBE					6	EXHAUST VENT CAP
						7	EXHAUST MUFFLER
						8	INTAKE MUFFLER
						9	CIRCULATING PUMP

REMARKS:
(1) MINIMUM EFFICIENCY AT MAXIMUM OUTPUT AND DESIGN FLOW AND TEMPERATURES PER AHRI CONDITIONS.
(2) FLUID TEMPERATURES AND PRESSURE DROP AT DESIGN FLOW RATE.
(3) PROVIDE SCHEDULE 40 CPVC INTAKE AND Type 29-4C STAINLESS STEEL VENT PIPING. REFER TO SPECIFICATION SECTION 235100.
(4) PROVIDE ALL REQUIRED STORM COLLARS AND ROOF FLASHING.

HYDRONIC PUMP (P) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	SYSTEM SERVED	MEDIA	FLOW RATE (GPM)	TDH (FT)	SHAFT POWER (BHP)	MOTOR POWER (HP)	MOTOR SPEED (RPM)	MOTOR (VOLTS / PH)	IMPELLER DIA. (IN)	PUMP EFF. (%)	FLUID TEMP. (°F) MAX.	FLUID TEMP. (°F) MIN.	SIZE (IN) SUCT.	SIZE (IN) DISCH.	NPSHA (FT)	SUCTION DIFFUSER (IN)	MTG. HEIGHT (IN)	WEIGHT (LBS)	LOCATION	REMARKS
HWP-1	GRUNDFOS, LCS	FMES	HYDRONIC	30% PG	655	40	8.9	10	1,760	460 / 3	7.87	75.4	250	40	5	4	11	5	-	287	AREA B	(1) (5)
HWP-2	GRUNDFOS, LCS	FMES	HYDRONIC	30% PG	655	40	8.9	10	1,760	460 / 3	7.87	75.4	250	40	5	4	11	5	-	287	AREA B	(1) (5)
HWP-3	GRUNDFOS, LCS	FMES	HYDRONIC	30% PG	300	50	6.8	7.5	1,775	460 / 3	9.07	78.8	250	40	3	2.5	9	3	-	287	AREA B	(1) (5)
HWP-4	GRUNDFOS, LCS	FMES	HYDRONIC	30% PG	300	50	6.8	7.5	1,775	460 / 3	9.07	78.8	250	40	3	2.5	9	3	-	287	AREA B	(1) (5)
HWP-5	GRUNDFOS, MAGNA 3	IC	SOLAR HOT WTR	30% PG	10	5	-	-	-	115 / 1	-	-	230	40	-	-	-	-	-	30	AREA B	(2)(3)(4)
HWP-6	GRUNDFOS, MAGNA 3	IC	SOLAR HOT WTR	50% PG	4	13	-	-	-	115 / 1	-	-	230	40	-	-	-	-	-	30	AREA B	(2)(3)(4)
HWP-7	GRUNDFOS, MAGNA 3	IC	SOLAR HOT WTR	WATER	15	17	-	-	-	115 / 1	-	-	230	40	-	-	-	-	-	30	AREA B	(2)(3)(4)

TYPE			
IC	IN-LINE CIRCULATOR (ECM MOTOR)	SP	SUBMERSIBLE PUMP
VCC	VERTICAL CLOSED COUPLED	VS	VERTICAL SUBMERSIBLE
CCES	CLOSE COUPLED END SUCTION	ES	EFFLUENT SUMP
FMES	BASE MOUNTED END SUCTION	PMV	PUMPED MIXING VALVE
DS	DOUBLE SUCTION	WRC	WET ROTOR CIRCULATOR

REMARKS:
(1) PROVIDE WITH VFD RATED MOTORS.
(2) PROVIDE WITH ECM MOTORS. REFER TO SPECIFICATION SECTION 235613 - SOLAR WATER HEATING EQUIPMENT.
(3) PROVIDE WITH FULL VOLTAGE CONTACTOR AND MOTOR OVERLOAD PROTECTION.
(4) SEE ELECTRICAL PLANS FOR DISCONNECT.
(5) PROVIDE WITH INERTIA BASE EQUAL TO MASON INDUSTRIES BMK6.

FLUID HEAT EXCHANGER (HX) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	CAP. (MBH)	HOT MEDIA (SOLAR TANK) TYPE	FLOW RATE (GPM)	FLOW RATE (LB/H)	TEMP. (°F) ENT.	TEMP. (°F) LEV.	MAX. PD (PSI)	COLD MEDIA (HEATING LOADS) TYPE	FLOW RATE (GPM)	FLOW RATE (LB/H)	TEMP. (°F) ENT.	TEMP. (°F) LEV.	MAX. PD (PSI)	DIMENSIONS (IN) LENGTH	DIMENSIONS (IN) WIDTH	WEIGHT (LB) EMPTY	WEIGHT (LB) OPER.	LOCATION	REMARKS
HX-B1	HUBBELL	ST	240	50% PG	4	-	130	160	1	WTR	6	-	40	160	-	48	-	85	-	AREA B	(1)
HX-B2	HUBBELL	ST	200	50% PG	4	-	130	160	1	30% PG	10	-	80	120	-	48	-	85	-	AREA B	(1)

TYPE	
ST	SHELL & TUBE
DWST	DOUBLE WALL SHELL & TUBE
PF	PLATE & FRAME
TH	TANK HEATER

REMARKS:
(1) SINGLE WALL TUBE BUNDLE.

UNIT HEATER (UH) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	NOMINAL CAPACITY (MBH)	AIR FLOW (CFM)	AIR FLOW HOR. or VER.	AIR THROW (FT)	MOTOR (HP)	ELECTRICAL (VOLTS/PH)	EAT (°F)	LAT (°F)	WATER FLOW (GPM)	WATER PD (FT)	WATER EWT (°F)	WATER LWT (°F)	ACCESSORIES	(1) MTG. HEIGHT (FT)	WEIGHT (LB)	LOCATION	REMARKS
UH-A1	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	15		SEE PLAN	
UH-A2	MODINE, V-78	HYD	24	1,100	VER.	36	1/15	115/1	60	74	1.7	0.1	140	110	1, 5	9		SEE PLAN	
UH-B1	MODINE, V-78	HYD	24	1,100	VER.	36	1/15	115/1	60	74	1.7	0.1	140	110	1, 5	11		SEE PLAN	
UH-B2	MODINE, V-78	HYD	24	1,100	VER.	36	1/15	115/1	60	74	1.7	0.1	140	110	1, 5	11		SEE PLAN	
UH-B3	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	15		SEE PLAN	
UH-B4	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	15		SEE PLAN	
UH-B5	MODINE, V-333	HYD	110	2,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	15		SEE PLAN	(2)
UH-C1	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	13'-4"		SEE PLAN	
UH-C2	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	24		SEE PLAN	
UH-C3	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	24		SEE PLAN	
UH-C4	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	24		SEE PLAN	
UH-C5	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	13'-4"		SEE PLAN	
UH-C6	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	22'-6"		SEE PLAN	
UH-C7	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	22'-6"		SEE PLAN	
UH-C8	MODINE, V-333	HYD	110	5,500	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	22'-6"		SEE PLAN	
UH-D1	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	17		SEE PLAN	
UH-E1	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	24		SEE PLAN	
UH-E2	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	24		SEE PLAN	
UH-E3	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	18		SEE PLAN	
UH-E4	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	18		SEE PLAN	
UH-E5	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	18		SEE PLAN	
UH-E6	MODINE, V-333	HYD	110	5,000	VER.	74	3/4	115/1	60	77	7.7	0.4	140	110	1, 5	22		SEE PLAN	

TYPE			
HYD	HYDRONIC	XPL	EXPLOSION PROOF
STM	STEAM	WD	WASH DOWN
GF	GAS-FIRED		
EL	ELECTRIC		

ACCESSORIES	
1	TRUNCONE AIR OUTLET
2	DOWN TURN AIR NOZZLE
3	STAINLESS STEEL HEAT EXCHANGER
4	STAINLESS STEEL BURNER
5	MANUFACTURER SUPPLIED MOUNTING HARDWARE
6	INTEGRAL THERMOSTAT
7	REMOTE THERMOSTAT
8	DISCONNECT SWITCH

REMARKS:
(1) MOUNTING HEIGHT SHALL BE FROM FINISHED FLOOR TO BOTTOM OF UNIT.
(2) UNIT TO BE WATER-PROOF FOR WASH-DOWN AREA.

Stantec
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571 280 7679 1

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Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
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ADD. NUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/7/2019

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PROJECT No: 1303500-160264.01

MECHANICAL SCHEDULES

M-604

EXHAUST FAN (EF) AND SUPPLY FAN (SF) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	FAN TYPE	AIR FLOW RATE (CFM)	ESP (IN WC)	MOTOR (BHP)	MOTOR (HP)	MOTOR TYPE	FAN SPEED (RPM)	DRIVE TYPE	ELECTRICAL (VOLTS/PH)	MTG. HEIGHT (FT)	MAXIMUM SOUND (3) (DB)	MAXIMUM SOUND (4) SONES	MAXIMUM SOUND INSTALL. TYPE	(1) INTERLOCK WITH	OPENING (IN) LENGTH	OPENING (IN) WIDTH	ACCESSORIES	WEIGHT (LB)	INTEGRAL VFD (Y OR N)	SERVICE	LOCATION	SERVICE	REMARKS
EF-A1	SEE AHU-A1 SCHEDULE	-	-	-	-	-	-	-	-	-	-	-	-	-	AHU-A1	-	-	-	-	-	AREA A	-	SEE AHU-A1 SCHEDULE	
EF-A2	GREENHECK, AER-E24C-315-VG	9	3,000	0.25	0.23	1/2	ECM	1121	DIRECT	115/1	12	68	16	B	AHU-A2	32	32	-	-	N	AREA A	RM 1025	PARTS ECONOMIZER	
EF-A3	GREENHECK, SQ-100-VG	2	1,100	0.50	0.23	3/4	ECM	998	DIRECT	115/1	8	55	8	D	AHU-A2	20	20	-	-	N	AREA A	RM 1026	COMPRESSOR ROOM	
EF-B1	GREENHECK, AER-E20C-605-VG	9	300	0.25	0.04	1/4	ECM	831	DIRECT	115/1	15	54	7	B	T-STAT	26	26	-	-	N	AREA B	RM 1054	FIRE RISER ROOM	
EF-C1	GREENHECK, AER-E48C-620-C-VGD	9	19,335	0.25	1.85	3	INV-TEFC	605	DIRECT	460/3	34	76	25	B	MAU-C1 & C2	56	56	-	-	Y	AREA C	RM 1084	CNG EXHAUST - HVM	(8) NIC
EF-C2	GREENHECK, AER-E48C-620-C-VGD	9	19,335	0.25	1.85	3	INV-TEFC	605	DIRECT	460/3	34	76	25	B	MAU-C1 & C2	56	56	-	-	Y	AREA C	RM 1084	CNG EXHAUST - HVM	(8) NIC
EF-C3	GREENHECK, AER-E48C-620-C-VGD	9	19,335	0.25	1.85	3	INV-TEFC	605	DIRECT	460/3	34	76	25	B	MAU-C1 & C2	56	56	-	-	Y	AREA C	RM 1084	CNG EXHAUST - HVM	(8) NIC
EF-D1	GREENHECK, SP-A90-130-VG	4	125	0.50	-	-	ECM	-	DIRECT	115/1	10	-	2.5	B	MAN. SWITCH	-	-	-	-	N	AREA D	RM 1099	TOILET EXHAUST	
EF-D2	GREENHECK, SQ-97-VG	2	100	0.50	0.06	1/4	ECM	1290	DIRECT	115/1		56	8.9	D						N	AREA D	RM	VEHICLE LIFT PIT	
EF-E1	GREENHECK, AER-E48C-625-C-VGD	9	25,900	0.25	3.24	5	INV-TEFC	674	DIRECT	460/3	27	78	29	B	MAU-E1	56	56	-	-	Y	AREA E	RM 1118	CNG EXHAUST - RADIO INSTALL	(5), (6)
EF-E2	GREENHECK, AER-E42C-625-C-VGD	9	15,800	0.25	1.60	2	INV-TEFC	629	DIRECT	460/3	27	74	24	B	MAU-E1	50	50	-	-	Y	AREA E	RM 1147	CNG EXHAUST - RADIO SERVICE	(5), (6)
EF-E3	GREENHECK, AER-E24C-615-VG	9	1,400	0.25	0.12	1/2	ECM	760	DIRECT	115/1	27	55	7	B	-	32	32	-	-	N	AREA E	RM 1150	EXTERNAL STORAGE BLDG.	(7)
EF-E4	SEE AHU-E1 SCHEDULE	-	-	-	-	-	-	-	-	-	-	-	-	-	AHU-E1	-	-	-	-	-	AREA E	-	SEE AHU-E1 SCHEDULE	

ALTERNATE BID NO.1, SEE SHEET M-001

FAN TYPE			
CENTRIFUGAL		AXIAL	
1	SIDEWALL	8	ROOFTOP DOWNBLAST
2	INLINE	9	SIDEWALL PROPELLER
3	UTILITY	10	TUBE AXIAL
4	CEILING	11	VANE AXIAL
5	ROOFTOP UPBLAST	12	ROOFTOP UPBLAST
6	ROOFTOP HOODED	13	ROOFTOP FRP UPBLAST
7	ROOFTOP FILTERED SUPPLY	14	ROOFTOP HOODED

MOTOR TYPE	
ODP	OPEN DRIP PROOF
TEFC	TOTALLY ENCLOSED FAN COOLED
XPL	EXPLOSION PROOF
INV	INVERTER DUTY
TEAO	TOTALLY ENCLOSED AIR OVER
ECM	ELECTRONICALLY COMMUTATED MOTOR

INSTALLATION TYPE	
A	FREE INLET, FREE OUTLET
B	FREE INLET, DUCTED OUTLET
C	DUCTED INLET, FREE OUTLET
D	DUCTED INLET, DUCTED OUTLET

ACCESSORIES			
1	GRAVITY BACKDRAFT DAMPER	11	OUTLET WIRE GUARD
2	MOTORIZED BACKDRAFT DAMPER	12	INLET FILTER GUARD
3	WEATHERHOOD	13	MOTOR COVER
4	WALL COLLAR	14	HOUSING INSULATION
5	MOTOR WIRE GUARD	15	BELT (OSHA) WIRE GUARD
6	MOTOR (OSHA) WIRE GUARD	16	INLET BELL
7	SHUTTER GUARD	17	INLET/OUTLET FLANGES
8	FAN SPEED CONTROLLER	18	INLET VANE DAMPER
9	NON-FUSED DISCONNECT SWITCH	19	EXTENDED LUBE LINES
10	INLET WIRE GUARD	20	MFR. ROOF CURB
		21	HOODED WALL CAP
		22	HOODED ROOF CAP
		23	HINGED ROOF CURB
		24	INLET GRILLE
		25	BASE MOUNTED VIBRATION ISOLATORS
		26	DUCT ADAPTOR
		27	HANGING SPRING ISOLATORS
		28	HANGING NEOPRENE ISOLATORS
		29	FACTORY INSULATED ANGLED FILTER BOX

REMARKS:
(1) SEE SPECIFICATION SECTION 230923 - HVAC SEQUENCE OF OPERATION.
(2) MOUNTING HEIGHT IS FROM FINISHED FLOOR LEVEL OF INDICATED ROOM, TO TOP OF FAN OR WALL OPENING.
(3) SOUND POWER LEVEL RATING PER AMCA 301.
(4) LOUDNESS VALUES AT 5 FT IN A HEMISPHERICAL FREE FIELD PER AMCA 301.
(5) FANS TO BE INSTALLED AND WIRED.
(6) SEE SPECIFICATION SECTION 230514 - VARIABLE FREQUENCY DRIVES.
(7) ALTERNATE BID NO.1
(8) FUTURE PLACEMENT OF EXHAUST FANS. (NOT IN CONTRACT; NIC)

VARIABLE FREQUENCY DRIVE (VFD) SCHEDULE

MARK	MODEL, MANUFACTURER NUMBER	SERVICE	SERVES	MOTOR (HP)	VOLTS / PHASE	ENCLOSURE	ACCESSORIES INTEGRAL DISCONNECT	ACCESSORIES MANUAL BYPASS		LOCATION	REMARKS
VFD-1	DANFOSS, VLT	DESTRAT.	DF-A1	0.75	460 / 3	NEMA 1	YES	NO	AREA A	RM 1025	(1)
VFD-2	DANFOSS, VLT	DESTRAT.	DF-B1	0.75	460 / 3	NEMA 1	YES	NO	AREA B	RM 1055	(1)
VFD-3	DANFOSS, VLT	DESTRAT.	DF-B2	0.75	460 / 3	NEMA 1	YES	NO	AREA B	RM 1055	(1)
VFD-4	DANFOSS, VLT	DESTRAT.	DF-B3	0.75	460 / 3	NEMA 1	YES	NO	AREA B	RM 1055	(1)
VFD-5	DANFOSS, VLT	DESTRAT.	DF-C1	0.75	460 / 3	NEMA 1	YES	NO	AREA C	RM 1084	(1)
VFD-6	DANFOSS, VLT	DESTRAT.	DF-C2	0.75	460 / 3	NEMA 1	YES	NO	AREA C	RM 1084	(1)
VFD-7	DANFOSS, VLT	DESTRAT.	DF-E1	0.75	460 / 3	NEMA 1	YES	NO	AREA E	RM 1118	(1)
VFD-8	DANFOSS, VLT	DESTRAT.	DF-E2	0.75	460 / 3	NEMA 1	YES	NO	AREA E	RM 1118	(1)
VFD-9	DANFOSS, VLT	DESTRAT.	DF-E3	0.75	460 / 3	NEMA 1	YES	NO	AREA E	RM 1146	(1)
VFD-10	DANFOSS, VLT	DESTRAT.	DF-E4	0.75	460 / 3	NEMA 1	YES	NO	AREA E	RM 1146	(1)
VFD-11	DANFOSS, VECON	WHEEL	AHU-A1	0.75	115 / 1	NEMA 1	YES	NO	AREA A	MEZZ	(1)
VFD-12	DANFOSS, VLT	SF-A1-1	AHU-A1	15	460 / 3	NEMA 1	YES	NO	AREA A	MEZZ	(1)
VFD-13	DANFOSS, VLT	RF-A1-1	AHU-A1	7.5	460 / 3	NEMA 1	YES	NO	AREA A	MEZZ	(1)
VFD-14	NOT USED	-	-	-	-	-	-	-	-	-	-
VFD-15	NOT USED	-	-	-	-	-	-	-	-	-	-
VFD-16	DANFOSS, VLT	SF-B1-1	MAU-B1	15	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-17	DANFOSS, VLT	SF-B1-2	MAU-B1	15	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-18	DANFOSS, VLT	RF-B1-1	MAU-B1	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-19	DANFOSS, VLT	RF-B1-2	MAU-B1	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-20	DANFOSS, VLT	SF-B2-1	MAU-B2	15	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-21	DANFOSS, VLT	SF-B2-2	MAU-B2	15	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-22	DANFOSS, VLT	RF-B2-1	MAU-B2	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-23	DANFOSS, VLT	RF-B2-2	MAU-B2	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-24	DANFOSS, VLT	SF-C1-1	MAU-C1	15	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(1)
VFD-25	DANFOSS, VLT	SF-C1-2	MAU-C1	15	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(1)
VFD-26	DANFOSS, VLT	RF-C1-1	MAU-C1	7.5	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(1)
VFD-27	DANFOSS, VLT	RF-C1-2	MAU-C1	7.5	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(1)
VFD-28	DANFOSS, VLT	SF-C2-1	MAU-C2	15	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ ABOVE 1095	(1)
VFD-29	DANFOSS, VLT	SF-C2-2	MAU-C2	15	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ ABOVE 1095	(1)
VFD-30	DANFOSS, VLT	RF-C2-1	MAU-C2	7.5	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ ABOVE 1095	(1)
VFD-31	DANFOSS, VLT	RF-C2-2	MAU-C2	7.5	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ ABOVE 1095	(1)
VFD-32	DANFOSS, VLT	SF-D1-1	MAU-D1	7.5	460 / 3	NEMA 1	YES	NO	AREA D	RM 2003	(1)
VFD-33	DANFOSS, VLT	SF-D1-2	MAU-D1	7.5	460 / 3	NEMA 1	YES	NO	AREA D	RM 2003	(1)
VFD-34	DANFOSS, VLT	RF-D1-1	MAU-D1	5	460 / 3	NEMA 1	YES	NO	AREA D	RM 2003	(1)
VFD-35	DANFOSS, VLT	RF-D1-2	MAU-D1	5	460 / 3	NEMA 1	YES	NO	AREA D	RM 2003	(1)
VFD-36	DANFOSS, VLT	SF-E1-1	MAU-E1	20	460 / 3	NEMA 1	YES	NO	AREA E	MEZZ	(1)
VFD-37	DANFOSS, VLT	SF-E1-2	MAU-E1	20	460 / 3	NEMA 1	YES	NO	AREA E	MEZZ	(1)
VFD-38	DANFOSS, VLT	RF-E1-1	MAU-E1	10	460 / 3	NEMA 1	YES	NO	AREA E	MEZZ	(1)
VFD-39	DANFOSS, VLT	RF-E1-2	MAU-E1	10	460 / 3	NEMA 1	YES	NO	AREA E	MEZZ	(1)
VFD-40	DANFOSS, VLT	EF-A1-1	AHU-A1	3	460 / 3	NEMA 1	YES	NO	AREA A	MEZZ	(1)
VFD-41	NOT USED	-	-	-	-	-	-	-	-	-	-
VFD-42	DANFOSS, VECON	WHEEL	AHU-E1	0.5	115 / 1	NEMA 1	YES	NO	AREA E	MEZZ	(1)
VFD-43	NOT USED	-	-	-	-	-	-	-	-	-	-
VFD-44	NOT USED	-	-	-	-	-	-	-	-	-	-
VFD-45	GREENHECK, VGD - INTEGRAL	EF-C1-1	EF-C1	3	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(2)
VFD-46	GREENHECK, VGD - INTEGRAL	EF-C2-1	EF-C2	3	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(2)
VFD-47	GREENHECK, VGD - INTEGRAL	EF-C3-1	EF-C3	3	460 / 3	NEMA 1	YES	NO	AREA C	MEZZ	(2)
VFD-48	GREENHECK, VGD - INTEGRAL	EF-E1-1	EF-E1	5	460 / 3	NEMA 1	YES	NO	AREA E	RM 1118	(2)
VFD-49	GREENHECK, VGD - INTEGRAL	EF-E2-1	EF-E2	2	460 / 3	NEMA 1	YES	NO	AREA E	RM 1147	(2)
VFD-50	DANFOSS, VLT	PRIMARY PUMP	HWP-1	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-51	DANFOSS, VLT	PRIMARY PUMP	HWP-2	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-52	DANFOSS, VLT	RADIANT PUMP	HWP-3	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)
VFD-53	DANFOSS, VLT	RADIANT PUMP	HWP-4	10	460 / 3	NEMA 1	YES	NO	AREA B	MEZZ	(1)

REMARKS:
(1) REFER TO SPECIFICATION 23 05 14 FOR VARIABLE FREQUENCY DRIVE SPECIFICATION. TCC SHALL FURNISH VFDS PER 23 09 14 SPECIFICATIONS.
(2) REFER TO SPECIFICATION 23 34 23 FOR HVAC POWER VENTILATORS FOR INTEGRAL VARIABLE FREQUENCY DRIVE SPECIFICATION.

AIR OUTLET AND INLET SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	APPLICATION	(4) MAX AIRFLOW (CFM)	OUTLET / INLET	TYPE	MOUNTING SYSTEM	(5) DAMPER	(3) FACE SIZE (IN)	NECK SIZE (IN)	(2) MAX NOISE LEVEL (NC)	PATTERN	MAX SP (IN WG)	FINISH	MATERIAL	(1) MOUNTING HEIGHT (IN)	ACCESSORIES	LOCATION	REMARKS
CD-1	TITUS, OMNI	SUPPLY	110	1	7	1	NONE	24x24	6	24	4-WAY	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(8)
CD-2	TITUS, OMNI	SUPPLY	225	1	7	1	NONE	24x24	8	24	4-WAY	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(8)
CD-3	TITUS, OMNI	SUPPLY	400	1	7	1	NONE	24x24	10	24	4-WAY	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(8)
CD-4	TITUS, OMNI	SUPPLY	575	1	7	1	NONE	24x24	12	24	4-WAY	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(8)
CD-5	TITUS, OMNI	SUPPLY	750	1	7	1	NONE	24x24	14	24	4-WAY	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(8)
SG-1	CARNES, RCLA	SUPPLY	15,330	3	2	4	NONE	50x48	48x46	40	-	0.1	W	STEEL			SEE PLANS	(6)(9)
SG-2	CARNES, RCLA	SUPPLY	4800	3	2	4	NONE	50x26	48x24	20	-	0.1	W	STEEL			SEE PLANS	(6)(9)
SG-3	TITUS, 272RS	SUPPLY	305	3	2	4	NONE	15x9	12x6	20	-	0.1	W	STEEL			SEE PLANS	(6)
SG-4	TITUS, 272RS	SUPPLY	1145	3	2	4	NONE	39x13	36x10	20	-	0.1	W	STEEL			SEE PLANS	(6)
SG-5	TITUS, 272RS	SUPPLY	500	3	2	4	NONE	15x13	12x10	20	-	0.1	W	STEEL			SEE PLANS	(6)
SG-6	TITUS, 272RS	SUPPLY	1275	3	2	3	NONE	27x15	24x12	25	-	1.1	W	STEEL			SEE PLANS	
SG-7	TITUS, 272RS	SUPPLY	2830	3	2	3	NONE	51x21	48x18	20	-	2.1	W	STEEL			SEE PLANS	
SG-8	TITUS, 272RS	SUPPLY	1600	3	2	3	NONE	51x13	48x10	20	-	3.1	W	STEEL	11'-2"		SEE PLANS	
SG-9	TITUS, 272RS	SUPPLY	710	3	2		NONE	21x13	18x10	20	-	0.1	W	STEEL			SEE PLANS	(6)
RG-1	TITUS, 50F	RETURN	575	3	8	1	NONE	15x15	12x12	20	-	0.1	W	ALUMINUM	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
RG-2	TITUS, 50F	RETURN	975	3	8	1	NONE	19x19	16x16	20	-	0.1	W	ALUMINUM	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
RG-3	TITUS, 50F	RETURN	1725	3	8	1	NONE	24x24	22x22	20	-	0.1	W	ALUMINUM	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
RG-4	TITUS, 350RL	RETURN	1800	3	3	3	NONE	38x16	36x14	22	-	0.1	W	STEEL			SEE PLANS	(7)
RG-5	TITUS, 350RL	RETURN	1800	3	3	4	NONE	38x16	36x14	22	-	0.1	W	STEEL			SEE PLANS	
RG-6	TITUS, 350RL	RETURN	4000	3	3	4	NONE	50x26	48x24	20	-	0.1	W	STEEL			SEE PLANS	
RG-7	TITUS, 350RL	RETURN	1245	3	3	3	NONE	26x14	24x12	30	-	0.1	W	STEEL			SEE PLANS	
RG-8	TITUS, 350RL	RETURN	2900	3	3	3	NONE	44x20	42x18	22	-	0.1	W	STEEL			SEE PLANS	(7)
EG-1	TITUS, 350RL	EXHAUST	125	3	3	2	NONE	12x8	10x6	20	-	0.1	W	STEEL	CEILING		SEE PLANS	(7)
EG-2	TITUS, 350RL	EXHAUST	125	3	3	1	NONE	12x8	10x6	20	-	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(7)
EG-3	TITUS, 350RL	EXHAUST	125	3	3	3	NONE	12x8	10x6	20	-	0.1	W	STEEL			SEE PLANS	(7)
EG-4	TITUS, 350RL	EXHAUST	125	3	3	4	NONE	12x8	10x6	20	-	0.1	W	STEEL			SEE PLANS	(7)
EG-5	TITUS, 350RL	EXHAUST	190	3	3	1	NONE	20x8	18x6	20	-	1.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(7)
EG-6	TITUS, 350RL	EXHAUST	375	3	3	1	NONE	20x20	18x18	20	-	2.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	(7)
EG-7	TITUS, PAR	EXHAUST	500	3	4	1	NONE	24x24	12x12	20	-	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
EG-8	TITUS, PAR	EXHAUST	725	3	4	1	NONE	24x24	15x15	20	-	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
EG-9	TITUS, PAR	EXHAUST	975	3	4	1	NONE	24x24	18x18	20	-	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
EG-10	TITUS, PAR	EXHAUST	1345	3	4	1	NONE	24x24	22x22	20	-	0.1	W	STEEL	CEILING	24x24 LAY-IN PANEL	SEE PLANS	
EG-11	TITUS, 350RL	EXHAUST	300	3	3	3	NONE	12x12	10x10	20	-	0.05	W	STEEL	10'-8"		SEE PLANS	(7)
TG-1	TITUS, 350RL	TRANSFER	115	3	3	2	NONE	12x12	10x10	15	-	0.05	W	STEEL			SEE PLANS	(7)
TG-2	TITUS, 350RL	TRANSFER	160	3	3	3	NONE	20x16	18x14	15	-	0.05	W	STEEL	7'-8"		SEE PLANS	(7)
TG-3	TITUS, 350RL	TRANSFER	375	3	3	3	NONE	20x20	18x18	20	-	2.1	W	STEEL	-		SEE PLANS	(7)
TG-4	TITUS, 350RL	TRANSFER	1145	3	3	3	NONE	32x14	30x12	15	-	0.05	W	STEEL			SEE PLANS	(7)
TG-5	TITUS, 350RL	TRANSFER	1800	3	3	3	NONE	38x16	36x14	20	-	0.1	W	STEEL			SEE PLANS	(7)

OUTLET/INLET TYPE				MOUNTING SYSTEM		DAMPER		FINISH	
1	DIFFUSER	1	SINGLE DEFLECTION	9	LOUVERED	1	T-BAR CEILING	N	NONE	M	MILL
2	REGISTER	2	DOUBLE DEFLECTION	10	HOODED	2	PLASTER/CONCRETE CEILING	BF	BUTTERFLY	W	MFR. STANDARD WHITE
3	GRILLE	3	FIXED BLADE	11	DOOR TRANSFER	3	PLASTER/MASONRY WALL	G	GRAVITY	S	MFR. SPECIAL COLOR
4	LOUVER	4	PERFORATED	12	BRICK	4	EXPOSED DUCTWORK	MP	MOTORIZED PNEUMATIC	A	ANODIZED ALUMINUM
5	PENTHOUSE	5	LINEAR	13	PUNKAH	5	METAL PANEL WALL	ME	MOTORIZED ELECTRIC	P	PRIME COAT (FINAL COAT BY GC)
6	VENT	6	PLENUM SLOT	14	LAMINAR	6	FLOOR	OB	OPPOSED BLADE	O	OTHER (SEE SPECIFICATIONS)
		7	PLAQUE	15	DRUM	7	ROOF	PB	PARALLEL BLADE		
		8	EGGCRATE			8	EXTERIOR STUD WALL	LL	LOW LEAKAGE, INSUL.		

REMARKS:
(1) MOUNTING HEIGHT SHALL BE FROM FINISHED FLOOR TO BOTTOM OF OPENING.
(2) ALL GRILLES AND DIFFUSERS SHALL NOT EXCEED NOISE CRITERIA LISTED (BASED ON 10 DB ROOM ATTENUATION) AND AT THE SCHEDULED MAXIMUM STATIC PRESSURE DROP.
(3) BORDER TYPES SHALL BE COMPATIBLE WITH CEILING OR WALL TYPES WHERE AIR DEVICE IS LOCATED. REFER TO ARCHITECTURAL PLANS AND ALL OTHER TRADES.
(4) SEE PLANS FOR ACTUAL INDIVIDUAL AIR QUANTITIES OF EACH DEVICE.
(5) IF DAMPER IS SCHEDULED 'NONE', EACH SUPPLY, RETURN, AND EXHAUST DEVICE TO HAVE A BALANCE DAMPER IN THE DUCT BRANCH TAKE-OFF UNLESS AN ASSOCIATED VAV BOX SERVES A SINGLE DEVICE.
(6) INDIVIDUALLY ADJUSTABLE AIRFOIL BLADE WITH 3/4" SPACING. FRONT BLADES PARALLEL TO THE SHORT DIMENSION. INITIALLY SET BLADES FOR APPROXIMATELY 30 DEGREE THROW.
(7) BLADES PARALLEL TO THE LONG DIMENSION WITH FIXED 30 DEGREE DEFLECTION AND 3/4" SPACING.
(8) INSULATE THE TOP OF THE DIFFUSER WHEN THE SUPPLY AIR TEMPERATURE IS 50 DEGREES OR LESS.
(9) CONTRACTOR APPLY LOCTITE SEALANT TO DOUBLE DEFLECTION GRILLES BLADES AFTER TESTING AND BALANCING. ADJUST VERTICAL/HORIZONTAL DIRECTIONAL BLADES PRIOR TO APPYING LOCTITE SEALANT.

SOUND ATTENUATING DEVICE (SAD) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER (2)	AIR FLOW (CFM)	MAX. PD (IN WC)	(2) DUCT SHAPE	INLET SIZE (IN) (1) WIDTH	INLET SIZE (IN) (1) DEPTH	OUTLET SIZE (IN) (1) WIDTH	OUTLET SIZE (IN) (1) DEPTH	ATTEN. LENGTH (FT)	TARGET ROOM NC LEVEL	DYNAMIC INSERTION LOSS (DB) OCTAVE BAND CENTER FREQUENCY (HZ) 63	125	250	500	1000	2000	4000	SELF-NOISE POWER LOSS (DB) OCTAVE BAND CENTER FREQUENCY (HZ) 63	125	250	500	1000	2000	4000	WEIGHT (LB)	LOCATION	REMARKS
SAD-E1	NOT USED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAD-E2	VIBRO-ACOUSTICS, TRED-MHV-NN-22932	3,800	0.26	ELB	12	54	12	40	60	NC 35	6	8	18	21	37	39	29	59	49	41	38	38	38	30	200	AHU-E1 SA	(3)(4)
SAD-E3	VIBRO-ACOUSTICS, EXRED-HV-NN-22932	3,800	0.26	ELB	12	26	12	26	72	NC 35	6	12	20	28	36	35	28	51	47	44	43	45	42	28	165	AHU-E1 RA	(3)
SAD-A1	VIBRO-ACOUSTICS, EXRED-UHV-NN-22932	10,700	0.35	ELB	20	60	20	60	84	NC 35	6	11	21	27	39	37	30	55	33	22	22	23	15	10	600	AHU-A1 SA	(3)(5)
SAD-A2	VIBRO-ACOUSTICS, RED-UUHV-NN-22932	10,700	0.23	ELB	28	28	28	28	60	NC 35	6	6	7	21	25	26	20	62	53	52	50	49	49	37	170	AHU-A1 RA	(3)

DUCT SHAPE			
RND	ROUND	OVAL	OVAL
REC	RECTANGULAR	ELB	ELBOW

REMARKS:
(1) DUCT SIZES MAY VARY DEPENDENT ON FIELD CONDITIONS AND SHALL BE VERIFIED BY CONTRACTOR.
(2) RD- RECTANGULAR DISSIPATIVE, TRED = TRANSITIONAL RECTANGULAR ELBOW DISSIPATIVE, RED = RECTANGULAR ELBOW DISSIPATIVE, EXRED = EXTENDED WIDTH RECTANGULAR ELBOW DISSPATIVE
(3) LENGTH FOR ELBOW TYPE SILENCER LISTED ON THE SCHEDULE IS EQUAL TO THE TOTAL CENTER LINE LENGTH.
(4) MAXIMUM PRESSURE DROP WITH SYSTEM EFFECTS = SILENCER PRESSURE DROP PER ASTM E477-13 + SYSTEM EFFECTS FOR NEARBY DUCT ELEMENTIONS.
(5) CASING TO BE HTL EQUIVALENT TO 12 GAUGE DUCT WALL TO CONTROL BREAKOUT.
(6) CASING TO BE HTL EQUIVALENT TO 8 GAUGE DUCT WALL TO CONTROL BREAKOU

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CITY OF MADISON
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FLEET/FIRE/RADIO SHOP FACILITY
4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714
ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 13003500-160264.01

MECHANICAL SCHEDULES

M-603

ADDENDUM 2

CUSTOM MAKE-UP AIR HANDLING UNIT (MAU) SCHEDULE (1)

MARK	MANUFACTURER, MODEL NUMBER	TYPE	OUTDOOR/AIRFLOW (CFM/%)	SUPPLY FAN: TOTAL CNG AIRFLOW (CFM)	SUPPLY FAN: TOTAL NORMAL AIRFLOW (CFM)	SUPPLY FAN: FAN TYPE	SUPPLY FAN: CLASS	SUPPLY FAN: FAN (QTY.)	SUPPLY FAN: ESP (IN WC)	SUPPLY FAN: TSP (IN WC)	SUPPLY FAN: FAN POWER (BHP)	SUPPLY FAN: FAN POWER (HP)	SUPPLY FAN: FAN SPEED (RPM)	EXHAUST FAN: TOTAL CNG AIRFLOW (CFM)	EXHAUST FAN: TOTAL NORMAL AIRFLOW (CFM)	EXHAUST FAN: FAN TYPE	EXHAUST FAN: CLASS	EXHAUST FAN: FAN (QTY.)	EXHAUST FAN: ESP (IN WC)	EXHAUST FAN: TSP (IN WC)	EXHAUST FAN: FAN POWER (BHP)	EXHAUST FAN: FAN POWER (HP)	EXHAUST FAN: FAN SPEED (RPM)	HEATING COIL MARK	COOLING COIL MARK	AIR FILTER MARK
MAU-B1	INNOVENT	C,I,H	100		21,000	PLEN / DIRECT	III	2	0.75	2.8	11.9 EA	2 @ 15	1971	-	21,000	PLEN / DIRECT	II	2	0.75	2.3	7.0 EA	2 @ 10	1845	HC-B1-1	-	AF-B1-1 & 2
MAU-B2	INNOVENT	C,I,H	100		21,000	PLEN / DIRECT	III	2	0.75	3.0	12.5 EA	2 @ 15	1993	-	21,000	PLEN / DIRECT	II	2	0.75	2.3	7.0 EA	2 @ 10	1875	HC-B2-1	-	AF-B2-1 & 2
MAU-C1	INNOVENT	C,I,H	100	28,350	16,500	PLEN / DIRECT	III	2	0.75	3.1	10.7 EA	2 @ 15	1850	0	16,500	PLEN / DIRECT	II	2	0.75	2.1	5.5 EA	2 @ 7.5	2241	HC-C1-1	-	AF-C1-1 & 2
MAU-C2	INNOVENT	C,I,H	100	28,350	16,500	PLEN / DIRECT	III	2	0.75	2.8	9.5 EA	2 @ 15	1504	0	16,500	PLEN / DIRECT	II	2	0.75	2.1	4.5 EA	2 @ 7.5	1551	HC-C2-1	-	AF-C2-1 & 2
MAU-D1	INNOVENT	C,I,H	100	-	17,000	PLEN / DIRECT	III	2	0.75	2.4	5.1 EA	2 @ 7.5	1613	-	14,500	PLEN / DIRECT	II	2	0.75	1.8	3.3 EA	2 @ 5.6	1393	HC-D1-1	-	AF-D1-1 & 2
MAU-E1	INNOVENT	C,I,H	100	45,000	30,000	PLEN / DIRECT	III	2	0.75	2.5	17.1 EA	2 @ 20	1641	0	30,000	PLEN / DIRECT	II	2	0.75	2.1	8.6 EA	2 @ 10	1495	HC-E1-2	-	AF-E1-1 & 2

MARK	STATIC-PLATE, AIR-TO-AIR HEAT EXCHANGER: WINTER - NORMAL AIRFLOW: SUPPLY AIR: EAT DB/WB (°F)	LAT DB/WB (°F)	AIR FLOW (CFM)	EXHAUST AIR: EAT DB/RH (°F/%)	LAT DB/RH (°F/%)	AIR FLOW (CFM)	HEAT RECOVERY (MBH)	EFFICIENCY (%)	SUMMER - NORMAL AIRFLOW: SUPPLY AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	HEATING COOLING APD (IN WC)	EXHAUST AIR: EAT DB/RH (°F/%)	LAT DB/RH (°F/%)	HEATING COOLING APD (IN WC)	AIR FLOW (CFM)	HEAT RECOVERY (MBH)	EFFICIENCY (%)	ELECTRICAL: (VOLTS/PH)	FLA (A)	MCA (A)	MOCP (A)	ACCESSORIES	WEIGHT (LB)	SERVICE	LOC.	REMARKS
MAU-B1	-15 / -15.5	36.9 / 25.4	21,000	70 / 30	26.7 / 100	21,000	1,003	-	21,000	89.6 / 74.2	80.8 / 71.6	0.80 / 1.0	75.0 / 50.0	83.7 /37.7	0.90 / 1.0	21,000	205	-	460 / 3	-	-	-		12,200	AREA B	MEZZ	
MAU-B2	-15 / -15.5	36.9 / 25.4	21,000	70 / 30	26.7 / 100	21,000	1,003	-	21,000	89.6 / 74.2	80.8 / 71.6	0.80 / 1.0	75.0 / 50.0	83.7 /37.7	0.90 / 1.0	21,000	205	-	460 / 3	-	-	-		12,600	AREA B	MEZZ	
MAU-C1	-15 / -15.5	37.3 / 25.7	16,500	70 / 30	26.5 / 100	16,500	770	-	16,500	89.6 / 74.2	80.8 / 71.6	0.80 / 1.0	75.0 / 50.0	83.8 / 37.8	0.75 / 0.85	16,500	161	-	460 / 3	-	-	-		12,100	AREA C	MEZZ	
MAU-C2	-15 / -15.5	37.3 / 25.7	16,500	70 / 30	26.5 / 100	16,500	770	-	16,500	89.6 / 74.2	80.8 / 71.6	0.65 / 0.85	75.0 / 50.0	83.7 / 37.7	0.75 / 0.85	16,500	161	-	460 / 3	-	-	-		12,300	AREA C	MEZZ	
MAU-D1	-15 / -15.5	35.3 / 24.4	14,500	70 / 30	22.2 / 100	14,500	692	-	14,500	89.6 / 74.2	80.8 / 71.6	0.80 / 1.0	75.0 / 50.0	84.8 ? 36.4	0.60 / 0.70	14,500	142	-	460 / 3	-	-	-		9,300	AREA D	MEZZ	
MAU-E1	-15 / -15.5	33.0 / 22.9	30,000	70 / 30	29.2 / 100	30,000	1,432	-	30,000	89.6 / 74.2	81.5 / 71.8	0.65 / 0.85	75.0 / 50.0	83.0 / 38.6	0.60 / 0.70	30,000	293	-	460 / 3	-	-	-		17,700	AREA E	MEZZ	

TYPE						ACCESSORIES			
PR	PACKAGED ROOFTOP	DF	DIRECT FIRED	D	DOWNFLOW	1	INTAKE HOOD	4	ROOF CURB
C	CUSTOM	I	INDOOR	H	HORIZONTAL	2	INLET DAMPER	5	DOUBLE WALL
IF	INDIRECT FIRED	O	OUTDO...	U	UPFLOW	3	DISCHARGE DAMPER	6	COIL GUARDS

REMARKS:
(1) REFER TO 23 73 00 FOR CUSTOM AIR HANDLING UNIT SPECIFICATION FOR ANY ADDITIONAL ACCESSORIES.

HEATING/COOLING COIL (HC/CC) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	COIL TYPE	AIR FLOW (CFM)	PD (IN WC)	COIL: FACE VEL. (FPM)	FACE AREA (FT²)	ROWS	FINS PER INCH	CAPACITY (MBH): TOTAL	SENS.	EAT (°F): DB	WB	LAT (°F): DB	WB	SST (°F)	MEDIA: FLOW RATE: TYPE	(LB/H)	(GPM)	(TDH)	PRESSURE: ENTER (PSI)	DROP (FT)	EWT (°F)	LWT (°F)	EQUIPMENT SERVED	LOCATION	REMARKS
CC-A1-1	INNOVENT, CUSTOM AHU	DX	3,800	0.44	240	15.8	6	10	184.4	120.3	81.2	67.3	52.2	51.2	46.5	R410a	-	-	-	-	-	-	-	AHU-A1 / ACCU-A1	MEZZ	(1)
CC-A1-2	INNOVENT, CUSTOM AHU	DX	10,700	0.62	532	20.1	4	10	153.2	133.3	66.6	58.6	55.2	53.5	47.0	R410a	-	-	-	-	-	-	-	AHU-A1 / ACCU-A2	MEZZ	(1)
CC-E1-1	DAIKIN, MODULAR AHU	DX	1,250	0.25	225	5.6	6	10	61.2	36.9	78.3	66.9	51.3	50.5	45.0	R410a	-	-	-	-	-	-	-	AHU-E1 / ACCU-E1	MEZZ	(1)
CC-E1-2	DAIKIN, MODULAR AHU	DX	3,800	0.48	510	7.5	3	12	58.7	48.2	66.6	58.6	55.0	53.0	45.0	R410a	-	-	-	-	-	-	-	AHU-E1 / ACCU-E3	MEZZ	(1)
HC-A1-1	INNOVENT, CUSTOM AHU	HWS	3,800	0.10	251	-	2	11	352	352	-15	-	70	-	-	30% PG	-	19	-	-	-	140	101	AHU-A1	MEZZ	(1)
HC-A1-2	INNOVENT, CUSTOM AHU	HGR	3,800	0.02	264	-	1	10	93	93	55	-	75	-	-	R410a	-	-	-	-	-	-	-	AHU-A1	MEZZ	(1)(2)
HC-A2-1	DAIKIN, MODULAR AHU	HWS	4,000	0.57	474	-	4	10	326	326	45	-	119	-	-	30% PG	-	16.2	-	-	-	140	100	AHU-A2	MEZZ	(1)
HC-E1-1	DAIKIN, MODULAR AHU	HWS	3,800	0.13	486	-	1	12	95	95	38	-	61	-	-	30% PG	-	4.7	-	-	-	140	100	AHU-E1	MEZZ	(1)
HC-E1-2	DAIKIN, MODULAR AHU	HGR	3,800	0.13	486	-	1	12	62	62	60	-	75	-	-	R410a	-	-	-	-	-	-	-	AHU-E1	MEZZ	(1)(3)
HC-B1-1	INNOVENT, CUSTOM MAU	HWS	21,000	0.54	897	-	2	12	889	889	36	-	75	-	-	30% PG	-	62.4	-	-	-	140	110	MAU-B1	MEZZ	(1)
HC-B2-1	INNOVENT, CUSTOM MAU	HWS	21,000	0.40	741	-	3	8	2,051	2,051	-15	-	75	-	-	30% PG	-	143.9	-	-	-	140	110	MAU-B2	MEZZ	(1)
HC-C1-1	INNOVENT, CUSTOM MAU	HWS	16,500	0.36	700	-	3	7	680	680	37	-	75	-	-	30% PG	-	47.7	-	-	-	140	110	MAU-C1 (NORMAL MODE)	MEZZ	(1)(4)
	INNOVENT, CUSTOM MAU	HWS	28,350	0.56	700	-	3	7	1,786	1,786	-15	-	43	-	-	30% PG	-	93.8	-	-	-	140	100	MAU-C1 (CNG MODE)	MEZZ	(1)(4)
HC-C2-1	INNOVENT, CUSTOM MAU	HWS	16,500	0.62	755	-	2	12	680	680	37	-	75	-	-	30% PG	-	47.7	-	-	-	140	110	MAU-C2 (NORMAL MODE)	MEZZ	(1)(4)
	INNOVENT, CUSTOM MAU	HWS	28,350	0.62	755	-	2	12	1,765	1,765	-15	-	42	-	-	30% PG	-	92.7	-	-	-	-140	100	MAU-C2 (CNG MODE)	MEZZ	(1)(4)
HC-D1-1	INNOVENT, CUSTOM MAU	HWS	14,500	0.16	420	-	2	9	614	614	36	-	75	-	-	30% PG	-	43.1	-	-	-	140	110	MAU-D1	MEZZ	(1)(4)
HC-E1-2	INNOVENT, CUSTOM MAU	HWS	30,000	0.54	697	-	2	12	1,269	1,269	36	-	75	-	-	30% PG	-	89.1	-	-	-	140	110	MAU-E1 (NORMAL MODE)	MEZZ	(1)(4)
	INNOVENT, CUSTOM MAU	HWS	45,000	0.54	697	-	2	12	2,849	2,849	-15	-	43	-	-	30% PG	-	142.0	-	-	-	140	100	MAU-E1 (CNG MODE)	MEZZ	(1)(4)

REMARKS:
(1) BY SAME MANUFACTURER OF MAKE-UP AIR OR AIR HANDLING UNIT.
(2) PROVIDE HOT GAS REHEAT COIL DOWNSTREAM OF REFRIGERATION COIL CC-A1-1
(3) PROVIDE HOT GAS REHEAT COIL DOWNSTREAM OF REFRIGERATION COIL CC-E1-1
(4) HOT WATER COILS PERFORMANCE SELECTIONS BASED ON NORMAL AND CNG MODES OF OPERATION.

MODULAR INDOOR - AIR HANDLING UNIT (AHU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	OUTDOOR AIRFLOW (CFM / %)	SUPPLY FAN: TOTAL NORMAL AIRFLOW (CFM)	SUPPLY FAN: FAN TYPE	SUPPLY FAN: FAN (QTY.)	SUPPLY FAN: ESP (IN WC)	SUPPLY FAN: FAN POWER (HP)	SUPPLY FAN: FAN SPEED (RPM)	RETURN FAN: TOTAL NORMAL AIRFLOW (CFM)	RETURN FAN: FAN TYPE	RETURN FAN: FAN (QTY.)	RETURN FAN: ESP (IN WC)	RETURN FAN: FAN POWER (HP)	RETURN FAN: FAN SPEED (RPM)	HEATING COIL MARK	COOLING COIL MARK	HOT GAS REHEAT COIL MARK	LOCATION	ACCESSORIES
AHU-A2	DAIKIN, CAH009GHCM	C,I,H	1,000 / 25	4,000	PLENUM	1	1.50	3.5	2,140	-	-	-	-	-	-	-	-	-	AREA A MEZZ	(5)
AHU-E1	DAIKIN, CAH008GDCM	C,I,H	1,435 / 37	3,800	PLENUM	1	1.50	6.3	2,120	3,800	PLENUM	1	0.5	2.10	1,503	HC-E1-1	CC-E1-1	HC-E1-2	AREA E MEZZ	(5)
																	CC-E1-2			

MARK	ROTARY WHEEL, AIR-TO-AIR HEAT EXCHANGER (DOAS-E1): WINTER - NORMAL AIRFLOW: SUPPLY AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	EXHAUST AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	ENERGY RECOVERY (MBH)	SUMMER - NORMAL AIRFLOW: SUPPLY AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	EXHAUST AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	ENERGY RECOVERY (MBH)	VFD MOTOR: POWER (HP)	VOLT / PHASE	TOTAL NORMAL AIRFLOW (CFM)	EXHAUST FAN: FAN TYPE	FAN (QTY.)	ESP (IN WC)	FAN POWER (HP)	FAN SPEED (RPM)	REMARKS
AHU-A2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(1)(4)(5)(6)
AHU-E1	1,435	-15 / -15.5	47.9 / 37.3	1,435	68.0 / 49.8	6.1 / 6.0	97.4	1,250	67.0 / 75.0	78.3 / 66.9	1,250	75.0 / 62.5	83.8 / 72.0	40.8	1/2	115 / 1	1,435	PLENUM	1	0.75	2.3	1,925	(1)(2)(3)(4)(5)(6)

TYPE				ACCESSORIES				SECTION TYPES			
CS	CENTRAL STATION	I	INDOOR	1	INTAKE HOOD	RF	RETURN FAN	HC	HEATING COIL	SF	SUPPLY FAN
PR	PACKAGED ROOFTOP	O	OUTDOOR	2	INLET DAMPER	EC	ECONOMIZER	AC	ACCESS	DP	DISCHARGE PLENUM
C	CUSTOM	D	DOWNFLOW	3	DISCHARGE DAMPER	MB	MIXING BOX	H	HUMIDIFIER	WH	WEATHER HOOD
IF	INDIRECT FIRED	H	HORIZONTAL	4	ROOF CURB	AB	AIR BLENDER	CC	COOLING COIL	D	DAMPER
DF	DIRECT FIRED	U	UPFLOW	5	DOUBLE WALL	BL	BLANK	ML	MOISTURE ELIMINATOR	B	BURNER
				6	COIL GUARDS	F	FILTER	ER	ENERGY RECOVERY		

REMARKS:
(1) SEE SPECIFICATION SECTION 237313 MODULAR INDOOR CENTRAL-STATION AHU FOR ANY ADDITIONAL ACCESSORIES.
(2) AIR-TO-AIR ENERGY RECOVERY WHEEL SHALL BE A TOTAL ENERGY WHEEL COATED WITH SILICA GEL DESICCANT ON POLYMER SUBSTRATE.
(3) OUTDOOR AIR VOLUME IS VARIABLE DURING ECONOMIZER AND FIXED FROM DOAS UNIT DURING NORMAL OPERATION.
(4) PROVIDE DIRECT DRIVE, PREMINUM EFFICIENCY ECM MOTORS. ELECTRICAL SERVICE TO MOTOR SHALL BE 460V / 3-PHASE.
(5) PROVIDE ECM FAN 1X1: 1 ACCORDING TO EBMPAPST OR EQUIVALENT MANUFACTURERS.
(6) PROVIDE INTEGRATED DRIVE WITH DISCONNECT WITH MOTOR STARTER ENCLOSURE NEMA 3R.

FLOW METER (WFM) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	PIPE SIZE (IN)	METER SIZE (IN)	FLUID TYPE	DESIGN PRESS. (PSI)	FLUID TEMP. (°F)	DESIGN FLUID FLOW RATE: MAX.	MIN.	UNITS	FLUID SPECIFIC GRAVITY	LOCATION	REMARKS
WFM-1	ONICON, F-3500 SERIES	8	6	30% PG	150	140	600	165	GPM	1.046	HWP-1/2	(1)(2)
WFM-2	ONICON, F-3500 SERIES	4	3	30% PG	150	140	300	75	GPM	1.046	HWP-3/4	(1)(2)

REMARKS:
(1) PROVIDE INSERTION BI-DIRECTIONAL FLOW METER WITH INSTALLATION KIT.
(2) INSTALL FLOW METER IN STRAIGHT RUN WITH MINIMUM 10 DIAMETERS UPSTREAM AND 5 DIAMETERS DOWNSTREAM OF THE METER

AIR FILTER (AF) SCHEDULE

MARK	TOTAL CNG AIRFLOW (CFM)	TOTAL NORMAL AIRFLOW (CFM)	SERVES	MERV RATING	MAX. FACE VELOCITY (FPM)	MAX. SP DROP @ 500 FT/S: INITIAL (IN)	FINAL (IN)	HOUSING TYPE	CARTRIDGES: QTY.	DEPTH (IN)	AREA (SF)	ARRANGEMENT	REMARKS
AF-A1-1	-	10,700	AHU-A1 OUTSIDE AIR	13	500	0.25	0.7	PLEATED	8	4	23.2		
AF-A1-2	-	3,800	AHU-A1 EXHAUST AIR	8	165	0.15	0.5	PLEATED	8	4	23.2		
AF-A1-3	-	10,700	AHU-A1 RETURN AIR	8	500	0.15	0.5	PLEATED	8	4	23.2		
AF-A2-1	-	4,000	AHU-A2 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	3	4	8.8		
AF-B1-1	-	21,000	MAU-B1 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	16	4	64.0	24X24 MODULES	(1)
AF-B1-2	-	21,000	MAU-B1 EXHAUST AIR	8	500	0.25	0.6	PLEATED	14	4	42.0	16X24 MODULES	
AF-B2-1	-	21,000	MAU-B2 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	16	4	64.0	24X24 MODULES	(1)
AF-B2-2	-	21,000	MAU-B2 EXHAUST AIR	8	500	0.25	0.6	PLEATED	14	4	42.0	16X24 MODULES	
AF-C1-1	28,350	16,500	MAU-C1 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	16	4	60.0	24X24 MODULES	(1)
AF-C1-2	-	16,500	MAU-C1 EXHAUST AIR	8	500	0.25	0.6	PLEATED	10	4	33.3	20X24 MODULES	
AF-C2-1	28,350	16,500	MAU-C2 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	16	4	60.0	24X24 MODULES	(1)
AF-C2-2	-	16,500	MAU-C2 EXHAUST AIR	8	500	0.25	0.6	PLEATED	10	4	33.3	20X24 MODULES	
AF-D1-1	-	17,000	MAU-D1 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	10	4	33.3	20X24 MODULES	
AF-D1-2	-	14,500	MAU-D1 EXHAUST AIR	8	500	0.25	0.6	PLEATED	8	4	32.0	24X24 MODULES	
AF-E1-1	45,000	30,000	MAU-E1 OUTSIDE AIR	13	500	0.25	0.6	PLEATED	24	4	96.0	24X24 MODULES	
AF-E1-2	-	30,000	MAU-E1 EXHAUST AIR	8	500	0.25	0.6	PLEATED	16	4	64.0	24X24 MODULES	
AF-E1-3	-	3,800	AHU-E1 OUTSIDE AIR	13	500	0.25	0.7	PLEATED	3	4	8.8		
AF-E1-4		1,435	AHU-E1 EXHAUST AIR	8	165	0.15	0.5	PLEATED	3	4	8.8		
AF-E1-5		3,800	AHU-E1 RETURN AIR	8	500	0.15	0.5	PLEATED	3	4	8.8		

REMARKS:
(1) FOR CNG MODE, THE OUTSIDE AIR FILTRATION'S MEDIA SHALL BE SIZED FOR THE MAXIMUM AIRFLOW.

CUSTOM AIR HANDLING UNIT (AHU) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	OUTDOOR AIRFLOW (CFM / %)	SUPPLY FAN: TOTAL NORMAL AIRFLOW (CFM)	SUPPLY FAN: FAN TYPE	SUPPLY FAN: FAN (QTY.)	SUPPLY FAN: ESP (IN WC)	SUPPLY FAN: FAN POWER (HP)	SUPPLY FAN: FAN SPEED (RPM)	RETURN FAN: TOTAL NORMAL AIRFLOW (CFM)	RETURN FAN: FAN TYPE	RETURN FAN: FAN (QTY.)	RETURN FAN: ESP (IN WC)	RETURN FAN: FAN POWER (HP)	RETURN FAN: FAN SPEED (RPM)	HEATING COIL MARK	COOLING COIL MARK	HOT GAS REHEAT COIL MARK	LOCATION	ACCESSORIES
AHU-A1	INNOVENT	C,I,H	3,385 / 32	10,700	PLENUM	1	1.75	15.0	1,590	10,500	PLENUM	1	1.0	10.0	1,593	HC-A1-1	CC-A1-1	HC-A1-2	AREA A MEZZ	(5)
																	CC-A1-2			

MARK	ROTARY WHEEL, AIR-TO-AIR HEAT EXCHANGER (DOAS-A1): WINTER - NORMAL AIRFLOW: SUPPLY AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	EXHAUST AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	ENERGY RECOVERY (MBH)	SUMMER - NORMAL AIRFLOW: SUPPLY AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	EXHAUST AIR: AIR FLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	HEAT RECOVERY (MBH)	VFD MOTOR: POWER (HP)	VOLT / PHASE	TOTAL NORMAL AIRFLOW (CFM)	EXHAUST FAN: FAN TYPE	FAN (QTY.)	ESP (IN WC)	FAN POWER (HP)	FAN SPEED (RPM)	REMARKS
AHU-A1	3,385	-15 / -15.5	40.0 / 31.9	3,165	68.0 / 48.5	8.8 / 8.7	227.2	3,385	87.0 / 75.0	79.3 / 68.5	3,165	75.0 / 62.5	83.3 / 71.3	96.3	1/2	115 / 1	3,385	PLENUM	1	1.5	3.0	2,378	(1)(2)(3)(4)

TYPE				ACCESSORIES				SECTION TYPES			
CS	CENTRAL STATION	I	INDOOR	1	INTAKE HOOD	RF	RETURN FAN	HC	HEATING COIL	SF	SUPPLY FAN
PR	PACKAGED ROOFTOP	O	OUTDOOR	2	INLET DAMPER	EC	ECONOMIZER	AC	ACCESS	DP	DISCHARGE PLENUM
C	CUSTOM	D	DOWNFLOW	3	DISCHARGE DAMPER	MB	MIXING BOX	H	HUMIDIFIER	WH	WEATHER HOOD
IF	INDIRECT FIRED	H	HORIZONTAL	4	ROOF CURB	AB	AIR BLENDER	CC	COOLING COIL	D	DAMPER
DF	DIRECT FIRED	U	UPFLOW	5	DOUBLE WALL	BL	BLANK	ML	MOISTURE ELIMINATOR	B	BURNER
				6	COIL GUARDS	F	FILTER	ER	ENERGY RECOVERY		

REMARKS:
(1) SEE SPECIFICATION SECTIONS 237300 - CUSTOM AIR HANDLING UNIT FOR ANY ADDITIONAL ACCESSORIES.
(2) AIR-TO-AIR ENERGY RECOVERY WHEEL SHALL BE A TOTAL ENERGY WHEEL COATED WITH SILICA GEL DESICCANT ON POLYMER SUBSTRATE.
(3) OUTDOOR AIR VOLUME IS VARIABLE DURING ECONOMIZER AND FIXED FROM DOAS UNIT DURING NORMAL OPERATION.
(4) PROVIDE DIRECT DRIVE, PREMINUM EFFICIENCY TEFC MOTORS WITH SHAFT GROUNDING RINGS.

Stantec
1600 WILSON BLVD.
SUITE 1600
ARLINGTON, VA 22209
571 290 7679 I

Mead & Hunt
Mead & Hunt, Inc.
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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 13033500-160264.01

MECHANICAL SCHEDULES

M-602

42 sheets

AIR TERMINAL (AT) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	AIR FLOW (CFM) MIN.	MAX.	HEATING	(1) MAX. PD (IN WC)	INLET SIZE (IN)	OUTLET SIZE (IN)	WEIGHT (LB)	ACCESSORIES	LOCATION	REMARKS
AT-1-1	ACCUTROL, ACCUVALVE AVT3000	1,3	60	540	60	1	8	8	12	3	RM. 1028-1	
AT-1-2	ACCUTROL, ACCUVALVE AVT3000	1,3	120	755	120	1	10	10	14	3	RM. 1042	
AT-1-3	ACCUTROL, ACCUVALVE AVT3000	1,3	120	595	120	1	10	10	14	3	RM. 1027-1	
AT-1-4	ACCUTROL, ACCUVALVE AVT3000	1,3	60	335	60	1	8	8	12	3	RM. 1041	
AT-1-5	ACCUTROL, ACCUVALVE AVT3000	1,3	180	915	180	1	12	12	16	3	RM. 1038	
AT-1-6	ACCUTROL, ACCUVALVE AVT3000	1,3	60	335	60	1	8	8	12	3	RM. 1028-2	
AT-1-7	ACCUTROL, ACCUVALVE AVT3000	1,3	1660	1660	1660	1	14	14	20	3	RM. 1024	
AT-1-8	ACCUTROL, ACCUVALVE AVT3000	1,3	180	910	180	1	12	12	16	3	RM. 1015	
AT-1-9	ACCUTROL, ACCUVALVE AVT3000	1,3	945	945	945	1	12	12	16	3	RM. 1022	
AT-1-10	ACCUTROL, ACCUVALVE AVT3000	1,3	30	280	30	1	6	6	9	3	RM. 1014	
AT-1-11	ACCUTROL, ACCUVALVE AVT3000	1,3	300	845	300	1	10	10	14	3	RM. 1017	
AT-1-12	ACCUTROL, ACCUVALVE AVT3000	1,3	60	400	60	1	8	8	12	3	RM. 1012	
AT-1-13	ACCUTROL, ACCUVALVE AVT3000	1,3	30	135	30	1	6	6	9	3	RM. 1007	
AT-1-14	ACCUTROL, ACCUVALVE AVT3000	1,3	120	935	120	1	10	10	14	3	RM. 1001/1002	
AT-1-15	ACCUTROL, ACCUVALVE AVT3000	1,3	60	240	60	1	8	8	12	3	RM. 1003	
AT-1-16	ACCUTROL, ACCUVALVE AVT3000	1,3	30	160	30	1	6	6	9	3	RM. 1004	
AT-1-17	ACCUTROL, ACCUVALVE AVT3000	1,3	30	130	30	1	6	6	9	3	RM. 1006	
AT-1-18	ACCUTROL, ACCUVALVE AVT3000	1,3	60	430	60	1	8	8	12	3	RM. 1009	
AT-1-19	ACCUTROL, ACCUVALVE AVT3000	1,3	30	155	30	1	6	6	9	3	RM. 1005	
AT-2-1	ACCUTROL, ACCUVALVE AVT3000	1,3	130	370	130	1	8	8	12	3	RM. 1121	
AT-2-2	ACCUTROL, ACCUVALVE AVT3000	1,3	130	370	130	1	8	8	12	3	RM. 1122	
AT-2-3	ACCUTROL, ACCUVALVE AVT3000	1,3	630	1910	630	1	14	14	20	3	RM. 1125/1135	
AT-2-4	ACCUTROL, ACCUVALVE AVT3000	1,3	70	200	70	1	6	6	9	3	RM. 1132	
AT-2-5	ACCUTROL, ACCUVALVE AVT3000	1,3	320	950	320	1	10	10	14	3	RM. 1141/1137	

TYPE				ACCESSORIES			
1	PRESSURE INDEPENDENT	5	SERIES FAN POWERED	1	ELECTRIC HEAT	5	2-WAY TWO-POSITION VALVE
2	PRESSURE DEPENDENT	6	PARALLEL FAN POWERED	2	FUSE	6	3-WAY TWO-POSITION VALVE
3	SINGLE DUCT	7	BYPASS	3	DDC CONTROLS	7	2-WAY PROPORTIONAL VALVE
4	DUAL DUCT			4	PNEUMATIC CONTROLS	8	3-WAY PROPORTIONAL VALVE

REMARKS:
(1) MAXIMUM STATIC PRESSURE DROP BASED ON MAXIMUM RATED AIR FLOW.

DESTRATIFICATION FAN (DF) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	FAN TYPE	AIRFLOW RATE (CFM)	MOTOR (HP)	INPUT (W)	TYPE	FAN SPEED (RPM)	DRIVE TYPE	ELECTRICAL (VOLTS/PH)	(2) MOUNTING HEIGHT	MAX. SOUND (DB)	WEIGHT (LB)	LOCATION	REMARKS
DF-A1	GREENHECK, DS-12 SERIES	CEILING	63,333	0.75	658	IP 40	119	DIRECT	460 / 3	22'-5"	50		ZONE A	(1)(3)(4)(5)(6)
DF-B1	GREENHECK, DS-12 SERIES	CEILING	65,833	0.75	658	IP 40	119	DIRECT	460 / 3	23'-5"	50		ZONE B	(1)(3)(4)(5)(6)
DF-B2	GREENHECK, DS-12 SERIES	CEILING	65,833	0.75	658	IP 40	119	DIRECT	460 / 3	23'-5"	55		ZONE B	(1)(3)(4)(5)(6)
DF-B3	GREENHECK, DS-12 SERIES	CEILING	65,833	0.75	658	IP 40	119	DIRECT	460 / 3	23'-5"	55		ZONE B	(1)(3)(4)(5)(6)
DF-C1	GREENHECK, DS-14 SERIES	CEILING	90,000	0.75	664	IP 40	97	DIRECT	460 / 3	24'-5"	55		ZONE C	(1)(3)(4)(5)(6)
DF-C2	GREENHECK, DS-14 SERIES	CEILING	90,000	0.75	664	IP 40	97	DIRECT	460 / 3	24'-5"	55		ZONE C	(1)(3)(4)(5)(6)
DF-D1	GREENHECK, DS-12 SERIES	CEILING	65,833	0.75	658	IP 40	119	DIRECT	460 / 3	24'-0"	55		ZONE E	(1)(3)(4)(5)(6)
DF-D2	GREENHECK, DS-12 SERIES	CEILING	65,833	0.75	658	IP 40	119	DIRECT	460 / 3	18'-0"	55		ZONE E	(1)(3)(4)(5)(6)
DF-D3	GREENHECK, DS-12 SERIES	CEILING	63,333	0.75	658	IP 40	119	DIRECT	460 / 3	24'-0"	55		ZONE E	(1)(3)(4)(5)(6)
DF-D4	GREENHECK, DS-12 SERIES	CEILING	63,333	0.75	658	IP 40	119	DIRECT	460 / 3	18'-0"	55		ZONE E	(1)(3)(4)(5)(6)

REMARKS:
(1) PROVIDE MOUNTING HARDWARE AND DROP TUBE.
(2) MOUNTING HEIGHT IS FROM FINISHED FLOOR TO BOTTOM OF FAN IN FEET.
(3) PROVIDE WITH WALL MOUNTED REMOTE CONTROL FOR ON/OFF AND SPEED CONTROL. PROVIDE VARIABLE FREQUENCY DRIVE.
(4) FAN CONTROL: NEMA 1 PANEL, SPEED CONTROL, START/STOP SWITCH, AND FUSED DISCONNECT. INTEGRATE W/ BUILDING AUTOMATION SYSTEM.
(5) PROVIDE DIRECT-DRIVE MOTOR.
(6) REMOVE ALL LOGOS AND DECALS, REFERENCING MANUFACTURER, FROM FAN AND FAN CONTROL
(7) 1 AIR TURN PER 3 MINUTES.

ZONE DAMPER (D) SCHEDULE

MARK	MANUFACTURER, MODEL NUMBER	TYPE	SIZE (IN) WIDTH	DEPTH	AIR FLOW (CFM)	MAX. PD (IN WC)	CONTROL TYPE	ACTUATOR TYPE	CONSTRUCTION MATERIAL	(1) INTERLOCK WITH	SERVING	LOCATION	REMARKS
ZD-MAU-D1-1	RUSKIN, CD-50	M-OB	24	12	1159	0.15	MOD	EL	GALV	T-STAT	AREA-D	RM 1098	
ZD-MAU-D1-2	RUSKIN, CD-50	M-OB	14	12	1550	0.15	MOD	EL	GALV	T-STAT	AREA-D	RM 1097	
ZD-MAU-D1-3	RUSKIN, CD-50	M-OB	12	12	1159	0.15	MOD	EL	GALV	T-STAT	AREA-D	RM 1098	
ZD-MAU-D1-4	RUSKIN, CD-50	M-OB	24	12	1559	0.15	MOD	EL	GALV	T-STAT	AREA-D	RM 1097	

TYPE				CONTROL TYPE		ACTUATOR TYPE	
M-PB	MOTOR OPERATED PARALLEL BLADE	G-PB	GRAVITY OPERATED PARALLEL BLADE	MOD	MODULATING	PN	PNEUMATIC
M-OB	MOTOR OPERATED OPPOSED BLADE	M-BF	MOTOR OPERATED BUTTERFLY	TP	TWO POSITION	EL	ELECTRIC

REMARKS:
(1) SEE SPECIFICATION SECTION 230993 - HVAC SEQUENCE OF OPERATIONS FOR BREATHABLE AIR SYSTEM ROOMS.

AIR FLOW MEASURING STATION (AFMS) SCHEDULE

MARK	MANUFACTURER, MODEL	DUCT DIMENSION (IN)	AIRFLOW RANGE (CFM)	VELOCITY RANGE (FPM)	SENSORS (NO)	MAX PRESS. DROP (IN WG)	HONEYCOMB AIR STRAIGHTENER	SENSOR ACCURACY	TEMPERATURE RANGE (°F)	SERVICE	SERVES	REMARKS
AFMS-A1-1	EBTRON, GOLD SERIES	90 X 60	0 - 10,500	100 - 2,000	15	0.1	NO	5%	-20 TO 140	AHU-A1-OA	AHU-A1	(1)(2)(3)
AFMS-A1-2	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-A1-1	AHU-A1	(4)
AFMS-A1-3	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-A1-1	AHU-A1	(4)
AFMS-A1-4	PIEZOMETER	-	0 - 3,183	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	EF-A1-1	AHU-A1	(4)
AFMS-A2-1	PIEZOMETER	-	0 - 000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-A2-1	AHU-A2	(4)
AFMS-E1-5	EBTRON, GOLD SERIES	42x12	0 - 3,800	100 - 2,000	4	0.1	NO	5%	-20 TO 140	AHU-E1-OA	AHU-E1	(1)(2)(3)
AFMS-E1-6	PIEZOMETER	-	0 - 3,800	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-E1-3	AHU-E1	(4)
AFMS-E1-7	PIEZOMETER	-	0 - 3,800	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-E1-3	AHU-E1	(4)
AFMS-E1-8	PIEZOMETER	-	0 - 3,800	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	EF-E1-4	AHU-E1	(4)
AFMS-B1-1	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-B1-1	MAU-B1	(4)
AFMS-B1-2	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-B1-2	MAU-B1	(4)
AFMS-B1-3	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-B1-1	MAU-B1	(4)
AFMS-B1-4	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-B1-2	MAU-B1	(4)
AFMS-B2-1	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-B2-1	MAU-B2	(4)
AFMS-B2-2	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-B2-2	MAU-B2	(4)
AFMS-B2-3	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-B2-1	MAU-B2	(4)
AFMS-B2-4	PIEZOMETER	-	0 - 10,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-B2-2	MAU-B2	(4)
AFMS-C1-1	PIEZOMETER	-	0 - 14,175	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-C1-1	MAU-C1	(4)
AFMS-C1-2	PIEZOMETER	-	0 - 14,175	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-C1-2	MAU-C1	(4)
AFMS-C1-3	PIEZOMETER	-	0 - 8,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-C1-1	MAU-C1	(4)
AFMS-C1-4	PIEZOMETER	-	0 - 8,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-C1-2	MAU-C1	(4)
AFMS-C2-1	PIEZOMETER	-	0 - 14,175	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-C2-1	MAU-C2	(4)
AFMS-C2-2	PIEZOMETER	-	0 - 14,175	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-C2-2	MAU-C2	(4)
AFMS-C2-3	PIEZOMETER	-	0 - 8,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-C2-1	MAU-C2	(4)
AFMS-C2-4	PIEZOMETER	-	0 - 8,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-C2-2	MAU-C2	(4)
AFMS-D1-1	PIEZOMETER	-	0 - 8,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-D1-1	MAU-D1	(4)
AFMS-D1-2	PIEZOMETER	-	0 - 8,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-D1-2	MAU-D1	(4)
AFMS-D1-3	PIEZOMETER	-	0 - 7,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-D1-1	MAU-D1	(4)
AFMS-D1-4	PIEZOMETER	-	0 - 7,250	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-D1-2	MAU-D1	(4)
AFMS-E1-1	PIEZOMETER	-	0 - 22,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-E1-1	MAU-E1	(4)
AFMS-E1-2	PIEZOMETER	-	0 - 22,500	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	SF-E1-2	MAU-E1	(4)
AFMS-E1-3	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-E1-1	MAU-E1	(4)
AFMS-E1-4	PIEZOMETER	-	0 - 15,000	100 - 2,000	PER MFGR	0.1	NO	5%	-20 TO 140	RF-E1-2	MAU-E1	(4)

REMARKS:
(1) DUCT MOUNTED THERMAL DISPERSION AIR FLOW STATION. REFER TO SPECIFICATION SECTION 230900 - INSTRUMENTATION AND CONTROL FOR HVAC.
(2) PROVIDE AN AIR FLOW STATION TO MEASURE THE OUTDOOR AIR CFM FOR EACH AIR HANDLING UNIT.
(3) ALL DUCT AND OUTSIDE AIR OPENING DIMENSIONS TO BE FIELD VERIFIED TO DETERMINE SENSOR LENGTH, SPACING, AND TUBE QUANTITIES.
(4) ALL INLET FAN PIEZOMETER RINGS SHALL BE PROVIDED BY SPECIFICATION SECTION 237300 AND 237313 MANUFACTURERS.

HVAC DUCT SCHEDULE

SYSTEM		DUCT MATERIAL TYPE	REFERENCE STANDARD	FINISH (1)	PRESS. CLASS (IN WG)	SEAL CLASS	LEAKAGE CLASS RECT.	LEAKAGE CLASS ROUND	COMMENTS (2)(3)(4)(5)(6)
SUPPLY AIR	DUCT CONNECTED TO FAN COIL UNITS AND TERMINAL UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO VARIABLE AIR VOLUME MAKE-UP AIR AND AIR HANDLING UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
RETURN AIR	DUCT CONNECTED TO FAN COIL UNITS AND TERMINAL UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO VARIABLE AIR VOLUME MAKE-UP AIR AND AIR HANDLING UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
EXHAUST AIR	DUCT CONNECTED TO EXHAUST FANS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO VARIABLE AIR VOLUME MAKE-UP AIR AND AIR HANDLING UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO HOODS - EXPOSED TO VIEW	304 SS	ASTM A 480	NO. 4	3	A	12	6	SEAL LIQUID-TIGHT
	DUCT CONNECTED TO HOODS - CONCEALED	304 SS	ASTM A 480	NO. 2	3	A	12	6	SEAL LIQUID-TIGHT
	DUCT CONNECTED TO SHOWER EXHAUST	ALUMINUM, ALLOY 3003H-14	ASTM B 209	MILL	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G60 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	EXPLOSION-PROOF FAN SYSTEM - EXPOSED TO VIEW	ALUMINUM, ALLOY 3003H-14	ASTM B 209	BRIGHT	3	A	12	6	
	EXPLOSION-PROOF FAN SYSTEM - CONCEALED	ALUMINUM, ALLOY 3003H-14	ASTM B 209	MILL	3	A	12	6	
OUTSIDE AIR	DUCT CONNECTED TO FAN COIL UNITS AND TERMINAL UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO VARIABLE AIR VOLUME MAKE-UP AIR AND AIR HANDLING UNITS	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	DUCT CONNECTED TO OTHER FAN POWERED EQUIPMENT	G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	3	A	12	6	
	FIRST 3 FEET FROM LOUVER/HOOD	PVC-COATED GALV.	ASTM A 653	4 MIL PVC	3	A	12	6	SEAL LIQUID-TIGHT. SLOPE TOWARD LOUVER.
TRANSFER DUCTS		G90 GALV.	ASTM A 653	MILL / PHOSPHATIZED	1	B	12	6	

FITTINGS

RECTANGULAR DUCT ELBOWS (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-2, "RECTANGULAR ELBOWS.")
RADIUS TYPE RE 1 WITH MINIMUM 1.5 RADIUS-TO-DIAMETER RATIO.
RADIUS TYPE RE 3 WITH MINIMUM 1.0 RADIUS-TO-DIAMETER RATIO AND TWO VANES.
MITERED TYPE RE 2 WITH VANES COMPLYING WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-3, "VANES AND VANE RUNNERS," AND FIGURE 2-4, "VANE SUPPORT IN ELBOWS."

ROUND DUCT ELBOWS (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-5, "ROUND DUCT ELBOWS.")
RADIUS TO DIAMETER RATIO: 1.5.
ROUND ELBOWS, 12 INCHES AND SMALLER IN DIAMETER: STAMPED OR PLEATED
ROUND ELBOWS, 14 INCHES AND LARGER IN DIAMETER: WELDED

RECTANGULAR BRANCH DUCT CONFIGURATION (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 2-6, "BRANCH CONNECTIONS.")
RECTANGULAR MAIN TO RECTANGULAR BRANCH: 45° ENTRY
RECTANGULAR MAIN TO ROUND BRANCH: SPIN IN

ROUND BRANCH DUCT CONFIGURATION (COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," FIGURE 3-4, "90 DEGREE TEES AND LATERALS," AND FIGURE 3-5, "CONICAL TEES." SADDLE TAPS ARE PERMITTED IN EXISTING DUCT)
VELOCITY 1500 FT/MIN AND LOWER: CONICAL TAP
VELOCITY GREATER THAN 1500 FT/MIN: 45° LATERAL

REMARKS:
(1) PROVIDE PAINT GRIP TYPE DUCT WHERE DUCT IS EXPOSED AND INDICATED TO BE PAINTED.
(2) INSTALL DUCT ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.
(3) INTERMEDIATE REINFORCEMENT MATERIAL SHALL MATCH DUCT MATERIAL.
(4) SUPPLY AIR DUCTS PASSING THROUGH UNCONDITIONED OR OUTDOOR SPACES SHALL BE SEAL CLASS A (ASHRAE 90.1 - 2007).
(5) RETURN AIR DUCTS PASSING THROUGH OUTDOOR SPACES SHALL BE SEAL CLASS A (ASHRAE 90.1 - 2007).
(6) SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.

HVAC DUCT INSULATION SCHEDULE

INDOOR OR OUTDOOR	CONCEALED OR EXPOSED	DUCT SHAPE	DUCT SERVICE	INSULATION TYPE	INSULATION THICKNESS (IN)	JACKETING TYPE	REMARKS
INDOOR	CONCEALED	SQUARE	SUPPLY AIR	D1	1 1/2	J1	-
			RETURN AIR	D1	1 1/2	J1	-
			OUTSIDE AIR	D1	3	J1	-
			EXHAUST AIR	D1	1	J1	-
		ROUND	SUPPLY AIR	D1	1 1/2	J1	-
			RETURN AIR	D1	1 1/2	J1	-
			OUTSIDE AIR	D1	3	J1	-
			EXHAUST AIR	D1	1	J1	-
	EXPOSED UNCONDITIONED SPACES	SQUARE	SUPPLY AIR	D3	3	J8	(2)
			RETURN AIR	D2	3	J1 / J9	(1)
			OUTSIDE AIR	D2	3	J1 / J9	(1)
			EXHAUST AIR	D2	1	J1 / J9	(1)
		ROUND	SUPPLY AIR	D3	3	J8	(2)
			RETURN AIR	D2	3	J1 / J9	(1)
			OUTSIDE AIR	D1	3	J1	-
			EXHAUST AIR	D1	3	J1	-
VEHICLE AND MEZZANINES AREA	EXPOSED UNCONDITIONED SPACES	SQUARE	AHU SUPPLY AIR	D3	3	J8	(2)
			AHU RETURN AIR	D2	3	J1 / J9	(1)
			MAU RETURN...	-	-	-	NOT INSULATED DUCTWORK IN EXPOSED AREAS
			MAU SUPPLY AIR				NOT INSULATED DUCTWORK IN EXPOSED AREAS
		ROUND	EXHAUST AIR	D2	3	J1 / J9	(1)
			OUTSIDE AIR	D2	3	J1 / J9	(1)
			AHU SUPPLY AIR	D3	3	J8	(2)
			AHU RETURN AIR	D3	3	J8	(2)
			MAU RETURN...	-	-	-	NOT INSULATED DUCTWORK IN EXPOSED AREAS
			MAU SUPPLY AIR				NOT INSULATED DUCTWORK IN EXPOSED AREAS
			EXHAUST AIR	D2	3	J1 / J9	(1)
			OUTSIDE AIR	D2	3	J1 / J9	(1)

INSULATION TYPE		JACKETING TYPE	
D1	MINERAL FIBER BLANKET (ASTM C 553 TYPE II) AVAIL. MFRS: CERTAINTEED CORP; DUCT WRAP JOHNS MANVILLE; MICROLITE. KNAUF INSULATION; DUCT WRAP OWENS CORNING; ALL-SERVICE DUCT WRAP	J1	FACTORY APPLIED FSK
		J2	FACTORY APPLIED FSP
		J3	FACTORY APPLIED VINYL
		J4	FACTORY APPLIED ASJ-SSL
D2	MINERAL FIBER BOARD (ASTM C 612 TYPE 1A OR 1B) AVAIL. MFRS: OWENS CORNING THERMAL FIBER VERSABOARD W/FSK MINIMUM 6 OR 8 PCF FOR OUTSIDE AIR, RETURN AND EXHAUST DUCTWORK EXPOSED IN UNCONDITIONED...	J5	PVC, 30 MIL THICK, WHITE, UVC RESISTANT, ASTM D 1784 CLASS 16354-C, AVAIL. MFRS: JOHNS MANVILLE; ZESTON P.I.C. PLASTICS, INC.; FG SERIES PROTO PVC CORP; LOSMOKE SPEEDLINE CORPORATION; SMOKESAFE
D3	LAMINATED EPDM FLEXIBLE ELASTOMERIC INSULATION (ASTM C534) - WHITE AVAIL. MFRS: AEROFLEX USA, AEROCEL@FACED SHEET ARMACELL LLC, ARMATUFF OR ARMATUFF SA (EMBOSSED) K-FLEX; CLAD JACKETING CLADBWT (POLYESTER FILM)	J6	ALUMINUM, 0.016" THICK, EMBOSSED, ASTM B 209, ALLOY 3003, 3005, 3105, OR 5005, TEMPER H-14, FACTORY FABRICATED FITTING COVERS AVAIL. MFRS: CHILDERS PRODUCTS, DIV OF ITW PABCO METALS CORP.; SUREFIT. RPR PRODUCTS, INC.; INSUL-MATE
D4	HIGH TEMPERATURE MINERAL FIBER BLANKET (ASTM C 553 TYPE V) AVAIL. MFRS: JOHNS MANVILLE, HTB 23 SPIN-GLAS OWNES CORNING; HIGH TEMP FLEXIBLE BATT	J7	STAINLESS STEEL, 304, 0.016" THICK, SMOOTH, 2B OR 4 FINISH, ASTM A 167 OR ASTM A 240 FACTORY FABRICATED FITTING COVERS AVAIL. MFRS: CHILDERS PRODUCTS, DIV OF ITW PABCO METALS CORP.; SUREFIT. RPR PRODUCTS, INC.; INSUL-MATE
D5	HIGH TEMPERATURE MINERAL FIBER BOARD (ASTM C 612 TYPE III) AVAIL. MFRS: JOHNS MANVILLE, HTB 23 SPIN-GLAS OWNES CORNING; HIGH TEMP FLEXIBLE BATT		
D6	[1] HR FIRE RATED BLANKET (ASTM C 591) AVAIL. MFRS: CERTAINTEED CORP.; FLAMECHEK JOHNS MANVILLE; FIRETEMP WRAP 3M; FIRE BARRIER WRAP PRODUCTS. THERMAL CERAMICS; FIREMASTER DUCT WRAP	J8	FACTORY APPLIED; SELF-ADHERING JACKETING. MINIMUM 6...
		J9	FIELD APPLIED; SELF-ADHERING JACKETING. MINIMUM 40 MILS. VENTURECLAD FLEXCLAD-400(MATT WHITE FINISH);...

REMARKS:
(1) PROVIDE A FACTORY FSK JACKETING (J1) AND FIELD APPLIED SELF-ADHERING JACKETING (J9).
(2) PROVIDE A FACTORY SELF ADHERING JACKETING WITH WHITE COLOR. INSTALL TWO LAYERS OF 1.5 INCHES OF ELASTOMERIC.

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NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY
4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714
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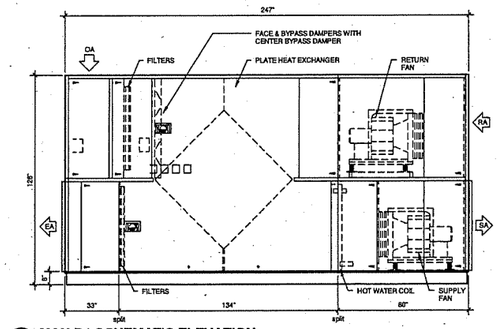
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	ISSUE FOR PERMIT	01/17/2019

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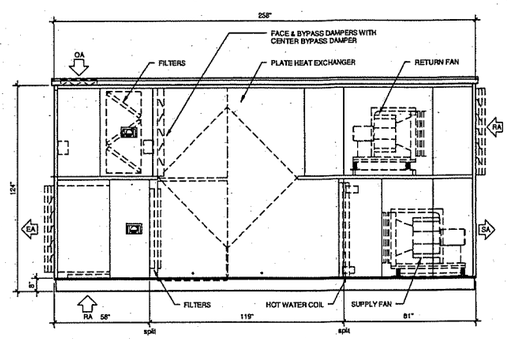
MECHANICAL SCHEDULES

M-601

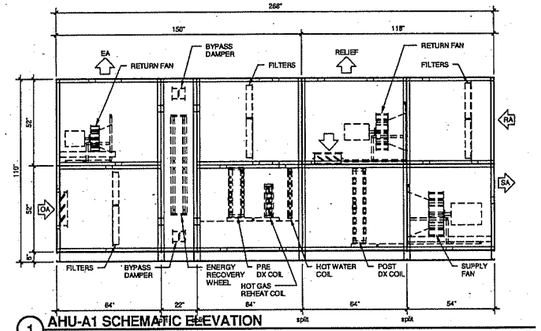
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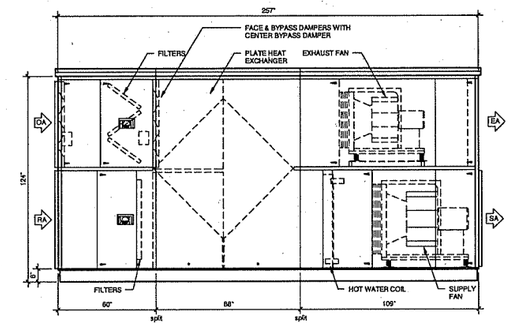
8 **MAU-D1 SCHEMATIC ELEVATION**
NO SCALE



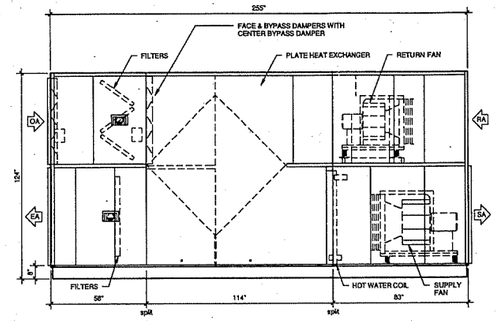
5 **MAU-B2 SCHEMATIC ELEVATION**
NO SCALE



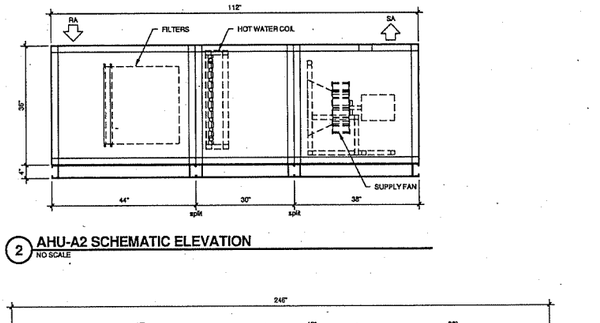
1 **AHU-A1 SCHEMATIC ELEVATION**
NO SCALE



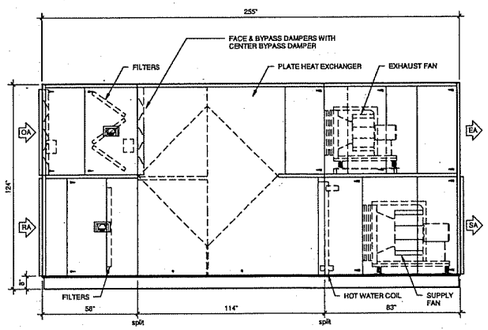
9 **MAU-E1 SCHEMATIC ELEVATION**
NO SCALE



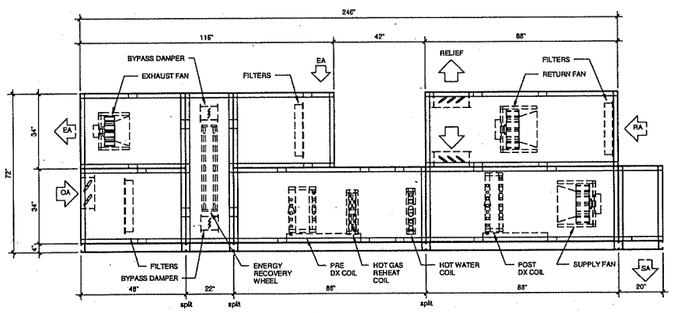
6 **MAU-C1 SCHEMATIC ELEVATION**
NO SCALE



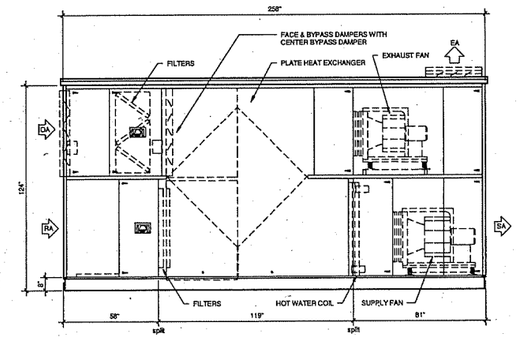
2 **AHU-A2 SCHEMATIC ELEVATION**
NO SCALE



7 **MAU-C2 SCHEMATIC ELEVATION**
NO SCALE



3 **AHU-E1 SCHEMATIC ELEVATION**
NO SCALE



4 **MAU-B1 SCHEMATIC ELEVATION**
NO SCALE

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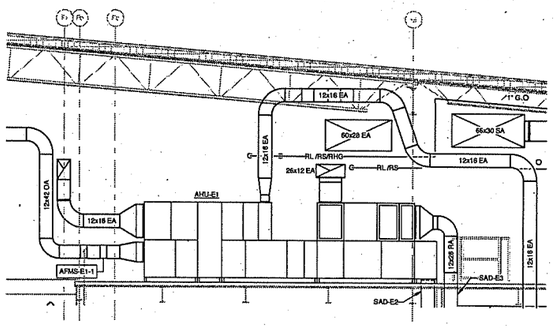
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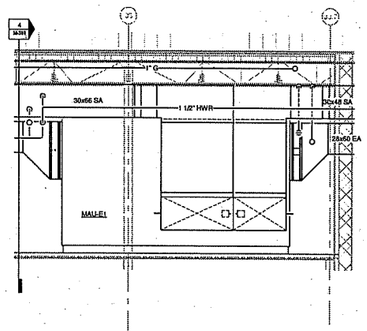
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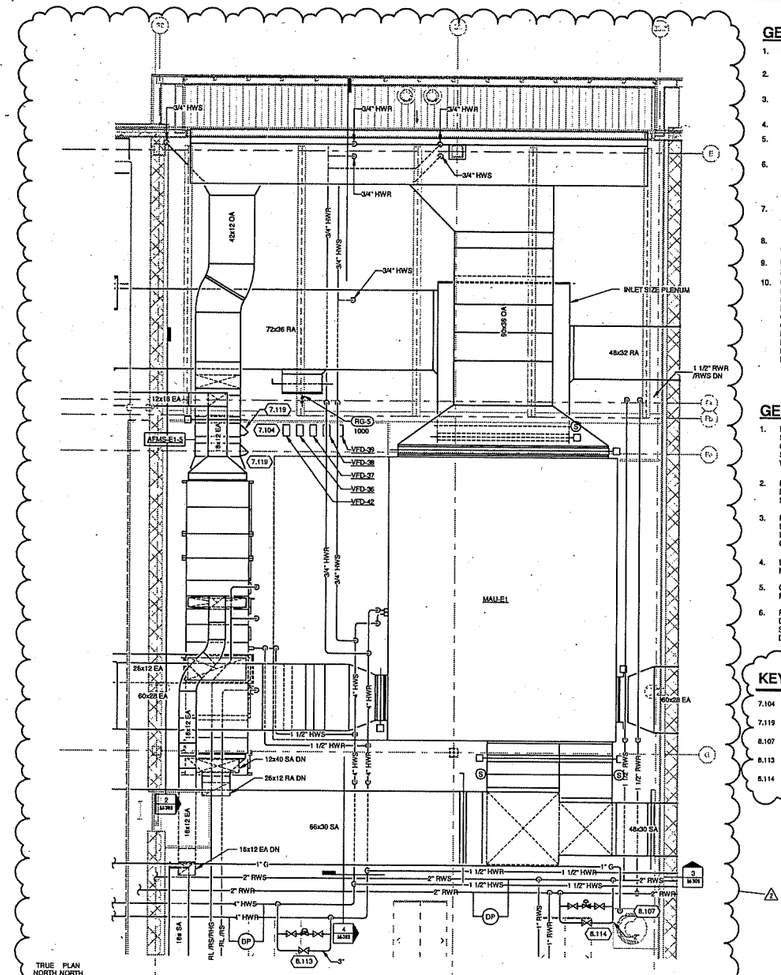
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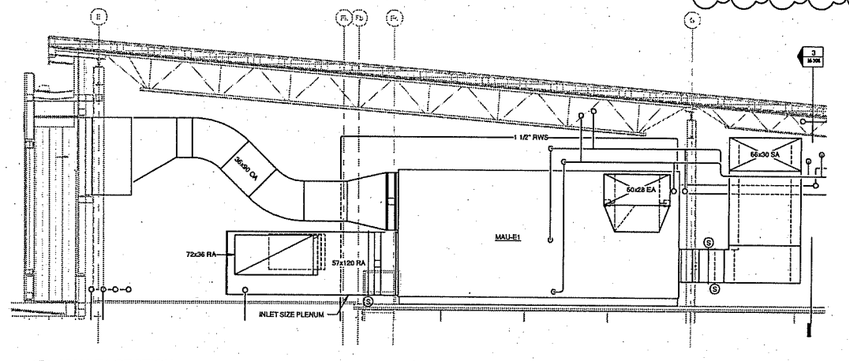
2 **AHU-E1 SECTION**
1/4" = 1'-0"



3 **RADIO MEZZANINE SECTION**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH
1 **ENLARGED MECHANICAL PLAN - MEZZANINE - AREA E**
1/4" = 1'-0"



4 **MAU-E1 SECTION**
1/4" = 1'-0"

GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELD-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
3. INSTALL DIELECTRIC FITTINGS WHERE PIPING OF DIFFERENT MATERIALS IS JOINED.
4. INSTALL PIPING FREE OF SAGS AND BENDS.
5. LOCATE ALL VALVES FOR EASY ACCESS. INSTALL VALVES WITH STEM UP OR HORIZONTAL.
6. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE. INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS IN PIPING, AT HEAT-TRANSFER COILS, AND ELSEWHERE AS REQUIRED FOR SYSTEM AIR VENTING.
7. PRIME AND PAINT ALL EXTERIOR GAS PIPING A COLOR AS SELECTED BY ARCHITECT. SUPPORT PIPING FROM BUILDING WALL WITH PAINTED WALL SUPPORTS AS NEEDED.
8. PROVIDE NAMEPLATE AT VALVE STATING, "EMERGENCY POWER SUPPLY GAS SHUTOFF VALVE".
9. HOUSEKEEPING PAD PROVIDED BY DIVISION 23 CONTRACTOR. REFER TO 23 05 29 FOR REQUIREMENTS.
10. GAS METER BY MGE. COORDINATE METER INSTALLATION WITH MGE. P.C. RESPONSIBLE FOR ALL PIPING DOWNSTREAM OF GAS METER. GAS METER SHALL BE SIZED FOR 7200 CFH WITH 2 PSI OUTLET GAS PRESSURE. GAS METER SHALL HAVE PULSE SIGNAL CAPABILITY TO OUTPUT GAS CONSUMPTION TO BUILDING'S FMCS. P.C. SHALL PAY ANY ADDITIONAL COST FOR UPGRADED GAS METER WITH PULSE OUTPUT CAPABILITY. MAINTAIN AT LEAST 10'-0" SEPARATION BETWEEN GAS METER REGULATOR VENT AND OUTSIDE AIR INTAKES. IF REQUIRED, ROUTE RELIEF VENT TO THE NORTH TO MAINTAIN CLEARANCE REQUIREMENTS. PAINT RELIEF VENT COLOR AS SELECTED BY ARCHITECT.

GENERAL HVAC NOTES:

1. INLET DUCT SIZE TO AIR TERMINAL DEVICES SHALL BE SAME AS INLET SIZE UNLESS OTHERWISE NOTED. IF RUNOUT TO AIR TERMINAL BOX IS GREATER THAN 6 FEET IN LENGTH, SIZE RUNOUT ONE EVEN INCREMENT SIZE LARGER (MINIMUM 2" LARGER) UNLESS OTHERWISE NOTED TO WITHIN 3 FEET OF BOX BEFORE REDUCING TO BOX INLET SIZE.
2. DUCTWORK DOWNSTREAM OF AIR TERMINAL BOXES TO BE INTERNALLY LINED FOR A MINIMUM OF 6'-0" FOR SOUND ATTENUATION. OUTLET DUCT SIZES TO MATCH AIR TERMINAL BOX OUTLET UNLESS NOTED OTHERWISE.
3. PROVIDE MANUAL BALANCE DAMPER AT EACH DIFFUSER, GRILLE OR BRANCH TAKE-OFF IN ALL SUPPLY, RETURN AND EXHAUST DUCTWORK EXCEPT KITCHEN GREASE EXHAUST DUCT. LOCATE BALANCE DAMPER AS CLOSE TO BRANCH TAKE-OFF AS POSSIBLE.
4. DUCT SIZE TO DIFFUSERS, REGISTERS, AND GRILLES SHALL BE SAME AS NECK SIZE UNLESS NOTED OR DETAILED OTHERWISE.
5. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH REFLECTED CEILING PLAN.
6. PROVIDE FLEXIBLE DUCTWORK FOR FINAL CONNECTIONS TO SUPPLY AIR DIFFUSERS UNLESS NOTED OTHERWISE ON DRAWINGS OR IN SPECIFICATIONS. FLEXIBLE DUCT SIZE SHALL BE SAME AS NECK SIZE OF DIFFUSER AND SHALL NOT EXCEED 5 FEET IN LENGTH.

KEYED NOTES

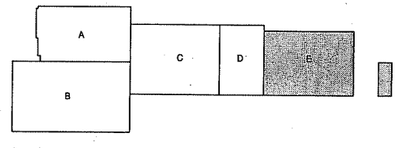
7.104 MOUNT VFDS TO UNISTRUT STAND.

7.119 16" X 16" DUCT ACCESS DOOR.

8.107 1" GAS DN TO GWH.

8.113 3" 2-WAY BYPASS.

8.114 2" 2-WAY BYPASS.



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ADDENDUM 2

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2	ADDENDUM 2	03/05/2019
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PROJECT No: 13033500-160254.01

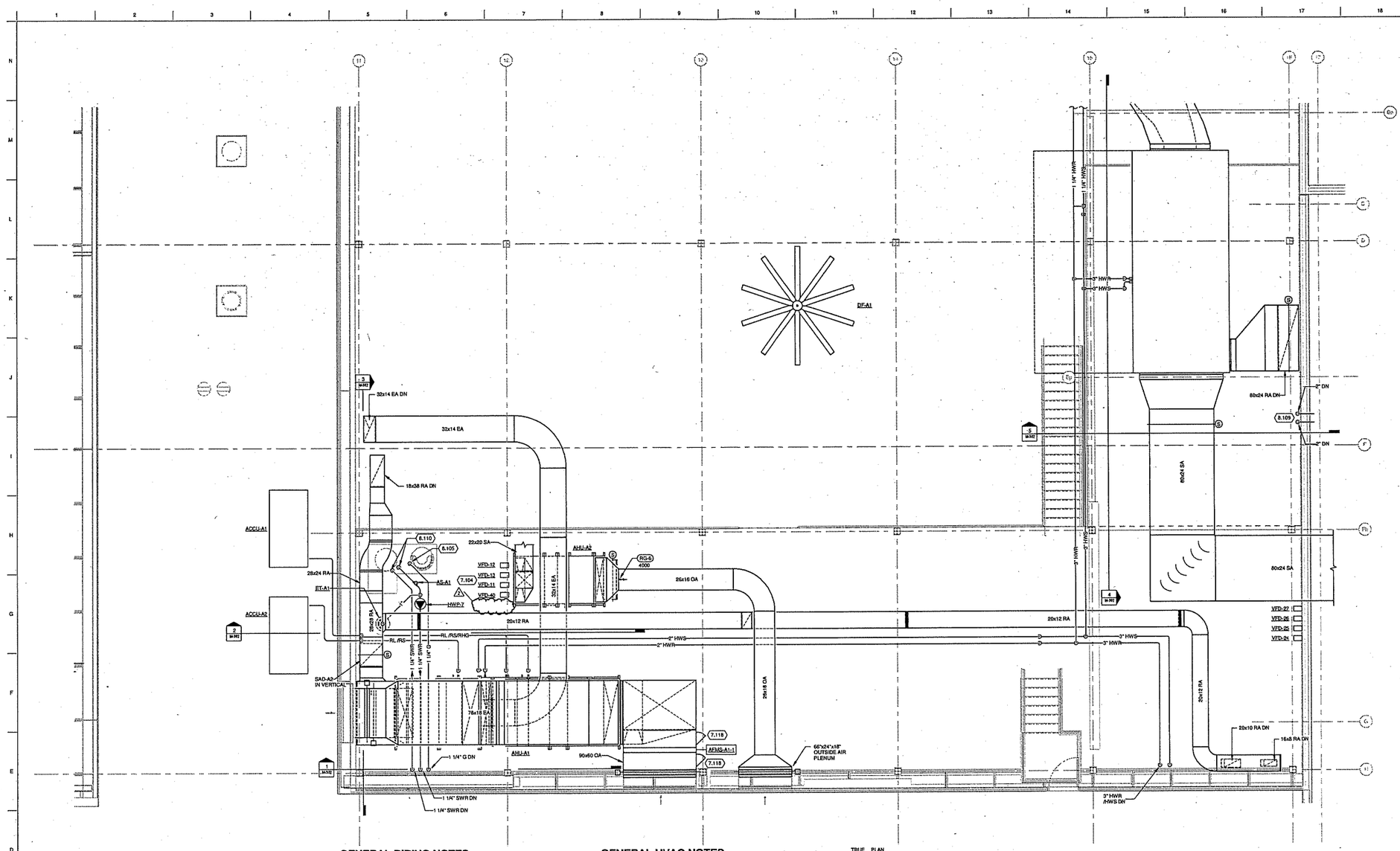
ENLARGED MECHANICAL PLAN AND SECTIONS - MEZZANINE - AREA E

M-308

Add. Num 2

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GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELDO-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
3. INSTALL DIELECTRIC FITTINGS WHERE PIPING OF DIFFERENT MATERIALS IS JOINED.
4. INSTALL PIPING FREE OF SAGS AND BENDS.
5. LOCATE ALL VALVES FOR EASY ACCESS. INSTALL VALVES WITH STEM UP OR HORIZONTAL.
6. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE. INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS IN PIPING, AT HEAT-TRANSFER COILS, AND ELSEWHERE AS REQUIRED FOR SYSTEM AIR VENTING.
7. PRIME AND PAINT ALL EXTERIOR GAS PIPING A COLOR AS SELECTED BY ARCHITECT. SUPPORT PIPING FROM BUILDING WALL WITH PAINTED WALL SUPPORTS AS NEEDED.
8. PROVIDE NAMEPLATE AT VALVE STATING, "EMERGENCY POWER SUPPLY GAS SHUTOFF VALVE".
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TRUE NORTH PLAN NORTH

1 ENLARGED MECHANICAL PLAN - PARTS MEZZANINE - AREA A

1/4" = 1'-0"

KEYED NOTES

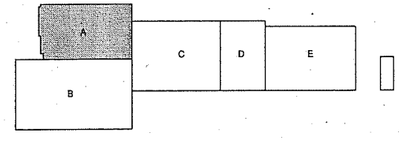
7.104 MOUNT VFDS TO UNISTRUT STAND.

7.118 16" X 16" DUCT ACCESS DOOR.

8.105 1 1/4" GAS DN TO GWH.

8.109 2" VENT FROM USED OIL AND COOLANT TANKS. VERIFY WITH EQUIPMENT PROVIDER CONNECTION SIZES, QUANTITY AND LOCATIONS.

8.110 1 1/4" SOLAR HOT WATER TO/FROM STORAGE TANK. SEE PLUMBING DRAWING.



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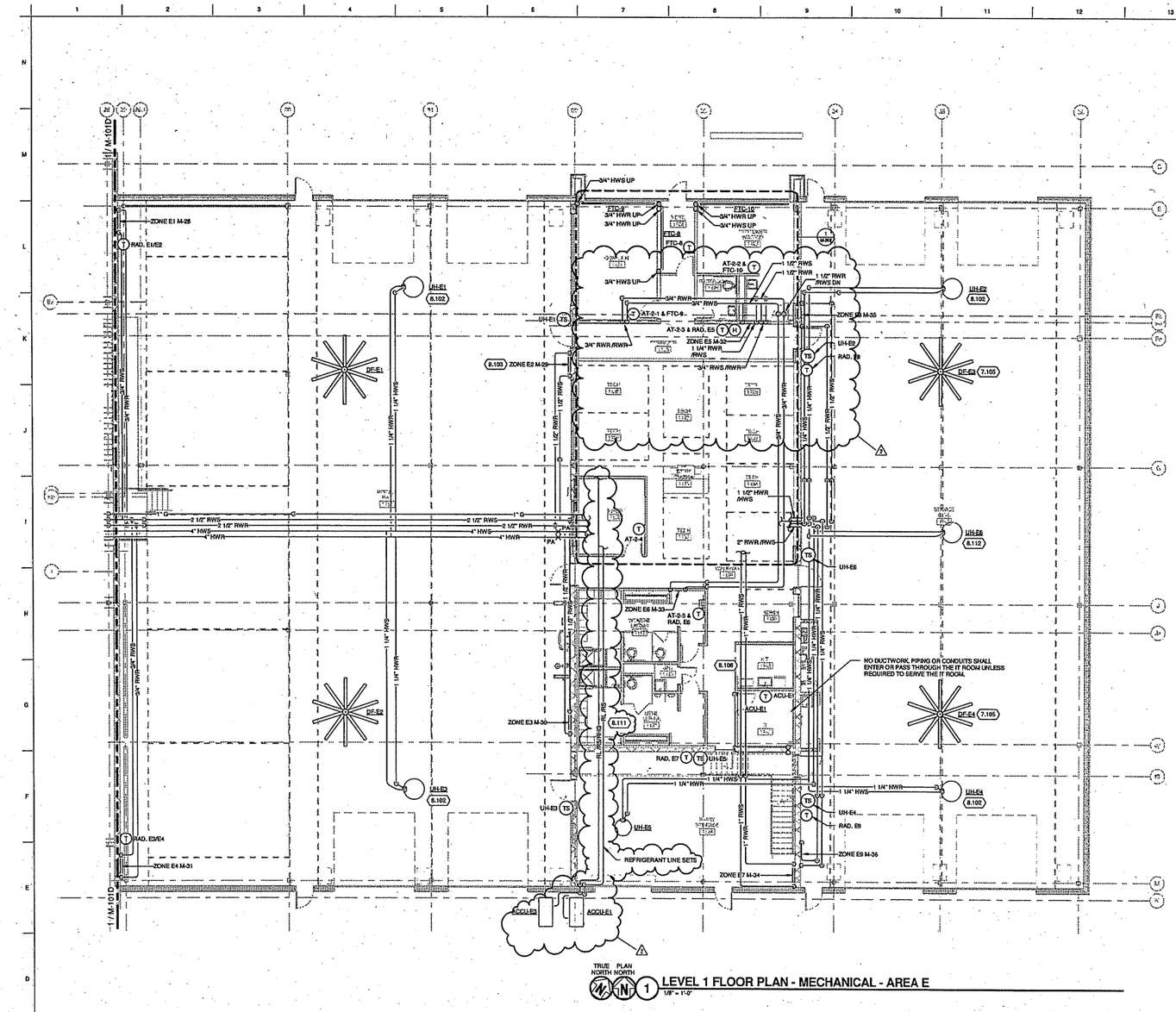
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PROJECT No: 1303500-160264.01

ENLARGED MECHANICAL PLAN - MEZZANINE - AREA A

M-301



TRUE NORTH PLAN NORTH

1 LEVEL 1 FLOOR PLAN - MECHANICAL - AREA E
1/8" = 1'-0"

GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELD-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
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KEYED NOTES

7.105 COORDINATE LOCATION OF FAN WITH VEHICLE EXHAUST RAIL SUPPORTS.

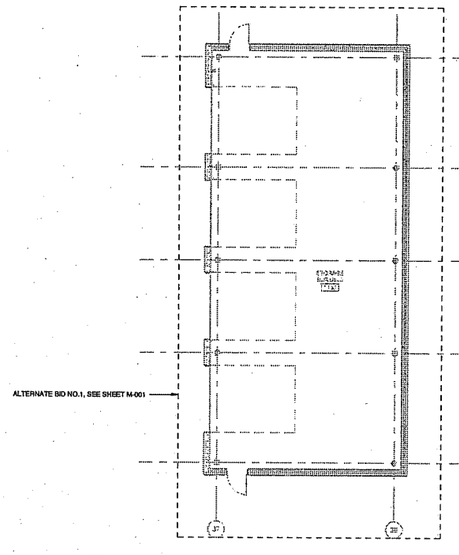
8.102 COORDINATE LOCATION OF UNIT HEATER WITH OVERHEAD DOOR TRACK AND VEHICLE EXHAUST RAIL SUPPORTS.

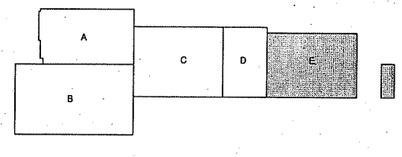
8.103 BOTTOM OF MANIFOLD CABINET TO BE 2' AFF TO FIT BELOW GLAZING.

8.106 HWS&HWR ROUTED ON MEZZANINE LEVEL.

8.111 REFRIGERANT LINE SET ROUTED THROUGH STRUCTURE ON MEZZANINE LEVEL.

8.112 COORDINATE LOCATION OF UNIT HEATER WITH VEHICLE EXHAUST RAIL SUPPORTS.





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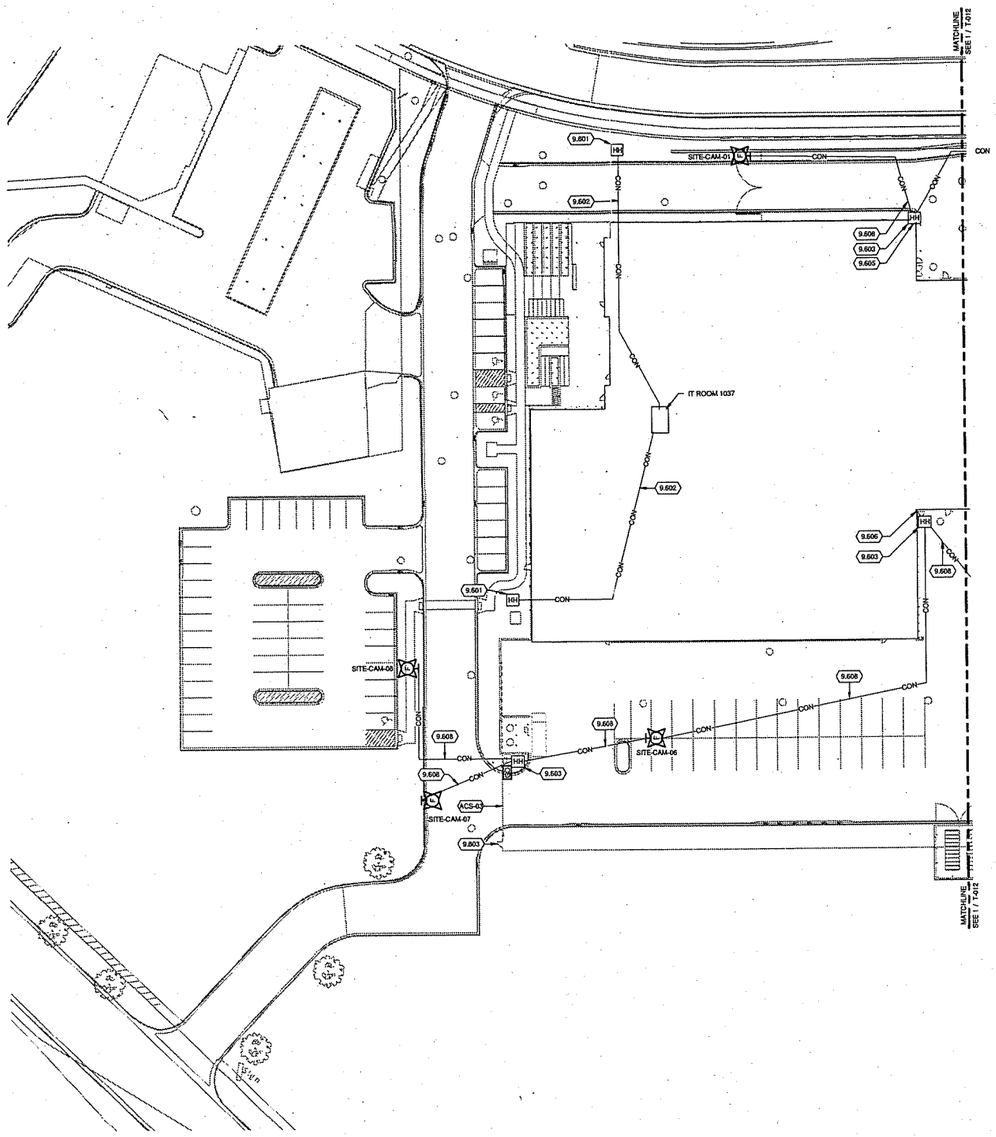
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PROJECT No: 1303500-160264.01

LEVEL 1 FLOOR PLAN - PIPING - AREA E

M-131E

ADDENDUM 2



TRUE NORTH PLAN NORTH 1 TECHNOLOGY SYSTEMS SITE PLAN - WEST
1" = 30'-0"

TECHNOLOGY SYSTEMS GENERAL NOTES:

1. MOUNT SECURITY CAMERAS AND CAMERA TELECOMMUNICATIONS OUTLETS TO LIGHT POLES AT A HEIGHT OF 15'-0" AFG UNLESS NOTED OTHERWISE. REFER TO 1/T-503, T-601, AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2. REFER TO T-100 FOR CONTINUATION OF PATHWAYS INSIDE BUILDING.
3. INSTALL GALVANIZED RIGID CONDUIT (GRC) UNDER ANY ROADWAY. GRC SHALL EXTEND 5 FEET BEYOND EACH SIDE OF ROADWAY BEFORE CONVERTING TO PVC. SEE ELECTRICAL SPECIFICATIONS FOR DETAILS.
4. COORDINATE CONDUIT AND PULL BOX INSTALLATION WITH BUILDING LAYOUT, BUILDING EQUIPMENT AND OTHER TRADES. 2
5. REFER TO STRUCTURAL PLANS FOR DETAILS ON FOUNDATION ENTRANCE LOCATIONS.

KEYED NOTES

9.601 HAND HOLE FOR INCOMING TELECOMMUNICATIONS SERVICE(S) PATHWAY. HAND HOLE SHALL BE QUAZITE TIER 22 OR APPROVED EQUIVALENT, NOMINAL SIZE 18" X 24" X 24". TELECOMMUNICATIONS SERVICE PROVIDERS SHALL BRING CABLE UNDERGROUND TO HANDHOLE AND EXTEND INTO BUILDING. 2

9.602 (2) 4" UNDERGROUND CONDUITS FOR INCOMING TELECOMMUNICATIONS SERVICE. STUB UP 5" INTO IT ROOM 1037. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT. LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.603 HAND HOLE FOR EXTERIOR UNDERGROUND TELECOMMUNICATIONS / SECURITY SYSTEM PATHWAYS. HAND HOLE SHALL BE QUAZITE TIER 15 OR APPROVED EQUIVALENT, NOMINAL SIZE 12" X 18" X 24".

9.605 (2) 2" CONDUITS FROM HAND HOLE TO CABLE TRAY ABOVE ROOM 1027. ROUTE CONDUITS THROUGH FOUNDATION WALL AND UP THE INSIDE OF THE BUILDING WALL TO THE NEAREST CABLE TRAY (REFER TO DRAWING 1/T-101 FOR CABLE TRAY LOCATIONS AND ELEVATIONS). INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT. LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.606 (2) 2" CONDUITS FROM HAND HOLE TO CABLE TRAY ABOVE ROOM 1045. ROUTE CONDUITS THROUGH FOUNDATION WALL AND UP THE INSIDE OF THE BUILDING WALL TO THE NEAREST CABLE TRAY (REFER TO DRAWING 1/T-102 FOR CABLE TRAY LOCATIONS AND ELEVATIONS). INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT. LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.608 (1) 2" UNDERGROUND CONDUIT BETWEEN HAND HOLES AND FROM HAND HOLES TO CAMERA POLES. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.803 PROVIDE ACCESS CONTROL FOR PEDESTRIAN GATE AS SHOWN ON DETAIL 1/T-503.

ACS-03 PERIMETER ACCESS-CONTROLLED GATE. REFER TO SCHEDULE ON T-602.

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PROJECT No: 1303500-160264.01

TECHNOLOGY SYSTEMS
SITE PLAN - WEST

T-011

ADDENDUM 2

Panel 1XHB

Panelboard: Panel 1XHB
Bus Ampacity: 100 | Volts: 480Y/277 | Panel Source: MDPXHA
Branch Brkr Space: 42 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 79 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	Panel 1XLC	1	70/3	15,152			1,305			20/1	2	AREA E LTG	
		3	|		15,272			500		20/1	4	AREA E LTG	
		5	|			12,740			500	20/1	6	RCHC	
	RF-E1-3	7	15/3	1,330			1,440			15/3	8	ACCU-E1	
		9	|		1,330			1,440		|	10		
		11	|			1,330			1,440	|	12		
	SF-E1-3	13	15/3	3,050			1,440			15/3	14	ACCU-E3	
		15	|		3,050			1,440		|	16		
		17	|			3,050			1,440	|	18		
	EF-EF-4	19	15/3	1,230			0					20	SPACE	
		21	|		1,330			0			22	SPACE	
		23	|			1,330			0		24	SPACE	
	SPARE	25	20/3	0			0					26	SPACE	
		27	|		0			0			28	SPACE	
		29	|			0			0		30	SPACE	
	SPARE	31	20/3	0			0					32	SPACE	
		33	|		0			0			34	SPACE	
		35	|			0			0		36	SPACE	
	SPACE	37		0			0					38	SPACE	
	SPACE	39			0			0				40	SPACE	
	SPACE	41				0			0			42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XLF

Panelboard: Panel 1XLF
Bus Ampacity: 100 | Volts: 208Y/120 | Panel Source: 1XLC
Branch Brkr Space: 18 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 29 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	RACK POWER	1	20/1	1,500			1,352			20/2	2	ACCU-E2	
	RACK POWER	3	20/1		1,500			1,352		|	4		
	RECEPTACLES	5	20/1			900			0		6	SPACE	
	ACCESS CONTROL	7	20/1	1,920			0				8	SPACE	
	ACCESS CONTROL	9	20/1		1,920			0			10	SPACE	
	SPARE	11	20/1			0			0		12	SPACE	
	SPARE	13	20/1	0			0				14	SPACE	
	SPARE	15	20/1		0			0			16	SPACE	
	SPARE	17	20/1			0			0		18	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XLB

Panelboard: Panel 1XLB
Bus Ampacity: 100 | Volts: 208Y/120 | Panel Source: 1XLA
Branch Brkr Space: 18 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MCB | Wires: 4
MCB Amps: 100 | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 38 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	RACK POWER	1	20/1	1,500			0				2	SPARE	
	RACK POWER	3	20/1		1,500			0		20/1	4	SPARE	
	RACK POWER	5	20/1			1,500			0	20/1	6	SPARE	
	RECEPTACLES	7	20/1	900			0			20/1	8	SPACE	
	RECEPTACLES	9	20/1		720			0			10	SPACE	
	ACCESS CONTROL	11	20/1			1,920			0		12	SPACE	
	ACCESS CONTROL	13	20/1	1,920			0				14	SPACE	
	ACCU-B2	15	20/2		1,920			0			16	SPACE	
		17	|			1,920			0		18	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XLG

Panelboard: Panel 1XLG
Bus Ampacity: 225 | Volts: 208Y/120 | Panel Source: 1XLA
Branch Brkr Space: 54 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 88 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	COPIER	1	20/1	1,200			720			20/1	2	RECEPTACLES	
	RECEPTACLES	3	20/1		720			720		20/1	4	RECEPTACLES	
	RECEPTACLES	5	20/1			720			1,680	20/1	6	EF-A1	
	RECEPTACLES	7	20/1	720			1,200			20/1	8	EF-A2	
	RECEPTACLES	9	20/1		720			1,656		20/1	10	AHU-1 WHEEL	
	RECEPTACLES	11	20/1			1,080			720	20/1	12	RECEPTACLES	
	RECEPTACLES	13	20/1	1,080			1,200			20/1	14	TCP	
	RECEPTACLES	15	20/1		1,080			1,200		20/1	16	TCP	
	RECEPTACLES	17	20/1			1,080			1,600	20/1	18	UNIT HEATER	
	RECEPTACLES	19	20/1	720			1,200			20/1	20	GWH-1	
	RECEPTACLES	21	20/1		720			500		20/1	22	CP-1	
	RECEPTACLES	23	20/1			720			500	20/1	24	CP-2	
	AUTO DOOR OPER.	25	20/1	600			500			20/1	26	HWP-7	
	AIR DRYER	27	20/1		1,560			600		20/1	28	GWH-1S	
	AIR DRYER	29	20/1			1,560			0		30	SPACE	
	TANK EQUIPMENT	31	20/1	1,200			0				32	SPACE	
	RECEPTACLES	33	20/1		540			0			34	SPACE	
	TANK MONITOR	35	20/1			720			0		36	SPACE	
	TANK MONITOR	37	20/1	720			420			15/3	38	OVERHEAD DOOR	
	TANK MONITOR	39	20/1		720			420		|	40		
	SPARE	41	20/1			0			420	|	42		
	SPARE	43	20/1	0			0				44	SPACE	
	SPARE	45	20/1		0			0			46	SPACE	
	SPARE	47	20/1			0			0		48	SPACE	
	SPARE	49	20/1	0			0				50	SPACE	
	SPARE	51	20/1		0			0			52	SPACE	
	SPARE	53	20/1			0			0		54	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1HH

Panelboard: Panel 1HH
Bus Ampacity: 250 | Volts: 480 | Panel Source: MDPHA
Branch Brkr Space: 42 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 3
MCB Amps: - | Delta/Wye: Delta | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 25 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 174 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	DF-1	1	15/3	450			5,820			40/3	2	SF-C1-1	
		3	|		450			5,820		|	4		
	EF-A1-1	5	|			450			5,820	|	6		
		7	15/3	1,230			5,820			40/3	8	SF-C1-2	
		9	|		1,230			5,820		|	10		
		11	|			1,330			5,820	|	12		
	RF-A1-1	13	20/3	3,050			8,864			40/3	14	ACCU-1	
		15	|		3,050			8,864		|	16		
		17	|			3,050			8,864	|	18		
	SF-A1-1	19	40/3	5,820			8,864			40/3	20	ACCU-2	
		21	|		5,820			8,864		|	22		
		23	|			5,820			8,864	|	24		
	RF-C1-1	25	20/3	3,050			0					26	SPACE	
		27	|		3,050			0			28	SPACE	
		29	|			3,050			0		30	SPACE	
	RF-C1-2	31	20/3	3,050			0					32	SPACE	
		33	|		3,050			0			34	SPACE	
		35	|			3,050			0		36	SPACE	
	SF-A2-1	37	15/3	2,100			0					38	SPACE	
		39	|		2,100			0			40	SPACE	
		41	|			2,100			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XLA

Panelboard: Panel 1XLA
Bus Ampacity: 400 | Volts: 208Y/120 | Panel Source: 1XHA
Branch Brkr Space: 42 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MCB | Wires: 4
MCB Amps: 400 | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 22 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 257 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	Panel 1XLB	1	90/3	4,220			0				2	SPACE	
		3	|		4,140			0			4	SPACE	
		5	|			5,340			0		6	SPACE	
	Panel 1XLD	7	90/3	20,880			0				8	SPACE	
		9	|		19,632			0			10	SPACE	
		11	|			17,492			0		12	SPACE	
	Panel 1XLG	13	90/3	11,480			0				14	SPACE	
		15	|		11,156			0			16	SPACE	
		17	|			10,800			0		18	SPACE	
	SPARE	19	20/1	0			0				20	SPACE	
	SPARE	21	20/1		0			0			22	SPACE	
	SPARE	23	20/1			0			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	
	SPACE	31		0			0				32	SPACE	
	SPACE	33			0			0			34	SPACE	
	SPACE	35				0			0		36	SPACE	
	SPACE	37		0			0				38	SPACE	
	SPACE	39			0			0			40	SPACE	
	SPACE	41				0			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1HF

Panelboard: Panel 1HF
Bus Ampacity: 400 | Volts: 480Y/277 | Panel Source: MDPHC
Branch Brkr Space: 84 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 221 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	REEL EXHAUST	1	20/3	3,047			12,000			60/3	2	PARTS WASHER	
		3	|		3,047			12,000		|	4		
		5	|			3,047			12,000	|	6		
	REEL EXHAUST	7	20/3	3,047			6,648			30/3	8	LIFT CHARGING	
		9	|		3,047			6,648		|	10		
		11	|			3,047			6,648	|	12		
	REEL EXHAUST	13	20/3	3,047			6,648			30/3	14	LIFT CHARGING	
		15	|		3,047			6,648		|	16		
		17	|			3,047			6,648	|	18		
	REEL EXHAUST	19	20/3	3,047			831			15/3	20	DF-5, DF-6	
		21	|		3,047			831		|	22		
		23	|			3,047			831	|	24		
	REEL EXHAUST	25	20/3	3,047			650			20/1	26	HEAVY VEHICLE LTG	
		27	|		3,047			2,700		20/1	28	HEAVY VEHICLE LTG	
		29	|			3,047			2,700	20/1	30	HEAVY VEHICLE LTG	
	CRANE	31	15/3	4,155						20/1	32	AREA C LTG	
		33	|		4,155			1,200		20/1	34	AREA D LTG	
		35	|			4,155			1,500	20/1	36	CHASSIS WASH LTG	
	LIFT	37	30/3	3,900						20/1	38	WELDING BAY LTG	
		39	|		3,900			1,900		20/1	40	PAINT,BODY SHOP LTG	
		41	|			3,900			1,700	20/1	42	PAINT,BODY SHOP LTG	
	OVERHEAD DOORS	43	15/3	942						1,550	20/1	44	AREA C & D EXT LTG	
		45	|		942			1,100		20/1	46	EXTERIOR LTG	
		47	|			942			600	20/1	48	EXTERIOR LTG	
	OVERHEAD DOORS	49	15/3	1,230			0			1,100	20/1	50	SPARE	
		51	|		1,330			0		20/3	52		
		53	|			1,330			0	|	54		
	OVERHEAD DOORS	55	15/3	942			0					56		
		57	|		942			0			58		
		59	|			942			0		60		
	OVERHEAD DOORS	61	15/3	1,230			0					62		
		63	|		1,330			0			64		
		65	|			1,330			0		66		
	SPARE	67	15/3	0			0					68		
		69	|		0			0			70		
		71	|			0			0		72		
	SPARE	73	15/3	0			0					74		
		75	|		0			0			76		
		77	|			0			0		78		
	SPARE	79	20/3	0			0					80		
		81	|		0			0			82		
		83	|			0			0		84		

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XHA

Panelboard: Panel 1XHA
Bus Ampacity: 250 | Volts: 480Y/277 | Panel Source: MDPXHA
Branch Brkr Space: 42 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 25 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 194 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	Panel 1XLA	1	100/3	36,760			1,860			20/1	2	PARTS RM LTG	
		3	|		34,948			1,220		20/1	4	PARTS RM LTG	
		5	|			33,632			1,130	20/1	6	AREA A LTG	
	FORKLIFT BAT. CHRG.	7	15/3	2,650			1,160			20/1	8	PARTS RM LTG	
		9	|		2,650			1,920		20/1	10	PARTS RM MEZZ. LTG	
		11	|			2,650			500	20/1	12	RCHA	
	AIR COMPRESSOR	13	20/3	3,880			500			20/1	14	RCEXT	
		15	|		3,880			0			16	SPACE	
		17	|			3,880			0		18	SPACE	
	AIR COMPRESSOR	19	20/3	3,880			0					20	SPACE	
		21	|		3,880			0			22	SPACE	
		23	|			3,880			0		24	SPACE	
	AIR COMPRESSOR	25	20/3	3,880			0					26	SPACE	
		27	|		3,880			0			28	SPACE	
		29	|			3,880			0		30	SPACE	
	AIR COMPRESSOR	31	20/3	3,880			0					32	SPACE	
		33	|		3,880			0			34	SPACE	
		35	|			3,880			0		36	SPACE	
	SPARE	37	20/3	0			0					38	SPACE	
		39	|		0			0			40	SPACE	
		41	|			0			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1XHC

Panelboard: Panel 1XHC
Bus Ampacity: 225 | Volts: 480Y/277 | Panel Source: MDPXHA
Branch Brkr Space: 42 Poles | Phase: 3 | Feed-Thru Lugs: None
Main Type: MLO | Wires: 4
MCB Amps: - | Delta/Wye: Wye | Sub-Feed Lugs: None
Mounting: Surface
Enclosure: NEMA 1 | Sub-Feed Brkr #1: None
SCCR: 10 kA
SE Rated | Sub-Feed Brkr #2: None
Prel MCA: 107 A
Comments: | SPD | Iso Grd

Key Note	Load Description	Ckt No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Ckt No	Load Description	Key Note
	REEL EXHAUST	1	20/3	3,770			0			15/3	2	SPARE	
		3	|		3,770			0		|	4		
		5	|			3,770			0	|	6		
	REEL EXHAUST	7	20/3	3,770			2,650			20/1	8	FIRE REPAIR BAY LTG	
		9	|		3,770			2,650		20/1	10	FIRE REPAIR BAY LTG	
	REEL EXHAUST	11	|			3,770			500	20/1	12	RCHB	
		13	20/3	3,770			0			20/1	14	SPARE	
		15	|		3,770			0		20/1	16	SPARE	
		17	|			3,770			0	20/1	18	SPARE	
	LIFT CHARGER	19	30/3	6,650			0			20/1	20	SPARE	
		21	|		6,650			0		20/1	22	SPARE	
		23	|			6,650			0	20/1	24	SPARE	
	100K LIFT	25	60/3	7,480			0					26	SPACE	
		27	|		7,480			0			28	SPACE	
		29	|			7,480			0		30	SPACE	
	OVERHEAD DOOR	31	15/3	942			0					32	SPACE	
		33	|		942			0			34	SPACE	
		35	|			942			0		36	SPACE	
	OVERHEAD DOOR	37	15/3	942			0					38	SPACE	
		39	|		942			0			40	SPACE	
		41	|			942			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

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1600 WILSON BLVD.
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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 13655500-160264.01

SCHEDULES

E-609

ADDENDUM 2

Panel 1HC

Panelboard: Panel 1HC

Bus Ampacity	400	Volts	480Y/277
Branch Brkr Space	84 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	25 kA
		SE Rated	
		Prd MCA	209 A

Panel Source: MSBHA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD: None
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	POWER WASHER	1	30/3	5,817			1,330			15/3	2	OVERHEAD DOOR	
		3			5,817			1,330			4		
		5				5,817			1,330		6		
	HYDRAULIC PRESS	7	15/3	1,385			950			15/3	8	OVERHEAD DOOR	
		9			1,385			950			10		
		11				1,385			950		12		
	CRANE	13	15/3	4,155			3,050			20/3	14	RF-C2-1	
		15			4,155			3,050			16		
		17				4,155			3,050		18		
	PAINT BOOTH	19	40/3	9,695			3,050			20/3	20	RF-C2-2	
		21			9,695			3,050			22		
		23				9,695			3,050		24		
	ACCU-D2	25	15/3	3,047			5,818			40/3	26	SF-C2-1	
		27			3,047			5,818			28		
		29				3,047			5,818		30		
	ACCU-D3	31	15/3	3,047			5,818			40/3	32	SF-C2-2	
		33			3,047			5,818			34		
		35				3,047			5,818		36		
	FCU-D1, -D2	37	15/3	500			0			20/3	38	SPARE	
		39			500			0			40		
		41				500			0		42		
	RF-D1-1	43	15/3	2,100			0				44		
		45			2,100			0			46		
		47				2,100			0		48		
	RF-D1-2	49	15/3	2,100			0				50		
		51			2,100			0			52		
		53				2,100			0		54		
	SF-D1-1	55	20/3	3,050			0				56		
		57			3,050			0			58		
		59				3,050			0		60		
	SF-D1-2	61	20/3	3,050			0				62		
		63			3,050			0			64		
		65				3,050			0		66		
	SPARE	67	20/3	0			0				68		
		69			0			0			70		
		71				0			0		72		
	SPARE	73	20/3	0			0				74		
		75			0			0			76		
		77				0			0		78		
	SPARE	79	20/3	0			0				80		
		81			0			0			82		
		83				0			0		84		

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1HB

Panelboard: Panel 1HB

Bus Ampacity	250	Volts	480Y/277
Branch Brkr Space	84 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	10 kA
		SE Rated	
		Prd MCA	143 A

Panel Source: MSBHA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	RAIL EXHAUST	1	15/3	1,275			1,164			15/3	2	OVERHEAD DOOR	
		3			1,275			1,164			4		
		5				1,275			1,164		6		
	RAIL EXHAUST	7	15/3	1,275			1,164			15/3	8	OVERHEAD DOOR	
		9			1,275			1,164			10		
		11				1,275			1,164		12		
	RAIL EXHAUST	13	15/3	1,275			1,164			15/3	14	OVERHEAD DOOR	
		15			1,275			1,164			16		
		17				1,275			1,164		18		
	INSTALL BAY LTG	19	20/1	1,850			1,164			15/3	20	OVERHEAD DOOR	
	INSTALL BAY LTG	21	20/1		1,300			1,164			22		
	INSTALL BAY LTG	23	20/1			1,700			1,164		24		
	PARTS STORAGE LTG	25	20/1	1,300			1,164			15/3	26	OVERHEAD DOOR	
	SERVICE BAY LTG	27	20/1		1,800			1,164			28		
	SERVICE BAY LTG	29	20/1			1,850			1,164		30		
	EF-E1	31	15/3	600			1,330				32	SF-C2-6, -8, -9, -10	
		33			600			1,330			34		
		35				600			1,330		36		
	EF-E2	37	15/3	600			0			20/2	38	SPARE	
		39			600			0			40		
		41				600			0		42		
	RF-E1-1	43	30/3	3,880			0			20/3	44	SPARE	
		45			3,880			0			46		
		47				3,880			0		48		
	RF-E1-2	49	30/3	3,880			0			20/3	50	SPARE	
		51			3,880			0			52		
		53				3,880			0		54		
	SF-E1-1	55	60/3	7,500			0			20/3	56	SPARE	
		57			7,500			0			58		
		59				7,500			0		60		
	SF-E1-2	61	60/3	7,500			0				62		
		63			7,500			0			64		
		65				7,500			0		66		
	AREA E EXT LTG	67	20/1	1,550			0				68		
	SPACE	69			0			0			70		
	SPACE	71				0			0		72		
	SPACE	73		0			0				74		
	SPACE	75			0			0			76		
	SPACE	77				0			0		78		
	SPACE	79		0			0				80		
	SPACE	81			0			0			82		
	SPACE	83				0			0		84		

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1HA

Panelboard: Panel 1HA

Bus Ampacity	100	Volts	480Y/277
Branch Brkr Space	42 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	42 kA
		SE Rated	
		Prd MCA	83 A

Panel Source: MSBHA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	AREA A LTG	1	20/1	1,650			0				2	SPACE	
	AREA A LTG	3	20/1		2,060			0			4	SPACE	
	AREA B LTG	5	20/1			2,110			0		6	SPACE	
	AREA B LTG	7	20/1	1,310			0				8	SPACE	
	LIGHT VEHICLE LTG	9	20/1		2,400			0			10	SPACE	
	LIGHT VEHICLE LTG	11	20/1			1,600			0		12	SPACE	
	LIGHT VEHICLE LTG	13	20/1	1,750			0				14	SPACE	
	LIGHT VEHICLE LTG	15	20/1		1,600			0			16	SPACE	
	LIGHT VEHICLE LTG	17	20/1			2,000			0		18	SPACE	
	LIGHT VEHICLE LTG	19	20/1	1,700			0				20	SPACE	
	AREA B MEZZ LTG	21	20/1		2,600			0			22	SPACE	
	AREA A & B EXT LTG	23	20/1			1,250			0		24	SPACE	
	SPARE	25	20/1	0			0				26	SPACE	
	SPARE	27	20/1		0			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	
	SPARE	31	20/1	0			0				32	SPACE	
	SPARE	33	20/1		0			0			34	SPACE	
	SPARE	35	20/1			0			0		36	SPACE	
	SPACE	37		0			0				38	SPACE	
	SPACE	39			0			0			40	SPACE	
	SPACE	41				0			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1HD

Panelboard: Panel 1HD

Bus Ampacity	250	Volts	480Y/277
Branch Brkr Space	42 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	42 kA
		SE Rated	
		Prd MCA	108 A

Panel Source: MSBHA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	VEHICLE LIFT	1	20/3	4,000			1,104			15/3	2	OVERHEAD DOORS	
		3			4,000			1,104			4		
		5				4,000			1,104		6		
	VEHICLE LIFT	7	20/3	4,000			1,104			15/3	8	OVERHEAD DOORS	
		9			4,000			1,104			10		
		11				4,000			1,104		12		
	PARTS WASHER	13	60/3	12,000			1,300				14	DF-2, -3, -4	
		15			12,000			1,300			16		
		17				12,000			1,300		18		
	POWER WASHER	19	30/3	5,817			0				20	SPACE	
		21			5,817			0			22	SPACE	
		23				5,817			0		24	SPACE	
	EXTERIOR LTG	25	20/1	500			0				26	SPACE	
	EXTERIOR LTG	27	20/1		750			0			28	SPACE	
	SPARE	29	20/1			0			0		30	SPACE	
	SPARE	31	20/1	0			0				32	SPACE	
	SPARE	33	20/1		0			0			34	SPACE	
	SPACE	35				0			0		36	SPACE	
	SPACE	37		0			0				38	SPACE	
	SPACE	39			0			0			40	SPACE	
	SPACE	41				0			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1LG

Panelboard: Panel 1LG

Bus Ampacity	225	Volts	208Y/120
Branch Brkr Space	84 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	10 kA
		SE Rated	
		Prd MCA	72 A

Panel Source: MDPLB
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	RECEPTACLES	1	20/1	360			720			20/1	2	RECEPTACLES	
	RECEPTACLES	3	20/1		720			720		20/1	4	RECEPTACLES	
	RECEPTACLES	5	20/1			720			720	20/1	6	RECEPTACLES	
	RECEPTACLES	7	20/1	720			720			20/1	8	RECEPTACLES	
	RECEPTACLES	9	20/1		720			720		20/1	10	RECEPTACLES	
	RECEPTACLES	11	20/1			720			720	20/1	12	RECEPTACLES	
	RECEPTACLES	13	20/1	720			720			20/1	14	RECEPTACLES	
	RECEPTACLES	15	20/1		720			720		20/1	16	RECEPTACLES	
	RECEPTACLES	17	20/1			720			720	20/1	18	RECEPTACLES	
	RECEPTACLES	19	20/1	240			720			20/1	20	GWH-1	
	RECEPTACLES	21	20/1		720			720		20/1	22	RECEPTACLES	
	RECEPTACLES	23	20/1			720			720	20/1	24	RECEPTACLES	
	RECEPTACLES	25	20/1	720			250			20/1	26	1123 UNDERCAB LTG	
	RECEPTACLES	27	20/1		720			1,800		20/1	28	UNIT HEATER	
	RECEPTACLES	29	20/1			720			1,600	20/1	30	UNIT HEATER	
	RECEPTACLES	31	20/1	720			1,200			20/1	32	GAS PANEL	
	RECEPTACLES	33	20/1		720			0			34	SPACE	
	RECEPTACLES	35	20/1			720			0		36	SPACE	
G	VACUUM (3610)	37	30/1	2,880			0				38	SPACE	
	RECEPTACLES	39	20/1		720			0			40	SPACE	
	RECEPTACLES	41	20/1			720			0		42	SPACE	
	SPARE	43	20/1	0			0				44	SPACE	
	SPARE	45	20/1		0			0			46	SPACE	
	SPARE	47	20/1			0			0		48	SPACE	
	SPARE	49	20/1	0			0				50	SPACE	
	SPARE	51	20/1		0			0			52	SPACE	
	SPARE	53	20/1			0			0		54	SPACE	
	SPARE	55	20/1	0			0				56	SPACE	
	SPARE	57	20/1		0			0			58	SPACE	
	SPARE	59	20/1			0			0		60	SPACE	
	SPARE	61	20/1	0			0				62	SPACE	
	SPARE	63	20/1		0			0			64	SPACE	
	SPARE	65	20/1			0			0		66	SPACE	
	SPARE	67	20/1	0			0				68	SPACE	
	SPARE	69	20/1		0			0			70	SPACE	
	SPARE	71	20/1			0			0		72	SPACE	
	SPARE	73	20/1	0			0				74	SPACE	
	SPARE	75	20/1		0			0			76	SPACE	
	SPARE	77	20/1			0			0		78	SPACE	
	SPARE	79	20/1	0			0				80	SPACE	
	SPARE	81	20/1		0			0			82	SPACE	
	SPARE	83	20/1			0			0		84	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1LB

Panelboard: Panel 1LB

Bus Ampacity	100	Volts	208Y/120
Branch Brkr Space	42 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	10 kA
		SE Rated	
		Prd MCA	56 A

Panel Source: MDPLA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	RECEPTACLES	1	20/1	180			720			20/1	2	RECEPTACLES	
	RECEPTACLES	3	20/1		720			720		20/1	4	RECEPTACLES	
	RECEPTACLES	5	20/1			720			720	20/1	6	RECEPTACLES	
	RECEPTACLES	7	20/1	720			720			20/1	8	RECEPTACLES	
	RECEPTACLES	9	20/1		720			0		20/1	10	SPARE	
	RECEPTACLES	11	20/1			720			0	20/1	12	SPARE	
	VEHICLE EXHAUST	13	20/1	500			0			20/1	14	SPARE	
	RECEPTACLES	15	20/1		720			0		20/1	16	SPARE	
	RECEPTACLES	17	20/1			720			0	20/1	18	SPARE	
	RECEPTACLES	19	20/1	720			0			20/1	20	SPARE	
	RECEPTACLES	21	20/1		720			0		20/1	22	SPARE	
	RECEPTACLES	23	20/1			720			0	20/1	24	SPARE	
	RECEPTACLES	25	20/1	720			0				26	SPACE	
	RECEPTACLES	27	20/1		720			0			28	SPACE	
	RECEPTACLES	29	20/1			720			0		30	SPACE	
	VEHICLE LIFT	31	20/2	1,310			0				32	SPACE	
		33			1,310			0			34	SPACE	
	VEHICLE LIFT	35	20/2			1,310			0		36	SPACE	
		37		1,310			0				38	SPACE	
	UNIT HEATER	39	20/1		1,600			0			40	SPACE	
	UNIT HEATER	41	20/1			1,600			0		42	SPACE	

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

Panel 1LA

Panelboard: Panel 1LA

Bus Ampacity	225	Volts	208Y/120
Branch Brkr Space	84 Poles	Phase	3
Main Type	MLO	Wires	4
MCB Amps	-	Delta/Wye	Wye
		Mounting	Surface
		Enclosure	NEMA 1
		SCCR	22 kA
		SE Rated	
		Prd MCA	150 A

Panel Source: MDPLA
Feed-Thru Lugs: None
Sub-Feed Lugs: None
Sub-Feed Brkr #1: None
Sub-Feed Brkr #2: None
SPD:
Iso Grd:
Comments:

Key Note	Load Description	Cct No	Brkr A/P	Left Side A	Left Side B	Left Side C	Right Side A	Right Side B	Right Side C	Brkr A/P	Cct No	Load Description	Key Note
	RECEPTACLES	1	20/1	360			720			20/1	2	RECEPTACLES	
	RECEPTACLES	3	20/1		500			720		20/1	4	RECEPTACLES	
	RECEPTACLES	5	20/1			720			720	20/1	6	RECEPTACLES	
	RECEPTACLES	7	20/1	720			720			20/1	8	RECEPTACLES	
	FLAT SCREEN	9	20/1		500			720		20/1	10	RECEPTACLES	
	RECEPTACLES	11	20/1			1,080			720	20/1	12	RECEPTACLES	
	RECEPTACLES	13	20/1	720			720			20/1	14	RECEPTACLES	
	RECEPTACLES	15	20/1		720			720		20/1	16	RECEPTACLES	
	ESWH-1; WH-1	17	20/1			500			720	20/1	18	RECEPTACLES	
	RECEPTACLES	19	20/1	1,800			720			20/1	20	RECEPTACLES	
	RECEPTACLES	21	20/1		720			720		20/1	22	RECEPTACLES	
	RECEPTACLES	23	20/1			720			500	20/1	24	FLAT SCREEN	
	RECEPTACLES	25	20/1	720			720			20/1	26	RECEPTACLES	
	RECEPTACLES	27	20/1		720			1,200		20/1	28	RECEPTACLES	
	RECEPTACLES	29	20/1			720			600	20/1	30	PUMPS	
	RECEPTACLES	31	20/1	720			500			20/1	32	VEHICLE EXHAUST	
	RECEPTACLES	33	20/1		720			1,560		20/2	34	VEHICLE LIFT	
	RECEPTACLES	35	20/1			720			1,560		36		
	RECEPTACLES	37	20/1	720			1,560			20/2	38	VEHICLE LIFT	
	RECEPTACLES	39	20/1		720			1,560			40		
	RECEPTACLES	41	20/1			720			1,200	20/1	42	HAND DRYER	
	RECEPTACLES	43	20/1	720			0			20/1	44	SPARE	
	RECEPTACLES	45	20/1		720			720		20/1	46	RECEPTACLES	
	RECEPTACLES	47	20/1			720			360	20/1	48	RECEPTACLES	
	RECEPTACLES	49	20/1	720			0			20/1	50	SPARE	
	RECEPTACLES	51	20/1		720			0		20/1	52	SPARE	
	RECEPTACLES	53	20/1			720			0	20/1	54	SPARE	
	RECEPTACLES	55	20/1	720			0			20/1	56	SPARE	
	RECEPTACLES	57	20/1		720			0		20/1	58	SPARE	
	RECEPTACLES	59	20/1			720			0	20/1	60	SPARE	
	RECEPTACLES	61	20/1	720			0				62	SPACE	
	RECEPTACLES	63	20/1		720			0			64	SPACE	
	RECEPTACLES	65	20/1			720			0		66	SPACE	
	RECEPTACLES	67	20/1	720			0				68	SPACE	
	RECEPTACLES	69	20/1		720			0			70	SPACE	
	RECEPTACLES	71	20/1			720			0		72	SPACE	
	RECEPTACLES	73	20/1	1,440			0				74	SPACE	
	RECEPTACLES	75	20/1		720			312		15/2	76	TIRE BALANCER	
	RECEPTACLES	77	20/1			720			312		78		
	RECEPTACLES	79	20/1	720			4,800			50/3	80	TIRE TRUCK CHANGER	
	RECEPTACLES	81	20/1		720			4,800			82		
	RECEPTACLES	83	20/1			720			4,800		84		

Key Notes: A=HACR G=GFI H=HANDLE LOCK C=THRU CONTACTOR I=ISOLATED GROUND S=SHUNT TRIP P=PADLOCK HASP D=HID LIGHTING

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ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	Revision 4	Date 4
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 130G500-160054.01

SCHEDULES

E-607

ADDENDUM 2

ELECTRICAL EQUIPMENT WIRING SCHEDULE

STARTER/DISCONNECT TYPE:
MX - MANUAL MOTOR SWITCH
MS - MANUAL MOTOR STARTER (W/OVERLOADS)
YD - WYE- DELTA
FV - FULL VOLTAGE
SS - REDUCED VOLTAGE, SOLID STATE
RE - REVERSING
2SP - 2 SPEED, 2 WINDING
SW - 2 SPEED, 1 WINDING
CS - COMBINATION MAGNETIC CONTROLLER
FS - FUSED SWITCH
VFD - VARIABLE FREQUENCY DRIVE
RVS - REDUCED VOLTAGE (MAGNETIC)
ECB - ENCLOSED CIRCUIT BREAKER

KEY:
MFR - MANUFACTURER
F- FUSED
NF - NON-FUSED
EC - ELECTRICAL CONTRACTOR
MC - MECHANICAL CONTRACTOR
PC - PLUMBING CONTRACTOR

EQUIPMENT	EQUIPMENT DESCRIPTION	LOCATION	LOAD					EQUIPMENT		BRANCH WIRING				STARTER			DISCONNECT TYPE AND RATING				KEYED NOTE
			KW	HP	FLA (AMPS)	MCA (AMPS)	MOCP (AMPS)	VOLTS	PHASE	NO.	SIZE	GND.	C	TYPE	NEMA SIZE	FURNISHED/ INSTALLED BY	TYPE	FRAME SIZE	NEMA ENCLOSURE	FURNISHED/ INSTALLED BY	
ACCU-A1	AIR COOLED CONDENSING UNIT	ROOF	-	-	-	32.0A	40A	480	3	3	8	10	1"	-	-	MFR	NF	60A	NEMA 3R	EC / EC	-
ACCU-A2	AIR COOLED CONDENSING UNIT	ROOF	-	-	-	32.0A	40A	480	3	3	8	10	1"	-	-	MFR	NF	60A	NEMA 3R	EC / EC	-
ACCU-B1	AIR COOLED CONDENSING UNIT	GRADE	-	-	-	14.0A	20A	208	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 3R	EC / EC	-
ACCU-B2	AIR COOLED CONDENSING UNIT	MEZZ	-	-	-	20.0A	20A	208	1	2	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
ACCU-D1	AIR COOLED CONDENSING UNIT	MEZZ	-	-	-	8.0A	15A	208	1	2	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
ACCU-D2	AIR COOLED CONDENSING UNIT	MEZZ	-	-	-	11.0A	15A	480	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
ACCU-D3	AIR COOLED CONDENSING UNIT	MEZZ	-	-	-	11.0A	15A	480	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
ACCU-E1	AIR COOLED CONDENSING UNIT	GRADE	-	-	-	12.0A	15A	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
ACCU-E2	AIR COOLED CONDENSING UNIT	MEZZ	-	-	-	13.0A	20A	208	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
ACCU-E3	AIR COOLED CONDENSING UNIT	GRADE	-	-	-	12.0A	15A	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
ADO-A	AUTO DOOR OPERATOR	VARIES	-	-	5.0A	-	-	120	1	2	12	12	3/4"	-	-	-	DIRECT	-	-	-	-
ACP	ACCESS CONTROL PANEL	VARIES	-	-	16.0A	-	-	120	1	2	12	12	3/4"	-	-	-	DIRECT	-	-	-	14
CP-1	CIRCULATING PUMP	MEZZ	-	-	0.5A	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
CP-2	CIRCULATING PUMP	MEZZ	-	-	0.4A	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
CP-3	CIRCULATING PUMP	MEZZ	-	-	0.4A	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
DF-1	DESTRAT FAN	1025	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-2	DESTRAT FAN	1055	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-3	DESTRAT FAN	1055	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-4	DESTRAT FAN	1055	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-5	DESTRAT FAN	1084	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-6	DESTRAT FAN	1084	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-7	DESTRAT FAN	1147	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-8	DESTRAT FAN	1147	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-9	DESTRAT FAN	1150	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
DF-10	DESTRAT FAN	1150	-	3/4 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC	F	30A	NEMA 1	EC / EC	9
EF-A1	EXHAUST FAN	1026	-	3/4 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-A1-1	AIR HANDLING UNIT	MEZZ	-	3 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
EF-A2	EXHAUST FAN	1025	-	1/2 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-B1	EXHAUST FAN	1054	-	1/4 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-D1	EXHAUST FAN	1099	-	FRAC	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-D2	EXHAUST FAN	1084	-	1/4 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-E1	EXHAUST FAN	1119	-	5 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MFR	NF	30A	NEMA 1	EC / EC	11
EF-E2	EXHAUST FAN	1147	-	2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MFR	NF	30A	NEMA 1	EC / EC	11
EF-E3	EXHAUST FAN	1147	-	1/4 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
EF-E1-4	AIR HANDLING UNIT	MEZZ	-	2 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
ESRW-1	EYE WASH	SEE PLANS	-	-	20A	-	-	120	1	2	12	12	3/4"	-	-	-	DIRECT	-	-	-	5
EV	ELECTRIC VEHICLE CHARGING	GRADE	-	-	16.0A	-	-	208	1	2	8	10	1"	-	-	-	-	-	-	-	16
FCU-B1	FAN COIL UNIT	1055	-	1/2 HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR	MS	30A	NEMA 1	EC / EC	7
FCU-D1	FAN COIL UNIT	1097	-	1 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
FCU-D2	FAN COIL UNIT	1097	-	1 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR	NF	30A	NEMA 1	EC / EC	-
FFW1	FIXED FURNITURE FEED - WALL	SEE PLANS	-	-	16.0A	-	-	120	1	2	12	12	3/4"	-	-	-	-	-	-	-	-
FFW2	FIXED FURNITURE FEED - WALL	SEE PLANS	-	-	(2) - 15A	-	-	120	1	4	12	12	3/4"	-	-	-	-	-	-	-	-
FPAIR	FIRE PROT. AIR COMPRESSOR	1054	-	1 HP	-	-	-	208	3	3	12	12	3/4"	CS	-	EC / EC			INTEGRAL TO STARTER		-
FSD	FLAT SCREEN DISPLY	SEE PLANS	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	5-20R	-	-	-	2,3
FUEL	FUEL FARM	EXTERIOR	-	-	(3) - 15A	-	-	120	1	6	8	8	1-1/4"	-	-	-	-	-	-	-	8
GAS	GAS PANEL	SEE PLANS	-	-	10.0A	-	-	120	1	2	12	12	3/4"	-	-	-	-	-	-	-	-
GATE	MOTORIZED GATE	SEE PLANS	-	-	16.2A	-	-	208	3	3	8	8	1-1/2"	-	-	MFR	NF	30A	NEMA 3R	EC / EC	15
GFT-1	GLYCOL FILL TANK	MEZZ	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	MX	30A	NEMA 1	EC / EC	7
GFT-2	GLYCOL FILL TANK	MEZZ	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	MX	30A	NEMA 1	EC / EC	7
GWH-1	GAS WATER HEATER	MEZZ	-	-	15.0A	-	-	120	1	2	12	12	3/4"	-	-	-	MX	30A	NEMA 1	EC / EC	7
GWH-1S	STORAGE TANK	MEZZ	-	-	5.0A	-	-	120	1	2	12	12	3/4"	-	-	-	MX	30A	NEMA 1	EC / EC	7
GWH-2	GAS WATER HEATER	MEZZ	-	-	15.0A	-	-	120	1	2	12	12	3/4"	-	-	-	MX	30A	NEMA 1	EC / EC	7
HD	HAND DRYER	SEE PLANS	1500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	DIRECT	-	-	-	1
HWB-1	HOT WATER BOILER	MEZZ	-	-	6.3A	-	15A	480	3	3	12	12	3/4"	-	-	-	NF	30A	NEMA 1	EC / EC	-
HWB-2	HOT WATER BOILER	MEZZ	-	-	6.3A	-	15A	480	3	3	12	12	3/4"	-	-	-	NF	30A	NEMA 1	EC / EC	-
HWP-1	HOT WATER PUMP	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
HWP-2	HOT WATER PUMP	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
HWP-3	HOT WATER PUMP	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
HWP-4	HOT WATER PUMP	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
HWP-5	HOT WATER PUMP	MEZZ	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
HWP-6	HOT WATER PUMP	MEZZ	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
HWP-7	HOT WATER PUMP	MEZZ	500W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	MS	30A	NEMA 1	EC / EC	7
LTS	LIGHTS - HVAC EQUIPMENT	VARIES	300W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	-	-	-	-	-
MC	MEDIA CONVERTER	VARIES	300W	-	-	-	-	120	1	2	12	12	3/4"	-	-	-	-	-	-	-	12
OHD	OVERHEAD DOOR	SEE PLANS	-	3/4HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR	F	30A	NEMA 1	EC/EC	6, 13
RF-A1-1	AIR HANDLING UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-B1-1	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-B1-2	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-B2-1	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-B2-2	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-C1-1	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-C1-2	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-C2-1	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-C2-2	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-D1-1	MAKE-UP AIR UNIT	MEZZ	-	5 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-D1-2	MAKE-UP AIR UNIT	MEZZ	-	5 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-E1-1	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-E1-2	MAKE-UP AIR UNIT	MEZZ	-	10 HP	-	-	-	480	3	3	10	10	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
RF-E1-3	AIR HANDLING UNIT	MEZZ	-	2 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
SF-A1-1	AIR HANDLING UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-A2-1	AIR HANDLING UNIT	MEZZ	-	3-1/2 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
SF-B1-1	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-B1-2	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-B2-1	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-B2-2	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-C1-1	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-C1-2	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-C2-1	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-C2-2	MAKE-UP AIR UNIT	MEZZ	-	15 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-D1-1	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-D1-2	MAKE-UP AIR UNIT	MEZZ	-	7-1/2 HP	-	-	-	480	3	3	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-E1-1	MAKE-UP AIR UNIT	MEZZ	-	20 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-E1-2	MAKE-UP AIR UNIT	MEZZ	-	20 HP	-	-	-	480	3	3	6	10	1"	VFD	-	MC / EC			INTEGRAL TO VFD		-
SF-E1-3	AIR HANDLING UNIT	MEZZ	-	6 HP	-	-	-	480	3	3	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
TCP	TEMPERATURE CONTROL PANEL	SEE PLANS	-	-	10.0A	-	-	120	1	2	12	12	3/4"	-	-	-	DIRECT	-	-	-	-
UH	UNIT HEATER	SEE PLANS	-	3/4HP	-	-	-	120	1	2	12	12	3/4"	-	-	MFR			INTEGRAL TO EQUIPMENT		-
WF-1	WALL FOUNTAIN	SEE PLANS	-	-	2.0A	-	-	120	1	2	12	12	3/4"	-	-	-	-	-	-	-	4
WHEEL	AIR HANDLING UNIT - WHEEL	MEZZ	-	3/4HP	-	-	-	120	1	2	12	12	3/4"	VFD	-	MC / EC			INTEGRAL TO VFD		-
WS-1	WATER SOFTENER	SEE PLANS	-	-	5.0A	-	-	120	1	2	12	12	3/4"	-	-	-	RECEPT	-	-	-	-

EQUIPMENT SCHEDULE GENERAL NOTES:

1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTIONS AND FOR COMPLETE INSTALLATION.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DRAWINGS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. INCLUDE STARTERS, DISCONNECTS AND OVERLOAD PROTECTION IF NOT INCLUDED HVAC SPECIFICATION. COORDINATE WITH HVAC SPECIFICATIONS.
5. THIS CONTRACTOR SHALL VERIFY WITH MECHANICAL CONTRACTOR, ELECTRICAL REQUIREMENTS INCLUDING VOLTAGES, HORSE POWER, DISCONNECTING MEANS, STARTERS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, FUSIBLE SWITCHES AND STARTERS.
6. FOR ALL FUSED DISCONNECTS, ELECTRICAL CONTRACTOR SHALL PROVIDE FUSES SIZED PER MANUFACTURER RECOMMENDATIONS.
7. ALL INTERLOCKING REQUIRED BY THE DRIVE MANUFACTURER BETWEEN THE VARIABLE FREQUENCY DRIVE AND THE DISCONNECT SWITCHES SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

EQUIPMENT SCHEDULE KEYED NOTES:

1. COORDINATE BACKBOX INSTALLATION HEIGHT WITH GENERAL CONTRACTOR PRIOR TO INSTALLATION.
2. PROVIDE 4-GANG RECESSED STEEL TV BOX (ARLINGTON BOX TVBS507 OR EQUAL) AND ASSOCIATED TRIM PLATE. PROVIDE WITH VOLTAGE DIVIDERS AS REQUIRED. REFER TO T-SERIES DETAILS FOR INSTALLATION REQUIREMENTS (HEIGHT AND LOCATION).
3. PROVIDE ONE (1) DUPLEX RECEPTACLE IN WALL MOUNTED BOX. REFER TO T-SERIES DRAWINGS FOR ADDITIONAL REQUIREMENTS.
4. PROVIDE GFCI DUPLEX RECEPTACLE FOR EACH WALL FOUNTAIN. COORDINATE HEIGHT WITH MANUFACTURER PRIOR TO INSTALLATION.
5. COORDINATE POWER INSTALLATION WITH PLUMBING CONTRACTOR PRIOR TO ROUGH-IN. POWER CONNECTION IS FOR EMERGENCY ALARM SYSTEM LOCATED ON EYE WASH STATION.
6. PROVIDE ALL CONDUIT AND WIRE REQUIRED FOR A COMPLETE AND OPERATIONAL OVERHEAD DOOR SYSTEM, INCLUDING BUT NOT LIMITED TO, STARTER, REMOTE CONTROL STATIONS, CONTROL DEVICES AND LOW-VOLTAGE SWITCHES/SENSORS. INSTALL DISCONNECT AT HEIGHT INDICATED ON DRAWINGS.
7. MOUNT DISCONNECT ADJACENT TO UNIT.
8. TERMINATE BRANCH CIRCUITS ASSOCIATED WITH FUEL FARM ON MANUFACTURER PROVIDED JUNCTION BOX.
9. DISCONNECT SWITCH SHALL BE MOUNTED OFF STRUCTURAL JOIST AND OUTSIDE OF FAN BLADE RADIUS. PROVIDE HARDWARE AS REQUIRED TO MOUNT DISCONNECT OUT OF HAZARDOUS ZONE AS INDICATED IN KEYED NOTE 8.30B (SEE E-SERIES POWER PLANS).
10. INSTALL FIRE ALARM CONTROL MODULE ADJACENT TO TEMPERATURE CONTROL PANEL FOR FIRE ALARM INTERFACE UPON ACTIVATION OF LOCAL DUCT SMOKE DETECTORS. COORDINATE EXACT LOCATION OF PANEL WITH CONTROLS CONTRACTOR PRIOR TO INSTALLATION.
11. MOUNT DISCONNECT ON WALL ADJACENT TO UNIT (OUTSIDE OF OVERHEAD DOOR PATH, IF APPLICABLE).
12. PROVIDE RECEPTACLE INSIDE CAMERA INTERFACE BOX MOUNTED TO SIDE OF POLE. COORDINATE CONDUIT INSTALLATION WITH LIGHTING CIRCUIT CONDUIT. ROUTE CONDUIT INTO CARLON J-BOX. REFER TO DETAILS 10 AND 11 ON SHEET T-503.
13. PROVIDE GRACE VOLTAGE INDICATOR (OR EQUAL) ON FRONT FACE OF OVERHEAD DOOR DISCONNECT SWITCH OR IN SEPARATE BOX DIRECTLY ABOVE DISCONNECT SWITCH. GRACE VOLTAGE INTACTOR SHALL BE MODEL R-3W-SR (NON-FLASHING LEDS) AND WIRED INTO LOAD SIDE OF DISCONNECT SWITCH.
14. INSTALL FIRE ALARM CONTROL MODULE ADJACENT TO ACCESS CONTROL PANEL FOR FIRE ALARM INTERFACE UPON ACTIVATION OF FIRE ALARM SYSTEM. COORDINATE EXACT LOCATION OF PANEL WITH ACCESS CONTROL CONTRACTOR PRIOR TO INSTALLATION.
15. REFER TO DETAIL 7/E-502. PROVIDE 2#10, 1#10G. FOR RECEPTACLE IN ACCESS CONTROL INTERFACE DEVICE.
16. COORDINATE FINAL POWER REQUIREMENTS WITH MANUFACTURER.

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ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 1503500-160264.01

SCHEDULES

E-605

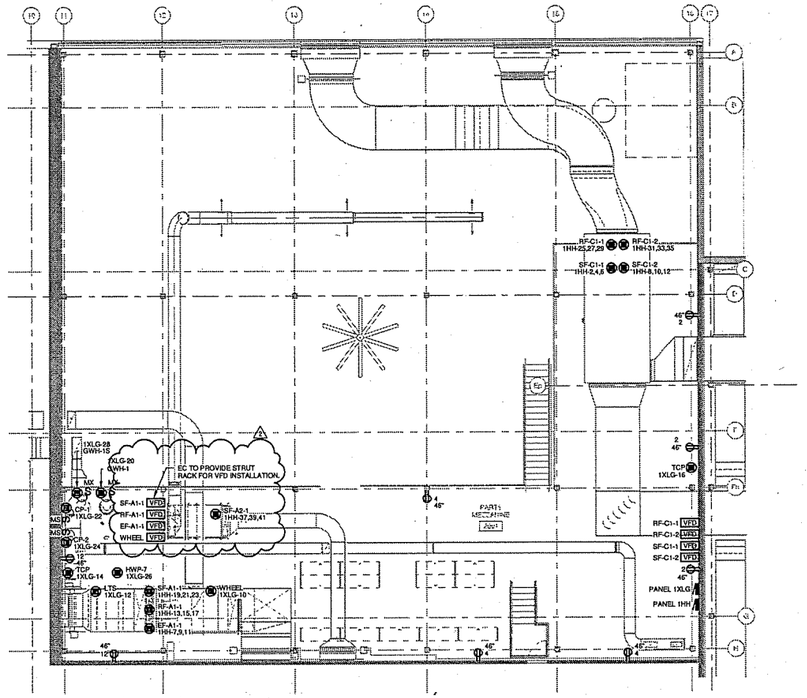
ADDENDUM 2

POWER GENERAL NOTES:

1. REFER TO OS-SERIES DRAWINGS FOR EQUIPMENT LOCATIONS. COORDINATE WITH ALL EQUIPMENT LOCATIONS PRIOR TO INSTALLATION.
2. ALL RACEWAYS IN THIS ROOM SHALL BE LOCATED SO THAT THEY ARE MORE THAN 15" ABOVE FINISHED FLOOR AND MORE THAN 18" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FROM CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.
3. COORDINATE CONDUIT ROUTING ON COLUMNS WITH EQUIPMENT LOCATIONS PRIOR TO INSTALLATION. ROUTE CONDUIT WITHIN WEBBING WHERE POSSIBLE AND PROVIDE LB FITTINGS TO GET OUT TO DEVICES MOUNTED ON FLANGES.
4. ELECTRICAL CONTRACTOR SHALL CAREFULLY ESTABLISH REQUIRED CONDUCTOR / CONDUIT ROUTES PRIOR TO MATERIAL ORDERING TO ACCOMODATE CODE REQUIRED VOLTAGE DROP LIMITATIONS ON DISTANCES GREATER THAN 100'-0".
5. REFER TO SHEET E-701 FOR ROOM NUMBERS ASSOCIATED WITH PANELBOARDS.

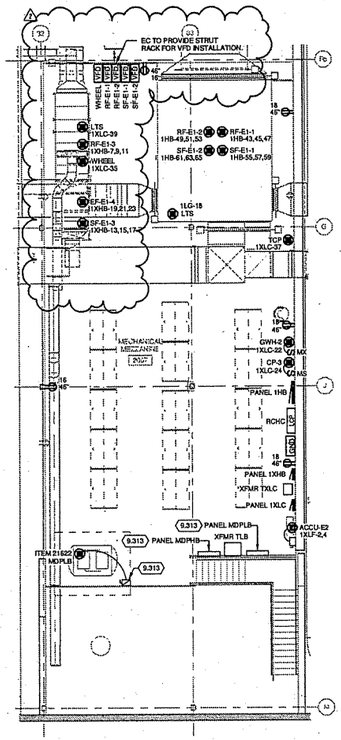
KEYED NOTES

9.313 PROVIDE STRUT SUPPORT SYSTEM FOR ELECTRICAL EQUIPMENT.



TRUE NORTH PLAN NORTH (2) MEZZANINE FLOOR PLAN PARTS AND STORAGE - POWER

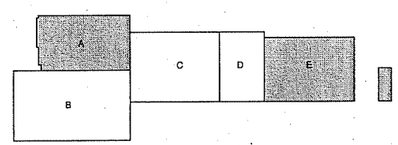
1/8" = 1'-0"



TRUE NORTH PLAN NORTH (1) MEZZANINE FLOOR PLAN RADIO - POWER

1/8" = 1'-0"

NOTE: ALL 120V NORMAL POWER DEVICES ON THIS DETAIL ARE FED FROM PANEL 1LG UNLESS NOTED OTHERWISE



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No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1203500-160264.01

MEZZANINE FLOOR PLANS - POWER

E-136

ADDENDUM 2

ADDENDUM 2

POWER GENERAL NOTES:

1. REFER TO DS-SERIES DRAWINGS FOR EQUIPMENT LOCATIONS. COORDINATE WITH ALL EQUIPMENT LOCATIONS PRIOR TO INSTALLATION.
2. COORDINATE CONDUIT ROUTING ON COLUMNS WITH EQUIPMENT LOCATIONS PRIOR TO INSTALLATION. ROUTE CONDUIT WITHIN WEBBING WHERE POSSIBLE AND PROVIDE LB FITTINGS TO GET OUT TO DEVICES MOUNTED ON FLANGES.
3. ELECTRICAL CONTRACTOR SHALL CAREFULLY ESTABLISH REQUIRED CONDUCTOR / CONDUIT ROUTES PRIOR TO MATERIAL ORDERING TO ACCOMODATE CODE REQUIRED VOLTAGE DROP LIMITATIONS ON DISTANCES GREATER THAN 100'-0".
4. REFER TO SHEET E-701 FOR ROOM NUMBERS ASSOCIATED WITH PANELBOARDS.

KEYED NOTES

9.301 INSTALL DUPLEX RECEPTACLE IN CONJUNCTION WITH LIGHTING CONTROL DEVICE. PROVIDE VOLTAGE DIVIDER AS REQUIRED. PROVIDE A SINGLE COMBINATION FACEPLATE.

9.303 PROVIDE WIREMOLD 5ISFM FLOOR BOX OR EQUAL. DATA OUTLETS SHALL BE INSTALLED IN LARGER CAPACITY COMPARTMENTS OF FLOOR BOX. COORDINATE LOCATION OF FLOOR BOX WITH ARCHITECT AND GENERAL CONTRACTOR PRIOR TO INSTALLATION. COORDINATE FLANGE AND COVER COLOR WITH ARCHITECT PRIOR TO ORDERING.

9.305 MOUNT DISCONNECT SWITCH ASSOCIATED WITH OVERHEAD DOOR AT 4'-0"AFF.

9.308 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR AND MORE THAN 18" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.309 DUPLEX RECEPTACLES SHALL BE INSTALLED IN WALL BELOW COUNTER.

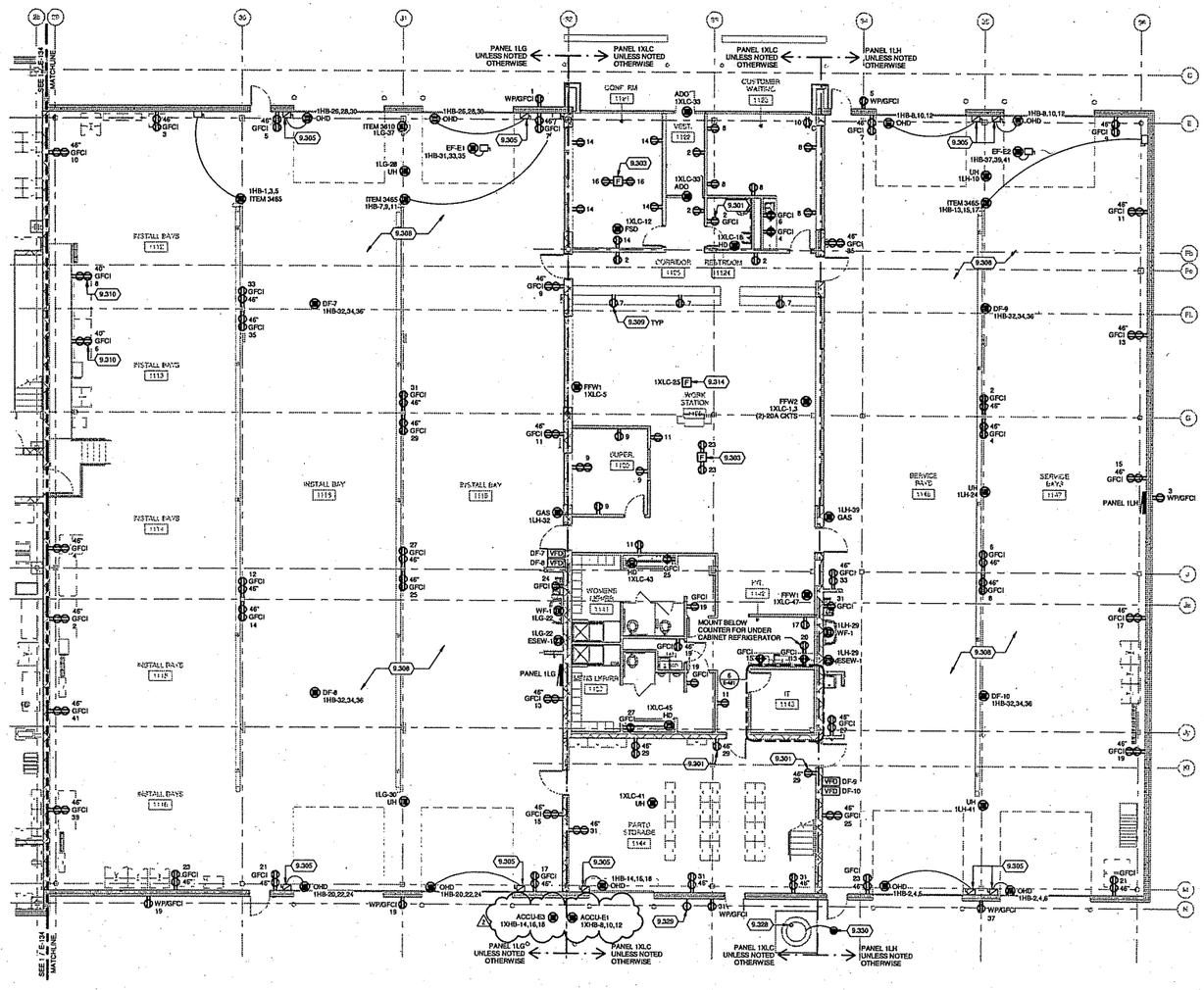
9.310 MOUNT DOUBLE DUPLEX RECEPTACLE TO VERTICAL RAILING SUPPORTS. BRANCH CIRCUIT ASSOCIATED WITH THESE RECEPTACLES SHALL BE ROUTED UNDERNEATH RAMP AND UP VERTICAL SUPPORTS TO SURFACE MOUNTED BOX.

9.314 REFER TO DETAIL 5/E-502 FOR FURNITURE FEED REQUIREMENTS.

9.328 PROVIDE 2" EMPTY CONDUIT BETWEEN BASE OF TOWER AND PANEL 1XLF. CONDUIT SHALL BE STUBBED UP AND CAPPED 6" ABOVE CONCRETE PAD BENEATH FOOTPRINT OF TOWER. COORDINATE INSTALLATION WITH TOWER CONTRACTOR AND GENERAL CONTRACTOR.

9.329 COORDINATE NEMA CONFIGURATION OF GENERATOR PLUG WITH OWNER PRIOR TO INSTALLATION. FOR BIDDING PURPOSES, ASSUME 150A, 208V, 3PH, 4W.

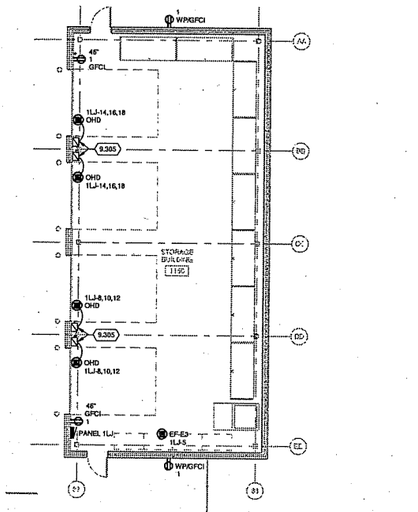
9.330 BOND #3/0 AWG COPPER CONDUCTOR BETWEEN TOWER AND GROUND ROD. PROVIDE #3/0AWG COPPER CONDUCTOR BETWEEN GROUND ROD AND GROUND BAR IN MEZZANINE OF AREA E. PROVIDE CONDUIT AS REQUIRED PER SPECIFICATION.



TRUE NORTH PLAN NORTH

2 LEVEL 1 FLOOR PLAN AREA E - POWER

1/8" = 1'-0"

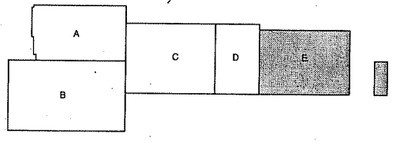


TRUE NORTH PLAN NORTH

1 LEVEL 1 FLOOR PLAN AREA E STORAGE - POWER

1/8" = 1'-0"

NOTE: ALL WORK ASSOCIATED WITH STORAGE BUILDING SHALL BE BID AS ALTERNATE NO. 1



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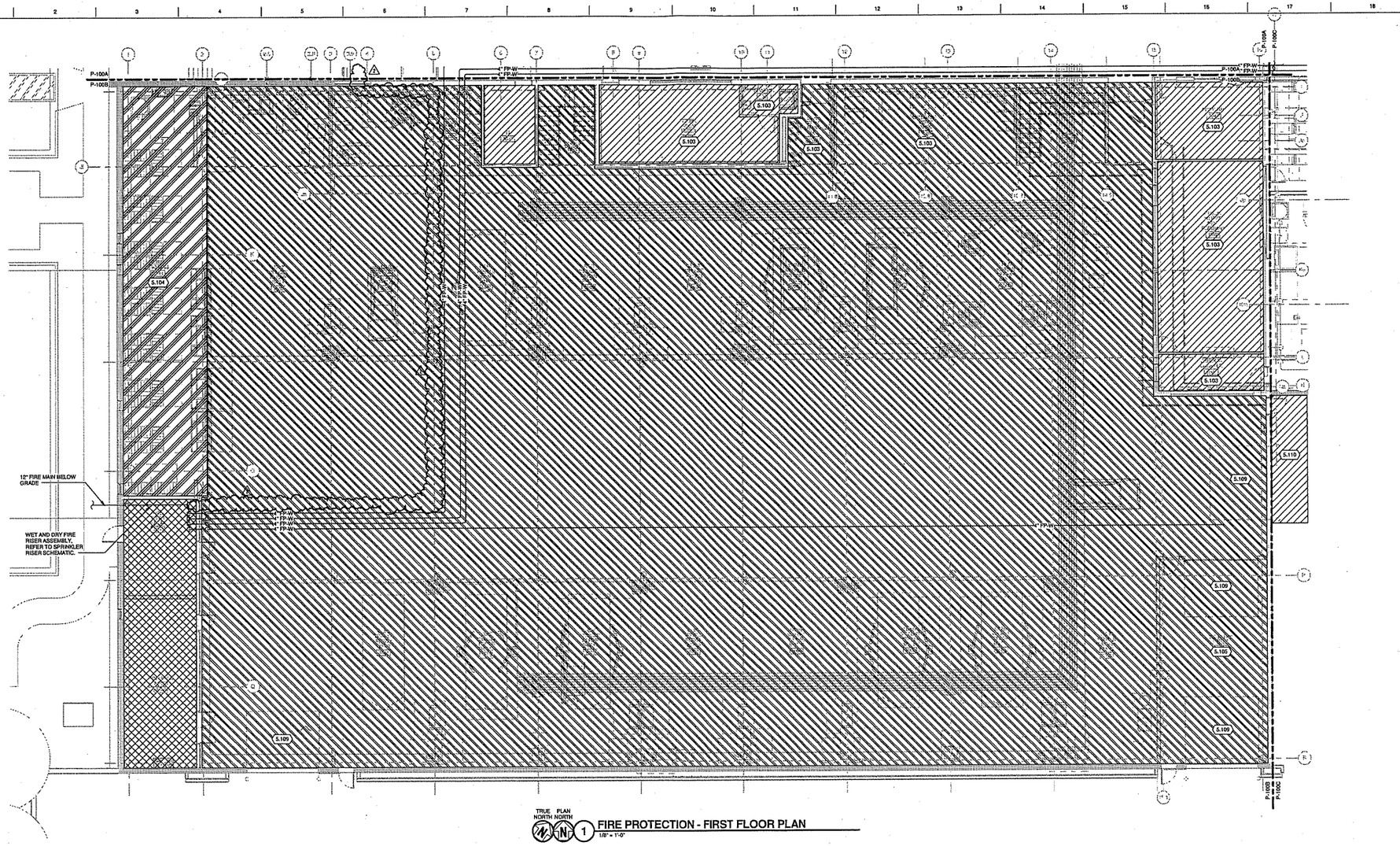
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PROJECT No: 1303500-160264.01

LEVEL 1 FLOOR PLAN AREA E - POWER

E-135



TRUE NORTH PLAN NORTH

1 FIRE PROTECTION - FIRST FLOOR PLAN

1/8" = 1'-0"

NFPA-13 HYDRAULIC CALCULATION STANDARD			
HAZARD CLASS	DENSITY GPM/SQ.FT.	AREA OF SPRINKLER OPERATION SQ. FT.	TOTAL HOSE STREAM GPM
LIGHT HAZARD	0.10	1500	100
ORDINARY GROUP 1	0.15	1500	250
ORDINARY HAZARD GROUP 2	.20	1500	250
EXTRA HAZARD GROUP1	.30	2500	500
EXTRA HAZARD GROUP2	.40	2500	500

* THE MOST HYDRAULICALLY REMOTE LOCATIONS MUST MEET THE ABOVE REQUIREMENTS.

FIRE PROTECTION HATCH PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2
- EXTRA HAZARD GROUP 1
- EXTRA HAZARD GROUP 2

KEYED NOTES

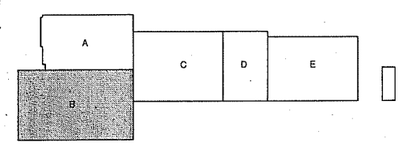
5.103 ROOM BELOW MEZZANINE. EXTEND SPRINKLER COVERAGE AS REQUIRED.

5.104 TIRE RACK STORAGE AREA. PROVIDE MINIMUM 0.39 GPM/SF DENSITY OVER A 2600 SF DESIGN AREA AND 750 GPM HOSE STREAM ALLOWANCE.

5.105 ROOM LID IS BELOW HIGHEST STRUCTURE OF BUILDING. PROVIDE SPRINKLER COVERAGE ABOVE AND BELOW ROOM LID.

5.109 PROVIDE SPRINKLER COVERAGE ABOVE AND BELOW OVERHEAD DOOR

5.110 PROVIDE DRY BARREL SIDEWALL SPRINKLER TO SERVE LOADING DOCK CANOPY.



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LEVEL 1 FLOOR PLAN - FIRE PROTECTION - AREA B

F-101B

ADDENDUM 2

FIRE PROTECTION NOTES:

1. PROVIDE A HYDRAULICALLY DESIGNED WET SPRINKLER SYSTEM AT CRITERIA FOR HAZARD CLASSIFICATION SHOWN IN CONFORMANCE WITH THE FOLLOWING CODES AND STANDARDS:
   A. WISCONSIN BUILDING CODE.
   B. NFPA - 13, (2010), NOT THE LATEST PREVAILING EDITION
2. DESIGN REQUIREMENTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

   USE AREA/DENSITY METHOD TO DETERMINE WATER DEMAND REQUIREMENTS. PROVIDE VALVED OUTLETS TO DRAIN ALL PIPING. EXTEND DRAIN PIPING TO EXTERIOR.

   PROVIDE SUPERVISORY SWITCHES ON ALL ISOLATION VALVES INSTALLED IN CIRCUITS TO ANY SPRINKLER.

   PROVIDE IDENTIFICATION TAGS ON SPECIFIC COMPONENTS.

   PAINT EXPOSED PIPE, SHOW FLOW DIRECTION AND PIPE IDENTIFICATION.

   PROVIDE SPLASH BLOCKS FOR DRAINS.

   INSTALL EXTENDED SLEEVES AT ALL WALL PENETRATIONS.

   FPE STAMP ON ALL SUBMITTALS.

FIRE PROTECTION HATCH PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2
- EXTRA HAZARD GROUP 1
- EXTRA HAZARD GROUP 2

NOTE TO BIDDERS:

QUALIFIED CONTRACTORS SHALL INSTALL BOTH FIRE SUPPRESSION AND FIRE DETECTION AS AN ALL INCLUSIVE SYSTEM

WATER SUPPLY FLOW BASIS FOR BID:

NOTES:
BASIS FOR BID SHOWN, NOT FOR DESIGN.
FIRE SPRINKLER DESIGN/INSTALLATION CONTRACTOR SHALL CONDUCT WATER FLOW TEST AND USE RESULTS IN HYDRAULIC CALCULATIONS.

PRELIMINARY FIRE TEST FLOW:	
LOCATION:	NAKOOSA TRAIL / WALSH ROAD
LOCATION ELAVATION:	24" ABOVE GRADE
STATIC PRESSURE:	90 PSI
RESIDUAL PRESSURE:	46 PSI
FLOWING:	3490 GPM
FLOWING PRESSURE:	66 PSI
TEST DATE:	05/05/2016
MAIN SIZE:	12"

FIRE PROTECTION GENERAL NOTES:

1. ABBREVIATIONS INDICATED HERE AND NOT USED IN THE CONTRACT DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL ABBREVIATIONS MAY BE INDICATED IN THE CONTRACT DOCUMENTS.
2. THESE DRAWINGS ARE DESIGN DRAWINGS AND ARE DIAGRAMMATIC. THEY MAY NOT SHOW ALL PHYSICAL ARRANGEMENTS, OFFSETS, BENDS, OR ELBOWS WHICH MAY BE REQUIRED FOR INSTALLATION OF VARIOUS MATERIALS, EQUIPMENT AND PIPING IN ALLOTTED SPACES. EXAMINE THESE AND OTHER AVAILABLE DRAWINGS TO DETERMINE SPACE LIMITATIONS AND INTERFERENCES. MAKE ANY MINOR CHANGES IN LOCATIONS OF EQUIPMENT AND PIPING FROM THAT SHOWN ON DRAWINGS AND FOR ALL PHYSICAL DETAILS REQUIRED FOR INSTALLATION. COST FOR ADAPTING WORK TO JOB SITE CONDITIONS SHALL NOT BE CONSIDERED AS BASIS OF AN EXTRA COST TO CONTRACT.
3. ELEVATION OF PIPING INDICATED ON THESE DRAWINGS ARE TO BE USED AS GUIDELINES TO ASSIST WITH INSTALLATIONS. MINOR CHANGES TO THESE ELEVATIONS MAY BE NECESSARY TO ELIMINATE UNFORESEEN INTERFERENCES. ANY CHANGE IN ELEVATION SHALL BE APPROVED PRIOR TO CHANGE.
4. ACCURATE AND LEGIBLE RECORD DRAWINGS SHALL BE MAINTAINED AT THE JOB SITE AND BE SUBMITTED PRIOR TO FINAL PAYMENT.
5. ROOFING SYSTEMS SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION ACTIVITIES.
6. TEMPORARILY PATCH ALL ROOF OPENINGS WATERTIGHT UNTIL FINAL CLOSURE CAN BE MADE.
7. VERIFY ALL EQUIPMENT LOCATIONS AND PIPE ROUTING WITH OWNER PRIOR TO INSTALLATION.
8. SEQUENCE OF WORK AND/OR PLACE OF COMMENCEMENT OF WORK SHALL BE APPROVED PRIOR TO WORK BEING STARTED. SCHEDULED SHUTDOWNS SHALL BE CLOSELY COORDINATED WITH OWNER & EXISTING OPERATIONS.
9. ALL SPRINKLERS IN ACOUSTICAL CEILINGS SHALL BE LOCATION IN CENTER OF TILE.
10. PROVIDE CONCEALED SPRINKLER HEADS IN ALL FINISHED AREAS.
11. COORDINATE WITH ARCHITECTURAL PLANS FOR CEILINGS TYPES AND HEIGHTS.
12. VISIT THE BUILDING SITE & BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS AFFECTING WORKING.
13. IT IS THE INTENT OF THESE DRAWINGS A COMPLETE WORKING SYSTEM PROPERTY DESIGNED & TESTED BY THIS CONTRACTOR AND BE APPROVED BY AHJ & OPERATIONAL UPON COMPLETION OF INSTALLATION.
14. PIPE SIZES INDICATED ARE FOR BIDDING PURPOSES ONLY. FINAL SYSTEM DESIGN, INCLUDING PIPE SIZE, TO BE DETERMINED BY THIS CONTRACTOR.

NFPA-13 HYDRAULIC CALCULATION STANDARD

HAZARD CLASS	DENSITY GPM/SQ.FT.	AREA OF SPRINKLER OPERATION SQ. FT.	TOTAL HOSE STREAM GPM
LIGHT HAZARD	0.10	1500	100
ORDINARY GROUP 1	0.15	1500	250
ORDINARY HAZARD GROUP 2	.20	1500	250
EXTRA HAZARD GROUP1	.30	2500	500
EXTRA HAZARD GROUP2	.40	2500	500
TIRE STORAGE	.39	2600	750

* THE MOST HYDRAULICALLY REMOTE LOCATIONS MUST MEET THE ABOVE REQUIREMENTS.

FIRE PROTECTION ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
BPD	BACKFLOW PREVENTION DEVICE
CW	COLD WATER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DI	DUCTILE IRON
FDC	FIRE DEPARTMENT CONNECTION
FPE	PROFESSIONAL FIRE PROTECTION
FP-W	ENGINEER WET SPRINKLER MAIN
FP-D	ENGINEER DRY SPRINKLER MAIN
TFB	TO FLOOR BELOW

FIRE PROTECTION SYMBOLS:

- FIRE DEPARTMENT CONNECTION
- ORIFICE
- FLOW SWITCH
- ALARM BELL
- ISOLATION VALVE
- GATE VALVE
- PRESSURE GAUGE
- CHECK VALVE
- VALVE SUPERVISION/TAMPER SWITCH
- STRAINER
- PIPE DROP
- PIPE RISE
- STRAINER

RISER SCHEMATIC KEYED NOTES:

1. SUPERVISED INDICATING ISOLATION VALVE.
2. MAIN DRAIN SHUT-OFF VALVE
3. ALARM TEST
4. PRESSURE GAUGE
5. FLOW SWITCH
6. CHECK VALVE
7. DOUBLE CHECK VALVE ASSEMBLY
8. CONNECTION FLANGE BY FPC
9. AUTOMATIC DRIP VALVE - ROUTE TO DRAIN
10. FLOOR OR HUB DRAIN
11. FIRE DEPT CONNECITON @ 36" AFG
12. 2" MAIN DRAIN & TEST OUTLET @ 18" AFG
13. FORWARD FLOW TEST CONNECTION @ 48"AFG

(2) **WET AND DRY PIPE SPRINKLER RISER SCHEMATIC**
1/2" = 1'-0"

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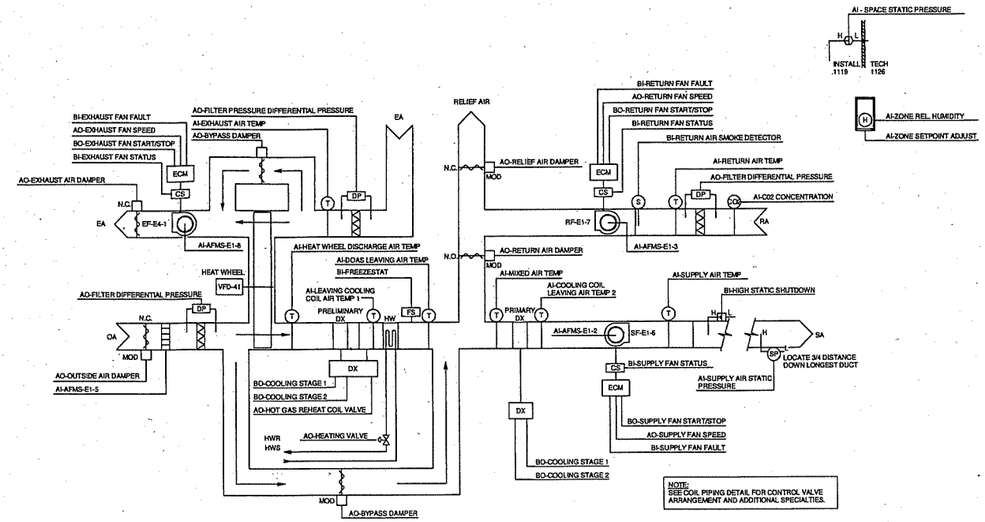
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PROJECT No: 1303500-160264.01

FIRE PROTECTION SYMBOLS, ABBREVIATIONS, NOTES AND DETAILS

F-001



SEQUENCE OF OPERATION:

FAN CONTROL:
Start/Stop: The DDC system shall start/stop the supply, return and exhaust fans via their associated ECMs.

Current Status Switch: Provide ECM Motor Run Status, in this Section for both the supply, return and exhaust fans.

Supply Fan Speed Control: Install a static pressure sensing probe in the main supply duct located at approximately ¾ of the way down the main supply duct or as shown on the plans. The inputs to the differential pressure transmitter shall be the static pressure inside of the duct and the reference input shall sense the actual space served by the air system. The DDC system shall modulate the supply fan ECM to maintain the static pressure setpoint as sensed by the static pressure sensor. Static pressure setpoint shall be as described in the Static Pressure Reset Control below.

Fan Static Pressure Setpoint Reset Control: Static pressure setpoint shall be reset using true Trim & Respond logic within the range 0.3 in w.c. (adj.) to 1.2 in w.c. (adj.). When the fan is off, the setpoint shall be reset to 1 in. w.c. (adj.) and this setpoint shall be used on system start up. While the fan is proven on, every three minutes, (adj.) trim the setpoint by 0.04 in. w.c. downward if there are zero zone pressure requests. If there are more than one zone pressure requests, respond by increasing the setpoint upward by 0.06 in. w.c. If there is exactly one zone pressure request, the static pressure setpoint shall not be adjusted.

Each zone VAV shall produce a zone pressure request analog value of 0, 1 or 2. When the VAV damper is less than 90% (adj.) open the pressure request analog value shall be zero. If the VAV damper is greater than 90% (adj.) and less than the pressure request two setpoint, then the pressure request analog value shall be one. If the VAV Damper is greater than 99% open for 60 seconds (adj.) then the zone pressure request analog value shall be two. Zone pressure requests for each VAV zone associated with the AHU shall be summed in the supervisory controller. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Return Fan Speed Control: The purpose of the return fan control is to maintain a slightly positive pressure relative to Install Bay 1119. The return fan ECM shall modulate to maintain a constant CFM offset of 1,250 CFM (adj.) from the supply fan to account for total exhaust from the area in which it serves while maintaining a slightly positive pressure. Temperature controls contractor shall coordinate with the balancing contractor to optimize this setting.

Exhaust Fan Control: The purpose of the exhaust fan is to remove air from the toilet and locker rooms. The exhaust fan shall run continuously at a constant speed anytime the unit is commanded on by the DDC system. Exhaust fan shall be interlock with AHU-E1.

Ventilation Air Control:
Minimum Ventilation Air Flow Control Using a Full Flow Outside Air Flow Station: When the economizer sequence is not enabled, the outside air damper shall modulate open to maintain the outside air flow minimum ventilation rate setpoint. When the outside air damper is 100% open, the return damper shall modulate towards closed to maintain the outside air flow minimum ventilation rate setpoint. When the economizer sequence is enabled, the outside air and return air dampers shall be limited from controlling below the outside air ventilation flow rate.

Filters:
Install a differential static pressure sensor across each filter bank. Ensure that the static probes do not impede filter removal.

For filter banks, provide an alarm to the operator interface when the differential static pressure exceeds 1.0" W.C. (adj.).

Discharge Air TEMPERATURE Control:
Install a temperature sensor in the supply duct downstream of the supply fan.
Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 65º F (adj.). Reset the discharge air temperature setpoint based on the space relative humidity setpoint setpoint between 55% (adj.) and 60% to maintain a discharge air temperature setpoint of 60º F (adj.).

Discharge Air Temperature Control: The mixed air dampers, and the primary DX cooling coil shall be controlled in sequence to maintain the discharge air setpoint temperature. Whenever the discharge air temperature is above the setpoint, the following shall occur in sequence: The economizer sequence is enabled, the economizer outside air damper and return air damper shall be modulated sequentially to maintain the discharge air temperature setpoint. See economizer control sequence below. When the outside air economizer damper is completely open and the return air damper is completely closed, or the economizer sequence is not enabled, the primary DX coil shall operate to maintain the discharge air temperature setpoint and the mixed air dampers modulate to mixed temperature of 50º F (adj.). When the discharge air setpoint is below setpoint the reverse shall occur.

Dehumidification Control:
Hot gas reheat shall be allow for dehumidification. Dehumidification will operate when outside air temperature is above 40º F (adj.). The economizer outside air damper shall close to minimum position during dehumidification. On call for dehumification by space humidity sensor, the modulating hot gas reheat coil valve shall open to maintain a discharge temperature of 60º F (adj.). When humidity control setpoint is satisfied, the hot gas reheat coil shall de-energized. If there is a call for cooling from one of the zone space temperatures while in reheat, the hot gas reheat valve shall de-energized.

DEDICATED OUTSIDE AIR SECTION (DOAS) CONTROL:
Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 52º F (adj.).

Heat Wheel Discharge Air Temperature Control: The heat wheel shall be used as the first stage of heating and cooling and shall be sequenced with the heating coil and DOAS DX cooling coil to maintain the discharge temperature setpoint. The heat wheel VFD speed shall be modulated to maintain the discharge air temperature setpoint subject to the frost control override. Whenever the discharge air temperature leaving the heat wheel is below the discharge air temperature setpoint the hot water heating coil shall control as described below. Whenever the discharge air temperature leaving the heat wheel is above the discharge air temperature setpoint the DOAS DX cooling coil shall control as described below.

Hot Water Heating Coil Control: Modulate the heating coil control valve as sequenced under discharge air control.

DOAS DX Cooling Coil Control: Energize the DOAS DX cooling coil and associated ACCU to maintain discharge air temperature.

Bypass Damper Control: Open the bypass dampers whenever the heat wheel is indexed off or the economizer sequence is active.

Frost Control: Override the heating wheel speed control to limit the leaving exhaust air temperature from the wheel to 15º F (adj.) at a relative exhaust air entering humidity of 30% RH (adj.) and reset linearly to 5º F (adj.) at 20% RH.

Cold Weather Start: Whenever outside air temperature is below 40º F (adj.), start the wheel at full speed and run the unit in full recirculation mode or run the exhaust fan for 3 minutes to pre-warm the wheel before starting the supply fan and then release the wheel to control.

Purge Control: When the heat wheel is deactivated, the wheel shall run for 20 seconds at minimum speed every 30 minutes to keep the rotor surface clean.

Rotation Alarm: The heat wheel shall come factory equipped with a proximity switch that shall provide a dry contact input to the DDC system. If the wheel is indexed to run and two switch closures are not seen within 10 minutes, an alarm shall be sent through the DDC system signalling a wheel rotation failure.

RELIEF DAMPER CONTROL:
The relief damper shall be modulated to maintain a space static pressure setpoint of 0.05" w.c. (adj.) from Install 1119 to Tech 1126. When the space static pressure is above setpoint, the relief damper shall modulate open. When the relief space static pressure is above setpoint the reverse shall occur. When economizer is switched to enabled by the economizer switchover as described below, the relief damper shall be commanded fully open and released to control.

ECONOMIZER CONTROL:
When the economizer sequence is enabled by the switchover sequence below, the outside air damper and return damper shall modulate to provide outside air to be used for free cooling as described in the Discharge Air Control sequence. The heat wheel shall be off and bypass control initiated as described in Heat Wheel Control.

Floating Dry Bulb Economizer Switchover: The economizer sequence shall be enabled whenever the outside air temperature is more than 4º F (adj.) cooler than the return air temperature.

SAFETIES:
General: All safeties shall be hard wired to the supply and return fan starters or ECMs safety circuits.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35º F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s). A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Supply Fan High Pressure Limit: Install a static pressure probe located in the air handling unit main discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be +4.0" w.c. (adj.)

Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information). An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

CO2 Concentration High Limit: Install a carbon dioxide sensor in the return air ductwork immediately upstream of the air handler intake. The CO2 sensor shall monitor the CO2 concentration in the return air stream and generate an alarm in the DDC system if the concentration exceeds 1000ppm (adj.). The alarm shall be manually reset through the DDC system.

Unit Shutdown:
Whenever the air handling unit is indexed off, the supply, return and exhaust fans shall stop. If any fan fails off, the other fans shall be indexed off. On a failure of either the supply, return or exhaust fans, an alarm shall be sent through the DDC system. Whenever both supply and return fans are off for any reason the following shall occur:

The outside air dampers and relief air dampers shall close and the return dampers shall open.

The exhaust fan and heat wheel shall be indexed off and the exhaust damper shall close.

The primary DX cooling and DOAS DX cooling systems shall deenergize.

The heating coil control valve shall remain under control from the heat wheel discharge air sensor to maintain 55 ºF (adj.). Freezestat shall override heating control valve(s) open.

Unoccupied Control:
General: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, Index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor.

Unoccupied Heating Control: The air handling unit shall remain off when in unoccupied mode and zone setback setpoints are below the cooling setback temperature setpoints. Unoccupied zone heating will be accomplished by terminal heating systems in each zone.

Unit Cycling to Maintain Cooling Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 86 ºF (adj.). Supply fan shall be limited to the maximum return fan airflow. In the cooling mode, the economizer and primary DX coil discharge temperature control shall be allowed to function as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off time for 30 minutes (adj.).

HEATING OPTIMUM START-UP:
This cycle shall override the unoccupied cycle. If the system was operating as a result of the unoccupied cycle, the system shall continue to operate. The DDC system shall measure the zone air temperature designated on the plans and the outside air dry bulb temperature to determine the minimum run time to warm the zone(s) to its setpoint. When the computed start time is reached, the DDC system shall start the air handling system and operate with the outside air and relief air dampers closed and the return air damper open. The air handling unit discharge air temperature shall be controlled as specified under Discharge Air Control. When the occupied time is reached, the unit shall be switch to occupied control and ventilation air shall be provided.

COOLING OPTIMUM START-UP:
This cycle shall override the unoccupied cycle. If the system was operating as a result of the unoccupied cycle, the system shall continue to operate. The DDC system shall measure the zone air temperature designated on the plans and the outside air dry bulb temperature to determine the minimum run time to cool the zone(s) to its setpoint. When the computed start time is reached, the DDC system shall start the air handling system. The air handling unit discharge air temperature shall be controlled as specified under Discharge Air Control with the economizer and primary DX cooling active. When the occupied time is reached, the unit shall be switch to occupied control and ventilation air shall be provided.

1 VARIABLE AIR VOLUME AHU - AHU-E1
NO SCALE

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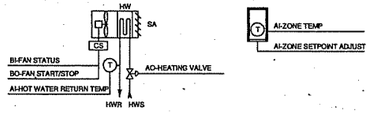
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MECHANICAL CONTROLS

M-803

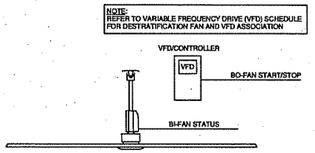
ADDENDUM 2



SEQUENCE OF OPERATIONS:

Provide a DDC space temperature sensor to control the control valve to maintain space temperature. Provide DDC start/stop for fan control. Cycle fan on when calling for heating. Modulate hot water control valve open in sequence with fan to maintain space temperature setpoint (adj.). When space is satisfied fan shall cycle off and hot water control valve shall modulate closed. Send an alarm if space temperature falls 10°F (adj.) below setpoint for more than 15 minutes (adj.).

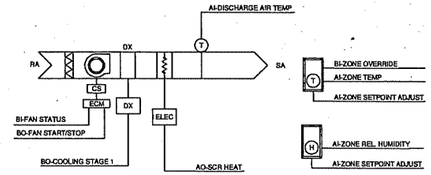
2 HOT WATER UNIT HEATER
NO SCALE



SEQUENCE OF OPERATION:

Integrate DDC with local fan controller provided by fan manufacturer. Each fan controller shall be equipped with ON/OFF/AUTO switch, speed controller, safety disconnect, and properly sized fuse block. DDC system shall enable/disable fan and monitor fan status through local fan controller. DDC system shall shut down fan when a power failure or fire alarm occurs. DDC system shall shut down fan upon receiving a signal from CNG methane sensors.

3 DESTRATIFICATION FAN
NO SCALE

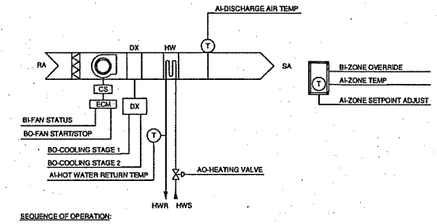


SEQUENCE OF OPERATION:

General: Fan Coil Units D1 & D2 are designed to only provide space humidity control for their respective spaces according to the Dehumidification Control sequence below. Dehumidification Control is not subject to Occupied/Unoccupied schedules.

Dehumidification Control: Provide a DDC space humidistat to control the DX cooling and electric heating to maintain space relative humidity. Provide a space high relative humidity setpoint of 75% RH (adj.) and a dehumidification cutout relative humidity setpoint of 55% RH (adj.). When the space relative humidity is above the high RH setpoint, the DDC controller shall fully close the MAU supply and return zone dampers associated with the zone served by the fan coil and enable the DX cooling. Enable electric heating coil to maintain space temperature setpoint of 68°F (adj.) as determined by DDC space temperature space sensor. Cycle fan on when calling for dehumidification. When space relative humidity is reduced below the dehumidification cutout RH setpoint, disable dehumidification control, de-energize the fan coil unit and open the MAU supply and return zone dampers.

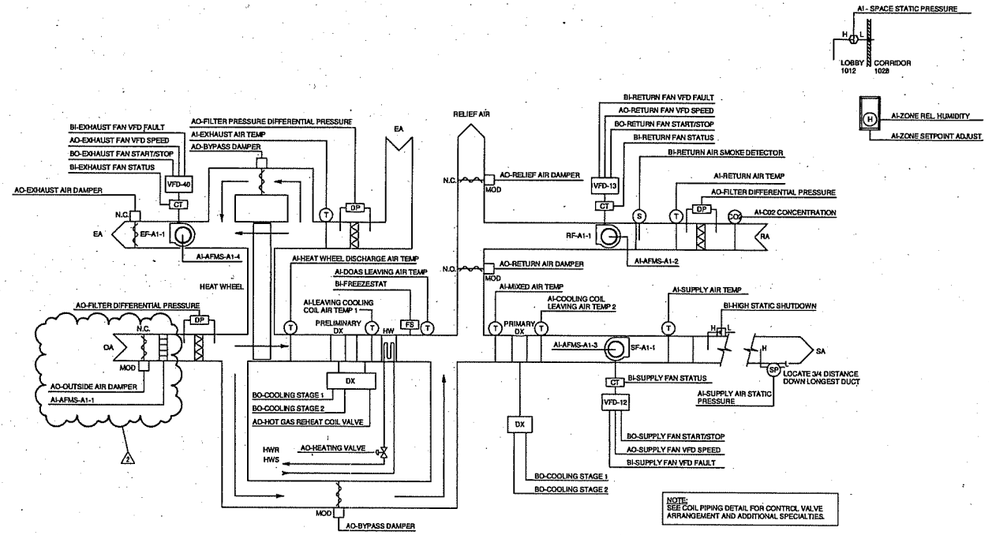
4 FAN COIL UNIT - DX AND ELECTRIC HEATING COILS
NO SCALE



SEQUENCE OF OPERATION:

Provide a DDC space temperature sensor to control the modulating control valve for hot water and the DX cooling to maintain space temperature. Provide separate heating and cooling setpoints. When the space temperature is below setpoint, the DDC controller shall disable the DX cooling. When the DX cooling is disabled, the hot water valve shall modulate open to maintain setpoint. When the space temperature is above setpoint, the DDC controller shall modulate the hot water valve closed. When the hot water valve is fully closed, the DX cooling shall be enabled and stage to maintain setpoint. Provide DDC start/stop for fan control. Cycle fan on when calling for heating or cooling. When space is satisfied fan shall be off. Provide a discharge temperature for monitoring purposes. The heating coil valve shall be commanded closed and the DX cooling disabled whenever the fan coil fan is off.

5 FAN COIL UNIT - DX AND HOT WATER COILS
NO SCALE



SEQUENCE OF OPERATION:

FAN CONTROL:
Start/Stops: The DDC system shall start/stop the supply, return and exhaust fans via their associated VFDs.

Current Status Switch: Provide VFD Motor Run Status, in this Section for both the supply, return and exhaust fans.

Supply Fan Speed Control: Install a static pressure sensing probe in the main supply duct located at approximately ⅔ of the way down the main supply duct or as shown on the plans. The inputs to the differential pressure transmitter shall be the static pressure inside of the duct and the reference input shall sense the actual space served by the air system. The DDC system shall modulate the supply fan VFD to maintain the static pressure setpoint as sensed by the static pressure sensor. Static pressure setpoint shall be as described in the Static Pressure Reset Control below.

Fan Static Pressure Setpoint Reset Control: Static pressure setpoint shall be reset using true Trim & Respond logic within the range 0.3 in w.c. (adj.) to 1.2 in w.c. (adj.). When the fan is off, the setpoint shall be reset to 1 in. w.c. (adj.) and this setpoint shall be used on system start up. While the fan is proven on, every three minutes, (adj.) trim the setpoint by 0.04 in. w.c. downward if there are zero zone pressure requests. If there are more than one zone pressure requests, respond by increasing the setpoint upward by 0.06 in. w.c. If there is exactly one zone pressure request, the static pressure setpoint shall not be adjusted.

Each zone VAV shall produce a zone pressure request analog value of 0, 1 or 2. When the VAV damper is less than 90% (adj.) open the pressure request analog value shall be zero. If the VAV damper is greater than 90% (adj.) and less than the pressure request two setpoint, then the pressure request analog value shall be one. If the VAV Damper is greater than 99% open for 60 seconds (adj.) then the zone pressure request analog value shall be two. Zone pressure requests for each VAV zone associated with the AHU shall be summed in the supervisory controller. The summing setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Return Fan Speed Control: The purpose of the return fan control is to maintain a slightly positive building pressure. The return fan VFD shall modulate to maintain a constant CFM offset of 3,185 CFM (adj.) from the supply fan to account for total exhaust from the area in which it serves while maintaining a slightly positive pressure. Temperature controls contractor shall coordinate with the balancing contractor to optimize this setting.

Exhaust Fan Control: The purpose of the exhaust fan is to remove air from the toilet and locker rooms. The exhaust fan shall run continuously at a constant speed anytime the unit is commanded on by the DDC system. Exhaust fan shall be interlock with AHU-A1.

Ventilation Air Control:
Minimum Ventilation Air Flow Control Using a Full Flow Outside Air Flow Station: When the economizer sequence is not enabled, the outside air damper shall modulate open to maintain the outside air flow minimum ventilation rate setpoint. When the economizer sequence is enabled, the outside air and return air dampers shall be limited from controlling below the outside air ventilation flow rate.

Filters:
Install a differential static pressure sensor across each filter bank. Ensure that the static probes do not impede filter removal.

For filter banks, provide an alarm to the operator interface when the differential static pressure exceeds 1.0" W.C. (adj.).

Discharge Air TEMPERATURE Control:
Install a temperature sensor in the supply duct downstream of the supply fan.
Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 55° F (adj.). Reset the discharge air temperature setpoint based on the space relative humidity setpoint setpoint between 55% (adj.) and 60% to maintain a discharge air temperature setpoint of 60° F (adj.).

Discharge Air Temperature Control: The mixed air dampers, and the primary DX cooling coil shall be controlled in sequence to maintain the discharge air setpoint temperatures. Whenever the discharge air temperature is above the setpoint, the following shall occur in sequence: The economizer sequence is enabled, the economizer outside air damper and return air damper shall be modulated sequentially to maintain the discharge air temperature setpoint. See economizer control sequence below. When the outside air economizer damper is completely open and the return air damper is completely closed, or the economizer sequence is not enabled, the primary DX coil shall operate to maintain the discharge air temperature setpoint and the mixed air dampers modulate to mixed temperature of 50° F (adj.). When the discharge air setpoint is below setpoint the reverse shall occur.

Dehumidification Control:
Hot gas reheat shall be allow for dehumidification. Dehumidification will operate when outside air temperature is above 40° F (adj.). The economizer outside air damper shall close to minimum position during dehumidification. On call for dehumidification by space humidity sensor, the modulating hot gas reheat coil valve shall open to maintain a discharge temperature of 60° F (adj.). When humidity control setpoint is satisfied, the hot gas reheat coil shall de-energized. If there is a call for cooling from one of the zone space temperatures while in reheat, the hot gas reheat valve shall de-energized.

DEDICATED OUTSIDE AIR SECTION (DOAS) CONTROL:
Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 52° F (adj.).

Heat Wheel Discharge Air Temperature Control: The heat wheel shall be used as the first stage of heating and cooling and shall be sequenced with the heating coil and DOAS DX cooling coil to maintain the discharge temperature setpoint. The heat wheel VFD speed shall be modulated to maintain the discharge air temperature setpoint subject to the frost control override. Whenever the discharge air temperature leaving the heat wheel is below the discharge air temperature setpoint the hot water heating coil shall control as described below. Whenever the discharge air temperature leaving the heat wheel is above the discharge air temperature setpoint the DOAS DX cooling coil shall control as described below.

Hot Water Heating Coil Control: Modulate the heating coil control valve as sequenced under discharge air control.

DOAS DX Cooling Coil Control: Energize the DOAS DX cooling coil and associated ACCU to maintain discharge air temperature.

Bypass Damper Control: Open the bypass dampers whenever the heat wheel is indexed off or the economizer sequence is active.

Frost Control: Override the heating wheel speed control to limit the leaving exhaust air temperature from the wheel to 15° F (adj.) at a relative exhaust air entering humidity of 30% RH (adj.) and reset linearly to 5° F (adj.) at 20% RH.

Cold Weather Start: Whenever outside air temperature is below 40° F (adj.), start the wheel at full speed and run the unit in full recirculation mode or run the exhaust fan for 3 minutes to pre-warm the wheel before starting the supply fan and then release the wheel to control.

Purge Control: When the heat wheel is deactivated, the wheel shall run for 20 seconds at minimum speed every 30 minutes to keep the rotor surface clean.

Rotation Alarm: The heat wheel shall come factory equipped with a proximity switch that shall provide a dry contact input to the DDC system. If the wheel is indexed to run and two switch closures are not seen within 10 minutes, an alarm shall be sent through the DDC system signalling a wheel rotation failure.

RELIEF DAMPER CONTROL:
The relief damper shall be modulated to maintain a space static pressure setpoint of 0.05" w.c. (adj.) from Lobby 1012 to Corridor 1022-2. When the space static pressure is above setpoint, the relief damper shall modulate open. When the relief space static pressure is above setpoint the reverse shall occur. When economizer is switched to enabled by the economizer switchover as described below, the relief damper shall be commanded fully open and released to control.

ECONOMIZER CONTROL:
When the economizer sequence is enabled by the switchover sequence below, the outside air damper and return damper shall modulate to provide outside air to be used for free cooling as described in the Discharge Air Control sequence. The heat wheel shall be off and bypass control initiated as described in Heat Wheel Control.

Floating Dry Bulb Economizer Switchover: The economizer sequence shall be enabled whenever the outside air temperature is more than 4° F (adj.) cooler than the return air temperature.

SAFETIES:
General: All safeties shall be hard wired to the supply and return fan starters or VFD safety circuits. Starters shall not function in the "Hand" or "Auto" and VFD's shall be disabled if they are indexed to the "Auto" or "Hand" position in either the VFD or bypass modes.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35° F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s). A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Supply Fan High Pressure Limit: Install a static pressure probe located in the air handling unit main discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be +4.0" w.c. (adj.)

Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information) and all fire/smoke and smoke dampers within this system shall close immediately through a hardwire interlock. An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

CO2 Concentration High Limit: Install a carbon dioxide sensor in the return air ductwork immediately upstream of the air handler intake. The CO2 sensor shall monitor the CO2 concentration in the return air stream and generate an alarm in the DDC system if the concentration exceeds 1000ppm (adj.). The alarm shall be manually reset through the DDC system.

Unit Shutdown:
Whenever the air handling unit is indexed off, the supply, return and exhaust fans shall stop. If any fan fails off, the other fans shall be indexed off. On a failure of either the supply, return or exhaust fans, an alarm shall be sent through the DDC system. Whenever both supply and return fans are off for any reason the following shall occur:

The outside air dampers and relief air dampers shall close and the return dampers shall open.

The exhaust fan and heat wheel shall be indexed off and the exhaust damper shall close.

The primary DX cooling and DOAS DX cooling systems shall deenergize.

The heating coil control valve shall remain under control from the heat wheel discharge air sensor to maintain 55 °F (adj.). Freezestat shall override heating control valve(s) open.

Unoccupied Control:
General: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, Index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor.

Unoccupied Heating Control: The air handling unit shall remain off when in unoccupied mode and zone setback setpoints are below the cooling setback temperature setpoints. Unoccupied zone heating will be accomplished by terminal heating systems in each zone.

Unit Cycling to Maintain Cooling Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 85 °F (adj.). Supply fan shall be limited to the maximum return fan airflow. In the cooling mode, the economizer and primary DX coil discharge temperature control shall be allowed to function as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off timer for 30 minutes (adj.).

HEATING OPTIMUM START-UP:
This cycle shall override the unoccupied cycle. If the system was operating as a result of the unoccupied cycle, the system shall continue to operate. The DDC system shall measure the zone air temperature designated on the plans and the outside air dry bulb temperature to determine the minimum run time to warm the zone(s) to its setpoint. When the computed start time is reached, the DDC system shall start the air handling system and operate with the outside air and relief air dampers closed and the return air damper open. The air handling unit discharge air temperature shall be controlled as specified under Discharge Air Control. When the occupied time is reached, the unit shall be switch to occupied control and ventilation air shall be provided.

COOLING OPTIMUM START-UP:
This cycle shall override the unoccupied cycle. If the system was operating as a result of the unoccupied cycle, the system shall continue to operate. The DDC system shall measure the zone air temperature designated on the plans and the outside air dry bulb temperature to determine the minimum run time to cool the zone(s) to its setpoint. When the computed start time is reached, the DDC system shall start the air handling system. The air handling unit discharge air temperature shall be controlled as specified under Discharge Air Control with the economizer and primary DX cooling active. When the occupied time is reached, the unit shall be switch to occupied control and ventilation air shall be provided.

1 VARIABLE AIR VOLUME AHU - AHU-A1
NO SCALE

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No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
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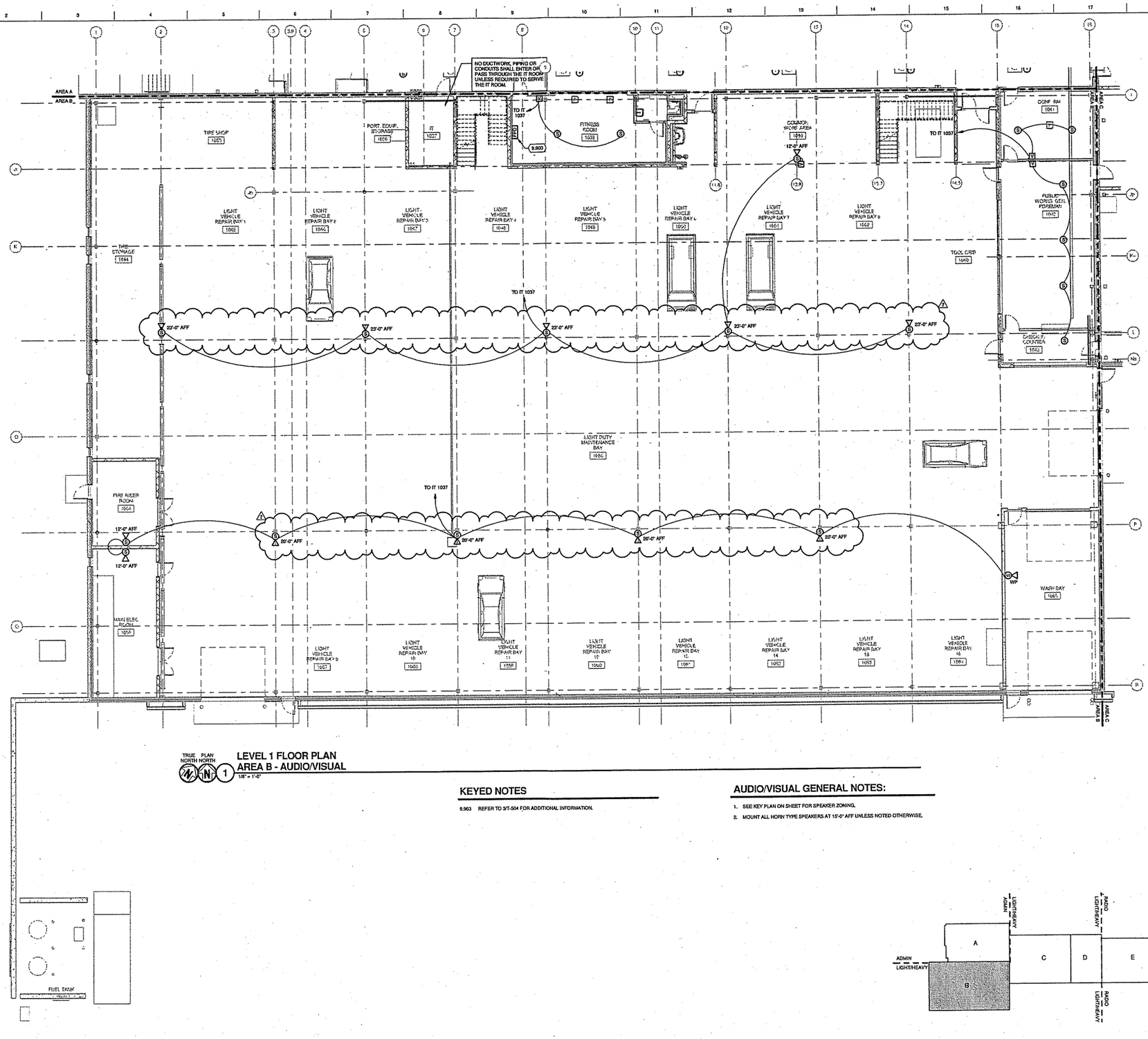
PROJECT No: 1303500-160264.01

MECHANICAL CONTROLS

M-801

ADDENDUM 2

ADDENDUM 2



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA B - AUDIO/VISUAL

1/8" = 1'-0"

KEYED NOTES

9.903 REFER TO 3/T-504 FOR ADDITIONAL INFORMATION.

AUDIO/VISUAL GENERAL NOTES:

1. SEE KEY PLAN ON SHEET FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.

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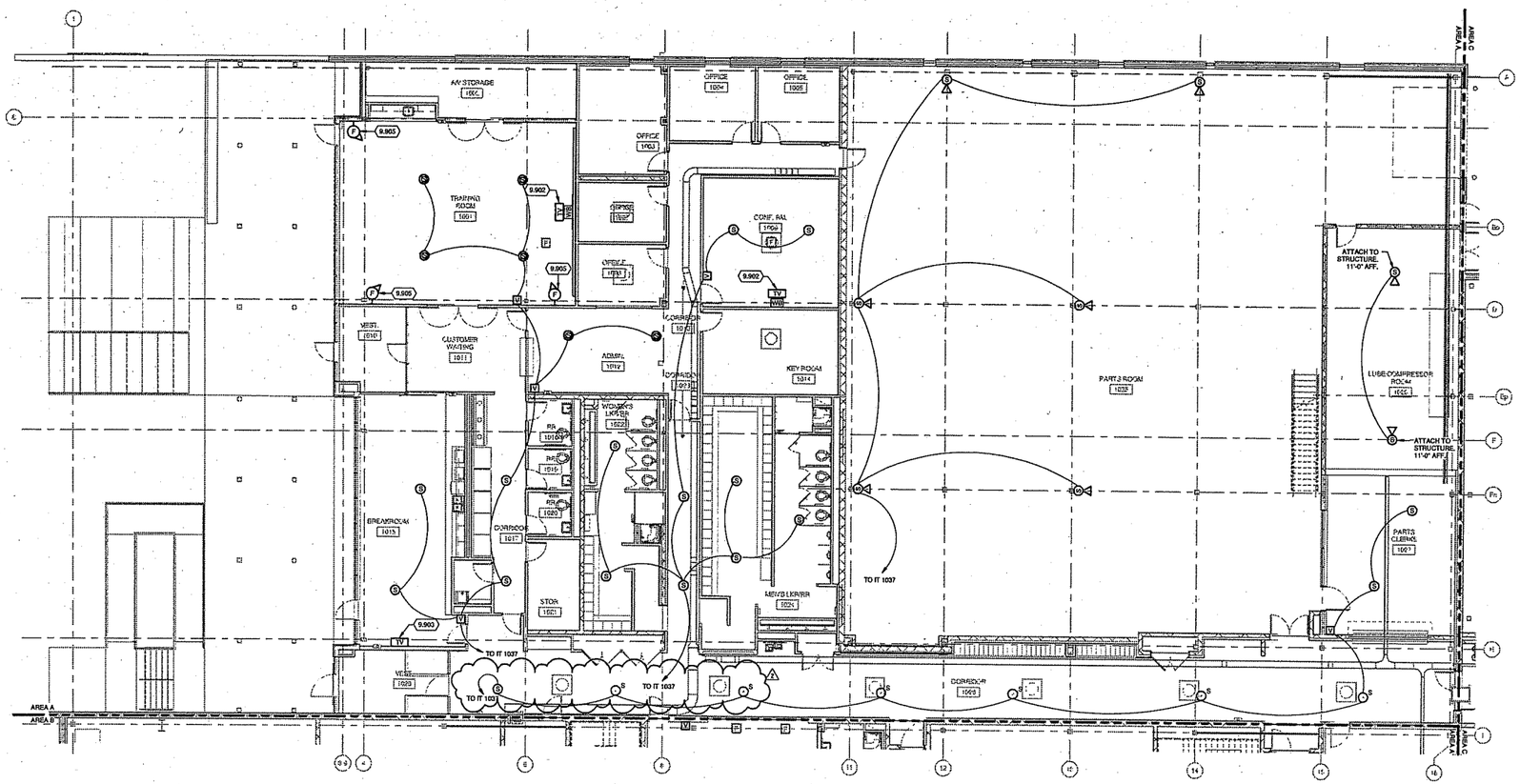
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LEVEL 1 FLOOR PLAN AREA B - AUDIO/VISUAL

T-142

ADDENDUM 2



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA A - AUDIO/VISUAL

1/8" = 1'-0"

KEYED NOTES

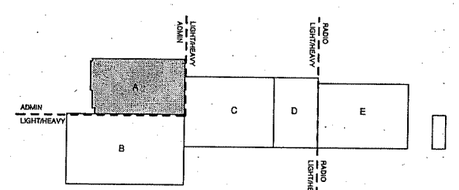
9.902 REFER TO 2/T-504 FOR ADDITIONAL INFORMATION.

9.903 REFER TO 3/T-504 FOR ADDITIONAL INFORMATION.

9.905 ROUGH IN ONLY. PROVIDE BACK BOX, CONDUIT AND CABLE FOR PTZ CAMERA FOR VIDEO CONFERENCING SYSTEM. SEE T-XXX FOR DETAILS

AUDIO/VISUAL GENERAL NOTES:

1. SEE KEY PLAN ON SHEET FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.



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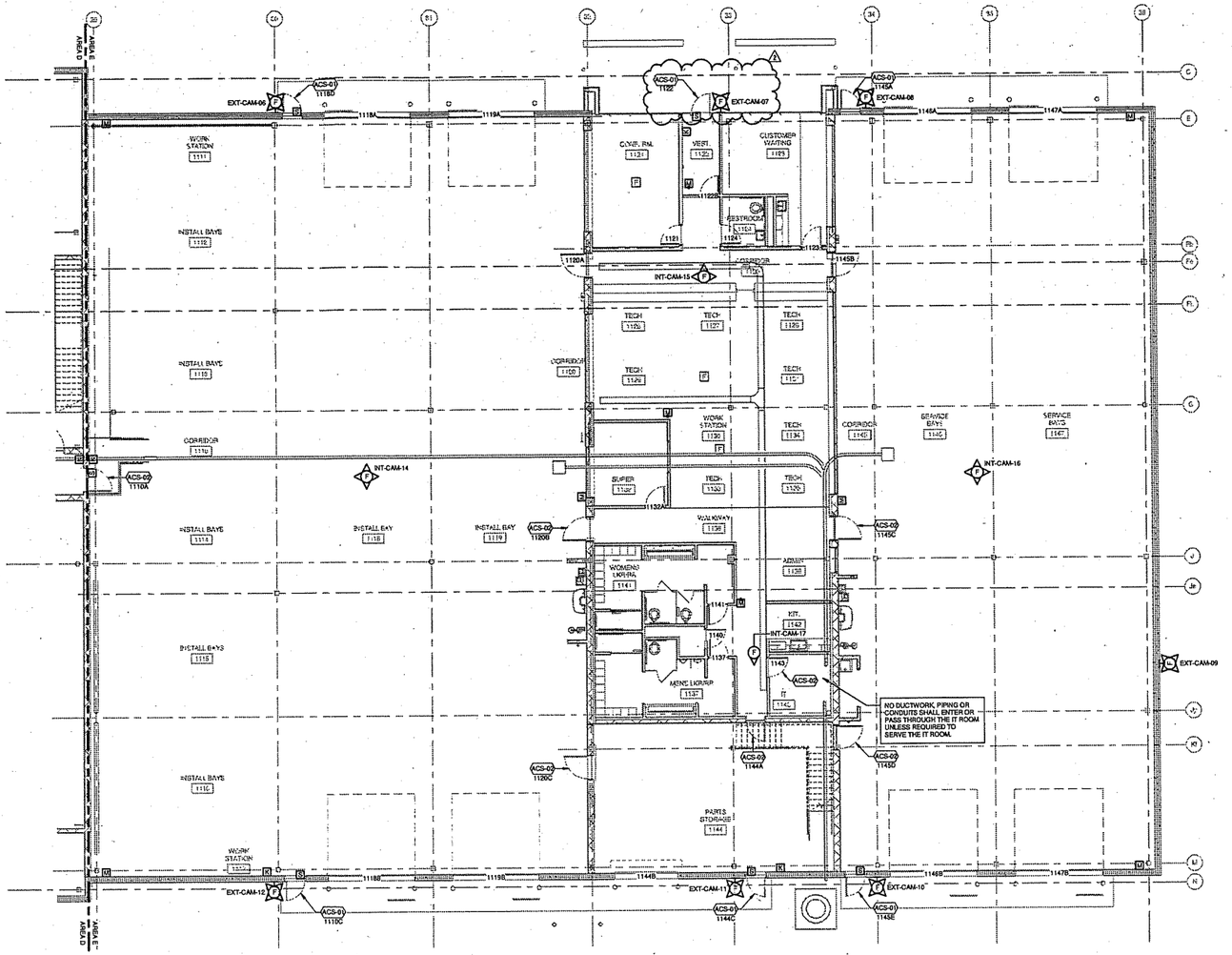
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LEVEL 1 FLOOR PLAN AREA A - AUDIO/VISUAL

T-141



TRUE NORTH PLAN NORTH

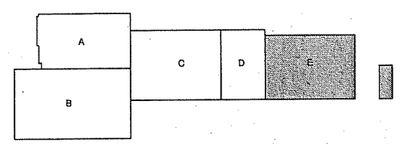
1 LEVEL 1 FLOOR PLAN AREA E - SECURITY

1/8" = 1'-0"

KEYED NOTES

ACS-01 EXTERIOR ACCESS-CONTROLLED DOOR. REFER TO SCHEDULE ON T-602.

ACS-02 INTERIOR ACCESS-CONTROLLED DOOR. REFER TO SCHEDULE ON T-602.



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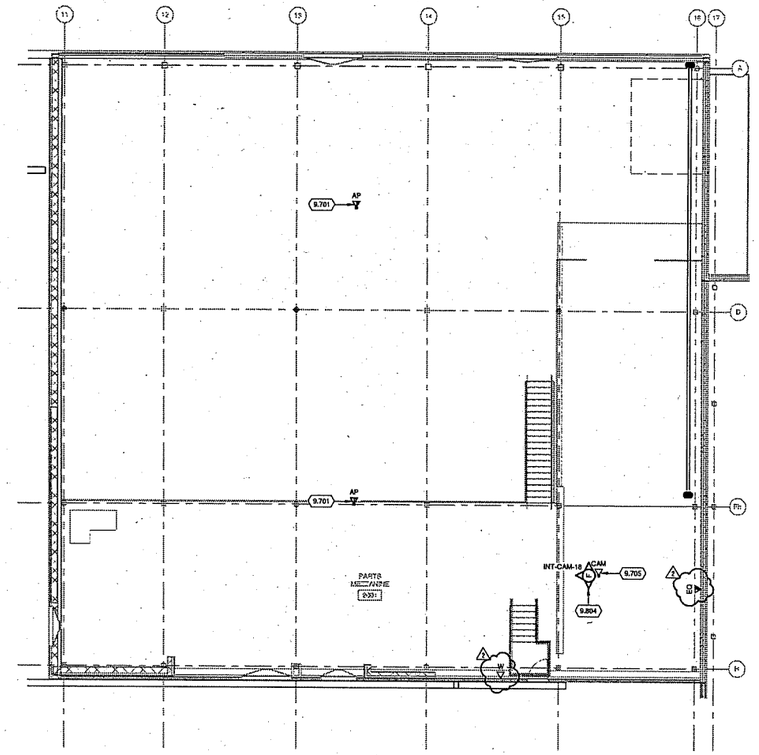
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LEVEL 1 FLOOR PLAN AREA E - SECURITY

T-125

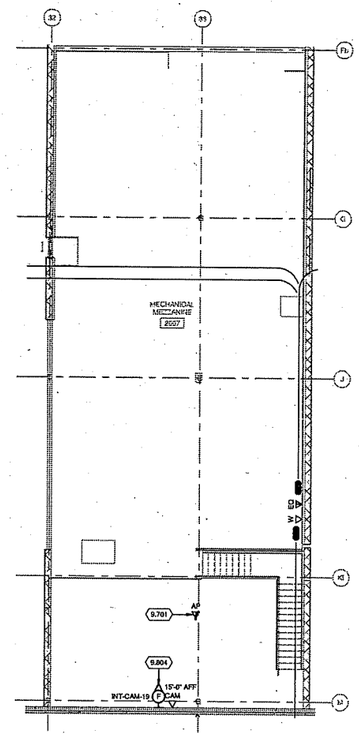
A ADDEND 2



TRUE NORTH PLAN NORTH

3 MEZZANINE FLOOR PLAN PARTS AND STORAGE - TECHNOLOGY

1/8" = 1'-0"



TRUE NORTH PLAN NORTH

1 MEZZANINE FLOOR PLAN RADIO - TECHNOLOGY

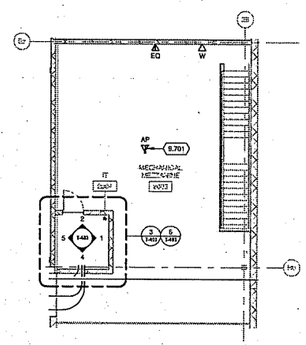
1/8" = 1'-0"

COMMUNICATIONS GENERAL NOTES:

1. REFER TO T-100 FOR ADDITIONAL INFORMATION ON PATHWAYS.
2. CABLE TRAY PATHWAY IS DIAGRAMMATIC ONLY. COORDINATE EXACT PATHWAY WITH OTHER DISCIPLINES PRIOR TO INSTALLATION.

KEYED NOTES

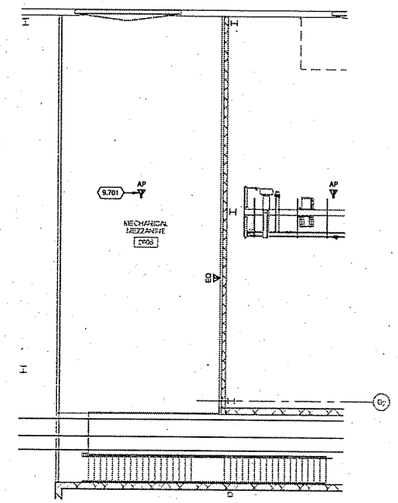
9.701	MOUNT 2-GANG BACKBOX TO BOTTOM CHORD OF STRUCTURE. REFER TO E/T-501.
9.705	MOUNT CAMERA TELECOMMUNICATIONS OUTLET TO STRUCTURE ABOVE.
9.804	COORDINATE CAMERA AND ASSOCIATED TELECOMMUNICATIONS OUTLET WITH SHELVING.



TRUE NORTH PLAN NORTH

4 MEZZANINE FLOOR PLAN FIRE - TECHNOLOGY

1/8" = 1'-0"



TRUE NORTH PLAN NORTH

2 MEZZANINE FLOOR PLAN MECHANICAL MEZZANINE - TECHNOLOGY

1/8" = 1'-0"

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ADDENDUM 2

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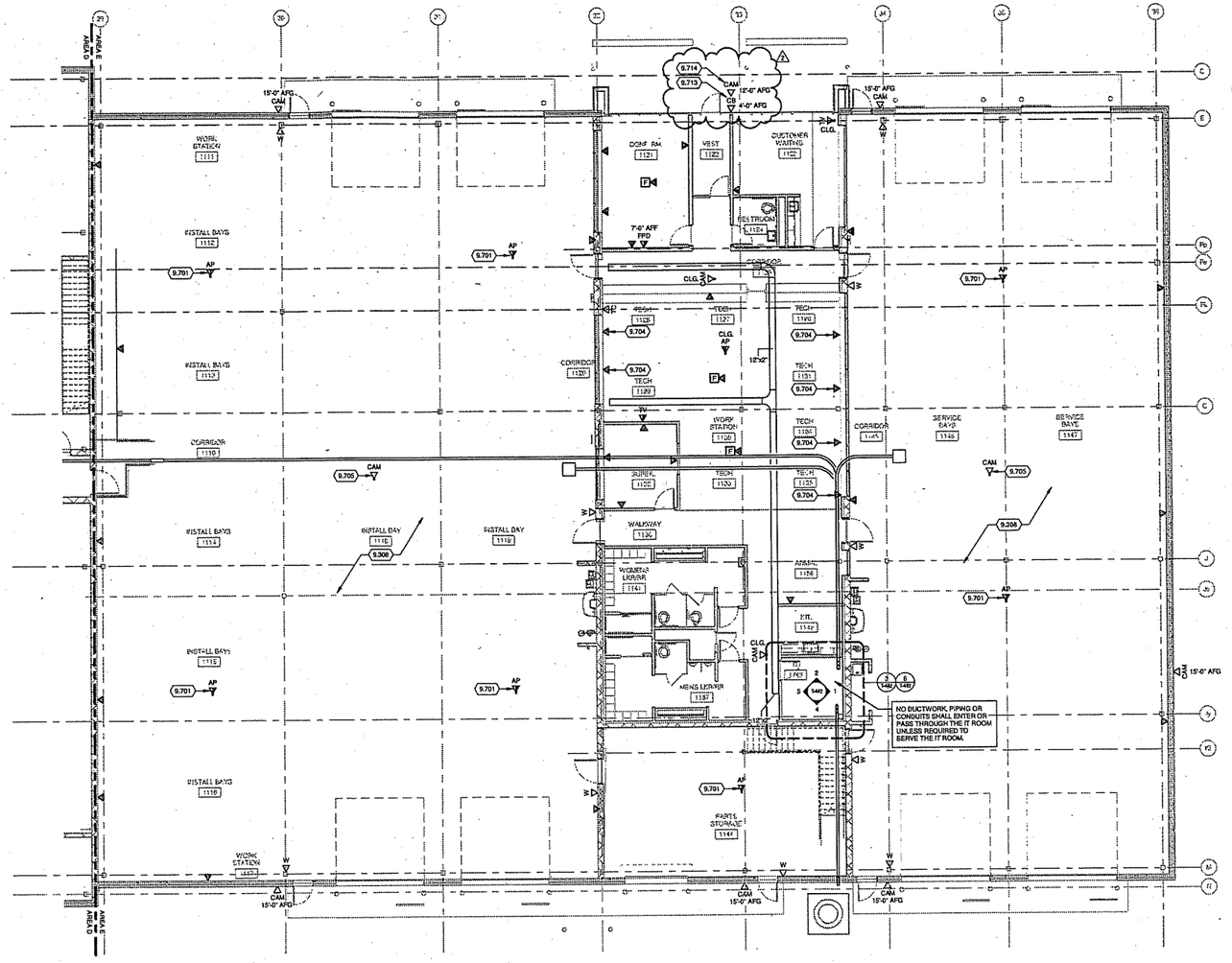
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MEZZANINE FLOOR PLANS - COMMUNICATIONS

T-106



TRUE NORTH PLAN NORTH

1 LEVEL 1 FLOOR PLAN AREA E - COMMUNICATIONS

1/8" = 1'-0"

KEYED NOTES

9.308 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR AND MORE THAN 12" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.701 MOUNT 2-GANG BACKBOX TO BOTTOM CHORD OF STRUCTURE. REFER TO 6/T-501.

9.704 REFER TO E-500 SERIES DRAWINGS FOR FURNITURE FEED DETAIL.

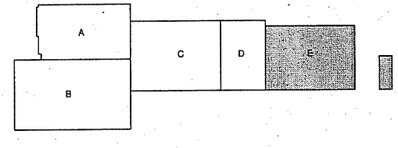
9.705 MOUNT CAMERA TELECOMMUNICATIONS OUTLET TO STRUCTURE ABOVE.

2 9.713 INSTALL CALLBOX DATA OUTLET FOR OWNER PROVIDED IP CALL BOX. INSTALL CABLES IN MULLION AND MOUNT OUTLET CENTERED AT 4'-0" AFG.

9.714 INSTALL CAMERA DATA OUTLET FOR OWNER PROVIDED IP CAMERA. INSTALL CABLES IN MULLION AND MOUNT OUTLET CENTERED AT 12'-0" AFG.

COMMUNICATIONS GENERAL NOTES:

1. REFER TO T-100 FOR ADDITIONAL INFORMATION ON PATHWAYS.
2 2. CABLE TRAY PATHWAY IS DIAGRAMMATIC ONLY. COORDINATE EXACT PATHWAY WITH OTHER DISCIPLINES PRIOR TO INSTALLATION.



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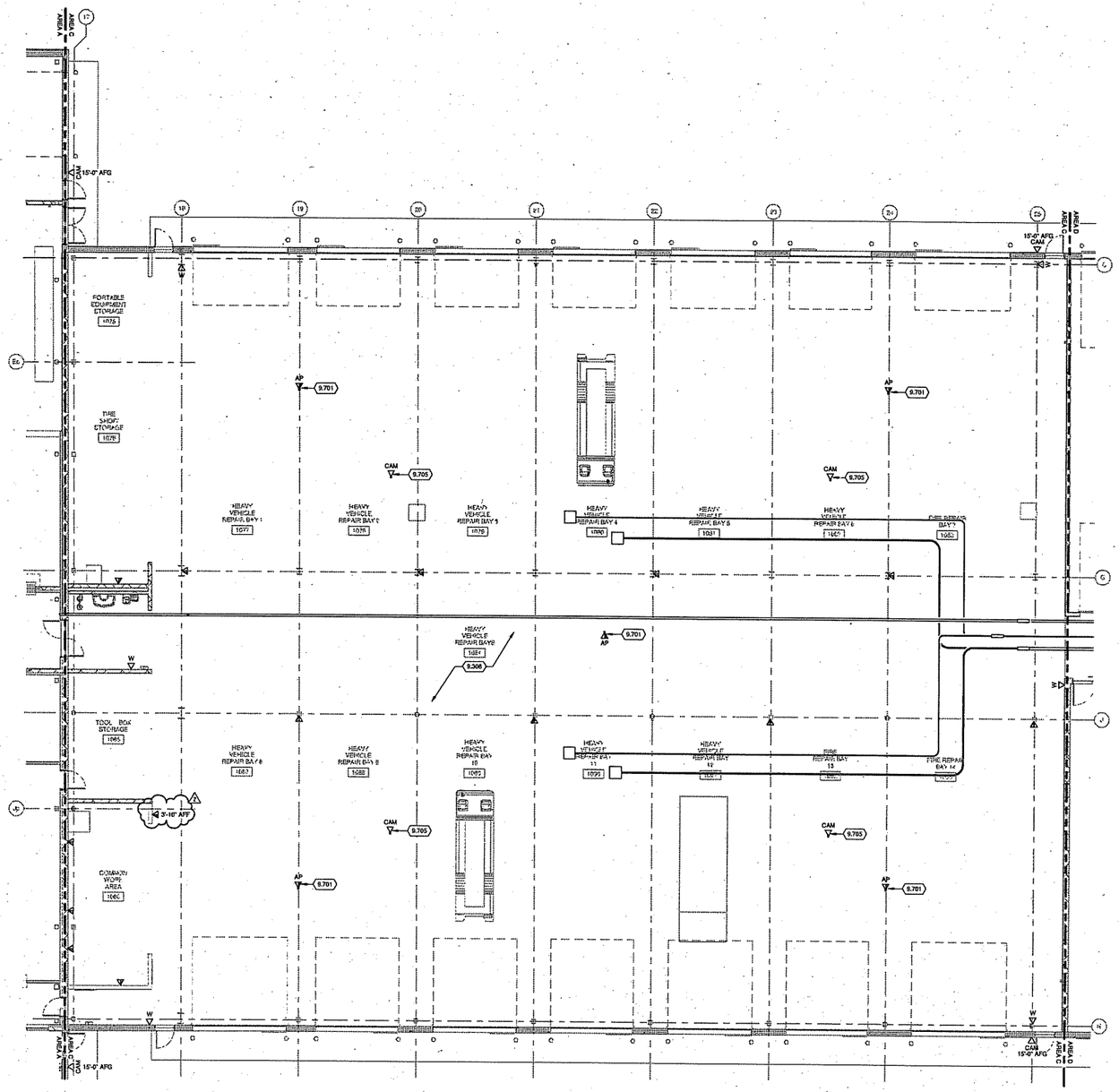
PROJECT No: 1303500-160264.01

LEVEL 1 FLOOR PLAN AREA E - COMMUNICATIONS

T-105

A ADDENDUM 2

ADDENDUM 2



TRUE NORTH / PLAN NORTH

LEVEL 1 FLOOR PLAN AREA C - COMMUNICATIONS

1/8" = 1'-0"

COMMUNICATIONS GENERAL NOTES:

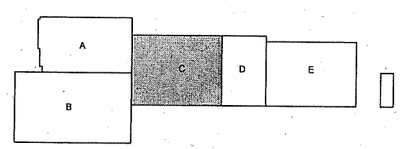
1. REFER TO T-100 FOR ADDITIONAL INFORMATION ON PATHWAYS.
2. CABLE TRAY PATHWAY IS DIAGRAMMATIC ONLY. COORDINATE EXACT PATHWAY WITH OTHER DISCIPLINES PRIOR TO INSTALLATION.

KEYED NOTES

9.306 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR AND MORE THAN 18" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.701 MOUNT 2-GANG BACKBOX TO BOTTOM CHORD OF STRUCTURE. REFER TO 8/T-501.

9.705 MOUNT CAMERA TELECOMMUNICATIONS OUTLET TO STRUCTURE ABOVE.



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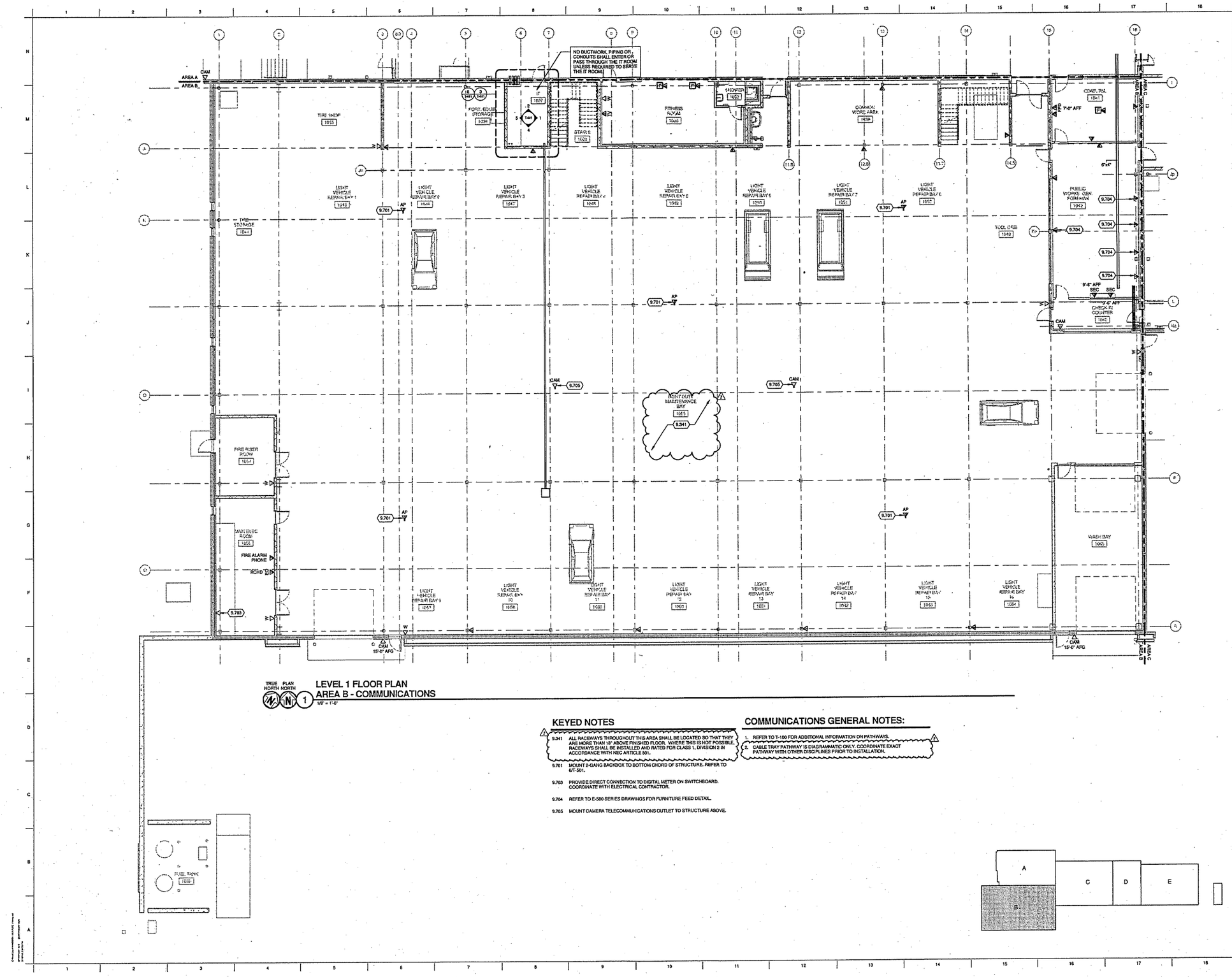
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LEVEL 1 FLOOR PLAN AREA C - COMMUNICATIONS

T-103



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA B - COMMUNICATIONS

1/8" = 1'-0"

KEYED NOTES

9.341 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.701 MOUNT 2-GANG BACKBOX TO BOTTOM CHORD OF STRUCTURE. REFER TO 6/T-501.

9.703 PROVIDE DIRECT CONNECTION TO DIGITAL METER ON SWITCHBOARD. COORDINATE WITH ELECTRICAL CONTRACTOR.

9.704 REFER TO E-500 SERIES DRAWINGS FOR FURNITURE FEED DETAIL.

9.705 MOUNT CAMERA TELECOMMUNICATIONS OUTLET TO STRUCTURE ABOVE.

COMMUNICATIONS GENERAL NOTES:

1. REFER TO T-100 FOR ADDITIONAL INFORMATION ON PATHWAYS.
2. CABLE TRAY PATHWAY IS DIAGRAMMATIC ONLY. COORDINATE EXACT PATHWAY WITH OTHER DISCIPLINES PRIOR TO INSTALLATION.

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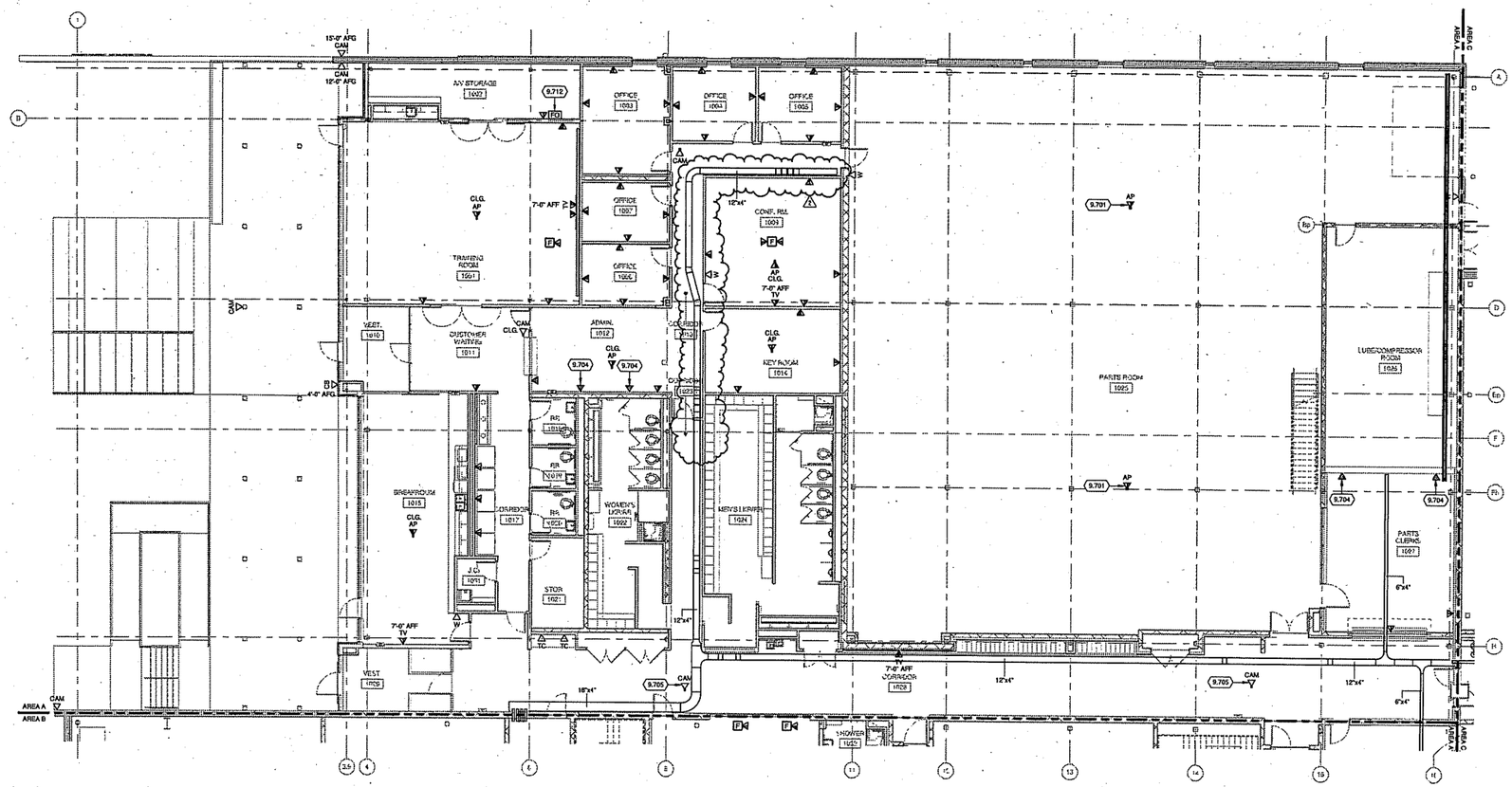
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LEVEL 1 FLOOR PLAN AREA B - COMMUNICATIONS

T-102

ADDENDUM 2



TRUE NORTH PLAN NORTH 1

LEVEL 1 FLOOR PLAN AREA A - COMMUNICATIONS

1/8" = 1'-0"

KEYED NOTES

9.701 MOUNT 2-GANG BACKBOX TO BOTTOM CHORD OF STRUCTURE. REFER TO 6/T-501.

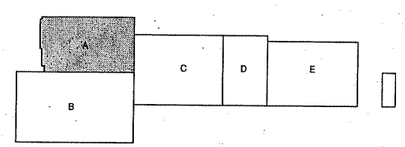
9.704 REFER TO E-500 SERIES DRAWINGS FOR FURNITURE FEED DETAIL.

9.705 MOUNT CAMERA TELECOMMUNICATIONS OUTLET TO STRUCTURE ABOVE.

9.712 PROVIDE 12-STRANDS SINGLEMODE FIBER FROM IT 1037 TO WALL-MOUNT FIBER OPTIC ENCLOSURE IN A/V STORAGE 1002 FOR FUTURE A/V CABINET.

COMMUNICATIONS GENERAL NOTES:

1. REFER TO T-100 FOR ADDITIONAL INFORMATION ON PATHWAYS.
2. CABLE TRAY PATHWAY IS DIAGRAMMATIC ONLY. COORDINATE EXACT PATHWAY WITH OTHER DISCIPLINES PRIOR TO INSTALLATION.



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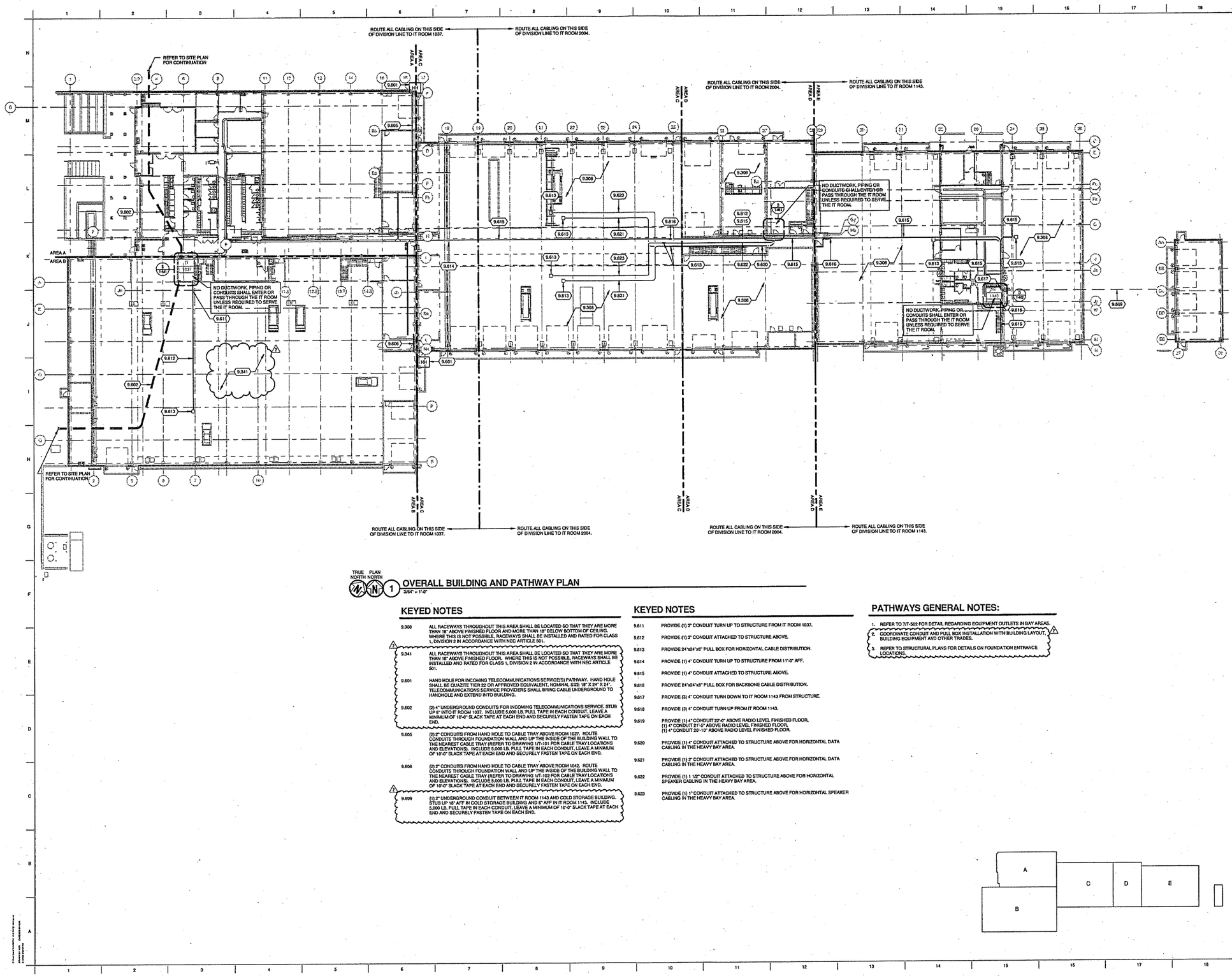
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LEVEL 1 FLOOR PLAN AREA A - COMMUNICATIONS

T-101



TRUE NORTH PLAN NORTH

1 OVERALL BUILDING AND PATHWAY PLAN

3/64" = 1'-0"

KEYED NOTES

9.308 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR AND MORE THAN 18" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.341 ALL RACEWAYS THROUGHOUT THIS AREA SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FOR CLASS 1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

9.601 HAND HOLE FOR INCOMING TELECOMMUNICATIONS SERVICE(S) PATHWAY. HAND HOLE SHALL BE QUAZITE TIER 22 OR APPROVED EQUIVALENT, NOMINAL SIZE 18" X 24" X 24". TELECOMMUNICATIONS SERVICE PROVIDERS SHALL BRING CABLE UNDERGROUND TO HANDHOLE AND EXTEND INTO BUILDING.

9.602 (2) 4" UNDERGROUND CONDUITS FOR INCOMING TELECOMMUNICATIONS SERVICE. STUB UP 6" INTO IT ROOM 1037. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.605 (2) 2" CONDUITS FROM HAND HOLE TO CABLE TRAY ABOVE ROOM 1037. ROUTE CONDUITS THROUGH FOUNDATION WALL AND UP THE INSIDE OF THE BUILDING WALL TO THE NEAREST CABLE TRAY (REFER TO DRAWING I/T-101 FOR CABLE TRAY LOCATIONS AND ELEVATIONS). INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.606 (2) 2" CONDUITS FROM HAND HOLE TO CABLE TRAY ABOVE ROOM 1043. ROUTE CONDUITS THROUGH FOUNDATION WALL AND UP THE INSIDE OF THE BUILDING WALL TO THE NEAREST CABLE TRAY (REFER TO DRAWING I/T-102 FOR CABLE TRAY LOCATIONS AND ELEVATIONS). INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.609 (1) 2" UNDERGROUND CONDUIT BETWEEN IT ROOM 1143 AND COLD STORAGE BUILDING. STUB UP 18" AFF IN COLD STORAGE BUILDING AND 6" AFF IN IT ROOM 1143. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

KEYED NOTES

9.611 PROVIDE (1) 3" CONDUIT TURN UP TO STRUCTURE FROM IT ROOM 1037.

9.612 PROVIDE (1) 3" CONDUIT ATTACHED TO STRUCTURE ABOVE.

9.613 PROVIDE 24"x24"x18" PULL BOX FOR HORIZONTAL CABLE DISTRIBUTION.

9.614 PROVIDE (1) 4" CONDUIT TURN UP TO STRUCTURE FROM 11'-0" AFF.

9.615 PROVIDE (1) 4" CONDUIT ATTACHED TO STRUCTURE ABOVE.

9.616 PROVIDE 24"x24"x18" PULL BOX FOR BACKBONE CABLE DISTRIBUTION.

9.617 PROVIDE (3) 4" CONDUIT TURN DOWN TO IT ROOM 1143 FROM STRUCTURE.

9.618 PROVIDE (3) 4" CONDUIT TURN UP FROM IT ROOM 1143.

9.619 PROVIDE (1) 4" CONDUIT 22'-0" ABOVE RADIO LEVEL FINISHED FLOOR, (1) 4" CONDUIT 21'-5" ABOVE RADIO LEVEL FINISHED FLOOR, (1) 4" CONDUIT 20'-10" ABOVE RADIO LEVEL FINISHED FLOOR.

9.620 PROVIDE (1) 4" CONDUIT ATTACHED TO STRUCTURE ABOVE FOR HORIZONTAL DATA CABLING IN THE HEAVY BAY AREA.

9.621 PROVIDE (1) 2" CONDUIT ATTACHED TO STRUCTURE ABOVE FOR HORIZONTAL DATA CABLING IN THE HEAVY BAY AREA.

9.622 PROVIDE (1) 1 1/2" CONDUIT ATTACHED TO STRUCTURE ABOVE FOR HORIZONTAL SPEAKER CABLING IN THE HEAVY BAY AREA.

9.623 PROVIDE (1) 1" CONDUIT ATTACHED TO STRUCTURE ABOVE FOR HORIZONTAL SPEAKER CABLING IN THE HEAVY BAY AREA.

PATHWAYS GENERAL NOTES:

1. REFER TO 7/T-502 FOR DETAIL REGARDING EQUIPMENT OUTLETS IN BAY AREAS.
2. COORDINATE CONDUIT AND PULL BOX INSTALLATION WITH BUILDING LAYOUT, BUILDING EQUIPMENT AND OTHER TRADES.
3. REFER TO STRUCTURAL PLANS FOR DETAILS ON FOUNDATION ENTRANCE LOCATIONS.

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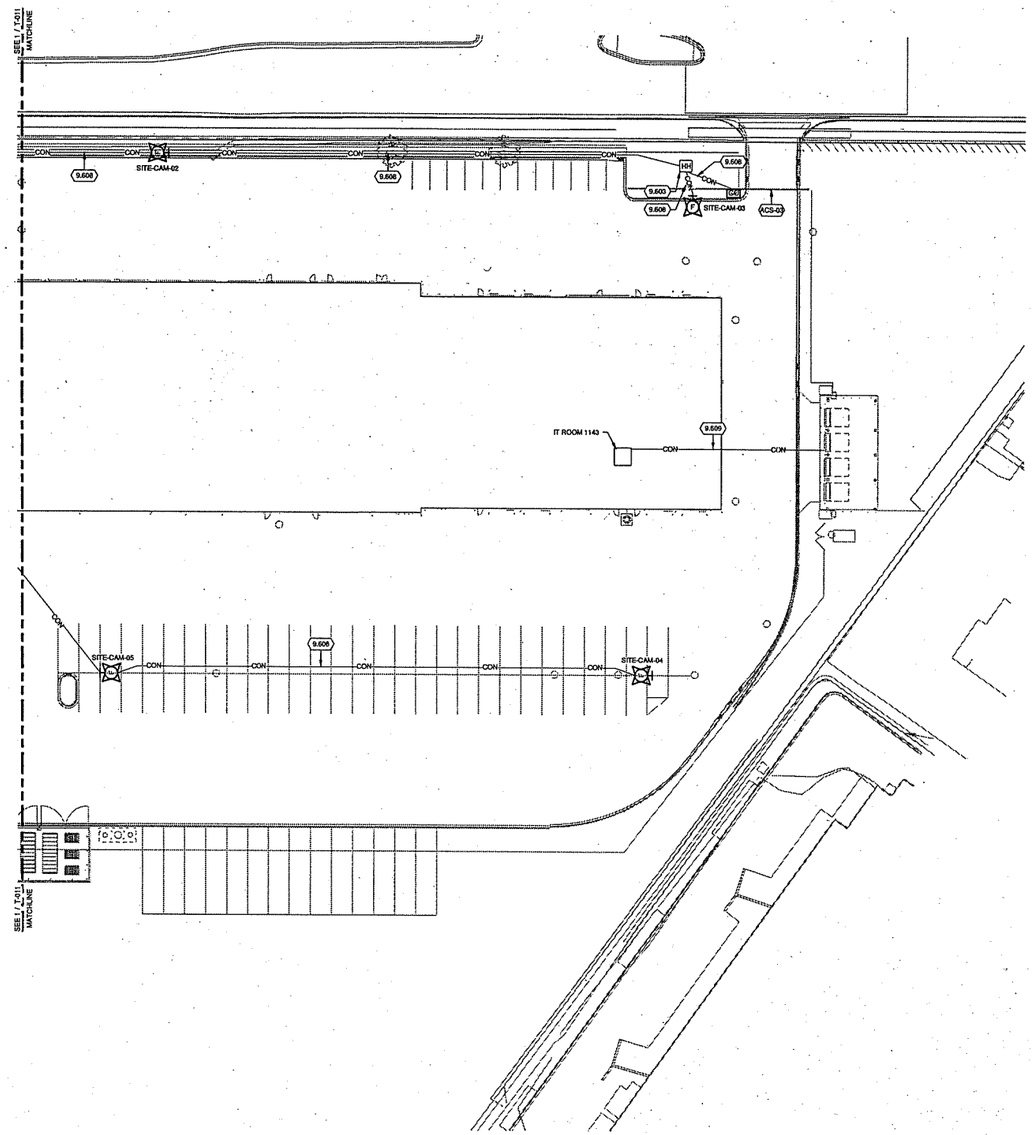
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OVERALL BUILDING PLAN

T-100



TRUE NORTH PLAN NORTH

1 TECHNOLOGY SYSTEMS SITE PLAN - EAST
1" = 30'-0"

TECHNOLOGY SYSTEMS GENERAL NOTES:

1. MOUNT SECURITY CAMERAS AND CAMERA TELECOMMUNICATIONS OUTLETS TO LIGHT POLES AT A HEIGHT OF 15'-0" AFG UNLESS NOTED OTHERWISE. REFER TO 107-360, T-401, AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
2. REFER TO T-100 FOR CONTINUATION OF PATHWAYS INSIDE BUILDING.
3. INSTALL GALVANIZED RIGID CONDUIT (GRC) UNDER ANY ROADWAY. GRC SHALL EXTEND 5 FEET BEYOND EACH SIDE OF ROADWAY BEFORE CONVERTING TO PVC. SEE ELECTRICAL SPECIFICATIONS FOR DETAILS.
4. COORDINATE CONDUIT AND PULL BOX INSTALLATION WITH BUILDING LAYOUT, BUILDING EQUIPMENT AND OTHER TRADES. 1
5. REFER TO STRUCTURAL PLANS FOR DETAILS ON FOUNDATION ENTRANCE LOCATIONS.

KEYED NOTES

9.603 HAND HOLE FOR EXTERIOR UNDERGROUND TELECOMMUNICATIONS / SECURITY SYSTEM PATHWAYS. HAND HOLE SHALL BE QUAZITE TIER 15 OR APPROVED EQUIVALENT, NOMINAL SIZE 12" X 18" X 24".

9.608 (1) 2" UNDERGROUND CONDUIT BETWEEN HAND HOLES AND FROM HAND HOLES TO CAMERA POLES. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END.

9.609 (1) 2" UNDERGROUND CONDUIT BETWEEN IT ROOM 1143 AND COLD STORAGE BUILDING. STUB UP 18" AFF IN COLD STORAGE BUILDING AND 6" AFF IN IT ROOM 1143. INCLUDE 5,000 LB. PULL TAPE IN EACH CONDUIT, LEAVE A MINIMUM OF 10'-0" SLACK TAPE AT EACH END AND SECURELY FASTEN TAPE ON EACH END. 1

ACS-03 PERIMETER ACCESS-CONTROLLED GATE. REFER TO SCHEDULE ON T-602.

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TECHNOLOGY SYSTEMS
SITE PLAN - EAST

T-012

ADDENDUM 2

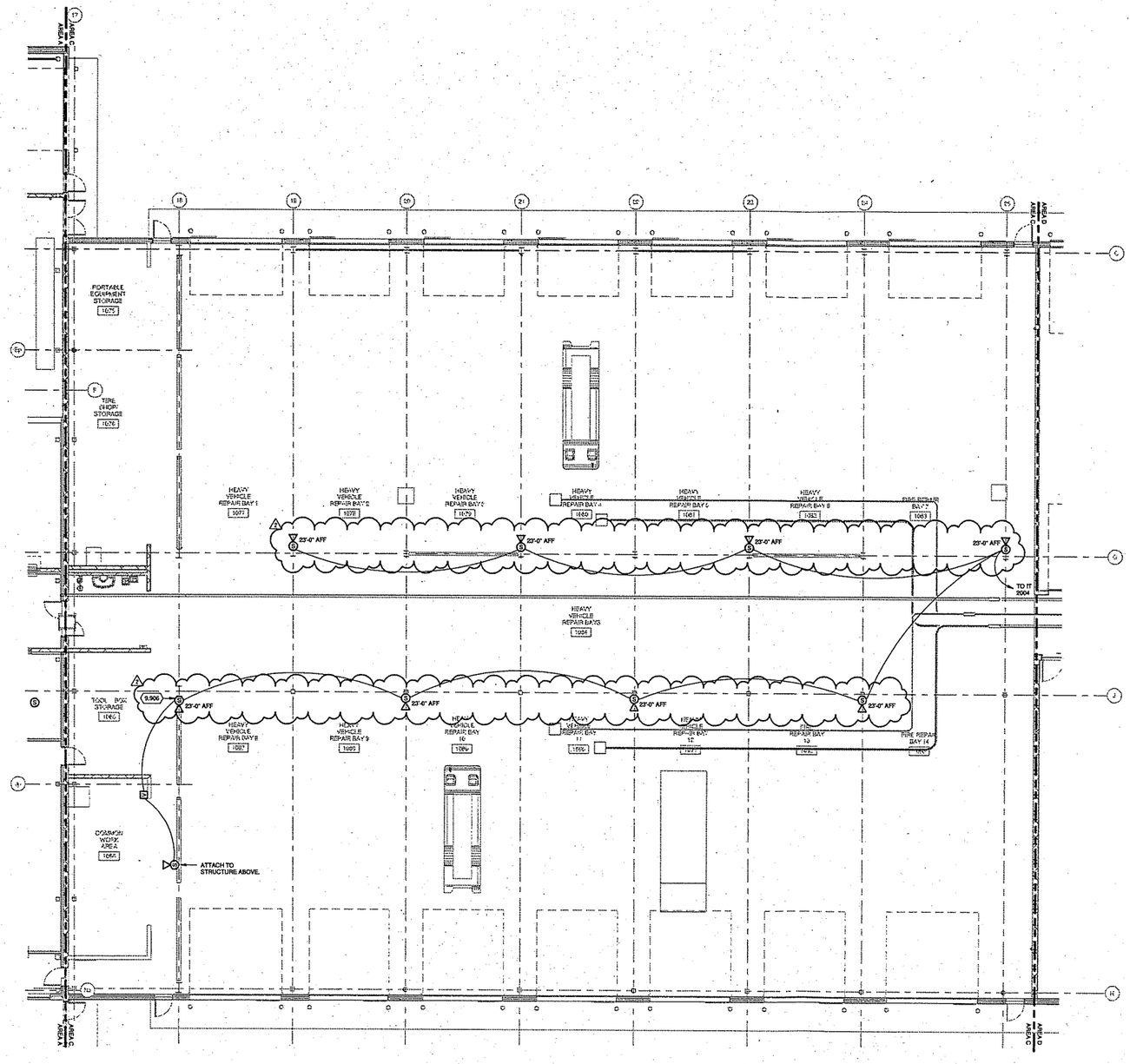
ADDENDUM 2

AUDIO/VISUAL GENERAL NOTES:

1. SEE KEY PLAN ON SHEET FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 10'-0" AFF UNLESS NOTED OTHERWISE.

KEYED NOTES

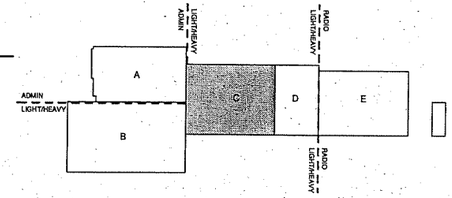
9.906 MOUNT HORN TYPE SPEAKER TO SIDE WALL



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA C - AUDIO/VISUAL

1/8" = 1'-0"



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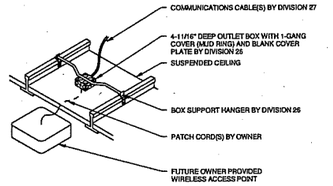
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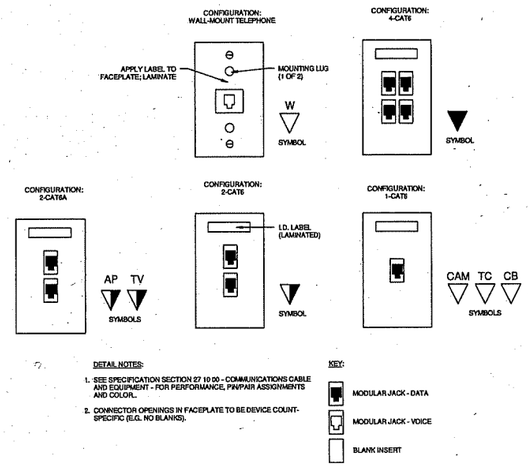
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LEVEL 1 FLOOR PLAN AREA C - AUDIO/VISUAL

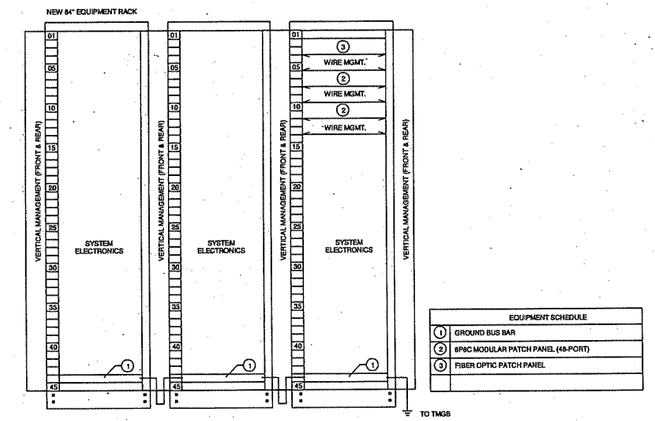
T-143



7 WAP - CEILING MOUNT
NO SCALE



4 TO LAYOUTS
NO SCALE

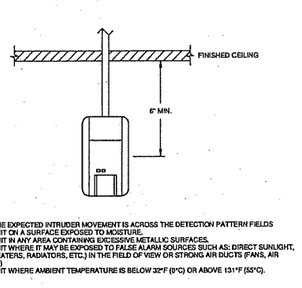


1 ROOM 1037 RACK LAYOUT
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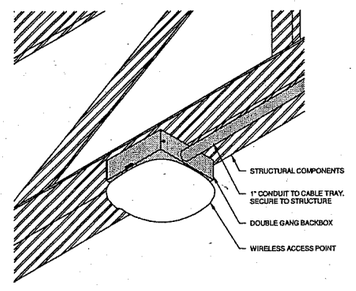
8 SURFACE MOUNTED KEYPAD DEVICE
NO SCALE

5 TMGB
NO SCALE

2 ROOM 1143 RACK LAYOUT
NO SCALE



9 SURFACE MOUNTED INFRARED MOTION DETECTOR
NO SCALE



6 WAP - PENDANT MOUNT
NO SCALE

3 ROOM 2004 RACK LAYOUT
NO SCALE

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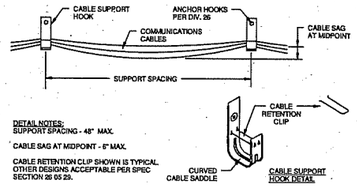
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DETAILS

T-501



DETAIL NOTES:
SUPPORT SPACING - 48" MAX.

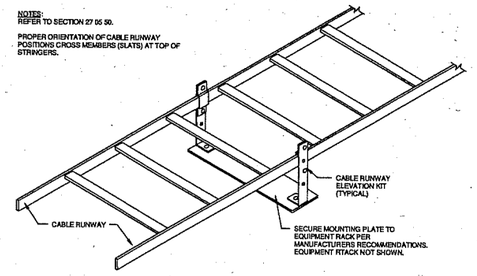
CABLE SAG AT MIDPOINT - 6" MAX.

CABLE RETENTION CLIP SHOWN IS TYPICAL. OTHER DESIGNS ACCEPTABLE PER SPEC SECTION 26 05 29.

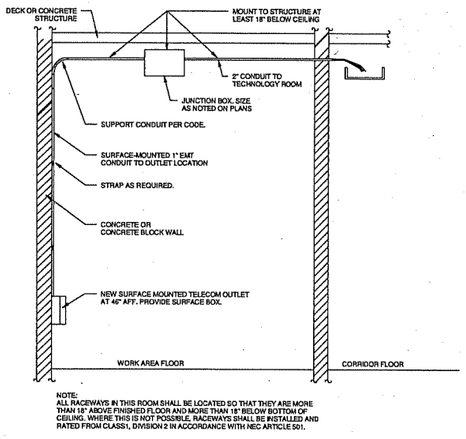
4 TO PATHWAY - J-HOOKS
NO SCALE

NOTES:
REFER TO SECTION 27 05 50.

PROPER ORIENTATION OF CABLE RUNWAY POSITIONS CROSS MEMBERS (SLATS) AT TOP OF STRINGERS.

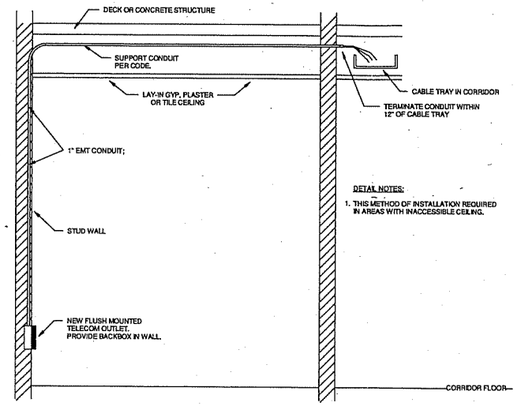


1 CABLE RUNWAY/RACK
NO SCALE



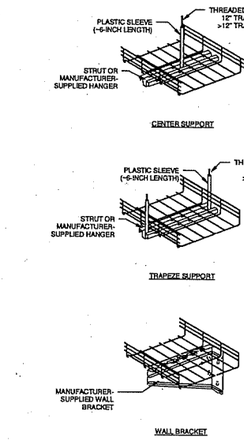
NOTE:
ALL RACEWAYS IN THIS ROOM SHALL BE LOCATED SO THAT THEY ARE MORE THAN 18" ABOVE FINISHED FLOOR AND MORE THAN 18" BELOW BOTTOM OF CEILING. WHERE THIS IS NOT POSSIBLE, RACEWAYS SHALL BE INSTALLED AND RATED FROM CLASS1, DIVISION 2 IN ACCORDANCE WITH NEC ARTICLE 501.

7 TO PATHWAY - BAY OUTLETS
NO SCALE



DETAIL NOTES:
1. THIS METHOD OF INSTALLATION REQUIRED IN AREAS WITH INACCESSIBLE CEILING.

5 TO PATHWAY - FLUSH - CONDUIT TRAY
NO SCALE



CABLE TRAY DETAIL GENERAL NOTES:

REFER TO SPECIFICATION SECTION 26 05 36 FOR TRAY SPACING AND OTHER INSTALLATION REQUIREMENTS.

SEE PLAN DRAWINGS FOR WIDTH(S) AND DEPTH(S).

ANCHOR THREADED ROD TO STEEL WITH BEAM CLAMPS OR USING STEEL DROP-IN ANCHORS. PLASTIC OR LEAD TYPE ANCHORS ARE NOT APPROVED.

COORDINATE WITH OTHER TRADES TO MAINTAIN CLEARANCE OF ONE (1) FOOT ON BOTH SIDES OF THE TRAY AND EIGHT (8) INCHES ABOVE TOP OF THE TRAY.

PROVIDE ALL ANGLES, TEE'S, CROSSES, SPLICES, ACCESSORIES, ETC. AS REQUIRED.

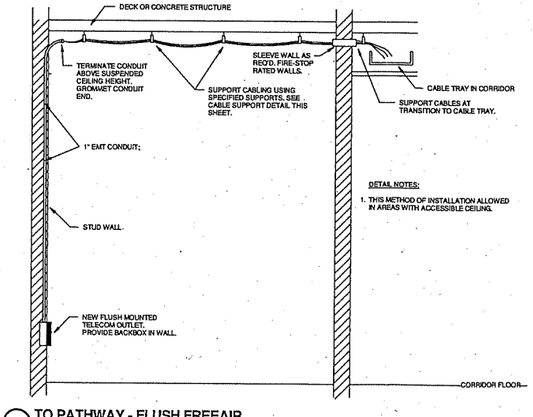
PROVIDE OFFSETS AS REQUIRED TO CHANGE ELEVATIONS AS OBSTRUCTIONS DICTATE. WHERE CABLE TRAY CONTINUITY CANNOT BE MAINTAINED, PROVIDE STRAP BONDED TO ADJACENT TRAY SECTIONS.

MAINTAIN MINIMUM SEPARATION DISTANCES FROM <480V POWER LINES AS FOLLOWS:
12" FROM POWER LINES OF <5-KVA
18" FROM HIGH VOLTAGE LIGHTING (INCL. FLUORESCENT)
39" FROM POWER LINES OF 5-KVA OR GREATER
39" FROM TRANSFORMERS AND MOTORS.

PROVIDE RADIUSED DROP-OUT AT LOCATIONS WHERE CABLE EXITS THE TRAY.

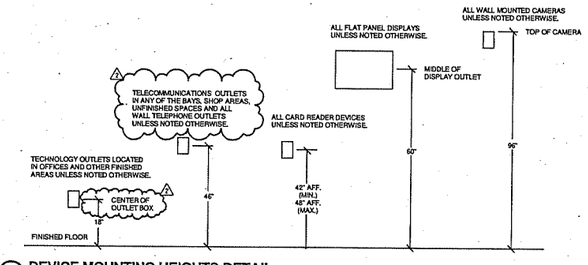
CENTER SUPPORT SHALL ONLY BE USED ON TRAY WITH 6" WIDTH AND LESS.

2 CABLE TRAY
NO SCALE



DETAIL NOTES:
1. THIS METHOD OF INSTALLATION ALLOWED IN AREAS WITH ACCESSIBLE CEILING.

6 TO PATHWAY - FLUSH FREEAIR
NO SCALE



3 DEVICE MOUNTING HEIGHTS DETAIL
NO SCALE

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 280 7679 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

ADDENDUM 2

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 1303500-160264.01

DETAILS

T-502

Department of Public Works
Engineering Division
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engineering@cityofmadison.com
cityofmadison.com/engineering

Deputy City Engineer
Gregory T. Fries , P.E.
Deputy Division Manager
Kathleen M. Cryan
Principal Engineer 2
Christopher J. Petykowski, P.E.
John S. Fahrney , P.E.
Principal Engineer 1
Christina M. Bachmann, P.E.
Mark D. Moder, P.E.
Janet Schmidt, P.E.
Facilities & Sustainability
Jeanne E. Hoffman, Manager
Bryan Cooper, Principal Architect
Mapping Section Manager
Eric T. Pederson, P.S.
Financial Manager
Steven B. Danner-Rivers

March 15, 2019

NOTICE OF ADDENDUM
ADDENDUM NO. 3

CONTRACT NO. 7528, PROJECT NO. 10305
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

This addendum consists of the following documents:

- **Reponses to Bidders Questions in Section 2**
- **Acceptable Equivalents in Section 3**
- **Specification changes outlined in Section 4**
- **Drawings changes as detailed in Section 5**
- **190228 Pre Bid Meeting Minutes and an Exhibit in Section 7**

1. **GENERAL CONTRACT CONDITIONS**
   No Change

2. **GENERAL QUESTIONS AND ANSWERS**
   Q1: Can Advanced Precast Company (APC) be added to manufacturer list in SECTION 03 45 00 PRECAST ARCHITECTURAL CONCRETE?
   A1: Specification does not limit to listed manufacturer. Qualified manufacturers not listed are welcome to bid on the project.

   Q2: Project includes demolition and renovation work on a former existing building. Regardless of whether asbestos is present, or whether the scope of work includes asbestos removal, State and Federal law requires a survey for Asbestos Containing Materials (ACM) and Presumed Asbestos Containing Materials (PACM) be completed in accordance with DNR and OSHA requirements. A completed survey report number must be listed on the permit application submitted to the DNR (DNR Notification Form # 4500-113) prior to any demolition. This report can take (30) days or longer to complete and as such may impact the project schedule. Please clarify if this survey has

been completed. If not, please indicate whether the Owner will commission said survey or if the bidding contractors will be required to provide by including costs in their bids.

A2: The former Cub Foods building shell and core above the concrete slab was demolished by the City as a separate project in 2016. Asbestos removal and demolition of the shell and core occurred at that time. It will not be necessary to apply to the DNR for a permit for removal of the existing slab on grade and the building foundation. The DNR Notification Form #4500-113 will not be required. A copy of the asbestos completion letter with the DNR asbestos abatement notification and asbestos notification summary for the asbestos removal work in 2016 is attached to this addendum for reference.

Q3: Can proR pre-assembled duct and fittings with internal duct insulation be substituted for the product material specified in 23 07 13 DUCT INSULATION.

A3: No. The product is not an equivalent substitution.

Q4: Please provide what BL-X is required in conference room 1041 on sheet A105.

A4: Per A-104, the borrowed lite being referred to is BL-12.

Q5: Sheet A-104 – Enlarged Plan note #9 states to include Corner Guards at all gypsum corners. Is that to include column corners in offices as well as corners at casework recesses like in Training Room 1001?

A5: Corner guards to be provided at all outside gypsum corner. Corner guards are not to be provided on outside corners of exposed columns.

Q6: Detail A14/A516, does this angle need to be continuous or can this be designed by the precast supplier?

A6: Per detail A14/A-516, this angle should be continuous.

Q7: Detail E14/A516, does this steel plate need to be continuous or can this be designed by the precast supplier

A7: Per detail E14/A-516, this angle should be continuous.

Q8: Sheet A104, the masonry wall between room 1003 and 1007 needs a wall tag. One is shown but no tag is indicated. Please provide.

A8: This is a 7 5/8" CMU wall with 2 1/2" metal studs and 5/8" gypsum wallboard on both sides. Shallow electrical boxes shall be provided.

Q9: Keynote 19 on sheet A-121 calls out a ladder with metal cage. Our understanding of the revised OSHA fixed ladder rules is that caged ladders are no longer required or acceptable as a fall prevention device. Please advise if a caged ladder is still required.

A9: Provide metal cage at all roof ladders.

Q10: Water repellent specification calls to spray all concrete surfaces. Please confirm all precast and concrete above grade is to be sprayed with water repellent.

A10: Only exposed, unpainted concrete and masonry surfaces are to receive water repellent coating in compliance with Specification Section 071900.

Q11:Water repellent in mortar and grout is called out in the unit masonry specification. None of the block is exposed to weather or grout. Please confirm locations on where this is required.
A11: Only exposed, unpainted concrete and masonry surfaces are to receive water repellent coating in compliance with Specification Section 071900.

Q12:Sheet A104, is it intended for the masonry wall from column line 12 to column line 15 go to the bottom of the structure or stop at the bottom of mechanical mezzanine?
A12: As shown in detail A12 on sheet A-310, the CMU wall between column line 12 and 15 goes to underside of metal deck.

Q13:Sheet A001 general note 29 mentions fireproofing. After reviewing all the plans no fireproofing is called out or shown. If there is fireproofing on the project, please indication locations and provide specs.
A13: Fireproofing is not required. However, provide fire stopping or sealant where indicated on specification 07 84 43 Penetration Firestopping.

Q14:Based on the soil conditions found in the soil's report, scaffold, cranes and other equipment needed to construct the building will need support. Please clarify if a construction road around the building would be acceptable.
A14: This is means and method.

Q15:Is it necessary to provide a weather barrier between the decorative panels and the precast (example G1/A511)? No barrier is called out, but one is shown on H13/A511. On A6 and I6 on sheet A511 doesn't show or call out any barrier behind the metal wall panels.
A15: No weather barrier is required between the precast and decorative wall panels. No weather barrier is required at any of the precast walls.

Q16:On G1/A511, the weather barrier does not go to the full height of the building, is this the intent to stop mid-way through the panel?
A16:See answer to Q15 above.

Q17: No air barrier is called out on the drawings, but a spec is provided. Please indicate locations.
A17:An A.I.B. (air infiltration barrier), in compliance with Specification Section 072500, is required on the outside face of sheathing on all exterior walls that are not precast, concrete finish.

Q18:There is a waterproof membrane called out in several locations above grade on metal studs. See A1/A511. What produce is this?
A18:This is an A.I.B. in compliance with Specification Section 072500.

Q19:Detail A1 on A512 calls out vapor barrier at the soffit while J12/A512 calls out waterproof membrane at the soffit. Please clarify which is correct. Also, if the vapor barrier is correct, is this weather barrier (Tyvek) or air and vapor barrier?
A19: All soffits require continuous A.I.B. in compliance with Specification Section 072500. This is only an air barrier.

Q20:Detail H13/A511 displays two different weights for a barrier system on the soffit and on the wall. Please clarify is this is a single product or two different products and what they are.
A20:This is a single product for all soffits and wall locations. No weights are called out on the drawings. For A.I.B. product specifics, refer to Specification Section 072500. Refer to answer 17.a. above for precast concrete walls.

Q21:There is no consistency in the thermal properties. On A7/A512 calls for a waterproof membrane. On A1/A511 that's also a waterproof membrane. Then on G1/A511 calls for a weather barrier. Which one is correct?
A21: Vertical walls and soffits require an A.I.B. on the exterior face of sheathing in compliance with Specification Section 072500. Horizontal roof surfaces require a vapor retarder in compliance with Specification Section 074113.16 Standing Seam Metal Roof or 075323 EPDM Roofing.

Q22: The specifications call for a Hubbell/Mohawk solution for the voice data portion. Not all bidders are able to supply a warranty for that system. Is a Panduit/General Solution would be acceptable? Please advise.
A22: No. The product is not an equivalent substitution.

Q23: On A200, Conc-2 calls for a Dunn Edwards manufacturer on the exterior materials schedule. Please confirm manufacturer?
A23: Dunn Edwards.

Q24: Dunn Edwards is not a readily available paint in WI. Please advise as to a match for Sherwin Williams, Hallman Lindsay, etc. as these are local paint manufacturers.
A24: Dunn Edwards or approved equal.

Q25: Sheets A-104 & A-722 – All the lockers shown on A-104 are noted to be 'Not In Contract' but A-722 appears to show an integral wood bench at the two locker rooms. Who furnishes and installs the wood bench?
A25: Locker benches, built in or not, shall be contractor furnished and installed.

Q26: Sheets A-104 & A-722 – All the lockers shown on A-104 are noted to be 'Not In Contract' but A-722 appears to show an integral wood bench at the two locker rooms. Who furnishes and installs the wood bench?
A26: Locker benches, built in or not, shall be contractor furnished and installed.

Q27: Sheets A-106 & A-534 – Is there a spec already provided we are to reference in regards to the Welded Wire Mesh fence enclosure at Tool Box Storage 1085?
A27: In specification. Refer to Addendum 2.

Q28: Sheets A-121 & A-200 series – Can exterior elevations be provided for the three remaining faces of roof and wall at the two sloped roof systems above the Office spaces 1001-1024 and Parts Room 1025? Needed to confirm scope of metal siding and related tie-ins.
A28: Refer to building sections for elevations not seen on elevation drawings.

Q29: Addenda 2, Sheet A104 calls for a free-standing copier. Is this being owner furnished owner installed? Answer: All free-standing copiers to be owner furnished, owner installed?
A29: Copier NIC.

Q30: Specification section 04 20 00 – unit masonry assemblies. 2.2 brick is called out. Please provide locations. Answer: There is no brick in this project?
A30: There is no brick in the project.

Q31: Question: Please confirm the radio communication tower is not part of this project. Contractor is only to provide structural concrete base.
Q31: Radio Tower NIC.

Q32: Regarding the Fire Test Pit on A1/AS003, where are the specifications for this item?
A32: Specification will not be provided. Refer to notes under detail.

Q33: Regarding the Fire Test Pit on A1/AS003, please confirm no insulation or waterproofing is required around the enclosure?
A33: Refer to notes in detail.

Q34: Regarding the Fire Test Pit on A1/AS003, is there any granular fill required under the slab?
A34: Provide 6" base course under the slab.

Q35: Regarding the Fire Test Pit on A1/AS003, what are the requirements for the removable wood plank?
A35: A metal u or c-channel anchored to concrete wall for oak wood slats to allow removal of slats at an angle from bottom up. Purpose of wood baffle is to control turbulence of water.

Q36: Regarding the Fire Test Pit on A1/AS003, is the manhole covered required to be provided by the site utility specification?
A36: Owner furnished, contractor installed.

Q37: Regarding the Fire Test Pit on A1/AS003, please confirm no site utilities are needed for this equipment. No sanitary or storm is attached to this tank.
A37: Yes. Portable pump will be used to remove clean water out of pit.

A38: Regarding the Fire Test Pit on A1/AS003, please confirm the contractor is required to design the test pit. A design has been provided on the drawing already.
A38: Removed note 3 in detail A1/AS-003.

Q39. Are there any other mechanical or electrical hookups needed for Fire Test Pit on A1/AS-003?
A39: No mechanical hookups. Provide surface mounted disconnect switch on trash enclosure wall next to pit. Power will be required for pumps, however requirements will need to be coordinated during construction.

Q40: Specification Section 06 10 53 – Miscellaneous Rough Carpentry paragraph 2.5.A describes Equipment Backing Panels, where are these to be located? None of the Electrical or IT Rooms show any panels
A40: Incoming telephone and/or cable service will require backing panels.

Q41: Specification Section 06 10 53 – Miscellaneous Rough Carpentry paragraph 2.5.D describes Rooftop Equipment Blocking which is also detailed on Plan Sheet A-515, details H5 and H10. The only rooftop units appear to be in Area A and doesn't call out any details for blocking, Mechanical drawings don't show anything either.
A41: Blocking for RTU shall be used if/when required as a means and method. Paragraph in specification shall remain.

Q42: Delegated design is called out throughout the specifications. Please provide full clarification of the requirements of the delegated design (hire a separate PE to confirm design. a. 03 45 00 – Architectural Precast b. 05 51 13 – Metal Pan Stairs c. 05 52 13 – Pipe and Tube Railings d. 07 42 13.33 – Metal Wall Panels for Transpired Solar Collections (2 designs). e. 10 14 26 – Post and Panel/Plyon Signage f. 21 90 00 – fire suppression g. 23 05 29 – hanger and supports.
A42: Professional Engineer responsible for the preparation of the submittals shall sign and seal document. Requirements for the design and submittal for delegated design are outlined in each specs. Trapeze hangers requires oversight by PE for hanging multiple pipes due to weight for large pipes. Contractor has the option not to use trapeze hangers on the project.

Q43: Spec. 07 95 13.13, Sheet A-106 & S-131C – Spec section 07 95 13.13 calls for Interior Expansion Joint Assemblies. Can we get clarification on A-106 & S-131C or others where they should be accounted for and whether there's a concrete floor detail that should be followed to receive the assemblies along Grid Line 17? Will a Wall to Floor assembly be required?
A44: Refer to structure drawings in Addendum 2 for location of expansion joint indicated with heavy dashed line. Expansion joint is located where Area A/B separate C. Floor, wall, and roof details are provided in the architectural drawings.

Q45: Detail 4 on S-551 shows an angle edge condition on the exterior wall and no edge condition on the interior edge. Is this correct? If not please indicate the desired edge condition here.
A45: No edge angle is required on line B.

Q46: Detail 11/S501, please confirm this detail is only typical at the actual openings and the panels on either side of the opening are to be continuous from footing to top of wall like 8/S501.
A46: Detail 11/S-551 is applicable only at openings. Detail 8/S-551 is typical at locations without openings.

Q47: We are assuming strip footing SF1.5 occurs at all stoops. Please confirm.
A47: Detail 11/S-501 applies to all stoops. Detail 11/S-501 requires SF1.5.

Q48: We are assuming strip footing SF1.5 occurs at all stoops. Please confirm.
A48: Detail 11/S-501 applies to all stoops. Detail 11/S-501 requires SF1.5.

Q49: Spec. 05 12 00 – Will the Fabricator's AISC Certification requirement be waived to allow for manufacturers that show a reasonable proof of history and level of experience?
A49: Requirement will not be waived.

Q50: For the metal roof deck are powder-actuated fasteners or puddle welds an acceptable alternative to the #12 screws called out on the drawings?
A50: Powder-actuated fasteners and puddle weld substitutions will be evaluated and accepted if shown to be of equivalent deck shear strength and stiffness.

Q51: Please provide the manufacturer and model number for all existing equipment being relocated that is identified is specification 11 11 40.A26: Reel are identified in Sheet QS -101C and equipment id is 7781.
A51: Reference attached data and cut sheet.

Q52: Please confirm that the (4) unidentified reel banks (North side of building) depicted on drawing Q- 101C are part number 7780.
A52: Reel are identified in Sheet QS -101C and equipment id is 7781.

Q53: Conflicting information regarding the air compressors. Specs reference to relocate two compressor and bid one compressor. Prints show four compressors on the plans. One each in: Light Duty, Heavy Duty, Body Shop, and Radio Shop. Please clarify.
A53: There are two new compressors both with ID: 2161 located in Lube / Compressor room. The other two compressors ID: 21611 and ID: 21612 are to be relocated.

Q54: Are Challenger and Omer acceptable manufactures for new lifts?
A54: What was submitted was not a substitution request, but an approved as equal request. The specifications note that "Alternate manufacturers: Contingent upon compliance with these specifications and documentation requirements set forth in Submittals, equipment produced by other manufacturer's may be considered as equal." During the formal submittal process we review the documents to ensure compliance with the specifications, but in this case, this is not a formal submittal from the Contractor. Without a full set shop drawings and product data, at this time we cannot say that they would meet the specifications.

3. **ACCEPTABLE EQUIVALENTS**
   A. XeteX Custom AHU Manufacturer for air-handling units is an acceptable product that may be incorporated into the Work.

4. **SPECIFICATIONS**
   A. **MODIFIED** 03 30 00 – CAST IN PLACE CONCRETE (Spec not attached)
      a. REVISE – 2.12.A Section header to be "Footings, Grade beams, Foundation Walls, Piers"

b. ADD - 3.7.G, F(F)45/F(L)35 in Corridors 1023, 1028, and 1136 where called out in finished schedule to be polished concrete.

B. **MODIFIED** 03 35 43 POLISHED CONCRETE FINISH (Spec not attached)
   a. REVISE - Paragraph 3.1A to "Polish: Level 3, Class A Aggregate Exposure."

C. **MODIFIED** 05 12 00 – STRUCTURAL STEEL (Spec not attached)
   a. ADD – Section 1.4.A.6: Connection Design: Provide final substantiating connection information in the form of calculations or a letter of certification. Whichever is submitted shall be signed and sealed from the licensed professional engineer in responsible charge of the connection design. Provide a means by which the substantiating connection information is referenced to the related connections on the shop and erection drawings for purpose of review.

D. **MODIFIED** 05 31 00 – STEEL DECKING (Spec not attached)
   a. DELETE – Section 3.4.B.1.

E. **MODIFIED** 07 21 00 – THERMAL INSULATION
   a. REVISE – Section 2.4

F. **MODIFIED** 07 25 00 – WEATHER BARRIERS
   a. Various sections revised

G. **MODIFIED** 10 11 16.13 – FIXED MARKER BOARDS
   a. ADD – Section 2.5 Tackboard Panels.

H. **MODIFIED** 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC
   a. ADD – Procedure for CNG Ventilation.

I. **MODIFIED** 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC
   a. ADD – Current Sensors product data.

J. **MODIFIED** 23 83 16 - RADIANT-HEATING HYDRONIC PIPING
   a. ADD – Custom Radiant Panel Enclosure product data.

A. **MODIFIED** 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
   a. DELETE - Article 3.3.C in its entirety.
   b. DELETE - Article 3.3.I.1 in its entirety.
   c. DELETE - Article 3.3.J in its entirety.

K. **MODIFIED** 26 31 00 - PHOTOVOLTAIC SYSTEM PERFORMANCE REQUIREMENTS (Spec not attached)
   a. REVISE – Article 2.1.C.4.g to be "DC to AC size Ratio: 1.2".

L. **MODIFIED** 26 31 11 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM (Spec not attached)
   a. ADD "Gamewell-FCI by Honeywell" as an acceptable manufacturer under Article 2.1.A.

M. **MODIFIED** 26 51 00 - INTERIOR LIGHTING (Spec not attached)
   a. REVISE – Warranty period for the interior LED light fixtures in paragraph 1.8.A. item1 to read as follows: min of Five (5) years from the date of substantial completion, unless ten (10) years warranties are listed as standard by the fixture manufacturer.

N. **MODIFIED** 26 56 00 - EXTERIOR LIGHTING (Spec not attached)
   a. REVISE - warranty period for the exterior LED luminaires in paragraph 1.7.A. items 1, 2 and 3 to read as follows: min of Five (5) years from the date of Substantial completion for LED Luminaries, Meal Corrosion and Color Retention.

O. **MODIFIED** 31 32 19, GEOTEXTILES, PART 2 – MATERIALS
   a. REPLACE - paragraph 2.1.B in its entirety with the following: "B. Geotextile, if needed, below base course shall be Mirafi 600X, or equal."

P. **MODIFIED** 32 11 00, AGGREGATE BASE COURSE, PART 2 – MATERIALS
   a. REPLACE - paragraph 2.1.A in its entirety with the following: "A. Aggregate for base course shall meet the requirements of Article 401 - Crushed Aggregate Base Course of the City of Madison Standard Specifications for Public Works Construction, Latest Edition."
   b. REPLACE - paragraph 2.1.B in its entirety with the following: "B. Base Course shall be uniformly graded and shall conform to Article 401.1(b). The 6-inch lower layer shall be Gradation 1 and the 6-inch upper layer shall be Gradation 2."

Q. **MODIFIED** 32 11 26, HOT MIX ASPHALT PAVING, PART 2 – MATERIALS
   a. REPLACE - paragraph 2.1.A in its entirety with the following: "A. Asphaltic mix shall be MT 58-28 H for both the lower layer and upper layer for all asphalt areas, except for the 41-stall employee parking lot near the western detention basin, where the asphalt mix shall be LT 58-28 S for both the lower layer and upper layer."
   b. REPLACE - paragraph 2.1.B in its entirety with the following: "B. Aggregate shall conform to the requirements of Section 460.2.2 of the Standard Specifications. Aggregate for the lower layer shall be nominal size of 19 mm. Aggregate for the upper layer shall be nominal size of 12.5 mm."

5. **DRAWINGS**

A. **MODIFIED** C-100-OVERALL SITE PLAN for the limits of the asphalt mill and overlay on Nakoosa Trail and provide temporary directional traffic signage for the existing gas station.

B. **MODIFIED** C-101-SITE PLAN for the limits of the asphalt mill and overlay on Nakoosa Trail and indicate permanent sanitary sewer easement and temporary construction easement.

C. **MODIFIED** C-103-SITE PLAN for providing a 6-inch perforated pipe at the modular retaining wall.

D. **MODIFIED** C-104-INTERSECTION DETAIL to reduce the extend of new asphalt.

E. **MODIFIED** C-105-UTILITY PLAN for the limits of the asphalt mill and overlay on Nakoosa Trail and provide a 6-inch perforated pipe at the modular retaining wall.

F. **MODIFIED** C-106-UTILITY PLAN for providing a 6-inch perforated pipe at the modular retaining wall.

G. **MODIFIED** C-107-EROSON CONTROL for the limits of the asphalt mill and overlay on Nakoosa Trail.

H. **MODIFIED** C-110-FIRE ACCESS for the limits of the asphalt mill and overlay on Nakoosa Trail.

I. **MODIFIED** C-112-DEMOLITION PLAN for the limits of the asphalt mill and overlay on Nakoosa Trail and adjusted the scale.

J. **MODIFIED** C-113-STANDARD DETAILS to Detail A for providing a pipe underdrain, and to Detail B for asphalt thicknesses and removal of the geotextile below the base course.

K. **MODIFIED** L-201-LANDSCAPING PLAN for the limits of the asphalt mill and overlay on Nakoosa Trail.

L. **MODIFIED** AS-001-SITE PLAN to include note in detail D14.

M. **MODIFIED** AS-002-ENLARGED SITE PLAN to include E16 Typical Fence Footing detail and add an overall length dimension in detail A1.

N. **MODIFIED** AS-003-SITE SECTIONS to remove an exterior bench detail, remove note 3 in detail A1, and add a hatch pattern and material callout to detail K10.

O. **MODIFIED** A-101-OVERALL LEVEL 1 FLOOR PLAN to remove green and gray hatch pattern and the exterior concrete benches between column line 32 and 34.

P. **MODIFIED** A-103-OVERALL ROOF PLAN to remove green and gray hatch pattern.

Q. **MODIFIED** A-104-LEVEL 1 FLOOR PLAN AREA A to revise wall between grid line 16 and 17 from 12" CMU to precast.

R. **MODIFIED** A-105-LEVEL 1 FLOOR PLAN AREA A to revise wall between grid line 16 and 17 from 12" CMU to precast.

S. **MODIFIED** A-106-LEVEL 1 FLOOR PLAN AREA A to revise wall between grid line 16 and 17 from 12" CMU to precast.

T. **MODIFIED** A-108-LEVEL 1 FLOOR PLAN AREA A to remove the exterior concrete benches between column line 32 and 34.

U. **MODIFIED** A-114-MEZZANINE FLOOR PLAN AREA E to show metal railings between Jy and Kf as well as the at the top of stair.

V. **MODIFIED** A-121-ROOF PLAN AREA A to add SS-2 material callouts to the roof.

W. **MODIFIED** A-134-LEVEL 1 AREA C REFLECTED CEILING PLAN to remove the RCP Notes.

X. **MODIFIED** A-201-BUILDING ELEVATIONS to revise Key Note 13.

Y. **MODIFIED** A-202-BUILDING ELEVATIONS to revise Key Note 13.

Z. **MODIFIED** A-203-BUILDING ELEVATIONS to revise Key Note 13.

AA. **MODIFIED** A-301-BUILDING SECTIONS to revise the wall between grid line 16 and 17 from 12" CMU to precast, and reduce height of CMU wall along column line 15 to stop at underside of mezzanine metal deck in detail J1.

BB. **MODIFIED** A-302-BUILDING SECTIONS to revise the wall between grid line 16 and 17 from 12" CMU to precast in detail J1 and E1.

CC. **MODIFIED** A-313-E/W WALL SECTIONS to add detail callouts in details A1, A4, and A10.

DD. **MODIFIED** A-501 – PARTITION TYPES to revise the detail number of detail 1 Partition Type M001 to be H12, add detail H16 Partition Type M005, and added "RE: STRUCTURAL" note in the following details:

a. E8 Partition Type A042, R070
b. E12 Partition Type A041
c. H1 Partition Type M006
d. H4 Partition Type M001
e. H8 Partition Type M002
f. H12 Partition Type M001

EE. **MODIFIED** A-513-EXTERIOR DETAILS to add detail F1 Typical Roof Overhang and revised the angle of the exterior grade gypsum sheathing soffit in detail H10.

FF. **MODIFIED** A-522-RAILING DETAILS to revise the stair tread in detail E1.

GG. **MODIFIED** A-551-EXPANSION JOINT DETAILS to revise detail A7, and E7.

HH. **MODIFIED** A-601-DOOR SCHEDULE to revise and add additional information.

II. **MODIFIED** 700 – INTERIORS FINISH SCHEDULE & LEGEND PC-1 polish finish to state "Refer to Specification" in lieu of "800-Grit."

JJ. **MODIFIED** A-911-SIGNAGE TYPES EXTERIOR to remove signs.

KK. **MODIFIED** A-921-SITE SIGNAGE ELEVATIONS AND DETAILS to revise notes in detail A8.

LL. **MODIFIED** S-001 - STRUCTURAL NOTES. See revised drawing attached.

MM. **MODIFIED** S-010 - LATERAL FORCE RESISTING SYSTEMS PLAN. See revised drawing attached.

NN. **MODIFIED** S-101A - FOUNDATION PLAN AREA A. See revised drawing attached.

OO. **MODIFIED** S-101B - FOUNDATION PLAN AREA B. See revised drawing attached.

PP. **MODIFIED** S-101C - FOUNDATION PLAN AREA C. See revised drawing attached.

QQ. **MODIFIED** S-101D - FOUNDATION PLAN AREA D. See revised drawing attached.

RR. **MODIFIED** S-101E - FOUNDATION PLAN AREA E. See revised drawing attached.

SS. **MODIFIED** S-111A - FLATWORK PLAN AREA A. See revised drawing attached.

TT. **MODIFIED** S-111B - FLATWORK PLAN AREA B. See revised drawing attached.

UU. **MODIFIED** S-111C - FLATWORK PLAN AREA C. See revised drawing attached.

VV. **MODIFIED** S-111D - FLATWORK PLAN AREA D. See revised drawing attached.

WW. **MODIFIED** S-111E - FLATWORK PLAN AREA E. See revised drawing attached.

XX. **MODIFIED** S-131A - LEVEL 1 STRUCTURAL FLOOR PLAN AREA A. See revised drawing attached.

YY. **MODIFIED** S-131B - LEVEL 1 STRUCTURAL FLOOR PLAN AREA B. See revised drawing attached.

ZZ. **MODIFIED** S-131E - LEVEL 1 STRUCTURAL FLOOR PLAN AREA E. See revised drawing attached.

AAA. **MODIFIED** S-132A - MEZZANINE STRUCTURAL FLOOR PLAN AREA A. See revised drawing attached.

BBB. **MODIFIED** S-132B - MEZZANINE STRUCTURAL FLOOR PLAN AREA B. See revised drawing attached.

CCC. **MODIFIED** S-132D - MEZZANINE STRUCTURAL FLOOR PLAN AREA D. See revised drawing attached.

DDD. **MODIFIED** S-132E - MEZZANINE STRUCTURAL FLOOR PLAN AREA E. See revised drawing attached.

EEE. **MODIFIED** S-142B - MEZZANINE FRAMING PLAN AREA B. See revised drawing attached.

FFF. **MODIFIED** S-142E - MEZZANINE FRAMING PLAN AREA E. See revised drawing attached.

GGG. **MODIFIED** S-151A - LOW ROOF FRAMING PLAN AREA A. See revised drawing attached.

HHH. **MODIFIED** S-151B - LOW ROOF FRAMING PLAN AREA B. See revised drawing attached.

III. **MODIFIED** S-151C - LOW ROOF FRAMING PLAN AREA C. See revised drawing attached.

JJJ. **MODIFIED** S-152A - HIGH ROOF FRAMING PLAN AREA A. See revised drawing attached.

KKK. **MODIFIED** S-152B - HIGH ROOF FRAMING PLAN AREA B. See revised drawing attached.

LLL. **MODIFIED** S-152C - HIGH ROOF FRAMING PLAN AREA C. See revised drawing attached.

MMM. **MODIFIED** S-152D - HIGH ROOF FRAMING PLAN AREA D. See revised drawing attached.

NNN. **MODIFIED** S-152E - HIGH ROOF FRAMING PLAN AREA E. See revised drawing attached.

OOO. **MODIFIED** S-241 - STRUCTURAL FRAMING ELEVATIONS. See revised drawing attached.

PPP. **MODIFIED** S-401 - MISCELLANEOUS FOUNDATION PLANS. See revised drawing attached.

QQQ. **MODIFIED** S-451 - MISCELLANEOUS FRAMING PLANS. See revised drawing attached.

RRR. **MODIFIED** S-503 - FOUNDATION DETAILS. See revised drawing attached.

SSS. **MODIFIED** S-511 - FLATWORK DETAILS. See revised drawing attached.

TTT. **MODIFIED** S-522 - STRUCTURAL WALL DETAILS. See revised drawing attached.

UUU. **MODIFIED** S-531 - STRUCTURAL FRAMING DETAILS. See revised drawing attached.

VVV. **MODIFIED** S-532 - STRUCTURAL FRAMING DETAILS. See revised drawing attached.

WWW. **MODIFIED** S-541 - STRUCTURAL FRAMING DETAILS. See revised drawing attached.

XXX. **MODIFIED** S-542 - STRUCTURAL FRAMING DETAILS. See revised drawing attached.

YYY. **MODIFIED** S-543 - STRUCTURAL FRAMING DETAILS. See revised drawing attached.

ZZZ. **MODIFIED** S-551 - STRUCTURAL ROOF FRAMING DETAILS. See revised drawing attached.

AAAA. **MODIFIED** S-552 - STRUCTURAL ROOF FRAMING DETAILS. See revised drawing attached.

BBBB. **MODIFIED** S-601 - STRUCTURAL SCHEDULES. See revised drawing attached.

CCCC. **MODIFIED** M-131E LEVEL 1 FLOOR PLAN – PIPING – AREA E:
a. Revise location of Zone E2 M-29 manifold as indicated on sheet M-131E

DDDD. **MODIFIED** M-132 LEVEL 1 FLOOR PLAN RADIANT INFLOOR EATING – AREAS A & B:
a. Revise RADIANT FLOOR HATCH PATTERN LEGEND as indicated on sheet M-132

EEEE. **MODIFIED** M-133 LEVEL 1 FLOOR PLAN RADIANT INFLOOR EATING – AREAS C, D, & E:
a. Revise RADIANT FLOOR HATCH PATTERN LEGEND as indicated on sheet M-133

FFFF. **MODIFIED** M-809 MECHANICAL WATER FLOW DIAGRAM:
a. Revised control sequences as indicated on sheet M-809.

GGGG. **MODIFIED** F-101B LEVEL 1 FLOOR PLAN – FIRE PROTECTION – AREA B:
a. Removed the hatch pattern for Tire Storage 1044

HHHH. **MODIFIED** F-101C LEVEL 1 FLOOR PLAN - FIRE PROTECTION – AREA C:
a. Removed the hatch pattern for Tire Shop/Storage 1076

IIII. **MODIFIED** E-503 DETAILS:
a. Add ground bar to the riser diagram and delete a couple articles in the specification to eliminate any confusion.

JJJJ. **MODIFIED** E-601 SCHEDULES:
a. Revise downlight fixture types D, D1, D2, and D4

KKKK. **MODIFIED** E-702 ONE-LINE DIAGRAM PHOTOVOLTAICS (Sheet not attached)
a. Revise general note #1 to indicate "Sheet E-142" in place of "Sheet E-138"

LLLL. **MODIFIED** T-141 LEVEL 1 FLOOR PLAN AREA A - AUDIO/VISUAL
a. Revise general note #1
b. Removed speaker zoning from key plan

MMMM. **MODIFIED** T-142 LEVEL 1 FLOOR PLAN AREA B - AUDIO/VISUAL
a. Revise general note #1
b. Removed speaker zoning from key plan

NNNN. **MODIFIED** T-143 LEVEL 1 FLOOR PLAN AREA C - AUDIO/VISUAL
a. Revise general note #1
b. Removed speaker zoning from key plan

OOOO. **MODIFIED** T-144 LEVEL 1 FLOOR PLAN AREA D - AUDIO/VISUAL
a. Revise general note #1
b. Removed speaker zoning from key plan

PPPP. **MODIFIED** T-145 LEVEL 1 FLOOR PLAN AREA E - AUDIO/VISUAL
   a. Revise general note #1
   b. Removed speaker zoning from key plan

6. **PROPOSAL**
   No Change

7. **ADDITIONAL DOCUMENTS**
   A. Existing Equipment Data Sheets and Cut Sheets (16 pages).
   B. EXHIBIT, A&A Environmental Services report for the City of Madison, dated October 19, 2016 regarding the Former Cub Foods Asbestos Removal/Demolition. (10 pages) is known information relating to the existing Commercial Building on site.
   C. Pre-Bid (Contractors) Meeting: The Pre-Bid (Contractors) Meeting was held at 10:30am on Thursday, February 28, 2019 at the Engineering Operations Facility located at 1600 Emil Street. A copy of the pre-bid meeting minutes are attached to this addendum for reference.

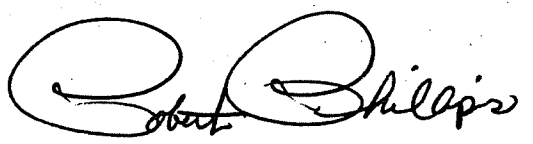
Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at:

https://www.bidexpress.com/

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 to receive the material by another route.

Sincerely,



Robert F. Phillips, P.E., City Engineer

Cc: Greg Fries, Kathy Cryan

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.
3. Mineral-wool blanket.
4. Spray-applied cellulosic insulation.

B. Applications include:

1. Under slab-on-grade.
2. On interior foundation wall surfaces backfilled.
3. In framed construction cavities.

C. Related Requirements:

1. Section 06 16 00 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
2. Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for insulation specified as part of roofing construction.
3. Section 09 29 00 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. LEED2009 - Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Data: For adhesives, indicating VOC content.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type X: ASTM C 578, Type X, 15-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. DiversiFoam Products.
    b. Dow Chemical Company (The).
    c. Owens Corning.
2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

C. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Applications include:
    a. On interior foundation wall surfaces.
2. Thermal Resistance (R Value): Minimum 5.0/inch.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. DiversiFoam Products.
    b. Dow Chemical Company (The).
    c. Owens Corning.
4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 GLASS-FIBER BLANKET

A. LEED2009 - Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. CertainTeed Corporation.
    b. Guardian Building Products, Inc.
    c. Johns Manville; a Berkshire Hathaway company.
    d. Knauf Insulation.
    e. Owens Corning.

2.3 MINERAL-WOOL BLANKETS

A. LEED2009 - Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Roxul Inc.
    b. Thermafiber Inc.; an Owens Corning company.

2.4 SPRAY-APPLIED CELLULOSIC INSULATION

A. LEED2009 - Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Self-Supported, Spray-Applied Cellulosic Insulation: ASTM C 1149, Type I (materials applied with liquid adhesive; suitable for either exposed or enclosed applications), Type II (materials containing a dry adhesive activated by water during installation; intended only for enclosed or covered applications), chemically treated for flame-resistance, processing, and handling characteristics.

03 Addendum

1. Basis-of-Design Product: Subject to compliance with requirements, provide k-13 spray on systems insulation by International Cellulose Corporation or comparable product by one of the following:
   a. Central Fiber LLC.
   b. Hamilton Manufacturing Inc.
   c. Nu-Wool Co., Inc.

2.5 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

2.6 ACCESSORIES

A. Joint Tape: Pressure-sensitive plastic tape recommended by insulation manufacturer for sealing joints and minor penetrations in board insulation.
   1. Tape Width: 2-7/8 inches minimum.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.
B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION UNDER SLAB-ON-GRADE

A. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
   1. If not otherwise indicated, extend insulation a minimum of 36 inches in from exterior walls.
   2. Stagger end joints and tightly abut insulation units.
   3. Seal seams and penetrations with joint tape centered over joints.

3.4 INSTALLATION AT FOUNDATION WALL INTERIOR FACE

A. On vertical foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
   1. If not otherwise indicated, extend insulation a minimum of 36 inches below exterior grade line.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 25 00 - WEATHER BARRIERS

03 Addendum
Section Revised

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes self-adhering modified bituminous sheet air barriers.
B. Related Requirements:
   1. Section 06 16 00 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

1.3 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.
B. Shop Drawings: For air-barrier assemblies.
   1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
   2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
   3. Include details of interfaces with other materials that form part of air barrier.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.
B. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
   1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.

B. Mockup Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.

1. Air-Leakage-Location Testing: Mockups will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
2. Air-Leakage-Volume Testing: Mockups will be tested for air-leakage rate according to ASTM E 783 .
3. Adhesion Testing: Mockups will be tested for required air-barrier adhesion to substrate according to ASTM D 4541.
4. Notify Architect seven days in advance of the dates and times when mockups will be tested.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
B. Protect stored materials from direct sunlight.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

2.3 SELF-ADHERING SHEET AIR BARRIER

A. Modified Bituminous Sheet: 40-mil- thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick, cross-laminated polyethylene film with release liner on adhesive side.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Carlisle Coatings & Waterproofing Inc; CCW-705 LT.
   b. Grace Construction Products; W.R. Grace & Co. -- Conn.; Perm-A-Barrier Low Temperature Wall Membrane.
   c. Henry Company; Blueskin SA LT.
   d. Polyguard Products, Inc.; Polyguard 400 Sheet Air Barrier.
   e. Rubber Polymer Corporation, Inc.; Rub-R-Wall SA.
   f. Tremco Incorporated; ExoAir 110/110LT.
   g. W.R. Meadows, Inc; SealTight Air-Shield.
2. Physical and Performance Properties:
   a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
   b. Tensile Strength: Minimum 250 psi ; ASTM D 412, Die C.
   c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
   d. Puncture Resistance: Minimum 40 lbf; ASTM E 154/E 154M.

e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg F; ASTM D 570.
f. Vapor Permeance: Maximum 0.1 perm); ASTM E 96/E 96M, Desiccant Method.
g. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541 as modified by ABAA.
h. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
i. UV Resistance: Can be exposed to sunlight for 60 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

C. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 123 Silicone Seal.
b. GE Construction Sealants; Momentive Performance Materials Inc.; US11000 UltraSpan.
c. Pecora Corporation; Sil-Span.
d. Tremco Incorporated; Spectrem Simple Seal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D 4263.
4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details and according to recommendations in ASTM D 6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.
2. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water.
2. Roll sheets firmly to enhance adhesion to substrate.

E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.

F. CMU: Install air-barrier sheet horizontally against the CMU beginning at base of wall. Align top edge of air-barrier sheet immediately below protruding masonry ties or joint reinforcement or ties, and firmly adhere in place.

1. Overlap horizontally adjacent sheets a minimum of 2 inches and roll seams.
2. Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly into place.
3. Seal around masonry reinforcing or ties and penetrations with termination mastic.
4. Continue the sheet into all openings in the wall, such as doors and windows, and terminate at points to maintain an airtight barrier that is not visible from interior.

G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, transition strip.

H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.

1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.

L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

M. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply preformed silicone extrusion so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

N. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.

O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.

P. Do not cover air barrier until it has been tested and inspected by testing agency.

Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air-barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed.
7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Air barrier has been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

D. Tests: As determined by testing agency from among the following tests:

1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783.
3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each 600 sq. ft. of installed air barrier or part thereof.

E. Air barriers will be considered defective if they do not pass tests and inspections.

1. Remove and replace deficient air-barrier components for retesting as specified above.

F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

G. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 25 00

SECTION 10 11 16.13

FIXED MARKERBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed markerboards.

B. Related Requirements:

1. Section 10 12 00 "Display Cases" for individually framed and enclosed, wall-mounted bulletin boards and for tackboards within display cases.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
2. Include electrical characteristics for motorized units.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.
2. Product Data for Credit IEQ 4.4: For composite wood products, documentation indicating that the product contains no urea formaldehyde.

C. Shop Drawings: For visual display units.

1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
3. Show locations and layout of special-purpose graphics.
4. Include sections of typical trim members.
5. Include wiring diagrams for power and control wiring.

D. Samples for Verification: For each type of visual display unit indicated.

1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch- long sections of each trim profile.
3. Display Rail: 6-inch- long section of each type.
4. Rail Support System: 6-inch- long sections.
5. Accessories: Full-size Sample of each type of accessory.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For visual display units to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display units by field measurements before fabrication.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.9 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Surfaces lose original writing and erasing qualities.
   b. Surfaces exhibit crazing, cracking, or flaking.
2. Warranty Period: 50 years from date of Substantial Completion.
3. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.

2.2 VISUAL DISPLAY BOARD ASSEMBLY

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Claridge Products and Equipment, Inc.

B. Markerboard Panel: Porcelain-enamel-faced markerboard panel on core indicated.

1. Color: White.

C. Tackboard Panel: Natural-cork Plastic-impregnated-cork Vinyl-fabric-faced Polyester-fabric-faced tackboard panel on core indicated.

D. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.

1. Aluminum Finish: Clear anodic finish.

E. Chalktray: Manufacturer's standard; continuous.

1. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

2.3 RAIL SUPPORT SYSTEM FOR VISUAL DISPLAY BOARD ASSEMBLIES

A. Visual Display Board Assemblies: Fabricated from not less than 3/8-inch- thick, kraft-paper honeycomb core; designed to be rigid and to resist warpage, and with aluminum trim designed to engage hanger clips.

03 Addendum

2.4 MARKERBOARD PANELS

A. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

2.5 TACKBOARD PANELS

A. Tackboard Panels:

1. Facing: 1 " Sound Silencer PEPP board by Acoustical Surfaces, Inc. 123 Columbia Court North, Suite 201, Chaska, MN 55318. Ph: 1-888-223-5287, www.acousticalsurfaces.com
2. Color: Selected from manufacturers full range of colors.
3. Backing: 1/4-inch- thick hardboard .

B. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.

1. Aluminum Finish: Clear anodic finish.

2.6 MATERIALS

A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.
B. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish with surface-burning characteristics indicated.
C. Extruded Aluminum: ASTM B 221, Alloy 6063.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.
C. Examine walls and partitions for proper preparation and backing for visual display units.
D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.
C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.
D. Prepare recesses for sliding visual display units as required by type and size of unit.

3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
B. Factory-Fabricated Visual Display Board Assemblies: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches o.c. Secure tops and bottoms of boards to walls.
C. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings.
D. Rail Support System: Install horizontal support rail at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall with fasteners at 12 inches o.c.
    1. Mounting Height: 72 inches above finished floor to top of rail.
    2. Hang visual display units on rail support system.

3.4 CLEANING AND PROTECTION

A. Clean visual display units according to manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
B. Touch up factory-applied finishes to restore damaged or soiled areas.
C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 10 11 16.13

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 ACTION SUBMITTALS

A. LEED Submittals:

1. Air-Balance Report for Prerequisite IEQ 1: Documentation of work performed for ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
2. TAB Report for Prerequisite EA 2: Documentation of work performed for ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 60 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

C. Certified TAB reports.

D. Sample report forms.

E. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC NEBB or TABB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB or TABB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB or TABB as a TAB technician.

B. TAB Conference: Meet with Owner, Construction team, Commissioning Authority and Engineer on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

   a. The Contract Documents examination report.
   b. The TAB plan.
   c. Coordination and cooperation of trades and subcontractors.
   d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

A. Subject to compliance with requirements, available TAB contractors that may be engaged include, but are not limited to, the following:

1. Balco Balancing, Inc.
2. Badger Balancing LLC
3. Environmental System Analysis
4. Professional System Analysis, Inc

3.2 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Section 233113 "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, and equipment with functioning controls is ready for operation.

I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

J. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

K. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

L. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

M. Examine system pumps to ensure absence of entrained air in the suction piping.

N. Examine operating safety interlocks and controls on HVAC equipment.

O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.

7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", or ASHRAE 111 or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and/or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. For variable-air-volume systems, develop a plan to simulate diversity.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling-unit components.

K. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow:

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fan's VFD or ECM motor to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

    a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.

6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record final fan-performance data.
9. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.

10. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

    a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

3.8 PROCEDURE FOR CNG VENTILATION

A. Contractor shall provide report of the testing, adjusting and balancing of the CNG ventilation mode for HVAC equipment. The make-up air units supply airflow and purge exhaust fans shall indicated CNG airflows. Contractor to engage ventilation system into CNG mode for the selected make-up air and exhaust fans. Set fans to their respective set-point for their maximum airflows per schedule. Contractor to adjust the exhaust purge airflows by variable frequency drive to maintain a negative space. The exhaust airflow shall exceed the supply airflow plus the negative offset. (Adj.)

B. In CNG mode, the Contractor shall demonstrate the force for pushing or pulling open interior swinging egress doors, other than fire doors, shall not exceed 5 pounds. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other swinging doors, as well as sliding and folding doors, the door latch shall release when subjected to a 15-pound force. The door shall be set in motion when subjected to a 30-pound force. The door shall swing to a full-open position when subjected to a 15-pound force.

C. Contractor shall provide field readings of the maximum pressure differential across adjacent interior doorways to demonstrate negative of the space in CNG mode.

3.9 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check liquid level in expansion tank.
3. Check makeup water-station pressure gage for adequate pressure for highest vent.
4. Check flow-control valves for specified sequence of operation, and set at indicated flow.
5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.10 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

3.11 PROCEDURES FOR PRIMARY-SECONDARY HYDRONIC SYSTEMS

A. Balance the primary circuit flow first and then balance the secondary circuits.

3.12 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.

6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

C. Motors Driven by Electronically Commutated Motor (ECM): Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.13 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.14 PROCEDURES FOR BOILERS

A. Hydronic Boilers: Measure and record entering- and leaving-water temperatures and water flow.

3.15 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.
2. Water flow rate.
3. Water pressure drop.
4. Dry-bulb temperature of entering and leaving air.
5. Wet-bulb temperature of entering and leaving air for cooling coils.
6. Airflow.
7. Air pressure drop.

B. Measure, adjust, and record the following data for each electric heating coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

C. Measure, adjust, and record the following data for each refrigerant and hot gas reheat coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.16 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.
4. Cooling-Water Flow Rate: Plus or minus 10 percent.
5. Solar Heating-Water Flow Rate: Plus or minus 10 percent.

3.17 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare biweekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system.

3.18 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.

15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Settings for supply-air, static-pressure controller.
    g. Other system operating conditions that affect performance.

D. Make-Up and Air-Handling-Unit Test Reports: For units with coils, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.

3. Test Data (Indicated and Actual Values):

    a. Total air flow rate in cfm.
    b. Total system static pressure in inches wg.
    c. Fan rpm.
    d. Discharge static pressure in inches wg.
    e. Filter static-pressure differential in inches wg.
    f. Preheat-coil static-pressure differential in inches wg.
    g. Cooling-coil static-pressure differential in inches wg.
    h. Heating-coil static-pressure differential in inches wg.
    i. Outdoor airflow in cfm.
    j. Return airflow in cfm.
    k. Outdoor-air damper position.
    l. Return-air damper position.

E. Apparatus-Coil Test Reports:

1. Coil Data:

    a. System identification.
    b. Location.
    c. Coil type.
    d. Number of rows.
    e. Fin spacing in fins per inch o.c.
    f. Make and model number.
    g. Face area in sq. ft.
    h. Tube size in NPS.

i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Water flow rate in gpm.
i. Water pressure differential in feet of head or psig.
j. Entering-water temperature in deg F.
k. Leaving-water temperature in deg F.
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig.
n. Refrigerant suction temperature in deg F.

F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

G. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft.

g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

H. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

I. System-Coil Reports: For water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Entering-water temperature in deg F.
c. Leaving-water temperature in deg F.
d. Water pressure drop in feet of head or psig.
e. Entering-air temperature in deg F.
f. Leaving-air temperature in deg F.

J. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and size.

e. Model number and serial number.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.
h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):

a. Static head in feet of head or psig.
b. Pump shutoff pressure in feet of head or psig.
c. Actual impeller size in inches.
d. Full-open flow rate in gpm.
e. Full-open pressure in feet of head or psig.
f. Final discharge pressure in feet of head or psig.
g. Final suction pressure in feet of head or psig.
h. Final total pressure in feet of head or psig.
i. Final water flow rate in gpm.
j. Voltage at each connection.
k. Amperage for each phase.

3.19 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Commissioning Authority.
3. Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.20 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

SECTION 23 09 00

INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

B. Related Sections include the following:
1. Section 230519 "Meters and Gages for HVAC Piping" for measuring equipment that relates to this Section.
2. Section 230925 "Direct Digital Control System for HVAC" for requirements that relate to this Section.
3. Section 230993 "Sequence of Operations for HVAC Controls" for requirements that relate to this Section.

C. Furnish and install all labor, materials, equipment, electronic interfaces and actuation devices, apparatus, software, services, permits and supervision, and all permanent and temporary facilities necessary to provide complete and proper working Direct Digital Control system as indicated on the drawings, called for in the specifications or required by job conditions. Drawings are diagrammatic only. Provide any equipment and labor not specifically referred to herein or on the drawings that are required to meet the functional intent, such as repeaters, routers, bridges, and gateways.

1.3 SYSTEM DESCRIPTION

A. System is to use direct digital control with electric actuation for air handling units; direct digital control with electric actuation for room temperature, room humidity, and terminal airflow control; and electric control for other terminal units.

1.4 DEFINITIONS

A. BAS: Building Automation System.

B. DDC: Direct digital control.

C. I/O: Input/output.

D. LAN: Local Area Network.

E. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.

F. RTD: Resistance temperature detector.

1.5 SYSTEM PERFORMANCE
1. Comply with the following performance requirements:
2. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:

a. Water Temperature: Plus or minus 1 deg F.

b. Water Flow: Plus or minus 5 percent of full scale.
c. Water Pressure: Plus or minus 2 percent of full scale.
d. Space Temperature: Plus or minus 1 deg F.
e. Ducted Air Temperature: Plus or minus 1 deg F.
f. Outside Air Temperature: Plus or minus 2 deg F.
g. Dew Point Temperature: Plus or minus 3 deg F.
h. Temperature Differential: Plus or minus 0.25 deg F.
i. Relative Humidity: Plus or minus 5 percent.
j. Airflow (Pressurized Spaces): Plus or minus 3 percent of full scale.
k. Airflow (Measuring Stations): Plus or minus 5 percent of full scale.
l. Airflow (Terminal): Plus or minus 10 percent of full scale.
m. Air Pressure (Space): Plus or minus 0.01-inch wg.
n. Air Pressure (Ducts): Plus or minus 0.1-inch wg.
o. Carbon Monoxide: Plus or minus 5 percent of reading.
p. Carbon Dioxide: Plus or minus 50 ppm.
q. Electrical: Plus or minus 5 percent of reading.

B. Communications protocol:
1. BACnet protocol per the latest version of ASHRAE Standard 135 and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
2. LonTalk protocol using the LonWorks neuron chip from Echelon Corporation and communicate using EIA/CEA 709.1 datalink/physical layer protocol.

C. Engineering units: English.

D. Provide at least 10% spare I/O connections on each controller.

E. Components shall operate within 32 deg F to 122 deg F and 5-85% relative humidity, non-condensing.

1.6 SEQUENCE OF OPERATION

A. Refer to Section 230925 "Direct Digital Control System for HVAC" for requirements that relate to this Section.

1.7 ACTION SUBMITTALS

A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
2. Schematic flow diagrams for each system showing fans, pumps, coils, dampers, valves, and control devices.
3. Wiring Diagrams: Power, signal, and control wiring. Differentiate between factory and field installed wiring.
4. Wire Tabulation List: wire ID, "to" and "from", and wire color.
5. Details of control panel faces, including controls, instruments, and labeling.
6. Schedule of dampers including size, leakage, and flow characteristics.
7. Schedule of valves including flow characteristics.
8. Control valve assemblies shall be provided and delivered from a single manufacturer as a complete assembly.

C. Samples for Initial Selection: For each color required, of each type of thermostat or sensor cover with factory-applied color finishes.

D. Samples for Verification: For each color required, of each type of thermostat or sensor cover.

1.8 INFORMATIONAL SUBMITTALS

A. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.

B. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with LonWorks.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

1.9 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
1. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station.
2. Interconnection wiring diagrams with identified and numbered system components and devices.
3. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
4. Calibration records and list of set points.
5. Programming manuals.
6. Maintenance instructions.
7. Record documents ("as-builts"), including updated schematic diagrams, wiring diagrams, and control sequences.
8. Training documentation.
9. Contact information of service contractor and parts suppliers.

1.10 QUALITY ASSURANCE

A. Installing contractor must be a manufacturer's branch office or an authorized representative of a Direct Digital Control (DDC) equipment manufacturer that provides engineering and commissioning of the DDC equipment. Submit written confirmation of such authorization from the manufacturer. Indicate in letter of authorization that installing contractor has successfully completed all necessary training required for engineering, installation, and commissioning of equipment and systems and that such authorization has been in effect for a period of not less than three years. DDC equipment may or may not be required to be installed by this contractor as part of the project, but the intent of this quality assurance specification is to ensure that the installing contractor has the capabilities to engineer, install, and commission the field devices supplied under this section for temperature control.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with ASHRAE 135 for DDC system components.

D. Comply with the following:
1. UL-916; Energy Management Systems.
2. UL-873; Temperature Indication and Regulating Equipment.
3. UL-864, Subcategories UUKL, UOXX, UDTZ; Fire Signaling and Smoke Control Systems.
4. FCC, Part 15, Subpart J, Class A Computing Devices.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.

1.12 COORDINATION

A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.

B. Coordinate supply of conditioned electrical branch circuits for control units and operator workstation.

C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

1.13 WARRANTY

A. Provide warranty on all parts and labor for one year starting at the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 CONTROL SYSTEM
1. Refer to Section 230925 "Direct Digital Control System for HVAC" for requirements that relate to this Section.

2.3 INTERFACE WITH DDC EQUIPMENT

A. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers. Systems which command multiple outputs over a single pair of wires, such as power line carrier systems, are not acceptable.
1. Binary Inputs: Allow monitoring of on-off signals without external power.
2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation with three-position (on-off-auto) override switches and status lights.
5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) with status lights, two-position (auto-manual) switch, and manually adjustable potentiometer.
6. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
7. Universal I/Os: Provide software selectable binary or analog outputs.
8. SPDT Output Relays: Indicate status with an LED.

B. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
1. Output ripple of 5.0 mV maximum peak to peak.
2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.
4. Provide all required power supplies for transducers, sensors, transmitters and relays. All low voltage transformers shall have a resettable secondary circuit break.

C. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
1. Minimum dielectric strength of 1000 V.
2. Maximum response time of 10 nanoseconds.
3. Minimum transverse-mode noise attenuation of 65 dB.
4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

D. Control Panels:
1. Provide panel enclosures for all DDC controllers and associated function modules. All controls to be in enclosures without exception. Panels will be approved provided all conduit is bonded and grounded.
2. Provide UL listed cabinets for use with line voltage devices.
3. See Division 26 for control panel assembly and installation.
4. NEMA Rating:
   a. Inside: NEMA-1.
   b. Outside: NEMA-3R or NEMA-4.
5. Constructed of steel or extruded aluminum, with hinged door, keyed lock, and baked enamel finish. Install controls, relays, transducers and automatic switches inside panels. Label devices with permanent printed labels and provide asbuilt wiring/piping diagram within enclosure. Provide raceways for wiring and poly within panel for neat appearance. Provide termination blocks for all wiring terminations. Label outside of panel with panel number corresponding to plan tags and asbuilt control drawings as well as building system(s) served.
6. Control panels that have devices or terminations that are fed or switch 50V or higher shall enclose the devices, terminations, and wiring so that Personal Protective Equipment (PPE) is not required to service the under 50V devices and terminations within the control panel. As an alternative, a separate panel for only the 50V and higher devices may be provided and mounted adjacent to the under 50V control panel.
7. For panels that have 120VAC power feeds provide a resettable circuit breaker. Provide label within the panel indicating circuit number of 120VAC serving panel
8. Provide a service shutdown toggle switch for each air handling unit system located inside the temperature control panel that will initiate a logical shutdown of the air handling unit system. Label the switch so it is clear which position is shutdown and which is auto.

E. Interface with Other Systems: All hardware and software required to provide the specified interactions with other systems, such as fire alarm, security, and lighting systems.

2.4 ELECTRONIC SENSORS AND TRANSMITTERS

A. General Requirements:
1. Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
2. For wall, immersion, or duct mounting as required.
   a. Architectural housing for office space mounting.
   b. Weatherproof/sunshield housing for outdoors.
   c. Thermowell housing for water applications.
      1) Non-corrosive fluids below 250 deg F: brass or stainless steel.
      2) Other applications: 300 series stainless steel.
   d. Protective housing for duct mounting.
   e. Water and dust tight stainless-steel housing for space sensors located in process areas.
3. The sensor/transducer shall be selected to withstand ambient conditions, including moisture or condensation and transient conditions for temperatures, pressures, humidities, etc.
4. Transducers may be supplied as an integral unit with the field sensor, or as part of the controller.
5. The sensor/transducer shall be appropriately selected to most closely match the expected sensing range.
6. Use a transmitter where the sensor is more than 100 feet from its associated controller, there is excessive electrical noise present, or the controller cannot accept direct sensor input, a 4-20mA type.
7. All temperature and humidity sensors shall be of the same manufacturer.

8. All pressure transmitters and transducers shall be of the same manufacturer.

B. RTDs and Transmitters:
1. Manufacturers:
   a. BEC Controls Corporation.
   b. MAMAC Systems, Inc.
   c. RDF Corporation.
2. Accuracy: Plus or minus 0.2 percent at calibration point.
3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 18 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
5. Averaging Elements in Ducts: 18 inches long, rigid use where prone to temperature stratification or where ducts are larger than 9 sq. ft.; length as required.
6. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches.
7. Room Sensor Cover Construction: Manufacturer's standard locking covers.
   a. Set-Point Adjustment: Concealed.
   b. Set-Point Indication: Concealed.
   c. Thermometer: Concealed.
   d. Color: White.
   e. Orientation: Vertical.
8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

C. Humidity Sensors: Bulk polymer sensor element.
1. Manufacturers:
   a. BEC Controls Corporation.
   b. General Eastern Instruments.
   c. MAMAC Systems, Inc.
   d. ROTRONIC Instrument Corp.
   e. TCS/Basys Controls.
   f. Vaisala.
2. Accuracy: 2 percent full range with linear output.
3. Room Sensor Range: 20 to 80 percent relative humidity.
4. Temperature Effect: 0.06 percent per deg F.
5. Repeatability: 0.5 percent relative humidity.
6. Hysteresis: 1 percent.
7. Long-term Stability: 1 percent relative humidity drift per year.
8. Room Sensor Cover Construction: Manufacturer's standard locking covers.
   a. Set-Point Adjustment: Concealed.
   b. Set-Point Indication: Concealed.
   c. Thermometer: Concealed.
   d. Color: White.
   e. Orientation: Vertical.
9. Duct Sensor: 0 to 95 percent relative humidity range with element guard and mounting plate.
10. Outside-Air Sensor: 0 to 95 percent relative humidity range with mounting enclosure, suitable for operation at outdoor temperatures of minus 40 to plus 170 deg F]
11. Duct and Sensors: With element guard and mounting plate, range of 0 to 100 percent relative humidity.

D. Pressure Transmitters/Transducers:
1. Manufacturers:
   a. BEC Controls Corporation.
   b. General Eastern Instruments.

c. MAMAC Systems, Inc.
d. ROTRONIC Instrument Corp.
e. TCS/Basys Controls.
f. Vaisala.

2. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.

a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
b. Output: 4 to 20 mA.
c. Building Static-Pressure Range: 0- to 0.25-inch wg.
d. Duct Static-Pressure Range: 0- to 5-inch wg.

3. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure; linear output 4 to 20 mA.
4. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
5. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
6. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.
7. Air Filters: Provide filters on all pressure probes in return or exhaust air systems.

E. PRESSURE TRANSDUCERS (AIR)

1. Provide pressure transducers specified below for the following applications:
   a. Duct static pressure applications where setpoints are specified to control at greater than 0.1" w.c.
   b. Pitot type fan inlet air flow stations.

2. Manufacturers: Mamac Systems, Setra, and Veris Industries.
3. Provide a transmitter that operates on the capacitance principle and is capable of sensing low positive, negative or differential pressures. Transmitter shall have a minimum of three pressure ranges adjustable by an onboard switch or jumper. Size the transmitter where the middle or high range is suitable for the application. Use a bi-directional transmitter for applications that may have both positive and negative pressure excursions. Transmitter shall be provided with an integral four-digit display of the pressure sensed.

a.	Accuracy (including non-linearity and hysteresis)	+ 1% FS
b.	Compensated Temperature Range	32°-140° F
c.	Temperature Effect	0-1"wc Range .09% FS/°F;
d.		>1"wc Range .02% FS/°F
e.	Output	4-20 MA
f.	Load Impedance (smallest maximum acceptable)	800 Ω max.
g.	Operating Temperature	32°-140° F

4. Provide pressure transducers specified below for the following applications:
   a. Duct static pressure applications where setpoints are specified to control at 0.1" w.c. or lower.
   b. All duct mounted pitot type air flow stations.
   c. Space/building static control or monitoring.

5. Manufacturers: Paragon Controls MicroTrans, Air Monitor Veltron DPT2500 Plus, or approved equal.
6. The airflow transducer shall provide noise filtration and automatic auto-zeroing. The automatic zeroing circuit shall be capable of maintaining the transducer output to within ±0.25% of operating span. The transducer output shall be locked and maintained at the last given output value during the automatic zeroing period so as not to interrupt the automatic control process. Use a bi-directional transmitter for applications that may have both positive and negative pressure excursions. Transmitter shall be provided with an integral four-digit display of the pressure sensed.
7. Transducer Span: <2 times the design velocity pressure at maximum flow, single range
8. Accuracy: ±0.25% of full scale, including non-linearity, hysteresis, deadband, and non-repeatability
9. Temperature Effect: ±0.15% of full scale/°F
10. Response: 0.5 sec. for 98% of full span change
11. Overpressure: 5 PSIG Proof

12. Power: 24VAC/VDC
13. Analog Output: 0-5VDC, 0-10VDC, or 4-20mA field adjustable
14. Auto Zero Frequency: every 1 to 24 hours on 1 hour intervals
15. For space or building static pressure monitoring, use Vaisala model SPH10 Static Pressure Head, or approved equal for outside air reference. Mount in location shown on plans or approved by AE.

F. Room Sensor Cover Construction: Manufacturer's standard locking covers.
1. Set-Point Adjustment: Concealed.
2. Set-Point Indication: Concealed.
3. Thermometer: Concealed.
4. Color: White
5. Orientation: Vertical.

G. Room sensor accessories include the following:
1. Insulating Bases: For sensors located on exterior walls.
2. Guards: Locking; heavy-duty, transparent plastic; mounted on separate base.
3. Adjusting Key: As required for calibration and cover screws.

2.5 STATUS SENSORS

A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg.

B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig, piped across pump.

C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.

D. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.

E. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.

F. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements. Provide a current sensor with adjustable threshold and digital output with LED display, equal to a Veris model H-708/H-904. Threshold adjustment must be by a multi-turn potentiometer or set by multiprocessor that will automatically compensate for frequency and amperage changes associated with variable frequency drives. When used on variable speed motor applications, use a current sensor that will not change state due to varying speeds.

G. Current Sensors: Series-connect current sensors produce a digital logic level output for monitoring. Series-connect current sensors produce a digital logic level output as signal feedback to monitor the current flowing of the HVAC equipment. Operating temperature range -25 to 85 degrees C. Provide solid core or split core Vdc output current transmitters. Current sensor to have a five year limited warranty.
1. Current Sensor: Provide Honeywell CS Series or equivalent.

H. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure NTP fitting, rated for 300 psig for chilled water applications or 150 psig other applications.
1. Manufacturers:
   a. BEC Controls Corporation.
   b. I.T.M. Instruments Inc.

I. Position Sensors:

1. Rotary Switches: cam action, lever, or proximity type, accuracy plus or minus 1 percent of full span, repeatability plus or minus 0.5 percent of full span, maximum temperature 125 deg F.
2. Door Position Switches: magnetic proximity type.

J. Paddle Flow Switches: Adjustable setpoint, selected for accuracy and ranges to match process conditions and electrical requirements; mounted on duct top, side, or bottom. Mounting in vertical duct with downward flow is not allowed.

2.6 GAS DETECTION EQUIPMENT

A. Standalone Carbon Monoxide and Nitrogen Dioxide Detectors and Controllers
1. Available Manufacturers:
   a. B. W. Technologies.
   b. CEA Instruments.
   c. Vulcain Inc.
2. Controller:
   a. General: Microprocessor controlled, capable of performing the specified sequence of operation.
   b. Enclosure: Corrosion resistant.
   c. Operating Temperature Range: 32 to 104 deg F.
   d. Operating Relative Humidity Range: 15 to 90%, non-condensing.
   e. Input Power: 120V connection. 24V with transformer is acceptable.
   f. Outputs:
      1) Indicating Lights: For power and alarm.
      2) Audible Alarm: with manual silence switch.
      3) Ventilation Equipment Activation Relay: 120V, 5A at 240 VAC.
      4) Fault Alarm Relay: 24V, to signal building automation system.
      5) Activate ventilation equipment when power to controller fails.
   g. Accessories:
      1) Calibration kit.
      2) Splash Protection: Corrosion-resistant splash guard with transparent cover to see indicating lights, or NEMA rating 3R or higher.
3. Sensors:
   a. General: Electrochemical, factory calibrated.
   b. Accuracy: +5%.
   c. Minimum Life: 2 years
   d. Repeatability: +10% at calibration point.
4. Alternates:
   a. A separate controller with remote transmitters is permitted.
   b. Combination carbon dioxide / nitrogen dioxide sensors or transmitters are permitted.

B. Manufacturers:
1. B. W. Technologies.
2. CEA Instruments, Inc.
3. Ebtron, Inc.
4. Gems Sensors Inc.
5. Greystone Energy Systems Inc.
6. Honeywell International Inc.; Home & Building Control.
7. INTEC Controls, Inc.
8. I.T.M. Instruments Inc.
9. MSA Canada Inc.

10. QEL/Quatrosense Environmental Limited.
11. Sauter Controls Corporation.
12. Sensidyne, Inc.
13. TSI Incorporated.
14. Vaisala.
15. Vulcain Inc.
16. Brasch Manufacturing Company.
17. General Analysis Corporation.
18. Macurco Inc.
19. MDA Scientific
20. Toxalert.

C. Carbon Monoxide Detectors: Single or multichannel, dual-level detectors using solid-state plug-in sensors with a 3-year minimum life; suitable over a temperature range of 32 to 104 deg F; with 2 factory-calibrated alarm levels at 35 and 200 ppm in a heavy-gauge aluminum NEMA 1 enclosure.

D. Carbon Dioxide Sensor and Transmitter: Single detectors using solid-state infrared sensors; suitable over a temperature range of 23 to 130 deg F and calibrated for 0 to 2 percent, with continuous or averaged reading, 4- to 20-mA output; range 0 to 2000 ppm, self-calibrating, for wall mounting.

E. Oxygen Sensor and Transmitter: Single detectors using solid-state zircon cell sensing; suitable over a temperature range of minus 32 to plus 1100 deg F and calibrated for 0 to 5 percent, with continuous or averaged reading, 4- to 20-mA output; for wall mounting.

F. Occupancy Sensor: Passive infrared, with time delay, daylight sensor lockout, sensitivity control, and 180-degree field of view with vertical sensing adjustment; for flush mounting.

G. Nitrogen Dioxide Detection System: packaged system with microcontroller, sensor(s), control relays and contacts in a heavy-gauge aluminum NEMA 1 enclosure.
1. Detection Resolution: Plus or minus 0.1 ppm.
2. Ambient Temperature Range: Minus 4 to plus 113 deg F (minus 20 to 45 deg C).
3. Ambient Humidity Range: 10 to 95 percent relative humidity.
4. Low alert level adjustable in increments of 0.1 ppm.
5. Indicator lights for power, relay status, and alarm condition.
6. Protected against static discharge, excessive electrical noise, and tested in accordance with ANSI/UL 1244.
7. Output relays providing a normally closed set of contacts for the alert states and the alarm states, which will automatically operate ventilation equipment on power loss to the sensor.
8. If a large area must be monitored with multiple sensors, a controller system with remote sensors may be used.

2.7 CARBON DIOXIDE (CO2) SENSOR

A. Provide a Carbon Dioxide (CO2) sensor that shall utilize non-dispersive infrared (NDIR) technology. The sensor shall have a linear analog output over a range of 0-2000 ppm and have built in display of CO2 level. The sensor shall have an automatic calibration algorithm that will compensate for sensor drift over time due to sensor element degradation. Unit shall be provided with a 0-10VDC or 4-20mA analog output that is selectable and a field adjustable relay alarm output. Accuracy shall be better than ±5% of reading or ±50ppm whichever is higher. The sensor shall be user calibratable with a minimum calibration interval of five years.

2.8 FLOW MEASURING STATIONS

A. Duct Airflow Station: Combination of air straightener and multiport, self-averaging pitot tube station.
1. Manufacturers:
   a. Ebtron.
   b. Tek-Air.
   c. Air Monitor.

d. Kurz Instruments.

2. Casing: Galvanized-steel frame, same size as duct.
3. Flow Straightener: Aluminum honeycomb, 3/4-inch parallel cell, 3 inches deep.
4. Sensing Manifold: Copper manifold with bullet-nosed static pressure sensors positioned on equal area basis.
5. Accuracy: 2 percent of full range.

B. Provide duct mounted airflow station type based on the following manufacturer's minimum design velocities. Outside air flow stations shall be thermal dispersion type only. Turndown of variable volume fan systems must be considered. Provide an airflow station schedule detailing the airflow range to be measured, corresponding velocity pressure, differential pressure transducer range, and the airflow station size.

C. Fan inlet piezometers: Where fan inlet piezometers are provided, these shall be used by the control contractor for air flow measurement. The air velocity transducers shall be provided under this Section and sized as described below.

D. For factory mounted fan piezometers rings, air velocity transducers range shall be sized less than two times the design velocity pressure at maximum flow and will meet the requirements under the PRESSURE TRANSDUCERS (AIR) specification later in this specification section unless noted below.

E. Thermal dispersion air flow stations:

1. Probe Sensor Density:

	Area (sq. ft.)	Sensors
a.	<= 1.5	2
b.	>1.5 to <4	4
c.	4 to <8	6
d.	8 to <12	8
e.	12 to <16	12
f.	>=16	15

2. Airflow Sensor Accuracy: ±2% of reading
3. Calibrated Range: 0-2500 FPM for duct applications and 5000 FPM for fan inlet applications
4. Temperature Sensor Accuracy: ±0.15°F
5. Temperature: -20°F to +140°F
6. Relative Humidity: 0 to 95% (non-condensing)

F. Provide transmitter that will average up to sixteen sensors and provide two field selectable linear analog output signals (4-20mA and 0-10 VDC) proportional to airflow and temperature. Sensor electronic circuitry other than the temperature sensors shall not be exposed to the air stream and shall be protected from moisture to prevent failure.

2.9 THERMOSTATS

A. Manufacturer: Basis-of-Design Product: The design is based on the following:

1. Honeywell TR71.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Erie Controls.
2. Danfoss Inc.; Air-Conditioning and Refrigeration Div.
3. Heat-Timer Corporation.
4. Sauter Controls Corporation.
5. Tekmar Control Systems, Inc.
6. Theben AG - Lumilite Control Technology, Inc.

C. Combination Thermostat and Fan Switches: Line-voltage thermostat with push-button or lever-operated fan switch.

1. Label switches "FAN ON-OFF" or "FAN HIGH-LOW-OFF" or "FAN HIGH-MED-LOW-OFF" based on system operation.
2. Mount on single electric switch box.

D. Electric, solid-state, microcomputer-based room thermostat with remote sensor and occupancy modes. (Type T1)
   1. Automatic switching from heating to cooling.
   2. Preferential rate control to minimize overshoot and deviation from set point.
   3. Set up for four separate temperatures per day.
   4. Instant override of set point for continuous or timed period from 1 hour to 31 days.
   5. Three-hour occupied override button.
   6. Short-cycle protection.
   7. Programming based on weekday, Saturday, and Sunday.
   8. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, fan on-auto, and occupied/unoccupied modes.
   9. Battery replacement without program loss.
   10. Minimum deadband temperature: 2 deg F.
   11. Control accuracy: +1 deg F.
   12. Multiple stage operation as required by equipment being controlled.
   13. Thermostat display features include the following:
      a. Time of day.
      b. Actual room temperature.
      c. Programmed temperature.
      d. Programmed time.
      e. Duration of timed override.
      f. Day of week.
      g. System mode indications include "heating," "cooling," "off," "fan auto," "fan on", "occupied," and "unoccupied."

E. Electric, solid-state, microcomputer-based room thermostat with remote sensor (Type T2).
   1. Automatic switching from heating to cooling.
   2. Preferential rate control to minimize overshoot and deviation from set point.
   3. Set up for four separate temperatures per day.
   4. Instant override of set point for continuous or timed period from 1 hour to 31 days.
   5. Short-cycle protection.
   6. Programming based on weekday, Saturday, and Sunday.
   7. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.
   8. Battery replacement without program loss.
   9. Minimum deadband temperature: 2 deg F.
   10. Control accuracy: +1 deg F.
   11. Multiple stage operation as required by equipment being controlled.
   12. Thermostat display features include the following:
      a. Time of day.
      b. Actual room temperature.
      c. Programmed temperature.
      d. Programmed time.
      e. Duration of timed override.
      f. Day of week.
      g. System mode indications include "heating," "cooling," "off," "fan auto," and "fan on."

F. Low-Voltage, On-Off Thermostats (Type T3): NEMA DC 3, 24-V, bimetal-operated, mercury-switch type, with adjustable or fixed anticipation heater, visible temperature reading, concealed set-point adjustment, 55 to 85 deg F set-point range, and 2 deg F maximum differential.

G. Line-Voltage, On-Off Thermostats (Type T4): Bimetal-actuated, open contact or bellows-actuated, enclosed, snap-switch or equivalent solid-state type, with heat anticipator; visible temperature reading, listed for electrical rating; with concealed set-point adjustment, 55 to 85 deg F set-point range, and 2 deg F maximum differential.
   1. Electric Heating Thermostats: Equip with off position on dial wired to break ungrounded conductors.
   2. Selector Switch: Integral, manual on-off-auto.

H. Remote-Bulb Thermostats (Type T5): On-off or modulating type, liquid filled to compensate for changes in ambient temperature; with copper capillary and bulb, unless otherwise indicated.
1. Bulbs in water lines with separate wells of same material as bulb.
2. Bulbs in air ducts with flanges and shields.
3. Averaging Elements: Copper tubing with either single- or multiple-unit elements, extended to cover full width of duct or unit; adequately supported.
4. Scale settings and differential settings are clearly visible and adjustable from front of instrument.
5. On-Off Thermostat: With precision snap switches and with electrical ratings required by application.
6. Modulating Thermostats: Construct so complete potentiometer coil and wiper assembly is removable for inspection or replacement without disturbing calibration of instrument.

I. Electric, Low-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual-reset switch that trips if temperature sensed across any 12 inches of bulb length is equal to or below set point.
1. Bulb Length: Minimum 1 foot (3 m) for every square foot of coil surface.
2. Quantity: One thermostat for every 20 sq. ft. of coil surface.

J. Electric, High-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual-reset switch that trips if temperature sensed across any 12 inches of bulb length is equal to or above set point.
1. Bulb Length: Minimum 20 feet.
2. Quantity: One thermostat for every 20 sq. ft. of coil surface.
3. Temperature Setpoint: 38 deg F, adjustable within 35 deg F to 45 deg F.

K. Heating/Cooling Valve-Top Thermostats: Proportional acting for proportional flow, with molded-rubber diaphragm, remote-bulb liquid-filled element, direct and reverse acting at minimum shutoff pressure of 25 psig and cast housing with position indicator and adjusting knob.

L. Hazardous Room Thermostats (Type T13): Equal to Johnson Controls A19BUC-2, line voltage, SPDT, single stage, external adjustment knob, external sensing coil secured to enclosure, and temperature sensing range 20 deg F to 80 deg F; for Class I or II, Group D, E, F, or G locations.

M. Thermostat Accessories:
1. Cover: Manufacturer's standard locking covers.
2. Guards: Locking; heavy-duty, transparent plastic; mounted on separate base
3. Insulating Bases: For sensors located on exterior walls.

2.10 ACTUATORS

A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action. Stroke time for 90-degree rotation 90 seconds or less for major equipment and 6 minutes or less for terminal equipment. Provide position feedback potentiometers connected to controller for closed loop control on major equipment analog control loops. Provide pilot positioners.
1. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
2. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
3. Nonspring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
4. Spring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running and breakaway torque of 150 in. x lbf.
5. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
6. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running and breakaway torque of 150 in. x lbf.
7. Provide external adjustable stops on damper actuators.

B. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. Stroke time for 90-degree rotation 90 seconds or less for major equipment and 6 minutes or less for terminal equipment. Provide

position feedback potentiometers connected to controller for closed loop control on major equipment analog control loops. Provide pilot positioners.

1. Manufacturers:
   a. Belimo Air Controls (USA), Inc.
2. Valves: Size for torque required for valve close off at maximum pump differential pressure. Provide operators and pilot positioners with linkages and brackets for mounting on control valve. Design mounting and/or support to provide no more than 5% hysteresis in either direction.
3. Dampers: Size for running torque calculated as follows:
   a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. of damper.
   b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
   c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft of damper.
   d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
   e. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
   f. Dampers with 3- to 4-Inch wg of Pressure Drop or Face Velocities of 2500 to 3000 fpm: Increase running torque by 2.0.
4. Coupling: V-bolt and V-shaped, toothed cradle.
5. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
6. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
7. Power Requirements (Two-Position Spring Return): 24-V ac.
8. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
9. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.
10. Temperature Rating: 40 to 104 deg F.
11. Temperature Rating (Smoke Dampers): Minus 22 to plus 250 deg F.
12. Run Time: 12 seconds open, 5 seconds closed.
13. Provide external adjustable stops on damper actuators.
14. Position Feedback:
    a. Two-position actuators with limits switches or other positive means of a position indication signal for remote monitoring of open and close position.
    b. Modulating actuators with a position feedback through current or voltage signal for remote monitoring. Add a 500 ohm resistor across a 4-20 mA signal to create a 2-10 VDC signal when required.
    c. Provide a position indicator and graduated scale on each actuator indicating open and closed travel limits.
    d. Provide auxiliary switches and feedback potentiometer for control valves and damper actuators for position indication. Belimo actuators and auxiliary switches are designed for IEC protection class II and double insulated.

2.11 CONTROL VALVES

A. Manufacturer: Basis-of-Design Product: The design is based on the following:
   1. Belimo Air Controls (USA), Inc.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Honeywell
   2. Siemens
   3. Johnson Controls, Inc.

C. Hydronic system control valves shall have the following characteristics:
   1. NPS 2 and Smaller:
      a. Class 125 bronze body, bronze trim, rising stem, renewable composition disc, and screwed ends with backseating capacity repackable under pressure.

b. Characterized Ball Valves: The following manufacturers are acceptable: Belimo, Air Controls (USA), and Johnson Controls. Forged brass or bronze body, stainless steel shaft and ball, reinforced Teflon or PTFE ball seals, double O-ring stem seals, characterized disk, maximum of ANSI Class IV (0.01%) leakage, suitable for use on water systems at 150 psig and 212° F. Minimum size for ball valves shall be 0.4 Cv.

1) Pressure Rating for NPS 1 and Smaller: Nominal 600 psi.
2) Pressure Rating for NPS 1-1/2 through NPS 2: Nominal 400 psi.
3) Close-off Pressure: 200 psig.
4) Process Temperature Range: Zero to 250 deg F.
5) Control Port Leakage: 0%
6) Body and Tail Piece: Cast bronze ASTM B61, ASTM B62, ASTM B584, or forged brass with nickel plating.
7) End Connections: Threaded (NPT) ends.
8) Ball: stainless steel.
9) Stem and Stem Extension:
10) Material to match ball.
11) Blowout-proof design.
12) Ball Seats: Reinforced PTFE.
13) Stem Seal: Reinforced PTFE packing ring with a threaded packing ring follower to retain the packing ring under design pressure with the linkage removed. Alternative means, such as EPDM O-rings, are acceptable if an equivalent cycle endurance can be demonstrated by testing.
14) Flow Characteristic: Equal percentage.

2. NPS 2-1/2 and Larger: Class 125 iron, bronze trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
3. Internal Construction: Replaceable plugs and stainless-steel or brass seats.

a. Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom.
b. Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom.

4. Sizing: 5-psig maximum pressure drop at design flow rate or the following:

a. Two Position: Line size.
b. Two-Way Modulating: Either the value specified above or twice the load pressure drop, whichever is more.
c. Three-Way Modulating: Twice the load pressure drop, but not more than value specified above.

5. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
6. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head for two-way valves and 100 percent of pressure differential across valve or 100 percent of total system (pump) head.

D. Butterfly Valves: 200-psig, 150-psig maximum pressure differential, ASTM A 126 cast-iron or ASTM A 536 ductile-iron body and bonnet, extended neck, stainless-steel stem, field-replaceable EPDM or Buna N sleeve and stem seals.
1. Body Style: Wafer or Lug.
2. Disc Type: Nickel-plated ductile iron or Elastomer-coated ductile iron.
3. Sizing: 1-psig maximum pressure drop at design flow rate.
4. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head for two-way valves and 100 percent of pressure differential across valve or 100 percent of total system (pump) head.

E. Terminal Unit Control Valves: Pressure Independent Control valve (PICV) Bronze body, bronze trim, two or three ports ball valve as indicated, replaceable plugs and seats, and union and threaded ends.
1. PICV equal to Belimo Zone Tight ball valve (PIQCV)
2. Combination of differential pressure regulator and 2-way valve.

3. Rating: Class 125 for service at 125 psig and 250 deg F operating conditions.
4. Sizing: 3-psig maximum pressure drop at design flow rate, to close against pump shutoff head.
5. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
6. Performance:
   a. Pressure Rating: 360 psig.
   b. Close-off pressure of 200 psig.
   c. Process Temperature Range: Between 36 deg F to 212 deg F.
   d. Rangeability: 100 to 1.
7. Integral Pressure Regulator: Located upstream of ball to regulate pressure, to maintain a constant pressure differential while operating within a pressure differential range of 5 to 50 psig.
8. Body: Forged brass, nickel plated, and with threaded ends.
9. Ball: Stainless steel.
10. Stem and Stem Extension: Stainless steel, blowout-proof design.
11. Ball Seats: Reinforced PTFE.
12. Stem Seal: Reinforced PTFE packing ring stem seal with threaded packing ring follower to retain the packing ring under design pressure with the linkage removed. Alternative means, such as EPDM O-rings, are acceptable if equivalent cycle endurance can be achieved.

F. All valves unless specifically noted on the plans or indicated below shall be globe style or Characterized Ball valves.

VALVE SERVING	**TYPE** Globe Butterfly (BF) Ball Press Independent Ball (PI Ball)	**SIGNAL** 0-10 VDC 2-Position Elect	**SPRING RETURN** REQUIRED Yes No	**FAIL POSITION** Open (thru Coil) Closed (bypass Coil) Last Position
Booster Reheat Coil	PICV Ball	0-10 VDC	No	Last Position
Radiation w/Reheat	PICV Ball	0-10 VDC	No	Last Position
Standalone Radiation	PICV Ball	0-10 VDC	No	Last Position
Radiant Manifolds	PICV Ball	0-10 VDC	No	Last Position
Unit Heaters	PICV Ball	2-Pos Elect	Yes	Open
MAU Heating Coil	Globe	0-10 VDC	Yes	Open
AHU Heating Coil	Globe	0-10 VDC	Yes	Open

2.12 DAMPERS

A. Manufacturer: Basis-of-Design Product: The design is based on the following:
   1. TAMCO 7000 (T. A. Morrison & Co. Inc.).

B. Manufacturers:
   1. Air Balance Inc.
   2. Don Park Inc.; Autodamp Div.
   3. United Enertech Corp.
   4. Vent Products Company, Inc.

C. Dampers: AMCA-rated, parallel or opposed-blade design; 0.108-inch-minimum thick, galvanized-steel or 0.125-inch-minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch-thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.
   1. Secure blades to 1/2-inch-diameter, zinc-plated axles using zinc-plated hardware, with oil-impregnated sintered bronze or nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.

2. Operating Temperature Range: From minus 40 to plus 200 deg F.
3. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
4. Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

D. High-Performance Control Dampers: AMCA-rated.
1. Frame: extruded-aluminum, 0.125-inch-minimum thick; frames with holes for duct mounting.
2. Blades: minimum 0.064-inch-thick aluminum with maximum blade width of 8 inches and length of 48 inches, with end caps.
3. Secure blades to 1/2-inch-diameter, zinc-plated axles using zinc-plated hardware, with Celcon inner bearing fixed to an aluminum hexagon blade pin rotating within a polycarbonate outer bearing inserted in the damper frame, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
4. Operating Temperature Range: From minus 40 to plus 200 deg F
5. Edge Seals: Use inflatable blade edging or replaceable silicone rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 1.7 cfm per sq. ft. of damper area, at differential pressure of 1-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

2.13 ELECTRICAL POWER DEVICES

A. Transformers:
1. Transformer shall be sized for the total connected load, plus an additional 25 percent of connected load.
2. Transformer shall be at least 100 VA.
3. Transformer shall have both primary and secondary fuses.

B. Power-Line Conditioner:
1. General Power-Line Conditioner Requirements:

a. Design to ensure maximum reliability, serviceability and performance.
b. Overall function of the power-line conditioner is to receive raw, polluted electrical power and purify it for use by electronic equipment. The power-line conditioner shall provide isolated, regulated, transient and noise-free sinusoidal power to loads served.

2. Standards: NRTL listed per UL 1012.
3. Performance:

a. Single phase, continuous, 100 percent duty rated KVA/KW capacity. Design to supply power for linear or nonlinear, high crest factor, resistive and reactive loads.
b. Automatically regulate output voltage to within 2 percent or better with input voltage fluctuations of plus 10 to minus 20 percent of nominal when system is loaded 100 percent. Use Variable Range Regulation to obtain improved line voltage regulation when operating under less than full load conditions.

1) At 75 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 35 percent of nominal.
2) At 50 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 40 percent of nominal.
3) At 25 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 45 percent of nominal.

c. With input voltage distortion of up to 40 percent, limit the output voltage sine wave to a maximum harmonic content of 5 percent.
d. Automatically regulate output voltage to within 2.5 percent when load (resistive) changes from zero percent to 100 percent to zero percent.

e. Output voltage returns to 95 percent of nominal level within two cycles and to 100 percent within three cycles when the output is taken from no load to full resistive load or vice-versa. Recovery from partial resistive load changes is corrected in a shorter period of time.
f. K Factor: 30, designed to operate with nonlinear, non-sinusoidal, high crest factor loads without overheating.
g. Input power factor within 0.95 approaching unity with load power factor as poor as 0.6.
h. Attenuate load-generated odd current harmonics 23 dB at the input.
i. Electrically isolate the primary from the secondary. Meet isolation criteria as defined in NFPA 70, Article 250-5D.
j. Lighting and Surge Protection: Compares to UL 1449 rating of 330 V when subjected to Category B3 (6000 V/3000 A) combination waveform as established by IEEE C62.41.
k. Common-mode noise attenuation of 140 dB.
l. Transverse-mode noise attenuation of 120 dB.
m. With loss of input power for up to 16.6 ms, the output sine wave remains at usable ac voltage levels.
n. Reliability of 200,000 hours' MTBF.
o. At full load, when measured at 1-m distance, audible noise is not to exceed 54 dB.
p. Approximately 92 percent efficient at full load.

4. Transformer Construction:

a. Ferroresonant, dry type, convection cooled, 600V class. Transformer windings of Class H (220 deg C) insulated copper.
b. Use a Class H installation system throughout with operating temperatures not to exceed 150 deg C over a 40-deg C ambient temperature.
c. Configure transformer primary for multi-input voltage. Include input terminals for source conductors and ground.
d. Manufacture transformer core using M-6 grade, grain-oriented, stress-relieved transformer steel.
e. Configure transformer secondary in a 240/120-V split with a 208-V tap or straight 120 V, depending on power output size.
f. Electrically isolate the transformer secondary windings from the primary windings. Bond neutral conductor to cabinet enclosure and output neutral terminal.
g. Include interface terminals for output power hot, neutral and ground conductors.
h. Label leads, wires and terminals to correspond with circuit wiring diagram.
i. Vacuum impregnate transformer with epoxy resin.

C. Transient Voltage Suppression and High-Frequency Noise Filter Unit:

1. The maximum continuous operating voltage shall be at least 125 percent.
2. The operating frequency range shall be 47 to 63 Hz.
3. Protection modes according to NEMA LS-1.
4. The rated single-pulse surge current capacity, for each mode of protection, shall be no less than the following:

a. Line to Neutral: 45,000 A.
b. Neutral to Ground: 45,000 A.
c. Line to Ground: 45,000 A.
d. Per Phase: 90,000 A.

5. Clamping voltages shall be in compliance with test and evaluation procedures defined in NEMA LS-1. Maximum clamping voltage shall be as follows:

a. Line to Neutral: 360 V.
b. Line to Ground: 360 V.
c. Neutral to Ground: 360 V.

6. Electromagnetic interference and RF interference noise rejection or attenuation values shall comply with test and evaluation procedures defined in NEMA LS-1.

   a. Line to Neutral:

      1) 100 kHz: 42 dB.
      2) 1 MHz: 25 dB.
      3) 10 MHz: 21 dB.
      4) 100 MHz: 36 dB.

   b. Line to Ground:

      1) 100 kHz: 16 dB.
      2) 1 MHz: 55 dB.
      3) 10 MHz: 81 dB.
      4) 100 MHz: 80 dB.

7. Unit shall have LED status indicator that extinguishes to indicate a failure.
8. Unit shall be listed by an NRTL as a transient voltage surge suppressor per UL 1449, and as an electromagnetic interference filter per UL 1283.
9. Unit shall not generate any appreciable magnetic field.
10. Unit shall not generate an audible noise.

D. DC Power Supply:

1. Plug-in style suitable for mating with a standard eight-pin octal socket. Include the power supply with a mating mounting socket.
2. Enclose circuitry in a housing.
3. Include both line and load regulation to ensure a stable output. To protect both the power supply and the load, power supply shall have an automatic-current limiting circuit.
4. Performance:

   a. Output voltage nominally 25-V dc within 5 percent.
   b. Output current up to 100 mA.
   c. Input voltage nominally 120-V ac, 60 Hz.
   d. Load regulation within 0.5 percent from zero- to 100-mA load.
   e. Line regulation within 0.5 percent at a 100-mA load for a 10 percent line change.
   f. Stability within 0.1 percent of rated volts for 24 hours after a 20-minute warmup.

2.14 CONTROL CABLE

A. Electronic and fiber-optic cables for control wiring are specified in Section 271500 "Communications Horizontal Cabling."

2.15 ANALOG ELECTRONIC INSTRUMENT INDICATORS

A. Panel mount type and at least 2" square.

B. Output: analog needle type or digital with ½" high LED or backlit LCD displays.

C. Marked in appropriate units (Degrees, PSI, %RH, GPM, CFM, etc.) and with appropriate range of values.

D. Minimum accuracy of 1% of scale range.

E. Digital units shall be scaled to show 3 digits plus 1 decimal point.

2.16 SWITCHES

A. Emergency Shutdown Pushbutton: Wall-mounted, mushroom-type momentary (reset through building automation system) pushbutton, pilot light or pushbutton illuminated after activation, NEMA 1, clear lifting cover, stainless steel cover plate, labeled "EMERGENCY VENTILATION STOP" or similar wording.
1. Available Manufacturers: Kele ST120SL.

B. Boiler Kill Switch: Kele WPS-MP-BS-CLM with auxiliary contacts Kele PILNCCB or equal. Switch shall be a push-pull maintained contact switch with clear hinged lockout lid and auxiliary contacts for DDC monitoring and each boiler. Labeling shall be provided to indicate switch is for Emergency Boiler Shut-Down and action required to reset.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditioned power supply is available to control units and operator workstation.

B. Verify that pneumatic piping and duct-, pipe-, and equipment-mounted devices are installed before proceeding with installation.

3.2 SYSTEM DESIGN

A. General Criteria:
1. Size all control devices to properly supply and/or operate and control the apparatus served.
2. Provide control devices suitable for the environment in which they will operate:

a. All devices shall be constructed to withstand system temperatures and pressures.
b. Devices used in outdoor ambient conditions shall be constructed to withstand those conditions or shall be suitably weather protected.
c. Devices in corrosive environments shall be constructed of materials to withstand the effects of that environment.

B. Control Dampers:
1. General:

a. Unless otherwise indicated, use opposed blade for modulating control dampers and use parallel blade dampers for two position (open/close) dampers and for mixing applications.
b. All blade linkage hardware shall have a corrosion resistant finish and be readily accessible for maintenance.
c. Damper construction material shall be the same as the connecting duct material. Exception: Aluminum damper may be used in a galvanized duct system.
d. Maximum single damper size shall be 48"x48". If total width or height exceeds maximum, use multiple dampers.
e. Locate actuators outside of the air stream, unless otherwise indicated.

2. Sizing/selection criteria:

a. Two position dampers shall be sized as close as possible to duct size but in no case is the damper to be less than duct area.
b. When damper is part of an intake louver assembly, damper shall be same nominal size as louver unless specified otherwise on drawings.
c. All dampers used for mixing of airstreams shall be sized for 1800 to 2000 feet per minute velocity.

3. All control dampers furnished by the control manufacturer are to be installed by the Mechanical Contractor under the coordinating control and supervision of the Control Contractor in locations shown on plans or where required to provide specified sequence of control
4. Damper end switches, where required, shall be independently mounted to the damper drive shaft or auxiliary shaft attached to a damper drive blade. End switches shall be adjusted to prove the damper the position opposite the fail position of the damper actuator unless the control sequence requires a different position to be proven to accomplish the specified control sequence.
5. Coordinate installation with the sheetmetal installer to obtain smooth duct transitions where damper size is different than duct size. Blank off plates will not be accepted.
6. Each operator shall serve a maximum damper area of 36 square feet. Where larger dampers are used, provide multiple operators.

C. Control Valves:
1. All temperature control valves furnished by the control manufacturer are to be installed by the Mechanical Contractor under the coordinating control and supervision of the Control Contractor in locations shown on plans or where required to provide specified sequence of control.
2. Sizing/selection criteria:

a. Valves with pressure drop greater than 50% of upstream pressure shall have sound reduction trim.
b. Water Service:

1) Characteristic: equal percentage for two-way valves; linear for three-way valves.
2) Select control valves based on pressure drop calculations based on C_v values at 100% stroke.
3) Heating: globe type, selected for a minimum of 25% of equipment subcircuit pressure drop but no more than maximum available pump head allowing 2 psi pressure drop for balancing valve.
4) Cooling: globe or butterfly type, selected for minimum of 10% of equipment subcircuit pressure drop, but not more than maximum pump head allowing minimum 2 psi pressure drop for balancing valve. Modulating butterfly valves shall be high performance type.

D. Air Temperature Sensors:
1. Ducts with cross-sectional area less than 3 square feet: single point type.
2. Ducts with cross-sectional area more than 3 square feet: RTD type.
3. Mixed air: averaging type

3.3 INSTALLATION

A. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.

B. Connect and configure equipment and software to achieve sequence of operation specified.
1. Check and verify location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation. Align with light switches and humidistats. For drywall installations, thermostat mounting shall use a back-box attached to a wall stud, drywall anchors are not acceptable.

C. Verify location of thermostats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above the floor.
1. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
2. Meet ADA requirements.
3. Locate temperature sensors away from direct sunlight, diffuser air streams, and heat sources.
4. Install thermostats and temperature sensors mounted on outside walls on insulated subbases. Subbase to provide a minimum of one half inch of insulation.
5. Install devices with visible readouts where the display can be easily read.

D. Install guards on thermostats in the following locations:
   1. Entrances.
   2. Public areas.
   3. Where indicated.
   4. Provide guards on thermostats and sensors in entrance hallways, other public areas, or in locations where thermostat is subject to physical damage.

E. Install automatic dampers according to Section 233300 "Air Duct Accessories."

F. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.

G. Install labels and nameplates to identify control components according to Section 230553 "Identification for HVAC Piping and Equipment."

H. Install hydronic instrument wells, valves, and other accessories according to Section 232116 Hydronic Piping Specialties."

I. Install refrigerant instrument wells, valves, and other accessories according to Section 232300 "Refrigerant Piping."

J. Install electronic and fiber-optic cables according to Section 271500 "Communications Horizontal Cabling."

K. Provide power wiring to each component requiring power, such as control panels. Use circuits dedicated for controls. For equipment on emergency power, use emergency power circuits for their controllers.

L. Mount all control devices in accessible locations.

M. Interposing Relays:
   1. Provide interposing relays necessary for interfacing to low voltage outputs with 120 VAC or line voltage motor control.

      a. Use Type C horsepower rated interposing relays for motors and electric heaters.
      b. Use Type K interposing relays for other general-purpose use.

N. Well-Mounted Sensors:
   1. Install thermal conducting compound.
   2. In pipe 2 ½ inches and smaller: install at elbow with tee fitting with well pointed upstream. Minimum 2" tee size.
   3. In pipe 3 inches and larger: install the element in the flow.

O. Low Limit Thermostats (Freezestats):
   1. Install low limit controls where indicated on the drawings or as specified. Unless otherwise indicated, install sensing element on the downstream side of heating coils.
   2. Mount units using flanges and element holders. Provide duct collars or bushings where sensing capillary passes through sheetmetal housings or ductwork; seal this penetration to eliminate air leakage. Mount the units in an accessible location as to allow for resetting after low limit trips while still meeting manufacturer's installation requirements for proper function.
   3. Distribute (serpentine) sensing element horizontally across the coil to cover every square foot of coil; on larger coils this may require more than one instrument. Install controls at accessible location with mounting brackets and element duct collars where required.

P. Liquid Flow Sensors
   1. Install where indicated on the drawings and details for flow sensing in hydronic piping systems. Do not install close to elbows, valves, or other piping specialties, which might affect the reading of the sensor; follow manufacturer's installation instructions.
   2. Location of remote mounted display shall be so that the flow measurement display shall be mounted four to five feet above finished floor. Refer to drawing detail for differential pressure transmitter piping detail.

All piping to and from sensors shall be by Section 23 21 13 and 23 22 13 contractor and shall comply with requirements of Sections 23 21 13 and 23 22 13.

Q. Pressure Transducers and High Limit Pressure Switches

1. Install capped tees in air piping at air pressure transducers for connection of calibration equipment. Capped tee shall consist of two inch poly tubing capped with a brass plug. Rubber caps are not acceptable. Install Petes Plugs fittings at each take-off from main piping for liquid pressure transducers for connection of calibration equipment.
2. Install differential pressure transducers for filter monitoring at the filter section of the air handling unless otherwise specified. All other differential or static pressure transducers and differential or static pressure high limit switches for air applications should be mounted in the temperature control panel serving the equipment being controlled or monitored. All devices mounted on equipment shall be mounted in a location that is at a maximum of five feet above the floor. For liquid applications, provide shutoff valves at piping takeoff points.

R. Air Flow Stations:

1. Install airflow stations in accordance with manufacturer's recommendations. Install straightening vanes upstream of unit where required per manufacturers recommendations.

S. Temperature Control Panels:

1. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. All control panel openings shall be plugged. Conduits and other penetrations on the top of the cabinets shall be sealed on the exterior of the cabinet with silicone caulk to resist water penetration. One cabinet may accommodate more than one system in same equipment room. Provide permanent printed labeling for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
2. Provide as-built control drawings of all systems served by each local panel in a location adjacent to or inside of panel cover. Provide a protective cover or envelope for drawings.

T. Carbon Dioxide (CO2) Sensor

1. Provide a Carbon Dioxide (CO2) sensor for conference areas and return ductwork for AHU-A1 and E1. Refer to plan for locations of devices.

U. Differential Pressure Switches:

1. Provide for each fan or pump specified or shown on point list. Provide shutoff valves at piping takeoff points. Readjust pressure and/or differential setpoints for proper operation after final balancing is completed.

V. Current Status Switches:

1. Provide for each fan or pump specified or shown on point list. Set threshold adjustment to indicate belt or coupling loss. Readjust threshold for proper operation after final balancing is completed. Use the variable frequency drive (VFD) integrated relay output for motor status, if provided on the VFD, in lieu of a discrete current switch.

W. HVAC System - Emergency Shutdown

1. Contractor to install wall-mounted pushbutton switches for shutdown of the HVAC systems at the main entry/exit for the Administration Building. Refer to plan for locations of devices.

X. Boiler System - Emergency Shutdown

1. Contractor to install two wall-mounted pushbutton switches for shutdown of the boiler system at the main entry/exit for the Mezzanine Level – Area B. Refer to plan for locations of devices.

3.4 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Section 260533 "Raceways and Boxes for Electrical Systems."

B. Install building wire and cable according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Install signal and communication cable according to Section 271500 "Communications Horizontal Cabling."
1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
2. Install cable in conduit in the following locations:
   a. Exposed areas, such as mechanical rooms and electrical rooms.
   b. Inaccessible concealed spaces, such as above gypboard ceilings and in concrete or furred walls.
3. Install exposed cable in raceway.
4. Install concealed cable in raceway.
5. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
6. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
7. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
8. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
9. Route wires parallel or perpendicular to the building structural elements.
10. Do not route wires across telephone equipment areas.
11. In enclosures, install wiring in plastic track.
12. In controllers, wrap and secure all wiring.
13. Install wires at least 3 inches away from hot surfaces, such as steam and hot water pipes.

D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

F. Where the sensor voltage exceeds the controller's allowed input voltage, modify the circuit with resistor(s) so that the input voltage to the controller is as high as practical and below the controller's limit.

G. Provide transient voltage surge protection according to Division 26.

H. For equipment powered by emergency power, provide power to the equipment's controller from an emergency power panel.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.6 ADJUSTING

A. Calibrating and Adjusting:
1. Calibrate instruments.
2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
   a. Use manufacturer's linearity curve to lineraize the signal from each sensor.
3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated. Factory calibration does not replace field calibration.
4. Control System Inputs and Outputs:
   a. Check analog inputs at 0, 50, and 100 percent of span.
   b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.

c. Check digital inputs using jumper wire.
d. Check digital outputs using ohmmeter to test for contact making or breaking.
e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.

5. Flow:

a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
b. Manually operate flow switches to verify that they make or break contact.

6. Pressure:

a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.

7. Temperature:

a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
b. Calibrate temperature switches to make or break contacts.

8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
10. Provide diagnostic and test instruments for calibration and adjustment of system.
11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other than normal occupancy hours for this purpose.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Division 01 "Demonstration and Training."

1. The first training session, minimum 8 hours, shall take place just prior to Substantial Completion. Training shall include system operation, maintenance procedures, and operating the system software. Submit O&M manuals at least one week prior to training session.
2. A follow-up training session, minimum 4 hours, shall take place approximately six months after Substantial Completion to assist troubleshooting answer questions.
3. A second follow-up training session, minimum 4 hours, shall take place approximately twelve months after Substantial Completion (just before the end of the warrantee period) to assist troubleshooting answer questions.

END OF SECTION 23 09 00

SECTION 23 83 16

RADIANT-HEATING HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes radiant-heating piping, including pipes, fittings, and piping specialties.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. PEX: Crosslinked polyethylene.

C. PEX/AL/PEX: Crosslinked polyethylene/aluminum/crosslinked polyethylene.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for piping, fittings, manifolds, specialties, and controls; include pressure and temperature ratings, oxygen-barrier performance, fire-performance characteristics, and water-flow and pressure-drop characteristics.
2. Provide product data for injection pumps and control valves

B. Shop Drawings: Show piping layout and details drawn to scale, including valves, manifolds, controls, and support assemblies, and their attachments to building structure.

1. Shop Drawing Scale: 1/4 inch = 1 foot.
2. Drawing(s) shall show proof of review and approval by radiant floor heating system manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For radiant-heating piping valves and equipment to include in operation and maintenance manuals.

1.6 WARRANTY

A. Manufacturer's standard twenty (20) year warranty on tubing.

B. Manufacturer's standard thirty-six (36) month warranty on manifolds and other auxiliary components.

PART 2 - PRODUCTS

2.1 PEX PIPE AND FITTINGS

A. Manufacturer Basis-of-Design Product: The design is based on the following:

1. Uponor- Radiant Rollout Mat.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. REHAU Incorporated.
2. Heatlink.
3. Watts Radiant, inc.; a Watts Water Technologies company.

C. Alternate for Roth XPert S5 or DuoPex S5- Pex C or may be substituted from the manufacturers listed in the following sections provided the materials of construction equal the basis of design, and the layout and scheduled performance is maintained. Final approval of substitutions will be determined by Architect/Engineer.
1. Roth XPert S5 with EVERLOC® Fitting System
2. Roth DuoPex S5 or Pex C

D. Pipe Material: PEX plastic according to ASTM F 876, PEX A.

E. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.10 mg per cu. m/day at 104 deg F according to DIN 4726.

F. Fittings: ASTM F 1807, metal insert and copper crimp rings for cold expansion fittings with reinforcing rings.
1. Uponor ProPEX® Fitting System
2. Sioux Chief PowerPEX™ F1960 Fitting System

G. Pressure/Temperature Rating: Minimum 100 psig and 180 deg F.

2.2 DISTRIBUTION MANIFOLDS

A. Manifold: Minimum NPS 1, brass or stainless steel.

B. Main Shutoff Valves:
1. Mount on supply and return connections.
2. Shut-off valves are specified in Section 230523 - "General-duty valves for HVAC Piping."

C. Manual Air Vents:
1. Mount on supply and return connections.
2. Manual air vents are specified in Section 232116 – "Hydronic Piping Specialties."

D. Balancing Valves:
1. Mount on return connections.
2. Balancing valves are specified in Section 232116 – "Hydronic Piping Specialties."

E. Zone Control Valves:
1. Temperature-control devices and sequence of operations are specified in Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence of Operations for HVAC Controls."

F. Mounting Brackets: Copper, or plastic- or copper-clad steel, where in contact with manifold.

G. Manifold Radiant Cabinets:

1. Contractor to provide radiant manifold cabinets for recessed wall cabinet and surface mounted enclosures. Manufacturer's standard recessed manifold cabinets 22 gauge shall be used. For surface mounted cabinet, the contractor to provide custom cabinetry with a minimum 18 gauge. Cabinetry shall be factory painted with a custom color. Architect to select a custom color for cabinetry. Provide cabinet one or two coin/screwdriver locks per door.

a. Badger Sheetmetal or equivalent for fabrication the cabinetry

2. Refer to the Architectural drawings for surface and recessed cabinetry location.

H. Mounting Brackets: Copper, or plastic- or copper-clad steel, where in contact with manifold.

2.3 PIPING SPECIALTIES

A. Cable Ties:

1. Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
2. Minimum Width: 1/8 inch.
3. Tensile Strength: 20 lb, minimum.
4. Temperature Range: Minus 40 to plus 185 deg F.

B. Floor Mounting Staples:

1. Steel, with corrosion-resistant coating and smooth finish without sharp edges.
2. Minimum Thickness: 3/32 inch.
3. Width: Minimum, wider than tubing.

C. Floor Mounting Clamps:

1. Two bolts, steel, with corrosion-resistant coating and smooth finish without sharp edges.
2. Minimum Thickness: 3/32 inch.
3. Width: Minimum, wider than tubing.

D. Floor Mounting Tracks:

1. Aluminum or plastic channel track with smooth finish and no sharp edges.
2. Minimum Thickness: 1/16 inch.
3. Slot Width: Snap fit to hold tubing.
4. Slot Spacing: 2-inch intervals.
5. Rehau "Octa Rail" or equivalent

2.4 CONTROLS

A. Temperature-control devices and sequence of operations are specified in Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence of Operations for HVAC Controls."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and substrates to receive radiant-heating piping for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Ensure that surfaces and pipes in contact with radiant-heating piping are free of burrs and sharp protrusions.
2. Ensure that surfaces and substrates are level and plumb.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Install the following types of radiant-heating piping for the applications described:

1. Piping in Interior Reinforced-Concrete Floors: PEX.

3.3 PRE-INSTALLATION CONFERENCE

A. 90 days prior to beginning of the installation of radiant heating hydronic piping, the contractor shall conduct a conference with the Architect/Engineer, Owner's Project Representative, Commissioning Provider (CxP) and the mechanical system and temperature control system installing Contractors. Provide AE and CxP with a complete copy of the radiant piping system with dimensions and system piping diagrams for the project. The objective is final coordination and verification of system operation and readiness for installation procedures and scheduling procedures with the above mentioned parties. Indicate work required to be completed prior to installation and identify the party responsible for completion of that work.

3.4 INSTALLATION

A. Engage a factory-authorized service representative to perform field inspections for installation of radiant heating hydronic piping. Install Uponor "Roll-Out" mats per manufacturer's requirements.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings or coordination drawings.

C. Install radiant-heating piping continuous from the manifold through the heated panel and back to the manifold without piping joints in heated panels.

1. If a fitting must be installed in the concrete slab it must be protected with a HDPE shrink sleeve as recommended by the manufacturer and must be approved by the engineer.

D. Contractor shall install the product "Octa Rail" or equivalent for securing Pex tubing to board insulation. fastened to insulation every 3 to 5 ft. using appropriate pins or nails. PEX tubing snaps easily into the pre-cut Rail grooves. Rail length is 3.4 feet and 1.25-inch high. Connect radiant piping to manifold in a reverse-return arrangement.

E. Do not bend pipes in radii smaller than manufacturer's minimum bend radius dimensions.

F. Install manifolds in accessible locations or install access panels to provide maintenance access as required in Division 08 "Access Doors and Frames."

G. Comply with requirements in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties" for pipes and connections to hydronic systems and for glycol-solution fill requirements.

H. Fire- and Smoke-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials according to Division 07 "Penetration Firestopping."

I. Piping in Interior Reinforced-Concrete Floors:

1. Secure piping in concrete floors by attaching pipes to reinforcement using cable ties.
2. Space cable ties a maximum of 18 inches o.c. and at center of turns or bends.
3. Maintain 2-inch minimum cover.
4. Install a sleeve of 3/8-inch-thick, foam-type insulation or PE pipe around tubing and extending for a minimum of 10 inches on each side of slab joints to protect the tubing passing through expansion or control joints. Anchor sleeve to slab form at control joints to provide maximum clearance for saw cut.
5. Maintain minimum 40-psig pressure in piping during concrete placement and continue for 24 hours after placement.

J. Revise locations and elevations from those indicated as required to suit field conditions and ensure integrity of piping and as approved by Architect.

K. After system balancing has been completed, mark balancing valves to permanently indicate final position.

L. Perform the following adjustments before operating the system:

1. Open valves to fully open position.
2. Check operation of automatic valves.
3. Set temperature controls so all zones call for full flow.
4. Purge air from piping.

M. After concrete or plaster heating panel has cured as recommended by concrete or plaster supplier, operate radiant-heating system as follows:

1. Start system heating at a maximum of 10 deg F above the ambient radiant-panel temperature and increase 10 deg F each following day until design temperature is achieved.
2. For freeze protection, operate at a minimum of 60 deg F supply-water temperature.

N. Maximum loop lengths shall be:

1. 5/8" diameter tubing: 500 ft.
2. 3/4" diameter tubing: 500 ft.

O. Tubing connections shall be made with compression fittings supplied by manufacturer. Fittings from other sources are not acceptable.

P. Extend power wiring from fused disconnect to electrical junction box on unit.

1. Install thermostat or sensor in indicated location, provide line or low voltage wiring from thermostat to electrical junction box on unit.
2. Comply with Division 16 specifications for wiring.

Q. All fittings shall be accessible for maintenance.

R. Acceptable tube spacing: 6" to 9" O.C.

1. When underfloor tubing is routed adjacent to an exterior wall having an excess of 30% glass area, tubing spacing shall be 6" o.c. within 12" of exterior wall.

S. When installing the tubing the joint must be made immediately or capped with tape to seal the tube from contaminants.

T. All circuits will be labeled and marked as supply and return. The contractor will submit a record of actual tube circuit length for final balancing purposes.

3.5 FIELD QUALITY CONTROL

A. Prepare radiant-heating piping for testing as follows:

1. Open all isolation valves and close bypass valves.
2. Open and verify operation of zone control valves.
3. Flush with clean water and clean strainers.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Leak Test: After installation, charge system and test for leaks. Subject piping to hydrostatic test pressure that is not less than 1.5 times the design pressure but not more than 100 psig. Repair leaks and retest until no leaks exist.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Radiant-heating piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Protect hydronic piping system from damage during construction.

END OF SECTION 23 83 16

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:

1. Common ground bonding with lightning protection system.

1.3. ACTION SUBMITTALS

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

1.4. INFORMATIONAL SUBMITTALS

A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:

1. Test wells.
2. Ground rods.
3. Grounding arrangements and connections for separately derived systems.

B. Qualification Data: For qualified testing agency and testing agency's field supervisor.

C. Field quality-control reports.

1.5. CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Instructions for periodic testing and inspection of grounding features at test wells, ground rings, and grounding connections for separately derived systems based on NETA MTS.

a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
b. Include recommended testing intervals.

2. NFPA 99 grounding test results for patient care areas.

1.6. QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Predrilled rectangular bars of 1/4 inches annealed copper, minimum 4 by 20 inches in main electrical rooms and minimum 4 by 10 inches in all other areas, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Panduit: Irreversible compression connectors.
2. Erico: Welded connectors.

B. Listed and labeled by a NRTL acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

C. Bolted Connectors for Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

D. Welded Connectors: Exothermic-welding kits, low-emission, electric-starting types and of types recommended by kit manufacturer for materials being joined and installation conditions.

E. Compression Connectors: Irreversible type meeting IEEE standard 837-2002 and UL listed.

F. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.01 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, sectional type; 3/4-inch diameter by10 feet.

B. Grounding Test Wells:

1. Well Pipe: 8-inch by 24-inch-long pipe with belled end.
2. Well Cover: Cast iron with legend "GROUND" embossed on cover. Provide bolted, traffic rated cover.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.

C. Grounding Bus: Install in all electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus bar on insulated spacers 1 inch, minimum, from wall 18 inches above finished floor, unless otherwise indicated.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors.
3. Connections to Ground Rods at Test Wells: Welded connectors.
4. Connections to Structural Steel: Welded connectors.
5. Aboveground Accessible Connections: Irreversible compression or welded connectors.
6. Connections in areas that may be a fire hazard to use welded connectors: Irreversible compression connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits. Terminate each end on suitable lug, bus or bushing.

B. Bond equipment grounding terminal bars of the normal and emergency electrical system panelboards that serve the same patient area with an insulated continuous copper conductor not smaller than 8 AWG.

C. Provide grounding and bonding in patient care areas to meet requirements of NFPA 99 and Regulatory Requirements.

D. Bond fuel storage tanks and associated metallic piping systems to building ground system.

E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide insulated grounding conductor in raceway (minimum 4 AWG) from the main service copper bus bar to each service location(s), terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a copper grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
3. Bond all cable tray, metallic conduits, and equipment racks with minimum 6 AWG to copper bus bar.

3.3 INSTALLATION

A. Install Products in accordance with manufacturer's instructions and NECA 331.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Ground Rods: Drive rods until tops are 12 inches below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.

D. Test Wells: Install at each ground rod. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts. Bond together metal siding not attached to grounded structure and bond to grounding electrode system.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Grounding and Bonding for dry type transformers:

1. Step-down transformer secondaries shall be grounded to the nearest electrical room ground bus bar. Also, bond the grounded conductor of the transformer to the nearest available point of the interior metal water piping system in the area served by the transformer in accordance with NEC Article 250-104.

H. Grounding for Steel Building Structure:
1. Install insulated copper grounding conductor in conduit from main electrical service copper bus bar to building structural steel.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor sized the same as building grounding electrode conductor and shall not be smaller than 4 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Locate at or near bottom of footing with minimum 2 inches concrete encasement.
3. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.4 TERMINATIONS AND CONNECTIONS

A. Make terminations and connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Test Wells: Use exothermic welded connections.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 LABELING

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

1. Manufacturer's Field Service – Electrolytic Grounding System: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.
4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

D. Grounding system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).

G. Excessive Ground Resistance: If resistance to ground exceeds specified values above, provide additional grounding electrodes to meet values above.

H. Provide a grounding system test in accordance with NFPA-99 for all patient care areas. Include test results in close-out documents. A Hampden Ground Integrity Tester Model MVO-1-PB or equivalent shall be used for grounding system test.

END OF SECTION 26 05 26

SECTION 31 32 19

GEOTEXTILES

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Geotextiles for areas below base course and below riprap.

1.2 REFERENCES

A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

B. Reference the City of Madison Standard Specifications for Public Works Construction, latest edition. The City of Madison Standard Specifications for Public Works Construction, latest edition, takes precedence over this specification section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Geotextile to be placed below riprap shall be Mirafi 180N, or equal.

B. Geotextile, if needed, below base course shall be Mirafi 600X, or equal. —03ADD

PART 3 - EXECUTION

3.1 INSTALLATION

A. Geotextile shall be installed in accordance with manufacturer's recommendations.

B. Geotextile shall be lapped a minimum of 24 inches.

C. CONTRACTOR shall protect the construction fabric from exposure to the sun until installation. Construction fabric shall be covered with stone or soil immediately upon placement.

END OF SECTION 31 32 19

SECTION 32 11 00

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Aggregate base course for roads and parking areas.

B. CONTRACTOR is cautioned that existing private and public roads and shoulders may not hold up to typical construction traffic or activities. CONTRACTOR shall repair all roads, shoulders, and gravel areas damaged in accordance with this section. All paved areas shall also be repaired in accordance with Section 32 11 26–Hot Mix Asphalt Paving.

1.2 REFERENCES

A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

B. Reference the City of Madison Standard Specifications for Public Works Construction, latest edition. The City of Madison Standard Specifications for Public Works Construction, latest edition, takes precedence over this specification section.

1.3 DEFINITIONS

A. Street or road shall include streets, roads, driveways, and parking lots.

1.4 SUBMITTALS

A. Submit sieve analysis for proposed materials.

1.5 DRAINAGE DURING CONSTRUCTION

A. CONTRACTOR shall comply with the provisions of Section 205.3.3 of the Standard Specifications.

PART 2 - PRODUCTS

03ADD

2.1 AGGREGATES

A. Aggregate for base course shall meet the requirements of Article 401–Crushed Aggregate Base Course of the City of Madison Standard Specifications for Public Works Construction, latest edition.

B. Base course shall be uniformly graded and shall conform to the Article 401.1(b). The 6-inch lower layer shall be Gradation 1 and the 6-inch upper layer shall be Gradation 2.

PART 3 - EXECUTION

3.1 PREPARATION

A. The subgrade shall be graded and rolled to provide uniform density and shall comply with the elevations contained in the drawings. All street subgrade in cut areas and all areas to receive fill shall be proof-rolled in the presence of OWNER or ENGINEER with a heavily loaded triaxle dump truck or similar equipment prior to the placement of any fill materials or base course. The subgrade shall be prepared in accordance with Section 31 23 00–Excavation, Fill, Backfill, and Grading, and also with Section 211 of the Standard Specifications.

3.2 CONSTRUCTION

A. Base course grade shall be set to allow placement of 5-inch thickness of asphaltic pavement.

B. Depth of base course below asphaltic pavement shall be 12 inches.

C. Each layer of base course shall be wetted and rolled to provide maximum compaction in accordance with Section 305 of the Standard Specifications.

D. The finished base course shall be fine graded in preparation for paving.

E. After final grading, CONTRACTOR shall maintain the base course until asphaltic paving work has been completed.

END OF SECTION 32 11 00

SECTION 32 11 26

HOT MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes Hot Mix Asphalt (HMA) paving, tack coat, and casting adjustments.

1.2 REFERENCES

A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

B. Reference the City of Madison Standard Specifications for Public Works Construction, latest edition. The City of Madison Standard Specifications for Public Works Construction, latest edition, takes precedence over this specification section.

1.3 DEFINITIONS

A. Street or road shall include streets, roads, driveways, and parking lots.

1.4 SUBMITTALS

A. Prior to the commencement of paving, mix designs and aggregate sieve analysis shall be submitted.

PART 2 - PRODUCTS

03ADD

2.1 HMA PAVEMENT

A. Asphaltic mix shall be MT 58-28 H for both the lower layer and upper layer for all asphalt areas, except for the 41-stall employee parking lot near the western detention basin, where the asphalt mix shall be LT 58-28 S for both the lower layer and upper layer.

B. Aggregate shall conform to the requirements of Section 460.2.2 of the Standard Specifications. Aggregate for the lower layer shall be nominal size of 19 mm. Aggregate for the upper layer shall be nominal size of 12.5 mm.

C. Asphaltic pavement lower layer shall be 3 inches minimum. Asphaltic pavement upper layer shall be 2 inches minimum. Asphaltic pavement upper layer shall be 2 inches minimum at the milled asphaltic pavement on Nakoosa Trail.

D. Materials for tack coat shall conform to the requirements of Section 455.2.5 and shall be MS-2, SS-1, SS-1h, CSS-1 or CSS-1h.

E. Pavement markings shall be yellow and shall conform to Section 646. If not otherwise specified, pavement markings shall have a minimum width of 4 inches. Diagonal pavement markings shall be 4 inches wide and 36 inches on center.

PART 3 - EXECUTION

3.1 ALLOWABLE REMOVAL OF PAVEMENT

A. CONTRACTOR shall remove asphalt pavement and road surface as a part of the general excavation. The width of pavement removed shall be the minimum possible and acceptable for convenient and safe installation of structures, utilities, and appurtenances.

B. All asphalt pavement shall be cut on neat, straight lines and shall not be damaged beyond the limits of the excavation. Should the cut edge be damaged, a new cut shall be made in neat, straight lines parallel to the original cut encompassing all damaged areas. Pavement removal shall be extended to a seam or joint if seam or joint is within 3 feet of damaged pavement.

3.2 CASTING ADJUSTMENTS

A. All new and existing manhole castings and valve boxes within the paving limits, which require adjustment, shall be adjusted to match the finished asphaltic surface. Adjustments shall not be made greater than 48 hours prior to the anticipated time of paving. CONTRACTOR shall furnish Class 1 barricades with flashers on all adjusted castings until paving has been completed. Tops of castings and valve boxes shall be oiled or protected by other methods to prevent sealing of lids and filling of lift holes during paving. Upon completion of paving operations, CONTRACTOR shall check all castings and valve boxes to see that the lids are clean and operational. Manhole casting adjustment shall be included in the cost of other items of work, and no further compensation will be made. Valve box adjustment shall be considered an incidental item of work.

3.3 TACK COAT

A. All work shall be in accordance with the Standard Specifications.

B. If asphaltic upper layer is applied to an existing street or is not applied the same day as lower layer, the existing street or lower layer shall be tack coated prior to surface paving. Prior to placement of tack coat, the streets shall be thoroughly cleaned and broomed. Tack coat shall be applied at a rate of 0.10 gallons per square yard immediately prior to placement of asphaltic upper layer.

C. In situations where traffic must be maintained, tack coat shall not be placed on the traveled half of the street until traffic can be switched to the new pavement.

3.4 JOINTS

A. Joints between old and new pavements or between successive day's work shall be constructed and treated as to provide thorough and continuous bond between the old and new mixtures. Transverse construction joints shall be constructed by cutting the material back for its full depth so as to expose the full depth of the course. Where a header is used, the cutting may be omitted provided the joint conforms to the specified thickness. These joints shall be treated with tack coat material applied with a hose and spray nozzle attachment to fully coat the joint surface.

B. The longitudinal joint shall be made by overlapping the screed on the previously laid material for a width of not more than 2 inches and depositing a sufficient amount of asphaltic mixture so that the finished joint will be smooth and tight. Longitudinal joints in the upper layer shall at no time be placed immediately over similar joints in the lower layer beneath. A minimum distance of 12 inches shall be permitted between the location of the joints in the lower layer and the location of similar joints in the upper layer above.

C. All costs for furnishing and applying tack coat to butt joints as specified above shall be considered incidental.

3.5 FINISHING ROADWAY

A. The finished base course shall be fine-graded in preparation for HMA paving. Base course ramps at all existing pavement shall be removed to provide a full depth butt joint. Base course around manhole castings and valve boxes shall be hand-trimmed and compacted with a vibratory plate compactor.

B. This item shall include all of the following preparatory and finishing items and any other incidental items of work required for construction. Asphaltic ramps around manholes on existing lower layer to receive upper layer shall be removed. Asphaltic ramps shall be installed on all manholes and at all butt joints in areas to receive lower layer only.

C. Finishing roadway shall be considered incidental to HMA paving.

D. Paint all markings as shown on drawings with lines not less than 4 inches wide.

3.6 TESTING HOT MIX ASPHALT

A. ENGINEER may require samples of HMA pavement for testing. CONTRACTOR shall cut samples from the finished pavement where marked by ENGINEER and patch the sample area.

3.7 HOT MIX ASPHALT PAVING

A. HMA paving work shall include the construction of plant-mixed hot mix asphalt pavement in the areas shown on the drawings. All work shall be performed in accordance with Section 460 of the Standard Specifications.

B. Prior to commencement of paving operations, CONTRACTOR shall examine the finished road bed. CONTRACTOR shall notify ENGINEER of any areas of suspected instability.

3.8 MILLED ASPHATIC PAVEMENT

A. Mill the existing asphaltic pavement to a depth of 2 inches on Nakoosa Trail for the area as shown on the drawings.

END OF SECTION 32 11 26

21611 Existing Equipment Datasheet

Manufacturer:	**Quincy**						**Dimensions**		**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:	**Quincy QT-10**							**Equipment**	**70**		**29**		**55**	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**	**Left** --- **Right** ---		**Front** --- **Back** ---		**Above** --- **Below** ---	
DISCIPLINE COORDINATION:														
Architectural	Coordinate size of housekeeping pad with equipment. Pad size should be appropriate to match functional requirements and work with other							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Structural	'Coordinate size of housekeeping pad with equipment. Pad size should be appropriate to match functional requirements and work with other							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Mechanical	---							**Venting**	Connection (inches)		---			
									Volume (CFM)		---			
Electrical	---							**Connection Size**	Requirements	---	---	---		
									Voltage	**30/46**	---	---		
									Phase	**3**	---	---		
									Horsepower (HP)	**10**	---	---		
									Amps	**28/14**	---	---		
								Connection Type	**Provide disconnect**					
Plumbing	Locate floor sink on housekeeping pad; provide 2 inch floor sink to sand-oil interceptor.							**Domestic Water**	Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
								Natural Gas	Connection (inches)		---			
									Capacity (BTU)		---			
								Drain	Floor Drain (Y/N)		**Y**			
								Compressed Air	Connection (inches)		**3/4**			
									Volume (CFM)		---			
									Capacity (PSI)		---			

Equipment Description:

Compressor, air, receiver mounted, 10 HP duplex

EQ ID Number:

21611

21611 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Compressor, air, receiver mounted, 10 HP duplex	**21611**

Manufacturer: Quincy **Model No.:** Quincy QT-10



21612 Existing Equipment Datasheet

Manufacturer:		**Quincy**						**Dimensions**		**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:		**Quincy QT-15**							**Equipment**	**70**		**29**		**55**	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**	**Left** / **Right**	--- / ---		**Front** / **Back**	--- / ---	**Above** / **Below**	--- / ---
DISCIPLINE COORDINATION:															
Architectural		Coordinate size of housekeeping pad with equipment. Pad size should be appropriate to match functional requirements and work with other elements						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Structural		'Coordinate size of housekeeping pad with equipment. Pad size should be appropriate to match functional requirements and work with other elements						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Mechanical		---						**Venting**		Connection (inches)		---			
										Volume (CFM)		---			
Electrical		---						**Connection Size**		Requirements	---	---	---		
										Voltage	---	---	---		
										Phase	---	---	---		
										Horsepower (HP)	---	---	---		
										Amps	---	---	---		
								Connection Type		**Provide disconnect**					
Plumbing		Locate floor sink on housekeeping pad; provide 2 inch floor sink to sand-oil interceptor.						**Domestic Water**		Connection (inches)		---			
										Flow Rate (GPM)		---			
										Capacity (PSI)		---			
								Natural Gas		Connection (inches)		---			
										Capacity (BTU)		---			
								Drain		Floor Drain (Y/N)		**Y**			
								Compressed Air		Connection (inches)		**3/4**			
										Volume (CFM)		---			
										Capacity (PSI)		---			

Equipment Description:

Compressor, air, receiver mounted, 15 HP duplex

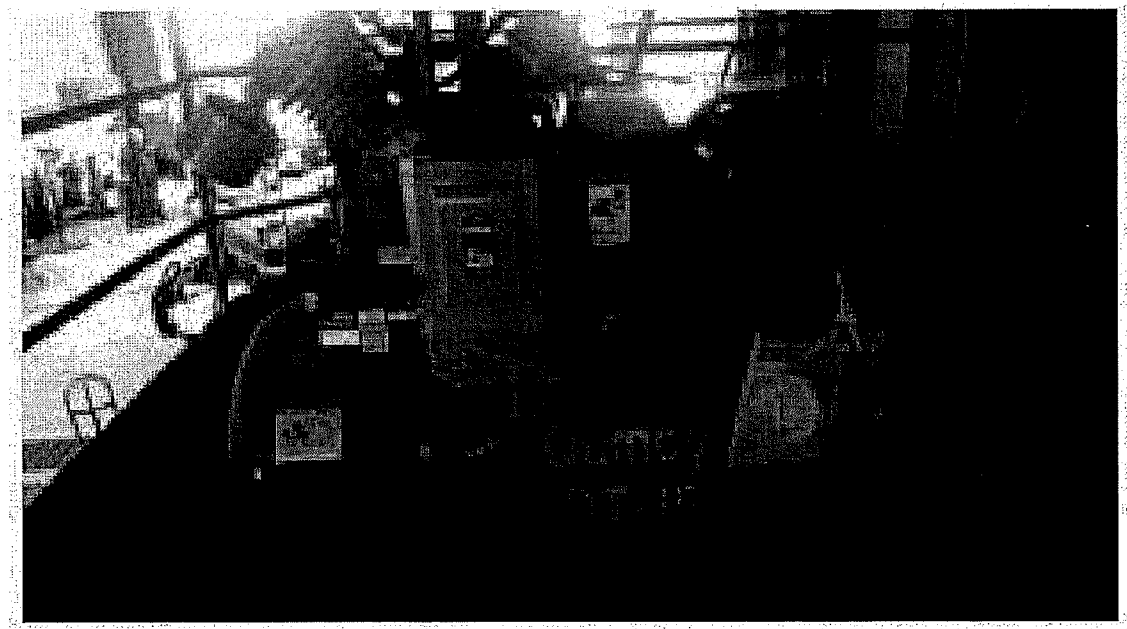
EQ ID Number:

21612

21612 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Compressor, air, receiver mounted, 15 HP duplex	**21612**

Manufacturer: Quincy **Model No.:** Quincy QT-15



24401 Existing Equipment Datasheet

Manufacturer:	Corghi							**Dimensions**	**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:	HD1200 E (2005)							**Equipment**	---		---		---	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**	**Left** --- **Right** ---		**Front** --- **Back** ---		**Above** --- **Below** ---	
DISCIPLINE COORDINATION:														
Architectural	---							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)				**N**	
Structural	---							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)				**N**	
Mechanical	---							**Venting**	Connection (inches)				---	
									Volume (CFM)				---	
Electrical	---							**Connection Size**	Requirements	---	---	---		
									Voltage	**230**	---	---		
									Phase	**3**	---	---		
									Horsepower (HP)	---	---	---		
									Amps	**40**	---	---		
								Connection Type	---					
Plumbing	---							**Domestic Water**	Connection (inches)				---	
									Flow Rate (GPM)				---	
									Capacity (PSI)				---	
								Natural Gas	Connection (inches)				---	
									Capacity (BTU)				---	
								Drain	Floor Drain (Y/N)				**N**	
								Compressed Air	Connection (inches)				**3/4**	
									Volume (CFM)				---	
									Capacity (PSI)				---	

Equipment Description:

Changer, tire, auto

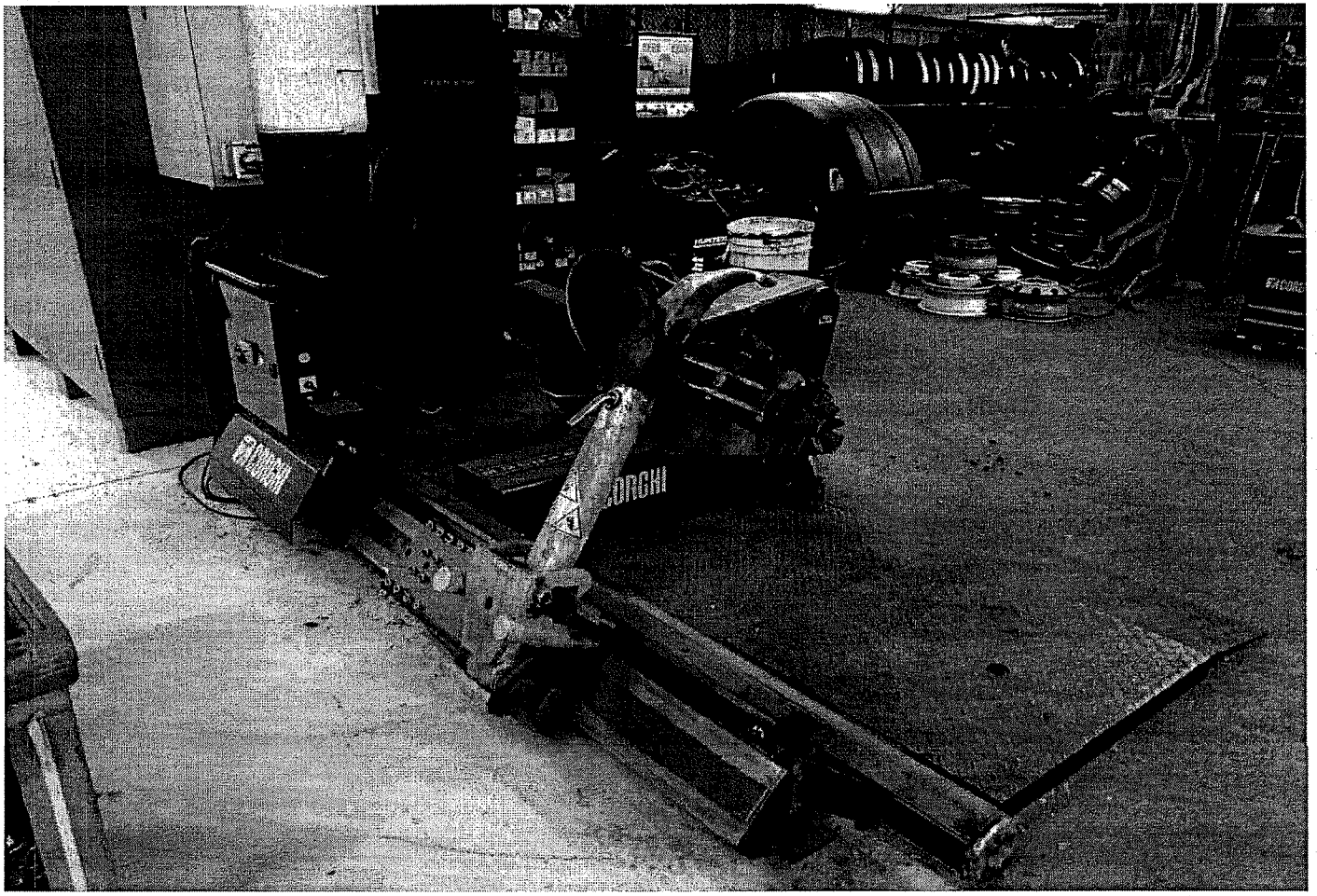
EQ ID Number:

24401

24401 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Changer, tire, auto	**24401**

Manufacturer: Corghi **Model No.:** HD1200 E (2005)



57091 Existing Equipment Datasheet

Manufacturer:		**Rotary**						**Dimensions**		**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:		**SPOA9-200**						**Equipment**		**120**		**138**		**140**	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**		**Left** --- **Right** ---		**Front** --- **Back** ---		**Above** --- **Below** ---	
DISCIPLINE COORDINATION:															
Architectural		---						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Structural		---						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Mechanical		---						**Venting**		Connection (inches)		---			
										Volume (CFM)		---			
Electrical		---						**Connection Size**		Requirements	**Unit**	---	---		
										Voltage	**208/230**	---	---		
										Phase	**1**	---	---		
										Horsepower (HP)	**2**	---	---		
										Amps	**12.6**	---	---		
								Connection Type		**Provide disconnect**					
Plumbing		---						**Domestic Water**		Connection (inches)		---			
										Flow Rate (GPM)		---			
										Capacity (PSI)		---			
								Natural Gas		Connection (inches)		---			
										Capacity (BTU)		---			
								Drain		Floor Drain (Y/N)		**N**			
								Compressed Air		Connection (inches)		---			
										Volume (CFM)		---			
										Capacity (PSI)		---			

Equipment Description:

Lift, surface mounted, twin-post, 9,000 pounds

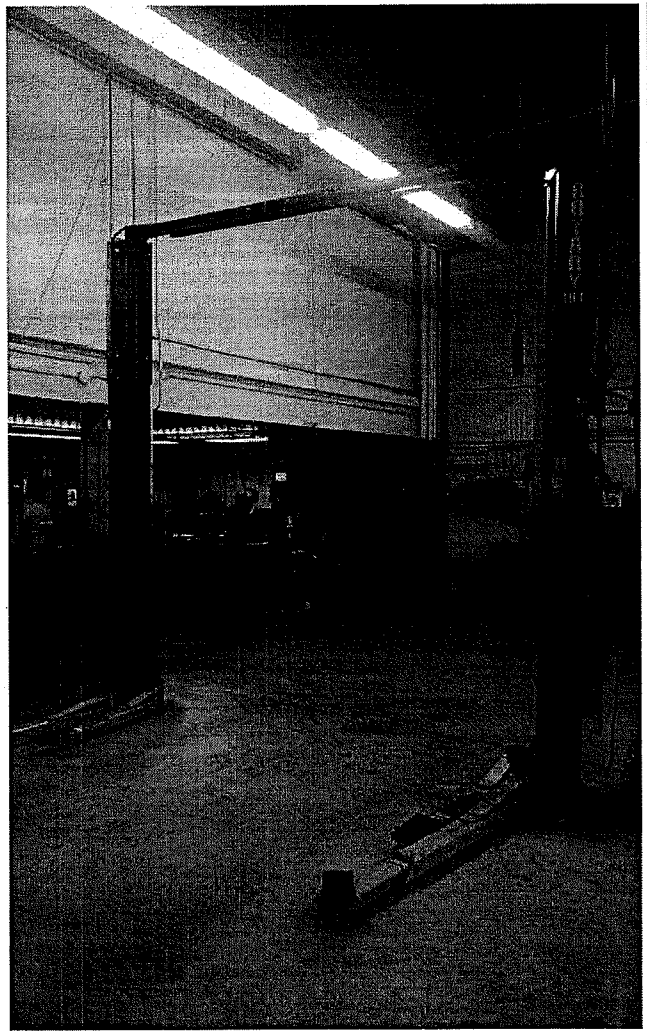
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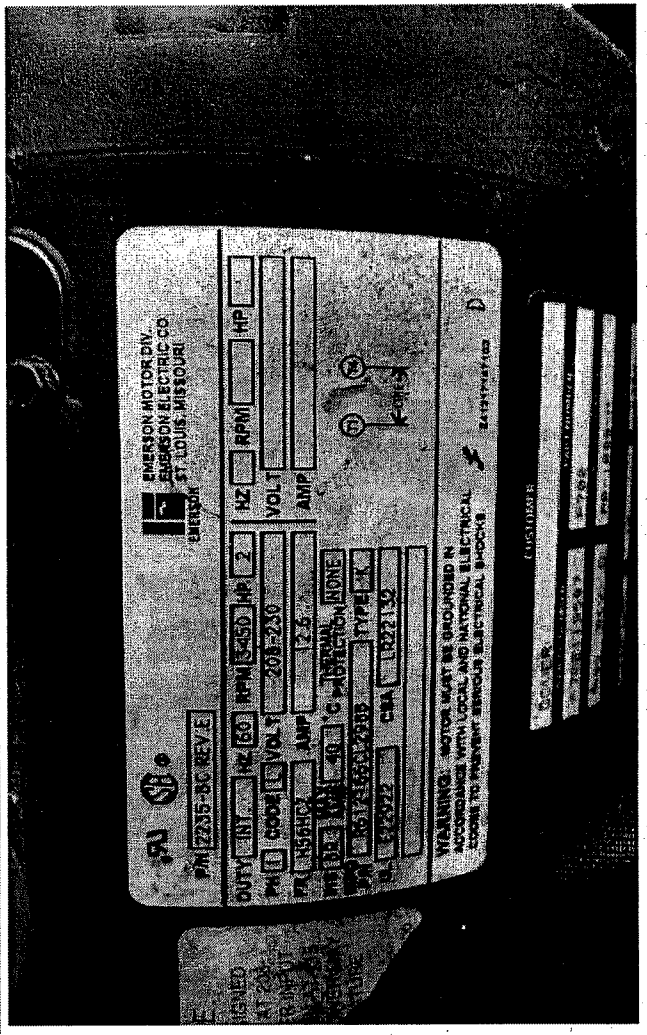
57091

57091 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Lift, surface mounted, twin-post, 9,000 pounds	**57091**

Manufacturer: Rotary **Model No.:** SPOA9-200





57092 Existing Equipment Datasheet

Manufacturer:	Rotary							**Dimensions**	**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:	SPOA9-200							**Equipment**	120		138		140	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**	Left --- Right ---		Front --- Back ---		Above --- Below ---	

DISCIPLINE COORDINATION:

Architectural	---	**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)	N		
Structural	---	**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)	N		
Mechanical	---	**Venting**	Connection (inches)	---		
			Volume (CFM)	---		
Electrical	---	**Connection Size**	Requirements	Unit	---	---
			Voltage	08/23	---	---
			Phase	1	---	---
			Horsepower (HP)	2	---	---
			Amps	12.6	---	---
		Connection Type	**Provide disconnect**			
Plumbing	---	**Domestic Water**	Connection (inches)	---		
			Flow Rate (GPM)	---		
			Capacity (PSI)	---		
		Natural Gas	Connection (inches)	---		
			Capacity (BTU)	---		
		Drain	Floor Drain (Y/N)	N		
		Compressed Air	Connection (inches)	---		
			Volume (CFM)	---		
			Capacity (PSI)	---		

Equipment Description:

Lift, surface mounted, twin-post, 9,000 pound

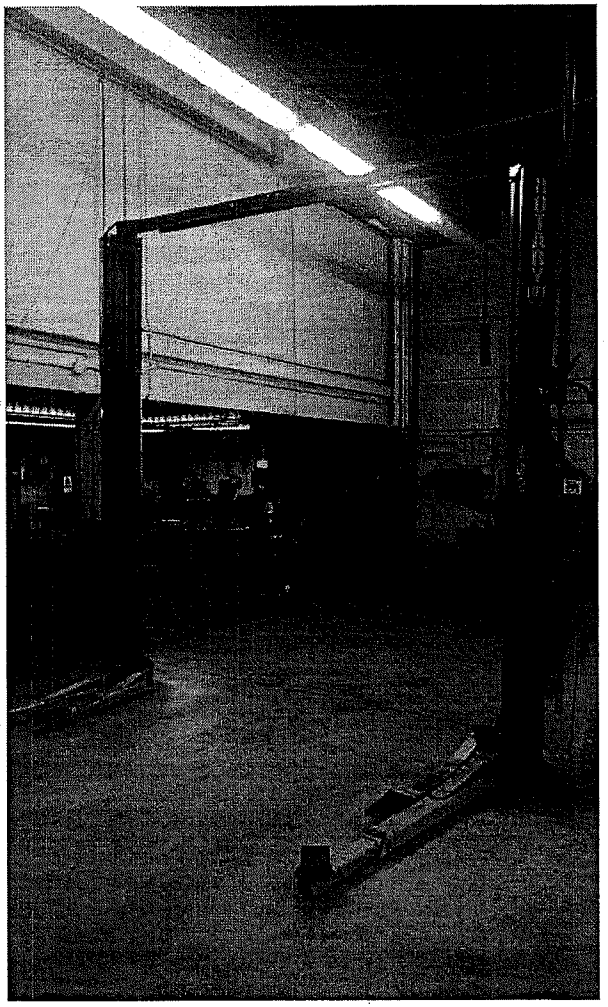
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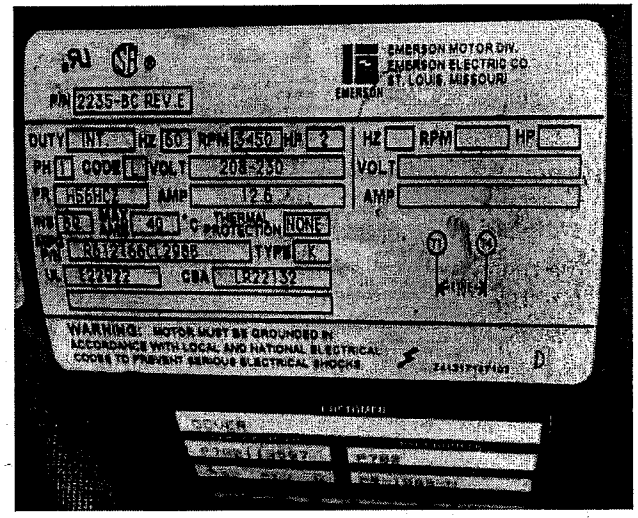
57092

57092 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Lift, surface mounted, twin-post, 9,000 pound	**57092**

Manufacturer: Rotary **Model No.:** SPOA9-200





57093 Existing Equipment Datasheet

Manufacturer:	Rotary							**Dimensions**	**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:	SPOA9-200							**Equipment**	120		138		140	
Provided:	Cutsheet	Y	Functional Model	Y	Design Details	N		**Operational Clearance**	Left --- Right ---		Front --- Back ---		Above --- Below ---	
DISCIPLINE COORDINATION:														
Architectural	---							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)		N			
Structural	---							**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)		N			
Mechanical	---							**Venting**	Connection (inches)		---			
									Volume (CFM)		---			
Electrical	---							**Connection Size**	Requirements	Unit	---	---		
									Voltage	08/23	---	---		
									Phase	1	---	---		
									Horsepower (HP)	2	---	---		
									Amps	12.6	---	---		
								Connection Type	**Provide disconnect**					
Plumbing	---							**Domestic Water**	Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
								Natural Gas	Connection (inches)		---			
									Capacity (BTU)		---			
								Drain	Floor Drain (Y/N)		N			
								Compressed Air	Connection (inches)		---			
									Volume (CFM)		---			
									Capacity (PSI)		---			

Equipment Description:

Lift, surface mounted, twin-post, 9,000 pound

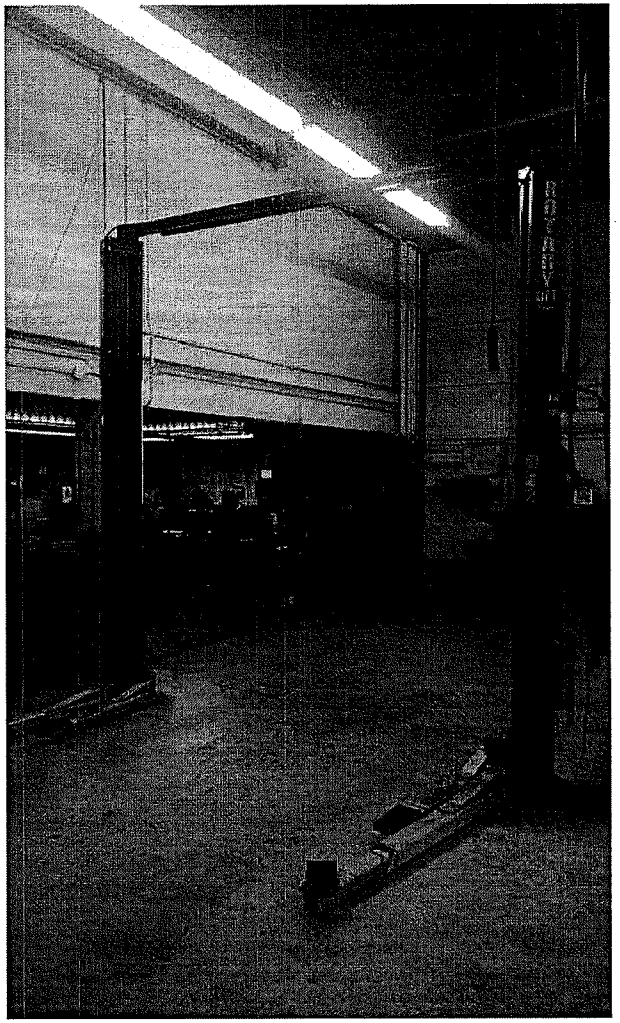
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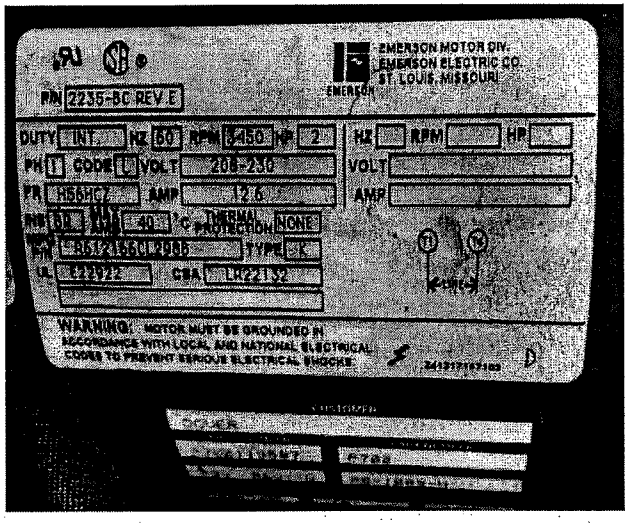
57093

57093 Existing Equipment Cutsheet

Equipment Description:	EQ ID Number:
Lift, surface mounted, twin-post, 9,000 pound	**57093**

Manufacturer: Rotary **Model No.:** SPOA9-200





57141 Equipment Datasheet

Manufacturer:	Rotary						**Dimensions**	Length (inches)		Width (inches)		Height (inches)	
Model No.:	SPO15N310						**Equipment**	144		138		178	
Provided:	Cutsheet	Y	Functional Model	N	Design Details	N	**Operational Clearance**	Left --- Right ---		Front --- Back ---		Above --- Below ---	

DISCIPLINE COORDINATION:

Architectural	---	**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)	N		
Structural	---	**Housekeeping Pad**	Mounted 6 inch high, steel reinforced (Y/N)	N		
Mechanical	---	**Venting**	Connection (inches)	---		
			Volume (CFM)	---		
Electrical	---	**Connection Size**	Requirements	**Unit**	---	---
			Voltage	208/230	---	---
			Phase	1	---	---
			Horsepower (HP)	2	---	---
			Amps	15-18	---	---
		Connection Type	**Provide disconnect**			
Plumbing	---	**Domestic Water**	Connection (inches)	---		
			Flow Rate (GPM)	---		
			Capacity (PSI)	---		
		Natural Gas	Connection (inches)	---		
			Capacity (BTU)	---		
		Drain	Floor Drain (Y/N)	N		
		Compressed Air	Connection (inches)	---		
			Volume (CFM)	---		
			Capacity (PSI)	---		

Equipment Description:

Lift, surface mounted, twin-post, 15,000 pound

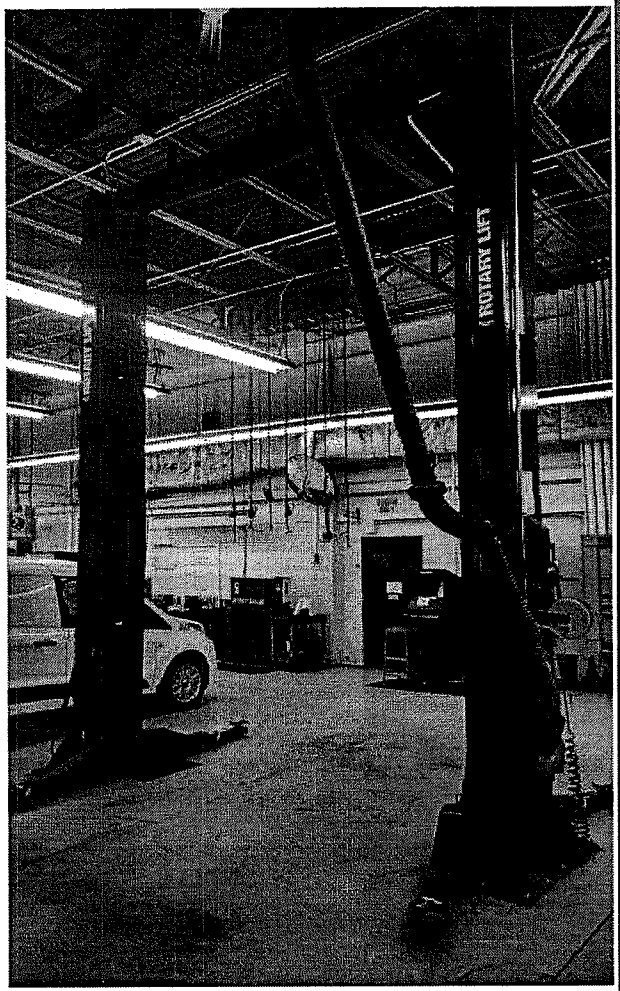
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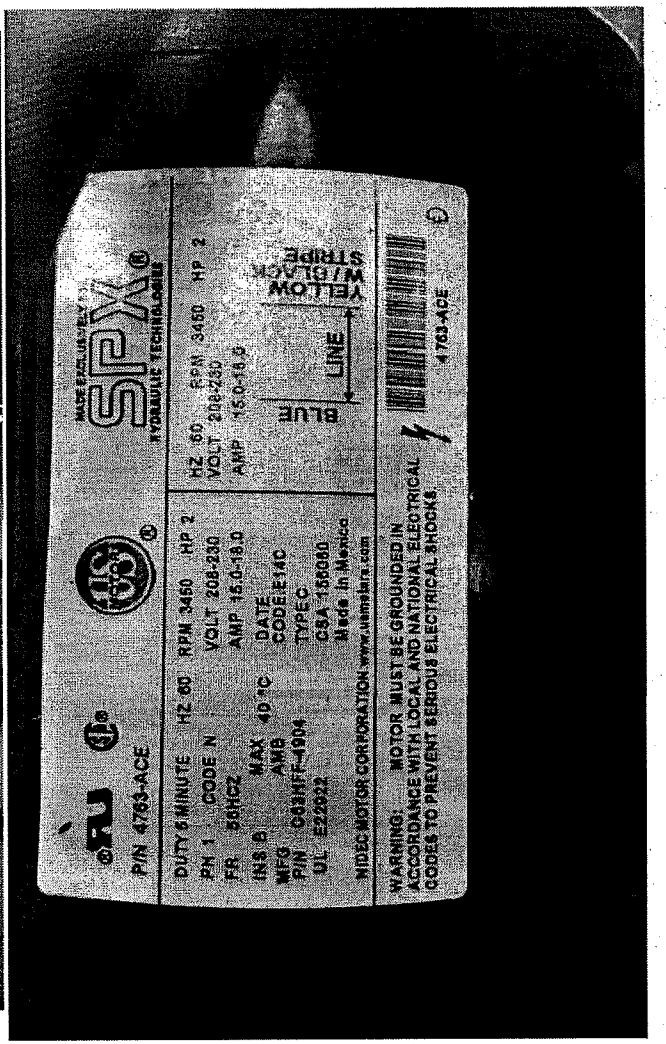
57141

57141 Equipment Cutsheet

Equipment Description:	EQ ID Number:
Lift, surface mounted, twin-post, 15,000 pound	**57141**

Manufacturer: Rotary **Model No.:** SPO15N310





57142 Equipment Datasheet

Manufacturer:		**Rotary**						**Dimensions**		**Length** (inches)		**Width** (inches)		**Height** (inches)	
Model No.:		**SPO15N310**						**Equipment**		**144**		**138**		**178**	
Provided:	Cutsheet	Y	Functional Model	N	Design Details	N		**Operational Clearance**		**Left** --- **Right** ---		**Front** --- **Back** ---		**Above** --- **Below** ---	
DISCIPLINE COORDINATION:															
Architectural		---						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Structural		---						**Housekeeping Pad**		Mounted 6 inch high, steel reinforced (Y/N)		**N**			
Mechanical		---						**Venting**		Connection (inches)		---			
										Volume (CFM)		---			
Electrical		---						**Connection Size**		Requirements	**Unit**	---	---		
										Voltage	**208/230**	---	---		
										Phase	**1**	---	---		
										Horsepower (HP)	**2**	---	---		
										Amps	**15-18**	---	---		
								Connection Type		**Provide disconnect**					
Plumbing		---						**Domestic Water**		Connection (inches)		---			
										Flow Rate (GPM)		---			
										Capacity (PSI)		---			
								Natural Gas		Connection (inches)		---			
										Capacity (BTU)		---			
								Drain		Floor Drain (Y/N)		**N**			
								Compressed Air		Connection (inches)		---			
										Volume (CFM)		---			
										Capacity (PSI)		---			

Equipment Description:

Lift, surface mounted, twin-post, 15,000 pound

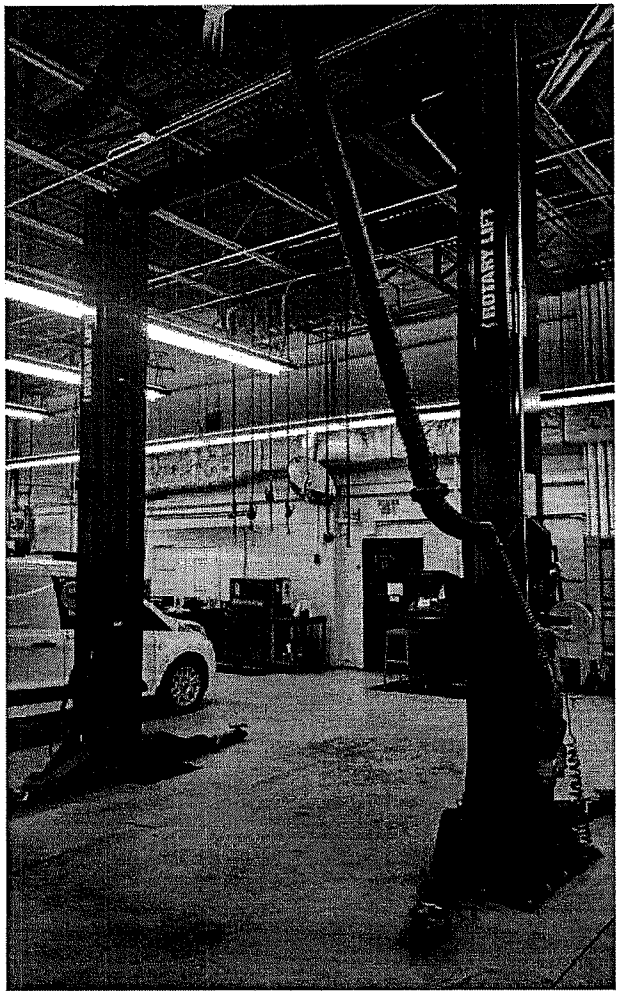
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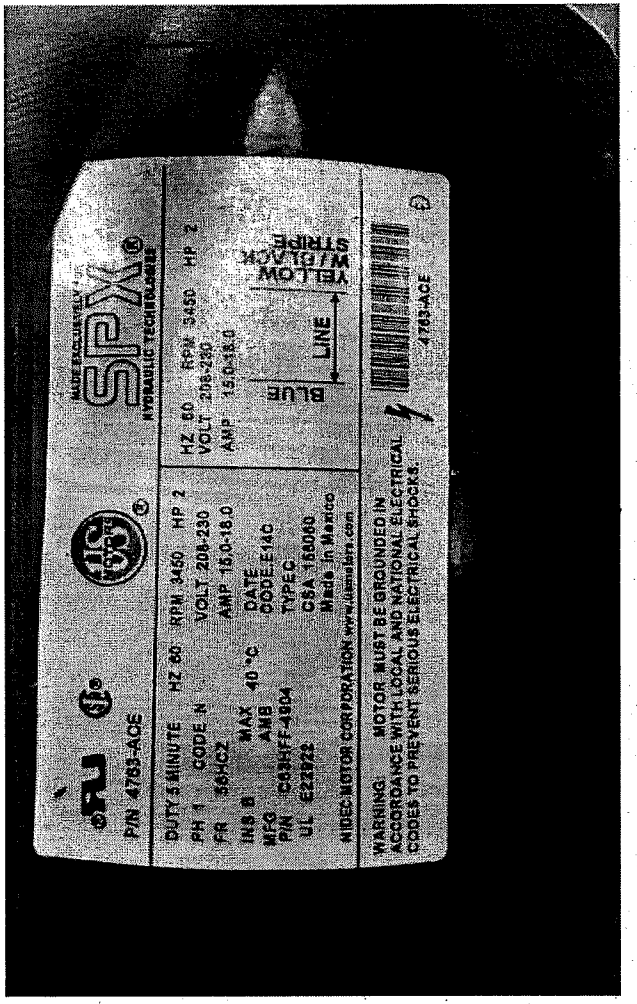
57142

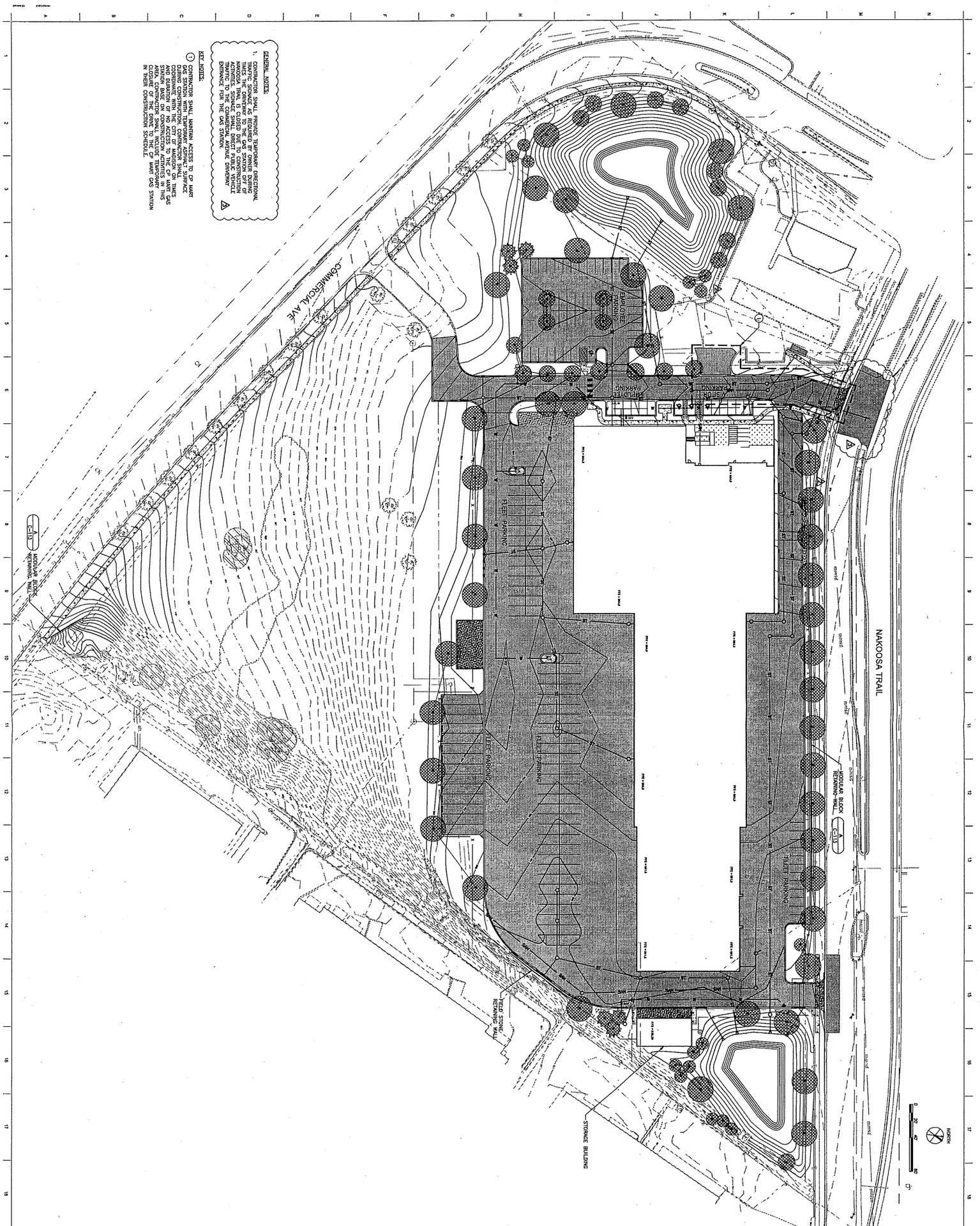
57142 Equipment Cutsheet

Equipment Description:	EQ ID Number:
Lift, surface mounted, twin-post, 15,000 pound	**57142**

Manufacturer: Rotary **Model No.:** SPO15N310







C-100

OVERALL SITE PLAN

AREA 1

PROJECT No. 370603

No.	REVISION/SUBMISSION	DATE
1	ADDENDUM NO. 1	3/14/19
2	ADDENDUM NO. 2	3/5/19
3	ADDENDUM NO. 3	3/8/19

STRAND ASSOCIATES

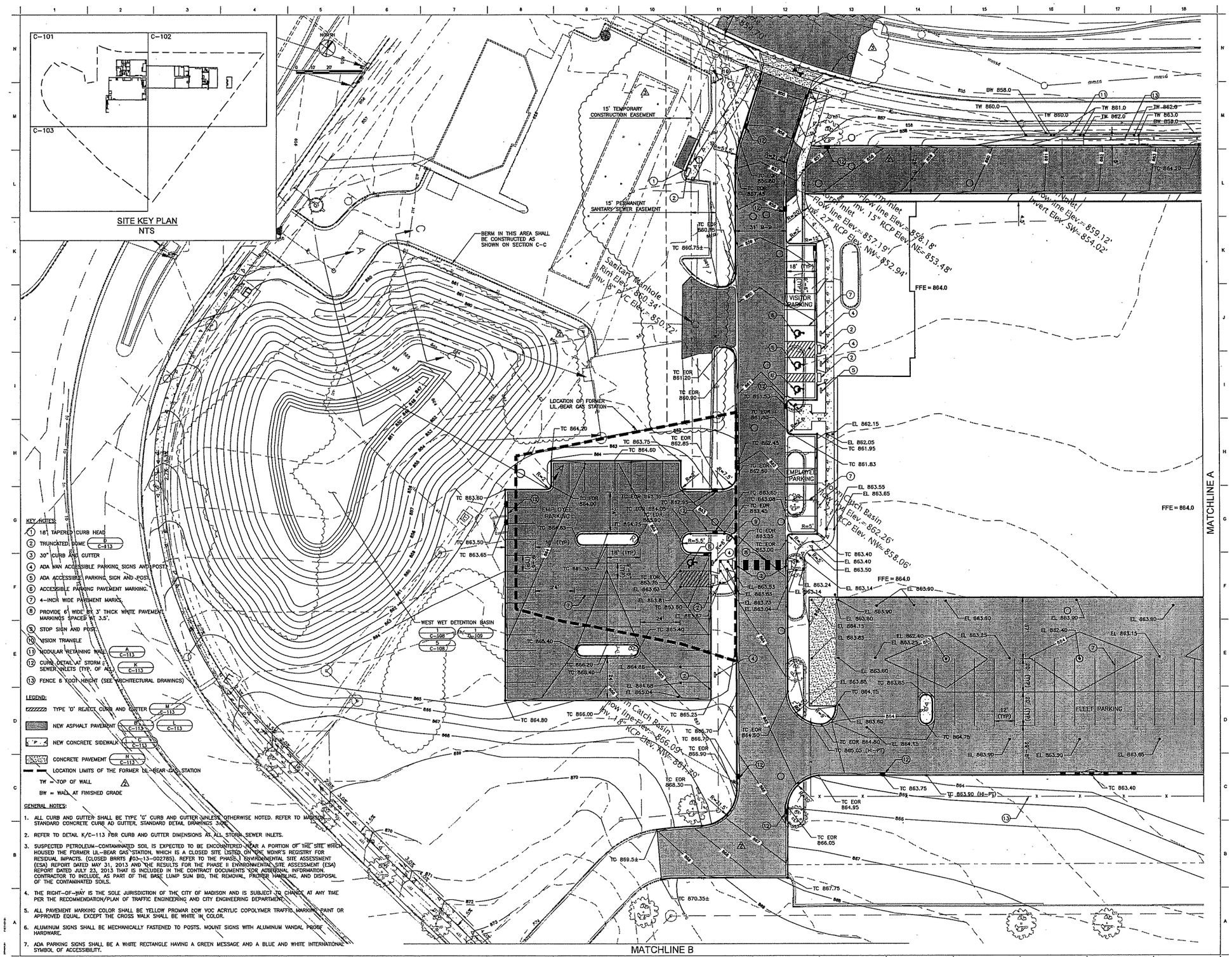
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

SD SUBMISSION

RNL

1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3



File: S:\MAD\3800--3899\3863\005\Acad\Civil 3D\SheetsPlan\Nakoosa Grading Plan.dwg Time: Mar 11, 2019 - 1:11pm

RNL
1500 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

No	REVISION/SUBMISSION	DATE
3	ADDENDUM NO. 3	3/14/19
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/7/19

PROJECT No 376603

AREA 1
SITE PLAN

C-101

A1 sheet 3

MATCHLINE B

EXISTING R=20'

EXISTING R=20'

Sign

COMMERCIAL AVE

Storm Inlet
Flow line Elev. = 901.47'
Inv. 12" RCP Elev. S: 898.07'

TW 905.00

TW 912.00

TW 905.00

MATCHLINE D

GENERAL NOTES:

1. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.

KEY NOTES:

1. TRUNCATED DOME (D, C-113)
2. MODULAR RETAINING WALL (A, C-113)
3. PROVIDE MILL OF THE EXISTING CONCRETE CURB HEAD TO MATCH NEW CURB RAMP.
4. STOP SIGN AND POST
5. 6-INCH PERFORATED PIPE (A, C-113)

LEGEND:

NEW CONCRETE SIDEWALK (C, C-113)

NORTH

0 10 20 40

C-101 C-102 C-103

SITE KEY PLAN
NTS

RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

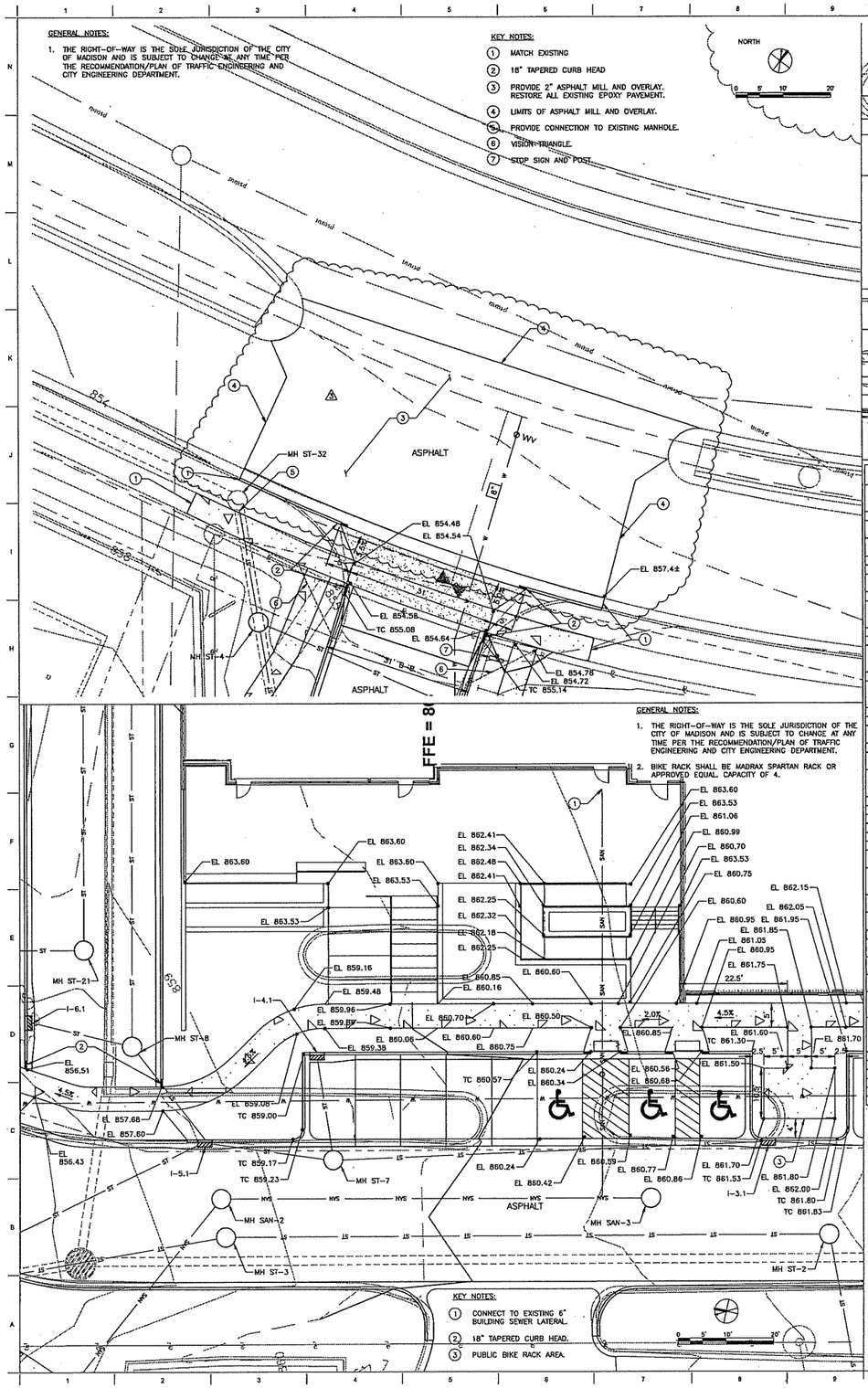
No	REVISION/SUBMISSION	DATE
	ISSUE FOR BID	2/7/19
3	ADDENDUM NO. 3	3/14/19

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PROJECT No. 376603

AREA 1
SITE PLAN

C-103



GENERAL NOTES:

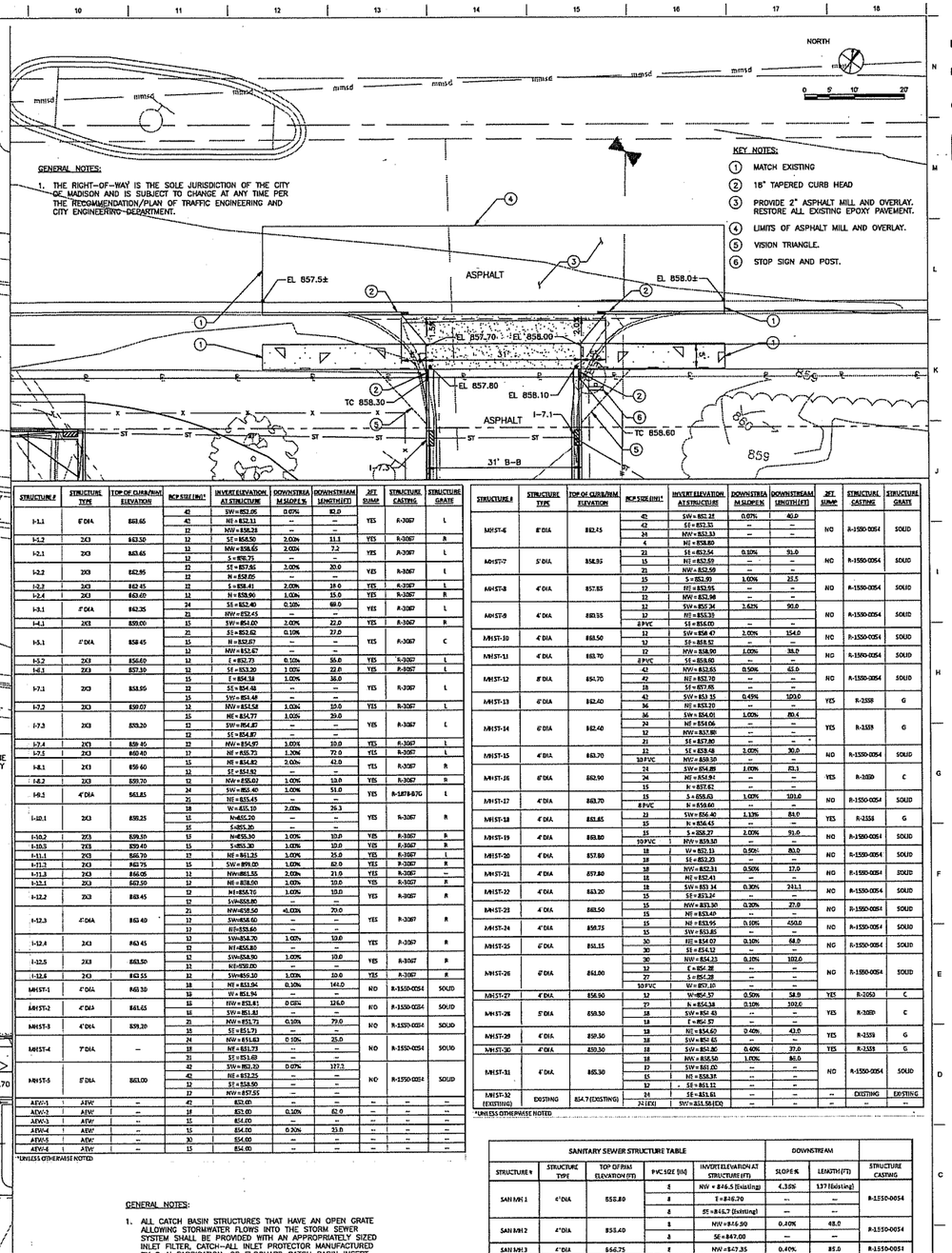
1. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.
2. BIKE RACK SHALL BE MADRAX SPARTAN RACK OR APPROVED EQUAL. CAPACITY OF 4.

STRUCTURE #	STRUCTURE TYPE	TOP OF CURB/RIM ELEVATION	INCP SIZE (IN)	INVERT ELEVATION AT STRUCTURE	DOWNSTREAM % SLOPE %	DOWNSTREAM LENGTH (FT)	JET SUMP	STRUCTURE CASTING	STRUCTURE GRATE
I-1.1	6' DIA	863.65	42	SW=852.06	0.07%	82.0			
			42	NE=852.11	--	--	YES	R-3067	L
			12	NW=856.28	--	--			
I-1.2	2X3	863.50	12	SE=858.50	2.00%	11.1	YES	R-3067	R
I-2.1	2X3	863.65	12	NW=858.05	2.00%	7.2	YES	R-3067	L
			12	S=858.71	--	--			
I-2.2	2X3	862.95	12	SE=857.86	2.00%	20.0	YES	R-3067	L
			12	N=858.05	--	--			
I-2.3	2X3	863.45	12	S=858.41	2.00%	18.0	YES	R-3067	L
I-2.4	2X3	863.60	12	N=858.96	1.00%	15.0	YES	R-3067	R
I-3.1	4' DIA	862.35	24	SE=852.40	0.50%	69.0	YES	R-3067	L
			21	NW=852.45	--	--			
I-4.1	2X3	859.00	15	SW=854.00	2.00%	22.0	YES	R-3067	R
I-3.1	4' DIA	858.45	25	SE=852.62	0.10%	27.0	YES	R-3067	C
			15	N=852.67	--	--			
I-5.2	2X3	856.60	12	NW=853.67	2.00%	--	YES	R-3067	L
I-6.1	2X3	857.30	12	E=852.73	0.10%	55.0	YES	R-3067	L
I-7.1	2X3	858.95	12	SE=853.20	1.00%	22.0	YES	R-3067	L
			15	E=854.38	1.00%	36.0			
			12	SE=854.48	--	--	YES	R-3067	L
			15	SW=854.48	--	--			
I-7.2	2X3	859.07	12	NW=854.58	1.00%	10.0	YES	R-3067	L
I-7.3	2X3	859.20	15	NE=854.77	1.00%	29.0	YES	R-3067	L
			12	SW=854.87	--	--			
			12	SE=854.87	--	--			
I-7.4	2X3	859.45	12	NW=854.97	1.00%	10.0	YES	R-3067	L
I-7.5	2X3	860.40	12	NE=855.73	1.30%	72.0	YES	R-3067	L
I-8.1	2X3	859.60	15	NE=854.82	2.00%	42.0	YES	R-3067	R
			12	SE=854.92	--	--	YES	R-3067	R
I-8.2	2X3	859.70	12	NW=858.03	1.00%	13.0	YES	R-3067	R
I-9.1	4' DIA	861.85	24	SW=852.40	1.00%	51.0	YES	R-3878-B7G	L
			21	NE=855.45	--	--			
I-10.1	2X3	858.25	18	W=855.10	2.00%	26.3	YES	R-3067	R
			15	N=855.20	--	--			
			15	S=855.20	--	--			
I-10.2	2X3	859.35	12	N=855.30	1.00%	10.0	YES	R-3067	R
I-10.3	2X3	859.40	15	S=855.30	1.00%	10.0	YES	R-3067	R
I-11.1	2X3	860.70	12	NE=861.25	3.00%	25.0	YES	R-3067	L
I-11.2	2X3	862.75	15	SW=859.00	1.00%	62.0	YES	R-3067	R
I-11.3	2X3	862.05	12	NW=861.55	2.00%	21.0	YES	R-3067	--
I-12.1	2X3	862.10	12	NE=858.60	1.00%	10.0	YES	R-3067	R
I-12.2	2X3	863.45	12	NE=858.70	1.00%	10.0	YES	R-3067	R
			12	S=858.80	--	--			
I-12.3	4' DIA	863.40	12	SW=858.60	-1.00%	79.0	YES	R-3067	R
			12	SE=858.60	--	--			
			12	E=858.60	--	--			
I-12.4	2X3	863.45	12	SW=858.70	1.00%	10.0	YES	R-3067	R
			12	NE=858.80	--	--			
I-12.5	2X3	863.50	12	SW=858.90	1.00%	10.0	YES	R-3067	R
			12	NE=859.00	--	--			
I-12.6	2X3	863.55	12	SW=859.10	1.00%	10.0	YES	R-3067	R
MHST-1	4' DIA	863.30	18	NE=853.94	0.30%	144.0	NO	R-1550-0054	SOLID
			18	W=853.96	--	--			
MHST-2	4' DIA	861.65	18	NW=853.81	0.08%	124.0	NO	R-1550-0254	SOLID
			18	SW=851.81	--	--			
MHST-3	4' DIA	859.20	21	NW=853.73	0.10%	72.0	NO	R-1550-0054	SOLID
			15	SE=851.73	--	--			
MHST-4	7' DIA	--	24	NW=851.63	0.10%	25.0	NO	R-1550-0254	SOLID
			18	NE=851.73	--	--			
			21	SE=851.68	--	--			
MHST-5	5' DIA	863.00	42	SW=852.20	0.07%	177.2	NO	R-1550-0054	SOLID
			42	NE=852.25	--	--			
			12	SE=854.50	--	--			
			12	NW=857.55	--	--			
AEW-1	AEW	--	42	853.00	--	--	--	--	--
AEW-2	AEW	--	18	853.00	0.10%	62.0	--	--	--
AEW-3	AEW	--	15	854.00	--	--	--	--	--
AEW-4	AEW	--	15	854.00	0.20%	25.0	--	--	--
AEW-5	AEW	--	30	854.00	--	--	--	--	--
AEW-6	AEW	--	15	854.00	--	--	--	--	--

*UNLESS OTHERWISE NOTED

GENERAL NOTES:

1. ALL CATCH BASIN STRUCTURES THAT HAVE AN OPEN GRATE ALLOWING STORMWATER FLOWS INTO THE STORM SEWER SYSTEM SHALL BE PROVIDED WITH AN APPROPRIATELY SIZED INLET FILTER, CATCH-ALL INLET PROTECTOR MANUFACTURED BY C+H FABRICATION. OR FLOGUARD CATCH BASIN INSERT FILTER MANUFACTURED BY OLDCASTLE. THE INLET FILTER SHALL BE PROVIDED AFTER RESTORATION HAS BEEN ESTABLISHED AND AFTER THE EROSION CONTROL INLET PROTECTION HAS BEEN REMOVED
2. PROVIDE 30-INCH OPENING IN THE FLAT SLAB FOR STORM MANHOLES WITH R-2558 CASTINGS.
3. PROVIDE FIELD CORES IN SAN MH 2, SAN MH 4, AND SAN MH 6 FOR THE CONNECTIONS TO THE EXISTING SANITARY SEWER MAIN. PROVIDE THE CONCRETE BENCH IN THE MANHOLE AFTER THE FIELD CORES. PROVIDE THE PIPING CONNECTIONS TO THE EXISTING SANITARY SEWER MAIN.
4. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.



STRUCTURE #	STRUCTURE TYPE	TOP OF CURB/RIM ELEVATION	INCP SIZE (IN)*	INVERT ELEVATION AT STRUCTURE	DOWNSTREAM % SLOPE %	DOWNSTREAM LENGTH (FT)	JET SUMP	STRUCTURE CASTING	STRUCTURE GRATE
MHST-6	8' DIA	862.45	42	SW=852.26	0.07%	40.0			
			42	SE=852.35	--	--	NO	R-1550-0054	SOLID
			24	NW=853.33	--	--			
			4	NE=858.80					
MHST-7	5' DIA	858.95	21	SE=852.54	0.10%	91.0			
			15	NE=852.59	--	--	NO	R-1550-0054	SOLID
			21	NW=852.59	--	--			
MHST-8	4' DIA	857.85	15	S=852.90	1.00%	23.5			
			12	NE=852.95	--	--	NO	R-1550-0054	SOLID
			12	NW=852.98	--	--			
MHST-9	4' DIA	860.55	12	SW=850.34	2.62%	90.0			
			12	NE=853.33			NO	R-1550-0054	SOLID
			8 PVC	SE=856.00	--	--			
MHST-10	4' DIA	858.50	12	SW=858.47	2.00%	154.0	NO	R-1550-0054	SOLID
MHST-11	4' DIA	863.70	12	SE=858.52	1.00%	38.0	NO	R-1550-0054	SOLID
			8 PVC	NW=858.60	--	--			
MHST-12	8' DIA	851.70	42	NW=852.65	0.50%	65.0	NO	R-1550-0054	SOLID
			42	NE=852.70	--	--			
			18	SE=857.85	--	--			
MHST-13	4' DIA	862.40	42	SW=853.35	0.45%	103.0	YES	R-2558	G
			36	NE=853.70	--	--			
MHST-14	6' DIA	862.40	36	SW=854.01	1.00%	80.4	YES	R-3358	G
			24	NE=854.06	--	--			
			12	NW=857.80	--	--			
MHST-15	4' DIA	863.70	21	SE=857.80	--	--			
			12	SE=858.45	2.00%	30.0	NO	R-1550-0054	SOLID
			10 PVC	NW=859.50	--	--			
MHST-16	6' DIA	862.90	24	SW=854.89	1.00%	83.1	YES	R-3358	C
			24	NE=854.91	--	--			
			15	N=857.62	--	--			
MHST-17	4' DIA	863.70	15	S=858.63	1.00%	103.0	NO	R-1550-0054	SOLID
			8 PVC	N=858.80	--	--			
MHST-18	4' DIA	863.85	23	SW=856.40	1.13%	84.0	YES	R-3358	G
			15	N=856.45	--	--			
MHST-19	4' DIA	863.80	15	S=858.27	2.00%	91.0	NO	R-1550-0054	SOLID
			10 PVC	NW=859.30	--	--			
MHST-20	4' DIA	857.80	18	W=852.13	0.95%	80.0	NO	R-1550-0054	SOLID
			18	SE=852.23	--	--			
MHST-21	4' DIA	857.80	18	NW=852.31	0.50%	17.0	NO	R-1550-0054	SOLID
			18	NE=852.41	--	--			
MHST-22	4' DIA	863.20	18	SW=853.34	0.30%	241.1	NO	R-1550-0054	SOLID
			15	SE=853.24	--	--			
MHST-23	4' DIA	863.50	15	NW=853.30	0.30%	27.0	NO	R-1550-0054	SOLID
			15	NE=853.40	--	--			
MHST-24	4' DIA	859.75	15	NE=853.95	0.10%	450.0	NO	R-1550-0054	SOLID
			15	SW=853.85	--	--			
MHST-25	4' DIA	861.15	30	NE=854.07	0.10%	68.0	NO	R-1550-0054	SOLID
			30	SE=854.12	--	--			
MHST-26	6' DIA	861.00	30	NW=854.23	0.10%	102.0	NO	R-1550-0054	SOLID
			12	E=854.38	--	--			
			27	S=854.28	--	--			
			10 PVC	W=857.10	--	--			
MHST-27	4' DIA	856.90	12	W=854.57	0.50%	54.9	YES	R-2050	C
MHST-28	5' DIA	859.30	27	N=854.38	0.10%	102.0	YES	R-2020	C
			18	SW=852.43	--	--			
			18	E=851.57	--	--			
MHST-29	4' DIA	859.30	18	NE=854.60	0.40%	43.0	YES	R-2559	G
			18	SW=852.65	--	--			
MHST-30	4' DIA	859.30	18	SW=851.80	0.40%	27.0	YES	R-2559	G
MHST-31	4' DIA	865.30	18	NW=850.50	1.70%	86.0	NO	R-1550-0054	SOLID
			17	SW=861.00	--	--			
			15	NE=858.31	--	--			
			12	E=851.11	--	--			
MHST-32 (EXISTING)	EXISTING	854.7 (EXISTING)	24	SE=851.61	--	--	EXISTING	EXISTING	
			24 (EX)	SW=851.58 (EX)	--	--	--	--	--

*UNLESS OTHERWISE NOTED

SANITARY SEWER STRUCTURE TABLE							
STRUCTURE #	STRUCTURE TYPE	TOP OF RIM ELEVATION (FT)	PVC SIZE (IN)	INVERT ELEVATION AT STRUCTURE (FT)	DOWNSTREAM SLOPE %	DOWNSTREAM LENGTH (FT)	STRUCTURE CASTING
SAN MH 1	4' DIA	855.80	8	NW = 846.5 (Existing)	4.38%	137 (Existing)	R-1550-0054
			8	E = 846.70	--	--	
			8	SE = 846.7 (Existing)	--	--	
SAN MH 2	4' DIA	858.40	8	NW = 846.90	0.40%	48.0	R-1550-0054
			8	SE = 847.00	--	--	
SAN MH 3	4' DIA	860.75	8	NW = 847.35	0.40%	85.0	R-1550-0054
SAN MH 4	4' DIA	861.00	8	NW = 851.29 (Existing)	0.40% (Existing)	147 (Existing)	R-1550-0054
			8	NE = 851.35	--	--	
SAN MH 5	4' DIA	860.30	8	SW = 851.55	0.40%	41.0	R-1550-0054
			8	SE = 851.65	--	--	
SAN MH 6	4' DIA	859.70	8	NW = 852.47	0.40%	205.0	R-1550-0054
			8	S = 852.57	--	--	
SAN MH 7	EXISTING	851.50 (Existing) 851.80 (New)	8 (Existing)	SW = 851.75 (Existing)	--	--	EXISTING
				NE = 852.17 (Existing)	--	--	
SAN MH 8	EXISTING	863.92 (Existing) 864.70 (New)	8 (Existing)	SE = 857.37 (Existing)	--	--	EXISTING
SAN MH 9	EXISTING	858.10 (Existing)	8 (Existing)	SE = 850.70 (Existing)	--	--	EXISTING
SAN MH 10	EXISTING	860.34 (Existing)	8 (Existing)	850.72 (Existing)	--	--	EXISTING

RNL
1600 WILSON BLVD.
SUITE 380
ARLINGTON, VA 22209
571 280 7879 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

No	REVISION/SUBMISSION	DATE
3	ADDENDUM NO 3	3/14/19
	ISSUE FOR BID	2/7/19

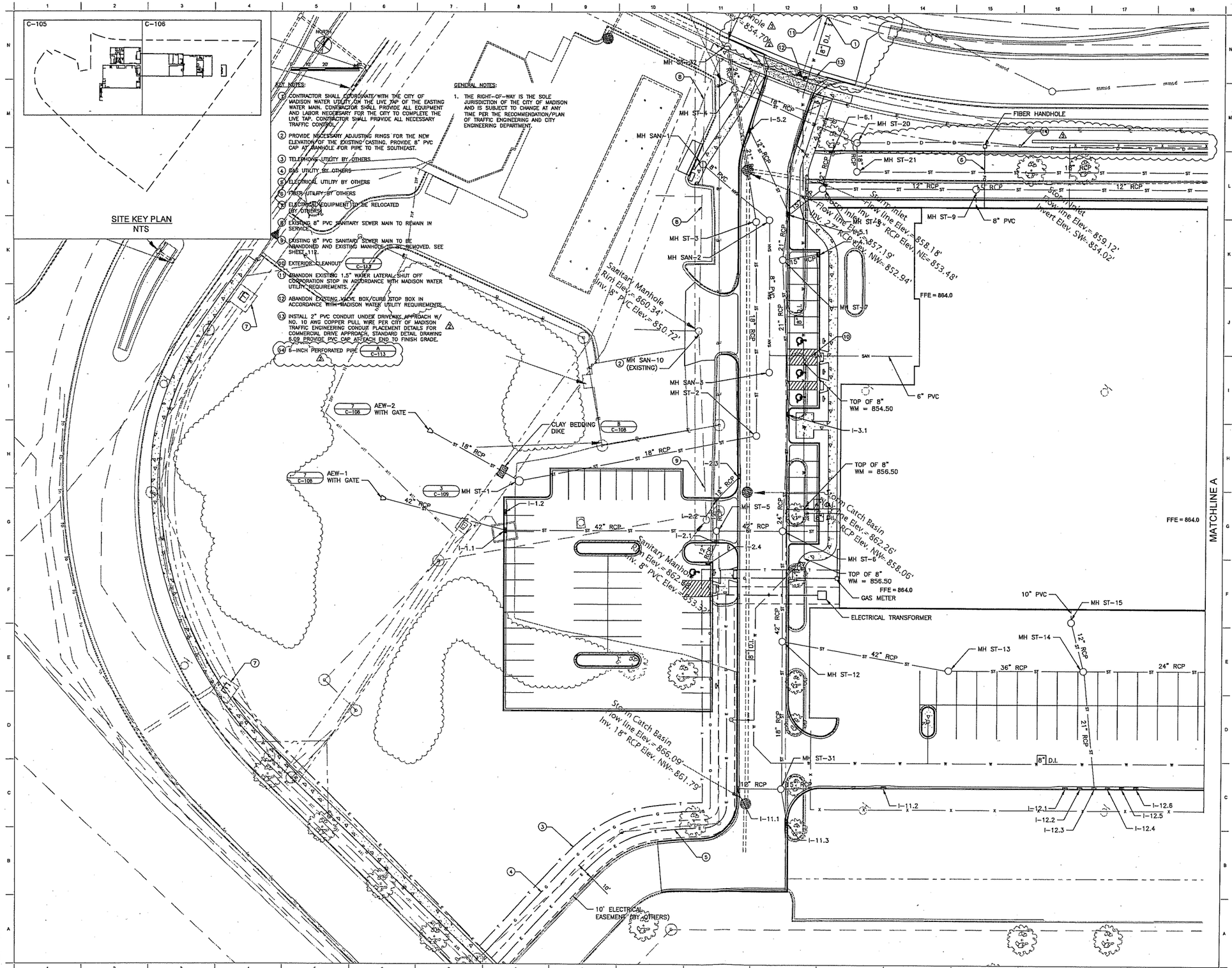
PROJECT No: 3786003

AREA 1
INTERSECTION DETAIL

C-104

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Addendum 3



RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO. 3	3/14/19
1	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/7/19

PROJECT No: 3766003

AREA 1
UTILITY PLAN

C-105

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RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

Area 3

MH SAN-9 (EXISTING)

MH ST-10

MH ST-22

MH ST-23

MH ST-11
FFE = 864.0
8" PVC

Storm Manhole
Rim Elev.=863.11'
Inv. 15" RCP Elev. SW=857.71'
Inv. 15" RCP Elev. SE=858.11'

15" RCP
12" RCP
24" RCP
21" RCP
18" RCP
30" RCP
27" RCP
10" PVC
8" PVC

MH ST-17
MH ST-19
MH ST-16
MH ST-18
MH ST-30
MH ST-29
MH ST-28
MH ST-25
MH ST-26
MH ST-27
MH SAN-8
MH SAN-4
MH SAN-5

FFE = 864.0
FFE = 861.5
FFE = 860.30

Sanitary Manhole
Rim Elev.= 859.12'
Inv. 8" PVC Elev. NW= 851.57'
Inv. 8" PVC Elev. SE= 851.67'

Sanitary Manhole
Rim Elev.= 859.97'
Inv. 8" PVC Elev. NW= 852.32'
Inv. 8" PVC Elev. S= 852.32'

Sanitary Manhole
Rim Elev.= 861.50'
Inv. 8" PVC Elev. NE= 854.50'
Inv. 5" PVC Elev. SE= 854.75

Storm Manhole
Rim Elev.= 861.21'
Inv. 15" RCP Elev. NE= 857.17'
Inv. 15" RCP Elev. SE= 857.37'

MH SAN-8 (EXISTING) 3
MH SAN-7 (EXISTING) 4 2

I-7.1
I-7.2
I-7.3
I-7.4
I-7.5
I-8.1
I-8.2
I-9.1
I-10.1
I-10.2
I-10.3

AEW-3 WITH GATE 7 C-108
AEW-4 WITH GATE 7 C-108
CLAY BEDDING DIKE 8 C-108
MH ST-24 4 C-109
AEW-5 WITH GATE 7 C-108
AEW-6 WITH GATE 7 C-109

MATCHLINE A

GENERAL NOTES:

1. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.

KEY NOTES:

1. PROVIDE CONNECTION TO EXISTING WATER MAIN. VERIFY PIPE SIZE, MATERIAL AND ELEVATION.
2. PROVIDE NECESSARY ADJUSTING RINGS FOR THE NEW ELEVATIONS OF THE EXISTING CASTING.
3. FIELD VERIFY AND REPLACE AS NECESSARY AN EXISTING SANITARY SEWER MANHOLE BARREL SECTION FOR THE NEW ELEVATION OF THE EXISTING CASTING.
4. PROVIDE WATER TIGHT PIPE CONNECTION TO EXISTING SANITARY SEWER MANHOLE.
5. EXISTING 8" PVC SANITARY SEWER MAIN TO REMAIN IN SERVICE.
6. EXISTING 8" PVC SANITARY SEWER MAIN TO BE REMOVED. SEE SHEET C-112.
7. INSTALL 2" PVC CONDUIT UNDER DRIVEWAY APPROACH W/ NO. 10 AWG COPPER PULL WIRE PER CITY OF MADISON TRAFFIC ENGINEERING CONDUIT PLACEMENT DETAILS FOR COMMERCIAL DRIVE APPROACH, STANDARD DETAIL DRAWING 6.09 PROVIDE PVC CAP AT EACH END TO FINISH GRADE.
8. 6-INCH PERFORATED PIPE A C-113

NORTH
0 10' 20' 40'

C-105 C-106

SITE KEY PLAN
NTS

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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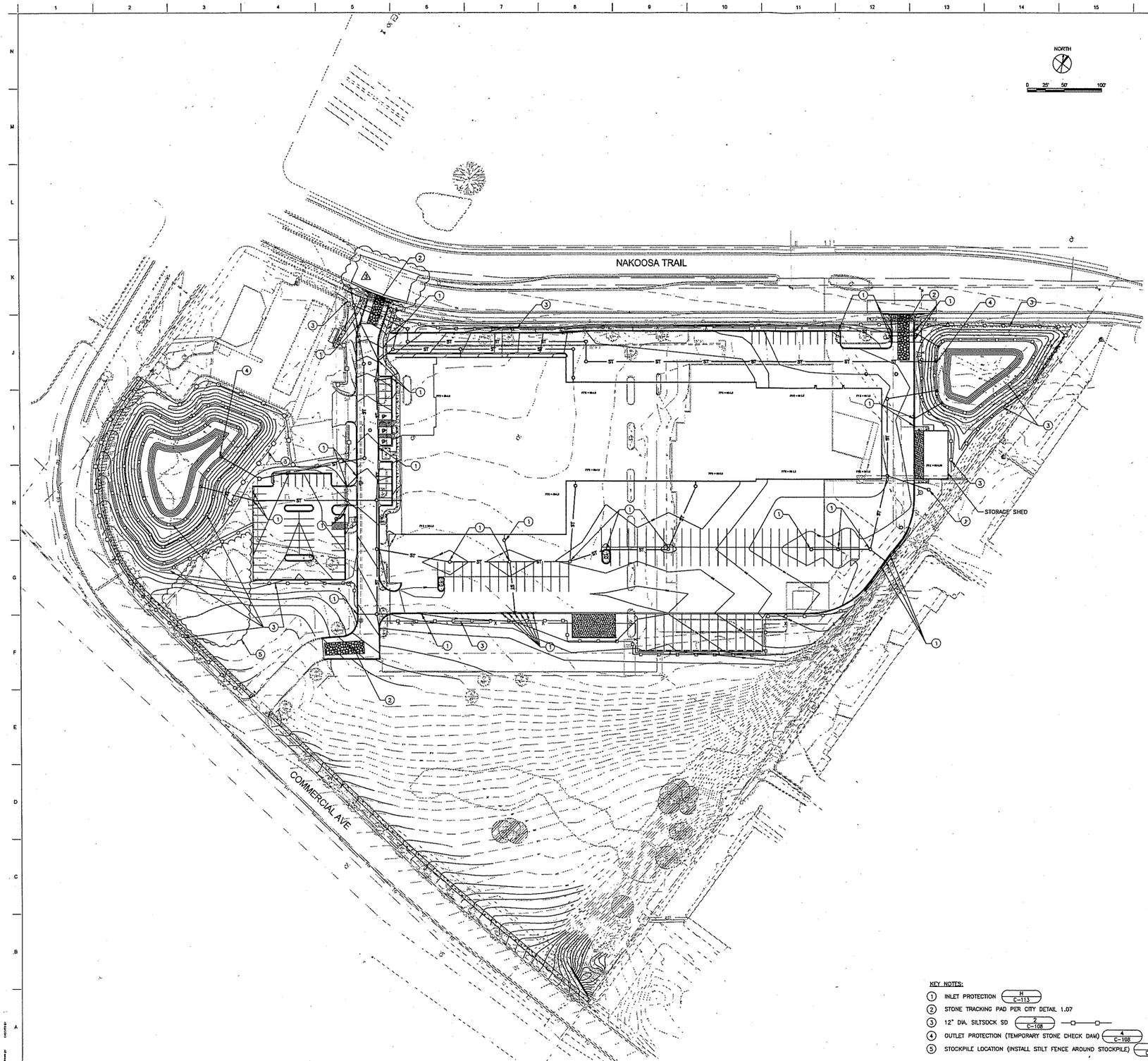
No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/7/19

PROJECT No: 376603

AREA 1
UTILITY PLAN

C-106

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GENERAL NOTES:

1. SOIL DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER AS TO MINIMIZE EROSION. SOIL STABILIZATION MEASURES SHALL CONSIDER THE TIME OF YEAR, SITE CONDITIONS AND THE USE OF TEMPORARY OR PERMANENT MEASURES.
2. SOIL EROSION AND SEDIMENT CONTROL FEATURES SHALL BE CONSTRUCTED PRIOR TO THE COMMENCEMENT OF HYDROLOGIC DISTURBANCE OF UPLAND AREAS.
3. ALL DISTURBED AREAS NOT INTENDED TO BE WORKED ON FOR 14 DAYS SHALL BE TEMPORARILY STABILIZED WITHIN 7 DAYS OF THE LAST ACTIVITY.
4. DISTURBED AREAS SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT MEASURES WITHIN 14 CALENDAR DAYS OF THE END OF ACTIVE HYDROLOGIC DISTURBANCE, OR REDISTURBANCE.
5. AREAS OR EMBANKMENTS HAVING SLOPES GREATER THAN OR EQUAL TO 3H:1V, SHALL BE STABILIZED WITH SOD OR EROSION MAT IN COMBINATION WITH SEEDING.
6. ALL STORM SEWERS THAT ARE OR WILL BE FUNCTIONING DURING CONSTRUCTION SHALL BE PROTECTED BY APPROPRIATE SEDIMENT CONTROL MEASURES.
7. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED.
8. ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES MUST BE MAINTAINED AND REPAIRED AS NEEDED.
9. A STABILIZED MAT OF AGGREGATE UNDERLAIN WITH FILTER CLOTH (OR OTHER APPROPRIATE MEASURE) SHALL BE LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY OR PARKING AREA. ANY SEDIMENT OR SOIL REACHING AN IMPROVED PUBLIC RIGHT-OF-WAY, STREET, ALLEY OR PARKING AREA SHALL BE REMOVED BY SCRAPING OR STREET CLEANING AS ACCUMULATIONS WARRANT AND TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA.
10. SOIL STOCKPILES SHALL NOT BE LOCATED IN A FLOOD PRONE AREA OR A DESIGNATED BUFFER PROTECTING WATERS OF THE UNITED STATES OR ISOLATED WATERS OF WILL COUNTY.
11. IF DEWATERING SERVICES ARE USED, ADJOINING PROPERTIES AND DISCHARGE LOCATIONS SHALL BE PROTECTED FROM EROSION. DISCHARGES SHALL BE ROUTED THROUGH AN EFFECTIVE SEDIMENT CONTROL MEASURE (E.G. SEDIMENT TRAP, SEDIMENT BASIN, OR OTHER APPROPRIATE MEASURE.
12. THE EROSION CONTROL MEASURES INDICATED ON THE DRAWINGS ARE THE MINIMUM REQUIREMENTS. ADDITIONAL MEASURES MAY BE REQUIRED, AS REQUESTED BY THE ENGINEER, OWNER, OR GOVERNING AGENCY.
13. PROVIDE CONSTRUCTION INLET PROTECTION AT ALL EXISTING INLETS ON SITE AND WITHIN THE IMMEDIATE AREA SURROUNDING THE SITE.
14. WHERE SEDIMENT HAS BEEN TRACKED-OUT FROM THE SITE ONTO THE SURFACE OF OFF-SITE STREETS, OTHER PAVED AREAS, AND SIDEWALKS, CONTRACTOR SHALL REMOVE THE DEPOSITED SEDIMENT BY THE END OF THE SAME WORK DAY IN WHICH THE TRACK-OUT OCCURS OR BY THE END OF THE NEXT WORK DAY IF TRACK-OUT OCCURS ON A NON-WORK DAY. CONTRACTOR MUST REMOVE THE TRACK-OUT BY SWEEPING, SHOVELING, OR VACUUMING THESE SURFACES, OR BY USING OTHER SIMILARLY EFFECTIVE MEANS OF SEDIMENT REMOVAL. CONTRACTOR IS PROHIBITED FROM HOSING OR SWEEPING TRACKED-OUT SEDIMENT INTO ANY STORMWATER CONVEYANCE (UNLESS IT IS CONNECTED TO A SEDIMENT BASIN, SEDIMENT TRAP, OR SIMILARLY EFFECTIVE CONTROL), STORM DRAIN INLET, OR SURFACE WATER.
15. AREAS WHERE GRADED OR STOCKPILED EARTH WILL REMAIN EXPOSED FOR MORE THAN FOURTEEN DAYS SHALL BE PROTECTED FROM EROSION BY TEMPORARY SEEDING. PROVIDE SILT FENCE SURROUNDING AREAS OF STOCKPILED SOIL.
16. TEMPORARY DITCHES AND CLEAN WATER DIVERSION DITCH SHALL BE PROVIDED IMMEDIATELY AND PRIOR TO MAJOR CONSTRUCTION ACTIVITIES.
17. TEMPORARY DITCHES AND TEMPORARY CLEAN WATER DIVERSION DITCH SHALL BE STABILIZED WITH EROSION MAT AND STONE DITCH CHECKS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DITCHES AND CLEAN WATER DIVERSION DITCH LOCATIONS.
19. TEMPORARY DITCHES ARE NOT REFLECTED IN FINAL GRADING PLAN.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING OF TEMPORARY DITCHES AND TEMPORARY CLEAN WATER DIVERSION DITCH. THIS GRADING IS NOT REFLECTED ON EROSION CONTROL PLAN. FINAL GRADING IS REFLECTED ON EROSION CONTROL PLAN.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING TEMPORARY DITCHES AND TEMPORARY CLEAN WATER DIVERSION DITCH AFTER MAJOR CONSTRUCTION ACTIVITIES ARE COMPLETE. CONTRACTOR SHALL GRADE ALL AREAS AFFECTED BY THE TEMPORARY DITCHES AND TEMPORARY CLEAN WATER DIVERSION DITCH TO THE FINAL GRADING PLAN AFTER MAJOR CONSTRUCTION ACTIVITIES ARE COMPLETE.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING OF SEDIMENT TRAP. SEDIMENT TRAP GRADING IS NOT REFLECTED ON EROSION CONTROL PLAN.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF SEDIMENT IN THE SEDIMENT TRAP AND THE SEDIMENT TRAP OUTFALL STRUCTURE. SEDIMENT TRAP SHALL BE REMOVED AND FINAL GRADES SHALL BE ESTABLISHED.
24. TEMPORARY DITCHES AND TEMPORARY CULVERTS SHALL REMAIN IN PLACE UNTIL IMMEDIATELY BEFORE FINAL GRADING AND RESTORATION. ALL TEMPORARY DITCHES AND TEMPORARY CULVERTS SHALL BE REMOVED.
25. STRAW WATTLES SHALL BE INSTALLED PER DETAIL 2/C-108 AND WDNR CONSERVATION PRACTICE STANDARD 1071. IF THE SHEET FLOW LENGTH EXCEEDS THE MAXIMUM SPACING IN TABLE 2 OF WDNR CONSERVATION PRACTICE STANDARD 1071 FOR A GIVEN SLOPE AND PRODUCT HEIGHT CLASS CONDITION, CONTRACTOR SHALL INSTALL ADDITIONAL STRAW WATTLES TO SHORTEN THE SLOPE LENGTH. INSTALL A CONSTRUCTION SITE DIVERSION PER WDNR CONSERVATION STANDARD 1066, OR INSTALL A SEDIMENT TRAP PER WDNR CONSERVATION STANDARD 1063.
26. THE RIGHT-OF-WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANY TIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENT.
27. CONTRACTOR SHALL PROVIDE A TEMPORARY CONCRETE WASHOUT FACILITY IN ACCORDANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). CONCRETE WASHOUT FACILITY SHALL BE LOCATED A MINIMUM OF 50 FEET FROM ANY STORM DRAIN INLET, OPEN DRAINAGE FACILITY, WATER BODY, CONSTRUCTION TRAFFIC, AND ACCESS AREA. PROVIDE APPROPRIATE SIGNAGE TO INFORM EQUIPMENT OPERATORS OF THE WASHOUT LOCATION.

KEY NOTES:

1. INLET PROTECTION (H / C-113)
2. STONE TRACKING PAD PER CITY DETAIL 1.07
3. 12" DIA. SILTSOCK SD (2 / C-108)
4. OUTLET PROTECTION (TEMPORARY STONE CHECK DAM) (4 / C-108)
5. STOCKPILE LOCATION (INSTALL STILT FENCE AROUND STOCKPILE) (C / C-113)

RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

STRAND ASSOCIATES®

No	REVISION/SUBMISSION	DATE
2	ADDENDUM NO 3	3/14/19
1	ISSUE FOR BID	2/7/19

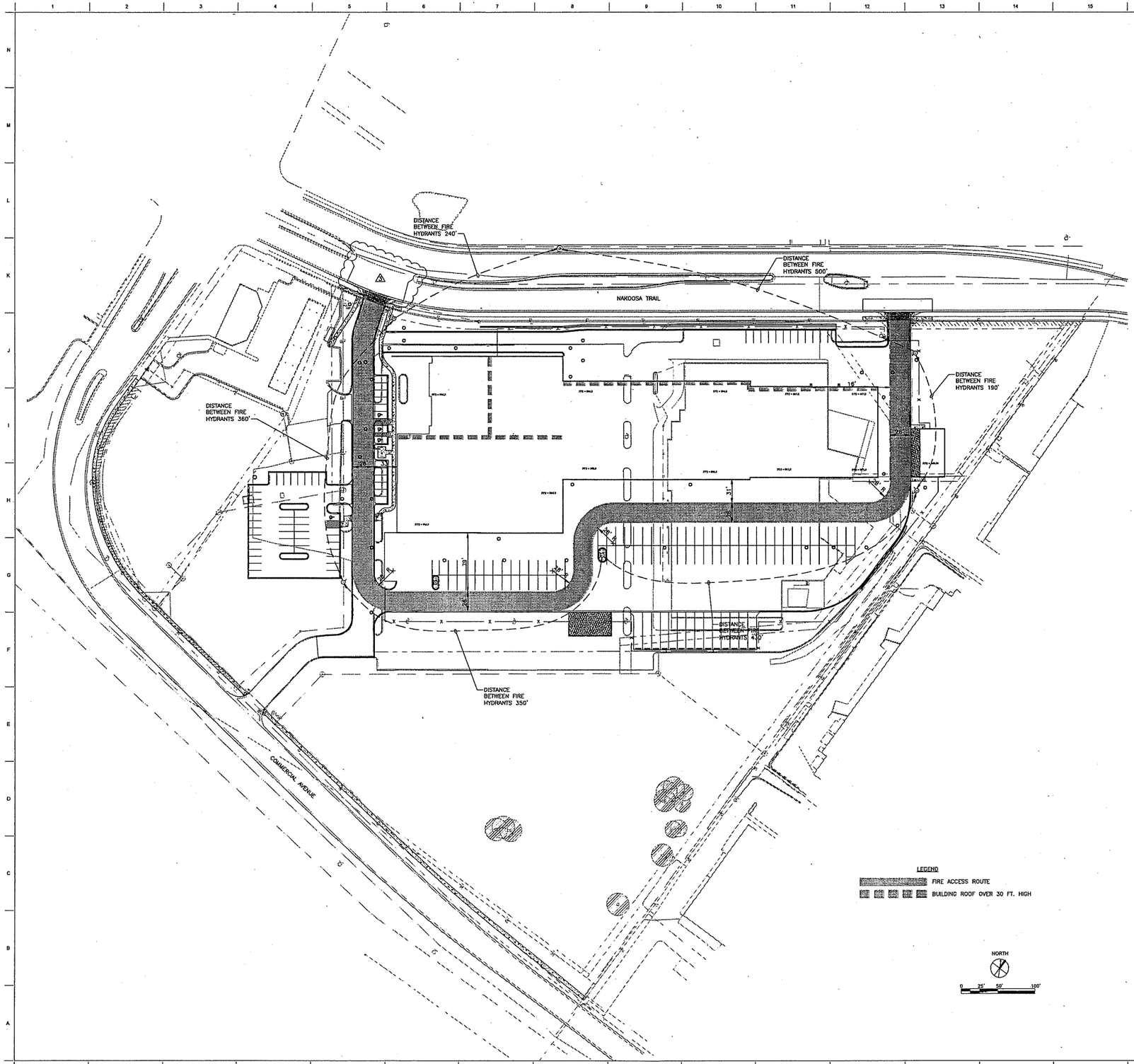
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PROJECT No: 3766G3

EROSION CONTROL

C-107

File: S:\MAD\3800--3899\3863\005\Acad\Civil 3D\SheetsPlan\C-107.dwg Time: Mar 11, 2019 - 1:26pm



RNL
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

Add. 1 Dwg 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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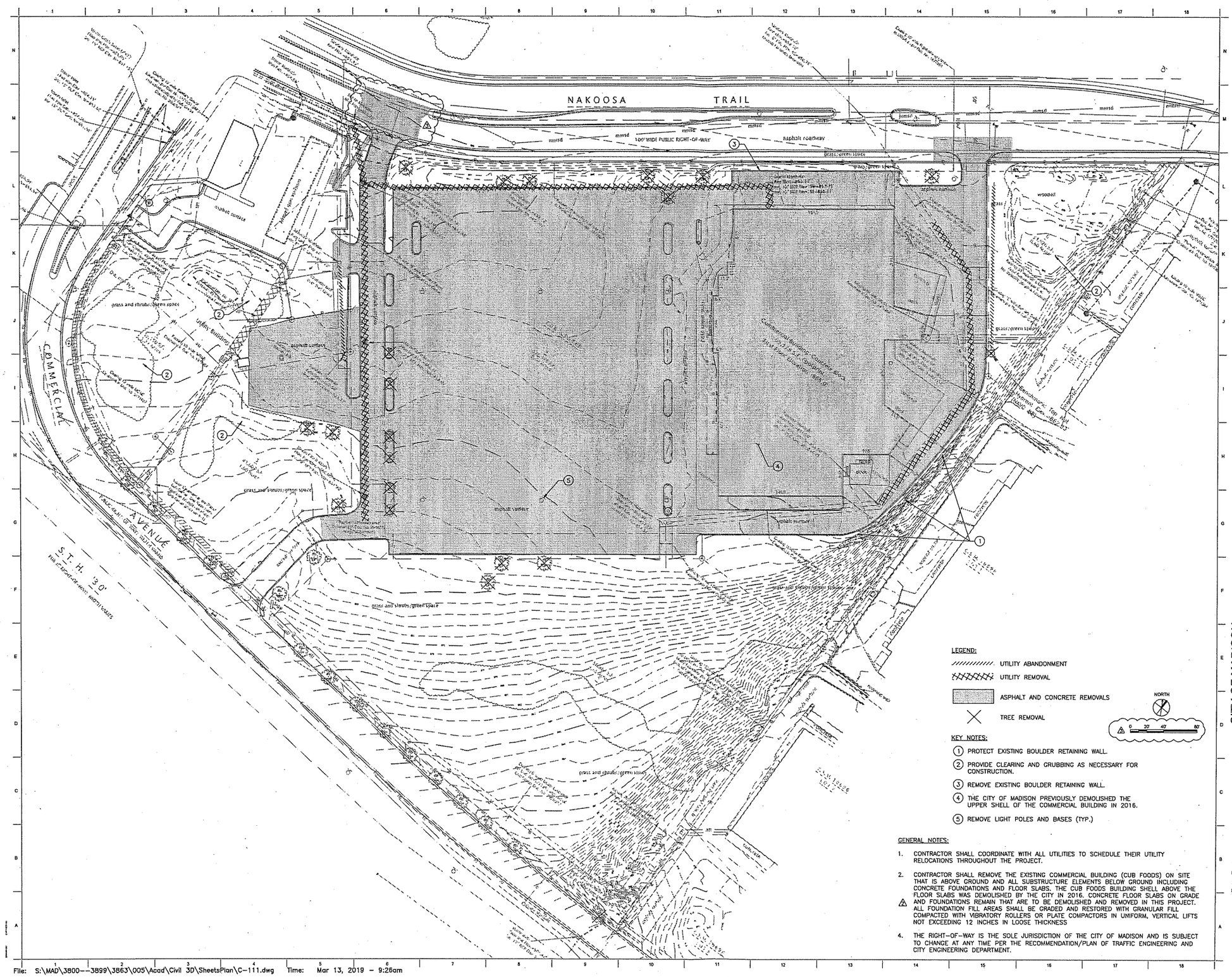
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1	ADDENDUM NO 3	3/14/19
	ISSUE FOR BID	3/7/19

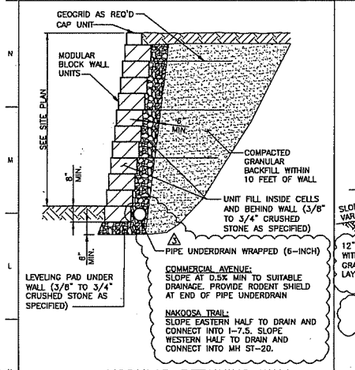
PROJECT No 376603

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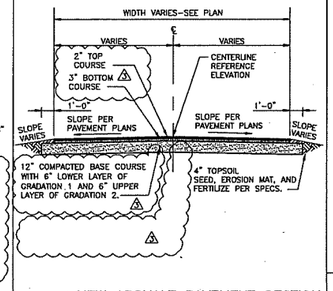
C-110

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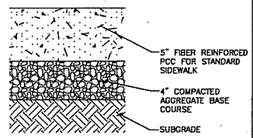

NAKOOSA TRAIL
100' WIDE PUBLIC RIGHT-OF-WAY
asphalt roadway
COMMERCIAL AVENUE
S.T.H. 30
Commercial Building Concrete Slab
Commercial Building Concrete Slab
Commercial Building Concrete Slab



A C-113 MODULAR RETAINING WALL
NO SCALE



B C-113 NEW APSHALT PAVEMENT SECTION
NO SCALE

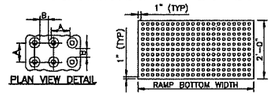


NOTES:

1. PROVIDE CONTROL JOINTS AT APPROXIMATELY 15 FT. ON CENTER
2. PROVIDE CONSTRUCTION JOINTS AS REQUIRED

C C-113 CONCRETE SIDEWALK
NO SCALE

NOTE: MATERIALS AND METHOD OF CONSTRUCTION FOR TRUNCATED DOMES SHALL BE SPECIFIED IN SPECIAL PROVISIONS OR AS REQUIRED BY THE CITY



PLAN VIEW DETAIL

PLAN VIEW
DETECTABLE WARNING FIELD (TYP)

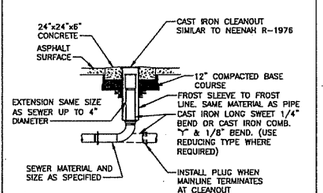
	MIN.	MAX.
A	1.6"	2.4"
B	0.65"	1.5"
C	*	*
D	0.9"	1.4"

* THE C DIMENSION IS 50% TO 65% OF THE D DIMENSION

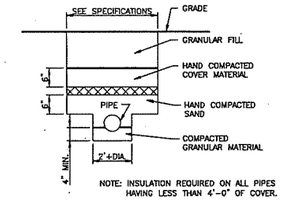


ELEVATION VIEW

D C-113 TRUNCATED DOMES
NO SCALE



E C-113 EXTERIOR CLEANOUT DETAIL
NO SCALE

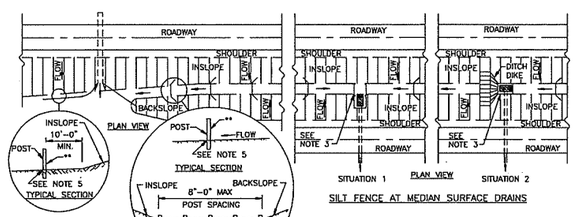


NOTE: INSULATION REQUIRED ON ALL PIPES HAVING LESS THAN 4'-0" OF COVER.

F C-113 UNDERGROUND PIPE INSULATION
NO SCALE

NOTES:

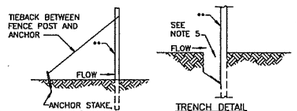
1. DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.
2. WHEN POSSIBLE THE SILT FENCE SHALL BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.
3. CROSS BRACE WITH 2"x4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
4. MINIMUM 14 GAGE WIRE REQUIRED, FOLD FABRIC 3" OVER THE WIRE AND STAPLE OR PLACE WIRE RINGS ON 12" C-C.
5. EXCAVATE TRENCH A MINIMUM OF 4" WIDE AND 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC, FOLD MATERIAL TO FIT TRENCH AND BACKFILL AND COMPACT TRENCH WITH EXCAVATED SOIL.
6. WIRE SUPPORT FENCE SHALL BE 14 GAGE MINIMUM WOVEN WIRE WITH A MAXIMUM MESH SPACING OF 6". SECURE TOP OF GEOTEXTILE FABRIC TO TOP OF FENCE WITH STAPLES OR WIRE RINGS AT 12" C TO C.
7. GEOTEXTILE FABRIC SHALL BE REINFORCED WITH AN INDUSTRIAL POLYPROPYLENE NETTING WITH A MAXIMUM MESH SPACING OF 1/4" OR EQUAL. A HEAVY DUTY NYLON TOP SUPPORT CORD OR EQUIVALENT IS REQUIRED.
8. STEEL POSTS SHALL BE STUDDED "TEE" OR "U" TYPE WITH A MINIMUM WEIGHT OF 1.2 LBS/LINEAR FOOT WITHOUT ANCHORS, OR ANCHORS SUFFICIENT TO RESIST POST MOVEMENT ARE REQUIRED. WOOD POSTS SHALL BE A MINIMUM SIZE OF 4" DIAMETER, OR 2 1/2"x3 1/2", EXCEPT WOOD POSTS FOR GEOTEXTILE FABRIC REINFORCED WITH NETTING SHALL BE A MINIMUM SIZE OF 1 1/8"x1 1/8" OAK OR HICKORY.
9. ALTERNATES "A" AND "B" ARE EQUAL AND EITHER MAY BE USED.



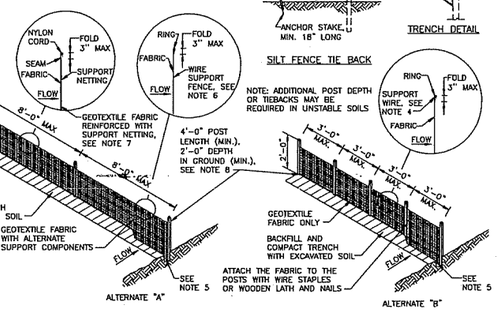
SILT FENCE AT MEDIAN SURFACE DRAINS

* 20' FOR NORMAL 10' DITCH
** GEOTEXTILE FABRIC SIDE

TYPICAL APPLICATIONS OF SILT FENCE



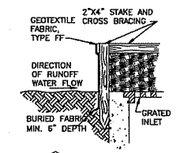
TRENCH DETAIL

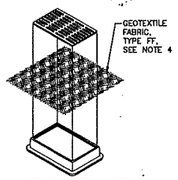


SILT FENCE TIE BACK

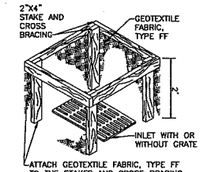
NOTE: ADDITIONAL POST DEPTH OR TIEBACKS MAY BE REQUIRED IN UNSTABLE SOILS

G C-113 SILT FENCE
NO SCALE

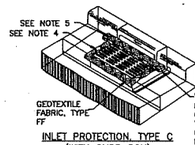




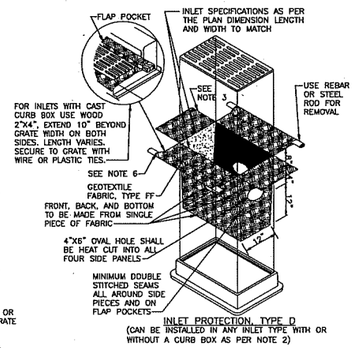
INLET PROTECTION, TYPE B
(WITHOUT CURB BOX)
(CAN BE INSTALLED IN ANY INLET WITHOUT CURB BOX)



INLET PROTECTION, TYPE A



INLET PROTECTION, TYPE C
(WITH CURB BOX)

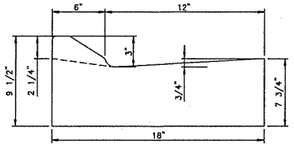


INLET PROTECTION, TYPE D
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE 2)

NOTES:

1. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.
2. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.
3. FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
4. FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.
6. FOR TYPES B AND C, TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE. THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.
7. FOR TYPE D, DO NOT INSTALL INLET PROTECTION TYPE D INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.
TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.
THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY, THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES, TO ACHIEVE THE 3" CLEARANCE.

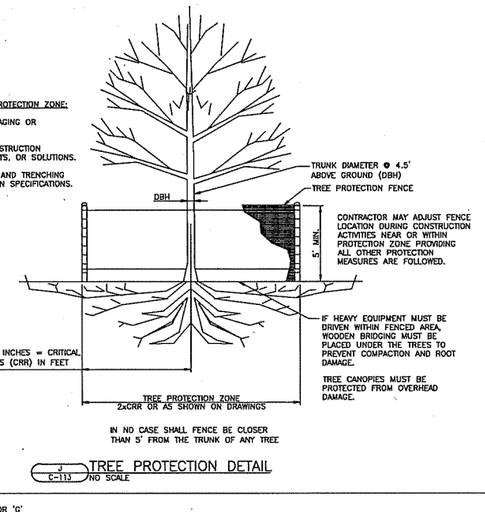
INLET PROTECTION
H C-113 TYPE A, B, C, AND D
NO SCALE



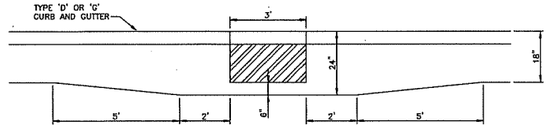
M C-113 MOUNTABLE CURB AND GUTTER SECTION
NO SCALE

PROHIBITED WITHIN TREE PROTECTION ZONE:

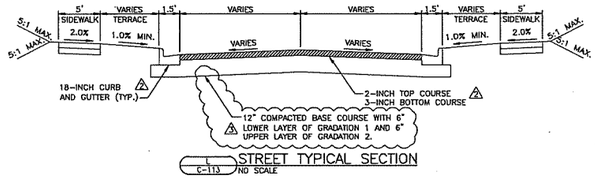
1. NO CONSTRUCTION STAGING OR MATERIALS STORAGE.
2. NO DISPOSAL OF CONSTRUCTION MATERIALS, BYPRODUCTS, OR SOLUTIONS.
3. GRADING EXCAVATION, AND TRENCHING ONLY AS DESCRIBED IN SPECIFICATIONS.



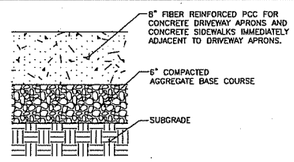
J C-113 TREE PROTECTION DETAIL
NO SCALE



K C-113 CURB DETAIL AT STORM SEWER INLETS
NO SCALE



L C-113 STREET TYPICAL SECTION
NO SCALE



N C-113 CONCRETE PAVEMENT
NO SCALE

RNL
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADD...DWG

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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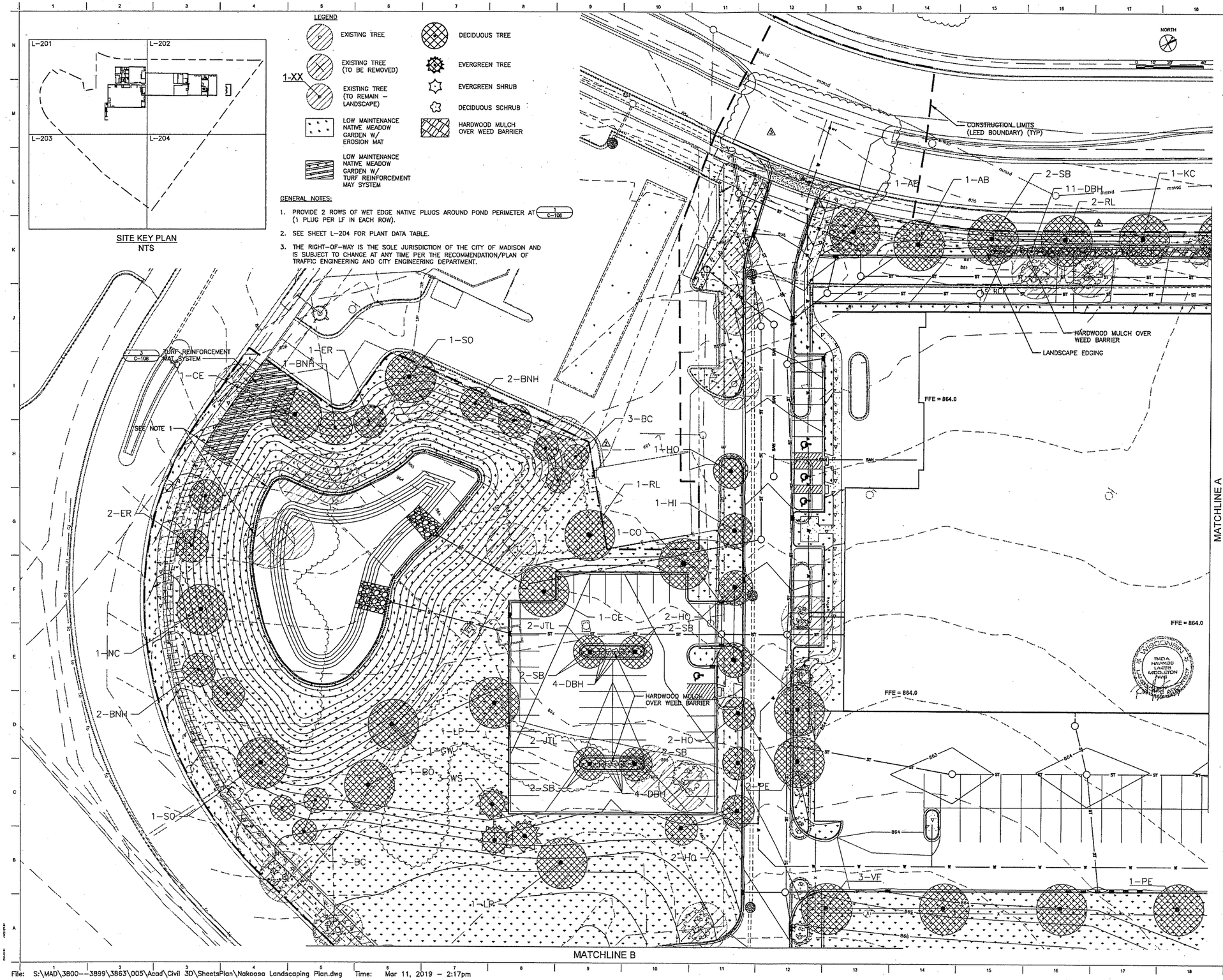
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3	ADDENDUM NO. 3	3/14/19
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/7/19

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PROJECT No: 376003

STANDARD DETAILS

C-113



RNL
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7676 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA 1
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
SD SUBMISSION

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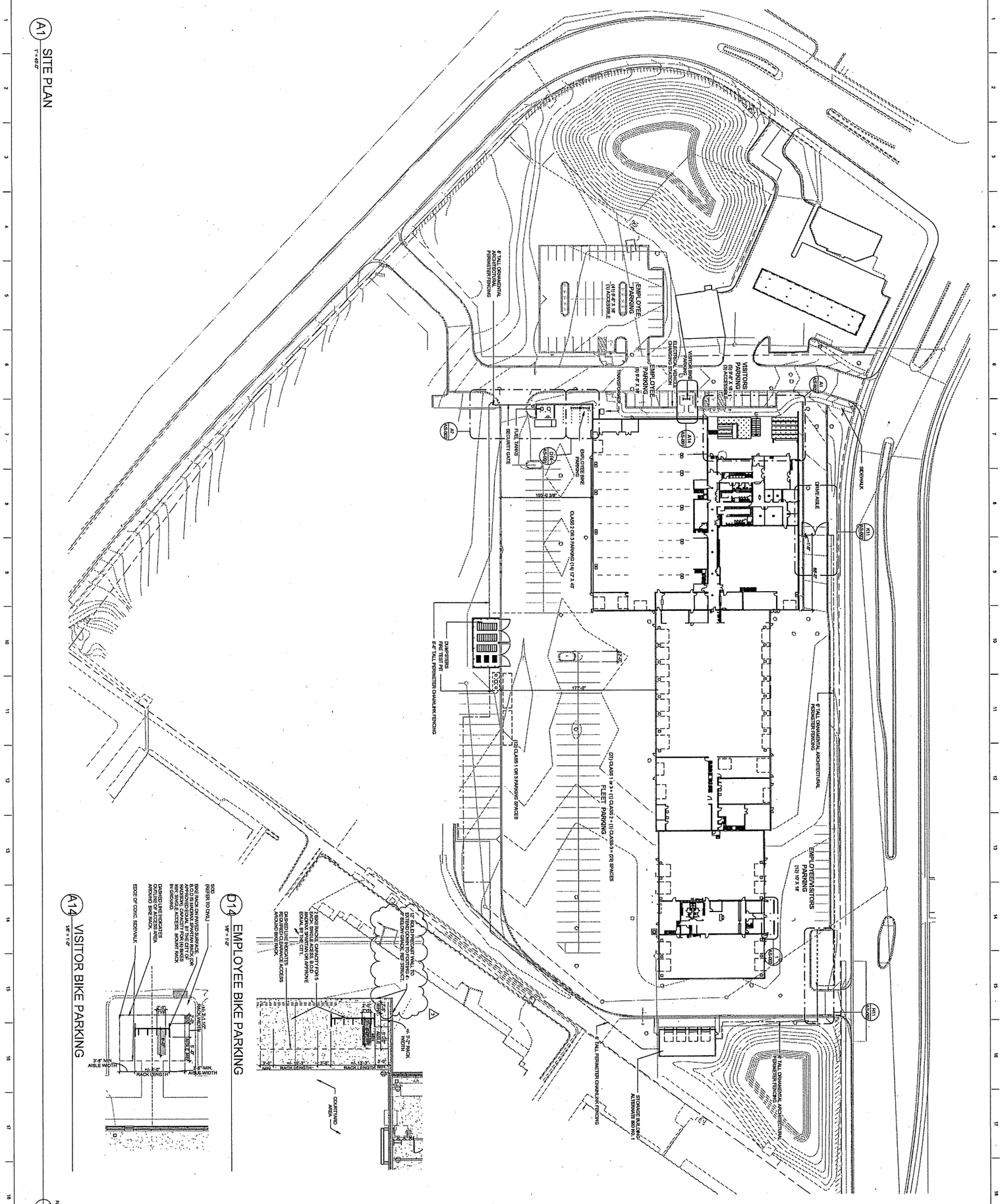
No	REVISION/SUBMISSION	DATE
3	ADDENDUM NO. 3	3/14/19
2	ADDENDUM NO. 2	3/5/19
	ISSUE FOR BID	2/07/19

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PROJECT No: 376603

AREA 1
LANDSCAPING PLAN

L-201



AS-001

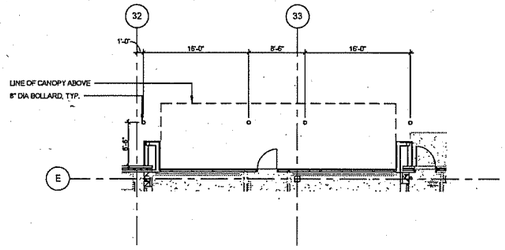
SITE PLAN

PROJECT No:	319003	
3	ADDENDUM 3	02/14/2017
2	ADDENDUM 2	02/07/2017
1	ISSUED FOR PERMIT	01/27/2017
No	REVISION/SUBMISSION	DATE

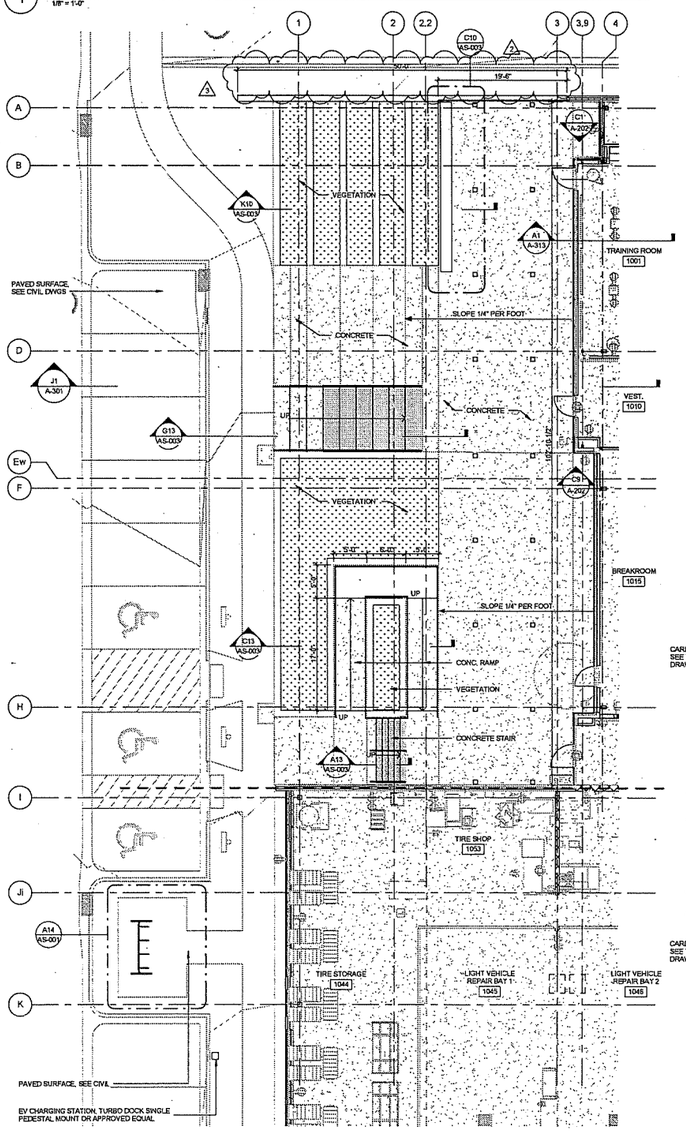
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

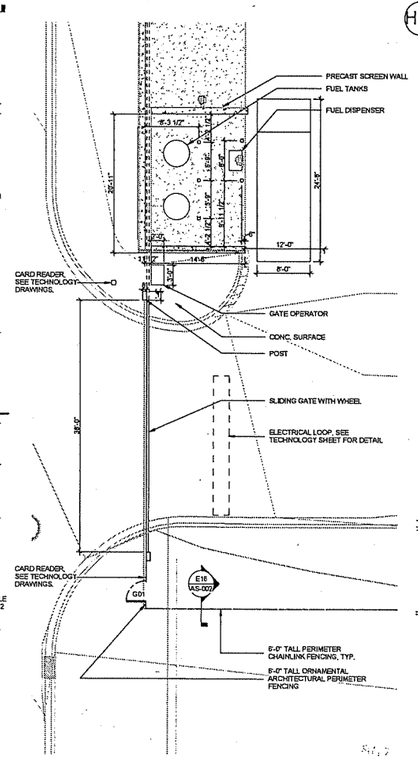
1. ENDUM 3



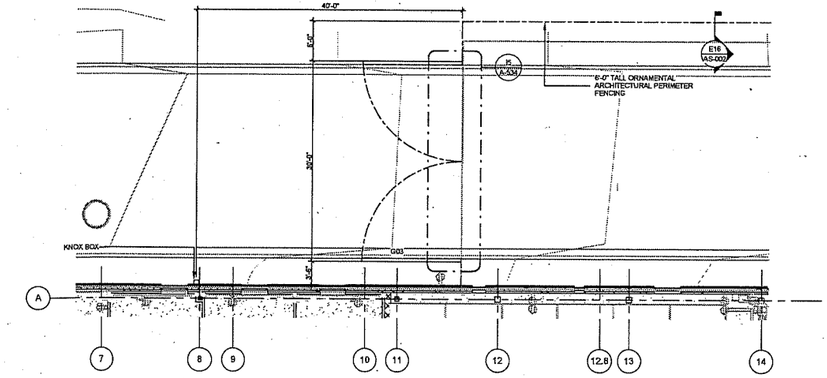
1 ENLARGED SITE PLAN - RADIO
1/8" = 1'-0"



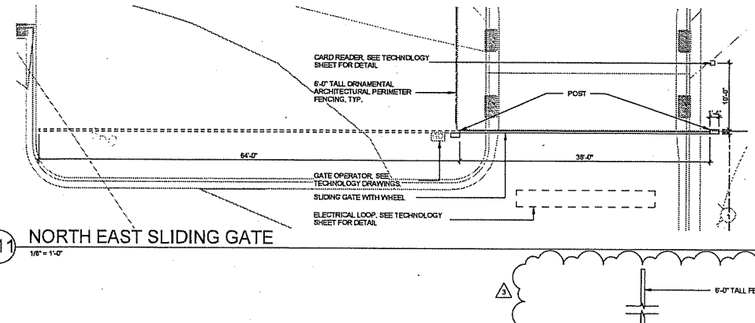
A1 ENLARGED FRONT ENTRY
1/8" = 1'-0"



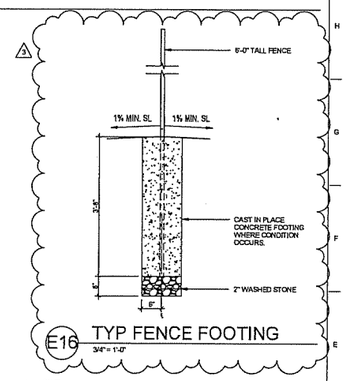
A7 FUELING AREA
1/8" = 1'-0"



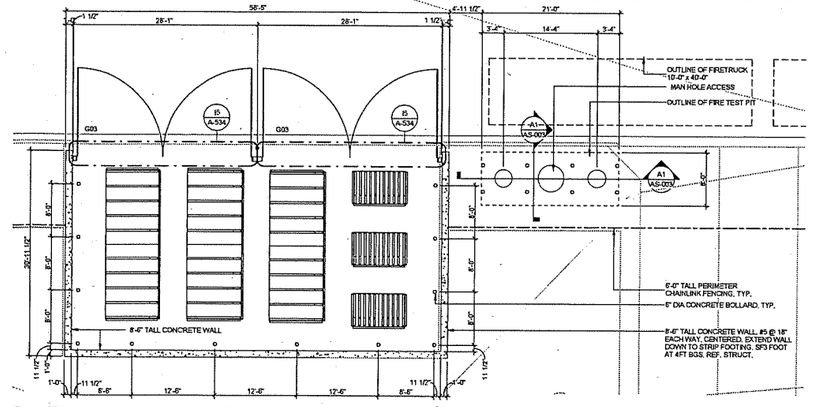
K11 NORTH ENTRY GATE
1/8" = 1'-0"



H11 NORTH EAST SLIDING GATE
1/8" = 1'-0"



E16 TYP FENCE FOOTING
3/4" = 1'-0"



A11 ENLARGED DUMPSTER PLAN
1/8" = 1'-0"

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ARLINGTON, VA 22209
571 280 7679 t

ADDENDUM 3

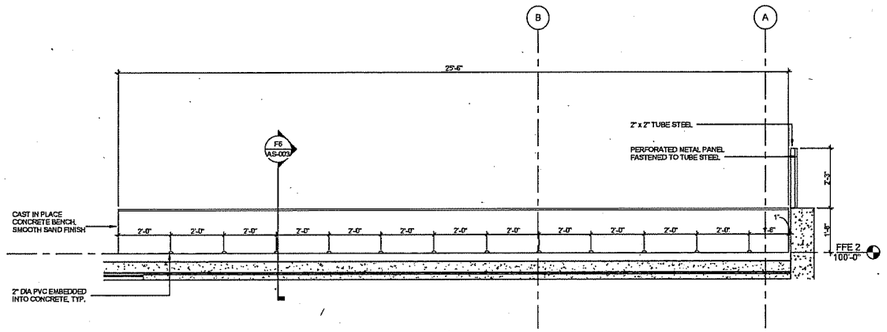
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/11/2019

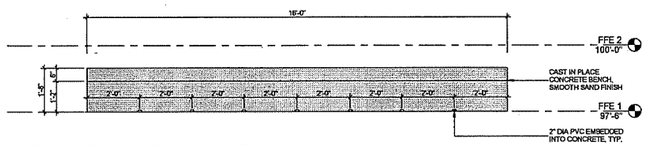
PROJECT No: 376603

ENLARGED SITE PLAN

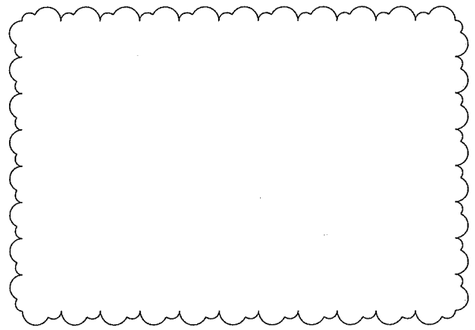
AS-002

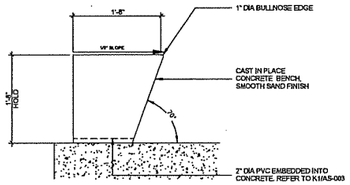


K1 ENLARGED ELEVATION OF ENTRY PLAZA SEATING
1/2" = 1'-0"

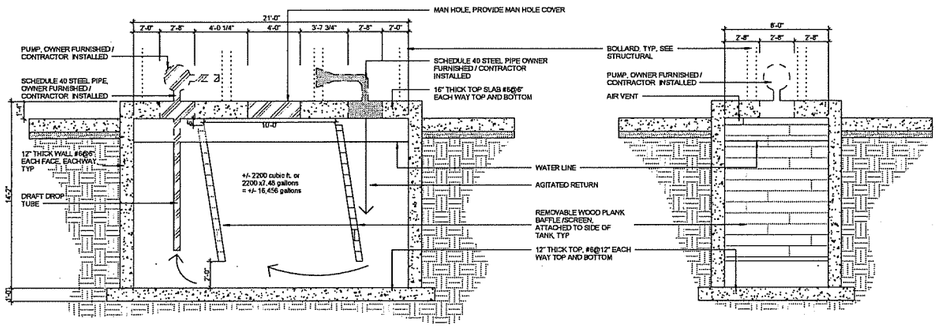


I1 BENCH ELEVATION (RADIO COMM. AREA)
1/2" = 1'-0"



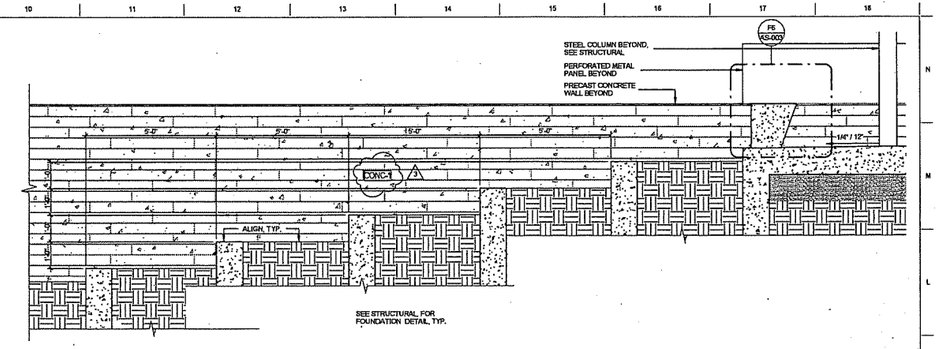


F6 OUTDOOR SEATING SECT
1" = 1'-0"

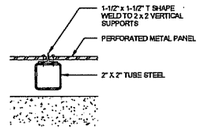


1. STRUCTURE TO BE WATER TIGHT WITH EXCERTION OF WALL TO TOP SLAB JOINT.
2. THE STRUCTURAL DESIGN SHALL CONFORM TO BUILDING CODEREQUIREMENTS FOR STRUCTURAL CONCRETE (ACI318)
4. TOP SLAB JOINT MIN 4" ABOVE PAVEMENT SURFACE.
5. NO LOADING ON TOP SLAB.
6. WATER DEPTH IN STRUCTURE WILL VARY.

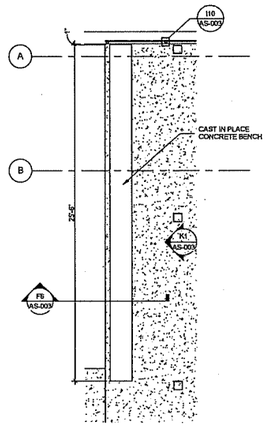
A1 FIRE TEST PIT
1/4" = 1'-0"



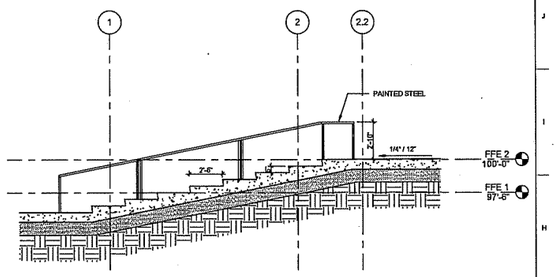
K10 LANDSCAPING SECTION
1/2" = 1'-0"



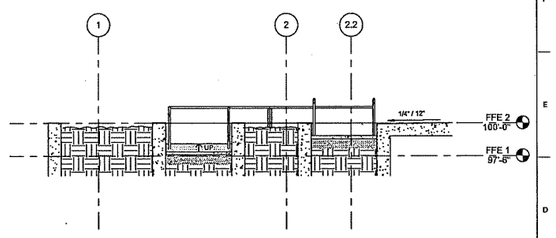
I10 PERFORATED PANEL WALL DETAIL
3" = 1'-0"



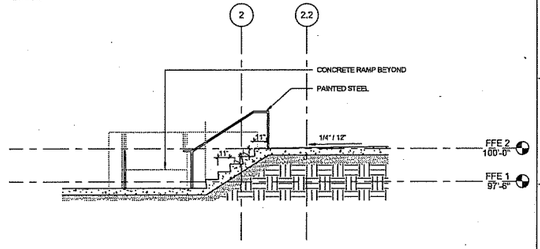
C10 OUTDOOR SEATING PLAN
1/4" = 1'-0"



G13 FRONT ENT STR SECTION
1/4" = 1'-0"



C13 FRNT STRS SECTION
1/4" = 1'-0"



A13 STAIRS SECTION
1/4" = 1'-0"

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571 290 7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 3756003

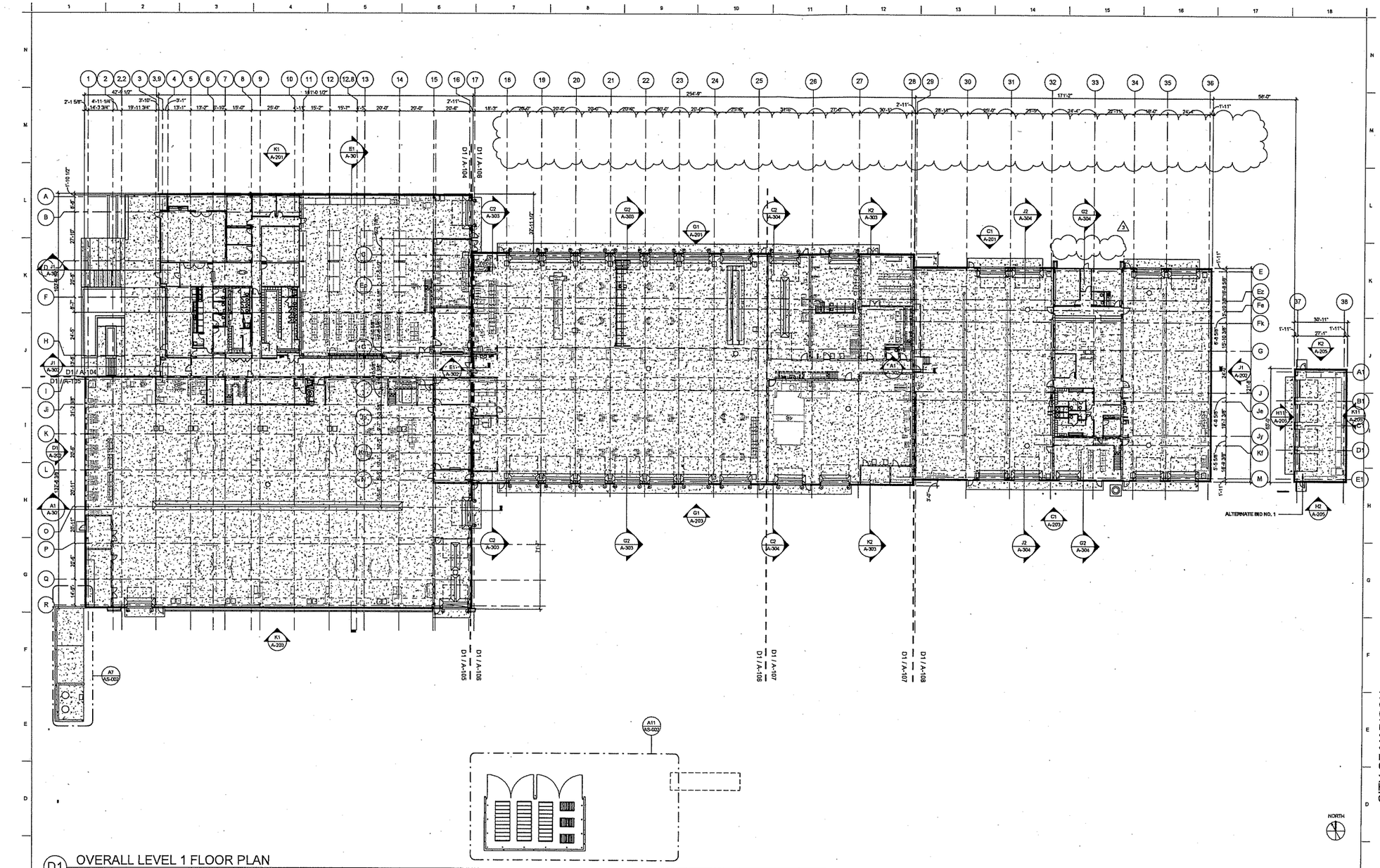
SITE SECTIONS

AS-003

ADDENDUM 3

ADDENDUM 3

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ARLINGTON, VA 22209
571 290 7878 t



D1 OVERALL LEVEL 1 FLOOR PLAN
3/64" = 1'-0"

OVERALL FLOOR PLAN NOTES	
1	DO NOT SCALE FROM THE DRAWINGS. CONTRACTOR SHALL REQUEST FROM THE ARCHITECT NECESSARY DIMENSIONS NOT SHOWN ON THE DRAWINGS.
2	GRID LINES SHOWN ARE LOCATED AT CENTERLINE OF COLUMNS, U.O.N.
3	REFER TO 1/8" FLOOR PLANS FOR ADDITIONAL GENERAL NOTES, DIMENSIONS, KEYNOTES, WALL SECTION TAGS, AND SIDE ELEVATION TAGS.
4	WINDOW AND DOOR OPENINGS DIMENSIONED ON 1/8" FLOOR PLANS.
5	DIMENSIONS ARE TAKEN FROM OUTSIDE FACE OF PRECAST WALL AND CENTERLINE OF COLUMNS WHERE INDICATED.

KEY NOTES

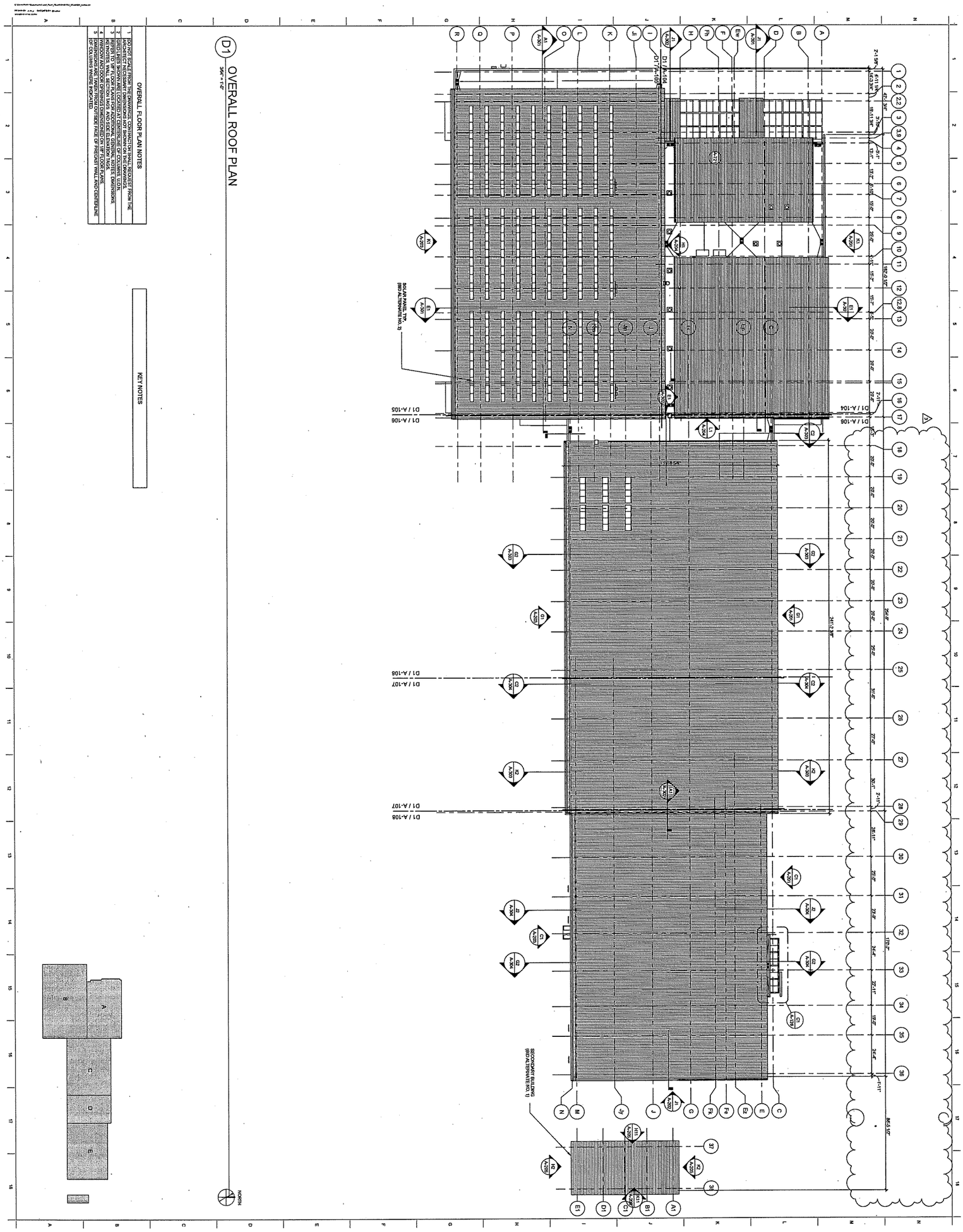
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
-	ISSUE FOR BID	02/07/2019
-	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 3760003

OVERALL LEVEL 1 FLOOR PLAN

A-101



A-103

OVERALL ROOF PLAN

NO.	ISSUE	DATE
1	PROGRESS	05/14/2021
2	ISSUE PERMIT	06/04/2021
3	ISSUE PERMIT(REV)	07/07/2021
4	ISSUE PERMIT(REV)	07/27/2021

PROJECT No. 315600

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF

4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

ARCHITECTURE

Stantec

1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

D1 LEVEL 1 PLAN AREA A

1/8" = 1'-0"

0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N. FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES, U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (M.O.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS, PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES	
66	LINE OF MEZZANINE ABOVE.
70	KNOX BOX.
71	FIRE ANNUNCIATOR PANEL.
73	TRENCH DRAIN. TYP.
78	ADA DOOR ACTUATOR.
79	ADA MULLION MOUNTED DOOR ACTUATOR.
81	RECESSED RADIANT FLOOR MANIFOLD MOUNTING BOX.
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX.

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ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/10/2019

PROJECT No: 376603

LEVEL 1 FLOOR PLAN
AREA A

A-104

A addendum 3

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SUITE 350
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571 280 7979 t

D1 / A-104

D1 / A-104

TIRE SHOP 1053
PORT. EQUIP. STORAGE 1036
STAIR 1033
FITNESS ROOM 1038
SHOWER 1032
COMMON WORK AREA 1039
STAIR 3 1054
COMP. RM. 1061
6" METAL STUD WALL
PUBLIC WORKS GEN. FOREMAN 1042
MEZZANINE ABOVE
TIRE STORAGE 1045
LIGHT VEHICLE REPAIR BAY 1 1045
LIGHT VEHICLE REPAIR BAY 2 1048
LIGHT VEHICLE REPAIR BAY 3 1047
LIGHT VEHICLE REPAIR BAY 4 1046
LIGHT VEHICLE REPAIR BAY 5 1045
LIGHT VEHICLE REPAIR BAY 6 1050
LIGHT VEHICLE REPAIR BAY 7 1051
LIGHT VEHICLE REPAIR BAY 8 1052
TOOL CRIB 1040
CHECK-IN COUNTER 1043
FLAT SURFACE
SLOPE 1/4" PER FOOT MIN. TYP.
LIGHT DUTY MAINTENANCE BAY 1055
FIRE RISER ROOM 1054
MAIN ELEC ROOM 1052
TRANSFORMER
LIGHT VEHICLE REPAIR BAY 9 1057
LIGHT VEHICLE REPAIR BAY 10 1058
LIGHT VEHICLE REPAIR BAY 11 1059
LIGHT VEHICLE REPAIR BAY 12 1060
LIGHT VEHICLE REPAIR BAY 13 1061
LIGHT VEHICLE REPAIR BAY 14 1062
LIGHT VEHICLE REPAIR BAY 15 1063
LIGHT VEHICLE REPAIR BAY 16 1064
8" PRECAST WALL SEE STRUCT.
WASH BAY 1065
SLOPE 1/4" PER FOOT MIN. TYP FOR ALL OVER HEAD DOORS.
225'-11 5/8"
155'-3"
D1 / A-105
NORTH

D1 LEVEL 1 PLAN AREA B
1/8" = 1'-0"
0 4' 8' 16'

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N.: FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES, U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (M.O.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS, PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES	
55	EV CHARGING STATION, OWNERS TO SELECT THE UNIT.
73	TRENCH DRAIN, TYP.
81	RECESSED RADIANT FLOOR MANIFOLD MOUNTING BOX.
82	SURFACE MOUNTED RADIANT FLOOR MANIFOLD MOUNTING BOX.

A B C D E

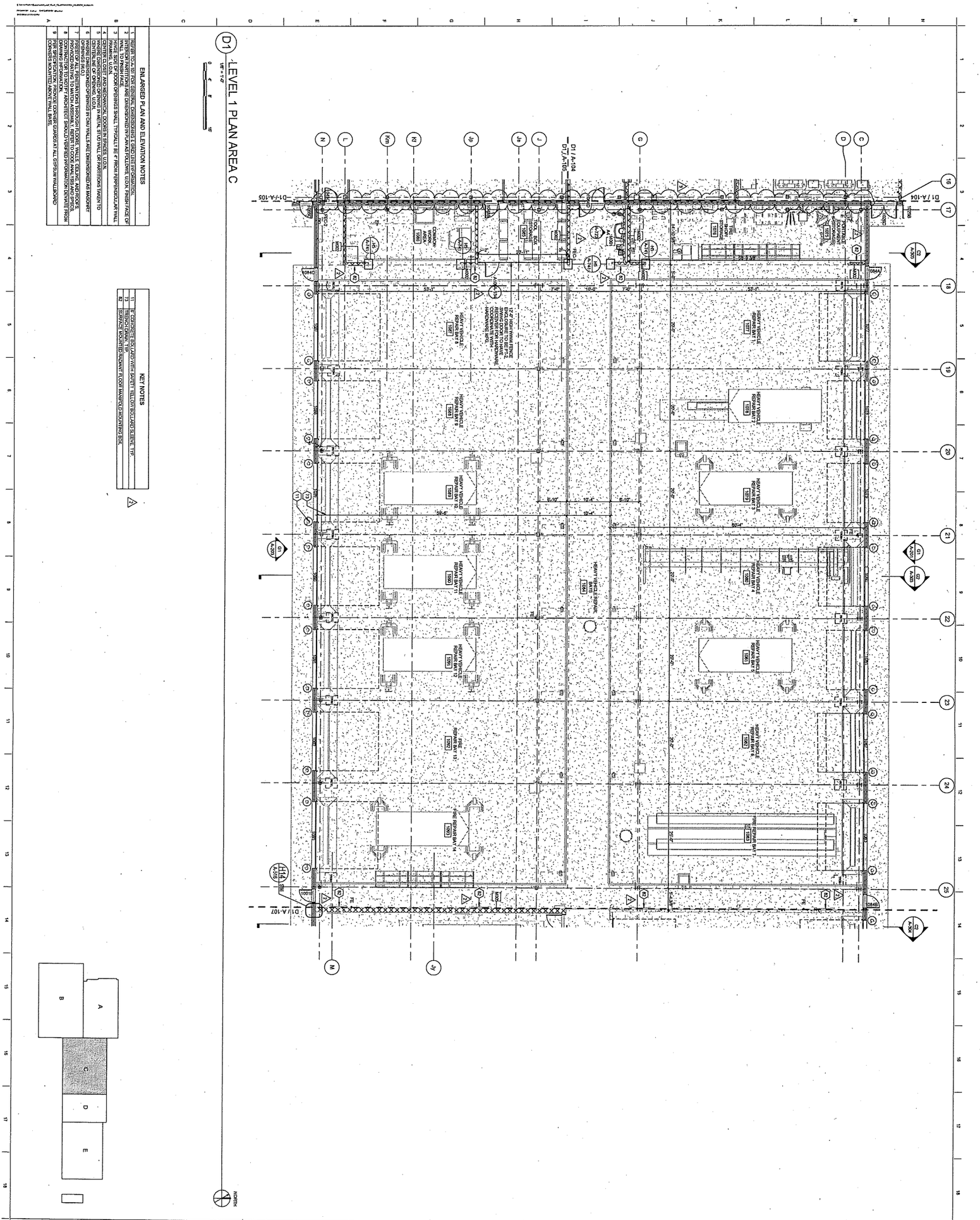
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No 316005

LEVEL 1 FLOOR PLAN
AREA B

A-105



1	REFER TO A-501 FOR GENERAL DOOR/DOORFRAME DETAILS FOR INFORMATION
2	ALL WALLS ADJACENT TO DOORS SHALL BE GRINDED/INFILLED/FLUSH FACE OF WALL TO FINISH FACE
3	PROVIDE 6" CLEAR FROM DOOR OPENING SWALL TYPICALLY BE 4" FROM FOR/GRINDED/FLUSH WALL
4	CENTER CLOSET RACK/SHELVING CLOSER TO SPACE SIDE
5	CENTERLINE OF OPENING UON
6	CENTERLINE OF OPENING UON + REF'N. STOP/WALL OR PARTITION TAGS TO
7	PROVIDE FIRE SEALANT AT ALL PENETRATIONS THROUGH FIRE RATED WALLS OR FLOORS
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM
9	PER SPECIFICATION, PROVIDE CONTROL JOINTS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE

11	6" CONCRETE EXCAVATED WITH SAWCUT YELLOW BOLLARD SLEEVE TYP.
12	SURFACE MOUNTED SIGNAGE FLOOR MAN HOLD MOUNTING BOL

3	ADDENDUM 3	02/14/2017
2	ADDENDUM 2	02/07/2017
1	ISSUE FOR BID	01/20/2017
0	ISSUE FOR PERMIT	01/11/2017
NO.	ISSUE/REVISION	DATE

PROJECT No. 217810

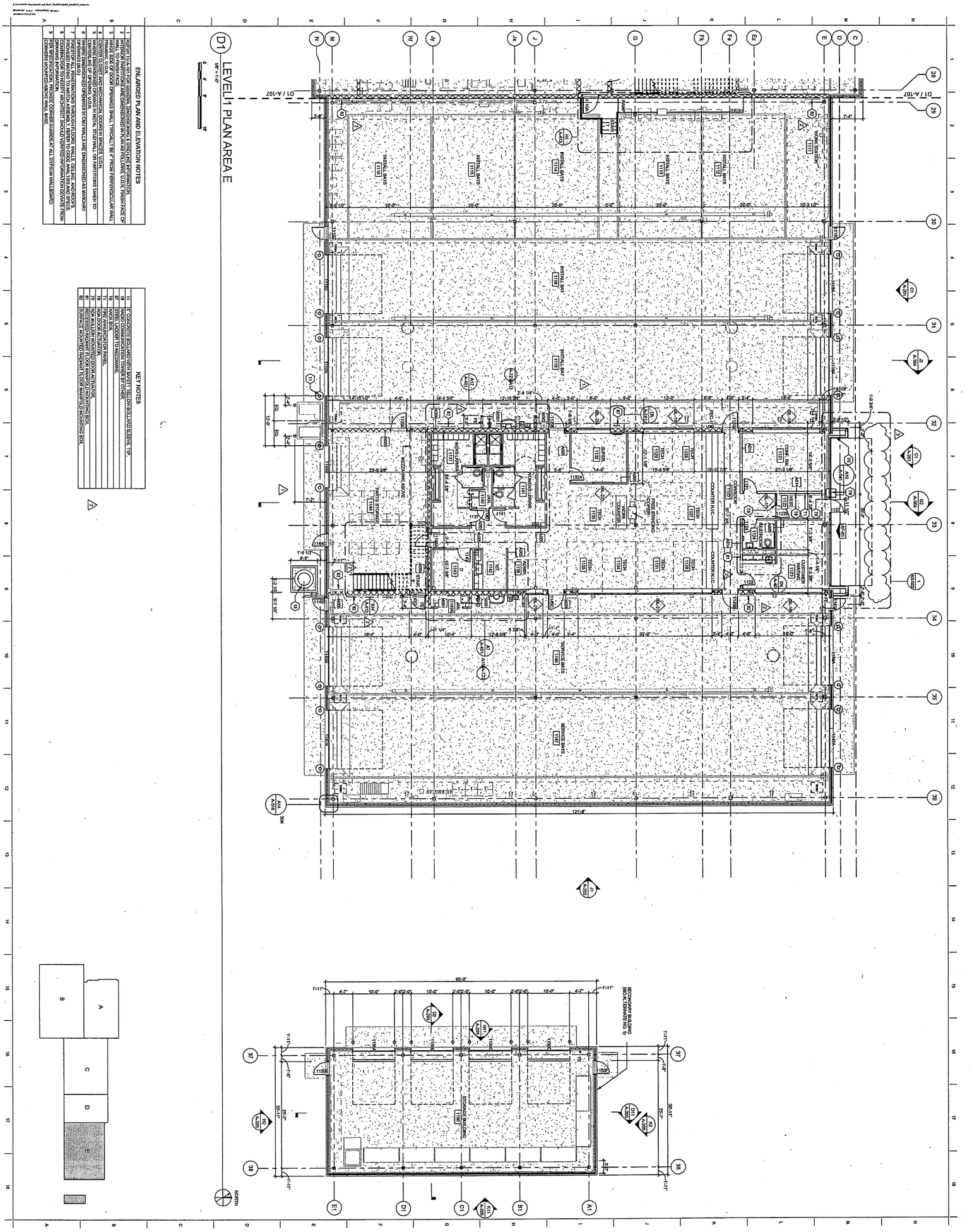
LEVEL 1 FLOOR PLAN AREA C

A-106

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3



CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF

4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

ARCHITECTURE

Stantec

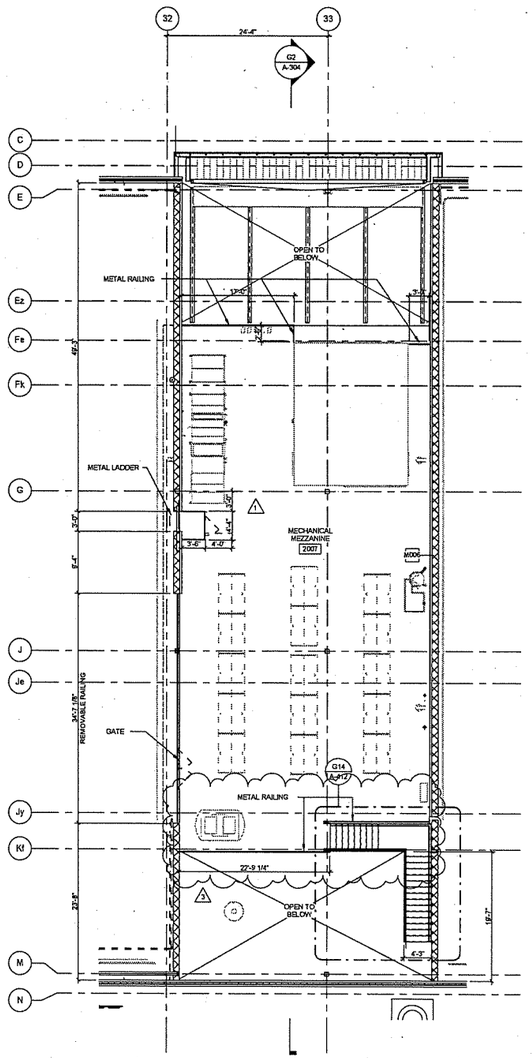
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

LEVEL 1 FLOOR PLAN
AREA E

A-108

ADDENDUM 3

ADDENDUM 3



D1 RADIO/COMM MEZZANINE

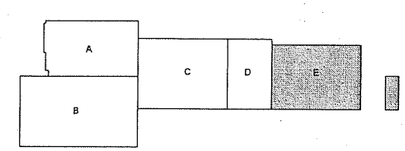
1/8" = 1'-0"

0 4' 8' 16'

NORTH

ENLARGED PLAN AND ELEVATION NOTES	
1	REFER TO A-101 FOR GENERAL DIMENSIONING & GRID LINE INFORMATION.
2	INTERIOR PARTITIONS ARE DIMENSIONED IN PLAN AS FOLLOWS, U.O.N., FINISH FACE OF WALL TO FINISH FACE.
3	HINGE SIDE OF DOOR OPENINGS SHALL TYPICALLY BE 4" FROM PERPENDICULAR WALL FRAMING, U.O.N.
4	CENTER CLOSET AND MECHANICAL DOORS IN SPACES, U.O.N.
5	WHERE DIMENSIONED OPENING IN METAL STUD WALL OR PARTITIONS TAKEN TO CENTERLINE OF OPENING, U.O.N.
6	WHERE DIMENSIONED OPENINGS IN CMU WALLS ARE DIMENSIONED AS MASONRY OPENINGS (MLO.)
7	FIRESTOP ALL PENETRATIONS THROUGH FLOORS, WALLS, CEILING, AND ROOFS, PROVIDED RATING TO MATCH ASSEMBLY, REFER TO CODE ANALYSIS AND SPECS.
8	CONTRACTOR TO NOTIFY ARCHITECT SHOULD VERIFIED INFORMATION DEVIATE FROM DRAWING INFORMATION.
9	PER SPECIFICATION, PROVIDE CORNER GUARDS AT ALL GYPSUM WALLBOARD CORNERS MOUNTED ABOVE WALL BASE.

KEY NOTES



Stantec
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SUITE 350
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571 260 7678 t

CITY OF MADISON
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ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	02/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376003

MEZZANINE FLOOR PLAN
AREA E

A-114

4 ADDENDUM 3

D1 AREA A ROOF PLAN

1/8" = 1'-0"

0 4' 8' 16'

ROOF PLAN NOTES	
1	PROVIDE 1/4" PER FOOT MINIMUM SLOPE TOWARD ROOF DRAIN A1 MEMBRANE ROOF U.O.N.
2	

KEY NOTES	
19	ROOF LADDER WITH METAL CAGE, TYP.
23	SOLATUBE, TYP.
60	ROOF DRAIN AND OVERFLOW DRAIN, TYP.
61	ROOF RIDGELINE.
62	CONTINUOUS SNOWGUARD, TYP.
63	CONTINUOUS METAL GUTTER WITH INTERNAL ROOF DRAINS.
64	STANDING SEAM METAL ROOF.
66	ROOF DRAIN AND OVERFLOW DRAIN AT THE MIDDLE OF THE ROOF BELOW.

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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

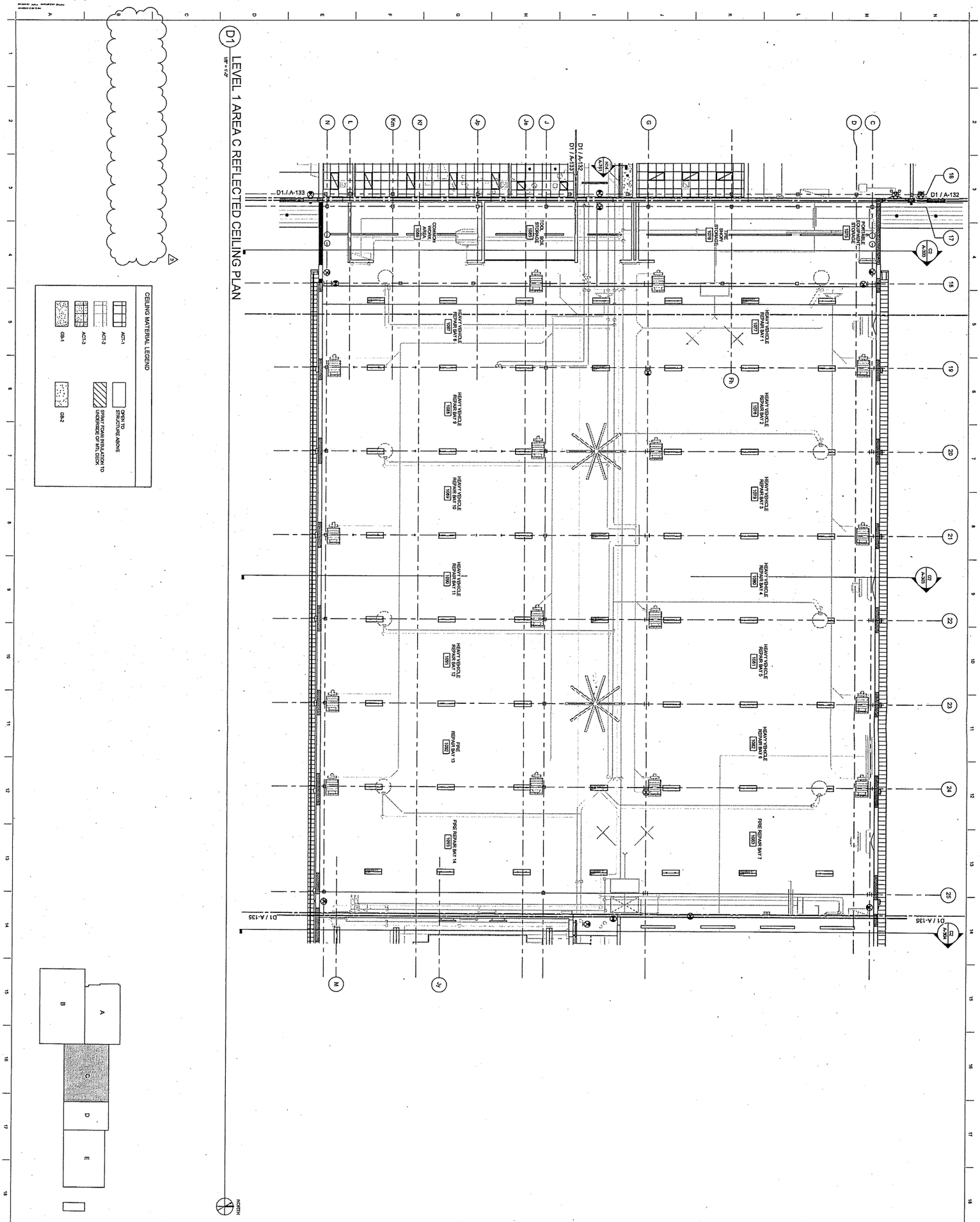
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 376803

ROOF PLAN AREA A

A-121



A-134

LEVEL 1 AREA C REFLECTED CEILING PLAN

No	REVISION/SUBMISSION	DATE
	ISSUE FOR BID	03/14/2017
2	ADDENDUM 2	03/24/2017
3	ADDENDUM 3	03/31/2017

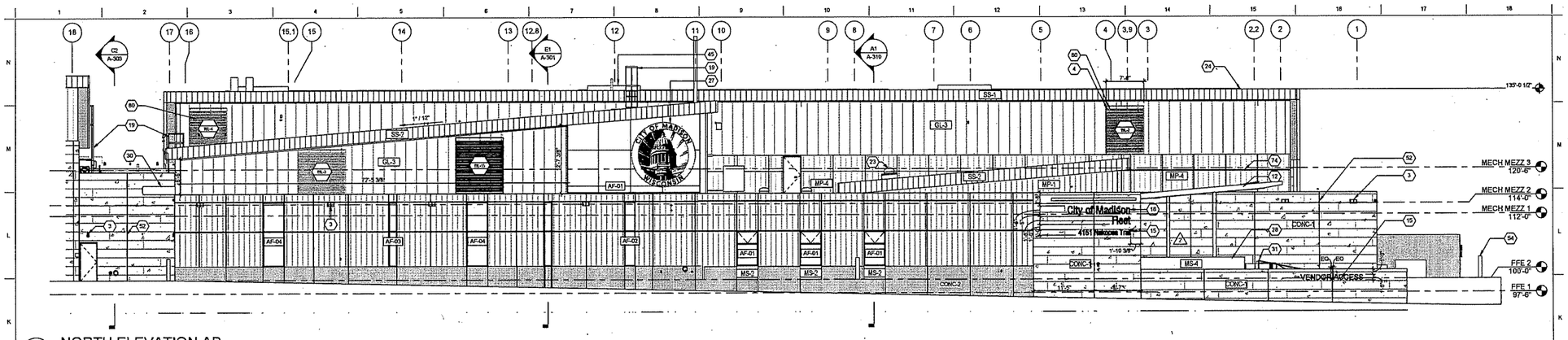
PROJECT No. 319600

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714

ARCHITECTURE

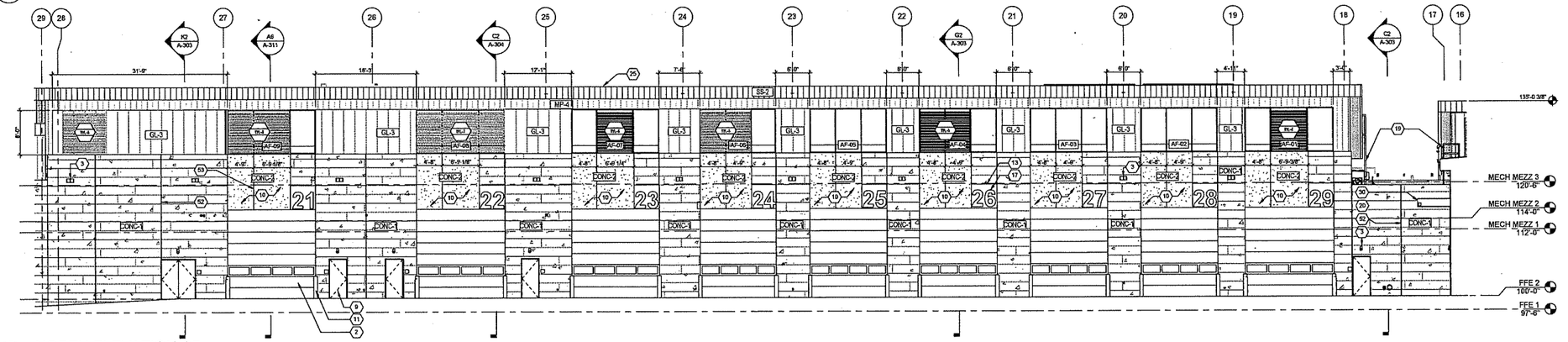
Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 280 7679 t

ADDENDUM 3



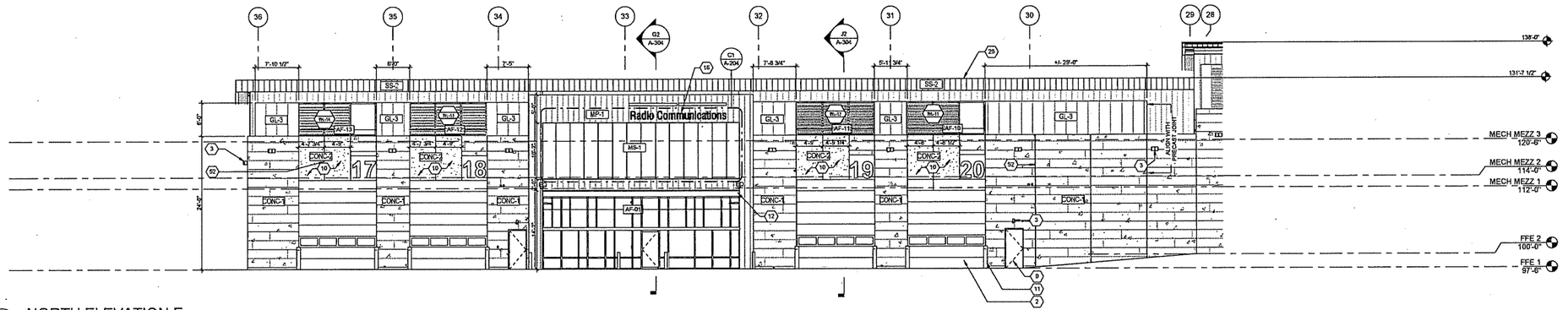
K1 NORTH ELEVATION AB

1/8" = 1'-0"



G1 NORTH ELEVATION CD

1/8" = 1'-0"



C1 NORTH ELEVATION E

1/8" = 1'-0"

ENLARGED ELEVATION NOTES	
1	REFER TO G-001 FOR PROJECT GENERAL NOTES, REFERENCE AND MATERIAL SYMBOLS, AND ABBREVIATIONS USED ON THIS DRAWING.
2	REFER TO THE ARCHITECTURAL GENERAL NOTES ON SHEET G-003 FOR ADDITIONAL NOTES WHICH MAY BE APPLICABLE TO THE WORK SHOWN ON THIS SHEET.
3	REFER TO AND COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4	REFER TO SITE SCHEDULE, ARCHITECTURAL GENERAL NOTES FOR SITE SIGNAGE AND SITE SIGNAGE LOCATION ON SHEET AS-005.
5	SEE SHEET A-200 FOR ADDITIONAL EXTERIOR FINISH INFORMATION AND SCHEDULE.
6	FOR ALUMINUM FRAMED (AF) WINDOW AND GLAZING TYPES, REFER TO SHEETS A-503 AND A-504.

KEY NOTES	
2	INSULATED STEEL SECTIONAL OVERHEAD DOOR WITH VISION AND PLASTIC GLAZING PANELS. TYP.
3	LIGHT FIXTURE. REFER TO ELECTRICAL DRAWINGS.
4	MECHANICAL LOUVER. TYP. REFER TO MECHANICAL DRAWINGS.
9	(PT-1) HOLLOW METAL DOOR AND FRAME, TYP.
10	(PT-2) PAINTED INSULATED PRECAST WALL PANELS WITH SMOOTH TEXTURE. SEE EXTERIOR FINISH SCHEDULE ON A-200.
11	6" CONCRETE BOLLARD WITH SAFETY YELLOW BOLLARD SLEEVE, TYP.
12	(PT-1) PAINTED STEEL STRUCTURE CANOPY
13	(PT-3) PAINTED STEEL PLATE WITH APPLIED MATTE ALUMINUM LETTERS TYP.
15	MATTE ALUMINUM LETTERS 1'-0" HEIGHT, TYP.
16	MATTE ALUMINUM LETTERS 1'-6" HEIGHT, TYP.
17	MATTE ALUMINUM LETTERS 2'-0" HEIGHT, TYP.
19	ROOF LADDER WITH METAL CAGE, TYP.
23	SKYLIGHT, TYP.
24	(SS-1) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
25	(SS-2) STANDING SEAM METAL ROOF, SEE EXTERIOR FINISH SCHEDULE ON A-200.
27	VINYL APPLIED GRAPHIC.
28	PERFORATED METAL SCREEN WITH PAINTED SUBSTRUCTURE TO MATCH MS-1.
30	METAL PANEL CANOPY WITH MEMBRANE ROOFING.

KEY NOTES CONT.	
31	PREFINISHED METAL PIPE HANDRAIL/GUARDRAIL, TYP.
45	SOLAR PANEL, TYP. SEE ELECTRICAL. (ALTERNATE BID NUMBER 2).
52	3/4" INSULATED PRECAST PANEL JOINT, TYP.
53	1/2" INSULATED PRECAST PANEL REVEAL, TYP.
54	BIKE RACK ON PAVED SURFACE. SEE AS-002.
74	1/2" REVEAL IN METAL PANEL, TYP.
80	PROVIDE BIRD-SCREEN ON EXTERIOR SIDE OF LOUVER.

MATERIAL GRAPHIC LEGEND	
LW-X	LOUVER TYPE, SEE SHEET A-602
AF-X	(AF) ALUMINUM FRAME, SEE SHEET A-503 - A-504
XXX-X	EXTERIOR FINISH, SEE SHEET A-200
PT-X	PAINTS AND COATINGS, SEE SHEET A-200
BL-X	BORROWED LITE TYPE, SEE SHEET A503 - A-504
XXX	KEYNOTE

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NAKOOSA TRAIL
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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

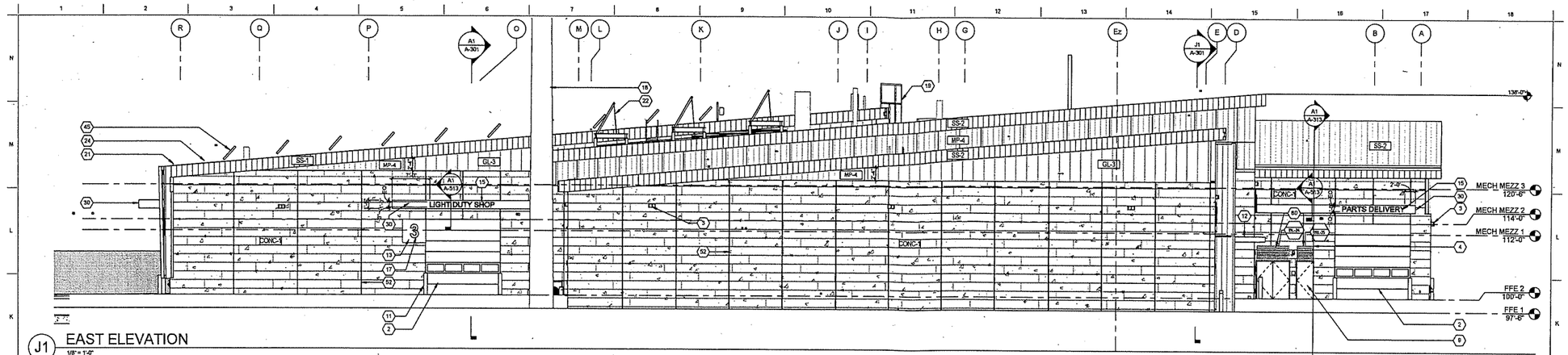
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	01/14/2019
2	ADDENDUM 2	01/03/2019
	ISSUE FOR GMP	01/01/2019
	DSPS RESPONSE 1	01/21/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No. 378003

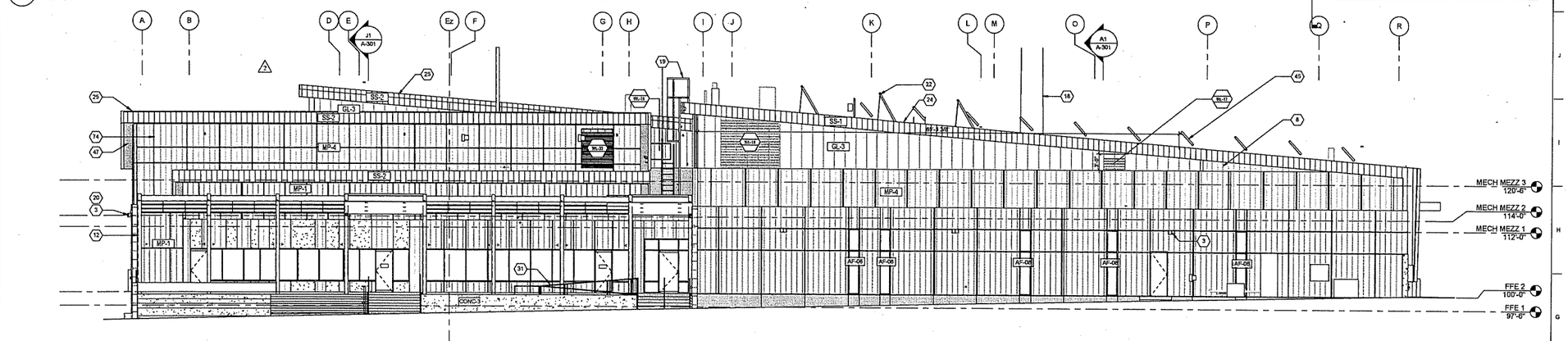
BUILDING ELEVATIONS

A-201

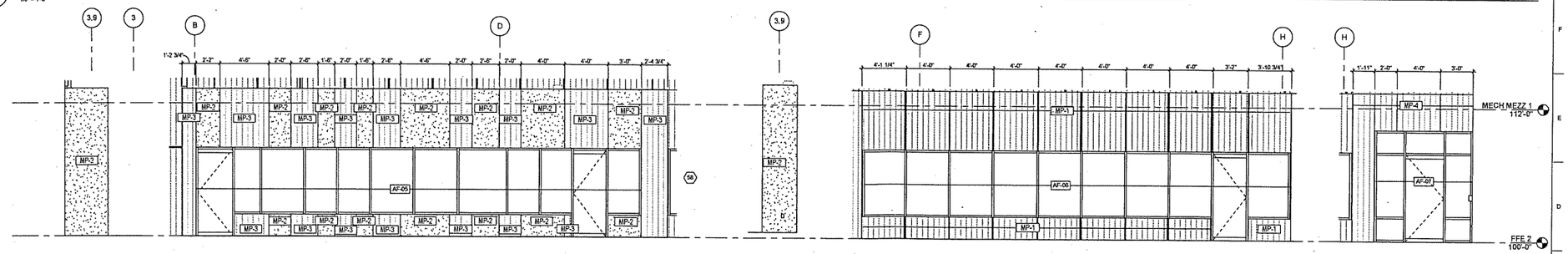
1, ADDENDUM 3



J1 EAST ELEVATION
1/8" = 1'-0"



D1 WEST ELEVATION
1/8" = 1'-0"



C1 NRTH ENTRY ELEV
1/4" = 1'-0"

C3 ENLARGED WEST ELEVATION AT ENTRY
1/4" = 1'-0"

C9 STH ENTRY ELEV
1/4" = 1'-0"

C11 ENLARGED WEST ELEVATION AT ENTRY1
1/4" = 1'-0"

C16 ENLRGD WST ELEV ENTRY 2
1/4" = 1'-0"

ENLARGED ELEVATION NOTES	
1	REFER TO G-001 FOR PROJECT GENERAL NOTES. REFERENCE AND MATERIAL SYMBOLS, AND ABBREVIATIONS USED ON THIS DRAWING.
2	REFER TO THE ARCHITECTURAL GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL NOTES WHICH MAY BE APPLICABLE TO THE WORK SHOWN ON THIS SHEET.
3	REFER TO AND COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4	REFER TO SITE SCHEDULE, ARCHITECTURAL GENERAL NOTES FOR SITE SIGNAGE AND SITE SIGNAGE LOCATION ON SHEET AS-005.
5	SEE SHEET A-200 FOR ADDITIONAL EXTERIOR FINISH INFORMATION AND SCHEDULE.
6	FOR ALUMINUM FRAMED (AF) WINDOW AND GLAZING TYPES, REFER TO SHEETS A-503 AND A-504.

KEY NOTES	
2	INSULATED STEEL SECTIONAL OVERHEAD DOOR WITH VISION AND PLASTIC GLAZING PANELS. TYP.
3	LIGHT FIXTURE, REFER TO ELECTRICAL DRAWINGS.
4	MECHANICAL LOUVER, TYP. REFER TO MECHANICAL DRAWINGS.
6	(MP-4) METAL WALL PANEL. SEE EXTERIOR FINISH SCHEDULE ON A-200.
9	(PT-1) HOLLOW METAL DOOR AND FRAME. TYP.
11	6" CONCRETE BOLLARD WITH SAFETY YELLOW BOLLARD SLEEVE. TYP.
12	(PT-1) PAINTED STEEL STRUCTURE CANOPY
13	(PT-3) PAINTED STEEL PLATE WITH APPLIED MATTE ALUMINUM LETTERS) TYP.
15	MATTE ALUMINUM LETTERS 1'-0" HEIGHT, TYP.
17	MATTE ALUMINUM LETTERS 3'-0" HEIGHT, TYP.
18	RADIO COMMUNICATION TOWER BY OTHER.
19	ROOF LADDER WITH METAL CAGE, TYP.
21	SNOWGUARD, TYP.
22	SOLAR HOT WATER PANEL SYSTEM, REFER TO MECHANICAL DRAWINGS.
24	(SS-1) STANDING SEAM METAL ROOF. SEE EXTERIOR FINISH SCHEDULE ON A-200.
25	(SS-2) STANDING SEAM METAL ROOF. SEE EXTERIOR FINISH SCHEDULE ON A-200.
30	METAL PANEL CANOPY WITH MEMBRANE ROOFING.
31	PREFINISHED METAL PIPE HANDRAIL/GUARDRAIL, TYP.
45	SOLAR PANEL, TYP. SEE ELECTRICAL (ALTERNATE BID NUMBER 2).

KEY NOTES CONT.	
47	PERFORATED METAL SOFFIT TO MATCH S-2. SEE EXTERIOR FINISH SCHEDULE ON A-200.
52	3/4" INSULATED PRECAST PANEL JOINT, TYP.
74	1/2" REVEAL IN METAL PANEL TYP.
80	PROVIDE BIRD SCREEN ON EXTERIOR SIDE OF LOUVER.

MATERIAL GRAPHIC LEGEND	
WL-X	LOUVER TYPE. SEE SHEET A-602
AF-X	(AF) ALUMINUM FRAME, SEE SHEET A-503 - A-504
XXX-X	EXTERIOR FINISH, SEE SHEET A-200
PT-X	PAINTS AND COATINGS, SEE SHEET A-200
BL-X	BORROWED LITE TYPE, SEE SHEET A503 - A-504
XXX	KEYNOTE

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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	05/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/17/2019

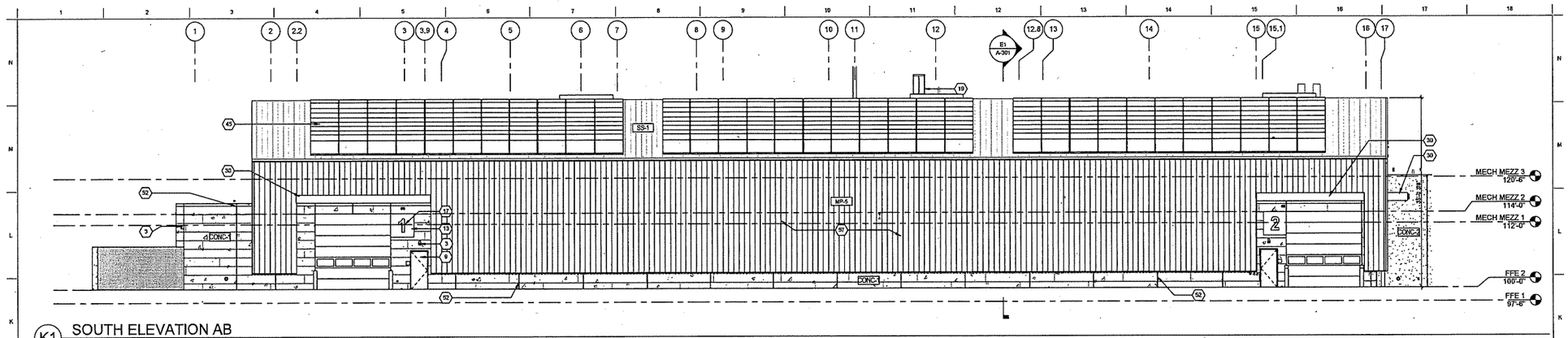
PROJECT No: 316603

BUILDING ELEVATIONS

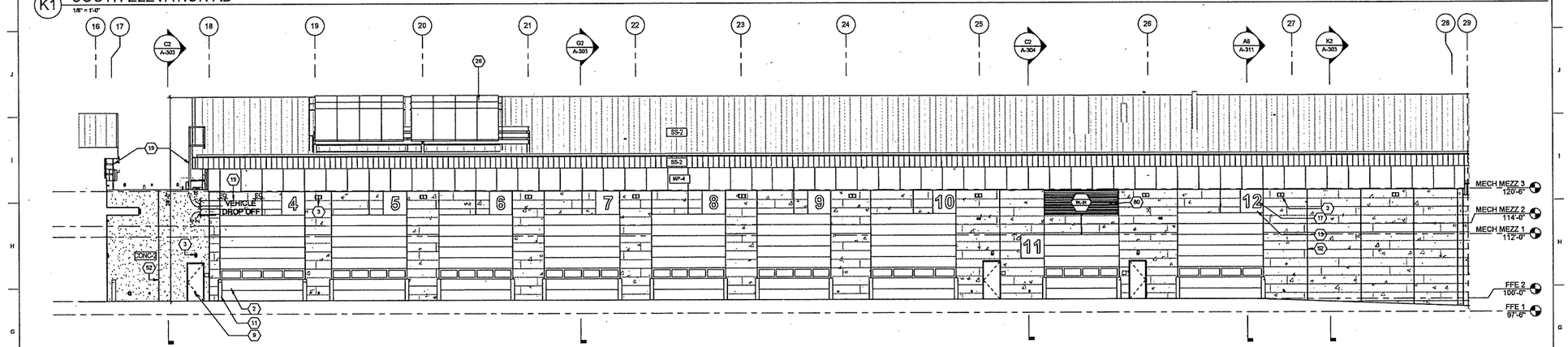
A-202

ADDENDUM 3

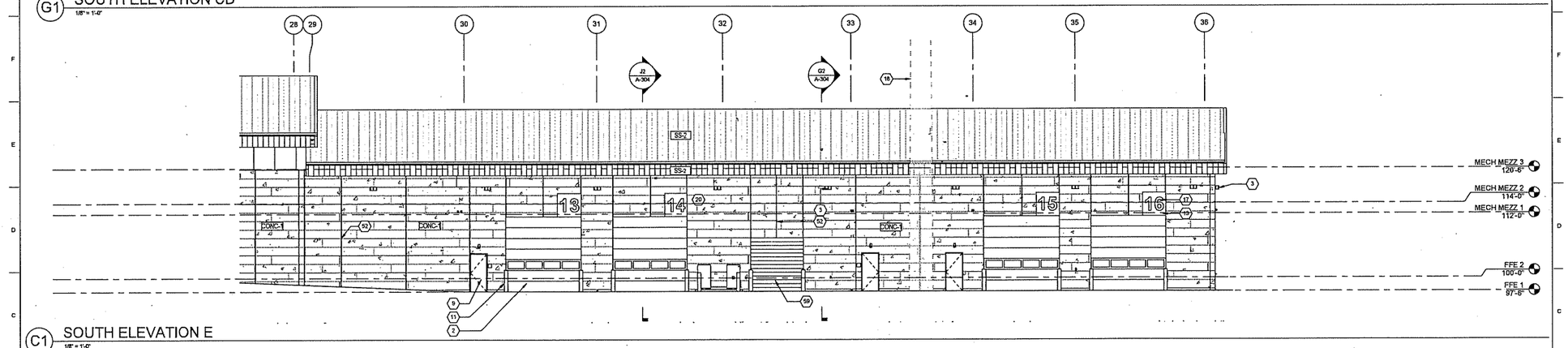
ADDENDUM 3



K1 SOUTH ELEVATION AB
1/8" = 1'-0"



G1 SOUTH ELEVATION CD
1/8" = 1'-0"



C1 SOUTH ELEVATION E
1/8" = 1'-0"

ENLARGED ELEVATION NOTES

1	REFER TO G-001 FOR PROJECT GENERAL NOTES, REFERENCE AND MATERIAL SYMBOLS, AND ABBREVIATIONS USED ON THIS DRAWING.
2	REFER TO THE ARCHITECTURAL GENERAL NOTES ON SHEET G-002 FOR ADDITIONAL NOTES WHICH MAY BE APPLICABLE TO THE WORK SHOWN ON THIS SHEET.
3	REFER TO AND COORDINATE WITH CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4	REFER TO SITE SCHEDULE, ARCHITECTURAL GENERAL NOTES FOR SITE SIGNAGE AND SITE SIGNAGE LOCATION ON SHEET AS-005.
5	SEE SHEET A-200 FOR ADDITIONAL EXTERIOR FINISH INFORMATION AND SCHEDULE.
6	FOR ALUMINUM FRAMED (AF) WINDOW AND GLAZING TYPES, REFER TO SHEETS A-503 AND A-504.

KEY NOTES

2	INSULATED STEEL SECTIONAL OVERHEAD DOOR WITH VISION AND PLASTIC GLAZING PANELS, TYP.
3	LIGHT FIXTURE, REFER TO ELECTRICAL DRAWINGS.
9	(PT-1) HOLLOW METAL DOOR AND FRAME, TYP.
11	8" CONCRETE BOLLARD WITH SAFETY YELLOW POWDER SLEEVE, TYP.
13	(PT-3) PAINTED STEEL PLATE WITH APPLIED MATTE ALUMINUM LETTERS, TYP.
15	MATTE ALUMINUM LETTERS 1'-0" HEIGHT, TYP.
17	MATTE ALUMINUM LETTERS 3'-0" HEIGHT, TYP..
18	RADIO COMMUNICATION TOWER BY OTHER.
19	ROOF LADDER WITH METAL CAGE, TYP.
26	SOLAR HOT WATER PANEL SYSTEM, TYP.REFER TO MECHANICAL DRAWINGS.
39	METAL PANEL CANOPY WITH MEMBRANE ROOFING.
45	SOLAR PANEL, TYP. SEE ELECTRICAL (ALTERNATE BID NUMBER 2).
52	3/4" INSULATED PRECAST PANEL JOINT, TYP.
57	(MP-5) TRANSPIRED SOLAR COLLECTOR, SEE EXTERIOR FINISH SCHEDULE ON A-200.
59	(PT-1) PAINTED INSULATED OVERHEAD COILING DOOR.
60	PROVIDE BIRD-SCREEN ON EXTERIOR SIDE OF LOUVER.

MATERIAL GRAPHIC LEGEND

WL-X	LOUVER TYPE, SEE SHEET A-502
AF-X	(AF) ALUMINUM FRAME, SEE SHEET A-503 - A-504
XXX-X	EXTERIOR FINISH, SEE SHEET A-200
PT-X	PAINTS AND COATINGS, SEE SHEET A-200
BL-X	BORROWED LITE TYPE, SEE SHEET A503 - A-504
XXX	KEYNOTE

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SUITE 360
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571 290 7679 t

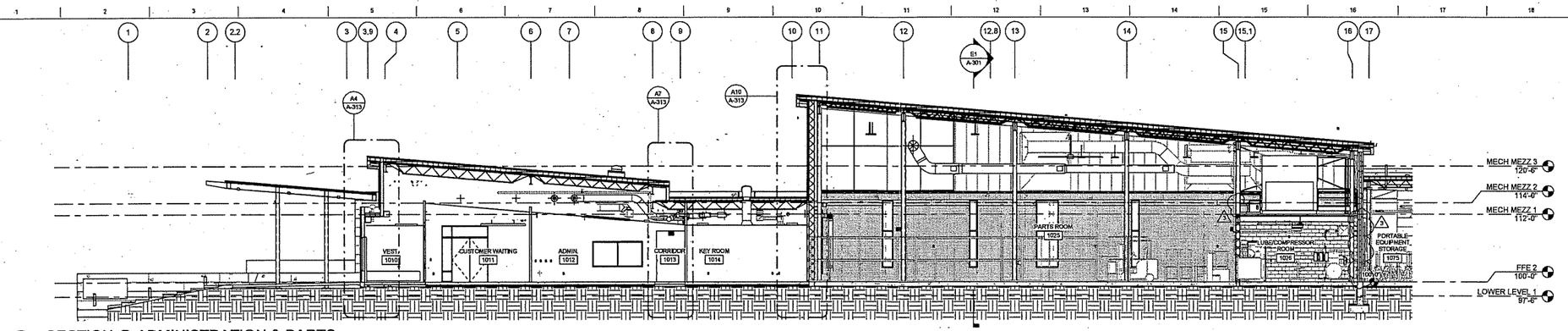
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/17/2019

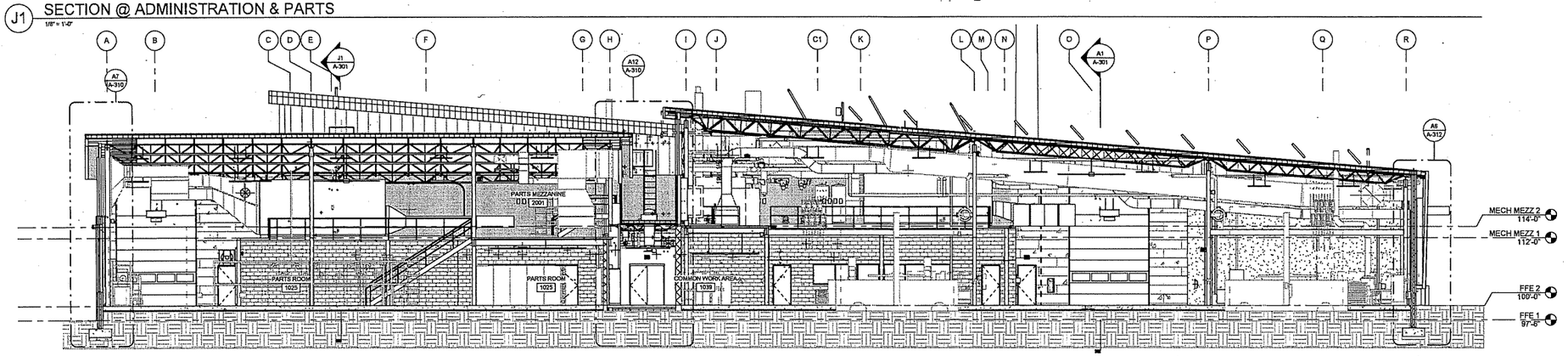
PROJECT No: 3706003

BUILDING ELEVATIONS

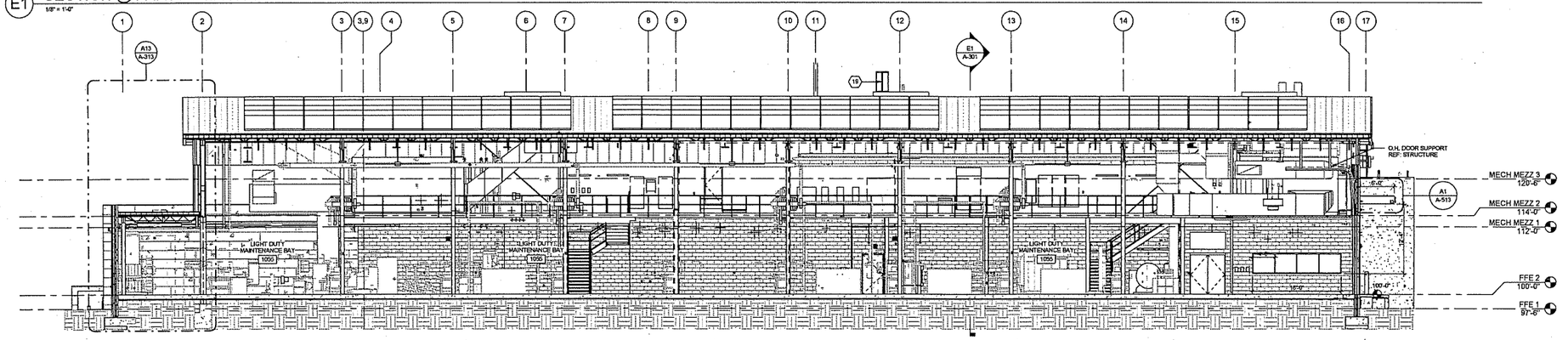
A-203



J1 SECTION @ ADMINISTRATION & PARTS
1/8" = 1'-0"



E1 SECTION @ PARTS & LIGHT MAINTENANCE
1/8" = 1'-0"



A1 SECTION @ LIGHT MAINTENANCE
1/8" = 1'-0"

BUILDING SECTION NOTES	
1	SAMPLE NOTE

KEY NOTES	
19	ROOF LADDER WITH METAL CASE, TYP.

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CITY OF MADISON
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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
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ARCHITECTURE

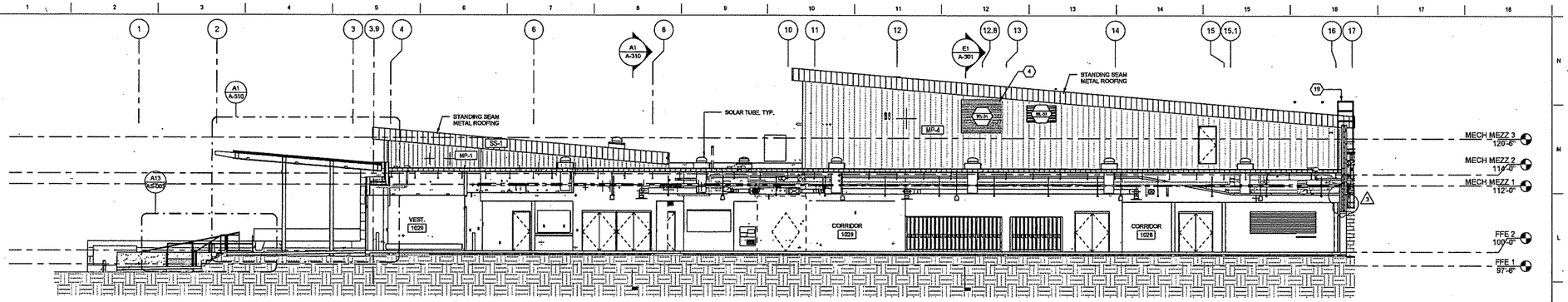
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376603

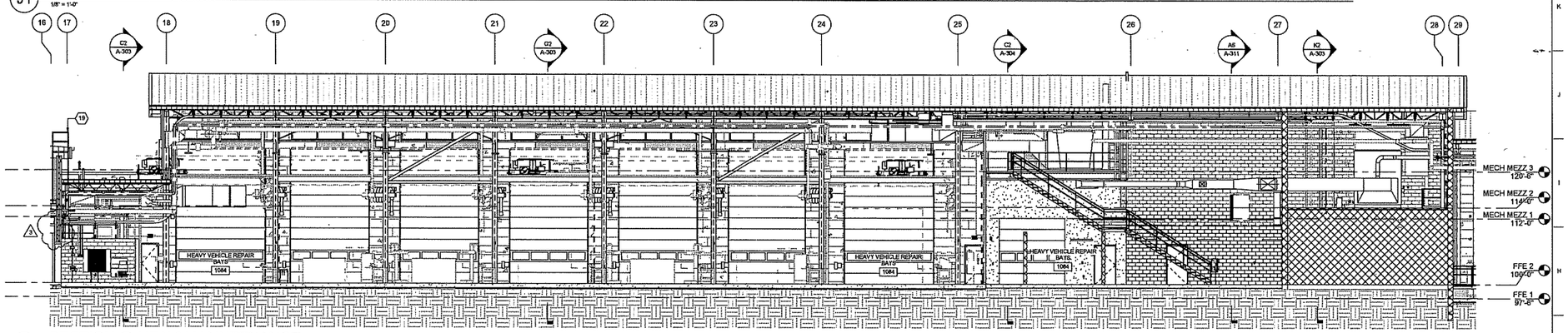
BUILDING SECTIONS

A-301

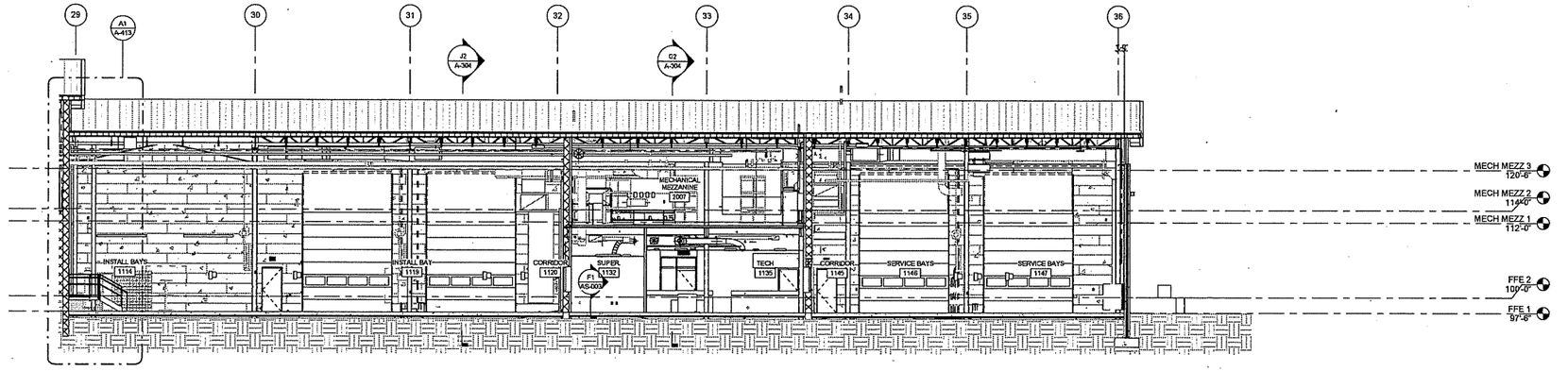
ADDENDUM 3



J1 SECTION @ ADMIN
1/8" = 1'-0"



E1 SECTION @ HEAVY MAINTENANCE
1/8" = 1'-0"



A1 SECTION @ RADIO/COMMUNICATION
1/8" = 1'-0"

BUILDING SECTION NOTES	
1	SAMPLE NOTE

KEY NOTES	
4	MECHANICAL LOUVER. TYP. REFER TO MECHANICAL DRAWINGS.
19	ROOF LADDER WITH METAL CAGE, TYP.

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1600 WILSON BLVD.
SUITE 350
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571 290 7670 t.

ADDENDUM 3

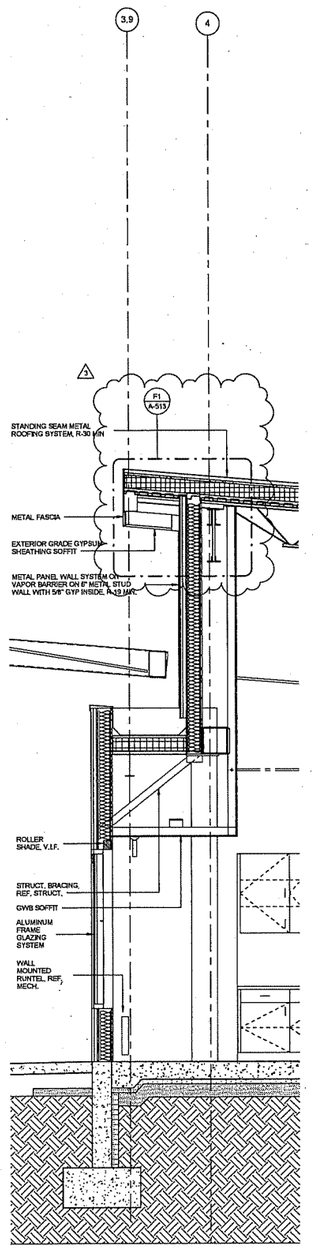
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/01/2019

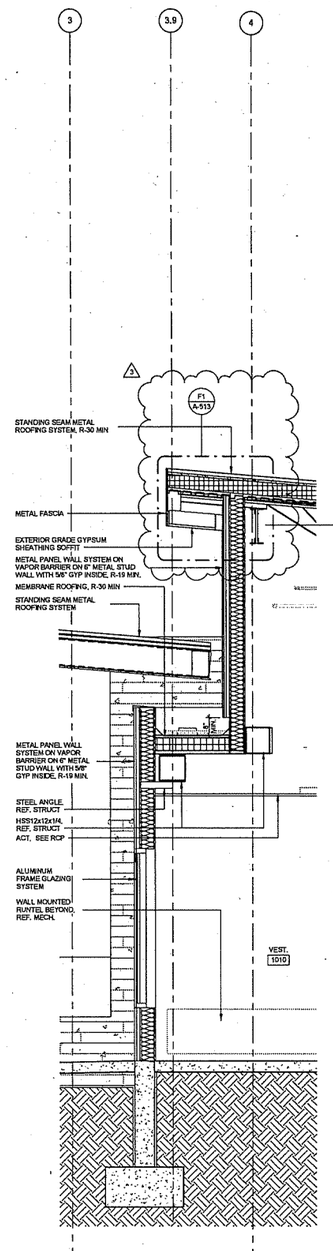
PROJECT No: 3766803

BUILDING SECTIONS

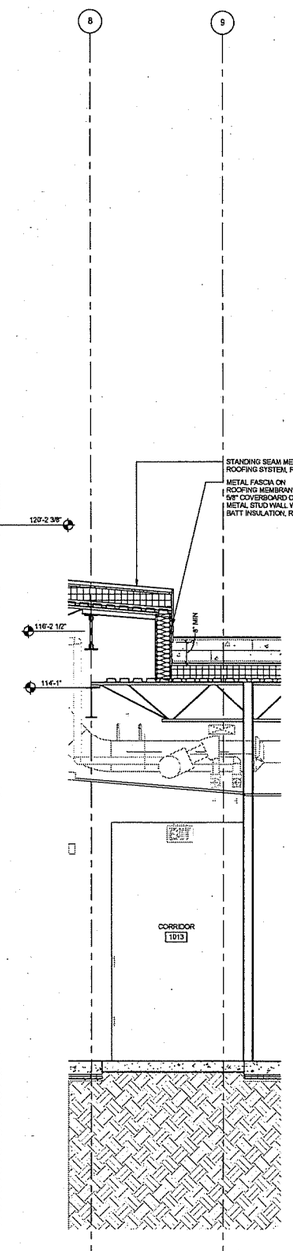
A-302



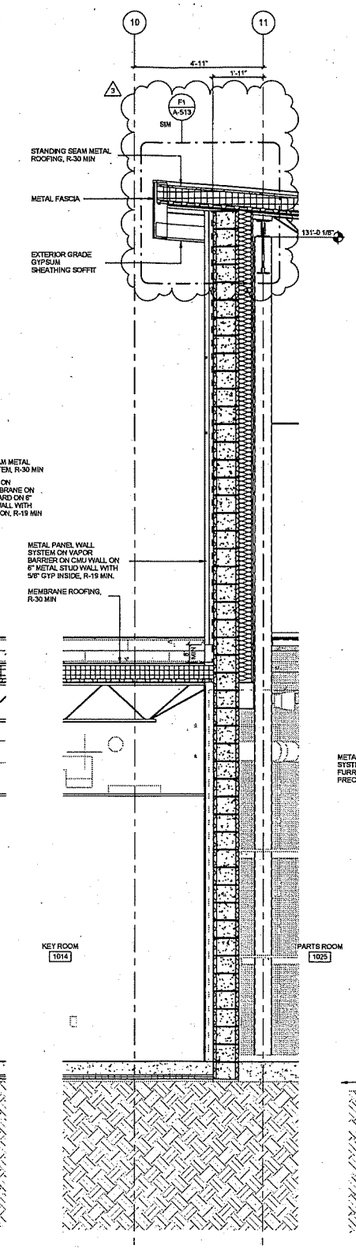
A1 Section @ TRAINING ROOM
1/2" = 1'-0"



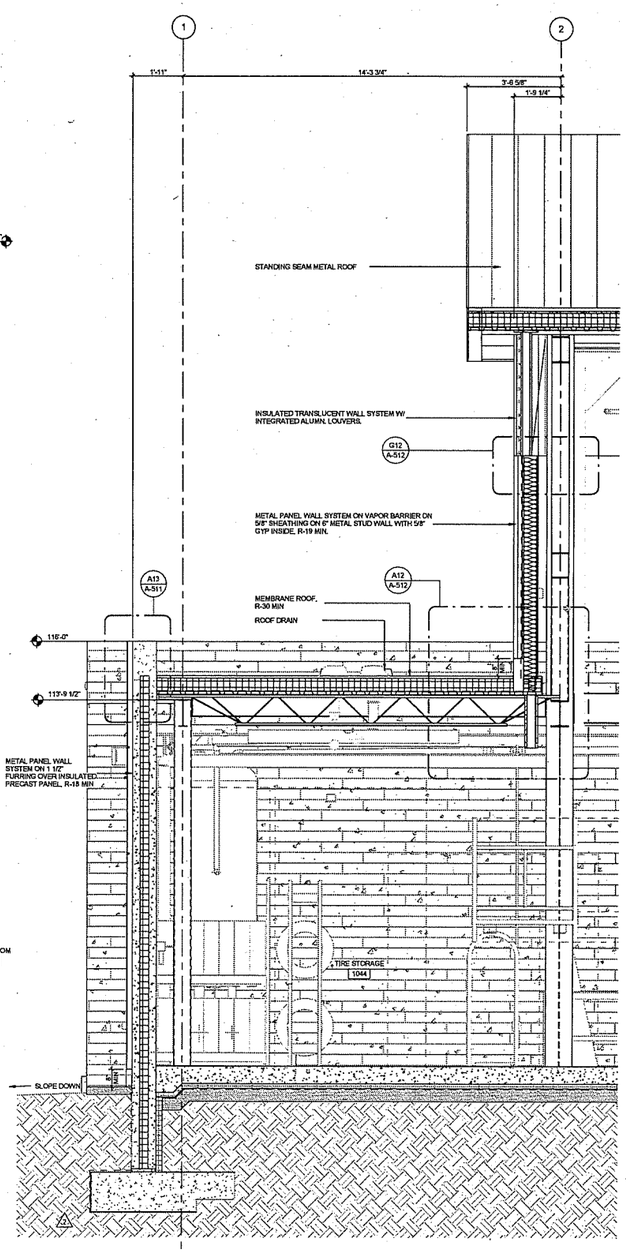
A4 SECTION @ ADMIN 22
1/2" = 1'-0"



A7 SECTION AT ADMIN
1/2" = 1'-0"



A10 SECTION @ ADMIN & PARTS
1/2" = 1'-0"



A13 SECTION @ LIGHT MAINT.
1/2" = 1'-0"

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CITY OF MADISON
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FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	05/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376003

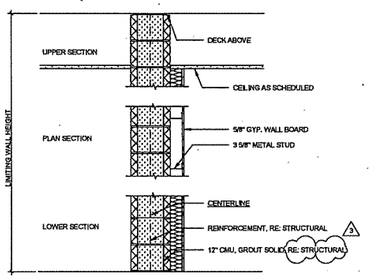
E/W WALL SECTIONS

A-313

ADDENDUM 3

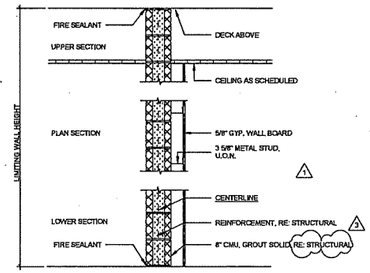
PARTITION LEGEND

- 1 HOUR
- 2 HOUR
- 3 HOUR
- 4 HOUR
- SMOKE
- DEMISING



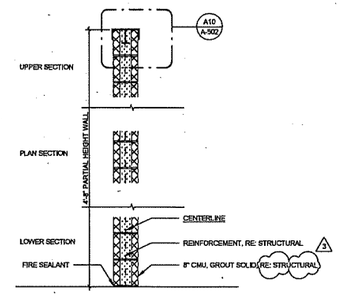
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

H1 PARTITION TYPE M006
3/4" = 1'-0"



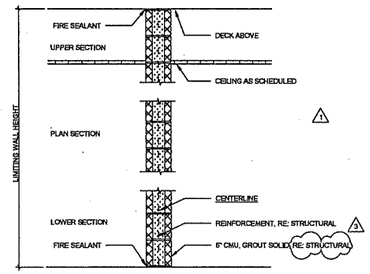
FIRE RATING:	1 HR
UL DESIGN:	U905
STC RATING:	
SOUND TEST NO.:	

H4 PARTITION TYPE M004
3/4" = 1'-0"



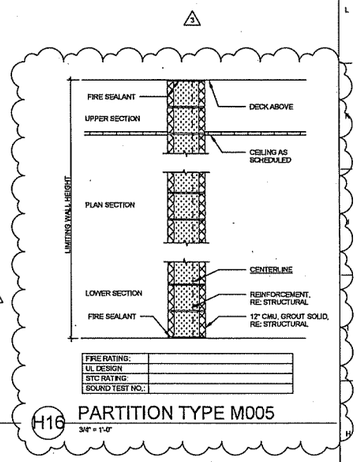
FIRE RATING:	N/A
UL DESIGN	N/A
STC RATING:	
SOUND TEST NO.:	

H8 PARTITION TYPE M002
3/4" = 1'-0"



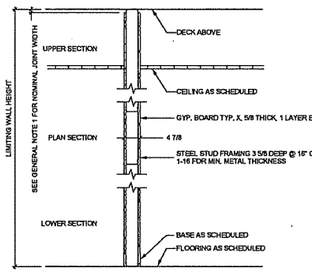
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

H12 PARTITION TYPE M001
3/4" = 1'-0"



FIRE RATING:	
UL DESIGN	
STC RATING:	
SOUND TEST NO.:	

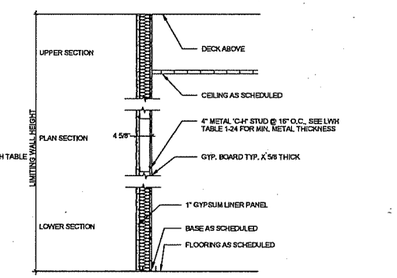
H16 PARTITION TYPE M005
3/4" = 1'-0"



FIRE RATING:	1 HOUR
UL DESIGN:	465
STC RATING	38
SOUND TEST NO.:	NBC-544 FOR WALL ASSEMBLY B, SLS5397/NRC-TL 92 418

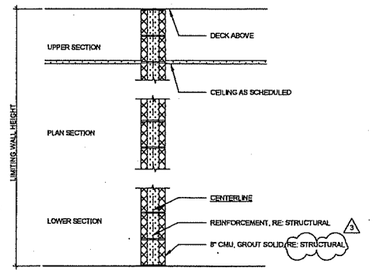
1,38,039,1,0,1016,0,1,1,00

E1 PARTITION TYPE R002
3/4" = 1'-0"



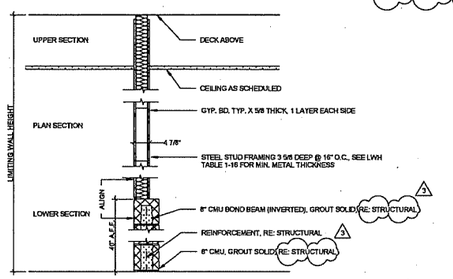
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

E4 PARTITION TYPE A043
3/4" = 1'-0"



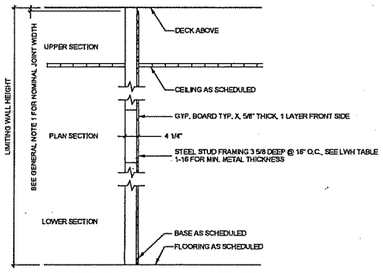
FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

E8 PARTITION TYPE A042, R070
3/4" = 1'-0"



FIRE RATING:	
UL DESIGN:	
STC RATING:	
SOUND TEST NO.:	

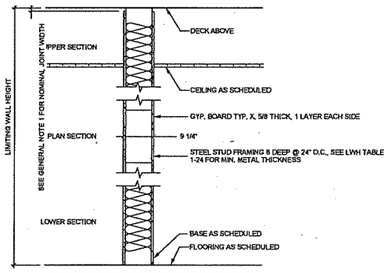
E12 PARTITION TYPE A041
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN:	NA
STC RATING:	NA
SOUND TEST NO.:	NA

0,38,039,1,0,1016,0,1,1,00

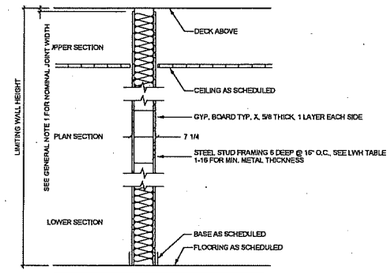
A1 PARTITION TYPE A040
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN:	NA
STC RATING:	1
SOUND TEST NO.:	NA

0,01,072,1,0,1024,0,1,1,00

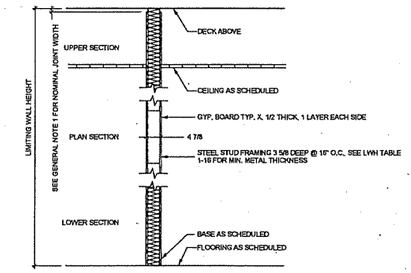
A4 PARTITION TYPE A036
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN:	NA
STC RATING:	51
SOUND TEST NO.:	ALA-TL65-288

0,51,058,1,0,1016,0,1,1,00

A8 PARTITION TYPE A014
3/4" = 1'-0"



FIRE RATING:	NA
UL DESIGN	NA
STC RATING:	NA
SOUND TEST NO.:	NA

0,38,039,1,0,1016,0,1,1,00

A12 PARTITION TYPE A005
3/4" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

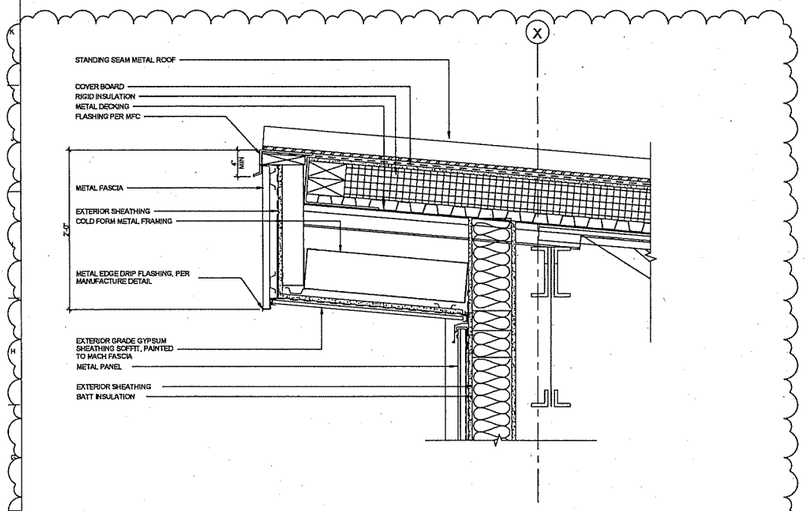
No	REVISION/SUBMISSION	DATE
3	ADDENDUN 3	03/14/2019
2	ADDENDUN 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 316023

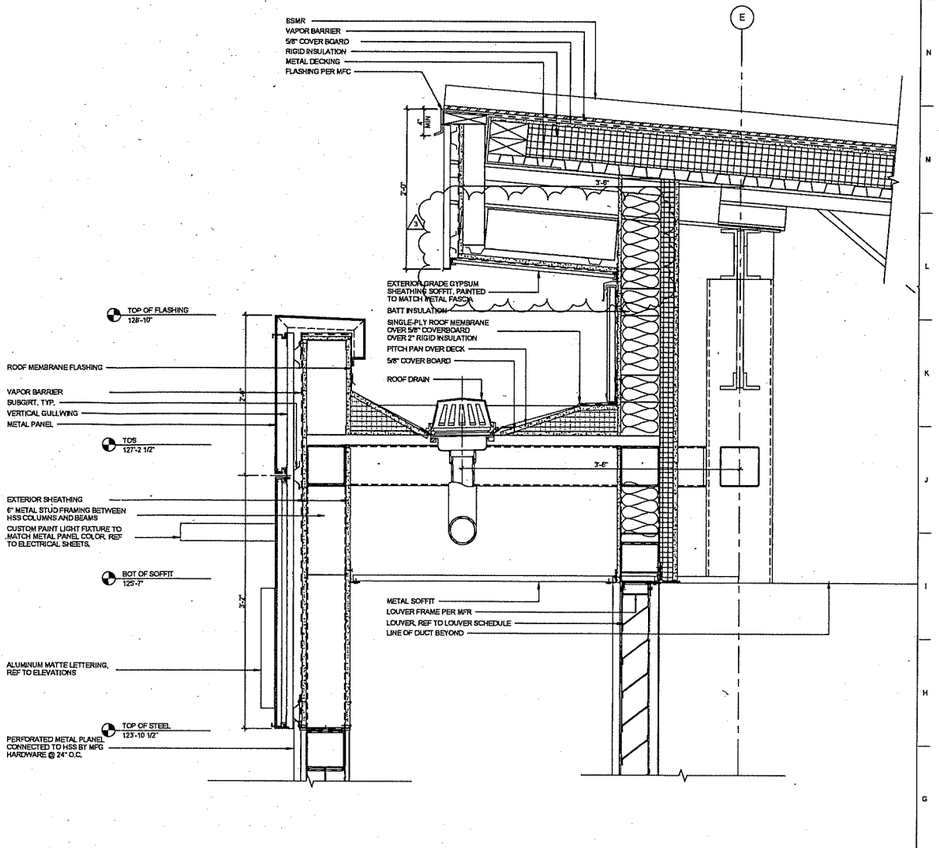
PARTITION TYPES

A-501

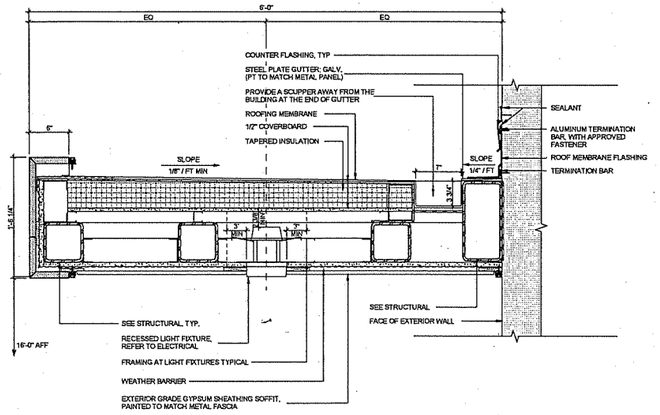
ADDENDUM 3



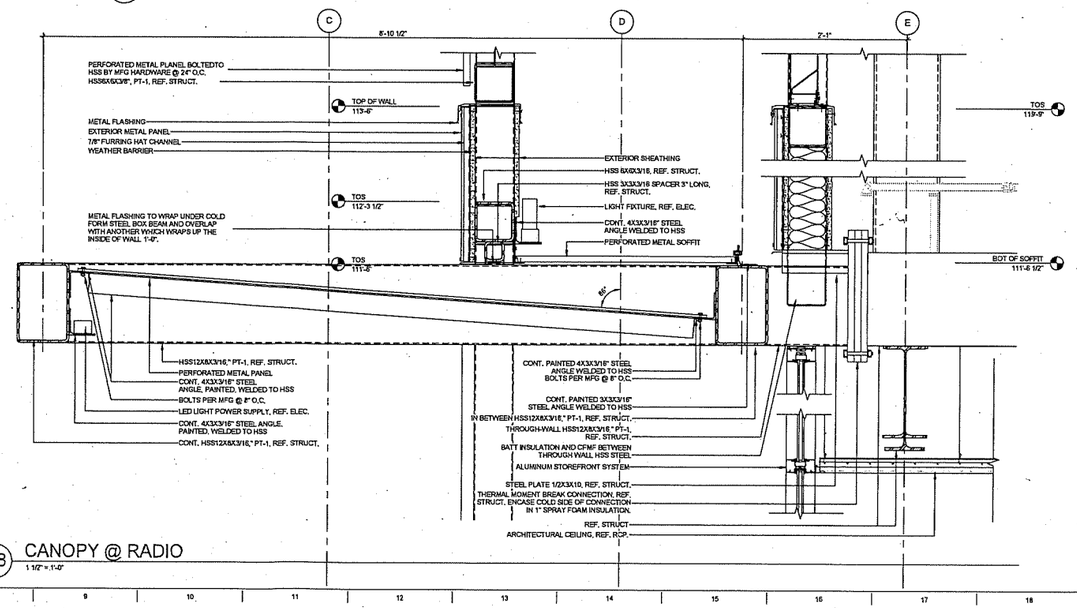
F1 TYPICAL ROOF OVERHANG
1 1/2" = 1'-0"



H10 ROOF EAVE @ RADIO
1 1/2" = 1'-0"



A1 CANOPY DETAIL
1 1/2" = 1'-0"



A8 CANOPY @ RADIO
1 1/2" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7678 t

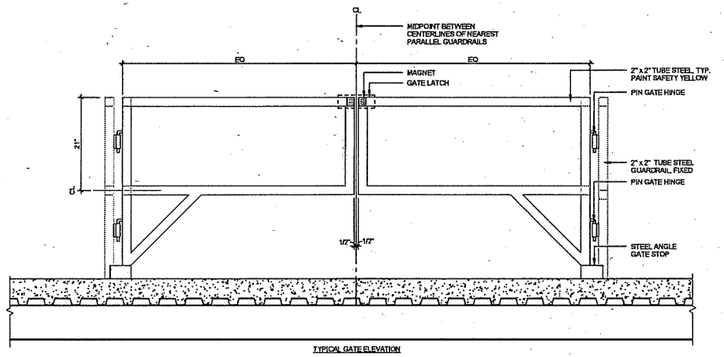
CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	05/14/2019
	ISSUE FOR BID	03/01/2019
	ISSUE FOR PERMIT	01/10/2019

PROJECT No: 3176903

EXTERIOR DETAILS

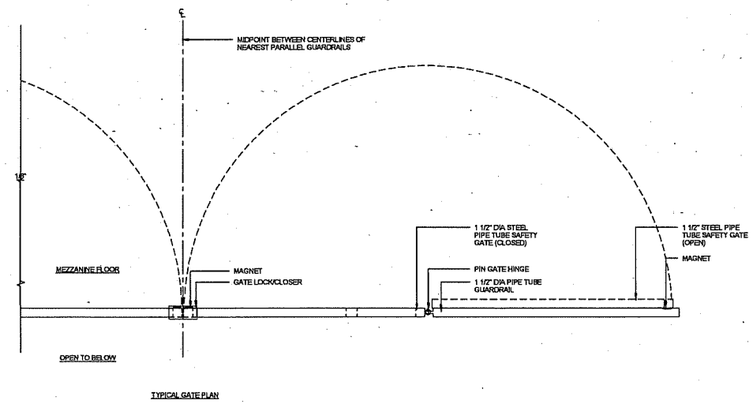
A-513



TYPICAL GATE ELEVATION

J1 MEZZANINE GATE ELEVATION

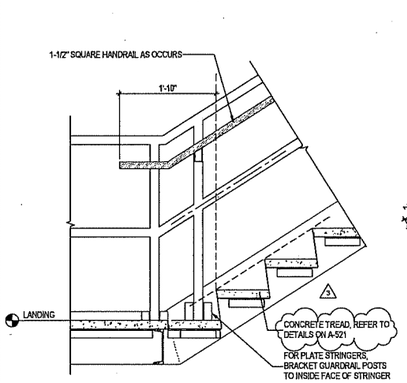
1" = 1'-0"



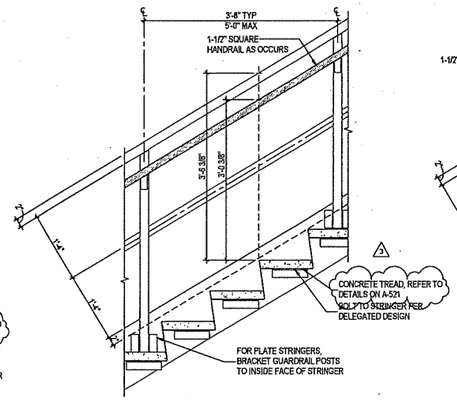
TYPICAL GATE PLAN

J8 MEZZANINE GATE PLAN

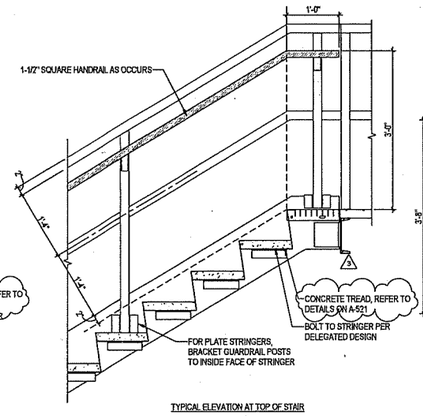
1" = 1'-0"



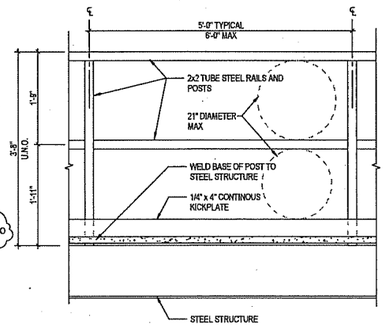
TYPICAL ELEVATION AT BOTTOM OF STAIR



TYPICAL ELEVATION AT STAIR

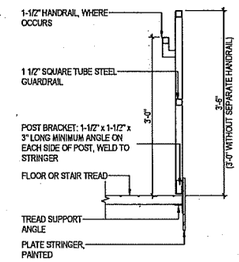


TYPICAL ELEVATION AT TOP OF STAIR



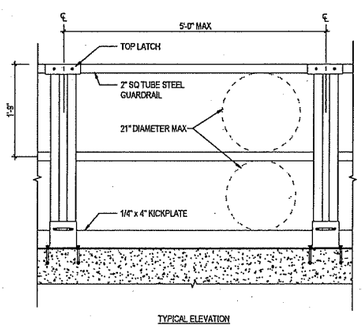
TYPICAL ELEVATION

NOTE: TYPE 1 GUARDRAIL SHALL BE PAINTED UNO

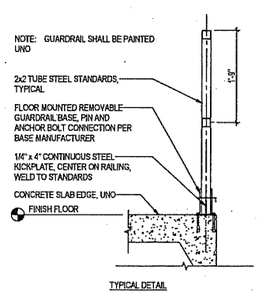


E1 GUARDRAIL @ STAIR & MEZZANINE- TUBE STEEL PAN STR

1" = 1'-0"



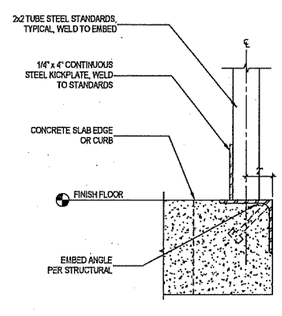
TYPICAL ELEVATION



TYPICAL DETAIL

A1 REMOVABLE GUARDRAIL @ MEZZANINE

1" = 1'-0"



A8 GUARDRAIL AT CONC EDGE

3" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 185
ARLINGTON, VA 22209
571 290 7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

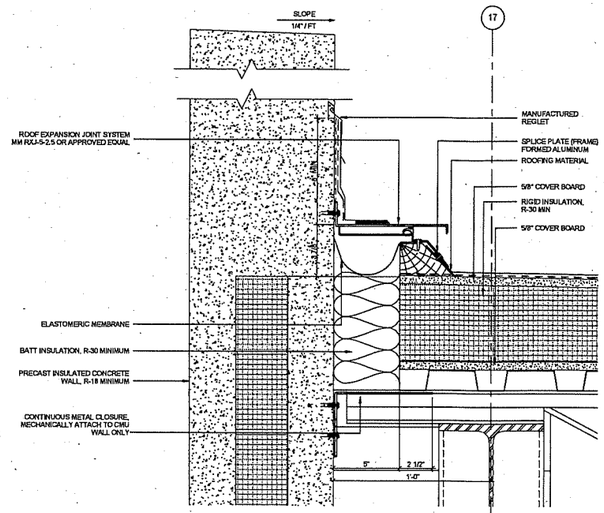
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	01/14/2019
	ISSUE FOR BID	01/07/2019
	ISSUE FOR PERMIT	01/07/2019

PROJECT No: 376603

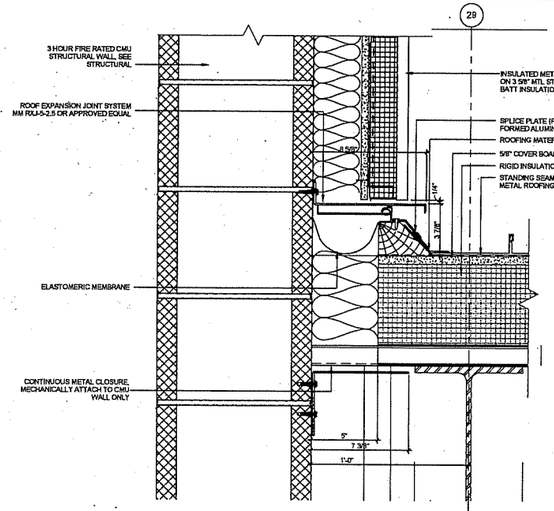
RAILING DETAILS

A-522

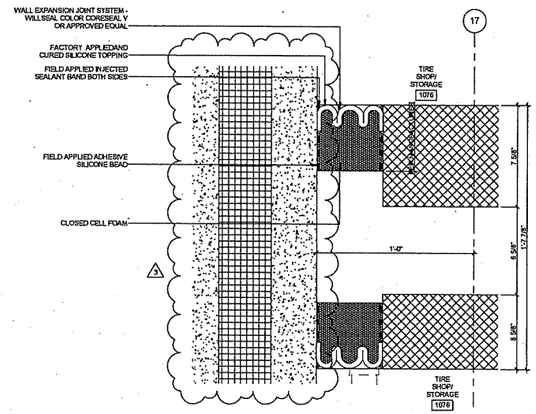
ADDENDUM 3



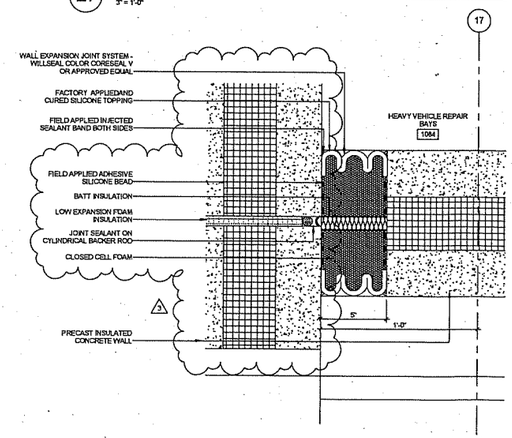
J7 ROOF EXP. JOINT SECTION DETAIL @ GRID 17
3" = 1'-0"



J14 ROOF EXP. JOINT SECTION DETAIL @ GRID 29
3" = 1'-0"



E7 WALL EXP. JOINT PLAN DETAIL @ GRID 17
3" = 1'-0"



A7 EXT. WALL EXP. JOINT PLAN DETAIL @ GRID 17
3" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/31/2019

PROJECT No: 370003

EXPANSION JOINT DETAILS

A-551

ADDENDUM 3

DOOR AND FRAME SCHEDULE

NO	HW SET #	DOOR SIZE W	DOOR SIZE H	DOOR T	DOOR TYPE	DOOR MATL.	DOOR FINISH	DOOR GLASS	FRAME TYPE	FRAME MATL	FRAME FINISH	FRAME GLASS	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	FIRE RATING	Notes
1001A	001	6'-4"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K1/A-532	H1/A-532	E1/A-532		9
1001B	002	3'-2"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532	E4/A-532		
1001E	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1002	006	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-532	H1/A-532			9
1003	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1004	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1005	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1007	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1008	003	3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1009	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1010	008	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532	E4/A-532		AUTOMATIC
1011	009	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532			AUTOMATIC
1012	010	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T		HM	PAINT	–	K1/A-531 SIM	K4/A-531 SIM			
1013	011	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1014	012	3'-0"	7'-0"	1 3/4"	N	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1015A	MFC	6'-0"	6'-0"	1 3/4"	GLASS	ALUM	PAINT	GL-03T	MFC	ALUM	PREFINISH	–	A14/A-532	K8/A-532	A14/A-532		FRITTED FILM APPLIED TO GLASS
1015B	013	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532			
1015C	014	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1017	010	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1018	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1019	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1020	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT	–	F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1021	016	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1023	017	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT	GL-02T	F1	HM	PAINT	–	K1/A-531	K4/A-531			
1025A	018	6'-0"	7'-0"	1 3/4"	N	HM	PAINT	-	F2	HM	PAINT	–	G10/A-531	G14/A-531			
1025B	019	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F5	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		AUTOMATIC
1025C	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1026B	021	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1026C		6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F6	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1027	022	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1028	009	3'-0"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532			
1029	008	3'-8"	7'-10"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K4/A-532	K8/A-532			
1030A	024	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1030B	024	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1031	016	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1032	025	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1037	026	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1038A	027	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1041A	028	3'-0"	7'-0"	1 3/4"	N	HM	PAINT	GL-02T	F2	HM	PAINT	–	D1/A-531	D4/A-531			
1041B	007	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	K1/A-531	K4/A-531			
1042A	029	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1043A	029	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1043B	022	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K10/A-531	K14/A-531			
1043C	030	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F6	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1043D	031	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D14/A-531			
1054A	032	3'-0"	6'-8"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1054B	033	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531		90 MIN	
1055A	034	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531			
1055B	035	6'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531			
1055C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1055D	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1055E	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1056	036	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531		90 MIN	
1057	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1058A	037	3'-0"	7'-0"	1 3/4"	HL	HM	PAINT		F1	HM	PAINT	–	D10/A-531	D4/A-531			
1058B	020	14'-0"	14'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K6/A-533		G6/A-533		
1058C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1059D	020	14'-0"	14'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1066B	038	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531		90 MIN	
1077	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1078	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1079	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1080	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1081	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1082	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1083	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1084A	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1084B	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1084C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		AUTOMATIC
1084D	039	6'-0"	7'-0"	1 3/4"	N	HM	PAINT		F1	HM	PAINT	–	K10/A-531	K14/A-531			
1084E	040	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D10/A-531	D4/A-531			
1065	041	3'-2 1/4"	7'-0"	2"	GD2	HM	WWM	–	FABRICATED	HM	PT-2	–	P10/A-534	A14/A-534	D1/A-534		
1087	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1088	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1089	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1090	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1091	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1092	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1093	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1095A	020	16'-0"	16'-0"	2"	OH	ALUM	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1095B	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1095C	042	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1096A	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1096B	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1096C	043	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1096E	024	5'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1096O	041	26'-8"	8'-0"	1 3/4"	GD3	HM	WWM	–	FABRICATED	HM	PT-2	–	J5/A-534	J5/A-534	J5/A-534		
1096Q	044	3'-0"	6'-8"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531	A14/A-532		
1096R	041	26'-8"	8'-0"	1 3/4"	GD3	HM	WWM	–	FABRICATED	HM	PT-2	–	J5/A-534	J5/A-534	J5/A-534		
1097	045	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1098A	022	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1098B	046	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1099	047	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			9
1100B	020	16'-0"	16'-0"	2"	OH	STL	PREFINISH			STL		–	K1/A-533	K11/A-533	G6/A-533		
1100C	020	14'-0"	12'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1100D	042	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1103	022	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1110A	048	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531		3HR	MAX 100 SQ IN. DOOR VISION PANEL
1110C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1118A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1118B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1118D	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1118A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1119B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1120A	030	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1120B	011	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1120C	011	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1121	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1122	008	2'-11 1/2"	7'-0"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K1/A-532	K8/A-532			AUTOMATIC
1122B	009	2'-11 1/4"	7'-1 3/4"	1 3/4"	FG	ALUM	PREFINISH	–	MFC	ALUM	PREFINISH	–	K1/A-532	K8/A-532			AUTOMATIC
1123	007	3'-0"	7'-0"	1 3/4"	FG	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1124	015	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1132A		3'-0"	7'-0"	1 3/4"	G	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1132D	041	30'-0"	8'-0"	1 3/4"	GD3	HM	WWM	–	FABRICATED	HM	PT-2	–	J5/A-534	J5/A-534	J5/A-534		
1137	049	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1140	050	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			9
1141	051	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1143	012	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1144A	027	3'-0"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1144B	020	10'-0"	10'-0"	2"	ECSD	STL	PREFINISH			STL	PREFINISH	–	K10/A-533	K11/A-533	G6/A-533		
1144C	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1145A	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1145B	030	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1145C	011	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	G10/A-531	G14/A-531			
1145D	011	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1145E	005	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1146A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1146B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1147A	020	14'-0"	16'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1147B	020	14'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150A	020	10'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150B	020	10'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150C	020	10'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150D	020	10'-0"	14'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K1/A-533	K11/A-533	G6/A-533		
1150E	002	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1150F	052	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1296	020	12'-0"	12'-0"	2"	OH	STL	PREFINISH			STL	PREFINISH	–	K6/A-533		G6/A-533		
1352	027	3'-8"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1353	004	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	G4/A-531	K14/A-531	G4/A-531		
1354	027	3'-8"	7'-0"	1 3/4"	N	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			
1355	052	6'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–					
1357	020	17'-0"	3'-10"	2"	CSD	MFC	PREFINISH		MFC	HM	PREFINISH	–					
1358	044	3'-0"	6'-8"	1 3/4"	F	HM	PAINT		F1	HM	PAINT	–	K1/A-531	K4/A-531			
1359	044	3'-0"	7'-0"	1 3/4"	F	HM	PAINT		F2	HM	PAINT	–	D1/A-531	D4/A-531			

DOOR AND HARDWARE NOTES

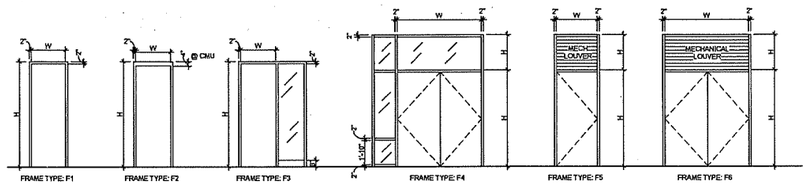
1. ALL DOOR FRAMES TO MATCH BUILDING STANDAROL TO BE PAINTED TO MATCH ADJACENT WALL U.N.O.
3. ALL EXISTING DOORS AND DOOR FRAMES TO REMAIN AT BASE BUILDING CORE ROOMS U.N.O.
4. ALL NEW DOORS TO RECEIVE HARDWARE. LEVERSET TO MATCH BASE BUILDING STANDARD. ALL HARDWARE TO BE ADA COMPLIANT AND UL RATED.
5. SECURITY VENDOR TO COORDINATE CARD READER ACCESS WITH BUILDING APPROVED SYSTEM AND TENANT REQUIREMENTS. REFER TO SCHEDULE AND CONSTRUCTION PLANS FOR INTENDED LOCATIONS OF CARD READERS. MOUNT CARD READERS 44" AFF TO CENTERLINE OF DEVICE, TYP. TOP OF CARD READER SHALL NOT BE MOUNTED ABOVE 48" AFF.
6. SECURITY VENDOR SHALL OBTAIN A SEPARATE ACCESS CONTROL PERMIT FROM THE BUILDING DEPARTMENT PRIOR TO INSTALLATION OF ANY ACCESS CONTROL DEVICES OR EQUIPMENT.
7. WHERE INDICATED PROVIDE COAT HOOKS. MOUNT ON WALL BEHIND DOOR AT CENTERLINE OF DOOR, 60" AFF. TYP.
8. KICK PLATES SHALL BE 8" HIGH, STAINLESS STEEL TO MATCH BASE BUILDING FINISH AND SHALL BE APPLIED TO NON-SIDE OF DOOR U.N.O.
9. ALL LOCKSETS SHALL BE KEYED TO THE BUILDING MASTER. COORDINATE REQUIREMENTS WITH TENANT AND BUILDING OWNER.
10. VERIFY IN FIELD FOR TRACK HEIGHT & LIFT CLEARANCE OF ALL OVERHEAD DOORS TO AVOID ANY BUILDING COMPONENTS INCLUDING STRUCTURES, EQUIPMENTS,MECHANICAL, ETC.

REMARKS LEGEND

1 ADA OPERATOR
2 INSULATED
4 3" TRACK
5 HIGH LIFT DOOR
6 CARD READER
7 PANIC DEVICE
8 ELECTRIC LATCH RETRACTION PANIC DEVICE
9 1" UNDERCUT DOORS

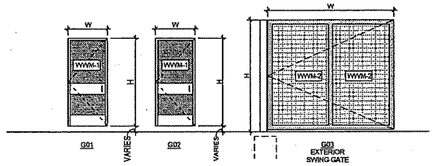
ABBREVIATIONS

ADA	AMERICANS WITH DISABILITIES ACT (ACCESSIBILITY)
ALUM.	ALUMINUM
CLR	CLEAR OPENING
CR	CARD READER
EXIST	EXISTING
G	GLASS
HM	HOLLOW METAL
MFC	MANUFACTURER
NO	MASONRY OPENING
OH	OVERHEAD DOOR
PERF MTL	PERFORATED METAL
PH	PANIC HARDWARE
PR	PAIR OF DOORS
RO	ROUGH OPENING
STL	STEEL
VIF	VERIFY IN FIELD



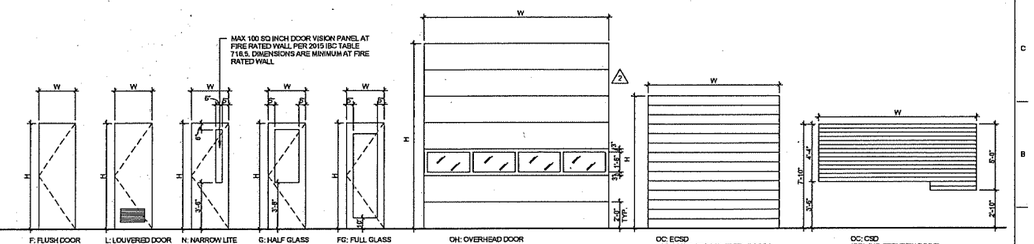
FRAME TYPES (common)

1/4" = 1'-0"



GATE TYPES (common) REFER TO A-534 FOR DETAILS

1/4" = 1'-0"



DOOR TYPES (common)

1/4" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISIONS/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/31/2019

PROJECT No. 376903

DOOR SCHEDULE

A-601

A ADDENDUM 3

ROOM FINISH SCHEDULE

Level	NO	NAME	FLOOR FINISH	FLOOR BASE	WALLS NORTH FINISH	WALLS SOUTH FINISH	WALLS EAST FINISH	WALLS WEST FINISH	CEILING FINISH	CEILING SUBSTRATE
Not Placed	159	MEZZANINE								
Not Placed	1099	RESTROOM								
Not Placed	1139	JANITOR								
Not Placed	1140	SHOWER								
Not Placed	1140	SHOWER								
Not Placed	1151	MECH & IT								
Not Placed	1152	Room								
MAIN LEVEL										
MAIN LEVEL	1001	TRAINING ROOM	RF-4	B-1	P-1	P-1	P-1	P-5	ACT-2	
MAIN LEVEL	1002	A/V STORAGE	SC-1	B-1	P-1	P-1	P-1	P-1	OTS	
MAIN LEVEL	1003	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1004	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1005	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1007	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1006	OFFICE	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1009	CONF. RM.	RF-4	B-1	P-5	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1010	VEST.	WCPT-1	B-1 @ GTP.BD.	–	P-1	–	–	ACT-1	
MAIN LEVEL	1011	CUSTOMER WAITING	RF-3	B-1	P-1	P-1	–	P-1	ACT-1	
MAIN LEVEL	1012	ADMIN.	RF-3	B-1	P-1	P-1	P-1	–	ACT-1	
MAIN LEVEL	1013	CORRIDOR	RF-3	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1014	KEY ROOM	RF-3	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1015	BREAKROOM	RF-3/RF-4	B-1	P-4	P-1	–	–	ACT-2	
MAIN LEVEL	1017	CORRIDOR	RF-3	B-1	–	–	P-4	P-1	ACT-1	
MAIN LEVEL	1018	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1019	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1020	RR	FT-1	B-2					GB-1	
MAIN LEVEL	1021	STOR.	SC-1	B-1	–	P-1	–	P-1	ACT-1	
MAIN LEVEL	1022	WOMEN'S LKRRR	FT-1	B-2					ACT-3	
MAIN LEVEL	1023	CORRIDOR	PC-1	B-1	–	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1024	MEN'S LKRRR	FT-1	B-2					ACT-3	
MAIN LEVEL	1024A	CLOSET	SC-1	B-1					GB-1	
MAIN LEVEL	1025	PARTS ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1025A	PARTS RECEIVING	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1026	LUBE/COMPRESSOR ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1027	PARTS CLERKS	SC-1	B-1	–	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1028	CORRIDOR	PC-1	B-1	–	–	–	–	ACT-1	
MAIN LEVEL	1029	VEST.	WCPT-1	B-1 @ GTP.BD.	–	P-1	–	–	ACT-1	
MAIN LEVEL	1030	ELECTRICAL CLOSET	SC-1	B-1					GB-1	
MAIN LEVEL	1031	J.C.	SC-1	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1032	SHOWER	FT-1/FT-2	B-2/B-3					GB-1	
MAIN LEVEL	1033	STAIR 2	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1034	STAIR 3	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1036	PORT, EQUIP, STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1037	IT	SC-1	B-1	P-1	P-1	P-1	P-1		
MAIN LEVEL	1038	FITNESS ROOM	RF-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1039	COMMON WORK AREA	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1040	TOOL CRIB	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1041	CONF. RM.	RF-4	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1042	PUBLIC WORKS GEN. FOREMAN	PC-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1043	CHECK-IN COUNTER	PC-1	B-1	P-1	P-1	P-1	P-1	ACT-2	
MAIN LEVEL	1044	TIRE STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1045	LIGHT VEHICLE REPAIR BAY 1 (2)	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1046	LIGHT VEHICLE REPAIR BAY 2	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1047	LIGHT VEHICLE REPAIR BAY 3	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1048	LIGHT VEHICLE REPAIR BAY 4	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1049	LIGHT VEHICLE REPAIR BAY 5	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1050	LIGHT VEHICLE REPAIR BAY 6	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1051	LIGHT VEHICLE REPAIR BAY 7	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1052	LIGHT VEHICLE REPAIR BAY 8	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1053	TIRE SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1054	FIRE RISER ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1055	LIGHT DUTY MAINTENANCE BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1056	MAIN ELEC ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1057	LIGHT VEHICLE REPAIR BAY 9	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1058	LIGHT VEHICLE REPAIR BAY 10	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1059	LIGHT VEHICLE REPAIR BAY 11	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1060	LIGHT VEHICLE REPAIR BAY 12	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1061	LIGHT VEHICLE REPAIR BAY 13	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1062	LIGHT VEHICLE REPAIR BAY 14	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1063	LIGHT VEHICLE REPAIR BAY 15	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1064	LIGHT VEHICLE REPAIR BAY 16	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1065	WASH BAY	RES-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1069	FUEL TANK	SC-1	–	–	–	–	–	–	
MAIN LEVEL	1075	PORTABLE EQUIPMENT STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1076	TIRE SHOP/ STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1077	HEAVY VEHICLE REPAIR BAY 1	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1078	HEAVY VEHICLE REPAIR BAY 2 (2)	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1079	HEAVY VEHICLE REPAIR BAY 3	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1080	HEAVY VEHICLE REPAIR BAY 4	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1081	HEAVY VEHICLE REPAIR BAY 5	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1082	HEAVY VEHICLE REPAIR BAY 6	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1083	FIRE REPAIR BAY 7	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1084	HEAVY VEHICLE REPAIR BAYS	PC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1085	TOOL BOX STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1086	COMMON WORK AREA	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1087	HEAVY VEHICLE REPAIR BAY 8	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1088	HEAVY VEHICLE REPAIR BAY 9	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1089	HEAVY VEHICLE REPAIR BAY 10	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1090	HEAVY VEHICLE REPAIR BAY 11	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1091	HEAVY VEHICLE REPAIR BAY 12	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1092	FIRE REPAIR BAY 13	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1093	FIRE REPAIR BAY 14	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1095	CHASSIS WASH	RES-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1096	FABRICATION BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1097	MASK & BREATHABLE AIR BOTTLE STOR. RM.	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1098	MASK SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1099	R.R.	PC-1	B-2					ACT-3	
MAIN LEVEL	1100	PAINT BOOTH	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1101	BODY SHOP	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1102	STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1103	DECAL ROOM	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1110	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1111	WORK STATION	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1112	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1113	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1114	INSTALL BAYS (2)	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1115	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1116	INSTALL BAYS	SC-1	–	–	–	–	–	OTS	
MAIN LEVEL	1117	WORK STATION	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1118	INSTALL BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1119	INSTALL BAY	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1120	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1121	CONF. RM.	RF-4	B-1	P-1	–	–	P-1	ACT-2	
MAIN LEVEL	1122	VEST.	WCPT-1	B-1 @ GTP.BD.	–	–	P-1	P-1	ACT-1	
MAIN LEVEL	1123	CUSTOMER WAITING	RF-2/RF-4	B-1	P-1	–	P-1	P-1	ACT-1	
MAIN LEVEL	1124	RESTROOM	FT-1	B-2					ACT-3	
MAIN LEVEL	1125	CORRIDOR	RF-2	B-1	–	–	–	–	ACT-1	
MAIN LEVEL	1126	TECH	ESD-1	B-1	–	–	P-1	–	ACT-2	
MAIN LEVEL	1127	TECH	ESD-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1128	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1129	TECH	ESD-1	B-1	–	–	P-1	–	ACT-2	
MAIN LEVEL	1130	WORK STATION	ESD-1	B-1	–	–	–	–	ACT-2	

ROOM FINISH SCHEDULE

Level	NO	NAME	FLOOR FINISH	FLOOR BASE	WALLS NORTH FINISH	WALLS SOUTH FINISH	WALLS EAST FINISH	WALLS WEST FINISH	CEILING FINISH	CEILING SUBSTRATE
MAIN LEVEL	1131	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1132	SUPER.	ESD-1	B-1	P-1	P-1	P-1	P-1	ACT-1	
MAIN LEVEL	1133	TECH	ESD-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1134	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1135	TECH	ESD-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1136	WALKWAY	PC-1	B-1	–	–	–	–	ACT-2	
MAIN LEVEL	1137	MEN'S LKRRR	FT-1/FT-2	B-2/B-3	–	–	–	–	ACT-3	
MAIN LEVEL	1138	ADMIN.	PC-1	B-1	–	–	–	P-1	ACT-2	
MAIN LEVEL	1140	JAN	SC-1	B-1	P-1	P-1	P-1	P-1	GB-1	
MAIN LEVEL	1141	WOMEN'S LKRRR	FT-1/FT-2	B-2/B-3					ACT-3	
MAIN LEVEL	1142	KIT.	PC-1	B-1			P-1	P-1	ACT-2	
MAIN LEVEL	1143	IT	SC-1	B-1	P-1	P-1	P-1	P-1		
MAIN LEVEL	1144	PARTS STORAGE	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1145	CORRIDOR (2)	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1146	SERVICE BAYS	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1146A	JAN.	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1147	SERVICE BAYS (2)	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1148	CORRIDOR	SC-1	B-1	–	–	–	–	OTS	
MAIN LEVEL	1150	STORAGE BUILDING	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE RADIO LEVEL										
MEZZANINE RADIO LEVEL	2007	MECHANICAL MEZZANINE	SC-1	B-1	–	–	P-1	P-1	OTS	
MEZZANINE MAIN LEVEL										
MEZZANINE MAIN LEVEL	2001	PARTS MEZZANINE	SC-1	B-1						
MEZZANINE MAIN LEVEL	2002	LIGHT DUTY MEZZANINE	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2003	MECHANICAL MEZZANINE	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2004	IT	SC-1	B-1	–	–	–	–	OTS	
MEZZANINE MAIN LEVEL	2006	MECH MEZZANINE								
MECH MEZZ 3										
MECH MEZZ 3	2005	MECHANICAL MEZZANINE	SC-1	B-1						

GENERAL NOTES

1. CEILING HEIGHT INDICATED ON RCP SHEETS

GENERAL FINISHES

MARKER BOARD							
MARKER BOARD	MB-1	CLARIDGE	MARKER BOARD	CLARIGDE	ANODIZED ALUM TRIM	WHITE	TBD
PAINT							
PAINT	P-1	SHERWIN WILLIAMS		FIELD PAINT	LATEX EGGSHELL	SW 7663 MONORAIL SILVER	
PAINT	P-2	SHERWIN WILLIAMS		BAY/SWASH FIELD PAINT/CEILING PAINT	SEE SPECS	SW 7005 PURE WHITE	
PAINT	P-3	SHERWIN WILLIAMS		HOLLOW METAL DOORS/FRAMES PAINT	LATEX EGGSHELL	SW 7074 SOFTWARE	
PAINT	P-4	SHERWIN WILLIAMS		ACCENT PAINT	LATEX EGGSHELL	SW 6174 FRESHWATER	
PAINT	P-5	SHERWIN WILLIAMS		ACCENT PAINT	LATEX EGGSHELL	SW 6495 GREAT FALLS	
PLASTIC LAMINATE							
PLASTIC LAMINATE	PL-1	WILSONART	PLASTIC LAMINATE		MATTE	MUSHROOM 5013K-19	SEE SPECIFICATION
PLASTIC LAMINATE	PL-2	WILSONART	PLASTIC LAMINATE		MATTE/LINEARITY	SATIN STAINLESS 4830K-18	SEE SPECIFICATION / AEON SCRATCH RESISTANCE
ROLLER SHADE							
ROLLER SHADE	RS-1	MECHOSHADE	ROLLER SHADES	MANUAL SHADES / & OR ELECTRIC	ANODIZED ALUMINUM	TBD	SEE SPECIFICATION
SOLID SURFACE							
SOLID SURFACE	SS-1	DALTILE	SOLID SURFACE, ONE QUARTZ SURFACES	QUARTZ	POLISHED	SIMPLY WHITE NQ76	3 CM SLAB
SOLID SURFACE	SS-2	CORIAN TERRA COLLECTION	SOLID SURFACE	SOLID SURFACE	SATIN	DOVE	
TILE							
TILE	WT-1	CROSSVILLE	PORCELAIN WALL TILE	WALL TILE	SATIN	COLOR: LEADEN RET07 UPS ; RETRO ACTIVE 2.0	6" X 12" / INSTALL 1/3 JOINT; GROUT: CUSTOM BUILDING PRODUCTS, COLOR: 335 WINTER GRAY
TILE	WT-2	CROSSVILLE	PORCELAIN WALL TILE	WALL TILE	SATIN	FLORIM USA, SERIES: LAYERS, COLOR: SEDIMENT	2" X 2" MOSAIC / INSTALL HORIZONTAL RUNNING BOND; GROUT: CUSTOM BUILDING PRODUCTS, COLOR:335 WINTER GRAY
TILE	WT-3	DALTILE	GLASS WALL TILE	GLASS WALL TILE	GLOSSY	CW01 ICE WHITE ; COLOR WAVE	2" X 12" / INSTALL STRAIGHT STACK; GROUT: CUSTOM BUILDING PRODUCTS, COLOR: 381 BRIGHT WHITE
WALL BASE							
WALL BASE	B-1	JOHNSONITE	RUBBER WALL BASE	WALL BASE		TAN GATEWAY WG	4" H ROLL GOODS
WALL BASE	B-2	CROSSVILLE	WALL TILE	COVE BASE	SATIN	COLOR: LEADEN RET07 UPS ; RETRO ACTIVE 2.0	6" X 12" COVE
WALL BASE	B-3	CROSSVILLE	WALL TILE	COVE BASE	SATIN	FLORIM USA, SERIES: LAYERS, COLOR: SEDIMENT	2" X 2" MOSAIC

FLOOR MATERIALS

Asphalt							
ESD-1	JULIE INDUSTRIES, INC	STATIC SMART DISCOVERY ECO	LEVEL 3 MOHSO SERIES CARPET TILE		GALILEO	24" x 24"	INSTALLATION PER MANUF.
FT-1	DALTILE	FLOOR TILE	PORCELAIN FLOOR TILE - TORREON TN9912241P6	MATTE	TN99 COAL	12" X 24"	INSTALLATION 1/3 OFF JOINT GROUT: CUSTOM BUILDING PRODUCTS 335 WINTER GRAY
FT-2	CROSSVILLE	FLOOR TILE	PORCELAIN FLOOR TILE - FLORIM USA SERIES: LAYERS	UNPOLISHED- MATTE V3		2" X 2" MOSAIC MESH-MOUNTED	GROUT: CUSTOM BUILDING PRODUCTS 335 WINTER GRAY
Paint - Safety Yellow			PT-6		(3)		
PC-1	RETROPLATE SYSTEM	POLISHED CONCRETE	POLISHED NATURAL CONCRETE	REFER TO SPECIFICATION 03 35 43 (2)			
RES-1	SEE SPECS	RESINOUS FLOORING	RESINOUS FLOORING / NON SLIP	MAPE NOVOLAY			
RF-1	JOHNSONITE	RUBBER ATHLETIC FLOORING	TRIUMPH SPORTEX FLOORING - SMH-XX		LB9 RAINSTORM	24" X 24" SQUARE EDGE TILES	
RF-2	NORA SYSTEMS, INC	NORAMENT GRAND	RUBBER FLOORING TILE		5320 SASSAFRAS	39.53" X 39.53", 3.5 MM THICKNESS	
RF-3	NORA SYSTEMS, INC	NORAMENT GRAND	RUBBER FLOORING TILE		5323 FRANKINCENSE	39.53" X 39.53", 3.5 MM THICKNESS	
RF-4	NORA SYSTEMS, INC	NORAMENT GRAND	RUBBER FLOORING TILE		5304 BLACK PEPPER	39.53" X 39.53", 3.5 MM THICKNESS	
SC-1	SEE SPECS	SEALED CONCRETE					
Site - Planting			Landscaped Area				
Stone (2)							
WCPT-1	MOHAWK GROUP	STEP UP II	WALKOFF CARPET		955 COBALT	24" x 24"	INSTALLATION VERTICAL ASHLAR

CEILING MATERIALS

ACT-1	ARMSTRONG	ULTIMA - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 9113 ACOUSTICAL PANEL CEILINGS
ACT-2	ARMSTRONG	OPTIMA - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 9113 ACOUSTICAL PANEL CEILINGS
ACT-3	ARMSTRONG	ULTIMA HEALTH ZONE - BEVELED TEGULAR	ACOUSTICAL PANEL CEILINGS	WHITE	24" x 24"	RE: 9113 ACOUSTICAL PANEL CEILINGS
MS-3 Lemon						

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

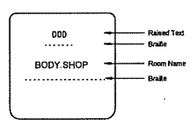
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	01/14/2019
2	ADDENDUM 2	01/03/2019
	ISSUE FOR BID	01/03/2019
	ISSUE FOR PERMIT	01/07/2019

PROJECT No: 3705573

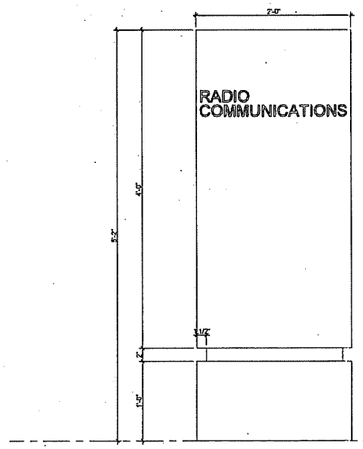
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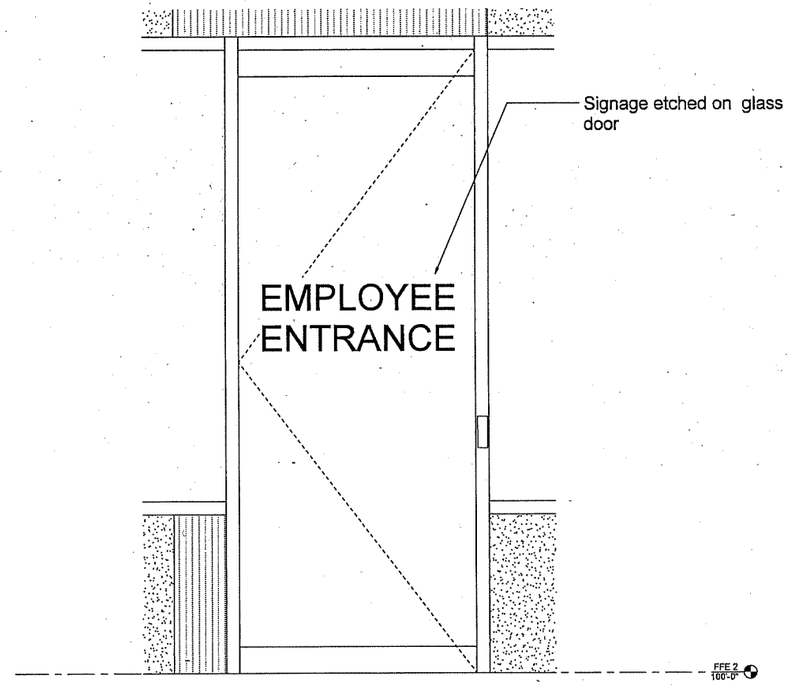
A-700

A- ADDM 3



AA - Generic Room Name
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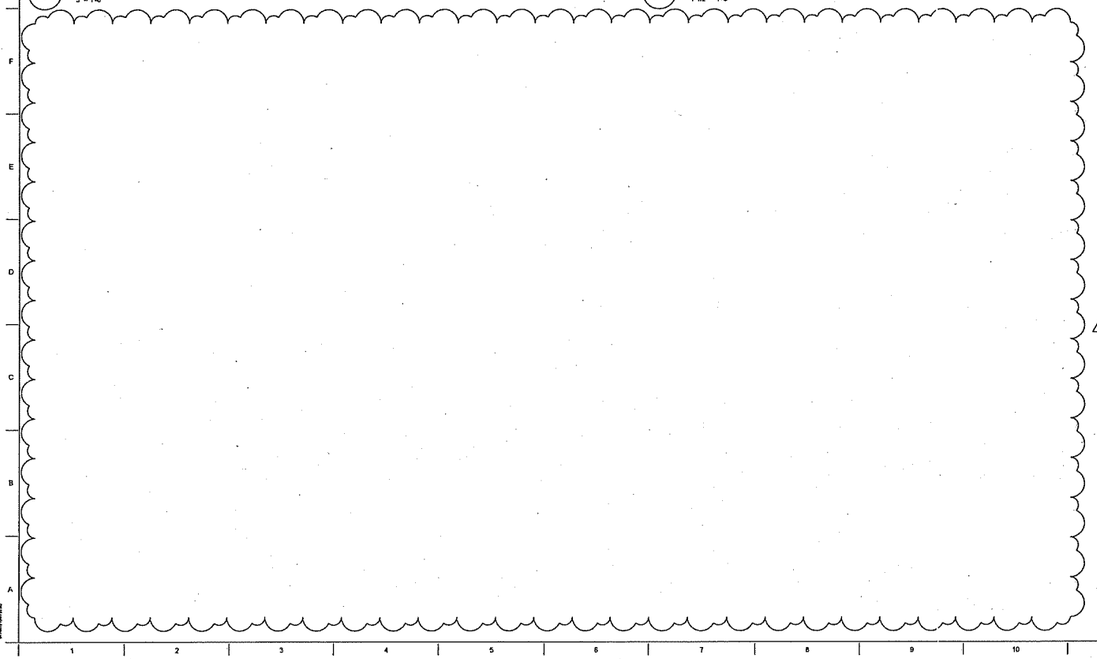




G1 EXTERIOR SIGNAGE TYPES
3" = 1'-0"

G6 SIGNAGE II- DETAIL
1 1/2" = 1'-0"

G11 SIGNAGE JJ-DETAIL
1 1/2" = 1'-0"



Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 260 7678 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/01/2019
	ISSUE FOR PERMIT	01/11/2019

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PROJECT No: 3716003

SIGNAGE TYPES
EXTERIOR

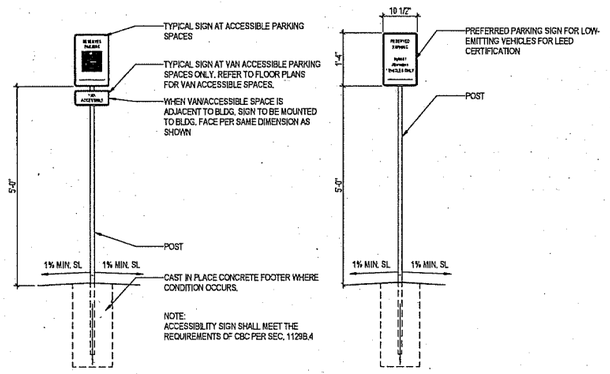
A-911

ADDENDUM 3

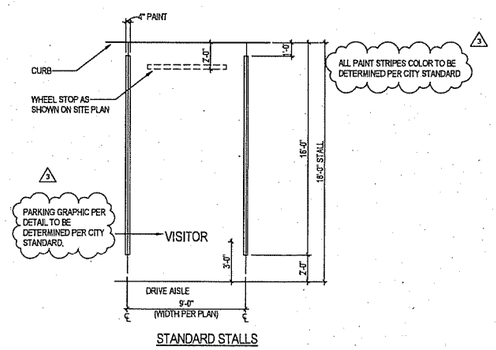
BASIS OF DESIGN EXAMPLES
SIGNAGE EXAMPLES
1. INFORMATION & CODE SIGNS BASED ON TAKEFORM FUSION 51 SIGNAGE TYPE

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1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 296 7878 t

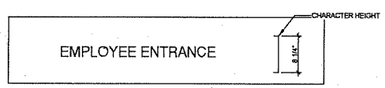


A1 PARKING SIGN
3/4" = 1'-0"



STANDARD STALLS

A8 PARKING STALLS
1/4" = 1'-0"



A14 SIGN TYPE D
1" = 1'-0"

CITY OF MADISON
NAKOOSA TRAIL
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AREA: 117,946 GROSS SF
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PROJECT No: 316003

SITE SIGNAGE ELEVATIONS AND DETAILS

A-921

STRUCTURAL DESIGN CRITERIA

1. GOVERNING CODE: WISCONSIN COMMERCIAL BUILDING CODE OCCUPANCY II (IBC 2015)

2. FLOOR LIVE LOAD (1603.1.1)

MEZZANINE LIVE LOAD:	250 PSF
MEZZANINE COLLATERAL LOAD	15 PSF
AREA D MEZZANINE M27-M28 LIVE LOAD	135 PSF

3. ROOF LIVE LOAD (1603.1.2)

UNREDUCIBLE ROOF LIVE LOAD:	21 PSF
ROOF COLLATERAL LOAD	L = 14 PSF
PHOTOVOLTAIC LOAD	L = 4 PSF

4. ROOF SNOW LOAD (1603.1.3)

GROUND SNOW LOAD:	PG = 30 PSF
SNOW EXPOSURE FACTOR:	CE = 1.0
SNOW LOAD IMPORTANCE FACTOR:	IS = 1.0
TYPICAL THERMAL FACTOR:	CT = 1.0
TYPICAL FLAT-ROOF SNOW LOAD:	PF = 21 PSF
TYPICAL SLOPED-ROOF SNOW LOAD:	PS = 21 PSF
CANOPY AND STORAGE BUILDING	CT = 1.2
CANOPY AND STORAGE BUILDING	PF = 25 PSF
CANOPY AND STORAGE BUILDING	PS = 25 PSF

5. WIND DESIGN DATA (1603.1.4)

BASIC WIND SPEED (3-SECOND GUST):	V = 115 MPH
WIND IMPORTANCE FACTOR:	IW = 1.0
WIND EXPOSURE:	C
ENCLOSURE, AREA A & B	ENCLOSED
ENCLOSURE, AREA C, D, E AND STORAGE	PARTIALLY ENCLOSED

6. EARTHQUAKE DESIGN DATA (1603.1.5)

OCCUPANCY CATEGORY:	II
IMPORTANCE FACTOR:	IE = 1.0
MAPPED, MCE, 5% DAMPED, SPECTRAL ACCELERATIONS:	
AT SHORT PERIODS:	Ss = .08 G
AT A PERIOD OF 1 SECOND:	S1 = .05 G
SITE CLASS:	D
DESIGN EARTHQUAKE SPECTRAL ACCELERATIONS	
AT SHORT PERIODS:	SDS = .09 G
AT A PERIOD OF 1 SECOND:	SD1 = .07 G
SEISMIC DESIGN CATEGORY:	SDC = B

7. GEOTECHNICAL DESIGN DATA (1603.1.6)

NET ALLOWABLE SOIL BEARING PRESSURE =4000 PSF
PER CGC GEOTECHNICAL REPORT, PROJECT: C160551-5, DATED AUGUST 4, 2016

8. FLOOD DESIGN DATA (1603.1.7)
BUILDING IS NOT LOCATED IN A FLOOD HAZARD AREA. THEREFORE FLOOD DESIGN DATA IS NOT REQUIRED.

9. SPECIAL LOADS (1603.1.8)

(2) FIVE TON CRANES CLASS B.

SNOW DRIFTING IS INCLUDED IN THE DESIGN OF THE JOIST AND OTHER FRAMING SHOWN ON ROOF PLANS.

ASSUMED ROOF DEAD LOAD	D = 13 PSF
ASSUMED MEZZANINE DEAD LOAD	D = 57 PSF

GENERAL NOTES

G-1. FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO START OF CONSTRUCTION - RESOLVE ANY DISCREPANCY WITH ARCHITECT/ENGINEER.

DO NOT SCALE DRAWINGS!!!!

G-2. FOR CLARITY, ALL EXTERIOR SLABS AND SIDEWALKS MAY NOT BE SHOWN. FOR EXACT DIMENSIONS, LOCATIONS, JOINTS AND SCORE LINES, SEE ARCHITECTURAL AND/OR CIVIL DRAWINGS.

G-3. VERIFY ALL SIZES, WEIGHTS AND LOCATIONS OF MECHANICAL AND ELECTRICAL EQUIPMENT, ROOF PENETRATIONS, DUCTS, ETC. WITH MECHANICAL AND ELECTRICAL CONTRACTORS AND FIELD CONDITIONS.

G-4. DETAILS MARKED "TYPICAL" MAY OR MAY NOT BE CUT ON PLANS, BUT SHALL APPLY UNLESS NOTED OTHERWISE.

G-5. STRUCTURAL SYSTEM IS DESIGNED TO WORK AS A COMPLETED SYSTEM. ANY SHORING OR BRACING NECESSARY DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.

G-6. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING PLANS FOR SLEEVES, INSERTS, ETC. NOT SHOWN ON STRUCTURAL PLANS.

G-7. NO PIPES OR SLEEVES FOR MECHANICAL TRADES SHALL PASS THROUGH STRUCTURAL MEMBERS WITHOUT APPROVAL OF THE STRUCTURAL ENGINEER.

G-8. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SITE SAFETY AND ALL ACCIDENTS WHICH RESULT IN DEATH, PERSONAL INJURY, OR DAMAGE TO PROPERTY ARISING OUT OF OR IN CONNECTION WITH THE PERFORMANCE OF THE WORK.

EARTHWORK NOTES

EW-1. SEE GEOTECHNICAL REPORT AND SPECIFICATIONS FOR DEFINITION OF MATERIALS AND COMPACTION REQUIREMENTS.

EW-2. U.N.O., THE CONTRACTOR SHALL RETAIN AN INDEPENDENT, QUALIFIED GEOTECHNICAL ENGINEERING FIRM/TESTING AGENCY TO IDENTIFY AREAS OF POOR SOILS, TO MONITOR PROPER SUBGRADE PREPARATIONS AND TO OVERSEE AND TEST THE PLACEMENT OF COMPACTED FILL MATERIAL.

EW-3. ALL SUBTERRANEAN STRUCTURES, UTILITIES, PIPING, ETC. IN THE AREA OF EXCAVATIONS TO BE LOCATED AND MARKED BY CONTRACTOR PRIOR TO EARTH REMOVAL WORK. CONTRACTOR TO MAINTAIN MARKERS UNTIL EXCAVATION ACTIVITIES HAVE CEASED. IF UNDERGROUND UTILITY CONFLICTS ARE DISCOVERED BEFORE OR ENCOUNTERED DURING EXCAVATION, NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.

EW-4. BEFORE PLACING FOOTINGS, FOUNDATIONS OR SLAB-ON-GRADE, THE SUB-GRADE SHALL BE PREPARED AND INSPECTED AS REQUIRED BY THE SPECIFICATIONS.

EW-5. WHERE STRUCTURES DERIVE SUPPORT FROM FILL-SUPPORTED FOUNDATIONS AND AT SLAB-ON-GRADE, FILL SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D-698), UNLESS NOTED OTHERWISE.

EW-6. NO FILL SHALL BE PLACED OVER FROZEN, MUDDY, OR OTHER DELETERIOUS MATERIAL. NO FILL SHALL BE PLACED OVER A PREVIOUS LIFT THAT HAS NOT BEEN ADEQUATELY COMPACTED PER SPECIFICATIONS.

EW-7. BACKFILL AGAINST FOUNDATION WALLS SHALL BE PLACED EVENLY ON ALL SIDES IN ORDER TO ACHIEVE GENERALLY BALANCED LOADINGS.

FOUNDATION NOTES

F-1. ALL COLUMN FOOTINGS ARE TO BE CENTERED UNDER COLUMN CENTERLINES, UNLESS NOTED OR DETAILED OTHERWISE.

F-2. THE FOUNDATION CONTRACTOR SHALL FULLY REVIEW UNDER-GROUND PLUMBING DRAWINGS AND SHALL COORDINATE WITH THE UNDER-GROUND PLUMBING CONTRACTOR TO DEPRESS FOOTINGS AND PROVIDE PIPE SLEEVES THROUGH FOUNDATION WALLS AS NECESSARY TO ACCOMMODATE PLUMBING LINES OR TRAPS WHICH PENETRATE CONCRETE FOOTINGS OR FOUNDATIONS.

F-3. PROVIDE PVC SLEEVES THROUGH FOUNDATION WALLS/FOOTINGS FOR PIPE, CONDUIT, AND CABLE PENETRATIONS, INCLUDING ELECTRICAL GROUNDING SYSTEM CABLES. SEE APPROPRIATE DRAWINGS FOR LOCATIONS/SIZES. PLACE SLEEVES IN LOCATIONS TO AVOID DISPLACING REINFORCING STEEL.

F-4. FOOTING SUBGRADES SHALL BE CLEAN AND FREE OF DEBRIS, STANDING WATER, AND LOOSE SOIL.

F-5. REFER TO ELECTRICAL DRAWING SITE LIGHTING FOR POLE BASES. SUPPLIED AND INSTALLED BY GENERAL CONTRACTOR.

F-6. COORDINATE WITH ARCHITECTURAL AND CIVIL DRAWINGS FOR MISCELLANEOUS FOUNDATIONS NOT SHOWN ON STRUCTURAL DRAWINGS.

F-8. COORDINATE GROUNDING REQUIREMENTS FOR FOUNDATION/FOOTING REINFORCING STEEL WITH ELECTRICAL DRAWINGS. COORDINATE INSTALLATION OF GROUNDING WIRES/EQUIPMENT WITH ELECTRICAL CONTRACTOR PRIOR TO CASTING CONCRETE.

MASONRY NOTES

MATERIAL PROPERTIES (U.N.O.)

COMPRESSIVE STRENGTH	- f'm = 2000 PSI
MASONRY REINFORCEMENT	- Fy = 60 KSI (A615 GR 60)
MORTAR	- TYPE S (ASTM C270)
GROUT AT 28-DAYS	- 2500 PSI (ASTM C476)

M-1. ALL MASONRY WALLS ARE TO HAVE 9 GAUGE HORIZONTAL JOINT REINFORCEMENT WHICH DOES NOT EXCEED 16 INCHES ON CENTER VERTICALLY.

M-2. ALL LAPS SHALL BE 50 BAR DIAMETERS U.N.O.

M-3. HOLLOW MASONRY UNITS SHALL BE LAID WITH FULL HEAD JOINTS AND FULL BED JOINTS OF THE FACE SHELLS AND UNDER WEBS WHERE THE ADJACENT CELLS ARE TO BE FILLED WITH GROUT AND AT THE BOTTOM COURSE.

M-4. GROUT SOLID ALL JAMBS IN ALL MASONRY WALLS FULL HEIGHT TO UNDERSIDE OF LINTEL. EXTEND GROUTED JAMB FROM FACE OF MASONRY OPENING AT LEAST 24" (A MINIMUM OF 3 CELLS). AT OTHER BEAM BEARING LOCATIONS, GROUT SOLID A MINIMUM 24"x24" AREA BENEATH THE BEARING PLATE, U.N.O.

M-5. PROVIDE CORNER SPLICE BARS FOR ALL BOND BEAMS OCCURRING AT CORNERS OR WALL INTERSECTIONS. SPLICE BAR TO BE THE SAME SIZE AS BARS IN THE BOND BEAM.

M-6. WHERE MASONRY IS APPLIED ADJACENT TO STEEL MEMBERS (BEAMS AND COLUMNS) PROVIDE ANCHORING DEVICES PER SPECIFICATIONS.

M-7. REFER TO ARCHITECTURAL PLANS AND DOOR/FRAME SCHEDULES FOR LINTEL ROUGH OPENING LOCATIONS, SIZES, AND ELEVATIONS.

M-8. USE SLEEVE TYPE EXPANSION ANCHORS IN NON-STRUCTURAL CMU WALL PARTITIONS, UNLESS NOTED OTHERWISE.

M-9. ALL CMU WALLS SHALL BE REINFORCED WITH A MINIMUM #5 VERTICAL BAR AT 48" O.C. WITH THAT CMU CORE GROUTED AND HORIZONTAL JOINT REINFORCEMENT AT 16" O.C. THE BOTTOM TWO COURSES SHALL BE GROUTED SOLID. PROVIDE A CONTINUOUS BOND BEAM AT TOP OF WALL WITH (2) #5 BARS CONTINUOUS, GROUT BOND BEAM SOLID. PROVIDE #5 DOWEL AT 48" O.C., INTO FOOTINGS.

M-10. REFER TO STRUCTURAL AND/OR ARCHITECTURAL DRAWINGS FOR CONTROL JOINT LOCATIONS. WHERE CMU CONTROL JOINT LOCATIONS ARE NOT INDICATED, SUBMIT CMU CONTROL JOINT LAYOUT FOLLOWING NCMA TEK 13-2B TO THE ENGINEER FOR APPROVAL.

M-11. NOT USED

M-12. PROVIDE HOT AND COLD WEATHER PROCEDURES AND TEMPORARY MOISTURE PROTECTION IN ACCORDANCE WITH ACI RECOMMENDATIONS AND PROJECT SPECIFICATIONS.

M-13. MASONRY SHALL BE PLACED IN ONE-HALF RUNNING BOND UNLESS NOTED OTHERWISE.

CONCRETE & REINFORCING STEEL NOTES

MATERIAL PROPERTIES (U.N.O.)

COMPRESSIVE STRENGTH	- f'c = 4 KSI
CONCRETE REINFORCEMENT	- Fy = 60 KSI (A615 GR 60)

CR-1. PROVIDE ONE (1) HOOKED REINFORCING BAR IN CONCRETE FOOTING TO SERVE AS A "CONCRETE ENCASED ELECTRODE" IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE. COORDINATE WITH ELECTRICAL CONTRACTOR FOR EXACT LOCATION. CODED REINFORCING BAR SHALL CONFORM TO THE FOLLOWING:
A. UNCOATED, LOW-ALLOY STEEL, CONFORMING TO ASTM A706.
B. BAR SIZE NUMBER 4.
C. HOOKED AT ONE END ONLY.
D. MINIMUM HORIZONTAL LENGTH OF REINFORCING BAR ENCASED IN CONCRETE FOOTING SHALL BE 20'-0" AS DEFINED IN NEC, ARTICLE 250.
E. MINIMUM VERTICAL PROJECTION OF REINFORCING BAR ABOVE CONCRETE SLAB SHALL BE 6'-6".
F. MINIMUM COVER ALL AROUND REINFORCING BAR SHALL BE 2".

CR-2. ALL BAR LAPS SHALL CONFORM TO ACI 318 CLASS "B" SPLICE CRITERIA. USE TOP BAR LAP LENGTHS FOR TOP BARS IN SLABS AND BEAMS OVER 14" DEEP. MINIMUM BAR LAPS AS FOLLOWS U.N.O.:

FOR EPOXY COATED BARS, PROVIDE 1.5 TIMES THE INDICATED LAP LENGTH. FOR TOP BARS PROVIDE 1.3 TIMES THE INDICATED LAP LENGTH.

CR-3. LAP LENGTH SHALL BE SPECIFICALLY NOTED ON SHOP DRAWINGS WHERE MORE THAN ONE BAR MAKES UP A CONTINUOUS STRING.

CR-4. HORIZONTAL BARS SHALL BE DETAILED TO SHOW THE DISTANCE FROM AT LEAST ONE END OF THE BAR TO THE NEAREST BUILDING GRID LINE OR WALL.

CR-5. REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 315.

CR-6. ALL REINFORCEMENT BARS SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST CRSI MANUAL OF STANDARD PRACTICE AND SHALL BE CLEAN AND FREE OF GREASE AND SCALING RUST.

CR-7. CONTINUOUS TOP AND BOTTOM BARS, WHEN SHOWN IN TRANSVERSE SECTION ONLY, SHALL BE LAPPED AS FOLLOWS:

TOP BARS NEAR MID-SPANS; BOTTOM BARS DIRECTLY OVER SUPPORTS, UNLESS NOTED OTHERWISE.

CR-8. HOOK HORIZONTAL WALL AND BEAM REINFORCING BARS AT DISCONTINUOUS ENDS, TYPICAL U.N.O. EXTEND REINFORCEMENT TO FAR FACE OF PERPENDICULAR WALL AND/OR CORNER U.N.O.

CR-9. PROVIDE HOT/COLD WEATHER PROCEDURES AND PROTECTION IN ACCORDANCE WITH ACI RECOMMENDATIONS AND PROJECT SPECIFICATIONS.

CR-10. CONCRETE REINFORCEMENT PROTECTION/CLEAR COVER, U.N.O.:

FOOTINGS:	
BOTTOM & SIDES	3"
TOP	2"
WALLS:	
EXTERIOR EXPOSURE	2"
INTERIOR EXPOSURE	1"
BEAMS/COLUMNS:	
OVER TIES OR STIRRUPS	1 1/2"
ELEVATED SLABS:	1"

CR-11. PROVIDE ADDITIONAL #4 BARS AT 4'-0" LONG 1" BELOW TOP OF SLAB AT 45° TO ALL REENTRANT CORNERS,OPENINGS IN CONCRETE SLABS AND AS INDICATED ON DRAWINGS.

CR-12. EXTEND ALL PIER STEEL TO PROVIDE STD. HOOK UNDER FOOTING REINFORCEMENT, UNLESS NOTED OTHERWISE.

CR-13. ALL CONCRETE DESIGN AND CONSTRUCTION SHALL CONFORM WITH THE LOCAL BUILDING CODE REQUIREMENTS AND THOSE OF THE FOLLOWING STANDARDS (LATEST EDITION):

"ACI 318, BUILDING CODE REQUIREMENTS FOR REINFORCED CONC."
"ACI 315, DETAILS AND DETAILING OF CONCRETE REINFORCEMENT"
"ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BLDGS."
"ACI 207, RECOMMENDED PRACTICE FOR CONCRETE FORM WORK"

CR-14. SEE SECTION 033000 OF SPECIFICATIONS FOR INFORMATION REGARDING CONCRETE MIX DESIGN, TESTING, MATERIALS, AND ADMIXTURES.

CR-15. ALUMINUM CONDUIT IS NOT PERMITTED TO BE EMBEDDED IN CONCRETE.

CR-16. PROVIDE FOOTING DOWELS TO MATCH VERTICAL WALL REINFORCING WITH STANDARD HOOKS EMBEDDED A MINIMUM OF 9" INTO FOOTING.

PRECAST CONCRETE NOTES

PC-1. PRECAST CONCRETE SUPPLIER SHALL BE RESPONSIBLE FOR DESIGN OF PRECAST ELEMENTS AND CONNECTIONS TO CARRY ALL DESIGN LOADS (VERTICAL AND LATERAL) TO THE FOUNDATIONS.

PC-2. REFER TO GENERAL NOTES AND DRAWINGS FOR SUPERIMPOSED LOADS USED IN DESIGN.

PC-3. ESTIMATED PRECAST WEIGHTS USED IN DESIGN:

DOUBLE-TEES:	
32" DEEP	= 74PSF
42 1/2" DEEP	= 87PSF
PLANK:	
8" HOLLOW-CORE	= 62PSF
12" HOLLOW-CORE	= 86PSF

PC-4. WHERE CONCRETE TOPPINGS ARE CALLED FOR, THE TOPPING THICKNESS INDICATED REPRESENTS THE MINIMUM THICKNESS REQUIRED THROUGHOUT THE LENGTH OF THE SUPPORTING PRECAST ELEMENT. FOR THOSE ELEMENTS THAT ARE CAMBERED, THE TOPPING SLAB SHALL VARY IN THICKNESS SO AS TO MAINTAIN A LEVEL SURFACE.

THE MINIMUM REQUIRED TOPPING SLAB THICKNESS SHALL BE PROVIDED AT THE MAXIMUM CAMBER LOCATION OF THE SUPPORTING PRECAST ELEMENT. THE TOPPING SLAB THICKNESS SHALL INCREASE AS REQUIRED TOWARDS THE BEARINGS TO MAINTAIN A LEVEL SURFACE AND TO ACCOMODATE THE CAMBER PROFILE OF THE SUPPORTING PRECAST ELEMENT.

THE DESIGN OF THE SUPPORTING PRECAST ELEMENT SHALL INCORPORATE THE VARIABLE THICKNESS AND WEIGHT OF THE CONCRETE TOPPING SLAB.

PC-5. PRECAST SLABS SHALL HAVE THAT PART OF THE TOTAL DEFLECTION OCCURRING AFTER ATTACHMENT OF THE NON STRUCTURAL ELEMENTS (SUM OF THE LONGTIME DEFLECTION DUE TO ANY ADDITIONAL LIVE LOAD) LIMITED TO L/480.

PC-6. ALL STEEL SHAPES AND PLATES SHALL COMPLY WITH ASTM A36. THE WELDING OF ALL STEEL IS TO BE WITH E70XX ELECTRODES.

PC-7. ALL EMBEDDED PLATES, CONNECTIONS, AND INSERTS EXPOSED TO WEATHER ARE TO BE GALVANIZED PER ASTM A153. ALL OTHER CONNECTIONS ARE TO BE COATED WITH A RUST INHIBITIVE PRIMER. ALL FIELD CUTS AND SCRATCHED CONNECTIONS ARE TO BE TOUCHED UP AFTER FINAL CONNECTION HAS BEEN COMPLETED. ALL GALVANIZED CONNECTIONS ARE TO BE REPAIRED WITH A COLD GALVANIZING COMPOUND.

PC-8. PROVIDE EMBEDDED PLATES FOR ATTACHMENT OF MECHANICAL EQUIPMENT WHERE REQUIRED. VERIFY EQUIPMENT WEIGHTS, LOCATIONS, AND ATTACHMENT REQUIREMENTS WITH THE MECHANICAL CONTRACTOR.

PC-9. ALL HEADERS REQUIRED AT SLAB OPENINGS ARE TO BE DESIGNED AND FURNISHED BY THE PRECAST SLAB SUPPLIER. VERIFY SIZE AND LOCATION OF ALL INDICATED OPENINGS WITH THE MECHANICAL CONTRACTOR. REFER TO MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR HOLES SMALLER THAN 10" SQUARE OR ROUND.

PC-10. ALL HOLES IN SLABS WHICH HAVE NOT BEEN CAST IN BY THE MANUFACTURER ARE TO BE FIELD CUT BY THE TRADES REQUIRING THEM, USING ONLY POWER SAWS OR CORE DRILLS. FIELD CUTS WHICH VARY IN SIZE AND/OR LOCATION FROM THOSE INDICATED ON PRECAST SHOP DRAWINGS SHALL BE APPROVED BY THE PRECAST SUPPLIER PRIOR TO CUTTING.

PC-11. DRAWINGS SHOW GENERAL REQUIREMENTS FOR BEARING AND ANCHORAGE. THE PRECAST SUPPLIER SHALL PROVIDE ADDITIONAL MATERIAL, ACCESSORIES AND WORK NECESSARY TO ACCOMMODATE ALL SPECIFIC JOB, SPAN AND LOADING REQUIREMENTS.

PC-12. ALL EMBEDDED PLATES AND CONNECTIONS SHOWN ARE MINIMUM REQUIREMENTS. THE PRECAST SUPPLIER SHALL VERIFY BY ANALYSIS THAT PLATE SIZES AND SPACING ARE ADEQUATE TO TRANSFER THE DESIGN LOADS INDICATED. ALL PRECAST CONNECTIONS SHALL BE DESIGNED USING THE CODE REQUIRED LOAD FACTORS. THE MINIMUM WELD SIZE SHALL BE 3/16", AND THE MINIMUM LENGTH OF WELD SHALL BE 4".

PC-13. TYPICAL EXTERIOR PRECAST LAYUP EQUALS 3.5" CONCRETE, 4" INSULATION, 3.5" CONCRETE.

STRUCTURAL STEEL NOTES

MATERIAL PROPERTIES (U.N.O.)

W-SHAPES	- Fy = 50 KSI (A992 OR A572 Gr 50)
C-SHAPES & ANGLES	- Fy = 36 KSI (A36)
PLATES & BARS	- Fy = 36 KSI (A36)
RECTANGULAR HSS	- Fy = 46 KSI (A500 Gr B)
ROUND HSS	- Fy = 42 KSI (A500 Gr B)
PIPE	- Fy = 35 KSI (A53 Gr B)
RODS	- Fy = 36 KSI (A36)

S-1. STEEL BEAMS WITH RESIDUAL CAMBER RESULTING FROM MILL FABRICATION OR ROLLING SHALL BE SHOP FABRICATED AND ERECTED SUCH THAT THIS RESIDUAL CAMBER COUNTERACTS GRAVITY LOAD DEFLECTION.

S-2. U.N.O., ALL BOLTED CONNECTIONS SHALL UTILIZE 3/4 INCH DIAMETER A325 BOLTS TIGHTENED TO THE SNUG-TIGHT CONDITION. THE SNUG-TIGHT CONDITION IS DEFINED BY THE RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".

S-3. ALL ANCHOR RODS ARE TO BE 3/4 INCH DIAMETER F1554 S1 GR. 55 THREADED RODS UNLESS NOTED OTHERWISE. TWO 1/2 INCH DIAMETER ANCHOR BOLTS SHALL BE PROVIDED AT ALL BEAM AND LINTEL BEARINGS ON CONCRETE OR MASONRY.

S-4. BEAM AND LINTEL PLATES SHALL BE FULLY GROUTED WITH A MINIMUM 1/2" NON-SHRINK GROUT.

S-5. ALL WELDING OF NEW STEEL IS TO BE WITH E70XX ELECTRODES, UNLESS NOTED OTHERWISE. WELDING SHALL BE IN ACCORDANCE WITH THE LATEST AWS SPECIFICATIONS BY CERTIFIED WELDERS.

S-6. WHEN FIELD WELDING TO EXISTING STEEL, ADJUST WELDING PROCEDURES AS REQUIRED TO BE COMPATIBLE WITH THE NEW AND EXISTING STEEL.

S-7. STEEL CONNECTIONS NOT DETAILED ON THE PLANS ARE TO BE THE FABRICATORS STANDARD AND ARE TO BE SELECTED AND DESIGNED IN ACCORDANCE WITH AISC ASD SPECIFICATIONS, TYPE 2 FRAMING CONNECTIONS, FOR THE REACTIONS INDICATED.

MINIMUM NO. BOLTS PER CONNECTION
n = 2 FOR MEMBERS 10 INCHES DEEP OR LESS
n = 3 FOR MEMBERS 12, 14, OR 16 INCHES DEEP
n = 4 FOR MEMBERS 18 OR 18 INCHES DEEP
n = 5 FOR MEMBERS 21 OR 24 INCHES DEEP
n = 6 FOR MEMBERS 27 OR 30 INCHES DEEP
n = 8 FOR MEMBERS 33 OR 36 INCHES DEEP

S-8. UNLESS NOTED OTHERWISE, THE MINIMUM CONNECTION PLATE/ANGLE THICKNESS SHALL BE 5/16". THE MINIMUM WELD 1/4", AND THE MINIMUM DESIGN LOAD ON ANY CONNECTION 10 KIPS STRENGTH LEVEL.

S-9. ALL CONNECTIONS TO PIPE AND TUBE COLUMNS SHALL BE THROUGH PLATE CONNECTIONS UNLESS OTHERWISE INDICATED.

S-10. THE CONTRACTOR SHALL FURNISH AND INSTALL MISCELLANEOUS STEEL (CURBS, HANGERS, BRACING, ETC.) AS INDICATED AND AS NECESSARY PER ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

S-11. ALL EXTERIOR STEEL SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A123.

S-12. WELDING TO, OR CUTTING OR GRINDING ON CRANE RUNWAY BEAMS AND BRACKETS IS NOT ALLOWED.

S-13. CHANGE SHOP WELDS TO FIELD WELDS WERE NECESSARY FOR FIT UP.

S-14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA TOLERANCES AND REQUIREMENTS.

STEEL BAR JOISTS

MATERIAL PROPERTIES (U.N.O)
COMPLY WITH SJI'S "SPECIFICATIONS" FOR WEB AND STEEL-ANGLE CHORD MEMBERS.

J-1. BAR JOISTS SHALL BE DESIGNED TO RESIST FORCES INDICATED ON DRAWINGS AND SPECIFICATIONS.

J-2. PLACE LOADS AT PANEL POINTS OR WELD ADDITIONAL DOUBLE ANGLE MEMBERS ONE EACH SIDE FROM POINT OF CONCENTRATED LOAD TO THE NEAREST PANEL POINT ON THE OPPOSITE CHORD.

J-3. ALL FIELD MODIFICATIONS OR REPAIRS TO THE JOIST, OR JOIST GIRDERS, SHALL BE APPROVED BY THE JOIST MANUFACTURER IN WRITING. THIS LETTER SHALL BE FORWARDED TO THE ENGINEER FOR REVIEW.

J-4. CUTTING AND DRILLING OF JOISTS IS NOT PERMITTED.

J-5. ALL BRIDGING SHALL BE EQUALLY SPACED, UNLESS NOTED OTHERWISE, BY JOIST MANUFACTURER.

J-6. CONTRACTOR(S) SHALL PROVIDE MEANS FOR ADEQUATE DISTRIBUTION OF CONSTRUCTION LOADS SO THAT CARRYING CAPACITY OF ANY BAR JOIST, JOIST GIRDER, OR OTHER STRUCTURAL MEMBER IS NOT EXCEEDED.

J-7. JOIST SHALL BE CONSIDERED AS UNSTABLE DURING ERECTION, UNDER NO CIRCUMSTANCES ARE CONSTRUCTION LOADS OF ANY DESCRIPTION TO BE PLACED ON UNBRIDGED JOISTS.

J-8. WHERE X-BRIDGING INTERFERES WITH MECHANICAL PIPING OR DUCTWORK, UTILIZE HORIZONTAL BRIDGING AS DIRECTED BY JOIST MANUFACTURER.

J-9. ALL BRIDGING SHALL BE PER SJI AND AS REQUIRED FOR DESIGN LOADS.

J-10. PROVIDE JOIST WITH UPLIFT CAPACITY OF 10 PSF, SERVICE LEVEL.

J-11. A = SERVICE LEVEL AXIAL LOAD.
PROVIDE JOIST TOP CHORD WITH AXIAL CAPACITY TO RESIST.
A2 = MINIMUM JOIST TOP CHORD CROSS SECTIONAL AREA = .67 IN²

J-12. ALL JOIST AND JOIST GIRDERS ON COLUMN LINES SHALL BE DESIGNED FOR A 5 KIP TOP CHORD AXIAL FORCE

J-13. ON HIGH ROOFS JOIST MAY BE SHIFTED UP TO 6 INCHES. ANY JOIST SPACE MAY NOT INCREASE MORE THAN 6 INCHES AND NEVER MORE THAN 6'-0" MAXIMUM. THIS APPLIES TO HIGH ROOFS ONLY. MAINTAIN JOISTS ALIGNED WITH COLUMNS.

METAL DECK

MD-1. BUTTON PUNCHING ROOF DECK IS NOT PERMITTED. REFERENCE DRAWINGS FOR ROOF DECK ATTACHMENT REQUIREMENTS. STRUCTURAL DIAPHRAGM ACTION IS PROVIDED BY THE ROOF DECK AND ITS ATTACHMENT.

MD-2. UNLESS NOTED OTHERWISE, ALL MISCELLANEOUS OPENINGS IN METAL ROOF DECK ARE TO BE FRAMED BY 2x6 (W) ANGLES. LONG LEG OF ANGLES SHALL BE VERTICAL. ANGLES SHALL BE WELDED TO THE TOP CHORD/FLANGE OF ROOF FRAMING AND EACH OTHER.

MD-3. UNLESS NOTED OTHERWISE, METAL DECKING SHALL BE CONTINUOUS OVER 2 SPANS AND HAVE JOINTS OVER SUPPORTING MEMBERS.

MD-4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POUR STOPS AT EDGES OF METAL DECK PER SDI POUR STOP SELECTION TABLE/RECOMMENDATIONS OR BENT PLATE POUR STOPS AS REQUIRED TO FORM THE SLAB EDGE.

STRUCTURAL TESTING AND INSPECTION

TI-1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT ALL STRUCTURAL WORK FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY STRUCTURAL INSPECTION PROVIDED BY OTHERS DOES NOT RELIEVE THE CONTRACTOR OF THIS RESPONSIBILITY. ANY STRUCTURAL DEVIATIONS FROM THE CONTRACT DOCUMENTS THAT ARE FOUND AT A LATER DATE AND ARE DECLARED TO BE SIGNIFICANT BY THE STRUCTURAL ENGINEER SHALL BE CORRECTED BY THE CONTRACTOR WITHOUT COST OR ANY DELAY TO THE PROJECT SCHEDULE.

TI-2. THE CONTRACTOR SHALL RETAIN AN INDEPENDENT TESTING AGENCY TO PROVIDE FIELD AND LAB TESTING OF CONSTRUCTION MATERIALS AND TO PROVIDE CONSTRUCTION INSPECTIONS. THE CONSTRUCTION INSPECTION SHALL BE BY QUALIFIED INSPECTORS THAT ARE SATISFACTORY TO THE ARCHITECT AND ENGINEER.

TI-3. THE CONTRACTOR SHALL PROVIDE THE TESTING AND INSPECTING AGENCY ACCESS TO ALL PLACES WHERE THE WORK IS BEING PERFORMED. A MINIMUM OF 24 HOURS NOTIFICATION SHALL BE GIVEN TO THE TESTING AGENCY AND ARCHITECT/ENGINEER PRIOR TO THE COMMENCEMENT OF WORK REQUIRING TESTING OR INSPECTION.

TI-4. THE TESTING AGENCY IS NOT AUTHORIZED TO DIRECT OR APPROVE ANY CHANGES FROM THE CONTRACT DOCUMENTS. IF THE CONTRACTOR WISHES TO QUESTION THE TESTING AGENCY'S INTERPRETATION OF THE CONTRACT DOCUMENTS, HE MAY DO SO DIRECTLY WITH THE ARCHITECT OR STRUCTURAL ENGINEER.

TI-5. THE TESTING AGENCY IS NOT AUTHORIZED TO STOP OR DELAY THE WORK. IF THE CONTRACTOR ELECTS TO CONTINUE WITH A CERTAIN PORTION OF WORK AFTER BEING NOTIFIED BY THE TESTING AGENCY THAT SUCH WORK IS NOT IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS, THE CONTRACTOR DOES SO AT THEIR OWN RISK AND MAY BE REQUIRED TO CORRECT THE WORK AT A LATER DATE.

TI-6. THE TESTING AND INSPECTING AGENCY IS NOT INSPECTING FOR O.S.H.A. COMPLIANCE OR REQUIRED TO INSPECT TEMPORARY CONSTRUCTION, SUCH AS TEMPORARY BRACING. TEMPORARY CONSTRUCTION IS THE CONTRACTOR'S SOLE RESPONSIBILITY.

TI-8. TESTING AND INSPECTION IS NOT REQUIRED FOR WORK PERFORMED AT AN OFFSITE FABRICATION SHOP, UNLESS SPECIFICALLY NOTED OR SPECIFIED OTHERWISE.

TI-9. THE TESTING AND INSPECTING AGENCY SHALL ISSUE ONGOING REPORTS OF INSPECTIONS AND TESTS TO THE CONTRACTOR, ENGINEER, AND ARCHITECT OF RECORD. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN IF UNCORRECTED, TO THE ENGINEER AND ARCHITECT OF RECORD.

TI-10. INSPECTION AGENCY SHALL INSPECT FOR CONFORMANCE TO SPECIFIED REQUIREMENTS FOR PROTECTING NEW CONCRETE AND MASONRY FROM THE ADVERSE EFFECTS OF WEATHER, HEATING EQUIPMENT AND OTHER POTENTIALLY HARMFUL CONDITIONS.

TI-11. CONSTRUCTION TESTING AND INSPECTION BY THE TESTING AND INSPECTING AGENCY IS REQUIRED AS FOLLOWS:

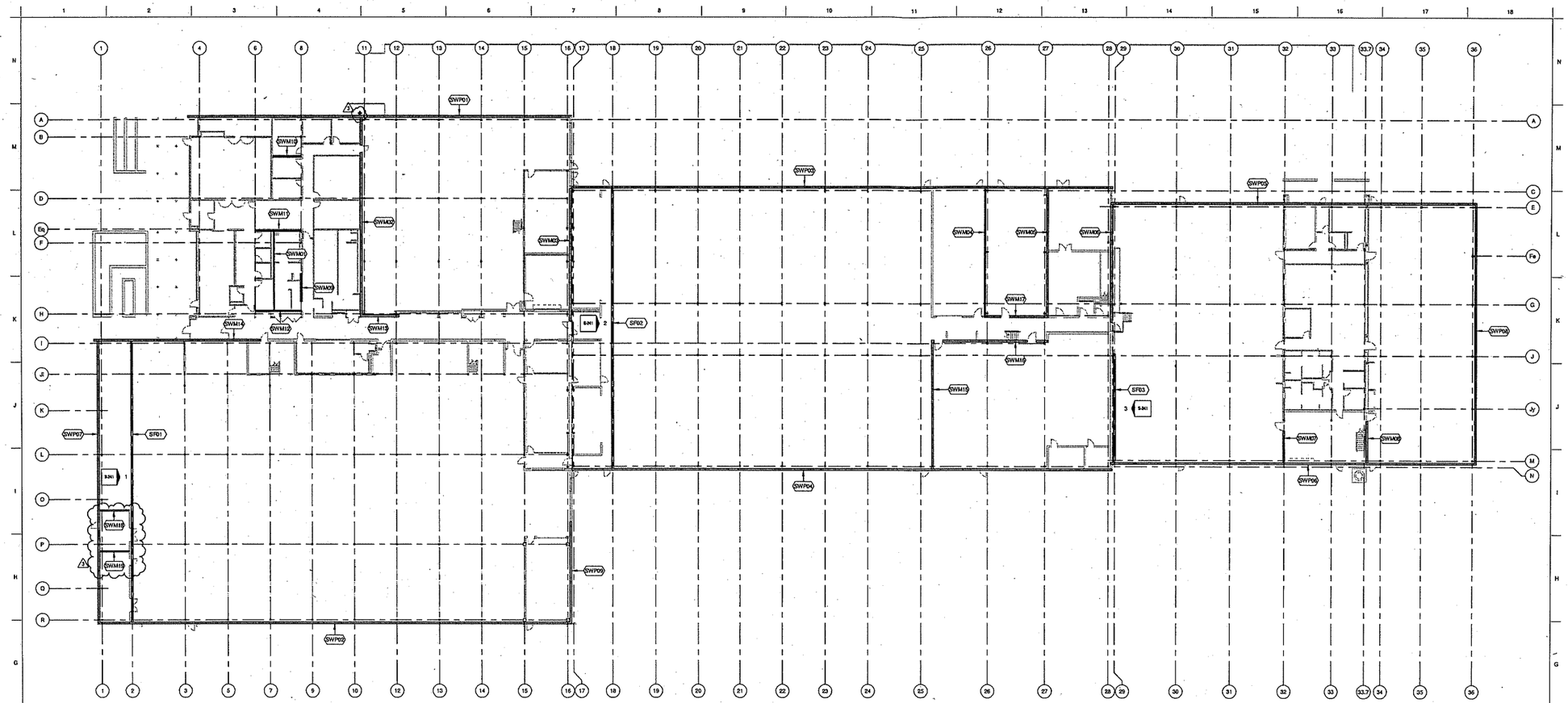
A. CONCRETE TESTING PER THE SPECIFICATIONS.

B. CONCRETE INSPECTION SHALL INCLUDE THE PLACEMENT OF REINFORCEMENT. REINFORCING BAR SIZES, SPACING, TIES, LAPS, AND COVER.

C. MASONRY TESTING PER THE BUILDING CODE.

D. MASONRY INSPECTION SHALL INCLUDE THE PLACEMENT OF REINFORCEMENT. REINFORCING BAR SIZES, SPACING, AND LAPS.

E. FIELD BOLTING INSPECTIONS SHALL INCLUDE VISUAL INSPECTION OF ALL THE CONNECTIONS RELATED TO STRUCTURAL STEEL. THE SIZE, TYPE, AND QUANTITY OF BOLTS AND THEIR INSTAL



LATERAL FORCE RESISTING SYSTEMS GENERAL NOTES:

1. SHEAR WALL PRECAST LOADS ARE SHOWN AS STRENGTH LEVEL.
2. SHEAR FRAMES HAVE GRADE BEAM FOUNDATIONS. NO PENETRATIONS OR NOTCHES ARE ALLOWED IN GRADE BEAMS.
3. SHEAR WALL PRECAST LOADS SHALL BE APPLIED AT THE TOP OF THE SHEAR WALL.

SHEAR WALLS - PRECAST

SWP01	PRECAST SHEAR WALL	V = 36.0K
SWP02	PRECAST SHEAR WALL	V = 40.7K
SWP03	PRECAST SHEAR WALL	V = 45.K
SWP04	PRECAST SHEAR WALL	V = 45.K
SWP05	PRECAST SHEAR WALL	V = 43.5K
SWP06	PRECAST SHEAR WALL	V = 43.5K
SWP07	PRECAST SHEAR WALL	V = 1.9K
SWP08	PRECAST SHEAR WALL	V = 17.6K
SWP09	PRECAST SHEAR WALL	V = 76.3K

SEGMENTS OF THE PRECAST WALL SHALL BE CONNECTED TO TRANSFER HORIZONTAL AND VERTICAL SHEAR.

SHEAR FRAMES

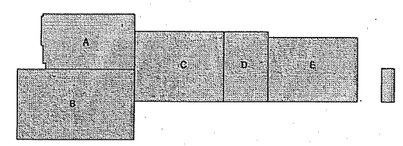
SF01	TRUSSED SWAY FRAME
SF02	TRUSSED SWAY FRAME
SF03	STEEL X-BRACE

SHEAR WALLS - MASONRY

SWM01	CMU SHEAR WALL
SWM02	CMU SHEAR WALL
SWM03	CMU SHEAR WALL
SWM04	CMU SHEAR WALL
SWM05	CMU SHEAR WALL
SWM06	CMU SHEAR WALL
SWM07	CMU SHEAR WALL
SWM08	CMU SHEAR WALL
SWM09	CMU SHEAR WALL
SWM10	CMU SHEAR WALL
SWM11	CMU SHEAR WALL
SWM12	CMU SHEAR WALL
SWM13	CMU SHEAR WALL
SWM14	CMU SHEAR WALL
SWM15	CMU SHEAR WALL
SWM16	CMU SHEAR WALL
SWM17	CMU SHEAR WALL
SWM18	CMU SHEAR WALL
SWM19	CMU SHEAR WALL

TRUE NORTH PLAN NORTH

1 LATERAL FORCE RESISTING SYSTEMS PLAN
1" = 20'-0"



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ADDENDUM 3

CITY OF MADISON
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FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
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ISSUE FOR BID

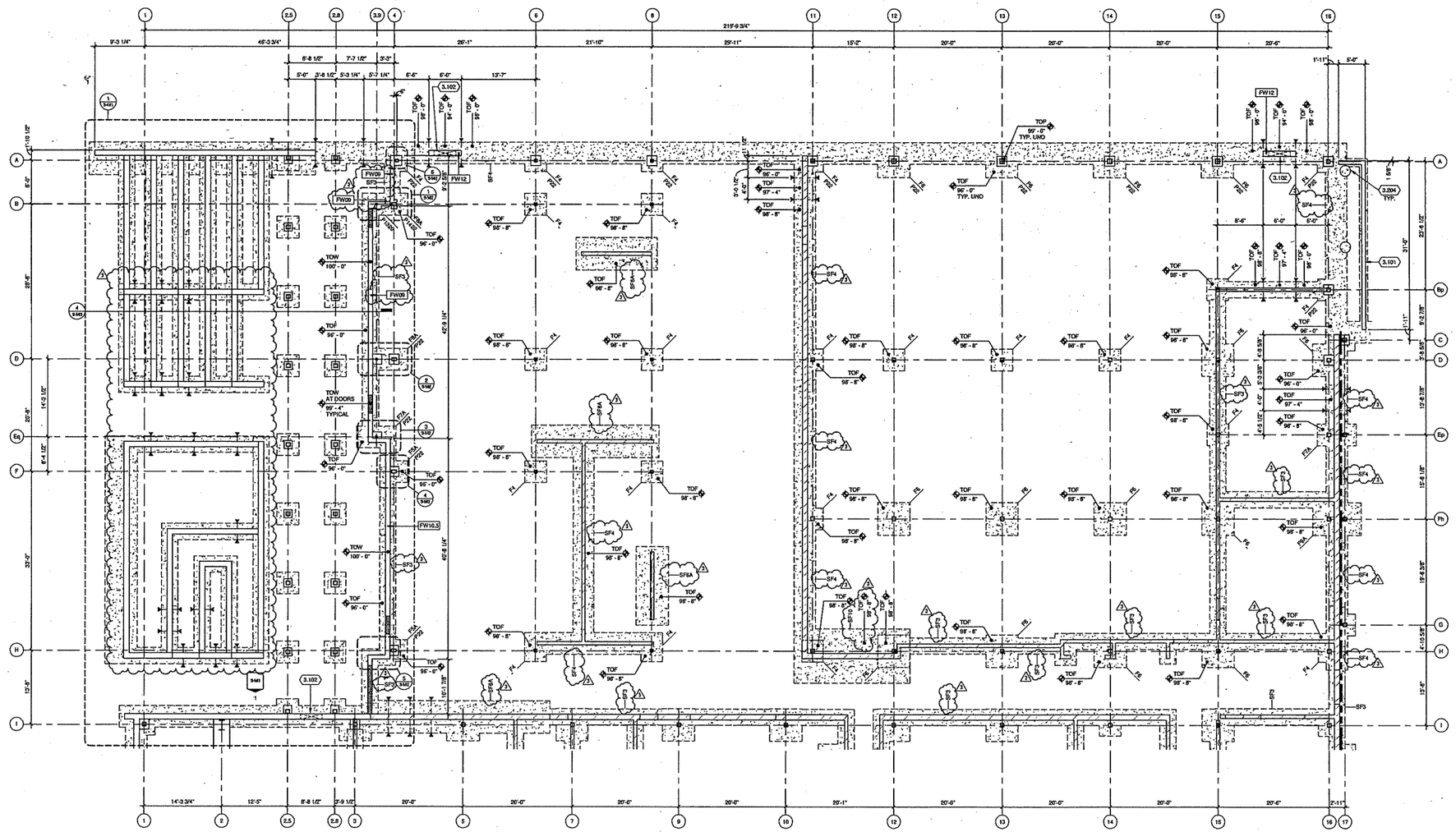
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PROJECT No: 1303500-160264.01

LATERAL FORCE RESISTING SYSTEMS PLAN

S-010



TRUE NORTH PLAN NORTH

1 FOUNDATION PLAN AREA A
1/8" = 1'-0"

KEYED NOTES

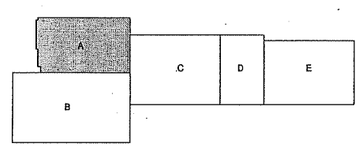
3.101 STOOP, SEE DETAIL 11/S-501

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.



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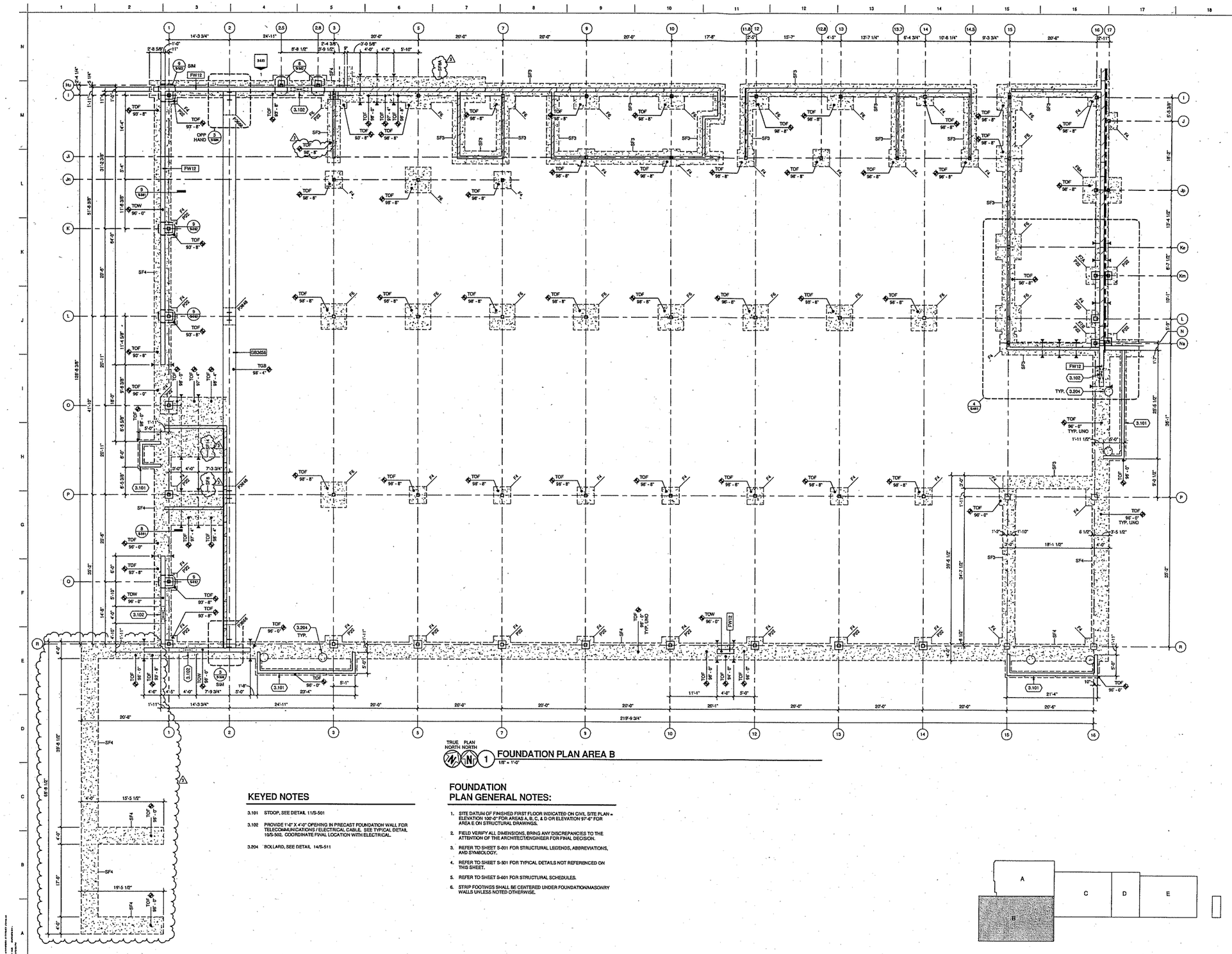
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PROJECT No: 1303500-160264.01

FOUNDATION PLAN AREA A

S-101A

A ADDENDUM 3



TRUE NORTH PLAN NORTH

1 FOUNDATION PLAN AREA B
1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

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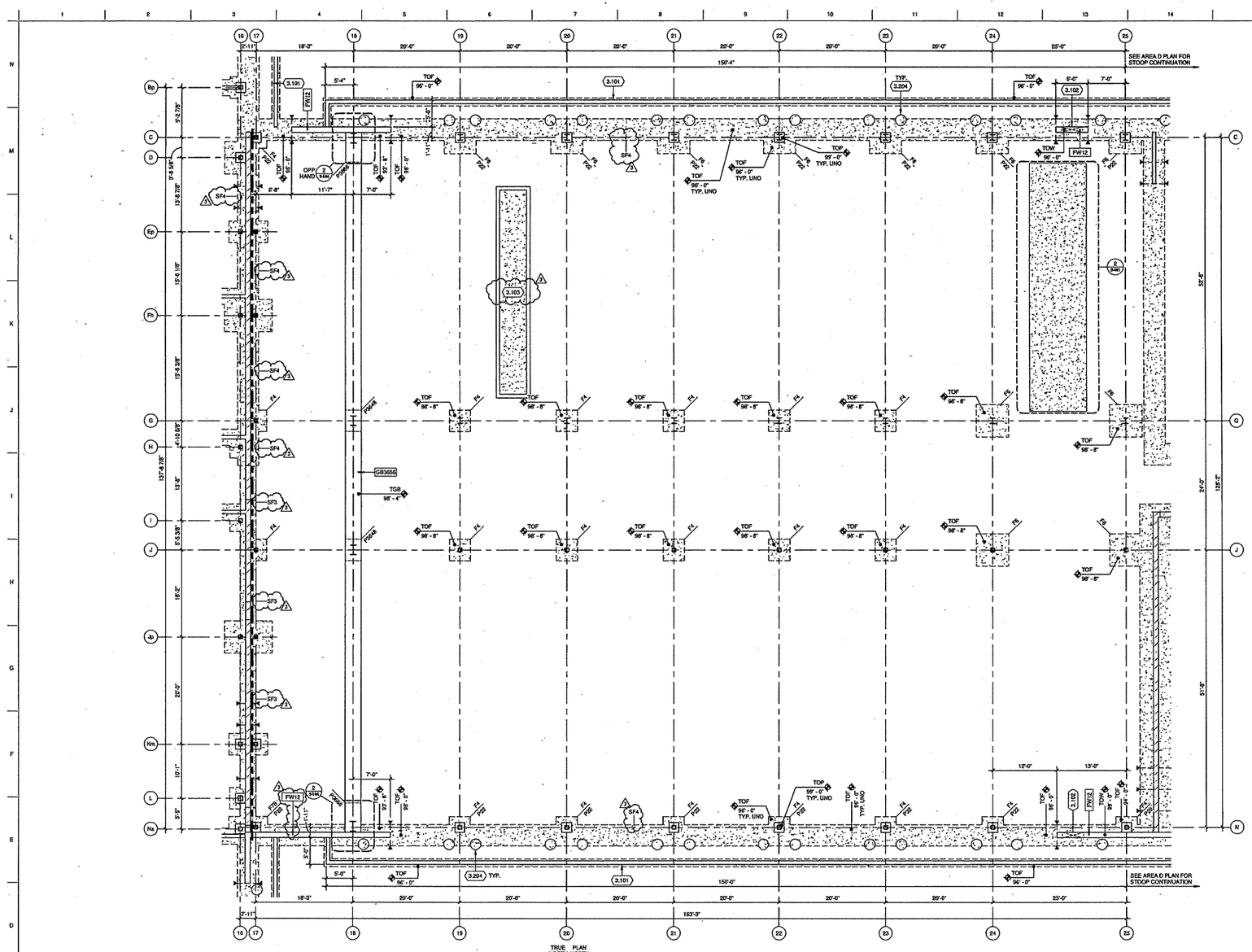
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	ISSUE FOR PERMIT	01/17/2019

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FOUNDATION PLAN AREA B

S-101B



TRUE NORTH PLAN NORTH

1 FOUNDATION PLAN AREA C
1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

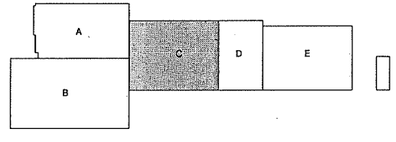
3.102 PROVIDE 1'-6" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELCO/MAU/NICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.103 LIFT FOUNDATION DESIGN BY LIFT SUPPLIERS PROFESSIONAL ENGINEER. SUBMIT PE STAMPED AND SIGNED FOUNDATION DESIGN.

3.204 , BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
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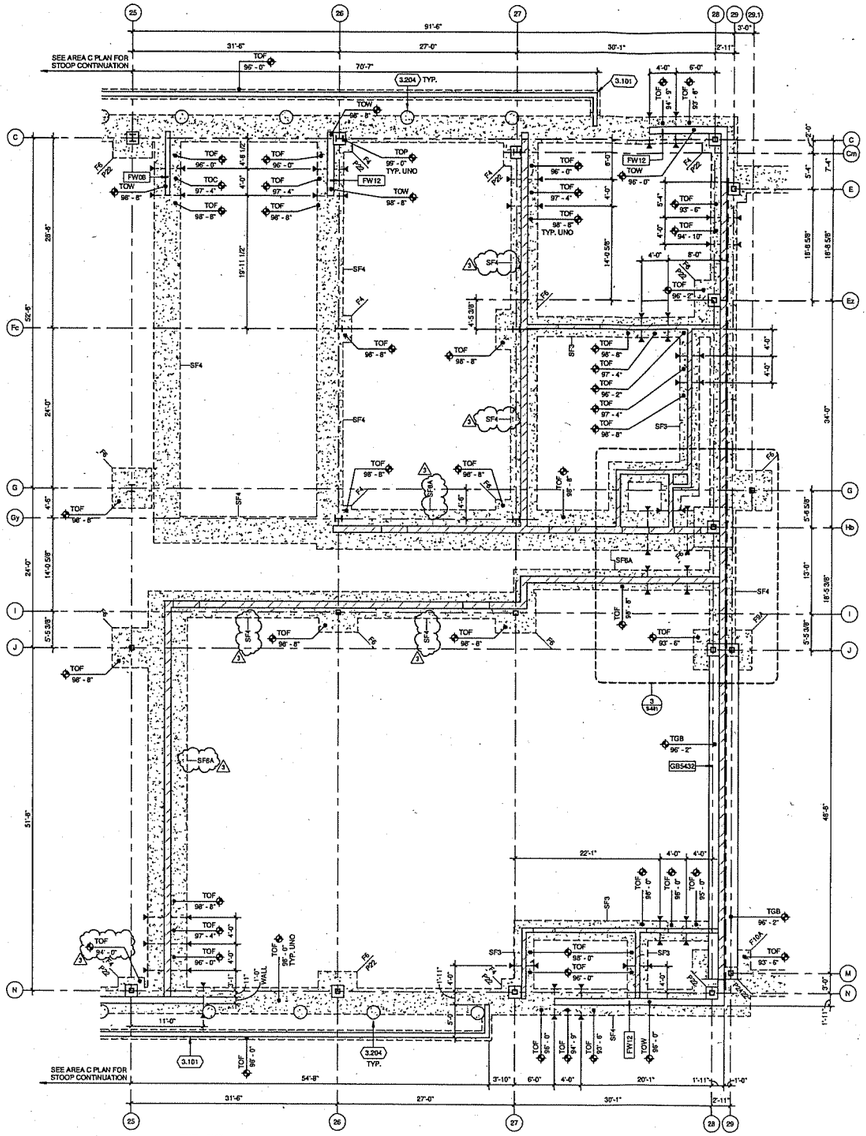
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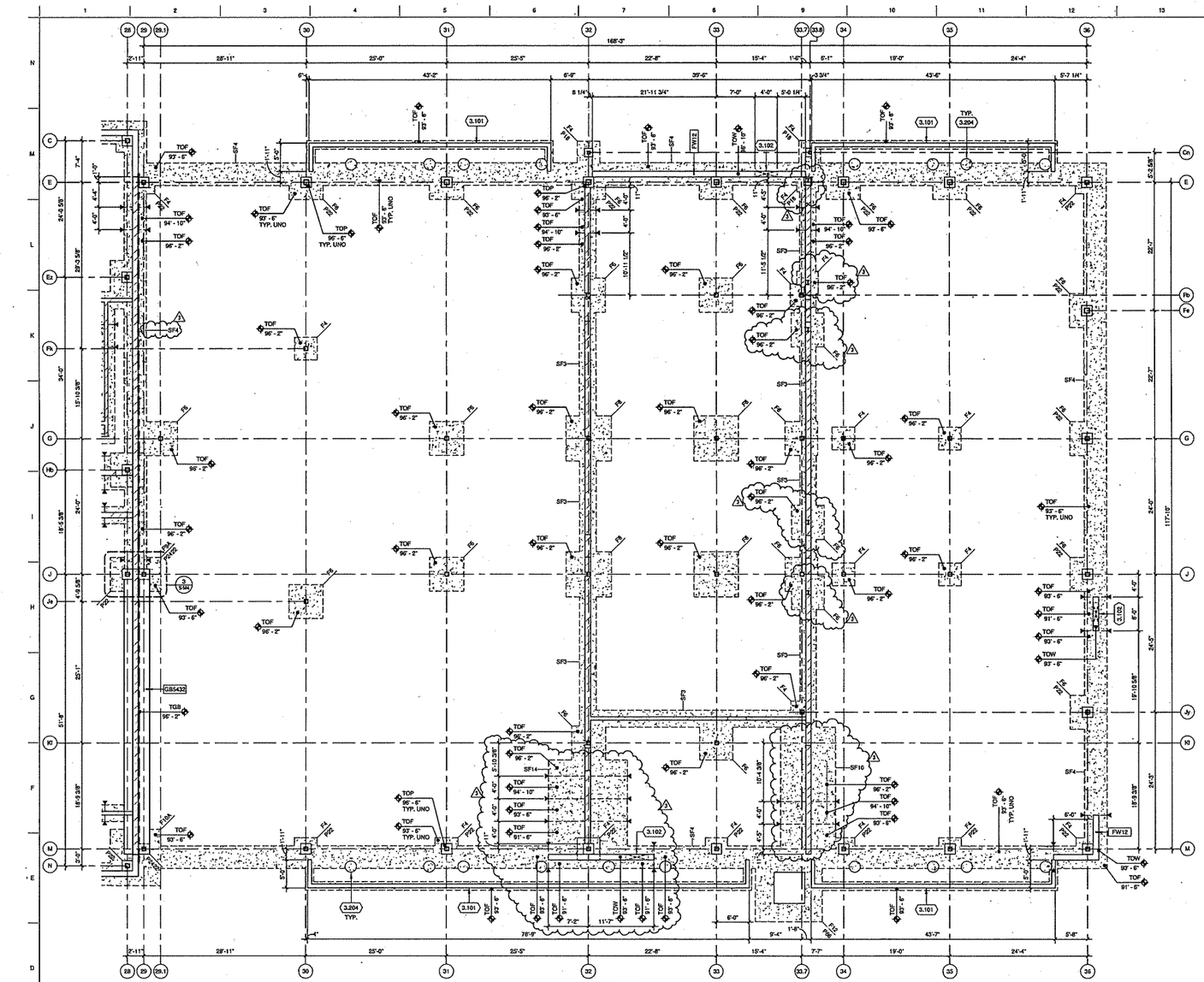
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FOUNDATION PLAN AREA C

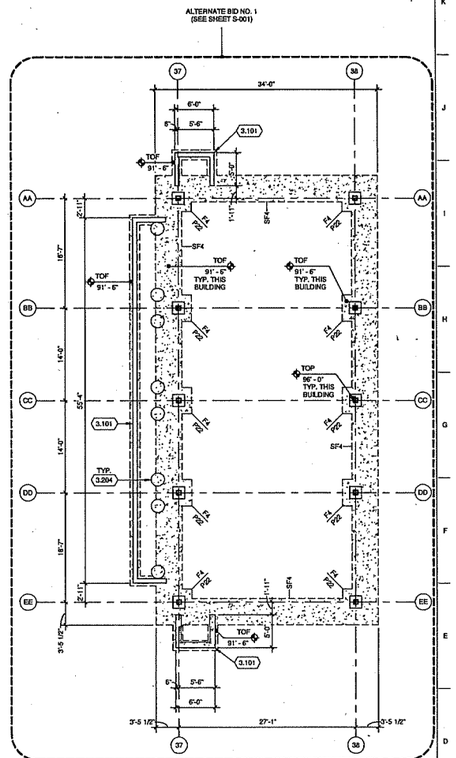
S-101C

Addendum 3


SEE AREA C PLAN FOR STOOP CONTINUATION
91'-6"
31'-6"
27'-0"
30'-1"
3'-0"
70'-7"
3.204 TYP.
3.101
TOW 98' - 8"
TOF 96' - 0"
TOP 99' - 0" TYP. UNO
FW08
FW12
TDC 97' - 4"
TOF 96' - 8"
TOF 97' - 4"
TOF 98' - 8"
TOW 98' - 8"
TOF 96' - 10"
TOF 95' - 6"
TOF 94' - 9"
TOF 92' - 8"
SF4
SF5
SF5A
TOF 98' - 8"
TOF 96' - 8"
TOF 97' - 4"
TOF 95' - 6"
TOF 93' - 6"
TOF 92' - 6"
TGB 96' - 2"
GB5432
TOF 95' - 0"
TOF 95' - 6"
TOF 95' - 0"
TOF 96' - 0"
TOF 97' - 4"
TOF 96' - 8"
TOF 98' - 8"
TOF 96' - 8"
TOF 97' - 4"
TOF 96' - 8"
TOF 96' - 8"
TOF 96' - 8



1 FOUNDATION PLAN AREA E
1/8" = 1'-0"



KEYED NOTES

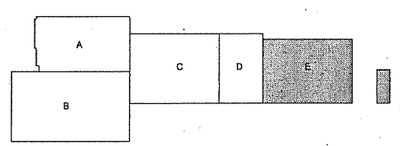
3.101 STOOP, SEE DETAIL 11/S-501

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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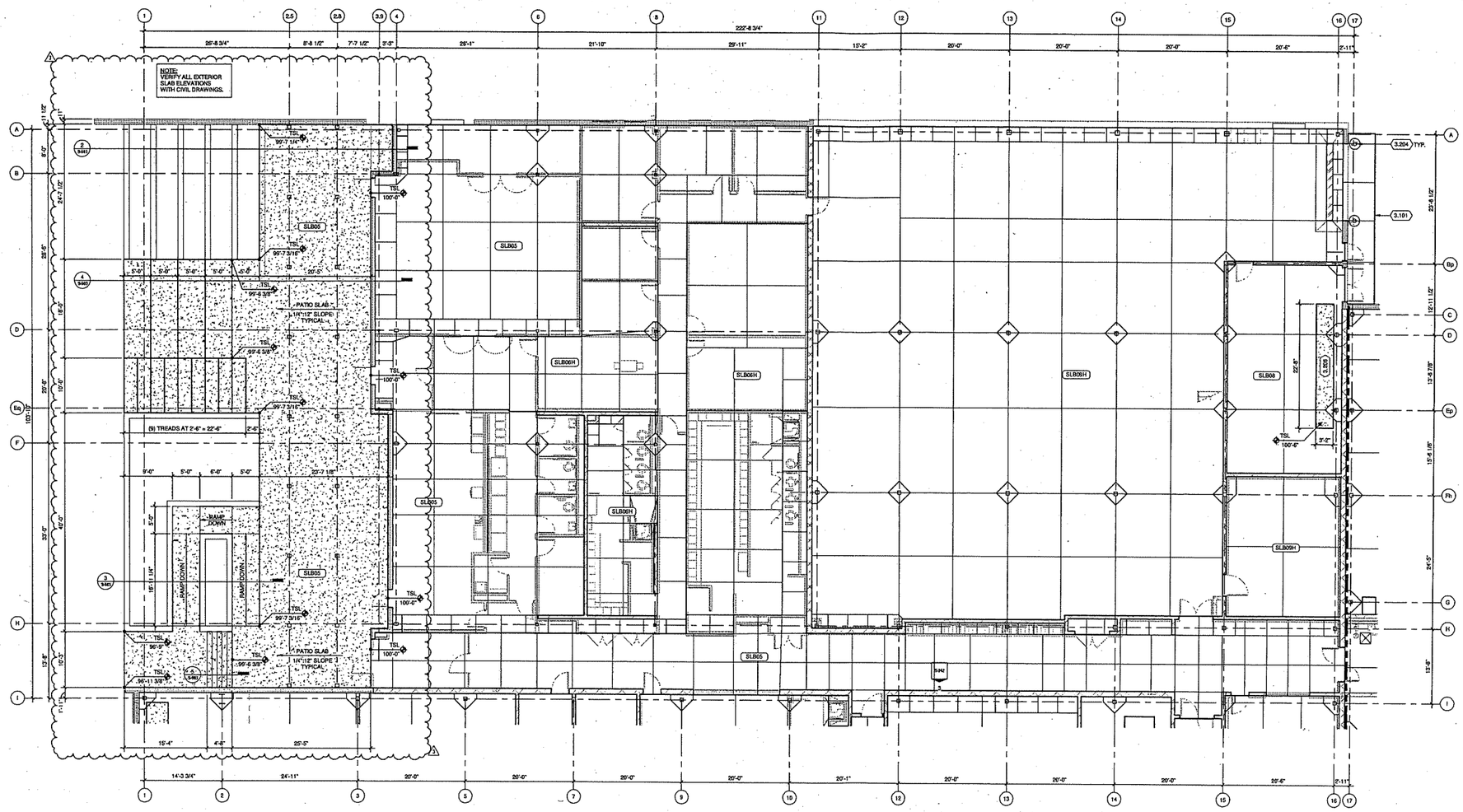
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FOUNDATION PLAN AREA E

S-101E

ADD 3



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

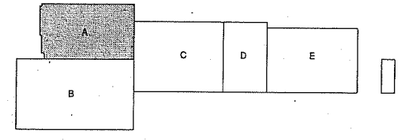
3.101 STOOP, SEE DETAIL 11/S-501

3.204 BOLLARD, SEE DETAIL 14/S-511

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-511 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO DETAIL 1/S-511 FOR STRUCTURAL SLAB TYPES.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES = = = = INDICATE (2) ADDITIONAL #4 BARS (5'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.
9. COORDINATE EXTENTS OF RADIANT FLOOR SLABS WITH MECHANICAL.
10. LINES SHOWN AT INTERIOR CONCRETE FLOOR SLABS-ON-GRADE INDICATE CONCEPT LEVEL CONYTROL/CONTRACTION/CONSTRUCTION JOINT LAYOUT. SEE JOINT DETAILS ON SHEET S-551.
11. CONTRACTOR SHALL SUBMIT A FINAL CONTROL/CONTRACTION/ CONSTRUCTION JOINT LAYOUT FOR APPROVAL PRIOR TO INSTALLATION OF CONCRETE SLABS.
12. THE FINAL CONTROL/CONTRACTION/CONSTRUCTION JOINT LAYOUT SHALL CONFORM TO THE FOLLOWING:
    - A. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 5-INCH SLAB SHALL BE LIMITED TO 15'-0".
    - B. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 6-INCH SLAB SHALL BE LIMITED TO 12'-0".
    - C. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 7-INCH SLAB SHALL BE LIMITED TO 14'-0".
    - D. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 8-INCH SLAB SHALL BE LIMITED TO 16'-0".
    - E. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 9-INCH SLAB SHALL BE LIMITED TO 18'-0".
    - F. PROVIDE JOINT SPACING AS NECESSARY TO MAINTAIN APPROXIMATELY SQUARE PANELS.
    - G. MAXIMUM CONTROL/CONTRACTION JOINT ASPECT RATIO SHALL BE LIMITED TO 1.5/1.0.
13. SEE SPECIFICATION SECTION 03 30 00 FOR ADDITIONAL INFORMATION REGARDING JOINTING FOR CONCRETE WORK.



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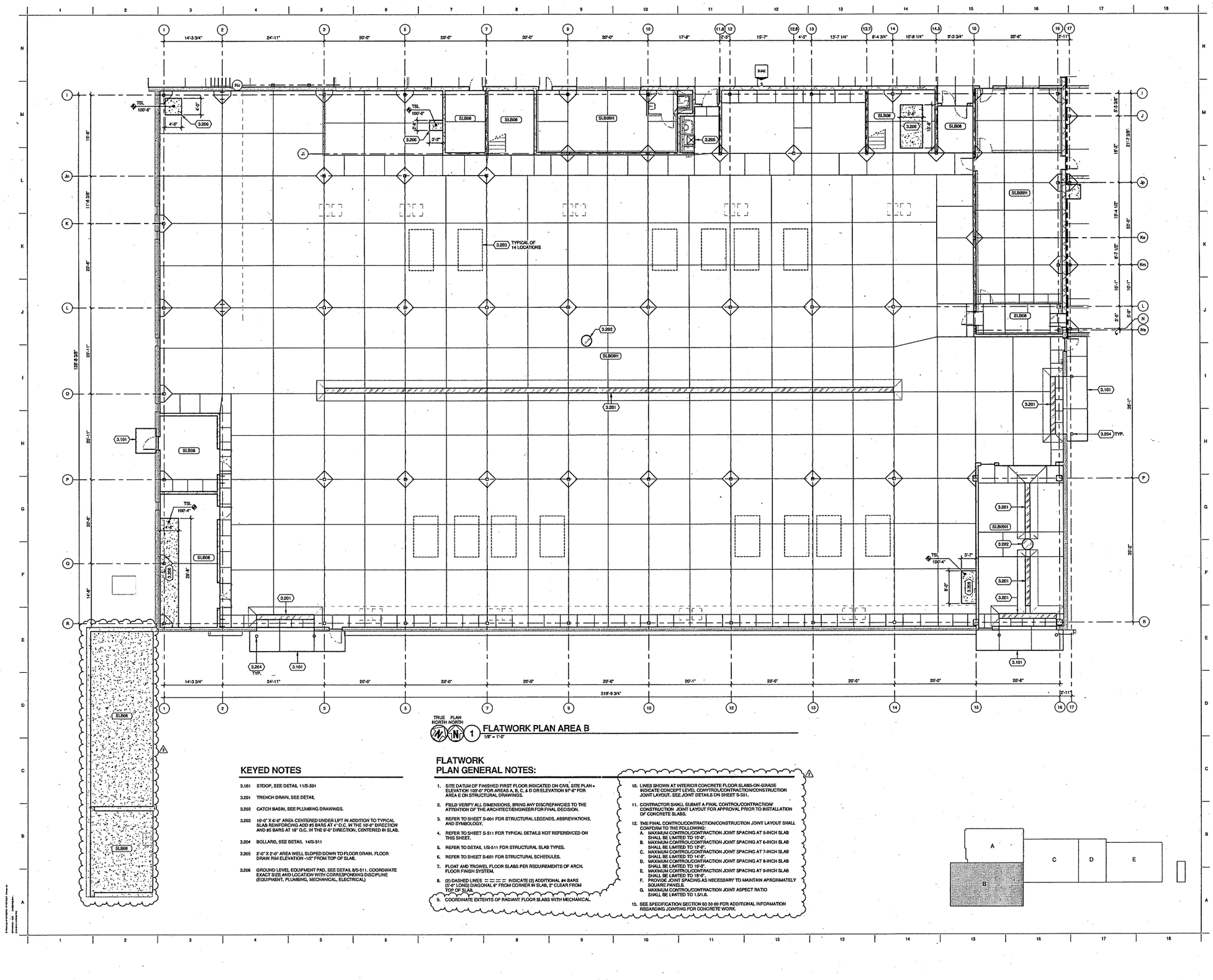
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PROJECT No. 1303500-160264.01

FLATWORK PLAN AREA A

S-111A

Add Item 3



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA B
1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

3.203 16'-0" X 6'-4" AREA CENTERED UNDER LIFT IN ADDITION TO TYPICAL SLAB REINFORCING ADD #5 BARS AT 4" O.C. IN THE 16'-0" DIRECTION AND #5 BARS AT 16" O.C. IN THE 6'-0" DIRECTION, CENTERED IN SLAB.

3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-0" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
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6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. FLOAT AND TROWEL FLOOR SLABS PER REQUIREMENTS OF ARCH. FLOOR FINISH SYSTEM.
8. (2) DASHED LINES = = = = INDICATE (2) ADDITIONAL #4 BARS (5'-0" LONG) DIAGONAL 6" FROM CORNER IN SLAB, 2" CLEAR FROM TOP OF SLAB.
9. COORDINATE EXTENTS OF RADIANT FLOOR SLABS WITH MECHANICAL.
10. LINES SHOWN AT INTERIOR CONCRETE FLOOR SLABS-ON-GRADE INDICATE CONCEPT LEVEL CONYTROL/CONTRACTION/CONSTRUCTION JOINT LAYOUT. SEE JOINT DETAILS ON SHEET S-551.
11. CONTRACTOR SHALL SUBMIT A FINAL CONTROL/CONTRACTION/ CONSTRUCTION JOINT LAYOUT FOR APPROVAL PRIOR TO INSTALLATION OF CONCRETE SLABS.
12. THE FINAL CONTROL/CONTRACTION/CONSTRUCTION JOINT LAYOUT SHALL CONFORM TO THE FOLLOWING:
    A. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 5-INCH SLAB SHALL BE LIMITED TO 15'-0".
    B. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 6-INCH SLAB SHALL BE LIMITED TO 12'-0".
    C. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 7-INCH SLAB SHALL BE LIMITED TO 14'-0".
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    E. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 9-INCH SLAB SHALL BE LIMITED TO 18'-0".
    F. PROVIDE JOINT SPACING AS NECESSARY TO MAINTAIN APROXIMATELY SQUARE PANELS.
    G. MAXIMUM CONTROL/CONTRACTION JOINT ASPECT RATIO SHALL BE LIMITED TO 1.5/1.0.
13. SEE SPECIFICATION SECTION 03 30 00 FOR ADDITIONAL INFORMATION REGARDING JOINTING FOR CONCRETE WORK.

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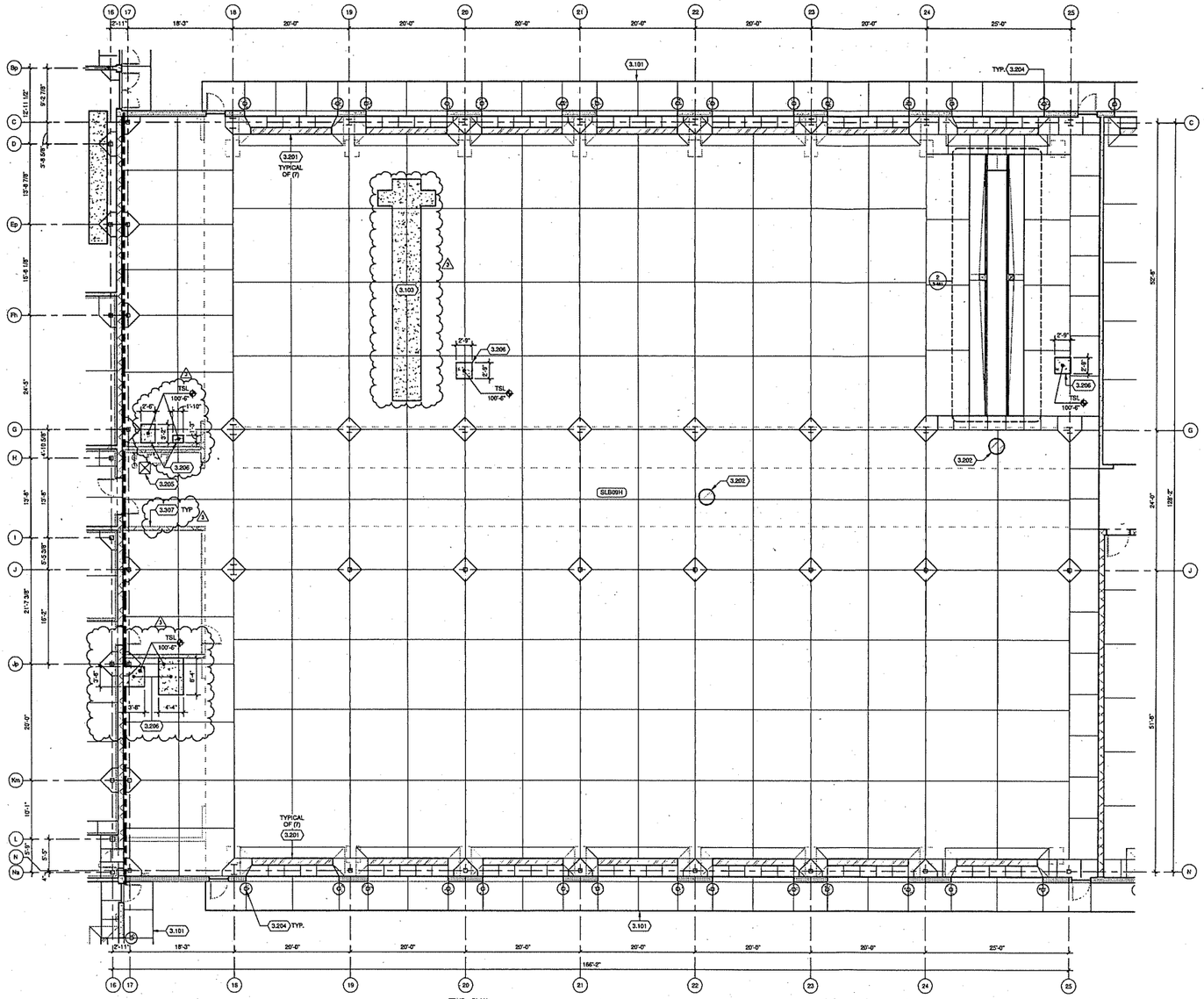
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FLATWORK PLAN AREA B

S-111B



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA C
1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.103 LIFT FOUNDATION DESIGN BY LIFT SUPPLIER'S PROFESSIONAL ENGINEER. SUBMIT PE STAMPED AND SIGNED FOUNDATION DESIGN.

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

3.204 BOLLARD, SEE DETAIL 14/S-511

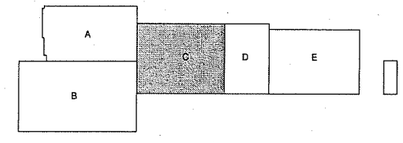
3.205 2'-0" X 2'-6" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD. SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

3.307 CONSTRUCTED MASONRY WALLS 8'-0" OR LESS IN HEIGHT ON TOP OF SLAB. REINFORCE WALL WITH #4 BARS AT 24" O.C. EXTEND REINFORCEMENT INTO SLAB 6" IN EPOXY.

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
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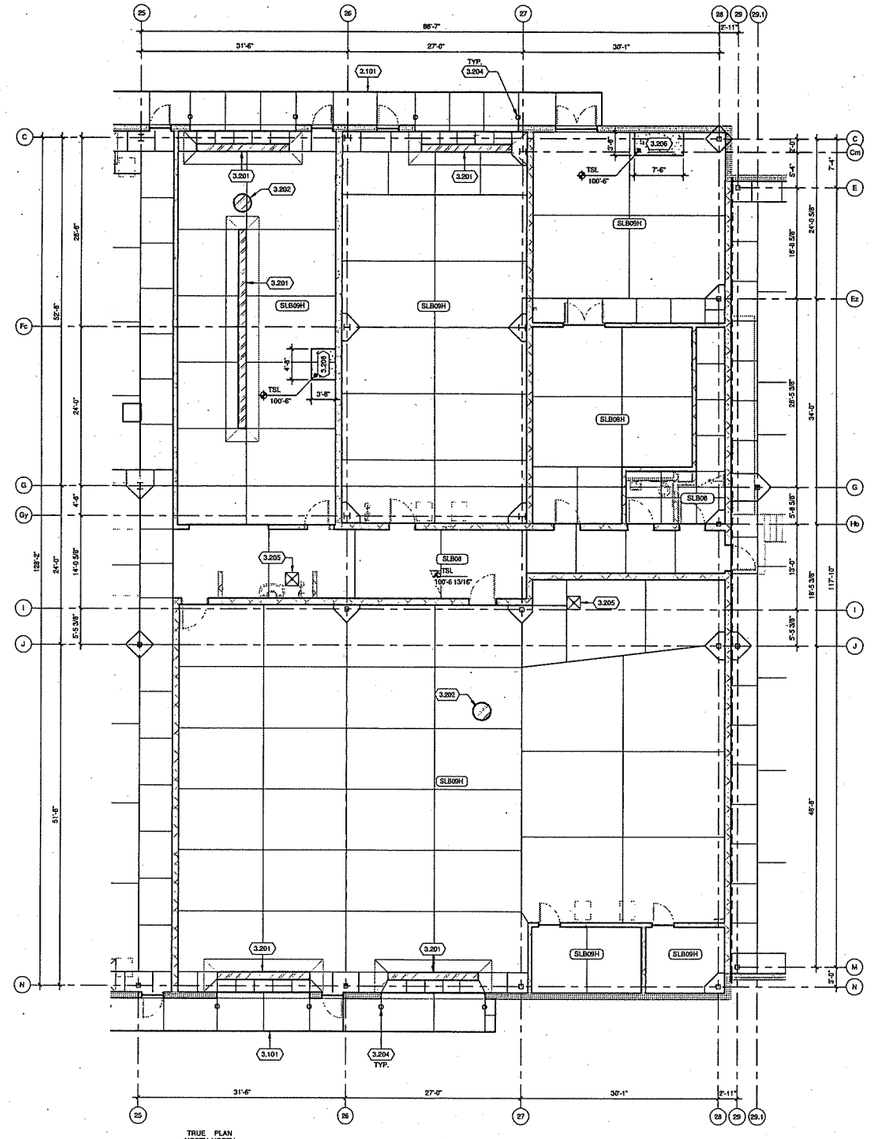
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PROJECT No: 1303500-160264.01

FLATWORK PLAN AREA C

S-111C



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA D

1/8" = 1'-0"

KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

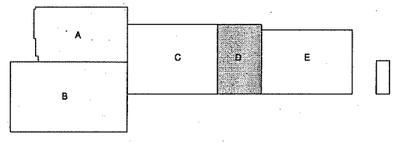
3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-6" X 2'-6" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.206 GROUND LEVEL EQUIPMENT PAD, SEE DETAIL 8/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE. (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

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2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
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    E. MAXIMUM CONTROL/CONTRACTION JOINT SPACING AT 9-INCH SLAB SHALL BE LIMITED TO 18'-0".
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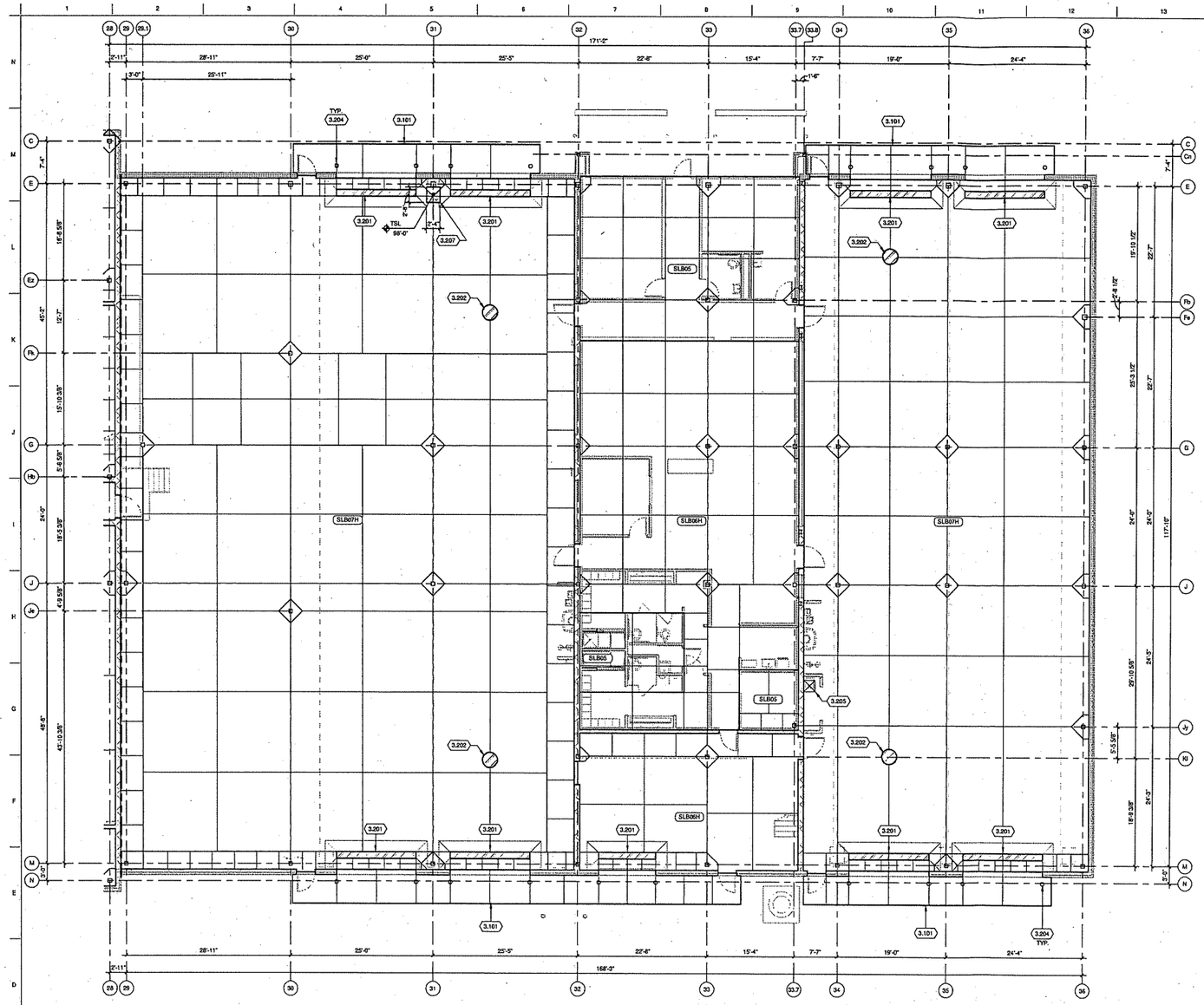
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FLATWORK PLAN AREA D

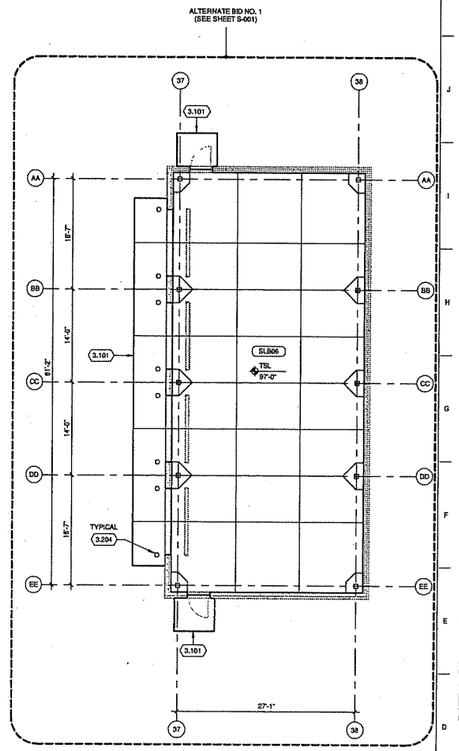
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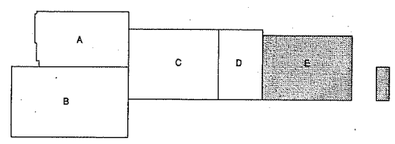
4 ADDUM 3



TRUE NORTH PLAN NORTH

1 FLATWORK PLAN AREA E
1/8" = 1'-0"





KEYED NOTES

3.101 STOOP, SEE DETAIL 11/S-501

3.201 TRENCH DRAIN, SEE DETAIL

3.202 CATCH BASIN, SEE PLUMBING DRAWINGS.

3.204 BOLLARD, SEE DETAIL 14/S-511

3.205 2'-0" X 2'-0" AREA WELL SLOPED DOWN TO FLOOR DRAIN. FLOOR DRAIN RIM ELEVATION -1/2" FROM TOP OF SLAB.

3.207 GROUND LEVEL EQUIPMENT PAD, SIMILAR TO DETAIL 8/S-511. ANCHOR PAD TO MAIN SLAB ON ONE SIDE OF CONTROL JOINT ONLY. INSTALL TWO LAYERS OF TAR PAPER BETWEEN MAIN SLAB AND PAD. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

FLATWORK PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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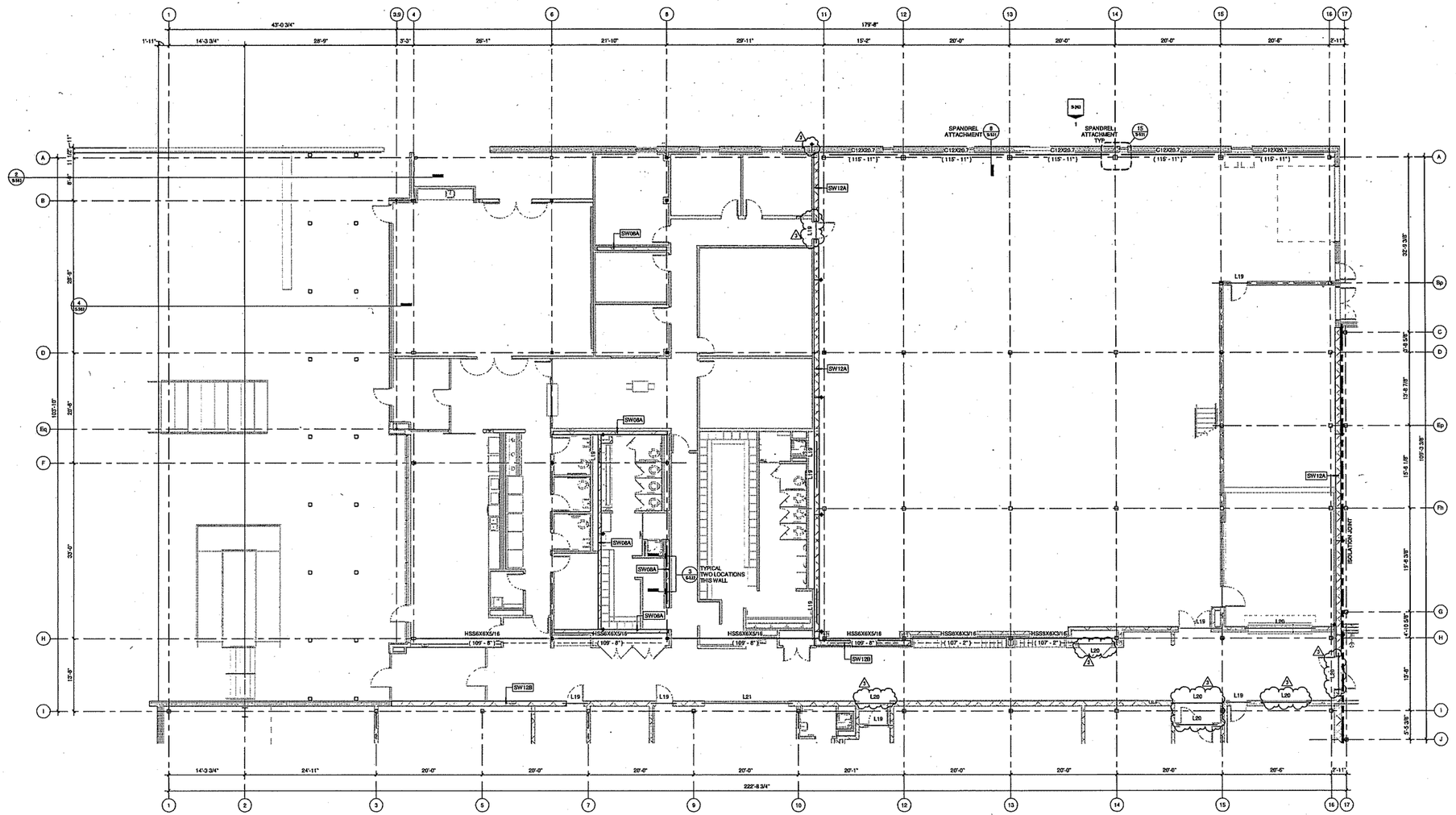
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FLATWORK PLAN AREA E

S-111E

ADDENDUM 3



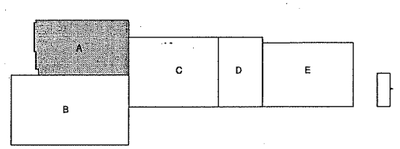
TRUE NORTH PLAN NORTH

1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA A
1/8" = 1'-0"

KEYED NOTES

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW08A UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.



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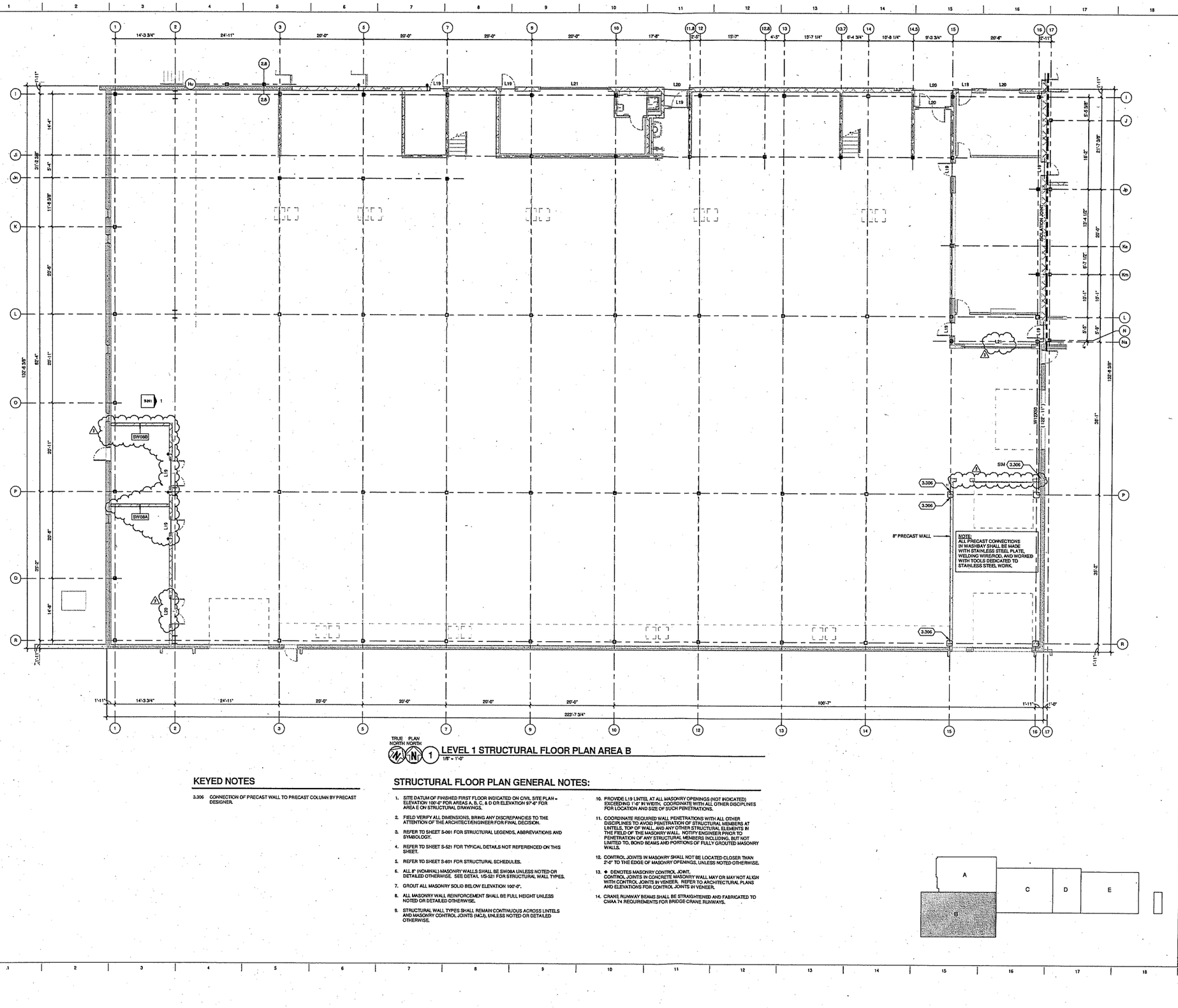
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3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
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	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-160284.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA A

S-131A



TRUE NORTH PLAN NORTH

1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

3.306 CONNECTION OF PRECAST WALL TO PRECAST COLUMN BY PRECAST DESIGNER.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

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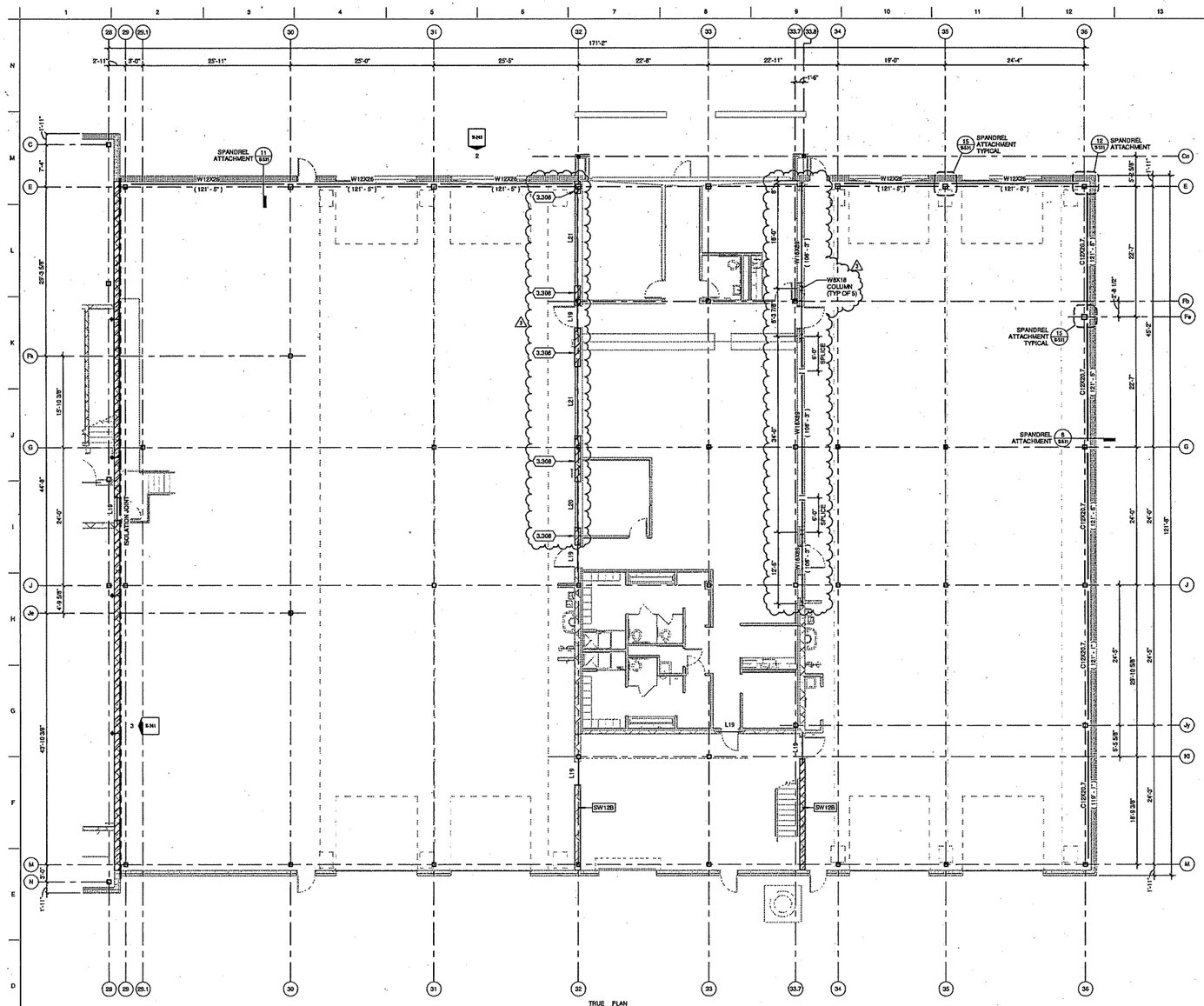
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PROJECT No: 1303500-160254.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA B

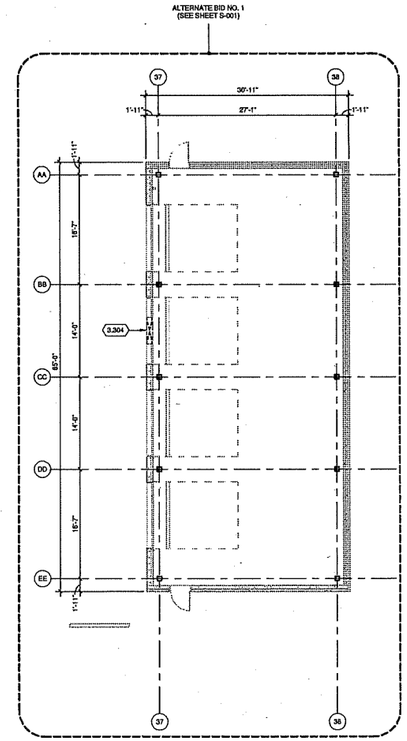
S-131B

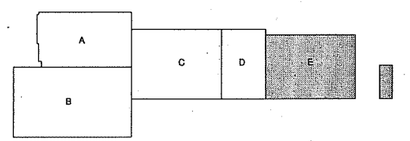
ADDENDUM 3



TRUE NORTH PLAN NORTH

1 LEVEL 1 STRUCTURAL FLOOR PLAN AREA E
1/8" = 1'-0"





KEYED NOTES

3.304 PRECAST SUPPLIER PROVIDE 1'-0" HIGH X 4'-0 WIDE OPENING IN PRECAST WALL PANEL BELOW FLOOR LEVEL FOR ELECTRICAL/TECHNOLOGY CONDUIT BANK. COORDINATE EXACT SIZE AND LOCATION WITH ELECTRICAL/TECHNOLOGY.

3.306 GROUT MASONRY SOLID. (1) #5 BAR AT 8" O.C. EACH FACE.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

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14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.

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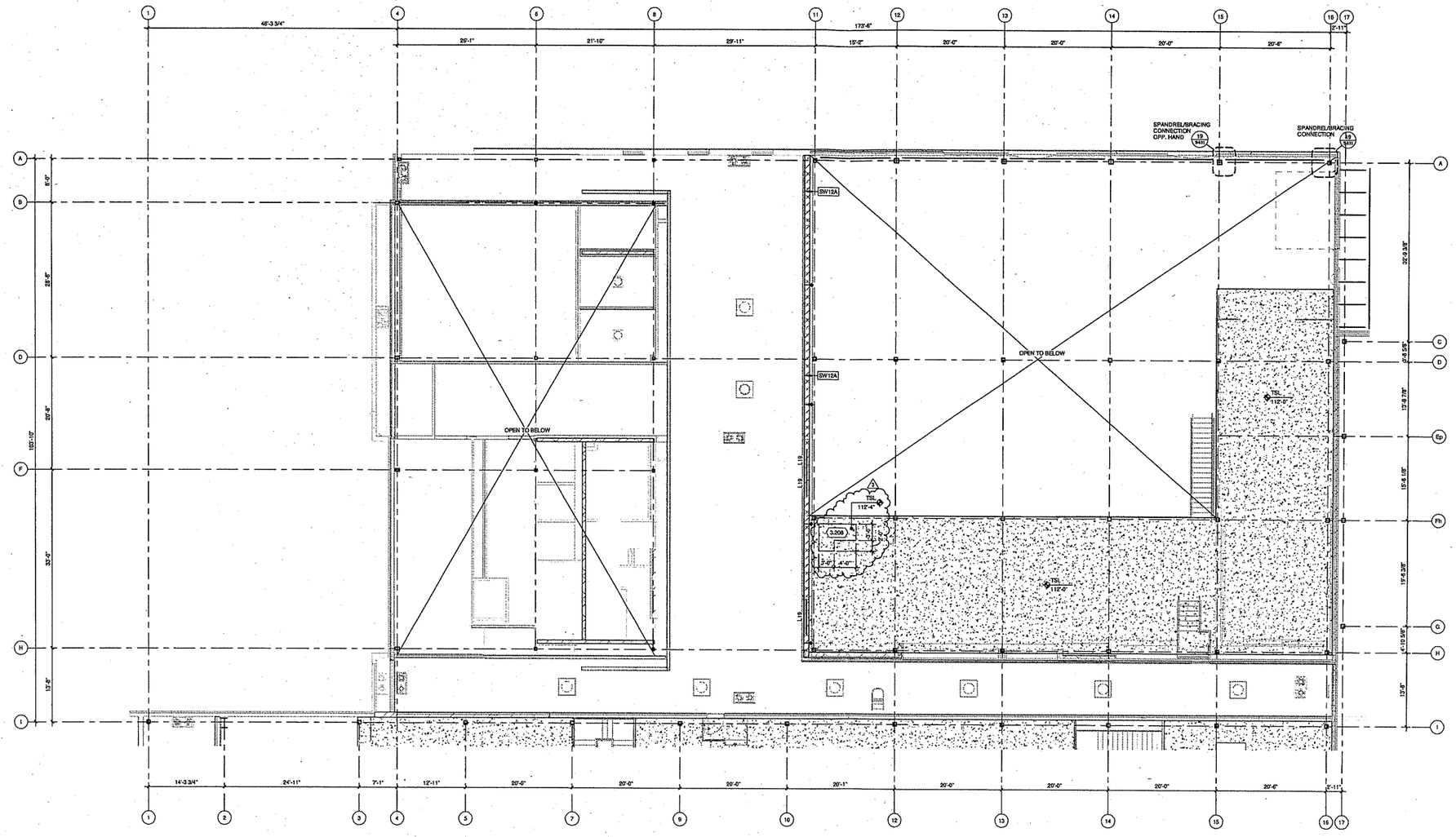
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PROJECT No: 1303500-160264.01

LEVEL 1 STRUCTURAL FLOOR PLAN AREA E

S-131E

A ADDM_3



TRUE NORTH PLAN NORTH

1 MEZZANINE STRUCTURAL FLOOR PLAN AREA A

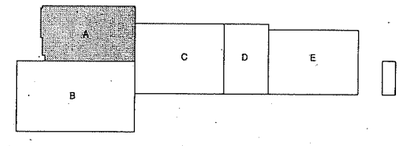
1/8" = 1'-0"

KEYED NOTES

3.209 MEZZANINE LEVEL EQUIPMENT PAD, SEE DETAIL 10/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

STRUCTURAL FLOOR PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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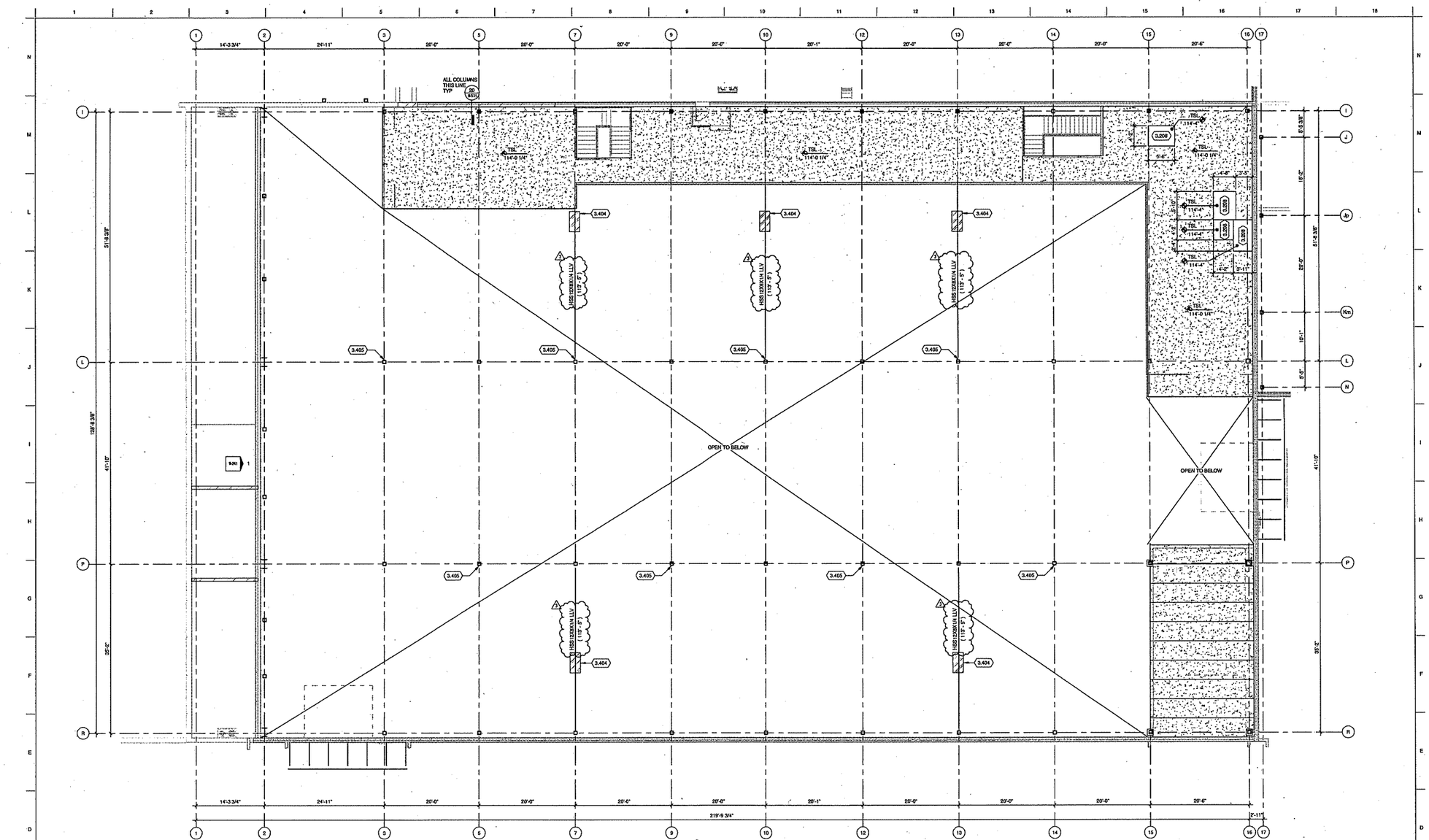
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PROJECT No: 130350-160264.01

MEZZANINE STRUCTURAL FLOOR PLAN AREA A

S-132A



TRUE NORTH PLAN NORTH

1 MEZZANINE STRUCTURAL FLOOR PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

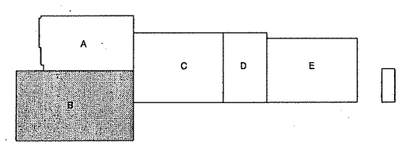
3.208 MEZZANINE LEVEL EQUIPMENT PAD, SEE DETAIL 19/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

3.404 PROVIDE 3/8" THICK PLATE WELDED TO HSS BEAM FOR SUPPORT OF LUBE REEL. COORDINATE SIZE OF PLATE AND HOLE PATTERN WITH EQUIPMENT SUPPLIED.

3.405 PROVIDE 3/8" THICK PLATE WELDED TO COLUMN FOR SUPPORT OF EXHAUST HOSE. COORDINATE SIZE OF PLATE AND HOLE PATTERN WITH EQUIPMENT SUPPLIED. (SEE DETAIL 2/O-501)

STRUCTURAL FLOOR PLAN GENERAL NOTES:

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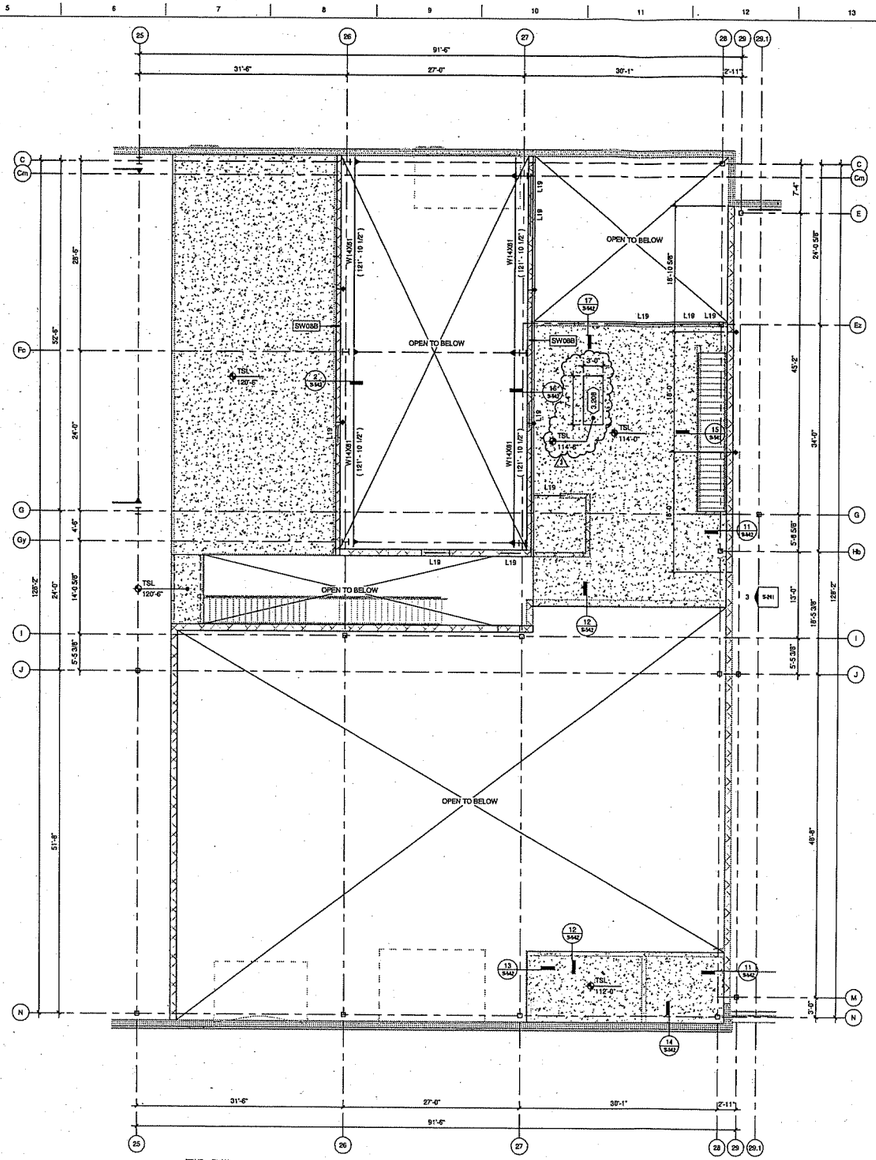
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MEZZANINE STRUCTURAL FLOOR PLAN AREA B

S-132B

Add Dum 3



TRUE NORTH PLAN NORTH

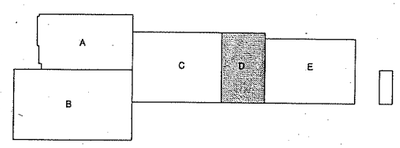
1 MEZZANINE STRUCTURAL FLOOR PLAN AREA D
1/8" = 1'-0"

KEYED NOTES

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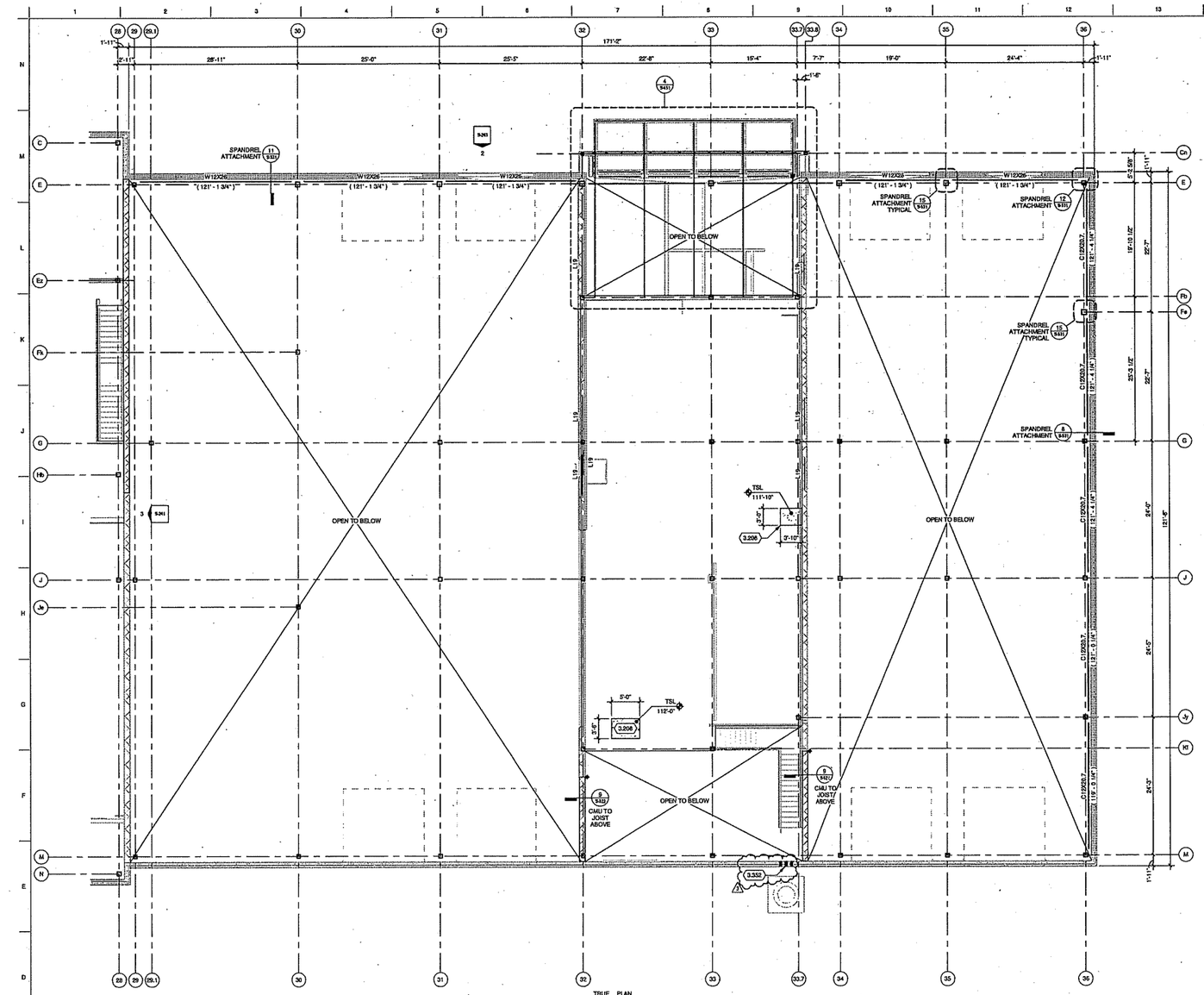
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ANY USE OR REUSE OF THESE DRAWINGS AND SPECIFICATIONS BY THE OWNER OR OTHERS ON EXTENSIONS OF THIS PROJECT OR ON ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF STANTEC SHALL BE AT THE OWNER'S OR OTHER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO STANTEC.

PROJECT No: 13035500-160264.01

MEZZANINE STRUCTURAL FLOOR PLAN AREA D

S-132D



KEYED NOTES

3.206 MEZZANINE LEVEL EQUIPMENT PAD. SEE DETAIL 10/S-511. COORDINATE EXACT SIZE AND LOCATION WITH CORRESPONDING DISCIPLINE (EQUIPMENT, PLUMBING, MECHANICAL, ELECTRICAL)

3.552 PROVIDE SLEEVES FOR (3) 4" CONDUIT THROUGH PRECAST WALL PANEL. COORDINATE ELEVATION AND EXACT LOCATION WITH TECHNOLOGY. THESE CONDUITS SERVE COMMUNICATIONS TOWER.

STRUCTURAL FLOOR PLAN GENERAL NOTES:

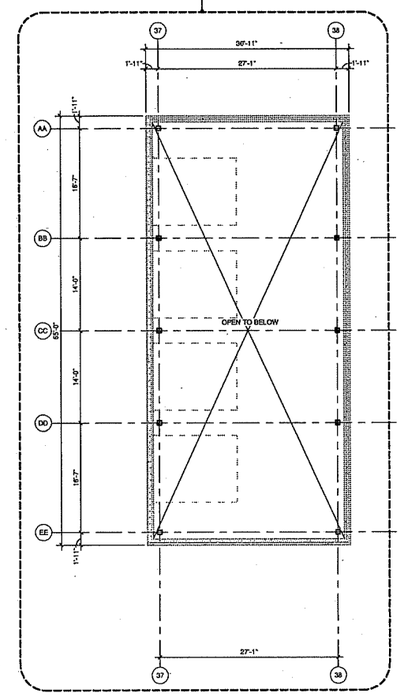
1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-4" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS AND SYMBOLOGY.
4. REFER TO SHEET S-521 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. ALL 8" (NOMINAL) MASONRY WALLS SHALL BE SW8IA UNLESS NOTED OR DETAILED OTHERWISE. SEE DETAIL 1/S-521 FOR STRUCTURAL WALL TYPES.
7. GROUT ALL MASONRY SOLID BELOW ELEVATION 100'-0".
8. ALL MASONRY WALL REINFORCEMENT SHALL BE FULL HEIGHT UNLESS NOTED OR DETAILED OTHERWISE.
9. STRUCTURAL WALL TYPES SHALL REMAIN CONTINUOUS ACROSS LINTELS AND MASONRY CONTROL JOINTS (MCJ), UNLESS NOTED OR DETAILED OTHERWISE.
10. PROVIDE L19 LINTEL AT ALL MASONRY OPENINGS (NOT INDICATED) EXCEEDING 1'-0" IN WIDTH. COORDINATE WITH ALL OTHER DISCIPLINES FOR LOCATION AND SIZE OF SUCH PENETRATIONS.
11. COORDINATE REQUIRED WALL PENETRATIONS WITH ALL OTHER DISCIPLINES TO AVOID PENETRATION OF STRUCTURAL MEMBERS AT LINTELS, TOP OF WALL, AND ANY OTHER STRUCTURAL ELEMENTS IN THE FIELD OF THE MASONRY WALL. NOTIFY ENGINEER PRIOR TO PENETRATION OF ANY STRUCTURAL MEMBERS INCLUDING, BUT NOT LIMITED TO, BOND BEAMS AND PORTIONS OF FULLY GROUTED MASONRY WALLS.
12. CONTROL JOINTS IN MASONRY SHALL NOT BE LOCATED CLOSER THAN 2'-0" TO THE EDGE OF MASONRY OPENINGS, UNLESS NOTED OTHERWISE.
13. ◆ DENOTES MASONRY CONTROL JOINT. CONTROL JOINTS IN CONCRETE MASONRY WALL MAY OR MAY NOT ALIGN WITH CONTROL JOINTS IN VENEER. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR CONTROL JOINTS IN VENEER.
14. CRANE RUNWAY BEAMS SHALL BE STRAIGHTENED AND FABRICATED TO CMAA 74 REQUIREMENTS FOR BRIDGE CRANE RUNWAYS.

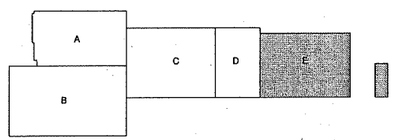
TRUE NORTH / PLAN NORTH

1 MEZZANINE STRUCURAL FLOOR PLAN AREA E

1/8" = 1'-0"

ALTERNATE BID NO. 1
(SEE SHEET S-001)





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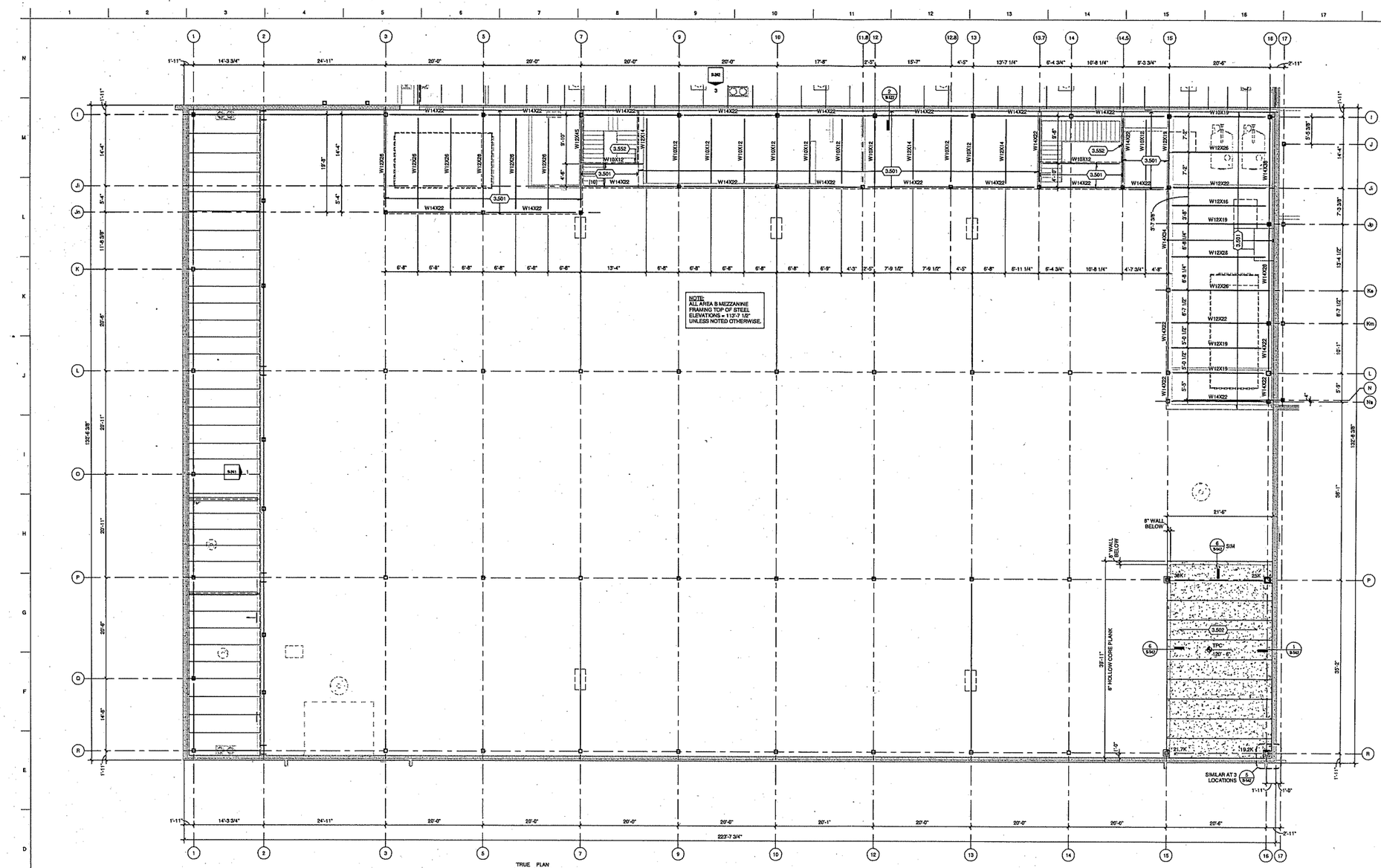
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PROJECT No: 1303500-160264.01

MEZZANINE STRUCTURAL FLOOR PLAN AREA E

S-132E

ADDENDUM 3



TRUE NORTH PLAN NORTH

1 MEZZANINE FRAMING PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

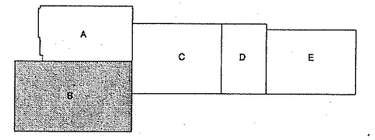
3.501 MEZZANINE DECK WILL BE CONSTRUCTED WITH CONCRETE ON COMPOSITE, 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK FOR A 4 1/2" TOTAL THICKNESS.

3.502 8" OR 8" HOLLOW CORE PLANK WITH GROUTED KEYWAYS AND NO TOPPING. PRECAST DIAPHRAGM SHEAR: V = 2K. PRECAST SUPPLIER TO DESIGN AND SUPPLY SUPPORT FOR HOLLOW CORE PLANK ON PRECAST WALL PANEL.

3.552 POST SIGN ON GUARDRAIL: "MEZZANINE LIVE LOAD = 250 PSF"

FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
7. ALL MEZZANINE BEAMS REQUIRE 3/4" DIAMETER X 3 1/2" LONG SHEAR STUDS SPACED AT 12" O.C. ALONG LENGTH.



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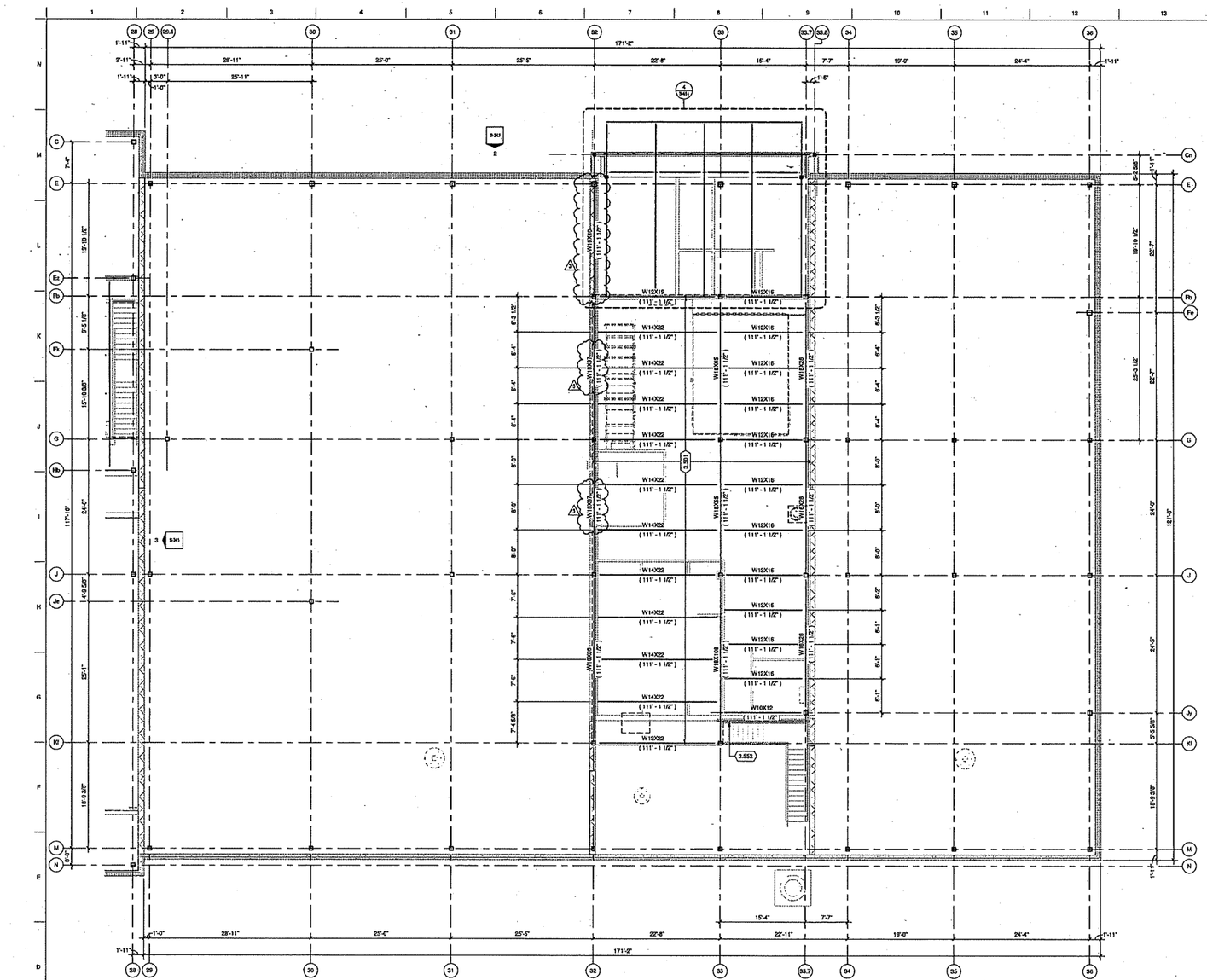
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PROJECT No: 1303500-160264.01

MEZZANINE FRAMING PLAN AREA B

S-142B

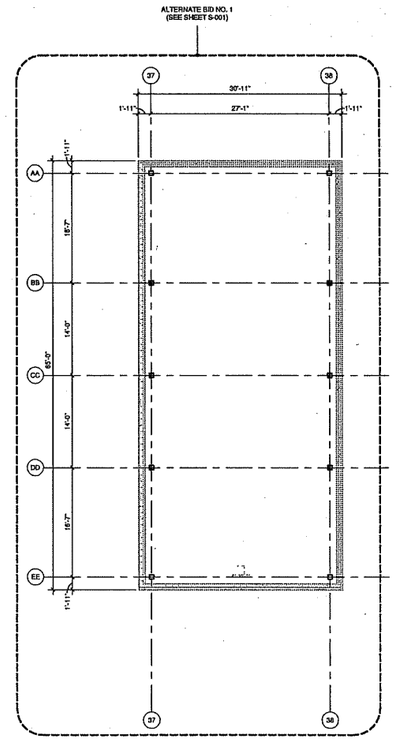
ADDENDUM 3



TRUE NORTH | PLAN NORTH

1 MEZZANINE FRAMING PLAN AREA E

1/8" = 1'-0"



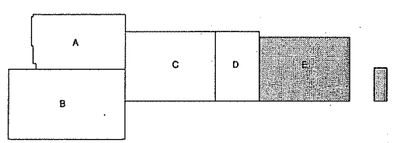
KEYED NOTES

3.501 MEZZANINE DECK WILL BE CONSTRUCTED WITH CONCRETE ON COMPOSITE, 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK FOR A 4 1/2" TOTAL THICKNESS.

3.552 POST SIGN ON GUARDRAIL: "MEZZANINE LIVE LOAD = 200 PSF"

FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
7. ALL MEZZANINE BEAMS REQUIRE 3/4" DIAMETER X 3 1/2" LONG SHEAR STUDS SPACED AT 12" O.C. ALONG LENGTH.



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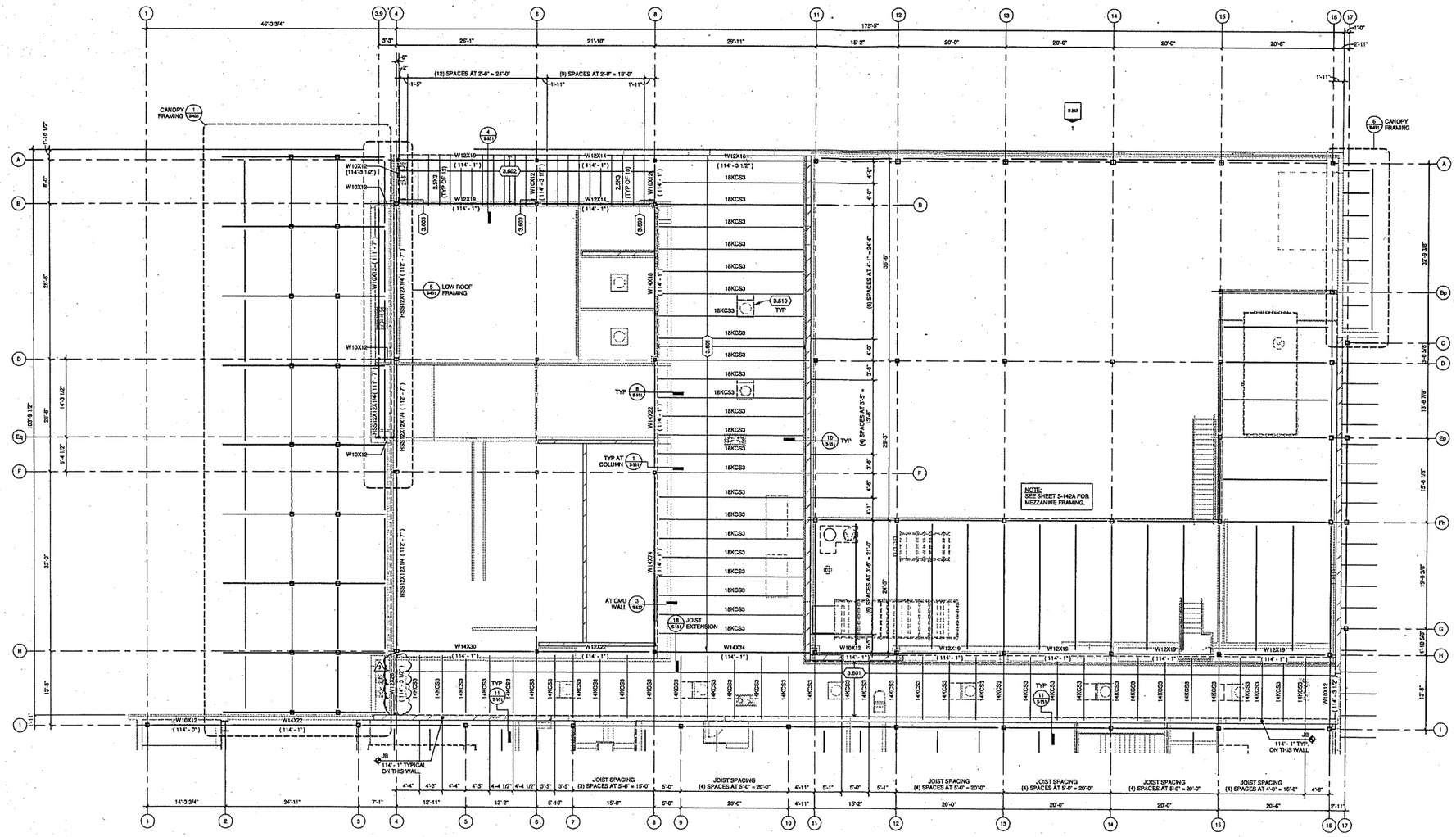
PROJECT No: 13035500-160264.01

MEZZANINE FRAMING PLAN AREA E

S-142E

ADDENDUM 3

ADDENDUM 3



LOW ROOF FRAMING PLAN AREA A

1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (3(4)-3)

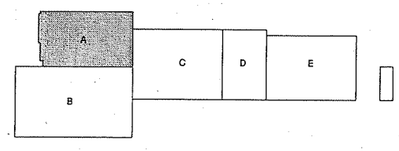
3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (3(7)-3)

3.603 FULLY PRETENSION CONNECTION BOLTS.

3.610 TYPICAL FRAMING FOR ROOF OPENING, SEE DETAIL 15/S-551.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS. BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE.
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5KCS JOISTS AT 5'-0" O.C. SPACING MAXIMUM. MINIMUM S_x=1.2IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S_x=1.673IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541.



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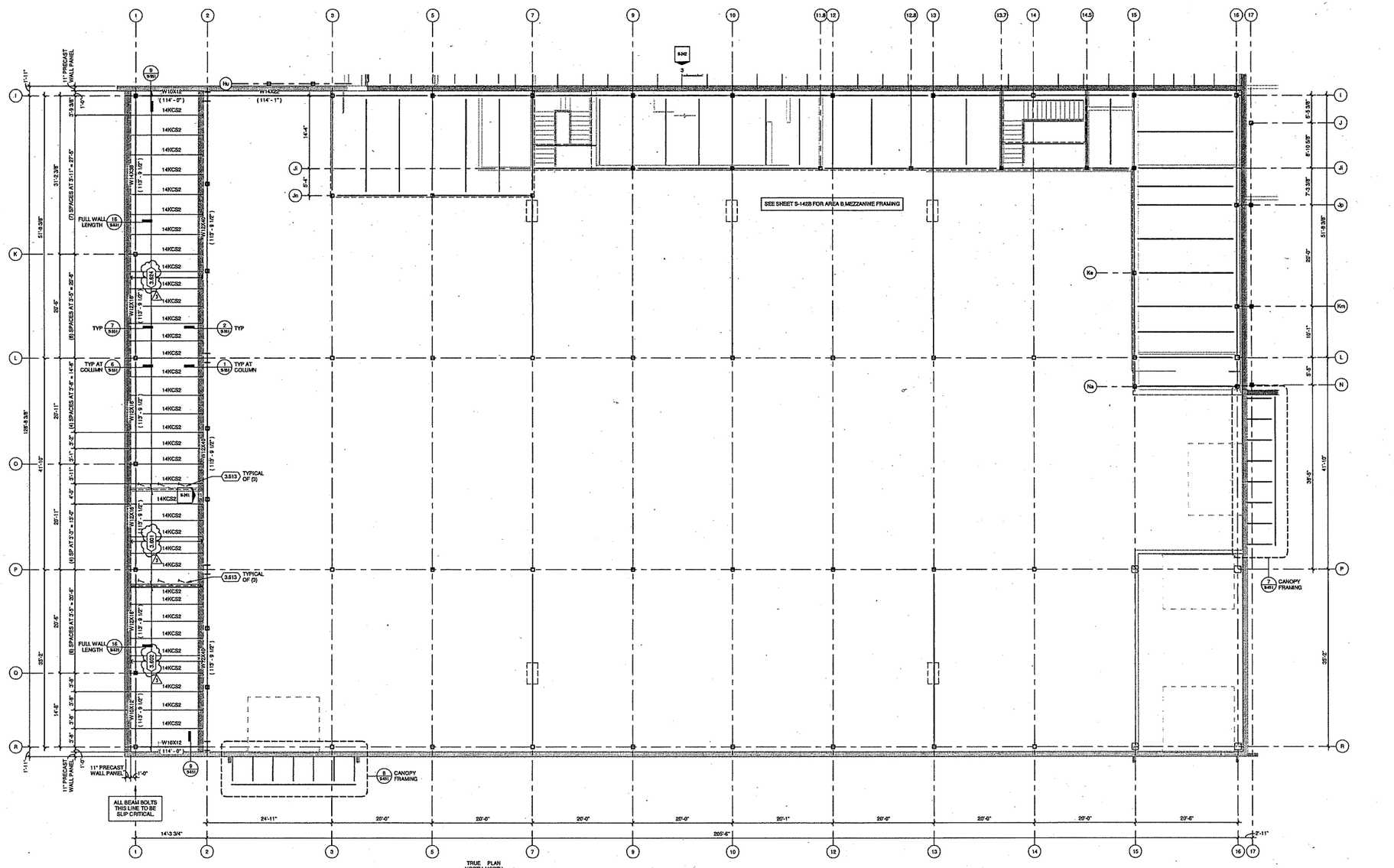
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3	ADDENDUM 3	03/14/2019
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PROJECT No: 1903300-150264.01

LOW ROOF FRAMING PLAN AREA A

S-151A



TRUE NORTH PLAN NORTH

1 LOW ROOF FRAMING PLAN AREA B

1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (36/4-3)

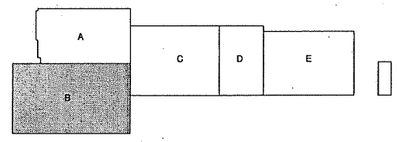
3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (36/7-3)

3.613 SEE DETAIL 8/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

3.624 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH 5/8" PUDDLE WELDS AT 6" ON CENTER AND SIX WELDS PER SPAN IN SIDELAPS, (36/7P-6W).

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
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3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-001 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5KCS2 JNO AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.29N3, MINIMUM I= 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.673IN3, MINIMUM I = 2.691IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541.



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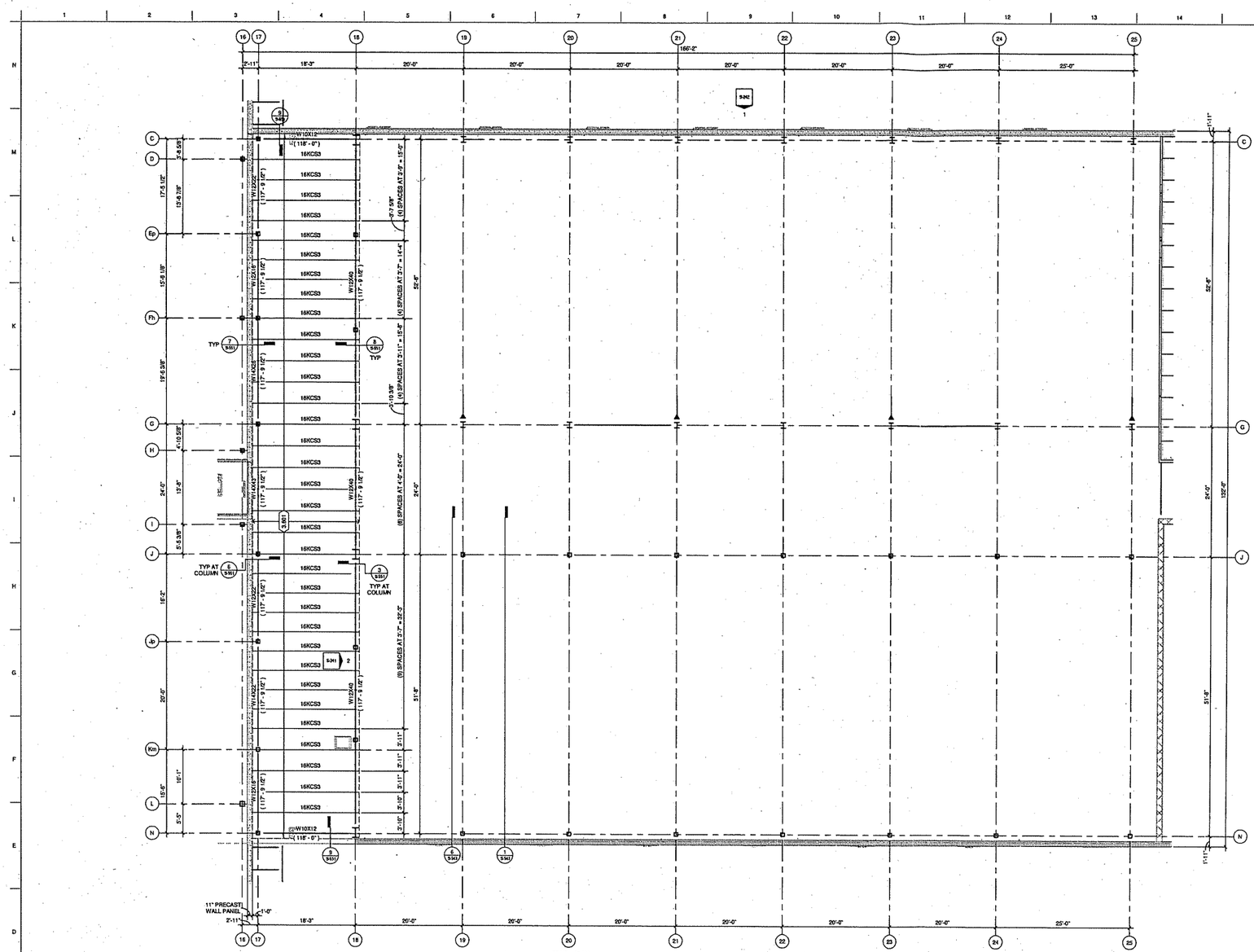
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PROJECT No: 1303500-160254.01

LOW ROOF FRAMING PLAN AREA B

S-151B

ADDENDUM 3



TRUE NORTH PLAN NORTH

1 LOW ROOF FRAMING PLAN AREA C

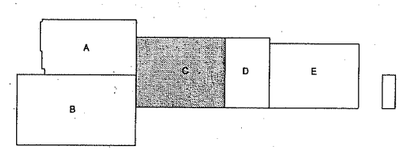
1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (3/4/4-3)

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-004 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-661 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4".
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED. (A)
9. OUTRIGGERS ARE 2.5KCS JOINT AT 6'-0" O.C. SPACING MAXIMUM, MINIMUM S=1.2IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9, MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541. (A)



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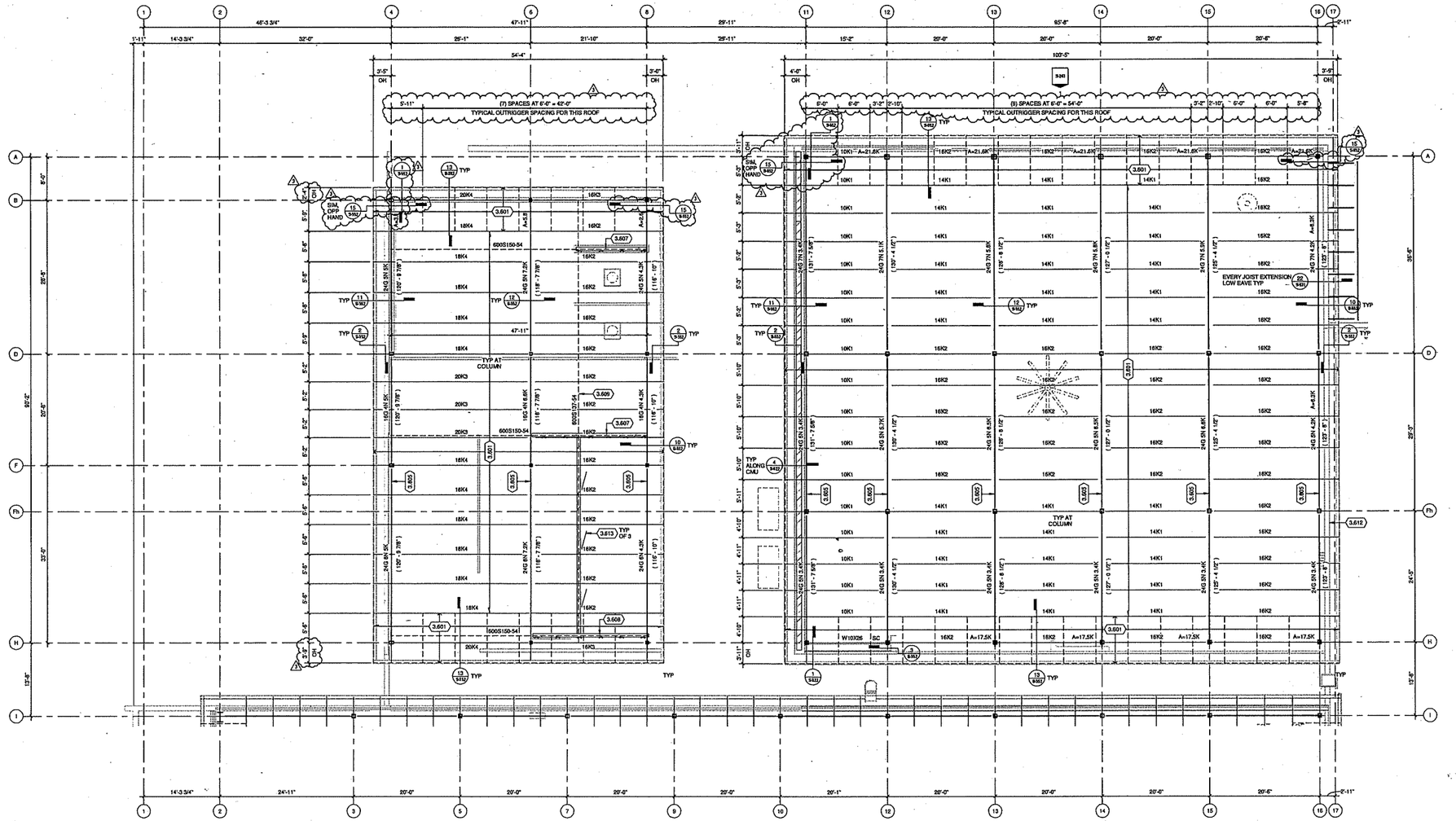
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PROJECT No: 1393500-160264.01

LOW ROOF FRAMING PLAN AREA C

S-151C

ADDENDUM 3



TRUE NORTH PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA A
1/8" = 1'-0"

KEYED NOTES

3.601 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 12" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (3X4=3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.607 600S150-54 STRUT WITH (10) #12 SCREWS PER SPLICE. FASTEN STRUTS TO ROOF DECK WITH #12 SCREWS AT 12" O.C. SEE DETAIL 6/S-522 FOR ATTACHMENT TO MASONRY WALL BELOW.

3.608 600S150-54 STRUT WITH TOES TURNED UP INTO DECK FLUTES. SPLICE STRUTS WITH 600T150-54 SPLINT SPLICE AND (10) #12 SCREWS INTO EACH 600S. FASTEN STRUTS TO ROOF DECK WITH #12 SCREWS AT 12" O.C. SEE DETAIL 6/S-522 FOR SIMILAR ATTACHMENT TO MASONRY WALL BELOW.

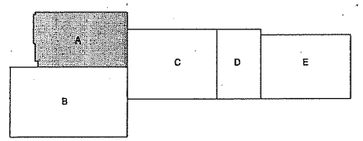
3.609 600S137-118 STRUT ON TOP OF JOISTS, BELOW ROOF DECK, NESTED INTO ROOF DECK FLUTES. FASTEN STRUT TO ROOF DECK WITH #10 SCREWS AT 12" O.C.

3.612 CMU WALL ATTACHMENT TO DECK SIMILAR TO DETAIL 4/S-522. BENT PLATES (14) TO BE PLACED ALONG THE LENGTH OF THE CMU WALL BETWEEN JOIST.

3.613 SEE DETAIL 8/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-5" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-90x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 8"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"; "KCS" SERIES - MIN. 2 1/2"; "LH" SERIES - MIN. 4"; "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K (UNO) AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.2IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-550 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541.



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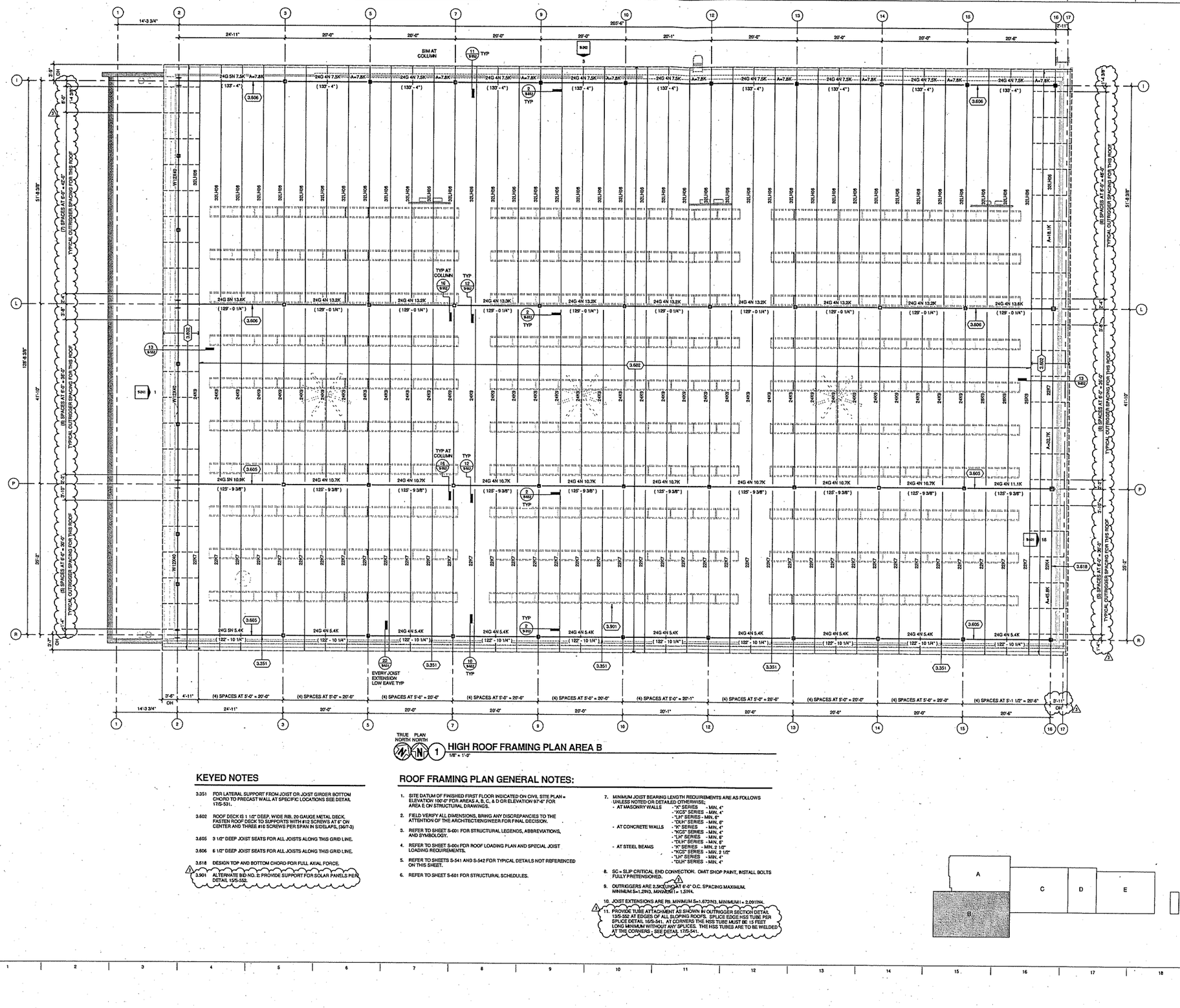
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PROJECT No: 1303500-160264.01

HIGH ROOF FRAMING PLAN AREA A

S-152A

1 DESIGN 3



TRUE NORTH PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA B
1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS, (36/7-3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.618 DESIGN TOP AND BOTTOM CHORD FOR FULL AXIAL FORCE.

3.901 ALTERNATE BID NO. 2: PROVIDE SUPPORT FOR SOLAR PANELS PER DETAIL 15/S-552.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-001 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS - "K" SERIES - MIN. 4"; "KCS" SERIES - MIN. 4"; "LH" SERIES - MIN. 6"; "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS - "K" SERIES - MIN. 2 1/2"; "KCS" SERIES - MIN. 2 1/2"; "LH" SERIES - MIN. 4"; "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K/LIN/AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S_x=1.2IN3, MINIMUM I = 1.3IN4.
10. JOIST EXTENSIONS ARE Rb. MINIMUM S_x=1.672IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541.

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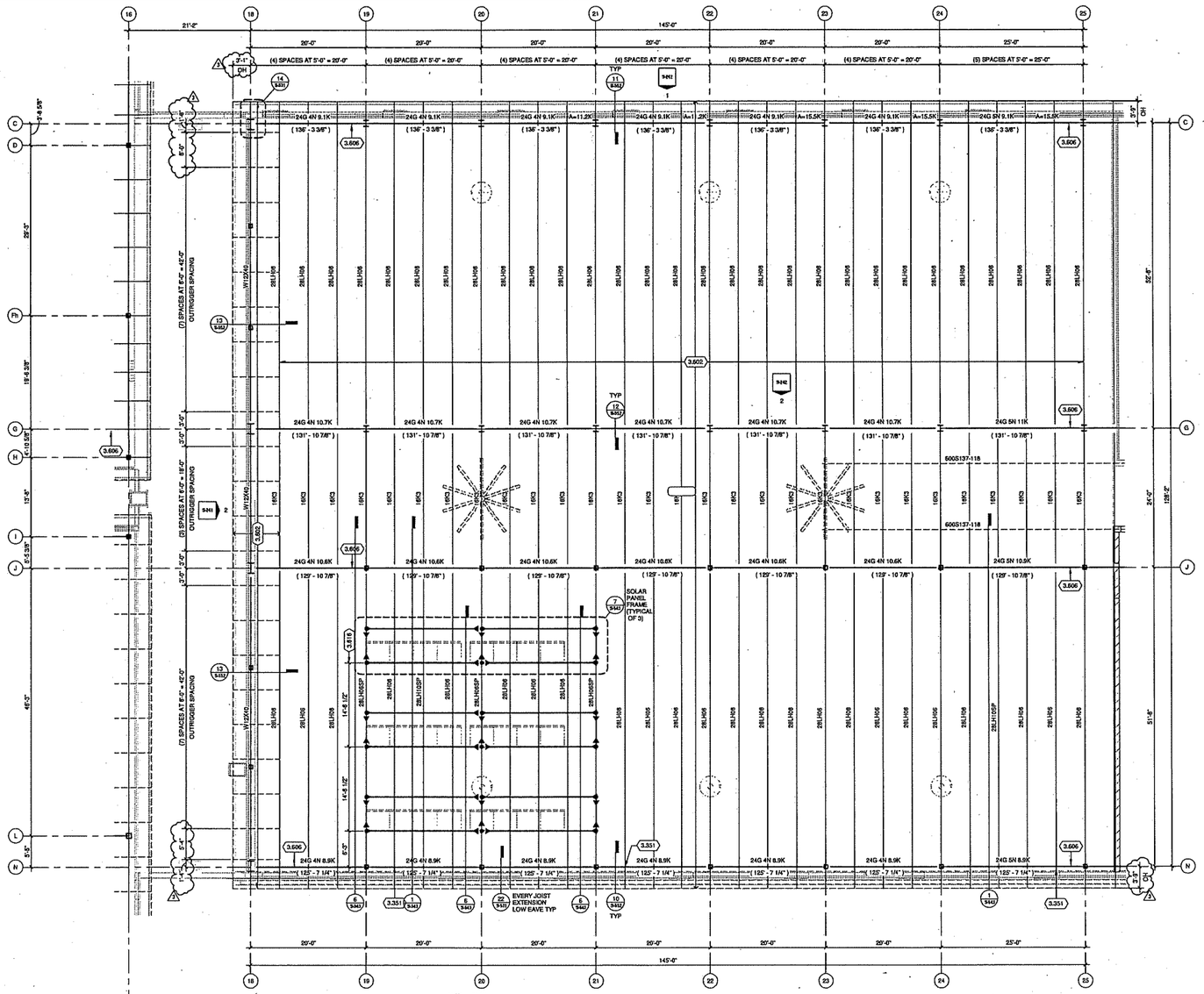
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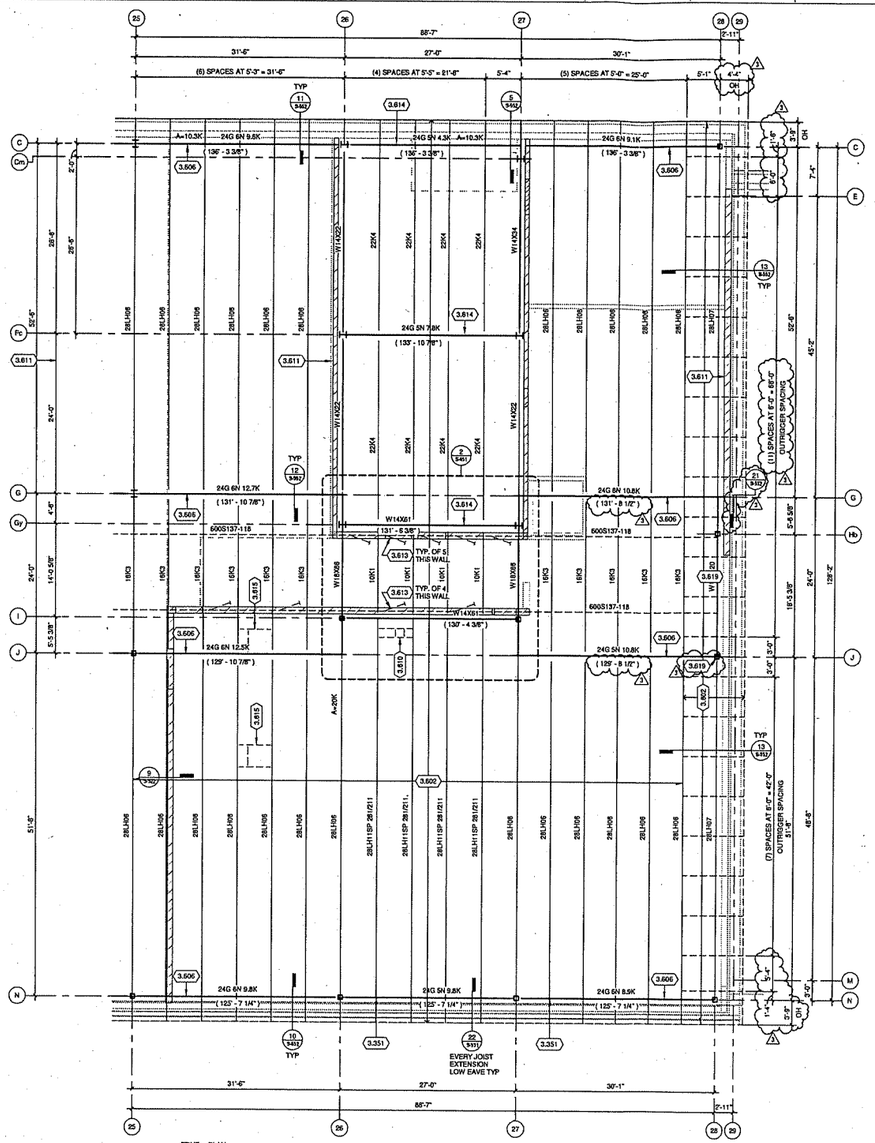
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HIGH ROOF FRAMING PLAN AREA B

S-152B

ADDENDUM 3


16
18
19
20
21
22
23
24
25
21'-6"
145'-0"
20'-0"
20'-0"
20'-0"
20'-0"
20'-0"
20'-0"
25'-0"
(4) SPACES AT 5'-0" = 20'-0"
(4) SPACES AT 5'-0" = 20'-0"
(4) SPACES AT 5'-0" = 20'-0"
(4) SPACES AT 5'-0" = 20'-0"
(4) SPACES AT 5'-0" = 20'-0"
(4) SPACES AT 5'-0" = 20'-0"
(5) SPACES AT 5'-0" = 25'-0"
TYP
11 S442
S-N1
14 S501
DN
5'-0"
C
D
Ph
G
H
I
J
L
N
29'-3"
15'-6 3/8"
13'-5"
6'-5 3/8"
46'-3"
5'-6"
5'-9 5/8"
5'-0"
5'-4"
2'-6"
12'-0"
5'-0"
5'-0"
5



HIGH ROOF FRAMING PLAN AREA D

1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.502 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (3X7-3)

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.610 TYPICAL FRAMING FOR ROOF OPENING, SEE DETAIL 15/S-551.

3.611 CMU WALL ATTACHMENT TO BEAM OR JOIST, SEE DETAIL 5/S-522. BENT PLATE CONTINUOUS ALONG THE LENGTH OF CMU WALL.

3.613 SEE DETAIL 8/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

3.614 PROVIDE BENT PLATE DECK SUPPORT FULL LENGTH OF THIS BEAM/JOIST GIRDER, SIMILAR TO DETAIL 17/S-552 EXCEPT ATTACH WITH #10 SCREWS AT 6" O.C.

3.615 AT PAINT BOOTH EXHAUST AND MIXING ROOM EXHAUST PROVIDE TYPICAL FRAMED ROOF OPENING (SEE DETAIL 15/S-551) PLUS (4) 3/16x8x12x4 BENT PLATES TO CREATE A FLAT, LEVEL SURFACE TO SUPPORT DUCT FLANGE. FIELD WELD BENT PLATES TO FRAMED OPENING. FIELD WELD FLANGE TO BENT PLATES.

3.619 SIDE FRAME JOIST, JOIST GIRDER AND BEAM INTO THIS COLUMN.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5K(LNG) AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.2IN3, MINIMUM I = 1.2IN4.
10. JOIST EXTENSIONS ARE R9. MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541, AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS - SEE DETAIL 17/S-541.

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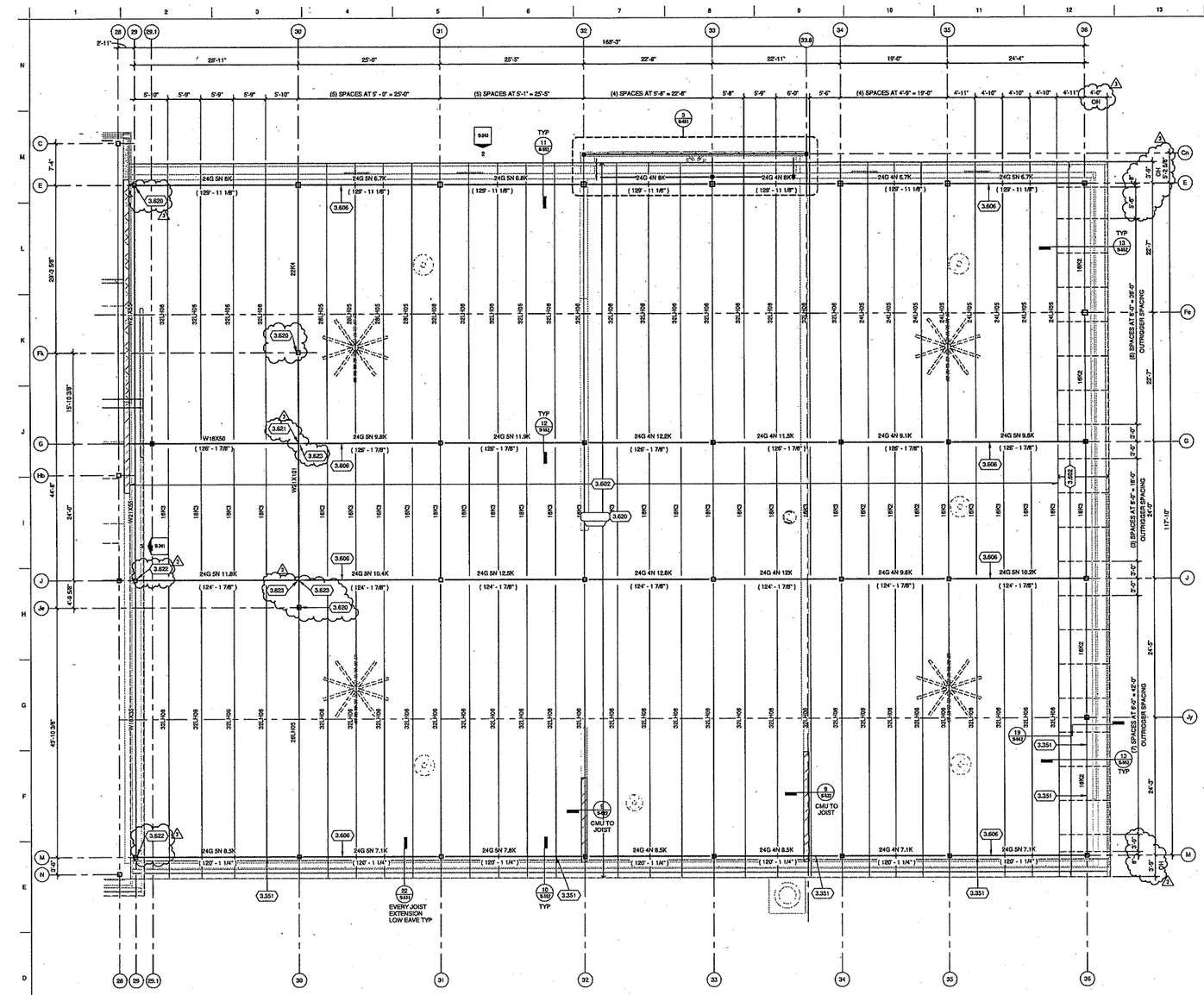
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PROJECT No: 13003500-160264.01

HIGH ROOF FRAMING PLAN AREA D

S-152D

ADDI #3



TRUE NORTH / PLAN NORTH

1 HIGH ROOF FRAMING PLAN AREA E

1/8" = 1'-0"

KEYED NOTES

3.351 FOR LATERAL SUPPORT FROM JOIST OR JOIST GIRDER BOTTOM CHORD TO PRECAST WALL AT SPECIFIC LOCATIONS SEE DETAIL 17/S-531.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK, FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (36/7-3)

3.605 3 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.606 6 1/2" DEEP JOIST SEATS FOR ALL JOISTS ALONG THIS GRID LINE.

3.620 SIDE FRAME THE BEAM WITH STANDARD SINGLE PLATE SHEAR CONNECTION. FULLY PRETENSION THE BOLTS. TOP FRAME THE JOIST TO THE COLUMN.

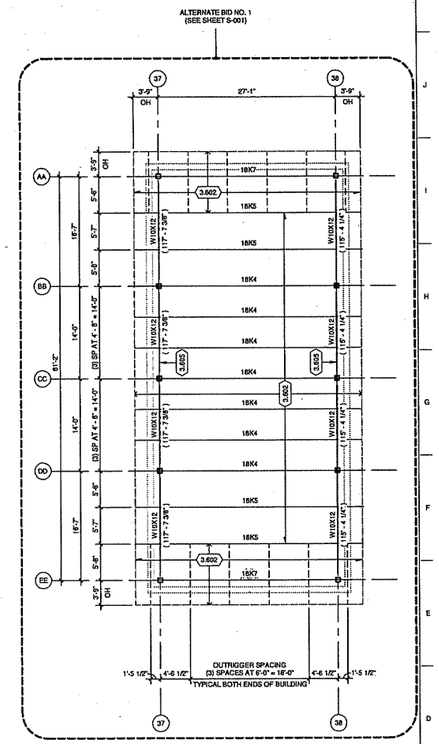
3.621 FULLY PRETENSION WEB BOLTS.

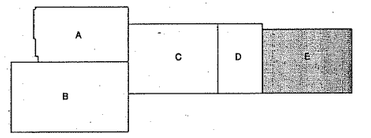
3.622 SIDE FRAME ALL BEAMS/JOIST/GIRDERS AT COLUMN.

3.623 SEE SECTION DETAIL 22/S-552 FOR GIRDER TO BEAM CONNECTION.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-002 FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE:
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT, INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.5KIP/LIN.AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.26IN3, MINIMUM I = 1.52IN4.
10. JOIST EXTENSIONS ARE R9, MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.
11. PROVIDE TUBE ATTACHMENT AS SHOWN IN OUTRIGGER SECTION DETAIL 13/S-552 AT EDGES OF ALL SLOPING ROOFS. SPLICE EDGE HSS TUBE PER SPLICE DETAIL 16/S-541. AT CORNERS THE HSS TUBE MUST BE 15 FEET LONG MINIMUM WITHOUT ANY SPLICES. THE HSS TUBES ARE TO BE WELDED AT THE CORNERS ; SEE DETAIL 17/S-541.





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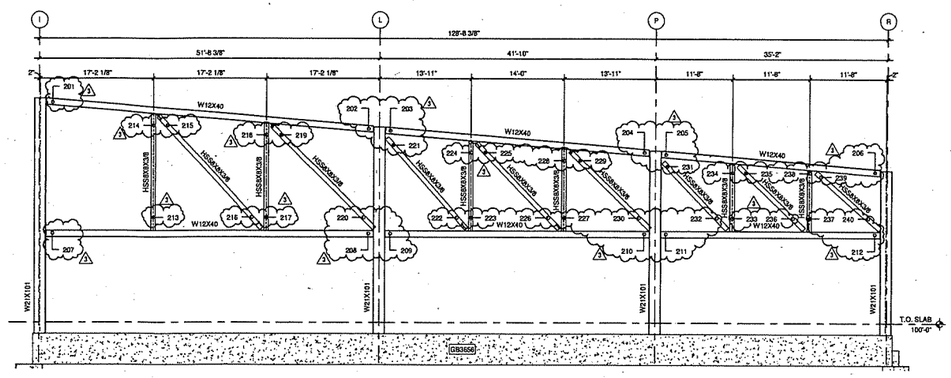
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PROJECT No: 1303500-160254.01

HIGH ROOF FRAMING PLAN AREA E

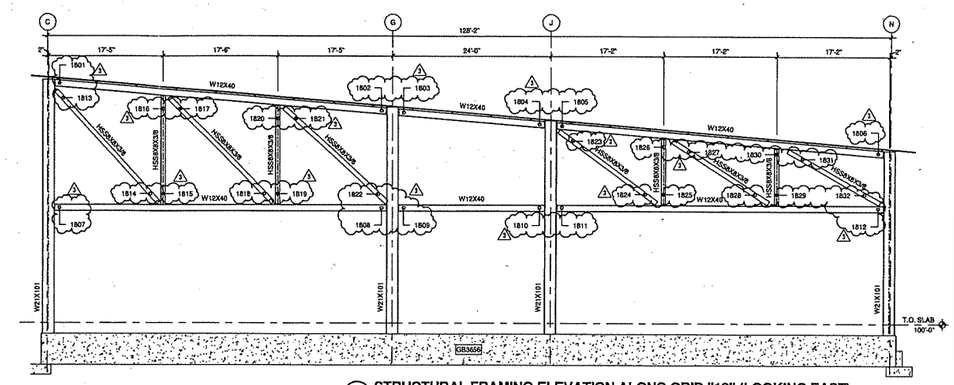
S-152E

TRUSS CONNECTION LOADS GRID 2		
CONNECTION NUMBER	AXIAL (KIPS)	SHEAR (KIPS)
201	3.8	9.6
202	94.2	6.9
203	50.8	6.0
204	28.7	6.1
205	4.3	5.3
206	18.4	5.4
207	14.5	5.1
208	21.5	2.5
209	91.1	2.2
210	17.2	2.5
211	33.2	2.1
212	26.5	2.4
213	3.2	0.0
214	3.5	0.0
215	30.0	0.2
216	30.3	0.2
217	31.0	0.0
218	31.2	0.0
219	96.1	0.2
220	96.4	0.2
221	61.7	0.1
222	61.4	0.1
223	35.8	0.0
224	35.5	0.0
225	37.8	0.1
226	37.5	0.1
227	19.1	0.0
228	18.9	0.0
229	22.3	0.1
230	22.5	0.1
231	48.5	0.1
232	48.3	0.1
233	25.1	0.0
234	25.0	0.0
235	28.4	0.1
236	28.2	0.1
237	11.4	0.0
238	11.2	0.0
239	30.8	0.1
240	30.9	0.1



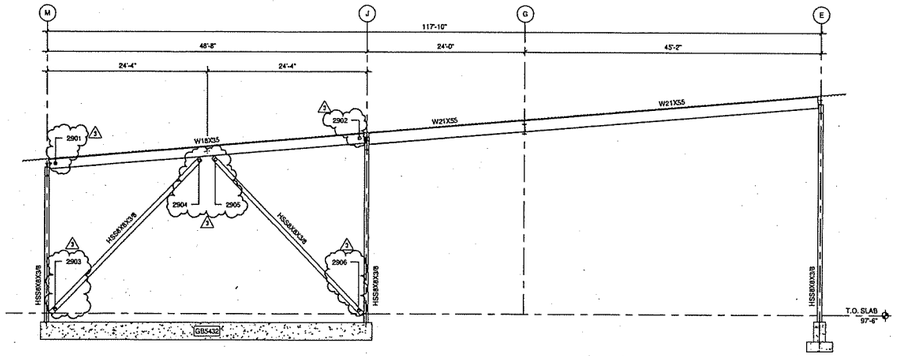
1 STRUCTURAL FRAMING ELEVATION ALONG GRID "2" (LOOKING EAST)
1/8" = 1'-0"

TRUSS CONNECTION LOADS GRID 18		
CONNECTION NUMBER	AXIAL (KIPS)	SHEAR (KIPS)
1801	12.8	4.0
1802	10.4	4.0
1803	5.8	6.7
1804	11.5	6.7
1805	11.9	3.9
1806	12.4	4.0
1807	16.7	0.3
1808	16.7	0.4
1809	7.2	0.5
1810	7.2	0.5
1811	25.7	0.4
1812	17.9	0.4
1813	24.5	0.2
1814	24.2	0.2
1815	17.1	0.0
1816	16.7	0.0
1817	16.2	0.2
1818	16.6	0.2
1819	12.8	0.0
1820	13.1	0.0
1821	30.5	0.2
1822	30.9	0.2
1823	22.9	0.2
1824	22.7	0.2
1825	18.8	0.0
1826	18.6	0.0
1827	21.3	0.2
1828	21.1	0.2
1829	11.1	0.0
1830	11.0	0.0
1831	34.8	0.2
1832	35.0	0.2



2 STRUCTURAL FRAMING ELEVATION ALONG GRID "18" (LOOKING EAST)
1/8" = 1'-0"

TRUSS CONNECTION LOADS GRID 29		
CONNECTION NUMBER	AXIAL (KIPS)	SHEAR (KIPS)
2901	0.2	2.2
2902	0.2	2.2
2903	27.0	0.2
2904	25.5	0.2
2905	25.2	0.2
2906	25.7	0.2



3 STRUCTURAL FRAMING ELEVATION ALONG GRID "29" (LOOKING WEST)
1/8" = 1'-0"

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NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

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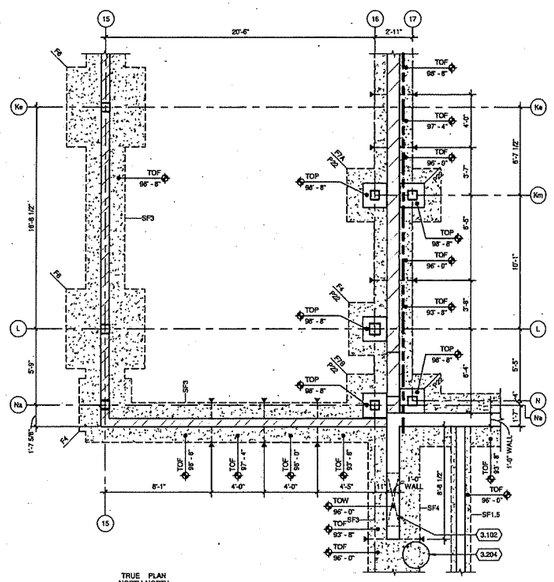
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	03/07/2019
	ISSUE FOR PERMIT	01/17/2019

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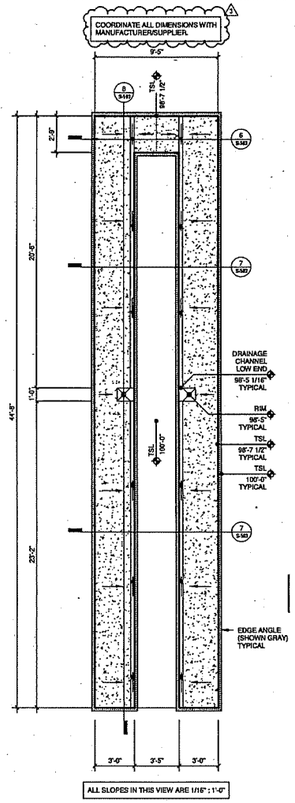
PROJECT No: 1303500-150264.01

STRUCTURAL FRAMING ELEVATIONS

S-241

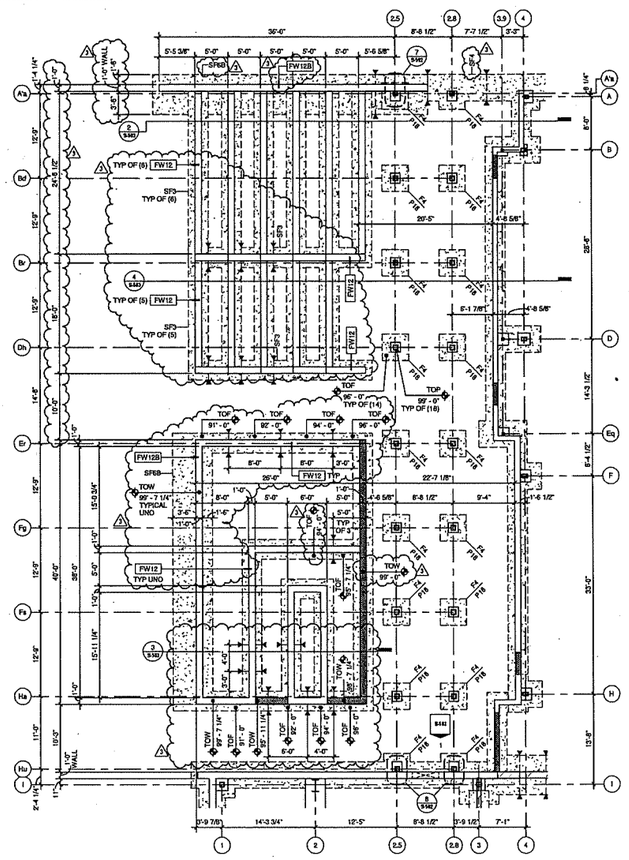


TRUE NORTH PLAN NORTH 4 **ENLARGED PARTIAL FOUNDATION PLAN AREA B**
1/4" = 1'-0"

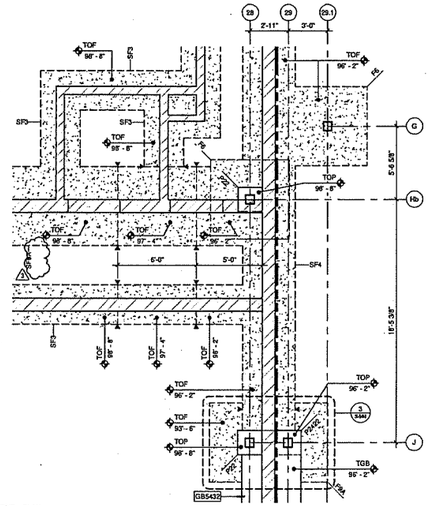


ALL SLOPES IN THIS VIEW ARE 1/16" : 1'-0"

TRUE NORTH PLAN NORTH 2 **ENLARGED FLATWORK PLAN AREA C**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 1 **PARTIAL FOUNDATION PLAN**
1/8" = 1'-0"



TRUE NORTH PLAN NORTH 3 **ENLARGED PARTIAL FOUNDATION PLAN AREA D**
1/4" = 1'-0"

KEYED NOTES

3.102 PROVIDE 1'-0" X 4'-0" OPENING IN PRECAST FOUNDATION WALL FOR TELECOMMUNICATIONS / ELECTRICAL CABLE. SEE TYPICAL DETAIL 10/S-502. COORDINATE FINAL LOCATION WITH ELECTRICAL.

3.204 BOLLARD, SEE DETAIL 14/S-511

FOUNDATION PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-501 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
5. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
6. STRIP FOOTINGS SHALL BE CENTERED UNDER FOUNDATION/MASONRY WALLS UNLESS NOTED OTHERWISE.

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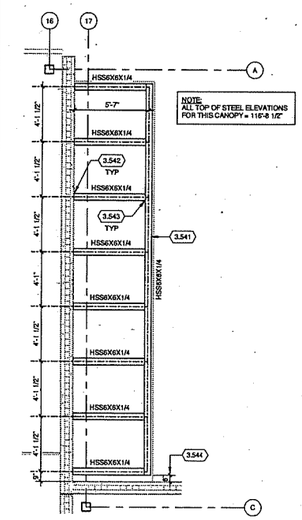
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PROJECT No: 1303300- 160264.01

MISCELLANEOUS FOUNDATION PLANS

S-401

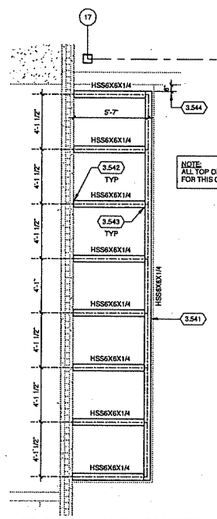
Ad Num 3



TRUE NORTH PLAN NORTH 6

DOOR CANOPY FRAMING PLAN - AREA A

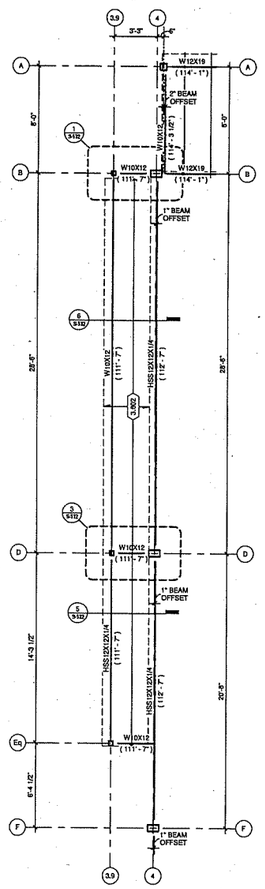
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 7

DOOR CANOPY FRAMING PLAN - AREA B

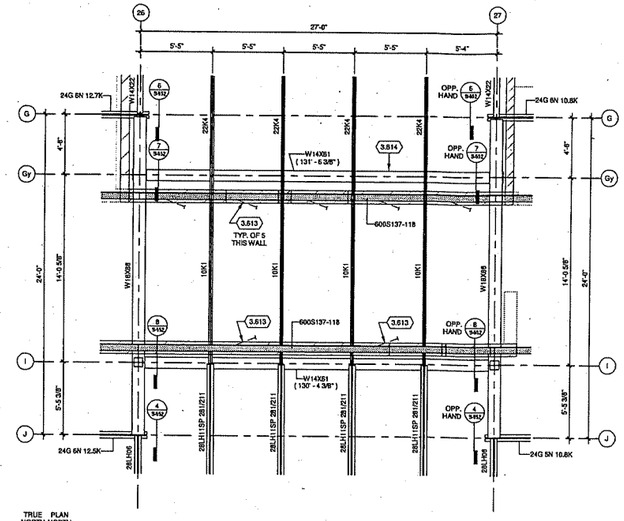
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 5

PARTIAL ENLARGED LOW ROOF FRAMING PLAN AREA A

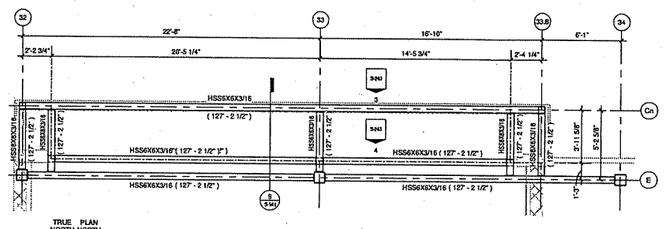
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 2

ENLARGED HIGH ROOF FRAMING PLAN AREA D

1/4" = 1'-0"



TRUE NORTH PLAN NORTH 3

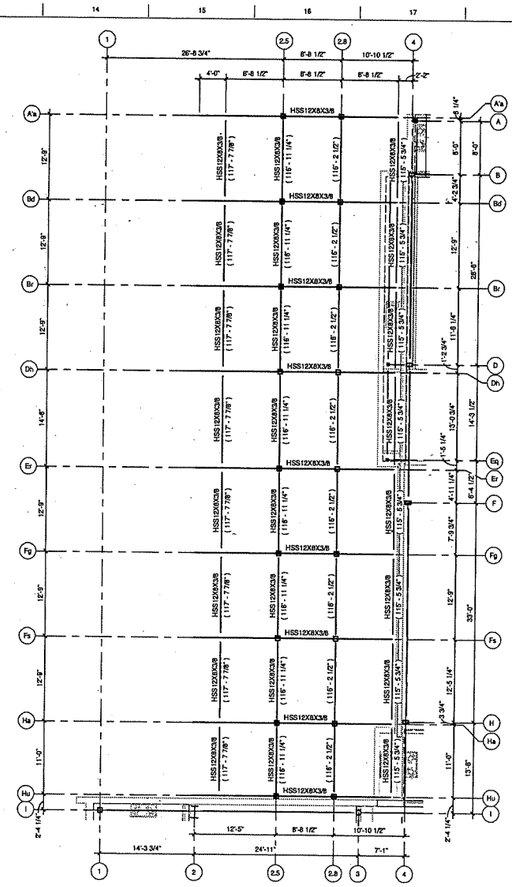
ENLARGED ENTRY HIGH FRAMING PLAN AREA E

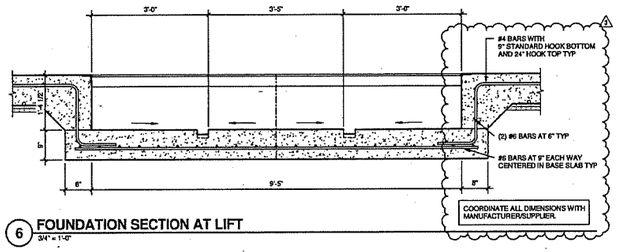
1/4" = 1'-0"

TRUE NORTH PLAN NORTH 4

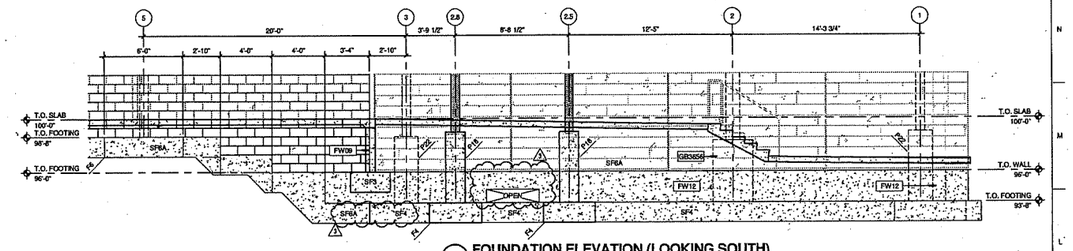
ENLARGED ENTRY CANOPY LOW FRAMING PLAN AREA E

1/4" = 1'-0"

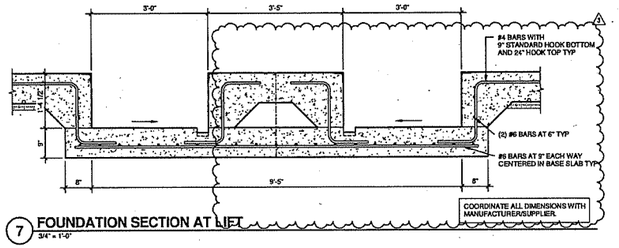

26'-8 3/4"
4'-0"
8'-8 1/2"
8'-8 1/2"
10'-10 1/2"
2'-2"
HSS12X8X3/8
HSS12X8X3/8
HSS12X8X3/8



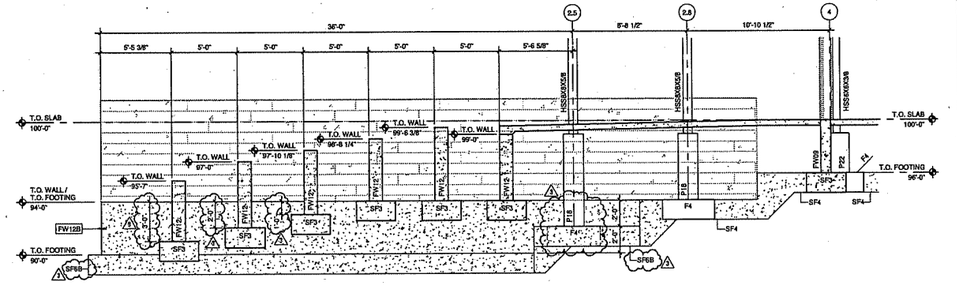
6 **FOUNDATION SECTION AT LIFT**
3/4" = 1'-0"



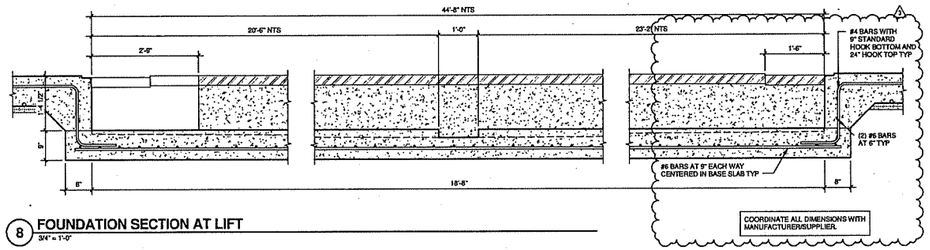
1 **FOUNDATION ELEVATION (LOOKING SOUTH)**
1/4" = 1'-0"



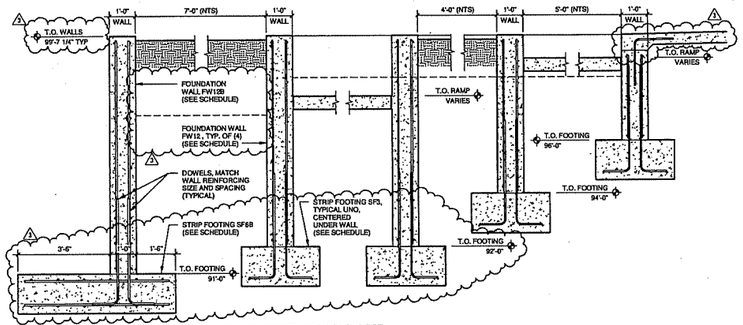
7 **FOUNDATION SECTION AT LIFT**
3/4" = 1'-0"



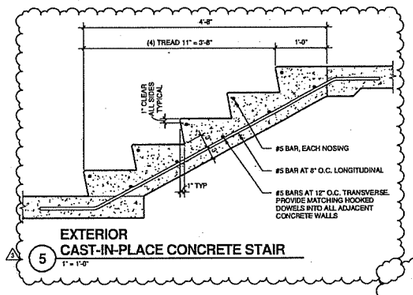
2 **FOUNDATION SECTION**
1/4" = 1'-0"



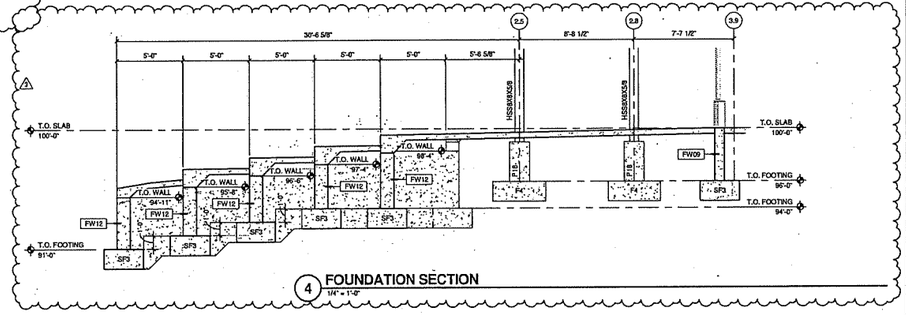
8 **FOUNDATION SECTION AT LIFT**
3/4" = 1'-0"



3 **FOUNDATION SECTION AT RAMP**
1/2" = 1'-0"



EXTERIOR
CAST-IN-PLACE CONCRETE STAIR
5 1" = 1'-0"



4 **FOUNDATION SECTION**
1/4" = 1'-0"

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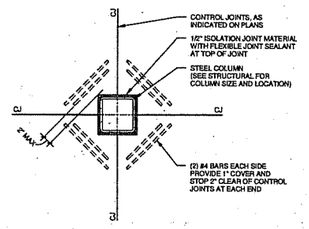
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No	REVISION/SUBMISSION	DATE
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2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

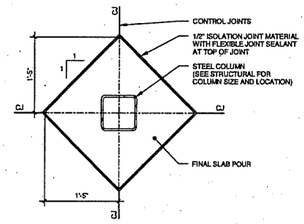
PROJECT No: 1303500-160064.01

FOUNDATION DETAILS

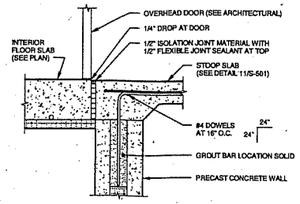
S-503



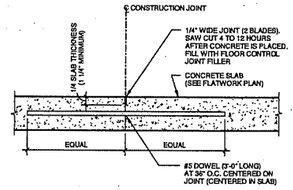
INTERIOR COLUMNS



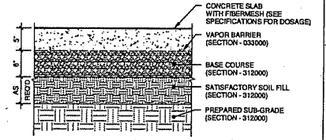
INTERIOR COLUMNS



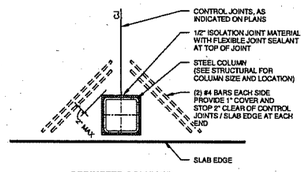
7 STOOP SLAB AT OVERHEAD DOOR
1" = 1'-0"



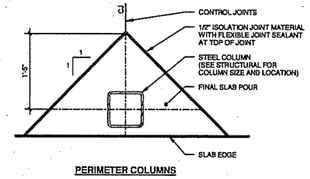
CONCRETE SLAB CONSTRUCTION JOINT (TYPICAL)
2 NO SCALE



SLB05

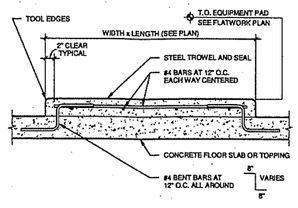


PERIMETER COLUMNS

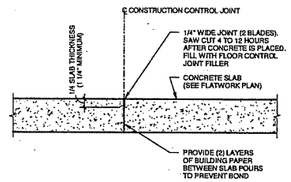


PERIMETER COLUMNS

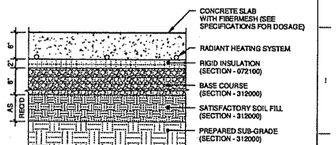
12 SLAB JOINTS AT ISOLATED COLUMN
1" = 1'-0"



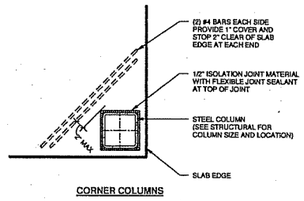
8 GROUND LEVEL EQUIPMENT PADS
NO SCALE



CONCRETE SLAB CONSTRUCTION CONTROL JOINT "CCJ" (TYPICAL)
3 NO SCALE

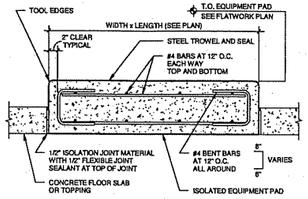


SLB06H

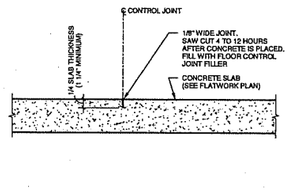


CORNER COLUMNS

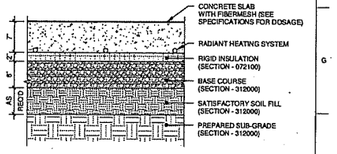
15 SLAB JOINTS AT ISOLATED COLUMN
1" = 1'-0"



9 ISOLATED EQUIPMENT PADS
NO SCALE

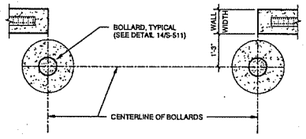


CONCRETE SLAB CONTROL JOINT "CJ" (TYPICAL)
4 NO SCALE

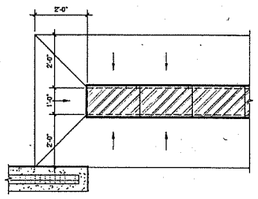


SLB07H

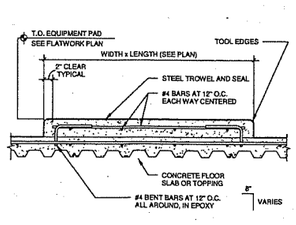
NOTE:
REFER TO FLATWORK PLANS FOR LOCATIONS. TYPICAL AT ALL OVERHEAD DOOR OPENINGS UNLESS NOTED OTHERWISE.



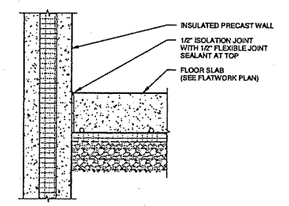
13 BOLLARD LOCATION PLAN
NO SCALE



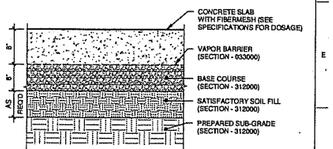
16 CONCRETE TRENCH DRAIN
1/2" = 1'-0"



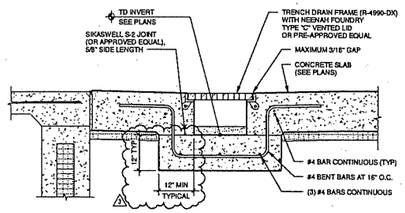
10 MEZZANINE EQUIPMENT PADS
1" = 1'-0"



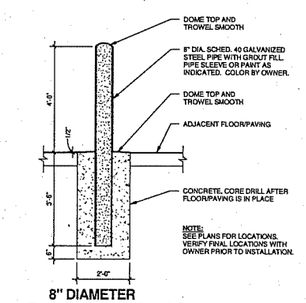
5 SLAB AT PRECAST WALL
NO SCALE



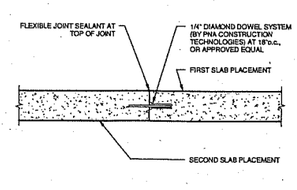
SLB08



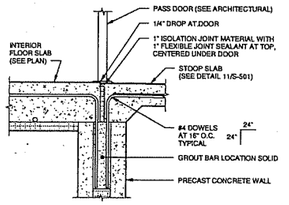
17 CONCRETE TRENCH DRAIN SECTION
1" = 1'-0"



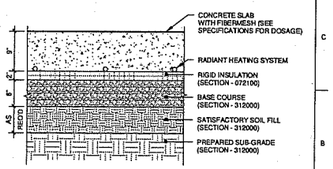
8" DIAMETER GALVANIZED BOLLARD POST
14 1/2" = 1'-0"



11 CONCRETE SLAB DOWELED JOINT
1 1/2" = 1'-0"



6 STOOP SLAB AT PASS DOOR
1" = 1'-0"



SLB09H

1 STRUCTURAL SLAB TYPES
1" = 1'-0"

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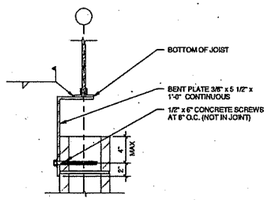
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3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
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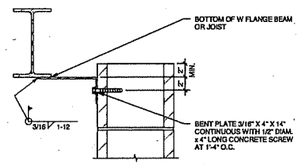
PROJECT No: 13003500-160284.01

FLATWORK DETAILS

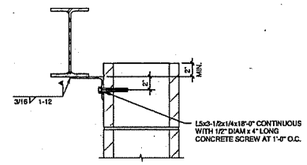
S-511



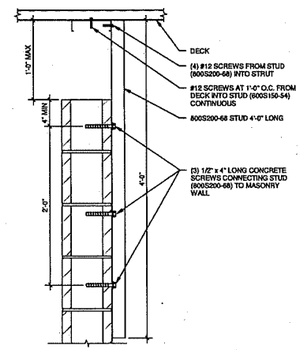
9 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



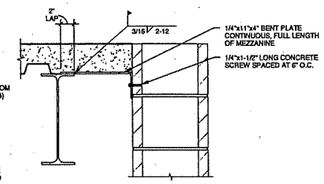
5 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



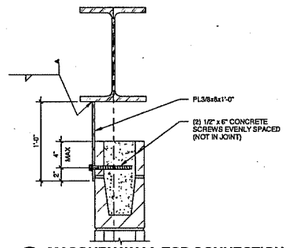
1 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



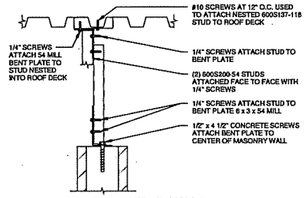
6 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



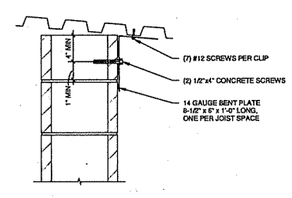
TYPICAL MEZZANINE TO MASONRY/PRECAST CONNECTION
2 1 1/2" = 1'-0"



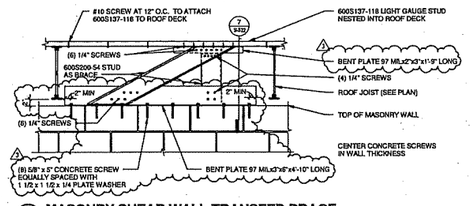
3 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



MASONRY SHEAR WALL TRANSFER BRACE SECTION
7 1 1/2" = 1'-0"



4 MASONRY WALL TOP CONNECTION
1 1/2" = 1'-0"



8 MASONRY SHEAR WALL TRANSFER BRACE
3/4" = 1'-0"

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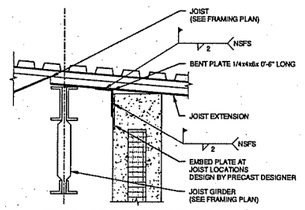
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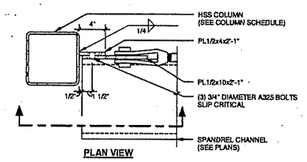
STRUCTURAL WALL DETAILS

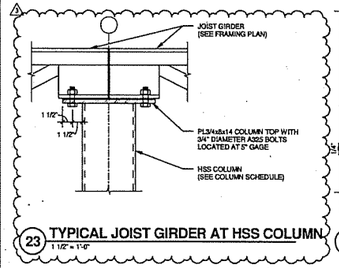
S-522

At. JDCM

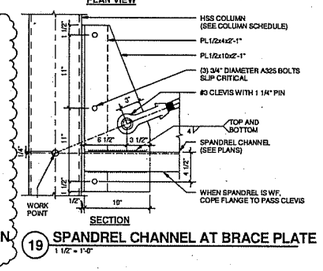


22 PRECAST TO JOIST EXTENSION CONNECTION
1" = 1'-0"

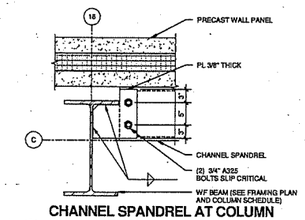




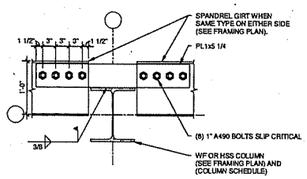
23 TYPICAL JOIST GIRDER AT HSS COLUMN
1 1/2" = 1'-0"



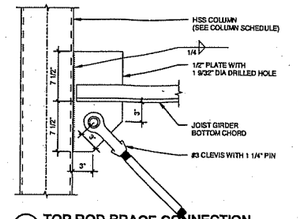
19 SPANDREL CHANNEL AT BRACE PLATE
1 1/2" = 1'-0"



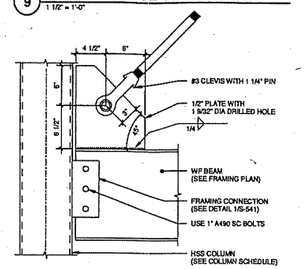
14 CHANNEL SPANDREL AT COLUMN CONNECTION
1" = 1'-0"



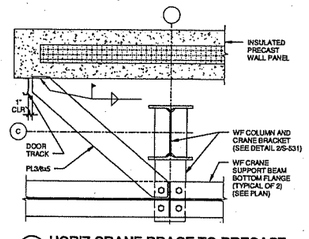
15 SPANDREL AT COLUMN CONNECTION
1" = 1'-0"



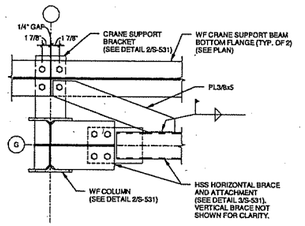
9 TOP ROD BRACE CONNECTION
1 1/2" = 1'-0"



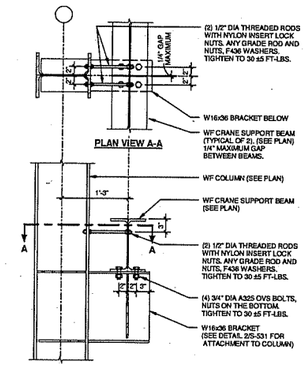
10 BOTTOM ROD BRACE CONNECTION
1 1/2" = 1'-0"



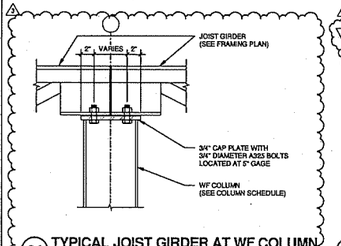
5 HORIZ CRANE BRACE TO PRECAST
1" = 1'-0"



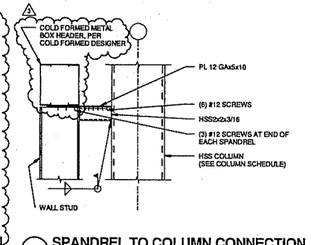
6 HORIZ CRANE BRACE TO HSS BEAM
1" = 1'-0"



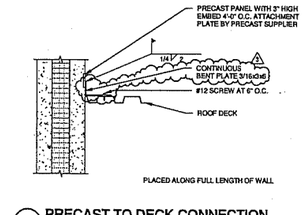
1 CRANE RAIL SUPPORT FRAMING
1" = 1'-0"



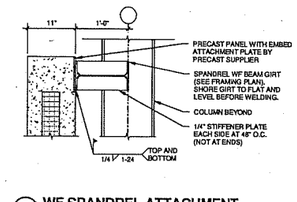
24 TYPICAL JOIST GIRDER AT WF COLUMN
1 1/2" = 1'-0"



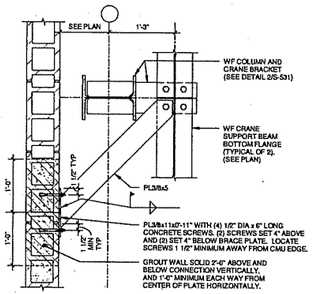
20 SPANDREL TO COLUMN CONNECTION
1 1/2" = 1'-0"



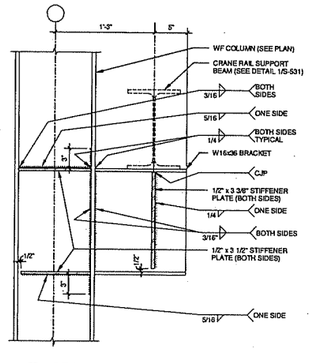
16 PRECAST TO DECK CONNECTION
1" = 1'-0"



11 WF SPANDREL ATTACHMENT
1" = 1'-0"



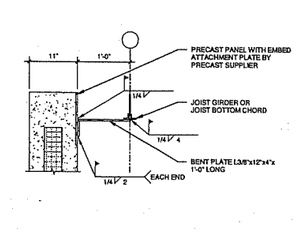
7 HORIZ CRANE BRACE TO CMU
1" = 1'-0"



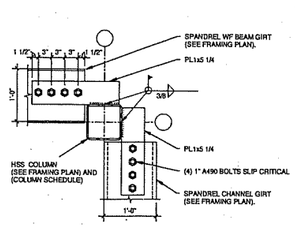
2 CRANE RAIL BRACKET ATTACHMENT
1 1/2" = 1'-0"



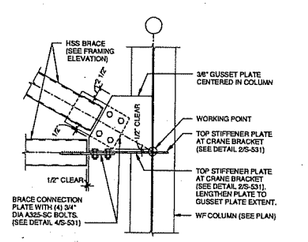
21 TOP CRANE BRACE CONNECTION
1" = 1'-0"



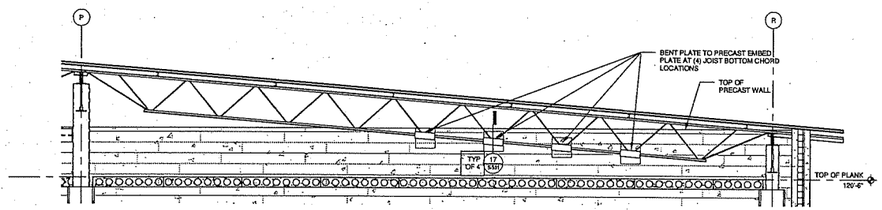
17 PRECAST TO JOIST CONNECTION
1" = 1'-0"



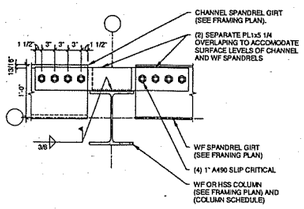
12 SPANDREL AT CORNER HSS COLUMN
1" = 1'-0"



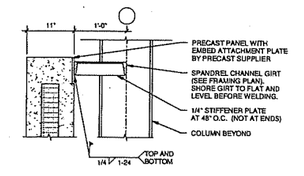
3 BOTTOM CRANE BRACE CONNECTION
1" = 1'-0"



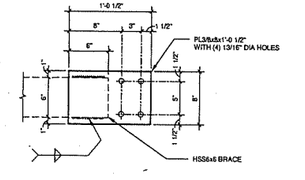
18 STRUCTURAL FRAMING ELEVATION ALONG GRID "16" (LOOKING EAST)
3/8" = 1'-0"



13 SPANDREL (2 TYPES) CONNECTION
1" = 1'-0"



8 CHANNEL SPANDREL ATTACHEMNT
1" = 1'-0"



4 CRANE BRACE CONNECTION PLATE
1 1/2" = 1'-0"

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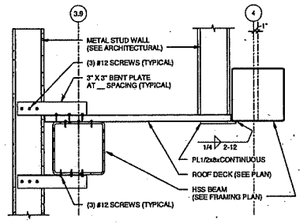
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	ISSUE FOR PERMIT	01/17/2019

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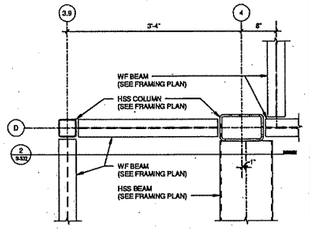
PROJECT No: 1503500-160264.01

STRUCTURAL FRAMING DETAILS

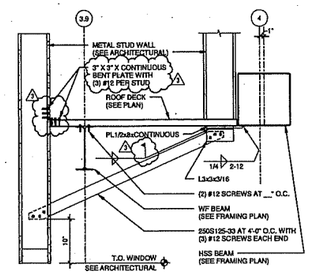
S-531



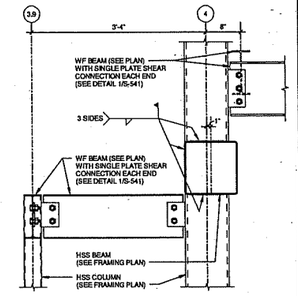
5 **FRAMING DETAIL**
1" = 1'-0"



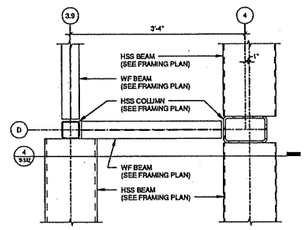
1 **FRAMING PLAN DETAIL**
1" = 1'-0"



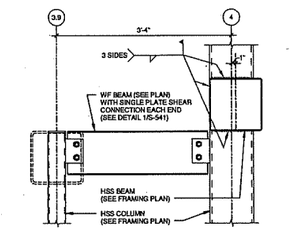
6 **FRAMING DETAIL**
1" = 1'-0"



2 **FRAMING DETAIL**
1" = 1'-0"



3 **FRAMING PLAN DETAIL**
1" = 1'-0"



4 **FRAMING DETAIL**
1" = 1'-0"

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No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019

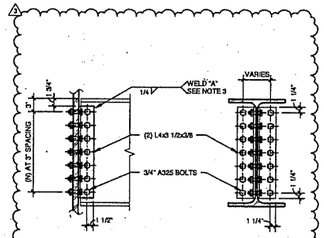
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PROJECT No: 1303500-160264.01

STRUCTURAL FRAMING DETAILS

S-532

A 5VDUM3

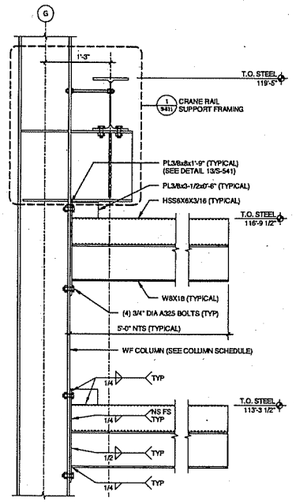


DOUBLE ANGLE CONNECTION		
NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS (N)	LENGTH OF ANGLE
W36	10	29 1/2"
W33	9	26 1/2"
W30	8	23 1/2"
W24 - W27	7	20 1/2"
W21	6	17 1/2"
W18	5	14 1/2"
W16	4	11 1/2"
W12 - W14	3	8 1/2"
W8 - W10	2	5 1/2"

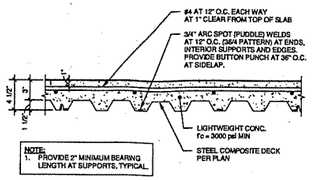
DOUBLE ANGLE CONNECTION NOTES

1. ALL FRAMING CONNECTIONS SHALL CONFORM TO SCHEDULE UNLESS DETAILED OR NOTED OTHERWISE.
2. STANDARD HOLES OR HORIZONTAL SHORT SLOT HOLES MAY BE UTILIZED AT CONTRACTORS OPTION IN EITHER THE CONNECTION ANGLE OR THE FRAMING MEMBERS.
3. WELD "A" MAY BE USED IN LIEU OF "A" SIDE BOLTS AT CONTRACTORS OPTION. WELD SHALL BE ON ALL 3 SIDES.
4. FOR MISS-ALIGNED BOLT HOLES, PROVIDE FIELD WELDS. NOTIFY THE ARCHITECT/ENGINEER OF LOCATIONS USING FIELD WELDED CONNECTION.
5. REFER TO TYPICAL COPING DETAIL FOR CONNECTIONS WHERE COPING IS REQUIRED.
6. THIS DETAIL IS NOT INTENDED FOR EVERY WF SECTION. CHECK RIDING THE FILLET AND COPE DEPTH PRIOR TO FABRICATION.

15 TYPICAL DOUBLE ANGLE FRAMING CONNECTION
1" = 1'-0"

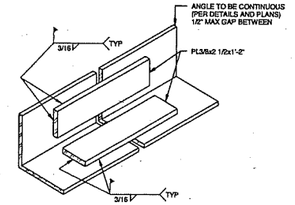


12 LUBE REEL ATTACHMENT FRAME
1" = 1'-0"

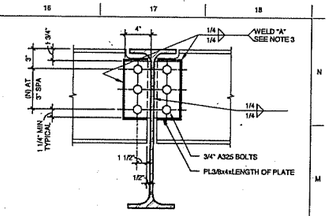


NOTE:
1. PROVIDE 2" MINIMUM BEARING LENGTH AT SUPPORTS, TYPICAL.

8 TYPICAL CONCRETE ON METAL DECK SECTION
1 1/2" = 1'-0"



4 TYPICAL ANGLE SPLICE
3" = 1'-0"

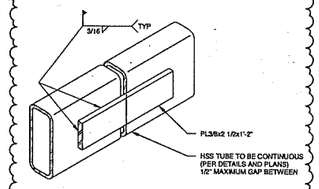


SINGLE PLATE SHEAR CONNECTION		
NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS (N)	LENGTH OF PLATE
W36	10	29 1/2"
W33	9	26 1/2"
W30	8	23 1/2"
W24 - W27	7	20 1/2"
W21	6	17 1/2"
W18	5	14 1/2"
W16	4	11 1/2"
W12 - W14	3	8 1/2"
W8 - W10	2	5 1/2"

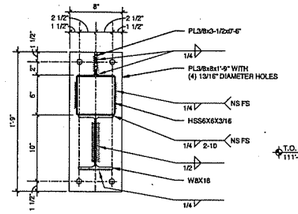
SINGLE PLATE SHEAR CONNECTION NOTES

1. ALL FRAMING CONNECTIONS SHALL CONFORM TO SCHEDULE UNLESS DETAILED OR NOTED OTHERWISE.
2. STANDARD HOLES OR HORIZONTAL SHORT SLOT HOLES MAY BE UTILIZED AT CONTRACTORS OPTION IN EITHER THE CONNECTION ANGLE OR THE FRAMING MEMBERS.
3. WELD "A" MAY BE USED IN LIEU OF "A" SIDE BOLTS AT CONTRACTORS OPTION. WELD SHALL BE ON ALL 3 SIDES.
4. FOR MISS-ALIGNED BOLT HOLES, PROVIDE FIELD WELDS. NOTIFY THE ARCHITECT/ENGINEER OF LOCATIONS USING FIELD WELDED CONNECTION.
5. REFER TO TYPICAL COPING DETAIL 5/S-541 FOR CONNECTIONS WHERE COPING IS REQUIRED.
6. THIS DETAIL IS NOT INTENDED FOR EVERY WF SECTION. CHECK RIDING THE FILLET AND COPE DEPTH PRIOR TO FABRICATION.

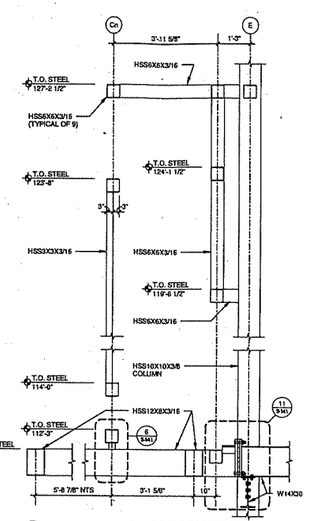
1 TYPICAL SINGLE PLATE SHEAR FRAMING CONNECTION
1 1/2" = 1'-0"



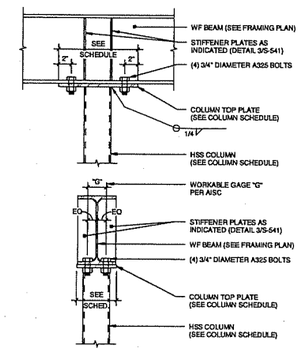
16 ROOF EDGE HSS SPLICE
3" = 1'-0"



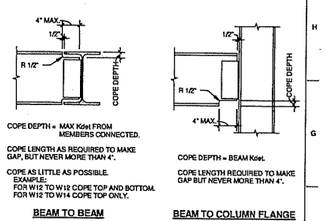
13 LUBE REEL ATTACHMENT PLATE
1 1/2" = 1'-0"



9 RADIO ENTRY CANOPY SECTION
1/2" = 1'-0"



5 TYPICAL WF BEAM OVER HSS COLUMN
1 1/2" = 1'-0"



COPE DEPTH = MAX Kdet FROM MEMBERS CONNECTED.

COPE LENGTH AS REQUIRED TO MAKE GAP, BUT NEVER MORE THAN 4".

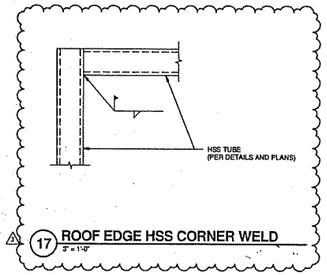
COPE AS LITTLE AS POSSIBLE.
EXAMPLE:
FOR W12 TO W12 COPE TOP AND BOTTOM.
FOR W12 TO W14 COPE TOP ONLY.

BEAM TO BEAM

COPE DEPTH = BEAM Kdet.

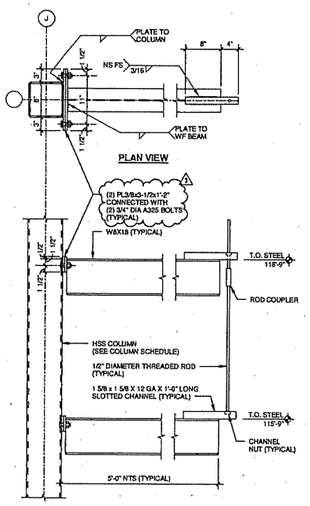
COPE LENGTH REQUIRED TO MAKE GAP BUT NEVER MORE THAN 4".

BEAM TO COLUMN FLANGE

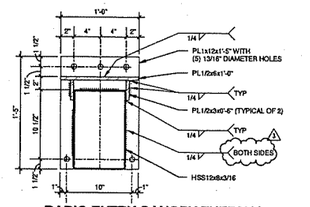


PLAN VIEW

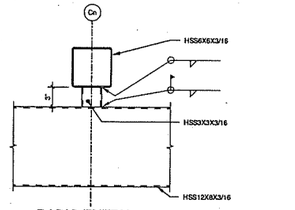
17 ROOF EDGE HSS CORNER WELD
3" = 1'-0"



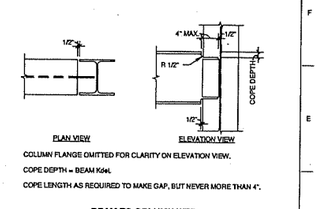
14 LUBE REEL ATTACHMENT FRAME
1" = 1'-0"



10 RADIO ENTRY CANOPY THERMAL MOMENT CONNECTION PLATE
1 1/2" = 1'-0"



6 RADIO ENTRY CANOPY FRAMING CONNECTION
1 1/2" = 1'-0"



PLAN VIEW — ELEVATION VIEW

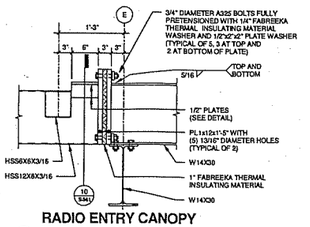
COLUMN FLANGE OMITTED FOR CLARITY ON ELEVATION VIEW.

COPE DEPTH = BEAM Kdet.

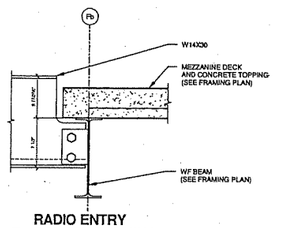
COPE LENGTH AS REQUIRED TO MAKE GAP, BUT NEVER MORE THAN 4".

BEAM TO COLUMN WEB

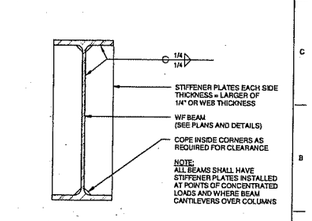
2 TYPICAL COPING DETAIL
1" = 1'-0"



11 RADIO ENTRY CANOPY THERMAL MOMENT CONNECTION
1" = 1'-0"



7 RADIO ENTRY CANOPY FRAMING CONNECTION
1 1/2" = 1'-0"



NOTE:
ALL BEAMS SHALL HAVE STIFFENER PLATES INSTALLED AT POINTS OF CONCENTRATED LOADS AND WHERE BEAM CANTILEVERS OVER COLUMNS

3 TYPICAL WF STIFFENER PLATE
1 1/2" = 1'-0"

ADDENDUM 3

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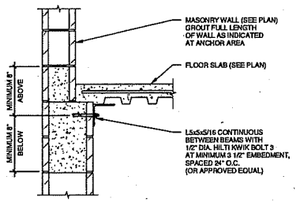
NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

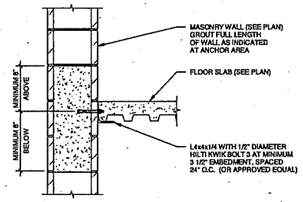
PROJECT No: 13033500-160264.01

STRUCTURAL FRAMING DETAILS

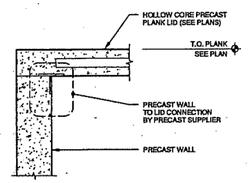
S-541



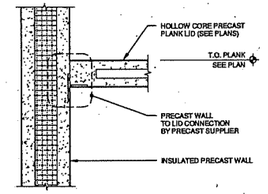
16 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



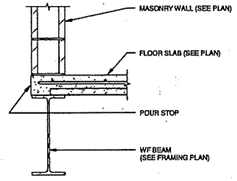
11 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



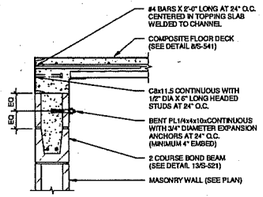
6 PRECAST PLANK BEARING ON PRECAST WALL
1" = 1'-0" SIMILAR AT SIDELAP



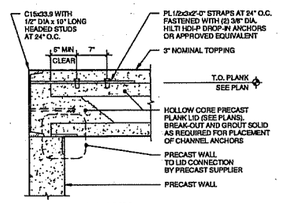
1 PRECAST PLANK BEARING ON PRECAST WALL
1" = 1'-0" SIMILAR AT SIDELAP



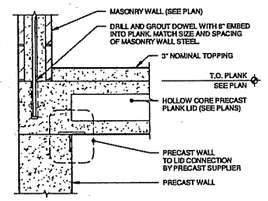
17 DECK BEARING AT WF BEAM
1" = 1'-0"



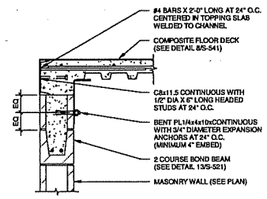
12 DECK BEARING AT MASONRY WALL
1" = 1'-0"



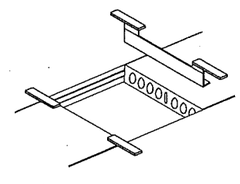
7 PRECAST PLANK BEARING ON PRECAST WALL
1" = 1'-0" SIMILAR AT SIDELAP



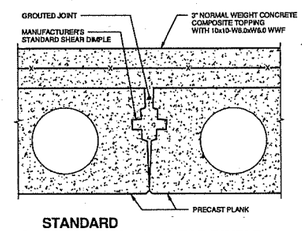
2 PRECAST PLANK BEARING ON PRECAST WALL
1" = 1'-0" SIMILAR AT SIDELAP



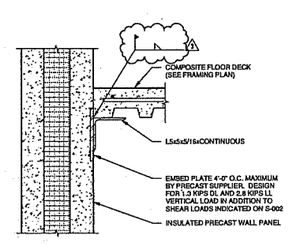
13 DECK SIDELAP AT MASONRY WALL
1" = 1'-0"



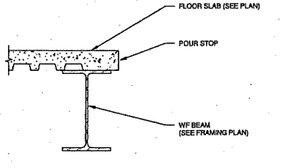
8 PRECAST PLANK HEADER SUPPORT
1/2" = 1'-0"



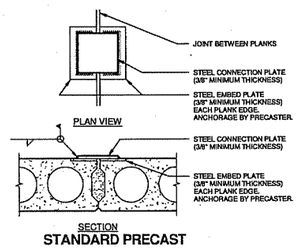
STANDARD
3 PRECAST PLANK SHEAR DIMPLE
3" = 1'-0"



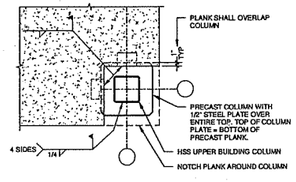
14 DECK SIDELAP AT PRECAST WALL
1 1/2" = 1'-0"



15 DECK SIDELAP AT WF BEAM
1" = 1'-0"



STANDARD PRECAST
4 SHEAR DIMPLE WITH WELD PLATES
1 1/2" = 1'-0"



PRECAST PLANK
5 TO PRECAST COLUMN ATTACHMENT
3/4" = 1'-0"

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ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

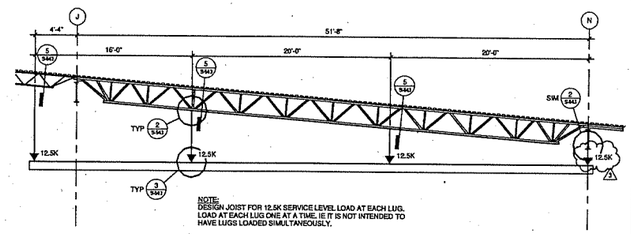
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PROJECT No: 1303500-160264.01

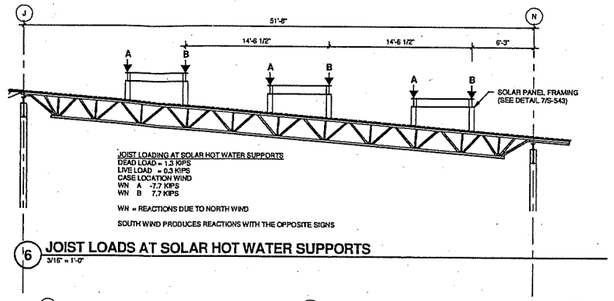
STRUCTURAL FRAMING DETAILS

S-542

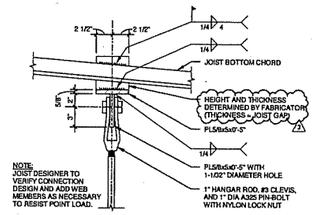
ADD 3



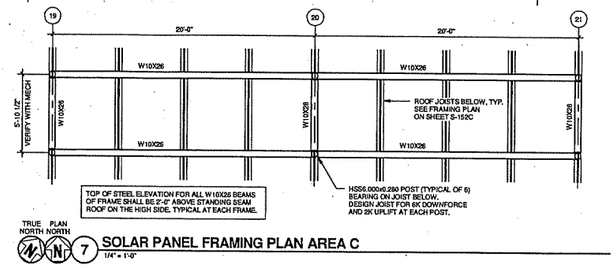
1 JOIST LOADS FOR FALL PROTECTION SUPPORT FRAMING
3/16" = 1'-0"



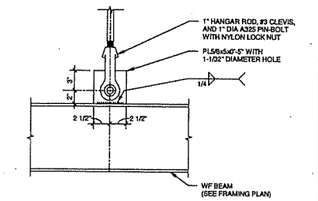
6 JOIST LOADS AT SOLAR HOT WATER SUPPORTS
3/16" = 1'-0"



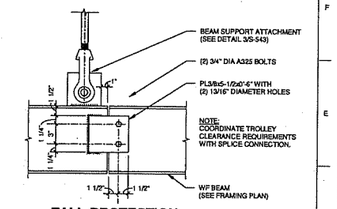
FALL PROTECTION SUPPORT
ATTACHMENT AT JOIST
2 1 1/2" = 1'-0"



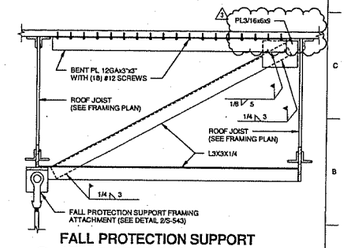
TRUE NORTH PLAN NORTH
7 SOLAR PANEL FRAMING PLAN AREA C
1/4" = 1'-0"



FALL PROTECTION SUPPORT
ATTACHMENT AT BEAM
3 1 1/2" = 1'-0"



FALL PROTECTION
SUPPORT BEAM SPLICE
4 1 1/2" = 1'-0"



FALL PROTECTION SUPPORT
ATTACHMENT BRACING
5 1" = 1'-0"

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ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

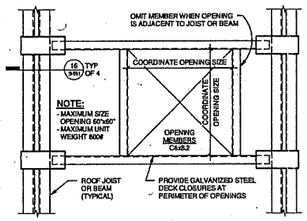
No	REVISION/SUBMISSION	DATE
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2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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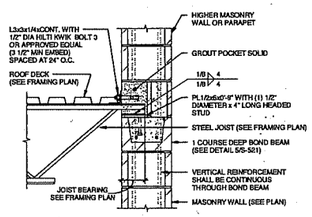
PROJECT No: 1303300-160264.01

STRUCTURAL FRAMING
DETAILS

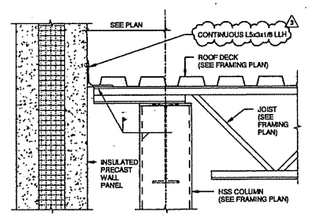
S-543



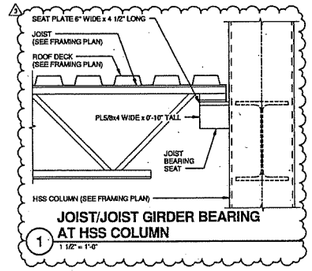
15 TYPICAL FRAMED ROOF OPENING
1" = 1'-0"



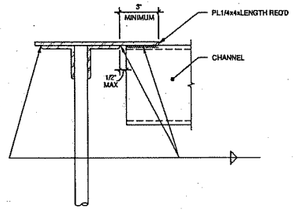
10 JOIST BEARING AT MASONRY WALL
1" = 1'-0"



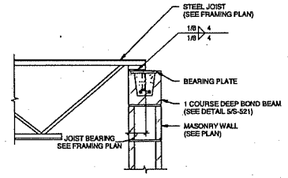
6 JOIST BEARING AT HSS COLUMN
1 1/2" = 1'-0"



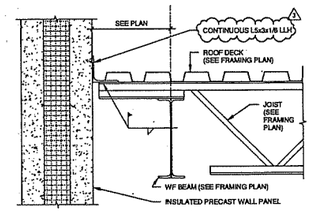
1 JOIST/JOIST GIRDER BEARING AT HSS COLUMN
1 1/2" = 1'-0"



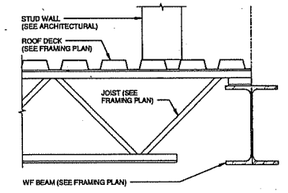
16 CHANNEL TO JOIST CONNECTION
3" = 1'-0"



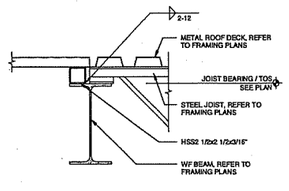
11 JOIST BEARING AT MASONRY WALL
1" = 1'-0"



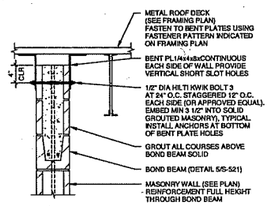
7 JOIST BEARING AT WF BEAM
1 1/2" = 1'-0"



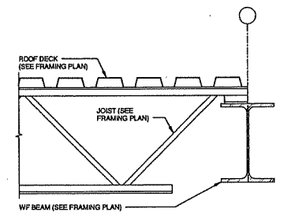
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1 1/2" = 1'-0"



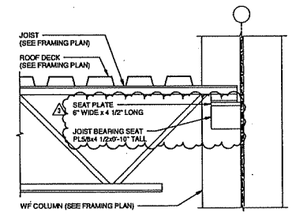
17 DECK DIRECTION CHANGE
1 1/2" = 1'-0"



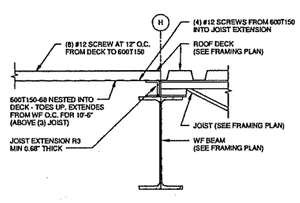
12 DECK BEARING AT MASONRY WALL
1" = 1'-0"



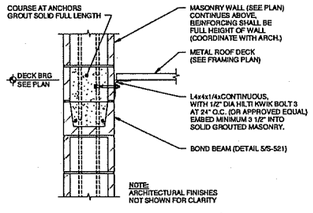
8 JOIST BEARING AT WF BEAM
1 1/2" = 1'-0"



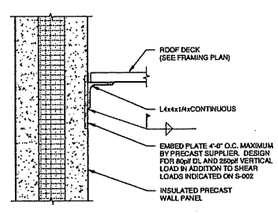
3 JOIST BEARING AT WF COLUMN
1 1/2" = 1'-0"



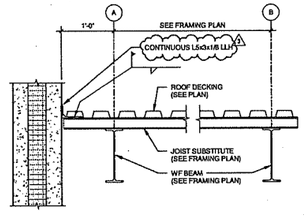
18 JOIST EXTENSION ALONG GRID H
1 1/2" = 1'-0"



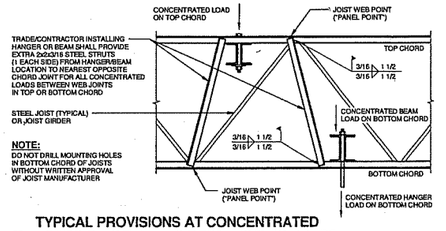
13 DECK BEARING AT MASONRY WALL
1" = 1'-0"



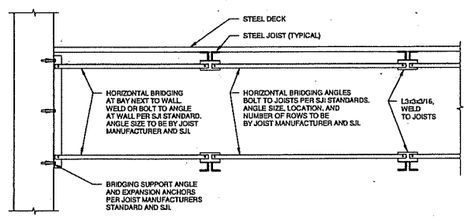
9 DECK BEARING AT PRECAST WALL
1 1/2" = 1'-0"



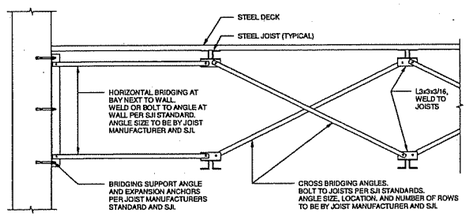
4 ROOF FRAMING SECTION
1" = 1'-0"



19 TYPICAL PROVISIONS AT CONCENTRATED LOADS ON OPEN WEB STEEL JOIST/GIRDERS
3/4" = 1'-0"



14 HORIZONTAL JOIST BRIDGING AT WALL
3/4" = 1'-0"



5 DIAGONAL JOIST BRIDGING AT WALL
3/4" = 1'-0"

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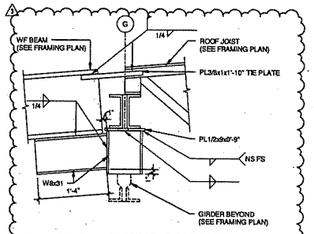
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	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1503500-1602664.01

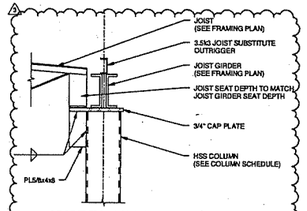
STRUCTURAL ROOF FRAMING DETAILS

S-551

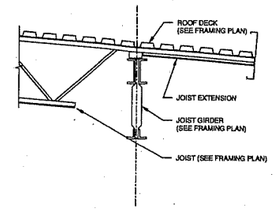
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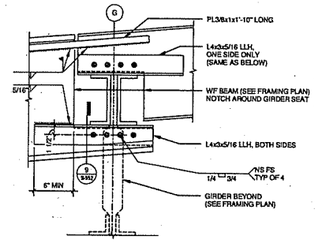
21 ROOF FRAMING CONNECTION
1" = 1'-0"



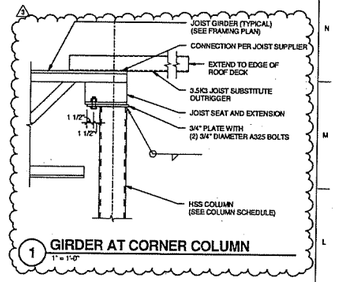
15 JOIST TO GIRDER AT CORNER COLUMN
1" = 1'-0"



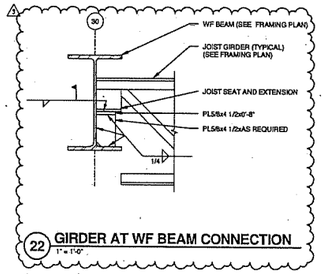
10 JOIST BEARING AT GIRDER
3/4" = 1'-0"



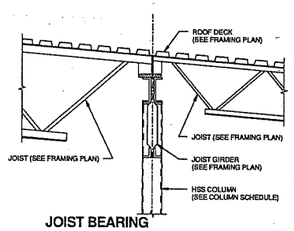
6 WF BEAM BEARING AT WF COLUMN
1 1/2" = 1'-0"



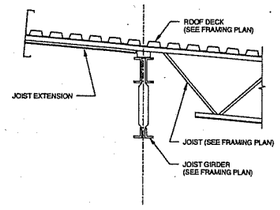
1 GIRDER AT CORNER COLUMN
1" = 1'-0"



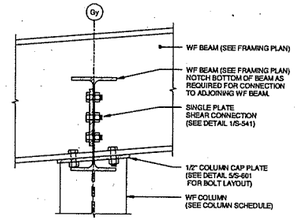
22 GIRDER AT WF BEAM CONNECTION
1" = 1'-0"



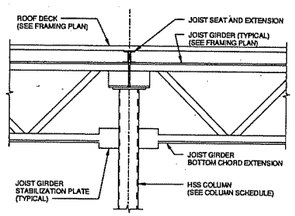
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3/4" = 1'-0"



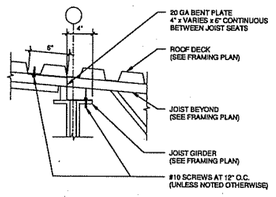
11 JOIST BEARING AT GIRDER
3/4" = 1'-0"



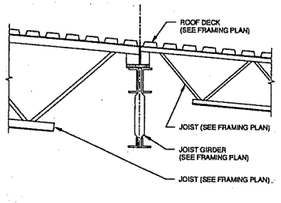
7 WF BEAM TO COLUMN CONNECTION
1 1/2" = 1'-0"



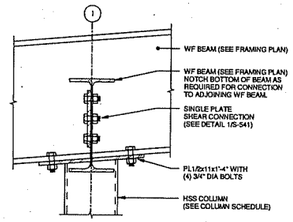
2 GIRDER AT SIDE COLUMN
3/4" = 1'-0"



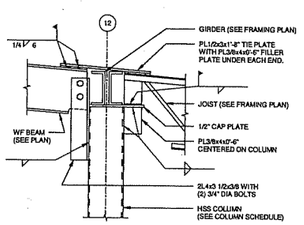
17 GIRDER EAVE CONDITION TYPICAL
1 1/2" = 1'-0"



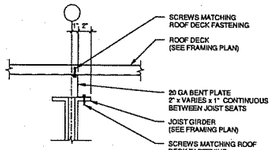
12 JOIST BEARING AT GIRDER
3/4" = 1'-0"



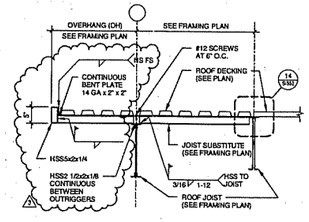
8 WF BEAM TO COLUMN CONNECTION
1 1/2" = 1'-0"



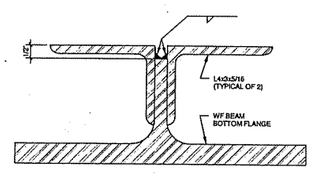
3 FRAMING CONNECTION
1" = 1'-0"



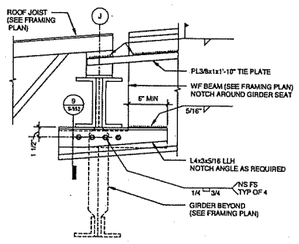
18 GIRDER AT RAKES CONDITION TYP
1 1/2" = 1'-0"



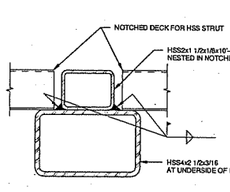
13 OUTRIGGER SECTION
3/4" = 1'-0"



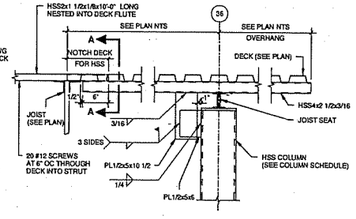
9 GIRDER SUPPORT BRACKET
6" = 1'-0"



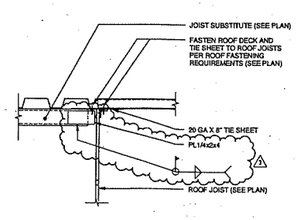
4 ROOF FRAMING CONNECTION
1 1/2" = 1'-0"



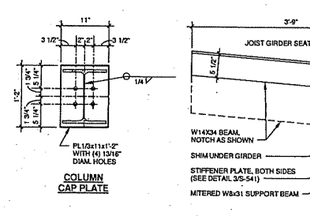
SECTION A-A

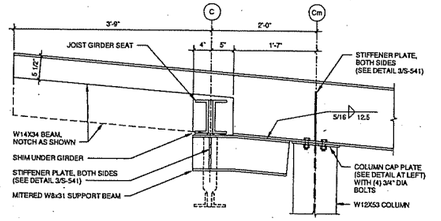


19 COLUMN TO DECK CONNECTION
1" = 1'-0"



14 JOIST SUBSTITUTE AT JOIST
1 1/2" = 1'-0"





5 CANTILEVERED ROOF BEAM
1" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 280 7679 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1903300-160254.01

STRUCTURAL ROOF FRAMING DETAILS

S-552

STRUCTURAL COLUMN SCHEDULE - AREA A

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
A'a-2.5	HSS6X6X5/8	S/S-602	1"	(4) 1" DIA / 18" EMBED	
A'a-2.8	HSS6X6X5/8	S/S-602	1"	(4) 1" DIA / 18" EMBED	
A-(E'-5')	HSS5X5X3/8	7/S-602			
A-5	HSS5X5X3/8	S/S-602			
A-8	HSS6X6X3/8	8/S-602			
A-11	HSS8X8X3/8	8/S-602			
A-12	HSS10X10X3/8	8/S-602			
A-13	HSS10X10X3/8	8/S-602			
A-14	HSS10X10X3/8	8/S-602			
A-15	HSS10X10X3/8	8/S-602			
A-16	HSS8X8X3/8	8/S-602			
B-3.9	HSS4X4X1/4	10/S-602			
B-4	HSS10X8X1/2	11/S-602			
B-5	HSS6X6X3/8	8/S-602			
B-8	HSS6X6X3/8	8/S-602			
Bd-2.5	HSS8X8X3/8	8/S-602			
Bd-2.8	HSS8X8X3/8	8/S-602			
Bp-15	HSS8X8X3/8				
Bp-16	HSS8X8X3/8	7/S-602			
Br-2.5	HSS8X8X3/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	
Br-2.8	HSS8X8X3/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	
D-3.9	HSS4X4X1/4	9/S-602			
D-4	HSS10X8X1/2	6/S-602			
D-6	HSS6X6X3/8	6/S-602			
D-8	HSS6X6X3/8	8/S-602			
D-11	HSS8X8X3/8	6/S-602			
D-12	HSS8X8X3/8	6/S-602			
D-13	HSS8X8X3/8	8/S-602			
D-14	HSS8X8X3/8	8/S-602			
D-15	HSS8X8X3/8	7/S-602			
D-16	HSS8X8X3/8	8/S-602			
Dh-2.5	HSS9X9X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Dh-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Ep-15	HSS8X8X3/8	7/S-602			
Ep-16	HSS8X8X3/8	6/S-602			
Ep-3.9	HSS4X4X1/4	9/S-602			
Er-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Er-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
F-4	HSS10X6X1/2	10/S-602			
F-6	HSS6X6X3/8	8/S-602			
F-8	HSS6X6X3/8	6/S-602			
Fp-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fp-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fh-11	HSS8X8X3/8	6/S-602			
Fh-11	HSS8X8X3/8	6/S-602			
Fh-12	HSS8X8X3/8	6/S-602			
Fh-13	HSS8X8X3/8	6/S-602			
Fh-14	HSS8X8X3/8	6/S-602			
Fh-15	HSS8X8X3/8	7/S-602			
Fh-16	HSS8X8X3/8	6/S-602			
Fs-2.5	HSS6X6X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Fs-2.8	HSS6X6X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
H-4	HSS10X6X1/2	10/S-602			
H-6	HSS6X6X3/8	6/S-602			
H-8	HSS6X6X3/8	6/S-602			
H-11	HSS8X8X3/8	7/S-602			
H-12	HSS8X8X3/8				
H-13	HSS8X8X3/8	6/S-602			
H-14	HSS8X8X3/8				
H-15	HSS8X8X3/8	6/S-602			
H-16	HSS8X8X3/8	6/S-602			
Ha-2.5	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Ha-2.8	HSS8X8X5/8	6/S-602	1"	(4) 1" DIA / 18" EMBED	
Hu-2.5	HSS8X8X5/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	
Hu-2.8	HSS8X8X5/8	8/S-602	1"	(4) 1" DIA / 18" EMBED	

STRUCTURAL COLUMN SCHEDULE - AREA B

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
I-1	HSS8X8X3/8	6/S-602			
I-2	W21X101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
I-3	HSS8X8X3/8	7/S-602			
I-5	HSS8X8X3/8	6/S-602			
I-7	HSS8X8X3/8	7/S-602			
I-9	HSS8X8X3/8	6/S-602			
I-10	HSS8X8X3/8	6/S-602			
I-12	HSS8X8X3/8	6/S-602			
I-13	HSS8X8X3/8	6/S-602			
I-14	HSS8X8X3/8	6/S-602			
I-15	HSS8X8X3/8	7/S-602			
I-16	HSS8X8X3/8	7/S-602			
Ji-9	HSS8X8X3/8	7/S-602			
Ji-10	HSS8X8X3/8	7/S-602			
Ji-11.8	HSS8X8X3/8	7/S-602			
Ji-12.8	HSS8X8X3/8	7/S-602			
Ji-13.7	HSS8X8X3/8	7/S-602			
Ji-14.5	HSS8X8X3/8	7/S-602			
Ji-15	HSS8X8X3/8	7/S-602			
Jn-3	HSS8X8X3/8	6/S-602			
Jn-5	HSS8X8X3/8	6/S-602			
Jn-7	HSS8X8X3/8	6/S-602			
Jp-16	HSS8X8X3/8	6/S-602			
K-1	HSS8X8X3/8	6/S-602			
Ke-15	HSS8X8X3/8	7/S-602			
Kn-16	HSS8X8X3/8	6/S-602			
L-1	HSS8X8X3/8	6/S-602			
L-2	W21X101	4/S-602	2"	(6) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
L-3	HSS8X8X3/8	6/S-602			
L-5	HSS8X8X3/8	6/S-602			
L-7	HSS8X8X3/8	6/S-602			
L-9	HSS8X8X3/8	6/S-602			
L-10	HSS8X8X3/8	6/S-602			
L-12	HSS8X8X3/8	6/S-602			
L-13	HSS8X8X3/8	6/S-602			
L-14	HSS8X8X3/8	6/S-602			
L-15	HSS8X8X3/8	7/S-602			
L-16	HSS10X10X3/8	6/S-602			
Na-15	HSS8X8X3/8	7/S-602			
Na-16	HSS8X8X3/8	6/S-602			
O-1	HSS8X8X3/8	6/S-602			
P-1	HSS8X8X3/8	6/S-602			
P-2	W21X101	4/S-602	2"	(6) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
P-3	HSS8X8X3/8	6/S-602			
P-5	HSS8X8X3/8	6/S-602			
P-7	HSS8X8X3/8	6/S-602			
P-9	HSS8X8X3/8	6/S-602			
P-10	HSS8X8X3/8	6/S-602			
P-12	HSS8X8X3/8	6/S-602			
P-13	HSS8X8X3/8	6/S-602			
P-14	HSS8X8X3/8	6/S-602			
P-15	16"x16"				SEE REMARK 1
P-15	HSS8X8X3/8	6/S-602			
P-16	16"x16"				SEE REMARK 1
P-16	HSS10X10X3/8	6/S-602			
O-1	HSS8X8X3/8	6/S-602			
R-1	HSS8X8X3/8	6/S-602			
R-2	W21X101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
R-3	HSS8X8X3/8	6/S-602			
R-5	HSS8X8X3/8	6/S-602			
R-7	HSS8X8X3/8	6/S-602			
R-9	HSS8X8X3/8	6/S-602			
R-10	HSS8X8X3/8	6/S-602			
R-12	HSS8X8X3/8	6/S-602			
R-13	HSS8X8X3/8	6/S-602			
R-14	HSS8X8X3/8	6/S-602			
R-15	16"x16"				SEE REMARK 1
R-15	HSS8X8X3/8	7/S-602			
R-16	16"x16"				SEE REMARK 1
R-16	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE - AREAS C AND D

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
C-17	HSS8X8X3/8	6/S-602			
C-18	W21X101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
C-19	W12X53	3/S-602			
C-20	W12X53	3/S-602			
C-21	W12X53	3/S-602			
C-22	W12X53	3/S-602			
C-23	W12X53	3/S-602			
C-24	W12X53	3/S-602			
C-25	W12X53	3/S-602			
C-26	W12X53	3/S-602			
C-28	HSS8X8X3/8	6/S-602			
Cn-27	W12X53	3/S-602			
Ep-17	HSS8X8X3/8	6/S-602			
Ez-28	HSS8X8X3/8	6/S-602			
Fc-26	W12X53	3/S-602			
Fc-27	W12X53	3/S-602			
Fh-17	HSS8X8X3/8	6/S-602			
G-17	HSS8X8X3/8	6/S-602			
G-18	W21X101	4/S-602	2"	(6) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
G-19	W12X53	3/S-602			
G-20	W12X53	3/S-602			
G-21	W12X53	3/S-602			
G-22	W12X53	3/S-602			
G-23	W12X53	3/S-602			
G-24	W12X53	3/S-602			
G-25	W12X53	3/S-602			
Gy-26	W12X53	3/S-602			
Gy-27	W12X53	3/S-602			
Hb-28	HSS8X8X3/8				
I-26	HSS8X8X3/8	7/S-602			
I-27	HSS8X8X3/8	7/S-602			
J-17	HSS8X8X3/8	6/S-602			
J-18	W21X101	4/S-602	2"	(6) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
J-19	HSS8X8X3/8	6/S-602			
J-20	HSS8X8X3/8	6/S-602			
J-21	HSS8X8X3/8	6/S-602			
J-22	HSS8X8X3/8	6/S-602			
J-23	HSS8X8X3/8	6/S-602			
J-24	HSS8X8X3/8	6/S-602			
J-25	HSS8X8X3/8	6/S-602			
J-28	HSS8X8X3/8	6/S-602			
Jp-17	HSS8X8X3/8	6/S-602			
Kn-17	HSS8X8X3/8	6/S-602			
N-17	HSS8X8X5/8	6/S-602			
N-18	W21X101	5/S-602	4"	(10) 1 1/2" DIA / 24" EMBED	SEE REMARK 2
N-19	HSS8X8X3/8	6/S-602			
N-20	HSS8X8X3/8	6/S-602			
N-21	HSS8X8X3/8	6/S-602			
N-22	HSS8X8X3/8	6/S-602			
N-23	HSS8X8X3/8	6/S-602			
N-24	HSS8X8X3/8	6/S-602			
N-25	HSS8X8X3/8	6/S-602			
N-26	HSS8X8X3/8	6/S-602			
N-27	HSS8X8X3/8	6/S-602			
N-28	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE - AREA E

COLUMN LOCATION	COLUMN SIZE	BASE PLATE DETAIL	BASE PLATE THICKNESS	ANCHOR BOLTS SIZE / EMBEDMENT	REMARKS
AA-37	HSS8X8X3/8	6/S-602			
AA-38	HSS8X8X3/8	6/S-602			
BB-37	HSS8X8X3/8	6/S-602			
BB-38	HSS8X8X3/8	6/S-602			
CC-37	HSS8X8X3/8	6/S-602			
CC-38	HSS8X8X3/8	6/S-602			
Cn-32	HSS6X6X3/16	6/S-602			
Cn-33.8	HSS6X6X3/16	7/S-602			
DD-37	HSS8X8X3/8	6/S-602			
DD-38	HSS8X8X3/8	6/S-602			
E-29	HSS8X8X3/8	6/S-602			
E-30	HSS10X10X3/8	6/S-602			
E-31	HSS10X10X3/8	6/S-602			
E-32	HSS10X10X3/8	6/S-602			
E-33	HSS10X10X3/8	6/S-602			
E-34	HSS10X10X3/8	6/S-602			
E-35	HSS10X10X3/8	6/S-602			
E-36	HSS8X8X3/8	6/S-602			
EE-37	HSS8X8X3/8	6/S-602			
EE-38	HSS8X8X3/8	6/S-602			
Fb-32	HSS8X8X3/8	6/S-602			
Fb-33	HSS8X8X3/8	6/S-602			
Fb-33.7	HSS8X8X3/8	7/S-602			
Fe-36	HSS10X10X3/8	6/S-602			
Fk-30	HSS8X8X3/8	6/S-602			
G-29.1	HSS8X8X3/8	6/S-602			
G-31	HSS8X8X3/8	6/S-602			
G-32	HSS8X8X3/8	6/S-602			
G-33	HSS8X8X3/8	6/S-602			
G-33.7	HSS8X8X3/8	7/S-602			
G-34	HSS8X8X3/8	6/S-602			
G-35	HSS8X8X3/8	6/S-602			
G-36	HSS8X8X1/2	6/S-602			
J-29	HSS8X8X3/8	6/S-602			
J-31	HSS8X8X3/8	6/S-602			
J-32	HSS8X8X3/8	6/S-602			
J-33	HSS8X8X3/8	6/S-602			
J-33.7	HSS8X8X3/8	7/S-602			
J-34	HSS8X8X3/8	6/S-602			
J-35	HSS8X8X3/8	6/S-602			
J-36	HSS8X8X3/8	6/S-602			
Je-30	HSS8X8X3/8	6/S-602			
Jy-33.7	HSS8X8X3/8	7/S-602			
Jy-36	HSS8X8X3/8	6/S-602			
Kf-32	HSS8X8X3/8	6/S-602			
Kf-33	HSS8X8X3/8	6/S-602			
M-29	HSS8X8X3/8	6/S-602			
M-30	HSS8X8X3/8	6/S-602			
M-31	HSS8X8X3/8	6/S-602			
M-32	HSS8X8X3/8	6/S-602			
M-33	HSS8X8X3/8	6/S-602			
M-34	HSS8X8X3/8	6/S-602			
M-35	HSS8X8X3/8	6/S-602			
M-36	HSS8X8X3/8	6/S-602			

STRUCTURAL COLUMN SCHEDULE GENERAL NOTES

1.
2.
3.

STRUCTURAL COLUMN SCHEDULE REMARKS

1. PRECAST COLUMN. PRECAST SUPPLIER TO DESIGN COLUMN FOR FOR AXIAL LOAD GIVEN ON PLAN.
2. ANCHORS SHALL BE HEAVY HEX HEAD ASTM F1554 GR.36. USE WELDED WASHERS PER DETAIL 2/S-502.

CONCRETE STRIP FOOTING SCHEDULE

MARK	SIZE WIDTH "W"	SIZE HEIGHT "H"	TOP REINFORCEMENT LONG.	TOP REINFORCEMENT TRANS.	BOTTOM REINFORCEMENT LONG.	BOTTOM REINFORCEMENT TRANS.	REMARKS
SF1.5	1'-6"	1'-0"			(2) #5 BARS		
SF3	3'-0"	1'-6"			(3) #5 BARS		
SF4	4'-0"	1'-6"			(4) #5 BARS	#5 BARS AT 12" O.C.	
SF5A	5'-0"	1'-6"			(6) #5 BARS	#5 BARS AT 12" O.C.	
SF6B	6'-0"	1'-6"	(6) #6 BARS	#6 BARS AT 12" O.C.	(6) #6 BARS	#6 BARS AT 12" O.C.	
SF8	8'-0"	1'-6"			(8) #5 BARS	#5 BARS AT 12" O.C.	
SF10	10'-0"	1'-6"			(10) #5 BARS	#3 BARS AT 12" O.C.	
SF14	14'-0"	1'-6"			(14) #6 BARS	#6 BARS AT 6" O.C.	

CONCRETE STRIP FOOTING SCHEDULE NOTES

1. SEE NOTE SHEET S-001 FOR BEARING SOILS PREPARATION REQUIREMENTS.
2. SEE US-501 FOR TYPICAL FOOTING INTERSECTION REINFORCING.
3. EMBED DOWELS INTO FOOTING, 3" CLEAR COVER FROM BOTTOM OF FOOTING.
4. EXCEPT WHERE SPECIFICALLY NOTED, TYPE "A" FOOTING DOWELS SHALL BE TIED IN PLACE PRIOR TO CONCRETE PLACEMENT.

CONCRETE SPREAD FOOTING SCHEDULE

MARK	SIZE WIDTH	SIZE LENGTH	SIZE THICKNESS	BOTTOM REINFORCEMENT LONG.	BOTTOM REINFORCEMENT TRANS.	TOP REINFORCEMENT LONG.	TOP REINFORCEMENT TRANS.	REMARKS
F4	4'-0"	4'-0"	1'-6"	(6) #5 BARS	(6) #5 BARS	-	-	
F5A	4'-0"	5'-2"	1'-6"	(6) #5 BARS	(7) #5 BARS	-	-	
F5	5'-0"	5'-0"	1'-6"	(6) #5 BARS	(8) #5 BARS	-	-	
F7A	4'-0"	7'-0"	2'-0"	(6) #5 BARS	(6) #6 BARS	(6) #5 BARS	(9) #5 BARS	
F7B	4'-3"	7'-3"	2'-0"	(6) #5 BARS	(9) #5 BARS	(6) #5 BARS	(9) #5 BARS	
F8	8'-0"	8'-0"	2'-0"	(10) #6 BARS	(10) #6 BARS	-	-	
F9A	4'-0"	9'-0"	2'-0"	(3) #6 BARS	(10) #6 BARS	(3) #6 BARS	(10) #6 BARS	
F9A	6'-0"	9'-0"	2'-0"	(3) #6 BARS	(11) #6 BARS	(9) #6 BARS	(11) #6 BARS	
F10A	9'-0"	10'-0"	2'-6"	(11) #7 BARS	(11) #7 BARS	(11) #7 BARS	(11) #7 BARS	
F12	12'-0"	12'-0"	3'-0"	(12) #8 BARS	(12) #8 BARS	(12) #8 BARS	(12) #8 BARS	REMARK 1

CONCRETE SPREAD FOOTING SCHEDULE GENERAL NOTES

1. SEE NOTE SHEET S-001 FOR BEARING SOILS PREPARATION REQUIREMENTS.
2. -

CONCRETE SPREAD FOOTING SCHEDULE REMARKS

1. COMMUNICATIONS TOWER FOOTING, SEE DETAIL 13/S-502.
2. -

FOUNDATION WALL SCHEDULE

MARK	WIDTH	REINFORCEMENT HORIZONTAL	REINFORCEMENT VERTICAL	REMARKS
FW08	8'-0"	#5 BARS AT 18" O.C. CENTERED	#5 BARS AT 18" O.C. CENTERED	
FW09	9'-0"	#3 BARS AT 18" O.C. EACH FACE	#5 BARS AT 18" O.C. EACH FACE	
FW10.5	0'-10 1/2"	#5 BARS AT 18" O.C. EACH FACE	#5 BARS AT 18" O.C. EACH FACE	
FW12	1'-0"	#5 BARS AT 18" O.C. EACH FACE	#5 BARS AT 12" O.C. EACH FACE	
FW12B	1'-0"	#6 BARS AT 12" O.C. EACH FACE	#6 BARS AT 12" O.C. EACH FACE	

CONCRETE PIER SCHEDULE

MARK	SIZE	VERTICAL REINFORCEMENT	TIES TYPE	TIES # AND SPACING	REMARKS
P18	18" X 18"	(6) #6 BARS	B	#3 AT 12"	
P22	22" X 22"	(6) #7 BARS	B	#3 AT 12"	
P66	66" X 66"	-	-	-	SEE REMARK 1
P1330	13" X 30"	(6) #7 BARS	D	#3 AT 12"	
P1422	14" X 22"	(6) #7 BARS	D	#3 AT 12"	
P2422	24" X 22"	(8) #6 BARS	B	#3 AT 12"	
P3648	36" X 48"	-	-	-	SEE REMARK 2
P3666	36" X 66"	-	-	-	SEE REMARK 3

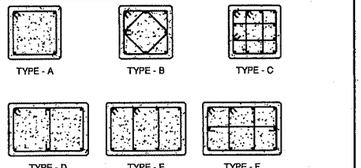
CONCRETE PIER SCHEDULE GENERAL NOTES

1. SEE FOUNDATION PLANS FOR TOP OF PIER ELEVATIONS.
2. REFERENCE TYPICAL TIE DETAILS FOR CROSS-TIE REQUIREMENTS.
3. WHEN PIERS ARE INTEGRAL WITH WALLS, PIER DIMENSIONS ARE INDICATED FOR THE PURPOSE OF DIMENSIONING PIER TIES, SETTING VERTICAL REINFORCING, DEFINING EXTENT OF TOP OF PIER RECESS OR PROJECTION FROM TOP OF WALL. CENTER PIER REINFORCING CAGE BELOW COLUMN AND ORIENT LONG DIMENSION OF PIER WITH AXIS OF WALL UNLESS NOTED OR DETAILED OTHERWISE. CONTINUE WALL REINFORCING THROUGH PIERS WITH LAPS AS REQUIRED.
4. SEE DETAIL 13/S-501 FOR TYPICAL PIER CONSTRUCTION.

CONCRETE PIER SCHEDULE REMARKS

1. COMMUNICATIONS TOWER PIER, SEE DETAIL 13/S-502.
2. PIER IN GRADE BEAM GB3656, SEE DETAILS 1/S-504, 5/S-504, AND 7/S-504.
3. PIER IN GRADE BEAM GB3656, SEE DETAILS 2/S-504, 6/S-504, AND 7/S-504.

TYPICAL TIE DETAILS



LINTEL SCHEDULE

MARK	DESCRIPTION	BEARING	DETAIL	REMARKS
L19	1 COURSE BOND BEAM WITH (2) #5 AT BOTTOM	4" E.E.		NO BOTTOM PLATE
L20	2 COURSE BOND BEAM WITH (2) #5 AT BOTTOM	4" E.E.		NO BOTTOM PLATE
L21	3 COURSE BOND BEAM WITH (2) #4 AT TOP AND BOTTOM	8" E.E.		NO BOTTOM PLATE

LINTEL SCHEDULE GENERAL NOTES

1. ALL LINTELS SHALL HAVE 1/4" THICK BOTTOM PLATE TO MATCH WIDTH OF WALL MINUS 1/4" EACH SIDE U.N.O.
2.
3.

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ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

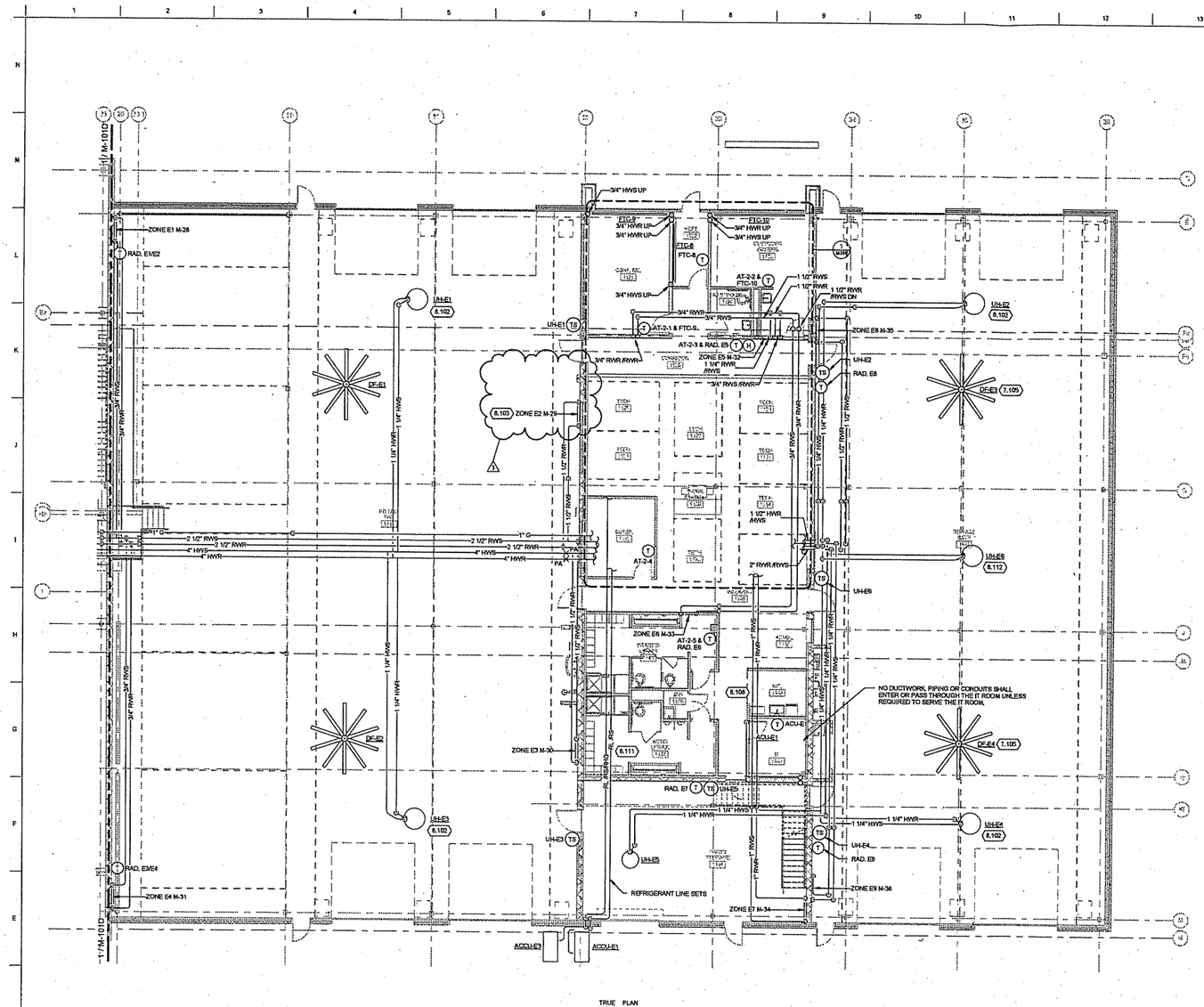
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PROJECT No: 13035XX-160204.01

STRUCTURAL SCHEDULES

S-601

ADDENDUM 3



TRUE NORTH PLAN NORTH

1 LEVEL 1 FLOOR PLAN - MECHANICAL - AREA E

1/8" = 1'-0"

GENERAL PIPING NOTES:

1. PIPING RUNOUTS TO ALL EQUIPMENT TO BE 3/4" UNLESS NOTED OTHERWISE.
2. WELD-O-LETS AND THREAD-O-LETS MAY BE USED FOR BRANCH TAKE-OFFS UP TO ONE-HALF THE DIAMETER OF THE MAIN.
3. INSTALL DIELECTRIC FITTINGS WHERE PIPING OF DIFFERENT MATERIALS IS JOINED.
4. INSTALL PIPING FREE OF SAGS AND BENDS.
5. LOCATE ALL VALVES FOR EASY ACCESS. INSTALL VALVES WITH STEM UP OR HORIZONTAL.
6. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE. INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS IN PIPING, AT HEAT-TRANSFER COILS, AND ELSEWHERE AS REQUIRED FOR SYSTEM AIR VENTING.
7. PRIME AND PAINT ALL EXTERIOR GAS PIPING A COLOR AS SELECTED BY ARCHITECT. SUPPORT PIPING FROM BUILDING WALL WITH PAINTED WALL SUPPORTS AS NEEDED.
8. PROVIDE NAMEPLATE AT VALVE STATING, "EMERGENCY POWER SUPPLY GAS SHUTOFF VALVE".
9. HOUSEKEEPING PAD PROVIDED BY DIVISION 23 CONTRACTOR. REFER TO 23 05 29 FOR REQUIREMENTS.
10. GAS METER BY MGE. COORDINATE METER INSTALLATION WITH MGE. P.C. RESPONSIBLE FOR ALL PIPING DOWNSTREAM OF GAS METER. GAS METER SHALL BE SIZED FOR 7200 CFH WITH 2 PSI OUTLET GAS PRESSURE. GAS METER SHALL HAVE PULSE SIGNAL CAPABILITY TO OUTPUT GAS CONSUMPTION TO BUILDING'S FMCS. P.C. SHALL PAY ANY ADDITIONAL COST FOR UPGRADED GAS METER WITH PULSE OUTPUT CAPABILITY. MAINTAIN AT LEAST 10'-0" SEPARATION BETWEEN GAS METER REGULATOR VENT AND OUTSIDE AIR INTAKES. IF REQUIRED, ROUTE RELIEF VENT TO THE NORTH TO MAINTAIN CLEARANCE REQUIREMENTS. PAINT RELIEF VENT COLOR AS SELECTED BY ARCHITECT.

KEYED NOTES

7.105 COORDINATE LOCATION OF FAN WITH VEHICLE EXHAUST RAIL SUPPORTS.

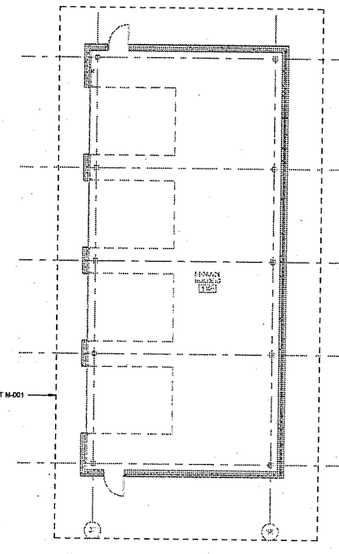
8.102 COORDINATE LOCATION OF UNIT HEATER WITH OVERHEAD DOOR TRACK AND VEHICLE EXHAUST RAIL SUPPORTS.

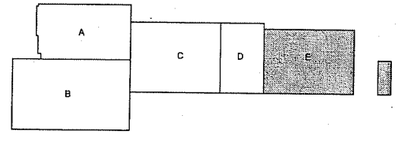
8.103 BOTTOM OF MANIFOLD CABINET TO BE 2" AFF TO FIT BELOW GLAZING.

8.108 HWS/HWR ROUTED ON MEZZANINE LEVEL.

8.111 REFRIGERANT LINE SET ROUTED THROUGH STRUCTURE ON MEZZANINE LEVEL.

8.112 COORDINATE LOCATION OF UNIT HEATER WITH VEHICLE EXHAUST RAIL SUPPORTS.





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ADDENDUM 3

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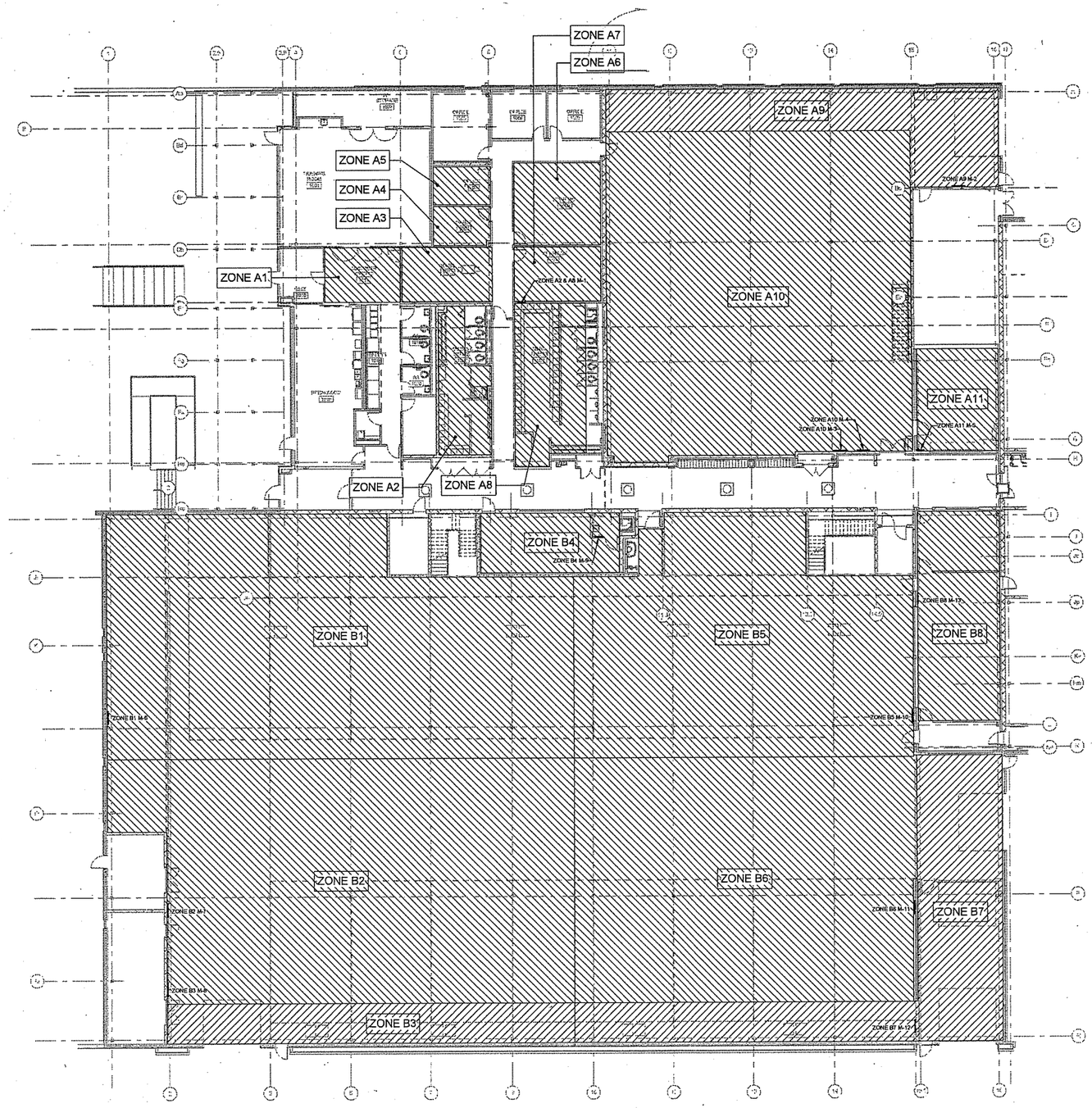
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3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-182264.01

LEVEL 1 FLOOR PLAN - PIPING - AREA E

M-131E

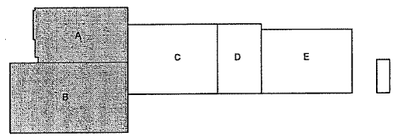


TRUE NORTH PLAN NORTH

1 LEVEL 1 RADIANT INFLOOR FLOOR PLAN - MECHANICAL - AREA A & B
3/32" = 1'-0"

RADIANT FLOOR HATCH PATTERN LEGEND:

- INTERIOR ZONE
- EXTERIOR ZONE (10'-0")
- EXTERIOR AREA - PART OF INTERIOR ZONE + EXTERIOR SPACE (10'-0")



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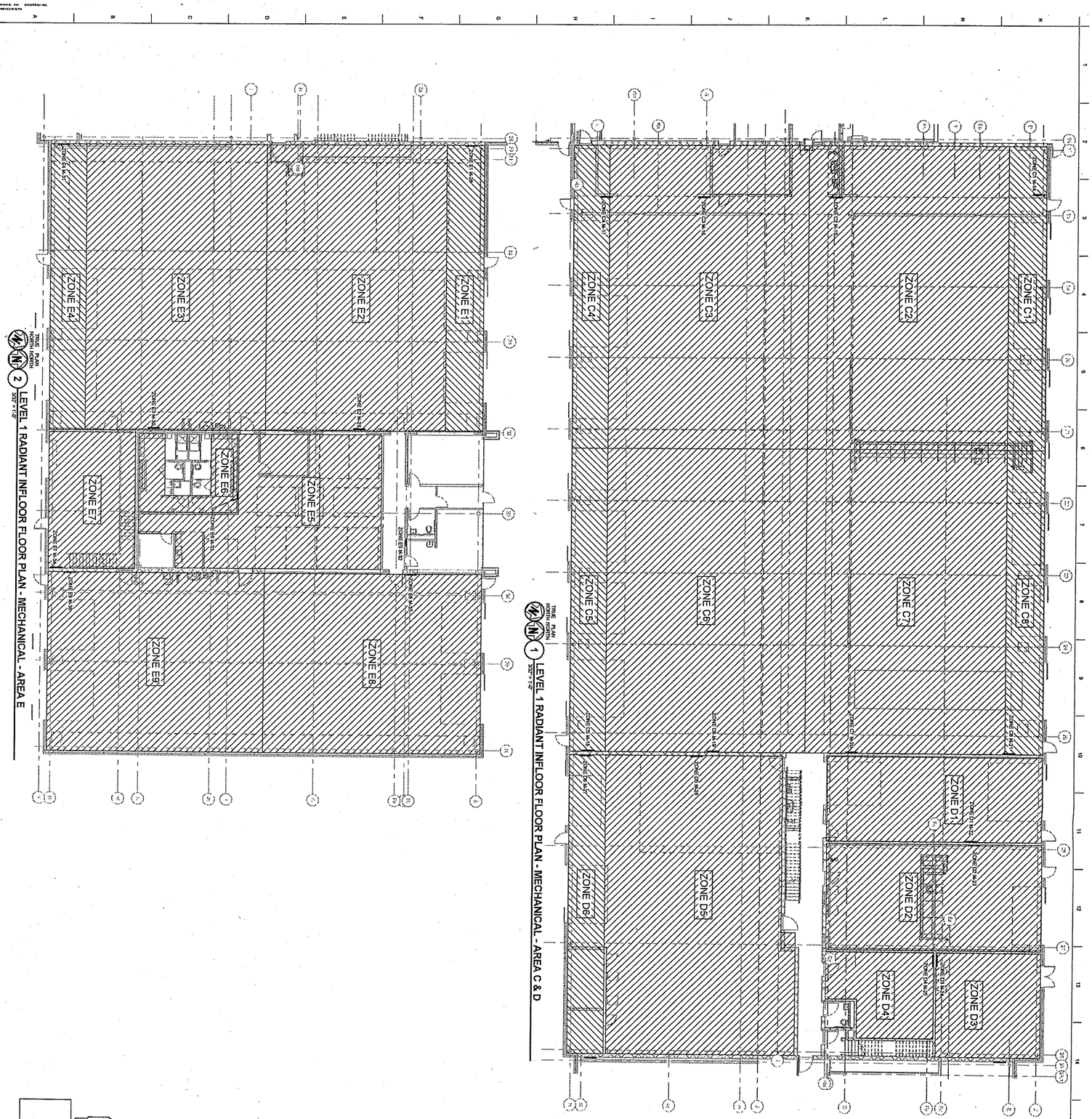
No	REVISION/SUBMISSION	DATE
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 13073500-1802/84.01

LEVEL 1 FLOOR PLAN - RADIANT INFLOOR HEATING - AREAS A & B

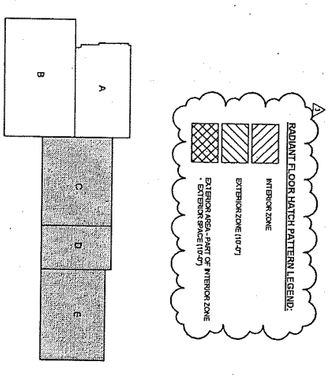
M-132

Addendum 3



2 LEVEL 1 RADIANT INFLOOR FLOOR PLAN - MECHANICAL - AREA E
3/32" = 1'-0"

1 LEVEL 1 RADIANT INFLOOR FLOOR PLAN - MECHANICAL - AREA C & D
3/32" = 1'-0"



M-133

LEVEL 1 FLOOR PLAN - RADIANT INFLOOR HEATING - AREAS C, D & E

No.	REVISION/SUBMISSION	DATE
	ISSUE FOR BID	03/07/2019
	ISSUE FOR BID - ADDENDUM 1	03/21/2019
	ISSUE FOR BID - ADDENDUM 2	04/04/2019

PROJECT No: 13000000-0000A.01

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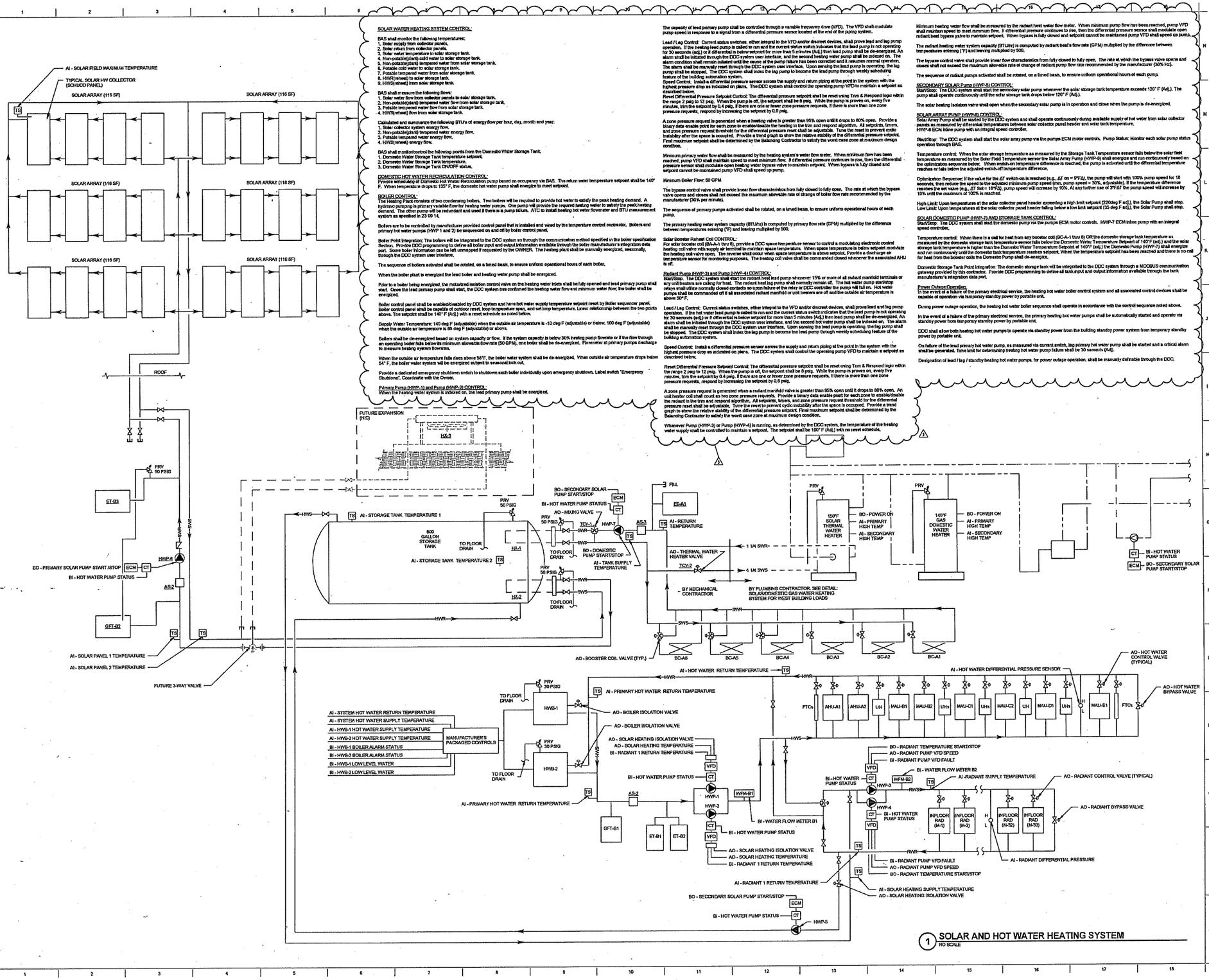
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ADDENDUM 3



1 SOLAR AND HOT WATER HEATING SYSTEM
NO SCALE

SOLAR WATER HEATING SYSTEM CONTROL:

BAS shall monitor the following temperatures:
1. Solar supply from collector panels.
2. Solar return from collector panels.
3. Solar water temperature in solar storage tank.
4. Non-potable(plant) cold water to solar storage tank.
5. Non-potable(plant) tempered water from solar storage tank.
6. Potable cold water to solar storage tank.
7. Potable tempered water from solar storage tank.
8. HWR(reheat) to solar storage tank.
9. HWS(reheat) from solar storage tank.

BAS shall measure the following flows:
1. Solar water flow from collector panels to solar storage tank.
2. Non-potable(plant) tempered water flow from solar storage tank.
3. Potable tempered water flow from solar storage tank.
4. HWS(reheat) flow from solar storage tank.

Calculated and summarize the following BTUs of energy flow per hour, day, month and year:
1. Solar collector system energy flow.
2. Non-potable(plant) tempered water energy flow.
3. Potable tempered water energy flow.
4. HWS(reheat) energy flow.

BAS shall monitor/control the following points from the Domesbo Water Storage Tank:
1. Domestic Water Storage Tank temperature setpoint.
2. Domestic Water Storage Tank temperature.
3. Domestic Water Storage Tank ON/OFF status.

DOMESTIC HOT WATER RECIRCULATION CONTROL:
Provide scheduling of Domestic Hot Water Recirculation pump based on occupancy via BAS. The return water temperature setpoint shall be 140° F. When temperature drops to 135° F, the domestic hot water pump shall energize to meet setpoint.

BOILER CONTROL:
The Heating Plant consists of two condensing boilers. Two boilers will be required to provide hot water to satisfy the peak heating demand. A hydronic pumping is primary variable flow for heating water pumps. One pump will provide the required heating water to satisfy the peak heating demand. The other pump will be redundant and used if there is a pump failure. ATC to install heating hot water flowmeter and BTU measurement system as specified in 23 09 14.

Boilers are to be controlled by manufacturer provided control panel that is installed and wired by the temperature control contractor. Boilers and primary hot water pumps (HWP 1 and 2) be sequenced on and off by boiler control panel.

Boiler Point Integration: The boilers will be integrated to the DDC system as through the communication method specified in the boiler specification Section. Provide DDC programming to define all boiler input and output information available through the boiler manufacturer's integration data port. Stored boiler information can be left unmapped if requested by the OWNER. The heating plant shall be manually energized, seasonally, through the DDC system user interface.

The sequence of boilers activated shall be rotated, on a timed basis, to ensure uniform operational hours of each boiler.

When the boiler plant is energized the lead boiler and heating water pump shall be energized.

Prior to a boiler being energized, the motorized isolation control valve on the heating water inlets shall be fully opened and lead primary pump shall start. Once the lead primary pump shall start, the DDC system has confirmed the heating water flow and minimum water flow; the boiler shall be energized.

Boiler control panel shall be enabled/disabled by DDC system and have hot water supply temperature setpoint reset by Boiler sequencer panel. Boiler control panel shall be capable of outdoor reset, loop temperature span, and set loop temperature. Linear relationship between the two points above. The setpoint shall be 140° F (Adj.) with a reset schedule as noted below.

Supply Water Temperature: 140 deg F (adjustable) when the outside air temperature is -10 deg F (adjustable) or below; 100 deg F (adjustable) when the outside air temperature is 65 deg F (adjustable) or above.

Boilers shall be de-energized based on system capacity or flow. If the system capacity is below 30% heating pump flowrate or if the flow through an operating boiler falls below its minimum allowable flow rate (50 GPM), one boiler shall be de-energized. Flowmeter at primary pumps discharge to measure heating system flowrates.

When the outside air temperature falls does above 56°F, the boiler water system shall be de-energized. When outside air temperature drops below 54° F, the boiler water system will be energized subject to seasonal lock out.

Provide a dedicated emergency shutdown switch to shutdown each boiler individually upon emergency shutdown, Label switch "Emergency Shutdown". Coordinate with the Owner.

Primary Pump (HWP-1) and Pump (HWP-2) CONTROL:
When the heating water system is initiated on, the lead primary pump shall be energized.

The capacity of lead primary pump shall be controlled through a variable frequency drive (VFD). The VFD shall modulate pump speed in response to a signal from a differential pressure sensor located at the end of the piping system.

Lead / Lag Control: Current status switches, either integral to the VFD and/or discreet devices, shall prove lead and lag pump operation. If the heating lead pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj.) or if differential is below setpoint for more than 5 minutes (Adj.) then lead pump shall be de-energized. An alarm shall be initiated through the DDC system user interface, and the second heating water pump shall be indexed on. The alarm conditions shall remain initiated until the cause of the pump failure has been corrected and the pump resumes normal operation. The alarm shall be manually reset through the DDC system user interface. Upon sensing the lead pump is operating, the lag pump shall be stopped. The DDC system shall index the lag pump to become the lead pump through weekly scheduling feature of the building automation system.
Speed Control: Install a differential pressure sensor across the supply and return piping at the point in the system with the highest pressure drop as indicated on plans. The DDC system shall control the operating pump VFD to maintain a setpoint as described below:
Reset Differential Pressure Setpoint Control: The differential pressure setpoint shall be reset using Trim & Respond logic within the range 2 psig to 12 psig. When the pump is off, the setpoint shall be 8 psig. While the pump is proven on, every five minutes, trim the setpoint by 0.4 psig. If there are one or fewer zone pressure requests, respond by increasing the setpoint by 0.6 psig.

A zone pressure request is generated when a heating valve is greater than 95% open until it drops to 80% open. Provide a binary data enable point for each zone to enable/disable the heating in the trim and respond algorithm. All setpoints, timers, and zone pressure request threshold for the differential pressure reset shall be adjustable. Tune the reset to prevent cyclic instability after the space is occupied. Provide a trend graph to show the relative stability of the differential pressure setpoint. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Minimum primary water flow shall be measured by the heating system's water flow meter. When minimum flow has been reached, pump VFD shall maintain speed to meet minimum flow. If differential pressure continues to rise, then the differential pressure sensor shall modulate open heating coil valve open. The reverse shall occur when space temperature is above setpoint. When bypass is fully closed and setpoint cannot be maintained pump VFD shall speed up pump.

Minimum Boiler Flow: 50 GPM.

The bypass control valve shall provide linear flow characteristics from fully closed to fully open. The rate at which the bypass valve opens and closes shall not exceed the maximum allowable rate of change of boiler flow rate recommended by the manufacturer (30% per minute).

The sequence of primary pumps activated shall be rotated, on a timed basis, to ensure uniform operational hours of each pump.

The primary heating water system capacity (BTU/Hr) is computed by primary flow rate (GPM) multiplied by the difference between temperatures entering (°F) and leaving multiplied by 500.

Solar Booster Reheat Coil CONTROL:
For solar booster coil (BA-A-1 thru 6), provide a DDC space temperature sensor to control a modulating electronic control heating coil valve with supply air terminal to maintain space temperature. When space temperature is below setpoint modulate the heating coil valve open. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes. The heating coil valve shall be commanded closed whenever the associated AHU is off.

Radiant Pump (HWP-3) and Pump (HWP-4) CONTROL:
Start/Stop: The DDC system shall start the radiant heat lead pump whenever 15% or more of all radiant manifold terminals or any unit heaters are calling for heat. The radiant heat lag pump shall normally remain off. The hot water pump start/stop relays shall utilize normally closed contacts so upon failure of the relay or DDC controller the pump will fail on. Hot water pumps shall be commanded off if all associated radiant manifold or unit heaters are off and the outside air temperature is above 50° F.

Lead / Lag Control: Current status switches, either integral to the VFD and/or discreet devices, shall prove lead and lag pump operation. If the hot water lead pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj) or if differential is below setpoint for more than 5 minutes (Adj.) then lead pump shall be de-energized. An alarm shall be initiated through the DDC system user interface, and the second hot water pump shall be indexed on. The alarm shall be manually reset through the DDC system user interface. Upon sensing the lead pump is operating, the lag pump shall be stopped. The DDC system shall index the lag pump to become the lead pump through weekly scheduling feature of the building automation system.

Speed Control: Install a differential pressure sensor across the supply and return piping at the point in the system with the highest pressure drop as indicated on plans. The DDC system shall control the operating pump VFD to maintain a setpoint as described below.

Reset Differential Pressure Setpoint Control: The differential pressure setpoint shall be reset using Trim & Respond logic within the range 2 psig to 12 psig. When the pump is off, the setpoint shall be 8 psig. While the pump is proven on, every five minutes, trim the setpoint by 0.4 psig. If there are one or fewer zone pressure requests, respond by increasing the setpoint by 0.6 psig.

A zone pressure request is generated when a radiant manifold valve is greater than 95% open until it drops to 80% open. An unit heater coil shall count as two zone pressure requests. Provide a binary data enable point for each zone to enable/disable the radiant in the trim and respond algorithm. All setpoints, timers, and zone pressure request threshold for the differential pressure reset shall be adjustable. Tune the reset to prevent cyclic instability after the space is occupied. Provide a trend graph to show the relative stability of the differential pressure setpoint. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Whenever Pump (HWP-3) or Pump (HWP-4) is running, as determined by the DDC system, the temperature of the heating water supply shall be controlled to maintain a setpoint. The setpoint shall be 100° F (Adj.) with no reset schedule.

Minimum heating water flow shall be measured by the radiant heat water flow meter. When minimum pump flow has been reached, pump VFD shall maintain speed to meet minimum flow. If differential pressure continues to rise, then the differential pressure sensor shall modulate open radiant heat bypass valve to maintain setpoint. When bypass is fully closed and setpoint cannot be maintained pump VFD shall speed up pump.

The radiant heating water system capacity (BTU/Hr) is computed by radiant heat's flow rate (GPM) multiplied by the difference between temperatures entering (°F) and leaving multiplied by 500.

The bypass control valve shall provide linear flow characteristics from fully closed to fully open. The rate at which the bypass valve opens and closes shall not exceed the maximum allowable rate of change of radiant pump flow rate recommended by the manufacturer (30% Hz).

The sequence of radiant pumps activated shall be rotated, on a timed basis, to ensure uniform operational hours of each pump.

SECONDARY SOLAR Pump (HWP-5) CONTROL:
Start/Stop: The DDC system shall start the secondary solar pump whenever the solar storage tank temperature exceeds 120° F (Adj.). The pump shall operate continuously until the solar storage tank drops below 120° F (Adj.).

The solar heating isolation valve shall open when the secondary solar pump is in operation and close when the pump is de-energized.

SOLAR ARRAY PUMP (HWP-B) CONTROL:
Solar Array Pump shall be started by the DDC system and shall operate continuously during available supply of hot water from solar collector panels as measured by differential temperatures between solar collector panel header and solar tank temperature.
HWP-6 ECM inline pump with an integral speed controller.

Start/Stop: The DDC system shall start the solar array pump via the pumps ECM motor controls. Pump Status: Monitor each solar pump status operation through BAS.

Temperature control: When the solar storage temperature as measured by the Storage Tank Temperature sensor falls below the solar field temperature as measured by the Solar Field Temperature sensor the Solar Array Pump (HWP-6) shall energize and run continuously based on the optimization sequence below. When switch-on temperature difference is reached, the pump is activated until the differential temperature reaches or falls below the adjusted switch-off temperature difference.

Optimization Sequence: If the value for the ΔT switch-on is reached (e.g., ΔT on = 9°F), the pump will start with 100% pump speed for 10 seconds, then reduce the speed to the adjusted minimum pump speed (min. pump speed = 30%, adjustable). If the temperature difference reaches the set value (e.g., ΔT Set = 18°F), pump speed will increase by 10%. At any further rise of 3°F/4° the pump speed will increase by 10% until the maximum of 100% is reached.

High Limit: Upon temperatures at the solar collector panel header exceeding a high limit setpoint (220deg F adj.), the Solar Pump shall stop.
Low Limit: Upon temperatures at the solar collector panel header falling below a low limit setpoint (35 deg F adj.), the Solar Pump shall stop.

SOLAR DOMESTIC PUMP (HWP-7) AND STORAGE TANK CONTROL:
Start/Stop: The DDC system shall start the domestic pump via the pumps ECM motor controls. HWP-7 ECM inline pump with an integral speed controller.

Temperature control: When there is a call for heat from any booster coil (BCA-1 thru 6) OR the domestic storage tank temperature as measured by the domestic storage tank temperature sensor falls below the Domestic Water Temperature Setpoint of 140°F (adj.) and the solar storage tank temperature is higher than the Domestic Water Temperature Setpoint of 140°F (adj.) the Domesbo Pump (HWP-7) shall energize and run continuously until the domestic tank temperature reaches setpoint. When the temperature setpoint has been reached and there is no call for heat from the booster coils the Domesbo Pump shall de-energize.

Domestic Storage Tank Point Integration: The domestic storage tank will be integrated to the DDC system through a MODBUS communication gateway provided by this contractor. Provide DDC programming to define all tank input and output information available through the tank manufacturer's integration data port.

Power Outage Operation:
In the event of a failure of the primary electrical service, the heating hot water boiler control system and all associated control devices shall be capable of operation via temporary standby power by portable unit.

Dump power outage operation, the heating hot water boiler sequence shall operate in accordance with the control sequence noted above.

In the event of a failure of the primary electrical service, the primary heating hot water pumps shall be automatically started and operate via standby power from temporary standby power by portable unit.

DDC shall allow both heating hot water pumps to operate via standby power from the building standby power system from temporary standby power by portable unit.

On failure of the lead primary hot water pump, as measured via current switch, lag primary hot water pump shall be started and a critical alarm shall be generated. Time limit for determining heating hot water pump failure shall be 30 seconds (Adj).

Designation of lead / lag / standby heating hot water pumps, for power outage operation, shall be manually definable through the DDC.

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CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

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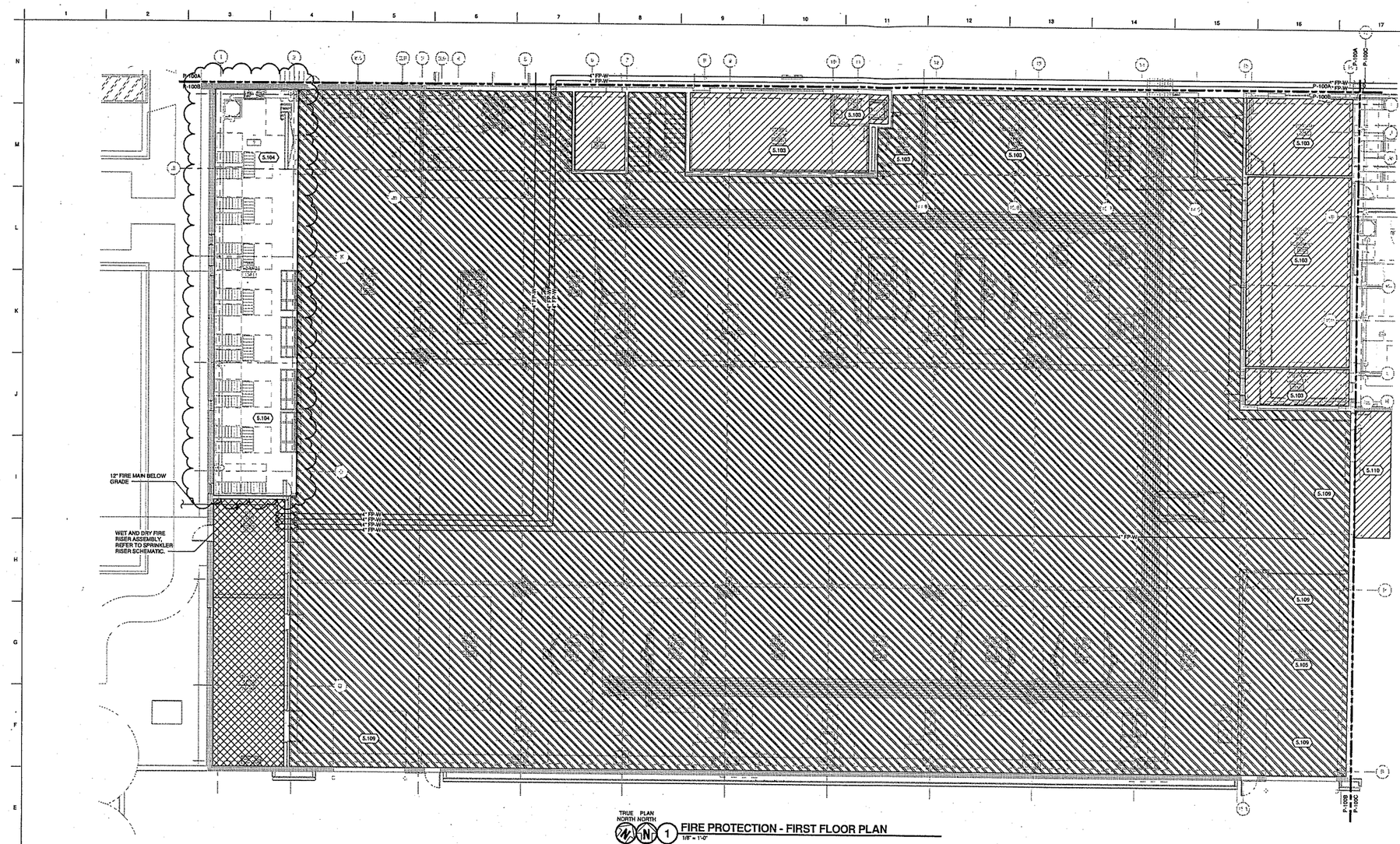
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/11/2019

PROJECT No: 13035500-1802564.01

MECHANICAL WATER FLOW DIAGRAM

M-809

A ADDUM.3



TRUE NORTH PLAN NORTH

1 FIRE PROTECTION - FIRST FLOOR PLAN

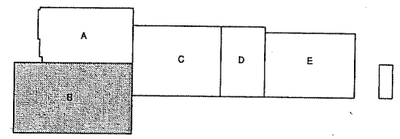
1/8" = 1'-0"

NFPA-13 HYDRAULIC CALCULATION STANDARD			
HAZARD CLASS	DENSITY GPM/SQ.FT.	AREA OF SPRINKLER OPERATION SQ. FT.	TOTAL HOSE STREAM GPM
LIGHT HAZARD	0.10	1500	100
ORDINARY GROUP 1	0.15	1500	250
ORDINARY HAZARD GROUP 2	.20	1500	250
EXTRA HAZARD GROUP1	.30	2500	500
EXTRA HAZARD GROUP2	.40	2500	500

* THE MOST HYDRAULICALLY REMOTE LOCATIONS MUST MEET THE ABOVE REQUIREMENTS.

FIRE PROTECTION HATCH PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2
- EXTRA HAZARD GROUP 1
- EXTRA HAZARD GROUP 2



KEYED NOTES

5.103 ROOM BELOW MEZZANINE. EXTEND SPRINKLER COVERAGE AS REQUIRED.

5.104 TIRE RACK STORAGE AREA. PROVIDE MINIMUM 0.39 GPM/SF DENSITY OVER A 2500 SF DESIGN AREA AND 750 GPM HOSE STREAM ALLOWANCE.

5.105 ROOM LID IS BELOW HIGHEST STRUCTURE OF BUILDING. PROVIDE SPRINKLER COVERAGE ABOVE AND BELOW ROOM LID.

5.109 PROVIDE SPRINKLER COVERAGE ABOVE AND BELOW OVERHEAD DOOR

5.110 PROVIDE DRY BARREL SIDEWALL SPRINKLER TO SERVE LOADING DOCK CANOPY.

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3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
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PROJECT No: 1303500-160264.01

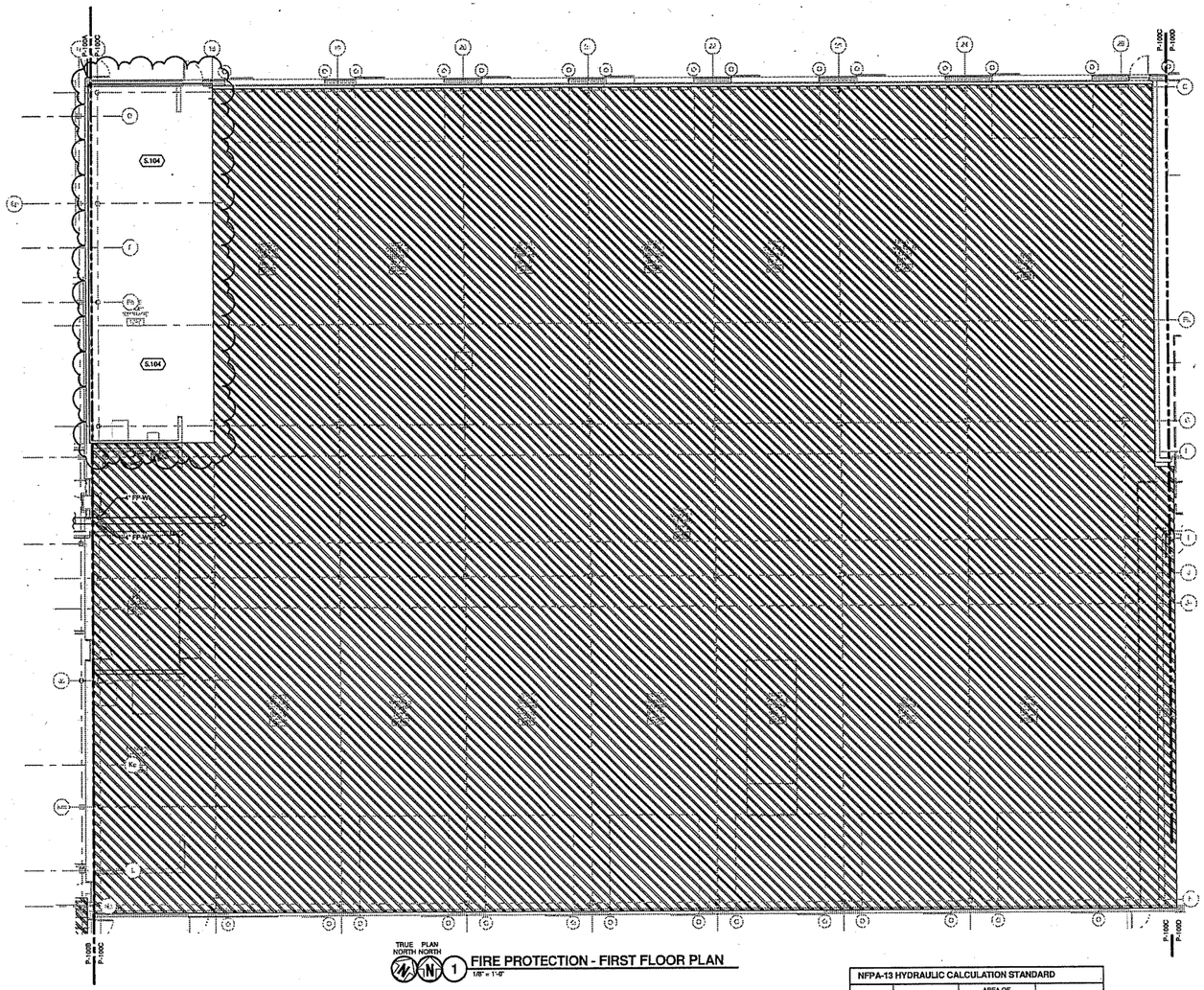
LEVEL 1 FLOOR PLAN - FIRE PROTECTION - AREA B

F-101B

Addendum 3

KEYED NOTES

S.104 TIRE RACK STORAGE AREA. PROVIDE MINIMUM 0.39 GPM/SF DENSITY OVER A 2600 SF DESIGN AREA AND 750 GPM HOSE STREAM ALLOWANCE.



TRUE NORTH PLAN NORTH

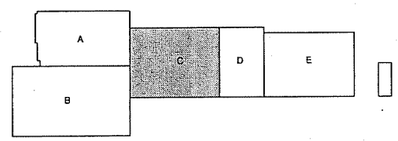
1 FIRE PROTECTION - FIRST FLOOR PLAN
1/8" = 1'-0"

NFPA-13 HYDRAULIC CALCULATION STANDARD			
HAZARD CLASS	DENSITY GPM/SQ.FT.	AREA OF SPRINKLER OPERATION SQ. FT.	TOTAL HOSE STREAM GPM
LIGHT HAZARD	0.10	1500	100
ORDINARY GROUP 1	0.15	1500	250
ORDINARY HAZARD GROUP 2	.20	1500	250
EXTRA HAZARD GROUP1	.30	2500	500
EXTRA HAZARD GROUP2	.40	2500	500

* THE MOST HYDRAULICALLY REMOTE LOCATIONS MUST MEET THE ABOVE REQUIREMENTS.

FIRE PROTECTION HATCH PATTERN LEGEND:

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2
- EXTRA HAZARD GROUP 1
- EXTRA HAZARD GROUP 2



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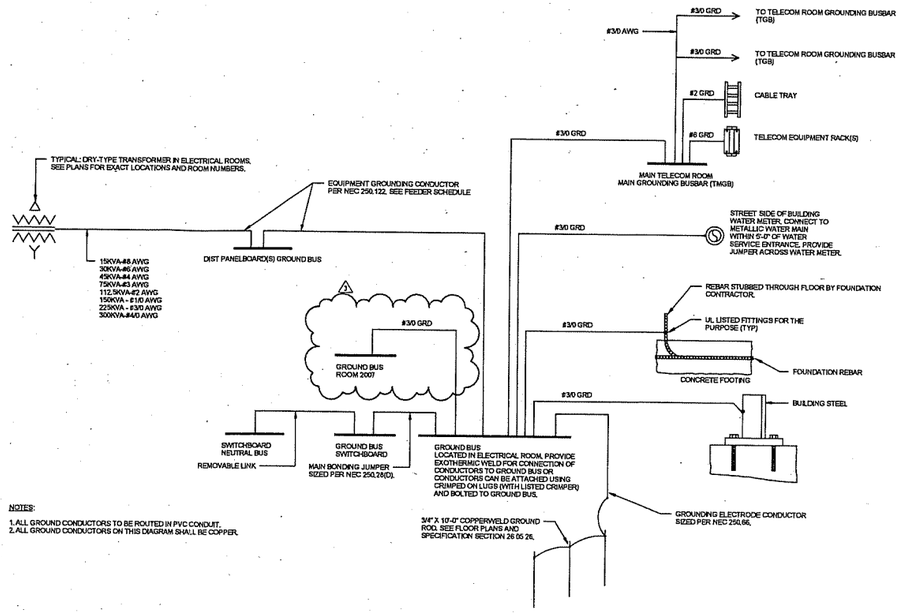
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PROJECT No: 1303500-160084.01

LEVEL 1 FLOOR PLAN -
FIRE PROTECTION - AREA C

F-101C

At 3DOM 3



NOTES:

1. ALL GROUND CONDUCTORS TO BE ROUTED IN PVC CONDUIT.
2. ALL GROUND CONDUCTORS ON THIS DIAGRAM SHALL BE COPPER.

1 **GROUNDING SYSTEM DETAIL**
NO SCALE

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ADDENDUM 3

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PROJECT No. 1303500-1602/04.01

DETAILS

E-503

OPTIONS/ACCESSORIES CODE LISTING:

15 MATTE DIFFUSE CLEAR REFLECTOR

BALLAST/DRIVER CODE LISTING: (SEE SPECIFICATIONS)

B LED NON-DIMMABLE POWER SUPPLY.
C LED DIMMABLE POWER SUPPLY (0-10V) 1%.
D LED DIMMABLE POWER SUPPLY (0-10V) 10%.
E LED DIMMABLE POWER SUPPLY (TRAILING EDGE).
F LED DIMMABLE POWER SUPPLY 1% DIMMING LUTRON HI LUME OR EQUAL.
G LED DIMMABLE POWER SUPPLY ADVANCE XITANIUM OR EQUAL.
H LED DIMMABLE POWER SUPPLY (0-10V) 5%.
J LED DIMMABLE POWER SUPPLY (0-10V) 1% ELDO OR EQUAL.

GENERAL NOTES:

1. ONLY DRIVERS LEGEND IS INDICATED ON THIS SCHEDULE TO ESTABLISH THE INTENT OF THE DESIGN AND ASSOCIATED CONTROLS. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION. EACH FIXTURE SUBMITTAL SHALL BE PROVIDED WITH FULL DRIVER ANDLED MODULES INFORMATION.
2. WHEN 0%-1% OR DMX DIMMING IS IDENTIFIED IN THE SCHEDULE, EC SHALL PROVIDE A MIN OF TWO DRIVERS OF EACH KIND TO THE CONTROL MANUFACTURER FOR TESTING AND COMPATABLITY APPROVAL.
3. ALL LED REPLACEMENT LAMPS SHALL BE TESTED FOR DIMMING COMPATABILITY WITH DIMMING SYSTEM BEING SUPPLIED. CONTRACTOR SHALL PROVIDE MINIMUM OF (4) FOUR LAMPS OF EACH TYPE LISTED IN THIS SCHEDULE OR ANY SUBSTITUTE TO BE SUPPLIES TO DIMMING SYSTEMS/DEVICE MANUFACTURER FOR TESTING TO VERIFY LAMP PERFORMANCE.
4. EC SHALL VERIFY AND CONFIRM ALL LUMINAIRE TRIMS/FLANGES WITH RESPECTIVE CEILING TYPES SCHEDULED AND/OR SUBMITTED BY THE GC PRIOR TO LUMINAIRES ORDER RELEASE. SCHEDULE INDICATES TRIM TYPES BASED ON THE GENERIC CEILING INFORMATION AVAILABLE AT THE TIME BIDDING DOCUMENTS WERE ISSUED AND MAY NOT REFLECT ACTUAL THICKNESS OF GYPSUM WALL BOARD OR PLASTER CEILING OR EXACT GRID TYPE SPECIFIED BY THE ARCHITECT.

KEYED NOTES:

1. PROVIDE WITH ALL REQUIRED ACCESSORIES TO ALLOW INSTALLATION AS SHOWN ON THE PLANS.
2. SEE PLANS FOR EXACT LENGTH. PROVIDE WITH REMOTE POWER SUPPLIES IN QUANTITIES AS DICTATED BY THE INSTALLATION. EACH STRIP SHALL BE PROVIDED WITH MOUNTING CLIPS AND STAINLESS STEEL CHANNEL.
3. PROVIDE WITH 20' ROUND STEEL TAPERED POLE; CATALOG # RTS-6-D-20-S-T-1-X OR EQUAL.
4. PROVIDE WITH 25' ROUND STEEL TAPERED POLE; CATALOG # RTS-6-D-25-S-T-2-X OR EQUAL.
5. PROVIDE WITH 25' ROUND STEEL TAPERED POLE; CATALOG # RTS-6-D-25-S-T-3-2-X-E OR EQUAL.
6. PROVIDE WITH 10' Y TOGGLE #2 CABLE FOR PENDANT MOUNT INSTALLATION. (2) PER FIXTURE.
7. FIXTURE SHALL BE MOUNTED 8" MIN. BELOW TOP OF POLE MEASURED FROM TOP OF FIXTURE TO ALLOW FOR TYPE OL SLIPFITTER MOUNTING ON TOP OF POLE.
8. LED MODULES AND THEIR DRIVERS SHALL BE WIRED AND INSTALLED TO ALLOW INBOARD -OUTBOARD SWITCHING ARRANGEMENTS AS SHOWN ON THE PLANS.
9. MANUFACTURERS LISTED AS ACCEPTABLE SUBSTITUTION FOR THIS FIXTURE WILL REQUIRE TO PROVIDE A CUSTOMIZATION OF THEIR RESPECTIVE BASIC MODELS TO MEET THE INTENT OF THE DESIGN TO BE CONSIDERED FOR AN APPROVAL.
10. IT IS UNDERSTOOD THAT EXACT MATCH TO THE SPECIFIED FIXTURE IS NOT AVAILABLE BUT THE CLOSEST MATCH OF IN THE APPEARANCE, WATTAGE AND CONSTRUCTION QUALITY WILL BE CONSIDERED FOR APPROVAL.
11. PROVIDE WITH 20' ROUND STEEL TAPERED POLE; CATALOG # RTS-6-D-20-S-T-2-1-X OR EQUAL.
12. PROVIDE WITH 25' ROUND STEEL TAPERED POLE; CATALOG # RTS-6-D-25-S-T-3-2-X OR EQUAL.

LUMINAIRE SCHEDULE

NOTE: SEE SPECIFICATION FOR ADDITIONAL INFORMATION REGARDING LUMINAIRE AND INSTALLATION REQUIREMENTS. PROVIDE OPTIONS AND ACCESSORIES REFERENCED BY THE COLUMN TITLED " OPTIONS/ACCESSORIES". MANUFACTURERS LISTED ACCEPTABLE SHALL MEET ALL REQUIREMENTS AND FEATURES INDICATED. ACCEPTABLE MANUFACTURERS MUST MEET THE PHOTOMETRIC PERFORMANCE OF THE LISTED UNIT.

ABBREVIATIONS: GWB = GYPSUM WALL BOARD; ES = EXPOSED STRUCTURE; LG = LAY-IN GRID; P = PENDANT; PLAS = PLASTER; PL = POLE MOUNTED; R = RECESSED; S = SURFACE; UNV = UNIVERSAL VOLTAGE; V = VARIES; W = WALL MOUNTED

DES.	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	LAMP DATA	VOLTAGE	BALLAST/ DRIVER	MOUNT	CEILING TYPE	FIXTURE DEPTH	LED SYSTEM INPUT WATTAGE	LED DELIVERED LUMENS	OPTIONS / ACCESSORIES	ACCEPTABLE MANUFACTURERS	KEYED NOTE
A	FINELITE	HPRLED-A-2X4-DCO-S-8 40-277-SC-C1	2' WIDE X 4' LONG VOLUMETRIC TROFFER	LED, 4000K	277	C	R	LG	4"	27	3,893		COOPER LIGHTING	
													PHILLIPS LIGHTING	
A1	FINELITE	HPRLED-A-2X4-DCO-S-8 40-277-SC-C1	SAME AS 'A' EXCEPT LUMEN OUTPUT	LED, 4000K	277	C	R	LG	4"	35.2	4,894		COOPER LIGHTING	
													PHILLIPS LIGHTING	
A2	METALUX	24FP4740C	2' WIDE X 4' LONG FLAT PANEL	LED, 4000K	277	D	R	LG	7/16"	40.3	4,658		TCP LIGHTING	
													LITHONIA	
B	FINELITE	HPRLED-A-2X2-DCO-S-8 40-277-SC-C1	2' WIDE X 4' LONG VOLUMETRIC TROFFER	LED, 4000K	277	D	R	LG	4"	28.5	3,506		COOPER LIGHTING	
													PHILLIPS LIGHTING	
B2	METALUX	22FP3240C	2' WIDE X 2' LONG FLAT PANEL	LED, 4000K	277	D	R	LG	5/16"	30	3,560		TCP LIGHTING	
													LITHONIA	
B5	METALUX	22FP3240C DF-22W-U	SAME AS 'B2' EXCEPT WITH DRYWALL KIT	LED, 4000K	277	D	R	GWB	5/16"	30	3,560		TCP LIGHTING	
													LITHONIA	
D	PATHWAY	6TCVLFL2X-2000-4K-120/ 277-D8-6VLEDMDSCLPF	6" DIAMETER DOWNLIGHT	LED, 4000K	UNV	C	R	V	8.375"	21	1,854	15	COOPER/PORTFOLIO	
													ACUITY/GOTHAM, GREE	
D1	PATHWAY	4TCVLFL2X-1500-4K-120/ 277-D8-4VLEDMDSCLPF	4" DIAMETER DOWNLIGHT	LED, 4000K	UNV	C	R	V	8.375"	15	1,317	15	COOPER/PORTFOLIO	
													ACUITY/GOTHAM, GREE	
D2	PATHWAY	6TCVLFL2X-2000-4K-120/ 277-D8-6VLEDPL-HAZ-W IL	6" DIAMETER DOWNLIGHT	LED, 4000K	UNV	C	R	GWB	8.375"	21	1,705	15	COOPER/PORTFOLIO	
													ACUITY/GOTHAM, GREE	
D3	PATHWAY	6VLFL2X-2000-4K-120/2 77-D8-6VWED-CLAY	6" DIAMETER DOWNLIGHT WITH DECORATIVE GLASS TRIM	LED, 4000K	UNV	C	R	LG	-	21	1,610	15	COOPER/APEER	
													ACUITY/GOTHAM, WALL LIGHTING	
D4	PATHWAY	4TCVLFL2X-1500-4K-120/ 277-D8-4VLEDWW-SCLP F	4" DIAMETER WALL WASH DOWNLIGHT	LED, 4000K	UNV	C	R	LG	8.375"	15	1,240	15	COOPER/PORTFOLIO	
													ACUITY/GOTHAM; CREE	
D5	FOCAL POINT	SPC44D-SQA-500L-3ZZ-A-1-BK-EC44-SC3-500L-40K-8-S-C-WH	4" DIAMETER DOWNLIGHT	LED, 4000K	UNV	C	R	WOOD	9.31"	24	1,500	15	COOPER/PORTFOLIO	
													PHILLIPS/LITHOLIER	
F10	FINELITE	HP-4-WW-R-K-10'-H-840-2 77-C1-SC	4" WIDE X 10' LONG WALL WASHER	LED, 4000K	277	D	R	LG	4"	3.8 / FT	364 / FT		AXIS LIGHTING; PRUDENTIAL	
													FOCAL POINT LIGHTS; LEDALITE	
G4	FINELITE	HP-4-R-4'-B-840-F-277-SC -C1	4" WIDE X 4' LONG RECESSED LINEAR	LED, 4000K	277	D	R	V	4"	4.6 / FT	479 / FT		AXIS LIGHTING; PRUDENTIAL	
													FOCAL POINT LIGHTS; LEDALITE	
G8	FINELITE	HP-4-R-8'-H-840-F-277-S C-C1	4" WIDE X 8' LONG RECESSED LINEAR	LED, 4000K	277	D	R	WOOD	4"	7.1 / FT	748 / FT		AXIS LIGHTING; PRUDENTIAL	
													FOCAL POINT LIGHTS; LEDALITE	
G8P	FINELITE	HP-2-ID-8'-S-B-940-WSO-BG-277V-SC-FA-FE	2" WIDE X 10' LONG PENDANT LINEAR	LED, 4000K	277	D	P	LG	4-3/4"	8.2 / FT	825 / FT		AXIS LIGHTING; PRUDENTIAL	
													FOCAL POINT LIGHTS; LEDALITE	
G10P	FINELITE	HP-2-ID-10'-H-H-940-WSO -BG-277V-SC-FA-FE	2' WIDE X 10' LONG PENDANT LINEAR	LED, 4000K	277	D	P	LG	4-3/4"	14.2 / FT	1402 / FT		AXIS LIGHTING; PRUDENTIAL	
													FOCAL POINT LIGHTS; LEDALITE	
H	METALUX	VT4LED-LD5-30-DRF-UN V-L840-CD3-WL-SSL-VT4 LED-SS-MBK-PK-U	15.5" WIDE X 52" LONG VAPORTITE INDUSTRIAL	LED, 4000K	UNV	D	P	ES	6-3/4"	232	30,548		COOPER LIGHTING	6,8
													PHILLIPS LIGHTING	
H1	METALUX	VT4LED-LD5-24-DRF-UN V-L840-CD2-WL-SSL-VT4 LED-SS-MBK-PK-U	15.5" WIDE X 52" LONG VAPORTITE INDUSTRIAL	LED, 4000K	UNV	D	P	ES	6-3/4"	179	24,014		COOPER LIGHTING	6,8
													PHILLIPS LIGHTING	
H2	METALUX	VT4LED-LD5-15-DRF-UN V-L840-CD2-WL-SSL-VT4 LED-SS-MBK-PK-U	15.5" WIDE X 52" LONG VAPORTITE INDUSTRIAL	LED, 4000K	UNV	D	P	ES	6-3/4"	112	15,229		COOPER LIGHTING	6,8
													PHILLIPS LIGHTING	
H3	METALUX	VT4LED-LD5-9-DRF-UNV-L840-CD1-WL-SSL-VT4LE D-SS-MBK-PK-U	15.5" WIDE X 52" LONG VAPORTITE INDUSTRIAL	LED, 4000K	UNV	D	P	ES	6-3/4"	64	8,781		COOPER LIGHTING	6
													PHILLIPS LIGHTING	
H4	METALUX	VT4LED-LD5-12-DRF-UN V-L840-CD1-WL-SSL-VT4 LED-SS-MBK-PK-U	15.5" WIDE X 52" LONG VAPORTITE INDUSTRIAL	LED, 4000K	UNV	D	P	ES	6-3/4"	93	11,990		COOPER LIGHTING	6
													PHILLIPS LIGHTING	
K	CREE	LS4-50L-40K-10V-AC5-18/ 5-48-Q14B-JB	2.5" WIDE X 4' LONG LINEAR PENDANT	LED, 4000K	UNV	H	P	V	3"	50	5,000		COOPER LIGHTING	
													PHILLIPS LIGHTING	
L4	CREE	LS4-40L-40K-10V-AC5-18/ 5-48-Q14B-JB	2.5" WIDE X 4' LONG LINEAR PENDANT	LED, 4000K	UNV	H	P	V	3"	44	4,000		COOPER LIGHTING	
													PHILLIPS LIGHTING	
L6	FINELITE	HP-ID-6'-S-B-840-TG-BG-277V-DC-EXPOSED	2.25" WIDE X 6' LONG DIRECT/INDIRECT LINEAR PENDANT	LED, 4000K	277	D	P	ES	4-3/4"	8.2 / FT	825 / FT		AXIS LIGHTING; PRUDENTIAL	
													ACUITY/PEERLITE	
L8	CREE	LS4-25L-40K-10V-TW-LS-RJ-L84TWK-AC5-18/5-48-Q14B-JB	2.5" WIDE X 8' LONG LINEAR PENDANT	LED, 4000K	UNV	H	P	V	3"	46	5,000		COOPER LIGHTING	
													PHILLIPS LIGHTING	
L12	CREE	LS4-25L-40K-10V-TW-LS-RJ-L84TWK-AC5-18/5-48-Q14B-JB	2.5" WIDE X 12' LONG LINEAR PENDANT	LED, 4000K	UNV	H	P	V	3"	69	7,500		COOPER LIGHTING	
													PHILLIPS LIGHTING	
P1	SPI LIGHTING	AIC11890-L57W-PT22-12 0-277V-4000K	25" X 25" SQUARE CUBES DECORATIVE LUMINAIRE CONSISTING OF FOUR CONNECTED CUBES	LED, 4000K	UNV	D	S	LG	13.7"	57	4,843		ACUITY/WINONA	
													MANNING LIGHTING	9
P5	EUREKA	4175-LED.13-40-277V-DV-C-CHR-ANTE-CLR	7" DIAMETER DECORATIVE GLASS PENDANT	LED, 4000K	277	D	P	WOOD	7-1/2"	13	1,000		TECH LIGHTING,	
													BRUCK LIGHTING	10
S4	CREE	LS4-40L-40K-10V	2.5" WIDE X 4' LONG LINEAR STRIP	LED, 4000K	UNV	H	S	V	3"	44	4,000		COOPER LIGHTING	
													PHILLIPS LIGHTING	
S6	FINELITE	HP-2SM-6'-B-840-BG-277 V-C1-SC	2.25" WIDE X 6' LONG SURFACE LINEAR STRIP	LED, 4000K	277		S	LG	4"	4.6 / FT	427 / FT		AXIS LIGHTING; PRUDENTIAL	
													ACUITY/PEERLITE	
S8	CREE	LS8-80L-40K-10V-AC5-18/ 5-48-Q14B-JB	2.5" WIDE X 8' LONG LINEAR STRIP	LED, 4000K	UNV	H	S	V	3"	88	8,000		COOPER LIGHTING	
													PHILLIPS LIGHTING	
T	FAIL-SAFE	FVS4W-8-LD4-1STD-40-2 77-P12S-EDD1	4" WIDE X 8' LONG WRAPAROUND	LED, 4000K	277	C	W	-	3-3/4"	68	7,876		PHILLIPS/DAYBRITE	
													ACUITY/LITHONIA	
U	PHILIPS	523-000027-91	19.25" UNDERCABINET LUMINAIRE	LED, 3000K	120	E	S	-	1.7"	13	450		COOPER/FAIL-SAFE	1
													ACCUITY/LITHONIA	
U1	PHILIPS	523-000027-92	39.25" UNDERCABINET LUMINAIRE	LED, 3000K	120	E	S	-	1.7"	25	862		COOPER/FAIL-SAFE	1
													ACUITY/LITHONIA	
V	VODE LIGHTING	107-WG-01-40'-WA-6-IP-A E-2-0-Z-LO-40-0-AL-0	40' OVERALL LENGTH - DISPAY BOARDS ACCENT LIGHT	LED, 4000K	UNV	J	W	-	2.12"	3.8 / FT	297 / FT		SPI LIGHTING	
													LUMIUM LIGHTING	
W2	OXYGEN LIGHTING	37-537-4024	24" VANITY LUMINAIRE	LED, 4000K	277	E	W	-	3.32"	11.6	1,258		MANNING LIGHTING	
													ACUITY/WINONA	
W4	CREE	LS4-25L-40K-10V	2.5" WIDE X 4' LONG LINEAR STRIP	LED, 4000K	UNV	H	W	-	3"	44	4,000		METALUX	
													LITHONIA; DAYBRITE	
W6	VODE LIGHTING	107-WG-01-72"-WA-12-IP-AE-2-Z-SO-40-1-AL	6' MARKERBOARD LIGHT ON 12" LONG CANTILIVERED ARM	LED, 4000K	UNV	J	W	-	2.12"	6.30 / FT	802 / FT		SPI LIGHTING	
													LUMIUM LIGHTING	
W8	METALUX	8T-SNLED-LD5-83SL-LC-UNV-L840-CD1-U	3' WIDE X 8' LONG LINEAR STRIP	LED, 4000K	UNV	D	W	-	3-7/8"	61	8,537		ACUITY/LITHONIA	
													PHILLIPS/DAYBRITE	

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meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

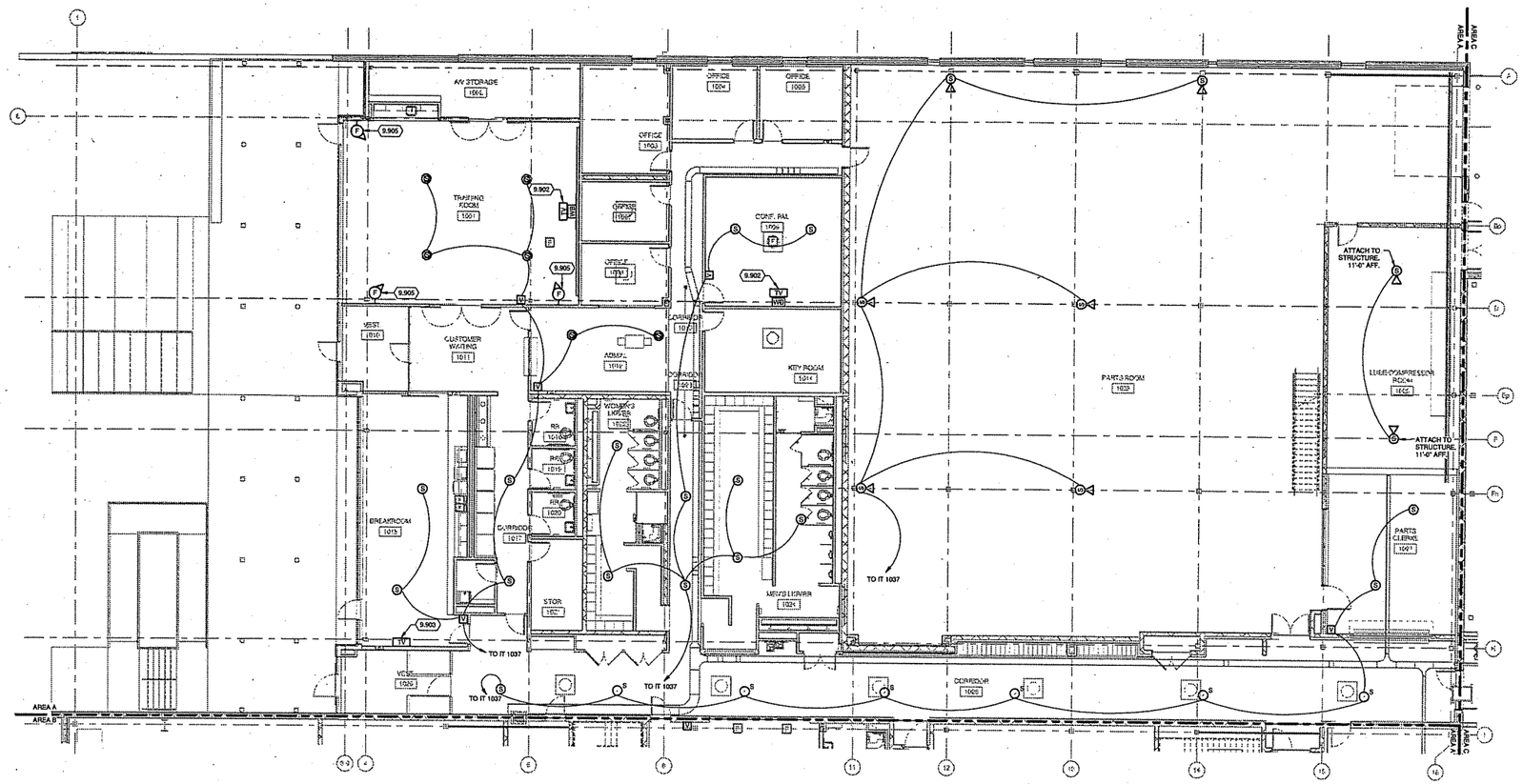
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-160264-01

SCHEDULES

E-601

4 addum 3



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA A - AUDIO/VISUAL

1/8" = 1'-0"

KEYED NOTES

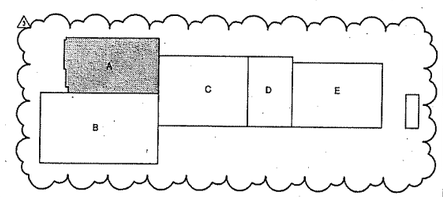
9.902 REFER TO 2/T-504 FOR ADDITIONAL INFORMATION.

9.903 REFER TO 3/T-504 FOR ADDITIONAL INFORMATION.

9.905 ROUGH IN ONLY. PROVIDE BACK BOX, CONDUIT AND CABLE FOR PTZ CAMERA FOR VIDEO CONFERENCING SYSTEM. SEE T-XXX FOR DETAILS

AUDIO/VISUAL GENERAL NOTES:

1. SEE PUBLIC ADDRESS ONE-LINE DIAGRAM ON SHEET T-701 FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.



Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 1

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

ADDENDUM 3

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

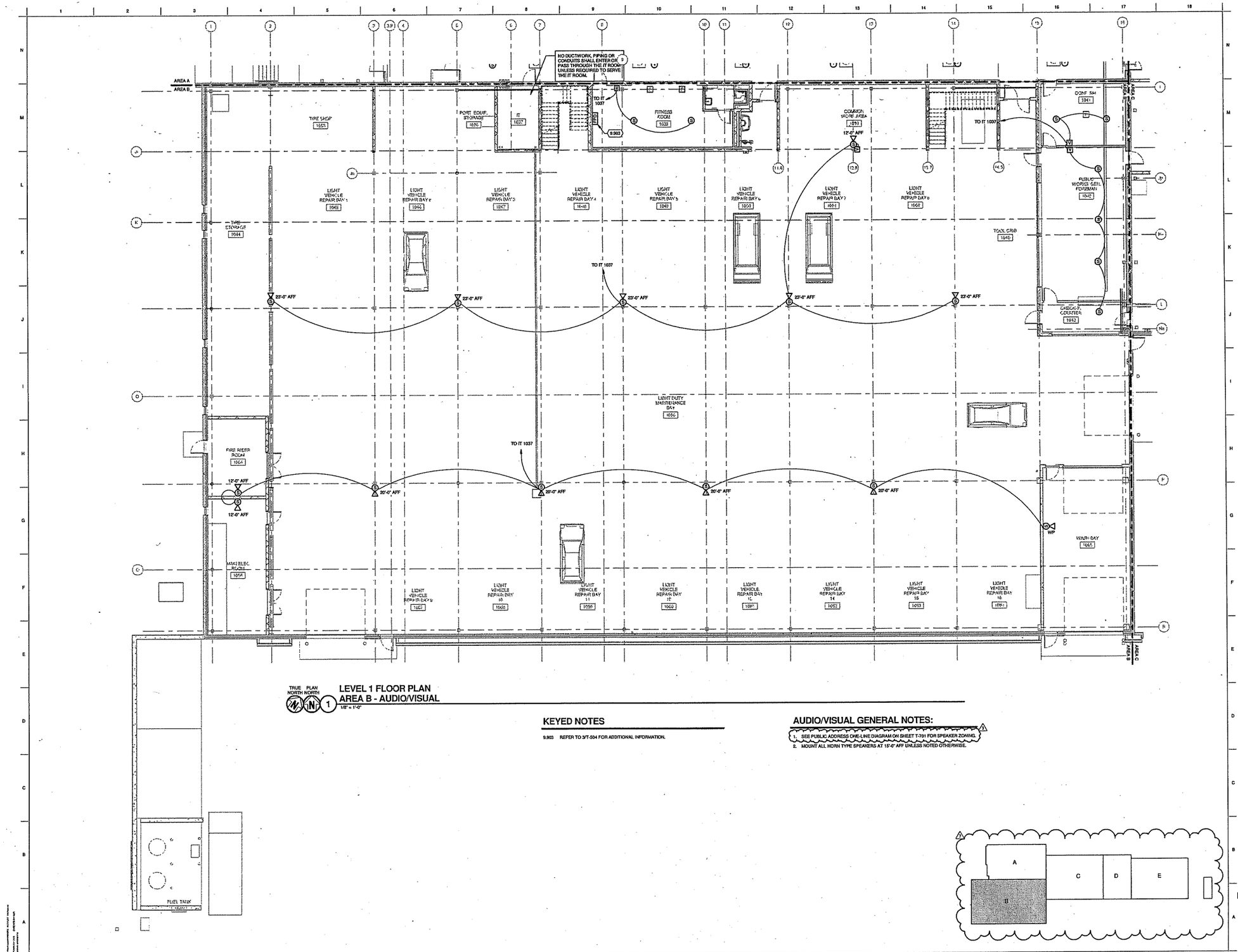
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PROJECT No: 13035500-160224.01

LEVEL 1 FLOOR PLAN AREA A - AUDIO/VISUAL

T-141

Addendum 3



TRUE NORTH PLAN NORTH 1

LEVEL 1 FLOOR PLAN
AREA B - AUDIO/VISUAL

1/8" = 1'-0"

KEYED NOTES

9.903 REFER TO 3/T-504 FOR ADDITIONAL INFORMATION.

AUDIO/VISUAL GENERAL NOTES:

1. SEE PUBLIC ADDRESS ONE-LINE DIAGRAM ON SHEET T-701 FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7679 t

Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 1303500-160264.01

LEVEL 1 FLOOR PLAN AREA B - AUDIO/VISUAL

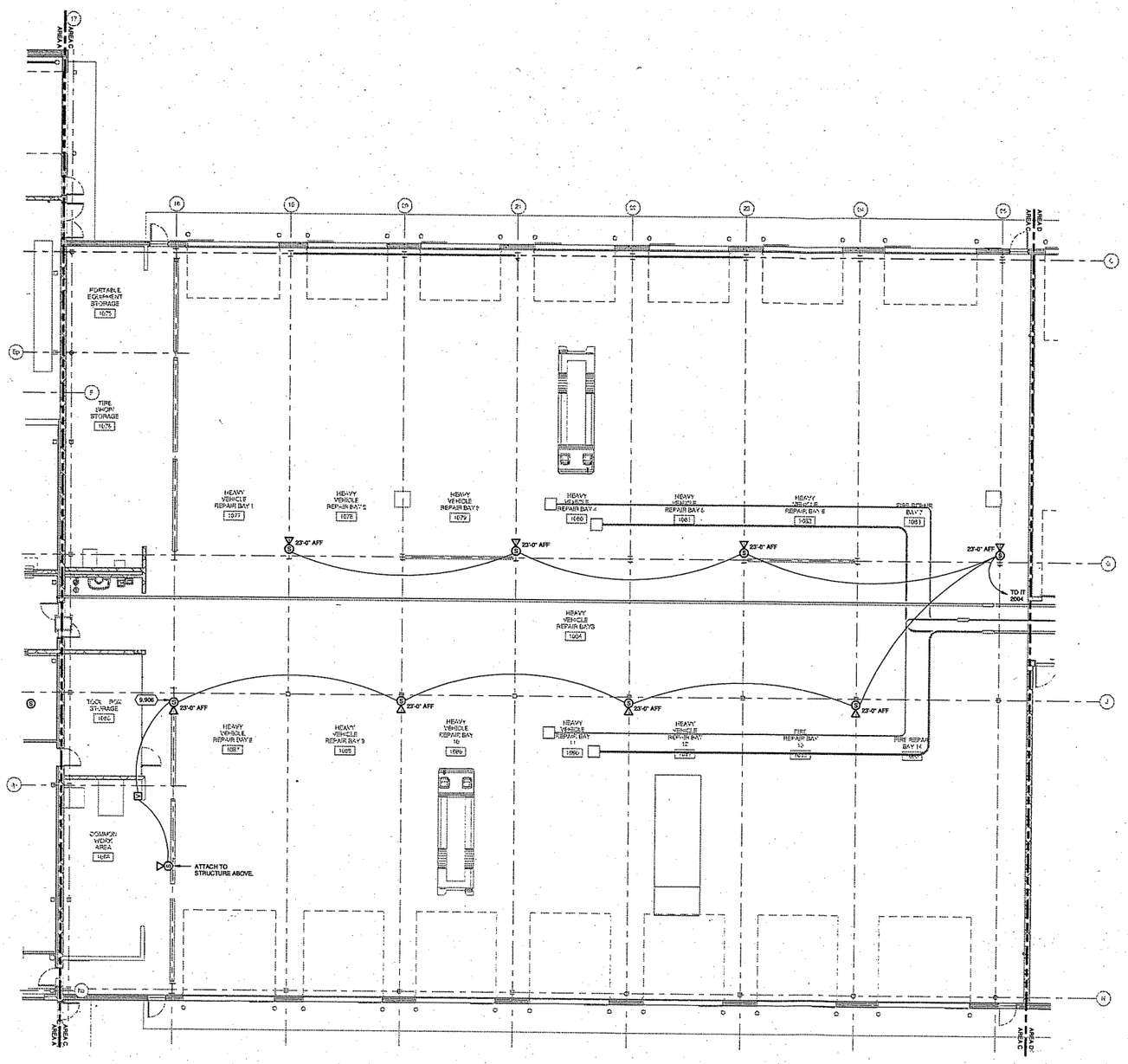
T-142

AUDIO/VISUAL GENERAL NOTES:

1. SEE PUBLIC ADDRESS ONE-LINE DIAGRAM ON SHEET T-701 FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.

KEYED NOTES

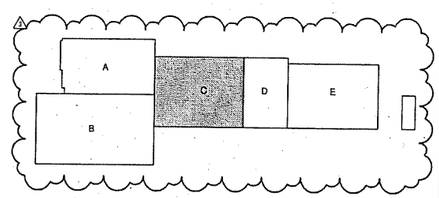
9.906 MOUNT HORN TYPE SPEAKER TO SIDE WALL.



TRUE PLAN NORTH NORTH

LEVEL 1 FLOOR PLAN AREA C - AUDIO/VISUAL

1/8" = 1'-0"



Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
2	ADDENDUM 2	03/05/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 13035000-160264.01

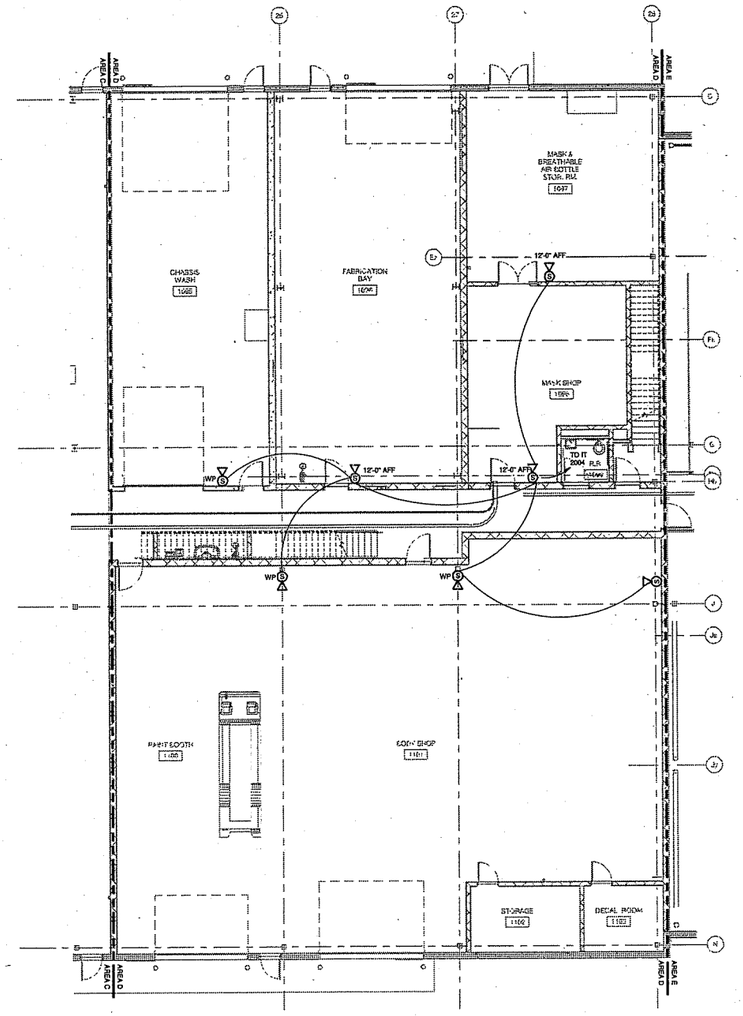
LEVEL 1 FLOOR PLAN AREA C - AUDIO/VISUAL

T-143

ADDENDUM 3

AUDIO/VISUAL GENERAL NOTES:

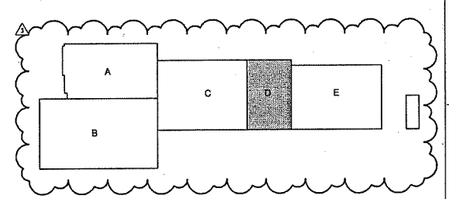
1. SEE PUBLIC ADDRESS ONE-LINE DIAGRAM ON SHEET T-701 FOR SPEAKER ZONING.
2. MOUNT ALL HORN TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.



TRUE NORTH PLAN NORTH

LEVEL 1 FLOOR PLAN AREA D - AUDIO/VISUAL

1/8" = 1'-0"



Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 280 7678 t

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: (608) 273-6380
meadhunt.com

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

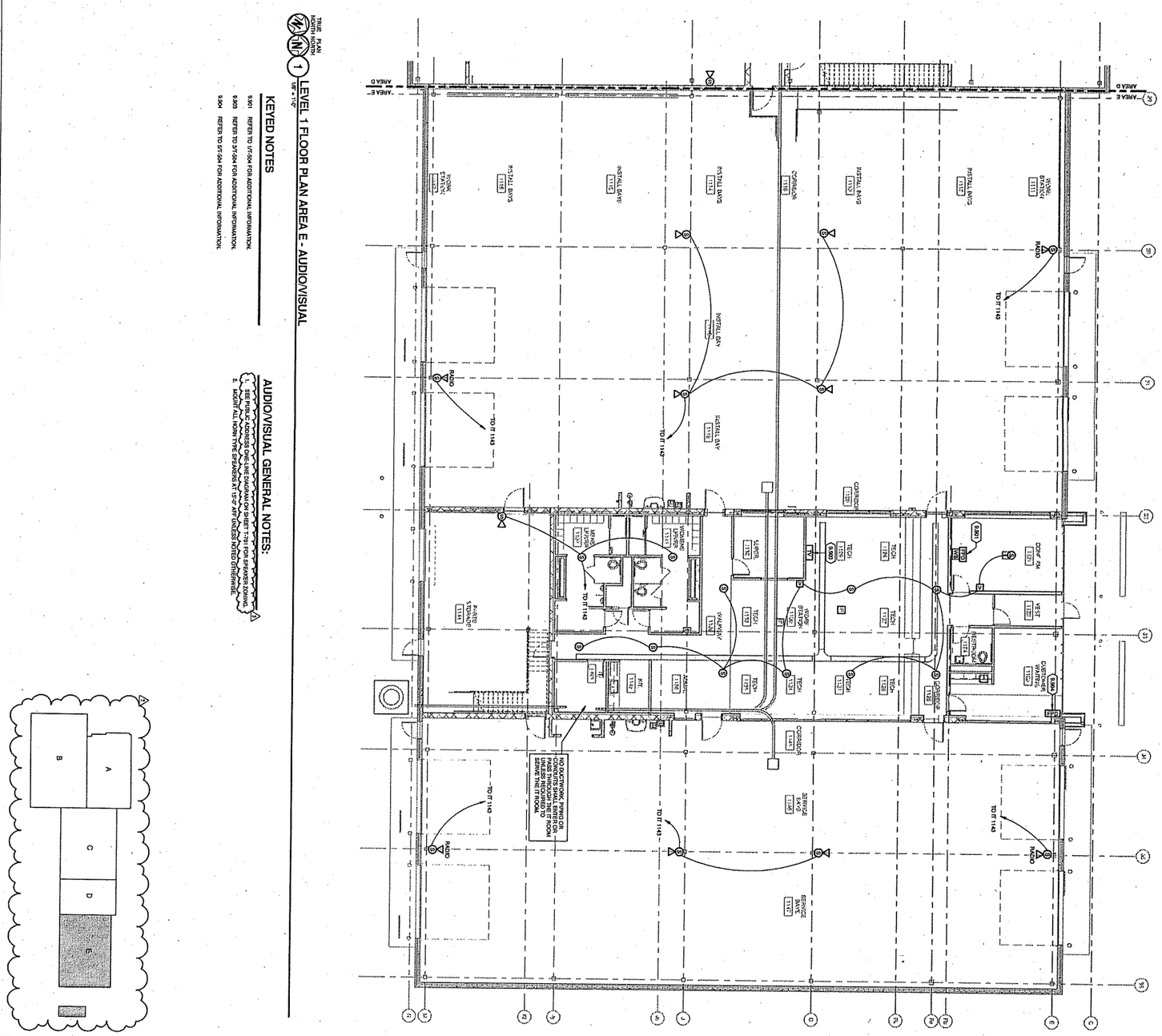
No	REVISION/SUBMISSION	DATE
3	ADDENDUM 3	03/14/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 13033500-160254.01

LEVEL 1 FLOOR PLAN AREA D - AUDIO/VISUAL

T-144

ADDL SOUND 3



LEVEL 1 FLOOR PLAN AREA E - AUDIO/VISUAL

KEYED NOTES

9.901 REFER TO 1/T-504 FOR ADDITIONAL INFORMATION.

9.903 REFER TO 2/T-504 FOR ADDITIONAL INFORMATION.

9.904 REFER TO 3/T-504 FOR ADDITIONAL INFORMATION.

AUDIO/VISUAL GENERAL NOTES:

1. SEE FIELD ADDRESS CABLING DIAGRAM SHEET T-741 FOR SPEAKER ZONING.
2. MOUNT ALL NON-TYPE SPEAKERS AT 15'-0" AFF UNLESS NOTED OTHERWISE.

CITY OF MADISON

NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
	ISSUE FOR PERMIT	07/07/2017
	ISSUE FOR BID	08/07/2017
3	ADDENDUM 3	09/14/2017

PROJECT No: 140030-140058.01

LEVEL 1 FLOOR PLAN AREA E - AUDIO/VISUAL

T-145

Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone: 608-273-6380
meadhunt.com

Stantec
1600 WILSON BLVD.
SUITE 360
ARLINGTON, VA 22209
571 290 7679 t

ADDENDUM 3

A&A ENVIRONMENTAL SERVICES

P.O. Box 708 • Poynette, WI 53955
Phone: (608) 240-1511 • Email: Office@aaenv.com • Fax: (608) 635-9717

October 19, 2016

David C. Schaller
City of Madison
215 Martin Luther King Jr. Blvd, Room 115
Madison, WI 53703
(608) 243-5891, Fax (608) 264-9275

RE: Former Cub Foods Asbestos Removal/Demolition

I have included the submittals provided by Robinson Brothers Environmental, Inc. and a copy of the original DNR notification filed by A&A Environmental, Inc. for the asbestos removal and demolition of the former Cubs Foods facility located at 4141 Nakoosa Trail in Madison, WI.

This project asbestos abatement portion of this project was satisfactorily completed on September 30, 2016 with visual inspections completed on September 29, 2016 and September 30, 3016.

Sincerely,

Kim Sopha
President/Inspector #AII01851

Encl

KAS/bls

7

Form 9300-207 04-09

Invoice No: ASB015419

Invoice Date: 09/02/2016 Due Upon Receipt

A&A Environmental Services, Inc.
PO Box 708
Poynette, WI 53955

Event Date: 09/02/2016

Notification Fee: $135.00
Invoices(s): PASB015419

Invoice Amount: $135.00
Reference: Notification ID:17-0952_ORIGINAL

REMITTANCE:

Please return this portion with your check to DNR. Alternatively, payments may be made electronically at http://dnr.wi.gov/epay/.

WI DNR
PO BOX 78816
MILWAUKEE WI 53278-0816

Make check payable to: Department of Natural Resources Amount Enclosed:

Invoice

Keep this portion for your records

State of Wisconsin
Department of Natural Resources **Duplicate**

dnr.wi.gov

Bill to:

A&A Environmental Services, Inc.
PO Box 708
Poynette, WI 53955

Remit to:

WI DNR
PO BOX 78816
MILWAUKEE WI 53278-0816

DNR Contact: MARK DAVIS at (608) 219-4251
mark.davis@wisconsin.gov

Invoice No: **ASB015419**
Invoice Date: 09/02/2016
Due Date: 09/12/2016
Notification Fee: $135.00
Invoices(s): PASB015419
Invoice Amount: $135.00

Event Date: 09/02/2016
Customer PO No:

Reference: Notification ID:17-0952_ORIGINAL
Facility Name: Commercial
Project No: 7

Item	Cost
Asbestos Abatement Notification	**$135.00**

Asbestos Notification Summary

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

PROJECT INFORMATION

		Project No:	16201-1
Invoice to:	Abatement Contractor		
Notification ID:	17-0952	**Notification Status:**	Submitted
Notification Type:	Revised		
Project Type:	Abatement/Demolition		
Insp Start Date:	12/10/2015	**Insp End Date:**	12/23/2015
Inspector:	SOPHA KIM No:1851		
Asbestos Present:	Yes		
Postmark Date:	09/02/2016		
Abtment Start Date:	09/26/2016	**Abtment End Date:**	10/10/2016
Ren/Dem Start Date:	10/24/2016	**Ren/Dem End Date:**	11/18/2016
Working Days:	Mo,Tu,We,Th,Fr		
Start Hours:	7:00 AM	**End Hours:**	5:30 PM
Ordered Demolition:	No		
Emergency:	No	**Emergency Date:**	
Project Schedule/Comments:	Removal of 11,800 sqft of black floor mastic		

Submitted By: MELISSA LOWENBERG 09/26/2016 09:51:26

FACILITY INFORMATION

Name:	FORMER CUB FOODS		
Address 1:	4141 Nakoosa Trail		
Address 2:			
City:	Madison	**County:**	DANE
Zip Code:	53714		
Prior Use:	Commercial	**Current Use:**	Commercial
Age:	29	**Size (sqft):**	83048
Stories No:	2	**Unit No:**	0
Contact:		**Phone No:**	

Single family home/garage/less than 5 apartment units?: NO

Does the project have two or more houses as part of an urban renewal, commercial, or a highway construction project?: NO

Owner Name:	City of Madison		
Address 1:	210 Martin Luther King Jr. Blvd, Room 115		
Address 2:			
City:	Madison	**State:**	WI
Zip Code:	53703		
Contact:	David Schaller	**Phone No:**	608-243-4891
Email:	DSchaller@cityofmadison.com		

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

ASBESTOS REPORT

Structures Demolished: 1

Inspection Procedures: Bulk sample - PLM
Description of ACM: Floor tile and mastic throughout the building.
Description of work: Enclosure removal method under negative air pressure, wetting agents used on materials, decon units and protective clothing worn by workers.

Work Practices: All asbestos is to be kept wet and put in double labeled bags, negative air pressure during the project in the enclosure where removal is taking place, bags will go through the 3 stage decon unit with bags wet wiped before coming out of containment.

If new ACM discovered: Work to be stopped, owner and regulatory agencies to be notified.

NAME	A. Friable RACM to be Removed	B. NonFriable to be Removed CAT I	B. NonFriable to be Removed CAT II	C. Nonfriable not removed CAT I	C. Nonfriable not removed CAT II
Pipes (linear feet)	0	0	0	0	0
Surface (square feet)	11800	0	0	0	0
Volume (cubic feet)	0	0	0	0	0

ABATEMENT CONTRACTOR

Project No: 16201-1

Contractor: Robinson Brothers Environmental Inc
Address 1: 220 Raemisch Rd
Address 2:
City: Waunakee
State: WI
Contact: Mike Bricco
E-mail: info@robinsonbros.com
County: Dane
Zip Code: 53597-
Phone No: 608-849-6980

Project Manager or Supervisor:

First Name:	Last Name:	Phone:
Mike	Bricco	608-849-6980

DEMOLITION CONTRACTOR

Contractor: Terra Engineering & Construction

Address 1: 2201 Vondron Rd
Address 2:
City: Madison
State: WI
Contact: Scott Zimmerman
E-mail:
County: Dane
Zip Code: 53704-
Phone No: 608-221-3501

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

TRANSPORT INFORMATION

Contractor: Town & Country Sanitation
Address 1: Rt 3
Address 2:
City: Boscobel
State: WI
Contact:
E-mail:
County: Grant
Zip Code: 53805-
Phone No: 608-375-5886

DISPOSAL INFORMATION

Disposal Site: Mallard Ridge Recycling & Disposal
Address 1: W8470 Hwy 11
Address 2:
City: Delavan
State: WI
Contact:
E-mail:
County: Walworth
Zip Code: 53115-
Phone No: 262-724-3257

FEE INFORMATION

Fee: 1325 **Paid:** **Date:**
Owed:
Reported Agency: DEPARTMENT OF NATURAL RESOURCES

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

NAME	A. Friable RACM to be Removed	B. NonFriable to be Removed CAT I	B. NonFriable to be Removed CAT II	C. Nonfriable not removed CAT I	C. Nonfriable not removed CAT II
Pipes (linear feet)	0	0	0	0	0
Surface (square feet)	0	11800	0	0	0
Volume (cubic feet)	0	0	0	0	0

ABATEMENT CONTRACTOR

Project No: 7

Contractor: Robinson Brothers Environmental Inc
Address 1: 220 Raemisch Rd
Address 2:
City: Waunakee **County:** Dane
State: WI **Zip Code:** 53597-
Contact: Mike Bricco **Phone No:** 608-849-6980
E-mail: info@robinsonbros.com

Project Manager or Supervisor:

First Name:	Last Name:	Phone:
Mike	Bricco	608-849-6980

DEMOLITION CONTRACTOR

Contractor: **To Be Determined** Terra

TRANSPORT INFORMATION

Contractor: Waste Management- Madison Prairie LF
Address 1: 6002 Nelson Road
Address 2:
City: Sun Prairie **County:**
State: WI **Zip Code:** 53590-
Contact: Louis Bohlander **Phone No:** 608-837-9031
E-mail:

DISPOSAL INFORMATION

Disposal Site: Madison Prarie Landfill
Address 1: 6002 Nelson Rd
Address 2:
City: Sun Prairie **County:** DANE
State: WI **Zip Code:** 53590-
Contact: Don Smith **Phone No:** 608-837-9031
E-mail:

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

FEE INFORMATION

Fee: 135 **Paid:** 0 **Date:**
Owed: 135
Reported Agency: DEPARTMENT OF NATURAL RESOURCES

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

PROJECT INFORMATION

Project No: 16201-1

Invoice to:	Abatement Contractor		
Notification ID:	17-0952	**Notification Status:**	Submitted
Notification Type:	Revised		
Project Type:	Abatement/Demolition		
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Postmark Date:	09/02/2016		
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Ren/Dem Start Date:	10/24/2016	**Ren/Dem End Date:**	11/18/2016
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Start Hours:	7:00 AM	**End Hours:**	5:30 PM
Ordered Demolition:	No		
Emergency:	No	**Emergency Date:**	
Project Schedule/Comments:	Removal of 11,800 sqft of black floor mastic		

Submitted By: MELISSA LOWENBERG 09/15/2016 02:25:09

FACILITY INFORMATION

Name:	Commercial		
Address 1:	4141 Nakoosa Trail		
Address 2:			
City:	Madison	**County:**	DANE
Zip Code:	53714		
Prior Use:	Commercial	**Current Use:**	Commercial
Age:	29	**Size (sqft):**	83048
Stories No:	2	**Unit No:**	0
Contact:		**Phone No:**	

Single family home/garage/less than 5 apartment units?: NO

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Address 2:			
City:	Madison	**State:**	WI
Zip Code:	53703		
Contact:	David Schaller	**Phone No:**	608-243-4891
Email:	DSchaller@cityofmadison.com		

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

ASBESTOS REPORT

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Surface (square feet)	11800	0	0	0	0
Volume (cubic feet)	0	0	0	0	0

ABATEMENT CONTRACTOR

Project No: 16201-1

Contractor: Robinson Brothers Environmental Inc
Address 1: 220 Raemisch Rd
Address 2:
City: Waunakee
State: WI
Contact: Mike Bricco
E-mail: info@robinsonbros.com
County: Dane
Zip Code: 53597-
Phone No: 608-849-6980

Project Manager or Supervisor:

First Name:	Last Name:	Phone:
Mike	Bricco	608-849-6980

DEMOLITION CONTRACTOR

Contractor: Terra Engineering & Construction

Address 1: 2201 Vondron Rd
Address 2:
City: Madison
State: WI
Contact: Scott Zimmerman
E-mail:
County: Dane
Zip Code: 53704-
Phone No: 608-221-3501

Submitted

State of Wisconsin Department of Natural Resources

Bureau of Air Management

dnr.wi.gov

TRANSPORT INFORMATION

Contractor: Waste Management- Madison Prairie LF
Address 1: 6002 Nelson Road
Address 2:
City: Sun Prairie
State: WI
Contact: Louis Bohlander
E-mail:
County:
Zip Code: 53590-
Phone No: 608-837-9031

DISPOSAL INFORMATION

Disposal Site: Madison Prarie Landfill
Address 1: 6002 Nelson Rd
Address 2:
City: Sun Prairie
State: WI
Contact: Don Smith
E-mail:
County: DANE
Zip Code: 53590-
Phone No: 608-837-9031

FEE INFORMATION

Fee: 1325 **Paid:** **Date:**
Owed:
Reported Agency: DEPARTMENT OF NATURAL RESOURCES

Department of Public Works
Engineering Division
Robert F. Phillips, P.E., City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
Madison, Wisconsin 53703
Phone: (608) 266-4751
Fax: (608) 264-9275
engineering@cityofmadison.com
www.cityofmadison.com/engineering

Deputy City Engineer
Gregory T. Fries, P.E.

Deputy Division Manager
Kathleen M. Cryan

Principal Engineer 2
Christopher J. Petykowski, P.E.
John S. Fahrney, P.E.

Principal Engineer 1
Christina M. Bachmann, P.E.
Mark D. Moder, P.E.
Janet Schmidt, P.E.

Facilities & Sustainability
Jeanne E. Hoffman, Manager
Bryan Cooper, Principal Architect

Mapping Section Manager
Eric T. Pederson, P.S.

Financial Manager
Steven B. Danner-Rivers

February 28, 2019

NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY
CITY OF MADISON - CONTRACT #7528
PRE-BID MEETING MINUTES

PURPOSE: To clarify any concerns bidders may have with the solicitation documents, scope of work and other requirements.

NOTE: All questions or requests for clarifications regarding plans and specifications shall be published by Stantec and the CPM (City Project Manager). Responses that change the contract scope and/or schedule will be published by Stantec and the CCM in the form of a bidding addendum that will be posted on Bid Express by the City of Madison.

- **Project Overview**
  - This contract is for construction and site development for a new 1-story vehicle maintenance and repair facility for Fleet Services, Fire Maintenance, and the Radio Shop facility. The Fleet Services spaces will have light duty repair bays and heavy duty repair bays for fleet and fire vehicles and equipment. The Radio Shop spaces will have installation bays and running repair bays for installation and repairs of vehicle communications systems. The Building is approximately 104,910 sq. ft with approximately 13,074 sq. ft. of mezzanine space.

- **City of Madison Team Introductions**
  - City Project Manager (CPM): Jim Whitney
  - City Project Manager (CPM): Jon Evans
  - City Construction Manager (CCM): Dave Schaller – not present
  - City Architectural Aide: Laura Amundson
  - Fleet Services Superintendent: Mahanth Joishy
  - Fleet Services Program Manager: Tyson Roessler

- **A/E Project Team Introductions**
  - Stantec Architecture – Architect: Ken Anderson – not present
  - Stantec Archtecture - Project Manager: Maybell Laluna
  - Strand Associates - Civil: Pat Rank
  - Strand Associates - Landscaping: Rad Hawkos – not present
  - Mead & Hunt – Construction Administrator: Robert Kapsner – not present
  - Mead & Hunt – Structural/Plumbing/Mechanical/Electrical: Kevin Lichtfuss

- **Attendee Introductions**
  - See attached sign-in sheet

- **City of Madison Requirements - Overview**
  - Bid Requirements
    i. General Contractor prequalification application due by 2:00 PM on Thursday, March 14, 2019
    ii. Bids Due by 2:00 PM on Thursday, March 21, 2019
      1. Options
        a. Electronically to Bid Express
        b. Hand deliver to 1600 Emil St. to Alane Boutelle
          i. Includes Bid and SBE package.

  - SBE Requirements – Contract Section C
    i. SBE Conference – Friday March 08, 2019 - 1:00 PM at 1600 Emil St – Conference Room
  - Bid Bonds – Contract Section G
  - Product Substitution Requirements
    i. Specification Section 01 25 13 Product Substitution Procedures.

- **Project Special Requirements**
  - Alternate Bid No. 1: Provide all work to construct the east Storage Building with approximately 2,010 sq. ft.
  - Alternate Bid No. 2: Provide all work to furnish and install the roof mounted solar photovoltaic (PV) system.

- **Schedule**
  - February 28 - Pre-Bid Meeting
  - March 07 - Last day City will accept questions from Contractors
  - March 08 - City holds SBE conference at 1600 Emil St conference room at 1:00 PM
  - March 14 - City posts the final Addendum on Bid Express
  - March 14 - General Contractor Prequalification applications are due by 2:00 PM
  - March 21 - Bids due by 2:00 PM either via Bid Express or to 1600 Emil St.
  - March 21 - Bids opened starting at 2:30 PM at 1600 Emil St. Training Room

- **Site Information**
  - The project is located at 4151 Nakoosa Trail in Madison, Wisconsin
  - A portion of the shared drive from Nakoosa Trail to the CP Mart gas station needs to remain open as much as possible during construction for public vehicle access to the gas station.

- **Power Point**
  - General project overview presented by Jim Whitney and Maybell Laluna. See attached. The information, documents, and renderings in this power point presentation are from preliminary planning and design and are for informational purposes only and are not to be used for construction.

- **Questions/General Discussion – will be included in upcoming addendum:**
  1. Are bid alternates taken in order? YES
  2. Is there an overhead crane in the shop? YES
  3. It sounds like there are two different solar systems. Is one required and the other an alternate? YES. The Hydronic system to supplement the radiant floor heating and domestic hot water is not part of the alternate.
  4. Is there any asbestos abatement that will be involved for the removal of the existing slabs? NO. See asbestos documentation in the bid documents.
  5. The architectural specifications seem to be very incomplete with references to missing specification divisions (ie: allowances) and many missing edited choices. Recommend to check the other MEP specs also. Please review and republish.
  6. There are terraced planters that are not shown as walls on the plans at the front entrance patio area. What are they made of? The top of wall elevations are on the plans, but do not have bottom of walls elevations. Need details and wall heights.
  7. There is a wall shown along Nakoosa Trail near the parking and sidewalk. Is this existing? Is it stone or modular block. Please clarify.
  8. Conflicting information regarding the air compressors. Specs reference to relocate two compressor and bid one compressor. Prints show four compressors on the plans. One each in: Light Duty; Heavy Duty; Body Shop and Radio Shop. Please clarify.
  9. Have provisions been made in the floor design of the piping for the radiant heat to allow for drilling in the floor for the lifts? YES. The radiant heat piping will be located at the bottom of the slabs.

NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

Contract # 7528

Pre-Bid Meeting

Thursday, February 28, 2019, 10:30 a.m.

ATTENDEES
PLEASE SIGN-IN

NAME	COMPANY	EMAIL	PHONE
Mike Mohan	Veit USA	MMohan@veitusa	262-901-2700
Tony Tome	Walt's Petro	tony+@waltspetro.com	715-551-0010
Marcia Huyer	midwest landscape	midwestlandscape@gmail.com	262.363-3970
John Zukowski	Fearing's Auditio Video Security	JZukowski@Fearings.com	608-443-5904
Logan Crull	CD Smith	lcrull@cdsmith.com	920-960-9585
AARON WESTHUIS	CD SMITH	awesthuis@cdsmith.com	414-810-8601
Val Neumaier	Greenfire Mgmt Services	jeb.miller@greenfirecm	414.801.1028
JAY THOMSEN	Vogel Bros CO Building	Jthomsen@vogelbldg.com	608 279 0295
Chris Hoffman	Summit Companies	choffman@summitcos.com	608 516 7514
Cory Huschka	JP Cullen	CORY.HUSCHKA@JPCullen.com	608 751 7350
Lou Olson	J.H. FINDORFF-GE	madisonbids@findorff.com lolson@findorff.com	608-257-5321
KEVIN LICHTFUSS	MEAD & HUNT	kevin.lichtfuss@meadhunt.com	608-443-0595
Kurt Koepp	Hot Water Products	Kkoepp@hotwaterproducts.com	414/432-5971
Clinton Dollak	McElroy Metals	SCID@mcelroymetal.com	608-838-1331

Nakoosa Trail
Fleet/Fire/Radio Shop Facility
City of Madison

PRELIMINARY INFORMATION ONLY - NOT FOR CONSTRUCTION

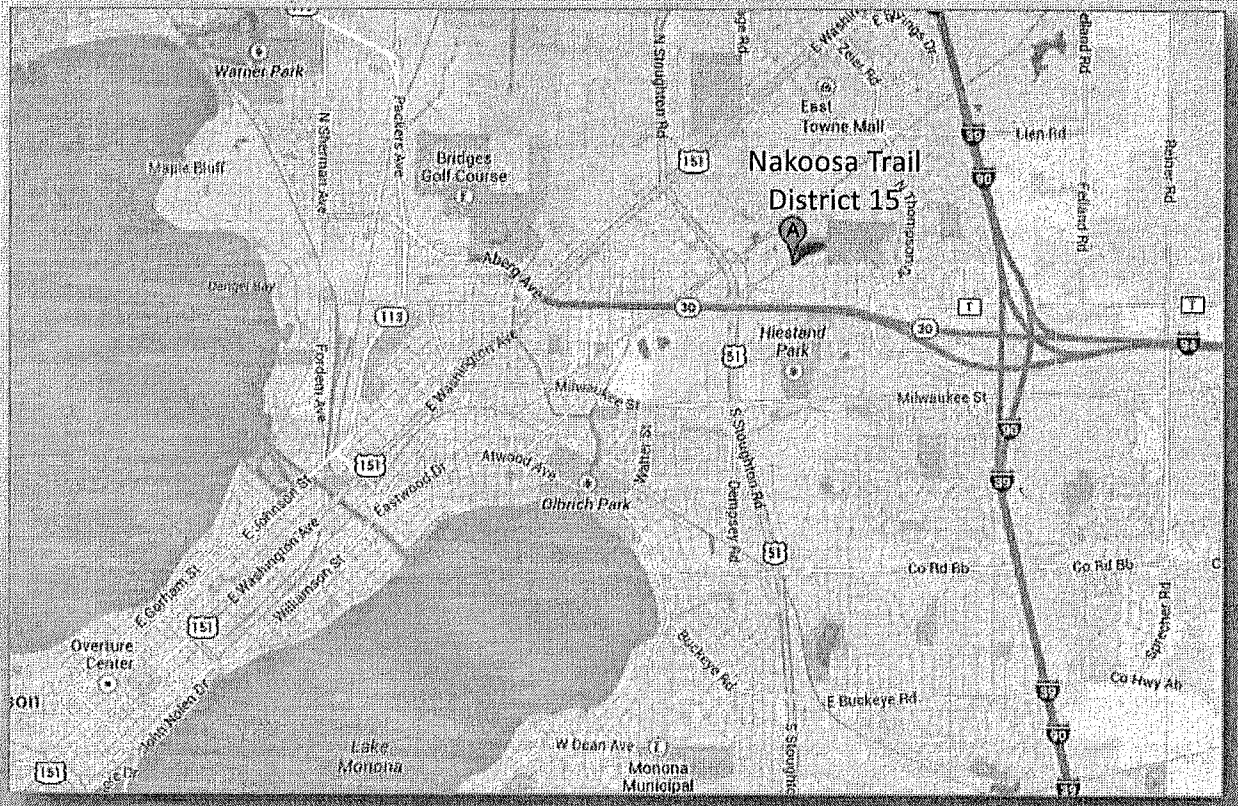
A Combined Facility for:

- Fleet Services
- Fire Maintenance Building
- Radio Shop

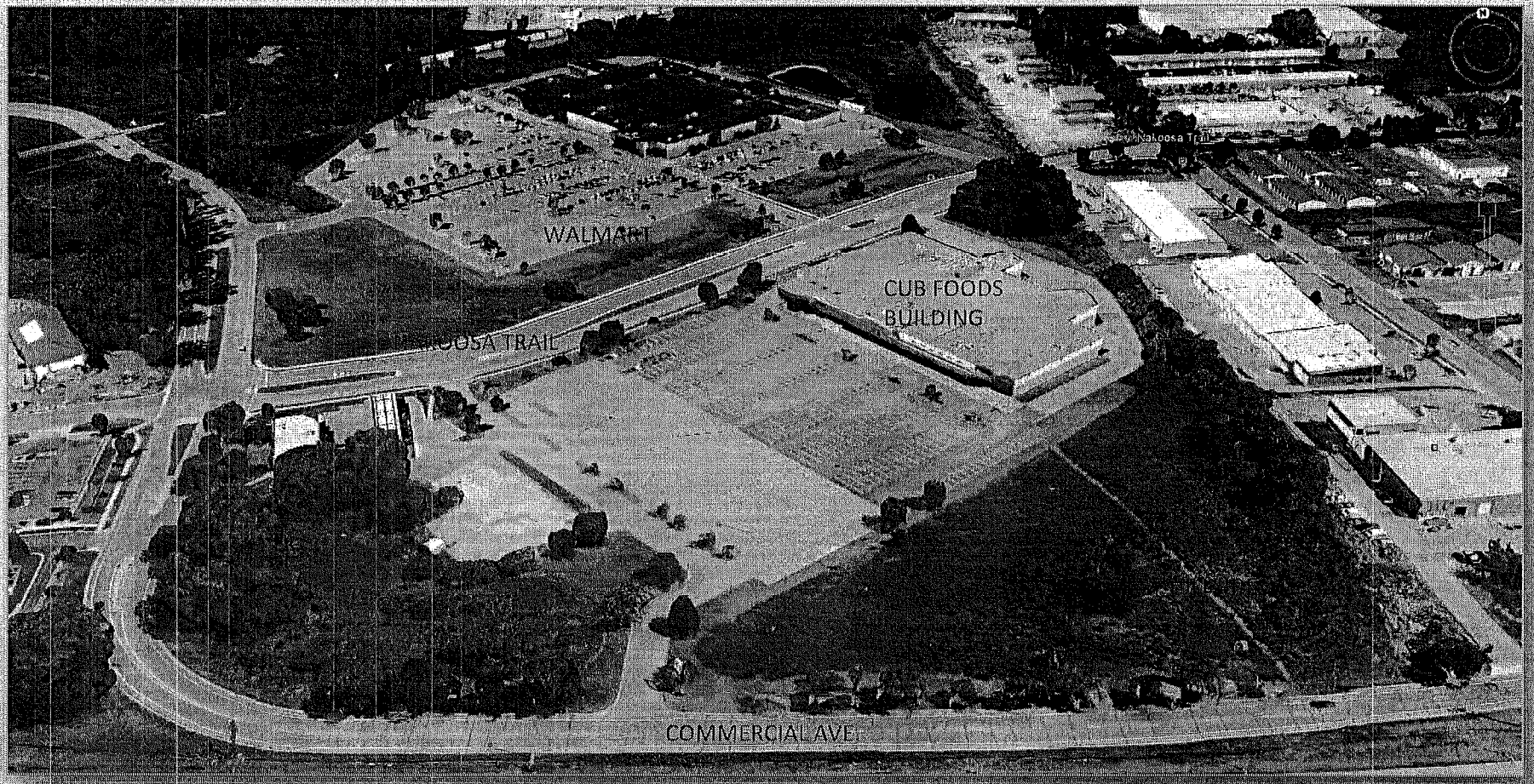
Mahanth Joishy, Fleet Services

Phillip Nehmer, Radio Shop

Prepared by:
Jim Whitney, AIA
City of Madison
January 23, 2019



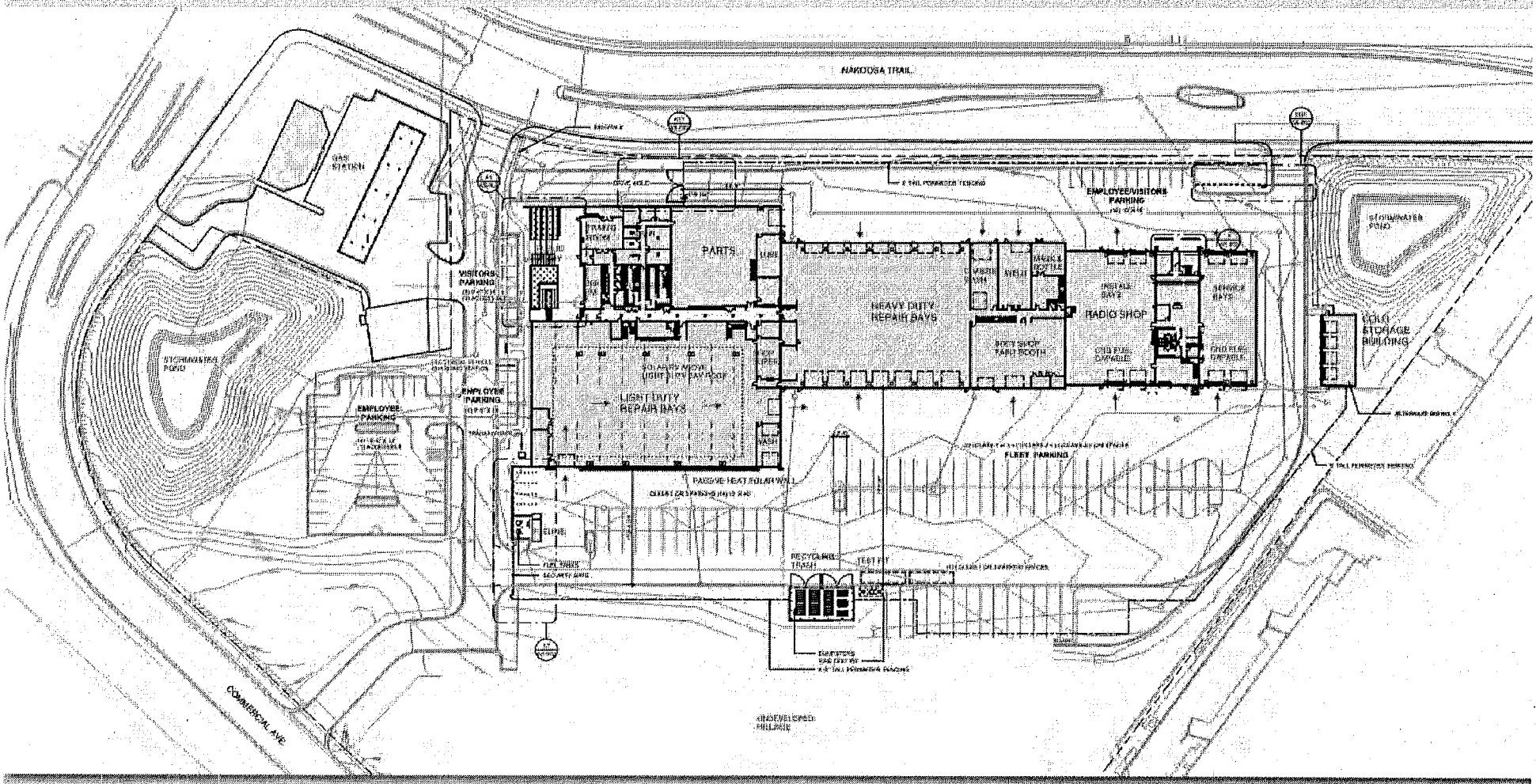
Cub Foods



Site Zone: Industrial Limited

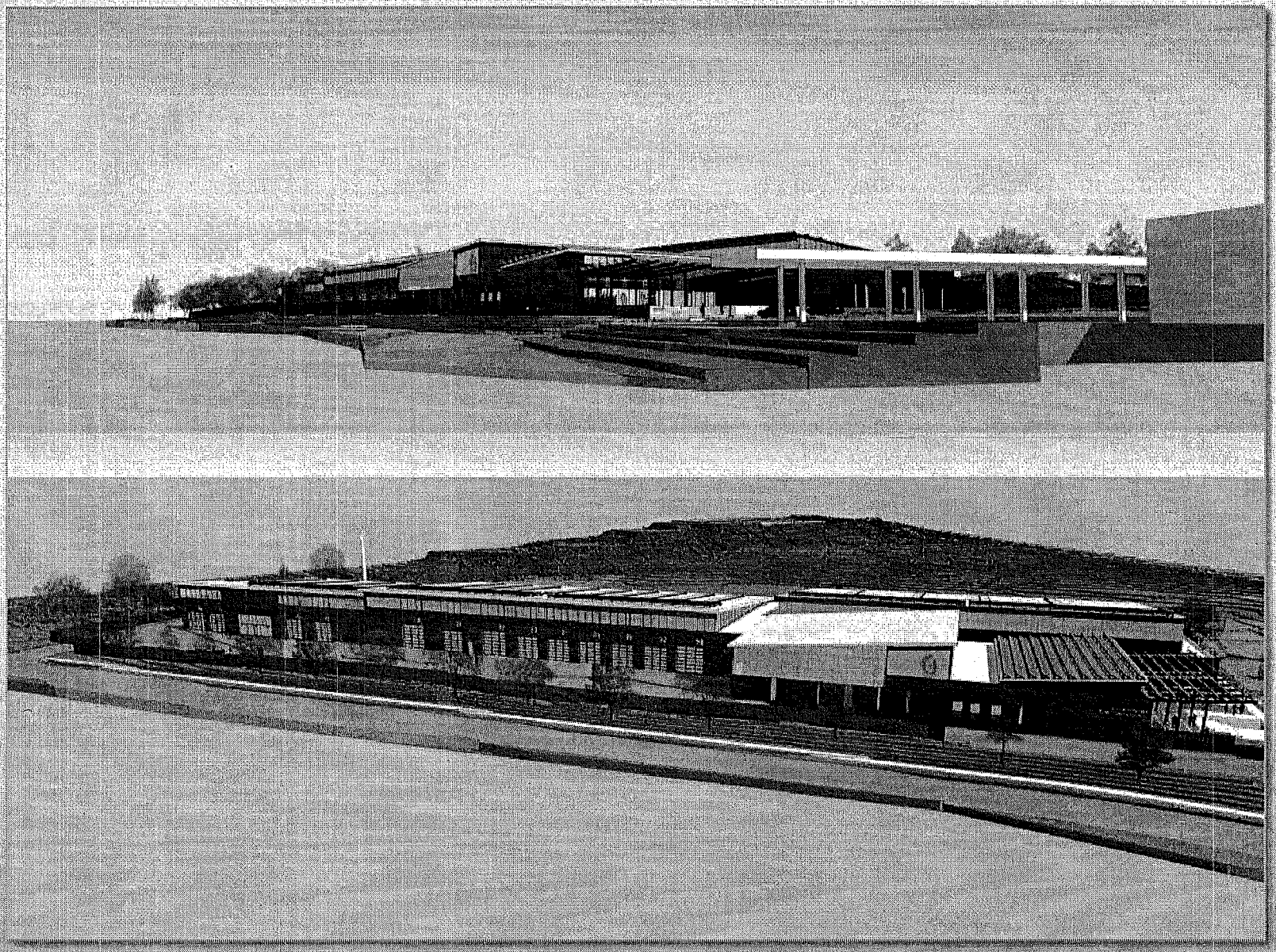
Google Earth

Fleet Services

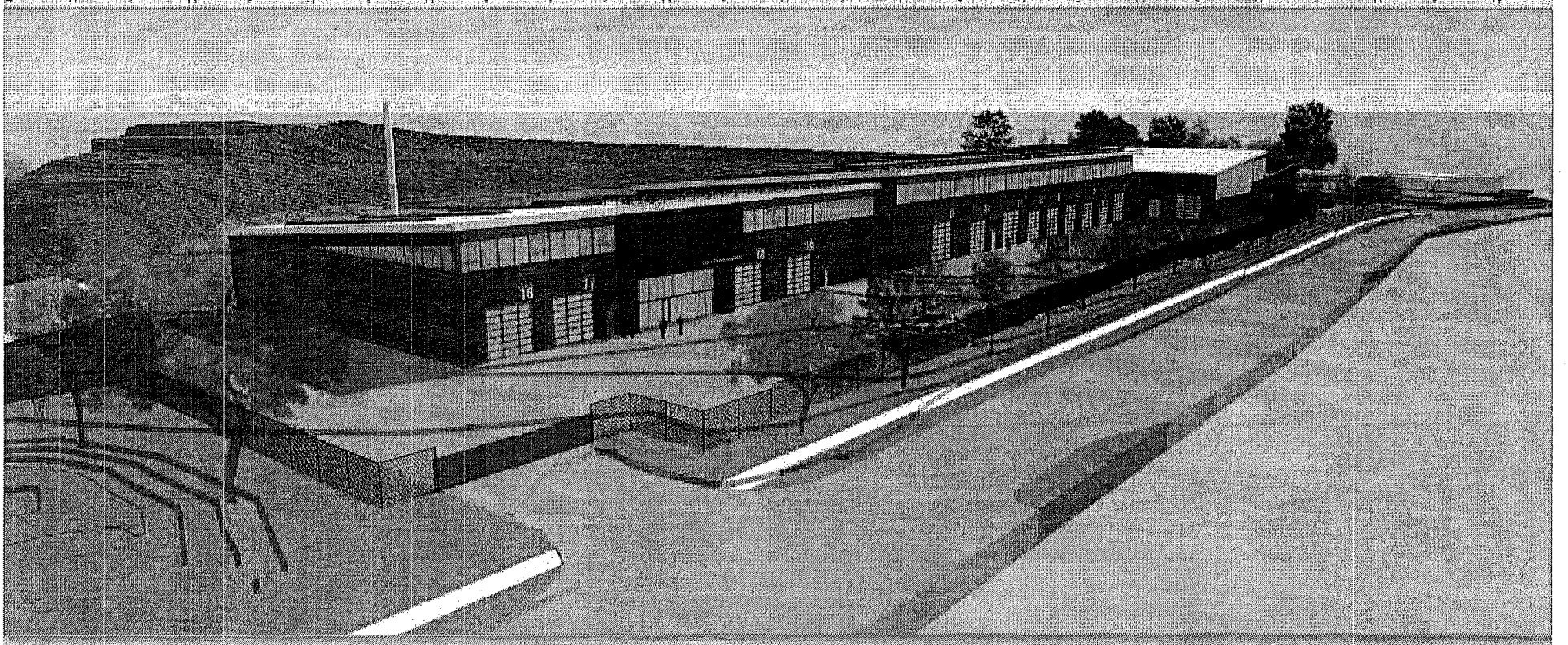


Site Plan

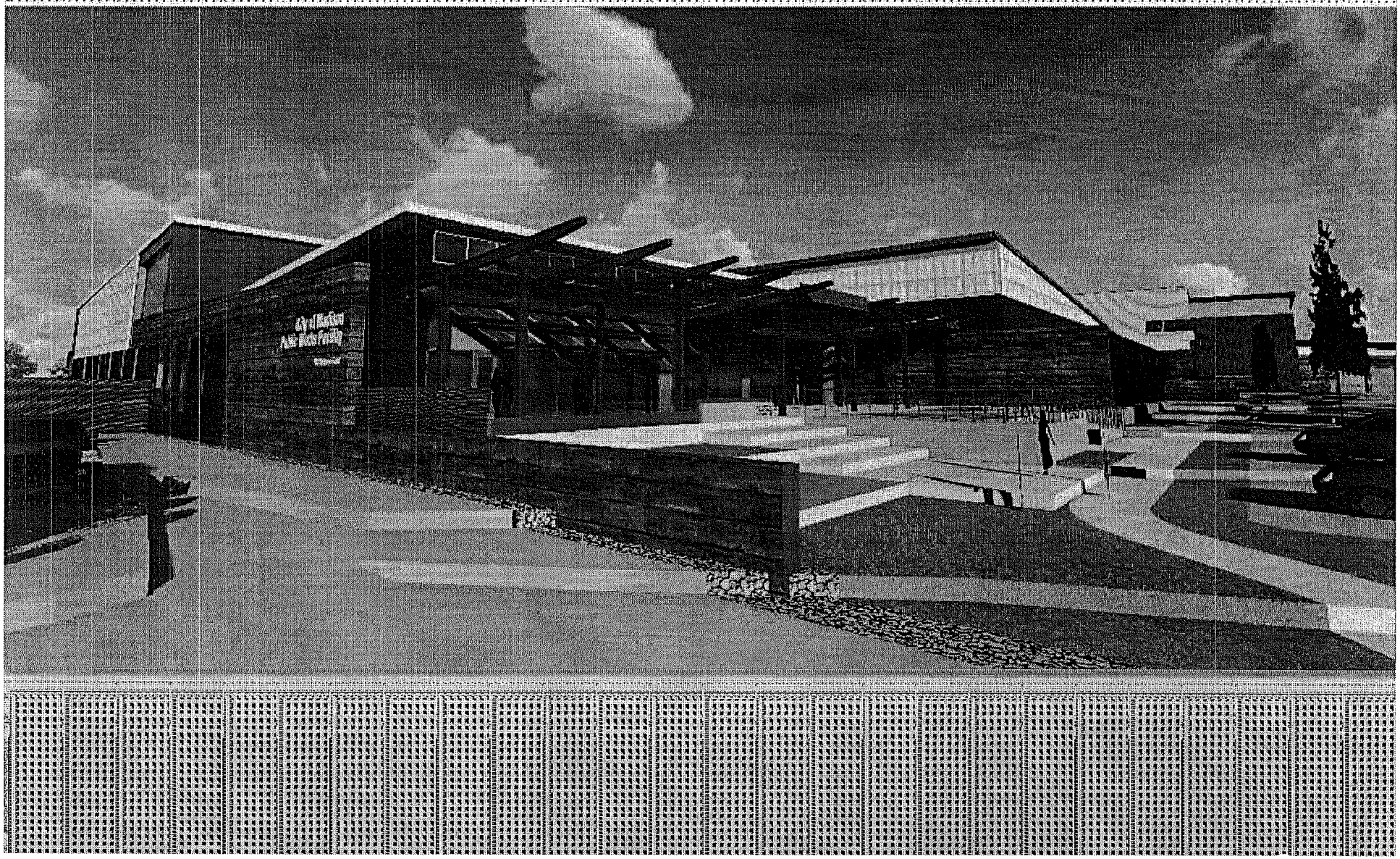
Fleet Services



Fleet Services



Fleet Services

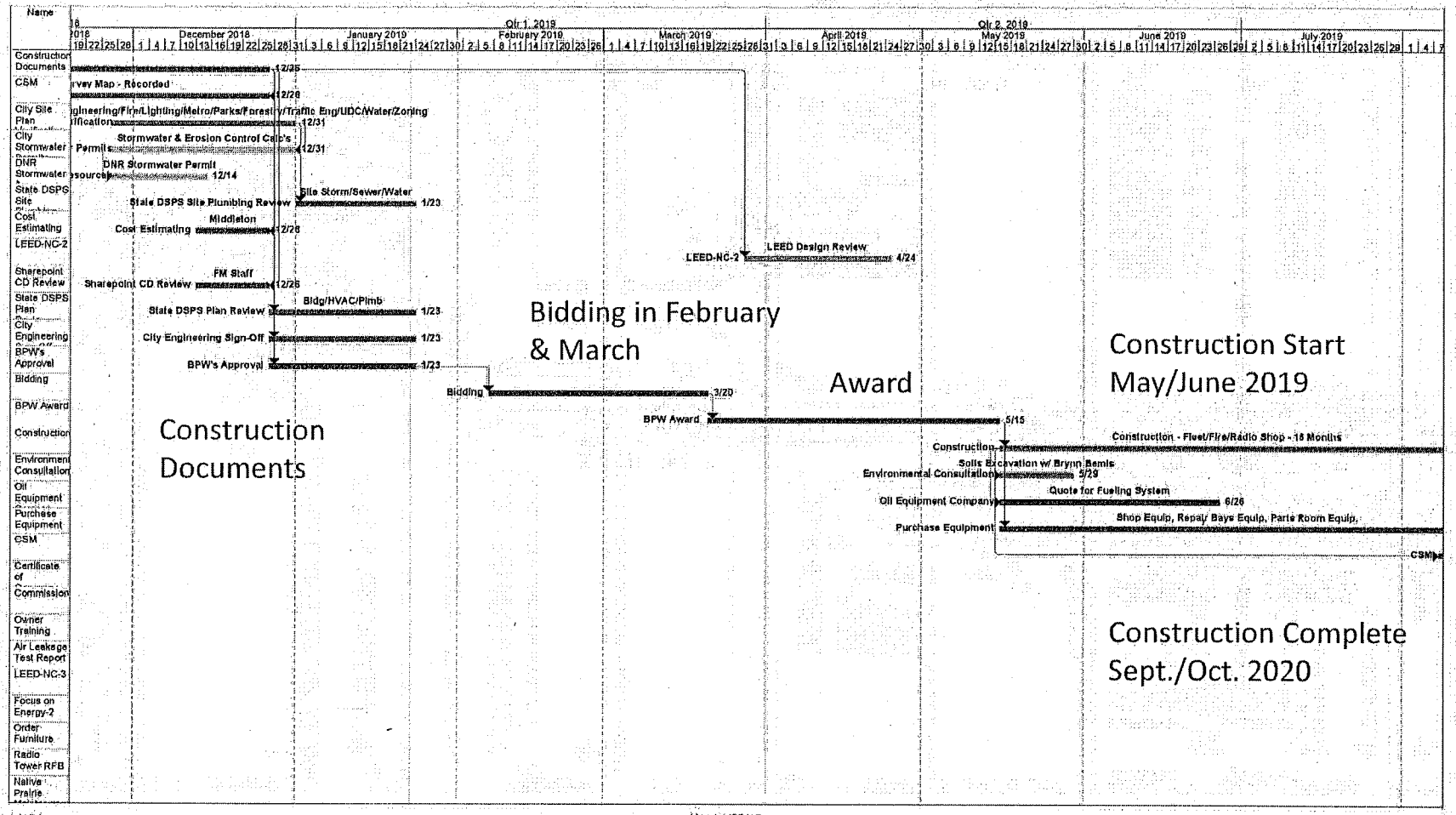


Construction Timeline

Planning Schedule

Nakoosa Trail Fleet Services Facility

draft



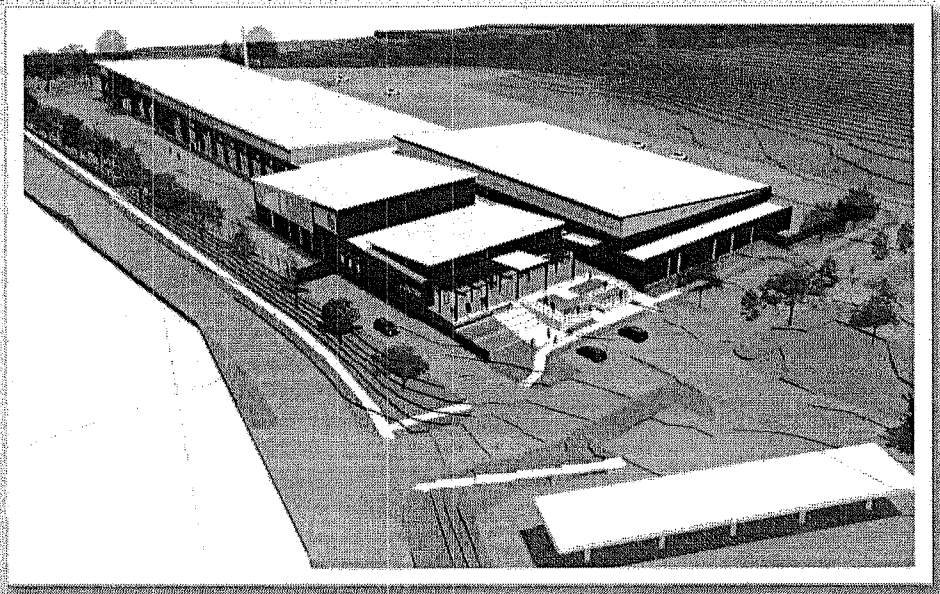
J. Whitney

Wed 1/23/19

Summary

Fleet/Fire/Radio Shop Facility

Alder District 15
Approximately 104,910 Square Feet Footprint
Estimated Construction Cost: $26,800,000
Estimated Construction Start: May/June 2019
Estimated Construction Completion: Sept./Oct. 2020
Alternate Bid No. 1: Cold Storage Building
Alternate Bid No. 2: Solar PV Photovoltaic Panels



Green Building Features

-Clerestory Window Daylighting
-Dimming Daylighting Controls
-Spray Foam Wall Insulation
-LED Lighting Systems w/ Sensors
-Hydronic Hot Water Floor Heating
-Variable Air Volume System
-Solar Electric Photovoltaic Panels, 100KW
-Passive Heat Solar Wall at Light Duty Bay
-LEED-Silver

Department of Public Works
Engineering Division
Robert F. Phillips, P.E., City Engineer
City-County Building, Room 115
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
Phone: (608) 266-4751 | Fax: (608) 264-9275
engineering@cityofmadison.com
cityofmadison.com/engineering

Deputy City Engineer
Gregory T. Fries , P.E.
Deputy Division Manager
Kathleen M. Cryan
Principal Engineer 2
Christopher J. Petykowski, P.E.
John S. Fahrney , P.E.
Principal Engineer 1
Christina M. Bachmann, P.E.
Mark D. Moder, P.E.
Janet Schmidt, P.E.
Facilities & Sustainability
Jeanne E. Hoffman, Manager
Bryan Cooper, Principal Architect
Mapping Section Manager
Eric T. Pederson, P.S.
Financial Manager
Steven B. Danner-Rivers

March 19, 2019

NOTICE OF ADDENDUM
ADDENDUM NO. 4

CONTRACT NO. 7528, PROJECT NO. 10305
NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

This addendum consists of the following documents:

- **Reponses to Bidders Questions in Section 2**
- **Specification changes outlined in Section 4**
- **Drawings changes as detailed in Section 5**

1. **GENERAL CONTRACT CONDITIONS**
   No change

2. **GENERAL QUESTIONS AND ANSWERS**

Q1: Dunn Edwards is not a readily available paint in WI. Please advise as to a match for Sherwin Williams, Hallman Lindsey, etc. as these are local paint manufacturers.

A1: Other acceptable paint companies include Sherwin Williams, Hallman Lindsey, Benjamin Moore, Diamond Vogel, PPG, and similar local paint manufacturers.

Q2: Confirm that the wall between grid line 16 & 17 is changed from 12" CMU to precast concrete.

A2: Yes confirming that the interior wall has changed to precast concrete, full height, between grid lines 16 & 17, where shown on Addendum No. 3 sheets A-104, A-105, & A-106 for reference.

Q3: Is thickened edge at exterior precast walls required? This is not shown in structural (see 5/S-511).

A3: A thickened edge is not required at the floor slab.

Q4: Should fencing extend through alternate storage building if it doesn't get accepted? If so, which fence type?

A4: Provide 6'-0" tall chain link fence through the alternate storage building if Alternate No 1 doesn't get accepted.

3. **ACCEPTABLE EQUIVALENTS**
No change

4. **SPECIFICATIONS**
   A. Section 03 30 00 – Cast In Place Concrete
      i. DELETE – Section 3.7.B "Light Reflective Finish" See specification 03 35 53.13"
   B. Section 03 30 00 – Cast In Place Concrete
      Revise 2.12.b.7 to include synthetic fiber shown below.

a. Interior: Do not allow air content of trowel-finished floors to exceed 3 percent.
b. Exterior: 6 percent, plus or minus 1.5 percent at point of delivery.

7. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb/cu. yd.

a. Products

1) Forta Ferro
2) FRC HPS 950

c. Concrete toppings: Normal-weight concrete.

   C. Section 14 45 00 – Vehicle Lifts
      Revise 2.4.E. Lift, Parallelogram, Accessories: Change rolling jack capacity to 42,000 pounds.

E. Accessories:

1. 42,000 rolling jack
2. Track lighting
3. Tape switch, 42 foot track

1. Repair bays:
   a. Center jack: 42,000 pound capacity, should slide on inner rail, one each
   b. Wheel set: Retractable, for loading or unloading of accessory center jack, one each
   c. Platform lighting system: Individual fluorescent lamps (built in), with unitized waterproof construction and clear shatterproof tubes, eight each
   d. Finish: Durable enamel in manufacturer's standard color

   D. Section 07 41 13.16 – STANDING SEAM METAL ROOF PANELS
      Add under paragraph 2.2.1 comparable product by Peterson Aluminum and MBCI.

5. **DRAWINGS**
   A. **MODIFIED** A-126 MISC ROOF PLANS with markups of support angle locations at the intermediate sidelap of MS-3 perforated panels. See attached drawing sheet.
   B. **MODIFIED** A-510 CANOPY DETAILS with support angle at intermediate sidelap of perforated panels.
   C. **MODIFIED** S-451 MISCELLANEOUS FRAMING PLANS. See attached drawing sheet.
   D. **MODIFIED** S-601 STRUCTURAL SCHEDULE Add structural column schedule general note: 1. ALL BASEPLATES ARE ¾" THICK UNO. (Drawing sheet not attached.)

6. **PROPOSAL**
   No change

7. **ADDITIONAL DOCUMENTS**
   No change

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at:

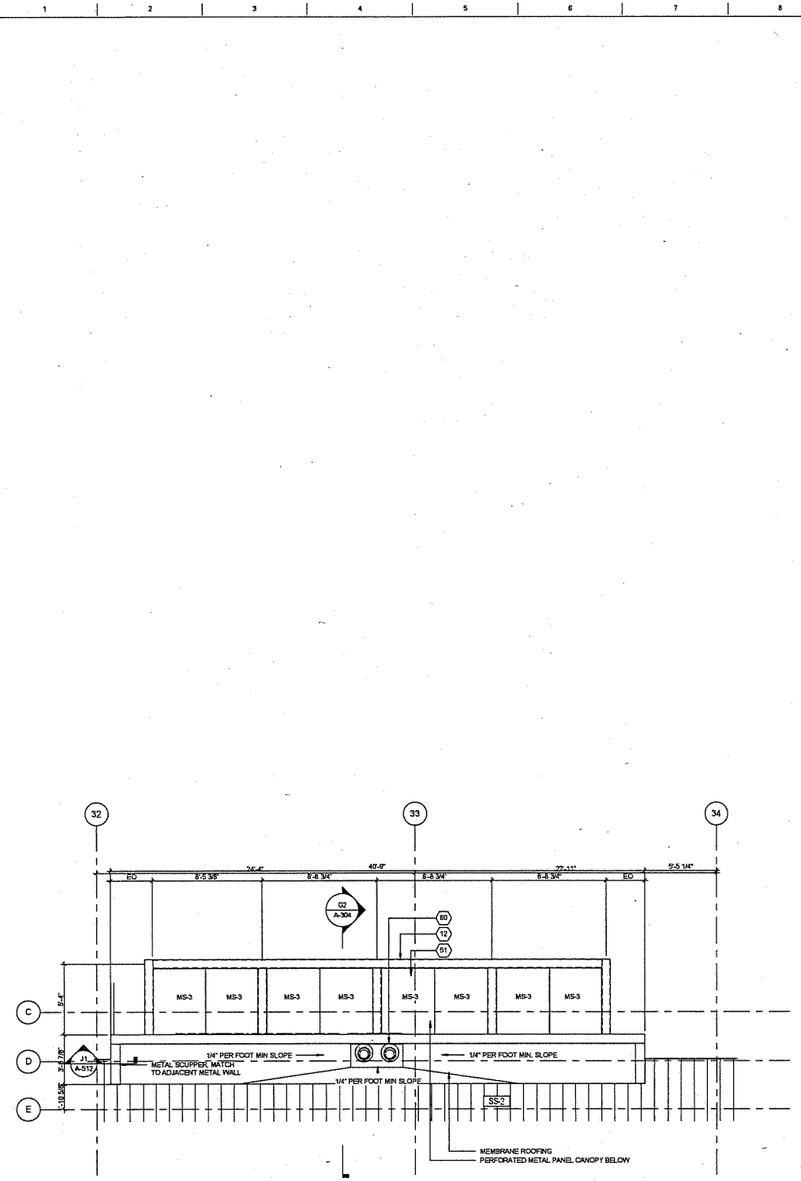
https://www.bidexpress.com/

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 to receive the material by another route.

Sincerely,

Robert F. Phillips, P.E., City Engineer

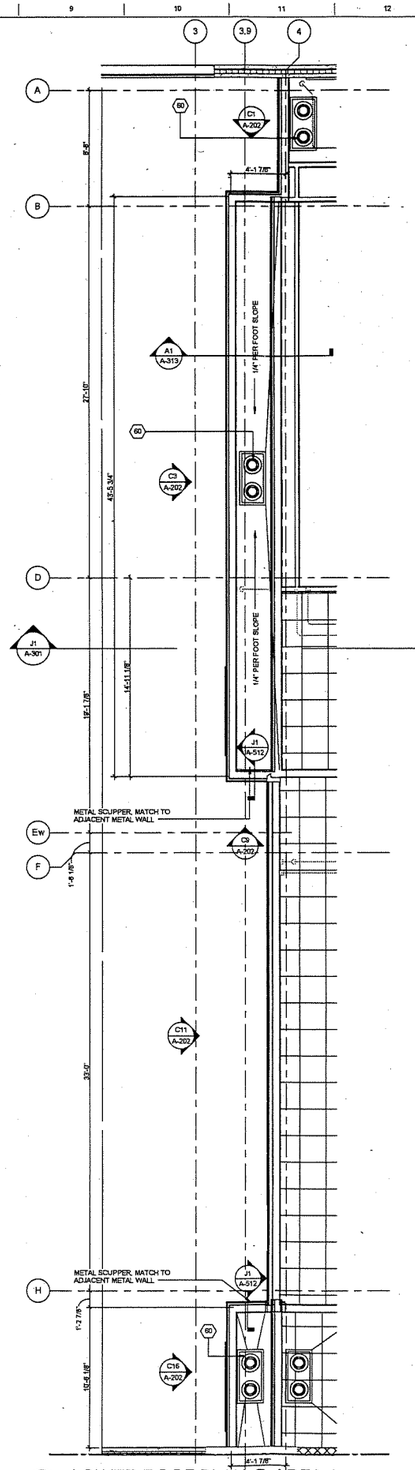
Cc: Greg Fries, Kathy Cryan



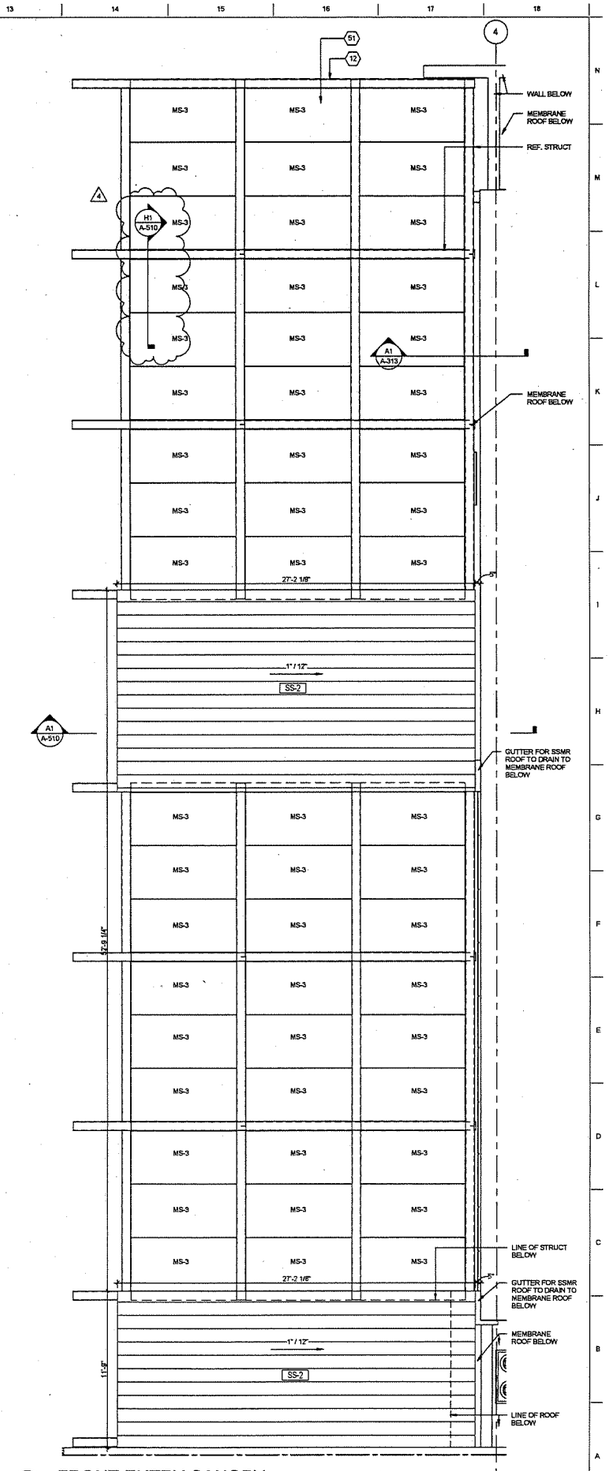
C1 LOWER ROOF PLAN @ AREA E
1/4" = 1'-0"

ROOF PLAN NOTES	
1	PROVIDE 1/4" PER FOOT MINIMUM SLOPE TOWARD ROOF DRAIN AT MEMBRANE ROOF U.O.N.
2	

KEY NOTES	
12	(PT-1) PAINTED STEEL STRUCTURE CANOPY.
51	(MS-3) PERFORATED METAL PANEL. SEE EXTERIOR FINISH SCHEDULE ON A-200.
60	ROOF DRAIN AND OVERFLOW DRAIN, TYP.



A8 LOWER ROOF PLAN @ AREA A
1/4" = 1'-0"



A13 FRONT ENTRY CANOPY
1/4" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7670 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

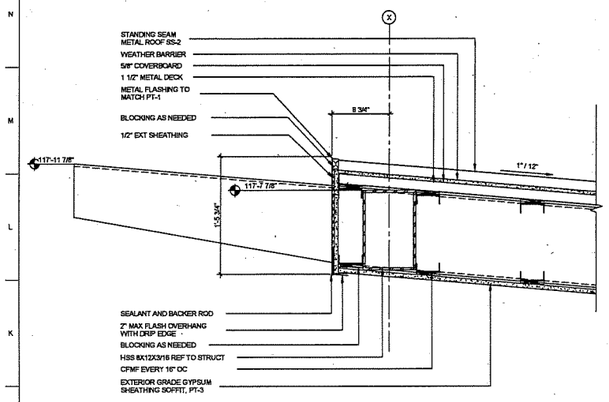
No	REVISIONS/SUBMISSION	DATE
4	ADDENDUM 4	03/19/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 376803

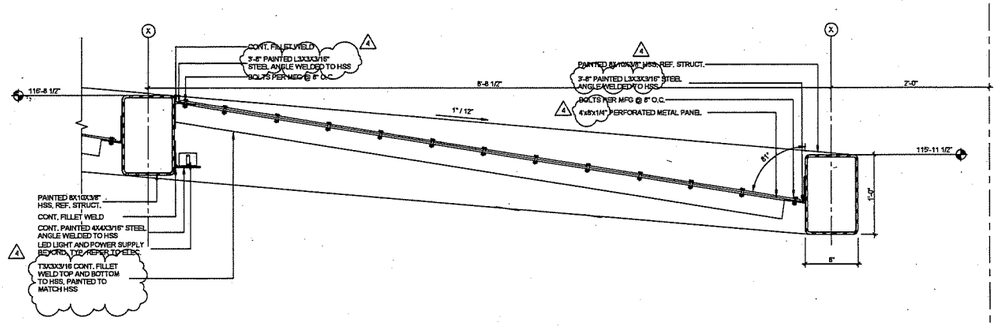
MISC. ROOF PLANS

A-126

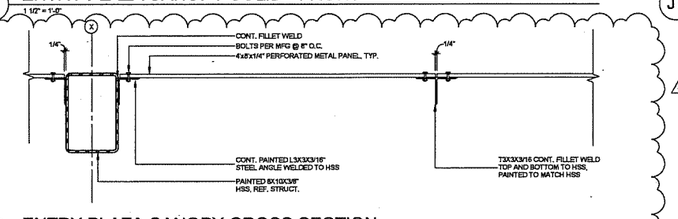
ADDENDUM 4



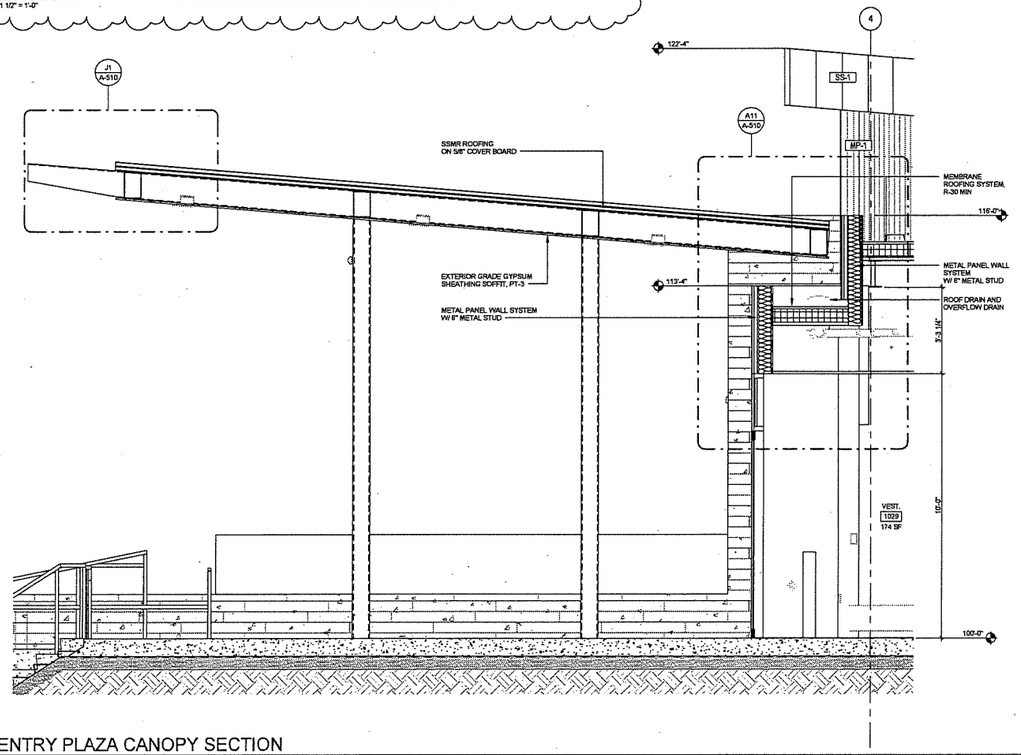
J1 ENTRY PLAZA CANOPY SOLID - FRONT
1 1/2" = 1'-0"



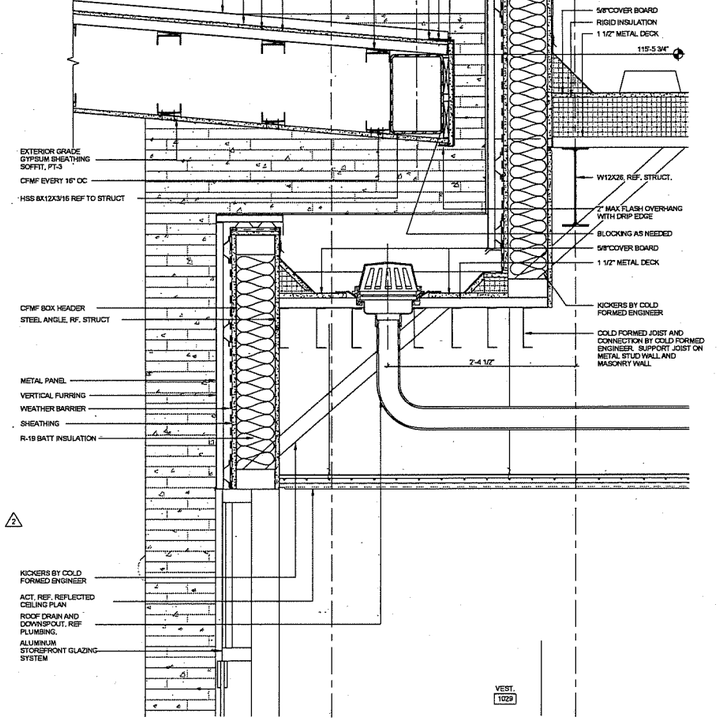
J7 ENTRY PLAZA CANOPY PERF-BACK
1 1/2" = 1'-0"



H1 ENTRY PLAZA CANOPY CROSS SECTION
1 1/2" = 1'-0"



A1 ENTRY PLAZA CANOPY SECTION
1/2" = 1'-0"



A11 ENTRY PLAZA CANOPY SECTION - Callout 1
1 1/2" = 1'-0"

Stantec
1600 WILSON BLVD.
SUITE 350
ARLINGTON, VA 22209
571 290 7979 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITIY
AREA: 117,946 GROSS SF
4151 NAKOOSA TRAIL
MADISON, WISCONSIN, 53714
ARCHITECTURE

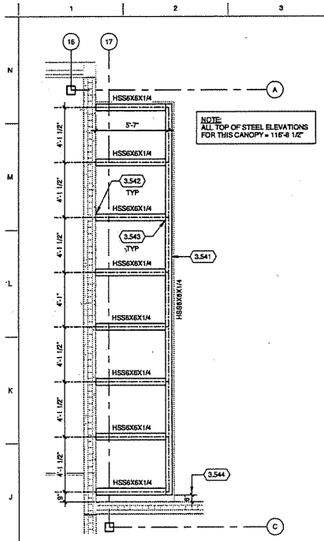
No	REVISION/SUBMISSION	DATE
4	ADDENDUM 4	01/10/2019
3	ADDENDUM 3	01/03/2019
	ISSUE FOR BID	01/01/2019
	ISSUE FOR PERMIT	01/17/2019

PROJECT No: 576903

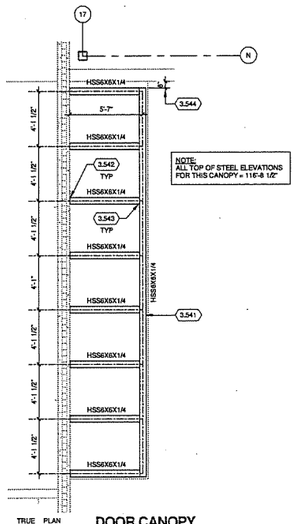
CANOPY DETAILS

A-510

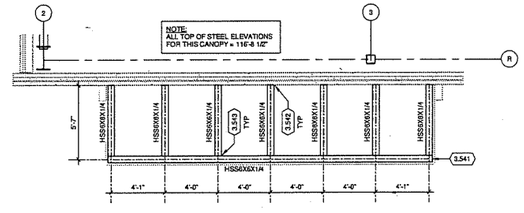
ADDENDUM 4



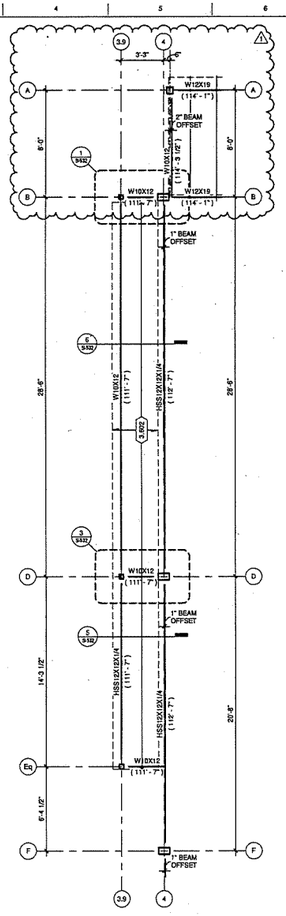
TRUE NORTH PLAN NORTH 6 **DOOR CANOPY FRAMING PLAN - AREA A**
1/4" = 1'-0"



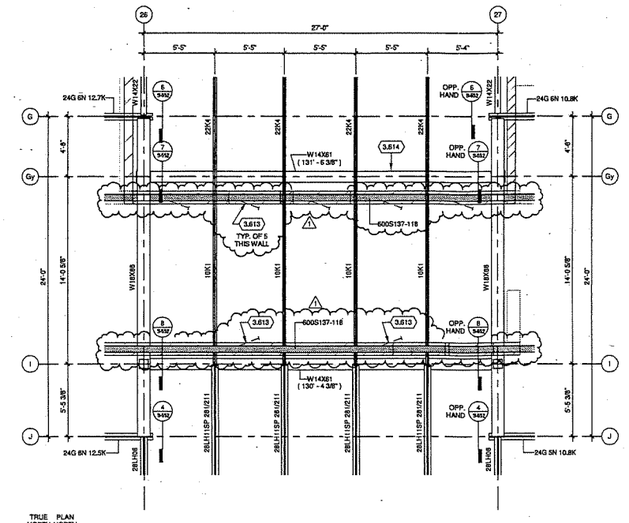
TRUE NORTH PLAN NORTH 7 **DOOR CANOPY FRAMING PLAN - AREA B**
1/4" = 1'-0"



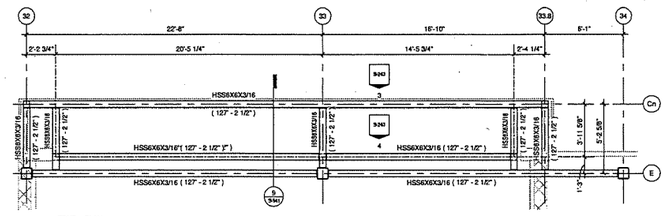
TRUE NORTH PLAN NORTH 8 **DOOR CANOPY FRAMING PLAN - AREA B**
1/4" = 1'-0"



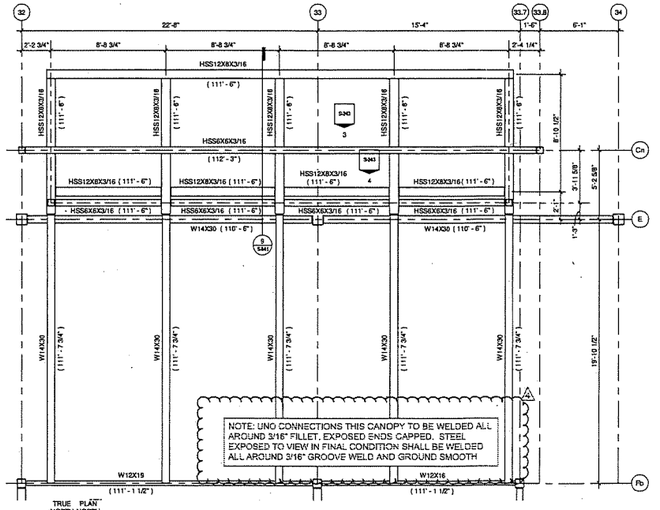
TRUE NORTH PLAN NORTH 5 **PARTIAL ENLARGED LOW ROOF FRAMING PLAN AREA A**
1/4" = 1'-0"



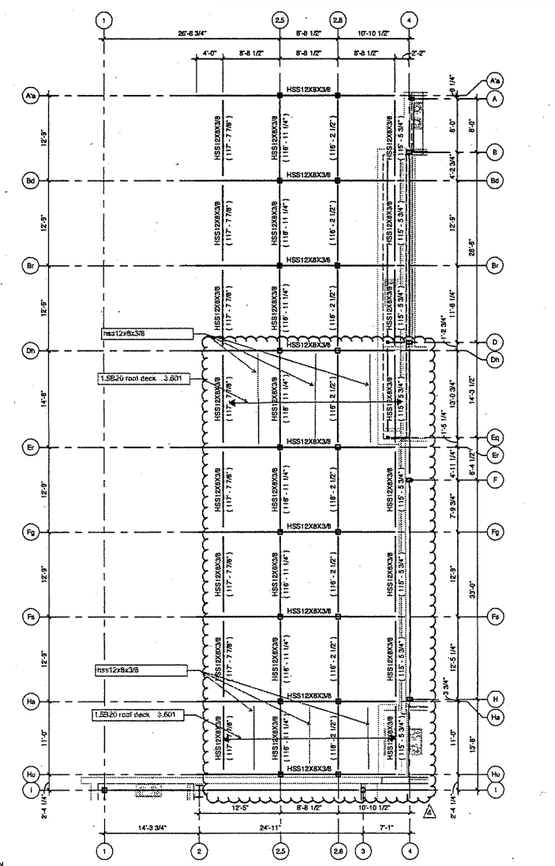
TRUE NORTH PLAN NORTH 2 **ENLARGED HIGH ROOF FRAMING PLAN AREA D**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 3 **ENLARGED ENTRY HIGH FRAMING PLAN AREA E**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 4 **ENLARGED ENTRY CANOPY LOW FRAMING PLAN AREA E**
1/4" = 1'-0"



TRUE NORTH PLAN NORTH 1 **CANOPY ROOF FRAMING PLAN AREA A**
1/8" = 1'-0"

KEYED NOTES

3.541 CAP EACH END OF HSS HEADER BEAM.

3.542 WELD ALL AROUND TO EMBED PLATE IN PRECAST WALL. LOAD TO PRECAST AT EACH OUTRIGGER (V=2.9K, M=104"K)

3.543 WELD OUTRIGGER ALL AROUND TO HSS HEADER BEAM.

3.544 NO CONNECTION ALLOWED FROM CANOPY TO AREA C. MAINTAIN 6 INCH GAP BETWEEN CANOPY STRUCTURE AND AREA C STRUCTURE.

3.602 ROOF DECK IS 1 1/2" DEEP, WIDE RIB, 20 GAUGE METAL DECK. FASTEN ROOF DECK TO SUPPORTS WITH #12 SCREWS AT 6" ON CENTER AND THREE #10 SCREWS PER SPAN IN SIDELAPS. (S&P-3)

3.613 SEE DETAIL 8/S-522 AND SECTION DETAIL 7/S-522 FOR MASONRY SHEAR TRANSFER BRACING.

3.614 PROVIDE BENT PLATE DECK SUPPORT FULL LENGTH OF THIS BEAM/JOIST GIRDER. SIMILAR TO DETAIL 17/S-522 EXCEPT ATTACH WITH #10 SCREWS AT 6" O.C.

ROOF FRAMING PLAN GENERAL NOTES:

1. SITE DATUM OF FINISHED FIRST FLOOR INDICATED ON CIVIL SITE PLAN = ELEVATION 100'-0" FOR AREAS A, B, C, & D OR ELEVATION 97'-6" FOR AREA E ON STRUCTURAL DRAWINGS.
2. FIELD VERIFY ALL DIMENSIONS, BRING ANY DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR FINAL DECISION.
3. REFER TO SHEET S-001 FOR STRUCTURAL LEGENDS, ABBREVIATIONS, AND SYMBOLOGY.
4. REFER TO SHEET S-00x FOR ROOF LOADING PLAN AND SPECIAL JOIST LOADING REQUIREMENTS.
5. REFER TO SHEETS S-541 AND S-542 FOR TYPICAL DETAILS NOT REFERENCED ON THIS SHEET.
6. REFER TO SHEET S-601 FOR STRUCTURAL SCHEDULES.
7. MINIMUM JOIST BEARING LENGTH REQUIREMENTS ARE AS FOLLOWS UNLESS NOTED OR DETAILED OTHERWISE;
   - AT MASONRY WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT CONCRETE WALLS
     - "K" SERIES - MIN. 4"
     - "KCS" SERIES - MIN. 4"
     - "LH" SERIES - MIN. 6"
     - "DLH" SERIES - MIN. 6"
   - AT STEEL BEAMS
     - "K" SERIES - MIN. 2 1/2"
     - "KCS" SERIES - MIN. 2 1/2"
     - "LH" SERIES - MIN. 4"
     - "DLH" SERIES - MIN. 4"
8. SC = SLIP CRITICAL END CONNECTION. OMIT SHOP PAINT. INSTALL BOLTS FULLY PRETENSIONED.
9. OUTRIGGERS ARE 2.9K3 AT 6'-0" O.C. SPACING MAXIMUM. MINIMUM S=1.2IN3, MINIMUM I = 1.5IN4.
10. JOIST EXTENSIONS ARE RS, MINIMUM S=1.673IN3, MINIMUM I = 2.091IN4.

Stantec
Mead & Hunt
Mead & Hunt, Inc.
2440 Deming Way
Middleton, WI 53562
phone 608-273-6380
meadhunt.com
1600 WILSON BLVD.
SUITE 380
ARLINGTON, VA 22209
571 280 7979 t

CITY OF MADISON
NAKOOSA TRAIL
FLEET/FIRE/RADIO SHOP
FACILITY

4141 NAKOOSA TRAIL
MADISON, WISCONSIN 53714

ISSUE FOR BID

NOT FOR CONSTRUCTION

No	REVISION/SUBMISSION	DATE
1	ADDENDUM 1	03/01/2019
	ISSUE FOR BID	02/07/2019
	ISSUE FOR PERMIT	01/17/2019

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PROJECT No: 1303500-160264.01

MISCELLANEOUS FRAMING PLANS

S-451

ADDENDUM 4

SECTION E: BIDDERS ACKNOWLEDGEMENT

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2019 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda Nos. 1 through 4 to the Contract, at the prices for said work as contained in this proposal. (Electronic bids submittals shall acknowledge addendum under Section E and shall not acknowledge here)
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. I hereby certify that I have met the Bid Bond Requirements as specified in Section 102.5. *(IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).*
5. I hereby certify that all statements herein are made on behalf of C. D. Smith Construction, Inc. (name of corporation, partnership, or person submitting bid) a corporation organized and existing under the laws of the State of WI a partnership consisting of _____; an individual trading as _____; of the City of _____ State of _____; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

SIGNATURE

Justin A. Smith, President
TITLE, IF ANY

Sworn and subscribed to before me this
2nd day of March, 20 19.

Joan E Koenig
(Notary Public or other officer authorized to administer oaths)
My Commission Expires 1-11-23

JOAN E. KOENIG NOTARY PUBLIC STATE OF WISCONSIN

Bidders shall not add any conditions or qualifying statements to this Proposal.

SECTION F: BEST VALUE CONTRACTING

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

Best Value Contracting

1. The Contractor shall indicate the non-apprenticeable trades used on this contract.

_____

_____

2. Madison General Ordinance (M.G.O.), 33.07(7), does provide for some exemptions from the active apprentice requirement. Apprenticeable trades are those trades considered apprenticeable by the State of Wisconsin. Please check applicable box if you are seeking an exemption.

☐ Contractor has a total skilled workforce of four or less individuals in all apprenticeable trades combined.

☐ No available trade training program; The Contractor has been rejected by the only available trade training program, or there is no trade training program within 90 miles.

☐ Contractor is not using an apprentice due to having a journey worker on layoff status, provided the journey worker was employed by the contractor in the past six months.

☐ First-time Contractor on City of Madison Public Works contract requests a onetime exemption but intends to comply on all future contracts and is taking steps typical of a "good faith" effort.

☐ Contractor has been in business less than one year.

☐ Contractor doesn't have enough journeyman trade workers to qualify for a trade training program in that respective trade.

☐ An exemption is granted in accordance with a time period of a "Documented Depression" as defined by the State of Wisconsin.

3. The Contractor shall indicate on the following section which apprenticeable trades are to be used on this contract. Compliance with active apprenticeship, to the extent required by M.G.O. 33.07(7), shall be satisfied by documentation from an applicable trade training body; an apprenticeship contract with the Wisconsin Department of Workforce Development or a similar agency in another state; or the U.S Department of Labor. This documentation is required prior to the Contractor beginning work on the project site.

☐ The Contractor has reviewed the list and shall not use any apprenticeable trades on this project.

LIST APPRENTICABLE TRADES (check all that apply to your work to be performed on this contract)

- [x] BRICKLAYER
- [x] CARPENTER
- [x] CEMENT MASON / CONCRETE FINISHER
- [x] CEMENT MASON (HEAVY HIGHWAY)
- [x] CONSTRUCTION CRAFT LABORER
- [ ] DATA COMMUNICATION INSTALLER
- [ ] ELECTRICIAN
- [ ] ENVIRONMENTAL SYSTEMS TECHNICIAN / HVAC SERVICE TECH/HVAC INSTALL / SERVICE
- [ ] GLAZIER
- [ ] HEAVY EQUIPMENT OPERATOR / OPERATING ENGINEER
- [ ] INSULATION WORKER (HEAT & FROST)
- [x] IRON WORKER
- [ ] IRON WORKER (ASSEMBLER, METAL BLDGS)
- [ ] PAINTER & DECORATOR
- [ ] PLASTERER
- [ ] PLUMBER
- [ ] RESIDENTIAL ELECTRICIAN
- [ ] ROOFER & WATER PROOFER
- [ ] SHEET METAL WORKER
- [ ] SPRINKLER FITTER
- [ ] STEAMFITTER
- [ ] STEAMFITTER (REFRIGERATION)
- [ ] STEAMFITTER (SERVICE)
- [x] TAPER & FINISHER
- [ ] TELECOMMUNICATIONS (VOICE, DATA & VIDEO) INSTALLER-TECHNICIAN
- [ ] TILE SETTER

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

Small Business Enterprise Compliance Report

This information may be submitted electronically through Bid Express or submitted with bid in sealed envelope.

Cover Sheet

Prime Bidder Information

Company: C. D. Smith Construction, Inc.

Address: 889 E. Johnson Street, Fond du Lac, WI 54935

Telephone Number: 920-924-2900 Fax Number: 920-924-2910

Contact Person/Title: crichardson@cdsmith.com

Prime Bidder Certification

I, Justin A. Smith (Name), President (Title) of

C. D. Smith Construction, Inc. (Company) certify that the information

contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

Joan Koenig
Witness' Signature

3/21/19
Date

Bidder's Signature
Justin A. Smith, President

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

Small Business Enterprise Compliance Report

Summary Sheet

SBE Subcontractors Who Are NOT Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
AMIGO CONSTRUCTION LLC	CLADDING, FOAMED METAL	2.5 %
BYCO INC.	FLOORING	.8 %
STEPUP CEILINGS LLC	CEILINGS, ACOUSTICAL	.2 %
URBAN CONSTRUCTION ADMINISTRATION	PAINTING	1.2 %
		%
		%
		%
		%
		%
		%
		%
		%
		%
Subtotal SBE who are NOT suppliers:		4.7 %

SBE Subcontractors Who Are Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
		%
		%
		%
		%
		%
		%
Subtotal Contractors who are suppliers:	_____ % x 0.6 = _____	% (discounted to 60%)

Total Percentage of SBE Utilization: 4.7 %.

NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY
CONTRACT NO. 7528
DATE: 3/21

C.D. Smith Construction, Inc.

Item	Quantity	Price	Extension
Section B: Proposal Page			
90000 - BASE BID: Nakoosa Trail Fleet/Fire/Radio Shop Facility - Lump Sum	1.00	$27,686,000.00	$27,686,000.00

SECTION G: BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT Principal and Surety, as identified below, are held and firmly bound unto the City of Madison, (hereinafter referred to as the "Obligee"), in the sum of five per cent (5%) of the amount of the total bid or bids of the Principal herein accepted by the Obligee, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that, whereas the Principal has submitted, to the City of Madison a certain bid, including the related alternate, and substitute bids attached hereto and hereby made a part hereof, to enter into a contract in writing for the construction of:

NAKOOSA TRAIL FLEET/FIRE/RADIO SHOP FACILITY
CONTRACT NO. 7528

1. If said bid is rejected by the Obligee, then this obligation shall be void.

2. If said bid is accepted by the Obligee and the Principal shall execute and deliver a contract in the form specified by the Obligee (properly completed in accordance with said bid) and shall furnish a bond for his/her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

   If said bid is accepted by the Obligee and the Principal shall fail to execute and deliver the contract and the performance and payment bond noted in 2. above executed by this Surety, or other Surety approved by the City of Madison, all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to forfeit to the Obligee as liquidated damages the sum mentioned above, it being understood that the liability of the Surety for any and all claims hereunder shall in no event exceed the sum of this obligation as stated, and it is further understood that the Principal and Surety reserve the right to recover from the Obligee that portion of the forfeited sum which exceed the actual liquidated damages incurred by the Obligee.

   The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

Seal PRINCIPAL

C.D. Smith Construction, Inc.
Name of Principal

By

March 21, 2019
Date

Robert Seibel / CFO
Name and Title

Seal SURETY

Federal Insurance Company
Name of Surety

By

March 21, 2019
Date

Matthew M. Spaude, Attorney-in-Fact
Name and Title

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under National Provider No. 16428356 for the year 2019, and appointed as attorney in fact with authority to execute this bid bond and the payment and performance bond referred to above, which power of attorney has not been revoked.

March 21, 2019
Date

Agent Signature

101 Camelot Drive Suite 2C
Address

Fond du Lac, WI 54935
City, State and Zip Code

920-266-4085
Telephone Number

NOTE TO SURETY & PRINCIPAL

The bid submitted which this bond guarantees shall be rejected if the following instrument is not attached to this bond:

Power of Attorney showing that the agent of Surety is currently authorized to execute bonds on behalf of the Surety, and in the amounts referenced above.

CHUBB®

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company

Know All by These Presents, That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint Donna F. Bardenwerper, Sarah C. Gantner, Matthew M. Spaude and Michael J. Spaude of Fond du Lac, Wisconsin ----------

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this **10th** day of **May, 2017.**

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney, Vice President

STATE OF NEW JERSEY

County of Hunterdon ss.

On this **10th** day of **May, 2017** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316885
Commission Expires July 16, 2019

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 21st day of March, 2019

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

FEDERAL INSURANCE COMPANY

STATEMENT OF ASSETS, LIABILITIES AND SURPLUS TO POLICYHOLDERS

Statutory Basis

DECEMBER 31, 2017

(in thousands of dollars)

ASSETS		*LIABILITIES AND SURPLUS TO POLICYHOLDERS*	
Cash and Short Term Investments	$ (78,340)	Outstanding Losses and Loss Expenses	$ 10,545,326
United States Government, State and Municipal Bonds	7,063,387	Unearned Premiums	2,087,124
Other Bonds	5,366,068	Ceded Reinsurance Premiums Payable	739,431
Stocks	134,041	Provision for Reinsurance	57,140
Other Invested Assets	1,006,599	Other Liabilities	1,044,341
TOTAL INVESTMENTS	13,491,755	TOTAL LIABILITIES	14,473,362
Investments in Affiliates:			
Chubb Investment Holdings, Inc.	3,890,677	Capital Stock	20,980
Great Northern Insurance Company	557,388	Paid-In Surplus	3,209,193
Vigilant Insurance Company	327,316	Unassigned Funds	4,066,505
Chubb Indemnity Insurance Company	171,786		
Chubb National Insurance Company	171,493		
Chubb European Investment Holdings, SLP	119,836	SURPLUS TO POLICYHOLDERS	7,296,678
Other Affiliates	76,806		
Premiums Receivable	1,594,780		
Other Assets	1,368,203		
TOTAL ADMITTED ASSETS	$ 21,770,040	TOTAL LIABILITIES AND SURPLUS	$ 21,770,040

Investments are valued in accordance with requirements of the National Association of Insurance Commissioners. At December 31, 2017, investments with a carrying value of $558,430,596 were deposited with government authorities as required by law.

State, County & City of New York, — ss:

Dawn M. Chloros, Assistant Secretary of the Federal Insurance Company being duly sworn, deposes and says that the foregoing Statement of Assets, Liabilities and Surplus to Policyholders of said Federal Insurance Company on December 31, 2017 is true and correct and is a true abstract of the Annual Statement of said Company as filed with the Secretary of the Treasury of the United States for the 12 months ending December 31, 2017.

Subscribed and sworn to before me this March 1, 2018.

Jeanette Shipsey
Notary Public

JEANETTE SHIPSEY
Notary Public, State of New York
No. 02SH5074142
Qualified in Nassau County
Commission Expires March 10, 2019

Dawn M. Chloros
Assistant Secretary

SECTION H: AGREEMENT

THIS AGREEMENT made this 17 day of APRIL in the year Two Thousand and Nineteen between **C.D. SMITH CONSTRUCTION, INC.** hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted **APRIL 16, 2019**, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.

3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum of **TWENTY-SEVEN MILLION SIX HUNDRED EIGHTY-SIX THOUSAND AND NO/100** ($**27,686,000.00**) Dollars being the amount bid by such Contractor and which was awarded to him/her as provided by law.

4. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, gender identity, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex, sexual orientation, gender identity or national origin.

   The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City Affirmative Action Division certain workforce utilization statistics, using a form to be furnished by the City.

   If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Affirmative Action Division no later than one year after the date on which the first form was required to be provided.

   The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City Affirmative Action Division of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications and application procedures

and deadlines. The Contractor agrees to interview and consider candidates referred by the Affirmative Action Division if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

Articles of Agreement

Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national original and that the employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin.

Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Affirmative Action Division Manager.

Article VI

The Contractor will maintain records as required by Section 39.02(9)(f) of the Madison General Ordinances and will provide the City Affirmative Action Division with access to such records and to persons who have relevant and necessary information, as provided in Section 39.02(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 39.03 and 39.02 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.

2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.

3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or ten thousand dollars ($10,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract. (In federally funded contracts the terms "DBE, MBE and WBE" shall be substituted for the term "small business" in this Article.)

5. Substance Abuse Prevention Program Required. Prior to commencing work on the Contract, the Contractor, and any Subcontractor, shall have in place a written program for the prevention of substance abuse among its employees as required under Wis. Stat. Sec. 103.503.

6. **Contractor Hiring Practices.**

Ban the Box - Arrest and Criminal Background Checks. (Sec. 39.08, MGO)

This provision applies to all prime contractors on contracts entered into on or after January 1, 2016, and all subcontractors who are required to meet prequalification requirements under MGO 33.07(7)(I), MGO as of the first time they seek or renew pre-qualification status on or after January 1, 2016. The City will monitor compliance of subcontractors through the pre-qualification process.

a. **Definitions.** For purposes of this section, "Arrest and Conviction Record" includes, but is not limited to, information indicating that a person has been questioned, apprehended, taken into custody or detention, held for investigation, arrested, charged with, indicted or tried for any felony, misdemeanor or other offense pursuant to any law enforcement or military authority.

"Conviction record" includes, but is not limited to, information indicating that a person has been convicted of a felony, misdemeanor or other offense, placed on probation, fined, imprisoned or paroled pursuant to any law enforcement or military authority.

"Background Check" means the process of checking an applicant's arrest and conviction record, through any means.

b. **Requirements.** For the duration of this Contract, the Contractor shall:

1. Remove from all job application forms any questions, check boxes, or other inquiries regarding an applicant's arrest and conviction record, as defined herein.

2. Refrain from asking an applicant in any manner about their arrest or conviction record until after conditional offer of employment is made to the applicant in question.

3. Refrain from conducting a formal or informal background check or making any other inquiry using any privately or publicly available means of obtaining the arrest or conviction record of an applicant until after a conditional offer of employment is made to the applicant in question.

4. Make information about this ordinance available to applicants and existing employees, and post notices in prominent locations at the workplace with information about the ordinance and complaint procedure using language provided by the City.

5. Comply with all other provisions of Sec. 39.08, MGO.

c. Exemptions: This section shall not apply when:

1. Hiring for a position where certain convictions or violations are a bar to employment in that position under applicable law, or

2. Hiring a position for which information about criminal or arrest record, or a background check is required by law to be performed at a time or in a manner that would otherwise be prohibited by this ordinance, including a licensed trade or profession where the licensing authority explicitly authorizes or requires the inquiry in question.

To be exempt, Contractor has the burden of demonstrating that there is an applicable law or regulation that requires the hiring practice in question, if so, the contractor is exempt from all of the requirements of this ordinance for the position(s) in question.

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused this contract to be sealed with its corporate seal and to be executed by its Mayor and City Clerk on the dates written below.

Countersigned:

Joan Koenig
Witness Date

Joan Koenig
Witness Date

C.D. SMITH CONSTRUCTION, INC.
Company Name

[signature] 4/18/19
President Date

[signature] 4.8.19
Secretary Date

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

[signature] 4/29/19
Finance Director Date

[signature] 4/30/19
Witness Date

[signature] 4/25/19
Witness Date

Approved as to form:

[signature]
City Attorney Date

[signature] 4/30/19
Mayor Date

Lauren N. Peres for 4/25/19
City Clerk Date

SECTION I: PAYMENT AND PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we **C.D. SMITH CONSTRUCTION, INC.** as principal, and Federal Insurance Company Company of Whitehouse Station, NJ as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of **TWENTY-SEVEN MILLION SIX HUNDRED EIGHTY-SIX THOUSAND AND NO/100** ($**27,686,000.00**) Dollars, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

NAKOOSA TRAIL FLEET/ FIRE/ RADIO SHOP FACILITY
CONTRACT NO. 7528

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this 17 day of April, 2019.

Countersigned:

Witness

Secretary

C.D. SMITH CONSTRUCTION, INC.
Company Name (Principal)

President Seal

Approved as to form:

City Attorney

Federal Insurance Company
Surety Seal

☒ Salary Employee ☐ Commission

By
Attorney-in-Fact Sarah C. Gantner

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under National Producer Number 6529244 for the year 2019, and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

4/17/2019
Date

Agent Signature Sarah C. Gantner

CHUBB

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company

Know All by These Presents, That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint Donna F. Bardenwerper, Sarah C. Gantner, Matthew M. Spaude and Michael J. Spaude of Fond du Lac, Wisconsin ----------

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this **10th** day of **May, 2017.**

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney, Vice President

STATE OF NEW JERSEY

County of Hunterdon ss.

On this **10th** day of **May, 2017** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316885
Commission Expires July 16, 2019

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,

(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and

(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 17 day of April, 2019.

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

FEDERAL INSURANCE COMPANY

STATEMENT OF ASSETS, LIABILITIES AND SURPLUS TO POLICYHOLDERS

Statutory Basis

DECEMBER 31, 2018

(in thousands)

ASSETS		*LIABILITIES AND SURPLUS TO POLICYHOLDERS*	
Cash and Short Term Investments	$ (360,335)	Outstanding Losses and Loss Expenses	$ 6,523,482
United States Government, State and Municipal Bonds	5,738,426	Reinsurance Payable on Losses and Expenses	1,490,981
Other Bonds	3,916,616	Unearned Premiums	1,914,190
Stocks	100,774	Ceded Reinsurance Premiums Payable	405,271
Other Invested Assets	959,127	Other Liabilities	565,865
TOTAL INVESTMENTS	10,354,608	TOTAL LIABILITIES	10,899,789
Investments in Affiliates:		Capital Stock	20,980
Great Northern Ins. Co.	384,987	Paid-In Surplus	2,711,474
Vigilant Ins. Co.	333,743	Unassigned Funds	2,057,388
Chubb Indemnity Ins. Co.	176,202		
Chubb National Ins. Co.	176,647	SURPLUS TO POLICYHOLDERS	4,789,842
Chubb European Inv. Holdings, SLP	120,469		
Other Affiliates	99,299		
Premiums Receivable	1,281,368		
Other Assets	2,762,308		
TOTAL ADMITTED ASSETS	$ 15,689,631	TOTAL LIABILITIES AND SURPLUS	$ 15,689,631

Investments are valued in accordance with requirements of the National Association of Insurance Commissioners, At December 31, 2018, investments with a carrying value of $566,806,856 were deposited with government authorities as required by law.

STATE OF PENNSYLVANIA

COUNTY OF PHILADELPHIA

John Taylor, being duly sworn, says that he is Senior Vice President of Federal Insurance Company and that to the best of his knowledge and belief the foregoing is a true and correct statement of the said Company's financial condition as of the 31 st day of December, 2018.

Sworn before me this March 19, 2019

Senior Vice President

Notary Public

August 8, 2019
My commission expires

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Diane Wright, Notary Public
City of Philadelphia, Philadelphia County
My Commission Expires Aug. 8, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES