

Date:	October 13, 2017	File # 43-EPDP App. # 01-116369
Project No:	2014037.01 Escuela Popular Parking Lot	
Owner:	Escuela Popular	
Contractor/CM:		CCD - CATEGORY A <input type="checkbox"/>
Attn:		CCD - CATEGORY B <input checked="" type="checkbox"/>
Requested By:	District	
Total Pages, Including This Sheet:	47	G.C. No. RFI No.

Construction Change Document (CCD) No. 1

The work described herein shall be carried out in accordance with the following supplemental instructions, in accordance with the Contract Documents. If the contractor anticipates a change in the Contract Sum or Contract Time, submit a proposal for the work prior to performing the change, unless otherwise directed by the Owner. The proposal shall be submitted within conformance with the Contract Documents.

Description of Changes:

Expand the parking lot along Comet Lane and relocate the existing garden, per the attached additional drawing sheets CCD 1-C1.1, CCD1-C2.1, CCD1-A1.02, CCD1-E1.01, CCD1-L1.1a, CCD1-L2.1a, CCD1-L3.1a, CCD1-L4.1a. The electrical Specifications for this scope of work shall be per the attached Specification Sections.

This scope of work shall be Bid Number B-01-17-18.

Reason:

To expand the rear parking area to accommodate more vehicle parking adjacent to the practice soccer field of James Lick HS, per the Client's request. Separate Electrical specifications are being issued as this electrical scope ties into a separate system.

Attachments:

CCD 1-C1.1; CCD1-C2.1; CCD1-A1.02; CCD1-E1.01; CCD1-L1.1a; CCD1-L2.1a; CCD1-L3.1a; CCD1-L4.1a; SPEC SECTIONS 26 00 00; 26 05 00; 26 05 23; 26 05 26; 26 05 33; 26 05 53; 26 28 16;

Client Authorization:

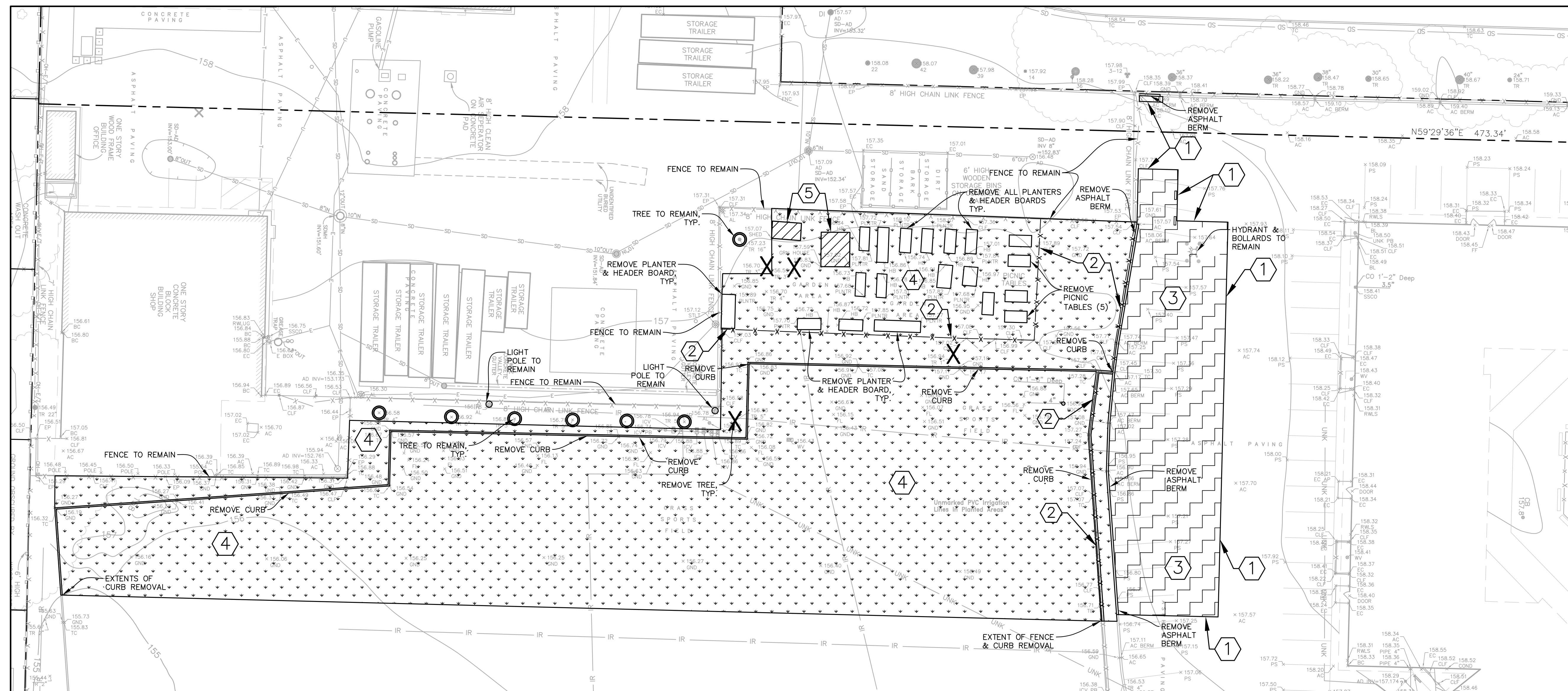
<input type="checkbox"/> Proceed with the work; perform work under T&M, coordinate with the IOR :	\$
<input type="checkbox"/> Proceed with the work; perform work Time and Material, Not to Exceed (N.T.E.) :	\$
<input type="checkbox"/> Proceed with the work; perform work for the agreed Lump Sum (LS) amount of :	\$
<input checked="" type="checkbox"/> Add <input type="checkbox"/> Deduct	

Client Authorization :

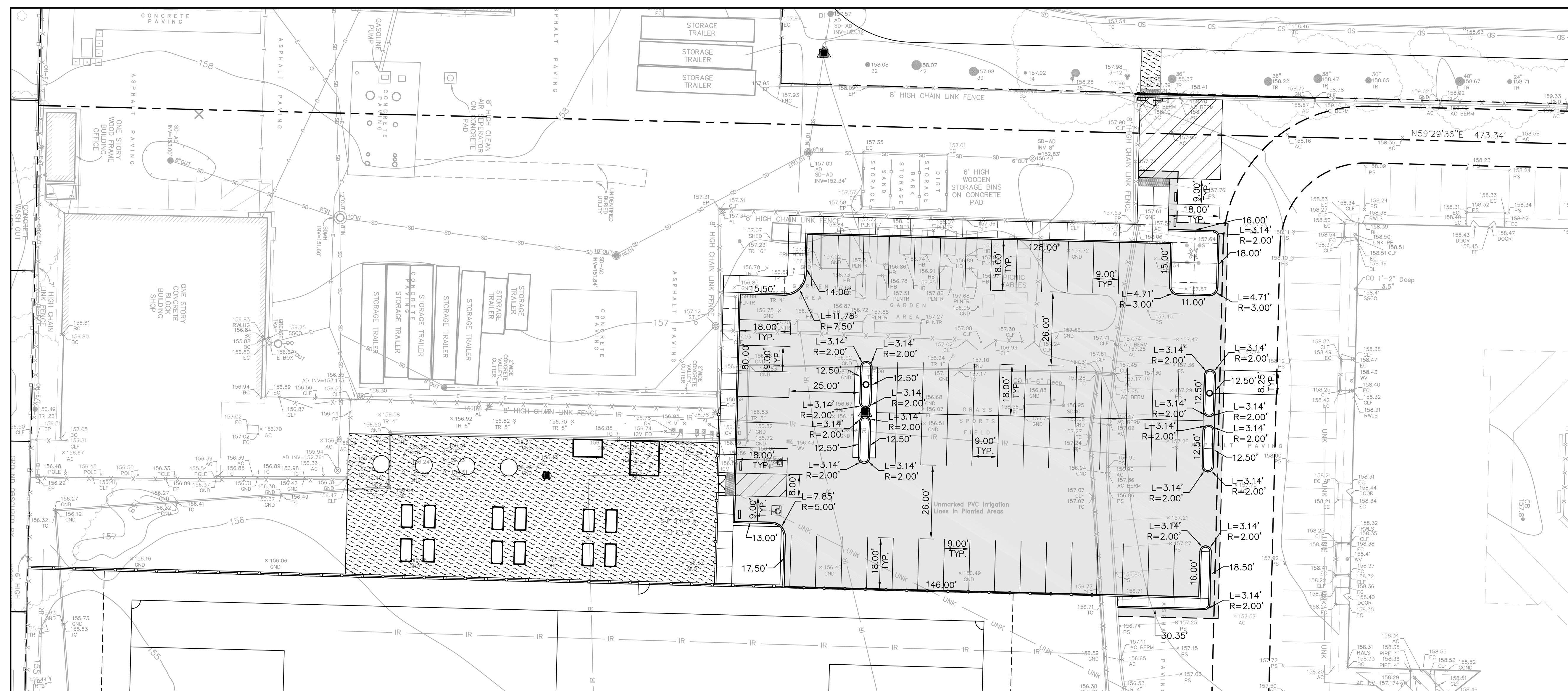
AEDIS, Inc. :

- cc: Contractor CM
 Inspector
 Owner

Created By Michelle Netzley



DEMOLITION PLAN
SCALE: 1"=20'



HORIZONTAL CONTROL PLAN
SCALE: 1"=20'

NOTE:
THE LIMITS OF DEMOLITION SHOWN HEREON ARE TO PROVIDE THE CONTRACTOR WITH A GENERAL SCOPE OF WORK. PRECISE LIMITS OF PAVEMENT REMOVAL AND GRADING SHOULD BE TAKEN FROM THE GRADING AND DRAINAGE PLAN. THE CONTRACTOR SHOULD ALSO REFERENCE LANDSCAPE ARCHITECT DRAWINGS, ARCHITECTURAL DRAWINGS, AND THE CONSTRUCTION DOCUMENTS FOR A COMPLETE SCOPE OF WORK. (VERIFY ALL DEMOLITION WITH THE SCHOOL DISTRICT)

NOTE:
SEE IRRIGATION DEMOLITION PLAN FOR REMOVAL AND SALVAGE OF EXISTING IRRIGATION SYSTEM. SEE LANDSCAPE DRAWINGS

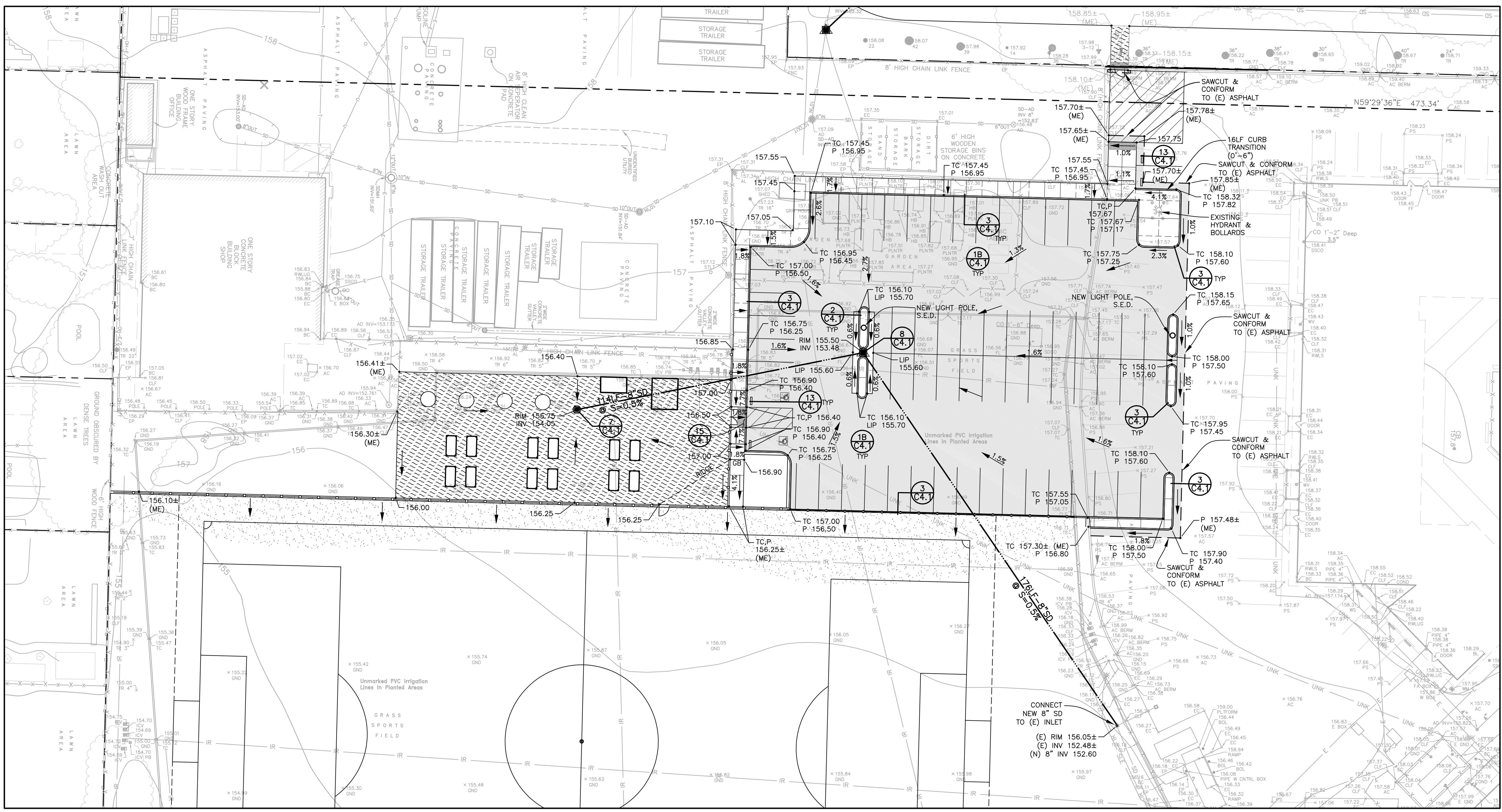
LEGEND

- X TREE TO BE REMOVED
REMOVE ALL ROOTS 2" AND LARGER
WITHIN 5' RADIUS OF REMOVED TREE
- O TREE TO BE REMAIN - PROTECT FROM
DAMAGE. SEE LANDSCAPE
SPECIFICATIONS AND DRAWINGS FOR
TREE PROTECTION NOTES
- ① SAWCUT ASPHALT OR REMOVE
CONCRETE TO NEAREST CONTROL
JOINT
- ② FENCE/GATES/FOUNDATIONS TO BE
REMOVED
- ③ ASPHALT PAVING & AGGREGATE BASE
ROCK TO BE REMOVED, REMOVE HEADER
BOARD TYP.
- ④ SHRUBS AND/OR LANDSCAPING TO BE
REMOVED. GRUB OUT ALL VEGETATION/
REMOVE BARK OR WOOD CHIPS. REMOVE
PLANTER BOXES. REMOVE ANY IRRIGATION
LINES OR VALVES.
- ⑤ RELOCATE SHEDS, S.L.D.

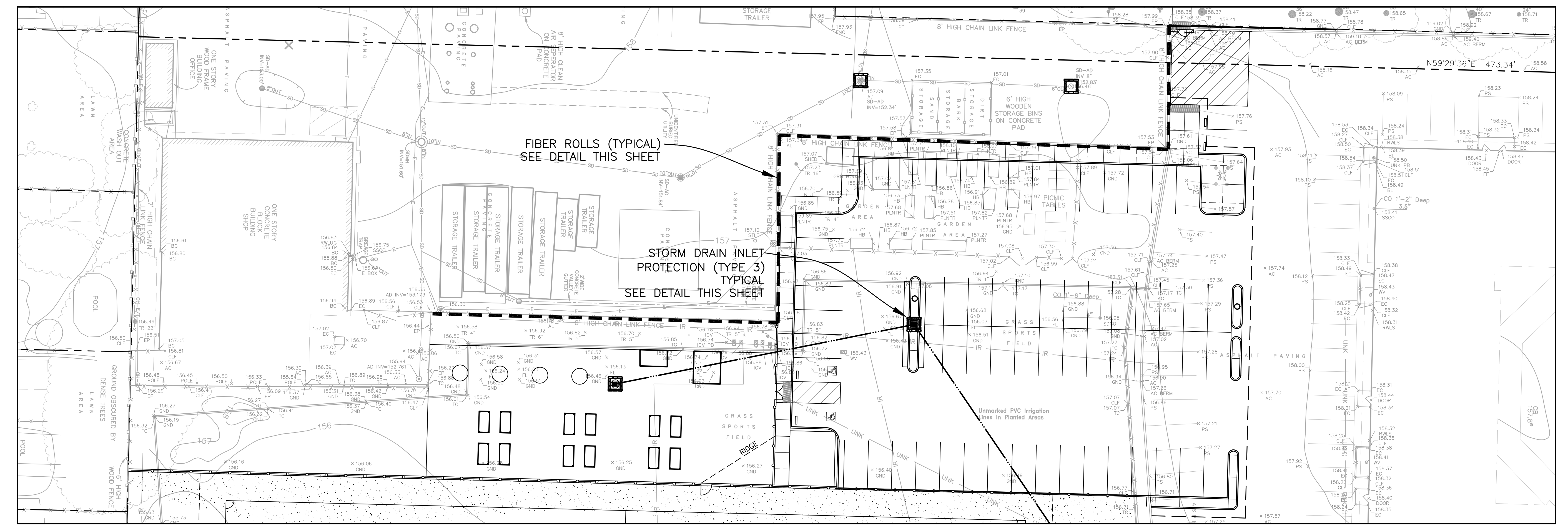
M:\2026 Escuela Popular.dwg 10-11-17 05:56:35 PM
 Construction Contractor agrees that in accordance with generally accepted construction practices, construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project including safety of all persons and property; that this requirement shall be made to apply continuously and not be limited to normal working hours, and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting liability arising from the design professional's negligence.

UNAUTHORIZED CHANGES & USES: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

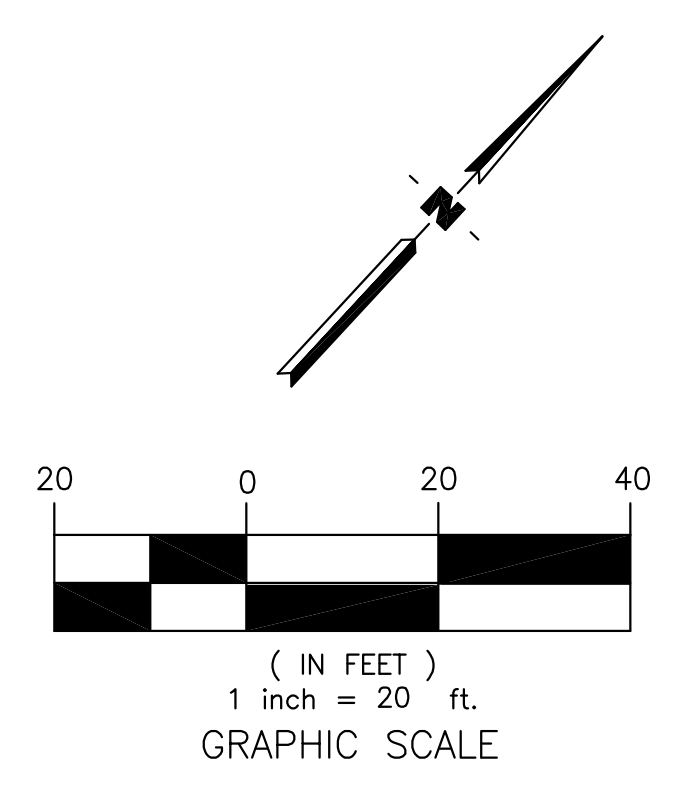
Construction Contractor agrees that in accordance with generally accepted construction practices, construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project including safety of all persons and property, that this requirement shall be made to apply continuously and not be limited to normal working hours, and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professional.



GRADING & DRAINAGE / UNDERGROUND UTILITIES PLAN
SCALE: 1"=20'

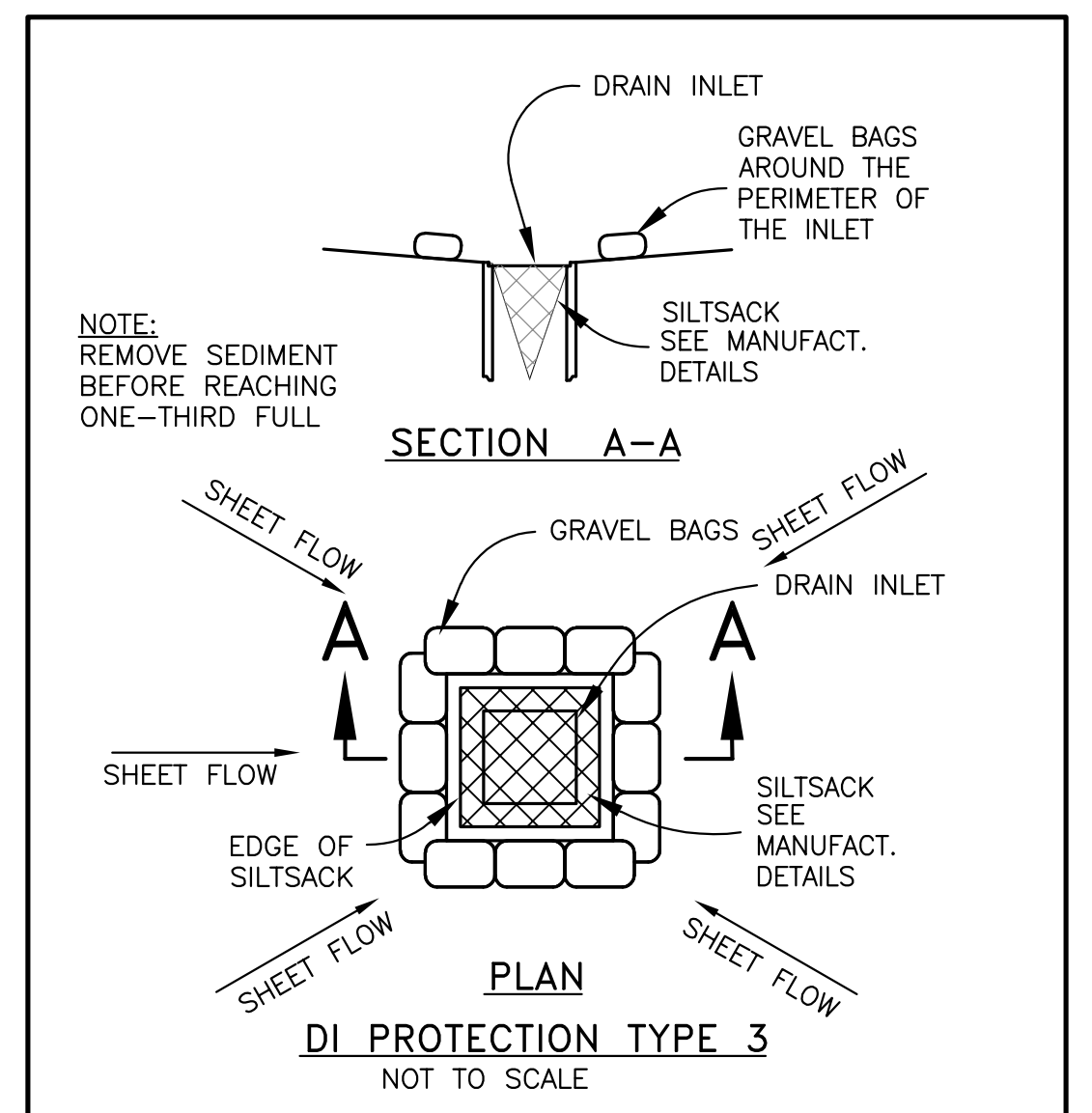


EROSION CONTROL PLAN
SCALE: 1"=20'

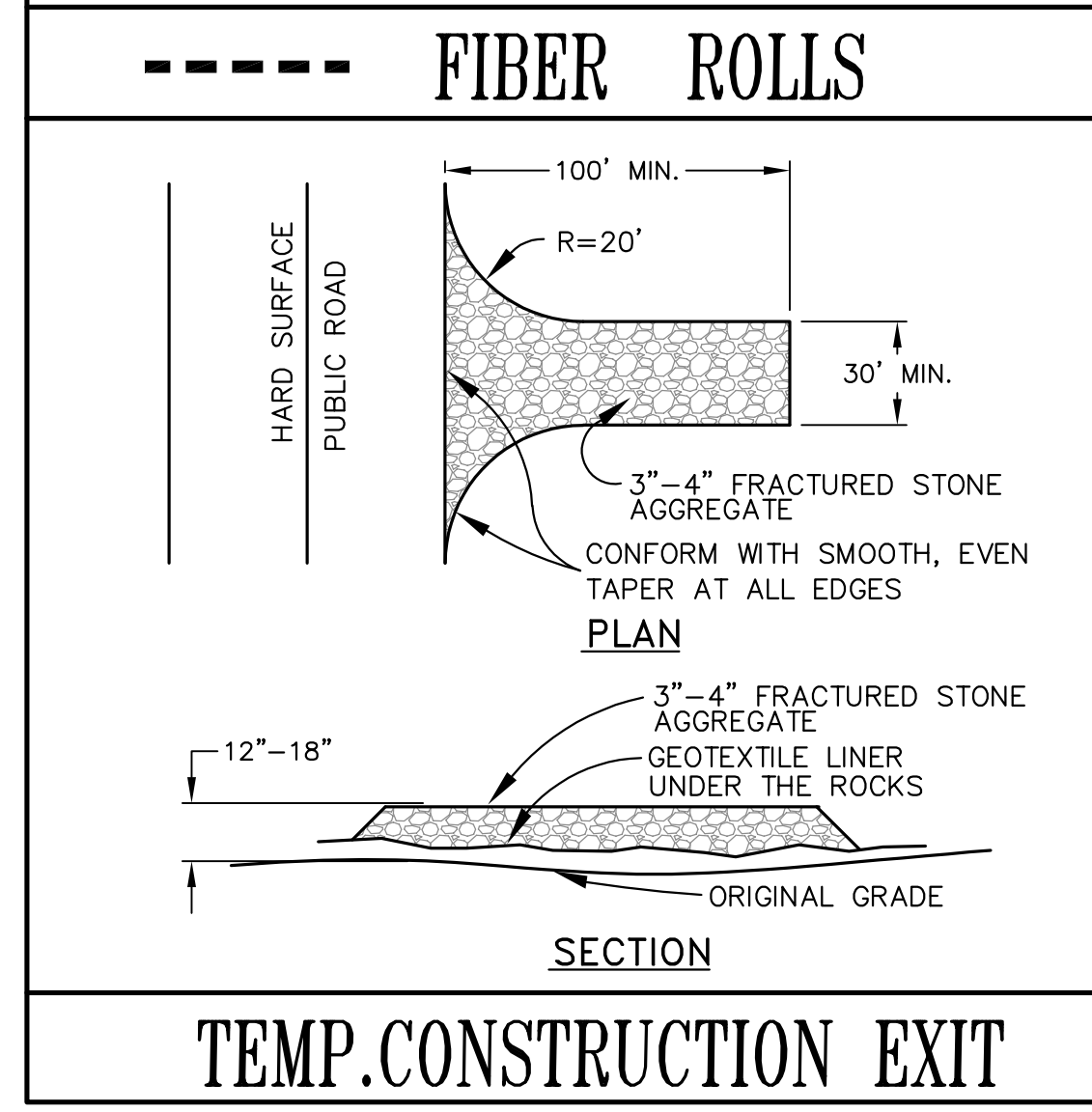
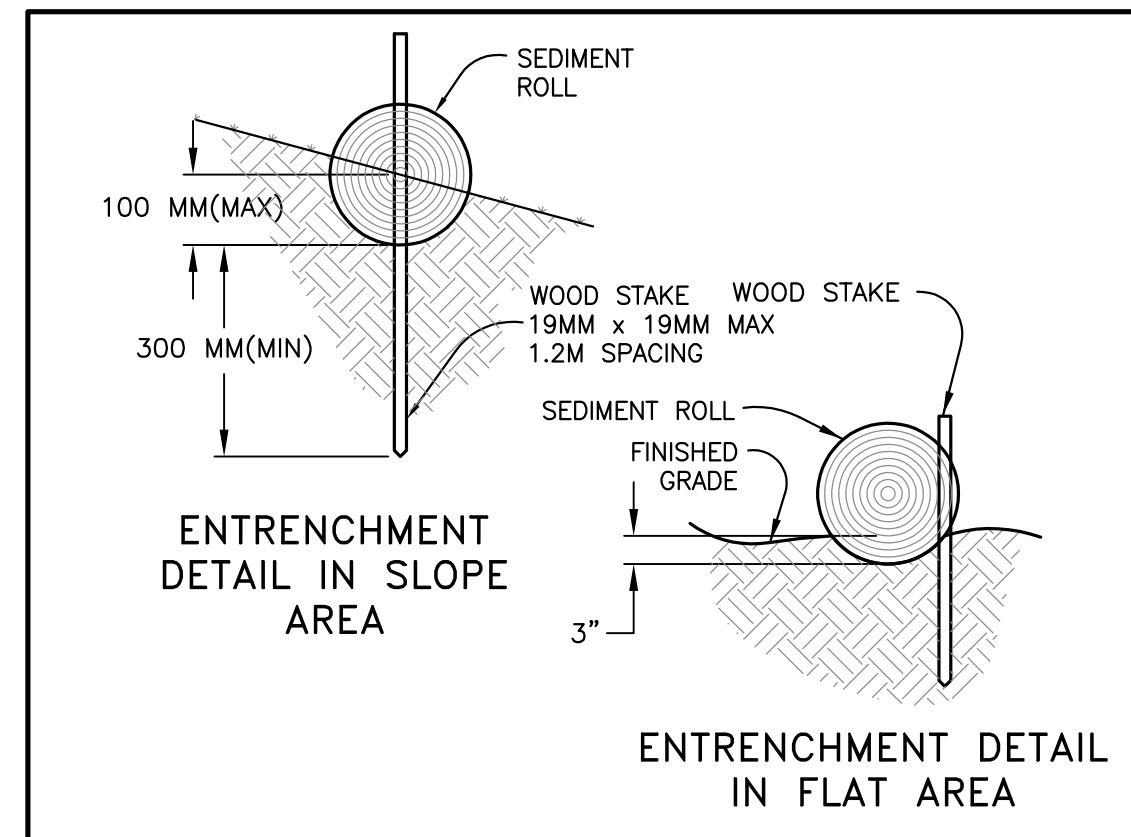


NOTE: SEE LANDSCAPE DRAWINGS (S.L.D.) FOR SEATWALLS, STAIRS, RAMPS, PLANTERS, CONCRETE & ASPHALT PAVING DETAILS AND LOCATIONS.

NOTE
 CONTRACTOR IS ADVISED TO VERIFY ALL INVERT ELEVATIONS AT POINTS OF CONNECTION TO EXISTING UTILITIES PRIOR TO CONSTRUCTION OF, OR EXCAVATION FOR, ALL NEW UTILITIES. IF A CONFLICT IS DETERMINED, THE ENGINEER SHALL BE NOTIFIED FOR DETERMINATION OF REMEDY - SEE UNDERGROUND NOTES.

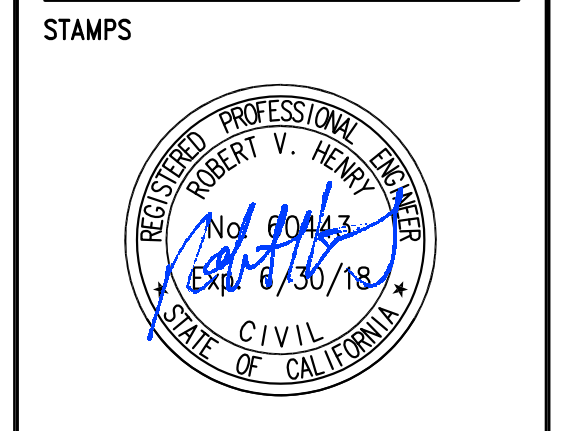


STORM DRAIN INLET PROTECTION - TYPE 3



PROJECT
**ESCUELA POPULAR
 NEW PARKING LOT**

CONSULTANT
ARROLL ENGINEERING
engineers and surveyors
 1101 S. WINCHESTER BLVD.
 SAN JOSE, CA 95128
 SAN JOSE, CA 95128
 TEL: (408) 281-0500
 FAX: (408) 281-0500
 E-MAIL: Robert@arroll-engineering.com



STATE
 DSA FILE NUMBER **43-H10**
 IDENTIFICATION STAMP
 DIV. OF THE STATE ARCHITECT
 APPL # **01-116369**
 AC _____ FLS _____ SS _____
 DATE **04/26/2017**

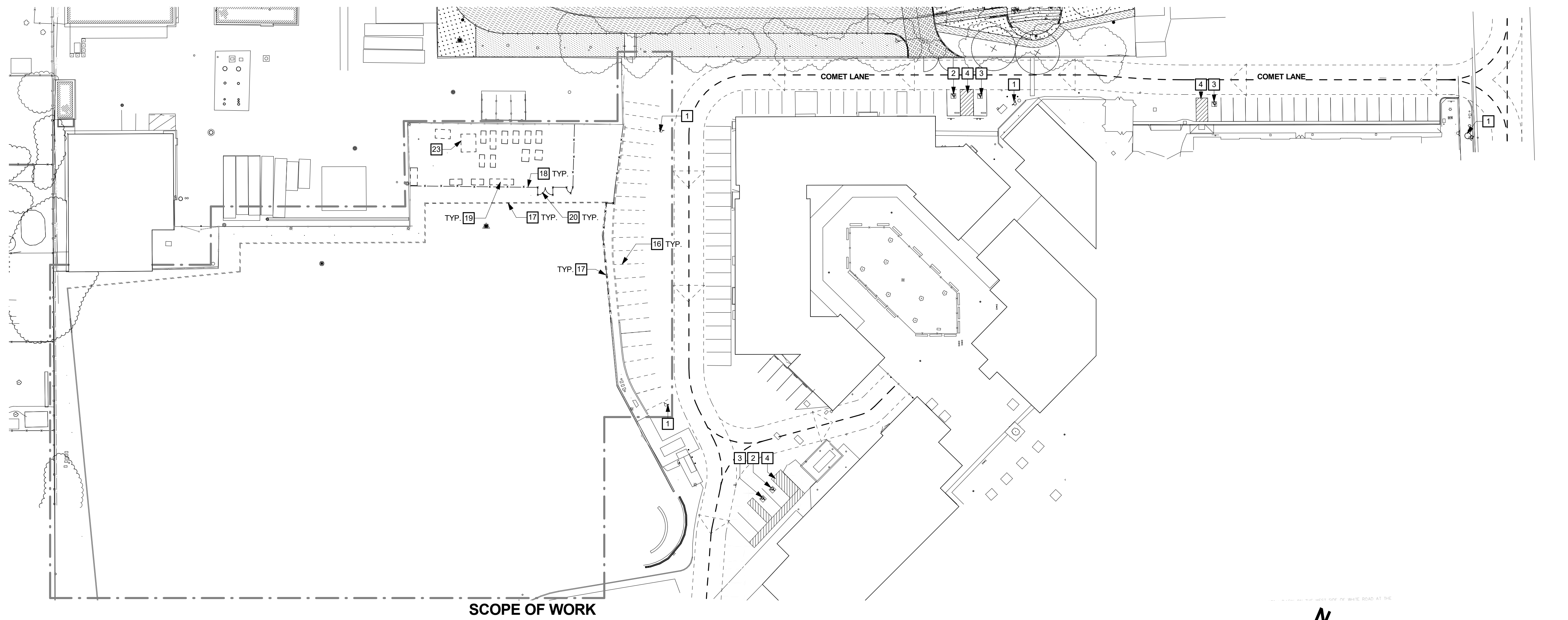
REVISIONS
 No. Description Date

MILESTONES
 SD
 DD
 25% DD
 50% CD
 75% CD
 DSA SUB

**GRADING &
 DRAINAGE
 PLAN /
 EROSION
 CONTROL
 PLAN**

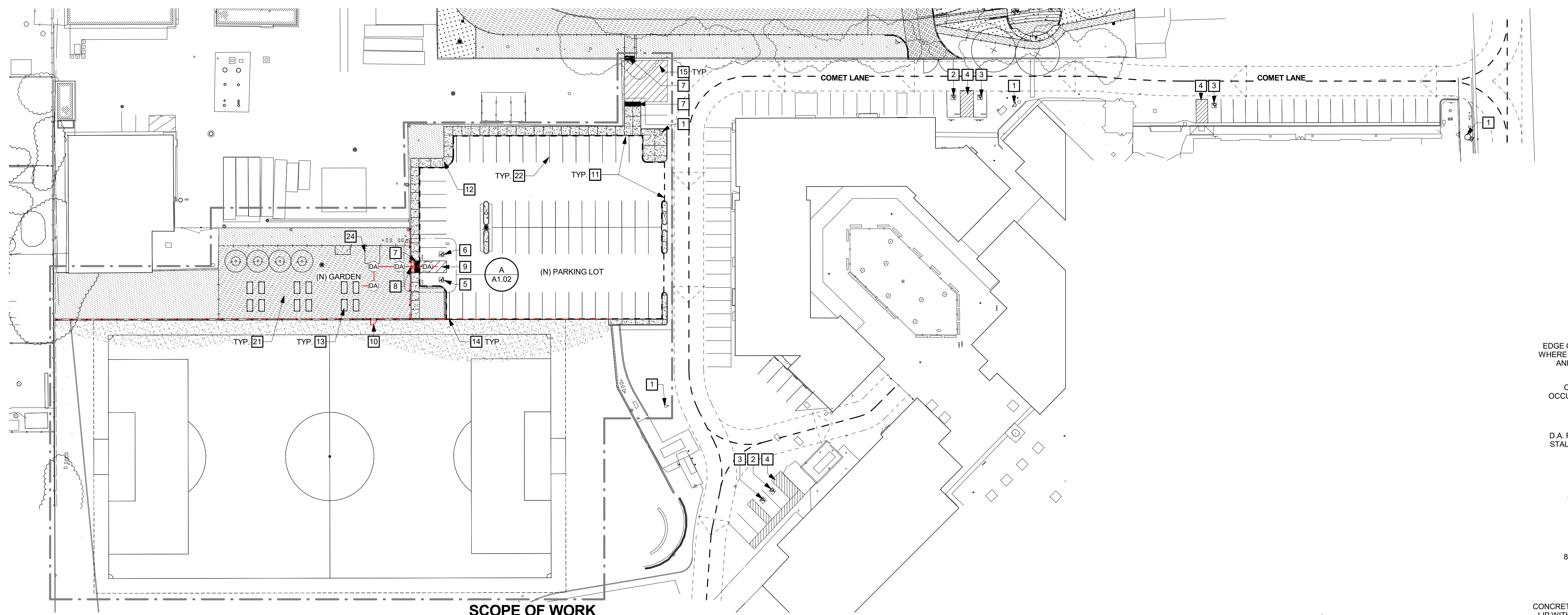
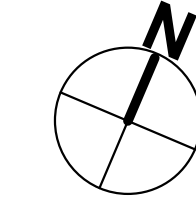
DATE **10/10/17**
 JOB # 2014037.01
 CEI JOB # 2026
 SHEET #

C21-C2.1



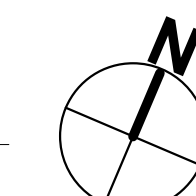
SCOPE OF WORK

1 NEW SITE PLAN - PARKING LOT DEMO
SCALE: 1" = 40'-0"



SCOPE OF WORK

2 NEW SITE PLAN - PARKING LOT NEW
SCALE: 1" = 40'-0"



PARKING COUNT

PARKING COUNT:	REQUIRED	ACTUAL
COMET LANE PARKING -		
- PARKING STALLS:		133
- D.A. PARKING STALLS:	5	7
- VAN D.A. PARKING STALLS:	1	4

GENERAL SHEET NOTES

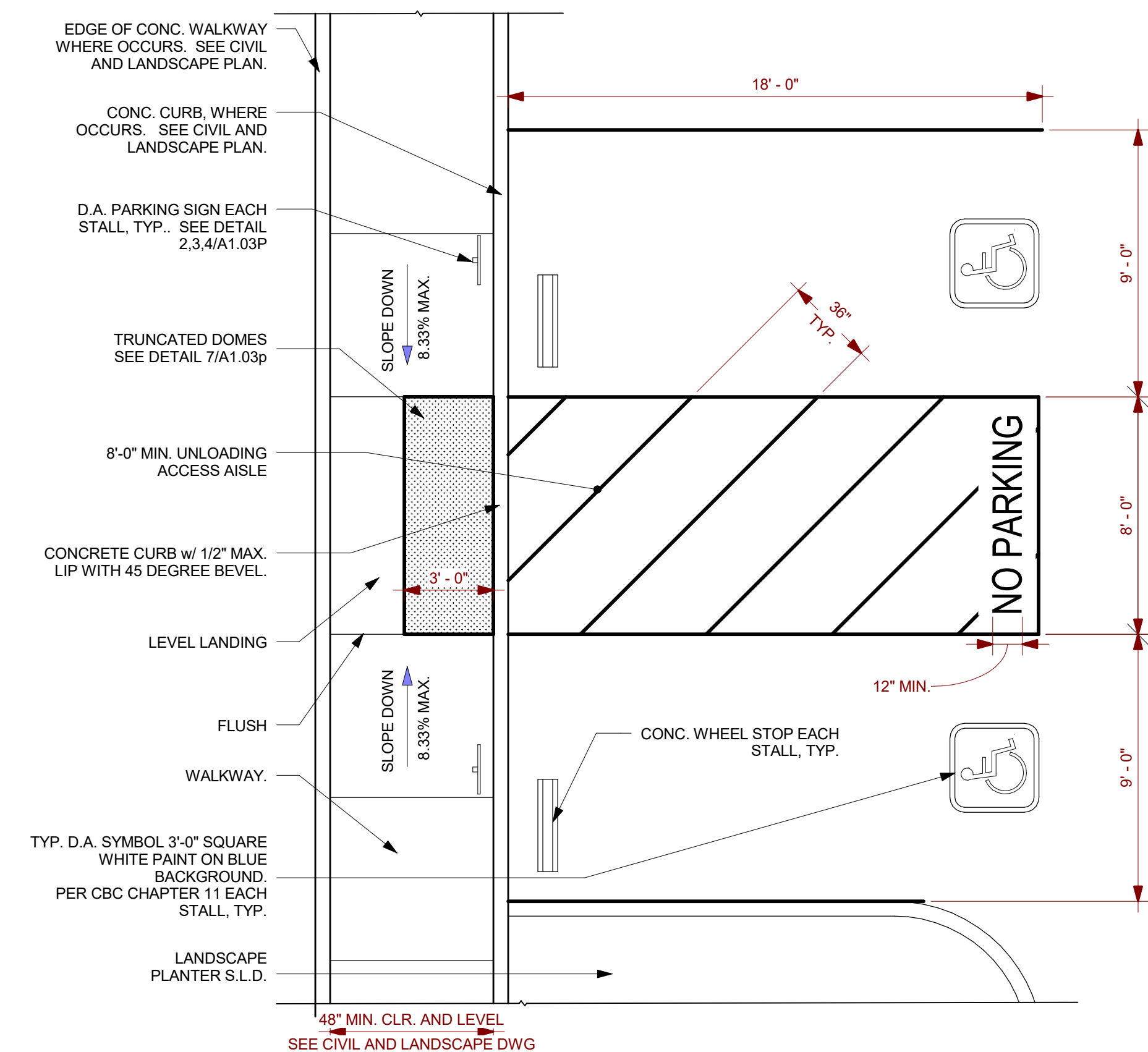
- A CONTRACTOR TO VERIFY THAT ALL BARRIERS IN THE PATH OF TRAVEL HAVE BEEN REMOVED OR WILL BE REMOVED UNDER THIS PROJECT AND PATH OF TRAVEL COMPLIES WITH CBC CHAPTER 11.
- B REFER TO CIVIL, ELECTRICAL, AND LANDSCAPE DRAWINGS FOR EXTENT OF CIVIL, ELECTRICAL, AND LANDSCAPE WORK.
- C CONTRACTOR SHALL MAINTAIN FIRE LANE ACCESS THROUGHOUT PROJECT.
- D DO NOT INTERRUPT EXISTING UTILITY SERVICES SERVING OCCUPIED OR USED FACILITIES, EXCEPT WHEN AUTHORIZED IN WRITING BY AND COORDINATED WITH THE OWNER.
- E PROTECT EXISTING & NEW STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, TREES AND SHRUBS FROM DAMAGE DURING CONSTRUCTION.

NEW SITE PLAN KEYNOTES

- 1 (E) FIRE HYDRANT.
- 2 (E) D.A. ACCESSIBLE PARKING AND SIGNAGE STATING THAT THERE IS "MINIMUM FINE \$250".
- 3 (E) D.A. VAN ACCESSIBLE PARKING AND SIGNAGE STATING THAT THERE IS "MINIMUM FINE 250".
- 4 (E) UNLOADING ACCESS AISLE.
- 5 D.A. VAN ACCESSIBLE PARKING AND SIGNAGE SEE DETAIL 2/.
- 6 D.A. PARKING AND SIGNAGE SEE DETAIL 2/.
- 7 TRUNCATED DOMES SEE DETAIL 7/A1.03p.
- 8 CHAINLINK MAINTENANCE GATE S.L.D. FOR DETAILS.
- 9 UNLOADING ACCESS AISLE.
- 10 CHAINLINK MAN GATE S.L.D. FOR DETAILS.
- 11 PARKING LOT, SEE LANDSCAPE AND CIVIL DRAWINGS
- 12 CONCRETE SIDEWALK AND CURB TYP.
- 13 PLANTER, SEE LANDSCAPE DRAWINGS.
- 14 CHAINLINK, SEE LANDSCAPE DRAWINGS
- 15 STRIPPING, SEE CIVIL AND LANDSCAPE DRAWINGS
- 16 (E) PARKING STRIPPING TO BE REMOVED, SEE LANDSCAPE AND CIVIL DRAWINGS
- 17 (E) CURB TO BE DEMOLISHED, SEE LANDSCAPE AND CIVIL DRAWINGS
- 18 (E) CHAINLINK FENCE TO BE REMOVED, SEE LANDSCAPE DRAWINGS
- 19 (E) MISC. STRUCTURE AND PLANTER TO BE REMOVED, SEE LANDSCAPE DRAWINGS
- 20 (E) CHAINLINK GATE TO BE REMOVED, SEE LANDSCAPE DRAWINGS
- 21 GARDEN AREA, SEE LANDSCAPE AND CIVIL DRAWINGS
- 22 PARKING STRIPPING, TYP.
- 23 (E) GREEN HOUSE TO BE RELOCATED, SEE PROPOSED SITE PLAN, CIVIL, AND LANDSCAPE DRAWINGS.
- 24 (E) GREEN HOUSE

GRAPHIC KEY

- PROPERTY LINE/ LEASE LINE
- AREA OF WORK
- (N) CHAIN LINK FENCE
- (E) CHAIN LINK FENCE
- (E) CHAIN LINK FENCE TO BE DEMOLISHED
- (E) FIRE DEPARTMENT ACCESS
FIRE DEPARTMENT ACCESS IS 20'-0" WIDE AND RATED FOR 96,000 LBS.
- D.A. PATH OF TRAVEL
D.A. PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER FREE ACCESS WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING 1/2" REVEALED AT 1/2" MAXIMUM SLOPE OR VERTICAL LEVEL CHANGES NOT EXCEEDING 1/4" MAXIMUM AND AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE INDICATED. D.A. PATH OF TRAVEL SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 8' MINIMUM HEIGHT AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL ABOVE 27" AND BELOW 87" ARCHITECT SHALL VERIFY THAT THERE ARE NO BARRIERS IN THE PATH OF TRAVEL.
- (E) F.H. EXISTING FIRE HYDRANT

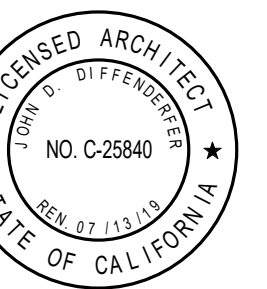


A D.A. PARKING STALL DETAIL
SCALE: 1/4" = 1'-0"

PROJECT
ESCUOLA POPULAR
NEW PARKING LOT

CONSULTANT

STAMP



STATE

DSA FILE NUMBER 43-EPDP
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APPL # 01-116369
AC FLS SS
DATE 6/20/17

REVISIONS

No. Description Date



MILESTONES

- SD
- DD
- 25% CD
- 50% CD
- 75% CD
- DSA SUB

SHEET

CCD 1-

DATE 6/21/2017
JOB # 2014037.01
SHEET # CCD1-
A1.02

ELECTRICAL SYMBOLS

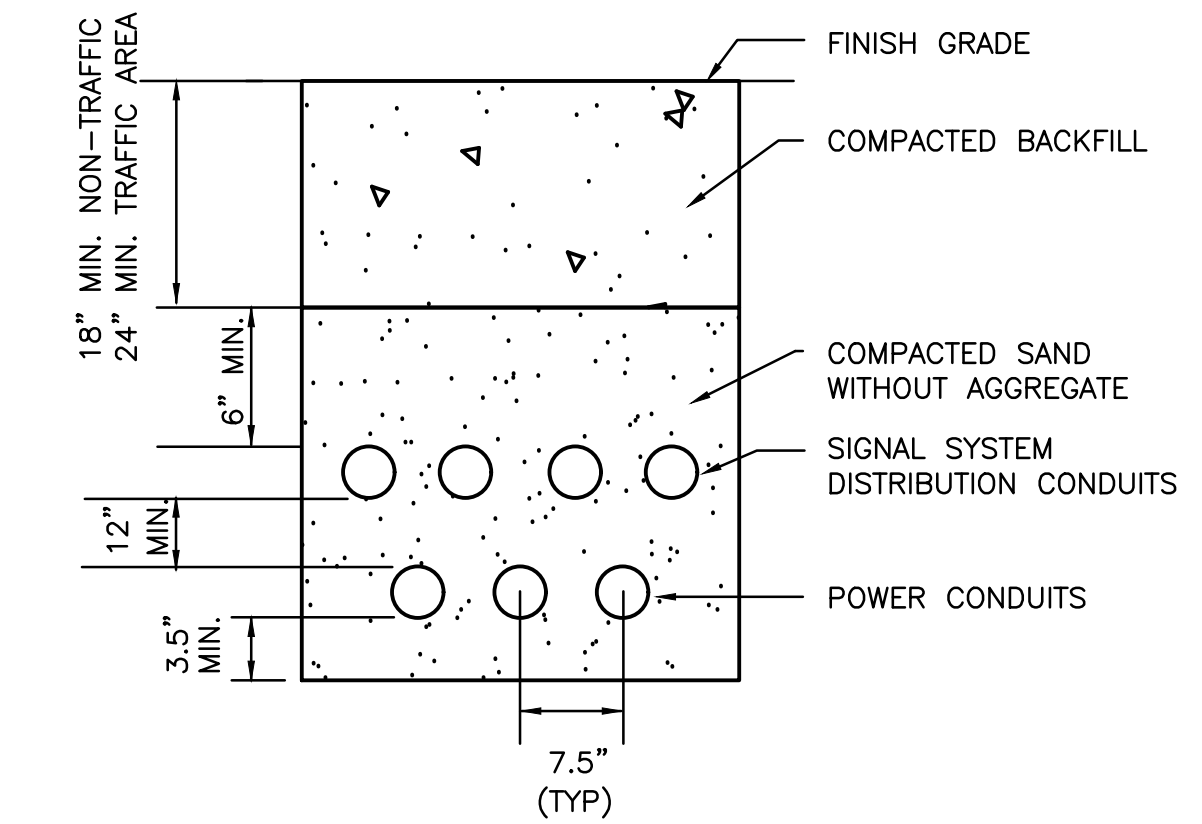
- □ □ POLE MOUNTED FIXTURE
- ⊕ JUNCTION BOX WITH COVER
- Ⓜ POWER PULL BOX
- Ⓢ SIGNAL PULL BOX
- CONDUIT AND CONDUCTORS INSTALLED UNDERGROUND OR BELOW SLAB
- ▬ SURFACE MOUNTED PANELBOARD

ABBREVIATIONS

A, AMPS	AMPERES
AC	ALTERNATE CURRENT
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTION CURRENT APPROXIMATE
APP.	ARCHITECT/ARCHITECTURAL
ARCH	ARCHITECT/ARCHITECTURAL
AWG	AMERICAN WIRE GAUGE
BKBD	BACKBOARD
BKR	BREAKER
C	CONDUIT
CO	CONDUIT ONLY
CU	COPPER
DET.	DETAIL
DIA	DIAMETER
DISC	DISCONNECT (SWITCH)
DWG	DRAWING
<E>	EXISTING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
G	GROUND
GFI	GROUND FAULT INTERRUPTER
KCMIL	KILO CIRCULAR MILLS
KVA	KILOVOLT-AMPERES
KW	KILOWATTS
MAX	MAXIMUM
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MTD	MOUNTED
HT.	MOUNTING HEIGHT
MSB	MAIN SWITCHBOARD
N	NEUTRAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
P	POLE
PH, ∅	PHASE
PA	PUBLIC ADDRESS
PNL	PANEL
<R>	REMOVE
<RE>	RELOCATED EXISTING
<RL>	RELOCATE
SYM	SYMMETRICAL
T	TELEPHONE
TRANS, XFMR	TRANSFORMER
TYP	TYPICAL
UN	UNLESS OTHERWISE NOTED
V	VOLTS
VA	VOLT-AMPERES
W	WATTS
WP	WEATHERPROOF

GENERAL NOTES

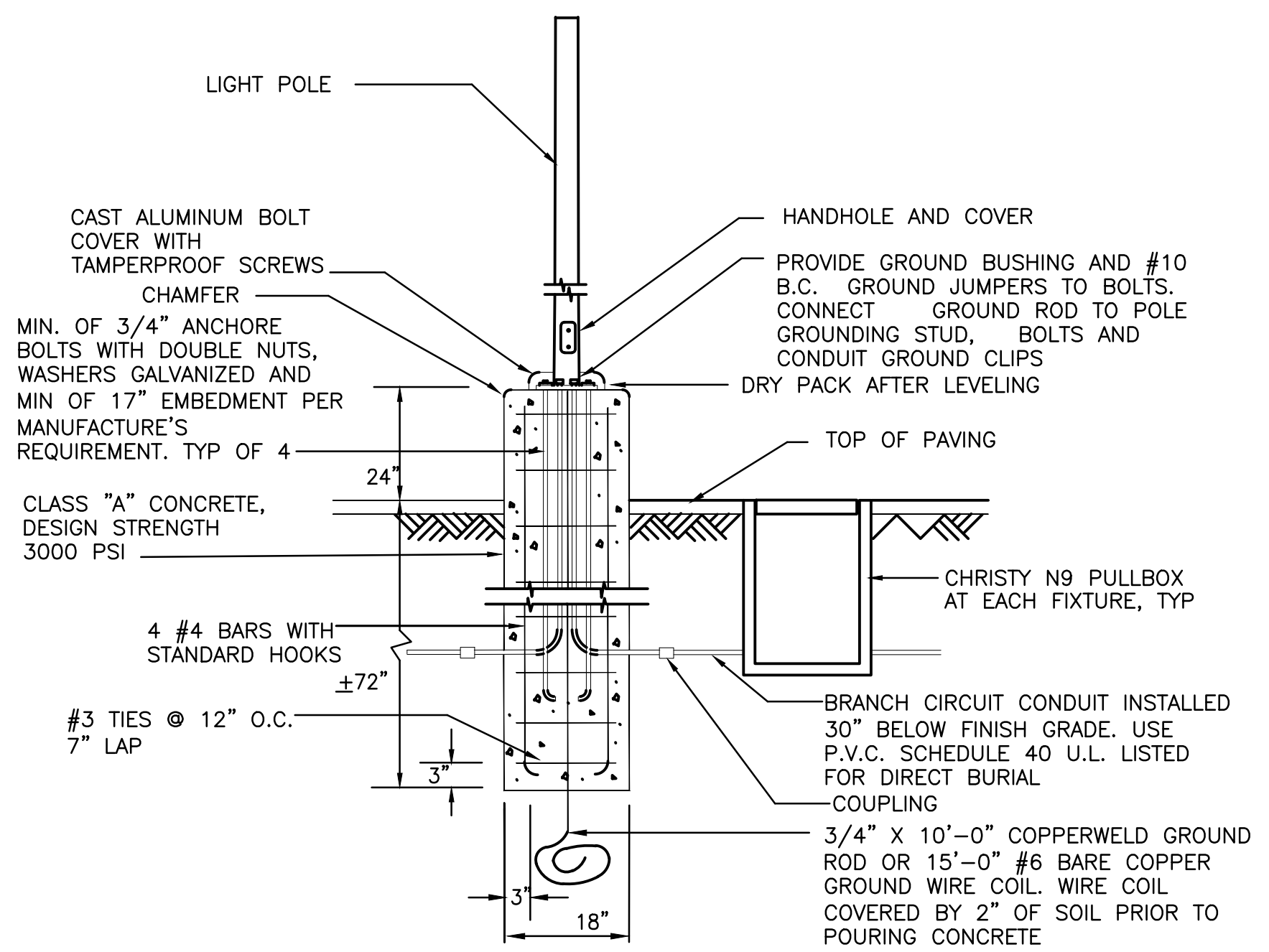
1. READ THE SPECIFICATIONS AND COMPLY WITH ALL REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO ASSIST THE CONTRACTOR DURING EXECUTION OF THE WORK; HOWEVER, THEY DO NOT COVER ALL OF THE SPECIFICATION REQUIREMENTS.
2. ALL ELECTRICAL WORK SHALL COMPLY WITH THE CURRENT APPROVED EDITION OF THE NATIONAL ELECTRICAL CODE, AS ACCEPTED AND AMENDED BY LOCAL ORDINANCES.
3. ANY EQUIPMENT AND MATERIALS FURNISHED BY THE CONTRACTOR SHALL BE NEW, UNUSED AND FREE FROM DEFECTS.
4. FINAL ACCEPTANCE OF WORK IN PLACE SHALL BE SUBJECT TO APPROVAL BY SCHOOL DISTRICT REPRESENTATIVE, TENANT AND ARCHITECT/ENGINEER. INSTALLATION APPROVAL SHALL BE BASED ON APPROVED SUBMITTAL, SHOP DRAWINGS AND LOCAL INSPECTIONS.
5. ALL WORK SHOWN ON DRAWINGS IS IN PART SCHEMATIC, INTENDED TO CONVEY SCOPE OF WORK AND GENERAL LAYOUT. VERIFY ALL EXISTING CONDITIONS AND MAKE ADJUSTMENTS AS REQUIRED.
6. BRANCH CIRCUIT RACEWAY SHALL BE A MINIMUM OF 3/4" ELECTRICAL METALLIC TUBING (EMT) UNLESS OTHERWISE NOTED. RACEWAYS IN RAISED FLOOR OR IN PLENUM SPACE SHALL BE A MINIMUM OF 3/4" RIGID GALVANIZED STEEL (RGS) OR RIGID ALUMINUM (RAL) UNLESS OTHERWISE NOTED.
7. ALL CONDUCTORS SHALL BE #12 AWG MINIMUM TYPE THHN/THWN UNLESS NOTED OTHERWISE.
8. ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE WEATHERPROOF.
9. EXACT LOCATION OF ELECTRICAL DEVICES SHALL BE VERIFIED WITH THE ARCHITECT PRIOR TO INSTALLATION.
10. CONDUIT ROUTES SHOWN ARE APPROXIMATE ONLY AND MUST BE ADJUSTED IN THE FIELD TO CLEAR OTHER FACILITIES.



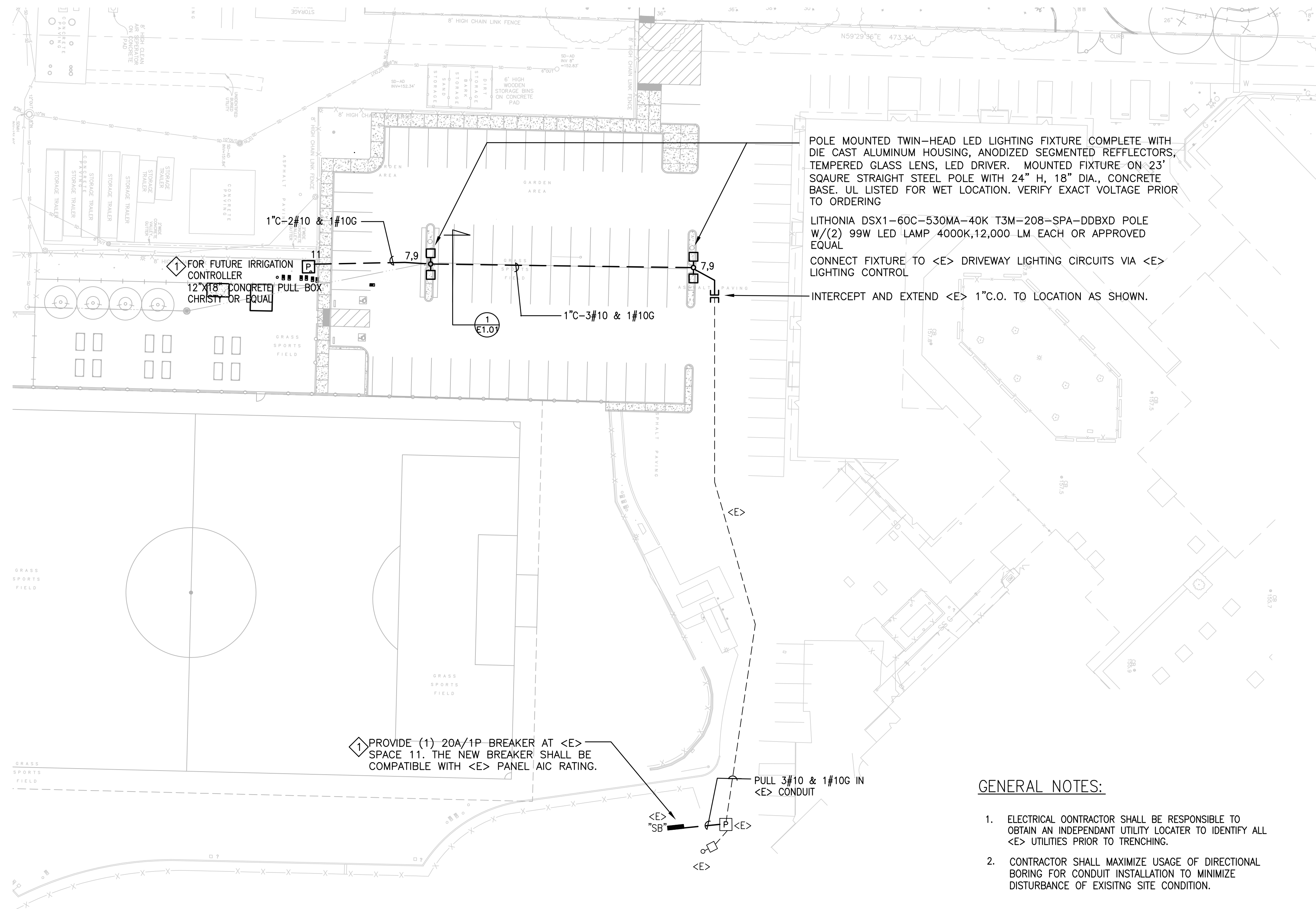
NOTES:

1. SEE SITE PLAN FOR NUMBER AND SIZE OF CONDUITS PER TRENCH.

1 TYPICAL TRENCH DETAIL
NOT TO SCALE



2 POLE MOUNTED FIXTURE DETAIL
NOT TO SCALE (NOTE: NOT PART OF DSA STRUCTURE REVIEW)



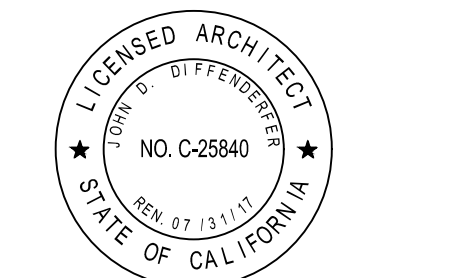
ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

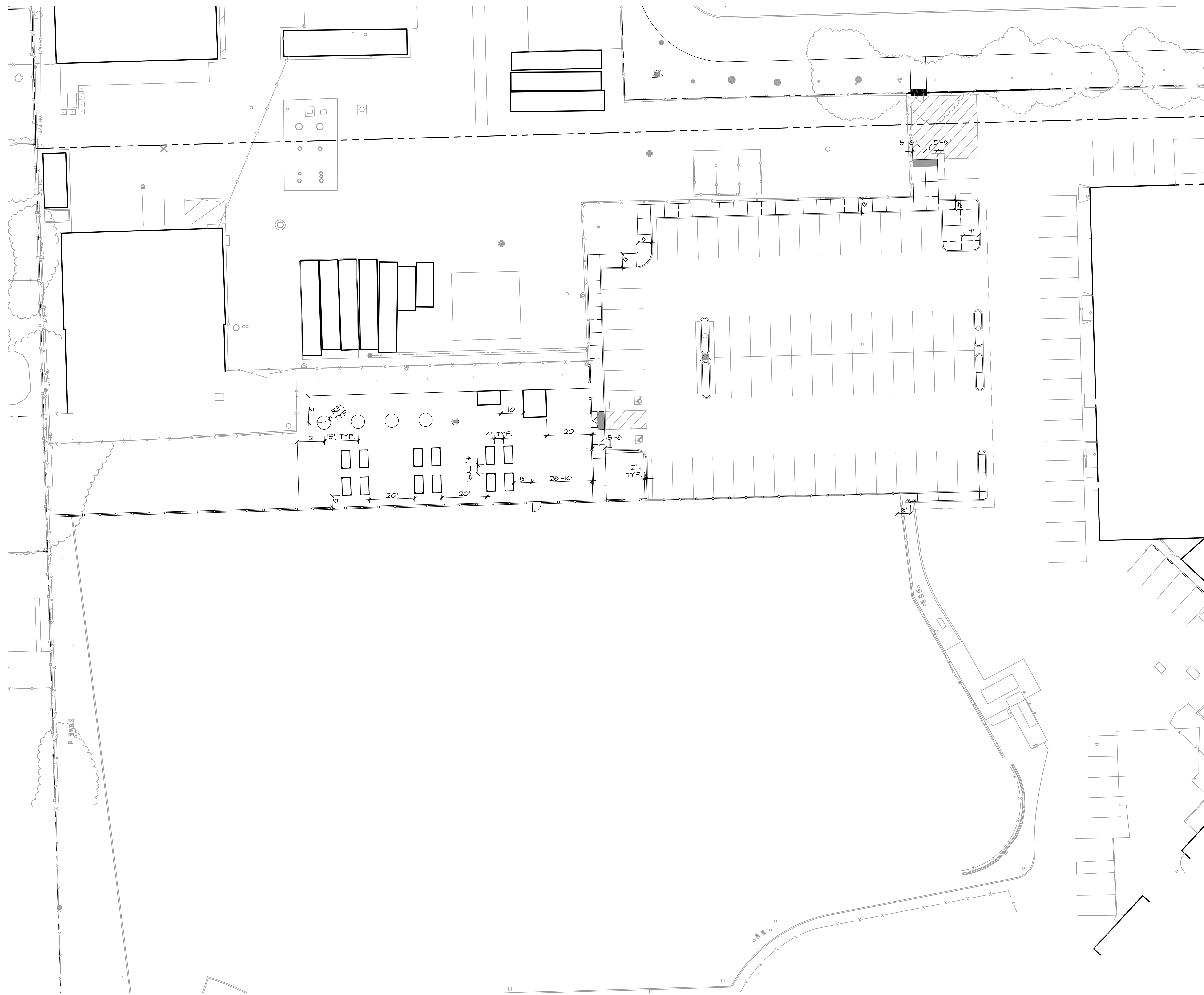
GENERAL NOTES:

1. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN AN INDEPENDENT UTILITY LOCATOR TO IDENTIFY ALL <E> UTILITIES PRIOR TO TRENCHING.
2. CONTRACTOR SHALL MAXIMIZE USAGE OF DIRECTIONAL BORING FOR CONDUIT INSTALLATION TO MINIMIZE DISTURBANCE OF EXISTING SITE CONDITION.

SHEET NOTES:

- ◇ TAPE AND SECURE SPARE CONDUCTORS FOR FUTURE CONNECTION.





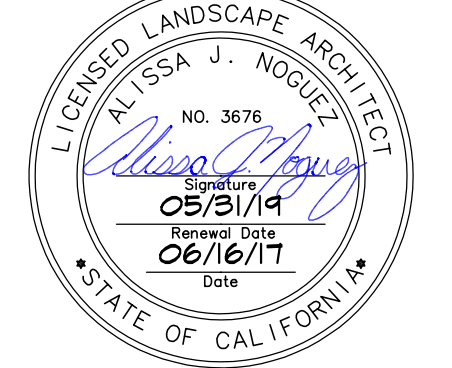
PROJECT
**ESCUELA
POPULAR
NEW PARKING LOT**

CONSULTANT



1213 Lincoln Ave., Suite 211
San Jose, CA 95125
T. 408.292.2196
www.anla-associates.com

STAMP



STATE

DSA FILE NUMBER **43-H10**
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DIV. OF THE STATE ARCHITECT
APPL # 01-116369
AC _____ FLS _____ SS _____
DATE **04/26/2017**

REVISIONS

No.	Description	Date

MILESTONES

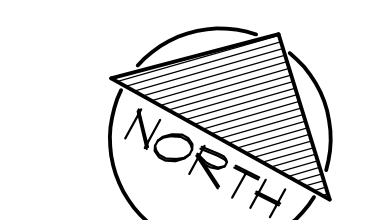
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50% CD	-
75% CD	-
DSA SUB	12/16/2015
DSA BACK	4/26/2017

SHEET

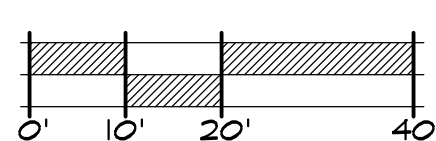
**CCD1 -
LAYOUT PLAN**

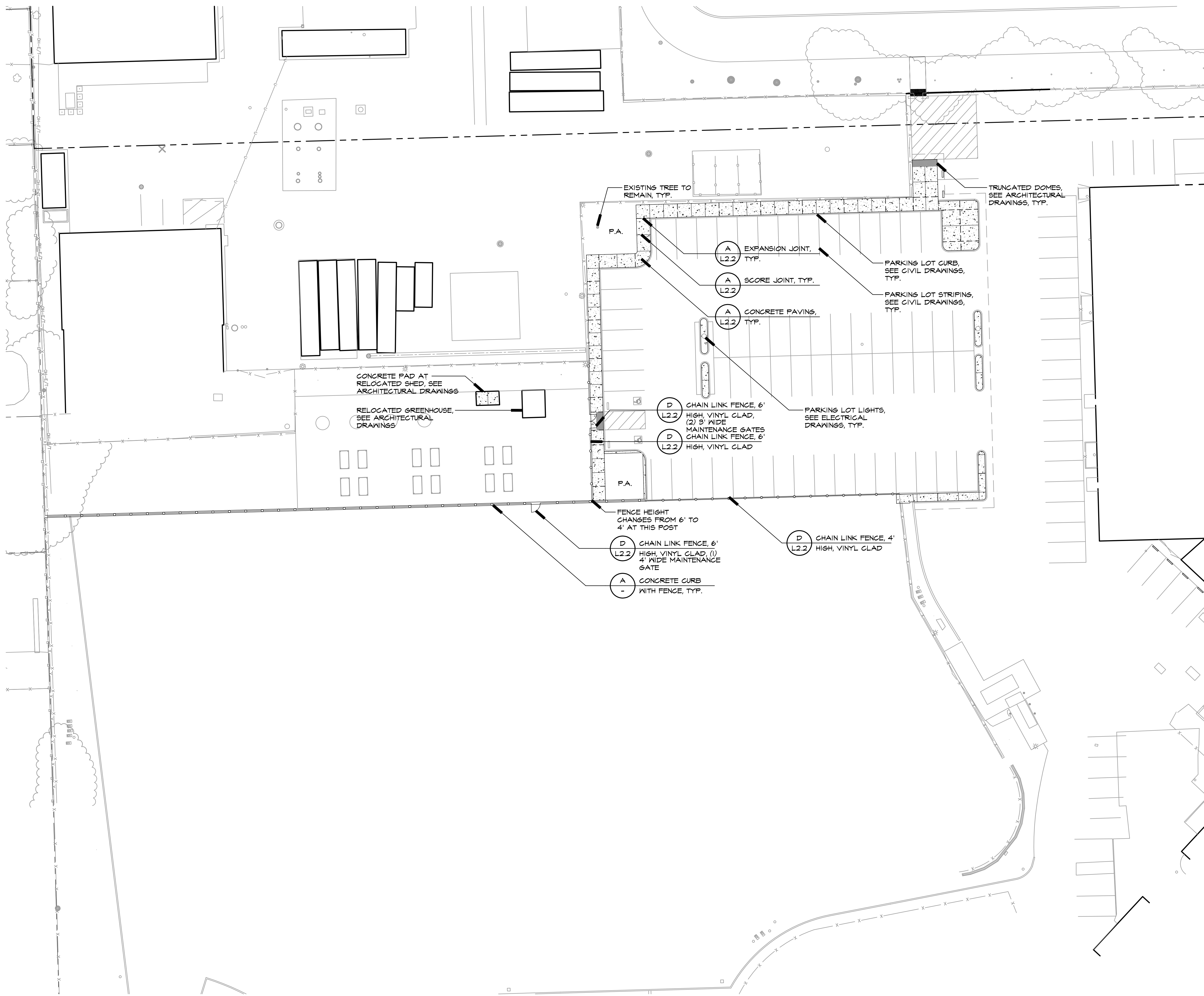
DATE **06/16/2016**
JOB # **2014037.01**
SHEET # **ANLA - H1014**

CCD1-L1.1a



SCALE: 1" = 20'-0"





MATERIAL AND DETAIL REFERENCE LEGEND

SYMBOL	DESCRIPTION	DETAIL
[Pattern]	CONCRETE PAVING TYPE 'A', PROFILE, PEDESTRIAN; COLOR, LAMP BLACK; FINISH, MEDIUM BROOM	A, L2.2
[Line]	EXPANSION JOINT IN CONCRETE PAVING	A, L2.2
[Line]	SCORE JOINT IN CONCRETE PAVING	A, L2.2
[Line]	CONCRETE CURB WITH FENCE	A, -
[Line]	CHAIN LINK FENCE, HEIGHT AND FINISH PER PLAN	D, L2.2

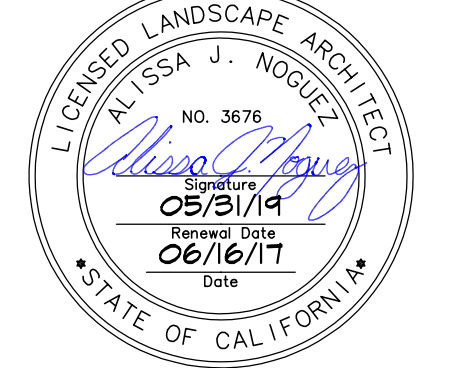
PROJECT
**ESCUELA POPULAR
NEW PARKING LOT**

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MILESTONES

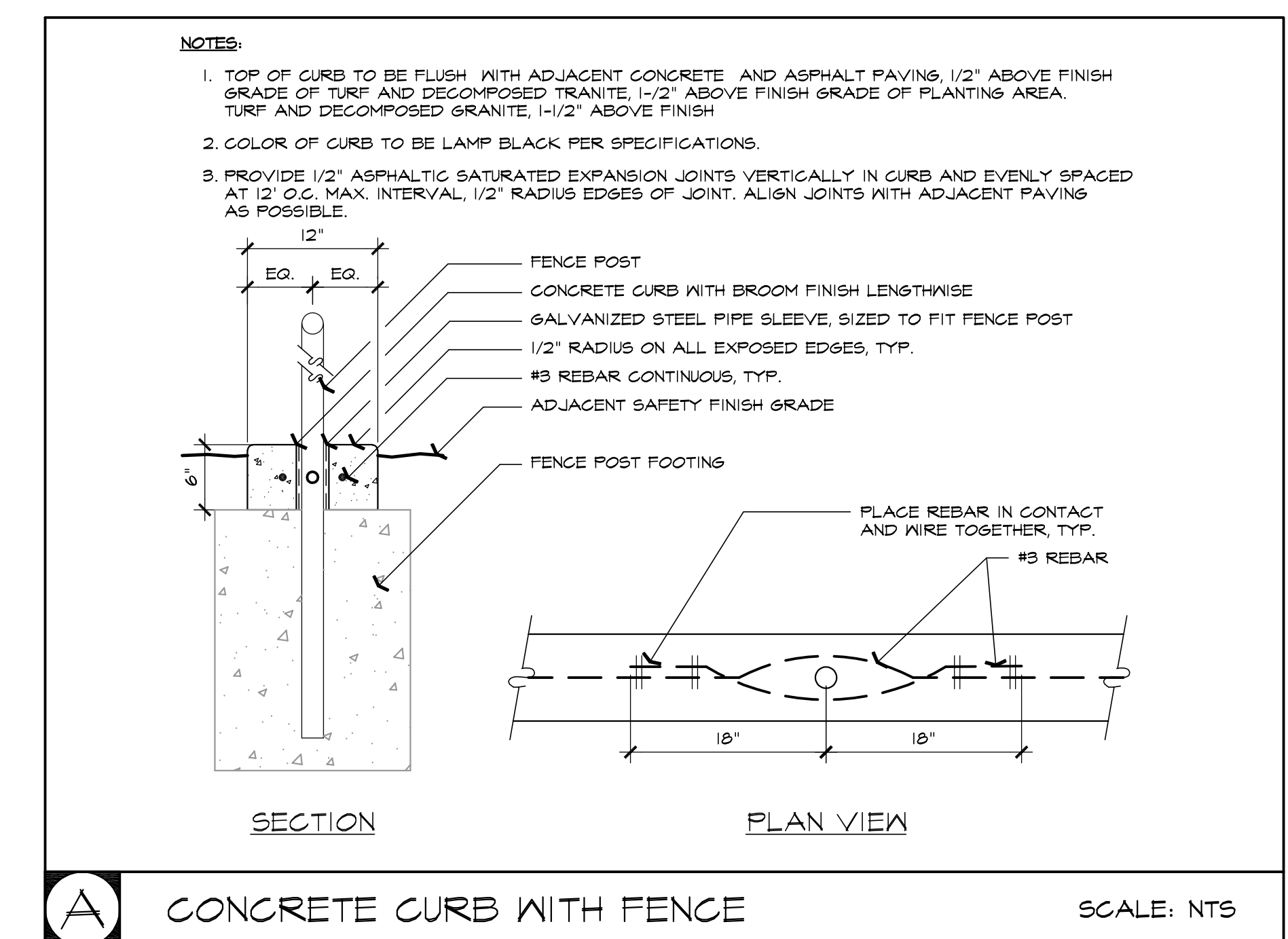
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DD	9/9/2015
25% CD	-
50% CD	-
75% CD	-
DSA SUB	12/16/2015
DSA BACK	4/26/2017

SHEET

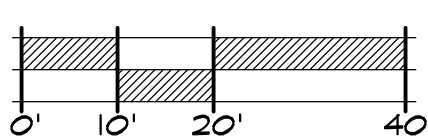
**CCD1 -
MATERIALS
AND DETAIL
REFERENCE
PLAN**

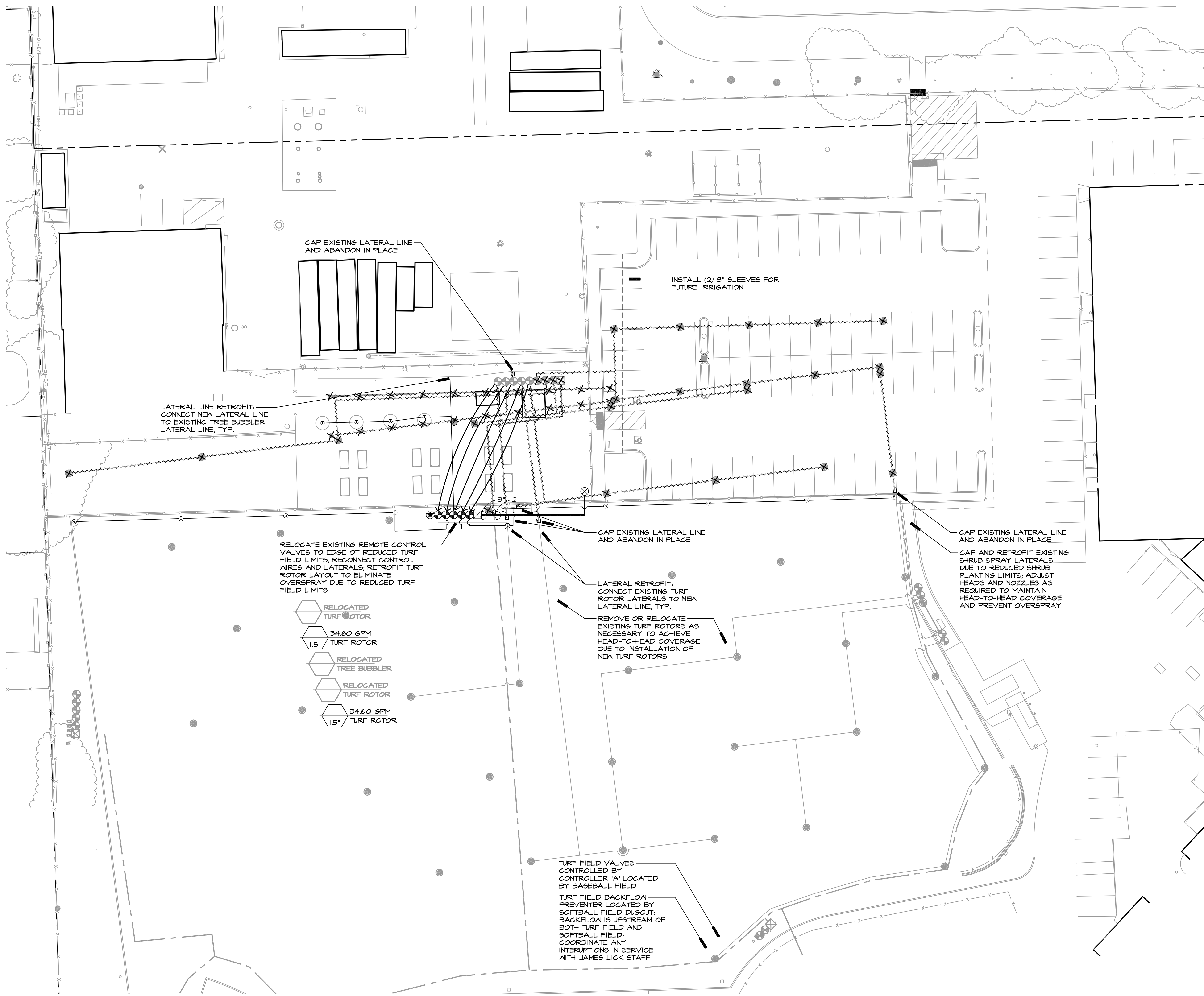
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JOB # **2014037.01**
SHEET # **ANLA - 11414**

CCD1-L2.1a



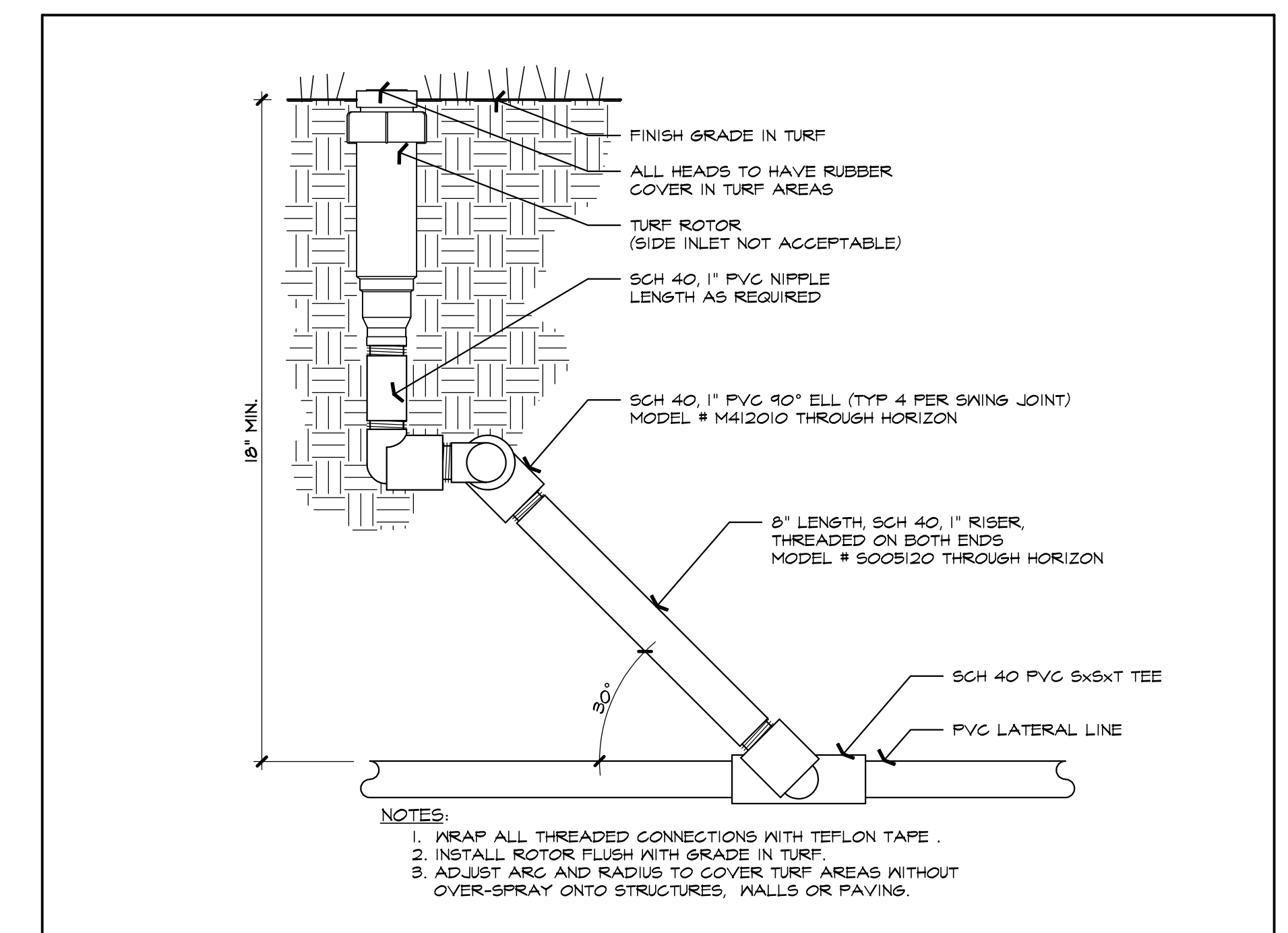
SCALE: 1" = 20'-0"



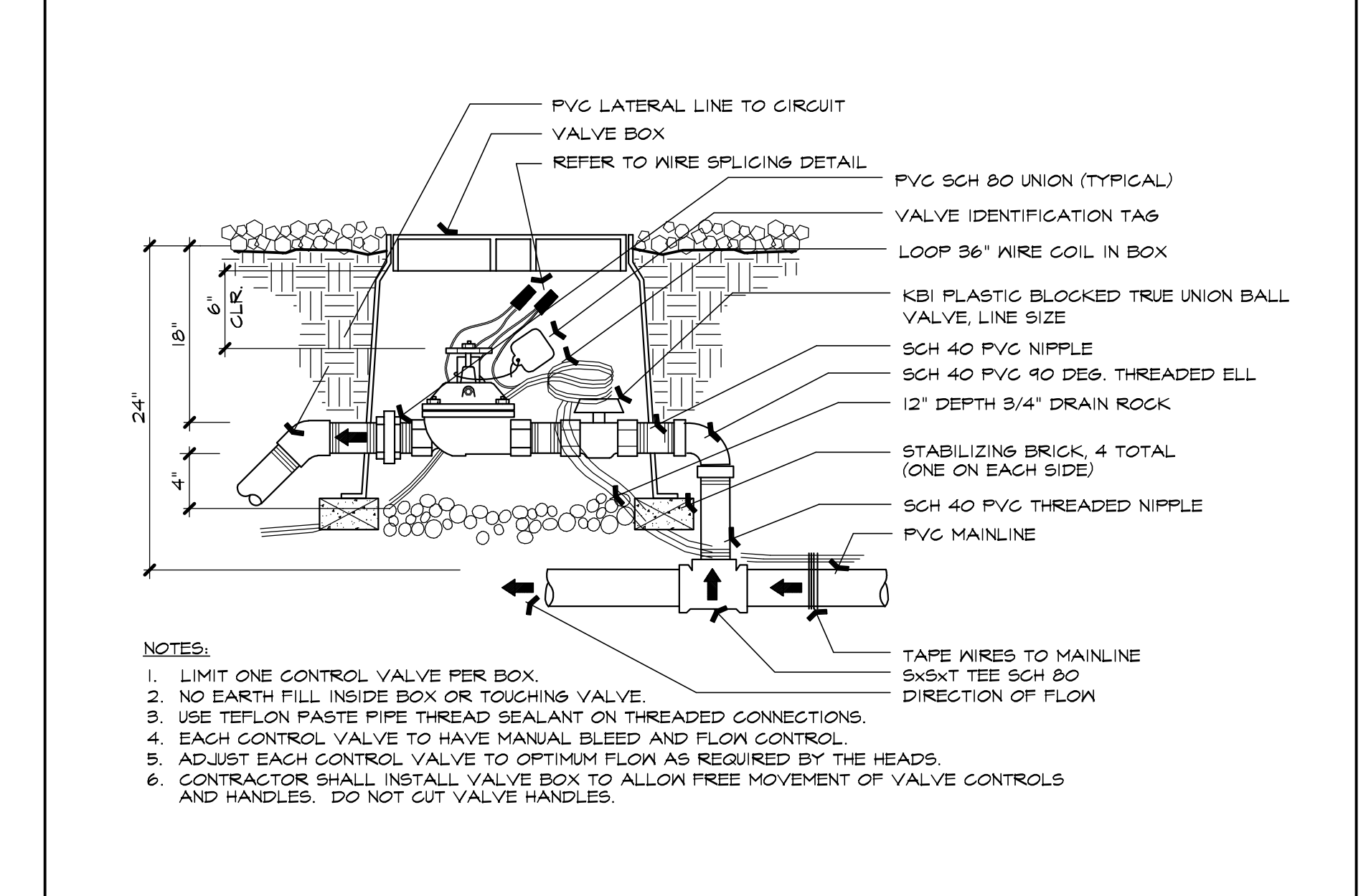


IRRIGATION LEGEND

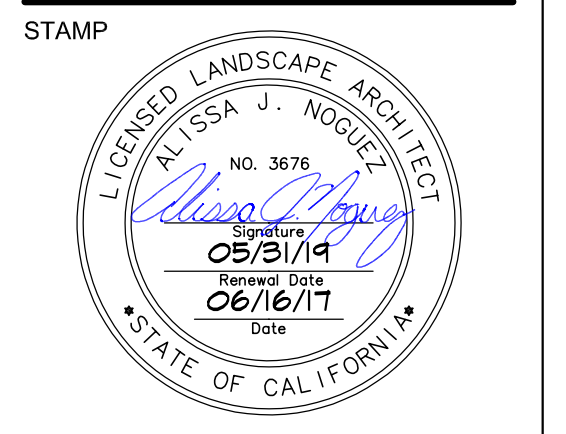
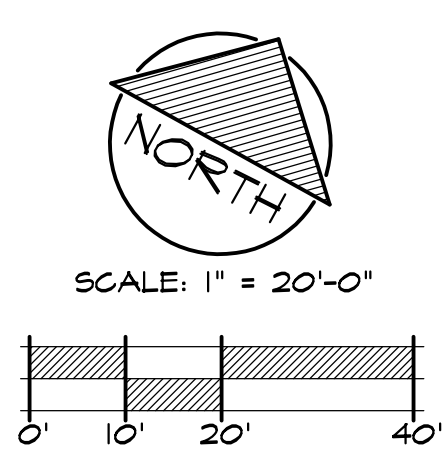
SYM	MODEL	MANUF.	DESCRIPTION	GPM	PSI	RAD
⊙	1402	RAINBIRD	FLOOD BUBBLER - TWO PER TREE, INSTALL IN DRAIN TUBE, PER DETAIL	0.25	30	-
X	-	-	EXISTING TURF SPRAY TO BE REMOVED, CLEANED AND RETURNED TO OWNER'S REPRESENTATIVE	-	-	-
⊙	1-40-04-SS-08	HUNTER	4" 180° ARC TURF ROTOR, 4" POP-UP	1.1	40	14'
⊙	1-40-04-SS-04	HUNTER	4" 90° ARC TURF ROTOR, 4" POP-UP	3.8	40	40'
X	-	-	EXISTING TURF ROTOR TO BE REMOVED, CLEANED, AND RETURNED TO OWNER'S REPRESENTATIVE	-	-	-
⊠	-	CARSON	PLASTIC SPLICE BOX	-	-	-
⊗	-	NIBCO	1/4"-2" BRONZE BODY BALL VALVE, LINE SIZE	-	-	-
⊗	ASV	-	EXISTING GATE VALVE, TO REMAIN	-	-	-
⊗	ASV	MATTS	2.5" x 4" BRASS BODY GATE VALVE, LINE SIZE	-	-	-
⊗	-	-	EXISTING REMOTE CONTROL VALVE TO REMAIN	-	-	-
⊗	FEB-FRS-D	RAINBIRD	PLASTIC ELECTRIC REMOTE CONTROL VALVE, SIZE PER PLAN WITH KBI PLASTIC BALL VALVE, LINE SIZE	-	-	-
⊗	-	-	EXISTING QUICK COUPLER VALVE TO REMAIN, TYP.	-	-	-
⊗	QUICK COUPLER, 44-LRC	RAINBIRD	QUICK COUPLING VALVE, PROVIDE (1) MATCHED QUICK COUPLING VALVE KEY, 44-K; AND (1) HOSE SWIVEL TO OWNER'S REPRESENTATIVE FOR EVERY (5) QUICK COUPLERS	-	-	-
⊗	-	-	EXISTING REMOTE CONTROL VALVE, TO BE REMOVED, CLEANED, AND RETURNED TO DISTRICT'S REPRESENTATIVE	-	-	-
PIPING						
---	SCHEDULE 40 PVC NON-PRESSURIZED LATERAL LINE, PURPLE COLOR, DEPTH PER SPECIFICATIONS, NSF APPROVED, SIZE PER CHART					
---	EXISTING IRRIGATION LATERAL LINE TO REMAIN, VERIFY LOCATION IN FIELD					
---	EXISTING IRRIGATION LATERAL LINE TO BE ABANDONED IN PLACE					
---	EXISTING IRRIGATION MAINLINE TO BE REMOVED, VERIFY LOCATION IN FIELD					
---	EXISTING IRRIGATION MAINLINE TO REMAIN, VERIFY LOCATION IN FIELD					
---	SCH 40 (UP TO 1-1/2") CLASS 315 (2" TO 4") PVC PRESSURIZED MAINLINE, PURPLE COLOR, NSF APPROVED, SIZE PER PLAN, DEPTH PER SPECIFICATIONS					
---	SCH 40 PVC SLEEVES, (2) IN EACH LOCATION, SIZE AS REQUIRED, 3" MIN. IN SIZE, 36" MINIMUM DEPTH					



B TURF ROTOR SCALE: NTS



A REMOTE CONTROL VALVE WITH BALL VALVE SCALE: NTS



STATE

DSA FILE NUMBER **43-H10**

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APPL # 01-116369

AC _____ SS _____

DATE **04/26/2017**

REVISIONS

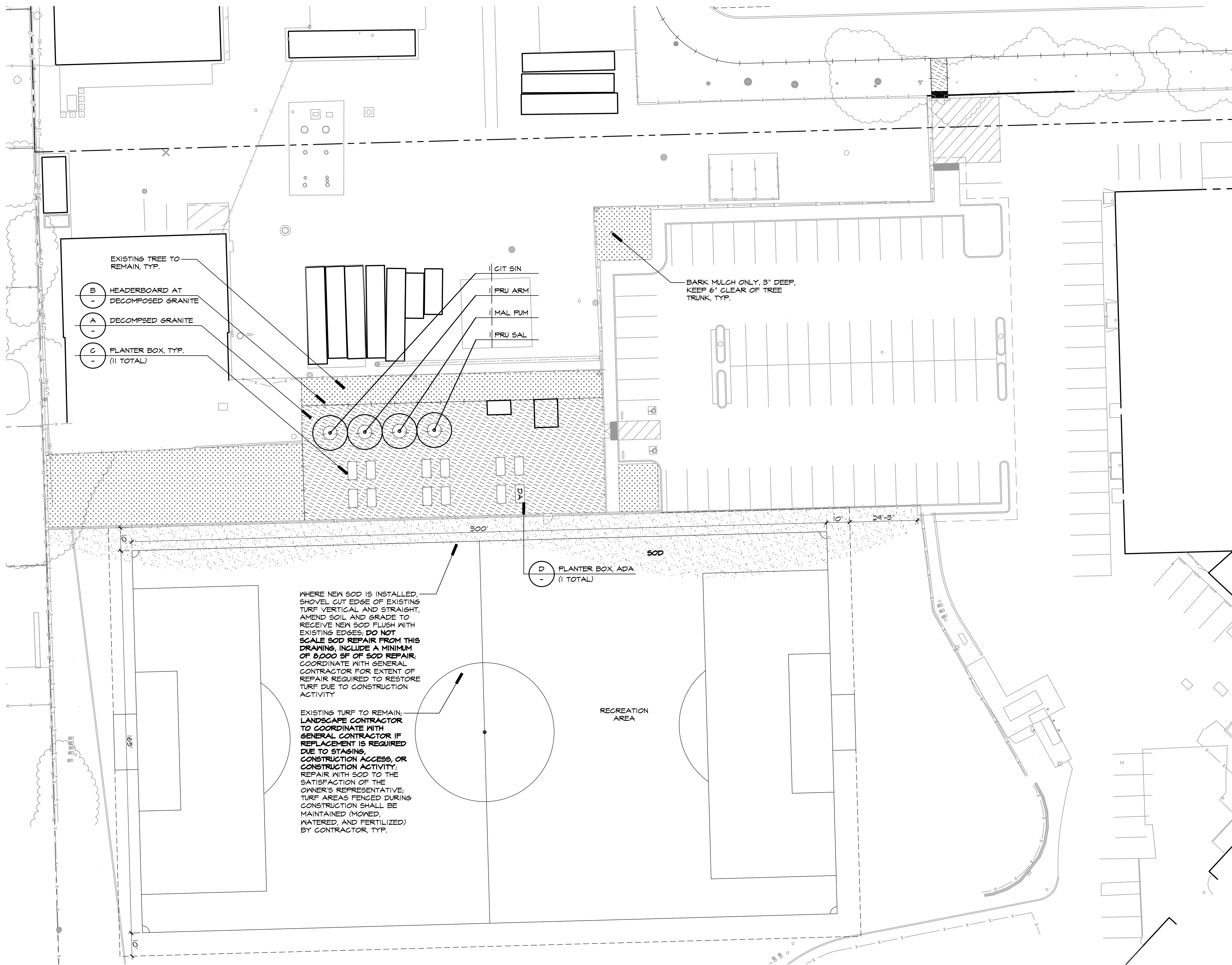
No.	Description	Date

MILESTONES

SD	-
DD	9/9/2015
25% CD	-
50% CD	-
75% CD	-
DSA SUB	12/16/2015
DSA BACK	4/26/2017

SHEET

**CCD1 -
IRRIGATION
PLAN**



PLANTING LEGEND

SYMBOL	SIZE	BOTANICAL NAME	COMMON NAME
TREES:			
CIT SIN	15 GAL	CITRUS SINENSIS	BLOOD ORANGE
MAL PUM	15 GAL	MALUS PUMILA	APPLE
FRU ARM	15 GAL	FRUNUS ARMENIACA 'BLENHEIM'	APRICOT
FRU SAL	15 GAL	FRUNUS SALICINA	PLUM

SYMBOL SIZE

GROUND COVERS:

800 800 "90/10 TALL FESQUE" BLEND, AVAILABLE FROM DELTA BLUEGRASS, (800) 697-8878

MATERIALS:

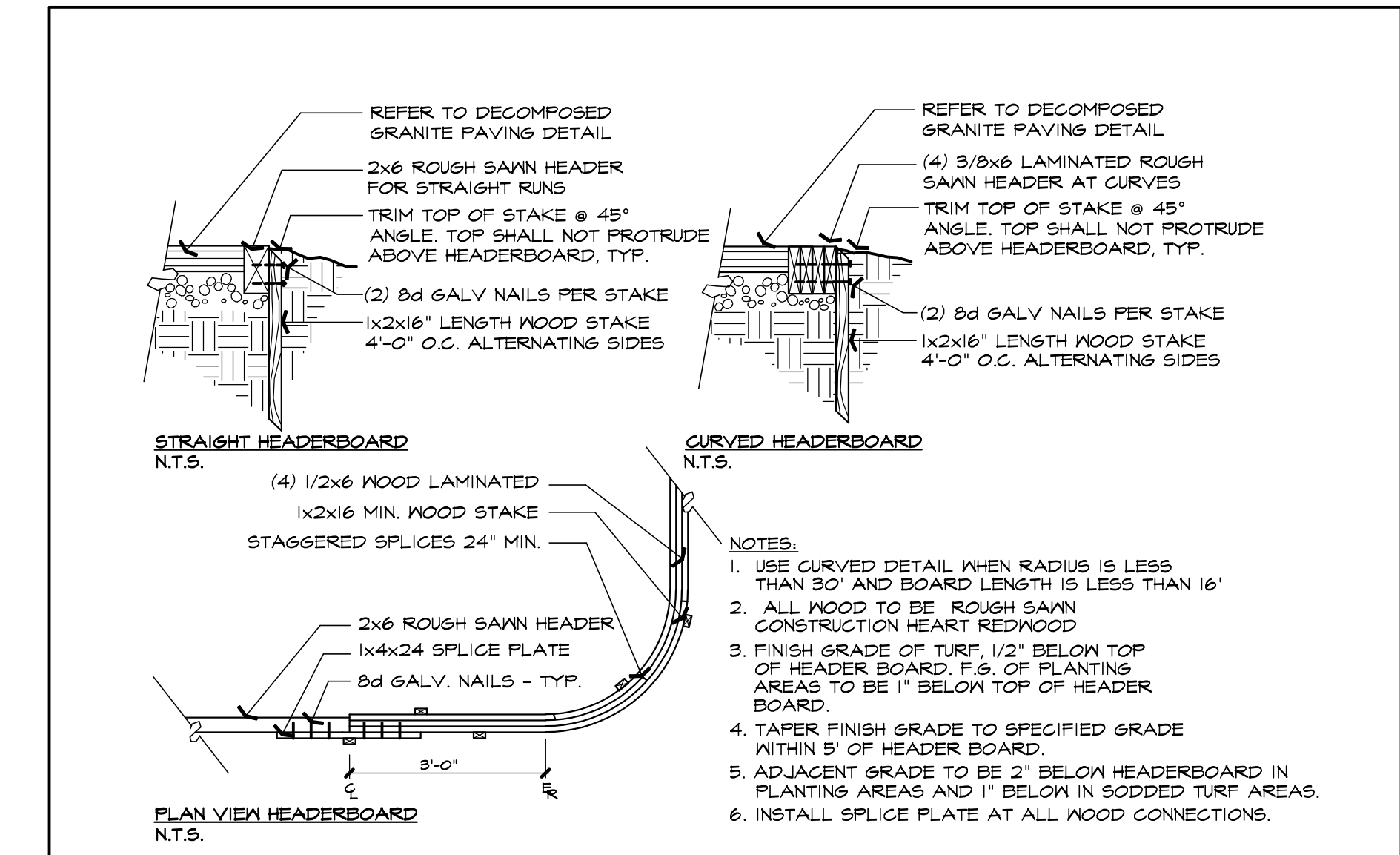
DECOMPOSED GRANITE

HEADERBOARD AT DECOMPOSED GRANITE

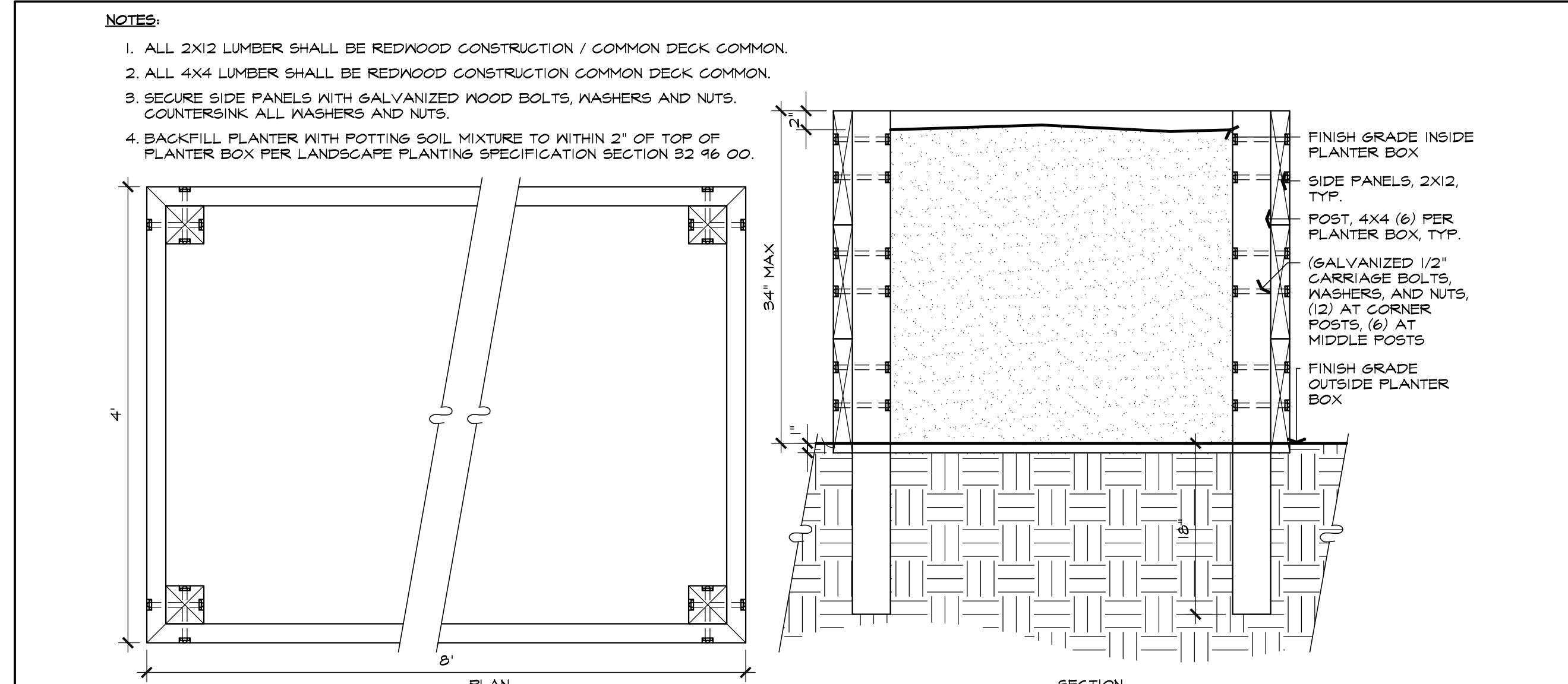
PLANTER BOX (11 TOTAL)

PLANTER BOX, ADA (1 TOTAL)

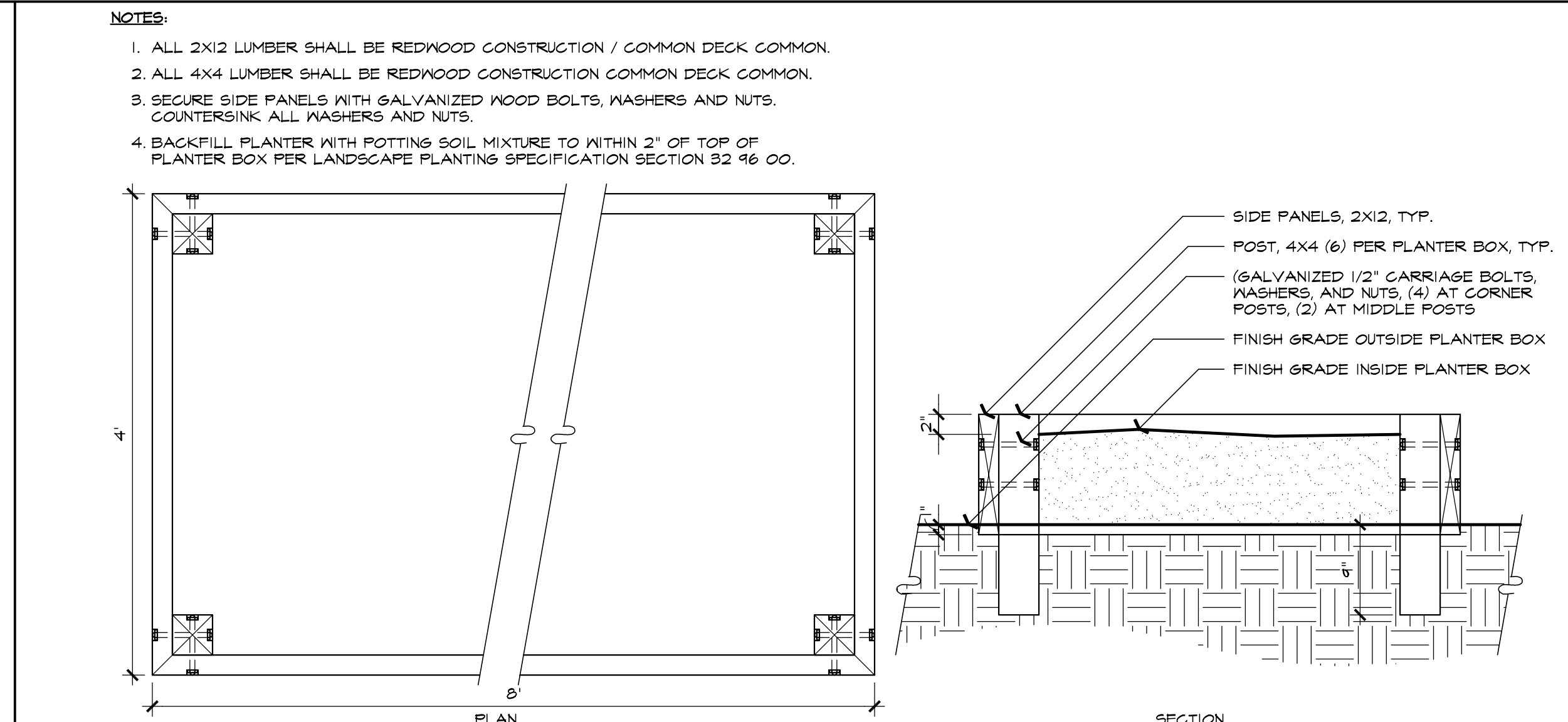
3" OF BARK MULCH AND PRE-EMERGENT ONLY



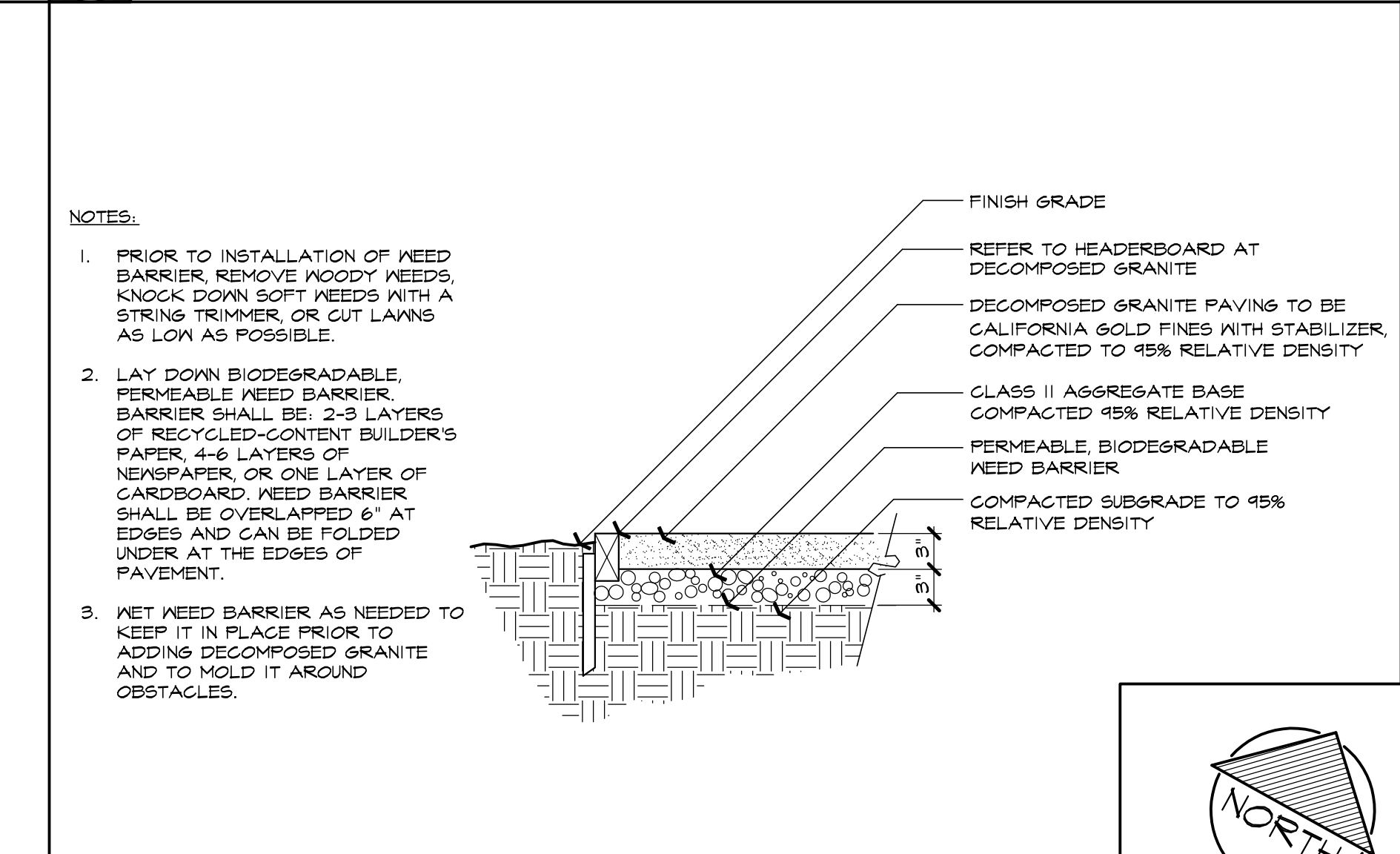
B HEADERBOARD AT DECOMPOSED GRANITE SCALE: NTS



D PLANTER BOX, ADA SCALE: NTS



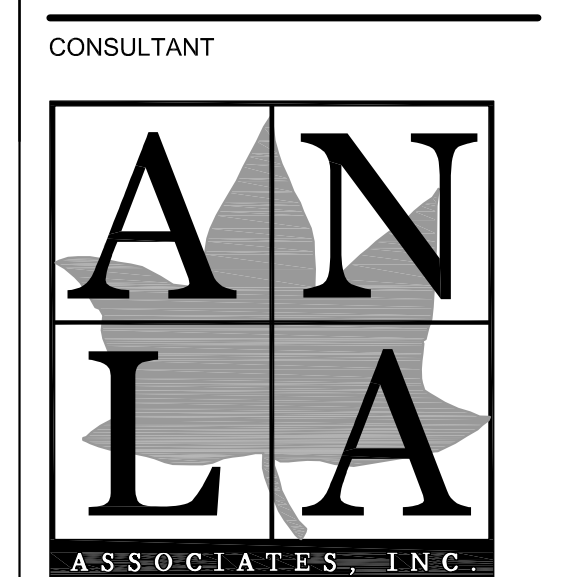
C PLANTER BOX SCALE: NTS



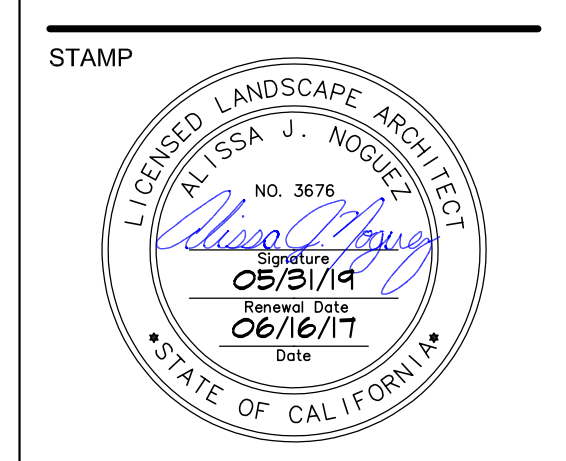
A DECOMPOSED GRANITE SCALE: NTS

PROJECT

ESCUELA POPULAR NEW PARKING LOT



1213 Lincoln Ave., Suite 211
San Jose, CA 95125
T. 408.292.2196
www.anla-associates.com



STATE

DSA FILE NUMBER **43-H10**

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APPL # 01-116369

AC _____ FLS _____ SS _____

DATE **04/26/2017**

REVISIONS

No.	Description	Date

MILESTONES

SD	-
DD	9/9/2015
25% CD	-
50% CD	-
75% CD	-
DSA SUB	12/16/2015
DSA BACK	4/26/2017

SHEET

CCD1 - PLANTING PLAN

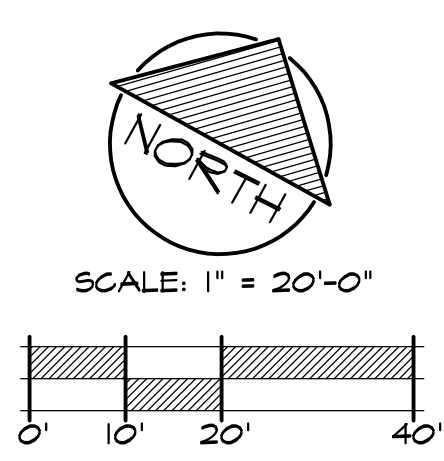
DATE **06/16/2016**

JOB # **2014037.01**

ANLA - 11414

SHEET #

CCD1-L4.1a



SECTION 26 00 00

ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

- A. Refer to the General Conditions, Supplementary Conditions and Division I - General Requirements, and the drawings. The Contractor, shall read the conditions and be responsible for, and governed by, all requirements thereunder. This Condition applies to all Sections of Specification Division 26.

1.2 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

- A. It is the intent of this Specification and the Drawings to describe complete, safe, operating systems and the materials and installation work to be performed under the Contract.
- B. The Contract Documents are complementary; what is called for by one is binding as if called for by all. If the Contractor finds a conflict, error or discrepancy in the Contract Documents, he shall call it to the Architect's/Engineer's attention in writing before proceeding with the work affected. Any work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials or equipment described in words which so applied have a well-known technical or trade meaning shall be deemed to refer to such recognized materials or work. The Contractor assumes full responsibility for familiarizing himself with the nature and extent of the Contract Documents, work, locality and local conditions that may in any manner affect the work to be done.
- C. The Drawings are, in general, drawn to scale and the Contractor may obtain approximate distances and dimensions by scaling the Drawings. It is distinctly understood, however, that he does so entirely on his own responsibility. The accuracy of the Drawings is not guaranteed. Refer to Architect's Drawings, Specifications and Room Schedules for construction details which will affect this work and equipment. Examine the Plumbing, Heating and Ventilating Drawings and Specifications to ensure that the Electrical work does not conflict with the above trades. Mechanical and Electrical Drawings are largely diagrammatic and, therefore, do not necessarily represent the exact installations; it is the Contractor's responsibility to cover all conditions on his prepared Shop Drawings and by arrangement with other trades in the field.

1.3 REGULATIONS

- A. The Contractor shall give required notices to the building inspectors, the Engineer and the Owner and comply with laws, ordinances, rules and regulations applicable to the work and safety. Authorities include, but are not limited to:
 - 1. The latest revision of the State of California, Electrical Code.

2. The applicable Rules and Regulations of the National Fire Protection Association.
 3. State Fire Marshall.
 4. The National Electric Code.
 5. Underwriters Laboratories.
 6. Any other applicable Federal, State, County or City Codes or Regulations, including O.S.H.A.
- B. Nothing in these Drawings or Specifications shall be construed to permit work not conforming to the above Regulations and Codes.

1.4 SAFETY AND INDEMNITY

- A. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of persons and property during performance of the contract. This requirement shall apply continuously and not be limited to normal working hours.
- B. No act, service, drawing review or construction review by the Owner, the Architect, the Engineers or their Consultants is intended to accept responsibility for the adequacy of the Contractor's safety measures, in, on, or near the construction site.

1.5 DRAWINGS AND SPECIFICATIONS

- A. Drawings and Divisions of these specifications shall be considered as a whole and work shown anywhere herein shall be furnished under this Division.
- B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult other drawings in preparation of the bid.
- C. Extra lengths of wiring or pull boxes or junction boxes, etc., necessitated by conditions shall be included in the bid. Report any apparent discrepancies before submitting bid.
- D. Right is reserved by the Owner to make changes of up to ten feet in location of any outlet or equipment prior to roughing-in without increasing contract cost.

1.6 EXAMINATION OF SITE

- A. The Contractor shall examine the site and the existing conditions and make allowances for them in preparing his proposal. In the event of discrepancies between existing conditions and the Drawings, the Contractor shall report such discrepancies prior to bid and bid the conditions necessary to complete the job and to provide a fully operable and acceptable systems.
- B. Extra charges will not be allowed for work that must be provided when it was apparent from a pre-bid inspection of the premises, even though the work is not shown on the drawings or called for in the Specification.

1.7 RECORD DRAWINGS AND SYSTEM OPERATION AND MAINTENANCE

- A. Submit one (1) copy of red lined record drawing indicating deviations from Contract Drawings. Show major changes only in location for any outlet, device or equipment, and hidden installations - such as feeders to architect for approval.
- B. Submit within thirty (30) days after the date of architect's acceptance, one (1) complete electronic file and three (3) complete sets as the Record of Electrical Construction.

1.8 GUARANTEE

- A. Materials and equipment furnished under this Specification and/or Drawings shall be guaranteed in writing for a period of one (1) year from the date of final acceptance against defective material, design and workmanship. The Contractor shall guarantee, in writing, that the systems shall be free of defects, and shall operate perfectly, and in accordance with their individual Specifications.
- B. Upon receipt of notice from the Owner of failure of material, equipment or section of the system, during the guaranty period, the Contractor shall make necessary corrections promptly, without expense or inconvenience to the Owner.

PART 2 - PRODUCTS

2.1 MATERIAL APPROVAL

- A. The design, manufacture and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE, ANSI, and U.L. Standards.
- B. Materials shall be new and bear Underwriters Laboratories (UL) label or other accepted testing laboratory certification. Materials that are not labeled by U.L. shall be tested and approved by an independent testing laboratory or a governmental agency acceptable to the Engineer, Owner and code enforcing authority.

2.2 SHOP DRAWINGS AND MATERIALS LIST

- A. Submittals shall be required for the following:
 - 1. Materials: A list identifying electrical items proposed for installation, including manufacturers names, part numbers, finishes, colors, materials, shape and dimensions. Items shall include wiring devices, boxes, conductors and cables, conduit, raceways, and fittings.
 - 2. Panelboards: Shop fabrication details and components.
 - 3. Transformer.
 - 4. Fire alarm system equipment and wiring diagrams.
 - 5. Security system equipment and wiring diagrams.
 - 6. Public address and clock system equipment and wiring diagrams.
 - 7. Data/Telephone System devices, equipment and cables.

2.3 OPERATING AND MAINTENANCE MANUALS

- A. Submit three (3) sets of Operating and Maintenance Manuals of equipment.
- B. Operating manuals and parts list are required for the following equipment:
 - 1. Panelboards and distribution panels.
 - 2. Transformer.
 - 3. Fire alarm system.
 - 4. PA system.
 - 5. Data Telephone System.

2.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Receive, store and handle materials in a manner to prevent damage. Costs of damage shall be borne by the Contractor.
- B. Protect equipment from weather (rain, sunshine, winds), water vapors, theft, and vehicular traffic.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

- A. Installation of parts and connection of parts into systems shall be completed by skilled electrical journeymen. Material assemblies and installation work shall be securely fastened to structure, attractive in appearance and safe to operate. Provide code required clearance about electrical equipment. Assembly work or installations that are improper, unsafe or unattractive shall be removed and replaced with satisfactory work at no additional cost to the Owner.
- B. Provide a foreman or superintendent in charge of this work at all times.

3.2 COORDINATION

- A. Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished by other trades. Inform other trades Sub-contractors of the required access to, and clearances around, electrical equipment to maintain serviceability and code compliance.
- B. Verify equipment dimensions and requirements. Check actual job conditions before installing work. Report necessary changes in design to Construction Manager in time to prevent needless work. Changes, or additions subject to additional compensation, which are made without written authorization and an agreed price, shall be at Contractor's risk and expense.

3.3 MANUFACTURER'S INSTRUCTIONS

- A. Where the specifications call for an installation to be made in accordance with Manufacturer's recommendations, a copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the Owner's representative.

- B. Follow manufacturer's instructions where they cover points not specifically indicated on drawings and specifications. If instructions are in conflict with the drawings and specifications, obtain clarification from the Engineer before starting work.

3.4 QUALITY ASSURANCE

- A. Provide a Quality Assurance program. These specifications set forth the minimum acceptable requirements. The specifications do not prohibit the Contractor from executing other Quality Assurance measures which can improve the operating facility, improve the construction schedule, and conserve energy within the scope of this project.
- B. The Contractor shall insure that workmen's practices, materials employed, equipment and methods of installation conform to accepted construction and engineering practices, and that each piece of equipment can satisfactorily perform its functional operation.

3.5 CLOSING IN UNINSPECTED WORK

- A. The Contractor shall not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested and/or approved. Field observations made by the architect or engineer do not waive the inspections required by the contract documents.
- B. Should a portion of the work be enclosed or covered up prior to inspection and testing, the contractor shall uncover the work at his own expense, and after it has been tested, inspected and approved, make repairs with such materials as may be necessary to restore the uncovered work to its intended condition.

3.6 PRELIMINARY OPERATION

- A. Should the Owner request that a portion of the plant, apparatus or equipment be operated prior to final completion and acceptance of the work, the Contractor shall consent, and such operation shall be under the supervision and direction of the Contractor, but expense thereof shall be paid by the Owner, separate and distinct from money paid on account of the Contract. Such preliminary operation and payment thereof shall not be construed as an acceptance of that portion of the work in this Contract.

3.7 ACCEPTANCE DEMONSTRATION

- A. Upon completion of work, at a time to be designated by the Engineer, the Contractor shall demonstrate for the Owner, the operation of the electrical installation, including any and all special items installed by him or installed under his supervision. A minimum of four (4) hours of time for each system must be allowed for this purpose.
- B. The system demonstrations shall be made by this Contractor in the presence of the District's facilities manager or his designated representative and the manufacturer's representative.

- C. Demonstrate the function (in the structure) of each system and indicate its relationship to the single line diagrams and drawings.
- D. Demonstrate by "start-stop operation", the controls, how to reset protective devices, how to replace fuses and what to do in case of emergency.
- E. Demonstrate how maintenance and spare parts manuals are related to the equipment and systems installed.

3.8 TESTS

- A. Where the Contract Documents, laws, ordinances or any public authority requires any work to be tested specifically or reviewed by another authority, the Contractor shall give the Engineer/Owner timely notice of readiness therefor. The Contractor shall give the Engineer/Owner the test results for review. If any work to be tested is covered up without written approval or consent of the Architect, it must, if directed by the Architect, be uncovered for examination at the Contractor's expense.
- B. The cost of all such tests shall be borne by the Contractor.
- C. Any work which fails to meet the requirements of any test or any work which does not meet the requirements of the Contract Documents shall be considered defective and may be rejected. Rejected work shall be corrected promptly by the Contractor or removed from the site.
- D. Provide written test reports for each test to the Engineer for review.

END OF SECTION 26 00 00

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SECTION 26 05 00

BASIC ELECTRICAL MATERIALS AND METHODS

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. Supporting devices for electrical components.
 - 2. Cutting and patching for electrical construction.
 - 3. Touchup painting.

1.3 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors."

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch diameter slotted holes at a maximum of 2 inches o.c., in webs.
 - 1. Channel Thickness: Selected to suit structural loading.
 - 2. Fittings and Accessories: Products of the same manufacturer as channel supports.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- F. Expansion Anchors: Carbon-steel wedge or sleeve type.
- G. Toggle Bolts: All-steel springhead type.

2.2 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumbing, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four (4); minimum of 200-lb design load.

3.3 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze or bracket-type hangers.
- D. Size supports for multiple raceway installations, so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the

- box and support the raceways with an approved fastener not more than 24-inches from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
 - L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
 - M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
 - 1. Wood: Fasten with wood screws or screw-type nails.
 - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 3. New Concrete: Concrete inserts with machine screws and bolts.
 - 4. Existing Concrete: Expansion bolts.
 - 5. Steel: Welded threaded studs or spring-tension clamps on steel.
 - a. Field Welding: Comply with AWS D1.1.
 - 6. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 - 7. Light Steel: Sheet-metal screws.
 - 8. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 FIRESTOPPING

- A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Firestopping."

3.5 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.6 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Supporting devices for electrical components.
 - 2. Electrical demolition.
 - 3. Cutting and patching for electrical construction.
 - 4. Touchup painting.

3.8 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touchup paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.9 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations, and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 26 05 00

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SECTION 26 05 23

CONDUCTORS AND CABLES

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 building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the International Electrical Testing Association and that is acceptable to authorities having jurisdiction.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
 - 1. American Insulated Wire Corp.; a Leviton Company.
 - 2. General Cable Corporation.
 - 3. Okonite Wire & Cable Company.
 - 4. Southwire Company.
- B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

- C. Conductor Material: Copper complying with NEMA WC 5; stranded conductor.
- D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC 5.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. AMP Incorporated/Tyco International.
 - 3. Hubbell/Anderson.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M Company; Electrical Products Division.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete and Below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- D. Exposed Branch Circuits: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- G. Fire Alarm Circuits: Refer to Section 16721.

3.2 INSTALLATION

- A. All conductors and cables shall be installed in raceways.
- B. 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.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

- D. Seal around conduits penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."
- E. Open cable installed above accessible ceiling space shall be supported by metallic J-hooks. No stapling is allowed. Staples used shall be removed by contractor at contractor's cost.

3.3 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.
- B. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.4 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
- B. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 23

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SECTION 26 05 26

GROUNDING AND BONDING

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 grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Ground rods and ground rod well.
 - 2. Fittings.
- B. Field Test Reports: Submit written test reports to include the following:
 - 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.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Grounding Conductors, Cables, Connectors, and Rods:
 - a. Apache Grounding/Erico Inc.
 - b. Chance/Hubbell.
 - c. Copperweld Corp.
 - d. Erico Inc.; Electrical Products Group.
 - e. Framatome Connectors/Burndy Electrical.
 - f. Galvan Industries, Inc.
 - g. Ideal Industries, Inc.
 - h. ILSCO.
 - i. Kearney/Cooper Power Systems.
 - j. Korns: C. C. Korns Co.; Division of Robroy Industries.
 - k. O-Z/Gedney Co.; a business of the EGS Electrical Group.
 - l. Racco, Inc.; Division of Hubbell.
 - m. Superior Grounding Systems, Inc.
 - n. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."
- B. Equipment Grounding Conductors: Insulated with green-colored insulation.
- C. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- D. Grounding Electrode Conductors: Stranded cable.
- E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- F. Bare Copper Conductors: Comply with the following:
1. Solid Conductors: ASTM B 3.
 2. Assembly of Stranded Conductors: ASTM B 8.
 3. Tinned Conductors: ASTM B 33.
- G. Copper Bonding Conductors: As follows:
1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.

2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
 1. Size: 5/8 by 96 inches in diameter.
- B. Test Wells: Provide handholes "Christy" G5 or equal, with cast iron traffic lid and hold down screws.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.
- F. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and branch circuits.
- C. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- D. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.
- E. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.
- F. Water Heater and Heat-Tracing Cable: Install a separate equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- G. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

- A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide 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 by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.
- G. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, Paragraph 250-81(c), using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor to the main ground bus in the electrical room.

3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare

grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding 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.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING

- A. Manholes and Handholes: Install a driven ground rod close to wall and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- B. Connections to Manhole Components: Connect exposed-metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

3.6 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
 - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.

2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the 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. Perform tests, by the fall-of-potential method according to IEEE 81.
3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - a. Equipment Rated 500 kVA and Less: 10 ohms.
 - b. Equipment Rated 500 to 1000 kVA: 5 ohms.
 - c. Manhole Grounds: 10 ohms.
4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect and Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

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SECTION 26 05 33

RACEWAYS AND BOXES

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 raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 26 Section "Basic Electrical Materials and Methods", "Security System", "Fire Alarm System", "Paging Clock System", "Data Telephone System" and "Television System" for supports, anchors, and identification products.
 - 2. Division 26 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.
 - 3. Division 23 Section "Automatic Temperature Control" for supports, anchors, and identification products.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For conduit, fittings, surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 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 manufacturers specified.

2.2 METAL CONDUIT AND TUBING

- A. Available Manufacturers:
 - 1. AFC Cable Systems, Inc.
 - 2. Alfex Inc.
 - 3. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 4. Electri-Flex Co.
 - 5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
 - 6. LTV Steel Tubular Products Company.
 - 7. Manhattan/CDT/Cole-Flex.
 - 8. O-Z Gedney; Unit of General Signal.
 - 9. Wheatland Tube Co.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. EMT and Fittings: ANSI C80.3.
 - 1. Fittings: Compression type.
- E. FMC: Aluminum.
- F. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

2.3 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers:
 - 1. American International.
 - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 3. Arnco Corp.
 - 4. Cantex Inc.
 - 5. Carlon.
 - 6. Certainteed Corp.; Pipe & Plastics Group.
 - 7. Condux International.
 - 8. ElecSYS, Inc.
 - 9. Electri-Flex Co.
 - 10. Lamson & Sessions; Carlon Electrical Products.
 - 11. Manhattan/CDT/Cole-Flex.
 - 12. RACO; Division of Hubbell, Inc.
 - 13. Thomas & Betts Corporation.
- B. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.
- C. RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.

2.4 METAL WIREWAYS

- A. Available Manufacturers:
 - 1. Hoffman.
 - 2. Square D.
- B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1.
- C. Fittings and Accessories: Include 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.
- D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
- E. Wireway Covers: Screw-cover type.
- F. Finish: Manufacturer's standard enamel finish.

2.5 SURFACE RACEWAYS

- A. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.
 - 1. Manufacturers:
 - a. Walker Systems, Inc.; Wiremold Company (The).
 - b. Wiremold Company (The); Electrical Sales Division.

- B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.6 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. Emerson/General Signal; Appleton Electric Company.
3. Erickson Electrical Equipment Co.
4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/Gedney; Unit of General Signal.
7. RACO; Division of Hubbell, Inc.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet-PLM Division.
10. Spring City Electrical Manufacturing Co.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Floor Boxes: Cast metal, fully adjustable, rectangular. Walker Omni box, RFB 4 or equal as indicated.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

G. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

2.7 FACTORY FINISHES

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors:

1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground, Single Run: RNC.
4. Underground, Grouped: RNC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures: NEMA 250, Type 3R.

B. Indoors:

1. Exposed: EMT.
2. Concealed: EMT.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
4. Damp or Wet Locations: Rigid steel conduit.
5. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
 - a. Damp or Wet Locations: NEMA 250, Type 4.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section "Basic Electrical Materials and Methods."
- D. Install temporary closures to prevent foreign matter from entering raceways.
- E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
- F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
 - 1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

- H. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches of concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Run conduit larger than 1-inch trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 4. Change from rigid nonmetallic conduit to rigid steel conduit or IMC before rising above the floor.

- I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

- J. Join raceways with fittings designed and approved for that purpose and make joints tight.
 - 1. Use insulating bushings to protect conductors.

- K. Terminations:
 - 1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
 - 2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

- L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 18 inches of slack at each end of pull wire.

- M. Telephone and Signal System Raceways, 2 Inch Trade Size and Smaller: In addition to above requirements, install raceways in maximum lengths of 150 feet and

with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

- N. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- O. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semi recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.
- P. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.
- Q. Set floor boxes level and flush with finished floor surface.
- R. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.4 CLEANING

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 26 05 33

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SECTION 26 05 53

ELECTRICAL IDENTIFICATION

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 electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

PART 2 - PRODUCTS

2.1 RACEWAY AND CABLE LABELS

- A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
 - 1. Color: Black letters on orange field.
 - 2. Legend: Indicates voltage and service.
- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating.
- C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
 - 1. Not less than 6 inches wide by 4 mils thick.
 - 2. Compounded for permanent direct-burial service.

3. Embedded continuous metallic strip or core.
 4. Printed legend indicating type of underground line.
- F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- G. Brass or Aluminum Tags: 2 by 2 by 0.05 inch metal tags with stamped legend, punched for fastener.

2.2 NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
1. Engraved legend with black letters on white face.
 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, one-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: According to color-coding.
- B. Paint: Formulated for the type of surface and intended use.
1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
 2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
 3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.

4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Install painted identification according to manufacturer's written instructions and as follows:
 1. Clean surfaces of dust, loose material, and oily films before painting.
 2. Prime surfaces using type of primer specified for surface.
 3. Apply one intermediate and one finish coat of enamel.
- F. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- G. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 12 inches below finished grade. Where width of multiple lines installed in a common trench does not exceed 16 inches overall, use a single line marker.
- H. Color-Coding of Secondary Phase Conductors: Use the following colors for phase conductors:
 1. 208/120-V Conductors:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral: White
 - e. Ground: Green.

2. 480/277-V Conductors:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - d. Neutral: Grey
 - e. Ground: Green.
3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG.
 - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a 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. Use 1-inch wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
 - b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.
- I. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
 1. Legend: 1/4 inch steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
 2. Tag Fasteners: Nylon cable ties.
 3. Band Fasteners: Integral ears.
- J. Apply identification to conductors as follows:
 1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
 2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
 3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.
- K. Apply warning, caution, and instruction signs as follows:
 1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

- L. Device Identification Labels: Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating. Install on each device cover of power receptacles, switches and tele/data outlets with feeder source (i.e. panelboard, MDF, IDF) and circuit number information.

- M. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch high lettering on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:
 - 1. Panelboards, electrical cabinets, and enclosures.
 - 2. Access doors and panels for concealed electrical items.
 - 3. Electrical switchboards.
 - 4. Disconnect switches.
 - 5. Enclosed circuit breakers.
 - 6. Telephone switching equipment.
 - 7. Paging and clock master equipment.
 - 8. Fire alarm master station or control panel.

END OF SECTION 26 05 53

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SECTION 26 28 16

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 Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes individually mounted enclosed switches and circuit breakers used for the following:
 - 1. Motor and equipment disconnecting means.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. RMS: Root mean square.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of switch, circuit breaker, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Maintenance Data: For enclosed switches and circuit breakers and for components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Closeout Procedures," include the following:
 - 1. Routine maintenance requirements for components.
 - 2. Manufacturer's written instructions for testing and adjusting switches and circuit breakers.
 - 3. Time-current curves, including selectable ranges for each type of circuit breaker.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
 - B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - C. Comply with NEMA AB 1 and NEMA KS 1.
 - D. Comply with NFPA 70.
- 1.6 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Fusible Switches:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electric Co.; Electrical Distribution & Control Division.
 - c. Square D Co.
 2. Molded-Case Circuit Breakers:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electric Co.; Electrical Distribution & Control Division.
 - c. Square D Co.
 3. Combination Circuit Breaker and Ground-Fault Trip:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electric Co.; Electrical Distribution & Control Division.
 - c. Square D Co.
 4. Molded-Case, Current-Limiting Circuit Breakers:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electric Co.; Electrical Distribution & Control Division.
 - c. Square D Co.

5. Integrally Fused, Molded-Case Circuit Breakers:

- a. Eaton Corp.; Cutler-Hammer Products.
- b. General Electric Co.; Electrical Distribution & Control Division.
- c. Square D Co.

2.2 ENCLOSED SWITCHES

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, lockable handle with two padlocks, and interlocked with cover in closed position.

2.3 ENCLOSED CIRCUIT BREAKERS

- A. Molded-Case Circuit Breaker: NEMA AB 1, 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 Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with 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^2t response.
 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
 6. GFCI Circuit Breakers: Single- and two-pole configurations with 5mA trip sensitivity.
 7. Molded-Case Switch: Molded-case circuit breaker without trip units.
- B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
 1. Lugs: Mechanical style suitable for number, size, trip ratings, and material of conductors.

2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
5. Auxiliary Switch: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
6. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
7. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.

2.4 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
 1. Outdoor Locations: NEMA 250, Type 3R.
 2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

2.5 FACTORY FINISHES

- A. Manufacturer's standard prime-coat finish ready for field painting.

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

3.2 INSTALLATION

- A. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Electrical Identification".
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.4 CONNECTIONS

- A. Install equipment grounding connections for switches and circuit breakers with ground continuity to main electrical ground bus.
- B. Install power wiring. Install wiring between switches and circuit breakers, and control and indication devices.
- C. 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.

3.5 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each enclosed switch, circuit breaker, component, and control circuit.
 - 2. Test continuity of each line- and load-side circuit.
- B. Testing Agency: Engage a qualified independent testing agency to perform specified testing.
- C. Testing: After installing enclosed switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. 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.

3.6 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges.

3.7 CLEANING

- A. On completion of installation, inspect interior and exterior of enclosures. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 28 16

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