NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER

MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

LEGEND:

- CONSTRUCTION NOTE
- WINDOW TAG
- NEW PARTITION/ NEW DOOR
- REVISION
- ROOM NO.
- DETAIL NUMBER / DRAWING NUMBER
- SECTION NUMBER / SECTION SHEET
- EXTERIOR ELEVATION MARK: ELEVATION NUMBER / SHEET NUMBER
- INTERIOR ELEVATION MARK: ELEVATION NUMBER / SHEET NUMBER
- PARTITION TYPE
- DOOR TAG: ROOM NUMBER / DOOR NAME
- DETAIL NUMBER / SHEET NUMBER
- ENLARGED PLAN MARK
- DETAIL NUMBER / SHEET NUMBER
- DOWN LIGHT
- 24" x 48" LAY IN LIGHT FIXTURE
- HVAC SUPPLY GRILLE
- HVAC RETURN GRILLE
- SPRINKLER HEAD

LOCAL UTILITIES:

MISSOURI ONE CALL
800-344-7483

SEWER & WATER
LEE'S SUMMIT WATER
220 SE GREEN
LEE'S SUMMIT, MO 62063

ELECTRICITY
KANSAS CITY POWER & LIGHT
PO BOX 418679
KANSAS CITY, MO 64141-9679

GAS
MISSOURI GAS ENERGY
3420 BROADWAY
KANSAS CITY, MO 64111
816-756-5252

AT&T
ENGINEERING DIVISION
215 N. SPRING STREET
INDEPENDENCE, MO 64050
816-325-5606

DESIGN TEAM

CIVIL
CDG ENGINEERS
TERRY ENTWISTLE
ONE CAMPBELL PLAZA
SUITE 4B
ST LOUIS, MO 63139
314-446-3542
ENTWISTLE@CDGENGINEERS.COM

STRUCTURAL
PILLAR DESIGN GROUP
Consulting Structural Engineers
IZABELA CZERNIKIEWICZ
TWO CAMPBELL PLAZA
SUITE 1B, PLAZA ENTRY
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314-446-3509
IZABELA@PILLARDESIGNGROUP.COM

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DAN SCHENFKE
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PLUMBING
McGRATH INCORPORATED — ENGINEERING/ CONSTRUCTION MANAGEMENT DENVER/ST.LOUIS
JOHN SCOTT
1881 CRAIG ROAD
ST. LOUIS, MO 63146
314-576-7640
JSCOTT@MCGRATH-INC.COM

MECHANICAL
McGRATH INCORPORATED — ENGINEERING/ CONSTRUCTION MANAGEMENT DENVER/ST.LOUIS
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314-576-7640
JSCOTT@MCGRATH-INC.COM

ELECTRICAL
CA INCORPORATED INNOVATIVE CONSTRUCTION CONCEPTS
GLEN SEITZ
1881 CRAIG ROAD
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314-576-0001
GSEITZCA@GMAIL.COM

FIRE PROTECTION
McGRATH INCORPORATED — ENGINEERING/ CONSTRUCTION MANAGEMENT DENVER/ST.LOUIS
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1881 CRAIG ROAD
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314-576-7640
JSCOTT@MCGRATH-INC.COM

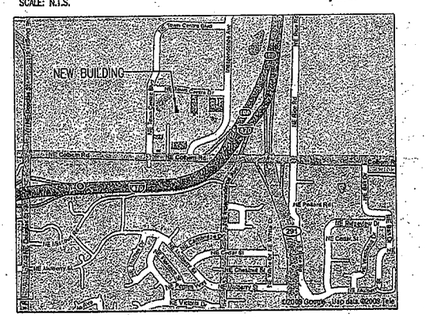
DATA CENTER
EDF
TOM PONDOFF
149 WELDON PARKWAY
SUITE 111
MARYLAND HEIGHTS, MO 63043
314-569-2548
TPONDOFF@EDF-RG.COM

DRAWING NUMBER	DRAWING DESCRIPTION	REV	DATE
GENERAL DRAWINGS			
G-101	COVER SHEET	0	6/10/09
G-102	LIFE SAFETY PLAN	0	6/10/09
CIVIL DRAWINGS		0	6/10/09
C-101	SITE PLAN	0	6/10/09
C-102	SANITARY SEWER PROFILES	0	6/10/09
C-201	SITE DETAILS	0	6/10/09
C-202	SPECIFICATIONS	0	6/10/09
C-203	SPECIFICATIONS	0	6/10/09
STRUCTURAL DRAWINGS			
S-101	GENERAL NOTES	0	6/10/09
S-102	GENERAL NOTES & TYPICAL DETAILS	0	6/10/09
S-103	FOUNDATION PLAN	0	6/10/09
S-104	CEILING FRAMING PLAN & DETAILS	0	6/10/09
S-105	FOUNDATION SECTIONS & DETAILS	0	6/10/09
S-106	FOUNDATION SECTIONS & DETAILS	0	6/10/09
S-107	SPECIFICATIONS	0	6/10/09
S-108	SPECIFICATIONS	0	6/10/09
ARCHITECTURAL DRAWINGS			
A-101	FLOOR PLAN	0	6/10/09
A-102	REFLECTIVE CEILING PLAN	0	6/10/09
A-201	BUILDING ELEVATIONS	0	6/10/09
A-301	BUILDING SECTIONS	0	6/10/09
A-302	BUILDING SECTIONS	0	6/10/09
A-303	WALL SECTIONS	0	6/10/09
A-304	WALL SECTIONS	0	6/10/09
A-305	WALL SECTIONS	0	6/10/09
A-401	ENLARGED FLOOR PLAN	0	6/10/09
A-402	ENLARGED FLOOR PLAN	0	6/10/09
A-501	DETAILS	0	6/10/09
A-502	DETAILS	0	6/10/09
A-503	DETAILS	0	6/10/09
A-504	DETAILS	0	6/10/09
A-601	ROOM FINISH SCHEDULE & DETAILS	0	6/10/09
A-602	DOOR SCHEDULE & DETAILS	0	6/10/09
A-701	SPECIFICATIONS	0	6/10/09
A-702	SPECIFICATIONS	0	6/10/09
A-703	SPECIFICATIONS	0	6/10/09
A-704	SPECIFICATIONS	0	6/10/09
A-705	SPECIFICATIONS	0	6/10/09
A-706	SPECIFICATIONS	0	6/10/09
A-707	SPECIFICATIONS	0	6/10/09
A-708	SPECIFICATIONS	0	6/10/09
A-709	SPECIFICATIONS	0	6/10/09
PLUMBING DRAWINGS			
P-001	PLUMBING SCHEDULES & DETAILS	0	6/10/09
P-002	PLUMBING SPECIFICATIONS	0	6/10/09
P-100	PARTIAL FLOOR PLUMBING PLAN – SOUTH	0	6/10/09
P-101	PARTIAL FLOOR PLUMBING PLAN – NORTH	0	6/10/09
MECHANICAL DRAWINGS			
M-001	MECHANICAL SPECIFICATIONS	0	6/10/09
M-002	MECHANICAL LEGENDS & DETAILS	0	6/10/09
M-003	MECHANICAL SCHEDULES	0	6/10/09
M-004	MECHANICAL DETAILS	0	6/10/09
M-100	MECHANICAL CONSTRUCTION PLAN	0	6/10/09
ELECTRICAL DRAWINGS			
E-001	ELECTRICAL SPECIFICATIONS	0	6/10/09
E-002	ELECTRICAL LEGENDS AND SYMBOLS	0	6/10/09
E-003	ELECTRICAL ONE-LINE	0	6/10/09
E-101	ELECTRICAL SITE PLAN	0	6/10/09
E-102	FLOOR PLAN – LIGHTING	0	6/10/09
E-103	FLOOR PLAN – POWER	0	6/10/09
E-104	1/4" SCALE PLAN COMPUTER ROOM	0	6/10/09
E-201	EQUIPMENT SPECIFICATIONS	0	6/10/09
E-202	EQUIPMENT SPECIFICATIONS	0	6/10/09
E-203	EQUIPMENT SPECIFICATIONS	0	6/10/09
E-204	EQUIPMENT SPECIFICATIONS	0	6/10/09
E-205	EQUIPMENT SPECIFICATIONS	0	6/10/09
FIRE PROTECTION PLAN			
FP-100	FLOOR FIRE PROTECTION PLAN	0	6/10/09
DATA CENTER EQUIPMENT			
AF-1	ACCESS FLOORING LAYOUT	0	6/10/09
AF-2	ACCESS FLOORING SPECIFICATIONS	0	6/10/09
DATA CENTER FIRE PROTECTION			
SP-1	FIRE PROTECTION SPECIFICATIONS	0	6/10/09
SP-2	FIRE PROTECTION SPECIFICATIONS	0	6/10/09
DFP-1	AIR-SAMPLING LAYOUTS	0	6/10/09
DFP-2	MECHANICAL LAYOUTS	0	6/10/09
DFP-3	ELECTRICAL LAYOUTS	0	6/10/09
DFP-4	BUILDING LAYOUT PLAN	0	6/10/09

STATE OF MISSOURI — GREGORY EDWARD BRUNKHORST — NUMBER A8006265 — REGISTERED PROFESSIONAL ENGINEER

VICINITY MAP

SCALE: N.T.S.



REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
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One Campbell Plaza
St. Louis, Missouri 63139
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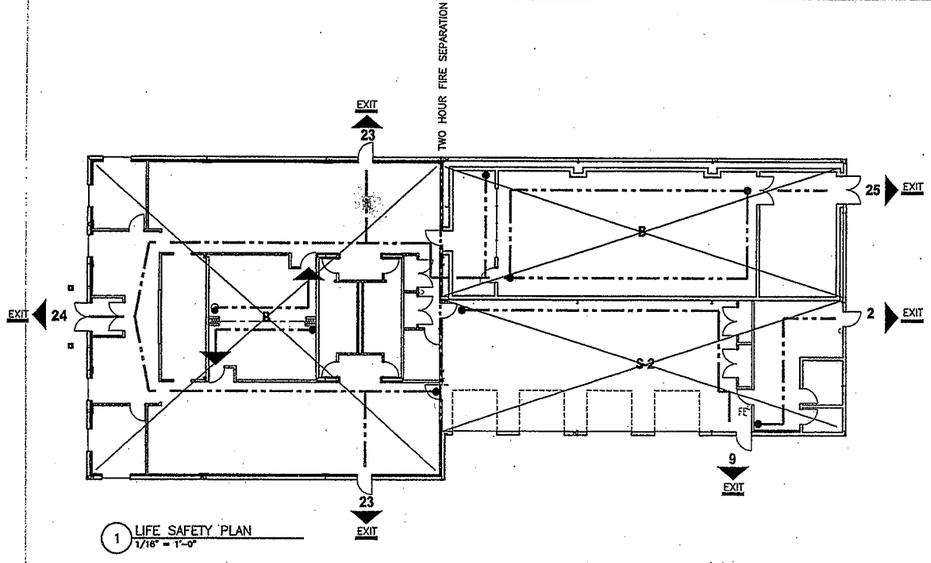
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

COVER SHEET
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

DRAWING NO. G-101



1 LIFE SAFETY PLAN
1/16" = 1'-0"

BUILDING CODE ANALYSIS:

APPLICABLE CODE:
2003 INTERNATIONAL BUILDING CODE (IBC)
2003 INTERNATIONAL MECHANICAL CODE (IMC)
2003 NATIONAL ELECTRIC CODE (NEC)
2003 INTERNATIONAL FIRE CODE (IFC)
1998 ANSI 117.1

FIRE PROTECTION:
WET AUTOMATIC FIRE SPRINKLER SYSTEM IN CONDITIONED SPACE.
DRY AUTOMATIC FIRE SPRINKLER IN THE GARAGE.
CLEAN AGENT FIRE SUPPRESSION SYSTEM IN DATA CENTER.

CONSTRUCTION TYPE:
TYPE 2B PER IBC 2003 SECTION 602 AND TABLE 601.

HOURLY FIRE RESISTANCE RATING:

BUILDING ELEMENT	REQ'D	PROVIDED
STRUCTURAL FRAME	0 HRS	0 HRS
ROOF CONSTRUCTION	0 HRS	0 HRS
EXTERIOR NON-LOAD BEARING WALLS	0 HRS	0 HRS
EXTERIOR LOAD BEARING WALLS	0 HRS	0 HRS
INTERIOR NON-LOAD BEARING WALLS	0 HRS	0 HRS
INTERIOR LOAD BEARING WALLS	0 HRS	0 HRS
FLOOR CONSTRUCTION	0 HRS	0 HRS
FIRE SEPERATION	2 HRS	2 HRS

BUILDING OCCUPANCIES:

"B" – BUSINESS	IBC SECTION 304
"S2"– LOW HAZARD STORAGE	IBC SECTION 311

NUMBER OF EXITS:
THE BUILDING COMPLIES WITH THE IBC TABLE 1018.1. TWO EXITS ARE REQUIRED WHEN THE FOLLOW OCCUPANT LOADS ARE EXCEEDED.

OCCUPANT LOAD	EXITS REQUIRED
1–500	2

EXIT ACCESS TRAVEL DISTANCE:
300' FOR "B" OCCUPANCY PER TABLE 1015.1 FOR SPRINKLED BUILDINGS.

400' FOR "S2" OCCUPANCY PER TABLE 1015.1 FOR SPRINKLED BUILDINGS.

ALLOWABLE AREA AND HEIGHT:
PER TABLE 503, THE FOLLOWING AREAS AND HEIGHTS ARE THE ALLOWABLE AREAS FOR THE DESIGNED OCCUPANCIES.

USE	ALLOWABLE	ACTUAL
"B" – BUSINESS	4 STORIES	1 STORY
	23,000 SF	9,540 SF
"S2" – LOW HAZARD STORAGE	4 STORIES	1 STORY
	26,000 SF	3,222 SF

COMMON PATH OF TRAVEL:
100' FOR "B" AND "S2" OCCUPANCIES PER SECTION 1013.3 WITH EXCEPTION NO. 1 FOR SPRINKLED BUILDINGS.

OCCUPANCY LOAD CALCULATIONS
MAXIMUM FLOOR AREA ALLOWANCE PER TABLE 104.1.2

USE	SF	OCCUPANT LOAD
"B"– BUSINESS	100 SF GROSS	96 OCCUPANT LOAD
"S2"– LOW HAZARDOUS	300 SF GROSS	11 OCCUPANT LOAD

EGRESS WIDTH REQUIREMENTS:
TABLE 1005.1

OCCUPANCY	0.15/OCCUPANT	REQ'D WIDTH	PROV WIDTH
"B"– BUSINESS	0.15/96 OCCUPANTS	14.4" EXIT DOOR WIDTH	180" EXIT DOOR WIDTH
"S2"– LOW HAZARDOUS	0.15/11 OCCUPANTS	1.65" EXIT DOOR WIDTH	72" EXIT DOOR WIDTH

STATE OF MISSOURI
REGISTERED
GREGORY EDWARD BRUNKHORST
NUMBER A8006265
PROFESSIONAL ENGINEER

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One Campbell Plaza
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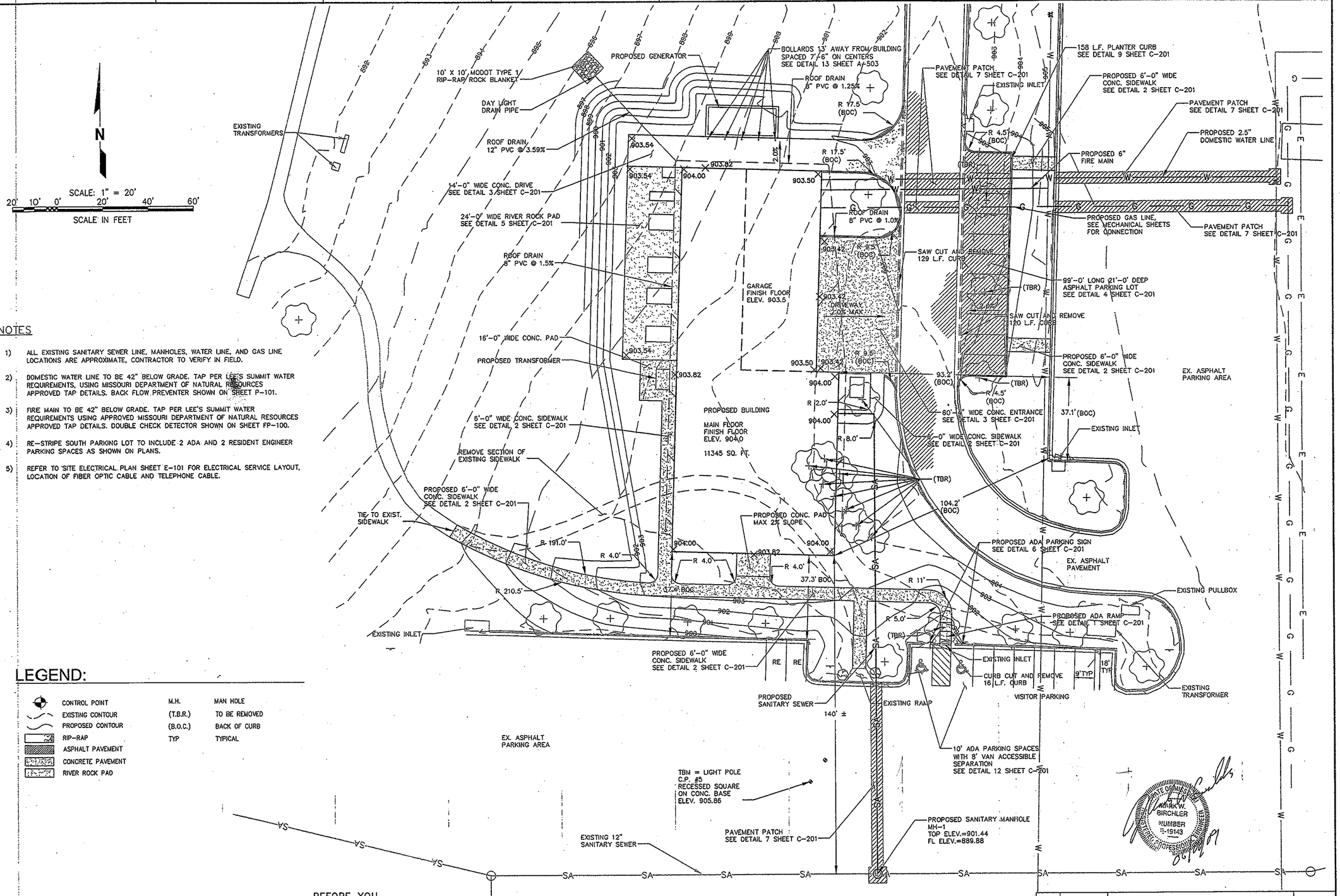
LIFE SAFTEY PLANS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. G-102



NOTES

1) ALL EXISTING SANITARY SEWER LINE, MANHOLES, WATER LINE, AND GAS LINE LOCATIONS ARE APPROXIMATE, CONTRACTOR TO VERIFY IN FIELD.

2) DOMESTIC WATER LINE TO BE 42" BELOW GRADE. TAP PER LEE'S SUMMIT WATER REQUIREMENTS, USING MISSOURI DEPARTMENT OF NATURAL RESOURCES APPROVED TAP DETAILS. BACK FLOW PREVENTER SHOWN ON SHEET P-101.

3) FIRE MAIN TO BE 42" BELOW GRADE. TAP PER LEE'S SUMMIT WATER REQUIREMENTS USING APPROVED MISSOURI DEPARTMENT OF NATURAL RESOURCES APPROVED TAP DETAILS. DOUBLE CHECK DETECTOR SHOWN ON SHEET FP-100.

4) RE-STRIPE SOUTH PARKING LOT TO INCLUDE 2 ADA AND 2 RESIDENT ENGINEER PARKING SPACES AS SHOWN ON PLANS.

5) REFER TO SITE ELECTRICAL PLAN SHEET E-101 FOR ELECTRICAL SERVICE LAYOUT, LOCATION OF FIBER OPTIC CABLE AND TELEPHONE CABLE.

LEGEND:

	CONTROL POINT	M.H.	MAN HOLE
	EXISTING CONTOUR	(T.B.R.)	TO BE REMOVED
	PROPOSED CONTOUR	(B.O.C.)	BACK OF CURB
	RIP-RAP	TYP	TYPICAL
	ASPHALT PAVEMENT		
	CONCRETE PAVEMENT		
	RIVER ROCK PAD		

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES SHOWN OR NOT SHOWN, AND SHALL COOPERATE WITH OWNERS OF UTILITIES PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION IN IMPROVEMENTS.

BEFORE YOU DIG - DRILL - BLAST CALL!
1-800-344-7483
(TOLL FREE)
MISSOURI ONE CALL SYSTEM, INC.

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One Campbell Plaza
St. Louis, Missouri 63139
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F. 314.781.9076
www.cdgengineers.com

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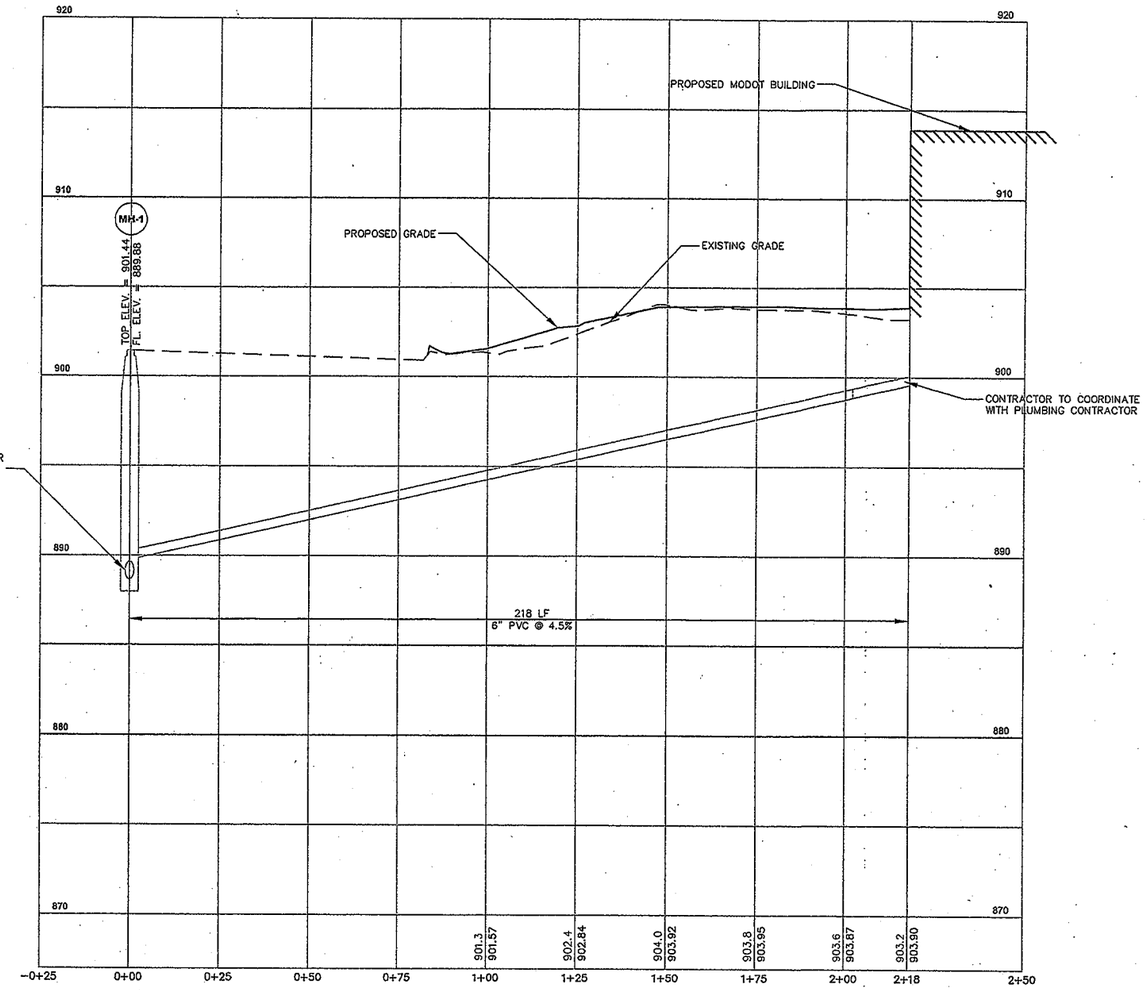
SCALE	1"=20'
DATE	6/10/09

SITE PLAN
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT MISSOURI

PROJECT NO.	08074
DRAWING NO.	C-101

STATE OF MISSOURI
MARK W. BIRCHLER
NUMBER E-15143
PROFESSIONAL ENGINEER
6/10/09



SANITARY SEWER PROFILE
HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=4'

NOTE: EXISTING GRADE FROM STATION 0+00.00 TO STATION 0+81.79 ARE ASSUMED PENDING FIELD VERIFICATION.

STATE OF MISSOURI
MARK W. BIRCHLER
NUMBER E-19143
REGISTERED PROFESSIONAL ENGINEER

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0	6/10/09	ISSUED FOR BIDDING	MWB

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SCALE: 1"=20'
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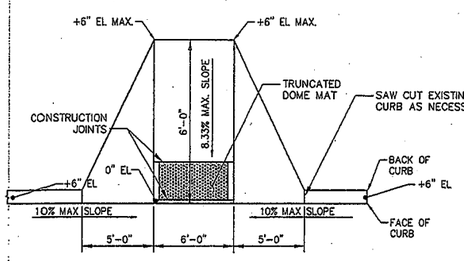
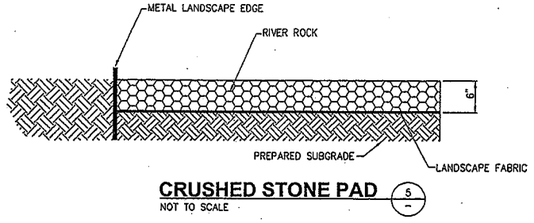
SANITARY SEWER
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT MISSOURI

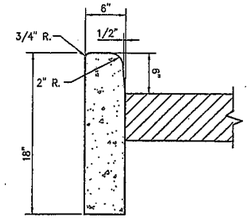
PROJECT NO. 08074
DRAWING NO. C-102



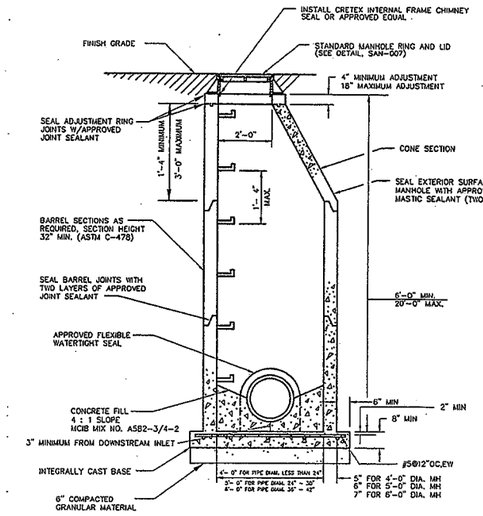
ADA RAMP
NOT TO SCALE (1)



CRUSHED STONE PAD
NOT TO SCALE (5)

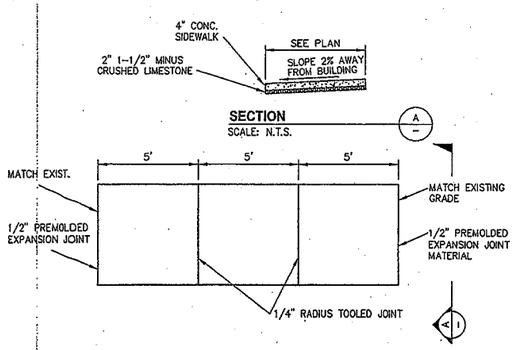


PLANTER CURB
NOT TO SCALE (9)



NOTE: ALL CONCRETE JOINTS, INCLUDING ADJUSTMENT RING(S), SHALL HAVE CRETEX EXTERNAL JOINT SEAL "MAC WRAP" ASTM C-877 TYPE II INSTALLED OR APPROVED EQUAL.

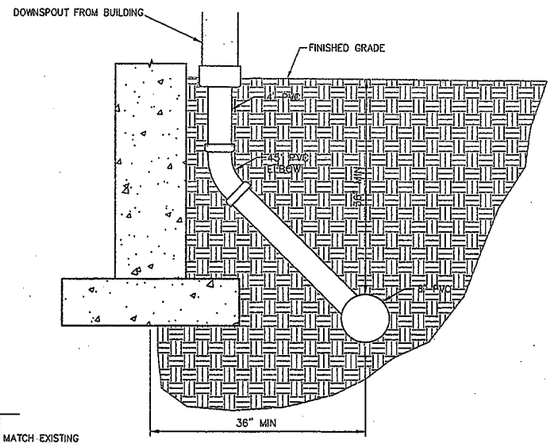
STANDARD PRECAST MANHOLE



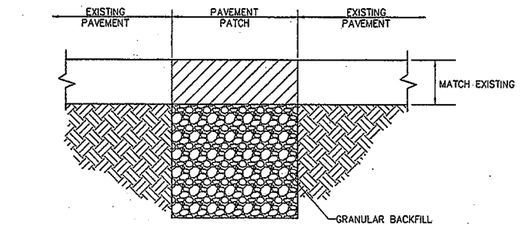
SECTION
SCALE: N.T.S. (A)

SIDEWALK
NOT TO SCALE (2)

ADA PARKING SIGN R7-8
NOT TO SCALE (6)



DOWNSPOUT CONNECTION
NOT TO SCALE (10)



PAVEMENT PATCH DETAIL
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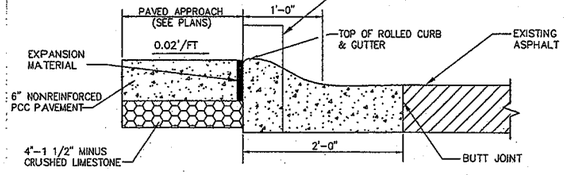

CONCRETE DRIVE
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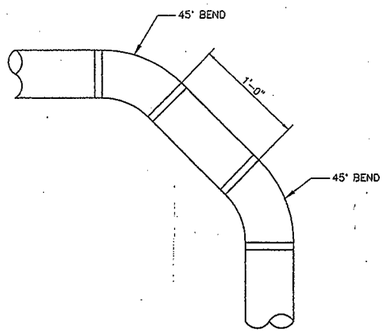
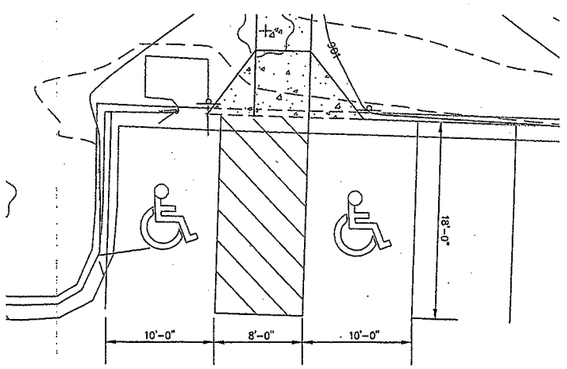
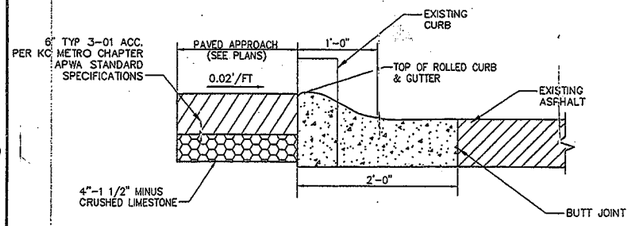


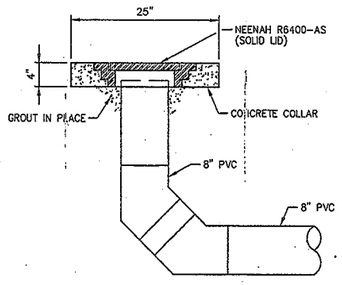
ROOF DRAIN LINE CORNER DETAIL
NOT TO SCALE (11)



ADA STRIPING DETAIL
NOT TO SCALE (12)



ASPHALT PARKING LOT
NOT TO SCALE (4)



CLEAN OUT
NOT TO SCALE (8)

REV.	DATE	DESCRIPTION	APPROVED
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STATE OF MISSOURI — MARK W. BIRCHLER — NUMBER E-19143 — REGISTERED PROFESSIONAL ENGINEER — 06/10/09

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SCALE	N/A
DATE	6/10/09

DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT MISSOURI

PROJECT NO.	08074
DRAWING NO.	C-201

SECTION 311000 – SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above– and below–grade site improvements.
6. Disconnecting, capping or sealing site utilities.
7. Temporary erosion– and sedimentation–control measures.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site–clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion– and sedimentation–control measures are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."

1. Obtain approved borrow soil material off–site when satisfactory soil material is not available on–site.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion– and sedimentation–control measures to prevent soil erosion and discharge of soil–bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion– and sedimentation–control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion– and sedimentation–control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on–site according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
2. Use only hand methods for grubbing within protection zones.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to a depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

A. Remove existing above– and below–grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 – EARTH MOVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks and pavements.
2. Excavating and backfilling for buildings and structures.
3. Subbase course for concrete walks and pavements.
4. Subbase course and base course for asphalt paving.
5. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot–mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off–site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab–on–grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man–made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot–mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot–mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On–site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1–1/2–inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1–1/2–inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1–1/2–inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1–inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse–aggregate grading Size 57; with 100 percent passing a 1–1/2–inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

A. Warning Tape: Acid– and alkali–resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

B. Detectable Warning Tape: Acid– and alkali–resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.

D. Trenches in Tree– and Plant–Protection Zones:

1. Hand–excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow–tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.5 SUBGRADE INSPECTION

A. Proof–roll Subgrade below the pavements with a pneumatic–tired dump truck to identify soft pockets and areas of excess yielding. Do not proof–roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28–day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Place and compact final backfill of satisfactory soil to final subgrade elevation.

E. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand–operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross–slope grades.
2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS–ON–GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast–in–place concrete slabs–on–grade as follows:

1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321216 – ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hot–mix asphalt patching.
2. Hot–mix asphalt paving.
3. Pavement–marking paint.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job–Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
2. Job–Mix Designs: For each job mix proposed for the Work.

B. Material Certificates: For each paving material, from manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving–mix manufacturer registered with and approved by authorities having jurisdiction or MoDOT.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of MoDOT for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 deg F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

B. Pavement–Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water–based materials, and not exceeding 95 deg F.

CONTINUED ON SHEET C–203

STATE OF MISSOURI
MARK W. BIRCHLER
NUMBER 2003143
ENGINEER
06/08/09

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	MWB

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SPECIFICATIONS
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PROJECT NO. 08074
DRAWING NO. C-202

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PART 2 – PRODUCTS

2.1 AGGREGATES

A. Asphalt cement used in the manufacture of asphalt paving mixtures shall conform to the Performance Graded system. The PG graded material used shall be PG64-22. The asphalt cement shall conform to ASTM D 6373. Sampling shall be in accordance with ASTM D 140. The contractor or asphalt supplier shall submit a quality assurance plan for the asphaltic cement to the engineer that conforms to AASHTO PP 26. He shall also submit a temperature–viscosity chart showing the recommended mix and compaction temperatures for non–modified asphalts, and shall provide the specific gravity of the asphalt.

B. Coarse Aggregate (Retained on the No. 4 Sieve):
LA Abrasion (ASTM C131), 35% loss (maximum)
Soundness using Mag Sulfate (ASTM C88 5 cycles), 15% loss (maximum)
Total shale, clay, and lignite content ASTM C 142, 1.0% by weight (maximum)

C. Fine Aggregate (Passing the No. 4 Sieve):
Organic Content, 1% maximum
The parent material of the manufactured sand must also meet the requirements for coarse aggregate shown above.

D. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

E. Sampling shall be in accordance with ASTM D 75. Gradation analysis shall be in accordance with Standard Method of Test for Material Finer than No. 200 (75 um) Sieve in Mineral Aggregates by Washing, ASTM C 117 and Standard Method Test for Sieve Analysis of Fine and Coarse Aggregate, ASTM C 136.

2.2 ASPHALT MATERIALS

A. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Pavement–Marking Paint: MPI #97 Latex Traffic Marking Paint.
1. Color: To match existing.

2.4 MIXES

A. Hot–Mix Asphalt: Dense, hot–laid, hot–mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS–2, "Mix Design Methods for Asphalt Concrete and Other Hot–Mix Types"; having the composition as stated in the Kansas City Metro Chapter, APWA Standard Specifications, Section 2205.3, Mixing and Proportioning; and complying with the following requirements:
1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: To match existing.
3. Surface Course: To match existing.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Proof–roll subgrade below pavements with heavy pneumatic–tired equipment to identify soft pockets and areas of excess yielding. Do not proof–roll wet or saturated subgrades.

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

3.2 PATCHING

A. Hot–Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound–aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.
1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound–aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot–mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..
1. Allow tack coat to cure undisturbed before applying hot–mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot–mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted–aggregate base before applying paving materials.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
1. Allow tack coat to cure undisturbed before applying hot–mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 HOT–MIX ASPHALT PLACING

A. Machine place hot–mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
1. Spread mix at minimum temperature of 250 deg F.
2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt–paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot–mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot–mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.

3.6 COMPACTION

A. General: Begin compaction as soon as placed hot–mix paving will bear roller weight without excessive displacement. Compact hot–mix paving with hot, hand tampers or with vibratory–plate compactors in areas inaccessible to rollers.
1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot–mix asphalt is still hot enough to achieve specified density. Continue rolling until hot–mix asphalt course has been uniformly compacted to the following density:
1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot–mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.7 ASPHALT CURBS

A. Construct hot–mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at minimum temperature of 250 deg F.
1. Asphalt Mix: Same as pavement surface–course mix.

B. Place hot–mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand–placed materials and screed to smooth finish. Remove forms after hot–mix asphalt has cooled.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10–foot straightedge applied transversely or longitudinally to paved areas:
1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.9 PAVEMENT MARKING

A. Do not apply pavement–marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Replace and compact hot–mix asphalt where core tests were taken.

C. Remove and replace or install additional hot–mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.11 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA–approved landfill.

END OF SECTION 321216

SECTION 321313 – CONCRETE PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:
1. Curbs and gutters.
2. Walkways.

1.2 SUBMITTALS

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

B. Design Mixtures: For each concrete pavement mixture.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready–mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

PART 2 – PRODUCTS

2.1 STEEL REINFORCEMENT

A. Plain–Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as–drawn steel wire into flat sheets.

B. Deformed–Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Plain Steel Wire: ASTM A 82, as drawn.

E. Deformed–Steel Wire: ASTM A 496.

F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
1. Portland Cement: ASTM C 150, Type III, gray.

B. Normal–Weight Aggregates: ASTM C 33, coarse aggregate, uniformly graded. Provide aggregates from a single source.

C. Water: ASTM C 94/C 94M.

D. Air–Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application, certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water–soluble chloride ions by mass of cementitious material.

2.3 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.

B. Moisture–Retaining Cover: ASTM C 171, polyethylene film or white burlap–polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

E. Clear Waterborne Membrane–Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. White Waterborne Membrane–Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.4 RELATED MATERIALS

A. Expansion– and Isolation–Joint–Filler Strips: ASTM D 1751, asphalt–saturated cellulosic fiber or ASTM D 1752, cork or self–expanding cork.

B. Color Pigment: ASTM C 979, synthetic mineral–oxide pigments or colored water–reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

C. Slip–Resistive Aggregate Finish: Factory–graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum–oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

D. Pavement–Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT–P–1952, with drying time of less than 3 minutes.
1. Color: To match existing.

2.5 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:
1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water–Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 5–8 percent plus or minus 1.5 percent.

2.6 CONCRETE MIXING

A. Ready–Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Proof–roll prepared subbase surface below concrete pavements with heavy pneumatic–tired equipment to identify soft pockets and areas of excess yielding.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form–release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one–half hour unless pavement terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint–filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

D. Contraction Joints: Form weakened–plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one–fourth of the concrete thickness.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8–inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

D. Screed pavement surfaces with a straightedge and strike off.

E. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed–water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power–driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium–to–Coarse–Textured Broom Finish: Provide a coarse finish by striating float–finished concrete surface 1/16 to 1/8 inch deep with a stiff–bristled broom, perpendicular to line of traffic.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold–weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture–retaining–cover curing, curing compound or a combination of these methods.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10–foot– long, unleveled straightedge not to exceed 1/4 inch.
4. Joint Spacing: 3 inches.
5. Contraction Joint Depth: Plus 1/4 inch, no minus.
6. Joint Width: Plus 1/8 inch, no minus.

3.9 PAVEMENT MARKING

A. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.

B. Sweep and clean surface to eliminate loose material and dust.

C. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 REPAIRS AND PROTECTION

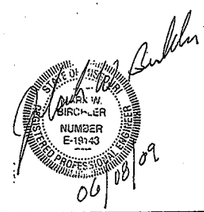
A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.

C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

END OF CIVIL SPECIFICATIONS



REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	MWB

CDG ENGINEERS
CDG Engineers Architects Planners Inc.
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MoDOT

DRAWN BY: BMG
CHECKED BY: TLE
SCALE: N/A
DATE: 5/14/09

SPECIFICATIONS
NEW RESIDENTS ENGINEER OFFICE AND DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT MISSOURI

PROJECT NO. 08074
DRAWING NO. C-203

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GENERAL NOTES

DESIGN CRITERIA

1. BUILDING CODE: 2006 INTERNATIONAL BUILDING CODE
2. DEAD AND LIVE LOADS
   ROOF DEAD LOAD: SEE ROOF FRAMING PLANS
3. SNOW LOAD:
   GROUND SNOW LOAD, Pg: 20 PSF
   SNOW LOAD IMPORTANCE FACTOR, Is: 1.2
   ROOF SNOW LOAD: 24 PSF PLUS DRIFTING
4. WIND DESIGN DATA:
   BASIC WIND SPEED: 90 MPH. (3 SEC. GUST)
   WIND IMPORTANCE FACTOR, Iw: 1.15
   WIND EXPOSURE: EXPOSURE C
5. SEISMIC DESIGN DATA:
   SEISMIC IMPORTANCE FACTOR, I_E : 1.5
   SEISMIC USE GROUP: III
   SPECTRAL ACCELERATIONS: S_S = 0.121, S_1 = 0.062
   SITE CLASS: SITE CLASS D
   SPECTRAL RESPONSE COEFFICIENT: S_{DS} = 0.129, S_{D1} = 0.100
   SEISMIC DESIGN CATEGORY: C
6. ALL INSPECTIONS THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENT, OR THESE PLANS SHALL BE DONE BY AN INDEPENDENT TESTING AGENCY.

REFERENCES:

1. THE DESIGN, DETAILING, FABRICATION, ERECTION AND CONSTRUCTION OF ALL STRUCTURES SHALL CONFORM TO THE LISTED EDITION OF THE FOLLOWING CODES, UNLESS OTHERWISE NOTES.
   A. "MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES" (ASCE 7-02) AMERICAN SOCIETY OF CIVIL ENGINEERS
   B. AMERICAN CONCRETE INSTITUTE – "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318).
   C. ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED, IN ACCORDANCE WITH ACI DETAILING MANUAL (SP–66).
   D. "SPECIFICATION FOR STRUCTURAL CONCRETE" (ACI–301).
   E.
   'S" (ACI–211.5R).
   J. "GUIDE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE (ACI–304R).
   K. AMERICAN INSTITUTE OF STEEL CONSTRUCTION – "MANUAL OF STEEL CONSTRUCTION" (NINTH EDITION) AND "DETAILING FOR STRUCTURAL STEEL" (NINTH EDITION, 1989).
   L. STANDARD SPECIFICATIONS FOR OPEN WEB STEEL JOISTS, K–SERIES.
   M. RECOMMENDED CODE OF STANDARD PRACTICE FOR STEEL JOISTS AND JOIST GIRDERS.
   N. SDI SPECIFICATIONS AND COMMENTARY FOR STEEL ROOF DECK.
   O. SDI DIAPHRAGM DESIGN MANUAL.
   P. AMERICAN WELDING SOCIETY – "AWS STRUCTURAL WELDING CODE –98"
   Q. AISI "SPECIFICATION FOR THE DESIGN OF COLD–FORMED STEEL STRUCTURAL MEMBERS".
   R. ASTM STANDARDS IN BUILDING CODES, VOLUMES I, II, III. AMERICAN SOCIETY FOR TESTING AND MATERIALS.

SUBMITTALS:

1. THE FOLLOWING SHOP DRAWING SUBMITTALS SHALL BE SUBMITTED (5 SETS) FOR REVIEW BY THE STRUCTURAL ENGINEER (THROUGH THE ARCHITECT) ONLY AFTER THE GENERAL CONTRACTOR HAS COMPLETED AN INITIAL REVIEW, MARKED AND STAMPED THE DRAWINGS:
   A. CONCRETE MIX DESIGNS INCLUDING STRENTGH DATA PER ACI 318 CH. 5 PREPARED BY READY–MIX PLANT
   B. STRUCTURAL STEEL SHOP DRAWINGS SIGNED AND SEALED FOR THE DESIGN OF CONNECTIONS BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE STRUCTURE IS LOCATED
   C. STEEL JOISTS SHOP DRAWINGS. IF JOISTS ARE NOT PROVIDED BY AN SJI MEMBER, THE DRAWINGS MUST BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE STRUCTURE IS LOCATED

FOUNDATIONS:

1. THE FOUNDATION HAS BEEN DESIGNED IN ACCORDANCE WITH THE CLIENT'S RECOMMENDATIONS.
2. SPREAD AND CONTINUOUS FOOTINGS SHALL BEAR ON SOILS CAPABLE OF SUSTAINING AN ULTIMATE BEARING CAPACITY 7.4 TSF FOR SQUARE FOUNDATIONS AND 5.7 TSF FOR STRIP FOUNDATION. AREAS OF LOW DENSITY ON–SITE SOILS MAY REQUIRE REMOVAL AND REPLACEMENT WITH ENGINEERED FILL.
3. FOOTINGS MAY BE POURED INTO A EARTH–FORMED TRENCH.
4. ALL BEARING MATERIAL SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO CONCRETE PLACEMENT. THE GEOTECHNICAL ENGINEER SHALL BE THE SOLE JUDGE AS TO THE SUITABILITY OF THE BEARING MATERIAL. FOOTING ELEVATIONS SHALL BE ADJUSTED AS REQUIRED.
5. BOTTOM OF EXTERIOR FOOTINGS SHALL BEAR A MINIMUM OF 36 INCHES BELOW FINAL EXTERIOR GRADE FOR FROST PROTECTION.
6. FOUNDATION WALLS THAT RETAIN EARTH SHALL BE BRACED AGAINST BACK–FILLING PRESSURES UNTIL FLOOR SLABS AT TOP AND BOTTOM ARE IN PLACE.
7. WHERE FOUNDATION WALLS ARE TO HAVE EARTH PLACED ON EACH SIDE, PLACE FILL SIMULTANEOUSLY SO AS TO MAINTAIN A COMMON ELEVATION ON EACH SIDE OF THE WALL.

FOUNDATIONS CONTINUED:

8. WATER SHALL NOT BE PERMITTED TO POND IN FOOTING EXCAVATION. KEEP EXCAVATION DRY. FAILURE TO DO SO WILL BE CAUSE FOR REQUIRING CONTRACTOR TO REMOVE WATER DAMAGED SOIL AND REPLACE WITH CONTROLLED FILL AS REQUIRED.
9. NO FILL OR BACKFILL SHALL BE "SETTLED" BY THE USE OF WATER.

CONCRETE:

1. STANDARDS
   A. ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE. (LATEST EDITION)
   B. ACI 350 CODE REQUIREMENTS FOR CONCRETE LIQUID CONTAINMENT STRUCTURES. (LATEST EDITION)
   C. CRSI HANDBOOK (LATEST EDITION)
2. ALL DETAILING, FABRICATION AND ERECTION FOR REINFORCING BARS AND THEIR SUPPORT IN THE FORMS WITH ACCESSORIES MUST FOLLOW THE ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", (ACI 315–LATEST) AND CRSI "MANUAL OF STANDARD PRACTICE" (LATEST EDITION).
3. MINIMUM CONCRETE COVER, UNLESS NOTED OTHERWISE:
   A. UNFORMED SURFACE IN CONTACT WITH THE GROUND. 3 IN
   B. FORMED SURFACES EXPOSED TO EARTH OR WEATHER #6 BAR AND LARGER. 2 IN
      FORMED SURFACES EXPOSED TO EARTH OR WEATHER #5 BAR AND SMALLER. 1–1/2 IN.
   C. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:
      1. WALLS, SLABS 3/4 IN.
      2. BEAMS, GIRDERS AND COLUMNS (TO TIES OR STIRRUPS) 1–1/2 IN.
4. CONCRETE SHALL HAVE A 28–DAY COMPRESSIVE STRENGTH AND DENSITY, IN ACCORDANCE WITH THE FOLLOWING:

	STRENGTH f'c, psi	DENSITY pcf
FOUNDATION	3000	145
ALL OTHER CONCRETE U.N.O.	4000	145

5. REINFORCING BARS SHALL BE ASTM A615–GRADE 60 STEEL, U.N.O. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185. WELDED WIRE FABRIC MUST LAP AT LEAST 2" AT SIDE AND 6" AT ENDS AND BE TIED TOGETHER.
6. THE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS MUST BE REFERRED TO FOR ALL MECHANICAL FLOOR REQUIREMENTS, HOUSEKEEPING PADS & EQUIPMENT INERTIA BASES, AND THE VARIOUS TRADES ARE RESPONSIBLE FOR THE PLACING OF SLEEVES, OUTLET BOXES, ANCHORS, ETC. THAT MAY BE REQUIRED.
7. DOWELS IN WALL FOOTINGS SHALL BE EQUIVALENT IN SIZE AND NUMBER TO VERTICAL BARS. DOWELS MUST BE ANCHORED OR TIED IN POSITION BEFORE PLACING CONCRETE, PUSHING BARS INTO FRESHLY POURED CONCRETE IS NOT ACCEPTABLE.
8. FINE AGGREGATE: SHALL BE CLEAN, HARD, DURABLE AND FREE OF DELETERIOUS SUBSTANCES AND CONFORM TO ASTM C33.
   COURSE AGGREGATE: SHALL BE CLEAN, HARD, DURABLE WITHOUT FLAT OR ELONGATED PIECES AND SHALL CONFORM TO ASTM C33 #57.
9. LAP SPLICES SHALL BE IN ACCORDANCE WITH ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (LATEST EDITION). WHERE CLASSES ARE NOT CALLED OUT ON DRAWINGS, USE CLASS "B" SPLICES.

BAR SIZE	TENSION SPLICES (IN.) TOP BARS A	TOP BARS B	OTHER BARS A	OTHER BARS B	COMPRESSION SPLICES (IN.)
#3	22	28	17	22	12
#4	29	37	22	29	15
#5	36	47	28	36	19
#6	43	56	33	43	23
#7	63	81	48	63	27
#8	72	93	55	72	30
#9	81	105	62	81	34
#10	91	116	70	91	38
#11	101	131	76	101	42

–COMPRESSION DOWEL EMBEDMENT: 22 BAR DIAMETERS LAP
–WELDED WIRE FABRIC: ONE SPACING OF CROSS WIRES PLUS 2" LAP

10. UNLESS OTHERWISE SHOWN IN THE ARCHITECTURAL DRAWINGS, PROVIDE 3/4" CHAMFERS AT ALL EDGES THAT ARE EXPOSED TO VIEW IN THE FINISHED STRUCTURE.
11. SEE ARCHITECTURAL DRAWINGS FOR DOOR AND WINDOW OPENINGS, DRIP SLOTS, REGLETS, MASONRY, ANCHORS, BRICK LEDGE ELEVATIONS AND FOR MISCELLANEOUS EMBEDDED PLATES, BOLTS, ANCHORS, ANGLES, ETC.
12. REFER TO ARCHITECTURAL DRAWINGS FOR CONCRETE FINISHES. WHERE FINISH IS NOT SPECIFIED, CONFORM TO REQUIREMENTS OF ACI 301.
13. FLOOR SLAB CONSTRUCTION SHALL CONFORM TO GUIDELINES OF ACI 302. FLOOR FINISHED SURFACE SHALL CONFORM TO THE ACI 302 TOLERANCES FOR FLATNESS AND LEVELNESS NUMBERS FF/FI SPECIFIED.
14. ALL STRUCTURAL STEEL MUST BE PROTECTED BY 3" OF CONCRETE WHERE EARTH WOULD OTHERWISE BE IN CONTACT WITH STEEL.
15. PROVIDE THE FOLLOWING ADDITIONAL REINFORCING UNLESS OTHERWISE CALLED FOR ON STRUCTURAL PLANS:
   A. CORNER BARS AT ALL CORNERS AND INTERSECTIONS OF CONCRETE WALLS, GRADE BEAMS AND FOOTINGS TO MATCH HORIZONTAL REINFORCING.
   B. PROVIDE #4 SLAB DOWELS AT 12" CENTERS AT DOORS UNLESS NOTED OTHERWISE.
   C. BARS AT OPENINGS IN SLAB AND WALLS. PROVIDE BARS WITH AREA EQUAL TO INTERRUPTED REINFORCING. PLACE 1/2 AT EACH SIDE OF OPENING.
16. PIPES, SLEEVES OR SLOTS SHALL NOT RUN THROUGH ANY BEAM OR GIRDER UNLESS SIZE AND LOCATION HAVE BEEN APPROVED BY THE STRUCTURAL ENGINEER.
17. CONCRETE WALLS SHALL HAVE CONSTRUCTION JOINTS NOT FURTHER THAN 100'–0" APART, UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER.
18. THE STRUCTURAL ENGINEER SHALL BE NOTIFIED FOR INSPECTION OF REBAR PLACEMENT, NOTICE SHALL BE GIVEN NOT LESS THAN 24 HOURS PRIOR TO CONCRETE PLACEMENT.
19. ALL ABUTTING CONCRETE MEMBERS SHALL BE DOWELED TOGETHER, UNLESS POURED MONOLITHICALLY. DOWELS SHALL BE EQUAL IN SIZE AND SPACING TO THE REINFORCING IN THE ADJACENT MEMBERS.
20. WELDED REINFORCING BARS SHALL CONFORM TO ASTM A706, GRADE 60, WELDABLE STEEL.
21. FOOTINGS MAY BE EARTH–FORMED AT CONTRACTOR'S OPTION. PROVIDE MINIMUM COVER AS SPECIFIED ABOVE.
22. SLAB–ON–GRADE SHALL HAVE CONTROL JOINTS IN BOTH DIRECTIONS SPACED AT NOT MORE THAN 15'–0" ON CENTERS AND LOCATED IN SUCH A MANNER THAT EACH FLOOR SLAB SECTION IS RECTANGULAR IN SHAPE. SEE TYPICAL DETAILS FOR CONTROL JOINT REQUIREMENTS.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL FABRICATION AND ERECTION SHALL COMPLY WITH THE ASD AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS (LATEST EDITION).
2. STEEL SHALL CONFORM TO THE FOLLOWING GRADES:
   WIDE FLANGE AND WT SHAPES (UNO)---------A992 (Fy = 50 KSI)
   ALL ANGLE, PLATE, BAR, BASE PLATES, CONN. PLATES (UNO)-- A36
   WELDING ELECTRODES----------E70XX
   STRUCTURAL PIPE----------A501 (Fy=36) OR A53 TYPE E OR S, GRADE B (Fy=35)
   BOLTS----------A325
   STRUCTURAL TUBE----------A500 GRADE B (Fy = 46)
   ANCHOR BOLTS----------A307, U.N.O.
3. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE (LATEST EDITION), EXCEPT AS MODIFIED IN THESE NOTES AND THE PROJECT SPECIFICATIONS.
4. CONNECTIONS MAY BE BOLTED OR WELDED. FABRICATOR IS RESPONSIBLE FOR THE DESIGN OF CONNECTIONS NOT DESIGNED ON THE DRAWINGS. GENERALLY, CONNECTIONS SHOWN ON THE STRUCTURAL DRAWINGS ARE SCHEMATIC AND ARE ONLY INTENDED TO SHOW THE RELATIONSHIP OF MEMBERS CONNECTED. ANY CONNECTION THAT IS NOT SHOWN OR IS NOT COMPLETELY DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGNED BY AN ENGINEER, REGISTERED IN THE STATE WHERE THE STRUCTURE IS LOCATED, RETAINED BY THE FABRICATOR. COMPLETELY DETAILED MEANS THE FOLLOWING INFORMATION IS SHOWN ON THE DETAIL DRAWINGS.
   A. ALL PLATE DIMENSIONS AND GRADES.
   B. ALL WELD SIZES, LENGTHS, PITCHES AND RETURNS.
   C. ALL HOLE SIZES AND SPACINGS.
   D. NUMBER AND TYPE OF BOLTS: WHERE BOLTS ARE SHOWN BUT NO NUMBER IS GIVEN THE CONNECTION HAS NOT BEEN COMPLETELY DETAILED.
   E. WHERE PARTIAL INFORMATION IS GIVEN, IT SHALL BE THE MINIMUM REQUIREMENT FOR THE CONNECTION.

   DESIGN CALCULATIONS FOR TYPICAL BEAM CONNECTIONS AND ALL PRIMARY BRACING AND HANGER CONNECTIONS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION. CALCULATIONS SHALL BE REVIEWED ONLY FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.
5. BEAM CONNECTIONS SHALL BE DESIGNED FOR A SERVICE SHEAR LOAD EQUAL TO ONE–HALF OF THE ALLOWABLE LOAD ON THE MEMBER, AS DEFINED IN THE ASD AISC TABLES FOR ALLOWABLE LOADS ON BEAMS OR THE REACTIONS SHOWN ON THE DRAWINGS, WHICHEVER IS GREATER.
6. ALL COLUMN BASE PLATES SHALL BE SET ON STEEL SHIMS TO TRUE LEVEL LINE. GENERAL CONTRACTOR SHALL RAM A NON–SHRINK GROUT SOLIDLY UNDER ENTIRE BASE PLATE AREA. PROVIDE 1 1/2" DEPTH NON–SHRINK GROUT BELOW PLATES (U.N.O.).
7. PROVIDE FULL HEIGHT SOLID MASONRY UNDER BEARING ENDS OF ALL STRUCTURAL STEEL. BEAMS AND LINTELS TO BEAR MINIMUM 8" ON MASONRY.
8. PROVIDE WALL ANCHORS 3/4"x1'–4" PLUS HOOK AT MASONRY BEARING AT ALL STRUCTURAL STEEL BEARING ON WALLS. SEE TYPICAL DETAIL.
9. ANCHOR BOLTS SHALL EXTEND INTO CONCRETE NOT LESS THAN 9" WHERE POSSIBLE SHALL BE HELD AT 2–1/2" MINIMUM FROM OUTSIDE FACE OF CONCRETE. ALL ANCHOR BOLTS SHALL BE HELD 1–1/2" FROM EDGE OF BASE PLATE WHERE POSSIBLE.
10. MEMBER FORCES ARE SHOWN ON THE DRAWINGS AS FOLLOWS:
    T = C = AXIAL FORCE IN KIPS (T) = TENSION (C) = COMPRESSION
    V = SHEAR IN KIPS
    R = BEAM REACTION IN KIPS
    M = MOMENT IN FOOT–KIPS

    THESE FORCES HAVE BEEN REDUCED IN CONFORMANCE WITH CODE PROVISIONS RELATED TO TEMPORARY COMBINATIONS OF LOADINGS THAT INCLUDE WIND AND SEISMIC FORCES.
11. THE MINIMUM PLATE THICKNESS SHALL BE 3/8", THE MINIMUM BOLT DIAMETER SHALL BE 3/4". THE MINIMUM WELD SHALL BE 3/16" AND THE MINIMUM DESIGN LOAD ON ANY CONNECTION SHALL BE 10k.
12. BOLTED CONNECTIONS:
    A. SLIP–CRITICAL TYPE CONNECTIONS OF A325–SC OR A490–SC BOLTS SHALL BE USED FOR ALL BOLTED CONNECTIONS OF BRACING MEMBERS, MOMENT CONNECTIONS, CANTILEVERS, AND AS SHOWN ON THE DRAWINGS. OVERSIZED AND LONG–SLOTTED HOLES ARE ALLOWED FOR SLIP CRITICAL CONNECTIONS.
    B. ALL OTHER BOLTED CONNECTIONS SHALL BE BEARING TYPE USING A325N OR A490N BOLTS. OVERSIZED HOLES AND LONG– SLOTTED HOLES ARE NOT ALLOWED UNLESS SHOWN ON THE DRAWINGS.
    C. A307 BOLTS MAY BE USED WHERE INDICATED ON THE DRAWINGS.
    D. PROTRUDING BOLTS HEADS, SHAFTS OR NUTS SHALL NOT EXTEND INTO NOR PROHIBIT THE APPLICATION OF ARCHITECTURAL FINISHES AND THEY SHALL NOT EXTEND INTO NOR PROHIBIT THE PLACEMENT OF STEEL DECKING TO THE CORRECT LINE AND ELEVATION.
    E. THE FABRICATOR IS RESPONSIBLE FOR VERIFYING THE TENSION CAPACITY OF AXIALLY LOADED MEMBERS AFTER A SECTION IS REDUCED FOR BOLT HOLES. MEMBER SIZE MAY BE INCREASED OR CONNECTION PLATES ADDED AS REQUIRED.
    F. SHOP DRAWINGS SHALL INDICATE THE TYPE OF BOLTS USED IN EACH CONNECTION AND THE ALLOWABLE VALUES USED FOR THE VARIOUS BOLT TYPES.

STRUCTURAL STEEL CONTINUED:

13. WELDED CONNECTIONS:
    A. ALL WELDING SHALL BE IN ACCORDANCE WITH THE "STRUCTURAL WELDING CODE" (AWS D.1–LATEST EDITION) PUBLISHED BY THE AMERICAN WELDING SOCIETY. ELECTRODES FOR WELDING SHALL COMPLY WITH THE REQUIREMENTS OF TABLE 4.1.1. OF (AWS D.1.1.– LATEST EDITION). USE MINIMUM E70 ELECTRODES.
    B. ALL WELDING SHALL BE DONE ONLY BY OPERATORS WHO MEET THE QUALIFICATIONS AND TESTS PRESCRIBED IN THE STANDARD QUALIFICATIONS PROCEDURE OF THE AMERICAN WELDING SOCIETY.
    C. ALL GROOVE WELDS SHALL BE COMPLETE PENETRATION U.N.O.
14. SPLICING OF STEEL MEMBERS, UNLESS SHOWN ON THE DRAWINGS, IS PROHIBITED WITHOUT WRITTEN APPROVAL OF THE ARCHITECT.
15. NO CHANGE IN SIZE OR POSITION OF THE STRUCTURAL ELEMENTS SHALL BE MADE AND HOLES, SLOTS, CUTS, ETC., ARE NOT PERMITTED THROUGH ANY MEMBER UNLESS THEY ARE DETAILED ON THE APPROVED SHOP DRAWINGS.
16. NO FINAL BOLTING OR WELDING SHALL BE MADE UNTIL AS MUCH OF THE STRUCTURE AS WILL BE STIFFENED THEREBY HAS BEEN PROPERLY ALIGNED.
17. UNLESS NOTED OTHERWISE, BEAMS SHALL BEAR 8" MINIMUM ON CONCRETE OR MASONRY. ANCHOR BEAMS TO MASONRY WITH A FLEXIBLE ANCHOR.
18. FABRICATE ALL BEAMS WITH THE MILL CAMBER UP.
19. BOLTING IN COMBINATION WITH WELDING SHALL NOT BE CONSIDERED AS SHARING THE STRESS AND WELDS SHALL BE PROVIDED TO CARRY THE ENTIRE STRESS FOR WHICH THE CONNECTION IS DESIGNED.

STEEL JOISTS:

1. STEEL JOISTS SHALL BE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST "STANDARD SPECIFICATIONS FOR OPEN WEB STEEL JOISTS, 'K–SERIES'.
2. STEEL JOISTS SHALL BE DESIGNED BY THE MANUFACTURER. THE MANUFACTURER'S ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN, ADEQUACY AND SAFETY OF ALL STEEL JOISTS. ALL SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY THE MANUFACTURER'S ENGINEER WITH THE ENGINEER'S SEAL FOR THE STATE WHERE THE STRUCTURE IS LOCATED.
3. UNLESS OTHERWISE NOTED, STEEL JOISTS SHALL BE DESIGNED AS SIMPLY SUPPORTED, UNIFORMLY LOADED TRUSSES WITH THE TOP CHORD BRACED AGAINST LATERAL BUCKLING. THE UNIFORM DESIGN LOAD SHALL BE THE TOTAL SAFE UNIFORMLY DISTRIBUTED LOAD AS SHOWN IN THE SJI STANDARD LOAD TABLE.
4. WHEN UPLIFT FORCES DUE TO WIND ARE SHOWN ON THE DRAWINGS, THE MANUFACTURER SHALL DESIGN THE JOISTS, BRIDGING AND CONNECTIONS OF THE JOISTS TO THE SUPPORTING STRUCTURE FOR THE NET UPLIFT. A SINGLE LINE OF BOTTOM CHORD BRIDGING MUST BE PROVIDED NEAR THE FIRST BOTTOM CHORD PANEL POINTS WHENEVER UPLIFT DUE TO WIND FORCES IS SHOWN ON THE DESIGN DRAWINGS.
5. WHEN NONUNIFORM OR CONCENTRATED LOADS ARE SHOWN ON THE DRAWINGS, THE MANUFACTURER SHALL DESIGN THE JOISTS IN ACCORDANCE WITH PARAGRAPH 4.1 OF THE "STANDARD SPECIFICATION FOR OPEN WEB STEEL JOISTS, 'K–SERIES'"
6. STEEL JOIST BRIDGING SHALL BE PROVIDED IN ACCORDANCE WITH THE SJI SPECIFICATION. ALL BRIDGING AND BRIDGING ANCHORS SHALL BE PLACED AND STEEL JOIST ENDS FIXED PRIOR TO THE APPLICATION OF ANY LOADS. BRIDGING THAT TERMINATES AT, OR IS INTERRUPTED BY, STRUCTURAL STEEL BEAMS, MASONRY WALLS OR CONCRETE WALLS SHALL BE ATTACHED THERETO. COORDINATE BRIDGING LOCATIONS TO AVOID INTERFERENCE WITH ALL MECHANICAL, ELECTRICAL AND FIRE PROTECTION EQUIPMENT.
7. MINIMUM BEARING REQUIREMENTS FOR K–SERIES JOISTS, UNLESS NOTED OTHERWISE.
   2–1/2" ON STRUCTURAL STEEL
   4" ON STEEL BEARING PLATES OVER MASONRY OR CONCRETE
8. UNLESS NOTED OTHERWISE, K–SERIES JOISTS SHALL BE ATTACHED TO SUPPORTING STEEL WORK OR STEEL BEARING PLATES WITH (2) 1/8" FILLET WELD (ONE EACH SIDE) 1" LONG, WITH (2) 1/2" DIAMETER BOLT, OR WITH A COMBINATION OF (1) 1/8" FILLET WELD AND (1) 1/2" DIAMETER BOLT.
9. STEEL JOISTS AT COLUMN CENTER LINES SHALL BE BOLTED TO STRUCTURAL STEEL WITH (2) 1/2" DIAMETER BOLTS. WHERE STEEL JOISTS DO NOT SPACE TO COLUMN CENTER LINES, USE BOLTED CONNECTIONS FOR THE STEEL JOIST CLOSEST TO THE CENTER LINE.
10. HOLES IN STEEL JOIST CHORDS WILL NOT BE PERMITTED, EXCEPT FOR BOLTED CONNECTIONS AT THE BEARING END OF THE STEEL JOIST.
11. ALL ITEMS SUCH AS MECHANICAL EQUIPMENT, DUCT WORK, PIPES, CEILING FIXTURES, ETC. THAT ARE TO BE SUPPORTED OR HUNG FROM THE STEEL JOIST SHALL BE FRAMED WITH AUXILIARY FRAMING TO THE PANEL POINTS OF THE STEEL JOIST. METHODS OF FRAMING THAT INDUCE BENDING TO THE STEEL JOIST CHORDS OR WEB MEMBERS WILL NOT BE PERMITTED.
12. ALL JOISTS AT COLUMN LINES SHALL BE PROVIDED WITH BOTTOM CHORD EXTENSION.

METAL DECK:

1. METAL DECK SHALL COMPLY WITH THE REQUIREMENTS OF THE STEEL DECK INSTITUTE SPECIFICATIONS AND COMMENTARY FOR STEEL DECK (1992).
2. METAL DECK SHALL BE CONFIGURATION, DEPTH AND GAGE AS SHOWN ON THE DRAWINGS. ATTACHMENT TO THE SUPPORTING STRUCTURE SHALL BE AS SHOWN ON THE DRAWINGS. SEE ROOF PLAN NOTES.
3. ALL SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY THE MANUFACTURER'S ENGINEER WITH THE ENGINEER'S SEAL FOR THE SAME STATE WHERE THE STRUCTURE IS LOCATED.
4. DO NOT HANG OR SUPPORT ANY LOADS FROM METAL DECK.
5. METAL DECK SHALL BE CONTINUOUS OVER A MINIMUM OF THREE SPANS.

REINFORCED MASONRY:

1. MASONRY CONSTRUCTION SHALL COMPLY WITH THE ACI 530 BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY.
2. MINIMUM PRISM STRENGTH (F'm) = 1500 PSI. CONCRETE MASONRY UNITS SHALL COMPLY WITH THE REQUIREMENTS OF ASTM C90 (LATEST EDITION) GROUT SHALL COMPLY WITH REQUIREMENTS OF ASTM C476 (LATEST EDITION). MORTAR SHALL COMPLY WITH REQUIREMENTS OF ASTM–C270 (LATEST EDITION) AND SHALL BE TYPE "S".
3. REINFORCING SHALL COMPLY TO ASTM A615, GRADE 60, UNLESS NOTED ON DRAWINGS.
4. DOWELS FROM CAST–IN–PLACE CONCRETE SHALL MATCH THE VERTICAL REINFORCEMENT IN THE WALL ABOVE UNLESS NOTED OTHERWISE. SUCH DOWELS SHALL BE FURNISHED BY THE CONCRETE CONTRACTOR.
5. REINFORCING ENTIRELY WITHIN THE MASONRY SHALL BE FURNISHED BY THE MASONRY CONTRACTOR.
6. WHEN A FOUNDATION DOWEL DOES NOT LINE UP WITH THE VERTICAL BLOCK CORE, IT SHALL NOT BE SLOPED MORE THAN ONE HORIZONTAL IN 6 VERTICAL. DOWELS MAY BE GROUTED INTO A CELL IN VERTICAL ALIGNMENT, EVEN THOUGH IT IS IN AN ADJACENT CELL TO THE VERTICAL WALL REINFORCING.
7. VERTICAL BARS SHALL BE HELD IN POSITION AT TOP AND BOTTOM AND AT INTERVALS NOT EXCEEDING 192 DIAMETERS OF THE REINFORCING.
8. VERTICAL REINFORCING BARS SHALL HAVE A MINIMUM CLEARANCE OF 3/4 OF AN INCH FROM MASONRY OR ADJACENT BARS AND NOT LESS THAN ONE BAR DIAMETER BETWEEN BARS NOT SPLICED.
9. REINFORCING STEEL SHALL BE SECURED IN PLACE AND INSPECTED BEFORE GROUTING STARTS.
10. VERTICAL GROUTING MAY BE EITHER "LOW LIFT" OR "HIGH LIFT" AT THE CONTRACTOR'S OPTION.
11. VERTICAL CELLS THAT WILL BE GROUTED SHALL HAVE VERTICAL ALIGNMENT TO MAINTAIN A CONTINUOUS UNOBSTRUCTED CELL AREA NOT LESS THAN 2"x3".
12. GROUTING SHALL BE STOPPED 1–1/2" BELOW THE TOP OF A COURSE SO AS TO FORM A KEY AT THE POUR JOINT.
13. GROUTING OF MASONRY BEAMS OVER OPENINGS SHALL BE DONE IN ONE CONTINUOUS OPERATION.
14. ALL BOLTS, ANCHORS, ETC., INSERTED IN THE WALLS, SHALL BE GROUTED SOLID IN POSITION.
15. REFER TO ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATIONS AND DETAILS OF DOOR AND WINDOW OPENINGS, DUCT OPENINGS, AND ELECTRICAL BUSWAYS FOR SPECIAL COURSING AND OTHER MASONRY DETAILS. THE INFORMATION SHOWN ON THE STRUCTURAL DRAWINGS IS INTENDED TO DEFINE THE STRUCTURAL REQUIREMENT ONLY.
16. PROVIDE STANDARD LADDER TYPE HORIZONTAL JOINT REINFORCING AT 16" ON CENTER UNLESS OTHERWISE NOTED. ALL JOINT REINFORCING SHALL BE OF TYPE 304 STAINLESS STEEL COMPLYING WITH ASTM A167 OR SHALL BE GALVANIZED AS FOLLOWS:
   A. ALL JOINT REINFORCEMENT IN EXTERIOR WALLS SHALL BE HOT–DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153.
   B. ALL JOINT REINFORCEMENT IN INTERIOR WALLS SHALL BE MILL GALVANIZED IN ACCORDANCE WITH ASTM A641.
17. GROUT SOLID AT ALL CELLS CONTAINING REINFORCING AND AS NOTED ON DRAWINGS.
18. MASONRY SHALL BE LAID IN A RUNNING BOND UNLESS NOTED OTHERWISE.
19. RAKE BACK MORTAR AND CUT 50% OF HORIZONTAL JOINT REINFORCING AT CONTROL JOINTS. BOND BEAM REINFORCING SHALL BE CONTINUOUS THROUGH JOINTS.
20. AT MASONRY VENEER WITH METAL OR WOOD STUD BACKUP, PROVIDE VENEER ANCHORS SPACED AT 16"x24". SEE SPECIFICATIONS.
21. SPLICED REINFORCING BARS SHALL BE LAPPED TO LENGTHS IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

MASONRY REINFORCING LAP SPLICE LENGTH, INCHES

BAR SIZE	NUMBER OF REINFORCING LAYERS (1) LAYER (BARS CENTERED IN WALL) NOMINAL WALL THICKNESS 8"	10"	12"	(2) LAYERS NOMINAL WALL THICKNESS 8"	10"	12"
#4	25	25	25	31	31	31
#5	31	31	31	48	48	48
#6	57	52	52	98	98	98
#7	79	61	61	177	121	121
#8	112	86	74	---	149	149

MISCELLANEOUS:

1. STRUCTURAL DRAWINGS ARE INTENDED TO BE USED WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING SUCH REQUIREMENTS INTO THEIR SHOP DRAWINGS AND WORK.
2. NO OPENING SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
3. NO CHANGE IN SIZE OF DIMENSION OF STRUCTURAL MEMBERS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
4. OPENINGS 1'–4" AND LESS ON A SIDE ARE GENERALLY NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SUCH OPENINGS.
5. VERIFY ELEVATOR PIT DIMENSIONS, LOCATIONS, LOADINGS AND DETAILS WITH SUPPLIERS PRIOR TO THE FABRICATIONS AND/OR INSTALLATION OF ANY MATERIAL.
6. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED UPON STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED.
7. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
8. UNLESS OTHERWISE NOTED, FIRE PROOFING METHODS AND MATERIALS FOR STR

GENERAL NOTES CONTINUED

COLD-FORMED STEEL:

1. ALL SIZING BASED ON STEEL STUD MANUFACTURERS ASSOCIATION (ICBO ER-4943P) PRODUCT TECHNICAL INFORMATION.

2. MATERIALS SHALL CONFORM TO THE FOLLOWING:
   A. GALVANIZED MATERIAL
      1. ALL GALVANIZED STUDS AND JOISTS 12, 14 AND 16 GAUGE SHALL BE FORMED FROM STEEL THAT CORRESPONDS TO THE MINIMUM REQUIREMENTS OF ASTM A 653 SS, GRADE 50, CLASS 1 OR 3 WITH A MINIMUM YIELD OF 50,000 PSI.
      2. ALL GALVANIZED 18 AND 20 GAUGE STUDS AND JOISTS; ALL GALVANIZED TRACK, BRIDGING, END CLOSURES, AND ACCESSORIES SHALL BE FORMED FROM STEEL THAT CORRESPONDS TO THE REQUIREMENTS OF ASTM A653 SS, GRADE 33 WITH A MINIMUM YIELD OF 33,000 PSI.
      3. ALL GALVANIZED STUDS, JOISTS, TRACK, BRIDGING AND ACCESSORIES SHALL BE FORMED FROM STEEL HAVING A GALVANIZED COATING MEETING THE REQUIREMENTS OF ASTM A525
   B. PROPERTIES
      1. THE PHYSICAL AND STRUCTURAL PROPERTIES LISTED BY THE STEEL STUD MANUFACTURER ASSOCIATION AND AISI DESIGN MANUAL SHALL BE CONSIDERED THE MINIMUM PERMITTED FOR ALL FRAMING MEMBERS. SPECIFICALLY, THE FOLLOWING MINIMUM PROPERTIES, CALCULATED IN ACCORDANCE WITH THE LATEST AISI SPECIFICATION SHALL BE PROVIDED: IX (IN.4), SX (IN.3), AREA (IN.2), RX (IN.), FY(KSI), RESISITING MOMENT (IN.-LB.).
   C. SUBSTITUTIONS
      1. ANY SUBSTITUTIONS MUST BE APPROVED IN WRITING PRIOR TO DELIVERY, BY THE ARCHITECT AND/OR ENGINEER OR RECORD.

3. INSTALLATION OF STUDS SHALL BE AS PER ASTM C1007-00 "INSTALLATION OF LOAD BEARING (TRANSVERSE AND AXIAL) STEEL STUDS AND ACCESSORIES", ASTM C955-00a "SPECIFICATION FOR LOAD BEARING (TRANSVERSE AND AXIAL) STEEL STUDS, RUNNERS (TRACK), AND BRACING OR BRIDGING FOR SCREW APPLICATION OF GYPSUM BOARD AND METAL PLASTER BASES", AND ASTM C754-00 "SPECIFICATION FOR INSTALLATION OF STEEL FRAMING MEMBERS TO RECEIVE SCREW ATTACHED GYPSUM BOARD".

4. ALL FRAMING COMPONENTS SHALL BE CUT SQUARELY FOR ATTACHMENT TO PERPENDICULAR MEMBERS, OR AS REQUIRED FOR AN ANGULAR FIT AGAINST ABUTTING MEMBERS. MEMBERS SHALL BE HELD POSITIVELY IN PLACE UNTIL PROPERLY FASTENED.

5. ALL TRACK BUTT JOINTS, ABUTTING PIECES OF TRACK SHALL BE SECURELY ANCHORED TO A COMMON STRUCTURAL ELEMENT, OR THEY SHALL BE BUTT-WELDED OR SPLICED TOGETHER.

6. ALL STUD BRIDGING SHALL BE ATTACHED IN A MANNER TO PREVENT STUD ROTATION. BRIDGING ROWS SHALL BE SPACED ACCORDING TO DIETRICH INDUST. RECOMMENDATION.

7. TEMPORARY BRACING SHALL BE PROVIDED UNTIL ERECTION IS COMPLETED.

8. JOISTS SHALL BE LOCATED DIRECTLY OVER BEARING STUDS OR A LOAD DISTRIBUTION MEMBER SHALL BE PROVIDED AT THE TOP TRACK.

9. PROVIDE WEB STIFFINERS AT REACTION POINTS WHERE INDICATED BY PLANS.

10. JOIST BRIDGING SHALL BE COMPRISED OF SOLID BRIDGING AND FLAT STRAPPING. USE SOLID BRIDGING IN FIRST AND LAST TWO ROWS OF JOISTS. ATTACH FLAT STRAPPING TO TOP AND BOTTOM OF FLANGES OF JOISTS FROM THIRD ROW EXTENDING FOR A MAXIMUM OF 10'-0". REPEAT SOLID BRIDGING FOR ONE JOIST SPACE AND THEN ANOTHER 10'-0" OF FLAT STRAPPING. REPEAT. OMIT TOP FLANGE BRIDGING WHERE METAL DECK IS PROPERLY ATTACHED TO THE TOP FLANGE OF JOISTS.

11. JOISTS SHALL BE BRIDGED AT MAXIMUM 8'-0" SPACING.

12. END BLOCKING SHALL BE PROVIDED WHERE JOIST ENDS ARE NOT OTHERWISE RESTRAINED FROM ROTATION.

13. JOISTS MUST HAVE A MINIMUM OF 10" UNPUNCHED STEEL AT BEARING POINTS. STUDS MUST HAVE A MINIMUM OF 10" OF UNPUNCHED STEEL AT EACH END.

14. STUD ENDS MUST BE SQUARELY SEATED AGAINST THE TRACK WEB. BOTH STUD FLANGES MUST BE ATTACHED TO TRACK MEMBERS AT TOP AND BOTTOM.

15. STUD BRIDGING SHALL BE PROVIDED BY 1 1/2" COLD ROLLED U-CHANNEL. THE U-CHANNEL MUST BE ATTACHED TO EACH STUD BY WELDING OR ATTACHING WITH CLIP ANGLES AND SCREWS. HORIZONTAL STRAPPING AND SOLID BRIDGING WITH TRACK MEMBERS CAN ALSO BE USED FOR BRIDGING. BRIDGING SHALL BE SPACED AT 4'-0" O.C. MAX.

16. BRICK TIES SHALL CONSIST OF "DUR-O-WAL" D/A 210 ABD D/A 807 SCREWS WITH D/A 700 SERIES TRIANGLE TIES AT 16" O.C. HORIZONTALLY AND VERTICALLY.

17. THE FOLLOWING MINIMUM COLD FORMED STEEL ATTACHMENTS SHALL BE PROVIDED U.N.O.:
   - TRACK TO STRUCTURAL STEEL ---------- (2) – 0.145" ø POWDER DRIVEN FASTENER @ 1'-4" O.C.
   - TRACK TO METAL DECK ---------- (2) – #10 TEK SCREW @ 1'-4" O.C.
   - TRACK TO MASONRY OR CONCRETE ------ (2) – 0.145" ø POWDER DRIVEN FASTENER @ 1'-4" O.C.
   - TRACK TO WOOD PLATE ---------- (2) – # 12 TRUGRIP GT BUILDEX SCREWS @ 16" O.C.
   - STUD TO STRUCTURAL STEEL ---------- (2) – L2x2x14 GA. CLIP ANGLE CONNECTION W/ (2) #10 TEK SCREWS INTO METAL STUD AND (2) – 0.145" ø POWDER DRIVEN FASTENERS INTO STRUCTURAL STEEL.

MEMBER DEPTH: (EXAMPLE: 6" = 600 x 1/100 INCHES) ALL MEMBER DEPTHS ARE TAKEN IN 1/100 INCHES.
FLANGE WIDTH: (EXAMPLE: 1 5/8" = 1.625" =162 x 1/100 INCHES) ALL FLANGE WIDTHS ARE TAKEN IN 1/100 INCHES.
(600) (S) (162) – (54)
STYLE: S = STUD OR JOIST SECTION, T = TRACK SECTIONS
MATERIAL THICKNESS: (EXAMPLE: 0.054" = 54 MILS. 1 MIL = 1/1000 INCH)

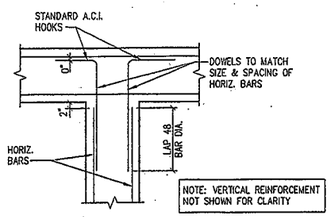
SPECIAL INSPECTIONS:

1. SPECIAL INSPECTIONS SHALL BE PROVIDED DURING CONSTRUCTION FOR THE FOLLOWING:
   A. CONCRETE:
      DURING THE TAKING OF TEST SPECIMENS AND PLACING OF REINFORCED CONCRETE (EXCEPT SLABS ON GRADE).
   B. BOLTS INSTALLED IN CONCRETE:
      PRIOR TO AND DURING THE PLACEMENT OF CONCRETE AROUND BOLTS IDENTIFIED ON THE DRAWINGS (IF ANY) AS REQUIRING SPECIAL INSPECTIONS.
   C. REINFORCING STEEL:
      FOR CONFORMANCE WITH THE APPROVED PLANS PRIOR TO THE CLOSING OF FORMS OR THE DELIVERY OF CONCRETE TO THE JOB SITE.
   D. STRUCTURAL WELDING:
      VERIFY THE MATERIALS, QUALIFICATIONS OF WELDING PROCEDURES AND WELDERS PRIOR TO THE START OF WORK AND PROVIDE PERIODIC INSPECTIONS OF WORK IN PROGRESS AND A VISUAL INSPECTION OF ALL WELDS (INCLUDING WELDING OF METAL ROOF DECK) PRIOR TO COMPLETION OF WORK. INSPECTION IS NOT REQUIRED FOR WELDING DONE IN AN APPROVED FABRICATOR'S SHOP.
   E. HIGH STRENGTH BOLTING:
      PROVIDE PERIODIC INSPECTIONS TO ENSURE THAT THE PLIES OF THE CONNECTED ELEMENTS HAVE BEEN BROUGHT INTO SNUG CONTACT.
   F. STRUCTURAL MASONRY:
      DURING THE PREPARATION AND TAKING OF ANY REQUIRED PRISMS OR TEST SPECIMENS, AT THE START OF LAYING UNITS, AFTER THE PLACEMENT OF REINFORCING STEEL, GROUT SPACE PRIOR TO EACH GROUTING OPERATION, AND DURING ALL GROUTING OPERATIONS.

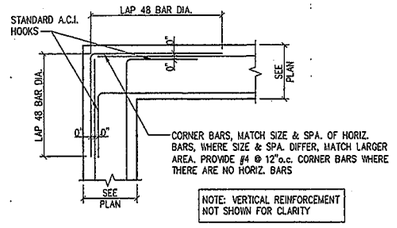
2. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION DEMONSRATE HIS COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL REQUIRING SPECIAL INSPECTION. DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR:
   A. OBSERVE THE WORK ASSIGNED FOR CONFORMANCE WITH THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS. THE INSPECTOR MAY NOT ALTER, MODIFY, ENLARGE, OR WAIVE ANY OF THE REQUIREMENTS OF THE DOCUMENTS.
   B. UNCORRECTED, SUBMIT A COMPLETE LIST TO ALL OUTSTANDING DISCREPANCIES ON A WEEKLY BASIS TO THE OWNER, THE BUILDING OFFICIAL, AND THE PROFESSIONAL OF RECORD UNTIL ALL CORRECTIONS HAVE BEEN COMPLETED.
   C. SUBMIT A FINAL SIGNED REPORT STATING WHETHER THE WORK REQUIRING SPECIAL INSPECTIONS WAS, TO THE BEST OF THE INSPECTOR'S KNOWLEDGE, IN CONFORMANCE WITH THE APPROVED PLANS AND SPECIFICATIONS AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE CODE.

3. STRUCTURAL OBSERVATION (AS DEFINED IN CHAPTER 17 OF THE BUILDING CODE) IS NOT REQUIRED.

4. WHERE SPECIAL INSPECTION REQUIREMENTS DUPLICATE THE REQUIREMENTS OF OTHER SPECIFIED TESTING, DUPLICATE INSPECTIONS SHALL NOT BE PERMITTED.



TYPICAL PLAN AT INTERSECTION OF WALLS/GRADE BEAMS/FOOTINGS
NTS



TYPICAL PLAN AT CORNERS OF WALLS/GRADE BEAMS/FOOTINGS
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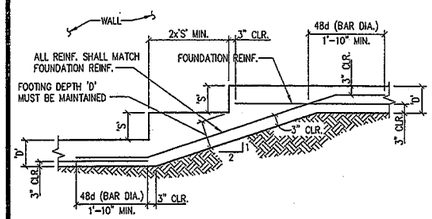
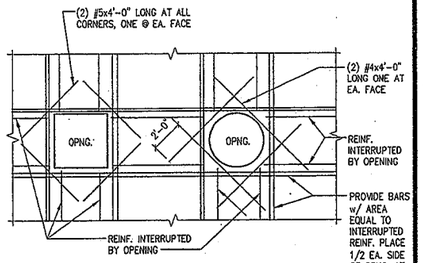
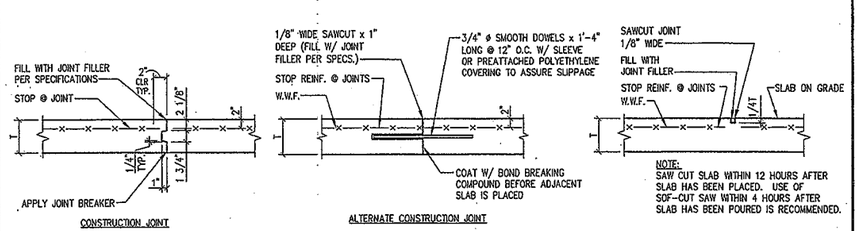


TYPICAL STEPPED FOOTING DETAIL
NTS



REINFORCING STEEL AT OPENING IN WALLS AND SLABS
NTS



TYPICAL SLAB JOINTS
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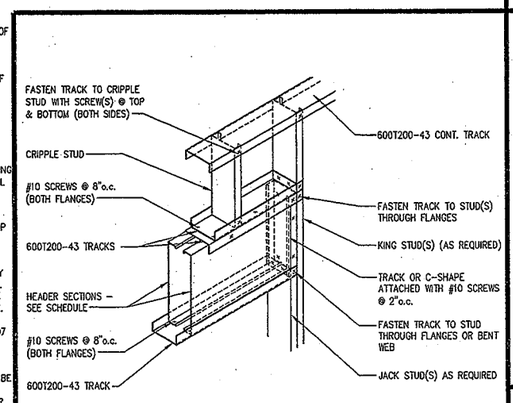
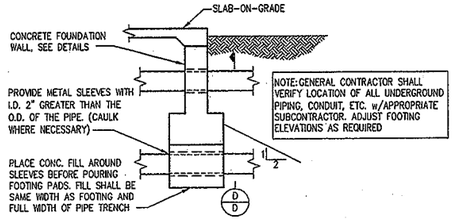


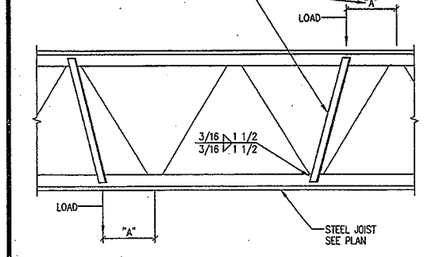
TYPICAL HEADER BEARING DETAIL

COLD FORMED HEADER SCHEDULE				
CLEAR SPAN	HEADER SECTION	JAMB FULL HEIGHT KING STUDS	JAMB FULL HEIGHT JACK STUDS	MAXIMUM CAPACITY
0'-0" TO 3'-4"	(2) 362S162-43 (BOX HEADER)	(2) 600S162-43	(1) 600S162-43	950plf
3'-4" TO 8'-9"	(2) 800S162-54 (Fy = 50 KSI) (BOX HEADER)	(3) 600S162-43	(1) 600S162-43	825plf
6'-9" TO 9'-0"	(2) 800S162-54 (Fy = 50 KSI) (BOX HEADER)	(3) 600S162-43	(1) 600S162-43	550plf
9'-0" TO 12'-0"	(2) 1000S162-54 (Fy = 50 KSI) (BOX HEADER)	(3) 600S162-43	(2) 600S162-43	400plf

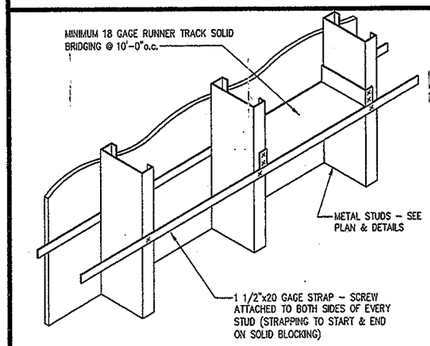
1. PROVIDE WEB STIFFENERS AT EACH END FOR ALL HEADERS.
2. MINIMUM YIELD STRENGTH Fy = 33ksi U.N.O.
3. ALL COLD FORMED LIGHT GAUGE FRAMING MEMBERS USED FOR HEADERS SHALL BE UNPUNCHED.



TYPICAL PIPE @ FOUNDATION DETAIL
NTS



TYPICAL JOIST LOAD STRUT DETAIL
NTS



TYPICAL FLAT STRAP LATERAL BRACE DETAIL
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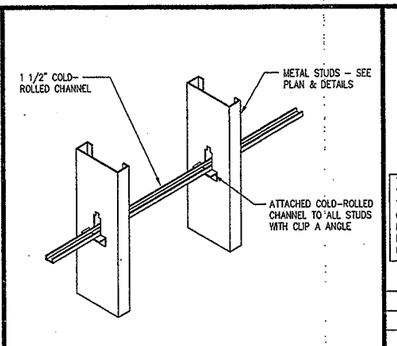

TYP. COLD ROLLED LATERAL BRACE DETAIL
NTS

THE PROFESSIONAL SEAL ATTACHED TO THIS SHEET INDICATES THAT PROFESSIONAL ENGINEER WHOSE NAME APPEARS THEREON HAS PREPARED OR HAS DIRECTED THE PREPARATION OF THE MATERIAL SHOWN ONLY ON THIS SHEET. OTHER DRAWINGS AND DOCUMENTS NOT EXHIBITING THIS SEAL SHALL NOT BE CONSIDERED PREPARED OR RESPONSIBILITY OF THE UNDERSIGNED. (PURSUANT TO SECTION 327.411 RSMo)

STATE OF MISSOURI – IZABELA M. CZERNIKIEWICZ – NUMBER E-28849 – PROFESSIONAL ENGINEER – 06/09/2009

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REV.	DATE	DESCRIPTION	APPROVED
0	06/10/09	ISSUE FOR BIDDING	IMC

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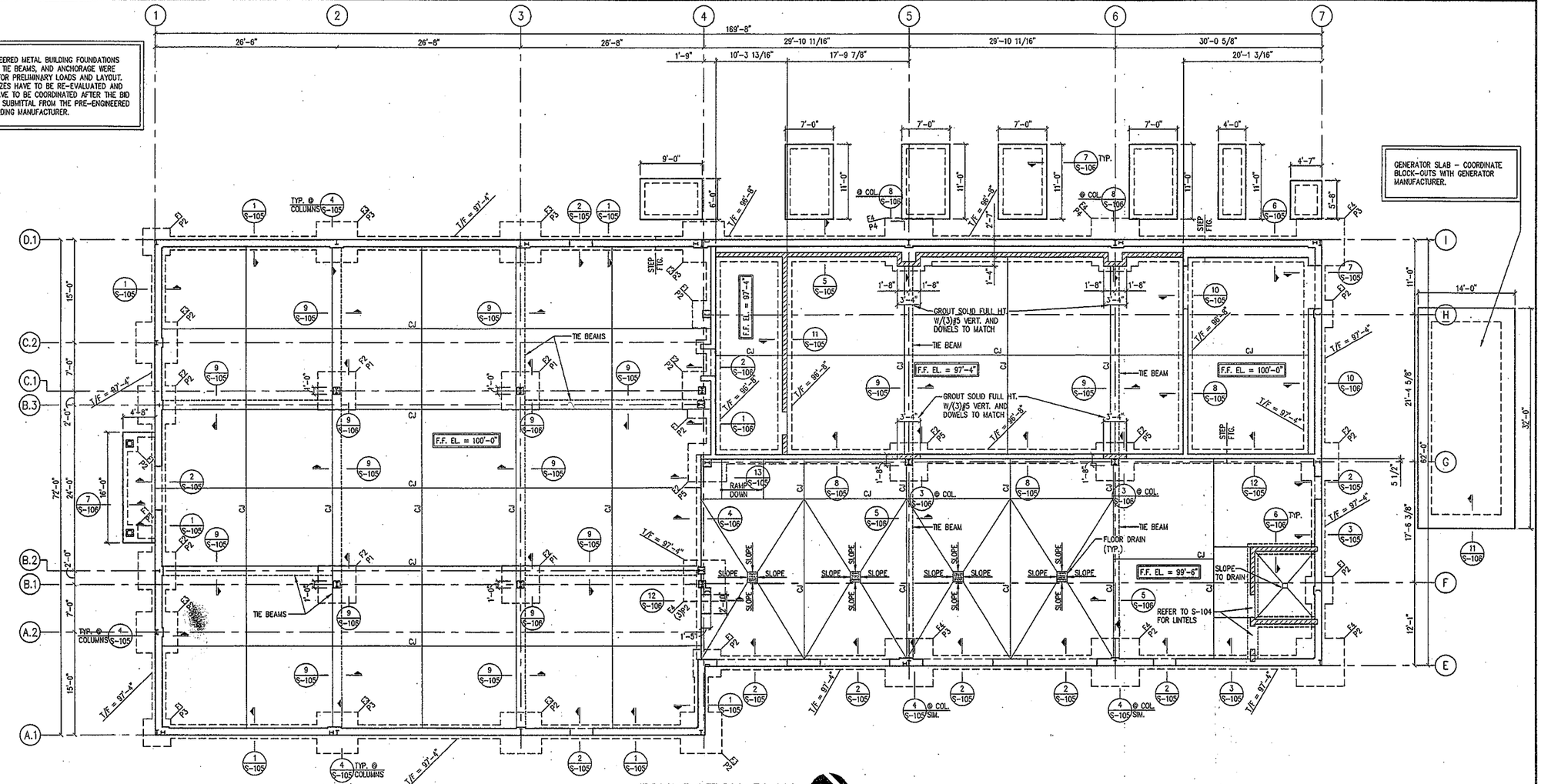
MoDOT

DRAWN BY: CMS
CHECKED BY: IMC
SCALE:
DATE: 6/10/09

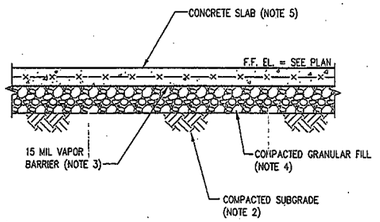
GENERAL NOTES AND TYPICAL DETAILS
NEW RESIDENT ENGINEER OFFICE & DATA CENTER
MoDOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. S-102

PRE-ENGINEERED METAL BUILDING FOUNDATIONS PILASTERS, TIE BEAMS, AND ANCHORAGE WERE DESIGNED FOR PRELIMINARY LOADS AND LAYOUT. ALL THE SIZES HAVE TO BE RE-EVALUATED AND DETAILS HAVE TO BE COORDINATED AFTER THE BID WITH FINAL SUBMITTAL FROM THE PRE-ENGINEERED METAL BUILDING MANUFACTURER.



FOUNDATION PLAN
SCALE 1/8" = 1'-0"



TYPICAL SLAB-ON-GRADE DETAIL
NTS

SLAB-ON-GRADE NOTES:

1. SLAB-ON-GRADE CONSTRUCTION REQUIREMENTS ARE BASED ON AMERICAN CONCRETE INSTITUTE STANDARDS OUTLINED IN AC 302.1R-15 "CONCRETE FLOOR AND SLAB CONSTRUCTION".
2. COMPACTED SUBGRADE SHALL BE ENGINEERED FILL CONSISTING OF ON-SITE SOILS PLACED PER THE GEOTECHNICAL REPORT.
3. VAPOR BARRIER/RETARDER - 15 MIL VAPOR BARRIER - SEE ARCHITECTURAL SPECIFICATIONS. CARE SHALL BE TAKEN DURING SLAB CURING TO REDUCE DIFFERENTIAL CURING AND CURLING OF THE SLAB DUE TO THE USE OF THE VAPOR BARRIER. OMIT VAPOR BARRIER AT EXTERIOR SLABS.
4. INSTALL A MINIMUM 6 IN. COMPACTABLE GRANULAR FILL SUBBASE LAYER CONSISTING OF RELATIVELY CLEAN, WELL-GRADED CRUSHED STONE CONTAINING LESS THAN 6% PASSING THE U.S. NO. 200 SIEVE.
5. SLAB-ON-GRADE SHALL BE 6" CONCRETE SLAB REINFORCED WITH 6x6-W2.9xW2.9 W.W.F.
6. PROVIDE CONTROL JOINTS (C.J.) IN SLAB-ON-GRADE AT 15'-0"o.c. (MAXIMUM) IN EACH DIRECTION.

PILASTER SCHEDULE

MARK	PILASTER SIZE	VERTICAL REINFORCING	HORIZONTAL REINFORCING	TIE TYPE
P1	1'-0"x1'-4"	(4) #5 DOWELS	#3 TIES @ 8"o.c.	A
P2	1'-4"x1'-4"	(4) #6 DOWELS	#3 TIES @ 8"o.c.	A
P3	1'-4"x2'-0"	(6) #6 DOWELS	#3 TIES @ 8"o.c.	B
P4	2'-0"x3'-3"	(8) #6 DOWELS	#3 TIES @ 8"o.c.	C
P5	1'-8"x1'-4"	(6) #6 DOWELS	#3 TIES @ 8"o.c.	B

TYPE A TYPE B TYPE C

FOUNDATION PLAN NOTES:

1. FOR TYPICAL DETAILS AND GENERAL NOTES, SEE SHEETS S101 AND S102.
2. TOP OF INTERIOR FOOTING ELEVATION = 99'-0".
3. TOP OF ALL PILASTERS = 100'-8"
4. CONTRACTOR SHALL COORDINATE TOP OF EXTERIOR FOOTINGS WITH EXTERIOR GRADE.
5. FINISHED FLOOR ELEVATION = SEE PLAN, COORDINATE ACTUAL FINISHED FLOOR ELEVATION WITH CIVIL DRAWINGS.
6. JOINT FILLER SHALL BE PLACED IN CLEAN JOINTS, OVERFILLED AND SHAVED FLUSH.
7. ALL FOOTINGS TO BE CENTERED UNDER WALLS AND/OR COLUMNS, UNLESS NOTED OTHERWISE.
8. NON-LOAD BEARING WALLS NOT SHOWN, SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL PARTITION WALLS.
9. C.J. = SLAB CONSTRUCTION OR CONTROL JOINT. SEE TYPICAL DETAILS.
10. REFER TO SECTION 13/S-106 FOR TYPICAL COLUMN BASE.
11. REFER TO ARCHITECTURAL DRAWINGS FOR CHAMFER REQUIREMENTS AT

FOOTING SCHEDULE

MARK	FOOTING SIZE	REINFORCING	REMARKS
F1	4'-0"x4'-0"x1'-0"	(4) #5 EACH WAY TOP & BOTTOM	
F2	5'-6"x5'-6"x1'-4"	(6) #5 EACH WAY TOP & BOTTOM	
F3	6'-0"x6'-0"x1'-8"	(6) #6 EACH WAY TOP & BOTTOM	
F4	7'-6"x7'-6"x1'-8"	(7) #6 EACH WAY TOP & BOTTOM	

STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER IZABELA-MARIA CZERWINSKIEWICZ NUMBER E-28849
06/09/2009

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SCALE:
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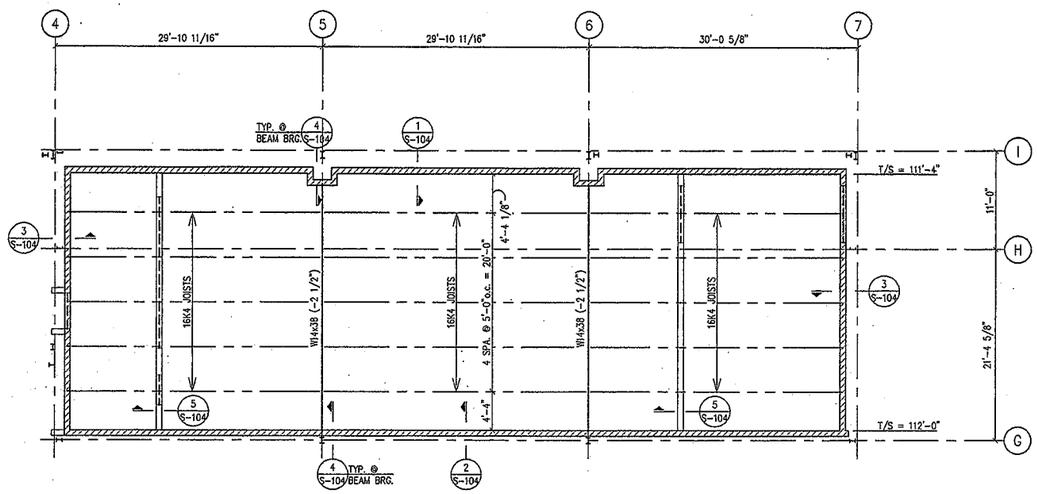
FOUNDATION PLAN
NEW RESIDENT ENGINEER OFFICE & DATA CENTER
MoDOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. S-103



CEILING FRAMING PLAN

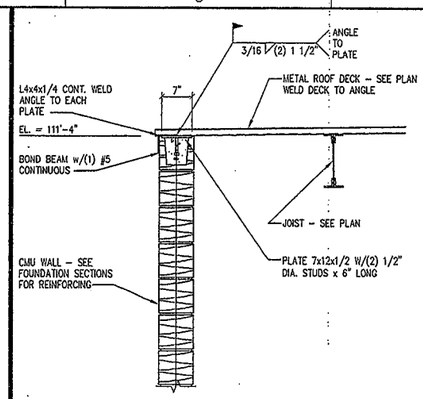
SCALE 1/8" = 1'-0"

CEILING FRAMING PLAN NOTES:

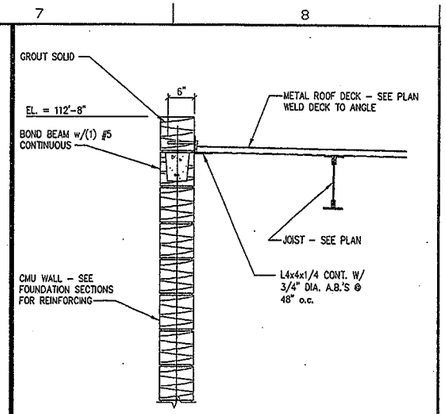
1. FOR TYPICAL DETAILS AND GENERAL NOTES, SEE SHEETS S-101 AND S-102.
2. TOP OF STEEL (T/S = XXX'-X") EQUALS TOP OF JOIST/UNDERSIDE OF METAL DECKS. BEAMS AND JOISTS REFERENCED +/- FROM TOP OF STEEL.
3. METAL ROOF DECKING SHALL BE 1 1/2"x36" WIDE, 22 GAGE PAINTED WIDE RIB ROOF DECK AND SHALL BE CONNECTED TO FRAMING MEMBERS AS FOLLOWS:
   A. TO ALL TRANSVERSE SUPPORTS, 5/8" DIAMETER PUDDLE WELDS, 3 PER SHEET.
   B. TO ALL SUPPORTS PARALLEL TO FLUTES, 5/8" DAIMETER PUDDLE WELDS @ 12"o.c.
   C. SIDE SEAMS, #10 SCREWS (BUILDEX), 2 PER SPAN.
4. METAL DECK MUST BE WATER TIGHT. SPECIAL CARE HAS TO BE TAKEN AS NOT TO BURN WELDS THRU DECK . ALL DEFECTIVE DECK SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.
5. STEEL JOIST CAMBER SHALL BE PROVIDED AND SHALL CONFORM TO SECTION 4.7 OF THE SJI SPECIFICATIONS FOR "K" SERIES.
6. PROVIDE HORIZONTAL JOIST BRIDGING TOP AND BOTTOM CHORD TO CONFORM TO SJI SPECIFICATIONS.
7. ALL ITEMS SUCH AS DUCT WORK, PIPES, CEILINGS, FICTURES, ETC. THAT ARE TO BE SUPPORTED OR HUNG FROM STEEL JOISTS SHALL BE FRAMED WITH AUXILIARY FRAMING TO THE PANEL POINT OF THE JOISTS (SEE TYPICAL JOIST STRUT DETAIL). METHODS OF FRAMING THAT INDUCE BENDING TO THE JOIST CHORD OR WEB MEMBERS WILL NOT BE PERMITTED. COORDINATE BRIDGING LOCATIONS SO AS NOT TO INTERFERE WITH ANY MECHANICAL EQUIPMENT.
8. PLACEMENT OF SPRINKLER CONTRACTOR'S PIPING AND STEEL CONTRACTOR'S JOIST BRIDGING SHALL BE COORDINATED BY THE GENERAL CONTRACTOR. THE CONTRACTOR SHALL MAKE PROVISIONS FOR THE STEEL ERECTOR TO ADJUST/RELOCATE BRIDGING OR SPRINKLER CONTRACTOR TO ADJUST OR RELOCATE PIPING WHERE CONFLICTS OCCUR. ALL CHANGES REQUIRED OF THE JOIST BRIDGING SHALL BE DESIGNED BY JOIST MANUFACTURER.

CEILING DEAD LOADS	
METAL DECK	= 2.0 PSF
INSULATION	= 2.0 PSF
JOISTS	= 2.0 PSF
BEAMS	= 2.0 PSF
CEILING	= 3.0 PSF
MECH./ELEC./FIRE PROT.	= 4.0 PSF
TOTAL DEAD LOAD	= 15.0 PSF

ROOF LIVE LOADS	
JOISTS	= 20.0 PSF
BEAMS	= 12.0 PSF



1 S-104 SECTION
SCALE: 3/4" = 1'-0"



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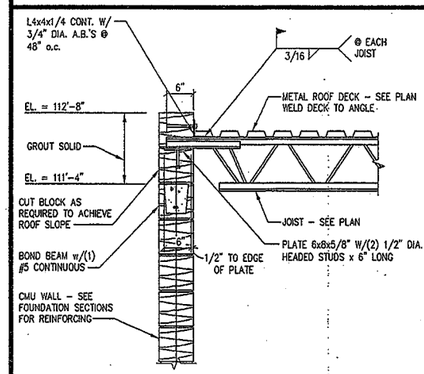

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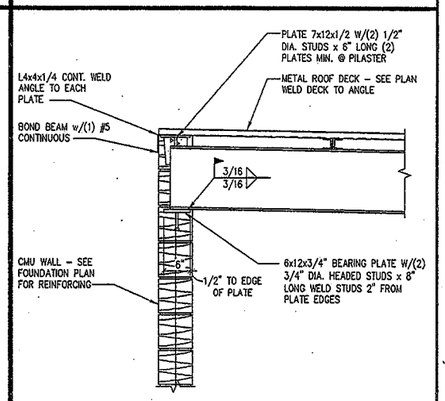

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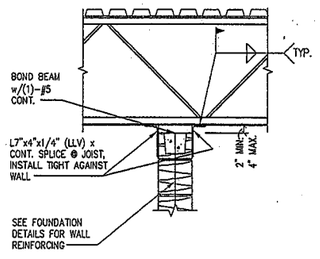
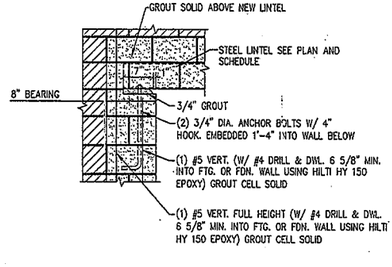


MASONRY PARTITION WALL SUPPORT

5 S-104 SCALE: 3/4" = 1'-0"



STEEL LINTEL SCHEDULE	
CLEAR SPAN	8" BLOCK
6'-4" OR LESS	(2) L5 x 3 1/2 x 5/16
OVER 6'-4" TO 10'-4"	(2) L6 x 3 1/2 x 5/16
16'-10"	W8x21 W/ 7"x1/4" BOTTOM PLATE

LINTEL NOTES:

1. LINTELS SHALL BE INSTALLED WITH LONG LEGS VERTICALLY.
2. LINTELS SHALL BE SHORED DURING CONSTRUCTION UNTIL THE MASONRY HAS ATTAINED SUFFICIENT STRENGTH TO CARRY IT'S OWN WEIGHT (24 HOURS MINIMUM).
3. LINTEL SIZES SHOWN APPLY WHERE LINTEL SIZES ARE NOT OTHERWISE SHOWN ON THE DRAWINGS.
4. SEE "TYPICAL LINTEL BEARING" DETAIL FOR END BEARING AND WALL ANCHORS.
5. ANGLE LINTELS WHICH OCCUR IN EXTERIOR WALL SHALL BE GALVANIZED.
6. SEE ARCHITECTURAL SPECIFICATIONS FOR MASONRY TIES.

TYPICAL LINTEL BEARING DETAIL

6 S-104 SCALE: 3/4" = 1'-0"

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CEILING FRAMING PLAN AND DETAILS
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STATE OF MISSOURI
IZABELA M. CZERNIKIEWICZ
NUMBER E-28849
REGISTERED PROFESSIONAL ENGINEER
06/09/2009

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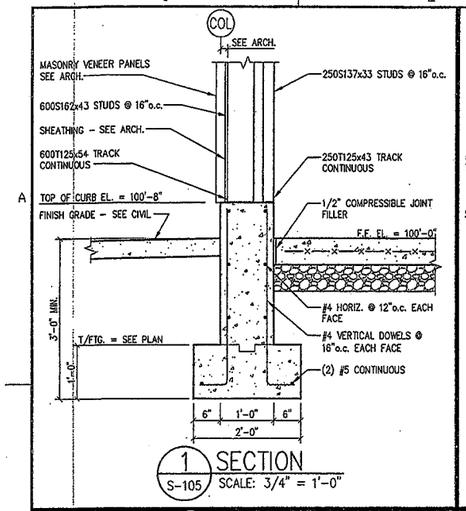

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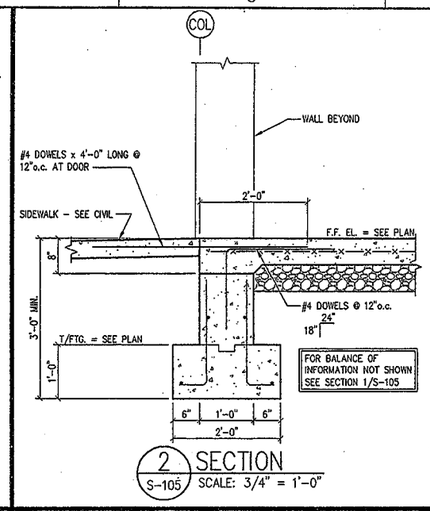

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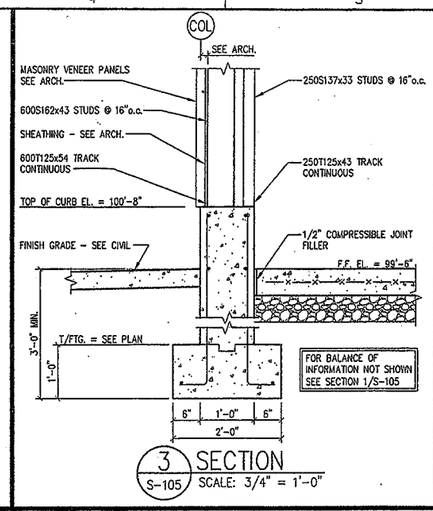

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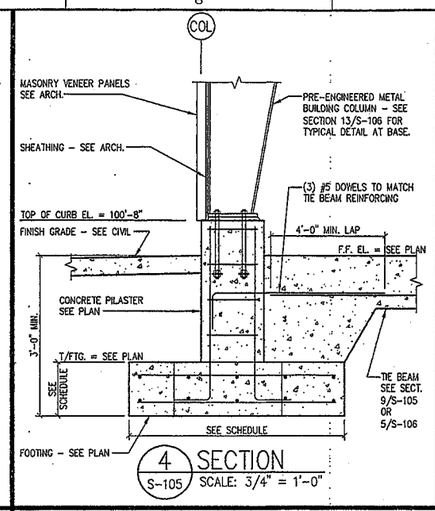

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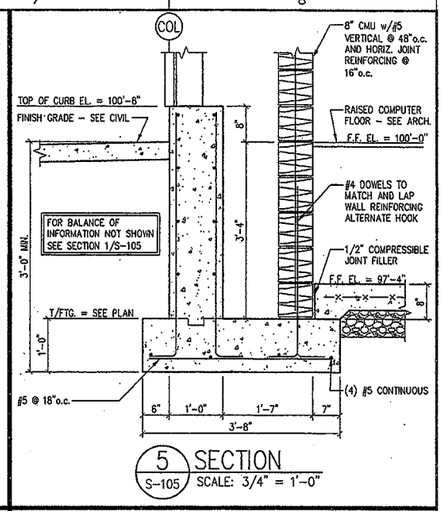

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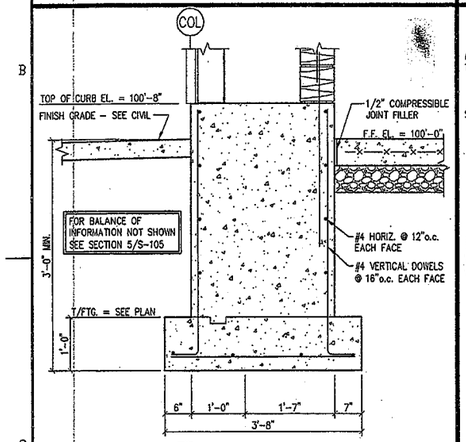

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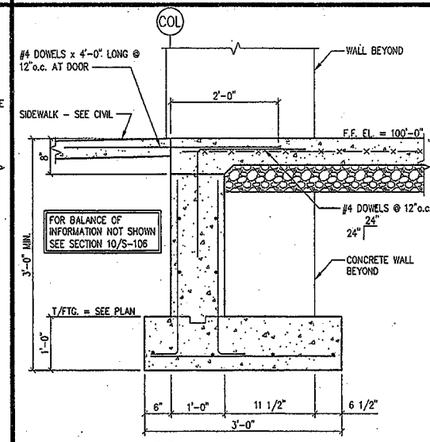

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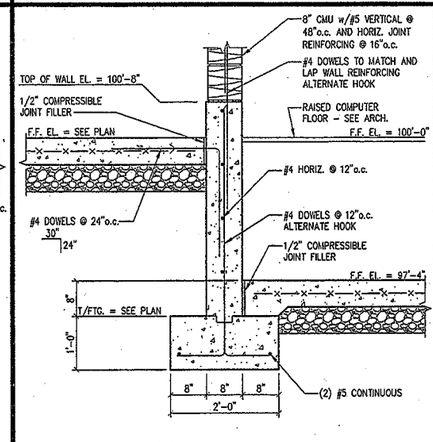

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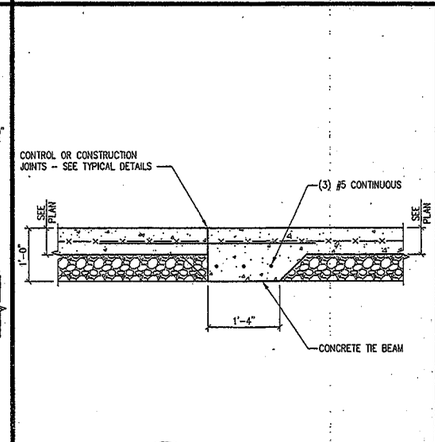

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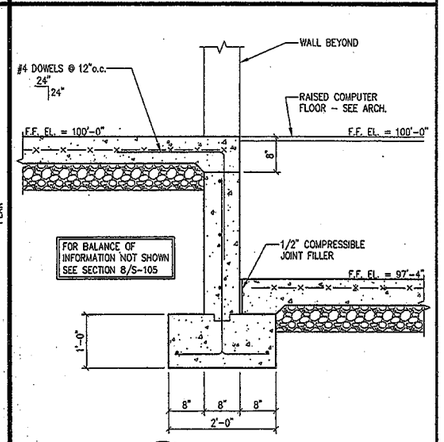

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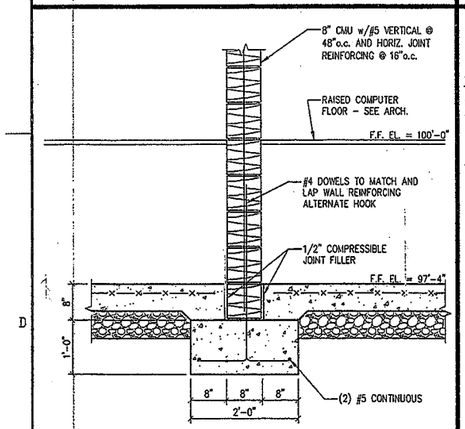

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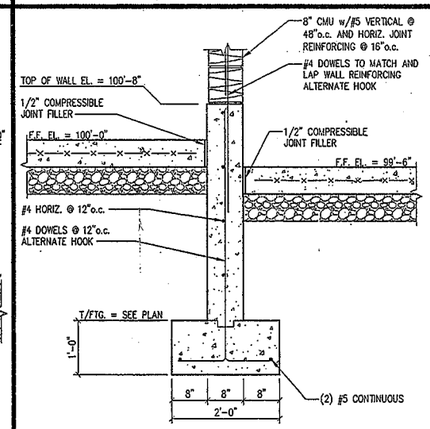

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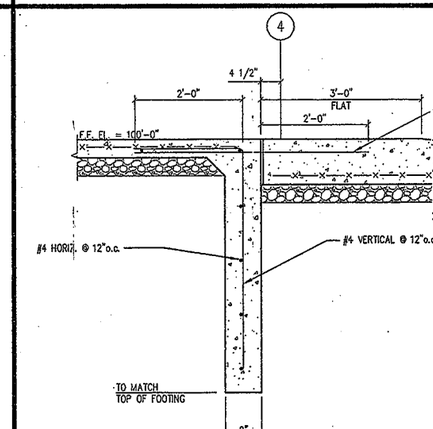

13 SECTION S-105 SCALE: 3/4" = 1'-0"

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FOUNDATION SECTIONS AND DETAILS
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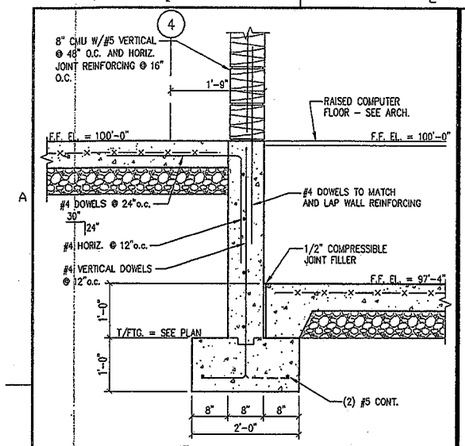

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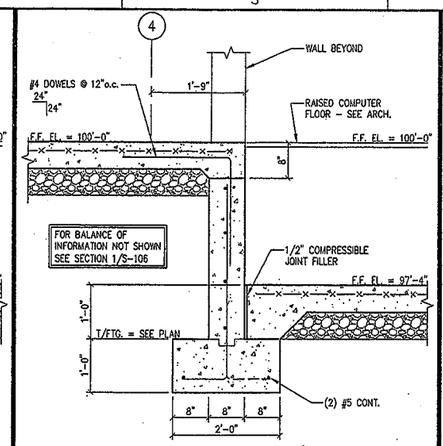

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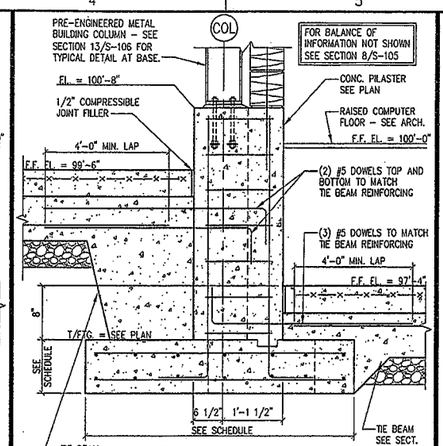

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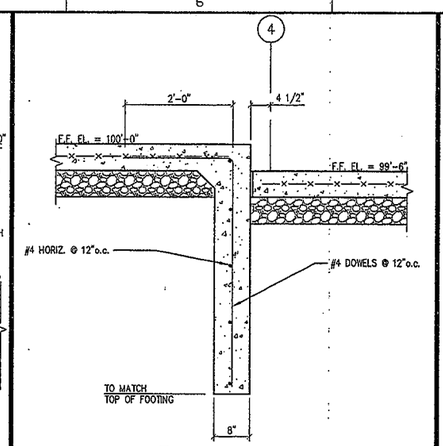

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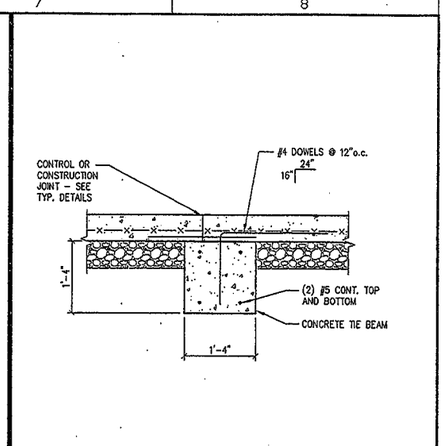

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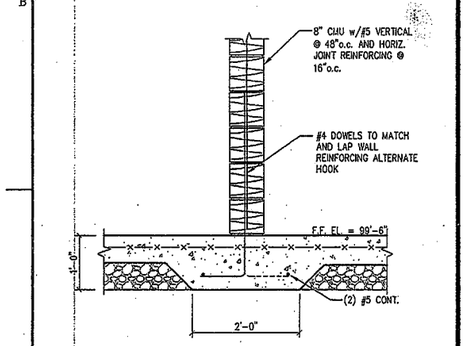

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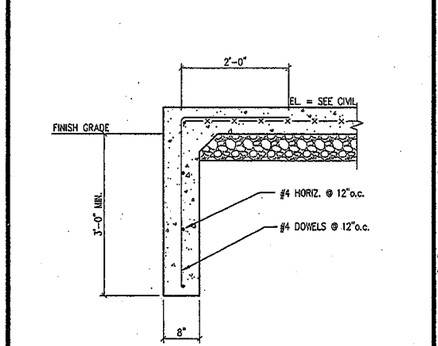

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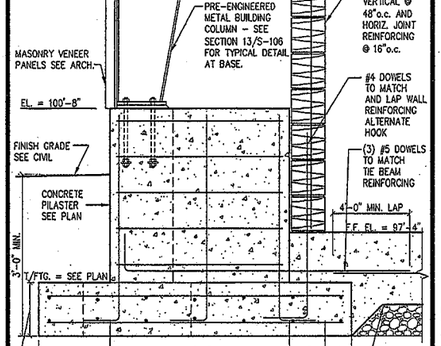

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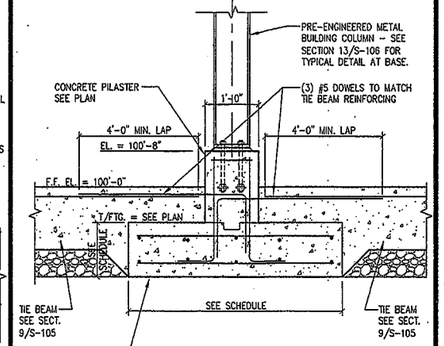

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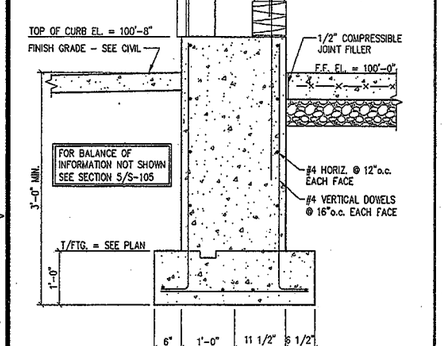

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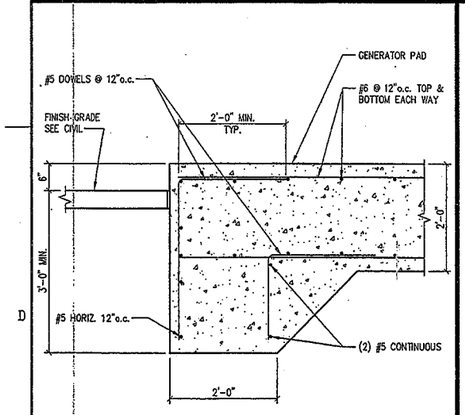

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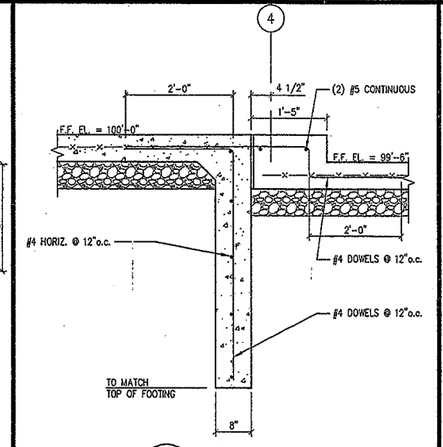
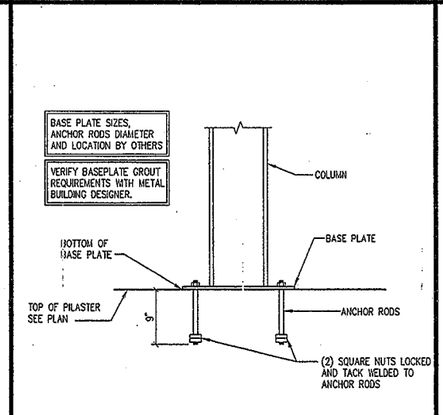


12 SECTION S-106 SCALE: 3/4" = 1'-0"



13 TYPICAL COLUMN BASE DETAIL S-106 SCALE: NTS

THE PROFESSIONAL SEAL ATTACHED TO THIS SHEET INDICATES THAT PROFESSIONAL ENGINEER WHOSE NAME APPEARS THEREON HAS PREPARED OR HAS DIRECTED THE PREPARATION OF THE MATERIAL SHOWN ONLY ON THIS SHEET. OTHER DRAWINGS AND DOCUMENTS NOT EXHIBITING THIS SEAL SHALL NOT BE CONSIDERED PREPARED OR RESPONSIBILITY OF THE UNDERSIGNED. (PURSUANT TO SECTION 327.411 RSMo)

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99% REVIEW

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FOUNDATION SECTIONS & DETAILS
NEW RESIDENT ENGINEER OFFICE & DATA CENTER
MoDOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. S-106

SPECIFICATIONS

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
B. See Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

1.2 SUBMITTALS

A Product Data: For each type of product indicated.
B Design Mixtures: For each concrete mixture.
C Shop Drawings: For steel reinforcement. Material certificates

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

C. Preinstallation Conference: Conduct conference at Project site

PART 2 – PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
D. Bar Supports: Bolsters, chairs, spacers and other devices for spacing supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of the same type, brand and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I or II [/it]. Select supplementary cementing materials from two subparagraphs below if permitted. Ready-mix concrete manufacturer blends these materials with Portland cement. Fly ash, slag, or pozzolanic materials may slow rate of concrete strengthening and affect color uniformity. Availability of Class F fly ash predominates over Class C fly ash.

a. Fly Ash: ASMT C 618, Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, graded 1 ½ inch (25 mm) nominal maximum coarse-aggregate size.

1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C94/C 94M and potable.
D. Air-Entraining Admixture: ASTM C 260.
E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 449M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Synthetic Fiber: fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1" long.

2.4 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
B. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
C. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
D. Water: Potable.

SECTION 03300 – CAST-IN-PLACE CONCRETE CONTINUED

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to rescure the total amount of Portland cement, which would otherwise be used, by not less than 40 percent, Zupon approvat of the Engineer of Record.
C. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength as shown on drawings: 5000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm), 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: 6 ½ percent, plus or minus 1.0 percent at point of delivery for 1 ½ (38 mm) nominal maximum aggregate size.
5. Air content: Do not allow air content of troweled finished floors to exceed 3 percent.
6. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. Yd (0.60 kg/cu. m).

2.8 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1 ½ hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
C. Chamfer exterior corners and edges of permanently exposed concrete. See Architectural drawings.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer of Record.
C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

SECTION 03300 – CAST-IN-PLACE CONCRETE CONTINUED

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.
D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces on footing and foundations.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, exposed foundation walls, to be covered with a coating or covering material applied directly to concrete. See Architectural drawings.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated. See Architectural drawings for finishes:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to cool surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.

1. Apply scratch finish to surfaces. See Architectural drawings.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces. See Architectural drawings.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces. See Architectural drawings.
2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05 M) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed ¼ inch (6 mm), -3/16 inch (4.8 mm) or 1/8 inch (3.2 mm).

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces. See Architectural drawings. While concrete is still plastic, slightly scorify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. See Architectural drawings.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry or windy conditions cause moisture loss approaching 0.2 lg/sq ft x h (1 kg/sq m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding and bull floating or darbying concrete, but before float finishing.
C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days.

SECTION 03300 – CAST-IN-PLACE CONCRETE CONTINUED

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing Services: Tests shall be performed according to ACI 301.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

a. Test one set of two field-cured specimens at 7 days and one set of two specimensat 28 days.
b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection ofconcrete.

SECTION 03300 – CAST-IN-PLACE CONCRETE CONTINUED

13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate das not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

END OF SECTION 03300

SECTION 05120 – STRUCTURAL STEEL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementory Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Prefabricated building columns.
3. Grout.

B. Reloted Sections include the following:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Metal Fabrications" for steel lintels not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
3. Division 9 painting Sections for surface preparation and priming requirements.
4. Division 13 Section "Metal Building Systems" for structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

C. Welding certificates.
D. Qualification Data: For Installer.
E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.
4. Nonshrink grout.

F. Source quality-control test reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant.
C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

SECTION 05120 – STRUCTURAL STEEL CONTINUED

D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
E. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
5. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 – PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M or ASTM A 572/A 572M, Grade 50 (345).
B. Channels, Angles: ASTM A 36/A 36M.
C. Plate and Bar: ASTM A 36/A 36M.
D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: As shown on drawings.
2. Finish: Black, except where indicated to be galvanized.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

1. Finish: Plain.

B. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

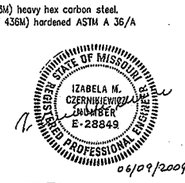
1. Configuration: Straight.
2. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
5. Finish: Plain.

C. Headed Anchor Rods: ASTM F 1554, Grade 36.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
4. Finish: Plain.

D. Threaded Rods: ASTM A 193/A 193M or as noted on drawings.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
2. Washers: [ASTM F 436 (ASTM F 436M) hardened ASTM A 36/A 36M carbon steel.
3. Finish: Plain.



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SPECIFICATIONS
NEW RESIDENT ENGINEER OFFICE & DATA CENTER
MoDOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074

DRAWING NO. S-107

SECTION 05120 – STRUCTURAL STEEL CONTINUED

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type I, iron oxide, zinc oxide, raw linseed oil, and alkyd.
B. Primer: SSPC-Paint 25 BCS, Type I, iron oxide, zinc oxide, raw linseed oil, and alkyd.
C. Primer: SSPC-Paint 23, latex primer.
D. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
E. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.4 GROUT

A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
B. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

1. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
2. Mark and match-mark materials for field assembly.
3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Bolt Holes: Cut, drill, thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning."
F. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.
G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embeddedmembers to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to receive sprayed fire-resistive materials.
4. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
4. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
5. SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."
6. SSPC-SP 8, "Pickling."
7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
8. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
9. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

SECTION 05120 – STRUCTURAL STEEL CONTINUED

D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Verify with Architect requirements.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.

1. Fill vent holes and grind smooth after galvanizing.
2. Galvanize lintels attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.

1. Set base plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Snug-tighten anchor rods after supported members have beenositioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.
F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 PRE-ENGINEERED BUILDING COLUMNS

A. Install pre-engineered building columns to comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design," manufacturer's written recommendations, and requirements of testing and inspecting agency.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and anchor bolt installation.
B. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
C. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

SECTION 05120 – STRUCTURAL STEEL CONTINUED

3.7 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05120

SECTION 05210 – STEEL JOISTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. K-series steel joists.
2. Joist accessories.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.
2. Division 4 Section "Unit Masonry Assemblies" for installing bearing plates in unit masonry.

1.3 DEFINITIONS

A. SJI "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

1.4 SUBMITTALS

A. Product Data: For each type of joist, accessory, and product indicated.
B. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.

1. Indicate locations and details of bearing plates to be embedded in other construction.
2. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

C. Welding certificates.
D. Manufacturer Certificates: Signed by manufacturers certifying that joists comply with requirements.
E. Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.
F. Qualification Data: For manufacturer.
G. Field quality-control test and inspection reports.
H. Research/Evaluation Reports: For joists.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables of SJI "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.
C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.7 SEQUENCING

A. Deliver steel bearing plates to be built into masonry construction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.
B Steel Bearing Plates: ASTM A 36/A 36M.
C Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

1. Finish: Plain, uncoated.

D. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
E. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

SECTION 05210 – STEEL JOISTS CONTINUED

C. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
D. Provide holes in chord members for connecting and securing other construction to joists.
E. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
F. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
G. Camber joists according to SJI's "Specifications."
H. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability. Coordinate bridging locations with work of other trades.
B. Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated.
C. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.
B. Apply 1 coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

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

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.
B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
D. Bolt joists to supporting steel framework using carbon-steel bolts for erection only.
E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
B. Field welds will be visually inspected according to AWS D1.1/D1.1M.
C. Bolted connections will be visually inspected.
D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.
E. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.4 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05210

SECTION 05310 – STEEL DECK

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Roof deck.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill.
2. Division 5 Section "Structural Steel" for shop- and field-welded shear connectors.
3. Division 9 painting Sections for repair painting of primed deck.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.
B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
C. Product Certificates: For each type of steel deck, signed by product manufacturer.
D. Welding certificates.

SECTION 05310 – STEEL DECK CONTINUED

E. Field quality-control test and inspection reports.
F. Research/Evaluation Reports: For steel deck.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.
B. Installer Qualifications: An experienced installer who has completed steel deck similar in material and design to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
C. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code – Sheet Steel."
D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

E. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Deck:

a. ASC Profiles, Inc.
b. Canam Steel Corp.; The Canam Manac Group.
c. Consolidated Systems, Inc.
d. DACS, Inc.
e. D-Mac Industries Inc.
f. Epic Metals Corporation.
g. Marlyn Steel Decks, Inc.
h. New Millennium Building Systems, LLC.
i. Nucor Corp.; Vulcraft Division;
j. Roof Deck, Inc.
k. United Steel Deck, Inc.
l. Valley Joist; Division of EBSCO Industries, Inc.
m. Verco Manufacturing Co.
n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop-primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: As indicated on architectural drawings.

2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.
5. Span Condition: Triple span or more.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
I. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

SECTION 05310 – STEEL DECK CONTINUED

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.
B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
C. Locate deck bundles to prevent overloading of supporting members.
D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated.
B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports: As indicated.
C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints lapped 2 inches minimum. Lap in the direction to shed water where applicable.
D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, and closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Field welds will be subject to inspection.
C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
D. Remove and replace work that does not comply with specified requirements.
E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas of prime-painted deck immediately after installation, and apply repair paint.
C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

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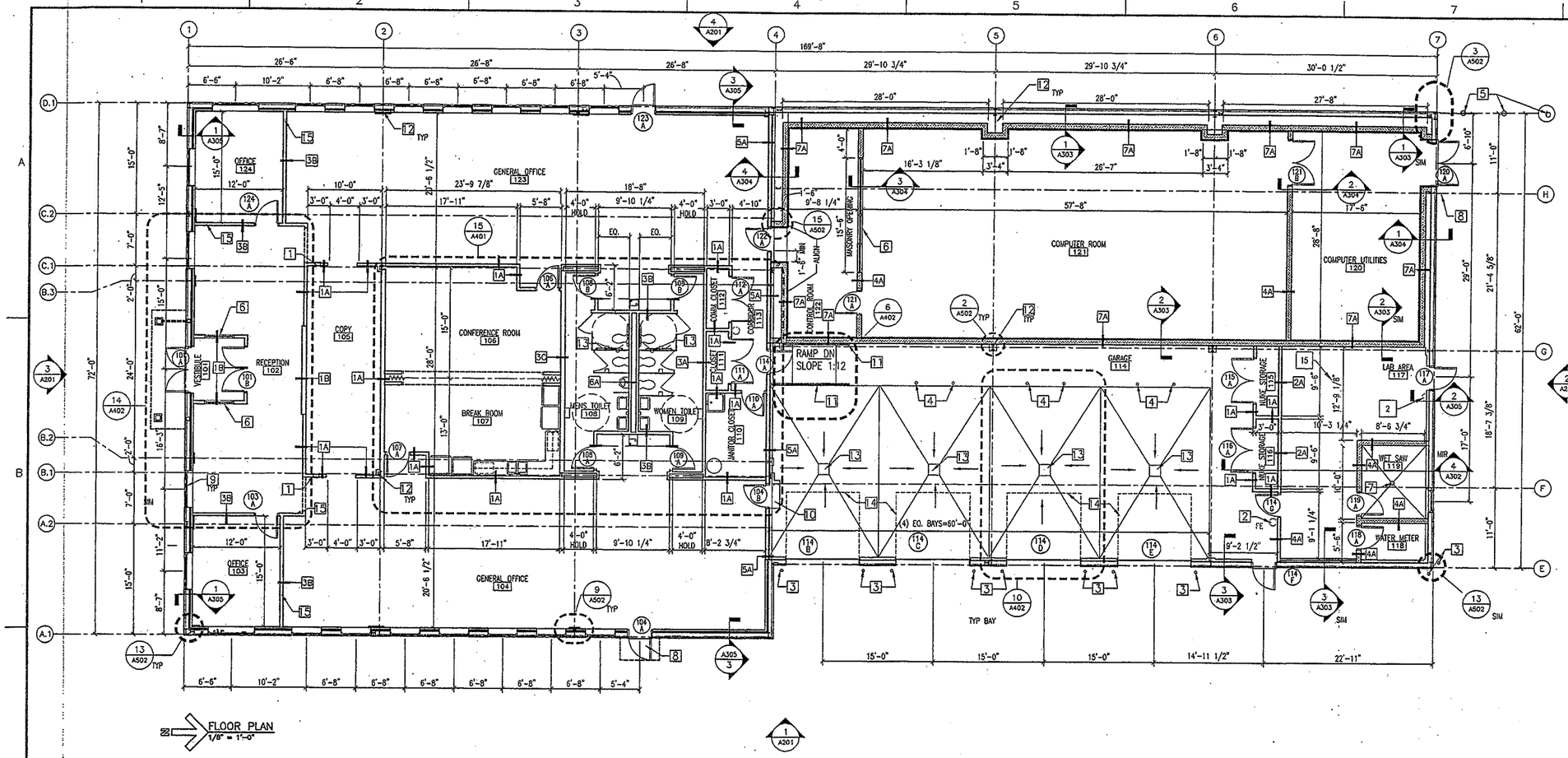
STATE OF MISSOURI
IZABELA N. CZERNIAKOWSKA
NUMBER E-28849
REGISTERED PROFESSIONAL ENGINEER

06/09/2009

THE PROFESSIONAL SEAL ATTACHED TO THIS SHEET INDICATES THAT PROFESSIONAL ENGINEER WHOSE NAME APPEARS THEREON HAS PREPARED OR HAS DIRECTED THE PREPARATION OF THE MATERIAL SHOWN ONLY ON THIS SHEET. OTHER DRAWINGS AND DOCUMENTS NOT EXHIBITING THIS SEAL SHALL NOT BE CONSIDERED PREPARED OR RESPONSIBILITY OF THE UNDERSIGNED. (PURSUANT TO SECTION 327.411 RSMo)

PILLAR DESIGN GROUP
Consulting Structural Engineers
TWO CAMPBELL PLAZA
SUITE 1B, PLAZA ENTRANCE
SAINT LOUIS, MISSOURI, 63139
(314) 772-6233

REV.	DATE	DESCRIPTION	APPROVED
0	06/10/09	ISSUE FOR BIDDING	IMC



GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS FOR INSTALLATION OF MECHANICAL EQUIPMENT.
2. REFER TO ELECTRICAL DRAWING FOR INSTALLATION OF ALL ELECTRICAL FIXTURES.
3. REFER TO FIRE PROTECTION DRAWINGS FOR INSTALLATION OF ALL FIRE PROTECTION FIXTURES.
4. REFER TO SHEET A601 FOR PARTITION TYPES.
5. ALL OPENINGS TO BE 3'-0" WIDE CLEAR UNLESS OTHERWISE DIMENSIONED ON PLAN.
6. ALL EQUIPMENT AND APPLIANCES ARE SUPPLIED BY THE OWNER UNLESS NOTED OTHERWISE ON PLAN. CONTRACTOR TO VERIFY ALL APPLIANCE DIMENSIONS BEFORE PROCEEDING WITH MILLWORK INSTALLATION/CONSTRUCTION. REFER TO ELEVATIONS, DETAILS, SPECIFICATIONS AND POWER PLAN FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO PROVIDE AND INSTALL FIRE RETARDANT WOOD BLOCKING IN WALL FOR ALL BUILT-IN MILLWORK, TOILET ACCESSORIES, ETC. TYPICAL.
8. CONTRACTOR TO PROVIDE AND INSTALL MINI-BLINDS AT ALL EXTERIOR WINDOW LOCATIONS. REFER TO THE SPECIFICATION SECTION
9. REFER TO PLAN ABOVE FOR FIRE EXTINGUISHER LOCATIONS. LOCATE 1'-0" FROM DOOR FRAME/WALL. CONTRACTOR TO PROVIDE ADDITIONAL FIRE EXTINGUISHER AS PER FIRE MARSHALL'S REQUEST. COORDINATE ALL LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
10. ELEVATED FLOOR IN ROOMS 121 AND 122, REFER TO SHEET AF-1 FOR LAYOUT.

CONSTRUCTION NOTES: (SAME ON SHEETS A-101 & A-402)

1. 5 LB ABC FIRE EXTINGUISHER IN SEMI-RECESSED EXTINGUISHER CABINET.
2. 10 LB ABC FIRE EXTINGUISHER IN SURFACE MOUNTED EXTINGUISHER CABINET.
3. 4" ø CONCRETE FILLED BOLLARD, SEE DETAIL 13/A-504.
4. 4" ø BOLLARD BOLTED TO CONCRETE SLAB SEE DETAIL 14/A-504.
5. 8" ø CONCRETE FILLED BOLLARD, SEE DETAIL 13/A-504.
6. 3' X 4' HOLLOW METAL WINDOW
7. FLOOR DRAIN CENTERED IN WET SAW 119, SLOPE 1/8" PER 1'-0" MIN. REFER TO PLUMBING DRAWINGS FOR MORE INFORMATION.
8. METAL AWNINGS ABOVE. REFER TO ELEVATION FOR MORE INFORMATION.
9. CANOPY ABOVE. REFER TO ELEVATIONS.
10. 6" CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
11. 1 1/2" ø METAL RAILING, PAINTED
12. PREFABRICATED METAL BUILDING STRUCTURE
13. FLOOR DRAIN, REFER TO PLUMBING DRAWINGS.
14. OVERHEAD TRACK ABOVE
15. EXTEND WALL TO UNDERSIDE OF ROOF DECK

FLOOR PLAN LEDGED

NEW PARTITION/ NEW DOOR

REVISION MARK
DOOR TAG
ROOM NUMBER
DOOR NAME

DETAIL NUMBER
SHEET NUMBER

PARTITION TYPE

CONSTRUCTION NOTE

SECTION NUMBER
SECTION SHEET

EXTERIOR ELEVATION MARK
ELEVATION NUMBER
SHEET NUMBER

INTERIOR ELEVATION MARK
ELEVATION NUMBER
SHEET NUMBER

ENLARGED PLAN MARK
DETAIL NUMBER
SHEET NUMBER

STATE OF MISSOURI
GREGORY EDWARD BRUNSWORST
NUMBER A-2006265
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
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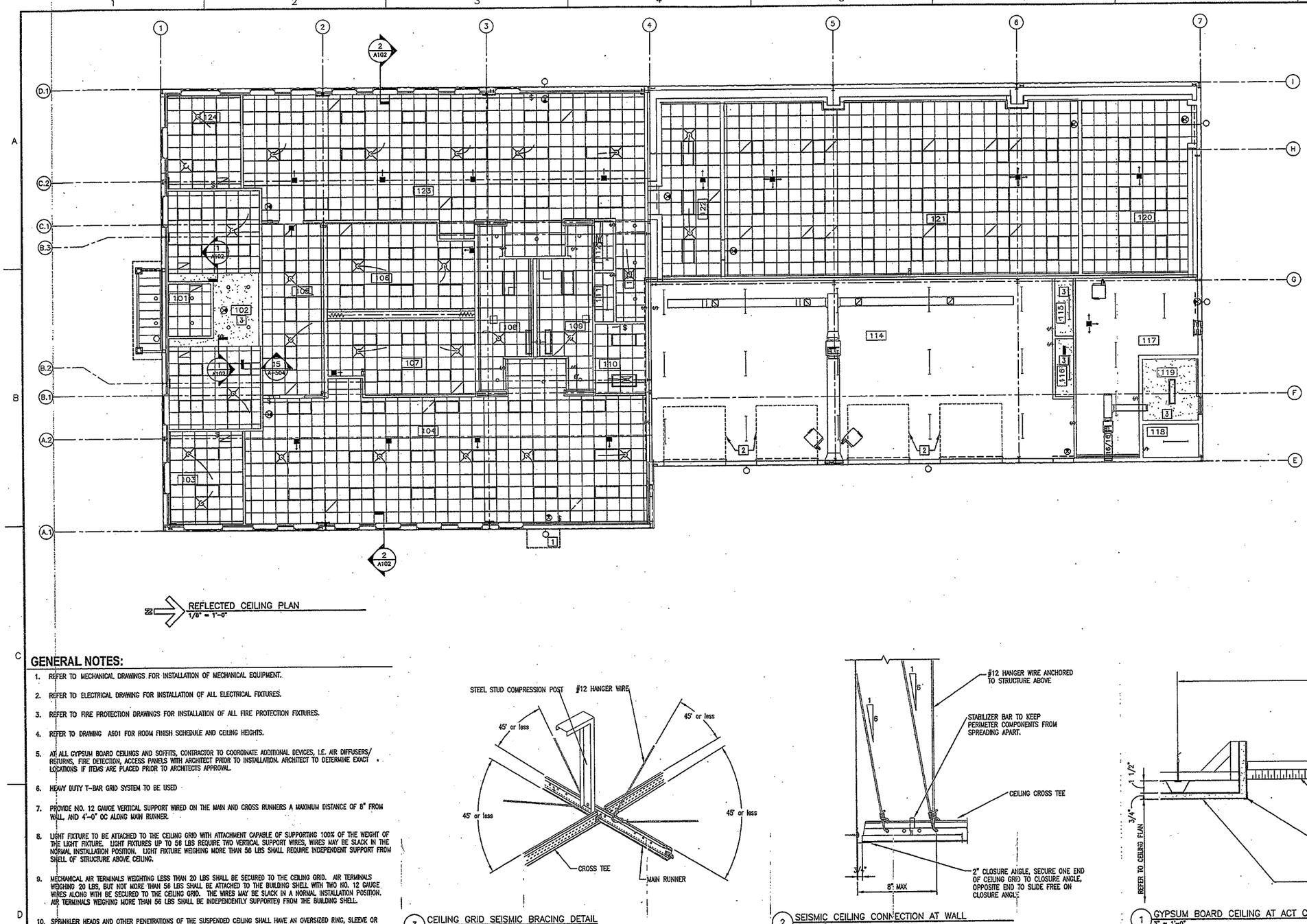
DATE: 6/10/09

FLOOR PLAN
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

DRAWING NO. A101



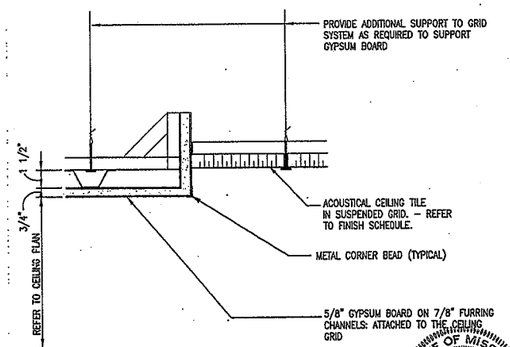
2 A102 REFLECTED CEILING PLAN
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO MECHANICAL DRAWINGS FOR INSTALLATION OF MECHANICAL EQUIPMENT.
2. REFER TO ELECTRICAL DRAWING FOR INSTALLATION OF ALL ELECTRICAL FIXTURES.
3. REFER TO FIRE PROTECTION DRAWINGS FOR INSTALLATION OF ALL FIRE PROTECTION FIXTURES.
4. REFER TO DRAWING A501 FOR ROOM FINISH SCHEDULE AND CEILING HEIGHTS.
5. AT ALL GYPSUM BOARD CEILINGS AND SOFFITS, CONTRACTOR TO COORDINATE ADDITIONAL DEVICES, I.E. AIR DIFFUSERS/ RETURNS, FIRE DETECTION, ACCESS PANELS WITH ARCHITECT PRIOR TO INSTALLATION. ARCHITECT TO DETERMINE EXACT LOCATIONS IF ITEMS ARE PLACED PRIOR TO ARCHITECTS APPROVAL.
6. HEAVY DUTY T-BAR GRID SYSTEM TO BE USED
7. PROVIDE NO. 12 GAUGE VERTICAL SUPPORT WIRED ON THE MAIN AND CROSS RUNNERS A MAXIMUM DISTANCE OF 8' FROM WALL, AND 4'-0" OC ALONG MAIN RUNNER.
8. LIGHT FIXTURE TO BE ATTACHED TO THE CEILING GRID WITH ATTACHMENT CAPABLE OF SUPPORTING 100% OF THE WEIGHT OF THE LIGHT FIXTURE. LIGHT FIXTURES UP TO 56 LBS REQUIRE TWO VERTICAL SUPPORT WIRES, WIRES MAY BE SLACK IN THE NORMAL INSTALLATION POSITION. LIGHT FIXTURE WEIGHING MORE THAN 56 LBS SHALL REQUIRE INDEPENDENT SUPPORT FROM SHELL OF STRUCTURE ABOVE CEILING.
9. MECHANICAL AIR TERMINALS WEIGHTING LESS THAN 20 LBS SHALL BE SECURED TO THE CEILING GRID. AIR TERMINALS WEIGHING 20 LBS, BUT NOT MORE THAN 56 LBS SHALL BE ATTACHED TO THE BUILDING SHELL WITH TWO NO. 12 GAUGE WIRES ALONG WITH BE SECURED TO THE CEILING GRID. THE WIRES MAY BE SLACK IN A NORMAL INSTALLATION POSITION. AIR TERMINALS WEIGHING MORE THAN 56 LBS SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING SHELL.
10. SPRINKLER HEADS AND OTHER PENETRATIONS OF THE SUSPENDED CEILING SHALL HAVE AN OVERSIZED RING, SLEEVE OR ADAPTOR THROUGH THE CEILING TILE TO ALLOW FREE MOVEMENT OF AT LEAST 1" IN ALL HORIZONTAL DIRECTIONS.
11. CONSTRUCTION TO A SEISMIC ZONE "D" STANDARD OR HIGHER. REFER TO DETAILS 2,3 ON THIS SHEET FOR CEILING GRID INSTALLATION.

3 CEILING GRID SEISMIC BRACING DETAIL
1" = 1'-0"

2 SEISMIC CEILING CONNECTION AT WALL
3" = 1'-0"



1 GYPSUM BOARD CEILING AT ACT CEILING
3" = 1'-0"

CONSTRUCTION NOTES:

1. METAL AWNINGS ABOVE. REFER TO ELEVATION FOR MORE INFORMATION.
2. OVERHEAD DOOR TRACK
3. GYPSUM BOARD CEILING

LEGEND

- HVAC SUPPLY GRILLE
- HVAC RETURN GRILLE
- DOWN LIGHT
- 24" x 48" LAY IN LIGHT FIXTURE
- SPRINKLER HEAD
- CEILING MOUNTED MOTION SENSOR
- 48" SUSPENDED OR SURFACE MOUNTED LIGHT FIXTURE
- CEILING MOUNTED EXIT LIGHT

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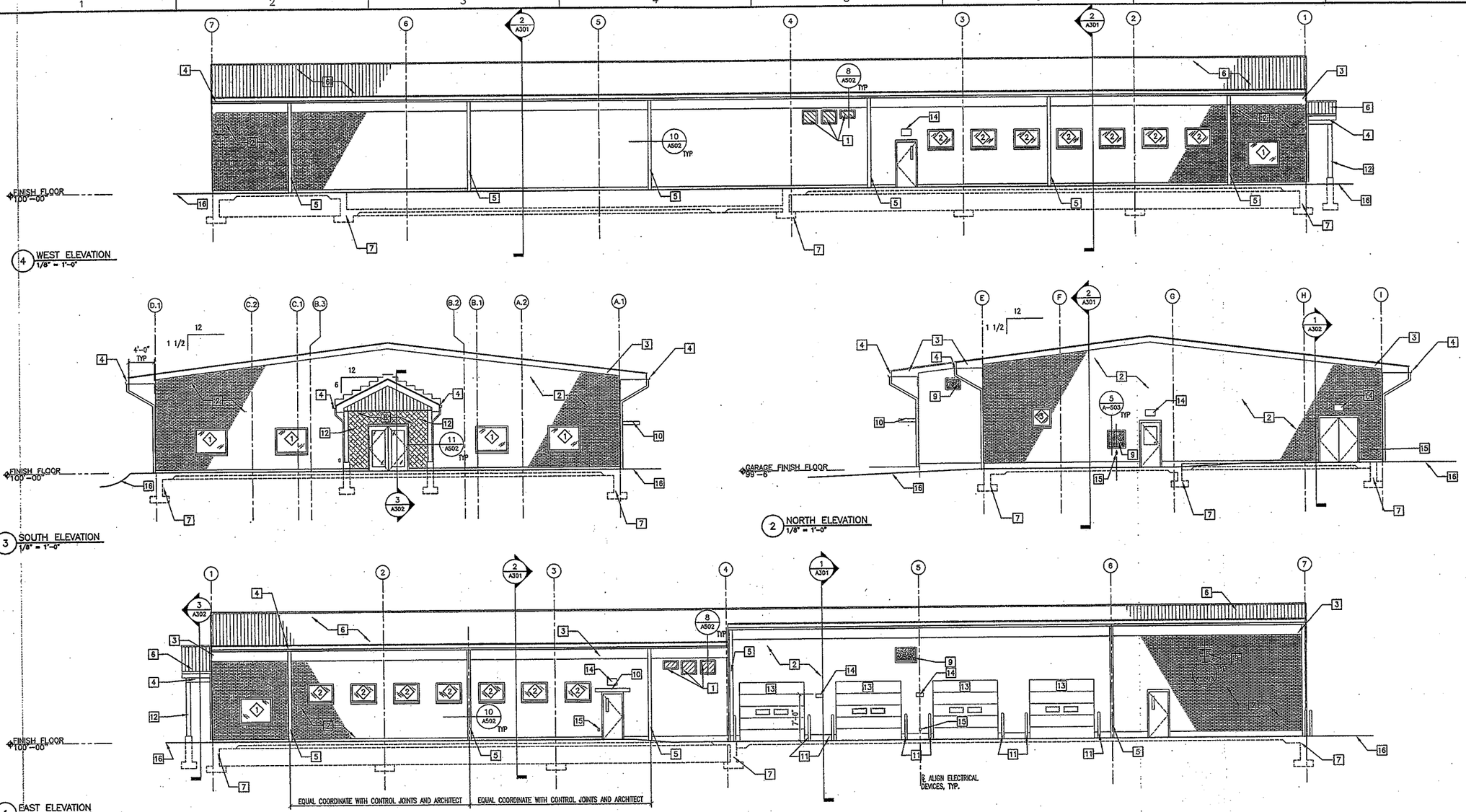
REFLECTED CEILING PLAN
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A102

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A-2005037
REGISTERED ARCHITECT



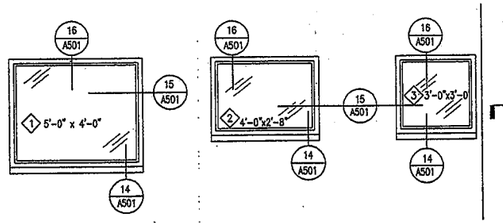
GENERAL NOTES:

1. CLEAN ALL EXTERIOR SURFACES AFTER COMPLETION OF EXTERIOR MASONRY WORK.
2. REFER TO MECHANICAL PLAN FOR LOCATION AND SIZES OF MECHANICAL UNITS.
3. FOR TYPICAL JOINT DETAIL OF THIN BRICK VENEER SYSTEM, REFER TO 5/A502.

CONSTRUCTION NOTES:

1. DUCT PENETRATION; REFER TO MECHANICAL DRAWINGS FOR SIZES AND EXACT LOCATION.
2. THIN BRICK VENEER PANEL SYSTEM; SECURE TO BUILDING PER MANUFACTURERS WRITTEN INSTRUCTIONS
3. PREFINISHED FASCIA BY METAL BUILDING MANUFACTURER
4. PREFINISHED METAL GUTTERS BY METAL BUILDING MANUFACTURER
5. PREFINISHED METAL DOWNSPOUTS BY METAL BUILDING MANUFACTURER, TIE INTO UNDER GROUND DRAINAGE SYSTEM, REFER TO CIVIL DRAWINGS. COORDINATE FINAL LOCATION OF DOWNSPOUTS WITH ARCHITECT.
6. METAL STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
7. FOOTINGS AND FOUNDATIONS SHOWN DASHED, REFER TO STRUCTURAL DRAWINGS FOR SIZES
8. THIN STONE VENEER PANELS; SECURE TO BUILDING PER MANUFACTURERS WRITTEN INSTRUCTIONS
9. EXHAUST VENT, REFER TO MECHANICAL DRAWINGS FOR EXACT SIZE AND LOCATION. REFER TO DETAIL 8/A502 FOR FLASHING DETAILS
10. METAL AWNINGS BY BUILDING MANUFACTURER.
11. BOLLARD, REFER TO FLOOR PLANS
12. STEEL TUBE COLUMN ON CONCRETE PIERS, REFER TO CROSS SECTION OF CANOPY ON 3/A302
13. 10'-0"X 9'-0" SECTIONAL OVERHEAD DOOR.
14. EXTERIOR SURFACE MOUNT LIGHT FIXTURE. REFER TO ELECTRICAL DRAWINGS.
15. EXTERIOR SURFACE ELECTRICAL DEVICE. REFER TO ELECTRICAL DRAWINGS.
16. FINISH GRADE, REFER TO CIVIL PLANS.

WINDOW TYPES



ELEVATION LEGEND

- WINDOW TAG
- CONSTRUCTION NOTE
- SECTION NUMBER / SECTION SHEET

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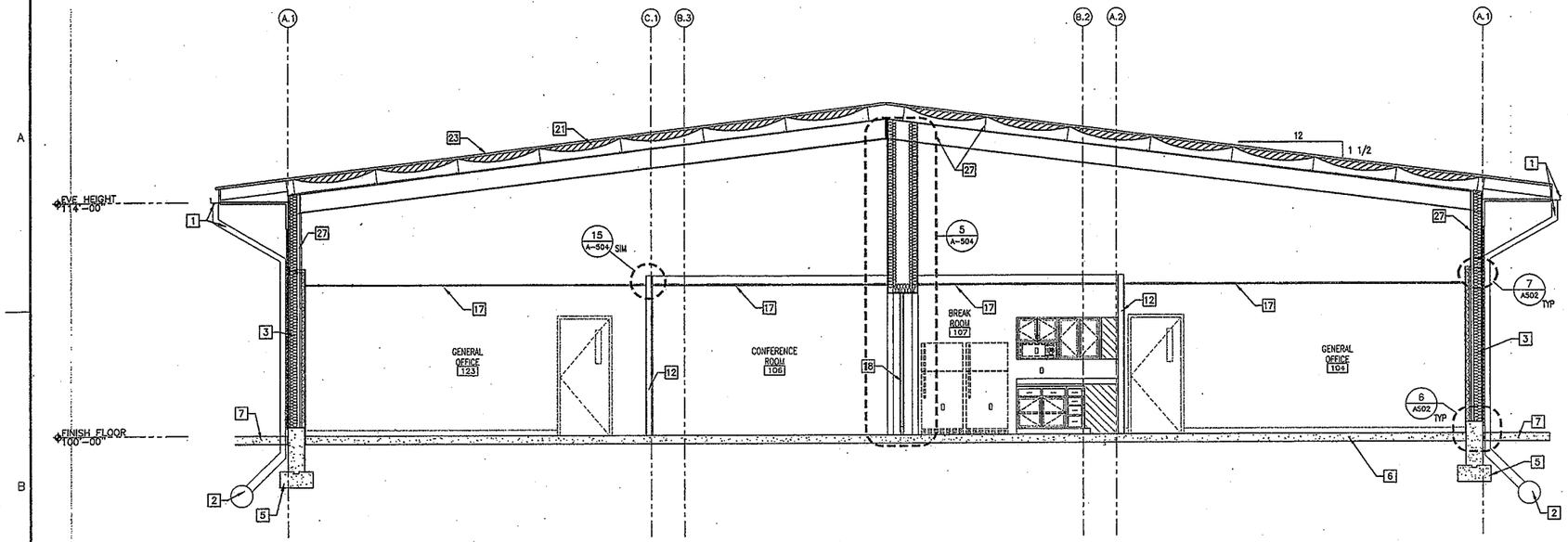
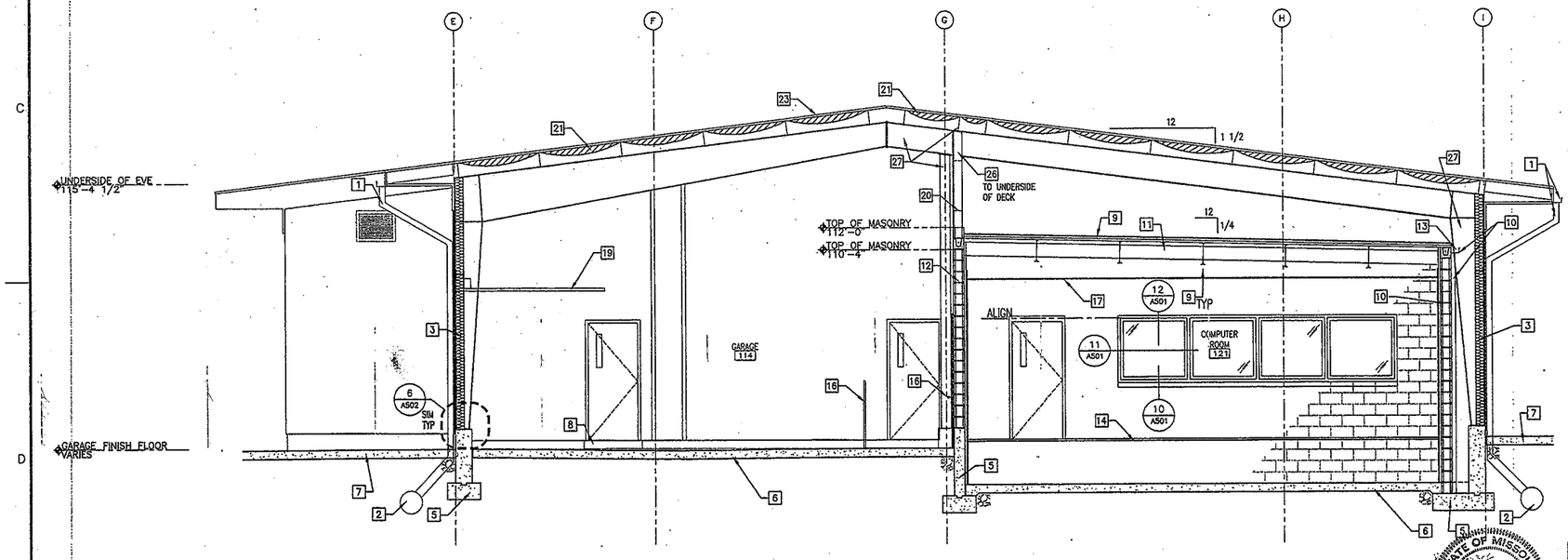
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A201



2 CROSS SECTION LOOKING NORTH @ OFFICE
1/4" = 1'-0"



1 CROSS SECTION LOOKING NORTH @ GARAGE
1/4" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER. COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
6. 6" CONCRETE SLAB ON GRAVEL BASE. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. 6" CONCRETE PAD ON GRAVEL BASE. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
8. CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
9. 1 1/2" HIGH DENSITY INSULATED METAL DECKING ON STEEL BAR JOIST. REFER TO STRUCTURAL DRAWINGS.
10. PREFINISHED 2x4 GUTTER & 4" DOWNSPOUT, REFER TO SPECIFICATIONS.
11. STEEL BEAM, REFER TO STRUCTURAL DRAWINGS.
12. INTERIOR WALL SYSTEM REFER TO PARTITION TYPES OF SHEET A-601.
13. RAIN WATER DETECTION SYSTEM, REFER TO ELECTRONICS DRAWINGS BY EDF
14. RAISED FLOOR, REFER TO ACCESS FLOOR DRAWINGS.
15. STEEL LENTIL, REFER TO STRUCTURAL DRAWINGS.
16. 1 1/2" ø PAINTED METAL RAILING, REFER TO INTERIOR ELEVATIONS.
17. FINISHED CEILING, REFER TO FINISH SCHEDULE ON SHEET A-601.
18. FOLDING PARTITION ON AN OVERHEAD TRACK, REFER TO SPECIFICATIONS.
19. OVERHEAD ROLLING DOOR TRACKS, REFER TO DOOR SCHEDULE ON SHEET A-602, AND SPECIFICATIONS.
20. METAL ACCESS PANEL, REFER TO SPECIFICATIONS AND DETAIL 8/A-504.
21. ROOF INSULATION BY METAL BUILDING MANUFACTURER
22. CMU BOND BEAM, REFER TO STRUCTURAL DRAWINGS.
23. STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
24. 6" METAL STUD WITH BATT INSULATION
25. 8" CMU BLOCK WALL
26. 3-5/8" METAL STUD WITH (1) SIDE 5/8" GYPSUM BOARD.
27. STRUCTURE BY PREFABRICATED METAL BUILDING MANUFACTURER
28. 7/8" HAT CHANNEL WITH 3/4" PLYWOOD WAINSCOT. REFER TO FINISH PLANS ON A-601, AND ELEVATION ON 7/A402.
29. THIN BRICK VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
30. 3 5/8" METAL STUD WITH BATT INSULATION AND (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601.
31. 10" PREFINISHED METAL TRIM BY METAL BUILDING MANUFACTURER.
32. PREFINISHED METAL SOFFIT WITH MATCHING SOFFIT VENTS @ 4'-0" O.C., BY METAL BUILDING MANUFACTURER
33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
34. 5/8" GYPSUM BOARD WITH VAPOR BARRIER ON 1 1/2" 25 GAUGE METAL FRAMING CHANNELS @ 16" OC
35. 1 1/2" HIGH DENSITY RIGID FOAM INSULATION GLUE TO MASONRY WALL OR METAL DECK WHERE SHOWN ON PLANS
36. 5/8" GYPSUM BOARD CEILING, REFER TO REFLECTED CEILING PLAN ON SHEET A-102.
37. 12x12x48 CONCRETE PIER ON 36X36X12 CONCRETE FOOTING
38. 8" 16 GA METAL JOIST @ 16" O.C.
39. 3/4" PLYWOOD DECK SCREWED TO METAL JOIST.
40. 8x8x3/8" PAINTED TUBE STEEL COLUMN ON AT 10x10x3/8" PLATE BOLTED TO CONCRETE PIER
41. 6x4x3/8" HOLLOW METAL TUBE STEEL WELDED TO COLUMN.
42. 6" 16 GA METAL RAFTERS/JOIST @ 16" O.C.
43. 3x3x4 METAL CLIP ANGLE WELDED TO TUBE STEEL
44. FIRE CAULK AS REQUIRED AT ALL DECK, SLAB EDGES, AND POINTS OF PENETRATION (BOTH SIDES).
45. (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601. USE CORNER BEADS AT ALL OUTER CORNERS, TYPICAL.
46. THIN STONE VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
47. VERTICAL RIBBED METAL SIDING, REFER TO SPECIFICATIONS.
48. 3/4" ANCHOR BOLTS WITH MIN 6" EMBEDMENT, TYPICAL.
49. STEPPED FLASHING WITH COUNTER FLASHING
50. SEALANT TYPICAL.
51. BUILDING WRAP ON 3/4" SHEATHING, REFER TO WALL SECTIONS ON SHEETS A301-A305.
52. 6x6x3/8" PAINTED TUBE STEEL COLUMN WELDED TO 8x8x3/8" PLATE BOLTED TO CONCRETE FOUNDATION.

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STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER AR006255
REGISTERED ARCHITECT

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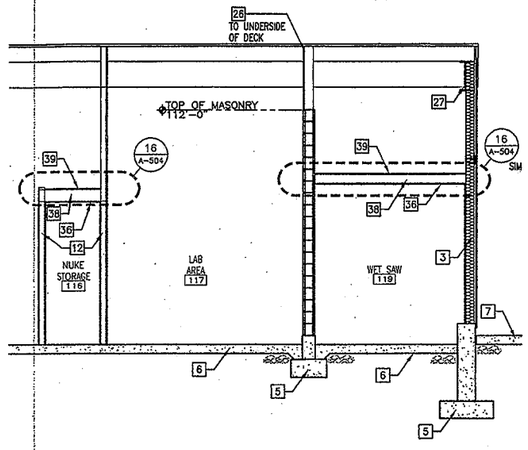
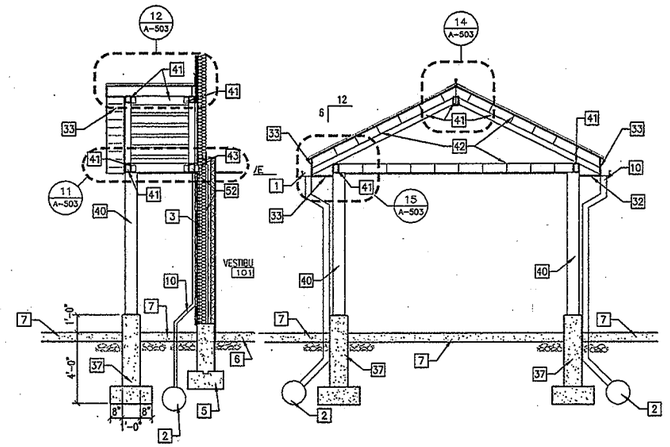
PROJECT NO. 08074
DRAWING NO. A301



4 SECTION @ WET SAW 119, LAB AREA 117, NUKE STORAGE 116
1/4" = 1'-0"



3 CROSS SECTION OF CANOPY
1/4" = 1'-0"

2 CROSS SECTION OF CANOPY
1/4" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER, COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
6. 6" CONCRETE SLAB ON GRAVEL BASE. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. 6" CONCRETE PAD ON GRAVEL BASE. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
8. CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
9. 1 1/2" HIGH DENSITY INSULATED METAL DECKING ON STEEL BAR JOIST. REFER TO STRUCTURAL DRAWINGS.
10. PREFINISHED 2x4 GUTTER & 4" DOWNSPOUT, REFER TO SPECIFICATIONS.
11. STEEL BEAM, REFER TO STRUCTURAL DRAWINGS.
12. INTERIOR WALL SYSTEM REFER TO PARTITION TYPES OF SHEET A-601.
13. RAIN WATER DETECTION SYSTEM, REFER TO ELECTRONICS DRAWINGS BY EDF
14. RAISED FLOOR, REFER TO ACCESS FLOOR DRAWINGS.
15. STEEL LENTIL, REFER TO STRUCTURAL DRAWINGS.
16. 1 1/2" ø PAINTED METAL RAILING, REFER TO INTERIOR ELEVATIONS.
17. FINISHED CEILING, REFER TO FINISH SCHEDULE ON SHEET A-601.
18. FOLDING PARTITION ON AN OVERHEAD TRACK, REFER TO SPECIFICATIONS.
19. OVERHEAD ROLLING DOOR TRACKS, REFER TO DOOR SCHEDULE ON SHEET A-602, AND SPECIFICATIONS.
20. METAL ACCESS PANEL, REFER TO SPECIFICATIONS AND DETAIL 8/A-504.
21. ROOF INSULATION BY METAL BUILDING MANUFACTURER
22. CMU BOND BEAM, REFER TO STRUCTURAL DRAWINGS.
23. STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
24. 6" METAL STUD WITH BATT INSULATION
25. 8" CMU BLOCK WALL
26. 3-5/8" METAL STUD WITH (1) SIDE 5/8" GYPSUM BOARD.
27. STRUCTURE BY PREFABRICATED METAL BUILDING MANUFACTURER
28. 7/8" HAT CHANNEL WITH 3/4" PLYWOOD WAINSCOT. REFER TO FINISH PLANS ON A-601, AND ELEVATION ON 7/A402.
29. THIN BRICK VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
30. 3 5/8" METAL STUD WITH BATT INSULATION AND (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601.
31. 10" PREFINISHED METAL TRIM BY METAL BUILDING MANUFACTURER.
32. PREFINISHED METAL SOFFIT WITH MATCHING SOFFIT VENTS @ 4'-0" O.C., BY METAL BUILDING MANUFACTURER
33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
34. 5/8" GYPSUM BOARD WITH VAPOR BARRIER ON 1 1/2" 25 GAUGE METAL FRAMING CHANNELS @ 16" OC
35. 1 1/2" HIGH DENSITY RIGID FOAM INSULATION GLUE TO MASONRY WALL OR METAL DECK WHERE SHOWN ON PLANS
36. 5/8" GYPSUM BOARD CEILING, REFER TO REFLECTED CEILING PLAN ON SHEET A-102.
37. 12x12x48 CONCRETE PIER ON 36X36X12 CONCRETE FOOTING
38. 8" 16 GA METAL JOIST @ 16" O.C.
39. 3/4" PLYWOOD DECK SCREWED TO METAL JOIST.
40. 8x8x3/8" PAINTED TUBE STEEL COLUMN ON AT 10x10x3/8" PLATE BOLTED TO CONCRETE PIER
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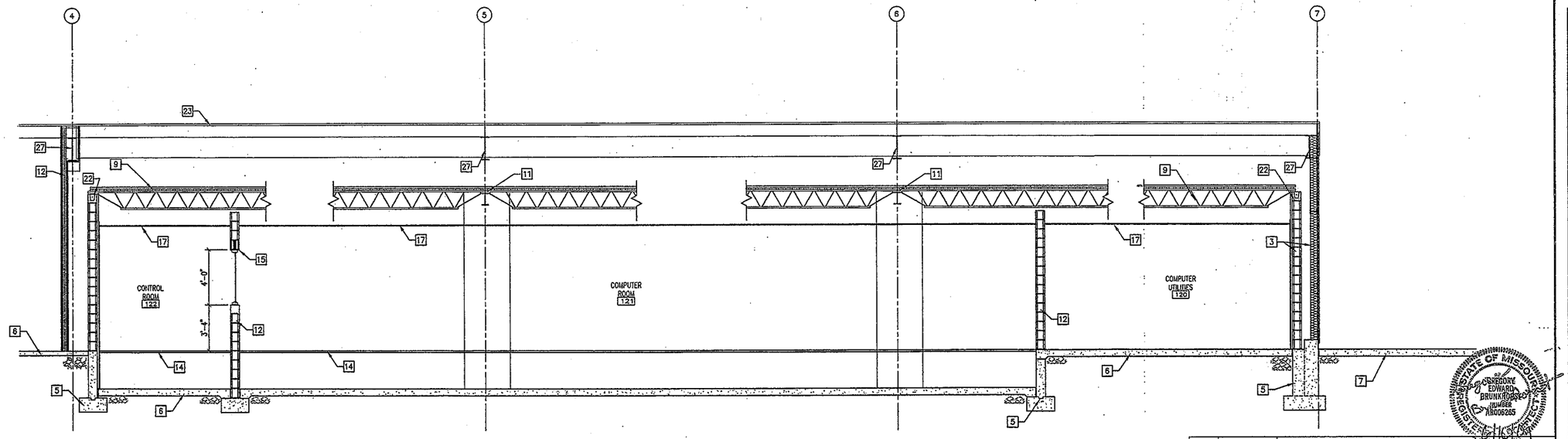
43. 3x3x4 METAL CLIP ANGLE WELDED TO TUBE STEEL
44. FIRE CAULK AS REQUIRED AT ALL DECK, SLAB EDGES, AND POINTS OF PENETRATION (BOTH SIDES).
45. (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601. USE CORNER BEADS AT ALL OUTER CORNERS, TYPICAL.
46. THIN STONE VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
47. VERTICAL RIBBED METAL SIDING, REFER TO SPECIFICATIONS.
48. 3/4" ANCHOR BOLTS WITH MIN 6" EMBEDMENT, TYPICAL.
49. STEPPED FLASHING WITH COUNTER FLASHING
50. SEALANT TYPICAL.
51. BUILDING WRAP ON 3/4" SHEATHING, REFER TO WALL SECTIONS ON SHEETS A301-A305.
52. 6x6x3/8" PAINTED TUBE STEEL COLUMN WELDED TO 8x8x3/8" PLATE BOLTED TO CONCRETE FOUNDATION.



1 CROSS SECTION LOOKING EAST @ DATA CENTER
1/4" = 1'-0"

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

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MoDOT

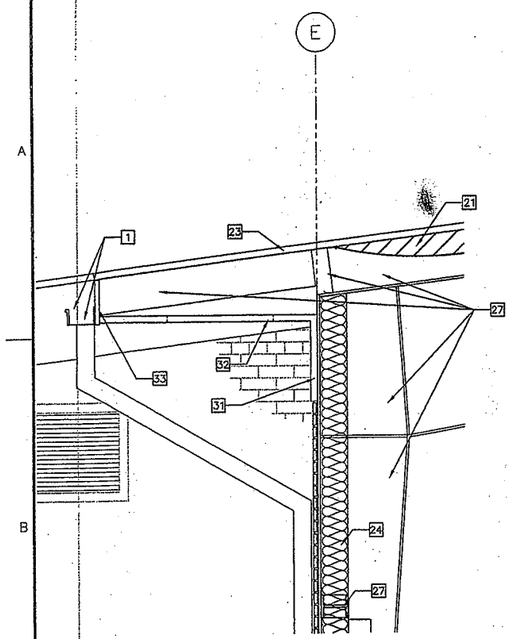
DRAWN BY: CAC
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

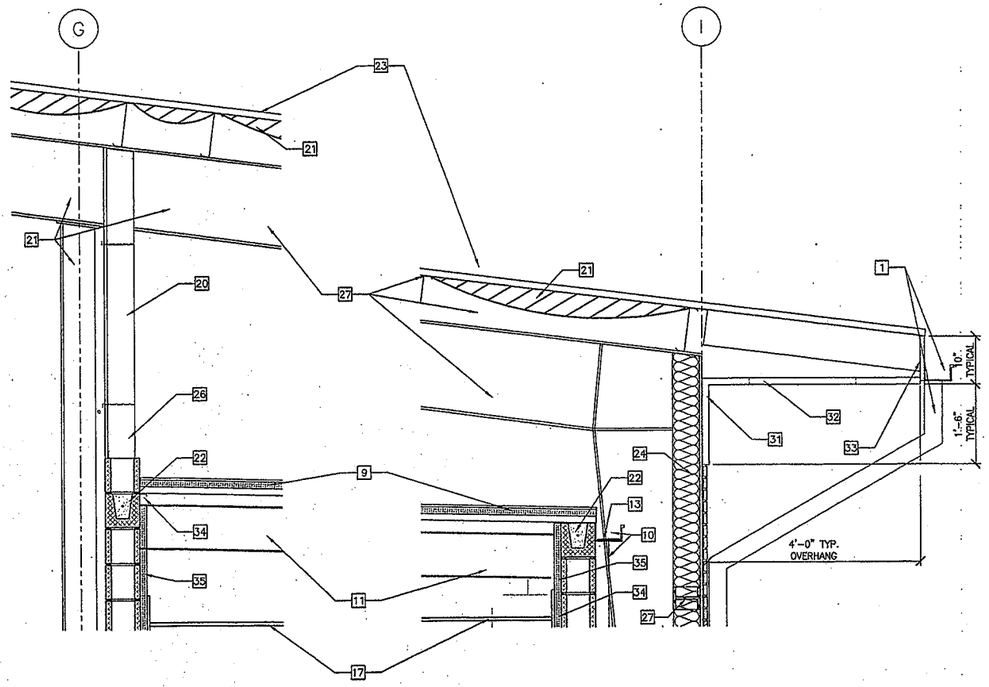
BUILDING SECTIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

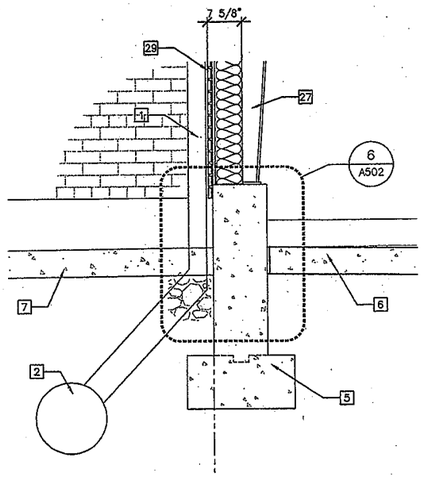
PROJECT NO. 08074

DRAWING NO. A302

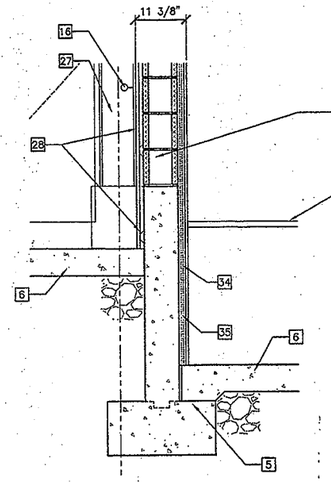
STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A-2005265
REGISTERED ARCHITECT



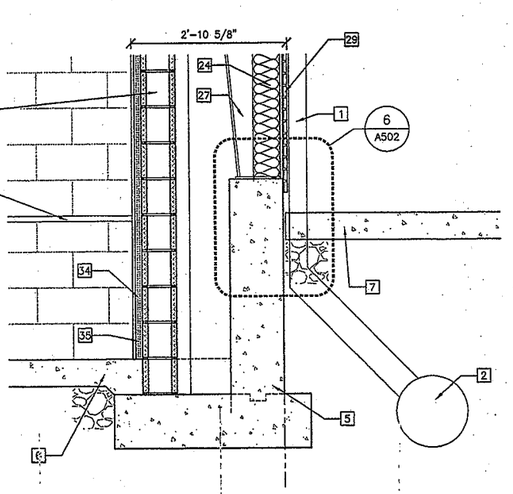




3 EAST WALL SECTION @ GARAGE 114
3/4" = 1'-0"



2 EAST WALL SECTION @ COMPUTER ROOM 121
3/4" = 1'-0"



1 WEST WALL SECTION @ COMPUTER ROOM 121
3/4" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER, COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
6. 6" CONCRETE SLAB ON GRAVEL BASE. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. 6" CONCRETE PAD ON GRAVEL BASE. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
8. CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
9. 1 1/2" HIGH DENSITY INSULATED METAL DECKING ON STEEL BAR JOIST. REFER TO STRUCTURAL DRAWINGS.
10. PREFINISHED 2x4 GUTTER & 4" DOWNSPOUT, REFER TO SPECIFICATIONS.
11. STEEL BEAM, REFER TO STRUCTURAL DRAWINGS.
12. INTERIOR WALL SYSTEM REFER TO PARTITION TYPES OF SHEET A-601.
13. RAIN WATER DETECTION SYSTEM, REFER TO ELECTRONICS DRAWINGS BY EDF
14. RAISED FLOOR, REFER TO ACCESS FLOOR DRAWINGS.
15. STEEL LENTIL, REFER TO STRUCTURAL DRAWINGS.
16. 1 1/2" ø PAINTED METAL RAILING, REFER TO INTERIOR ELEVATIONS.
17. FINISHED CEILING, REFER TO FINISH SCHEDULE ON SHEET A-601.
18. FOLDING PARTITION ON AN OVERHEAD TRACK, REFER TO SPECIFICATIONS.
19. OVERHEAD ROLLING DOOR TRACKS, REFER TO DOOR SCHEDULE ON SHEET A-602, AND SPECIFICATIONS.
20. METAL ACCESS PANEL, REFER TO SPECIFICATIONS AND DETAIL 8/A-504.
21. ROOF INSULATION BY METAL BUILDING MANUFACTURER
22. CMU BOND BEAM, REFER TO STRUCTURAL DRAWINGS.
23. STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
24. 6" METAL STUD WITH BATT INSULATION
25. 8" CMU BLOCK WALL
26. 3-5/8" METAL STUD WITH (1) SIDE 5/8" GYPSUM BOARD.
27. STRUCTURE BY PREFABRICATED METAL BUILDING MANUFACTURER
28. 7/8" HAT CHANNEL WITH 3/4" PLYWOOD WAINSCOT. REFER TO FINISH PLANS ON A-601, AND ELEVATION ON 7/A402.
29. THIN BRICK VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
30. 3 5/8" METAL STUD WITH BATT INSULATION AND (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601.
31. 10" PREFINISHED METAL TRIM BY METAL BUILDING MANUFACTURER.
32. PREFINISHED METAL SOFFIT WITH MATCHING SOFFIT VENTS @ 4'-0" O.C., BY METAL BUILDING MANUFACTURER
33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
34. 5/8" GYPSUM BOARD WITH VAPOR BARRIER ON 1 1/2" 25 GAUGE METAL FRAMING CHANNELS @ 16" OC
35. 1 1/2" HIGH DENSITY RIGID FOAM INSULATION GLUE TO MASONRY WALL OR METAL DECK WHERE SHOWN ON PLANS
36. 5/8" GYPSUM BOARD CEILING, REFER TO REFLECTED CEILING PLAN ON SHEET A-102.
37. 12x12x48 CONCRETE PIER ON 36X36X12 CONCRETE FOOTING
38. 8" 16 GA METAL JOIST @ 16" O.C.
39. 3/4" PLYWOOD DECK SCREWED TO METAL JOIST.
40. 8x8x3/8" PAINTED TUBE STEEL COLUMN ON AT 10x10x3/8" PLATE BOLTED TO CONCRETE PIER
41. 6x4x3/8" HOLLOW METAL TUBE STEEL WELDED TO COLUMN.
42. 6" 16 GA METAL RAFFERS/JOIST @ 16" O.C.
43. 3x3x4 METAL CLIP ANGLE WELDED TO TUBE STEEL
44. FIRE CAULK AS REQUIRED AT ALL DECK, SLAB EDGES, AND POINTS OF PENETRATION (BOTH SIDES).
45. (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601. USE CORNER BEADS AT ALL OUTER CORNERS, TYPICAL.
46. THIN STONE VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
47. VERTICAL RIBBED METAL SIDING, REFER TO SPECIFICATIONS.
48. 3/4" ANCHOR BOLTS WITH MIN 6" EMBEDMENT, TYPICAL.
49. STEPPED FLASHING WITH COUNTER FLASHING
50. SEALANT TYPICAL.
51. BUILDING WRAP ON 3/4" SHEATHING, REFER TO WALL SECTIONS ON SHEETS A301-A305.
52. 6x6x3/8" PAINTED TUBE STEEL COLUMN WELDED TO 8x8x3/8" PLATE BOLTED TO CONCRETE FOUNDATION.

STATE OF MISSOURI
GREGORY EDWARD BRUNNWORTH
ENGINEER
AR006265
REGISTERED PROFESSIONAL

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
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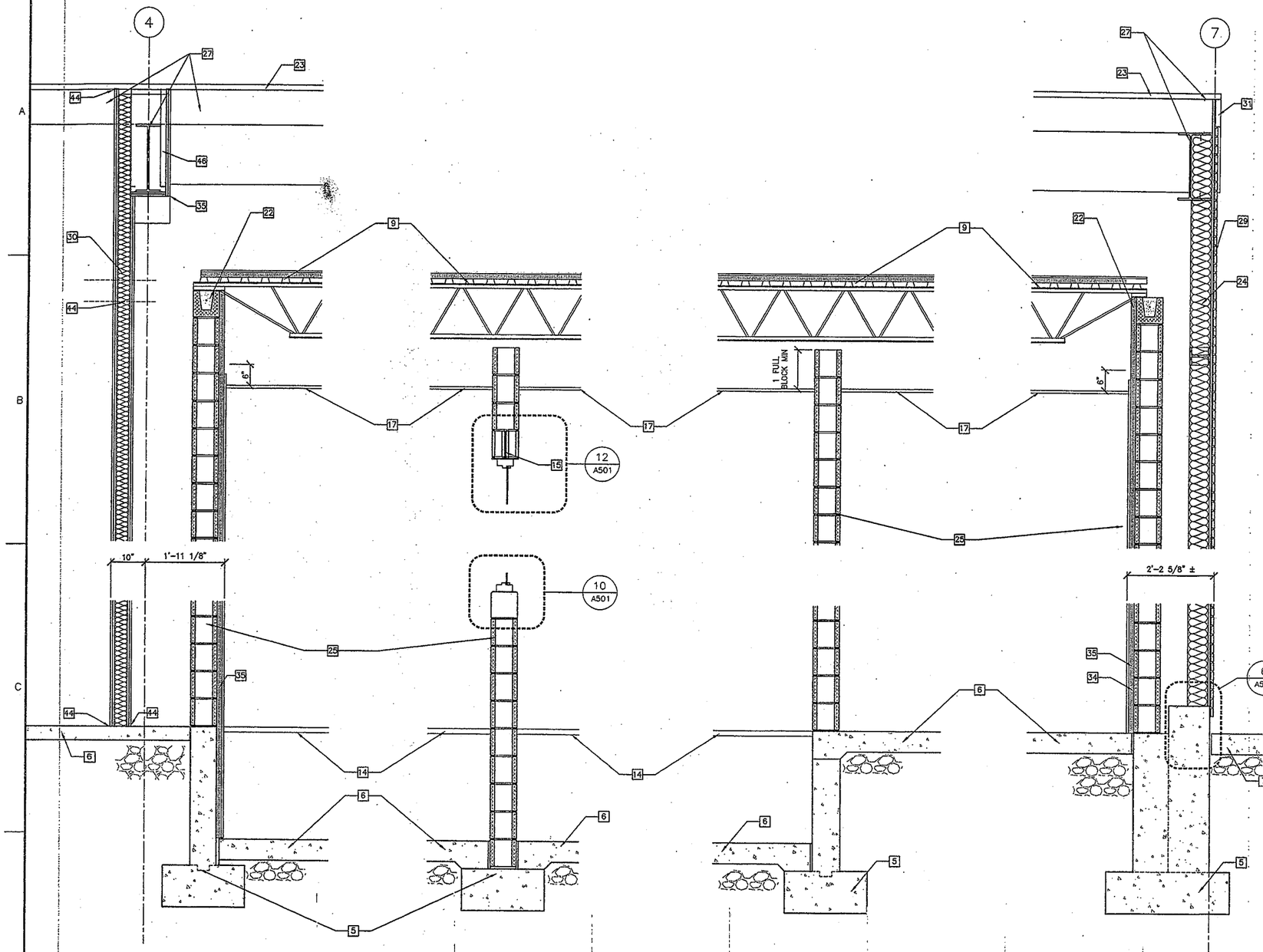
SCALE: AS SHOWN
DATE: 6/10/09

WALL SECTIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A303



4 NORTH WALL SECTION @ GENERAL OFFICE 123
3/4" = 1'-0"

3 NORTH WALL SECTION @ CONTROL ROOM 122
3/4" = 1'-0"

2 NORTH WALL SECTION @ COMPUTER ROOM 121
3/4" = 1'-0"

1 NORTH WALL SECTION @ COMPUTER UTILITES 120
3/4" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER, COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
6. 6" CONCRETE SLAB ON GRAVEL BASE. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. 6" CONCRETE PAD ON GRAVEL BASE. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
8. CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
9. 1 1/2" HIGH DENSITY INSULATED METAL DECKING ON STEEL BAR JOIST. REFER TO STRUCTURAL DRAWINGS.
10. PREFINISHED 2x4 GUTTER & 4" DOWNSPOUT, REFER TO SPECIFICATIONS.
11. STEEL BEAM, REFER TO STRUCTURAL DRAWINGS.
12. INTERIOR WALL SYSTEM REFER TO PARTITION TYPES OF SHEET A-601.
13. RAIN WATER DETECTION SYSTEM, REFER TO ELECTRONICS DRAWINGS BY EDF
14. RAISED FLOOR, REFER TO ACCESS FLOOR DRAWINGS.
15. STEEL LENTIL, REFER TO STRUCTURAL DRAWINGS.
16. 1 1/2" ø PAINTED METAL RAILING, REFER TO INTERIOR ELEVATIONS.
17. FINISHED CEILING, REFER TO FINISH SCHEDULE ON SHEET A-601.
18. FOLDING PARTITION ON AN OVERHEAD TRACK, REFER TO SPECIFICATIONS.
19. OVERHEAD ROLLING DOOR TRACKS, REFER TO DOOR SCHEDULE ON SHEET A-602, AND SPECIFICATIONS.
20. METAL ACCESS PANEL, REFER TO SPECIFICATIONS AND DETAIL 8/A-504.
21. ROOF INSULATION BY METAL BUILDING MANUFACTURER
22. CMU BOND BEAM, REFER TO STRUCTURAL DRAWINGS.
23. STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
24. 6" METAL STUD WITH BATT INSULATION
25. 8" CMU BLOCK WALL
26. 3-5/8" METAL STUD WITH (1) SIDE 5/8" GYPSUM BOARD.
27. STRUCTURE BY PREFABRICATED METAL BUILDING MANUFACTURER
28. 7/8" HAT CHANNEL WITH 3/4" PLYWOOD WAINSCOT. REFER TO FINISH PLANS ON A-601, AND ELEVATION ON 7/A402.
29. THIN BRICK VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
30. 3 5/8" METAL STUD WITH BATT INSULATION AND (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601.
31. 10" PREFINISHED METAL TRIM BY METAL BUILDING MANUFACTURER.
32. PREFINISHED METAL SOFFIT WITH MATCHING SOFFIT VENTS @ 4'-0" O.C., BY METAL BUILDING MANUFACTURER
33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
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37. 12x12x48 CONCRETE PIER ON 36X36X12 CONCRETE FOOTING
38. 8" 16 GA METAL JOIST @ 16" O.C.
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49. STEPPED FLASHING WITH COUNTER FLASHING
50. SEALANT TYPICAL.
51. BUILDING WRAP ON 3/4" SHEATHING, REFER TO WALL SECTIONS ON SHEETS A301-A305.
52. 6x6x3/8" PAINTED TUBE STEEL COLUMN WELDED TO 8x8x3/8" PLATE BOLTED TO CONCRETE FOUNDATION.

STATE OF MISSOURI
GREGORY EDWARD BRUNSWOST
Number A-2006285
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

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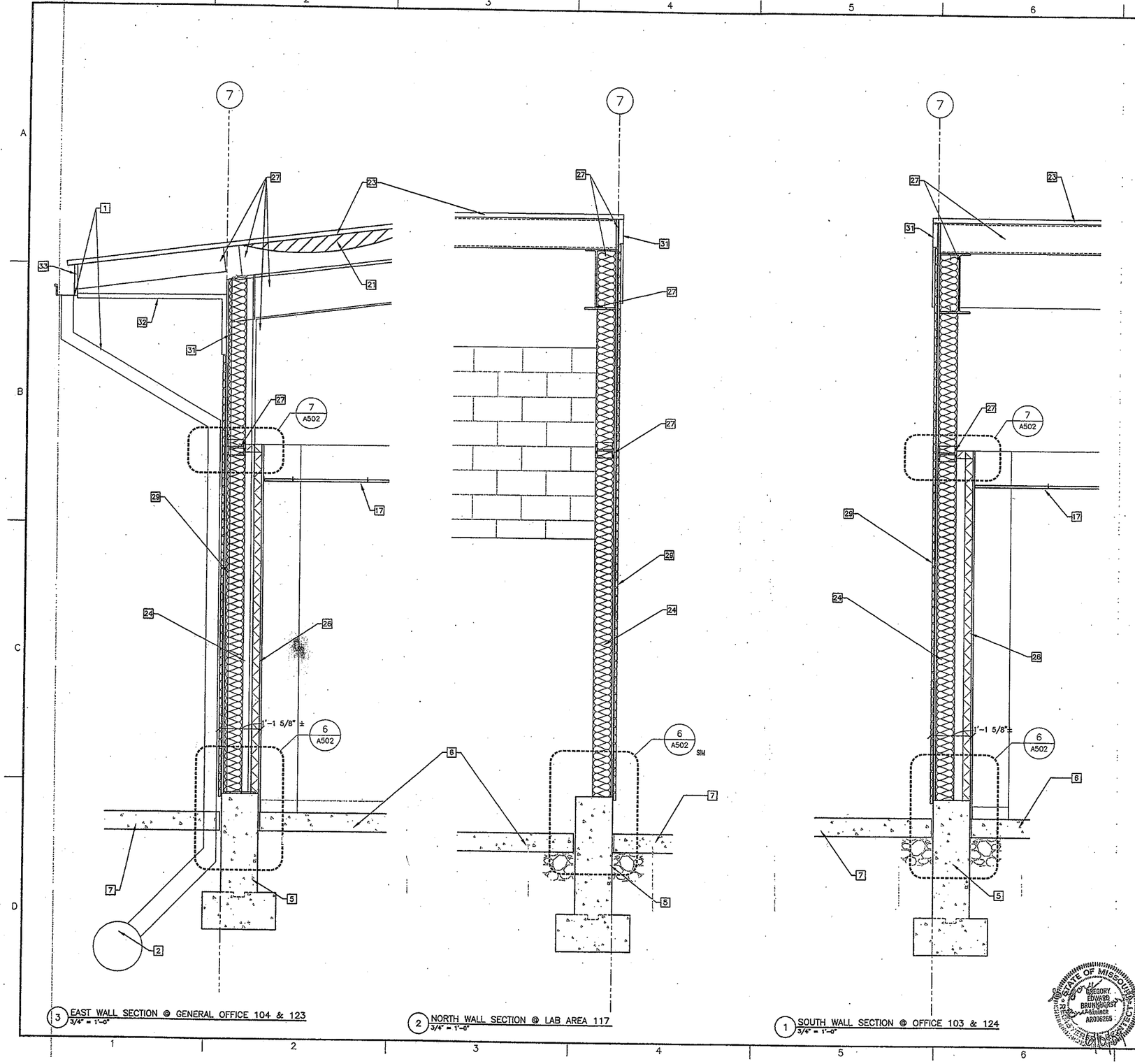
CHECKED BY	DLS
SCALE	AS SHOWN
DATE	6/10/09

WALL SECTIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO.	08074
DRAWING NO.	A304



3 EAST WALL SECTION @ GENERAL OFFICE 104 & 123
3/4" = 1'-0"

2 NORTH WALL SECTION @ LAB AREA 117
3/4" = 1'-0"

1 SOUTH WALL SECTION @ OFFICE 103 & 124
3/4" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER, COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
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33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
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40. 8x8x3/8" PAINTED TUBE STEEL COLUMN ON AT 10x10x3/8" PLATE BOLTED TO CONCRETE PIER
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STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A-2006265
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUE FOR BIDDING	DLS

CDG ENGINEERS
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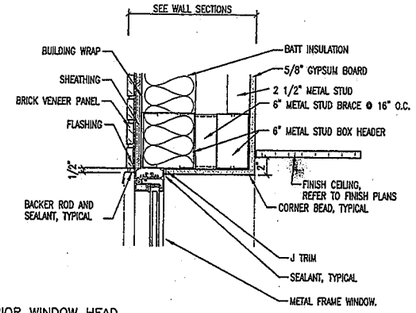
MoDOT

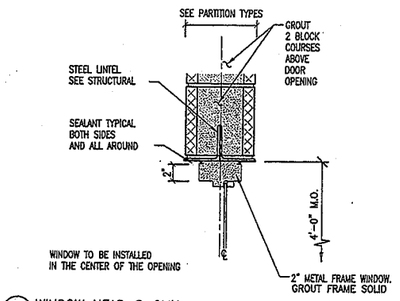
DRAWN BY: CAC
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

WALL SECTIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

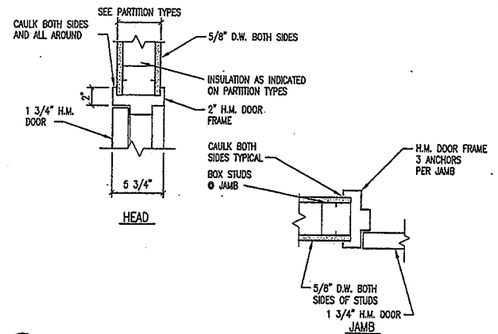
PROJECT NO. 08074
DRAWING NO. A305



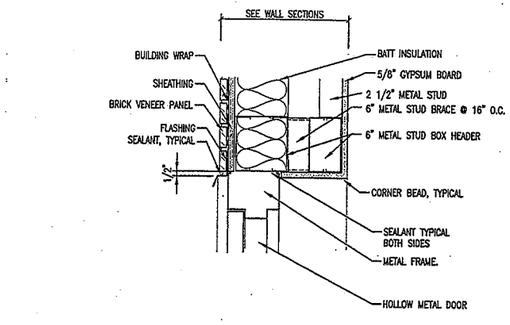
16 EXTERIOR WINDOW HEAD
1 1/2" = 1'-0"



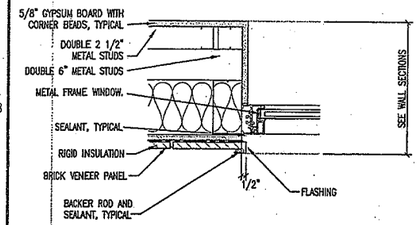
12 WINDOW HEAD @ CMU
1 1/2" = 1'-0"



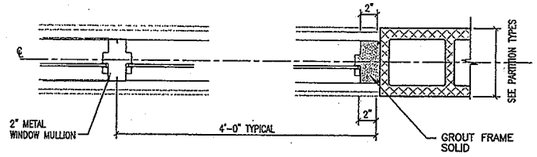
8 HOLLOW METAL DOOR FRAME HEAD AND JAMB DETAILS
1 1/2" = 1'-0"



4 EXTERIOR DOOR HEAD DETAIL
1 1/2" = 1'-0"

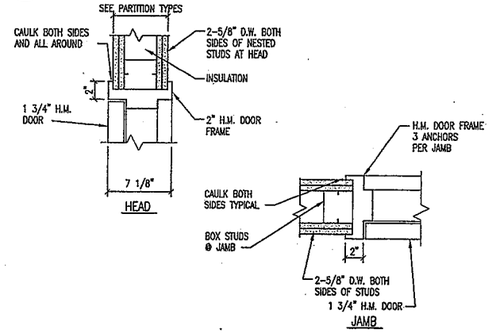


15 EXTERIOR WINDOW JAMB
1 1/2" = 1'-0"

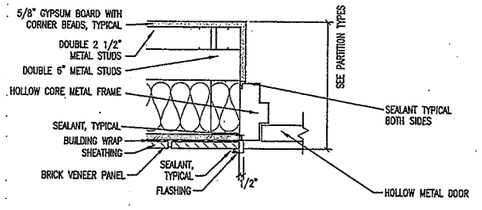


11 WINDOW JAMB/MULLUION @ CMU
1 1/2" = 1'-0"

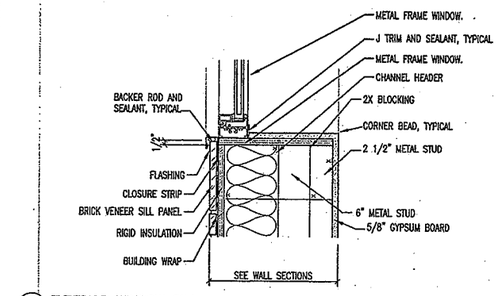
WINDOW TO BE INSTALLED IN THE CENTER OF THE OPENING



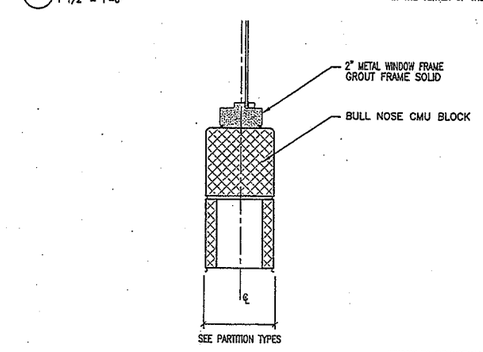
7 HOLLOW METAL DOOR FRAME HEAD AND JAMB DETAILS 2
1 1/2" = 1'-0"



3 EXTERIOR DOOR JAMB DETAIL
1 1/2" = 1'-0"

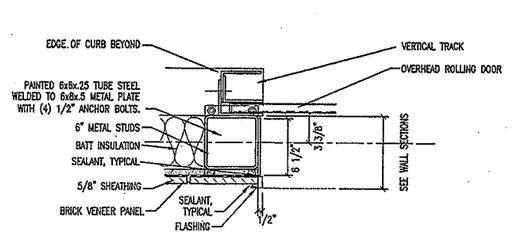


14 EXTERIOR WINDOW SILL
1 1/2" = 1'-0"

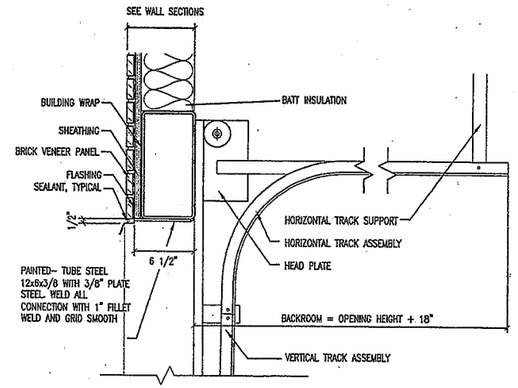


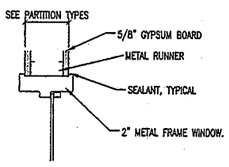
10 WINDOW SILL @ CMU
1 1/2" = 1'-0"

WINDOW TO BE INSTALLED IN THE CENTER OF THE OPENING

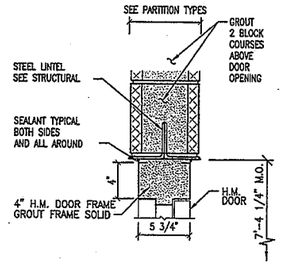


6 OVERHEAD ROLLING DOOR JAMB
1 1/2" = 1'-0"

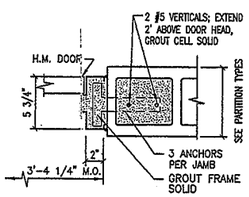




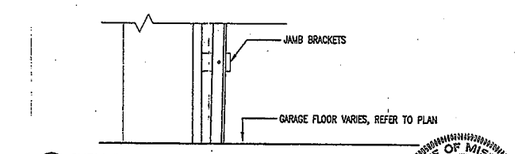
13 WINDOW/HEAD/JAMB SILL @ INTERIOR WALL
1 1/2" = 1'-0"



9 DOOR HEAD @ CMU
1 1/2" = 1'-0"



5 CMU JAMB DETAIL
1 1/2" = 1'-0"



1 OVERHEAD ROLLING DOOR HEAD AND SILL
1 1/2" = 1'-0"

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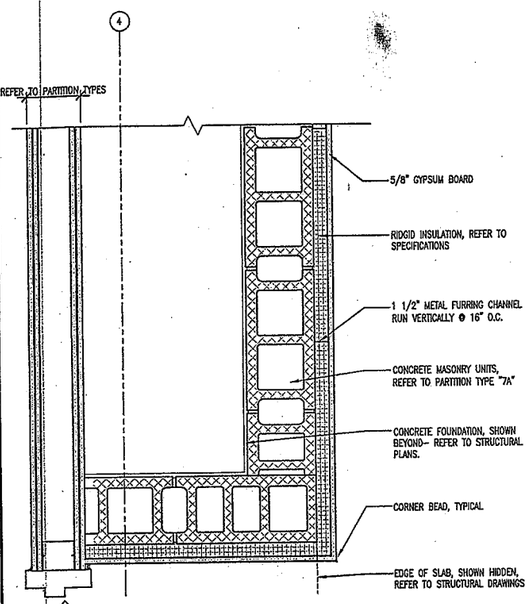
DRAWN BY: CAC
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

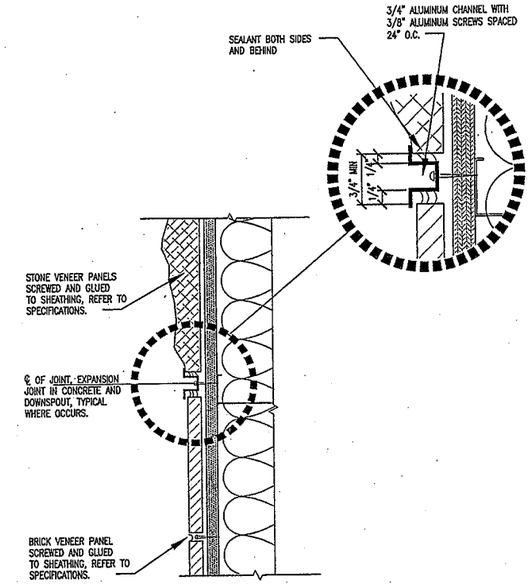
DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A501

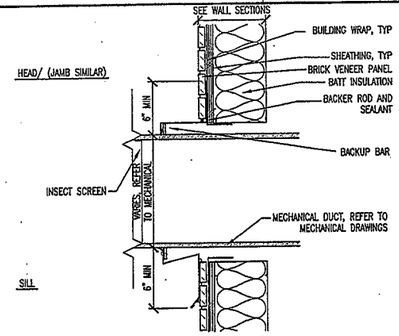
STATE OF MISSOURI
GREGORY EDWARD BRUNSWORTH
NUMBER A2006285
REGISTERED ARCHITECT



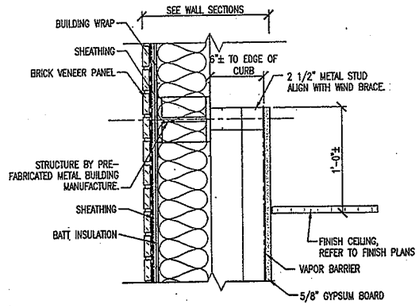
15 CORNER DETAIL @ CONTROL ROOM 122
1 1/2" = 1'-0"



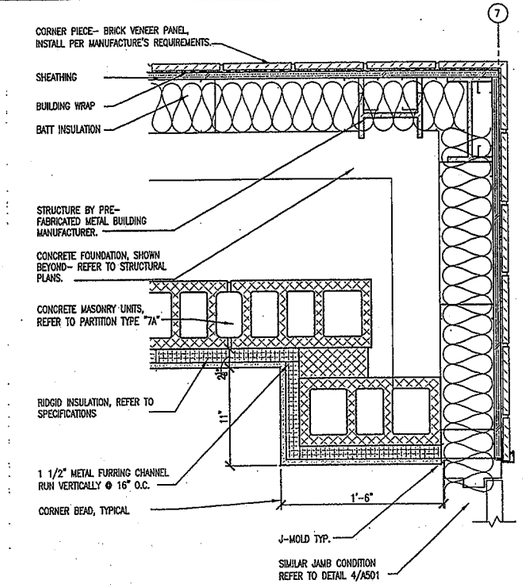
11 BRICK VENEER PANEL TO STONE VENEER PANEL DETAIL
3" = 1'-0"



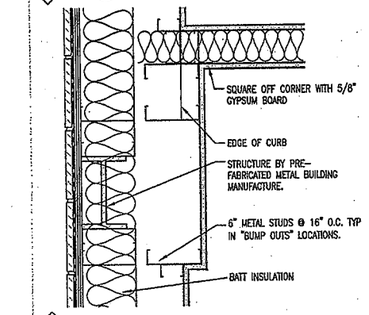
8 MECHANICAL WALL PENETRATION
1 1/2" = 1'-0"



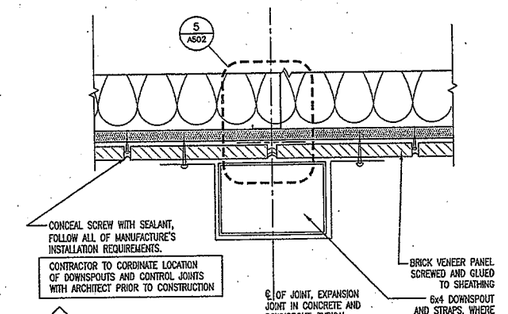
7 DETAIL @ TOP OF PARTITION DETAIL
1 1/2" = 1'-0"



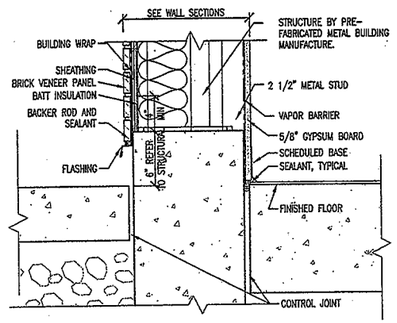
3 CORNER DETAIL
1 1/2" = 1'-0"



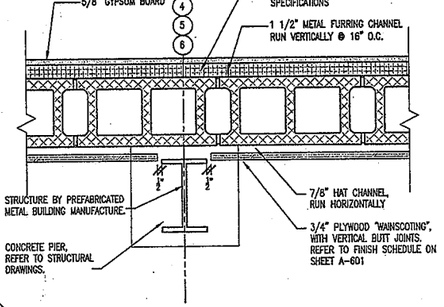
14 BUMP OUT @ OFFICE
1 1/2" = 1'-0"



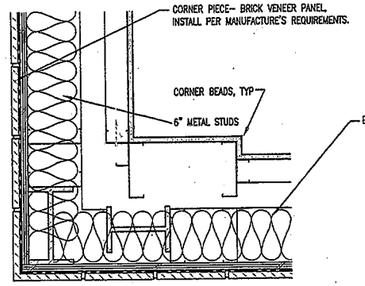
10 TYPICAL BRICK VENEER PANEL DETAIL
3" = 1'-0"



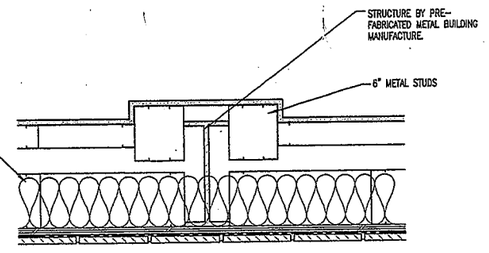
6 FLASHING DETAIL @ SILL PLATE
1 1/2" = 1'-0"



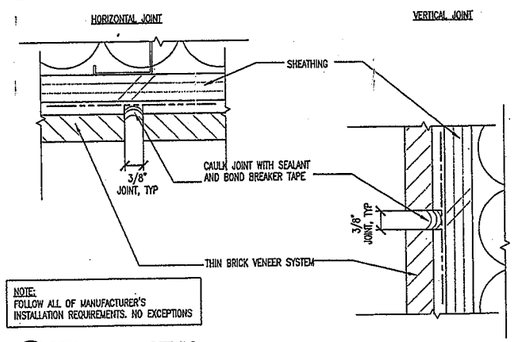
2 DETAIL @ COLUMN
1 1/2" = 1'-0"



13 DETAIL @ TYPICAL CORNER
1 1/2" = 1'-0"



9 DETAIL @ BUMP OUT
1 1/2" = 1'-0"



5 BRICK VENEER DETAILS
6" = 1'-0"

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
ARCHITECT
A2006265

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DRAWN BY: CAC
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SCALE: AS SHOWN
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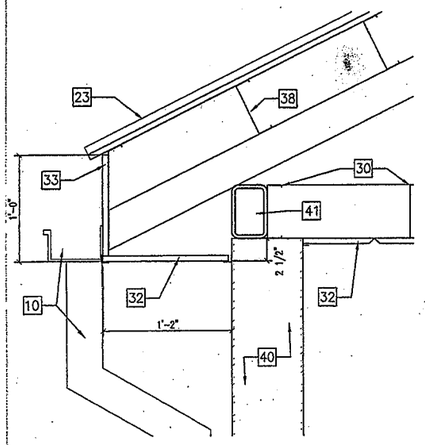
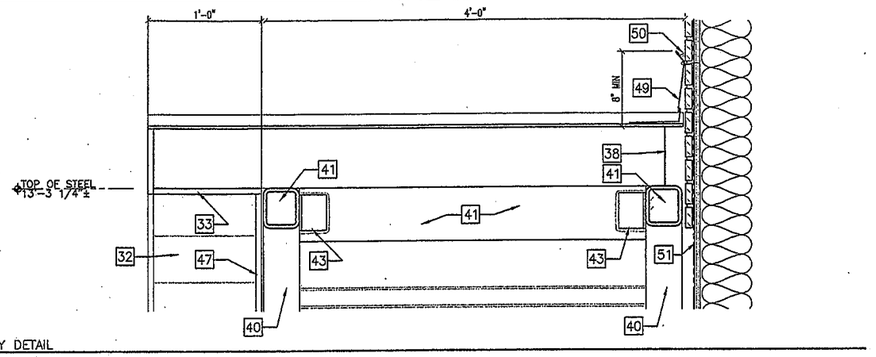
DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

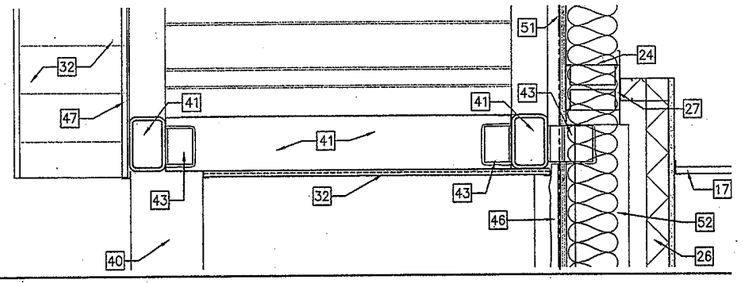
PROJECT NO. 08074
DRAWING NO. A502



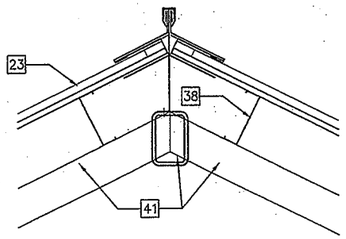
15 CANOPY DETAIL
1 1/2" = 1'-0"



12 UPPER CANOPY DETAIL
1 1/2" = 1'-0"

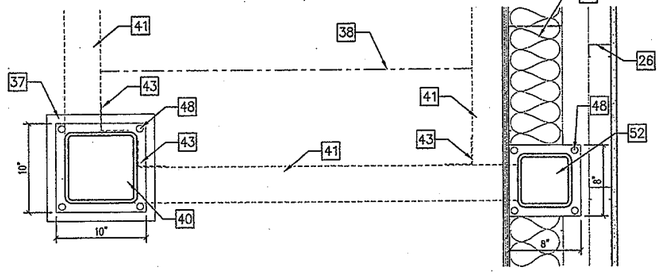


11 LOWER CANOPY DETAIL
1 1/2" = 1'-0"

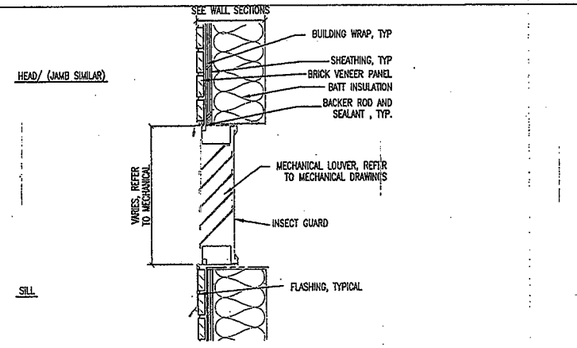


14 CANOPY RIDGE DETAIL
1 1/2" = 1'-0"

N



10 ENLARGED PLAN
1 1/2" = 1'-0"



5 LOUVER DETAIL
1 1/2" = 1'-0"

CONSTRUCTION NOTES:

1. PREFINISHED METAL GUTTER AND 6x4 DOWNSPOUT BY METAL BUILDING MANUFACTURER, COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF DOWNSPOUTS.
2. DRAIN TILE, REFER TO CIVIL DRAWINGS FOR SIZES AND DETAILS
3. EXTERIOR WALL, REFER TO WALL SECTIONS ON SHEETS A-303, A-304, A-305
4. NOT USED.
5. CONCRETE FOOTINGS AND FOUNDATIONS, REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
6. 6" CONCRETE SLAB ON GRAVEL BASE. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
7. 6" CONCRETE PAD ON GRAVEL BASE. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
8. CONCRETE STEP, REFER TO STRUCTURAL DRAWINGS.
9. 1 1/2" HIGH DENSITY INSULATED METAL DECKING ON STEEL BAR JOIST. REFER TO STRUCTURAL DRAWINGS.
10. PREFINISHED 2x4 GUTTER & 4" DOWNSPOUT, REFER TO SPECIFICATIONS.
11. STEEL BEAM, REFER TO STRUCTURAL DRAWINGS.
12. INTERIOR WALL SYSTEM REFER TO PARTITION TYPES OF SHEET A-601.
13. RAIN WATER DETECTION SYSTEM, REFER TO ELECTRONICS DRAWINGS BY EDF.
14. RAISED FLOOR, REFER TO ACCESS FLOOR DRAWINGS.
15. STEEL LENTIL, REFER TO STRUCTURAL DRAWINGS.
16. 1 1/2" ø PAINTED METAL RAILING, REFER TO INTERIOR ELEVATIONS.
17. FINISHED CEILING, REFER TO FINISH SCHEDULE ON SHEET A-601.
18. FOLDING PARTITION ON AN OVERHEAD TRACK, REFER TO SPECIFICATIONS.
19. OVERHEAD ROLLING DOOR TRACKS, REFER TO DOOR SCHEDULE ON SHEET A-602, AND SPECIFICATIONS.
20. METAL ACCESS PANEL, REFER TO SPECIFICATIONS AND DETAIL 8/A-504.
21. ROOF INSULATION BY METAL BUILDING MANUFACTURER
22. CMU BOND BEAM, REFER TO STRUCTURAL DRAWINGS.
23. STANDING SEAM ROOF BY METAL BUILDING MANUFACTURER
24. 6" METAL STUD WITH BATT INSULATION
25. 8" CMU BLOCK WALL
26. 3-5/8" METAL STUD WITH (1) SIDE 5/8" GYPSUM BOARD.
27. STRUCTURE BY PREFABRICATED METAL BUILDING MANUFACTURER
28. 7/8" HAT CHANNEL WITH 3/4" PLYWOOD WAINSCOT. REFER TO FINISH PLANS ON A-601, AND ELEVATION ON 7/A402.
29. THIN BRICK VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
30. 3 5/8" METAL STUD WITH BATT INSULATION AND (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601.
31. 10" PREFINISHED METAL TRIM BY METAL BUILDING MANUFACTURER.
32. PREFINISHED METAL SOFFIT WITH MATCHING SOFFIT VENTS @ 4'-0" O.C., BY METAL BUILDING MANUFACTURER
33. PREFINISHED METAL FASCIA BY METAL BUILDING MANUFACTURER
34. 5/8" GYPSUM BOARD WITH VAPOR BARRIER ON 1 1/2" 25 GAUGE METAL FRAMING CHANNELS @ 16" OC
35. 1 1/2" HIGH DENSITY RIGID FOAM INSULATION GLUE TO MASONRY WALL OR METAL DECK WHERE SHOWN ON PLANS
36. 5/8" GYPSUM BOARD CEILING, REFER TO REFLECTED CEILING PLAN ON SHEET A-102.
37. 12x12x48 CONCRETE PIER ON 36X36X12 CONCRETE FOOTING
38. 8" 16 GA METAL JOIST @ 16" O.C.
39. 3/4" PLYWOOD DECK SCREWED TO METAL JOIST.
40. 8x8x3/8" PAINTED TUBE STEEL COLUMN ON AT 10x10x3/8" PLATE BOLTED TO CONCRETE PIER
41. 6x4x3/8" HOLLOW METAL TUBE STEEL WELDED TO COLUMN.
42. 6" 16 GA METAL RAFTERS/JOIST @ 16" O.C.
43. 3x3x4 METAL CLIP ANGLE WELDED TO TUBE STEEL
44. FIRE CAULK AS REQUIRED AT ALL DECK, SLAB EDGES, AND POINTS OF PENETRATION (BOTH SIDES).
45. (2) LAYERS OF TYPE "X" GYPSUM BOARD, REFER TO PARTITION TYPE 7A ON SHEET A-601. USE CORNER BEADS AT ALL OUTER CORNERS, TYPICAL.
46. THIN STONE VENEER PANEL SYSTEM, REFER TO SPECIFICATIONS.
47. VERTICAL RIBBED METAL SIDING, REFER TO SPECIFICATIONS.
48. 3/4" ANCHOR BOLTS WITH MIN 6" EMBEDMENT, TYPICAL.
49. STEPPED FLASHING WITH COUNTER FLASHING
50. SEALANT TYPICAL.
51. BUILDING WRAP ON 3/4" SHEATHING, REFER TO WALL SECTIONS ON SHEETS A301-A305.
52. 6x6x3/8" PAINTED TUBE STEEL COLUMN WELDED TO 8x8x3/8" PLATE BOLTED TO CONCRETE FOUNDATION.

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DETAILS
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MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-503

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A2006265
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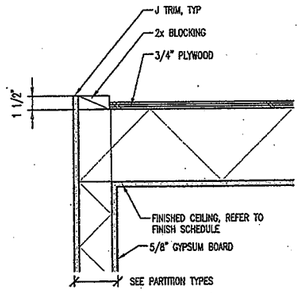
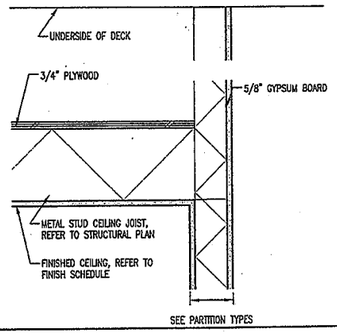
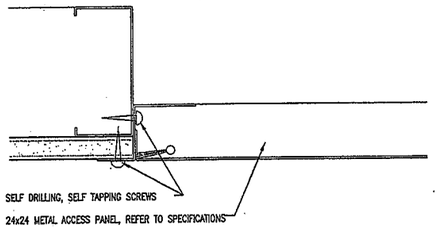
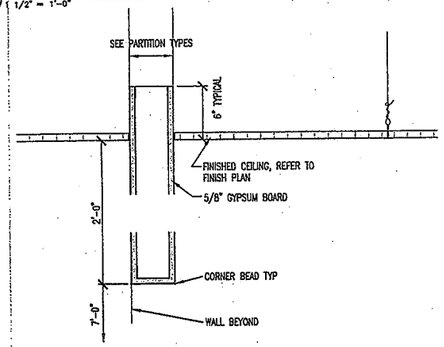


16 SECTION @ CEILING (NUKE STORAGE)
1/2" = 1'-0"

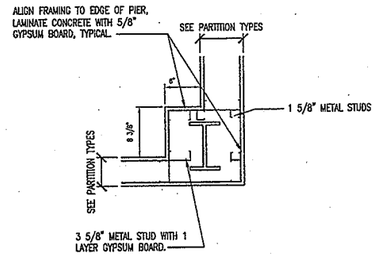




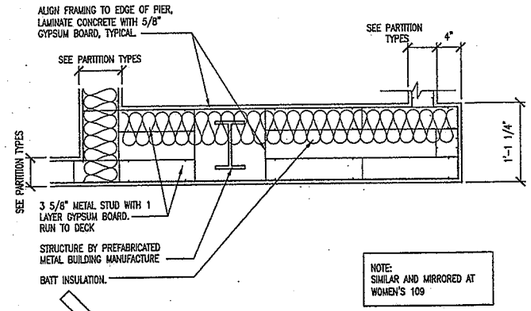
N 8 ACCESS PANEL DETAIL
6" = 1'-0"



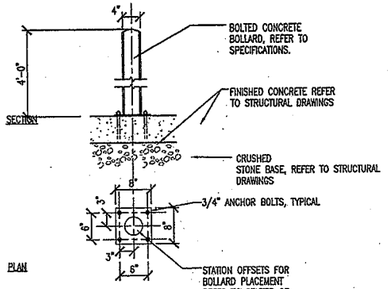
15 TYPICAL BULK HEAD DETAIL
1/2" = 1'-0"



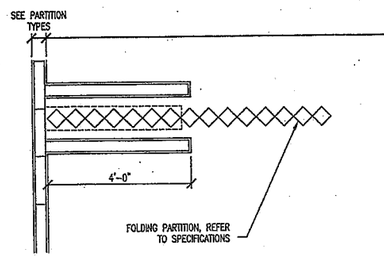
N 11 ENLARGED COLLUMN DETAIL @ COPY 105
1" = 1'-0"



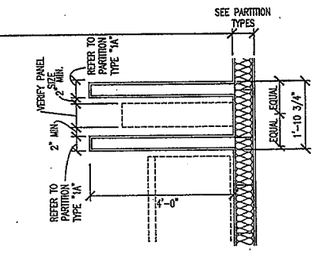
N 6 ENLARGED PLAN DETAIL @ MEN'S TOLIET 108
1" = 1'-0"

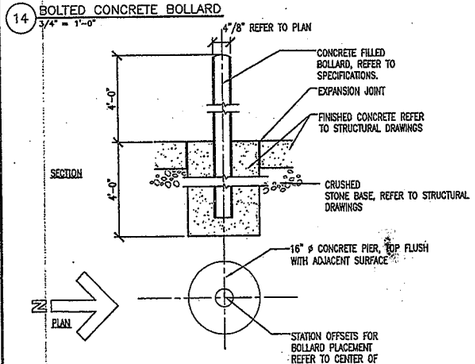


14 BOLTED CONCRETE BOLLARD
3/4" = 1'-0"

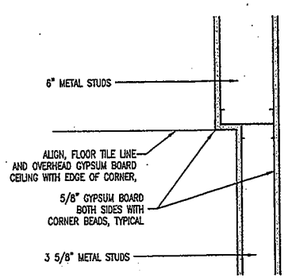


N 10 ENLARGED PLAN DETAIL @ BREAK ROOM 107
1/2" = 1'-0"

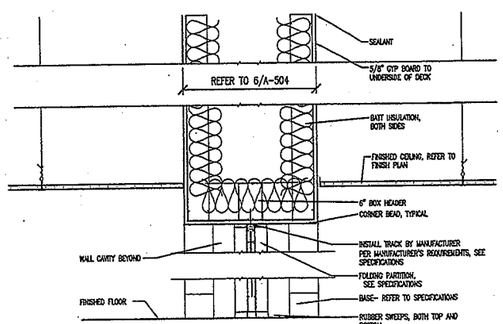




13 CONCRETE FILL BOLLARD
3/4" = 1'-0"



N 9 DETAIL @ RECEPTION 102
1 1/2" = 1'-0"



5 DETAIL @ ACCORDIAN DOOR HEAD
1" = 1'-0"

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUE FOR BIDDING	DLS

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER AR006285
REGISTERED ARCHITECT

CDG ENGINEERS
CDG Engineers Architects Planners Inc.
One Campbell Plaza
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www.cdgengineers.com

MoDOT

DRAWN BY: CAC
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-504

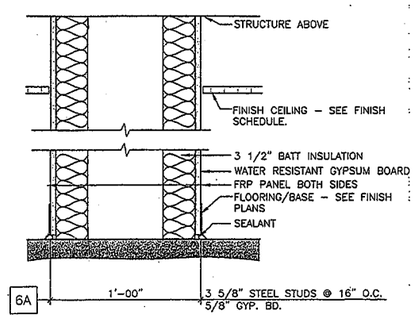
ROOM FINISH SCHEDULE

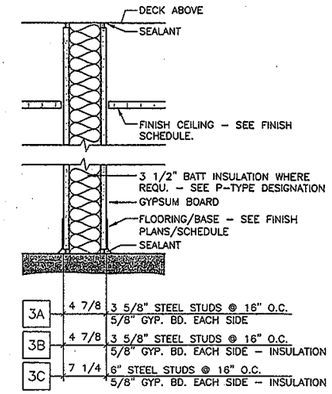
ROOM NO	NAME	FLOOR	WALLS								CEILING			NOTES
			N		S		E		W					
			MATL	FIN	MATL	FIN	MATL	FIN	MATL	FIN	FIN	MATL	HEIGHT	
101	VESTIBULE	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
102	RECEPTION	CPT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
103	OFFICE	CPT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
104	GENERAL OFFICE	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
105	COPY	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
106	CONFERENCE ROOM	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
107	BREAK ROOM	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
108	MENS TOILET	VCT	FRP	---	GYP	PT	GYP	PT	GYP	PT	---	ACT1	9'-0"	---
109	WOMEN TOILET	VCT	GYP	PT	FRP	---	GYP	PT	GYP	PT	---	ACT1	9'-0"	---
110	JANITOR CLOSET	SC	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT2	9'-0"	---
111	CLOSET	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
112	COMM CLOSET	VCT	PLY		PLY		PLY		PLY			ACT3	9'-0"	INSTALL 1/2" AC PLY ON SOUTH WALL
113	CORRIDOR	VCT	GYP	PT	GYP	PT	GYP	PT	---	---	---	ACT3	9'-0"	---
114	GARAGE	SC	GYP/PLY	PT	GYP/PLY	PT	GYP/PLY	PT	GYP/PLY	PT	---	ERS	14'-0"	INSTALL 3/4" CD PLY TO 8'-0" ON ALL EXPOSED WALL SURFACES
115	NUKE STORAGE	SC	GYP	PT	GYP	PT	GYP	PT	CMU	PT	PT	GYP	9'-0"	---
116	NUKE STORAGE	SC	GYP	PT	GYP	PT	GYP	PT	GYP	PT	PT	GYP	9'-0"	---
117	LAB AREA	SC	GYP/PLY	PT	GYP/PLY	PT	GYP/PLY	PT	GYP/PLY	PT	---	ERS	8'-6"	---
118	WATER METER	SC	GYP	PT	GYP/PLY	PT	GYP	PT	GYP/PLY	PT	---	ERS	14'-0"	---
119	WET SAW	SC	CMU	EP	CMU	EP	CMU	EP	CMU	EP	---	ERS	14'-0"	---
120	COMPUTER UTILITIES	SC	CMU	EP	CMU	EP	CMU	EP	CMU	EP	---	ACT1	9'-0"	---
121	COMPUTER ROOM	EF	CMU	EP	CMU	EP	CMU	EP	CMU	EP	---	ACT1	9'-0"	ELEVATED FLOOR BY OTHERS
122	CONTROL ROOM	EF	CMU	EP	CMU	EP	CMU	EP	CMU	EP	---	ACT1	9'-0"	ELEVATED FLOOR BY OTHERS
123	GENERAL OFFICE	VCT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---
124	OFFICE	CPT	GYP	PT	GYP	PT	GYP	PT	GYP	PT	---	ACT3	9'-0"	---

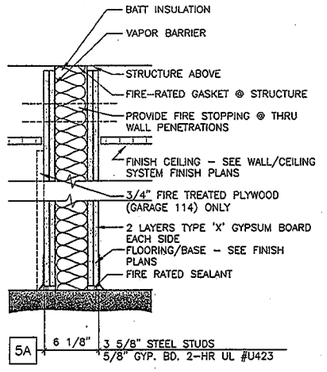
ROOM FINISH SCHEDULE

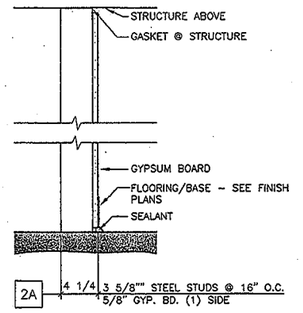
ACT- ACOUSTICAL CEILING TILE, REFER TO SPECIFICATIONS FOR TYPES
CPT- CARPET TILE
CMU- CONCRETE MASONRY UNIT
EF - ELEVATED FLOOR, BY OTHERS
EP - EPOXY PAINT
ERS- EXPOSED ROOF SYSTEM
FRP- FIBERGLASS PANELS
GYP- GYPSUM BOARD, REFER TO SPECIFICATIONS FOR TYPES
PLY- PLYWOOD, REFER TO REMARKS FOR SIZE AND TYPE
PT - PAINT, REFER TO SPECIFICATIONS FOR TYPE
SC - SEALED CONCRETE
VCT- VINYL COMPOSITION TILE

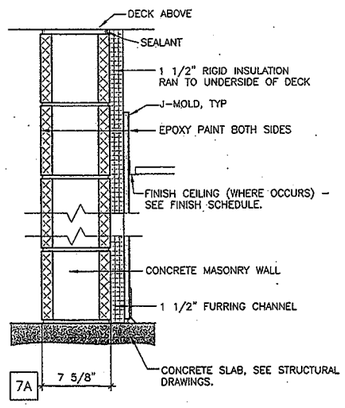
PARTITION TYPES

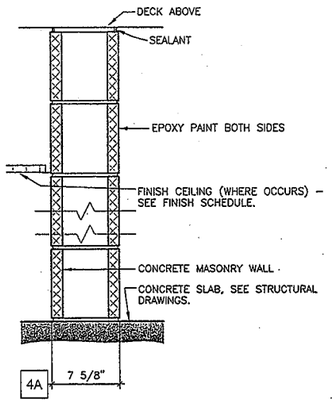


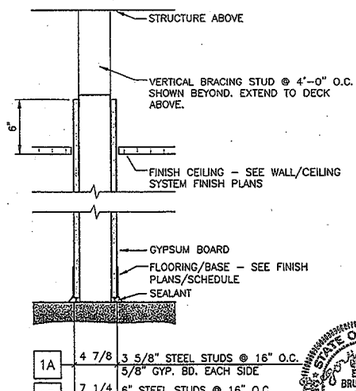












STATE OF MISSOURI
GREGORY EDWARD BRUNNHORST
NUMBER AR006265
REGISTERED ARCHITECT

PARTITION TYPE GENERAL NOTES:

1. ALL PARTITIONS ARE TYPE "1A", UNLESS NOTED OTHERWISE.
2. USE MOISTURE RESISTANT GYPSUM BOARD IN WET AREAS, NO EXCEPTIONS.
3.

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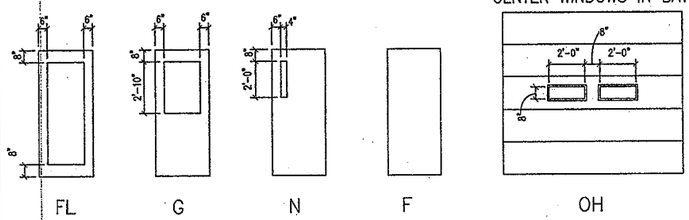
ROOM FINISH SCHEDULE-PARTITION TYPES
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A601

DOOR AND FRAME SCHEDULE

MARK	DOOR SIZE WD	DOOR SIZE HGT	DOOR SIZE THK	DOOR MATL	DOOR TYPE	SET NO	GLAZING	FRAME MATL	FRAME EL	FRAME DETAIL HEAD	FRAME DETAIL JAMB	FRAME DETAIL SILL	FIRE RATING LABEL	NOTES
101A	6'-0"	7'-0"	1 3/4"	MTL	FL	A	TEMP	MTL	3	4/A501	3/A501	--	--	--
101B	6'-0"	7'-0"	1 3/4"	MTL	FL	A	TEMP	MTL	3	8/A501	8/A501	--	--	--
103A	3'-0"	7'-0"	1 3/4"	MTL	N	B	TEMP	MTL	2	8/A501	8/A501	--	--	--
104A	3'-0"	7'-0"	1 3/4"	MTL	N	C	TEMP	MTL	1	4/A501	3/A501	--	--	--
104B	3'-0"	7'-0"	1 3/4"	MTL	N	D	WG	MTL	2	7/A501	7/A501	--	B	--
106A	3'-0"	7'-0"	1 3/4"	MTL	N	E	TEMP	MTL	2	8/A501	8/A501	--	--	--
107A	3'-0"	7'-0"	1 3/4"	MTL	N	E	TEMP	MTL	2	8/A501	8/A501	--	--	--
108A	3'-0"	7'-0"	1 3/4"	MTL	F	F	--	MTL	2	8/A501	8/A501	--	--	--
108B	3'-0"	7'-0"	1 3/4"	MTL	F	F	--	MTL	2	8/A501	8/A501	--	--	--
109A	3'-0"	7'-0"	1 3/4"	MTL	F	F	--	MTL	2	8/A501	8/A501	--	--	--
109B	3'-0"	7'-0"	1 3/4"	MTL	F	F	--	MTL	2	8/A501	8/A501	--	--	--
110A	3'-0"	7'-0"	1 3/4"	MTL	F	G	--	MTL	2	8/A501	8/A501	--	--	--
111A	6'-0"	7'-0"	1 3/4"	MTL	F	H	--	MTL	3	8/A501	8/A501	--	--	--
112A	6'-0"	7'-0"	1 3/4"	MTL	F	H	--	MTL	3	8/A501	8/A501	--	--	--
114A	3'-0"	7'-0"	1 3/4"	MTL	N	D	WG	MTL	2	7/A501	7/A501	--	B	--
114B	10'-0"	9'-0"	1"	MTL	OH	--	--	--	--	1/A501	6/A501	1/A501	--	--
114C	10'-0"	9'-0"	1"	MTL	OH	--	--	--	--	1/A501	6/A501	1/A501	--	--
114D	10'-0"	9'-0"	1"	MTL	OH	--	--	--	--	1/A501	6/A501	1/A501	--	--
114E	10'-0"	9'-0"	1"	MTL	OH	--	--	--	--	1/A501	6/A501	1/A501	--	--
114F	3'-0"	7'-0"	1 3/4"	MTL	N	C	TEMP	MTL	1	4/A501	3/A501	--	--	--
114G	3'-0"	7'-0"	1 3/4"	MTL	G	D	TEMP	MTL	2	8/A501	8/A501	--	--	--
115A	6'-0"	7'-0"	1 3/4"	MTL	F	J	--	MTL	3	8/A501	8/A501	--	--	--
116A	6'-0"	7'-0"	1 3/4"	MTL	F	J	--	MTL	3	8/A501	8/A501	--	--	--
117A	3'-0"	7'-0"	1 3/4"	MTL	G	C	TEMP	MTL	1	4/A501	3/A501	--	--	--
118A	3'-0"	7'-0"	1 3/4"	MTL	F	K	--	MTL	2	9/A501	5/A501	--	--	--
119A	3'-0"	7'-0"	1 3/4"	MTL	G	K	TEMP	MTL	2	9/A501	5/A501	--	--	--
120A	6'-0"	7'-0"	1 3/4"	MTL	F	L	--	MTL	3	4/A501	3/A501	--	--	--
121A	3'-0"	7'-0"	1 3/4"	MTL	N	I	TEMP	MTL	1	9/A501	5/A501	--	--	--
121B	6'-0"	7'-0"	1 3/4"	MTL	N	M	TEMP	MTL	3	9/A501	5/A501	--	--	--
122A	3'-0"	7'-0"	1 3/4"	MTL	N	I	WG	MTL	2	7/A501	7/A501	--	B	--
123A	3'-0"	7'-0"	1 3/4"	MTL	N	C	TEMP	MTL	1	4/A501	3/A501	--	--	--
124A	3'-0"	7'-0"	1 3/4"	MTL	N	B	TEMP	MTL	2	8/A501	8/A501	--	--	--

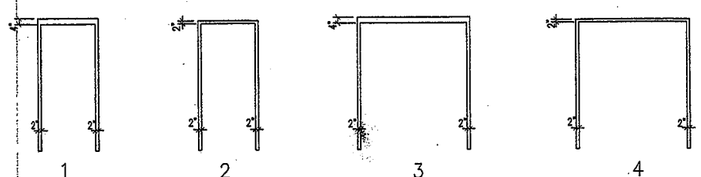


CENTER WINDOWS IN BAY

LEGEND

MTL– METAL
TEMP– TEMP GLASS
WG– WIRE GLASS

DOOR TYPES



FRAME TYPES

HARDWARE SCHEDULE

GROUP A

DOORS: 101A, 101B

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
3	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	9827-L-NL-626	EXIT DEVICE	VON DUPRIN
1	EA	9827-L-DT-626	EXIT DEVICE	VON DUPRIN
2	EA	4041 EDA-626	CLOSERS	LCN
2	EA	8X34	KICKPATES	ROCKWOOD
1	EA	PK55BL	WEATHERSTRIP	PEMKO
1	EA	170B	THRESHOLD	PEMKO
1	EA	369AS	ASTRAGAL	PEMKO

GROUP B

DOORS: 103A, 124A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KCTABDSTK-626	LOCKSET	BEST
1	EA		INTERCHANGABLE CORE	BEST
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP C

DOORS: 104A, 114F, 117A, 123A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	98-L-NL-626	EXIT DEVICE	VON DUPRIN
1	EA	4041 EDA-626	CLOSER	LCN
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	PK55BL	WEATHERSTRIP	PEMKO
1	EA	170B	THRESHOLD	PEMKO

GROUP D

DOORS: 104B, 114A, 114G

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC0N140STK-626	PASSAGE SET	BEST
1	EA	4041 EDA-626	CLOSER	LCN
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP E

DOORS: 106A, 107A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC0N140STK-626	PASSAGE SET	BEST
1	EA		INTERCHANGABLE CORE	BEST
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP F

DOORS: 108A, 108B, 109A, 109B

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	4041 EDA	CLOSER	LCN
1	EA	70C	PUSH PLATE	ROCKWOOD
1	EA	105-70C	PULL WITH PLATE	ROCKWOOD
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP G

DOORS: 110A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	4041 EDA	CLOSER	LCN
1	EA	73KC7D140STK-626	STOREROOM LOCK	BEST
1	EA		INTERCHANGABLE CORE	BEST
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP H

DOORS: 111A, 112A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
3	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC0N14DSTK-626	PASSAGE LOCK	BEST
1	EA	73KC01DTDSTK-626	DUMMY TRIM	BEST
2	EA	580-8	FLUSH BOLTS	ROCKWOOD

GROUP I

DOORS: 121A, 122A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC7R14DSTK-626	LOCKSET	BEST
1	EA		INTERCHANGEABLE CORE	BEST
1	EA	4041 EDA	CLOSER	LCN
1	EA	PK55BL	DOOR SEAL	PEMKO
1	EA	4131SNRL	AUTOMATIC DOOR BOTTOM	PEMKO
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	170B	THRESHOLD	PEMKO

GROUP J

DOORS: 115A, 116A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC0N14DSTK-626	PASSAGE SET	BEST
1	EA	4041 EDA	CLOSER	LCN
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP K

DOORS: 118A, 119A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
1 1/2	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC7R14DSTK-626	LOCKSET	BEST
1	EA		INTERCHANGEABLE CORE	BEST
1	EA	4041 EDA	CLOSER	LCN
1	EA	8X34	KICKPATES	ROCKWOOD
1	EA	406	WALL STOP	ROCKWOOD

GROUP L

DOORS: 120A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
3	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	98-L-NL-626	EXIT DEVICE	VON DUPRIN
1	EA	4041 EDA-626	CLOSER	LCN
2	EA	8X34	KICKPATES	ROCKWOOD
1	EA	PK55BL	DOOR SEAL	PEMKO
2	EA	4131SNRL	AUTOMATIC DOOR BOTTOM	PEMKO
1	EA	170B	THRESHOLD	PEMKO
1	EA	369AS	ASTRAGAL	PEMKO
2	EA	580-8	FLUSHBOLTS	ROCKWOOD

GROUP M

DOORS: 121A

QTY	UNIT	PART NAME	DESCRIPTION	MANUFACTURER
3	PRS	4 1/2"X4 1/2" BB1199	BUTTS	HAGER
1	EA	73KC7R14DSTK-626	LOCKSET	BEST
1	EA		INTERCHANGEABLE CORE	BEST
1	EA	PK55BL	DOOR SEAL	PEMKO
1	EA	4131SNRL	AUTOMATIC DOOR BOTTOM	PEMKO
1	EA	4041 EDA-626	CLOSER	LCN
2	EA	8X34	KICKPATES	ROCKWOOD
1	EA	369AS	ASTRAGAL	PEMKO
2	EA	580-8	FLUSHBOLTS	ROCKWOOD

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A2006265
REGISTERED ARCHITECT

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DOOR SCHEDULE AND DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A602

SECTION 042000 – UNIT MASONRY

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. CONCRETE MASONRY UNITS (CMU'S).

B. RELATED SECTIONS:

1. DIVISION 05 SECTION "METAL FABRICATIONS" FOR FURNISHING STEEL LINTELS AND SHELF ANGLES FOR UNIT MASONRY.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: FOR REINFORCING STEEL. DETAIL BENDING AND PLACEMENT OF UNIT MASONRY REINFORCING BARS. COMPLY WITH ACI 315, "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT."

C. MIX DESIGNS: FOR EACH TYPE OF MORTAR AND GROUT. INCLUDE DESCRIPTION OF TYPE AND PROPORTIONS OF INGREDIENTS.

1. INCLUDE TEST REPORTS FOR MORTAR MIXES REQUIRED TO COMPLY WITH PROPERTY SPECIFICATION. TEST ACCORDING TO ASTM C 109/C 109M FOR COMPRESSIVE STRENGTH, ASTM C 1506 FOR WATER RETENTION, AND ASTM C 91 FOR AIR CONTENT.

2. INCLUDE TEST REPORTS, ACCORDING TO ASTM C 1019, FOR GROUT MIXES REQUIRED TO COMPLY WITH COMPRESSIVE STRENGTH REQUIREMENT.

1.3 QUALITY ASSURANCE

A. MASONRY STANDARD: COMPLY WITH ACI 530.1/ASCE 6/TMS 602 UNLESS MODIFIED BY REQUIREMENTS IN THE CONTRACT DOCUMENTS.

1.4 PROJECT CONDITIONS

A. HOT-WEATHER REQUIREMENTS: COMPLY WITH HOT-WEATHER CONSTRUCTION REQUIREMENTS CONTAINED IN ACI 530.1/ASCE 6/TMS 602.

PART 2 – PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. DEFECTIVE UNITS: REFERENCED MASONRY UNIT STANDARDS MAY ALLOW A CERTAIN PERCENTAGE OF UNITS TO CONTAIN CHIPS, CRACKS, OR OTHER DEFECTS EXCEEDING LIMITS STATED IN THE STANDARD. DO NOT USE UNITS WHERE SUCH DEFECTS WILL BE EXPOSED IN THE COMPLETED WORK.

2.2 CONCRETE MASONRY UNITS

A. REGIONAL MATERIALS: PROVIDE CMUS THAT HAVE BEEN MANUFACTURED WITHIN 500 MILES OF PROJECT SITE FROM AGGREGATES THAT HAVE BEEN EXTRACTED, HARVESTED, OR RECOVERED, AS WELL AS MANUFACTURED, WITHIN 500 MILES OF PROJECT SITE.

B. SHAPES: PROVIDE SHAPES INDICATED AND FOR LINTELS, CORNERS, JAMBS, MOVEMENT JOINTS, HEADERS, BONDING, AND OTHER SPECIAL CONDITIONS.

C. CMUS: ASTM C 90.

1. UNIT COMPRESSIVE STRENGTH: PROVIDE UNITS WITH MINIMUM AVERAGE NET-AREA COMPRESSIVE STRENGTH OF 2800 PSI.

2. DENSITY CLASSIFICATION: NORMAL WEIGHT.

2.3 MORTAR AND GROUT MATERIALS

A. REGIONAL MATERIALS: PROVIDE AGGREGATE FOR MORTAR AND GROUT, CEMENT, AND LIME THAT HAVE BEEN EXTRACTED, HARVESTED, OR RECOVERED, AS WELL AS MANUFACTURED, WITHIN 500 MILES OF PROJECT SITE.

B. PORTLAND CEMENT: ASTM C 150, TYPE I OR II, EXCEPT TYPE III MAY BE USED FOR COLD-WEATHER CONSTRUCTION. PROVIDE NATURAL COLOR OR WHITE CEMENT AS REQUIRED TO PRODUCE MORTAR COLOR INDICATED.

C. HYDRATED LIME: ASTM C 207, TYPE S.

D. PORTLAND CEMENT-LIME MIX: PACKAGED BLEND OF PORTLAND CEMENT AND HYDRATED LIME CONTAINING NO OTHER INGREDIENTS.

E. MASONRY CEMENT: ASTM C 91.

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. HOLCIM (US) INC.; MORTAMIX MASONRY CEMENT.

b. LAFARGE NORTH AMERICA INC.; LAFARGE MASONRY CEMENT.

c. LEHIGH CEMENT COMPANY; LEHIGH MASONRY CEMENT.

d. NATIONAL CEMENT COMPANY, INC.; COOSA MASONRY CEMENT.

F. MORTAR PIGMENTS: NATURAL AND SYNTHETIC IRON OXIDES AND CHROMIUM OXIDES, COMPOUNDED FOR USE IN MORTAR MIXES AND COMPLYING WITH ASTM C 979. USE ONLY PIGMENTS WITH A RECORD OF SATISFACTORY PERFORMANCE IN MASONRY MORTAR.

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. DAVIS COLORS; TRUE TONE MORTAR COLORS.

b. LANXESS CORPORATION; BAYFERROX IRON OXIDE PIGMENTS.

c. SOLOMON COLORS, INC.; SGS MORTAR COLORS.

G. AGGREGATE FOR MORTAR: ASTM C 144.

1. FOR JOINTS LESS THAN 1/4 INCH THICK, USE AGGREGATE GRADED WITH 100 PERCENT PASSING THE NO. 16 SIEVE.

H. AGGREGATE FOR GROUT: ASTM C 404.

I. WATER: POTABLE.

2.4 REINFORCEMENT

A. UNCOATED STEEL REINFORCING BARS: ASTM A 615/A 615M OR ASTM A 996/A 996M, GRADE 60.

B. MASONRY JOINT REINFORCEMENT, GENERAL: ASTM A 951/A 951M.

1. INTERIOR WALLS: HOT-DIP GALVANIZED, CARBON STEEL.

2. WIRE SIZE FOR SIDE RODS: 0.187-INCH DIAMETER.

3. WIRE SIZE FOR CROSS RODS: 0.187-INCH DIAMETER.

4. PROVIDE IN LENGTHS OF NOT LESS THAN 10 FEET, WITH PREFABRICATED CORNER AND TEE UNITS.

C. MASONRY JOINT REINFORCEMENT FOR SINGLE-WYTHE MASONRY: EITHER LADDER OR TRUSS TYPE WITH SINGLE PAIR OF SIDE RODS.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. COMPRESSIBLE FILLER: PREMOLDED FILLER STRIPS COMPLYING WITH ASTM D 1056, GRADE 2A1; COMPRESSIBLE UP TO 35 PERCENT; FORMULATED FROM URETHANE.

B. PREFORMED CONTROL-JOINT GASKETS: MADE FROM PVC, COMPLYING WITH ASTM D 2287, TYPE PVC-65406 AND DESIGNED TO FIT STANDARD SASH BLOCK AND TO MAINTAIN LATERAL STABILITY IN MASONRY WALL; SIZE AND CONFIGURATION AS INDICATED.

C. BOND-BREAKER STRIPS: ASPHALT-SATURATED, ORGANIC ROOFING FELT COMPLYING WITH ASTM D 226, TYPE I (NO. 15 ASPHALT FELT).

2.6 MASONRY CLEANERS

A. PROPRIETARY ACIDIC CLEANER: MANUFACTURER'S STANDARD-STRENGTH CLEANER DESIGNED FOR REMOVING MORTAR/GROUT STAINS, EFFLORESCENCE, AND OTHER NEW CONSTRUCTION STAINS FROM NEW MASONRY WITHOUT DISCOLORING OR DAMAGING MASONRY SURFACES. USE PRODUCT EXPRESSLY APPROVED FOR INTENDED USE BY CLEANER MANUFACTURER AND MANUFACTURER OF MASONRY UNITS BEING CLEANED.

2.7 MORTAR AND GROUT MIXES

A. GENERAL: DO NOT USE ADMIXTURES, INCLUDING PIGMENTS, AIR-ENTRAINING AGENTS, ACCELERATORS, RETARDERS, WATER-REPELLENT AGENTS, ANTIFREEZE COMPOUNDS, OR OTHER ADMIXTURES, UNLESS OTHERWISE INDICATED.

1. DO NOT USE CALCIUM CHLORIDE IN MORTAR OR GROUT.

2. USE MASONRY CEMENT MORTAR UNLESS OTHERWISE INDICATED.

3. FOR EXTERIOR MASONRY, USE MASONRY CEMENT MORTAR.

4. FOR REINFORCED MASONRY, USE MASONRY CEMENT MORTAR.

5. ADD COLD-WEATHER ADMIXTURE (IF USED) AT SAME RATE FOR ALL MORTAR THAT WILL BE EXPOSED TO VIEW, REGARDLESS OF WEATHER CONDITIONS, TO ENSURE THAT MORTAR COLOR IS CONSISTENT.

B. PREBLENDED, DRY MORTAR MIX: FURNISH DRY MORTAR INGREDIENTS IN FORM OF A PREBLENDED MIX. MEASURE QUANTITIES BY WEIGHT TO ENSURE ACCURATE PROPORTIONS, AND THOROUGHLY BLEND INGREDIENTS BEFORE DELIVERING TO PROJECT SITE.

C. MORTAR FOR UNIT MASONRY: COMPLY WITH ASTM C 270, PROPORTION SPECIFICATION. PROVIDE THE FOLLOWING TYPES OF MORTAR FOR APPLICATIONS STATED UNLESS ANOTHER TYPE IS INDICATED.

1. FOR REINFORCED MASONRY, USE TYPE S.

2. FOR EXTERIOR, ABOVE-GRADE, LOAD-BEARING AND NON-LOAD-BEARING WALLS AND PARAPET WALLS; FOR INTERIOR LOAD-BEARING WALLS; FOR INTERIOR NON-LOAD-BEARING PARTITIONS; AND FOR OTHER APPLICATIONS WHERE ANOTHER TYPE IS NOT INDICATED, USE TYPE N.

3. FOR INTERIOR NON-LOAD-BEARING PARTITIONS, TYPE O MAY BE USED INSTEAD OF TYPE N.

D. GROUT FOR UNIT MASONRY: COMPLY WITH ASTM C 476.

1. USE GROUT OF TYPE INDICATED OR, IF NOT OTHERWISE INDICATED, OF TYPE (FINE OR COARSE) THAT WILL COMPLY WITH TABLE 1.15.1 IN ACI 530.1/ASCE 6/TMS 602 FOR DIMENSIONS OF GROUT SPACES AND POUR HEIGHT.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. USE FULL-SIZE UNITS WITHOUT CUTTING IF POSSIBLE. IF CUTTING IS REQUIRED TO PROVIDE A CONTINUOUS PATTERN OR TO FIT ADJOINING CONSTRUCTION, CUT UNITS WITH MOTOR-DRIVEN SAWS; PROVIDE CLEAN, SHARP, UNCHIPPED EDGES. ALLOW UNITS TO DRY BEFORE LAYING UNLESS WETTING OF UNITS IS SPECIFIED. INSTALL CUT UNITS WITH CUT SURFACES AND, WHERE POSSIBLE, CUT EDGES CONCEALED.

B. SELECT AND ARRANGE UNITS FOR EXPOSED UNIT MASONRY TO PRODUCE A UNIFORM BLEND OF COLORS AND TEXTURES.

3.2 TOLERANCES

A. DIMENSIONS AND LOCATIONS OF ELEMENTS:

1. FOR DIMENSIONS IN CROSS SECTION OR ELEVATION DO NOT VARY BY MORE THAN PLUS 1/2 INCH OR MINUS 1/4 INCH.

2. FOR LOCATION OF ELEMENTS IN PLAN DO NOT VARY FROM THAT INDICATED BY MORE THAN PLUS OR MINUS 1/2 INCH.

3. FOR LOCATION OF ELEMENTS IN ELEVATION DO NOT VARY FROM THAT INDICATED BY MORE THAN PLUS OR MINUS 1/4 INCH IN A STORY HEIGHT OR 1/2 INCH TOTAL.

B. LINES AND LEVELS:

1. FOR BED JOINTS AND TOP SURFACES OF BEARING WALLS DO NOT VARY FROM LEVEL BY MORE THAN 1/4 INCH IN 10 FEET, OR 1/2 INCH MAXIMUM.

2. FOR CONSPICUOUS HORIZONTAL LINES, SUCH AS LINTELS, SILLS, PARAPETS, AND REVEALS, DO NOT VARY FROM LEVEL BY MORE THAN 1/8 INCH IN 10 FEET, 1/4 INCH IN 20 FEET, OR 1/2 INCH MAXIMUM.

3. FOR VERTICAL LINES AND SURFACES DO NOT VARY FROM PLUMB BY MORE THAN 1/4 INCH IN 10 FEET, 3/8 INCH IN 20 FEET, OR 1/2 INCH MAXIMUM.

4. FOR CONSPICUOUS VERTICAL LINES, SUCH AS EXTERNAL CORNERS, DOOR JAMBS, REVEALS, AND EXPANSION AND CONTROL JOINTS, DO NOT VARY FROM PLUMB BY MORE THAN 1/8 INCH IN 10 FEET, 1/4 INCH IN 20 FEET, OR 1/2 INCH MAXIMUM.

5. FOR LINES AND SURFACES DO NOT VARY FROM STRAIGHT BY MORE THAN 1/4 INCH IN 10 FEET, 3/8 INCH IN 20 FEET, OR 1/2 INCH MAXIMUM.

C. JOINTS:

1. FOR BED JOINTS, DO NOT VARY FROM THICKNESS INDICATED BY MORE THAN PLUS OR MINUS 1/8 INCH, WITH A MAXIMUM THICKNESS LIMITED TO 1/2 INCH.

2. FOR HEAD AND COLLAR JOINTS, DO NOT VARY FROM THICKNESS INDICATED BY MORE THAN PLUS 3/8 INCH OR MINUS 1/4 INCH.

3. FOR EXPOSED HEAD JOINTS, DO NOT VARY FROM THICKNESS INDICATED BY MORE THAN PLUS OR MINUS 1/8 INCH.

3.3 LAYING MASONRY WALLS

A. LAY OUT WALLS IN ADVANCE FOR ACCURATE SPACING OF SURFACE BOND PATTERNS WITH UNIFORM JOINT THICKNESSES AND FOR ACCURATE LOCATION OF OPENINGS, MOVEMENT-TYPE JOINTS, RETURNS, AND OFFSETS. AVOID USING LESS-THAN-HALF-SIZE UNITS, PARTICULARLY AT CORNERS, JAMBS, AND, WHERE POSSIBLE, AT OTHER LOCATIONS.

B. BOND PATTERN FOR EXPOSED MASONRY: UNLESS OTHERWISE INDICATED, LAY EXPOSED MASONRY IN RUNNING BOND; DO NOT USE UNITS WITH LESS THAN NOMINAL 4-INCH HORIZONTAL FACE DIMENSIONS AT CORNERS OR JAMBS.

C. BUILT-IN WORK: AS CONSTRUCTION PROGRESSES, BUILD IN ITEMS SPECIFIED IN THIS AND OTHER SECTIONS. FILL IN SOLIDLY WITH MASONRY AROUND BUILT-IN ITEMS.

D. FILL SPACE BETWEEN STEEL FRAMES AND MASONRY SOLIDLY WITH MORTAR UNLESS OTHERWISE INDICATED.

E. FILL CORES IN HOLLOW CMUS WITH GROUT 24 INCHES UNDER BEARING PLATES, BEAMS, LINTELS, POSTS, AND SIMILAR ITEMS UNLESS OTHERWISE INDICATED.

3.4 MORTAR BEDDING AND JOINTING

A. LAY HOLLOW CMUS AS FOLLOWS:

1. WITH FACE SHELLS FULLY BEDDED IN MORTAR AND WITH HEAD JOINTS OF DEPTH EQUAL TO BED JOINTS.

2. WITH WEBS FULLY BEDDED IN MORTAR IN ALL COURSES OF PIERS, COLUMNS, AND PILASTERS.

3. WITH WEBS FULLY BEDDED IN MORTAR IN GROUTED MASONRY, INCLUDING STARTING COURSE ON FOOTINGS.

4. WITH ENTIRE UNITS, INCLUDING AREAS UNDER CELLS, FULLY BEDDED IN MORTAR AT STARTING COURSE ON FOOTINGS WHERE CELLS ARE NOT GROUTED.

B. LAY SOLID MASONRY UNITS WITH COMPLETELY FILLED BED AND HEAD JOINTS; BUTTER ENDS WITH SUFFICIENT MORTAR TO FILL HEAD JOINTS AND SHOVE INTO PLACE. DO NOT DEEPLY FURROW BED JOINTS OR SLUSH HEAD JOINTS.

C. TOOL EXPOSED JOINTS SLIGHTLY CONCAVE WHEN THUMBPRINT HARD, USING A JOINTER LARGER THAN JOINT THICKNESS UNLESS OTHERWISE INDICATED.

D. CUT JOINTS FLUSH FOR MASONRY WALLS TO RECEIVE PLASTER OR OTHER DIRECT-APPLIED FINISHES (OTHER THAN PAINT) UNLESS OTHERWISE INDICATED.

3.5 MASONRY JOINT REINFORCEMENT

A. GENERAL: INSTALL ENTIRE LENGTH OF LONGITUDINAL SIDE RODS IN MORTAR WITH A MINIMUM COVER OF 5/8 INCH ON EXTERIOR SIDE OF WALLS, 1/2 INCH ELSEWHERE. LAP REINFORCEMENT A MINIMUM OF 6 INCHES.

1. SPACE REINFORCEMENT NOT MORE THAN 16 INCHES O.C.

2. SPACE REINFORCEMENT NOT MORE THAN 8 INCHES O.C. IN FOUNDATION WALLS AND PARAPET WALLS.

3. PROVIDE REINFORCEMENT NOT MORE THAN 8 INCHES ABOVE AND BELOW WALL OPENINGS AND EXTENDING 12 INCHES BEYOND OPENINGS IN ADDITION TO CONTINUOUS REINFORCEMENT.

B. INTERRUPT JOINT REINFORCEMENT AT CONTROL AND EXPANSION JOINTS UNLESS OTHERWISE INDICATED.

C. PROVIDE CONTINUITY AT WALL INTERSECTIONS BY USING PREFABRICATED T-SHAPED UNITS.

D. PROVIDE CONTINUITY AT CORNERS BY USING PREFABRICATED L-SHAPED UNITS.

3.6 REPAIRING, POINTING, AND CLEANING

A. IN-PROGRESS CLEANING: CLEAN UNIT MASONRY AS WORK PROGRESSES BY DRY BRUSHING TO REMOVE MORTAR FINSH AND SMEARS BEFORE TOOLING JOINTS.

B. FINAL CLEANING: AFTER MORTAR IS THOROUGHLY SET AND CURED, CLEAN EXPOSED MASONRY AS FOLLOWS:

1. TEST CLEANING METHODS ON SAMPLE WALL PANEL; LEAVE ONE-HALF OF PANEL UNCLEANED FOR COMPARISON PURPOSES.

2. PROTECT SURFACES FROM CONTACT WITH CLEANER.

3. WET WALL SURFACES WITH WATER BEFORE APPLYING CLEANERS; REMOVE CLEANERS PROMPTLY BY RINSING SURFACES THOROUGHLY WITH CLEAR WATER.

4. CLEAN BRICK BY BUCKET-AND-BRUSH HAND-CLEANING METHOD DESCRIBED IN BIA TECHNICAL NOTES 20.

5. CLEAN MASONRY WITH A PROPRIETARY ACIDIC CLEANER APPLIED ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

6. CLEAN CONCRETE MASONRY BY CLEANING METHOD INDICATED IN NCMA TEK 8-2A APPLICABLE TO TYPE OF STAIN ON EXPOSED SURFACES.

3.7 MASONRY WASTE DISPOSAL

A. WASTE DISPOSAL AS FILL MATERIAL: DISPOSE OF CLEAN MASONRY WASTE, INCLUDING EXCESS OR SOIL-CONTAMINATED SAND, WASTE MORTAR, AND BROKEN MASONRY UNITS, BY CRUSHING AND MIXING WITH FILL MATERIAL AS FILL IS PLACED.

1. DO NOT DISPOSE OF MASONRY WASTE AS FILL WITHIN 18 INCHES OF FINISHED GRADE.

B. EXCESS MASONRY WASTE: REMOVE EXCESS CLEAN MASONRY WASTE THAT CANNOT BE USED AS FILL, AS DESCRIBED ABOVE, AND OTHER MASONRY WASTE, AND LEGALLY DISPOSE OF OFF OWNER'S PROPERTY.

END OF SECTION 042000

SECTION 048000 – ADHERED MASONRY VENEER

PART 1 – GENERAL

1.1 DESCRIPTION

A. WORK INCLUDED: PROVIDE ADHERED MASONRY VENEER WHERE SHOWN ON THE DRAWINGS, AS SPECIFIED HEREIN, AND AS NEEDED FOR COMPLETE AND PROPER INSTALLATION.

1.2 QUALITY ASSURANCE

A. USE ADEQUATE NUMBERS OF SKILLED WORKMEN WHO ARE THOROUGHLY TRAINED AND EXPERIENCED IN THE NECESSARY CRAFTS AND WHO ARE COMPLETELY FAMILIAR WITH THE SPECIFIED REQUIREMENTS AND THE M METHODS NEEDED FOR PROPER PERFORMANCE OF THE WORK ON THIS SECTION.

B. USE A QUALIFIED MASONRY CONTRACTOR EXPERIENCED IN INSTALLATIONS OF SIMILAR PROCEDURES, AS APPROVED BY THE ARCHITECT.

1.3 SUBMITTALS

A. COMPLY WITH PERTINENT PROVISIONS OF SECTION 013300.

1.4 PRODUCT HANDLING

A. COMPLY WITH PERTINENT PROVISIONS OF SECTION 016000.

B. STORE THE MATERIALS OF THIS SECTION OFF GROUND, AND COVER TO PROTECT FROM ELEMENTS AND ADULTERANTS, PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

PART 2 – PRODUCTS

2.1 MATERIALS

A. VENEER BRICK:

1. PROVIDE UNITS 48 INCHES WIDE BY 96 INCHES LONG BY ¾ INCH THICK, IN BACKWALL FACE TEXTURE AND "RED IRON SPOT WIRE CUT" COLOR, COMPLETE WITH MATCHING 90-DEGREE CORNER UNITS, AS MANUFACTURED BY FULLERTON FINISH SYSTEMS, OR APPROVED EQUAL

2. PROVIDE ALL UNITS WITH STRAIGHT CUT EDGES AND SQUARE CORNERS.

3. DO NOT PERMIT VENEER BRICK UNITS TO VERY MORE THAN 1/8 INCH IN ANY DIMENSIONS FROM THOSE SPECIFIED.

B. MORTAR:

1. PORTLAND CEMENT: COMPLY WITH ASTM C150, TYPE I OR II.

2. SAND: COMPLY WITH ASTM C144, OR PROVIDE FROM 30 TO 60 MESH DRIED AND BAGGED SAND APPROVED IN ADVANCE BY THE ARCHITECT.

3. PROVIDE WATER THAT IS FIT FOR HUMAN CONSUMPTION AND IS FREE FROM IMPURITIES WHICH WOULD BE INJURIOUS TO THE CONSTRUCTION.

4. LIME: PROVIDE HYDRATED LIME COMPLYING WITH ASTM C207.

5. FOR POINTING MORTAR, PROVIDE A MIX OF ONE PART PORTLAND CEMENT AND 1/4 TO 1/2 PART LIME TO THREE PARTS SAND BY VOLUME.

2.2 OTHER MATERIALS

A. PROVIDE OTHER MATERIALS, NOT SPECIFICALLY DESCRIBED BUT REQUIRED FOR A COMPLETE AND PROPER INSTALLATION, AS SELECTED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ARCHITECT.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

A. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH WORK OF THIS SECTION WILL BE PERFORMED. CORRECT CONDITIONS DETRIMENTAL TO TIMELY AND PROPER COMPLETION OF THE WORK. DO NOT PROCEED UNTIL UNSATISFACTORY CONDITIONS ARE CORRECTED.

B. VERIFY THAT VENEER BRICK UNITS AVAILABLE FOR INSTALLATION COMPLY WITH THE SPECIFIED REQUIREMENTS AND ARE WHOLE, UNCHIPPED, AND WITHOUT VISIBLE DEFECTS.

3.2 INSTALLATION

A. THOROUGHLY CLEAN THE SUBSTRATA FREE FROM DEBRIS, DUST, AND FINISHES WHICH WILL NOT BOND WITH THE MORTAR.

1. REMOVE SEALERS, BONDBREAKERS, AND OTHER APPLIED FINISHES BY USE OF LIGHT SANDBLAST OR OTHER MEANS APPROVED BY ARCHITECT.

2. PROVIDE SUBSTRATA WITH THE ABILITY TO RECEIVE AND BOND WITH THE MORTAR.

B. SETTING BED:

1. SPREAD THE APPROVED MORTAR OVER THE SURFACE BY USE OF A NOTCHED TROWEL, ACHIEVING A UNIFORM SETTING BED OF 1/8-INCH MINIMUM THICKNESS.

2. AS AN ALTERNATIVE, WHEN SPECIFICALLY APPROVED IN ADVANCE FOR DESIGNATED SURFACES BY THE ARCHITECT, MORTAR MAY BE APPLIED AS A FULL COVERING ON THE BACK OF BRICK VENEER UNITS.

C. AFTER MORTAR HAS BEEN APPLIED, SLIDE THE VENEER BRICK UNITS INTO PLACE AND PRESS FIRMLY .

1. ACHIEVE FULL CONTACT WITH THE FRESH MORTAR AND ALLOW FULL BEDDING.

2. OCCASIONALLY. LIFT AND REMOVE A BRICK TO VERIFY THAT FUN BEDDING HAS BEEN ACHIEVED.

3. PERMIT MORTAR TO SET UP FULLY PRIOR 10 START OF THE GROUT INSTALLATION.

4. TAKE SPECIAL CARE NOT TO BREAK THE INITAL BOND BETWEEN BRICK AND MORTAR.

5. PLACE BRICK VENEER UNITS TRUE AND LEVEL.

6. LAY OUT EACH WALL OF PANEL IN A MANNER TO MINIMIZE CUTTING OF BRICK VENEER UNITS.

7. PROVIDE MORTAR JOINTS 3/8-INCH WIDE IN EACH DIRECTION.

D. JOINT PATTERN:

1. UNLESS OTHERWISE CALLED FOR ON THE DRAWINGS, SET ALL BRICK VENEER UNITS IN 1/2 BOND.

2. UNLESS OTHERWISE CALLED FOR ON THE DRAWINGS, TOOL ALL MORTAR JOINTS TO A SLIGHT CONCAVE.

E. CLEANING:

1. PROMPTLY DEAN THE BRICK VENEER UNITS AS THE WORK PROGRESSES, MINIMIZING THE NEED FOR FINAL CLEANING.

2. REMOVE ALL CEMENT STAINS AND ALL MORTAR STAINS FROM THE FACE OF THE BRICK VENEER UNITS.

3. IF OTHER METHODS OF CLEANING DO NOT PRODUCE A UNIFORMLY CLEAN SURFACE TO THE APPROVAL OF THE ARCHITECT, PROVIDE LIGHT SANDBLASTING AT NO ADDITIONAL COST TO THE OWNER.

3.3 SEALING

A. UPON COMPLETION OF THE CLEANING OPERATIONS, AND THEIR APPROVAL BY THE ARCHITECT, APPLY ONE COAT OF THE SPECIFIED WATER REPELLENT COALING IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS AS APPROVED BY THE ARCHITECT.

END OF SECTION 04800

SECTION 054000 – COLD-FORMED METAL FRAMING

PART 1 – GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. INTERIOR AND EXTERIOR LOAD-BEARING WALL FRAMING.

2. INTERIOR NON-LOAD BEARING WALL FRAMING

1.2 PERFORMANCE REQUIREMENTS

A. STRUCTURAL PERFORMANCE: PROVIDE COLD-FORMED METAL FRAMING CAPABLE OF WITHSTANDING DESIGN LOADS WITHIN LIMITS AND UNDER CONDITIONS INDICATED.

1. DESIGN LOADS: AS FOLLOWS:

a. DEAD LOADS: 15 LBS/LF.

b. LIVE LOADS: 40 LBS/LF.

2. DEFLECTION LIMITS: DESIGN FRAMING SYSTEMS TO WITHSTAND DESIGN LOADS WITHOUT DEFLECTIONS GREATER THAN THE FOLLOWING:

a. INTERIOR LOAD-BEARING WALL FRAMING: HORIZONTAL DEFLECTION OF 1/240 OF THE WALL HEIGHT UNDER A HORIZONTAL LOAD OF 5 LBF/SQ. FT..

1.3 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT AND ACCESSORY INDICATED.

1.4 QUALITY ASSURANCE

A. PRODUCT TESTS: MILL CERTIFICATES OR DATA FROM A QUALIFIED INDEPENDENT TESTING AGENCY INDICATING STEEL SHEET COMPLIES WITH REQUIREMENTS.

B. AISI SPECIFICATIONS AND STANDARDS: COMPLY WITH AISI'S "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" AND ITS "STANDARD FOR COLD-FORMED STEEL FRAMING – GENERAL PROVISIONS."

1. COMPLY WITH AISI'S "STANDARD FOR COLD-FORMED STEEL FRAMING – HEADER DESIGN."

PART 2 – PRODUCTS

2.1 MATERIALS

A. STEEL SHEET: ASTM A 1003/A 1003M, STRUCTURAL GRADE, TYPE H, METALLIC COATED, OF GRADE AND COATING WEIGHT AS FOLLOWS:

1. GRADE: ST50H.

2. COATING: A60.

2.2 LOAD-BEARING WALL FRAMING

A. STEEL STUDS: MANUFACTURER'S STANDARD C-SHAPED STEEL STUDS, OF WEB DEPTHS INDICATED, PUNCHED, WITH STIFFENED FLANGES, AND AS FOLLOWS:

1. MINIMUM BASE-METAL THICKNESS: 16-GAUGE.

B. STEEL TRACK: MANUFACTURER'S STANDARD U-SHAPED STEEL TRACK, OF WEB DEPTHS INDICATED, UNPUNCHED, WITH STRAIGHT FLANGES, AND SAME MINIMUM BASE-METAL THICKNESS AS STEEL STUDS.

C. STEEL BOX OR BACK-TO-BACK HEADERS: MANUFACTURER'S STANDARD C-SHAPES USED TO FORM HEADER BEAMS, OF WEB DEPTHS INDICATED, PUNCHED, WITH STIFFENED FLANGES, AND AS FOLLOWS:

1. MINIMUM BASE-METAL THICKNESS: 16-GAUGE.

2. FLANGE WIDTH: 1-5/8 INCHES.

LOAD-BEARING WALL FRAMING

A. STEEL STUDS: MANUFACTURER'S STANDARD C-SHAPED STEEL STUDS, OF WEB DEPTHS INDICATED, PUNCHED, WITH STIFFENED FLANGES, AND AS FOLLOWS:

1. MINIMUM BASE-METAL THICKNESS: 25-GAUGE.

B. STEEL TRACK: MANUFACTURER'S STANDARD U-SHAPED STEEL TRACK, OF WEB DEPTHS INDICATED, UNPUNCHED, WITH STRAIGHT FLANGES, AND SAME MINIMUM BASE-METAL THICKNESS AS STEEL STUDS.

C. STEEL BOX OR BACK-TO-BACK HEADERS: MANUFACTURER'S STANDARD C-SHAPES USED TO FORM HEADER BEAMS, OF WEB DEPTHS INDICATED, PUNCHED, WITH STIFFENED FLANGES, AND AS FOLLOWS:

1. MINIMUM BASE-METAL THICKNESS: 22-GAUGE.

2. FLANGE WIDTH: 1-5/8 INCHES.

2.3 FRAMING ACCESSORIES

A. FABRICATE STEEL-FRAMING ACCESSORIES FROM STEEL SHEET, ASTM A 1003/A 1003M, STRUCTURAL GRADE, TYPE H, METALLIC COATED, OF SAME GRADE AND COATING WEIGHT USED FOR FRAMING MEMBERS, UNLESS OTHERWISE INDICATED.

B. STEEL SHAPES AND CLIPS: ASTM A 36/A 36M, ZINC COATED BY HOT-DIP PROCESS ACCORDING TO ASTM A 123/A 123M.

C. ANCHOR BOLTS: ASTM F 1554, GRADE 36, THREADED CARBON-STEEL HEX-HEADED BOLTS AND CARBON-STEEL NUTS; AND FLAT, HARDENED-STEEL WASHERS; ZINC COATED BY HOT-DIP PROCESS ACCORDING TO ASTM A 153/A 153M, CLASS C.

D. EXPANSION ANCHORS: FABRICATED FROM CORROSION-RESISTANT MATERIALS, WITH CAPABILITY TO SUSTAIN, WITHOUT FAILURE, A LOAD EQUAL TO 5 TIMES DESIGN LOAD, AS DETERMINED BY TESTING PER ASTM E 488 CONDUCTED BY A QUALIFIED INDEPENDENT TESTING AGENCY.

E. POWER-ACTUATED ANCHORS: FASTENER SYSTEM OF TYPE SUITABLE FOR APPLICATION INDICATED, FABRICATED FROM CORROSION-RESISTANT MATERIALS, WITH CAPABILITY TO SUSTAIN, WITHOUT FAILURE, A LOAD EQUAL TO 10 TIMES DESIGN LOAD, AS DETERMINED BY TESTING PER ASTM E 1190 CONDUCTED BY A QUALIFIED INDEPENDENT TESTING AGENCY.

F. MECHANICAL FASTENERS: ASTM C 1513, CORROSION-RESISTANT-COATED, SELF-DRILLING, SELF-TAPPING STEEL DRILL SCREWS.

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A2006285
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
CDG Engineers Architects Planners Inc.
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MoDOT

DRAWN BY: DLS
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

DRAWING NO. A-701

2.4 MISCELLANEOUS MATERIALS

A. GALVANIZING REPAIR PAINT: ASTM A 780.

B. SHIMS: LOAD BEARING, HIGH-DENSITY MULTIMONOMER PLASTIC, NONLEACHING.

PART 3 – EXECUTION

3.1 PREPARATION

A. INSTALL LOAD BEARING SHIMS OR GROUT BETWEEN THE UNDERSIDE OF WALL BOTTOM TRACK OR RIM TRACK AND THE TOP OF FOUNDATION WALL OR SLAB AT STUD OR JOIST LOCATIONS TO ENSURE A UNIFORM BEARING SURFACE ON SUPPORTING CONCRETE OR MASONRY CONSTRUCTION.

B. INSTALL SEALER GASKETS TO ISOLATE THE UNDERSIDE OF WALL BOTTOM TRACK OR RIM TRACK AND THE TOP OF FOUNDATION WALL OR SLAB AT STUD OR JOIST LOCATIONS.

3.2 INSTALLATION, GENERAL

A. INSTALL COLD-FORMED METAL FRAMING ACCORDING TO AISI'S "STANDARD FOR COLD-FORMED STEEL FRAMING – GENERAL PROVISIONS" AND TO MANUFACTURER'S WRITTEN INSTRUCTIONS UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.

B. INSTALL COLD-FORMED METAL FRAMING AND ACCESSORIES PLUMB, SQUARE, AND TRUE TO LINE, AND WITH CONNECTIONS SECURELY FASTENED.

C. INSTALL FRAMING MEMBERS IN ONE-PIECE LENGTHS.

D. INSTALL TEMPORARY BRACING AND SUPPORTS TO SECURE FRAMING AND SUPPORT LOADS COMPARABLE IN INTENSITY TO THOSE FOR WHICH STRUCTURE WAS DESIGNED. MAINTAIN BRACES AND SUPPORTS IN PLACE, UNDISTURBED, UNTIL ENTIRE INTEGRATED SUPPORTING STRUCTURE HAS BEEN COMPLETED AND PERMANENT CONNECTIONS TO FRAMING ARE SECURED.

E. ERECTION TOLERANCES: INSTALL COLD-FORMED METAL FRAMING LEVEL, PLUMB, AND TRUE TO LINE TO A MAXIMUM ALLOWABLE TOLERANCE VARIATION OF 1/8 INCH IN 10 FEET AND AS FOLLOWS:

3.3 LOAD-BEARING WALL INSTALLATION

A. INSTALL CONTINUOUS TOP AND BOTTOM TRACKS SIZED TO MATCH STUDS. ALIGN TRACKS ACCURATELY AND SECURELY ANCHOR AT CORNERS AND ENDS, AND AT SPACINGS AS FOLLOWS:

1. ANCHOR SPACING: 24 INCHES.

B. SQUARELY SEAT STUDS AGAINST TOP AND BOTTOM TRACKS WITH GAP NOT EXCEEDING OF 1/8 INCH BETWEEN THE END OF WALL FRAMING MEMBER AND THE WEB OF TRACK. FASTEN BOTH FLANGES OF STUDS TO TOP AND BOTTOM TRACKS. SPACE STUDS AS FOLLOWS:

1. STUD SPACING: 16 INCHES.

C. SET STUDS PLUMB, EXCEPT AS NEEDED FOR DIAGONAL BRACING OR REQUIRED FOR NONPLUMB WALLS OR WARPED SURFACES AND SIMILAR CONFIGURATIONS.

D. ANCHOR STUDS ABUTTING STRUCTURAL COLUMNS OR WALLS, INCLUDING MASONRY WALLS, TO SUPPORTING STRUCTURE AS INDICATED.

E. INSTALL HEADERS OVER WALL OPENINGS WIDER THAN STUD SPACING. LOCATE HEADERS ABOVE OPENINGS AS INDICATED. FABRICATE HEADERS OF COMPOUND SHAPES INDICATED OR REQUIRED TO TRANSFER LOAD TO SUPPORTING STUDS, COMPLETE WITH CLIP-ANGLE CONNECTORS, WEB STIFFENERS, OR GUSSET PLATES.

1. FRAME WALL OPENINGS WITH NOT LESS THAN A DOUBLE STUD AT EACH JAMB OF FRAME AS INDICATED ON SHOP DRAWINGS. FASTEN JAMB MEMBERS TOGETHER TO UNIFORMLY DISTRIBUTE LOADS.

2. INSTALL RUNNER TRACKS AND JACK STUDS ABOVE AND BELOW WALL OPENINGS. ANCHOR TRACKS TO JAMB STUDS WITH CLIP ANGLES OR BY WELDING, AND SPACE JACK STUDS SAME AS FULL-HEIGHT WALL STUDS.

F. INSTALL SUPPLEMENTARY FRAMING, BLOCKING, AND BRACING IN STUD FRAMING INDICATED TO SUPPORT FIXTURES, EQUIPMENT, SERVICES, CASEWORK, HEAVY TRIM, FURNISHINGS, AND SIMILAR WORK REQUIRING ATTACHMENT TO FRAMING.

G. FASTEN AT EACH STUD INTERSECTION.

H. INSTALL STEEL SHEET DIAGONAL BRACING STRAPS TO BOTH STUD FLANGES, TERMINATE AT AND FASTEN TO REINFORCED TOP AND BOTTOM TRACKS. FASTEN CLIP-ANGLE CONNECTORS TO MULTIPLE STUDS AT ENDS OF BRACING AND ANCHOR TO STRUCTURE.

I. INSTALL MISCELLANEOUS FRAMING AND CONNECTIONS, INCLUDING SUPPLEMENTARY FRAMING, WEB STIFFENERS, CLIP ANGLES, CONTINUOUS ANGLES, ANCHORS, AND FASTENERS, TO PROVIDE A COMPLETE AND STABLE WALL-FRAMING SYSTEM.

3.4 REPAIRS AND PROTECTION

A. GALVANIZING REPAIRS: PREPARE AND REPAIR DAMAGED GALVANIZED COATINGS ON FABRICATED AND INSTALLED COLD-FORMED METAL FRAMING WITH GALVANIZED REPAIR PAINT ACCORDING TO ASTM A 780 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

B. PROVIDE FINAL PROTECTION AND MAINTAIN CONDITIONS, IN A MANNER ACCEPTABLE TO MANUFACTURER AND INSTALLER, THAT ENSURE THAT COLD-FORMED METAL FRAMING IS WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.

END OF SECTION 054000

SECTION 055000 – METAL FABRICATIONS

PART 1 – GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. METAL BOLLARDS.

PART 2 – PRODUCTS

2.1 METALS

A. METAL SURFACES, GENERAL: PROVIDE MATERIALS WITH SMOOTH, FLAT SURFACES WITHOUT BLEMISHES.

B. FERROUS METALS:

1. STEEL PLATES, SHAPES, AND BARS: ASTM A 36/A 36M.

2.2 MISCELLANEOUS MATERIALS

A. UNIVERSAL SHOP PRIMER: FAST-CURING, LEAD- AND CHROMATE-FREE, UNIVERSAL MODIFIED-ALKYD PRIMER COMPLYING WITH MPI #79.

2.3 FABRICATION

A. GENERAL: PREASSEMBLE ITEMS IN THE SHOP TO THE GREATEST EXTENT POSSIBLE. USE CONNECTIONS THAT MAINTAIN STRUCTURAL VALUE OF JOINED PIECES.

1. WELD CORNERS AND SEAMS CONTINUOUSLY. USE MATERIALS AND METHODS THAT MINIMIZE DISTORTION AND DEVELOP STRENGTH AND CORROSION RESISTANCE OF BASE METALS. OBTAIN FUSION WITHOUT UNDERCUT OR OVERLAP. REMOVE WELDING FLUX IMMEDIATELY. FINISH EXPOSED WELDS SMOOTH AND BLENDED.

B. MISCELLANEOUS FRAMING AND SUPPORTS: PROVIDE STEEL FRAMING AND SUPPORTS NOT SPECIFIED IN OTHER SECTIONS AS NEEDED TO COMPLETE THE WORK. FABRICATE UNITS FROM STEEL SHAPES, PLATES, AND BARS OF WELDED CONSTRUCTION. CUT, DRILL, AND TAP UNITS TO RECEIVE HARDWARE, HANGERS, AND SIMILAR ITEMS.

C. MISCELLANEOUS STEEL TRIM: FABRICATE UNITS FROM STEEL SHAPES, PLATES, AND BARS OF PROFILES SHOWN WITH CONTINUOUSLY WELDED JOINTS AND SMOOTH EXPOSED EDGES. MITER CORNERS AND USE CONCEALED FIELD SPLICES WHERE POSSIBLE. PROVIDE CUTOUTS, FITTINGS, AND ANCHORAGES AS NEEDED TO COORDINATE ASSEMBLY AND INSTALLATION WITH OTHER WORK.

1. EXTERIOR MISCELLANEOUS STEEL TRIM: PRIME WITH ZINC-RICH PRIMER.

D. METAL BOLLARDS: FABRICATE FROM SCHEDULE 40 STEEL PIPE.

1. CAP BOLLARDS WITH 1/4-INCH- THICK STEEL PLATE.

2. FABRICATE BOLLARDS WITH 3/8-INCH- THICK STEEL BASEPLATES FOR BOLTING TO CONCRETE SLAB. DRILL BASEPLATES AT ALL FOUR CORNERS FOR 3/4-INCH ANCHOR BOLTS.

2.4 FINISHES

A. COMPLY WITH NAAMM'S "METAL FINISHES MANUAL FOR ARCHITECTURAL AND METAL PRODUCTS" FOR RECOMMENDATIONS FOR APPLYING AND DESIGNATING FINISHES. FINISH METAL FABRICATIONS AFTER ASSEMBLY.

B. STEEL AND IRON FINISHES:

1. SHOP PRIMING: APPLY SHOP PRIMER TO UNCOATED SURFACES OF METAL FABRICATIONS TO COMPLY WITH SSPC-PA 1, "PAINT APPLICATION SPECIFICATION NO. 1: SHOP, FIELD, AND MAINTENANCE PAINTING," FOR SHOP PAINTING.

PART 3 – EXECUTION

3.1 INSTALLATION

A. GENERAL: PERFORM CUTTING, DRILLING, AND FITTING REQUIRED FOR INSTALLING METAL FABRICATIONS. SET METAL FABRICATIONS ACCURATELY IN LOCATION, WITH EDGES AND SURFACES LEVEL, PLUMB, AND TRUE.

1. FIT EXPOSED CONNECTIONS ACCURATELY TOGETHER. WELD CONNECTIONS THAT ARE NOT TO BE LEFT AS EXPOSED JOINTS BUT CANNOT BE SHOP WELDED. DO NOT WELD, CUT, OR ABRADE SURFACES OF EXTERIOR UNITS THAT HAVE BEEN HOT-DIP GALVANIZED AFTER FABRICATION.

2. PROVIDE ANCHORAGE DEVICES AND FASTENERS WHERE METAL FABRICATIONS ARE REQUIRED TO BE FASTENED TO IN-PLACE CONSTRUCTION.

B. BOLLARDS:

1. ANCHOR BOLLARDS TO EXISTING CONSTRUCTION WITH EXPANSION ANCHORS. PROVIDE FOUR 3/4-INCH BOLTS AT EACH BOLLARD.

C. TOUCH UP SURFACES AND FINISHES AFTER ERECTION.

1. PAINTED SURFACES: CLEAN FIELD WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS AND TOUCH UP PAINT WITH THE SAME MATERIAL AS USED FOR SHOP PAINTING.

END OF SECTION 055000

SECTION 061053 – MISCELLANEOUS ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. WOOD BLOCKING AND NAILERS.

1.2 QUALITY ASSURANCE

A. FOREST CERTIFICATION: FOR THE FOLLOWING WOOD PRODUCTS, PROVIDE MATERIALS PRODUCED FROM WOOD OBTAINED FROM FORESTS CERTIFIED BY AN FSC-ACCREDITED CERTIFICATION BODY TO COMPLY WITH FSC STD-01-001, "FSC PRINCIPLES AND CRITERIA FOR FOREST STEWARDSHIP":

1. DIMENSION LUMBER FRAMING.

2. MISCELLANEOUS LUMBER.

PART 2 – PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. LUMBER: DOC PS 20 AND APPLICABLE RULES OF GRADING AGENCIES INDICATED. IF NO GRADING AGENCY IS INDICATED, PROVIDE LUMBER THAT COMPLIES WITH THE APPLICABLE RULES OF ANY RULES-WRITING AGENCY CERTIFIED BY THE ALSC BOARD OF REVIEW. PROVIDE LUMBER GRADED BY AN AGENCY CERTIFIED BY THE ALSC BOARD OF REVIEW TO INSPECT AND GRADE LUMBER UNDER THE RULES INDICATED.

1. FACTORY MARK EACH PIECE OF LUMBER WITH GRADE STAMP OF GRADING AGENCY.

2. PROVIDE DRESSED LUMBER, S4S, UNLESS OTHERWISE INDICATED.

2.2 DIMENSION LUMBER FRAMING

A. MAXIMUM MOISTURE CONTENT: 19 PERCENT.

B. OTHER FRAMING: CONSTRUCTION OR NO. 2 GRADE AND THE FOLLOWING SPECIES:

1. SOUTHERN PINE; SPIB.

2. DOUGLAS FIR-LARCH; WCLIB OR WWPA.

2.3 MISCELLANEOUS LUMBER

A. GENERAL: PROVIDE MISCELLANEOUS LUMBER INDICATED AND LUMBER FOR SUPPORT OR ATTACHMENT OF OTHER CONSTRUCTION, INCLUDING THE FOLLOWING:

1. BLOCKING.

2. NAILERS.

2.4 FASTENERS

A. POWER-DRIVEN FASTENERS: NES NER-272.

B. SCREWS FOR FASTENING TO COLD-FORMED METAL FRAMING: ASTM C 954, EXCEPT WITH WAFER HEADS AND REAMER WINGS, LENGTH AS RECOMMENDED BY SCREW MANUFACTURER FOR MATERIAL BEING FASTENED.

2.5 PLYWOOD BACKING PANELS

A. TELEPHONE AND ELECTRICAL EQUIPMENT BACKING PANELS: DOC PS 1, EXTERIOR, C-C PLUGGED, IN THICKNESS INDICATED OR, IF NOT INDICATED, NOT LESS THAN 3/4-INCH NOMINAL THICKNESS.

2.6 MISCELLANEOUS MATERIALS

A. FLEXIBLE FLASHING: SELF-ADHESIVE, RUBBERIZED-ASPHALT COMPOUND, BONDED TO A HIGH-DENSITY, POLYETHYLENE FILM TO PRODUCE AN OVERALL THICKNESS OF NOT LESS THAN 0.025 INCH.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. SECURELY ATTACH CARPENTRY WORK TO SUBSTRATE BY ANCHORING AND FASTENING AS INDICATED.

END OF SECTION 061053

SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. PLASTIC LAMINATE CABINETS.

2. PLASTIC-LAMINATE COUNTERTOPS.

1.2 PROJECT CONDITIONS

A. ENVIRONMENTAL LIMITATIONS: DO NOT DELIVER OR INSTALL WOODWORK UNTIL BUILDING IS ENCLOSED, WET WORK IS COMPLETE, AND HVAC SYSTEM IS OPERATIONS AND MAINTAINING TEMPERATURE AND RELATIVE HUMIDITY AT OCCUPANCY LEVELS DURING THE REMAINDER OF THE CONSTRUCTION PERIOD.

PART 2 – PRODUCTS

2.1 CABINET HARDWARE AND ACCESSORIES

A. GENERAL: PROVIDE CABINET HARDWARE AND NECESSARY MATERIALS ASSOCIATED WITH ARCHITECTURAL WOODWORK.

B. FRAMELESS CONCEALED HINGES (EUROPEAN TYPE): BHMA A156.9, B01602, 170 DEGREES OF OPENING.

C. BACK-MOUNTED PULLS: BHMA A156.9, B02011.

D. DRAWER SLIDES: BHMA A156.09, B05091.

1. STANDARD DUTY (GRADE 1): SIDE MOUNTED; FULL-EXTENSION TYPE; WITH POLYMER ROLLERS.

2.2 FABRICATION

A. WOOD PRODUCTS:

1. HARDBOARD: AHA A135.4

2. MEDIUM DENSITY FIBERBOARD: ANSI A208.2 GRADE MD

3. PARTICLE BOARD: ANSI 208.1 GRADE M-2 EXTERIOR GLUE

B. PLASTIC-LAMINATE COUNTERTOPS:

1. HIGH-PRESSURE DECORATIVE LAMINATE GRADE: HGP.

2. COLORS, PATTERNS, AND FINISHES: AS SELECTED BY ARCHITECT FROM LAMINATE MANUFACTURER'S FULL RANGE OF SOLID COLORS.

3. EDGE TREATMENT: SAME AS LAMINATE CLADDING ON HORIZONTAL SURFACES.

4. CORE MATERIAL AT SINKS: PARTICLEBOARD MADE WITH EXTERIOR GLUE.

2.3 PLASTIC-LAMINATE CABINETS:

A. AWI TYPE OF CABINET CONSTRUCTION: FLUSH OVERLAY

B. AWI DOOR AND DRAWER FRONT STYLE: FLUSH OVERLAY

C. LAMINATE CLADDING FRO EXPOSED SURFACES: HIGH-PRESSURE DECORATIVE LAMINATE AS FOLLOWS:

1. HORIZONTAL SURFACES: GRADE HGS

2. POST-FORMED SURFACES: GRADE HGP

3. VERTICAL SURFACES: GRADE HGS

4. EDGES: GRADE HGS

D. MATERIALS FOR SEMI-EXPOSED SURFACES OTHER THAN DRAWER BODIES: HIGH-PRESSURE DECORATIVE LAMINATE, GRADE CLS.

E. DRAWER BOTTOMS: THERMOSET DECORATIVE PANELS

F. COLORS, PATTERNS AND FINISHES: AS SELECTED BY THE ARCHITECT FROM LAMINATE MANUFACTURERS FULL RANGE OF SOLID COLORS OR PATTERNS IN MATTE FINISH.

G.

PART 3 – EXECUTION

3.1 INSTALLATION

A. BEFORE INSTALLATION, CONDITION WOODWORK TO AVERAGE PREVAILING HUMIDITY CONDITIONS IN INSTALLATION AREAS. EXAMINE SHOP-FABRICATED WORK FOR COMPLETION AND COMPLETE WORK AS REQUIRED, INCLUDING REMOVAL OF PACKING AND BACKPRIMING.

B. GRADE: INSTALL WOODWORK TO COMPLY WITH REQUIREMENTS FOR THE SAME GRADE SPECIFIED IN PART 2 FOR FABRICATION OF TYPE OF WOODWORK INVOLVED.

C. INSTALL WOODWORK LEVEL, PLUMB, TRUE, AND STRAIGHT TO A TOLERANCE OF 1/8 INCH IN 96 INCHES. SHIM AS REQUIRED WITH CONCEALED SHIMS.

D. SCRIBE AND CUT WOODWORK TO FIT ADJOINING WORK, REFINISH CUT SURFACES, AND REPAIR DAMAGED FINISH AT CUTS.

E. ANCHOR WOODWORK TO ANCHORS OR BLOCKING BUILT IN OR DIRECTLY ATTACHED TO SUBSTRATES. SECURE WITH COUNTERSUNK, CONCEALED FASTENERS AND BLIND NAILING AS REQUIRED FOR COMPLETE INSTALLATION. USE FINE FINISHING NAILS OR FINISHING SCREWS FOR EXPOSED FASTENING, COUNTERSUNK AND FILLED FLUSH WITH WOODWORK AND MATCHING FINAL FINISH IF TRANSPARENT FINISH IS INDICATED.

F. CABINETS: INSTALL WITHOUT DISTORTION SO DOORS AND DRAWERS FIT OPENINGS PROPERLY AND ARE ACCURATELY ALIGNED. ADJUST HARDWARE TO CENTER DOORS AND DRAWERS IN OPENINGS AND TO PROVIDE UNENCUMBERED OPERATION.

G. COUNTERTOPS: ANCHOR SECURELY BY SCREWING THROUGH CORNER BLOCKS OF BASE CABINETS OR OTHER SUPPORTS INTO UNDERSIDE OF COUNTERTOP. CALK SPACE BETWEEN BACKSPLASH AND WALL WITH SEALANT SPECIFIED IN DIVISION 07 SECTION "JOINT SEALANTS."

END OF SECTION 064023

SECTION 066400 – PLASTIC PANELING

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES GLASS-FIBER REINFORCED PLASTIC (FRP) WALL PANELING AND TRIM ACCESSORIES.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

PART 2 – PRODUCTS

2.1 PLASTIC SHEET PANELING

A. GENERAL: GELCOAT-FINISHED, GLASS-FIBER REINFORCED PLASTIC PANELS COMPLYING WITH ASTM D 5319.

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. KEMLITE COMPANY INC.

b. MARLITE.

c. NUDO PRODUCTS, INC.

2. NOMINAL THICKNESS: NOT LESS THAN 0.075 INCH.

3. SURFACE FINISH: MOLDED PEBBLE TEXTURE.

4. COLOR: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

2.2 ACCESSORIES

A. TRIM ACCESSORIES: MANUFACTURER'S STANDARD ONE-PIECE VINYL EXTRUSIONS DESIGNED TO RETAIN AND COVER EDGES OF PANELS. PROVIDE DIVISION BARS, INSIDE CORNERS, OUTSIDE CORNERS, AND CAPS AS NEEDED TO CONCEAL EDGES.

1. COLOR: MATCH PANELS.

B. ADHESIVE: AS RECOMMENDED BY PLASTIC PANELING MANUFACTURER.

1. VOC CONTENT: 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

C. SEALANT: SINGLE-COMPONENT, MILDEW-RESISTANT, NEUTRAL-CURING SILICONE SEALANT RECOMMENDED BY PLASTIC PANELING MANUFACTURER.

PART 3 – EXECUTION

3.1 PREPARATION

A. CLEAN SUBSTRATES OF SUBSTANCES THAT COULD IMPAIR BOND OF ADHESIVE, INCLUDING OIL, GREASE, DIRT, AND DUST.

B. CONDITION PANELS BY UNPACKING AND PLACING IN INSTALLATION SPACE BEFORE INSTALLATION ACCORDING TO MANUFACTURER'S WRITTEN RECOMMENDATIONS.

C. LAY OUT PANELING BEFORE INSTALLING. LOCATE PANEL JOINTS WHERE INDICATED SO THAT TRIMMED PANELS AT CORNERS ARE NOT LESS THAN 12 INCHES WIDE.

.2 INSTALLATION

A. INSTALL PLASTIC PANELING ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

B. INSTALL PANELS IN A FULL SPREAD OF ADHESIVE.

C. INSTALL TRIM ACCESSORIES WITH ADHESIVE. DO NOT FASTEN THROUGH PANELS.

D. FILL GROOVES IN TRIM ACCESSORIES WITH SEALANT BEFORE INSTALLING PANELS AND BED INSIDE CORNER TRIM IN A BEAD OF SEALANT.

E. MAINTAIN UNIFORM SPACE BETWEEN PANELS AND WALL FIXTURES. FILL SPACE WITH SEALANT.

F. REMOVE EXCESS SEALANT AND SMEARS AS PANELING IS INSTALLED. CLEAN WITH SOLVENT RECOMMENDED BY SEALANT MANUFACTURER AND THEN WIPE WITH CLEAN DRY CLOTHS UNTIL NO RESIDUE REMAINS.

END OF SECTION 066400

SECTION 072100 – THERMAL INSULATION

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. FOAM-PLASTIC BOARD INSULATION.

2. GLASS-FIBER BLANKET INSULATION.

3. VAPOR RETARDERS.

PART 2 – PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. EXTRUDED-POLYSTYRENE BOARD INSULATION: ASTM C 578, WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY, PER ASTM E 84.

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. DIVERSIFOAM PRODUCTS.

b. DOW CHEMICAL COMPANY (THE).

c. OWENS CORNING.

d. PACTIV BUILDING PRODUCTS.

2.2 GLASS-FIBER BLANKET INSULATION

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. CERTAINTEED CORPORATION.

2. JOHNS MANVILLE.

3. OWENS CORNING.

B. POLYPROPYLENE-SCRIM-KRAFT-FACED, GLASS-FIBER BLANKET INSULATION: ASTM C 665, TYPE II (NON-REFLECTIVE FACED), CLASS A (FACED SURFACE WITH A FLAME-SPREAD INDEX OF 25 OR LESS); CATEGORY 1 (MEMBRANE IS A VAPOR BARRIER).

2.3 VAPOR RETARDERS

A. POLYETHYLENE VAPOR RETARDERS: ASTM D 4397, 6 MILS THICK, WITH MAXIMUM PERMEANCE RATING OF 0.13 PERM.

B. VAPOR-RETARDER TAPE: PRESSURE-SENSITIVE TAPE OF TYPE RECOMMENDED BY VAPOR-RETARDER MANUFACTURER FOR SEALING JOINTS AND PENETRATIONS IN VAPOR RETARDER.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. COMPLY WITH INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS APPLICABLE TO PRODUCTS AND APPLICATIONS INDICATED.

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. CUT AND FIT TIGHTLY AROUND OBSTRUCTIONS AND FILL VOIDS WITH INSULATION. REMOVE PROJECTIONS THAT INTERFERE WITH PLACEMENT.

D. PROVIDE SIZES TO FIT APPLICATIONS INDICATED AND SELECTED FROM MANUFACTURER'S STANDARD THICKNESSES, WIDTHS AND LENGTHS. APPLY SINGLE LAYER OF INSULATION UNITS TO PRODUCE THICKNESS INDICATED UNLESS MULTIPLE LAYERS ARE OTHERWISE SHOWN OR REQUIRED TO MAKE UP TOTAL THICKNESS.

3.2 INSTALLATION OF BELOW-GRADE INSULATION

A. ON VERTICAL FOOTING AND FOUNDATION WALL SURFACES, SET INSULATION UNITS LOOSELY LAID ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

1. IF NOT OTHERWISE INDICATED, EXTEND INSULATION A MINIMUM OF 24 INCHES BELOW EXTERIOR GRADE LINE.

B. ON HORIZONTAL SURFACES UNDER SLABS, 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 24 INCHES IN FROM EXTERIOR WALLS.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. APPLY INSULATION UNITS TO SUBSTRATES BY METHOD INDICATED, COMPLYING WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. IF NO SPECIFIC METHOD IS INDICATED, BOND UNITS TO SUBSTRATE WITH ADHESIVE OR USE MECHANICAL ANCHORAGE TO PROVIDE PERMANENT PLACEMENT AND SUPPORT OF UNITS.

B. FOAM-PLASTIC BOARD INSULATION: SEAL JOINTS BETWEEN UNITS BY APPLYING ADHESIVE, MASTIC, OR SEALANT TO EDGES OF EACH UNIT TO FORM A TIGHT SEAL AS UNITS ARE SHOVED INTO PLACE. FILL VOIDS IN COMPLETED INSTALLATION WITH ADHESIVE, MASTIC, OR SEALANT AS RECOMMENDED BY INSULATION MANUFACTURER.

C. GLASS-FIBER 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. INSTALL EAVE VENTILATION TROUGHS BETWEEN ROOF FRAMING MEMBERS IN INSULATED ATTIC SPACES AT VENTED EAVES.

5. 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.

6. SVAPOR-RETARDER-FACED BLANKETS: TAPE JOINTS AND RUPTURES IN VAPOR-RETARDER FACINGS, AND SEAL EACH CONTINUOUS AREA OF INSULATION TO ENSURE AIRTIGHT INSTALLATION.

a. EXTERIOR WALLS: SET UNITS WITH FACING PLACED TOWARD EXTERIOR OF CONSTRUCTION.

b. INTERIOR WALLS: SET UNITS WITH FACING PLACED TOWARD AREAS OF HIGH HUMIDITY.

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER AR005255
REGISTERED ARCHITECT
6/10/09

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

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DATE 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-702

3.4 INSTALLATION OF INSULATION FOR CONCRETE SUBSTRATES

A. INSTALL BOARD INSULATION ON CONCRETE SUBSTRATES BY ADHESIVELY ATTACHED, SPINDLE-TYPE INSULATION ANCHORS AS FOLLOWS:

1. FASTEN INSULATION ANCHORS TO CONCRETE SUBSTRATES WITH INSULATION ANCHOR ADHESIVE ACCORDING TO ANCHOR MANUFACTURER'S WRITTEN INSTRUCTIONS. SPACE ANCHORS ACCORDING TO INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSULATION TYPE, THICKNESS, AND APPLICATION INDICATED.
2. AFTER ADHESIVE HAS DRIED, INSTALL BOARD INSULATION BY PRESSING INSULATION INTO POSITION OVER SPINDLES AND SECURING IT TIGHTLY IN PLACE WITH INSULATION-RETAINING WASHERS, TAKING CARE NOT TO COMPRESS INSULATION BELOW INDICATED THICKNESS.

END OF SECTION 072100

SECTION 072500 – WEATHER BARRIERS

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. BUILDING PAPER.
2. BUILDING WRAP.
3. FLEXIBLE FLASHING.

1.2 ACTION SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT.

PART 2 – PRODUCTS

2.1 WATER-RESISTIVE BARRIER

A. BUILDING PAPER: ASTM D 226, TYPE 1 (NO. 15 ASPHALT-SATURATED ORGANIC FELT), UNPERFORATED.

B. BUILDING WRAP: ASTM E 1677, TYPE I AIR BARRIER; WITH FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF LESS THAN 25 AND 450, RESPECTIVELY, WHEN TESTED ACCORDING TO ASTM E 84; UV STABILIZED; AND ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

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 CHEMICAL COMPANY (THE); STYROFOAM WEATHERMATE PLUS BRAND HOUSEWRAP.
   b. DUPONT (E. I. DU PONT DE NEMOURS AND COMPANY); TYVEK COMMERCIALWRAP.
   c. LUDLOW COATED PRODUCTS; BARRICADE BUILDING WRAP.
2. WATER-VAPOR PERMEANCE: NOT LESS THAN 50 G THROUGH 1 SQ. M OF SURFACE IN 24 HOURS PER ASTM E 96/E 96M, DESICCANT METHOD (PROCEDURE A).

C. BUILDING-WRAP TAPE: PRESSURE-SENSITIVE PLASTIC TAPE RECOMMENDED BY BUILDING-WRAP MANUFACTURER FOR SEALING JOINTS AND PENETRATIONS IN BUILDING WRAP.

PART 3 – EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. COVER SHEATHING WITH WATER-RESISTIVE BARRIER AS FOLLOWS:

1. CUT BACK BARRIER 1/2 INCH ON EACH SIDE OF THE BREAK IN SUPPORTING MEMBERS AT EXPANSION- OR CONTROL-JOINT LOCATIONS.
2. APPLY BARRIER TO COVER VERTICAL FLASHING WITH A MINIMUM 4-INCH OVERLAP UNLESS OTHERWISE INDICATED.

B. BUILDING PAPER: APPLY HORIZONTALLY WITH A 2-INCH OVERLAP AND A 6-INCH END LAP; FASTEN TO SHEATHING WITH GALVANIZED STAPLES OR ROOFING NAILS.

C. BUILDING WRAP: COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

1. SEAL SEAMS, EDGES, FASTENERS, AND PENETRATIONS WITH TAPE.
2. EXTEND INTO JAMBS OF OPENINGS AND SEAL CORNERS WITH TAPE.

END OF SECTION 072500

SECTION 078413 – PENETRATION FIRESTOPPING

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. PRODUCT TEST REPORTS.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

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. GRACE CONSTRUCTION PRODUCTS.
2. 3M FIRE PROTECTION PRODUCTS.
3. TREMCO, INC.; TREMCO FIRE PROTECTION SYSTEMS GROUP.

2.2 PENETRATION FIRESTOPPING

A. PROVIDE PENETRATION FIRESTOPPING THAT IS PRODUCED AND INSTALLED TO RESIST SPREAD OF FIRE ACCORDING TO REQUIREMENTS INDICATED, RESIST PASSAGE OF SMOKE AND OTHER GASES, AND MAINTAIN ORIGINAL FIRE-RESISTANCE RATING OF CONSTRUCTION PENETRATED. PENETRATION FIRESTOPPING SYSTEMS SHALL BE COMPATIBLE WITH ONE ANOTHER, WITH THE SUBSTRATES FORMING OPENINGS, AND WITH PENETRATING ITEMS IF ANY.

B. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: RATINGS DETERMINED PER ASTM E 814 OR UL 1479, BASED ON TESTING AT A POSITIVE PRESSURE DIFFERENTIAL OF 0.01-INCH WG.

1. F-RATING: NOT LESS THAN THE FIRE-RESISTANCE RATING OF CONSTRUCTIONS PENETRATED.

C. EXPOSED PENETRATION FIRESTOPPING: PROVIDE PRODUCTS WITH FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF LESS THAN 25 AND 450, RESPECTIVELY, AS DETERMINED PER ASTM E 84.

D. VOC CONTENT: PROVIDE PENETRATION FIRESTOPPING THAT COMPLIES WITH THE FOLLOWING LIMITS FOR VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24):

1. ARCHITECTURAL SEALANTS: 250 G/L.
2. SEALANT PRIMERS FOR NONPOROUS SUBSTRATES: 250 G/L.
3. SEALANT PRIMERS FOR POROUS SUBSTRATES: 775 G/L.

E. ACCESSORIES: PROVIDE COMPONENTS FOR EACH PENETRATION FIRESTOPPING SYSTEM THAT ARE NEEDED TO INSTALL FILL MATERIALS AND TO MAINTAIN RATINGS REQUIRED. USE ONLY THOSE COMPONENTS SPECIFIED BY PENETRATION FIRESTOPPING MANUFACTURER AND APPROVED BY QUALIFIED TESTING AND INSPECTING AGENCY FOR FIRESTOPPING INDICATED.

PART 3 – EXECUTION

3.1 INSTALLATION

A. EXAMINE SUBSTRATES AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR OPENING CONFIGURATIONS, PENETRATING ITEMS, SUBSTRATES, AND OTHER CONDITIONS AFFECTING PERFORMANCE OF THE WORK.

B. INSTALL PENETRATION FIRESTOPPING TO COMPLY WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AND PUBLISHED DRAWINGS FOR PRODUCTS AND APPLICATIONS INDICATED.

C. INSTALL FORMING MATERIALS AND OTHER ACCESSORIES OF TYPES REQUIRED TO SUPPORT FILL MATERIALS DURING THEIR APPLICATION AND IN THE POSITION NEEDED TO PRODUCE CROSS-SECTIONAL SHAPES AND DEPTHS REQUIRED TO ACHIEVE FIRE RATINGS INDICATED.

1. AFTER INSTALLING FILL MATERIALS AND ALLOWING THEM TO FULLY CURE, REMOVE COMBUSTIBLE FORMING MATERIALS AND OTHER ACCESSORIES NOT INDICATED AS PERMANENT COMPONENTS OF FIRESTOPPING.

3.2 IDENTIFICATION

A. IDENTIFY PENETRATION FIRESTOPPING WITH PREPRINTED METAL OR PLASTIC LABELS. ATTACH LABELS PERMANENTLY TO SURFACES ADJACENT TO AND WITHIN 6 INCHES OF FIRESTOPPING EDGE SO LABELS WILL BE VISIBLE TO ANYONE SEEKING TO REMOVE PENETRATING ITEMS OR FIRESTOPPING. USE MECHANICAL FASTENERS OR SELF-ADHERING-TYPE LABELS WITH ADHESIVES CAPABLE OF PERMANENTLY BONDING LABELS TO SURFACES ON WHICH LABELS ARE PLACED. INCLUDE THE FOLLOWING INFORMATION ON LABELS:

1. THE WORDS "WARNING – PENETRATION FIRESTOPPING – DO NOT DISTURB. NOTIFY BUILDING MANAGEMENT OF ANY DAMAGE."
2. DATE OF INSTALLATION.
3. MANUFACTURER'S NAME.
4. INSTALLER'S NAME.

3.3 PENETRATION FIRESTOPPING SCHEDULE

A. WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

B. FIRESTOPPING FOR METALLIC PIPES, CONDUIT, OR TUBING:

1. UL-CLASSIFIED SYSTEMS: W-L-1149.

C. FIRESTOPPING FOR NONMETALLIC PIPE, CONDUIT, OR TUBING:

1. UL-CLASSIFIED SYSTEMS: W-L-1154.

D. FIRESTOPPING FOR ELECTRICAL CABLES:

1. UL-CLASSIFIED SYSTEMS: W-L-3120.

END OF SECTION 078413

SECTION 079200 – JOINT SEALANTS

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. SILICONE JOINT SEALANTS.
2. LATEX JOINT SEALANTS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH JOINT-SEALANT PRODUCT INDICATED.

B. PRODUCT TEST REPORTS.

C. WARRANTIES.

1.3 WARRANTY

A. SPECIAL INSTALLER'S WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH INSTALLER AGREES TO REPAIR OR REPLACE JOINT SEALANTS THAT DO NOT COMPLY WITH PERFORMANCE AND OTHER REQUIREMENTS SPECIFIED IN THIS SECTION WITHIN SPECIFIED WARRANTY PERIOD.

1. WARRANTY PERIOD: TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

A. VOC CONTENT OF INTERIOR SEALANTS: PROVIDE SEALANTS AND SEALANT PRIMERS FOR USE INSIDE THE WEATHERPROOFING SYSTEM THAT COMPLY WITH THE FOLLOWING LIMITS FOR VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, PART 59, SUBPART D (EPA METHOD 24):

1. ARCHITECTURAL SEALANTS: 250 G/L.
2. SEALANT PRIMERS FOR NONPOROUS SUBSTRATES: 250 G/L.
3. SEALANT PRIMERS FOR POROUS SUBSTRATES: 775 G/L.

2.2 SILICONE JOINT SEALANTS

A. NEUTRAL-CURING SILICONE JOINT SEALANT: ASTM C 920.

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. BASF BUILDING SYSTEMS.
   b. DOW CORNING CORPORATION.
   c. TREMCO INCORPORATED.
2. TYPE: SINGLE COMPONENT (S).
3. GRADE: NONSAG (NS).
4. CLASS: 50.
5. USES RELATED TO EXPOSURE: NONTRAFFIC (NT).

2.3 LATEX JOINT SEALANTS

A. LATEX JOINT SEALANT: ACRYLIC LATEX OR SILICONIZED ACRYLIC LATEX, ASTM C 834, TYPE OP, GRADE NF.

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. BASF BUILDING SYSTEMS.
   b. PECORA CORPORATION.
   c. TREMCO INCORPORATED.

2.4 JOINT SEALANT BACKING

A. CYLINDRICAL SEALANT BACKINGS: ASTM C 1330, TYPE C (CLOSED-CELL MATERIAL WITH A SURFACE SKIN), AND OF SIZE AND DENSITY TO CONTROL SEALANT DEPTH AND OTHERWISE CONTRIBUTE TO PRODUCING OPTIMUM SEALANT PERFORMANCE.

B. BOND-BREAKER TAPE: POLYETHYLENE TAPE OR OTHER PLASTIC TAPE RECOMMENDED BY SEALANT MANUFACTURER.

2.5 MISCELLANEOUS MATERIALS

A. PRIMER: MATERIAL RECOMMENDED BY JOINT-SEALANT MANUFACTURER WHERE REQUIRED FOR ADHESION OF SEALANT TO JOINT SUBSTRATES INDICATED, AS DETERMINED FROM PRECONSTRUCTION JOINT-SEALANT-SUBSTRATE TESTS AND FIELD TESTS.

B. CLEANERS FOR NONPOROUS SURFACES: CHEMICAL CLEANERS ACCEPTABLE TO MANUFACTURERS OF SEALANTS AND SEALANT BACKING MATERIALS.

C. MASKING TAPE: NONSTAINING, NONABSORBENT MATERIAL COMPATIBLE WITH JOINT SEALANTS AND SURFACES ADJACENT TO JOINTS.

PART 3 – EXECUTION

3.1 PREPARATION

A. SURFACE CLEANING OF JOINTS: CLEAN OUT JOINTS IMMEDIATELY BEFORE INSTALLING JOINT SEALANTS TO COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTRUCTIONS.

1. CLEAN NONPOROUS JOINT SUBSTRATE SURFACES WITH CHEMICAL CLEANERS OR OTHER MEANS THAT DO NOT STAIN, HARM SUBSTRATES, OR LEAVE RESIDUES CAPABLE OF INTERFERING WITH ADHESION OF JOINT SEALANTS.

B. JOINT PRIMING: PRIME JOINT SUBSTRATES WHERE RECOMMENDED BY JOINT-SEALANT MANUFACTURER OR AS INDICATED BY PRECONSTRUCTION JOINT-SEALANT-SUBSTRATE TESTS OR PRIOR EXPERIENCE. APPLY PRIMER TO COMPLY WITH JOINT-SEALANT MANUFACTURER'S WRITTEN INSTRUCTIONS. CONFINE PRIMERS TO AREAS OF JOINT-SEALANT BOND; DO NOT ALLOW SPILLAGE OR MIGRATION ONTO ADJOINING SURFACES.

C. MASKING TAPE: USE MASKING TAPE WHERE REQUIRED TO PREVENT CONTACT OF SEALANT OR PRIMER WITH ADJOINING SURFACES THAT OTHERWISE WOULD BE PERMANENTLY STAINED OR DAMAGED BY SUCH CONTACT OR BY CLEANING METHODS REQUIRED TO REMOVE SEALANT SMEARS. REMOVE TAPE IMMEDIATELY AFTER TOOLING WITHOUT DISTURBING JOINT SEAL.

3.2 INSTALLATION

A. SEALANT INSTALLATION STANDARD: COMPLY WITH RECOMMENDATIONS IN ASTM C 1193 FOR USE OF JOINT SEALANTS AS APPLICABLE TO MATERIALS, APPLICATIONS, AND CONDITIONS INDICATED.

B. INSTALL SEALANT BACKINGS OF KIND INDICATED TO SUPPORT SEALANTS DURING APPLICATION AND AT POSITION REQUIRED TO PRODUCE CROSS-SECTIONAL SHAPES AND DEPTHS OF INSTALLED SEALANTS RELATIVE TO JOINT WIDTHS THAT ALLOW OPTIMUM SEALANT MOVEMENT CAPABILITY.

C. INSTALL BOND-BREAKER TAPE BEHIND SEALANTS WHERE SEALANT BACKINGS ARE NOT USED BETWEEN SEALANTS AND BACKS OF JOINTS.

D. INSTALL SEALANTS USING PROVEN TECHNIQUES THAT COMPLY WITH THE FOLLOWING AND AT THE SAME TIME BACKINGS ARE INSTALLED:

1. PLACE SEALANTS SO THEY DIRECTLY CONTACT AND FULLY WET JOINT SUBSTRATES.
2. COMPLETELY FILL RECESSES IN EACH JOINT CONFIGURATION.
3. PRODUCE UNIFORM, CROSS-SECTIONAL SHAPES AND DEPTHS RELATIVE TO JOINT WIDTHS THAT ALLOW OPTIMUM SEALANT MOVEMENT CAPABILITY.

E. TOOLING OF NONSAG SEALANTS: IMMEDIATELY AFTER SEALANT APPLICATION AND BEFORE SKINNING OR CURING BEGINS, TOOL SEALANTS ACCORDING TO REQUIREMENTS SPECIFIED IN SUBPARAGRAPHS BELOW TO FORM SMOOTH, UNIFORM BEADS OF CONFIGURATION INDICATED; TO ELIMINATE AIR POCKETS; AND TO ENSURE CONTACT AND ADHESION OF SEALANT WITH SIDES OF JOINT.

F. CLEAN OFF EXCESS SEALANT OR SEALANT SMEARS ADJACENT TO JOINTS AS THE WORK PROGRESSES BY METHODS AND WITH CLEANING MATERIALS APPROVED IN WRITING BY MANUFACTURERS OF JOINT SEALANTS AND OF PRODUCTS IN WHICH JOINTS OCCUR.

END OF SECTION 079200

SECTION 081113 – HOLLOW METAL DOORS AND FRAMES

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. STANDARD HOLLOW METAL DOORS AND FRAMES.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: INCLUDE ELEVATIONS, DOOR EDGE DETAILS, FRAME PROFILES, METAL THICKNESSES, PREPARATIONS FOR HARDWARE, AND OTHER DETAILS.

C. SCHEDULE: PREPARED BY OR UNDER THE SUPERVISION OF SUPPLIER, USING SAME REFERENCE NUMBERS FOR DETAILS AND OPENINGS AS THOSE ON DRAWINGS.

1.3 QUALITY ASSURANCE

A. FIRE-RATED DOOR ASSEMBLIES: ASSEMBLIES COMPLYING WITH NFPA 80 THAT ARE LISTED AND LABELED BY A QUALIFIED TESTING AGENCY, FOR FIRE-PROTECTION RATINGS INDICATED, BASED ON TESTING AT AS CLOSE TO NEUTRAL PRESSURE AS POSSIBLE ACCORDING TO NFPA 252.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

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. AMWELD BUILDING PRODUCTS, LLC.
2. CECO DOOR PRODUCTS; AN ASSA ABLOY GROUP COMPANY.
3. STEELCRAFT; AN INGERSOLL-RAND COMPANY.

2.2 MATERIALS

A. COLD-ROLLED STEEL SHEET: ASTM A 1008/A 1008M, CS, TYPE B; SUITABLE FOR EXPOSED APPLICATIONS.

B. HOT-ROLLED STEEL SHEET: ASTM A 1011/A 1011M, CS, TYPE B.

C. METALLIC-COATED STEEL SHEET: ASTM A 653/A 653M, COMMERCIAL STEEL (CS), TYPE B; WITH MINIMUM A40 METALLIC COATING.

D. FRAME ANCHORS: ASTM A 591/A 591M, COMMERCIAL STEEL (CS), 40Z COATING DESIGNATION; MILL PHOSPHATIZED.

E. INSERTS, BOLTS, AND FASTENERS: HOT-DIP GALVANIZED ACCORDING TO ASTM A 153/A 153M.

F. GROUT: ASTM C 476, EXCEPT WITH A MAXIMUM SLUMP OF 4 INCHES, AS MEASURED ACCORDING TO ASTM C 143/C 143M.

G. MINERAL-FIBER INSULATION: ASTM C 665, TYPE I.

H. GLAZING: DIVISION 08 SECTION "GLAZING."

2.3 STANDARD HOLLOW METAL DOORS

A. GENERAL: COMPLY WITH ANSI/SDI A250.8.

1. DESIGN: FLUSH PANEL.
2. CORE CONSTRUCTION: MANUFACTURER'S STANDARD KRAFT-PAPER HONEYCOMB, POLYSTYRENE, POLYURETHANE, POLYISOCYANURATE, MINERAL-BOARD, OR VERTICAL STEEL-STIFFENER CORE.
   a. FIRE DOOR CORE: AS REQUIRED TO PROVIDE FIRE-PROTECTION RATINGS INDICATED.
3. VERTICAL EDGES FOR SINGLE-ACTING DOORS: BEVELED EDGE, 1/8 INCH IN 2 INCHES.
4. TOP AND BOTTOM EDGES: CLOSED WITH FLUSH END CLOSURES OR CHANNELS OF SAME MATERIAL AS FACE SHEETS.
5. TOLERANCES: SDI 117, "MANUFACTURING TOLERANCES FOR STANDARD STEEL DOORS AND FRAMES."

A. EXTERIOR DOORS: FACE SHEETS FABRICATED FROM METALLIC-COATED STEEL SHEET. COMPLY WITH ANSI/SDI A250.8 FOR LEVEL AND MODEL AND ANSI/SDI A250.4 FOR PHYSICAL PERFORMANCE LEVEL:

1. LEVEL 2 AND PHYSICAL PERFORMANCE LEVEL B (HEAVY DUTY).

C. INTERIOR DOORS: FACE SHEETS FABRICATED FROM COLD-ROLLED STEEL SHEET. PROVIDE DOORS COMPLYING WITH REQUIREMENTS INDICATED BELOW BY REFERENCING ANSI/SDI A250.8 FOR LEVEL AND MODEL AND ANSI/SDI A250.4 FOR PHYSICAL PERFORMANCE LEVEL:

1. LEVEL 1 AND PHYSICAL PERFORMANCE LEVEL C (STANDARD DUTY).
   a. WIDTH: 1-3/4 INCHES.

D. HARDWARE REINFORCEMENT: ANSI/SDI A250.6.

2.4 STANDARD HOLLOW METAL FRAMES

A. GENERAL: COMPLY WITH ANSI/SDI A250.8.

B. EXTERIOR FRAMES: FABRICATED FROM METALLIC-COATED STEEL SHEET.

1. FABRICATE FRAMES WITH MITERED OR COPED CORNERS.
2. FABRICATE FRAMES AS FULL PROFILE WELDED UNLESS OTHERWISE INDICATED.
3. FRAMES FOR LEVEL 2 STEEL DOORS: 0.053-INCH- THICK STEEL SHEET.

C. INTERIOR FRAMES: FABRICATED FROM COLD-ROLLED STEEL SHEET UNLESS METALLIC-COATED SHEET IS INDICATED.

1. FABRICATE FRAMES WITH MITERED OR COPED CORNERS.
2. FABRICATE FRAMES AS FULL PROFILE WELDED UNLESS OTHERWISE INDICATED.
3. FABRICATE KNOCKED-DOWN, DRYWALL SLIP-ON FRAMES FOR IN-PLACE GYPSUM BOARD PARTITIONS.
4. FRAMES FOR LEVEL 1 STEEL DOORS: 0.042-INCH- THICK STEEL SHEET.
5. FRAMES FOR BORROWED LIGHTS: 0.042-INCH- THICK STEEL SHEET.

D. HARDWARE REINFORCEMENT: ANSI/SDI A250.6.

2.5 FRAME ANCHORS

A. JAMB ANCHORS:

1. MASONRY TYPE: ADJUSTABLE STRAP-AND-STIRRUP OR T-SHAPED ANCHORS TO SUIT FRAME SIZE, NOT LESS THAN 0.042 INCH THICK, WITH CORRUGATED OR PERFORATED STRAPS NOT LESS THAN 2 INCHES WIDE BY 10 INCHES LONG; OR WIRE ANCHORS NOT LESS THAN 0.177 INCH THICK.
2. STUD-WALL TYPE: DESIGNED TO ENGAGE STUD, WELDED TO BACK OF FRAMES; NOT LESS THAN 0.042 INCH THICK.

B. FLOOR ANCHORS: FORMED FROM SAME MATERIAL AS FRAMES, NOT LESS THAN 0.042 INCH THICK, AND AS FOLLOWS:

1. MONOLITHIC CONCRETE SLABS: CLIP-TYPE ANCHORS, WITH TWO HOLES TO RECEIVE FASTENERS.

2.6 STOPS AND MOLDINGS

A. MOLDINGS FOR GLAZED LITES IN DOORS: MINIMUM 0.032 INCH THICK, SAME MATERIAL AS DOOR FACE SHEET.

B. FIXED FRAME MOLDINGS: FORMED INTEGRAL WITH HOLLOW METAL FRAMES, A MINIMUM OF 5/8 INCH HIGH UNLESS OTHERWISE INDICATED.

C. LOOSE STOPS FOR GLAZED LITES IN FRAMES: MINIMUM 0.032 INCH THICK, SAME MATERIAL AS FRAMES.

2.7 FABRICATION

A. TOLERANCES: FABRICATE HOLLOW METAL WORK TO TOLERANCES INDICATED IN SDI 117.

B. HOLLOW METAL DOORS:

1. EXTERIOR DOORS: PROVIDE WEEP-HOLE OPENINGS IN BOTTOM OF EXTERIOR DOORS. SEAL JOINTS IN TOP EDGES OF DOORS AGAINST WATER PENETRATION.
2. GLAZED LITES: FACTORY CUT OPENINGS IN DOORS.
3. ASTRAGALS: PROVIDE OVERLAPPING ASTRAGAL ON ONE LEAF OF PAIRS OF DOORS WHERE REQUIRED BY NFPA 80 FOR FIRE-PERFORMANCE RATING OR WHERE INDICATED.

C. HOLLOW METAL FRAMES: WHERE FRAMES ARE FABRICATED IN SECTIONS, PROVIDE ALIGNMENT PLATES OR ANGLES AT EACH JOINT, FABRICATED OF SAME THICKNESS METAL AS FRAMES.

1. WELDED FRAMES: WELD FLUSH FACE JOINTS CONTINUOUSLY; GRIND, FILL, DRESS, AND MAKE SMOOTH, FLUSH, AND INVISIBLE.
2. PROVIDE COUNTERSUNK, FLAT- OR OVAL-HEAD EXPOSED SCREWS AND BOLTS FOR EXPOSED FASTENERS UNLESS OTHERWISE INDICATED.
3. FLOOR ANCHORS: WELD ANCHORS TO BOTTOM OF JAMBS AND MULLIONS WITH AT LEAST FOUR SPOT WELDS PER ANCHOR.
4. JAMB ANCHORS: PROVIDE NUMBER AND SPACING OF ANCHORS AS FOLLOWS:
   a. MASONRY TYPE: LOCATE ANCHORS NOT MORE THAN 18 INCHES FROM TOP AND BOTTOM OF FRAME. SPACE ANCHORS NOT MORE THAN 32 INCHES O.C. AND AS FOLLOWS:
   b. STUD-WALL TYPE: LOCATE ANCHORS NOT MORE THAN 18 INCHES FROM TOP AND BOTTOM OF FRAME. SPACE ANCHORS NOT MORE THAN 32 INCHES O.C.
5. DOOR SILENCERS: EXCEPT ON WEATHER-STRIPPED DOORS, DRILL STOPS TO RECEIVE DOOR SILENCERS.
   a. SINGLE-DOOR FRAMES: THREE DOOR SILENCERS.
   b. DOUBLE-DOOR FRAMES: SIX DOOR SILENCERS, 3 PER DOOR.

D. HARDWARE PREPARATION: FACTORY PREPARE HOLLOW METAL WORK TO RECEIVE TEMPLATED MORTISED HARDWARE ACCORDING TO THE DOOR HARDWARE SCHEDULE AND TEMPLATES FURNISHED AS SPECIFIED IN DIVISION 08 SECTION "DOOR HARDWARE."

E. STOPS AND MOLDINGS: PROVIDE STOPS AND MOLDINGS AROUND GLAZED LITES WHERE INDICATED. FORM CORNERS OF STOPS AND MOLDINGS WITH BUTTED OR MITERED HAIRLINE JOINTS.

2.8 STEEL FINISHES

A. PRIME FINISH: APPLY MANUFACTURER'S STANDARD PRIMER IMMEDIATELY AFTER CLEANING AND PRETREATING.

1. SHOP PRIMER: ANSI/SDI A250.10.

PART 3 – EXECUTION

3.1 INSTALLATION

A. HOLLOW METAL FRAMES: COMPLY WITH ANSI/SDI A250.11.

1. SET FRAMES ACCURATELY IN POSITION, PLUMBED, ALIGNED, AND BRACED SECURELY UNTIL PERMANENT ANCHORS ARE SET. AFTER WALL CONSTRUCTION IS COMPLETE, REMOVE TEMPORARY BRACES, LEAVING SURFACES SMOOTH AND UNDAMAGED.
2. FLOOR ANCHORS: PROVIDE FLOOR ANCHORS FOR EACH JAMB AND MULLION THAT EXTENDS TO FLOOR, AND SECURE WITH POSTINSTALLED EXPANSION ANCHORS.
   a. FLOOR ANCHORS MAY BE SET WITH POWDER-ACTUATED FASTENERS INSTEAD OF POSTINSTALLED EXPANSION ANCHORS IF SO INDICATED AND APPROVED ON SHOP DRAWINGS.
3. METAL-STUD PARTITIONS: SOLIDLY PACK MINERAL-FIBER INSULATION BEHIND FRAMES.
4. MASONRY WALLS: COORDINATE INSTALLATION OF FRAMES TO ALLOW FOR SOLIDLY FILLING SPACE BETWEEN FRAMES AND MASONRY WITH GROUT.
5. INSTALLATION TOLERANCES: ADJUST HOLLOW METAL DOOR FRAMES FOR SQUARENESS, ALIGNMENT, TWIST, AND PLUMB TO PLUS OR MINUS 1/16 INCH.

B. HOLLOW METAL DOORS: FIT HOLLOW METAL DOORS ACCURATELY IN FRAMES, WITHIN CLEARANCES SPECIFIED BELOW. SHIM AS NECESSARY.

1. NON-FIRE-RATED STANDARD STEEL DOORS:
   a. JAMBS AND HEAD: 1/8 INCH PLUS OR MINUS 1/16 INCH.
   b. BETWEEN EDGES OF PAIRS OF DOORS: 1/8 INCH PLUS OR MINUS 1/16 INCH.
   c. BETWEEN BOTTOM OF DOOR AND TOP OF THRESHOLD: MAXIMUM 3/8 INCH.
   d. BETWEEN BOTTOM OF DOOR AND TOP OF FINISH FLOOR (NO THRESHOLD): MAXIMUM

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
Number
A0006265
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

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SCALE AS SHOWN
DATE 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-703

1. FIRE-RATED DOORS: INSTALL DOORS WITH CLEARANCES ACCORDING TO NFPA 80.

A. GLAZING: COMPLY WITH INSTALLATION REQUIREMENTS IN DIVISION 08 SECTION "GLAZING" AND WITH HOLLOW METAL MANUFACTURER'S WRITTEN INSTRUCTIONS.

1. SECURE STOPS WITH COUNTERSUNK FLAT-- OR OVAL-HEAD MACHINE SCREWS SPACED UNIFORMLY NOT MORE THAN 9 INCHES O.C. AND NOT MORE THAN 2 INCHES O.C. FROM EACH CORNER.

3.2 ADJUSTING AND CLEANING

A. FINAL ADJUSTMENTS: CHECK AND READJUST OPERATING HARDWARE ITEMS IMMEDIATELY BEFORE FINAL INSPECTION. LEAVE WORK IN COMPLETE AND PROPER OPERATING CONDITION. REMOVE AND REPLACE DEFECTIVE WORK, INCLUDING HOLLOW METAL WORK THAT IS WARPED, BOWED, OR OTHERWISE UNACCEPTABLE.

B. PRIME-COAT TOUCHUP: IMMEDIATELY AFTER ERECTION, SAND SMOOTH RUSTED OR DAMAGED AREAS OF PRIME COAT AND APPLY TOUCHUP OF COMPATIBLE AIR-DRYING, RUST-INHIBITIVE PRIMER.

C. METALLIC-COATED SURFACES: CLEAN ABRADED AREAS AND REPAIR WITH GALVANIZING REPAIR PAINT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

END OF SECTION 081113

SECTION 083513 - FOLDING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. ACCORDION FOLDING DOORS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, ATTACHMENTS TO OTHER WORK.

C. SAMPLES: FOR EACH EXPOSED PRODUCT AND FOR EACH COLOR AND TEXTURE SPECIFIED.

1.3 QUALITY ASSURANCE

A. SURFACE-BURNING CHARACTERISTICS: AS DETERMINED BY TESTING IDENTICAL PRODUCTS ACCORDING TO ASTM E 84 BY A QUALIFIED TESTING AGENCY. IDENTIFY PRODUCTS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AGENCY.

1. FLAME-SPREAD INDEX: 25 OR LESS.

2. SMOKE-DEVELOPED INDEX: 450 OR LESS.

PART 2 - PRODUCTS

2.1 ACCORDION FOLDING DOORS

B. 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. HUFCOR, INC.

2. MODERNFOLD, INC; A DORMA GROUP COMPANY.

3. PANELFOLD INC.

B. GENERAL: TOP-SUPPORTED, HORIZONTAL-SLIDING, MANUALLY OPERATED ACCORDION FOLDING DOORS, WITH CHAIN CONTROLLING THE SPACING AND EXTENSION OF PANTOGRAPHIC OR X-TYPE ACCORDION FOLDING FRAMES. INNER AND OUTER COVERS ARE CONTINUOUS SURFACE FACINGS THAT ATTACH TO AND COMPLETELY COVER THE FOLDING FRAMES AND ARE PLEATED AS THE DOOR IS RETRACTED.

C. OUTER COVERING: COMPLYING WITH INDICATED SURFACE-BURNING CHARACTERISTICS; ATTACHED TO DOOR SUPPORT FRAMES IN A CONCEALED MANNER AT SUFFICIENT INTERVALS TO PREVENT SAGGING AND SEPARATION AND TO PERMIT ON-SITE REMOVAL AND REPAIR, WITH VERTICAL SEAMS LOCATED IN VALLEYS AND MATERIAL HEMMED AT TOP AND BOTTOM.

1. MANUFACTURER'S STANDARD NONWOVEN CARPET, NEEDLE PUNCHED WITH FUSED FIBERS TO PREVENT UNRAVELING.

c. COLOR, TEXTURE, AND PATTERN: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

D. SWEEP SEALS: MANUFACTURER'S STANDARD TOP AND BOTTOM SWEEP SEALS ON BOTH SIDE(S).

E. CARRIERS: FOUR-WHEEL CARRIERS AT LEAD POST AND TWO-WHEEL CARRIERS AT INTERMEDIATE SPACING, AS NECESSARY FOR SIZE AND WEIGHT OF PARTITION, TO ENSURE SECURE, EASY, AND QUIET OPERATION.

1. DOORS 96 INCHES HIGH OR LESS: NYLON WHEELS ON STEEL SHAFTS.

F. TRACKS: MANUFACTURER'S STANDARD METAL TRACK MADE OF EXTRUDED ALUMINUM OR FORMED STEEL WITH FACTORY-APPLIED, CORROSION-RESISTANT FINISH. LIMIT TRACK DEFLECTION, INDEPENDENT OF STRUCTURAL SUPPORTING SYSTEM, TO NO MORE THAN 80 PERCENT OF BOTTOM CLEARANCE.

1. METAL CEILING CONTACT GUARD TO PROTECT FINISHED CEILING SURFACE FROM DAMAGE BY MOVING TOP SWEEP SEALS; WITH FINISH MATCHING OTHER EXPOSED METAL.

G. HARDWARE: MANUFACTURER'S STANDARD HEAVY-DUTY, MANUALLY OPERATED METAL PULLS AND LATCHES AS FOLLOWS:

1. FINISH: DULL CHROMIUM-FINISH STEEL.

2. LATCH: OPERABLE FROM BOTH SIDE(S) OF CLOSED DOOR.

3. LOCK: MANUFACTURER'S STANDARD KEY-OPERATED CYLINDER LOCK, OPERABLE FROM BOTH SIDES.

H. JAMB MOLDING: MANUFACTURER'S STANDARD WOOD OR METAL MOLDING AT CLOSING JAMB AS REQUIRED FOR LIGHT-TIGHT JAMB CLOSURE.

I. LEAD POSTS AND JAMB POSTS: NOT LESS THAN 0.048-INCH- THICK EXTRUDED ALUMINUM, FORMED FOR RIGIDITY AND LIGHT SEAL AT SUPPORTING CONSTRUCTION.

1. NONFERROUS JAMB STRIP FOR SINGLE-OPERATING PARTITIONS TO ENSURE TIGHT CLOSURE BY ENGAGING RUBBER BUMPER ON LEAD POST.

J. MEETING POST: CENTER MEETING POST FOR CENTER-OPENING DOORS.

K. STACKING: TIEBACKS TO MAINTAIN DOOR IN STACKED POSITION.

L. STACKING CONFIGURATION: STACK CENTER-OPENING DOORS AT BOTH ENDS OF OPENING.

M. OPENING SIZE: AS INDICATED ON DRAWINGS.

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL: INSTALL FOLDING DOORS COMPLYING WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. INSTALL TRACK IN ONE PIECE.

B. STANDARD FLOOR CLEARANCES: 1/4 TO 3/4 INCH MAXIMUM (ABOVE FLOOR FINISH).

C. ADJUST UNITS AS NECESSARY TO ENSURE SMOOTH, QUIET OPERATION WITHOUT WARPING OR BINDING. ADJUST HARDWARE TO FUNCTION SMOOTHLY. CONFIRM THAT LATCHES ENGAGE ACCURATELY AND SECURELY WITHOUT FORCING OR BINDING.

END OF SECTION 083513

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES ELECTRICALLY OPERATED SECTIONAL DOORS.

B. RELATED SECTION:

1. DIVISION 05 SECTION "METAL FABRICATIONS" FOR MISCELLANEOUS STEEL SUPPORTS.

1.2 PERFORMANCE REQUIREMENTS

A. GENERAL PERFORMANCE: SECTIONAL DOORS SHALL MEET PERFORMANCE REQUIREMENTS SPECIFIED WITHOUT FAILURE DUE TO DEFECTIVE MANUFACTURE, FABRICATION, INSTALLATION, OR OTHER DEFECTS IN CONSTRUCTION AND WITHOUT REQUIRING TEMPORARY INSTALLATION OF REINFORCING COMPONENTS.

B. STRUCTURAL PERFORMANCE: EXTERIOR SECTIONAL DOORS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS, AND THE FOLLOWING LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. WIND LOADS: UNIFORM PRESSURE (VELOCITY PRESSURE) OF 20 LBF/SQ. FT., ACTING INWARD AND OUTWARD.

1.3 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE AND SIZE OF SECTIONAL DOOR AND ACCESSORY.

B. SHOP DRAWINGS: FOR EACH INSTALLATION AND FOR SPECIAL COMPONENTS NOT DIMENSIONED OR DETAILED IN MANUFACTURER'S PRODUCT DATA. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.

C. MAINTENANCE DATA.

1.4 QUALITY ASSURANCE

A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

B. STANDARD FOR SECTIONAL DOORS: FABRICATE SECTIONAL DOORS TO COMPLY WITH DASMA 102 UNLESS OTHERWISE INDICATED.

PART 2 - PRODUCTS

2.1 STEEL DOOR SECTIONS

A. EXTERIOR SECTION FACES AND FRAMES: FABRICATE FROM MANUFACTURER'S STANDARD ZINC-COATED (GALVANIZED), COLD-ROLLED, STEEL SHEET.

1. ROLL HORIZONTAL MEETING EDGES TO A CONTINUOUS, INTERLOCKING, KEYED, RABBETED, SHIPLAP, OR TONGUE-IN-GROOVE WEATHERTIGHT SEAL, WITH A REINFORCING FLANGE RETURN.

2. FOR INSULATED DOORS, PROVIDE SECTIONS WITH CONTINUOUS THERMAL-BREAK CONSTRUCTION, SEPARATING THE EXTERIOR AND INTERIOR FACES OF DOOR.

B. SECTION ENDS AND INTERMEDIATE STILES: ENCLOSE OPEN ENDS OF SECTIONS WITH CHANNEL END STILES FORMED FROM GALVANIZED-STEEL SHEET WELDED TO DOOR SECTION. PROVIDE INTERMEDIATE STILES FORMED FROM GALVANIZED-STEEL SHEET, CUT TO DOOR SECTION PROFILE, AND WELDED IN PLACE. SPACE STILES NOT MORE THAN 48 INCHES APART.

C. REINFORCE BOTTOM SECTION WITH A CONTINUOUS CHANNEL OR ANGLE CONFORMING TO BOTTOM-SECTION PROFILE AND ALLOWING INSTALLATION OF ASTRAGAL.

D. REINFORCE SECTIONS WITH CONTINUOUS HORIZONTAL AND DIAGONAL REINFORCEMENT, AS REQUIRED TO STIFFEN DOOR AND FOR WIND LOADING. PROVIDE GALVANIZED-STEEL BARS, STRUTS, TRUSSES, OR STRIP STEEL, FORMED TO DEPTH AND BOLTED OR WELDED IN PLACE.

E. PROVIDE REINFORCEMENT FOR HARDWARE ATTACHMENT.

F. THERMAL INSULATION: INSULATE INTERIOR OF STEEL SECTIONS WITH DOOR MANUFACTURER'S STANDARD CFC-FREE INSULATION, WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY, ACCORDING TO ASTM E 84. ENCLOSE INSULATION COMPLETELY WITHIN STEEL SECTIONS THAT INCORPORATE THE FOLLOWING INTERIOR FACING MATERIAL, WITH NO EXPOSED INSULATION:

1. INTERIOR FACING MATERIAL: ZINC-COATED (GALVANIZED), COLD-ROLLED, COMMERCIAL STEEL (CS) SHEET.

2.2 TRACKS, SUPPORTS, AND ACCESSORIES

A. TRACKS: MANUFACTURER'S STANDARD, GALVANIZED-STEEL TRACK SYSTEM OF CONFIGURATION INDICATED, SIZED FOR DOOR SIZE AND WEIGHT, DESIGNED FOR LIFT TYPE INDICATED AND CLEARANCES SHOWN ON DRAWINGS. PROVIDE COMPLETE TRACK ASSEMBLY INCLUDING BRACKETS, BRACING, AND REINFORCEMENT FOR RIGID SUPPORT OF BALL-BEARING ROLLER GUIDES FOR REQUIRED DOOR TYPE AND SIZE. SLOT VERTICAL SECTIONS OF TRACK SPACED 2 INCHES APART FOR DOOR-DROP SAFETY DEVICE. SLOPE TRACKS AT PROPER ANGLE FROM VERTICAL OR DESIGN TRACKS TO ENSURE TIGHT CLOSURE AT JAMBS WHEN DOOR UNIT IS CLOSED.

B. TRACK REINFORCEMENT AND SUPPORTS: GALVANIZED-STEEL TRACK REINFORCEMENT AND SUPPORT MEMBERS. SECURE, REINFORCE, AND SUPPORT TRACKS AS REQUIRED FOR DOOR SIZE AND WEIGHT TO PROVIDE STRENGTH AND RIGIDITY WITHOUT SAG, SWAY, AND VIBRATION DURING OPENING AND CLOSING OF DOORS.

C. WEATHERSEALS: REPLACEABLE, ADJUSTABLE, CONTINUOUS, COMPRESSIBLE WEATHER-STRIPPING GASKETS OF FLEXIBLE VINYL, RUBBER, OR NEOPRENE FITTED TO BOTTOM AND TOP OF SECTIONAL DOOR UNLESS OTHERWISE INDICATED.

D. WINDOWS: MANUFACTURER'S STANDARD WINDOW UNITS OF TYPE AND SIZE INDICATED AND IN ARRANGEMENT SHOWN. PROVIDE REMOVABLE STOPS OF SAME MATERIAL AS DOOR-SECTION FRAMES.

2.3 HARDWARE

A. GENERAL: PROVIDE HEAVY-DUTY, CORROSION-RESISTANT HARDWARE, WITH HOT-DIP GALVANIZED, STAINLESS-STEEL, OR OTHER CORROSION-RESISTANT FASTENERS, TO SUIT DOOR TYPE.

B. HINGES: HEAVY-DUTY, GALVANIZED-STEEL HINGES AT EACH END STILE AND AT EACH INTERMEDIATE STILE, ACCORDING TO MANUFACTURER'S WRITTEN RECOMMENDATIONS FOR DOOR SIZE. ATTACH HINGES TO DOOR SECTIONS THROUGH STILES AND RAILS.

C. ROLLERS: HEAVY-DUTY ROLLERS WITH STEEL BALL-BEARINGS IN CASE-HARDENED STEEL RACES, MOUNTED WITH VARYING PROJECTIONS TO SUIT SLOPE OF TRACK. PROVIDE 3-INCH- DIAMETER ROLLER TIRES FOR 3-INCH- WIDE TRACK AND 2-INCH- DIAMETER ROLLER TIRES FOR 2-INCH- WIDE TRACK.

D. PUSH/PULL HANDLES: FOR PUSH-UP OR EMERGENCY-OPERATED DOORS, PROVIDE GALVANIZED-STEEL LIFTING HANDLES ON EACH SIDE OF DOOR.

2.4 LOCKING DEVICES

A. LOCKING DEVICE ASSEMBLY: FABRICATE WITH CYLINDER LOCK, SPRING-LOADED DEADBOLT, OPERATING HANDLE, CAM PLATE, AND ADJUSTABLE LOCKING BARS TO ENGAGE THROUGH SLOTS IN TRACKS.

1. LOCK CYLINDERS: PROVIDE CYLINDERS STANDARD WITH MANUFACTURER.

2. KEYS: THREE FOR EACH CYLINDER.

B. SAFETY INTERLOCK SWITCH: EQUIP POWER-OPERATED DOORS WITH SAFETY INTERLOCK SWITCH TO DISENGAGE POWER SUPPLY WHEN DOOR IS LOCKED.

2.5 COUNTERBALANCE MECHANISM

A. TORSION SPRING: COUNTERBALANCE MECHANISM CONSISTING OF ADJUSTABLE-TENSION TORSION SPRINGS MOUNTED ON TORSION SHAFT MADE OF STEEL TUBE OR SOLID STEEL. PROVIDE SPRINGS DESIGNED FOR NUMBER OF OPERATION CYCLES INDICATED.

B. CABLE DRUMS AND SHAFT FOR DOORS: CAST-ALUMINUM OR GRAY-IRON CASTING CABLE DRUMS MOUNTED ON TORSION SHAFT AND GROOVED TO RECEIVE DOOR-LIFTING CABLES AS DOOR IS RAISED. MOUNT COUNTERBALANCE MECHANISM WITH MANUFACTURER'S STANDARD BALL-BEARING BRACKETS AT EACH END OF TORSION SHAFT.

C. CABLES: GALVANIZED-STEEL LIFTING CABLES.

D. CABLE SAFETY DEVICE: INCLUDE, ON EACH SIDE-EDGE OF DOOR, A DEVICE DESIGNED TO AUTOMATICALLY STOP DOOR IF EITHER LIFTING CABLE BREAKS.

E. BRACKET: PROVIDE ANCHOR SUPPORT BRACKET AS REQUIRED TO CONNECT STATIONARY END OF SPRING TO THE WALL AND TO LEVEL THE SHAFT AND PREVENT SAG.

F. PROVIDE A SPRING BUMPER AT EACH HORIZONTAL TRACK TO CUSHION DOOR AT END OF OPENING OPERATION.

2.6 ELECTRIC DOOR OPERATORS

A. GENERAL: ELECTRIC DOOR OPERATOR ASSEMBLY OF SIZE AND CAPACITY RECOMMENDED AND PROVIDED BY DOOR MANUFACTURER FOR DOOR SPECIFIED, WITH ELECTRIC MOTOR AND FACTORY-PREWIRED MOTOR CONTROLS, STARTER, GEAR-REDUCTION UNIT, SOLENOID-OPERATED BRAKE, CLUTCH, REMOTE-CONTROL STATIONS, CONTROL DEVICES, INTEGRAL GEARING FOR LOCKING DOOR, AND ACCESSORIES REQUIRED FOR PROPER OPERATION.

1. COMPLY WITH NFPA 70.

2. PROVIDE CONTROL EQUIPMENT COMPLYING WITH NEMA ICS 1, NEMA ICS 2, AND NEMA ICS 6; WITH NFPA 70, CLASS 2 CONTROL CIRCUIT, MAXIMUM 24-V AC OR DC.

B. USAGE CLASSIFICATION: ELECTRIC OPERATOR AND COMPONENTS CAPABLE OF OPERATING FOR NOT LESS THAN NUMBER OF CYCLES PER HOUR INDICATED FOR EACH DOOR.

C. DOOR-OPERATOR TYPE: UNIT OF TYPE INDICATED, CONSISTING OF ELECTRIC MOTOR, GEARS, PULLEYS, BELTS, SPROCKETS, CHAINS, AND CONTROLS NEEDED TO OPERATE DOOR AND MEET REQUIRED USAGE CLASSIFICATION.

D. ELECTRIC MOTORS: COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS SPECIFIED IN DIVISION 11 SECTION "COMMON MOTOR REQUIREMENTS FOR EQUIPMENT" UNLESS OTHERWISE INDICATED.

1. ELECTRICAL CHARACTERISTICS:

a. PHASE: SINGLE PHASE.

b. VOLTS: 115 V.

c. HERTZ: 60.

2. MOTOR TYPE AND CONTROLLER: REVERSIBLE MOTOR AND CONTROLLER (DISCONNECT SWITCH) FOR MOTOR EXPOSURE INDICATED.

3. MOTOR SIZE: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH TO START, ACCELERATE, AND OPERATE DOOR IN EITHER DIRECTION FROM ANY POSITION, AT A SPEED NOT LESS THAN 8 IN./SEC. AND NOT MORE THAN 12 IN./SEC., WITHOUT EXCEEDING NAMEPLATE RATINGS OR SERVICE FACTOR.

4. OPERATING CONTROLS, CONTROLLERS (DISCONNECT SWITCHES), WIRING DEVICES, AND WIRING: MANUFACTURER'S STANDARD UNLESS OTHERWISE INDICATED.

E. OBSTRUCTION DETECTION DEVICE: EQUIP MOTORIZED DOOR WITH INDICATED EXTERNAL AUTOMATIC SAFETY SENSOR CAPABLE OF PROTECTING FULL WIDTH OF DOOR OPENING. ACTIVATION OF DEVICE IMMEDIATELY STOPS AND REVERSES DOWNWARD DOOR TRAVEL.

1. SENSOR EDGE: AUTOMATIC SAFETY SENSOR EDGE, LOCATED WITHIN ASTRAGAL OR WEATHER STRIPPING MOUNTED TO BOTTOM BAR. CONTACT WITH SENSOR ACTIVATES DEVICE. CONNECT TO CONTROL CIRCUIT USING MANUFACTURER'S STANDARD TAKE-UP REEL OR SELF-COILING CABLE.

F. REMOTE-CONTROL STATION: MOMENTARY-CONTACT, THREE-BUTTON CONTROL STATION WITH PUSH-BUTTON CONTROLS LABELED "OPEN," "CLOSE," AND "STOP."

1. INTERIOR UNITS, FULL-GUARDED, SURFACE-MOUNTED, HEAVY-DUTY TYPE, WITH GENERAL-PURPOSE NEMA ICS 6, TYPE 1 ENCLOSURE.

G. EMERGENCY MANUAL OPERATION: EQUIP EACH ELECTRICALLY POWERED DOOR WITH CAPABILITY FOR EMERGENCY MANUAL OPERATION. DESIGN MANUAL MECHANISM SO REQUIRED FORCE FOR DOOR OPERATION DOES NOT EXCEED 25 LBF.

H. EMERGENCY OPERATION DISCONNECT DEVICE: EQUIP OPERATOR WITH HAND-OPERATED DISCONNECT MECHANISM FOR AUTOMATICALLY ENGAGING MANUAL OPERATOR AND RELEASING BRAKE FOR EMERGENCY MANUAL OPERATION WHILE DISCONNECTING MOTOR WITHOUT AFFECTING TIMING OF LIMIT SWITCH. MOUNT MECHANISM SO IT IS ACCESSIBLE FROM FLOOR LEVEL. INCLUDE INTERLOCK DEVICE TO AUTOMATICALLY PREVENT MOTOR FROM OPERATING WHEN EMERGENCY OPERATOR IS ENGAGED.

I. MOTOR REMOVAL: DESIGN OPERATOR SO MOTOR MAY BE REMOVED WITHOUT DISTURBING LIMIT-SWITCH ADJUSTMENT AND WITHOUT AFFECTING EMERGENCY MANUAL OPERATION.

2.7 DOOR ASSEMBLY

A. STEEL SECTIONAL DOOR: SECTIONAL DOOR FORMED WITH HINGED SECTIONS.

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. CLOPAY BUILDING PRODUCTS; A GRIFFON COMPANY.

b. OVERHEAD DOOR CORPORATION.

c. RAYNOR.

B. OPERATION CYCLES: NOT LESS THAN 50,000.

C. INSTALLED R-VALUE: 7.35.

D. STEEL SECTIONS: ZINC-COATED (GALVANIZED) STEEL SHEET, FORMED INTO SECTIONS 1-3/4 INCHES THICK.

1. EXTERIOR-FACE SURFACE: RIBBED.

2. INTERIOR FACING MATERIAL: ZINC-COATED (GALVANIZED) STEEL SHEET.

E. TRACK CONFIGURATION: HIGH-LIFT TRACK.

F. WEATHERSEALS: FITTED TO BOTTOM AND TOP AND AROUND ENTIRE PERIMETER OF DOOR. PROVIDE COMBINATION BOTTOM WEATHERSEAL AND SENSOR EDGE.

G. WINDOWS: APPROXIMATELY 24 BY 11 INCHES, WITH CURVED CORNERS, AND SPACED APART THE APPROXIMATE DISTANCE AS INDICATED ON DRAWINGS; IN ONE ROW AT HEIGHT INDICATED ON DRAWINGS; INSTALLED WITH INSULATED GLAZING OF CLEAR FLOAT GLASS.

H. LOCKING DEVICES: EQUIP DOOR WITH LOCKING DEVICE ASSEMBLY.

1. LOCKING DEVICE ASSEMBLY: CREMONE TYPE, BOTH JAMB SIDES, LOCKING BARS, OPERABLE FROM INSIDE WITH THUMBTURN.

I. MANUAL DOOR OPERATOR: PUSH-UP OPERATION.

J. ELECTRIC DOOR OPERATOR:

1. USAGE CLASSIFICATION: STANDARD DUTY, UP TO 60 CYCLES PER HOUR.

2. OPERATOR TYPE: AS SHOWN ON DRAWINGS.

3. MOTOR EXPOSURE: INTERIOR, CLEAN, AND DRY.

4. EMERGENCY MANUAL OPERATION: PUSH-UP TYPE.

5. OBSTRUCTION-DETECTION DEVICE: AUTOMATIC ELECTRIC SENSOR EDGE ON BOTTOM BAR PNEUMATIC SENSOR EDGE ON BOTTOM BAR.

6. REMOTE-CONTROL STATION: INTERIOR.

K. DOOR FINISH:

1. ALUMINUM FINISH: ANODIZED COLOR AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

2. BAKED-ENAMEL OR POWDER-COATED FINISH: COLOR AND GLOSS AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE. SAMPLE.

3. FINISH OF INTERIOR FACING MATERIAL: FINISH AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL SECTIONAL DOORS AND OPERATING EQUIPMENT COMPLETE WITH NECESSARY HARDWARE, ANCHORS, INSERTS, HANGERS, AND EQUIPMENT SUPPORTS; ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND AS SPECIFIED.

B. TRACKS: PROVIDE SWAY BRACING, DIAGONAL BRACING, AND REINFORCEMENT AS REQUIRED FOR RIGID INSTALLATION OF TRACK AND DOOR-OPERATING EQUIPMENT. REPAIR GALVANIZED COATING ON TRACKS ACCORDING TO ASTM A 780.

C. ADJUST HARDWARE AND MOVING PARTS TO FUNCTION SMOOTHLY SO THAT DOORS OPERATE EASILY, FREE OF WARP, TWIST, OR DISTORTION. ADJUST DOORS AND SEALS TO PROVIDE WEATHERTIGHT FIT AROUND ENTIRE PERIMETER.

3.2 DEMONSTRATION

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN SECTIONAL DOORS.

END OF SECTION 083613

SECTION 085113 - ALUMINUM WINDOWS

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 FIXED ALUMINUM-FRAMED WINDOWS FOR EXTERIOR LOCATIONS.

1.3 DEFINITIONS

A. PERFORMANCE CLASS DESIGNATIONS ACCORDING TO AAMA/WDMA 101/I.S.2/NAFS:

1. HC: HEAVY COMMERCIAL.

1.4 SUBMITTALS

A. PRODUCT DATA: INCLUDE CONSTRUCTION DETAILS, MATERIAL DESCRIPTIONS, FABRICATION METHODS, DIMENSIONS OF INDIVIDUAL COMPONENTS AND PROFILES, HARDWARE, FINISHES, AND OPERATING INSTRUCTIONS FOR EACH TYPE OF ALUMINUM WINDOW INDICATED.

B. SHOP DRAWINGS: INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, HARDWARE, ATTACHMENTS TO OTHER WORK, OPERATIONAL CLEARANCES, INSTALLATION DETAILS, AND THE FOLLOWING:

1. MULLION DETAILS, INCLUDING REINFORCEMENT AND STIFFENERS.

2. JOINERY DETAILS.

3. EXPANSION PROVISIONS.

4. FLASHING AND DRAINAGE DETAILS.

5. WEATHER-STRIPPING DETAILS.

6. THERMAL-BREAK DETAILS.

7. GLAZING DETAILS.

C. PRODUCT SCHEDULE: FOR ALUMINUM WINDOWS. USE SAME DESIGNATIONS INDICATED ON DRAWINGS.

D. WARRANTY: SPECIAL WARRANTY SPECIFIED IN THIS SECTION.

1.5 QUALITY ASSURANCE

A. SOURCE LIMITATIONS: OBTAIN ALUMINUM WINDOWS THROUGH ONE SOURCE FROM A SINGLE MANUFACTURER.

B. GLAZING PUBLICATIONS: COMPLY WITH PUBLISHED RECOMMENDATIONS OF GLASS MANUFACTURERS AND WITH GANA'S "GLAZING MANUAL" UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.

1.6 PROJECT CONDITIONS

A. FIELD MEASUREMENTS: VERIFY ALUMINUM WINDOW OPENINGS BY FIELD MEASUREMENTS BEFORE FABRICATION AND INDICATE MEASUREMENTS ON SHOP DRAWINGS.

1. ESTABLISHED DIMENSIONS: WHERE FIELD MEASUREMENTS CANNOT BE MADE WITHOUT DELAYING THE WORK, ESTABLISH OPENING DIMENSIONS AND PROCEED WITH FABRICATING ALUMINUM WINDOWS WITHOUT FIELD MEASUREMENTS. COORDINATE WALL CONSTRUCTION TO ENSURE THAT ACTUAL OPENING DIMENSIONS CORRESPOND TO ESTABLISHED DIMENSIONS.

1.7 WARRANTY

A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE ALUMINUM WINDOWS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.

1. FAILURES INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

a. FAILURE TO MEET PERFORMANCE REQUIREMENTS.

b. STRUCTURAL FAILURES INCLUDING EXCESSIVE DEFLECTION, WATER LEAKAGE, AIR INFILTRATION, OR CONDENSATION.

c. FAULTY OPERATION OF MOVABLE SASH AND HARDWARE.

d. DETERIORATION OF METALS, OTHER MATERIALS, AND METAL FINISHES BEYOND NORMAL WEATHERING.

e. FAILURE OF INSULATING GLASS.

2. WARRANTY PERIOD:

a. WINDOW: TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

b. GLAZING: FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

c. METAL FINISH: 10 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. EFCO CORPORATION.

2. KAWNEER; AN ALCOA COMPANY.

2.2 MATERIALS

A. ALUMINUM EXTRUSIONS: ALLOY AND TEMPER RECOMMENDED BY ALUMINUM WINDOW MANUFACTURER FOR STRENGTH, CORROSION RESISTANCE, AND APPLICATION OF REQUIRED FINISH, BUT NOT LESS THAN 22,000-PSI ULTIMATE TENSILE STRENGTH, NOT LESS THAN 16,000-PSI MINIMUM YIELD STRENGTH, AND NOT LESS THAN 0.062-INCH THICKNESS AT ANY LOCATION FOR THE MAIN FRAME AND SASH MEMBERS.

B. FASTENERS: ALUMINUM, NONMAGNETIC STAINLESS STEEL, EPOXY ADHESIVE, OR OTHER MATERIALS WARRANTED BY MANUFACTURER TO BE NONCORROSIVE AND COMPATIBLE WITH ALUMINUM WINDOW MEMBERS, TRIM, HARDWARE, ANCHORS, AND OTHER COMPONENTS.

1. REINFORCEMENT: WHERE FASTENERS SCREW ANCHOR INTO ALUMINUM LESS THAN 0.125 INCH THICK, REINFORCE INTERIOR WITH ALUMINUM OR NONMAGNETIC STAINLESS STEEL TO RECEIVE SCREW THREADS, OR PROVIDE STANDARD, NONCORROSIVE, PRESSED-IN, SPLINED GROMMET NUTS.

2. EXPOSED FASTENERS: UNLESS UNAVOIDABLE FOR APPLYING HARDWARE, DO NOT USE EXPOSED FASTENERS. FOR APPLICATION OF HARDWARE, USE FASTENERS THAT MATCH FINISH OF MEMBER OR HARDWARE BEING FASTENED, AS APPROPRIATE.

C. ANCHORS, CLIPS, AND ACCESSORIES: ALUMINUM, NONMAGNETIC STAINLESS STEEL, OR ZINC-COATED STEEL OR IRON COMPLYING WITH ASTM B 633 FOR SC 3 SEVERE SERVICE CONDITIONS; PROVIDE SUFFICIENT STRENGTH TO WITHSTAND DESIGN PRESSURE INDICATED.

D. REINFORCING MEMBERS: ALUMINUM, NONMAGNETIC STAINLESS STEEL, OR NICKEL/CHROME-PLATED STEEL COMPLYING WITH ASTM B 456 FOR TYPE SC 3 SEVERE SERVICE CONDITIONS, OR ZINC-COATED STEEL OR IRON COMPLYING WITH ASTM B 633 FOR SC 3 SEVERE SERVICE CONDITIONS; PROVIDE SUFFICIENT STRENGTH TO WITHSTAND DESIGN PRESSURE INDICATED.

E. COMPRESSION-TYPE WEATHER STRIPPING: PROVIDE COMPRESSIBLE WEATHER STRIPPING DESIGNED FOR PERMANENTLY RESILIENT SEALING UNDER BUMPER OR WIPER ACTION AND FOR COMPLETE CONCEALMENT WHEN ALUMINUM WINDOW IS CLOSED.

1. WEATHER-STRIPPING MATERIAL: ELASTOMERIC CELLULAR PREFORMED GASKETS COMPLYING WITH ASTM C 509.

2. WEATHER-STRIPPING MATERIAL: DENSE ELASTOMERIC GASKETS COMPLYING WITH ASTM C 864.

3. WEATHER-STRIPPING MATERIAL: MANUFACTURER'S STANDARD SYSTEM AND MATERIALS COMPLYING WITH AAMA/WDMA 101/I.S.2/NAFS.

F. SLIDING-TYPE WEATHER STRIPPING: PROVIDE WOVEN-PILE WEATHER STRIPPING OF WOOL, POLYPROPYLENE, OR NYLON PILE AND RESIN-IMPREGNATED BACKING FABRIC. COMPLY WITH AAMA 701/702.

1. WEATHER SEALS: PROVIDE WEATHER STRIPPING WITH INTEGRAL BARRIER FIN OR FINS OF SEMIRIGID, POLYPROPYLENE SHEET OR POLYPROPYLENE-COATED MATERIAL. COMPLY WITH AAMA 701/702.

G. REPLACEABLE WEATHER SEALS: COMPLY WITH AAMA 701/702.

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER AR0052615
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
CDG Engineers

2.3 WINDOW

A. WINDOW TYPE: FIXED

B. AAMA/WDMA PERFORMANCE REQUIREMENTS: PROVIDE ALUMINUM WINDOWS OF PERFORMANCE INDICATED THAT COMPLY WITH AAMA/WDMA 101/I.S.2/NAFS.

1. PERFORMANCE CLASS: HC.

C. CONDENSATION-RESISTANCE FACTOR (CRF): PROVIDE ALUMINUM WINDOWS TESTED FOR THERMAL PERFORMANCE ACCORDING TO AAMA 1503, SHOWING A CRF OF 52.

D. THERMAL TRANSMITTANCE: PROVIDE ALUMINUM WINDOWS WITH A WHOLE-WINDOW, U-FACTOR MAXIMUM INDICATED AT 15-MPH EXTERIOR WIND VELOCITY AND WINTER CONDITION TEMPERATURES WHEN TESTED ACCORDING TO AAMA 1503.

E. AIR INFILTRATION: MAXIMUM RATE NOT MORE THAN INDICATED WHEN TESTED ACCORDING TO AAMA/WDMA 101/I.S.2/NAFS, AIR INFILTRATION TEST.

1. MAXIMUM RATE: 0.3 CFM/SQ. FT. OF AREA AT AN INWARD TEST PRESSURE OF 6.24 LBF/SQ. FT..

F. WATER RESISTANCE: NO WATER LEAKAGE AS DEFINED IN AAMA/WDMA REFERENCED TEST METHODS AT A WATER TEST PRESSURE EQUALING THAT INDICATED, WHEN TESTED ACCORDING TO AAMA/WDMA 101/I.S.2/NAFS, WATER RESISTANCE TEST.

1. TEST PRESSURE: 15 PERCENT OF POSITIVE DESIGN PRESSURE, BUT NOT LESS THAN 2.86 LBF/SQ. FT. OR MORE THAN 15 LBF/SQ. FT..

2.4 GLAZING

A. GLASS: CLEAR, INSULATING-GLASS UNITS, ARGON GAS FILLED, WITH LOW-E COATING PYROLYTIC ON SECOND SURFACE OR SPUTTERED ON SECOND OR THIRD SURFACE, COMPLYING WITH DIVISION 08 SECTION "GLAZING."

B. GLAZING SYSTEM: MANUFACTURER'S STANDARD FACTORY-GLAZING SYSTEM THAT PRODUCES WEATHERTIGHT SEAL.

2.5 HARDWARE

A. GENERAL: PROVIDE MANUFACTURER'S STANDARD HARDWARE FABRICATED FROM ALUMINUM, STAINLESS STEEL, CARBON STEEL COMPLYING WITH AAMA 907, OR OTHER CORROSION-RESISTANT MATERIAL COMPATIBLE WITH ALUMINUM; DESIGNED TO SMOOTHLY OPERATE, TIGHTLY CLOSE, AND SECURELY LOCK ALUMINUM WINDOWS, AND SIZED TO ACCOMMODATE SASH OR VENTILATOR WEIGHT AND DIMENSIONS. DO NOT USE ALUMINUM IN FRICTIONAL CONTACT WITH OTHER METALS. WHERE EXPOSED, PROVIDE EXTRUDED, CAST, OR WROUGHT ALUMINUM.

B. SILL CAP/TRACK: EXTRUDED-ALUMINUM TRACK WITH NATURAL ANODIZED FINISH, OF THICKNESS, DIMENSIONS, AND PROFILE INDICATED; DESIGNED TO COMPLY WITH PERFORMANCE REQUIREMENTS INDICATED AND TO DRAIN TO THE EXTERIOR.

2.7 FABRICATION

A. FABRICATE ALUMINUM WINDOWS IN SIZES INDICATED. INCLUDE A COMPLETE SYSTEM FOR ASSEMBLING COMPONENTS AND ANCHORING WINDOWS.

B. WEATHER STRIPPING: PROVIDE FULL-PERIMETER WEATHER STRIPPING FOR EACH OPERABLE SASH AND VENTILATOR.

1. HORIZONTAL-SLIDING WINDOWS: PROVIDE OPERABLE SASH WITH A DOUBLE ROW OF SLIDING WEATHER STRIPPING IN HORIZONTAL RAILS AND SINGLE- OR DOUBLE-ROW WEATHER STRIPPING IN MEETING OR JAMB STILES, AS REQUIRED TO MEET SPECIFIED PERFORMANCE REQUIREMENTS. PROVIDE COMPRESSION-TYPE WEATHER STRIPPING AT PERIMETER OF EACH MOVABLE PANEL WHERE SLIDING-TYPE WEATHER STRIPPING IS NOT APPROPRIATE.

C. WEEP HOLES: PROVIDE WEEP HOLES AND INTERNAL PASSAGES TO CONDUCT INFILTRATING WATER TO EXTERIOR.

D. SUBFRAMES: PROVIDE SUBFRAMES WITH ANCHORS FOR WINDOW UNITS AS SHOWN, OF PROFILE AND DIMENSIONS INDICATED BUT NOT LESS THAN 0.062-INCH- THICK EXTRUDED ALUMINUM. MITER OR COPE CORNERS, AND WELD AND DRESS SMOOTH WITH CONCEALED MECHANICAL JOINT FASTENERS. FINISH TO MATCH WINDOW UNITS. PROVIDE SUBFRAMES CAPABLE OF WITHSTANDING DESIGN LOADS OF WINDOW UNITS.

E. FACTORY-GLAZED FABRICATION: GLAZE ALUMINUM WINDOWS IN THE FACTORY WHERE PRACTICAL AND POSSIBLE FOR APPLICATIONS INDICATED. COMPLY WITH REQUIREMENTS IN DIVISION 08 SECTION "GLAZING" AND WITH AAMA/WDMA 101/I.S.2/NAFS.

F. GLAZING STOPS: PROVIDE SNAP-ON GLAZING STOPS COORDINATED WITH DIVISION 08 SECTION "GLAZING" AND GLAZING SYSTEM INDICATED. PROVIDE GLAZING STOPS TO MATCH SASH AND VENTILATOR FRAMES.

2.8 FINISHES, GENERAL

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: VARIATIONS IN APPEARANCE OF ABUTTING OR ADJACENT PIECES ARE ACCEPTABLE IF THEY ARE WITHIN ONE-HALF OF THE RANGE OF APPROVED SAMPLES. NOTICEABLE VARIATIONS IN THE SAME PIECE ARE NOT ACCEPTABLE. VARIATIONS IN APPEARANCE OF OTHER COMPONENTS ARE ACCEPTABLE IF THEY ARE WITHIN THE RANGE OF APPROVED SAMPLES AND ARE ASSEMBLED OR INSTALLED TO MINIMIZE CONTRAST.

2.9 ALUMINUM FINISHES

A. FINISH DESIGNATIONS PREFIXED BY AA COMPLY WITH THE SYSTEM ESTABLISHED BY THE ALUMINUM ASSOCIATION FOR DESIGNATING ALUMINUM FINISHES.

B. CLASS I, COLOR ANODIC FINISH: AA-M12C22A42/A44 (MECHANICAL FINISH: NONSPECULAR AS FABRICATED; CHEMICAL FINISH: ETCHED, MEDIUM MATTE; ANODIC COATING: ARCHITECTURAL CLASS I, INTEGRALLY COLORED OR ELECTROLYTICALLY DEPOSITED COLOR COATING 0.018 MM OR THICKER) COMPLYING WITH AAMA 611.

1. COLOR: MEDIUM BRONZE.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE OPENINGS, SUBSTRATES, STRUCTURAL SUPPORT, ANCHORAGE, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF WORK. VERIFY ROUGH OPENING DIMENSIONS, LEVELNESS OF SILL PLATE, AND OPERATIONAL CLEARANCES. EXAMINE WALL FLASHINGS, VAPOR RETARDERS, WATER AND WEATHER BARRIERS, AND OTHER BUILT-IN COMPONENTS TO ENSURE A COORDINATED, WEATHERTIGHT WINDOW INSTALLATION.

1. METAL SURFACES: DRY; CLEAN; FREE OF GREASE, OIL, DIRT, RUST, CORROSION, AND WELDING SLAG; WITHOUT SHARP EDGES OR OFFSETS AT JOINTS.

2. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.2 INSTALLATION

A. COMPLY WITH DRAWINGS, SHOP DRAWINGS, AND MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLING WINDOWS, HARDWARE, ACCESSORIES, AND OTHER COMPONENTS.

B. INSTALL WINDOWS LEVEL, PLUMB, SQUARE, TRUE TO LINE, WITHOUT DISTORTION OR IMPEDING THERMAL MOVEMENT, ANCHORED SECURELY IN PLACE TO STRUCTURAL SUPPORT, AND IN PROPER RELATION TO WALL FLASHING AND OTHER ADJACENT CONSTRUCTION.

C. SET SILL MEMBERS IN BED OF SEALANT OR WITH GASKETS, AS INDICATED, FOR WEATHERTIGHT CONSTRUCTION.

D. INSTALL WINDOWS AND COMPONENTS TO DRAIN CONDENSATION, WATER PENETRATING JOINTS, AND MOISTURE MIGRATING WITHIN WINDOWS TO THE EXTERIOR.

E. SEPARATE ALUMINUM AND OTHER CORRODIBLE SURFACES FROM SOURCES OF CORROSION OR ELECTROLYTIC ACTION AT POINTS OF CONTACT WITH OTHER MATERIALS.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. ADJUST OPERATING SASHES AND VENTILATORS, SCREENS, HARDWARE, AND ACCESSORIES FOR A TIGHT FIT AT CONTACT POINTS AND WEATHER STRIPPING FOR SMOOTH OPERATION AND WEATHERTIGHT CLOSURE. LUBRICATE HARDWARE AND MOVING PARTS.

B. CLEAN ALUMINUM SURFACES IMMEDIATELY AFTER INSTALLING WINDOWS. AVOID DAMAGING PROTECTIVE COATINGS AND FINISHES. REMOVE EXCESS SEALANTS, GLAZING MATERIALS, DIRT, AND OTHER SUBSTANCES.

C. CLEAN FACTORY-GLAZED GLASS IMMEDIATELY AFTER INSTALLING WINDOWS. COMPLY WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS FOR FINAL CLEANING AND MAINTENANCE. REMOVE NONPERMANENT LABELS, AND CLEAN SURFACES.

D. REMOVE AND REPLACE GLASS THAT HAS BEEN BROKEN, CHIPPED, CRACKED, ABRADED, OR DAMAGED DURING CONSTRUCTION PERIOD.

E. PROTECT WINDOW SURFACES FROM CONTACT WITH CONTAMINATING SUBSTANCES RESULTING FROM CONSTRUCTION OPERATIONS. IN ADDITION, MONITOR WINDOW SURFACES ADJACENT TO AND BELOW EXTERIOR CONCRETE AND MASONRY SURFACES DURING CONSTRUCTION FOR PRESENCE OF DIRT, SCUM, ALKALINE DEPOSITS, STAINS, OR OTHER CONTAMINANTS. IF CONTAMINATING SUBSTANCES DO CONTACT WINDOW SURFACES, REMOVE CONTAMINANTS IMMEDIATELY ACCORDING TO MANUFACTURER'S WRITTEN RECOMMENDATIONS.

END OF SECTION 085113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. COMMERCIAL DOOR HARDWARE.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: DETAILS OF ELECTRIFIED DOOR HARDWARE.

C. OTHER ACTION SUBMITTALS:

1. DOOR HARDWARE SCHEDULE: PREPARED BY OR UNDER THE SUPERVISION OF INSTALLER, DETAILING FABRICATION AND ASSEMBLY OF DOOR HARDWARE, AS WELL AS INSTALLATION PROCEDURES AND DIAGRAMS.

2. KEYING SCHEDULE: PREPARED BY OR UNDER THE SUPERVISION OF INSTALLER, DETAILING OWNER'S FINAL KEYING INSTRUCTIONS FOR LOCKS.

1.3 QUALITY ASSURANCE

A. FIRE-RATED DOOR ASSEMBLIES: WHERE FIRE-RATED DOOR ASSEMBLIES ARE INDICATED, PROVIDE DOOR HARDWARE RATED FOR USE IN ASSEMBLIES COMPLYING WITH NFPA 80 THAT ARE LISTED AND LABELED BY A QUALIFIED TESTING AGENCY, FOR FIRE-PROTECTION RATINGS INDICATED, BASED ON TESTING AT POSITIVE PRESSURE ACCORDING TO NFPA 252 OR UL 10C, UNLESS OTHERWISE INDICATED.

B. MEANS OF EGRESS DOORS: LATCHES DO NOT REQUIRE MORE THAN 15 LBF (67 N) TO RELEASE THE LATCH. LOCKS DO NOT REQUIRE USE OF A KEY, TOOL, OR SPECIAL KNOWLEDGE FOR OPERATION.

C. ACCESSIBILITY REQUIREMENTS: FOR DOOR HARDWARE ON DOORS IN AN ACCESSIBLE ROUTE, COMPLY WITH ICC/ANSI A117.1.

1.4 DELIVERY, STORAGE, AND HANDLING

A. DELIVER KEYS AND PERMANENT CORES TO OWNER BY REGISTERED MAIL OR OVERNIGHT PACKAGE SERVICE.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. PROVIDE DOOR HARDWARE FOR EACH DOOR AS SCHEDULED ON THE DRAWINGS TO COMPLY WITH REQUIREMENTS IN THIS SECTION.

2.2 HINGES

A. HINGES: BHMA A156.1. PROVIDE TEMPLATE-PRODUCED HINGES FOR HINGES INSTALLED ON HOLLOW-METAL DOORS AND HOLLOW-METAL FRAMES.

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. BALDWIN HARDWARE CORPORATION.

b. HAGER COMPANIES.

c. STANLEY COMMERCIAL HARDWARE; DIV. OF THE STANLEY WORKS.

2.3 MECHANICAL LOCKS AND LATCHES

A. STRIKES: PROVIDE MANUFACTURER'S STANDARD STRIKE FOR EACH LOCK BOLT OR LATCHBOLT COMPLYING WITH REQUIREMENTS INDICATED FOR APPLICABLE LOCK OR LATCH AND WITH STRIKE BOX AND CURVED LIP EXTENDED TO PROTECT FRAME; FINISHED TO MATCH LOCK OR LATCH.

B. BORED LOCKS: BHMA A156.2; GRADE 1; SERIES 4000.

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK:

a. BEST ACCESS SYSTEMS; DIV. OF STANLEY SECURITY SOLUTIONS, INC.

2.4 SURFACE BOLTS

A. SURFACE BOLTS: BHMA A156.16.

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. DOOR CONTROLS INTERNATIONAL, INC.

b. IVES HARDWARE; AN INGERSOLL-RAND COMPANY.

c. ROCKWOOD MANUFACTURING COMPANY.

2.5 EXIT DEVICES AND AUXILIARY ITEMS

A. EXIT DEVICES AND AUXILIARY ITEMS: BHMA A156.3.

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. CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY GROUP COMPANY.

b. PRECISION HARDWARE, INC.; DIVISION OF STANLEY SECURITY SOLUTIONS, INC.

c. VON DUPRIN; AN INGERSOLL-RAND COMPANY.

2.6 LOCK CYLINDERS

A. LOCK CYLINDERS: TUMBLER TYPE, CONSTRUCTED FROM BRASS OR BRONZE, STAINLESS STEEL, OR NICKEL SILVER.

1. MANUFACTURER: SAME MANUFACTURER AS FOR LOCKING DEVICES.

B. CONSTRUCTION CORES: PROVIDE CONSTRUCTION CORES THAT ARE REPLACEABLE BY PERMANENT CORES. PROVIDE 10 CONSTRUCTION MASTER KEYS.

2.7 KEYING

A. KEYING SYSTEM: FACTORY REGISTERED, COMPLYING WITH GUIDELINES IN BHMA A156.28, APPENDIX A. INCORPORATE DECISIONS MADE IN KEYING CONFERENCE.

1. MASTER KEY SYSTEM: CHANGE KEYS AND A MASTER KEY OPERATE CYLINDERS.

2. GRAND MASTER KEY SYSTEM: CHANGE KEYS, A MASTER KEY, AND A GRAND MASTER KEY OPERATE CYLINDERS.

3. KEYED ALIKE: KEY ALL CYLINDERS TO SAME CHANGE KEY.

B. KEYS: BRASS.

1. STAMPING: PERMANENTLY INSCRIBE EACH KEY WITH A VISUAL KEY CONTROL NUMBER AND INCLUDE THE FOLLOWING NOTATION:

a. NOTATION: "DO NOT DUPLICATE."

2. QUANTITY: IN ADDITION TO ONE EXTRA KEY BLANK FOR EACH LOCK, PROVIDE THE FOLLOWING:

a. CYLINDER CHANGE KEYS: THREE.

b. MASTER KEYS: FIVE.

c. GRAND MASTER KEYS: FIVE.

2.8 OPERATING TRIM

A. OPERATING TRIM: BHMA A156.6; BRONZE, 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. HAGER COMPANIES.

b. IVES HARDWARE; AN INGERSOLL-RAND COMPANY.

c. ROCKWOOD MANUFACTURING COMPANY.

2.9 ACCESSORIES FOR PAIRS OF DOORS

A. ASTRAGALS: BHMA A156.22.

2.10 SURFACE CLOSERS

A. SURFACE CLOSERS: BHMA A156.4; RACK-AND-PINION HYDRAULIC TYPE WITH ADJUSTABLE SWEEP AND LATCH SPEEDS CONTROLLED BY KEY-OPERATED VALVES AND FORGED-STEEL MAIN ARM. PROVIDE FACTORY-SIZED CLOSERS, ADJUSTABLE TO MEET FIELD CONDITIONS AND REQUIREMENTS FOR OPENING FORCE.

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. CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY GROUP COMPANY.

b. K2 COMMERCIAL HARDWARE; A BLACK & DECKER CORP. COMPANY.

c. LCN CLOSERS; AN INGERSOLL-RAND COMPANY.

2.11 MECHANICAL STOPS AND HOLDERS

A. WALL- AND FLOOR-MOUNTED STOPS: BHMA A156.16; BRONZE BASE METAL.

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. BALDWIN HARDWARE CORPORATION.

b. HAGER COMPANIES.

c. IVES HARDWARE; AN INGERSOLL-RAND COMPANY.

d. ROCKWOOD MANUFACTURING COMPANY.

2.12 DOOR GASKETING

A. DOOR GASKETING: BHMA A156.22; AIR LEAKAGE NOT TO EXCEED 0.50 CFM PER FOOT (0.000774 CU. M/S PER M) OF CRACK LENGTH FOR GASKETING OTHER THAN FOR SMOKE CONTROL, AS TESTED ACCORDING TO ASTM E 283; WITH RESILIENT OR FLEXIBLE SEAL STRIPS THAT ARE EASILY REPLACEABLE AND READILY AVAILABLE FROM STOCKS MAINTAINED BY MANUFACTURER.

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. HAGER COMPANIES.

b. NATIONAL GUARD PRODUCTS.

c. PEMKO MANUFACTURING CO.; AN ASSA ABLOY GROUP COMPANY.

2.13 THRESHOLDS

A. THRESHOLDS: BHMA A156.21; FABRICATED TO FULL WIDTH OF OPENING 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. HAGER COMPANIES.

b. NATIONAL GUARD PRODUCTS.

c. PEMKO MANUFACTURING CO.; AN ASSA ABLOY GROUP COMPANY.

2.14 FABRICATION

A. FASTENERS: PROVIDE DOOR HARDWARE MANUFACTURED TO COMPLY WITH PUBLISHED TEMPLATES PREPARED FOR MACHINE, WOOD, AND SHEET METAL SCREWS. PROVIDE PHILLIPS FLAT-HEAD SCREWS WITH FINISHED HEADS TO MATCH SURFACE OF DOOR HARDWARE, UNLESS OTHERWISE INDICATED.

1. CONCEALED FASTENERS: FOR DOOR HARDWARE UNITS THAT ARE EXPOSED WHEN DOOR IS CLOSED, EXCEPT FOR UNITS ALREADY SPECIFIED WITH CONCEALED FASTENERS. DO NOT USE THROUGH BOLTS FOR INSTALLATION WHERE BOLT HEAD OR NUT ON OPPOSITE FACE IS EXPOSED UNLESS IT IS THE ONLY MEANS OF SECURELY ATTACHING THE DOOR HARDWARE. WHERE THROUGH BOLTS ARE USED ON HOLLOW DOOR AND FRAME CONSTRUCTION, PROVIDE SLEEVES FOR EACH THROUGH BOLT.

2.15 FINISHES

A. PROVIDE FINISHES COMPLYING WITH BHMA A156.18 AS INDICATED IN DOOR HARDWARE SCHEDULE.

B. PROTECT MECHANICAL FINISHES ON EXPOSED SURFACES FROM DAMAGE BY APPLYING A STRIPPABLE, TEMPORARY PROTECTIVE COVERING BEFORE SHIPPING.

PART 3 - EXECUTION

3.1 INSTALLATION

A. STEEL DOORS AND FRAMES: FOR SURFACE APPLIED DOOR HARDWARE, DRILL AND TAP DOORS AND FRAMES ACCORDING TO ANSI/SDI A250.6.

B. MOUNTING HEIGHTS: MOUNT DOOR HARDWARE UNITS AT HEIGHTS TO COMPLY WITH THE FOLLOWING UNLESS OTHERWISE INDICATED OR REQUIRED TO COMPLY WITH GOVERNING REGULATIONS.

1. STANDARD STEEL DOORS AND FRAMES: ANSI/SDI A250.8.

SECTION 085113 - ALUMINUM WINDOWS

A. HINGES: INSTALL TYPES AND IN QUANTITIES INDICATED IN DOOR HARDWARE SCHEDULE BUT NOT FEWER THAN THE NUMBER RECOMMENDED BY MANUFACTURER FOR APPLICATION INDICATED OR ONE HINGE FOR EVERY 30 INCHES (750 MM) OF DOOR HEIGHT, WHICHEVER IS MORE STRINGENT.

B. LOCK CYLINDERS: INSTALL CONSTRUCTION CORES TO SECURE BUILDING AND AREAS DURING CONSTRUCTION PERIOD.

1. REPLACE CONSTRUCTION CORES WITH PERMANENT CORES AS DIRECTED BY OWNER.

2. FURNISH PERMANENT CORES TO OWNER FOR INSTALLATION.

E. THRESHOLDS: SET THRESHOLDS FOR EXTERIOR DOORS AND OTHER DOORS INDICATED IN FULL BED OF SEALANT COMPLYING WITH REQUIREMENTS SPECIFIED IN DIVISION 07 SECTION "JOINT SEALANTS."

F. PERIMETER GASKETING: APPLY TO HEAD AND JAMB, FORMING SEAL BETWEEN DOOR AND FRAME.

G. MEETING STILE GASKETING: FASTEN TO MEETING STILES, FORMING SEAL WHEN DOORS ARE CLOSED.

H. DOOR BOTTOMS: APPLY TO BOTTOM OF DOOR, FORMING SEAL WITH THRESHOLD WHEN DOOR IS CLOSED.

I. ADJUSTMENT: ADJUST AND CHECK EACH OPERATING ITEM OF DOOR HARDWARE AND EACH DOOR TO ENSURE PROPER OPERATION OR FUNCTION OF EVERY UNIT. REPLACE UNITS THAT CANNOT BE ADJUSTED TO OPERATE AS INTENDED. ADJUST DOOR CONTROL DEVICES TO COMPENSATE FOR FINAL OPERATION OF HEATING AND VENTILATING EQUIPMENT AND TO COMPLY WITH REFERENCED ACCESSIBILITY REQUIREMENTS.

END OF SECTION 087100

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES NON-LOAD-BEARING STEEL FRAMING MEMBERS FOR THE FOLLOWING APPLICATIONS:

1. INTERIOR FRAMING SYSTEMS (E.G., SUPPORTS FOR PARTITION WALLS, FRAMED SOFFITS, FURRING, ETC.).

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. FRAMING MEMBERS, GENERAL: COMPLY WITH ASTM C 754 FOR CONDITIONS INDICATED.

1. STEEL SHEET COMPONENTS: COMPLY WITH ASTM C 645 REQUIREMENTS FOR METAL, UNLESS OTHERWISE INDICATED.

2.2 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. STEEL STUDS AND RUNNERS: ASTM C 645.

1. MINIMUM BASE-METAL THICKNESS: 0.027 INCH.

B. FLAT STRAP AND BACKING PLATE: STEEL SHEET FOR BLOCKING AND BRACING IN LENGTH AND WIDTH INDICATED.

1. MINIMUM BASE-METAL THICKNESS: 0.027 INCH.

C. HAT-SHAPED, RIGID FURRING CHANNELS: ASTM C 645.

1. MINIMUM BASE METAL THICKNESS: 0.0179 INCH.

2. DEPTH: 7/8 INCH.

D. RESILIENT FURRING CHANNELS: 1/2-INCH- DEEP, STEEL SHEET MEMBERS DESIGNED TO REDUCE SOUND TRANSMISSION.

1. CONFIGURATION: ASYMMETRICAL.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. INSTALLATION STANDARD: ASTM C 754.

1. GYPSUM BOARD ASSEMBLIES: ALSO COMPLY WITH REQUIREMENTS IN ASTM C 840 THAT APPLY TO FRAMING INSTALLATION.

3.2 INSTALLING FRAMED ASSEMBLIES

A. WHERE STUDS ARE INSTALLED DIRECTLY AGAINST EXTERIOR MASONRY WALLS OR DISSIMILAR METALS AT EXTERIOR WALLS, INSTALL ISOLATION STRIP BETWEEN STUDS AND EXTERIOR WALL.

B. INSTALL TRACKS (RUNNERS) AT FLOORS AND OVERHEAD SUPPORTS. EXTEND FRAMING FULL HEIGHT TO STRUCTURAL SUPPORTS OR SUBSTRATES ABOVE SUSPENDED CEILINGS, EXCEPT WHERE PARTITIONS ARE INDICATED TO TERMINATE AT SUSPENDED CEILINGS. CONTINUE FRAMING AROUND DUCTS PENETRATING PARTITIONS ABOVE CEILING.

1. DOOR OPENINGS: SCREW VERTICAL STUDS AT JAMBS TO JAMB ANCHOR CLIPS ON DOOR FRAMES; INSTALL RUNNER TRACK SECTION (FOR CRIPPLE STUDS) AT HEAD AND SECURE TO JAMB STUDS.

a. INSTALL TWO STUDS AT EACH JAMB, UNLESS OTHERWISE INDICATED.

b. INSTALL CRIPPLE STUDS AT HEAD ADJACENT TO EACH JAMB STUD, WITH A MINIMUM 1/2-INCH CLEARANCE FROM JAMB STUD TO ALLOW FOR INSTALLATION OF CONTROL JOINT IN FINISHED ASSEMBLY.

c. EXTEND JAMB STUDS THROUGH SUSPENDED CEILINGS AND ATTACH TO UNDERSIDE OF OVERHEAD STRUCTURE.

2. OTHER FRAMED OPENINGS: FRAME OPENINGS OTHER THAN DOOR OPENINGS THE SAME AS REQUIRED FOR DOOR OPENINGS, UNLESS OTHERWISE INDICATED. INSTALL FRAMING BELOW SILLS OF OPENINGS TO MATCH FRAMING REQUIRED ABOVE DOOR HEADS.

3. SOUND-RATED PARTITIONS: INSTALL FRAMING TO COMPLY WITH SOUND-RATED ASSEMBLY INDICATED.

C. INSTALLATION TOLERANCE: INSTALL EACH FRAMING MEMBER SO FASTENING SURFACES VARY NOT MORE THAN 1/8 INCH FROM THE PLANE FORMED BY FACES OF ADJACENT FRAMING.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:

1. INTERIOR GYPSUM BOARD.

2. FIRE-RESISTANCE RATED GYPSUM BOARD.

3. MOLD AND MOISTURE RESISTANCE GYPSUM BOARD.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. GENERAL: COMPLYING WITH ASTM C 36/C 36M OR ASTM C 1396/C 1396M, AS APPLICABLE TO TYPE OF GYPSUM BOARD INDICATED AND WHICHEVER IS MORE STRINGENT.

1. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

a. G-P GYPSUM.

b. NATIONAL GYPSUM COMPANY.

c. USG CORPORATION.

A. REGULAR TYPE:

1. THICKNESS: 5/8 INCH.

2. LONG EDGES: TAPERED.

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER AR006265
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
CDG Engineers Architects Planners Inc.
One Campbell Plaza
St. Louis, Missouri 63139
T. 314 781 7770
F. 314 781 8075
www.cdgengineers.com

MoDOT

DRAWN BY: DLS
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

DRAWING NO. A-705

A. MOISTURE- AND MOLD-RESISTANT TYPE: WITH MOISTURE- AND MOLD-RESISTANT CORE AND SURFACES.
   1. CORE: 5/8 INCH, TYPE MR.
   2. LONG EDGES: TAPERED.
D. FIRE-RESISTANT TYPE:
   1. CORE: 5/8 INCH, TYPE X.
   2. LONG EDGES: TAPERED.

2.2 TRIM ACCESSORIES
A. INTERIOR TRIM: ASTM C 1047.
   1. MATERIAL: GALVANIZED OR ALUMINUM-COATED STEEL SHEET OR ROLLED ZINC.
   2. SHAPES:
      a. CORNERBEAD.
      b. BULLNOSE BEAD.

2.3 JOINT TREATMENT MATERIALS
A. GENERAL: COMPLY WITH ASTM C 475/C 475M.
B. JOINT TAPE:
   1. INTERIOR GYPSUM WALLBOARD: PAPER.
C. JOINT COMPOUND FOR INTERIOR GYPSUM WALLBOARD: FOR EACH COAT USE FORMULATION THAT IS COMPATIBLE WITH OTHER COMPOUNDS APPLIED ON PREVIOUS OR FOR SUCCESSIVE COATS.
   1. PROVIDE JOINT COMPOUND COMPATIBLE WITH USE FOR MOISTURE-RESISTANT AND FIRE-RESISTANT GYPSUM BOARD.

2.4 AUXILIARY MATERIALS
A. GENERAL: PROVIDE AUXILIARY MATERIALS THAT COMPLY WITH REFERENCED INSTALLATION STANDARDS AND MANUFACTURER'S WRITTEN RECOMMENDATIONS.
B. STEEL DRILL SCREWS: ASTM C 1002, UNLESS OTHERWISE INDICATED.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL
A. COMPLY WITH ASTM C 840.
B. EXAMINE PANELS BEFORE INSTALLATION. REJECT PANELS THAT ARE WET, MOISTURE DAMAGED, AND MOLD DAMAGED.

3.2 APPLYING INTERIOR GYPSUM BOARD
A. INSTALL INTERIOR GYPSUM BOARD IN THE FOLLOWING LOCATIONS:
   1. REGULAR TYPE: VERTICAL SURFACES, UNLESS OTHERWISE INDICATED.
   2. MOISTURE- AND MOLD-RESISTANT TYPE: AS INDICATED ON DRAWINGS.
   3. FIRE-RESISTANT TYPE: AS INDICATED ON DRAWINGS.

3.3 INSTALLING TRIM ACCESSORIES
A. GENERAL: FOR TRIM WITH BACK FLANGES INTENDED FOR FASTENERS, ATTACH TO FRAMING WITH SAME FASTENERS USED FOR PANELS. OTHERWISE, ATTACH TRIM ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
B. CONTROL JOINTS: INSTALL CONTROL JOINTS ACCORDING TO ASTM C 840 AND IN SPECIFIC LOCATIONS APPROVED BY ARCHITECT FOR VISUAL EFFECT.
C. INTERIOR TRIM: INSTALL IN THE FOLLOWING LOCATIONS:
   1. CORNERBEAD: USE AT OUTSIDE CORNERS.

3.4 FINISHING GYPSUM BOARD
A. GENERAL: TREAT GYPSUM BOARD JOINTS, INTERIOR ANGLES, EDGE TRIM, CONTROL JOINTS, PENETRATIONS, FASTENER HEADS, SURFACE DEFECTS, AND ELSEWHERE AS REQUIRED TO PREPARE GYPSUM BOARD SURFACES FOR DECORATION. PROMPTLY REMOVE RESIDUAL JOINT COMPOUND FROM ADJACENT SURFACES.
B. PREFILL OPEN JOINTS, ROUNDED OR BEVELED EDGES, AND DAMAGED SURFACE AREAS.
C. APPLY JOINT TAPE OVER GYPSUM BOARD JOINTS, EXCEPT THOSE WITH TRIM HAVING FLANGES NOT INTENDED FOR TAPE.

3.5 PROTECTION
A. PROTECT INSTALLED PRODUCTS FROM DAMAGE FROM WEATHER, CONDENSATION, DIRECT SUNLIGHT, CONSTRUCTION, AND OTHER CAUSES DURING REMAINDER OF THE CONSTRUCTION PERIOD.
B. REMOVE AND REPLACE PANELS THAT ARE WET, MOISTURE DAMAGED, AND MOLD DAMAGED.
   1. INDICATIONS THAT PANELS ARE WET OR MOISTURE DAMAGED INCLUDE, BUT ARE NOT LIMITED TO, DISCOLORATION, SAGGING, OR IRREGULAR SHAPE.
   2. INDICATIONS THAT PANELS ARE MOLD DAMAGED INCLUDE, BUT ARE NOT LIMITED TO, FUZZY OR SPLOTCHY SURFACE CONTAMINATION AND DISCOLORATION.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY
A. THIS SECTION INCLUDES ACOUSTICAL PANELS AND EXPOSED SUSPENSION SYSTEMS FOR CEILINGS.

1.2 SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
B. SAMPLES: FOR EACH EXPOSED FINISH.

1.3 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. ACOUSTICAL CEILING PANELS: FULL-SIZE PANELS EQUAL TO 2.0 PERCENT OF QUANTITY INSTALLED.
   2. SUSPENSION SYSTEM COMPONENTS: QUANTITY OF EACH EXPOSED COMPONENT EQUAL TO 2.0 PERCENT OF QUANTITY INSTALLED.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANEL CEILINGS, GENERAL
A. ACOUSTICAL PANEL STANDARD: COMPLY WITH ASTM E 1264.
B. METAL SUSPENSION SYSTEM STANDARD: COMPLY WITH ASTM C 635.
C. WIRE HANGERS, BRACES, AND TIES: ZINC-COATED CARBON-STEEL WIRE; ASTM A 641/A 641M, CLASS 1 ZINC COATING, SOFT TEMPER.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL CEILING - ACT 1
A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ARMSTRONG FINE FISSURED CERMAGUARD UNPERFORATED CEILING TILES IN AREAS INDICATED ON DRAWINGS, OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
   1. CHICAGO METALLIC CORPORATION.
   2. ECOPHON CERTAINTEED, INC.
   3. USG INTERIORS, INC.
B. CLASSIFICATION: PRODUCT PANEL COMPLYING WITH ASTM E-1264 FOR TYPE AND FORM AS FOLLOWS:
   1. TYPE AND FORM: TYPE XX, DESCRIBED AS HIGH-DENSITY, CERAMIC- AND MINERAL-BASE PANELS WITH SCRUBBABLE FINISH, RESISTANT TO HEAT, MOISTURE, AND CORROSIVE FUMES.
C. COLOR: WHITE.
D. LR: NOT LESS THAN 0.088.
E. JOINT DETAIL: SQUARE.
F. THICKNESS: 5/8 INCH.
G. MODULAR SIZE: 24 INCHES X 24 INCHES.

2.3 ACOUSTICAL PANELS FOR ACOUSTICAL CEILING - ACT 2
A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ARMSTRONG FINE FISSURED CERMAGUARD PERFORATED CEILING TILES IN AREAS INDICATED ON DRAWINGS, OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
   1. CHICAGO METALLIC CORPORATION.
   2. ECOPHON CERTAINTEED, INC.
   3. USG INTERIORS, INC.
B. CLASSIFICATION: PROVIDE PANEL COMPLYING WITH ASTM E-1264 FOR TYPE AND FORM AS FOLLOWS:
   1. TYPE AND FORM: TYPE XX, DESCRIBED AS HIGH-DENSITY, CERAMIC- AND MINERAL-BASE PANELS WITH SCRUBBABLE FINISH, RESISTANT TO HEAT, MOISTURE, AND CORROSIVE FUMES.
C. COLOR: WHITE.
D. LR: NOT LESS THAN 0.82.
E. EDGE/JOINT DETAILS: SQUARE.
F. THICKNESS: 5/8 INCH.
G. MODULAR SIZE: 24 INCHES X 24 INCHES.

2.4 ACOUSTICAL PANELS FOR ACOUSTICAL CEILING - ACT 3
A. BASIS-OF-DESIGN: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ARMSTRONG FINE FISSURED PERFORATED CEILING TILES IN AREAS INDICATED ON DRAWINGS, OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
   1. CHICAGO METALLIC CORPORATION.
   2. ECOPHON CERTAINTEED, INC.
   3. USG INTERIORS, INC.
B. CLASSIFICATION: PROVIDE PANEL COMPLYING WITH ASTM E-1264 FOR THE TYPE AND FOR AS FOLLOWS:
   1. TYPE AND FORM: TYPE III, MINERAL BASE WITH PAINTED FINISH, FORM 2, PATTERN C E.
C. COLOR: WHITE.
D. LR: NOT LESS THAN 0.85.
E. EDGE/JOINT DETAIL: SQUARE.
F. THICKNESS: 5/8 INCH.
G. MODULAR SIZE: 24 INCHES X 24 INCHES.

2.5 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING
A. BASIS-OF-DESIGN: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ARMSTRONG PRELUDE XL 15/16" EXPOSED TEE SUSPENSION SYSTEM, OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
   1. CHICAGO METALLIC CORPORATION.
   2. ECOPHON CERTAINTEED, INC.
   3. USG INTERIORS, INC.
B. DOUBLE WEB, STEEL SUSPENSION SYSTEM: MAIN AND CROSS RUNNERS ROLL FORMED FROM COLD ROLLED STEEL SHEET, PRE-PAINTED, ELECTRONICALLY ZINC-COATED, OR HOT-DIPPED GALVANIZED ACCORDING TO ASTM A-653.
   1. STRUCTURAL CLASSIFICATION: INTERMEDIATE-DUTY SYSTEM.
   2. CAP MATERIAL: STEEL.
   3. CAP FINISH: WHITE.

PART 3 - EXECUTION

3.1 INSTALLATION
A. COMPLY WITH ASTM C 636 AND SEISMIC DESIGN REQUIREMENTS INDICATED, PER MANUFACTURER'S WRITTEN INSTRUCTIONS AND CISCA'S "CEILING SYSTEMS HANDBOOK."
B. MEASURE EACH CEILING AREA AND ESTABLISH LAYOUT OF ACOUSTICAL PANELS TO BALANCE BORDER WIDTHS AT OPPOSITE EDGES OF EACH CEILING. AVOID USING LESS-THAN-HALF-WIDTH PANELS AT BORDERS.
C. SUSPEND CEILING HANGERS FROM BUILDING'S STRUCTURAL MEMBERS, PLUMB AND FREE FROM CONTACT WITH INSULATION OR OTHER OBJECTS WITHIN CEILING PLENUM. SPLAY HANGERS ONLY WHERE REQUIRED TO MISS OBSTRUCTIONS; OFFSET RESULTING HORIZONTAL FORCES BY BRACING, COUNTERSPLAYING, OR OTHER EQUALLY EFFECTIVE MEANS. WHERE WIDTH OF DUCTS AND OTHER CONSTRUCTION WITHIN CEILING PLENUM PRODUCES HANGER SPACINGS THAT INTERFERE WITH LOCATION OF HANGERS, USE TRAPEZES OR EQUIVALENT DEVICES. WHEN STEEL FRAMING DOES NOT PERMIT INSTALLATION OF HANGER WIRES AT SPACING REQUIRED, INSTALL CARRYING CHANNELS OR OTHER SUPPLEMENTAL SUPPORT FOR ATTACHMENT OF HANGER WIRES.
   1. DO NOT SUPPORT CEILINGS DIRECTLY FROM PERMANENT METAL FORMS OR FLOOR DECK; ANCHOR INTO CONCRETE SLABS.
   2. DO NOT ATTACH HANGERS TO STEEL DECK TABS OR TO STEEL ROOF DECK.
D. INSTALL EDGE MOLDINGS AND TRIM OF TYPE INDICATED AT PERIMETER OF ACOUSTICAL CEILING AREA AND WHERE NECESSARY TO CONCEAL EDGES OF ACOUSTICAL PANELS. SCREW ATTACH MOLDINGS TO SUBSTRATE AT INTERVALS NOT MORE THAN 16 INCHES O.C. AND NOT MORE THAN 3 INCHES FROM ENDS, LEVELING WITH CEILING SUSPENSION SYSTEM TO A TOLERANCE OF 1/8 INCH IN 12 FEET. MITER CORNERS ACCURATELY AND CONNECT SECURELY.
E. INSTALL SUSPENSION SYSTEM RUNNERS SO THEY ARE SQUARE AND SECURELY INTERLOCKED WITH ONE ANOTHER. REMOVE AND REPLACE DENTED, BENT, OR KINKED MEMBERS.
F. INSTALL ACOUSTICAL PANELS WITH UNDAMAGED EDGES AND FIT ACCURATELY INTO SUSPENSION SYSTEM RUNNERS AND EDGE MOLDINGS. SCRIBE AND CUT PANELS AT BORDERS AND PENETRATIONS TO PROVIDE A NEAT, PRECISE FIT.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY
A. SECTION INCLUDES:
   1. RESILIENT BASE.

1.2 SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
B. SAMPLES: FOR EACH TYPE OF PRODUCT INDICATED, IN MANUFACTURER'S STANDARD-SIZE SAMPLES BUT NOT LESS THAN 12 INCHES LONG, OF EACH RESILIENT PRODUCT COLOR, TEXTURE, AND PATTERN REQUIRED.

1.3 PROJECT CONDITIONS
A. MAINTAIN AMBIENT TEMPERATURES WITHIN RANGE RECOMMENDED BY MANUFACTURER IN SPACES TO RECEIVE RESILIENT PRODUCTS.
B. UNTIL SUBSTANTIAL COMPLETION, MAINTAIN AMBIENT TEMPERATURES WITHIN RANGE RECOMMENDED BY MANUFACTURER.
C. INSTALL RESILIENT PRODUCTS AFTER OTHER FINISHING OPERATIONS, INCLUDING PAINTING, HAVE BEEN COMPLETED.

PART 2 - PRODUCTS

2.1 RESILIENT BASE
A. RESILIENT BASE:
   1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
      a. ARMSTRONG WORLD INDUSTRIES, INC.
      b. FLEXCO, INC.
      c. JOHNSONITE.
      d. VPI, LLC; FLOOR PRODUCTS DIVISION.
B. RESILIENT BASE STANDARD: ASTM F 1861.
   1. MATERIAL REQUIREMENT: TYPE TV (VINYL, THERMOPLASTIC).
   2. MANUFACTURING METHOD: GROUP I (SOLID, HOMOGENEOUS).
   3. STYLE: COVE BASE WITH TOE.
C. MINIMUM THICKNESS: 0.125 INCH.
D. HEIGHT: 4 INCHES.
E. LENGTHS: COILS IN MANUFACTURER'S STANDARD LENGTH.
F. OUTSIDE CORNERS: PREFORMED.
G. INSIDE CORNERS: PREFORMED.
H. FINISH: SATIN.
I. COLORS AND PATTERNS: AS SELECTED BY ARCHITECT FROM FULL RANGE OF INDUSTRY COLORS.

PART 3 - EXECUTION

3.1 PREPARATION
A. PREPARE SUBSTRATES ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS TO ENSURE ADHESION OF RESILIENT PRODUCTS.

3.2 RESILIENT BASE INSTALLATION
A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLING RESILIENT BASE.
B. APPLY RESILIENT BASE TO WALLS, COLUMNS, PILASTERS, CASEWORK AND CABINETS IN TOE SPACES, AND OTHER PERMANENT FIXTURES IN ROOMS AND AREAS WHERE BASE IS REQUIRED.
C. INSTALL RESILIENT BASE IN LENGTHS AS LONG AS PRACTICABLE WITHOUT GAPS AT SEAMS AND WITH TOPS OF ADJACENT PIECES ALIGNED.
D. TIGHTLY ADHERE RESILIENT BASE TO SUBSTRATE THROUGHOUT LENGTH OF EACH PIECE, WITH BASE IN CONTINUOUS CONTACT WITH HORIZONTAL AND VERTICAL SUBSTRATES.
E. DO NOT STRETCH RESILIENT BASE DURING INSTALLATION.

3.3 CLEANING AND PROTECTION
A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR CLEANING AND PROTECTION OF RESILIENT PRODUCTS.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY
A. SECTION INCLUDES:
   1. VINYL COMPOSITION FLOOR TILE.

1.2 SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
B. SAMPLES: FULL-SIZE UNITS OF EACH COLOR AND PATTERN OF FLOOR TILE REQUIRED.
C. MAINTENANCE DATA.

1.3 PROJECT CONDITIONS
A. MAINTAIN AMBIENT TEMPERATURES WITHIN RANGE RECOMMENDED BY MANUFACTURER IN SPACES TO RECEIVE FLOOR TILE.
B. UNTIL SUBSTANTIAL COMPLETION, MAINTAIN AMBIENT TEMPERATURES WITHIN RANGE RECOMMENDED BY MANUFACTURER.
C. CLOSE SPACES TO TRAFFIC DURING FLOOR TILE INSTALLATION.
D. CLOSE SPACES TO TRAFFIC FOR 48 HOURS AFTER FLOOR TILE INSTALLATION.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION FLOOR TILE
A. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
   1. ARMSTRONG WORLD INDUSTRIES, INC.; STANDARD EXCELON IMPERIAL TEXTURE.
   2. CONGOLEUM CORPORATION; ALTERNATIVES.
   3. TARKETT, INC.; EXPRESSIONS.
B. TILE STANDARD: ASTM F 1066, CLASS 2, THROUGH-PATTERN TILE.
C. WEARING SURFACE: SMOOTH.
D. THICKNESS: 0.125 INCH.
E. SIZE: 12 BY 12 INCHES.
F. COLORS AND PATTERNS: AS SELECTED BY ARCHITECT FROM FULL RANGE OF INDUSTRY COLORS.

2.2 INSTALLATION MATERIALS
A. TROWELABLE LEVELING AND PATCHING COMPOUNDS: LATEX-MODIFIED, PORTLAND CEMENT BASED OR BLENDED HYDRAULIC-CEMENT-BASED FORMULATION PROVIDED OR APPROVED BY MANUFACTURER FOR APPLICATIONS INDICATED.
B. ADHESIVES: WATER-RESISTANT TYPE RECOMMENDED BY MANUFACTURER TO SUIT FLOOR TILE AND SUBSTRATE CONDITIONS INDICATED.
   1. USE ADHESIVES THAT COMPLY WITH THE FOLLOWING LIMITS FOR VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24):
      a. VCT AND ASPHALT TILE ADHESIVES: NOT MORE THAN 50 G/L.
      b. RUBBER FLOOR ADHESIVES: NOT MORE THAN 60 G/L.
C. FLOOR POLISH: PROVIDE PROTECTIVE LIQUID FLOOR POLISH PRODUCTS AS RECOMMENDED BY MANUFACTURER.

PART 3 - EXECUTION

3.1 PREPARATION
A. PREPARE SUBSTRATES ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS TO ENSURE ADHESION OF RESILIENT PRODUCTS.
B. CONCRETE SUBSTRATES: PREPARE ACCORDING TO ASTM F 710.
   1. VERIFY THAT SUBSTRATES ARE DRY AND FREE OF CURING COMPOUNDS, SEALERS, AND HARDENERS.
   2. REMOVE SUBSTRATE COATINGS AND OTHER SUBSTANCES THAT ARE INCOMPATIBLE WITH ADHESIVES AND THAT CONTAIN SOAP, WAX, OIL, OR SILICONE, USING MECHANICAL METHODS RECOMMENDED BY MANUFACTURER. DO NOT USE SOLVENTS.
   3. ALKALINITY AND ADHESION TESTING: PERFORM TESTS RECOMMENDED BY MANUFACTURER. PROCEED WITH INSTALLATION ONLY AFTER SUBSTRATES PASS TESTING.
   4. MOISTURE TESTING: PERFORM TESTS RECOMMENDED BY FLOOR COVERING MANUFACTURER. PROCEED WITH INSTALLATION ONLY AFTER SUBSTRATES PASS TESTING.
C. FILL CRACKS, HOLES, AND DEPRESSIONS IN SUBSTRATES WITH TROWELABLE LEVELING AND PATCHING COMPOUND AND REMOVE BUMPS AND RIDGES TO PRODUCE A UNIFORM AND SMOOTH SUBSTRATE.
D. SWEEP AND VACUUM CLEAN SUBSTRATES TO BE COVERED BY RESILIENT PRODUCTS IMMEDIATELY BEFORE INSTALLATION.

3.2 FLOOR TILE INSTALLATION
A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLING FLOOR TILE.
B. LAY OUT FLOOR TILES FROM CENTER MARKS ESTABLISHED WITH PRINCIPAL WALLS, DISCOUNTING MINOR OFFSETS, SO TILES AT OPPOSITE EDGES OF ROOM ARE OF EQUAL WIDTH. ADJUST AS NECESSARY TO AVOID USING CUT WIDTHS THAT EQUAL LESS THAN ONE-HALF TILE AT PERIMETER.
C. MATCH FLOOR TILES FOR COLOR AND PATTERN BY SELECTING TILES FROM CARTONS IN THE SAME SEQUENCE AS MANUFACTURED AND PACKAGED, IF SO NUMBERED. DISCARD BROKEN, CRACKED, CHIPPED, OR DEFORMED TILES.
D. SCRIBE, CUT, AND FIT FLOOR TILES TO BUTT NEATLY AND TIGHTLY TO VERTICAL SURFACES AND PERMANENT FIXTURES INCLUDING BUILT-IN FURNITURE, CABINETS, PIPES, OUTLETS, AND DOOR FRAMES.
E. EXTEND FLOOR TILES INTO TOE SPACES, DOOR REVEALS, CLOSETS, AND SIMILAR OPENINGS. EXTEND FLOOR TILES TO CENTER OF DOOR OPENINGS.
F. MAINTAIN REFERENCE MARKERS, HOLES, AND OPENINGS THAT ARE IN PLACE OR MARKED FOR FUTURE CUTTING BY REPEATING ON FLOOR TILES AS MARKED ON SUBSTRATES. USE CHALK OR OTHER NONPERMANENT, NONSTAINING MARKING DEVICE.
G. ADHERE FLOOR TILES TO FLOORING SUBSTRATES USING A FULL SPREAD OF ADHESIVE APPLIED TO SUBSTRATE TO PRODUCE A COMPLETED INSTALLATION WITHOUT OPEN CRACKS, VOIDS, RAISING AND PUCKERING AT JOINTS, TELEGRAPHING OF ADHESIVE SPREADER MARKS, AND OTHER SURFACE IMPERFECTIONS.

3.3 CLEANING AND PROTECTION
A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR CLEANING AND PROTECTION OF FLOOR TILE.
B. FLOOR POLISH: REMOVE SOIL, VISIBLE ADHESIVE, AND SURFACE BLEMISHES FROM FLOOR TILE SURFACES BEFORE APPLYING LIQUID FLOOR POLISH.
   1. APPLY TWO COAT(S).
C. COVER FLOOR TILE UNTIL SUBSTANTIAL COMPLETION.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY
A. SECTION INCLUDES MODULAR, FUSION-BONDED CARPET TILE.

1.2 ACTION SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
B. SAMPLES: FOR EACH EXPOSED PRODUCT AND FOR EACH COLOR AND TEXTURE SPECIFIED.

1.3 CLOSEOUT SUBMITTALS
A. MAINTENANCE DATA.

1.4 QUALITY ASSURANCE
A. INSTALLER QUALIFICATIONS: AN EXPERIENCED INSTALLER WHO IS CERTIFIED BY THE INTERNATIONAL CERTIFIED FLOOR COVERING INSTALLERS ASSOCIATION AT THE COMMERCIAL II CERTIFICATION LEVEL.

1.5 DELIVERY, STORAGE, AND HANDLING
A. COMPLY WITH CRI 104.

1.6 FIELD CONDITIONS
A. COMPLY WITH CRI 104 FOR TEMPERATURE, HUMIDITY, AND VENTILATION LIMITATIONS.

PART 2 - PRODUCTS

2.1 CARPET TILE
A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE THE NEW PATCRAFT AND DESIGNWEAVE TWEED MODULAR 10096 OR APPROVED EQUAL.
B. COLOR: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.
C. FIBER CONTENT: 100 PERCENT POLYPROPYLENE.
D. FIBER TYPE: ECO SOLUTION Q.
E. PILE CHARACTERISTIC: PATTERN LOOP.
F. DENSITY20 OZ./CU. YD.
G. PRIMARY BACKING/BACKCOATING: MANUFACTURER'S STANDARD COMPOSITE MATERIALS.
H. SECONDARY BACKING: ECOWORX.
I. SIZE: 24 BY 24 INCHES.

2.2 INSTALLATION ACCESSORIES
A. TROWELABLE LEVELING AND PATCHING COMPOUNDS: LATEX-MODIFIED, HYDRAULIC-CEMENT-BASED FORMULATION PROVIDED OR RECOMMENDED BY CARPET TILE MANUFACTURER.
B. ADHESIVES: WATER-RESISTANT, MILDEW-RESISTANT, NONSTAINING, PRESSURE-SENSITIVE TYPE TO SUIT PRODUCTS AND SUBFLOOR CONDITIONS INDICATED, THAT COMPLIES WITH FLAMMABILITY REQUIREMENTS FOR INSTALLED CARPET TILE AND IS RECOMMENDED BY CARPET TILE MANUFACTURER FOR RELEASABLE INSTALLATION.
   1. ADHESIVES SHALL HAVE A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
   2. ADHESIVES SHALL COMPLY WITH THE TESTING AND PRODUCT REQUIREMENTS OF THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES' "STANDARD PRACTICE FOR THE TESTING OF VOLATILE ORGANIC EMISSIONS FROM VARIOUS SOURCES USING SMALL-SCALE ENVIRONMENTAL CHAMBERS."

PART 3 - EXECUTION

3.1 INSTALLATION
A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR MAXIMUM MOISTURE CONTENT, ALKALINITY RANGE, INSTALLATION TOLERANCES, AND OTHER CONDITIONS AFFECTING CARPET TILE PERFORMANCE. EXAMINE CARPET TILE FOR TYPE, COLOR, PATTERN, AND POTENTIAL DEFECTS.
B. CONCRETE SUBFLOORS: VERIFY THAT CONCRETE SLABS COMPLY WITH ASTM F 710.
C. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
D. PREPARATION: COMPLY WITH CRI 104, SECTION 6.2, "SITE CONDITIONS; FLOOR PREPARATION." AND WITH CARPET TILE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS FOR PREPARING SUBSTRATES INDICATED TO RECEIVE CARPET TILE INSTALLATION.

GREGORY EDWARD BRINKHORST NUMBER AP0002655 REGISTERED PROFESSIONAL ENGINEER

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
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MoDOT

DRAWN BY: DLS
CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-706

E. INSTALLATION: COMPLY WITH CRI 104, SECTION 14, "CARPET MODULES," AND WITH CARPET TILE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

F. INSTALLATION METHOD: GLUE DOWN; INSTALL EVERY TILE WITH FULL-SPREAD, RELEASABLE, PRESSURE-SENSITIVE ADHESIVE.

G. MAINTAIN DYE LOT INTEGRITY. DO NOT MIX DYE LOTS IN SAME AREA.

H. CUT AND FIT CARPET TILE TO BUTT TIGHTLY TO VERTICAL SURFACES, PERMANENT FIXTURES, AND BUILT-IN FURNITURE INCLUDING CABINETS, PIPES, OUTLETS, EDGINGS, THRESHOLDS, AND NOSINGS. BIND OR SEAL CUT EDGES AS RECOMMENDED BY CARPET TILE MANUFACTURER.

I. EXTEND CARPET TILE INTO TOE SPACES, DOOR REVEALS, CLOSETS, OPEN-BOTTOMED OBSTRUCTIONS, REMOVABLE FLANGES, ALCOVES, AND SIMILAR OPENINGS.

J. MAINTAIN REFERENCE MARKERS, HOLES, AND OPENINGS THAT ARE IN PLACE OR MARKED FOR FUTURE CUTTING BY REPEATING ON FINISH FLOORING AS MARKED ON SUBFLOOR. USE NONPERMANENT, NONSTAINING MARKING DEVICE.

K. INSTALL PATTERN PARALLEL TO WALLS AND BORDERS.

L. PERFORM THE FOLLOWING OPERATIONS IMMEDIATELY AFTER INSTALLING CARPET TILE:

1. REMOVE EXCESS ADHESIVE, SEAM SEALER, AND OTHER SURFACE BLEMISHES USING CLEANER RECOMMENDED BY CARPET TILE MANUFACTURER.
2. REMOVE YARNS THAT PROTRUDE FROM CARPET TILE SURFACE.
3. VACUUM CARPET TILE USING COMMERCIAL MACHINE WITH FACE-BEATER ELEMENT.

M. PROTECT INSTALLED CARPET TILE TO COMPLY WITH CRI 104, SECTION 16, "PROTECTING INDOOR INSTALLATIONS."

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES SURFACE PREPARATION AND THE APPLICATION OF PAINT SYSTEMS ON THE FOLLOWING INTERIOR SUBSTRATES:

1. GYPSUM BOARD.
2. STEEL.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SAMPLES: FOR EACH FINISH AND FOR EACH COLOR AND TEXTURE REQUIRED.

C. PRODUCT LIST: PRINTOUT OF CURRENT "MPI APPROVED PRODUCTS LIST" FOR EACH PRODUCT CATEGORY SPECIFIED IN PART 2, WITH THE PROPOSED PRODUCT HIGHLIGHTED.

1.3 QUALITY ASSURANCE

A. MPI STANDARDS:

1. PRODUCTS: COMPLYING WITH MPI STANDARDS INDICATED AND LISTED IN "MPI APPROVED PRODUCTS LIST."
2. PREPARATION AND WORKMANSHIP: COMPLY WITH REQUIREMENTS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" FOR PRODUCTS AND PAINT SYSTEMS INDICATED.

1.4 EXTRA MATERIALS

A. FURNISH EXTRA MATERIALS DESCRIBED BELOW THAT ARE FROM SAME PRODUCTION RUN (BATCH MIX) AS MATERIALS APPLIED AND THAT ARE PACKAGED FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. BASIS-OF-DESIGN PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE THE PRODUCTS INDICATED IN SECTION 3 AS MANUFACTURED BY INDURON PROTECTIVE COATINGS, OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:

1. BENJAMIN MOORE & CO.
2. ICI DULUX PAINT CENTERS, INC.
3. PPG INDUSTRIES.

2.2 PAINT, GENERAL

A. MATERIAL COMPATIBILITY:

1. PROVIDE MATERIALS FOR USE WITHIN EACH PAINT SYSTEM THAT ARE COMPATIBLE WITH ONE ANOTHER AND SUBSTRATES INDICATED, UNDER CONDITIONS OF SERVICE AND APPLICATION AS DEMONSTRATED BY MANUFACTURER, BASED ON TESTING AND FIELD EXPERIENCE.
2. FOR EACH COAT IN A PAINT SYSTEM, PROVIDE PRODUCTS RECOMMENDED IN WRITING BY MANUFACTURERS OF TOPCOAT FOR USE IN PAINT SYSTEM AND ON SUBSTRATE INDICATED.

B. CHEMICAL COMPONENTS OF FIELD-APPLIED INTERIOR PAINTS AND COATINGS: PROVIDE PRODUCTS THAT COMPLY WITH THE FOLLOWING LIMITS FOR VOC CONTENT, EXCLUSIVE OF COLORANTS ADDED TO A TINT BASE, WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24) AND THE FOLLOWING CHEMICAL RESTRICTIONS; THESE REQUIREMENTS DO NOT APPLY TO PRIMERS OR FINISHES THAT ARE APPLIED IN A FABRICATION OR FINISHING SHOP:

1. FLAT PAINTS AND COATINGS: VOC CONTENT OF NOT MORE THAN 50 G/L.
2. NONFLAT PAINTS AND COATINGS: VOC CONTENT OF NOT MORE THAN 150 G/L.
3. AROMATIC COMPOUNDS: PAINTS AND COATINGS SHALL NOT CONTAIN MORE THAN 1.0 PERCENT BY WEIGHT OF TOTAL AROMATIC COMPOUNDS (HYDROCARBON COMPOUNDS CONTAINING ONE OR MORE BENZENE RINGS).

C. COLORS: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE SUBSTRATES AND CONDITIONS, WITH APPLICATOR PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR MAXIMUM MOISTURE CONTENT AND OTHER CONDITIONS AFFECTING PERFORMANCE OF WORK.

B. MAXIMUM MOISTURE CONTENT OF SUBSTRATES: WHEN MEASURED WITH AN ELECTRONIC MOISTURE METER AS FOLLOWS:

1. GYPSUM BOARD: 12 PERCENT.

C. VERIFY SUITABILITY OF SUBSTRATES, INCLUDING SURFACE CONDITIONS AND COMPATIBILITY WITH EXISTING FINISHES AND PRIMERS.

D. BEGIN COATING APPLICATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED AND SURFACES ARE DRY.

1. BEGINNING COATING APPLICATION CONSTITUTES CONTRACTOR'S ACCEPTANCE OF SUBSTRATES AND CONDITIONS.

3.2 PREPARATION AND APPLICATION

A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" APPLICABLE TO SUBSTRATES INDICATED.

B. CLEAN SUBSTRATES OF SUBSTANCES THAT COULD IMPAIR BOND OF PAINTS, INCLUDING DIRT, OIL, GREASE, AND INCOMPATIBLE PAINTS AND ENCAPSULANTS.

1. REMOVE INCOMPATIBLE PRIMERS AND REPRIME SUBSTRATE WITH COMPATIBLE PRIMERS AS REQUIRED TO PRODUCE PAINT SYSTEMS INDICATED.

C. APPLY PAINTS TO PRODUCE SURFACE FILMS WITHOUT CLOUDINESS, SPOTTING, HOLIDAYS, LAPS, BRUSH MARKS, ROLLER TRACKING, RUNS, SAGS, ROPINESS, OR OTHER SURFACE IMPERFECTIONS. CUT IN SHARP LINES AND COLOR BREAKS.

D. PROTECT WORK OF OTHER TRADES AGAINST DAMAGE FROM PAINT APPLICATION. CORRECT DAMAGE TO WORK OF OTHER TRADES BY CLEANING, REPAIRING, REPLACING, AND REFINISHING, AS APPROVED BY ARCHITECT, AND LEAVE IN AN UNDAMAGED CONDITION.

E. AT COMPLETION OF CONSTRUCTION ACTIVITIES OF OTHER TRADES, TOUCH UP AND RESTORE DAMAGED OR DEFACED PAINTED SURFACES.

3.3 PAINTING SCHEDULE

A. GYPSUM BOARD: PROVIDE THE FOLLOWING SYSTEMS OVER INTERIOR GYPSUM WALL SURFACES:

1. ACRYLIC FINISH: TWO COATS OVER PRIMER.
   a. PRIMER TO BE INDURON AC210 ACRYLIC PRIMER.
   b. FINISH TO BE INDURON AC230 ACRYLIC, EGGSHELL FINISH, DRY FILM THICKNESS OF NOT LESS THAN 1.50 MILS.

B. CONCRETE MASONRY UNITS: PROVIDE THE FOLLOWING SYSTEMS OVER CMU WALL SURFACES.

1. ACRYLIC FINISH: TWO COATS OVER BLOCK FILLER.
   a. BLOCK FILLER TO BE INDURON AC220 ACRYLIC BLOCK FILTER, DRY FILM THICKNESS OF NOT LESS THAN 1.0 MIL
   b. FINISH TO BE INDURON AC230 ACRYLIC EGGSHELL FINISH, DRY FILM THICKNESS OF NOT LESS THAN 1.50 MILS.

C. PLYWOOD SURFACE: PROVIDE THE FOLLOWING SYSTEM OVER PLYWOOD SURFACES:

1. ACRYLIC FINISH: TWO COATS OVER PRIMER.
   a. PRIMER TO BE INDURON AC210 ACRYLIC PRIMER.
   b. FINISH TO BE INDURON AC230 ACRYLIC EGGSHELL FINISH, DRY FILM THICKNESS OF NOT LESS THAN 1.50 MILS.

D. STEEL DOORS AND FRAMES: PROVIDE THE FOLLOWING SYSTEM OVER BOTH FACES OF STEEL DOORS AND FRAMES.

1. ACRYLIC FINISH: ONE COAT OVER PRIMER.
   a. PRIMER TO BE INDURON AQUANAUT PRIMER APPLIED AT 1.5 DRY MILS.
   b. FINISH TO BE ONE COAT AQUANAUT II ACRYLIC GLOSS ENAMEL APPLIED AT 1.5 DRY MILS.

END OF SECTION 099123

SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. STEEL TOILET COMPARTMENTS CONFIGURED AS TOILET ENCLOSURES.

PART 2 - PRODUCTS

2.1 MATERIALS

A. STEEL SHEET: COMMERCIAL STEEL SHEET FOR EXPOSED APPLICATIONS; MILL PHOSPHATIZED AND SELECTED FOR SMOOTHNESS.

1. ELECTROLYTICALLY ZINC COATED: ASTM A 879/A 879M, 01Z.
2. HOT-DIP GALVANIZED: ASTM A 653/A 653M, EITHER HOT-DIP GALVANIZED OR GALVANNEALED.

2.2 STEEL UNITS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. ACCURATE PARTITIONS CORPORATION.
2. BRADLEY CORPORATION; MILLS PARTITIONS.
3. GLOBAL STEEL PRODUCTS CORP.
4. SANYMETAL; A CRANE PLUMBING COMPANY.

B. TOILET-ENCLOSURE STYLE: FLOOR ANCHORED.

C. URINAL-SCREEN STYLE: WALL HUNG, FLAT PANEL.

D. DOOR, PANEL, AND PILASTER CONSTRUCTION: SEAMLESS, METAL FACING SHEETS PRESSURE LAMINATED TO CORE MATERIAL; WITH CONTINUOUS, INTERLOCKING MOLDING STRIP OR LAPPED-AND-FORMED EDGE CLOSURES; CORNERS SECURED BY WELDING OR CLIPS AND EXPOSED WELDS GROUND SMOOTH. EXPOSED SURFACES SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, TELEGRAPHING OF CORE MATERIAL, OR OTHER IMPERFECTIONS.

1. CORE MATERIAL: MANUFACTURER'S STANDARD SOUND-DEADENING HONEYCOMB OF RESIN-IMPREGNATED KRAFT PAPER IN THICKNESS REQUIRED TO PROVIDE FINISHED THICKNESS OF 1 INCH FOR DOORS AND PANELS AND 1-1/4 INCHES FOR PILASTERS.
2. GRAB-BAR REINFORCEMENT: PROVIDE CONCEALED INTERNAL REINFORCEMENT FOR GRAB BARS MOUNTED ON UNITS.
3. TAPPING REINFORCEMENT: PROVIDE CONCEALED REINFORCEMENT FOR TAPPING (THREADING) AT LOCATIONS WHERE MACHINE SCREWS ARE USED FOR ATTACHING ITEMS TO UNITS.

E. URINAL-SCREEN CONSTRUCTION:

1. FLAT-PANEL URINAL SCREEN: MATCHING PANEL CONSTRUCTION.
2. INTEGRAL-FLANGE, WALL-HUNG URINAL SCREEN: SIMILAR TO PANEL CONSTRUCTION, WITH INTEGRAL FULL-HEIGHT FLANGES FOR WALL ATTACHMENT, AND MAXIMUM 1-1/4 INCHES THICK.

F. FACING SHEETS AND CLOSURES: ELECTROLYTICALLY COATED STEEL SHEET WITH NOMINAL BASE-METAL (UNCOATED) THICKNESSES STANDARD WITH MANUFACTURER.

G. PILASTER SHOES AND CAPS: STAINLESS-STEEL SHEET, NOT LESS THAN 3 INCHES HIGH, FINISHED TO MATCH HARDWARE.

H. BRACKETS (FITTINGS):

1. STIRRUP TYPE: EAR OR U-BRACKETS; STAINLESS STEEL.
2. FULL-HEIGHT (CONTINUOUS) TYPE: MANUFACTURER'S STANDARD DESIGN; STAINLESS STEEL.

I. STEEL-SHEET FINISH: MANUFACTURER'S STANDARD BAKED-ON FINISH, WITH ONE COLOR IN EACH ROOM.

1. COLOR: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 102113

SECTION 102226 - OPERABLE PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. MANUALLY OPERATED, ACOUSTICAL PANEL PARTITIONS.

1.2 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN OPERABLE PANEL PARTITIONS INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. SEISMIC PERFORMANCE: OPERABLE PANEL PARTITIONS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO SEI/ASCE 7.

1. THE TERM "WITHSTAND" MEANS "THE PANELS WILL REMAIN IN PLACE WITHOUT SEPARATION OF ANY PARTS FROM THE ASSEMBLY WHEN SUBJECTED TO THE SEISMIC FORCES SPECIFIED."

C. ACOUSTICAL PERFORMANCE: PROVIDE OPERABLE PANEL PARTITIONS TESTED BY A QUALIFIED TESTING AGENCY FOR THE FOLLOWING ACOUSTICAL PROPERTIES ACCORDING TO TEST METHODS INDICATED:

1. SOUND-TRANSMISSION REQUIREMENTS: OPERABLE PANEL PARTITION ASSEMBLY TESTED FOR LABORATORY SOUND-TRANSMISSION LOSS PERFORMANCE ACCORDING TO ASTM E 90, DETERMINED BY ASTM E 413, AND RATED FOR NOT LESS THAN THE STC INDICATED.
2. ACOUSTICAL PERFORMANCE REQUIREMENTS: INSTALLED OPERABLE PANEL PARTITION ASSEMBLY, IDENTICAL TO PARTITION TESTED FOR STC, TESTED FOR NIC ACCORDING TO ASTM E 336, DETERMINED BY ASTM E 413, AND RATED FOR 10 DB LESS THAN STC VALUE INDICATED.

1.3 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. LEED SUBMITTALS:

1. CERTIFICATES FOR CREDIT MR 7: CHAIN-OF-CUSTODY CERTIFICATES CERTIFYING THAT OPERABLE PANEL PARTITIONS COMPLY WITH FOREST CERTIFICATION REQUIREMENTS. INCLUDE EVIDENCE THAT MANUFACTURER IS CERTIFIED FOR CHAIN OF CUSTODY BY AN FSC-ACCREDITED CERTIFICATION BODY.
2. PRODUCT DATA FOR CREDIT EQ 4.4: FOR EACH COMPOSITE WOOD PRODUCT USED IN OPERABLE PANEL PARTITIONS, DOCUMENTATION INDICATING THAT PRODUCT CONTAINS NO UREA FORMALDEHYDE.

C. SHOP DRAWINGS: INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.

1. INDICATE STORAGE AND OPERATING CLEARANCES. INDICATE LOCATION AND INSTALLATION REQUIREMENTS FOR HARDWARE AND TRACK, BLOCKING, AND DIRECTION OF TRAVEL.
2. WIRING DIAGRAMS: FOR POWER, SIGNAL, AND CONTROL WIRING.

D. SAMPLES: FOR EACH TYPE OF EXPOSED MATERIAL, FINISH, COVERING, OR FACING INDICATED.

E. DELEGATED-DESIGN SUBMITTAL: FOR OPERABLE PANEL PARTITIONS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS, INCLUDING ANALYSIS DATA AND CALCULATIONS SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.

1. DESIGN CALCULATIONS: CALCULATE REQUIREMENTS FOR SEISMIC RESTRAINTS.

F. COORDINATION DRAWINGS: REFLECTED CEILING PLANS, DRAWN TO SCALE AND COORDINATED WITH EACH OTHER, BASED ON INPUT FROM INSTALLERS OF THE ITEMS INVOLVED:

G. SETTING DRAWINGS: FOR EMBEDDED ITEMS AND CUTOUTS REQUIRED IN OTHER WORK, INCLUDING SUPPORT-BEAM, MOUNTING-HOLE TEMPLATE.

H. SEISMIC QUALIFICATION CERTIFICATES: FOR OPERABLE PANEL PARTITIONS, ACCESSORIES, AND COMPONENTS, FROM MANUFACTURER.

I. OPERATION AND MAINTENANCE DATA.

J. WARRANTY: SAMPLE OF SPECIAL WARRANTY.

1.4 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS: A QUALIFIED MANUFACTURER THAT IS CERTIFIED FOR CHAIN OF CUSTODY BY AN FSC-ACCREDITED CERTIFICATION BODY.

B. INSTALLER QUALIFICATIONS: AN EMPLOYER OF WORKERS TRAINED AND APPROVED BY MANUFACTURER.

C. TESTING AGENCY QUALIFICATIONS: QUALIFIED ACCORDING TO DIVISION 01 SECTION "QUALITY REQUIREMENTS" FOR TESTING INDICATED.

D. FOREST CERTIFICATION: FABRICATE PRODUCTS WITH WOOD, WOOD VENEERS, AND WOOD-BASED PANEL PRODUCTS PRODUCED FROM WOOD OBTAINED FROM FORESTS CERTIFIED BY AN FSC-ACCREDITED CERTIFICATION BODY TO COMPLY WITH FSC STD-01-001, "FSC PRINCIPLES AND CRITERIA FOR FOREST STEWARDSHIP."

E. FIRE-TEST-RESPONSE CHARACTERISTICS: PROVIDE PANELS WITH FINISHES MEETING ONE OF THE FOLLOWING AS DETERMINED BY TESTING IDENTICAL PRODUCTS BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION:

1. SURFACE-BURNING CHARACTERISTICS: AS DETERMINED BY TESTING PER ASTM E 84.
   a. FLAME-SPREAD INDEX: 25 OR LESS.
   b. SMOKE-DEVELOPED INDEX: 450 OR LESS.

1.5 DELIVERY, STORAGE, AND HANDLING

A. PROTECTIVELY PACKAGE AND SEQUENCE PANELS IN ORDER FOR INSTALLATION. CLEARLY MARK PACKAGES AND PANELS WITH NUMBERING SYSTEM USED ON SHOP DRAWINGS. DO NOT USE PERMANENT MARKINGS ON PANELS.

1.6 WARRANTY

A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF OPERABLE PANEL PARTITIONS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.

1. WARRANTY PERIOD: TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

2.1 MATERIALS

A. STEEL FRAME: STEEL SHEET, MANUFACTURER'S STANDARD THICKNESS.

B. STEEL FACE/LINER SHEETS: TENSION-LEVELED STEEL SHEET, MANUFACTURER'S STANDARD THICKNESS.

C. ALUMINUM: ALLOY AND TEMPER RECOMMENDED BY ALUMINUM PRODUCER AND FINISHER FOR TYPE OF USE, CORROSION RESISTANCE, AND FINISH INDICATED; MANUFACTURER'S STANDARD STRENGTHS AND THICKNESSES FOR TYPE OF USE.

D. WOOD FRAME: CLEAR, VERTICAL-GRAIN, STRAIGHT, KILN-DRIED WOOD; OF MANUFACTURER'S STANDARD SPECIES.

E. GYPSUM BOARD: ASTM C 36/C 36M.

F. CEMENT BOARD: ASTM C 1288.

G. PLYWOOD: DOC PS 1.

H. PARTICLEBOARD: ANSI A208.1.

I. MEDIUM-DENSITY FIBERBOARD: ANSI A208.2.

2.2 OPERABLE ACOUSTICAL PANELS

A. OPERABLE ACOUSTICAL PANELS: OPERABLE ACOUSTICAL PANEL PARTITION SYSTEM, INCLUDING PANELS, SEALS, FINISH FACING, SUSPENSION SYSTEM, OPERATORS, AND ACCESSORIES.

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
2. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT INDICATED ON DRAWINGS OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
   a. HUFCOR.
   b. MODERCO INC.
   c. PANELFOLD INC.

B. PANEL OPERATION: MANUALLY OPERATED, PAIRED PANELS.

C. PANEL CONSTRUCTION: PROVIDE TOP REINFORCEMENT AS REQUIRED TO SUPPORT PANEL FROM SUSPENSION COMPONENTS AND PROVIDE REINFORCEMENT FOR HARDWARE ATTACHMENT. FABRICATE PANELS WITH TIGHT HAIRLINE JOINTS AND CONCEALED FASTENERS. FABRICATE PANELS SO FINISHED IN-PLACE PARTITION IS RIGID; LEVEL; PLUMB; ALIGNED, WITH TIGHT JOINTS AND UNIFORM APPEARANCE; AND FREE OF BOW, WARP, TWIST, DEFORMATION, AND SURFACE AND FINISH IRREGULARITIES.

D. DIMENSIONS: FABRICATE OPERABLE ACOUSTICAL PANEL PARTITIONS TO FORM AN ASSEMBLED SYSTEM OF DIMENSIONS INDICATED AND VERIFIED BY FIELD MEASUREMENTS.

E. STC: NOT LESS THAN 45.

F. PANEL CLOSURE: MANUFACTURER'S STANDARD.

G. HARDWARE: MANUFACTURER'S STANDARD AS REQUIRED TO OPERATE OPERABLE PANEL PARTITION AND ACCESSORIES; WITH DECORATIVE, PROTECTIVE FINISH.

2.3 SEALS

A. GENERAL: PROVIDE TYPES OF SEALS INDICATED THAT PRODUCE OPERABLE PANEL PARTITIONS COMPLYING WITH ACOUSTICAL PERFORMANCE REQUIREMENTS AND THE FOLLOWING:

1. MANUFACTURER'S STANDARD SEALS.
2. SEALS MADE FROM MATERIALS AND IN PROFILES THAT MINIMIZE SOUND LEAKAGE.
3. SEALS FITTING TIGHT AT CONTACT SURFACES AND SEALING CONTINUOUSLY BETWEEN ADJACENT PANELS AND BETWEEN OPERABLE PANEL PARTITION PERIMETER AND ADJACENT SURFACES, WHEN OPERABLE PANEL PARTITION IS EXTENDED AND CLOSED.

B. HORIZONTAL BOTTOM SEALS: PVC-FACED, MECHANICAL, RETRACTABLE, CONSTANT-FORCE-CONTACT SEAL EXERTING UNIFORM CONSTANT PRESSURE ON FLOOR WHEN EXTENDED, ENSURING HORIZONTAL AND VERTICAL SEALING AND RESISTING PANEL MOVEMENT.

1. MECHANICALLY OPERATED FOR ACOUSTICAL PANELS: EXTENSION AND RETRACTION OF BOTTOM SEAL BY OPERATING HANDLE OR BUILT-IN OPERATING MECHANISM, WITH OPERATING RANGE NOT LESS THAN 1-1/2 INCHES BETWEEN RETRACTED SEAL AND FLOOR FINISH.

2.4 FINISH FACING

A. GENERAL: PROVIDE FINISH FACINGS FOR PANELS THAT COMPLY WITH INDICATED FIRE-TEST-RESPONSE CHARACTERISTICS AND THAT ARE FACTORY APPLIED TO OPERABLE PANEL PARTITIONS WITH APPROPRIATE BACKING, USING MILDEW-RESISTANT NONSTAINING ADHESIVE AS RECOMMENDED BY FACING MANUFACTURER'S WRITTEN INSTRUCTIONS.

1. COLOR/PATTERN: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

B. CARPET WALL COVERING: MANUFACTURER'S STANDARD NONWOVEN, NEEDLE-PUNCHED CARPET WITH FIBERS FUSED TO BACKING, FROM SAME DYE LOT, TREATED TO RESIST STAINS.

C. PAINT: MANUFACTURER'S STANDARD FACTORY-PAINTED FINISH.

D. CAP-TRIMMED EDGES: PROTECTIVE PERIMETER-EDGE TRIM WITH TIGHT HAIRLINE JOINTS CONCEALING EDGES OF PANEL AND FINISH FACING.

2.5 SUSPENSION SYSTEMS

A. SUSPENSION TRACKS: STEEL OR ALUMINUM WITH ADJUSTABLE STEEL HANGER RODS FOR OVERHEAD SUPPORT, DESIGNED FOR TYPE OF OPERATION, SIZE, AND WEIGHT OF OPERABLE PANEL PARTITION INDICATED. SIZE TRACK TO SUPPORT PARTITION OPERATION AND STORAGE WITHOUT DAMAGE TO SUSPENSION SYSTEM, OPERABLE PANEL PARTITIONS, OR ADJACENT CONSTRUCTION. LIMIT TRACK DEFLECTION TO NO MORE THAN 0.10 INCH BETWEEN BRACKET SUPPORTS. PROVIDE A CONTINUOUS SYSTEM OF TRACK SECTIONS AND ACCESSORIES TO ACCOMMODATE CONFIGURATION AND LAYOUT INDICATED FOR PARTITION OPERATION AND STORAGE.

B. CARRIERS: TROLLEY SYSTEM AS REQUIRED FOR CONFIGURATION TYPE, SIZE, AND WEIGHT OF PARTITION AND FOR EASY OPERATION; WITH BALL-BEARING WHEELS.

C. STEEL FINISH: MANUFACTURER'S STANDARD, FACTORY-APPLIED, CORROSION-RESISTANT, PROTECTIVE COATING UNLESS OTHERWISE INDICATED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL: COMPLY WITH ASTM E 557 EXCEPT AS OTHERWISE REQUIRED BY OPERABLE PANEL PARTITION MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

B. INSTALL OPERABLE PANEL PARTITIONS AND ACCESSORIES AFTER OTHER FINISHING OPERATIONS, INCLUDING PAINTING, HAVE BEEN COMPLETED.

C. INSTALL PANELS FROM MARKED PACKAGES IN NUMBERED SEQUENCE INDICATED ON SHOP DRAWINGS.

D. BROKEN, CRACKED, CHIPPED, DEFORMED, OR UNMATCHED PANELS ARE NOT ACCEPTABLE.

E. BROKEN, CRACKED, DEFORMED, OR UNMATCHED GASKETING OR GASKETING WITH GAPS AT BUTTED ENDS IS NOT ACCEPTABLE.

3.2 ADJUSTING

A. ADJUST OPERABLE PANEL PARTITIONS TO OPERATE SMOOTHLY, WITHOUT WARPING OR BINDING. LUBRICATE HARDWARE, ELECTRIC OPERATOR, AND OTHER MOVING PARTS.

3.3 FIELD QUALITY CONTROL

A. LIGHT-LEAKAGE TEST: ILLUMINATE ONE SIDE OF PARTITION INSTALLATION AND OBSERVE VERTICAL JOINTS AND TOP AND BOTTOM SEALS FOR VOIDS; ADJUST PARTITIONS FOR ACCEPTABLE FIT.

B. REPAIR OR REPLACE OPERABLE PANEL PARTITIONS THAT DO NOT COMPLY WITH REQUIREMENTS.

C. ADDITIONAL TESTING AND INSPECTING, AT CONTRACTOR'S EXPENSE, WILL BE PERFORMED TO DETERMINE COMPLIANCE OF REPAIRED, REPLACED, OR ADDITIONAL WORK WITH SPECIFIED REQUIREMENTS.

D. PREPARE TEST AND INSPECTION REPORTS.

3.4 DEMONSTRATION

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN OPERABLE PANEL PARTITIONS.

END OF SECTION 102226

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. WASHROOM ACCESSORIES.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. PRODUCT SCHEDULE: INDICATING TYPES, QUANTITIES, SIZES, AND INSTALLATION LOCATIONS BY ROOM OF EACH ACCESSORY REQUIRED.

1. IDENTIFY LOCATIONS USING ROOM DESIGNATIONS INDICATED.

C. MAINTENANCE DATA.

1.3 QUALITY ASSURANCE

A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

PART 2 - PRODUCTS

2.1 WASHROOM ACCESSORIES

A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT INDICATED ON DRAWINGS OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:

1. BOBRICK WASHROOM EQUIPMENT, INC.
2. BRADLEY CORPORATION.
3. TUBULAR SPECIALTIES MANUFACTURING, INC.

B. TOILET TISSUE (ROLL) DISPENSER:

1. BASIS-OF-DESIGN PRODUCT: BOBRICK B-2888.
2. DESCRIPTION: ROLL-IN-RESERVE DISPENSER WITH HINGED FRONT SECURED WITH TUMBLER LOCKSET.
3. MOUNTING: SURFACE MOUNTED.
4. OPERATION: NONCONTROL DELIVERY WITH STANDARD SPINDLE.
5. CAPACITY: DESIGNED FOR DIAMETER TISSUE ROLLS.
6. MATERIAL AND FINISH: STAINLESS STEEL, NO. 4 FINISH (SATIN).

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A2006285
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

CDG ENGINEERS
CDG Engineers Architects Planners Inc.
One Campbell Plaza
St. Louis, Missouri 63139
www.cdgengineers.com
T. 314 781 7770
F. 314 781 8075

MoDOT

DRAWN BY DLS
CHECKED BY DLS
SCALE AS SHOWN
DATE 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-707

C. COMBINATION TOWEL (FOLDED) DISPENSER/WASTE RECEPTACLE:
1. BASIS-OF-DESIGN PRODUCT: BOBRICK B-3905.
2. DESCRIPTION: COMBINATION UNIT FOR DISPENSING C-FOLD OR MULTIFOLD TOWELS, WITH REMOVABLE WASTE RECEPTACLE.
3. MOUNTING: SURFACE MOUNTED.
4. MINIMUM TOWEL-DISPENSER CAPACITY: 600 C-FOLD OR 800 MULTIFOLD PAPER TOWELS.
5. MINIMUM WASTE-RECEPTACLE CAPACITY: 12 GAL.
6. MATERIAL AND FINISH: STAINLESS STEEL, NO. 4 FINISH (SATIN).
7. LOCKSET: TUMBLER TYPE FOR TOWEL-DISPENSER COMPARTMENT.

D. LIQUID-SOAP DISPENSER:
1. BASIS-OF-DESIGN PRODUCT: BOBRICK B-2111.
2. DESCRIPTION: DESIGNED FOR DISPENSING SOAP IN LIQUID FORM.
3. MOUNTING: VERTICALLY ORIENTED, SURFACE MOUNTED.
4. CAPACITY: 40 FLUID OZ.
5. MATERIALS: 304 STAINLESS STEEL WITH SATIN FINISH, CORROSION-RESISTANT VALVE. VALVE OPERATION TO MEET ADA GUIDELINES.
6. LOCKSET: TUMBLER TYPE.
7. REFILL INDICATOR: WINDOW TYPE.

E. GRAB BAR:
1. BASIS-OF-DESIGN PRODUCT: BOBRICK B-6806.
2. MOUNTING: FLANGES WITH CONCEALED FASTENERS.
3. MATERIAL: STAINLESS STEEL, 0.05 INCH THICK.
a. FINISH: SMOOTH, NO. 4 FINISH (SATIN) ON ENDS AND SLIP-RESISTANT TEXTURE IN GRIP AREA.
4. OUTSIDE DIAMETER: 1-1/2 INCHES.
5. CONFIGURATION AND LENGTH: AS INDICATED ON DRAWINGS.

F. MIRROR UNIT:
1. BASIS-OF-DESIGN PRODUCT: BOBRICK B-290.
2. FRAME: STAINLESS-STEEL ANGLE, 0.05 INCH THICK.
a. CORNERS: MANUFACTURER'S STANDARD.
3. HANGERS: PRODUCE RIGID, TAMPER- AND THEFT-RESISTANT INSTALLATION, USING METHOD INDICATED BELOW.
a. ONE-PIECE, GALVANIZED-STEEL, WALL-HANGER DEVICE WITH SPRING-ACTION LOCKING MECHANISM TO HOLD MIRROR UNIT IN POSITION WITH NO EXPOSED SCREWS OR BOLTS.
4. SIZE: AS INDICATED ON DRAWINGS.

2.2 FABRICATION

A. KEYS: PROVIDE UNIVERSAL KEYS FOR INTERNAL ACCESS TO ACCESSORIES FOR SERVICING AND RESUPPLYING. PROVIDE MINIMUM OF SIX KEYS TO OWNER'S REPRESENTATIVE.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL ACCESSORIES ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS, USING FASTENERS APPROPRIATE TO SUBSTRATE INDICATED AND RECOMMENDED BY UNIT MANUFACTURER. INSTALL UNITS LEVEL, PLUMB, AND FIRMLY ANCHORED IN LOCATIONS AND AT HEIGHTS INDICATED.

B. GRAB BARS: INSTALL TO WITHSTAND A DOWNWARD LOAD OF AT LEAST 250 LBF, WHEN TESTED ACCORDING TO ASTM F 446.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES FIRE PROTECTION CABINETS FOR FIRE EXTINGUISHERS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: FOR FIRE PROTECTION CABINETS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.

C. SAMPLES: FOR EACH EXPOSED PRODUCT AND FOR EACH COLOR AND TEXTURE SPECIFIED.

D. MAINTENANCE DATA.

1.3 QUALITY ASSURANCE

A. COORDINATE SIZE OF FIRE PROTECTION CABINETS TO ENSURE THAT TYPE AND CAPACITY OF FIRE EXTINGUISHERS INDICATED ARE ACCOMMODATED.

B. COORDINATE SIZES AND LOCATIONS OF FIRE PROTECTION CABINETS WITH WALL DEPTHS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. COLD-ROLLED STEEL SHEET: ASTM A 1008/A 1008M, COMMERCIAL STEEL (CS), TYPE B.

B. TRANSPARENT ACRYLIC SHEET: ASTM D 4802, CATEGORY A-1 (CELL-CAST SHEET), 3 MM THICK, WITH FINISH 2 (PATTERNED, TEXTURED).

2.2 FIRE PROTECTION CABINET

A. CABINET TYPE: SUITABLE FOR FIRE EXTINGUISHER.
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. J. L. INDUSTRIES, INC., A DIVISION OF ACTIVAR CONSTRUCTION PRODUCTS GROUP; AMBASSADOR SERIES.
b. LARSONS MANUFACTURING COMPANY, ARCHITECTURAL SERIES.
c. POTTER ROEMER LLC; 1700 SERIES.

B. CABINET CONSTRUCTION: NONRATED.

C. CABINET MATERIAL: STEEL SHEET.

D. SEMIRECESSED CABINET: CABINET BOX PARTIALLY RECESSED IN WALLS OF SUFFICIENT DEPTH TO SUIT STYLE OF TRIM INDICATED; WITH ONE-PIECE COMBINATION TRIM AND PERIMETER DOOR FRAME OVERLAPPING SURROUNDING WALL SURFACE WITH EXPOSED TRIM FACE AND WALL RETURN AT OUTER EDGE (BACKBEND). PROVIDE WHERE WALLS ARE OF INSUFFICIENT DEPTH FOR RECESSED CABINETS BUT ARE OF SUFFICIENT DEPTH TO ACCOMMODATE SEMIRECESSED CABINET INSTALLATION.
1. ROLLED-EDGE TRIM: 2-1/2-INCH BACKBEND DEPTH.

E. SURFACE-MOUNTED CABINET: CABINET BOX FULLY EXPOSED AND MOUNTED DIRECTLY ON WALL WITH NO TRIM. PROVIDE WHERE WALLS ARE OF INSUFFICIENT DEPTH FOR SEMIRECESSED CABINET INSTALLATION.

F. CABINET TRIM MATERIAL: STEEL SHEET. SAME MATERIAL AND FINISH AS DOOR.

G. DOOR MATERIAL: STEEL SHEET.

H. DOOR STYLE: FULLY GLAZED PANEL WITH FRAME.

I. DOOR GLAZING: ACRYLIC SHEET.
1. ACRYLIC SHEET COLOR: CLEAR TRANSPARENT ACRYLIC SHEET.

J. DOOR HARDWARE: MANUFACTURER'S STANDARD DOOR-OPERATING HARDWARE OF PROPER TYPE FOR CABINET TYPE, TRIM STYLE, AND DOOR MATERIAL AND STYLE INDICATED.

K. ACCESSORIES:
1. MOUNTING BRACKET: MANUFACTURER'S STANDARD STEEL, DESIGNED TO SECURE FIRE EXTINGUISHER TO FIRE PROTECTION CABINET, OF SIZES REQUIRED FOR TYPES AND CAPACITIES OF FIRE EXTINGUISHERS INDICATED, WITH PLATED OR BAKED-ENAMEL FINISH.
2. IDENTIFICATION: LETTERING COMPLYING WITH AUTHORITIES HAVING JURISDICTION FOR LETTER STYLE, SIZE, SPACING, AND LOCATION. LOCATE AS INDICATED.
a. IDENTIFY FIRE EXTINGUISHER IN FIRE PROTECTION CABINET WITH THE WORDS " INSERT IDENTIFICATION."
1) LOCATION: APPLIED TO CABINET GLAZING LOCATION INDICATED ON DRAWINGS.
2) APPLICATION PROCESS: SILK-SCREENED.
3) LETTERING COLOR: RED.
4) ORIENTATION: VERTICAL.

L. FINISHES:
1. MANUFACTURER'S STANDARD BAKED-ENAMEL PAINT FOR THE FOLLOWING:
a. EXTERIOR OF CABINET, DOOR, AND TRIM, EXCEPT FOR THOSE SURFACES INDICATED TO RECEIVE ANOTHER FINISH.
b. INTERIOR OF CABINET.
2. STEEL: BAKED ENAMEL OR POWDER COAT.
a. COLOR AND GLOSS: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

2.3 FABRICATION

A. FIRE PROTECTION CABINETS: PROVIDE MANUFACTURER'S STANDARD BOX (TUB), WITH TRIM, FRAME, DOOR, AND HARDWARE TO SUIT CABINET TYPE, TRIM STYLE, AND DOOR STYLE INDICATED. MITER AND WELD JOINTS AND GRIND SMOOTH.

PART 3 - EXECUTION

3.1 INSTALLATION

A. EXAMINE WALLS AND PARTITIONS FOR SUITABLE FRAMING DEPTH AND BLOCKING WHERE SEMIRECESSED CABINETS WILL BE INSTALLED AND PREPARE RECESSES AS REQUIRED BY TYPE AND SIZE OF CABINET AND TRIM STYLE.

B. INSTALL FIRE PROTECTION CABINETS IN LOCATIONS AND AT MOUNTING HEIGHTS INDICATED OR, IF NOT INDICATED, AT HEIGHTS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

C. FIRE PROTECTION CABINETS: FASTEN CABINETS TO STRUCTURE, SQUARE AND PLUMB.

D. IDENTIFICATION: APPLY DECALS AT LOCATIONS INDICATED.

E. ADJUST FIRE PROTECTION CABINET DOORS TO OPERATE EASILY WITHOUT BINDING. VERIFY THAT INTEGRAL LOCKING DEVICES OPERATE PROPERLY.

F. REPLACE FIRE PROTECTION CABINETS THAT HAVE BEEN DAMAGED OR HAVE DETERIORATED BEYOND SUCCESSFUL REPAIR BY FINISH TOUCHUP OR SIMILAR MINOR REPAIR PROCEDURES.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. OPERATION AND MAINTENANCE DATA.

C. WARRANTY: SAMPLE OF SPECIAL WARRANTY.

1.3 QUALITY ASSURANCE

A. NFPA COMPLIANCE: FABRICATE AND LABEL FIRE EXTINGUISHERS TO COMPLY WITH NFPA 10, "PORTABLE FIRE EXTINGUISHERS."

B. FIRE EXTINGUISHERS: LISTED AND LABELED FOR TYPE, RATING, AND CLASSIFICATION BY AN INDEPENDENT TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

C. COORDINATE TYPE AND CAPACITY OF FIRE EXTINGUISHERS WITH FIRE PROTECTION CABINETS TO ENSURE FIT AND FUNCTION.

1.4 WARRANTY

A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE FIRE EXTINGUISHERS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
1. FAILURES INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
a. FAILURE OF HYDROSTATIC TEST ACCORDING TO NFPA 10.
b. FAULTY OPERATION OF VALVES OR RELEASE LEVERS.
2. WARRANTY PERIOD: SIX YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. FIRE EXTINGUISHERS: TYPE, SIZE, AND CAPACITY FOR EACH FIRE PROTECTION CABINET INDICATED.
1. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE J.L. INDUSTRIES COSMIC 5E OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
a. ANSUL INCORPORATED; TYCO INTERNATIONAL LTD.
b. KIDDE RESIDENTIAL AND COMMERCIAL DIVISION; SUBSIDIARY OF KIDDE PLC.
c. POTTER ROEMER LLC.
2. INSTRUCTION LABELS: INCLUDE PICTORIAL MARKING SYSTEM COMPLYING WITH NFPA 10, APPENDIX B.

B. MULTIPURPOSE DRY-CHEMICAL TYPE 2A-10BC: UL-RATED 5LB NOMINAL CAPACITY, WITH MONOAMMONIUM PHOSPHATE-BASED DRY CHEMICAL IN MANUFACTURER'S STANDARD ENAMELED CONTAINER.

PART 3 - EXECUTION

3.1 INSTALLATION

A. EXAMINE FIRE EXTINGUISHERS FOR PROPER CHARGING AND TAGGING.
1. REMOVE AND REPLACE DAMAGED, DEFECTIVE, OR UNDERCHARGED FIRE EXTINGUISHERS.

B. INSTALL FIRE EXTINGUISHERS IN LOCATIONS INDICATED AND IN COMPLIANCE WITH REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

END OF SECTION 104416

SECTION 122113 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SECTION INCLUDES THE FOLLOWING:
1. HORIZONTAL LOUVER BLINDS WITH ALUMINUM SLATS.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: SHOW FABRICATION AND INSTALLATION DETAILS FOR HORIZONTAL LOUVER BLINDS.
1. WIRING DIAGRAMS: POWER, SYSTEM, AND CONTROL WIRING.

C. SAMPLES: FOR EACH EXPOSED FINISH.

D. MAINTENANCE DATA.

1.3 QUALITY ASSURANCE

A. PRODUCT STANDARD: PROVIDE HORIZONTAL LOUVER BLINDS COMPLYING WITH WCSC A 100.1.

PART 2 - PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. HUNTER DOUGLAS; LIGHTING.
2. LEVOLOR, A NEWELL RUBBERMAID COMPANY; MARK I.
3. GEABER, A SPRINGS WINDOW FASHIONS DIVISION, INC.; PERFORMANCE SUPREME.

B. SLATS: ALUMINUM; ALLOY AND TEMPER RECOMMENDED BY PRODUCER FOR TYPE OF USE AND FINISH INDICATED; WITH CROWNED PROFILE AND RADIUSED CORNERS.
1. WIDTH: 1 INCH.
2. FINISH: ONE COLOR.
a. IONIZED COATING: ANTISTATIC, DUST-REPELLENT, BAKED POLYESTER FINISH.
b. REFLECTIVE COATING: MANUFACTURER'S SPECIAL COATING ENHANCING THE REFLECTION OF SOLAR ENERGY ON THE OUTSIDE-FACING SLAT SURFACE.

C. HEADRAIL: FORMED STEEL OR EXTRUDED ALUMINUM; LONG EDGES RETURNED OR ROLLED; FULLY ENCLOSING OPERATING MECHANISMS ON THREE SIDES AND END PLUGS.

D. BOTTOM RAIL: FORMED-STEEL OR EXTRUDED-ALUMINUM TUBE, WITH PLASTIC OR METAL CAPPED ENDS.

E. LADDERS: EVENLY SPACED TO PREVENT LONG-TERM SLAT SAG.
1. FOR BLINDS WITH NOMINAL SLAT WIDTH 1 INCH OR LESS: BRAIDED STRING.

F. LIFT CORDS: MANUFACTURER'S STANDARD.

G. LIFT OPERATION: MANUAL.

H. VALANCE: MANUFACTURER'S STANDARD.

I. MOUNTING: END MOUNTING.

J. HOLD-DOWN BRACKETS AND HOOKS OR PINS: MANUFACTURER'S STANDARD.

K. SIDE CHANNELS AND PERIMETER LIGHT GAP SEALS: MANUFACTURER'S STANDARD.

L. COLORS, TEXTURES, PATTERNS, AND GLOSS: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.

2.2 HORIZONTAL LOUVER BLIND FABRICATION

A. CONCEALED COMPONENTS: NONCORRODIBLE OR CORROSION-RESISTANT-COATED MATERIALS.
1. LIFT-AND-TILT MECHANISMS: WITH PERMANENTLY LUBRICATED MOVING PARTS.

B. UNIT SIZES: OBTAIN UNITS FABRICATED IN SIZES TO FILL WINDOW AND OTHER OPENINGS AS FOLLOWS:
1. BLIND UNITS INSTALLED BETWEEN (INSIDE) JAMBS: WIDTH EQUAL TO 1/4 INCH PER SIDE OR 1/2 INCH TOTAL, PLUS OR MINUS 1/8 INCH, LESS THAN JAMB-TO-JAMB DIMENSION OF OPENING IN WHICH EACH BLIND IS INSTALLED. LENGTH EQUAL TO 1/4 INCH, PLUS OR MINUS 1/8 INCH, LESS THAN HEAD-TO-SILL DIMENSION OF OPENING IN WHICH EACH BLIND IS INSTALLED.

C. INSTALLATION BRACKETS: DESIGNED FOR EASY REMOVAL AND REINSTALLATION OF BLIND, FOR SUPPORTING HEADRAIL, VALANCE, AND OPERATING HARDWARE, AND FOR HARDWARE POSITION AND BLIND MOUNTING METHOD INDICATED.

D. INSTALLATION FASTENERS: NO FEWER THAN TWO FASTENERS PER BRACKET, FABRICATED FROM METAL NONCORROSIVE TO BLIND HARDWARE AND ADJOINING CONSTRUCTION; TYPE DESIGNED FOR SECURING TO SUPPORTING SUBSTRATE, AND SUPPORTING BLINDS AND ACCESSORIES UNDER CONDITIONS OF NORMAL USE.

E. COMPONENT COLOR: PROVIDE RAILS, CORDS, LADDERS, AND EXPOSED-TO-VIEW METAL, WOOD, AND PLASTIC MATCHING OR COORDINATING WITH SLAT COLOR, UNLESS OTHERWISE INDICATED.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES, OPERATIONAL CLEARANCES, AND OTHER CONDITIONS AFFECTING PERFORMANCE.
1. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.2 INSTALLATION

A. INSTALL HORIZONTAL LOUVER BLINDS LEVEL AND PLUMB AND ALIGNED WITH ADJACENT UNITS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS, AND LOCATED SO EXTERIOR SLAT EDGES IN ANY POSITION ARE NOT CLOSER THAN 2 INCH TO INTERIOR FACE OF GLASS. INSTALL INTERMEDIATE SUPPORT AS REQUIRED TO PREVENT DEFLECTION IN HEADRAIL. ALLOW CLEARANCES BETWEEN ADJACENT BLINDS AND FOR OPERATING GLAZED OPENING'S OPERATION HARDWARE IF ANY.

B. JAMB MOUNTED: INSTALL HEADRAIL FLUSH WITH FACE OF OPENING JAMB AND HEAD.

C. ADJUST HORIZONTAL LOUVER BLINDS TO OPERATE SMOOTHLY, EASILY, SAFELY, AND FREE OF BINDING OR MALFUNCTION THROUGHOUT ENTIRE OPERATIONAL RANGE.

D. CLEAN HORIZONTAL LOUVER BLIND SURFACES AFTER INSTALLATION, ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

END OF SECTION 122113

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:
1. STRUCTURAL-STEEL FRAMING.
2. METAL ROOF PANELS.
3. METAL SOFFIT PANELS.
4. THERMAL INSULATION.
5. ACCESSORIES.

1.2 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF METAL BUILDING SYSTEM COMPONENT.

B. SHOP DRAWINGS: FOR METAL BUILDING SYSTEM COMPONENTS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.

C. WELDING CERTIFICATES.

D. METAL BUILDING SYSTEM CERTIFICATES: FOR EACH TYPE OF METAL BUILDING SYSTEM, FROM MANUFACTURER.
1. LETTER OF DESIGN CERTIFICATION: SIGNED AND SEALED BY A QUALIFIED PROFESSIONAL ENGINEER. INCLUDE THE FOLLOWING:
a. NAME AND LOCATION OF PROJECT.
b. ORDER NUMBER.
c. NAME OF MANUFACTURER.
d. NAME OF CONTRACTOR.
e. BUILDING DIMENSIONS INCLUDING WIDTH, LENGTH, HEIGHT, AND ROOF SLOPE.
f. INDICATE COMPLIANCE WITH AISC STANDARDS FOR HOT-ROLLED STEEL AND AISI STANDARDS FOR COLD-ROLLED STEEL, INCLUDING EDITION DATES OF EACH STANDARD.
g. GOVERNING BUILDING CODE AND YEAR OF EDITION.
h. DESIGN LOADS: INCLUDE DEAD LOAD, ROOF LIVE LOAD, COLLATERAL LOADS, ROOF SNOW LOAD, DEFLECTION, WIND LOADS/SPEEDS AND EXPOSURE, SEISMIC DESIGN CATEGORY OR EFFECTIVE PEAK VELOCITY-RELATED ACCELERATION/PEAK ACCELERATION, AND AUXILIARY LOADS (CRANES).
i. LOAD COMBINATIONS: INDICATE THAT LOADS WERE APPLIED ACTING SIMULTANEOUSLY WITH CONCENTRATED LOADS, ACCORDING TO GOVERNING BUILDING CODE.

E. MATERIAL TEST REPORTS.

F. SOURCE QUALITY-CONTROL REPORTS.

G. FIELD QUALITY-CONTROL REPORTS.

H. MAINTENANCE DATA.

I. WARRANTIES: SAMPLE OF SPECIAL WARRANTIES.

1.3 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS: A QUALIFIED MANUFACTURER AND MEMBER OF MBMA.
1. ENGINEERING RESPONSIBILITY: PREPARATION OF SHOP DRAWINGS AND COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER.

B. ERECTOR QUALIFICATIONS: AN EXPERIENCED ERECTOR WHO SPECIALIZES IN ERECTING AND INSTALLING WORK SIMILAR IN MATERIAL, DESIGN, AND EXTENT TO THAT INDICATED FOR THIS PROJECT AND WHO IS ACCEPTABLE TO MANUFACTURER.

C. WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO THE FOLLOWING:
1. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."
2. AWS D1.3, "STRUCTURAL WELDING CODE - SHEET STEEL."

D. STRUCTURAL STEEL: COMPLY WITH AISC 360, "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS," FOR DESIGN REQUIREMENTS AND ALLOWABLE STRESSES.

E. COLD-FORMED STEEL: COMPLY WITH AISI'S "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" FOR DESIGN REQUIREMENTS AND ALLOWABLE STRESSES.

1.4 WARRANTY

A. SPECIAL WARRANTY ON METAL PANEL FINISHES: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR FINISH OR REPLACE METAL PANELS THAT SHOW EVIDENCE OF DETERIORATION OF FACTORY-APPLIED FINISHES WITHIN SPECIFIED WARRANTY PERIOD.
1. FINISH WARRANTY PERIOD: 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

B. SPECIAL WEATHERTIGHTNESS WARRANTY FOR STANDING-SEAM METAL ROOF PANELS: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE STANDING-SEAM METAL ROOF PANEL ASSEMBLIES THAT LEAK OR OTHERWISE FAIL TO REMAIN WEATHERTIGHT WITHIN SPECIFIED WARRANTY PERIOD.
1. WARRANTY PERIOD: 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE BEHLEN MANUFACTURING COMPANY OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
1. BUTLER MANUFACTURING COMPANY; A BLUESCOPE STEEL COMPANY.
2. GARCO BUILDING SYSTEMS; DIVISION OF NCI BUILDING SYSTEMS, L.P.
3. VP BUILDINGS; A UNITED DOMINION COMPANY.
4. BEHLEN MANUFACTURING COMPANY

METAL BUILDING SYSTEM PERFORMANCE

A. DELEGATED DESIGN: DESIGN METAL BUILDING SYSTEM, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. STRUCTURAL PERFORMANCE: METAL BUILDING SYSTEMS SHALL BE DESIGNED ACCORDING TO PROCEDURES IN MBMA'S "METAL BUILDING SYSTEMS MANUAL."
1. DESIGN LOADS: AS INDICATED ON DRAWINGS.
2. DEFLECTION LIMITS: DESIGN METAL BUILDING SYSTEM ASSEMBLIES TO WITHSTAND DESIGN LOADS WITH DEFLECTIONS NO GREATER THAN THE FOLLOWING:
a. PURLINS AND RAFTERS: VERTICAL DEFLECTION OF 1/180 OF THE SPAN.
b. GIRTS: HORIZONTAL DEFLECTION OF 1/240 OF THE SPAN.
c. METAL ROOF PANELS: VERTICAL DEFLECTION OF 1/240 OF THE SPAN.
d. DESIGN SECONDARY-FRAMING SYSTEM TO ACCOMMODATE DEFLECTION OF PRIMARY FRAMING AND CONSTRUCTION TOLERANCES, AND TO MAINTAIN CLEARANCES AT OPENINGS.
3. DRIFT LIMITS: ENGINEER BUILDING STRUCTURE TO WITHSTAND DESIGN LOADS WITH DRIFT LIMITS NO GREATER THAN THE FOLLOWING:
a. LATERAL DRIFT: MAXIMUM OF 1/400 OF THE BUILDING HEIGHT.

C. SEISMIC PERFORMANCE: METAL BUILDING SYSTEMS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO ASCE/SEI 7.

D. THERMAL MOVEMENTS: ALLOW FOR THERMAL MOVEMENTS RESULTING FROM THE FOLLOWING MAXIMUM CHANGE (RANGE) IN AMBIENT AND SURFACE TEMPERATURES BY PREVENTING BUCKLING, OPENING OF JOINTS, OVERSTRESSING OF COMPONENTS, FAILURE OF JOINT SEALANTS, FAILURE OF CONNECTIONS, AND OTHER DETRIMENTAL EFFECTS. BASE ENGINEERING CALCULATIONS ON SURFACE TEMPERATURES OF MATERIALS DUE TO BOTH SOLAR HEAT GAIN AND NIGHTTIME-SKY HEAT LOSS.
1. TEMPERATURE CHANGE (RANGE): 120 DEG F, AMBIENT; 180 DEG F, MATERIAL SURFACES.

E. AIR INFILTRATION FOR METAL ROOF PANELS: AIR LEAKAGE THROUGH ASSEMBLY OF NOT MORE THAN 0.06 CFM/SQ. FT. OF ROOF AREA WHEN TESTED ACCORDING TO ASTM E 1680 AT NEGATIVE TEST-PRESSURE DIFFERENCE OF 1.57 LBF/SQ. FT..

F. WATER PENETRATION FOR METAL ROOF PANELS: NO WATER PENETRATION WHEN TESTED ACCORDING TO ASTM E 1646 AT TEST-PRESSURE DIFFERENCE OF 2.86 LBF/SQ. FT..

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER E-2005255
6/10/09

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

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CHECKED BY: DLS
SCALE: AS SHOWN
DATE: 6/10/09

SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

DRAWING NO. A-708

G. WIND-UPLIFT RESISTANCE: PROVIDE METAL ROOF PANEL ASSEMBLIES THAT COMPLY WITH UL 580 FOR CLASS 60.

H. ENERGY PERFORMANCE: PROVIDE ROOF PANELS WITH SOLAR REFLECTANCE INDEX NOT LESS THAN 78 WHEN CALCULATED ACCORDING TO ASTM E 1980 BASED ON TESTING IDENTICAL PRODUCTS BY A QUALIFIED TESTING AGENCY.

I. ENERGY PERFORMANCE: PROVIDE ROOF PANELS THAT ARE LISTED ON THE DOE'S ENERGY STAR ROOF PRODUCTS QUALIFIED PRODUCT LIST FOR LOW-SLOPE ROOF PRODUCTS.

2.3 STRUCTURAL-STEEL FRAMING

A. PRIMARY FRAMING: MANUFACTURER'S STANDARD PRIMARY-FRAMING SYSTEM, DESIGNED TO WITHSTAND REQUIRED LOADS AND SPECIFIED REQUIREMENTS. PRIMARY FRAMING INCLUDES TRANSVERSE AND LEAN-TO FRAMES; RAFTER, RAKE, AND CANOPY BEAMS; SIDEWALL, INTERMEDIATE, END-WALL, AND CORNER COLUMNS; AND WIND BRACING.

1. GENERAL: PROVIDE FRAMES WITH ATTACHMENT PLATES, BEARING PLATES, AND SPLICE MEMBERS. FACTORY DRILL FOR FIELD-BOLTED ASSEMBLY.
2. FRAME CONFIGURATION: SINGLE GABLE.
3. EXTERIOR COLUMN TYPE: UNIFORM DEPTH OR TAPERED AS SHOWN ON DRAWINGS.
4. RAFTER TYPE: TAPERED.

B. END-WALL FRAMING: MANUFACTURER'S STANDARD PRIMARY END-WALL FRAMING FABRICATED FOR FIELD-BOLTED ASSEMBLY.

C. SECONDARY FRAMING: MANUFACTURER'S STANDARD SECONDARY FRAMING, INCLUDING PURLINS, GIRTS, EAVE STRUTS, FLANGE BRACING, BASE MEMBERS, GABLE ANGLES, CLIPS, HEADERS, JAMBS, AND OTHER MISCELLANEOUS STRUCTURAL MEMBERS. UNLESS OTHERWISE INDICATED, FABRICATE FRAMING FROM EITHER COLD-FORMED, STRUCTURAL-STEEL SHEET OR ROLL-FORMED, METALLIC-COATED STEEL SHEET, PREPAINTED WITH COIL COATING.

D. BOLTS: PROVIDE PLAIN-FINISH BOLTS FOR STRUCTURAL-FRAMING COMPONENTS THAT ARE PRIMED OR FINISH PAINTED. PROVIDE ZINC-PLATED OR HOT-DIP GALVANIZED BOLTS FOR STRUCTURAL-FRAMING COMPONENTS THAT ARE GALVANIZED.

E. RECYCLED CONTENT OF STEEL PRODUCTS: PROVIDE STEEL PRODUCTS WITH AN AVERAGE RECYCLED CONTENT SO POSTCONSUMER RECYCLED CONTENT PLUS ONE-HALF OF PRECONSUMER RECYCLED CONTENT IS NOT LESS THAN 25 PERCENT.

F. FINISH: FACTORY PRIMED. APPLY SPECIFIED PRIMER IMMEDIATELY AFTER CLEANING AND PRETREATING.

2.4 METAL ROOF PANELS

A. VERTICAL-RIB, STANDING-SEAM METAL ROOF PANELS: FORMED WITH RIBS AT PANEL EDGES AND INTERMEDIATE STIFFENING RIBS SYMMETRICALLY SPACED BETWEEN RIBS; DESIGNED FOR SEQUENTIAL INSTALLATION BY MECHANICALLY ATTACHING PANELS TO SUPPORTS USING CONCEALED CLIPS LOCATED UNDER ONE SIDE OF PANELS AND ENGAGING OPPOSITE EDGE OF ADJACENT PANELS.

1. MATERIAL: ZINC-COATED (GALVANIZED) STEEL SHEET, 0.022-INCH NOMINAL THICKNESS.
   a. EXTERIOR FINISH: THREE-COAT FLUOROPOLYMER.
   b. COLOR: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE.
2. CLIPS: MANUFACTURER'S STANDARD, FIXED TYPE; FABRICATED FROM ZINC-COATED (GALVANIZED) STEEL SHEET.
3. JOINT TYPE: MECHANICALLY SEAMED, FOLDED ACCORDING TO MANUFACTURER'S STANDARD.
4. PANEL COVERAGE: 16 INCHES.
5. PANEL HEIGHT: 2 INCHES.
6. UPLIFT RATING: UL 90.

2.5 METAL SOFFIT PANELS

A. GENERAL: PROVIDE FACTORY-FORMED METAL SOFFIT PANELS DESIGNED TO BE INSTALLED BY LAPPING AND INTERCONNECTING SIDE EDGES OF ADJACENT PANELS AND MECHANICALLY ATTACHING THROUGH PANEL TO SUPPORTS USING CONCEALED FASTENERS IN SIDE LAPS. INCLUDE ACCESSORIES REQUIRED FOR WEATHERTIGHT INSTALLATION.

B. METAL SOFFIT PANELS: MATCH PROFILE AND MATERIAL OF METAL ROOF PANELS.

1. FINISH: AS SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD COLORS.

2.6 ACCESSORIES

A. GENERAL: PROVIDE ACCESSORIES AS STANDARD WITH METAL BUILDING SYSTEM MANUFACTURER AND AS SPECIFIED. FABRICATE AND FINISH ACCESSORIES AT THE FACTORY TO GREATEST EXTENT POSSIBLE, BY MANUFACTURER'S STANDARD PROCEDURES AND PROCESSES. COMPLY WITH INDICATED PROFILES AND WITH DIMENSIONAL AND STRUCTURAL REQUIREMENTS.

1. FORM EXPOSED SHEET METAL ACCESSORIES THAT ARE WITHOUT EXCESSIVE OIL-CANNING, BUCKLING, AND TOOL MARKS AND THAT ARE TRUE TO LINE AND LEVELS INDICATED, WITH EXPOSED EDGES FOLDED BACK TO FORM HEMS.

B. ROOF PANEL ACCESSORIES: PROVIDE COMPONENTS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY INCLUDING COPINGS, FASCIAE, CORNER UNITS, RIDGE CLOSURES, CLIPS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS. MATCH MATERIAL AND FINISH OF METAL ROOF PANELS UNLESS OTHERWISE INDICATED.

C. FLASHING AND TRIM: FORMED FROM 0.022-INCH NOMINAL-THICKNESS, METALLIC-COATED STEEL SHEET OR ALUMINUM-ZINC ALLOY-COATED STEEL SHEET PREPAINTED WITH COIL COATING; FINISHED TO MATCH ADJACENT METAL PANELS.

D. GUTTERS: FORMED FROM 0.022-INCH NOMINAL-THICKNESS, METALLIC-COATED STEEL SHEET OR ALUMINUM-ZINC ALLOY-COATED STEEL SHEET PREPAINTED WITH COIL COATING; FINISHED TO MATCH ROOF FASCIA AND BASE TRIM. MATCH PROFILE OF CABLE TRIM, COMPLETE WITH END PIECES, OUTLET TUBES, AND OTHER SPECIAL PIECES AS REQUIRED. FABRICATE IN MINIMUM 96-INCH- LONG SECTIONS, SIZED ACCORDING TO SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL."

1. GUTTER SUPPORTS: FABRICATED FROM SAME MATERIAL AND FINISH AS GUTTERS.
2. STRAINERS: BRONZE, COPPER, OR ALUMINUM WIRE BALL TYPE AT OUTLETS.

E. DOWNSPOUTS: FORMED FROM 0.022-INCH NOMINAL-THICKNESS, ZINC-COATED (GALVANIZED) STEEL SHEET OR ALUMINUM-ZINC ALLOY-COATED STEEL SHEET PREPAINTED WITH COIL COATING; FINISHED TO MATCH METAL WALL PANELS. FABRICATE IN MINIMUM 10-FOOT- LONG SECTIONS, COMPLETE WITH FORMED ELBOWS AND OFFSETS.

1. 2.2 MOUNTING STRAPS: FABRICATED FROM SAME MATERIAL AND FINISH AS GUTTERS.

F. PIPE FLASHING: PREMOLDED, EPDM PIPE COLLAR WITH FLEXIBLE ALUMINUM RING BONDED TO BASE.

2.7 FABRICATION

A. GENERAL: DESIGN COMPONENTS AND FIELD CONNECTIONS REQUIRED FOR ERECTION TO PERMIT EASY ASSEMBLY.

1. MARK EACH PIECE AND PART OF THE ASSEMBLY TO CORRESPOND WITH PREVIOUSLY PREPARED ERECTION DRAWINGS, DIAGRAMS, AND INSTRUCTION MANUALS.
2. FABRICATE STRUCTURAL FRAMING TO PRODUCE CLEAN, SMOOTH CUTS AND BENDS. PUNCH HOLES OF PROPER SIZE, SHAPE, AND LOCATION. MEMBERS SHALL BE FREE OF CRACKS, TEARS, AND RUPTURES.

B. TOLERANCES: COMPLY WITH MBMA'S "METAL BUILDING SYSTEMS MANUAL" FOR FABRICATION AND ERECTION TOLERANCES.

C. PRIMARY FRAMING: SHOP FABRICATE FRAMING COMPONENTS TO SIZE AND SECTION, WITH BASEPLATES, BEARING PLATES, STIFFENERS, AND OTHER ITEMS REQUIRED FOR ERECTION WELDED INTO PLACE. CUT, FORM, PUNCH, DRILL, AND WELD FRAMING FOR BOLTED FIELD ASSEMBLY.

D. SECONDARY FRAMING: SHOP FABRICATE FRAMING COMPONENTS TO SIZE AND SECTION BY ROLL-FORMING OR BREAK-FORMING, WITH BASEPLATES, BEARING PLATES, STIFFENERS, AND OTHER PLATES REQUIRED FOR ERECTION WELDED INTO PLACE. CUT, FORM, PUNCH, DRILL, AND WELD SECONDARY FRAMING FOR BOLTED FIELD CONNECTIONS TO PRIMARY FRAMING.

E. METAL PANELS: FABRICATE AND FINISH METAL PANELS AT THE FACTORY TO GREATEST EXTENT POSSIBLE, BY MANUFACTURER'S STANDARD PROCEDURES AND PROCESSES, AS NECESSARY TO FULFILL INDICATED PERFORMANCE REQUIREMENTS. COMPLY WITH INDICATED PROFILES AND WITH DIMENSIONAL AND STRUCTURAL REQUIREMENTS.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. ERECT METAL BUILDING SYSTEM ACCORDING TO MANUFACTURER'S WRITTEN ERECTION INSTRUCTIONS AND ERECTION DRAWINGS.

B. DO NOT FIELD CUT, DRILL, OR ALTER STRUCTURAL MEMBERS WITHOUT WRITTEN APPROVAL FROM METAL BUILDING SYSTEM MANUFACTURER'S PROFESSIONAL ENGINEER.

C. SET STRUCTURAL FRAMING ACCURATELY IN LOCATIONS AND TO ELEVATIONS INDICATED, ACCORDING TO AISC SPECIFICATIONS REFERENCED IN THIS SECTION. MAINTAIN STRUCTURAL STABILITY OF FRAME DURING ERECTION.

D. BASE AND BEARING PLATES: CLEAN CONCRETE- AND MASONRY-BEARING SURFACES OF BOND-REDUCING MATERIALS, AND ROUGHEN SURFACES PRIOR TO SETTING PLATES. CLEAN BOTTOM SURFACE OF PLATES.

1. SET PLATES FOR STRUCTURAL MEMBERS ON WEDGES, SHIMS, OR SETTING NUTS AS REQUIRED.
2. TIGHTEN ANCHOR RODS AFTER SUPPORTED MEMBERS HAVE BEEN POSITIONED AND PLUMBED. DO NOT REMOVE WEDGES OR SHIMS BUT, IF PROTRUDING, CUT OFF FLUSH WITH EDGE OF PLATE BEFORE PACKING WITH GROUT.
3. PROMPTLY PACK GROUT SOLIDLY BETWEEN BEARING SURFACES AND PLATES SO NO VOIDS REMAIN. NEATLY FINISH EXPOSED SURFACES; PROTECT GROUT AND ALLOW TO CURE. COMPLY WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS FOR SHRINKAGE-RESISTANT GROUTS.

E. ALIGN AND ADJUST STRUCTURAL FRAMING BEFORE PERMANENTLY FASTENING. BEFORE ASSEMBLY, CLEAN BEARING SURFACES AND OTHER SURFACES THAT WILL BE IN PERMANENT CONTACT WITH FRAMING. PERFORM NECESSARY ADJUSTMENTS TO COMPENSATE FOR DISCREPANCIES IN ELEVATIONS AND ALIGNMENT.

1. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF STRUCTURE.
2. MAKE ALLOWANCES FOR DIFFERENCE BETWEEN TEMPERATURE AT TIME OF ERECTION AND MEAN TEMPERATURE WHEN STRUCTURE WILL BE COMPLETED AND IN SERVICE.

F. PRIMARY FRAMING AND END WALLS: ERECT FRAMING LEVEL, PLUMB, RIGID, SECURE, AND TRUE TO LINE. LEVEL BASEPLATES TO A TRUE EVEN PLANE WITH FULL BEARING TO SUPPORTING STRUCTURES, SET WITH DOUBLE-NUTTED ANCHOR BOLTS. USE GROUT TO OBTAIN UNIFORM BEARING AND TO MAINTAIN A LEVEL BASE-LINE ELEVATION. MOIST-CURE GROUT FOR NOT LESS THAN SEVEN DAYS AFTER PLACEMENT.

1. MAKE FIELD CONNECTIONS USING HIGH-STRENGTH BOLTS INSTALLED ACCORDING TO RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS" FOR BOLT TYPE AND JOINT TYPE SPECIFIED.
   a. JOINT TYPE: SNUG TIGHTENED OR PRETENSIONED.

G. SECONDARY FRAMING: ERECT FRAMING LEVEL, PLUMB, RIGID, SECURE, AND TRUE TO LINE. FIELD BOLT SECONDARY FRAMING TO CLIPS ATTACHED TO PRIMARY FRAMING.

1. PROVIDE RAKE OR GABLE PURLINS WITH TIGHT-FITTING CLOSURE CHANNELS AND FASCIAE.
2. LOCATE AND SPACE WALL GIRTS TO SUIT OPENINGS SUCH AS DOORS AND WINDOWS.
3. LOCATE CANOPY FRAMING AS INDICATED.
4. PROVIDE SUPPLEMENTAL FRAMING AT ENTIRE PERIMETER OF OPENINGS, INCLUDING DOORS, WINDOWS, LOUVERS, VENTILATORS, AND OTHER PENETRATIONS OF ROOF AND WALLS.

H. BRACING: INSTALL BRACING IN ROOF AND SIDEWALLS WHERE INDICATED ON ERECTION DRAWINGS.

1. TIGHTEN ROD AND CABLE BRACING TO AVOID SAG.
2. LOCATE INTERIOR END-BAY BRACING ONLY WHERE INDICATED.

I. FRAMING FOR OPENINGS: PROVIDE SHAPES OF PROPER DESIGN AND SIZE TO REINFORCE OPENINGS AND TO CARRY LOADS AND VIBRATIONS IMPOSED, INCLUDING EQUIPMENT FURNISHED UNDER MECHANICAL AND ELECTRICAL WORK. SECURELY ATTACH TO STRUCTURAL FRAMING.

J. ERECTION TOLERANCES: MAINTAIN ERECTION TOLERANCES OF STRUCTURAL FRAMING WITHIN AISC 303.

3.2 METAL ROOF PANEL INSTALLATION

A. GENERAL: PROVIDE METAL ROOF PANELS OF FULL LENGTH FROM EAVE TO RIDGE UNLESS OTHERWISE INDICATED OR RESTRICTED BY SHIPPING LIMITATIONS.

1. INSTALL RIDGE CAPS AS METAL ROOF PANEL WORK PROCEEDS.
2. FLASH AND SEAL METAL ROOF PANELS WITH WEATHER CLOSURES AT EAVES AND RAKES. FASTEN WITH SELF-TAPPING SCREWS.

B. STANDING-SEAM METAL ROOF PANELS: FASTEN METAL ROOF PANELS TO SUPPORTS WITH CONCEALED CLIPS AT EACH STANDING-SEAM JOINT, AT LOCATION AND SPACING AND WITH FASTENERS RECOMMENDED BY MANUFACTURER.

1. INSTALL CLIPS TO SUPPORTS WITH SELF-DRILLING OR SELF-TAPPING FASTENERS.
2. INSTALL PRESSURE PLATES AT LOCATIONS INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
3. SEAMED JOINT: CRIMP STANDING SEAMS WITH MANUFACTURER-APPROVED MOTORIZED SEAMER TOOL SO THAT CLIP, METAL ROOF PANEL, AND FACTORY-APPLIED SEALANT ARE COMPLETELY ENGAGED.
4. RIGIDLY FASTEN EAVE END OF METAL ROOF PANELS AND ALLOW RIDGE END FREE MOVEMENT DUE TO THERMAL EXPANSION AND CONTRACTION. PREDRILL PANELS FOR FASTENERS.
5. PROVIDE METAL CLOSURES AT PEAKS EACH SIDE OF RIDGE CAPS.

3.3 METAL SOFFIT PANEL INSTALLATION

A. PROVIDE METAL SOFFIT PANELS THE FULL WIDTH OF SOFFITS. INSTALL PANELS PERPENDICULAR TO SUPPORT FRAMING.

B. FLASH AND SEAL METAL SOFFIT PANELS WITH WEATHER CLOSURES WHERE PANELS MEET WALLS AND AT PERIMETER OF ALL OPENINGS.

3.4 ACCESSORY INSTALLATION

A. GENERAL: INSTALL ACCESSORIES WITH POSITIVE ANCHORAGE TO BUILDING AND WEATHERTIGHT MOUNTING, AND PROVIDE FOR THERMAL EXPANSION. COORDINATE INSTALLATION WITH FLASHINGS AND OTHER COMPONENTS.

1. INSTALL COMPONENTS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY, INCLUDING TRIM, COPINGS, RIDGE CLOSURES, SEAM COVERS, FLASHINGS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS.
2. WHERE DISSIMILAR METALS CONTACT EACH OTHER OR CORROSIVE SUBSTRATES, PROTECT AGAINST GALVANIC ACTION BY PAINTING CONTACT SURFACES WITH CORROSION-RESISTANT COATING, BY APPLYING RUBBERIZED-ASPHALT UNDERLAYMENT TO EACH CONTACT SURFACE, OR BY OTHER PERMANENT SEPARATION AS RECOMMENDED BY MANUFACTURER.

B. FLASHING AND TRIM: COMPLY WITH PERFORMANCE REQUIREMENTS, MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AND SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL." PROVIDE CONCEALED FASTENERS WHERE POSSIBLE, AND SET UNITS TRUE TO LINE AND LEVEL AS INDICATED. INSTALL WORK WITH LAPS, JOINTS, AND SEAMS THAT WILL BE PERMANENTLY WATERTIGHT AND WEATHER RESISTANT.

1. INSTALL EXPOSED FLASHING AND TRIM THAT IS WITHOUT EXCESSIVE OIL-CANNING, BUCKLING, AND TOOL MARKS AND THAT IS TRUE TO LINE AND LEVELS INDICATED, WITH EXPOSED EDGES FOLDED BACK TO FORM HEMS. INSTALL SHEET METAL FLASHING AND TRIM TO FIT SUBSTRATES AND TO RESULT IN WATERPROOF AND WEATHER-RESISTANT PERFORMANCE.
2. EXPANSION PROVISIONS: PROVIDE FOR THERMAL EXPANSION OF EXPOSED FLASHING AND TRIM. SPACE MOVEMENT JOINTS AT A MAXIMUM OF 10 FEET WITH NO JOINTS ALLOWED WITHIN 24 INCHES OF CORNER OR INTERSECTION. WHERE LAPPED OR BAYONET-TYPE EXPANSION PROVISIONS CANNOT BE USED OR WOULD NOT BE SUFFICIENTLY WEATHER RESISTANT AND WATERPROOF, FORM EXPANSION JOINTS OF INTERMESHING HOOKED FLANGES, NOT LESS THAN 1 INCH DEEP, FILLED WITH MASTIC SEALANT (CONCEALED WITHIN JOINTS).

C. GUTTERS: JOIN SECTIONS WITH RIVETED-AND-SOLDERED OR LAPPED-AND-SEALED JOINTS. ATTACH GUTTERS TO EAVE WITH GUTTER HANGERS SPACED AS REQUIRED FOR GUTTER SIZE, BUT NOT MORE THAN 36 INCHES O.C. USING MANUFACTURER'S STANDARD FASTENERS. PROVIDE END CLOSURES AND SEAL WATERTIGHT WITH SEALANT. PROVIDE FOR THERMAL EXPANSION.

D. DOWNSPOUTS: JOIN SECTIONS WITH 1-1/2-INCH TELESCOPING JOINTS. PROVIDE FASTENERS DESIGNED TO HOLD DOWNSPOUTS SECURELY 1 INCH AWAY FROM WALLS; LOCATE FASTENERS AT TOP AND BOTTOM AND AT APPROXIMATELY 60 INCHES O.C. IN BETWEEN.

1. PROVIDE ELBOWS AT BASE OF DOWNSPOUTS TO DIRECT WATER AWAY FROM BUILDING.
2. TIE DOWNSPOUTS TO UNDERGROUND DRAINAGE SYSTEM INDICATED.

E. PIPE FLASHING: FORM FLASHING AROUND PIPE PENETRATION AND METAL ROOF PANELS. FASTEN AND SEAL TO PANEL AS RECOMMENDED BY MANUFACTURER.

END OF SECTION 133419

END OF ARCHITECTURAL SPECIFICATIONS

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SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT-DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. A-709

STATE OF MISSOURI
GREGORY EDWARD BRUNKHORST
NUMBER A-2006265
REGISTERED ARCHITECT

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	DLS

PLUMBING FIXTURES & EQUIPMENT SCHEDULE

CODE	DESCRIPTION	MANUFACTURER	MODEL	VALVE/FAUCET MANUFACTURER	VALVE/FAUCET MODEL	STRAINER	TRAP	SUPPLIES STOPS	SEAT	CARRIER/MOUNTING	MOUNTING HEIGHT FLOOR TO RIM/BUBBLER	FINISH OR COLOR	ACCESSORIES AND REMARKS
WC-1	HANDICAPPED WATER CLOSET	KOHLER	K-4330	SLOAN	ROYAL 111	NA	INTEGRAL	CxC 1/2"X3/8"X12"	KOHLER K-4670-C	JOSAM 12000 SERIES	16-1/2"	WHITE	1.6 GPF, ELONGATED, WALL MOUNTED
WC-2	WATER CLOSET	KOHLER	K-4330	SLOAN	ROYAL 111	NA	INTEGRAL	CxC 1/2"X3/8"X12"	KOHLER K-4654	JOSAM 12000 SERIES	14-5/8"	WHITE	1.6 GPF, ELONGATED, WALL MOUNTED
U-1	URINAL	KOHLER	K-5016-ET	SLOAN	ROYAL 186	NA	INTEGRAL	CxC 1/2"X3/8"X12"	NA	JOSAM 17810	17"	WHITE	ELONGATED RIM, SIPHON JET, 1 GPF, WALL MOUNTED
L-1	WALL MOUNTED LAVATORY	TOTO	LT307	DELTA	21T154	LK-35	17 GA P-TRAP	CxC 1/2"X3/8"X12"	NA	JOSAM 17100	RE: ARCHITECTURAL	WHITE	(1) (2)
EWC-1	ELECTRIC WATER COOLER	ACORN	A111108F	NA	NA	NA	NA	NA	NA	JOSAM 17900	36"	WHITE	
EWC-2	ELECTRIC WATER COOLER	ACORN	A111108F	NA	NA	NA	NA	NA	NA	JOSAM 17900	41"	WHITE	
S-1	SINK	ELKAY	LRAD3319	DELTA	2603244	NA	P-TRAP	CxC 1/2"X3/8"X12"	NA	COUNTER MOUNTED	RE: ARCHITECTUAL	STAINLESS STEEL	
DU-1	DISPOSER	ISE	SS-50	NA	NA	NA	NA	NA	NA	SINK MOUNTED	N/A	NA	6.2 A AT 120V/1PH
S-2	SINK	FIAT	L-1	DELTA	27T4945	NA	P-TRAP	CxC 1/2"X3/8"X12"	NA	INTEGRAL	RE: ARCHITECTUAL	PVC/MOLDED STONE	
MSB-1	MOP SERVICE BASIN	WILLIAMS	HL-1900	DELTA	28T9	DOME	3" CI	NA	N/A	N/A	36" FLOOR TO FAUCET	TERRAZZO	(3) (4) PROVIDE REINFORCING AT MTG. OF FAUCET SUPPORT BRACKET

NOTES: (1) CxC : COMPRESSION BY COMPRESSION SUPPLIES & STOPS

(2) INSULATE CW & HW SUPPLIES, AND P-TRAP OF LAVATORIES WITH PLUMBEREX P2000, IN ACCORDANCE WITH ADA REQUIREMENTS.

(3) BP - SPLASH PANEL-20GA TYPE 304 STAINLESS STEEL, A-20 ANODIZED ALUMINUM CAP AND 6" DROP FRONT.

(4) MOP HANGER-28T910, HOSE AND HANGER 28T911.

PLUMBING LEGEND & ABBREVIATIONS

ABBR.	SYMBOLS	DESCRIPTION	ABBR.	SYMBOLS	DESCRIPTION
CW		DOMESTIC COLD WATER PIPING	SDV		STOP AND DRAIN VALVE
HW		DOMESTIC HOT WATER PIPING	SC		SILL COCK
HWC		DOMESTIC HOT WATER CIRC. PIPING	HB		HOSE BIBB
V		SANITARY VENT PIPING	AVB		ATMOSPHERIC VACUUM BREAKER
W		WASTE PIPING (ABOVE FLOOR IN BUILDING)	RPF		REDUCED PRESSURE BACKFLOW PREVENTER
BD		BUILDING DRAIN PIPING (BELOW FLOOR IN BUILDING)	MH		MANHOLE
G	G	NATURAL GAS PIPING	FD		FLOOR DRAIN (ROUND GRATE)
		BREAK PIPE SYMBOL	FCO		FLOOR CLEANOUT
SA		SHOCK ABSORBER	GCO		GRADE CLEANOUT
LPV		GAS VALVE	WCO		WALL CLEANOUT

ABBREVIATIONS

AFF	ABOVE FINISH FLOOR	GPF	GALLONS PER FLUSH
VTR	VENT THRU ROOF	PC	PLUMBING CONTRACTOR
IE	INVERT ELEVATION	GC	GENERAL CONTRACTOR
CONT.	CONTINUATION	AFG	ABOVE FINISH GRADE

EQUIPMENT DESIGNATIONS

DETAIL DESIGNATION: A / M1.1 — A = DETAIL NUMBER; M1.1 = SHEET DETAIL IS DRAWN ON

H-WP-1 — EQUIPMENT DESIGNATIONS WHICH ARE UNDERLINED INDICATES THAT SUCH EQUIPMENT IS SCHEDULED IN THE MECHANICAL EQUIPMENT SCHEDULES

DOMESTIC WATER HEATER SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	INPUT (MBH)	RECOVERY GPH @ SL (40degF TO 140degF)	WATER TEMP. RISE (deg F)	STORAGE CAPACITY (GALLONS)	ACCESSORIES AND REMARKS
GWH-1	RHEEM HE45-100	100	115	100	45	(1) (2)

NOTES: (1) SEALED COMBUSTION. (2) PROVIDE WITH MANUFACTURER'S CONCENTRIC VENT KIT.

PLUMBING SPECIALTIES SCHEDULE

CODE	DESCRIPTION	MANUFACTURER	MODEL/ SERIES	SIZE/ CAPACITY	MATERIAL/ FINISH	ACCESSORIES AND REMARKS
FD-1	FLOOR DRAIN	JOSAM	30000-A-2 SERIES	SEE DWGS	SATIN BRONZE	FINSIHED AREA
FD-2	FLOOR DRAIN	JOSAM	38620-40-50	SEE DWGS	CAST IRON	GARAGE AREA
FCO	FLOOR CLEANOUT	JOSAM	56000-2	SEE DWGS	BRONZE	
WCO	WALL CLEANOUT	JOSAM	58600	SEE DWGS	STAINLESS STEEL COVER	
SA-A	SHOCK ARRESTOR	SIOUX CHIEF	650	1/2"	N/A	4-11 f.u.'s
SA-B	SHOCK ARRESTOR	SIOUX CHIEF	650	3/4"	N/A	12-32 f.u.'s
SA-C	SHOCK ARRESTOR	SIOUX CHIEF	650	1"	N/A	33-60 f.u.'s
TP-1	TRAP PRIMER	SIOUX CHIEF	695-01	1/2"	BRASS	PROVIDE ACCESS PANEL
MV-1	MIXING VALVE	SYMMONS	5-225-CK-MS	1/2"x1/2"	BRASS	
BFP-1	REDUCED PRESSURE BACKFLOW PREVENTER	FEBCO	--	--	--	
PCP-1	CIRCULATING PUMP	BELL & GOSSETT	NBF-33	1 GPM 15' HEAD	ALL BRONZE	125 W AT 115V/1PH
RWB-1	REFRIGERATOR WALL BOX	GUY GRAY	88080	1/2"	PVC	WITH WATER HAMMER ARRESTOR
SOI-1	SAND OIL INTERCEPTOR	COPELAND	7500	320 GAL.	CONCRETE	
GCO	GRADE CLEANOUT	JOSAM	58850	SEE DWGS	CAST IRON	
HB-1	HOSE BIBB	WOODFORD	67	N/A	N/A	

STATE OF MISSOURI — KEVIN L. AINSWORTH — NUMBER PE-2005000001 — PROFESSIONAL ENGINEER — 6/8/09

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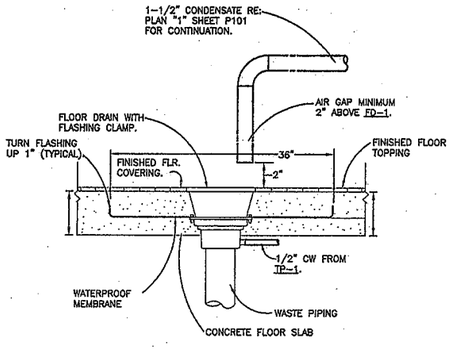
DATE 6/10/09

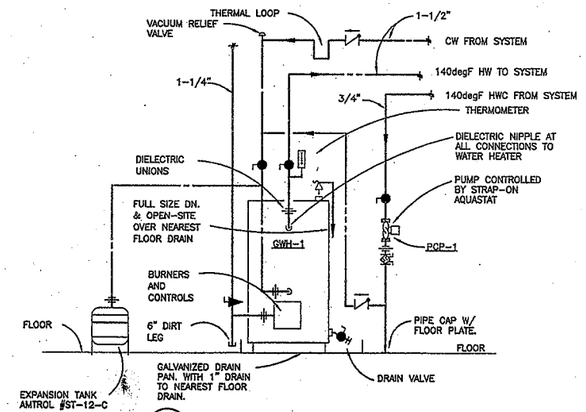
PLUMBING SCHEDULES AND LEGEND
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074

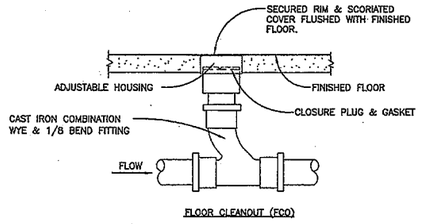
DRAWING NO. P001



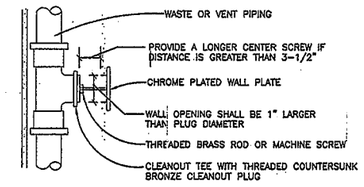
3 / P002 FLOOR DRAIN DETAIL
SCALE: N.T.S.



2 / P002 WATER HEATER PIPING DETAIL
SCALE: N.T.S.



FLOOR CLEANOUT (FCO)



WALL CLEANOUT (WCO)

1 / P002 CLEANOUT DETAIL
SCALE: N.T.S.

PLUMBING SPECIFICATIONS

EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

1. INSTALL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO BUILDING SYSTEMS.
2. INSTALL MECHANICAL EQUIPMENT TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT COMPONENTS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE LOCATIONS.

HANGERS

1. PIPE HANGERS, SUPPORTS AND COMPONENTS SHALL BE MSS SP-58, FACTORY FABRICATED COMPONENTS.
2. HORIZONTAL PIPE SHALL BE HUNG WITH ADJUSTABLE WROUGHT IRON OR MALLEABLE IRON PIPE HANGERS SPACED PER THE UNIFORM PLUMBING CODE. PROVIDE INSULATED SHIELDS ON ALL DOMESTIC WATER PIPING.

PIPE INSULATION

1. ALL DOMESTIC CW AND HW PIPING SHALL BE INSULATED WITH 1-INCH FIBERGLASS MINERAL FIBER INSULATION WITH CONTINUOUS VAPOR BARRIER ON CW PIPING.
2. INSULATION SHALL BE TESTED ACCORDING TO ASTM E 84 FOR A FLAME-SPREAD RATING OF 25 OR LESS AND SMOKE-DEVELOPED RATING OF 50 OR LESS. ALL ACCESSORY ITEMS SUCH AS PVC JACKETING AND FITTINGS, ADHESIVE, MASTIC, CEMENT, TAPE, AND CLOTH SHALL ALSO HAVE THIS RATING.

DOMESTIC WATER PIPING

1. ABOVE GROUND DOMESTIC WATER PIPING SHALL BE HARD COPPER TUBE, ASTM B 88, TYPE L, DRAWN TEMPER: SOLDER-JOINT FITTINGS AND SOLDERED JOINTS. COPPER PRESSURE FITTINGS SHALL BE ASME B16.18, CAST-COPPER-ALLOY OR ASME B16.22, WROUGHT-COPPER, SOLDER-JOINT FITTINGS. FURNISH WROUGHT-COPPER FITTINGS IF INDICATED.
2. SOLDER FILLER METAL SHALL BE ALLOY Sn95, 95%TIN AND 5% SILVER COMPLYING WITH ASTM B 32.
3. UNDERGROUND DOMESTIC WATER PIPING SHALL BE SOFT COPPER TUBE, ASTM B88, TYPE K, ANNEALED TEMPER, NO JOINTS.
4. FOR SHUT OFF DUTY AND THROTTLING DUTY USE BRONZE BALL VALVES. FOR HOT WATER PIPING BALANCING DUTY USE CALIBRATED BALANCING VALVES.
5. INSTALL UNDERGROUND COPPER TUBING ACCORDING TO CDA'S "COPPER TUBE HANDBOOK." INSTALL ABOVE GROUND DOMESTIC WATER PIPING LEVEL WITHOUT PITCH.
6. CLEAN AND DISINFECT DOMESTIC WATER PIPING AS FOLLOWS:
   A. PURGE NEW PIPING BEFORE USING.
   B. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION OR, IF METHODS ARE NOT PRESCRIBED USE PROCEDURES DESCRIBED IN AWWA C651.
   C. PREPARE AND SUBMIT REPORTS OF PURGING AND DISINFECTING ACTIVITIES.
   D. CLEAN INTERIOR OF DOMESTIC WATER PIPING SYSTEM. REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.

SANITARY DRAINAGE AND VENT PIPING

1. BELOW SLAB SANITARY DRAINAGE AND VENT PIPING SHALL BE SOLID-WALL SCHEDULE 40 PVC PIPE, PVC SOCKET FITTINGS AND SOLVENT-CEMENTED JOINTS. INSTALL PIPING ACCORDING TO ASTM D 2321. JOIN PIPING ACCORDING TO ASTM D 2665.
2. ABOVE SLAB SANITARY DRAINAGE AND VENT PIPING SHALL BE HUBLESS CAST IRON SOIL PIPE AND FITTINGS, ASTM A 888 OR ISPI 301. COUPLINGS SHALL BE COMPACT, STAINLESS STEEL, CISPI 310 WITH ASTM A 167, TYPE 301 OR ASTM A 666, TYPE 301 STAINLESS-STEEL CORRUGATED SHIELD, STAINLESS STEEL BANDS AND SLEEVE.
3. INSTALL CAST-IRON SOIL PIPING ACCORDING TO CISPI'S "CAST IRON SOIL PIPE AND FITTINGS HANDBOOK," CHAPTER IV, "INSTALLATION OF CAST IRON SOIL PIPE AND FITTINGS."
4. INSTALL HORIZONTAL SANITARY DRAINAGE PIPING AT A 2 PERCENT DOWNWARD SLOPE IN THE DIRECTION OF THE FLOW.

GENERAL SPECIFICATIONS

1. THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS APPLY TO THIS CONTRACT. CONTRACTOR SHALL REVIEW AND ADHERE TO ALL REQUIREMENTS OF THESE DOCUMENTS.
2. MANUFACTURERS' NAMES ARE SCHEDULED FOR EQUIPMENT AS A BASIS OF DESIGN, IT IS NOT THE INTENT TO LIMIT THE COMPETITION. EQUIVALENT EQUIPMENT OF OTHER MANUFACTURERS WILL BE CONSIDERED FOR ACCEPTANCE AND INSTALLATION.
3. ALL MECHANICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF APPLICABLE CODES AND STANDARDS AS REQUIRED BY THE STATE OF MISSOURI AND LOCAL JURISDICTIONS.
4. BEFORE FABRICATING/RUNNING ANY DUCTWORK OR PIPING, THIS CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE RUN AS CONTEMPLATED IN COOPERATION WITH CONTRACTORS OF OTHER DIVISIONS OF THE WORK AND THE PHYSICAL CONSTRAINTS OF THE STRUCTURAL AND ARCHITECTURAL WORK.
5. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR, MATERIALS, TOOLS, SUPERVISION AND EQUIPMENT REQUIRED TO COMPLETE THE MECHANICAL WORK AS SHOWN ON THE MECHANICAL DRAWINGS. PROVIDE ALL MINOR INCIDENTAL ITEMS SUCH AS OFFSETS, FITTINGS, AND ACCESSORIES REQUIRED AS PART OF THE WORK EVEN THOUGH NOT INDICATED. MECHANICAL DRAWINGS ARE SCHEMATIC AND NOT TO BE SCALED. REFER TO ARCHITECTURAL OR CERTIFIED DRAWINGS FOR DIMENSIONS.
6. THIS CONTRACTOR SHALL MAINTAIN AT THE SITE (1) COPY OF ALL DRAWINGS IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING SHOP DRAWINGS AND PRODUCT SUBMITTALS FOR COMPLIANCE WITH CONTRACT DOCUMENTS. SUBMIT (4) COPIES TO ARCHITECT / ENGINEER FOR APPROVAL PRIOR TO ORDERING.
8. UPON COMPLETION OF WORK PROVIDE (2) COPIES OF OPERATING AND MAINTENANCE MANUAL TO OWNER FOR ALL SYSTEMS AND EQUIPMENT. INCLUDE ALL FAN LUBRICATION SCHEDULE, FILTER TYPES AND SIZES ALONG WITH RECOMMENDED FILTER CHANGE SCHEDULE AND STARTING AND STOPPING PROCEDURES. PROVIDE DETAILED INFORMATION ON PROGRAMMABLE THERMOSTAT TO INCLUDE HOW TO PROGRAM DESIRED SETBACK SCHEDULES. LIST HVAC AND PLUMBING CONTRACTOR CONTACTS AND PHONE NUMBERS.
9. PROVIDE PROPER CURBS, SUPPORTS, AND ANCHORS FOR ALL MECHANICAL WORK. CHAINS, TAPE, AND/OR WIRE WILL NOT BE ALLOWED.
10. PROVIDE SLEEVES AND COLLARS FOR ALL DUCTWORK THROUGH WALLS, FLOORS, AND CEILINGS. WHERE REQUIRED TO CONNECT TO EQUIPMENT IN FINISHED AREAS.
11. THIS CONTRACTOR SHALL NOT CUT THROUGH STRUCTURAL MEMBERS WITHOUT WRITTEN CONSENT FROM THE STRUCTURAL ENGINEER.
12. THIS CONTRACTOR SHALL SECURE AND MAINTAIN, FOR THE LIFE OF THIS CONTRACT ALL INSURANCE POLICIES OR COVERAGE AS REQUIRED BY LAW.
13. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHER TRADES TO INSURE THAT ALL WORK CAN BE INSTALLED IN AN EXPEDIENT AND WORKMANLIKE MANNER. THIS CONTRACTOR WILL BE EXPECTED TO COOPERATE WITH OTHER CONTRACTORS IN THE PLACEMENT OF WORK TO AVOID CONFLICTS AND TO MAINTAIN JOB PROGRESS. THE ARCHITECT SHALL BE ADVISED IN THE EVENT THAT CONFLICTS ARISE.
14. THIS CONTRACTOR SHALL OBTAIN PERMITS AND PAY FEES ASSOCIATED WITH HIS PORTION OF THE MECHANICAL SYSTEM INSTALLATION. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING INSPECTIONS WITH THE APPROPRIATE BUILDING OFFICIALS.
15. ALL MATERIALS, EQUIPMENT AND DEVICES FURNISHED BY THIS CONTRACTOR SHALL BE GUARANTEED TO BE FREE FROM MECHANICAL DEFECTS OR FAULTY WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY THE OWNER.
16. THIS CONTRACTOR SHALL CONFIRM VOLTAGE AND AMPACITY WITH ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT. ALL CONTROL AND INTERLOCK WIRING FOR MECHANICAL EQUIPMENT SHALL BE BY DIVISION 15 CONTRACTOR. CONTROL SETPOINTS AND HEATING/COOLING EQUIPMENT SHALL BE WIRED TO AUTOMATICALLY RESTART AFTER POWER FAILURE. ALL WIRE SHALL BE INSTALLED IN CONDUIT PER NEC LATEST EDITION.
17. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING OF ALL PENETRATIONS ASSOCIATED WITH THEIR WORK. REFERENCE ARCHITECTURAL SPECIFICATIONS AND PLANS FOR REQUIRED RATINGS AND MATERIALS.

SEISMIC SPECIFICATIONS

1 DELEGATED-DESIGN SUBMITTAL: FOR VIBRATION ISOLATION AND SEISMIC-RESTRAINT DETAILS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.

A. DESIGN CALCULATIONS: CALCULATE STATIC AND DYNAMIC LOADING DUE TO EQUIPMENT WEIGHT AND OPERATION, SEISMIC AND WIND FORCES REQUIRED TO SELECT VIBRATION ISOLATORS, SEISMIC AND WIND RESTRAINTS, AND FOR DESIGNING VIBRATION ISOLATION BASES.

a. COORDINATE DESIGN CALCULATIONS WITH WIND LOAD CALCULATIONS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS. COMPLY WITH REQUIREMENTS IN OTHER DIVISION SECTIONS FOR EQUIPMENT MOUNTED OUTDOORS.

B. RISER SUPPORTS: INCLUDE RISER DIAGRAMS AND CALCULATIONS SHOWING ANTICIPATED EXPANSION AND CONTRACTION AT EACH SUPPORT POINT, INITIAL AND FINAL LOADS ON BUILDING STRUCTURE, SPRING DEFLECTION CHANGES, AND SEISMIC LOADS. INCLUDE CERTIFICATION THAT RISER SYSTEM HAS BEEN EXAMINED FOR EXCESSIVE STRESS AND THAT NONE WILL EXIST.

C. VIBRATION ISOLATION BASE DETAILS: DETAIL OVERALL DIMENSIONS, INCLUDING ANCHORAGES AND ATTACHMENTS TO STRUCTURE AND TO SUPPORTED EQUIPMENT. INCLUDE AUXILIARY MOTOR SLIDES AND RAILS, BASE WEIGHTS, EQUIPMENT STATIC LOADS, POWER TRANSMISSION, COMPONENT MISALIGNMENT, AND CANTILEVER LOADS.

D. SEISMIC AND WIND RESTRAINT DETAILS:

b. DESIGN ANALYSIS: TO SUPPORT SELECTION AND ARRANGEMENT OF SEISMIC AND WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE AND SHEAR LOADS.

c. DETAILS: INDICATE FABRICATION AND ARRANGEMENT. DETAIL ATTACHMENTS OF RESTRAINTS TO THE RESTRAINED ITEMS AND TO THE STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND SPACINGS. IDENTIFY COMPONENTS. LIST THEIR STRENGTHS, AND INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE STRUCTURE DURING SEISMIC EVENTS. INDICATE ASSOCIATION WITH VIBRATION ISOLATION DEVICES.

d. COORDINATE SEISMIC-RESTRAINT AND VIBRATION ISOLATION DETAILS WITH WIND-RESTRAINT DETAILS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS. COMPLY WITH REQUIREMENTS IN OTHER DIVISION 22 SECTIONS FOR EQUIPMENT MOUNTED OUTDOORS.

e. PREAPPROVAL AND EVALUATION DOCUMENTATION: BY AN EVALUATION SERVICE MEMBER OF ICC-ES OR OSHPD OR AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM RATINGS OF RESTRAINT ITEMS AND THE BASIS FOR APPROVAL (TESTS OR CALCULATIONS).

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PLUMBING DETAILS AND SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. P002

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2 / P100 **PARTIAL PLUMBING PLAN-SOUTHWEST**
SCALE: 1/4"=1'-0"

1 / P100 **PARTIAL PLUMBING PLAN-SOUTH**
SCALE: 1/4"=1'-0"

GENERAL NOTES

1. COORDINATE ALL ROOF PENETRATIONS WITH METAL BUILDING MANUFACTURER. NO CUTTING OF RIBS ALLOWED.
2. USE "DEK-TITE" OR AN APPROVED EQUAL FOR ALL ROOF JACKS/ ROOF PENETRATIONS AND COORDINATE WITH METAL BUILDING MANUFACTURER.

STATE OF MISSOURI
KEVIN M. AINSWORTH
NUMBER PE-2005000001
PROFESSIONAL ENGINEER
6/10/09

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PARTIAL PLUMBING PLANS
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PROJECT NO. 08074
DRAWING NO. P100

1 P101 **PARTIAL PLUMBING PLAN-NORTH**
SCALE: 1/4"=1'-0"

N

GENERAL NOTES

1. COORDINATE ALL ROOF PENETRATIONS WITH METAL BUILDING MANUFACTURER. NO CUTTING OF RIBS ALLOWED.
2. USE "DEK-TITE" OR AN APPROVED EQUAL FOR ALL ROOF JACKS/ ROOF PENETRATIONS AND COORDINATE WITH METAL BUILDING MANUFACTURER.

STATE OF MISSOURI
KEVIN L. AINSWORTH
NUMBER PE-2005020001
PROFESSIONAL ENGINEER
6/8/09

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PARTIAL PLUMBING PLAN-NORTH
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. P101

MECHANICAL SPECIFICATIONS

EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

1. INSTALL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO BUILDING SYSTEMS.
2. INSTALL MECHANICAL EQUIPMENT TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT COMPONENTS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE LOCATIONS.

MOTORS

1. THIS CONTRACTOR SHALL FURNISH ALL STARTERS REQUIRED FOR THE HVAC SYSTEMS. STARTERS WILL BE INSTALLED BY THE ELECTRICAL CONTRACTOR.
2. MOTOR EFFICIENCY: CONFORM TO IEEE–112 AND NEMA MG1, TABLE 12–10.

VIBRATION ISOLATION

1. ALL MOTOR DRIVEN EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATORS. UNLESS NOTED OTHERWISE, SUSPENDED EQUIPMENT SHALL HAVE SPRING ISOLATOR HANGERS AND BASE MOUNTED EQUIPMENT SHALL HAVE DOUBLE DEFLECTION NEOPRENE ISOLATORS.

METAL DUCTS

1. METAL AND GAUGE: GALVANIZED IRON TO BE USED THROUGHOUT, FABRICATED AND INSTALLED SO THAT NO VIBRATION OR NOISE RESULTS. FABRICATE FROM THE BEST GRADE OF MILD STEEL SHEETS OF THE U.S. STANDARD GAUGE JOINT AND SEAL RECOMMENDED IN THE LATEST EDITION OF THE SMACNA MANUAL.
2. DUCTWORK SHALL BE OF 2–INCH PRESSURE CLASS FOR LOW PRESSURE DUCT AND CAULKED AT JOINTS AND CONNECTIONS WITH "IRON GRIP".
3. DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS.
4. FLEXIBLE DUCT SHALL NOT EXCEED 6'–0" IN LENGTH
5. ALL SUPPLY AIR DUCT SHALL BE INSULATED WITH 1–1/2" THICK FIBERGLASS INSULATION WITH A CONTINUOUS VAPOR BARRIER AND RETURN AIR DUCTS SHALL BE LINED.
6. DUCT LINER SHALL BE FIBROUS–GLASS LINER, COMPLY WITH NFPA 90A OR NFPA 90B AND NAIMA AH124 ASTM C 1071 WITH COATED SURFACE EXPOSED TO AIRSTREAM TO PREVENT EROSION OF GLASS FIBERS, 1" THICK UNLESS NOTED OTHERWISE, THERMAL CONDUCTIVITY (K–VALUE) OF 0.26 AT 75 DEG F MEAN TEMPERATURE. FIRE–HAZARD CLASSIFICATION; MAXIMUM FLAME–SPREAD RATING OF 25 AND SMOKE–DEVELOPED RATING OF 50, WHEN TESTED ACCORDING TO ASTM E 84. LINER ADHESIVE SHALL COMPLY WITH NFPA 90A OR NFPA 90B AND ASTM C 916. MECHANICAL FASTENERS SHALL BE GALVANIZED STEEL SUITABLE FOR ADHESIVE ATTACHMENT, MECHANICAL ATTACHMENT, OR WELDING ATTACHMENT TO DUCT WITHOUT DAMAGING LINER.
7. FOR ALL EXTERIOR SUPPLY AND RETURN DUCT USE SMACNA JOINT T–24, FORMED FLANGE ON ALL EXTERIOR DUCT JOINTS, INSULATE WITH 2 INCH THICK MINERAL FIBER BOARD AND WRAP WITH ALUMINUM JACKET.

HANGERS

1. HANGER MATERIALS FOR DUCTS SHALL BE GALVANIZED, SHEET STEEL OR ROUND, THREADED STEEL ROD. STRAPS AND ROD SIZES SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS" FOR SHEET STEEL WIDTH AND THICKNESS FOR STEEL ROD DIAMETERS.
2. COORDINATE MOTOR SUPPORT WITH REQUIREMENTS FOR DRIVEN LOAD: ACCESS FOR MAINTENANCE AND MOTOR REPLACEMENT: INSTALLATION OF ACCESSORIES, BELTS, BELT GUARDS; AND ADJUSTMENT OF SLIDING RAILS FOR BELT TENSIONING.
3. HANGER INSTALLATION SHALL BE IN ACCORDANCE WITH SMACNA SEISMIC RESTRAINT MANUAL.

COLD WATER AND CONDENSATE DRAIN PIPING

1. COLD WATER AND CONDENSATE DRAIN PIPING SHALL BE TYPE L COPPER WITH SOLDERED JOINTS. MINIMUM SLOPE OF CONDENSATE DRAIN PIPE SHALL BE 1–INCH IN 8 FEET. PROVIDE A CONDENSATE DRAIN TRAP AS PER THE MANUFACTURER.

REFRIGERATION PIPING

1. REFRIGERANT PIPING INDICATED ON DRAWINGS IS SCHEMATIC ONLY. SIZE PIPING AND DESIGN ACTUAL PIPING LAYOUT, INCLUDING OIL TRAPS, DOUBLE RISERS, SPECIALTIES, AND PIPE AND TUBE SIZES TO ACCOMMODATE, AS A MINIMUM, EQUIPMENT PROVIDED, ELEVATION DIFFERENCE BETWEEN COMPRESSOR AND EVAPORATOR, AND LENGTH OF PIPING TO ENSURE PROPER OPERATION AND COMPLIANCE WITH WARRANTIES OF CONNECTED EQUIPMENT.
2. USE TYPE "L" ACR COPPER TUBE, NITROGEN PURGED WITH BRAZED JOINTS OR LINE SETS AS RECOMMENDED BY THE MANUFACTURER.
3. STORE PIPING IN A CLEAN AND PROTECTED AREA WITH END CAPS IN PLACE TO ENSURE THAT PIPING INTERIOR AND EXTERIOR ARE CLEAN WHEN INSTALLED.
4. ARRANGE PIPING TO ALLOW INSPECTION AND SERVICE OF REFRIGERATION EQUIPMENT. INSTALL VALVES AND SPECIALTIES IN ACCESSIBLE LOCATIONS TO ALLOW FOR SERVICE AND INSPECTION.
5. ARRANGE PIPING TO ALLOW INSPECTION AND SERVICE OF REFRIGERATION EQUIPMENT. INSTALL VALVES AND SPECIALTIES IN ACCESSIBLE LOCATIONS TO ALLOW FOR SERVICE AND INSPECTION.

QUALITY ASSURANCE

1. WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO THE ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING QUALIFICATIONS." PROVIDE COPIES OF WELDING CERTIFICATES FOR WELDING PROCEDURES AND PERSONNEL.
2. ASME COMPLIANCE: COMPLY WITH ASME B31.9, "BUILDING SERVICES PIPING," FOR MATERIALS, PRODUCTS, AND INSTALLATION.

TEST AND BALANCE

1. CONTRACTOR SHALL BALANCE AIR SYSTEMS IN THEIR ENTIRETY.
2. TEST AND BALANCE SERVICES SHALL BE PERFORMED BY AN APPROVED TEST AND BALANCING FIRM WHO HAS BEEN IN THE BUSINESS FOR AT LEAST 5 YEARS AND IS CERTIFIED BY AABC, NEBB OR TABB.
3. TAB CONTRACTOR IS TO COORDINATE WITH THE HVAC CONTRACTOR TO ENSURE THAT THE SYSTEM IS COMPLETE AND OPERATIONAL AND THAT NEW FILTERS ARE INSTALLED PRIOR TO PERFORMING TEST AND BALANCE SERVICES.
4. ADJUST DAMPERS, FANS, AND SHEAVES UNTIL EVEN DISTRIBUTION AND REQUIRED CFM OF AIR IS OBTAINED THROUGHOUT.
5. SUBMIT (6) TEST AND BALANCE REPORTS TO THE OWNER UPON COMPLETION OF WORK. TEST AND BALANCE REPORT IS TO INCLUDE ALL PERTINENT OPERATING DATA: CFM AND FPM AT EACH OUTLET, FAN RPM, FAN TSP, MOTOR CURRENT, ETC. INCLUDE CERTIFICATION SHEET IN FRONT OF REPORT SIGNED AND SEALED BY THE CERTIFIED TEST AND BALANCE CONTRACTOR. INCLUDE A LIST OF THE INSTRUMENTS USED FOR PROCEDURES ALONG WITH PROOF OF CALIBRATION.

PIPE INSULATION

1. INSULATION SHALL BE TESTED ACCORDING TO ASTM E 84 FOR A FLAME–SPREAD RATING OF 25 OR LESS AND SMOKE–DEVELOPED RATING OF 50 OR LESS. ALL ACCESSORY ITEMS SUCH AS PVC JACKETING AND FITTINGS, ADHESIVE, MASTIC, CEMENT, TAPE, AND CLOTH SHALL ALSO HAVE THIS RATING.
2. OUTDOOR, EXPOSED REFRIGERANT INSULATION SHALL HAVE ALUMINUM JACKET.
3. INSULATE COLD WATER AND CONDENSATE PIPING WITH 1/2" THCIK FIBERGLASS PIPE INSULATION WITH A CONTINUOUS VAPOR BARRIER.

GENERAL SPECIFICATIONS

1. THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS APPLY TO THIS CONTRACT. CONTRACTOR SHALL REVIEW AND ADHERE TO ALL REQUIREMENTS OF THESE DOCUMENTS.
2. MANUFACTURERS' NAMES ARE SCHEDULED FOR EQUIPMENT AS A BASIS OF DESIGN, IT IS NOT THE INTENT TO LIMIT THE COMPETITION. EQUIVALENT EQUIPMENT OF OTHER MANUFACTURERS WILL BE CONSIDERED FOR ACCEPTANCE AND INSTALLATION.
3. ALL MECHANICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF APPLICABLE CODES AND STANDARDS AS REQUIRED BY THE STATE OF MISSOURI AND LOCAL JURISDICTIONS.
4. BEFORE FABRICATING/RUNNING ANY DUCTWORK OR PIPING, THIS CONTRACTOR SHALL ASSURE HIMSELF THAT THEY CAN BE RUN AS CONTEMPLATED IN COOPERATION WITH CONTRACTORS OF OTHER DIVISIONS OF THE WORK AND THE PHYSICAL CONSTRAINTS OF THE STRUCTURAL AND ARCHITECTURAL WORK.
5. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR, MATERIALS, TOOLS, SUPERVISION AND EQUIPMENT REQUIRED TO COMPLETE THE MECHANICAL WORK AS SHOWN ON THE MECHANICAL DRAWINGS. PROVIDE ALL MINOR INCIDENTAL ITEMS SUCH AS OFFSETS, FITTINGS, AND ACCESSORIES REQUIRED AS PART OF THE WORK EVEN THOUGH NOT INDICATED. MECHANICAL DRAWINGS ARE SCHEMATIC AND NOT TO BE SCALED. REFER TO ARCHITECTURAL OR CERTIFIED DRAWINGS FOR DIMENSIONS.
6. THIS CONTRACTOR SHALL MAINTAIN AT THE SITE (1) COPY OF ALL DRAWINGS IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING SHOP DRAWINGS AND PRODUCT SUBMITTALS FOR COMPLIANCE WITH CONTRACT DOCUMENTS. SUBMIT (4) COPIES TO ARCHITECT / ENGINEER FOR APPROVAL PRIOR TO ORDERING.
8. UPON COMPLETION OF WORK PROVIDE (2) COPIES OF OPERATING AND MAINTENANCE MANUAL TO OWNER FOR ALL SYSTEMS AND EQUIPMENT. INCLUDE ALL FAN LUBRICATION SCHEDULE, FILTER TYPES AND SIZES ALONG WITH RECOMMENDED FILTER CHANGE SCHEDULE AND STARTING AND STOPPING PROCEDURES. PROVIDE DETAILED INFORMATION ON PROGRAMMABLE THERMOSTAT TO INCLUDE HOW TO PROGRAM DESIRED SETBACK SCHEDULES. LIST HVAC AND PLUMBING CONTRACTOR CONTACTS AND PHONE NUMBERS.
9. PROVIDE PROPER CURBS, SUPPORTS, AND ANCHORS FOR ALL MECHANICAL WORK. CHAINS, TAPE, AND/OR WIRE WILL NOT BE ALLOWED.
10. PROVIDE SLEEVES AND COLLARS FOR ALL DUCTWORK THROUGH WALLS, FLOORS, AND CEILINGS. WHERE REQUIRED TO CONNECT TO EQUIPMENT IN FINISHED AREAS.
11. THIS CONTRACTOR SHALL NOT CUT THROUGH STRUCTURAL MEMBERS WITHOUT WRITTEN CONSENT FROM THE STRUCTURAL ENGINEER.
12. THIS CONTRACTOR SHALL SECURE AND MAINTAIN, FOR THE LIFE OF THIS CONTRACT ALL INSURANCE POLICIES OR COVERAGE AS REQUIRED BY LAW.
13. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHER TRADES TO INSURE THAT ALL WORK CAN BE INSTALLED IN AN EXPEDIENT AND WORKMANLIKE MANNER. THIS CONTRACTOR WILL BE EXPECTED TO COOPERATE WITH OTHER CONTRACTORS IN THE PLACEMENT OF WORK TO AVOID CONFLICTS AND TO MAINTAIN JOB PROGRESS. THE ARCHITECT SHALL BE ADVISED IN THE EVENT THAT CONFLICTS ARISE.
14. THIS CONTRACTOR SHALL OBTAIN PERMITS AND PAY FEES ASSOCIATED WITH HIS PORTION OF THE MECHANICAL SYSTEM INSTALLATION. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING INSPECTIONS WITH THE APPROPRIATE BUILDING OFFICIALS.
15. ALL MATERIALS, EQUIPMENT AND DEVICES FURNISHED BY THIS CONTRACTOR SHALL BE GUARANTEED TO BE FREE FROM MECHANICAL DEFECTS OR FAULTY WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY THE OWNER.
16. THIS CONTRACTOR SHALL CONFIRM VOLTAGE AND AMPACITY WITH ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT. ALL CONTROL AND INTERLOCK WIRING FOR MECHANICAL EQUIPMENT SHALL BE BY DIVISION 15 CONTRACTOR. CONTROL SETPOINTS AND HEATING/COOLING EQUIPMENT SHALL BE WIRED TO AUTOMATICALLY RESTART AFTER POWER FAILURE. ALL WIRE SHALL BE INSTALLED IN CONDUIT PER NEC LATEST EDITION.
17. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING OF ALL PENETRATIONS ASSOCIATED WITH THEIR WORK. REFERENCE ARCHITECTURAL SPECIFICATIONS AND PLANS FOR REQUIRED RATINGS AND MATERIALS.

SEISMIC SPECIFICATIONS

1. DELEGATED–DESIGN SUBMITTAL: FOR VIBRATION ISOLATION AND SEISMIC–RESTRAINT DETAILS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.
   - A. DESIGN CALCULATIONS: CALCULATE STATIC AND DYNAMIC LOADING DUE TO EQUIPMENT WEIGHT AND OPERATION, SEISMIC AND WIND FORCES REQUIRED TO SELECT VIBRATION ISOLATORS, SEISMIC AND WIND RESTRAINTS, AND FOR DESIGNING VIBRATION ISOLATION BASES.
     - a. COORDINATE DESIGN CALCULATIONS WITH WIND LOAD CALCULATIONS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS. COMPLY WITH REQUIREMENTS IN OTHER DIVISION SECTIONS FOR EQUIPMENT MOUNTED OUTDOORS.
   - B. RISER SUPPORTS: INCLUDE RISER DIAGRAMS AND CALCULATIONS SHOWING ANTICIPATED EXPANSION AND CONTRACTION AT EACH SUPPORT POINT, INITIAL AND FINAL LOADS ON BUILDING STRUCTURE, SPRING DEFLECTION CHANGES, AND SEISMIC LOADS. INCLUDE CERTIFICATION THAT RISER SYSTEM HAS BEEN EXAMINED FOR EXCESSIVE STRESS AND THAT NONE WILL EXIST.
   - C. VIBRATION ISOLATION BASE DETAILS: DETAIL OVERALL DIMENSIONS, INCLUDING ANCHORAGES AND ATTACHMENTS TO STRUCTURE AND TO SUPPORTED EQUIPMENT. INCLUDE AUXILIARY MOTOR SLIDES AND RAILS, BASE WEIGHTS, EQUIPMENT STATIC LOADS, POWER TRANSMISSION, COMPONENT MISALIGNMENT, AND CANTILEVER LOADS.
   - D. SEISMIC AND WIND RESTRAINT DETAILS:
     - a. DESIGN ANALYSIS: TO SUPPORT SELECTION AND ARRANGEMENT OF SEISMIC AND WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE AND SHEAR LOADS.
     - b. DETAILS: INDICATE FABRICATION AND ARRANGEMENT. DETAIL ATTACHMENTS OF RESTRAINTS TO THE RESTRAINED ITEMS AND TO THE STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND SPACINGS. IDENTIFY COMPONENTS, LIST THEIR STRENGTHS, AND INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE STRUCTURE DURING SEISMIC EVENTS. INDICATE ASSOCIATION WITH VIBRATION ISOLATION DEVICES.
     - c. COORDINATE SEISMIC–RESTRAINT AND VIBRATION ISOLATION DETAILS WITH WIND–RESTRAINT DETAILS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS. COMPLY WITH REQUIREMENTS IN OTHER DIVISION 22 SECTIONS FOR EQUIPMENT MOUNTED OUTDOORS.
     - d. PREAPPROVAL AND EVALUATION DOCUMENTATION: BY AN EVALUATION SERVICE MEMBER OF ICC–ES OR OSHPD OR AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM RATINGS OF RESTRAINT ITEMS AND THE BASIS FOR APPROVAL (TESTS OR CALCULATIONS).

STATE OF MISSOURI
KEVIN L. AINSWORTH
NUMBER PE-2005000001
PROFESSIONAL ENGINEER
6/8/09

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MECHANICAL SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. M004

SEISMIC CODE BLOCK

LISTING OF EQUIPMENT AND SYSTEM COMPONENTS	ANCHORAGE TO FLOORS, ROOFS, ETC.		SWAY BRACING		LOCATION OF PROFESSIONALLY SEALED ANCHORAGE AND SWAY BRACING DETAILS			COMMENTS
					ON CONSTRUCTION DOCUMENTS	SUBSEQUENT SUBMITTAL		
	NOT PROVIDED	PROVIDED	NOT PROVIDED	PROVIDED	DRAWING NO. OR SPEC. SECTION	SHOP DRAWINGS	SEPARATE PERMIT & PLANS	
FIRE PROTECTION, DETECTION, & ALARM EQUIPMENT AND SYSTEM COMPONENTS. Ip=1.5 FIRE SPRINKLER PIPING		X		X				(1)
EMERGENCY OR STANDBY EQUIPMENT AND SYSTEM COMPONENTS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
OTHER EQUIPMENT AND SYSTEM COMPONENTS NEEDED FOR CONTINUED OPERATION OF SEISMIC USE GROUP II FACILITIES OR WHOSE FAILURE COULD IMPAIR THEIR CONTINUED OPERATION.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
OTHER GENERAL EQUIPMENT AND SYSTEM COMPONENTS Ip=1.0 ROOF TOP : RTU-1 & RTU-2 > 400 LBS		X				X		(1)
GRADE MOUNTED: N/A								
SUSPENDED FROM STRUCTURE: N/A		X				X		(1)(2)(3)
WALL MOUNTED: N/A								
FIRE DAMPERS, LOUVERS	N/A		N/A					
DUCTWORK	X		X					(4)
PIPING <= 3"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
AIR DEVICES	X		X					(5)

NOTES:
(1) CONTRACTOR SHALL PROVIDE SHOP DRAWINGS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO SUBMITTAL TO THE PLAN REVIEWER.
(2) TABLE 500, EXCEPTION 4 – 3 FT. MINIMUM FLEX CONNECTION BETWEEN COMPONENTS SHALL BE PROVIDED.
(3) TYPICAL SEISMIC ANCHORAGE (OR SWAY BRACING) IS PROVIDED ON THE DRAWINGS FOR REFERENCE ONLY. SHOP DRAWINGS ARE REQUIRED.
(4) TABLE 600 EXCEPTION B FOR DUCT A CROSS SECTIONAL AREA LESS THAN 6 SQUARE FEET.
(5) COMPONENTS SHALL BE POSITIVELY ATTACHED WITH MECHANICAL FASTENERS.

MECHANICAL LEGEND & ABBREVIATIONS

SYMBOLS	DESCRIPTION	ABBREVIATIONS	
	LIGHT TEXT/LINEWEIGHT INDICATES EXISTING DARK TEXT/LINEWEIGHT INDICATES NEW	POC	POINT OF CONNECTION
	NEW SUPPLY DUCT TURNING UP	(E)	EXISTING
	NEW SUPPLY DUCT TURNING DOWN	(N)	NEW
	NEW RETURN / EXHAUST DUCT TURNING UP	ALT	ALTERNATE
	NEW RETURN / EXHAUST DUCT TURNING DOWN	G.C.	GENERAL CONTRACTOR
	NEW MANUAL VOLUME DAMPER	M.C.	MECHANICAL CONTRACTOR
	NEW CONICAL SPIN-IN FITTING WITH MANUAL VOLUME DAMPER	E.C.	ELECTRICAL CONTRACTOR
	NEW 90? ELBOW WITH TURNING VANES	U.N.O.	UNLESS NOTED OTHERWISE
	NEW FLEX DUCT	S.A.	SUPPLY AIR
	NEW SUPPLY AIR DIFFUSER	R.A.	RETURN AIR
	NEW RETURN AIR GRILLE	F.A.	FRESH AIR
FS-??	NEW FIRE-SMOKE DAMPER	NO	NORMALLY OPEN
FD??	NEW FIRE DAMPER	NC	NORMALLY CLOSED
	NEW ZONE COIL	C	COMMON
M	MOTORIZED DAMPER		
T	THERMOSTAT / TEMPERATURE SENSOR		
LV	ACCESS DOOR		

EQUIPMENT DESIGNATIONS

GRILLES, REGISTERS & DIFFUSERS	CODE A 150 CFM	HHWP-1	EQUIPMENT DESIGNATIONS WHICH ARE UNDERLINED INDICATES THAT SUCH EQUIPMENT IS SCHEDULED IN THE MECHANICAL EQUIPMENT SCHEDULES
DETAIL DESIGNATION	DETAIL NUMBER SHEET DETAIL IS DRAWN ON	SECTION DESIGNATION	A/M3.2 SHEET SECTION IS DRAWN ON SECTION NUMBER

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MECHANICAL LEGENDS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. M002

STATE OF MISSOURI
KEVIN L. AINSWORTH
NUMBER PE-2005000091
PROFESSIONAL ENGINEER
6/10/09

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A Fluor, Daniel, Raytheon & Stone & Webster Company

REV.	DATE	DESCRIPTION	APPROVED
0	6/10/09	ISSUED FOR BIDDING	KLA

COMPUTER ROOM AIR CONDITIONING (CRAC) UNIT SCHEDULE

CODE	MANUFACTURER AND MODEL No.	SERVICE	SUPPLY FAN DATA			COOLING COIL DATA									HUMIDIFIER (LBS./HR)	REHEAT (kW)	FILTERS		ELECTRICAL			UNIT OPERATING WEIGHT (LBS.)	ACCESSORIES AND REMARKS
			CFM AT ALTITUDE	E.S.P. (IN. W.C.) AT SL	HP	FACE VEL. (FPM)	A.P.D. (IN. W.C.)	ENTERING AIR TEMP (DEG F) DB	ENTERING AIR TEMP (DEG F) WB	LEAVING AIR TEMP (DEG F) DB	LEAVING AIR TEMP (DEG F) WB	CAPACITY SENS (BTUH)	CAPACITY TOTAL (BTUH)	REFRIGERANT TYPE	NUMBER CIRCUITS			TYPE	EFFICIENCY	VOLTAGE/ PHASE	M.C.A.	M.O.C.P.		
CRAC-1	LIEBERT DS105AUAOEI	COMPUTER ROOM #124	14,600	0.3	15	449	0.2	72.0	60.0	54.3	51.6	242,000	289,300	R-407C	2	22.0	30.0	4" PLEATED	4" - MERV 8	460/3	95.4	125	3,200	(1)(2)(3)(7)
CRAC-2	LIEBERT VS077AUAOOO	COMPUTER UTILITIES #123	11,000	0.3	7.5	442	0.2	72.0	60.0	53.6	51.3	195,800	233,600	R-407C	2	N/A	N/A	4" PLEATED	4" - MERV 8	460/3	52.4	70	2,700	(4)(5)(6)

NOTES:
1. UNITS ARE LIEBERT DS DOWNFLOW AIR COOLED SYSTEMS
2. CAPACITY RATING AT 791' ASL, 100 F AMBIENT, 72F EAT, 50% RH
3. UNITS TO INCLUDE 4" MERV 8 FILTERS, DUAL RECIP. COMPRESSORS, 4 STAGE OPERATION (UNLOADER ON EACH COMPRESSOR), INFRARED HUMIDIFIER, ELECTRIC REHEAT, SMOKE DETECTORS, NON-LOCKING ELECTRICAL DISCONNECTS, 24" FLOOR STAND WITH TURNING VANE, DUAL FLOAT CONDENSATE PUMP, DESIGNED FOR R-407C REFRIGERANT (FIELD CHARGED), 5 YEAR COMPRESSOR WARRANTY, ICOM CONTROLS, PREMIUM EFFICIENCY MOTOR AND 2 LEAK DETECTORS PER UNIT.
4. UNITS ARE LIEBERT VS UPFLOW AIR COOLED SYSTEMS WITH TOP MOUNTED SUPPLY AIR PLENUM, FRONT DISCHARGE.
5. CAPACITY RATING AT 791' ASL, 100 F AMBIENT, 72F EAT, 50% RH
6. UNITS TO INCLUDE 4" MERV 8 FILTERS, DUAL RECIP. COMPRESSORS, 4 STAGE OPERATION (UNLOADER ON EACH COMPRESSOR), NO HUMIDIFIER, NO REHEAT, SMOKE DETECTORS, NON-LOCKING ELECTRICAL DISCONNECTS, TOP MOUNTED SUPLY AIR PLENUM, DUAL FLOAT CONDENSATE PUMP, DESIGNED FOR R-407C REFRIGERANT (FIELD CHARGED), 5 YEAR COMPRESSOR WARRANTY, ICOM CONTROLS, PREMIUM EFFICIENCY MOTOR AND 2 LEAK DETECTORS PER UNIT.
7. PROVIDE ONE VNSA8-ICOM FOR INTER-UNIT COMMUNICATIONS, NETWORK WIRING BY E.C.

AIR COOLED CONDENSING UNIT SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	NOMINAL TONS	AMBIENT (DEG F)	REFRIGERANT TYPE	COMPRESSORS		CONDENSER FANS		ELECTRICAL DATA			OPERATING WEIGHT (LBS)	ACCESSORIES AND REMARKS
					NUMBER	STAGES	NUMBER	AIR FLOW (@ ALT.)	VOLTS/PH	MCA	MAX FUSE		
ACCU-1	LIEBERT DCDF616-A	30	100	R-407C	2	2	6	--	460/3	11.8	15	1,500	(1)(2)(3)
ACCU-2	LIEBERT DCDF415-A	20	100	R-407C	2	2	4	--	460/3	7.6	15	1,300	(1)(2)(3)

NOTES: (1) LEE-TEMP HEAD PRESSURE CONTROL FOR OPERATION DOWN TO -30 DEGREE F UTILIZING R-407C REFRIGERANT. (2) UNITS ARE PROVIDED WITH AN INTEGRAL ELECTRICAL DISCONNECT. (3) PROVIDE SEPARATE 120 VOLT, 1 PHASE ELECTRICAL SERVICE TO (2) 150 WATT LEE-TEMP RECEIVER HEATERS PER CONDENSER.

AIR CONDITIONING UNIT SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	SERVICE	SUPPLY FAN DATA				DX COOLING COIL DATA								HEATING SECTION						ELECTRICAL DATA			OPERATING WEIGHT (LBS.)	ACCESSORIES AND REMARKS
			CFM AT ALTITUDE	MINIMUM O.A. CFM	E.S.P. (IN. W.C.) AT S.L.	HP	MAXIMUM FACE VEL. (FPM)	MAXIMUM A.P.D. (IN. W.C.)	ENTERING AIR TEMP (DEG F) DB	ENTERING AIR TEMP (DEG F) WB	LEAVING AIR TEMP (DEG F) DB	LEAVING AIR TEMP (DEG F) WB	CAPACITY (MBH) TOTAL	CAPACITY (MBH) SENS.	TYPE	GAS PRESS. RANGE	ENTERING AIR TEMP (DEG F) DB	ENTERING AIR TEMP (DEG F) WB	LEAVING AIR TEMP (DEG F) DB	LEAVING AIR TEMP (DEG F) WB	INPUT (MBH) AT S.L.	VOLTAGE/ PHASE	M.C.A.	M.O.C.P.		
AC-1	TRANE YCH150	OFFICE AREA WEST	3,800	400	0.75"	2	500	0.2	81.2	60	55	52.5	138.5	100.0	NATURAL GAS	2.5" - 14.0	65.0	--	92.0	--	150.0	460/3	31.8	35	1,200	(1)(3)
AC-2	TRANE YCH150	OFFICE AREA EAST	3,800	400	0.75"	2	500	0.2	81.2	60	55	52.5	138.5	100.0	NATURAL GAS	2.5" - 14.0	65.0	--	92.0	--	150.0	460/3	31.8	35	1,200	(1)(2)(3)

NOTES: (1) PROVIDE WITH 2" (30%) T.A. FILTERS, ECONOMIZER CYCLE, LOW LEAK ECONOMIZER DAMPER, AND HAIL GUARD. (2) ON EMERGENCY GENERATOR POWER, RE: ELECTRICAL. (3) PROVIDE WITH A 24/7 PROGRAMMABLE THERMOSTAT.

FAN SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	SERVICE	TYPE	CFM AT ALTITUDE	T.S.P. (IN. W.C.)	ELECTRICAL DATA			OPERATING WEIGHT (LBS.)	ACCESSORIES AND REMARKS
						HP	R.P.M.	VOLTS/PH		
EF-1	GREENHECK BSQ-120	RESTROOMS	INLINE CENTRIFUGAL	900	0.75	1/4	1725	120/1	150	(1)
EF-2	GREENHECK BSQ-180	GARAGE	INLINE CENTRIFUGAL	3,150	0.75	3/4	1725	480/3	400	(2)
EF-3	GREENHECK BSQ-120	LAB / WET SAW	INLINE CENTRIFUGAL	1,600	0.75	1/2	1725	120/1	150	(2)

NOTES: (1) INTERLOCK WITH LIGHT SWITCH (2) LOCAL ON/OFF CONTROL

ELECTRIC UNIT HEATER SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	CFM	ELECTRICAL DATA			TYPE	OPERATING WEIGHT (LBS)	ACCESSORIES AND REMARKS
			KW	VOLTS/PH	AMPS			
WH	INDEECO 933U04000C	160	4.0	208/1	--	WALL MOUNTED	24	(1)(2)
EUH	INDEECO 926U03000DA	700	3.0	208/1	--	CEILING HUNG	45	(1)

NOTES: (1) PROVIDE WITH TAMPER PROOF THERMOSTAT AND SINGLE POINT DISCONNECT SWITCH.
(2) COLOR AS PER THE ARCHITECT.

NATURAL GAS UNIT HEATER SCHEDULE

CODE	MANUFACTURER AND MODEL No.	CFM	CAPACITY (MBH)	OUTPUT (MBH)	E.A.T. (DEG F)	L.A.T. (DEG F)	TYPE	GAS PRESSURE RANGE	ELECTRICAL DATA			TYPE	WEIGHT (LBS)	ACCESSORIES AND REMARKS
									VOLTS/PH	FLA	MOCP			
UH-1	REZNOR MODEL UDAP	629	45.0	37.35	60	115.0	NATURAL GAS	5.0" - 14.0"	120/1	2.4	15	CEILING HUNG	150	(1)
UH-2	REZNOR MODEL UDAP	456	30.0	24.6	60	109.9	NATURAL GAS	5.0" - 14.0"	120/1	1.9	15	CEILING HUNG	150	(1)

NOTES: (1) PROVIDE WITH UNIT MOUNTED THERMOSTAT AND DISCONNECT SWITCH.
(2) PROVIDE MANUFACTURER'S CONCENTRIC COMBUSTION AIR INLET/FLUE SYSTEM ADAPTER.

GRILLES, REGISTERS & DIFFUSER SCHEDULE

CODE	MANUFACTURER AND MODEL NO.	SERVICE	INSTALLATION TYPE	FACE SIZE	NECK SIZE	VOLUME DAMPER	FINISH	MATERIAL	ACCESSORIES AND REMARKS
(A)	PRICE SPD	SUPPLY	LAY-IN	24"x24"	SEE PLANS	NO	WHITE	STEEL	
(B)	PRICE PDDR	RETURN	LAY-IN	12"X24"	10"X20"	NO	WHITE	STEEL	
(C)	PRICE PDDR	RETURN	LAY-IN	24"X24"	20"X20"	NO	WHITE	STEEL	
(D)	PRICE SPD	SUPPLY	LAY-IN	12"x24"	SEE PLANS	NO	WHITE	STEEL	

FIRE & FIRE SMOKE DAMPER SCHEDULE

CODE	MANUFACTURER	DAMPER TYPE	RATING	INSTALLATION H or V	SIZE	REMARKS
FS.1	RUSKIN	FIRE-SMOKE	3 HR	V	12/12	(1)
FS.2	RUSKIN	FIRE-SMOKE	3 HR	V	12/12	(1)

NOTE: (1) 120V ACTUATOR BY M.C., CONNECTION BY E.C., RELAY TO CUT POWER TO DAMPER BY FIRE ALARM CONTRACTOR.

STATE OF MISSOURI KEVIN LEE AINSWORTH NUMBER PE-2005000001 PROFESSIONAL ENGINEER 6/10/09

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MECHANICAL SCHEDULES
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
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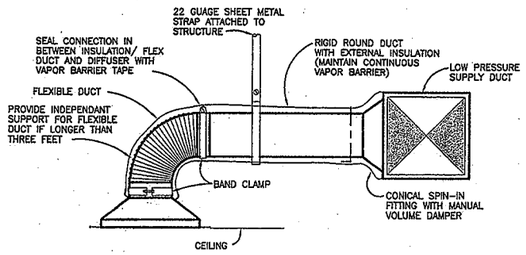
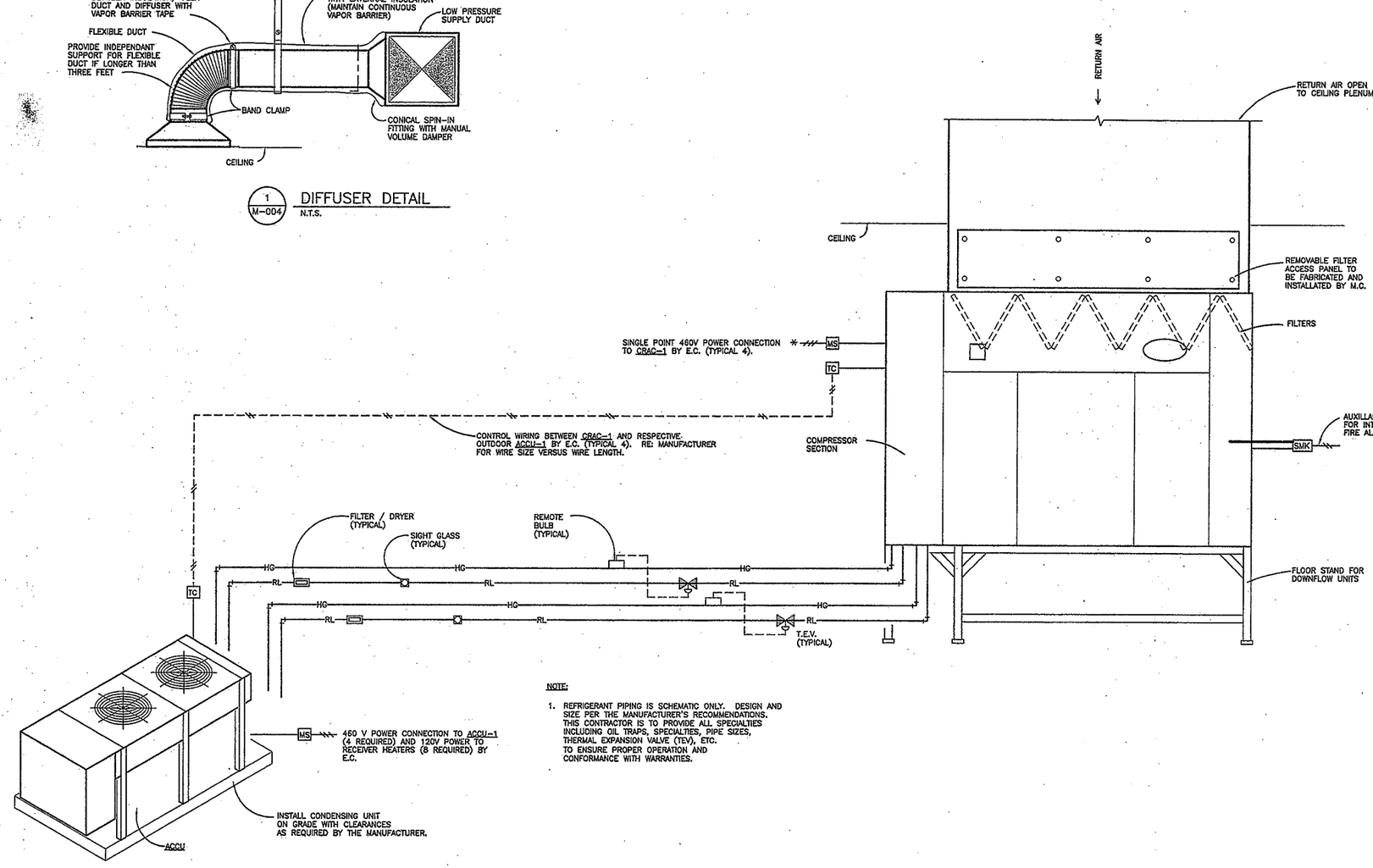
PROJECT NO. 08074
DRAWING NO. M003



1 / M-004 DIFFUSER DETAIL
N.T.S.



NOTE:

1. REFRIGERANT PIPING IS SCHEMATIC ONLY. DESIGN AND SIZE PER THE MANUFACTURER'S RECOMMENDATIONS. THIS CONTRACTOR IS TO PROVIDE ALL SPECIALTIES INCLUDING OIL TRAPS, SPECIALTIES, PIPE SIZES, THERMAL EXPANSION VALVE (TEV), ETC. TO ENSURE PROPER OPERATION AND CONFORMANCE WITH WARRANTIES.

2 / M-004 COMPUTER ROOM AIR CONDITIONER & ACCU PIPING DIAGRAM & CONTROL SCHEMATIC
N.T.S.

STATE OF MISSOURI
KEVIN A. AINSWORTH
NUMBER PE-2005000001
PROFESSIONAL ENGINEER
6/8/09

McGRATH INCORPORATED | ENGINEERING/ CONSTRUCTION MANAGEMENT | DENVER/ST.LOUIS
A Fehrenbacher, Bartell, Arett & Nierkardt Company
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MoDOT

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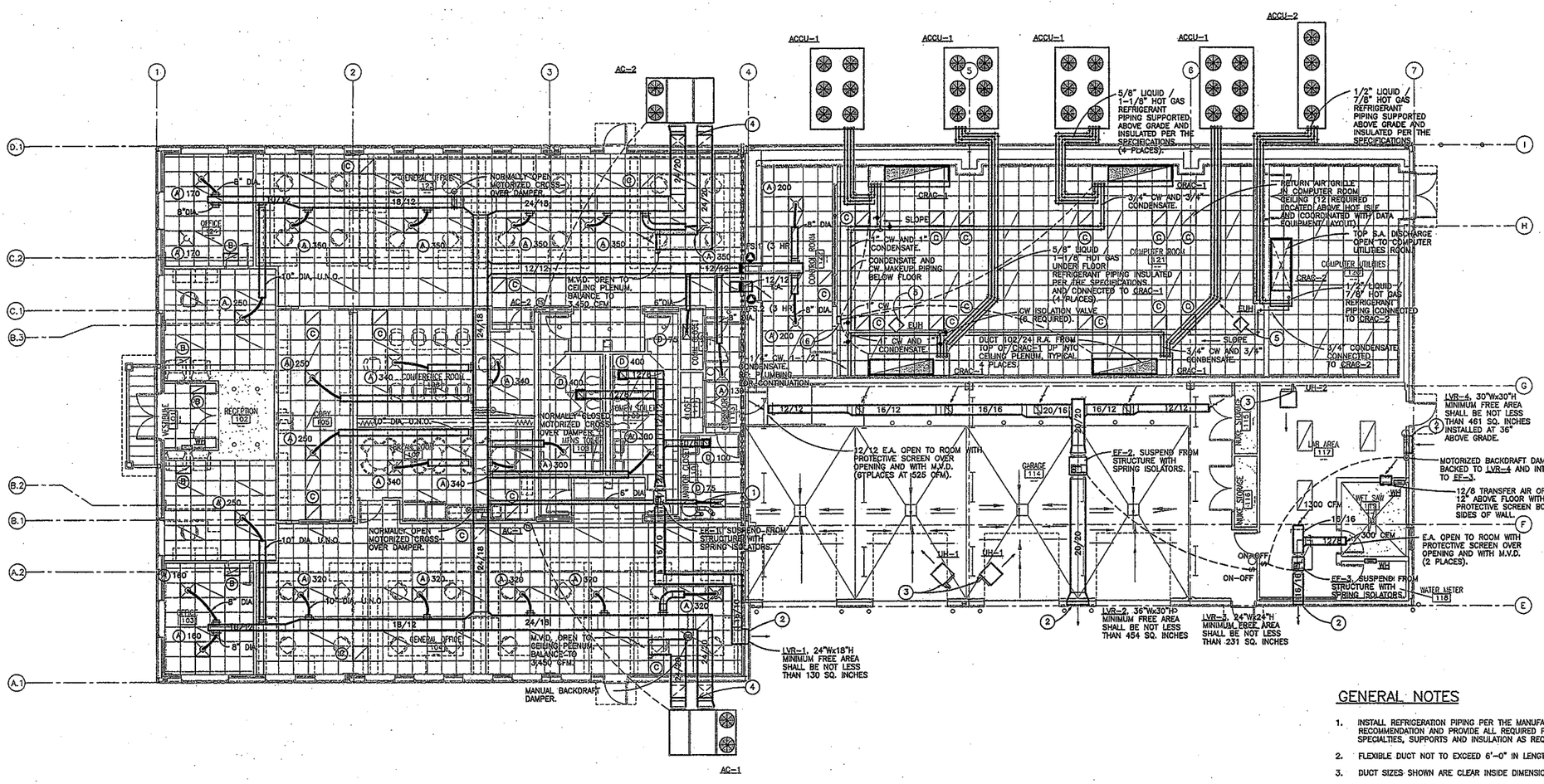
MECHANICAL DETAILS
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO.	08074
DRAWING NO.	M004



1 / M100 **MECHANICAL CONSTRUCTION PLAN**
SCALE: 1/8"=1'-0"

GENERAL NOTES

1. INSTALL REFRIGERATION PIPING PER THE MANUFACTURERS RECOMMENDATION AND PROVIDE ALL REQUIRED PIPING SPECIALTIES, SUPPORTS AND INSULATION AS REQUIRED.
2. FLEXIBLE DUCT NOT TO EXCEED 6'-0" IN LENGTH.
3. DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS.
4. PROVIDE SINGLE VANES ON ALL SUPPLY DUCT ELBOWS.
5. SLOPE CONDENSATE PIPING AT 1/8" PER FOOT TO DRAIN.
6. TEMPERATURE CONTROL WIRING BY E.C.
7. COORDINATE ALL ROOF PENETRATIONS WITH METAL BUILDING MANUFACTURER. NO CUTTING OF RIBS ALLOWED.
8. USE "DEK-TITE" OR AN APPROVED EQUAL FOR ALL ROOF JACKS/ ROOF PENETRATIONS AND COORDINATE WITH METAL BUILDING MANUFACTURER.

KEY NOTES

1. ONE 4" DIA. INTAKE VENT TERMINAL AND ONE 4" DIA. EXHAUST VENT TERMINAL CONNECTED TO GAS FIRED WATER HEATER AND UP THROUGH THE ROOF. ABOVE THE ROOF, PROVIDE A (4" DIA. INTAKE VENT WITH 45 DEGREE ELBOW, DIVERTER PLATE AND ADAPTER SCREEN, A 4" DIA. EXHAUST VENT TERMINAL WITH 45 DEGREE ELBOW WITH A MESH PROTECTIVE SCREEN INSIDE THE EXHAUST VENT TERMINAL. INSTALL BOTH VENT AND INTAKE TERMINALS AS PER THE MANUFACTURER, AT MINIMUM 36" ABOVE ROOF, ORIENTED IN THE SAME DIRECTION AND A MINIMUM 24" APART.
2. RE: ARCHITECTURAL PLANS FOR ALL LOUVER LOCATIONS, HEIGHTS ABOVE GRADE, ETC.
3. ONE 3" DIA. COMBUSTION AIR INTAKE AND ONE 3" DIA. EXHAUST VENT UP THROUGH THE ROOF. PROVIDE WITH CONCENTRIC VENT TERMINATION KIT PROVIDED BY THE MANUFACTURER.
4. COORDINATE WALL OPENINGS AND DUCT PENETRATIONS WITH ARCHITECTURAL PLANS.
5. INSTALL CEILING HUNG ELECTRIC UNIT HEATER EUH, IN THE CEILING SPACE ABOVE THE DATA CENTER AND BELOW THE ROOF. PROVIDE WITH INTEGRAL THERMOSTAT SET AT 45 DEGREE F.
6. INSTALL LIEBERT VNSAB-ICOM INTER-UNIT CONTROLLER THIS LOCATION. PROVIDE HOMERUN NETWORK CABLE TO EACH CRAC-1 (TYPICAL 4).

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A Haberberg, Russell, Scott & Ainsworth Company

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MECHANICAL CONSTRUCTION PLAN
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. M100

ELECTRICAL SPECIFICATIONS

A. BASIC REQUIREMENTS

1. WORK INCLUDED

FURNISH ALL LABOR, MATERIAL, SERVICES AND SKILLED SUPERVISION NECESSARY FOR THE CONSTRUCTION, ERECTION, INSTALLATION, CONNECTIONS, TESTING AND ADJUSTMENT OF ALL EQUIPMENT SPECIFIED HEREINAFTER, OR SHOWN OR NOTED ON THE DRAWINGS, AND ITS DELIVERY TO THE OWNER COMPLETE IN ALL RESPECTS AND READY FOR USE.

2. COORDINATION OF WORK:

PLAN AND COORDINATE ALL WORK SO THAT IT PROCEEDS WITH A MINIMUM OF INTERFERENCE WITH OTHER TRADES. CONFLICTS ARISING FROM LACK OF COORDINATION SHALL BE THIS CONTRACTOR'S RESPONSIBILITY. PROVIDE ALL SPECIAL FRAMES, SLEEVES AND ANCHOR BOLTS AS REQUIRED. COORDINATE THE ELECTRICAL WORK WITH THE MECHANICAL INSTALLATION.

3. EQUIPMENT AND FIXTURES:

EQUIPMENT AND FIXTURES SHALL BE CONNECTED PROVIDING CIRCUIT CONTINUITY IN ACCORDANCE WITH APPLICABLE CODES, WHETHER OR NOT EACH PIECE OF CONDUCTOR, CONDUIT, OR PROTECTIVE DEVICE IS SHOWM BETWEEN SUCH ITEMS OF EQUIPMENT OR FIXTURES, AND THE POINT OF CIRCUIT ORGIN.

ONLY NEW AND UNDAMAGED PRODUCTS SHALL BE UTILIZED FOR PERMANENT CONSTRUCTION.

4. APPLICABLE DOCUMENTS:

DESIGN, MANUFACTURE, TESTING AND METHOD OF INSTALLATION OF ALL APPARATUS AND MATERIALS FURNISHED UNDER THE REQUIREMENTS OF THESE SPECIFICATIONS SHALL CONFORM TO THE LATEST AND/OR APPLICABLE PUBLICATIONS OR STANDARD RULES OF THE FOLLOWING:

NATIONAL ELECTRICAL CODE – NEC
INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS – IEEE
NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION – NEMA
UNDERWRITERS' LABORATORIES, INC.
NATIONAL FIRE PROTECTION ASSOCIATION – NFPA
AMERICAN SOCIETY FOR TESTING AND MATERIALS – ASTM
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION – OSHA
AMERICAN STANDARDS INSTITUTE, INC. – ANSI
NATIONAL ELECTRICAL SAFETY CODE – NESC
INSULATED POWER CABLE ENGINEERS ASSOCIATION – IPCEA
ELECTRICAL INSTITUTE ASSOCIATION – EIA
AMERICANS WITH DISABILITIES ACT – ADA
BOCA – NATIONAL BUILDING CODE

PROVIDE THE DESIGN, FABRICATION, AND ERECTION OF SUPPLEMENTARY STRUCTURAL FRAMING REQUIRED FOR ATTACHMENT OF HANGERS OR OTHER DEVICES SUPPORTING ELECTRICAL EQUIPMENT. PROVIDE MEMBERS WELDED TO STRUCTURAL MEMBERS EQUAL TO THE SPECIFICATION FOR THE MAIN STRUCTURAL MEMBER. PROVIDE "SIMPLE BEAM" TYPE FRAMING WITH END CONNECTIONS WELDED OR BOLTED FOR SHEAR LOADS. USE CANTILEVERS ONLY WHEN SPECIFICALLY APPROVED BY THE STRUCTURAL ENGINEER. THE ENGINEER'S APPROVAL IS ALSO REQUIRED FOR LOCATION OF SUPPLEMENTARY FRAMING. WHEN SUPPLEMENTARY FRAMING IS REQUIRED, DESIGN–FRAMING MEMBERS FOR THEIR ACTUAL LOADS, WITH ALLOWABLE STRESSES SPECIFIED BY AISC. VERIFY THAT DIMENSIONS ARE SUITABLE FOR THE EQUIPMENT FURNISHED. PROVIDE ADDITIONAL STRENGTH WHEN EQUIPMENT FURNISHED IS HEAVIER THAN THAT SPECIFIED.

5. OUTLET LOCATION

POSITION OF OUTLETS: CENTER ALL OUTLETS WITH REGARD TO PANELING FURRING AND TRIM. SYMMETRICALLY ARRANGE OUTLETS IN THE ROOM. SATISFACTORILY CORRECT OUTLETS IMPROPERLY LOCATED OR INSTALLED. MOUNTED HEIGHTS ARE TO BE TO THE CENTER OF BOX ABOVE FINISH FLOOR.

6. SPECIAL CONSIDERATIONS:

WHEN CUTTING AND PIERCING IS REQUIRED, OBTAIN WRITTEN PERMISSION OF THE STRUCTURAL ENGINEER BEFORE CUTTING OR PIERCING STRUCTURAL MEMBERS. SLEEVES SHALL BE GALVANIZED SHEET METAL, GALVANIZED RIGID STEEL CONDUIT OR PLASTIC SLEEVES, PROPERLY SIZED TO ACCOMMODATE THE RACEWAY. ALL SLEEVES MUST BE SEALED AND MADE TO A FIRE RATED PROTECTION STANDARD AFTER CONDUIT OR CABLES HAVE BEEN INSTALLED. SEAL EQUIPMENT OR COMPONENTS EXPOSED TO THE WEATHER AND MAKE WATERTIGHT AND INSECT–PROOF.

NAMEPLATES / IDENTIFICATION SHALL BE PROVIDED FOR ALL PANELBOARDS ISOLATION PANELS, SAFETY SWITCHES, AND INDIVIDUAL MOTOR CONTROL EQUIP. THE NAMEPLATE SHALL INCLUDE THE EQUIPMENT NAME/NUMBER, VOLTAGE, AMPERES AND THE FEEDER OR THE EQUIPMENT THAT IT FEEDS. THE NAMEPLATES FOR PANELBOARDS SHALL BE MOUNTED ON THE FRONT COVER ABOVE THE DOOR. ALL PANELBOARDS SHALL INCLUDE NEW TYPED DIRECTORIES WITH ALL EXISTING AND NEW LOADS VERIFIED AND IDENTIFIED. PROVIDE SHOP DRAWINGS AND SUBMITTALS INCLUDING SYSTEM–WIRING DIAGRAMS. PARTIAL OR STANDARD WIRING DIAGRAMS WILL NOT BE ACCEPTABLE. THE WIRING DIAGRAMS SHALL BE FOR THE COMPLETE INSTALLED SYSTEM.

TEST: PROVIDE WRITTEN TEST RECORD NECESSARY TO ESTABLISH THE ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS AND SUITABLE OPERATION OF EACH SYSTEM.

7. IDENTIFICATION OF EQUIPMENT

MICARTA NAMEPLATES SHALL BE PROVIDED FOR ALL PANEL BOARDS. THE MAIN AND ALL FEEDERS SHALL BE IDENTIFIED BY NAMEPLATES THAT INCLUDE EQUIPMENT MARK NUMBER, VOLTAGE, AMPERES AND THE FEEDER OR THE EQUIPMENT IT FEEDS.

PROVIDE "DYMO TAPE" IDENTIFICATION FOR ALL EQUIPMENT NOT COVERED ABOVE, WHICH SHALL INCLUDE: DISCONNECT SWITCHES, MOTOR STARTERS, CONTROL PANELS, ETC.

ALL PANEL DIRECTORY CARDS SHALL BE TYPED AND INDICATE AREA AND DEVICES SERVED BY THE RENOVATION. PROVIDE NEW DIRECTORIES IN ALL EXISTING PANELS AFFECTED.

8. TEMPORARY SERVICE

THE EC SHALL FURNISH, INSTALL AND MAINTAIN TEMPORARY SERVICE FOR LIGHTING AND SMALL HAND TOOLS. ALL TEMPORARY SERVICES SHALL BE INSTALLED IN A SAFE MANNER AND PROTECTED FROM DAMAGE, AND SHALL CONFORM TO ALL REGULATORY CODES AND AGENCIES.

UPON COMPLETION OF JOB, THE EC SHALL REMOVE ALL TEMPORARY WIRING INSTALLED BY HIS FORCES WHETHER AS A PART OF THIS CONTRACT OR AS PART OF ANY EXTRA WORK ALLOWED OR DIRECTED BY OTHERS.

9. EQUIPMENT, CONNECTIONS, STARTERS, AND CONTROLS

THE EC SHALL FURNISH AND INSTALL ALL CONDUIT, WIRING AND MATERIAL REQUIRED TO PROVIDE CIRCUIT AND DISCONNECTING MEANS FOR ALL EQUIPMENT. HE SHALL INSTALL AND SET ALL BELT–DRIVEN MOTORS AND ALL STARTERS AND CONTROL DEVICES AS FURNISHED WITH, AND AS A PART OF THE EQUIPMENT FURNISHED BY OTHERS. EC SHALL ASSIST IN EQUIPMENT UNLOADING AND HANDLING AS ESTABLISHED BY LOCAL LABOR CUSTOM AND PROCEDURES.

THE EC SHALL PROVIDE FVNR MAGNETIC AND/OR COMBINATION STARTERS AS INDICATED. STARTERS SHALL BE PROVIDED WITH START–STOP, HOA, PILOT LIGHT, AUXILIARY CONTACTS AND CONTROL TRANSFORMER.

ALL CONNECTION AND WIRING REQUIRED FOR INTERLOCK AND/OR TEMPERATURE CONTROL WILL BE BY THE MECHANICAL SUBCONTRACTOR.

10. GROUNDING SYSTEM

FURNISH AND INSTALL A GROUNDING SYSTEM INCLUDING ALL FITTINGS, CLAMPS, CONDUIT AND WIRE OF THE PROPER SIZE TO MAKE GROUND CONNECTIONS BETWEEN ALL APPARATUS, NEUTRAL BUS, CONDUITS, ETC. AS REQUIRED BY THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND ACCORDING TO THE REQUIREMENTS OF THE UTILITY COMPANY AND LOCAL AUTHORITIES. PROVIDE ELECTRICAL SYSTEM GROUNDING ELECTRODE SYSTEM CONSISTING OF GROUND ROD(S), REINFORCING STEEL IN FOOTING AND AVAILABLE GROUNDED METAL WATER PIPE, GROUNDED METAL BUILDING STEEL, ETC PER THE NEC. CONTRACTOR SHALL COORDINATE WITH G.C. TO ENSURE BONDING TO REINFORCING STEEL IN FOOT IS INSTALLED PRIOR TO THE POURING OF THE FOOTING.

PROVIDE #10 AWG BARE GROUND CONDUCTOR TO GROUND RAISED FLOOR IN COMPUTER ROOOM AND CONTROL ROOM. BOND GROUND CONDUCTOR TO EVERY OTHER RAISED FLOOR SUPPORT.

11. LIGHTING FIXTURE INSTALLATION

UPON COMPLETION OF JOB, ALL FIXTURES SHALL BE LAMPED AND LEFT IN FIRST–CLASS CONDITION AND COMPLETELY CLEANED OF ALL PLASTER, PAINT AND SMUDGES.

THE EC SHALL PROVIDE ALL MOUNTING HARDWARE AND ACCESSORIES REQUIRED. DO NOT DEPEND ON CEILING GRID FOR SUPPORT OF FIXTURES.

12. EXCAVATION

THE EC SHALL PROVIDE ALL NECESSARY EXCAVATION, BACK FILL AND COMPACTION TO PERFORM THE ELECTRICAL INSTALLATION QAS DEFINED IN THIS SPECIFICATION DOCUMENT. ALL SURPLUS EXCAVATION MATERIALS SHALL BE REMOVED FROM THE PREMISE AND SHALL BE THE RESPONSIBILITY OF THE EC.

B. BASIC MATERIALS AND METHODS

1. RACEWAYS, FITTINGS AND BOXES

CONDUITS RUN ABOVE CEILINGS, IN WALLS OR EXPOSED SHALL BE ELECTRICAL METALLIC TUBING WITH STEEL SET SCREW FITTINGS. TYPE AC AND /OR MC CABLE MAY BE USED FOR LIGHTING AND RECEPTACLE CIRCUITS, AS PERMITTED BY CODE. HOME RUNS TO PANELS SHALL BE EMT.

CONDUITS ROUTED BELOW COMPUTER AREA RAISED FLOOR FOR COMPUTER EQUIPMENT SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT WITH COLOR CODED WEATHERPROOF JACKET, ORANGE WHERE FED FROM PMMA AND BLUE WHERE FED FROM PMMB.

CONDUITS IN DIRECT CONTACT WITH EARTH OR BELOW VAPOR BARRIER SHALL BE HEAVY WALL GALVANIZED STEEL OR SCHEDULE 40PVC.

PROVIDE HEAVY WALL GALVANIZED STEEL ELBOWS FOR PVC CONDUIT SERVING PANELS AND EQUIPMENT.

PROVIDE GROUND WIRE, PER NEC IN ALL PVC CONDUIT.
OUTLET BOXES FOR ALL INTERIOR OUTLETS SHALL BE STANDARD, GALVANIZED PRESSED STEEL WITH SUITABLE FRAMES TO SERVE PURPOSE INDICATED AND TO FIT SPACE ALLOTTED.

ALL OUTDOOR LIGHTS, SWITCHES AND OUTLETS SHALL BE PROVIDED WITH APPROVED WEATHERPROOF OUTLET BOXES.

FURNISH AND INSTALL JUNCTION BOXES WHERE SHOWN ON THE DRAWINGS OR WHERE REQUIRED FOR THE PROPER INSTALLATION OF THE SYSTEMS.

WHERE FLUSH COVER PLATES ARE REQUIRED, THEY SHALL BE PAINTED TO MATCH ADJACENT WALL OR CEILING FINISHES.

ALL JUNCTION BOXES, OTHER THAN FOR POWER OR LIGHTING SHALL BE IDENTIFIED AS TO THEIR USAGE ON THE INSIDE OF THE COVER PLATE.

2. CONDUCTORS/CABLE ASSEMBLIES

UNLESS OTHERWISE SPECIFICED, PROVIDE SOLID COPPER CONDUCTORS TYPE THWN (75C WET OR DRY) OR THHN (90C DRY ONLY) FOR ALL CONDUCTORS NO. 10 AWG AND SMALLER.

UNLESS OTHERWISE SPECIFIED, PROVIDE STRANDED COPPER CONDUCTORS THYPE THW, THWN, XHHW (75C WET OR DRY), THHN OR XHHW (90C DRY ONLY) FOR ALL CONDUCTORS NO. 10 AWG AND SMALLER.

CABLE ASSEMBLIES SUCH AS TYPE AC, MAC ETC., AS PERMITTED BY CODE, ARE ACCEPTABLE.

COLOR– CODE ALL CONDUCTOR INSULATION WITH THE STANDARD COLORS, OR TAPE AT EACH TERMINATION AND JUNCTION BOX. EACH VOLTAGE, PHASE, NEUTRAL AND GROUND SHALL BE IDENTIFIED WITH A SEPARATE COLOR AND SHALL BE USED CONSISTENTLY THROUGHOUT.

NO SPLICING OR JOINTS WILL BE PERMITTED IN EITHER FEEDER OR BRANCH CIRCUITS EXCEPT AT OUTLET AR ACCESSIBLE JUNCTION BOXES. UTILIZE COMPRESSION TYPE SOLDER LESS CONNECTORS, SIMILAR TO THOMAS AND BETTS TYPE 545 WITH 3M, 8400 SERIES SPLICE KITS AND COLD SHRINK CONNECTORS WHEN MAKING SPLICES OR TAPS IN CONDUCTORS NO. 8 AWG OR LARGER.

UTILIZE PREINSULATED CONNECTORS 3M COMPANY "SCOTCHLOK" OR IDEAL INDUSTRIES, INC. "SUPER NUT", FOR SPLICES AND TAPS IN CONDUCTORS NO. 10AWG AND SMALLER. ALL OTHER TWIST–ON CONNECTORS SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. ALSO, UTILIZE THIS TYPE OF CONNECTOR FOR FACTORY–MADE SPLICES IN FIXTURES AND EQUIPMENT.

3. PANELS AND SAFETY SWITCHES

ACCEPTABLE MANUFACTURERS ARE SIEMENS, G.E., SQUARE D, WESTINGHOUSE OR APPROVED EQUAL.

ALL PANELS WITH DOORS SHALL BE KEYED ALIKE, DEAD FRONT TYPE AND ENCLOSED IN CODE GAUGE GALVANIZED STEEL CABINETS COMPLETE WITH TRIM AS INDICATED. WHERE SECTIONAL PANELS ARE REQUIRED, EACH GROUP OF SECTIONS SHALL BE SAME CONSTRUCTION, SIZE AND TRIM.

PANELS SHALL BE BOLTED BUS CONSTRUCTION AND MANUFACTURED BY NEMA STANDARDS.

UNLESS NOTED OTHERWISE, FUSIBLE SWITCH SHALL BE QUICK MAKE, QUICK BREAK WITH FUSES DEAD IN OPEN POSITION.

SAFETY SWITCHES SHALL BE HEAVY DUTY, SIZE AND TYPE AND AS REQUIRED FOR THE PURPOSE INTENDED.

4. WIRING DEVICES AND PLATES

ALL SWITCHES AND RECEPTACLES SHALL BE 20A COMMERCIAL GRADE, HP RATED DEVICES SHALL BE STANDARD COLORS AS APPROVED BY THE ARCHITECT.

PLATES SHALL MATCH DEVICE COLOR AND BE HIGH IMPACT, THERMOPLASTIC FOR ALL FLUSH MOUNTED DEVICES.

5. ELECTRIC SERVICE

FURNISH AND INSTALL ALL MEDIUM VOLTAGE PRIMARY CONDUITS, CONCRETE TRANSFORMER PAD GROUNDING SYSTEM AT PAD MOUNT TRANSFORMER SECONDARY CONDUIT AND WIRE METERING CT CABINET, METER BASES, METER WIRING, ETC FOR COMPLETE ELECTRIC SERVICE(S) AS HEREIN SPECIFIED AND SHOWN ON THE DRAWINGS. CONCRETE TRANSFORMER PAD BY E.C.

THE ELECTRIC UTILITY SHALL FURNISH AND INSTALL MEDIUM VOLTAGE CABLES, PADMOUNT TRANSFORMER, METERING CT'S, METER WIRING AND METER.

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRIC UTILITY.

6. STANDBY POWER SYSTEM

RECEIVE, UNLOAD, INSTALL AND WIRE DIESEL POWER GENERATOR, GENERATOR ACCESSORIES AND TRANSFER SWITCHES BEING FURNISHED BY OWNER. ACCESSORIES INCLUDE BUT NOT LIMITED TO ENGINE JACKET HEATERS, BATTERIES, BATTERY CHARGER, REMOTE ANNUNCIATOR, REMOTE DERANGEMENT PANEL AND REMOTE EMERGENCY POWER OFF STATION.

ASSIST GENERATOR CONTRACTOR ON FIELD INSPECTION START–UP, ADJUSTING AND TESTING. INSTALLATION OF EXHAUST MUFFLER, FUEL OIL PIPING, ETC. BY M.C., CONCRETE PAD BY G.C.

7. UNTERRUPTABLE POWER SUPPLY (UPS)

FURNISH, RECEIVE, UNLOAD, INSTALL AND WIRE UPS AND ASSESSORIES BEING FOR REQUIREMENTS. SEE EQUIPMENT SPECIFICATON DRAWINGS.

8. POWER MANAGEMENT MODULES (PMM)

FURNISH AND INSTALL POWER MANAGEMENT MODULES (2 TOTAL) AS INDICATED ON THE DRAWINGS. FOR POWER MANAGEMENT MODULE REQUIREMENTS. SEE EQUIPMENT SPECIFICATIONS SHEETS.

9. SURGE SUPPRESSION DEVICES (TVSS)

FURNISH AND INSTALL SURGE SUPPRESSION DEVICES AND WIRING. AS INDICATED ON THE DRAWINGS. FOR SURGE SUPPRESSION DEVICES, SEE EQUIPMENT SPECIFICATIONS SHEETS.

10. POWER CIRCUIT BREAKERS

POWER CIRCUIT BREAKERS SHALL HAVE ELECTRONIC TRIP UNITS WITH ADJUSTABLE LONG TIME, SHORT TIME, SHORT TIME DELAY, INSTANTANEOUS, INSTANTANEOUS DELAY TO PROVIDE A COORDINATED ELECTRICAL SYSTEM. POWER CIRCUIT BREAKER(S) RATED 480 VOLTS, 1000 AMPS OR AOBE SHALL BE PROVIDED WITH GROUND FAULT SENSOR WITH ADJUSTABLE TIME DELAY TO COORDINATE WITH DOWN STREAM DEVICE. POWER CIRCUIT BREAKERS RATED 800 AMPS AND BELOW SHALL HAVE GROUND FAULT SENSORS WHERE INDICATED ON THE DRAWINGS.

11. TELEPHONE AND 'FIBER' OPTICS

FURNISH AND INSTALL DIRECT BURIED PVC CONDUITS FROM EXISTING MANHOLE TO NEW BUILDING AS INDICATED ON THE DRAWINGS. CONDUITS SHALL BE 4" UNLESS OTHERWISE INDICATED ON DRAWINGS WITH PULL ROPE. ALL ELBOWS SHALL BE THE WIDE SWEEP TYPE.

12. FUSES

FUSES SHALL BE BUSSMANN OR APPROVED EQUAL AND SHALL MEET ALL REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. FUSE SIZES SHALL BE VERIFIED BY THE EC FOR FINAL LOAD SERVED.

13. FIRE ALARM AND DETECTION SYSTEM

FIRE ALARM AND DETECTION SYSTEM IN THE COMPUTER AREA SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE FIRE SUPPRESSION CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL POWER WIRING, EMERGENCY POWER OFF SWITCH(ES), FIRE SUPPRESSION ABORT SWITCH(ES), REMOTE ALARMS, ETC. AS SHOWN ON THE DRAWINGS AND REQUIRED.

14. OPERATION AND MAINTENANCE MANUALS:

BEFORE FINAL APPROVAL OF THE ELECTRICAL INSTALLATION, SUBMIT FOUR (4) COPIES OF DESCRIPTIVE LITERATURE, MAINTENANCE, RECOMMENDATIONS FROM THE EQUIPMENT MANUFACTURER, DATE OF INITIAL OPERATION, WIRING DIAGRAMS AND PARTS LIST OF EACH ITEM OF ELECTRICAL EQUIPMENT INSTALLED UNDER THIS CONTRACT.

15. WARRANTIES

THE ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP SUPPLIED BY HIM TO BE FREE OF DEFECT FOR THE PERIOD OF ONE YEAR AFTER THE ACCEPTANCE DATE OF WORK, AND SHALL BE REQUIRED TO REPLACE OR MAKE ADJUSTMENTS FOR ANY DEFECTS DUE TO FAULTY MATERIAL OR POOR WORKMANSHIP. ALL GUARANTEES AND WARRANTIES PROVIDED BY MANUFACTURERS OR OTHERS FOR LONGER PERIODS SHALL BE IDENTIFIED AND PASSED THROUGH TO THE OWNER. A COMPLETE LIST OF ALL WARRANTIES SHALL BE SUBMITTED WITH CONTRACT NAMES, AND ADDRESSES AND PHONE NUMBERS PRIOR TO PROJECT COMPLETION.

16. ADD/DECUCT PER UNIT COSTS

CONTRACTOR SHALL PROVIDE IN HIS PROPOSAL A PER UNIT INSTALLED COST FOR COMPUTER EQUIPMENT WIRING AS FOLLOWS:

1. PER LINEAR FOOT FOR LIQUID TIGHT FLEXIBLE CONDUIT WITH 2 #10, 1#10G. INSTALLED BELOW RAISED COMPUTER ROOM FLOOR.
2. PER UNIT FOR NEMA L6–30R RECEPTACLE WITH OUTLET BOX.
3. PER UNIT FOR NEMA L5–30R RECEPTACLE WITH OUTLET BOX.

LIGHTING FIXTURE SCHEDULE

SYMBOL	MANUFACTURER & CATALOG #	LAMP DATA QTY	DESCRIPTION	VOLT	MOUNTING	FINISH	REMARKS
A	LITHONIA–2PM3N–G–H–2–32–18–LD–277–GEB 1/3	2	F32W–T8	277	RECESSED	WHITE	W/ 3"DEEP 18 CELL LOW IRRESDESENT PARABOLIC LOUVER
A1	LITHONIA–2PM3N–G–H–3–32–18–LD–277–GEB	3	F32W–T8	277	RECESSED	WHITE	W/ 3" DEEP 18 CELL, LOW IRRESDESCENT PARABOLIC LOUVER.
B	LITHONIA–2SP8–G–2–32–A12125–277–GEB	2	F32W–T8	277	RECESSED	WHITE	W/ .125" THICK ACRYLIC PRISMATIC LOUVER
C	LITHONIA–WC–2–32–MVOLT–GEB	2	F32W–T8	MVOLT	WALL	WHITE	WITH MATTE WHITE OPAL ACRYLIC DIFFUSER
D	GOTHAM AF 2–32–8AR–MVOLT	2	32TRT	MVOLT	RECESSED	WHITE	8" ROUND DOWNLIGHT WITH CLEAR ALZAK REFLECTOR
E	LITHONIA S132–277–GEB	1	F32W–T8	277	SURFACE	WHITE	STRIP FIXTURE, PROVIDE CHAIN MOUNTED WHERE INDICATED
F	LITHONIA TWA 82TRT–MVOLT–PE–DMB–LP1	1	42W TRT	MVOLT	WALL	BRONZ	WITH PRISMATIC BORDSILICATE GLASS U.L. LISTED WET LOCATIONS & PHOTOCELL
G	LITHONIA 2SRT–G–2–32–PWA12125V–MVOLT–GEB	3	F32W–T8	MVOLT	RECESSED	WHITE	W/ SEALED STEEL HOUSING, GASKETED ACRYLIC LENS AND HOLD DOWN CLIPS.
H	LITHONIA DM 2–48–277–GEB	2	F32W–T8	277	SURFACE	WHITE	FIBERGLASS FIXTURE WITH ACRYLIC GASKETED DIFFUSER.
X	LITHONIA LQM–S–W–*–R–120/277–ELN	–	FUR W/FIX	120/277	SURFACE	WHITE	SINGLE OR DOUBLE FACED AS INDICATED W/ NICKEL CADMIUM BATTERY & CHG.

STATE OF MISSOURI — GLENNON C. SEITZ — E-23687 — REGISTERED PROFESSIONAL ENGINEER — 6/8/09

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ELECTRICAL SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074

DRAWING NO. E-001

ELECTRICAL LEGEND AND ABBREVIATIONS

ABBREVIATIONS

A.C.S.	ACESS CONTROL SYSTEM	FM	F/O MODEM	PP	POWER PANEL
A.F.F.	ABOVE FINISHED FLOOR	F/O	FIBER OPTIC	PR.	PAIR
ATS	AUTOMATIC TRANSFER SWITCH	FS	FUSIBLE SWITCH	PVC	POLYVINYL CHLORIDE CONDUIT
B.C.	BELOW CEILING	GF	GROUND FAULT	PWCP	PRE WIRED CONTROL PANEL
C	CONDUIT	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	R	RECESSED
CAM	CAMERA	GRD	GROUND	RF	RADIO FREQUENCY
CB	CIRCUIT BREAKER	HH	HANDHOLE	RGS	RIGID GALAVANIZED STEEL
CC	CONTROL CONTACTOR	IMC	INTERMEDIATE METAL CONDUIT	RT	RAINTIGHT
CCTV	CLOSED CIRCUIT TELEVISION	I/O	INPUT/OUTPUT	(S)	SUMMER LOADS
CCW	COUNTER CLOCKWISE	IG	ISOLATED GROUND	SHLD	SHIELED (AS IN CABLE)
CW	CLOCK WISE	LAN	LOCAL AREA NETWORK	SWBD	SWITCHBOARD
DCU	DISTRIBUTED CONTROLLER UNIT	LP	LIGHTING PANEL	T	TELEPHONE
DN	DOWN	MATV	MASTER ANTENNA TELEVISION	TS	TIME SWITCH CONTROLLED
DT	DUSTIGHT	MC	METAL CLAD	TYP.	TYPICAL
DR	DOCTOR'S REGISTER	MCC	MOTOR CONTROL CENTER	UNG	UNGROUNDED
DWG	DRAWING	MCP	MOTOR CONTROL PANEL	UNO	UNLESS NOTED OTHERWISE
EC	ELECTRICAL CONTRACTOR	MH	MANHOLE	UPS	UNINTERUPTIBLE POWER SUPPLY
ELEC	ELECTRIC OR ELECTRICAL	MT	EMPTY CONDUIT	VT	VAPORTIGHT
EMT	ELECTRICAL METALLIC TUBING	NC	NURSE CALL	(W)	WINTER LOADS
ER	EXISTING RELOCATED	NIC	NOT IN CONTRACT	WP	WEATHER-PROOF
EXT	EXISTING TO REMAIN	NL	NIGHT LIGHT	WT	WATERTIGHT
EWC	ELECTRIC WATER COOLER	PA	PUBLIC ADDRESS	XP	EXPLOSION PROOF
FA	FIRE ALARM	PI	PORTABLE INTERFACE		
FBO	FURNISHED BY OTHERS	P.I.R.	PASSIVE INFARED		

WIRING PLANS

NOTE: -3/4" RIGID CONDUIT MIN.
-ALL EXPOSED CONDUIT TO BE RIGID.
P-INDICATES PVC SCH.40 RACEWAY

- RACEWAY CONCEALED ABOVE CEILING OR IN WALL
- RACEWAY CONCEALED IN OR BELOW FLOOR SLAB.
- RACEWAY EXPOSED
- RACEWAY DIRECT BURIED
- HOMERUN RACEWAY-LONG STROKE INDICATES NEUTRAL CONDUCTORS. SHORT STROKE INDICATES PHASE OR SWITCHED WIRES. LONG STROKE WITH HOOK INDICATES GROUNDING CONDUCTOR (IE-#12G). HOMERUN TO BE #12THHN IN 3/4" RIGID UNLESS NOTED OTHERWISE
- MC CABLE INSTALLED IN CEILING OR DRYWALL PARTITIONS. (3Ø THHN)
- MODULAR SYSTEM CABLE INSTALLED IN CEILING, EXPOSED OR DRYWALL PARTITIONS.
- CONDUIT UP, CONDUIT DOWN
- FLEXIBLE CONDUIT
- 3/4" x 8'-0" COPPER CLAD GROUND ROD
- CONDUIT CAPPED FOR FUTURE USE
- —NE— CONDUIT CONTAINING EMERGENCY WIRING ONLY.
- —SB— CONDUIT CONTAINING STAND-BY WIRING ONLY.
- —E/SB— CONDUIT CONTAINING COMBINATION STAND-BY AND EMERGENCY WIRING.
- CABLE TRAY
- HOMERUN

ONE-LINE DIAGRAM SYMBOLS

- FUSIBLE SWITCH (SIZE/FUSE) XX/XX
- DRAWOUT CIRCUT BREAKER
- CIRCUIT BREAKER XX/XX
- (W) ELECTRIC METER
- (G) GENERATOR
- POWER TRANSFORMER
- —G— GROUND BUS
- —N— NEUTRAL BUS
- GROUND

JUNCTION AND PULL BOXES

- (J) JUNCTION BOX.
- (J) JUNCTION BOX WITH FLEXIBLE CONDUIT CONNECTION
- $(J)_L$ LIGHTING BAY BOX-MODULAR WIRING SYSTEM
- (P) PULL BOX.

GROUNDING SYMBOLS

- GROUNDING ROD W/ EXOTHERMIC CABLE CONNECTION
- —GC— GROUNDING CONDUCTOR
- --GC-- BURIED GROUND CONDUCTOR

POWER EQUIPTMENT

- (3) MOTOR -NUMBER EQUALS HORSEPOWER
- (3) WHEN DEVICE IS ATTACHED TO MOTOR SYMBOL, DEVICE SHALL BE FURNISHED & INSTALLED W/ EQ.-NUMBER EQUALS HORSEPOWER
- (3) WHEN DEVICE IS NOT ATTACHED TO MOTOR SYMBOL, DEVICE SHALL BE FURNISHED & INSTALLED BY E.C.- NUMBER EQUALS HORSEPOWER
- STARTER-MANUAL
- STARTER-MAGENTIC
- STARTER-MAGENTIC W/ DISCONNECT
- MOTOR CONTROL CENTER
- SWITCHBOARD
- PANELBOARD
- CONTROL CABINET
- UPS UNINTERRUPTABLE POWER SUPPLY
- FUSED DISCONNECT SWITCH
- NF NONFUSED DISCONNECT SWITCH
- EQUIPMENT DESIGN, LOADS, ROUGH-IN BASED ON UNVERIFIED OR ASSUMED INFORMATION. VERIFY ALL REQUIRED INFO W/ VENDOR, SHOP DRAWINGS AND OR INSTALLING CONTRACTOR PRIOR TO ROUGH-IN.

LIGHTING FIXTURES

- A 2 x 4 FLUORESCENT LIGHTING FIXTURE, RECESSED "A" INDICATES FIXTURE TYPE SEE LIGHTING FIXTURE SCHEDULE.
- 2 x 4 FLUORESCENT LIGHTING FIXTURE, SURFACE MOUNTED
- 2 x 2 FLUORESCENT LIGHTING FIXTURE, RECESSED
- EMERGENCY FIXTURE W/BATTERY BACK-UP.
- EMERGENCY FIXTURE W/BATTERY BACK-UP - REMOTE HEADS.
- REMOTE BATTERY PACK FOR EGRESS LIGHTING
- POLE BASE, POLE & POLE MOUNTED LIGHT FIXTURE
- RECESSED, SURFACE PL FLUOR. H.I.D. OR INCANDESCENT LIGHTING FIXTURE.
- WALL MOUNTED PL FLUOR. H.I.D. OR INCANDESCENT LIGHTING FIXTURE.
- CEILING MTD. EXIT LIGHT FIXTURE-SELF CONTAINED BATTERY OPERATED
- WALL MTD. EXIT LIGHT FIXTURE-SELF CONTAINED BATTERY OPERATED
- 1 x 4 RECESSED FLUORESCENT
- 4' WALL MOUNTED FLUORESCENT

SPECIAL

- PUSH BUTTON STATION
- (T) THERMOSTAT (F.B.O.)
- (PC) PHOTO ELECTRIC CONTROL
- M.O.L. MOTOR-OPERATED LOUVER

DUAL DATA OUTLET

- RECESSED/FLUSH FLOOR TELEPHONE OUTLET
- RECESSED/FLUSH FLOOR DATA OUTLET
- DUEL DATA OUTLET (18" A.F.F.) OUTLET SHALL BE DOUBLE GANG BOX.
- DUAL DATA OUTLET (18" A.F.F.) 3/4" STUB UP.
- T_P TELEPHONE OUTLET WALL MOUNTED (18" A.F.F.-U.N.O.) WITH 3/4" STUP-UP.
- TELEPHONE TERMINAL BOARD
- TC TELEPHONE TERMINAL CABINET

WIRING DEVICES, RECEPTACLES-MISC.

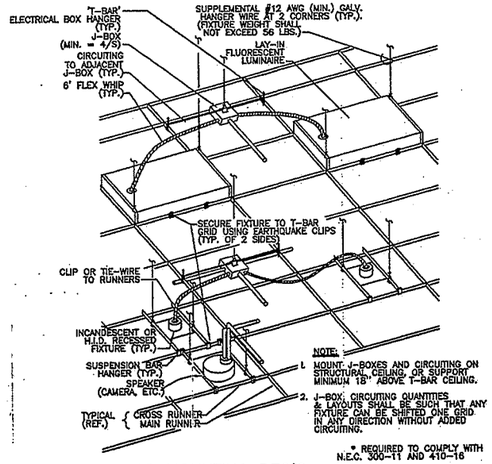
- SPECIAL PURPOSE OUTLET AS NOTED.
- SINGLE RECEPTACLE OUTLET (18" A.F.F.-UNO)
- DUPLEX RECEPTACLE OUTLET (18" A.F.F.-U.N.O.)
- DUPLEX RECEPTACLE OUTLET W/ ONE OUTLET SWITCHED
- D_D DEDICATED DUPLEX RECEPTACLE OUTLET (18" A.F.F.-U.N.O.)
- D_{IG} DUPLEX RECEPTACLE OUTLET (18" A.F.F.-U.N.O.) ISOLATED GROUND (SEE SPECS)
- D_{GFI} DUPLEX RECEPTACLE OUTLET (18" A.F.F.-U.N.O.) GROUND FAULT TYPE
- D_{WPGFI} W.P. GROUND FAULT INTERRUPTER DUPLEX RECETACLE. OUTLET W/WATER TIGHT COVER F.S. BACK BOX
- D_{WP} DUPLEX RECEPTACLE OUTLET WITH WEATHERPROOF COVER (18" A.F.F.-U.N.O.) FS BOX W/ WOODHEAD # 3061 WP COVER
- DUPLEX RECEPTACLE OUTLET MOUNTED 8" ABOVE COUNTER TOP
- D_{GFI} DUPLEX RECEPTACLE OUTLET MOUNTED ABOVE COUNTER TOP-GROUND FAULT TYPE
- D_{EWC} SINGLE RECEPTACLE MOUNTED BEHIND ELECTRIC WATER COOLER.
- DOUBLE DUPLEX RECEPTACLE OUTLET (18" A.F.F.-U.N.O.)
- RECESSED/FLUSH FLOOR BOX (FOR ELEC. PARTITIONS)
- DOUBLE DUPLEX RECEPTACLE OUTLET EMERGENCY
- DUPLEX RECEPTACLE OUTLET EMERGENCY

WIRING DEVICES, SWITCHES

- 1 2 3 P SWITCHES - SINGLE POLE, 2 POLE, 3 WAY, 4 WAY (48" A.F.F.)
- S_P SINGLE POLE SWITCH W/ PILOT LIGHT
- S_{MS} MOMENTARY CONTACT SWITCH
- S_M MANUAL MOTOR STARTER WITH PILOT LIGHT

FIRE ALARM SYMBOLS

- (F) FIRE ALARM MANUAL STATION. MOUNT 48 INCHES A.F.F. TO CENTER LINE
- $(F)_V$ FIRE ALARM STROBE, MOUNT 80" AFF.
- $(F)_{VH}$ FIRE ALARM HORN (V INDICATES COMBINATION TYPE WITH VISUAL INDICATION MOUNTED 80" AFF)
- $(F)_{VC}$ FIRE ALARM CHIME (V INDICATES COMBINATION TYPE WITH VISUAL INDICATION MOUNTED 80" AFF)
- $(F)_V$ FIRE ALARM BELL (V INDICATES COMBINATION TYPE WITH VISUAL INDICATION MOUNTED 80" AFF)
- $(F)_{VS}$ FIRE ALARM SPEAKER (V INDICATES COMBINATION TYPE WITH VISUAL INDICATION MOUNTED 80" AFF)
- $(F)_S$ EXTINGUISHING SYSTEM PRESSURE SWITCH
- $(F)_{WF}$ SPRINKLER SYSTEM WATER FLOW SWITCH
- $(F)_{SS}$ SPRINKLER SYSTEM TAMPER (SUPERVISORY) SWITCH
- $(F)_{ESV}$ SPRINKLER SYSTEM ELECTRICAL SOLENOID SWITCH
- $(F)_{PR}$ EXTINGUISHING SYSTEM PRESSURE SWITCH
- $(F)_{SD}$ SMOKE DETECTOR-PHOTOELECTRIC TYPE
- $(F)_{ID}$ SMOKE DETECTOR-IONIZATION TYPE
- $(F)_{DD}$ DUCT MOUNTED SMOKE DETECTOR - PHOTOELECTRIC TYPE
- $(F)_{DDI}$ DUCT MOUNTED SMOKE DETECTOR - IONIZATION TYPE
- $(F)_{SMD}$ SMOKE DAMPER
- $(F)_R$ FIRE ALARM CONTROL RELAY
- $(F)_{CMX}$ ADDRESSABLE CONTROL MODULE
- $(F)_{MMX}$ ADDRESSABLE MONITOR MODULE



TYPICAL T-BAR MOUNTING REQ'S
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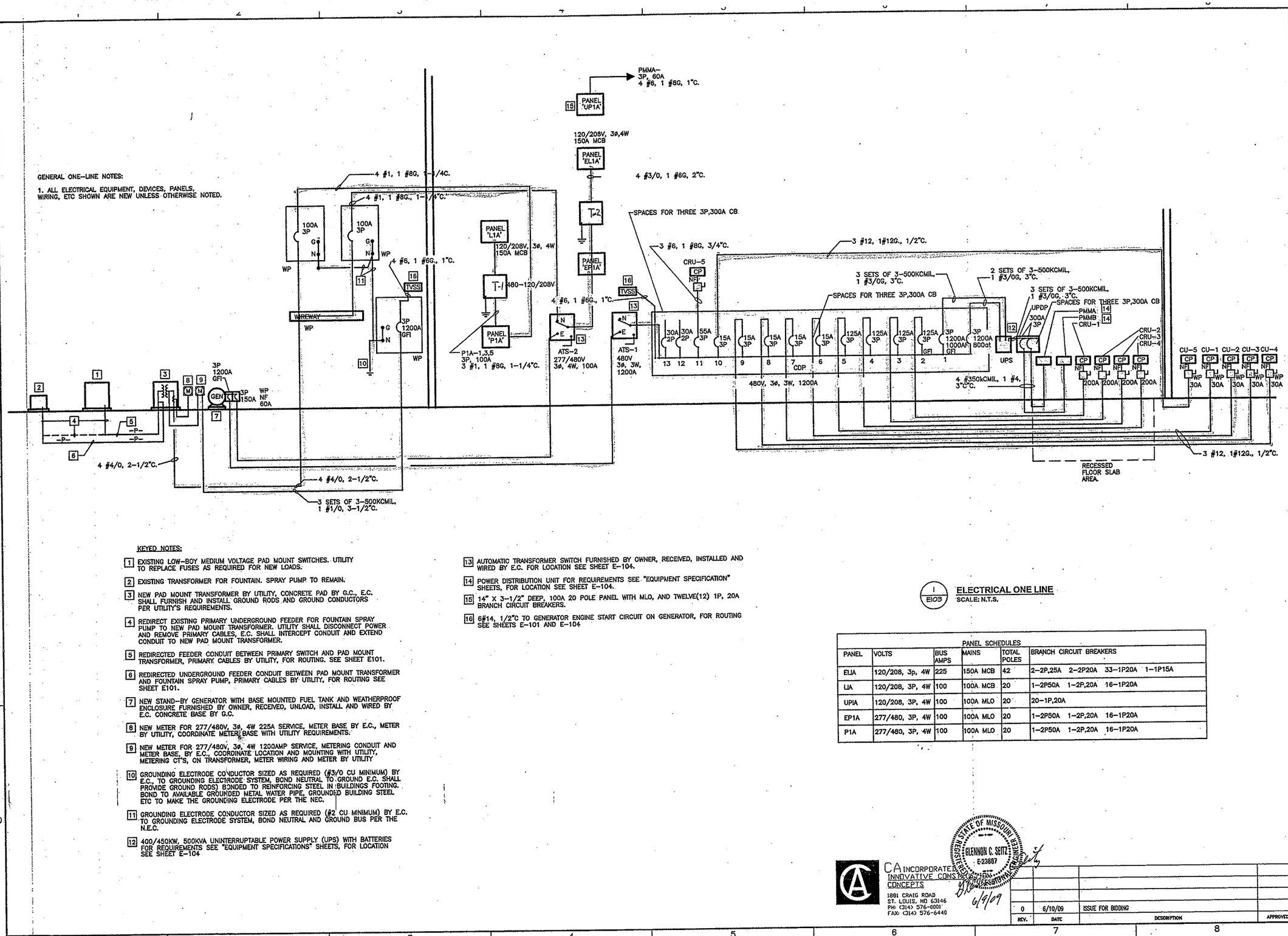
ELECTRICAL LEGEND AND SYMBOLS
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
ELECTRICAL LEGEND AND SYSMBOLS
LEE'S SUMMIT, MISSOURI

PROJECT NO.	08074
DRAWING NO.	E-002



KEYED NOTES:

1. EXISTING LOW-BOY MEDIUM VOLTAGE PAD MOUNT SWITCHES. UTILITY TO REPLACE FUSES AS REQUIRED FOR NEW LOADS.
2. EXISTING TRANSFORMER FOR FOUNTAIN. SPRAY PUMP TO REMAIN.
3. NEW PAD MOUNT TRANSFORMER BY UTILITY, CONCRETE PAD BY G.C., E.C. SHALL FURNISH AND INSTALL GROUND RODS AND GROUND CONDUCTORS PER UTILITY'S REQUIREMENTS.
4. REDIRECT EXISTING PRIMARY UNDERGROUND FEEDER FOR FOUNTAIN SPRAY PUMP TO NEW PAD MOUNT TRANSFORMER. UTILITY SHALL DISCONNECT POWER AND REMOVE PRIMARY CABLES, E.C. SHALL INTERCEPT CONDUIT AND EXTEND CONDUIT TO NEW PAD MOUNT TRANSFORMER.
5. REDIRECTED FEEDER CONDUIT BETWEEN PRIMARY SWITCH AND PAD MOUNT TRANSFORMER, PRIMARY CABLES BY UTILITY, FOR ROUTING. SEE SHEET E101.
6. REDIRECTED UNDERGROUND FEEDER CONDUIT BETWEEN PAD MOUNT TRANSFORMER AND FOUNTAIN SPRAY PUMP, PRIMARY CABLES BY UTILITY, FOR ROUTING SEE SHEET E101.
7. NEW STAND-BY GENERATOR WITH BASE MOUNTED FUEL TANK AND WEATHERPROOF ENCLOSURE FURNISHED BY OWNER, RECEIVED, UNLOAD, INSTALL AND WIRED BY E.C. CONCRETE BASE BY G.C.
8. NEW METER FOR 277/480V, 3ø, 4W 225A SERVICE, METER BASE BY E.C., METER BY UTILITY, COORDINATE METER BASE WITH UTILITY REQUIREMENTS.
9. NEW METER FOR 277/480V, 3ø, 4W 1200AMP SERVICE, METERING CONDUIT AND METER BASE, BY E.C., COORDINATE LOCATION AND MOUNTING WITH UTILITY, METERING CT'S, ON TRANSFORMER, METER WIRING AND METER BY UTILITY
10. GROUNDING ELECTRODE CONDUCTOR SIZED AS REQUIRED (#3/0 CU MINIMUM) BY E.C., TO GROUNDING ELECTRODE SYSTEM, BOND NEUTRAL TO GROUND E.C. SHALL PROVIDE GROUND RODS) BONDED TO REINFORCING STEEL IN BUILDINGS FOOTING. BOND TO AVAILABLE GROUNDED METAL WATER PIPE, GROUNDED BUILDING STEEL ETC TO MAKE THE GROUNDING ELECTRODE PER THE NEC.
11. GROUNDING ELECTRODE CONDUCTOR SIZED AS REQUIRED (#2 CU MINIMUM) BY E.C. TO GROUNDING ELECTRODE SYSTEM, BOND NEUTRAL AND GROUND BUS PER THE N.E.C.
12. 400/450KW, 500KVA UNINTERRUPTABLE POWER SUPPLY (UPS) WITH BATTERIES FOR REQUIREMENTS SEE "EQUIPMENT SPECIFICATIONS" SHEETS, FOR LOCATION SEE SHEET E-104
13. AUTOMATIC TRANSFORMER SWITCH FURNISHED BY OWNER, RECEIVED, INSTALLED AND WIRED BY E.C. FOR LOCATION SEE SHEET E-104.
14. POWER DISTRIBUTION UNIT FOR REQUIREMENTS SEE "EQUIPMENT SPECIFICATION" SHEETS, FOR LOCATION SEE SHEET E-104.
15. 14" X 3-1/2" DEEP, 100A 20 POLE PANEL WITH MLO, AND TWELVE(12) 1P, 20A BRANCH CIRCUIT BREAKERS.
16. 6#14, 1/2"C TO GENERATOR ENGINE START CIRCUIT ON GENERATOR, FOR ROUTING SEE SHEETS E-101 AND E-104

1 / E103 **ELECTRICAL ONE LINE**
SCALE: N.T.S.

PANEL SCHEDULES

PANEL	VOLTS	BUS AMPS	MAINS	TOTAL POLES	BRANCH CIRCUIT BREAKERS
ELIA	120/208, 3p, 4W	225	150A MCB	42	2-2P,25A 2-2P20A 33-1P20A 1-1P15A
LIA	120/208, 3P, 4W	100	100A MCB	20	1-2P50A 1-2P,20A 16-1P20A
UPIA	120/208, 3P, 4W	100	100A MLO	20	20-1P,20A
EP1A	277/480, 3P, 4W	100	100A MLO	20	1-2P50A 1-2P,20A 16-1P20A
P1A	277/480, 3P, 4W	100	100A MLO	20	1-2P50A 1-2P,20A 16-1P20A

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ELECTRICAL ONE LINE
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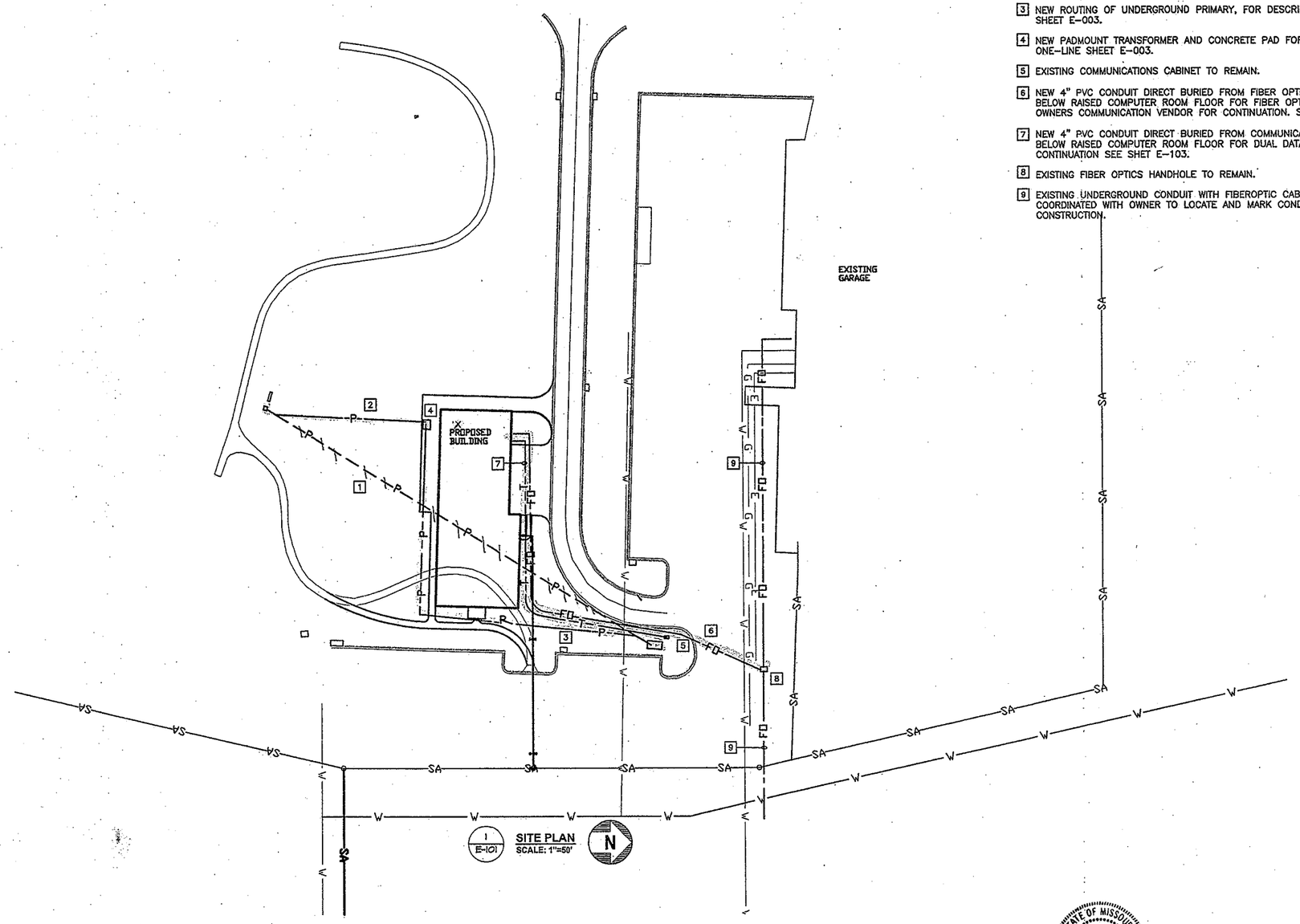
PROJECT NO. 08074

DRAWING NO. E-003.



KEY NOTES

1. EXISTING DIRECT BURIED BASEN PUMP PRIMARY FEEDER TO BE REDIRECTED TO NEW TRANSFORMER, FOR DESCRIPTION OF WORK SEE ONE-LINE SHEET E-003, FOR NEW ROUTING SEE NOTES 2 & 3 THIS SHEET.
2. NEW ROUTING OF BASIN PUMP PRIMARY FEEDER. E.C. SHALL FURNISH AND INSTALL 4" PVC CONDUIT DIRECT BURIED 36" BELOW GRADE. PROVIDE WARNING TAPE 18" BELOW GRADE.
3. NEW ROUTING OF UNDERGROUND PRIMARY, FOR DESCRIPTION SEE ONE-LINE SHEET E-003.
4. NEW PADMOUNT TRANSFORMER AND CONCRETE PAD FOR DESCRIPTION SEE ONE-LINE SHEET E-003.
5. EXISTING COMMUNICATIONS CABINET TO REMAIN.
6. NEW 4" PVC CONDUIT DIRECT BURIED FROM FIBER OPTIC HANDHOLE TO SPACE BELOW RAISED COMPUTER ROOM FLOOR FOR FIBER OPTIC CABLES, CABLES BY OWNERS COMMUNICATION VENDOR FOR CONTINUATION. SEE SHEET E-103.
7. NEW 4" PVC CONDUIT DIRECT BURIED FROM COMMUNICATION CABINET TO SPACE BELOW RAISED COMPUTER ROOM FLOOR FOR DUAL DATA CABLES. FOR CONTINUATION SEE SHET E-103.
8. EXISTING FIBER OPTICS HANDHOLE TO REMAIN.
9. EXISTING UNDERGROUND CONDUIT WITH FIBEROPTIC CABLE. CONTRACTOR SHALL COORDINATED WITH OWNER TO LOCATE AND MARK CONDUIT PRIOR TO CONSTRUCTION.

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SITE PLAN
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SITE PLAN
LEE'S SUMMIT, MISSOURI

PROJECT NO.	08074
DRAWING NO.	E-101

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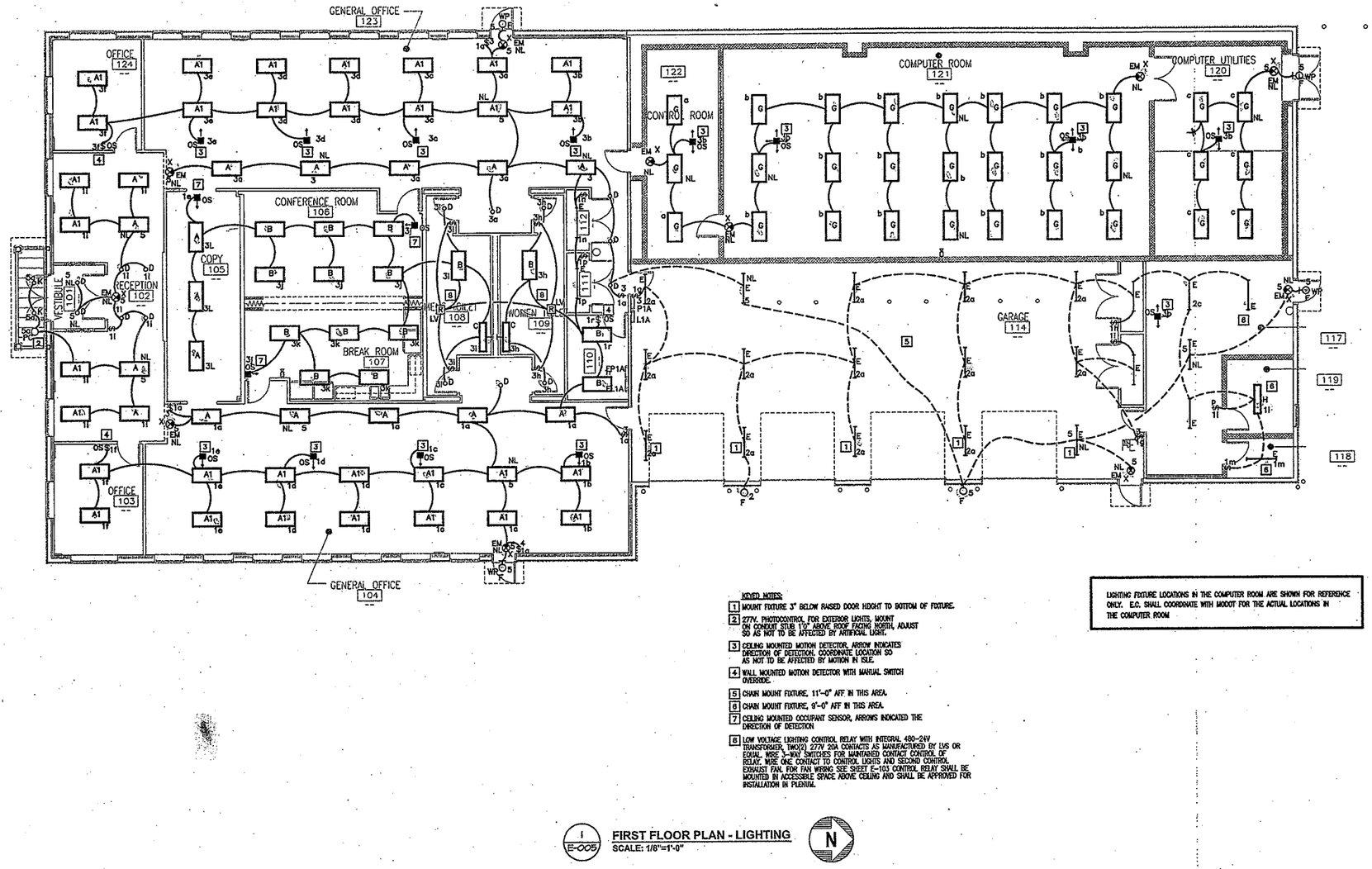

KEYED NOTES:

1. MOUNT FIXTURE 3" BELOW RAISED DOOR HEIGHT TO BOTTOM OF FIXTURE.
2. 277V. PHOTOCONTROL FOR EXTERIOR LIGHTS. MOUNT ON CONDUIT STUB 10" ABOVE ROOF FACING NORTH. ADJUST SO AS NOT TO BE AFFECTED BY ARTIFICIAL LIGHT.
3. CEILING MOUNTED MOTION DETECTOR, ARROW INDICATES DIRECTION OF DETECTION. COORDINATE LOCATION SO AS NOT TO BE AFFECTED BY MOTION IN ISLE.
4. WALL MOUNTED MOTION DETECTOR WITH MANUAL SWITCH OVERRIDE.
5. CHAIN MOUNT FIXTURE, 11'-0" AFF IN THIS AREA.
6. CHAIN MOUNT FIXTURE, 9'-0" AFF IN THIS AREA.
7. CEILING MOUNTED OCCUPANT SENSOR, ARROWS INDICATED THE DIRECTION OF DETECTION
8. LOW VOLTAGE LIGHTING CONTROL RELAY WITH INTEGRAL 480-24V TRANSFORMER, TWO(2) 277V 20A CONTACTS AS MANUFACTURED BY LVS OR EQUAL. WIRE 3-WAY SWITCHES FOR MAINTAINED CONTACT CONTROL OF RELAY. WIRE ONE CONTACT TO CONTROL LIGHTS AND SECOND CONTROL EXHAUST FAN. FOR FAN WIRING SEE SHEET E-103 CONTROL RELAY SHALL BE MOUNTED IN ACCESSIBLE SPACE ABOVE CEILING AND SHALL BE APPROVED FOR INSTALLATION IN PLENUM.

LIGHTING FIXTURE LOCATIONS IN THE COMPUTER ROOM ARE SHOWN FOR REFERENCE ONLY. E.C. SHALL COORDINATE WITH MODOT FOR THE ACTUAL LOCATIONS IN THE COMPUTER ROOM

1 / E-005 FIRST FLOOR PLAN - LIGHTING
SCALE: 1/8"=1'-0"

N

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FLOOR PLAN - LIGHTING
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PROJECT NO.	08074
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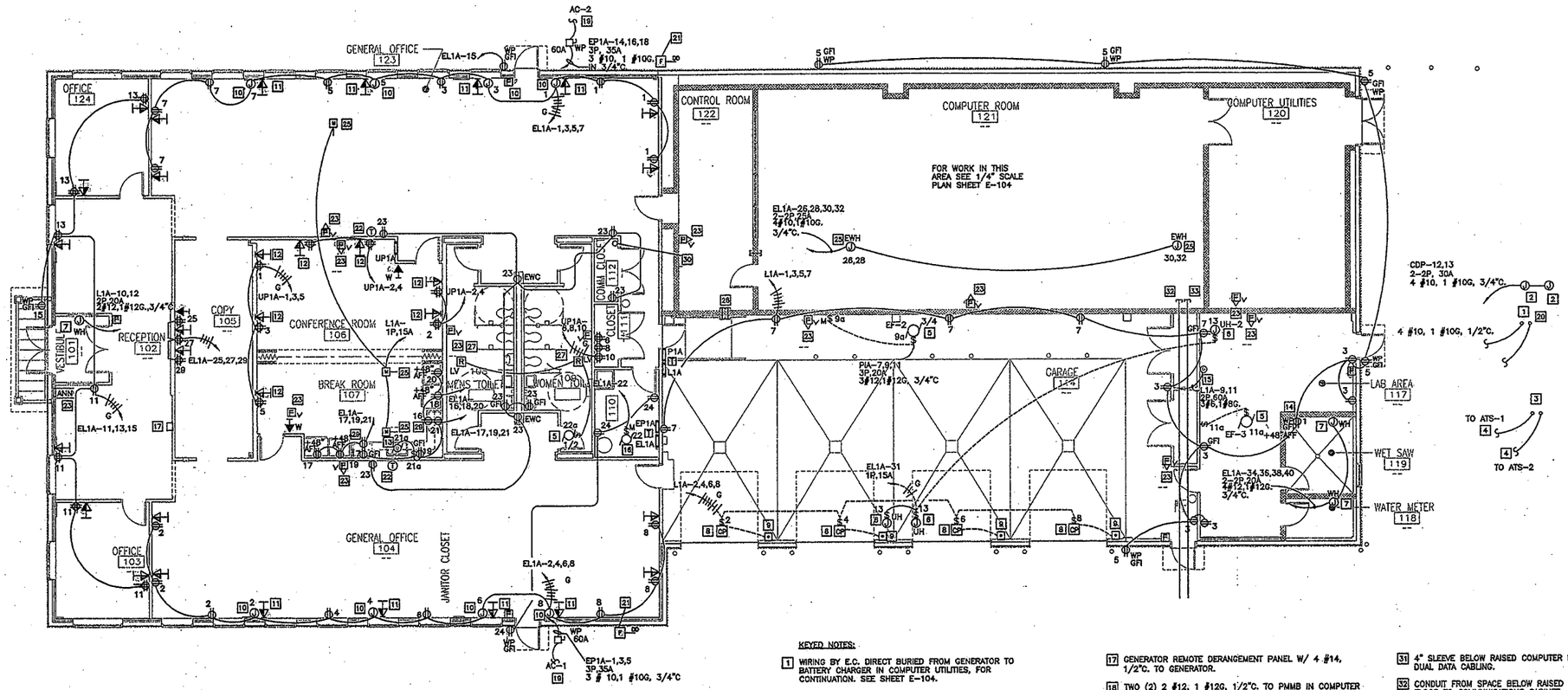

1 / E600 **FIRST FLOOR PLAN - POWER**
SCALE: 1/8"=1'-0"

N

KEYED NOTES:

1. WIRING BY E.C. DIRECT BURIED FROM GENERATOR TO BATTERY CHARGER IN COMPUTER UTILITIES, FOR CONTINUATION. SEE SHEET E-104.
2. GENERATOR BLOCK HEATER FURNISHED BY OWNER ON GENERATOR, WIRED BY E.C.
3. GENERATOR IN NEMA 3R ENCLOSURE W/ SKID MOUNTED FUEL TANK FURNISHED BY OWNER, RECEIVED, INSTALLED AND WIRED BY E.C. FOR WIRING SEE SHEET E-003.
4. FEEDERS FROM GENERATOR TO TRANSFER SWITCHES, FOR DESCRIPTIONS SEE E-003. FOR TRANSFER SWITCH LOCATIONS SEE SHEET E-104.
5. EXHAUST FAN BY M.C. WIRED BY E.C. VIA 1P, 20A DISCONNECT SWITCH.
6. UNIT HEATER BY M.C., WIRED BY E.C., DISCONNECT SWITCH BY M.C. WITH UNIT.
7. ELECTRIC WALL HEATER BY M.C. INSTALLED AND WIRED BY E.C.
8. GARAGE DOOR OPERATOR BY GARAGE DOOR CONTRACTOR WIRED BY E.C. VIA DISCONNECT SWITCH.
9. GARAGE DOOR OPERATOR CONTROL STATION FURNISH WITH DOOR OPERATOR, INSTALLED AND WIRED BY E.C.
10. 4" SQUARE OUTLET BOX BY E.C. WITH 3/4" KNOCK OUT IN FLAT COVER PLATE AND 3/4" FLEXIBLE CONDUIT AND WIRE TO ELECTRIFIED PARTITION, ELECTRIFIED PARTITION BY OWNER. FLUSH MOUNT OUTLET BOX.
11. 4" SQUARE OUTLET BOX BY E.C. WITH (2) 3/4" CONDUITS STUBBED UP INTO ACCESSIBLE CEILING SPACE SINGLE GANG COVER AND SINGLE GANG COVER PLATE FOR FOUR SETS OF DUAL DATA OUTLETS, CABLES BY E.C..
12. 2-1/2" OUTLET BOX WITH SINGLE GANG COVER AND SINGLE GANG, 2-PORT COVER PLATE FOR DUAL DATA CABLES, DATA CABLES BY E.C.
13. GARBAGE DISPOSAL BY P.C., WIRED BY E.C.
14. OUTLET BY E.C. FOR WET SAW.
15. RANGE OUTLET BY E.C.
16. HOT WATER CIRCULATING PUMP BY P.C. WIRED BY E.C.
17. GENERATOR REMOTE DERANGEMENT PANEL W/ 4 #14, 1/2"C. TO GENERATOR.
18. TWO (2) 2 #12, 1 #12G, 1/2"C. TO PMMB IN COMPUTER ROOM, FOR LOCATION SEE SHEET E-104.
19. EQUIPMENT FURNISHED AND INSTALLED BY M.C. WIRED BY E.C. VIA NON-FUSED DISCONNECT SWITCH.
20. WIRING BY E.C. DIRECT BURIED FROM GENERATOR CONTROL PANEL TO REMOTE ANNUNCIATOR PANEL IN CONTROL ROOM, FOR DESCRIPTION AND LOCATION SEE SHEET E-104.
21. FIRE ALARM SYSTEM DUCT DETECTOR FURNISHED AND INSTALLED BY FIRE ALARM SYSTEM CONTRACTOR. E.C. SHALL INSTALL HOUSING WITH 3/4" CONDUIT TO ABOVE GENERAL OFFICE CEILING. OPENING IN DUCT BY M.C.
22. PROGRAMMABLE THERMOSTAT FURNISHED BY M.C. WITH UNIT INSTALLED AND WIRED BY E.C., SEE MECHANICAL DRAWINGS FOR CABLE SPECIFICATIONS.
23. FIRE ALARM SYSTEM DEVICE FURNISHED AND INSTALLED BY FIRE ALARM CONTRACTOR, E.C. SHALL ROUGH-IN, INSTALL BOX WITH 3/4" CONDUIT TO SPACE ABOVE CEILING.
24. ELECTRIC DAMPER FURNISHED AND INSTALLED BY M.C. WIRED BY E.C.
25. ELECTRIC UNIT HEATER WITH DISCONNECT SWITCH FURNISHED AND INSTALLED BY M.C. IN SPACE ABOVE COMPUTER ROOM WIRED BY E.C.
26. TWO(2)-2-1/2" CONDUIT SLEEVES.
27. LOW VOLTAGE LIGHTING CONTROL RELAY, FOR DESCRIPTIONS SEE SHEET E-102. WIRE SECOND CONTACT IN PARALLEL SO FAN OPERATE IF EITHER OR BOTH TOILET LIGHTS ARE ON.
28. 3-1/2" DEEP PANEL BOARD FOR DESCRIPTION SEE SHEET E-003.
29. MOUNT OUTLET ABOVE MICROWAVE SHELF, COORDINATE LOCATION WITH MICROWAVE UNIT.
30. 4" CONDUIT ROUTED BELOW FLOOR AND STUBBED INTRO SPACE BELOW RAISED COMPUTER ROOM FLOOR FOR CABLE MANAGEMENT.
31. 4" SLEEVE BELOW RAISED COMPUTER ROOM FLOOR FOR DUAL DATA CABLING.
32. CONDUIT FROM SPACE BELOW RAISED COMPUTER ROOM FLOOR TO COMMUNICATIONS CABINET. FOR CONTINUATION AND DESCRIPTION SEE SHEET E-101.
33. CONDUIT FROM SPACE BELOW RAISED COMPUTER ROOM FLOOR TO FIBER OPTICS HANDHOLE. FOR CONTINUATION AND DESCRIPTION SEE SHEET E-101.

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REGISTERED STATE OF MISSOURI GLENNON C. SEITZ E-23687 PROFESSIONAL ENGINEER
6/1/09

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DRAWN BY: KYLE C
CHECKED BY: G S.
SCALE:
DATE: 5/26/09

FLOR PLAN - POWER
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. E-103

1 E-7 COMPUTER ROOM
SCALE: 1/4"=1'-0"

N

KEYED NOTES:

1. EQUIPMENT FURNISHED AND INSTALLED BY M.C. WITH DISCONNECT SWITCH WIRED BY E.C.
2. POWER MANAGEMENT MODULE BY E.C. FOR DESCRIPTION AND WIRING SEE SHEET E-003.
3. UNINTERRUPTABLE POWER SUPPLY, FOR DESCRIPTION AND WIRING SEE SHEET E-003.
4. AUTOMATIC TRANSFER SWITCH, FOR DESCRIPTION SEE SHEET E-003.
5. DISTRIBUTION PANEL, FOR DESCRIPTION SEE SHEET E-003.
6. CLEAN AGENT FIRE SUPPRESSANT SYSTEM CONTROL PANEL FURNISHED AND INSTALL BY FIRE SUPPRESSANT CONTRACTOR WIRED BY E.C.
7. ABORT STATION FURNISHED AND INSTALLED BY FIRE SUPPRESSANT CONTRACTOR.
8. SURFACE MOUNTED PUSH–BUTTON STATION WITH RED MUSHROOM HEAD, FORM "C" CONTACTS AND NAMEPLATE ENGRAVED "EMERGENCY POWER OFF". WIRE TO UPS TO SHUT DOWN POWER TO COMPUTER ROOM UPON ACTIVATION.
9. 120VOLT SMOKE DAMPER FURNISHED AND INSTALLED BY M.C. WIRE BY E.C. VIA CONTACT IN FIRE SUPPRESSION CONTROL PANEL AND CONTACT ON DUCT DETECTORS. COORDINATE WORK WITH FIRE SUPPRESSION CONTRACTOR DAMPER TO CLOSE UPON ACTIVATION OF FIRE SUPPRESSION AND/OR DUCT DETECTORS.
10. GENERATOR REMOTE ALARM PANEL FURNISHED BY OWNER WITH GENERATOR. RECEIVED INSTALLED AND WIRED BY E.C. VIA 14 #14, 3/4"C. TO GENERATOR CONTROL PANEL.
11. NOT USED.
12. NOT USED.
13. ELECTRIC SERVICE SWITCH, FOR DESCRIPTION AND WIRING SEE SHEET E-003.
14. UNDERGROUND FEEDER TO GENERATOR, FOR DESCRIPTION SEE SHEET E-003 FOR CONTINUATION TO GENERATOR SEE SHEET E-103.
15. FEEDER TO PANEL P1A, FOR PANEL LOCATION SEE SHEET E-102, FOR DESCRIPTION SEE SHEET E-003.
16. FEEDER TO PANEL EP1A, FOR PANEL LOCATION SEE SHEET E-102, FOR DESCRIPTION SEE SHEET E-003.
17. CONDUIT AND WIRE TO POWER MANAGEMENT MODULE FOR LEE-TEMP RECEIVER HEATER.
18. UNINTERRUPTABLE POWER DISTRIBUTION PANEL AND FEEDER, FOR DESCRIPTION SEE SHEET E-003
19. 6 #14, 1/2"C TO GENERATOR CONTROL PANEL FOR ENGINE START AND SWITCH INDICTION. FOR CONTINUATION TO GENERATOR SEE SHEET E-104.

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SCALE:
DATE: 05/08/09

1/4" SCALE PLAN - COMPUTER ROOM
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. E-104

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6/9/09

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SURGE SUPPRESSION DEVICES (TVSS)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Surge Protection Devices for low-voltage power, control, and communication equipment.

B. Related Sections include the following:

1.3 LISTING REQUIREMENTS

A. UL 1449 Third Edition listed.

1.4 SUBMITTALS

A. Must have fifteen days prior approval to bid on project.

B. Drawings: Electrical and mechanical drawings shall be provided by the manufacturer which show unit dimensions, weights, mounting provisions, connection notes, wire size and wiring diagram.

C. Equipment Manual: The manufacturer shall furnish an installation manual with installation notes, start-up and operating instructions for the specified SPD. Installation instructions shall clearly state whether the system requires an external overcurrent device to maintain the system's UL 1449 listing.

D. Verification that all SPD are UL tested and labeled with 20kA (in) nominal discharge rating for compliance to UL96A Lightning Protection Master Label and NFPA 780.

E. UL 1449 stipulation for fused SPD – The manufacturer's authorized representative is required to submit the following:

1. Certify that the SPD is UL 1449 listed (UL Card) with UL Card.
2. Indicate the type of internal or external fusing that is incorporated in the SPD and what impact the fusing has on the performance of the device with respect to surge capacity and clamping levels.

F. Manufacturer must provide independent testing on repetitive capability and maximum surge current rating of service entrance suppressor units. This shall be performed at a nationally recognized lab not affiliated with the manufacturer.

1. Single pulse surge current capacity: single pulse surge current tested in a mode at rated surge currents. Single pulse surge current capacities of 200,000 A or less per mode are established by single pulse testing in a mode.
2. Single pulse surge current capacity test: an initial UL 1449 defined as 1.2 x 50µs, 6000V open circuit voltage waveform and an 8 x 20µs, 500A and 3kA short circuit current waveform is applied to benchmark the unit's suppression voltage.
3. A single pulse surge of maximum rated surge current (for units rated over 200,000A per mode, components or sub-assemblies are tested) magnitude with an approximated 8 x 20µs waveform is then applied. To complete the test, another UL 1449 surge shall be applied to verify the unit's survival. Survival is achieved if the suppression voltage measured from the two UL1449 surges does not vary by more than 10%.

G. Minimum Repetitive Surge Current Capacity.

1. Service entrance suppressor units should be tested repetitively to verify repetitive capacity.
2. Minimum Repetitive Surge Current Capacity Test:
   a. An initial UL 1449 surge defined as 1.2 x 50µs, 6000V open circuit voltage waveform and an 8 x 20µs, 500A and 3kA short circuit current waveform is applied to benchmark the unit's suppression voltage.
   b. A repetitive number of ANSI/IEEE C62.41.2-2002 (Category C3) surges defined as a 1.2 x 50µs 10kV or 20kV open circuit voltage waveform and an 8 x 20µs 10,000A short circuit current waveform are then applied at one minute intervals.
   c. To complete the test, another UL 1449 surge shall be applied to verify the unit's survival.
3. Survival is achieved if the suppression voltage measured from the two UL 1449 surges does not vary by more than 10%.
4. Proof of such testing shall be the test log generated by the surge generator.

H. Short Circuit Fuse Testing.

1. Each design configuration shall be short circuit tested in accordance with the type of fusing utilized in the suppression path.
2. Short Circuit Fuse Test:
   a. Testing shall include application of a sustained overvoltage that causes the unit to enter a bolted fault condition.
   b. This bolted fault condition shall occur with the full rated AIC current of the fuse available.
3. The fuse shall fail in a safe manner with no physical or structural damage to the unit and any failure shall be self-contained within the unit.

I. Surge Current Fuse Testing.

1. Each design configuration shall be surge tested with fusing in series to verify that a transient of maximum surge current capacity magnitude is fully suppressed without fuse failure, operation or degradation.

J. Service Entrance SPD must be subjected to a series of waveforms as described in IEEE C62.41.2-2002. Clamping voltage measurements were taken throughout the tests to evaluate any deviations in performance as a result of the surges. Injected surges included the 1.2/50µs, 8/20µs waveforms at levels of 6kV/500A for bench marking, and high current 10/1000µs surges at 1.5, 3.1, 3.6 and 6.2 kA levels.

1.5 Standards

A. UL 1449 3rd Edition. Underwriters laboratories safety standard for Surge Protection Devices.
B. NEC Article 285. National electrical code 2008 rev.
C. NFPA 780. STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS.
D. IEEE (Institute of Electrical and Electronic Engineering Inc.) C62.41.1 and C62.41.2 – 2002 rev.
   IEEE C62.45 – 2002 rev
   IEEE Std. 1100 ?The Emerald Book? Section 8.4.2.5
E. CBEMA (ITIC) and IEC – (Computer Business Equipment Manufacturers Association or Information Technology Industry Council and International Electrotechnical Commission define clamping voltage tolerance guidelines for sensitive equipment)
F. All manufacturers must comply with above listed standards and any additions current revisions of industry standards. All products that do not comply with current industry standards will not be accepted.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain all suppression devices and accessories through one source from a single manufacturer. Correlate with Division 1 requirements.

1.7 PROJECT CONDITIONS

A. Placing into Service: Do not energize or connect service entrance equipment, panelboards, control terminals, or data terminals to their sources until the surge protective devices are installed and connected.
B. Each protection device shall have a capacitive filtering system connected in each Line to Neutral (LN)(Wye) mode or Line to Line (LL)(Delta) mode to provide EMI/RFI noise attenuation.
C. Protection modes: The SPD shall provide Line to Neutral (LN)(Wye), Line to Ground (LG)(Wye or Delta), Line to Line (LL)(Delta) and Neutral to Ground (NG)(Wye) protection.
D. Service Conditions: Rate surge protective devices for continuous operation under the following conditions, unless otherwise indicated:
   1. Maximum Continuous Operating Voltage (MCOV): Should be tested to 115% per UL 1449 3rd.
   2. Operating Temperature: 40 TO 60 DEGR C.
   3. Humidity: 0 to 95 percent, noncondensing.
   4. Altitude: Less than 12,000 above sea level.

1.8 COORDINATION

Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.

D. All devices must be installed on the load side of the facility after the first overcurrent protection or disconnect.
E. Products shall be installed external to service, distribution, and branch panel equipment. All SPDs must have the same or greater AIC, Interrupting, or Fault rating of the equipment the SPD is protecting.
F. Coordinate surge protective devices with Division 16 Section "Electrical Power Monitoring and Control."

1.9 WARRANTY

Most manufacturers offer five-year extended warranties on their equipment. Some manufacturers of cord-connected, plug-in surge suppressors offer extended warranties that either repair or replace damaged equipment that is protected by the suppressor. When warranties are required, verify with Owner's counsel that special warranties stated in this Article are not less than remedies available to Owner under prevailing local laws. Coordinate with Division 1 Section "Warranties."

A. General Warranty: Special warranties specified in this article shall not deprive owner of other rights owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by contractor under requirements of the Contract Documents.
B. Manufacturer shall provide a product warranty for a period of not less than ten (10) years from date of installation. Warranty shall cover unlimited replacement of SPD or modules during the warranty period. Those firms responding to this specification shall provide proof that they have been regularly engaged in the design, manufacturing and testing of SPD for not less than thirty (30) years.

PART 2 – PRODUCTS

2.1 SERVICE ENTRANCE SUPPRESSORS

Select one of two paragraphs and associated subparagraphs below.

A. Acceptable Manufacturers and Models:
   a. LEA International Inc. – PV400]
   b. Current Technology – SL2-200-L2
   c. Liebert – SI-040-ANCE

B. SPD shall be a multi-stage parallel protector. Please see one-line diagram and panelboard schedule to confirm voltages. SPD's minimum surge current capacity shall be 400kA per phase (L-N plus L-G) and 200kA per mode (L-N, L-G, L-L and N-G).

C. SPD shall be modular design with field replaceable modules per phase. Each protection module shall have a visual indicator that signifies that the protection circuitry is powered. The unit shall not be taken off line to verify integrity of system. Redundant status indicators shall be mounted on the front of the door that monitors the system protection circuitry.

D. SPD shall contain a technology that utilizes multiple thermally protected metal oxide varistors (MOV) per mode.

E. SPD shall be labeled as minimum with Type 2 (verifiable at UL.com). Every component of every mode, including N-G, shall be protected by internal thermal protection. SPDs relying upon external or supplementary installed safety overcurrent protection do not meet the intent of this specification.

F. All primary transient paths shall utilize copper wire, aluminum bus bar and lugs of equivalent capacity to provide equal impedance interconnection between phases. No plug-in module or components shall be used in surge carrying paths.
G. SPD shall provide the following monitoring features: dry contacts, digital surge counter and audible alarm with alarm disable switch. Equipment shall utilize a NEMA 12 enclosure.
H. Provide internal disconnect switch.
Adjust clamping voltages to comply with Project conditions and verify compatibility of peak surge current rating and clamping voltage.

2.2 Distribution PANEL SUPPRESSORS

A. Acceptable Manufacturers and Models:
   a. LEA International Inc. – PV200
   b. Current Technology – SL2-100-L2
   c. Liebert – SI-025-ANCE

B. SPD shall be a multi-stage parallel protector. Please see one-line diagram and panelboard schedule to confirm voltages. SPD's minimum surge current capacity shall be 200kA per phase (L-N plus L-G) and 100kA per mode (L-N, L-G, L-L and N-G).

C. SPD shall meet all specification requirements in section 2.1 (D through F) and as follows:

1. SPD shall be modular design with a field replaceable module. SPD shall provide the following monitoring features: dry contacts, surge counter and audible alarm with alarm disable switch. SPD shall utilize a NEMA 12 enclosure. If no circuit breaker is available add internal disconnect switch.

Adjust clamping voltages to comply with Project conditions and verify compatibility of peak surge current rating and clamping voltage. Provide 160 kA protection level

PART 3 – EXECUTION

3.1 INSTALLATION OF SURGE PROTECTIVE DEVICES

A. The specified unit shall be installed external to switchboard, distribution and panelboard as stand alone. Internal products will not be accepted.
B. The specified service entrance/switchboard/switchgear system shall be installed with the shortest lead length possible from the power conductor(s) it is protecting, must have a grounding of 25 Ohms (NEC Article 250.56) or less and shall avoid any unnecessary or sharp bends. Utilize a 60 amp breaker for connection means. See manufacturer's installation manual. If no circuit breaker is available, see one-line diagram for connection information.
C. The specified distribution system shall be installed with the shortest lead length possible from the power conductor(s) it is protecting, must have a grounding of 25 Ohms (NEC Article 250.56) or less and shall avoid any unnecessary or sharp bends. See one-line diagram for connection information.

3.2 CONNECTIONS

UL 486A pertains to copper, and UL 486B pertains to aluminum connections.

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Testing: Contractor shall perform the following field quality-control testing:
B. Testing: Perform the following field quality-control testing:
After installing surge protective devices, but before electrical circuitry has been energized verify that the unit voltage and connecting equipment voltage is same.

1. Verify per NEC 285.6 that the SPD AIC rating is equal or greater to connecting equipment.
2. Complete startup checks according to manufacturer's written instructions.
3. Perform visual and mechanical inspection of each unit to verify light functionality.

END OF SECTION 16289

SINGLE MODULE UPS

1.0 GENERAL

1.1 SUMMARY

This specification describes a three phase, continuous duty, solid state Uninterruptible Power Supply, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide precisely controlled power for critical equipment loads. The system shall consist of a solid-state inverter, rectifier/battery charger, a low KVAR solid state input filter, a K-20 output transformer, a storage battery, a 100% rated for continuous duty static switch, synchronization control circuitry, connection control circuitry, disconnection control circuitry, system metering, system status indicators, system alarm annunciation circuitry, and accessories as specified herein. The system shall automatically ensure continuity of electric power within specified tolerances, without interruption, upon failure or deterioration of the normal power supply. Continuity of electric power to the load shall be supplied by the batteries up to the specified maximum protection time or until restoration of the normal input AC power source, whichever occurs first.

1.2 STANDARDS

The UPS shall meet the requirements of the following standards:

A) UL listed under 1778, standards for Uninterruptible Power Supply Equipment
B) UL Canada (cUL)
C) FCC rules and regulations of part 15, subpart j, class A
D) IEEE 587-1980/ANSI C62.41 1980 standards for surge withstand ability
E) ISO 9001 Quality Standard
F) The UPS shall be designed in accordance with the applicable sections of the documents published by:

- National Fire Protection Association (NFPA)/National Electric Code (NEC)
- National Electrical Manufacturer's Association (NEMA)
- Occupational Safety & Health Administration (OSHA)

1.3 SUBMITTALS

Submittals shall contain the following documentation:

A. Product Data: Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements.

SINGLE MODULE UPS CONT. ON E-202

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SCALE:
DATE: 05/08/09

EQUIPMENT SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. E-201

SINGLE MODULE UPS CONT. FROM E-201

A. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product. Include equipment installation outline, connection diagram for external cabling, internal wiring diagram, and written instruction for installation.

1.4 FINAL SUBMITTALS

Upon delivery of the UPS system the following submittals shall be included:

A complete set of installation drawings showing all the information stated in section 1.3.

An installation and users manual showing safe and correct operation of all UPS functions.

1.5 QUALIFICATIONS AND QUALITY ASSURANCE

A. Manufacturer's Certification: The manufacturer shall specialize in manufacturing of on-line, double conversion three phase UPS modules specified in this document with a minimum of twenty years documented experience and with a nation wide first party service organization. The manufacturer shall be ISO 9001 certified and shall design to internationally accepted standards.

B. Factory Testing: Prior to shipment the manufacturer shall complete a documented test procedure to test all functions of the UPS module and batteries (via a discharge test), when supplied by the UPS manufacturer, and guarantee compliance with the specification. The factory test shall be performed in the presence of the customer providing the manufacturer receives adequate prior notice. The manufacturer shall provide a copy of the test report upon request.

C. Materials and Assemblies: All materials and parts comprising the UPS shall be new, of current manufacture, and shall not have been in prior service, except as required during factory testing. All active electronic devices shall be solid state and not exceed the manufacturers recommended tolerances for temperature or current to ensure maximum reliability. All semiconductor devices shall be sealed. All relays shall be provided with dust covers. The manufacturer shall conduct inspections on incoming parts, modular assemblies, and final products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All products shall be packaged in a manner to prevent penetration by debris and to allow safe delivery by all modes of ground transportation and air transportation where specified.

A. Prior to shipping all products shall be inspected at the factory for damage.

A. Equipment shall be protected against extreme temperature and humidity and shall be stored in a conditioned or protected environment.

A. Equipment containing batteries shall not be stored for a period exceeding three months without powering up the equipment for a period of eight hours to recharge the batteries.

1.7 ENVIRONMENTAL REQUIREMENTS

The UPS shall be capable of withstanding any combination of the following environmental conditions in which it must operate without mechanical or electrical damage or degradation of operating characteristics.

A. Temperature

Operating:	0° to 40°C (32°F to 104°F)
Non-Operating:	-25°C to +70°C (-13°F to 158°F)
Battery System:	-20°C to +45°C (-4°F to 113°F)

B. Relative Humidity (operating): 0 to 90% non-condensing

Barometric Pressure: Up to 1,000 meters above sea level (up to 2,000 meters with ambient temperature less than 28°C)

Non-Operating: Up to 12,000 meters above sea level

D. Audible Noise: 75 dB "A" weighing when measured five feet in front of the unit

1.8 WARRANTY

A. UPS Module: The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of twelve (12) months from date of installation or acceptance by customer or eighteen (18) months from date of shipment from the manufacturer, whichever occurs first.

B. Battery: The battery manufacturer's warranty shall be passed through to the final customer and shall have a minimum period of three years.

1.9 SERVICE AND SPARE PARTS

The manufacturer shall, upon request, provide spare parts kits for the UPS module in a timely manner; as well as provide access to qualified factory trained first party service personnel to provide preventative maintenance and service on the UPS module when required.

1.10 MAINTENANCE, ACCESSIBILITY AND SELF DIAGNOSTICS

All UPS subassemblies, as well as the battery, shall be accessible from the front. UPS design shall provide maximum reliability and minimum MTTR (mean time to repair). To that end, the UPS shall be equipped with a self-test function to verify correct system operation. The self-test function shall identify the subassembly requiring repair in the event of a fault. The electronic UPS control and monitoring assembly shall therefore be fully microprocessor based, thus doing away with all potentiometer settings. This shall allow:
- Auto-compensation of component drift;
- Self-adjustment of replaced subassemblies;
- Extensive acquisition of information vital for computer-aided diagnostics (local or remote);
- A socket for connection to a computer-aided diagnostics system.

The UPS shall be repairable by replacing standard subassemblies requiring no adjustments or settings. Communication via a modem with a remote maintenance system shall be possible.

2.0 PRODUCT DESCRIPTION

2.1 APPROVED MANUFACTURERS AND PRODUCT DESCRIPTION

A. Approved Manufacturer(s): The specified equipment will be manufactured by APC/MGE UPS SYSTEMS or approved manufacturer in compliance with specifications.

B. Product Description: This specification describes a three phase, continuous duty, solid state Uninterruptible Power Supply, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide precisely controlled power for critical equipment loads. The system shall consist of a solid-state inverter, rectifier/battery charger, a low KVAR solid state input filter, a K-20 output transformer, a storage battery, a 100% rated for continuous duty static switch, synchronization control circuitry, connection control circuitry, disconnection control circuitry, system metering, system status indicators, system alarm annunciation Continuity of circuitry, and accessories as specified herein. The system shall automatically ensure continuity of electric power within specified tolerances, without interruption, upon failure or deterioration of the normal power supply. electric power to the load shall be supplied by the batteries up to the specified maximum protection time or until restoration of the normal input AC power source, whichever occurs first.

2.2 SYSTEM DESCRIPTION

A. UPS Design Requirements

1. Output Power Continuous Rating: The continuous output power rating of the UPS shall be 400 kVA /360kW. System shall be field upgradeable to 500kVA/450kW.
2. Input Voltage: 480 VAC, ± 10%, 3 phase, 3 wire plus ground
3. Output voltage: 480 VAC, ± 3%, 3 phase, 3 or 4 wire plus ground
4. Battery Autonomy: The UPS shall be capable of operating at full load for 15 minutes at 0.8 PF output at a temperature of 25°C on battery power.
5. Battery Type: Sealed, high rate discharge, flame retardant, valve regulated lead acid (VRLA)

B. AC Input Characteristics

1. Voltage: 480 VAC, ± 10%, 3 phase, 3 wire plus ground
2. Frequency: 60 Hz, ± 5%
3. Power Factor: Up to .90 lagging with filter
4. Total Harmonic Distortion: Maximum 7% with full load and nominal input voltage
5. Power Walk-In: 0 to 100% over a 10 second period
6. Inrush Current: 600% of nominal input current for less than one cycle
7. Reactive Current: < 15% of nominal input current at no load

C. AC Output Characteristics

1. Voltage: 480 VAC (adjustable ± 3%), 3 phase, 3 or 4 wire plus ground
2. Frequency: 60 Hz ± 2.0 Hz synchronized with bypass (selectable in 0.25 Hz increments), 60 Hz ± 0.1% free running.
3. Voltage Regulation: ± 0.5% from no load to full load for balanced load
   ± 3% for 100% unbalanced load
4. Voltage Distortion: Maximum 2% L-L (4% L-N) THD
5. Voltage Transient Response: ± 2% for 50% step load change
   ± 3% for 75% step load change
   ± 5% for 100% step load change (defined as 0%-100%-0% of nominal load)
6. Voltage Recovery Time: Return to within ±1% of steady state value within 16.67 milliseconds.
7. Phase Angle Displacement: 120° ± 1° for balanced load, 120° ± 3° for 100% unbalanced load
8. Non-Linear Load Capability: Output voltage total harmonic distortion shall be less than 4% when connected to a 100% non-linear load with a crest factor not to exceed 3.5.
9. Slew Rate: 1 Hz/second maximum (selectable in 0.5 Hz increments up to 2.0 Hz)
10. Power Factor: 0.9 at nominal kVA/up to unity at rated nominal kW
11. Inverter Overload Capability: 125% of rated load for 10 minutes
    150% of rated load for 1 minute
    212% of rated output current for 200 milliseconds

D. Battery

1. Battery Voltage: Range is 400-545 VDC, 480 VDC nominal
2. Maximum DC Current: Maximum DC current at the cutoff voltage shall be 962 A.
3. DC Cutoff Voltage: Maximum 1.67V per cell
4. DC Ripple: Maximum 1% of DC voltage
5. Low Battery Protection: At a pre-set battery voltage value or 2 hours after the UPS has shutdown on a DC undervoltage condition (battery cut off voltage), the battery circuit breaker shall open in order to prevent excessive battery discharge.

2.3 MODES OF OPERATION

The UPS module shall be designed to operate as a double conversion, on-line reverse transfer system in the following modes:

A. Normal: The inverter shall continuously supply power to the critical load. The rectifier/battery charger shall derive power from the utility AC source and supply DC power to the inverter while simultaneously float charging the battery.

B. Emergency: Upon failure of the utility AC power source, the critical load shall be supplied by the inverter, which, without any switching, shall obtain its power from the storage battery.

C. Recharge: Upon restoration of the utility AC source (prior to complete battery discharge), the rectifier/battery charger shall power the inverter and simultaneously recharge the battery.

D. Bypass Mode: The system static switch shall be used to transfer the load to the bypass without interruption to the critical power load. This shall be accomplished by turning the inverter off. Automatic re-transfer or forward transfer of the load shall be accomplished by turning the inverter on.

E. Maintenance Bypass/Test Mode: A manual make before break maintenance bypass switch shall be provided to isolate the UPS inverter output and static bypass transfer switch for maintenance. This shall allow the UPS to be tested or repaired without affecting load operation.

2.4 COMPONENT DESCRIPTION

A. Rectifier/Battery Charger: Incoming AC power shall be converted to a regulated DC output voltage by the rectifier/battery charger. A solid-state full-wave SCR phase-controlled bridge rectifier shall provide regulated DC voltage, which shall be subsequently filtered to provide power for the inverter and battery charging functions. The rectifier/battery charger shall employ input AC current limiting as well as battery charge current limiting for battery protection. The battery charging circuitry shall be capable of being set for automatic battery recharge operation, float service, manual battery charge service and equalizing or commissioning operation.

1. Input Protection: The rectifier/battery charger shall be protected by an AC input circuit breaker and input fuses.
2. Input Current Limiting: Input current limit shall be set at 150% of nominal input current. A programmable second step input current limit, allowing a further limit of the input current, shall be activated by a dry contact input.
3. Battery Charge Current Limiting: Maximum recharge current is limited to 10% of maximum DC discharge current. DC current limit settings are customer programmable up to 1000 amps. A second step battery charge current limit shall be provided, activated by a customer provided dry contact input.
4. Operating Modes:
   a) Automatic Charge Sequence: The rectifier/battery charger shall automatically charge the batteries at an elevated voltage after an outage of a set (selectable between 0-255 seconds) duration.
   b) Float Service: Nominal DC bus voltage (programmable) provided under nominal operating conditions.
   c) Manual Charge Service: The rectifier/battery charger output voltage shall be selectable to a voltage slightly higher than the normal float voltage setting, normally the maximum float voltage setting specified by the battery manufacturer.
   d) Equalize/Commissioning Service: A high charge rate of DC voltage capable of being set at 2.5 volts per cell at a user selected time period.

B. Inverter

The UPS output shall be derived from a Pulse Width Modulated (PWM) variable frequency and variable pulse width, IGBT-type inverter design. The inverter shall be capable of providing the specified precise output power characteristics (specified in paragraph 2.2.C.1 and 2.2.C.3) while operating over the battery voltage range (2.2.D.1). The inverter assembly shall be constructed of modular rack out assemblies to facilitate maintenance.

C. Static Bypass

The static bypass transfer switch shall be solid-state, rated for continuous duty, and shall operate under the following conditions:

1. Uninterrupted Transfer: The static bypass transfer switch shall automatically cause the bypass source to assume the critical load without interruption after the logic senses one of the following conditions:
   a) Inverter overload exceeds unit's rating
   b) Battery protection period expired and bypass available
   c) Inverter failure
2. Interrupted Transfer: If the bypass source is beyond the conditions stated below, an interrupted transfer (not less than 0.2 seconds in duration) shall be made upon detection of a fault condition.
   a) Bypass voltage greater than ± 10% from the UPS rated output voltage
   b) Bypass frequency greater than ± 2 Hz (selectable in 0.25 Hz increments) from the UPS rated output frequency
3. Automatic Uninterrupted Forward Transfer: The static bypass transfer switch shall automatically forward transfer, without interruption, after (1) the UPS inverter is turned "ON", or (2) after an instantaneous overload-induced reverse transfer has occurred and the load current returns to less than the unit's 100% rating.

SINGLE MODULE UPS CONT. ON E-203

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SINGLE MODULE UPS (UPS) CONT. FROM E-202

4. Manual Transfer: A manual static transfer shall be initiated from the System Status and Control Panel by turning the UPS inverter off.

5. Overload Ratings: The static bypass transfer switch shall have the following overload characteristics:

a) 1000% of UPS system output rating for 0.016 seconds (one cycle)
b) 160% of UPS system output rating for 5 minutes

D. Low kVAR Input Filter: Low KVAR input filter shall be provided to limit input current harmonic distortion to less than 7% THD and improve input power factor to 0.90. The input filter shall be mounted inside the UPS cabinet. The low kVAR filter shall also limit reactive current / kVAR to under 20% of the nominal input current at all load levels to ensure optimum generator compatibility. The input filter shall not utilize any electromechanical contactors and shall never disengage the capacitor bank.

E. Microprocessor Controlled Logic

The full UPS operation shall be provided through the use of microprocessor controlled logic. All operations and parameters are firmware controlled, thus eliminating the need for manual adjustments or potentiometers. The logic shall include a self-test and diagnostic circuitry such that a fault can be isolated down to the printed circuit assembly or plug-in power assembly level. Every printed circuit assembly or plug-in power assembly shall be monitored. Diagnostics shall be performed via a PC through the local diagnostics port on the unit, or via a modem through the RS232 communication port.

3.0 SYSTEM CONTROLS AND INDICATORS

A. The UPS shall be provided with a system status and control panel which controls, monitors, and displays system operation and parameters. The display shall utilize a combination of front panel steady state and flashing LED's, a 40-character x 2-line backlit LCD display, and keypad. The display/keypad shall incorporate multiple menus (listed below), which provide step-by-step procedures for system operation, display metering functions (listed below), and display more than 40 normal and alarmed conditions (listed below). The front panel display shall be selectable in five languages (English, French, Spanish, Dutch and Italian).

1. **The LCD display shall provide the following menus and instructions:**

- Inverter On/Off commands - Language Selection
- Alarm Display - Battery Capacity
- Display Contrast - Frequency & Power Measurements
- Voltage Measurements - Current Measurements
- Communication Options

2. **The following controls shall be provided:**

- Internal input circuit breaker - Control circuitry
- Inverter output contactor - Output circuit breaker (in SSC).
- UPS isolation circuit breaker - Maintenance bypass circuit breaker

3. **Front panel (push buttons) shall include:**

- Inverter ON - Inverter OFF
- Emergency power off (EPO).

Note: The EPO push button includes a protective cover to prevent unintentional operation.

4. **Hidden Panel (push buttons) shall include:**

- Settings - > (scroll arrow)
- Volt - Amp
- Watt/Hz - Battery
- Alarms - ON/OFF
- * (Asterisk) - Clear fault
- Battery charge cycle - Return to float
- Security key- Bypass AC input non-synchronization
- Forced inverter to bypass- Forced bypass to inverter
- Audible alarm reset.

5. **System Parameters Monitored on LCD:** The LCD display shall display the following system parameters based on true RMS metering. Meter Accuracy is ±1%, true RMS. All three-phase readings shall be displayed simultaneously.

- Input voltage (LL) (three phase simultaneously)
- Input current/phase (three phase simultaneously)
- Input frequency
- Bypass input voltage (LL and LN) (three phase simultaneously)
- Bypass input frequency
- UPS module output voltage (LL & LN) (three phase simultaneously)
- UPS module output current/phase (three phase simultaneously)
- UPS module output frequency
- UPS module output percent (%) of load
- UPS module output power factor (PF)
- UPS module output kVA and kW
- System output voltage (LL & LN) (three phase simultaneously)
- System output current/phase (three phase simultaneously)
- System output frequency
- System output percent (%) of load
- System output power factor (PF)
- System output kVA and kW
- DC voltage
- Crest factor per phase
- Battery current (charge/discharge)
- Time remaining on battery and available battery time
- Battery cabinet temperature (on optional purchase and matching battery cabinets)

6. **Alarm/Status conditions displayed on LED's shall indicate:**

a) Front Panel LED's:
- Load protected - Battery operation
- Operating problem - Load not protected

b) Hidden Panel LED's:
- Emergency shutdown - Main AC input outside tolerance
- Rectifier/Charger ON - Rectifier/Charger fault
- Inverter fault - Inverter desynchronized
- Transfer function fault - Bypass AC input outside
- Overload - Battery charging (vented type)
- Maintenance position - Battery Cabinet temperature outside
- Battery discharged

7. **UPS status and operating instructions displayed on the LCD shall include:**

- UPS operation is normal - Load on UPS (UPS is on Line)
- Load is protected - Load on Battery
- Load on Bypass - Load on Maintenance Bypass (MBS)
- UPS on overload - UPS overload shutdown
- Circuit breakers in open position- Contactor in open position
- Buzzer ON- Fan failure
- Electronic power supply fault- Environmental problem
- Emergency shutdown, REPO ON - UPS alarm, call
- UPS input failure - Input problem, check voltage
- Input problem, check frequency - Input has wrong phase rotation
- Input has single phase condition- Input circuit breaker tripped
- Input fuse blown - Charger OFF
- Charger module alarm - Charger shutdown
- Charger fault, call service- Charger current sensor fault
- Input over/under voltage - Input over/under frequency
- Charger over-temperature - Maximum battery voltage
- UPS low battery, shutdown imminent - Battery under voltage shutdown
- Available battery time - Remaining battery time
- Battery circuit breaker open - Static switch over temperature
- Bypass input wrong phase rotation - Bypass input has single phase
- Bypass and Inverter are Out-of-Sync - Bypass input RC filter fuse blown
- Bypass problem, check voltage - Bypass problem, check frequency
- Bypass input over/under voltage- Bypass input over/under-frequency
- Phase shift problem, check bypass - Transfer problem, call
- Static switch overload, emergency off - Bypass transfer
- Start Inverter - Stop Inverter
- Inverter fault, call service - Inverter overload (check P.F./ KW)
- Inverter OFF - Inverter output contactor
- Inverter fuse blown - Inverter output over/under
- Inverter current limit - Inverter current sensor fault
- UPS overload shutdown - Operating on internal
- Inverter leg 1 over temperature - Inverter leg 2 over temperature
- Inverter leg 3 over temperature - Inverter transformer over temperature
- Inverter leg 1 trans. out of saturation - Inverter leg 1 power supply fault
- Inverter leg 2 trans. out of saturation - Inverter leg 2 power supply fault
- Inverter leg 3 trans. out of saturation - Inverter leg 3 power supply fault.

A. **Audible Alarm Reset Touch Pad:** The audible alarm reset touch pad shall be used to silence the audible alarm. If a new alarm is sensed after the original alarm has been silenced, it shall reactivate the audible alarm.

C. **Emergency Power Off (EPO):** When the EPO is pressed it shall cause the AC input, bypass input and battery circuit breaker to open, thereby shutting down the UPS and the load. The EPO function shall be capable of being initiated by an externally provided isolated dry contact (REPO).

D. **Dry Contacts:** Alarm dry contacts shall be available for external connection. Each alarm shall include two (2) form C contacts rated 5 Amp @ 250 Volts.

These contacts shall indicate:

- UPS on line - Inverter fault
- Overload - Rectifier/Charger on
- UPS on battery - Rectifier/Charger fault
- Low battery shutdown imminent - Bypass out of tolerance
- Summary alarm - Static switch fault
- UPS on maintenance.

E. **Customer Provided Dry contacts:** Nine (9) inputs shall be available to control UPS operation. Upon receipt of a closed dry contact the UPS shall perform the operations listed below (all inputs are normally open unless noted):

- Remote UPS ON - Remote UPS OFF
- Inverter non-sync with bypass - Remote EPO
- Second step input current limit - Bypass transfer prohibited
- Second step battery charge limit- Break transfer prohibited
- Progressive stop of rectifier/charger

F. **RS 232 / RS485 Serial Communications:** A standard serial communication port shall be provided to remotely monitor the UPS. All alarms messages and standard measurements shall be available on the local port. The port shall be configurable for RS-232 or RS-485 communications. The port shall use an open J-BUS (subset of ModBus) protocol with all UPS status information (86 parameters) available remotely.

3.1 MECHANICAL DESIGN AND VENTILATION

A. **Enclosure:** The UPS shall be housed in a freestanding enclosure with a dead front construction. The back of the UPS shall be capable of being mounted as close to a wall as practical. The UPS cabinet shall be designed for top cable entry with optional bottom entry cabinets available. Copper wire or bus shall be exclusively for all internal electrical connections excluding heat sink subassemblies. Front access only shall be required for installation and maintenance. All power connections and component removal shall be possible from the front only. The Battery Cabinets shall be matching and include battery disconnects.

B. **Ventilation:** Forced air-cooling shall be provided to ensure that all components are operated within their specified temperature ratings. Power component modules shall be cooled by redundant fans located directly above critical power components ensuring that the cooling air path is not obstructed. Internal air baffles shall carry heated air from large magnetic components directly outside of the UPS to minimize the interior cabinet temperature. Redundant fans shall also be located above the air baffles. Fan failures or a thermal overload shall be annunciated by a contact closure. Air inlets shall be provided from the front of the UPS enclosure. Air exhaust shall be from the top portion of the unit. Air filters on the inlets shall be provided as standard and shall be readily replaceable from the front of the unit with out the requirement of opening the UPS module doors.

1. **Airflow:** Airflow shall be up to 4,070 CFM per UPS module.

2. **Heat Rejection:** Maximum heat rejection per UPS module at full load shall be 78,100 BTUs per hour at 400kva/360kw and 110,750 BTUs per hour at 500kva/450kw.

3. **Enclosure Color:** The cabinet shall be painted an off-white (RAL 9002) color.

4.0 ACCESSORIES (To be included)

A. **Three (3) Breaker External Maintenance Bypass:** A manual make-before-break maintenance bypass shall be provided to isolate the UPS output, including the module static switch, for maintenance. The maintenance bypass shall be interlocked with the UPS module to protect the system from damage in the event of out-of-service transfer. The maintenance bypass shall be housed in a separate, adjacent matching enclosure. The maintenance bypass cabinet shall increase the overall width of the UPS no more than 22.75".

B. **Remote Alarm Status Panel:** A wall mounted panel, 17.5"Hx12"Wx4"D, with twelve (12) indicating LED's shall display UPS status and any active alarms. The alarms shall be a latching type, such that if an alarm is triggered, the LED will stay ON (latch) even if the alarm is corrected. This feature will provide the operator the chance to verify the occurrence of the alarm. The parameters monitored and controls provided on the RASP panel include:

1. UPS on line (Green LED)
2. UPS on battery (Yellow LED)
3. Load on bypass (Yellow LED)
4. UPS summary alarm (Red LED)
5. Low Battery shutdown
6. Charger on
7. Inverter fault
8. Overload
9. Charger fault

The Remote Alarm Status Panel shall also be equipped with:

- Alarm Test/Reset push-button: (white LED) to reset the latching alarm
- Audible Alarm: for alarm annunciation
- Audible Alarm reset push-button: (white LED) to silence the audible alarm

The RASP door shall be equipped with a key lock. The recommended maximum distance from the UPS module shall be 500 feet.

C. **External Control and Communications Devices**

Two communication slots shall be provided for customer use.

10. **Network Management Link:** The MultiSlot shall provide three additional communication slots. The Network Management Card (NMC) shall be installed in one or all three slots for monitoring and graceful shutdown for most popular file servers. The NMC provides a web interface, SNMP, logging and email capabilities.

11. **Serial Port Adder (COMM+2):** The standard UPS has one available serial port. The COMM+2 option adds two additional serial ports for use as RS232 or RS485, allowing the UPS to have a total of three serial ports.

D. **Graphical User Interface (GUI):** The UPS system shall be equipped with a Graphical Command Center / Graphical User Interface (GUI) with 12.0" daylight viewable TFT LCD color monitor with touch screen operation. The GUI shall utilize an industrial operating system with a static flash disk drive storage medium. The GUI shall provide detailed system level and module level operating information. An animated, color-coded single line diagram shall illustrate module and system level current flow, major UPS component status, breaker position and module and system operating status. Individual screens shall indicate operating conditions and electrical measurements for all specific UPS module(s) including the rectifier and bypass input, inverter, rectifier, individual battery banks, and the critical load output.

The GUI shall have a clear menu leading to operator instructions for all major UPS operating procedures. All alarms and events shall be recorded and time and date stamped and stored on a rolling log capable of recording n excess of 1,500 records. Major alarms shall be indicated on any screen that the operator may browse at the time. The GUI shall also have the capability to trend key parameters on a variable scale graph.

The GUI shall facilitate the unique naming of all circuit breakers. Software updates to the GUI shall be possible via exchange of flash chips or over the network but shall not require the removal of the device. Failure of the GUI shall not compromise UPS operation. All key status and operating information shall remain visible on the primary UPS display regardless of the GUI operating status. All GUI screens shall be accessible and navigable using a conventional browser. No additional network or server hardware shall be required.

5.0 FIELD QUALITY CONTROL & SERVICE ORGANIZATION

5.1 FIELD SERVICE ENGINEER QUALIFICATIONS

The manufacturer must employ a 7 X 24 nation wide (international where applicable) field service organization with rapid access to all regions of the nation. The responding service professionals must be factory-trained engineers with an accredited and proven competence to service three phase UPS,

5.2 SPARE PARTS

Field engineers must have immediate access to recommended spare parts with additional parts storage located in regional depots. Additional spare parts shall be accessible on a 7 x 24 basis from the national depot and must be expedited on a next available flight basis or via direct courier (whichever mode is quickest).

5.3 MAINTENANCE & SERVICE CONTRACTS

The manufacturer shall offer additional preventative maintenance and service contracts covering both the UPS system and the battery bank. Accredited professional service engineers employed exclusively in the field of critical power systems service shall perform all maintenance and service. The manufacturer shall also offer extended warranty contracts.

On-Site Factory Start-UP

Start -up to be performed according to published start-up procedures by accredited professional service engineers employed exclusively by the manufacturer. Start-up shall be performed during normal hours.

END OF SECTION

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POWER MANAGEMENT MODULE (PMM)

1.0 GENERAL

1.1 SUMMARY

This specification covers the electrical characteristics and general requirements for AC low voltage power distribution equipment, hereafter referred to as the PMM (Power Management Module). The PMM is designed primarily for distribution, monitoring and isolation of electrical power and will properly interface the building's AC power source with sensitive electronic loads in data center, telecom, office, or industrial environments.

1.2 STANDARDS

The following standards and documents apply to the specified equipment to the extent defined herein:

A. FCC Part 15 Class A (47 CFR 0-19)
B. UL 60950 (while standard is applicable) & UL 1062 Safety of Information Technology Equipment, including Electrical Business Equipment (effective 12/1/00, replacing UL 1950) with the exception of 380 V units
C. CSA Standard 60950.
D. NEMA Standard ST-1
E. NEMA ST20 - Dry-Type Transformers for General Applications
F. NEMA AB1 - Molded Case Circuit Breakers
G. NEMA PB1 - Panelboards
H. NEC (NFPA70) Section 645Code
I. ISO 9000 - International Organization for Standardization

POWER MANAGEMENT MODULE (PMM) CONT.ON E-204)

STATE OF MISSOURI GLENNON C. SEITZ E-23687 REGISTERED PROFESSIONAL ENGINEER
6/9/09

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PROJECT NO. 08074
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POWER MANAGEMENT MODULE (PMM) CONT. FROM E-203

1.3 SUBMITTALS

Submittals shall contain the following documentation:

A. **Installation Package:** Complete electrical characteristics and connection requirements. Provide detailed equipment outlines with cabinet dimensions and spacing requirements; location of conduit entry/exit paths; location of floor/seismic mounting; all cabinet weights; heat rejection and air flow requirements; single-line diagram; control and external wiring.

A. **Product Data:** Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements.

A. **Manufacturer's Installation Instructions:** Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product. Include equipment installation outline, connection diagram for external cabling, internal wiring diagram, and written instruction for installation.

1.4 FINAL SUBMITTALS

Upon delivery of the PMM, the following submittals shall be included:

A. A complete set of installation drawings showing all the information stated in section 1.3.

A. An owner's manual showing safe and correct operation of all PMM functions.

1.5 QUALIFICATIONS & QUALITY ASSURANCE

A. **Manufacturer's Certification:** The manufacturer shall specialize in manufacturing of Power Management Modules (PMM) specified in this document, with a nationwide first party service organization. The manufacturer shall be ISO 9001 certified and shall design to internationally accepted standards.

B. **Factory Testing:** Prior to shipment the manufacturer shall complete a documented test procedure to test all functions of the PMM, and guarantee compliance with the specification. The factory test shall be performed in the presence of the customer providing the manufacturer receives adequate prior notice. The manufacturer shall provide a copy of the test report upon request.

C. **Materials and Assemblies:** All materials and parts comprising the PMM shall be new, of current manufacture, and shall not have been in prior service, except as required during factory testing. All active electronic devices shall be solid state and not exceed the manufacturer's recommended tolerances for temperature or current to ensure maximum reliability. All semiconductor devices shall be sealed. All relays shall be provided with dust covers. The manufacturer shall conduct inspections on incoming parts, modular assemblies, and final products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All products shall be packaged in a manner to prevent penetration by debris and to allow safe delivery by all modes of ground transportation and air transportation where specified.

A. Prior to shipping all products shall be inspected at the factory for damage.

A. Equipment shall be protected against extreme temperature and humidity and shall be stored in a conditioned or protected environment.

1.7 ENVIRONMENTAL REQUIREMENTS

A. **Temperature:**
Operating: -10°C to +40°C (14°F to 104°F)
Storage: -40°C to +60°C (-40°F to 140°F)

B. **Relative Humidity:**
Operating: 10% to 90% non-condensing
Non-operating: 10% to 70% condensing

C. **Altitude:**
Operating: 500 feet below to 7,000 feet above sea level
Non-operating: 500 feet below to 25,000 feet above sea level

D. **Audible Noise:** Typical, average noise level, 'A' weighted at three feet from the front of the cabinet at no load: 45dB: < 50 kVA
50dB: 51 kVA to 150 kVA
55dB: 151 kVA to 300 kVA

1.8 WARRANTY

The PMM shall be covered by a full parts and labor warranty from the manufacturer. The warranty period shall be for twelve (12) months from date of installation and start-up or eighteen (18) months from date of shipment from the manufacturer, whichever occurs first.

2.0 PRODUCT DESCRIPTION

2.1 APPROVED MANUFACTURERS & PRODUCT DESCRIPTION

A. **Approved Manufacturer(s):** The specified equipment shall be manufactured by APC/MGE UPS SYSTEMS or approved equal.

B. **Product Description:** This specification covers the electrical characteristics and general requirements for AC low voltage power distribution equipment, hereafter referred to as the PMM (Power Management Module). The PMM is designed primarily for distribution, monitoring and isolation of electrical power and will properly interface the building's AC power source with sensitive electronic loads in data center, telecom, office, or industrial environments.

2.2 SYSTEM DESCRIPTION

A. **PMM Design Requirements**

1. The power rating of the PMM's shall be 225 kVA.

B. **Input Characteristics**

1. Voltage: 480 VAC, ±15%, 3 phase, 3 wire plus ground when provided with an isolation transformer
2. Frequency: 60 Hz, ±5 Hz
3. Current: 282

C. **Output Characteristics**

1. Voltage: 208 VAC, ±15%, 3 phase, 4 wire plus ground
2. Frequency: 60 Hz, ±5 Hz
3. Current: 625
4. Load Power Factor: 60% lagging to 60% leading power factor
5. Harmonic Distortion, Voltage: < 1%
6. Efficiency at Full kW Load: > 96-97%

2.3 MODES OF OPERATION

A. **Normal:** Under normal operation the input power is routed through the main input circuit breaker, which applies and disconnects AC power to the unit and protects the system in the event of a power overload. Power is directed to the isolation transformer where it will be electrically isolated on the output side of transformer. Depending on the transformer output voltage selected the voltage may be stepped down to the specified level. A monitoring system placed on the output of the transformer will monitor the output power and trigger an alarm in the event of a power quality deviation. Output power is fed to the respective panelboards and / or distribution breakers to distribute power to specific loads. Load circuits can be controlled manually from distribution panelboards.

B. **Emergency:** An EPO (Emergency Power Off) switch shall be provided. This shall be a snap-action, momentary, rectangular, red push-button with a transparent, hinged cover to prevent accidental operation. It shall be illuminated by a red replaceable LED. When activated, the EPO will shunt trip the main input circuit breaker, illuminate the "EPO activated" LED and the "Alarm" LED, and energize the audible alarm at the control panel.

2.4 COMPONENT DESCRIPTION

A. **Main Input Circuit Breaker:** The PMM shall be equipped with a main input circuit breaker (CB1) which, when closed and fed by a voltage source, energizes the PMM. The circuit breaker provides internal thermal overcurrent and instantaneous short circuit protection. The circuit breaker (CB1) includes a 24Vdc shunt trip to automatically open the circuit breaker and disconnect power to the entire unit when the Emergency Power Off (EPO) or remote EPO is activated, or when a designated alarm occurs.

The Main input circuit breaker is manually operated, automatic trip, rated for 600 VAC, 60 Hz, 3 Phase, and rated not less than 125% of the PMMs full load input current rating. It shall carry the manufacturer's standard interrupting capacity for that rating. High interrupting capacity ratings shall be available at 65KAIC for 480V systems. Higher ratings are also possible. The main input CB shall be vertically mounted for maximum reliability. The 'On (1)' and 'Off (0)' positions shall be clearly marked. The CB will provide internal thermal/magnetic overcurrent and instantaneous short circuit protection in each pole. Phase polarities shall be clearly marked.

B. **Main Isolation Transformer:** The main isolation transformer is provided as a standard feature. The output rating of the transformer shall be the same as the continuous duty maximum full load rating of the PMM. The isolation transformer is a NEMA ST20, factory-assembled, dry type, double shielded isolation transformer with 200% rated neutral. Each phase of the transformer is a three-wire DELTA connected input winding and four-wire WYE connected 208Y/120 VAC output winding. The isolation transformer characteristics are described below:

K-Factor: K-20
Windings:
Copper: 200-300 kVA, standard
Harmonic Distortion: less than 1%
Efficiency: greater than 97%
Insulation system: 220°C, with 150°C winding temperature rise
Impedance: 3% to 4.5% at rated load
Basic impulse level: 10kV
Common mode: -120db,10Hz to 1Mhz
Normal mode: 20db per decade
Ventilation: Convection cooled.
Taps: Compensation taps are provided on the primary windings to allow field adjustment for either low or high source voltages as follows:

FCAN = Full capacity above normal (taps): 2.5%, 5.0%
FCBN = Full capacity below normal (taps): 2.5%, 5.0%, 7.5%, 10%

Temperature Sensors: Two thermal switches are wound into each coil "hot spot'. The switches are normally-open contacts. The switches are wired to a terminal block mounted inside the cabinet. At 180°C the first contact closes and causes an LED to illuminate and an audible alarm to turn on at the status panel. At 195°C the second contact closes causing the main input circuit breaker to trip. An LED will illuminate and an audible alarm will turn on at the status panel.

C. **Circuit Breakers and Panelboards:** The PMM is provided with output distribution panelboards, each with the following characteristics and/or features:

1. **Branch Circuit Panelboard:**

NEMA PB1, Square D type Universal (Plug-in or Bolt-on) NQOM442L225CUNLB. Panelboard accepting QOB or QOB-VH bolt-on (standard), plug-in (QO) circuit breakers.

Pole Capacity: 42 poles, capable of accepting 1, 2, 3-pole circuit breakers
Bus Rating: 225 Amperes
Copper Ground Bus: 42 terminals
Copper Neutral Bus: Rated for 200% of nominal phase current (450 Amps)

The panelboard shall accommodate up to 100 Amp CBs and can be mounted based on available panelboard cable bending space.

2. **Panelboard Main Breaker:** The PMM has one panelboard main circuit breaker per 42 pole distribution panelboard (described below). The panelboard main CB provides thermal/magnetic overload and short-circuit protection for each panelboard, and allows manual on/off control.

Each panelboard is protected by a main circuit breaker:

Rating: 225 Amperes
Interrupting Capacity:22,000 AIC (10.000 AIC for 380 V models)
Voltage Rating: 240 VAC maximum (415VAC maximum for 380 V models)
Model Type: Q2 (For 380V: SQL)

3. Qty. (5) 42 pole distribution panelboards shall be provided along with (4) 225 Amp mainframeCB's for sub distributuion.

D. **Grounding**

1. **Construction:** A main grounding bus bar is provided and is effectively bonded to the unit frame.
A ground bus bar is installed in all cabinets.

2. **Identification:** All ground connections use copper conductors with green insulation or green marking where required.

3. **Connections:** The following points are connected to ground:
a) Isolation transformer neutral
b) Isolation transformer shields and core
c) Primary input cable ground (when provided with jbox)

4. **Panelboard Ground Bus:** Ground bus located below the panelboard with wire connections for up to 42 wires. Lug range is 4 to 14AWG. Ground bus is provided for easy access.

3.0 SYSTEM CONTROLS AND INDICATORS

A. **Monitoring:** The PMM shall monitor the EPO, LED indicators and audible alarm.

The PMM shall be equipped with advanced multi-function meter options that encompass additional metering and monitoring features as specified in section 4.0.Q.

B. **Indicators:** The PMM provides audible and visual alarm indication of abnormal conditions. Upon activation of selected alarms, the PMM sounds an audible alarm and activates an alarm LED. The alarm sounds until an operator presses the "Audible Alarm Silence" button. The reset button silences all existing alarms. Upon activation of the same or a new alarm, the audible alarm will sound again. The audible alarm will be activated only by selected alarm conditions with thresholds factory programmable and stored in non-volatile memory. Factory setting shall be as follows:

Output Overvoltage: +10%
Output Undervoltage: -10%
Transformer Over temperature: Alarm at 180°C: alarm shut down at 195°C
Overload (overcurrent):
Each Phase: 110%
Phase Loss (output Voltage) 25% of nominal phase-to-neutral
kVA: 110% of nominal

The yellow 'TVSS Alarm LED' shall illuminate upon failure of the Transient Voltage Surge Suppression (TVSS) network.

The yellow "Transformer Overtemp" LED' shall illuminate upon a transformer over-temperature of 180° C.

3.1 MECHANICAL DESIGN AND VENTILATION

A. **Enclosure:** The PMM is housed in a free standing NEMA-1 enclosure with dead front construction designed for installation on a raised or a flush floor. The PMM can accommodate bottom or top feed cables. The system monitor panel, input and output circuit breakers, and all customer power and control connection points are accessible from the front or side of the PMM. All circuit breakers are protected with "hinged dead front" panels to prevent access without a tool.

The cabinet is mounted on heavy-duty casters with leveling jacks.

Exterior and interior sheet metal is 16 gauge or better. Exterior, use 10-32 Truss head S/S with locking patch screws mounted with x nylon washers. Interior, use rivets & monobolts where possible, all others use standard hardware

Outside painted panels are interlocked. Side and rear panels consist of a top and bottom panel requiring removal of the top panel prior to removal of the bottom panel.

Panelboard dead front covers are hinged on all cabinets to provide easy access when changing branch circuit breakers or performing infrared heat scans. Panelboard dead front covers are also adjustable for proper alignment.

B. **Casters:** The main cabinet is mounted on four (4) 700 lb heavy duty casters from 30 to 300 kVA. The side cabinet is mounted on two casters and must be shipped attached to the main unit.

C. **Leveling Jacks:** Four leveling jacks are typically provided to support the maximum weight of the PMM. Design allows the leveling jacks to be raised a minimum of one inch (1") to prevent damage during shipment. Nylon Thread Lock is used to prevent the jacks from vibrating down during shipment. Jacks are easily accessible with a crescent wrench or flat screwdriver when in the raised or lowered position. Leveling jacks are field replaceable using a forklift.

D. **Center of Gravity:** The design allows the PMM2 to be tilted and moved up a 15° incline without tipping over.

E. **Access:** The system monitor panel, input and output circuit breakers, and all customer power and control connection points are accessible from the front of the PMM. Side access is required when panelboards are provided in a side facing orientation. Top access is required for TVSS. Rear access is not required for normal maintenance ('Normal' means routine maintenance such as circuit monitor service, distribution panelboard service, circuit breaker additions/deletions, etc. Transformer service, tap changes, and CT replacement are specifically excluded.) Output circuit breakers are protected with swinging, removable "dead front" panels. The doors are provided with a latched door lock (keyed lock optional).

F. **Lifting:** The PMM is designed to allow lifting the unit using a forklift.

G. **Maintenance:** Maintenance can be accomplished without the need for a special tool (other than a screw driver or crescent wrench) or fixture. Field replacement of any electrical component or assembly (other than the transformer) is achieved without lifting of more than 40 pounds (18 kilograms) of weight and without the use of hoists or jacks. The design allows for easy and safe replacement, adjustment or repair of all assemblies, subassemblies, modules, components, etc. A minimum of 36" may be required per local or national electrical codes in front of each panelboard.

H. **Dimensions:** The overall size of the PMM shall not exceed 72" high, 30" deep with a width of 69 inches.

I. **Weight:** The weight of the PMM shall not exceed 2,895 lbs.

J. **Ventilation & Heat Rejection:** The PMM is convection cooled. Air access is from the bottom and exhausts from the top. The PMM has a six (6") inch recommended rear clearance.

K. **Heat Rejection:** At full rated load the PMM heat rejection shall not exceed 15,700 BTU /HR.

L. **Conduit Landing:** The input conduit landing panel shall have three 1/2 inch knockouts located below the input circuit breaker. Each knockout can be punched to accept up to 3" conduits. The panelboard conduit landing panel shall have a combination of up to (32) 1/2", (12) concentric 1/2" & 3/4", (2) 1", and (1) 1-1/4" knockouts.

M. **Termination:** All primary and secondary power wiring shall be suitably terminated using UL acceptable pressure (crimp) or screw-type lug assemblies. Belleville-type washers and lock washers shall be used on all associated studs or bolt-stacks. Control instrumentation, PC board, and interconnection wiring terminations shall conform to the UL standard.

Inductive Noise Coupling: Maximum separation shall be maintained between primary and secondary wiring and / or control/alarm wiring. To the extent possible, no primary or input wiring is permitted to share any area within the PMM2 that is occupied by secondary wiring except within the main transformer compartment.

N. **Power Wiring:** All internal wiring shall be stranded copper with PVC, Neoprene or Silicon insulation with a minimum operating voltage of 600 volts RMS. All wires shall be appropriately marked UL and CSA recognized as being suitable for the application. Minimum insulation temperature rating shall be no less than 105°C, and in no case is less than that required by the location/application of the wiring.

O. **Control Wiring:** All control and instrumentation wiring used in this application shall be tinned, stranded copper with a temperature rating of at least 75° C. Insulation type is to be at least 125% of anticipated continuous load (3 hours or longer). Voltage rating is no less than required per UL and NEC. In areas where either primary or secondary AC voltages are present, PC board wiring and interconnect wiring will conform to the requirements of UL Standard 1950 for the application and location of the wiring.

4.0 OPTIONAL ACCESSORIES (To be included)

A. **Transient Voltage Surge Suppression (TVSS) System:** The transient suppression system is a solid state filter system designed to clip voltages. The output transient voltage surge suppression (TVSS) system shall be mounted at the secondary (output) side of the transformer. It shall clip high voltage transients phase-to-phase, phase-to-ground, or phase-to-neutral. Its operation shall be the same whether the spike is line-generated or load-generated. Voltage shall be clipped to a maximum range of plus or minus 200 volts proportional to the sine wave. The TVSS shall include self diagnostics to sound an audible alarm and indicator lights when a critical element has failed and needs replacement. The TVSS shall be externally fused and UL1449 listed and have the following electrical characteristics:

POWER MANAGEMENT MODULE (PMM) CONT. on E-205

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GLENNON C. SEITZ
NUMBER E-23687
REGISTERED PROFESSIONAL ENGINEER
STATE OF MISSOURI
6/10/09

REV.	DATE	DESCRIPTION	APPROVED
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DRAWN BY: KYLE C
CHECKED BY: G S.
SCALE:
DATE: 05/08/09

EQUIPMENT SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
MODOT DISTRICT 4
LEE'S SUMMIT, MISSOURI

PROJECT NO. 08074
DRAWING NO. E-204

4.0 OPTIONAL ACCESSORIES (To be included)

A. **Transient Voltage Surge Suppression (TVSS) System:** The transient suppression system is a solid state filter system designed to clip voltages. The output transient voltage surge suppression (TVSS) system shall be mounted at the secondary (output) side of the transformer. It shall clip high voltage transients phase-to-phase, phase-to-ground, or phase-to-neutral. Its operation shall be the same whether the spike is line-generated or load-generated. Voltage shall be clipped to a maximum range of plus or minus 200 volts proportional to the sine wave. The TVSS shall include self diagnostics to sound an audible alarm and indicator lights when a critical element has failed and needs replacement. The TVSS shall be externally fused and UL1449 listed and have the following electrical characteristics:

Peak current handling:	100,000 Amp L-L, 50,000 Amps L-N, L-G or N-G
EMI/RFI noise rejection:	-40dB
Clamping level, LN:	420VAC, @ 200 Amp (ANSI/IEE C62.41 Category A3)
	530VAC, @ 500 Amp (ANSI/IEE C62.41 Category B3)
	650VAC, @ 3000 Amp (ANSI/IEE C62.41 Category C1)
Response Time:	<1 nano-second
Dimensions:	2.6" x 4.75" x 10.6"
Diagnostics:	Green Status LED, Dry Contacts, Audible Alarm
Connections:	#10 awg wire leads
Fuse Type & Rating:	VSP20, 20ka, 600V

B. **Manual Restart:** The Manual Restart system shall automatically trip the Main Input Circuit Breaker upon detecting a loss of one or more input phases for three cycles. When power is restored, the Main Input Circuit Breaker must be manually reset. The system shall include a key switch to activate and deactivate the manual restart feature.

C. **Mainframe Circuit Breakers:** When circuit breaker ratings greater than those specified in paragraph 2.4.C are required, one panelboard is removed and replaced with up to four (4) Square D type KAL 225A circuit breakers (CB#1 to #4) in the specified panelboard position.

D. **Isolated Ground:** An additional "isolated ground" bus bar shall be provided that is dedicated for termination of "isolated ground" receptacles with connections for up to 42 wires and a lug range of 4 to 14AWG. The isolated ground bus is bonded to the main grounding bus bar.

E. **Copper Transformer:** The main isolation transformer shall have copper windings. Transformer characteristics are described in section 3.0.B.

Q. **Monitoring**

1. **Multi-Circuit Monitor (MCM):** The MCM can be configured to display the input (line side) or output (load side) voltage, current, kVA, kW and frequency and other parameters defined below. All measured values will be displayed on a large format LCD display mounted on the front of PMM. The meter shall also be equipped with LED alarm status indication.

Metering: All metered values will be in "true RMS" values with 0.35% accuracy. The monitor shall include a keypad allowing for the viewing of different selected values. The monitor shall display the following values and alarm conditions:

Data Output

- kWH Energy Consumption
- kW Real Power
- kVAR Reactive Power
- kVA Apparent Power
- Power Factor Total
- Voltage, L-L, average of 3 phases
- Voltage, L-N, average of 3 phases
- Current, average of 3 phases
- kW Real Power, phase A, B, C
- Power Factor, phase A, B, C
- Line to Line Voltage, phase A-B
- Line to Line Voltage, phase B-C
- Line to Line Voltage, phase A-C
- Line to Neutral Voltage, phase A-N
- Line to Neutral Voltage, phase B-N
- Line to Neutral Voltage, phase C-N
- Current, phase A, B, C
- kW Average
- kW Minimum
- Frequency (measured from phase A)
-
- **Modbus Alarms**
-
- Overvoltage
- Undervoltage
- Overcurrent
- Over kVA
- Phase Loss

Controls and Communications: The user shall be able to control and communicate with the PMM via the following interfaces:

a) Emergency Power Off (EPO and REPO) button that when activated shall trip the AC input circuit breaker with shunt trip
b) Audible Alarm "Test/Silence" push-button
c) Dry contact form C relay located on the MCM monitor and activated by any condition listed in section 3.0.B.
d) RS485 serial communications interface
e) Infrared communication with a Palm OS PDA (only when serial port is disabled)

2. **Branch Circuit Current Monitoring :**

- Monitors current on individual branch circuit breakers
- Alarms when current exceeds a preset threshold
- To display on unit, must be used with the MGE Multi-Circuit Meter
- Optional split core CTs for retrofit applications

The Branch Multi Circuit Monitor monitors the current individually on all 42 branch circuit breakers on a standard SQ-D NQ panelboard. In the event the current exceeds a threshold (custom programmable on every pole for pre-alarm/summary alarm and vital alarm thresholds), the alarm (audible and LED) will be activated to alert the operator to an overcurrent condition. Alarm parameters and currents are available via the MCM LCD display, serial output, or can be downloaded to a PDA via the IR port on the MCM display (serial port is disabled if IR port is enabled).

5.0 FIELD QUALITY CONTROL & SERVICE ORGANIZATION

5.1 FIELD SERVICE ENGINEER QUALIFICATIONS

The manufacturer must employ a 7 X 24 nation wide (international where applicable) field service organization with rapid access to all regions of the nation. The responding service professionals must be factory-trained engineers with an accredited and proven competence to service PMM equipment.

5.2 SPARE PARTS

Spare parts kits shall be available and are designed to provide replacement spares which will solve: 50% of problems encountered (Level "50"), 75% of problems encountered (Level "75"), or 90% of problems encountered (Level "90").

5.3 On Site Factory Start-Up

The manufacturer shall perform start-up according to published procedures utilizing directly employed field engineers during normal hours.

5.4 MAINTENANCE & SERVICE CONTRACTS

The manufacturer shall offer additional preventative maintenance and service contracts covering the PMM. Accredited professional service engineers employed exclusively in the field of critical power systems service shall perform all maintenance and service. The manufacturer shall also offer extended warranty contracts.

END OF SECTION

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EQUIPMENT SPECIFICATIONS
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
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PROJECT NO. 08074

DRAWING NO. E-205

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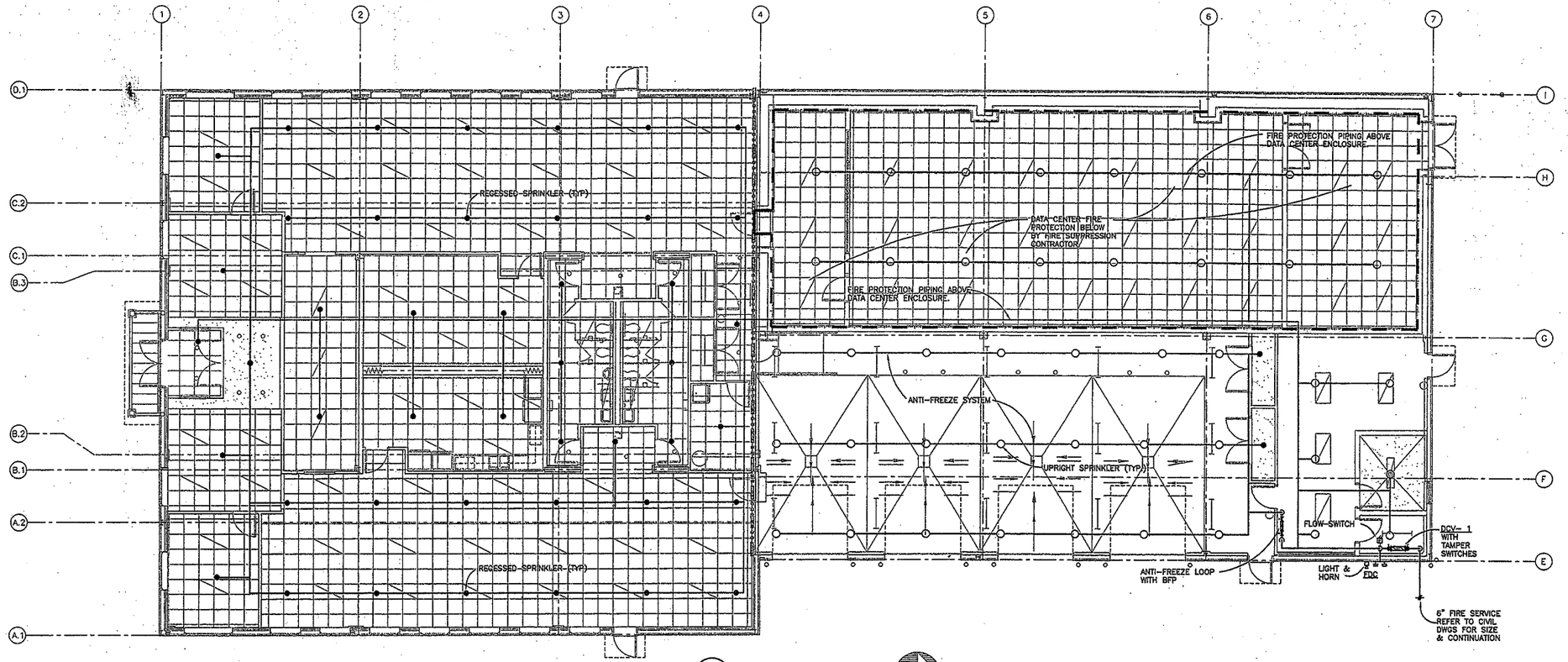


1 FP100 **FIRE PROTECTION PLAN**
SCALE: 1/8"=1'-0"

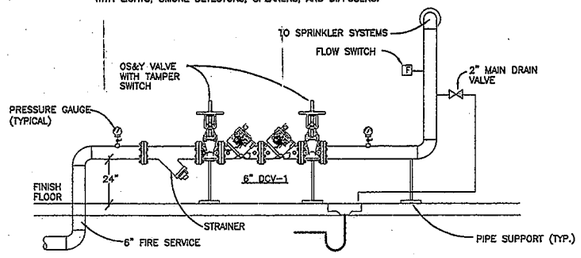
N

FIRE PROTECTION SPECIFICATIONS

1. FIRE PROTECTION CONTRACTOR IS TO DESIGN, FURNISH AND INSTALL A FULLY AUTOMATIC SPRINKLER SYSTEM FOR THE PROJECT AREA SHOWN.
2. SYSTEM DESIGN REQUIREMENTS:
   A. VERIFY REQUIREMENTS WITH JURISDICTIONAL AUTHORITIES. PROVIDE SYSTEM COMPLETE, FUNCTIONAL AND ACCEPTABLE TO INSURANCE CARRIER WITHOUT PENALTY OF ANY TYPE TO THE INSURANCE PREMIUM RATE.
   B. SYSTEM SHALL BE PIPED SCHEDULED PER NFPA.
   C. OFFICE AREA: LIGHT HAZARD
      ALL OTHER AREAS: ORDINARY HAZARD
3. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS TO BE REVIEWED AND ACCEPTED BY LOCAL FIRE DEPARTMENT AND THE ENGINEER.
4. PIPE AND JOINTS SHALL BE BLACK STEEL AND GALVANIZED STEEL THREADED OR ROLL GROOVED SCHEDULE 40 CONFORMING TO ANSI/ASTM A-135 AS FOLLOWS: SCHEDULE 10 FOR SIZES UP TO 5", 300 PSI MAXIMUM SYSTEM PRESSURE. ALL PIPE SHALL CONFORM TO NFPA #13, CHAPTER 3.
5. CONTRACTOR SHALL COMPLETE THE AUTOMATIC FIRE SPRINKLER READY FOR OPERATION, IN ALL RESPECTS, AS SOON AS POSSIBLE. WHEN SYSTEM IS COMPLETE AND READY FOR CONTINUOUS OPERATION, ACTIVATE THE SYSTEM FOR ITS' INTENDED USE.
6. FIRE PROTECTION CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL NEW FIRE PROTECTION EQUIPMENT AND PIPING WITH ALL OTHER TRADES PRIOR TO SUBMITTAL OF SHOP DRAWINGS AND SYSTEM INSTALLATION, SO AS NOT TO INTERFERE WITH THE ROUTING OF NEW DUCTWORK, PLUMBING PIPING, ETC.
7. SEAL ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS AND CEILINGS WITH APPROVED FIRE STOP MATERIALS AS REQUIRED.
8. PROVIDE ALL FITTINGS, RISER NIPPLES, ARM-OVERS, HANGERS, ETC. TO MAINTAIN CONFORMANCE WITH APPLICABLE STANDARDS AND TO POSITION THE SPRINKLER HEADS IN THE PROPER LOCATIONS.
9. THIS CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS PRIOR TO PURCHASE OF ANY MATERIALS AND THE COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES FOR RESOLUTION.
10. CONTRACTOR SHALL PROVIDE "AS CONSTRUCTED" (AS-BUILT) DRAWINGS WITHIN (14) DAYS OF COMPLETION OF PROJECT.
11. ANTI-FREEZE SHALL BE PROPYLENE GLYCOL AT A 50% CONCENTRATION IN ACCORDANCE WITH NFPA 13. ETHYLENE GLYCOL IS PROHIBITED.
12. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING OF ALL PENETRATIONS ASSOCIATED WITH THEIR WORK. REFERENCE ARCHITECTURAL SPECIFICATIONS AND PLANS FOR REQUIRED RATINGS AND MATERIALS.

GENERAL NOTES

1. FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE INSTALLATION OF COMPLETE AND PROPERLY FUNCTIONING FIRE PROTECTION SYSTEM.
2. THE INFORMATION PRESENTED ON THESE DRAWINGS IS DIAGRAMMATIC. IT DOES NOT NECESSARILY REPRESENT ALL ELBOWS, OFFSETS, HANGERS, ETC., REQUIRED FOR A COMPLETE WORKING SYSTEM.
3. ALL FIRE PROTECTION SYSTEMS INSTALLED SHALL BE IN ACCORDANCE WITH NFPA-13 AND LOCAL BUILDING CODES AND ORDINANCES.
4. FIRE PROTECTION CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL NEW FIRE PROTECTION EQUIPMENT AND PIPING WITH ALL OTHER TRADES PRIOR TO SUBMITTAL OF SHOP DRAWINGS AND SYSTEM INSTALLATION, SO AS NOT TO INTERFERE WITH THE ROUTING OF NEW DUCTWORK, PLUMBING PIPING, ETC.
5. SEAL ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS AND WITH APPROVED FIRE PROOF MATERIALS AS REQUIRED.
6. PROVIDE ALL FITTINGS, RISER NIPPLES, ARM-OVERS, HANGERS, ETC. TO MAINTAIN CONFORMANCE WITH APPLICABLE STANDARDS AND TO POSITION THE SPRINKLER HEADS IN THE PROPER LOCATIONS.
7. PROVIDE FIELD COORDINATION OF PIPING AND SPRINKLER HEAD INSTALLATIONS WITH LIGHTS, SMOKE DETECTORS, SPEAKERS, AND DIFFUSERS.



A FP100 **FIRE SERVICE ENTRY DETAIL**
SCALE: NONE

FIRE PROTECTION SPECIALTIES SCHEDULE

CODE	DESCRIPTION	MFGR	MODEL/ SERIES	SIZE/ CAPACITY	MATERIAL/ FINISH	REMARKS
DCV-1	DOUBLE CHECK VALVE ASSEMBLY	FEBCO	860	SEE DWGS	PAINTED STEEL	HORIZONTAL FLOW IN / HORIZONTAL FLOW OUT
RPP-1	REDUCED PRESSURE BACKFLOW PREVENTER	FEBCO	825Y	--	BRONZE	HORIZONTAL FLOW IN / HORIZONTAL FLOW OUT
FDC	FIRE DEPT. CONNECTION	POTTER ROEMER	5021	SEE DWGS	CHROME	TWO WAY INLET
●	RECESSED PENDENT SPRINKLER	TYCO	TY-FRB	K=5.6	CHROME	QUICK RESPONSE
○	UPRIGHT SPRINKLER	TYCO	TY-FRB	K=5.6	CHROME	QUICK RESPONSE

NOTES:

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KEVIN L. AINSWORTH
MANAGER
PE-2005000001
PROFESSIONAL ENGINEER
6/10/09

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ENGINEERING/ CONSTRUCTION MANAGEMENT
DENVER/ST. LOUIS
A Fulbright, Bassett, Scott & Ainsworth Company
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SCALE: AS SHOWN
DATE: 6/10/09

FIRE PROTECTION PLAN
NEW RESIDENT ENGINEERS OFFICE AND DATA CENTER
MODOT - DISTRICT 4
LEE'S SUMMIT, MO

PROJECT NO. 08074
DRAWING NO. FP100

Section 09 69 00
Access Floor Specification

PART 1 – GENERAL

1.01 Description

A. The access floor system shall consist of interchangeable panels, understructure, and all labor, material, equipment, and installation as called for in the specifications and/or shown on the Architect's Drawings.

B. Related Work Specified Elsewhere:

1. Concrete work and concrete floor sealer
   a) Concrete sealer and pedestal adhesive must be chemically compatible with each other.
2. Carpet and carpet tile work
3. Mechanical air distribution
4. Electrical connections and grounding

1.02 Design Performance and Certification of Product

A. Provide access flooring system consisting of moveable assemblies composed of modular floor panels supported on pedestals forming accessible under floor cavities to accommodate electrical, mechanical, and HVAC services and complying with performance requirements specified. Raised Floor panels must be interchangeable with each other except where cut for special conditions.

B. Load testing shall be performed according to "Recommended Test Procedures for Access Flooring" as established by the Ceiling and Interior Systems Construction Association (CISCA). These procedures shall be used as a guideline when presenting load performance product information.

1. Concentrated Load: 1500 lb on one square inch (25 mm) load at any location with a top surface deflection not to exceed +/– 0.10" (2.5 mm) and a permanent set not to exceed .010" (.25 mm).
2. Ultimate Load: Panel shall be designed to withstand load of 3,750 lb. minimum at weakest point with stringer.
3. Rolling Load: Panels shall withstand a rolling load of 1,250 lbs. applied through a 3" dia. (76 mm) x 1–13/16" (46 mm) wide caster for 10 cycles over the same path with less than 0.040" top surface permanent set. Panels shall withstand a rolling load of 1000 lb. applied through a hard rubber–surfaced wheel 6" (152 mm) dia. x 1–1/2" wide for 10,000 cycles over the same path. Permanent set at the conclusion of the test shall not exceed 0.040"(1 mm).
4. Flame spread of 5 or less and smoke developed of 10 or less when tested according to ASTM E–84.

C. Product tests shall be witnessed and certified by an accredited independently audited engineering and testing laboratory based in the U.S.A. with experience testing access floor components in accordance with CISCA test methods.

1.03 Submittals

A. Samples: Submit a sample of the floor panel and each understructure component.

B. Shop Drawings:

1. Submit drawings indicating floor panel layout including ramp, step, and railing location.
2. Include details of assembly components, edge details and anchoring.

C. Certificates:

1. Submit independent testing organization certificates indicating compliance with specified design criteria when tested and reported according to CISCA "Recommended Test Procedures for Access Floor".
2. Submit seismic calculations in accordance with building codes as specified and cite the specific criteria. Calculations shall be performed using a current seismic program and submitted to a local structural engineer licensed in the state where the project is located. The structural engineer shall sign and seal these calculations confirming that these calculations meet all local and state codes for seismic pedestal assemblies. A signed copy of these calculations must be given to the architect and local building department as required.

1.04 Quality Assurance

A. Installer: A company with minimum of 5 years experience in the installation of access floor systems of comparable size and complexity.

B. Tolerances:

1. Manufacturing tolerance:
   a) Nominal panel size ± 0.020" (.5mm) or less.
   b) Panel flatness ± 0.020" (.5mm) or less.
   c) Panel squareness ± 0.015" (.4mm) or less.
   d) Panel interchangeability–all panels, except those modified to meet special conditions, shall be interchangeable.
2. Installation Tolerance:
   a) Finished installation shall be level within ± 0.060" (2mm) in 10 feet (3m) and ± 0.100" (3mm) for the entire floor.

1.05 Project Site Conditions

A. The General Contractor and/or owner shall provide a clean, level, dry subfloor, temperature controlled and protected from the weather.

Access flooring storage and installation areas shall be maintained at a temperature between 40 deg F to 90 deg F, and between 20% to 70% relative humidity for 24 hours a day before, during, and after installation.

Overhead construction work must be completed before installing access floors to avoid damage to panels and finishes.

Substrate must be level to within 1/8" in 10 feet.

PART 2 – PRODUCTS

2.01 Manufacturer: The access flooring system shall be supplied by Haworth, Inc. located in Holland, MI 49423 or approved equal.

2.02. Materials

A. Floor Panels: shall be cementitious filled panels fabricated with full hard steel top sheet and die formed, 64–domed, steel bottom pan joined together by resistance welding to form an enclosed assembly. Thickness of steel sheet shall be as required to meet specific load requirements

1. Panels shall be nominal finished 24" (610mm) square and protected against corrosion by manufacturer's factory applied finish.
2. Floor panel surface shall be factory applied 1/16" thick high pressure laminate, static dissipative. Color to be selected by owner.
3. High pressure laminates shall be optionally finished at the edges. Separate edge trim pieces are not acceptable
4. Panels shall have a maximum electrical resistance of 10 ohms or less from the top edge of the panel to the understructure, less surface covering, as tested according to NFPA 99 modified.

B. Pedestals: 30" FFH

1. Pedestal bases shall be of hot–dipped galvanized steel. The pedestal head shall be yellow zinc dichromate finished steel.
2. The base shall be a minimum of 16 square inches and shall be stamped and/or embossed on its underside and shall be adhered to the sub floor with an adhesive recommended by the access flooring manufacturer.
3. Where mechanical anchors are required for seismic zones, provide same as required by project specific seismic calculations.
4. The threaded stud will be 3/4" (19mm) diameter steel.
5. The head assembly shall be designed to accept rigid grid stringers fastened in place with 1/4"–20 machine screws
6. The entire assembly shall provide a minimum of +/–1" of vertical adjustment, when finished floor height is 6" or more, adjustable at 1/64" increments, without rotating pedestal head.
7. The assembly shall provide a mechanical means to lock the floor in a level plane and adjustments shall be capable of being made without special tools.
8. Pedestal assembly shall support not less than 5,000 lb. axial load and shall resist an average 1,000 inch–pound overturning moment when bonded to a clean concrete slab.

C. Stringers:

1. Stringers shall be roll formed 18 gauge yellow zinc dichromate steel with an integrated gasket.
2. Stringer shall nest between the panels and be capable of supporting a 350 lb. concentrated load at mid span with less than 0.010" permanent set.
3. Stringer shall be 4'x 4' basketweave pattern and shall be secured by a fastener.

D. Accessories:

1. Furnish ramps, steps, lateral bracing, fascia, handrails, cutouts and miscellaneous items where indicated.
2. Provide service outlets for power, communications, and data wiring in locations as shown on Drawings.
3. Provide 5% spare solid floor panels and understructure systems for each type used in the project for maintenance stock. Provide 40 spare perforated panels. Deliver to project in manufacturer's standard packaging clearly marked with the contents.
4. Provide 5 panel lifting devices.

Perforated Panels: Perforated panels designed for static load bearing shall be interchangeable with standard field panels and shall comply with the following requirements. Perforated panels shall have 25% open surface area with the following air distribution:

1. Panel without damper shall be capable of delivering 725 cfm at 0.1–inch of H2O (static pressure).
2. Panel with damper at 100% open position shall be capable of delivering 550 cfm at 0.1–inch of H2O (static pressure).
3. Base bid to include qty. 40 perforated panels. – HPL surface
4. Provide line item price for additional perforated panels.

PART 3 – EXECUTION

3.01 Inspection

A. Examine the subfloor which is to receive access flooring for dryness, cleanliness, unevenness, or any irregularities that will affect the quality of the access flooring.

1. Verify that material storage and installation areas are at recommended temperature and relative humidity before, during, and after installation.
2. Verify that substrate is level to within 1/8" (3mm) in 10 feet (3m).

B. Do not commence installation of access flooring until subfloor is clean and dry, temperature controlled, and protected from the weather.

3.02 Installation

A. Install the access floor system per the manufacturer's instructions.

B. Furnish and install floor diffusers if required as indicated on Mechanical Plans.

C. Remove debris generated by the installation as work progresses.

D. Replace damaged materials prior to the application of field applied finishes.

3.03 Field Quality Control

A. Take random panel from shipment received at construction site and test panel for compliance with stated load criteria if directed by architect/owner.

3.04 Acceptance

A. General Contractor or Owner shall accept completed access floor in whole or in part, prior to allowing other trades to perform work which affects the installed access floor.

B. General Contractor shall suitably protect the accepted access floor and accessories from damage, contamination or overloading.

END OF SECTION

ENGINEERED DESIGNED FACILITIES
149 WELDON PARKWAY, SUITE 113, MARYLAND HEIGHTS, MO 63043
PHONE 314-469-2568 - FAX 314-569-2569

MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO

ACCESS FLOORING SPECIFICATIONS

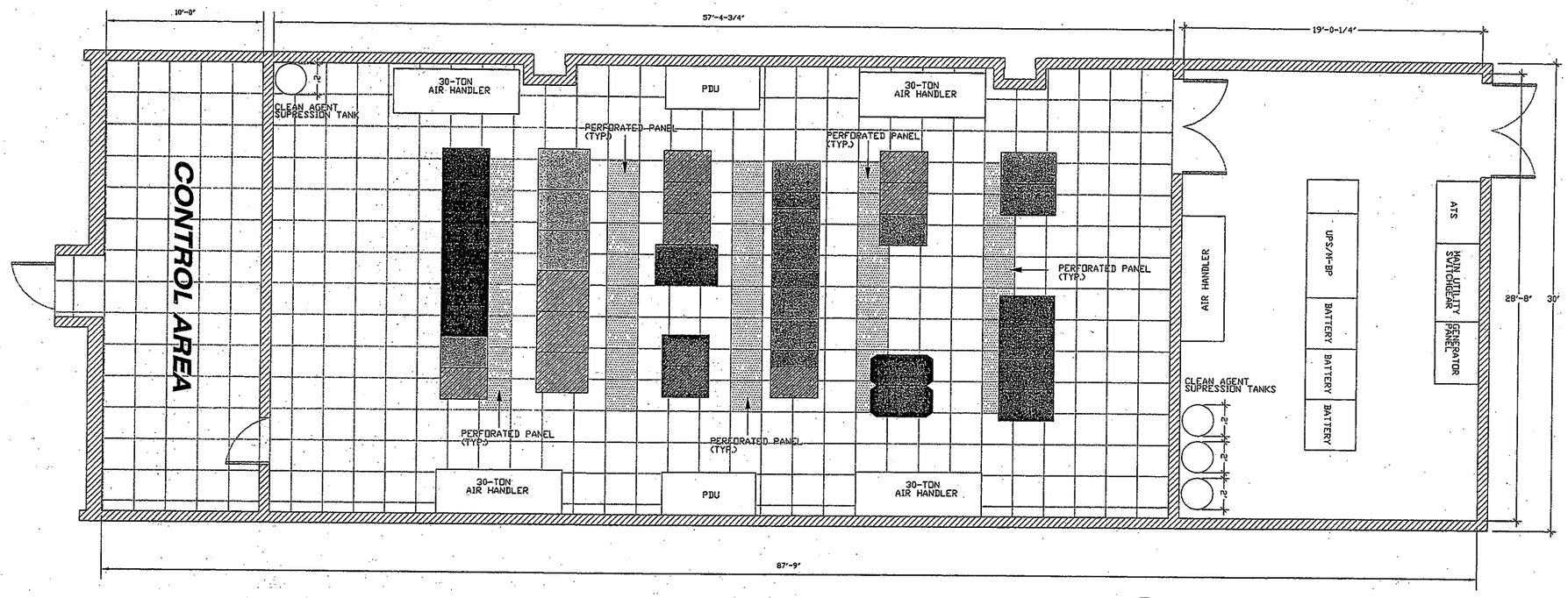
REV	DATE	DESCRIPTION	BY	APPRD	CHKD
0	06/10/09	ISSUED FOR BIDDING	KGH	WHC	DDK

ENGINEERS SEAL

DESIGNED K.G HETLAGE DATE 06/10/09
DRAWN K.G HETLAGE DATE 06/10/09
CHECKED
SCALE N/A

SHEET NO. AF-1

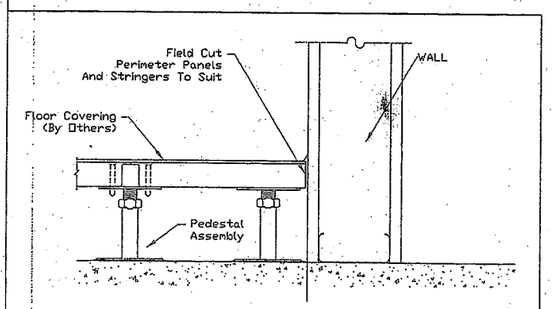
REV D



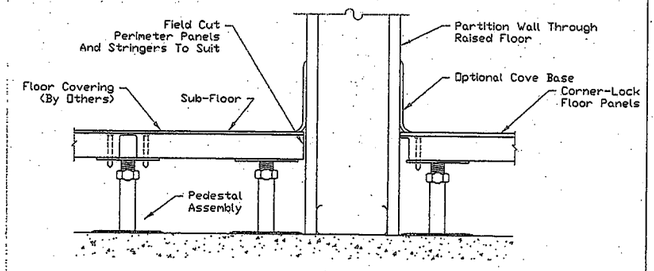
1 AF-1 MODOT FLOOR LAYOUT

SCALE: 1/4"=1'-0"
SUB-FLOOR HEIGHT: 2'-6"

REPRESENTS PERFORATED PANELS 40 ea.



PERIMITER DETAIL



PARTITION WALL THROUGH TO SUB-FLOOR

ENGINEERS SEAL

REV	DATE	DESCRIPTION	BY	APPRD	CHKD
0	06/10/09	ISSUED FOR BIDDING	KGH	WHC	DDK

ENGINEERED DESIGNED FACILITIES
149 WELDON PARKWAY, SUITE 111, MARYLAND HEIGHTS, MO 63043
PHONE 314-569-2548 FAX 314-569-2549

MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO

ACCESS FLOORING LAYOUT

DESIGNED	K.G HETLAGE	DATE	06/10/09
DRAWN	K.G HETLAGE	DATE	06/10/09
CHECKED		SCALE	AS NOTED

SHEET NO. AF-2 REV D

SECTION 15320 - CLEAN AGENT FIRE PROTECTION WORK

PART 1 GENERAL

1 SCOPE

A. THIS SPECIFICATION OUTLINES THE REQUIREMENTS FOR SINGLE PROTECTION ZONE CLEAN AGENT TOTAL FLOODING FIRE GASEOUS SUPPRESSION SYSTEM WITH AUTOMATIC DETECTION AND CONTROL FOR THE COMMUNICATIONS AND PROJECTION ROOMS UP TO THE CEILING LEVEL INCLUDING THE UNDERFLOOR CAVITY AND THE VOLUME OF THE HVAC SYSTEMS. ALL PROJECT SPECIFICATION SECTIONS OF DIVISION 1. THE WORK DESCRIBED HEREIN INCLUDES ALL ENGINEERING, LABOR, MATERIALS, EQUIPMENT, AND SERVICES REQUIRED TO COMPLETE AND TEST THE SUPPRESSION SYSTEM.
   1. THE AGENT TANKS SHALL BE LOCATED IN THE COMP. ROOM 121 & COMP. UTILITIES ROOM 120 WHERE SHOWN ON THE PLANS.
   2. THE RELEASE PANEL SHALL BE LOCATED WHERE SHOWN ON DRAWINGS.
   3. THE RELEASE PANEL SHALL ALSO FUNCTION AS THE DETECTION, RELEASE, AND SUPERVISION FOR THE ASSOCIATED PRE-ACTION SPRINKLER SYSTEM.
   4. ALL THE FIRE ALARM WORK FOR THE CLEAN AGENT SYSTEM AND PRE-ACTION SPRINKLER SYSTEM IS DEFINED IN THIS PROJECT AS PART OF THE CLEAN AGENT WORK SCOPE.
   5. THE FINISHED TANK SUPPORT AND DISTRIBUTION PIPING SYSTEM.

II APPLICABLE STANDARDS AND PUBLICATIONS

A. THE DESIGN, EQUIPMENT, INSTALLATION, TESTING, AND MAINTENANCE OF THE CLEAN AGENT SUPPRESSION SYSTEM SHALL BE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS SET FORTH IN THE LATEST EDITION OF THE FOLLOWING CODES AND STANDARDS:
   1. NFPA NO. 2001 - CLEAN AGENT FIRE EXTINGUISHING SYSTEMS
   2. NFPA NO. 70 - NATIONAL ELECTRICAL CODE
   3. NFPA NO. 72 - NATIONAL FIRE ALARM CODE
   4. NFPA NO. 75 - PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT
   5. UL LISTINGS
   6. REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION (AHJ)

III REQUIREMENTS:

A. THE CLEAN AGENT GASEOUS SUPPRESSION SYSTEM INSTALLATION SHALL BE IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, AND APPLICABLE STANDARDS.
B. CLEAN AGENT TYPE SHALL BE DUPONT HFC-125 OR HFC-227ea
C. CLEAN AGENT MUST BE UL LISTED AND FM APPROVED

IV QUALITY ASSURANCE:

A. MANUFACTURER:
   1. THE MANUFACTURER OF THE CLEAN AGENT SUPPRESSION SYSTEM HARDWARE AND DETECTION COMPONENTS SHALL HAVE A MINIMUM OF 10 YEARS EXPERIENCE IN THE DESIGN AND MANUFACTURE OF SIMILAR TYPES OF SUPPRESSION SYSTEMS AND WHO CAN REFER TO SIMILAR INSTALLATIONS PROVIDING SATISFACTORY SERVICE.
   2. THE NAME OF THE MANUFACTURER, PART NUMBERS AND SERIAL NUMBERS SHALL APPEAR ON ALL MAJOR COMPONENTS.
   3. ALL DEVICES, COMPONENTS AND EQUIPMENT SHALL BE NEW AND STANDARD PRODUCTS OF THE MANUFACTURER'S LATEST DESIGN, SUITABLE TO PERFORM THE FUNCTIONS INTENDED.
   4. ALL DEVICES AND EQUIPMENT SHALL BE UL LISTED AND/OR FM APPROVED.
   5. ALL CLEAN AGENT EQUIPMENT, DETECTION, AND CONTROL PANEL SHALL BE PROVIDED BY A SINGLE FIRE SUPPRESSION MANUFACTURER. DIFFERENT MANUFACTURERS FOR THE CLEAN AGENT AND DETECTION AND CONTROL SHALL NOT BE ACCEPTABLE.

B. INSTALLER:
   1. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL BE TRAINED BY THE MANUFACTURER TO DESIGN, INSTALL, TEST, AND MAINTAIN CLEAN AGENT FIRE SUPPRESSION SYSTEMS. DISTRIBUTOR AND DESIGN CERTIFICATES SHALL BE PROVIDED TO THE OWNER.
   2. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL EMPLOY A NICET CERTIFIED SPECIAL HAZARD DESIGNER, LEVEL III OR ABOVE, WHO WILL BE RESPONSIBLE FOR THIS PROJECT.
   3. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL BE AN EXPERIENCED FIRM REGULARLY ENGAGED IN THE INSTALLATION OF AUTOMATIC CLEAN AGENT, OR SIMILAR, FIRE SUPPRESSION SYSTEMS IN ACCORDANCE WITH NFPA STANDARDS.
   4. THE CLEAN AGENT INSTALLING CONTRACTOR MUST HAVE A MINIMUM 5 YEARS EXPERIENCE IN THE DESIGN, INSTALALTION AND TESTING OF CLEAN AGENT, OR SIMILAR, FIRE SUPPRESSION SYSTEMS. A LIST OF SYSTEMS OF A SIMILAR NATURE AND SCOPE SHALL BE PROVIDED ON REQUEST.
   5. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL SHOW EVIDENCE THAT HIS COMPANY CARRIES A MINIMUM $2,000,000.00 LIABILITY AND COMPLETED OPERATIONS INSURANCE POLICY. THESE LIMITS SHALL SUPERSEDE LIMITS REQUIRED IN THE "GENERAL CONDITIONS" OF THE SPECIFICATIONS.
   6. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL HAVE CLEAN AGENT RECHARGING STATION. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE PROOF OF HIS ABILITY TO RECHARGE THE LARGEST CLEAN AGENT SYSTEM WITHIN 60 HOURS AFTER A DISCHARGE. INCLUDE THE AMOUNT OF CLEAN AGENT BULK STORAGE AVAILABLE.
   7. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL BE AN AUTHORIZED STOCKING DISTRIBUTOR OF THE CLEAN AGENT SYSTEM MANUFACTURER SO THAT IMMEDIATE REPLACEMENT PARTS ARE AVAILABLE FROM INVENTORY.
   8. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL SHOW PROOF OF EMERGENCY SERVICE AVAILABLE ON A 24 HOUR, 7 DAYS A WEEK BASIS; SERVICE PERSONNEL SHALL BE AVAILABLE FOR EMERGENCY SERVICE RESPONSE AT ALL TIMES.

C. SUBMITTALS:
   1. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL SUBMIT THE FOLLOWING DESIGN INFORMATION AND DRAWINGS FOR APPROVAL PRIOR TO STARTING WORK ON THIS PROJECT.
      a. FIELD INSTALLATION LAYOUT DRAWINGS HAVING A SCALE OF NOT LESS THAN 1/8"=1 FT O INCH DETAILING THE LOCATION OF ALL AGENT STORAGE TANKS, PIPE RUNS INCLUDING PIPE SIZES AND LENGTHS, CONTROL PANEL, DETECTORS, MANUAL PULL STATIONS, ABORT STATIONS, AUDIBLE AND VISUAL ALARMS, ETC.
      b. AUXILIARY DETAILS AND INFORMATION SUCH AS MAINTENANCE PANELS, DOOR HOLDERS, SPECIAL SEALING REQUIREMENTS AND EQUIPMENT SHUTDOWNS.
      c. SEPARATE LAYOUTS OR DRAWINGS SHALL BE PROVIDED FOR EACH ROOM AND SUBFLOOR AND FOR MECHANICAL AND ELECTRICAL WORK.
      d. A SEPARATE LAYOUT OR DRAWING SHALL SHOW ISOMETRIC DETAILS OF AGENT STORAGE CONTAINERS, MOUNTING DETAILS, AND AND PROPOSED PIPE RUNS AND SIZES.
      e. ELECTRICAL LAYOUT DRAWINGS SHALL SHOW THE LOCATION OF ALL DEVICES AND INCLUDE POINT-TO-POINT CONDUIT RUNS.
      f. PROVIDE AN INTERNAL CONTROL PANEL WIRING DIAGRAM, WHICH SHALL INCLUDE POWER SUPPLY REQUIREMENTS AND FIELD WIRING TERMINATION POINTS.
      g. COMPLETE HYDRAULIC FLOW CALCULATIONS, FROM A UL LISTED COMPUTER PROGRAM, SHALL BE PROVIDED FOR ALL ENGINEERED CLEAN AGENT SYSTEMS. CALCULATION SHEETS MUST INCLUDE THE MANUFACTURER'S NAME AND UL LISTING FOR VERIFICATION. THE INDIVIDUAL SECTIONS OF PIPE AND EACH FITTING TO BE USED, S SHOWN ON THE ISOMETRICS, MUST BE IDENTIFIED NO INCLUDED IN THE CALCULATION. TOTAL AGENT DISCHARGE TIME MUST BE SHOWN AND DETAILED BY ZONE.
      h. DETECTOR AIR SAMPLING LAYOUT DRAWINGS SHALL SHOW THE LOCATION OF ALL DETECTORS, PIPING LAYOUT AND SAMPLING POINT LOCATIONS. COMPLETE HYDRAULIC FLOW CALCULATIONS, FROM A UL LISTED COMPUTER PROGRAM, SHALL BE PROVIDED FOR EACH AIR SAMPLING SYSTEM.
      i. PROVIDE CALCULATIONS FOR THE BATTERY STANDBY POWER SUPPLY TAKING INTO CONSIDERATION THE POWER REQUIREMENTS OF ALL ALARMS, INITIATING DEVICES, AND AUXILIARY COMPONENTS UNDER FULL LOAD.
      j. A COMPLETE SEQUENCE OF OPERATION SHALL BE SUBMITTED DETAILING ALL ALARM DEVICES, SHUTDOWN FUNCTIONS, REMOTE SIGNALING, DAMPER OPERATION, TIME DELAY, AND AGENT DISCHARGE FOR EACH ZONE OR SYSTEM.

V. SYSTEM DESCRIPTION AND OPERATION

A. THE SYSTEM SHALL BE A TOTAL FLOODING CLEAN AGENT EXTINGUISHING SYSTEM USING COMPONENTS MANUFACTURED BY:

   FIKE PROTECTION SYSTEMS
   704 SOUTH 10TH STREET
   BLUE SPRINGS, MO 64015

   OR APPROVED EQUAL

B. THE SYSTEM SHALL PROVIDE THE CLEAN AGENT MIMIMUM DESIGN CONCENTRATION ESTABLISHED BY NFPA 2001 FOR CLASS-A HAZARDS, IN ALL AREAS AND/OR PROTECTED SPACES AT THE MINIMUM ANTICIPATED TERMPERATURE WITH THE PROTECTED AREA.
C. THE SYSTEM SHALL BE COMPLETE IN ALL WAYS. IT SHALL INCLUDE ALL MECHANICAL AND ELECTRICAL INSTALLATION, ALL DETECTION AND CONTROL EQUIPMENT, AGENT STORAGE CONTAINERS, CLEAN AGENT, NOZZLES, PIPE AND FITTINGS, MANUAL RELEASE, AND ABORT STATIONS, AUDIBLE AND VISUAL ALARM DEVIVES, AUXILIARY DEVICES AND CONTROLS, SHUTDOWNS, ALARM INTERFACE, CAUTION/ADVISORY SIGNS, FUNCTIONAL CHECK OUT AND TESTING; TRAINING AND ALL OTHER OPERATIONS NECESSARY FOR A FUNCTIONAL, UL LISTED AND/OR FM APPROVED, CLEAN AGENT SUPPRESSION SYSTEM.
D. PROVIDE TWO (2) INSPECTIONS DURING THE FIRST YEAR OF SERVICE. INSPECTIONS SHALL BE MADE AT 6 MONTH INTERVALS COMMENCING WHEN THE SYSTEM IS FIRST PLACED INTO NORMAL SERVICE.
E. CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING AND SECURING THE PROTECTED SPACES AGAINST AGENT LOSS AND/OR LEAKAGE DURING THE 10 MINUTE "HOLD" TIME. ALL PENETRATIONS SHALL BE FIRE STOPPED TO A MINIMUM 1-HOUR FIRE RATING.
F. GENERAL CONTRACTOR SHALL PROVIDE A FULL TIME FIRE STOPPING FIRM EMPLOYING AN INDIVIDUAL CERTIFIED AS A DRI (DESIGNATED RESPONSIBLE INDIVIDUAL) BY FACTORY MUTUAL ACCORDING TO FM 4991, "APPROVAL OF FIRESTOP CONTRACTORS", OR BY UNDERWRITER LABORTORIES "QUALIFIED FIRESTOP CONTRACTOR PROGRAM" SHALL BE PROVIDED BY THE CLEAN AGENT CONTRACTOR.
   1. INSTALLATION RESPONSIBILITY:
      a. ASSIGN INSTALLATION OF THROUGH-PENETRATION FIRESTOP SYSTEMS ON THE PROJECT TO A SINGLE QUALIFIED INSTALLER.
   2. SOURCE LIMITATIONS:
      a. OBTAIN FIRESTOP PRODUCTS, FOR EACH TYPE OF PENETRATION AND CONSTRUCTION CONDITION INDICATED, FROM A SINGLE MANUFACTURER THROUGH ONE DISTRIBUTION SOURCE. EXCEPTIONS MAYBE MADE FOR PROPRIETARY PRODUCTS THE REQUEST OF THE DRI.
   3. IDENTIFICATION:
      a. LABEL AND DOCUMENT ALL PENETRATIONS AS REQUIRED BY THE FCIA MANUAL OF PRACTICE, APPENDIX D (12/29/2005, REVISION NO. 2).
      b. PRESENT CLOSEOUT DOCUMENTS, AS OUTLINED IN THE FCIA MANUAL OF PRECTICE SECTION 5.7, TO THE OWNER'S REPRESENTATIVE AT THE COMPLETION OF THE PROJECT.
G. THE CLEAN AGENT SYSTEMS SHALL BE ACTUATED BOY VESDA LASERPLUS AIR SAMPLING POINTS INSTALLED AT A MAXIMUM SPACING OF 250 SQ. FT. PER SAMPLING POINT. THE CLEAN AGENT AND PREACTION SPRINKLER SYSTEM SHALL BE ACTUATED BY THE VESDA FIRE 2 ALARM LEVEL.
H. ALL INITIATING AND INDICATING CIRCUITS SHALL BE WIRED IN ACCORDANCE WITH NFPA-72. ALL WIRING SHALL BE IN CONDUIT.

I. AUTOMATIC OPERATION OF EACH CLEAN AGENT AND PREACTION SPRINKLER PROTECTED AREA SHALL BE AS FOLLOWS:
   1. PREALARM 1 - VESDA ALARM LEVEL "ALERT" SHALL SOUND LOCAL AUDIBLE AND VISUAL ALARM ON THE DISPLAY MODULE.
   2. VESDA ALARM LEVEL "ACTION" SHALL SOUND LOCAL AUDIBLE AND VISUAL ALARM ON THE DISPLAY MODULE.
   3. ALARM - VESDA ALARM LEVEL "FIRE 1"
      a. ACTIVATE ALARM LED "FIRE 1" ON THE VESDA DISPLAY
      b. ACTIVATE RELEASING PANEL "ALARM" LED AND DISPLAY REAL TIME SMOKE OBS/SQ. FT. ON DISPLAY
      c. ENERGIZE ALARM HORN / STROBES IN THE PROTECTED AREAS (HORN SOUNDS SLOW PULSE)
      d. TRANSMIT SIGNAL TO THE BUILDING FIRE ALARM
      e. SHUT DOWN AIR HANDLING UNITS IN THE PROTECTED AREAS.
      f. CLOSE FIRE / SMOKE DAMPERS
   4. PRE-DISCHARGE - VESDA ALARM LEVEL "FIRE 2"
      a. ACTIVATE ALARM LED "FIRE 2" ON THE VESDA DISPLAY
      b. ACTIVATE RELEASING PANEL "PRE-DISCHARGE" LED AND DISPLAY REAL TIME SMOKE OBS/SQ. FT. ON DISPLAY
      c. ENERGIZE ALARM HORN / STROBES IN THE PROTECTED AREAS (HORN SOUNDS FAST PULSE)
      d. START TIME-DELAY SEQUENCE (NOT TO EXCEED 60 SECONDS)
      e. SYSTEM ABORT SEQUENCE IS ENABLED AT THIS TIME
      f. TRANSMIT SIGNAL TO THE BUILDING FIRE ALARM
   5. DISCHARGE - TIME DELAY EXPIRES
      a. ACTIVATE DISCHARGE LED ON RELEASING PANEL
      b. ACTIVATE RELEASING PANEL CUSTOM DISPLAY
      c. ENERGIZE ALARM HORN / STROBES IN THE PROTECTED AREAS (HORN SOUNDS STEADY)
      d. CLEAN AGENT DISCHARGES INTO THE PROTECTED AREAS (IN LESS THAN 10 SECONDES)
      e. TRANSMIT DISCHARGE SIGNAL TO THE BUILDING FIRE ALARM
      f. ALARM PRESSURE SWITCH IS ACTIVATED SHUTTING DOWN POWER TO COMPUTER EQUIPMENT (U.P.S. EPO)
   6. THE SYSTEM SHALL BE CAPABLE OF BEING ACTUATED BY MANUAL DISCHARGE DEVICES LOCATED AT EACH HAZARD EXIT. OPERATION OF A MANUAL DEVICE SHALL DUPLICATE THE PRE-DISCHARGE SEQUENCE DESCRIPTION ABOVE EXCEPT THAT THE TIME-DELAY AND ABORT FUNCTIONS SHALL BE BY-PASSED. THE MANUAL DISCHARGE STATION SHALL BE OF THE ELECTRICAL ACTUATION TYPE AND SHALL BE SUPERVISED.

PART 2 PRODUCTS

1. MATERIALS AND EQUIPMENT

A. THE CLEAN AGENT SYSTEM MATERIAL AND EQUIPMENT SHALL BE STANDARD PRODUCTS OF THE MANUFACTURER'S LATEST DESIGN AND SUITABLE TO PERFORM THE FUNCTIONS INTENDED. WHEN ONE OR MORE PIECES OF EQUIPMENT MUST PERFORM THE SAME FUNCTIONS, THEY SHALL BE DUPLICATES PRODUCED BY ONE MANUFACTURER. ALL DEVICES AND EQUIPMENT SHALL BE UL AND FM APPROVED.
   1. CLEAN AGENT STORAGE AND DISTRIBUTION: EACH SYSTEM SHALL HAVE ITS OWN SUPPLY OF CLEAN AGENT.
      a. THE SYSTEM DESIGN SHALL BE CENTRAL STORAGE.
      b. SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINE.
      c. AGENT SUPPLY SHALL BE LOCATED WITHIN THE ADJACENT MECHANICAL ROOM.
      d. THE CLEAN AGENT SHALL BE STORED IN FLOOR-MOUTED CYLINDRICAL CONTAINERS. CONTAINERS SHALL BE SUPER-PRESSURIZED WITH DRY NITROGEN, TO AN OPERATING PRESSURE OF 360 DEGREES PSIG, AT 70 DEG. F. CONTAINERS SHALL BE OF HIGH-STRENGTH ALLOY STEEL CONSTRUCTION THAT COMPLIES WITH THE DEPARTMENT OF TRANSPORTATION REGULATIONS FOR REFILLABLE PRESSURE VESSELS AND CONFORM TO NFPA 2001.
      e. CONTAINERS SHALL BE ACTUATED BY PARALLEL-WIRED INITIATORS OR SOLENOIDS LOCATED AT EACH AGENT CONTAINER.
      f. EACH CONTAINER SHALL HAVE A PRESSURE GAUGE AND LOW-PRESSURE SWITCH TO PROVIDE VISUAL AND ELECTRICAL SUPERVISION OF THE CONTAINER PRESSURE. THE LOW PRESSURE SWITCH SHALL BE WIRED TO AN ADDRESSABLE MONITOR MODULE TO PROVIDE AN AUDIBLE AND VISUAL "SUPERVISORY" ALARM IN THE EVENT THE CONTAINER PRESSURE DROPS BELOW 288 PSI. THE PRESSURE GAUGE SHALL BE COLOR CODED TO PROVIDE AN EASY, VISUAL INDICATION OF CONTAINER PRESSURE.
      g. EACH CONTAINER SHALL HAVE A PRESSURE RELIEF PROVISION THAT AUTOMATICALLY OPERATES WHEN THE INTERNAL TEMPERATURE EXCEEDES 150 DEG. F.
      h. EACH CONTAINER SHALL BE FITTED WITH A LIQUID LEVEL INDICATING DEVICE. IT SHALL BE POSSIBLE TO DETERMINE THE CONTAINER AGENT QUANTITY WITHOUT REMOVING THE CONTAINER FROM ITS MOUNTING BRACKET, DISCONNECTING THE DISTRIBUTION PIPING, OR REMOVING THE CLEAN AGENT SYSTEM FROM SERVICE.
      i. ENGINEERED DISCHARGED NOZZLES SHALL BE PROVIDED, WITHIN THE MANUFACTURER'S GUIDELINES, TO DISTRIBUTE THE CLEAN AGENT THROUGHOUT THE PROTECTED SPACES. THE NOZZLES SHALL BE DESIGNED TO PROVIDE PROPER AGENT QUANTITY AND DISTRIBUTION. EACH SIZE NOZZLE SHALL BE AVAILABLE IN 180 AND 360 DEGREE DISTRIBUTION PATTERNS.
      j. CEILING NOZZLES SHALL BE INSTALLED WITH THE MANUFACTURER'S STANDARD NOZZLE DEFLECTOR AS DETAILED ON THE PLANS. TOTAL DISCHARGE RATES SHALL NOT EXCEED 20 LBS/SEC.
      k. DISTRIBUTION PIPING AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS, NFPA 2001 AND APPROVED PIPING STANDARDS AND GUIDELINES. ALL DISTRIBUTION PIPING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS USING GOOD, ACCEPTED PRACTICES AND QUALITY WORKMANSHIP PROCEDURES. ALL PIPING SHALL BE ADEQUATELY SUPPORTED AND ANCHORED AT ALL DIRECTIONAL CHANGES AND NOZZLE LOCATIONS.
         - ALL PIPING SHALL BE REAMED, BLOWN CLEAN AND SWABBED WITH SUITABLE SOLVENTS TO REMOVE BURRS, MILL VARNISH AND CUTTING OILS BEFORE ASSEMBLY.
         - ALL MALE PIPE THREADS SHALL BE SEALED WITH TEFLON TAPE PIPE SEALANT APPLIED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND GOOD PIPING PRACTICES.
         - ALL PIPING SHALL BE PRESSURE TESTED IN ACCORDANCE WITH NFPA 2001.
         - CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE STEEL SUPPORT SYSTEMS NECESSARY TO MOUNT AND BRACE THE STORAGE TANKS. A FIRE RESISTANT 8 FT x 4 FT x 3/4" SHEET OF PLYWOOD SHALL BE INSTALLED AS ADDITIONAL SUPPORT AS PER PLANS. PLYWOOD SHALL BE PAINTED WITH A MINIMUM 2 COATS OF WHITE PAINT.

PART 2 PRODUCTS

1 MATERIALS AND EQUIPMENT

A. CONTROL PANEL
   1. THE CLEAN AGENT / PRE-ACTION PANEL AND ITS COMPONENTS SHALL BE UL LISTED (REV. 9 COMPLIANT) AND FM APPROVDED FOR USE AS A LOCAL FIRE ALARM SYSTEM WITH RELEASING DEVICE SERVICE.
   2. THE CONTROL SYSTEM SHALL PERORM ALL FUNCTIONS NECESSARY TO OPERATE THE SYSTEM DETECTION, ACTUATION AND AUXILIARY FUNCTIONS, AS OUTLINED.
   3. THE CLEAN AGENT SYSTEM SHALL BE CAPABLE OF PROVIDING BATTERY STANDBY POWER TO PROVIDE A MINIMUM 24 HOUR EMERGENCY POWER. A TROUBLE SIGNAL WILL BE INITIATED IF BATTERY IS DISCONNECTED OR IF BATTERY IS IN AN ABNORMALLY LOW CHARGE STATE.
   4. THE CONTROL SYSTEM SHALL BE MICROPROCESSOR BASED WITH HARDWARE AND SOFTWARE INTEGRATION DESIGNED TO GUARANTEE RELIABILITY.
   5. THE CONTROL SYSTEM SHALL PROVIDE THE FOLLOWING CAPABILITIES AND FUNCTIONS:
      a. TWO (2) SIGNAL LINE CIRCUITS, STYLE 4/6 (CLASS A/B). COMMUNICATIONS TO UP TO 254 ADDRESSABLE DEVICES PER CIRCUIT. ADDRESSABLE DEVICES DESCRIBED BELOW.
      b. TWO (2) CLASS B (STYLE Y), INDICATING APPLICANCE CIRCUITS RATED FOR 2.0 AMPS @24 VDC.
      c. TWO AUXILIARY POWER SUPPLY CIRCUITS RATED 2A @24 VDC.
      d. ONE RESETTABLE AUXILIARY POWER SUPPLY CIRCUIT RATED 2A @ 24 VDC.
      e. THREE (3) FORM "C" RELAYS, RATED 2 AMPS @30VDC. THESE RELAYS PROVIDE ALARM, TROUBLE, AND SUPERVISORY ANNUNCIATION.
      f. AUXILIARY RELAY MODULE PROVIDING 4 PROGRAMMABLE CONTACTS RATED 2A @30 VDC. PANEL SHALL SUPPORT TWO MODULES.
      g. TEN (10) STATUS LEDS PLUS ALFPHA-NUMERIC DISPLAY FOR TROUBLESHOOTING: AC POWER; ALARM; TROUBLE; SUPERVISORY; SILENCE; PRE-DISCHARGE; RELEASE; RELEASE DISABLED; ABORT AND GROUND FAULT.
      h. PROGRAMMABLE PRE-DISCHARGE AND DISCHARGE TIMERS.
      i. SIX (6) OPTIONAL ABORT TYPES

B. DETECTORS:
   1. AUTOMATIC DETECTORS SHALL BE ADDRESSABLE SPOT TYPE IONICATION AND PHOTOELECTRIC AND VESDA AIR SAMPLING.
   2. ALL ADDRESSABLE SPOT DETECTORS & BASES AND ADDRESSABLE MODULES SHALL BE PROVIDED WITH ISOLATOR OPTION WHICH OPERATE PEER-TO-PEER.
   3. THE SENSORS SHALL BE SPACED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THE GUIDELINES OF NFPA 72.
   4. AIR SAMPLING SCANNER DETECTOR (FOUR ZONE) SHALL BE INSTALLED IN THE PROJECTION AND COMMUNICATIONS ROOM. A SEPARATE DEDICATED AIR SAMPLING DETECTOR SHALL BE INSTALLED IN THE AREA BENEATH THE RAISED FLOOR. EACH VESDA DETECTOR SHALL BE MONITORED INDEPENDENTLY BY A HIGH LEVEL INTERFACE MODULE (HLI) MODULE LOCATED IN THE CONTROL PANEL.
   5. AIR SAMPLING VESDA SCANNER DETECTOR (FOUR ZONE) SHALL BE INSTALLED IN THE PROJECTION AND COMMUNICATIONS ROOM. A SEPARATE DEDICATED AIR SAMPLING DETECTOR SHALL BE INSTALLED IN THE AREA BENEATH THE RAISED FLOOR. EACH VESDA DETECTOR SHALL BE MONITORED INDEPENDENTLY BY A HIGH LEVEL INTERFACE MODULE (HLI) MODULE LOCATED IN THE CONTROL PANEL.
   6. SPOT SENSORS (PHOTOELECTRIC & IONIZATIONS) FOR THE MECHANICAL ROOM SHALL BE PROVIDED TO ACTIVATE THE PRE-ACTION SPRINKLER SYSTEM.

C. ADDRESSABLE DEVICES:

   THE CONTROL PANEL SHALL BE CAPABLE OF COMMUNICATING TO UP TO 254 DEVICES PER SLC CIRCUIT
   1. VESDA HIGH LEVEL INTERFACE (HLI) SHALL BE INSTALLED IN THE CONTROL PANEL PROVIDING A NETWORK CONNECTION TO EACH VESDA AIR SAMPLING DETECTOR.
   2. RELEASING CONTROL MODULE (RCM)
      a. CAPABLE OF SUPPORTING UP TO 2.0A @24VDC RELEASING CURRENT.
      b. THE RCM SHALL BE CAPABLE OF OPERATING IN ONE OF TWO MODES; CONNECTION TO A SINGLE COMPATIBLE SOLENOID (PRE-ACTION) OR CONNECTION TO AGENT RELEASE MODULES (ARM).
   3. SUPERVISED CONTROL MODULE (SCM)
      a. THE SCM SHALL BE CAPABLE OF SUPPLYING UP TO 2.0 A @24VDC OUTPUT CURRENT FOR CONNECTION TO COMPATIBLE BELLS, HORNS, STROBES, ETC.
   4. RELAY MODULE (RM)
      a. THE RM SHALL BE FUNCTION PROGRAMMABLE BY THE CONTROL PANEL. EACH CONTACT SHALL BE CAPABLE OF SWITCHING UP TO 2A @30VDC.
   5. THE MM SHALL MONITOR NORMALL OPEN OR NORMALLY CLOSED CONTACTS AND SHALL BE PROGRAMMED FOR A VARIETY OF INPUT TYPES.
   6. INTELLIGENT MANUAL RELEASE STATION
      a. THE INTELLIGENT PULL STATION SHALL BE AN INTELLIGENT INPUT MODULE THAT IS ACTIVATED THROUGH DUAL-ACTION, PUSHING IN AND PULLING DOWN AS INSTRUCTED TO PROVIDE A MEANS OF MANUALLY DISCHARGING THE AUTOMATIC FIRE EXTINGUISHING SYSTEM.
      b. THE FRONT SHALL BE MARKED "CLEAN AGENT RELEASE".
      c. THE MANUAL RELEASE SHALL BE LOCATED AT EACH EXIT FROM THE PROTECTED HAZARD AND SHALL HAVE AN ADVISORY SIGN PROVIDED AT EACH LOCATION.
      d. THE MANUAL ACTUATIONS SHALL BY-PASS THE TIME DELAY AND ABORT FUNCTIONS, SHALL CAUSE THE SYSTEM TO DISCHARGE AND SHALL CAUSE ALL RELEASE AND SHUTDOWN DEVICES TO OPERATE IN THE SAME MANNER AS IF THE SYSTEM HAD OPERATED AUTOMATICALLY.

D. ABORT STATION
   1. THE ABORT STATION SHALL BE THE "DEAD MAN" TYPE AND SHALL BE LOCATED NEXT TO EACH MANUAL RELEASE SWITCH.
   2. "LOCKING" OR "KEYED" ABORT STATIONS SHALL NOT BE PERMITTED.
   3. EACH ABORT STATION SHALL BE PROVIDED WITH A MINI-MONITOR MODULE AND CONNECTED TO THE ADDRESSABLE SLC LOOP.
   4. THE ABORT STATION STALL BE SUPERVISED AND SHALL INDICATE TROUBLE CONDITION AT THE RELEASE PANEL IF DEPRESSED.

C. ADDRESSABLE DEVICES:

   THE CONTROL PANEL SHALL BE CAPABLE OF COMMUNICATING TO UP TO 254 DEVICES PER SLC CIRCUIT
   1. VESDA HIGH LEVEL INTERFACE (HLI) SHALL BE INSTALLED IN THE CONTROL PANEL PROVIDING A NETWORK CONNECTION TO EACH VESDA AIR SAMPLING DETECTOR.
   2. RELEASING CONTROL MODULE (RCM)
      a. CAPABLE OF SUPPORTING UP TO 2.0A @24VDC RELEASING CURRENT.
      b. THE RCM SHALL BE CAPABLE OF OPERATING IN ONE OF TWO MODES; CONNECTION TO A SINGLE COMPATIBLE SOLENOID (PRE-ACTION) OR CONNECTION TO AGENT RELEASE MODULES (ARM).
   3. SUPERVISED CONTROL MODULE (SCM)
      a. THE SCM SHALL BE CAPABLE OF SUPPLYING UP TO 2.0 A @24VDC OUTPUT CURRENT FOR CONNECTION TO COMPATIBLE BELLS, HORNS, STROBES, ETC.
   4. RELAY MODULE (RM)
      a. THE RM SHALL BE FUNCTION PROGRAMMABLE BY THE CONTROL PANEL. EACH CONTACT SHALL BE CAPABLE OF SWITCHING UP TO 2A @30VDC.
   5. THE MM SHALL MONITOR NORMALL OPEN OR NORMALLY CLOSED CONTACTS AND SHALL BE PROGRAMMED FOR A VARIETY OF INPUT TYPES.

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MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO

SPECIFICATIONS SHEET

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G. INTELLIGENT MANUAL RELEASE STATION

a. THE INTELLIGENT PULL STATION SHALL BE AN INTELLIGENT INPUT MODULE THAT IS ACTIVATED THROUGH DUAL-ACTION, PUSHING IN AND PULLING DOWN AS INSTRUCTED TO PROVIDE A MEANS OF MANUALLY DISCHARGING THE AUTOMATIC FIRE EXTINGUISHING SYSTEM.

b. THE FRONT SHALL BE MARKED "CLEAN AGENT RELEASE".

c. THE MANUAL RELEASE SHALL BE LOCATED AT EACH EXIT FROM THE PROTECTED HAZARD AND SHALL HAVE AN ADVISORY SIGN PROVIDED AT EACH LOCATION.

d. THE MANUAL ACTUATIONS SHALL BY-PASS THE TIME DELAY AND ABORT FUNCTIONS, SHALL CAUSE THE SYSTEM TO DISCHARGE AND SHALL CAUSE ALL RELEASE AND SHUTDOWN DEVICES TO OPERATE IN THE SAME MANNER AS IF THE SYSTEM HAD OPERATED AUTOMATICALLY.

D. ABORT STATION

1. THE ABORT STATION SHALL BE THE "DEAD MAN" TYPE AND SHALL BE LOCATED NEXT TO EACH MANUAL RELEASE SWITCH.
2. "LOCKING" OR "KEYED" ABORT STATIONS SHALL NOT BE PERMITTED.
3. EACH ABORT STATION SHALL BE PROVIDED WITH A MINI-MONITOR MODULE AND CONNECTED TO THE ADDRESSABLE SLC LOOP.
4. THE ABORT STATION STALL BE SUPERVISED AND SHALL INDICATE TROUBLE CONDITION AT THE RELEASE PANEL IF DEPRESSED.

D. AUDIBLE AND VISUAL ALARMS: ALARM SIGNAL DEVICES SHALL OPERATE FROM THE CLEAN AGENT CONTROL PANEL.

1. HORN/STROBE UNITS SHALL BE PROVIDED AND INSTALLED WITH THE MINIMUM ADA AND NFPA REQUIRMENTS. STROBES SHOULD BE OF THE SELECTABLE TYPE.
2. A DISCHARGE STROBE DEVICE SHALL BE INSTALLED OUTSIDE, AND ABOVE, EACH EXIT DOOR FROM THE PROTECTED SPACE. PROVIDE AN ADVISORY SIGN AT EACH LIGHT LOCATION.
3. A DISCHARGE STROBE DEVICE SHALL BE INSTALLED OUTSIDE, AND ABOVE, EACH EXIT DOOR FROM THE PROTECTED SPACE. PROVIDE AN ADVISORY SIGN AT EACH LIGHT LOCATION.

E. CAUTION AND ADVISORY SIGNS
PROVIDE SIGNS, AS REQUIRED, TO COMPLY WITH NFPA-2001 AND THE RECOMMENDATIONS OF THE CLEAN AGENT EQUIPMENT SUPPLIER.

1. ENTRANCE WARNING SIGN: (1) REQUIRED AT EACH ENTRANCE TO A PROTECTED SPACE
2. MANUAL DISCHARGE SIGN: (1) AT EACH MANUAL DISCHARGE STATION.
3. SYSTEM ABORT SIGN: (1) AT EACH MANUAL DISCHARGE STATION.
4. FLASHING LIGHT SIGN: (1) REQUIRED AT EACH FLASHING LIGHT OVER EACH EXIT FROM A PROTECTED SPACE.
5. EXIT WARNING SIGN: (1) REQUIRED AT EACH EXIT TO A PROTECTED SPACE.

F. SYSTEM AND CONTROL WIRING: ALL REQUIRED CLEAN AGENT SYSTEM POWER, CONTROL AND SIGNAL WIRING SHALL BE FURNISHED AND INSTALLED BY THE CLEAN AGENT SYSTEM CONTRACTOR.

1. ALL WIRING ABOVE CEILING AND EXPOSED IN ROOMS SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT) OR CONDUIT.
2. ALL SYSTEM COMPONENTS SHALL BE SECURELY SUPPORTED INDEPENDENT OF THE WIRING. RUNS OF CONDUIT AND WIRING SHALL BE STRAIGHT, NEATLY ARRANGED, PROPERLY SUPPORTED, INSTALLED PARALLEL AND PERPENDICULAR TO WALLS AND PARTITIONS.
3. THE SIZES OF CONDUCTORS SHALL BE THOSE SPECIFIED BY THE MANUFACTURER. COLOR CODES SHALL BE USED. ALL WIRES SHALL BE TAGGED AT ALL JUNCTION POINTS AND SHALL BE FREE FROM GROUNDS AND CROSSES BETWEEN CONDUCTORS. FINAL CONNECTIONS BETWEEN EQUIPMENT AND SYSTEM WIRING SHALL BE MADE UNDER THE DIRECT SUPERVISION OF A FACTORY-TRAINED REPRESENTATIVE.
4. ALL WIRING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS, IN A NEAT AND WORKMANLIKE MANNER, TO CONFORM TO THE NATIONAL ELECTRICAL CODE, ARTICLE 725 FOR CLASS 1 SIGNAL SYSTEMS, EXCEPT AS OTHERWISE PERMITTED FOR LIMITED ENERGY CIRCUITS, AS DESCRIBED IN NFPA-72 CURRENT EDITION. WIRING INSTALLATION SHALL MEET ALL STATE AND LOCAL CODES.
5. THE COMPLETE SYSTEM ELECTRICAL INSTALLATION AND ALL AUXILIARY COMPONENTS SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

PART 3 EXECUTION

I. SYSTEM INSPECTION AND CHECKOUT

A. AFTER THE SYSTEM INSTALLATION HAS BEEN COMPLETED, THE ENTIRE SYSTEM SHALL BE CHECKED OUT, INSPECTED AND FUNCTIONALLY TESTED BY QUALIFIED, TRAINED PERSONNEL, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES AND NFPA STANDARDS.

B. ALL CONTAINERS AND DISTRIBUTION PIPING SHALL BE CHECKED FOR PROPER MOUNTING AND INSTALLATION.

C. ALL ELECTRICAL WIRING SHALL TEST FOR PROPER CONNECTION, CONTINUITY AND RESISTANCE TO GROUND.

D. THE COMPLETE SYSTEM SHALL BE FUNCTIONALLY TESTED, IN THE PRESENCE OF THE OWNER AND/OR HIS REPRESENTATIVE, AND ALL FUNCTIONS, INCLUDING SYSTEM AND EQUIPMENT INTERLOCKS, MUST BE OPERATIONAL AT LEAST 5 DAYS PRIOR TO THE FINAL ACCEPTANCE TESTS.

1. EACH DETECTOR SHALL BE TESTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES, AND TEST VALUES RECORDED.
2. ALL SYSTEM AND EQUIPMENT INTERLOCKS, AUDIBLE AND VISUAL DEVICES, EQUIPMENT SHUTDOWNS, LOCAL AND REMOTE ETC. SHALL FUNCTION AS REQUIRED AND DESIGNED.
3. EACH CONTROL PANEL CIRCUIT SHALL BE TESTED FOR TROUBLE BY INDUCING A TROUBLE CONDITION INTO THE SYSTEM.
4. PANEL TROUBLE AND ALARM AT BUILDING MAIN FIRE ALARM PANEL SHALL BE TESTED.

II. TRAINING REQUIREMENTS

A. PRIOR TO FINAL ACCEPTANCE, THE CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE OPERATIONAL TRAINING TO THE OWNER'S PERSONNEL. EACH TRAINING SESSION SHALL INCLUDE SYSTEM CONTROL PANEL OPERATION, MANUAL AND ABORT FUNCTIONS, TROUBLE PROCEDURES, AUXILIARY FUNCTIONS AND EMERGENCY PROCEDURES.

III. OPERATION AND MAINTENANCE

A. PRIOR TO FINAL ACCEPTANCE, THE CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE COMPLETE OPERATION AND MAINTENANCE INSTRUCTION MANUALS, THREE (3) COPIES FOR EACH SYSTEM, TO THE OWNER. ALL ASPECTS OF SYSTEM OPERATION AND MAINENANCE SHALL BE DETAILED, INCLUDING PIPING ISOMETRICS, WIRING DIAGRAMS OF ALL CIRCUITS, WRITTEN DESCRIPTION OF THE SYSTEM DESIGN AND AND SEQUENCE OF OPERATION, DRAWINGS ILLUSTRATING CONTROL LOGIC AND EQUIPMENT USED IN THE SYSTEM. CHECKLISTS AND PROCEDURES FOR EMERGENCY SITUATIONS, TROUBLESHOOTING TECHNIQUES AND MAINTENANCE OPERATIONS AND PROCEDURES SHALL BE INCLUDED IN THE MANUAL.

IV. AS-BUILT DRAWINGS

A. UPON COMPLETION OF EACH SYSTEM, THE CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE THREE (3) COPIES OF SYSTEM AS-BUILT DRAWINGS TO THE OWNER. THE DRAWINGS SHALL SHOW ACTUAL INSTALLATION DETAILS INCLUDING ALL EQUIPMENT LOCATIONS, I.E. CONTROL PANELS, AGENT CONTAINERS, DETECTORS, AND THEIR ADDRESSES, ALARMS, MANUALS AND ABORTS, ETC., AS WELL AS PIPING AND CONDUIT ROUTING DETAILS. SHOW ALL ROOM OR FACILITIES MODIFICATIONS, INCLUDING DOOR AND/OR DAMPER INSTALLATION COMPLETED. ONE CD DISK SHALL BE PROVIDED WITH THE "AS-BUILT" DRAWINGS AND SYSTEM MANUAL IN ELECTRONIC FORMAT.

V. ACCEPTANCE TESTS

A. AT THE TIME "AS-BUILT" DRAWINGS AND MAINTENANCE/OPERATIONS MANUALS ARE SUBMITTED, THE INSTALLING CONTRACTOR SHALL SUBMIT A "TEST PLAN" DESCRIBING PROCEDURES TO BE USED TO TEST THE CONTROL SYSTEM. THE TEST PLAN SHALL INCLUDE A STEP-BY-STEP DESCRIPTION OF ALL TESTS TO BE PERFORMED AND SHALL INDICATE THE TYPE AND LOCATION OF TEST APPARATUS TO BE EMPLOYED. THE TESTS SHALL DEMONSTRATE THAT THE OPERATIONAL AND INSTALLATION REQUIREMENTS OF THIS SPECIFICATION HAVE BEEN MET. ALL TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER AND SHALL NOT BE CONDUCTED UNTIL THE TEST PLAN HAS BEEN APPROVED.

B. THE TESTS SHALL DEMONSTRATE THAT THE ENTIRE CONTROL SYSTEM FUNCTIONS AS DESIGNED AND INTENDED. ALL CIRCUITS SHALL BE TESTED: AUTOMATICE ACTUATION, MANDUAL ACTUATION, HVAC, AUDIBLE AND VISUAL ALARM DEVICES, MANUAL OVERRIDE ABORT FUNCTIONS AND AGENT CONTAINER PRESSURE SUPERVISION. SUPERVISION OF ALL PANEL CIRCUITS, INCLUDING AC POWER AND BATTERY POWER SUPPLIESM, SHALL BE TESTED AND QUALIFIED.

C. A PRESSURIZATION TEST SHALL BE CONDUCTED, IN EACH PROTECTED SPACE, TO DETERMINE THE PRESENCE OF OPENINGS, WHICH WOUDLD AFFECT THE CLEAN AGENT SYSTEM CONCENTRATION LEVELS. ALL TESTING SHALL BE COMPLETED BY A FACTORY CERTIFIED LEVEL II TESTER AND IN ACCORDANCE WITH NFPA-2002

D. IF PRESSURIZATION TESTING INDICATES THAT OPENINGS EXIST WHICH WOULD RESULT IN LEAKAGE AND/OR LOSS OF THE CLEAN AGENT EXTINGUISING AGENT, THE SEALING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE PROPER SEALING ALL PROTECTED SPACES AGAINST AGENT LOSS OR LEAKAGE. THE SEALING CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESSURIZATION TEST SUCCESS. IF THE FIRST PRESSURIZATION TEST IS NOT SUCCESSFUL, IN ACCORDANCE WITH THESE SPECIFICATIONS, THE CONTRACTOR SHALL DETERMINE, AND CORRECT, THE CAUSE OF THE TEST FAILURE. THE CONTRACTOR SHALL CONDUCT ADDITIONAL PRESURIZATION TESTS, AT NO ADDITIONAL COST TO THE OWNER, UNTIL A SUCCESSFUL TEST IS OBTAINED. COPIES OF SUCCESSFUL TEST RESULTS SHALL BE SUBMITTED TO THE OWNER FOR RECORD.

E. UPON ACCEPTANCE BY THE OWNER, THE COMPLETED CLEAN AGENT SYSTEM SHALL BE PLACED IN NORMAL SERVICE.

VI. CLEAN AGENT SYSTEM INSPECTIONS

A. THE CLEAN AGENT INSTALLING CONTRACTOR SHALL PROVIDE TWO (2) INSPECTIONS OF EACH CLEAN AGENT SYSTEM, INSTALLED UNDER THIS CONTRACT, DURING THE ONE-YEAR WARRANTY PERIOD. THE FIRST INSPECTION SHALL BE AT 6 MONTH INTERVAL, AND THE SECOND INSPECTION AT THE 12 MONTH INTERVAL, AFTER SYSTEM ACCEPTANCE. INSPECTIONS SHALL BE CONDUCTED IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES AND SHALL COMPLY WITH THE RECOMMENDATIONS OF NFPA-2001.

B. DOCUMENTS CERTIFYING SATISFACTORY SYSTEMS OPERATION SHALL BE SUBMITTED TO THE OWNER UPON COMPLETION OF EACH INSPECTION.

VII. WARRANTY

A. ALL SYSTEM COMPONENTS FURNISHED, AND INSTALLED UNDER THIS CONTRACT, SHALL BE GUARANTEED AGAINST DEFECTS IN DESIGN, MATERIALS AND WORKMANSHIP FOR A FULL WARRANTY PERIOD WHICH IS STANDARD WITH THE MANUFACTURER, BUT IN NO CASE LESS THAN ONE YEAR FROM THE DATE OF SYSTEM ACCEPTANCE.

B. THE CLEAN AGENT CONTRACTOR SHALL PROVIDE A 5 YEAR WARRANTY AGAINST DEFECTS IN MATERIALS PROVIDED THE OWNER MAINTAINS A SERVICE AGREEMENT DURING THE WARRANTY PERIOD.

ENGINEERED DESIGNED FACILITIES
149 WELDON PARKWAY, SUITE 111, MARYLAND HEIGHTS, MO 63043
PHONE 314-569-2548 - FAX 314-569-2549

MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO
SPECIFICATIONS

REV	DATE	DESCRIPTION	BY	APPRD	CHKD
0	06/10/09	ISSUED FOR BIDDING	KGH	WHC	DDK

ENGINEER'S SEAL

DESIGNED K.G HETLAGE DATE 06/10/09
DRAWN K.G HETLAGE DATE 06/10/09
CHECKED SCALE AS NOTED

SHEET NO. SP-2

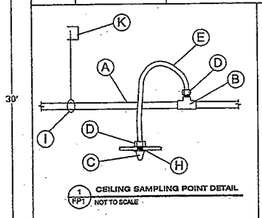
REV D

1 FP-1 AIR-SAMPLING FLOOR LAYOUT
SCALE: 1/4"=1'-0" SUB-FLOOR HEIGHT 2'-6"

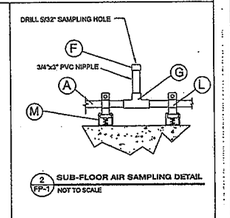
AIR-SAMPLING PIPING INSTALLATION NOTES

1. ALWAYS USE TOOLS SPECIFICALLY DESIGNED FOR PLASTIC PIPE.
2. PROTECTIVE GLOVES ARE RECOMMENDED FOR USE WHEN SOLVENT CEMENTING. IF HANDS COME INTO CONTACT WITH CEMENT, USE A WATERLESS ABRASIVE SOAP.
3. AVOID SOURCES OF HEAT OR OPEN FLAMES WHEN SOLVENT CEMENTING. DO NOT SMOKE.
4. ALWAYS CHAMFER AND DEBURR PIPE ENDS.
5. USE THE PROPER SOLVENT CEMENT.
6. ALWAYS REPLACE LIDS ON CANS WHEN NOT IN USE.
7. NEVER DILUTE SOLVENT.
8. AVOID DIRECT INHALATION OF FUMES. USE IN A WELL VENTILATED AREA.
9. WIPE UP SPILLS OR LEAKS IMMEDIATELY WITH CLEAN LINTFREE CLOTH OR PAPER TOWELS.
10. FOLLOW RECOMMENDED CURE TIMES PRIOR TO TESTING THE SYSTEM.
11. PREVENT EXCESSIVE SOLVENT CEMENT FROM RUNNING INTO THE PIPE OR FITTING SOCKET.
12. THE INTEGRITY OF AIR SAMPLING SYSTEM MAY BE AFFECTED IF PROPER CPVC SOLVENT CEMENT IS NOT USED.
13. PIPE SHOULD BE PROPERLY SUPPORTED IN STORAGE TO PREVENT SAGGING OR BENDING. PIPE SHOULD BE STORED AT THE JOB SITE ON LEVEL GROUND IN THE PACKAGES PROVIDED. CAUTION MUST BE EXERCISED TO AVOID COMPRESSION, DAMAGE OR DEFORMATION.
14. AIR SAMPLING PIPE NETWORK CALCULATIONS SHALL BE PROVIDED BY EDF.
15. ALL SOLVENT CEMENTED CONNECTIONS SHALL BE ASSEMBLED IN ACCORDANCE WITH VISION SYSTEMS RECOMMENDATIONS.
16. MAXIMUM SUPPORT SPACING FOR MAIN SAMPLING PIPES SHALL NOT EXCEED 5FT. HANGERS AND SUPPORTS USED SHALL BE FREE OF ROUGH OR SHARP EDGES AND SHALL NOT BIND THE PIPE FROM MOVEMENT.
17. END CAPS SHALL BE SOLVENT CEMENTED TO EACH MAIN SAMPLING PIPE, AND DRILLED WITH A HOLE AS SPECIFIED BY THE ASPIRE MODELING PROGRAM.
18. SAMPLING HOLES SHALL BE 5/32" DIAMETER, OR OTHERWISE APPROPRIATELY SIZED TO ACHIEVE THE SPECIFIED SYSTEM PERFORMANCE AS SPECIFIED AND CALCULATED BY THE SYSTEM DESIGN.
19. SAMPLING POINTS SHALL NOT BE SPACED AT MORE THAN 20 FT INTERVALS.
20. EACH SAMPLING POINT SHALL BE IDENTIFIED WITH A LABEL.
21. MAXIMUM LENGTH OF CAPILLARY TUBE SHALL NOT EXCEED 20 FT.
22. THE CAPILLARY TUBE SHALL TERMINATE AT AN APPROVED CEILING SAMPLING POINT.
23. THE FOLLOWING PROCEDURE MUST BE FOLLOWED FOR JOINING PROCEDURES:
    1. THE PIPE MUST BE CUT SQUARE. CUTTING THE PIPE AS SQUARELY AS POSSIBLE PROVIDES A MAXIMUM BONDING AREA. PIPE SHALL BE CUT USING THE CUTTERS PROVIDED BY EDF.
    2. REMOVE ALL BURRS AND FILINGS, AND PLACE A PROPER BEVEL ON THE PIPE END BY USING CLEAN DRY RAG. CHECK THE "DRY FIT" OF THE COMPONENTS BEING JOINED TO ENSURE COMPATIBILITY. THE PIPE SHOULD ENTER THE FITTING SOCKET ⅓ TO ½ OF THE WAY. IF THE PIPE BOTTOMS WITH LITTLE INTERFERENCE FIT USE EXTRA SOLVENT CEMENT WHEN MAKING THE JOINT.

PC	PART NO.	DESCRIPTION
A	68-042	PIPING, PLENUM RATED, 3/4" CPVC
B	68-049	TEE, FPT, CPVC
C	68-031	MINIATURE SAMPLING POINT
D	68-033	CONNECTOR KIT FOR 68-031
E	68-034	TUBING, POLYETHYLENE, 1/2" OD
F	68-047	END CAP, 3/4", CPVC
G	68-048	TEE EQUAL, 3/4", CPVC
H	68-032	DECAL - RED FOR 68-031
I		3/4" TEARDROP HANGER RING
J		3/8" ALL THREAD ROD
K		3/8" BEAM CLAMP
L		3/4" STRUT CLAMP
M		UNISTRUT 6"



1 FP1 CEILING SAMPLING POINT DETAIL
NOT TO SCALE



2 FP-1 SUB-FLOOR AIR SAMPLING DETAIL
NOT TO SCALE

2 FP-1 AIR-SAMPLING CEILING LAYOUT
SCALE: 1/4"=1'-0"

EDF ENGINEERED DESIGNED FACILITIES
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MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO
AIR-SAMPLING LAYOUTS

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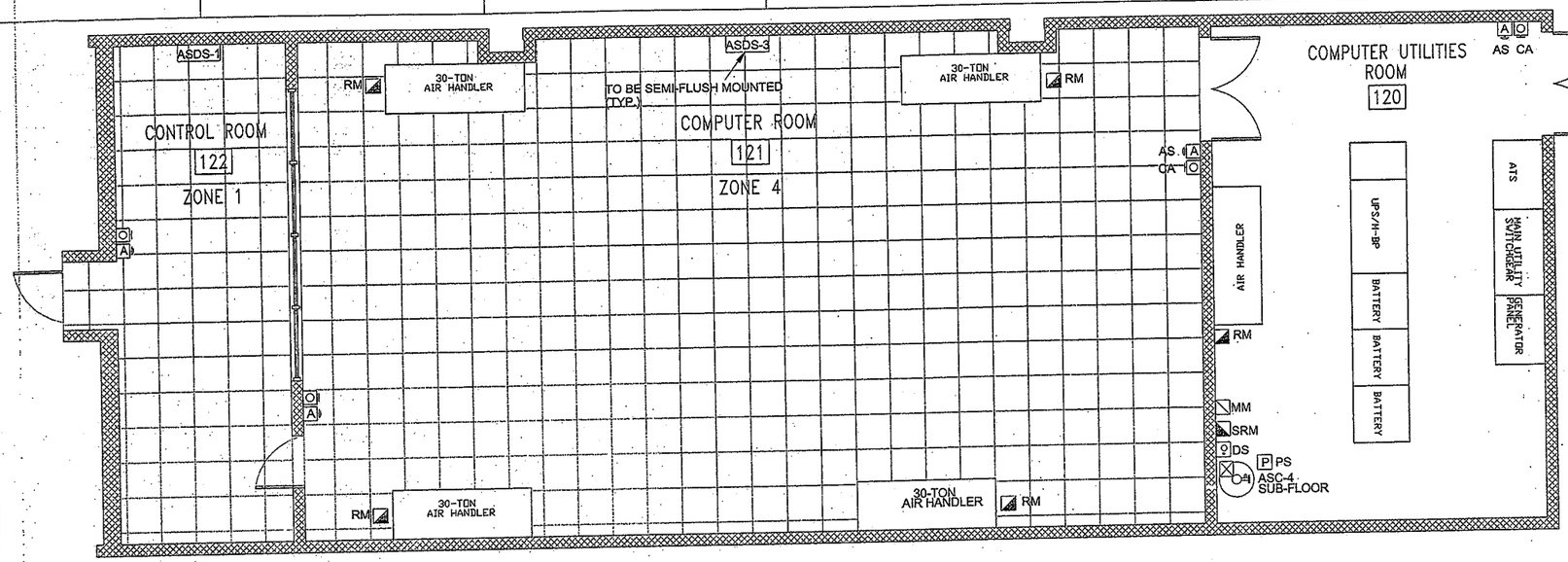
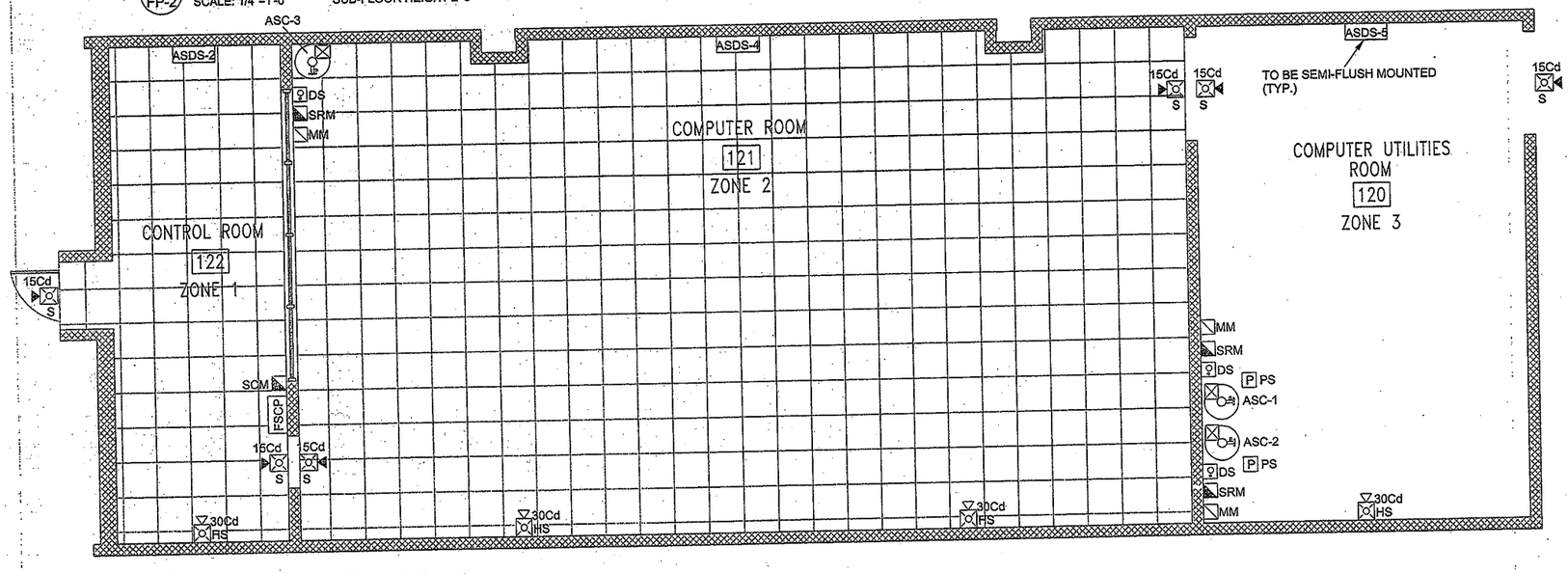


1 FP-2 ELECTRICAL FLOOR LAYOUT
SCALE: 1/4"=1'-0" SUB-FLOOR HEIGHT 2'-6"



2 FP-2 ELECTRICAL CEILING LAYOUT
SCALE: 1/4"=1'-0"

BILL OF MATERIALS

SYMBOL	PC NO.	QTY	DESCRIPTION
FSCP	1	1-EA	FIRE SUPPRESSION CONTROL PANEL
ASDS	2	-EA	AIR SAMPLING DETECTION SYSTEM
CA	3	4-EA	MANUAL PULL STATION
AS	4	4-EA	ABORT SWITCH
RM	5	5-EA	RELAY MODULE
HS	6	5-EA	WALL MOUNTED HORN STROBE
DS	7	4-EA	WALL MOUNTED STROBE
MM	5	4-EA	MONITOR MODULE
SRM	6	4-EA	SUPERVISED RELEASE MODULE
DS*	7	4-EA	TANK MAINTENANCE BYPASS DISCONNECT SWITCH
PS	8	3-EA	ASC PRESSURE SWITCH
ARM	9	4-EA	AGENT RELEASE MODULE
ASC	10	1-EA	FIRE SUPPRESSION AGENT STORAGE CONTAINER

CLEAN AGENT ZONE CONTROL LEGEND

ZONE #	ZONE LOCATION
ZONE 1	CONTROL ROOM (122) (ASC-3)
ZONE 2	COMPUTER ROOM (121 ABOVE FLOOR) (ASC-2)
ZONE 3	COMPUTER UTILITIES ROOM (120) (ASC-1)
ZONE 4	COMPUTER ROOM (121 SUB-FLOOR) (ASC-4)

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MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO
ELECTRICAL LAYOUTS

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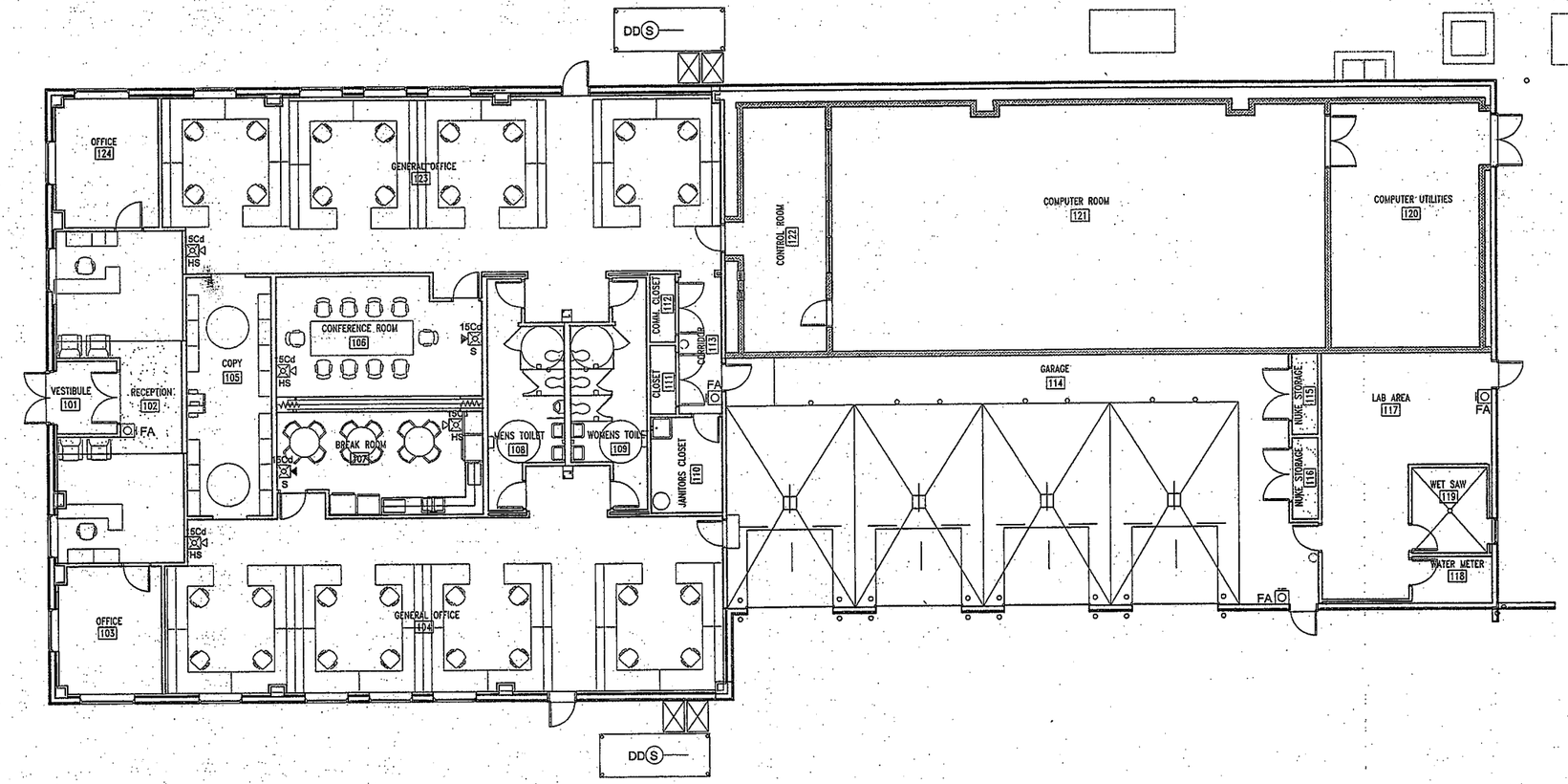

BILL OF MATERIALS			
SYMBOL	PC NO.	QTY	DESCRIPTION
FA	1	4-EA	FIRE ALARM PULL STATION
HS	2	4-EA	WALL MOUNTED HORN STROBE
DS	3	4-EA	WALL MOUNTED STROBE
S—DD	4	3-EA	DUCT DETECTOR
	5	2-EA	CLASS-1 LOW LEAKAGE FIRE/SMOKE DAMPER

ENGINEERED DESIGNED FACILITIES
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MODOT - DISTRICT 4
NEW RESIDENT ENGINEERS OFFICE & DATA CENTER
LEE'S SUMMIT, MO
BUILDING LAYOUT PLAN

REV	DATE	DESCRIPTION	BY	APPRD	CHKD
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ENGINEER'S SEAL

DESIGNED K G HETLAGE DATE 06/10/09
DRAWN K G HETLAGE DATE 06/10/09
CHECKED SCALE AS NOTED

SHEET NO. DFP-4

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