



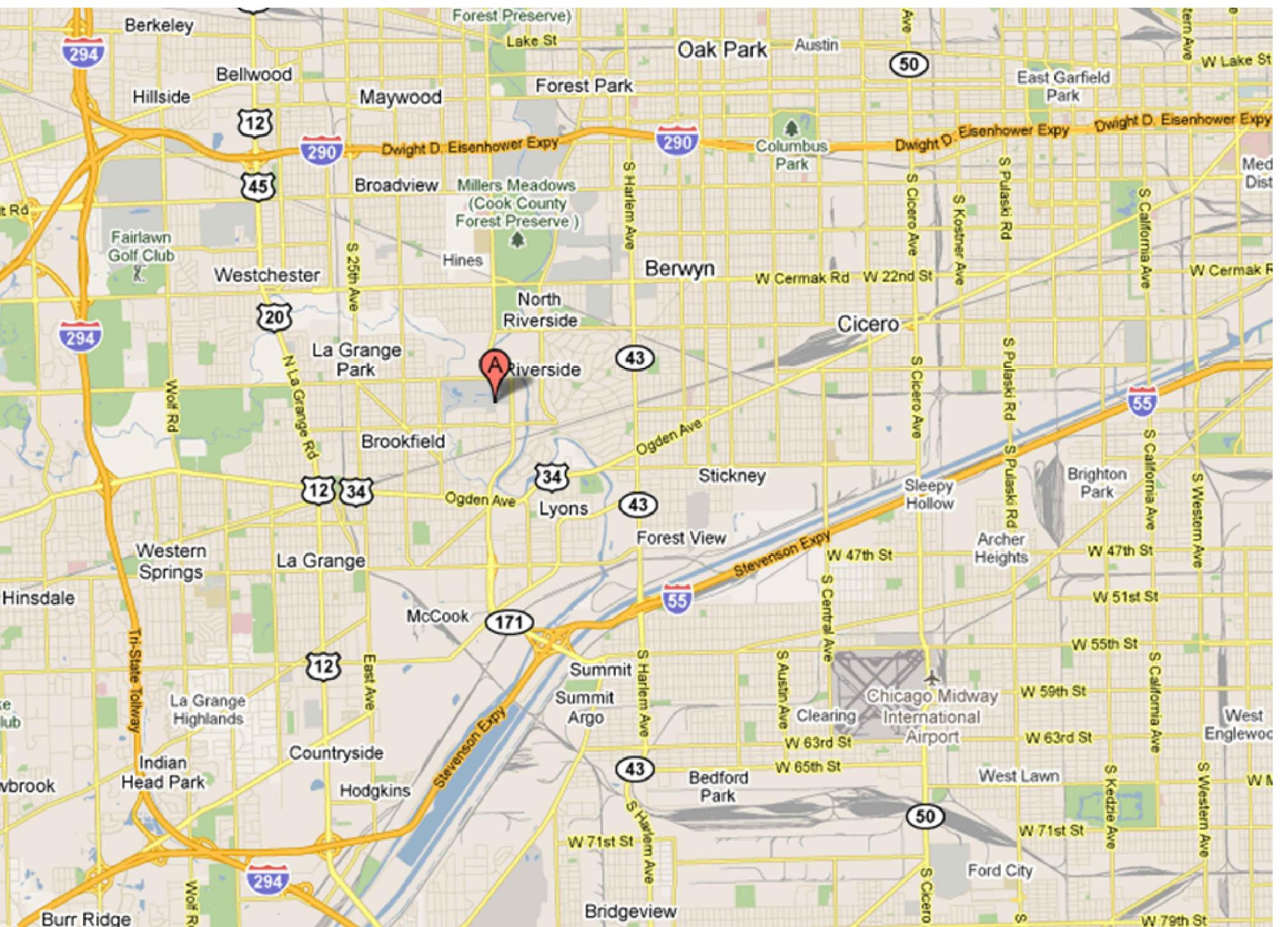
Chicago Zoological Society BROOKFIELD ZOO

Site Lighting Expansion Project

3300 Golf Road
Brookfield, Illinois 60513

GENERAL NOTES:

- VERIFY LOCATION OF UNDERGROUND UTILITIES AND OBSTRUCTIONS BEFORE EXCAVATION.
- PATH LIGHT LOCATIONS MAY BE ADJUSTED IN THE FIELD A MAXIMUM OF 10 FEET TO AVOID EXISTING OBSTRUCTIONS. ANY RELOCATIONS BEYOND 10 FEET REQUIRE THE APPROVAL OF THE OWNER, CHICAGO ZOOLOGICAL SOCIETY (CZS).
- ALL WORK AREAS WHERE MEDIUM-LARGE EQUIPMENT IS BEING USED, THERE ARE OPEN TRENCHES, OR LIVE CIRCUITS ARE EXPOSED MUST BE COMPLETELY ENCLOSED WITHIN A MINIMUM 4' FENCE.
- PATH LIGHT POLE CONCRETE BASE EDGE SHALL BE LOCATED 12" FROM THE PATH EDGE.
- PATH LIGHT POLES SHALL BE ORIENTED WITH THE SERVICE COVER FACING AWAY FROM THE PATH.
- PATH LIGHT RECEPTACLES SHALL BE ORIENTED TO FACE AWAY FROM THE PATH.
- WIRES SHALL BE STRANDED COPPER WET LOCATION THWN MINIMUM, SIZE AS INDICATED ON THE DRAWINGS. VOLTAGE DROP TO THE LAST FIXTURE ON EACH CIRCUIT SHALL NOT EXCEED 3%.
- ALL SPLICES SHALL BE MADE WITHIN THE PATH LIGHT POLE HANDHOLE OR IN A PULL BOX.
- MINIMUM BURIAL DEPTH SHALL BE 24" BELOW GRADE.
- INLINE FUSES SHALL BE INSTALLED IN THE BASE OF THE POLE AND BE ACCESSIBLE BY THE POLE ACCESS COVER.
- CONTRACTOR SHALL REPAIR AT HIS COST; DAMAGE CAUSED TO EXISTING UNDERGROUND UTILITIES AND ABOVE GROUND EQUIPMENT. REPAIRS SHALL BE MADE WITHIN FIVE DAYS AFTER DAMAGE OCCURS.
- ALL REVISIONS TO THE PLANS AND SUBSTITUTION REQUESTS PROPOSED DURING CONSTRUCTION SHALL BE SUBMITTED IN WRITING TO THE CZS FOR APPROVAL.
- ALL AREAS OF EXCAVATION, INCLUDING PATHWAYS AND ROADWAYS SHALL BE REPAIRED TO MATCH THE EXISTING CONDITION.
- COORDINATE ANY POWER OUTAGES WITH THE OWNER. POWER OUTAGES, IF REQUIRED, SHALL BE PLANNED TO OCCUR DURING HOURS WHEN THE ZOO IS CLOSED.
- PROVIDE HIGH POWER TRANSMITTERS BETWEEN THE EAST AND WEST POLE CIRCUITS AS INDICATED ON THE PLANS.
- LIGHTING EQUIPMENT PROVIDER/MANUFACTURER SHALL PROVIDE COMMISSIONING SERVICES FOR THE LIGHTING CONTROL SYSTEM.
- ALL LIGHT FIXTURES, POLES, AND CONTROLLERS SHALL BE FURNISHED BY CZS AND INSTALLED BY CONTRACTOR.
- CONTRACTOR SHALL INSPECT, INSTALL, AND TEST ALL MATERIALS FURNISHED BY CZS.
- ALL OUTLET CONTROLLERS, DRIVERS, ANTENNAS, ETC. SHALL BE INSTALLED BY FIXTURE MANUFACTURER.
- OBTAIN LIGHTING CONTROL SCHEDULES FROM CZS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL THE ABOVE AND BELOW GROUND UTILITIES, EVEN THOUGH THEY MAY NOT APPEAR ON THE PLANS. ANY DAMAGE DONE TO THE EXISTING UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- CONSULT AND COORDINATE WITH ALL TRADES AND AUTHORITIES INVOLVED TO AVOID INTERFERENCE WITH EXISTING AND NEW UNDERGROUND UTILITIES.
- ALL CONDUIT, EQUIPMENT AND APPURTENANCES ARE ILLUSTRATED DIAGRAMMATICALLY. THE ACTUAL LOCATIONS IN THE FIELD SHALL MEET THE APPROVAL OF THE ENGINEER.
- WHERE THE CONTRACTOR'S EXCAVATION MEETS AN OBSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE OWNER FOR DIRECTIONS IN WRITING PRIOR TO FURTHER EXCAVATION. THE CONTRACTOR SHALL RESTORE ANY DAMAGE TO EXISTING SYSTEMS OR UTILITIES TO THE SATISFACTION OF THE OWNER. THIS WORK WILL BE CONSIDERED INCIDENTAL TO THIS CONTRACT.



LOCATION MAP
NTS

ENERGY CODE COMPLIANCE:
LIGHTING DESIGN IN COMPLIANCE WITH IECC 2015. ALL SITE LIGHTING TO BE CONTROLLED VIA TIME ASTRONOMICAL TIME CLOCK PER SECTIONS 405.2.5.1 & 2.
ALL SITE LIGHTING POWER IS INDEPENDENT OF ANY ENERGY SERVICES THRU A BUILDING AND IS CONSIDERED STREET LIGHTING; THEREFORE IT IS EXEMPT FROM REQUIREMENTS OF SECTION 405.5 EXTERIOR LIGHTING POWER DENSITIES. LIGHTING CONTROLLERS SHALL BE PROGRAMMED TO TURN PATHWAY LIGHTING OFF AT SUNRISE AND ON AT SUNSET WITH A 30% REDUCTION IN LIGHT OUTPUT BETWEEN MIDNIGHT AND 6AM.

Drawing List

Client Company	Chicago Zoological Society	ESD Project #	52640
Client Contact	STEVE RAASCH	Last Updated	8/24/2017
Project Name	Brookfield Zoo Site Lighting Expansion II		

Index Number	Drawing Number	Scale	Sheet Name	CAD File Name:	Issued For: Owner Review	Date: 08/04/17	Issued For: Bid & Permit	Date: 08/24/17	Issued For:	Date:	Issued For:	Date:	Issued For:	Date:
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Electrical														
E0.0	NTS		DRAWING LIST GENERAL NOTES	EG_01	X	X								
E0.1	NTS		SYMBOL LIST AND SPECIFICATIONS	EG_01	X	X								
E0.2	NTS		WIRING DIAGRAM	EG_01	X	X								
E0.3	NTS		VOLTAGE DROP DIAGRAM	EG_01	X	X								
E0.4	NTS		PANEL SCHEDULES	EG_01	X	X								
E0.5	NTS		DETAILS SHEET 1	EG_01	X	X								
E0.6	NTS		DETAILS SHEET 2	EG_02	X	X								
E1.0	1/16"=1'-0"		SITE LIGHTING NORTH ENTRANCE NORTH OF 31ST ST. RUN	EL_Site	X	X								
E1.1	1/16"=1'-0"		SITE LIGHTING NORTH ENTRANCE SOUTH OF 31ST ST. RUN	EL_Site	X	X								
E1.2	1/16"=1'-0"		SITE LIGHTING PACHYDERM BLDG SOUTH RUN 1/3	EL_Site	X	X								
E1.3	1/16"=1'-0"		SITE LIGHTING PACHYDERM BLDG SOUTH RUN 2/3	EL_Site	X	X								
E1.4	1/16"=1'-0"		SITE LIGHTING PACHYDERM BLDG SOUTH RUN 3/3	EL_Site	X	X								
E1.5	1/16"=1'-0"		SITE LIGHTING EAST MALL NORTH AND SOUTH RUNS	EL_Site	X	X								
E1.6	1/16"=1'-0"		SITE LIGHTING DISCOVERY CENTER RUNS	EL_Site	X	X								

Total Number of Drawings

14

14

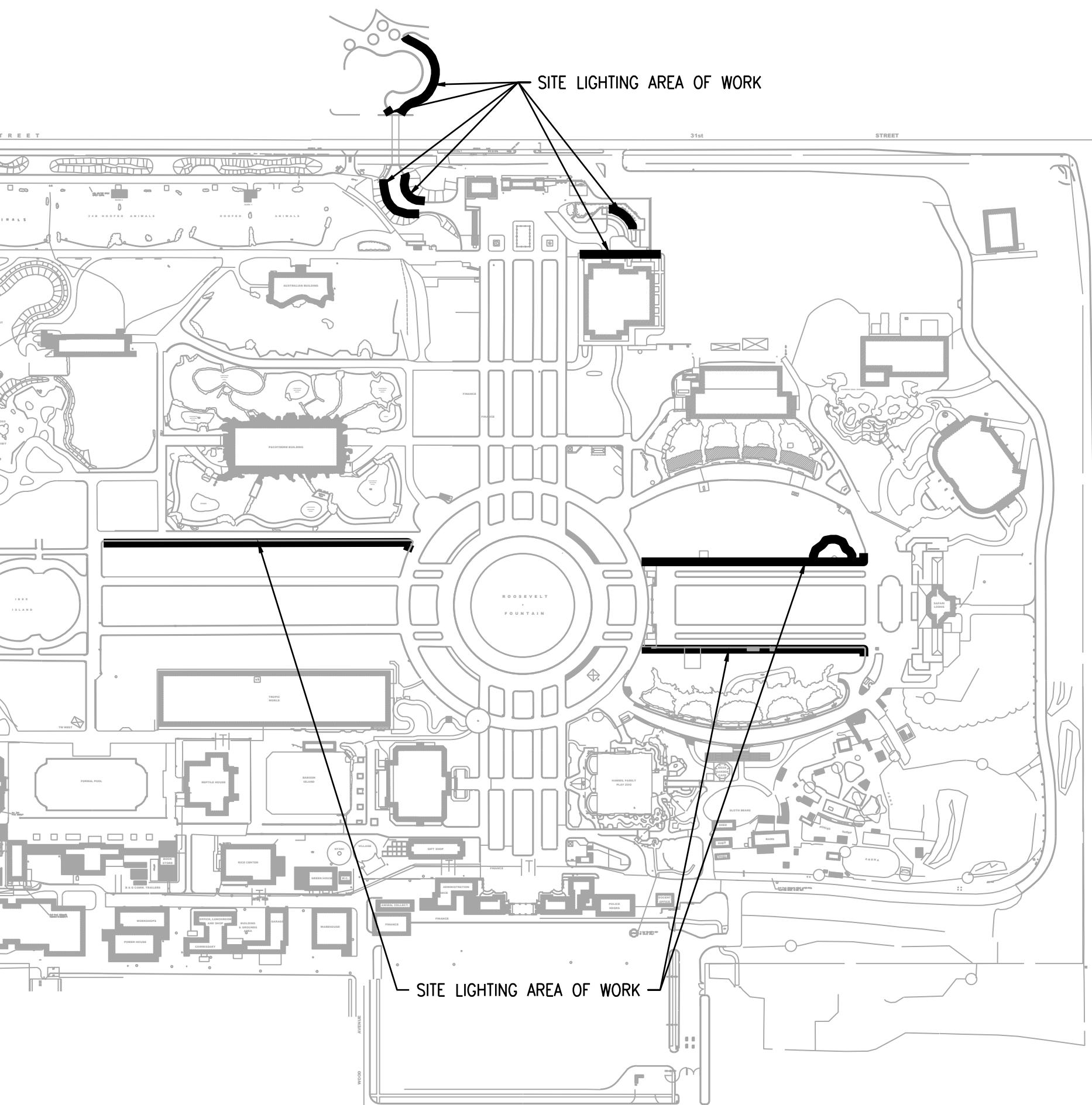
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DRAWING LIST NTS



KEY PLAN
NTS

2	ISSUED FOR BID & PERMIT	08/24/17
1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

Brookfield Zoo Site Lighting Expansion II

COVER SHEET DRAWING LIST GENERAL NOTES

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER EO.0

SCALE
NTS

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3300 GOLF RD
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Chicago, Illinois 60604
312 372 1200 fax 312 372 1222
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ABBREVIATIONS		ONE-LINE ELECTRICAL DIAGRAM SYMBOL	
CB	CIRCUIT BREAKER		GROUND
CCT	CIRCUIT		CIRCUIT BREAKER-(3-POLE, UNO)
CO	CONDUIT ONLY		CONTACTOR
CZS	CHICAGO ZOOLOGICAL SOCIETY		
DISC	DISCONNECT		SINGLE THROW SWITCH
DN	DOWN		FUSE
EM	EMERGENCY		
GEC	GROUNDING ELECTRODE COND		
GFI	GROUND FAULT INTERRUPTER		
GRD	GROUND		
LIGHTING			
JB	JUNCTION BOX		STREET LIGHT W/ DUPLEX RECEPTACLE P# - INDICATES POLE NUMBER X - INDICATES CKT NUMBERS
KVA	KILOVOLT AMP		STREET FLOOD LIGHT P# - INDICATES POLE NUMBER X - INDICATES CKT NUMBERS
KW	KILOWATT		
MCB	MAIN CIRCUIT BREAKER		
LTC	LIGHTING		
MLO	MAIN LUGS ONLY		
NIC	NOT IN CONTRACT		
NTS	NOT TO SCALE		
PNL	PANEL		
PRI	PRIMARY		
SEC	SECONDARY		
SPDT	SINGLE POLE DOUBLE THROW		
SW	SWITCH		
T	TIMER CONTROLLED RECP		
UG	UNDERGROUND		
UNO	UNLESS NOTED OTHERWISE		
WAP	WIRELESS ACCESS POINT		
WP	WEATHERPROOF (NEMA 4X)		
SWITCHES			
			SINGLE POLE SWITCH. THE NUMBER DENOTES CIRCUIT NUMBER AND THE LETTER "o" SWITCH CONTROL
RECEPTACLES			
			SINGLE RECEPTACLE
			DUPLEX RECEPTACLE: "GFI" INDICATES GROUND FAULT INTERRUPTER, "W.P." INDICATES "WHILE IN USE" WEATHER PROOF COVER
			DOUBLE DUPLEX RECEPTACLE
RACEWAYS AND WIREWAYS			
			PULL BOX OR TAP JUNCTION BOX FOR POWER FEEDERS
			JUNCTION BOX
CONDUIT			
			CONDUIT RUN CONCEALED IN SLAB OR BELOW GRADE
			CONDUIT SEAL
			GROUND WIRE
			CONDUIT TERMINATION, STUB OUT
			UNDERGROUND ELECTRICAL RACEWAY
PANELBOARDS			
			SURFACE MOUNTED PANEL

PART I - ELECTRICAL WORK

- 1.1 GENERAL CONDITIONS
 - 1.2 ELECTRICAL INSTALLATION
 - A. THE WORD "PROVIDE" MEANS "THE CONTRACTOR SHALL FURNISH AND INSTALL."
 - B. PROVIDE ALL LABOR AND MATERIALS NECESSARY FOR A COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEM AND INSTALLATION.
 - C. MATERIALS AND INSTALLATION SHALL COMPLY WITH OWNER STANDARDS AND ALL CODES, LAWS, AND ORDINANCES OF FEDERAL, STATE, AND LOCAL GOVERNING BODIES HAVING JURISDICTION.
 - D. ALL MATERIALS AND EQUIPMENT SHALL BE LISTED AND/OR LABELED BY UL, ETL, CSA, OR ANOTHER CITY CODE RECOGNIZED TESTING LABORATORY.
 - E. SECURE AND PAY FOR ALL PERMITS, GOVERNMENTAL FEES TAXES AND LICENSES NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF ALL ELECTRICAL WORK.
 - F. PREPARE AND SUBMIT TO OWNER, GOVERNMENTAL AGENCIES, AND LOCAL CODE OFFICIALS, SHOP DRAWINGS AND/OR INSTALLATION DETAILS WHICH ARE REQUIRED BY THESE AGENCIES FOR THEIR REVIEW AND APPROVAL.
 - G. NOTIFY THE OWNER IN WRITING OF ANY MATERIALS, INSTALLATIONS OR APPARATUS BELIEVED TO BE INADEQUATE, UNSUITABLE, IN VIOLATION OF LAWS, ORDINANCES, RULES, OR REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION PRIOR TO PURCHASE AND INSTALLATION.
 - H. CAREFULLY EXAMINE THE CONTRACT DOCUMENTS AND MAKE A SCHEDULED ARRANGEMENT WITH THE OWNER TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH EXISTING CONDITIONS RELATING TO THE WORK. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF THE OBLIGATIONS OF THE CONTRACT AND REFERENCES NOTED ABOVE.
 - I. NUMBERED CIRCUITS SHOWN ON PLAN ARE FOR THE CONVEYANCE OF DESIGN INTENT ONLY. ACTUAL FIELD CONDITIONS MAY AFFECT CIRCUITRY. INDICATE THE ACTUAL (AS-BUILT) CIRCUIT NUMBERS INSTALLED AND PANELBOARD ORIGINATION ON THE "AS-BUILT" DRAWINGS.
 - J. WHERE CONDUIT RACEWAY SYSTEMS ARE SHOWN ON THE DRAWINGS, IT IS SHOWN DIAGRAMMATICALLY. THE EXACT ROUTING OF THE EXISTING CONDUIT RACEWAY SYSTEMS SHALL BE DETERMINED ON THE JOB SITE BY THE CONTRACTOR.
 - K. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS. IN THE EVENT THAT MORE STRINGENT REQUIREMENTS THAN THOSE DESCRIBED HEREIN ARE SET FORTH UNDER EFFECTIVE UPDATED CODES, LAWS, AND ORDINANCES OF FEDERAL, STATE, AND LOCAL GOVERNING BODIES HAVING JURISDICTION, THE GREATER REQUIREMENTS SHALL BE COMPLIED WITH. SUBMIT WRITTEN STATEMENT OF COMPLIANCE, EXCLUSIONS AND EXEMPTIONS IF ANY, TO ARCHITECT/ENGINEER AND BUILDING OWNER PRIOR TO FINAL BID ACCEPTANCE.
 - L. EXISTING CONDITIONS OF ALL EXISTING EQUIPMENT, DEVICES, FIXTURES, AND SYSTEMS THAT REQUIRE REWIRING, REUSE, RELOCATION, OR REFURBISHING AS PER DRAWINGS AND SPECIFICATIONS SHALL BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF ANY WORK TO BE COMPLETELY OPERATIONAL. CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT AND ITEMIZED LISTING OF ALL EXISTING UNSUITABLE CONDITIONS.
 - M. SUBMIT THE WRITTEN STATEMENT TO THE OWNER PRIOR TO WORK. IN THE EVENT THAT THE CONTRACTOR COMMENCES WORK WITHOUT SUBMITTAL, ASSUME ALL RESPONSIBILITY AND COST TO MAINTAIN THE ABOVE IN GOOD WORKING ORDER AND CONDITION.
 - N. WHERE THE INSTALLATION OF NEW CONSTRUCTION SURFACES OR MATERIALS RENDERS AN EXISTING JUNCTION BOX, PULL BOX OR OTHER ELECTRICAL EQUIPMENT INACCESSIBLE, RELOCATE THESE ITEMS TO MAINTAIN THE REQUIRED ACCESSIBILITY.
 - O. VERIFY CLEARANCES FOR ALL ELECTRICAL WORK BEFORE PROCEEDING WITH CONSTRUCTION. COORDINATE USAGE OF AVAILABLE SPACE WITH THE OWNER. IN THE EVENT OF CONFLICTS, NOTIFY THE OWNER BEFORE PROCEEDING WITH THE WORK.
 - P. ALL CONDUITS SHALL RUN CONTINUOUS WITHOUT ANY UNDERGROUND SPLICES. SPLICING OF CONDUCTORS WILL BE PERMITTED ONLY IN THE BASE OF THE LIGHTING UNITS AND IN PULL BOXES.
 - Q. LANDSCAPING FLOODLIGHT LUMINAIRES SHALL BE ORIENTED WITH THE OPTICS PERPENDICULAR TO THE LANDSCAPING UNLESS OTHERWISE INDICATED OR DIRECTED BY THE OWNER. THE LUMINAIRES MAY REQUIRE NIGHT-TIME OPTICAL ADJUSTMENT UPON INSPECTION BY THE OWNER.

PART 3 - EXECUTION

- 3.1 SUBMITTALS/AS-BUILTS
 - A. PROVIDE A WRITTEN GUARANTEE THAT THE ELECTRICAL INSTALLATION IS FREE FROM MECHANICAL AND ELECTRICAL DEFECTS. CONTRACTOR SHALL AT THEIR SOLE COST, REPLACE AND/OR REPAIR, TO THE SATISFACTION OF THE OWNER AND TO COMPLY WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, ANY PARTS OF THE INSTALLATION WHICH MAY FAIL WITHIN A PERIOD OF 12 MONTHS FROM CONSTRUCTION WRITTEN ACCEPTANCE, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN MATERIAL, WORKMANSHIP, OR FAILURE TO FOLLOW THE SPECIFICATIONS, MANUFACTURER'S INSTALLATION INSTRUCTIONS AND/OR DRAWINGS. PROVIDE WARRANTIES FOR ALL EQUIPMENT EXPRESSED BY THE MANUFACTURER BEYOND 12 MONTHS.
 - B. SHOP DRAWINGS SHALL INCLUDE MANUFACTURER'S NAMES, CATALOG NUMBERS, PRODUCT LITERATURE, DIAGRAMS, AND OTHER SUCH DESCRIPTIVE DATA AS MAY BE REQUIRED TO IDENTIFY AND REVIEW THE EQUIPMENT. SUBMITTALS SHALL BE IN LOGICAL GROUPS (FOR EXAMPLE ALL LIGHTING FIXTURES). PARTIAL SUBMITTALS WILL NOT BE REVIEWED. SUBSTITUTION OF MATERIALS SUBMITTED IN SHOP DRAWINGS SHALL BE APPROVED BY BUILDING OWNER AND ENGINEER/ARCHITECT IN WRITING PRIOR TO SUBMITTAL. DETERMINATION OF EQUALITY TO BE MADE BY ENGINEER PRIOR TO APPROVAL.
 - C. SUBMIT TWO COPIES OF THE FOLLOWING SHOP DRAWINGS FOR REVIEW:
 - DISTRIBUTION EQUIPMENT AND PANELBOARDS
 - WIRING DEVICES
 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY. SUBMITTALS SHALL BE IN DIGITAL AND WRITTEN FORM. SUBMITTALS SHALL INCLUDE:
 - FAULT CURRENT STUDY REPORT PER IEEE 141 AND 242
 - COORDINATION STUDY INPUT DATA
 - ARC FLASH STUDY REPORT PER NFPA-70E
 - D. PROVIDE AS-BUILT CAD FILES AND TWO HARD COPY AS-BUILT DRAWING SETS AT THE COMPLETION OF THE PROJECT. SUBMIT AS-BUILTS TO THE OWNER. AS-BUILT DRAWINGS SHALL INDICATE EXACT CIRCUIT NUMBERS, LOCATIONS OF ALL EQUIPMENT AND RACEWAY FOR POWER DISTRIBUTION SYSTEMS AS INSTALLED. DRAWING FORMAT FOR AS-BUILTS SHALL BE AUTOCAD DWG FORMAT VERSION 2017 OR HIGHER OR DXF.
 - E. PROVIDE AS-BUILT SINGLE LINE DIAGRAMS.
 - F. PROVIDE OPERATING AND MAINTENANCE MANUALS INCLUDING THE FOLLOWING:
 1. EQUIPMENT RATINGS AND SELECTED OPTIONS.
 2. REQUIRED ROUTINE MAINTENANCE PROCEDURES.
 3. IDENTIFICATION OF QUALIFIED SERVICE AGENCY.
 4. COMPLETE OPERATIONAL NARRATIVE.
 - G. AS-BUILT DOCUMENTS SHALL INCLUDE UPDATE TO SITE ELECTRICAL ONE LINE DIAGRAMS. CONTRACTOR SHALL CONTACT OWNER TO OBTAIN DRAWINGS OF ELECTRICAL DIAGRAMS. UPDATE APPLICABLE SECTIONS OF DIAGRAM AFFECTED BY THIS PROJECT AND INDICATE ON AS-BUILT SUBMITTALS.



Chicago Zoological Society
3300 GOLF RD
BROOKFIELD, IL 60513

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2	ISSUED FOR BID & PERMIT	08/24/17
1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

Brookfield Zoo
Site Lighting Expansion II

SYMBOL LIST AND SPECIFICATIONS	
PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SCHEMATIC NNTS
	E0.1

KEYNOTES

1 20A, GFCI RECEPTACLE WITH WP WHILE IN USE COVER.
ALTERNATE RECEPTACLE HOT CONNECTION BETWEEN PHASES FROM
POLE TO POLE AS INDICATED ON THE PLANS.



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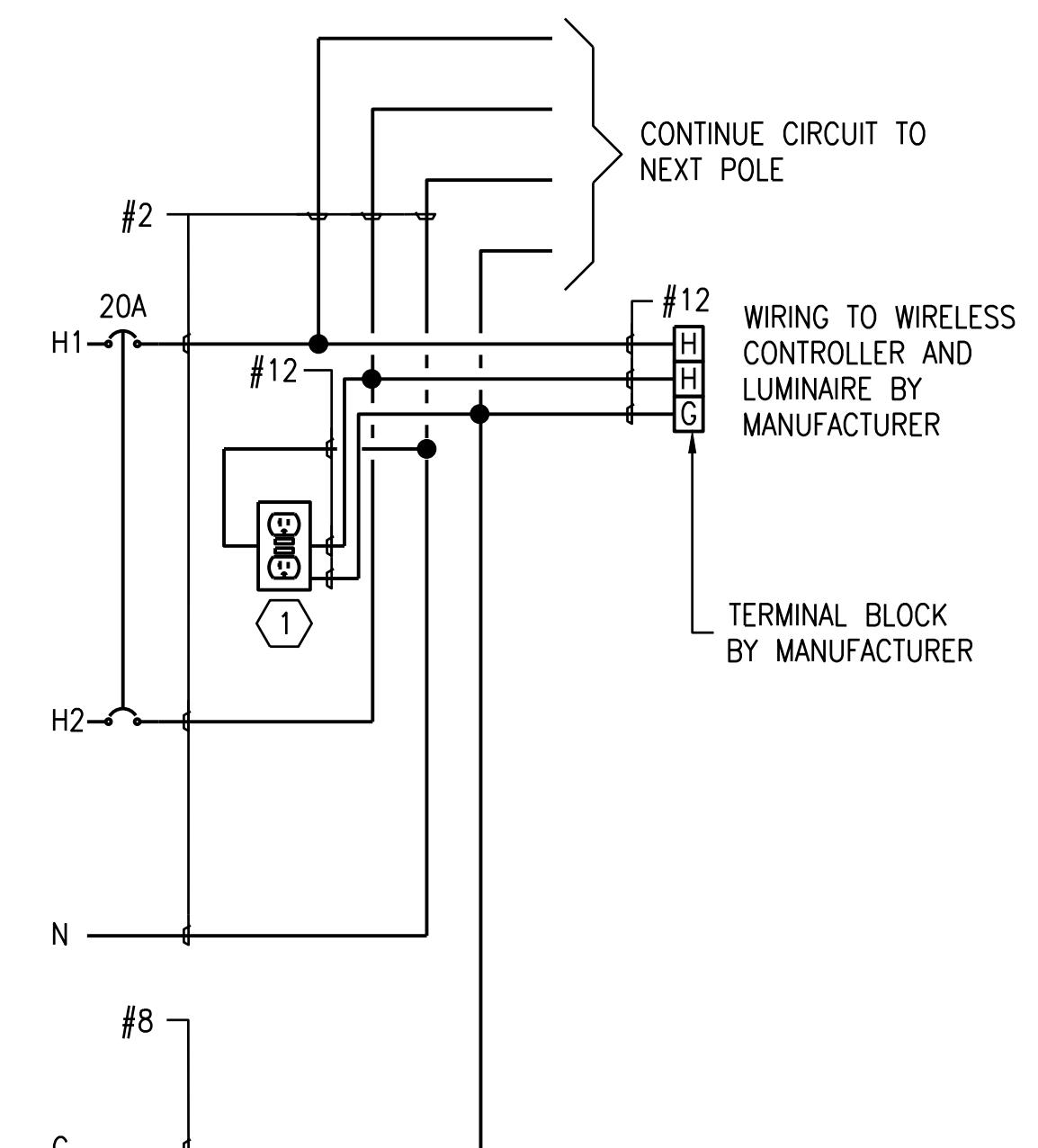
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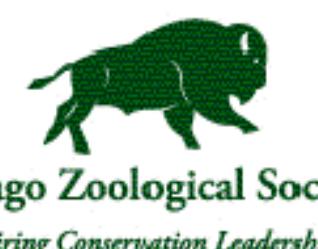
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Brookfield Zoo Site Lighting Expansion II

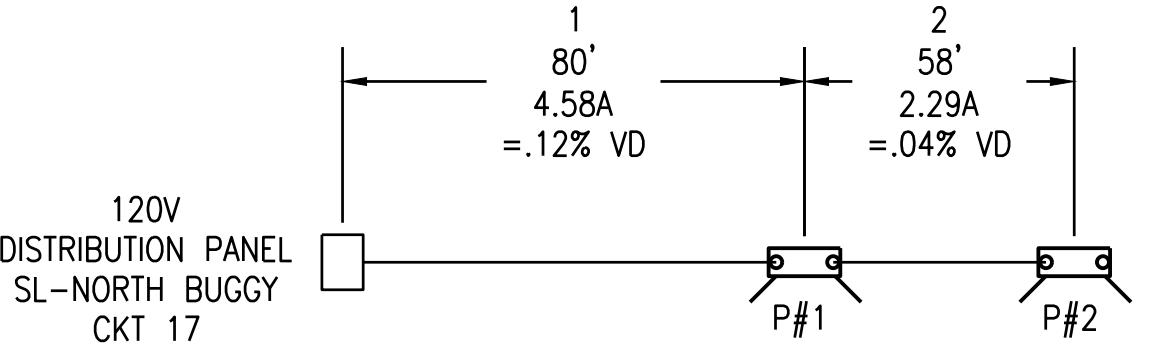
WIRING DIAGRAM

1 LIGHT POLE WIRING DIAGRAM

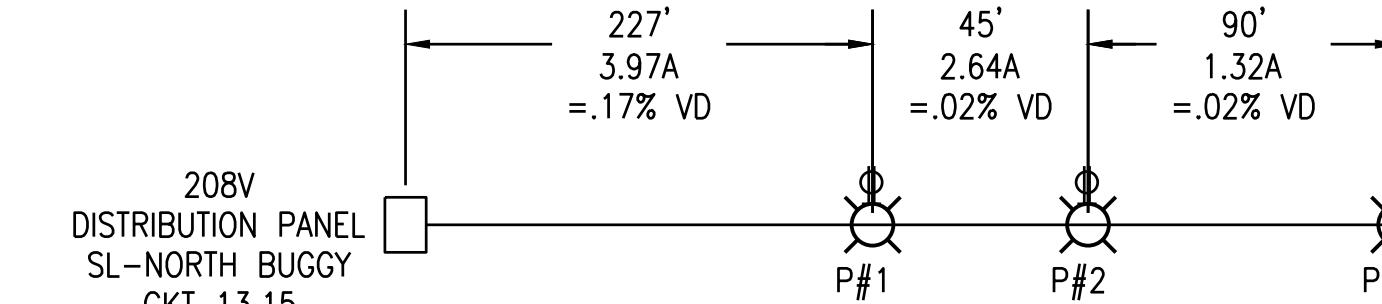
PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER
SCALE NTS	E0.2



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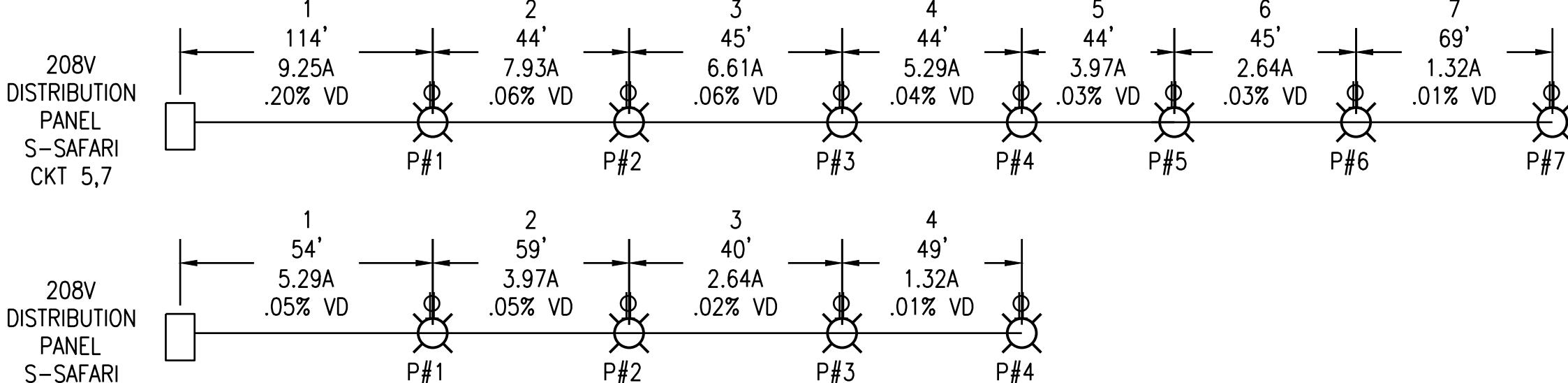


VOLTAGE DROP CKT 17
1 -.12% VD
2 -.04% VD
TOTAL = .16% VD

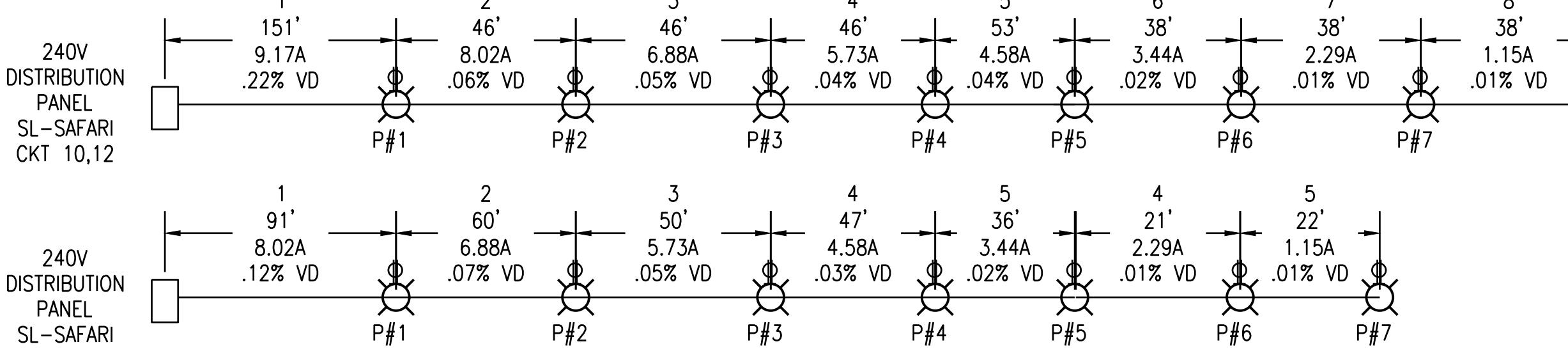


VOLTAGE DROP CKT 13,15
1 -.17% VD
2 -.02% VD
3 -.02% VD
TOTAL = .21% VD

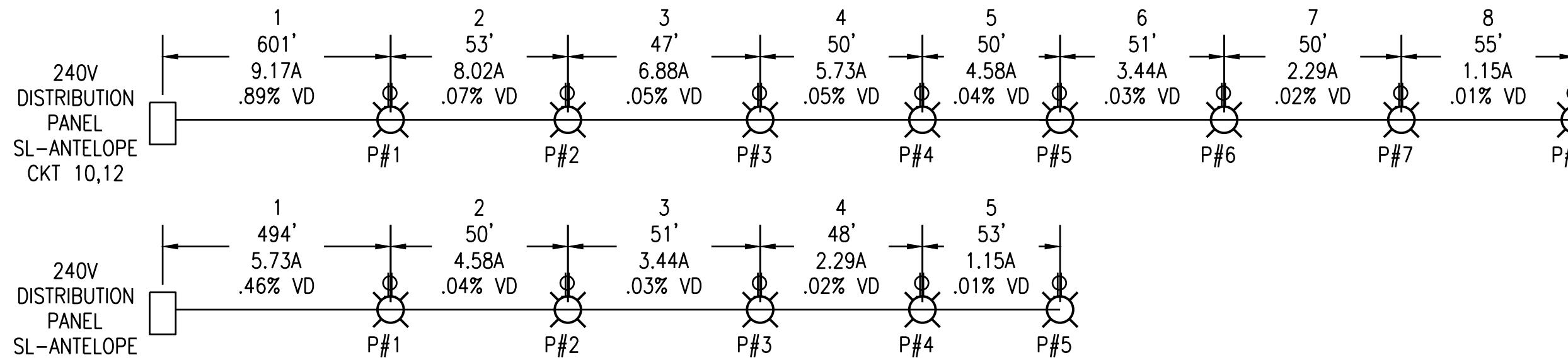
7 DISCOVERY CENTER PLANTERS RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



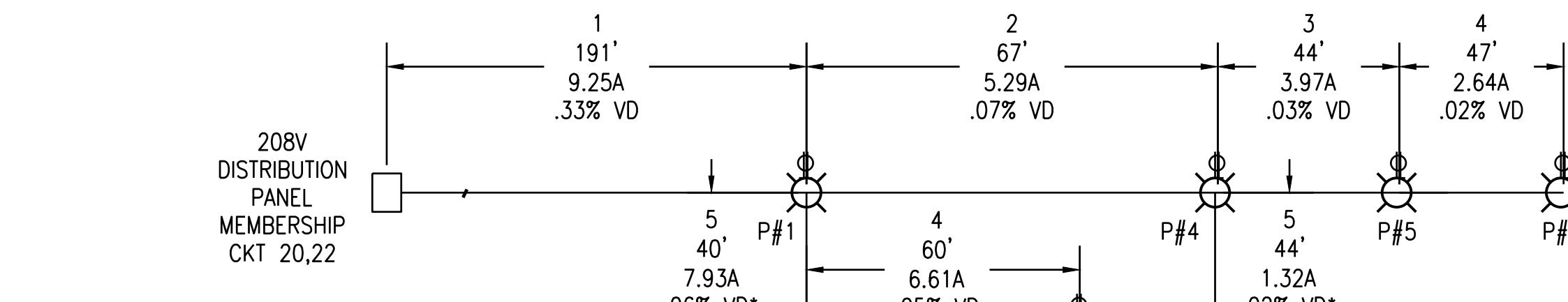
5 EAST MALL SOUTH RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



4 EAST MALL NORTH RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



3 PACHYDERM BLDG SOUTH RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



VOLTAGE DROP CKT 5,7
1 -.20% VD
2 -.06% VD
3 -.06% VD
4 -.04% VD
5 -.02% VD
6 -.03% VD
7 -.01% VD
TOTAL = .43% VD

VOLTAGE DROP CKT 1,3
1 -.05% VD
2 -.05% VD
3 -.02% VD
4 -.01% VD
5 -.01% VD
6 -.03% VD
7 -.01% VD
TOTAL = .13% VD

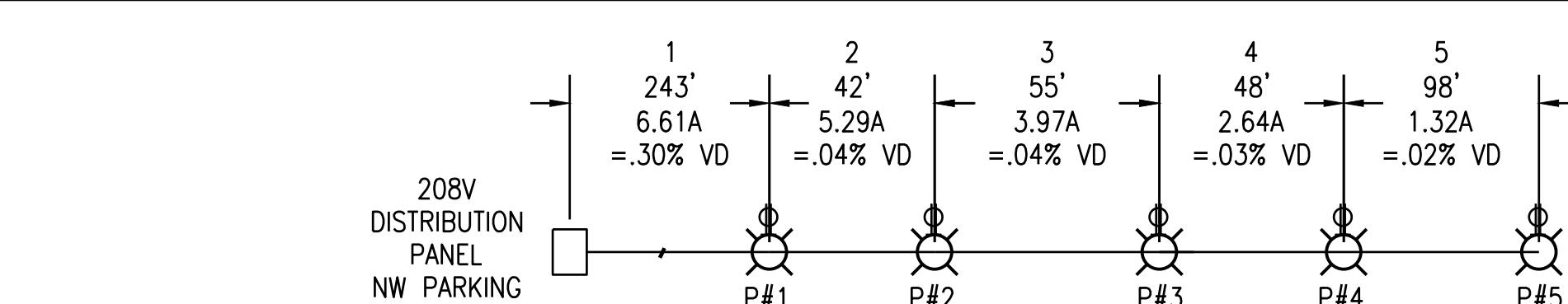
VOLTAGE DROP CKT 9,11
1 -.12% VD
2 -.07% VD
3 -.05% VD
4 -.03% VD
5 -.02% VD
6 -.01% VD
7 -.01% VD
8 -.01% VD
TOTAL = .30% VD

VOLTAGE DROP CKT 10,12
1 -.22% VD
2 -.06% VD
3 -.05% VD
4 -.04% VD
5 -.04% VD
6 -.02% VD
7 -.01% VD
8 -.01% VD
TOTAL = .46% VD

VOLTAGE DROP CKT 10,12
1 -.89% VD
2 -.07% VD
3 -.05% VD
4 -.05% VD
5 -.04% VD
6 -.03% VD
7 -.02% VD
8 -.01% VD
TOTAL = .55% VD

VOLTAGE DROP CKT 9,11
1 -.46% VD
2 -.04% VD
3 -.03% VD
4 -.02% VD
5 -.01% VD
6 -.01% VD
7 -.02% VD
8 -.01% VD
TOTAL = 1.15% VD

2 NORTH ENTRANCE SOUTH OF 31ST ST. RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



VOLTAGE DROP CKT 4,6
1 -.30% VD
2 -.04% VD
3 -.04% VD
4 -.03% VD
5 -.02% VD
TOTAL = .43% VD

1 NORTH ENTRANCE NORTH OF 31ST ST. RUN VOLTAGE DROP DIAGRAM
NOT TO SCALE



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Site Lighting
Expansion II

**VOLTAGE
DROP
DIAGRAMS**

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER EO.3
SCALE NTS	



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PANELBOARD SCHEDULE									
Designation: NW PARKING MAIN TYPE: MB				MOUNTING: SURFACE OCP TYPE: MOLDED CASE C/B					
Voltage: 208/120V BUS AMPS: 225A				ENCLOSURE: NEMA 4X FAULT DUTY: 10KAIC					
1PH 3W GROUND BUS: YES				NEUTRAL BUS: 100% RATED SPD: NO					
No.	Description	A	B	Size	Size	A	B	Description	No.
1	EXISTING LOAD			20A	20A			EXISTING LOAD	2
3	SPARE			20A	20A				
5	EXISTING LOAD			20A	20A*	688		PATH LTG: NORTH ENTRY NORTH OF 31ST ST.	4
7	EXISTING LOAD			20A	20A				
9	EXISTING LOAD			20A	20A			SPARE	8
11	EXISTING LOAD			20A	20A				
13	EXISTING LOAD			20A	20A			EXISTING LOAD	14
15	EXISTING LOAD			20A	20A				
17	EXISTING LOAD			20A	20A			EXISTING LOAD	16
19	EXISTING LOAD			20A	20A				
21	EXISTING LOAD			20A	20A			EXISTING LOAD	18
23	EXISTING LOAD			20A	20A				
25	EXISTING LOAD			20A	20A			EXISTING LOAD	26
27	EXISTING LOAD			20A	20A				
15	EXISTING LOAD			20A	20A			EXISTING LOAD	16
17	EXISTING LOAD			20A	20A				
19	EXISTING LOAD			20A	20A			EXISTING LOAD	18
21	EXISTING LOAD			20A	20A				
23	EXISTING LOAD			20A	20A			EXISTING LOAD	24
25	EXISTING LOAD			20A	20A				
27	EXISTING LOAD			20A	20A			EXISTING LOAD	28
29	EXISTING LOAD			20A	20A				
Total				688	688	Total			
Total Phase A: 688 VA				Total Connected Load: 1.38 kVA					
Total Phase B: 688 VA				6.62 Amps					

PANELBOARD SCHEDULE									
Designation: SL-SAFARI MAIN TYPE: MB				MOUNTING: SURFACE OCP TYPE: MOLDED CASE C/B					
Voltage: 240/120V BUS AMPS: 225A				ENCLOSURE: NEMA 4X FAULT DUTY: 10KAIC					
1PH 3W GROUND BUS: YES				NEUTRAL BUS: 100% RATED SPD: NO					
No.	Description	A	B	Size	Size	A	B	Description	No.
1	EXISTING LOAD			20A	20A			EXISTING LOAD	2
3	RD SL			80A	80A			EXISTING FRAGILE KINGDOM SL	4
5	EXISTING LOAD			20A*	688	688			
7	EXISTING LOAD			20A	20A			SPARE	6
9	PATH LTG: SAFARI NORTH PLAYGROUND			963	963	20A*			
11	PATH LTG: SAFARI NORTH PLAYGROUND			963	963	20A*			
13	SPACE							SPACE	14
15	SPACE							SPACE	16
17	SPACE								
19	SPACE								
21	SPACE								
23	SPACE								
25	SPACE								
27	SPACE								
29	SPACE								
Total				963	963			1100	1100
Total Phase A: 2063 VA				Total Connected Load: 4.13 kVA					
Total Phase B: 2063 VA				17.19 Amps					

PANELBOARD SCHEDULE									
Designation: S SAFARI MAIN TYPE: MB				MOUNTING: SURFACE OCP TYPE: MOLDED CASE C/B					
Voltage: 208/120V BUS AMPS: 400A				ENCLOSURE: NEMA 4X FAULT DUTY: 10KAIC					
1PH 3W GROUND BUS: YES				NEUTRAL BUS: 100% RATED SPD: NO					
No.	Description	A	B	Size	Size	A	B	Description	No.
1	PATH LTG: SAFARI SOUTHWEST	550	20A*	20A*	90A			SPARE	2
3	PATH LTG: SAFARI SOUTHWEST	550	20A*	90A				SPARE	4
5	PATH LTG: SAFARI SOUTHEAST	963	20A*	60A				SPARE	6
7	SPARE	963	20A	20A				SPARE	8
9	SPARE			20A	20A			EXISTING LOAD	10
11	SPARE			20A	20A				12
13	SPARE			20A	20A			EXISTING LOAD	14
15	SPARE			20A	20A			EXISTING LOAD	16
17	SPARE			20A	20A			EXISTING LOAD	18
19	SPARE			20A	20A			EXISTING LOAD	20
21	SPARE			20A	20A			EXISTING LOAD	22
23	SPARE			20A	20A			EXISTING LOAD	24
25	SPARE			20A	20A			EXISTING LOAD	26
27	EXISTING LOAD			20A	20A			EXISTING LOAD	28
29	SPARE			20A	20A			EXISTING LOAD	30
31	SPARE			20A	20A				32
33	SPARE			20A	20A				34
35	SPARE			20A	20A				36
37	SPARE			20A	20A				38
39	SPARE			20A	20A				40
41	SPARE			20A	20A				42
Total				1513	1513			0	0
Total Phase A: 1513 VA				Total Connected Load: 3.03 kVA					
Total Phase B: 1513 VA				14.55 Amps					



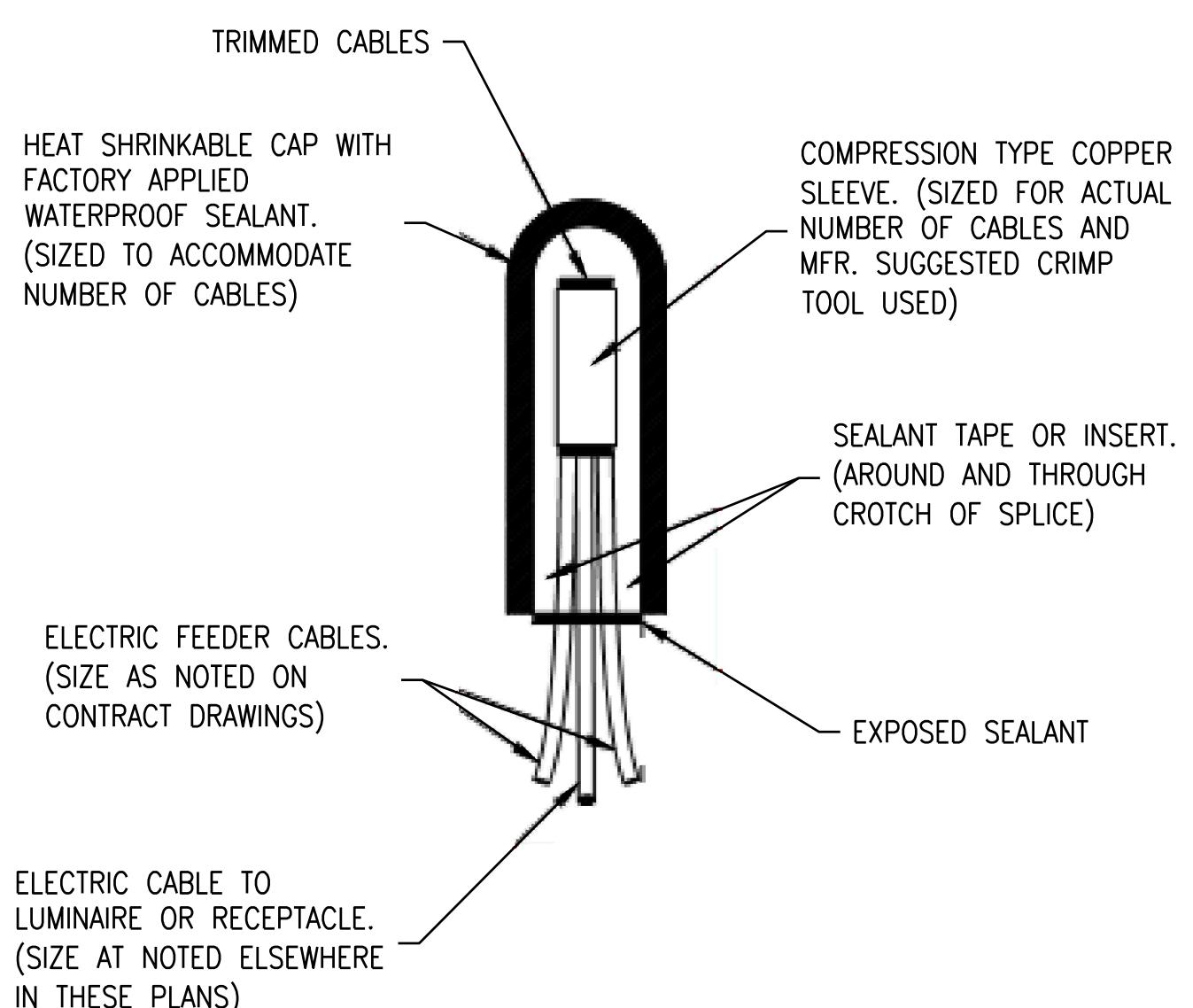
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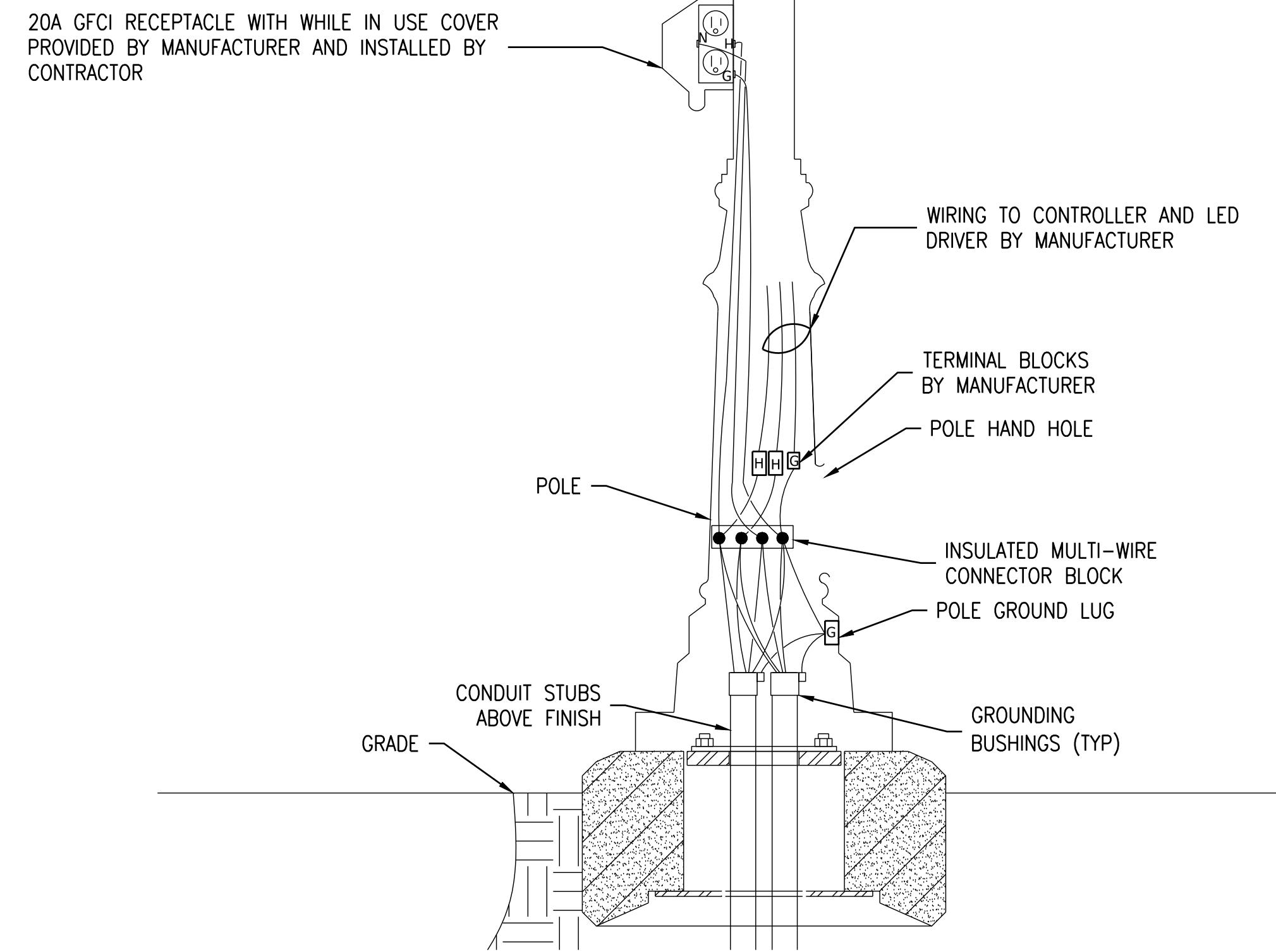
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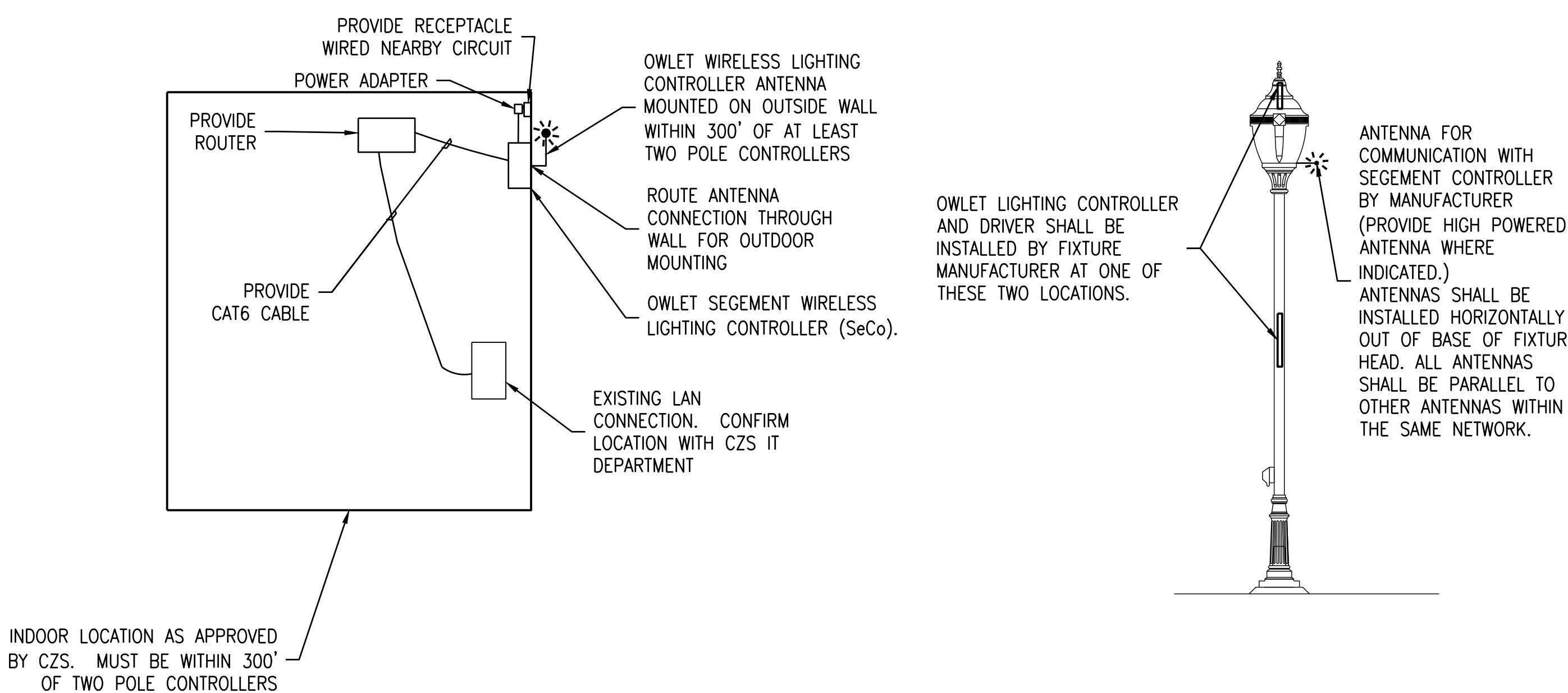
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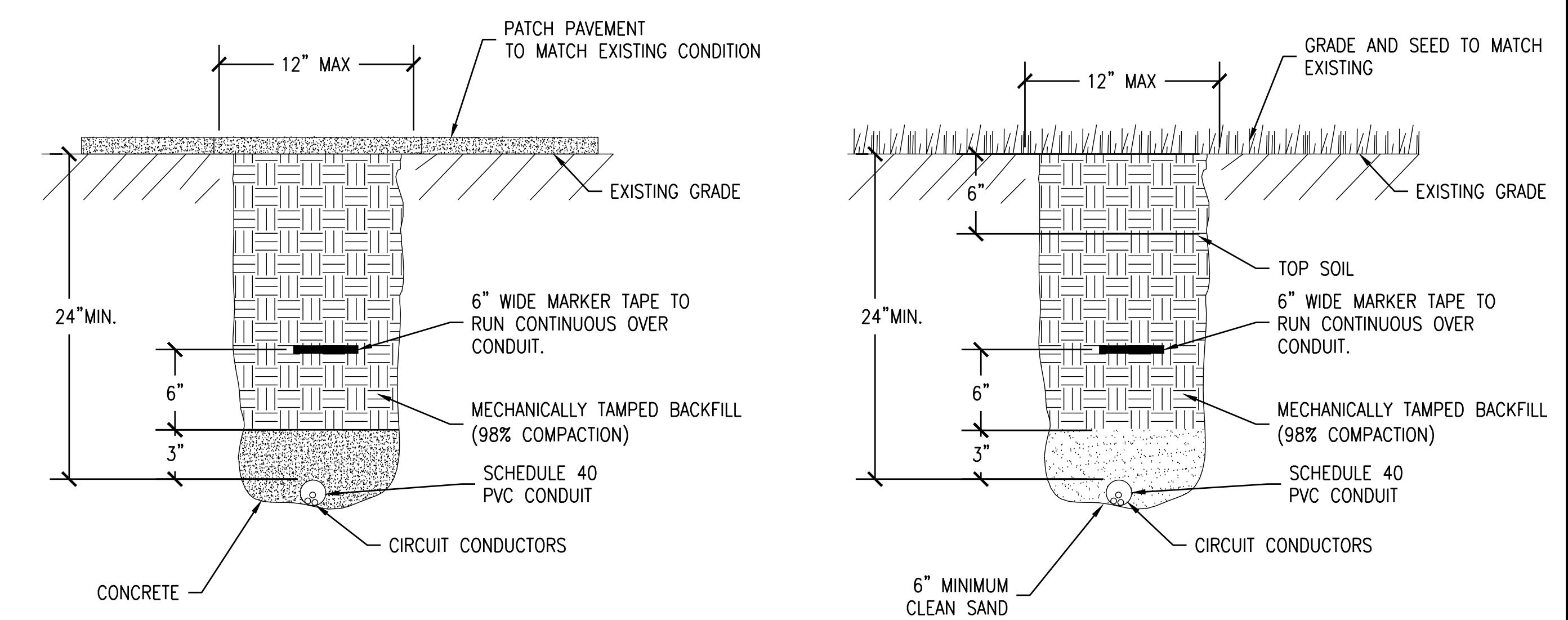
4 TYPICAL SPICE DETAIL
NTS



2 LIGHT POLE ELECTRICAL WIRING DETAIL
NTS



3 SECO LIGHTING CONTROL CONNECTION DETAIL
NTS



1 TRENCH DETAILS
NTS

NOTE:
WHERE MORE THAN ONE CONDUIT IS INSTALLED IN THE TRENCH, PROVIDE THE PROPER MARKER TAPE OVER EACH CONDUIT.

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NO.	RECORD	DATE

Brookfield Zoo Site Lighting Expansion II

DETAILS SHEET 1

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SCHEMATIC NUMBER E0.5
SCALE NTS	

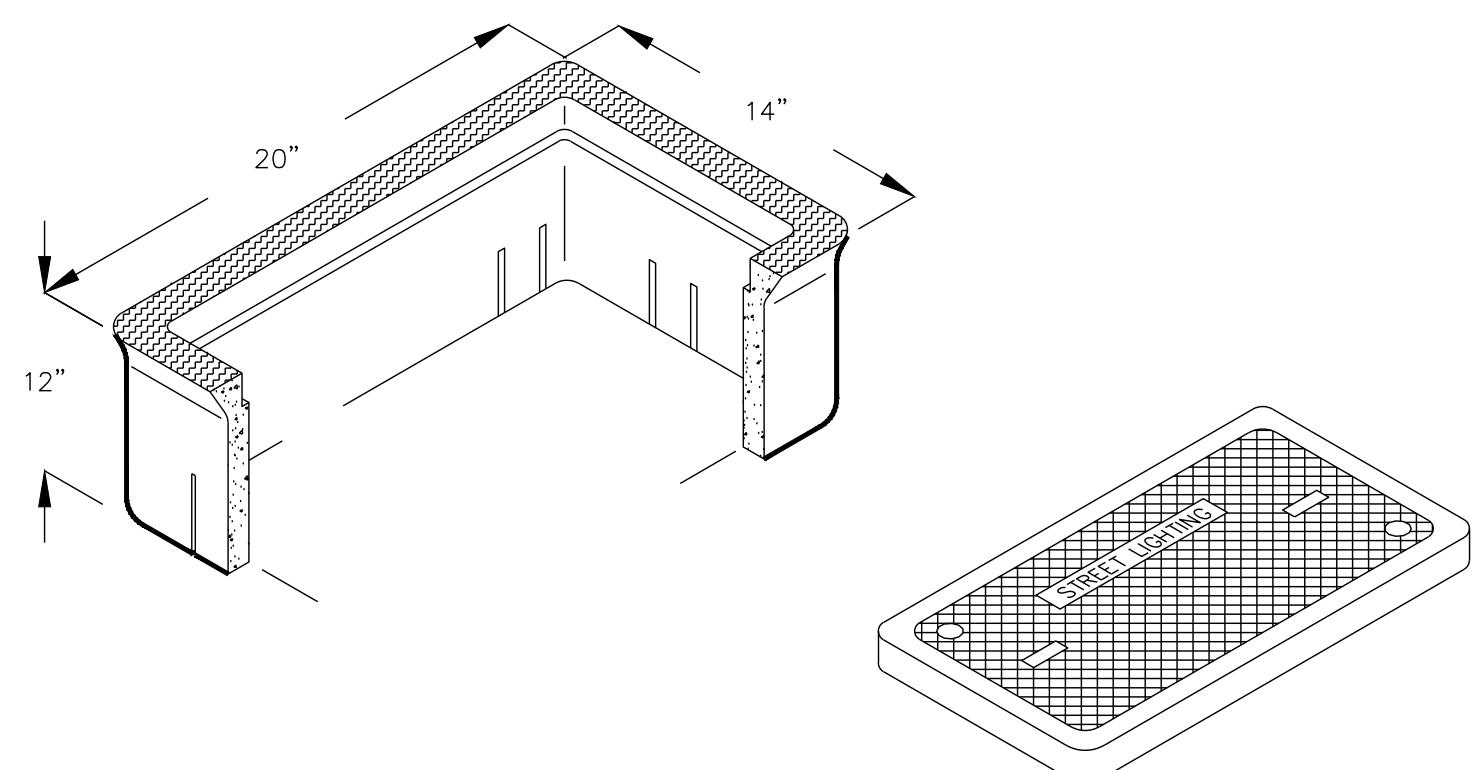


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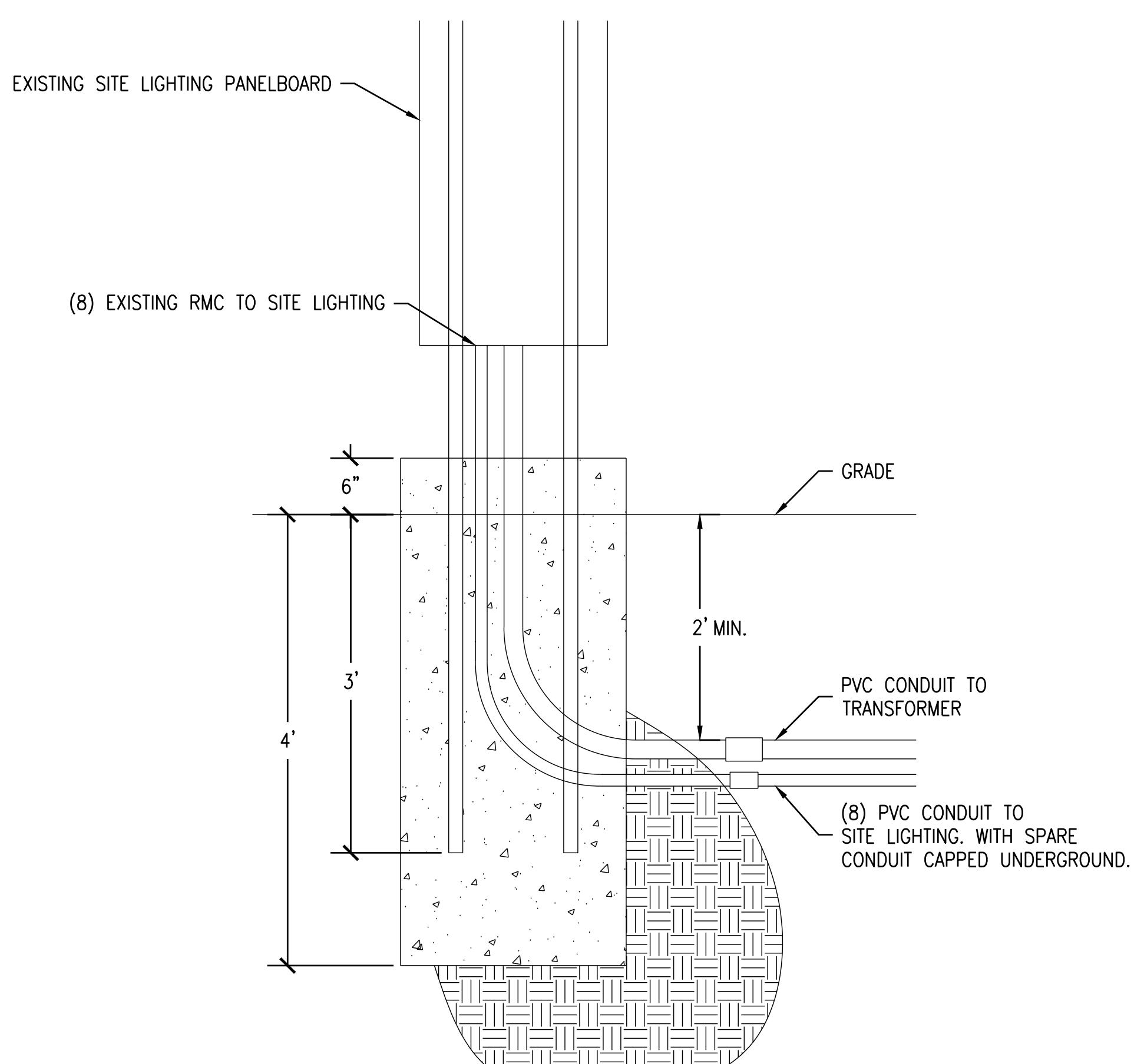


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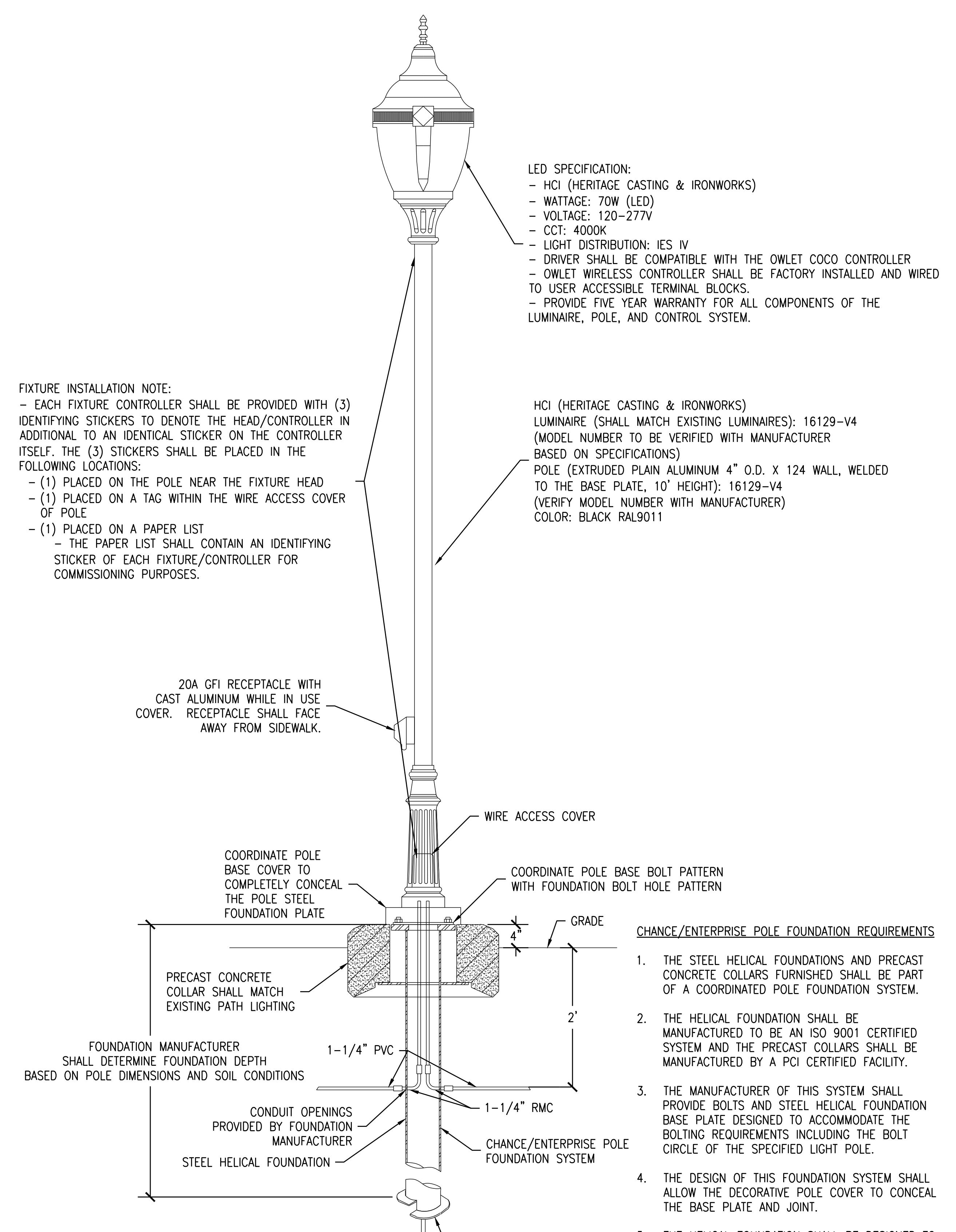


-HIGH DENSITY REINFORCED CONCRETE
-NON-METALIC COVER
-PULL AND JUNCTION BOX
-PROVIDE 6 INCHES OF CRUSHED ROCK
UNDER JUNCTION BOX FOR DRAINAGE
-DESIGN LOAD: PEDESTRIAN TRAFFIC

3 PULL BOX DETAIL NTS



2 EXISTING PANELBOARD FOUNDATION DETAIL NTS



Fixture Installation Note:
- EACH FIXTURE CONTROLLER SHALL BE PROVIDED WITH (3) IDENTIFYING STICKERS TO DENOTE THE HEAD/CONTROLLER IN ADDITIONAL TO AN IDENTICAL STICKER ON THE CONTROLLER ITSELF. THE (3) STICKERS SHALL BE PLACED IN THE FOLLOWING LOCATIONS:
- (1) PLACED ON THE POLE NEAR THE FIXTURE HEAD
- (1) PLACED ON A TAG WITHIN THE WIRE ACCESS COVER OF POLE
- (1) PLACED ON A PAPER LIST
- THE PAPER LIST SHALL CONTAIN AN IDENTIFYING STICKER OF EACH FIXTURE/CONTROLLER FOR COMMISSIONING PURPOSES.

LED SPECIFICATION:
- HCI (HERITAGE CASTING & IRONWORKS)
- WATTAGE: 70W (LED)
- VOLTAGE: 120-277V
- CCT: 4000K
- LIGHT DISTRIBUTION: IES IV
- DRIVER SHALL BE COMPATIBLE WITH THE OWLET COCO CONTROLLER
- OWLET WIRELESS CONTROLLER SHALL BE FACTORY INSTALLED AND WIRED TO USER ACCESSIBLE TERMINAL BLOCKS.
- PROVIDE FIVE YEAR WARRANTY FOR ALL COMPONENTS OF THE LUMINAIRE, POLE, AND CONTROL SYSTEM.

POLE SPECIFICATION:
LUMINAIRE (SHALL MATCH EXISTING LUMINAIRES): 16129-V4
(MODEL NUMBER TO BE VERIFIED WITH MANUFACTURER
BASED ON SPECIFICATIONS)
POLE (EXTRUDED PLAIN ALUMINUM 4" O.D. X 124 WALL, WELDED
TO THE BASE PLATE, 10' HEIGHT): 16129-V4
(VERIFY MODEL NUMBER WITH MANUFACTURER)
COLOR: BLACK RAL9011

CHANCE/ENTERPRISE POLE FOUNDATION REQUIREMENTS

1. THE STEEL HELICAL FOUNDATIONS AND PRECAST CONCRETE COLLARS FURNISHED SHALL BE PART OF A COORDINATED POLE FOUNDATION SYSTEM.
2. THE HELICAL FOUNDATION SHALL BE MANUFACTURED TO BE AN ISO 9001 CERTIFIED SYSTEM AND THE PRECAST COLLARS SHALL BE MANUFACTURED BY A PCI CERTIFIED FACILITY.
3. THE MANUFACTURER OF THIS SYSTEM SHALL PROVIDE BOLTS AND STEEL HELICAL FOUNDATION BASE PLATE DESIGNED TO ACCOMMODATE THE BOLTING REQUIREMENTS INCLUDING THE BOLT CIRCLE OF THE SPECIFIED LIGHT POLE.
4. THE DESIGN OF THIS FOUNDATION SYSTEM SHALL ALLOW THE DECORATIVE POLE COVER TO CONCEAL THE BASE PLATE AND JOINT.
5. THE HELICAL FOUNDATION SHALL BE DESIGNED TO SUPPORT THE POLE WITH SPECIFIED LUMINAIRE USING SOIL DATA AND POLE CATALOG CUTS PROVIDED BY THE POLE MANUFACTURER. DESIGN CALCULATIONS AND SHOP DRAWINGS SHALL BE PROVIDED TO CONFIRM COMPLIANCE TO ALL REQUIREMENTS.
6. PRIOR TO THE INSTALLATION OF THE CONCRETE COLLAR, ENSURE THAT THE SOIL DISRUPTED DURING CONDUIT INSTALLATION HAS BEEN COMPACTED.
7. COLLAR DIAMETER, COLOR, FINISH: MATCH EXISTING

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NO.	RECORD	DATE

Brookfield Zoo Site Lighting Expansion II

DETAILS SHEET 2

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER E0.6
SCALE NTS	

1 LIGHT POLE FOUNDATION DETAIL NTS



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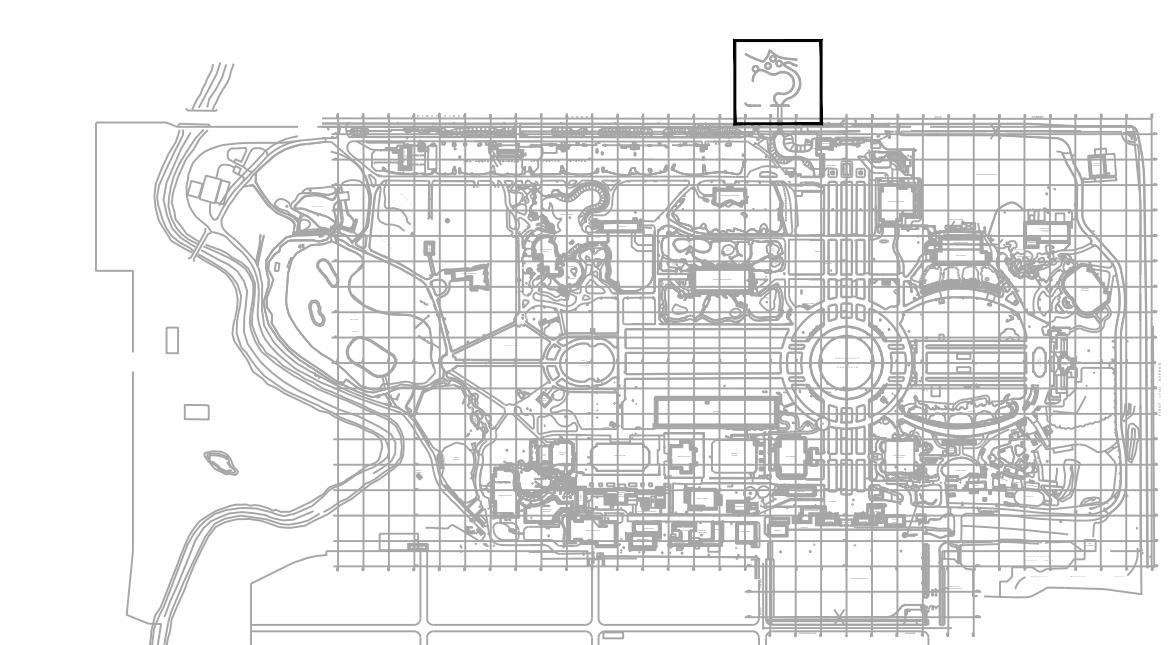
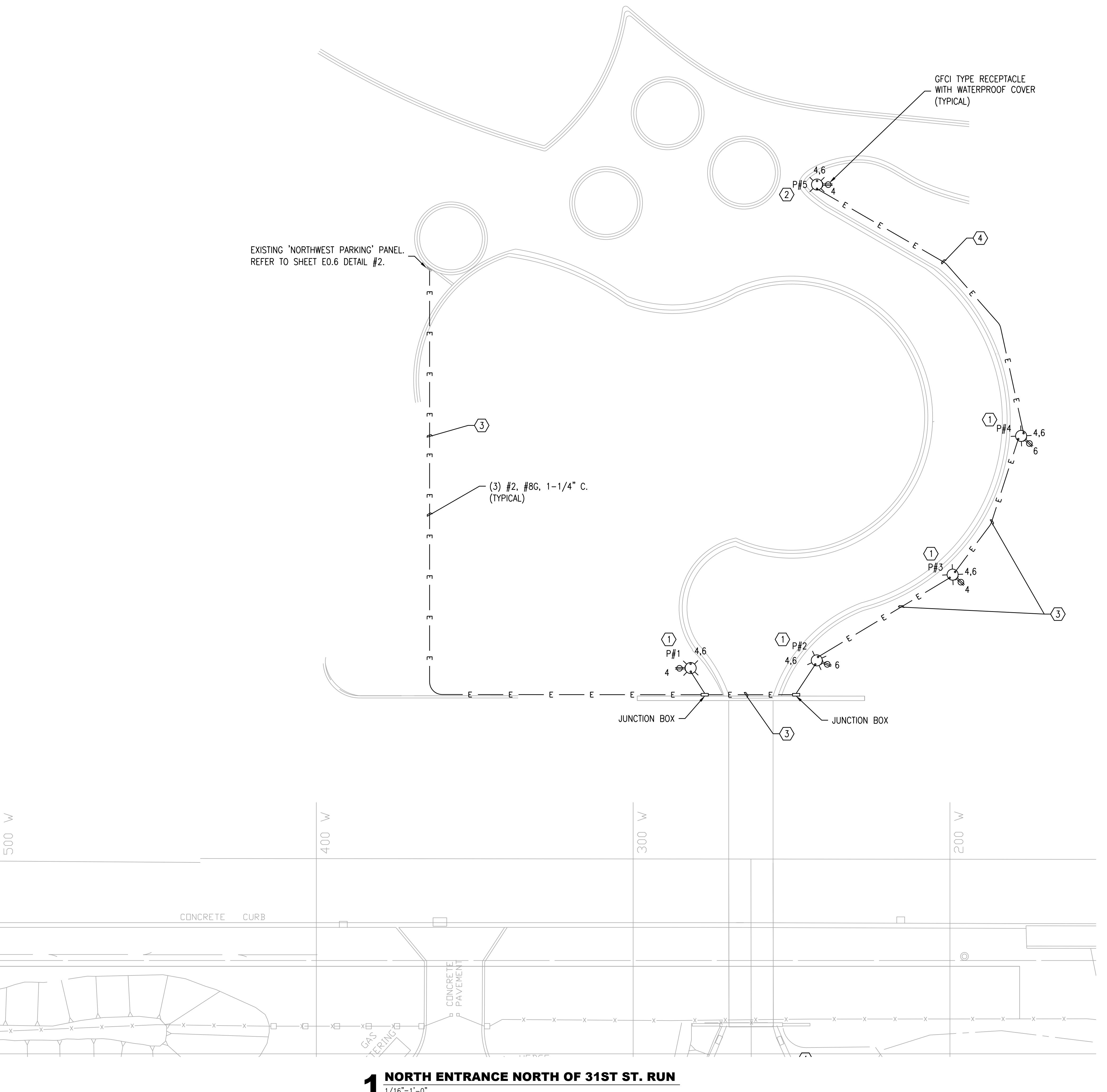
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KEYNOTES:

- ① EXISTING LIGHT FIXTURE AND FOUNDATION TO BE REPLACED. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ③ EXISTING CONDUIT TO REMAIN. EXISTING WIRING TO BE REPLACED. PROVIDE ALTERNATE PRICING TO REPLACE EXISTING CONDUIT IN THE EVENT THE CONDUIT IS INADEQUATE FOR REUSE. TO TEST EXISTING CONDUIT, PULL A MANDREL (1/2" SMALLER IN DIAMETER THAN THE CONDUIT AND 6" LONG) THROUGH EACH CONDUIT PRIOR TO UNDERGROUND CABLE INSTALLATION, FOLLOWED BY A PULLING LINE (1800 LB. MINIMUM TENSILE STRENGTH MULE LINE PREFERRED) WHICH SHALL REMAIN IN EACH DUCT.
- ④ NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.

SHEET NOTES:

1. ALL LIGHT FIXTURES ON THIS PLAN SHALL JOIN THE THE EXISTING SECO NETWORK #991.
2. ALL LUO ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL BE PARALLEL TO EACH OTHER AS WELL AS TO EXISTING ANTENNAS WITHIN SECO NETWORK #991.



**Brookfield Zoo
Site Lighting
Expansion II**

**SITE LIGHTING
NORTH ENTRANCE NORTH
OF 31ST ST. RUN**

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER E1.0
SCALE 1/16" = 1'-0"	



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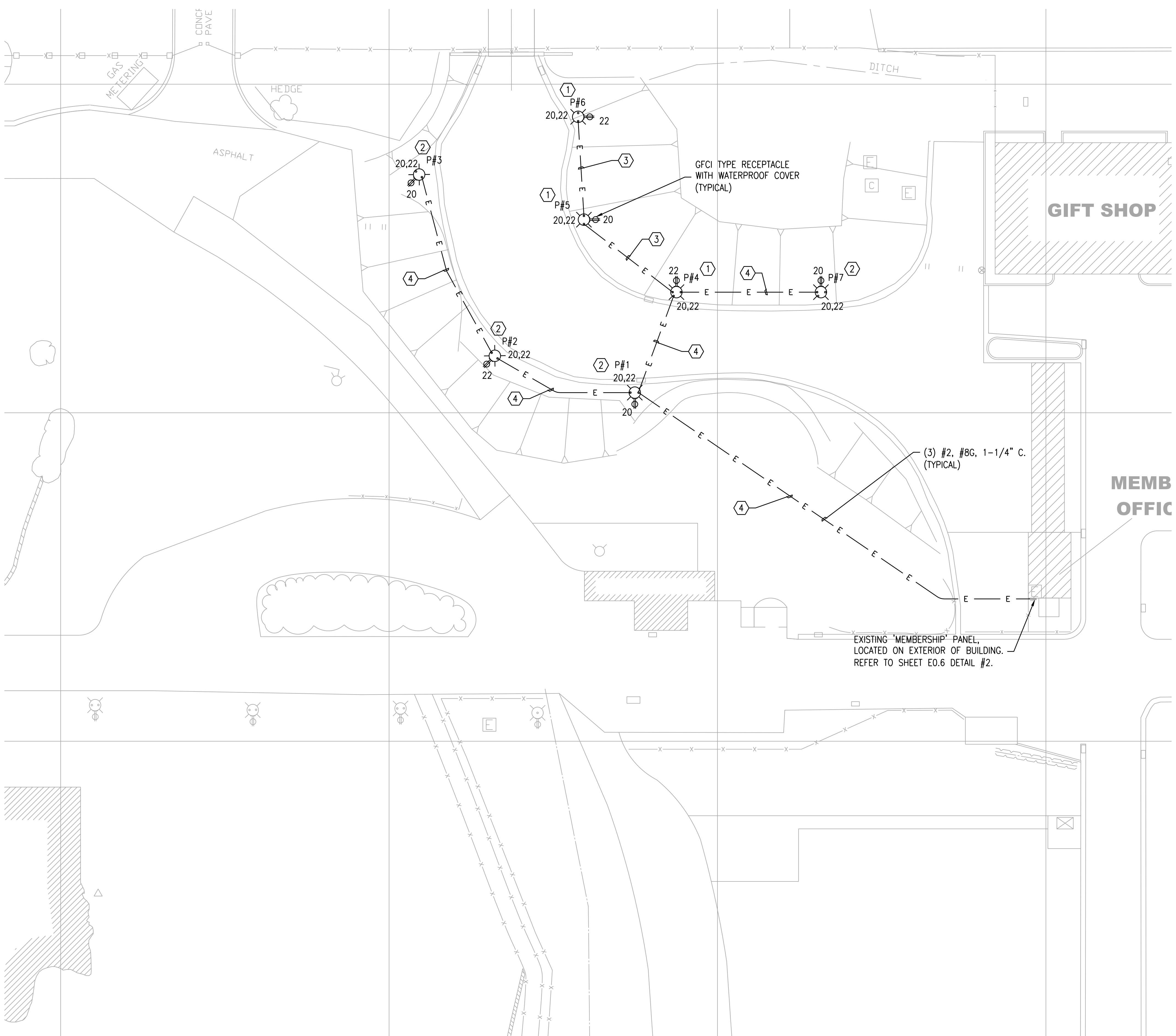
KEYNOTES:

- ① EXISTING LIGHT FIXTURE AND FOUNDATION TO BE REPLACED. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ③ EXISTING CONDUIT TO REMAIN. EXISTING WIRING TO BE REPLACED. PROVIDE ALTERNATE PRICING TO REPLACE EXISTING CONDUIT IN THE EVENT THE CONDUIT IS INADEQUATE FOR REUSE. TO TEST EXISTING CONDUIT, PULL A MANDREL (1/2" SMALLER IN DIAMETER THAN THE CONDUIT AND 6" LONG) THROUGH EACH CONDUIT PRIOR TO UNDERGROUND CABLE INSTALLATION, FOLLOWED BY A PULLING LINE (1800 LB. MINIMUM TENSILE STRENGTH MULE LINE PREFERRED) WHICH SHALL REMAIN IN EACH DUCT.
- ④ NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.

SHEET NOTES:

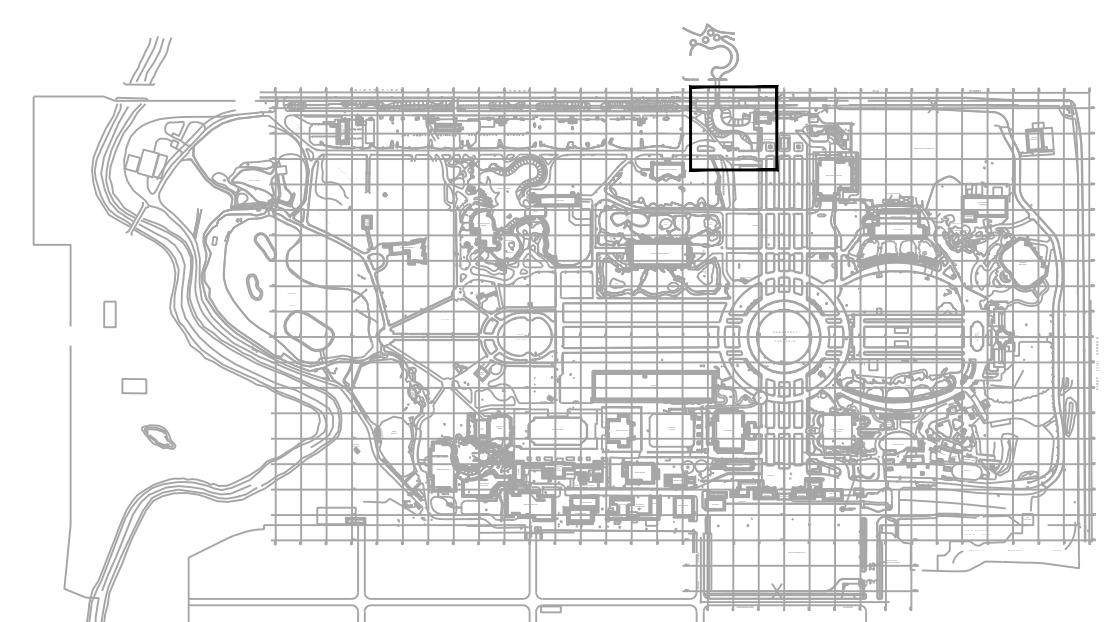
1. ALL LIGHT FIXTURES ON THIS PLAN SHALL JOIN THE THE EXISTING SECO NETWORK #991.

2. ALL LUO ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL BE PARALLEL TO EACH OTHER AS WELL AS TO EXISTING ANTENNAS WITHIN SECO NETWORK #991.



1 NORTH ENTRANCE SOUTH OF 31ST ST. RUN

1/16"=1'-0"



KEYPLAN

2	ISSUED FOR BID & PERMIT	08/24/17
1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

**Brookfield Zoo
Site Lighting
Expansion II**

**SITE LIGHTING
NORTH ENTRANCE SOUTH
OF 31ST ST. RUN**

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER E1.1
SCALE 1/16"=1'-0"	



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ANTELOPE

KEYNOTES:

- ① NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.
- ③ NEW PULL BOX. REFER TO SHEET E0.6 DETAIL #3.

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1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

Brookfield Zoo Site Lighting Expansion II

SITE LIGHTING PACHYDERM BLDG SOUTH RUN 1/3

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER
SCALE 1/16"=1'-0"	E1.2

KEYPLAN

1 PACHYDERM BLDG SOUTH RUN

neilsoft\esdpuna\Brookfield_Zoo\Site_Lighting_Expansion II\DWGS\CAD\Elec\EL_Site.dwg 8/24/2017 9:58 AM tv

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KEYNOTES:

- ① NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.
- ③ NEW PULL BOX. REFER TO SHEET E0.6 DETAIL #3.

SHEET NOTES:

1. ALL LIGHT FIXTURES ON THIS PLAN SHALL JOIN THE THE EXISTING SECO NETWORK #991.

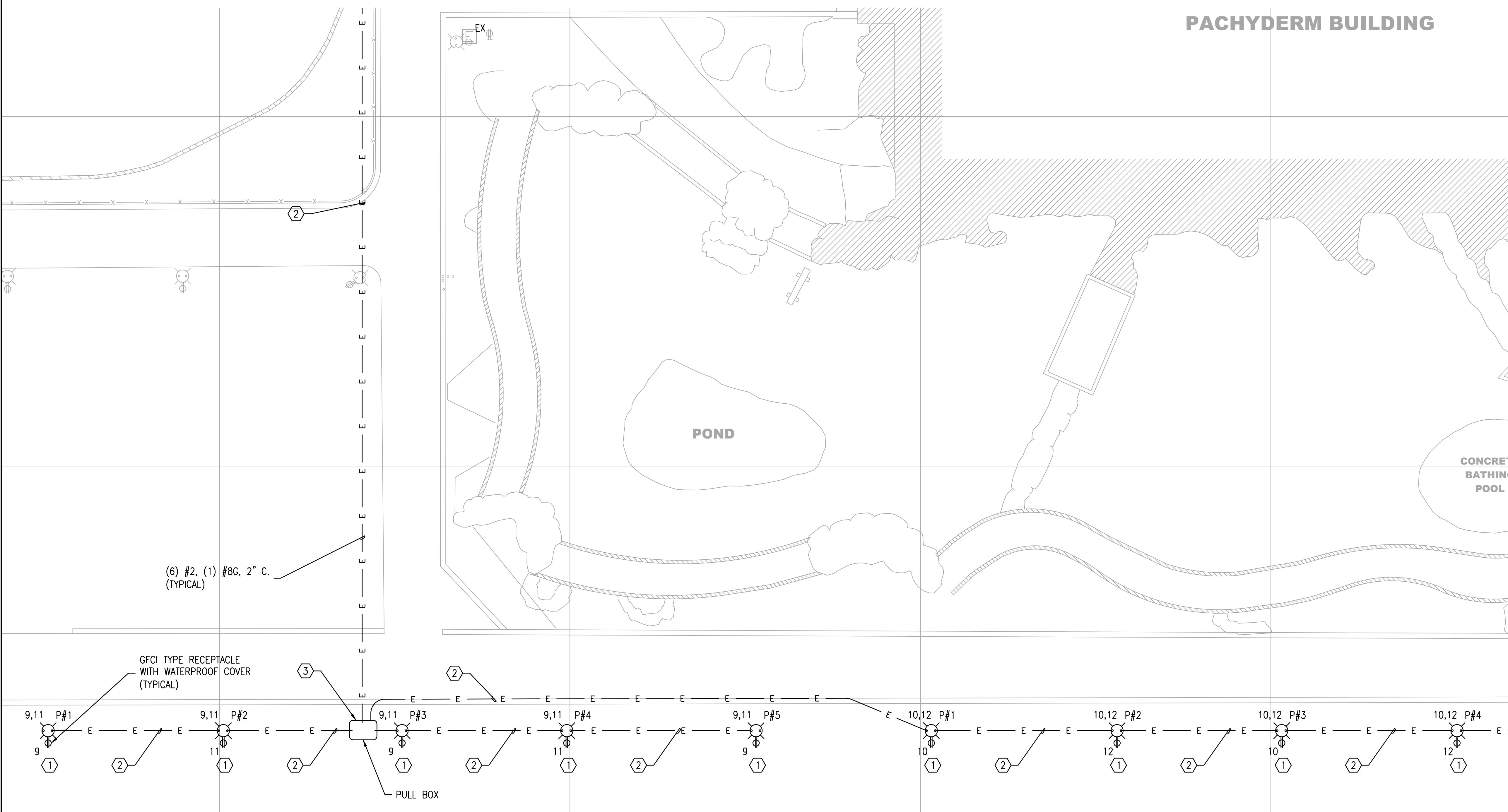
2. ALL LUO ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL BE PARALLEL TO EACH OTHER AS WELL AS TO EXISTING ANTENNAS WITHIN SECO NETWORK #991.



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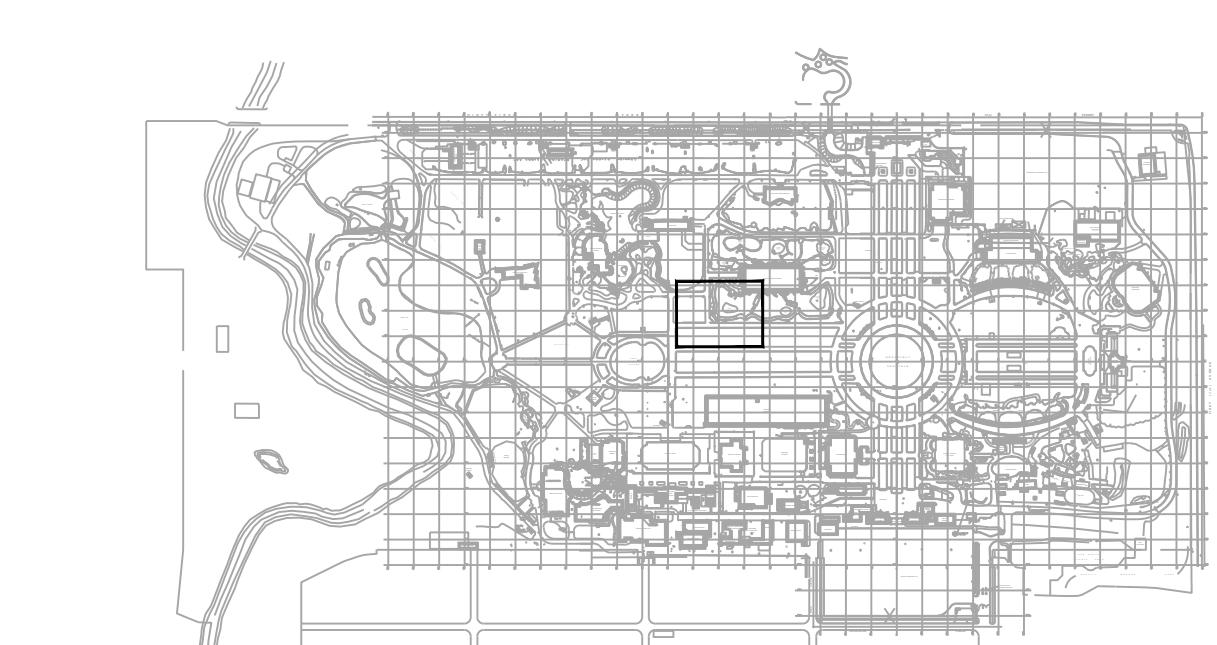
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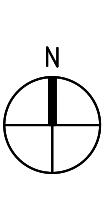
1 PACHYDERM BLDG SOUTH RUN

1/16"=1'-0"

PACHYDERM BUILDING



KEYPLAN



2	ISSUED FOR BID & PERMIT	08/24/17
1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

Brookfield Zoo Site Lighting Expansion II

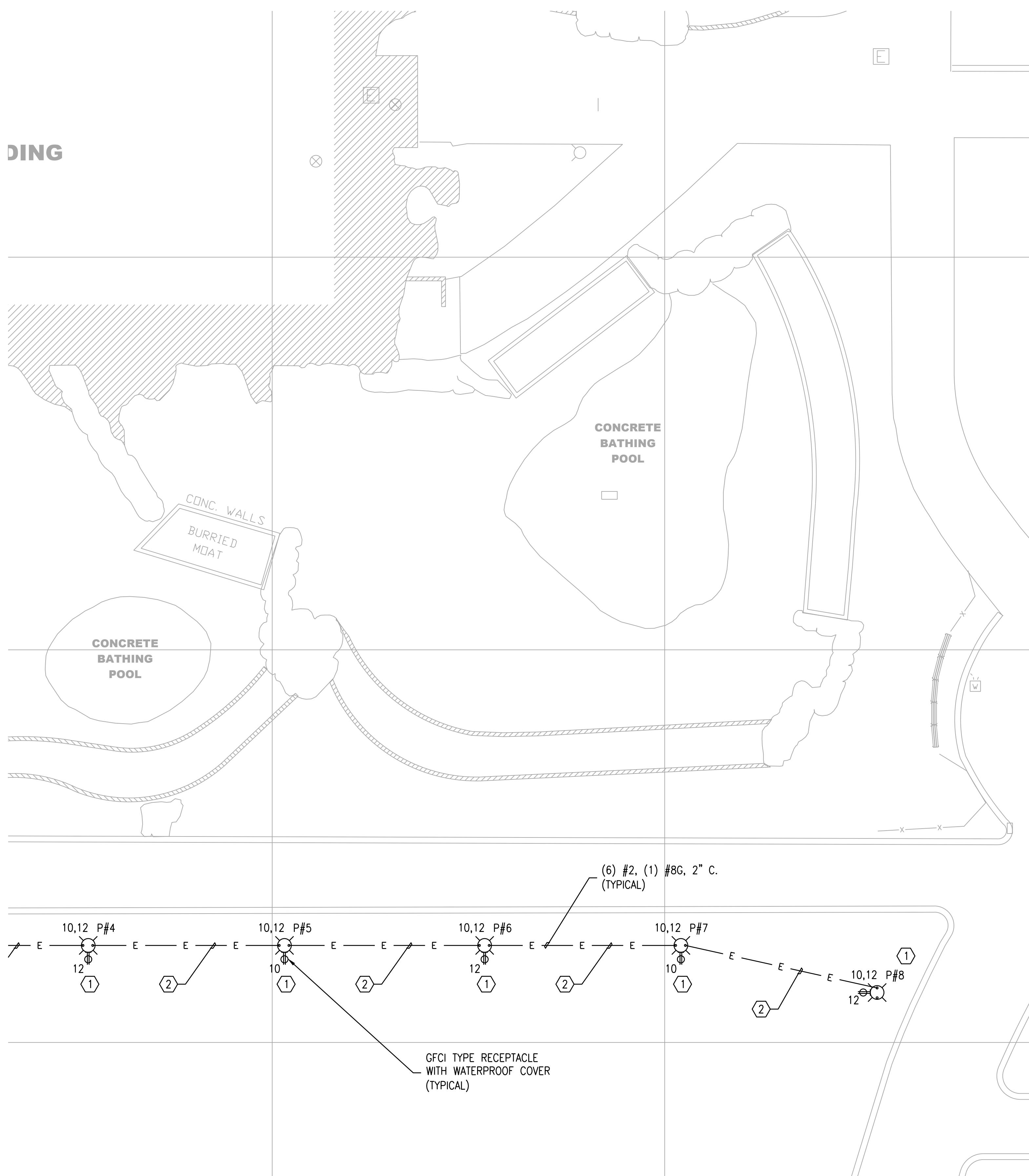
SITE LIGHTING PACHYDERM BLDG SOUTH RUN 2/3

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER E1.3
SCALE 1/16"=1'-0"	

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1 PACHYDERM BLDG SOUTH RUN

1/16"=1'-0"

KEYNOTES:

- ① NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.
- ③ NEW PULL BOX. REFER TO SHEET E0.6 DETAIL #3.

SHEET NOTES:

1. ALL LIGHT FIXTURES ON THIS PLAN SHALL JOIN THE THE EXISTING SECO NETWORK #991.

2. ALL LUOC ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL BE PARALLEL TO EACH OTHER AS WELL AS TO EXISTING ANTENNAS WITHIN SECO NETWORK #991.

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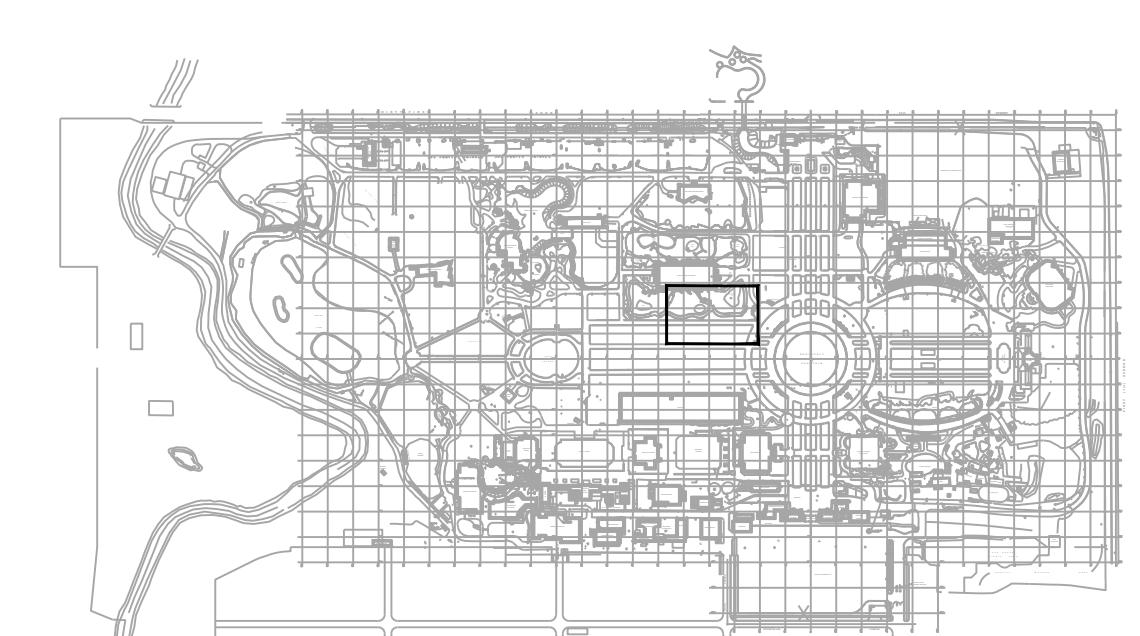


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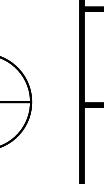
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1	ISSUED FOR OWNER REVIEW	08/04/17
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**Brookfield Zoo
Site Lighting
Expansion II**



KEYPLAN



E1.4

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER
SCALE 1/16"=1'-0"	E1.4

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1	ISSUED FOR OWNER REVIEW	08/04/17
NO.	RECORD	DATE

**Brookfield Zoo
Site Lighting
Expansion II**

**SITE LIGHTING
EAST MALL NORTH
AND SOUTH RUNS**

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	SHEET NUMBER
SCALE 1/16"=1'-0"	E1.5

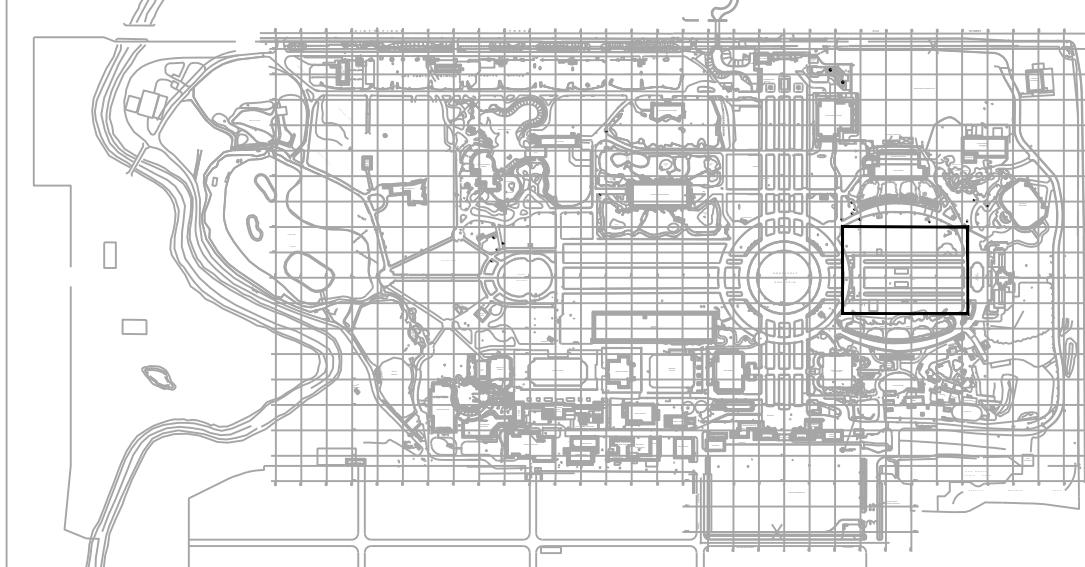
KEYNOTES:

- ① NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ② NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.
- ③ NEW PULL BOX. REFER TO SHEET E0.6 DETAIL #3.
- ④ REFER TO SHEET E0.5 DETAIL #3 FOR SECO DETAILS

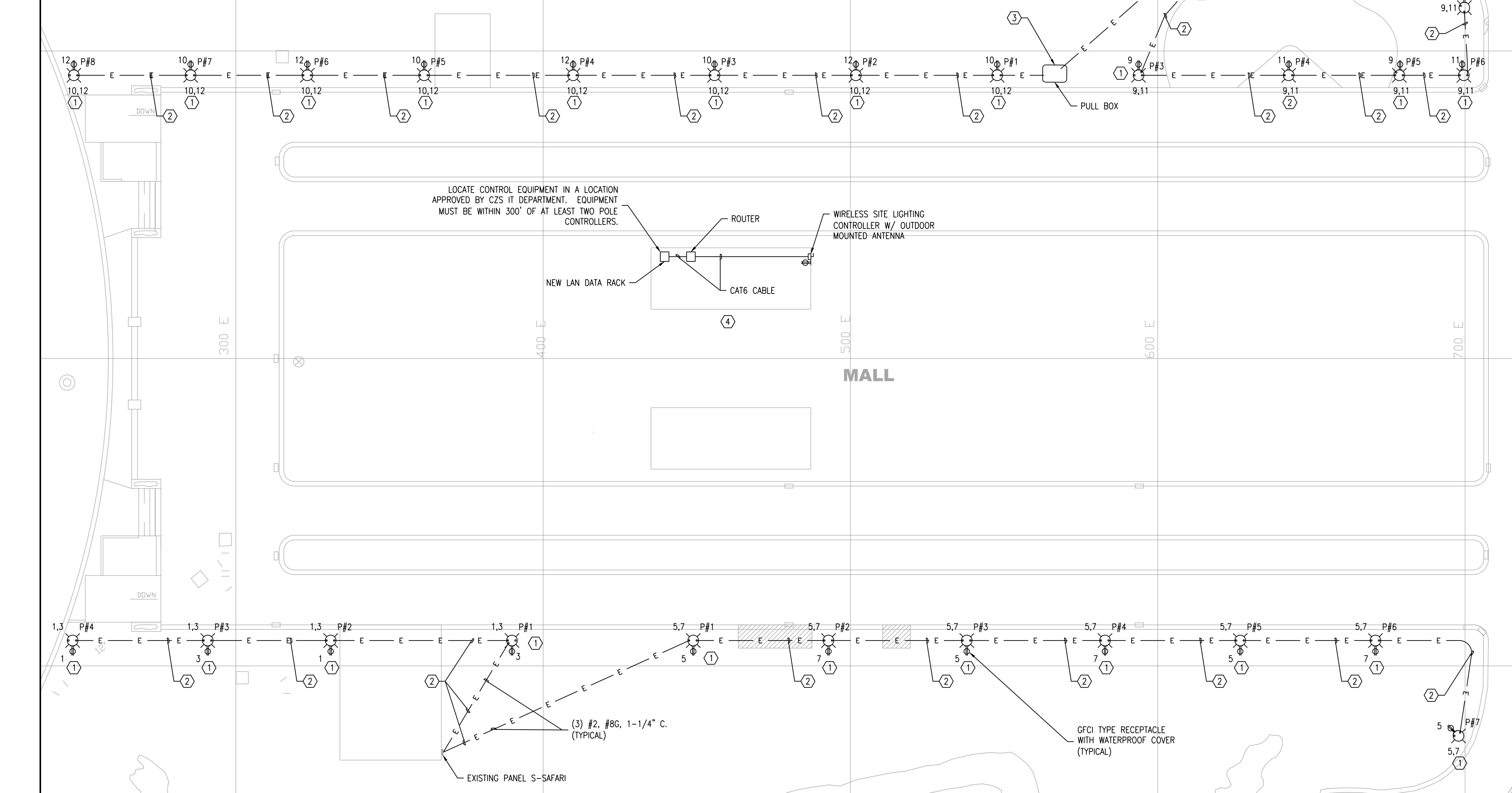
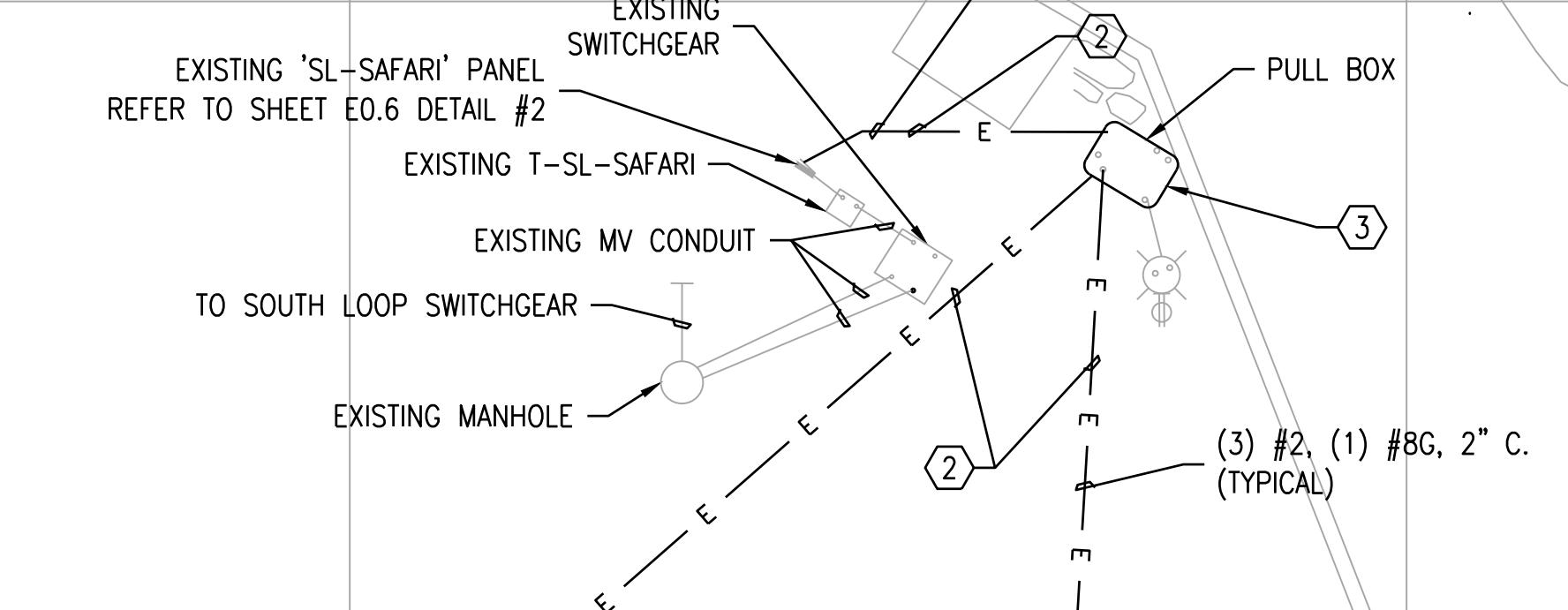
SHEET NOTES:

1. EAST MALL NORTH AND SOUTH RUNS SHALL BOTH BE
CONTROLLER BY A NEW SECO ANTENNA LOCATED ON THE
EXTERIOR ROOF OF THE CONCESSION BUILDING.

2. ALL LUCA ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT
OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL
BE PARALLEL TO EACH OTHER.



KEYPLAN



KEYNOTES:

- ① LIGHTING CIRCUIT SHALL BE CONTROLLED WITH INTERMATIC T7402B 7-DAY TIME CLOCK.
- ② NEW LIGHT FIXTURE. REFER TO SHEET E0.6 DETAIL #1.
- ③ NEW CONDUIT AND WIRING. REFER TO NOTES ON PLAN FOR SIZING.
- ④ NEW JUNCTION BOX

SHEET NOTES:

1. ALL LIGHT FIXTURES ON THIS PLAN SHALL JOIN THE THE EXISTING SECO NETWORK #991.

2. ALL LUO ANTENNAS SHALL BE INSTALLED HORIZONTALLY OUT OF THE BASE OF EACH FIXTURE HEAD. ALL ANTENNAS SHALL BE PARALLEL TO EACH OTHER AS WELL AS TO EXISTING ANTENNAS WITHIN SECO NETWORK #991.



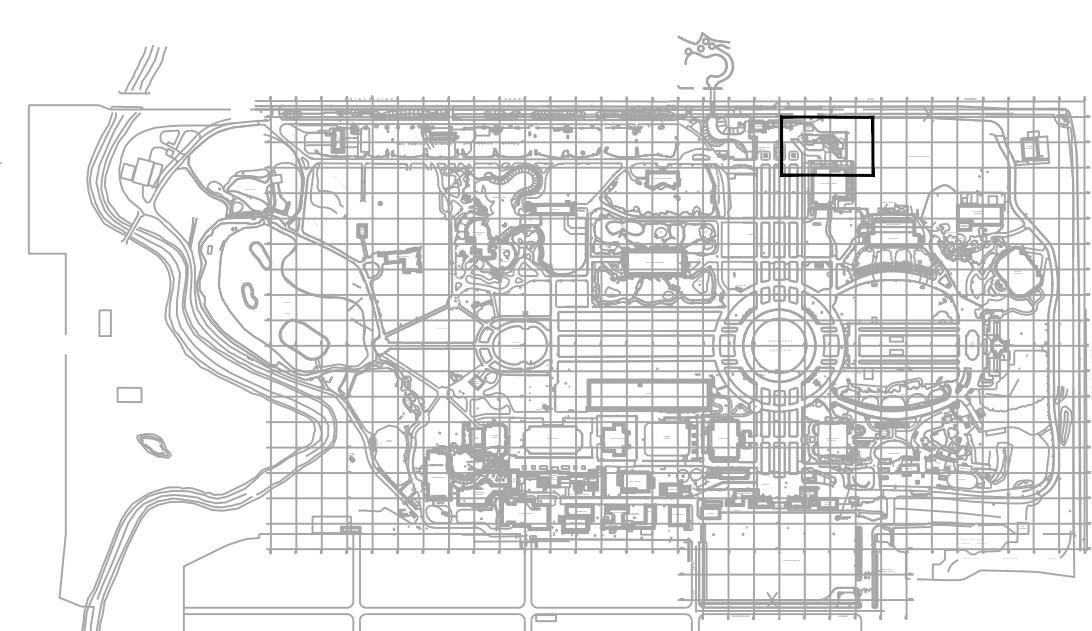
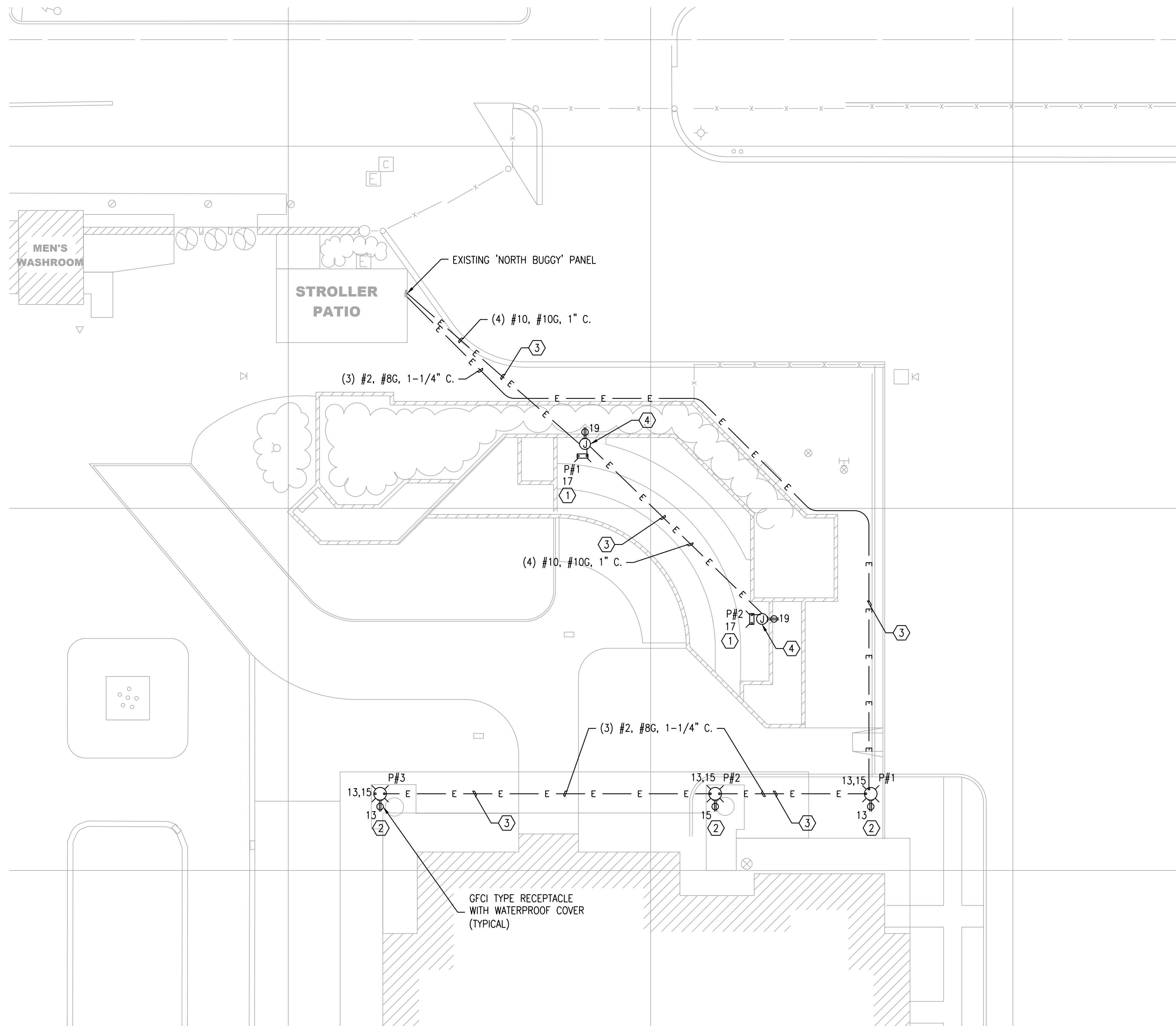
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**Brookfield Zoo
Site Lighting
Expansion II**

**SITE LIGHTING
DISCOVERY CENTER
RUNS**

PRINCIPAL IN CHARGE KAL	PROJECT NUMBER 52640
PROJECT MANAGER SE	DATE 08/04/17
PROJECT ENGINEER TV	KEYPLAN N E1.6 SCALE 1/16"=1'-0"
SCALE 1/16"=1'-0"	Sheet Number E1.6