Dexter High School - Twin Turf Fields Restroom

Date Issued: 09.05.2025

Dexter, MI 48130

BIDS

Project Site Locations

Dexter High School
2200 N. Parker Road

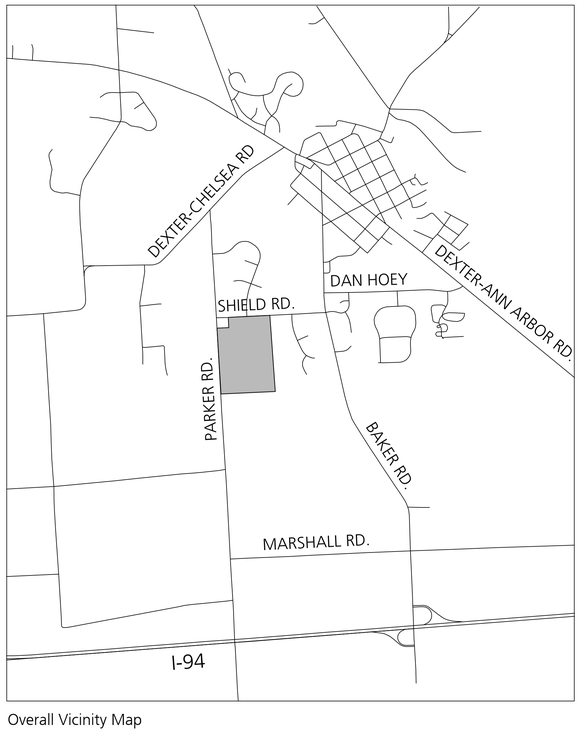
Project Contacts

Owner:

Brian Schuler
Director of Facilities
Dexter Community Schools
734.424.4100

Consultants:

Brian Barrick
Principal
Beckett & Raeder, Inc.
734.663.2622



Overall Vicinity Map



Site Vicinity Map

Location Maps

NTS

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Civil Engineer

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Landscape Architect

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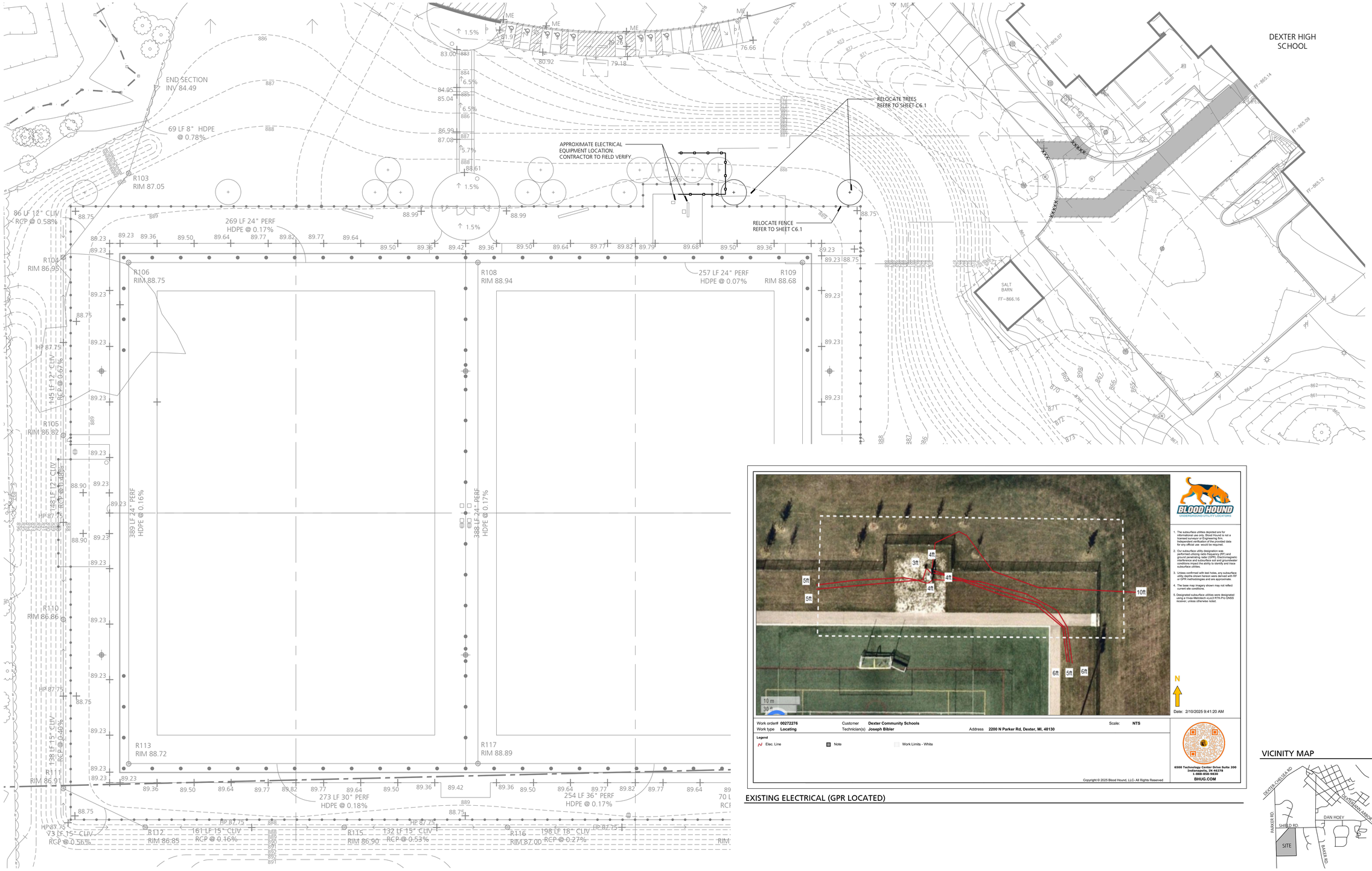
Architect

Edge
DESIGN
ASSOCIATES

MEP Engineer

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CONSULTING ENGINEERS

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EXISTING ELECTRICAL (GPR LOCATED)

EXISTING CONDITIONS, SESC & DEMOLITION LEGEND

- PARCEL LINE
- RIGHT-OF-WAY LINE
- LIMIT OF WORK LINE
- TREE PROTECTION FENCE
- FF — FILTER FABRIC FENCE
- INLET FILTER / SEDIMENT TRAP
- SAWCUT
- XXXXXXXXXXXXXXXX — CURB REMOVAL

SESC NOTES

1. THIS PROJECT MUST BE CONSTRUCTED IN COMPLIANCE WITH PART 91 OF MICHIGAN NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT 451 OF 1994, AS AMENDED, THE SOIL EROSION AND SEDIMENT CONTROL ACT.
2. PRIOR TO ANY SITE DISTURBANCE, INCLUDING DEMOLITION, CONTRACTOR SHALL PLACE EROSION CONTROL MEASURES ON ALL EXISTING STORM SEWER STRUCTURES AFFECTED BY WORK IN THIS CONTRACT. SUCH EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT MEASURES ARE IN PLACE.
3. CONTRACTOR SHALL PLACE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED AND SHOWN ON PLANS.
4. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL EROSION CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL GOVERNING AUTHORITIES.
5. DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES. ANY NECESSARY REPAIRS SHALL BE MADE WITHOUT DELAY.
6. ALL EROSION AND SEDIMENT RESULTING FROM WORK ON SITE SHALL BE CONTAINED ON SITE AND NOT ALLOWED TO COLLECT IN ANY OFF-SITE AREAS OR WATERWAYS. WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, RIVERS, OR PONDS.
7. CONTRACTOR SHALL PLACE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED AND SHOWN ON PLANS.
8. CONTRACTOR SHALL PLACE INLET FILTER PROTECTION ON ALL STORM STRUCTURES AFFECTED BY THIS PROJECT. .
9. ALL TEMPORARY SEDIMENT BASINS USED DURING CONSTRUCTION SHALL BE CLEANED AND ALL SEDIMENT LEGALLY DISPOSED OF PRIOR TO STABILIZATION. REMOVAL OF ALL FINES AND SEDIMENT IS CRITICAL IN AREAS WHERE INFILTRATION PRACTICES SHALL BECOME PERMANENT BEST MANAGEMENT PRACTICE.
10. CONTRACTOR SHALL CLEAN DEBRIS FROM STREETS ON A DAILY BASIS AS NEEDED. STREETS SHALL BE SWEPT WEEKLY.

DEMOLITION NOTES

1. CONTRACTOR SHALL CALL MISS DIG (811) A MINIMUM OF THREE WORKING DAYS PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL INVESTIGATE EXTENT AND LOCATION OF EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR PROTECTION AND RESTORATION OF SAME IF DAMAGED AS A RESULT OF CONTRACTOR'S OPERATIONS.
3. ALL ITEMS NOT INDICATED FOR REMOVAL SHALL REMAIN UNDISTURBED AND PROTECTED. CONTRACTOR SHALL FULLY RESTORE ANY ITEMS/MATERIALS DAMAGED DURING CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.
4. ALL CONCRETE PAVEMENT AND CURB REMOVALS SHALL BE TO THE NEAREST JOINT BEYOND INDICATED EXTENT.
5. CONTRACTOR SHALL MAINTAIN CLEAN SAW CUT EDGES FOR PROPOSED WORK TO ABUT. BROKEN EDGES RESULTING FROM CONTRACTOR'S FAILURE TO PROTECT THE EDGE WILL BE SAW CUT BEYOND THE BREAKS AT THE NEAREST JOINT, AT THE CONTRACTOR'S EXPENSE.
6. ALL REMOVALS SHALL BE SAW CUT FULL DEPTH AND COORDINATED WITH LAYOUT / GRADING PLANS.
7. REMOVALS SHALL INCLUDE SUBSOIL/EXISTING BASE MATERIALS TO FULL DEPTH REQUIRED FOR INSTALLATION OF NEW WORK INCLUDING BASE COURSE. ALL EXCAVATIONS SHALL PROVIDE ADEQUATE SOIL SUPPORT THROUGH THE USE OF ADEQUATE CUT SLOPES OR STRUCTURAL SHORING.
8. OWNER TO COORDINATE WITH RESPECTIVE UTILITY COMPANY FOR REMOVAL OF EXISTING TRANSFORMER, ELECTRICAL, CABLE, TELEPHONE AND FIBER OPTIC LINES.
9. PROJECT AREA IS PARTIALLY IRRIGATED. REMOVE EQUIPMENT AFFECTED BY NEW WORK AND SALVAGE TO OWNER. CUT, CAP AND RECORD LOCATIONS OF ALL LINES.
10. CONTRACTOR SHALL REPAIR ALL DISTURBED TURF AREAS OUTSIDE OF PROJECT LIMITS DAMAGED DURING CONSTRUCTION.
11. ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE REMOVED FROM UNDER PROPOSED BUILDING, FOOTINGS, SLABS, AND PAVED AREAS.
12. ALL SPOIL MATERIAL, INCLUDING TOPSOIL, TO BE REMOVED OFF SITE AND DISPOSED IN A LEGAL MANNER.
13. CONTRACTOR TO RELOCATE TREE PROTECTION FENCE WITH LANDSCAPE ARCHITECT/ENGINEER'S APPROVAL IN ORDER TO ACCOMPLISH WORK.
14. LAWN AND TOPSOIL REMOVALS AROUND EXISTING TREES TO BE PERFORMED WITH EXTREME CARE. REMOVALS TO BE COMPLETED BY HAND. NO HEAVY EQUIPMENT ALLOWED BENEATH TREE CANOPY.
15. DISCHARGE OF WATER, DUST, OR DEBRIS FROM CONCRETE AND ASPHALT WORK TO STORM OR SANITARY SYSTEMS IS PROHIBITED.
16. STORM DRAINS MUST BE PROTECTED FROM DUST AND DEBRIS.
17. ANY WATER USED DURING CONCRETE AND ASPHALT WORK (INCLUDING SWEEPING AND SAWCUTTING) MUST BE CONTAINED AND COLLECTED FOR PROPER DISPOSAL. SUGGESTED CONTROLS INCLUDE WET VACUUM OR ABSORBENTS.

811 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

Twin Turf Fields
Restroom Building

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Existing Conditions,
SESC & Demolition Plan

Dates

DATE	ISSUED FOR
03.12.2025	IN-PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

1" = 30'

Quality Control

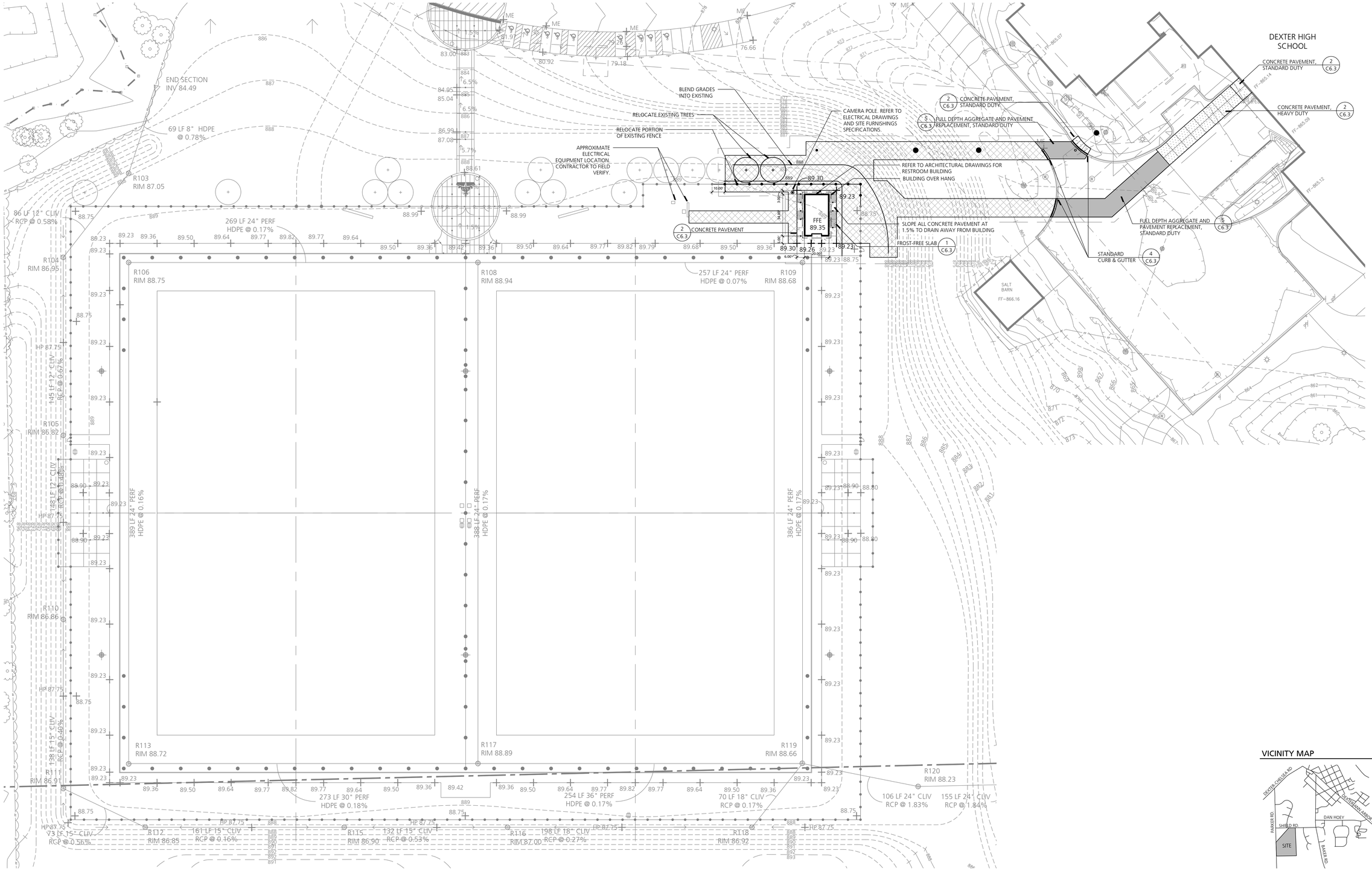
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Approved: BB

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)

LAYOUT & MATERIALS NOTES

1. ALL WORK SHALL BE COMPLETED IN CONFORMANCE WITH CURRENT ADA STANDARDS.
2. ALL DIMENSIONS ARE TO BACK OF CURB, FACE OF BUILDING OR EDGE OF MATERIAL UNLESS OTHERWISE NOTED.
3. ALL LINES ARE PARALLEL OR PERPENDICULAR TO THE CURB/ PAVEMENT/ BUILDING LINE FROM WHICH THEY ARE DIMENSIONED UNLESS OTHERWISE NOTED.
4. FOLLOWING LAYOUT OF ALL MATERIALS, CONTRACTOR SHALL REVIEW WITH OWNER'S REPRESENTATIVE.
5. ANY DISCREPANCIES IN THE LAYOUT PLAN SHOULD BE IMMEDIATELY REPORTED TO OWNER'S REPRESENTATIVE.
6. NORTHINGS AND EASTINGS ON THE PLAN HAVE BEEN TRUNCATED BY THE FOLLOWING: NORTHINGS: xxxx; EASTINGS: xxxxx

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Project Title

Dexter Community Schools

Twin Turf Fields
Restroom Building

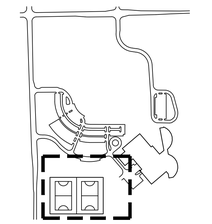
Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Layout & Grading Plan

VICINITY MAP

KEY PLAN



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1" = 30'

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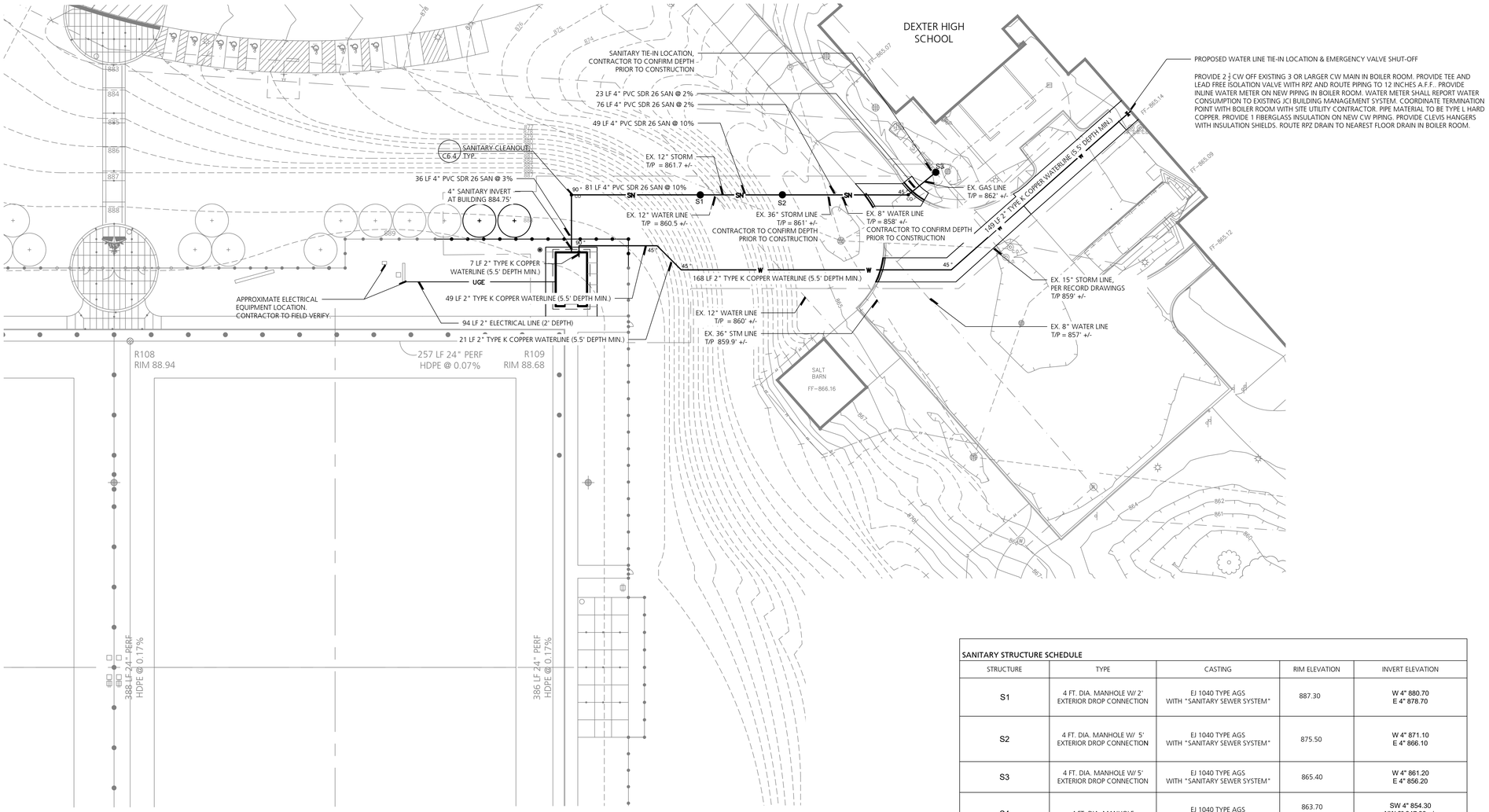
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BRI 2021097

Sheet Number

C6.1



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

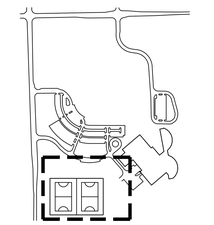
1. PROPOSED CONTOUR LINES AND SPOT ELEVATIONS REFLECT FINISH GRADES. HOLD DOWN SUBGRADE ELEVATIONS ACCORDINGLY. ADJUST RIM ELEVATIONS OF ALL UTILITIES AFFECTED BY WORK IN THIS CONTRACT. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE ON THE SITE. ANY AREA THAT APPEARS TO NOT PROPERLY DRAIN SHALL BE BROUGHT 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.

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VICINITY MAP



KEY PLAN



0 15 30 60 90

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Project Title

Dexter Community Schools

Twin Turf Fields
Restroom Building

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Utility & Restoration Plan

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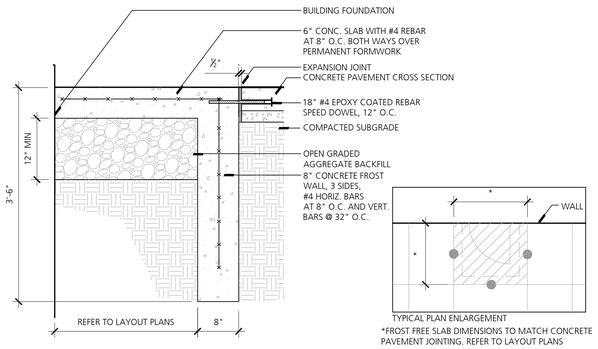
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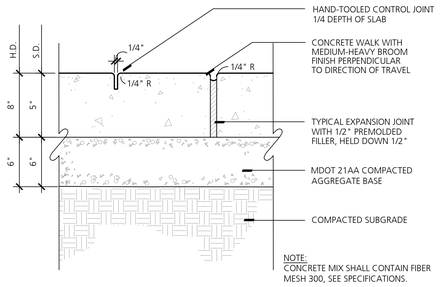
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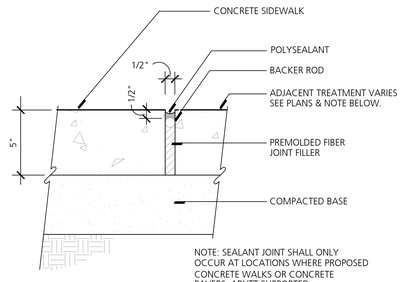
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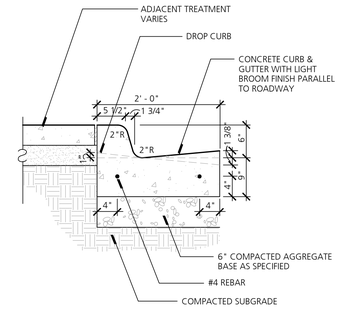
1 **Frost-Free Slab**
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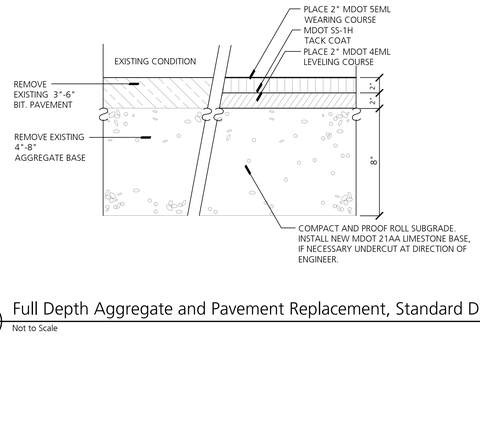
2 **Concrete Pavement**
NO SCALE



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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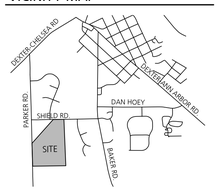
Twin Turf Fields
Restroom Building

Dexter, Michigan

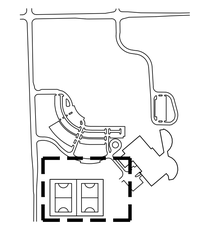
Sheet Title

DHS Twin Turf Fields
Site Details

VICINITY MAP



KEY PLAN



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No Scale

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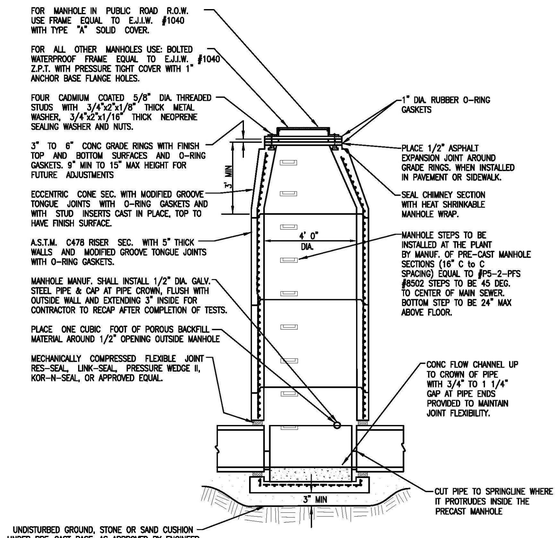
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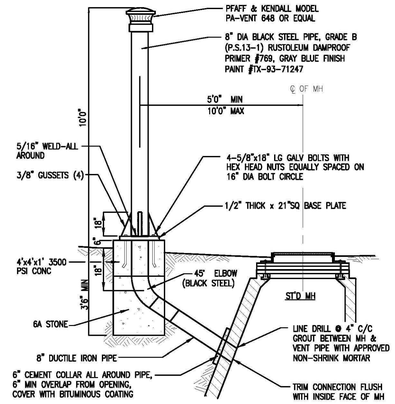
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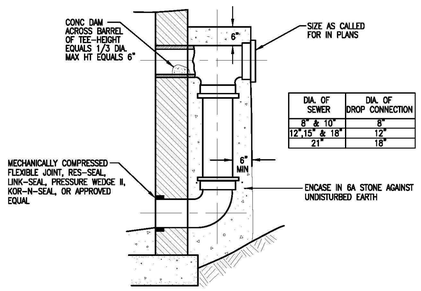
0 15 30 60 90



STANDARD SANITARY MANHOLE FOR SEWERS 8" THRU 21"



STANDARD VENT ASSEMBLY



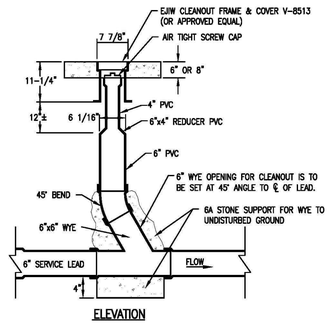
DIA. OF SEWER	DIA. OF DROP CONNECTION
8" & 10"	8"
12",15" & 18"	12"
21"	18"

DROP CONNECTION

SANITARY SEWER NOTES

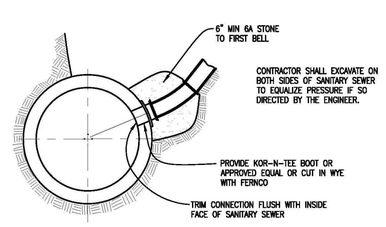
1. ALL MANHOLE RIMS SHALL BE SET TO GRADE AS APPROVED BY THE VILLAGE ENGINEER.
2. RISERS ON SANITARY SEWERS SHALL BE INSTALLED IN LOCATIONS WHERE SEWER IS OVER 10' DEEP. RISERS SHALL BE INSTALLED TO A DEPTH OF 10 FEET BELOW THE FINISHED GROUND ELEVATION.
3. ONE SANITARY SEWER SERVICE LEAD SHALL BE PROVIDED 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

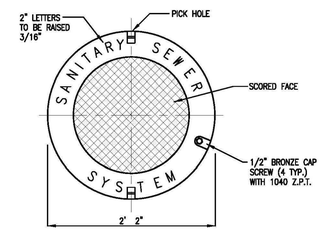


ELEVATION

DETAIL OF SANITARY SEWER CLEANOUT



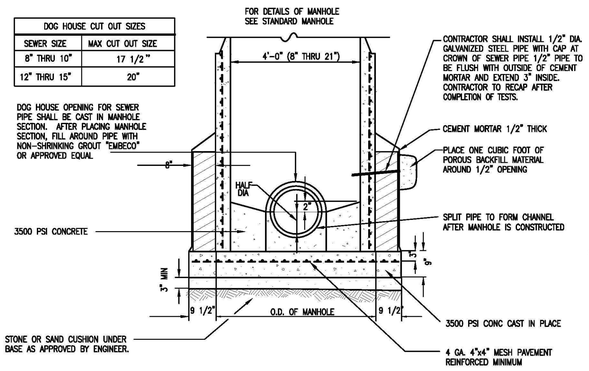
SADDLE CONNECTION (FOR CONNECTION OF NEW LEADS TO EXISTING SEWERS)



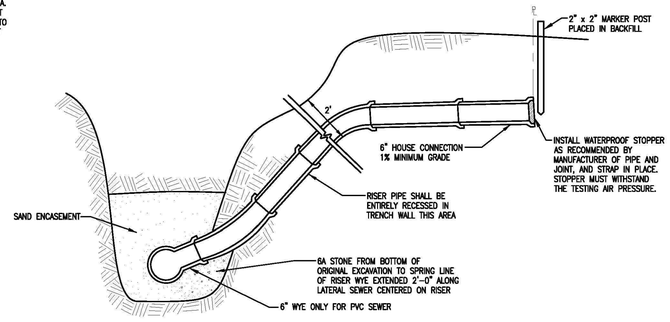
STANDARD FRAME & COVER

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"

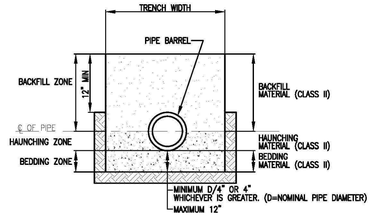


STANDARD SANITARY MANHOLE ON EXISTING SEWERS 8" THRU 21"



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_SanSht1.dwg Nov 02, 2011 - 1:27pm

OHM

COUNTY: WASHTENAW COUNTY
CITY/VILLAGE/TOWNSHIP: VILLAGE OF DEXTER
SCALE: H: NTS V: NTS
DESIGNED: DATE:
DRAWN: DATE:
CHECKED: REVISIONS:
APPROVED: REVISIONS:
CADD: JK/KC
ENGINEER: PRELIMINARY
SECTION: TOWN: RANGE:
CLIENT: VILLAGE OF DEXTER
DATE: 02/14/08
BID DATE:
DATE: REVISIONS:
HORZ DATUM: VERT DATUM:

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VILLAGE OF DEXTER
SANITARY SEWER
STANDARD DETAILS

SHEET X OF X

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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

Project Title
Dexter Community Schools

Twin Turf Fields
Restroom Building

Dexter, Michigan

Sheet Title
DHS Twin Turf Fields
Utility Details

Dates

DATE	ISSUED FOR
03.12.2025	IN-PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

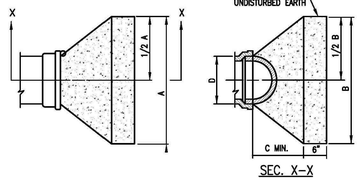
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Quality Control
Drawn: DF
Checked: BB
Approved: BB

Project Number
BRI 2021097

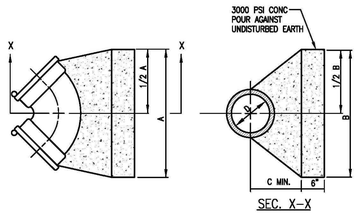
Sheet Number
C6.4

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"



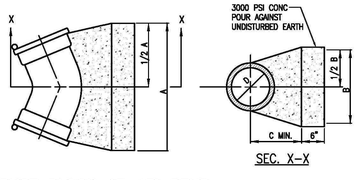
THRUST BLOCK AT PLUG

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"



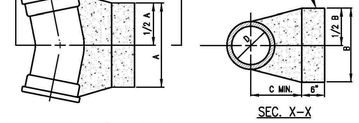
THRUST BLOCK AT 90° BEND

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"



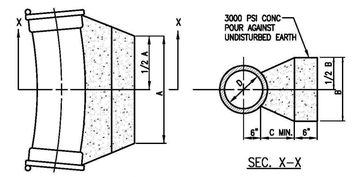
THRUST BLOCK AT 45° BEND

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



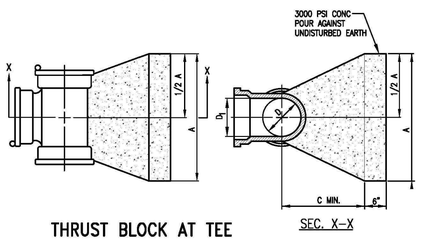
THRUST BLOCK AT 22 1/2° BEND

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

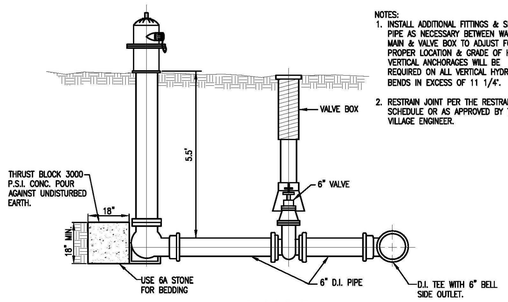


THRUST BLOCK AT 11 1/4° BEND

DIA. OF WATER MAIN		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"



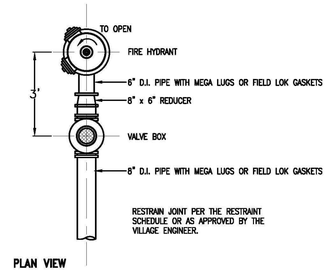
THRUST BLOCK AT TEE



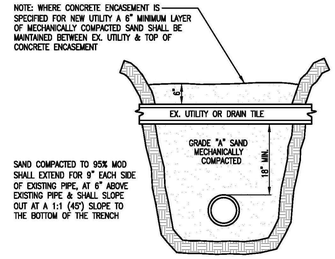
STANDARD HYDRANT SETTING

WATER MAIN NOTES

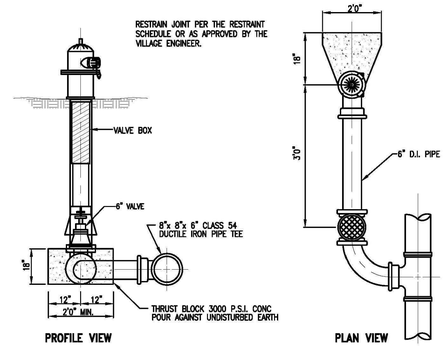
1. ALL WATER SYSTEM CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND GENERAL SPECIFICATION OF THE VILLAGE OF DEXTER (APPROVED XX/XX/2011) AND ANY OTHER AGENCY HAVING JURISDICTION OVER THE CONSTRUCTION AREA.
2. ALL SURFACE STRUCTURES, SUCH AS HYDRANTS, GATE VALVES AND VALVE BOXES SHALL BE SET TO 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



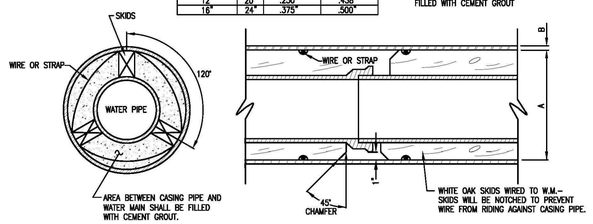
STANDARD PIPE SUPPORT



CLOSE COUPLE HYDRANT SETTING

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

VILLAGE OF DEXTER
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VILLAGE OF DEXTER
WATER MAIN DETAILS
STANDARD DETAILS

SHEET

OF

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Consultants

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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

Project Title

Dexter Community Schools

Twin Turf Fields
Restroom Building

Dexter, Michigan

Sheet Title

DHS Twin Turf Fields
Utility Details

Dates

DATE	ISSUED FOR
03.12.2025	IN-PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

No Scale

Quality Control

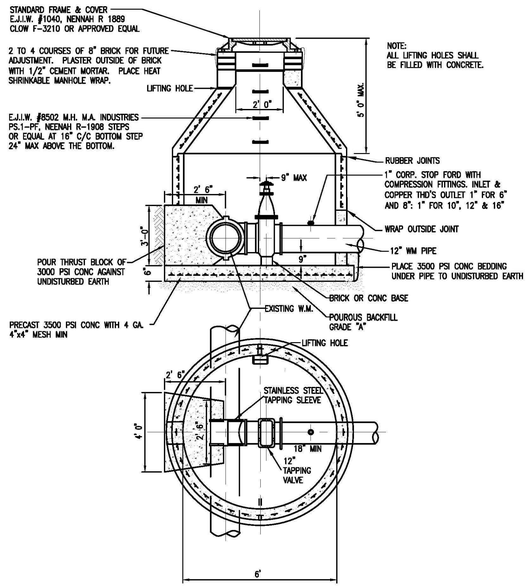
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Checked: BB
Approved: BB

Project Number

BRI 2021097

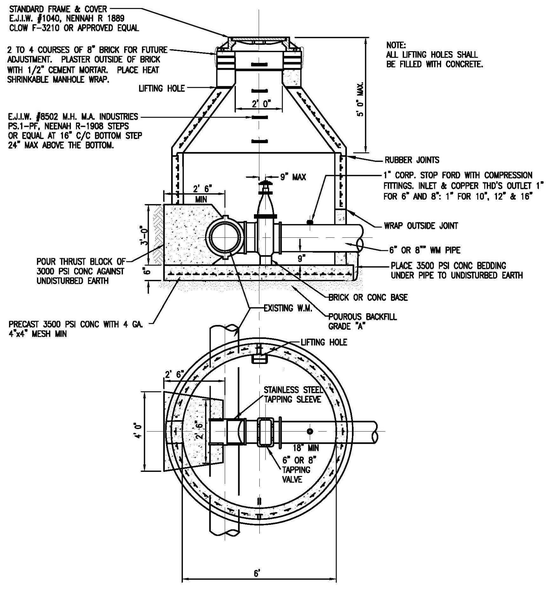
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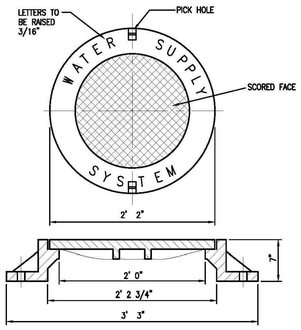
STANDARD 12" TAPPING SLEEVE, VALVE & WELL

NOTE:
LOCATE TAPPING SLEEVE, VALVE & WELL SUCH THAT THE EXISTING JOINT IS OUTSIDE THE STRUCTURE.

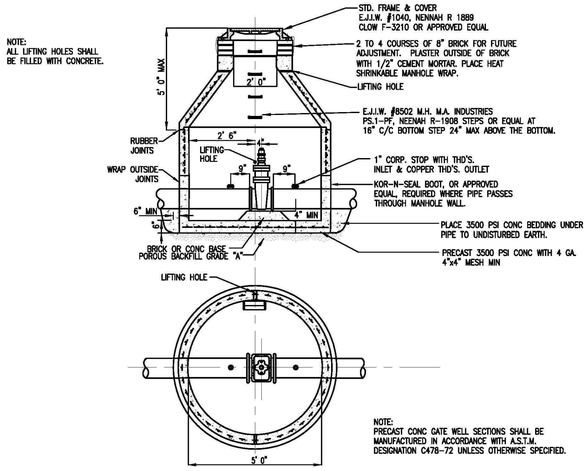


STANDARD 6" & 8" TAPPING SLEEVE, VALVE & WELL

NOTE:
LOCATE TAPPING SLEEVE, VALVE & WELL SUCH THAT THE EXISTING JOINT IS OUTSIDE THE STRUCTURE.



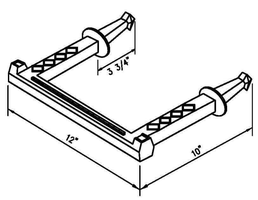
STANDARD FRAME & COVER
E.J.I.W. #1040 TYPE AGS



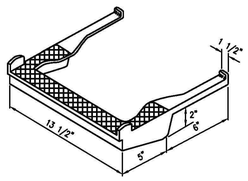
STANDARD PRECAST GATE WELL

NOTE: FOR 6" OR 8" WATER MAIN, USE 5'-0" DIAMETER GATE WELL
FOR 12" OR 16" WATER MAIN, USE 6'-0" DIAMETER GATE WELL

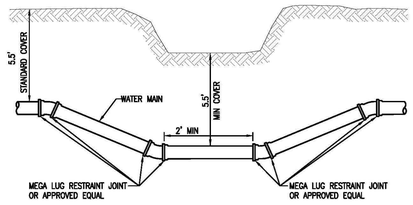
NOTE:
PRECAST CONC GATE WELL SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH A.S.T.M. DESIGNATION C478-72 UNLESS OTHERWISE SPECIFIED.



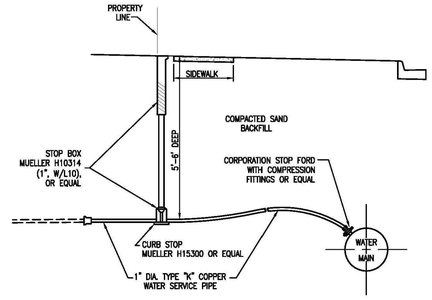
MANHOLE STEP
M.A. PSI-375



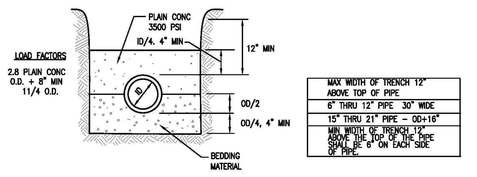
STANDARD MANHOLE STEP
E.J.I.W. 8502



DITCH OR STREAM CROSSING



TYPICAL WATER SERVICE DETAIL



PIPE BEDDING DETAILS

DRAWING PATH: C:\Users\tgodwin\Desktop\Dexter_WM2.dwg Nov 02, 2011 - 11:24am

OHM

CITY/TWP/VILLAGE: VILLAGE OF DEXTER
COUNTY: WASHTENAW COUNTY
JOB #
SCALE: H: 1"=40' V: 1"=4'
HORIZ DATUM
VERT DATUM
DATE:
REVISIONS:
DATE: 07/13/05
DRAWN: JCK/CJ
CHECKED:
ENGINEER:
PROJ MGR:
SECTION
TOWN
RANGE
CLIENT: VILLAGE OF DEXTER
DATE:
REVISIONS:

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VILLAGE OF DEXTER
WATER MAIN DETAILS
STANDARD DETAILS

SHEET

OF

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Consultants

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Twin Turf Fields
Restroom Building

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Scale

No Scale

Quality Control

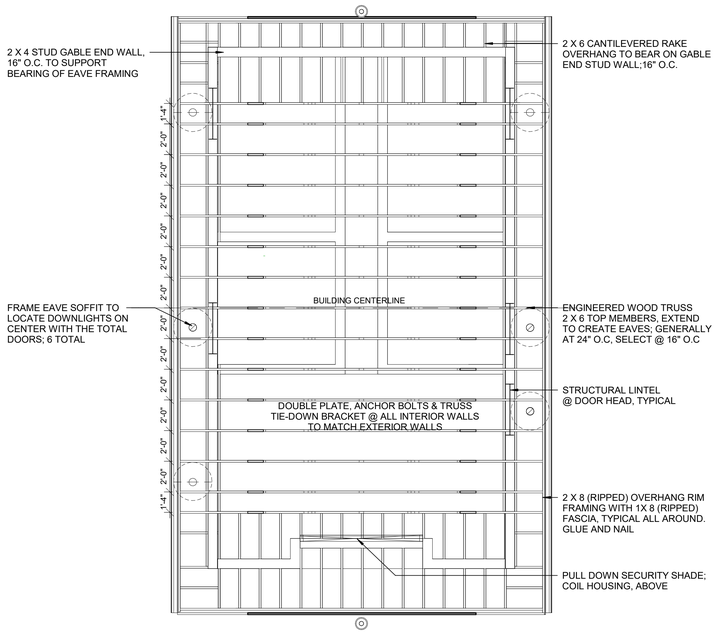
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Checked: BB
Approved: BB

Project Number

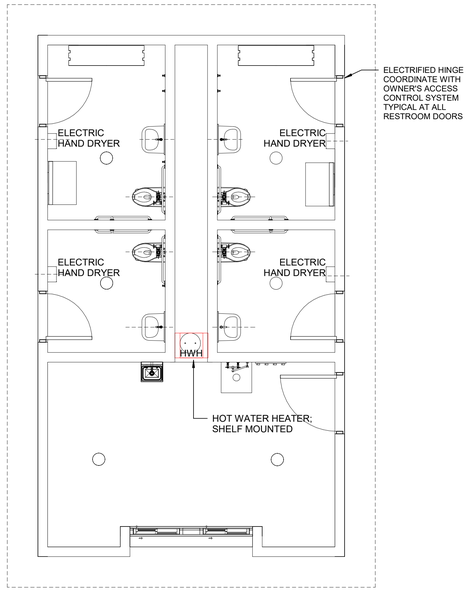
BRI 2021097

Sheet Number

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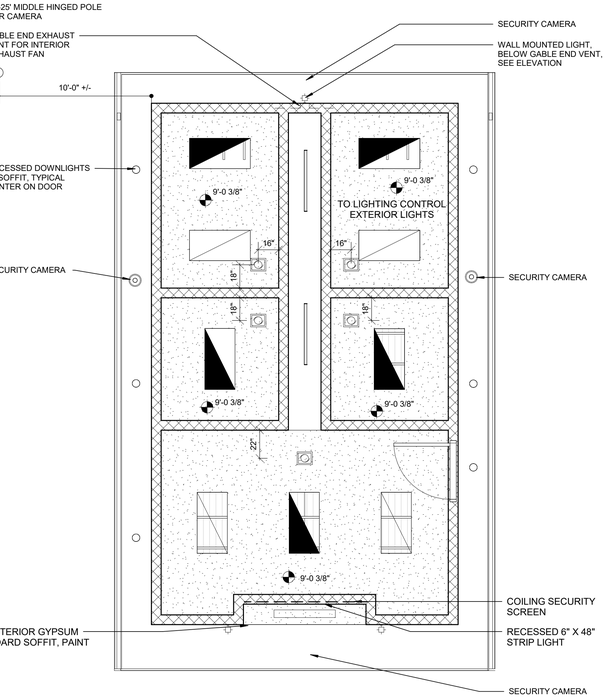


3 A-100 ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

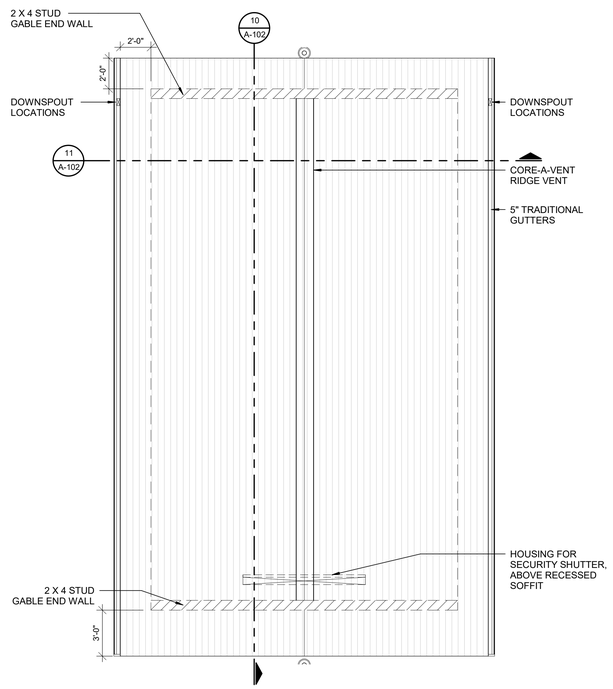


SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION

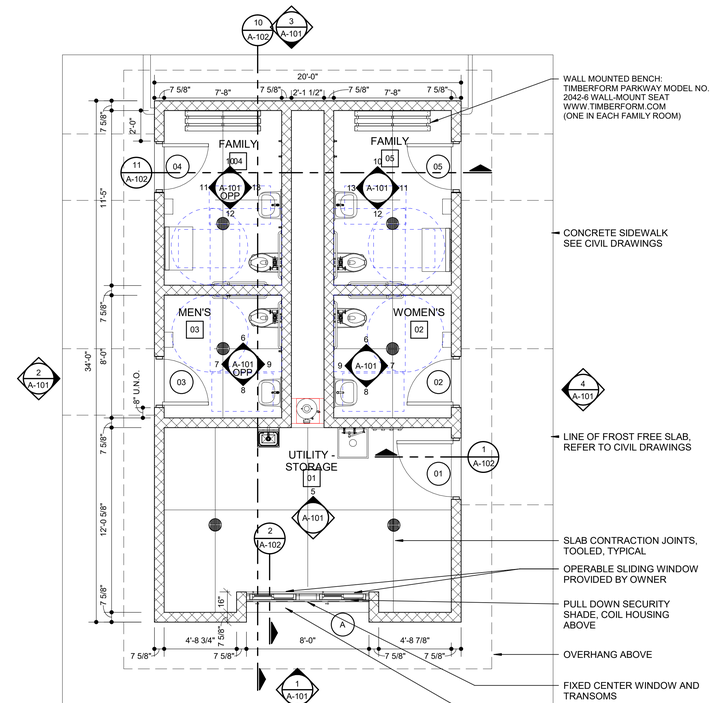
6 A-100 POWER PLAN
SCALE: 1/4" = 1'-0"



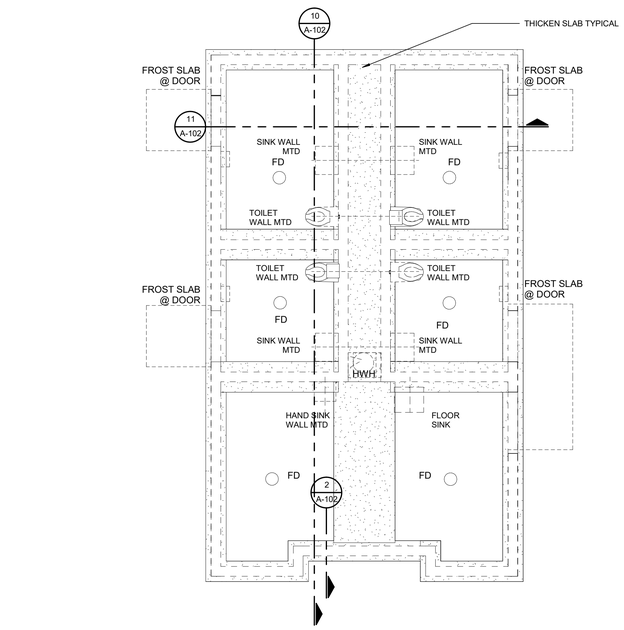
4 A-100 REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"



5 A-100 ROOF PLAN
SCALE: 1/4" = 1'-0"



1 A-100 FLOOR PLAN
SCALE: 1/4" = 1'-0"



2 A-100 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

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ARCHITECT
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Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

PLANS

Issues

DATE	ISSUED FOR
2.20.2025	PROGRESS SET
3.12.2025	90% SET
5.2.2025	95% CO OWNER REVIEW
7.11.2025	BCC REVIEW
09.05.2025	BIDS

Seals

Specifier Comment

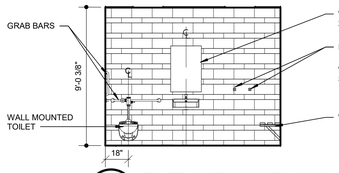
Project Number

BRI 2021097

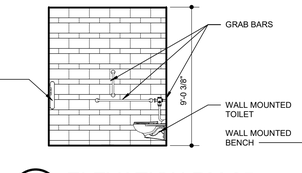
Sheet Number

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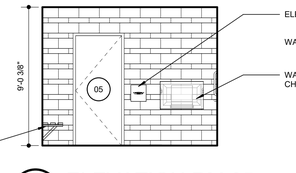
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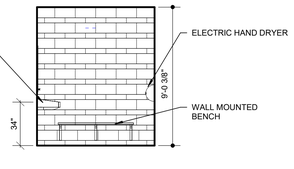
13 A-101 ELEVATION RM 05
SCALE: 1/4" = 1'-0" RM 04 OPPOSITE



12 A-101 ELEVATION RM 05
SCALE: 1/4" = 1'-0" RM 04 OPPOSITE

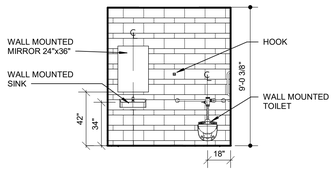


11 A-101 ELEVATION RM 05
SCALE: 1/4" = 1'-0" RM 04 OPPOSITE

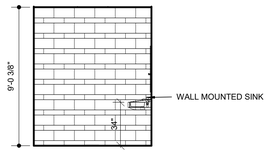


10 A-101 ELEVATION RM 05
SCALE: 1/4" = 1'-0" RM 04 OPPOSITE

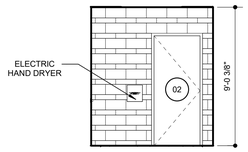
NOTE: PAINT ALL INTERIOR CMU
TWO COATS OF BLOCK FILLER PRIMER AND TWO COATS OF FINISH



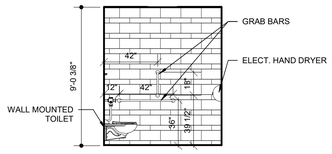
9 A-101 ELEVATION RM 02
SCALE: 1/4" = 1'-0" RM 03 OPPOSITE



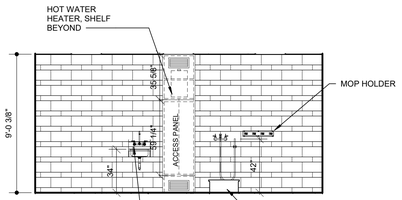
8 A-101 ELEVATION RM 02
SCALE: 1/4" = 1'-0" RM 03 OPPOSITE



7 A-101 ELEVATION RM 02
SCALE: 1/4" = 1'-0" RM 03 OPPOSITE

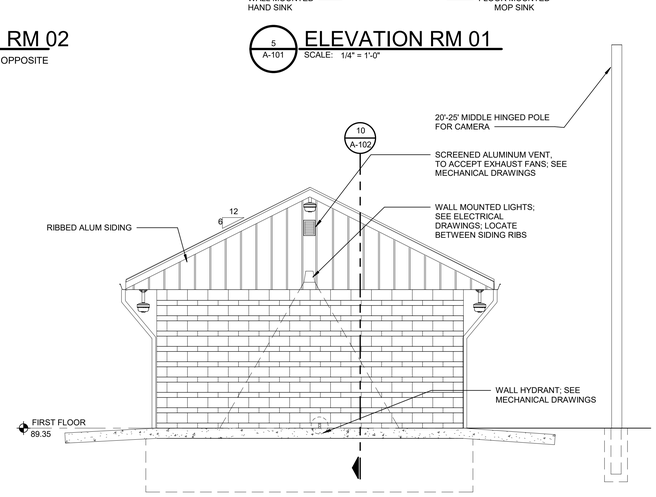


6 A-101 ELEVATION RM 02
SCALE: 1/4" = 1'-0" RM 03 OPPOSITE



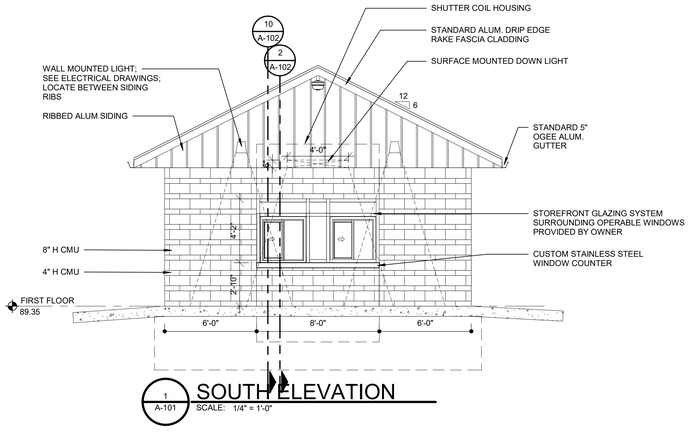
5 A-101 ELEVATION RM 01
SCALE: 1/4" = 1'-0"

4 A-101 EAST ELEVATION
SCALE: 1/4" = 1'-0"



3 A-101 NORTH ELEVATION
SCALE: 1/4" = 1'-0"

2 A-101 WEST ELEVATION
SCALE: 1/4" = 1'-0"



1 A-101 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

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Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

ELEVATIONS - INTERIOR AND EXTERIOR

Issues

DATE	ISSUED FOR
2.20.2025	PROGRESS SET
3.12.2025	90% SET
5.2.2025	95% CD OWNER REVIEW
7.11.2025	BCC REVIEW
09.05.2025	BIDS

Seals

Specifier Comment

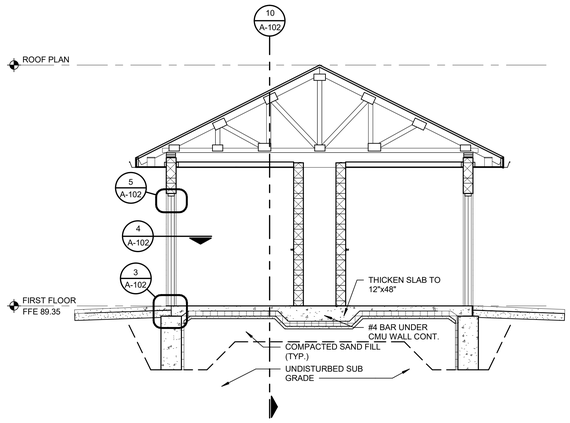
Project Number

BRI 2021097

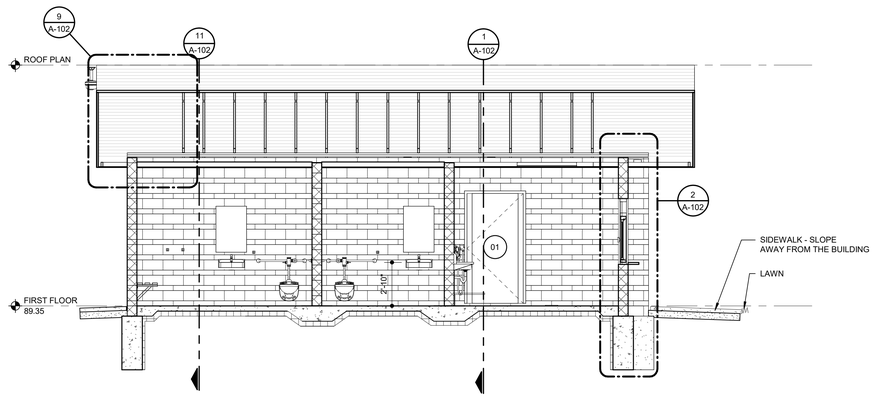
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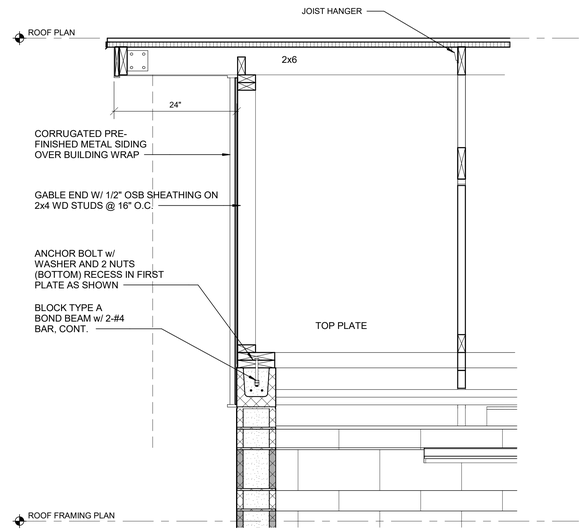
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11 A-102 SECTION
SCALE: 1/4" = 1'-0"



10 A-102 SECTION
SCALE: 1/4" = 1'-0"

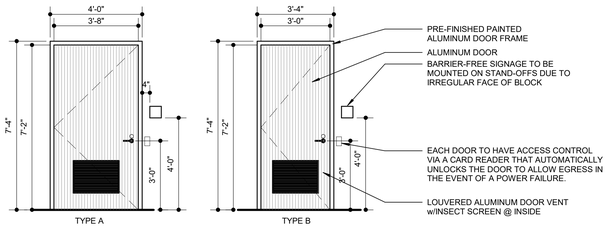


9 A-102 SECTION AT GABLE END WALL AND RAKE
SCALE: 1" = 1'-0"

DOOR SCHEDULE

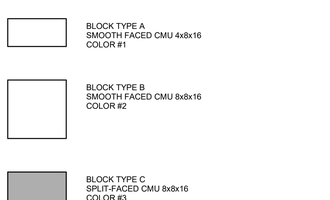
DOOR OR LITE NO.	DOOR SIZE W	DOOR SIZE H	DOOR TYPE	DOOR MAT'L	FRAME DETAILS HEAD	FRAME DETAILS JAMB	FRAME DETAILS SILL	FRAME MAT'L	NOTES
01	3'-8"	7'-2"	A	ALUM	5/A102	4/A102	3/A102	ALUM	NOTE 1,3
02	3'-0"	7'-2"	B	ALUM	5/A102	4/A102	3/A102	ALUM	NOTE 1, 2, 3
03	3'-0"	7'-2"	B	ALUM	5/A102	4/A102	3/A102	ALUM	NOTE 1, 2, 3
04	3'-0"	7'-2"	B	ALUM	5/A102	4/A102	3/A102	ALUM	NOTE 1, 2, 3
05	3'-0"	7'-2"	B	ALUM	5/A102	4/A102	3/A102	ALUM	NOTE 1, 2, 3

NOTE 1
SEE DOOR ELEVATIONS FOR DOOR HARDWARE
NOTE 2
COORDINATE ACCESS CONTROL/LOW VOLTAGE REQUIREMENTS WITH OWNER
NOTE 3:
EACH DOOR TO HAVE ACCESS CONTROL VIA A CARD READER THAT AUTOMATICALLY UNLOCKS THE DOOR TO ALLOW EGRESS IN THE EVENT OF A POWER FAILURE.

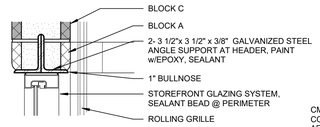


NOTE: ALL DOOR HARDWARE TO MEET MICHIGAN BARRIER-FREE DESIGN REQUIREMENTS.

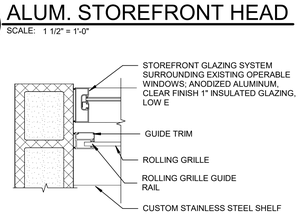
12 A-102 DOOR ELEVATIONS
SCALE: 3/8" = 1'-0"



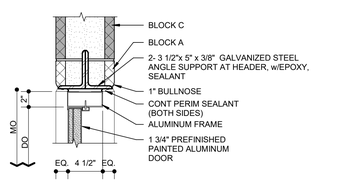
8 A-102 BLOCK TYPES
SCALE: 1 1/2" = 1'-0"



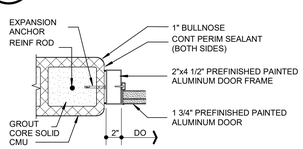
7 A-102 ALUM. STOREFRONT HEAD
SCALE: 1 1/2" = 1'-0"



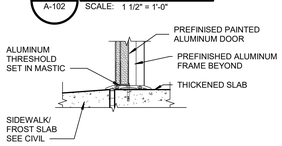
6 A-102 ALUM. STOREFRONT JAMB
SCALE: 1 1/2" = 1'-0"



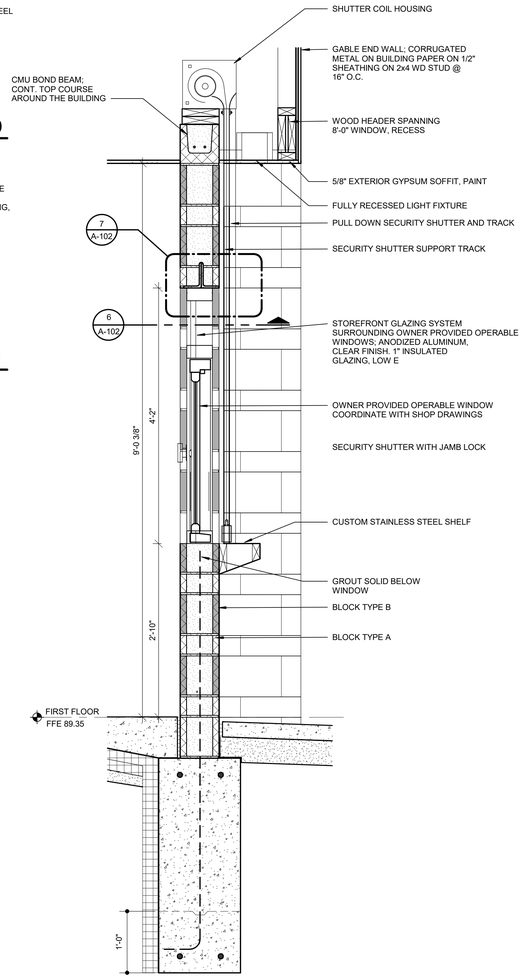
5 A-102 DOOR HEAD
SCALE: 1 1/2" = 1'-0"



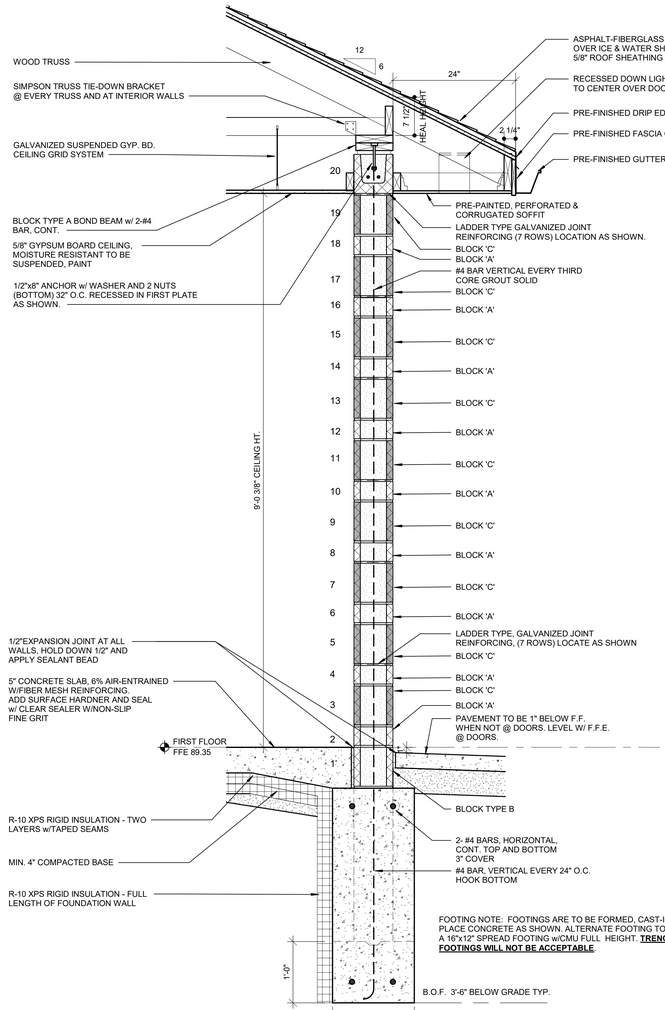
4 A-102 DOOR JAMB
SCALE: 1 1/2" = 1'-0"



3 A-102 DOOR SILL
SCALE: 1 1/2" = 1'-0"



2 A-102 WALL SECTION
SCALE: 1" = 1'-0"



1 A-102 WALL SECTION
SCALE: 1" = 1'-0"

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Twin Turf Field
Restroom Building

Dexter, Michigan

SECTIONS AND
DETAILS

Notes

DATE	ISSUED FOR
2.20.2025	PROGRESS SET
3.12.2025	50% SET
5.2.2025	95% CD OWNER REVIEW
7.11.2025	BCC REVIEW
09.05.2025	BIDS

Seals

Quality Control

Project Number

BRI 2021097

Sheet Number

A-102

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Autodesk Docs://24-600 Dexter School Restroom Storage/24-600 Dexter School Restroom Storage.rvt

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
DIR	DEIONIZED RETURN
DIS	DEIONIZED SUPPLY
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
ECM	ELECTRONICALLY COMMUTATED MOTOR
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
FGR	FUEL GAS RETURN
FGS	FUEL GAS SUPPLY
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE

ABBREVIATION	DESCRIPTION
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASURING STATION
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
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
HWR(___)	DOMESTIC HOT WATER RETURN (SPECIFIC TEMP °F)
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
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
NPHW	NON POTABLE HOT WATER
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

ABBREVIATION	DESCRIPTION
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
(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
ROR	REVERSE OSMOSIS RETURN
ROS	REVERSE OSMOSIS SUPPLY
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
TK	TANK
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
WAGD	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
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
FM	FLOW METER
	GUARD FOR STAT OR SENSOR
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)
OS	OCCUPANCY SENSOR
PT	PRESSURE TRANSMITTER
SP	STATIC PRESSURE SENSOR OR PROBE
	VALVE - 2 WAY CONTROL VALVE
	VALVE - 3 WAY CONTROL VALVE
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 / MV	AIR VENT - AUTOMATIC
	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
	VENT
WM	WATER METER
GM	GAS METER

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
	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 WITH TURNING VANES
	ELBOW - RECTANGULAR/ ROUND 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
	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 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

SHEET NO.	SHEET TITLE
M-001	MECHANICAL STANDARDS AND DRAWING INDEX
M-002	MECHANICAL SPECIFICATIONS
M-003	MECHANICAL SPECIFICATIONS
M-200	MECHANICAL NEW WORK PLANS
M-601	MECHANICAL DETAILS
M-701	MECHANICAL SCHEDULES
M-702	MECHANICAL SCHEDULES
M-801	TEMPERATURE CONTROLS

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 / TU-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

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

AREA OF ENLARGEMENT

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

SECTION OR PLAN NUMBER / 1 / M5.1 — **SECTION OR ENLARGED PLAN** SCALE: 1/8" = 1' - 0"

SHEET WHERE SECTION IS CUT OR ENLARGED PLAN IS REFERENCED

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

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

MECHANICAL STANDARDS AND DRAWING INDEX

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: TEF
Checked: SVM
Approved: SVM

Project Number

BRI 2021097

Sheet Number

M-001

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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. REFRIGERANT INSTALLATION AND DISPOSAL: PERFORM ALL WORK RELATED TO REFRIGERANT CONTAINED IN AIR CONDITIONERS, AND SIMILAR EQUIPMENT, INCLUDING RELATED PIPING, IN STRICT ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:
1. ASHRAE STANDARD 15 AND RELATED REVISIONS: SAFETY CODE FOR MECHANICAL REFRIGERATION.
2. ASHRAE STANDARD 34 AND RELATED REVISIONS: NUMBER DESIGNATION AND SAFETY CLASSIFICATION OF REFRIGERANTS.
3. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) REQUIREMENTS OF SECTION 8 08 (PROHIBITION OF VENTING AND REGULATION OF CFC) AND APPLICABLE STATE AND LOCAL REGULATIONS OF AUTHORITIES HAVING JURISDICTION.

N. RECOVERED REFRIGERANT IS THE PROPERTY OF THE CONTRACTOR. DISPOSE OF REFRIGERANT LEGALLY, IN ACCORDANCE WITH APPLICABLE RULES AND REGULATIONS.

O. WORK IN EXISTING BUILDINGS:
1. OWNER WILL PROVIDE ACCESS TO EXISTING BUILDINGS AS REQUIRED. ACCESS REQUIREMENTS TO OCCUPIED BUILDINGS SHALL BE IDENTIFIED ON THE PROJECT SCHEDULE. CONTRACTOR, ONCE WORK IS STARTED IN EXISTING BUILDING, SHALL COMPLETE SAME WITHOUT INTERRUPTION IN ORDER TO RETURN WORK AREAS AS SOON AS POSSIBLE TO OWNER.
2. ADEQUATELY PROTECT AND PRESERVE ALL EXISTING AND NEWLY INSTALLED WORK. PROMPTLY REPAIR ANY DAMAGE TO SAME AT CONTRACTOR'S EXPENSE.
3. CONSULT WITH OWNER'S REPRESENTATIVE AS TO METHODS OF CARRYING ON WORK SO AS NOT TO INTERFERE WITH 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.
4. PRIOR TO STARTING WORK IN ANY AREA, OBTAIN APPROVAL FOR DOING SO FROM A QUALIFIED REPRESENTATIVE OF THE OWNER WHO IS DESIGNATED AND AUTHORIZED BY THE OWNER TO PERFORM TESTING AND ABATEMENT, IF NECESSARY, OF ALL HAZARDOUS MATERIALS INCLUDING BUT NOT LIMITED TO, ASBESTOS. CONTRACTOR SHALL NOT PERFORM ANY INSPECTION, TESTING, CONTAINMENT, REMOVAL OR OTHER WORK THAT IS RELATED IN ANY WAY WHATSOEVER TO HAZARDOUS MATERIALS UNDER THE CONTRACT.

P. TEMPORARY SERVICES: THE EXISTING BUILDING WILL BE OCCUPIED DURING CONSTRUCTION. MAINTAIN MECHANICAL SERVICES AND PROVIDE NECESSARY TEMPORARY CONNECTIONS AND THEIR REMOVAL AT NO ADDITIONAL EXPENSE.

Q. 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.

R. 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.

200516 – PIPE FLEXIBLE CONNECTORS, EXPANSION FITTINGS AND LOOPS

A. MATERIALS FOR ANCHORS:
1. STEEL SHAPES AND PLATES: ASTM A 36/A 36M.
2. BOLTS AND NUTS: ASME B18.10 OR ASTM A 183, STEEL, HEX HEAD.
3. WASHERS: ASTM F 844, STEEL, PLAIN, FLAT WASHERS.
4. MECHANICAL FASTENERS: INSERT-WEDGE-TYPE STUD WITH EXPANSION PLUG ANCHOR FOR USE IN HARDENED PORTLAND CEMENT CONCRETE, AND TENSION AND SHEAR CAPACITIES APPROPRIATE FOR APPLICATION.
5. CHEMICAL FASTENERS: INSERT-TYPE-STUD BONDING SYSTEM ANCHOR FOR USE WITH HARDENED PORTLAND CEMENT CONCRETE, AND TENSION AND SHEAR CAPACITIES APPROPRIATE FOR APPLICATION.
6. CONCRETE: PORTLAND CEMENT MIX, 3000 PSI MINIMUM. REFER TO DIVISION 3 SECTION "CAST-IN-PLACE CONCRETE" FOR FORMWORK, REINFORCEMENT, AND CONCRETE.
7. GROUT: ASTM C 1107, FACTORY-MIXED AND -PACKAGED, DRY, HYDRAULIC-CEMENT, NONSHRINK, NONMETALLIC GROUT; SUITABLE FOR INTERIOR AND EXTERIOR APPLICATIONS.

B. RUBBER FLEXIBLE CONNECTORS/EXPANSION JOINTS:
1. ASTM F 1123, FABRIC-REINFORCED RUBBER WITH EXTERNAL CONTROL RODS OR CABLES, AND COMPLYING WITH FSA'S "TECHNICAL HANDBOOK: NON-METALLIC EXPANSION JOINTS AND FLEXIBLE PIPE CONNECTORS."
a. MANUFACTURERS: FLEX-WELD, INC./KEFLEX | MASON INDUSTRIES, INC.; MERCER RUBBER CO. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC. | VIBRATION MOUNTINGS & CONTROLS, INC.
2. MATERIAL: EPDM.
3. END CONNECTIONS: FULL-FACED, INTEGRAL, STEEL FLANGES WITH STEEL RETAINING RINGS.
4. COATING: FACTORY APPLIED HYPALON PAINT FOR OUTDOOR APPLICATIONS.

C. HOSE AND BRAID FLEXIBLE CONNECTORS:
1. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC. | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC.
2. FLEXIBLE CONNECTORS FOR COPPER PIPING: MULTIPLE-PLY PHOSPHOR-BRONZE CORRUGATED HOSE WITH BRONZE OUTER BRAID, COPPER FERRULE, AND COPPER PIPE END CONNECTIONS.
3. FLEXIBLE CONNECTORS FOR STEEL PIPING: MULTIPLE-PLY STAINLESS-STEEL CORRUGATED HOSE WITH STAINLESS STEEL OUTER BRAID, AND STEEL PIPE END CONNECTIONS.
4. MINIMUM PRESSURE RATING: 150 PSIG, UNLESS OTHERWISE INDICATED.
5. MAXIMUM TEMPERATURE RATING: 450 DEG F FOR COPPER PIPING CONNECTORS, 800 DEG F FOR STEEL PIPING CONNECTORS.

D. EXPANSION COMPENSATORS:
1. DOUBLE-PLY CORRUGATED STEEL, STAINLESS-STEEL, OR COPPER-ALLOY BELLOWS IN HOUSING WITH INTERNAL GUIDES, ANTITORQUE DEVICE, AND REMOVABLE END CLIP FOR POSITIONING.
a. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC./KEFLEX | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC.
2. MINIMUM PRESSURE RATING: 200 PSIG, UNLESS OTHERWISE INDICATED.
3. CONFIGURATION FOR COPPER PIPING: TWO-PLY STAINLESS-STEEL BELLOWS AND BRONZE OR STAINLESS-STEEL SHROUD.
4. END CONNECTIONS FOR COPPER TUBING: SOLDER JOINT.
5. CONFIGURATION FOR STEEL PIPING: TWO-PLY STAINLESS-STEEL BELLOWS AND CARBON-STEEL SHROUD.
6. END CONNECTIONS FOR STEEL PIPE: NPS 2 AND SMALLER: THREADED. NPS 2-1/2 TO NPS 4: FLANGED OR WELD.

E. FLEXIBLE-HOSE EXPANSION JOINTS:
1. MANUFACTURED ASSEMBLY WITH TWO FLEXIBLE-METAL-HOSE LEGS JOINED BY LONG-RADIUS, 180-DEGREE RETURN BEND OR CENTER SECTION OF FLEXIBLE HOSE; WITH INLET AND OUTLET ELBOW FITTINGS, CORRUGATED-METAL INNER HOSES, AND BRAIDED OUTER SHEATHS.
a. MANUFACTURERS: FLEX-HOSE CO., INC. | METRAFLEX, INC.; METRALOOP | TWIN CITY HOSE, INC.
2. FLEXIBLE-HOSE EXPANSION JOINTS FOR COPPER PIPING: COPPER-ALLOY FITTINGS WITH SOLDER-JOINT END CONNECTIONS.
3. FLEXIBLE-HOSE EXPANSION JOINTS FOR STEEL PIPING: CARBON-STEEL FITTINGS WITH THREADED END CONNECTIONS FOR NPS 2 AND SMALLER AND FLANGED OR WELD END CONNECTIONS TO MATCH PIPING SYSTEM FOR NPS 2-1/2 AND LARGER.

F. ALIGNMENT GUIDES:
1. STEEL, FACTORY FABRICATED, WITH BOLTED TWO-SECTION OUTER CYLINDER AND BASE FOR ALIGNMENT OF PIPING AND TWO-SECTION GUIDING SPIDER FOR BOLTING TO PIPE.
a. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC. | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC., PATHWAY DIVISION.

G. SLIDING/GUIDING DEVICES:
1. FOR PIPE SIZE NPS 4 AND SMALLER ON ALL HOT PIPING, PROVIDE GUIDES EQUAL TO FLEXONICS SEMI-STEEL SPIDER AND GUIDING CYLINDER PIPE ALIGNMENT GUIDES FOR ALL EXPANSION JOINTS AND LOOPS. PROVIDE PIPE ALIGNMENT GUIDES IN QUANTITIES AT ALL LOCATIONS AS REQUIRED ACCORDING TO THE MANUFACTURER'S DESIGN CRITERIA AND RECOMMENDATIONS. PIPE ALIGNMENT GUIDES SHALL SERVE TO GUIDE THE EXPANSION JOINTS, LOOPS OR BENDS.
a. MANUFACTURERS: B-LINE SYSTEMS, INC.; A DIVISION OF COOPER INDUSTRIES; FIGURE 3281 SERIES | SENIOR FLEXONICS | SYPRIS TECHNOLOGIES; TUBE TURNS DIVISION | U.S. FLEXIBLE METALLIC TUBING CO., KELFLEX TYPE M | METRAFLEX, INC.
2. FOR PIPE SIZES NPS 6 AND LARGER AND ALL GUIDES ON COLD PIPING, FURNISH PRE-ENGINEERED PRE-INSULATED GUIDES WITH PUBLISHED VERTICAL AND LATERAL LOAD RATINGS. CONSTRUCTION SHALL CONSIST OF AN INSULTED SHIELD CONTAINING STRUCTURAL CALCIUM SILICATE (100 PSI NON-LOAD BEARING AND 600 PSI LOAD BEARING) ENCASED IN 360 DEGREES OF OVERLAPPING SHEET METAL. A 36 STEEL CLAMPS TORQUED ONTO INSULATED SHIELD WITH RECOMMENDED CATALOG TORQUE VALVES. SLIDE SERVICE SHALL BE STAINLESS STEEL TO POLYETHYLENE OR TEFLON WITH A MAXIMUM COEFFICIENT OF FRICTION OF 0.15.
a. MANUFACTURERS: PIPE SHIELDS, INC. B3000, B4000, B7000 AND B8000 SERIES | CARPENTER AND PATERSON, INC. | RILCO MFG. HG 3000, HG 4000, HG 7000, AND HG 8000 SERIES.

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. CHILLED WATER/CONDENSER WATER: 30 TO 130 DEG F OR 0 TO 120 DEG F.
4. HEATING WATER: 30 TO 240 DEG F.
5. 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.

200547 – MECHANICAL VIBRATION CONTROLS

A. EQUIPMENT TO BE ISOLATED IS SCHEDULED ON THE DRAWINGS.

B. VIBRATION ISOLATORS:
1. TYPE 3
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.

200553 – MECHANICAL 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. PEX PIPE AND FITTINGS: ASTM F 876 AND ASTM F 877, SDR 9 TUBING.
1. FITTINGS FOR PEX TUBE: ASTM F 1807, METAL-INSERT TYPE WITH COPPER CRIMP RINGS AND MATCHING PEX TUBE DIMENSIONS; OR PLASTIC-INSERT TYPE COLD EXPANSION FITTINGS AND CORRESPONDING RINGS, MATERIAL MEETING REQUIREMENTS OF ASTM F 1960.
2. MANIFOLD: MULTIPLE-OUTLET, PLASTIC OR CORROSION-RESISTANT-METAL ASSEMBLY COMPLYING WITH ASTM F 877 AND WITH PLASTIC OR CORROSION-RESISTANT-METAL VALVE FOR EACH OUTLET.

H. GENERAL-DUTY VALVES; AND DRAIN VALVES ARE SPECIFIED IN "VALVES."

I. BALANCING VALVES ARE SPECIFIED IN "DOMESTIC WATER PIPING SPECIALTIES."

J. 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.

K. INSTALL SUPPORTS ACCORDING TO "HANGERS AND SUPPORTS."

L. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.

M. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.

N. 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.

O. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.

P. SUPPORT PIPING AND TUBING NOT LISTED ABOVE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

Q. 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.

R. 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
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.

221123 – DOMESTIC WATER CIRCULATION PUMPS

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. BASIS OF DESIGN UNITS ARE SCHEDULED ON THE DRAWINGS.

C. MANUFACTURERS: ARMSTRONG PUMPS INC. | BELL & GOSSETT; XYLEM INC. | GRUNDFOS PUMP CORP. | TACO, INC.

D. CONTROLS: REFER TO CONTROL DIAGRAMS.

E. EXAMINATION: EXAMINE ROUGHING-IN OF DOMESTIC-WATER-PIPING SYSTEM TO VERIFY ACTUAL LOCATIONS OF CONNECTIONS BEFORE PUMP INSTALLATION.

F. PUMP INSTALLATION:
1. COMPLY WITH HI 1.4.
2. INSTALL PUMPS WITH ACCESS FOR PERIODIC MAINTENANCE INCLUDING REMOVAL OF MOTORS, IMPELLERS, COUPLINGS, AND ACCESSORIES.
3. INDEPENDENTLY SUPPORT PUMPS AND PIPING SO WEIGHT OF PIPING IS NOT SUPPORTED BY PUMPS AND WEIGHT OF PUMPS IS NOT SUPPORTED BY PIPING. DO NOT USE PUMP MOTORS AS A SUPPORT POINT.

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. STAINLESS-STEEL FLOOR SINK DRAINS FS-1:
1. STANDARD: ASME A112.6.3.
2. OUTLET: BOTTOM.
3. TOP OR STRAINER MATERIAL: STAINLESS STEEL.
4. TOP SHAPE: SQUARE.
5. DIMENSIONS OF TOP OR STRAINER: 12 INCH BY 12 INCH, 14 GAGE, TYPE 304 STAINLESS STEEL RIBBED, NON-TILT LOOSE SET HALF GRATE WITH 1/2 INCH SQUARE HOLES AND PERFORATED STAINLESS STEEL SEDIMENT BUCKET.
6. SEEPAGE FLANGE: REQUIRED.
7. CLAMPING DEVICE: REQUIRED.
8. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SMITH, JAY R. MFG. CO.; MODEL 3006-12 | TYLER PIPE; WADE DIV. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

I. CAST-IRON FLOOR DRAINS (MECHANICAL 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. 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
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.

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Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

MECHANICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: TEF
Checked: SVM
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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 – ELECTROIC 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:
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

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. ACCEPTABLE PLUMBNG FIXTURES ARE SCHEDULED ON THE DRAWINGS.

F. 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.

G. 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.

H. 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.

224700 – DRINKING FOUNTAINS, WATER COOLERS AND CUSPIDORS

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

B. 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.

C. ASHRAE STANDARD: COMPLY WITH ASHRAE 34, "DESIGNATION AND SAFETY CLASSIFICATION OF REFRIGERANTS," FOR WATER COOLERS.

D. ELECTRIC WATER COOLERS, EWC-1:
1. DESCRIPTION: ARI 1010, TYPE PB, PRESSURE WITH BUBBLER, ACCESSIBLE, STYLE W, DUAL-HEIGHT, ARCHITECTURAL-STYLE WALL-MOUNTING WATER COOLER.
a. MATERIAL: STAINLESS STEEL.
b. RECEPTOR SHAPE: ROUND.
c. BACK PANEL: STAINLESS-STEEL BEHIND RECEPTORS WITH VENTILATION GRILLE LOCATED BELOW RECEPTORS.
d. BUBBLERS: ONE FOR EACH RECEPTOR, FLEXIBLE OR ELASTOMERIC OVERMOLDED, WITH ADJUSTABLE STREAM REGULATOR, LOCATED ON RECEPTORS.
e. CONTROL: PUSH BUTTON.
f. SUPPLY: NPS 3/8 WITH BALL, GATE, OR GLOBE VALVE.
g. DRAIN: GRID WITH NPS 1-1/4 MINIMUM HORIZONTAL WASTE AND TRAP COMPLYING WITH ASME A112.18.2.
h. COOLING SYSTEM: ELECTRIC, WITH HERMETICALLY SEALED COMPRESSOR, COOLING COIL, AIR-COOLED CONDENSING UNIT, CORROSION-RESISTANT TUBING, REFRIGERANT, CORROSION-RESISTANT-METAL STORAGE TANK, AND ADJUSTABLE THERMOSTAT.
i. CAPACITY: 8 GPH OF 50 DEG F COOLED WATER FROM 80 DEG F INLET WATER AND 90 DEG F AMBIENT AIR TEMPERATURE.
j. ELECTRICAL CHARACTERISTICS: 1/5 HP; 120-V AC; SINGLE PHASE; 60 HZ.
k. SUPPORT: REFER TO "FIXTURE SUPPORTS."
2. MANUFACTURERS: ACORNAQUA; A DIVISION OF ELKAY MANUFACTURING CO. MODEL EZH20 EZWS-SFGRN8K.

E. FIXTURE SUPPORTS: ASME A112.6.1M, WATER COOLER CARRIERS. INCLUDE VERTICAL, STEEL UPRIGHTS WITH FEET AND TIE RODS AND BEARING PLATES WITH MOUNTING STUDS MATCHING FIXTURE TO BE SUPPORTED.
1. MANUFACTURERS: JOSAM CO. | 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. AIR HANDLING SYSTEM BALANCING PROVISIONS:
1. PROVIDE EXTRA SHEAVES, SIZED AS RECOMMENDED BY THE BALANCING AGENT, FOR THE ADJUSTMENT OF FAN SPEED FOR EACH AIR HANDLING SYSTEM DURING AIR QUANTITY BALANCING OPERATIONS. FURNISH SHEAVES AS SPECIFIED.
2. PROVIDE SHEAVES, SIZED AS RECOMMENDED BY THE BALANCING AGENT, FOR THE ADJUSTMENT OF FAN SPEED FOR EACH EXISTING AIR HANDLING SYSTEM REQUIRING REBALANCING DURING AIR QUANTITY BALANCING OPERATIONS. FURNISH SHEAVES AS SPECIFIED.

H. 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.

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

J. ROOFTOP EQUIPMENT ENCLOSURES:
1. DESCRIPTION: LOUVERED OR CORRUGATED, DIRECT ATTACHED SCREENING SYSTEM AS SELECTED BY THE ARCHITECT.
2. MOUNTS DIRECTLY TO MECHANICAL EQUIPMENT AND REQUIRES NO ROOF PENETRATION.
3. SLIDING PANELS PROVIDE ACCESS TO EQUIPMENT COMPARTMENTS FOR SERVICE AND MAINTENANCE.
4. RATED TO WITHSTAND LATERAL FORCES DEVELOPED DUE TO WIND SPEEDS OF 225 MPH (362 KPH).
5. BAKED ON POLYESTER POWDER COAT FINISH MEETING ASTM B-117 STANDARD FOR 500 HOUR SALT SPRAY.
6. MANUFACTURERS: SPINNAKER INDUSTRIES INC.

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 AND WATER FLOW 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.
b. HEATING-WATER FLOW RATE: 0 TO MINUS 10 PERCENT.

230933 – TEMPERATURE CONTROLS

A. TEMPERATURE CONTROLS CONSISTING OF CONTROL DAMPERS, AND ELECTRIC CONTROLS DEVICES AS REQUIRED.

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. CONTROLS DAMPERS: PERFORMANCE – TEST IN ACCORDANCE WITH AMCA 500. FRAMES – GALVANIZED STEEL, MINIMUM 16 GAUGE, MINIMUM 2 INCHES IN WIDTH, WELDED OR RIVETED WITH CORNER REINFORCEMENT FOR 12 GAGE STRUCTURAL EQUIVALENCE. BLADES – GALVANIZED STEEL, MINIMUM 14 GAUGE, MAXIMUM BLADE SIZE 8 INCHES WIDE, 60 INCHES LONG, ATTACHED TO MINIMUM 1/2 INCH SHAFTS. DAMPERS WHICH ARE REQUIRED TO HAVE A STATIC PRESSURE RATING OVER 4 INCH W.G. SHALL HAVE MINIMUM 3/4 INCH SOLID SHAFTS. BLADE SEALS – SYNTHETIC ELASTOMERIC OR NEOPRENE, MECHANICALLY ATTACHED, FIELD REPLACEABLE. JACKSHAFTS (WHERE REQUIRED) – MINIMUM 1/2 INCH GALVANIZED STEEL. JAMB SEALS – STAINLESS STEEL. BEARINGS – OIL IMPREGNATED SINTERED BRONZE OR LUBRICANT FREE, SOLID STAINLESS STEEL. PROVIDE THRUST WASHERS AT BEARINGS FOR ALL DAMPERS WHICH ARE TO BE MOUNTED WITH BLADES IN THE VERTICAL POSITION. LINKAGES – ACCESSIBLE FOR MAINTENANCE LOCATED IN AIRSTREAM (ZINC PLATED) OR IN DAMPER FRAME EXTERNAL TO THE DUCT. LEAKAGE – LESS THAN 8 CFM PER SQUARE FOOT BASED ON 4 INCHES W.G. PRESSURE DIFFERENTIAL. STATIC PRESSURE RATING – AS SCHEDULED ON THE DRAWINGS, OR IF NOT SCHEDULED, MINIMUM 4" W.G. MAXIMUM VELOCITY – AS SCHEDULED ON THE DRAWINGS, OR DESIGN FOR MAXIMUM VELOCITY TO BE ENCOUNTERED IN LOCATION WHERE INSTALLED. TEMPERATURE LIMITS – NEG 40 TO 200°F. MANUFACTURERS: AMERICAN WARMING & VENTILATING, ARROW UNITED INDUSTRIES, GREENHECK, HONEYWELL, JOHNSON CONTROLS, LOUVERS & DAMPERS, INC, RUSKIN, TAMCO, VENT PRODUCTS.

G. 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. DATA TRANSMISSION CABLING AND EQUIPMENT GROUNDING PROCEDURES SHALL MEET THE LATEST FCC GUIDELINES FOR ELECTROMAGNETIC FIELD GENERATION.
7. ALL CONTROL WIRING SIZES AND TYPES SHALL MEET OR EXCEED THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

H. 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, LINKAGES, CONTROL DEVICES, ACCESSORIES AND CONNECTIONS AS REQUIRED FOR A COMPLETE AND OPERATIONAL CONTROL SYSTEM AS SPECIFIED HEREIN AND SHOWN.
6. IDENTIFICATION AND MARKING: ALL THERMOSTATS, RELAYS, SWITCHES, ETC. SHALL BE MARKED WITH THE SAME IDENTIFICATION NUMBER AS USED ON THE AS-BUILT SHOP DRAWINGS. USE BROTHER P-TOUCH LABEL MAKER OR SIMILAR WITH BLACK TEXT ON CLEAR OR WHITE SUPER ADHESIVE TAPE. IF LABEL APPLIED IN WET ENVIRONMENT, SPRAY LABEL WITH CLEAR ENAMEL FOR WATERPROOFING. ALL CONTROL PANELS AND AUXILIARY ENCLOSURES SHALL BE SUPPLIED WITH ENGRAVED PLASTIC NAMEPLATE PERMANENTLY ATTACHED IDENTIFYING IT AS CONTROL PANEL NUMBER, SYSTEM SERVED, AREA SERVED, FED FROM LIGHTING PANEL NUMBER, CIRCUIT NUMBER, ETC
7. SEQUENCE OF OPERATION IN WRITTEN (TEXT) FORMAT FOR EACH HVAC SYSTEM.

I. OWNER INSTRUCTION AND TRAINING: PROVIDE A MINIMUM OF TWO (2) HOURS] OF ON-SITE WALK-THRU AND TRAINING TO THE OWNER ON THE OPERATION OF THE CONTROL SYSTEMS FOR THE INITIAL INSTALLATION. INSTRUCTION AND TRAINING SHALL BE PERFORMED BY A COMPETENT CONTRACTOR REPRESENTATIVE FAMILIAR WITH THE CONTROL SYSTEMS OPERATION, MAINTENANCE AND CALIBRATION

J. CALIBRATION AND START-UP: AFTER INSTALLATION AND CONNECTION OF CONTROL COMPONENTS, TEST, ADJUST AND RE-ADJUST AS REQUIRED ALL CONTROL COMPONENTS IN TERMS OF FUNCTION, DESIGN, SYSTEMS BALANCE AND PERFORMANCE. MAKE SYSTEMS READY FOR ENVIRONMENTAL EQUIPMENT ACCEPTANCE TESTS

K. ACCEPTANCE PROCEDURE: UPON SUCCESSFUL COMPLETION OF START-UP AND RECALIBRATION AS INDICATED IN THIS SECTION, THE ARCHITECT SHALL BE REQUESTED IN WRITING TO INSPECT THE SATISFACTORY OPERATION OF THE CONTROL SYSTEMS. AFTER CORRECTING ALL ITEMS APPEARING ON THE PUNCH LIST, MAKE A SECOND WRITTEN REQUEST TO THE OWNER AND ARCHITECT FOR INSPECTION AND APPROVAL. AFTER ALL ITEMS ON THE PUNCH LIST ARE CORRECTED AND FORMAL APPROVAL OF THE CONTROL SYSTEMS IS PROVIDED BY THE ARCHITECT, THE CONTRACTOR SHALL INDICATE TO THE OWNER IN WRITING THE COMMENCEMENT OF THE WARRANTY PERIOD.

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.

C. ROOF CURBS:
1. CONSTRUCTION: GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH- THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH CHEMICALLY TREATED WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.
2. HEIGHT: CURB SHALL EXTEND A MINIMUM 12 INCHES ABOVE TOP SURFACE OF ROOF INSULATION.
3. MANUFACTURERS: CREATIVE METALS | PATE | ROOF PRODUCTS & SYSTEMS | THYCURB | ANY OF THE APPROVED ROOF MOUNTED EXHAUST FAN MANUFACTURERS.

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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B R i
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PBA Project No.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

MECHANICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: TEF
Checked: SVM
Approved: SVM

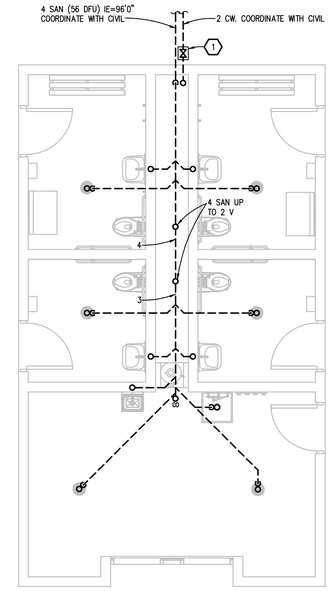
Project Number

BRI 2021097

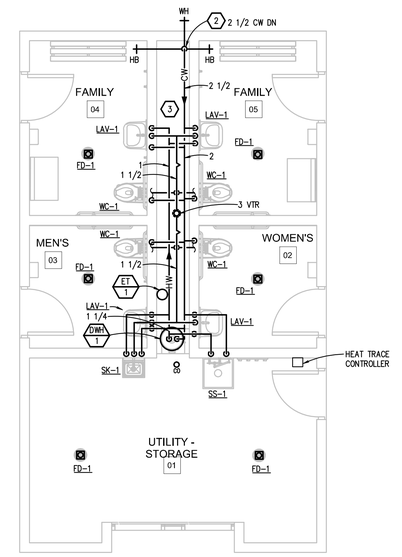
Sheet Number

M-003

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



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



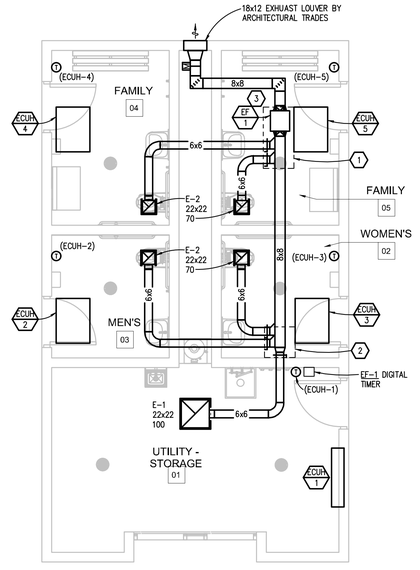
FIRST FLOOR PLUMBING PLAN
SCALE: 1/4" = 1' - 0"

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 , OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.

(#) 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 ISOLATION 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.



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

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 48x24 ACCESS PANEL IN LAY-IN CEILING.
2. PROVIDE 24x24 ACCESS PANEL IN LAY-IN CEILING.
3. MOUNT INLINE EXHAUST FAN IN ATTIC.

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PBA Project No.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

MECHANICAL NEW WORK PLANS

Dates

DATE	ISSUED FOR
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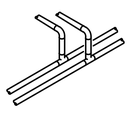
Project Number

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Sheet Number

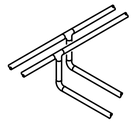
M-200

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BRANCH CONNECTION OFF TOP

APPLIES TO THE FOLLOWING SYSTEMS:
DOMESTIC WATER
STEAM & CONDENSATE
LABORATORY GASES
LABORATORY VACUUM
COMPRESSED AIR
NATURAL GAS

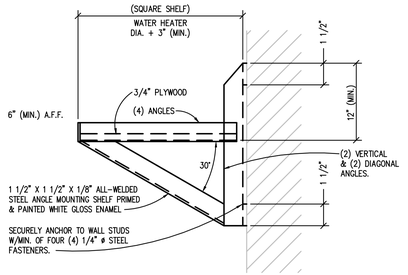


BRANCH CONNECTION OFF BOTTOM

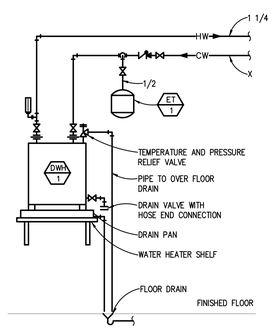
APPLIES TO THE FOLLOWING SYSTEMS:
HOT WATER HEATING
CHILLED WATER
CONDENSER WATER
ENERGY RECOVERY
PROCESS COOLING WATER

NOTE: BOTTOM AS INDICATED OR SIDE CONNECTION IS ACCEPTABLE. CONNECTION ABOVE CENTERLINE OF MAINS IS NOT ACCEPTABLE.

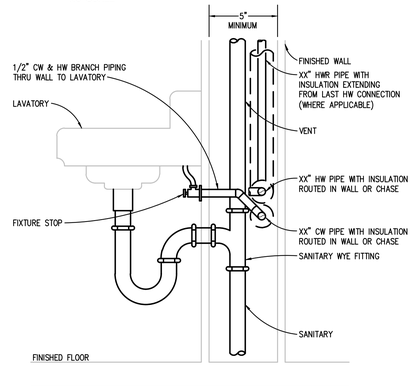
TYPICAL BRANCH TAKE-OFF CONNECTION PIPING DETAIL
NO SCALE



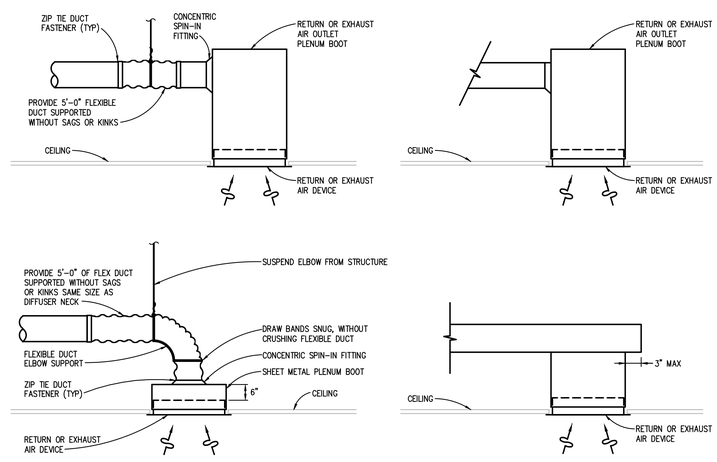
WATER HEATER MOUNTING SHELF DETAIL
NO SCALE



ELECTRIC WATER HEATER PIPING DIAGRAM
NO SCALE

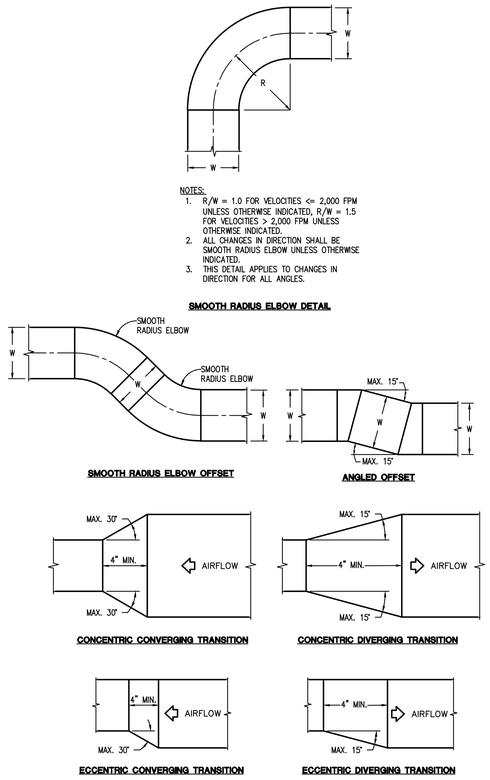


TYPICAL LAVATORY DETAIL
NO SCALE

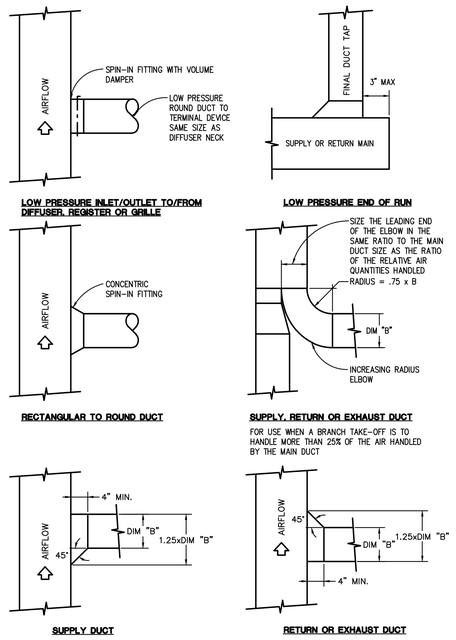


RETURN OR EXHAUST AIR DEVICE INSTALLATION DETAIL
NO SCALE

NOTE: PAINT INTERIOR SURFACE OF PLENUM BOX FLAT BLACK.



DUCT TRANSITION AND OFFSET DETAILS
NO SCALE



RECTANGULAR DUCT BRANCH TAKE-OFF DETAILS
NO SCALE

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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
UNINSULATED SINGLE PIPE										
UP TO 2 INCH	X	X								
2-1/2 INCH TO 4 INCH	X	X								
INSULATED SINGLE COLD PIPES										
UP TO 2 INCH	X	X						X	X	A
2-1/2 INCH TO 4 INCH	X								X	
INSULATED SINGLE HOT PIPES										
UP TO 2 INCH	X	X					X	X	X	A, C
2-1/2 INCH TO 4 INCH			X	X	X	X	X		X	B, 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.

ABOVEGROUND PLUMBING PIPE & ACCESSORY INSULATION APPLICATION SCHEDULE

INDOOR PIPE SYSTEM AND SIZE (INCHES)	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
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.

DUCT SYSTEM APPLICATION SCHEDULE

AIR SYSTEMS	DUCT MATERIAL: G90 GALV. SHEET METAL	DOUBLE-WALL LINED G90 GALV. SHEET METAL (COLD INNER WALL)	DOUBLE-WALL LINED G90 GALV. SHEET METAL (HOT INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	GALVANNEALED 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.

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
4 AND LARGER							X															X															X		A
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.

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 THEIR 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.

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Sheet Number

M-701

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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				MAXIMUM SOUND POWER LEVELS														MODEL NUMBER	KEYED NOTES
							BHP	HP	RPM	DRIVE TYPE			VOLTS	PHASE	SCCR KA (NOTE 3)	OPTIONS/ ACCESSORIES	UNIT DISCHARGE Lw BY OCTAVE BAND								UNIT INLET Lw BY OCTAVE BAND									
																	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)		
EF-1	RESTROOMS + STRORAGE	INLINE	380	0.50	4599	1615	0.07	1/10	1725	DIRECT	---	AUTO	120	1	5	B	77	76	64	57	54	50	47	41	76	74	70	63	59	56	53	45	SQ-090-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.

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	1
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.

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	34.2	500	60.0	123.1	1/8	1550	6.7	10	45	26 3/8	9 3/4	4	PLEATED	---	AUTO	208	3	29	40	5	A	CU945	
ECUH-2	10.3	250	60.0	97.9	1/8	1550	2	3	35	26 3/8	9 3/4	9 3/4	PLEATED	---	AUTO	208	3	9	15	5	A	CU935	
ECUH-3	10.3	250	60.0	97.9	1/8	1550	2	3	35	26 3/8	9 3/4	9 3/4	PLEATED	---	AUTO	208	3	9	15	5	A	CU935	
ECUH-4	13.7	250	60.0	110.5	1/8	1550	2.7	4	35	26 3/8	9 3/4	9 3/4	PLEATED	---	AUTO	208	3	12	15	5	A	CU935	
ECUH-5	13.7	250	60.0	110.5	1/8	1550	2.7	4	35	26 3/8	9 3/4	9 3/4	PLEATED	---	AUTO	208	3	12	15	5	A	CU935	

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE MARKEL 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	18	DIAPHRAGM	40	35	74	40	140	0.9	0.38	2.0	8	12-5/8	HFT-15	

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.

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	FLA	MOP	SCCR KA	OPTIONS/ ACCESSORIES		
DWH-1	17	2.5	11	40	120	AUTO	120	1	20.8	30	5	---	JER-20 SCF	

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

PLUMBING FIXTURE SCHEDULE

UNIT IDENTIFICATION	WATER CLOSET/URINAL						FLUSH VALVE		TOILET SEAT	KEYED NOTES
	FIXTURE MATERIAL	FIXTURE COLOR	MOUNTING STYLE	INSTALLED RIM HEIGHT (INCHES)	SUPPLY SPUD LOCATION	MANUFACTURER/ MODEL	CONSUMPTION (GALLONS PER FLUSH)	MANUFACTURER/ MODEL	MANUFACTURER/ MODEL	
WC-1	VITREOUS CHINA	WHITE	WALL	SEE ARCH.	TOP	KOHLER / K-4235	1.28	SLOAN / 111-1.28	CHURCH / 295SSCT	

APPROVED MANUFACTURERS:
WATER CLOSETS – AMERICAN STANDARD, FERGUSON, KOHLER, SLOAN, ZURN
FLUSHOMETER – AMERICAN STANDARD, COYNE&DELANY, DELTA, KOHLER, MOEN, SLOAN, ZURN
TOILET SEATS – BEMIS, CENTOCO, CHURCH, FERGUSON, OLSONITE, SANDERSON, ZURN

UNIT IDENTIFICATION	LAVATORY/SINK						FAUCET			KEYED NOTES
	FIXTURE MATERIAL	FIXTURE COLOR	MOUNTING STYLE	NUMBER OF BOWLS	OVERALL DIMENSIONS L x W x D INCHES	MANUFACTURER/ MODEL	FLOW RATE GALLONS/ MINUTE	DESCRIPTION	MANUFACTURER/ MODEL	
LAV-1	VITREOUS CHINA	WHITE	WALL	1	20 x 18 x 6-3/8	ZURN / Z5340	0.5	SINGLE HOLE, PUSH BUTTON, POLISHED CHROME FINISH	ZURN / Z86100-XL	1, 3, 4

APPROVED MANUFACTURERS:
LAVATORIES – AMERICAN STANDARD, FERGUSON, KOHLER, SLOAN, ZURN
FAUCETS – AMERICAN STANDARD, CHICAGO, DELTA, KOHLER, MOEN, SPEAKMAN, T&S BRASS, ZURN

UNIT IDENTIFICATION	SERVICE SINKS						FAUCET			KEYED NOTES
	FIXTURE MATERIAL	FIXTURE COLOR	MOUNTING STYLE	TRAP TYPE	OVERALL DIMENSIONS L x W x D INCHES	MANUFACTURER/ MODEL	FLOW RATE GALLONS/ MINUTE	DESCRIPTION	MANUFACTURER/ MODEL	
SS-1	MOLDED STONE	WHITE	FLOOR MOUNT	STANDARD	24 x 24 x 10	FIAT / MSBID2424	2.5	SERVICE SINK FAUCET WITH INTEGRAL STOPS, VACUUM BREAKER, AND PAIL HOOK. INCLUDE HOT AND COLD WATER INDICATORS. INCLUDE 5 FOOT RUBBER HOSE AND WALL MOUNTED HOSE CLAMP.	ZURN / Z1996-SF	

APPROVED MANUFACTURERS:
SERVICE SINK, MOLDED STONE – ACORN, CRANE, FLORESTONE, FERGUSON, MUSTEE, SWAN, ZURN
FAUCETS – AMERICAN STANDARD, CHICAGO, DELTA, KOHLER, MOEN, SPEAKMAN, T&S BRASS, ZURN

UNIT IDENTIFICATION	FLOOR DRAINS AND FLOOR SINKS								KEYED NOTES
	FIXTURE MATERIAL	FIXTURE SHAPE	OUTLET SIZE	OUTLET TYPE	GRATE SIZE	MANUFACTURER/ MODEL	DIMENSIONS INCHES	DESCRIPTION	
FD-1	NICKEL BRONZE	ROUND	3	BOTTOM	7ø	ZURN / Z415B	8-3/8ø	TOILET ROOM FLOOR DRAIN WITH ENAMEL COATING AND ROUND TOP	6

APPROVED MANUFACTURERS:
FLOOR DRAINS – JOSAM, MIFAB, SIOUX CHIEF, JR SMITH, TYLER, WATTS, ZURN

GENERAL NOTES:
1. PROVIDE ALL ALL FIXTURE SUPPORTS AS REQUIRED.
2. ALL PLUMBING FIXTURES, EQUIPMENT, TRIM AND FITTINGS SHALL COMPLY WITH LOCAL, STATE AND FEDERAL REGULATIONS AND CODES, INCLUDING, BUT NOT LIMITED TO, WATER AND ENERGY CONSERVATION CODES. THE SCHEDULED AND/OR SPECIFIC PLUMBING FIXTURES AND EQUIPMENT REPRESENT THE MINIMUM CRITERIA AND SHALL BE THE BASIS FOR THE CONTRACTOR'S BASE BID. IF THE SCHEDULED OR SPECIFIED FIXTURES OR EQUIPMENT DO NOT COMPLY WITH GOVERNING CODES OR REGULATIONS IN ALL RESPECTS, THE CONTRACTOR SHALL PROVIDE AN ALTERNATE BID FOR COMPLYING FIXTURES, EQUIPMENT, TRIM OR FITTINGS. THE ABSENCE OF AN ALTERNATE BID SHALL BE CONSTRUED TO MEAN THAT THE CONTRACTOR'S BID INCLUDES ALL COSTS NECESSARY TO MEET ALL REGULATIONS AND CODES.

KEYED NOTES:
1. COMPLETE W/FLAT GRID DRAIN & UNDERSINK PIPING PROTECTION BY "PLUMBEREX".
2. PROVIDE GRID WASTE OUTLET UNLESS SINK REQUIRES DISPOSAL OUTLET OR NOTED OTHERWISE.
3. PROVIDE 1-1/4 17 GAGE CHROME PLATED, CAST BRASS P-TRAP AND WASTE TO WALL ESCUTCHEON.
4. INSTALL COMPLETE WITH THERMOSTATIC MIXING VALVE.
5. PROVIDE GRID DRAIN FOR SHOWER/TUB AND ANY REQUIRED DRAIN TAILPIECES, UNLESS NOT REQUIRED BY SELECTED BASIN/ENCLOSURE OR NOTED OTHERWISE.
6. PROVIDE WITH TRAP SEAL PROTECTION DEVICE.

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PBA Project No.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

MECHANICAL SCHEDULES

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

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M-702

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

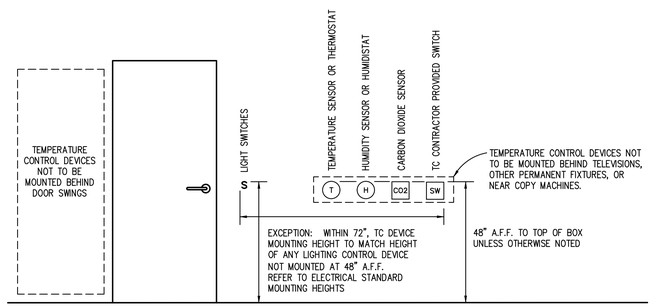
SYMBOL	DESCRIPTION
	AUDIBLE DEVICE (AS DEFINED ON TC DRAWINGS)
M/S	COIL – MOTOR STARTER CONTACTOR
R	COIL – RELAY
TDR	COIL – TIME DELAY RELAY
VFC	COIL – VARIABLE SPEED DRIVE CONTACTOR
	COIL – EP OR SOLENOID VALVE
	CONTACT – INSTANT OPERATING, NO
	CONTACT – INSTANT OPERATING, NC
	CONTACT – TIMED AFTER 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

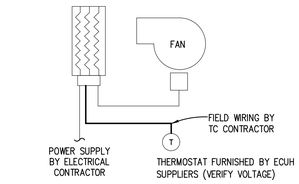
NOTES:

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

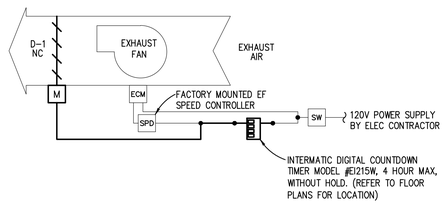


ELECTRIC CUH CONTROL

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.



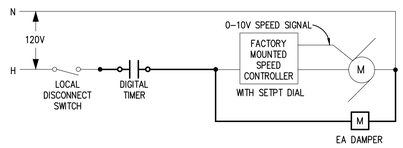
EXHAUST FAN (EF-1) CONTROL

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 DIGITAL COUNTDOWN TIMER. 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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PBA Project No.: 2025.0071

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Twin Turf Field
Restroom Building

Dexter, Michigan

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TEMPERATURE CONTROLS

Dates

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ELECTRICAL SYMBOL LIST

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

SYMBOL	DESCRIPTION
X (NL)	X DENOTES FIXTURE TYPE (NL INDICATES NIGHT LIGHT)
	FILL DENOTES EMERGENCY FIXTURE
	TROFFER LIGHT
	STRIP LIGHT
	LINEAR LIGHT
	MULTIHEAD ADJUSTABLE LIGHT
	DOWN LIGHT
	DIRECTIONAL DOWN LIGHT
	DECORATIVE LIGHT
	DECORATIVE LIGHT
	WALL MOUNTED LIGHT
	WALL SCONCE
	ARM MOUNTED LIGHT
	LIGHTING TRACK
	TRACK LIGHT
	ADJUSTABLE FLOOD LIGHT
	STEP LIGHT
	LED TAPE
	REMOTE DRIVER
	HIGH BAY LIGHT
	POLE MOUNTED LIGHT
	POST TOP LIGHT
	BOLLARD LIGHT
	IN GROUND LIGHT
	EMERGENCY LIGHT
	EXIT LIGHT WITH DIRECTIONAL ARROWS (FILLED AREA INDICATES FACE)
	EXIT LIGHT WITH DIRECTIONAL ARROWS (FILLED AREA INDICATES FACE)
	EXIT LIGHT – WALL MOUNTED (FILLED AREA INDICATES FACE)
	EXIT/EMERGENCY LIGHT COMBO – WALL MOUNTED (FILLED AREA INDICATES FACE)
BCELTS	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH
ALCR	AUTOMATIC LOAD CONTROL RELAY
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
HH	HANDHOLE
	ABOVE COUNTER DUPLEX RECEPTACLE OUTLET (SIMILAR FOR TAMPER RESISTANT, CONTROLLED, QUADS, EMERGENCY, UPS, USB, AND GFCI RECEPTACLE OUTLETS)
	DUPLEX GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE OUTLET
	DEAD FRONT GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX EMERGENCY RECEPTACLE OUTLET
	DUPLEX TAMPER RESISTANT RECEPTACLE OUTLET
	QUAD TAMPER RESISTANT RECEPTACLE OUTLET
	DUPLEX UPS RECEPTACLE OUTLET
	DUPLEX RECEPTACLE OUTLET WITH 2 USB PORTS
	4 PORT USB CHARGING STATION
	CEILING MOUNTED DUPLEX/QUAD RECEPTACLE OUTLET
	POWER POLE
"X"	WALL/CEILING MOUNTED SPECIAL RECEPTACLE OUTLET – REFER TO ELECTRICAL STANDARD SCHEDULES
	BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH
	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 S3	DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S3 S3	3-WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S4 S4	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
	COMBINATION MAGNETIC CONTROLLER
	NON-FUSIBLE DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
CB	ENCLOSED CIRCUIT BREAKER
	PUSH BUTTON STATION
J	JUNCTION BOX
	HARD WIRE POWER CONNECTION
	GROUND ROD
	GROUND CONNECTION
	EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	ABOVE COUNTER EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	EMPTY BOX FOR FUTURE CEILING MOUNTED TELECOMMUNICATION OUTLET
	TELECOMMUNICATION OUTLET "X" INDICATES TYPE
	ABOVE COUNTER TELECOMMUNICATION OUTLET "X" INDICATES TYPE
	TELECOMMUNICATION CEILING MOUNTED OUTLET "X" INDICATES TYPE
	TELECOMMUNICATION BACKBOARD
TGB	TELECOMMUNICATION GROUNDING BUS BAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUS BAR
IC	INTERCOM OUTLET
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
	TIME CLOCK
C	CONTACTOR
P	PHOTOCELL
TT	TWIST TIMER
EVSE	ELECTRICAL VEHICLE SUPPLY EQUIPMENT
DCFC	DC FAST CHARGER – STANDALONE
DCPM	DC FAST CHARGER – POWER MODULE
DCDP	DC FAST CHARGER – DISPENSER

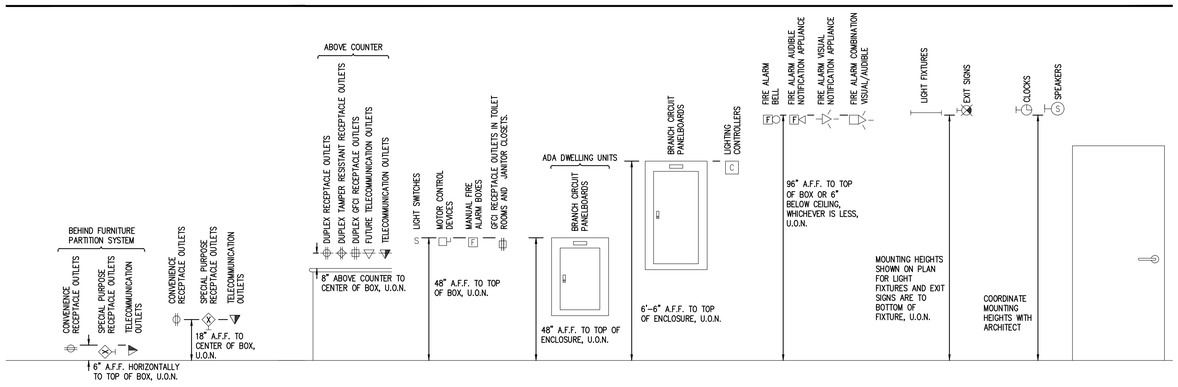
REFER TO ELECTRICAL STANDARD SCHEDULES

SYMBOL	DESCRIPTION
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
PRM	PHASE ROTATION MONITOR
	CAMLOK – MALE
	CAMLOK – FEMALE
	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 EQUIPMENT
GB	ELECTRICAL GROUNDING BUS BAR
PB	PLUG IN BUSWAY
FB	FEEDER BUSWAY
12x4	CABLE TRAY – ALL SIZES IN INCHES

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
	ACCESS CONTROL CONTROL PANEL
	ACCESS CONTROL POWER SUPPLY
	CIRCUIT BREAKER
	DRAWOUT CIRCUIT BREAKER MANUALLY/ OPERATED
	DRAWOUT CIRCUIT BREAKER ELECTRICALLY/ OPERATED
	SWITCH
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL
MM	ADDRESSABLE MONITORING MODULE
CM	ADDRESSABLE CONTROL MODULE
TS	ADDRESSABLE MONITORING MODULE FOR TAMPER SWITCH
FS	ADDRESSABLE MONITORING MODULE FOR FLOW SWITCH
DR	MAGNETIC DOOR RELEASE

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)
HD	HEAT 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

STANDARD MOUNTING HEIGHTS



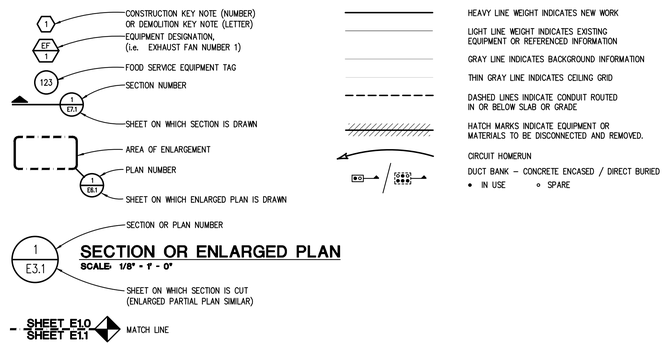
ELECTRICAL DRAWING INDEX

SHEET NO.	SHEET TITLE
E-001	ELECTRICAL STANDARDS AND DRAWING INDEX
E-002	ELECTRICAL STANDARD SCHEDULES
E-003	ELECTRICAL SPECIFICATIONS
E-004	ELECTRICAL SITE NEW WORK PLAN
E-200	ELECTRICAL NEW WORK PLANS
E-501	ONE LINE DIAGRAM & ELECTRICAL DETAILS

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
ECM	ELECTRONICALLY COMMUTATED MOTOR
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
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
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
ST	SHUNT TRIP
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
WAP	WIRELESS ACCESS POINT
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

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ELECTRICAL STANDARDS AND DRAWING INDEX

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: MPD
Checked: STP
Approved: STP

Project Number

BRI 2021097

Sheet Number

E-001

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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	RECEPTACLE CONTROL	EMERGENCY LIGHTING CIRCUIT CONTROL	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	N/A	MANUAL ON / SENSOR OFF	DUAL TECHNOLOGY	FULL 100%	N/A	N/A	N/A		20			BATTERY		
B	STORAGE ROOM (ALL OTHER STORAGE ROOMS)	LINE VOLTAGE	ON-OFF	N/A	MANUAL ON / SENSOR OFF	DUAL TECHNOLOGY	FULL 100%	N/A	N/A	N/A		20			BATTERY		

N/A = NOT APPLICABLE

NOTE:
1. REFER TO PLANS FOR LOCATION OF LOCAL CONTROL.
2. CONTRACTOR SHALL PROVIDE FLOOR PLAN INDICATING SENSOR AND EQUIPMENT LOCATIONS OF CHOSEN CONTROL SYSTEM.
3. LIGHTING SENSOR SHALL HAVE CONTACT FOR HVAC CONTROL WHEN A "YES" SELECTION IS MADE IN THE HVAC CONTROL COLUMN.
4. REFER TO TEMPERATURE CONTROL DRAWINGS AND DIAGRAMS FOR ADDITIONAL SENSOR REQUIREMENTS.
5. PROVIDE WIRING CONTROL DIAGRAM FOR APPLICABLE CONTROL SYSTEM(S).

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LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER(S)	WATTAGE	VOLTAGE	LIGHT CHARACTERISTICS	REMARKS
L1	RECESSED VANDAL PROOF 2'X4' TROFFER: 20 GAUGE 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.	1. LITHONIA VRTL SERIES 2. FAIL SAFE GRV SERIES 3. NEW STAR 37M SERIES	46	MULTI	LED 5000K 5,000 LUMENS 80 CRI MINIMUM	FOR FIXTURES INDICATED AS EMERGENCY ON PLAN, PROVIDE COLD WEATHER 1400 LUMEN EMERGENCY BATTERY PACK.
L2	SURFACE MOUNTED INDUSTRIAL LED 4'-0" LED FIXTURE: FROSTED LENS WITH WIREGUARD.	1. LITHONIA ZL1D SERIES 2. METALUX SNLED SERIES 3. COLUMBIA MPS SERIES	30	MULTI	LED 5000K 3,000 LUMENS 80 CRI MINIMUM	
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.	1. GOTHAM EVO VR SERIES 2. PORTFOLIO FFLD6A SERIES 3. NEW STAR DLM6 LED SERIES	24.7	MULTI	LED 4000K 2,000 LUMENS 80 CRI MINIMUM	FOR FIXTURES INDICATED AS EMERGENCY ON PLAN, PROVIDE COLD WEATHER 1400 LUMEN EMERGENCY BATTERY PACK.
OL2	RECESSED LINEAR 4' VANDAL RESISTANT LED FIXTURE: FULLY SEALED AND GASKETED, IP 65 RATED, SELF FLANGED, SYMMETRIC DISTRIBUTION FROSTED ACRYLIC LENS + .250" CLEAR POLYCARBONATE LENS, UL LISTED FOR WET LOCATIONS. DARK BRONZE FINISH.	1. KENALL BHRS4 SERIES 2. FAIL-SAFE FSN6 SERIES 3. NULITE RXT-F SERIES	24	MULTI	LED 4000K 500 MIN. LUMENS PER FOOT 80 CRI MINIMUM	
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.	1. MCGRAW-EDISON ISS SERIES 2. LITHONIA WSQ SERIES 3. HUBBELL QSP2 SERIES	33.4	MULTI	LED 4000K 3,500 LUMENS 80 CRI MINIMUM	

GENERAL NOTES:
1. WATTAGE IS BASED ON THE FIRST LISTED MANUFACTURER.
2. ALL LUMINAIRES TO BE AS SPECIFIED OR EQUAL APPROVED BY PBA PRIOR TO BIDS.

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"	

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-2 UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
4. CONDUIT SIZES ARE VALID FOR EMT OR RSC. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
5. SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
6. OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY.

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.

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 XG	REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE EPG	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 PARKING LOTS AND ROADWAYS		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	X						
BELOW PARKING LOTS AND ROADWAYS		X			X	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.

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%.

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

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Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ELECTRICAL STANDARD SCHEDULES

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: MPD
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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. ELECTRICAL GROUNDING BUSBAR: PROVIDE 24" (MIN) X 2" X 1/4" TIN PLATED, COPPER BUSBAR WITH TWO ROWS OF 1/4" X 20 TAPPED HOLES 1" ON CENTER.
B. 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.
C. PROVIDE EQUIPMENT GROUNDING CONDUCTORS IN EACH RACEWAY.
  1. WHERE EXISTING BRANCH CIRCUITS ARE USING CONDUIT AS EQUIPMENT GROUNDING CONDUCTOR AND ARE EXTENDED, PROVIDE GROUNDING BUSHING ON EXISTING CONDUIT AND PROVIDE NEW EQUIPMENT GROUNDING CONDUCTOR WITH NEW BRANCH CIRCUIT.

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, COMPRESSION 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.
  3. TEN TIMES THE INTERNAL DIAMETER OF CONDUITS FOR FIBER CABLING.

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 WITH MULTIPLE POWER OR CONTROL SOURCES: APPLY TO DOOR OR COVER OF EQUIPMENT INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:
  2. 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. MOUNT PHOTOCELL ON ROOF OR PARAPET TO ½" GRS CONDUIT, SUPPORTED TO BUILDING STRUCTURE BELOW. COORDINATE ROOF PENETRATION WITH ROOFING CONTRACTOR.
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.
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. DO NOT USE TANDEM CIRCUIT BREAKERS.
  5. PROVIDE CIRCUIT BREAKERS U.L. LISTED AS TYPE GFEPCI FOR ALL SELF REGULATING HEATING (SNOW MELTING AND HEAT TRACE) CABLES BRANCH CIRCUITS.
  6. PROVIDE LOCK ON DEVICES FOR CIRCUIT BREAKERS WHEN CALLED OUT ON PANEL SCHEDULES WITH "LOD" DESIGNATION.
  7. 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: COMMERICAL 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: 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.
  4. DEAD FRONT GFCI, 20A: HUBBELL GFBFST20 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, INCLUDING POOL ENVIRONMENTS.
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 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.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ELECTRICAL SPECIFICATIONS

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: MPD
Checked: STP
Approved: STP

Project Number

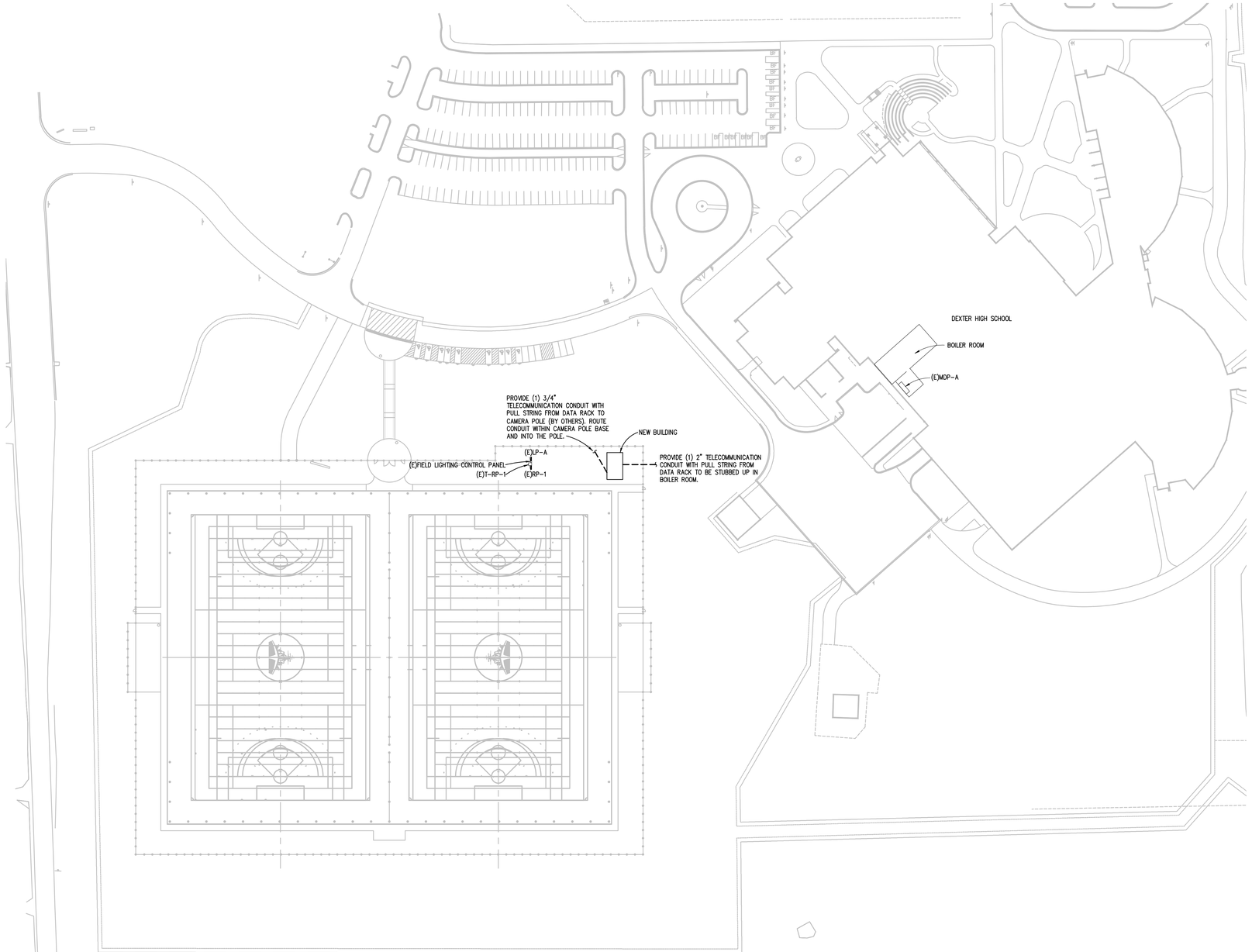
BRI 2021097

Sheet Number

E-003

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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



ELECTRICAL SITE NEW WORK PLAN
SCALE: 1" = 60'

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. COORDINATE DEMOLITION WORK, AND ELECTRICAL AND TELEPHONE SERVICES TO THE SITE, WITH THE RESPECTIVE LOCAL UTILITY COMPANY REPRESENTATIVES PRIOR TO COMMENCEMENT OF WORK. INCLUDE ALL ASSOCIATED COST/FEES BY THE UTILITY COMPANIES IN THE BID PRICE.
7. INSTALL UNDERGROUND CONDUITS 42" BELOW FINISHED GRADE, MINIMUM, UNLESS NOTED OTHERWISE.
8. 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.
9. REMOVE ALL DE-ENERGIZED CONDUCTORS FROM SITE AT COMPLETION OF THE PROJECT.
10. SPARE CONDUITS SHALL INCLUDE PULL STRING AND SHALL BE TERMINATED WITH A CAP.
11. EXCAVATE THE ENTIRE LENGTH OF TRENCH TO PROPERLY SET DUCT ELEVATIONS.

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PBA Project No.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ELECTRICAL SITE NEW WORK PLAN

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
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Quality Control

Drawn: MPD
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Approved: STP

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BRI 2021097

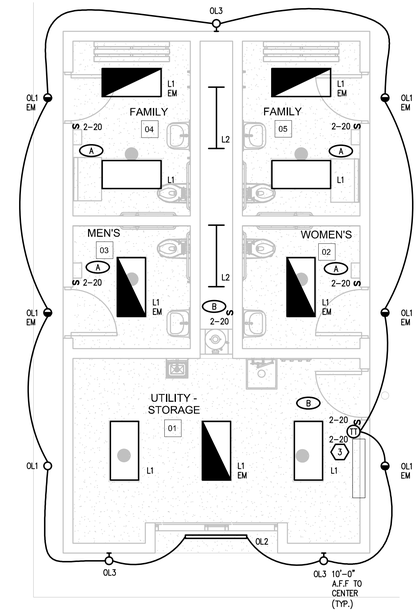
Sheet Number

E-004

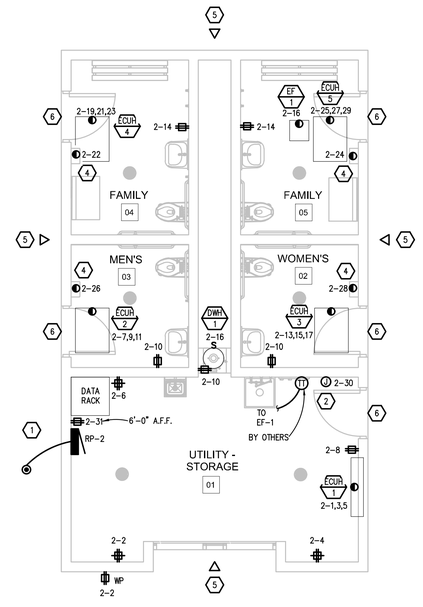
811 Know what's below. Call before you dig.

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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 TEMPERATURE CONTROLS SHEETS FOR REQUIRED FIRE ALARM CONTROL MODULES, DUCT SMOKE DETECTORS, AND MOTOR CONTROLLERS. PROVIDE ALL ACCESSORIES INDICATED.

(#) CONSTRUCTION KEY NOTES:

1. PROVIDE GROUNDING AS REQUIRED PER THE NEC.
2. HEAT TRACE BY OTHERS. COORDINATE WITH MECHANICAL CONTRACTOR.
3. PROVIDE INTERMATIC FF6H TWIST TIMER.
4. ELECTRIC HAND DRYER FURNISHED BY OTHERS, INSTALLED BY ELECTRICAL CONTRACTOR. FIELD COORDINATE MOUNTING HEIGHT WITH ARCHITECT.
5. SECURITY CAMERA INSTALLED BY OTHERS. FIELD COORDINATE EXACT LOCATION WITH OWNER. PROVIDE 3/4" CONDUIT FROM DATA RACK.
6. REFER TO ARCHITECTURAL FLOOR PLANS, DOOR HARDWARE SCHEDULE ON ARCHITECTURAL DRAWINGS, ACCESS CONTROL SYSTEM SPECIFICATION SECTION AND ACCESS CONTROL DOOR DIAGRAM(S) ON E7 SERIES FOR RACEWAY AND BACK BOX REQUIREMENTS FOR DOORS INDICATED. PROVIDE ALL RACEWAYS AND BACK BOXES REQUIRED. COORDINATE WITH DOOR HARDWARE CONTRACTOR.

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PBA Project No.: 2025.0071

Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ELECTRICAL NEW WORK PLANS

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

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(E)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	12181			12001		NEW		NC	8
9	R	EXISTING LOAD	EXIST	20	180		11994		11814	150	NEW	RP-2	NC	10
11		SPARE	EXIST	20				12917	12917		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
						13981 ØA	13794 ØB	13797 ØC						

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

☐ FEED-THROUGH LUGS
☐ DOUBLE LUGS
☐ INTEGRAL SPD

PANELBOARD LOCATION

BRANCH CIRCUIT CONNECTED LOAD		DEMAND FACTOR	CALCULATED LOAD	FEEDER AND OCPD SIZING	
CONTINUOUS LOAD (C)		100%		125%	
ELECTRIC HEAT (E)		100%		100%	
NON-CONTINUOUS LOAD (NC)	37432	100%	37432	100%	37432
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):	41.6		
		TOTAL (AMPS):	115.4	TOTAL (AMPS):	117.4

NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

NOTES:

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RP-2

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØB	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	NC		NEW		3483	3843			360	20	NEW	RECEPTACLE	R	2
3	NC	ECUH - 1	NEW	40	3483		3663		180	20	NEW	RECEPTACLE	R	4
5	NC		NEW		3483			3663	180	20	NEW	RECEPTACLE	R	6
7	NC		NEW		1081	1261			180	20	NEW	RECEPTACLE	R	8
9	NC	ECUH - 2	NEW	15	1081		1621		540	20	NEW	RECEPTACLE	R	10
11	NC		NEW		1081			1261	180	20	NEW	RECEPTACLE	R	12
13	NC		NEW		1081	1441			360	20	NEW	RECEPTACLE	R	14
15	NC	ECUH - 3	NEW	15	1081		1248		167	15	NEW	EF-1	C	16
17	NC		NEW		1081			3581	2500	30	NEW	DWH-1	NC	18
19	NC		NEW		1441	2315			874	20	NEW	LIGHTING	L	20
21	NC	ECUH - 4	NEW	15	1441		2641		1200	20	NEW	ELECTRIC HAND DRYER	NC	22
23	NC		NEW		1441			2641	1200	20	NEW	ELECTRIC HAND DRYER	NC	24
25	NC		NEW		1441	2641			1200	20	NEW	ELECTRIC HAND DRYER	NC	26
27	NC	ECUH - 5	NEW	15	1441		2641		1200	20	NEW	ELECTRIC HAND DRYER	NC	28
29	NC		NEW		1441			1771	330	20	GFEP	HEAT TRACE	C	30
31	C	SECURITY SYSTEM	NEW	20	500	500				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
						12001 ØA	11814 ØB	12917 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 OCPD SIZING	
CONTINUOUS LOAD (C)	997	100%	997	125%	1246
ELECTRIC HEAT (E)		100%		100%	
NON-CONTINUOUS LOAD (NC)	32881	100%	32881	100%	32881
KITCHEN LOAD (K)		100%		100%	
RECEPTACLE BASE LOAD (R)	1980	100%	1980	100%	1980
RECEPTACLE DEMAND LOAD (R)		50%		100%	
LIGHTING LOAD (L)	874	100%	874	125%	1093
ADDITIONAL TRACK LIGHTING LOAD				100%	
MOTORS, HIGHEST LOAD (MH)		125%		100%	
MOTORS, REMAINING LOAD (M)		100%		100%	
		TOTAL(KVA):	36.7		
		TOTAL (AMPS):	102.0	TOTAL (AMPS):	103.3

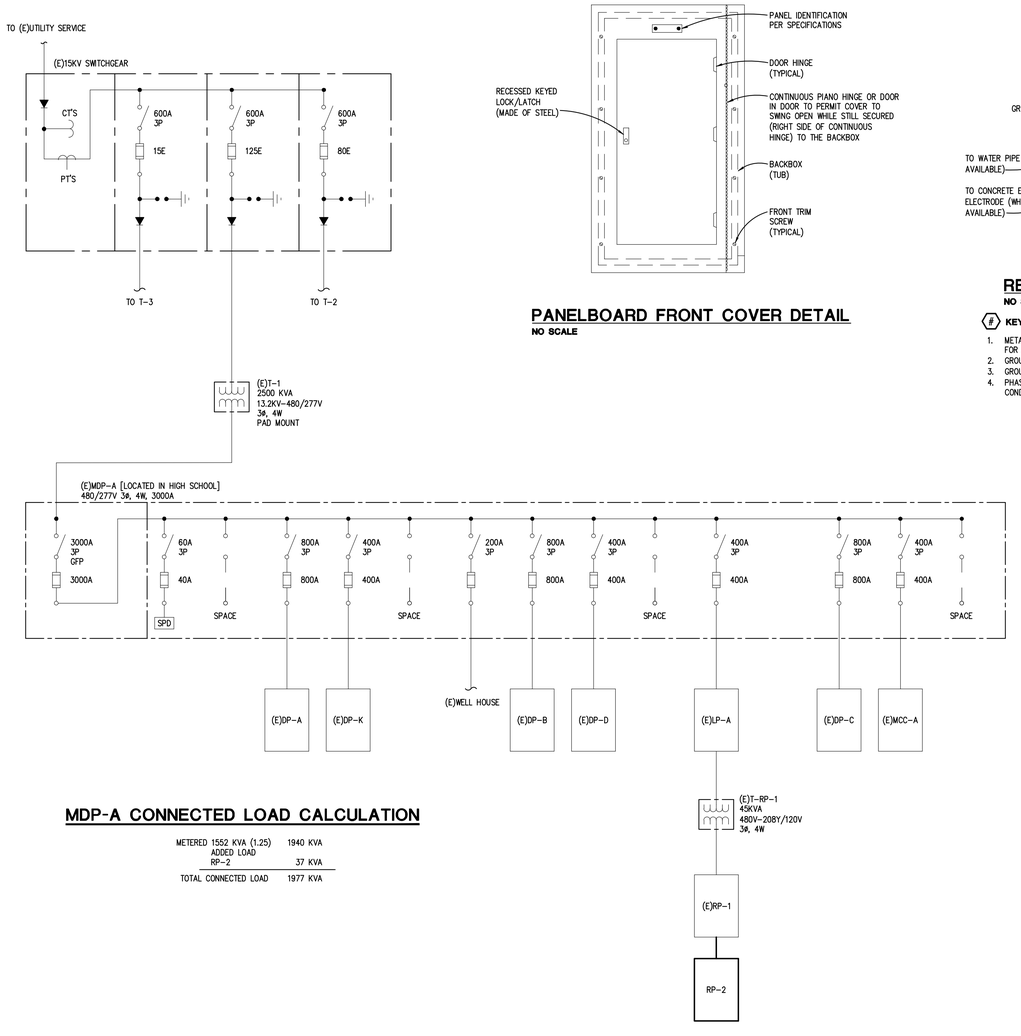
NOTE: DEMAND AND SIZING INFORMATION IS CALCULATED FROM CONNECTED LOAD

NOTES:

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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.



MDP-A CONNECTED LOAD CALCULATION

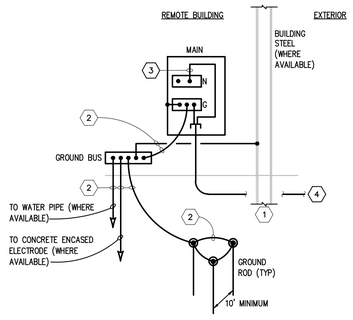
METERED 1552 KVA (1.25)	1940 KVA
ADDED LOAD RP-2	37 KVA
TOTAL CONNECTED LOAD	1977 KVA

ONE LINE DIAGRAM

NO SCALE

PANELBOARD FRONT COVER DETAIL

NO SCALE

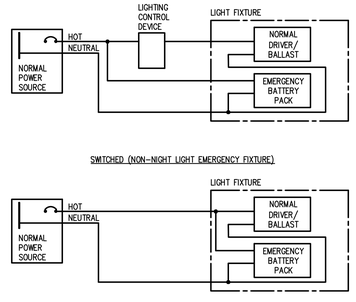


REMOTE BUILDING GROUNDING

NO SCALE

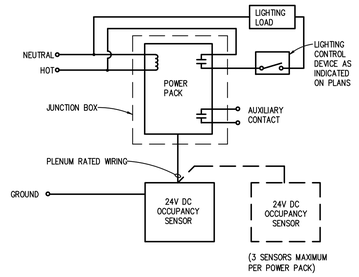
KEYED NOTES:

1. METAL IN-GROUND SUPPORT STRUCTURE IN DIRECT CONTACT WITH EARTH VERTICALLY FOR A MINIMUM OF 10FT, WHERE AVAILABLE.
2. GROUNDING ELECTRODE CONDUCTOR, #4/0 COPPER.
3. GROUNDED CONDUCTOR (NEUTRAL), SEE ONE LINE DIAGRAM.
4. PHASE CONDUCTORS, GROUNDED CONDUCTOR (NEUTRAL), AND EQUIPMENT GROUNDING CONDUCTOR IN CONDUIT TO MAIN BUILDING. SEE ONE LINE DIAGRAM.



EMERGENCY BATTERY BACKUP WIRING DIAGRAM - INTERNAL TO LIGHT FIXTURE

NO SCALE



OCCUPANCY SENSOR WIRING DIAGRAM

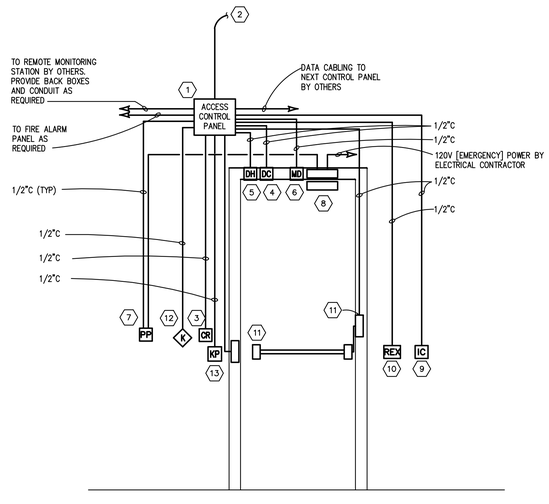
NO SCALE

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.

GENERAL NOTES:

1. REFER TO ELECTRICAL FLOOR PLANS FOR DOOR LOCATIONS.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE BACK BOXES, CONDUIT, 120 VOLT WIRING AND TERMINATIONS AS REQUIRED BY MANUFACTURE.
3. ACCESS CONTROL CONTRACTOR SHALL PROVIDE EQUIPMENT DEVICES AND ALL LOW VOLTAGE WIRING AND TERMINATIONS.
4. SOME DEVICES INDICATED MAY NOT APPLY REFER TO DOOR HARDWARE AND DOOR SCHEDULE. COORDINATE ALL WORK WITH HARDWARE CONTRACTOR.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE INTERCONNECTION WITH FIRE ALARM PANEL TO RELEASE DOORS I.E. ELECTROMAGNETIC LOCKS UPON AN ALARM CONDITION, AS REQUIRED.



KEYED NOTES:

1. ACCESS CONTROL SYSTEM, DOOR PANEL BY OTHERS.
2. LOW VOLTAGE CABLING, BY OTHERS.
3. PROXIMITY CARD READER, BY OTHERS.
4. DOOR MONITOR CONTACT SWITCH, BY OTHERS.
5. DOOR HOLDER, BY OTHERS. ELECTROMAGNETIC SWITCH MOUNTED ON/IN DOOR AND FRAME. [FOR DELAYED OPERATION] IN LIEU OF ELECTRIC STRIKE.
6. MOTION DETECTOR, BY OTHERS. REQUEST TO EXIT MOTION DETECTOR MOUNTED TO TOP OF DOOR FRAME. COORDINATE WITH DOOR AND FRAME CONTRACTOR.
7. DOOR OPERATOR PUSH PLATE, BY OTHERS.
8. DOOR OPERATOR, BY OTHERS.
9. INTERCOM STATION, BY OTHERS.
10. REQUEST TO EXIT PUSH PAD, BY OTHERS.
11. ELECTRIC STRIKE, PANIC HARDWARE, POWER TRANSFER, BY OTHERS.
12. KEY-SWITCH, BY OTHERS.
13. KEYPAD, BY OTHERS.

TYPICAL ACCESS CONTROL SINGLE DOOR CONNECTION DIAGRAM

NO SCALE

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Project Title

Dexter Community Schools

Twin Turf Field
Restroom Building

Dexter, Michigan

Sheet Title

ONE LINE DIAGRAM, PANEL SCHEDULES, ELECTRICAL DETAILS & DIAGRAMS

Dates

DATE	ISSUED FOR
03.12.2025	IN PROGRESS OWNER REVIEW
05.02.2025	95% CD OWNER REVIEW
07.11.2025	BCC REVIEW
09.05.2025	BIDS

Scale

Quality Control

Drawn: MPD
Checked: STP
Approved: STP

Project Number

BRI 2021097

Sheet Number

E-501

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