

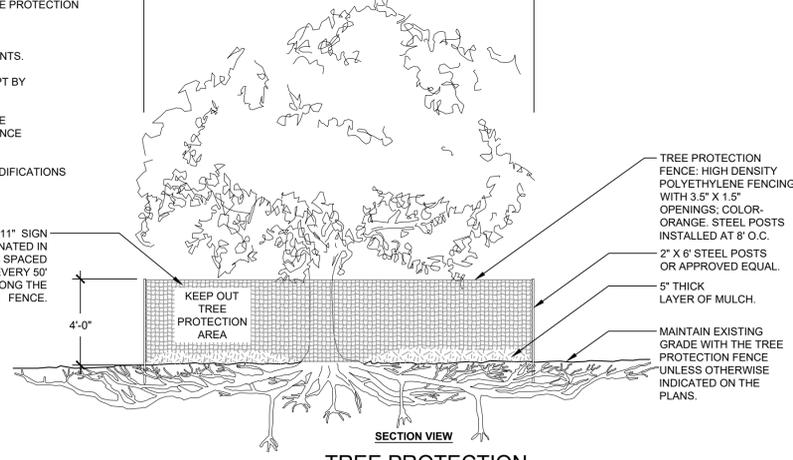
- DEMOLITION LEGEND**
- 1 REMOVE FENCE
 - 2 REMOVE GATE
 - 3 TREE TO BE BOXED, PRESERVED AND RELOCATED BY ARBORWELL PROFESSIONAL TREE MANAGEMENT. CONTACT ARBORWELL TWO WEEKS PRIOR TO THE START OF DEMOLITION TO ARRANGE FOR TREE BOXING AND PRESERVATION. CONTACT PHONE NUMBER 888.897.1987 ORANGE COUNTY OFFICE 2031 WEST COMMONWEALTH AVE. FULLERTON, CA 92833 PRESERVE OFF SITE UNTIL LANDSCAPE CONTRACTOR REQUESTS DELIVERY
 - 4 SAW CUT AND REMOVE PUBLIC ROAD CURB AS SHOWN (PER SEPARATE PERMIT)
 - 5 CAREFULLY REMOVE WALL AND FOOTING BY HAND, WITHIN THE TREE'S DRIP LINE. USE AIR SPADE TO REMOVE ALL SOIL WITHIN THE TREE'S TPZ
 - 6 ALL PLANT MATERIAL, GRASS AND WEEDS TO BE REMOVED, CLEAR AND GRUB WITHIN LIMIT OF WORK LINE TYP.
 - 7 APRON CUT TO BE REMOVED INSTALL NEW PARKWAY AND CURB/GUTTER (PER SEPARATE PERMIT)
 - 8 COMPLETELY REMOVE ALL PILASTERS AND ALL FOOTINGS

- DEMOLITION SYMBOLS LEGEND**
- DL = DRIP LINE
 - TPZ = TREE PROTECTION ZONE
 - 5' TPZ SAW CUT
 - (Symbol: Tree with dot) = TREE PROTECTION ZONE (TYP. 5' OUTSIDE OF DL) DO NOT BLOCK THE PUBLIC RIGHT-OF-WAY
 - (Symbol: Tree with circle) = TREE TO REMAIN SHOWN WITH TREE PROTECTION ZONE DO NOT BLOCK THE PUBLIC RIGHT-OF-WAY
 - (Symbol: Tree with square) = PARKWAY TREE TO REMAIN (FENCE ALONG PARKWAY LIMITS) DO NOT BLOCK THE PUBLIC RIGHT-OF-WAY
 - (Symbol: Tree with dashed line) = EXISTING TREE TO BE BOXED, PRESERVED AND RELOCATED, REFER TO DEMOLITION NOTES FOR ALL DETAILS AND CONTACT INFORMATION
 - (Symbol: Tree with X) = EXISTING TREE TO BE REMOVED
 - (Symbol: Hatched area) = EXISTING HARDSCAPE TO BE REMOVED
 - (Symbol: Cross-hatched area) = EXISTING PARKWAY TO BE REMOVED
 - (Symbol: Circle with dot) = POINT OF BEGINNING

- DEMOLITION NOTES**
- ALL DEMOLITION AND REMOVAL WORK SHALL BE CAREFULLY PERFORMED TO AVOID DAMAGE TO EXISTING TREES NOTED ON THE PLANS AS REMAINING.
 - ALL REMOVAL WORK (EXCEPT AS NOTED) SHALL BE DISPOSED OF OFF-SITE, IN A LEGAL MANNER, AT THE CONTRACTOR'S EXPENSE.
 - CLEAR THE SITE OF GRASS, WEED GROWTH, RUBBISH, DEBRIS, PAVEMENT, CONCRETE, INACTIVE OR ABANDONED FACILITIES (VERIFIED BY THE AGENCY'S AUTHORIZED REPRESENTATIVE), ETC., THAT ARE TO BE REMOVED FOR CONSTRUCTION OF THE SITE IMPROVEMENTS TO THE LIMITS AND DEPTHS SHOWN ON THE PLANS.
 - ABANDONED UNDERGROUND FACILITIES (VERIFIED BY THE AGENCY'S AUTHORIZED REPRESENTATIVE), ROOTS 3" IN DIAMETER AND LARGER, ROCKS AND BROKEN MASONRY LARGER THAN 4" IN ANY DIMENSION SHALL BE REMOVED TO A MINIMUM DEPTH OF 12" BELOW FINISH GRADE.
 - MISCELLANEOUS, INACTIVE, OR ABANDONED UNDERGROUND FACILITIES LOCATED 12" OR MORE BELOW FINISH GRADE MAY BE REMOVED WITH THE AGENCY'S AUTHORIZED REPRESENTATIVE APPROVAL.
 - MISCELLANEOUS ACTIVE LINES WITHIN 12" OF FINISH GRADE THAT ARE UNCOVERED DURING THE GRADING OPERATIONS SHALL BE PROTECTED.
 - ALL DELETERIOUS MATERIALS WITHIN THE LIMITS OF THE WORK SHALL BE DISPOSED OF OFF-SITE BY THE CONTRACTOR, WHO SHALL MAKE ALL NECESSARY ARRANGEMENTS AND PAY ALL COSTS RELATED TO THE DISPOSAL.
 - ACTIVE UTILITIES SHALL BE PROTECTED BY AND AT THE EXPENSE OF THE CONTRACTOR. KEEP ALL REQUIRED UTILITIES IN OPERATING CONDITION DURING THE ENTIRE PERIOD OF WORK, INCLUDING EXISTING IRRIGATION SYSTEMS FOR LANDSCAPE MAINTENANCE.
 - INACTIVE OR ABANDONED UTILITIES SHALL BE DISCONNECTED, REMOVED, AND PLUGGED OR CAPPED SUBJECT TO THE LOCAL GOVERNING ORDINANCES.
 - IF THE CONTRACTOR ENCOUNTERS ANY EXISTING UNDERGROUND UTILITIES NOT SHOWN ON THE DRAWINGS, HE SHALL IMMEDIATELY NOTIFY THE OWNER WHO WILL DETERMINE FURTHER PROCEDURE
 - BURNING OF DEBRIS WILL NOT BE PERMITTED EXCEPT BY WRITTEN PERMISSION FROM THE AIR POLLUTION CONTROL AUTHORITIES AND GOVERNING FIRE AUTHORITIES.

- NOTES:**
- SEE SPECIFICATIONS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS.
 - IF THERE IS NO EXISTING IRRIGATION, SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.
 - NO PRUNING SHALL BE PERFORMED EXCEPT BY APPROVED ARBORIST.
 - NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING INCLUDING DURING FENCE INSTALLATION AND REMOVAL.
 - SEE SITE PREPARATION PLAN FOR ANY MODIFICATIONS WITH THE TREE PROTECTION AREA.

TREE PROTECTION ZONE (TPZ) = CROWN DRIP LINE OR 5' OUTSIDE DRIP LINE FOR PROTECTED TREES. SEE TREE PRESERVATION NOTE FOR FENCE ALIGNMENT.



TREE PROTECTION NOTES

- "TREE PROTECTION ZONE" (TPZ) FOR EXISTING TREES:
- BEFORE BEGINNING ANY DEMOLITION OR CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL INSTALL A TEMPORARY PLASTIC ORANGE WEB FENCE AROUND ALL EXISTING TREES TO BE SAVED.
 - COORDINATE ALL OFF-SITE IMPROVEMENTS WITHIN THE TPZ WITH THE COMMUNITY FORESTER OFFICE.
 - NO CONSTRUCTION MATERIALS OR ACTIVITIES ALLOWED IN THIS AREA.
 - PRUNING OF CITY TREES TO PROVIDE CLEARANCE FOR CONSTRUCTION ACTIVITIES SHALL ONLY BE DONE BY CITY OF SANTA MONICA.
 - TPZ FOR ALL TREE SPECIES (EXCEPT PROTECTED TREES) THE FENCE SHALL BE INSTALLED NO CLOSER THAN THE DRIP-LINE (OR AS FAR AWAY FROM THE TRUNK AS PRACTICABLE).
 - TPZ FOR ALL PROTECTED TREES THE FENCE SHALL BE INSTALLED NO CLOSER TO THE TREE THAN 5' FROM THE EDGE OF THE TREE'S DRIPLINE OR 15' FEET FROM THE TRUNK, WHICHEVER IS GREATER.
 - FENCING SHALL CONSIST OF HIGH DENSITY POLYETHYLENE FENCING WITH 3.5" X 1.5" OPENINGS, COLOR- ORANGE.
 - STEEL POSTS INSTALLED AT 8' O.C.
 - ALL CONTRACTORS AND THEIR CREWS SHALL NOT BE ALLOWED INSIDE THIS "SAFE ZONE", NOR SHALL THEY BE ALLOWED TO STORE OR DUMP FOREIGN MATERIALS WITHIN THIS AREA. NO WORK OF ANY KIND, INCLUDING TRENCHING, SHALL BE ALLOWED WITHIN THE SAFE ZONE EXCEPT AS DESCRIBED BELOW. THE FENCING SHALL REMAIN AROUND EACH TREE TO BE SAVED UNTIL THE COMPLETION OF CONSTRUCTION OPERATIONS.
 - CONTRACTOR SHALL PROTECT FROM DAMAGE ALL ELEMENTS TO REMAIN AND SHALL REPLACE IN KIND, TO THE SATISFACTION OF THE CITY, ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTORS OPERATIONS.
- PROTECTED TREES** - ANY OF THE FOLLOWING SOUTHERN CALIFORNIA NATIVE TREE SPECIES, WHICH MEASURES FOUR INCHES OR MORE IN CUMULATIVE DIAMETER, FOUR AND ONE-HALF FEET ABOVE THE GROUND LEVEL AT THE BASE OF THE TREE:
- OAK TREE INCLUDING VALLEY OAK (QUERCUS LOBATA) AND CALIFORNIA LIVE OAK (QUERCUS AGRIFOLIA), OR ANY OTHER TREE OF THE OAK GENUS INDIGENOUS TO CALIFORNIA BUT EXCLUDING THE SCRUB OAK (QUERCUS DUMOSA).
 - SOUTHERN CALIFORNIA BLACK WALNUT (JUGLANS CALIFORNICA VAR. CALIFORNICA)
 - WESTERN SYCAMORE (PLATANUS RACEMOSA)
 - CALIFORNIA BAY (UMBELLULARIA CALIFORNICA)

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UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

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REVISIONS

DEMOLITION PLAN

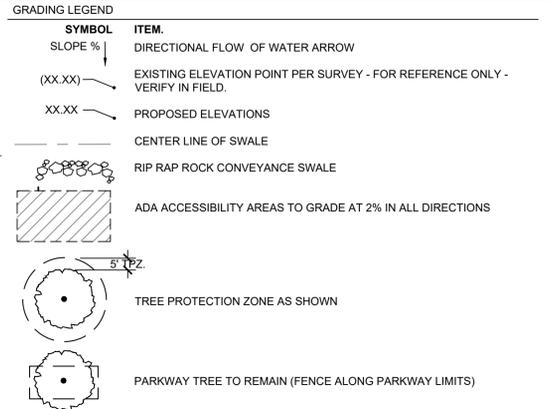
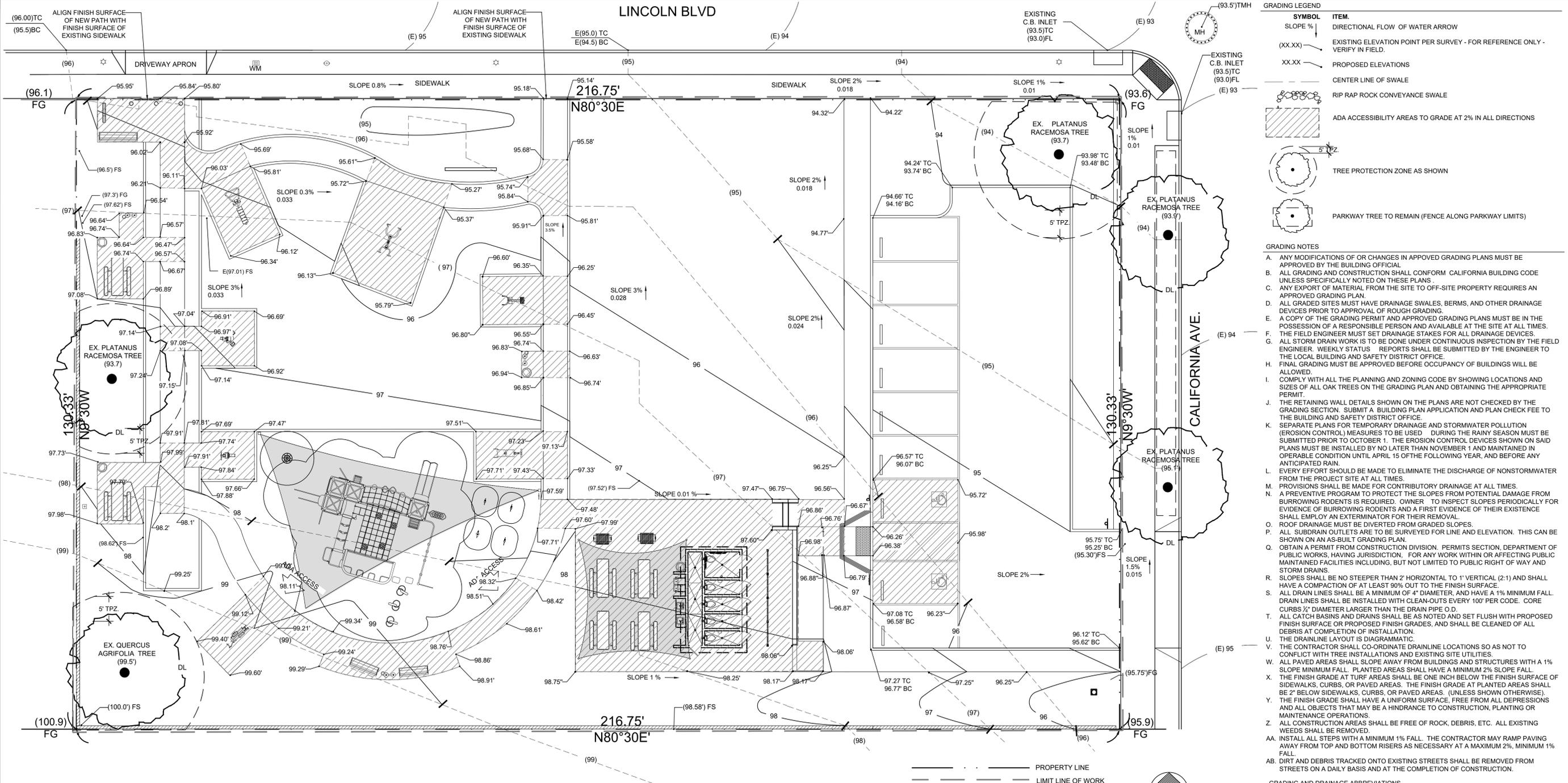
OWNER
2457 S LINCOLN BLVD
2461 S LINCOLN BLVD
VENICE, CA 90291

LANDSCAPE PROJECT

PREPARED BY: XX
REVIEWED BY: XX

DATE: XX-XX-XX

SHEET NO.
LD-1.0
X OF X



GRADING AND DRAINAGE ABBREVIATIONS

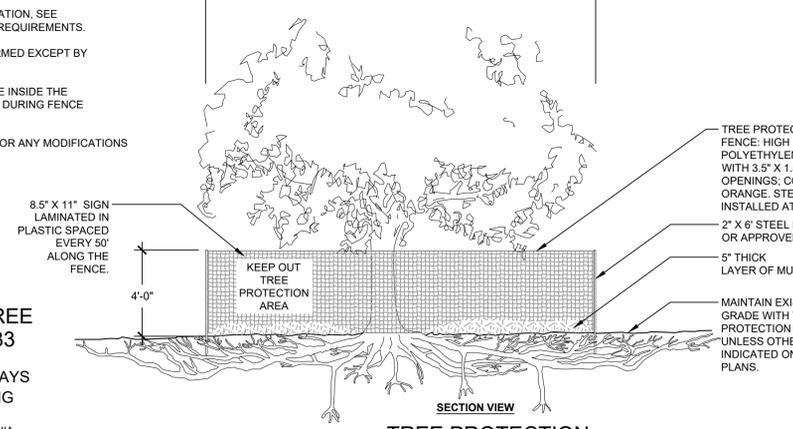
INI	= INVERT ELEVATION IN	TC	= TOP OF CURB
INO	= INVERT ELEVATION OUT	TG	= TOP OF GRATE
INV	= INVERT ELEVATION	TL	= TOP OF LANDING
FG	= FINISHED GRADE	TP	= TOP OF PLASTER
FH	= FIRE HYDRANT	TR	= TOP OF RAIL
FL	= FLOW LINE	TW	= TOP OF WALL
FS	= FINISHED SURFACE		
PP	= POWER POLE		

- NOTES:**
- SEE SPECIFICATIONS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS.
 - IF THERE IS NO EXISTING IRRIGATION, SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.
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REVISIONS

NO.	DATE	DESCRIPTION

GRADING PLAN

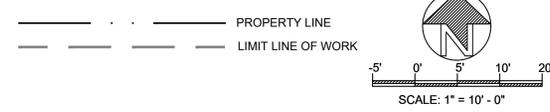
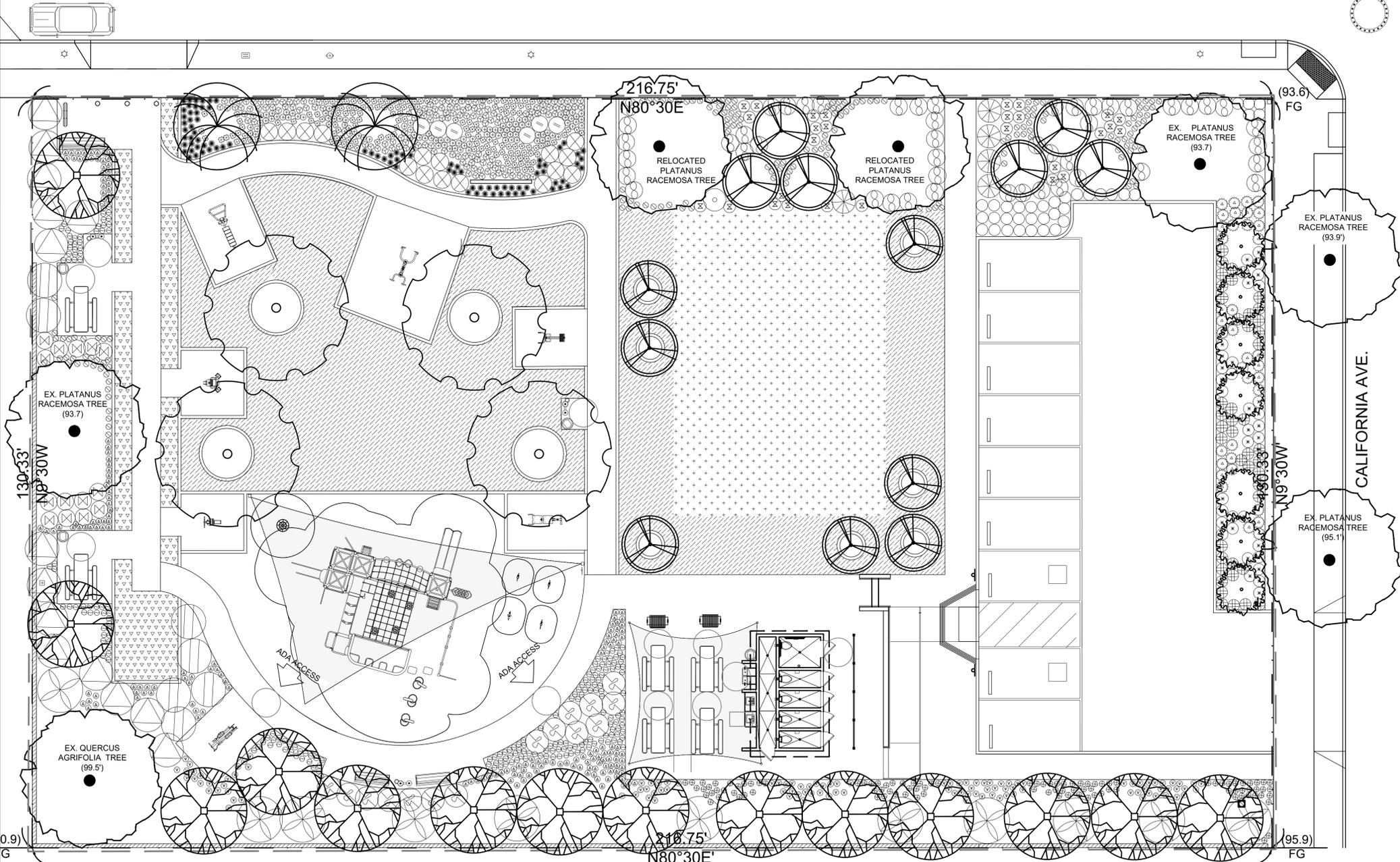
SHEET TITLE

LANDSCAPE PROJECT

OWNER
 2457 S LINCOLN BLVD
 2461 S LINCOLN BLVD
 VENICE, CA 90291

PREPARED BY: XX
 REVIEWED BY: XX
 DATE: XX-XX-XX
 SHEET NO.
LG-1.0
 X OF X

LINCOLN BLVD



PLANTING NOTES

- A. CONTRACTOR IS TO REVIEW PLANS, VERIFY SITE CONDITIONS AND PLANT QUANTITIES PRIOR TO INSTALLATION. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR ANY COST INCURRED DUE TO DAMAGE OF EXISTING UTILITIES. PLANT MATERIAL QUANTITIES ARE LISTED FOR THE CONVENIENCE OF THE CONTRACTOR. ACTUAL NUMBER OF SYMBOLS SHALL HAVE PRIORITY OVER QUANTITY DESIGNATED. CONFLICTS BETWEEN THE SITE AND THESE PLANS OR WITHIN THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO LANDSCAPE INSTALLATION. ANY DEVIATION(S) FROM THE PLANS OR SPECIFICATIONS WILL REQUIRE WRITTEN APPROVAL FROM THE OWNER AND/OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATION.
B. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OF ALL SITE CONDITIONS WHICH PREVENT INSTALLATION PER PLANS AND SPECIFICATIONS.
C. THE CONTRACTOR SHALL BE LIABLE FOR REMOVING AND REINSTALLING ALL IRRIGATION EQUIPMENT. AND REPLANTING AREAS WHICH ARE NOT INSTALLED PER PLANS AND SPECIFICATIONS.
D. THE IRRIGATION SYSTEM SHALL BE INSTALLED AND TESTED PRIOR TO PLANT MATERIALS.
E. TREES AND SHRUBS SHALL BE PLANTED AFTER CONCRETE PLACEMENT. BUT NOT BEFORE THE IRRIGATION COVERAGE TEST HAS BEEN APPROVED (REFER TO SPECIFICATIONS).
F. PLACE TREES BETWEEN IRRIGATION HEADS WHEREVER POSSIBLE.
G. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS AND/OR REPLACEMENT OF ANY DAMAGED LANDSCAPE AREAS BEYOND THE LIMIT OF WORK. AS A DIRECT RESULT OF THE LANDSCAPE CONSTRUCTION BY THE CONTRACTOR AND/OR BY HIS SUB-CONTRACTOR. REPLACEMENT ITEMS SHALL BE AN EXACT DUPLICATE OF THE ORIGINAL WORK. UNLESS OTHERWISE APPROVED BY THE LANDSCAPE ARCHITECT.
H. CLEAN-UP SHALL TAKE PLACE ON A DAILY BASIS UNLESS OTHERWISE APPROVED BY THE OWNER.
I. THE PLANTING PLANS ARE ONLY ACCURATE FOR THE PLANTING LOCATION AND PLANT SIZE. THE CONTRACTOR SHALL VERIFY ALL QUANTITIES BY PLAN CHECK.
J. THE CONTRACTOR SHALL MAINTAIN A QUALIFIED SUPERVISOR ON THE SITE AT ALL TIMES DURING CONSTRUCTION THROUGH COMPLETION OF PICK-UP WORK.
K. THE CONTRACTOR SHALL RECEIVE SITE GRADED WITHIN .10 FOOT OF FINISH GRADE. COMMENCEMENT OF WORK INDICATES CONTRACTOR'S ACCEPTANCE OF EXISTING GRADES AND CONDITIONS. FINAL GRADES SHALL BE ADJUSTED BY CONTRACTOR AS DIRECTED BY OWNERS REPRESENTATIVE. ALL GRADING SHALL BE COMPLETED PRIOR TO COMMENCEMENT OF PLANTING OPERATIONS.
L. THE CONTRACTOR SHALL FURNISH AND PAY FOR ALL CONTAINER GROWN TREES, SHRUBS, VINES, SEEDED/SODDED TURF, HYDROMULCHES, AND FLATTED GROUNDCOVERS. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR AND PAY FOR PLANTING, STAKING, AND GUARANTEE OF ALL PLANT MATERIALS. SEE PLANTING DETAILS. FOR PLANTING AND STAKING/GUYING REQUIREMENTS.
M. THE LANDSCAPE ARCHITECT AND/OR OWNER SHALL APPROVE PLANT MATERIAL PLACEMENT BY CONTRACTOR PRIOR TO INSTALLATION.
N. INSTALL SHREDDED MULCH IN ALL SHRUB AND GROUNDCOVER AREAS AT A DEPTH OF 3" UNLESS OTHERWISE INDICATED ON THE PLANS.
O. FERTILIZER FOR ALL LAWN AREAS SHALL BE A SLOW-RELEASE, HIGH-NITROGEN FERTILIZER INCORPORATED INTO THE SOIL DURING PLANTING.
P. FOR AREAS TO BE LANDSCAPED AND IRRIGATED. THE FOLLOWING AMENDMENTS SHALL BE UNIFORMLY BROADCAST AND THOROUGHLY INCORPORATED 8" DEEP BY MEANS OF A ROTOTILLER OR EQUAL AMOUNT PER 1000 SQUARE FEET 2 CU. YDS. NITROGEN STABILIZED ORGANIC COMPOST 50 LBS. AGRICULTURAL GYPSUM
Q. THE PLANTING PITS FOR TREES SHALL BE DUG TWO TIMES THE DIAMETER OF THE ROOTBALL AND THE SAME DEPTH AS THE ROOTBALL.

PLANTING PITS FOR SHRUBS AND PERENNIALS SHALL BE DUG TWICE AS WIDE AND ONE-AND-A-HALF TIMES AS DEEP AS THE ROOTBALL. THE BACKFILL MIX FOR USE AROUND THE ROOTBALL OF ALL TREES, SHRUBS, AND PERENNIALS SHALL CONSIST OF THE FOLLOWING FORMULA:

- 3 PARTS BY VOLUME ON-SITE SOIL
1 PART BY VOLUME ORGANIC AMENDMENT (AS IN #7 ABOVE)
R. THE LANDSCAPE CONTRACTOR SHALL MAINTAIN ALL PLANTED AREAS SHOWN ON THE PLANS. INCLUDING (BUT NOT LIMITED TO) WATERING, WEEDING, MOWING, PRUNING, AND EDGING, FOR A PERIOD OF THIRTY (30) DAYS.
S. THE LANDSCAPE CONTRACTOR SHALL WARRANT AND REPLACE ANY PLANT MATERIAL THAT DIES OR SHOWS SIGNS OF LACK OF VIGOR OR OTHER UNHEALTHFUL APPEARANCE WITHIN NINETY (90) DAYS OF COMPLETION OF CONTRACT AT NO COST TO THE OWNER.

SYMBOLS LEGEND

- SURE-LOC SURE EDGE STEEL LANDSCAPE EDGING 3/18" X 4" X 18" .182-.188" AVERAGE THICKNESS. CONTACT SURELOCK INGLEWOOD CAPHONE1-800-787-3582

PLANT LEGEND

Table with columns: PLANT TYPE, SYMBOL, SCIENTIFIC NAME, COMMON NAME, PLANT FACTOR, SIZE, QTY., REMARKS. Lists various trees, shrubs, perennials, and grasses with their respective quantities and notes.

ALL PLANTING AREAS TO RECEIVE A MIN. OF 1" DEEP LAYER OF KELLOGG'S 'XERIMULCH' (AVAILABLE THROUGH KELLOGG'S SUPPLY, INC. 1.800.232.2322) AND 2" LAYER OF WOOD MULCH.



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REVISIONS table with columns for revision number and description.

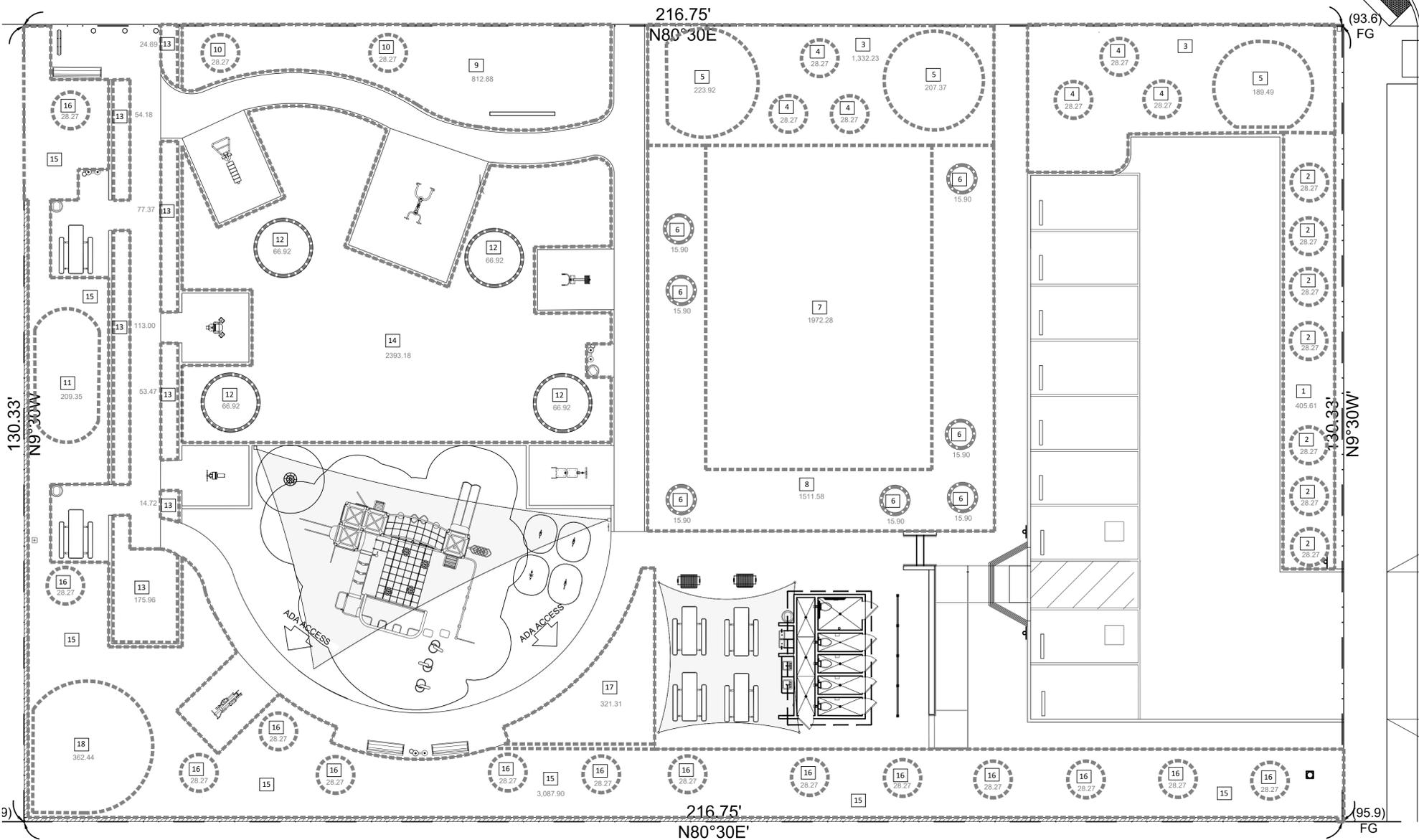
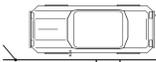
PLANTING PLAN

OWNER: 2457 S LINCOLN BLVD, 2461 S LINCOLN BLVD, VENICE, CA 90291. LANDSCAPE PROJECT

PREPARED BY: XX, REVIEWED BY: XX. DATE: XX-XX-XX.

SHEET NO. LP-1.0 X OF X

LINCOLN BLVD



CALIFORNIA AVE.



SYMBOLS LEGEND

HYDROZONE AREAS 1

HYDROZONE LIMITS

REFER TO THE HYDROZONES ON THE "WATER EFFICIENT LANDSCAPE WORKSHEET" ON SHEET LH-1.0

WATER EFFICIENT LANDSCAPE WORKSHEET							
Non-Residential Landscape Projects							
Reference ETo for the area ETo=	50.10						
Hydrozone # / Planting Description	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Landscape Area (sq. ft.)	ETAF x Landscape Area	Estimated Total Water Use (ETWU) gallons/yr
Regular Landscape Areas							
1 - LOW WATER SHRUBS	0.2	DRIP	0.81	0.25	405.61	100.15	3,110.88
2 - LOW WATER TREES	0.2	BUBBLERS	0.81	0.25	197.89	48.86	1,517.74
3 - MODERATE WATER SHRUBS	0.5	DRIP	0.81	0.62	1,332.23	822.36	25,544.28
4 - MODERATE WATER TREES	0.5	BUBBLERS	0.81	0.62	169.62	104.70	3,252.31
5 - MODERATE WATER TREES	0.5	BUBBLERS	0.81	0.62	620.78	383.20	11,902.88
6 - MODERATE WATER TREES	0.5	BUBBLERS	0.81	0.62	111.13	68.60	2,130.81
9 - LOW WATER SHRUBS	0.2	DRIP	0.81	0.25	812.88	200.71	6,234.49
10 - LOW WATER TREES	0.2	BUBBLERS	0.81	0.25	56.54	13.96	433.64
11 - MODERATE WATER TREES	0.5	BUBBLERS	0.81	0.62	209.35	129.23	4,014.09
12 - LOW WATER TREES	0.2	BUBBLERS	0.81	0.25	267.68	66.09	2,053.01
13 - MODERATE WATER GRASS PAVERS	0.5	DRIP	0.81	0.62	513.39	316.91	9,843.78
15 - LOW WATER SHRUBS	0.2	DRIP	0.81	0.25	3,087.90	762.44	23,683.05
16 - LOW WATER TREES	0.2	BUBBLERS	0.81	0.25	395.78	97.72	3,035.49
17 - LOW WATER SHRUBS	0.2	DRIP	0.81	0.25	321.31	79.34	2,464.33
18 - MULCH					362.44		362.44
Totals					8,864.53	3,194.28	
Special Landscape Areas							
14 - PASSIVE RECREATIONAL				1	2,393.18	2,393.18	74,336.96
7 - ACTIVE RECREATIONAL				1	1,972.28	1,972.28	61,262.96
8 - PASSIVE RECREATIONAL				1	1,511.58	1,511.58	46,952.70
Totals					5,877.04	5,877.04	
Estimated Total Water Use in gallons per year, ETWU Total							282,135.83
Max Annual Water Allowance in gallons per year, MAWA Total							306,460.13
MAWA - ETWU=							24,324.30
ETAF Calculations							
Regular Landscape Areas							
Total ETAF x Area	3,194.28						
Total Area	8,864.53	Average ETAF for Regular Landscape Areas must be					
Average ETAF	0.36	0.45 or below for non-residential areas.					
All Landscape Areas							
Total ETAF x Area	9,071.32						
Total Landscape Area (LA)	14,741.57						
Sitewide ETAF	0.62						
Formulas							
Estimated Total Water Use (ETWU) calculation: (Eto) (.62) (ETAF) (LA)							
MAWA calculation: (Eto) (.62) [(ETAFxLA) + ((1-ETAF) x SLA)]							



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REVISIONS

HYDROZONE PLAN

OWNER
 2457 S LINCOLN BLVD
 2461 S LINCOLN BLVD
 VENICE, CA 90291

LANDSCAPE PROJECT

PREPARED BY: XX
 REVIEWED BY: XX
 DATE: XX-XX-XX

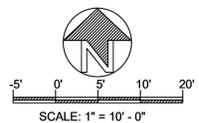
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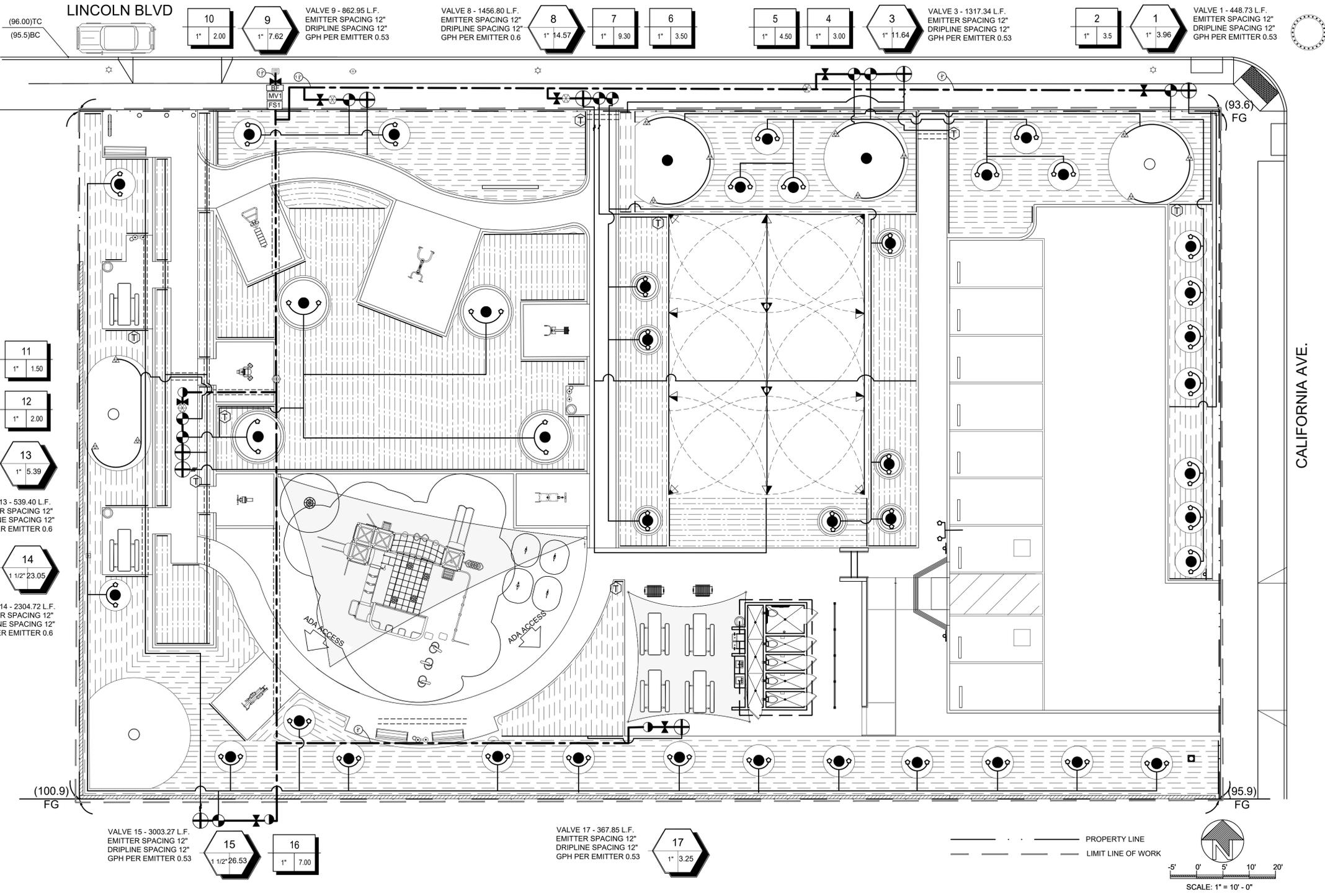


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UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA





IRRIGATION PRESSURE CALCULATION

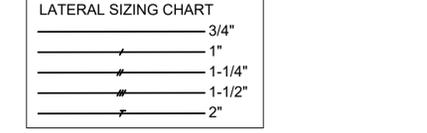
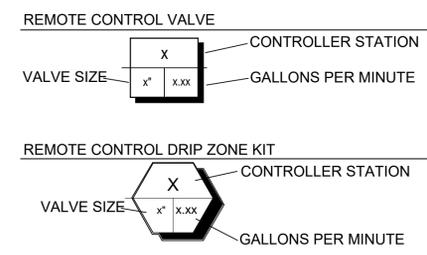
STATIC PRESSURE (AFTER 1" WATER METER) 120 P.S.I. HIGH 85 P.S.I. LOW
 SOURCE OF INFORMATION:
 WEST BASIN MUNICIPAL WATER DISTRICT
 ADDRESS: 17140 AVALON BLVD, CARSON, CA 90746
 310-237-2411

SHEET NUMBER LI-1.0
 VALVE STATION / GPM: 6 / 9.30

ITEM:	SIZE	QUANTITY / LINEAR FEET	G.P.M.	P.S.I. LOSS
WATER METER	1"		9.3	4.60
BACKFLOW	1-1/4"		9.3	10.00
MASTER VALVE	1-1/4"		9.3	1.90
FLOW SENSOR	1"		9.3	0.90
GATE VALVE	1-1/4"		9.3	0.07
MAINLINE	1-1/4"	79'	9.3	0.54
LATERAL LINE	3/4"	18'	0.43	0.02
LATERAL LINE	3/4"	15'	1.2	0.07
LATERAL LINE	3/4"	19'	1.97	0.08
LATERAL LINE	3/4"	19'	2.4	0.18
LATERAL LINE	3/4"	19'	6.9	0.86
LATERAL LINE	3/4"	34'	9.3	0.89
REMOTE CONTROL VALVE	1"		9.3	3.00
SYSTEM LOSSES SUB TOTAL				23.11
FITTINGS LOSS 10% OF TOTAL				2.31
ELEVATION LOSSES (ADD)	0.433	3' x 0.433	(+)	1.94
ELEVATION GAINS (SUBTRACT)	0.433	0' x 0.433	(-)	0
TOTAL LOSSES				27.36
AVAILABLE PRESSURE (LOW)				85
(-) DEFICIT OR (+) RESIDUAL PRESSURE				57.64
PRESSURE REQUIRED				30

NOTE: CONTRACTOR SHALL FIELD VERIFY STATIC PRESSURE PRIOR TO CONSTRUCTION.

- ### SYMBOLS LEGEND
- NEW TREE TRUNK
 - EXISTING TREE TRUNK
 - ⊕ DRIP FLAG MISTER TATTLE TALE
 - MAINLINE SCHEDULE 40 PVC
 - LATERAL SCHEDULE 40 PVC
 - 4" PVC SLEEVING



PIPE SIZING LEGEND - MAINLINE & LATERALS

LETTER	PIPE SIZE	FLOW RANGE (GPM)
A	3/4" SCH 40 PVC	(0-8 GPM)
B	1" SCH 40 PVC	(8-12 GPM)
C	1-1/4" SCH 40 PVC	(12-22 GPM)
D	1-1/2" SCH 40 PVC	(22-30 GPM)
E	2" SCH 40 PVC	(30-50 GPM)

- PRESSURIZE MAINLINE. SCH 40 PVC AT 18" DEPTH BENEATH RELATIVE FINISH GRADE. SIZE PER PLAN.
- LATERAL LINE. SCH 40 PVC AT 12" DEPTH BELOW RELATIVE FINISH GRADE. SIZE PER PLAN
- SLEEVING UNDER PAVING SCHEDULE 40 P.V.C. (4" SIZE OR NOTED)

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AT LEAST TWO DAYS BEFORE YOU DIG

UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

IRRIGATION LEGEND

SYMBOL	MANUFACTURER /DESCRIPTION	MODEL	HOUSING	COMMENTS
⊕	HUNTER REMOTE CONTROL VALVE 40 PSI	ICV-101G-1"	CARSON #1324-15 W/ FLUSH COVER AND L-BOLT LOCK	SIZE PER PLAN
⊕	HUNTER REMOTE CONTROL DRIP ZONE KIT GLOBE VALVE W/ FILTER & REGULATOR	ICZ-101-1" / ICZ-151-XL-1 1/2"	CARSON #1324-15 W/ FLUSH COVER AND L-BOLT LOCK	SIZE PER PLAN
⊕	HUNTER LOCKING QUICK COUPLER, SIZE 1"	HQ44 LRC	CARSON # 910-10 W/ T-COVER	INSTALL PER MANUFACT. SPECIFICATIONS
⊕	NEPTUNE POTABLE WATER METER	T-10-DR-075-G-F 3/4" and 1"	CARSON #1324-15 W/FLUSH COVER AND L-BOLT LOCK	N/A
⊕	NIBCO GATE VALVE BRONZE CLASS 125 T113K 1 1/4 GATE W/CROSS HW	NLOJE0B	CARSON #1324-15 W/ FLUSH COVER AND L-BOLT LOCK	VALVE SIZE TO MATCH MAINLINE SIZE
⊕	FEBCO BACKFLOW PREVENTER REDUCED PRESS. ZONE ASSEMBLIES	825 Y	GUARDSHACK ENCLOSURE	SIZE TO MATCH MAINLINE SIZE
⊕	SUPERIOR NORMALLY OPEN MASTER VALVE	3100 1-1/4"	CARSON H-SERIES #1730-24	INSTALL PER MANUFACT. SPECIFICATIONS
⊕	HUNTER FLOW SENSOR FLOW SYNC 1-1/2" SCHEDULE 40 RECEPTACLE TEE	FCT-150	CARSON H-SERIES #1730-24	INSTALL PER MANUFACT. SPECIFICATIONS
⊕	WATER METER	N/A	N/A	STATIC PRESSURE AFTER 1" WATER METER 120 PSI HIGH 85 PSI LOW, LIM 35 GAL/MIN

TYPE	SYMBOL	MANUFACTURER /DESCRIPTION	MODEL	RAD	HOUSING / REMARKS	GPM			PSI	PRECIP. RATE
						360°	180°	90°		
ROTARY NOZZLES	360° 180° 90°	HUNTER POP-UP ROTARY SPRAY MP ROTATOR SPRINKLER	MP 2000	13'-21"	PROS-06-PRS40-CV	1.48	.77	.43	40	.39 IN/HR
BUBBLERS	△	HUNTER SHORT-RADIUS MICRO SPRAY NOZZLES	6Q	6	PROS-4-CV	.50			30	N/A
	○	HUNTER BUBBLER	RZWS-10-25-CV	N/A	DEEP ROOT WATERING SLEEVE W/ SOCK	.25			30	N/A
IN-LINE DRIP	---	NETAFIM SUBSURFACE TECHLINE HCVXR 0.53	TLHCVXR5-1205	N/A	DRIPLINE TO BE BURIED 4"-6" MAX. IN GROUND	.53	GPH		40	.53
	---	HUNTER ECO-MAT	ECO-MAT	N/A	DRIPLINE TO BE BURIED 4"-6" MAX. IN GROUND	.6	GPH		40	.83
SUPPLY TUBING	---	HUNTER POLYETHYLENE TUBING - SIZE 1/2"	TWPE-700-500	N/A	TO BE BURIED 4"-6" MAX. IN GROUND	N/A			40	N/A

THEO VUDURIS

IRRIIGATION PLAN

OWNER: 2457 S LINCOLN BLVD, 2461 S LINCOLN BLVD, VENICE, CA 90291

LANDSCAPE PROJECT

PREPARED BY: XX, REVIEWED BY: XX

DATE: XX-XX-XX

SHEET NO. LI-1.0 OF X

CERTIFICATE OF COMPLETION
THIS CERTIFICATE IS FILLED OUT BY THE PROJECT APPLICANT
UPON COMPLETION OF THE LANDSCAPE PROJECT.

PART 1. PROJECT INFORMATION SHEET

DATE
PROJECT NAME
NAME OF PROJECT APPLICANT
TELEPHONE NO.
FAX NO.
TITLE
EMAIL ADDRESS

PROJECT ADDRESS AND LOCATION:

STREET ADDRESS
PARCEL, TRACT OR LOT NUMBER, IF AVAILABLE.
CITY
LATITUDE/LONGITUDE (OPTIONAL)/STATE
ZIP CODE

PROPERTY OWNER OR HIS/HER DESIGNEE:

NAMETELEPHONE NO.
FAX NO.
TITLE
EMAIL ADDRESS
COMPANYSTREET ADDRESSCITY
STATEZIP CODE

PROPERTY OWNER

I/WE CERTIFY THAT I/WE HAVE RECEIVED COPIES OF ALL THE DOCUMENTS WITHIN THE LANDSCAPE DOCUMENTATION PACKAGE AND THE CERTIFICATE OF COMPLETION AND THAT IT IS OUR RESPONSIBILITY TO SEE THAT THE PROJECT IS MAINTAINED IN ACCORDANCE WITH THE LANDSCAPE AND IRRIGATION MAINTENANCE SCHEDULE.

PROPERTY OWNER SIGNATURE DATE

PLEASE ANSWER THE QUESTIONS BELOW:

- 1. DATE THE LANDSCAPE DOCUMENTATION PACKAGE WAS SUBMITTED TO THE LOCAL AGENCY
2. DATE THE LANDSCAPE DOCUMENTATION PACKAGE WAS APPROVED BY THE LOCAL AGENCY
3. DATE THAT A COPY OF THE WATER EFFICIENT LANDSCAPE WORKSHEET (INCLUDING THE WATER BUDGET CALCULATION) WAS SUBMITTED TO THE LOCAL WATER PURVEYOR

PART 2. CERTIFICATION OF INSTALLATION ACCORDING TO THE LANDSCAPE DOCUMENTATION PACKAGE

I/WE CERTIFY THAT I/WE HAVE BASED UPON PERIODIC SITE OBSERVATIONS, THE WORK HAS BEEN SUBSTANTIALLY COMPLETED IN ACCORDANCE WITH THE ORDINANCE AND THAT THE LANDSCAPE PLANTING AND IRRIGATION INSTALLATION CONFORM WITH THE CRITERIA AND SPECIFICATIONS OF THE APPROVED LANDSCAPE DOCUMENTATION PACKAGE.

SIGNATURE* DATE

NAME (PRINT)
TELEPHONE NO.
TITLE
EMAIL ADDRESS
COMPANY
CITY
FAX NO.
LICENSE NO. OR CERTIFICATION NO.
STREET ADDRESS
STATE ZIP CODE

*SIGNER OF THE LANDSCAPE DESIGN PLAN, SIGNER OF THE IRRIGATION PLAN, OR A LICENSED LANDSCAPE CONTRACTOR.

PART 3. IRRIGATION SCHEDULING

ATTACH PARAMETERS FOR SETTING THE IRRIGATION SCHEDULE ON CONTROLLER AS REQUIRED BY THE ORDINANCE.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE

ATTACH SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE AS REQUIRED BY THE ORDINANCE.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT

ATTACH LANDSCAPE IRRIGATION AUDIT REPORT AS REQUIRED BY THE ORDINANCE.

PART 6. SOIL MANAGEMENT REPORT

ATTACH SOIL ANALYSIS REPORT, IF NOT PREVIOUSLY SUBMITTED WITH THE LANDSCAPE DOCUMENTATION PACKAGE AS REQUIRED BY THE ORDINANCE.
ATTACH DOCUMENTATION VERIFYING IMPLEMENTATION OF RECOMMENDATIONS FROM SOIL ANALYSIS REPORT AS REQUIRED BY THE ORDINANCE

GREEN BUILDING CODE MODEL WATER EFFICIENCY LANDSCAPE ORDINANCE (MWEO) (2017 LAGBC)

IRRIGATION PLAN

THE NAME OF WATER PURVEYOR IS _____, FOR CONTACT INFORMATION REFER TO PROJECT CONTACT LIST, ON TITLE SHEET

PRESSURE REGULATING DEVICES ARE REQUIRED IF WATER PRESSURE IS BELOW OR EXCEEDS THE RECOMMENDED PRESSURE OF THE SPECIFIED IRRIGATION DEVICES.*

CHECK VALVES OR ANTI-DRAIN VALVES ARE REQUIRED ON ALL SPRINKLER HEADS WHERE LOW POINT DRAINAGE COULD OCCUR.

I HAVE COMPLIED WITH THE CRITERIA OF THE ORDINANCE AND APPLIED THEM FOR THE EFFICIENT USE OF WATER IN THE LANDSCAPE DESIGN PLANS.

A DIAGRAM OF THE IRRIGATION PLAN SHOWING HYDROZONES SHALL BE KEPT WITH THE IRRIGATION CONTROLLER FOR SUBSEQUENT MANAGEMENT PURPOSES.

A CERTIFICATE OF COMPLETION SHALL BE FILLED OUT AND CERTIFIED BY EITHER THE SIGNER OF THE LANDSCAPE PLANS, THE SIGNER OF THE IRRIGATION PLANS, OR THE LICENSED LANDSCAPE CONTRACTOR FOR THE PROJECT.

AN IRRIGATION AUDIT REPORT SHALL BE COMPLETED AT THE TIME OF FINAL INSPECTION.*

SOILS MANAGEMENT REPORT

WALLACE LABORATORIES, LLC

365 CORAL CIRCLE EL SEGUNDO, CA 90245
PHONE (310) 615-0116 FAX (310) 640-6863

RE:SOIL MANAGEMENT REPORT, 24*, OUR ID NO. X-XXX-XX
OWNER'S NAME, ADDRESS, SANTA MONICA, CA
JULY X, 201X

THE SOIL IS MODERATELY ACIDIC WITH A PH OF 6.36. SALINITY IS MODERATE AT 0.55 MILLIMO/CM. NITROGEN AND POTASSIUM ARE MODERATE. BORON AND SULFUR ARE MODEST. MAGNESIUM IS MODERATE. THE MICRONUTRIENTS ARE HIGH. ZINC IS HIGHER THAN DESIRED AT 53 PARTS PER MILLION. OPTIMUM ZINC IS SEVERAL PARTS PER MILLION. SENSITIVE PLANTS SUCH AS WOODY PLANTS NEED PLANT AVAILABLE ZINC BELOW ABOUT 30 PARTS PER MILLION. HERBACEOUS PLANTS NEED ZINC BELOW ABOUT 50 PARTS PER MILLION. GRASSES ARE FAIRLY TOLERANT OF HIGH ZINC. EXCESSIVE ZINC CAUSES STUNTING, DIEBACK AND DISCOLORATION. TREES AND SHRUBS DO NOT FAIL IMMEDIATELY AFTER INSTALLATION BUT SEVERAL YEARS WITHOUT ROOTING THEY FAIL. HIGH ZINC RESTRICTS THE UPTAKE OF POTASSIUM AND OTHER MICRO-NUTRIENTS. SINCE HEAVY METALS DO NOT NORMALLY MIGRATE THROUGH THE SOIL PROFILE, DEEPER SOIL IS EXPECTED TO BE MORE SUITABLE.

THE SOIL TEXTURE IS LOAMY SAND, BASED ON THE NON-GRAVEL FRACTION, IT CONTAINS 83.8% SAND, 13.8% SILT AND 2.4% CLAY. THE GRAVEL FRACTION IS 2.5%. SOIL ORGANIC MATTER IS MODERATE AT 3.27% ON A DRY WEIGHT BASIS. THE SOIL IS HYDROPHOBIC. IT IS DIFFICULT TO WET. WATER BEADS UP ON THE SOIL SURFACE INITIALLY AND THEN SLOWLY MOVES INTO THE SOIL. THE ESTIMATED RATE OF WATER PERCOLATION BASED ON SOIL WATER CHARACTERISTICS VERSION 6.02.74 MODEL DEVELOPED BY KEITH SAXTON OF THE USDA IS GOOD AT 5.31 INCHES PER HOUR FOR NORMAL SOIL COMPACTION. THE MODEL IS BASED ON THE SOIL TEXTURE, PERCENT GRAVEL AND PERCENT SOIL ORGANIC MATTER.

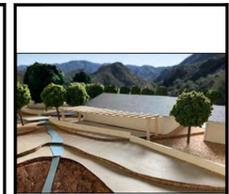
RECOMMENDATIONS
THE SOIL HAS SUFFICIENT FERTILITY AND SOIL ORGANIC MATTER. HOWEVER, THE CONCENTRATION OF ZINC IS EXCESSIVELY HIGH FOR ZINC-SENSITIVE PLANTS. USE A MORE SUITABLE SOIL FOR ZINC-SENSITIVE PLANTS. OVER SIZED PLANTING PITS CAN BE EXCAVATED AND BACKFILLED WITH A SUITABLE SOIL. FOR MAINTENANCE FERTILIZATION OF THIS SOIL, APPLY CALCIUM NITRATE (15.5-0-0) AT 6 POUNDS PER 1,000 SQUARE FEET ABOUT 4 TIMES A YEAR. MONITOR THE SOIL WITH PERIODIC TESTING.

IRRIGATION NOTES

- A. DO NOT WILLFULLY INSTALL THE SYSTEM AS DESIGNED, WHEN IT IS OBVIOUS THAT OBSTRUCTIONS OR GRADE DIFFERENCES EXIST THAT WERE NOT KNOWN DURING DESIGNING. SUCH CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNERS AUTHORIZED REPRESENTATIVE, OTHERWISE THE IRRIGATION CONTRACTOR MUST ASSUME FULL RESPONSIBILITY FOR ANY REVISIONS NECESSARY.
B. THIS DESIGN IS DIAGRAMMATIC. EQUIPMENT SHOWN IN PAVED AREAS IS FOR CLARIFICATION ONLY, AND IS TO BE INSTALLED IN PLANTING AREA WHEREVER POSSIBLE.
C. SYSTEM DESIGN IS BASED ON MINIMUM OPERATING PRESSURE SHOWN AT EACH POINT OF CONNECTION WITH MAXIMUM GPM DEMAND SPECIFIED. THE IRRIGATION CONTRACTOR SHALL VERIFY ALL PRESSURES ON SITE PRIOR TO CONSTRUCTION. NOTIFY THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES.
D. MAINLINE PIPING BETWEEN THE POINT OF CONNECTION, METER AND BACKFLOW PREVENTER TO BE OF MATERIAL AS REQUIRED BY THE GOVERNING WATER DISTRICT.
E. UNLESS OTHERWISE NOTED, 120 VOLT ELECTRICAL POWER FOR CONTROLLER(S) TO BE PROVIDED BY OTHERS. THE IRRIGATION CONTRACTOR WILL MAKE FINAL ELECTRICAL CONNECTION TO AUTOMATIC CONTROLLER(S) FROM OUTLET PROVIDED BY OTHERS.
F. ALL WIRES FROM CONTROLLER TO AUTOMATIC VALVES TO BE COPPER, DIRECT BURIAL, MIN. #14 GAUGE. INSTALL IN SAME TRENCH AS MAINLINE PIPING WHERE POSSIBLE. MIN. COVERAGE OVER WIRE TO BE 18". COMMON WIRE TO BE WHITE IN COLOR. CONTROL WIRES TO BE A DIFFERENT COLOR FOR EACH CONTROLLER USED. BUNDLE AND TAPE WIRES TOGETHER MIN. 20' ON CENTER.
G. FINAL LOCATION OF THE AUTOMATIC CONTROLLER ENCLOSURE AND THE BACKFLOW PREVENTION DEVICE SHALL BE APPROVED BY THE PROJECT LANDSCAPE ARCHITECT, WHERE APPLICABLE.
H. FINAL LOCATIONS FOR BACKFLOW PREVENTER(S) AND CONTROLLER(S) TO BE DETERMINED BY OWNERS AUTHORIZED REPRESENTATIVE.
I. INSTALL EQUIPMENT AS PER DETAILS.
J. PROVIDE MIN. 18" COVERAGE OVER ALL PRESSURE LINES, AND A MIN. OF 12" COVERAGE OVER ALL NON-PRESSURE LINES. ALL PIPING UNDER PAVING TO BE MIN. SCHEDULE 40 P.V.C. AND TO HAVE MIN. 24" COVER OVER PIPING.
K. IRRIGATION CONTRACTOR SHALL ADJUST MAINLINE DEPTH AS REQUIRED TO ACCOMMODATE 3" MINIMUM CLEARANCE FROM THE TOP OF QUICK COUPLER VALVE, GATE VALVE, AND REMOTE CONTROL VALVE TO BOTTOM OF VALVE BOX LID.
L. IRRIGATION CONTRACTOR TO FLUSH ALL LINES AND ADJUST ALL SPRINKLERS FOR MAXIMUM PERFORMANCE, AND TO PREVENT EXCESSIVE OVERSPRAY ONTO WALKS, DRIVES, BUILDINGS AS MUCH AS POSSIBLE. THIS SHALL INCLUDE SELECTING THE BEST DEGREE OF ARC TO FIT ACTUAL SITE CONDITIONS.
M. ALL SHRUBBERY SPRINKLERS ADJACENT TO PARKING LOT OR ALONG WALKS OR ROADS WILL BE INSTALLED WITH HIGH POP-UP BODIES.
N. IRRIGATION CONTRACTOR WILL INSTALL SWING CHECK VALVES OR SPRING LOADED CHECK VALVES AS REQUIRED TO ELIMINATE EXCESSIVE DRAINAGE FROM LOW SPRINKLERS. THIS WILL BE IN ADDITION TO ANY CHECK VALVES SHOWN ON PLAN.
O. ALL P.V.C. MAINLINE FITTINGS TO BE "LONG SOCKET" TYPE AS MANUFACTURED BY DURA COMPANY.
P. IN ADDITION TO THE SLEEVES SHOWN ON THE PLAN, THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ADDITIONAL SLEEVES OF SUFFICIENT SIZE UNDER ALL PAVED AREAS PRIOR TO PAVING UPON AND DIRECTION AND APPROVAL OF THE PROPERTY LANDSCAPE ARCHITECT, IF REQUIRED TO OPERATE SYSTEMS.
Q. THE IRRIGATION CONTRACTOR SHALL FLUSH ALL LINES AND ADJUST ALL HEADS FOR MAXIMUM PERFORMANCE AND TO PREVENT OVER SPRAY ONTO WALLS, STREETS, AND BUILDINGS. THIS SHALL INCLUDE SELECTING THE BEST NOZZLE RADIUS TO FIT UNUSUAL SITE CONDITIONS AT NO EXTRA COST TO THE AGENCY. CALL THE LANDSCAPE ARCHITECT 48 HOURS IN ADVANCE FOR ANY COVERAGE TESTS.
R. UPON COMPLETION, IRRIGATION CONTRACTOR TO SUPPLY TO OWNER, A COMPLETE SET OF REPRODUCIBLE "AS-BUILT" DRAWINGS. DRAWINGS WILL SHOW LOCATION OF ALL VALVES, CROSSINGS, QUICK COUPLING VALVES, ETC. EACH CONTROLLER TO HAVE ITS OWN CONTROLLER CHART. CHART WILL CLEARLY SHOW EACH AREA SPRINKLED IN A DIFFERENT COLOR, AND WILL BE LAMINATED BETWEEN 2 LAYERS OF 10 MIL. CLEAR PLASTIC.
S. THE IRRIGATION SYSTEM SHALL BE FULLY GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY OWNER. ANY DEFECTIVE MATERIALS OR POOR WORKMANSHIP SHALL BE REPLACED OR CORRECTED BY IRRIGATION CONTRACTOR AT NO COST TO OWNER.
T. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO FAMILIARIZE HIMSELF WITH ALL GRADE DIFFERENCES, SLOPES, LOCATION OF WALLS, RETAINING WALLS, CURBS, ETC. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE GENERAL CONTRACTOR AND OTHER SUBCONTRACTORS FOR THE LOCATION OF PIPE SLEEVES THROUGH WALLS AND FOOTINGS, UNDER ROADS, PAVING AND STRUCTURES.

LANDSCAPE MANAGEMENT SCHEDULE

- JANUARY:
• PRUNE ANY TREE BRANCHES THAT INTERFERE WITH PUBLIC SAFETY OR SIGHT LINES.
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED (USE MULCHING MOWER THAT CHOPS CLIPPINGS FINELY AND BLOWS MULCH DOWN INTO TURF TO DECOMPOSE AND FEED SOIL.)
FEBRUARY:
• APPLY ORGANIC COMPOST AROUND TREES OR SHRUBS IN LATE FEBRUARY. MAKE APPLICATION PRIOR TO A RAINFALL SO THE RAIN WILL SOAK THE COMPOST IN. MULCH MOW ALL TURF AREAS ONCE PER MONTH.
• ADD NEW MULCH TO PLANTED AREAS WHERE THE MULCH DEPTH HAS BEEN REDUCED TO LESS THAN 2 INCHES THICK. MULCH NOT REQUIRED WHERE SHRUBS OR GROUND COVER COMPLETELY HIDE THE SOIL SURFACE FROM VIEW
MARCH:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
• REPLACE ANY DEAD OR MISSING PLANTS
• FLUSH OUT IRRIGATION SYSTEMS AS NEEDED. RUN AND CHECK FOR PROPER OPERATION OF EACH VALVE ZONE. TEST SENSORS (RAIN, SOIL, OR WEATHER SENSORS).
• REMOVE AND CLEAN WYE FILTER SCREENS.
• CLEAN OR REPLACE PLUGGED SPRINKLER NOZZLES. REPLACE PLUGGED DRIP EMITTERS.
• REPLACE IRRIGATION CONTROLLER PROGRAM BACK-UP BATTERIES.
APRIL:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
• APPLY ORGANIC COMPOST AROUND TREES OR SHRUBS. SHRUBS/GROUND COVER AREAS MAY BE ELIMINATED WHEN THE PLANTS REACH MATURITY.
• ADD NEW MULCH TO PLANTED AREAS WHERE THE MULCH DEPTH HAS BEEN REDUCED TO LESS THAN 2 INCHES THICK. MULCH NOT REQUIRED WHERE SHRUBS OR GROUND COVER COMPLETELY HIDE THE SOIL SURFACE FROM VIEW.
MAY:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
• TURN ON IRRIGATION SYSTEM, RUN AND VISUALLY INSPECT FOR PROPER ZONE COVERAGE. SET ET-BASED, WEATHER OR SOIL SENSOR-BASED, OR SEASONAL PROGRAMS TO ADJUST IRRIGATION UP IN JULY-AUGUST, AND DOWN FOR MAY-JUNE AND SEPTEMBER.
JUNE:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
• PRUNE SPRING & WINTER-FLOWERING SHRUBS AS NEEDED TO MAINTAIN PROPER SHAPE(NATURAL, TOUCHING, NOT HEDGED OR TOPIARY EXCEPT WHERE SPECIFIED BY OWNER).
• ADD NEW MULCH TO PLANTED AREA WHERE THE MULCH DEPTH HAS BEEN REDUCED TO LESS THAN 2 INCHES THICK. MULCH NOT REQUIRED WHERE SHRUBS OR GROUND COVER COMPLETELY HIDE THE SOIL SURFACE FROM VIEW.
JULY:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED
• PRUNE VINES AS NEEDED
AUGUST:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED
• ADD NEW MULCH TO PLANTED AREAS WHERE THE MULCH DEPTH HAS BEEN REDUCED TO LESS THAN 2 INCHES THICK. MULCH NOT REQUIRED WHERE SHRUBS OR GROUND COVER COMPLETELY HIDE THE SOIL SURFACE FROM VIEW.
SEPTEMBER:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED
• PRUNE VINES AS NEEDED
• APPLY ORGANIC COMPOST AROUND TREES OR SHRUBS IN SEPTEMBER OR EARLY OCTOBER. THE SHRUBS/GROUND COVER AREAS MAY BE ELIMINATED WHEN THE PLANTS REACH MATURITY
OCTOBER:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED
• ADD NEW MULCH TO PLANTED AREAS WHERE THE MULCH DEPTH HAS BEEN REDUCED TO LESS THAN 2 INCHES THICK. MULCH ADDITIONS ARE NOT REQUIRED WHERE SHRUBS OR GROUND COVER COMPLETELY HIDE THE SOIL SURFACE FROM VIEW.
NOVEMBER:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
DECEMBER:
• MULCH MOW NATIVE GRASS AREAS ONCE PER MONTH IF PREFERRED MOWED.
• PRUNE ANY TREE BRANCHES THAT INTERFERE WITH
• PRUNE SUMMER AND FALL-BLOOMING SHRUBS AS NEEDED TO MAINTAIN PROPER SHAPE.



THEO VUDURIS

Table with 12 columns for REVISIONS and 1 row for SHEET TITLE.

IRRIGATION NOTES
WATERING SCHEDULE

OWNER
2457 S LINCOLN BLVD
2461 S LINCOLN BLVD
VENICE, CA 90291
LANDSCAPE PROJECT

PREPARED BY: XX
REVIEWED BY: XX

DATE: XX-XX-XX

SHEET NO. LI-1.3
X OF X



THEO
VUDURIS

REVISIONS

SHEET TITLE
**LIGHTING
DETAIL SHEET**

OWNER
2457 S LINCOLN BLVD
2461 S LINCOLN BLVD
VENICE, CA 90291

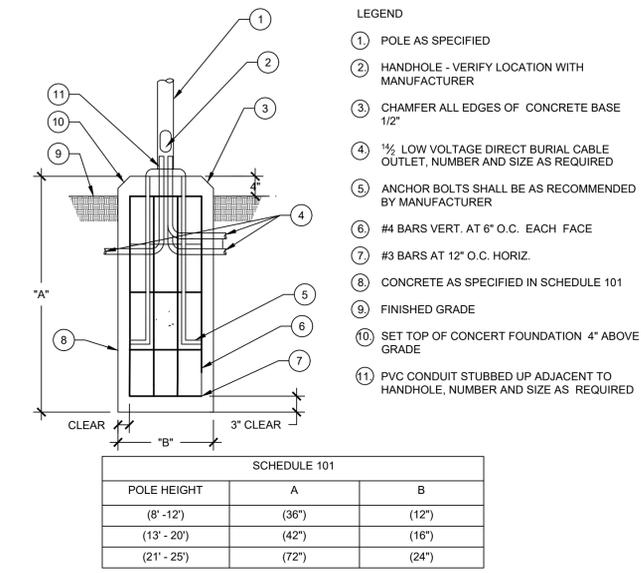
LANDSCAPE
PROJECT

PREPARED BY:
XX

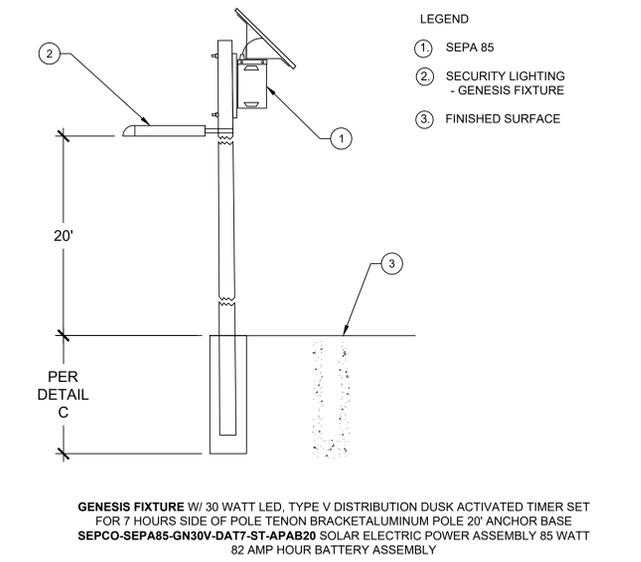
REVIEWED BY:
XX

DATE:
XX-XX-XX

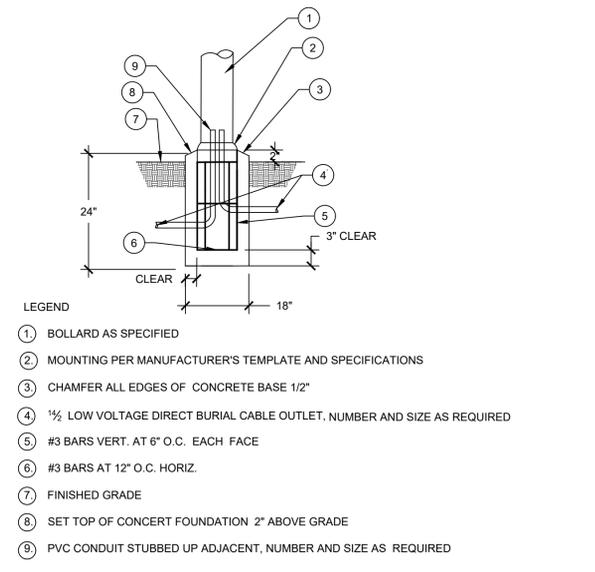
SHEET NO.
LL-1.1
X OF X



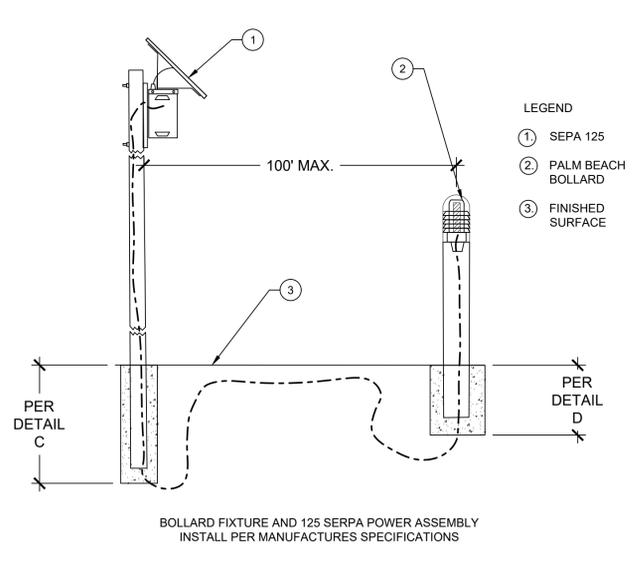
C POLE BASE DETAIL NOT TO SCALE



B SECURITY LIGHTING NOT TO SCALE



D BOLLARD BASE DETAIL NOT TO SCALE



A BOLLARD LIGHTING NOT TO SCALE

L NOT USED SCALE

I NOT USED SCALE

F NOT USED SCALE

K NOT USED SCALE

H NOT USED SCALE

E NOT USED SCALE

J NOT USED SCALE

G NOT USED SCALE

PROJECT MANUAL

SUMMER PARK

2457 S LINCOLN BLVD
VENICE, CA 90291

2461 S LINCOLN BLVD
VENICE, CA 90291

3/16/2021



Theo Vuduris
UCLA Extension Landscape Architecture Student

Phone: (310) 555-5555
Email: theo.vuduris@gmail.com

555 Christopher Street, Munich, CA 10210

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02230 SITE CLEARING

PART 1 GENERAL

1.01 SUMMARY

- A. Clear the site as shown on the Drawings and as specified in this Section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the approval of the Agency.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
- C. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by operations under this Section.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.03 CLEARING

- A. In areas that are to be excavated, clean out roots one inch in diameter and larger to a depth of at least 12 inches below the existing ground surface or subgrade of new graded surface, whichever is lower. Treat roots remaining in the soil with a weed killer approved by the Agency.

3.04 CONSERVATION OF TOPSOIL

- A. After the area has been cleared of vegetation, strip the existing topsoil in those areas to be excavated.

B. Stockpile in an area clear of new construction.

3.05 DISPOSAL

A. General:

1. Remove brush, grass, roots, trash, and other material from clearing operations.
2. May be stockpiled on site within approved fenced area.
2. Dispose of away from the site in a legal manner within 7 days of finalizing the project.
3. Do not store or permit debris to accumulate on the job site.

B. Do not burn debris at the site.

3.06 UTILITIES

A. Coordinate with utility companies and agencies as required.

B. Where utility cutting, capping or plugging is required, perform such work in accordance with requirements of the utility or governmental agency having jurisdiction.

02310 GRADING

PART 1 GENERAL

1.01 SUMMARY

- A. In accordance with pertinent provisions of this Section, excavate backfill, compact and grade the site to the elevations shown on the Drawings and as needed to meet the requirements of the construction shown in the Contract Documents.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Fill materials:
 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 1-1/2 inches in greatest dimension and with not more than fifteen percent of the rocks or lumps larger than 1 inch in their greatest dimension.
 2. In planting areas provide approved backfill material to a point 12 inches below indicated finish grade.
 3. Fill material is subject to the approval of the Agency.

2.02 TOPSOIL

- A. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoils, roots, heavy or stiff clay, stones larger than 1 inch in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PROCEDURES

- A. Utilities:
 1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Agency.
 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Agency.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Agency and secure its instructions.
 5. Do not proceed with permanent relocation of utilities until written instructions are received from the

Agency.

- B. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.
- C. Maintain access to adjacent areas at all times.

3.03 EXCAVATING

- A. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades and elevations indicated and specified herein.
- B. Satisfactory excavated materials:
 - 1. Transport to, and place in, fill or embankment areas within the limits of the Work.
- C. Surplus materials:
 - 1. Dispose of unsatisfactory excavated materials, and surplus satisfactory excavated materials, away from the site at disposal areas arranged and paid for by the Contractor.
- D. Excavation of rock:
 - 1. Where rocks, boulders, granite or similar material is encountered excavate by conventional earth moving or ripping equipment and remove or excavate such material by means which will not endanger buildings or structures whether on or off site.
 - 2. Do not use explosives without written permission from the Agency.
- E. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

3.04 FILLING

- A. Ground surface preparation:
 - 1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from the ground surface prior to placement of fills.
 - 2. Plow, strip or break up surfaces steeper than one vertical to four horizontal, so that fill material will bond with existing surface.
 - 3. At exposed soils in areas to be paved, scarify to a minimum depth of 6 inches, and recompact at a moisture content that will permit proper compaction as specified for fill.
 - 4. Do not place fill material on surfaces that are muddy, frozen or containing frost or ice.
 - 5. Place fill materials evenly adjacent to structures, to required elevations.

3.05 GRADING

- A. General:
 - 1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
 - 2. Smooth the finished surfaces within specified tolerance.
 - 3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
- B. Grading outside building lines:
 - 1. Grade areas adjacent to buildings to achieve drainage away from structures and to prevent ponding.
 - 2. Finish the surfaces to be free from irregular surface changes.

3.06 MAINTENANCE

- A. Protection of newly graded areas:
 - 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
 - 2. Repair and reestablish grades in settled, eroded and rutted areas to the specified grades.
- B. Where completed compacted areas are distributed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact to the required density prior to further construction.

02315 EXCAVATION AND FILL

PART 1 GENERAL

1.01 SUMMARY

- A. Excavate, backfill, compact and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents. Unless otherwise indicated, provide compaction of 90% or greater.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 1-1/2 inches in greatest dimension.
- B. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonable free from subsoil, roots, heavy or stiff clay, stones larger than 1 inche in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PROCEDURES

- A. Utilities:
 - 1. Protect active utility lines. If damaged, repair or replace at no additional cost to the Agency.
 - 2. If existing utilities are found to interfere with the permanent facilities being constructed, immediately notify the Agency and secure its instructions.

3.03 EXCAVATING

- A. Perform excavating as required within the limits of the Work to the lines, grades and elevations as specified on the Drawings and as indicated herein.
- B. Excavate topsoil and stockpile in area designated on site.
- C. Excavate subsoil required for building foundations, construction operations and other Work.
- D. Dispose of unsatisfactory excavated material away from the site at disposal areas arranged and paid for by the Contractor.
- E. Slope banks to angle of repose or less, until shored.
- F. Where rocks, boulders, granite or similar material is encountered, remove such material by means which will neither cause additional cost to the Agency nor endanger buildings or structures on or off the site.
- G. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

H. Correct unauthorized excavation at no additional cost to the Agency.

3.04 TOLERANCES

- A. Conform to elevations and dimensions shown within a tolerance of 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, other required construction and inspection.
- B. In excavating for footings and foundations, take care not to disturb bottom of excavation.

3.05 FILLING AND BACKFILLING

- A. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
 - 1. Acceptance of construction below finish grade.
 - 2. Removing concrete formwork.
 - 3. Inspecting, testing and approving underground utilities.
 - 4. Removing of trash and debris.
 - 5. Placement of horizontal bracing on horizontally supported walls.
- B. Placing and compacting.
 - 1. Do not place backfill or fill material on surfaces that are muddy frozen or containing frost or ice.
 - 2. Place backfill or fill material evenly adjacent to structures, to required elevations. Unless otherwise indicated, provide compaction of 90% or greater.
 - 3. Employ a placement method so as not to disturb or damage foundations, foundation dampproofing or utilities in trenches.
 - 4. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

3.06 MAINTENANCE

- A. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact prior to further construction.

02316 TRENCHING

PART 1 GENERAL

1.01 SUMMARY

- A. Trench, backfill, compact as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 3 inches in greatest dimension.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PROCEDURES

- A. Utilities:
 - 1. Protect active utility lines. If damaged, repair or replace at no additional cost to the Agency.
 - 2. If existing utilities are found to interfere with the permanent facilities being constructed, immediately notify the Agency and secure instructions.

3.03 TRENCHING

- A. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel. Prior to backfilling, remove sheeting.
- B. Open cut:
 - 1. Excavate for utilities by open cut.
 - 2. If conditions at the site prevent such open cut trenching may be used.
 - 3. Remove boulders and other interfering objects, and backfill voids left by such removals.
- C. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.
- D. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover and other requirements as directed.
- E. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.
- F. Provide minimum trench depth as indicated on the Drawings or as specified by the Agency, the Project Engineer or by the local governmental authority.

3.03 BACKFILLING

A. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:

1. Inspecting, testing and approving underground utilities.
2. Removing of trash and debris.

B. Placing and compacting.

1. Do not place backfill or fill material on surfaces that are muddy frozen or containing frost or ice.
2. Backfill trenches to the ground surface with selected material selected by the Agency.
3. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified.
4. Mechanically compact backfill within ten feet of buildings.

3.06 MAINTENANCE

A. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.

02510 WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. Provide water distribution system as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

- A. General: Assume connection point to building service lines as being approximately 5 feet outside buildings and structures to which service is required.

2.02 WATER PIPING, BURIED BEYOND BUILDING

- A. Cast Iron Pipe: ANSI/AWWA with ductile iron fittings, rubber gasket, mechanical joints and 3/4 inch diameter rods.
- B. Copper Tubing: ASTM B88, Type K, annealed with wrought copper fittings and compression joints.
- C. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, minimum 150 psi pressure rating with solvent weld joints.

D. Fittings and specials:

1. Cast iron pipe:

- a. Use fittings and specials suitable for 150 psi pressure rating unless otherwise specified.
- b. For use with mechanical joint pipe, comply with ANSI A-21.10.
- c. For use with push-on joint pipe, comply with ANSI A-21.10 and ANSI A-21.11.
- d. Use cement mortar lining complying with ANSI A-21.4, standard thickness.

2. Plastic pipe:

- a. Use fittings and specials suitable for Schedule 40 rating unless otherwise specified.
- b. Use fittings and specials for PVC pipe complying with ASTM D2468.
- c. For threaded PVC fittings, use Schedule 80.

E. Valves: Use valves designed for a working pressure of not less than 150 psi.

F. Service fittings:

- 1. PVC mains smaller than 2 inches in diameter: Make 3/4 inch maximum service with tees or plastic valve tees.
- 2. PVC mains 2 inches to 3-1/2 inches in diameter: For 3/4 inch to 1 inch service, use bronze service clamp and bronze corporation stop designed for PVC.
- 3. Service lines larger than those listed above: Make with standard tees on new lines, and tapping tees on existing lines.

2.03 VALVE BOXES

- A. Valves 3 inches and larger: Use service box of cast iron with "WATER" cast into the cover, extension type of the required length, with screw adjustment.

B. Valves 2-1/2 inches and smaller:

1. Use precast concrete or metal box with the word “WATER” cast into the cover.
2. Provide risers on pipe line to place valve within box depth.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FIELD MEASUREMENT

- A. Make necessary measurements in the field to assure precise fit of items in accordance with the approved design.

3.03 HANDLING

- A. Handle pipe accessories so as to ensure delivery to the trench in sound, undamaged condition.
- B. Thoroughly clean interior of pipe and accessories before lowering pipe into trench. Keep clean during laying operation by plugging or other method approved by the Agency.
- C. Before installation, inspect each piece of pipe and each fitting for defects. Replace defective material.
- D. Rubber gaskets: Store in a cool dark place until just prior to time of installation.

3.04 LOCATING

- A. Locate water pipe at least 10 feet away, horizontally, from sewer pipes. Where bottom of the water pipe will be at least 12 inches above top of sewer pipe, locate water pipe at least 6 feet away, horizontally, from the sewer pipe.
- B. Where water lines cross under gravity-flow sewer lines, fully encase the sewer pipe in concrete for a distance of at least 10 feet each side of the crossing, or provide pressure pipe with no joint located within 3 feet of the crossing.
- C. Cross water lines in cases above sewage force mains or inverted siphons at least 2 feet above the sewer line. Encase in concrete those joints in the sewer main closer than 3 feet, horizontally, to the crossing.

3.05 JOINT DEFLECTION

- A. Cast iron pipe: Maximum allowable deflection:

Diameter:	Push-on joint:	Mechanical joint:
3-4 inches	19 inches	31 inches
6 inches	19 inches	27 inches
8 inches	19 inches	10 inches

- B. Plastic pipe: Unless a lesser amount is recommended by the pipe manufacturer, maximum allowable deflections from a straight line or grade, or offsets, will be 5 degrees.

3.06 PLACING AND LAYING

- A. General:

1. Do not drop or dump any of the materials of this Section into the trench.
2. Except where necessary in making connections to other lines, lay pipe with the bells facing in the

direction of laying.

3. Rest the full length of each section of pipe solidly on the pipe bed, with recesses excavated to accommodate bells, couplings and joints.
4. Do not lay pipe in water or when trench conditions are unsuitable for the work; keep water out of trench until jointing is completed.
5. Securely close open ends of pipe, fittings and valves when work is not in progress.

B. Plastic pipe:

1. Position plastic pipe and fittings in trench in a manner that identifying markings will be readily visible for inspection.
2. Do not thread plastic pipe. Make connections only with the solvent cement or with special adapter fittings designed for the purpose.
3. Support plastic pipe in trenches with a 3 inch layer of sand. Do not allow rocks, debris or other potentially damaging substances within 6 inches of plastic pipe in trenches.
4. Provide an electrically continuous type TW insulated No. 14 tracer wire in the trench along the pipe, fastened to the pipe at 20 foot intervals and terminating above ground with a 12 inch lead taped around each riser.

C. Connections: Use specials and fittings to suit the actual conditions where connections are made between new work and existing mains. Use only those specials and fittings approved by the utility having jurisdiction.

D. Sleeves:

1. Where pipe passes through walls of valve pits or structures, provide cast iron or PVC wall sleeves.
2. Fill space between sleeve and wall with rich cement mortar or grout. Fill space between pipe and sleeve with mastic or grout.

3.07 SERVICE BOXES

- A. Where water lines are located below paved street having curbs, install boxes directly back of curbs.
- B. Where no curbing exists, install boxes in accessible locations beyond limits of street surfacing, walks and driveways.

3.08 TESTING

- A. Provide personnel and equipment necessary, and perform tests required to demonstrate that the work of this Section has been completed in accordance with specified requirements and with governmental authority having jurisdiction.

02630 STORM DRAINAGE

PART 1 GENERAL

1.01 SUMMARY

- A. Provide storm sewerage system where shown on the Drawings, as specified herein and as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

- A. Provide pipe and associated materials of the size indicated on the Drawings and meeting the following requirements.
 - 1. Non-reinforced concrete pipe (NRCP): Provide “extra strength”, ASTM C14.
 - 2. Clay pipe (CP): Provide “extra strength”, ASTM C700.
 - 3. Plastic pipe: ANSI/ASTM D2751, ABS material, bell and spigot style solvent sealed joint end.
 - 4. Plastic pipe: ANSI/ASTM D3033, Type PSP, PVC material, bell and spigot style solvent sealed joint end.
 - 5. Flexible watertight joints:
 - a. Provide rubber type gaskets for concrete pipe.
 - b. Provide factory fabricated resilient materials for clay pipe, ASTM C425.

2.02 CATCH BASINS

- A. Basin lid and frame: Cast iron, hinged lid.
- B. Shaft construction and cone top section: Reinforced precast concrete pipe sections, lipped male/female joints.
- C. Base pad: Cast-in-place concrete, leveled top surface to receive concrete shaft sections, sleeved to receive storm sewer pipe sections.

2.03 MANHOLES

- A. Lid and frame: Cast iron, removable lid.
- B. Shaft construction and cone top section: Reinforced concrete pipe sections, lipped male/female joints, cast steel ladder rungs into shaft sections at 12 inches o.c.
- C. Base pad: Cast-in-place concrete, leveled top surface to receive concrete shaft sections, sleeved to receive storm sewer pipe sections.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory

conditions are corrected.

B. Verify that excavations are ready to receive work.

C. Hand trim excavations. Correct over-excavation with coarse filler aggregate.

D. Bedding:

1. Provide a bedding surface for the pipe with a firm foundation of uniform density throughout the entire length of the pipe.

2. Where plastic pipe is used, provide a minimum of 4 inches of sand bedding over the top and under the pipe.

3.02 INSTALLATION - PIPE

A. General:

1. Carefully examine each pipe prior to placing. Do not install defective or damaged pipe.

2. Place pipe to the grades and alignment indicated, with a tolerance of one in 1000 vertical and one in 500 horizontal.

3. Do not place pipe in water or when trench or weather conditions are unsuitable.

B. Concrete pipe and clay pipe: Place by proceeding upgrade with the spigot ends of bell and spigot pipe, and the tongue ends of tongue and groove pipe pointing in the direction of flow.

3.03 JOINTS

A. Joining concrete and clay pipe: Use the specified mortar ingredients. Protect the mortar bead from sun and air until cured.

3.04 INSTALLATION - CATCH BASINS AND MANHOLES

A. Form and place cast-in-place concrete base pad, with provisions for sewer pipe end sections, to required elevations.

B. Install shaft and top cone.

C. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 BACKFILL

A. Backfill and compact in accordance with provisions of Section 02220.

3.06 TESTING AND INSPECTION

A. Provide personnel and equipment necessary, and perform tests required to demonstrate that the work of this Section has been completed in accordance with the specified requirements.

02730 *DECOMPOSED GRANITE SURFACING*

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Provisions of the latest Edition of the Standard Specifications for Public Works Construction, Section 200 apply except as modified herein.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Decomposed Granite Paving with incorporated soil stabilizer.
 - 2. Decomposed Granite Paving
 - 3. Cast-in-place concrete edge restraints.
- B. Related Sections include the following:
 - 1. Division 2 Section “Earthwork” for excavation and compacted subgrade.
 - 2. Division 2 Section “Cement Concrete Pavement” for cast-in-place concrete curbs that serve as edge restraints for decomposed granite paving.

1.03 SUBMITTALS

- A. Product Data:
- B. Submit manufacturer’s soil stabilizer product data and installation instructions.
- C. Product Materials for the following:
 - 1. Stabilized Decomposed Granite – 1 quart sample of stabilized decomposed granite material in color specified.
 - 2. Decomposed Granite – 1 quart sample of decomposed granite material in color specified.
- D. Sieve Analysis

1.04 QUALITY ASSURANCE

- A. Soil sterilization. Contractor shall maintain all areas of paving free of vegetative growth ninety (90) days after the date of acceptance. Any procedure required for eradication of such vegetative growth shall be completed by the Contractor at no additional cost to the County.
- B. Contractor to furnish conformance tests and obtain approval of material prior to delivery.
- C. Mock-up
 - 1. Contractor shall install 20 square feet minimum of stabilized decomposed granite surfacing at location approved by Agency authorized representative.
 - 2. Allow Landscape Architect to view mock-up before proceeding with rest of stabilized decomposed granite surfacing.
 - 3. Remove mock-up after acceptance of work specified in this Section.

1.05 FIELD CONDITIONS

- A. Do not install stabilized decomposed granite surfacing when sub-base is wet at saturated field capacity.

PART 2 PRODUCTS

2.01 STABILIZED DECOPOSED GRANITE MATERIALS

- A. Produce from naturally friable granite. Blends of coarse sand and rock dust are not acceptable.
- B. Stabilized Decomposed Granite and Decomposed Granite: Shall meet the requirements of SSPW Section 200-2.7.2, Disintegrated Granite, except grading which shall be as follows:

Sieve sizes:	Percentage passing:
1/2 inch	100%
3/8 inch	90 - 100%
No. 4	50 - 100%
No. 30	25 - 55%
No. 100	10 - 20%
No. 200	5 - 18%

The R Value shall be a minimum of 70.

- C. Sand Equivalent: 30 minimum in accordance with ASTM D2419.
- D. Material: California Gold as supplied by Gail Materials 951-279-1095 or approved equal.
- E. Installation depth: As indicated on plans.
- F. Binder: Provide Natracil as supplied by Gail Materials 951-279-1095 or approved equal with the following requirements:
 - 1. Swell Volume: 35 ml/gm minimum in accordance with USP procedures.
 - 2. 90% minimum shall pass a No. 40 mesh screen.
- G. Factory Blending:
 - 1. Mix decomposed granite and approved binder with a pug mill that includes a weigh-belt feeder.
 - 2. For vehicular drives and roadways: Mix 14 lbs. of binder per 2000 lbs. of aggregate.

2.02 AGGREGATE SUBGRADE

- A. Graded Aggregate for Base Course: Sound crushed stone or gravel.

2.03 ACCESSORIES

- A. Water: Free from contaminants that would discolor or be deleterious to stabilized decomposed granite surfacing.
- B. Concrete Edging:
 - 1. Material: per Division 2 Section "Cement Concrete Pavement".
 - 2. Dimensions: per construction plans.

PART 3 EXECUTION

3.01 PREPARATION

- A. Excavation: Excavate to depth required so edges of stabilized decomposed granite surface will match adjacent grades when adjoining hardscape surfaces, 2" below adjacent finish grade at shrub areas and

1” below adjacent finish grade at turf areas.

- B. Prepared subgrade according to requirements in Division 2 Section “Earthwork” to identify soft pockets and areas of excess yielding. Proceed with aggregate base only after deficient subgrades have been corrected and are ready to receive base course.
- C. Prepare aggregate base according to requirements in Division 2 Section “Earthwork”.
- D. Treat graded area with a non-translocating, pre-emergent herbicide.
- E. Approval of subgrade is required prior to placement of surfacing. No base course or surfacing shall be placed on muddy subgrade.
- F. Edging: Install flush with stabilized decomposed granite and decomposed granite surfacing. Provide sufficient stakes to secure in place.

3.02 INSTALLATION, GENERAL

- A. Prior to installation, thoroughly presoak surface on which stabilized decomposed granite and decomposed granite surfacing is to be placed.
- B. Evenly distribute stabilized decomposed granite in 2” maximum lift thickness and soak with sufficient water to activate binder through entire depth of lift. Install the additional lifts and soak with sufficient water to activate binder as required to bring grades to required level after compaction.
- C. Evenly distribute decomposed granite to bring grades to required level after compaction.
- D. Grade and smooth to required elevation.
- E. Compact:
 - 1. Stabilized Decomposed Granite: After +/- 4 hours, compact final lift with a three-five ton double or single static drum roller to a minimum 95% compaction.
- F. Minimum Compacted Thickness: Install to depth shown on Drawings.
- G. Surface:
 - 1. Path shall be graded per Drawings.
- H. Completed surface shall be of consistent quality and free of deleterious materials such as organic materials, nails, stones, and loose material. Surface shall not have depressions or humps greater than ¼ inch in ten feet.

3.03 MAINTENANCE, REPAIRS AND PROTECTION

- A. Do not allow traffic on stabilized decomposed granite surfacing for four days after placement or until compacted stabilized decomposed granite has fully cured. Erect barricades and warning signs as required during curing period.
- B. Protect stabilized decomposed granite surfacing from damage until Project completion. Repair damaged areas to match specified requirements.
- C. Loose aggregate will appear on the stabilized surface over time which is a natural occurrence. If excessive aggregate over ¼ inches occurs, redistribute the stabilized decomposed granite over the entire surface, water thoroughly and re-compact with a minimum one ton drum roller. This process can be repeated as necessary.
- D. To repair, excavate damaged area leaving a minimum one inch depth of existing stabilized decomposed granite, water and scarify. Scarifying existing stabilized decomposed granite will prevent a cold joint layer between the existing stabilized decomposed granite and the newly imported pre-blended stabilized decomposed granite.
- E. Add water to the pre-blended stabilized decomposed granite to activate. Apply moistened pre-blended

stabilized decomposed granite to excavated area at or above finished grade.

- F. Compact with a walk behind drum roller. Do not allow traffic on stabilized decomposed granite surfacing for one-two days after placement or until compacted stabilized decomposed granite has fully cured.

END OF SECTION 02782

02740 ASPHALT PAVING

PART 1 GENERAL

1.01 SUMMARY

- A. Provide asphaltic concrete paving where shown on the Drawings, as specified herein and as needed for a proper and complete installation.

PART 2 PRODUCTS

2.01 AGGREGATES

- A. Provide aggregates consisting of crushed stone, gravel, sand or other sound, durable mineral laterials processed and blended and naturally combined.
- B. Subbase aggregate minimum size: 1-1/2 inches.
- C. Base aggregate maximum size:
 - 1. Base courses over 6 inches thick: 1-1/2 inches.
 - 2. Other base courses: 3/4 inch.
- D. Aggregates for asphaltic concrete paving: Provide a mixture of sand, mineral aggregate and liquid asphalt mixed in such proportions that the percentage by weight will be within:

Sieve sizes:	Percentage passing:
3/4 inch	100%
3/8 inch	65 - 85%
1/4 inch	50 - 65%
No. 8 mesh	37 - 50%
No. 30 mesh	15 - 25%
No. 200 mesh	3 - 8%

plus 50/60 penetration liquid asphalt at 5 to 6 percent of the combined dry aggregates.

2.02 ASPHALTS

- A. Comply with the provisions of Asphalt Institute Specification:
 - 1. Asphalt cement: Penetration grade 50/60.
 - 2. Prime coat: Cut-back type, grade MC-250.
 - 3. Tack coat: Uniformly emulsified, grade SS-1H.

2.03 MIXING ASPHALTIC CONCRETE MATERIALS

- A. Provide hot plant mixed asphaltic concrete paving materials.
 - 1. Temperature leaving the plant: 290 degrees F minimum, 320 degrees F maximum.
 - 2. Temperature at time of placing: 280 degrees F minimum.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PLACEMENT OF BASE COURSES

A. Subbase and base:

1. Spread the specified subbase and base material to a thickness providing the compacted thickness shown on the Drawings.
2. Compact to 95 percent.

- B. Thickness tolerance: Provide the compacted thickness shown on the Drawings within a tolerance of minus 0.0" to plus 0.5".

- C. Smoothness tolerance: Provide the lines and grades shown on the Drawings within a tolerance of 3/8 inch in ten feet. Correct deviations by removing materials, replacing with new materials and reworking or recompacting as required.

- D. Moisture content: Use only the amount of moisture needed to achieve the specified compaction.

3.03 PLACEMENT OF ASPHALTIC CONCRETE PAVING

- A. Install headers and stakes as required to achieve the arrangement of paving shown on the Drawings.

- B. Remove loose materials from the compacted base.

- C. Do not accept material unless it is covered with a tarpaulin until unloaded and unless the material has a temperature of not less than 280 degrees F.

- D. Do not commence placement of asphaltic concrete materials when the atmospheric temperature is below 50 degrees F, nor during fog, rain or other unsuitable condition.

- E. Spread material in a manner which requires the least handling. Where thickness of finished paving will be 3 inches or less, spread in one layer.

F. Rolling:

1. After the material has been spread to the proper depth, roll until the surface is hard, smooth, unyielding and true to the thickness and elevations shown on the Drawings.
2. Roll until no roller marks are visible.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with a ten foot straight edge.

- B. Compacted schedule thickness: Within 1/4 inch of design thickness.

- C. Variation from true elevation: Within 1/2 inch.

3.05 PROTECTION

- A. Protect the asphaltic concrete paved areas from traffic until the sealer is set and cured and does not pick up under foot or wheeled traffic.

02750 PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

- A. Provide Portland cement concrete paving where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.02 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.

PART 2 PRODUCTS

2.01 FORMS

- A. Provide wood or metal formwork profiled to suit conditions, including adequate bracing to the lines and grades shown on the Drawings.
- B. Earth forms will not be permitted for paving.

2.02 REINFORCEMENT

- A. Comply with the following as minimums:
 - 1. Bars: ASTM A615/A615M, grade 60, unless otherwise shown on the Drawings, using deformed bars for number 3 and larger.
 - 2. Bending: ACI 318.

2.03 CONCRETE MIX

- A. Provide concrete with the following characteristics:
 - 1. Compressive strength at 28 days: 2500 psi.
 - 2. Slump: 4 inches maximum.
 - 3. Water: Clean and potable.
- B. Use only such additives as are recommended in the mix design and approved by the Agency and governmental agencies having jurisdiction.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINAL PREPARATION OF SUBGRADES

- A. Thoroughly scarify and sprinkle the entire area to be paved. Compact to a smooth, hard, even surface of 90 percent compaction to receive the aggregates.

3.03 PLACEMENT OF BASE COURSE

- A. Base (where required):
 - 1. Spread the specified coarse aggregate to a thickness providing the compacted thickness shown on the

Drawings.

2. Compact to 95 percent.
3. Moisten substrate to minimize absorption of water from fresh concrete.

3.04 FORMING

- A. Place and secure forms to correct location, dimension and profile.

3.05 INSTALLATION

- A. Upon completion of base course and formwork, install reinforcement as shown on the Drawings.
- B. Transit mix the concrete in accordance with provisions of ASTM C94.
- C. Do not use concrete that has stood over 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.
- D. Placing concrete:
 1. Place concrete on accordance with ACI301.
 2. Remove rejected concrete from the site.
 3. Do not disturb reinforcement or formwork components during concrete placement.
- E. Deposit and consolidate concrete in a continuous operation within the limits of construction joints until the placing of a panel or section is completed.
 1. Bring surfaces to the correct level with a straight-edge, and then strike off.
 2. Smooth the surface leaving it free from bumps and hollows.
 3. Do not sprinkle water on the plastic surface. Do not disturb the surfaces prior to start of finishing operations.
- F. Expansion joints:
 1. Locate expansion joints where indicated, filled to full depth with expansion joint material.
 2. In curbs, locate 1/2 inch thick joint at the beginning and end of curves, and at 25 foot centers elsewhere.
 3. In curbs and paving, hold down 1/2 inch and seal exposed joints with joint sealer.
- G. Finishing:
 1. Float to produce a surface level within 1/4 inch in 2 feet.
 2. With a bristle broom produce a textured finish, light, medium or coarse as directed by the Agency.

3.06 CURING AND PROTECTION

- A. Beginning immediately after placement, protect concrete from premature drying, excessively hot or cool temperatures and mechanical injury.

02782 CONCRETE GRID PAVERS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide concrete grid pavers as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

1.02 REFERENCES

- A. National Concrete Masonry Association (NCMA): Specification for Grid Pavers.
- B. Concrete Paver Institute (CPI): Concrete grid Pavements.

1.03 ENVIRONMENTAL CONDITIONS

- A. Do not install sand or pavers during heavy rain or snowfall.
- B. Do not install pavers on frozen sand.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Acceptable Manufacturers

- 1. _____
- 2. _____
- 3. _____

B. Product

- 1. _____ Shape _____
- 2. _____ Shape _____

C. Product Dimensions

- 1. Length: _____
- 2. Width: _____
- 3. Thickness: _____

D. Pavers shall meet the following requirements:

- 1. Minimum average compressive strength: 5,000 psi.
- 2. Average absorption: no more than 7%.
- 3. Proven field performance in resisting freeze-thaw or resistance to 50 freeze-thaw cycles with no more than 1% loss by weight.

2.02 BEDDING SAND

- A. Bedding sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that base is dry, uniform, even and ready to support sand, pavers and imposed loads.
- C. Verify that gradients and elevations of base are correct.
- D. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.
- E. Beginning of installation means acceptance of edge restraints.
- F. Verify source and content of top soil.
- G. Verify grass seed mix and sources.
- H. Verify source and gradation of aggregate base.

3.02 INSTALLATION

- A. Spread the sand evenly over the base course and screed uniformly to 1 inch to 1-1/2 inches thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers.
- B. Ensure that grid pavers are free of foreign materials before installation.
- C. Lay the pavers in the patterns shown on the Drawings. Maintain straight pattern lines.
- D. Fill gaps at the edges of the paved area with cut grid pavers or edge units.
- E. Cut grid pavers to be placed along the edge with a double-bladed splitter or masonry saw.
- F. Use a low amplitude, high-frequency plate vibrator capable of 3,000 to 5,000 lbs. centrifugal compaction force to vibrate the pavers into the sand. Protection between the vibrator and the grid pavers may be necessary to prevent cracking or chipping.
- G. Vibrate the pavers, sweeping top soil into the joints and vibrating until they are full within 1/8-inch from the top surface. Do not vibrate within 3-ft. of the unrestrained edges of the paving units.
- H. Work to within 3-ft. of the laying face must be left fully compacted at the completion of each day.
- I. Broadcast grass seed at the rate recommended by seed source. Sweep off excess topsoil. Distribute straw covering to protect germinating grass seed.
- J. The final surface elevations shall not deviate more than 3/8-in. under a 10-ft. long straightedge.
- K. The surface elevation of pavers shall be 1/8-in. to 1/4-in. above adjacent drainage inlets, concrete edges, collars or channels.

02811 *LANDSCAPE IRRIGATION*

PART 1 GENERAL

1.01 SUMMARY

- A. Provide landscape irrigation system as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

1.02 QUALITY ASSURANCE

- A. Permits: Obtain and pay for all permits and inspections required by governing agencies.
- B. Ordinances and regulations: Local, municipal and state laws and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in the specifications shall not be construed to conflict with any of these rules and regulations or requirements of the same. However, when the specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by these rules and regulations, the provisions of the specifications and drawings shall take precedence.
- C. Protection: Erect and maintain barricades, warning signs and lights and provide guards as necessary or required to protect all persons on the site.
- D. Underwriters Laboratories: Electrical wiring, controls, motors and devices shall be U.L. listed and so labeled.
- E. Installer qualifications (for solvent and rubber gasket joints): Each person shall be trained by the manufacturer's representative in techniques for making correct joints prior to performing work on the site.
- F. Work of this Section which is allied with the work of other trades shall be coordinated as necessary.
- G. Discrepancies: When discrepancies exist between drawings and specifications, and no specific interpretation is issued prior to bidding, the decision regarding this interpretation will rest with the Agency's Representative. The Contractor will be compelled to act on this decision as directed. In the event the installation deviates from the directions given, it shall be corrected at the Contractor's expense.
- H. Manufacturer's directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers used in this Contract furnish directions covering points not shown in the drawings and specifications.
- I. Work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.
- J. The Contractor shall not install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in equipment usage or area dimensions exist that

might have been considered in the engineering. Such obstructions or differences shall be brought to the attention of the Agency's authorized representative. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary at no cost to the Agency.

1.03 WATER METERS

- A. See Plans for size and location.
- B. Contractor shall pay for all fees required to make connection to meter and water costs during construction and maintenance.

1.04 POINT OF CONNECTION

- A. Make connection of irrigation system main line at the water meter in approximate location shown. See Plans for details.

1.05 ELECTRICAL METERS

- A. New electrical meters required by this contract shall be provided under the Electrical Section.

1.06 DRAWINGS

- A. The drawings are diagrammatic only. It is the intent of the plans and specifications that the irrigation system shall efficiently and uniformly irrigate all areas according to horticultural and soil requirements, and that it shall be complete in every respect and shall be ready for operation to the satisfaction of the Agency.
- B. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc. which may be required. Carefully investigate the structural and finished conditions affecting all of this work and plan this work accordingly, furnishing such fittings, etc. as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting and architectural features.
- C. Materials List and Manufacturer's Catalogs. Within 15 days after award of contract, submit four (4) copies of a complete materials list, including manufacturer's name and number covering all material required under this Division, together with four (4) copies of descriptive literature.

1.07 RECORD DRAWINGS

- A. Record dimensioned locations and depths for each of the following:
 - 1) Point of connection.
 - 2) Sprinkler pressure line (mainline) routing. (Provide dimensions for each 100 linear feet [maximum] along each routing and for each change in direction.)
 - 3) Flow meters.
 - 4) Gate valves.
 - 5) Sleeves/Conduits.
 - 6) Remote control valves.
 - 7) Quick coupling valves.

- 8) Control wire routing.
- 9) Other related items as may be directed by the Agency's Representative.
- 10) Locate all dimensions from two permanent points (buildings, monuments, sidewalks, curbs or pavements).
- 11) Record all changes which are made from the Contract Drawings, including changes in the pressure and non-pressure lines.
- 12) Record all required information on a set of black line prints of the drawings. Do not use these prints for any other purpose.
- 13) Maintain information daily. Keep drawings at the site at all times and available for review by the Agency's representative.
- 14) When record drawings have been approved by the Agency's representative, transfer all information to a set of reproducible prints using permanent India ink. Changes using ballpoint pens are not acceptable.
- 15) Make dimensions accurately at the same scale used on original drawings or larger. If photo reduction is required to facilitate controller chart housing, notes or dimensions must be a minimum 1/4 inch in size.
- 16) Make reproducible prints (5 maximum) for the Agency.
- 17) Use appropriate eradicating fluid for removing original lines and dimensions where changes are made. Completed reproducibles shall be equal to the original drawings.
- 18) Controller Charts. On the inside surface of the cover of each automatic controller, the Contractor shall prepare and mount a chart showing the valves and sprinkler heads serviced by that particular controller. All valves shall be numbered to match the operation schedule and the drawings. Only those areas controlled by that controller shall be shown. This chart shall be a plot plan, entire or partial, showing building, walks, roads and walls. A photostatic print of this plan, reduced as necessary, and legible in all details, shall be made to size that will fit into the controller cover. Do not prepare charts until record drawings have been approved by the Agency's Representative. Provide one controller chart for each automatic controller installed. Identify the area of coverage of each remote control valve, using a distinctly different pastel color, drawn over the entire area of coverage. Charts must be completed and approved prior to final review of irrigation system. This print shall be approved by the Agency's representative and shall be hermetically sealed in 20 mil plastic (2-10 mil Pieces). This shall then be secured to the inside of the cover. Show controller designation on each chart.

1.08 MISCELLANEOUS ITEMS TO BE FURNISHED BY THE CONTRACTOR

A. Provide the following tools as a part of this contract:

- 1) Two (2) wrenches for disassembling each type sprinkler head used;
- 2) Two (2) operating keys suitable to operate each type of valve used;
- 3) One (1) set of automatic controller cabinet keys for each controller used;
- 4) Provide three (3) sets of maintenance and parts manuals for controller, remote control valves, shut-off valves, quick coupler valves, rotary heads, and all other mechanical devices with moving parts used in this contract.
- 5) Present in hardback three-ring binders.

1.09 CHECKLIST

A. Provide a signed and dated checklist and deliver to the Agency's Representative prior to final review of the work using the following format:

- 1) Confirmation of service pressure: psi, by whom and date.
- 2) Plumbing permits: if none required, so noted.
- 3) Materials approvals: approved by and date.
- 4) Pressure line tests: by whom and date.
- 5) Record drawings: received by and date.
- 6) Controller charts: received by and date.
- 7) Materials furnished: received by and date.
- 8) Operation and maintenance manuals: received by and date.
- 9) System and equipment operation instructions: received by and date.
- 10) Manufacturer's warranties if required: received by and date.
- 11) Written guarantee: received by and date.
- 12) Lowering of heads in lawn areas: if incomplete, so state.

1.010 GUARANTEE

- A. A letter of guarantee from each manufacturer shall be submitted to the Agency guaranteeing his materials for a period of one year against material defects and workmanship. In cases where longer guarantees are required by these specifications, such guarantees shall be submitted.

PART 2 PRODUCTS

2.01 SPECIFYING BY NAME

- A. Whenever any material is specified by name and number thereof, such specifications shall be deemed to be used for the purpose of facilitating a description of the materials and established quality, and shall be deemed and construed to be followed by the words "or approved equal". No substitution will be permitted which has not been submitted for approval by the Agency within 30 days after the contract has been awarded. Three (3) copies of descriptive literature, including pressure loss curves, nozzle performance characteristics, etc., shall be furnished for any materials submitted as "equal" substitutes. No item will be considered as "equal" if it is constructed of different materials or alloy or is of a different principle of operation. Piping, tubing, conduit, valve, or any device through which the flow of water must pass shall not cause a greater resistance, turbulence, or pressure loss due to friction than that material as engineered and designed into this system.
- B. Pressure loss curves shall be certified by an impartial commercial testing laboratory with all costs for tests and reports being paid for by the Contractor wishing to make the substitution.
- C. Contractor shall submit letter (with material list) stating his reasons for any substitution and showing amount of credit offered if substitution should be acceptable.

2.02 GENERAL

- A. All materials shall be new and of size and type as called out on the drawings. All materials of like kind shall be of one manufacture.

2.03 Valve Boxes for Main Shut-Off Valves:

- A. Size and type as called out on the drawings.

2.04 Backflow Preventer and Enclosure:

- A. Backflow preventer shall be of size and type as called out on the drawings, complete with gate valves and test cocks provided by the manufacturer of the device.
- B. Wye strainers at backflow prevention units shall be 85% red brass, American National Standard Institute

(ANSI) with 40 mesh monel screen.

2.05 Red Brass Pipe:

- A. Shall be Federal Specification No. WW-P-351 medium weight, IPS, with threads to conform to ASA Specification B2. Fittings shall be medium pattern, banded, threaded with standard taper pipe threads.

2.06 Fittings - Steel:

- A. 150 lb. galvanized malleable iron, banded.

2.07 Unions - Steel:

- A. Galvanized steel with brass to iron seat, minimum 300 lb. WOG, ground joint.

2.08 Risers - Ferrous Metal:

- A. Shall be galvanized steel pipe (to strainer assembly). Material for sprinkler head risers shall be as called out on the drawings.

2.09 Pipe Wrap:

- A. Galvanized steel pipe to strainer assemblies shall be field wrapped as detailed or to 6 inches above finished grade. Use ten mil PVC tape, two layers (half-lapped) to equal forty mil thick total wrapping. Clean surfaces and prime with solution required by manufacturer of tape. Field wrap all joints with same materials leaving identification marks visible, re-apply wrap as recommended by tape manufacturer. All wrapping to be tested in the presence of the Agency Representative using approved detector.

2.010 PVC Pipe (General):

- A. All pipe to be permanently and continuously marked with manufacturer's name, pipe size (IPS) and schedule (D-1785-68 for schedule pipe), manufacturer's lot number and NSF approval. Pipe with dents, ripples, wrinkles, die or heat marks is not acceptable. Pipe shall be delivered to the site in 20 foot lengths.

2.011 Tracer Wires:

- A. A No. 12 Green Type TW plastic-coated copper tracer wire shall be installed with non-metallic main lines.

2.012 Threaded PVC Nipples:

- A. Schedule 80, Type 1, 3 inch minimum length, except where detailed otherwise on drawings. PVC domestic main to drinking fountains shall be PVC Schedule 80 solvent welded plastic pipe; gray in color, meeting ASTM D-1785.

2.013 PVC Mainline:

- A. Shall be 1120/1220 normal impact, 2" through 12" use Schedule 40 with integrally thickened bell ends, solvent weld type meeting ASTM D-1785, 2 through 22", use Class 315, solvent weld type meeting ASTM D-1785, 3" and larger use Class 200 O-ring gasketed pipe. All pressure supply lines under vehicular paving shall be installed in a PVC Schedule 40 sleeve.

2.014 PVC Laterals (Non-Pressure Piping):

- A. Normal impact, Schedule 40, solvent weld type meeting ASTM D-1785.

2.015 Fittings - PVC:

- A. For make-up shall be of same chemical compound as pipe on which it is installed. Use Schedule 40 medium-wall fittings for any "all socket" connections. Use Schedule 40 heavy-wall fittings for all fittings with one or more threaded outlets. Fittings for ring-type connections shall be compatible with the pipe on which they are used. Sealing rings shall be procured from the Manufacturer of the pipe and

meet configuration of grooves and diameters provided.

2.016 P.V.C. Pipe Compound:

- A. Plastic pipe and threaded fittings: Assemble using teflon tape applied to male threads only.

2.017 Primer:

- A. For PVC solvent weld connections shall be as recommended by the manufacturer of the PVC pipe. Primer shall be chemically compatible with the pipe, fittings and solvent. No primer need be used if “Christy’s Red Hot Blue Glue” is used as solvent material.

2.018 Solvent:

- A. For PVC solvent weld connections shall be as recommended by the manufacturer of the PVC pipe. Solvent shall be chemically compatible with the pipe, fittings and primer.

2.019 Sprinkler Risers:

- A. The riser shall be PVC Schedule 80 to fit sprinkler opening in swing joint assembly and proper length as detailed on the drawings.

2.020 Valves:

A. Ball Valve:

- 1) 2 inches and smaller bronze ball valve (unless otherwise noted on drawings); ASTM B-584 Alloy-844, 150 PSI saturated steam-600 WOG rating. 2 piece body, chrome plated ball, blowout-proof stem UL listed.

B. Check Valves:

- 1) Swing check valve, 2 inches and smaller on non-pressure lines: bronze or plastic construction, 100 pound S.W.P. female i.p.s.
- 2) Swing check valves, 2-1/2 inches and larger on pressure lines: cast iron, 150 pound class with no-slam feature.

C. Couplers:

- 1) Same manufacturer as quick coupling valve; cast bronze, machined shank, coupler to include operating handle. Top of coupler equipped with 3/4” hose swivel.

D. Gate Valves:

- 1) 2 inches and smaller (unless otherwise noted on drawings): ASTM B62 brass body, 150 pound saturated steam rated; with screwed joints; non-rising stem; screwed bonnet solid disc. Provide with brass or bronze handwheel.
- 2) 3 inches and larger (unless otherwise noted on Drawings): ASTM A-126 class B, iron body 150 pound W.O.G. with flanged joints, non-rising stem; bolted bonnet and double disc, equipped with operating nut, or as otherwise approved.

E. Quick Coupler Valves:

- 1) 150 lb. cast bronze body, self-closing metal cover with yellow rubber protective caps, locking type. Threaded track, one inch size.

F. Remote Control Valves:

- 1) All bronze globe type, contamination proof, slow closing, 150 lb.; electrically operated, 24 volt, epoxy encapsulated waterproof, solenoid to be an integral part of the unit; throttling device with cross arm on top; manual operated to cause valve to open and close with out use of electricity. Manual operator shall be provided by the factory and not fabricated by the Contractor. Valves shall

be of same manufacture as automatic controller unless noted otherwise. Valves shall have one year manufactures warranty.

G. Master Valve:

- 1) Shall be normally open master valve, with a voltage range from 17 to 40 VAC self cleaning slow closing iron and bronze construction with a 5 year warrantee.

2.021 Sprinkler Heads:

- A. Make, size, type and performances as called out on the drawings.

2.022 Automatic Controller:

- A. 120 volt, single phase, 60 cycle electric clock control unit in plastic cabinet. Shall incorporate the following features: 8 day variable cycle, 0 to 99 minutes timing integrally variable; automatic, semi-automatic, and manual operation; manual immediate-station-advance; station-in-operation indicator; 24-hour start clock; on-off and repeat device. No delay between stations. To operate 24 volt valves. Contains pump-starting-stopping circuit. Master switch cuts all power circuits except starting clock. Controller shall be as called out on the drawings.

2.023 Valve Boxes:

- A. Valve boxes unless otherwise noted shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical action of soils. They shall be green in color. The cover shall be secured with a stainless steel bolt mechanism. The cover shall be capable of sustaining a load of 1500 PSI. Valve box extensions shall be by the same manufacturer as the valve box. All valve boxes shall be as manufactured by Brooks, Carson or an approved equal.
- B. Quick coupling valve boxes shall be round. The cover shall be heat branded with the letters "QCV," 2" high.
- C. Gate valve boxes shall be round. The cover shall be heat branded with the letters "GV," 2" high.
- D. Remote control valves shall be 12" X 18". The cover shall be heat branded with the letters "RCV" and the valve number in characters 2" high.
- E. Splice boxes shall be 12" X 18". The cover shall be heat branded with the letters "SB," 2" high.
- F. Valve boxes for moisture sensing stations shall be 12" X 18". The cover shall be heat branded with the letters "MSS," two inches high.
- G. Traffic area boxes: concrete cast iron lid designed for vehicular traffic use.

2.024 Electrical Requirements to Automatic Controllers - (120 v):

- A. Service to automatic controllers and final hook up shall be provided by electrical subcontractor.
- B. Electrical equipment installed outside building shall be NEMA 4 type.
- C. All connections between electrical services and equipment shall be in rigid galvanized electrical conduit, with conduit and wiring size as required.
- D. To be complete in every respect to City Electrical Code, ready for use and in accordance with manufacturer's requirements. Provide separate power shut-off switch at panel for each controller. All wiring in galvanized conduit and fittings from source provided under the electrical section. No running threads accepted; use nipples. Conduit system shall be 660 volt insulation, NEC standard annealed copper wire and shall be minimum AWG #12 TW or RW. Protect each controller by a code approved ground connection. Supply to be 120 volts, 60 cycle, single phase, one amp. Use only galvanized steel fasteners in securing controllers in position. Install new controller as detailed on drawings.

2.025 Electrical Requirements from Automatic Controllers (24 volts):

A. Control and Common Wire

- 1) To remote control valves wires shall be U.F. type, U.L. approved, AWG number 14 solid strand copper wire with minimum 4/64" PVC coating, 600 volt, 75 C. "Common" wire to be white coated. Each controller to have a different color pilot wire where more then 2 controllers are on a site.

B. Wire Connectors for Direct Burial Conductors (24 volt):

- 1) Splices, where permitted, shall be waterproofed using Rain Bird or Pen-Tite Connectors.

C. Di-Electric Isolation:

- 1) Provide between all connections joining ferrous and non-ferrous metals, or old (existing) ferrous and new ferrous metals. Submit for approval type intended for use.

D. Concrete:

- 1) 2,500 lb. strength at 28 days. Fine aggregate may be granular sand. All rock and gravel for use in concrete shall be mechanically washed and free from injurious amounts of deleterious substances.

PART 3 EXECUTION

3.01 General:

- A. All work shall be performed by competent, experienced workmen and in a manner to coincide with methods as set forth by the manufacturers of the equipment to be used and as acceptable to the Agency's Representative. No consideration will be given to any design changes unless called for by the Agency.
- B. Contractor shall be responsible for damages caused during his operations to any existing underground utility lines including existing irrigation control wires, storm sewers, sanitary sewer systems, gas lines, potable water lines, irrigation lines, telephone cables, gasoline or oil lines, electrical cables, or any other systems (buried or overhead). If such damage should occur, Contractor shall immediately notify Landscape Designer, Agency, and department affected by such damages and shall pay all ensuing costs.
- C. Where it is necessary to excavate adjacent to existing trees, use all possible care to avoid injury to trees and tree roots. Excavation in areas where 2 inches and larger roots occur shall be done by hand. Roots 2 inches and larger in diameter, except directly in the path of pipe or conduit, shall be tunneled under and shall be heavily wrapped in burlap, to prevent scarring or excessive drying. Where a ditching machine is run close to trees having roots smaller than 2 inches in diameter, the wall of the trench adjacent to the tree shall be hand trimmed, making clean cuts through. Roots 1 inch and larger in diameter shall be painted with two coats of Tree Seal, or equal. Trenches adjacent to trees would be closed within 24 hours. Where this is not possible, the side of the trench adjacent to the tree shall be kept shaded with burlap or canvas.
- D. Comply with all governing construction and plumbing ordinances for all work under this contract.
- E. All work shall be assembled to conform to details and notes on the drawings, whether or not mentioned in the specifications.

3.02 Site Reviews:

- A. Before any work commences, a conference shall be held with the Agency's Representative and Contractor regarding general requirements of this work.
- B. Prior to trenching, Contractor shall be responsible for verifying existing pressure at point of connection. If pressure varies from what is indicated on drawings, the Contractor shall immediately notify the Agency's representative.
- C. Contractor's responsibility:
 - 1) Examine surfaces for conditions that will adversely affect execution, permanence and quality of

work.

- 2) Verify that grading has been completed and the work of this section can properly proceed.
- 3) Exercise extreme care in excavating and working near existing utilities. Contractor is responsible for damages to utilities which are caused by his operations or neglect. Check existing utility drawings for locations.
- 4) Notify the Agency's Representative in writing, describing unacceptable conditions.
- 5) Do not proceed with work until unacceptable site conditions are corrected or existing utilities are located.

D. Verification of Dimensions:

- 1) Verify all horizontal and vertical site dimensions prior to staking of heads. Do not exceed spacing shown on drawings for any given area. If such modified spacing demand additional or less materials than shown on the drawings, notify the Agency's representative before commencing work.

E. Manufacturer's Requirements:

- 1) Manufacturer's requirements for installation of products shall apply:
 - a) When no other direction is given;
 - b) When it is a more stringent requirement than the Standard Specifications and these Special Provisions.

F. Work Space:

- 1) The Contractor shall erect fences or guards as are required for the protection of the public and protection of construction materials, and maintain same in good repair until the completion of the work under the contract.

G. Drawings of Record:

- 1) Obtain black line prints from the Agency's Representative and maintain daily records showing every change from the contract drawings of all locations of main lines, buried valves, conductors, quick coupler valves, and plugged or capped outlets. Locate each item from two points of architectural permanence, i.e., curbs, walls, light standards, etc. Do not dimension from sprinkler heads or other parts of the irrigation system. Keep record drawings on site for daily observation by the Agency's Representative. All dimensions to be taken prior to backfill. On date of final observation, deliver corrected drawings to the Agency's Representative. Final drawings shall be prepared by the Contractor on black line prints obtained from the Agency's Representative, showing all field notes in India ink finalized by a competent draftsman. Delivery of prints does not relieve the Contractor of responsibility for providing any information that may be omitted from the prints.

H. Trenching:

- 1) Do all excavation for installation of all work included in contract. Mechanical trenching machines shall be type to cut trenches with straight, parallel sides. Trenches to be only wide enough as may be required to lay the pipe and control wires. "Pulling" of main line pipe and/or control wires will not be permitted. Contractor shall use all possible care to protect existing trees and plants during trenching. Roots 2" or larger shall be tunneled under and wrapped with wet burlap to prevent scarring with two coats of approved sealer manufactured for this purpose. Cover all trenches in root areas (only while open) with wet burlap, and backfill within 24 hours after opening the trench. Obtain Agency Representative's approval before cutting any root over one inch diameter. All trenching in such areas shall be done by hand.

I. Backfill:

- 1) After the work has been installed to depths as detailed on the drawings, flushed, tested, and proven tight in the presence of the Agency's Representative, backfill with fine granular materials as approved by the Agency representative. Allow no rocks or other objects larger than one inch diameter to fall in the first 6" of cover. Backfill carefully and tamp properly to avoid any voids. Flooding of trenches shall be done only with the approval of the Agency's Representative; however, all sandy soils shall be flooded during the backfill-compaction operation.
- 2) After compacting backfill over all pipe lines to equal density of adjoining undisturbed soils, Contractor shall remove all remaining debris caused by his operation from the site and dispose of same in legal manner. All trenches shall be left flush to the adjoining undisturbed grades. Any work covered prior to field observations by the Agency's Representative shall be uncovered at the expense of the Contractor to allow for such observations.

J. Laying of Lines:

- 1) Lines shall be staked and installed in the locations shown on the drawings. Discrepancies between drawings and site shall be brought to the attention of the Agency's Representative prior to trenching. Do not exceed maximum spacing shown on drawings, nor exceed the GPM on the pipe sizes shown. Assemble all pipes free from dirt and scale; ream and deburr. Piping and electrical sleeves under concrete shall be set in place prior to paving work. If pipe must be laid after paving is in place, it shall be done by jacking, boring, or hydraulic driving.
- 2) If cutting or breaking of any paving is necessary, it shall be done and replaced with like material at the expense of the Contractor. Obtain the approval of the Agency's Representative prior to any cutting or breaking. Hydraulic driving will not be permitted under asphalt paving. All sleeves set in place under paving shall extend 18" minimum beyond such paving and be capped hand tight. No fittings, including couplings, will be permitted under surfaces to be paved except where the length of the line under the paving exceeds 20 feet or where lines are encased in sleeves.
- 3) Unless installed in a PVC sleeve, all pipes under pavement surface to be installed a minimum of 24 inches below A.C. paving with a 6-inch bedding and a 6-inch cover of sand backfill.
- 4) Replace and restore all surfaces to original condition, including grade and landscaping.
- 5) Restoration work shall match the original work in every respect, including type, strength, texture and finish.
- 6) In new paved areas, coordinate installation of piping and wires under paved areas with General Contractor.
- 7) If the only piping installed is over 20 feet long, pressure testing is required for that section at the time of installation. Upon completion of piping installation, the entire system must be tested.
- 8) If wire under paved areas cannot be continuous, all splices shall be enclosed in an approved box.

K. Assembly of Metal Pipe:

- 1) Do not bend or spring pipe; make all offsets or changes in direction with fittings. Cut threads with sharp, clean dies to conform to ASA specifications B2. Make up joints by applying oil base compound to male threads only. Remove excessive compound after makeup.

L. Assembly of PVC Pipe:

- 1) Handle with care when loading, unloading, transporting and storing to avoid damage. Store pipe and fittings under cover before using. Transport in vehicle with bed of sufficient length to carry pipe flat and fully supported. Store pipe in same manner. Notify Agency Representative when each pipe and fittings shipment reaches the site, for observation. Rejected materials shall be immediately removed from the site and replaced with new shipment of different batch number.

M. Joining by Ring Seals:

- 1) Provide for expansion and contraction at each end. Use rubber ring and lubricate with non-toxic lubricant. Center load, leaving all connections exposed. Do not lay pipe in trench containing water or at less than 32 degrees F.

N. Joint Restraints:

- 1) Ductible iron joint restraints shall be installed on all fittings and gate valves for all IPS-Size, ring joint PVC pipe. The joint restraint shall be capable of securing the PVC pipe directly to the lugs on the Leemco and HARCO deep bell ductible iron fittings without the use of bolts, links, and adapters. The joint restraint shall be capable of securing PVC pipe to PVC pipe and PVC pipe to ring joint gate valves without the use of threaded linkages.
- 2) All ductible iron fittings shall be secured to full-length pipes and on all bends and tee branches, the next joint of the pipe shall be secured. At least two full lengths of pipe must be secured when attached to bends and tee branched 8" and larger, and at least three full lengths when attached to a fitting shall also be secured.
- 3) The joint restraint must be similar in all respects to the joint restraints as manufactured by Leemco, Corona, California.

O. Joining by Solvent Weld:

- 1) Use non-synthetic brush to spread primer and solvent using no larger than pint-sized cans. Clean and refill cans each day. Cut pipe square, ream, chamfer outside end at 10 degrees. Clean and dry pipe and fitting socket. PVC solvent weld connections shall be made as recommended by the manufacturer of the PVC pipe. Bottom the pipe in socket and turn 90 degrees. Hold joint together 30 seconds. Wipe off excess solvent. Allow to set 30 minutes before moving. Snake pipe side to side in trench bottom, keeping 4" horizontal clearance between two pipes in same trench. Do not lay pipe in trench containing water or at less than 32 degrees F. Center load immediately leaving joints exposed.

P. Locating Assemblies and Valves:

- 1) Install backflow assemblies in shrub areas at minimum height permitted by local code. Paint assemblies with 2 coats of flat black enamel.
- 2) Hose bibbs: Locate bibbs in shrub areas within 12 inches of header or hardscape.
- 3) Quick coupling valves: Unless otherwise indicated, locate valves within 12 inches of hardscape.
- 4) Manual control valves: Locate as indicated on Drawings within 12 inches of hardscape, with access sleeve, unless otherwise noted.
- 5) Fill area under valve box with minimum 3 cubic feet of pea gravel before box is installed.

Q. Flushing of Lines:

- 1) Main lines shall be flushed before attaching remote control valves, quick coupler valves and with pipe center loaded. All water being discharged shall be temporarily piped up and out of the trenches. Trenches to be kept dry for pressure tests to follow. Install all valves after approval of flushing procedure by the Agency's Representative.
- 2) Laterals shall be flushed before sprinkler heads are in place. Cap all risers, apply pressure, remove caps in sequence starting at the control valve. Replace caps before removing caps to follow. Continue to end of each lateral. Flush until all foreign matter and mud is cleared of the system. Contractor to provide all materials required for flushing operations.

R. Pressure Tests:

- 1) Do not backfill over any line more than is necessary for testing until it has been inspected, tested,

and approved.

- 2) Perform all hydrostatic tests in presence of the Agency's Representative after flushing lines. Maintain 125 psi on main lines for four (4) hours with all air expelled from line without quick coupler and control valves in place. All leaks shall be corrected in mechanical manner without use of epoxy fillers or other filler compounds. Provide all equipment for tests including force pump and pressure gauges. No pressure test shall be required for lateral lines unless otherwise noted.
- 3) If pressure tests are noted, lateral lines shall be pressure tested at 100 psi for two (2) hours where they are providing water to street trees only and will be primarily buried under concrete or asphalt paving. Swing joints do not need to be tested.

S. Laying of Control Wires (24 volt):

- 1) Lay wires in common trench with main lines unless otherwise approved. Splicing allowed only every 500 feet. Provide 2 feet expansion loop at splice. Use concrete electrical junction box with bolt down lid at each splice point. White coated common wire in junction boxes to be tagged with 1/4" wide embossed plastic labeling tape showing controller designation. Use plastic electrical tape and bind all control wires in bundles at 10 foot intervals. All approved splices, including splices at remote control valves, shall be waterproof and enclosed in an acceptable box. Install PVC sleeve where wire is not installed with main lines.

T. Laying of Tracer Wires:

- 1) Tracer wire shall be placed on bottom of trench under vertical projection of pipe, paved carefully to avoid stress from backfilling, and shall be continuous throughout length of pipe with spliced joints soldered and covered with insulation type tape.
- 2) Tracer wire shall follow main line pipe and branch lines and terminate in yard box with gate valve that controls these main irrigation lines. Provide enough length of wire to reach surface grade, bend back end of wire to make a loop and attach a Dyno-tape plastic label with designation of ATracer Wire@.
- 3) Location of tracer and its termination shall be recorded on Project Record Documents.

U. Protection during Hydromulching:

- 1) If seeding of any portion of the site is to be done by hydromulching methods, Contractor shall protect all sprinkler heads in the areas to be hydromulched by slipping plastic bags of appropriate size over each head prior to hydromulching operation. All bags shall be removed after cessation of hydromulching and properly disposed of.

V. Adjusting System

- 1) Adjust the entire system prior to coverage test and again at conclusion of maintenance period.
 - a) Set all shut-off valves in the system to full open position.
 - b) Adjust all stationary heads to equal and uniform coverage using adjusting screws in each sprinkler head and by control of the throttle device in each remote control valve.
 - c) Adjust all rotary head radii to fit requirements on drawing if heads are equipped with such a device.
 - d) Adjust arcs of all adjustable arc type heads so as to prevent overspray on areas to be kept dry. This can also mean the replacement of nozzles or arcs in stationary heads to nozzles of difference cut, i.e., 180° nozzles to change to 120° nozzles, etc.

W. Site Cleaning:

- 1) Clean all debris from site, remove all storage rooms and all other constructions and make site ready for planting work to follow. Work or debris not cleared for landscape work may be backcharged to

this subcontractor by the landscape subcontractor.

X. Observations:

- 1) Observations will be performed by the Agency's Representative at the following times and at random visits when the observer may be on the site.
 - a) Pre-work conference. To be conducted prior to any irrigation work under this contract.
 - b) Observation of flushing.
 - c) Observation of pressure test.
 - d) Observation of coverage performance.
 - e) Final observations of the completed installation.
 - f) Contractor shall not cover any work prior to observation by the Agency's Representative.
 - g) All observances called for by the Contractor shall be requested in writing, at least 48 hours prior to the anticipated observation.
- 2) Contractor shall provide "walkie-talkie" equipment and/or personnel to maintain communication from review are to automatic controllers.
- 3) All work shall meet the approval of the Agency's Representative or be rectified by the Contractor to a condition that does meet this acceptance at no additional cost to the Agency. If the Contractor calls for observations and is not ready for the observations, it shall be backcharged, hourly, including travel time for all members of the team of observers involved.

Y. Lowering of Heads, Valve Boxes, Quick Coupler Valves, etc.:

- 1) All equipment that may be damaged by mowing shall be set flush to finished grade as called out on the drawings, prior to final acceptance of the work.

Z. Guarantee:

- 1) The Contractor shall guarantee the entire irrigation system against defects in materials and workmanship for a period of one (1) year from the date of acceptance of the work. The Contractor shall furnish a Faithful Performance Bond in the amount of 10% of the amount bid for the installation of the irrigation system to be in force for the one (1) year guarantee period.
- 2) A copy of the guarantee form shall be provided at the time of contract award and shall also be included in the Operations and Maintenance Manual.
- 3) The guarantee form shall be retyped onto the Contractor's letterhead and contain the following information.

GUARANTEE FOR IRRIGATION SYSTEM

We hereby guarantee that the irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications. We agree to repair or replace all defects in material or workmanship which may develop during the period of one year from date of acceptance and also to repair or replace all damages resulting from the repair of such defects at no additional cost to the Agency. We shall make such repairs or replacements within a reasonable time, as determined by the Agency, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of written notice from the Agency, we authorize the Agency to proceed to have said repairs or replacements made at our expense, and we will pay the costs and charges therefore upon demand.

PROJECT: _____
LOCATION: _____
CONTRACTOR/COMPANY: _____
LICENSE NO.: _____
ADDRESS: _____
PHONE: _____
DATE OF FINAL ACCEPTANCE: _____
SIGNED: _____
DATE: __

02830 CMU RETAINING WALL

PART 1 GENERAL

1.01 SUMMARY

- A. Provide concrete modular unit retaining wall system where shown on the Drawings, as specified herein and with all accessories as needed for a complete and proper installation.

1.02 REFERENCES

- A. ASTM C90 - Hollow Load Bearing Masonry Units
- B. ASTM C140 - Sampling and Testing Concrete Masonry Units
- C. ASTM C145 - Solid Load Bearing Concrete Masonry Units

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle materials in such manner as to prevent damage. Store materials above ground on wood pallets or blocking. Remove damaged or otherwise unusable material, when so determined from the site.
- B. Faces of the concrete units shall be free of chips, cracks or stains.

1.04 EXTRA MATERIALS

- A. Furnish Agency with three (3) replacement units identical to those installed on the Project.

PART 2 PRODUCTS

2.01 MODULAR CONCRETE UNITS

- A. Provide high strength, dense concrete units meeting the requirements of ASTM C90 except that compressive strength shall be a minimum of 3,000 psi and the maximum water absorption shall be limited to 7.0%.
- B. The concrete shall have adequate freeze thaw resistance in accordance with ASTM C90 for a minimum of 50 cycles.
- C. Color as indicated on drawings.
- D. Face pattern as indicated on drawings.
- E. Manufacturers:
 - (1) Product
 - (2) Product
 - (3) Product

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Excavate foundation soil to the lines and grades as shown on the construction Drawings, or as directed by the engineer.
- B. In the absence of compacted fill or undisturbed soil, place 6 inch layer of crushed rock base over the subgrade prior to setting the first course of concrete unit retaining wall.

3.03 INSTALLATION

- A. Erect units in accordance with manufacturer's recommendations and as specified herein.

3.04 BACKFILL

- A. Place backfill in 8" lifts and compact to 95% of standard Proctor density.
- B. Only hand operated equipment shall be allowed within 3 feet of the back surface of the concrete units.

02870 SITE FURNISHINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide site furnishings, accessories and mounting hardware where shown on the Drawings, as specified herein and with accessories as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 TREE GRATES

- A. Manufacturer:
- B. Model:
- C. Color:
- D. Finish:

2.02 BENCHES, FREESTANDING

- A. Manufacturer:
- B. Model:
- C. Color:
- D. Finish:

2.03 BENCHES, ANCHORED

- A. Manufacturer:
- B. Model:
- C. Color:
- D. Finish:

2.04 TRASH RECEPTACLES

- A. Manufacturer:
- B. Model:
- C. Color:
- D. Finish:

2.05 DRINKING FOUNTAINS

- A. Manufacturer:
- B. Model:
- C. Color:
- D. Finish:

2.06 BIKE RACKS

- A. Manufacturer:
- B. Model:

C. Color:

D. Finish:

2.07 TABLES

A. Manufacturer:

B. Model:

C. Color:

D. Finish:

2.08 CLOCKS

A. Manufacturer:

B. Model:

C. Color:

D. Finish:

2.09 PLANTERS

A. Manufacturer:

B. Model:

C. Color:

D. Finish:

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Install site furnishings at the required furniture locations as shown on the Drawings.
- B. Clean furnishings with cleaning materials recommended by the manufacturer.
- C. Repair any damage incurred during installation.
- D. Check to insure that site furnishings are properly installed and are in perfect operating condition.

02900 PLANTING

PART 1 GENERAL

1.01 SUMMARY

- A. Provide trees, plants and ground cover as shown on the Drawings, as specified herein and as needed for a complete and proper installation.
- B. Changes, Substitutions, and Any Extras: any extras, revisions, or substitutions to the work as shown on the plans and specified herein shall be approved in writing by the Agency's representative prior to installation.

1.02 WARRANTY

- A. Provide one year warranty including coverage of plants from death or unhealthy conditions.
- B. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.03 QUALITY ASSURANCE

- A. Standards for Plants and Planting Material: Meet or exceed the Specifications of federal, state and county laws requiring inspection for plant disease and insect control.

1.04 VERIFICATION OF EXISTING CONDITIONS

- A. The contractor shall verify *all existing conditions* including plants to remain, prior to starting work.

1.05 COORDINATION

- A. All irrigation work shall be completed and approved prior to starting planting work.

1.06 SOIL TESTING

- A. The contractor shall supply a complete soil test including ph, nutrients, texture, salinity, etc., as per note 3.04-C

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials shall be best of their kind available.

2.02 PLANTS

- A. All plants shall be healthy, vigorous of normal growth, free of disease, insects, pests or their eggs, and shall have healthy, normal root systems, well filling their containers but not root bound.
- B. Plants shall not be pruned prior to delivery except as authorized by the Agency's representative.
- C. Tree caliper, if noted on plan, shall be measured 4' above surface of ground.

2.03 SOIL AMENDMENT

- A. Soil amendments shall be nitrogen-stabilized redwood or fir shavings.

2.04 FERTILIZER

- A. Fertilizers shall be specified under "soil preparation" and "maintenance" below.

2.05 SOIL CONDITIONERS

- A. Soil Conditioner shall be "Gro-Power" (5-3-1) as manufactured by Gro-Power Inc., Chino, Ca. (909) 393-3744 or equal.

2.06 MULCH

- A. Mulch shall be Kellogg's fir bark 1/2" to 3/4" diameter.

2.07 IMPORTED SOIL

- A. Any import soil required for planter backfill or for finish grading shall be a fertile, friable natural loam topsoil, free of subsoil, hard clods, clay, sod, debris, or any other undesirable material.

2.08 SEED BED TOPPING

- A. Seed bed topping shall be Kellogg's screened nitromulch topper.

2.09 COMMERCIAL FERTILIZER

- A. Commercial fertilizer shall be granular fertilizer (16-6-8).

2.010 AGRICULTURAL GYPSUM

- A. Agricultural gypsum shall be registered as an agricultural mineral with the State Dept. of Agriculture.

2.011 STAKES AND HEADER BORDERS

- A. Stakes and Header Boards shall be as shown in details on the plans.

PART 3 EXECUTION

3.01 GENERAL

- A. Landscape work shall be according to the workmanlike standards established for landscape construction and planting.
- B. Contractor is responsible for verifying the locations of all utilities and other underground obstructions to prevent damage. Notify the Agency's representative of any conflict between such obstructions and plant locations.

3.02 FINISH GRADING

- A. All areas will be received by the contractor at substantially within 0.1 foot of finish grade.
- B. Grade all lawn and planting areas to smooth, uniform levels or slope without abrupt changes of surface. Soil areas adjacent to buildings shall be graded to allow free flow of water to drainage devices.
- C. Finish grade after adding soil amendment and settlement, shall be 1" below curbs, headers and paving in lawn areas and 2" below in planting areas.

3.03 WEED CONTROL

- A. The contractor shall germinate and destroy existing weed seeds before preparing areas for planting. Sufficient water shall be applied to cause weed seeds to sprout. Weeds shall be removed before they set seed.

3.04 SOIL PREPARATION

- A. Cultivate all lawn and planting areas to a depth of 6". Dispose of all debris and rocks over 3" size.
- B. Soil amendments and quantities shall be determined by soil analysis. The contractor shall take 2 soil samples from 2 different areas 6"-12" deep and submit these to a local soil testing laboratory. Lab shall test for soil nutrients, ph, soil texture, and salts. A copy of the test results and amendments and backfill recommendations shall be sent directly to the Agency's Representative.
- C. For bidding purposes, the following shall be used: (quantities per 1000 sq.ft.):
 - 1) 4 cu. yds. nitrogen-stabilized redwood or fir shavings
 - 2) 150 lbs. soil conditioner

- 3) 100 lbs agricultural gypsum

D. Spread soil amendments evenly over all areas and till into top 4" of soil.

E. SHRUB AND TREE PLANTING

- 1) Do not commence planting until all grading and irrigation work have been completed. No planting shall be done on extremely hot, dry, windy, or freezing weather.
- 2) The relative position of all plants is subject to the approval of the Agency's representative and may be relocated at his direction.
- 3) Planting pits shall be sized as shown in details. Backfill mix shall be determined by soil test per Section 3.04-C above. For bidding purposes, the following backfill mix shall be used:
 - a) 6 parts by volume rock free on-site soil
 - b) 4 parts by volume nitrogen-stabilized redwood or fir shavings
- 4) Backfill mix for acid loving shade plants shall be:
 - a) 1 part by volume backfill mix
 - b) 2 parts by volume saturated coarse peat moss
- 5) All plants shall be set so that when settled they bear the same relation to the finish grade as they bore to soil level before planting. Form an earth berm around each plant.
- 6) Water each plant immediately after planting. Apply water in such a manner as to not disturb backfill and in such a quantity that all materials in hole are thoroughly wet.
- 7) Trees shall be staked or guyed immediately after planting. Refer to details on plan.
- 8) Remove nursery stakes from all plants. Vines and espaliers shall be tied to supports as noted on plan using galvanized hooks and wires, and plastic ties. Trees shall be staked per drawing details.

F. PALM PLANTING

- 1) Care shall be taken to protect palm trunks from being scarred.
- 2) Placement of palms shall be approved by the Agency and installed in a natural upright manner.
- 3) Pits shall be 2x the diameter of the root ball of the palm for both width and height. Provide a 12" diameter x 36" deep drain hole filled with gravel in each pit.
- 4) Backfill: use one sack of manure (2-1/2 cu. ft.) per palm tree. Mix 1/2 sack with 4 lbs. soil sulphur per cu. yd., spread in pit bottom and scarify into soil. Mix remaining 1/2 sack of manure with existing sandy soil (max. 1 part manure with 3 parts sandy soil) used as backfill. Backfill to be compacted. Jet with water to aid compaction and avoid air pockets. Form a watering basin around the base of the palm. Palms are to be planted deep enough so they do not require guying.
- 5) Palms are to be deep watered (flooded) twice weekly during the maintenance period.

G. GROUND COVER PLANTING

- 1) Grade out earth berms around shrubs and trees before planting groundcover
- 2) Spacing and varieties of ground covers shall be as shown on plans. Soil shall be firmly pressed around each plant and excess soil removed from the crown.
- 3) Each section of ground cover shall be thoroughly watered immediately after planting.
- 4) All ground cover areas shall be treated with a pre-emergent per manufacturer's instructions before final inspection. Weed all areas prior to application.
- 5) Spread mulch 1" deep in all planting areas.

H. SOD TURF

- 1) Sod shall be as specified on plan and shall be installed within 24 hours after harvesting.
- 2) Sod area shall be rolled lightly and watered to a depth of 6" the day prior to installing sod. Fill or regrade any areas as necessary. Lightly water again just prior to laying sod.
- 3) Sod shall be laid in a staggered pattern, with tight joints and in the same direction each time. On slopes, install sod from the bottom up. Protect the newly laid sod by walking on boards as the installer moves upward, sod on slopes shall be pinned down with wooden pegs.
- 4) Roll sod with adequately weighted roller to smooth out sod bed.
- 5) Keep sod thoroughly watered to a depth of 6" until established. No foot traffic should be allowed for 2 to 3 weeks after installation.

I. STOLON LAWN PLANTING

- 1) Stolons:
 - a) 'Santa Ana' hybrid Bermuda stolons, available from Cal-Turf (805) 485-9634. Stolons shall be fresh living sections of runners and stems of hybrid Bermuda grass 1" to 4" long, free of turf disease, insects, or weeds and capable of healthy, vigorous growth.
- 2) Topdressing:
 - a) Top dressing shall be Kellogg's Topper, a uniform blend of organic materials containing Nitrohumus, wood fibers, rice hulls, iron, and micronutrients.
- 3) Stolon Planting:
 - a) Stolons shall be planted within 24 hours of delivery to the job site. Keep stolons in the shade, piled no more than 2 containers deep, and continually saturated with water.
 - b) Scatter stolons evenly over planting area at a rate of 5 bushels per 1000 square feet. Topdress with a 1/4" layer of topdressing (1 cu. yd per 1000 sq. ft.) and roll with a hand roller
 - c) Water newly planted stolons to a depth of 8" immediately after planting. Newly planted stolons shall be kept moist at all times for 10 to 20 days after planting or until new turf plants are sufficiently rooted to withstand less frequent irrigation.

J. ANNUAL COLOR

- 1) Plants shall be planted in 6" diameter x 6" deep holes. Backfill mix shall be as specified in "GROUND COVER PLANTING" above, adding 1 teaspoon bone meal in each hole.
- 2) Refer to "GROUND COVER PLANTING" above for further specifications.

K. CLEAN-UP

- 1) Upon completion of all planting work and before final acceptance, contractor shall remove all material, and debris resulting from his work. Remove all tags, labels, nursery stakes and ties from plants. All paved areas shall be swept clean and the site left in a neat and acceptable condition as approved by the Agency's representative.

L. GUARANTEES

- 1) The contractor shall guarantee all plants, 15 gallon and larger for a period of one year. All other plants shall be guaranteed for a period of 90 days. Plants which die or loose more than 30% of their original leaves during this period shall be replaced. Replacements shall be made within 7 days of written notification to contractor.

M. MAINTENANCE SERVICE

- 1) Project maintenance consists of a minimum 30 day plant establishment period and a subsequent 60 day maintenance period, totaling a minimum 90 day maintenance period.
- 2) Initial Plant establishment period: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after all plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.
 - a) Maintenance period: plant establishment begins when all plants have been planted. The establishment period will continue not less than 30 days.
- 3) Continuing Maintenance: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after the Agency Representative as approved plant establishment and shall continue for a period not less than maintenance period below:
 - a) Maintenance Period: Two months from the date of approval of the plant establishment period.
- 4) The contractor shall be relieved from maintenance work required under the Maintenance provisions with the project maintenance work has been satisfactorily completed.

N. EXTRAS

- 1) Any extras or revisions to the plans are to be approved in writing by the Agency's representative.

O. INSPECTIONS

- 1) The following inspections will be performed by the Agency's representative (contractor to give 48 hours notice):
 - a) At completion of soil preparation and finish grading
 - b) Plant materials after delivery to site but prior to planting
 - c) Plant locations prior to planting
 - d) Finish grading prior to lawn installation
 - e) Finish construction inspection prior to maintenance
 - f) Final acceptance at end of maintenance period

P. CERTIFICATIONS

- 1) Prior to final acceptance, written certifications shall be submitted to the Agency's representative for the following:
 - a) Quantities of soil amendments and fertilizers.
 - b) Quantities by species and size of all plant material.

03305 CAST-IN-PLACE CONCRETE (INCLUDING FORMWORK AND REINFORCEMENT)

PART 1 GENERAL

1.01 SUMMARY

- A. Provide cast-in-place concrete including formwork and reinforcement as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

1.02 QUALITY ASSURANCE

- A. Perform all work in accordance with ACI 301.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Except for metal forms, use new materials. Materials may be re-used during progress of the work providing they are completely cleaned and reconditioned, recoated for each use and capable of producing formwork of the required quality.
- B. Plywood: PS1, grade B/B, class I or II, exterior, 3/4 inch Douglas fir sheets with clean true edges.
- C. Lumber: Spruce or Douglas fir.
- D. Prefabricated fibrous glass reinforced resin type: Matched, tight fitting, stiffened to support the weight of concrete.
- E. For footings and foundations, use boards or planks secured to wood or steel stakes, substantially constructed to shapes indicated and to support the required loads.
- F. Pan type: Steel or glass fiber; of size and profile required.
- G. Column forms, if required:
 - 1. For square or rectangular columns, use 2 inch thick planks, surfaced one side,
 - 2. For round columns use metal forms or patented paper tube forms approved by the Agency.
 - 3. Construct column forms with tight joints and securely clamped together with steel clamps.

2.02 FORM TIES

- A. Hold inner and outer forms for vertical concrete together with combination steel ties and spreaders.

2.03 FORM RELEASE AGENT

- A. Provide colorless mineral oil which will not stain concrete or impair natural bonding characteristics of coating intended for use on concrete.

2.04 DESIGN OF FORMWORK

- A. Design, erect, support, brace and maintain formwork so it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure.
- B. Construct formwork so concrete members and structures are of correct size, shape alignment, elevation and position.
- C. Provide formwork that is sufficiently tight to prevent leakage of cement paste during concrete placement.

Solidly butt joints and provide backup material at joints if required to prevent leakage and prevent fins.

2.05 EARTH FORMS

- A. Side forms for footings may be omitted, and concrete may be placed directly against excavation, only when requested by the Contractor and approved by the Agency, providing such placement is permitted by the local governmental agency having jurisdiction.
- B. When omission of forms is accepted, provide additional concrete 1 inch on each side of the minimum design profiles and dimensions shown on the Drawings.

2.06 REINFORCEMENT MATERIALS AND ACCESSORIES

- A. Bars: Deformed billet steel bars, ASTM A615/A615M; grade 60.
- B. Steel wire: For tie wire use black annealed steel, 16 gage minimum.
- C. Welded wire fabric: Welded steel, ASTM A185; plain type in coiled rolls; plain finish.
- D. Fibrous concrete reinforcement: Use only 100 percent virgin polypropylene, fibrillated fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete secondary reinforcement. Volume per cubic yard shall equal a minimum of 0.1 percent (1.5 pounds).

2.07 FABRICATION

- A. Fabricate reinforcing bars to conform to the required shapes and dimensions.
- B. Place reinforcement, supported and secured against displacement.
- C. Ensure reinforcing is clean, free of loose scale, dirt or other foreign coatings.

2.08 CEMENT

- A. Provide a standard brand of Portland cement, ASTM C150, type I or II.

2.09 AGGREGATES

- A. General: Provide hardrock aggregate, ASTM C33, with additional attributes as specified herein.
- B. Fine aggregate: Provide washed natural sand having strong, hard, durable particles, and containing not more than 2 percent by weight of deleterious matter such as clay lumps, mica, shale or schist. Grade from coarse to fine.
- C. Coarse aggregate:
 - 1. Provide coarse aggregate consisting of clean, hard, fine-grained, sound crushed rock or washed gravel, or a combination of both, containing not more than 5 percent by weight of flat, chip-like, thin, elongated, friable or laminated pieces, nor more than 2 percent by weight of shale or cherty material.
 - 2. Use coarse aggregate of the largest practicable size for each condition of placement.

2.10 WATER

- A. Use only clean potable water.

2.11 CONCRETE MIXES

- A. Unless otherwise directed use Portland cement to achieve a weight of not more than 110 pcf and an ultimate compressive strength of 3000 psi at 28 days.
- B. Slump: Footings and slabs on grade: 3 inches.
 All other concrete: 4 inches.

2.12 OTHER MATERIALS

- A. Expansion joint filler: Use preformed strips, non-extruding and resilient bituminous type, of thickness indicated, ASTM D1751.
- B. Vapor barrier membrane: Use polyethylene sheet of the thickness shown on the Drawings, ASTM D2103. If thickness is not shown on the Drawings, comply with soils report recommendation. Use a minimum 8 mil thickness, if not indicated on Drawings or soils report.
- C. Provide other materials not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Agency.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FORM CONSTRUCTION

- A. Construct forms in accordance with ACI 347 to the exact sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.
- B. Provide for openings, offsets, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts and other features as required.
- C. Locate control joints as indicated on the Drawings.
- D. Provisions for other trades:
 - 1. Provide openings in concrete formwork to accommodate work of the other trades.
 - 2. Verify size and location of openings, recesses, and chases with the trade requiring such items.
 - 3. Accurately place and securely support items to be built into the concrete.

3.03 FORM COATINGS

- A. Coat form contact surfaces with form coating compound before reinforcement is placed.
- B. Do not allow excess form coating material to accumulate in the forms or to come in contact with surfaces which will bond to fresh concrete.
- C. Apply the form coating material in strict accordance with the manufacturer's instructions.
- D. Do not apply form release agent where concrete surfaces will receive special finishes.

3.04 REMOVAL OF FORMS

- A. General:
 - 1. Do not disturb or remove forms until the concrete has hardened sufficiently to permit form removal with complete safety.
 - 2. Do not remove shoring until the member has acquired sufficient strength to support its own weight, the load upon it and the added load of construction.
 - 3. Do not strip floor slabs in less than 2 days.
 - 4. Do not strip vertical concrete in less than 7 days.
- B. Finished surfaces:
 - 1. Exercise care in removing forms from finished concrete surfaces so that the surfaces are not marred

or gouged, and that the corners are true, sharp and unbroken.

2. Do not permit steel spreaders, form ties or other metal to project from, or be visible on, any concrete surface except where so shown on the Drawings.
3. Solidly pack form tie holes, rod holes and similar holes in the concrete with cement grout. Flush the holes with water before packing, screed off flush and grind to match adjacent surfaces.

3.05 REINFORCEMENT FABRICATION

- A. Fabricate reinforcing bars to conform to the required shapes and dimensions.
- B. Place reinforcement, supported and secured against displacement.
- C. Ensure reinforcing is clean, free of loose scale, dirt or other foreign coatings.

3.06 REINFORCEMENT INSTALLATION

- A. Locate and support reinforcement by metal chairs, runners, bolsters, spacers and hangers as required.
- B. Place reinforcement to obtain minimum coverages for concrete protection.
- C. Arrange, space and securely tie bars and bar supports together with the specified tie wire.
- D. Set wire ties so twisted ends are directed away from exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable, lapping adjoining pieces at least one full mesh.
- F. Provide sufficient numbers of supports, and of strength to carry the reinforcement.

3.07 REINFORCEMENT SPLICES

- A. Lap splices: Ties securely with the specified wire to prevent displacement of splices during placement of concrete.

3.08 CONCRETE MIXING

- A. Concrete for minor work may be mixed at the site in a power mixer when the mixer has a capacity not less than one full sack batch.
- B. Unless otherwise approved by the Agency, use ready mixed concrete complying with ASTM C94.
- C. If fibrous concrete reinforcement is used add fibrous material to concrete materials at the time concrete is batched in amounts in accordance with manufacturer's instructions.

3.09 INSERTS AND EMBEDDED ITEMS

- A. Coordinate the various trades who are required to fasten work to the structure, or are required to insert therein any sleeve, box, bolt, anchor or other rough hardware.
- B. Provide every facility for setting all required items accurately in the forms.
- C. Conduits and sleeves:
 1. Locate so as not to reduce the strength of construction. Do not place pipes, except conduits, in slabs less than 3-1/2 inches in thickness.
 2. In placing conduits in slabs on earth, place below the reinforcement and encase in concrete by increasing the thickness of the slab locally to at least 3 inches of concrete around the conduit on all sides.

3.10 CONVEYING AND PLACING CONCRETE

- A. Before placing concrete, thoroughly clean forms and make tight.
- B. Do not place concrete until reinforcement, conduits, outlet boxes, anchors, sleeves, hangers, bolts and

other embedded materials are securely and properly fastened in their correct positions.

- C. Prepare previously prepared concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in strict accordance with manufacturer's instructions.
- D. Install vapor barrier under interior slabs-on-grade. Lap joints a minimum of 6 inches and seal watertight. Repair damaged vapor barrier with vapor barrier material lapped over damaged areas a minimum of 6 inches and sealed watertight.
- E. Separate slabs-on-grade from vertical surfaces with joint filler, extended from bottom of slab to within 1/4 inch of finished slab surface.
- F. Place concrete continuously between predetermined expansion, control and construction joints.
- G. Where new concrete is doweled to existing work, drill holes in existing work, insert steel dowels and pack with non-shrink grout.
- H. Screed floors, slabs-on-grade and concrete base for toppings level, maintain surface flatness of maximum 1/8 inch in 10 feet.
- I. Thoroughly work concrete around reinforcement and embedded fixtures and into corners of forms during placing operations.
- J. Completely compact with tamping poles and by tapping forms until the concrete is thoroughly compact and without voids.

3.11 CURING

- A. Immediately after placement, protect concrete from premature drying.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for a period necessary for hydration of cement and hardening of concrete.

03365 CONCRETE SEALING

PART 1 GENERAL

1.01 SUMMARY

- A. Seal concrete surfaces where shown on the Drawings, as specified herein and as needed for a complete and proper installation.

1.03 WARRANTY

- A. Upon completion of the work, and as a condition of its acceptance, deliver to the Agency one copy of the manufacturer's standard written warranty.

PART 2 PRODUCTS

2.01 SEALER

A. Manufacturer:

1. _____ Product _____.
2. _____ Product _____.
3. _____ Product _____.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 APPLICATION

A. Preparation:

1. On freshly finished concrete surfaces, no additional surface preparation is required.
2. On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the surface.
3. On existing concrete, vertical surfaces and masonry surfaces:
 - a. Sweep areas to be treated using a fine bristle broom or hose off with water and let dry to remove all surface dust and dirt.
 - b. Free the surface from contaminants which would inhibit penetration of the product into the pores of the material to be treated.
 - c. Remove curing, sealing and coating agents by use of chemical or mechanical means as necessary.
 - d. If acid is used to remove surface coatings, flush the surface with water sufficiently to remove acid and acid residue.
4. Avoid contact of sealer with plant life, glass, aluminum, finished surfaces and asphaltic concrete.

- B. Application: Comply with manufacturer's instructions.

04730 SIMULATED STONE

PART 1 GENERAL

1.01 SUMMARY

- A. Provide simulated stone where shown on the Drawings, as specified herein and as needed for a complete and proper installation.
- B. Installer shall have not less than two years successful experience in installation of similar products, as approved by the Agency.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Store the materials of this Section off ground and cover to protect from the elements.

PART 2 PRODUCTS

2.01 SIMULATED STONE

A. Manufacturers:

- 1. _____ Product _____.
- 2. _____ Product _____.
- 3. _____ Product _____.

2.02 OTHER MATERIALS

- A. Portland cement: ASTM C150, type II.
- B. Sand: ASTM C144.
- C. Water: Clean and potable.
- D. Hydrated lime: ASTM C207, type S.
- E. Metal lath: Use self-furring metal lath secured with galvanized furring nails.
- F. Building paper: Use No. 15 waterproof felt under all metal lath, except over substrates of exterior Portland cement plaster.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 SUBSTRATE PREPARATION

- A. On unsealed and unpainted masonry and concrete substrate, apply mortar directly without a setting bed.
- B. On wood, gypsum board and similar substrata, use a setting bed consisting of the specified building paper, metal lath and a mixture of one part Portland cement to three parts sand with 1/2 part lime, all solidly anchored to the structure in accordance with local building codes.

3.03 INSTALLATION

- A. Apply simulated masonry in accordance with manufacturer's instructions.

- B. Arrange and cut stones so as to achieve joints approximately 3/4 inch in width.
- C. Pattern: Balance the number of small stones and large stones throughout the exposed area; balance the distribution of color.
- D. Joints: Tool the joints between stones to a dense, smooth surface which is completely watertight and in a uniform plane.

3.04 CLEANING

- A. Upon completion of this phase of the Work, hose down and clean all finished surfaces, removing mortar, dirt and other foreign matter.

05720 ORNAMENTAL HANDRAILS AND RAILINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide handrails and railings where shown on the Drawings, as specified herein and with all accessories as needed for a complete and proper installation.

1.02 WORK COMPLETED UNDER OTHER SECTIONS

- A. Furnish anchors for concrete or masonry in accordance with manufacturer's instructions and as shown on the Drawings.

1.04 STRUCTURAL REQUIREMENTS

- A. Handrail and guardrail assemblies and attachments shall be capable of withstanding a minimum uniform load of _____ pounds applied horizontally/vertically at any point on the top rail.

1.05 DELIVERY STORAGE AND HANDLING

- A. Deliver the materials to the job site in good condition and properly protected against damage to finished surfaces.
- B. Store material in a location and in a manner to avoid damage. Stacking shall be done in a way which will prevent bending.
- C. Store material in a clean, dry location away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin or polypropylene sheeting in a manner that will permit circulation of air inside the covering.
- D. Keep handling on site to a minimum. Exercise particular care to avoid damaged finishes of material.

PART 2 PRODUCTS

2.01 MANUFACTURER. Railing and components shall be as manufactured by

2.02 MATERIALS AND FINISHES

A. Aluminum

1. Extruded pipe: Alloy 6063-T52 meeting ASTM B 221.
2. Drawn pipe: Alloy 6063-T832 meeting ASTM B 483.
3. Reinforcing bars: Alloy 6061-T6 meeting ASTM B 221.
4. Extruded bars: Alloy 6063-T52 meeting ASTM B 221.
5. Extruded posts: 6063-T6 meeting ASTM B 221.
6. Castings: Almag 35 meeting ASTM B 26.
7. Extruded toe board: 6063-T52 meeting ASTM B 221.
8. Anodized finish shall meet the requirements of AAMA as applicable.
9. Painted finish shall meet the requirements of AAMA Specification for high performance organic coatings.
 - (1) Color:
 - (2) Type:

B. Stainless steel: Type 304.

1. Tubing: ASTM A 269.
2. Bars, shapes and mouldings: ASTM A 276.
3. Finish:

C. Acrylic/wood:

1. Handrail moulding species:
2. Finish:

2.03 RAILING SYSTEM

A. Material shall conform to paragraph above.

B. Railing system shall be permanently anchored/removable.

C. Rails

1. Material:
2. Size:
3. Post reinforcement:

D. Posts

1. Material:
2. Size:
3. Post reinforcement:

E. Fittings

1. Fittings shall be of wrought material compatible with rail/post materials. Tee-fittings and elbows which are fabricated from more than one piece shall be of welded construction with no weld marks visible when the fitting is installed.

F. Connector sleeves

1. Internal connector sleeves shall be of extruded aluminum.

G. Mounting flanges

1. Floor flanges, material:
2. Fascia and heavy duty floor flanges shall have a solid aluminum reinforcing bar.

H. Toe board

1. Material:

2.04 FASTENINGS

A. Mechanical fasteners used in the assembly of the railings and posts shall be stainless steel.

B. Exposed mechanical fasteners for use with bronze materials shall be manufactured from yellow brass.

2.05 FABRICATION

A. Form all changes in direction by miter/radius elbows.

B. Cut material square and remove burrs from all exposed edges with no chamfer.

C. Make exposed joints butt tight and flush.

- D. Closed exposed ends by use of appropriate end cap.
- E. For posts set in concrete, furnish matching sleeves or inserts of not less than 5 inches long.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 DISSIMILAR METALS

- A. When bronze and aluminum components come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with a heavy coat of primer paint.
- B. When aluminum components come into contact with cement or lime mortar, exposed aluminum surfaces shall be painted with zinc chromate.

3.03 INSTALLATION

- A. Install components in accordance with shop Drawings.
- B. Erect work square and level and free from distortion or defects detrimental to appearance or performance.
- C. Expansion joints shall be provided to allow for thermal expansion and contraction.

3.04 CLEANING

- A. As installation is completed, wash thoroughly using clean water and soap; rinse with clean water.
- B. Do not use acid solution, steel wool or other abrasives.
- C. If stain remains after washing, remove finish and restore in accordance with NAAMM Metal Finishes Manual.

3.05 REPAIR OF DEFECTIVE WORK

- A. Remove stained or otherwise defective work and replace with material that meets Specification requirements.

10350 FLAGPOLES

PART 1 GENERAL

1.01 SUMMARY

- A. Provide flagpole(s) as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 FLAGPOLES

A. Manufacturers:

- 1. _____ Product _____.
- 2. _____ Product _____.
- 3. _____ Product _____.

B. Materials:

- 1. Aluminum: 6063T6 alloy, seamless tubing.
- 2. Stainless steel: AISI 304 alloy.
- 3. Fiberglass: Woven roving, polyester resin, with more than 75 percent of the reinforcing fiberglass in the vertical plane, axial tensile strength exceeding 40,000 psi; wind loading capacity of 120 mph unflagged; Entasis taper.

C. Mounting: Ground set/tilting/nautical/wall mounted.

D. Dimensions: Exposed height _____ feet.

2.02 FITTINGS

- A. Finial: _____.
- B. Truck: _____.
- C. Halyard: _____.
- D. Snap hooks: _____.
- E. Cleats: _____.

2.03 FOUNDATIONS

- A. Construct foundations in the location shown on the Drawings and in accordance with the flagpole manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Install flagpole and accessories in accordance with the manufacturer's instructions.

- B. Install the flagpole plumb to a vertical tolerance of one in 1000. Adjust operating components for smooth operation.

10430 EXTERIOR SIGNS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide exterior signage as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 SIGN SYSTEM

A. Manufacturers:

1. _____ Product _____.
2. _____ Product _____.
3. _____ Product _____.

B. Sign Panels:

1. Panels shall be 0.080 - 0.125-in. aluminum, acrylic, fiberglass or polycarbonate.
2. All aluminum components to have factory applied acrylic polyurethane finish.
3. Panel Color: _____.
4. Panel size: _____.
5. Mounting method: _____.
6. Type style: _____.
7. Graphics color: _____.
8. Message location: _____.
9. Copy to be supplied by Agency.

C. Posts:

1. Type: _____.
2. Materials: Heavy duty 6063T5 alloy aluminum extrusions.

D. Hardware: Stainless steel tamper resistant fasteners.

E. Mounting Method: _____.

F. Graphics: Graphics to be provided by manufacturer or qualified sign installer.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. For free standing signs provide ground set foundation and mounting system as recommended by the

manufacturer in the locations shown on the Drawings.

- B. For wall-mounted signs securely anchor the sign to substrate in accordance with the Drawings.
- C. Install signs plumb and level.
- D. Touch up any scratches made during installation.

16525 SITE LIGHTING

PART 1 GENERAL

1.01 SUMMARY

- A. Provide site lighting as shown on the Drawings, as specified herein and as needed for a complete and proper installation.

PART 2 PRODUCTS

2.01 FLOODLIGHTS, STRUCTURE MOUNTED

- A. Luminaire schedule: Product requirements for each luminaire and lampholder are specified in the Lighting Fixture Schedule.
- B. Provide required accessories for mounting and operation of each luminaire.
- C. Housing: Die cast aluminum, medium bronze acrylic powder finish, size:
- D. Lens: Clear, tempered glass
- E. Lamp: Mercury vapor/metal halide/high pressure sodium.
- F. Manufacturers:
 - 1. _____ Product _____.
 - 2. _____ Product _____.
 - 3. _____ Product _____.

2.02 FLOODLIGHTS, POLE MOUNTED

- A. Luminaire schedule: Product requirements for each luminaire and lampholder are specified in the Lighting Fixture Schedule.
- B. Provide required accessories for mounting and operation of each luminaire.
- C. Housing: Die cast aluminum, medium bronze acrylic powder finish, size:
- D. Lens: Clear, tempered glass
- E. Lamp: Mercury vapor/metal halide/high pressure sodium.
- F. Poles: Poles to have 2" x 4" hand hole with cover and grounding lug.
 - 1. Steel: ___ x ___ square/ ___ diameter round. Primed; medium bronze acrylic powder finish.
 - 2. Aluminum: One piece shaft with fabricated welded base, resistant to brittle failure.
 - 3. Size:

G. Manufacturers:

- 1. _____ Product _____.

2. _____ Product _____.
3. _____ Product _____.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Install luminaires and accessories in accordance with manufacturer's instructions.
- B. Construct luminaire pole bases as indicated on the Drawings. Install pole bases plumb; provide for adjustment.

3.03 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers.
- B. Aim adjustable luminaires as directed by the Agency.
- C. Clean paint splatters, dirt and debris from installed luminaires.
- D. Touch up luminaire and pole finish at completion of work.

16535 *PATHWAY SOLAR POWERED LIGHTING*

PART 1 GENERAL

1.01 SUMMARY

- A. Provide solar powered outdoor lighting as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.02 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions.

1.03 QUALITY ASSURANCE

- A. Manufacturer shall possess a minimum of 15 years' experience in the manufacture of solar powered lighting systems.
- B. Perform work in accordance with Contract Documents

PART 2 PRODUCTS

2.01 SOLAR ELECTRIC POWER ASSEMBLY

A. Solar Panel Assembly

1. The solar panel(s) shall be of single crystal technology, with a full solar panel replacement warranty of 10 years against the power output of the solar panel degrading by over 10% plus a 25 year warranty against the solar panel degrading by over 20%. The panel(s) shall be UL listed (Per UL 1703) under file number E79555. The panel(s) shall have passed complete environmental requirements of the Jet Propulsion Laboratory, JPL Specification No. 5101-61 (Block V).
2. The solar power array shall be sized such that the system will operate the specified lighting fixture from dusk for 7 hours year round. All panel(s) within the array shall be mechanically bonded together to form a single flat array which shall mount at a fixed angle of 45 Degrees. The array shall also be capable of being installed at a fixed angle of 5 Degrees, for aesthetics and standardization as other security, power and lighting, water pumping or aeration applications are identified. The solar array shall be constructed such that one panel may be removed and replaced without the need of removing adjacent panels.
3. The single array shall be integrally mounted upon and power riveted to a vented aluminum panel pan constructed of minimum .090 thickness with a minimum temper of 5052-H32 and featuring full panel backside coverage to prevent backside panel damage from wind blown debris or acts of vandalism. The aluminum sheet shall completely cover the rear of the array. The panel and the aluminum sheet on the rear shall form one closed solar electrical box, a solar panel assembly, which shall have aluminum extruded angles welded to the rear/bottom as a means of support for mounting. These aluminum rails shall extend beyond the mounting bracket contact points of the array and dovetail to the edges to form anti-buffeting wings to prevent the panel from buffeting in high winds. The entire array shall be complete with all stainless steel mounting hardware. All metal crafting shall be performed by high speed robotic presses using computer programmed instructions.
4. The solar panel assembly shall be vented on the rear near the bottom and also on the top of the assembly which shall create, due to the angled panel, a "chimney effect" action in the panel

box. This will force cooling, circulating air behind the solar panel reducing heat build up thereby increasing power and prolonging panel life. The venting shall consist of a minimum open area of 34 sq. Inch and placed such that no area shall allow penetration of materials wider than 3/8" in section. The venting shall be placed such that the possibility of rain water entering the panel assembly will be minimized.

5. The solar panel assembly power wires shall be of 12 Gauge THHN stranded wire. The wires shall exit the rear of the panel assembly through flexible conduit and terminate in a weather proof electrical connector used to disconnect the solar power assembly and allow for quick, easy installation and fast component change out. This electrical connector shall consist of copper bladed terminals that are crimped and soldered to the wires. These copper bladed terminals shall use positive contact spring pressure and a minimum of 75% surface contact area with the mating terminal. The connector shall have a captive device to mechanically lock connector to mating plug.

B. Battery Assembly

1. The storage battery(s) shall be of a sealed valve regulated thixotropic gel lead acid type. It shall be pressurized through the use of bunsen type vents, maintenance free, air shippable, 100% recyclable, and capable of a minimum of 1000 cycles in this application.
2. The battery(s) shall be of a capacity capable of operating the specified fixture for a minimum of 7 nights of operation through inclement weather, using a 10% of average for the sun factor.
3. The battery shall be mounted in a vented aluminum box constructed of .090 aluminum sheet and of a high quality marine grade to a minimum temper of 5052-H32. The battery box shall be vented in at least eight locations using a minimum 3" machine punch vent placed in such a fashion as to allow cooling air to circulate through the battery box and to minimize rain water intrusion. The storage battery in the aluminum box shall be mounted in the shade behind the solar panel assembly and separated from the panel assembly so that the battery will not be in thermal communication with the solar panels. The battery box shall be a low profile design and contain a preformed and welded back mounting plate for easy slide on attachment to the Power Bracket. The Battery Assembly shall contain a "Through the Pole" rear wire routing output for no exposed wiring to provide a neat clean appearance for the finished installation. All metal crafting shall be performed by high speed robotic presses using computer programmed instructions.
4. The battery shall be field replaceable within the aluminum box through the use of an internal wiring harness which shall be of 12 Gauge THHN wire. The harness shall terminate in a weather proof electrical connector used to disconnect the solar power assembly from the controller and the controller from the battery. This will allow for quick, easy installation with no hard wiring or incorrectly placed wires, and also allow for fast component change out and trouble shooting. The harness shall be equipped with a fuse located in a waterproof fuse holder with a positive sealing cover. The battery assembly shall contain a spare fuse. The electrical connectors on the harness shall consist of copper bladed terminals that are crimped and soldered to the wires. These copper bladed terminals shall use positive contact spring pressure and a minimum of 75% surface contact area with the mating terminal. The connector shall have a captive device to mechanically lock connector to mating plug.
5. The battery shall be fully warranted for a minimum of 2 years with a 5 year prorated warranty, and designed for 5 to 7 years of operation.

C. Control Electronics

1. The entire charge and dusk till dawn load control electronics shall be housed in an ABS case which

is totally encapsulated with a U.L. approved polymer epoxy for protection from weather, which shall render the control electronics as waterproof to the point whereby it actually can be used underwater. No exposed circuit boards, even with conjugal coating will be allowed. Each of four input leads shall be lightning protected and the controller shall be equipped with a four prong blade type plug with captive mechanical locking mechanism to provide for quick disconnect to facilitate installation and service.

2. The charge current from the solar panel shall be controlled in a 3-Stage, PWM Pulse Width Modulation fashion to charge the Gel battery to a float of 14.1 VDC. The series charge shall not be allowed to resume unless the battery voltage falls below 13.4 VDC. The charge shall not connect unless the solar panel can actually charge the battery with a current of at least 200ma. The charge condition shall be indicated by a Green micro L.E.D. and there shall also be an L.E.D. of Red to indicate a divert or OFF charge condition. At no time shall the charge control use more than 3 ma. of power from the battery during the charge process and the controller shall not represent more than .003 Ohms of resistance in the charge path.
3. The load function shall use the output of the solar panel to determine when dusk will turn the fixture "ON" after 7 hours will turn the fixture "OFF". This is to eliminate any photo-cell operation to insure proper performance even when other types of natural or ambient light are present. There shall be a Green micro L.E.D. to indicate a load "ON" condition.
4. As the load is functioning during the dark hours, the battery voltage will be monitored. If at any time during the load cycle the battery voltage falls below 10.85 VDC the fixture will be extinguished by a low voltage disconnect circuit. A low voltage disconnect condition shall be indicated by a Red micro L.E.D. This circuit serves to prohibit operation of the fixture anytime the battery capacity is consumed, thereby preventing operation of the fixture from a deeply discharged battery. This prolongs battery life by turning "OFF" the fixture when the end of the storage capacity is reached, usually after five nights of operation during inclement weather.
5. This low voltage disconnect shall be automatically reset upon the first dawn cycle to insure that the fixture(s) will operate every night regardless of charge received during the day.
6. The controller shall be equipped with an internal circuit which can be remotely actuated by an invisible force that can be actuated from ground level to test the system at any time, day or night without accessing the system. This test circuit shall not include any through the case switch, which can become corroded and/or inoperative rendering the control electronics useless. This circuit shall cause the controller to perform a self -test, and test every function and component of the system and display through the LED readouts which component section of the system has failed.
7. The control shall be entirely solid state and constructed with no relays, blocking diodes, or wire crimp/screw terminal connectors. The entire control shall be sealed as indicative of its ability to operate completely submerged in salt water. The entire charge electronics shall be fully warranted for 5 years and life cycle tested to over 15 years of operation.

D. Light Fixture

1. Luminaire mounting shall be made through a slip fitter which accommodates a standard Ø2-3/8" x 4" mounting arm and allows for 3.5° of adjustability in all axes. Luminaire shall be secured in place by six stainless steel setscrews.
2. The electrical assembly shall be mounted to an aluminum tray that may be removed without the use of tools. The electronic IP-67 compliant driver(s) shall be mounted with stainless steel fasteners to the removable component tray, and the LED driver(s) have a high-temperature, flame-resistant (UL

94V-0 minimum) enclosure. The input voltage range shall be 120-277 VAC, 47 to 63 Hz with a 90% power factor at full load. An integral step-down transformer may be provided when a 347V or 480V input voltage is required. Load regulation shall be +/- 3%. LED driver(s) have output over voltage, over current protection and output short circuit protection with auto recovery with LED drivers rated for 385K hours (MTBF). Operating temperature shall be -30°C to 60°C. Dual drivers may be wired for bi-level switching or control.

3. The LED source shall be rated for a minimum of 50K hours (70% lumen maintenance @ 25°C ambient temperature), based on physical thermal testing correlated to LM-80 data provided by CREE. The LED source shall be mounted to the luminaire's heat-sinking housing and sealed to IP66 standards behind a thermoformed acrylic lens. LED color temperature shall be a minimum of 4000K. CRI shall be a minimum of 70.
4. LED module shall deliver at least 70% of initial lumens, when installed for a minimum of 50K hours.
5. The luminaire shall bear a CSA label and be marked suitable for wet locations.
6. The luminaire shall be all cast aluminum parts manufactured from marine grade aluminum. The extruded aluminum housing shall be fully anodized 6063-T6 aluminum alloy. All fasteners shall be stainless steel. When tamper resistant fasteners are required, spanner HD (snake eye) style shall be provided.
7. The extruded luminaire heat-sinking housing shall be fully anodized (clear). Housing may be optionally powder coated with end caps powder coated. Powdercoat finish shall be polyester powdercoat paint electrostatically applied, thermocured and warranted for a period of 5 years. Finish may be optionally selected and shall be warranted for a period of 10 years. Luminaires shall be subjected to chemical pre-treatment prior to painting by full immersion process.

E. Power Bracket

1. The solar panel assembly and battery assembly with lighting controller shall be mounted upon an aluminum power bracket constructed of T6063 Tempered extrusions. The bracket shall consist of a substantial vertical aluminum channel with like channels horizontally oriented at the distal ends of the substantial channel. The double support bracket shall be capable of attachment to any pole or wall with a section of 4" or greater. The horizontal substantial channel members shall have two triangular disposed aluminum pipe sections. These sections shall be circumference welded in six places and formed in such a manner that the power bracket can be installed to allow the solar panel assembly to be a fixed mount of 15 or 45 degrees of tilt. The power bracket shall be of sufficient strength to hold the solar panel and battery up to withstand 135 MPH winds + a 10% gust factor. All associated hardware shall be of stainless steel.

F. Fixture Bracket

1. The fixture includes a 4 Ft. Aluminum utility standard side of pole bracket constructed of a substantial channel with circumference welded 3" elliptical pipe curved upward to hold the fixture out from the side of the pole below the solar panel assembly. The bracket is finished in bright, brushed aluminum finish.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's installation instructions.