Dexter Community Schools - 2022 Sitework Projects

Date Issued: 03.04.2022

Dexter, MI 48130

BID PACKAGE #2 - Bids

Project Site Locations

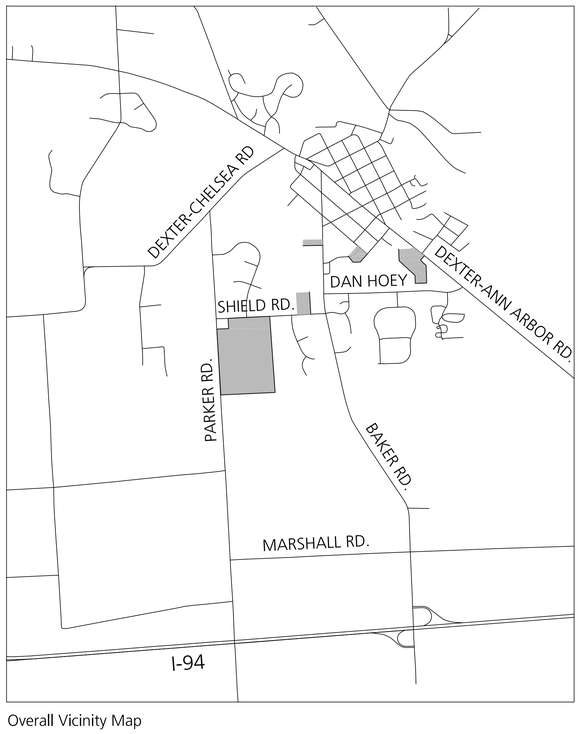
Jenkins Early Childhood Learning Center
2801 Baker Road

Wylie Elementary School
3060 Kensington Street

Mill Creek Middle School
7305 Ann Arbor Street

Al Ritt Stadium
8100 Shield Road

Dexter High School
2200 N. Parker Road



Overall Vicinity Map

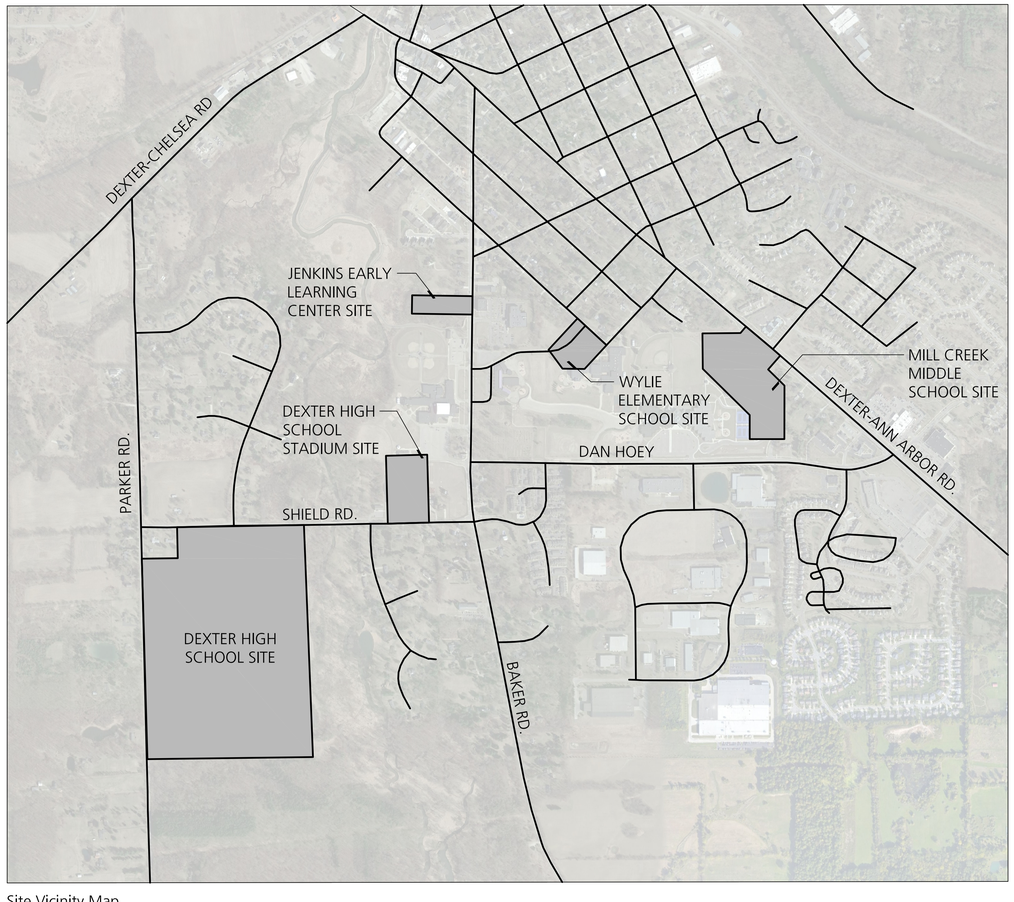
Project Contacts

Owner:

Craig McCalla
Principal for Operations
Dexter Community Schools
734.424.4100

Consultants:

Brian Barrick
Principal
Beckett & Raeder, Inc.
734.663.2622



Site Vicinity Map

Location Maps

NTS

Sheet Index

Civil Engineer

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Landscape Architecture
Planning, Engineering and
Environmental Services

Beckett & Raeder, Inc.
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Ann Arbor, MI 48103

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734 663.6759 fx

Landscape Architect

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Ann Arbor, MI 48103

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Architect

COOPER DESIGN

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Ann Arbor, Michigan 48104
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734.769.9919 fax
info@cooperdesignine.com

MEP Engineer

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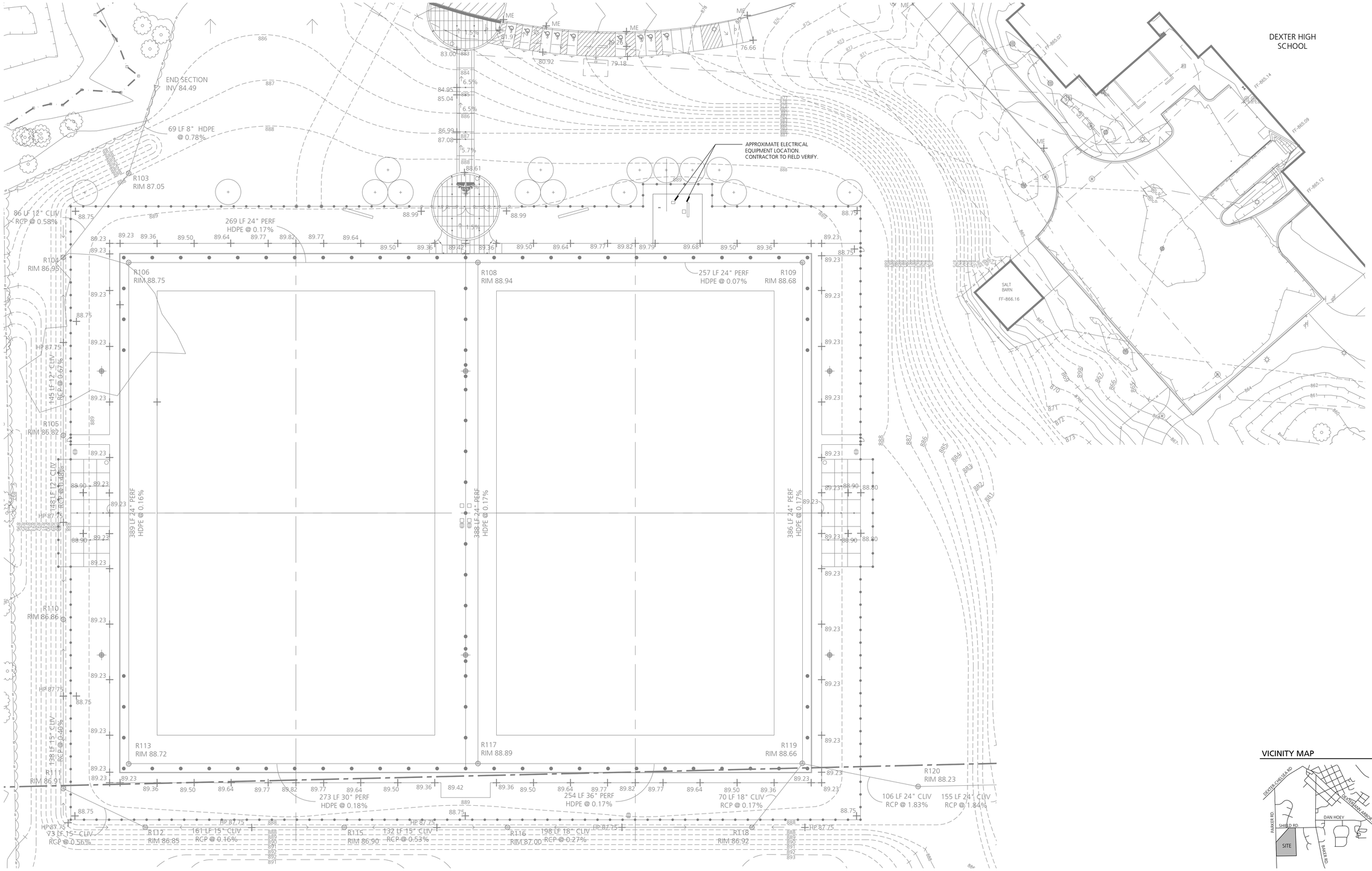
CONSULTING ENGINEERS

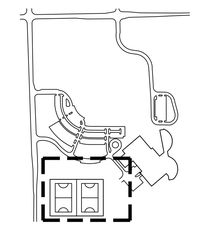
5145 Livernois, Suite 100
Troy, Michigan 48098-3276
Tel: 248-879-5666
Fax: 248-879-0007
www.PeterBassoAssociates.com

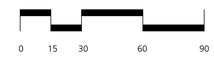


EXISTING CONDITIONS LEGEND

VICINITY MAP

KEY PLAN





811 Know what's below. Call before you dig.

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Existing Conditions

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

1" = 30'

Quality Control

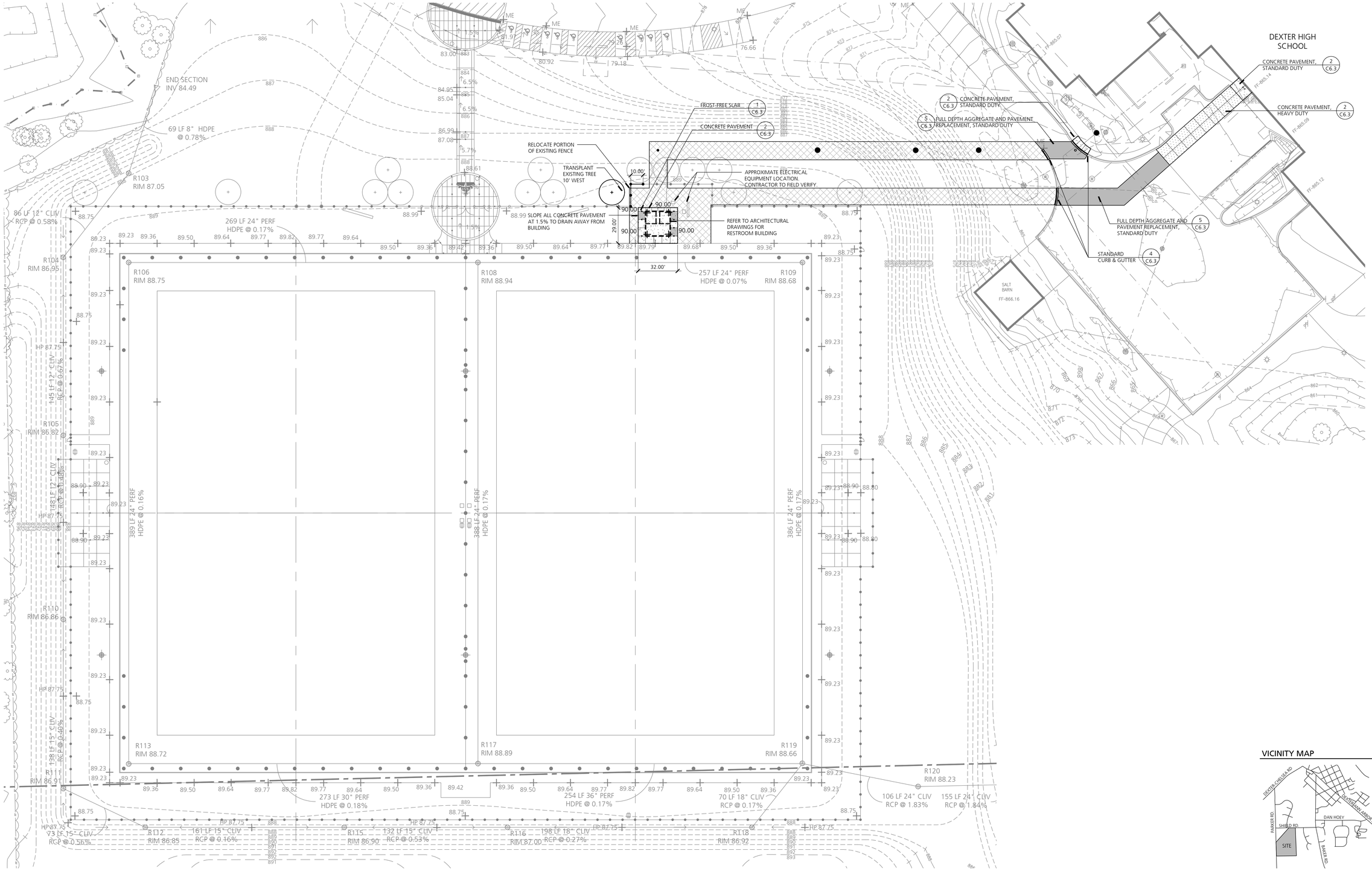
Drawn: AT
Checked: BB
Approved: BB

Project Number

BRI 2021097

Sheet Number

C6.0



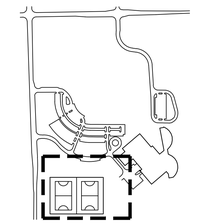
LAYOUT & GRADING LEGEND

- S.D. CONCRETE PAVEMENT
- H.D. CONCRETE PAVEMENT
- FULL DEPTH AGGREGATE AND PAVEMENT REPLACEMENT, STANDARD DUTY
- LAWN SEED
- PROPOSED CURB AND GUTTER
- LIMIT OF WORK LINE
- 89.50 EXISTING SPOT GRADE
- 880 EXISTING MAJOR CONTOUR
- 878 EXISTING MINOR CONTOUR
- 885 PROPOSED MAJOR CONTOUR
- 888 PROPOSED MINOR CONTOUR
- TREE PROTECTION FENCE
- FILTER FABRIC FENCE
- ME MATCH EXISTING GRADE
- 90.00 PROPOSED SPOT GRADE (+ X00)

Know what's below. Call before you dig.

VICINITY MAP

KEY PLAN



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Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Layout & Grading Plan

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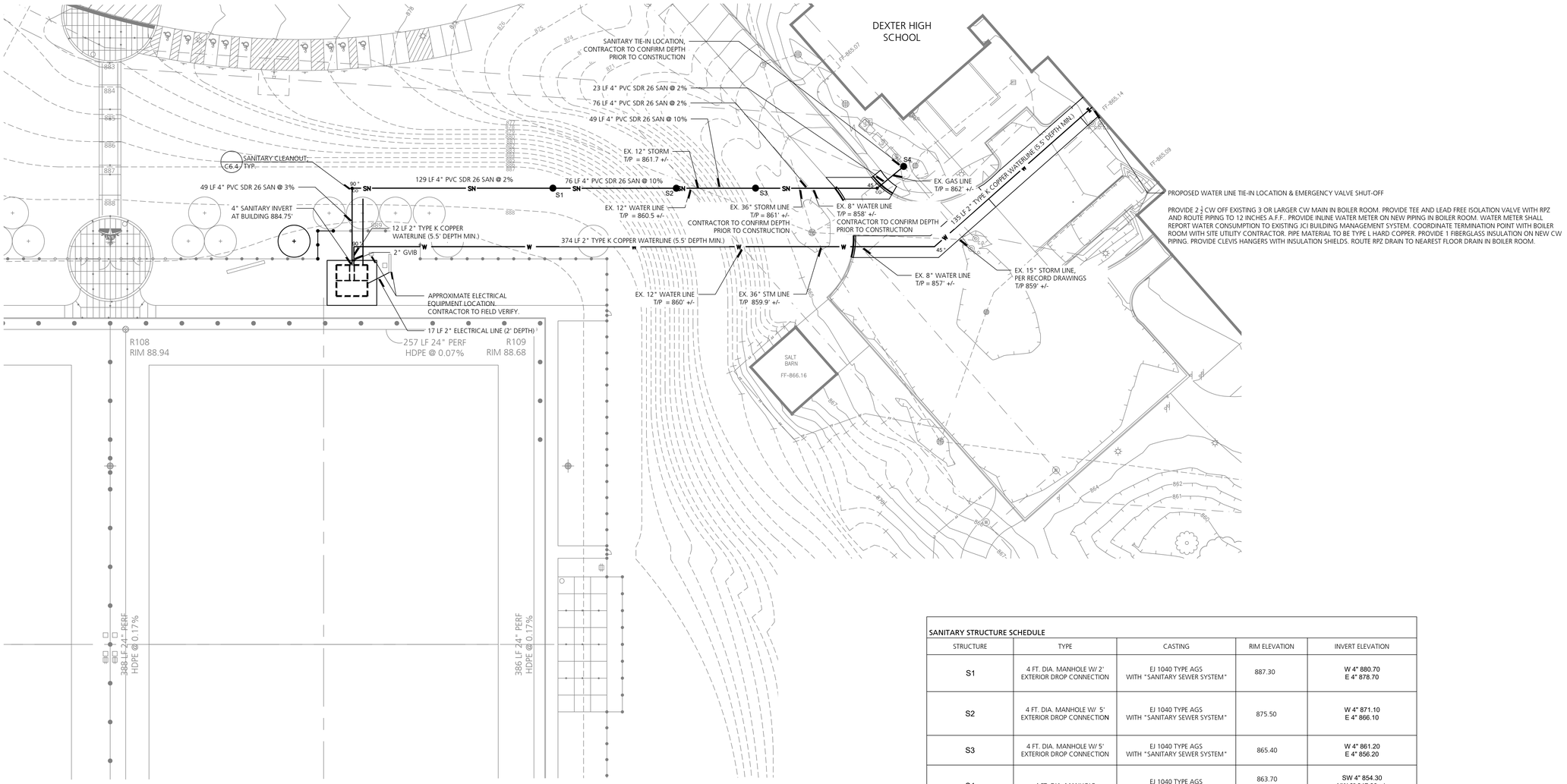


SANITARY STRUCTURE SCHEDULE				
STRUCTURE	TYPE	CASTING	RIM ELEVATION	INVERT ELEVATION
S1	4 FT. DIA. MANHOLE W/ 2' EXTERIOR DROP CONNECTION	EJ 1040 TYPE AGS WITH "SANITARY SEWER SYSTEM"	887.30	W 4" 880.70 E 4" 878.70
S2	4 FT. DIA. MANHOLE W/ 5' EXTERIOR DROP CONNECTION	EJ 1040 TYPE AGS WITH "SANITARY SEWER SYSTEM"	875.50	W 4" 871.10 E 4" 866.10
S3	4 FT. DIA. MANHOLE W/ 5' EXTERIOR DROP CONNECTION	EJ 1040 TYPE AGS WITH "SANITARY SEWER SYSTEM"	865.40	W 4" 861.20 E 4" 856.20
S4	4 FT. DIA. MANHOLE	EJ 1040 TYPE AGS WITH "SANITARY SEWER SYSTEM"	863.70	SW 4" 854.30 NW 8" 847.90 +/- SE 8" 848.00 +/-

UTILITY & RESTORATION LEGEND

- UGE — PROPOSED ELECTRIC LINE
- SN — PROPOSED SANITARY LINE
- W — PROPOSED WATER LINE
- PROPOSED WATER STRUCTURE
- PROPOSED SANITARY CLEANOUT
- PROPOSED SANITARY MANHOLE

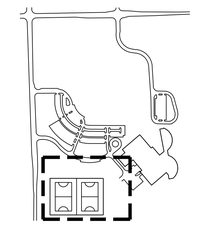
UTILITY PLAN NOTES

1. PROPOSED CONTOUR LINES AND SPOT ELEVATIONS REFLECT FINISH GRADES. HOLD DOWN SUBGRADE ELEVATIONS ACCORDINGLY. ADJUST RIM ELEVATIONS OF ALL UTILITIES AFFECTED BY WORK IN THIS CONTRACT. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE ON THE SITE. ANY AREA THAT APPEARS TO NOT PROPERLY DRAIN SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE LANDSCAPE ARCHITECT / ENGINEER FOR RESOLUTION.
2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITY LOCATIONS, DEPTHS AND ELEVATIONS PRIOR TO CONSTRUCTION. NO CHANGES IN CONTRACT PRICE WILL BE AWARDED FOR ACTUAL DISCREPANCIES IN UTILITY LOCATIONS DUE TO THE FAILURE TO VERIFY ACTUAL FIELD LOCATIONS.
3. THE CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS TO A CONDITION EQUAL TO OR BETTER THAN THAT EXISTING PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CLEAN UP AND HAUL AWAY ALL CONSTRUCTION DEBRIS AND LITTER CAUSED BY HIS OPERATIONS.
4. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE INCURRED SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
5. ALL UTILITY CROSSINGS SHALL HAVE A MINIMUM OF 18" VERTICAL CLEARANCE.
6. THE WORK SHALL BE PERFORMED IN COMPLETE CONFORMANCE WITH THE CURRENT STATE OF MICHIGAN STANDARD SPECIFICATIONS AND DETAILS, UNLESS OTHERWISE NOTED. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT.

Know what's below. Call before you dig.

VICINITY MAP

KEY PLAN



0 15 30 60 90

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Project Title

Dexter Community Schools 2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Utility & Restoration Plan

Dates

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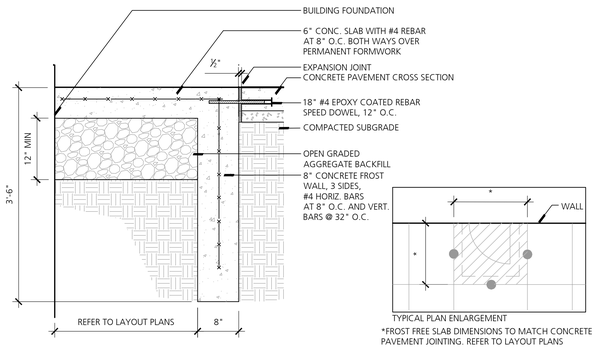
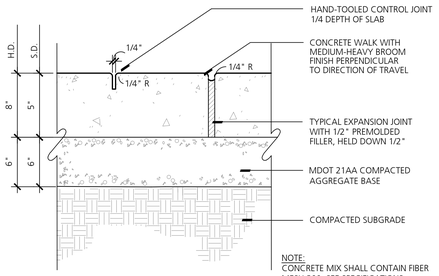
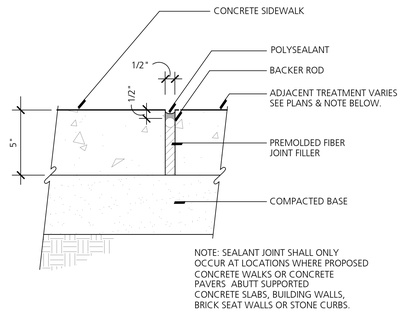


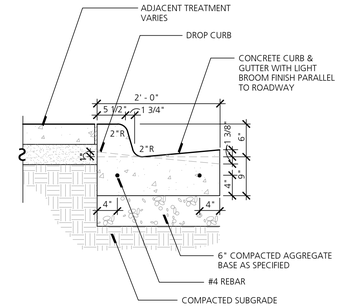
1 **Frost-Free Slab**
NO SCALE



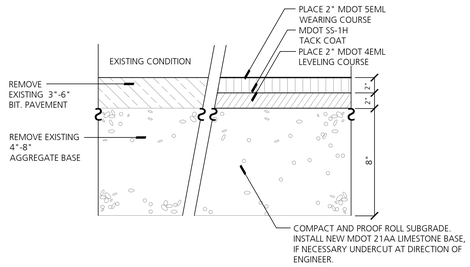
2 **Concrete Pavement**
NO SCALE



3 **Expansion Joint with Sealant**
NO SCALE



4 **Standard Curb & Gutter / MDOT F4**
NO SCALE



5 **Full Depth Aggregate and Pavement Replacement, Standard Duty (DHS)**
Not to Scale

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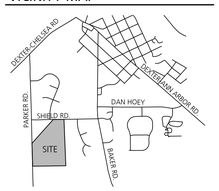
Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

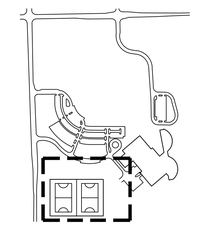
Sheet Title

DHS Twin Turf Fields
Site Details

VICINITY MAP



KEY PLAN



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Dates

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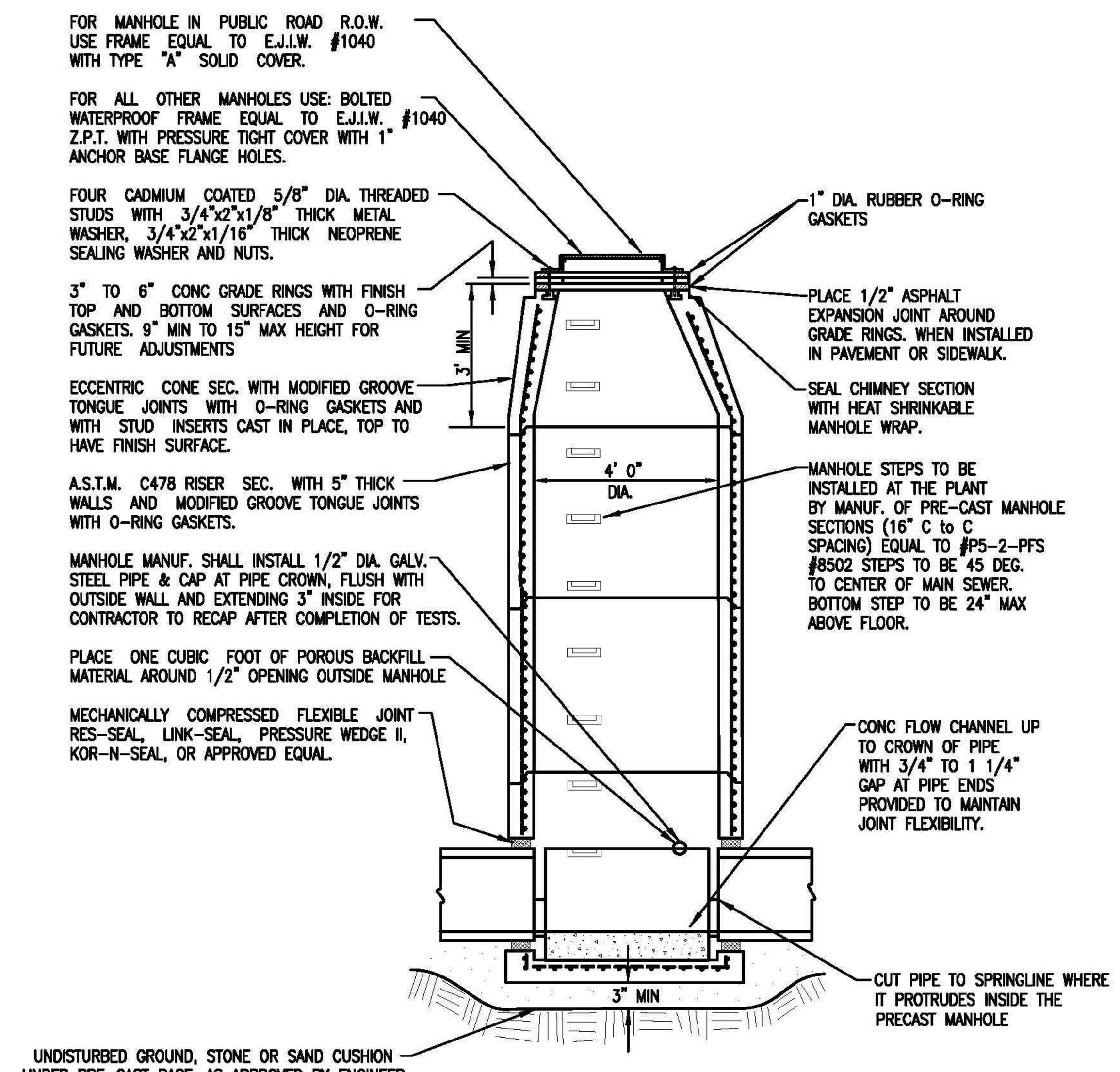
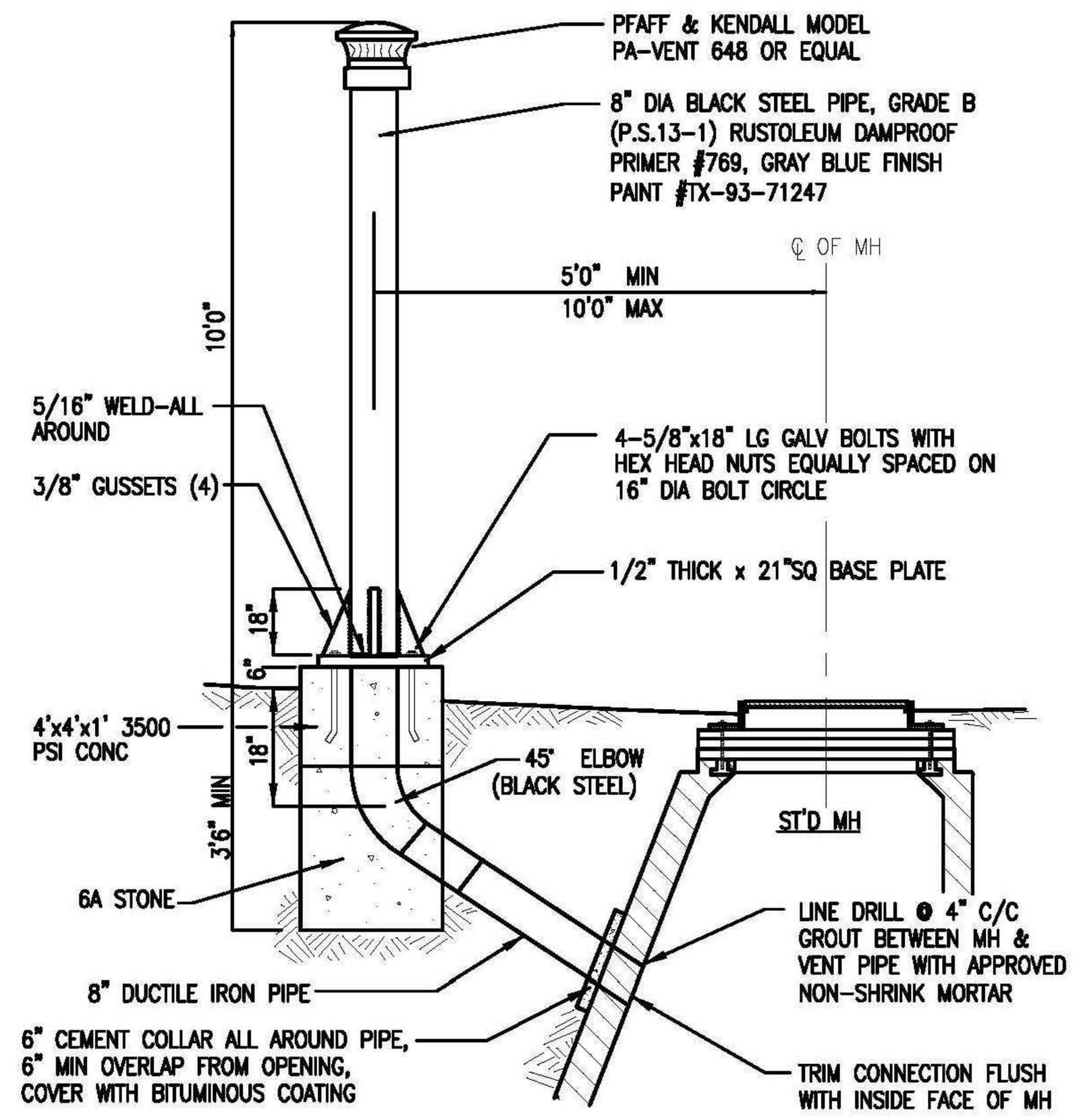
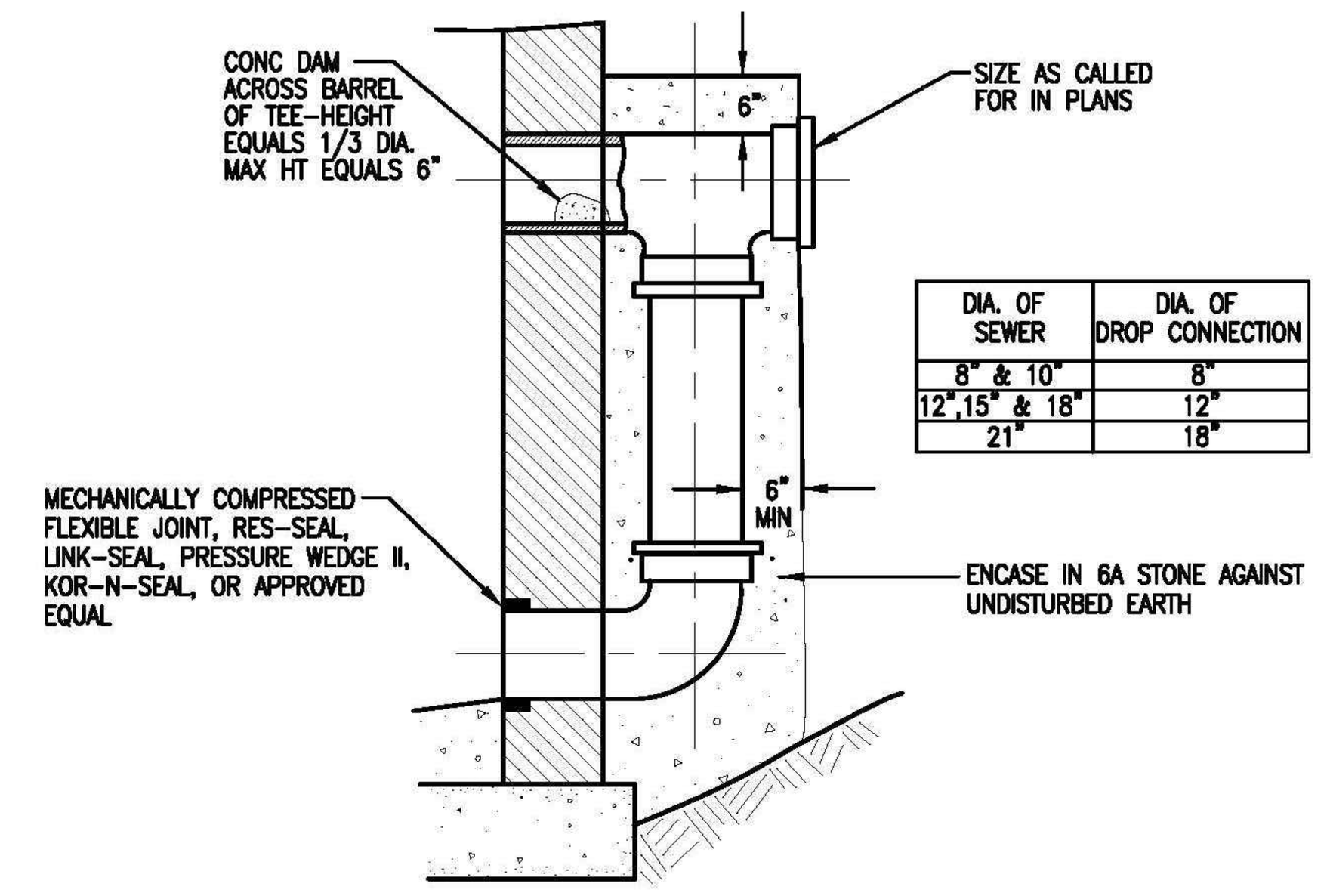


STANDARD SANITARY MANHOLE
FOR SEWERS 8" THRU 21"



STANDARD VENT ASSEMBLY

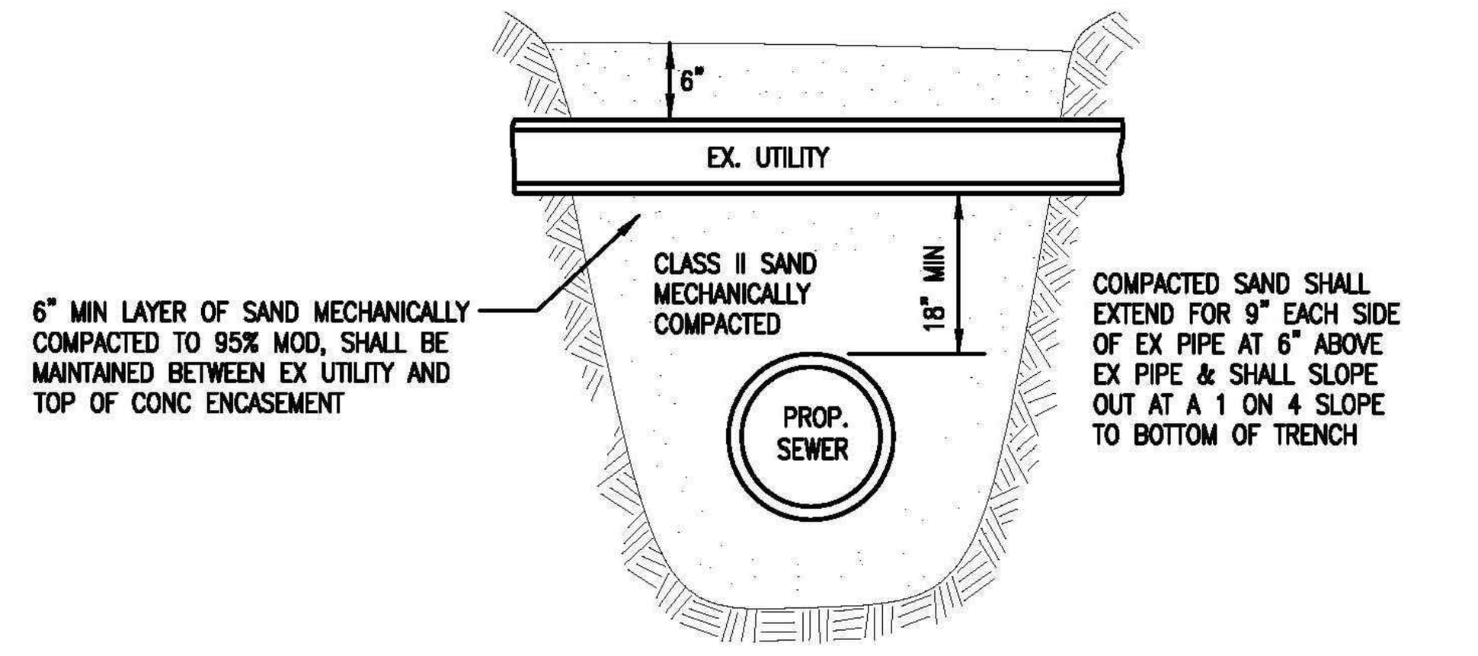


DIA. OF SEWER	DIA. OF DROP CONNECTION
8" & 10"	8"
12",15" & 18"	12"
21"	18"

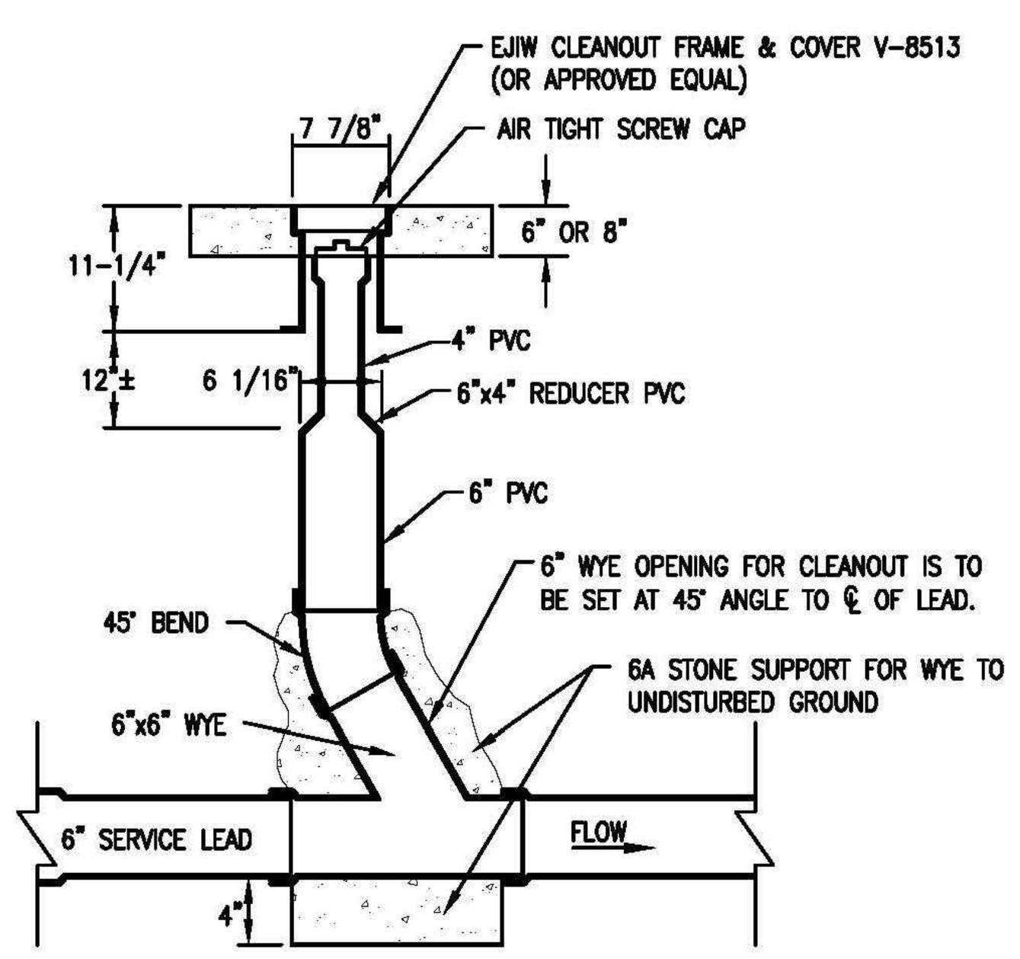
DROP CONNECTION

SANITARY SEWER NOTES

1. ALL MANHOLE RIMS SHALL BE SET TO GRADE AS APPROVED BY THE VILLAGE ENGINEER.
2. RISERS ON SANITARY SEWERS SHALL BE INSTALLED IN LOCATIONS WHERE SEWER IS OVER 10' DEEP. RISERS SHALL BE INSTALLED TO A DEPTH OF 10 FEET BELOW THE FINISHED GROUND ELEVATION.
3. ONE SANITARY SEWER SERVICE LEAD SHALL BE PROVIDED FOR EACH LOT ALONG THE ROUTE OF THE SANITARY SEWER UNLESS OTHERWISE SPECIFIED. THE SANITARY SEWER SERVICE LEAD SHALL EXTEND A MINIMUM OF 2 FEET BEYOND THE PRIVATE UTILITY EASEMENT.
4. ALL MANHOLES SHALL USE ECCENTRIC CONES PLACED TOWARD THE PROPERTY LINE UNLESS OTHERWISE NOTED.
5. HEAT SHRINKABLE MANHOLE WRAPS TO BE PLACED ON ALL MANHOLES.
6. INFILTRATION FOR ANY SECTION OF SEWERS SHALL NOT EXCEED 100 GALLONS PER INCH DIAMETER PER MILE OF SEWER PER 24 HOURS.
7. NO FOOTING OR ROOF DRAINS SHALL BE CONNECTED TO THE SANITARY SEWER.
8. DIFFERENTIAL OF EXCAVATION AROUND EXISTING MANHOLES SHALL NOT EXCEED 6 FEET.
9. NO CONNECTION RECEIVING STORM WATER, SURFACE WATER OR GROUND WATER SHALL BE MADE TO SANITARY SEWERS.
10. ALL SANITARY SEWERS SHALL BE SUBJECT TO TELEVISION INSPECTION AND AIR INFILTRATION OR EXFILTRATION TESTS, OR A COMBINATION OF SAME, PRIOR TO ACCEPTANCE. ALL SEWERS OVER 24 INCHES IN DIAMETER SHALL BE SUBJECTED TO INFILTRATION TESTS. ALL SEWERS 24 INCHES IN DIAMETER AND SMALLER, WHERE THE GROUND WATER LEVEL ABOVE THE TOP OF THE PIPE IS OVER 2 FEET, SHALL BE SUBJECTED TO INFILTRATION TESTS. ALL SEWERS 24 INCHES IN DIAMETER OR SMALLER, WHERE THE GROUND WATER LEVEL ABOVE THE TOP OF THE PIPE IS 2 FEET OR LESS, SHALL BE SUBJECTED TO AIR TESTS OR EXFILTRATION TESTS.
11. ALL SEWER SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND GENERAL SPECIFICATIONS OF THE VILLAGE OF DEXTER (ADOPTED XX/XX/2011) AND THE AGENCY OR AGENCIES HAVING JURISDICTION OVER THE CONSTRUCTION AREA.
12. ALL SEWERS SHALL BE TELEVISED, WITH TEST RESULTS APPROVED BY THE VILLAGE ENGINEER OR THE VILLAGE OF DEXTER UTILITIES DEPARTMENT PRIOR TO PLACING THE SEWER IN SERVICE. COPIES OF THE TAPE MUST BE SUBMITTED TO THE VILLAGE OF DEXTER AND WILL NOT BE RETURNED.
13. MANDREL TESTING SHALL TAKE PLACE TO ENSURE THE FLEXIBLE PIPE HAS BEEN PROPERLY BEDDED AND BACKFILLED. THE DEFLECTION TEST MUST BE CONDUCTED NO LESS THAT 30 DAYS AFTER INSTALLATION OF FINAL BACKFILL. THE MAXIMUM ALLOWED DEFLECTION IS 5%. A NINE-ARM (POINT) MANDREL SHALL BE USED.
14. ALL SANITARY SEWER STUBS SHALL HAVE A WATER AND AIR TIGHT BULKHEAD WITH A MARKER DESIGNATING THE LOCATION OF THE STUB.
15. ALL ELEVATIONS ARE BASED ON USGS DATUM.
16. NO DEBRIS, FROZEN MATERIAL, OR ORGANIC MATERIAL MAY BE PLACED WITHIN 2 FEET OF THE TOP OF THE PIPE. HIGHLY COMPRESSIBLE OR ORGANIC SOILS IN FOUNDATION AREA MAY NEED TO BE REPLACED.

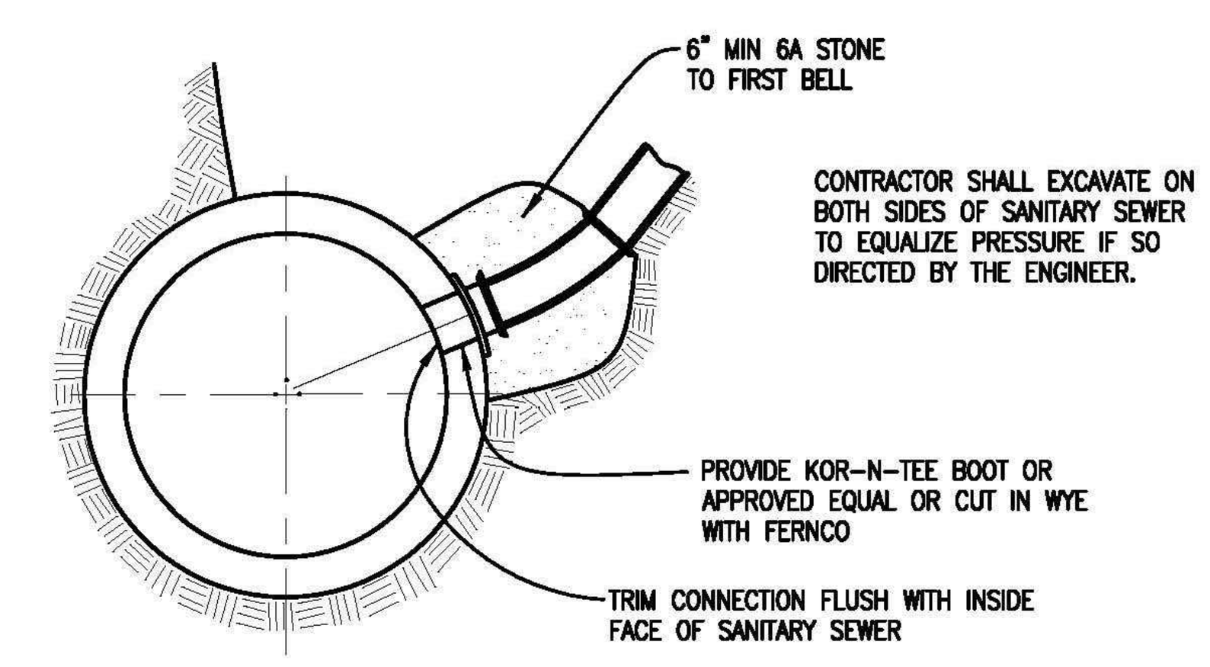


STANDARD PIPE SUPPORT
SANITARY OR STORM

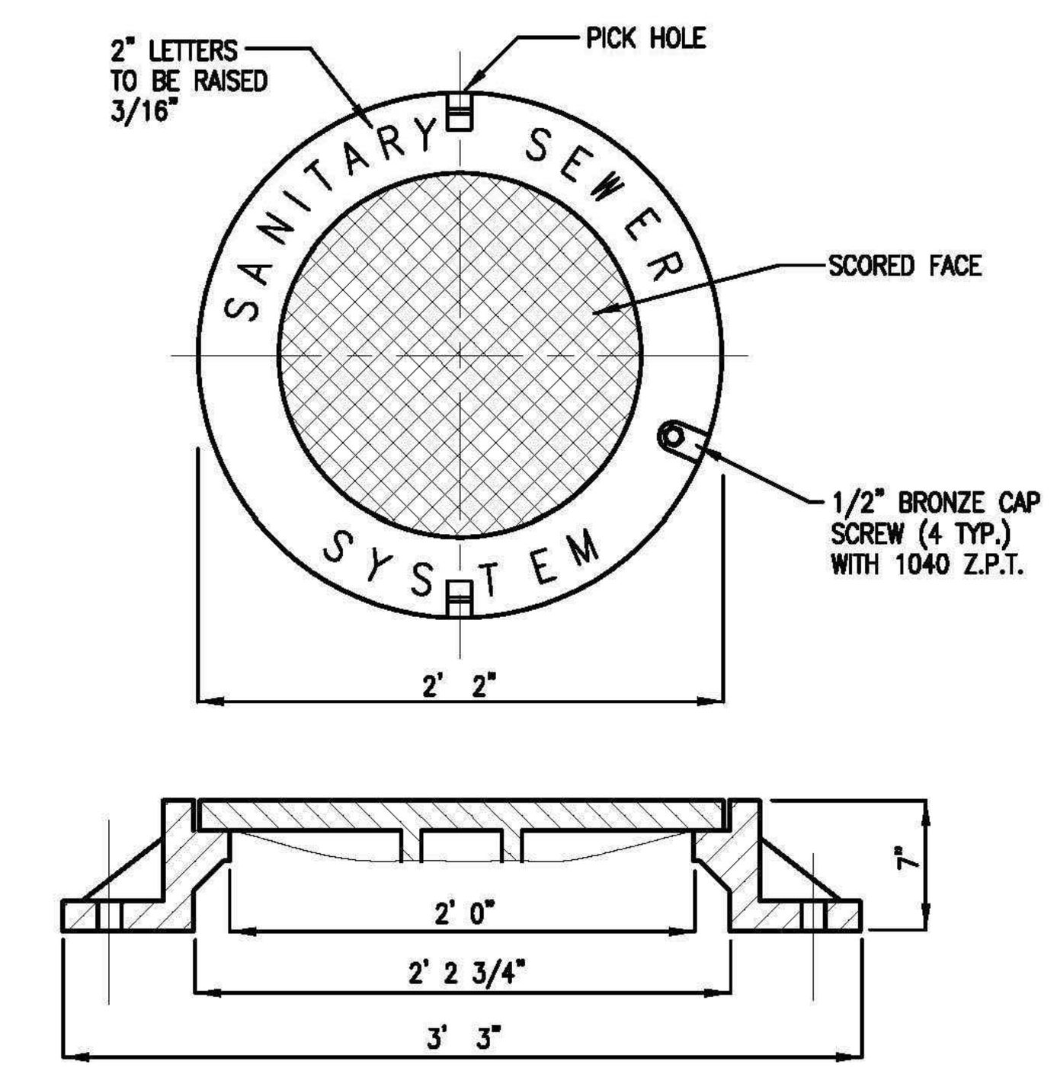


ELEVATION

DETAIL OF SANITARY SEWER CLEANOUT

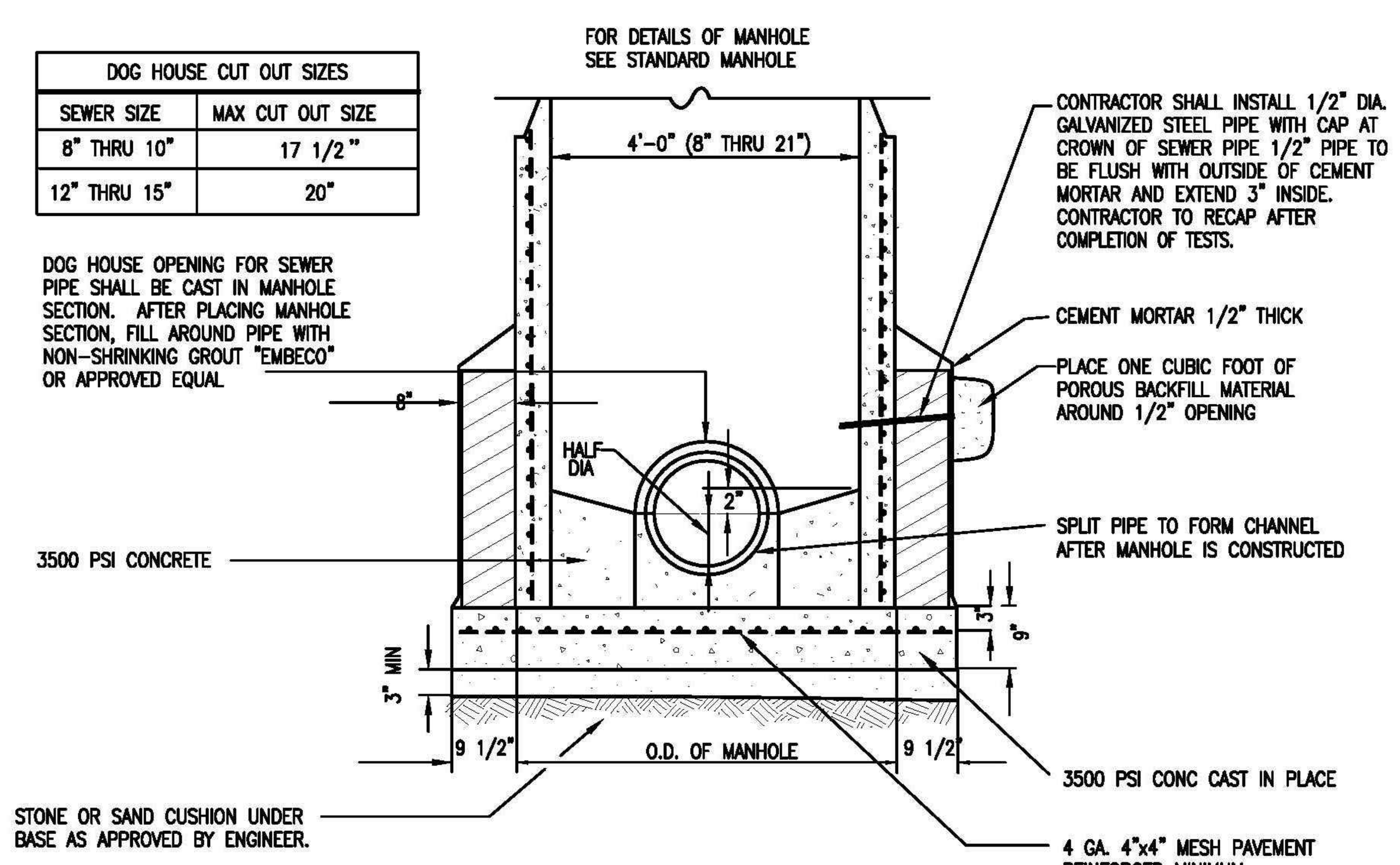


SADDLE CONNECTION
(FOR CONNECTION OF NEW
LEADS TO EXISTING SEWERS)

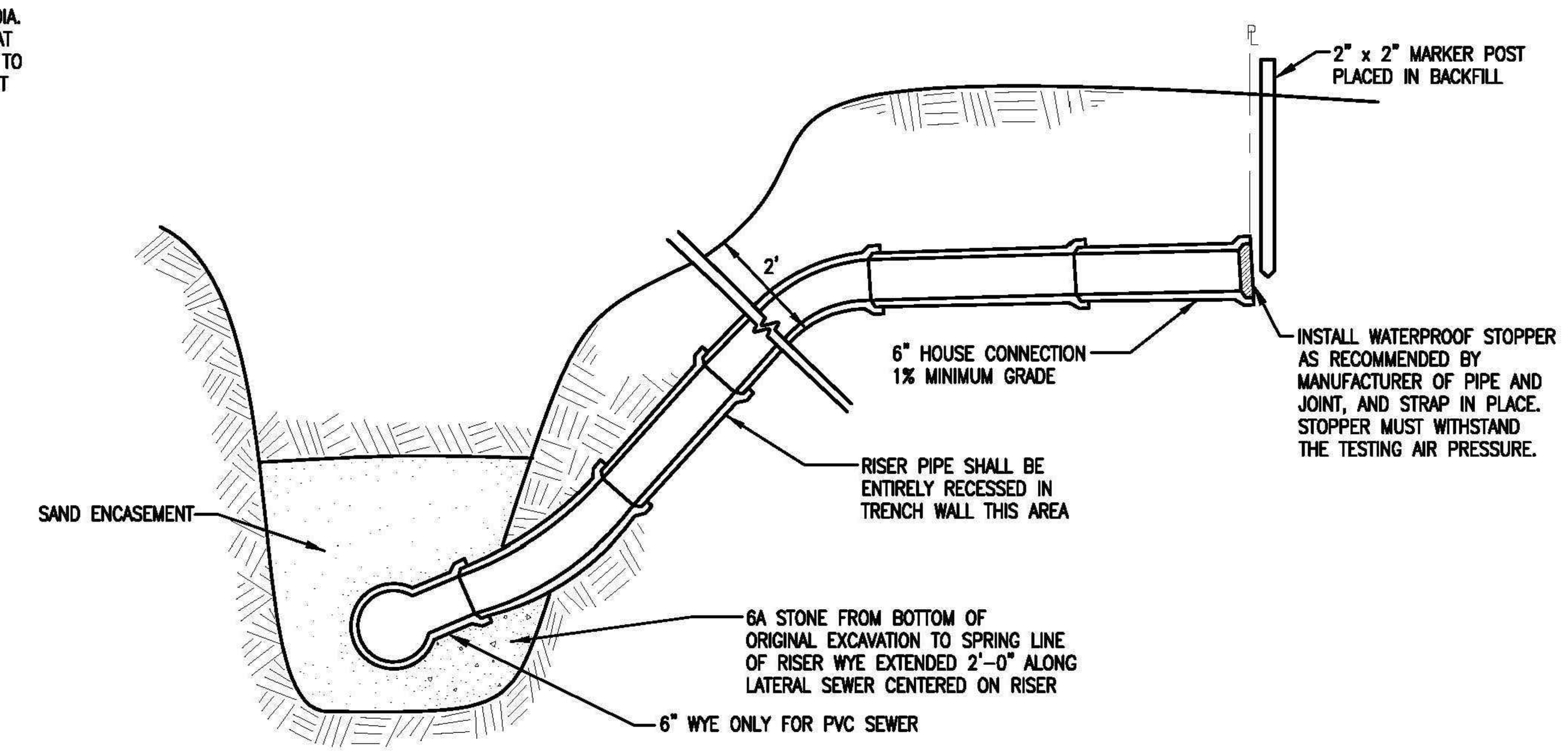


STANDARD FRAME & COVER
E.J.I.W. #1040 TYPE AGS

DOG HOUSE CUT OUT SIZES	
SEWER SIZE	MAX CUT OUT SIZE
8" THRU 10"	17 1/2"
12" THRU 15"	20"

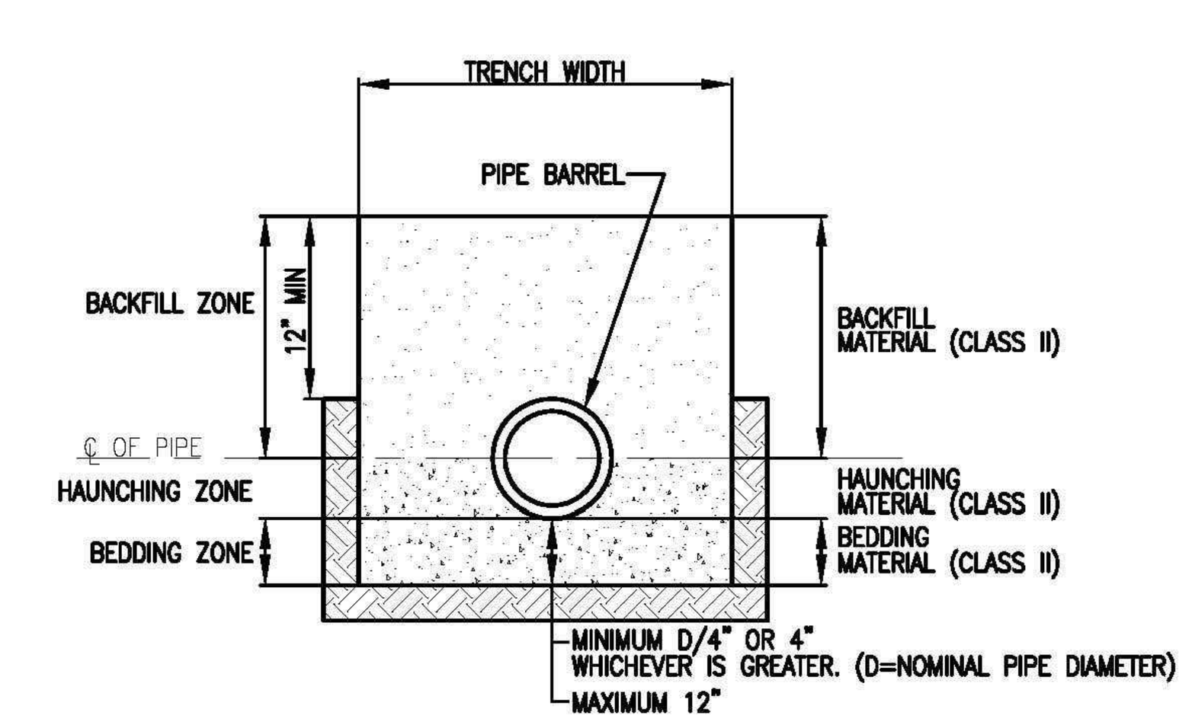


STANDARD SANITARY MANHOLE
ON EXISTING SEWERS 8" THRU 21"



SERVICE LEAD DETAIL

MAX WIDTH OF TRENCH 12" ABOVE TOP OF PIPE	
6" THRU 12" PIPE	30" WIDE
15" THRU 21" PIPE	OD+16"
MIN WIDTH OF TRENCH 12" ABOVE THE TOP OF THE PIPE SHALL BE 6" ON EACH SIDE OF PIPE	



PVC SDR 26 PIPE (D3034) PER ASTM D2321-91

NOTES:
1. CLASS II MATERIAL MUST BE IN ACCORDANCE WITH VILLAGE SPECIFICATIONS AND MAY USED FOR THE BEDDING, HAUNCHING AND BACKFILL AREAS, UPON WRITTEN APPROVAL OF THE PROJECT ENGINEER.

PIPE BEDDING DETAILS

DRAWING PATH: C:\Users\ngoodwin\Desktop\Dexter_SanStm1.dwg Nov 02, 2011 - 11:27am

OHM

VERT DATUM	HORIZ DATUM	SCALE H: NTS V: NTS	CITY/VILLAGE/TOWNSHIP VILLAGE OF DEXTER	COUNTY WASHTENAW COUNTY	RANGE	TOWN	SECTION	PROJ MGR	ENGINEER	CADD JK/KC	BID DATE	DATE 02/14/08

JOB # | DATE: | REVISIONS: | DATE: | REVISIONS: | DATE: | REVISIONS:

CLIENT: VILLAGE OF DEXTER

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

VILLAGE OF DEXTER
SANITARY SEWER
STANDARD DETAILS

SHEET
X
OF X

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Utility Details

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

No Scale

Quality Control

Drawn: AT
Checked: BB
Approved: BB

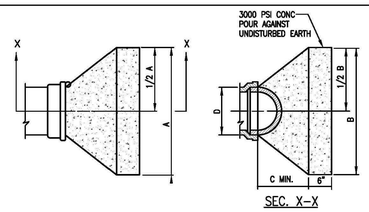
Project Number

BRI 2021097

Sheet Number

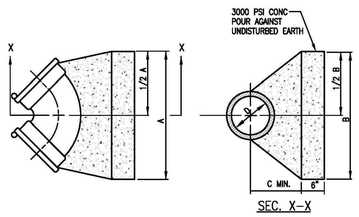
C6.4

DIA. OF WATER MAIN	THRUST BLOCK		
D	A	B	C
6"	1'8"	1'8"	9"
8"	2'0"	2'0"	12"
12"	3'0"	3'0"	15"
16"	4'0"	4'0"	18"



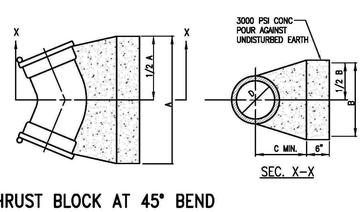
THRUST BLOCK AT PLUG

DIA. OF WATER MAIN	THRUST BLOCK		
D	A	B	C
6"	2'0"	1'8"	9"
8"	2'9"	2'0"	12"
12"	4'0"	3'0"	15"
16"	5'6"	4'0"	18"



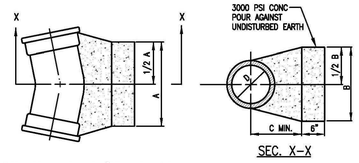
THRUST BLOCK AT 90° BEND

DIA. OF WATER MAIN	THRUST BLOCK		
D	A	B	C
8"	2'0"	1'8"	15"
12"	3'3"	2'0"	18"
16"	4'0"	3'0"	21"



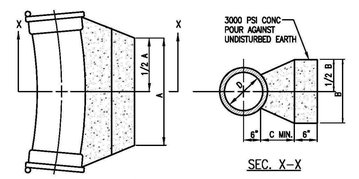
THRUST BLOCK AT 45° BEND

DIA. OF WATER MAIN	THRUST BLOCK		
D	A	B	C
8"	2'0"	1'8"	21"
16"	3'0"	2'0"	21"



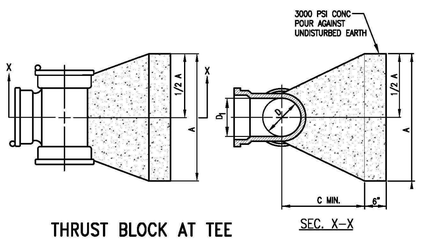
THRUST BLOCK AT 22 1/2° BEND

DIA. OF WATER MAIN	THRUST BLOCK		
D	A	B	C
16"	2'0"	1'8"	12"

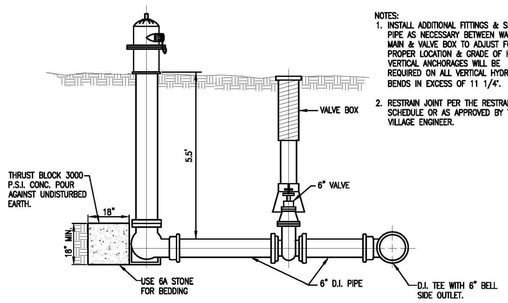


THRUST BLOCK AT 11 1/4° BEND

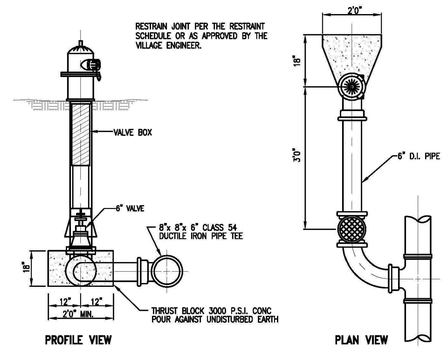
DIA. OF TEE		THRUST BLOCK	
D	D_1	A	C
8"	8"	2'0"	21"
12"	8"	2'0"	21"
16"	8"	2'0"	21"
12"	12"	3'0"	2'0"
16"	12"	3'0"	2'0"
20"	12"	3'0"	2'0"
24"	12"	3'0"	2'0"
16"	16"	4'0"	2'3"



THRUST BLOCK AT TEE



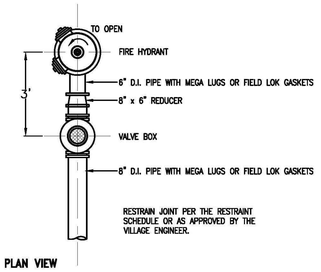
STANDARD HYDRANT SETTING



CLOSE COUPLE HYDRANT SETTING

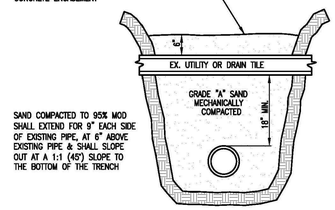
WATER MAIN NOTES

1. ALL WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND GENERAL SPECIFICATION OF THE VILLAGE OF DEXTER (APPROVED XX/XX/2011) AND ANY OTHER AGENCY HAVING JURISDICTION OVER THE CONSTRUCTION AREA.
2. ALL SURFACE STRUCTURES, SUCH AS HYDRANTS, GATE VALVES AND VALVE BOXES SHALL BE SET TO GRADE AS APPROVED BY THE VILLAGE ENGINEER.
3. WATER MAIN SHALL BE PLACED LEVEL THROUGH ALL GATE WELLS.
4. PROVIDE A MINIMUM OF 5-FOOT, 6-INCH COVER BELOW EXISTING ROADWAY CENTERLINE ELEVATION OR EXISTING ELEVATION AT WATER MAIN LOCATION, WHICHEVER IS LOWEST.
5. WHEN JACKING OR BORING, ALL VOIDS SHALL BE FILLED BY MEANS OF PRESSURE GROUTING WITH 1:3 CEMENT-SAND MORTAR. THIS WORK MUST BE ACCOMPLISHED WITHIN 24 HOURS OF THE WATER MAIN BEING SUCCESSFULLY TESTED. WATER MAIN JACKING OR BORING SHALL EXTEND A MINIMUM OF 10 FEET BEYOND THE EDGES OF THE PAVEMENT.
6. FIRE HYDRANTS SHALL BE EAST JORDAN IRON WORKS MODEL 5 BR, A-423 CONFORMING TO A.W.W.A. C-502 IMPROVED HYDRANT SPECIFICATION. ALL FIRE HYDRANTS SHALL BE EQUIPPED WITH A 4-INCH STORZ CONNECTION.
7. GATE VALVES FOR SIZES 6-INCH THROUGH 16-INCH WATER MAIN SHALL BE IRON BODY, FULLY BRONZE MOUNTED, RESILIENT WEDGE WITH NON-RISING STEMS OPENING COUNTERCLOCKWISE WITH A 2-INCH SQUARE OPERATING NUT. VALVES SHALL CONFORM TO A.W.W.A. C-500 SPECIFICATION. VALVES SHALL BE DESIGNED FOR A WORKING PRESSURE OF 200 P.S.I. AND A TEST PRESSURE OF 400 P.S.I. VALVES SHALL BE ORDERED WITH INLET AND OUTLET CONNECTIONS COMPATIBLE TO THE WATER PIPE JOINT USED ON THE SYSTEM.
8. WATER SERVICE AND WATER MAIN PIPE SHALL BE:
   A. 1-INCH THROUGH 2-INCH DIAMETER SERVICE LINES SHALL BE DOMESTIC TYPE "K" COPPER WITH COMPRESSION FITTINGS ONLY.
   B. 4-INCH THROUGH 16-INCH DIAMETER WATER MAIN SHALL BE DUCTILE IRON A.N.S.I. A 21-55-65 CLASS 54.
9. CONNECTION TO EXISTING WATER MAIN SHALL BE MADE ONLY AFTER HYDROSTATIC AND BACTERIOLOGICAL TESTS HAVE BEEN SUCCESSFULLY COMPLETED AND APPROVED BY THE VILLAGE ENGINEER OR THE VILLAGE OF DEXTER UTILITIES DEPARTMENT.
10. COMPACTED SAND BACKFILL CONSISTING OF M.D.O.T. CLASS II GRANULAR MATERIAL COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT MUST BE PLACED IN ALL TRENCHES WITHIN THE 1:1 INFLUENCE OF THE ROADWAY, SIDEWALK, BIKEPATH, ETC.
11. THRUST BLOCK IS ONLY ALLOWED WITH PRIOR APPROVAL OF VILLAGE ENGINEER. OTHERWISE, USE THE JOINT RESTRAINT SCHEDULE WITH BENDS.
12. FLUSHING SHALL INCLUDE THE USE OF A "POLLY PIG" OR APPROVED EQUAL EQUIPMENT, TO REMOVE ACCUMULATED DEPOSITS AS DIRECTED BY THE VILLAGE ENGINEER.
13. POLYETHYLENE ENCASEMENT SHALL BE INSTALLED ON ALL DUCTILE IRON WATER MAIN AND FITTINGS. POLYETHYLENE ENCASEMENT SHALL MEET THE REQUIREMENTS SPECIFIED IN AWWA C105 (ANSI 21.5), LATEST REVISION, AS DIRECTED BY THE VILLAGE ENGINEER.
14. ALL PUBLIC WATER MAIN SHALL CONTAIN TRACER WIRE.



TEMPORARY HYDRANT

NOTE: WHERE CONCRETE ENCASEMENT IS SPECIFIED FOR NEW UTILITY A 6" MINIMUM LAYER OF MECHANICALLY COMPACTED SAND SHALL BE MAINTAINED BETWEEN EX. UTILITY & TOP OF CONCRETE ENCASEMENT

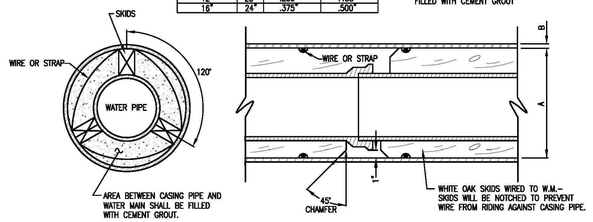


SAND COMPACTED TO 95% MOD SHALL EXTEND FOR 9" EACH SIDE OF EXISTING PIPE, AT 6" ABOVE EXISTING PIPE & SHALL SLOPE OUT AT A 1:1 (45°) SLOPE TO THE BOTTOM OF THE TRENCH

STANDARD PIPE SUPPORT

DIA. OF WATER MAIN	MIN. (I.D.) "A"	ROAD CROSSING MIN."B"	RAILROAD CROSSING MIN."B"
6"	14"	.250"	.312"
8"	16"	.250"	.375"
12"	20"	.250"	.438"
16"	24"	.375"	.500"

NOTES:
1. MAINTAIN MIN OF 5'6" OF COVER BETWEEN GROUND ELEVATION & TOP OF CASING
2. THE ENDS OF THE CASING SHALL BE BULKHEADED AND ANNULAR SPACE FILLED WITH CEMENT GROUT



STANDARD CASING SECTION

OHM

CITY/VILLAGE/TOWNSHIP: VILLAGE OF DEXTER | JOB #
COUNTY: WASHTENAW COUNTY | SCALE: H: NTS V: NTS | DATE:
TOWN | RANGE | SECTION | PROJ MGR | ENGINEER | CADD: JK/KC | BID DATE | DATE: 01/13/05
REVISIONS: | DATE:
REVISIONS: | DATE:
VILLAGE OF DEXTER
HORZ DATUM | VERT DATUM

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

VILLAGE OF DEXTER
WATER MAIN DETAILS
STANDARD DETAILS

SHEET

OF

DRAWING PATH: S:\OT\Dexter\Engr\Standards\CADD\Updating In Process\Dexter_WM1.dwg Apr 28, 2017 - 3:42pm

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CONSULTING ENGINEERS
5145 Livernois, Suite 100
Troy, Michigan 48098-3276
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Fax: 248-879-0007
www.PeterBassoAssociates.com

Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Utility Details

Dates

DATE	ISSUED FOR
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Sheet Number

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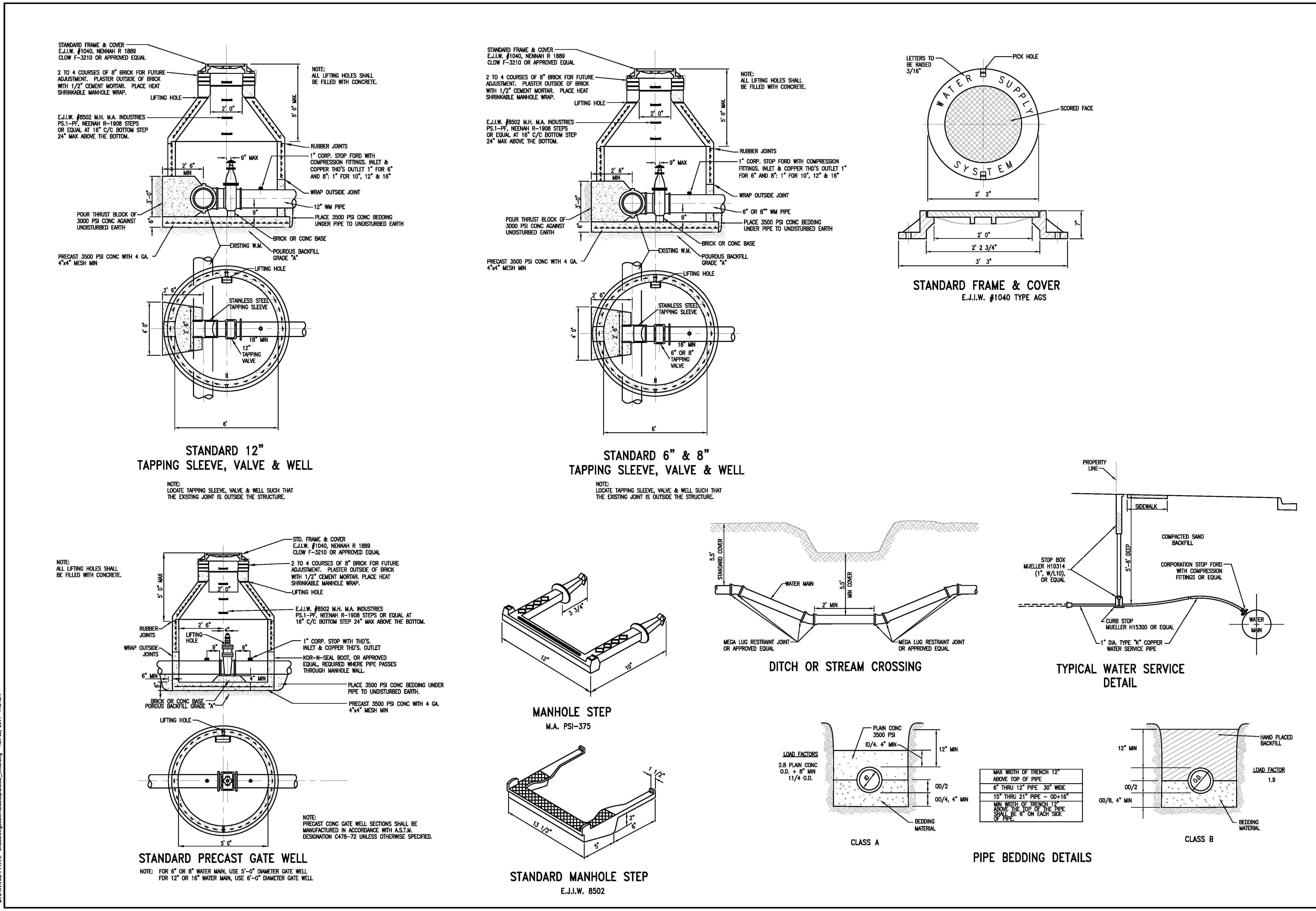

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CITY/VILLAGE/TOWNSHIP: VILLAGE OF DEXTER
COUNTY: WASHTENAW COUNTY
CLIENT: VILLAGE OF DEXTER
DATE: 01/13/05
CADD: JKKC
SCALE H: 1"=40' V: 1"=4'

VILLAGE OF DEXTER
WATER MAIN DETAILS
STANDARD DETAILS

SHEET OF

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Project Title

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2022 Sitework Projects

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Sheet Number

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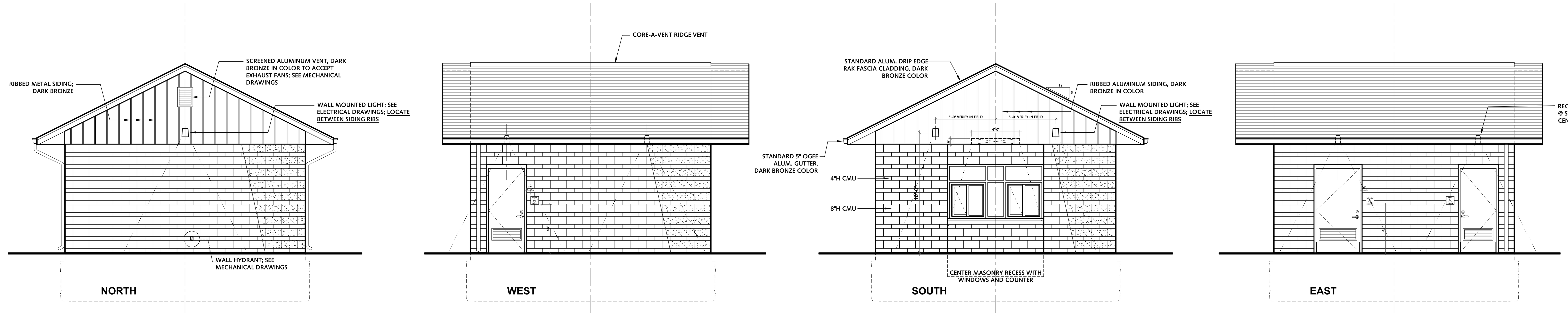
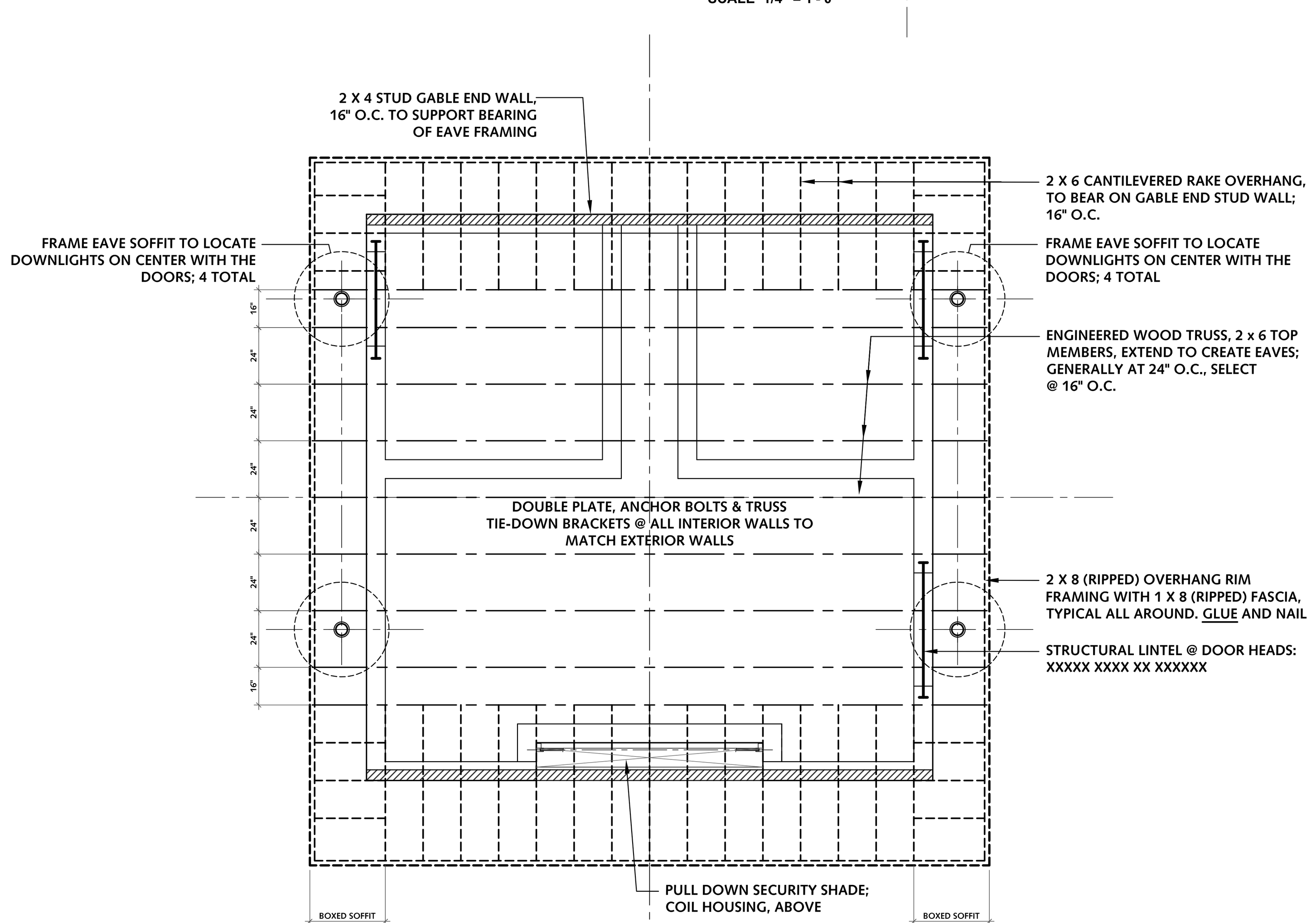
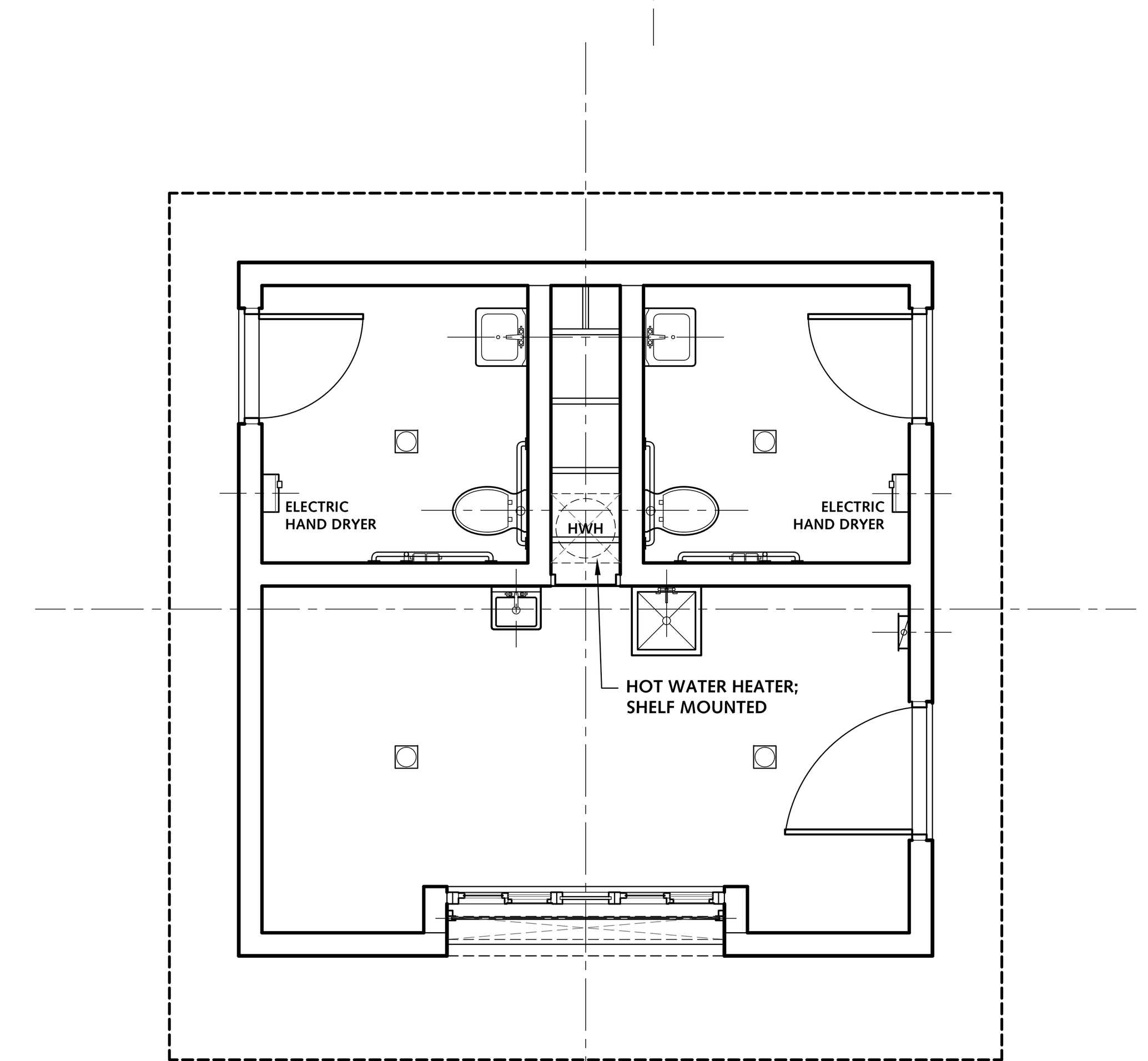


7 A1.0 **EXTERIOR ELEVATIONS**
SCALE 1/4" = 1'- 0"

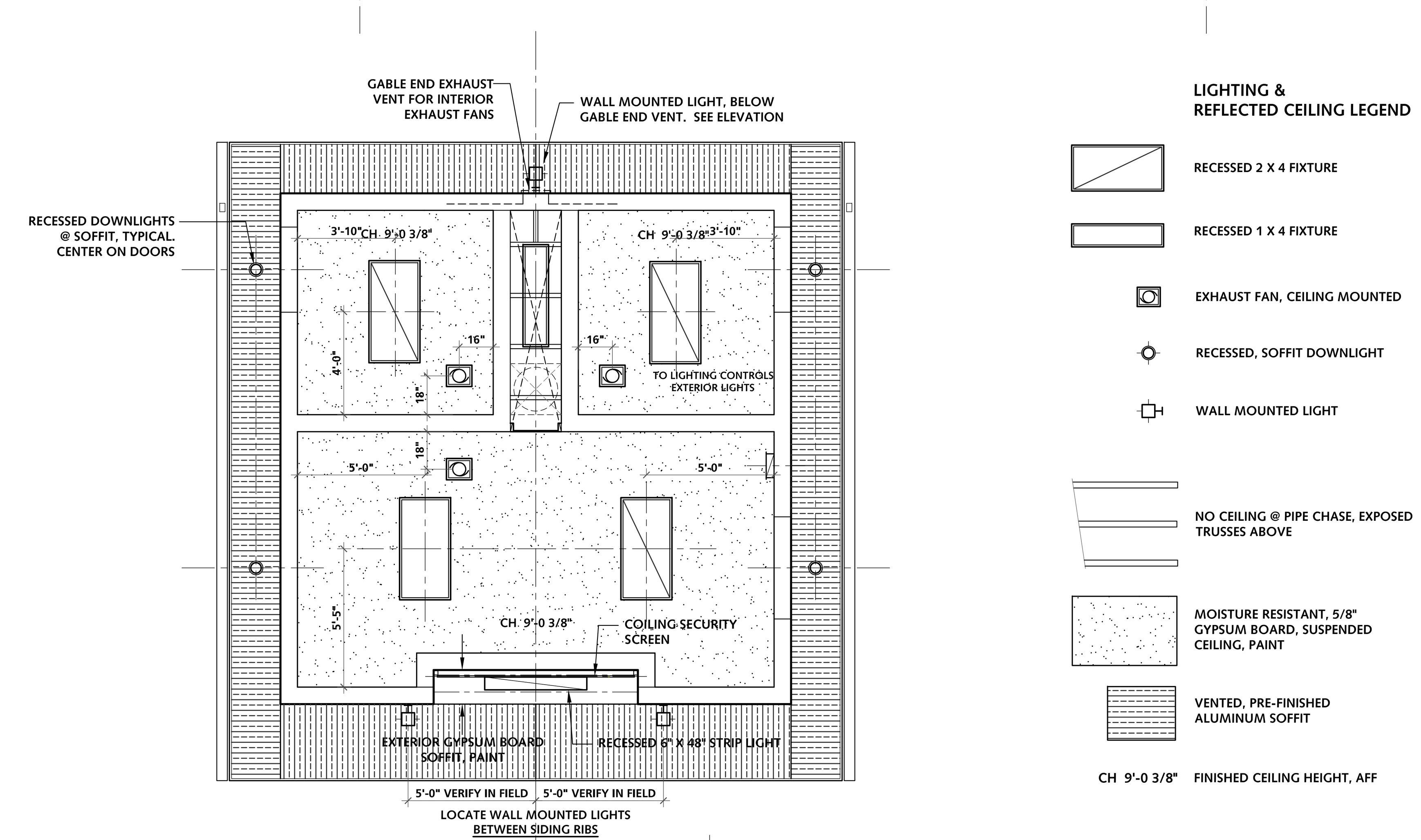


4 A1.0 **ROOF FRAMING PLAN**
SCALE 1/4" = 1'- 0"

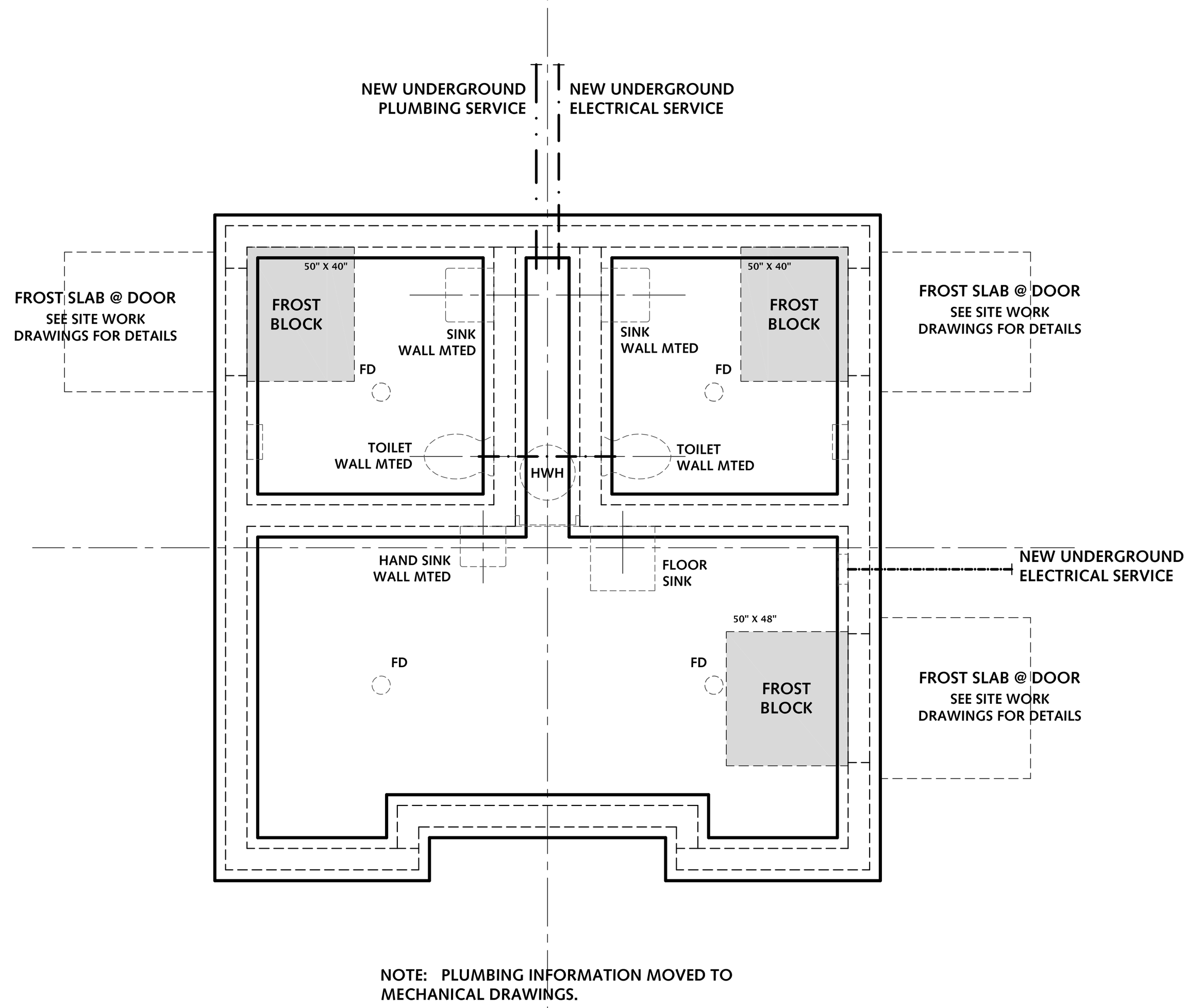


5 A1.0 **POWER PLAN**
SCALE 1/4" = 1'- 0"

NOTE: POWER INFORMATION MOVED TO ELECTRICAL DRAWINGS.

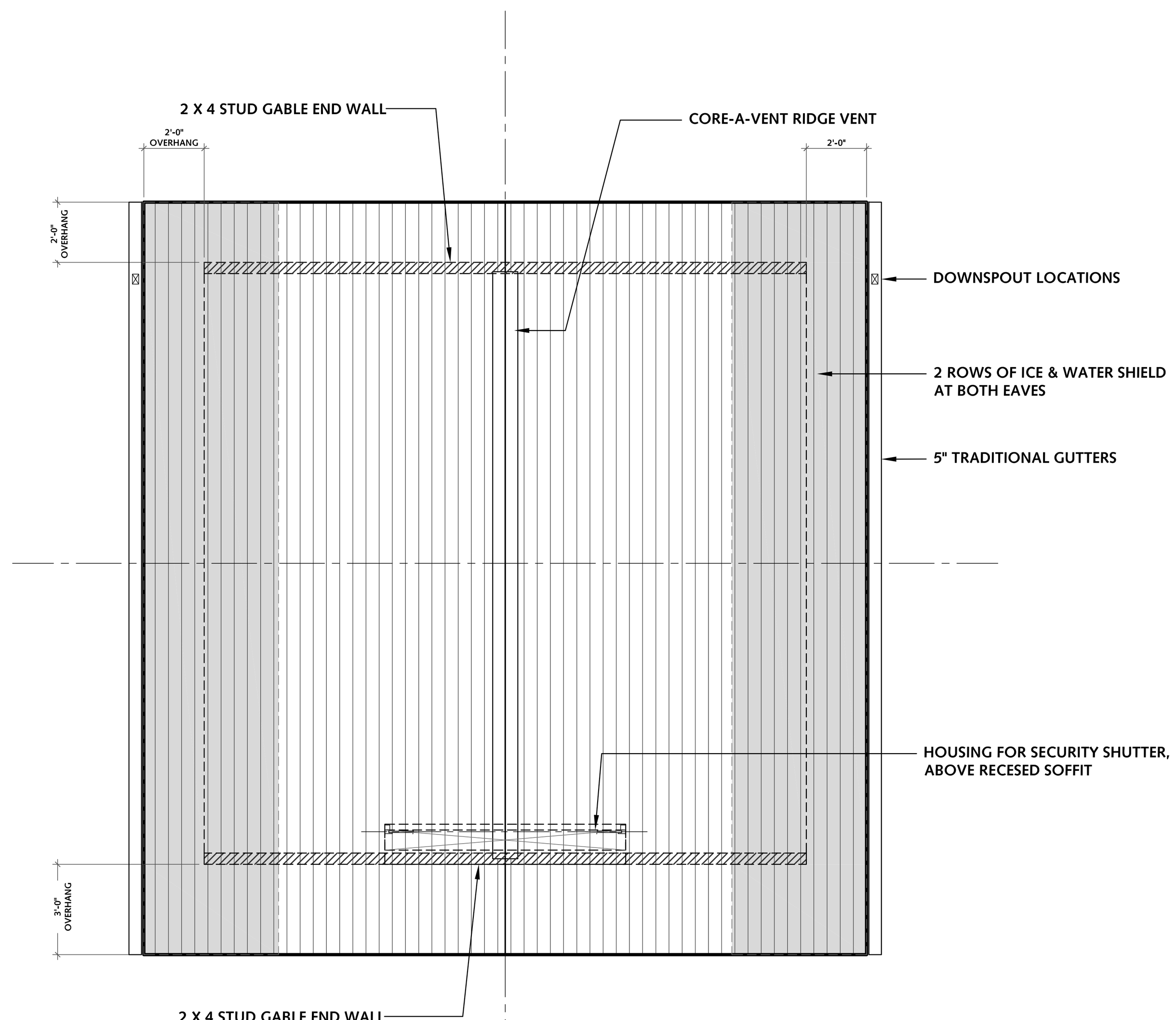


6 A1.0 **REFLECTED CEILING PLAN**
SCALE 1/4" = 1'- 0"



NOTE: PLUMBING INFORMATION MOVED TO MECHANICAL DRAWINGS.

3 A1.0 **FOUNDATION & PLUMBING PLAN**
SCALE 1/4" = 1'- 0"



2 A1.0 **ROOF PLAN**
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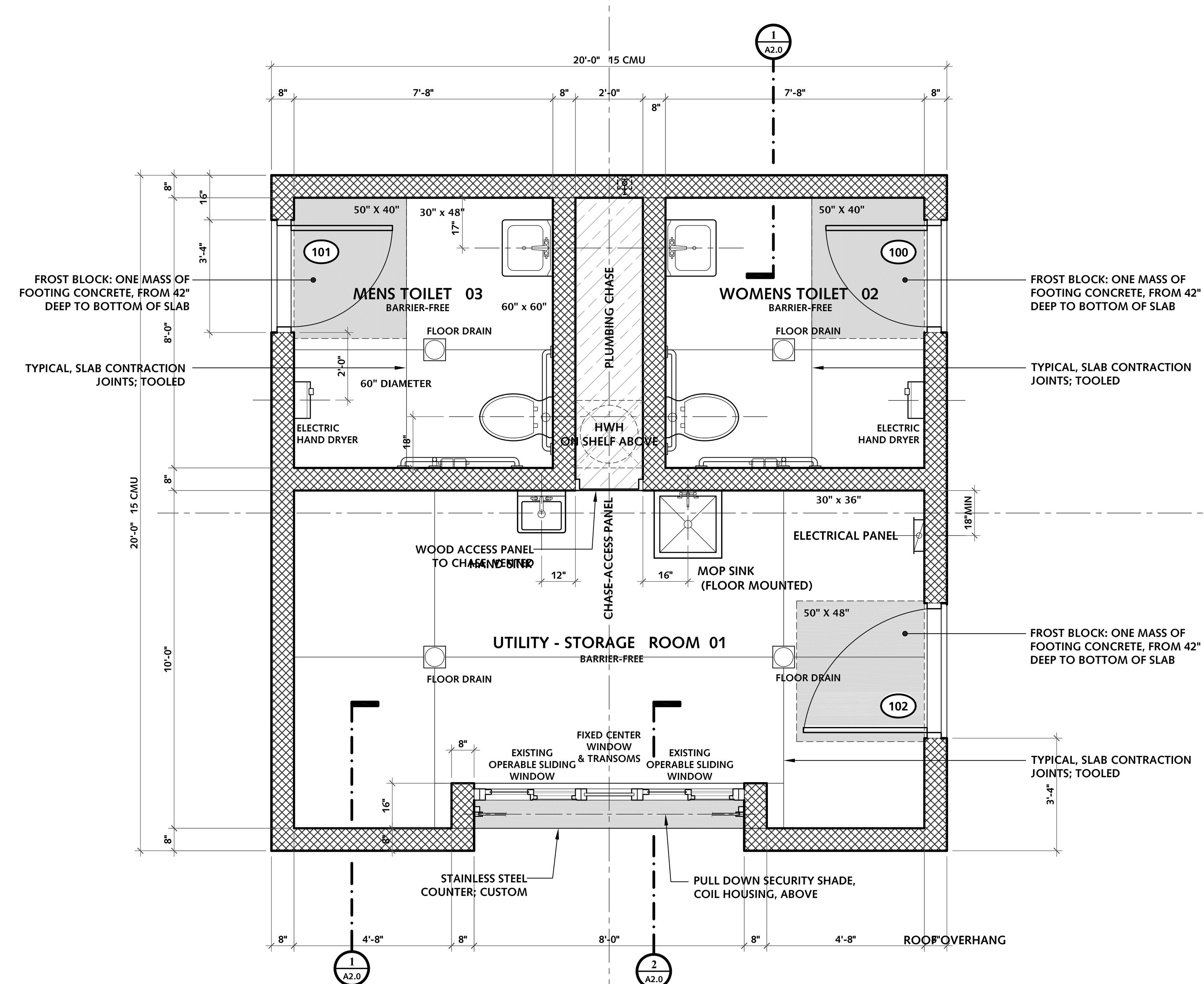

1 A1.0 **FRONT PORCH ELEVATIONS**
SCALE 3/8" = 1'- 0"

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

Restroom-Storage Building
Plans & Exterior Elevations

Dates

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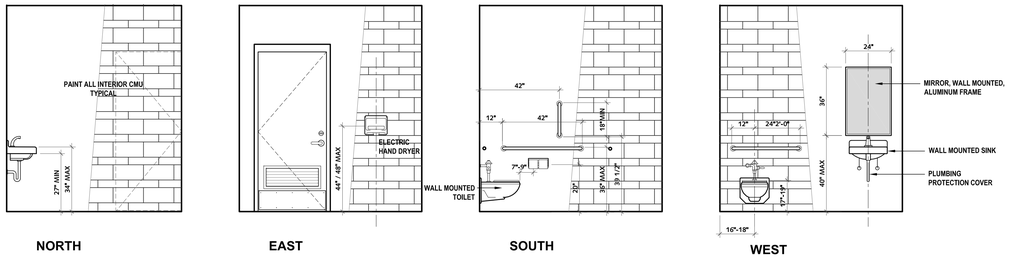
A1.0

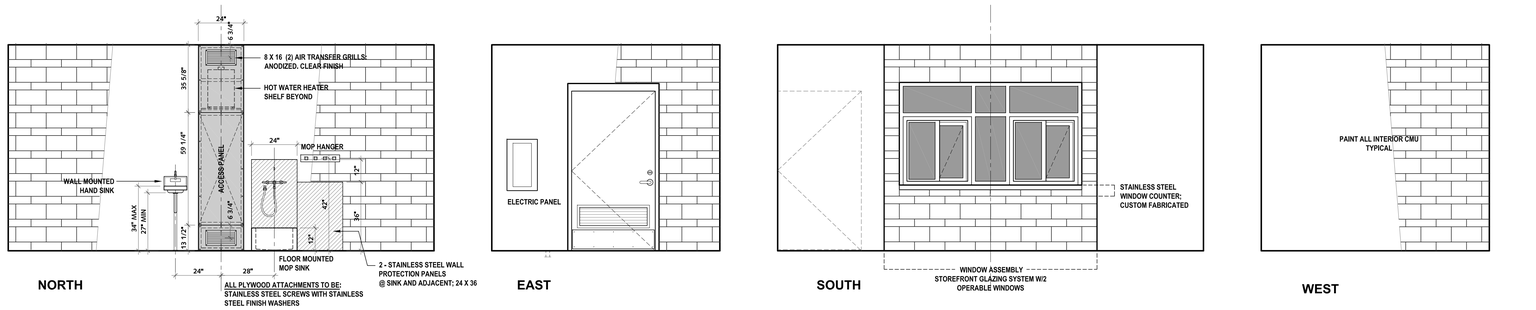


WOMENS TOILET ROOM
INTERIOR ELEVATIONS

5 / A2.0

SCALE 3/8" = 1'- 0"

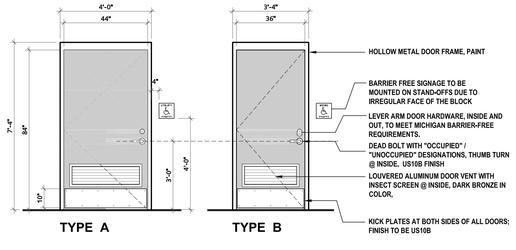
NOTE: MENS TOILET ROOM IS A MIRROR IMAGE



STORAGE ROOM
INTERIOR ELEVATIONS

4 / A2.0

SCALE 3/8" = 1'- 0"

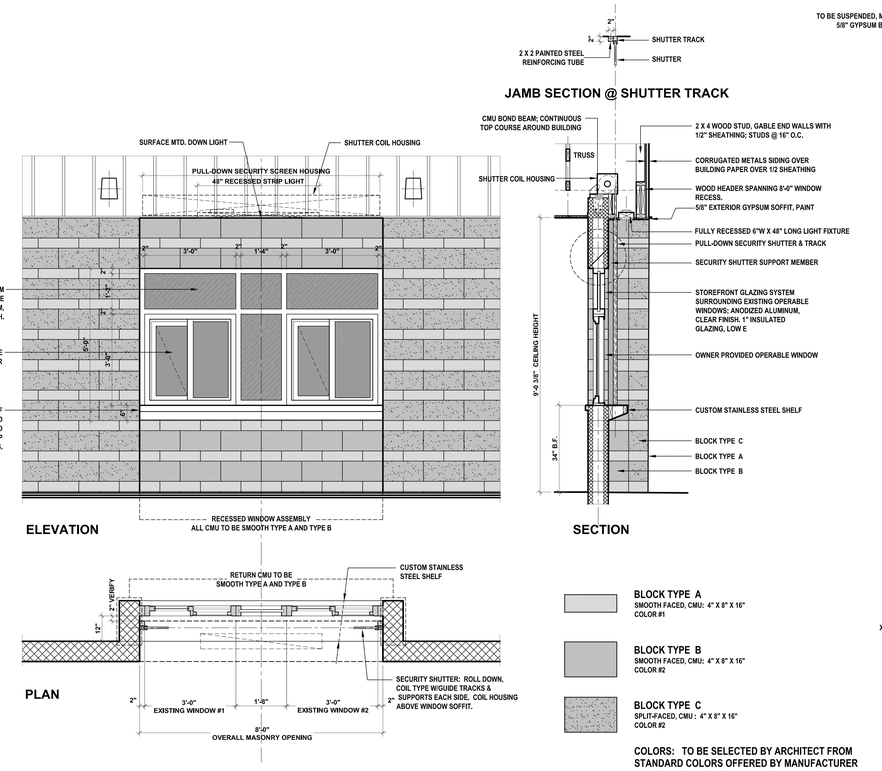


DOOR TYPES

3 / A2.0

SCALE 3/8" = 1'- 0"

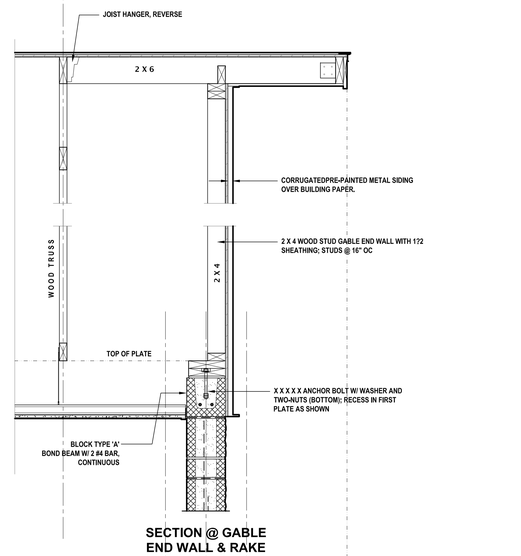
NOTE: ALL DOOR HARDWARE TO MEET MICHIGAN BARRIER-FEE DESIGN REQUIREMENTS FOR ACCESSIBILITY



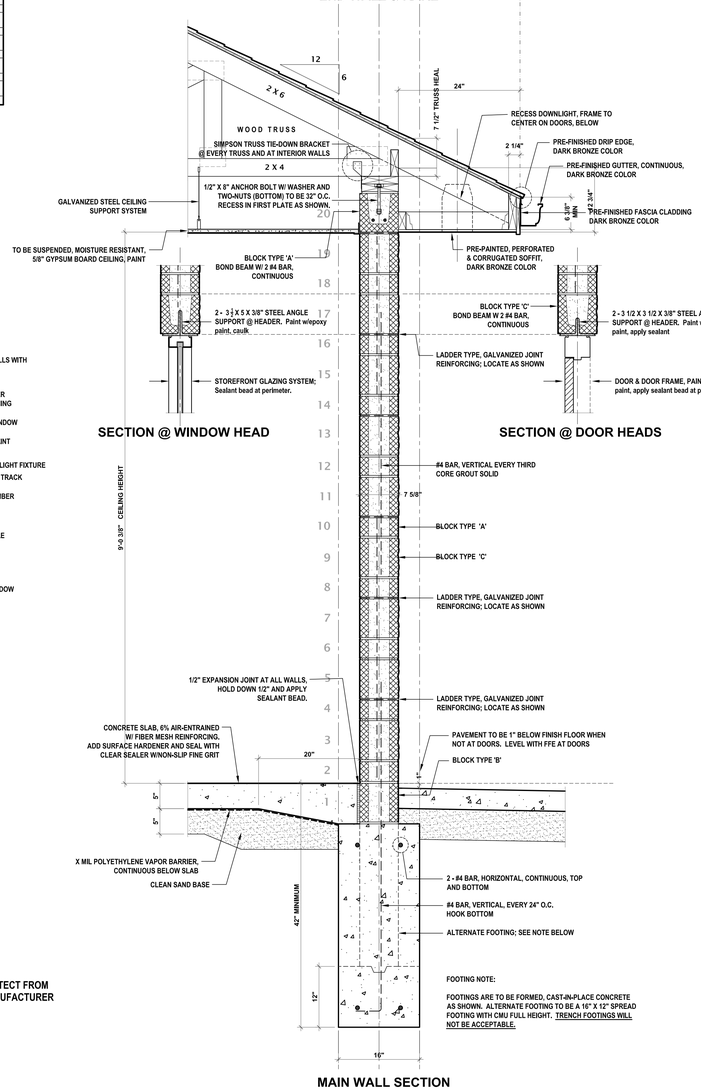
FRONT WINDOW DETAIL ELEVATION, SECTION & PLAN

2 / A2.0

SCALE 1/2" = 1'- 0"



SECTION @ GABLE END WALL & RAKE



MAIN WALL SECTION

TYPICAL WALL SECTION

1 / A2.0

SCALE 1" = 1'- 0"

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

Restroom-Storage Building
Interior Elevations & Details

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Sheet Number

A2.0

MECHANICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	COMPRESSED AIR
A(___#)	COMPRESSED AIR (SPECIFIC PSIG)
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AD	AREA DRAIN
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AMP	AMPERE
APD	AIR PRESSURE DROP
AR	ARGON
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS
ASR	AUTOMATIC SPRINKLER RISER
ATD	AIR TRANSFER DUCT
AUX	AUXILIARY
AV	ACID VENT
AVTR	ACID VENT THROUGH ROOF
AW	ACID WASTE
BAS	BUILDING AUTOMATION SYSTEM
BCU	BLOWER COIL UNIT
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BVC	BEVERAGE CONDUIT
BWV	BACKWATER VALVE
C	COMMON
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CB	CATCH BASIN
CC	COOLING COIL
CD	COLD DECK
CD	CONDENSATE DRAIN
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHW	CHILLED WATER
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	COOLING
CNDS	CONDENSATE
CNDS (___#)	CONDENSATE (SPECIFIC PSIG)
CO	CLEAN OUT
CO2	CARBON DIOXIDE
CONT	CONTINUATION OR CONTINUED
CONTR	CONTRACTOR
CONV	CONVECTOR
COP	COEFFICIENT OF PERFORMANCE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CSS	CLINICAL SERVICE SINK
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CW	DOMESTIC COLD WATER
CWF	DOMESTIC COLD WATER - FILTERED
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D&T	DRIP AND TRAP
DA	DISCHARGE AIR
DAT	DISCHARGE AIR TEMPERATURE
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DFU	DRAINAGE FIXTURE UNITS
DIA	DIAMETER
DMPR	DAMPER
D/N	DAY/NIGHT
DN	DOWN
DNZ	DOWNSPOUT NOZZLE
DS	DUCT SILENCER
DT	DRAIN TILE
DTC	DRAIN TILE CONNECTION
DWH	DOMESTIC WATER HEATER
DWG	DRAWING
(E)	EXISTING
E	EXHAUST GRILLE OR REGISTER
EA	EACH
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EXPANSION COMPENSATOR
ECUH	ELECTRIC CABINET UNIT HEATER
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EES	EMERGENCY EYE WASH / SHOWER
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
ERL	ENERGY RECOVERY LOOP
ERLR	ENERGY RECOVERY LOOP RETURN
ERLS	ENERGY RECOVERY LOOP SUPPLY
ERU	ENERGY RECOVERY UNIT
ESH	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FIRE PROTECTION
°F	DEGREES FAHRENHEIT
F&B	FACE AND BYPASS
F&T	FLOAT AND THERMOSTATIC
FA	FACE AREA
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FFD	FUNNEL FLOOR DRAIN
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASURING STATION
FPM	FEET PER MINUTE
FP	FIRE PUMP
FPTU	FAN POWERED (AIR) TERMINAL UNIT
FS	FLOOR SINK
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FT	FEET
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	NATURAL GAS
GA	GAUGE
GAL	GALLON
GRH	GRAVITY RELIEF HOOD
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GSAN	GREASE SANITARY WASTE
H	HYDROGEN
HB	HOSE BIBB
HC	HEATING COIL
HD	HOT DECK
HEPA	HIGH EFFICIENCY PARTICULATE ARRESTANCE
HL	HIGH LIMIT
HOA	HAND/OFF/AUTO
HP	HEAT PUMP
HP	HORSEPOWER
HPCW	HIGH PRESSURE DOMESTIC COLD WATER
HPHW	HIGH PRESSURE DOMESTIC HOT WATER
HPHWR	HIGH PRESSURE DOMESTIC HOT WATER RETURN
HPL	HEAT PUMP LOOP
HPLR	HEAT PUMP LOOP RETURN
HPLS	HEAT PUMP LOOP SUPPLY
HR	HOUR
HTG	HEATING
HV	HEATING VENTILATING
HVAC	HEATING, VENTILATING, AIR CONDITIONING
HWH	HOT WATER HEATING
HWHR	HOT WATER HEATING RETURN
HWHS	HOT WATER HEATING SUPPLY
HW	DOMESTIC HOT WATER
HW(___)	DOMESTIC HOT WATER (SPECIFIC TEMP °F)
HWR	DOMESTIC HOT WATER RETURN
HX	HEAT EXCHANGER
HZ	HERTZ
IAQ	INDOOR AIR QUALITY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCHES
IR	INFRARED HEATER
IW	INDIRECT WASTE
JC	JANITOR'S CLOSET
JP	JOCKEY PUMP
KA	THOUSAND AMP
KW	KILOWATT
KWH	KILOWATT-HOUR
LAT	LEAVING AIR TEMPERATURE
LAB	LABORATORY
LAV	LAVATORY
LBS	POUNDS
LDB	LEAVING DRY BULB
LL	LOW LIMIT
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MEDICAL COMPRESSED AIR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MH	MANHOLE
MIL	1/1000th INCH
MIN	MINIMUM
MISC	MISCELLANEOUS
MMBH	MILLION BRITISH THERMAL UNITS PER HOUR
MOP	MAXIMUM OVERCURRENT PROTECTION
M/S	MOTOR STARTER
MTD	MOUNTED
MTR	MOTOR
MV	MANUAL AIR VENT
MVAC	MEDICAL VACUUM
N	NITROGEN
N2O	NITROUS OXIDE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NCTC	NORMALLY CLOSED TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NOTC	NORMALLY OPEN TIMED CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPCW	NON POTABLE COLD WATER
O	OXYGEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OB	OUTLET BOX
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER/CENTER TO CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD
ORC	OVERFLOW RAIN CONDUCTOR
ORD	OVERFLOW ROOF DRAIN
OS&Y	OUTSIDE SCREW AND YOKE
OV	OUTLET VELOCITY
OWS	OPERATOR WORKSTATION
PACU	PACKAGED AIR CONDITIONING UNIT
PBD	PARALLEL BLADE DAMPER
PC	PUMPED CONDENSATE
PCW	PROCESS COOLING WATER
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PD	PRESSURE DROP (FEET OF WATER)
PH	PERIMETER HEAT
PHR	PERIMETER HEAT RETURN
PHS	PERIMETER HEAT SUPPLY
PNL	PANEL
PPM	PARTS PER MILLION
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSAN	PUMPED SANITARY
PST	PUMPED STORM
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAUGE
PW	PURIFIED WATER
PWR	PURIFIED WATER RETURN
PWS	PURIFIED WATER SUPPLY
(R)	RELOCATED
R	RETURN GRILLE OR REGISTER
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RC	RAIN CONDUCTOR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REQD	REQUIRED
REF	ROOF EXHAUST FAN
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RLFA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
RPDA	REDUCED PRESSURE BACKFLOW PREVENTION DETECTION ASSY
RPZA	REDUCED PRESSURE BACKFLOW PREVENTION ZONE ASSY
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
S	SUPPLY AIR DIFFUSER OR GRILLE
SA	SOUND ATTENUATOR
SA	SUPPLY AIR
SAN	SANITARY WASTE
SAT	SUPPLY AIR TEMPERATURE
SECT	SECTION
SCCR	SHORT CIRCUIT CURRENT RATING
SF	SUPPLY FAN
SH	SHOWER
SK	SINK
SMR	SNOW MELT RETURN
SMS	SNOW MELT SUPPLY
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SQFT	SQUARE FOOT/SQUARE FEET
S/S	START/STOP
SS	SERVICE SINK
ST	STORM
STD	STANDARD
STK	STACK
STM	STEAM
STM(___#)	STEAM (SPECIFIC PSIG)
S/W	SUMMER/WINTER
SW	SWITCH
T	TRANSFER GRILLE
TC	TEMPERATURE CONTROL
TC	TEMPERING COIL
TCP	TEMPERATURE CONTROL PANEL
TD	TRENCH DRAIN
TEMP	TEMPERATURE
TEMP	TEMPORARY
TH	TERMINAL HEATING
THA	TOTAL HEAT ABSORBED
THR	TERMINAL HEATING RETURN
THR	TOTAL HEAT REJECTED
THS	TERMINAL HEATING SUPPLY
TMR	TIMER SWITCH
TPD	TEPID WATER
TSP	TOTAL STATIC PRESSURE
TU	(AIR) TERMINAL UNIT
TV	TURNING VANES
TW	TEMPERED WATER
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UON	UNLESS OTHERWISE NOTED
UR	URINAL
UV	UNIT VENTILATOR
V	VALVE
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER (MANUALLY ADJUSTABLE)
VOL	VOLUME
VFC	VARIABLE FREQUENCY CONTROLLER
VTR	VENT THROUGH ROOF
VTU	VENTURI TERMINAL UNIT
VUV	VERTICAL UNIT VENTILATOR
W	WASTE
W&V	WASTE AND VENT
WASD	WASTE ANESTHETIC GAS DISPOSAL
WB	WET BULB
WC	WATER CLOSET
WC	WATER COLUMN
WG	WATER GAUGE
WH	WALL HYDRANT
WMSD	WASHING MACHINE SUPPLY AND DRAIN BOX
WPD	WATER PRESSURE DROP
WT	WEIGHT
XFMR	TRANSFORMER
ZVB	ZONE VALVE BOX

TEMPERATURE CONTROL - PARTIAL SYMBOLS LIST

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CO2	CARBON DIOXIDE SENSOR	OS	OCCUPANCY SENSOR
CO	CARBON MONOXIDE SENSOR	PT	PRESSURE TRANSMITTER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	SP	STATIC PRESSURE SENSOR OR PROBE
FM	FLOW METER		VALVE - 2 WAY CONTROL VALVE
	GUARD FOR STAT OR SENSOR		VALVE - 3 WAY CONTROL VALVE
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)	T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)

NOTE: LIST OF ADDITIONAL SYMBOLS & ABBREVIATIONS ASSOCIATED WITH TEMPERATURE CONTROLS ARE IDENTIFIED ON TC DRAWINGS.

MECHANICAL SYMBOL LIST

PIPING SYMBOLS

SYMBOL	DESCRIPTION
AV	AIR VENT - AUTOMATIC
MV	AIR VENT - MANUAL
BFP	BACKFLOW PREVENTER
	CATCH BASIN
	CIRCULATING PUMP
CO	CLEAN OUT - IN FLOOR
CO	CLEAN OUT - FLANGE
	DIRECTION OF FLOW
	DIRECTION OF PITCH - DOWN
	FINNED TUBE RADIATION
	FIRE PROTECTION - SIAMESE CONNECTION - FREE STANDING
	FIRE PROTECTION - SIAMESE CONNECTION - WALL MOUNTED
	FIRE PROTECTION - SPRINKLER HEAD, CONCEALED
	FIRE PROTECTION - SPRINKLER HEAD, PENDANT
	FIRE PROTECTION - SPRINKLER HEAD, UPRIGHT
	FIRE PROTECTION - SPRINKLER HEAD, SIDEWALL
	FLOOR DRAIN
	FLOOR DRAIN - ELEVATION
	FLOOR DRAIN - FUNNEL
	FLOOR DRAIN - FUNNEL, ELEVATION
	FLOW MEASURING DEVICE (FOR TEST AND BALANCING)
FS	FLOW SWITCH
FM	FLOW METER
HB	HOSE BIBB
MH	MANHOLE
	OPEN SITE DRAIN
	PIPE - ANCHOR
	PIPE - CAP OR PLUG
	PIPE - ELBOW DOWN
	PIPE - ELBOW UP
	PIPE - EXPANSION JOINT OR COMPENSATOR
	PIPE - FLANGE
	PIPE - HOSE AND BRAID FLEXIBLE CONNECTION
	PIPE - RUBBER FLEXIBLE CONNECTION
	PIPE - GUIDE
	PIPE - TEE DOWN
	PIPE - TEE UP
	PIPE - UNION
P/T	PRESSURE AND TEMPERATURE TEST PLUG
	PRESSURE GAUGE AND COCK
	REDUCER - CONCENTRIC
	REDUCER - ECCENTRIC
	ROOF/OVERFLOW DRAIN
	STEAM TRAP - FLOAT AND THERMOSTATIC
	STEAM TRAP - BUCKET
	STRAINER
	STRAINER WITH VALVE AND BLOW-OFF
	THERMOMETER
	TRAP
	VALVE - ANGLE
	VALVE - BALL
	VALVE - BUTTERFLY
0.5	VALVE - BALANCE (i.e. BALANCE VALVE TO 0.5 GPM)
0.5	VALVE - COMBINATION BALANCE & FLOW MEASURING (i.e. BALANCE VALVE TO 0.5 GPM)
	VALVE - CHECK
	VALVE - SPRING CHECK
	VALVE - GAS (MANUAL)
	VALVE - GLOBE
	VALVE - ISOLATION
	VALVE - NEEDLE
	VALVE - OS&Y
	VALVE - PLUG
	VALVE - PRESSURE REGULATING
	VALVE - PRESSURE REDUCING
	VALVE - PRESSURE RELIEF
	VALVE - PRESSURE & TEMPERATURE RELIEF
VTR	VENT THROUGH ROOF
WH	WALL HYDRANT
	VALVE - OS&Y HORIZONTAL STEM
	VALVE - OS&Y VERTICAL STEM

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
TU-101	AIR TERMINAL UNIT
TU-101	AIR TERMINAL UNIT WITH HEATING COIL
VTU-101	VENTURI AIR TERMINAL UNIT
VTU-101	VENTURI AIR TERMINAL UNIT WITH HEATING COIL
	DAMPER - HORIZONTAL FIRE (EXISTING, NEW)
	DAMPER - HORIZONTAL FIRE / SMOKE (EXISTING, NEW)
	DAMPER - SMOKE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE / SMOKE (EXISTING, NEW)
BDD	DAMPER - BACK DRAFT
M	DAMPER - MOTORIZED
	DAMPER - VOLUME (MANUALLY ADJUSTABLE)
	DIFFUSER - BLANK OFF
	DIFFUSER - LINEAR SLOT
	DIFFUSER - SQUARE OR RECTANGULAR
	DUCT CROSS SECTION - SUPPLY
	DUCT CROSS SECTION - RETURN
	DUCT CROSS SECTION - EXHAUST
	DUCT - FLEXIBLE CONNECTION
	DUCT - FLEXIBLE DUCT
	DUCT TAKE-OFF - ROUND CONICAL
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	ELBOW - RECTANGULAR W/ TURNING VANES
	ELBOW - RECTANGULAR/ ROUND SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	FAN - AXIAL
	FAN - CENTRIFUGAL (ELEVATION)
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	INTAKE OR RELIEF HOOD
	REGISTER - RETURN OR EXHAUST
	REGISTER - RETURN WITH BOOT
	REGISTER - TRANSFER GRILLE
	ROOF EXHAUST FAN
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC
	UNIT HEATER - HORIZONTAL THROW
	UNIT HEATER - VERTICAL THROW

DOUBLE LINE PIPING SYMBOLS

SYMBOL	DESCRIPTION
	FLANGE
	FLEX CONNECTION
	STRAINER - BASKET
	STRAINER - Y TYPE
	VALVE - 2 WAY CONTROL
	VALVE - 3 WAY CONTROL
	VALVE - BUTTERFLY
	VALVE - CHECK
	VALVE - DETECTOR CHECK

DOUBLE LINE DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	DUCT TAKE-OFF - ROUND CONICAL
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR SHORT RADIUS WITH SPLITTER VANES
	ELBOW - ROUND
	ELBOW - RECTANGULAR SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC

MECHANICAL DRAWING INDEX

STANDARD METHODS OF NOTATION

S-1
10ø
350-4
SUPPLY DIFFUSER WITH SCHEDULE TAG "1",
10" DIAMETER NECK SIZE
350 CFM TYPICAL FOR 4

R-1
22x22
640-2
RETURN REGISTER WITH SCHEDULE TAG "1",
22"x 22" NECK SIZE
640 CFM TYPICAL FOR 2
EXHAUST REGISTER E DESIGNATION SIMILAR.

TU-101
AIR TERMINAL UNIT WITH HEATING COIL NO. 101
WITH SERVICE CLEARANCE SHOWN

VTU-101
VENTURI AIR TERMINAL WITH HEATING COIL NO. 101
WITH SERVICE CLEARANCE SHOWN

(2)WC-1
PLUMBING FIXTURE UNIT IDENTIFICATION TAG
WATER CLOSET TYPE "1"
TYPICAL FOR 2

8
PIPE DIAMETER NOTATION
ALL SIZES IN INCHES

8ø
22x10
18x14ø
DUCT SIZE NOTATION
ALL SIZES IN INCHES
OVAL DUCT
RECTANGULAR DUCT

1
CONSTRUCTION KEY NOTE (NUMBER) OR
DEMOLITION KEY NOTE (LETTER)

EF
1
EQUIPMENT DESIGNATION,
(i.e. EXHAUST FAN NUMBER 1)

HW-1
PIPING RISER DESIGNATION
(i.e. HOT WATER RISER NUMBER 1)

NEW SYSTEM COMPONENT
EXISTING SYSTEM COMPONENT TO REMAIN
POINT OF NEW CONNECTION SYMBOL

M5.1
SECTION OR PLAN NUMBER
SHEET WHERE SECTION IS DRAWN

AREA OF ENLARGEMENT

1
M5.1
PLAN NUMBER
SHEET WHERE ENLARGED PLAN IS DRAWN

1
M5.1
SECTION OR PLAN NUMBER
SHEET WHERE SECTION IS CUT OR
ENLARGED PLAN IS REFERENCED

SECTION OR ENLARGED PLAN
SCALE: 1/8" = 1' - 0"

SHEET M1.0
SHEET M1.1
MATCH LINE

HEAVY LINE WEIGHT INDICATES NEW WORK
LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT OR REFERENCED INFORMATION
GRAY LINE INDICATES BACKGROUND INFORMATION
DASHED LINES INDICATE PIPING ROUTED BELOW SLAB OR GRADE
HATCH MARKS INDICATE EQUIPMENT OR MATERIALS TO BE DISCONNECTED AND REMOVED.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

MECHANICAL STANDARDS AND DRAWING INDEX

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

NONE

Quality Control

Drawn: JJB
Checked: SVM
Approved: SVM

Project Number

BRI 2021097

Sheet Number

M0.1

200500 – MECHANICAL GENERAL REQUIREMENTS

A. REFERENCES: MECHANICAL AND PHYSICAL PROPERTIES OF ALL MATERIALS, AND THE DESIGN, PERFORMANCE CHARACTERISTICS, AND METHODS OF CONSTRUCTION OF ALL ITEMS OF EQUIPMENT, SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF THE VARIOUS, APPLICABLE STANDARD SPECIFICATIONS.
B. PERFORMANCE REQUIREMENTS: SYSTEMS COMPONENTS PRESSURE AND TEMPERATURE RATINGS: NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES.
C. QUALITY ASSURANCE:
  1. SCOPE OF WORK: FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TECHNICAL SUPERVISION, AND INCIDENTAL SERVICES REQUIRED TO COMPLETE, TEST AND LEAVE READY FOR OPERATION THE MECHANICAL SYSTEMS AS SPECIFIED AND AS INDICATED ON DRAWINGS.
  2. ORDINANCES AND CODES: PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES AND REGULATIONS, THE RULES AND REGULATIONS OF ASHRAE, NFPA, SMACNA AND UL, UNLESS OTHERWISE INDICATED.
  3. SOURCE LIMITATIONS: EQUIPMENT OF THE SAME OR SIMILAR SYSTEMS SHALL BE BY THE SAME MANUFACTURER.
  4. TESTS AND INSPECTIONS: PERFORM ALL TESTS REQUIRED BY STATE, CITY, COUNTY AND/OR OTHER AGENCIES HAVING JURISDICTION. PROVIDE ALL MATERIALS, EQUIPMENT, ETC., AND LABOR REQUIRED FOR TESTS.
  5. SEQUENCE AND SCHEDULE: WORK SO AS TO AVOID INTERFERENCE WITH THE WORK OF OTHER TRADES. BE RESPONSIBLE FOR REMOVING AND RELOCATING ANY WORK WHICH IN THE OPINION OF THE OWNER'S REPRESENTATIVES CAUSES INTERFERENCE.
  6. LABELING REQUIREMENT FOR PACKAGED EQUIPMENT: ELECTRICAL PANELS ON PACKAGED MECHANICAL EQUIPMENT SHALL BEAR UL LABEL OR LABEL OF OTHER NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) (ITSNA, CSA, ETC.).
  7. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
D. CODES, PERMITS AND FEES:
  1. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR MECHANICAL WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.
  2. WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE RULES AND REGULATIONS SET FORTH IN LOCAL AND STATE CODES. PREPARE ANY DETAILED DRAWINGS OR DIAGRAMS WHICH MAY BE REQUIRED BY THE GOVERNING AUTHORITIES. WHERE THE DRAWINGS AND SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND SPECIFICATIONS SHALL GOVERN.
E. THE DRAWINGS SHOW LOCATION AND GENERAL ARRANGEMENT OF EQUIPMENT, PIPING AND RELATED ITEMS. FOLLOW DRAWINGS AS CLOSELY AS ELEMENTS OF THE CONSTRUCTION PERMIT.
F. MATERIAL AND EQUIPMENT MANUFACTURERS:
  1. EQUIPMENT: ALL ITEMS OF EQUIPMENT SHALL BE FURNISHED COMPLETE WITH ALL ACCESSORIES NORMALLY SUPPLIED WITH THE CATALOG ITEMS LISTED AND ALL OTHER ACCESSORIES NECESSARY FOR COMPLETE AND SATISFACTORY OPERATING SYSTEM. EQUIPMENT AND MATERIALS SHALL BE NEW AND SHALL BE STANDARD PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF FIRE PROTECTION; PLUMBING; HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT; AND SHALL BE MANUFACTURER'S LATEST DESIGN.
  2. PACKAGE UNIT EQUIPMENT AND SKID MOUNTED MECHANICAL COMPONENTS THAT ARE FACTORY ASSEMBLED SHALL MEET, IN DETAIL, PRODUCTS NAMED AND SPECIFIED IN EACH SECTION OF MECHANICAL AND ELECTRICAL SPECIFICATIONS.
  3. WHERE EQUIPMENT CHANGES ARE MADE THAT INVOLVE ADDITIONAL ELECTRICAL WORK (LARGER SIZE MOTOR, ADDITIONAL WIRING OF EQUIPMENT, ETC.) THE MECHANICAL TRADES INVOLVED SHALL COMPENSATE THE ELECTRICAL TRADES FOR THE COST OF THE ADDITIONAL WORK REQUIRED.
G. INSPECTION OF SITE: VISIT SITE, EXAMINE AND VERIFY CONDITIONS UNDER WHICH WORK MUST BE CONDUCTED BEFORE SUBMITTING PROPOSAL. SUBMITTING OF PROPOSAL IMPLIES THAT CONTRACTOR HAS VISITED SITE AND UNDERSTANDS CONDITIONS UNDER WHICH WORK MUST BE CONDUCTED. NO ADDITIONAL CHARGES WILL BE ALLOWED BECAUSE OF FAILURE TO MAKE THIS EXAMINATION OR TO INCLUDE ALL MATERIALS AND LABOR TO COMPLETE WORK.
H. SUBMITTALS: SUBMIT PROJECT SPECIFIC SUBMITTALS FOR REVIEW.
I. DELIVERY, STORAGE, AND HANDLING: STORAGE AND PROTECTION: PROVIDE ADEQUATE WEATHER PROTECTED STORAGE SPACE FOR ALL MECHANICAL EQUIPMENT AND MATERIALS DELIVERIES TO THE JOB SITE. STORAGE LOCATIONS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE. EQUIPMENT STORED IN UNPROTECTED AREAS MUST BE PROVIDED WITH TEMPORARY PROTECTION.
J. INSTRUCTION OF OWNER PERSONNEL: BEFORE FINAL INSPECTION, INSTRUCT OWNER'S DESIGNATED PERSONNEL IN OPERATION, ADJUSTMENT, AND MAINTENANCE OF MECHANICAL EQUIPMENT AND SYSTEMS AT AGREED UPON TIMES. A MINIMUM OF 24 HOURS OF FORMAL INSTRUCTION TO OWNER'S PERSONNEL SHALL BE PROVIDED FOR EACH BUILDING. ADDITIONAL HOURS ARE SPECIFIED IN INDIVIDUAL SPECIFICATION SECTIONS.
K. WARRANTY: CONTRACTOR SHALL WARRANTY THAT MECHANICAL INSTALLATION IS FREE FROM DEFECTS AND AGREES TO REPLACE OR REPAIR, TO OWNER'S SATISFACTION, ANY PART OF THIS MECHANICAL INSTALLATION WHICH BECOMES DEFECTIVE WITHIN A PERIOD OF ONE YEAR (UNLESS SPECIFIED OTHERWISE) FROM THE DATE OF SUBSTANTIAL COMPLETION FOLLOWING FINAL ACCEPTANCE, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN EQUIPMENT, MATERIAL, WORKMANSHIP OR FAILURE TO FOLLOW CONTRACT DOCUMENTS. FILE WITH OWNER ANY AND ALL WARRANTIES FROM EQUIPMENT MANUFACTURERS INCLUDING OPERATING CONDITIONS AND PERFORMANCE CAPACITIES THEY ARE BASED ON.
L. MECHANICAL DEMOLITION WORK: DEMOLITION OF EXISTING MECHANICAL EQUIPMENT AND MATERIALS SHALL BE DONE BY THE CONTRACTOR UNLESS OTHERWISE INDICATED. INCLUDE ALL ITEMS SUCH AS, BUT NOT LIMITED TO, EXISTING PIPING, PUMPS, DUCTWORK, SUPPORTS AND EQUIPMENT WHERE SUCH ITEMS ARE NOT REQUIRED FOR PROPER OPERATION OF MODIFIED SYSTEM. IN GENERAL, DEMOLITION WORK IS INDICATED ON DRAWINGS. HOWEVER, THE CONTRACTOR SHALL VISIT JOB SITE TO DETERMINE FULL EXTENT AND CHARACTER OF THIS WORK.
M. RECOVERED REFRIGERANT IS THE PROPERTY OF THE CONTRACTOR. DISPOSE OF REFRIGERANT LEGALLY, IN ACCORDANCE WITH APPLICABLE RULES AND REGULATIONS.
N. WORK INVOLVING OTHER TRADES: CERTAIN ITEMS OF EQUIPMENT OR MATERIALS SPECIFIED IN THE MECHANICAL DIVISION MAY HAVE TO BE INSTALLED BY OTHER TRADES DUE TO CODE REQUIREMENTS OR UNION JURISDICTIONAL REQUIREMENTS. IN SUCH INSTANCES, CONTRACTOR SHALL COMPLETE WORK THROUGH AN APPROVED, QUALIFIED SUBCONTRACTOR AND SHALL INCLUDE FULL COST FOR SAME IN PROPOSAL.
O. ACCEPTANCE PROCEDURE: UPON SUCCESSFUL COMPLETION OF START-UP AND RECALIBRATION, BUT PRIOR TO BUILDING ACCEPTANCE, SUBSTANTIAL COMPLETION AND COMMENCEMENT OF WARRANTIES, ARCHITECT/ENGINEER SHALL BE REQUESTED IN WRITING TO OBSERVE THE SATISFACTORY OPERATION OF ALL MECHANICAL SYSTEMS.
  1. CONTRACTOR SHALL DEMONSTRATE OPERATION OF EQUIPMENT AND CONTROL SYSTEMS, INCLUDING EACH INDIVIDUAL COMPONENT, TO OWNER AND ARCHITECT/ENGINEER.
  2. AFTER CORRECTING ALL ITEMS APPEARING ON THE PUNCH LIST, MAKE A SECOND WRITTEN REQUEST TO THE OWNER AND ARCHITECT/ENGINEER FOR OBSERVATION AND APPROVAL.
  3. AFTER ALL ITEMS ON PUNCH LIST ARE CORRECTED AND FORMAL APPROVAL OF MECHANICAL SYSTEMS IS PROVIDED BY ARCHITECT/ENGINEER, CONTRACTOR SHALL INDICATE TO THE OWNER IN WRITING THE COMMENCEMENT OF THE WARRANTY PERIOD.

200510 – BASIC MECHANICAL MATERIALS AND METHODS

A. PIPE, TUBE, AND FITTINGS:
  1. REFER TO INDIVIDUAL PIPING SECTIONS FOR PIPE, TUBE, AND FITTING MATERIALS AND JOINING METHODS.
  2. PIPE THREADS: ASME B1.20.1 FOR FACTORY-THREADED PIPE AND PIPE FITTINGS.
B. JOINING MATERIALS:
  1. REFER TO INDIVIDUAL PIPING SPECIFICATIONS FOR SPECIAL JOINING MATERIALS NOT LISTED BELOW.
  2. UNIONS: PIPE SIZE 2 INCHES AND SMALLER: FERROUS PIPE: MALLEABLE IRON GROUND JOINT TYPE UNIONS. UNIONS IN GALVANIZED PIPING SYSTEM SHALL BE GALVANIZED. COPPER TUBE AND PIPE: BRONZE UNIONS WITH SOLDERED JOINTS.
  3. FLANGES: PIPE SIZES 2-1/2 INCH AND LARGER: FERROUS PIPE: STANDARD WEIGHT FORGED STEEL WELD NECK FLANGES. COPPER TUBE AND PIPE: SLIP-ON BRONZE FLANGES.
  4. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.
  5. FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL, UNLESS OTHERWISE INDICATED. SQUARE HEAD BOLTS AND NUTS ARE NOT ACCEPTABLE.
  6. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE, ANTIMONY-FREE, SILVER-BEARING ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.
  7. BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING, UNLESS OTHERWISE INDICATED; AND AWS A5.8, BAG1, SILVER ALLOY FOR REFRIGERANT PIPING, UNLESS OTHERWISE INDICATED.
C. PIPE THREAD COMPOUNDS:
  1. PIPE THREAD COMPOUNDS FOR THE FLUID SERVICE COMPATIBLE WITH PIPING MATERIALS PROVIDED.
  2. COMPOUNDS FOR POTABLE WATER SERVICE AND SIMILAR APPLICATIONS ACCEPTABLE TO U.S. DEPARTMENT OF AGRICULTURE (USDA) OR FOOD AND DRUG ADMINISTRATION (FDA). COMPOUNDS CONTAINING LEAD ARE PROHIBITED.
  3. INORGANIC ZINC-RICH COATINGS OR CORROSION INHIBITED PROPRIETARY COMPOUNDS FOR GALVANIZED CARBON STEEL SYSTEMS TO COAT RAW CARBON STEEL SURFACES, IN LIEU OF SUBSEQUENT PAINTING. MANUFACTURERS: CARBOLINE CARBO-ZINC 12 | TNEMEC; KOPPERS.
  4. GRAPHITE AND OIL OR PROPRIETARY CORROSION INHIBITED COMPOUNDS SUITABLE FOR SYSTEM TEMPERATURES FOR STEAM OR CONDENSATE. MANUFACTURERS: WKM, DIVISION OF COOPER INDUSTRIES, INC., KEY GRAPHITE PASTE | OTHER APPROVED.
  5. USE TETRAFLUOROETHYLENE (TEFLON) TAPE 2 TO 3 MILS THICK FOR NATURAL GAS SYSTEM THREADED JOINTS. MANUFACTURERS: CADILLAC PLASTIC; PERMACEL | OTHER APPROVED.
D. DIELECTRIC FITTINGS: PROVIDE DIELECTRIC FITTINGS AS SCHEDULED ON THE DRAWINGS.
  1. DIELECTRIC-FLANGE KITS:
    a. MANUFACTURERS: ADVANCE PRODUCTS & SYSTEMS, INC. | CALPICO, INC. | CENTRAL PLASTICS COMPANY | PIPELINE SEAL AND INSULATOR, INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.
  2. DIELECTRIC NIPPLE/WATERWAY FITTINGS:
    a. MANUFACTURERS: ASC ENGINEERED SOLUTIONS; GRUVLOK MANUFACTURING; DI-LOK NIPPLES | ELSTER GROUP; PERFECTION CORP.; CLEARFLOW | PRECISION PLUMBING PRODUCTS, INC.; CLEARFLOW | SIOUX CHIEF MANUFACTURING CO., INC. | TYCO FIRE & BUILDING PRODUCTS; GRINNELL MECHANICAL PRODUCTS; FIGURE 407 CLEARFLOW | VICTAULIC CO. OF AMERICA; STYLE 47 CLEARFLOW.
E. MECHANICAL SLEEVE SEALS:
  1. DESCRIPTION: MODULAR SEALING ELEMENT UNIT, DESIGNED FOR FIELD ASSEMBLY, TO FILL ANNULAR SPACE BETWEEN PIPE AND SLEEVE.
  2. MANUFACTURERS: ADVANCE PRODUCTS & SYSTEMS, INC. | CALPICO, INC. | METRAFLEX CO. | PIPELINE SEAL AND INSULATOR, INC., THUNDERLINE LINK SEAL.
F. SLEEVES:
  1. STEEL PIPE: ASTM A53, TYPE E, GRADE B, SCHEDULE 40, AND 0.375 INCH WALL BLACK.
  2. STEEL PIPE: ASTM A53, TYPE E, GRADE B, SCHEDULE 40, AND 0.375 INCH WALL GALVANIZED, PLAIN ENDS.
  3. CAST IRON: CAST OR FABRICATED "WALL PIPE" EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.
  4. STACK SLEEVE FITTINGS: MANUFACTURED, CAST-IRON SLEEVE WITH INTEGRAL CLAMPING FLANGE. INCLUDE CLAMPING RING AND BOLTS AND NUTS FOR MEMBRANE FLASHING.
G. ESCUTCHEONS: MANUFACTURED WALL AND CEILING ESCUTCHEONS, WITH AN ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF INSULATED PIPING AND AN OD THAT COMPLETELY COVERS OPENING.
H. EPOXY BONDING COMPOUND: TWO-COMPONENT SYSTEM SUITABLE FOR BONDING WET OR DRY CONCRETE TO EACH OTHER AND TO OTHER MATERIALS.
  1. MANUFACTURERS: EUCO 452 #450, EUCLID CHEMICAL CO. | EPOBOND, L & M CONSTRUCTION CHEMICALS | SIKADUR 87, SIKA CORP.
I. LEAK DETECTOR SOLUTION: COMMERCIAL LEAK DETECTOR SOLUTION FOR PIPE SYSTEM TESTING.
  1. MANUFACTURERS: AMERICAN GAS AND CHEMICALS INC., LEAK TEC | COLE-PARMER INST. CO., LEAK DETECTOR | GUY SPEAKER CO. INC., SQUIRT 'N BUBBLES.
J. PIPE ROOF PENETRATION ENCLOSURES: MINIMUM 18 GAGE WELDED GALVANIZED STEEL CONSTRUCTION. INTEGRAL BASE PLATE. BUILT-IN FULLY MITERED CANT. FACTORY INSTALLED INSECT AND DECAY RESISTANT WOOD NAILER. FACTORY INSTALLED 1-1/2 INCH THICK, 3 POUNDS PER CUBIC FOOT DENSITY RIGID INSULATION. EPDM COMPRESSION MOLDED RUBBER CAP FOR SINGLE OR MULTIPLE PIPES AS REQUIRED. STAINLESS STEEL DRAW-BAND CLAMPS.
  1. MANUFACTURERS: PATE COMPANY | PORTALS PLUS, INC. | THYBAR CORPORATION, THYCURB.

200513 – MOTORS

A. MANUFACTURERS: DAYTON | TOSHIBA INTL. | BALDOR ELECTRIC/RELIANCE | NIDEC MOTOR CORPORATION; U.S. ELECTRICAL MOTORS | REGAL BELOIT/GE COMMERCIAL MOTORS | REGAL BELOIT/LEESON | REGAL BELOIT/MARATHON | SIEMENS.
B. MOTOR CHARACTERISTICS:
  1. MOTORS 1/2 HP AND LARGER: THREE PHASE, UNLESS OTHERWISE INDICATED.
  2. MOTORS SMALLER THAN 1/2 HP: SINGLE PHASE, UNLESS OTHERWISE INDICATED.
  3. FREQUENCY RATING: 60 HZ.
  4. VOLTAGE RATING: NEMA STANDARD VOLTAGE SELECTED TO OPERATE ON NOMINAL CIRCUIT VOLTAGE TO WHICH MOTOR IS CONNECTED.
  5. SERVICE FACTOR: 1.15 FOR OPEN DRIPPROOF MOTORS; 1.0 FOR TOTALLY ENCLOSED MOTORS.
  6. DUTY: CONTINUOUS DUTY AT AMBIENT TEMPERATURE OF 105 DEG F AND AT ALTITUDE OF 3300 FEET ABOVE SEA LEVEL.
  7. CAPACITY AND TORQUE CHARACTERISTICS: SUFFICIENT TO START, ACCELERATE, AND OPERATE CONNECTED LOADS AT DESIGNATED SPEEDS, AT INSTALLED ALTITUDE AND ENVIRONMENT, WITH INDICATED OPERATING SEQUENCE, AND WITHOUT EXCEEDING NAMEPLATE RATINGS OR CONSIDERING SERVICE FACTOR.
  8. BRAKE HORSEPOWER INPUT SHALL NOT EXCEED 90 PERCENT OF THE RATED MOTOR HORSEPOWER.
  9. ENCLOSURE: OPEN DRIPPROOF (ODP) FOR MOTORS INSTALLED INDOORS AND OUT OF THE AIRSTREAM. TOTALLY-ENCLOSED FAN-COOLED (TEFC) FOR MOTORS INSTALLED OUTDOORS OR WITHIN THE AIRSTREAM.
C. POLYPHASE MOTORS:
  1. DESCRIPTION: NEMA MG 1, DESIGN B, MEDIUM INDUCTION MOTOR.
  2. EFFICIENCY: MOTORS 1 HORSEPOWER TO 200 HORSEPOWER SHALL BE PREMIUM EFFICIENT MOTORS MEETING REQUIREMENTS OF NEMA PREMIUM EFFICIENCY MOTOR PROGRAM. EFFICIENCY OF THE MOTOR SHALL BE DETERMINED BASED ON NEMA MG1. THE NOMINAL EFFICIENCIES SHALL MEET OR EXCEED TABLE 12-12.
  3. EFFICIENCY: FIRE PUMP MOTORS, C-FACE MOTORS, JP AND JM FRAME MOTORS, AND MOTORS OVER 200 HORSEPOWER SHALL BE ENERGY EFFICIENT MOTORS. EFFICIENCY OF THE MOTOR SHALL BE DETERMINED BASED ON NEMA MG1. THE MINIMUM EFFICIENCIES, NOMINAL EFFICIENCIES AND SHALL MEET OR EXCEED TABLE 12-11.
D. MOTORS USED WITH VARIABLE FREQUENCY CONTROLLERS:
  1. PREMIUM-EFFICIENT MOTORS: CLASS B TEMPERATURE RISE; CLASS F INSULATION.
  2. SHAFT GROUNDING: PROVIDE A MEANS TO PROTECT MOTOR FROM COMMON MODE CURRENTS IN ACCORDANCE WITH NEMA MG1-31.4.4.3.
    a. MANUFACTURERS: ELECTRO STATIC TECHNOLOGY, INC.; AEGIS.
E. SINGLE-PHASE MOTORS
  1. TYPE: TO SUIT STARTING TORQUE AND REQUIREMENTS OF SPECIFIC MOTOR APPLICATION.
  2. SHADED-POLE MOTORS: FOR MOTORS 1/20 HP AND SMALLER ONLY.
F. ADJUSTING: ALIGN MOTORS, BASES, SHAFTS, PULLEYS AND BELTS. TENSION BELTS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

200519 – METERS AND GAGES

A. METAL-CASE, LIQUID-IN-GLASS THERMOMETERS:
  1. MANUFACTURERS: AMETEK, INC.; U.S. GAUGE DIV. | MILJOCO CORPORATION | REOTEMP INSTRUMENT CORPORATION | TRERICE, H. O. CO. | WEISS INSTRUMENTS, INC. | WEKSLER INSTRUMENTS OPERATING UNIT; DRESSER INDUSTRIES; INSTRUMENT DIV.
  2. CASE: DIE-CAST ALUMINUM OR CHROME-PLATED BRASS, 9 INCHES LONG.
  3. TUBE: RED OR BLUE READING, ORGANIC-LIQUID FILLED, WITH MAGNIFYING LENS.
  4. CONNECTOR: ADJUSTABLE TYPE, 180 DEGREES IN VERTICAL PLANE, 360 DEGREES IN HORIZONTAL PLANE, WITH LOCKING DEVICE.
  5. STEM: COPPER-PLATED STEEL, ALUMINUM, OR BRASS FOR THERMOWELL INSTALLATION AND OF LENGTH TO SUIT INSTALLATION.
  6. ACCURACY: PLUS OR MINUS 1 PERCENT OF RANGE OR PLUS OR MINUS 1 SCALE DIVISION TO MAXIMUM OF 1.5 PERCENT OF RANGE.
B. THERMOWELLS: SAME AS MANUFACTURER OF THERMOMETER BEING USED. PRESSURE-TIGHT, SOCKET-TYPE METAL FITTING MADE FOR INSERTION INTO PIPING AND OF TYPE, DIAMETER, AND LENGTH REQUIRED TO HOLD THERMOMETER. BRASS FOR COMPATIBLE SERVICES LESS THAN 353 DEG F; ANSI 18-8 STAINLESS STEEL FOR ALL OTHERS TO SUIT SERVICE. FURNISH EXTENSION NECK TO ACCOMMODATE INSULATION WHERE APPLICABLE.
C. PROVIDE THE FOLLOWING TEMPERATURE RANGES FOR THERMOMETERS:
  1. DOMESTIC COLD WATER: 30 TO 130 DEG F OR 0 TO 120 DEG F.
  2. DOMESTIC HOT WATER: 30 TO 180 DEG F.
  3. ALL OTHER LOCATIONS: AS INDICATED ON DRAWINGS.
D. PRESSURE GAGES:
  1. MANUFACTURERS: AMETEK, INC.; U.S. GAUGE DIV. | CAMBRIDGE | DWYER INSTRUMENTS, INC. | MARSH BELLOFRAM | MILJOCO CORPORATION | TRERICE, H. O. CO. | WEISS INSTRUMENTS, INC. | WEKSLER INSTRUMENTS OPERATING UNIT; DRESSER INDUSTRIES; INSTRUMENT DIV.
  2. DIRECT-MOUNTING, DIAL-TYPE PRESSURE GAGES: INDICATING-DIAL TYPE COMPLYING WITH ASME B40.100.
  3. CASE: STAINLESS STEEL, ALUMINUM, OR FRP, 4-1/2-INCH DIAMETER.
  4. PRESSURE-ELEMENT ASSEMBLY: BOURDON TUBE, UNLESS OTHERWISE INDICATED.
  5. PRESSURE CONNECTION: BRASS, NPS 1/4, BOTTOM-OUTLET TYPE UNLESS BACK-OUTLET TYPE IS INDICATED.
  6. ACCURACY: GRADE A, PLUS OR MINUS 1 PERCENT OF MIDDLE HALF SCALE.
  7. VACUUM-PRESSURE RANGE: 30-IN. HG OF VACUUM TO 15 PSIG OF PRESSURE.
  8. WATER: 0-100 PSIG (1 PSI DIVISIONS TO 50 PSI; 5 PSI DIVISIONS ABOVE 50 PSI), LIQUID FILLED.
  9. STEAM (15 PSIG AND LESS): 30 INCHES HG VACUUM-30 PSIG (1 INCH DIVISIONS BELOW 0 PSI; 1 PSI DIVISIONS ABOVE 0 PSI), SILICONE DAMPENED.
  10. STEAM (16 TO 60 PSIG): 30 INCHES HG VACUUM-100 PSIG, SILICONE DAMPENED.
  11. RANGE FOR FLUIDS UNDER PRESSURE: 1-1/2 TIMES EXPECTED WORKING PRESSURE. IF NOT A STANDARD SCALE, SELECT NEXT LARGEST SCALE.
  12. PRESSURE-GAGE FITTINGS:
    a. VALVES: NPS 1/4 BRASS BALL TYPE.
    b. SYPHONS: NPS 1/4 COIL OF BRASS TUBING WITH THREADED ENDS.
    c. SNUBBERS: ASME B40.5, NPS 1/4 BRASS BUSHING WITH CORROSION-RESISTANT, POROUS-METAL DISC OF MATERIAL SUITABLE FOR SYSTEM FLUID AND WORKING PRESSURE.
E. INSTALL DRY-CASE-TYPE PRESSURE GAGES ON INLET AND OUTLET OF EACH PRESSURE-REDUCING VALVE.
F. INSTALL LIQUID-FILLED-CASE-TYPE PRESSURE GAGES AT SUCTION AND DISCHARGE OF EACH PUMP.

200529 – HANGERS AND SUPPORTS

A. PIPE HANGERS, SUPPORTS, AND ACCESSORIES SHALL COMPLY WITH THE FOLLOWING:
  1. MSS SP-58, PIPE HANGERS AND SUPPORTS – MATERIALS, DESIGN AND MANUFACTURE.
  2. MSS SP-69, PIPE HANGERS AND SUPPORTS – SELECTION AND APPLICATION.
  3. MSS SP-89, PIPE HANGERS AND SUPPORTS – FABRICATION AND INSTALLATION PRACTICES.
B. HANGER ROD MATERIAL: THREADED, HOT ROLLED, STEEL ROD CONFORMING TO ASTM A 36 OR ASTM A 575.
C. STEEL PIPE HANGERS AND SUPPORTS: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS.
  1. MANUFACTURERS: ASC ENGINEERED SOLUTIONS | B-LINE BY EATON | CARPENTER & PATERSON, INC. | HILTI USA | NVENT ELECTRIC PLC | PHD MANUFACTURING, INC.
D. TRAPEZE PIPE HANGERS: MSS SP-69, TYPE 59, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE FROM STRUCTURAL-STEEL SHAPES WITH MSS SP-58 HANGER RODS, NUTS, SADDLES, AND U-BOLTS.
E. METAL FRAMING SYSTEMS: DESCRIPTION: MFMA-3, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE OF STEEL CHANNELS AND OTHER COMPONENTS.
  1. MANUFACTURERS: B-LINE BY EATON | HILTI USA | POWER-STRUT A PART OF ATKORE INTERNATIONAL | UNISTRUT A PART OF ATKORE INTERNATIONAL.
F. THERMAL-HANGER SHIELD INSERTS: DESCRIPTION: INSULATION INSERT ENCASED IN 360 DEGREE SHEET METAL SHIELD.
  1. MANUFACTURERS: AMERICAN MECHANICAL INSULATION SALES INC. (AMIS) | B-LINE BY EATON | NVENT ELECTRIC PLC | PIPE SHIELDS, INC. | RILCO MANUFACTURING COMPANY, INC. | VALUE ENGINEERED PRODUCTS.
G. ROOF TOP PIPE STANDS: SHOP-FABRICATED ASSEMBLIES MADE OF MANUFACTURED CORROSION-RESISTANT COMPONENTS TO SUPPORT ROOF-MOUNTED PIPING.
  1. MANUFACTURERS: B-LINE BY EATON | ECO SUPPORT PRODUCTS | NVENT ELECTRIC PLC | MAPA INDUSTRIES | MIRO INDUSTRIES | PORTABLE PIPE HANGERS.
H. EQUIPMENT SUPPORTS: WELDED, SHOP- OR FIELD-FABRICATED EQUIPMENT SUPPORT MADE FROM STRUCTURAL-STEEL SHAPES.
I. MISCELLANEOUS MATERIALS: ASTM A 36/A 36M, STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.

200533 – ELECTRICAL HEAT TRACING

A. SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES
  1. MANUFACTURERS: THERMON AMERICAS INC <http://www.specagent.com/LookUp/?uid=123456828018&mf=04&src=wd>.; FLX SELF-REGULATING HEATING CABLE. | RAYCHEM <http://www.specagent.com/LookUp/?uid=123456828017&mf=04&src=wd>; NVENT ELECTRIC PLC; XLTRACE. | DELTA-THERM CORPORATION <http://www.specagent.com/LookUp/?uid=123456828013&mf=04&src=wd>; IN SERIES.
  2. COMPLY WITH IEEE 515.1.
  3. HEATING ELEMENT: PAIR OF NO. 16 AWG, PARALLEL, NICKEL-COATED COPPER BUS WIRES EMBEDDED IN CROSSLINKED CONDUCTIVE POLYMER CORE, WHICH VARIES HEAT OUTPUT IN RESPONSE TO TEMPERATURE ALONG ITS LENGTH. TERMINATE WITH WATERPROOF, FACTORY-ASSEMBLED, NON-HEATING LEADS WITH CONNECTORS AT ONE END, AND SEAL THE OPPOSITE END WATERTIGHT. CABLE SHALL BE CAPABLE OF CROSSING OVER ITSELF ONCE WITHOUT OVERHEATING.
  4. ELECTRICAL INSULATING JACKET: FLAME-RETARDANT POLYOLEFIN.
  5. CABLE COVER: TINNED-COPPER BRAID AND POLYOLEFIN OUTER JACKET.
  6. MAXIMUM OPERATING TEMPERATURE (POWER ON): 150 DEG F.
  7. MAXIMUM EXPOSURE TEMPERATURE (POWER OFF): 185 DEG F.
  8. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
  9. CAPACITIES AND CHARACTERISTICS:
    a. MAXIMUM HEAT OUTPUT: W/FT. AS RECOMMENDED BY MANUFACTURER.
    b. PIPING DIAMETER: AS INDICATED ON THE DRAWINGS.
    c. NUMBER OF PARALLEL CABLES: AS RECOMMENDED BY MANUFACTURER.
    d. ELECTRICAL CHARACTERISTICS FOR SINGLE-CIRCUIT CONNECTION: COORDINATE ELECTRICAL SYSTEM REQUIREMENTS WITH DIVISION 26.
  10. ELECTRICAL POWER SYSTEM CHARACTERISTICS: AS SCHEDULED ON THE DRAWINGS.
B. CONTROLS
  1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
    a. THERMON AMERICAS INC <http://www.specagent.com/LookUp/?uid=123456828018&mf=04&src=wd>.
    b. RAYCHEM <http://www.specagent.com/LookUp/?uid=123456828017&mf=04&src=wd>; NVENT ELECTRIC PLC.
    c. DELTA-THERM CORPORATION <http://www.specagent.com/LookUp/?uid=123456828013&mf=04&src=wd>.
  2. PIPE-MOUNTED THERMOSTATS FOR FREEZE PROTECTION:
    a. REMOTE BULB UNIT WITH ADJUSTABLE TEMPERATURE RANGE FROM 30 TO 50 DEG F.
    b. SNAP ACTION; OPEN-ON-RISE, SINGLE-POLE SWITCH WITH MINIMUM CURRENT RATING ADEQUATE FOR CONNECTED CABLE.
    c. REMOTE BULB ON CAPILLARY, RESISTANCE TEMPERATURE DEVICE, OR THERMISTOR FOR DIRECTLY SENSING PIPE-WALL TEMPERATURE.
    d. CORROSION-RESISTANT, WATERPROOF CONTROL ENCLOSURE.
C. ACCESSORIES
  1. CABLE INSTALLATION ACCESSORIES: FIBERGLASS TAPE, HEAT-CONDUCTIVE PUTTY, CABLE TIES, END SEALS AND SPLICE KITS, AND INSTALLATION CLIPS ALL FURNISHED BY MANUFACTURER, OR AS RECOMMENDED IN WRITING BY MANUFACTURER.
  2. WARNING LABELS: SELF-ADHESIVE LABELS WITH LEGEND "ELECTRIC HEAT TRACING." REFER TO DIVISION 20 SECTION "MECHANICAL IDENTIFICATION" FOR ADDITIONAL REQUIREMENTS
  3. WARNING TAPE: CONTINUOUSLY PRINTED "ELECTRICAL TRACING"; VINYL, AT LEAST 3 MILS THICK, AND WITH PRESSURE-SENSITIVE, PERMANENT, WATERPROOF, SELF-ADHESIVE BACK.
    a. WIDTH FOR MARKERS ON PIPES WITH OD, INCLUDING INSULATION, LESS THAN 6 INCHES: 3/4 INCH MINIMUM.
    b. WIDTH FOR MARKERS ON PIPES WITH OD, INCLUDING INSULATION, 6 INCHES OR LARGER: 1-1/2 INCHES MINIMUM.

200547 – MECHANICAL VIBRATION CONTROLS

A. EQUIPMENT TO BE ISOLATED IS SCHEDULED ON THE DRAWINGS.
B. VIBRATION ISOLATORS:
  1. TYPE 3 SPRING ISOLATORS: FREESTANDING, OPEN-SPRING ISOLATORS.
    a. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE MASON INDUSTRIES, INC.; TYPE SLF OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING: AMBER/BOOTH COMPANY, INC. | KINETICS NOISE CONTROL, INC. | VIBRATION ELIMINATOR CO., INC. | VIBRATION MOUNTINGS & CONTROLS/KORFUND | VIBRO-ACOUSTICS.
C. PROVIDE FLEXIBLE ELECTRICAL CONNECTIONS IN THE FORM OF LARGE RADIUS, 360 DEGREE LOOP OF FLEXIBLE CONDUIT FOR ALL VIBRATION ISOLATED EQUIPMENT. PIPING SERVICES (EXCEPT INLET AND OUTLET WATER CONNECTIONS FOR PUMPS) SHALL BE MADE WITH 360 DEGREE LOOPS OF REINFORCED NEOPRENE HOSE, WHICH ARE ATTACHED USING NIPPLES OF APPROPRIATE GENDER. ALL SERVICE CONNECTIONS MADE WITH NEOPRENE HOSE SHALL HAVE SHUT-OFF VALVES BETWEEN THE HOSE AND THE SUPPLY SERVICE.

200553 – MECHAICAL IDENTIFICATION

A. MANUFACTURERS: SETON | BRADY | EMED | CRAFTMARK | BRIMAR INDUSTRIES, INC. | MARKING SERVICES INC. (MSI) | KOLBI PIPE MARKER CO.
B. EQUIPMENT NAMEPLATES: METAL, WITH DATA ENGRAVED OR STAMPED, FOR PERMANENT ATTACHMENT ON EQUIPMENT.
  1. LOCATION: ACCESSIBLE AND VISIBLE.
  2. FASTENERS: AS REQUIRED TO MOUNT ON EQUIPMENT.
C. EQUIPMENT MARKERS: ENGRAVED, COLOR-CODED LAMINATED PLASTIC. INCLUDE CONTACT-TYPE, PERMANENT ADHESIVE.
  1. SIZE: 2-1/2 BY 4 INCHES FOR CONTROL DEVICES, DAMPERS, AND VALVES; 4-1/2 BY 6 INCHES FOR EQUIPMENT.
D. PIPE MARKERS:
  1. GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS: PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.
  2. PRETENSIONED PIPE LABELS: PRECOILED, SEMIRIGID PLASTIC FORMED TO COVER FULL CIRCUMFERENCE OF PIPE AND TO ATTACH TO PIPE WITHOUT FASTENERS OR ADHESIVE.
  3. SELF-ADHESIVE PIPE LABELS: PRINTED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE BACKING.
  4. PIPE LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS, PIPE SIZE, AND AN ARROW INDICATING FLOW DIRECTION.
    a. FLOW-DIRECTION ARROWS: INTEGRAL WITH PIPING SYSTEM SERVICE LETTERING TO ACCOMMODATE BOTH DIRECTIONS, OR AS SEPARATE UNIT ON EACH PIPE LABEL TO INDICATE FLOW DIRECTION.
    b. LETTERING SIZE: AT LEAST 1-1/2 INCHES HIGH.
E. DUCT LABELS
  1. DUCT MARKERS: VINYL, 2-INCH MINIMUM CHARACTER HEIGHT, WITH PERMANENT PRESSURE SENSITIVE ADHESIVE. INCLUDE DIRECTION AND QUANTITY OF AIRFLOW, AIR HANDLING UNIT OR FAN NUMBER, AND DUCT SERVICE (SUCH AS SUPPLY, RETURN, AND EXHAUST).
    a. ADHESIVE: CONTACT-TYPE PERMANENT ADHESIVE, COMPATIBLE WITH LABEL AND WITH SUBSTRATE.
  2. DUCT MARKERS: ENGRAVED, COLOR-CODED LAMINATED PLASTIC. INCLUDE DIRECTION AND QUANTITY OF AIRFLOW, AIR HANDLING UNIT OR FAN NUMBER, AND DUCT SERVICE (SUCH AS SUPPLY, RETURN, AND EXHAUST). INCLUDE CONTACT-TYPE, PERMANENT ADHESIVE.
    a. FASTENERS: STAINLESS-STEEL RIVETS OR SELF-TAPPING SCREWS.

200700 – MECHANICAL INSULATION

A. ACCEPTABLE PIPE, DUCT, AND EQUIPMENT INSULATION MATERIALS AND THICKNESSES ARE SCHEDULED ON THE DRAWINGS. WHERE NOT SCHEDULED, THE FOLLOWING APPLY:
  1. INDOOR PIPING:
    a. HOT SERVICE DRAINS, ALL PIPE SIZES: GLASS-FIBER OR MINERAL WOOL, PREFORMED PIPE INSULATION, TYPE I OR II: 1 INCH THICK.
    b. HOT SERVICE VENTS, ALL PIPE SIZES: GLASS-FIBER OR MINERAL WOOL, PREFORMED PIPE INSULATION, TYPE I OR II: 1 INCH THICK.
    c. EXISTING PLASTIC WATER PIPING WITHIN RETURN AIR PLENUM SPACE: ALL PIPE SIZES: INSULATION SHALL BE:
      1) FIRE-RATED PLENUM WRAP: 1/2 INCH THICK.
B. FIELD-APPLIED JACKETING SYSTEMS DESCRIPTION:
  1. ACCEPTABLE JACKETING MATERIALS ARE SCHEDULED ON THE DRAWINGS. WHERE NOT SCHEDULED, THE FOLLOWING APPLY:
    a. STEAM CONDENSATE PIPING WITHIN AIR HANDLING UNITS: ALUMINUM, STUCCO EMBOSSED: 0.016 INCH THICK.
    b. PIPING WITHIN ENERGY RECOVERY UNITS: TYPE 304 STAINLESS STEEL, SMOOTH: 0.010 INCH THICK. SEAMS AND JOINTS CALKED WITH CHEMICALLY RESISTANT SEALER.
C. PIPE INSULATION MATERIALS:
  1. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS.
    a. PRODUCTS: AEROFLEX USA, INC.; AEROCEL TUBE AND SHEET | ARMACELL LLC; AP ARMAFLEX | IK INSULATION GROUP; K-FLEX; INSUL-TUBE AND INSUL-SHEET.
  2. GLASS-FIBER, PREFORMED PIPE INSULATION: TYPE I, 850 DEG F MATERIALS: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 547, TYPE I, GRADE A, WITH FACTORY-APPLIED ASJ OR ASJ-SSL.
    a. PRODUCTS: JOHNS MANVILLE; MICRO-LOK | KNAUF INSULATION; 1000 PIPE INSULATION | MANSON INSULATION INC.; ALLEY-K | OWENS CORNING; FIBERGLAS PIPE INSULATION.
D. DUCTWORK INSULATION MATERIALS:
  1. BLANKET INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET.
    a. PRODUCTS: CERTAINTEED CORP.; DUCT WRAP | JOHNS MANVILLE; MICROLITE | KNAUF INSULATION; DUCT WRAP | MANSON INSULATION INC.; ALLEY WRAP FSK | OWENS CORNING; ALL-SERVICE DUCT WRAP.
  2. BOARD INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE IA OR TYPE IB. FOR DUCT AND PLENUM APPLICATIONS, PROVIDE INSULATION WITH FACTORY-APPLIED FSK JACKET. FOR EQUIPMENT APPLICATIONS, PROVIDE INSULATION WITH FACTORY-APPLIED ASJ.
    a. PRODUCTS: CERTAINTEED CORP.; COMMERCIAL BOARD | FIBREX INSULATIONS INC.; FBX | JOHNS MANVILLE; 800 SERIES SPIN-GLAS | KNAUF INSULATION; INSULATION BOARD | MANSON INSULATION INC.; AK BOARD | OWENS CORNING; FIBERGLAS 700 SERIES.
E. INSULATING CEMENTS, ADHESIVES, TAPES, AND SEALANTS: USE MANUFACTURER RECOMMENDED PRODUCTS.
F. MASTICS: MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES; COMPLY WITH MIL-C-19565C, TYPE II.
G. FIELD-APPLIED JACKETS: FIELD-APPLIED JACKETS SHALL COMPLY WITH ASTM C 921, TYPE I, UNLESS OTHERWISE INDICATED.
  1. PVC JACKET: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C; THICKNESS AS SPECIFIED; ROLL STOCK READY FOR SHOP OR FIELD CUTTING AND FORMING.
    a. PRODUCTS: JOHNS MANVILLE; ZESTON AND CEEL-CO | P.I.C. PLASTICS, INC.; FG SERIES | PROTO PVC CORPORATION; LOSMOKE | SPEEDLINE CORPORATION; SMOKESAFE.
  2. PVC FITTING COVERS: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C, AND INCLUDING FLEXIBLE GLASS FIBER INSULATION INSERTS.
    a. PRODUCTS: JOHNS MANVILLE; ZESTON AND CEEL-CO | P.I.C. PLASTICS, INC.; FG SERIES | PROTO PVC CORPORATION; LOSMOKE | SPEEDLINE CORPORATION; SMOKESAFE.
  3. ALUMINUM JACKET: COMPLY WITH ASTM B 209, ALLOY 3003, 3005, 3105 OR 5005, TEMPER H-14. SHEET AND ROLL STOCK READY FOR SHOP OR FIELD SIZING OR FACTORY CUT AND ROLLED TO SIZE.
    a. PRODUCTS: PABCO-CHILDERS METALS; ITW INSULATION SYSTEMS; METAL JACKETING SYSTEMS | RPR PRODUCTS, INC.; INSUL-MATE.

220523 – GENERAL-DUTY VALVES FOR PLUMBING

A. QUALITY ASSURANCE:
  1. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
  2. NSF COMPLIANCE: NSF 61 AND NSF 372 FOR VALVE MATERIALS FOR POTABLE-WATER SERVICE.
B. TWO-PIECE, REGULAR PORT BRONZE BALL VALVES WITH STAINLESS-STEEL TRIM: TYPE 316 STAINLESS-STEEL BALL AND STEM, REINFORCED TFE SEATS, BLOW-OUT-PROOF STEM, WITH ADJUSTABLE STEM PACKING, SOLDERED OR THREADED ENDS; AND 150 PSIG SWP AND 600-PSIG CWP RATINGS.
  1. MANUFACTURERS: APOLLO VALVES; BY CONBRACO INDUSTRIES, INC.; SERIES 70LF-140/240 | HAMMOND VALVE | MILWAUKEE VALVE COMPANY; MODEL UPBA100S/150S | NIBCO INC.; MODELS S-580-70-66-LF/T-580-70-66-LF | WATTS WATER TECHNOLOGIES, INC.
C. DRAIN VALVES: BALL-VALVE-TYPE, HOSE-END DRAIN VALVES:
  1. BRONZE BALL VALVE AS SPECIFIED IN THIS SECTION. LEAD FREE CONSTRUCTION IS NOT REQUIRED.
  2. OUTLET: THREADED, SHORT NIPPLE WITH GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7 AND CAP WITH BRASS CHAIN.
D. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN.
E. LOCATE VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.
F. INSTALL VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE. BUTTERFLY VALVES SHALL BE INSTALLED WITH STEM HORIZONTAL TO ALLOW SUPPORT FOR THE DISC AND THE CLEANING ACTION OF THE DISC.
G. INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.
H. INSTALL CHECK VALVES FOR PROPER DIRECTION OF FLOW AND AS FOLLOWS:

221116 – DOMESTIC WATER PIPING

A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
B. PIPING SYSTEM MATERIALS ARE SCHEDULED ON THE DRAWINGS.
C. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHERE SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY:
  1. HOT-WATER-PIPING, BALANCING DUTY: CALIBRATED BALANCING VALVES.
  2. DRAIN DUTY: HOSE-END DRAIN VALVES.
D. TRANSITION AND SPECIAL FITTINGS WITH PRESSURE RATINGS AT LEAST EQUAL TO PIPING RATING MAY BE USED IN APPLICATIONS BELOW, UNLESS OTHERWISE INDICATED.
E. FLANGES MAY BE USED ON ABOVEGROUND PIPING, UNLESS OTHERWISE INDICATED.
F. HARD COPPER TUBE: ASTM B 88, TYPE L, WATER TUBE, DRAWN TEMPER.
  1. COPPER PRESSURE FITTINGS: ASME B16.18, CAST-COPPER-ALLOY OR ASME B16.22, WROUGHT-COPPER, SOLDER-JOINT FITTINGS. FURNISH WROUGHT-COPPER FITTINGS IF INDICATED.
  2. BRONZE FLANGES: ASME B16.24, CLASS 150, WITH SOLDER-JOINT ENDS. FURNISH CLASS 300 FLANGES IF REQUIRED TO MATCH PIPING.
  3. COPPER UNIONS: MSS SP-123, CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY, WITH BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES, AND SOLDER-JOINT OR THREADED ENDS.
G. GENERAL-DUTY VALVES; AND DRAIN VALVES ARE SPECIFIED IN "VALVES."
H. BALANCING VALVES ARE SPECIFIED IN "DOMESTIC WATER PIPING SPECIALTIES."
I. PIPE HANGER AND SUPPORT DEVICES ARE SPECIFIED IN "HANGERS AND SUPPORTS." INSTALL THE FOLLOWING:
  1. VERTICAL PIPING: MSS TYPE 8 OR TYPE 42, CLAMPS.
  2. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: ACCORDING TO THE FOLLOWING:
    a. 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS.
    b. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
    c. LONGER THAN 100 FEET: MSS TYPE 49, SPRING CUSHION ROLLS, IF INDICATED.
  3. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER: MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
  4. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.
J. INSTALL SUPPORTS ACCORDING TO "HANGERS AND SUPPORTS."
K. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
L. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.
M. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
  1. NPS 3/4 AND SMALLER: 60-INCHES WITH 3/8-INCH ROD.
  2. NPS 1 AND NPS 1-1/4: 72 INCHES WITH 3/8-INCH ROD.
  3. NPS 1-1/2 AND NPS 2: 96 INCHES WITH 3/8-INCH ROD.
  4. NPS 2-1/2: 108 INCHES WITH 1/2-INCH ROD.
  5. NPS 3 TO NPS 5: 10 FEET WITH 1/2-INCH ROD.
N. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
O. SUPPORT PIPING AND TUBING NOT LISTED ABOVE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.
P. TEST DOMESTIC WATER PIPING AS FOLLOWS:
  1. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 150 PSIG. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
  2. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
  3. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.
Q. CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
  1. PURGE NEW PIPING AND PARTS OF EXISTING DOMESTIC WATER PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
  2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION OR, IF METHODS ARE NOT PRESCRIBED, PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR AS DESCRIBED BELOW:
    a. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
    b. FILL AND ISOLATE SYSTEM ACCORDING TO EITHER OF THE FOLLOWING: FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS. FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 200 PPM OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR THREE HOURS.
    c. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
    d. SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
  3. PREPARE AND SUBMIT REPORTS OF PURGING AND DISINFECTING ACTIVITIES.

221119 – DOMESTIC WATER PIPING SPECIALTIES

A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
B. MINIMUM WORKING PRESSURE FOR DOMESTIC WATER PIPING SPECIALTIES: 125 PSIG, UNLESS OTHERWISE INDICATED.
C. BRONZE CALIBRATED BALANCING VALVES NPS 1/2 :
  1. TYPE: BALL OR Y-PATTERN GLOBE VALVE WITH TWO READOUT PORTS AND MEMORY SETTING INDICATOR.
  2. BODY: BRONZE.
  3. MINIMUM FLOW RATE: 0.3 GPM.
  4. MANUFACTURERS: ARMSTRONG INTERNATIONAL, INC. | ARMSTRONG PUMPS, INC. | FLO FAB INC. | GRISWOLD CONTROLS | BELL & GOSSETT; XYLEM INC. | NIBCO INC. | IMI INDOOR CLIMATE; TOUR & ANDERSSON | TACO, INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.
D. WATER-TEMPERATURE LIMITING DEVICES:
  1. STANDARD: ASSE 1070.
  2. PRESSURE RATING: 125 PSIG.
  3. TYPE: THERMOSTATICALLY CONTROLLED WATER MIXING VALVE.
  4. MATERIAL: BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONENTS.
  5. CONNECTIONS: 1/2-INCH UNION OR 3/8-INCHCOMPRESSION; WITH INTEGRAL CHECK VALVES.
  6. OUTLET TEMPERATURE RANGE: ADJUSTABLE FROM 85 DEG F TO 120 DEG F. SET AT 105 DEG F.
  7. MINIMUM FLOW RATE: 0.5 GPM
  8. VALVE FINISH: CHROME PLATED.
  9. MANUFACTURERS: APOLLO VALVES; MODEL MVD (34D SERIES) | BRADLEY CORPORATION | LAWLER MANUFACTURING COMPANY, INC. | LEONARD VALVE COMPANY; SERIES 170 AND 270 | WATTS WATER TECHNOLOGIES, INC.; POWERS DIVISION; HYDROGUARD SERIES E480 AND LM495 | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO. | ZURN PLUMBING PRODUCTS GROUP; WILKINS DIV.
E. Y-PATTERN STRAINERS:
  1. CWP: 200 PSIG MINIMUM, UNLESS OTHERWISE INDICATED.
  2. SWP: 125 PSIG MINIMUM, UNLESS OTHERWISE INDICATED.
  3. BODY: BRONZE FOR NPS 2 AND SMALLER; CAST IRON WITH INTERIOR LINING COMPLYING WITH AWWA C550 OR FDA-APPROVED, EPOXY COATING AND FOR NPS 2-1/2 AND LARGER.
  4. END CONNECTIONS: THREADED OR SOLDERED FOR NPS 2 AND SMALLER; FLANGED FOR NPS 2-1/2 AND LARGER.
  5. SCREEN: STAINLESS STEEL WITH ROUND PERFORATIONS, UNLESS OTHERWISE INDICATED.
  6. DRAIN: PIPE PLUG.
  7. MANUFACTURERS: APOLLO VALVES; CONBRACO INDUSTRIES, INC. | KECKLEY COMPANY | METRAFLEX COMPANY | MUELLER STEAM SPECIALTY; A WATTS BRAND | NIBCO, INC. | TITAN FLOW CONTROL, INC. | WATTS | YARWAY; EMERSON AUTOMATION SOLUTIONS.
F. HOSE BIBBS: STANDARD: ASME A112.18.1 FOR SEDIMENT FAUCETS.
  1. BODY MATERIAL: BRONZE.
  2. SEAT: BRONZE, REPLACEABLE.
  3. SUPPLY CONNECTIONS: NPS 1/2 OR NPS 3/4 THREADED OR SOLDER-JOINT INLET.
  4. OUTLET CONNECTION: GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
  5. PRESSURE RATING: 125 PSIG.
  6. VACUUM BREAKER: INTEGRAL NONREMOVABLE, DRAINABLE, HOSE-CONNECTION VACUUM BREAKER COMPLYING WITH ASSE 1011.
  7. FINISH: CHROME OR NICKEL PLATED.
  8. OPERATION: OPERATING KEY.
  9. INCLUDE OPERATING KEY WITH EACH HOSE BIBB.
  10. INCLUDE INTEGRAL WALL FLANGE WITH EACH CHROME- OR NICKEL-PLATED HOSE BIBB.
G. WATER HAMMER ARRESTERS (COPPER TUBE TYPE):
  1. STANDARD: ASSE 1010 OR PDI-WH 201.
  2. TYPE: COPPER TUBE WITH PISTON.
  3. SIZE: ASSE 1010, SIZES AA AND A THROUGH F OR PDI-WH 201, SIZES A THROUGH F.
  4. MANUFACTURERS: MIFAB, INC. | PPP INC. | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.
H. WALL HYDRANTS: NONFREEZE
  1. MANUFACTURERS: JOSAM COMPANY | MIFAB, INC. | SMITH, JAY R. MFG. CO. | TYLER PIPE | WATTS WATER TECHNOLOGIES, INC. | WOODFORD MANUFACTURING COMPANY | ZURN PLUMBING PRODUCTS GROUP
  2. STANDARD: ASME A112.21.3M FOR SELF-DRAINING WALL HYDRANTS.
  3. PRESSURE RATING: 125 PSIG.
  4. OPERATION: LOOSE KEY.
  5. CASING AND OPERATING ROD: OF LENGTH REQUIRED TO MATCH WALL THICKNESS. INCLUDE WALL CLAMP.
  6. INLET: NPS 3/4 OR NPS 1.
  7. OUTLET: CONCEALED, WITH INTEGRAL VACUUM BREAKER AND GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
  8. BOX: DEEP, FLUSH MOUNTING WITH COVER.
  9. BOX AND COVER FINISH: POLISHED NICKEL BRONZE OR CHROME PLATED.
  10. OUTLET: EXPOSED, WITH INTEGRAL VACUUM BREAKER AND GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
  11. NOZZLE AND WALL-PLATE FINISH: POLISHED NICKEL BRONZE.
  12. OPERATING KEYS(S): ONE WITH EACH WALL HYDRANT.

221316 – SANITARY WASTE AND VENT PIPING

A. PIPING SYSTEM MATERIALS ARE SCHEDULED ON THE DRAWINGS.
B. PIPING MATERIALS SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.
C. CAST-IRON SOIL PIPE SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF CAST IRON SOIL PIPE INSTITUTE (CISPI).
D. COMPLY WITH NSF 14, "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS," FOR PLASTIC PIPING COMPONENTS. INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING; "NSF-DRAIN" FOR PLASTIC DRAIN PIPING; "NSF-TUBULAR" FOR PLASTIC CONTINUOUS WASTE PIPING; AND "NSF-SEWER" FOR PLASTIC SEWER PIPING.
E. SOLID-WALL PVC PIPE: SCHEDULE 40, ASTM D 2665, DRAIN, WASTE, AND VENT.
  1. PVC SOCKET FITTINGS: ASTM D 2665, SOCKET TYPE, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.
F. INSTALL SOIL AND WASTE DRAINAGE AND VENT PIPING AT THE FOLLOWING MINIMUM SLOPES, UNLESS OTHERWISE INDICATED:
  1. BUILDING SANITARY DRAIN: 1/8-INCH PER FOOT DOWNWARD IN DIRECTION OF FLOW, UNLESS OTHERWISE NOTED.
  2. HORIZONTAL SANITARY DRAINAGE PIPING: 1/8-INCH PER FOOT DOWNWARD IN DIRECTION OF FLOW, UNLESS OTHERWISE NOTED.
  3. VENT PIPING: 1/8-INCH PER FOOT DOWN TOWARD VERTICAL FIXTURE VENT OR TOWARD VENT STACK.
G. PIPE HANGERS AND SUPPORTS ARE SPECIFIED IN "HANGERS AND SUPPORTS." INSTALL THE FOLLOWING:
  1. VERTICAL PIPING: MSS TYPE 8 OR TYPE 42, CLAMPS.
  2. INSTALL INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS ACCORDING TO THE FOLLOWING:
    a. 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS.
    b. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
    c. LONGER THAN 100 FEET, IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
  3. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER: MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
  4. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.
H. INSTALL SUPPORTS ACCORDING TO "HANGERS AND SUPPORTS."
I. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
J. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, WITH 3/8-INCH MINIMUM RODS.
K. INSTALL HANGERS FOR CAST-IRON SOIL PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
  1. NPS 1-1/2 AND NPS 2: 60 INCHES WITH 3/8-INCH ROD.
  2. NPS 3: 60 INCHES WITH 1/2-INCH ROD.
  3. NPS 4 AND NPS 5: 60 INCHES WITH 5/8-INCH ROD.
  4. NPS 6: 60 INCHES WITH 3/4-INCH ROD.
  5. NPS 8 TO NPS 12: 60 INCHES WITH 7/8-INCH ROD.
L. INSTALL SUPPORTS FOR VERTICAL CAST-IRON SOIL PIPING EVERY 15 FEET.
M. TEST SANITARY DRAINAGE AND VENT PIPING ACCORDING TO PROCEDURES OF AUTHORITIES HAVING JURISDICTION OR, IN ABSENCE OF PUBLISHED PROCEDURES, AS FOLLOWS:
  1. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
  2. ROUGHING-IN PLUMBING TEST PROCEDURE: TEST DRAINAGE AND VENT PIPING, EXCEPT OUTSIDE LEADERS, ON COMPLETION OF ROUGHING-IN. CLOSE OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10-FOOT HEAD OF WATER. FROM 15 MINUTES BEFORE INSPECTION STARTS TO COMPLETION OF INSPECTION, WATER LEVEL MUST NOT DROP. INSPECT JOINTS FOR LEAKS.
  3. FINISHED PLUMBING TEST PROCEDURE: AFTER PLUMBING FIXTURES HAVE BEEN SET AND TRAPS FILLED WITH WATER, TEST CONNECTIONS AND PROVE THEY ARE GASTIGHT AND WATERTIGHT. PLUG VENT-STACK OPENINGS ON ROOF AND BUILDING DRAINS WHERE THEY LEAVE BUILDING. INTRODUCE AIR INTO PIPING SYSTEM EQUAL TO PRESSURE OF 1-INCH WG. USE U-TUBE OR MANOMETER INSERTED IN TRAP OF WATER CLOSET TO MEASURE THIS PRESSURE. AIR PRESSURE MUST REMAIN CONSTANT WITHOUT INTRODUCING ADDITIONAL AIR THROUGHOUT PERIOD OF INSPECTION. INSPECT PLUMBING FIXTURE CONNECTIONS FOR GAS AND WATER LEAKS.
  4. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING, OR PORTION THEREOF, UNTIL SATISFACTORY RESULTS ARE OBTAINED.
  5. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

221319 – DRAINAGE PIPING SPECIALTIES

A. DRAINAGE PIPING SPECIALTIES SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.
B. CLEANOUTS SHALL BE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO 4 INCHES. FOR PIPES LARGER THAN 4 INCHES NOMINAL SIZE, MINIMUM SIZE OF CLEANOUT SHALL BE 4 INCHES.
C. EXPOSED CAST-IRON CLEANOUTS:
  1. STANDARD: ASME A112.36.2M FOR CAST IRON FOR CLEANOUT TEST TEE.
  2. BODY MATERIAL: CAST-IRON SOIL PIPE T-BRANCH OR CAST-IRON SOIL PIPE TEST TEE AS REQUIRED TO MATCH CONNECTED PIPING.
  3. CLOSURE: COUNTERSUNK OR RAISED-HEAD, BRASS OR BRONZE PLUG WITH TAPERED THREADS.
  4. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV.; SERIES 58910 | SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.; 4510 SERIES | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
D. CAST-IRON FLOOR CLEANOUTS (ON-GRADE INTERIOR FLOOR AREAS):
  1. STANDARD: ASME A112.36.2M.
  2. TYPE: ADJUSTABLE HOUSING.
  3. BODY OR FERRULE: CAST IRON.
  4. OUTLET CONNECTION: SPIGOT.
  5. CLOSURE: BRASS OR BRONZE PLUG WITH TAPERED THREADS.
  6. FRAME AND COVER MATERIAL AND FINISH: NICKEL-BRONZE, COPPER ALLOY WITH SCORIATED COVER IN SERVICE AREAS, AND RECESSED COVER TO ACCEPT FLOOR FINISH MATERIAL IN FINISHED FLOOR AREAS.
  7. TOP LOADING CLASSIFICATION: MEDIUM DUTY.
    a. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | SMITH, JAY R. MFG. CO.; MODEL 4023S-F | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
E. CAST-IRON FLOOR CLEANOUTS (NOT-ON-GRADE INTERIOR FLOOR AREAS):
  1. STANDARD: ASME A112.36.2M.
  2. TYPE: ADJUSTABLE HOUSING.
  3. BODY OR FERRULE: CAST IRON.
  4. CLAMPING DEVICE: REQUIRED.
  5. OUTLET CONNECTION: SPIGOT.
  6. CLOSURE: BRASS OR BONZE PLUG WITH TAPERED THREADS.
  7. FRAME AND COVER MATERIAL AND FINISH: NICKEL-BRONZE, COPPER ALLOY WITH SCORIATED COVER IN SERVICE AREAS, AND RECESSED COVER TO ACCEPT FLOOR FINISH MATERIAL IN FINISHED FLOOR AREAS.
  8. TOP LOADING CLASSIFICATION: MEDIUM DUTY.
  9. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | SMITH, JAY R. MFG. CO.; MODEL 4333C | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
F. CAST-IRON WALL CLEANOUTS (FINISHED WALL AREAS):
  1. STANDARD: ASME A112.36.2M. INCLUDE WALL ACCESS.
  2. BODY: HUB-AND-SPIGOT, CAST-IRON SOIL PIPE T-BRANCH OR HUBLESS, CAST-IRON SOIL PIPE TEST TEE AS REQUIRED TO MATCH CONNECTED PIPING.
  3. CLOSURE: COUNTERSUNK OR RAISED-HEAD, DRILLED-AND-THREADED BRONZE OR BRASS PLUG WITH TAPERED THREADS.
  4. WALL ACCESS: ROUND, FLAT, CHROME-PLATED BRASS OR STAINLESS-STEEL COVER PLATE WITH SCREW.
  5. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV.; MODEL 58790-20 | SMITH, JAY R. MFG. CO.; | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
G. CAST-IRON FLOOR DRAINS (TOILET ROOMS AND JANITOR'S CLOSET) FD-1:
  1. STANDARD: ASME A112.6.3.
  2. BODY MATERIAL: GRAY IRON.
  3. SEEPAGE FLANGE: REQUIRED.
  4. CLAMPING DEVICE: REQUIRED.
  5. OUTLET: BOTTOM.
  6. COATING ON INTERIOR AND EXPOSED EXTERIOR SURFACES: ENAMEL.
  7. TOP OF BODY AND STRAINER FINISH: NICKEL BRONZE.
  8. TOP SHAPE: ROUND.
  9. DIMENSIONS OF TOP OR STRAINER: 7 INCH DIAMETER.
  10. TRAP-SEAL PRIMER VALVE FITTING:
    a. DESCRIPTION: CAST IRON, WITH SPIGOT INLET AND SPIGOT OUTLET, AND TRAP-SEAL PRIMER VALVE CONNECTION.
    b. SIZE: SAME AS FLOOR DRAIN OUTLET WITH NPS 1/2 SIDE INLET.
  11. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SIOUX CHIEF MANUFACTURING COMPANY, INC.; FINISH LINE ADJUSTABLE DRAINAGE SYSTEM | SMITH, JAY R. MFG. CO.; MODEL 2010-A | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
H. CAST-IRON FLOOR DRAINS (TOILET ROOMS) FD-1:
  1. STANDARD: ASME A112.6.3.
  2. BODY MATERIAL: GRAY IRON.
  3. SEEPAGE FLANGE: REQUIRED.
  4. CLAMPING DEVICE: REQUIRED.
  5. OUTLET: BOTTOM.
  6. COATING ON INTERIOR AND EXPOSED EXTERIOR SURFACES: ENAMEL.
  7. TOP OR STRAINER MATERIAL: NICKEL BRONZE
  8. TOP SHAPE: ROUND, WITH VANDEL PROOF SCREWS
  9. DIMENSIONS OF TOP OR STRAINER: 7 INCH DIAMETER
  10. TOP LOADING CLASSIFICATION: LIGHT DUTY.
  11. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.; MODEL 2142 | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
I. CAST-IRON FLOOR DRAINS (STORAGE ROOM) FD-2:
  1. STANDARD: ASME A112.6.3.
  2. BODY MATERIAL: GRAY IRON.
  3. SEEPAGE FLANGE: REQUIRED.
  4. CLAMPING DEVICE: REQUIRED.
  5. OUTLET: BOTTOM.
  6. COATING ON INTERIOR AND EXPOSED EXTERIOR SURFACES: ENAMEL.
  7. SEDIMENT BUCKET: 3-3/4 INCHES DEEP, SLOTTED SEDIMENT BUCKET WITH LIFT BAR.
  8. TOP OR STRAINER MATERIAL: CAST-IRON.
  9. TOP SHAPE: ROUND.
  10. DIMENSIONS OF TOP OR STRAINER: 11-1/2 INCH DIAMETER TRACTOR GRATE, 29 SQUARE INCHES OF FREE AREA. PROVIDE PARTIAL GRATE WHERE REQUIRED TO ACCEPT EQUIPMENT DRAINS.
  11. TOP LOADING CLASSIFICATION: HEAVY DUTY.
  12. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.; MODEL 2142 | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.
J. AIR-GAP FITTINGS:
  1. STANDARD: ASME A112.1.2, FOR FITTING DESIGNED TO ENSURE FIXED, POSITIVE AIR GAP BETWEEN INSTALLED INLET AND OUTLET PIPING.
  2. BODY: BRONZE OR CAST IRON.
  3. INLET: OPENING IN TOP OF BODY.
  4. OUTLET: LARGER THAN INLET.
  5. SIZE: SAME AS CONNECTED WASTE PIPING AND WITH INLET LARGE ENOUGH FOR ASSOCIATED INDIRECT WASTE PIPING.
K. FLASHING MATERIALS
  1. COPPER SHEET: ASTM B 152/B 152M, OF THE FOLLOWING MINIMUM WEIGHTS AND THICKNESSES, UNLESS OTHERWISE INDICATED:
    a. GENERAL APPLICATIONS: 12 OZ./SQ. FT.
    b. VENT PIPE FLASHING: 8 OZ./SQ. FT.
  2. ZINC-COATED STEEL SHEET: ASTM A 653/A 653M, WITH 0.20 PERCENT COPPER CONTENT AND 0.04-INCH MINIMUM THICKNESS, UNLESS OTHERWISE INDICATED. INCLUDE G90 HOT-DIP GALVANIZED, MILL-PHOSPHATIZED FINISH FOR PAINTING IF INDICATED.
  3. ELASTIC MEMBRANE SHEET: ASTM D 4068, FLEXIBLE, CHLORINATED POLYETHYLENE, 40-MIL MINIMUM THICKNESS.
  4. FASTENERS: METAL COMPATIBLE WITH MATERIAL AND SUBSTRATE BEING FASTENED.
  5. METAL ACCESSORIES: SHEET METAL STRIPS, CLAMPS, ANCHORING DEVICES, AND SIMILAR ACCESSORY UNITS REQUIRED FOR INSTALLATION; MATCHING OR COMPATIBLE WITH MATERIAL BEING INSTALLED.
  6. SOLDER: ASTM B 32, LEAD-FREE ALLOY.
  7. BITUMINOUS COATING: SSPC-PAINT 12, SOLVENT-TYPE, BITUMINOUS MASTIC.

223300 – ELECTRCIC DOMESTIC WATER HEATER

A. LIGHT-COMMERCIAL ELECTRIC WATER HEATERS:
  1. STORAGE-TANK CONSTRUCTION: STEEL, VERTICAL ARRANGEMENT.
    a. PRESSURE RATING: 150 PSIG.
    b. INTERIOR FINISH: COMPLY WITH NSF 61 BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
  2. FACTORY-INSTALLED STORAGE-TANK APPURTENANCES:
    a. ANODE ROD: REPLACEABLE MAGNESIUM.
    b. DIP TUBE: PROVIDE UNLESS COLD-WATER INLET IS NEAR BOTTOM OF TANK.
    c. DRAIN VALVE: ASSE 1005.
    d. INSULATION: COMPLY WITH ASHRAE/IESNA 90.1 OR ASHRAE 90.2.
    e. JACKET: STEEL WITH ENAMELED FINISH.
    f. HEAT TRAP FITTINGS: INLET TYPE IN COLD-WATER INLET AND OUTLET TYPE IN HOT-WATER OUTLET.
    g. HEATING ELEMENTS: TWO; ELECTRIC, SCREW-IN IMMERSION TYPE; WIRED FOR SIMULTANEOUS OPERATION, UNLESS OTHERWISE INDICATED.
    h. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT FOR EACH ELEMENT.
    i. SAFETY CONTROL: HIGH-TEMPERATURE-LIMIT CUTOFF DEVICE OR SYSTEM.
    j. RELIEF VALVE: ASME RATED AND STAMPED AND COMPLYING WITH ASME PTC 25.3 FOR COMBINATION TEMPERATURE AND PRESSURE RELIEF VALVES. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.
  3. CAPACITY AND CHARACTERISTICS: REFER TO SCHEDULE ON DRAWINGS.
  4. MANUFACTURERS: BRADFORD WHITE CORPORATION | LOCHINVAR CORPORATION | PVI INDUSTRIES, LLC; DURAWATT CL SERIES | SMITH, A. O. WATER PRODUCTS COMPANY; GOLD SERIES AND DURA-POWER DEN AND DEL MODELS.
B. STORAGE ELECTRIC WATER HEATERS: COMPLY WITH UL 174.
C. MANUFACTURERS: BOCK WATER HEATERS, INC.| BRADFORD WHITE CORPORATION.| LOCHINVAR CORPORATION. | PVI INDUSTRIES, LLC; A WATTS BRAND; DURAWATT CL SERIES. | SMITH, A. O. WATER PRODUCTS COMPANY; GOLD SERIES AND DURA-POWER DEN AND DEL MODELS.
D. STORAGE-TANK CONSTRUCTION: STEEL, VERTICAL ARRANGEMENT.
  1. TAPPINGS: ASME B1.20.1 PIPE THREAD.
  2. PRESSURE RATING: 150 PSIG (1035 KPA).
  3. INTERIOR FINISH: COMPLY WITH NSF 61 BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
E. FACTORY-INSTALLED STORAGE-TANK APPURTENANCES:

B R ⓘ
Beckett&Raeder
Landscape Architecture
Planning & Engineering

Beckett & Raeder, Inc.
535 West William, Suite 101
Ann Arbor, MI 48103

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PBA Project No.: 2022.0011.05

Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

MECHANICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

NONE

Quality Control

Drawn: JJB
Checked: SVM
Approved: SVM

Project Number

BRI 2021097

Sheet Number

M0.2

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1. ANODE ROD: REPLACEABLE MAGNESIUM REQUIRED FOR GLASS LINED TANKS.
2. DIP TUBE: PROVIDE UNLESS COLD-WATER INLET IS NEAR BOTTOM OF TANK.
3. DRAIN VALVE: ASSE 1005.

F. INSULATION: COMPLY WITH ASHRAE/IESNA 90.1.
  1. JACKET: STEEL WITH ENAMELED FINISH.
  2. HEAT TRAP FITTINGS: INLET TYPE IN COLD-WATER INLET AND OUTLET TYPE IN HOT-WATER OUTLET.
  3. HEATING ELEMENTS: TWO; ELECTRIC, SCREW-IN IMMERSION TYPE; WIRED FOR SIMULTANEOUS OPERATION, UNLESS OTHERWISE INDICATED.
  4. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT FOR EACH ELEMENT.
  5. SAFETY CONTROL: HIGH-TEMPERATURE-LIMIT CUTOFF DEVICE OR SYSTEM.
  6. RELIEF VALVE: ASME RATED AND STAMPED AND COMPLYING WITH ASME PTC 25.3 FOR COMBINATION TEMPERATURE AND PRESSURE RELIEF VALVES. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.

G. CAPACITY AND CHARACTERISTICS: REFER TO SCHEDULE ON DRAWINGS

H. WATER HEATER INSTALLATION:
  1. INSTALL WATER HEATERS LEVEL AND PLUMB, ACCORDING TO LAYOUT DRAWINGS, ORIGINAL DESIGN, AND REFERENCED STANDARDS. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES. ARRANGE UNITS SO CONTROLS AND DEVICES NEEDING SERVICE ARE ACCESSIBLE.
  2. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST FIELD-ASSEMBLED COMPONENTS AND EQUIPMENT INSTALLATION, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.

224200 - PLUMBING FIXTURES

A. SELECT COMBINATIONS OF FIXTURES AND TRIM, FAUCETS, FITTINGS, AND OTHER COMPONENTS THAT ARE COMPATIBLE.

B. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN ICC A117.1, "ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES" FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES.

C. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 102-486, "ENERGY POLICY ACT," ABOUT WATER FLOW AND CONSUMPTION RATES FOR PLUMBING FIXTURES.

D. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.

E. HIGH EFFICIENCY TOILETS, WC-1:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC.; AFWALL FLOWISE ELONGATED 1.28GPF. | KOHLER CO.; K 4325 KINGSTON. | SLOAN VALVE COMPANY. |ZURN PLUMBING PRODUCTS GROUP; Z5615.
  2. DESCRIPTION: WALL-MOUNTING, BACK-OUTLET, ULTRA-LOW WATER CONSUMPTION, VITREOUS-CHINA FIXTURE DESIGNED FOR FLUSHOMETER VALVE OPERATION.
    a. STYLE: FLUSHOMETER VALVE.
    b. BOWL TYPE: ELONGATED WITH SIPHON-JET DESIGN.
    c. SUPPLY SPUD LOCATION: TOP.
    d. DESIGN CONSUMPTION: 1.28 GAL./FLUSH.
    e. COLOR: WHITE.
    f. FLUSHOMETER: HET-FV-1.
    g. TOILET SEAT: TS-1.
    h. FIXTURE SUPPORT: WATER-CLOSET SUPPORT COMBINATION CARRIER.

F. HIGH EFFICIENCY TOILET FLUSHOMETERS HET-FV-1:
  1. MANUFACTURERS: SLOAN VALVE COMPANY; ROYAL 111-1.28.
  2. DESCRIPTION: FLUSHOMETER FOR WATER-CLOSET-TYPE FIXTURE. INCLUDE BRASS BODY WITH CORROSION-RESISTANT INTERNAL COMPONENTS, NON-HOLD-OPEN FEATURE, CONTROL STOP WITH CHECK VALVE, VACUUM BREAKER, COPPER OR BRASS TUBING, AND POLISHED CHROME-PLATED FINISH ON EXPOSED PARTS.
    a. INTERNAL DESIGN: DIAPHRAGM OR PISTON OPERATION.
    b. STYLE: EXPOSED.
    c. INLET SIZE: NPS 1.
    d. TRIP MECHANISM: OSCILLATING, LOW-FORCE ADA COMPLIANT LEVER-HANDLE ACTUATOR.
    e. CONSUMPTION: 1.28 GAL./FLUSH.
    f. TAILPIECE SIZE: NPS 1-1/2 AND STANDARD LENGTH TO TOP OF BOWL.

G. TOILET SEATS, TS-1:
  1. MANUFACTURERS: BEMIS MANUFACTURING COMPANY; 1955SSC/1955SSCT. | CENTOCO MANUFACTURING CORP. | CHURCH SEATS; 295SSC/295SSCT. | COMFORT SEATS; A JONES STEPHENS BRAND; MODEL NUMBER C106SSC. | FERGUSON ENTERPRISES, INC.; PROFLO PFTSCOF2000WH. | OLSONITE SEAT COMPANY; MODEL 10SSC/10SSCT. | SANDERSON PLUMBING PRODUCTS, INC.; BENEKE DIV. | ZURN PLUMBING PRODUCTS GROUP; 5955STS-WH.
  2. DESCRIPTION: TOILET SEAT FOR WATER-CLOSET-TYPE FIXTURE.
    a. MATERIAL: MOLDED, SOLID PLASTIC.
    b. CONFIGURATION: OPEN FRONT WITHOUT COVER.
    c. SIZE: ELONGATED.
    d. HINGE TYPE: SC, SELF-SUSTAINING, CHECK.
    e. CLASS: STANDARD COMMERCIAL.
    f. COLOR: WHITE.

H. LAVATORIES, LAV-1:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC.; LUCERNE MODEL 0355.012. | FERGUSON ENTERPRISES, INC.; PROFLO PF5504. | KOHLER CO.; K 2005 KINGSTON. | SLOAN VALVE COMPANY. | ZURN PLUMBING PRODUCTS GROUP; Z5344.
  2. DESCRIPTION: ACCESSIBLE, WALL-MOUNTING, VITREOUS-CHINA FIXTURE.
    a. TYPE: WITH CONTOURED BACK AND SIDE SHIELDS.
    b. SIZE: 20 BY 18 INCHES RECTANGULAR.
    c. FAUCET HOLE PUNCHING: THREE HOLES, 2-INCH CENTERS.
    d. COLOR: WHITE.
    e. FAUCET: LF-1.
    f. WATER TEMPERATURE LIMITING DEVICE: REQUIRED.
    g. DRAIN: GRID.
    h. DRAIN PIPING: NPS 1-1/4 CHROME-PLATED, CAST-BRASS P-TRAP; NPS 1-1/4, 17 GAGE TUBULAR BRASS WASTE TO WALL; AND WALL ESCUTCHEON.
    i. FIXTURE SUPPORT: LAVATORY WITH CONCEALED ARMS.

I. LAVATORY FAUCETS, LF-1:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC.; HERITAGE METERING FAUCET MODEL 1340.000. | CHICAGO FAUCETS; MODEL 333-665VPA. | DELTA FAUCET COMPANY; 86T SERIES. | GEBERIT MANUFACTURING, INC. | KOHLER CO. | MOEN COMMERCIAL. | SPEAKMAN COMPANY; MODEL S-4122-4DP. | T & S BRASS AND BRONZE WORKS, INC. | ZURN PLUMBING PRODUCTS GROUP; Z81600.
  2. DESCRIPTION: SINGLE-CONTROL NONMIXING FAUCET, VANDAL RESISTANT, SINGLE HOLE WITH ESCUTCHEON PLATE FOR 4 INCH CENTERS.
    a. BODY MATERIAL: COMMERCIAL, SOLID BRASS.
    b. FINISH: POLISHED CHROME PLATE.
    c. MAXIMUM FLOW: 0.25 GAL..
    d. MOUNTING: DECK, CONCEALED.
    e. VALVE HANDLE(S): PUSH BUTTON, REQUIRING LESS THAN 5 POUNDS OF OPERATING FORCE.
    f. INLET(S): NPS 1/2.
    g. SPOUT OUTLET: VANDAL RESISTANT AERATOR.
    h. OPERATION: SELF-CLOSING, METERING, WITH REPLACEABLE VALVE CARTRIDGE.

J. COMMERCIAL SINK SK-1:
  1. MANUFACTURERS: ELKAY MANUFACTURING CO. | FRANKE CONSUMER PRODUCTS, INC., COMMERCIAL DIV. | JUST MANUFACTURING COMPANY.
  2. DESCRIPTION: WALL-MOUNTING, TYPE 304 STAINLESS-STEEL, 14 GAGE, COMMERCIAL SINK FIXTURE.
    a. TYPE: BASIN WITH RADIUS CORNERS, 8 INCH HIGH BACK FOR FAUCET, WALL SIDE SPLASH, AND SUPPORT BRACKETS.
    b. SIZE: 27 INCHES BY 48 INCHES.
    c. BASIN: 24 INCHES BY 24 INCHES BY 14 INCHES DEEP.
    d. FAUCET: SF-1.
    e. SUPPLIES: NPS 1/2 CHROME-PLATED COPPER WITH STOPS.
    f. DRAIN: GRID.
    g. DRAIN PIPING: NPS 1-1/2 CHROME-PLATED, CAST-BRASS P-TRAP; 17 GAGE TUBULAR BRASS WASTE TO WALL; AND WALL ESCUTCHEON.
    h. FIXTURE SUPPORT: SINK FOR WALL-MOUNTING INSTALLATION.

K. SERVICE SINKS, SS-1:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC.; FLORWELL CAST IRON SERVICE SINK. | KOHLER CO.; WHITBY K 6710. | ZURN PLUMBING PRODUCTS GROUP; Z5850.
  2. DESCRIPTION: FLOOR-MOUNTING, ENAMELED, CAST-IRON FIXTURE WITH FRONT APRON, RAISED BACK, AND COATED, WIRE RIM GUARD.
    a. SIZE: 28 BY 28 INCHES.
    b. COLOR: WHITE.
    c. FAUCET: SINK SF-2.
  DRAIN: GRID WITH NPS 3 OUTLET.

L. SINK FAUCET, SF-1:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC. | CHICAGO FAUCETS; NO. 631-R. | DELTA FAUCET COMPANY; MODEL 28C4934-R2. | ELKAY MANUFACTURING CO.; LK940GN08T4H. | KOHLER CO.; K7320-4. | MOEN COMMERCIAL. | SPEAKMAN COMPANY; SC-5749. | T & S BRASS AND BRONZE WORKS, INC. | ZURN PLUMBING PRODUCTS GROUP; Z842B4.
  2. DESCRIPTION: COMMERCIAL/INDUSTRIAL SINK FAUCET. INCLUDE HOT- AND COLD-WATER INDICATORS; COORDINATE FAUCET INLETS WITH SUPPLIES AND FIXTURE HOLES; COORDINATE OUTLET WITH SPOUT AND FIXTURE RECEPTOR.
    a. BODY MATERIAL: COMMERCIAL, SOLID BRASS.
    b. FINISH: POLISHED CHROME PLATE.
    c. MIXING VALVE: TWO HANDLE.
    d. CENTERS: 8 INCHES.
    e. MOUNTING: BACK/WALL.
    f. HANDLE(S): WRIST BLADE, 4 INCHES.
    g. OPERATION: NONCOMPRESSION, MANUAL.
    h. INLET(S): NPS 1/2.
    i. SPOUT TYPE: 70 TO 120-DEGREE RESTRICTED SWING GOOSENECK.
    j. SPOUT OUTLET: AERATOR.
    k. MAXIMUM FLOW RATE: 2.2 GPM

M. SINK FAUCET, SF-2:
  1. MANUFACTURERS: AMERICAN STANDARD COMPANIES, INC. | CHICAGO FAUCETS; MODEL 897. | DELTA FAUCET COMPANY; MODEL 28C2383. | FERGUSON ENTERPRISES, INC.; PROFLO PF1118. | KOHLER CO. | MOEN COMMERCIAL. | SPEAKMAN COMPANY; SC5811-RCP-LEV-5H-WHK. | SYMMONS INDUSTRIES, INC. | T & S BRASS AND BRONZE WORKS, INC. | ZURN PLUMBING PRODUCTS GROUP.
  2. DESCRIPTION: SERVICE SINK FAUCET WITH STOPS IN SHANKS, VACUUM BREAKER, HOSE-THREAD OUTLET, AND PAIL HOOK. INCLUDE HOT- AND COLD-WATER INDICATORS; COORDINATE FAUCET INLETS WITH SUPPLIES AND FIXTURE HOLES; COORDINATE OUTLET WITH SPOUT AND FIXTURE RECEPTOR. INCLUDE 5 FOOT RUBBER HOSE AND WALL MOUNTED HOSE CLAMP.
    a. BODY MATERIAL: COMMERCIAL, SOLID BRASS.
    b. FINISH: POLISHED CHROME PLATE.
    c. MAXIMUM FLOW RATE: 2.5 GPM, UNLESS OTHERWISE INDICATED.
    d. MIXING VALVE: TWO HANDLE.
    e. CENTERS: 8 INCHES.
    f. MOUNTING: BACK/WALL.
    g. HANDLE(S): LEVER.
    h. INLET(S): NPS 1/2.
    i. SPOUT TYPE: RIGID, SOLID BRASS WITH WALL BRACE AND PAIL HOOK.
    j. SPOUT OUTLET: HOSE THREAD.
    k. VACUUM BREAKER: REQUIRED.
    l. OPERATION: NONCOMPRESSION, MANUAL.

N. FIXTURE SUPPLIES: CHROME-PLATED BRASS, LOOSE-KEY OR SCREWDRIVER ANGLE STOPS WITH BRASS STEMS, CHROME-PLATED COPPER RISERS, AND CHROME-PLATED WALL FLANGES.
  1. MANUFACTURERS: BRASSCRAFT; A MASCO COMPANY | MCGUIRE MFG. CO., INC. | ANY OF THE APPROVED PLUMBING FIXTURE MANUFACTURERS.

O. PROTECTIVE SHIELDING PIPE COVERS (PSG-1): MANUFACTURED PLASTIC WRAPS FOR COVERING PLUMBING FIXTURE HOT- AND COLD-WATER SUPPLIES AND TRAP AND DRAIN PIPING. COMPLY WITH AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS.
  1. MANUFACTURERS: ENGINEERED BRASS CO. | INSUL-TECT PRODUCTS CO.; A SUBSIDIARY OF MVG MOLDED PRODUCTS | MCGUIRE MANUFACTURING CO., INC. | PLUMBEREX SPECIALTY PRODUCTS INC. | TCI PRODUCTS; SG-200BV | TRUEBRO, INC. | ZURN PLUMBING PRODUCTS GROUP; TUBULAR BRASS PLUMBING PRODUCTS OPERATION.

P. FIXTURE SUPPORTS:
  1. MANUFACTURERS: JOSAM COMPANY | MIFAB MANUFACTURING INC. | SMITH, JAY R. MFG. CO. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC.; A DIV. OF WATTS INDUSTRIES, INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

230500 - COMMON WORK RESULTS FOR HVAC

A. ENVIRONMENTAL REQUIREMENTS: DO NOT OPERATE EQUIPMENT FOR ANY PURPOSE, TEMPORARY OR PERMANENT, UNTIL DUCTWORK IS CLEAN, FILTERS ARE IN PLACE, BEARINGS LUBRICATED, AND FAN HAS BEEN TEST RUN UNDER OBSERVATION.

B. FAN POWER TRANSMISSION: V-BELT TYPE FAN DRIVES: IN ACCORDANCE WITH ENGINEERING STANDARD SPECIFICATION FOR DRIVES USING MULTIPLE V-BELTS, SPONSORED BY THE MECHANICAL POWER TRANSMISSION ASSOCIATION AND THE RUBBER MANUFACTURER'S ASSOCIATION.
  1. MANUFACTURERS: EMERSON POWER TRANSMISSION; BROWNING | ROCKWELL AUTOMATION; DODGE | T.B. WOOD'S INCORPORATED.

C. NOTCHED OR COGGED STYLE, ENDLESS TYPE, OF DACRON REINFORCED ELASTOMER CONSTRUCTION, WITH CROSS-SECTION TO SUIT SHEAVE GROOVES.
  1. MANUFACTURERS: EMERSON POWER TRANSMISSION; BROWNING; AX, BX, AND CX SERIES AND 3VX AND 5VX SERIES | ROCKWELL AUTOMATION; DODGE; CLASSIC COG AND NARROW COG V-BELTS | T.B. WOOD'S INCORPORATED; CLASSICAL COG AND NARROW COG V-BELTS.

D. V-BELT DRIVE MOTOR BASES: PROVIDE FOR ADJUSTMENT OF BOTH BELT TENSION AND ALIGNMENT.

E. BELT DRIVE GUARDS: ANSI AND OSHA COMPLIANT WITH PROVISION FOR READILY VIEWING BELT TENSION AND MEASURING SHAFT SPEEDS. GUARDS SHALL BE INSTALLED WITH QUICK RELEASE PINS.

F. SHEAVES: FURNISH SHEAVES OF MACHINED CAST IRON OR CARBON STEEL, BUSHING TYPE OF FIXED BORE, SECURED TO THE SHAFT BY KEY AND KEYWAY.

G. FAN BEARINGS: ANTI-FRICTION BALL OR ROLLER TYPE WITH PROVISION FOR SELF-ALIGNMENT AND THRUST LOAD. MADE IN USA. WITH ABMA L_{10} MINIMUM LIFE OF 200,000 HOURS. USE CAST IRON HOUSINGS AND DUST-TIGHT SEALS SUITABLE FOR LUBRICANT PRESSURES.
  1. LUBRICATION PROVISIONS: USE SURFACE BALL CHECK TYPE SUPPLY FITTINGS. PROVIDE EXTENSION TUBES TO ALLOW SAFE MAINTENANCE WHILE EQUIPMENT IS OPERATING. PROVIDE MANUAL OR AUTOMATIC PRESSURE RELIEF FITTINGS TO PREVENT OVERHEATING OR SEAL BLOW-OUT DUE TO EXCESS LUBRICANT OR PRESSURE. ARRANGE RELIEF FITTINGS OPPOSITE SUPPLY BUT VISIBLE FOR NORMAL MAINTENANCE OBSERVATION.
  2. BEARINGS ON EQUIPMENT WITH LESS THAN 1/2 HORSEPOWER RATING OR ON SHAFTS SMALLER THAN 1-3/4 INCH IN DIAMETER: PERMANENTLY SEALED, PRE-LUBRICATED ANTI-FRICTION BEARINGS PER SPECIFIED MATERIALS AND ABMA L_{10} LIFE REQUIREMENTS.

H. INSTALL SHEAVES WHERE RECOMMENDED BY TESTING, ADJUSTING, AND BALANCING AGENCY.

230593 - TESTING, ADJUSTING, AND BALANCING

A. GENERAL PROCEDURES FOR TESTING AND BALANCING:
  1. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS" OR NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" AND THIS SECTION.
  2. MARK EQUIPMENT AND BALANCING DEVICE SETTINGS WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS.

B. GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS:
  1. PREPARE TEST REPORTS FOR BOTH FANS AND OUTLETS. OBTAIN MANUFACTURER'S OUTLET FACTORS AND RECOMMENDED TESTING PROCEDURES. CROSSCHECK THE SUMMATION OF REQUIRED OUTLET VOLUMES WITH REQUIRED FAN VOLUMES.
  2. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS, OR USE REDUCED SCALE CONTRACT DOCUMENTS WITH NOTATIONS.
  3. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.
  4. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.
  5. CUT INSULATION, AND DRILL DUCTS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES. AFTER TESTING AND BALANCING, CLOSE PROBE HOLES WITH NEAT PATCHES, NEOPRENE PLUGS, THREADED PLUGS, OR THREADED TWIST-ON METAL CAPS, AND PATCH INSULATION WITH NEW MATERIALS IDENTICAL TO THOSE REMOVED. RESTORE VAPOR BARRIER AND FINISH ACCORDING TO INSULATION SPECIFICATIONS FOR THIS PROJECT.
  6. CHECK AIR FLOW WITHIN INTAKE PLENUMS AND MIXING BOXES OF AIR HANDLING UNITS FOR UNEVEN FLOW AND TEMPERATURE STRATIFICATION AND PREPARE A REPORT WITH PROFILE ELEVATIONS (TEMPERATURE AND VELOCITY) ON EACH COIL OR FILTER FACE FOR ARCHITECT.
  7. LOCATE START-STOP AND DISCONNECT SWITCHES, ELECTRICAL INTERLOCKS, AND MOTOR STARTERS.
  8. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.
  9. CHECK DAMPERS FOR PROPER POSITION TO ACHIEVE DESIRED AIRFLOW PATH.
  10. CHECK FOR AIRFLOW BLOCKAGES.
  11. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.
  12. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.
  13. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

C. TOLERANCES:
  1. SET HVAC SYSTEM AIRFLOW RATES WITHIN THE FOLLOWING TOLERANCES:
    a. AIR HANDLING EQUIPMENT AND OUTLETS: PLUS OR MINUS 5 PERCENT. WHERE TERMINAL UNITS SERVE 6 OR MORE OUTLETS WITHIN A COMMON ROOM, INDIVIDUAL OUTLETS MAY VARY UP TO PLUS OR MINUS 10 PERCENT OF DESIGN FLOW RATES IF OVERALL ROOM SUPPLY IS WITHIN PLUS OR MINUS 5 PERCENT.

230933 - TEMPERATURE CONTROLS

A. TEMPERATURE CONTROL SYSTEM CONSISTING OF RELAYS, SWITCHES, ALL ASSOCIATED CONTROL WIRING AND RACEWAY SYSTEMS.

B. THERMOSTAT CONTROL WHERE INDICATED.

C. CONTROL SEQUENCES FOR HVAC SYSTEMS, SUBSYSTEMS, AND EQUIPMENT ARE INDICATED ON PROJECT DRAWINGS.

D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.

E. COMPLY WITH NFPA 90A, "INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS."

F. DAMPERS, INSULATED EXHAUST AIR - AUTOMATED
  1. PERFORMANCE: AMCA CERTIFIED FOR AIR PERFORMANCE AND AIR LEAKAGE.
  2. FRAMES: EXTRUDED ALUMINUM, .080-INCH THICKNESS MINIMUM, 4 INCHES DEEP MINIMUM, THERMALLY BROKEN, AND INSULATED WITH POLYSTYRENE OR POLYURETHANE FOAM INSULATION.
  3. BLADES: EXTRUDED ALUMINUM, INTERNALLY INSULATED, AND THERMALLY BROKEN. MAXIMUM BLADE SIZE 8 INCHES WIDE, 60 INCHES LONG.
  4. SHAFTS: MINIMUM 7/16 INCH HEXAGONAL OR SQUARE CORROSION RESISTANT ZINC PLATED STEEL.
  5. BLADE SEALS: EXTRUDED EPDM, SILICONE, OR SYNTHETIC ELASTOMERIC, MECHANICALLY ATTACHED.
  6. JAMB SEALS: SILICONE, OR SYNTHETIC ELASTOMERIC, MECHANICALLY ATTACHED.

  BEARINGS: DUAL BEARING ASSEMBLY OF DURABLE SYNTHETIC POLYMER RESULTING IN NO METAL-TO-METAL CONTACT. PROVIDE THRUST WASHERS AT BEARINGS FOR ALL DAMPERS WHICH ARE TO BE MOUNTED WITH BLADES IN THE VERTICAL POSITION.

  7. LINKAGE: LINKAGE SHALL BE INSTALLED IN THE FRAME SIDE AND SHALL BE CONSTRUCTED OF ALUMINUM AND/OR CORROSION RESISTANT ZINC PLATED STEEL.
  8. LEAKAGE: LESS THAN 3 CFM PER SQUARE FOOT AT 1 INCH W.G. PRESSURE DIFFERENTIAL AT MINUS 40 DEG F.
  9. STATIC PRESSURE RATING: AS SCHEDULED ON THE DRAWINGS, OR IF NOT SCHEDULED, MINIMUM 4 INCHES W.G.
  10. MAXIMUM VELOCITY: AS SCHEDULED ON THE DRAWINGS, OR DESIGN FOR MAXIMUM VELOCITY TO BE ENCOUNTERED IN LOCATION WHERE INSTALLED.
  11. TEMPERATURE LIMITS: MINUS 40 TO 155 DEG F.
  12. MANUFACTURERS:

  GREENHECK ICD-45.

  RUSKIN TED50 SERIES.
  TAMCO SERIES 9000 BF.

G. DAMPER OPERATORS - ELECTRIC
  1. ELECTRIC DAMPER MOTOR SHALL BE 24 OR 120 VOLT TWO-POSITION OR MODULATING AS REQUIRED WITH SPRING RETURN TYPE AND SIZED TO OPERATE THE DAMPER WITH SUFFICIENT RESERVE POWER FOR SMOOTH OPERATION FROM FULL CLOSE TO FULL OPEN AND TIGHT SHUT-OFF. DAMPER MOTOR SHALL HAVE "O RING" GASKETS FOR WEATHERPROOF OPERATION.
  2. NUMBER: SUFFICIENT TO ACHIEVE UNRESTRICTED MOVEMENT THROUGHOUT DAMPER RANGE. PROVIDE SUFFICIENT NUMBER OF OPERATORS SUCH THAT ONE OPERATOR DOES NOT OPERATE MORE THAN THE MAXIMUM SQUARE FOOTAGE OF DAMPER AREA AS RECOMMENDED IN STANDARD CATALOG OF MANUFACTURER.
  3. MANUFACTURERS:

  BELIMO.
  DELTA CONTROL PRODUCTS.
  HONEYWELL.
  SCHNEIDER ELECTRIC CONTROLS.
  JOHNSON CONTROLS.
  SIEMENS.

H. ELECTRICAL REQUIREMENTS FOR CONTROLS WORK:
  1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  2. ELECTRICAL ACCESSORIES SUCH AS RELAYS, SWITCHES, CONTACTORS AND CONTROL TRANSFORMERS SHALL MEET THE REQUIREMENTS OF THE DIVISION 26 SPECIFICATIONS OF RESPECTIVE PROJECT.
  3. ELECTRICAL WIRING AND CONDUIT SHALL MEET THE REQUIREMENTS OF THE DIVISION 26 SPECIFICATIONS. ALL CONTROL WIRING IN MECHANICAL ROOMS AND ANY OTHER EXPOSED AREAS SHALL BE RUN IN CONDUIT. LOW VOLTAGE TEMPERATURE CONTROL WIRING IN CONCEALED ACCESSIBLE LOCATIONS (I.E. ABOVE LAY-IN CEILINGS), AS WELL AS LOW VOLTAGE TEMPERATURE CONTROL WIRING WITHIN PARTITIONS, MAY BE RUN USING PLENUM RATED CABLE, NEATLY TIE-WRAPPED AND FASTENED TO THE BUILDING STRUCTURE (NOT TO CEILING OR CEILING SUPPORT WIRES).
  4. CONDUITS CARRYING CONTROL WIRING SHALL BE SIZED FOR A MAXIMUM FILL OF 40% OF CAPACITY.
  5. WHERE RACEWAY IS REQUIRED, TWO SEPARATE RACEWAY SYSTEMS SHALL BE PROVIDED; ONE FOR A.C. WIRING AND THE OTHER FOR D.C. WIRING.
  6. ALL CONTROL WIRING SIZES AND TYPES SHALL MEET OR EXCEED THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

I. INSTALLATION - CONTROL SYSTEMS:
  1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  2. CHECK AND VERIFY LOCATION OF TEMPERATURE SENSORS, THERMOSTATS AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION. LOCATE ROOM TEMPERATURE SENSORS AND THERMOSTATS 48 INCHES ABOVE FLOOR UNLESS NOTED OTHERWISE.
  3. LOCATE ALL CONTROL COMPONENTS AND ACCESSORIES SUCH THAT THEY ARE EASILY ACCESSIBLE FOR ADJUSTMENT, SERVICE AND REPLACEMENT.
  4. LOCATE, SUPPORT AND INSTALL ALL CONTROL COMPONENTS AND ACCESSORIES SO THAT THEY WILL NOT BE SUBJECT TO VIBRATION, EXCESSIVE TEMPERATURES, DIRT, MOISTURE OR OTHER HARMFUL CONDITIONS BEYOND THEIR RATED LIMITATIONS.
  5. PROVIDE ALL NECESSARY RELAYS, SWITCHES, CONTROL DEVICES, ACCESSORIES AND CONNECTIONS AS REQUIRED FOR A COMPLETE AND OPERATIONAL CONTROL SYSTEM AS SPECIFIED HEREIN AND SHOWN.

233113 - METAL DUCTS

A. SHEET METAL MATERIALS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS, UNLESS OTHERWISE INDICATED. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.
  1. GALVANIZED SHEET STEEL: LOCK-FORMING QUALITY; COMPLYING WITH ASTM A 653/A 653M AND HAVING G90 COATING DESIGNATION; DUCTS SHALL HAVE MILL-PHOSPHATIZED FINISH FOR SURFACES EXPOSED TO VIEW.
  2. STAINLESS STEEL: ASTM A 480/A 480M, TYPE 316.
  3. REINFORCEMENT SHAPES AND PLATES: GALVANIZED-STEEL REINFORCEMENT WHERE INSTALLED ON GALVANIZED SHEET METAL DUCTS.

B. SEALANT MATERIALS:
  1. JOINT AND SEAM SEALANTS, GENERAL: THE TERM "SEALANT" IS NOT LIMITED SOLELY TO MATERIALS OF MASTIC NATURE BUT ALSO INCLUDES TWO-PART ADHESIVE/OPEN-WEAVE FABRIC STRIP SYSTEMS, AND ELASTOMERIC SEALANT TAPE.
  2. ELASTOMERIC SEALANT TAPE: 3 INCHES WIDE; MODIFIED BUTYL ADHESIVE BACKED.
    a. MANUFACTURERS: HARDCAST; FOIL-GRIP 1402 AND FOIL-GRIP 1402-181BFX.
  3. WATER-BASED JOINT AND SEAM SEALANT: FLEXIBLE, MASTIC SEALANT, RESISTANT TO UV LIGHT WHEN CURED, UL 723 LISTED, AND COMPLYING WITH NFPA REQUIREMENTS FOR CLASS 1 DUCTS.
    a. MANUFACTURERS: HARDCAST; FLEX-GRIP 550 AND VERSA-GRIP 181 | POLYMER ADHESIVES; NO. 11 | UNITED MCGILL.
  4. FLANGED JOINT MASTIC: ONE-PART, ACID-CURING, ELASTOMERIC JOINT SEALANT COMPLYING WITH ASTM C 920, TYPE S, GRADE NS, CLASS 25, USE O.
  5. GASKETS: CHLOROPRENE ELASTOMER, 40 DUROMETER, 1/8 INCH THICK, FULL FACE, ONE PIECE VULCANIZED OR DOVETAILED AT JOINTS.

C. HANGERS AND SUPPORTS:
  1. BUILDING ATTACHMENTS: CONCRETE INSERTS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED.
  2. HANGER MATERIALS: GALVANIZED SHEET STEEL OR THREADED STEEL ROD.
  3. DUCT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH DUCT MATERIALS. ATTACHMENTS FOR STAINLESS STEEL AND PVC-COATED DUCT SHALL BE STAINLESS STEEL.
  4. TRAPEZE AND RISER SUPPORTS: STEEL SHAPES COMPLYING WITH ASTM A 36/A 36M.
  5. LOAD RATED CABLE SUSPENSION SYSTEM: TESTED TO FIVE TIMES THE SAFE WORKING LOADS AND VERIFIED BY THE SMACNA TESTING AND RESEARCH INSTITUTE.
    a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC., CLUTCHER AND EZ-LOCK | DURO DYNE CORP., DYNA-TITE SYSTEM | GRIPPLE INC., HANG-FAST SYSTEM.
  6. WELDED SUPPORTS: STRUCTURAL STEEL SHAPES WITH ZINC RICH PAINT. EQUIVALENT, PROPRIETARY DESIGN ROLLED STEEL STRUCTURAL SUPPORT SYSTEMS MAY BE USED IN LIEU OF MILL ROLLED STRUCTURAL STEEL.

D. RECTANGULAR DUCT FABRICATION: FABRICATE DUCTS, ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER CONSTRUCTION ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" AND COMPLYING WITH REQUIREMENTS FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE-ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.

E. ROUND AND FLAT-OVAL DUCT AND FITTING FABRICATION:
  1. DIAMETER AS APPLIED TO FLAT-OVAL DUCTS IN THIS ARTICLE IS THE DIAMETER OF A ROUND DUCT WITH A CIRCUMFERENCE EQUAL TO THE PERIMETER OF A GIVEN SIZE OF FLAT-OVAL DUCT.
  2. ROUND, SPIRAL LOCK-SEAM DUCTS: FABRICATE SUPPLY DUCTS OF GALVANIZED STEEL ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE."
  3. FLAT-OVAL, SPIRAL LOCK-SEAM DUCTS: FABRICATE SUPPLY DUCTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE."

233300 - DUCT ACCESSORIES

A. QUALITY ASSURANCE: COMPLY WITH NFPA 90A, "INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS," AND NFPA 90B, "INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS."

B. BIRD SCREENS: NO. 2 MESH, 0.063 INCH DIAMETER GALVANIZED WIRE SCREEN WITH OPEN AREA OF NOT LESS THAN 72 PERCENT. CONCEAL SHARP EDGES BY ADDING METAL EDGING CONSISTING OF ROD, FLAT OR ANGLE IRON, OR 16 GAGE GALVANIZED SHEET STEEL TURNED OVER AT LEAST 3/4 INCH ON BOTH SIDES.

C. MANUAL VOLUME DAMPERS (LOW PRESSURE):
  1. FACTORY FABRICATED, WITH REQUIRED HARDWARE AND ACCESSORIES. STIFFEN DAMPER BLADES FOR STABILITY. INCLUDE LOCKING DEVICE TO HOLD SINGLE-BLADE DAMPERS IN A FIXED POSITION WITHOUT VIBRATION. CLOSE DUCT PENETRATIONS FOR DAMPER COMPONENTS TO SEAL DUCT CONSISTENT WITH PRESSURE CLASS.
  2. DAMPER HARDWARE: ZINC-PLATED, DIE-CAST CORE WITH DIAL AND HANDLE MADE OF 3/32-INCH-THICK ZINC-PLATED STEEL, AND A 3/4-INCH HEXAGON LOCKING NUT. INCLUDE CENTER HOLE TO SUIT DAMPER OPERATING-ROD SIZE. INCLUDE ELEVATED PLATFORM FOR INSULATED DUCT MOUNTING.
  3. MANUFACTURERS: AMERICAN WARMING AND VENTILATING | ARROW UNITED INDUSTRIES | GREENHECK | KRUEGER | LOUVERS AND DAMPERS | NAILOR INDUSTRIES INC. | RUSKIN COMPANY | VENT PRODUCTS COMPANY, INC. | YOUNG REGULATOR COMPANY.

D. TURNING VANES:
  1. FABRICATE TO COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR VANES AND VANE RUNNERS. VANE RUNNERS SHALL AUTOMATICALLY ALIGN VANES.
  2. MANUFACTURED TURNING VANES: DOUBLE-VANE OR AIRFOIL-SHAPED, CURVED BLADES OF GALVANIZED SHEET STEEL SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
    a. MANUFACTURERS: AERO/DYNE COMPANY | DUCTMATE INDUSTRIES, INC. | DURO DYNE CORP. | WARD INDUSTRIES, INC.
  3. ACOUSTIC TURNING VANES: DOUBLE-VANE CURVED BLADES OF GALVANIZED SHEET STEEL WITH PERFORATED FACES AND FIBROUS-GLASS FILL SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
    a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC. | WARD INDUSTRIES, INC.

E. DUCT-MOUNTING ACCESS DOORS:
  1. FABRICATE DOORS AIRTIGHT AND SUITABLE FOR DUCT PRESSURE CLASS. DOORS MAY BE FIELD FABRICATED IN ACCORDANCE WITH SMACNA STANDARDS, OR COMMERCIALLY PRODUCED.
  2. DOOR: DOUBLE WALL, DUCT MOUNTING, AND RECTANGULAR; FABRICATED OF GALVANIZED SHEET METAL WITH INSULATION FILL AND THICKNESS AS INDICATED FOR DUCT PRESSURE CLASS. INCLUDE VISION PANEL WHERE INDICATED. INCLUDE BUTT OR PIANO HINGE AND CAM LATCHES.
    a. MANUFACTURERS: AIR BALANCE, INC. | GREENHECK | NAILOR INDUSTRIES INC. | RUSKIN COMPANY.
  3. DOOR: DOUBLE WALL, DUCT MOUNTING, AND ROUND; FABRICATED OF GALVANIZED SHEET METAL WITH INSULATION FILL AND 1-INCH THICKNESS. INCLUDE CAM LATCHES.
    a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC. | FLEXMASTER U.S.A., INC.
  4. INSTALL DUCT-MOUNTING, RECTANGULAR ACCESS DOORS WITH LONG DIMENSION AT RIGHT ANGLES TO DIRECTION OF AIRFLOW AND OF LARGEST STANDARD SIZE WHICH CAN BE ACCOMMODATED IN DUCT. MAXIMUM SIZE: 21 BY 14 INCHES.

F. FLEXIBLE CONNECTORS:
  1. FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1.
  2. METAL-EDGED CONNECTORS: FACTORY FABRICATED WITH A FABRIC STRIP ATTACHED TO TWO STRIPS OF GALVANIZED SHEET STEEL, STAINLESS STEEL OR ALUMINUM SHEETS. SELECT METAL COMPATIBLE WITH DUCTS.
  3. INDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH NEOPRENE.
  4. OUTDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH WEATHERPROOF, SYNTHETIC RUBBER RESISTANT TO UV RAYS AND OZONE.
  5. HIGH-TEMPERATURE SYSTEM, FLEXIBLE CONNECTORS: GLASS FABRIC COATED WITH SILICONE RUBBER.
  6. HIGH-CORROSIVE-ENVIRONMENT SYSTEM, FLEXIBLE CONNECTORS: GLASS FABRIC WITH CHEMICAL-RESISTANT COATING.
  7. MANUFACTURERS: ADSCO MANUFACTURING LLC. | DURO DYNE CORP. | SENIOR FLEXONICS PATHWAY. | VENTFABRICS, INC.

G. FLEXIBLE DUCTS, LOW AND MEDIUM PRESSURE:
  1. FLEXIBLE DUCTS: INTERLOCKING SPIRAL OF GALVANIZED STEEL OR ALUMINUM CONSTRUCTION OR FABRIC SUPPORTED BY HELICALLY WOUND SPRING STEEL WIRE OR FLAT STEEL BANDS; RATED TO 6 INCHES WG POSITIVE AND 4 INCHES WG NEGATIVE FOR LOW AND MEDIUM PRESSURE DUCTS.
  2. INSULATED FLEXIBLE DUCTS: FLEXIBLE DUCT WRAPPED WITH FLEXIBLE GLASS FIBER INSULATION, ENCLOSED BY A FIRE RETARDANT POLYETHYLENE VAPOR BARRIER JACKET; MAXIMUM 0.23 K VALUE AT 75 DEG F.
  3. ACOUSTICAL PERFORMANCE SHALL BE TESTED IN ACCORDANCE WITH THE AIR DIFFUSION COUNCIL'S "FLEXIBLE AIR DUCT TEST CODE FD 72-R1, SECTION 3.0, SOUND PROPERTIES."
  4. FLEXIBLE DUCT FITTINGS: GALVANIZED STEEL, TWIST-IN DESIGN WITH DAMPER. SIZE AS INDICATED.
  5. FLEXIBLE DUCT CLAMPS: STAINLESS-STEEL BAND WITH CADMIUM-PLATED HEX SCREW TO TIGHTEN BAND WITH A WORM-GEAR ACTION, IN SIZES 3 THROUGH 18 INCHES TO SUIT DUCT SIZE.
  6. MANUFACTURERS: FLEXMASTER U.S.A., INC. | AUTOMATION INDUSTRIES THERMAFLEX | HART & COOLEY, INC.

H. FLEXIBLE DUCT ELBOW SUPPORTS:
  1. ELBOW SUPPORTS SHALL BE CONSTRUCTED OF DURABLE COMPOSITE MATERIAL AND BE FULLY ADJUSTABLE TO SUPPORT FLEXIBLE DUCT DIAMETERS 6 INCHES THROUGH 16 INCHES.
  2. ELBOW SUPPORTS SHALL BE UL LISTED FOR USE IN RETURN AIR PLENUM SPACES.
  3. MANUFACTURERS: AUTOMATION INDUSTRIES THERMAFLEX; FLEXFLOW ELBOW | SMART AIR & ENERGY SOLUTIONS; SMART FLOW ELBOW.

I. DUCT ACCESSORY HARDWARE: ADHESIVES: HIGH STRENGTH, QUICK SETTING, NEOPRENE BASED, WATERPROOF, AND RESISTANT TO GASOLINE AND GREASE.

233423 - POWER VENTILATORS

A. PERFORMANCE REQUIREMENTS: CLASSIFY ACCORDING TO AMCA 99.

B. POWER VENTILATORS: BASIS OF DESIGN UNITS ARE SCHEDULED ON THE DRAWINGS. PROVIDE THE PRODUCT INDICATED ON DRAWINGS OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
  1. MANUFACTURERS: ACME ENGINEERING & MFG. CORP. | AEROVENT | GREENHECK | LOREN COOK COMPANY | MOFFIT CORPORATION, INC. | PENNBARRY.

233713 - DIFFUSERS, REGISTERS, AND GRILLES

A. AIR DIFFUSION DEVICES ARE SCHEDULED ON THE DRAWINGS.
  1. MANUFACTURERS: KREUGER| NAILOR INDUSTRIES | PRICE INDUSTRIES | TITUS | TUTTLE & BAILEY.
  2. PROVIDE PLASTER FRAMES FOR UNITS INSTALLED IN PLASTER CEILINGS.
  3. PROVIDE GASKETS FOR SUPPLY TERMINAL AIR DEVICES MOUNTED IN FINISHED SURFACES.
  4. AIR DIFFUSION DEVICE FACE AND VISIBLE TRIM: STANDARD OFF WHITE BAKED ENAMEL FINISH UNLESS NOTED OTHERWISE.
  5. AIR DIFFUSION DEVICE INTERIOR SURFACES, INCLUDING BLANK-OFFS: BLACK MATTE FINISH.

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

MECHANICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

1/8"=1'-0"

Quality Control

Drawn: JJB
Checked: SVM
Approved: SVM

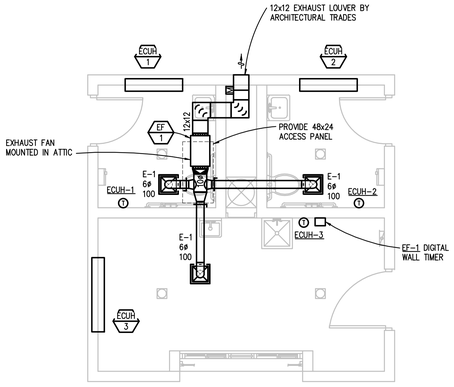
Project Number

BRI 2021097

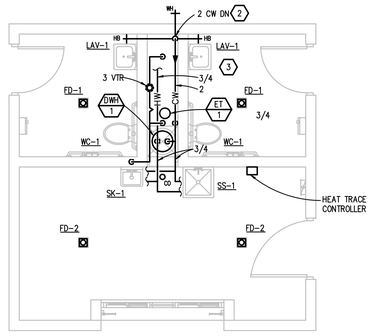
Sheet Number

M0.3

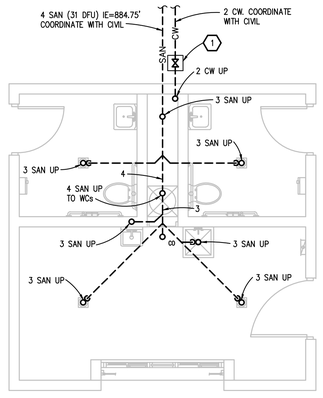
THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



SHEET METAL PLAN
SCALE: 1/4" = 1' - 0"



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



UNDERGROUND PLUMBING PLAN
SCALE: 1/4" = 1' - 0"

PLUMBING GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF PLUMBING FIXTURES.
7. HOT AND COLD WATER PIPING RUN-OUTS TO LAVATORIES AND SINKS SHALL BE 1/2" UNLESS OTHERWISE NOTED.
8. PLUMBING VENT PIPING THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10'-0" FROM ANY FRESH AIR INTAKE LOCATION AND A MINIMUM OF 18" CLEAR FROM THE INSIDE FACE OF PARAPET.
9. PROVIDE CODE REQUIRED CLEARANCE FOR ALL CLEANOUTS INSTALLED IN SANITARY WASTE AND VENT PIPING.
10. MINIMUM UNDERGROUND PIPE SIZE SHALL BE 3".
11. WATER SERVICE ENTRANCE PIPING SHALL BE BURIED WITH DEPTH OF COVER OVER TOP OF PIPE OF AT LEAST 72", OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.

SHEET METAL GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
7. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES.

(#) CONSTRUCTION KEY NOTES:

1. PROVIDE VALVE BOX FOR COLD WATER MAIN SHUT OFF AND COMPRESSED AIR FITTING WITH QUICK CONNECT FITTING FOR WINTERIZATION.
2. PROVIDE VALVE LOW IN CW RISER FOR SYSTEM DRAIN. PIPING IN CHASE TO BE INSTALLED TO MAINTAIN ACCESS TO THIS VALVE.
3. PROVIDE INSULATION AND HEAT TRACE ON ALL CW/HW PIPING.

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PBA Project No.: 2022.0011.05

Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

RESTROOM-STORAGE BUILDING
MECHANICAL PLANS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

1/4" = 1'-0"

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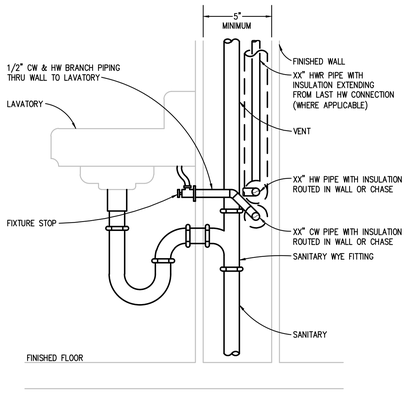
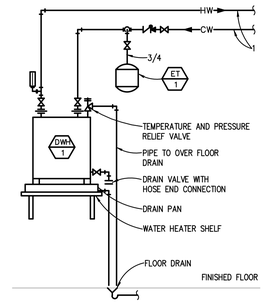
Sheet Number

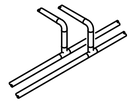
M2.0



TYPICAL LAVATORY DETAIL
NO SCALE



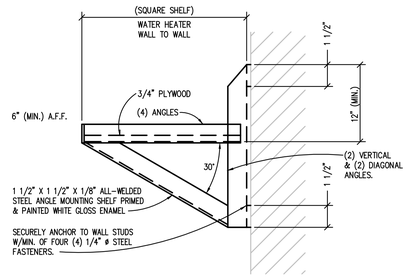
ELECTRIC WATER HEATER PIPING DIAGRAM
NO SCALE



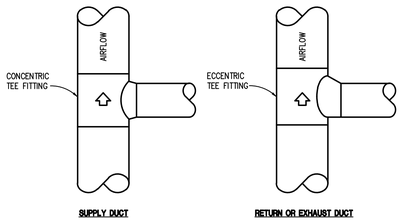
BRANCH CONNECTION OFF TOP

APPLIES TO THE FOLLOWING SYSTEMS:
DOMESTIC WATER

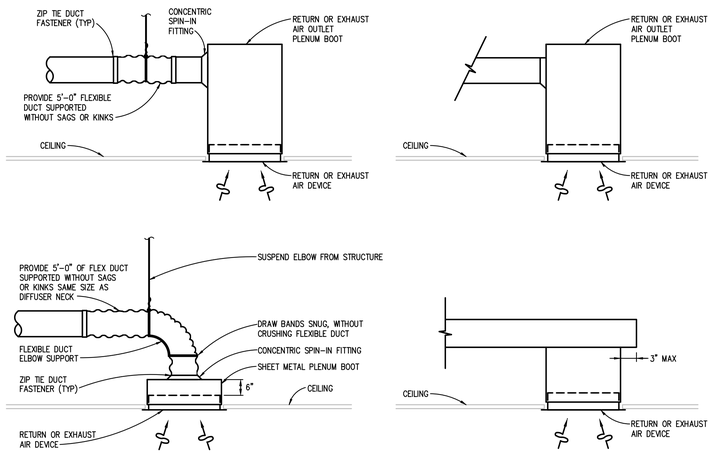
TYPICAL BRANCH TAKE-OFF CONNECTION PIPING DETAIL
NO SCALE



WATER HEATER MOUNTING SHELF DETAIL
NO SCALE

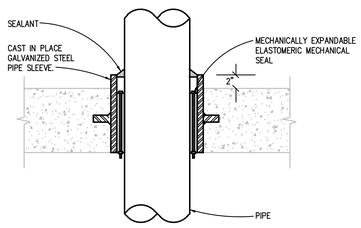


SPIRAL DUCT BRANCH TAKE-OFF DETAILS
NO SCALE **(ROUND AND FLAT OVAL SIMILAR)**

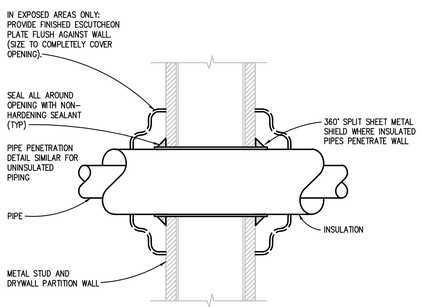


RETURN OR EXHAUST AIR DEVICE INSTALLATION DETAIL
NO SCALE

NOTE: PAINT INTERIOR SURFACE OF PLENUM BOX FLAT BLACK.

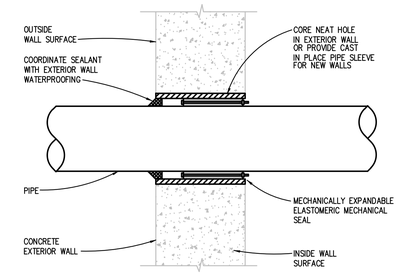


NEW SLAB ON GRADE FLOOR PIPE PENETRATION DETAIL
NO SCALE

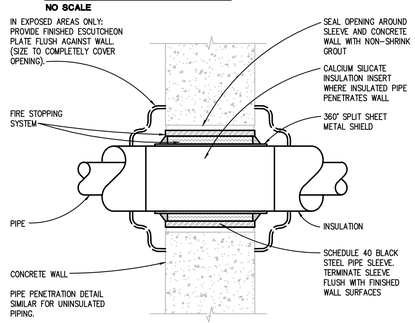


THIS DETAIL DOES NOT APPLY TO HEATING PIPING 2" AND LARGER. FOR HEATING PIPING 2" AND LARGER REFER TO "FIRE RATED AND NON-FIRE RATED METAL STUD AND DRYWALL PARTITION WALL PIPE PENETRATION DETAIL."

NON-FIRE RATED METAL STUD AND DRYWALL PARTITION WALL PIPE PENETRATION DETAIL
NO SCALE



EXTERIOR BELOW GRADE WALL PIPE PENETRATION DETAIL
NO SCALE



DETAIL INDICATES THE INSTALLATION REQUIREMENTS FOR A FIRE RATED ASSEMBLY. FOR A NON-FIRE RATED ASSEMBLY PACK SLEEVED OPENING WITH INSULATION MATERIAL AND CAULK WITH NON-HARDENING SEALANT.

FIRE RATED AND NON-FIRE RATED POURED CONCRETE OR BLOCK WALL PIPE PENETRATION DETAIL
NO SCALE

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MECHANICAL DETAILS

Dates

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NONE

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PLUMBING PIPING & VALVE APPLICATION SCHEDULE

PIPE SIZE (INCHES)	MATERIAL: SOFT COPPER TYPE K	HARD COPPER TYPE L	HARD COPPER TYPE M	CARBON STEEL (SCHED. 40)	CARBON STEEL (STD.)	GALV. STEEL (SCHED. 40)	STAINLESS STEEL (SCHED. 10)	PEX	PE PIPE	PE SHEATHED CARBON STEEL PIPE	CSST	NO-HUB CISP	PVC TYPE DWV	PP DRAINAGE PIPE	COPPER TYPE DWV	DUCTILE IRON PIPE	PRESSURE CONNECTIONS: SOLDERED	BRAZED	WELDED	THREADED	FLANGED	GROOVED	INSERT & CRIMP	FUSION	PRESSURE-SEAL	MECHANICALLY-FORMED TEE	MECHANICAL JOINT	PUSH-ON-JOINT	GRAVITY DWV CONNECTIONS: SOLVENT WELDED	SOLDERED	FUSION	CISP HUBLESS	HEAVY-DUTY HUBLESS	ISOLATION VALVES: BALL	AGA BALL	GENERAL SERVICE BUTTERFLY	LUBRICATED PLUG	GATE	KEYED NOTES
ABOVEGROUND DOMESTIC WATER (POTABLE AND NON-POTABLE) ON DISTRIBUTION SIDE OF METER - MIN. WORKING PRESS. & TEMP.: 125 PSIG AT 200 DEG F																																							
UP TO 4		X															X	X			X	X			X	X								X		X			A
UNDERGROUND DOMESTIC WATER (POTABLE AND NON-POTABLE) ON DISTRIBUTION SIDE OF METER - MIN. WORKING PRESS. & TEMP.: 125 PSIG AT 150 DEG F																																							
UP TO 1-1/2	X																																						B
2 TO 2-1/2	X																																						B
ABOVEGROUND SANITARY WASTE & VENT - MIN. WORKING PRESS.: 10-FOOT HEAD OF WATER																																							
1-1/2 TO 15												X																				X							
UNDERGROUND SANITARY WASTE & VENT - MIN. WORKING PRESS.: 10-FOOT HEAD OF WATER																																							
3 TO 12												X																							X				
3 TO 12													X																	X									

GENERAL NOTES

1. "X" INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A PIPING SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. DISSIMILAR-METAL PIPING JOINTS: CONSTRUCT JOINTS USING DIELECTRIC FITTINGS COMPATIBLE WITH BOTH PIPING MATERIALS.
   a. NPS 2 AND SMALLER: USE DIELECTRIC NIPPLE/WATERWAY.
   b. NPS 2-1/2 AND LARGER: USE DIELECTRIC FLANGE KITS.
3. USE UNIONS OR FLANGES AT VALVE AND EQUIPMENT CONNECTIONS.
4. PLUMBING EQUIPMENT DRAINS, VENTS, SAFETY VALVE PIPING, BLOWDOWN PIPING AND THE LIKE SHALL BE SAME PIPING MATERIAL AS ASSOCIATED PIPING SYSTEM.
5. GROOVED END VALVES MAY BE USED WITH GROOVED PIPING.

KEYED NOTES

A. GROOVED AND FLANGED FITTINGS, JOINTS, AND COUPLINGS, IF INDICATED AS AN ACCEPTABLE SELECTION, MAY BE USED IN ACCESSIBLE LOCATIONS ONLY FOR THIS PIPING SYSTEM. ACCESSIBLE LOCATIONS ARE DEFINED AS EXPOSED CONSTRUCTION OR ABOVE LAY-IN CEILINGS.
B. JOINTS ARE NOT PERMITTED ON UNDERGROUND WATER PIPING.
C. USE CAST IRON DRAINAGE PATTERN (DURHAM) FITTINGS.
D. INSTALL IN CONTAINMENT JACKET, REFER TO SPECIFICATIONS.
E. VALVES, UNIONS, AND FLANGED JOINTS MAY BE USED IN ACCESSIBLE LOCATIONS ONLY, EXCLUDING CEILINGS USED AS AIR PLENUMS. ACCESSIBLE LOCATIONS ARE DEFINED AS EXPOSED CONSTRUCTION OR ABOVE LAY-IN CEILINGS. USE ONLY STEEL WELDED FITTINGS AND WELDED JOINTS IN CEILING USED AS AIR PLENUMS.
F. NO JOINTS ALLOWED UNDERGROUND.

ABOVEGROUND PLUMBING PIPE & ACCESSORY INSULATION APPLICATION SCHEDULE

	INSULATION MATERIAL & THICKNESS (INCHES): FLEXIBLE ELASTOMERIC	FIBERGLASS	MINERAL WOOL	POLYISOCYANURATE	PHENOLIC	CELLULAR GLASS	CALCIUM SILICATE	FIELD-APPLIED JACKET MATERIAL: ALUMINUM	STAINLESS STEEL	PVC	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	PVDC (INDOOR)	PVDC (OUTDOOR)	KEYED NOTES
INDOOR PIPE SYSTEM AND SIZE (INCHES)														
DOMESTIC COLD WATER	1	1						X		X				A
DOMESTIC HOT WATER SUPPLY & RETURN 140 DEG F AND LESS:														
NPS 1-1/4 AND SMALLER	1	1						X		X				A
NPS 1-1/2 AND LARGER	1.5	1.5						X		X				A

UNLESS OTHERWISE INDICATED OR SCHEDULED, DO NOT INSULATE THE FOLLOWING:
- FIRE SUPPRESSION PIPING
- UNDERGROUND PIPING
- LABORATORY GAS AND VACUUM PIPING
- MEDICAL GAS AND VACUUM PIPING
- FUEL GAS PIPING
- FUEL OIL PIPING

GENERAL NOTES

1. "X" OR THICKNESS IN INCHES INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. INSULATE PIPING WITHIN AIR HANDLING EQUIPMENT THE SAME AS INDOOR PIPING. PROVIDE ALUMINUM OR STAINLESS STEEL JACKET.

KEYED NOTES

A. PROVIDE FIELD APPLIED JACKET FOR PIPING EXPOSED IN EQUIPMENT ROOMS, STORAGE ROOMS, JANITORS CLOSETS, RECEIVING ROOMS, TEST AREAS, CIRCULATION AREAS AND SUCH AREAS SUBJECT TO DAMAGE, WITHIN 10 FEET (3 METERS) OF FINISHED FLOOR.
B. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL INSULATION.

SCHEDULES GENERAL NOTES:

TYPICAL FOR ALL SCHEDULE SHEETS:

1. REFER TO ELECTRICAL STANDARD SCHEDULES, ONE LINE DIAGRAM AND PANEL SCHEDULES FOR ADDITIONAL ELECTRICAL INFORMATION
2. PROVIDE THE FOLLOWING FACTORY-WIRED ELECTRICAL OPTIONS/ACCESSORIES WHERE INDICATED IN SCHEDULE:
   - A - NON-FUSED DISCONNECT SWITCH
   - B - UNIT SHALL BE SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS
   - C - SERVICE RECEPTACLE
   - D - FUSED DISCONNECT SWITCH
   - E - COMBINATION STARTER
   - F - UNIT SHALL HAVE (2) SINGLE POINT CONNECTIONS WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS. (1) CONNECTION SHALL BE FOR CONDENSING SECTION AND (1) CONNECTION SHALL BE FOR THE REMAINDER OF THE UNIT.
3. FOR MODULATION/CONTROL TYPE COLUMN, "VFC" INDICATES VARIABLE FREQUENCY CONTROLLERS, "AUTO" INDICATES AUTOMATIC OPERATION (CONTROLLED BY TEMPERATURE CONTROLS OR SELF CONTAINED CONTROLS), "MANUAL" INDICATES HAND OPERATION.
4. IF VARIABLE FREQUENCY CONTROLLERS ARE INDICATED TO BE PROVIDED AND ARE NOT INSTALLED INTEGRAL TO THE UNIT, VARIABLE FREQUENCY CONTROLLERS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR (UNLESS OTHERWISE NOTED) AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE LINE SIDE AND LOAD SIDE WIRING TO THE MOTOR AND INCLUDING MISCELLANEOUS STEEL REQUIRED FOR THE SUPPORT AND MOUNTING OF THE VFC. REFER TO FLOOR PLANS FOR LOCATION.
5. WHERE EQUIPMENT IS INDICATED TO HAVE A SINGLE POINT ELECTRICAL CONNECTION, THAT EQUIPMENT SHALL COME COMPLETE WITH FACTORY INSTALLED STARTERS, MOTOR OVERLOAD PROTECTION, CONTACTORS, FUSING AND ALL NECESSARY INTERNAL WIRING AND CONTROLS. PROVIDE A FACTORY MOUNTED UNIT DISCONNECTING MEANS WHERE THE ELECTRICAL CONTRACTOR SHALL MAKE SINGLE POINT CONNECTION. INSTALL PACKAGED EQUIPMENT SUCH THAT THE ELECTRICAL CONNECTION AND CONTROLS ARE ACCESSIBLE AND HAVE CLEARANCES MEETING THE NATIONAL ELECTRICAL CODE.
6. WHERE PACKAGED EQUIPMENT IS PROVIDED, NAMEPLATE MUST INDICATE MAXIMUM OVERCURRENT PROTECTION BY HACR RATED CIRCUIT BREAKERS OR FUSES. IF FUSE PROTECTION ONLY IS INDICATED, PROVIDE A FUSIBLE DISCONNECT AND FUSES WITH THE UNIT.
7. WHERE EQUIPMENT IS DESIGNATED BY MANUFACTURER AND MODEL NUMBER, THIS IS THE BASIS OF DESIGN. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT BY OTHER SPECIFIED MANUFACTURERS OR PROPOSED ALTERNATE EQUIPMENT BY THE BASIS OF DESIGN MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS TO ELECTRICAL REQUIREMENTS, STRUCTURAL LOADING, OR ARCHITECTURAL APPURTENANCES AND SHALL INCLUDE THE COST OF SUCH REVISIONS IN HIS BID.
8. WHERE EQUIPMENT IS SCHEDULED TO INCLUDE A SERVICE RECEPTACLE, PROVIDE A FACTORY MOUNTED SERVICE RECEPTACLE WITH APPROPRIATE FUSES AND TRANSFORMERS CONNECTED ON THE LINE SIDE OF THE UNIT DISCONNECT. PROVIDE A NAMEPLATE ON THE DISCONNECT SWITCH INDICATING THE PRESENCE OF LIVE POWER TO THE SERVICE RECEPTACLE WHEN THE UNIT DISCONNECT IS IN THE OFF POSITION.
9. SIZE ALL EQUIPMENT FEEDERS BASED ON THE LISTED MOP (MAXIMUM OVERCURRENT PROTECTION). REFER TO THE FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE ON THE ELECTRICAL STANDARD SCHEDULES SHEET.

DUCT SYSTEM APPLICATION SCHEDULE

AIR SYSTEMS	DUCT MATERIAL: G90 GALV. SHEET METAL	DOUBLE-WALL LINED G90 GALV. SHEET METAL (SOLID INNER WALL)	DOUBLE-WALL LINED G90 GALV. SHEET METAL (PERF. INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	CALVANNEALED SHEET METAL	ALUMINUM	TYPE 304 STAINLESS STEEL	TYPE 316 STAINLESS STEEL	PVC COATED GALV. SHEET METAL (4X1)	PVC COATED GALV. SHEET METAL (1X4)	PVC COATED GALV. SHEET METAL (4X4)	16 GA. CARBON STEEL	ZERO-CLEARANCE PREFABRICATED RANGE HOOD EXHAUST DUCT	FABRIC	DESIGN PRESSURE CLASS (INCHES WG)	SEAL CLASS	MAX. ALLOWABLE LEAKAGE RATE (PERCENT)	KEYED NOTES
EXHAUST AIR WITHOUT TERMINAL UNITS	X														-2	A	5	

GENERAL NOTES

1. "X" INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. 4 X 1 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON EXTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON INTERIOR SURFACES.
3. 1 X 4 (4 X 1 REVERSE COATED) PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON INTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON EXTERIOR SURFACES.
4. 4 X 4 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND 4 MILS (0.10 MM) THICK ON OPPOSITE SURFACES.

KEYED NOTES

A. SCREWS, DAMPERS, OR PROJECTIONS OF ANY TYPE ON INTERIOR OF DUCT SURFACE ARE PROHIBITED.
B. DUCT SHALL BE LINED WITHIN 25 FEET UPSTREAM OF FANS.
C. ALL WELDED CONSTRUCTION.

DUCT SYSTEM INSULATION APPLICATION SCHEDULE

	INSULATION MATERIAL & THICKNESS (INCHES): FIBERGLASS BLANKET 0.75 LB/CU FT	FIBERGLASS BLANKET 1.0 LB/CU FT	FIBERGLASS BOARD 2.25 LB/CU FT	FIBERGLASS BOARD 6.0 LB/CU FT	FLEXIBLE ELASTOMERIC	ASTM E2336 2-HOUR FIRE RATED BLANKET	2-HOUR FIRE RATED BLANKET	FIELD APPLIED JACKET MATERIAL: ALUMINUM	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	KEYED NOTES
DUCT SYSTEMS LOCATED IN ATTICS, CRAWL SPACES, OR PARKING GARAGES HAVING NATURAL OR MECHANICAL VENTILATION										
RECTANGULAR DUCTS AND AIR PLENUMS, ALL TYPES	3			2						
ROUND & FLAT OVAL EXHAUST AIR	3									

PLENUMS, DUCTS, AND DUCT ACCESSORIES NOT REQUIRING INSULATION:
- FIBROUS-GLASS DUCTS
- DOUBLE-WALL METAL DUCTS WITH INSULATION OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
- METAL DUCTS WITH DUCT LINER OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
- FABRIC SUPPLY DUCTS
- FACTORY-INSULATED FLEXIBLE DUCTS
- FACTORY-INSULATED PLENUMS AND CASINGS
- FLEXIBLE CONNECTORS
- VIBRATION-CONTROL DEVICES
- FACTORY-INSULATED ACCESS PANELS AND DOORS

GENERAL NOTES

1. "X" OR THICKNESS IN INCHES INDICATE ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. REFER TO METAL DUCT SECTION OF SPECIFICATIONS FOR DUCT LINING AND DOUBLE-WALL INSULATED DUCT.
3. REFER TO HVAC CASINGS SECTION OF SPECIFICATIONS FOR DOUBLE-WALL INSULATED PLENUMS.

KEYED NOTES

A. INCLUDE INSULATION AROUND DUCT MOUNTED COILS AND AIR TERMINAL UNIT COILS.
B. NUMBER OF LAYERS AND TOTAL INSULATION THICKNESS AS RECOMMENDED BY SELECTED MANUFACTURER.
C. DOES NOT APPLY TO PREFABRICATED, ZERO-CLEARANCE GREASE DUCT.
D. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL DUCT INSULATION.
E. EXPOSED SUPPLY DUCTWORK LOCATED IN CONDITIONED SPACE SERVED BY THAT SYSTEM IS NOT REQUIRED TO BE INSULATED.

HORIZONTAL PIPING AND SUPPORT APPLICATION SCHEDULE

METAL PIPE TYPE & SIZE	HANGER OR SUPPORT TYPE: MSS TYPE 1 CLEVIS HANGER	MSS TYPE 10 SWIVEL RING BAND HANGER	MSS TYPE 41 DOUBLE ROD PIPE ROLLER	MSS TYPE 43 SINGLE ROD ROLLER HANGER	MSS TYPE 44 PIPE ROLLER & STAND	MSS TYPE 46 ADJUSTABLE PIPE ROLL STAND	SHIELD TYPE: MSS TYPE 39 PROTECTION SADDLE	MSS TYPE 40 INSULATION PROTECTION SHIELD	THERMAL-HANGER SHIELD	KEYED NOTES
INSULATED SINGLE COLD PIPES										
UP TO 2 INCH	X	X					X	X	A	
INSULATED SINGLE HOT PIPES										
UP TO 2 INCH	X	X					X	X	X	A, C

GENERAL NOTES

1. "X" INDICATES APPROVED HANGER OR SUPPORT ELEMENTS. IF MORE THAN ONE HANGER OR SUPPORT ELEMENT IS INDICATED, SELECTION FROM APPROVED ELEMENTS IS CONTRACTOR'S OPTION.
2. REFER TO HANGER AND SUPPORT SECTION FOR APPROVED MANUFACTURERS.
3. HANGERS AND SUPPORTS USED FOR FIRE PROTECTION SERVICES SHALL BE UL LISTED OR FMG APPROVED.
4. HANGER ELEMENTS IN CONTACT WITH BARE COPPER PIPE SHALL BE COPPER PLATED, PLASTIC COATED, FELT LINED, OR USE MANUFACTURED COPPER TUBE ISOLATORS.
5. REFER TO INDIVIDUAL PIPING SPECIFICATION SECTIONS FOR HANGER SPACING.
6. MULTIPLE PARALLEL COLD PIPES MAY BE TRAPEZE SUPPORTED FROM BELOW USING U-BOLTS OR STRUT CLAMPS AND THERMAL HANGER SHIELDS. REFER TO KEYED NOTE A.
7. MULTIPLE PARALLEL COLD PIPES MAY BE TRAPEZE SUPPORTED FROM ABOVE USING STANDARD HANGER ELEMENTS INDICATED FOR SINGLE COLD PIPES.
8. MULTIPLE PARALLEL HOT PIPES MAY BE TRAPEZE SUPPORTED FROM BELOW USING ROLLER ELEMENTS AND THERMAL HANGER SHIELD OR INSULATION PROTECTION SADDLE. REFER TO KEYED NOTES B AND C.
9. MULTIPLE PARALLEL HOT PIPES MAY BE TRAPEZE SUPPORTED FROM ABOVE USING STANDARD ROLLER HANGERS INDICATED AND THERMAL HANGER SHIELD OR INSULATION PROTECTION SADDLE. REFER TO KEY NOTES B AND C.
10. REFER TO INDIVIDUAL PIPING SPECIFICATION SECTIONS FOR ADDITIONAL SYSTEM SPECIFIC HANGER APPLICATIONS.

KEYED NOTES

A. USE THERMAL HANGER SHIELD ON TRAPEZE SUPPORTED INSULATED PIPE TO PREVENT CRUSHING OF INSULATION.
B. USE THERMAL HANGER SHIELD DESIGNED FOR USE ON ROLLER SUPPORTS FOR INSULATED HOT PIPE .
C. USE TYPE 39 PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION MATCHING ADJOINING INSULATION.

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2022 Sitework Projects

Jenkins Early Learning Center
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Al Ritt Stadium
Dexter High School

Dexter, Michigan

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MECHANICAL SCHEDULES

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GRILLE, REGISTER, AND DIFFUSER SCHEDULE

UNIT IDENTIFICATION	TYPE	FACE SIZE	NECK SIZE	FRAME TYPE	ACCESSORY	CONSTRUCTION	FINISH	MODEL NUMBER	REMARKS
E-1	DIFFUSER	12x12	SEE PLANS	NOTE 2	---	ALUMINUM	NOTE 3	80	---

NOTE:
1. MODEL NUMBERS ARE PRICE UNLESS OTHERWISE NOTED.
2. COORDINATE FRAME TYPE WITH ARCHITECTURAL TRADES.
3. COORDINATE FINISH TYPE WITH ARCHITECTURAL TRADES.

VIBRATION ISOLATOR APPLICATION SCHEDULE

EQUIPMENT TYPE	EQUIPMENT CATEGORY	HORSEPOWER AND OTHER	RPM	EQUIPMENT LOCATION						KEYED NOTES
				SLAB ON GRADE			UP TO 40 FT (12 M) FLOOR SPAN			
				BASE TYPE	ISOLATOR TYPE	MIN. DEFL., IN. (MM)	BASE TYPE	ISOLATOR TYPE	MIN. DEFL., IN. (MM)	
SUSPENDED AXIAL FANS, PLENUM FANS, CABINET FANS, FAN SECTIONS, CENTRIFUGAL INLINE FANS	UP TO 22 IN. DIAMETER	ALL	ALL				A OR B	8a OR 8b	0.75 (19)	NOTES 1, 3, 4
	24 IN. DIAMETER AND UP	≤2 IN. SP	UP TO 300 301 TO 500 500 AND UP				A OR B A OR B A OR B	8a OR 8b 8a OR 8b 8a OR 8b	1.50 (38) 1.50 (38) 1.50 (38)	
		>2 IN. SP	UP TO 300 301 TO 500 500 AND UP				A OR B A OR B A OR B	8a OR 8b 8a OR 8b 8a OR 8b	3.50 (89) 2.50 (64) 2.50 (64)	

GENERAL NOTES:

KEYED NOTES:
1. THRUST RESTRAINTS: PROVIDE THRUST RESTRAINTS BETWEEN FAN DISCHARGE AND DUCT (IN PAIRS, LOCATED ON THE CENTERLINE OF THE DISCHARGE OUTLET OF THE FAN, BRIDGING THE FLEXIBLE DUCT CONNECTOR) FOR ALL FAN HEADS, FOR AXIAL AND CENTRIFUGAL FANS UNITS OPERATING AT 2 INCHES OR GREATER TOTAL STATIC PRESSURE AND AS SHOWN ON DRAWINGS. SPRING DEFLECTION SHALL BE SAME AS THE SUPPORT ISOLATORS.
2. PIPING RISER ISOLATION: PROVIDE PIPE RISER RESILIENT ANCHORS, SPRING MOUNTS AND RESILIENT PIPE GUIDES CAPABLE OF DISTRIBUTING THE LOADS WITHIN THE BUILDING DESIGN LIMITS AT THE SUPPORT POINTS.
3. HORIZONTAL PIPING VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS FOR PIPING CONNECTED TO VIBRATION ISOLATED EQUIPMENT FOR ALL PIPING IN MECHANICAL ROOMS OR THE FOLLOWING MINIMUM HORIZONTAL DISTANCES FROM THE ISOLATED EQUIPMENT: UP TO 6" – 50 FEET (1 1/2" MINIMUM DEFLECTION), 8" AND LARGER – 100 FEET (2 1/2" MINIMUM DEFLECTION), WHICHEVER IS GREATER, AND AS SHOWN ON DRAWINGS. THE FIRST 4 HANGERS FROM THE ISOLATED EQUIPMENT SHALL BE TYPE 8b.
4. DUCTWORK VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS FOR DUCTWORK WITH A CROSS SECTION OF 2 SQUARE FEET OR GREATER CONNECTED TO AIR HANDLING UNITS, RETURN OR RELIEF FANS, AND VIBRATION ISOLATED EQUIPMENT FOR ALL SUCH DUCTWORK IN MECHANICAL ROOMS OR FOR A MINIMUM HORIZONTAL DISTANCE OF 100 FEET FROM THE ISOLATED EQUIPMENT, WHICHEVER IS GREATER, AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).
5. IF SPAN DOES NOT EXCEED 20 FT, SPRING DEFLECTION MAY BE 1.0 IN AND TYPE D BASE MAY BE USED. FOR SPANS GREATER THAN 20 FT, USE SPRING DEFLECTION INDICATED AND TYPE E BASE.

BASE TYPES:

BASE TYPE A – NO BASE, ISOLATORS ATTACHED DIRECTLY TO EQUIPMENT.
BASE TYPE B – STRUCTURAL, STEEL RAILS OR BASE.
BASE TYPE C – CONCRETE INERTIA BASE.
BASE TYPE D – CURB – MOUNTED ALUMINUM BASE WITH 1" DEFL. SPRING ISOLATORS
BASE TYPE E – CURB – MOUNTED STEEL BASE WITH ADJUSTABLE 1", 2" OR 3" DEFL. SPRING ISOLATORS

ISOLATOR TYPES:

ISOLATOR TYPE 1a – ELASTOMERIC ISOLATION PAD.
ISOLATOR TYPE 1b – ELASTOMERIC ISOLATION PAD WITH STEEL LOAD BEARING PLATE.
ISOLATOR TYPE 2 – ELASTOMERIC FLOOR ISOLATOR.
ISOLATOR TYPE 3 – FREE STANDING SPRING FLOOR ISOLATOR.
ISOLATOR TYPE 4 – RESTRAINED SPRING ISOLATOR.
ISOLATOR TYPE 5 – THRUST RESTRAINT.
ISOLATOR TYPE 6 – AIR SPRING.
ISOLATOR TYPE 7 – ELASTOMERIC HANGERS.
ISOLATOR TYPE 8a – SPRING HANGERS.
ISOLATOR TYPE 8b – SPRING HANGERS WITH VERTICAL-LIMIT STOP.

PLUMBING CONNECTION SCHEDULE

UNIT IDENTIFICATION	CW INCHES	HW INCHES	SAN INCHES	VENT INCHES	KEYED NOTES
WC-1	1 1/2	–	4	2	
LAV-1	1/2	1/2	1 1/2	1 1/2	
SK-1	3/4	3/4	1 1/2	1 1/2	
SS-1	3/4	3/4	3	–	
FD-1	–	–	3	–	
FD-2	–	–	3	–	

GENERAL NOTES:
1. INDIVIDUAL WATER LINE BRANCHES, WASTE LINES, VENTS, AND TRAPS FOR CONNECTION TO INDIVIDUAL FIXTURES, FIXTURE FITTINGS, AND SPECIALTIES SHALL BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE OR AS INDICATED ON DRAWINGS, WHICHEVER IS GREATER.

KEYED NOTES:
1. PROVIDE MIXING VALVE.

DOMESTIC WATER HEATER SCHEDULE (ELECTRIC)

UNIT IDENTIFICATION	STORAGE CAPACITY GALLONS	KW INPUT	RECOVERY GPH	E.W.T. °F	L.W.T. °F	MODULATION/ CONTROL TYPE	ELECTRICAL				MODEL NUMBER	KEYED NOTES
							VOLTS	PHASE	SCCR KA	OPTIONS/ ACCESSORIES		
DWH-1	10	5	28	40	120	AUTO	208	1	5	---	JRJ010MS	

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE LOCHINVAR UNLESS OTHERWISE NOTED.

DOMESTIC HOT WATER SYSTEM EXPANSION TANK SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	ESTIMATED TOTAL SYSTEM VOLUME GALLONS	TYPE	OPERATING PRESSURES AT EXPANSION TANK			SYSTEM OPERATING TEMPERATURES		EXPANSION VOLUME GALLONS	ACCEPTANCE FACTOR	MINIMUM TANK VOLUME GALLONS	DIMENSIONS		MODEL NUMBER	KEYED NOTES
				INITIAL PSIG	PRE-CHARGE PSIG	MAX (OPERATING) PSIG	MINIMUM °F	MAXIMUM °F				DIAMETER INCHES	HEIGHT INCHES		
ET-1	DWH-1	17	DIAPHRAGM	40	35	80	40	120	0.9	0.4	0.9	8	12 5/8	PT-5	

GENERAL NOTES:
1. MODEL NUMBERS ARE BELL & GOSSETT UNLESS OTHERWISE NOTED.
2. THE CONTRACTOR SHALL PRE-CHARGE THE TANK TO THE VALUE INDICATED IN THE SCHEDULE. FOR TANKS THAT ARE SUPPLIED PRE-CHARGED BY THE MANUFACTURER, THE CONTRACTOR SHALL CONFIRM THE PRESSURE AND MAKE ADJUSTMENTS AS REQUIRED.

POWER VENTILATOR SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	TYPE	AIRFLOW CFM	T.S.P. IN. W.G.	TIP SPEED FPM	FAN RPM	MOTOR				CURB HEIGHT INCHES	MODULATION/ CONTROL TYPE	ELECTRICAL				MODEL NUMBER	KEYED NOTES
							BHP	HP	RPM	DRIVE TYPE			VOLTS	PHASE	SCCR KA (NOTE 3)	OPTIONS/ ACCESSORIES		
EF-1	TOILET BUILDING	INLINE	300	0.75	---	1535	0.14	1/4	1725	DIRECT	---	MANUAL	120	1	5	B	SQ-98-VG	

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE GREENHECK UNLESS OTHERWISE NOTED.
3. CONTROLLER (E.G. VARIABLE FREQUENCY CONTROLLER, MOTOR STARTER) FOR SPECIFIED EQUIPMENT SHALL BE MANUFACTURED AND MARKED PER NEC WITH A MINIMUM SHORT CIRCUIT CURRENT RATING AS INDICATED.

ELECTRIC CENTRIFUGAL FAN CABINET UNIT HEATER SCHEDULE

UNIT IDENTIFICATION	CAPACITY MBH	AIR			FAN		HEATING ELEMENT		DIMENSIONS			RECESS DEPTH INCHES	FILTER		MODULATION/ CONTROL TYPE	ELECTRICAL						MODEL NUMBER	KEYED NOTES
		AIRFLOW CFM	E.D.B. °F	L.D.B. °F	H.P.	R.P.M.	1ST STAGE KW	TOTAL KW	LENGTH INCHES	HEIGHT INCHES	DEPTH INCHES		TYPE	AREA SQ. FT.		VOLTS	PHASE	FLA	MOP	SCCR KA	OPTIONS/ ACCESSORIES		
ECUH-1	13.7	500	60.0	86.0	1/8	1550	3.0	4.0	45	26 3/4	9 3/4	5	PLEATED	---	AUTO	208	3	12	20	5	B	CU94504203FF	#1
ECUH-2	13.7	500	60.0	86.0	1/8	1550	3.0	4.0	45	26 3/4	9 3/4	5	PLEATED	---	AUTO	208	3	12	20	5	B	CU94504203FF	#1
ECUH-3	27.3	750	60.0	94.0	1/8	1550	5.0	8.0	58	26 3/4	9 3/4	5	PLEATED	---	AUTO	208	3	23	30	5	B	CU95808203FF	#1

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE QMARK UNLESS OTHERWISE NOTED.

KEYED NOTES:
1. MANUFACTURER PROVIDED THERMOSTAT FOR FIELD INSTALLATION.

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TEMPERATURE CONTROL - SYMBOLS LIST

SCHEMATIC SYMBOLS

SYMBOL	DESCRIPTION
	LINE – ELECTRIC
M/S	MOTOR STARTER
OS	OCCUPANCY SENSOR
R	RELAY, ELECTRIC
SW	SWITCH
T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)
TMR	TIMER SWITCH
XF	TRANSFORMER

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NOTC	NORMALLY OPEN TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NCTC	NORMALLY CLOSED TIMED CLOSED
SPST	SINGLE POLE SINGLE THROW
SPDT	SINGLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW

WIRING SYMBOLS

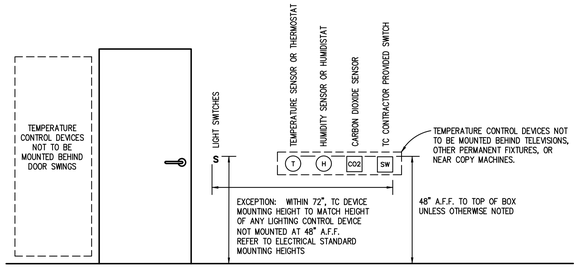
SYMBOL	DESCRIPTION
	AUDIBLE DEVICE (AS DEFINED ON TC DRAWINGS)
M/S	COIL – MOTOR STARTER CONTACTOR
R	COIL – RELAY
TDR	COIL – TIME DELAY RELAY
VFC	COIL – VARIABLE SPEED DRIVE CONTACTOR
	COIL – EP OR SOLENOID VALVE
	CONTACT – INSTANT OPERATING, NO
	CONTACT – INSTANT OPERATING, NC
	CONTACT – TIMED AFTER COIL IS ENERGIZED, NOTC
	CONTACT – TIMED AFTER COIL IS ENERGIZED, NCTO
	CONTACT – TIMED AFTER COIL IS DE-ENERGIZED, NOTO
	CONTACT – TIMED AFTER COIL IS DE-ENERGIZED, NCTC
	GROUND
	MOTOR, SINGLE PHASE
R	PILOT LIGHT OR BEACON R – RED LENSE A – AMBER LENS B – BLUE LENSE G – GREEN LENS
R	PILOT LIGHT, WITH PUSH-TO-TEST
	PUSH BUTTON – MOMENTARY CONTACT, NO
	PUSH BUTTON – MOMENTARY CONTACT, NC
	PUSH BUTTON – MOMENTARY CONTACT, NO & NC
	PUSH BUTTON – MOMENTARY, NO (MUSHROOM HEAD)
	PUSH BUTTON – MOMENTARY, NC (MUSHROOM HEAD)
1 2	SWITCH – 2 POSITION SELECTOR
H O A	SWITCH – 3 POSITION SELECTOR HAND/OFF/AUTO

WIRING SYMBOLS (CONT.)

SYMBOL	DESCRIPTION
	SWITCH – FLOW (AIR, WATER, ETC.), NO
	SWITCH – FLOW (AIR, WATER, ETC.), NC
	SWITCH – LIMIT, NO
	SWITCH – LIMIT, NO, HELD CLOSED
	SWITCH – LIMIT, NC
	SWITCH – LIMIT, NC, HELD OPEN
	SWITCH – LIQUID LEVEL, NO
	SWITCH – LIQUID LEVEL, NC
	SWITCH – MANUAL SPST, NO
	SWITCH – MANUAL DPST, NO
	SWITCH – MANUAL SPST, NC
	SWITCH – MANUAL DPST, NC
	SWITCH – MANUAL SPDT
	SWITCH – MANUAL DPDT
	SWITCH – PRESSURE & VACUUM, NO
	SWITCH – PRESSURE & VACUUM, NC
	SWITCH – TEMPERATURE ACTUATED, NO
	SWITCH – TEMPERATURE ACTUATED, NC
	THERMAL OVERLOAD, SINGLE PHASE
OLs	THERMAL OVERLOAD CONTACTS – 3 PHASE
	TRANSFORMER
	WIRE TERMINATION AT DEVICE
	WIRE TO WIRE TERMINATION
	WIRING NOT CONNECTED

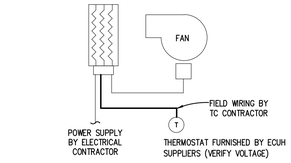
NOTES:

1. SOME SYMBOLS & ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.
2. REFER TO MECHANICAL STANDARDS ON DRAWING M0.1 FOR ADDITIONAL SYMBOLS & ABBREVIATIONS THAT MAY BE USED ON TEMPERATURE CONTROL DRAWINGS.



TC DEVICE STANDARD MOUNTING HEIGHTS DETAIL

NO SCALE

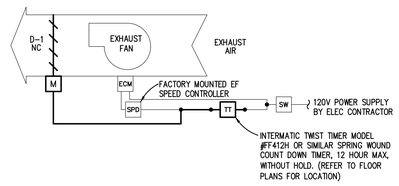


ELECTRIC CUH CONTROL

TYPICAL

NOTE:
REFER TO FLOOR PLANS FOR QUANTITY AND LOCATION OF UNITS.

SEQUENCE OF OPERATION:
SPACE THERMOSTAT SHALL ENERGIZE CABINET UNIT HEATER CONTROL CIRCUIT TO MAINTAIN SPACE TEMPERATURE SETPOINT.



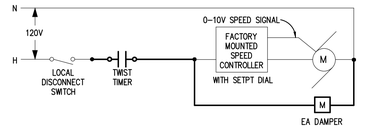
EXHAUST FAN (EF-1) CONTROL

NOTES:

1. REFER TO FLOOR PLANS FOR LOCATION OF UNIT.
2. CONTROL DAMPER FURNISHED BY TC CONTRACTOR. COORDINATE INSTALLATION WITH MECH CONTRACTOR.

SEQUENCE OF OPERATION:

1. EXHAUST FAN SHALL BE STARTED AND STOPPED BY LOCAL COUNTDOWN TWIST TIMER SWITCH. WIRING INTERLOCK SHALL OPEN DAMPER.
2. FAN SPEED SHALL BE MANUALLY SET THRU ON BOARD POTENTIOMETER BY AIR BALANCER TO DESIGN AIRFLOW.



EXHAUST FAN (EF-1) M/S WIRING

TC GENERAL NOTES

1. THESE GENERAL NOTES SHALL BE APPLICABLE FOR ALL TEMPERATURE CONTROL (TC) DRAWINGS.
2. "PROVIDE" IS DEFINED AS "FURNISH AND INSTALL".
3. TEMPERATURE CONTROLS CONTRACTOR (TC CONTRACTOR) SHALL BE RESPONSIBLE TO COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.
4. FOR TEMPERATURE CONTROL DRAWINGS ONLY: ALL DETAILED INFORMATION IDENTIFIED WITH HEAVY LINE WEIGHT SHALL BE PROVIDED BY TC CONTRACTOR. ALL OTHER INFORMATION IDENTIFIED WITH LIGHT LINE WEIGHT SHALL BE PROVIDED BY OTHER TRADES.
5. ALL CONTROL SCHEMATICS AND WIRING DIAGRAMS ARE FOR THE CLARIFICATION OF EQUIPMENT INTERLOCKING FUNCTIONS AND THE INTERFACE OF VARIOUS CONTRACTORS' WORK AND SHALL NOT BE MISTAKEN AS SHOP DRAWINGS FOR ACTUAL INSTALLATION.
6. ALL TC PROVIDED COMPONENTS AND ALL TC CONTRACTOR INSTALLED WIRING SHALL BE LABELED PER SPECIFICATIONS.
7. ALL WIRING AND SYSTEM CONTROL VOLTAGES SHALL BE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATION AND THE ELECTRICAL SPECIFICATIONS.
8. FAN AND PUMP MOTOR STARTERS, STARTER WIRING, CONTROL VOLTAGE TRANSFORMERS AND ASSOCIATED POWER WIRING SHALL BE PROVIDED BY OTHER TRADES.
9. ALL CONTROL INTERLOCK WIRING SHALL BE BY TC CONTRACTOR UNLESS OTHERWISE NOTED. TC CONTRACTOR SHALL COORDINATE WITH MOTOR STARTER SUPPLIERS TO DETERMINE EXACT WIRING REQUIREMENTS AND TERMINATION POINTS.
10. ALL CONTROL INTERLOCK WIRING BETWEEN COMPONENTS SHALL BE INSTALLED WITHOUT INTERMEDIATE STOPS. WIRE SPLICING AT INTERMEDIATE TERMINAL STRIPS IS NOT ACCEPTABLE.
11. ALL ELECTRICAL WIRING AND RACEWAY SYSTEMS SHALL COMPLY WITH ELECTRICAL SPECIFICATION REQUIREMENTS. WHERE RACEWAY IS REQUIRED, TWO SEPARATE ELECTRICAL RACEWAY SYSTEMS SHALL BE PROVIDED: ONE FOR 120V WIRING AND THE OTHER FOR 24V WIRING.
12. TC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER SUPPLIES REQUIRED FOR TC SYSTEM UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PANEL SCHEDULES FOR SPARE CIRCUITS OR CIRCUITS DEDICATED TO TEMPERATURE CONTROLS. COORDINATE CIRCUIT USE WITH ELECTRICAL CONTRACTOR.
13. TC CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL FIELD MOUNTED COMPONENTS.
14. REFER TO TEMPERATURE CONTROLS STANDARD MOUNTING HEIGHTS DETAIL FOR ELEVATIONS OF WALL MOUNTED TEMPERATURE CONTROL DEVICES. PROVIDE WALL MOUNTED DEVICE GUARDS WHERE INDICATED ON TC DETAILS OR AT SPECIFIC LOCATIONS INDICATED ON MECHANICAL FLOOR PLANS.
15. TC CONTRACTOR SHALL PROVIDE AUXILIARY PANELS FOR REQUIRED PANEL MOUNTED EQUIPMENT SUCH AS RELAYS, TRANSDUCERS, CONTROL TRANSFORMERS, ETC. AUXILIARY PANELS SHALL BE LOCATED NEXT TO ASSOCIATED DDC PANEL. DEPENDING ON WIRE QUANTITY OR COMPLEXITY, PROVIDE CONDUITS BETWEEN PANELS OR WIRING THROUGH WITH CONDUIT STUBS ABOVE ALL ASSOCIATED PANELS.
16. REMOTELY MOUNTED FIELD DEVICES SUCH AS RELAYS, CONTROL TRANSFORMERS, ETC., SHALL BE HOUSED IN AN ENCLOSURE PROVIDED BY THE TC CONTRACTOR.
17. CONTROL TRANSFORMERS WHEN REQUIRED SHALL BE SIZED FOR 150% OF ACTUAL LOAD.
18. TC CONTRACTOR SHALL FIELD MOUNT ALL REQUIRED "SHIPPED LOOSE" PACKAGED CONTROL COMPONENTS FURNISHED BY EQUIPMENT SUPPLIERS WHERE INDICATED. ALL REQUIRED 24V AND 120V FIELD WIRING SHALL BE PROVIDED BY TC CONTRACTOR UNLESS NOTED OTHERWISE. TC CONTRACTOR SHALL COORDINATE SPECIFIC SYSTEM WIRING REQUIREMENTS WITH PACKAGED EQUIPMENT SUPPLIERS.

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Dexter, Michigan

Sheet Title

TEMPERATURE CONTROL STANDARDS AND GENERAL NOTES

Dates

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ELECTRICAL SYMBOL LIST

(NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
FX (NL)	FIXTURE TYPE (NL INDICATES NIGHT LIGHT)
	LIGHTING FIXTURE
	DIRECT/INDIRECT LIGHTING FIXTURE
	EMERGENCY FIXTURE
	LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE
	LIGHTING FIXTURE
	DIRECTIONAL LIGHTING FIXTURE
	PENDANT LIGHTING FIXTURE
	WALL SCONCE
	LIGHTING TRACK
	TRACK LIGHTING FIXTURE
	POLE MOUNTED LIGHTING FIXTURE
	POLE MOUNTED LIGHTING FIXTURE – POST TOP
	BOLLARD LIGHTING FIXTURE
	EMERGENCY LIGHTING UNIT
	EXIT LIGHTING FIXTURE WITH DIRECTIONAL ARROWS (SHADED AREA INDICATES FACE)
	EXIT LIGHTING FIXTURE WITH DIRECTIONAL ARROWS (SHADED AREA INDICATES FACE)
	EXIT LIGHTING FIXTURE – WALL MOUNTED
	EXIT/EMERGENCY LIGHTING COMBO
BCELTS	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH AUTOMATIC LOAD CONTROL RELAY
ALCR	
LC	LIGHTING CONTROL DEVICE – REFER TO LIGHTING CONTROL SCHEDULE
XX	ROOM CONTROL DESIGNATION – REFER TO LIGHTING CONTROL SCHEDULE
S	SINGLE POLE TOGGLE SWITCH
S2	TWO POLE TOGGLE SWITCH
S3	3 WAY TOGGLE SWITCH
S4	4 WAY TOGGLE SWITCH
K	KEY OPERATED SWITCH
K3	3 WAY KEY OPERATED SWITCH
K4	4 WAY KEY OPERATED SWITCH
D	DIMMER SWITCH
D3	3 WAY DIMMER SWITCH
DO	DIMMER OCCUPANCY SENSOR SWITCH
DL	LOW VOLTAGE DIMMER SWITCH
SP	PILOT SWITCH

SYMBOL	DESCRIPTION
TWC	TWO-WAY COMMUNICATION SYSTEM CALL STATION
TWCD	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER
TWCA	TWO-WAY COMMUNICATION SYSTEM ANNUNCIATOR & COMMUNICATION PANEL
TWCP	TWO-WAY COMMUNICATION SYSTEM POWER SUPPLY WITH BATTERY BACK-UP
TWCDP	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER POWER SUPPLY WITH BATTERY BACK-UP
RGP	REMOTE GENERATOR ANNUCIATOR PANEL
ATS	AUTOMATIC TRANSFER SWITCH
UPS	UNINTERRUPTIBLE POWER SUPPLY
CSX	LOW VOLTAGE CONTROL STATION "X" INDICATES TYPE
"X"	SINGLE / DUPLEX RECEPTACLE OUTLET "X" INDICATES TYPE
	SINGLE/DUPLEX RECEPTACLE OUTLET CONTROLLED BY AUTOMATIC CONTROL DEVICE/SYSTEM
	QUAD RECEPTACLE OUTLET
	ABOVE COUNTER DUPLEX RECEPTACLE (SIMILAR FOR TAMPER RESISTANT, QUADS, EMERGENCY AND GFCI RECEPTACLES)
	DUPLEX RECEPTACLE–GROUND FAULT CIRCUIT INTERRUPTER
	DEAD FRONT–GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX EMERGENCY RECEPTACLE OUTLET
	DUPLEX TAMPER RESISTANT RECEPTACLE OUTLET
	QUAD TAMPER RESISTANT RECEPTACLE OUTLET
	ABOVE COUNTER DUPLEX TAMPER RESISTANT RECEPTACLE OUTLET
	DUPLEX UPS RECEPTACLE
	DUPLEX RECEPTACLE WITH 2 USB PORTS OUTLET
	4 PORT USB CHARGING STATION
	CEILING MOUNTED DUPLEX/QUAD RECEPTACLE
	POWER POLE
	WALL/CEILING MOUNTED SPECIAL RECEPTACLE – REFER TO ELECTRICAL STANDARD SCHEDULES
IC	INTERCOM OUTLET
	MULTI–OUTLET SURFACE RACEWAY
"X"	MULTI–SERVICE DROP SEE ELECTRICAL DETAILS AND DIAGRAMS SHEET "X" INDICATES TYPE
PTX	POKE–THROUGH ASSEMBLY "X" INDICATES TYPE
FBX	FLOOR SERVICE FITTING "X" INDICATES TYPE
AFX	ACCESS FLOOR SERVICE FITTING "X" INDICATES TYPE
RX	CORD REEL "X" INDICATES TYPE
S3	DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S3S3	3–WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S4S4	4–WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
ST	DIGITAL TIME SWITCH
SI	ILLUMINATED TOGGLE SWITCH FOR CONTROL OF LIGHTING ON CRITICAL POWER–ILLUMINATED WHEN SWITCH IS IN "OFF" POSITION
SL	LOW VOLTAGE SWITCH
SO	OCCUPANCY SENSOR REFER TO ELECTRICAL STANDARD SCHEDULES
SO2	OCCUPANCY SENSOR
OS X	OCCUPANCY SENSOR "X" INDICATES TYPE

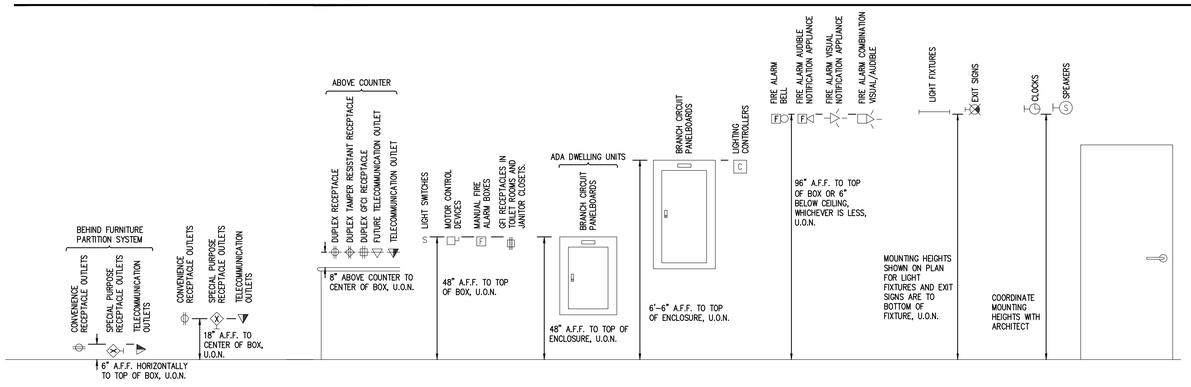
SYMBOL	DESCRIPTION
CP	CONTROL PANEL
	MOTOR
VFC	VARIABLE FREQUENCY CONTROLLER.
	MANUAL CONTROLLER
	MAGNETIC CONTROLLER
KP	COMBINATION MAGNETIC CONTROLLER
CR	NON–FUSIBLE DISCONNECT SWITCH
DB	FUSIBLE DISCONNECT SWITCH
CB	ENCLOSED CIRCUIT BREAKER
	PUSH BUTTON STATION
JB	JUNCTION BOX
	HARD WIRE POWER CONNECTION
	GROUND ROD
	GROUND CONNECTION
HH	HANDHOLE
X	CONDUIT SLEEVE WITH BUSHINGS LENGTH AS REQUIRED "X" INDICATES CONDUIT SIZE
	CONDUIT UP
	CONDUIT DOWN
	EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	ABOVE COUNTER EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	EMPTY BOX FOR FUTURE CEILING MOUNTED TELECOMMUNICATION OUTLET
X	TELECOMMUNICATION OUTLET "X" INDICATES TYPE
X	ABOVE COUNTER TELECOMMUNICATION OUTLET "X" INDICATES TYPE
X	TELECOMMUNICATION CEILING MOUNTED OUTLET "X" INDICATES TYPE
	TELECOMMUNICATION BACKBOARD
TGB	TELECOMMUNICATION GROUNDING BUS BAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUS BAR
S	SPEAKER
S	SPEAKER – WALL MOUNTED
MIC	MICROPHONE
VC	VOLUME CONTROL/STATION SELECTOR
B	SIGNALING BELL
	SINGLE FACE CLOCK – CEILING MOUNTED
	SINGLE FACE CLOCK – WALL MOUNTED
	DOUBLE FACE CLOCK – CEILING MOUNTED
S	DOUBLE FACE COMBINATION CLOCK/SPEAKER CEILING MOUNTED
	DOUBLE FACE CLOCK – WALL MOUNTED
S	DOUBLE FACE COMBINATION CLOCK/SPEAKER WALL MOUNTED
TC	TIME CLOCK
C	CONTACTOR
P	PHOTOCELL
TT	TWIST TIMER

SYMBOL	DESCRIPTION
	SECURITY CAMERA
MD	MOTION DETECTOR
K	SECURITY KEY SWITCH
DC	DOOR CONTACT
KP	KEY PAD
CR	CARD READER
DB	DURESS PUSH BUTTON STATION
DE	DELAYED EGRESS
REX	REQUEST TO EXIT STATION
PP	AUTOMATIC DOOR PUSH PAD OPERATOR
DO	DOOR OPERATOR
DA	DOOR ACTUATOR
AC	ACCESS CONTROL STATION
ACCP	ACCESS CONTROL CONTROL PANEL
ACPS	ACCESS CONTROL POWER SUPPLY
	CIRCUIT BREAKER
	DRAWOUT CIRCUIT BREAKER MANUALLY/ OPERATED
	DRAWOUT CIRCUIT BREAKER ELECTRICALLY/ OPERATED
	SWITCH
	AUTOMATIC OR MANUAL TRANSFER SWITCH
	FUSE
	TRANSFORMER
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	LIGHTNING ARRESTOR
X	PANELBOARD "X" INDICATES PANELBOARD NAME
	GROUND
	STRESS CONE TERMINATION
K	SECURITY KEY INTERLOCK
G	ENGINE GENERATOR
M	UTILITY METER
EMU	ELECTRONIC METERING UNIT
A	AMMETER
V	VOLTMETER
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
SPD	SURGE PROTECTIVE DEVICE
CR	CONTROL RELAY
TDR	TIME DELAY RELAY
	THERMAL OVERLOAD RELAY
	NORMALLY OPEN CONTACTS
	NORMALLY CLOSED CONTACTS
	N.O. PUSH BUTTON SINGLE CIRCUIT
	N.C. PUSH BUTTON SINGLE CIRCUIT
X–X	CABLE VAULT "X–X" INDICATES TYPE
	BRANCH CIRCUIT PANELBOARD
	LOAD CENTER
	MOTOR CONTROL CENTER
T	TRANSFORMER
	DISTRIBUTION PANEL
GB	GROUND BUS
PB	PLUG IN BUSWAY
FB	FEEDER BUSWAY

REFER TO ELECTRICAL STANDARD SCHEDULES

SYMBOL	DESCRIPTION
F	MANUAL FIRE ALARM BOX
SD	SMOKE DETECTOR
DD	DUCT SMOKE DETECTOR
CO	CARBON MONOXIDE DETECTOR
RT	REMOTE TEST STATION (FOR DUCT DETECTOR)
TD	THERMAL DETECTOR
BD	PROJECTED BEAM DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
F XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE NOTIFICATION APPLIANCE– CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE – CEILING MOUNTED
F	FIREFIGHTERS PHONE JACK
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL
IM	ADDRESSABLE MONITORING MODULE
CM	ADDRESSABLE CONTROL MODULE
TS	TAMPER SWITCH
FS	FLOW SWITCH
DR	MAGNETIC DOOR RELEASE

STANDARD MOUNTING HEIGHTS



ELECTRICAL DRAWING INDEX

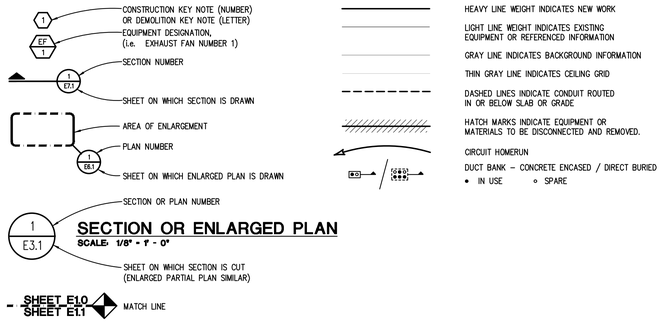
ELECTRICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	AMPERES
AER	ARC ENERGY REDUCTION
AF	AMPERES FRAME (BREAKER RATING)
AFCI	ARC FAULT CIRCUIT INTERRUPTER
A.F.F.	ABOVE FINISH FLOOR
AIC	AMPS INTERRUPTING CAPACITY
AL	AUDIENCE LEFT
ALCR	AUTOMATIC LOAD CONTROL RELAY
AR	AUDIENCE RIGHT
AT	AMPERES TRIP (BREAKER SETTING)
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
BCELTS	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH
BKR	BREAKER
BPS	BOLTED PRESSURE SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
DEMO	DEMOLITION
DIM	DIMENSION
DISC	DISCONNECT
DP	DISTRIBUTION PANEL
DS	DOWNSTAGE
DWG	DRAWING
EBU	EMERGENCY BATTERY UNIT
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
EM/ EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
EPO	EMERGENCY POWER OFF
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
FA	FIRE ALARM
FLA	FULL LOAD AMPS
FLR	FLOOR
FOH	FRONT OF HOUSE
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FU	FUSE

ABBREVIATION	DESCRIPTION
G/GRD/EG	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HOA	HAND–OFF–AUTO
HP	HORSEPOWER
HV	HIGH VOLTAGE
HZ	HERTZ
IG	ISOLATED GROUND
JB	JUNCTION BOX
KA	THOUSAND AMP
KV	KILOVOLT
KVA	KILOVOLT – AMPERES
KW	KILOWATT
KWH	KILOWATT – HOURS
LA	LIGHTNING ARRESTOR
LP	LIGHTING PANEL
LDP	LIGHTING DISTRIBUTION PANEL
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MIN	MINIMUM
MISC.	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MOP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NF	NON–FUSIBLE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE

ABBREVIATION	DESCRIPTION
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
P	POLE
PB	PUSHBUTTON STATION
PH	PHASE
PT	POTENTIAL TRANSFORMER
PDP	POWER DISTRIBUTION PANEL
RECEPT.	RECEPTACLE
RDP	RECEPTACLE DISTRIBUTION PANEL
RP	RECEPTACLE PANEL
RSC	RIGID STEEL CONDUIT
SCCR	SHORT CIRCUIT CURRENT RATING
SCHED	SCHEDULE
SPD	SURGE PROTECTION DEVICE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TB	TERMINAL BOX
TELECOM	TELECOMMUNICATIONS
TR	TAMPER RESISTANT
TTB	TELEPHONE TERMINAL BACKBOARD
TYP	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
US	UPSTAGE
V	VOLTS
W	WIRE OR WATTS
WG	WIRE GUARD
WP	WEATHERPROOF
WR	WEATHER RESISTANT
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
(E)	EXISTING
(R)	RELOCATED

STANDARD METHODS OF NOTATION



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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

ELECTRICAL STANDARDS AND DRAWING INDEX

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FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE

OVERCURRENT DEVICE RATING (AMPERES)	COPPER CONDUCTORS						KEYED NOTES
	WIRE SIZE (AWG OR KCMIL)		CONDUIT SIZE				
	PHASE & NEUTRAL	GROUND	SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G, 2PH, 1G)	SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	THREE PHASE 3 WIRE+G (3PH, 1G)	THREE PHASE & NEUTRAL 4 WIRE+G (3PH, 1N, 1G)	
15–20	12	12	3/4"	3/4"	3/4"	3/4"	
25–30	10	10	3/4"	3/4"	3/4"	3/4"	
35–40	8	10	3/4"	3/4"	3/4"	3/4"	
45–50	8 (6)	10	3/4"	3/4"	3/4"	3/4"	1
60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")	1" (1 1/4")	1
70	4	8	1"	1 1/4"	1 1/4"	1 1/4"	
80	4 (3)	8	1"	1 1/4"	1 1/4"	1 1/4"	1
90–100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1
110	2 (1)	6	–	1 1/4"	1 1/4"	1 1/4" (1 1/2")	1
125	1 (1/0)	6	–	1 1/4" (1 1/2")	1 1/4" (1 1/2")	1 1/2"	1
150	1/0	6	–	1 1/2"	1 1/2"	1 1/2"	
175	2/0	6	–	2"	2"	2"	
200	3/0	6	–	2"	2"	2 1/2"	
225	4/0	4	–	2"	2"	2 1/2"	
250	250	4	–	2 1/2"	2 1/2"	2 1/2"	
300	350	4	–	2 1/2"	2 1/2"	3"	
350	500	3	–	3"	3"	3"	
400	500	3	–	3"	3"	3"	
450	2–4/0	2–2	–	2–2"	2–2"	2–2 1/2"	
500	2–250	2–2	–	2–2 1/2"	2–2 1/2"	2–2 1/2"	
600	2–350	2–1	–	2–2 1/2"	2–2 1/2"	2–3"	
700	2–500	2–1/0	–	2–3"	2–3"	2–3"	
800	2–500	2–1/0	–	2–3"	2–3"	2–3 1/2"	
1000	3–400	3–2/0	–	3–3"	3–3"	3–3"	
1200	3–600	3–3/0	–	3–3 1/2"	3–3 1/2"	3–3 1/2"	
1600	4–600	4–4/0	–	4–3 1/2"	4–3 1/2"	4–3 1/2"	
2000	5–600	5–250	–	5–3 1/2"	5–3 1/2"	5–3 1/2"	

GENERAL NOTES:
1. CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
2. CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
3. CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
4. CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
5. ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LUG SIZES.
6. SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
7. OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY.
8. SPLICE FROM ALUMINUM TO COPPER PRIOR TO ENTERING EQUIPMENT LISTED FOR USE WITH COPPER CONDUCTORS ONLY OR USE COPPER CONDUCTORS FOR THE ENTIRE LENGTH OF FEEDER.

KEYED NOTES:
1. CONDUCTORS ARE BASED ON 90°C, 600V. INSULATED WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES.

MOTOR CIRCUIT SIZING SCHEDULE (208V, 3 PHASE)

MOTOR HP	SWITCH/ FUSE	CIRCUIT BREAKER	STARTER SIZE/TYPE	MOTOR DISCONNECT (NOTE 3)
1/2	30/6A	15A	1	30A
3/4	30/6A	15A	1	30A
1	30/10A	15A	1	30A
1 1/2	30/10A	15A	1	30A
2	30/10A	15A	1	30A
3	30/20A	20A	1	30A
5	30/25A	35A	1	30A
7 1/2	60/40A	50A	1	60A
10	60/50A	60A	2	60A
15	60/60A	90A	3	60A
20	100/90A	100A	3	100A
25	100/100A	110A	3	100A
30	200/125A	125A	4	200A
40	200/175A	175A	4	200A
50	200/200A	200A	5	200A
60	400/250A	250A	5	400A
75	400/300A	300A	5	400A
100	400/400A	400A	6	400A
125	600/500A	600A	6	600A
150	600/600A	600A	6	600A

GENERAL NOTES:
1. BASED ON MOTOR FULL LOAD AMPERES AS PROVIDED BY THE NEC
2. BASED ON MOTOR RUNNING OVERLOAD PROTECTIONS PROVIDED BY THERMAL OVERLOAD RELAYS.
3. WHERE THE STARTER IS LOCATED REMOTE FROM THE MOTOR, PROVIDE DISCONNECT LOCATED AT THE MOTOR, SIZE AS INDICATED.

MOTOR CIRCUIT SIZING SCHEDULE (120V, SINGLE PHASE)

MOTOR HP	CIRCUIT BREAKER	MANUAL MOTOR STARTER SIZE	COMBINATION STARTER SIZE	MOTOR DISCONNECT (NOTE 3)
1/6	15A	1 HP	0	20A
1/4	15A	1 HP	0	20A
1/3	15A	1 HP	0	20A
1/2	20A	1 HP	0	20A

GENERAL NOTES:
1. BASED ON MOTOR FULL LOAD AMPERES AS PROVIDED BY THE NEC
2. BASED ON MOTOR RUNNING OVERLOAD PROTECTIONS PROVIDED BY THERMAL OVERLOAD RELAYS.
3. WHERE THE STARTER IS LOCATED REMOTE FROM THE MOTOR, PROVIDE DISCONNECT LOCATED AT THE MOTOR, SIZE AS INDICATED.

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS

BRANCH CKT RATING (A)	WIRE SIZE (AWG)	MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)				
		120V	208V	240V	277V	480V
20A	12	83	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
30A	10	85	148	170	197	341
	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

GENERAL NOTES:
1. THE ABOVE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR OF 0.85 PER NEC CHAPTER 9, TABLE 9.
2. PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.
3. CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 9 CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
4. LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOADING OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP TO COMPLY WITH ASHRAE 90.1 AND THE NEC. FOR CIRCUITS LOADED GREATER THAN 64% OF BRANCH BREAKER RATING, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

RACEWAY / CONDUCTOR / CABLE APPLICATION SCHEDULE

		WIRE		RACEWAY										CABLE/ CORD	
		COPPER, TYPE THHN/THWN-2	COPPER, TYPE XHHW-2	ELECTRICAL METALLIC TUBING (EMT)	INTERMEDIATE METAL CONDUIT (IMC)	RIGID STEEL CONDUIT (RSC)	PVC COATED RIGID STEEL CONDUIT	RIGID NON-METALLIC CONDUIT (RNC) TYPE EPC-40	HIGH DENSITY POLYETHYLENE (HDPE) SCHEDULE 40	REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE XS	REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE BS	LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC)	METAL CLAD TYPE CABLE WITH INSULATED GROUND WIRE (TYPE MC)	POWER LIMITED CABLE
FEEDERS – EXTERIOR	EXPOSED, SURFACE MOUNTED TO STRUCTURE		X		X	X	X				X				
	EXPOSED, WITH FREESTANDING SUPPORT		X		X	X	X				X				
	CONCEALED IN RETAINING WALL OR SIMILAR ELEMENT		X			X	X	X							
	BELOW GREEN SPACE		X				X	X	X		X				
	WITHIN 5' OF FOUNDATION WALL		X			X	X								
	ROOFTOPS (WHEN APPROVED BY ENGINEER)		X		X	X	X								
FEEDERS – INTERIOR	CONCEALED, ACCESSIBLE CEILINGS	X		X	X										
	CONCEALED, INACCESSIBLE CEILINGS	X		X	X										
	CONCEALED IN GYPSUM BOARD PARTITION WALLS	X		X	X										
	CONCEALED IN CMU WALLS	X		X	X										
	EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X			X	X	X								
	EXPOSED, BELOW 10' AFF AND NOT SUBJECT TO DAMAGE	X		X	X										
	EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X		X	X										
	EXPOSED, FINISHED SPACES	X													
	BELOW SLAB ON GRADE	X				X	X	X							
	DAMP AND WET LOCATIONS	X			X	X	X	X							
BRANCH CIRCUITS – EXTERIOR	EXPOSED, SURFACE MOUNTED TO STRUCTURE		X		X	X	X								
	EXPOSED, WITH FREESTANDING SUPPORT		X		X	X	X								
	CONCEALED IN RETAINING WALL OR SIMILAR ELEMENT		X				X	X							
	BELOW GREEN SPACE		X					X							
	WITHIN 5' OF FOUNDATION WALL		X			X	X								
	ROOFTOPS (WHEN APPROVED BY ENGINEER)		X		X	X	X								
BRANCH CIRCUITS – INTERIOR	CONCEALED, ACCESSIBLE CEILINGS	X			X	X								X	
	CONCEALED, INACCESSIBLE CEILINGS	X			X	X									
	CONCEALED IN GYPSUM BOARD PARTITION WALLS	X			X	X								X	
	CONCEALED IN CMU WALLS	X			X	X									
	EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X				X	X	X							
	EXPOSED, BELOW 10' AFF AND NOT SUBJECT TO DAMAGE	X			X	X									
	EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X			X	X									
	EXPOSED, FINISHED SPACES	X													
	BELOW SLAB ON GRADE	X						X							
	EMBEDDED IN ELEVATED CONCRETE SLAB	X						X							
	DAMP AND WET LOCATIONS	X			X	X	X	X				X			
SPECIAL APPLICATIONS	SERVICE ENTRANCE – UNDERGROUND		X				X	X	X						
	SERVICE ENTRANCE – ABOVE GROUND		X	X	X	X									
	CLASS 1 CONTROL CIRCUITS	X			X	X	X								
	CLASS 2 CONTROL CIRCUITS	X			X	X	X								X
	CLASS 3 CONTROL CIRCUITS	X			X	X	X								X

GENERAL NOTES:
1. TRANSITION FROM PVC/HDPE AND PROVIDE RIGID STEEL OR RTRC SWEEPS WHERE CONDUITS PENETRATE WALLS, CONCRETE SLABS, CONCRETE BASES, AND ASPHALT.
2. REFER TO SPECIFICATIONS FOR RESTRICTIONS ON MC/AC CABLE INSTALLATION.
3. EMT SHALL NOT BE USED ON THE EXTERIOR OF A BUILDING OR IN AREAS SUBJECT TO DAMAGE BELOW 10' AFF.
4. INSTALL SURFACE RACEWAYS ONLY WHERE INDICATED ON DRAWINGS.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

ELECTRICAL STANDARD SCHEDULES

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

NONE

Quality Control

Drawn: BAG
Checked: STP
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260010 – ELECTRICAL GENERAL REQUIREMENTS

A. SCOPE OF WORK: ALL MATERIAL SHALL BE NEW UNLESS OTHERWISE INDICATED. FURNISH ALL LABOR, EQUIPMENT, TECHNICAL SUPERVISION, AND INCIDENTAL SERVICES REQUIRED TO COMPLETE, TEST, AND LEAVE READY FOR OPERATION THE ELECTRICAL SYSTEMS AS SPECIFIED AND AS INDICATED ON DRAWINGS.
B. ORDINANCES AND CODES: PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES AND REGULATIONS, THE RULES AND REGULATIONS OF NFPA, NECA, AND UL, UNLESS OTHERWISE INDICATED.
C. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR ELECTRICAL WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.
D. THE DRAWINGS SHOW THE LOCATION AND GENERAL ARRANGEMENT OF EQUIPMENT, ELECTRICAL SYSTEMS AND RELATED ITEMS. THEY SHALL BE FOLLOWED AS CLOSELY AS ELEMENTS OF THE CONSTRUCTION WILL PERMIT.
E. EXAMINE THE DRAWINGS OF OTHER TRADES AND VERIFY THE CONDITIONS GOVERNING THE WORK ON THE JOB SITE. ARRANGE WORK ACCORDINGLY, PROVIDING SUCH FITTINGS, CONDUIT, JUNCTION BOXES AND ACCESSORIES AS MAY BE REQUIRED TO MEET SUCH CONDITIONS.
F. COORDINATE ARRANGEMENT, MOUNTING AND SUPPORT OF ELECTRICAL EQUIPMENT WITH OTHER TRADES.
G. VISIT THE SITE, EXAMINE AND VERIFY THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED BEFORE SUBMITTING PROPOSAL. THE SUBMITTING OF A PROPOSAL IMPLIES THAT THE CONTRACTOR HAS VISITED THE SITE AND UNDERSTANDS THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED. NO ADDITIONAL CHARGES WILL BE ALLOWED BECAUSE OF FAILURE TO MAKE THIS EXAMINATION OR TO INCLUDE ALL MATERIALS AND LABOR TO COMPLETE THE WORK.
H. BIDS SHALL BE BASED UPON MANUFACTURED EQUIPMENT SPECIFIED. VOLUNTARY ALTERNATES MAY BE SUBMITTED FOR CONSIDERATION, WITH LISTED ADDITION OR DEDUCTION TO THE BID.
I. WARRANTY: CONTRACTOR SHALL WARRANTY THAT THE ELECTRICAL INSTALLATION IS FREE FROM DEFECTS AND AGREES TO REPLACE OR REPAIR, TO THE OWNER'S SATISFACTION, ANY PART OF THIS ELECTRICAL INSTALLATION WHICH BECOMES DEFECTIVE WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION FOLLOWING FINAL ACCEPTANCE, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN THE EQUIPMENT, MATERIAL, WORKMANSHIP OR FAILURE TO FOLLOW THE CONTRACT DOCUMENTS.
J. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY SERVICES INCLUDING EQUIPMENT AND INSTALLATION REQUIRED TO MAINTAIN OPERATION AS A RESULT OF ANY EQUIPMENT FAILURE OR DEFECT DURING WARRANTY PERIOD.
K. FILE WITH THE OWNER ANY AND ALL WARRANTIES FROM THE EQUIPMENT MANUFACTURERS INCLUDING THE OPERATING CONDITIONS AND PERFORMANCE CAPACITIES THEY ARE BASED ON.
L. CONSULT WITH THE OWNER'S REPRESENTATIVE AS TO THE METHODS OF CARRYING ON THE WORK SO AS NOT TO INTERFERE WITH THE OWNER'S OPERATION ANY MORE THAN ABSOLUTELY NECESSARY. ACCORDINGLY, ALL SERVICE LINES SHALL BE KEPT IN OPERATION AS LONG AS POSSIBLE AND THE SERVICES SHALL ONLY BE INTERRUPTED AT SUCH TIME AS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE.
M. ALL CUTTING, PATCHING AND REPAIR WORK SHALL BE PERFORMED BY THE CONTRACTOR THROUGH APPROVED, QUALIFIED SUBCONTRACTORS. CONTRACTOR SHALL INCLUDE FULL COST OF SAME IN BID.
N. PROVIDE ALL EXCAVATION, TRENCHING, TUNNELING, DEWATERING AND BACKFILLING REQUIRED FOR THE ELECTRICAL WORK. COORDINATE THE WORK WITH OTHER EXCAVATING AND BACKFILLING IN THE SAME AREA.
O. INSPECT THE INSTALLATION OF ALL EQUIPMENT PER THE MANUFACTURER'S RECOMMENDATION AND APPLICABLE CODES.
P. PROVIDE UL APPROVED FIRE-STOPPING SYSTEM FOR ALL PENETRATIONS PASSING THROUGH FIRE RATED ASSEMBLIES.
Q. COMPLY WITH NECA 1.
R. PROVIDE COMPLETE OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS COVERING ALL ELECTRICAL EQUIPMENT HEREIN SPECIFIED, TOGETHER WITH PARTS LISTS.
S. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT/ENGINEER, RECORD DRAWINGS ON ELECTRONIC MEDIA OR MYLAR WHICH HAVE BEEN NEATLY MARKED TO REPRESENT AS-BUILT CONDITIONS FOR ALL NEW ELECTRICAL WORK.
T. SUBMIT FOR REVIEW SHOP DRAWINGS FOR ELECTRICAL SYSTEMS OR EQUIPMENT LISTED BELOW:
   1. PANELBOARDS
   2. DISCONNECT SWITCHES
   3. TIME SWITCHES
   4. WIRING DEVICES
   5. LIGHTING FIXTURES
   6. LIGHTING CONTROL SYSTEMS AND DEVICES
   7. FUSES
U. PROVIDE AND INSTALL ARC-FLASH HAZARD LABELS ON EACH ELECTRICAL EQUIPMENT AND ENCLOSURES DEFINED BY NFPA 70E. LABELS SHALL COMPLY WITH THE REQUIREMENTS OF NFPA 70E AND CONTAIN AS A MINIMUM:
   1. LOCATION DESIGNATION.
   2. NOMINAL SYSTEM VOLTAGE (PHASE-PHASE).
   3. ARC FLASH BOUNDARY (INCHES).
   4. INCIDENT ENERGY LEVEL (CAL/CM2) AND THE WORKING DISTANCE (INCHES); OR PPE CATEGORY FROM NFPA 70E TABLE.
   5. ENGINEERING REPORT NUMBER, REVISION NUMBER AND ISSUE DATE.

260519 – CONDUCTORS AND CABLES

A. CONDUCTOR MATERIAL: COPPER COMPLYING WITH NEMA WC 70; STRANDED CONDUCTOR.
B. CONDUCTOR INSULATION TYPES: TYPE THHN-THWN, XHHW-2, SO, COMPLYING WITH NEMA WC 70.
C. CONCEAL CABLES IN FINISHED WALLS, CEILINGS, AND FLOORS, UNLESS OTHERWISE INDICATED.
D. USE CONDUCTOR NOT SMALLER THAN 12 AWG FOR POWER AND LIGHTING CIRCUITS. UNLESS INDICATED OTHERWISE, ALL CIRCUITS SHALL BE 2#12, 1#12G, 3/4"C.
E. USE CONDUCTOR NOT SMALLER THAN 14 AWG FOR CONTROL CIRCUITS, PROVIDED BY ELECTRICAL CONTRACTOR.
F. SUPPORT COMMUNICATION CABLES ABOVE ACCESSIBLE CEILING, USING SPRING METAL CLIPS OR PLASTIC CABLE TIES TO SUPPORT CABLES FROM STRUCTURE. DO NOT REST CABLE ON CEILING PANELS.
G. USE "STA-KON" CONNECTORS TO TERMINATE STRANDED CONDUCTORS #10 AWG AND SMALLER TO SCREW TERMINALS.
H. CONDUCTOR AND INSULATION APPLICATIONS:
   1. REFER TO APPLICATION SCHEDULE INCLUDED ON THE DRAWINGS.
   2. CORD DROPS AND PORTABLE APPLIANCE CONNECTIONS: TYPE SO, HARD SERVICE CORD

260526 – GROUNDING AND BONDING

A. EQUIPMENT GROUNDING: COMPLY WITH NFPA 70, ARTICLE 250, FOR TYPES, SIZES, AND QUANTITIES OF EQUIPMENT GROUNDING CONDUCTORS, UNLESS SPECIFIC TYPES, LARGER SIZES, OR MORE CONDUCTORS THAN REQUIRED BY NFPA 70 ARE INDICATED.
B. PROVIDE EQUIPMENT GROUNDING CONDUCTORS IN EACH RACEWAY.

260533 – RACEWAYS AND BOXES

A. MINIMUM RACEWAY SIZE: 3/4-INCH TRADE SIZE.
B. INSTALL CONDUIT IN ACCORDANCE WITH NECA "NATIONAL ELECTRICAL INSTALLATION STANDARDS".
C. ROUTE CONDUITS IN FINISHED AREAS WITH EXPOSED CEILINGS AT UNDERSIDE OF STRUCTURAL DECK OR AS HIGH AS POSSIBLE. WHERE STEEL METAL DECK ON STEEL JOIST CONSTRUCTION, ROUTE CONDUITS ABOVE JOISTS. DO NOT SECURE CONDUIT TO BOTTOM OF JOISTS.
D. RACEWAY APPLICATIONS: REFER TO RACEWAY APPLICATIONS SCHEDULE INCLUDED ON THE DRAWINGS.
E. FITTINGS FOR EMT: STEEL, SET SCREW TYPE.
F. CONCEAL CONDUIT AND EMT WITHIN FINISHED WALLS, CEILINGS, AND FLOORS UNLESS OTHERWISE INDICATED.
G. COMMUNICATIONS AND SIGNAL CABLING SYSTEMS RACEWAYS: ALL BENDS WILL BE LONG, SWEEPING BENDS WITH A RADIUS NOT LESS THAN:
   1. SIX TIMES THE INTERNAL DIAMETER OF CONDUITS 2 INCHES OR SMALLER.
   2. TEN TIMES THE INTERNAL DIAMETER OF CONDUITS LARGER THAN 2 INCHES.

260553 – ELECTRICAL IDENTIFICATION

A. COMPLY WITH ANSI A13.1, ANSI C2, NFPA 70, AND 29 CFR 1910.145.
B. COORDINATE IDENTIFICATION NAMES, ABBREVIATIONS, COLORS, AND OTHER FEATURES WITH REQUIREMENTS IN THE CONTRACT DOCUMENTS, SHOP DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND THE OPERATION AND MAINTENANCE MANUAL, AND WITH THOSE REQUIRED BY CODES, STANDARDS, AND 29 CFR 1910.145. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.
C. COORDINATE INSTALLATION OF IDENTIFYING DEVICES WITH COMPLETION OF COVERING AND PAINTING OF SURFACES WHERE DEVICES ARE TO BE APPLIED, WITH LOCATION OF ACCESS PANELS AND DOORS.
D. INSTALL IDENTIFYING DEVICES BEFORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR CONCEALMENT.
E. INSTALL ENGRAVED, LAMINATED ACRYLIC OR MELAMINE LABEL THAT ARE PUNCHED OR DRILLED FOR SCREW MOUNTING WITH SELF TAPPING STAINLESS STEEL SCREWS. LABELS SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND. MINIMUM LETTER HEIGHT SHALL BE 3/8 INCH (10 MM). LABELS SHALL BE INSTALLED ON ALL ELECTRICAL EQUIPMENT AFFECTED BY PROJECT.
   1. PANELBOARD AND TRANSFORMER NAMEPLATES: IDENTIFY SOURCE FED FROM, VOLTAGE, SIZE, AND NAME.
   2. ENCLOSED CONTROLLERS, CIRCUIT BREAKERS, DISCONNECT SWITCHES: IDENTIFY SOURCE AND LOAD SERVED.
F. WIRING DEVICES: USE ADHESIVE LABEL WITH BLACK FILLED LETTERING ON FACE OF WALL PLATE (ON THE REAR OF THE FACEPLATE) AND DURABLE WIRE MARKERS OR TAGS INSIDE OUTLET BOXES. LABELS SHALL BE CLEAR POLYESTER WITH BLACK LETTER, FONT SIZE OF 7. IDENTIFY PANELBOARD AND CIRCUIT NUMBER FROM WHICH SERVED.
G. USE THE COLORS LISTED BELOW FOR UNGROUNDED SERVICE, FEEDER, AND BRANCH-CIRCUIT CONDUCTORS.
   1. COLOR SHALL BE FACTORY APPLIED OR, FOR SIZES LARGER THAN NO. 10 AWG IF AUTHORITIES HAVING JURISDICTION PERMIT, FIELD APPLIED.
   2. COLORS FOR 208/120-V CIRCUITS:
      a. PHASE A: BLACK.
      b. PHASE B: RED.
      c. PHASE C: BLUE.
      d. NEUTRAL: WHITE.
   3. FIELD-APPLIED, COLOR-CODING CONDUCTOR TAPE: APPLY IN HALF-LAPPED TURNS FOR A MINIMUM DISTANCE OF 6 INCHES FROM TERMINAL POINTS AND IN BOXES WHERE SPLICES OR TAPS ARE MADE. APPLY LAST TWO TURNS OF TAPE WITH NO TENSION TO PREVENT POSSIBLE UNWINDING. LOCATE BANDS TO AVOID OBSCURING FACTORY CABLE MARKINGS.
H. WARNING LABELS FOR INDOOR CABINETS, BOXES, AND ENCLOSURES FOR POWER AND LIGHTING: COMPLY WITH 29 CFR 1910.145 AND APPLY SELF-ADHESIVE WARNING LABELS. IDENTIFY SYSTEM VOLTAGE WITH BLACK LETTERS ON AN ORANGE BACKGROUND. APPLY TO EXTERIOR OF DOOR, COVER, OR OTHER ACCESS.
   1. EQUIPMENT REQUIRING WORKSPACE CLEARANCE ACCORDING TO NFPA 70: UNLESS OTHERWISE INDICATED, APPLY TO DOOR OR COVER OF EQUIPMENT BUT NOT ON FLUSH PANELBOARDS AND SIMILAR EQUIPMENT IN FINISHED SPACES.
I. ACCESSIBLE RACEWAYS AND CABLES OF AUXILIARY SYSTEMS: IDENTIFY THE FOLLOWING SYSTEMS WITH COLOR-CODED, SELF-ADHESIVE VINYL TAPE APPLIED IN BANDS:
   1. CONTROL WIRING: GREEN AND RED.

260923 – LIGHTING CONTROL DEVICES

A. INSTALL LIGHTING CONTROL DEVICES AS INDICATED ON PLAN. INSTALL AT ACCESSIBLE LOCATIONS
B. COORDINATE OCCUPANCY SENSOR LOCATIONS, COVERAGES AND REQUIRED QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS. COVERAGE AREAS INDICATED ON THE DRAWINGS ARE FOR MINOR MOTION (6 TO 8 INCHES OF HAND MOVEMENT). PROVIDE ADDITIONAL OCCUPANCY SENSORS AND CONTROL UNITS AS REQUIRED TO ACHIEVE COMPLETE MINOR MOTION COVERAGE OF THE SPACE INDICATED.
C. OCCUPANCY SENSOR ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SENSORS TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO SITE OUTSIDE NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.
D. OCCUPANCY SENSOR:
   1. WALL SWITCH PASSIVE INFRARED OCCUPANCY SENSOR: WATTSTOPPER PW-100 OR EQUAL.
   2. DUAL LEVEL SWITCHING PASSIVE INFRARED OCCUPANCY SENSOR: WATTSTOPPER PW-200 OR EQUAL.
   3. 360° CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR: WATTSTOPPER DT 300 OR EQUAL.
   4. 110° WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR: WATTSTOPPER DT-200 OR EQUAL.
   5. 360° CEILING MOUNTED ULTRASONIC OCCUPANCY SENSORS: WATTSTOPPER "WT" SERIES OR EQUAL.
   6. 360° CEILING MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR. WATTSTOPPER CI-200 OR EQUAL.
E. OCCUPANCY SENSOR CONTROL UNITS:
   1. DESCRIPTION: TRANSFORMER AND RELAY COMBINED IN SINGLE UNIT TO PROVIDE 24DC POWER TO SENSORS AND PROVIDE 20A CONTACT(S) FOR CONTROL OF LIGHTING LOADS AT 120 OR 277V. CONTROL UNIT INPUT POWER SHALL BE FROM UNSWITCHED LEG OF LIGHTING CIRCUIT IT IS CONTROLLING.
      a. CONTROL UNITS SHALL BE PROVIDED AS REQUIRED TO POWER CEILING MOUNTED OCCUPANCY SENSORS, CONTROL LIGHTING LOADS AND PROVIDE A MINIMUM OF ONE AUXILIARY CONTACT.
      b. OCCUPANCY SENSOR CONTROL UNITS SHALL MOUNT EXTERNAL TO 4"SQ JUNCTION BOX IN THE CEILING SPACE. ALL WIRING BETWEEN CONTROL UNIT AND OCCUPANCY SENSOR SHALL BE PLENUM RATED.
      c. LOCATE CONTROL UNIT IN ACCESSIBLE LOCATION IN GYP-BOARD CEILINGS, ADJACENT TO RETURN AIR GRILLES, OR PROVIDE ACCESS PANEL.
      d. ADDITIONAL AUXILIARY RELAY MODULES SHALL BE PROVIDED AS REQUIRED TO PROVIDE CONTROL OF ALL LIGHTING CIRCUITS AND ADDITIONAL AUXILIARY CONTACTS AS REQUIRED.
      e. IT IS ACCEPTABLE TO PROVIDE CONTROLS AND AUXILIARY CONTACTS AS REQUIRED INTEGRAL TO THE CEILING SENSOR, PROVIDED ALL REQUIRED CONTACTS ARE PROVIDED.
      f. MAXIMUM OF 3 SENSORS PER POWER PACK. VERIFY EXACT QUANTITIES REQUIRED WITH MANUFACTURER.

262416 – PANELBOARDS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS; PROVIDE PRODUCTS BY SQUARE D, EATON, GENERAL ELECTRIC, OR SIEMENS.
B. COORDINATE LAYOUT AND INSTALLATION OF PANELBOARDS AND COMPONENTS WITH OTHER CONSTRUCTION THAT PENETRATES WALLS OR IS SUPPORTED BY THEM, INCLUDING ELECTRICAL AND OTHER TYPES OF EQUIPMENT, RACEWAYS, PIPING, AND ENCUMBRANCES TO WORKSPACE CLEARANCE REQUIREMENTS.
C. PHASE AND GROUND BUSES SHALL BE HARD-DRAWN COPPER, 98 PERCENT CONDUCTIVITY.
D. SERVICE EQUIPMENT LABEL: UL LABELED FOR USE AS SERVICE EQUIPMENT FOR PANELBOARDS WITH MAIN SERVICE DISCONNECT SWITCHES.
E. SHORT-CIRCUIT RATING: FULLY RATED TO INTERRUPT SYMMETRICAL SHORT-CIRCUIT CURRENT AVAILABLE AT TERMINALS.
F. INSTALL PANELBOARDS AND ACCESSORIES ACCORDING TO NEMA PB 1.1.
G. MOUNT TOP OF TRIM 74 INCHES (1880 MM) ABOVE FINISHED FLOOR, UNLESS OTHERWISE INDICATED.
H. STUB FOUR 1-INCH (27-GRC) EMPTY CONDUITS FROM RECESSED PANELBOARD INTO ACCESSIBLE CEILING SPACE OR SPACE DESIGNATED TO BE CEILING SPACE IN THE FUTURE. STUB FOUR 1-INCH (27-GRC) EMPTY CONDUITS INTO RAISED FLOOR SPACE OR BELOW SLAB NOT ON GRADE.
I. CREATE A DIRECTORY TO INDICATE INSTALLED CIRCUIT LOADS AFTER BALANCING PANELBOARD LOADS OR CREATED BY RETROFITTING. OBTAIN APPROVAL BEFORE INSTALLING. USE A COMPUTER OR TYPEWRITER TO CREATE DIRECTORY; HANDWRITTEN DIRECTORIES ARE NOT ACCEPTABLE. COORDINATE FINAL DIRECTORY ROOM NAMES AND NUMBERS WITH OWNER.
J. LOAD BALANCING: AFTER SUBSTANTIAL COMPLETION, BUT NOT MORE THAN 60 DAYS AFTER FINAL ACCEPTANCE, MEASURE LOAD BALANCING AND MAKE CIRCUIT CHANGES.
K. ON COMPLETION OF INSTALLATION, INSPECT INTERIOR AND EXTERIOR OF PANELBOARDS. REMOVE PAINT SPLATTERS AND OTHER SPOTS. VACUUM DIRT AND DEBRIS; DO NOT USE COMPRESSED AIR TO ASSIST IN CLEANING. REPAIR EXPOSED SURFACES TO MATCH ORIGINAL FINISH.
L. LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS
   1. BRANCH OVERCURRENT PROTECTIVE DEVICES: BOLT-ON CIRCUIT BREAKERS, REPLACEABLE WITHOUT DISTURBING ADJACENT UNITS.
M. MOLDED-CASE CIRCUIT BREAKERS: UL 489, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS.
   1. THERMAL-MAGNETIC CIRCUIT BREAKERS: INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS, AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER WITH RESTRICTED ACCESS COVER.
N. MOLDED-CASE CIRCUIT-BREAKER FEATURES AND ACCESSORIES:
   1. LUGS: MECHANICAL STYLE, SUITABLE FOR NUMBER, SIZE, TRIP RATINGS, AND CONDUCTOR MATERIALS.
   2. APPLICATION LISTING: APPROPRIATE FOR APPLICATION; TYPE SWD FOR SWITCHING FLUORESCENT LIGHTING LOADS; TYPE HACR FOR HEATING, AIR-CONDITIONING, AND REFRIGERATING EQUIPMENT.
   3. GROUND-FAULT PROTECTION: INTEGRALLY MOUNTED RELAY AND TRIP UNIT WITH ADJUSTABLE PICKUP AND TIME-DELAY SETTINGS, PUSH-TO-TEST FEATURE, AND GROUND-FAULT INDICATOR.
   4. SHUNT TRIP: 120-V TRIP COIL ENERGIZED FROM SEPARATE CIRCUIT SET TO TRIP AT 75 PERCENT OF RATED VOLTAGE.
   5. DO NOT USE TANDEM CIRCUIT BREAKERS.
   6. PROVIDE CIRCUIT BREAKERS U.L. LISTED AS TYPE GFEPCI FOR ALL SELF REGULATING HEATING (SNOW MELTING AND HEAT TRACE) CABLES BRANCH CIRCUITS.
   7. PROVIDE LOCK ON DEVICES FOR CIRCUIT BREAKERS WHEN CALLED OUT ON PANEL SCHEDULES WITH "LOD" DESIGNATION.
   8. PROVIDE GROUND FAULT INTERRUPT 5MA CIRCUIT BREAKER WHEN CALLED OUT ON PANEL SCHEDULES WITH "GFCI" DESIGNATION.
O. ENCLOSURES: MOUNTING AS NOTED ON PANEL SCHEDULES. NEMA PB 1, RATED FOR ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION.
      a. INDOOR DRY LOCATIONS: NEMA 250, TYPE 1.
      b. OUTDOOR LOCATIONS: NEMA 250, TYPE 3R.
      c. OTHER WET OR DAMP INDOOR LOCATIONS: NEMA 250, TYPE 4.
   2. CABINET FRONT: FLUSH OR SURFACE CABINET AS NOTED ON THE DRAWINGS, WITH FRONT WITH CONCEALED TRIM CLAMPS, PIANO TYPE HINGED DEAD FRONT COVER, HINGED DOOR, AND FLUSH LOCK ALL KEYED ALIKE.
   3. DIRECTORY CARD: WITH TRANSPARENT PROTECTIVE COVER, MOUNTED IN METAL FRAME, INSIDE PANELBOARD DOOR.

262726 – WIRING DEVICES

A. GENERAL WIRING DEVICE REQUIREMENTS: COMPLY WITH NFPA 70, NEMA WD 1, NEMA WD 6, AND UL498.
B. WIRING DEVICE AND WALL SWITCH COLOR AS WHITE UNLESS OTHERWISE INDICATED OR REQUIRED BY NFPA 70.
C. STANDARD GRADE RECEPTACLES
   1. TAMPER-RESISTANT DUPLEX RECEPTACLE, NEMA 5-20R: HEAVY-DUTY GRADE. SAFETY MECHANISM TO ENERGIZE CONTACTS ONLY WHEN BOTH OPENINGS ARE SIMULTANEOUSLY ENGAGED. HUBBELL 5362TR OR EQUAL BY EATON/ARROW HART, LEVITON, OR LEGRAND PASS & SEYMOUR.
   2. WEATHER- AND TAMPER-RESISTANT DUPLEX RECEPTACLE, NEMA 5-20R: SAFETY MECHANISM TO ENERGIZE CONTACTS ONLY WHEN BOTH OPENINGS ARE SIMULTANEOUSLY ENGAGED. HUBBELL BR20WRTR OR EQUAL BY EATON/ARROW HART, LEVITON, OR LEGRAND PASS & SEYMOUR.
D. GFCI RECEPTACLES
   1. COMPLY WITH UL943
   2. TAMPER-RESISTANT DUPLEX GFCI RECEPTACLE, NEMA 5-20R: HUBBELL GFTRST20 OR EQUAL BY EATON/ARROW HART, LEVITON, OR LEGRAND PASS & SEYMOUR.
   3. TAMPER- AND WEATHER-RESISTANT DUPLEX GFCI RECEPTACLE, NEMA 5-20R: SAFETY MECHANISM TO ENERGIZE CONTACTS ONLY WHEN BOTH OPENINGS ARE SIMULTANEOUSLY ENGAGED. HUBBELL GFTWRST20 OR EQUAL BY EATON/ARROW HART, LEVITON, OR LEGRAND PASS & SEYMOUR.
E. STRAIGHT-BLADE AND TWIST-LOCK RECEPTACLES, OTHER THAN NEMA 5-20R. PROVIDE COMMERCIAL SPECIFICATION GRADE STRAIGHT BLADE AND TWIST-LOCK RECEPTACLES WITH STANDARD NEMA CONFIGURATIONS IN ACCORDANCE WITH THE SPECIAL RECEPTACLES SCHEDULE INCLUDED ON THE DRAWINGS. HUBBELL, EATON/ARROW HART, AND LEVITON,
F. CORD AND PLUG SETS: MATCH VOLTAGE AND CURRENT RATINGS AND NUMBER OF CONDUCTORS TO REQUIREMENTS OF EQUIPMENT BEING CONNECTED.
   1. CORD: RUBBER-INSULATED, STRANDED-COPPER CONDUCTORS, WITH TYPE SOW-A JACKET; WITH GREEN-INSULATED GROUNDING CONDUCTOR AND EQUIPMENT-RATING AMPACITY PLUS A MINIMUM OF 30 PERCENT.
   2. PLUG: NYLON BODY AND INTEGRAL CABLE-CLAMPING JAWS. MATCH CORD AND RECEPTACLE TYPE FOR CONNECTION.
G. INSTALL RECEPTACLES FLUSH, WITH LONG DIMENSION VERTICAL, AND WITH GROUNDING TERMINAL ON TOP.
H. INSTALL GFCI RECEPTACLES SO THAT THE "PUSH TO TEST" AND "RESET" DESIGNATIONS CAN BE READ CORRECTLY. IF PRINTED IN BOTH DIRECTIONS, INSTALL WITH GROUNDING TERMINAL ON TOP.
I. INSTALL WEATHER-RESISTANT TYPE RECEPTACLES IN ALL DAMP AND WET LOCATIONS.
J. INSTALL TAMPER-RESISTANT TYPE RECEPTACLES IN ALL LOCATIONS.
K. WALL SWITCHES: SINGLE AND DOUBLE-POLE SWITCHES COMPLY WITH DSCC W-C-896F AND UL 20. HUBBELL 1220 SERIES OR EQUAL BY EATON/ARROW HART, LEVITON, OR LEGRAND PASS & SEYMOUR.
L. WHERE MULTIPLE SWITCHES, DIMMERS, AND/OR OCCUPANCY SENSORS ARE ADJACENT TO EACH OTHER, PROVIDE A SINGLE COVER PLATE.
M. WALL PLATES:
   1. PROVIDE SATIN-FINISHED STAINLESS-STEEL WALL PLATES IN FINISHED AREAS.
   2. PROVIDE GALVANIZED STEEL WALL PLATES IN UNFINISHED AREAS.
   3. PROVIDE GASKETED CAST ALUMINUM EXTRA DUTY WEATHERPROOF WHILE-IN-USE COVERPLATES FOR WET LOCATIONS.
   4. PROVIDE GASKETED CAST ALUMINUM WEATHERPROOF COVER FOR DAMP LOCATIONS.
N. CONNECT WIRING DEVICE GROUNDING TERMINAL TO OUTLET BOX WITH BONDING JUMPER. USE OF QUICK GROUND STRAP OR SCREW IS NOT ACCEPTABLE.

262813 – FUSES

A. OBTAIN FUSES FROM A SINGLE MANUFACTURER.
B. COORDINATE FUSE RATINGS WITH UTILIZATION EQUIPMENT NAMEPLATE LIMITATIONS OF MAXIMUM FUSE SIZE.
C. EXAMINE UTILIZATION EQUIPMENT NAMEPLATES AND INSTALLATION INSTRUCTIONS. INSTALL FUSES OF SIZES AND WITH CHARACTERISTICS APPROPRIATE FOR EACH PIECE OF EQUIPMENT.
D. INSTALL LABELS INDICATING FUSE REPLACEMENT INFORMATION ON INSIDE DOOR OF EACH FUSED SWITCH.
E. SUBJECT TO COMPLIANCE WITH REQUIREMENTS; PROVIDE PRODUCTS BY COOPER BUSSMAN, INC. OR EQUAL.
F. CARTRIDGE FUSES: NEMA FU 1, NONRENEWABLE CARTRIDGE FUSE; CLASS AND CURRENT RATING INDICATED; VOLTAGE RATING CONSISTENT WITH CIRCUIT VOLTAGE.
   1. SERVICE ENTRANCE: CLASS L, TIME DELAY.
   2. FEEDERS: CLASS RK5 TIME DELAY.
   3. MOTOR BRANCH CIRCUITS: CLASS RK1, TIME DELAY.
   4. OTHER BRANCH CIRCUITS: CLASS RK1, TIME DELAY.
G. COMPLY WITH:
   1. NEMA FU 1 – LOW VOLTAGE CARTRIDGE FUSES.
   2. NFPA 70 – NATIONAL ELECTRICAL CODE.
   3. UL 198C – HIGH-INTERRUPTING-CAPACITY FUSES, CURRENT-LIMITING TYPES.
   4. UL 198E – CLASS R FUSES.
   5. UL 512 – FUSEHOLDERS.

262816 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS; PROVIDE PRODUCTS BY SQUARE D, EATON, GENERAL ELECTRIC, OR SIEMENS.
B. FUSIBLE AND NON-FUSIBLE SWITCHES: NEMA KS 1, QUICK MAKE, QUICK-BREAK LOAD INTERRUPTER ENCLOSED KNIFE SWITCH TYPE HD, WITH CLIPS OR BOLT PADS TO ACCOMMODATE SPECIFIED FUSES (IF REQUIRED), EXTERNALLY OPERABLE LOCKABLE HANDLE WITH CAPABILITY TO ACCEPT TWO PADLOCKS, AND INTERLOCKED WITH COVER IN CLOSED POSITION. SQUARE D OR EQUAL.
C. TOGGLE DISCONNECT SWITCH: HEAVY DUTY, 30A, 600 VOLT, DOUBLE OR THREE POLE AS REQUIRED, SINGLE THROW, MOTOR RATED SWITCH WITHOUT OVERLOAD PROTECTION. PROVIDE NEMA 1 ENCLOSURE AND PADLOCK ATTACHMENT.
D. MOLDED-CASE CIRCUIT BREAKER: NEMA AB 1, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS. THERMAL-MAGNETIC CIRCUIT BREAKER WITH INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER.
E. MOLDED-CASE SWITCHES: MOLDED-CASE CIRCUIT BREAKER WITH FIXED, HIGH-SET INSTANTANEOUS TRIP ONLY, AND SHORT-CIRCUIT WITHSTAND RATING EQUAL TO EQUIVALENT BREAKER FRAME SIZE INTERRUPTING RATING.
F. COMPLY WITH APPLICABLE PORTIONS OF NECA 1, NEMA PB 1.1, AND NEMA PB 2.1 FOR INSTALLATION OF ENCLOSED SWITCHES AND CIRCUIT BREAKERS.
G. SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP AND TIME DELAY SETTINGS.

265119 – LED INTERIOR LIGHTING

A. PROVIDE LUMINAIRES (LIGHTING FIXTURES) AS INDICATED ON DRAWINGS.
B. PROVIDE DRIVERS AS AN INTEGRATED COMPONENT OF THE LUMINAIRE OR AS AN EXTERNAL COMPONENT OF AN ASSEMBLY OF LUMINARIES.
C. INSTALL FIXTURES LEVEL, PLUMB, AND SQUARE WITH CEILINGS AND WALLS UNLESS OTHERWISE INDICATED.
D. SUPPORT LUMINAIRES INDEPENDENT OF CEILING FRAMING. SUPPORT RECESSED GRID LUMINARIES FROM TWO OPPOSITE CORNERS DIRECTLY TO STRUCTURE. WIRE OR ROD SHALL HAVE BREAKING STRENGTH OF THE WEIGHT OF FIXTURE AT A SAFETY FACTOR OF 3.
E. INSTALL RECESSED LUMINAIRES TO PERMIT REMOVAL FROM BELOW.
F. INSTALL RECESSED LUMINAIRES USING ACCESSORIES AND FIRESTOPPING MATERIALS TO MEET REGULATORY REQUIREMENTS FOR FIRE RATING.
G. INSTALL SURFACE MOUNTED LUMINAIRES AND EXIT SIGNS PLUMB AND ADJUST TO ALIGN WITH BUILDING LINES AND WITH EACH OTHER. SECURE TO PROHIBIT MOVEMENT.
H. 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.
I. MAKE WIRING CONNECTIONS TO BRANCH CIRCUIT USING BUILDING WIRE WITH INSULATION SUITABLE FOR TEMPERATURE CONDITIONS WITHIN LUMINAIRE.
J. BOND PRODUCTS AND METAL ACCESSORIES TO BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.
K. CONNECT LUMINAIRES TO BRANCH CIRCUIT OUTLET BOXES PROVIDED UNDER RACEWAYS AND BOXES SECTION USING 1/2" FLEXIBLE CONDUIT.
L. CLEAN ELECTRICAL PARTS TO REMOVE CONDUCTIVE AND DELETERIOUS MATERIALS.
M. REMOVE DIRT AND DEBRIS FROM ENCLOSURES AND LENSES.
N. CLEAN PHOTOMETRIC CONTROL SURFACES AS RECOMMENDED BY MANUFACTURER.
O. CLEAN FINISHES AND TOUCH UP DAMAGE.
P. EMERGENCY LIGHTING FIXTURES: SELF-CONTAINED, MODULAR, BATTERY-INVERTER UNIT FACTORY MOUNTED WITHIN FIXTURE BODY. COMPLY WITH UL 924.
   1. TEST SWITCH AND LIGHT-EMITTING-DIODE INDICATOR LIGHT: VISIBLE AND ACCESSIBLE WITHOUT OPENING FIXTURE OR ENTERING CEILING SPACE. INSTALL REMOTE TEST SWITCH AND PLATE IN ADJACENT CEILING TILE.
   2. BATTERY: SEALED, MAINTENANCE-FREE, NICKEL-CADMIUM TYPE WITH MINIMUM SEVEN-YEAR NOMINAL LIFE.
   3. CHARGER: FULLY AUTOMATIC, SOLID-STATE, CONSTANT-CURRENT TYPE.
   4. UNIVERSAL TRANSFORMER TO OPERATE AT 120 VOLT OR 277 VOLT.

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PBA Project No.: 2022.0011.05

Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

ELECTRICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

NONE

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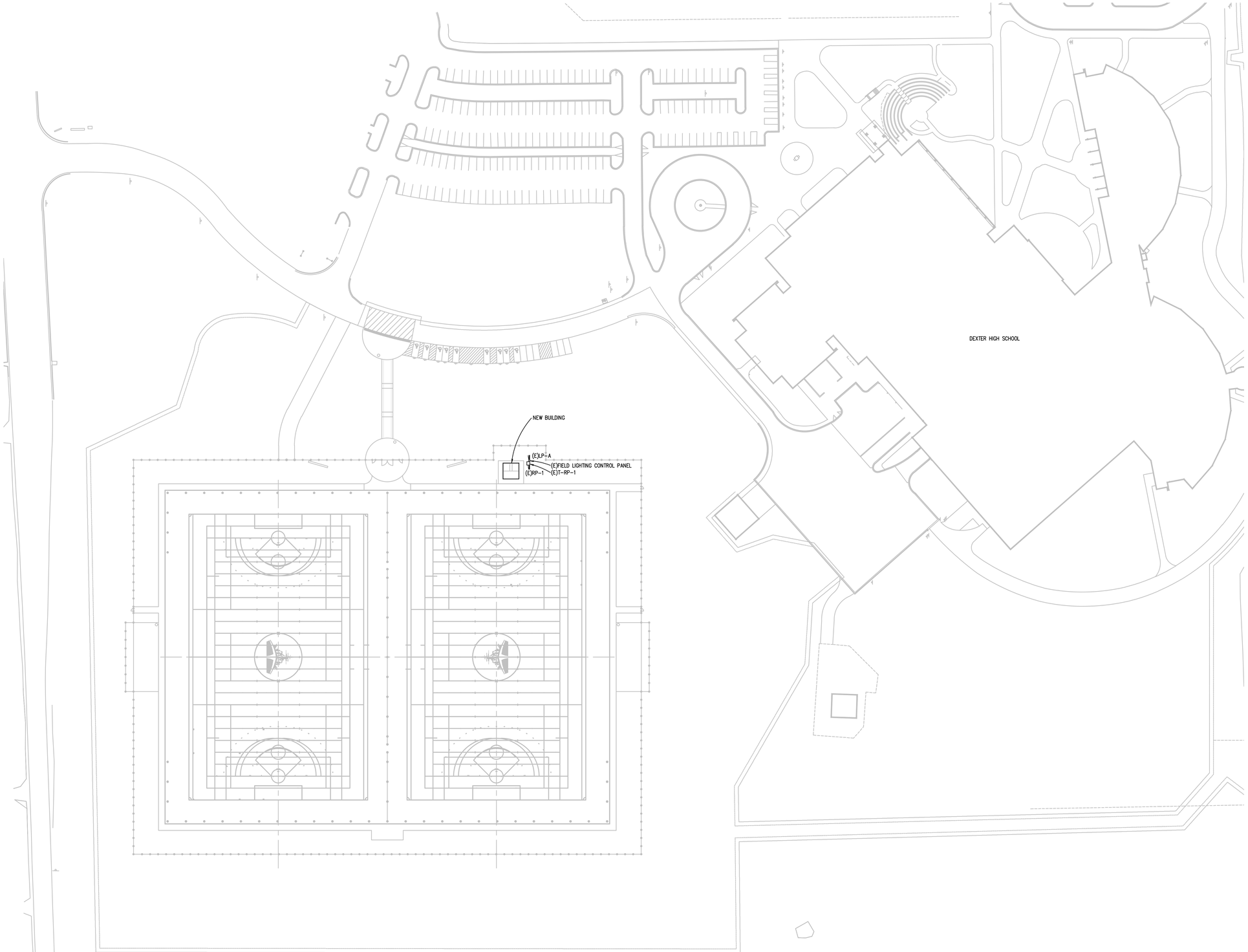

ELECTRICAL SITE PLAN
SCALE: 1" = 50'

SITE PLAN GENERAL NOTES:

1. THESE NOTES ARE GENERIC GUIDELINES ONLY. ELECTRICAL CONTRACTOR'S PERSONNEL ON SITE SHALL BE THOROUGHLY FAMILIAR WITH THE PUBLISHED SPECIFICATIONS FOR EXACT DESCRIPTIONS OF SCOPE, METHODS, AND MATERIAL.
2. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
3. CONDUCT A SURVEY TO IDENTIFY ALL UNDERGROUND UTILITIES. CALL 811 PRIOR TO EXCAVATION.
4. UTILITIES SHOWN ON THESE DRAWINGS ARE FOR REFERENCE ONLY. COORDINATE EXACT LOCATION OF ALL EXISTING UTILITIES, AND ROUTING OF ALL NEW UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
5. DEWATER TRENCHES PRIOR TO INSTALLATION OF CONDUITS. PROVIDE WATER TIGHT FITTINGS ON ALL UNDERGROUND CONDUITS.
6. INSTALL UNDERGROUND CONDUITS 42" BELOW FINISHED GRADE, MINIMUM, UNLESS NOTED OTHERWISE.
7. COORDINATE SERVICE SHUT-DOWNS WITH ALL TRADES INVOLVED ON SITE AND OBTAIN WRITTEN AUTHORIZATION FROM OWNER 72 HOURS PRIOR TO ANY ELECTRICAL AND/OR TELEPHONE SHUT-DOWN.
8. SPARE CONDUITS SHALL INCLUDE PULL STRING AND SHALL BE TERMINATED WITH A CAP.
9. EXCAVATE THE ENTIRE LENGTH OF TRENCH TO PROPERLY SET DUCT ELEVATIONS.

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PBA Project No.: 2022.0011.05

Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

ELECTRICAL SITE PLAN

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

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1"=50'

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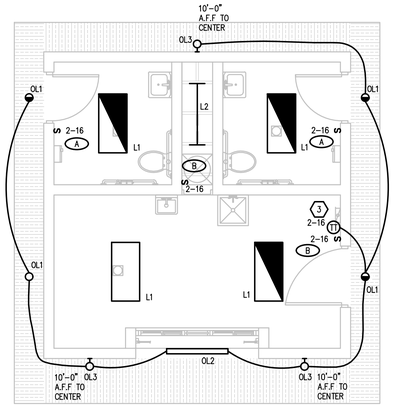
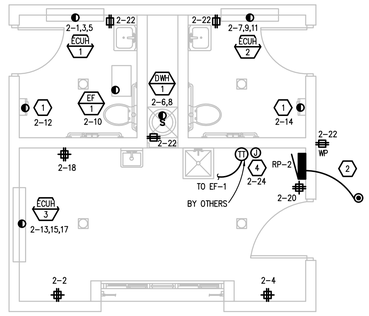
Know what's below.
Call before you dig.

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



LIGHTING PLAN

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



POWER AND AUXILIARY SYSTEMS PLAN

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

ELECTRICAL GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
5. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
6. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
7. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
8. REFER TO LIGHTING CONTROL SCHEDULE FOR ROOM CONTROL AND EMERGENCY LIGHTING CIRCUIT CONTROL REQUIREMENTS. DESIGNATION FOR ROOM IS INDICATED AS A LETTERED OVAL SYMBOL.

(#) CONSTRUCTION KEY NOTES:

1. ELECTRIC HAND DRYER FURNISHED BY OTHERS, INSTALLED BY ELECTRICAL CONTRACTOR. FIELD COORDINATE MOUNTING HEIGHT WITH ARCHITECT.
2. PROVIDE GROUNDING AS REQUIRED PER THE NEC.
3. PROVIDE INTERMATIC FF6H TWIST TIMER.
4. HEAT TRACE BY OTHERS. COORDINATE WITH MECHANICAL CONTRACTOR.

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PBA Project No.: 2022.0011.05

Project Title

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2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

RESTROOM-STORAGE BUILDING
ELECTRICAL PLANS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

1/4" = 1'-0"

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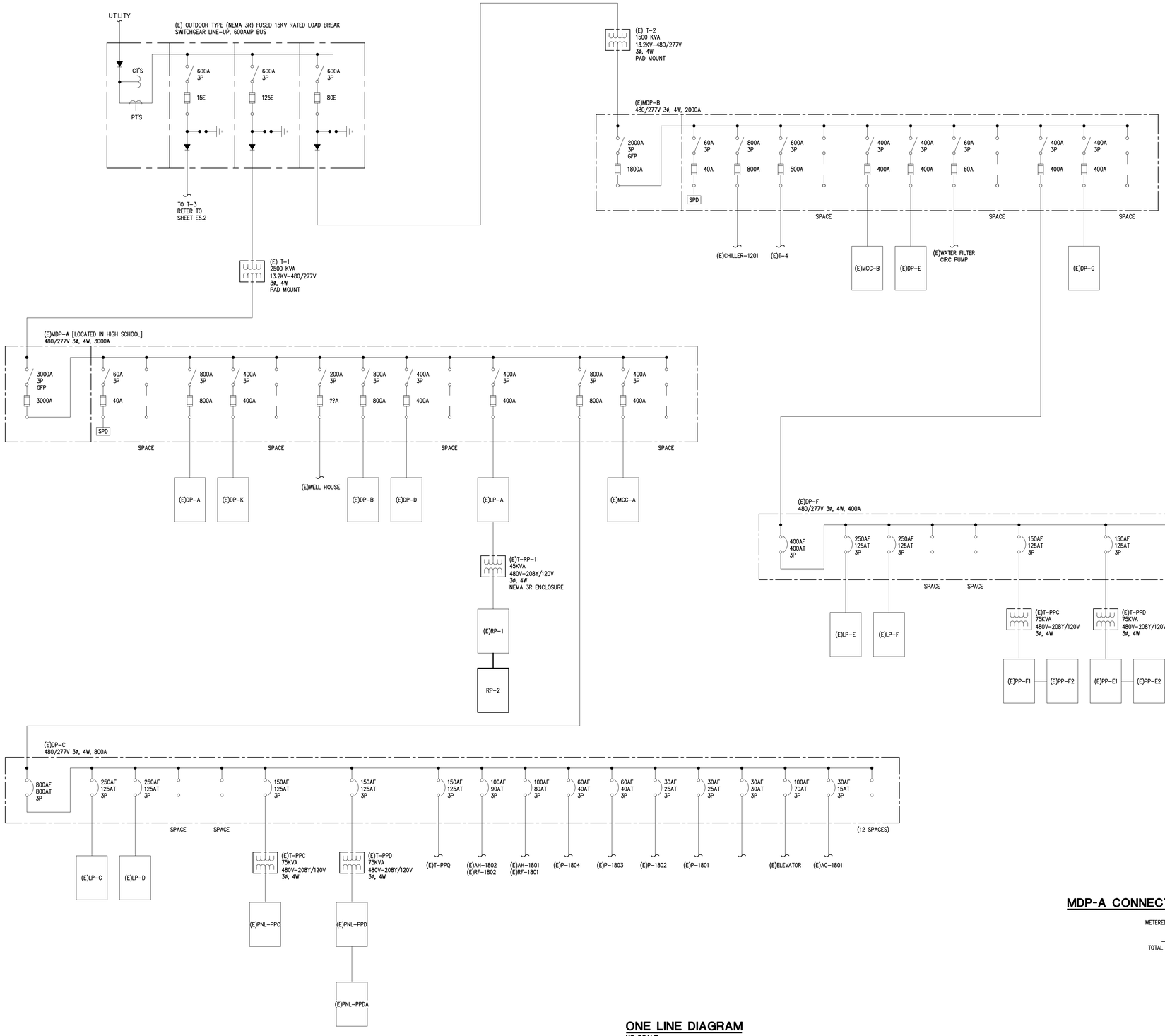

ONE LINE DIAGRAM
NO SCALE

MDP-A CONNECTED LOAD CALCULATION

METERED 1552 KVA (1.25)	1940 KVA
ADDED LOAD	
RP-2	27 KVA
TOTAL CONNECTED LOAD	1967 KVA

DIAGRAM GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. COORDINATE EXACT EQUIPMENT LOCATIONS, ELEVATIONS, AND FINAL CONNECTION REQUIREMENTS. PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS AND OFFSETS.
2. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
3. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH THE MOTOR CIRCUIT SIZING SCHEDULES ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.

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ONE LINE DIAGRAM

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Sheet Number

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LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	VOLTAGE	(QTY.) LAMPS	MANUFACTURERS
L1	RECESSED VANDAL PROOF 2'X4' TROFFER: 20 GUAGE STEEL HOUSING, FLUSH 18 GUAGE STEEL DOOR WITH TORX FASTENERS; WHITE FINISHED PAINTED AFTER FABRICATION; #12, 125" ACRYLIC/.250" CLEAR POLYCARBONATE LENS. 0-10V 10% DIMMING. FOR FIXTURES INDICATED AS EMERGENCY ON PLAN, PROVIDE COLD WEATHER 1400 LUMEN EMERGENCY BATTERY PACK.	120/277V	LED 5000K WHITE 4,000 MIN LUMENS 80 CRI MINIMUM	1. LITHONIA VRTL SERIES 2. FAIL SAFE ORV SERIES 3. NEW STAR 37M SERIES
L2	INDUSTRIAL LED 4'-0" LED FIXTURE: FROSTED LENS WITH WIREGUARD.	120/277V	LED 5000K WHITE 3,000 MIN. LUMENS 80 CRI MINIMUM	1. COLUMBIA MPS SERIES 2. METALUX SNLED SERIES 3. LITHONIA ZL1D SERIES
OL1	6" ROUND RECESSED VANDAL RESISTANT LED ROUND DOWNLIGHT: LED WITH VENTILATED DIE CAST ALUMINUM HEAT SINK, DIE CAST ALUMINUM BEZEL, TAMPER RESISTANT TORX SCREWS, FULLY SEALED AND GASKETED, SELF FLANGED WHITE TRIM RING WITH CLEAR POLYCARBONATE LENS, WIDE DISTRIBUTION. IP 65 RATED. UL LISTED FOR WET LOCATIONS. FOR FIXTURES INDICATED AS EMERGENCY ON PLAN, PROVIDE COLD WEATHER 900 LUMEN EMERGENCY BATTERY PACK.	120V/277V	LED 4000K WHITE 2000 MIN. LUMENS 80 CRI MINIMUM	1. NEW STAR DLM6 LED SERIES 2. PORTFOLIO FFLD6A SERIES 3. GOTHAM EVO VR SERIES
OL2	RECESSED LINEAR 4' VANDAL RESISTANT LED FIXTURE: FULLY SEALED AND GASKETED, IP 65 RATED, SELF FLANGED, FROSTED ACRYLIC LENS + .250" CLEAR POLYCARBONATE LENS, UL LISTED FOR WET LOCATIONS. WHITE FINISH.	120/277V	LED 4000K WHITE 500 MIN. LUMENS PER FOOT 80 CRI MINIMUM	1. FAIL-SAFE FSN6 SERIES 2. KENALL BHR54 SERIES 3. NULITE RXT-F SERIES
OL3	LED ARCHITECTURAL VANDAL PROOF WALL PACK LIGHT FIXTURE: TYPE III DISTRIBUTION, WEATHER RESISTANT ALUMINUM HOUSING MULTI VOLT, SOLID STATE DRIVER, IP 65 RATED. U.L. LISTED FOR WET LOCATIONS. DARK BRONZE FINISH	120V/277V	LED 4000K WHITE 3500 MIN LUMENS 80 CRI MINIMUM	1. MCGRAW-EDISON ISS SERIES 2. LITHONIA WSQ SERIES 3. HUBBELL QSP2 SERIES

COORDINATE WITH ARCHITECTURAL PLANS FOR CEILING TYPES.

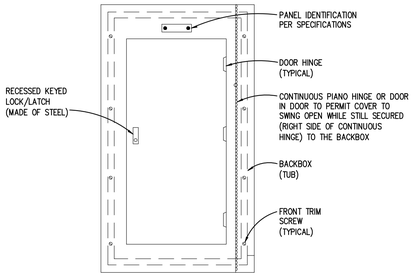
ALL LED FIXTURES SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
MULTI-VOLT ELECTRONIC DRIVER, MINIMUM OF 50,000 HOURS OPERATION WITH GREATER THAN 70% DELIVERED LUMEN OUTPUT.
LUMENS SHALL BE DELIVERED LUMENS.
INDOOR DRIVERS SHALL BE RATED FOR A MINIMUM 65°C.
OUTDOOR DRIVERS SHALL BE RATED FOR MINIMUM -20°C.
DRIVER SHALL BE LABELED TO COMPLY WITH NEMA SSL1, AND THD OF LESS THAN 20%.
DRIVER SHALL BE SERVICEABLE FROM BELOW CEILING.
LUMINAIRE SHALL COMPLY WITH IES STANDARDS LM-79 AND LM-80.

INTERIOR LIGHTING CONTROL SCHEDULE

PLAN REFERENCE	ROOM TYPE	LOCAL CONTROL			CONTROL ON / OFF	SENSOR TYPE	TURN ON LIGHTING TO %	BI-LEVEL CONTROL	DAYLIGHT			NO DETECTION FULL OFF (MIN)	TIME-CLOCK SCHEDULE	EMERGENCY LIGHTING CIRCUIT CONTROL	CONTACT FOR HVAC CONTROL	NOTES
		SWITCH TYPE	SWITCH CONTROL	SCENE CONTROL					SIDE LIGHT	TOP LIGHT	MAINTAIN FC LEVEL					
A	RESTROOM (ALL OTHER RESTROOMS)	LINE VOLTAGE	ON-OFF	NA	SENSOR ON / SENSOR OFF	ULTRASONIC	FULL 100%	NA	NA	NA	NA	20	NA	BATTERY	NA	
B	ELECTRICAL/MECHANICAL ROOM	LINE VOLTAGE	ON-OFF	NA	NA	NA	FULL 100%	NA	NA	NA	NA	NA	NA	BATTERY	NA	

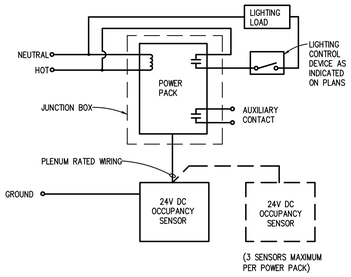
NA = NOT APPLICABLE

NOTE:
1. REFER TO PLANS FOR LOCATION OF LOCAL CONTROL.
2. REFER TO PLANS FOR SCENE CONTROL.
3. REFER TO PLANS FOR PRIMARY AND SECONDARY DAYLIGHT ZONES.
4. PROVIDE EMERGENCY LIGHTING CIRCUIT CONTROL (BCELTS OR ALCR) PER SWITCHING CIRCUIT AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE FLOOR PLAN INDICATING SENSOR AND EQUIPMENT LOCATIONS OF CHOSEN CONTROL SYSTEM.
6. REFER TO LUMINAIRE SCHEDULE FOR FIXTURE CHARACTERISTICS.
7. LIGHTING SENSOR SHALL HAVE CONTACT FOR HVAC CONTROL WHEN A "YES" SELECTION IS MADE IN THE HVAC CONTROL COLUMN.
8. REFER TO TEMPERATURE CONTROL DRAWINGS AND DIAGRAMS FOR ADDITIONAL SENSOR REQUIREMENTS.
9. PROVIDE WIRING CONTROL DIAGRAM FOR APPLICABLE CONTROL SYSTEM(S).
10. PERCENTAGE LIGHT OUTPUT REDUCTION IS FOR ALL FIXTURES WITHIN THE DESIGNATED ROOM UNLESS OTHERWISE NOTED.



PANELBOARD FRONT COVER DETAIL

NO SCALE

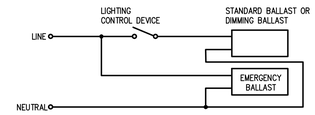


OCCUPANCY SENSOR WIRING DIAGRAM

NO SCALE

NOTES:

1. REFER TO SPECIFICATIONS FOR ACCEPTED MANUFACTURERS.
2. PROVIDE POWER PACKS AND SLAVE PACKS AS REQUIRED FOR SWITCHING AS INDICATED ON PLAN. REVISE DETAIL AS REQUIRED BY MANUFACTURER.
3. MOUNTING LOCATION PER MANUFACTURER'S RECOMMENDATION.
4. ADJUST SENSITIVITY LEVELS PER THE OWNER REQUIREMENTS.
5. PROVIDE FACTORY SUPPORT FOR AIMING/ADJUSTING OF SENSORS.
6. PLACE CEILING MOUNTED OCCUPANCY SENSORS IN CENTER OF A FULL CEILING TILE, WHERE APPLICABLE.
7. SENSOR ADJUSTMENT: BEFORE MAKING ADJUSTMENTS, MAKE SURE ROOM FURNITURE IS INSTALLED, LIGHTING CIRCUITS ARE TURNED ON, AND THE HVAC SYSTEMS ARE IN THE ON POSITION. VAV SYSTEMS SHOULD BE SET TO THEIR HIGHEST AIRFLOW. SET THE LOGIC CONFIGURATION DIP SWITCHES TO "EITHER". EITHER REQUIRES MOTION DETECTION BY ONLY ONE TECHNOLOGY. SET THE TIME DELAY PER OWNERS DIRECTION.



SWITCHED (NON-NIGHT LIGHT EMERGENCY FIXTURE)

EMERGENCY BALLAST WIRING DIAGRAM

NO SCALE

NOTE:

PRIMARY CIRCUIT ONLY. LAMP LEADS NOT SHOWN.

EXISTING RP-1

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØB	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	L	EXISTING LOAD	EXIST	20	1440	1800			360	20	EXIST	EXISTING LOAD	R	2
3	L	EXISTING LOAD	EXIST	20	1440		1800		360	20	EXIST	EXISTING LOAD	R	4
5	R	EXISTING LOAD	EXIST	20	180			880	700	20	EXIST	EXISTING LOAD	NC	6
7	R	EXISTING LOAD	EXIST	20	180	9884			9704	150-3	NEW	RP-2	NC	8
9	R	EXISTING LOAD	EXIST	20	180		7811		7631	–	NEW	–	NC	10
11		SPARE	EXIST	20				9854	9854	–	NEW	–	NC	12
13		SPARE	EXIST	20						20	EXIST	SPARE		14
15		SPARE	EXIST	20						20	EXIST	SPARE		16
17		SPARE	EXIST	20						20	EXIST	SPARE		18
19		SPARE	EXIST	20						20	EXIST	SPARE		20
21		SPARE	EXIST	20						20	EXIST	SPARE		22
23		SPARE	EXIST	20						20	EXIST	SPARE		24
25		SPARE	EXIST	20						20	EXIST	SPARE		26
27		SPARE	EXIST	20						20	EXIST	SPARE		28
29		SPARE	EXIST	20						20	EXIST	SPARE		30
31		SPARE	EXIST	20						20	EXIST	SPARE		32
33		SPARE	EXIST	20						20	EXIST	SPARE		34
35		SPARE	EXIST	20						20	EXIST	SPARE		36
37		SPARE	EXIST	20						20	EXIST	SPARE		38
39		SPARE	EXIST	20						20	EXIST	SPARE		40
41		SPARE	EXIST	20						20	EXIST	SPARE		42
						11684	9611	10734						
						ØA	ØB	ØC						

PANELBOARD INFORMATION
VOLTAGE: 208Y/120
BUS AMPACITY: 225A
MAIN TYPE: 175A MCB
MINIMUM A.I.C.: 10,000
MOUNTING: SURFACE

☐ FEED-THROUGH LUGS
☐ DOUBLE LUGS
☐ INTEGRAL SPD

PANELBOARD LOCATION

BRANCH CIRCUIT CONNECTED LOAD		DEMAND FACTOR	CALCULATED LOAD	FEEDER AND OVERCURRENT SIZING		NOTES:
CONTINUOUS LOAD (C)		100%		125%		
ELECTRIC HEAT (E)		100%		125%		
NON-CONTINUOUS LOAD (NC)	27889	100%	27889	100%	27889	
KITCHEN LOAD (K)		100%		100%		
RECEPTACLE BASE LOAD (R)	1260	100%	1260	100%	1260	
RECEPTACLE DEMAND LOAD (R)		50%		100%		
LIGHTING LOAD (L)	2880	100%	2880	125%	3600	
ADDITIONAL TRACK LIGHTING LOAD				100%		
MOTORS, HIGHEST LOAD (MH)		125%		100%		
MOTORS, REMAINING LOAD (M)		100%		100%		
		TOTAL(KVA):	32.03	TOTAL (AMPS):	91	

NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

RP-2

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØB	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	NC	ECUH – 1	NEW	20-3	1441	1621			180	20	NEW	RECEPTACLE	R	2
3	NC	–	NEW	–	1441		1621		180	20	NEW	RECEPTACLE	R	4
5	NC	–	NEW	–	1441			3941	2500	30-2	NEW	DWH – 1	NC	6
7	NC	ECUH – 2	NEW	20-3	1441	3941			2500	–	NEW	–	NC	8
9	NC	–	NEW	–	1441		2137		696	15	NEW	EF – 1	NC	10
11	NC	–	NEW	–	1441			2641	1200	20	NEW	ELECTRIC HAND DRYER	NC	12
13	NC	ECUH – 3	NEW	30-3	2762	3962			1200	20	NEW	ELECTRIC HAND DRYER	NC	14
15	NC	–	NEW	–	2762		3153		391	20	NEW	LIGHTING	L	16
17	NC	–	NEW	–	2762			2942	180	20	NEW	RECEPTACLE	R	18
19		SPARE	NEW	20		180			180	20	NEW	RECEPTACLE	R	20
21		SPARE	NEW	20			720		720	20	NEW	RECEPTACLE	R	22
23		SPARE	NEW	20				330	330	20	GFEP	HEAT TRACE	C	24
25		SPARE	NEW	20						20	NEW	SPARE		26
27		SPARE	NEW	20						20	NEW	SPARE		28
29		SPARE	NEW	20						20	NEW	SPARE		30
31		SPARE	NEW	20						20	NEW	SPARE		32
33		SPARE	NEW	20						20	NEW	SPARE		34
35		SPARE	NEW	20						20	NEW	SPARE		36
37		SPARE	NEW	20						20	NEW	SPARE		38
39		SPARE	NEW	20						20	NEW	SPARE		40
41		SPARE	NEW	20						20	NEW	SPARE		42
						9704	7631	9854						
						ØA	ØB	ØC						

PANELBOARD INFORMATION
VOLTAGE: 208Y/120
BUS AMPACITY: 225A
MAIN TYPE: 150A MCB
MINIMUM A.I.C.: 10,000
MOUNTING: SURFACE

☐ FEED-THROUGH LUGS
☐ DOUBLE LUGS
☐ INTEGRAL SPD

PANELBOARD LOCATION

BRANCH CIRCUIT CONNECTED LOAD		DEMAND FACTOR	CALCULATED LOAD	FEEDER AND OVERCURRENT SIZING		NOTES:
CONTINUOUS LOAD (C)	330	100%	330	125%	413	
ELECTRIC HEAT (E)		100%		125%		
NON-CONTINUOUS LOAD (NC)	25028	100%	25028	100%	25028	
KITCHEN LOAD (K)		100%		100%		
RECEPTACLE BASE LOAD (R)	1440	100%	1440	100%	1440	
RECEPTACLE DEMAND LOAD (R)		50%		100%		
LIGHTING LOAD (L)	391	100%	391	125%	489	
ADDITIONAL TRACK LIGHTING LOAD				100%		
MOTORS, HIGHEST LOAD (MH)		125%		100%		
MOTORS, REMAINING LOAD (M)		100%		100%		
		TOTAL(KVA):	27.19			
		TOTAL (AMPS):	75	TOTAL (AMPS):	76	

NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

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Project Title

Dexter Community Schools
2022 Sitework Projects

Jenkins Early Learning Center
Wylie Elementary School
Mill Creek Middle School
Al Ritt Stadium
Dexter High School

Dexter, Michigan

Sheet Title

ELECTRICAL DETAILS AND DIAGRAMS

Dates

DATE	ISSUED FOR
03.04.2022	BID PACKAGE #2 - BIDS

Scale

NONE

Quality Control

Drawn: BAG
Checked: STP
Approved: STP

Project Number

BRI 2021097

Sheet Number

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