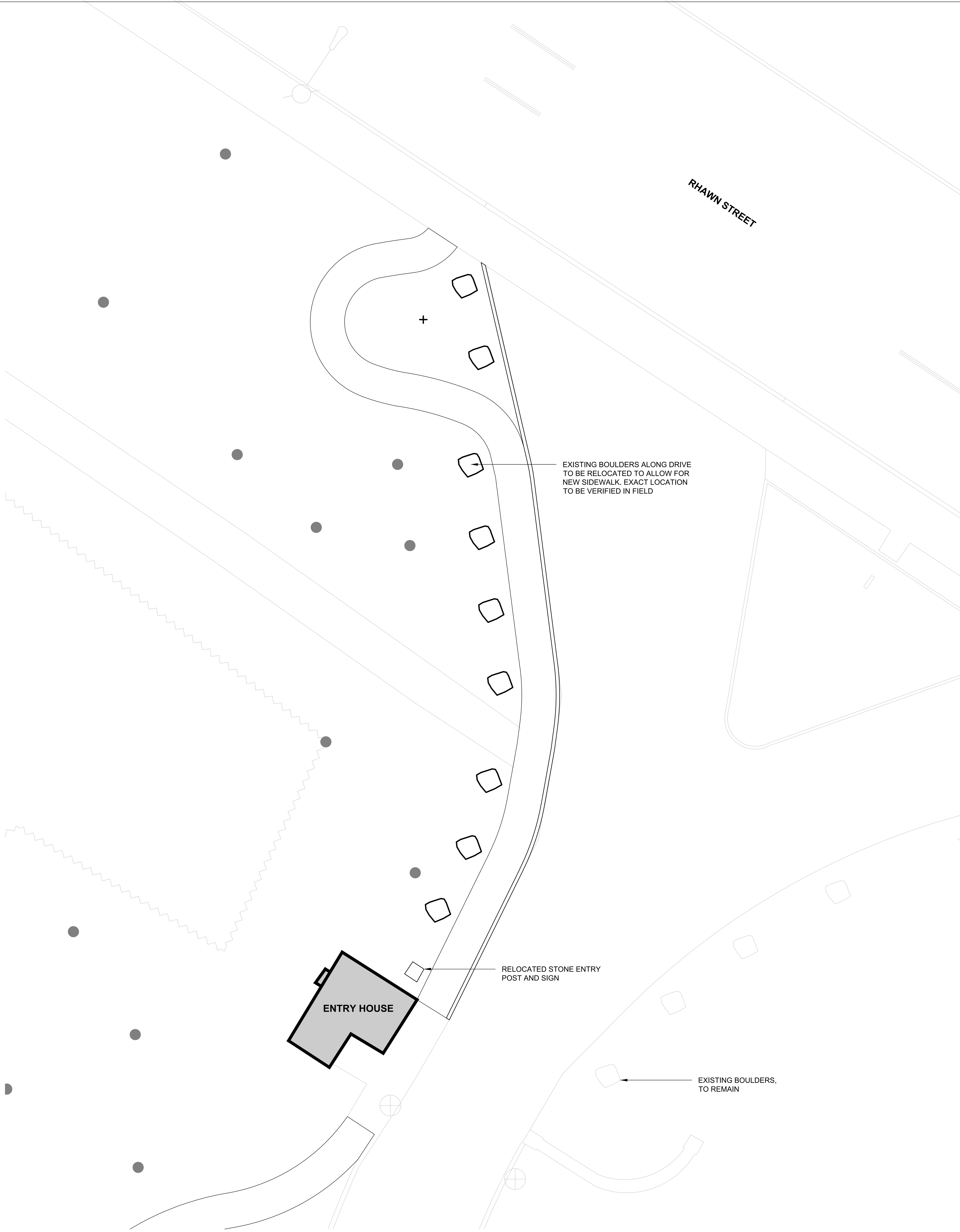

01 FURNISHING PLAN - RHAWN ST. ENTRY
SCALE: 1/8" = 1'-0"

1/8"=1'-0" 0 8 16

N

LEGEND

TREE TRUNK	
C.I.P. CONCRETE CURB	
STREET LIGHT POLE	
WOODLAND EDGE	
EXISTING BOULDER	
PROPOSED TREE	
EXISTING BUILDING	

NOTE:

1. **BOULDER LOCATIONS TO BE V.I.F.**

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANETO

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP-CALL BEFORE YOU DIG!

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NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
PENNSYLVANIA
YADIEL J. RIVERA-DIAZ
REGISTRATION NUMBER 3379
REGISTERED LANDSCAPE ARCHITECT

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
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417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
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600 Chestnut Street, Suite 772
Philadelphia, PA 19106

COST ESTIMATOR:
ELLANA CONSTRUCTION CONSULTANTS
32 Broadway, 8TH Floor
New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
PLAYFUL LEARNING LANDSCAPES ACTION NEXTWORK
Philadelphia, PA
267.468.8610

ARBORIST:
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Philadelphia, PA 19118
215.247.5777

ACCESSIBILITY CONSULTANT:
CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:

PENNYPACK PARK UNIVERSAL PLAYGROUND

RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:

FURNISHING PLAN - RHAWN ST. ENTRY

PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	SS, TW
CHECKED BY:	TS

DRAWING NO.: **L-300**

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

01 FURNISHING PLAN - PARKING AREA
SCALE: 1/8" = 1'-0"

1/8"=1'-0" 0" 0 8 16

N

LEGEND

- TREE TRUNK
- C.I.P. CONCRETE CURB
- 08 / L-901 — SITE BOULDER
- LITTER RECEPTACLE
- PICNIC TABLE
- 01 / L-903 — ENTRY FENCE
- 03 / L-903 — SECURITY FENCE AND GATE
- WOODLAND EDGE
- BIKE RACK
- PROPOSED TREE

NOTES:

1. **BOULDER LOCATIONS TO BE V.I.F.**
2. **FOR FURNISHING QUANTITY AND PRODUCT DETAILS, SEE FURNISHING SCHEDULE, L-310**

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL: PENNSYLVANIA · YAMEL L. RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

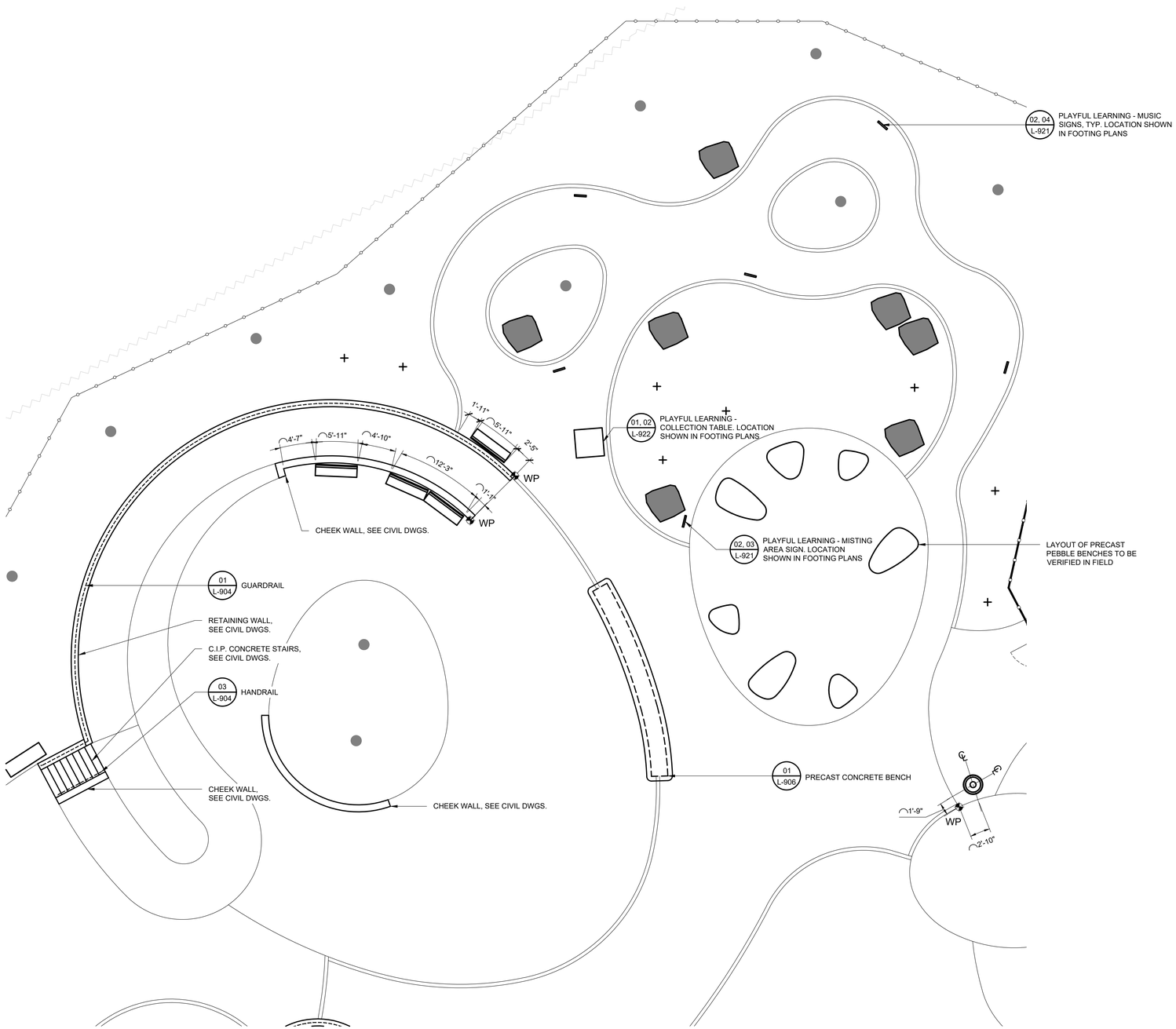
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
FURNISHING PLAN - PARKING AREA

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-301
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



01 FURNISHING PLAN - PLAYGROUND - NORTH
SCALE: 1/8" = 1'-0"

1/8"=1'-0" 8" 0 8 16

N

LEGEND

TREE TRUNK

C.I.P. CONCRETE CURB

BENCH

08 / L-901 SITE BOULDER

LITTER RECEPTACLE

01 / L-903 ENTRY FENCE

03 / L-903 SECURITY FENCE AND GATE

RAIL

WOODLAND EDGE

PROPOSED TREE +

NOTES:

1. **BOULDER LOCATIONS TO BE V.I.F.**
2. **FOR FOOTING LOCATIONS, SEE FOOTING PLAN, L-112.**
3. **FOR FURNISHING QUANTITY AND PRODUCT DETAILS, SEE FURNISHING SCHEDULE, L-310**

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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925 Irwin Run Road
West Mifflin, Pennsylvania
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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
PENNSYLVANIA · ANGEL L. RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

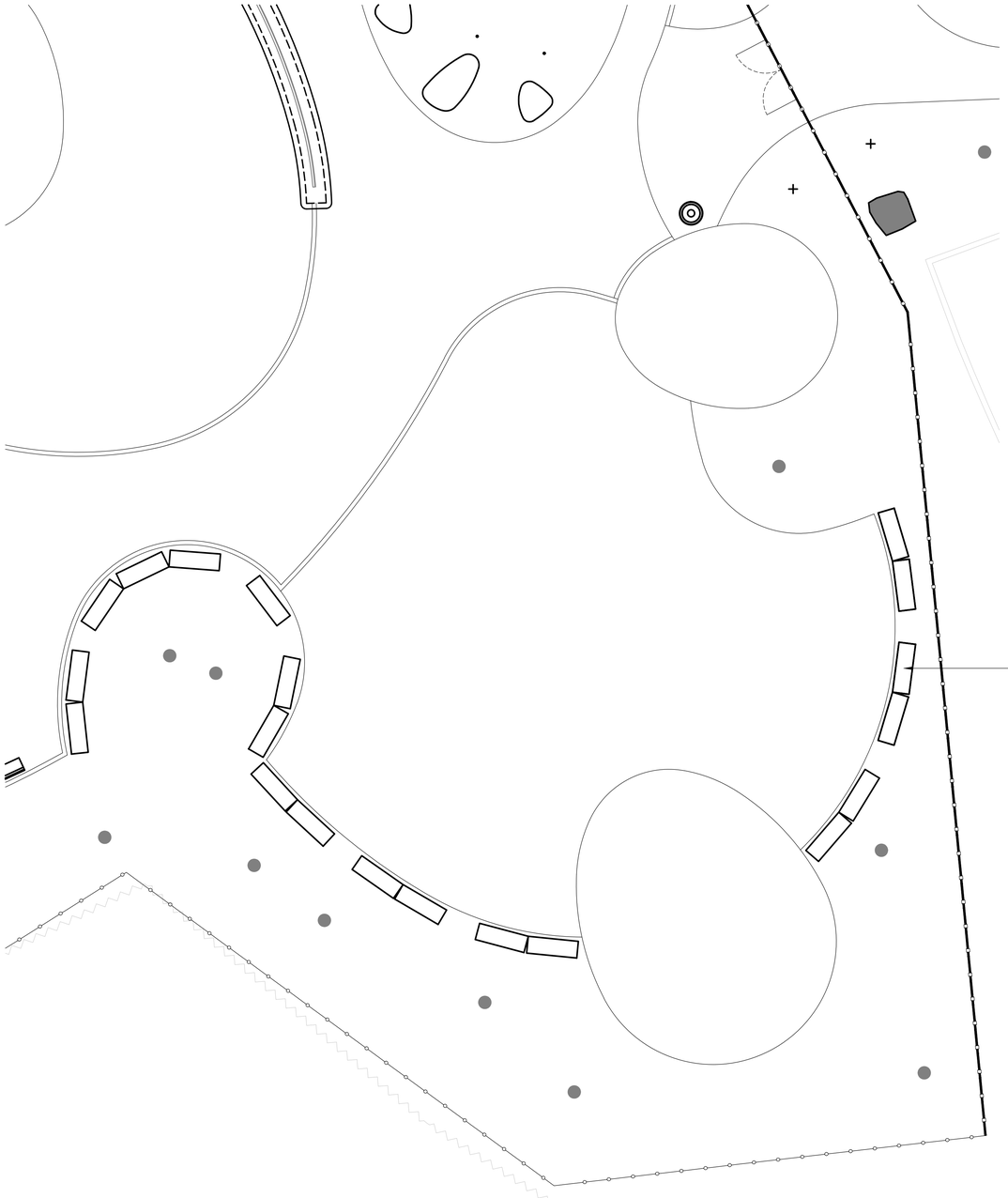
PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
FURNISHING PLAN - PLAYGROUND - NORTH

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-302
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



LAYOUT OF GRANITE BLOCKS TO BE VERIFIED IN FIELD

01 FURNISHING PLAN - PLAYGROUND - SOUTHEAST
SCALE: 1/8" = 1'-0"

1/8"=1'-0" 8" 0 8 16

N

LEGEND

- TREE TRUNK
- C.I.P. CONCRETE CURB
- BENCH
- 06, 07 / L-901 — GRANITE BLOCK SEATING
- 08 / L-901 — SITE BOULDER
- LITTER RECEPTACLE
- 01 / L-903 — ENTRY FENCE
- 03 / L-903 — SECURITY FENCE AND GATE
- RAIL
- WOODLAND EDGE
- PROPOSED TREE +

NOTES:

1. **BOULDER LOCATIONS TO BE V.I.F.**
2. **FOR FOOTING LOCATIONS, SEE FOOTING PLAN, L-112**
3. **FOR FURNISHING QUANTITY AND PRODUCT DETAILS, SEE FURNISHING SCHEDULE, L-310**

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL: YAMEL RIVERA — REGISTRATION NUMBER 3379 — REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

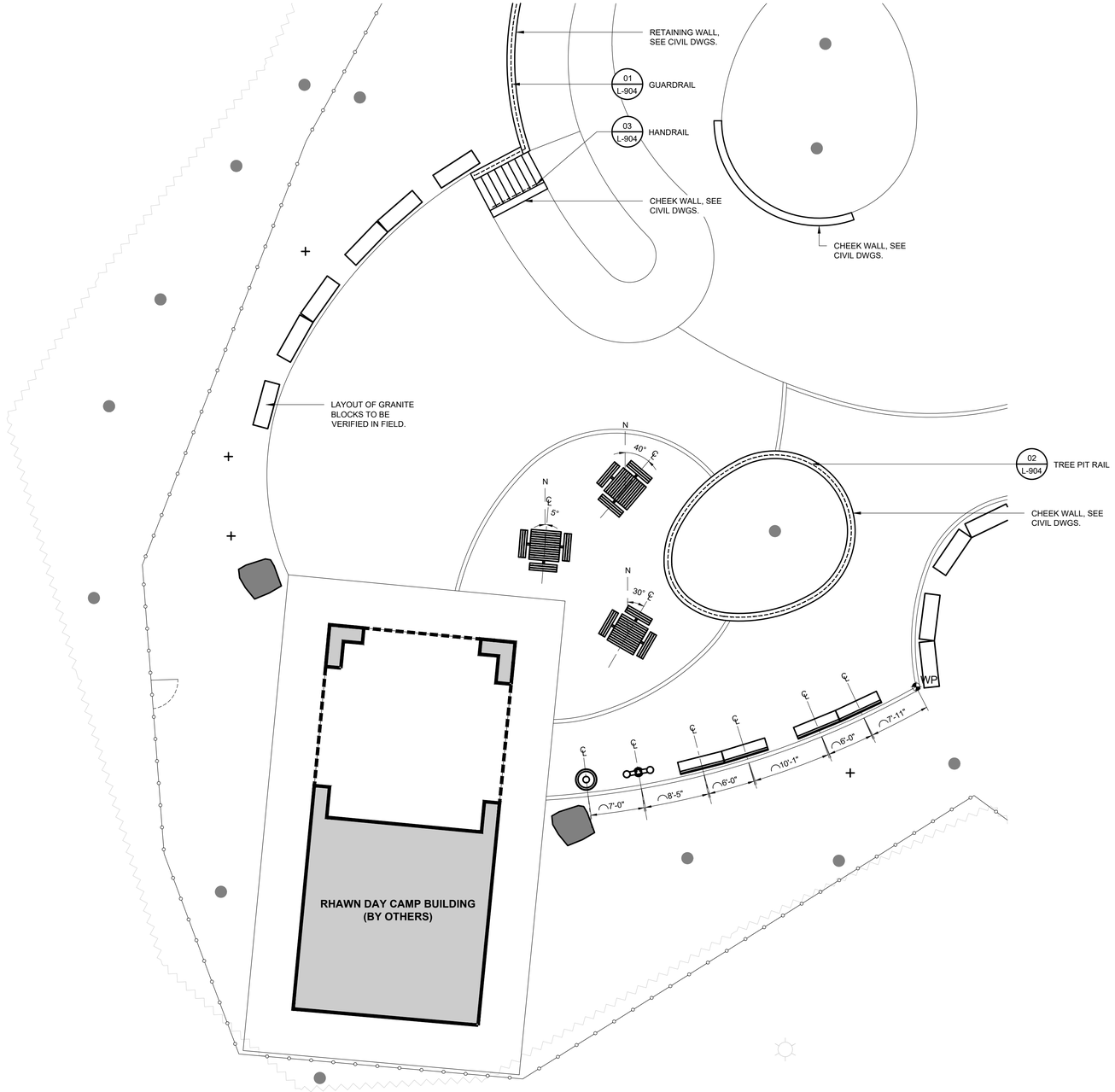
PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
FURNISHING PLAN - PLAYGROUND - SOUTHEAST

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-303
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



01 FURNISHING PLAN - PLAYGROUND - SOUTHWEST
SCALE: 1/8" = 1'-0"

1/8"=1'-0" 0' 4' 8' 16'

N

LEGEND

- TREE TRUNK
- C.I.P. CONCRETE CURB
- BENCH
- 06, 07 / L-901 GRANITE BLOCK SEATING
- 08 / L-901 SITE BOULDER
- LITTER RECEPTACLE
- 01 / L-903 ENTRY FENCE
- 03 / L-903 SECURITY FENCE AND GATE
- RAIL
- WOODLAND EDGE
- PROPOSED TREE +

NOTES:

1. **BOULDER LOCATIONS TO BE V.I.F.**
2. **FOR FOOTING LOCATIONS, SEE FOOTING PLAN, L-112**
3. **FOR FURNISHING QUANTITY AND PRODUCT DETAILS, SEE FURNISHING SCHEDULE, L-310**

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANETO

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL: PENNSYLVANIA — KYLE L. RIVERA — REGISTRATION NUMBER 3379 — REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
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Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
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600 Chestnut Street, Suite 772
Philadelphia, PA 19106

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New York, NY 10004

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christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
FURNISHING PLAN - PLAYGROUND - SOUTHWEST

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-304
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

FURNISHING SCHEDULE					
SYM.	NAME	MANUFACTURER	PRODUCT	FINISH/COLOR	QUANTITY
	CAFE TABLE	DUMOR	76-33D, 4' SQ. TABLE, 3 SEATS, 3 X 4 DOUGLAS FIR	COLOR: BLACK, FINISH: POWDERCOAT, TOPPER: DOUGLAS FIR	3
	BENCH	DUMOR	69 871 6D 3ART 6' CAST BENCH, 3 ARMS, TAMPER PROOF	COLOR: BLACK, FINISH: POWDERCOAT, STL SLATS	8
	PICNIC TABLE	DUMOR	FRAMES: 71-20, TABLES: 71-68-1D	COLOR: BLACK, FINISH: POWDERCOAT, TOPPER: DOUGLAS FIR	3
	LITTER RECEPTACLE	DUMOR	57 32 32 GAL STL RECEPT	BLACK	2
	BIKE RACK	DUMOR	83-00/S-1	COLOR: BLACK, FINISH: POWDERCOAT	9
	DRINKING FOUNTAIN	ELKAY	OUTDOOR EZH2O UPPER BOTTLE FILLING STATION TRI-LEVEL PEDESTAL, NON-FILTERED NON-REFRIGERATED, MODEL LK4430BF1U	BLACK	1
	PRECAST CONCRETE PEBBLE BENCH 1	WAUSAU TILE	GALET I BENCH	COLOR: FOG, FINISH: ACID WASH	3
	PRECAST CONCRETE PEBBLE BENCH 2	WAUSAU TILE	GALET II BENCH	COLOR: BUFF, FINISH: ACID WASH	1
	PRECAST CONCRETE PEBBLE BENCH 3	WAUSAU TILE	GALET III BENCH	COLOR: CHARCOAL, FINISH: ACID WASH	3
	BOULDER	WISSAHICKON STONE QUARRY	QUARRIED WISSAHICKON SCHIST, 6'x6' OR SIM.	N/A	10
	STONE BLOCK SEATING	STONE FARM	RECLAIMED STONE BLOCKS (TYPE TBD, DEPENDS ON STOCK)	N/A	26
	GUARDRAIL	N/A	CUSTOM, SEE DETAIL 01/L-904	POWDERCOATED STEEL, COLOR TO BE SELECTED BY LANDSCAPE ARCHITECT	108 LF
	TREE PIT RAIL	N/A	CUSTOM, SEE DETAIL 02/L-904	POWDERCOATED STEEL, COLOR TO BE SELECTED BY LANDSCAPE ARCHITECT	71 LF

PPR STANDARD SIGNAGE SCHEDULE				
SIGN TYPE	SIGN NAME	MOUNTING TYPE	LOCATION	QUANTITY
VID.1	VEHICULAR PARK ID	POST MOUNT	RHAWN STREET ENTRANCE	1
PID.2	LARGE PARK ID (WITH MAP)	POST MOUNT	NEAR GUARD HOUSE	1
PID.4	PARK ID	POST MOUNT	OUTSIDE PLAYGROUND GATES AT ENTRANCE	1
VID. 1	PLAYGROUND ID/RULES + REGS	POST MOUNT OR FENCE MOUNT	INSIDE PLAYGROUND	2
PLY.1	PET WASTE STATION	POST MOUNT	PARKING LOT ISLAND/PICNIC AREA	1
SID.3	VEHICLE PARKING ID: RULES	POST MOUNT	NEAR PARKING ENTRANCE, PAST GUARD HOUSE/LOT GATE	1
RUL.6	SMOKE-FREE PARK	FENCE MOUNT	PLAYGROUND ENTRANCE	1
RUL.6	NO LITTERING	FENCE MOUNT	PLAYGROUND ENTRANCE	1
RUL.6	NO ANIMALS	FENCE MOUNT	PLAYGROUND ENTRANCE	1
RUL.7	NO DUMPING	POST MOUNT	PARKING LOT ISLAND/PICNIC AREA	1
RUL.7	NO FEEDING WILDLIFE	POST MOUNT	PARKING LOT ISLAND/PICNIC AREA	1

ADDITIONAL SIGNAGE SCHEDULE			
SIGN NAME	MOUNTING TYPE	LOCATION	QUANTITY
PEDESTRIAN CROSSING	POST MOUNT	RAISED CROSSWALK	1
DCNR GRANT SIGN	FENCE MOUNT	PLAYGROUND ENTRANCE	1

NOTE:
1. EXACT PPR STANDARD SIGN LOCATION TO BE CONFIRMED BY LANDSCAPE ARCHITECT.
2. ADDITIONAL NON-PPR STANDARD PEDESTRIAN CROSSING SIGN REQUIRED AT RAISED CROSSWALK.
3. DCNR SIGN (DETAIL 01/L-921) LOCATION TO BE CONFIRMED BY LANDSCAPE ARCHITECT.

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANETO

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SEAL:
PENNSYLVANIA
YADIEL J. RIVERA-DIAZ
REGISTRATION NUMBER 3379
REGISTERED LANDSCAPE ARCHITECT

SIGNATURE

DATE SIGNED 04/05/2024

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Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
FURNISHING SCHEDULE

PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 12/15/2023
SCALE: AS NOTED
DRAWN BY: SS, TW
CHECKED BY: TS

DRAWING NO.: **L-310**

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.

01 SAFETY SURFACE COLOR PLAN
SCALE: 1" = 20'-0"

0 20' 40'

N

LEGEND

TREE TRUNK

C.I.P. CONCRETE CURB

01 L-903 ENTRY FENCE

03 L-903 SECURITY FENCE AND GATE

RAIL

WOODLAND EDGE

BIKE RACK

PROPOSED TREE +

MULCH

NOTE:

1. SEE L-210 PAVING SCHEDULE FOR SAFETY SURFACE COLOR MIXES AND QUANTITIES.

SS-PR-8HT-M1

SS-PR-4HT-M2

SS-PR-4HT-M3

SS-PR-4HT-M4

SS-C-5HT

SS-C-8HT

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANETO

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 - 1078

BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA! CALL 1-800-242-1776
NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
PENNSYLVANIA · ANGEL L. RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
THE LIGHTING PRACTICE
600 Chestnut Street, Suite 772
Philadelphia, PA 19106

COST ESTIMATOR:
ELLANA CONSTRUCTION CONSULTANTS
32 Broadway, 8TH Floor
New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
PLAYFUL LEARNING LANDSCAPES ACTION NEXTWORK
Philadelphia, PA
267.468.8610

ARBORIST:
MORRIS ARBORETUM
100 East Northwestern Avenue
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215.247.5777

ACCESSIBILITY CONSULTANT:
CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

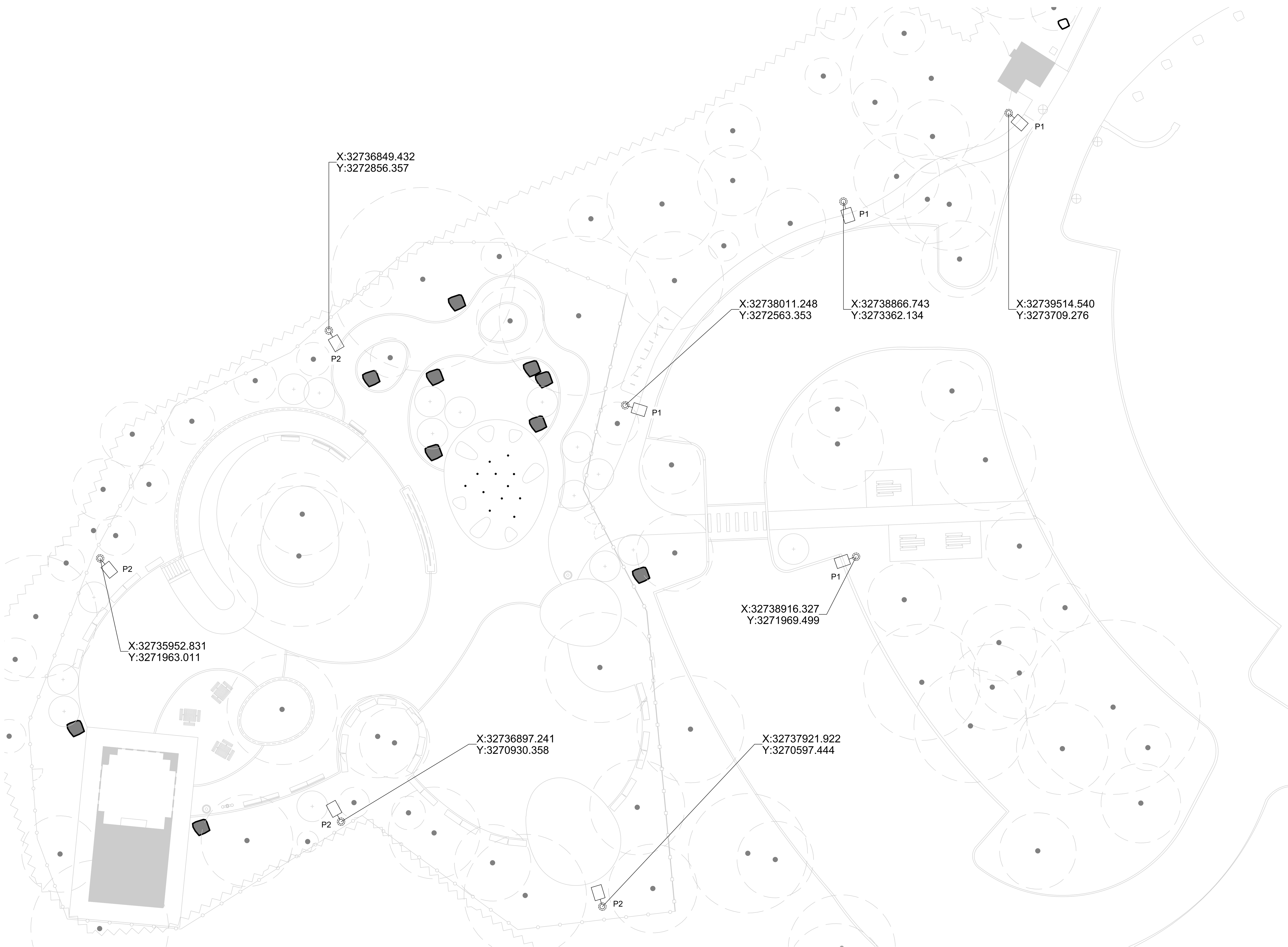
DRAWING TITLE:
SAFETY SURFACE COLOR PLAN

PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 12/15/2023
SCALE: AS NOTED
DRAWN BY: SS, TW
CHECKED BY: TS

DRAWING NO.: **L-400**

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.

LIGHTING FIXTURE SCHEDULE											
TYPE	MTG.	DESCRIPTION	LIGHT SOURCE			WATTAGE (W)	VOLTS (V)	DIMMING PROTOCOL/RANGE[6]	MANUFACTURER	CATALOG NUMBER
			DELIVERED LUMENS OR LAMP NO. DESIGNATION	COLOR/CCT	OPTICS					
P1	POLE	LIGHT POLE ASSEMBLY CONSISTING OF ARM-MOUNTED LUMINAIRE ATTACHED TO 25 FOOT TALL POLE. HEAD: LED FULL CUTOFF POST-TOP LUMINAIRE, NOMINAL 15-3/4 INCH DIAMETER X 4 INCH TALL ALUMINUM HOUSING, PROVIDE WITH NOMINAL 6-INCH LONG MOUNTING ARM AND POLE-TOP SLIP-FITTER FOR USE WITH 3-1/2 INCH OUTSIDE DIAMETER POLE TOP OR TENON, CLEAR TEMPERED GLASS LENS, SILICON GASKETS, OVERALL PAINT FINISH TO BE BLACK. U.L. WET LOCATION LISTED. LUMINAIRE EFFECTIVE PROJECTED AREA NOT TO EXCEED 0.47 SQUARE FEET. PROVIDE IP66 OUTDOOR RATED PHOTOCELL DEVICE. POLE: STRAIGHT ROUND ALUMINUM POLE, NOMINAL 25 FOOT TALL X 6 INCH DIAMETER WITH MINIMUM 0.156 INCH WALL THICKNESS. PROVIDE WITH 3-1/2 INCH OUTSIDE DIAMETER POLE-TOP TENON FOR LUMINAIRE MOUNTING, OVERALL POLE FINISH TO MATCH LUMINAIRE HEADS, ANCHOR BOLT DETAIL TO BE COORDINATED WITH STRUCTURAL ENGINEER. POLE SHALL BE RATED TO SUPPORT MINIMUM 2.7 EPA AT 100 MPH WIND WITH A 1.3 GUST FACTOR.	6,325 LMS	3000K	TYPE III B2-U0-G2	62	277	-	SELUX VALMONT	HEAD: DSC4L-R3W-S1-5G700-30-25-BLACK-UNV-TLRP POLE: R-+250060605S4-P3-DBL
P2	POLE	LIGHTING POLE ASSEMBLY CONSISTING OF MODULAR FLOOD LIGHT ATTACHED TO 25 FOOT TALL POLE. LUMINAIRE: NOMINAL 13 INCH LONG X 5 INCH TALL X 6 INCH DEEP DIE-CAST ALUMINUM HOUSING. PROVIDE TILT MOUNTING BRACKET AND POLE-TOP SLIP-FITTER FOR USE WITH 2-3/8 INCH OUTSIDE DIAMETER POLE TOP OR TENON, POLYCARBONATE LENS, OVERALL PAINT FINISH TO BE BLACK, INTEGRAL DIMMING DRIVER, U.L. WET LOCATION LISTED, LUMINAIRE EFFECTIVE PROJECTED AREA NOT TO EXCEED 0.50 SQUARE FEET, PROVIDE IP66 OUTDOOR RATED PHOTOCELL DEVICE. POLE: STRAIGHT ROUND ALUMINUM POLE, NOMINAL 25 FOOT TALL X 6 INCH DIAMETER WITH MINIMUM 0.156 INCH WALL THICKNESS. PROVIDE WITH 2-3/8 INCH OUTSIDE DIAMETER POLE-TOP TENON FOR LUMINAIRE MOUNTING, FULL BASE COVER, HAND HOLE AT BASE, OVERALL POLE FINISH TO MATCH LUMINAIRE HEADS, ANCHOR BOLT DETAIL TO BE COORDINATED WITH STRUCTURAL ENGINEER. POLE SHALL BE RATED TO SUPPORT MINIMUM 2.7 EPA AT 100 MPH WIND WITH A 1.3 GUST FACTOR.	16,900 LMS	3000K	60° X 60°	100	277	0-10V	SPECGRADE VALMONT	HEAD: MFL-100-3000K-60-V01-[FINISH]-TL-VDIM-80CRI-GS POLE: R-+250060605S4-P2-DBL



01 LIGHTING PLAN
SCALE: 1" = 20'

LEGEND

- TREE CANOPY
- TREE TRUNK
- C.I.P. CONCRETE CURB
- BENCH
- GRANITE BLOCK SEATING
- SITE BOULDER
- LITTER RECEPTACLE
- DRINKING FOUNTAIN
- CAFE TABLE
- PICNIC TABLE
- ENTRY FENCE
- SECURITY FENCE AND GATE
- RAIL
- WOODLAND EDGE
- BIKE RACK
- PROPOSED TREE
- EXISTING BUILDING

NOTE:

1. SEE L-001 FOR LIGHTING NOTES.

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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SEAL: PENNSYLVANIA · YADIEL J. RIVERA-DIAZ · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE — DATE SIGNED 04/05/2024

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145 Hudson Street, Floor 3
New York, NY 10013

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646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

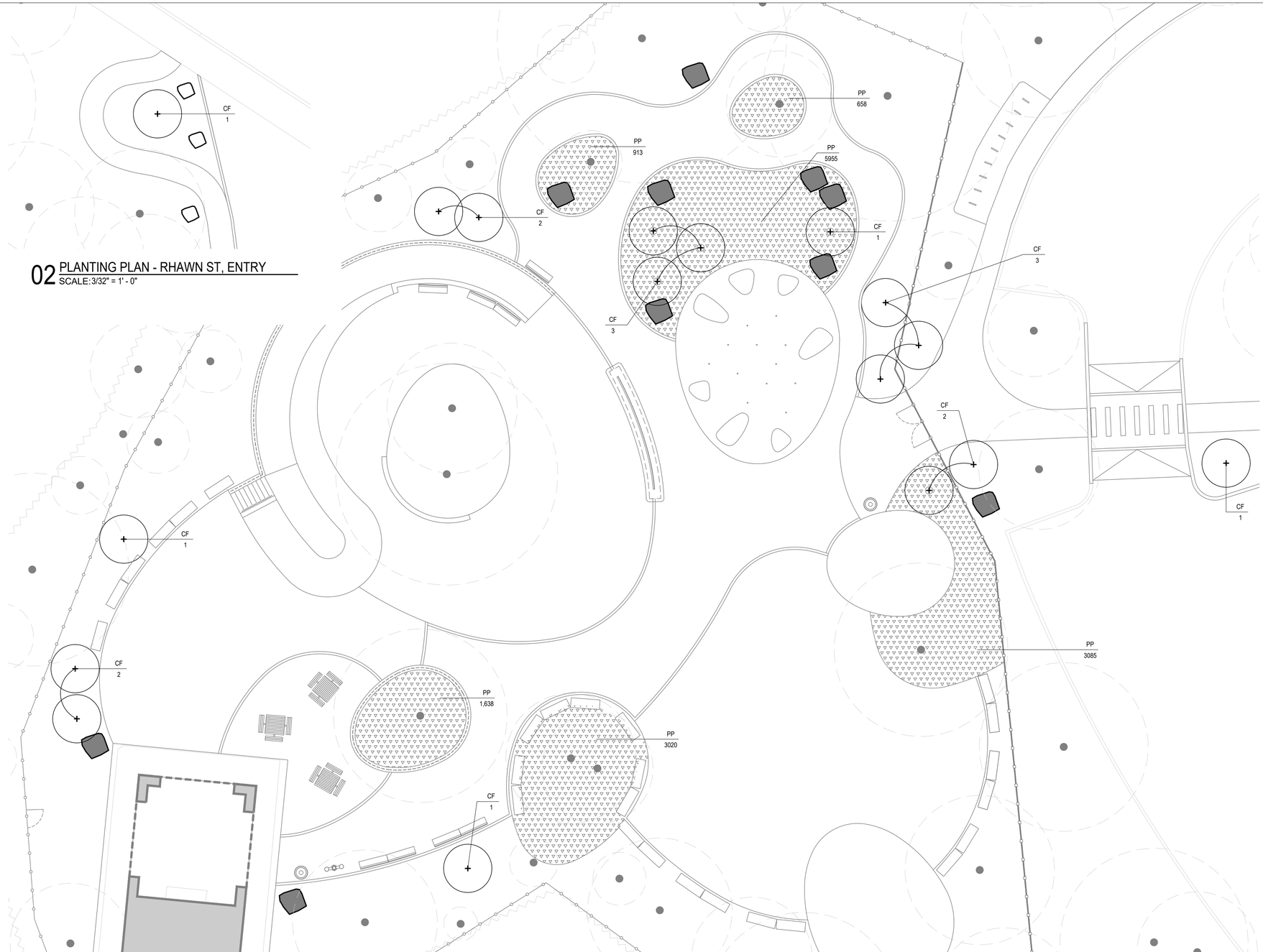
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
LIGHTING PLAN

PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	SS, TW
CHECKED BY:	TS
DRAWING NO.:	L-500

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



02 PLANTING PLAN - RHAWN ST, ENTRY
SCALE: 3/32" = 1' - 0"

01 PLANTING PLAN
SCALE: 3/32" = 1' - 0"

LEGEND

- TREE CANOPY
- TREE TRUNK
- C.I.P. CONCRETE CURB
- GRANITE BLOCK SEATING
- SITE BOULDER
- ENTRY FENCE
- SECURITY FENCE AND GATE
- RAIL
- WOODLAND EDGE
- BIKE RACK
- PROPOSED TREE
- EXISTING BUILDING
- PROPOSED PERENNIALS

NOTES:

1. SEE L-001 FOR PLANTING NOTES.
2. SEE L-910 FOR PLANTING DETAILS.

PLANTING SCHEDULE

TREES

KEY	BOTANICAL NAME	COMMON NAME	QTY.	CALIPER SIZE	CONTAINER	NOTES
CF	*Cornus florida*	Flowering Dogwood	17	3.5"-4"	B&B	White flowering variety

PERENNIALS, GRASSES, FERNS, AND VINES

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SPACING	CONTAINER	NOTES
PP	*Pachysandra procumbens*	Allegheny Spurge	15,269	6"	1 QT. POT	

3/32"=1'-0" 10' 0 10' 20'

N

REVISIONS

ISSUE	DATE	REVISIONS
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15122 – 1078

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SEAL: ANGEL L. RIVERA — PENNSYLVANIA — REGISTRATION NUMBER 3379 — REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

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CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER 16-21-7062-01

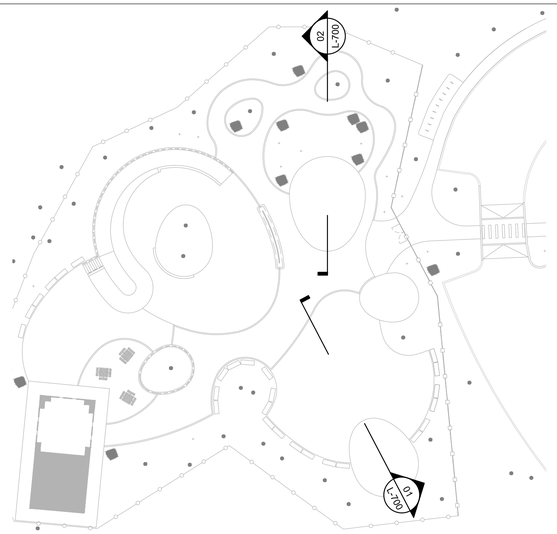
PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
PLANTING PLAN

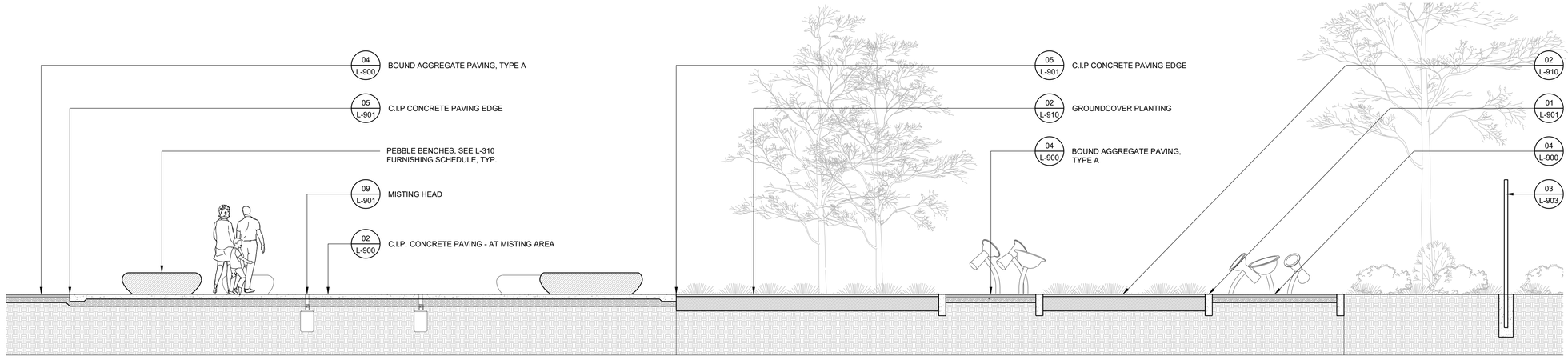
PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 12/15/2023
SCALE: AS NOTED
DRAWN BY: SS, TW
CHECKED BY: TS

DRAWING NO.: **L-600**

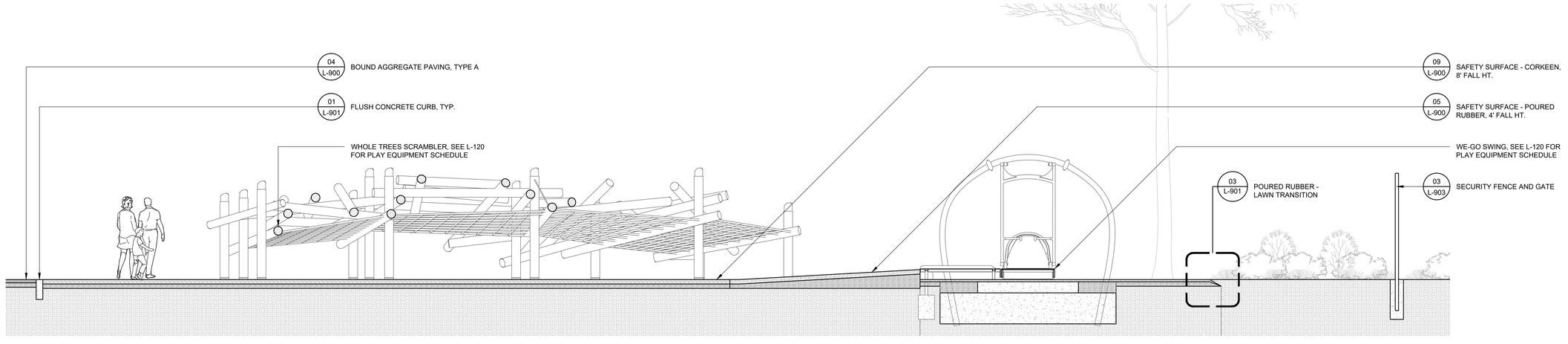
NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



SECTION KEY PLAN
SCALE: 1/32" = 1' - 0"



02 MISTING AREA AND MUSIC PATH SECTION
SCALE: 1/4" = 1'-0"



01 5-12 Y.O. PLAY AREA SECTION
SCALE: 1/4" = 1'-0"

REVISIONS		
ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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SIGNATURE DATE SIGNED 04/05/2024

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CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

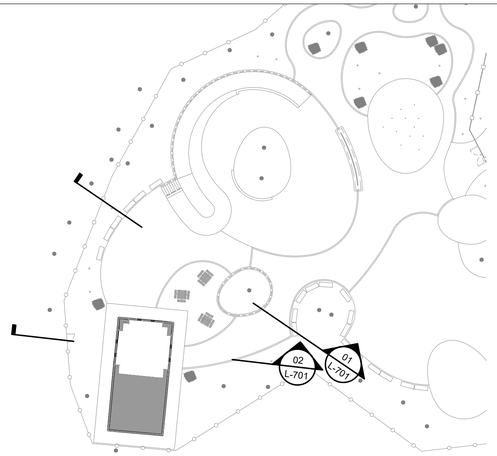
PPR PROJECT NUMBER 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

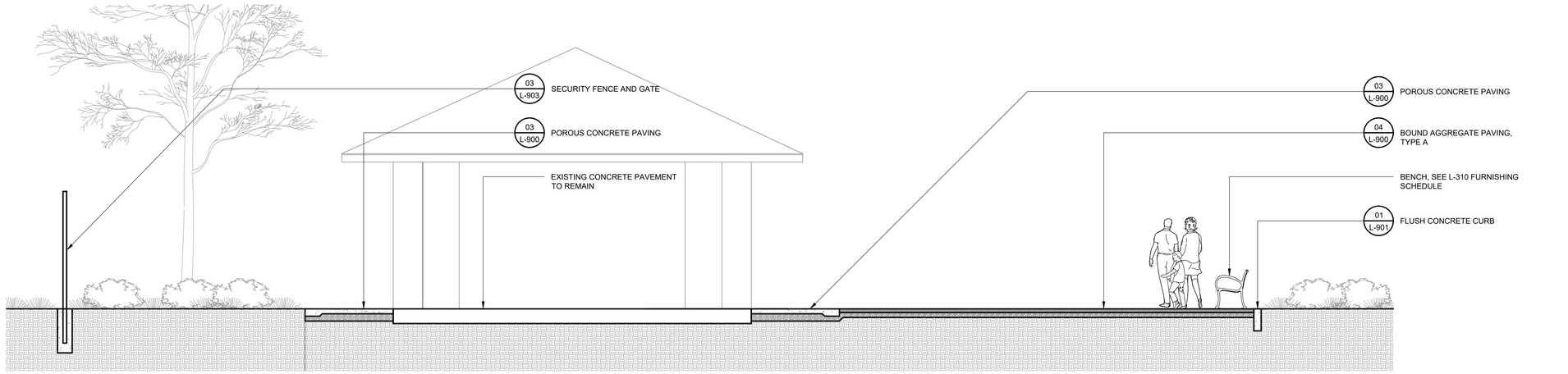
DRAWING TITLE:
SECTIONS - 1

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-700
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

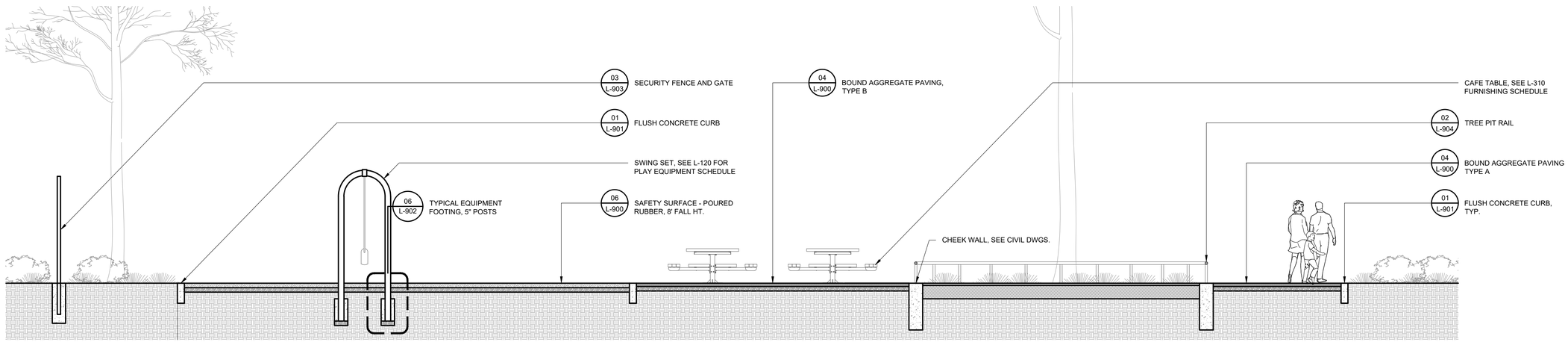
NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



SECTION KEY PLAN
SCALE: 1/32" = 1' - 0"



02 BUILDING AND PATH SECTION
SCALE: 1/4" = 1'-0"



01 PICNIC AREA SECTION
SCALE: 1/4" = 1'-0"

REVISIONS		
ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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MEGAN FUNK

SEAL:


SIGNATURE
DATE SIGNED
04/05/2024

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CONSULTANT PROJECT NUMBER
2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER
16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SECTIONS - 2

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **L-701**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

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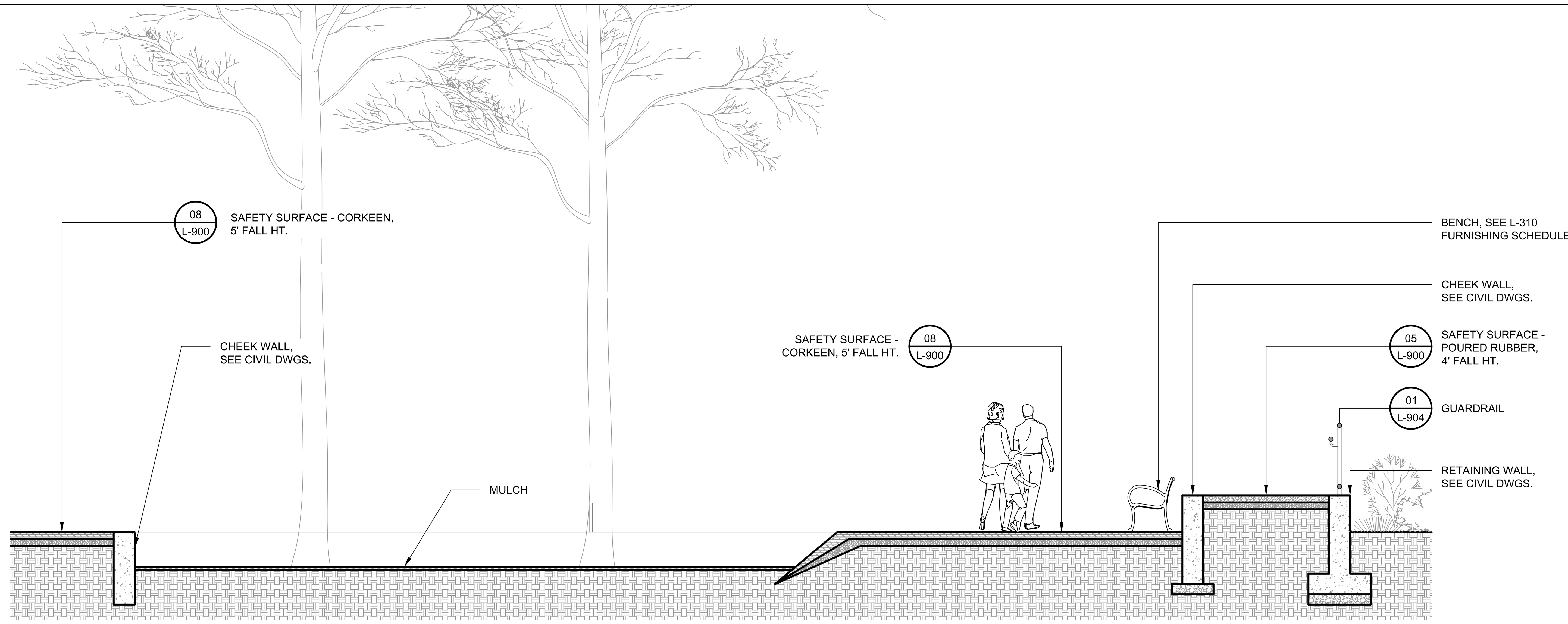
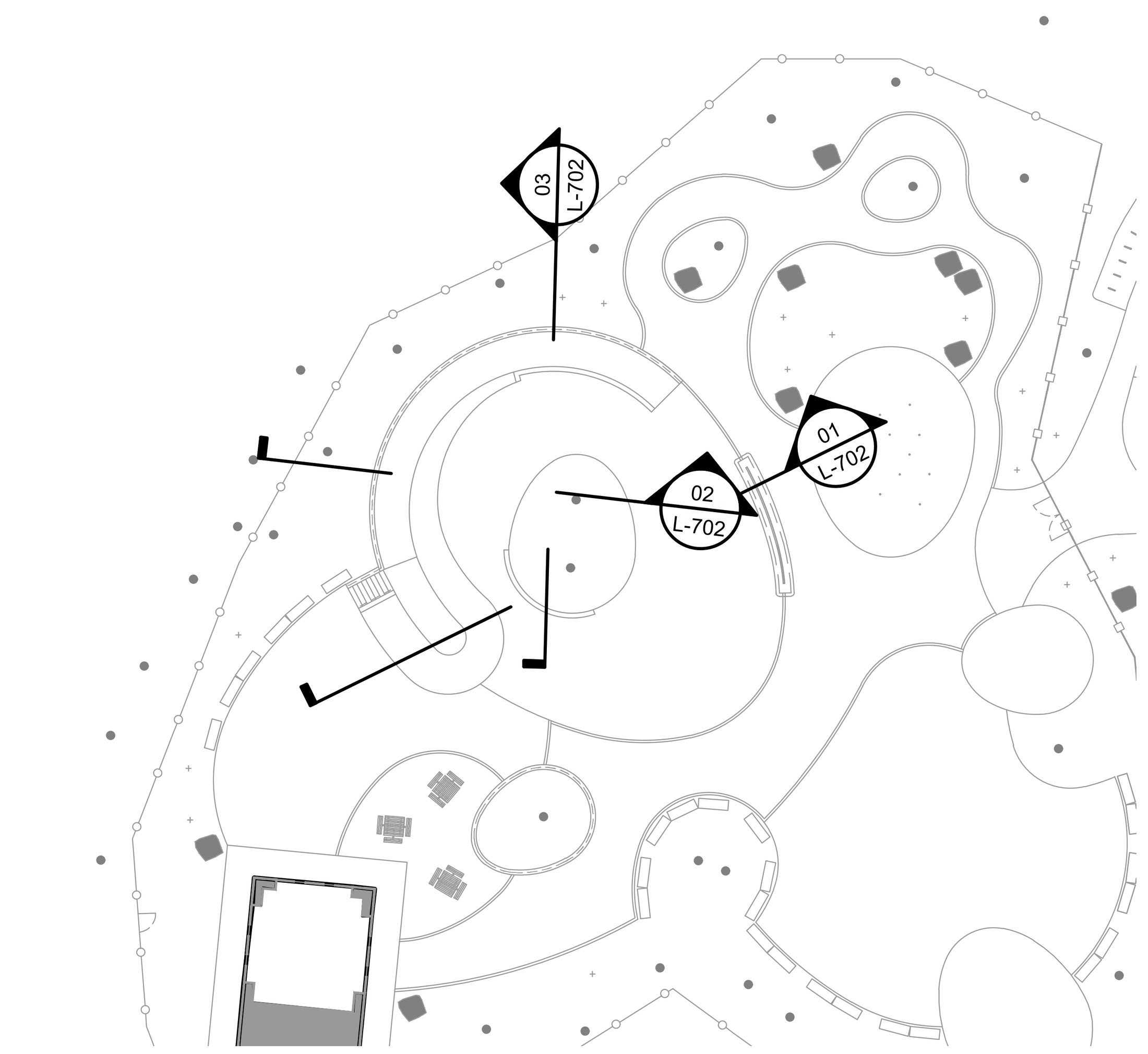
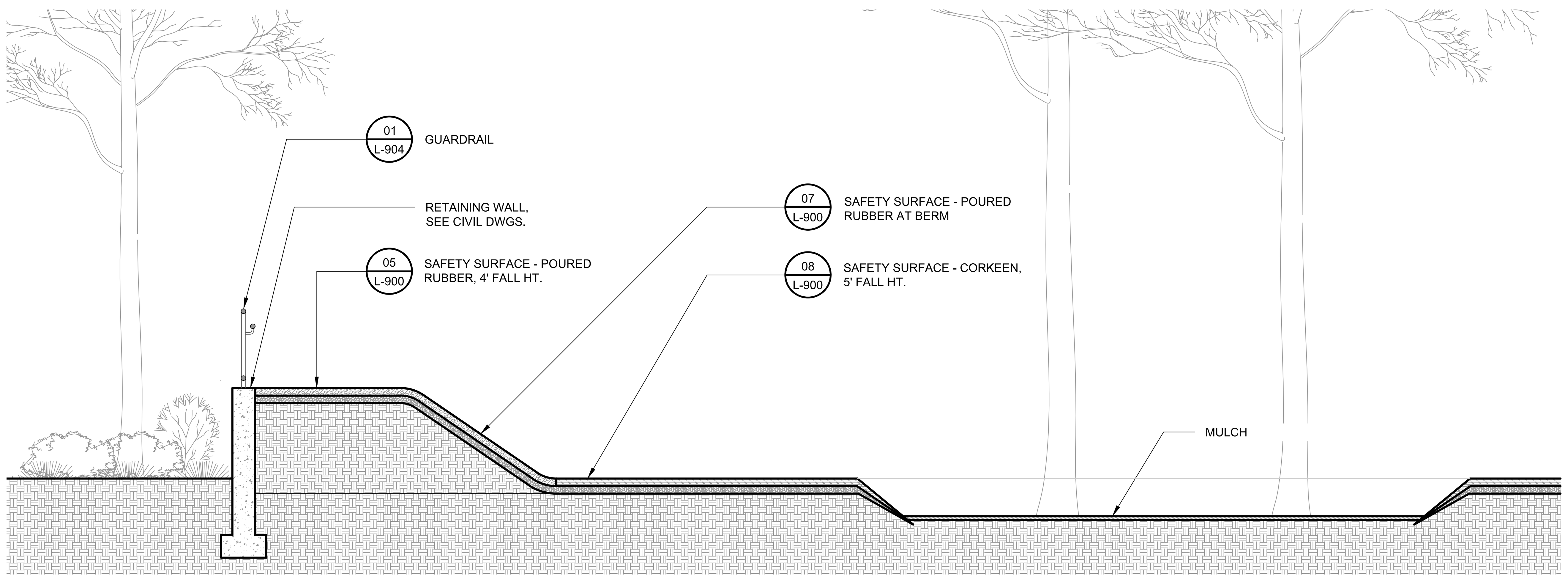


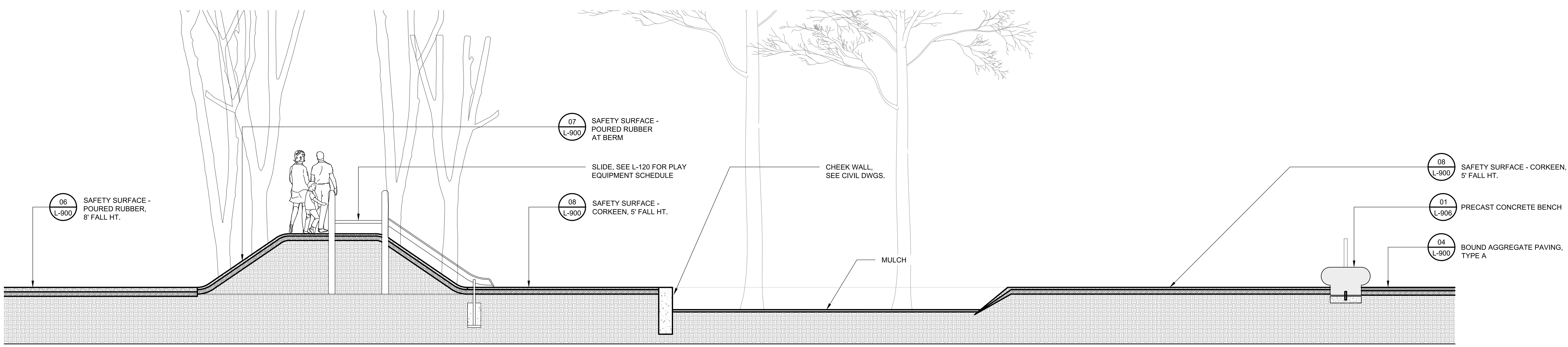
03 2-5 Y.O. PLAY AREA SECTION - 3
SCALE:1/4" = 1'-0"



SECTION KEY PLAN
SCALE:1/32" = 1' - 0"



02 2-5 Y.O. PLAY AREA SECTION - 2
SCALE:1/4" = 1'-0"



01 2-5 Y.O. PLAY AREA SECTION - 1
SCALE:1/4" = 1'-0"

REVISIONS

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CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER 16-21-7062-01

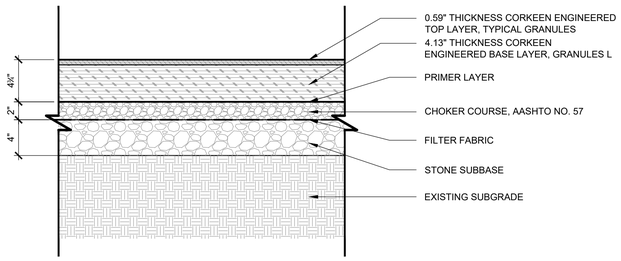
PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SECTIONS - 3

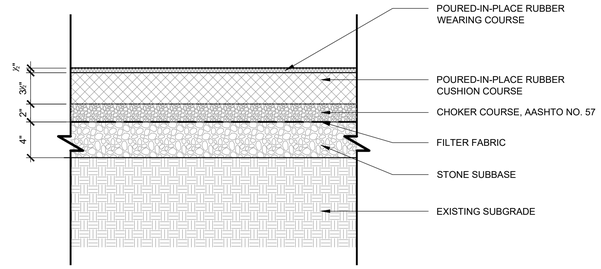
PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	SS, TW
CHECKED BY:	TS

DRAWING NO.: **L-702**

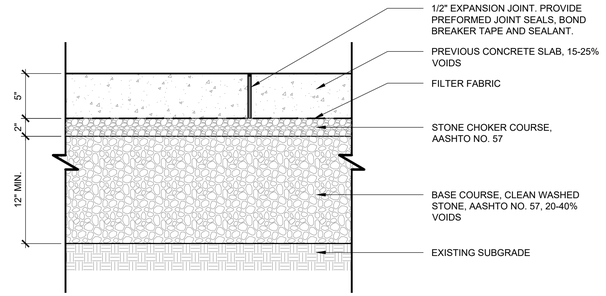
NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



09 SAFETY SURFACE - CORKEEN, 8' FALL HT.
SCALE: 1-1/2" = 1' - 0"

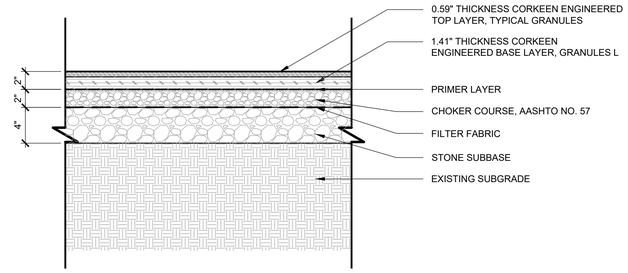


06 SAFETY SURFACE - POURED RUBBER, 8' FALL HT.
SCALE: 1-1/2" = 1' - 0"

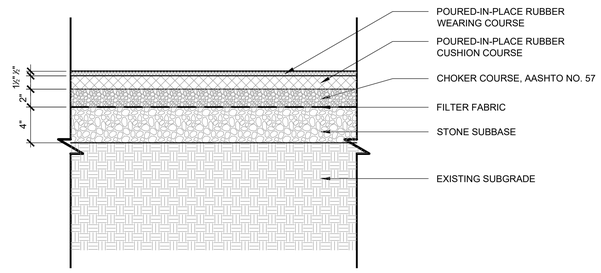


NOTE:
1. EXPANSION JOINTS PLACED AT 20' O.C. MAX. SPACING OR AS SHOWN ON PLANS. FORM JOINT AROUND ALL APPURTENANCES EXTENDING INTO OR THROUGH CONCRETE AND BETWEEN CONCRETE AND ANY FIXED STRUCTURE (BUILDING, CURB, ETC.).
2. CONTROL JOINTS, TROWELED, 1/8" THK., PLACED AT 5'-0" O.C. MAX. SPACING OR AS SHOWN ON PLANS.
3. POROUS CONCRETE SHALL UTILIZE PORTLAND CEMENT TYPE I OR II CONFORMING TO ASTM C 150 OR PORTLAND CEMENT TYPE IP OR IS CONFORMING TO ASTM C 595.
4. AGGREGATE SHALL BE NO. 8 COARSE AGGREGATE (3/8 TO NO. 16) PER ASTM C 33 OR NO. 89 COARSE AGGREGATE (3/8 TO NO. 50) PER ASTM D 448.
5. AN AGGREGATE/CEMENT RATIO RANGE OF 4:1 TO 4.5:1 AND A WATER/CEMENT RATIO RANGE OF 0.34 TO40 SHOULD PRODUCE PERVIOUS PAVEMENT OF SATISFACTORY PROPERTIES IN REGARD TO PERMEABILITY, LOAD CARRYING CAPACITY, AND DURABILITY CHARACTERISTICS.

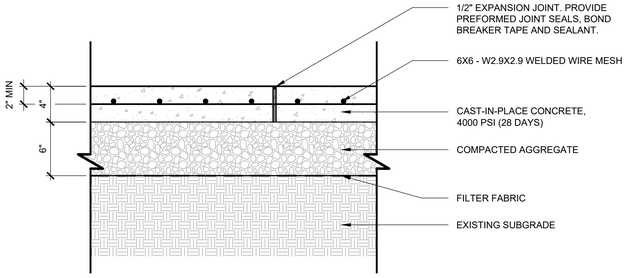
03 POROUS CONCRETE PAVING
SCALE: 1-1/2" = 1' - 0"



08 SAFETY SURFACE - CORKEEN, 5' FALL HT.
SCALE: 1-1/2" = 1' - 0"

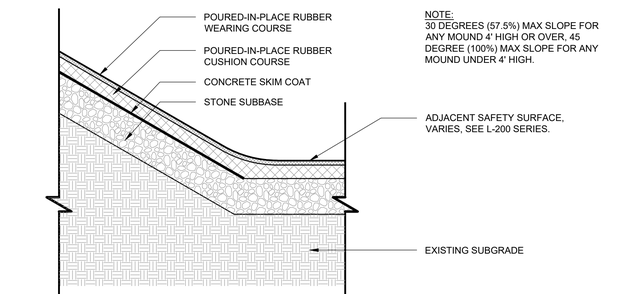


05 SAFETY SURFACE - POURED RUBBER, 4' FALL HT.
SCALE: 1-1/2" = 1' - 0"



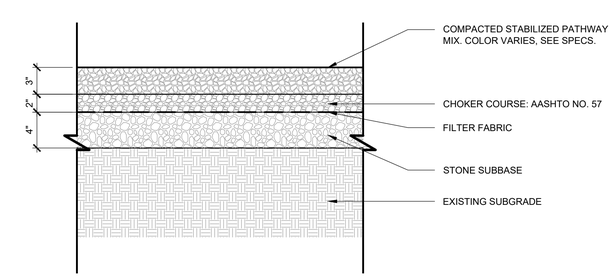
NOTE:
1. EXPANSION JOINTS PLACED AT 20' O.C. MAX. SPACING OR AS SHOWN ON PLANS. FORM JOINT AROUND ALL APPURTENANCES EXTENDING INTO OR THROUGH CONCRETE AND BETWEEN CONCRETE AND ANY FIXED STRUCTURE (BUILDING, CURB, ETC.).
2. CONTROL JOINTS, TROWELED, 1/8" THK., PLACED AT 5'-0" O.C. MAX. SPACING OR AS SHOWN ON PLANS.

02 C.I.P. CONCRETE PAVING - AT MISTING AREA
SCALE: 1-1/2" = 1' - 0"

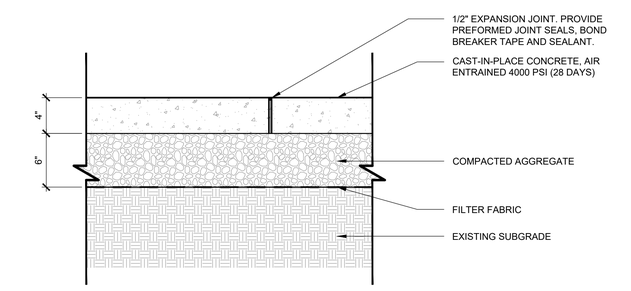


NOTE:
30 DEGREES (57.5%) MAX SLOPE FOR ANY MOUND 4' HIGH OR OVER, 45 DEGREE (100%) MAX SLOPE FOR ANY MOUND UNDER 4' HIGH.

07 SAFETY SURFACE - POURED RUBBER AT BERM
SCALE: 1-1/2" = 1' - 0"



04 BOUND AGGREGATE PAVING
SCALE: 1-1/2" = 1' - 0"



NOTE:
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2. CONTROL JOINTS, TROWELED, 1/8" THK., PLACED AT 5'-0" O.C. MAX. SPACING OR AS SHOWN ON PLANS.

01 C.I.P. CONCRETE PAVING - AT PATHWAYS
SCALE: 1-1/2" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA! CALL 1–800–242–1776
NON–MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL: PENNSYLVANIA · YAMEL RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE DATE SIGNED 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
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Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
THE LIGHTING PRACTICE
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COST ESTIMATOR:
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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
TYPICAL DETAILS - 1

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **L-900**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

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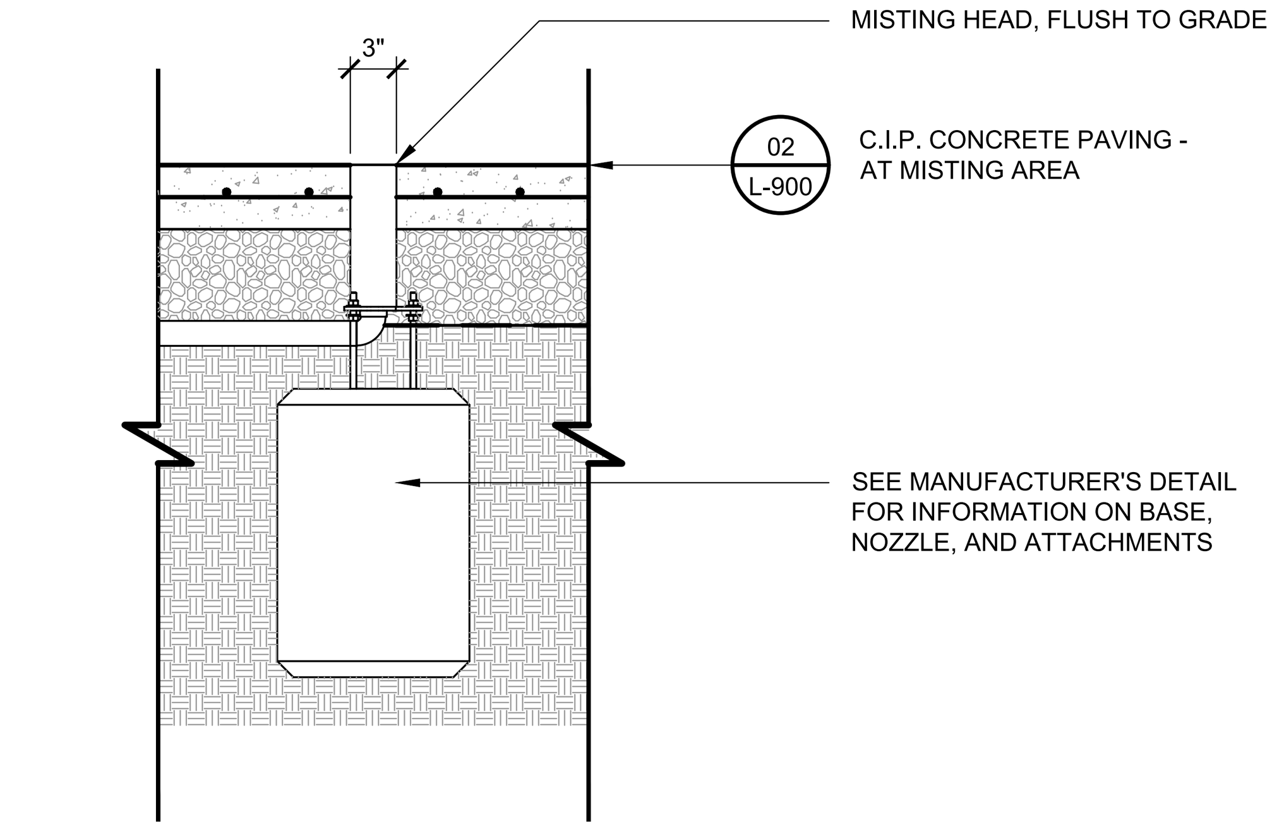
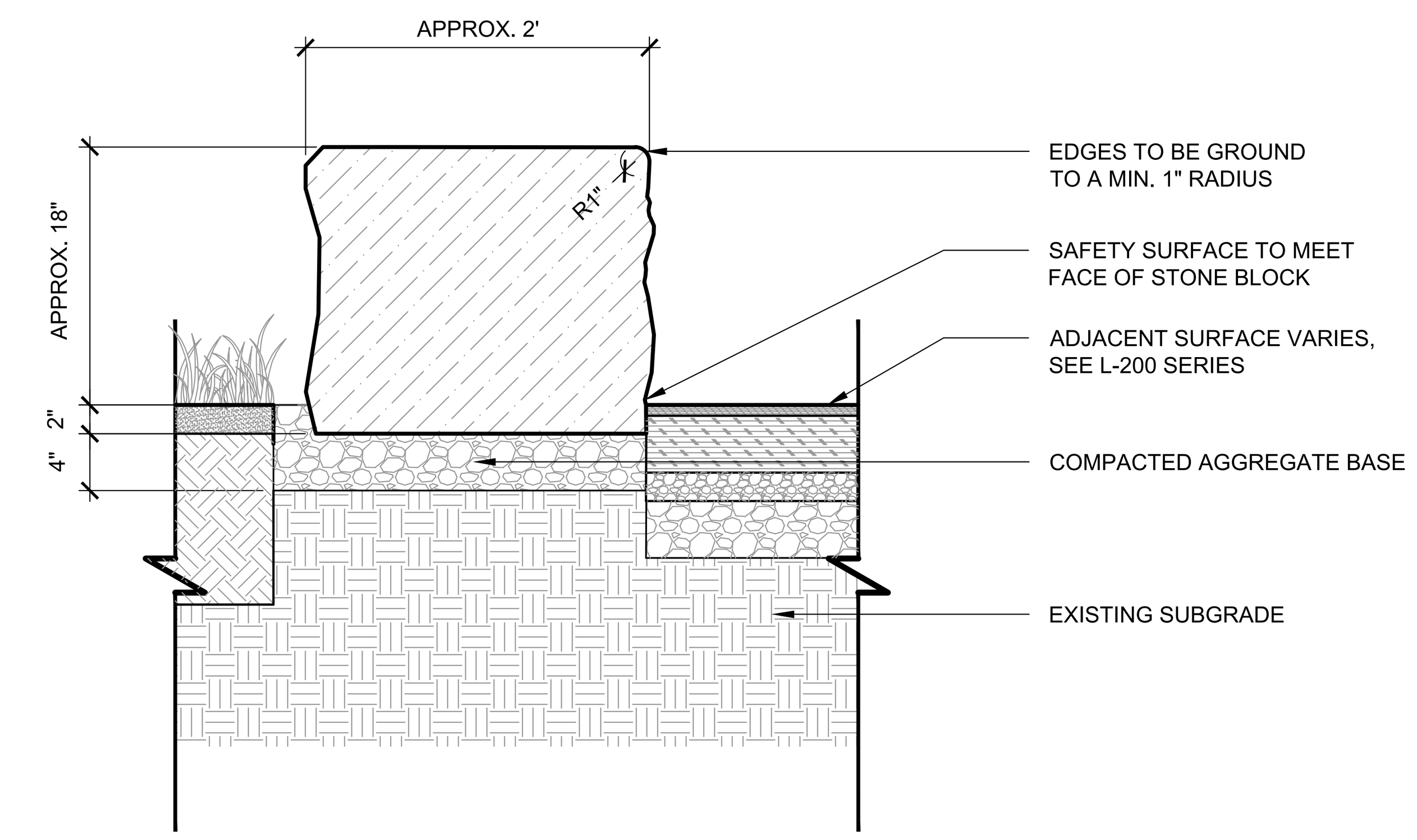
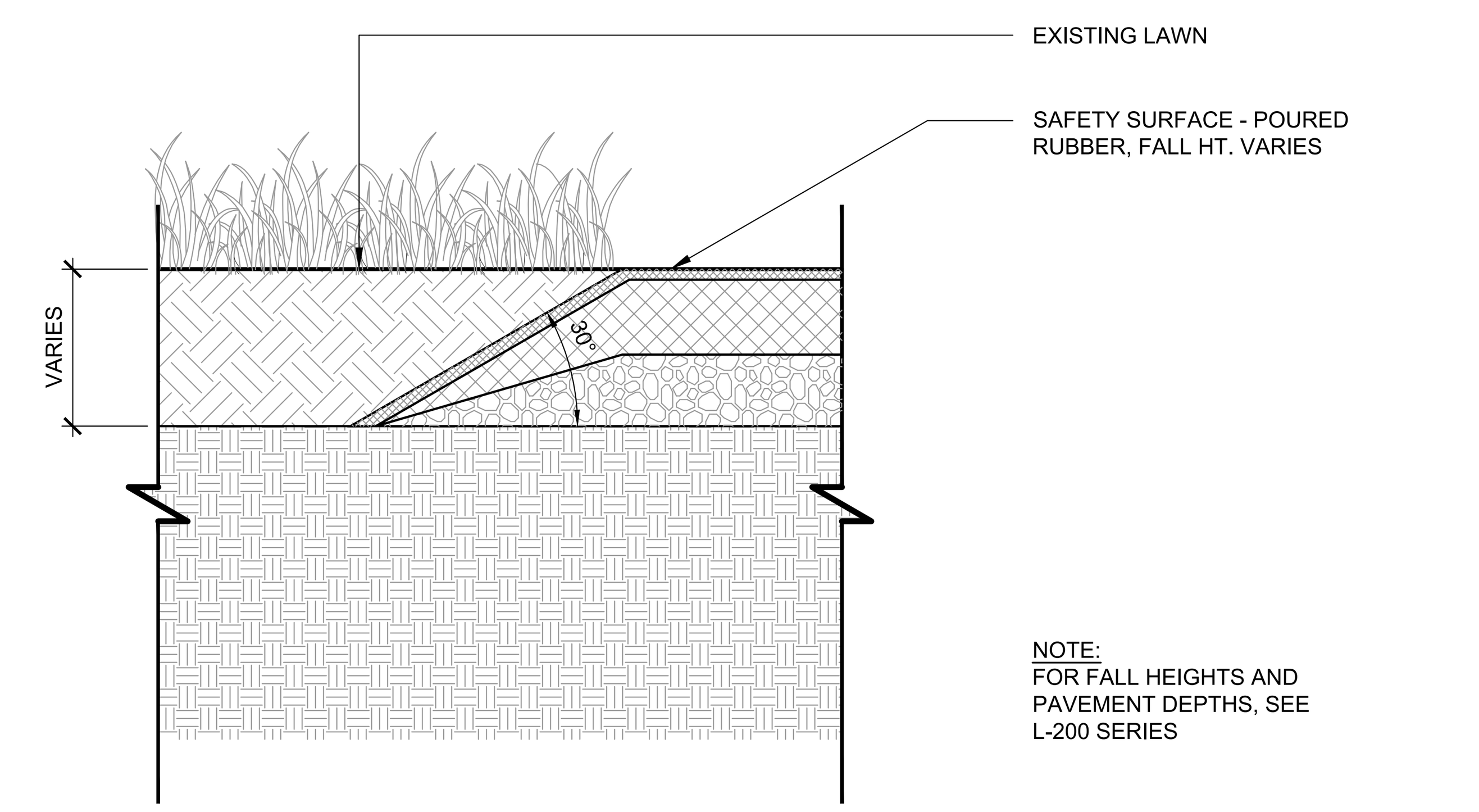


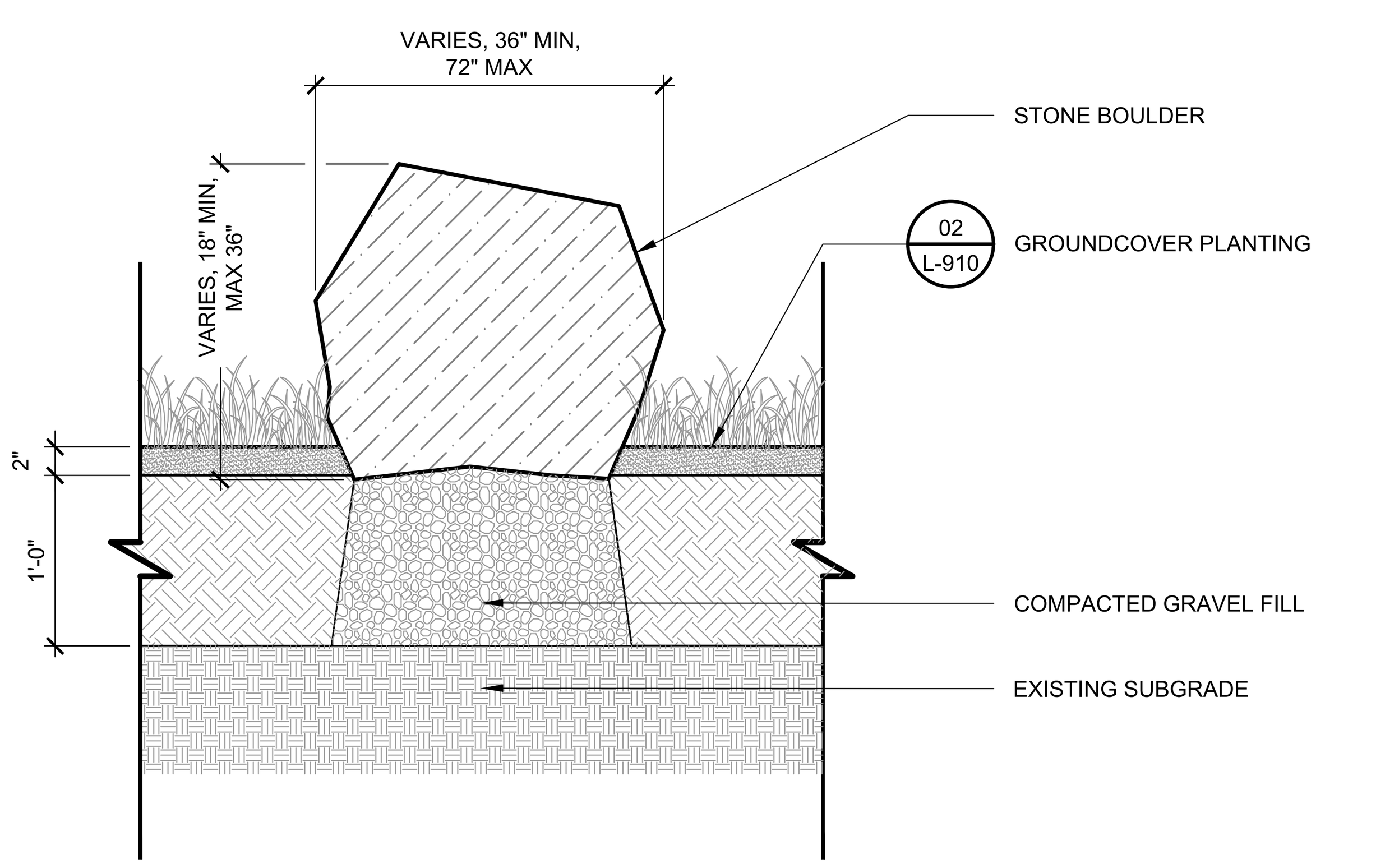
09 MISTING HEAD
SCALE: 1" = 1' - 0"



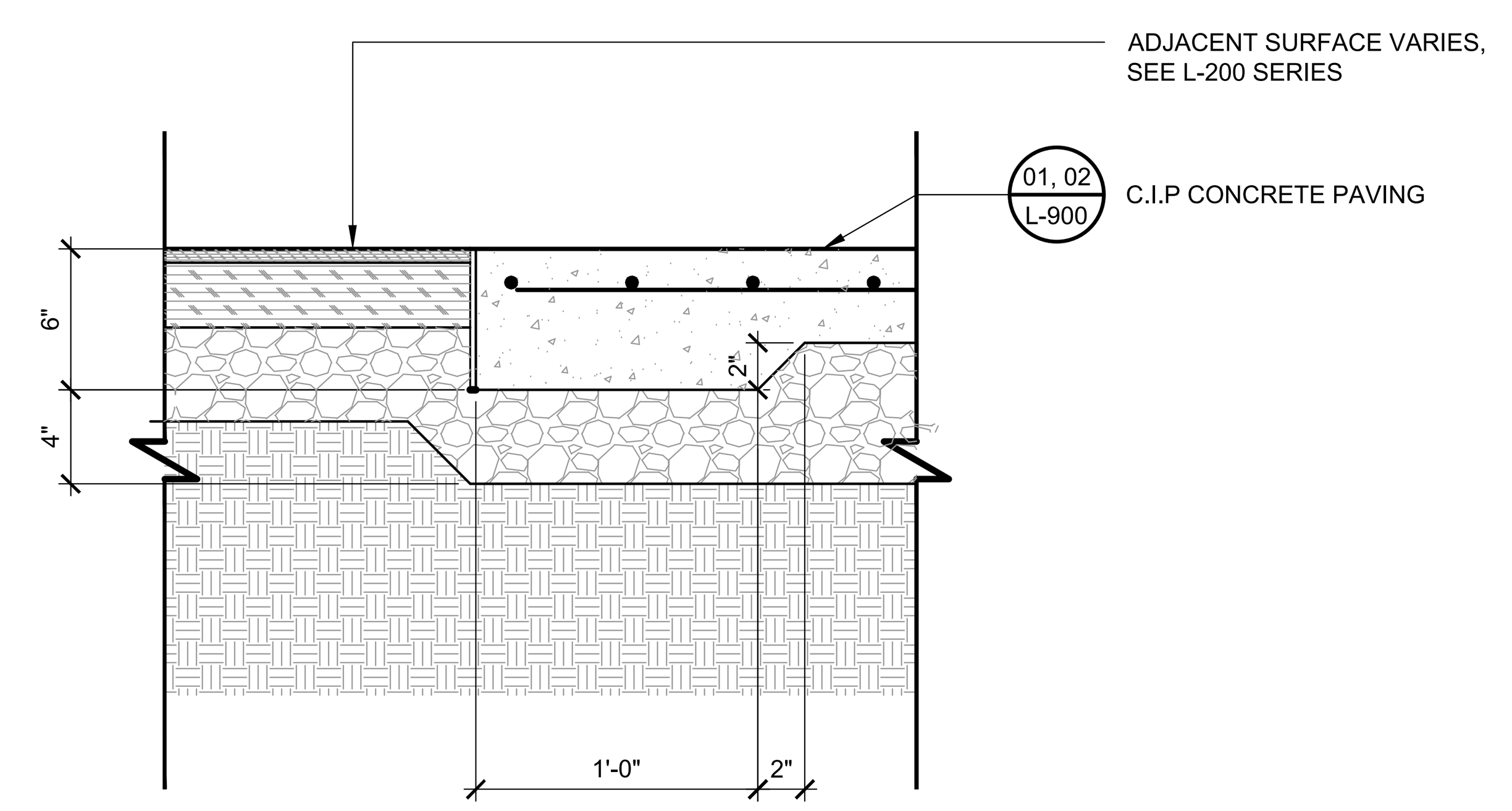
06 GRANITE BLOCK SEATING - AT SAFETY SURFACE
SCALE: 1" = 1' - 0"



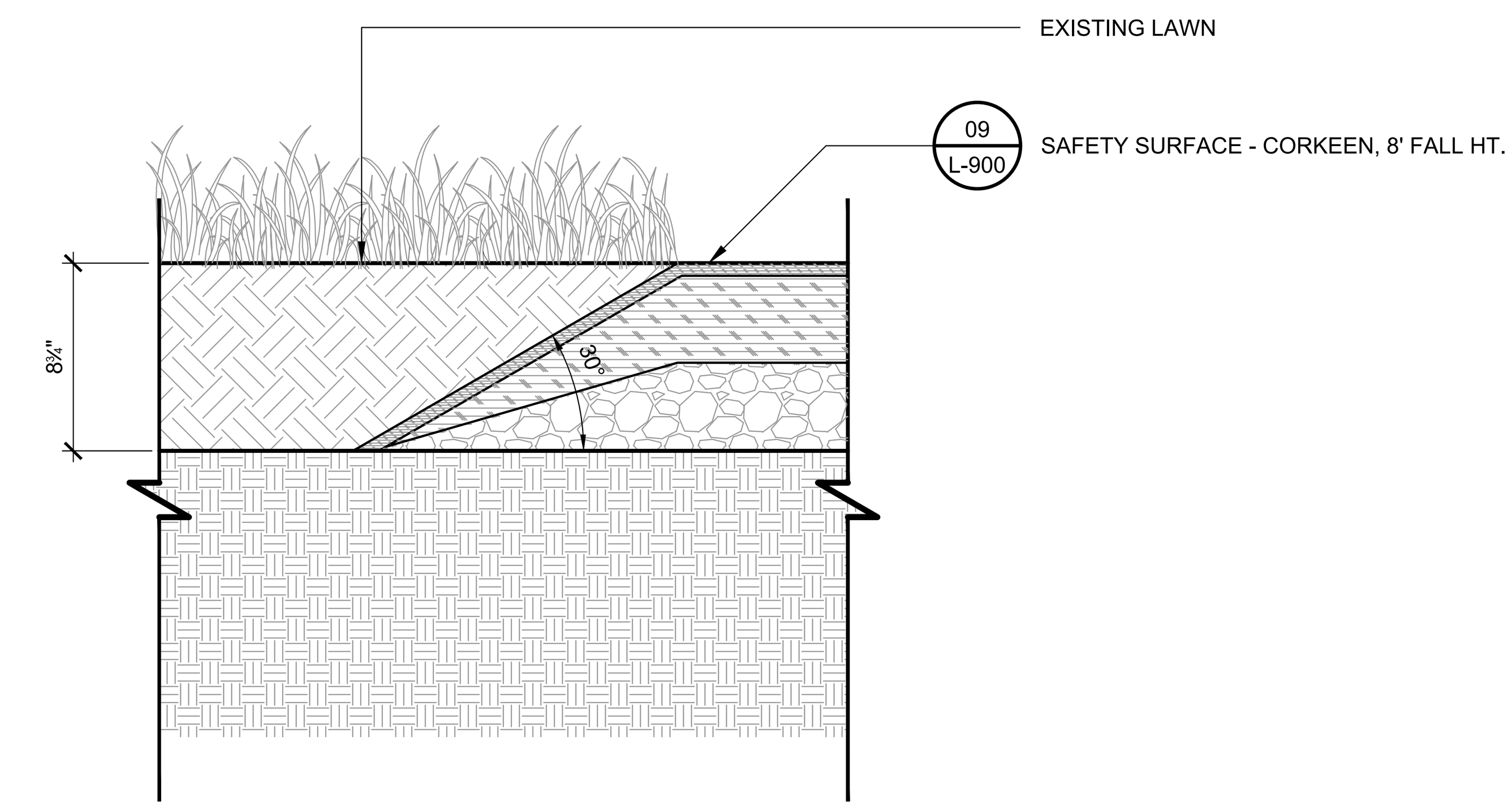
03 POURED RUBBER - LAWN TRANSITION
SCALE: 1-1/2" = 1' - 0"



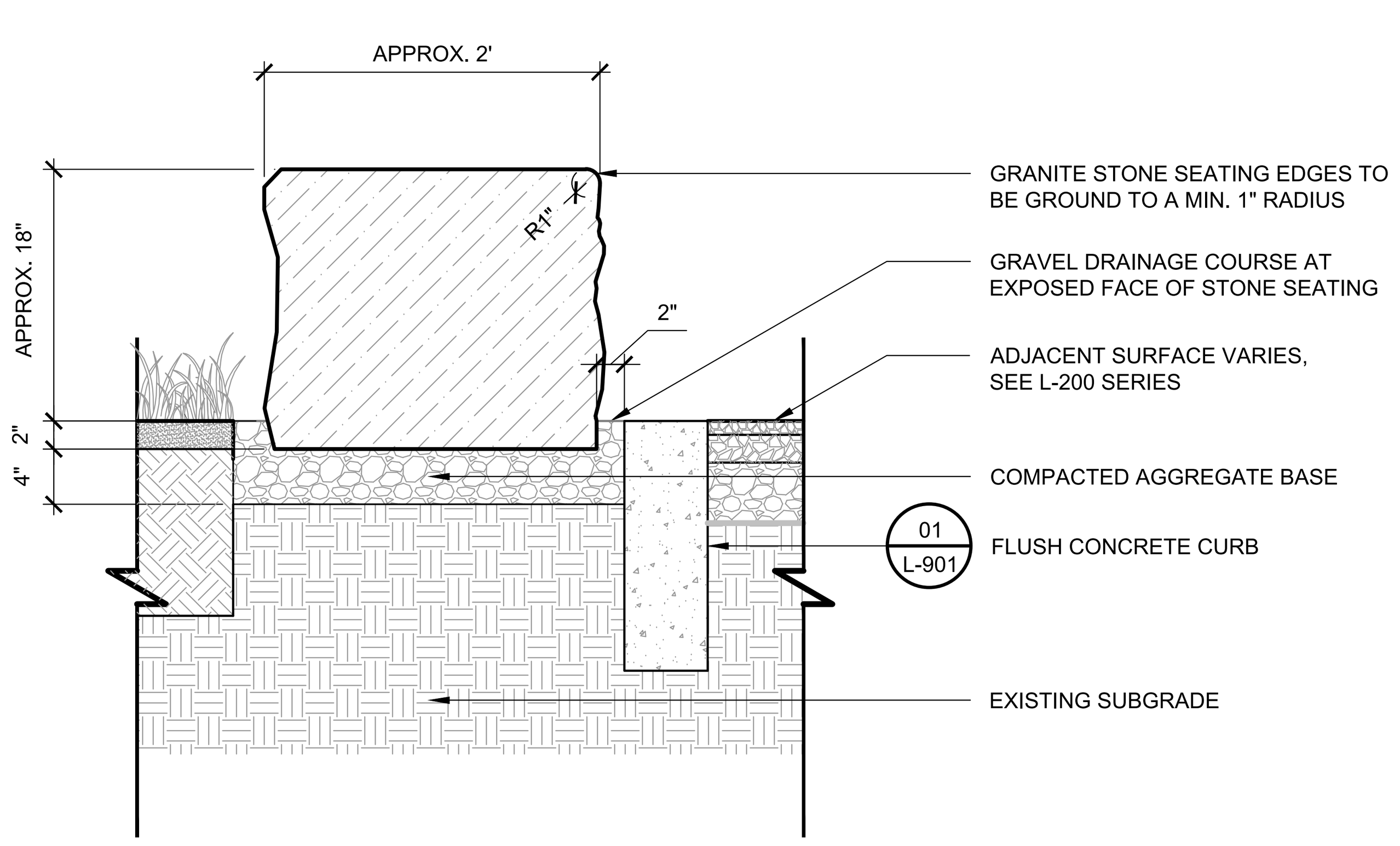
08 SITE BOULDER
SCALE: 1" = 1' - 0"



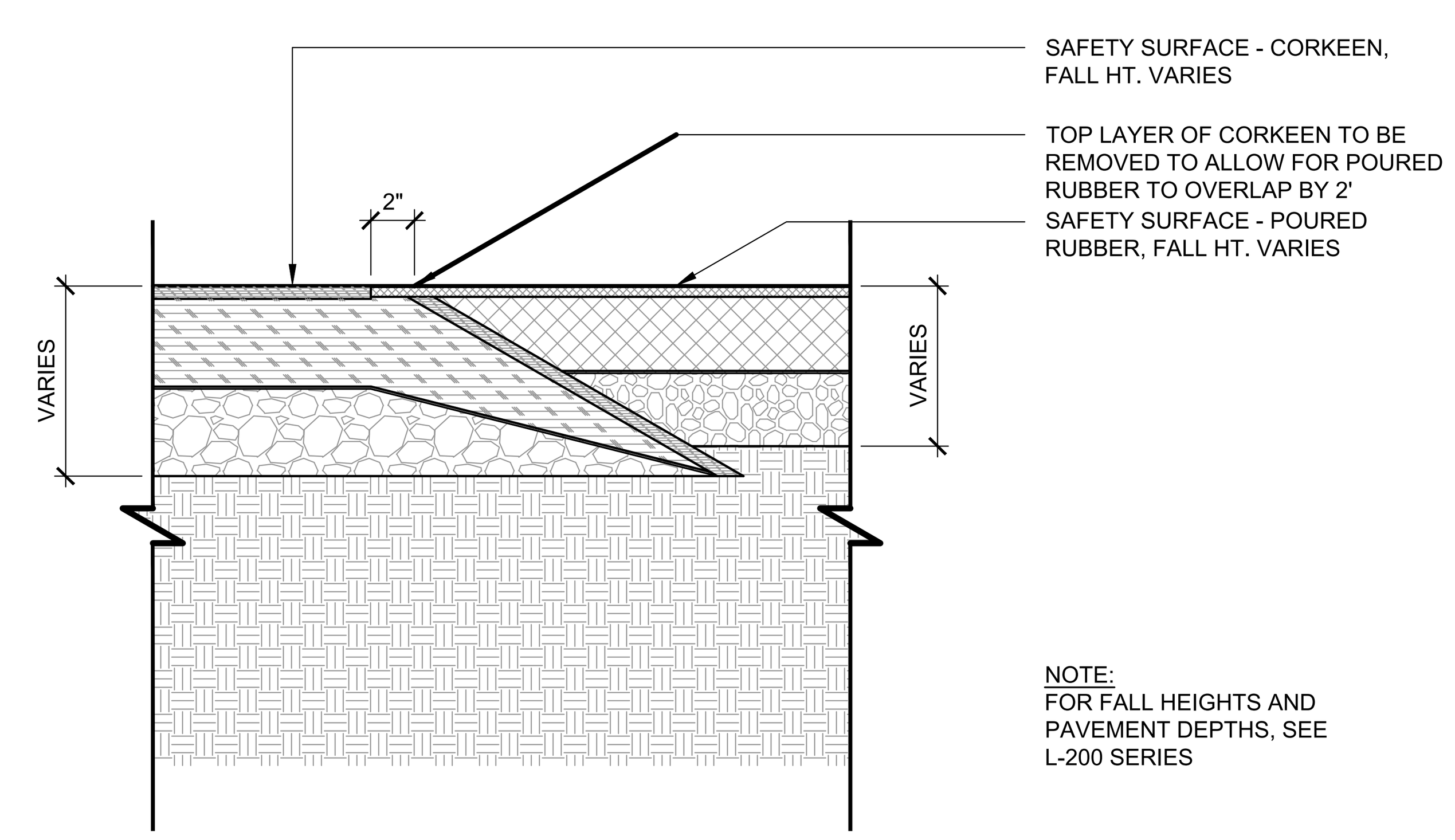
05 C.I.P CONCRETE PAVING EDGE
SCALE: 1-1/2" = 1' - 0"



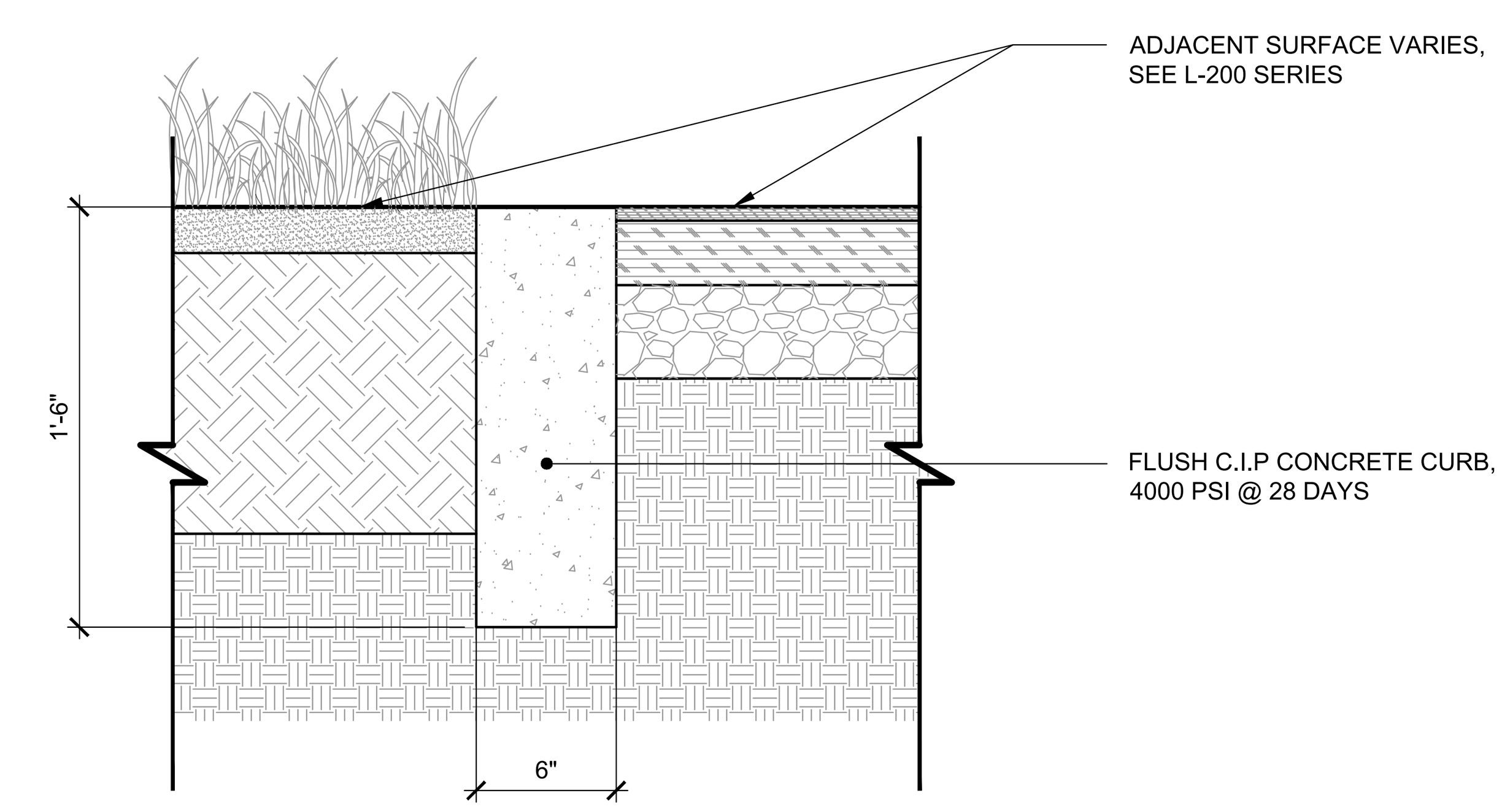
02 CORKEEN - LAWN TRANSITION
SCALE: 1-1/2" = 1' - 0"



07 GRANITE BLOCK SEATING - AT FLUSH CURB
SCALE: 1" = 1' - 0"



04 CORKEEN - POURED RUBBER TRANSITION
SCALE: 1-1/2" = 1' - 0"



01 FLUSH CONCRETE CURB
SCALE: 1-1/2" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
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15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

SIGNATURE — DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

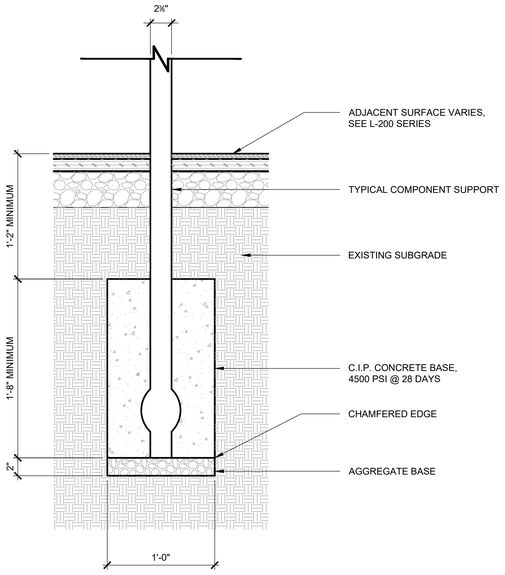
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

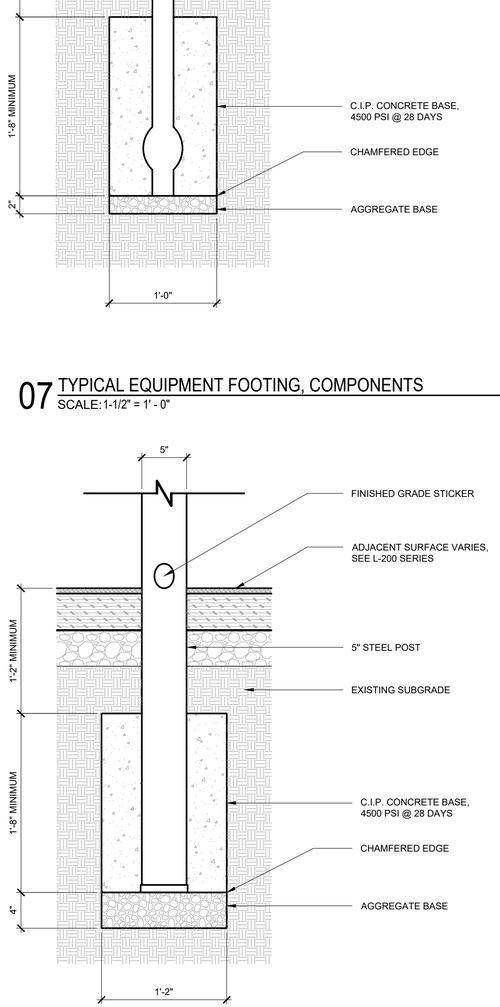
DRAWING TITLE:
TYPICAL DETAILS - 2

PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 12/15/2023
SCALE: AS NOTED
DRAWN BY: SS, TW
CHECKED BY: TS
DRAWING NO.: **L-901**

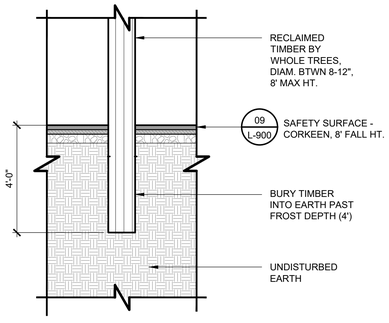
NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



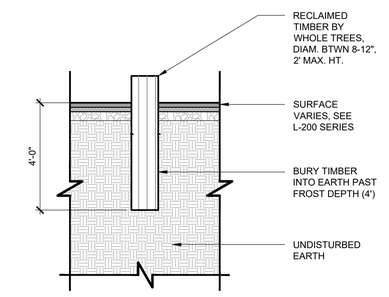
07 TYPICAL EQUIPMENT FOOTING, COMPONENTS
SCALE:1-1/2" = 1' - 0"



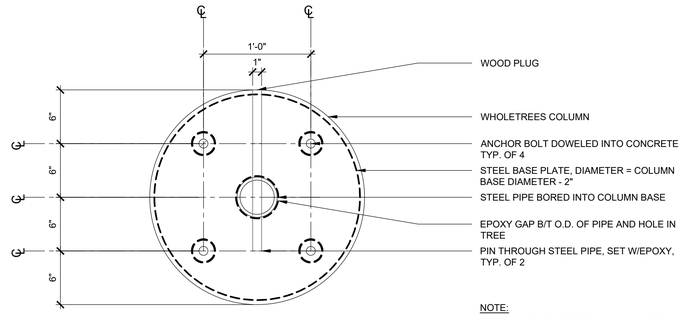
06 TYPICAL EQUIPMENT FOOTING, 5" POSTS
SCALE:1-1/2" = 1' - 0"



05 TYPICAL SCRAMBLER POST EMBEDMENT
SCALE:3/8" = 1' - 0"

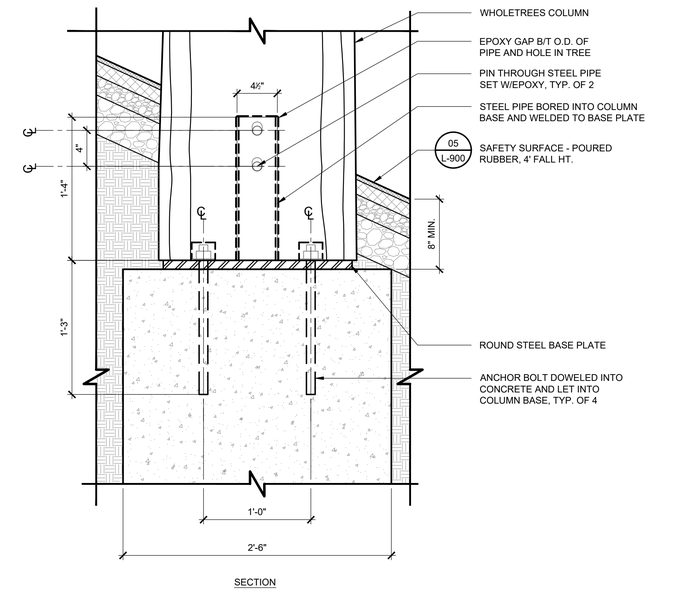


04 TYPICAL STUMP EMBEDMENT
SCALE:1/2" = 1' - 0"



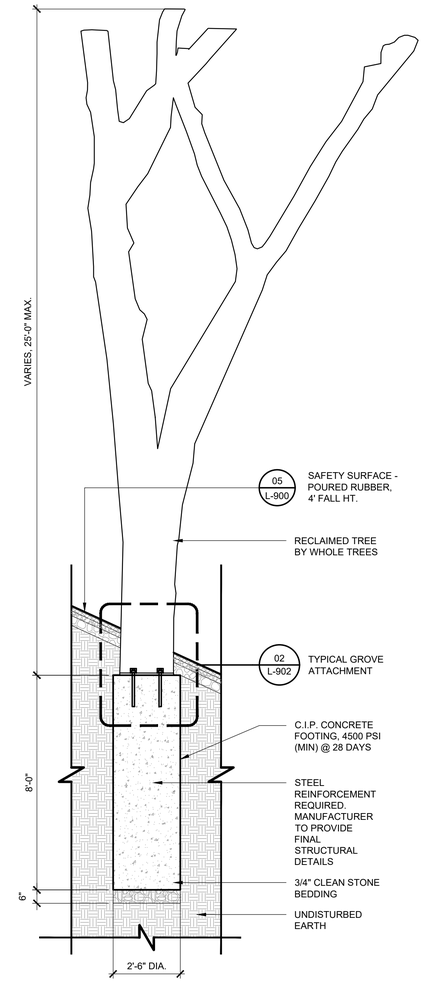
PLAN

NOTE:
FOOTING TO BE VERIFIED BY ENGINEER.

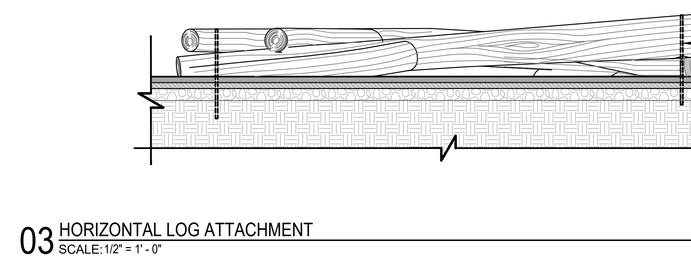


SECTION

02 TYPICAL GROVE ATTACHMENT
SCALE:1-1/2" = 1' - 0"



01 TYPICAL GROVE FOOTING
SCALE:3/8" = 1' - 0"



03 HORIZONTAL LOG ATTACHMENT
SCALE:1/2" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR:
MEGAN FUNK

SEAL:
PENNSYLVANIA · ANGEL L. RIVERA · REGISTERED LANDSCAPE ARCHITECT · REGISTRATION NUMBER 3379

SIGNATURE
DATE SIGNED
04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
TYPICAL DETAILS - 3

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **L-902**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE:
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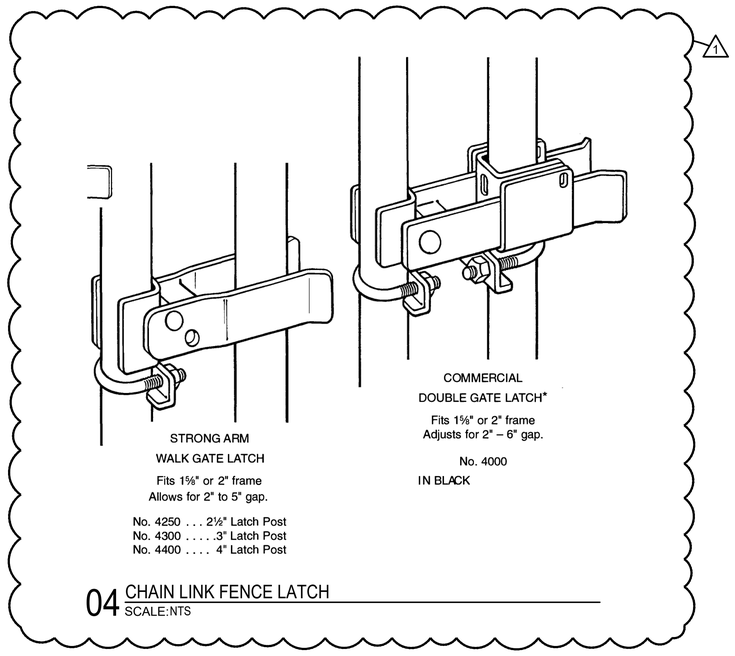
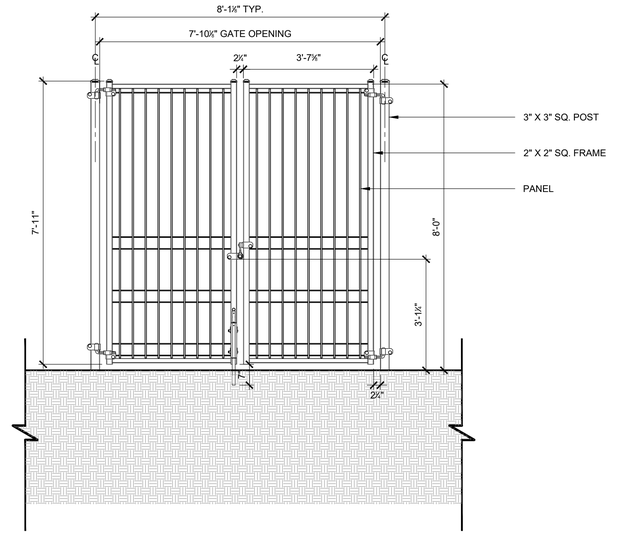
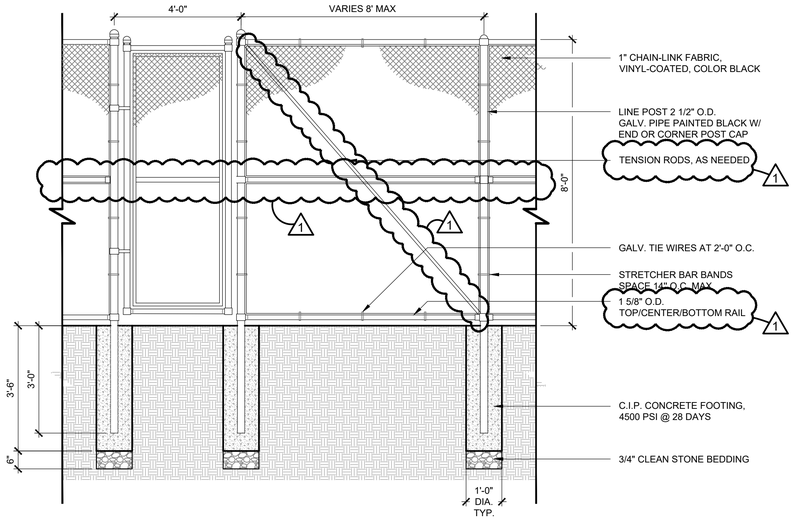


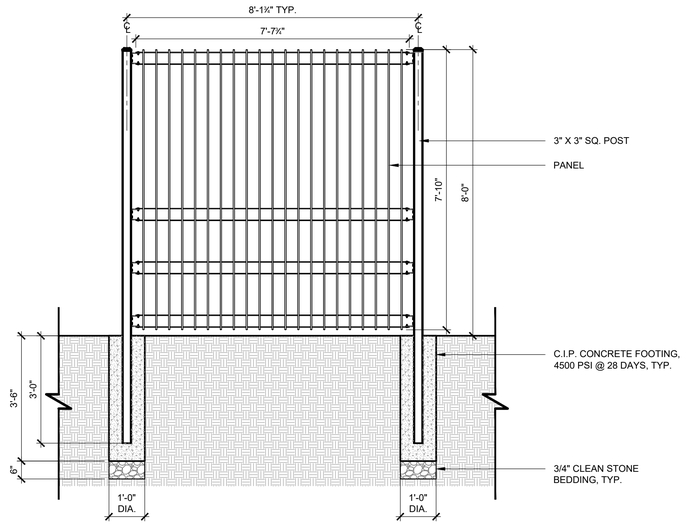
04 CHAIN LINK FENCE LATCH
SCALE: NTS



02 ENTRY FENCE GATE
SCALE: 1/2" = 1' - 0"



03 SECURITY FENCE AND GATE
SCALE: 1/2" = 1' - 0"



01 ENTRY FENCE
SCALE: 1/2" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
COMMONWEALTH OF PENNSYLVANIA · KYLE L. RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE
DATE SIGNED: 12/15/2023

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
THE LIGHTING PRACTICE
600 Chestnut Street, Suite 772
Philadelphia, PA 19106

COST ESTIMATOR:
ELLANA CONSTRUCTION CONSULTANTS
32 Broadway, 8TH Floor
New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
PLAYFUL LEARNING LANDSCAPES ACTION NEXTWORK
Philadelphia, PA
267.468.8610

ARBORIST:
MORRIS ARBORETUM
100 East Northwestern Avenue
Philadelphia, PA 19118
215.247.5777

ACCESSIBILITY CONSULTANT:
CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

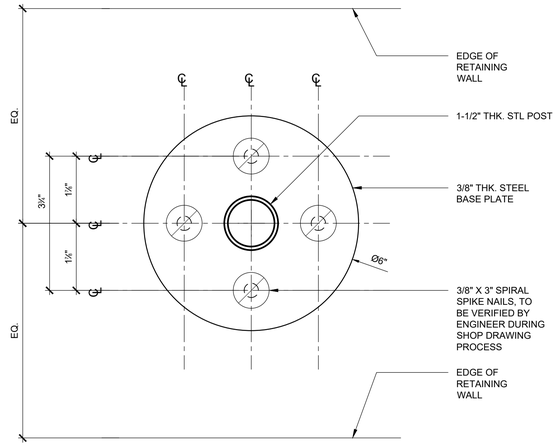
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

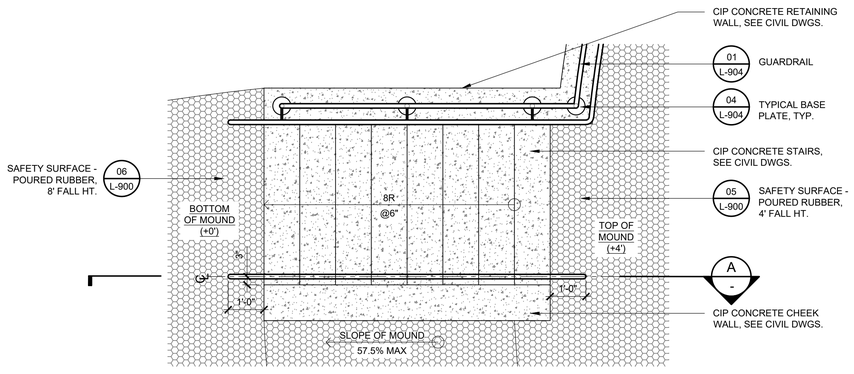
DRAWING TITLE:
TYPICAL DETAILS - 4

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-903
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

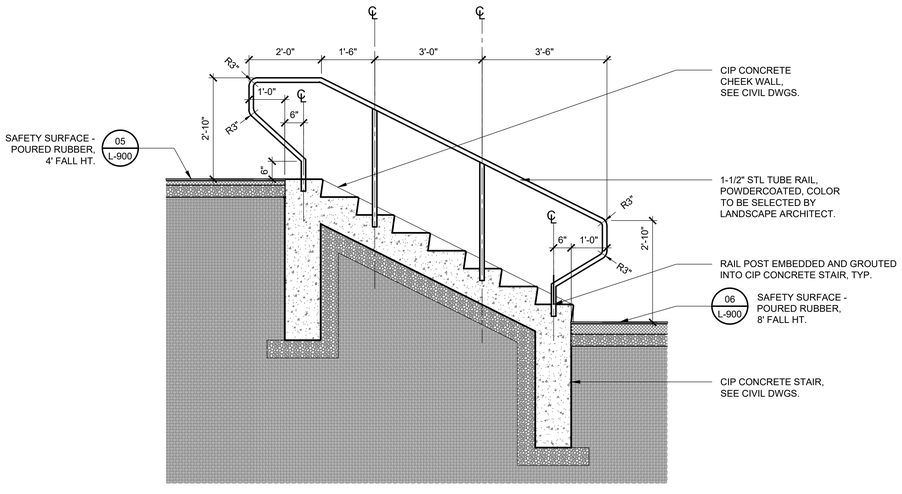
NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



04 TYPICAL BASE PLATE
SCALE: 6" = 1' - 0"

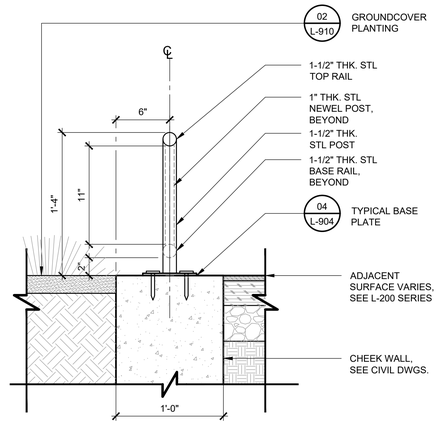


B. PLAN

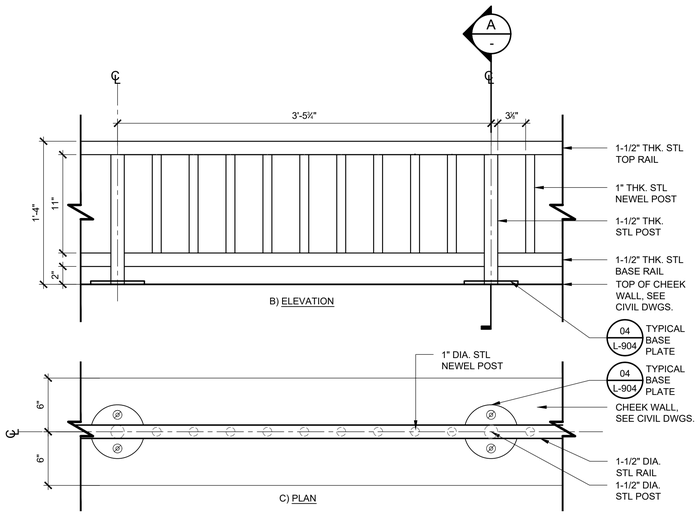


A. SECTION

03 HANDRAIL
SCALE: 1/2" = 1' - 0"



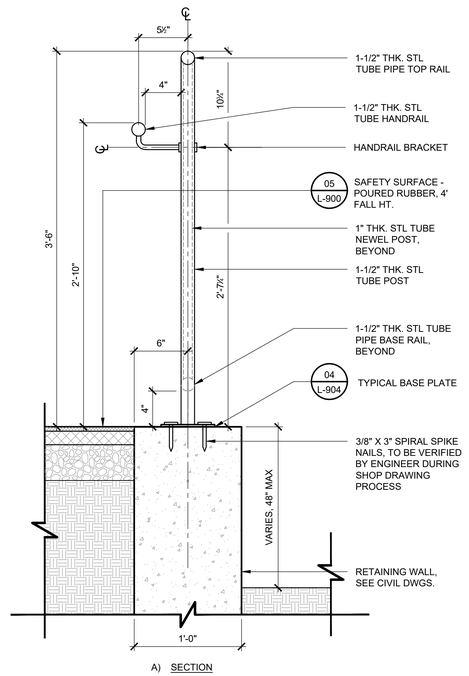
A) SECTION



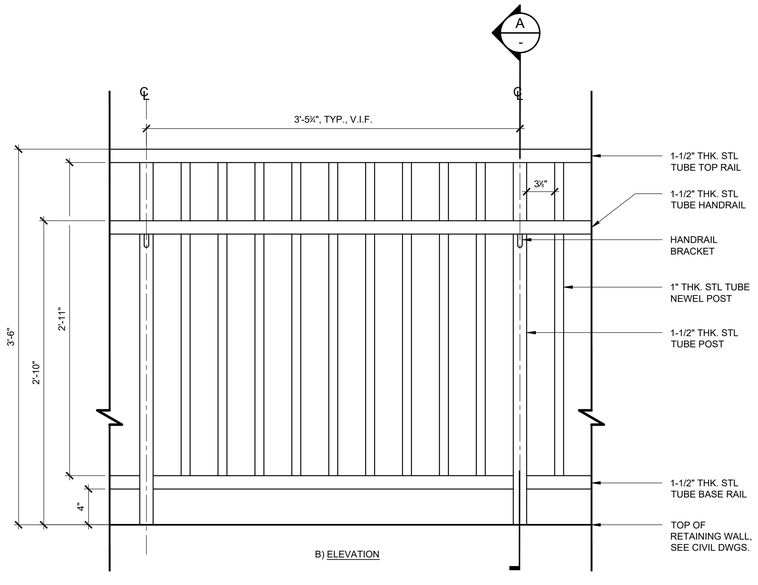
B) ELEVATION

C) PLAN

02 TREE PIT RAIL
SCALE: 1-1/2" = 1' - 0"



A) SECTION



B) ELEVATION

01 GUARDRAIL
SCALE: 1-1/2" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA! CALL 1-800-242-1776
NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL: PENNSYLVANIA — ANGEL L. RIVERA — REGISTERED LANDSCAPE ARCHITECT — REGISTRATION NUMBER 3379

SIGNATURE: DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

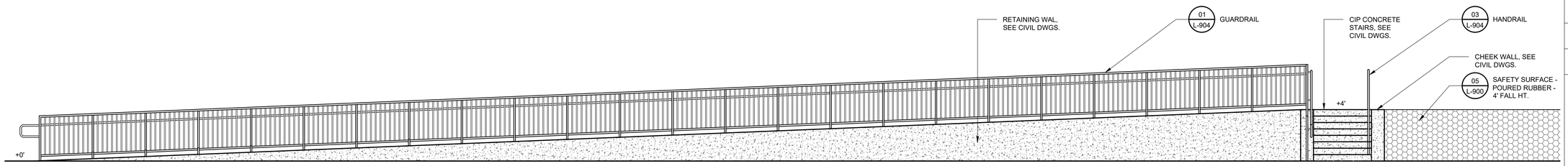
PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
TYPICAL DETAILS - 5

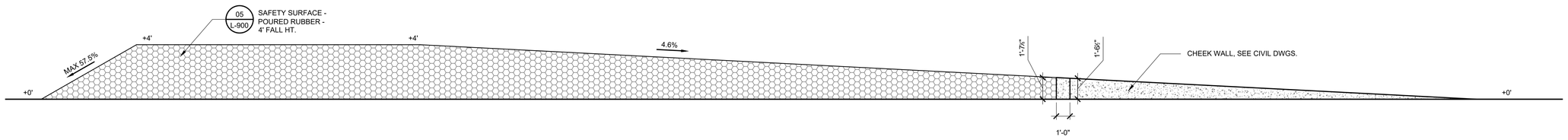
PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 12/15/2023
SCALE: AS NOTED
DRAWN BY: SS, TW
CHECKED BY: TS

DRAWING NO.: **L-904**

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



02 BERM ELEVATION - OUTSIDE
SCALE: 1/4" = 1' - 0"



01 BERM ELEVATION - INSIDE
SCALE: 1/4" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
PENNSYLVANIA · ANGEL L. RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

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MEP ENGINEER:
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646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

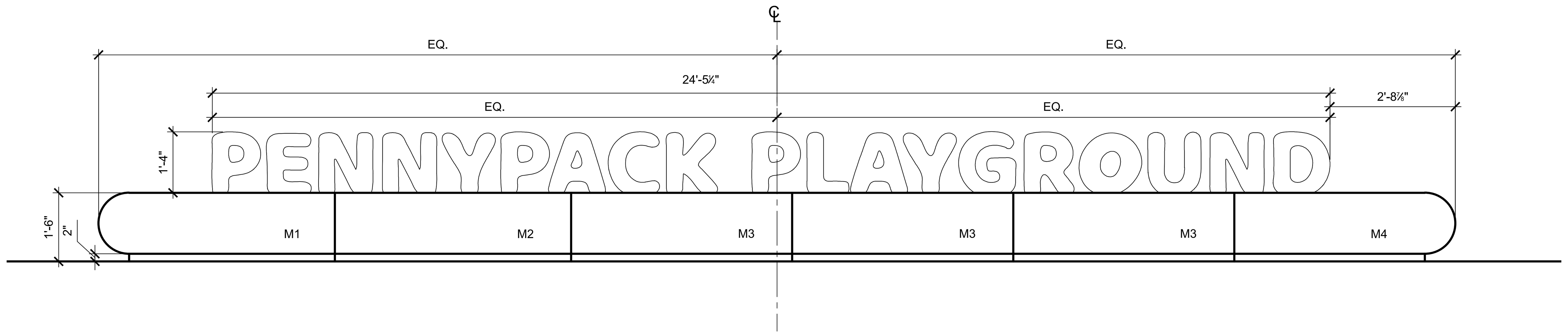
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

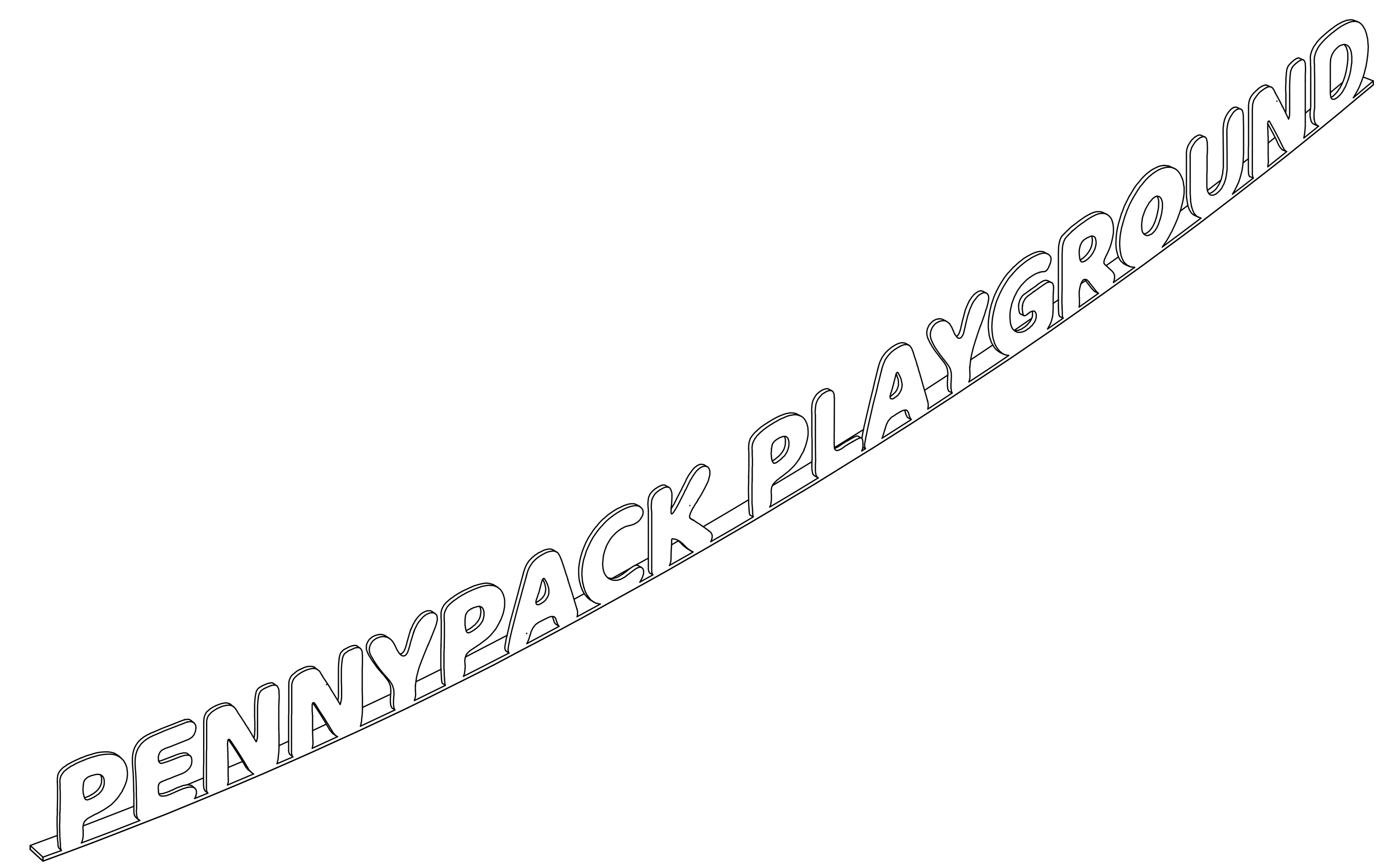
DRAWING TITLE:
TYPICAL DETAILS - 6

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **L-905**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

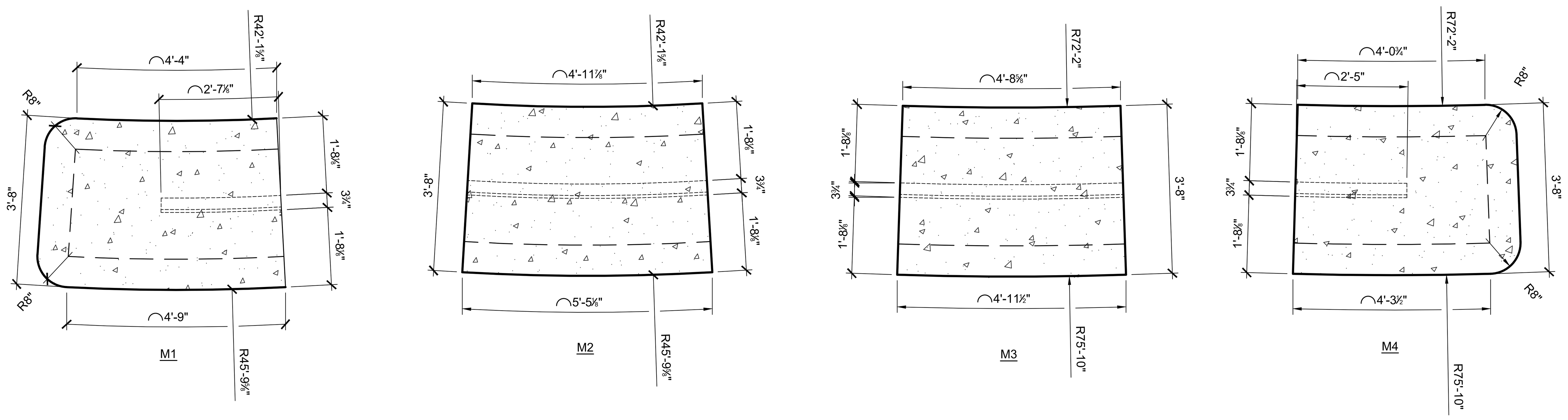
NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

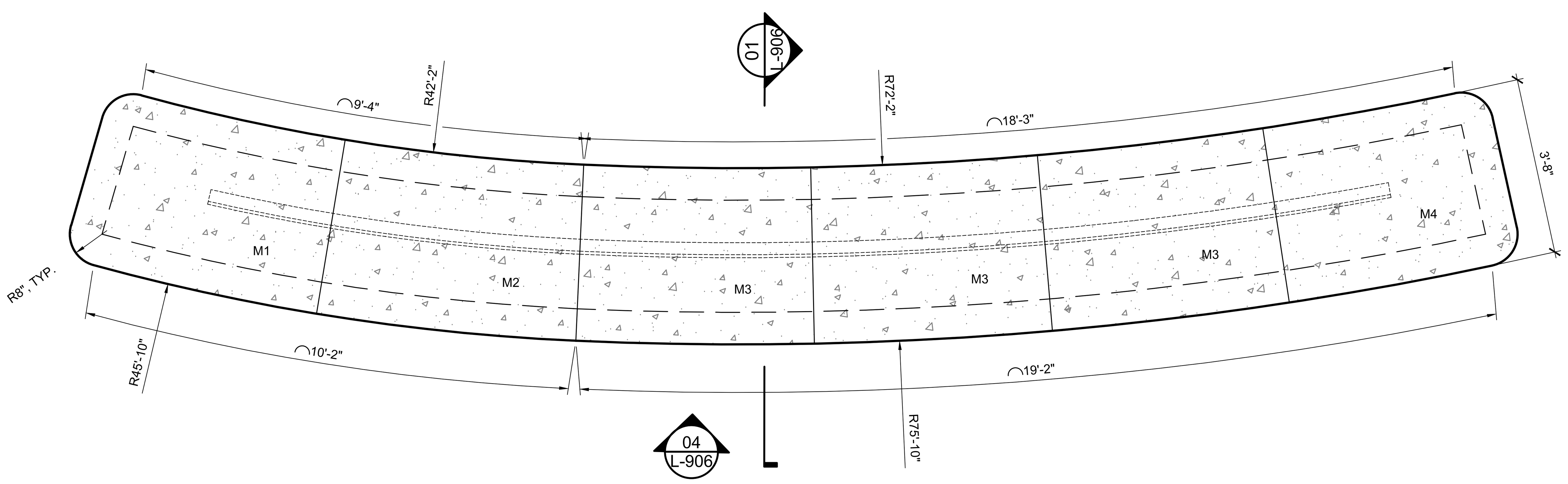


04 PRECAST CONCRETE BENCH - ELEVATION
SCALE: 1/2" = 1'-0"

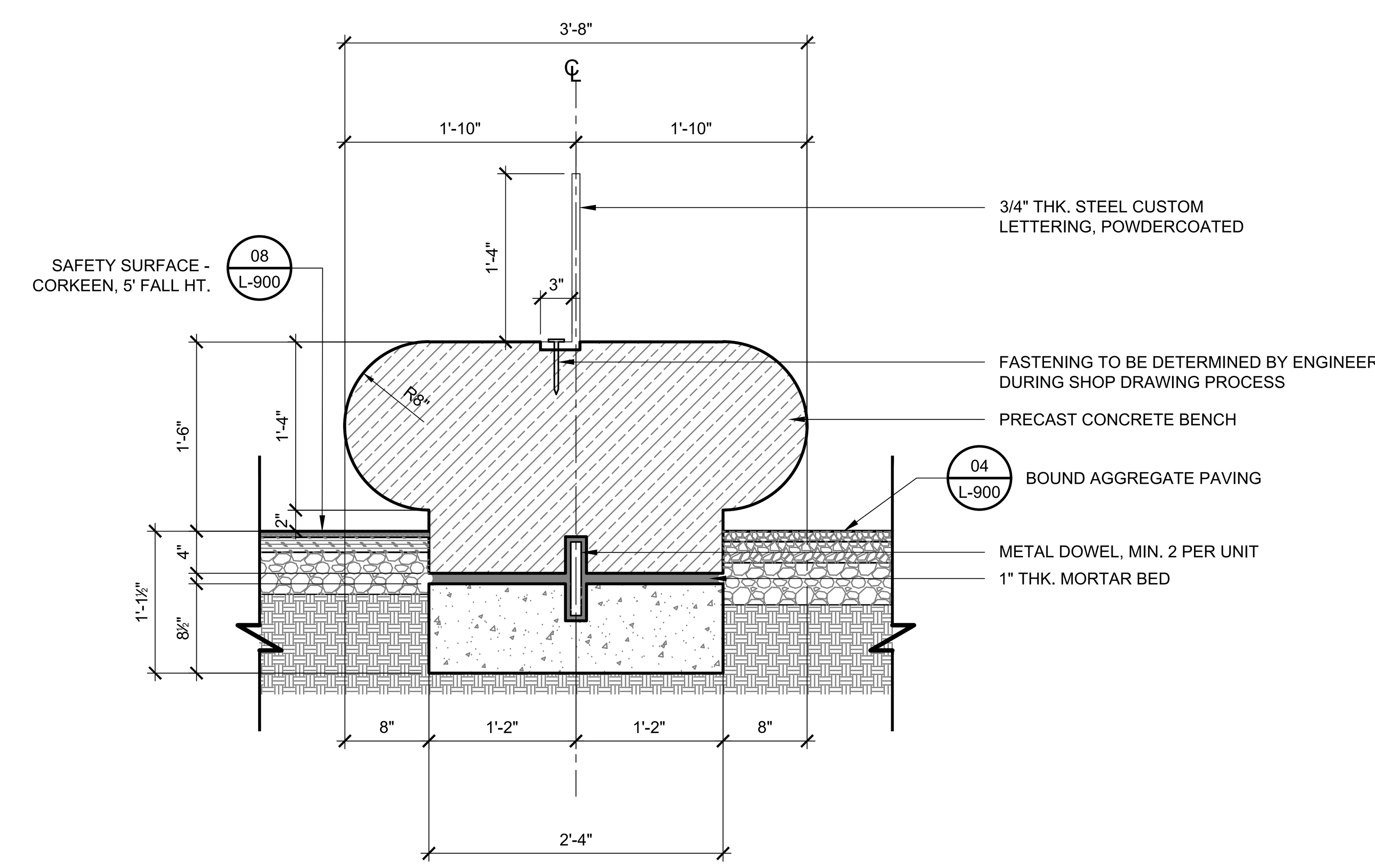


02 CUSTOM METAL LETTERING - AXON
SCALE: 1/2" = 1'-0"





03 PRECAST CONCRETE BENCH - PLAN
SCALE: 1/2" = 1' - 0"



01 PRECAST CONCRETE BENCH - SECTION
SCALE: 1" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
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Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
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COST ESTIMATOR:
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New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
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ACCESSIBILITY CONSULTANT:
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646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

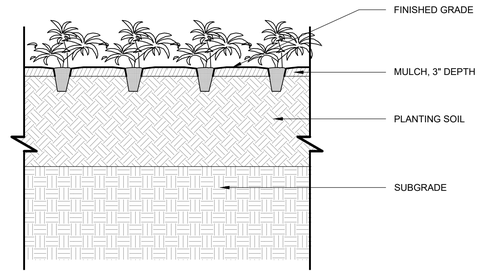
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

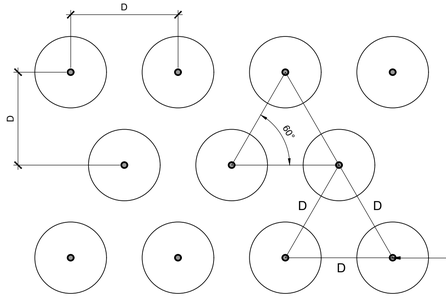
DRAWING TITLE:
TYPICAL DETAILS - 7

PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	SS, TW
CHECKED BY:	TS
DRAWING NO.:	L-906

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.

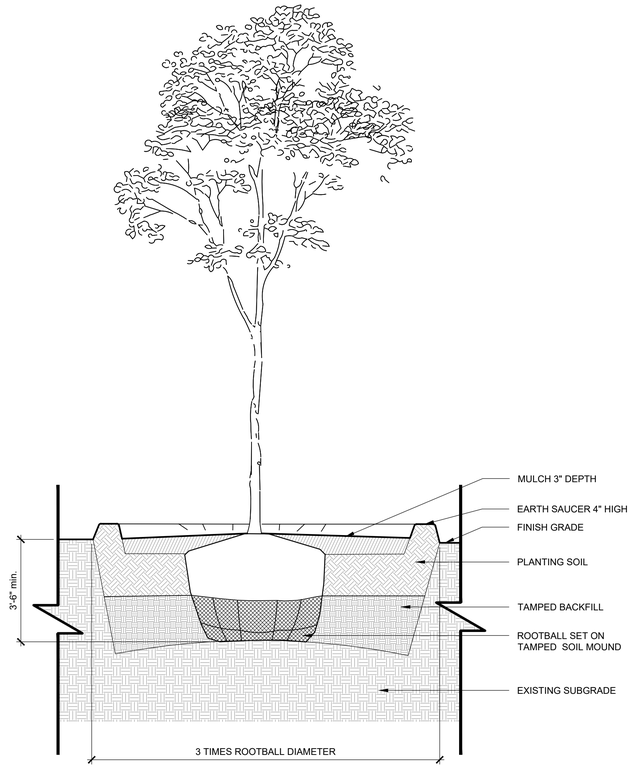


02 GROUNDCOVER PLANTING
SCALE: 1" = 1' - 0"



NOTE:
1. REMOVE ALL WIRE AND PLASTIC TAGS OR SYNTHETIC MATERIAL FROM PLANTS PRIOR TO PLANTING
2. D = TYPICAL ON CENTER (O.C) SPACING AS INDICATED IN THE PLANT LIST

03 PLANT SPACING
SCALE: 1" = 1' - 0"



01 TREE PLANTING
SCALE: 3/8" = 1' - 0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
PENNSYLVANIA · YAMEL RIVERA · REGISTRATION NUMBER 3379 · REGISTERED LANDSCAPE ARCHITECT

SIGNATURE
DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
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646.632.7344

PLAY CONSULTANT:
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1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
PLANTING DETAILS

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-910
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

SUPERGRAPHIC APPLIED
WITH SPORT COAT PAINT

SUPERGRAPHIC
PAINT COLOR A:
RAL 5002

SUPERGRAPHIC
PAINT COLOR B:
RAL 7035

01 PLAYFUL LEARNING - MISTING AREA SUPERGRAPHIC
SCALE: 3/8" = 1'-0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANETO

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

PENNSYLVANIA ONE CALL SYSTEM, INC.

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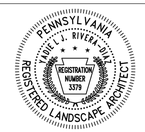
PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR:
MEGAN FUNK

SEAL:


SIGNATURE


DATE SIGNED
04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

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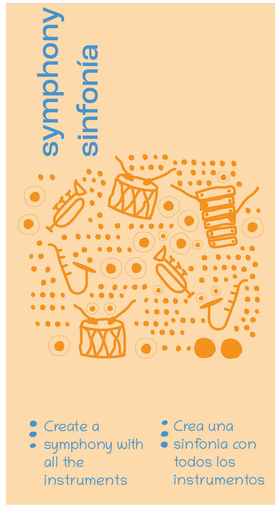
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

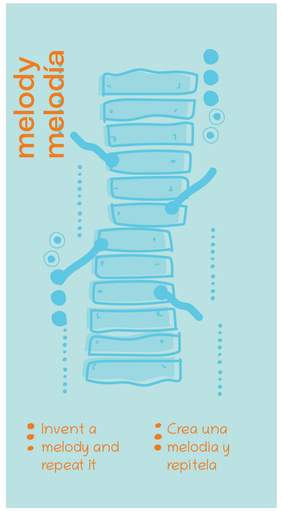
DRAWING TITLE:
SIGNAGE DETAILS - 1

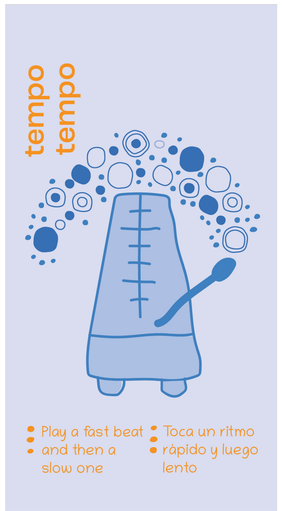
PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **L-920**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

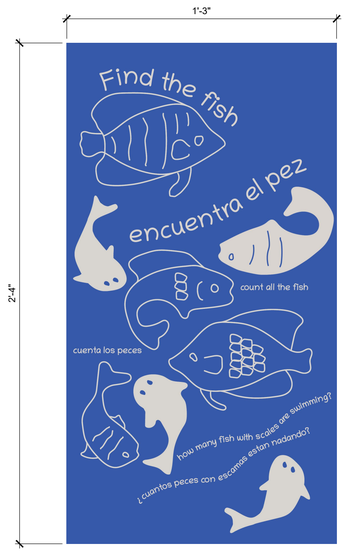
NOTE:
THE BEAT / RITMO GRAPHIC WILL BE USED TWICE, ONE AT EACH DRUM SETS



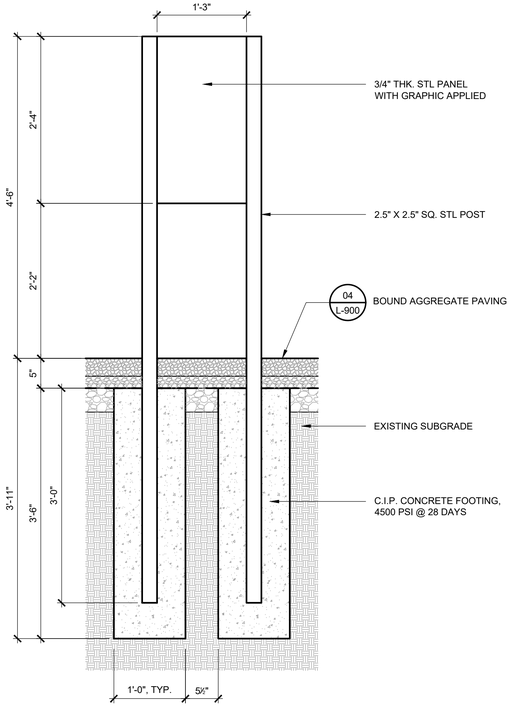




04 PLAYFUL LEARNING - MUSIC SIGNS
SCALE: 3" = 1'-0"



03 PLAYFUL LEARNING - MISTING AREA SIGN
SCALE: NTS



02 PLAYFUL LEARNING - TYPICAL SIGN
SCALE: 1" = 1'-0"

NOTE:
1. OVERALL SIZE: 18"x24"
2. BASE MATERIAL: ALUMINUM
3. THICKNESS: 0.080
4. OVERLAY: EG VINYL

01 DCNR SIGN
SCALE: NTS

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA! CALL 1-800-242-1776
NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:


SIGNATURE:

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
THE LIGHTING PRACTICE
600 Chestnut Street, Suite 772
Philadelphia, PA 19106

COST ESTIMATOR:
ELLANA CONSTRUCTION CONSULTANTS
32 Broadway, 8TH Floor
New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
PLAYFUL LEARNING LANDSCAPES ACTION NEXTWORK
Philadelphia, PA
267.468.8610

ARBORIST:
MORRIS ARBORETUM
100 East Northwestern Avenue
Philadelphia, PA 19118
215.247.5777

ACCESSIBILITY CONSULTANT:
CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St. Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

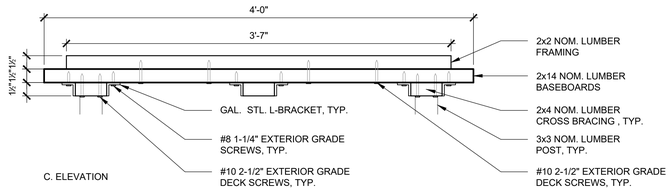
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

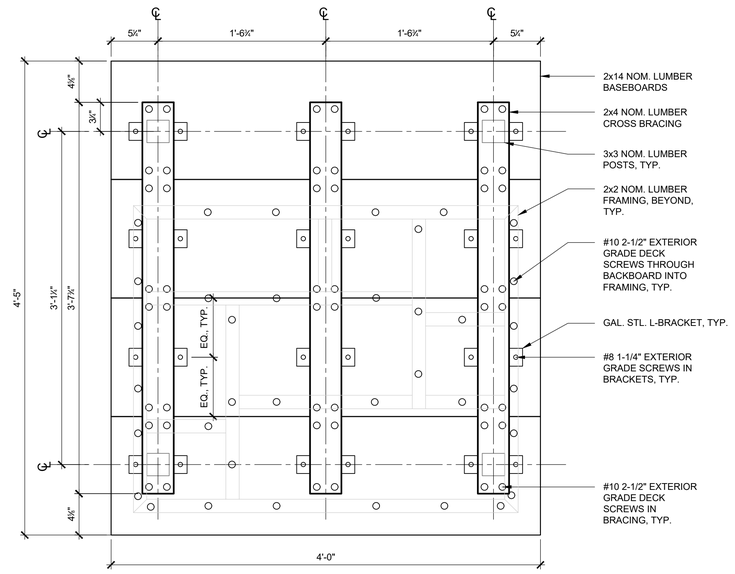
DRAWING TITLE:
SIGNAGE DETAILS - 2

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-921
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



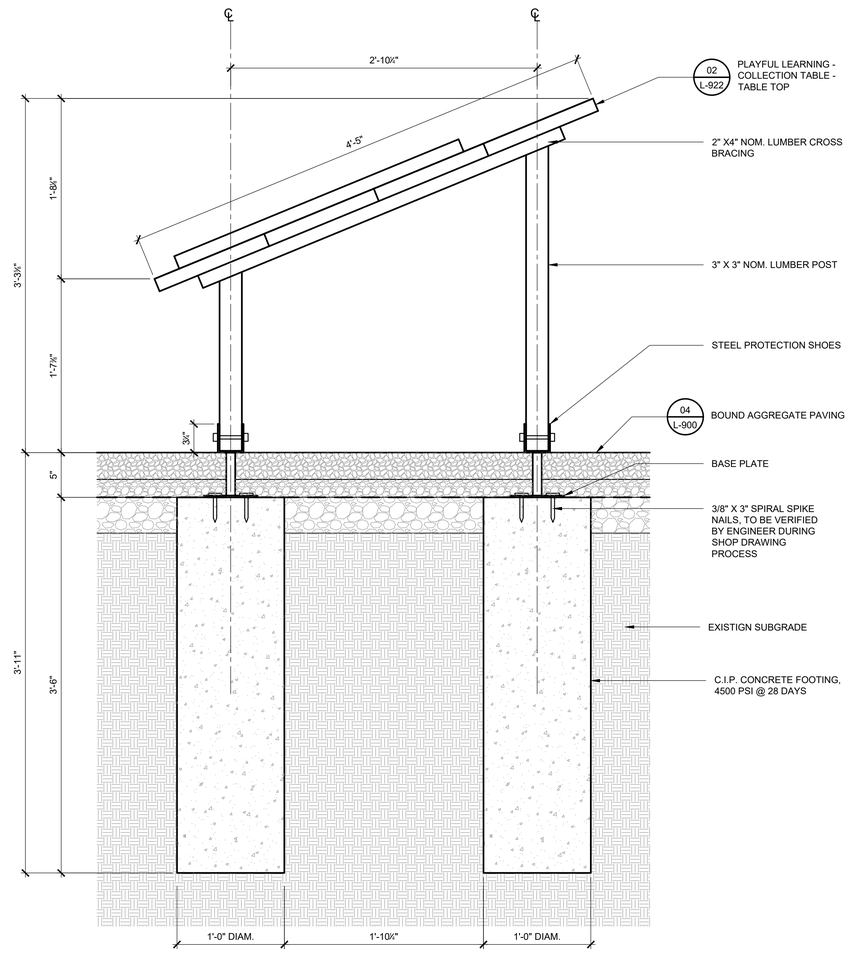
C. ELEVATION



B. BACK

A. FRONT

02 PLAYFUL LEARNING - COLLECTION TABLE - TABLE TOP
SCALE: 3" = 1'-0"



01 PLAYFUL LEARNING - COLLECTION TABLE - SECTION
SCALE: 1-1/2" = 1'-0"

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SIGNAGE DETAILS - 3

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: L-922
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: SS, TW	
CHECKED BY: TS	

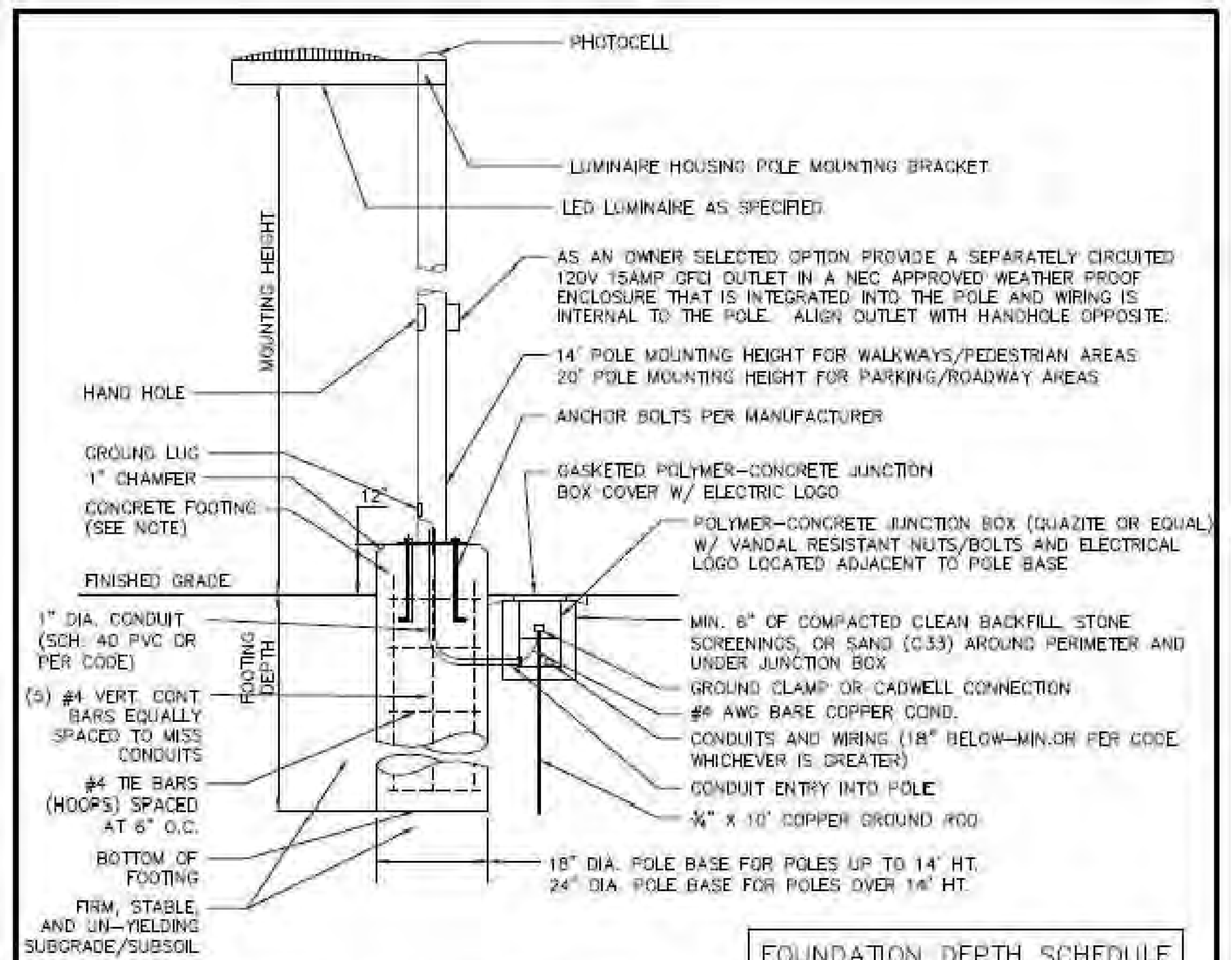
NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

GENERAL ELECTRICAL NOTES

1. ALL WORK SHALL CONFORM TO THE LATEST REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, PENNSYLVANIA CODES, NFPA, UL, THE LATEST ENERGY CONSERVATION CONSTRUCTION CODE, AND ALL OTHER GOVERNING AGENCIES HAVING JURISDICTION. ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR AND FILED WILL ALL AUTHORITIES HAVING JURISDICTION.
2. THE ELECTRICAL CONTRACTOR SHALL VISIT AND CAREFULLY EXAMINE THE AREAS AFFECTED BY THIS WORK TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND WITH DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. CONTRACTOR SHALL PERFORM THIS PRIOR TO SUBMITTING HIS PROPOSAL. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
3. SUBSEQUENT TO AWARD OF THE CONTRACT, THE ELECTRICAL CONTRACTOR SHALL SUBMIT A PROPOSED SCHEDULE OF WORK TO THE ARCHITECT. THE SCHEDULE SHALL BE MODIFIED AS NECESSARY AND RE-ISSUED WHEN ANY CHANGES THERETO ARE REQUIRED.
4. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATIONS AND ELEVATIONS OF ALL LIGHTING FIXTURES, ETC., SHALL BE DETERMINED BY THE ARCHITECT AND OWNER.
5. CIRCUIT NUMBERS INDICATED ON PLANS ARE FOR GROUPING PURPOSES ONLY. WHERE DRAWINGS CALL FOR SEPARATE NEUTRAL WIRES OR DEDICATED CIRCUITS, THE ELECTRICAL CONTRACTOR SHALL PROVIDE CIRCUITS WITH PROPER PHASE SEQUENCING FOR EVERY SHARED NEUTRAL WIRE.
6. BRANCH CIRCUITS SHALL BE ARRANGED TO BALANCE LOADS TO THE EXTENT POSSIBLE. LOADS IMBALANCES BETWEEN PHASES SHALL NOT EXCEED 10%.
7. ALL PANELS SHALL HAVE COMPLETE DIRECTORIES INDICATING LOADS SERVED AS WELL AS SPARES AND SPACES.
8. ELECTRIC PANEL COVERS SHALL NOT BE LEFT OFF AT ANY TIME UNLESS CONTRACTOR'S PERSONNEL ARE WORKING ON SAME. COVERS SHALL BE REPLACED AT THE END OF THE WORK DAY.
9. PROVIDE GROUND WIRE IN ALL FEEDERS TO MOTORIZED EQUIPMENT.
10. PROVIDE ARC FAULT CIRCUIT BREAKERS OR RECEPTACLES WHERE INDICATED OR WHERE REQUIRED BY CODE.
11. PROVIDE GROUND FAULT CIRCUIT BREAKERS OR RECEPTACLES WHERE INDICATED OR WHERE REQUIRED BY CODE.
12. ANY ELECTRICAL EQUIPMENT INDICATED OUTDOORS SHALL BE WEATHERPROOF IN NEMA 3R ENCLOSURES.
13. ALL DEVICE COLORS AND FINISHES, AND MOUNTING HEIGHTS OF ELECTRICAL DEVICES SHALL BE IN ACCORDANCE TO ARCHITECTURAL DRAWINGS.
14. 1/2" CONDUIT SHALL BE THE MINIMUM SIZE CONDUIT INSTALLED.
15. ARMOR CLAD (AC) OR METAL-CLAD CABLE (MC) MAY BE USED AS PERMITTED BY CODE. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED WITH SET SCREW TYPE FITTINGS.
16. FLEXIBLE METALLIC CONDUIT (FMC) (GREENFIELD) SHALL BE USED FOR FINAL CONNECTION TO MOTORS AND TO RECESSED MOUNTED LIGHTING FIXTURES. LENGTH SHALL NOT EXCEED 6 FEET.
17. ALL MATERIALS SHALL BE NEW AND SHALL CONFORM WITH THE STANDARDS OF THE UNDERWRITERS LABORATORIES, INC. (UL) WHERE SUCH A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR TYPE OF MATERIAL IN QUESTION, UNLESS OTHERWISE NOTED.
18. THE CONTRACTOR SHALL SUBMIT CATALOG CUTS AND SHOP DRAWINGS OF ALL DEVICES, EQUIPMENT AND MATERIAL PROPOSED TO BE USED TO THE ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL. A SHOP DRAWING LOG SHALL BE MAINTAINED BY THE CONTRACTOR AND STATUS OF SUBMISSIONS SHALL BE UPDATED AT LEAST BI-WEEKLY.
19. THE ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES AND CONTRACTORS WHOSE WORK MIGHT AFFECT THIS INSTALLATION.
20. BEFORE INSTALLING ANY WORK, THE CONTRACTOR, SHALL CONFIRM THAT IT DOES NOT INTERFERE WITH CLEARANCES REQUIRED FOR EQUIPMENT, FINISHES AND OTHER ITEMS, AS SHOWN ON THE ARCHITECTURAL DRAWINGS AND DETAILS. IF ANY WORK IS SO INSTALLED AND IT LATER DEVELOPS THAT SUCH DETAILS OR DESIGN CANNOT BE FOLLOWED, THIS CONTRACTOR AT HIS OWN EXPENSE SHALL MAKE SUCH CHANGES IN THE WORK AS NECESSARY AND AS DIRECTED BY THE ARCHITECT, TO PERMIT THE INSTALLATION OF THE ARCHITECTURAL WORK AS SHOWN ON THE PLANS AND DETAILS.
21. DURING THE PROJECT DURATION, THE ARCHITECT AND ENGINEER WILL INSPECT THE WORK PROGRESS. ANY WORK WHICH IS JUDGED UNSATISFACTORY FOR ANY REASON OR NOT IN COMPLIANCE WITH THE CONTRACT, CODE, OR STANDARDS SHALL BE REMOVED AND REPLACED AS DIRECTED AND AT THE EXPENSE OF THE CONTRACTOR.
22. CHOPPING OR CHASING OF MASONRY MUST BE COORDINATED WITH THE ENGINEER AND ARCHITECT PRIOR TO COMMENCING WORK.
23. UPON COMPLETION OF THE WORK, A SET OF "AS-BUILT" DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE. FINAL AS-BUILTS SHALL BE SUBMITTED TO THE OWNER PRIOR TO PROJECT CLOSEOUT.
24. THE ENERGIZATION OF THE ELECTRICAL INSTALLATION DOES NOT CONSTITUTE AN ACCEPTANCE OF THE WORK BY THE OWNER. FINAL ACCEPTANCE IS TO BE MADE AFTER THE CONTRACTOR HAS DEMONSTRATED THAT THE WORK FULFILLS THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS AND HAS FURNISHED ALL REQUIRED CERTIFICATES OF APPROVAL FROM THE STATE AUTHORITIES, MUNICIPAL AUTHORITIES AND UNDERWRITERS.
25. ELECTRICAL CONTRACTOR SHALL FILE FOR NECESSARY INSPECTIONS AND SHALL PROVIDE AN ELECTRICAL INSPECTION APPROVAL CERTIFICATE TO THE ARCHITECT UPON COMPLETION OF THE WORK.
26. ALL ELECTRICAL WORK TO CONFORM TO NEC AND LOCAL ELECTRICAL CODES.
27. THE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH NEC REQUIREMENTS. ALL NON-CURRENT METAL PARTS SHALL BE CONNECTED TO THE GROUNDING SYSTEM. PROVIDE GROUND ROD IN FIRST BOX & BOND TO CONDUIT.
28. ALL UNDERGROUND CONDUIT SHALL BE HOT DIPPED GALVANIZED STEEL WITH WARNING TAPE ABOVE IT. RIGID PVC CONDUIT IS ACCEPTABLE TO USE FOR ALL UNDERGROUND RACEWAYS IN AREAS NOT REGULARLY SUBJECT TO VEHICULAR TRAFFIC. PROVIDE CODE-SIZED GROUND WIRE IN EACH PVC CONDUIT AS PER NEC 250.
29. FOR EXACT LAYOUT & EQUIPMENT LOCATIONS SEE LANDSCAPE PLAN
30. COORDINATE CONDUIT ROUTING/LAYOUT TO AVOID ANY EQUIPMENT FOOTINGS & TREE ROOTS.
31. EXCAVATION AROUND TREES SHALL BE PERFORMED BY HAND TO NOT DISTURB EXISTING ROOT SYSTEM.
32. MINIMUM SIZE WIRING SHALL BE #12. ELECTRICAL CONTRACTOR SHALL INCREASE WIRE SIZE AND CONDUIT AS NECESSARY TO MEET ALL VOLTAGE DROP LIMITATIONS
33. CONTRACTOR SHALL INSTALL PULL BOXES AS REQUIRED BY CODE AND TO FACILITATE CABLE INSTALLATION. COORDINATE LOCATIONS OF PULL BOXES WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

TRENCHING NOTES

1. CONTRACTOR SHALL LOCATE ALL EXISTING UNDERGROUND UTILITIES PRIOR TO DIGGING.
2. ALL EXCAVATION IN THE AREA OF THE EXISTING UNDERGROUND EQUIPMENT, PIPES AND CONDUITS SHALL BE PERFORMED BY HAND.
3. ANY AREA PLANTS OR LANDSCAPING OR PAVEMENT DISTURBED DURING THE EXCAVATION SHALL BE RESTORED OR REPLACED TO MATCH EXISTING CONDITIONS BY THE CONTRACTOR AT NO COST TO THE OWNER.
4. ANY EXISTING BURIED CONDUITS, DRAINAGE, SPRINKLER PIPING, ETC. THAT IS DISTURBED AND/OR DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.
5. CONTRACTOR SHALL VERIFY AND COORDINATE FOR EXISTING UNDERGROUND UTILITIES AND UTILITIES OF ALL OTHER TRADES TO BE INSTALLED AS PART OF THIS CONTRACT TO LOCATE FEEDERS SHOWN ON THESE DRAWINGS. THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH UTILITY PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY OR MAY NOT BE SHOWN OR EXACTLY DEPICTED ON THE PLANS. IT IS RESPONSIBILITY OF THIS CONTRACTOR TO PROCEED WITH GREAT CARE IN EXECUTING ANY WORK.



FOUNDATION DEPTH SCHEDULE	
MOUNTING HEIGHT	MIN. FOOTING DEPTH
8 TO 14 FEET	4'-6" MIN.
14 TO 25 FEET	5'-0" MIN.

NOTE(S):
1. CONCRETE STRENGTH SHALL BE A MINIMUM OF 3,500 PSI @ 28 DAYS OR PER CIVIL/STRUCTURAL DRAWINGS, WHICHEVER IS GREATER. PROVIDE 3" OF CONCRETE COVER SHALL BE PROVIDED OVER ALL REINFORCEMENT BARS. REINFORCEMENT SHOWN IS MINIMUM. ENGINEER/DESINGER OF RECORD IS RESPONSIBLE FOR FOOTING DESIGN.
2. COORDINATE ELECTRICAL CONDUIT AND GROUNDING WITH ELECTRICAL DRAWINGS.
3. REFER TO LIGHTING SCHEDULE ON LIGHTING PLAN FOR LUMINAIRE TYPE AND MOUNTING HEIGHT.
4. SEE GRADING PLANS FOR FINISHED GRADE ELEVATIONS.
5. USE GASKETED CONDUIT HUBS BETWEEN HAND HOLES/JUNCTION BOX AND CONDUITS TO PREVENT ENTRY OF SOIL, DEBRIS, AND WATER INTO HANDHOLE/JUNCTION BOX.
6. FOOTING DEPTH MAY VARY DUE TO UNSUITABLE SUB-SURFACE SOIL CONDITIONS. VERIFY IN FIELD WITH CIVIL/GEOTECHNICAL ENGINEER AND/OR SOILS INSPECTOR.

PHILADELPHIA PARKS & RECREATION

EXTERIOR LED LIGHT, POLE, AND BASE DETAIL

SCALE: NTS
DATE: DEC 2019

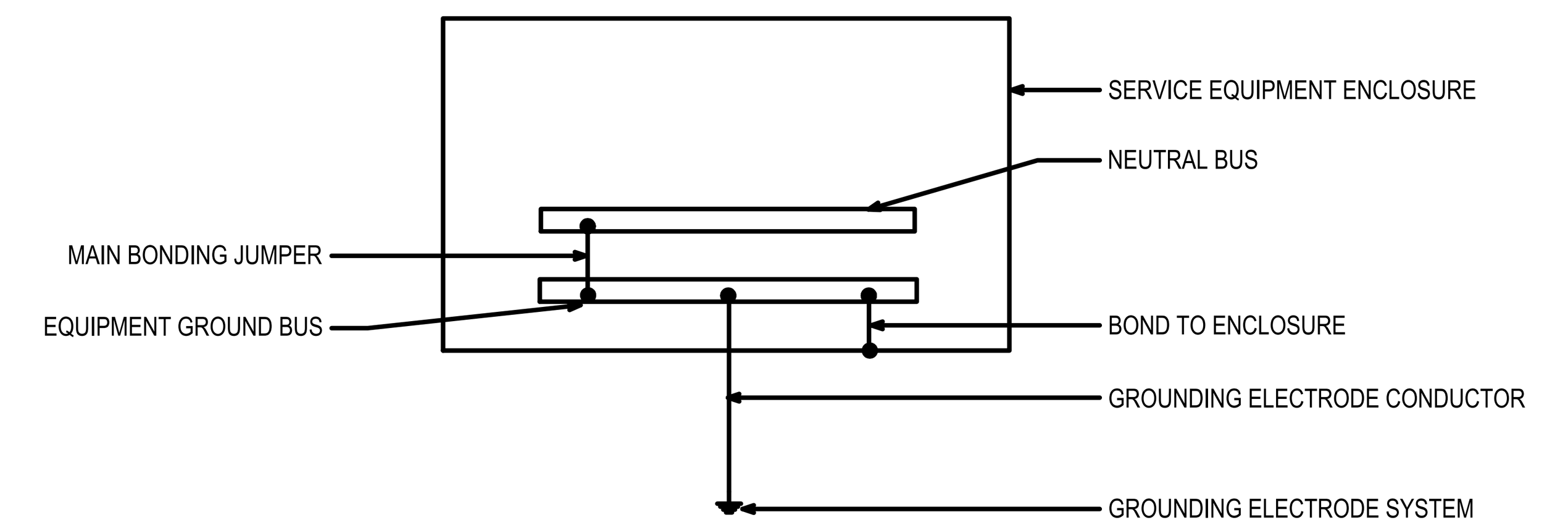
ELECTRIC LEGEND

- SECURITY CAMERA
- NEW ELECTRICAL & CCTV SECURITY CONDUIT
- P1 — NEW P1 LIGHTING POLE
- P2 — NEW P2 LIGHTING POLE
- J — GROUND JUNCTION BOX
- HOMERUN
- NEW ELECTRIC PANEL
- EXISTING ELECTRIC PANEL
- ELECTRICAL WIRING

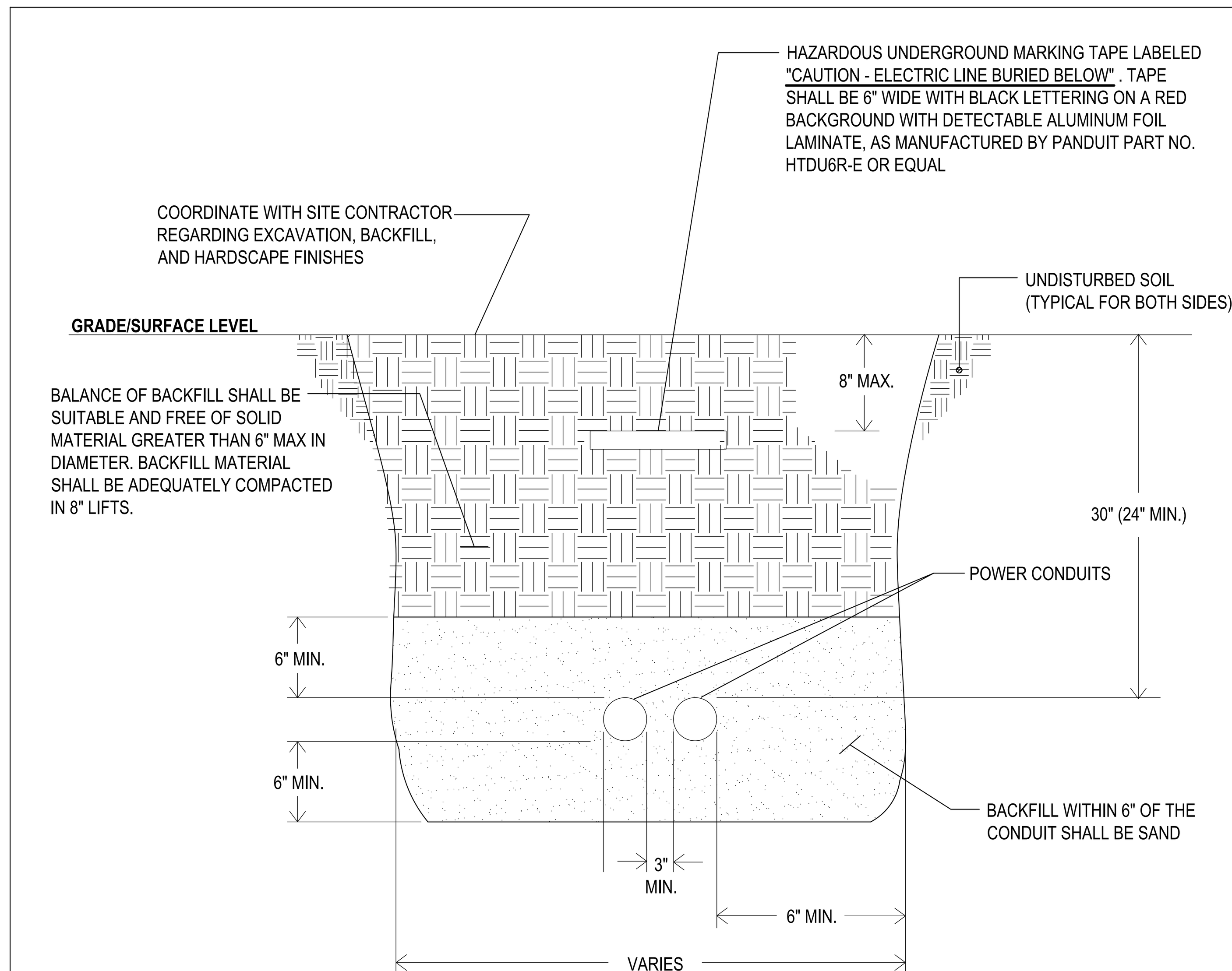
ELECTRICAL DRAWING LIST

E-001	ELECTRICAL NOTES, SYMBOLS & ABBREVIATIONS
E-100	ELECTRICAL POWER PLAN
E-200	ELECTRICAL SITE LIGHTING/ SECURITY PLAN
E-300	SCHEDULE AND RISER DIAGRAM
E-400	VOLTAGE DROP AND SECURITY NOTES
E-500	ELECTRICAL DETAILS

1



01 GROUNDING SYSTEM WITH GROUND BUS AND NEUTRAL BUS
NTS



NOTES:

1. DETAILS SHOWN FOR INFORMATION PURPOSE ONLY. SAME CONCEPT SHALL ALSO APPLY FOR SINGLE CONDUITS.

02 TRENCHING DETAIL FOR CONDUITS
NTS

ELECTRICAL ABBREVIATIONS
(NOT ALL ABBREVIATIONS COULD BE USED)

A	AMPERES	EM	EMERGENCY	HZ	HERTZ	NO.	NUMBER
ACT	ABOVE COUNTER TOP	EQUIP	EQUIPMENT	JB	JUNCTION BOX	NL	NIGHT LIGHT
AFF	ABOVE FINISH FLOOR	FACP	FIRE ALARM CONTROL PANEL	KVA	KILOVOLT AMPERES	NTS	NOT TO SCOPE
AWG	AMERICAN WIRE GAUGE	FBO	FURNISH OTHER DIVISION OF WORK	KW	KILOWATTS	P	POLE
BLDG	BUILDING	FIXT	FIXTURE	LP	PANEL DESIGNATION	PL	PROPERTY LINE BOX
C	CONDUIT	FL	FLOOR	LTG	LIGHTING	PC	PERSONAL COMPUTER (COMPUTER CIRCUIT)
CAT	CATALOG	FLEX	FLEXIBLE	MAX	MAXIMUM	PNL	PANEL
CAM	CAMERA	FT	FEET OR FOOT	MCB	MAIN CIRCUIT BREAKER	O	PHASE
CB	CIRCUIT BREAKER	GA	GAUGE	MECH	MECHANICAL	SW	SWITCH
CKT	CIRCUIT	G,GRD,GND,	GROUND	MER ROOM	MECHANICAL EQUIPMENT	SWBD	SWITCHBOARD
CLG	CEILING	GC	GENERAL CONTRACTOR	MFS	MAIN FUSED SWITCH	SEB	SERVICE END BOX
DGP	DATA GATHERING PANEL	GFI	GROUND FAULT INTERRUPTER	MIN	MINIMUM	TEL	TELEPHONE
DISC	DISCONNECT	HD	HAND DRYER	MLO	MAIN LUGS ONLY	TYP	TYPICAL
DN	DOWN	HP	HORSEPOWER	MTD	MOUNTED	U.O.N.	UNLESS OTHERWISE NOTED
DR	DOOR RELEASE	HVAC	HEATING, VENTILATION & AIR CONDITIONING	MW	MICROWAVE	UL	UNDERWRITERS LABORATORIES
DWG	DRAWING			N	NEUTRAL	V	VOLTAGE
ELEC	ELECTRICAL			NC	NORMALLY CLOSED	WP	WEATHERPROOF
				NIC	NOT IN CONTRACT		

LIGHTING FIXTURE SCHEDULE

TYPE	MTG.	DESCRIPTION	LIGHT SOURCE: DELIVERED LUMENS OR LAMP NO. DESIGNATION	LIGHT SOURCE: COLOR/CCT	LIGHT SOURCE: OPTICS	WATTAGE (W)	VOLTS (V)	DIMMING PROTOCOL/RANGE	MANUFACTURER	CATALOG NUMBER
P1	POLE	LIGHT POLE ASSEMBLY CONSISTING OF ARM-MOUNTED LUMINAIRE ATTACHED TO 25 FOOT TALL POLE.	6,325 LMS	3000K	TYPE III B2-U0-G2	62	120	-	SELUX VALMONT	HEAD: DSC4L-R3W-S1-5G700-30-25-BLACK-UNV-TLRP POLE: R-+250060605S4-P3-DBL
P2	POLE	LIGHT POLE ASSEMBLY CONSISTING OF MODULAR FLOOD LIGHT ATTACHED TO 25 FOOT TALL POLE.	16,900 LMS	3000K	60° X 60°	100	120	0-10V	SPECGRADE VALMONT	HEAD: MFL-100-3000K-60-V01-[FINISH]-TL-VDIM-80CRI-GS POLE: R-+250060605S4-P2-DBL

REVISIONS

ISSUE	DATE	REVISIONS
1	05/17/24	Addundum1

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West Mifflin, Pennsylvania
15122 - 1078

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NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

SIGNATURE — DATE SIGNED: 05/17/2024

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CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

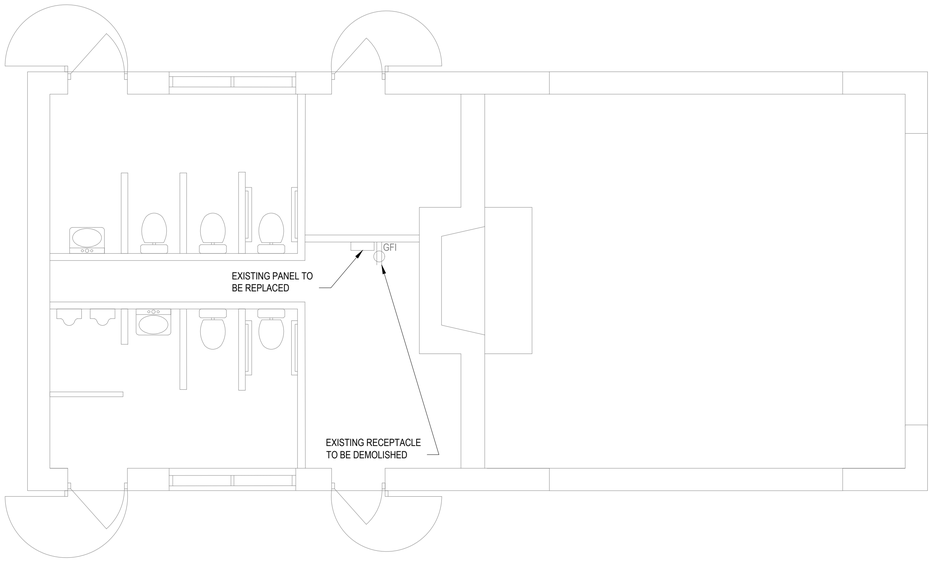
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SITE ELECTRICAL
GENERAL NOTES

PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 05/17/2024
SCALE: AS NOTED
DRAWN BY: EB
CHECKED BY: EP
DRAWING NO.: **E-001**

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.



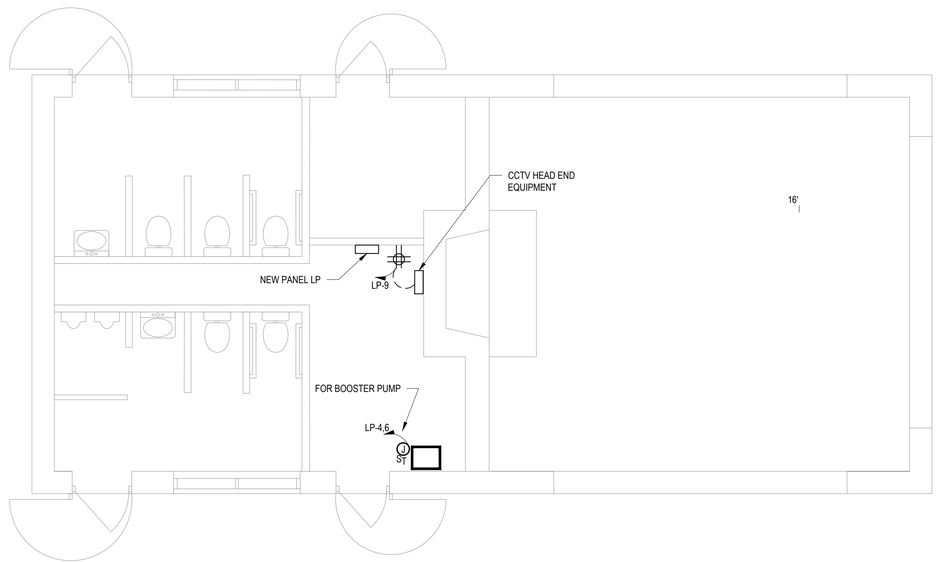
1 DEMOLITION PLAN

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

0 4' 8' 16'

ELECTRICAL DEMOLITION NOTES

1. EXISTING ELECTRICAL PANELS LP TO BE REPLACED.
2. CONTRACTOR TO KEEP CIRCUIT CONTINUITY WITH OUTLETS EXISTING TO REMAIN.
3. ELECTRICAL CONTRACTOR SHALL REMOVE ALL OBSOLETE, UNUSED TAPS, WIRING AND CONDUITS DISCONNECTED AS A RESULT OF DEMOLITION SCOPE OF WORK.
4. EXISTING LIGHTING IN AREA OF WORK TO BE REMAIN.
5. COORDINATE ALL WORK WITH OTHER TRADE CONTRACTORS, AND OWNER.



2 POWER PLAN

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

0 4' 8'

NEW WORK POWER NOTES

1. ELECTRICAL CONTRACTOR SHALL TRACE OUT AND FIELD VERIFY EXISTING CIRCUITS FOR DEVICES AND EQUIPMENT TO REMAIN. ELECTRICAL CONTRACTOR SHALL TAP EXISTING CIRCUITS AND EXTEND BRANCH WIRING CONDUCTORS AND CONDUIT TO NEW QUAD RECEPTACLE.
2. ALL POWER TO BE PROVIDED FROM EXISTING ELECTRICAL PANELS LP.
3. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH WIRING FOR EXISTING AND NEW EQUIPMENT AND DEVICES.
4. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REMOVAL AND CLEANING AFTER ALL ELECTRICAL RELATED WORK IS FINISHED.
5. ROUTING CONDUIT INTO EXTERIOR WALLS, DEMISING WALLS AND FLOOR SLABS IS NOT PERMITTED. ALL CONDUIT SHALL BE RUN IN FURRED OUT WALLS AND INTERIOR PARTITIONS. SEE ARCHITECTURE PLANS FOR DETAILS AND LOCATIONS.

1

REVISIONS

ISSUE	DATE	REVISIONS
1	05/17/24	Addundum1

PENNSYLVANIA ONE CALL SYSTEM, INC.

925 Irwin Run Road
West Mifflin, Pennsylvania
15122 - 1078

BEFORE YOU DIG ANYWHERE IN
PENNSYLVANIA! CALL 1-800-242-1776

NON-MEMBERS MUST BE CONTACTED DIRECTLY

PA LAW REQUIRES THREE WORKING DAYS
NOTICE TO UTILITIES BEFORE YOU EXCAVATE,
DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
CAPPY EZ SABIR
ENGINEER
No. PE071684

SIGNATURE

DATE SIGNED: 05/17/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th/ Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.585.2811

LIGHTING DESIGN:
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COST ESTIMATOR:
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New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
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christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:

PENNYPACK PARK
UNIVERSAL PLAYGROUND

RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:

ELECTRICAL POWER PLAN

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: E-100
CONSULTANT PROJECT NO.: 2107	
DATE: 05/17/2024	
SCALE: AS NOTED	
DRAWN BY: EB	
CHECKED BY: EP	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

LIGHTING / SECURITY CAMERA NOTES

1. REFER TO E-001 FOR NOTES
2. CONTRACTOR TO TEST AND VERIFY THAT ALL LIGHTING CONTROLS ARE FUNCTIONAL
3. CONTRACTOR TO INCLUDE AN ALLOWANCE TO PROVIDE NEW CIRCUITING TO ALL LIGHT POLES
4. CONTRACTOR SHALL INCLUDE AN ALLOWANCE FOR ALL LIGHTING CONTROLS AS ONE TO ONE REPLACEMENTS, AS PER PPR LIGHTING CONTROL DESIGN STANDARDS
5. SECURITY CAMERA SHALL BE MOUNTED ON LIGHT POLES AS INDICATED ON THE DRAWINGS.
6. ALL SECURITY EQUIPMENT AND CAMERAS SHALL BE INSTALLED BY A CERTIFIED INSTALLER.
7. CERTIFIED INSTALLER SHALL AIM CAMERAS AND DEMONSTRATE TO THE OWNER COVERAGE, OPERABILITY AND TRAIN OWNER'S STAFF.
8. REFER TO SPECIFICATIONS SECTION 28 23 00 FOR CAMERA AND CABLING SPECIFICATIONS.
9. VIDEO SURVEILLANCE SYSTEM SHALL BE GENETEC STANDARD OMNICAST PACKAGE WITH SECURITY CENTER BASE PACKAGE, OR APPROVED EQUAL BY OTHERS. REFER TO SPEC SECTION FOR BASIS OF DESIGN.

   PRODUCT CODES ARE AS FOLLOWS:

   BASE PACKAGE: GSC-BASE-5.10

   a. CLIENT & WEB CONNECTION: GSC-1STU
   b. MOBILE CONNECTION: GSC-1MOBILESTU
   c. FAILOVER DIRECTORY: GSC-1FOD
   d. CAMERA INTEGRITY MONITOR: GSC-OM-1CIM-5K (ONE PER CAMERA NEEDED)
   e. OMNICAST STANDARD BASE PACKAGE: GSC-OM-S
   f. CAMERA CONNECTION: GSC-OM-S-1C
   g. DEMO LICENSE: GSC-DEMO-ACCESSVIDEO
   h. SERVER: SEE SPECS ATTACHED
   i. WORKSTATION: SEE SPECS ATTACHED

SECURITY CAMERA SCHEDULE

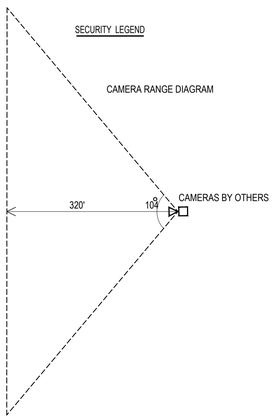
CODE	MANUFACTURER/ CATALOG NO.	NOTES
	AXIS P3267-LVE DOME - POLE MOUNTED	REFER TO SPECIFICATION SECTION 28 23 00

SECURITY LEGEND

- SECURITY CAMERA BY OTHERS
- NEW ELECTRICAL & CCTV SECURITY CONDUIT
- NEW LIGHTING POLE
- LIGHTING AND SWITCHES WIRING

SECURITY LEGEND

CAMERA RANGE DIAGRAM

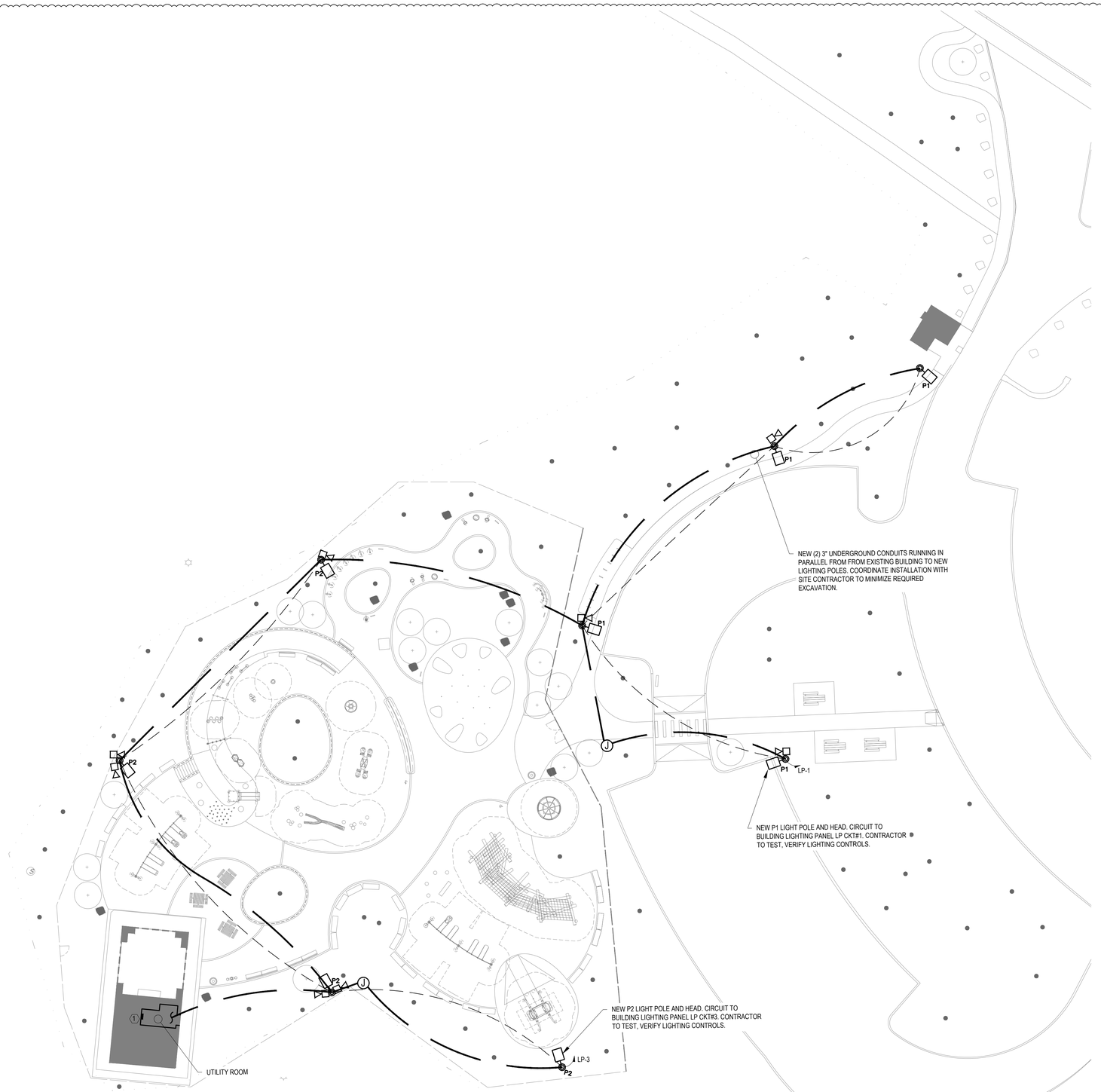


SPRAYGROUND GROUNDING NOTES:

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL GROUNDING AS REQUIRED TO MAKE A COMPLETE GROUNDING SYSTEM FOR SPRAY GROUND AS REQUIRED BY THE LATEST NATIONAL ELECTRICAL CODE (NFPA 70) .
2. ALL PRODUCTS ASSOCIATED WITH THE GROUNDING SYSTEM SHALL BE UL-LISTED AND LABELED.
3. CONTRACTOR SHALL COORDINATE HIS WORK WITH THE PLUMBING AND GENERAL CONTRACTOR TO ENSURE THAT ALL PLUMBING WORK ARE COMPLETE PRIOR TO BEGINNING THE INSTALLATION OF GROUNDING PROTECTION COMPONENTS.

KEYNOTES:

(1) NEW PANEL LP



1

01 SITE LIGHTING/SECURITY PLAN
SCALE:1" = 20'

0 20' 40'

N

REVISIONS

ISSUE	DATE	REVISIONS
1	05/17/24	Addundum1

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15122 - 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — CAPPY FASABI — ENGINEER — No. PE071484

SIGNATURE

DATE SIGNED: 05/17/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:

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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:

PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:

SITE LIGHTING/SECURITY PLAN

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **E-200**
CONSULTANT PROJECT NO.: 2107	
DATE: 05/17/2024	
SCALE: AS NOTED	
DRAWN BY: EB	
CHECKED BY: EP	

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.

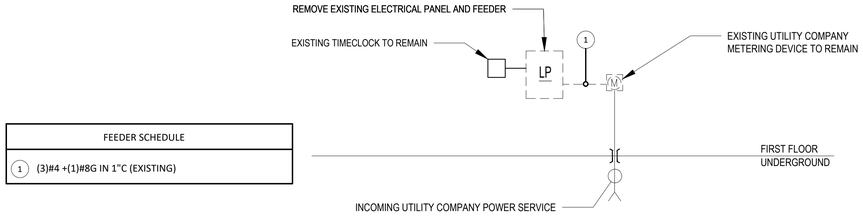
NEW ELECTRICAL PANEL: LP

VOLTS: 120/240
PHASE: 1

BRANCH CIRCUIT			CONDUCTOR		CONDUIT		W	MLO: 60A A	MLO: 60A B	BRANCH CIRCUIT			CONDUCTOR		CONDUIT		W
CIRCUIT BREAKER POLE #	CIRCUIT BREAKER TRIP AMP	LOAD DESIGNATION	No.	AWG MCM	No.	SIZE				CIRCUIT BREAKER POLE #	CIRCUIT BREAKER TRIP AMP	LOAD DESIGNATION	No.	AWG MCM	No.	SIZE	
1	20	SITE LIGHTING	2	#12	1	3/4"C	372			2	20	WATER HEATER	2	#12	1	3/4"C	2500
3	20	SITE LIGHTING	2	#12	1	3/4"C	400			4	2P / 30	PUMP	3	#10	1	3/4"C	2250
5	20	QUAD RECEPTACLE	2	#12	1	3/4"C	360			6							
7	20	SPARE								8	20	SPARE					
9	20	SPARE								10	20	SPARE					
11	20	SPARE								12	20	SPARE					

TOTAL LOAD: 5582 W = 24A

1. WHERE EQUIPMENT GROUNDS ARE INDICATED, THEY SHALL BE RUN FROM THE EQUIPMENT DISCONNECT SWITCH OR CIRCUIT BREAKER THROUGH THE FLEXIBLE CONNECTION TO THE EQUIPMENT SERVED. BOND THE GROUND WIRE TO THE PROTECTIVE DEVICE ENCLOSURE AND TO THE EQUIPMENT.



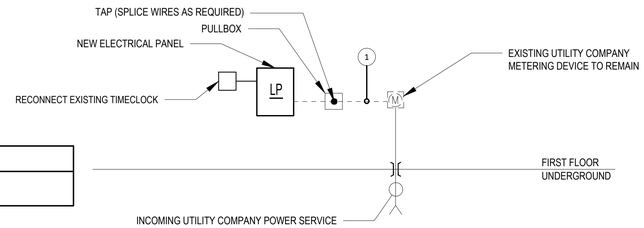
FEEDER SCHEDULE
1 (3)#4 +(1)#8G IN 1"C (EXISTING)

EXISTING POWER RISER DIAGRAM

NTS

DEMO WORK POWER NOTES

1. ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE, DISCONNECT, REMOVE EXISTING PANEL.
2. ELECTRICAL CONTRACTOR SHALL REMOVE ALL OBSOLETE WIRES AND CONDUIT AND CIRCUITING/FEEDERS DISCONNECTED AS A RESULT OF DEMOLITION SCOPE OF WORK AND WHICH ARE NO LONGER IN USE AND SAFE-OFF FOR FUTURE USE, IF APPLICABLE. COORDINATE WORK WITH OWNER, ARCHITECT, ENGINEER AND GENERAL CONTRACTOR. .
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY ELECTRICAL COMPONENTS TO REMOVE ANY CONDUIT AND WIRE TO DISCONNECT POWER TO EXISTING PANEL.
4. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REMOVAL AND CLEANING OF TEMPORARY WORK SET-UP.
5. ROUTING CONDUIT INTO EXTERIOR WALLS, DEMISING WALLS AND FLOOR SLABS IS NOT PERMITTED. ALL CONDUIT SHALL BE RUN CONCEALED IN FURRED OUT WALLS AND INTERIOR PARTITIONS. SEE ARCHITECT PLANS FOR DETAILS AND LOCATIONS.
6. COORDINATE ALL WORK WITH OTHER TRADE CONTRACTORS, ANS OWNER.



FEEDER SCHEDULE
1 (3)#4 +(1)#8G IN 1"C (EXISTING)

NEW POWER RISER DIAGRAM

NTS

NEW WORK POWER NOTES

1. ELECTRICAL CONTRACTOR SHALL TAP EXISTING FEEDER, INSTALL, MOUNT, RE-CONNECT AND EXTEND WIRE AND CONDUIT AS MUCH AS PRACTICAL TO ENERGIZE AND PROVIDE POWER TO NEW PANEL LP.
2. ELECTRICAL CONTRACTOR SHALL INCLUDE IN HIS PRICE ALL REQUIRED RISER SUPPORTS, SLEEVES, FIRES TOPPING, PULL BOXES AND ACCESS DOORS OF THE APPROPRIATE FIRE RATING.
3. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH WIRING FOR NEW EQUIPMENT AND DEVICES AS REQUIRED.

1

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MEGAN FUNK

SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
CAPPY EA SABIE
ENGINEER
No. PE071684

SIGNATURE

DATE SIGNED
05/17/2024

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CONSULTANT PROJECT NUMBER
2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER
16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SCHEDULE AND RISER DIAGRAM

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: E-300
CONSULTANT PROJECT NO.: 2107	
DATE: 05/17/2024	
SCALE: AS NOTED	
DRAWN BY: EB	
CHECKED BY: EP	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

Security Center 5.10 client workstation requirements

To ensure optimal performance for your needs, client workstations must meet or exceed the minimum, recommended, or high performance profile for Security Center 5.10.

IMPORTANT: The recommended system requirements for Security Center 5.10.0.0 refer to newer generation hardware. Upgrading from Security Center 5.9 with older hardware does not impact performance when using the same feature set.

The requirements for Security Center 5.10 client workstations are as follows:

Client profile	Client characteristics
Minimum	• Intel® Core™ 2 X6800 @ 2.93 GHz • 2 GB of RAM or better • 32-bit operating system • 80 GB hard drive for OS and Security Center applications, with a minimum of 66 GB of free disk space to install the Security Center client application • 256 MB PCI-Express x16 video card • 1280 x 1024 or higher screen resolution with 96 dpi • 100 Mbps Ethernet network interface card
Recommended	• 9th Generation Intel® Core™ i7-9700 or better • 8 GB of RAM or better • 64-bit operating system • 120 GB Solid State Drive for OS and Security Center applications, with a minimum of 6 GB of free disk space to install the Security Center client application • GbE network interface card • NVIDIA® GTX 1660 video card
High performance *Video intensive configuration*	• 9th Generation Intel® Core™ i9-9940X or better • 16 GB of RAM or better • 64-bit operating system • 240 GB Solid State Drive for OS and Security Center applications, with a minimum of 6 GB of free disk space to install the Security Center client application • GbE network interface card • Dual NVIDIA® GeForce® RTX 2080 video card

Security Center 5.10 server requirements

To ensure optimal performance for your needs, servers must meet or exceed the minimum, recommended, or high performance profile for a Security Center 5.10 Directory, Archiver, Access Manager, and Media Gateway.

The requirements for Security Center 5.10 servers are as follows:

Server profile	Server characteristics
Minimum[1]	• Intel® Core™ 2 Duo E6850 3.0 GHz or better • 4 GB of RAM or better • 80 GB hard drive for OS and Security Center applications, with a minimum of 15 GB of free disk space to install a Security Center server • Separate storage disk from OS primary disk for Archiver storage • 32-bit operating system • 100/1000 Mbps Ethernet network interface card • Standard SVGA video card
Recommended **(Up to 300 Mbps)**	• Intel® Xeon® Silver 4210 2.2 GHz or better • 16 GB of RAM or better • 64-bit operating system • 80 GB SATA II hard drive or better for OS, Security Center applications, and Archiver database storage (when using a local Archiver database), with a minimum of 15 GB of free disk space to install a Security Center server • GbE network interface card • Standard SVGA video card[1]
Above 300 Mbps and up to 500 Mbps	• Intel® Xeon® Silver 4210 2.2 GHz or better • 16 GB of RAM or better • 64-bit operating system • 80 GB SATA II hard drive or better for OS and Security Center applications, with a minimum of 15 GB of free disk space to install a Security Center server • Dedicated video disks of at least 12 drives in RAID 5 or 6 • GbE network interface card • Standard SVGA video card[1] • Pre-event recording values set to the default value of 4 seconds[2] • Playback or Archive transfer should not exceed 100 Mbps[3]
Above 250,000 and up to 600,000 cardholders	• Intel® Xeon® E5-2620 v4 2.10 GHz or better • 32 GB of RAM or better • 64-bit operating system • 80 GB SATA II hard drive or better for OS and Security Center applications, with a minimum of 15 GB of free disk space to install a Security Center server • GbE network interface card • Standard SVGA video card[1]

Server profile	Server characteristics
High performance[4] *Video intensive configuration*	• **Streamvault™ rackmount appliance** The Streamvault™ 2000, 4000, and 7000 Series offer high performance for video intensive archiving. Starting from 500 cameras or 500 Mbps, and 150 Mbps of video redirection, up to 1000 cameras or 2000 Mbps, and 400 Mbps of video redirection. To find the right Streamvault™ model for your project, contact Genetec™ Sales at sales@genetec.com, or call 1-866-684-8006 (option #2).
Media transcoding applications	• Intel® Core™ i7-9700K, Intel® Xeon® E-2186G, or better • CPU with support for Intel® Quick Sync™ Video • 16GB of RAM or better • 64-bit operating system • 80 GB SATA II hard driver or better for OS and Security Center applications • NVIDIA® P2000 video card

[1] For the minimum server profile, the *Maximum server memory* of SQL Server must be limited to 512 MB.

[2] To increase this value, you must proportionally reduce the Archiver's maximum bitrate.

[3] For cases that exceed 100 Mbps, subtract the equivalent bandwidth from the maximum archiving bandwidth.

[4] The intended throughput requires specific hardware and software configurations.

KiwiVision™ deployments

For the deployment of KiwiVision™ modules, use the KiwiVision™ Hardware Calculator.

Voltage drop at 75 C for #10AWG (NEC Table 9) PF=0.85													
Voltage	120												
Phase	1												
Current draw (A)	0.85												
Parallel sets	1												
Run Length (ft)		100			200			300			400		
Conduit Material		PVC	Aluminum	Steel	PVC	Aluminum	Steel	PVC	Aluminum	Steel	PVC	Aluminum	Steel
Voltage drop (V)		0.19	0.19	0.19	0.37	0.37	0.37	0.56	0.56	0.56	0.75	0.75	0.75
Percentage drop		0.16%	0.16%	0.16%	0.31%	0.31%	0.31%	0.47%	0.47%	0.47%	0.63%	0.63%	0.63%
End Voltage (V)		119.81	119.81	119.81	119.63	119.63	119.63	119.44	119.44	119.44	119.25	119.25	119.25
Run Length (ft)		500			543			560			600		
Conduit Material		PVC	Aluminum	Steel	PVC	Aluminum	Steel	PVC	Aluminum	Steel	PVC	Aluminum	Steel
Voltage drop (V)		0.94	0.94	0.94	1.02	1.02	1.02	1.05	1.05	1.05	1.12	1.12	1.12
Percentage drop		0.78%	0.78%	0.78%	0.85%	0.85%	0.85%	0.88%	0.88%	0.88%	0.93%	0.93%	0.93%
End Voltage (V)		119.06	119.06	119.06	118.98	118.98	118.98	118.95	118.95	118.95	118.88	118.88	118.88

1

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SEAL:

SIGNATURE

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PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
VOLTAGE DROP AND SECURITY NOTES

PPR PROJECT NO.: 16-21-7062-01
CONSULTANT PROJECT NO.: 2107
DATE: 05/17/2024
SCALE: AS NOTED
DRAWN BY: EB
CHECKED BY: EP

DRAWING NO.: **E-400**

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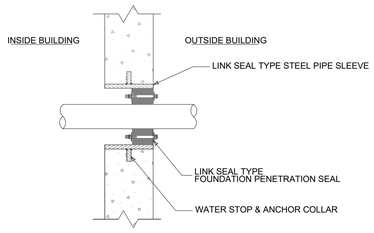
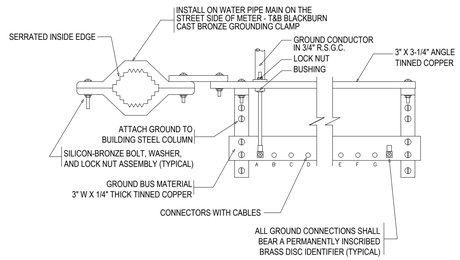


1 CONDUIT PENETRATION FOUNDATION WALL
NOT TO SCALE



2 GROUNDING WATER PIPE GROUND CONNECTIONS AND GROUND BUS
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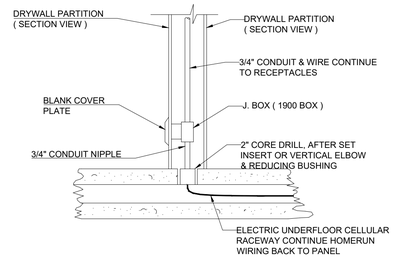
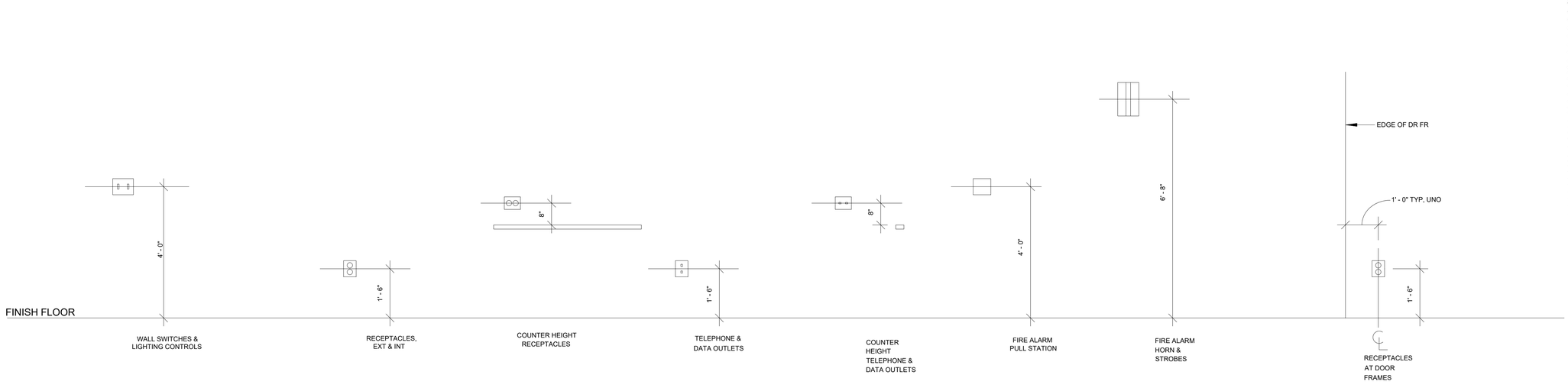


4 CONNECTION TO FLOOR CELL TO HOMERUN
NOT TO SCALE



5 MOUNTING HEIGHT DETAILS
N.T.S.

1

REVISIONS		
ISSUE	DATE	REVISIONS
1	05/17/24	Addundum1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 - 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR:
MEGAN FUNK

SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
CAPPY EZ SABIR
ENGINEER
No. PE071684

SIGNATURE

DATE SIGNED
05/17/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
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145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St, Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER
2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER
16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
ELECTRICAL DETAILS

PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: E-500
CONSULTANT PROJECT NO.: 2107	
DATE: 05/17/2024	
SCALE: AS NOTED	
DRAWN BY: EB	
CHECKED BY: EP	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**

PLUMBING GENERAL NOTES - "A"

1. THE WORK INDICATED ON THESE DRAWINGS ARE DRAWN DIAGRAMMATIC AND ARE INTENDED TO INDICATE GENERAL ARRANGEMENT OF EQUIPMENT AND PIPING. THE CONTRACTOR MAY MAKE CHANGES WHEN APPROVED IN WRITING BY THE ARCHITECT/ENGINEER WITH NO ADDITIONAL COST.
2. THE CONTRACTOR SHALL PROVIDE NEW PLUMBING FIXTURES, PIPING, INSULATION, VALVES AN APPURTENANCES AS SHOWN ON THE DRAWINGS AND AS REQUIRED FOR A COMPLETE SYSTEM.
3. DURING CONSTRUCTION ALL OPEN ENDS OF PIPING SHALL BE PLUGGED AND CAPPED WITH PLASTIC OR METAL CAPS TO KEEP DIRT OUT OF THE SYSTEM.
4. NO DEAD ENDS SHALL BE LEFT ON ANY DRAINAGE PIPING UPON COMPLETION OF WORK.
5. UPON COMPLETION OF WORK THE ENTIRE SYSTEM SHALL BE LEFT IN PERFECT WORKING ORDER.
6. SUBMIT SHOP DRAWINGS SUFFICIENTLY IN ADVANCE OF THE WORK TO ALLOW PROPER TIME FO REVIEW. MATERIALS SHALL NOT BE FABRICATED OR DELIVERED TO THE SITE BEFORE THE SHOP DRAWINGS HAVE BEEN APPROVED.
7. NEW SHUT-OFF VALVES SHALL BE PROVIDED AS REQUIRED TO ISOLATE DIFFERENT AREAS OF THE PLUMBING SYSTEM.
8. VENT PIPE SHALL BE GRADED TO DRAIN OUT ALL MOISTURE AND PREVENT SCALE ACCUMULATION.
9. ALL VALVES AND SPECIALTIES SHALL BE SO PLACED AS TO PERMIT EASY OPERATION AND ACCESS.
10. PROVIDE CAULKING BETWEEN WATER CLOSETS AND FINISHED FLOOR AS REQUIRED.
11. FINAL INSPECTION AND TEST OF COMPLETED SYSTEM SHALL BE MADE IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
12. THE CONTRACTOR SHALL INSULATE ALL HOT AND COLD DOMESTIC WATER PIPING LOCATED ABOVE CEILINGS AND IN WALLS AFTER TESTING THE SYSTEM.
13. BEFORE BEING PLACED IN SERVICE ALL POTABLE WATER PIPING SHALL BE CLEANED, FLUSHED AND DISINFECTED.
14. UPON COMPLETION OF WORK ALL EXCESS MATERIAL, DEBRIS, ETC, SHALL BE REMOVED AND WORK AREA LEFT CLEAN TO THE OWNER'S SATISFACTORY.
15. INSTALL ARROWS ON PIPING IN ACCESSIBLE AREAS TO INDICATE DIRECTION OF FLOW.
16. ALL CONSTRUCTION MATERIALS DISTURBED BY THIS CONTRACTOR SHALL BE REPLACED WITH NEW MATERIAL TO MATCH EXISTING.
17. WHEN THE NEW EQUIPMENT IS INSTALLED BY OTHERS, THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NEW APPROPRIATE ROUGHING AND MAKING FINAL CONNECTIONS SUCH AS COLD AND HOT WATER, VENTS, GAS, ETC.
18. TESTING OF COMPLETE SYSTEM SHALL BE MADE IN THE PRESENCE OF OWNER'S REPRESENTATIVE AND THE AUTHORITIES HAVING JURISDICTION, AS REQUIRED BY LOCAL CODE.
19. IF INSPECTION OR TEST SHOW DEFECTS, SUCH DEFECTIVE WORK OR MATERIAL SHALL BE REPLACED AND INSPECTION AND TEST SHALL BE REPORTED. REPAIR TO PIPING SHALL BE MADE WITH NEW MATERIAL.
20. STANDARD FOR EQUIPMENT MANUFACTURER, MODEL AND CAPACITY OF EQUIPMENT OR FIXTURES ARE LISTED ON THE DRAWINGS OR IN SPECIFICATION. ANY OTHER MANUFACTURER OR MODELS ARE CONSIDERED TO BE SUBSTITUTIONS.
21. SUBSTITUTIONS ARE SUBJECT TO THE APPROVAL OF THE ENGINEER. IF A SUBSTITUTION IS SUBMITTED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO EVALUATE IT AND CERTIFY THAT THE SUBSTITUTION IS EQUIVALENT IN ALL RESPECTS TO THE BASE SPECIFICATIONS.
22. IF SUBSTITUTION ARE APPROVED, NOTIFY ALL OTHER CONTRACTORS OR TRADES AFFECTED BY THE SUBSTITUTION AND FULLY COORDINATE. ANY COST RESULTING FROM SUBSTITUTION AND WHETHER BY CONTRACTOR OR OTHERS, SHALL BE THE RESPONSIBILITY OF AND PAID FOR BY SUBSTITUTION CONTRACTORS.
23. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. PROVIDE UL LISTED FIRE STOPPING.
24. FULLY WARRANTY ALL MATERIALS, EQUIPMENT AND WORKMANSHIP FOR ONE YEAR FROM DATE OF ACCEPTANCE.
25. REPAIR OR REPLACE WITHOUT CHARGE TO THE OWNER ALL ITEMS FOUND DEFECTIVE DURING THE WARRANTY PERIOD.
26. PIPING INSTALLED UNDER SLAB SHALL BE CAREFULLY LAID OR PLACED ON WELL PREPARED, TAMPED SOIL BED OF FINE CRUSHED STONE OR SAND TO FIT THE PIPE CONTOUR, WITH ALL VOID UNDER PIPE FILLED AND THOROUGHLY TAMPED PROVIDING FULL BARREL LENGTH SUPPORT.
27. INSTALL PIPE TO UNIFORM PITCHES BETWEEN POINTS FOR WHICH ELEVATIONS ARE ESTABLISHED OR SHALL BE VERIFIED BY USE OF LEVEL OR OTHER APPROVED METHOD. PIPE INVERT SHALL BE ADJUSTED BY THE ADDITION OR SUBTRACTION OF FULL BEDDING AND NOT BY WEDGING OR BLOCKING.
28. ACCESS DOORS SHALL BE PROVIDED, AS MINIMUM FOR:
    1. CONCEALED VALVES.
    2. CONCEALED SHOCK ABSORBERS.
    3. CONCEALED AIR-POP CONNECTIONS.
    4. CONCEALED TRAP PRIMER UNITS.
29. ACCESS DOOR SHALL BE FURNISHED BY THIS CONTRACTOR AND INSTALLED BY GENERAL CONTRACTOR.
30. CONTRACTOR SHALL SIZE ACCESS DOOR TO PERMIT REMOVAL AND SERVICING OF ALL EQUIPMENT, BUT IN ANY CASE, SHALL NOT BE LESS THAN 12"X16".
31. NOTES ON ANY DRAWING SHALL ALSO APPLY TO ALL OTHER CONTRACT DRAWINGS UNLESS OTHERWISE SPECIFIED.
32. ALL BRACKETS, PLATES, CHANNELS, ETC, SHALL BE GALVANIZED UNLESS OTHERWISE SPECIFIED.
33. ALL SURFACES DAMAGED IN THE COURSE OF THE WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND IN A FULLY OPERABLE MANNER.
34. COORDINATE AND SCHEDULE ALL WORK TO MEET THE OVERALL DESIGN OBJECTIVE.
35. FOR ALL PIPES AND CONDUITS PASSING THROUGH WALL OR FLOORS, PROVIDE PIPE SLEEVES.
36. PROVIDE DRAIN VALVES AT ALL LOW POINTS.
37. CHANGES IN DIRECTION IN DRAINAGE PIPING SHALL BE MADE WITH APPROPRIATE USE OF 45 DEGREE WYES, LONG SWEEPS, QUARTER, SIXTH, EIGHTH, OR SIXTEENTH BENDS.
38. PROVIDE CLEANOUTS ON DRAIN LINES AS SHOWN ON DRAWINGS AND AS REQUIRED BY CODE.
39. CORE DRILLING FOR PENETRATION THROUGH FOUNDATION WALLS SHALL BE DONE BY PLUMBING CONTRACTOR.
40. CONTRACTOR SHALL NOT FASTEN ANY EQUIPMENT AND MATERIAL FROM ROOF DECKING. CONTRACTOR SHALL SUPPORT EQUIPMENT AND MATERIAL FROM BEAMS/JOISTS, IF NEED TO CONTRACTOR SHALL PROVIDE ADDITIONAL SUPPORT STEEL ON METAL TO ATTACH TO BEAMS.
41. ALL PLUMBING EQUIPMENT SHALL BE INSTALLED AND ADJUSTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION UNLESS OTHERWISE SHOWN.
42. ALL GALVANIZED PARTS SHALL BE PAINTED PER SPECIFICATIONS BY THE PLUMBING CONTRACTOR.
43. ALL PIPES 1.5" IN DIAMETER AND SMALLER SHALL HAVE A MINIMUM OF 1" INSULATION. PIPES LARGER THAN 1.5" IN DIAMETER SHALL HAVE A MINIMUM OF 1.5" OF INSULATION. EXCEPTION: PROVIDE 1/2" INSULATION FOR ALL COLD WATER PIPES

PHILADELPHIA DEPARTMENT OF LICENSE & INSPECTION

THE PLUMBING SYSTEMS (SANITARY, VENT, WATER DISTRIBUTION AND GAS) AND ALL ASSOCIATED EQUIPMENT WILL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE FULL REQUIREMENTS OF THE BUILDING CODE OF THE CITY OF PHILADELPHIA, THE PHILADELPHIA PLUMBING CODE, THE IBC FUEL GAS CODE AND APPLICABLE LOCAL LAWS.

1. MATERIALS, INSTALLATIONS, SUPPORT, ETC WILL BE FULL COMPLIANCE WITH SECTION P-301 TO 305
2. THE TESTING AND INSPECTION OF PIPING AND INSTALLATIONS WILL BE IN FULLACCORDANCE WITH CHAPTER 15
3. THE INSTALLATION OF FIXTURES WILL BE IN FULL ACCORDANCE OF ALL APPLICABLE SECTIONS OF CHAPTER 7 OF THE PLUMBING CODE.
4. THE INSTALLATION OF WATER HEATERS WILL BE IN FULL ACCORDANCE OF ALLAPPLICABLE SECTIONS OF CHAPTER 8 OF THE PLUMBING CODE.
5. THE WATER SUPPLY SYSTEMS OF THE SUBJECT BUILDING SHALL BE INSTALLED ANDMAINTAINED IN FULL COMPLIANCE WITH ALL APPLICABLE SECTIONS OFTHE PLUMBING CODE.
6. THE SANITARY DRAINAGE SYSTEM WILL BE SIZED AND INSTALLED IN FULLCOMPLIANCE WITH ALL APPLICABLE SECTIONS OF CHAPTER 9 OF THE PLUMBINGCODE.
7. ANY INDIRECT/SPECIAL WASTES WILL BE SIZED AND INSTALLED IN FULL COMPLIANCEALL APPLICABLE SECTIONS OF CHAPTER 12 OF THE PLUMBING CODE.
8. THE VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM OF THE SUBJECT BUILDINGWILL BE INSTALLED IN FULL COMPLIANCE WITH ALL APPLICABLE SECTIONS OFCHAPTER 11 OF THE PLUMBING CODE.
9. TRAPS/INTERCEPTOR INSTALLED WITHIN THE SANITARY DRAINAGE SYSTEM OF THE SUBJECT BUILDING WILL BE INSTALLED IN FULL COMPLIANCE WITH ALL APPLICABLE SECTIONS OF CHAPTERS 9 & 11 OF THE PLUMBING CODE.
10. THE STORM DRAINAGE SYSTEM OF THE SUBJECT BUILDING WILL BE INSTALLED IN FULL COMPLIANCE WITH ALL APPLICABLE SECTIONS OF CHAPTER 10 OF THEPLUMBING CODE.
11. TEMPORARY TOILET FACILITIES SHALL BE PROVIDED FOR WORKMAN AS PER SECTIONP-718.

PLUMBING GENERAL NOTES - "B"

1. ALL EXPOSED PIPES SHALL BE ARRANGED TO PERMIT ACCESS FOR MAINTENANCE.
2. ALL DRAIN AND VENT PIPES SHALL HAVE A MINIMUM SLOPE OF 1/8" PER FOOT.
3. ALL COLD WATER PIPES OUTSIDE THE HEATED STRUCTURES LESS THAN 4'-6" BELOW GRADE OR SUBJECT TO FREEZING SHALL BE INSULATED AND HEAT TRACED. COORDINATE WITH ELECTRICAL CONTRACTOR FOR POWER SUPPLY.
4. COORDINATE WORK SHOWN ON THESE DRAWINGS WITH OTHER DRAWINGS.
5. COORDINATE SLOPING OF FLOORS TO FLOOR DRAINS.
6. THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK THE DRAWINGS OF THE OTHER TRADES TO VERIFY WHICH WORK WILL BE INSTALLED FIRST BEFORE PROCEEDING WITH INSTALLATION.
7. THE CONTRACTOR SHALL REPAIR AT OWN EXPENSE ANY PIECE OF EQUIPMENT AND /OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE DONE AS SOON AS NOTIFIED. THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGES TO SURROUNDING WORK CAUSED BY FAILURE OF REPAIR OR REPLACEMENT OF THE DEFECTED EQUIPMENT OR MATERIAL.
8. MINIMUM PITCH FOR SANITARY WASTE AND STORM DRAINAGE LINES SHALL BE 1/8 INCH PER FOOT.
9. RECORD DRAWINGS SHALL BE PREPARED BY CONTRACTOR AND SHALL INDICATE THE ACTUAL INSTALLED LOCATION OF ALL PIPING AND VALVES INCLUDING INVERT ELEVATION FOR UNDERSLAB PIPING.
10. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS AND PAY ALL GOVERNMENT SALES TAXES, FEES AND OTHER COST INCLUDING UTILITY CONNECTIONS COST.
11. IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS AND ACCESSORIES THAT MAY BE REQUIRED. CONTRACTOR SHALL MAKE ALL NECESSARY OFFSETS, FITTINGS AND ACCESSORIES AS REQUIRED WITH NO ADDITIONAL COST TO THE OWNER.

PIPE MATERIAL SCHEDULE

SERVICE	MAXIMUM PRESSURE	PIPE MATERIAL			COUPLING (4 BANDS)	JOINTS
		CI	COP	STL		
DOMESTIC WATER	125 PSI		X			BRAZED
SANITARY WASTE	10" W.C.	X			X	NO HUB
SANITARY VENT		X			X	NO HUB

PIPING INSULATION SCHEDULE

PIPING SYSTEM	PIPE SIZE	INSULATION MINIMUM THICKNESS, INCHES
DOMESTIC COLD AND GREY WATER	UP TO 6 INCHES	1.0
	8 INCHES AND LARGER	1.0
FLOOR DRAIN RECEIVING CONDENSATE/ WASTE FROM HVAC COOLING EQUIPMENT, PLUS 15 FEET OF ASSOCIATED DOWNSTREAM DRAIN PIPING.	ALL	1.0
LAVATORY WASTE PIPING, EXPOSED UNDER FIXTURES FOR THE DISABLED	ALL	0.5

PLUMBING DRAWING LIST

SP-001	SITE PLUMBING GENERAL NOTES
SP-100	SITE PLUMBING PLAN
SP-200	SITE PLUMBING DETAILS

ABBREVIATIONS & SYMBOLS LIST

SYMBOL	ABBREVIATION	DESCRIPTION
	SAN/W/S	SANITARY/WASTE/SOIL PIPING
	V	VENT PIPING
	CW	COLD WATER PIPING
	HW	HOT WATER PIPING
	HWR	HOT WATER RETURN PIPING
		EXISTING PIPING
		EXISTING TO BE REMOVED
	CODP	CLEANOUT DECK PLATE
		BALL VALVE
	CV	CHECK VALVE
	C0DP	CLEANOUT DECK PLATE
		NEW PIPING CONNECT TO EXISTING
	H&CW	HOT & COLD WATER
	EX or EXIST	EXISTING
		SOLENOID VALVE WITH TIMER
		TIMER
		PIPE REDUCER
	SS	SERVICE SINK
	DF	DRINKING FOUNTAIN
	HB	HOSE BIBB
	BFP	BACKFLOW PREVENTER
	RPV	PRESSURE REDUCING VALVE
	WH	WATER HEATER
	FD	FLOOR DRAIN
	CI	CAST IRON
	COP	COPPER
	STL	STEEL

PLUMBING FIXTURE SCHEDULE

FIXTURE TYPE	DESCRIPTION			SERVICE CONNECTION					REMARKS
	FIXTURE	MANUFACTURER	MODEL & NUMBER	S	W	V	CW	HW	
DF	DRINKING FOUNTAIN	ELKAY	LK4430BF1U	-	2"	1 1/2"	½"	-	OUTDOOR INSTALLATION

PUMPS SCHEDULE

TAG	DESIGNATION	NO. REQUIRED	GPM	TDH , FEET	MODEL NO. (BASED ON)	H.P.	R.P.M.	VOLTS	PHASE	CYCLE	EFFICIENCY	FACTORY PACKAGE	LOCATION
SGP	SPRAY GROUND BOOSTER PUMP	1	81	104	TACO 1900 SERIES, MODEL 1915	3	3500	115	1	60	54%	●	

1. PUMPS SHALL BE MAINTENANCE FREE/SELF LUBRICATED TYPE WITH LEAD FREE/BRONZE FITTED CONSTRUCTION.
2. COORDINATE ALL POWER REQUIREMENTS, CONTROLS & CONTROL WIRING OF AQUASTAT WITH THE ELECTRICAL CONTRACTOR.
3. PROVIDE BALL VALVE ISOLATION FLANGES AS MANUFACTURED BY BELL AND GOSSETT.

ENERGY CODE NOTES

1. ALL PIPING IN CIRCULATING SYSTEM IS INSULATED. 1.5" FOR PIPES <= 1.5" AND 2" FOR PIPES > 1.5".
2. OPERATION AND MAINTENANCE MANUAL SHALL BE PROVIDED TO BUILDING OWNER
3. AUTOMATIC CONTROLS FOR FREEZE PROTECTION SYSTEMS SHALL BE PRESENT.
4. AUTOMATIC TIME SWITCHES SHALL BE INSTALLED TO AUTOMATICALLY SWITCH OFF THE RECIRCULATING HOT-WATER SYSTEM.
5. PIPING FLUIDS ABOVE 105 DEGREES AND BELOW 55 DEGREES SHALL HAVE A MINIMUM OF R-3 INSULATION
6. DOMESTIC WATER HEATER MEETS MINIMUM 95% EFFICIENCY REQUIREMENTS:
7. ALL PIPING IN DOMESTIC HOT AND COLD WATER SYSTEM IS INSULATED. 1.5" FOR PIPES <= 1.5" AND 2" FOR PIPES > 1.5".

THIS PLAN IS APPROVED FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON TO BE CONSIDERED AS EITHER BEING APPROVED OR IN

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REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PHILADELPHIA MANAYUNK

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL CAPPY EASABE ENGINEER No. PE079684

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:

PENNYPACK PARK UNIVERSAL PLAYGROUND

RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:

SITE PLUMBING GENERAL NOTES

PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	CW
CHECKED BY:	CS

DRAWING NO.: **SP-001**

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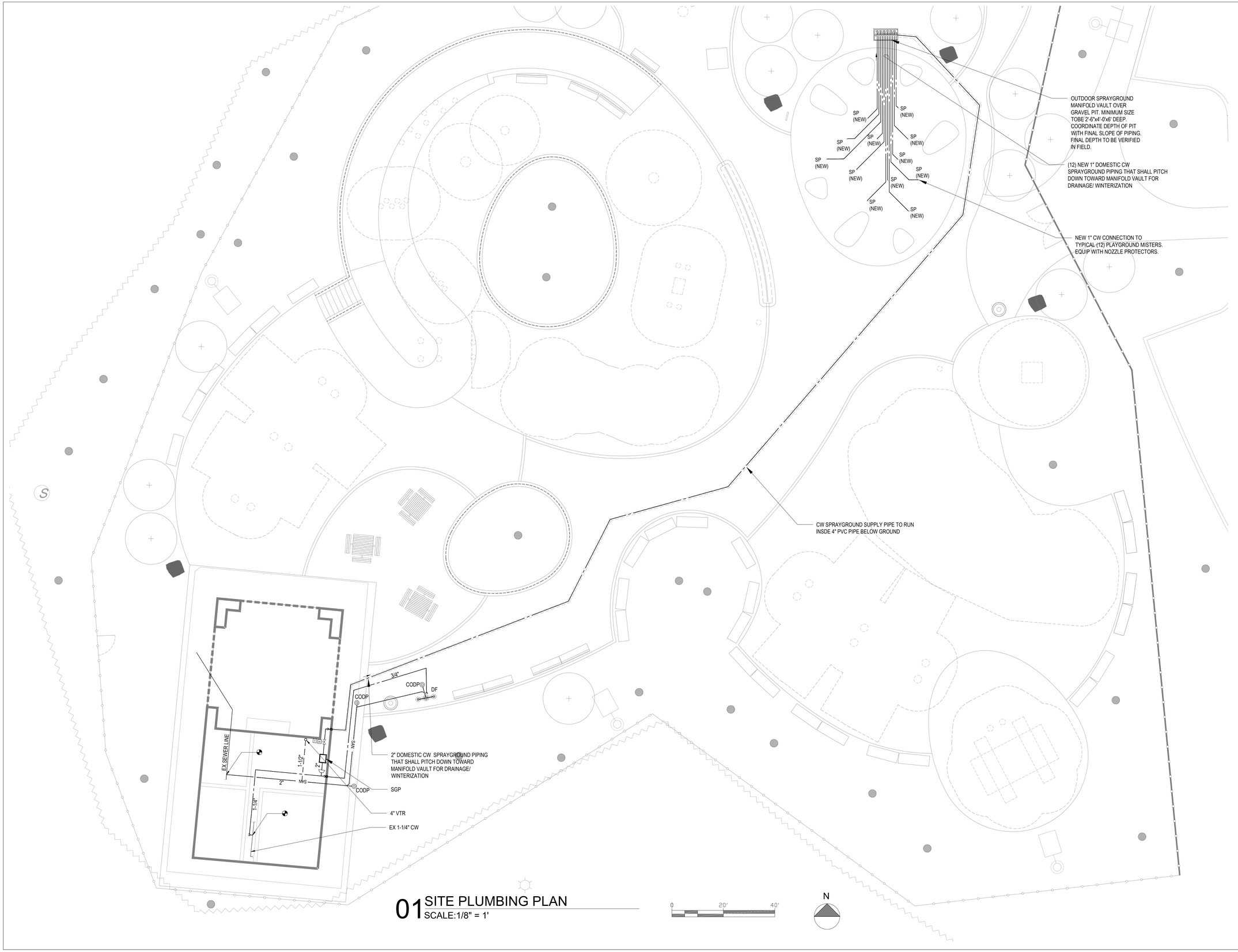

01 SITE PLUMBING PLAN
SCALE:1/8" = 1'

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
925 Irwin Run Road
West Mifflin, Pennsylvania
15122 – 1078

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PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
CAPPY EA SABIR
ENGINEER
No. PE071684

SIGNATURE

DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
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New York, NY 10013

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CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA
PHILADELPHIA PARKS AND RECREATION
1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

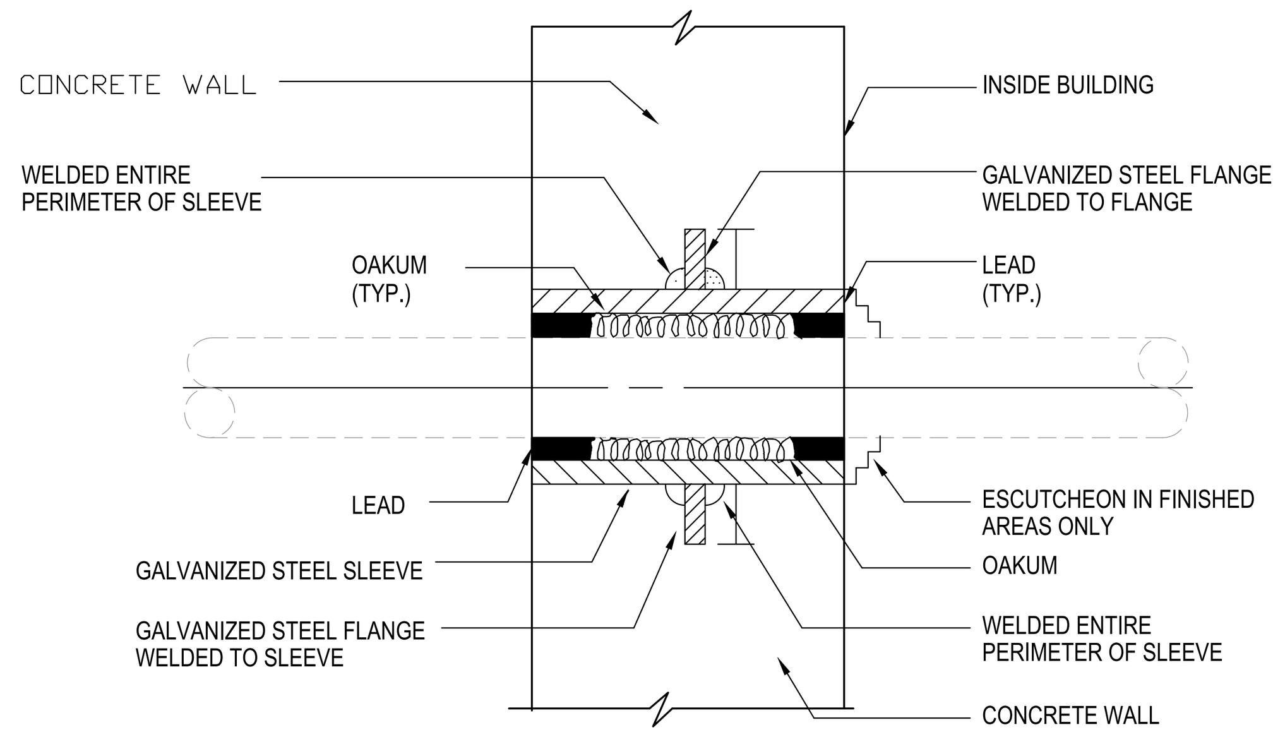
PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SITE PLUMBING PLAN

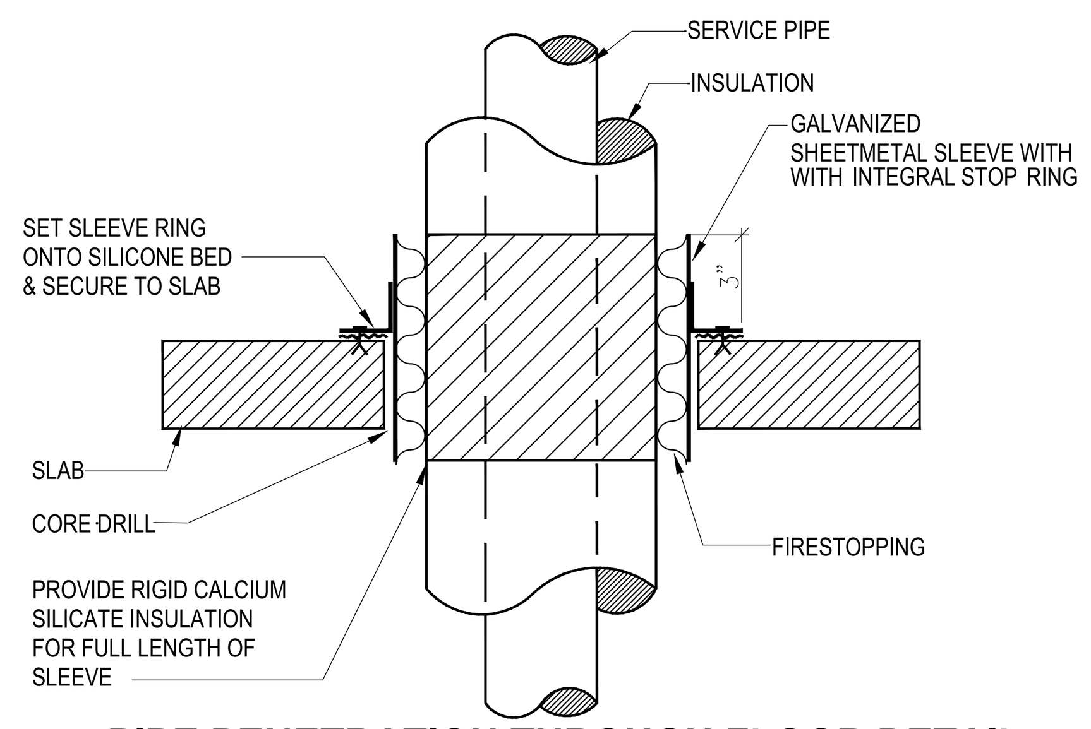
PPR PROJECT NO.: 16-21-7062-01	DRAWING NO.: **SP-100**
CONSULTANT PROJECT NO.: 2107	
DATE: 12/15/2023	
SCALE: AS NOTED	
DRAWN BY: CW	
CHECKED BY: CS	

NOTE: **ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.**



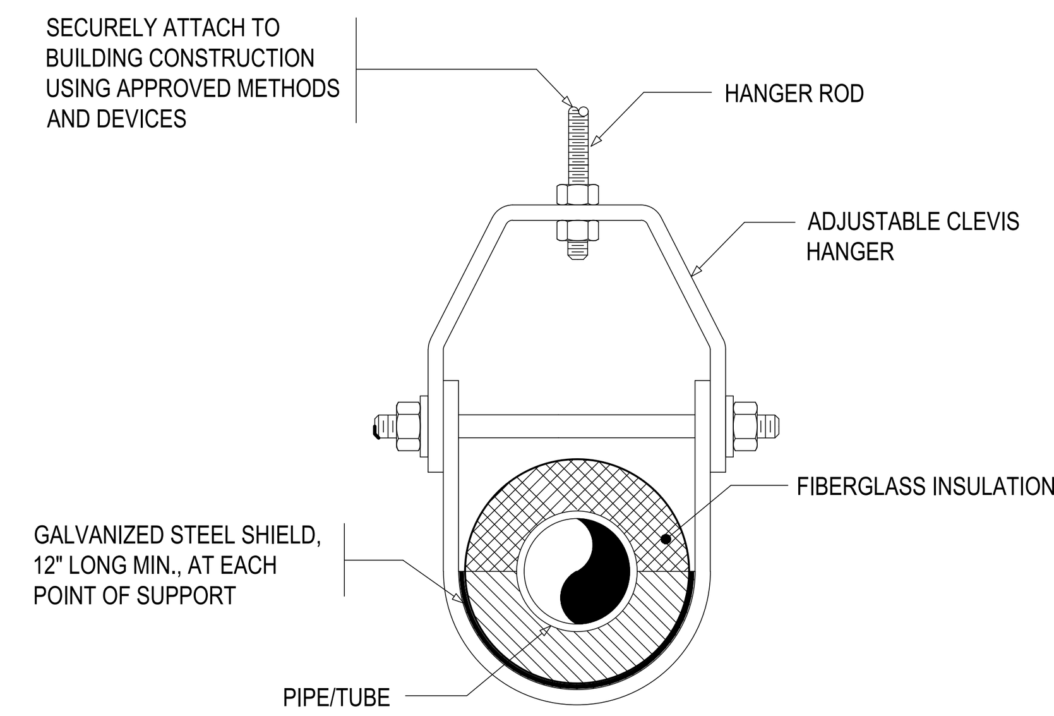
DETAIL OF WATERTIGHT SLEEVE

NOT TO SCALE



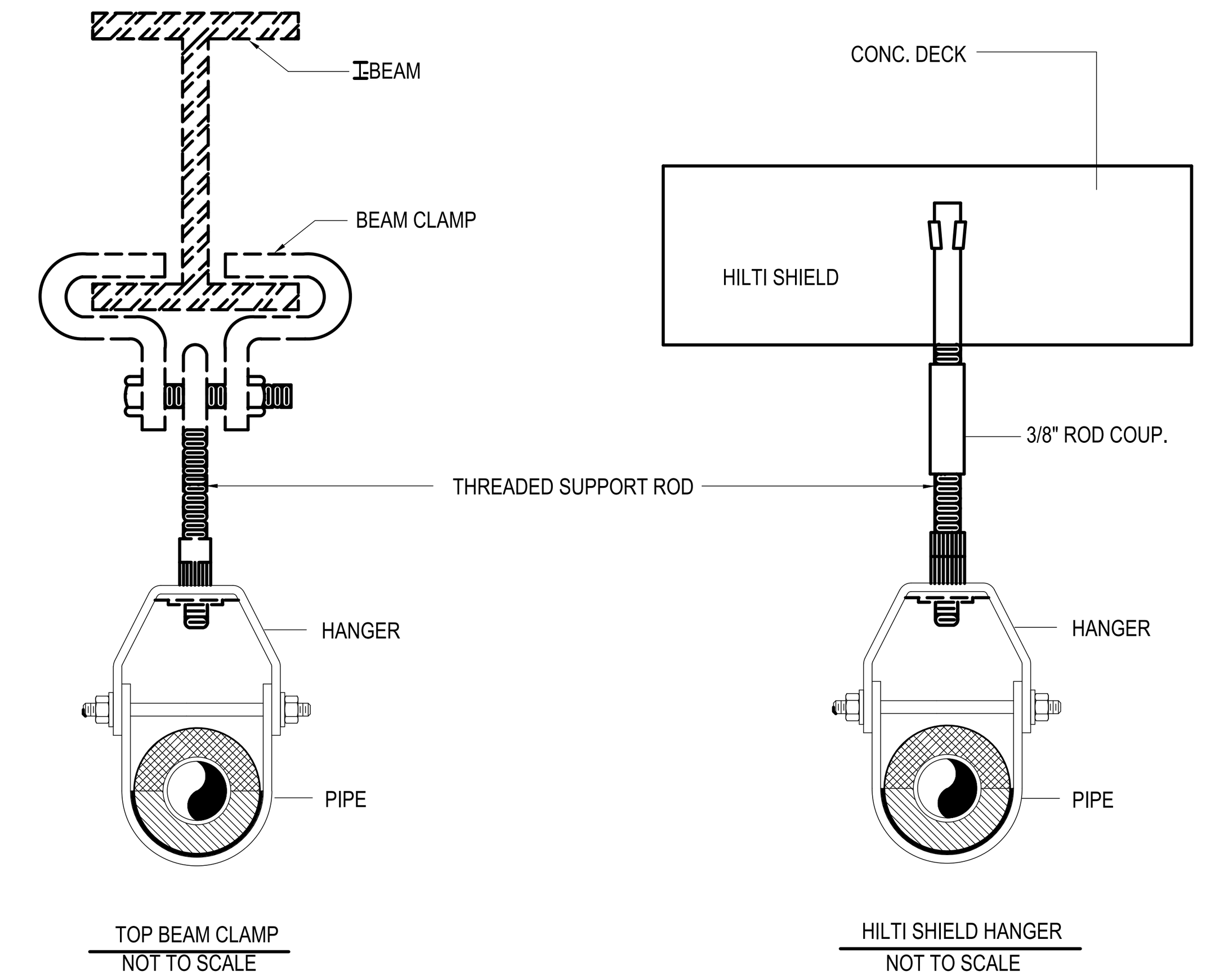
PIPE PENETRATION THROUGH FLOOR DETAIL

NO SCALE



ADJUSTABLE CLEVIS PIPE SUPPORT

FOR INSULATED PIPING/TUBING 1 1/2" AND LARGER
NOT TO SCALE

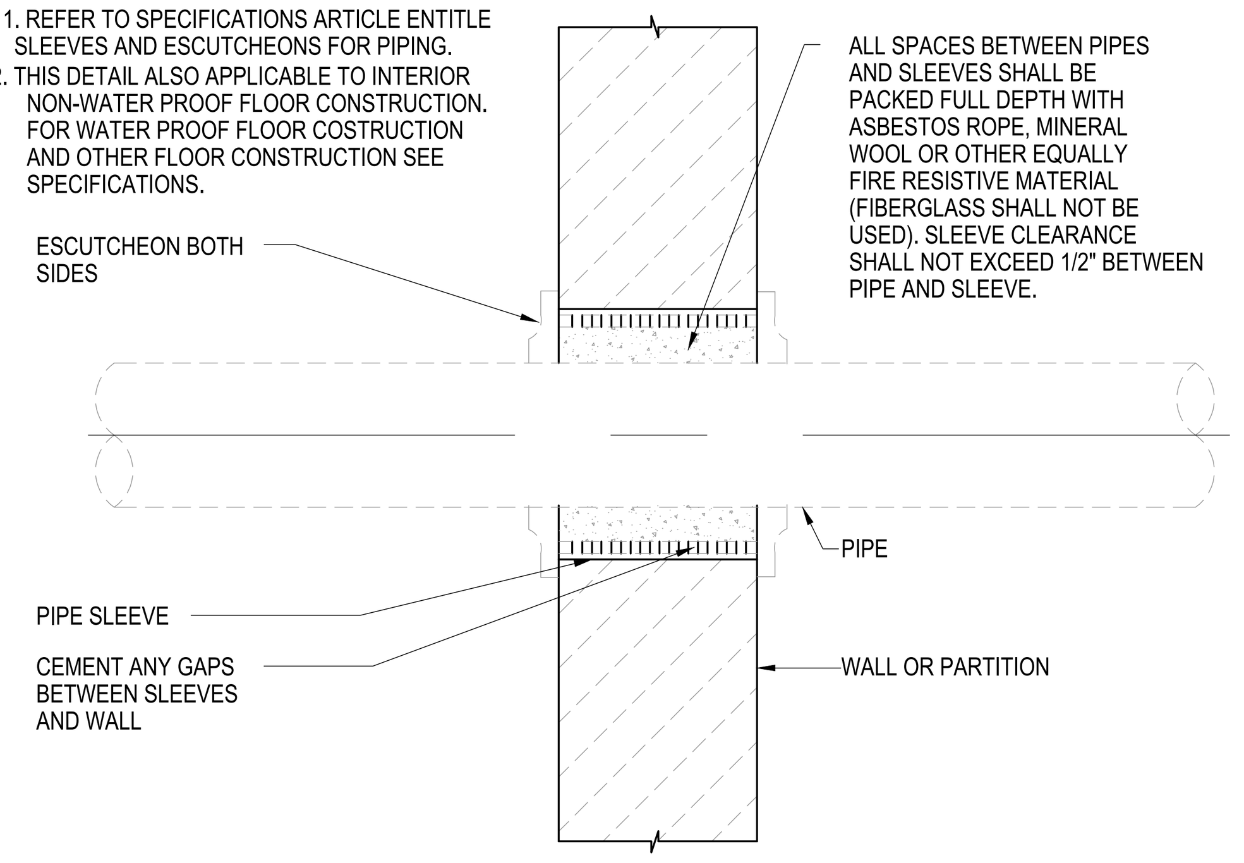


ATTACHMENT DETAIL

NOT TO SCALE

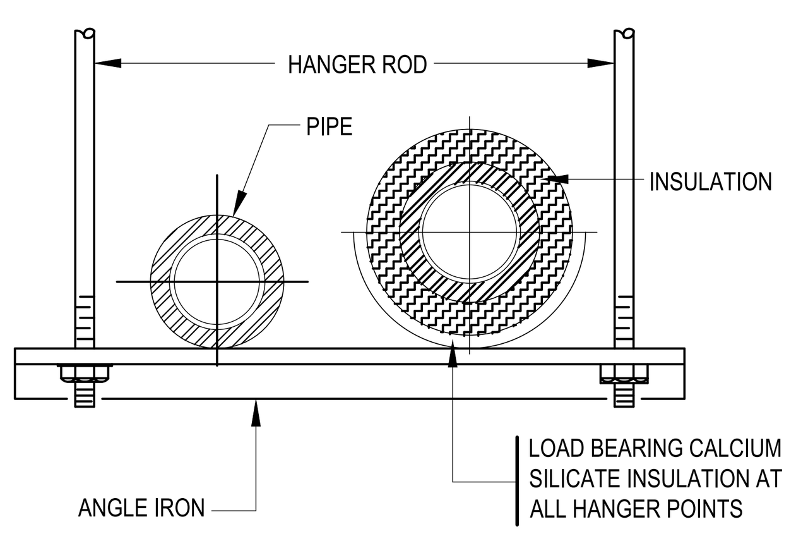
NOTE:

1. REFER TO SPECIFICATIONS ARTICLE ENTITLE SLEEVES AND ESCUTCHEONS FOR PIPING.
2. THIS DETAIL ALSO APPLICABLE TO INTERIOR NON-WATER PROOF FLOOR CONSTRUCTION. FOR WATER PROOF FLOOR COSTRUCTION AND OTHER FLOOR CONSTRUCTION SEE SPECIFICATIONS.



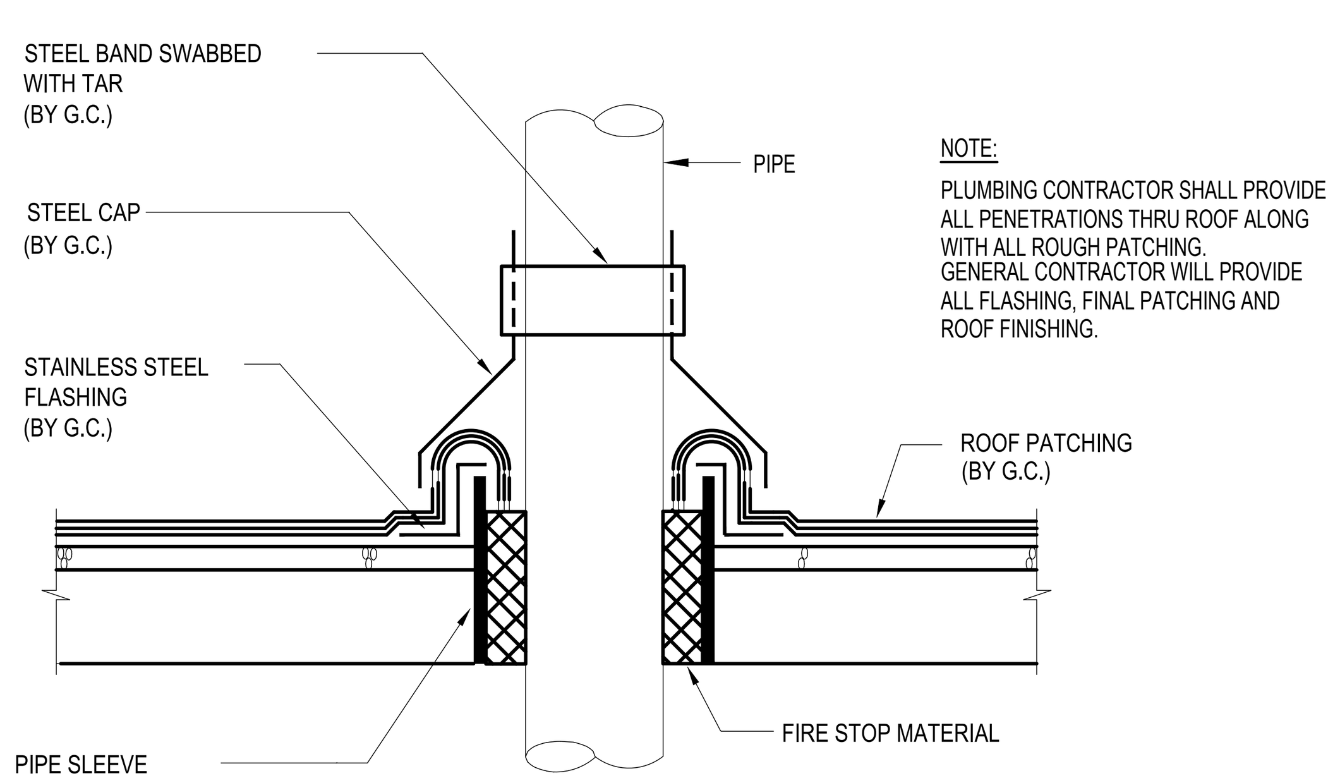
DETAIL OF PIPING PIERCING REQUIRED FIRE RATED WALLS

N.T.S



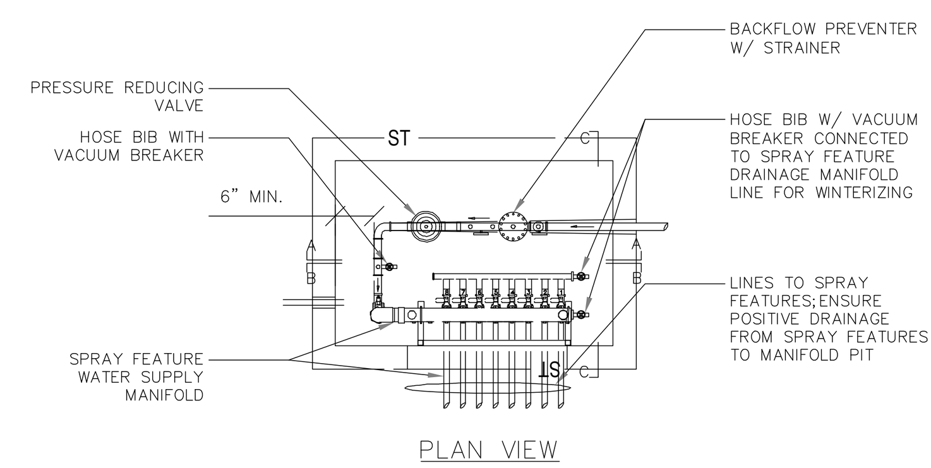
TRAPEZE HANGER

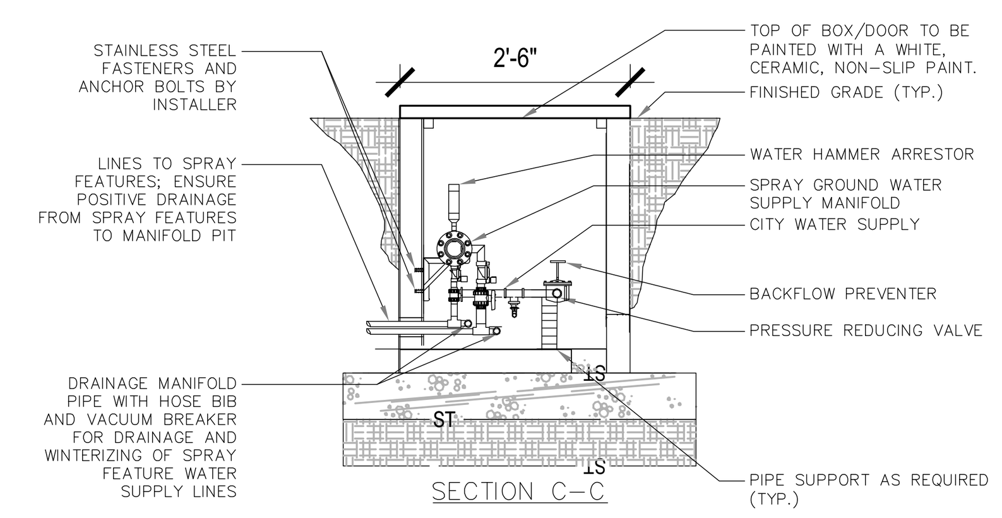
NOT TO SCALE

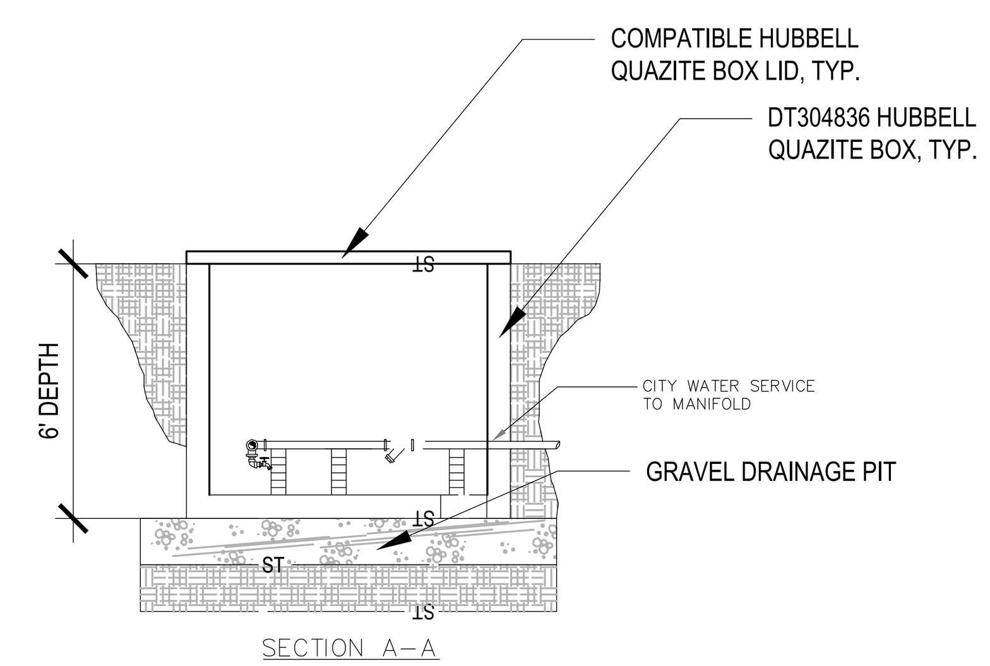


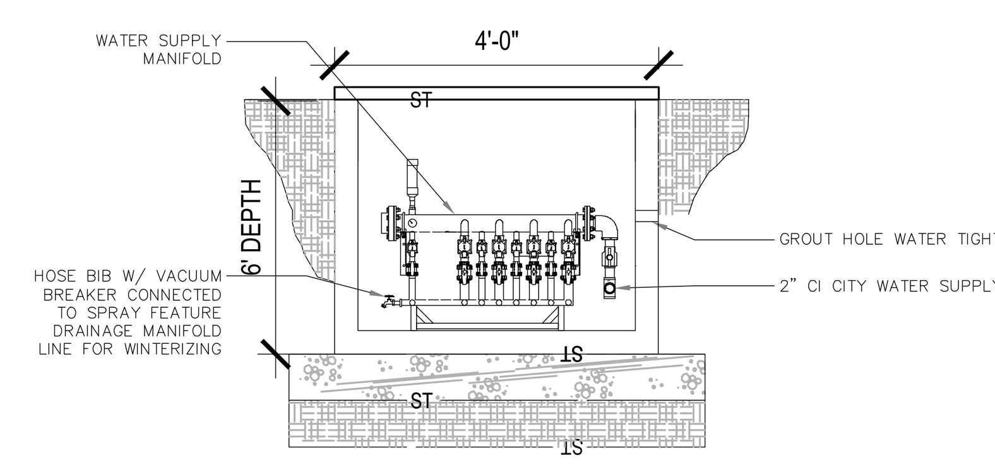
PIPE PENETRATION THRU ROOF DETAIL

NOT TO SCALE









IMPORTANT: VISUALLY INSPECT THE EQUIPMENT ON A DAILY BASIS FOR:

1. SIGNS OF VANDALISM/WEAR/DAMAGE/LOOSE OR MISSING COMPONENTS THAT WOULD MAKE THE EQUIPMENT UNSAFE.
2. LOOSE OR MISSING FASTENERS (NUTS, BOLTS, CLAMPS, CABLES, SCREWS, ETC).
3. EQUIPMENT DAMAGE (IMPROPERLY SECURED, WORN, MISSING, OR DAMAGED STRUCTURES, SUPPORT ARMS, BRACKETS, PROTECTIVE COVERS, BASE SKIRTS, HANDLES, NOZZLES ETC).
4. EQUIPMENT MALFUNCTION (LOOSE, MISSING, WORN, DAMAGED EQUIPMENT COMPONENTS).
5. IF COMPONENT REPLACEMENT IS REQUIRED, REPLACE WITH NEW COMPONENT OF SAME TYPE/DESIGN. DO NOT REUSE COMPONENT.
6. IT IS NOT RECOMMENDED TO RE-USE FLANGE MOUNTING GASKETS.
7. PROPERLY BALANCED AND SANITIZED WATER SUPPLY.

NOTES:

1. TRIM LENGTH OF 1" SCH 80 RISER PIPE TO LEVEL AND FLUSH THE NOZZLE PIPE TO THE DRAINAGE SLOPED GRAVEL PIT.
2. A SHUT OFF VALVE MUST BE INSTALLED ON THE DRAIN LINE.
3. A VALVE MUST BE INSTALLED ON THE SUPPLY LINE TO REGULATE FLOW.
4. WINTERIZATION TO BE PERFORMED BY A TRAINED TECHNICIAN FAMILIAR WITH PROPER WINTERIZATION PROCEDURES.
5. USE STACKABLE ASSEMBLY AS NEEDED TO REACH REQUIRED DEPTH.

SPRAYGROUND OUTDOOR MANIFOLD DETAIL

NOT TO SCALE

REVISIONS

ISSUE	DATE	REVISIONS
1	05/16/24	ADDENDUM 1

PENNSYLVANIA ONE CALL SYSTEM, INC.
BEFORE YOU DIG ANYWHERE IN PENNSYLVANIA! CALL 1-800-242-1776
NON-MEMBERS MUST BE CONTACTED DIRECTLY
PA LAW REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH

PA ONE-CALL NUMBER (FOR DESIGN ONLY):

PPR PROJECT COORDINATOR: MEGAN FUNK

SEAL:

SIGNATURE
DATE SIGNED: 04/05/2024

PRIMARY CONSULTANT, LANDSCAPE ARCHITECT:
MARVEL
145 Hudson Street, Floor 3
New York, NY 10013

SUB-CONSULTANTS:

CIVIL/SURVEY:
ENGINEERING & LAND PLANNING ASSOCIATES, INC.
219 Cuthbert Street, 5th Floor
Philadelphia, PA 19106

MEP ENGINEER:
SRW
417 N 8th Street, Suite 204
Philadelphia, PA 19123
267.565.2811

LIGHTING DESIGN:
THE LIGHTING PRACTICE
600 Chestnut Street, Suite 772
Philadelphia, PA 19106

COST ESTIMATOR:
ELLANA CONSTRUCTION CONSULTANTS
32 Broadway, 8TH Floor
New York, NY 10004

PLAYFUL LEARNING CONSULTANT:
PLAYFUL LEARNING LANDSCAPES ACTION NEXTWORK
Philadelphia, PA
267.468.8610

ARBORIST:
MORRIS ARBORETUM
100 East Northwestern Avenue
Philadelphia, PA 19118
215.247.5777

ACCESSIBILITY CONSULTANT:
CHRIS NOEL
christopher.noel@parks.nyc.gov
646.632.7344

PLAY CONSULTANT:
STUDIO LUDO
1313 S 33rd St. Unit A
Philadelphia, PA 19146

CONSULTANT PROJECT NUMBER: 2107

CITY OF PHILADELPHIA

PHILADELPHIA PARKS AND RECREATION

1515 ARCH STREET
11TH FLOOR, ONE PARKWAY BUILDING

PPR PROJECT NUMBER: 16-21-7062-01

PROJECT TITLE:
PENNYPACK PARK
UNIVERSAL PLAYGROUND
RHAWN ST. & HOLMEHURST AVE.
PHILADELPHIA, PA 19136

DRAWING TITLE:
SITE PLUMBING DETAILS

PPR PROJECT NO.:	16-21-7062-01
CONSULTANT PROJECT NO.:	2107
DATE:	12/15/2023
SCALE:	AS NOTED
DRAWN BY:	CW
CHECKED BY:	CS
DRAWING NO.:	SP-200

NOTE: ALL DIMENSIONS AND CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH THE WORK.

SECTION 323113

CHAIN-LINK FENCING AND GATES

1.1 Chain-Link Fencing shall conform to the following minimum standards:

A. General Site Fencing Standards (Chain-link):

1. Height: All chain-link fencing will measure 8' tall (96") in height from the finished grade, unless otherwise requested or approved by Philadelphia Parks and Recreation.

2. Gates: All gates are to match the height of the new fencing that they are linked to. Gate widths will either be 4' (48") for single man gates or 8' (96") for double man gates. Fabric will match the specifications of the new fence that it is linked to.

3. Fabric: All chain-link fabric will be vinyl coated and have a weave of 1"x1" with 9GA tie wire, knuckled on both top and bottom. Cut ends of fence fabric shall be turned or knuckled over in the field to sharp wire ends are not exposed. Tie wires will be 24" on center, unless otherwise approved by Philadelphia Parks and Recreation. The color will be black, unless otherwise stated/approved by Philadelphia Parks and Recreation.

4. Posts: Minimum 2.5" (outside diameter) galvanized steel, painted black. Posts should have a maximum spacing of 8' (96") on center per section of chain-link fencing. All Terminal posts will have caps and tension bar. All line posts will have top and bottom connectors. Terminal posts: minimum 3" OD. Gate posts: minimum 4" OD.

5. Rails: Minimum 1-5/8" (outside diameter) galvanized steel, painted black. The bottom rail will be a 2" from finished grade.

6. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.

7. Approved Manufacturers:

   a. Northeast Fence and Iron Works – 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, Phone: (215) 335-1681, Web: http://www.northeastfence.net/

   b. Stephens Pipe and Steel, LLC – 300 Streibeigh Lane, Montoursville,

Pennsylvania 17754, Phone: (888) 275-1638, Web: http://www.spsfence.com

c. Master Halco – 3010 Lyndon B Johnson Freeway, Suite 800, Dallas, Texas 75234, Phone: (800) 883-8384, Web: www.masterhalco.com

d. Equal approved Philadelphia Parks and Recreation.

- END -

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum to the General Conditions and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 600 V and less.

2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 260513 "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.

1.3 DEFINITIONS

A. VFC: Variable frequency controller.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

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

1. Alcan Products Corporation; Alcan Cable Division.

2. Alpha Wire.

3. Belden Inc.

4. Encore Wire Corporation.

5. General Cable Technologies Corporation.

6. Southwire Incorporated.

B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2, Type XHHW-2, and Type UF.

D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC, and mineral-insulated, metal-sheathed cable, Type MI with ground wire.

E. VFC Cable:

1. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable.

2. Type TC-ER with oversized crosslinked polyethylene insulation, spiral-wrapped foil plus 85 percent coverage braided shields and insulated full-size ground wire and dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires, and sunlight- and oil-resistant outer PVC jacket.

3. Comply with UL requirements for cables in direct burial applications.

2.2 CONNECTORS AND SPLICES

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

1. AFC Cable Systems, Inc.

2. Gardner Bender.

3. Hubbell Power Systems, Inc.

4. Ideal Industries, Inc.

5. Ilsco; a branch of Bardes Corporation.

6. NSi Industries LLC.

7. O-Z/Gedney; a brand of the EGS Electrical Group.

8. 3M; Electrical Markets Division.

9. Tyco Electronics.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

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

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller, except VFC cable, which shall be extra flexible stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-2-THWN-2, single conductors in raceway, Type XHHW-2, single conductors in raceway or Type SE or Type USE multiconductor cable.

B. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway, Type XHHW-2, single conductors in raceway, Metal-clad cable, Type MC.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway, or Metal-clad cable, Type MC Coordinate "Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground" Paragraph below with Section 260543 "Underground Ducts and Raceways for Electrical Systems."

D. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway, or Metal-clad cable, Type MC.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway, or Metal-clad cable, Type MC.

F. VFC Output Circuits: Type XHHW-2 in metal conduit.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors and conductors feeding critical equipment and services for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.

b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

B. Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.

2. Results that comply with requirements.

3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

C. Cables will be considered defective if they do not pass tests and inspections.

- END -

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. For definitions of grounding and bonding terms see NFPA 70.

1.2 SUMMARY

A. Section includes grounding and bonding systems and equipment.

B. Related Requirements:

1. Section 280526 "Grounding and Bonding for Electronic Safety and Security" for grounding conductors, connectors, busbars for electronic security system.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

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

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. Harger Lightning and Grounding.
4. ILSCO.
5. O-Z/Gedney; A Brand of the EGS Electrical Group.
6. Robbins Lightning, Inc.
7. Siemens Power Transmission & Distribution, Inc
8. Or Engineer approved equal

2.2 SYSTEM DESCRIPTION

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

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.

2. Stranded Conductors: ASTM B 8.

C. Grounding & Bonding Conductors

1. All raceways and equipment shall be provided with an Equipment Grounding Conductor as shown on the drawings. When the Equipment Grounding Conductor is not shown on the drawings, provide an Equipment Grounding Conductor per Table 250.122 of the NEC

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate

insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.

3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

C. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal**,** at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81 and NETA Standards.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: **5**ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: **5** ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: **3** ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: **3** ohm(s).

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

- END -

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

D. GRC: Galvanized rigid steel conduit.

E. FMC: Flexible Metallic Conduit

F. LFMC: Liquid Tight Flexible Metallic Conduit

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

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

a. Allied Tube & Conduit.

b. Cooper B-Line, Inc.

c. ERICO International Corporation.

d. GS Metals Corp.

e. Thomas & Betts Corporation.

f. Unistrut; Atkore International.

g. Wesanco, Inc.

h. or Approved Equal

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices shall be as indicated below:

1. PVC Conduit – PVC, Fiberglass, or Stainless Steel (unless atmosphere is corrosive to Stainless Steel)

2. RGS Conduit – Galvanized Steel

3. EMT – Painted or Galvanized Steel

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

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

1) Hilti, Inc.

2) ITW Ramset/Red Head; Illinois Tool Works, Inc.

3) MKT Fastening, LLC.

4) Simpson Strong-Tie Co., Inc.

5) or Approved Equal

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

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

1) Cooper B-Line, Inc.

2) Empire Tool and Manufacturing Co., Inc.

3) Hilti, Inc.

4) ITW Ramset/Red Head; Illinois Tool Works, Inc.

5) MKT Fastening, LLC.

6) or Approved Equal

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.

7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

1.1 SUMMARY

A. Section Includes:

1. Type EMT-S raceways and elbows.
2. Type ERMC-S raceways, elbows, couplings, and nipples.
3. Type FMC-S and Type FMC-A raceways.
4. Type IMC raceways.
5. Type LFMC raceways.
6. Fittings for conduit, tubing, and cable.
7. Threaded metal joint compound.
8. Surface metal raceways and fittings.
9. Wireways and auxiliary gutters.
10. Metallic outlet boxes, device boxes, rings, and covers.
11. Cabinets, cutout boxes, junction boxes, and pull boxes.
12. Cover plates for device boxes.
13. Hoods for outlet boxes.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wireways and auxiliary gutters.
2. Surface metal raceways.
3. Floor boxes.

4. Cabinets and cutout boxes.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details. Show that floor boxes are located to avoid interferences and are structurally allowable. Indicate floor thickness where boxes are embedded in concrete floors and underfloor clearances where boxes are installed in raised floors.

C. Samples: For surface raceways for colors and textures specified 12” long.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of conduit groups with common supports.

2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

B. Qualification Data: For professional engineer.

C. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

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

1. AFC Cable Systems, Inc.

2. Allied Tube & Conduit.

3. Anamet Electrical, Inc.

4. Electri-Flex Company.

5. O-Z/Gedney.

6. Picoma Industries.

7. Republic Conduit.

8. Robroy Industries.

9. Southwire Company.

10. Thomas & Betts Corporation.

11. Western Tube and Conduit Corporation.

12. Wheatland Tube Company.

2.2 TYPE EMT-S RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Material: Steel.

2. Options:

a. Minimum Trade Size: ¾".

2.3 TYPE ERMC-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 6 and UL Category Control Number DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Zinc.

2. Options:

a. Minimum Trade Size: ¾".

2.4 TYPE FMC-S AND TYPE FMC-A RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 1 and UL Category Control Number DXUZ.

B. Steel Flexible Metal Conduit (FMC-S):

1. Material: Steel.

2. Options:

a. Minimum Trade Size: ¾".

C. Aluminum Flexible Metal Conduit (FMC-A):

1. Material: Aluminum.

2. Options:

a. Minimum Trade Size: ¾".

2.5 TYPE IMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 1242 and UL Category Control Number DYBY.

B. Steel Electrical Intermediate Metal Conduit (IMC):

1. Options:

a. Minimum Trade Size: ¾".

2.6 TYPE LFMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 360 and UL Category Control Number DXHR.

B. Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Material: Steel.

2. Options:

a. Minimum Trade Size: ¾".

2.7 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type ERMC, Type IMC:

1. General Characteristics: UL 514B and UL Category Control Number DWTT.

2. Options:

a. Material: Steel.

b. Coupling Method: Compression or dual set screw.

c. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type EMT Raceways:

1. General Characteristics: UL 514B and UL Category Control Number FKAV.

2. Options:

a. Material: steel.

b. Coupling Method: dual set screw.

c. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Fittings for Type FMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number ILNR.

E. Fittings for Type LFMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.8 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

2.9 SURFACE METAL RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 5 and UL Category Control Number RJBT.

B. Surface Metal Raceways and Fittings with Metal Covers:

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

a. Mono-Systems, Inc.

b. Panduit Corp.

c. Wiremold / Legrand.

2. Options:

a. Galvanized steel or aluminu base with snap-on covers.

b. Manufacturer's standard enamel finish in color selected by Architect.

c. Wiring Channels: Single, dual, or triple as indicated on plans. Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

2.10 WIREWAYS AND AUXILIARY GUTTERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 870 and UL Category Control Number ZOYX.

B. Metal Wireways and Auxiliary Gutters:

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

a. Cooper B-Line, Inc.

b. Hoffman.

c. Mono-Systems, Inc.

d. Square D

2. Additional Characteristics:

a. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

b. Finish: Manufacturer's standard enamel finish.

3. Options:

a. Degree of Protection: Type 1 indoors and Type 3R outdoors, unless otherwise indicated.

b. Wireway Covers: Screw type unless otherwise indicated.

2.11 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

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

1. Adalet.

2. Cooper Technologies Company; Cooper Crouse-Hinds.

3. EGS/Appleton Electric.

4. Erickson Electrical Equipment Company.

5. FSR Inc.

6. Hoffman.

7. Hubbell Incorporated.

8. Kraloy.

9. Milbank Manufacturing Co.

10. Mono-Systems, Inc.

11. O-Z/Gedney.

12. RACO; Hubbell.

13. Robroy Industries.

14. Spring City Electrical Manufacturing Company.

15. Stahlin Non-Metallic Enclosures.

16. Thomas & Betts Corporation.

17. Wiremold / Legrand.

B. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics: UL 514A and UL Category Control Number QCIT.

C. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.

2. Options:

a. Material: sheet steel or cast metal.

D. Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point.

E. Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.

2. Options:

a. Material: sheet steel or cast metal.

F. Metallic Floor Boxes and Floor Box Covers:

1. Description: Box mounted in floor with floor box cover and other components to complete floor box enclosure.

G. Metallic Recessed Access-Floor Boxes and Recessed Floor Box Covers:

1. Description: Floor box with provisions for mounting wiring devices below floor surface and floor box cover with provisions for passage of cords to recessed wiring devices mounted within floor box.

H. Metallic Concrete Boxes and Covers:

1. Description: Box intended for use in poured concrete.

2.12 CABINETS, CUTOUT BOXES, JUNCTION BOXES, AND PULL BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics:

a. Non-Environmental Characteristics: UL 50.

b. Environmental Characteristics: UL 50E.

B. Indoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.

2. Additional Characteristics: UL Category Control Number CYIV.

3. Options:

a. Degree of Protection: Type 1.

C. Indoor Sheet Metal Cutout Boxes:

1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.

2. Additional Characteristics: UL Category Control Number CYIV.

3. Options:

a. Degree of Protection: Type 1.

D. Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2. Additional Characteristics: UL Category Control Number BGUZ.

3. Options:

a. Degree of Protection: Type 1.

E. Indoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2. Additional Characteristics: UL Category Control Number BGUZ.

3. Options:

a. Degree of Protection: Type 1.

F. Outdoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.

2. Additional Characteristics: UL Category Control Number CYIV.

3. Options:

a. Degree of Protection: Type 3R.

G. Outdoor Sheet Metal Cutout Boxes:

1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.

2. Additional Characteristics: UL Category Control Number CYIV.

3. Options:

a. Degree of Protection: Type 3R.

H. Outdoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2. Additional Characteristics: UL Category Control Number BGUZ.

3. Options:

   a. Degree of Protection: Type 3R.

I. Outdoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2. Additional Characteristics: UL Category Control Number BGUZ.

3. Options:

   a. Degree of Protection: Type 3R.

2.13 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics:

   a. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.

   b. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

B. Metallic Cover Plates for Device Boxes:

1. Options:

   a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.

   b. Wallplate Material: Cover plates shall be stainless steel or as specified by the Architect.

2.14 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics:

   a. Reference Standards:

      1) UL 514D and UL Category Control Numbers QCIT and QCMZ.

      2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.

3. Mounts to box using fasteners different from wiring device.

B. Retractable or Reattachable Hoods for Outlet Boxes:

1. Options:

   a. Provides weatherproof, "while-in-use" cover.

C. Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Additional Characteristics: Marked "Extra-Duty" in accordance with UL 514D.

2. Options:

   a. Provides weatherproof, "while-in-use" cover.

   b. Manufacturer may combine nonmetallic device box with hood as extra-duty rated assembly.

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC.

2. Exposed and Subject to Physical Damage: ERMC or IMC.

3. Exposed and Not Subject to Physical Damage: ERMC or IMC.

4. Concealed Aboveground: ERMC, IMC, EMT.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Hazardous Classified Locations: ERMC.

2. Exposed and Subject to Severe Physical Damage: ERMC. Subject to severe physical damage includes the following locations:

a. Loading docks.

b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

c. Mechanical rooms.

d. Gymnasiums.

3. Exposed and Subject to Physical Damage: IMC. Subject to physical damage includes the following locations:

a. Locations less than 8’ above finished floor.

b. Stub-ups to above suspended ceilings.

4. Exposed and Not Subject to Physical Damage: ERMC, IMC, EMT.

5. Concealed in Ceilings and Interior Walls and Partitions: ERMC, IMC, EMT.

6. Damp or Wet Locations: ERMC, IMC, Corrosion-resistant EMT.

7. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC, FMC.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC and IMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

a. NEMA Type 3R.

2. Indoors:

a. Type 1 unless otherwise indicated.

b. Damp or Dusty Locations: Type 2.

c. Surface Mounted in Kitchens and Other Locations Exposed to Oil or Coolants: Type 12.

d. Flush Mounted in Kitchens and Other Locations Exposed to Oil or Coolants: Type 12.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.

2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

4. Comply with NECA NEIS 101 for installation of steel raceways.

5. Comply with NECA NEIS 102 for installation of aluminum raceways.

6. Comply with NECA NEIS 111 for installation of nonmetallic raceways.

7. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.

8. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

9. Raceway Terminations at Locations Subject to Moisture or Vibration:

a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.

2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination.

3. Install no more than equivalent of three 90-degree bends in conduit run. Support within 12” of changes in direction.

4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.

5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

6. Support conduit within 12” of enclosures to which attached.

7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.

8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:

    a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

    b. Where an underground service raceway enters a building or structure.

    c. Conduit extending from interior to exterior of building.

    d. Conduit extending into pressurized duct and equipment.

    e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.

    f. Where otherwise required by NFPA 70.

9. Do not install conduits within 2 inches of the bottom side of a metal deck roof.

10. Keep raceways at least 6” away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

11. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.

12. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb. tensile strength. Leave at least 12 inches of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERMC and IMC:

a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

2. Types FMC and LFMC:

a. Comply with NEMA RV 3. Provide a maximum of 36 inch of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

3.

D. Stub-ups to Above Recessed Ceilings:

1. Provide EMT, IMC, or ERMC for raceways.

2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

E. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

2. EMT: Provide dual setscrew, steel fittings. Comply with NEMA FB 2.10.

3. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

F. Expansion-Joint Fittings:

1. Install in runs of aboveground ERMC, IMC, and EMT conduit that are located where environmental temperature change may exceed 100 deg F and that have straight-run length that exceeds 100 ft.

2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

   c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.

   d. Attics: 135 deg F temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.

4. Install expansion fittings at locations where conduits cross building or structure expansion joints.

5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

G. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty[or approved firestopping.

3.4 INSTALLATION OF SURFACE RACEWAYS

A. Install surface raceways only where indicated on Drawings.

B. Install surface raceway with a minimum 2 inch radius control at bend points.

C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.5 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

C. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.

D. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

E. Locate boxes so that cover or plate will not span different building finishes.

F. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.

G. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

H. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

I. Set metal floor boxes level and flush with finished floor surface.

J. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

K. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

M. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.

2. Provide gaskets for wallplates and covers.

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.8 CLEANING

A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION 260533

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway.
2. Identification for conductors, communication and control cable.
3. Warning labels and signs.
4. Instruction signs.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1, ANSI C2, and ANSI Z635.4.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.145.

1.5 COORDINATION

A. 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.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install all signs and labels horizontal (level) and consistent for similar equipment and panels.

PART 2 - PRODUCTS

2.1 RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 9 painting Sections.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with snap-around label.

1. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, snap-around, color-coding bands:

1. Snap-Around Labels: Slit, pre-tensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
2. Security System: Blue and yellow.
3. Mechanical and Electrical Supervisory System: Green and blue.
4. Telecommunication System: Green and yellow.
5. Control Wiring: Green and red.

C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.

1. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

D. Conductor Color Code Identification: Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a given branch circuit shall be identified by color coded tape or cable insulation at all termination, connection or splice points.

E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.

1. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

2. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

4. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

G. 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:

a. Power transfer switches.

b. Controls with external control power connections. 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.

2. Comply with NFPA 70 and 29 CFR 1910.145.

3. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

H. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with ENGINEER/OWNER APPROVED instructions where needed for system or equipment operation. Instructions are needed for all equipment unless otherwise noted.

a. Signs shall be engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

b. The engraved legend shall be ½ "White letters on Brown face, and punched or drilled for mechanical fasteners.

c. The signs shall be installed with stainless hardware.

I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor and Outdoor Equipment: Use engraved, laminated acrylic or melamine labels, punched or drilled for screw mounting. Identification labels shall have white letters on a dark-gray background. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high. Mount labels with stainless hardware.

2. Equipment to Be Labeled:

a. Identification labeling of some items listed below may be required by individual Sections or by NFPA 70.

b. Panelboards, electrical cabinets, and enclosures.

c. Access doors and panels for concealed electrical items.

d. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.

e. Monitoring and control equipment.

f. Uninterruptible power supply equipment.

g. Terminals, racks, and patch panels for data communication and for signal and control functions.

h. Radio system.

i. Field mounted devices

j. Field mounted instruments

3.2 INSTALLATION PRACTICES

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

D. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: 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.

3. Colors for 480/277-V Circuits:

   a. Phase A: Brown.

   b. Phase B: Orange.

   c. Phase C: Yellow.

4. 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.

5. Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, the color codes used to identify each phase, neutral (if applicable) and ground conductor throughout the system shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment. Provide factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

E. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

- END -

SECTION 260800

ELECTRICAL SYSTEMS COMMINSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 SUMMARY

A. The purpose of this Section is to define Contractor responsibilities in the commissioning process, which are being directed by the Contractor. Other electrical system testing is required under other Division 26 Specification Sections. National Electrical Installation Standards (NEIS) NECA 90-2004, "Recommended Practice for Commissioning Building Electrical Systems", 27th Volume of the NEIS Series, provides additional guidance for the commissioning of electrical systems.

B. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents. General Commissioning requirements and coordination are detailed in Division 01. Division 26 shall be familiar with all parts of Division 01 and the Commissioning Plan issued by the Contractor and shall execute all Commissioning responsibilities assigned to them in the Contract Documents and include the cost of Commissioning in the Contract price.

C. Electrical systems to be commissioned include the following:

1. Lighting Fixtures and Controls.

2. Grounding Equipment and Grounding System.

1.3 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards.

1.4 DEFINITIONS

A. Refer to Specification Section 019113 – General Commissioning Requirements for definitions.

1.5 SUBMITTALS

A. Contractor shall prepare Prefunctional Checklists and Functional Performance Test (FPT) procedures and execute and document results. All Prefunctional Checklists and tests must be documented using specific, procedural forms in Microsoft Word or Excel software developed for that purpose. Prior to testing, Contractor shall submit those forms to the Owner for review and approval.

B. Contractor shall provide Owner with documentation required for Commissioning work. At minimum, documentation shall include: Detailed Start-up procedures, Full sequences of operation, Operating and Maintenance data, Performance data, Functional Performance Test Procedures, Control Drawings, and details of Owner-Contracted tests.

C. Contractor shall submit to Owner installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians.

D. Contractor shall review and approve other relative documentation for impact on FPT's of the systems:

1. Shop Drawings and product submittal data related to systems or equipment to be commissioned. The Subcontractor responsible for the FPT shall review and incorporate comments from the Owner and Architect/Engineer via the Contractor.

2. Incorporate manufacturer's Start-up procedures with Prefunctional checklists.

3. Draft Electrical Testing Agency (ETA) Reports: Review and provide comments to Owner.

4. Factory Performance Test Reports: Review and compile all factory performance data to assure that the data is complete prior to executing the FPT's.

5. Completed equipment Start-up certification forms along with the manufacturer's field or factory performance and Start-up test documentation: Subcontractor performing the test will review the documentation prior to commencing with the scheduled FPT's.

6. Final ETA Reports: Subcontractor performing the test will review the documentation prior to commencing with the scheduled FPT's.

7. Operating and Maintenance (O&M) information per requirements of the Technical Specifications and Division 01 requirements: To validate adequacy and completeness of the FPT, the Contractor shall ensure that the O&M manual content, marked-up record Drawings and Specifications, component submittal drawings, and other pertinent documents are available at the Project Site for review.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Testing Equipment:

1. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified.

PART 3 - EXECUTION

3.1 PREPARATION

A. Construction Phase:

1. In each purchase order or subcontract that is written for changes in scope, include the following requirements for submittal data, commissioning documentation, testing assistance, Operating and Maintenance (O&M) data, and training, as a minimum.
2. Attend Pre-Commissioning Meeting(s), Pre-Installation Meeting(s), and other Project meetings scheduled by the Contractor to facilitate the Commissioning process.
3. Provide manufacturer's data sheets and shop drawing submittals of equipment.
4. Provide additional requested documentation to the Contractor, prior to O&M manual submittals, for development of Prefunctional Checklist and Functional Performance Tests procedures.
   a. Typically, this will include detailed manufacturer's installation and Start-up, operating, troubleshooting and maintenance procedures, full details of any Owner-contracted tests, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified.
   b. In addition, the installation, Start-up, and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Contractor.
   c. This information and data request may be made prior to normal submittals.
5. With input from the Architect/Engineer, Clarify the operation and control of commissioned equipment in areas where the Specifications, or equipment documentation are not sufficient for writing detailed test procedures.
6. Prepare the specific Functional Performance Test procedures specified in Section 26 08 16. Ensure that Functional Performance Test procedures address feasibility, safety, and equipment protection and provide necessary written alarm limits to be used during the tests.
7. Develop the Commissioning Plan using manufacturer's Start-up procedures and the Prefunctional Checklists. Submit manufacturer's detailed Start-up procedures and the Commissioning Plan and procedures and other requested equipment documentation to Owner for review.
8. During the Start-up and initial checkout process, execute and document related portions of the Prefunctional Checklists for all commissioned equipment.
9. Perform and clearly document all completed Prefunctional Checklists and Start-up procedures. Provide a copy to the Owner prior to the Functional Performance Test.
10. Address current Architect/Engineer and Owner punch list items before Functional Performance Tests. Air and water test, adjust and balance shall be completed with discrepancies and problems remedied before Functional Performance Tests of the respective air or water related systems are executed.

11. Provide skilled technicians to execute starting of equipment and to assist in execution of Functional Performance Tests. Ensure that they are available and present during the agreed-upon schedules and for a sufficient duration to complete the necessary tests, adjustments, and problem solving.
12. Correct deficiencies (differences between specified and observed performance) as interpreted by the Owner's Project Manager and Architect/Engineer and retest the system and equipment.
13. Compile all Commissioning records and documentation to be included in a Commissioning and Closeout Manual.
14. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to Record Drawing conditions.
15. During construction, maintain marked-up Record Drawings and Specifications of all Contract Documents and Contractor-generated coordination Drawings. Update after completion of Commissioning activities (include deferred tests). The Record Drawings and Specifications shall be delivered to the Owner both in electronic format as required by the Owner.
16. Provide training of the Owner's operating personnel as specified.
17. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

B. Warranty Phase:

1. Execute seasonal or deferred tests, witnessed by the Owner, according to the Specifications.
    a. Complete deferred tests as part of this Contract during the Warranty Period. Schedule this activity with Owner. Perform tests and document and correct deficiencies. Owner may observe the tests and review and approve test documentation and deficiency corrections.
    b. If any check or test cannot be completed prior to Substantial Completion due to the building structure, required occupancy condition, or other condition, execution of such test may be delayed to later in the Warranty Period, upon approval of the Owner. Contractor shall reschedule and conduct these unforeseen deferred tests in the same manner as deferred tests.
2. Correct deficiencies and make necessary adjustments to O&M manuals, Commissioning documentation, and Record Drawings for applicable issues identified in any seasonal testing.

C. Electrical Testing Agency (ETA):

1. When requested by Owner, the Contractor shall retain an independent Electrical Testing Agency (ETA). Their specific testing responsibilities requires checking and testing of the electrical power distribution equipment per National Electrical Testing Association (NETA).
2. Attend Pre-Commissioning Meeting(s), Pre-Installation Meeting(s), and other Project meetings scheduled by the Contractor to facilitate the Commissioning process.

3. Obtain all required manufacturer's data to facilitate tests.

4. Provide assistance to the Contractor in preparation of the specific Prefunctional Checklist and Functional Performance Test procedures specified in Section 260813 and 260816. ETA shall provide their standard forms to document the NETA tests to be incorporated into the Prefunctional Checklist and Functional Performance Tests record.

5. During related tests, execute and document the tests in the approved forms and/or test record.

6. Perform and clearly document all completed Start-up and system operational checkout procedures, providing a copy to the Contractor.

7. Clearly indicate any deficiencies identified during testing and add to an action list for resolution and tracking. The field technicians shall keep a running log of events and issues. Submit hand-written reports of discrepancies, deficient or uncompleted work by others, Contract interpretation requests and lists of completed tests to the Contractor at least twice a week and provide technical assistance in the resolution of deficiencies.

8. Provide skilled technicians to execute testing. Ensure that they are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.

3.2 TESTING

A. Prefunctional Checklists and Start-up:

1. Follow the Start-up and initial checkout procedures listed in this Section and in Division 01. Start-up and complete systems and sub-systems so they are fully functional, meeting the requirements of the Contract Documents.

2. Prefunctional Checklists shall be complete prior to commencement of a Functional Performance test.

3. Refer to Section 260813 for specific details on required Prefunctional Checklists.

B. Functional Performance Tests:

1. Functional Performance Tests are conducted after system Start-up and checkout is satisfactorily completed.

2. Refer to Section 260816 for specific details on the required Functional Performance Tests.

C. Coordination Between Testing Parties:

1. Factory Start-ups: Factory Start-ups are specified for certain equipment. Factory Start-ups generally are Start-up related activities that will be reviewed and checked prior to Functional Performance Tests. All costs associated with factory Start-ups shall be included with the contract price unless otherwise noted. Notify the Commissioning Team of the factory Start-up schedule and coordinate these factory Start-ups with witnessing parties. The Commissioning Team members may witness these Start-ups at their discretion.

2. Independent Testing Agencies: For systems that specify testing by an independent testing agency, the cost of the test shall be included in the Contract price unless otherwise noted. Testing performed by independent agencies may cover aspects required in the Prefunctional Checklists, Start-ups, and Functional Performance Tests. Coordinate with the independent testing agency so that Owner and/or A/E can witness the test to ensure that applicable aspects of the test meet requirements.

3.3 TRAINING

A. Refer to Specification Section 01 79 00 – Demonstration and Training.

- END -

SECTION 260923

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Time switches.
2. Photoelectric switches.
3. Switchbox-mounted occupancy and vacancy sensors
4. High-bay occupancy and vacancy sensors.
5. Outdoor motion sensors.
6. Lighting contactors.

B. Related Requirements:

1. Section 262726 "Wiring Devices" for wall-box daylighters, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Show installation details for the following:
   a. Occupancy sensors.
   b. Vacancy sensors.
2. Interconnection diagrams showing field-installed wiring.
3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Field quality-control reports.

C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

B. Software and firmware operational documentation.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.

1. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

A. Tork

B. GE

C. Topgreener

D. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Contact Configuration: SPST, DPST, DPDT.

3. Contact Rating: 20-A ballast load, 120-/240-V ac.

4. Programs: Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.

5. Programs: Two on-off set points on a 24-hour schedule, allowing different set points for each day of the week and an annual holiday schedule that overrides the weekly operation on holidays.

6. Programs: four channels; each channel is individually programmable with eight on-off set points on a 24-hour schedule.

7. Programs: eight channels; each channel is individually programmable with two on-off set points on a 24-hour schedule with a skip-a-day weekly schedule.

8. Programs: twelve channels; each channel is individually programmable with two on-off set points on a 24-hour schedule, allowing different set points for each day of the week.

9. Programs: sixteen channels; each channel is individually programmable with 40 on-off operations per week and an annual holiday schedule that overrides the weekly operation on holidays.

10. Programs: twenty channels; each channel is individually programmable with 40 on-off operations per week, plus four seasonal schedules that modify the basic program and an annual holiday schedule that overrides the weekly operation on holidays.

11. Programs: and an annual holiday schedule that overrides the weekly operation on holidays.

12. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.

13. Astronomic Time: All channels.

14. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

E. Electromechanical-Dial Time Switches: Comply with UL 917.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Contact Configuration: SPST.

3. Contact Rating: 20-A ballast load, 120-/240-V ac.

4. Circuitry: Allows connection of a photoelectric relay as a substitute for the on-off function of a program.

5. Astronomic time dial.

6. Eight-Day Program: Uniquely programmable for each weekday and holidays.

7. Skip-a-day mode.

8. Wound-spring reserve carryover mechanism to keep time during power failures, minimum of 16 hours.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

A. Omron

B. Hubbell

C. Description: Solid state, with SPST dry contacts rated for 1000 W incandescent or 1800 VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lux), with an adjustment for turn-on and turn-off levels within that range and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.

3. Time Delay: Fifteen-second minimum, to prevent false operation.

4. Surge Protection: Metal-oxide varistor.

5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

6. Failure Mode: Luminaire stays ON.

D. Description: Solid state; one set of NO dry contacts rated for 24 V ac at 1 A, to operate connected load, complying with UL 773, and compatible with luminaire power pack [lighting control panelboard].

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lux), with an adjustment for turn-on and turn-off levels within that range.

3. Time Delay: Thirty-second minimum, to prevent false operation.

4. Mounting: 1/2-inch (13-mm) threaded male conduit.

5. Failure Mode: Luminaire stays ON.

6. Power Pack: Dry contacts rated for 20-A ballast or LED load at 120- and 277-V ac, for 13-Atungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.

   a. LED status lights to indicate load status.

   b. Plenum rated.

7. Power Pack: Digital controller capable of accepting four RJ45 inputs with two outputs rated for 20-A incandescent or LED load at 120- and 277-V ac, for 13-A 16-A ballast or LED at 120- and 277-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, Class 2 power source, as defined by NFPA 70.

   a. With integral current monitoring

   b. Compatible with digital addressable lighting interface.

   c. Plenum rated.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Lutron

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox, with provisions for connection to BAS using hardwired connection.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application, and shall comply with New York Title 24.

2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time, delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).

4. Switch Rating: Not less than 800-VA ballast or LED load at 120 V, 1200-VA ballast or LED load at 277 V, and 800-W incandescent.

C. Wall-Switch Sensor Tag WS1:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 2100 sq. ft (196 sq. m).

2. Sensing Technology: PIR-Dual technology.

3. Switch Type: SP, dual circuit.

4. Capable of controlling load in three-way application.

5. Voltage: Match the circuit voltage 120 V.

6. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.

7. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.

8. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.

9. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

10. Color: Black.

11. Faceplate: Color matched to switch.

D. Wall-Switch Sensor Tag WS2:

1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft. (84 sq. m).

2. Sensing Technology: PIR.

3. Switch Type: SP, dual circuit.

4. Capable of controlling load in three-way application.

5. Voltage: Match the circuit voltage 120 V.

6. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.

7. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.

8. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.

9. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

10. Color: Black.

11. Faceplate: Color matched to switch.

2.4 OUTDOOR MOTION SENSORS

A. Rab

B. Leviton

C. General Requirements for Sensors: Solid-state outdoor motion sensors.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application, and shall comply with New York Title 24.

2. PIR-Dual-technology type, weatherproof. Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm). Comply with UL 773A.

3. Switch Rating:
    a. Luminaire-Mounted Sensor: 1000-W incandescent, 500-VA fluorescent/LED.
    b. Separately Mounted Sensor: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
4. Switch Type: SP, dual circuit.
5. Voltage: Match the circuit voltage 120-V type.
6. Detector Coverage:
    a. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft. (84 sq. m).
    b. Long Range: 180-degree field of view and 110-foot (34-m) detection range.
    c. .
7. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
8. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
9. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.
10. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and help eliminate false "off" switching.
11. Operating Ambient Conditions: Suitable for operation in ambient temperatures ranging from minus 40 to plus 130 deg F (minus 40 to plus 54 deg C), rated as "raintight" according to UL 773A.

2.5 LIGHTING CONTACTORS

A. Square D

B. GE

C. Siemens

D. Description: Electrically operated and electrically held, combination-type lighting contactors with nonfused disconnect, complying with NEMA ICS 2 and UL 508.
1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide with control and pilot devices as indicated on drawings, and matching the NEMA type specified for the enclosure.

2.6 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18, No. 22, No. 24 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than [No. 14, No. 16, No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

C. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

D. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

E. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.2 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).

B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 IDENTIFICATION

A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."

B. Label time switches and contactors with a unique designation.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Lighting control devices will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

2. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.6 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.7 DEMONSTRATION

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

- END -

SECTION 262416

PANELBOARDS

GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.

2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

A. SVR: Suppressed voltage rating.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.

2. Detail enclosure types and details for types other than NEMA 250, Type 1.

3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices.

5. Include evidence of NRTL listing for series rating of installed devices.

6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

7. Include wiring diagrams for power, signal, and control wiring.

8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field Quality-Control Reports:

1. Test procedures used.

2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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

1. Keys: Two spares for each type of panelboard cabinet lock to match owner standard.

2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.

3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

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

E. Comply with NEMA PB 1.

F. Comply with NFPA 70.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407, NEMA PB 1.

1.10 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not exceeding minus 22 deg F (minus 30 deg C), 104 deg F (plus 40 deg C).

b. Altitude: Not exceeding 6600 feet (2000 m).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.

2. Altitude not exceeding 1000 feet (300 m).

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect, Construction Manager no fewer than two days in advance of proposed interruption of electric service.

2. Do not proceed with interruption of electric service without Architect's, Construction Manager's written permission.

3. Comply with NFPA 70E.

1.11 COORDINATION

A. 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, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.12 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."

B. Enclosures: Flush- and surface-mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

3. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.

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

4. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

5. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

6. Square D; a brand of Schneider Electric

7. Finishes:

a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

b. Back Boxes: Same finish as panels and trim.

8. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.

C. Incoming Mains Location: Top and bottom.

D. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

3. Neutral Bus: Neutral bus rated 100 percent of phase bus and UL listed as suitable for nonlinear loads.

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Main and Neutral Lugs: Mechanical type.

3. Ground Lugs: Mechanical type.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

G. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.3 DISTRIBUTION PANELBOARDS

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

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

D. Mains: Circuit breaker or Lugs only.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

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

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Square D; a brand of Schneider Electric.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

a. Instantaneous trip.

b. Long- and short-time pickup levels.

c. Long- and short-time time adjustments.

d. Ground-fault pickup level, time delay, and I squared x t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).

7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.

8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.

    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

    e. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system specified in Section 260913 "Electrical Power Monitoring and Control."

    f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.

    g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.

    h. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.

    i. Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.

    j. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.

    k. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.

l. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.

m. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

n. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses, and Spare-Fuse Cabinet: Comply with requirements specified in Section 262813 "Fuses."

2. Fused Switch Features and Accessories: Standard ampere ratings and number of poles.

3. Auxiliary Contacts: Two normally open and normally closed contact(s) that operate with switch handle operation.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NECA 407, NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install panelboards and accessories according to NECA 407, NEMA PB 1.1.

B. Equipment Mounting: Install panelboards on concrete bases, 4-inch (100-mm) nominal thickness. Comply with requirements for concrete base specified in Section 033000 "Cast-in-Place Concrete."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.

2. For panelboards, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

4. Install anchor bolts to elevations required for proper attachment to panelboards.

5. Attach panelboard to the vertical finished or structural surface behind the panelboard.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

D. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."

E. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.

F. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

G. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

H. Install filler plates in unused spaces.

I. Stub four 1-inch (27-GRC) empty conduits from 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.

J. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

K. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.

b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.

c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

F. Panelboards will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.

2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.

3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.

4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

SECTION 262726

WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Tamper-resistant receptacles.
4. Weather-resistant receptacles.
5. Snap switches and wall-box dimmers.
6. Solid-state fan speed controls.
7. Wall-switch and exterior occupancy sensors.
8. Communications outlets.
9. Cord and plug sets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.8 MAINTENANCE MATERIAL SUBMITTALS

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

1. Service/Power Poles: One for every 10, but no fewer than one.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).

2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

3. Leviton Mfg. Company Inc. (Leviton).

4. Pass & Seymour/Legrand (Pass & Seymour).

B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

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

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.

2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 5351 (single), CR5362 (duplex).

b. Hubbell; HBL5351 (single), HBL5352 (duplex).

c. Leviton; 5891 (single), 5352 (duplex).

d. Pass & Seymour; 5361 (single), 5362 (duplex).

B. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; TR8300.

b. Hubbell; HBL8300SGA.

c. Leviton; 8300-SGG.

d. Pass & Seymour; TR63H.

2. Description: Labeled shall comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

2.4 GFCI RECEPTACLES

A. General Description:

1. Straight blade, feed-through type.

2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.

3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; VGF20.

b. Hubbell; GFR5352L.

c. Pass & Seymour; 2095.

d. Leviton; 7590.

C. Tamper-Resistant GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; GFTR20.

b. Pass & Seymour; 2095TR.

2.5 TVSS RECEPTACLES

A. General Description: Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.

1. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.

2. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."

B. Duplex TVSS Convenience Receptacles:

1. Products: Subject to compliance with requirements, provide one of the following:
    a. Cooper; 5362BLS.
    b. Hubbell; HBL5362SA.
    c. Leviton; 5380.
    d. Pass & Seymour; 5362BLSP.
2. Description: Straight blade, 125 V, 20 A; NEMA WD 6 Configuration 5-20R.

2.6 HAZARDOUS (CLASSIFIED) LOCATION RECEPTACLES

A. Available Wiring Devices for Hazardous (Classified) Locations: Comply with NEMA FB 11 and UL 1010.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Cooper Crouse-Hinds.
    b. EGS/Appleton Electric.
    c. Killark; Division of Hubbell Inc.

2.7 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration L5-20R, and UL 498.
1. Products: Subject to compliance with requirements, provide one of the following:
    a. Cooper; CWL520R.
    b. Hubbell; HBL2310.
    c. Leviton; 2310.
    d. Pass & Seymour; L520-R.

2.8 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
B. Switches, 120/277 V, 20 A:
1. Products: Subject to compliance with requirements, provide one of the following:
    1) Single Pole:
    2) Cooper; AH1221.
    3) Hubbell; HBL1221.
    4) Leviton; 1221-2.
    5) Pass & Seymour; CSB20AC1.
    6) Two Pole:
    7) Cooper; AH1222.

8) Hubbell; HBL1222.

9) Leviton; 1222-2.

10) Pass & Seymour; CSB20AC2.

11) Three Way:

12) Cooper; AH1223.

13) Hubbell; HBL1223.

14) Leviton; 1223-2.

15) Pass & Seymour; CSB20AC3.

16) Four Way:

17) Cooper; AH1224.

18) Hubbell; HBL1224.

19) Leviton; 1224-2.

20) Pass & Seymour; CSB20AC4.

C. Key-Operated Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; AH1221L.

b. Hubbell; HBL1221L.

c. Leviton; 1221-2L.

d. Pass & Seymour; PS20AC1-L.

2. Description: Single pole, with factory-supplied key in lieu of switch handle.

D. Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 1995.

b. Hubbell; HBL1557.

c. Leviton; 1257.

d. Pass & Seymour; 1251.

E. Tamper-Resistant Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; TR6252.

b. Hubbell; DR15TR.

c. Pass & Seymour; TR26252.

2. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.

F. Tamper-Resistant and Weather-Resistant Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; TWRBR15.

b. Hubbell; DR15TR.

c. LevitonTRW15.

d. Pass & Seymour; TRW26252.

2. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section, when installed in wet and damp locations.

G. GFCI, Feed-Through Type, Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498, and UL 943 Class A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; VGF15.

b. Hubbell; GF15LA.

c. Leviton; 8599.

d. Pass & Seymour; 1594.

H. GFCI, Tamper-Resistant and Weather-Resistant Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498, and UL 943 Class A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; TWRVGF15.

b. Hubbell; GFTR15.

c. Pass & Seymour; 1594TRWR.

2. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.

2.9 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Type 302 stainless steel [0.04-inch- (1-mm-) thick, brushed brass with factory polymer finish.

3. Material for Unfinished Spaces: Galvanized steel.

4. Material for Damp Locations: Cast aluminum] with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.10 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.

2. TVSS Devices: Blue.

B. Wall Plate Color: For plastic covers, match device color.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.

b. Straighten conductors that remain and remove corrosion and foreign matter.

c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.

2. Test Instruments: Use instruments that comply with UL 1436.

3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

- END -

SECTION 262816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Molded-case switches.
5. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in electronic format.

B. Shop Drawings: For enclosed switches and circuit breakers.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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

1. Fuses: 10 percent of quantity installed for each size and type, but no fewer than three (3) of each size and type.

2. Fuse Pullers: One (1) for each size and type.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by UL and marked for intended location and application.

B. Comply with NFPA 70.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).

2. Altitude: Not exceeding 6600 feet (2010 m).

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

C. Comply with NFPA 70.

2.2 FUSIBLE SWITCHES

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

1. Eaton Corp. Electrical Group

2. Siemens Industry Inc.

3. Schneider (Square D)

B. Type HD, Heavy Duty:

Single Throw, 240v or 600v AC rated as required by the applicable system voltage, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.

4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

5. Auxiliary Contact Kit: One (1) NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.

6. Lugs: Mechanical type, suitable for number, size, and conductor material.

7. Service-Rated Switches: Labeled for use as service equipment.

2.3 NON-FUSIBLE SWITCHES

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

1. Eaton Corp. Electrical Group.

2. Siemens Industry Inc.

B. Type GD, General Duty, Three Pole, Single Throw, 240-V ac, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: One (1) NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open
6. Lugs: Mechanical or Compression type as recommended by the switch manufacturer, suitable for number, size, and conductor material.
7. Service-Rated Switches: Labeled for use as service equipment.

2.4 MOLDED-CASE CIRCUIT BREAKERS

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

1. Eaton Corp. Electrical Group.
2. Siemens Industry Inc.

B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.

C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

D. MCCBs shall be equipped with a device for locking in the isolated position.

E. Lugs shall be suitable for 40 deg F (60 deg C) rated wire on 125-A circuit breakers and below, 167 deg F (75 deg C) rated wire, sized according to the temperature rating in NFPA 70.

F. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.

G. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal 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.

H. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

I. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I-squared t response.

J. Ground-Fault Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

K. Ground-Fault Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).

L. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Appropriate for application.
4. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

2.5 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

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

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven (7) days in advance of proposed interruption of electric service.

2. Indicate method of providing temporary electric service.

3. Do not proceed with interruption of electric service without Architect's and/or Owner's written permission.

4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.

2. Outdoor Locations: NEMA 250, Type 3R.

3.4 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

C. Install fuses in fusible devices.

D. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections with the assistance of a factory-authorized service representative.

B. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

a. Inspect physical and mechanical condition.

b. Inspect anchorage, alignment, grounding, and clearances.

c. Verify that the unit is clean.

d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.

e. Verify that fuse sizes and types match the Specifications and Drawings.

f. Verify that each fuse has adequate mechanical support and contact integrity.

g. Inspect bolted electrical connections for high resistance using one of the two following methods:

1) Use a low-resistance ohmmeter.

a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.

i. Verify correct phase barrier installation.

j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.

e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

C. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.

b. Inspect physical and mechanical condition.

c. Inspect anchorage, alignment, grounding, and clearances.

d. Verify that the unit is clean.

e. Operate the circuit breaker to ensure smooth operation.

f. Inspect bolted electrical connections for high resistance using one of the two following methods:

1) Use a low-resistance ohmmeter.

a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

g. Inspect operating mechanism, contacts, and chutes in unsealed units.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state

components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.

e. Determine the following by primary current injection:

1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.

2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.

3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.

4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.

3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

1. Test procedures used.

2. Include identification of each enclosed switch and circuit breaker tested and describe test results.

3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

- END -

SECTION 265613

LIGHTING POLES AND STANDARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Poles and accessories for support of luminaires.

2. Luminaire-lowering devices.

1.2 DEFINITIONS

A. EPA: Equivalent projected area.

B. Luminaire: Complete luminaire.

C. Pole: Luminaire-supporting structure, including tower used for large-area illumination.

D. Standard: See "Pole."

1.3 ACTION SUBMITTALS

A. Product Data: For each pole, accessory, and luminaire-supporting and -lowering device.

B. Shop Drawings:

1. Include plans, elevations, sections, and mounting and attachment details.

2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Detail fabrication and assembly of poles and pole accessories.

4. Foundation construction details, including material descriptions, dimensions, anchor bolts, support devices, and calculations, signed and sealed by a professional engineer licensed in the state of installation.

5. Anchor bolt templates keyed to specific poles and certified by manufacturer.

6. Method and procedure of pole installation. Include manufacturer's written installations.

1.4 INFORMATIONAL SUBMITTALS

A. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements according to AASHTO LTS-6-M and that load imposed by luminaire and attachments has been included in design. The certification shall be based on design calculations signed and sealed by a professional engineer.

B. Seismic Qualification Certificates: For Pole lights, accessories, and components, from manufacturer.

C. Material test reports.

D. Field quality-control reports.

E. Sample warranty.

F. Soil test reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data for pole-lowering devices and pole-mounted accessories.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of pole(s) and luminaire-lowering device(s)] that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within a specified warranty period. Manufacturers may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCT.

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design pole foundation and pole power system.

B. Seismic Performance: Foundation and pole shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."

2. Component Importance Factor: 1.5.

3. Requirements for Component Amplification Factor and Component Response Modification Factor.

C. Structural Characteristics: Comply with AASHTO LTS-6-M.

D. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied according to AASHTO LTS-6-M.

E. Live Load: Single load of 500 lbf distributed according to AASHTO LTS-6-M.

F. Ice Load: Load of 3 lbf/sq. ft., applied according to AASHTO LTS-6-M for applicable areas on the Ice Load Map.

G. Wind Load: Pressure of wind on pole and luminaire, calculated and applied according to AASHTO LTS-6-M.

1. Basic wind speed for calculating wind load for poles exceeding 50 feet in height is 100 mph value from AASHTO LTS-6-M for this Project.

a. Wind Importance Factor: 1.0 value from AASHTO LTS-6-M.

b. Minimum Design Life: 50 years value from AASHTO LTS-6-M.

c. Velocity Conversion Factor: 1.0 Insert value from AASHTO LTS-6-M.

2. Basic wind speed for calculating wind load for poles 50 feet high or less is 100 mph value from AASHTO LTS-6-M for this Project>.

a. Wind Importance Factor: 1.0 from AASHTO LTS-6-M.

b. Minimum Design Life: 25 years from AASHTO LTS-6-M.

c. Velocity Conversion Factor: 1.0 from AASHTO LTS-6-M.

H. Strength Analysis: For each pole, multiply the actual EPA of luminaires and brackets by a factor of 1.1 to obtain the EPA to be used in pole selection strength analysis.

I. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.

2.2 STEEL POLES

A. Source Limitations: Obtain poles from single manufacturer or producer.

B. Source Limitations: For poles, obtain each color, grade, finish, type, and variety of pole from single source with resources to provide products of consistent quality in appearance and physical properties.

C. Poles: Comply with ASTM A500/A500M, Grade B carbon steel with a minimum yield of 46,000 psig; one-piece construction up to 40 feet in height with access handhole in pole wall.

1. Shape: Round, straight.

2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

D. Poles: Comply with ASTM A240/A240M, stainless steel with a minimum yield of 55,000 psig; one-piece construction up to 40 feet in height with access handhole in pole wall.

1. Shape: Round, straight.

2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

E. Steel Mast Arms: Truss type, continuously welded to pole attachment plate. Material and finish same as plate.

F. Brackets for Luminaires: Detachable, cantilever, without underbrace.

1. Adaptor fitting welded to pole, allowing the bracket to be bolted to the pole-mounted adapter, then bolted together with stainless or galvanized-steel bolts.

2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire. Match pole material and finish.

G. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

H. Fasteners: Stainless steel or Galvanized steel, size and type as determined by manufacturer. Corrosion-resistant items compatible with support components.

1. Materials: Compatible with poles and standards as well as the substrates to which poles and standards are fastened and shall not cause galvanic action at contact points.

2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot dip galvanized after fabrication unless otherwise indicated.

I. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Section 260526 "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size indicated, and accessible through handhole.

J. Handhole: Oval shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.

K. Intermediate Handhole and Cable Support: Weatherproof, 3-by-5-inch handhole located at midpoint of pole, with cover for access to internal welded attachment lug for electric cable support grip.

L. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported load multiplied by a 5.0 safety factor.

M. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.

N. Galvanized Finish: After fabrication, hot dip galvanizes according to ASTM A123/A123M.

O. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces according to SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.

3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high gloss, high-build polyurethane enamel.

    a. Color: As indicated by manufacturer's designations.

P. Powder-Coat Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces according to SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair powder coat bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Powder Coat: Comply with AAMA 2604.

    a. Electrostatic-applied powder coating; single application and cured to a minimum 2.5- to 3.5-mils dry film thickness. Coat interior and exterior of pole for equal corrosion protection.

    b. Color: As indicated by manufacturer's designations

3. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.

4. Class I, Clear-Anodic Finish: AA-M32C22A41 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I clear coating of 0.018 mm or thicker), complying with AAMA 611.

5. Class I, Color-Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: Medium; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I integrally colored or electrolytically deposited color coating 0.018 mm or thicker), complying with AAMA 611.

Q. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.

3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

a. Color: As indicated by manufacturer's designations.

R. Powder-Coat Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair powder coat bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Powder coat shall comply with AAMA 2604.

a. Electrostatic applied powder coating; single application with a minimum 2.5- to 3.5-mils dry film thickness; cured according to manufacturer's instructions. Coat interior and exterior of pole for equal corrosion protection.

b. Color: As indicated by manufacturer's designations

2.3 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units, finished same as pole, and arranged to cover pole's mounting bolts and nuts.

B. Transformer-Type Base: Same material and color as pole. Coordinate dimensions to suit pole's base flange and to accept ballast(s). Include removable flanged access cover secured with bolts or screws.

2.4 MOUNTING HARDWARE

A. Anchor Bolts: Manufactured to ASTM F1554, Grade 55, with a minimum yield strength of 55,000 psi.

1. Galvanizing: Hot dip galvanized according to ASTM A153, Class C

2. Bent rods 40 inches in diameter by 50 inches in length.

3. Threading: Uniform National 8, Class 2A.

B. Nuts: ASTM A563, Grade A, Heavy-Hex.

1. Galvanizing: Hot dip galvanized according to ASTM A153, Class C.

2. Four nuts provided per anchor bolt, shipped with nuts pre-assembled to the anchor bolts.

C. Washers: ASTM F436, Type 1.

1. Galvanizing: Hot dip galvanized according to ASTM A153, Class C

2. Two washer(s) provided per anchor bolt.

2.5 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 POLE FOUNDATION

A. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Structural steel complying with ASTM A36/A36M and hot-dip galvanized according to ASTM A123/A123M; and with top-plate and mounting bolts to match pole-base flange and strength required to support pole, luminaire, and accessories. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

B. Pre-Cast Foundations: Factory fabricated, with structural steel complying with ASTM A36/A36M and hot-dip galvanized according to ASTM A123/A123M; and with top-plate and mounting bolts to match pole-base flange and strength required to support pole, luminaire, and accessories. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

C. Power-Installed Screw Foundations: Factory fabricated by pole manufacturer, with structural steel complying with ASTM A36/A36M and hot-dip galvanized according to ASTM A123/A123M; and with top-plate and mounting bolts to match pole-base flange and strength required to support pole, luminaire, and accessories.

1. Baseplate: Stamped with manufacturer's name, date of production, and cable entry.

D. Direct-Buried Foundations: Install to depth indicated on Drawings, but not less than as indicated. Add backfill in 6-inch to 9-inch layers, tamping each layer as shown on Drawings. To ensure a plumb installation, continuously check pole orientation with plumb bob while tamping.

E. Direct-Buried Poles with Concrete Backfill: Set poles in augered holes to depth below finished grade indicated on Drawings, but not less than as indicated. To ensure a plumb installation, continuously check pole orientation with plumb bob while tamping.

1. Make holes 6 inches in diameter larger than pole diameter.

2. Fill augered hole around pole with air-entrained concrete having a minimum compressive strength of 3000 psi at 28 days and finish in a dome above finished grade.

3. Use a short piece of 1/2-inch diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

4. Cure concrete a minimum of 72 hours before performing work on pole.

F. Anchor Bolts: Install plumb using manufacturer-supplied steel template, uniformly spaced.

3.2 POLE INSTALLATION

A. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 033000 "Cast-in-Place Concrete."

B. Foundation-Mounted Poles: Mount pole with leveling nuts and tighten top nuts to torque level according to pole manufacturer's written instructions.

C. Poles and Pole Foundations Set in Concrete-Paved Areas: Install poles with a minimum 6-inch wide, unpaved gap between the pole or pole foundation and the edge of the adjacent concrete slab. Fill unpaved ring with pea gravel. Insert material to a level 1 inch below top of concrete slab.

D. Raise and set pole using web fabric slings (not chain or cable) at locations indicated by manufacturer.

3.3 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum using insulating fittings or treatment.

B. Steel Conduits: Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch thick, pipe-wrapping plastic tape applied with a 50-percent overlap.

3.4 GROUNDING

A. Ground Metal Poles and Support Structures: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

1. Install grounding electrode for each pole unless otherwise indicated.

2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

B. Ground Nonmetallic Poles and Support Structures: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

1. Install grounding electrode for each pole.

2. Install grounding conductor and conductor protector.

3. Ground metallic components of pole accessories and foundation.

- END -

SECTION 265619

LED EXTERIOR LIGHTING

PART 1 - GENERAL

Includes:

1. Exterior solid-state luminaires are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted photoelectric relays.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Section 260926 "Lighting Control Panelboards" for panelboard-based lighting control.
3. Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
4. Section 265613 "Lighting Poles and Standards" for poles and standards used to support exterior lighting equipment.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire." Type XA, 7700 lumens, Type XA1, 4200 lumens

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

B. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale and coordinated.

B. Product Certificates: For each type of the following:

1. Luminaire.
2. Photoelectric relay.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project, use manufacturers' codes.

1.6 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

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

B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. UL Compliance: Comply with UL 1598 and listed for wet location.

D. CRI of 90. CCT of 4000 K.

E. L70 lamp life of 50,000 hours.

F. Lamps dimmable from 100 percent to 0 percent of maximum light output.

G. Nominal Operating Voltage: 120 V ac

H. In-line Fusing: On the primary for each luminaire

I. Lamp Rating: Lamp marked for outdoor use.

J. Source Limitations:

1. Obtain luminaires from single source from a single manufacturer.

2.2 LUMINAIRE TYPES

A. Area and Site: Type XA, XA1-Exterior

1. Luminaire Shape: Exterior Wall Up / Down

90 CRI-4000K CCT

2. Mounting: Building mounted with one piece die-cast aluminum housing and hinged revovable die-cast aluminum door 16-5/8” (422mm) in length and 11-3/8” wide (290mm).

3. Luminaire-Mounting Height: To be determined.

2.3 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Corrosion-resistant aluminum Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

D. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

2. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. Specular Surfaces: 83 percent.

G. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.

2. Provide filter/breather for enclosed luminaires.

2.4 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

a. Color: Finish by Architect

b. Retain "Factory-Applied Finish for Steel Luminaires" Paragraph below when luminaire material is steel that is not to be field painted and is not required to match finish of pole or support materials.

C. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

a. Color:

1) As selected by Architect from manufacturer's full range.

2.5 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Supports:

1. Sized and rated for luminaire weight.

2. Able to maintain luminaire position after cleaning and relamping.

3. Support luminaires without causing deflection of finished surface.

4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

C. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls Attached to a minimum 1/8 inch (3 mm) backing plate attached to wall structural members Attached using through bolts and backing plates on either side of wall

D. Wiring Method: Install cables in raceways. Conceal raceways and cables.

E. Install luminaires level, plumb, and square with finished grade unless otherwise indicated. Install luminaires at height and aiming angle as indicated on Drawings.

F. Coordinate layout and installation of luminaires with other construction.

G. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

H. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.2 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections[with the assistance of a factory-authorized service representative:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Verify operation of photoelectric controls.

3. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

C. Luminaire will be considered defective if it does not pass tests and inspections.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

- END -