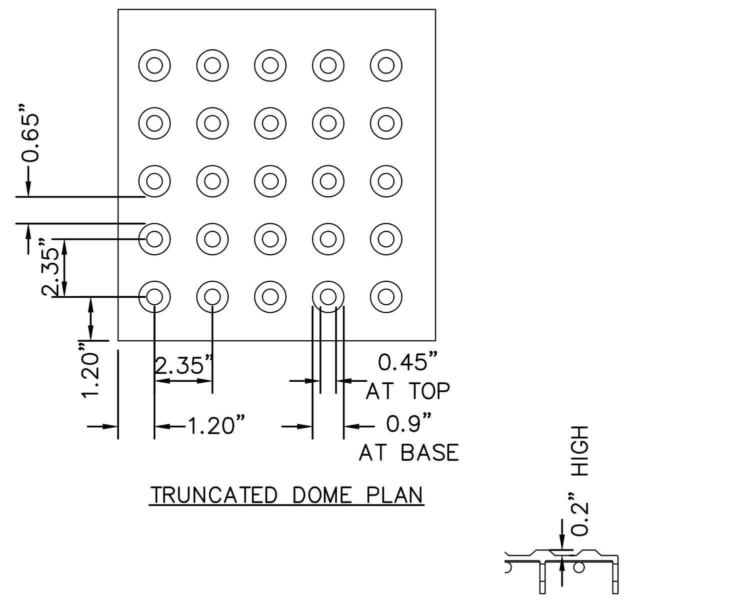
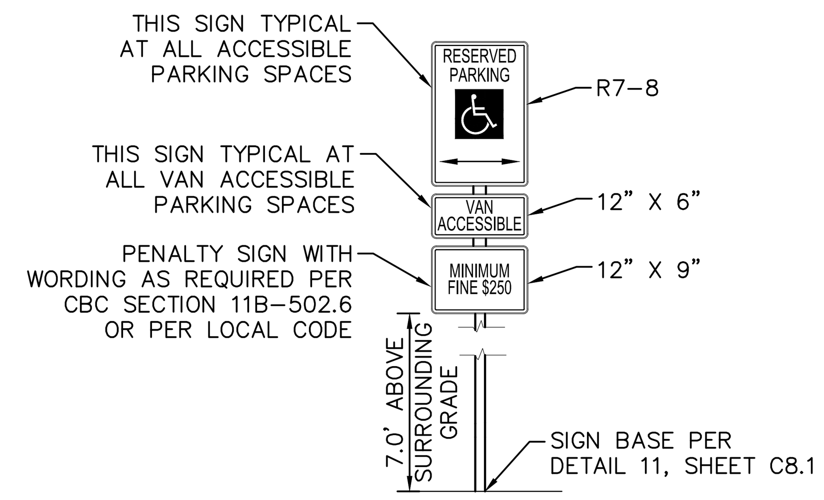


NOTES:

1. CONTRACTOR TO REFERENCE MANUFACTURERS GUIDELINES FOR INSTALLATION OF TRUNCATED DOMES.
2. COLOR TO BE YELLOW UNLESS NOTED OTHERWISE

TRUNCATED DOMES (15)

N.T.S.

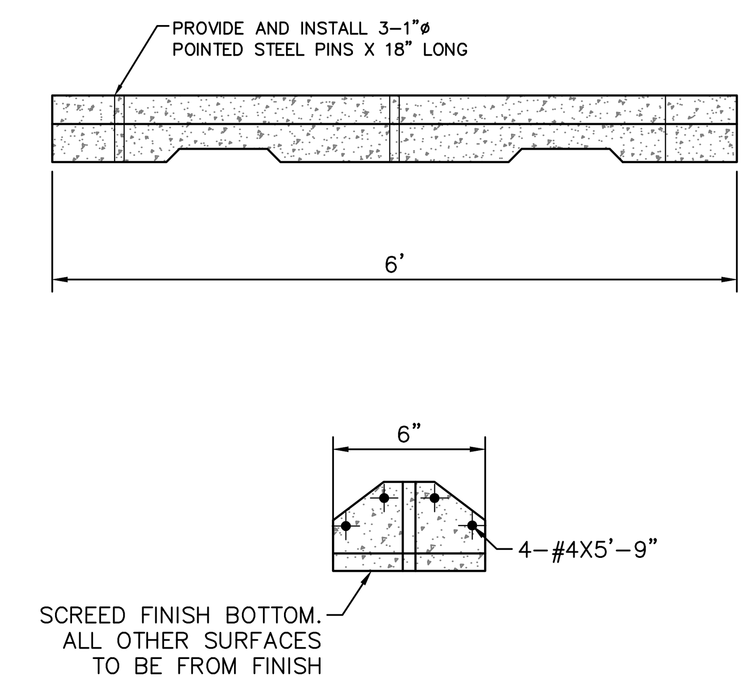


NOTES:

1. SIGNS SHALL CONFORM WITH THE MOST CURRENT CALIFORNIA MUTCD STANDARDS.
2. SIGNS SHALL BE WALL MOUNTED OR MOUNTED ON A POST PER DETAIL 11, SHEET C8.1.

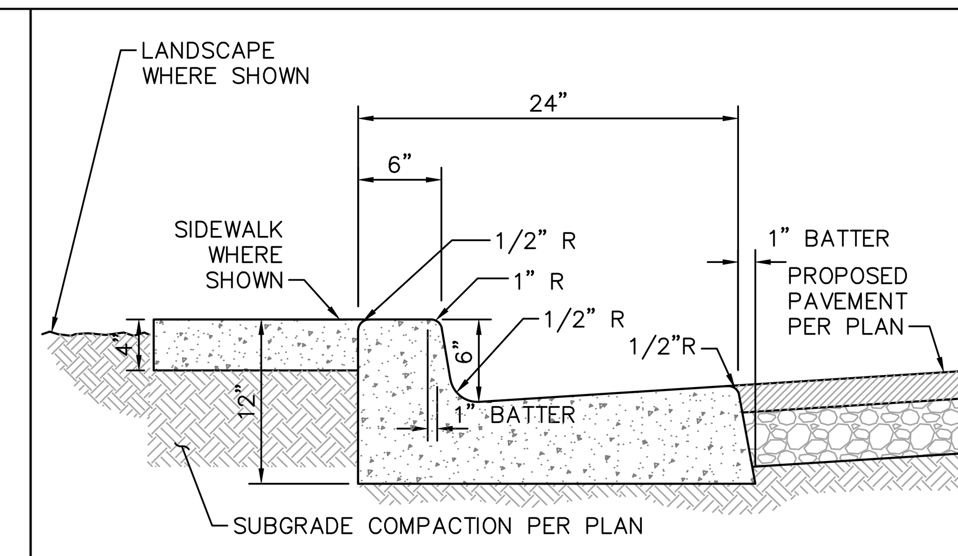
ACCESSIBLE PARKING SIGN DETAIL (12)

N.T.S.



6' WIDE PRECAST WHEEL STOP (9)

N.T.S.

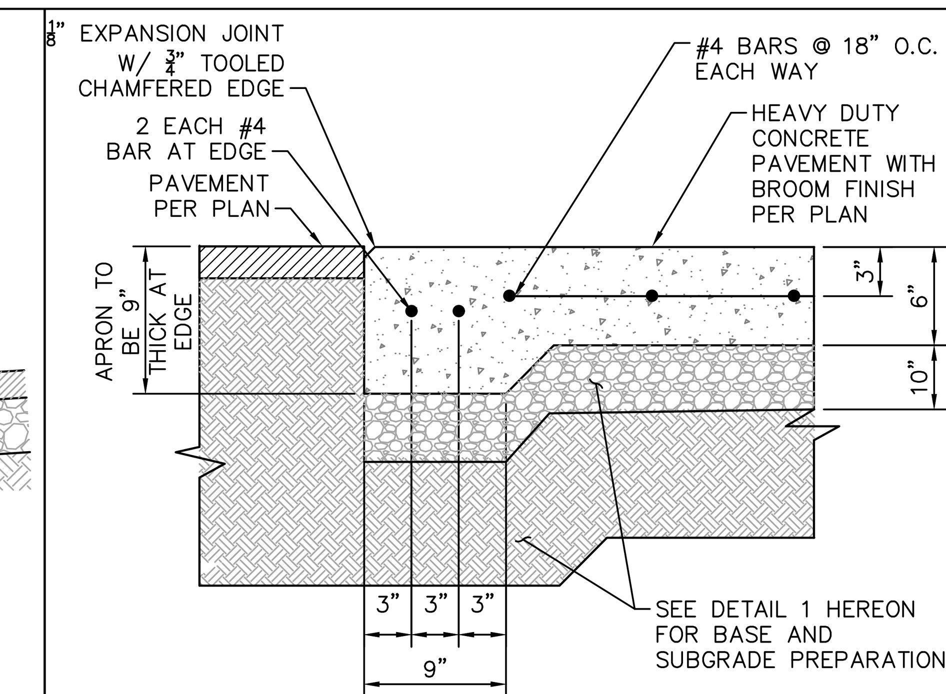


NOTES:

1. CONCRETE SHALL BE 2500 PSI.
2. ISOLATION JOINTS SHALL BE PLACED ONLY AS SPECIFIED
3. CONTRACTION JOINTS CONSISTING OF 1" DEEP SCORES SHALL BE PLACED AT 15' INTERVALS O.C.
4. WHERE A WALK IS ADJACENT TO THE CURB THE JOINTS SHALL ALIGN WITH JOINTS IN THE WALK.

CONCRETE CURB & GUTTER (6)

N.T.S.

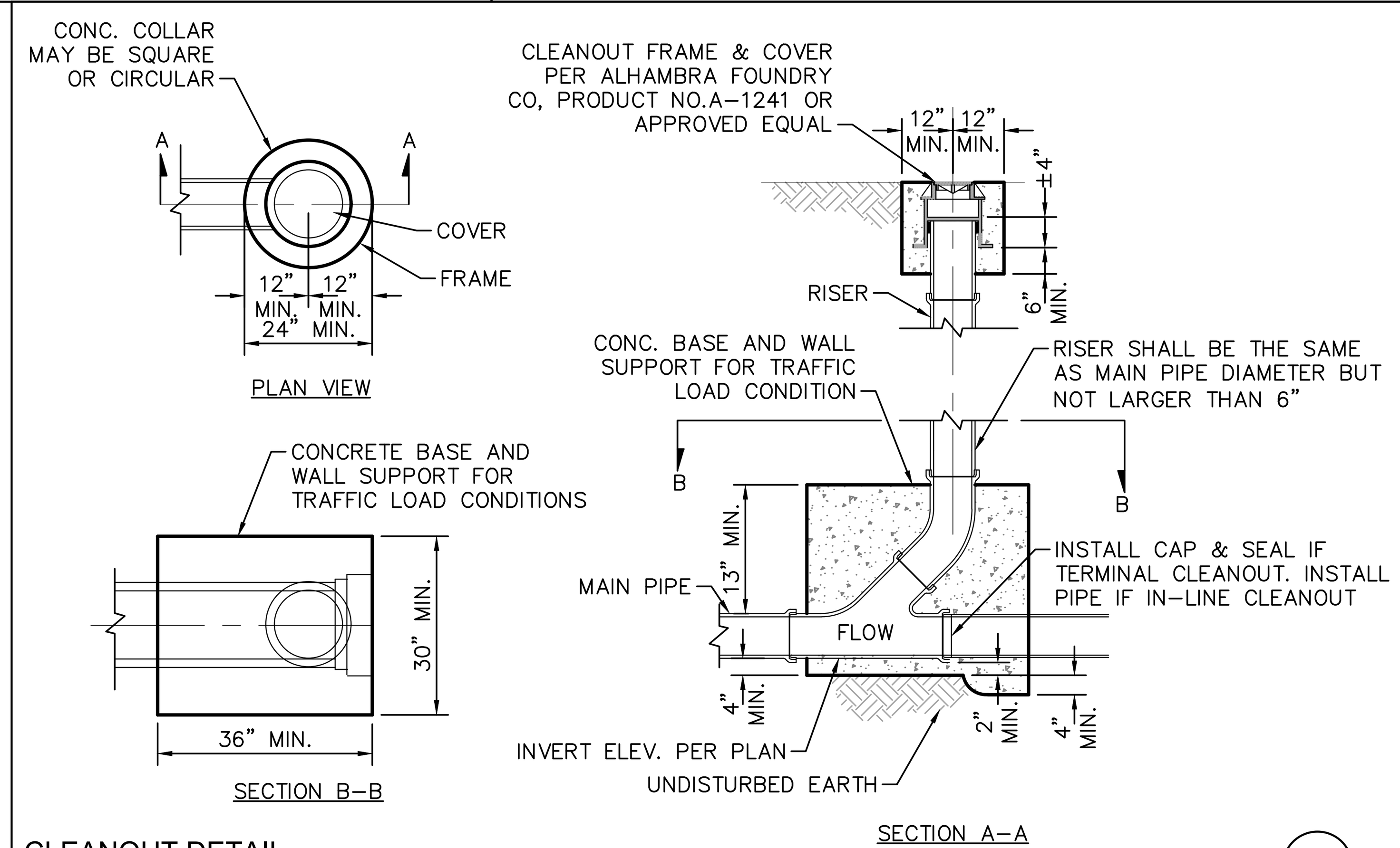


NOTES:

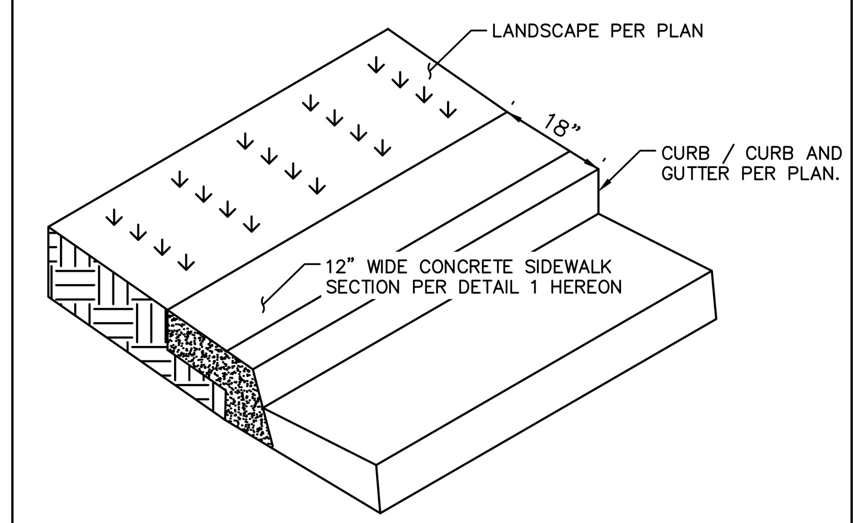
1. SEE DETAIL 1 HEREON FOR ADDITIONAL INFORMATION.
2. ISOLATION JOINTS, CONSTRUCTION JOINTS, AND CONTROL JOINTS SHALL BE PLACED ONLY AS SPECIFIED

CONCRETE PAVEMENT AT DUMPSTER PAD (3)

N.T.S.

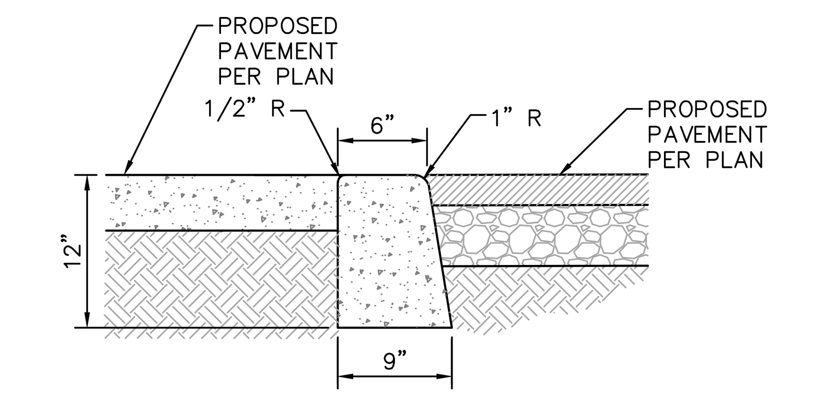


CLEANOUT DETAIL (11)



18" WALK-OFF CURB DETAIL (8)

N.T.S.



NOTES:

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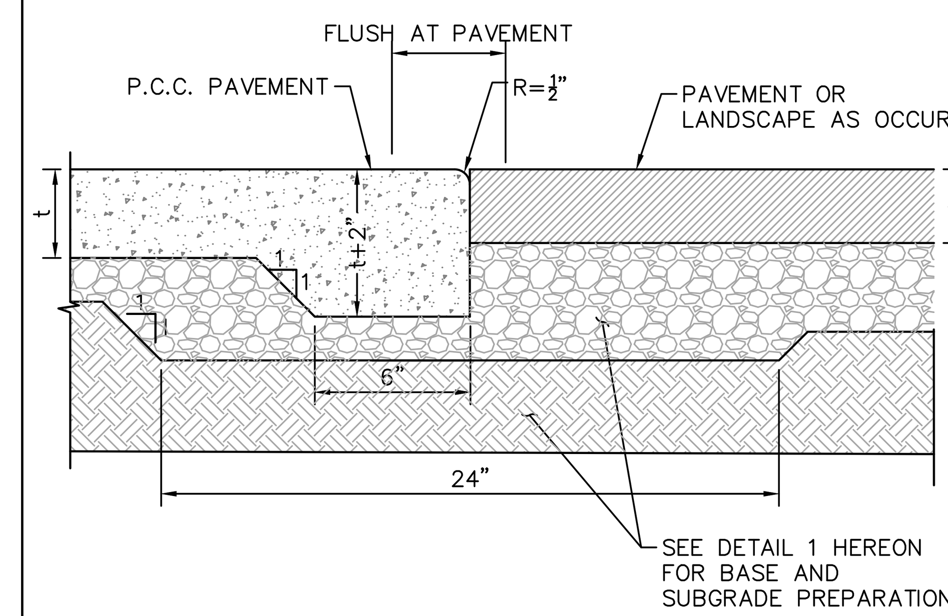
4. WHERE A WALK IS ADJACENT TO THE CURB THE JOINTS SHALL ALIGN WITH JOINTS IN THE WALK.

0" CONCRETE CURB (5)

N.T.S.

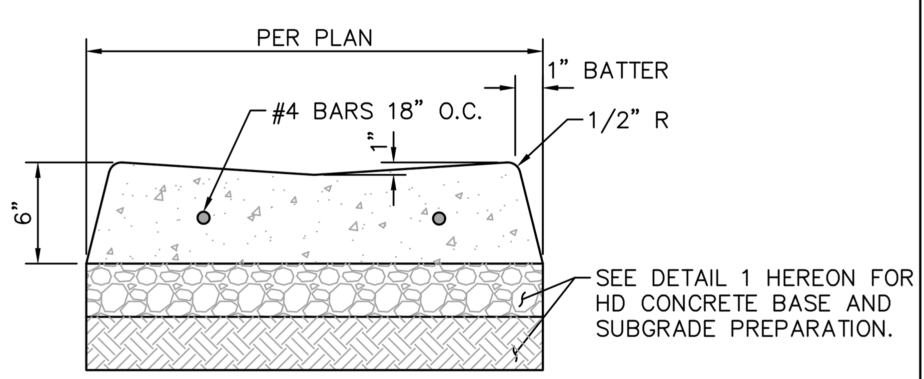


NOTES:

1. APPROVED BONDING AGENT SHALL BE APPLIED AT CONSTRUCTION JOINT.
2. SEE DETAIL 1 FOR PAVEMENT SECTION AND THICKNESS (t).
3. DETAIL APPLIES AT ALL SIDEWALK EDGE CONDITIONS AND PAVEMENT TRANSITIONS

THICKENED EDGE (2)

N.T.S.

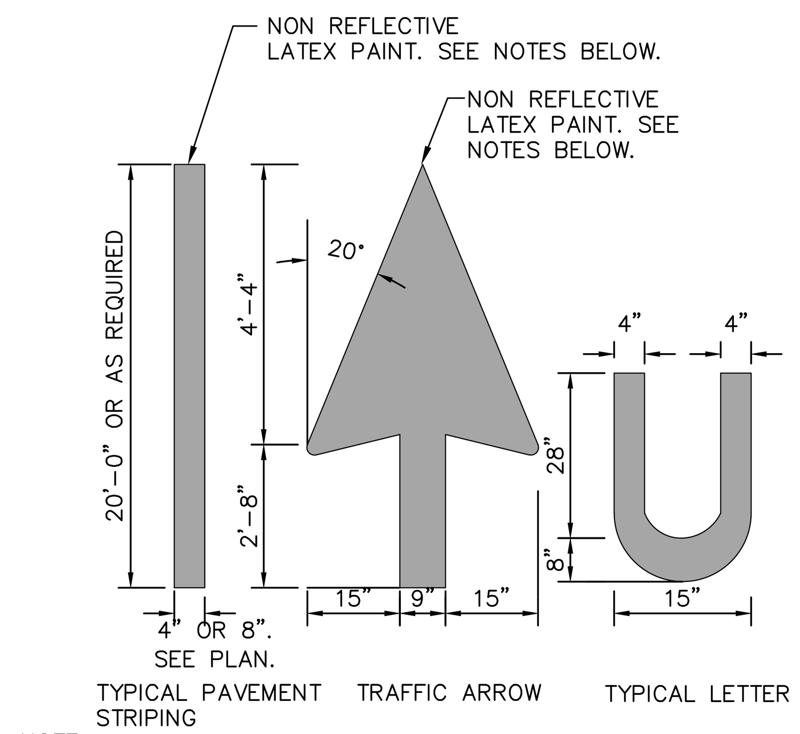


NOTE:

CONCRETE SHALL BE 3000 PSI.

VALLEY GUTTER (13)

N.T.S.

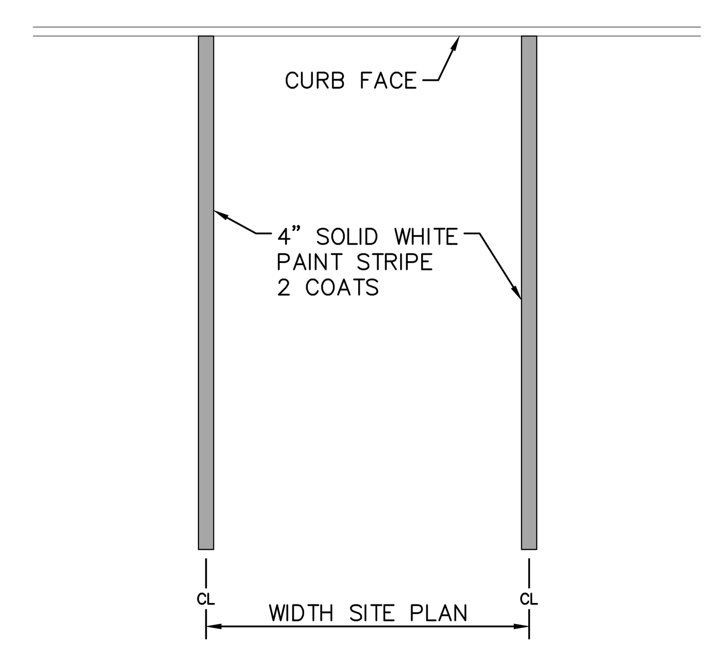


NOTE:

1. PAINT SHALL BE APPLIED AT A THICKNESS OF 22 WET MILS AND 15 DRY MILS.
2. PAVEMENT MARKINGS SHALL BE WHITE ON ASPHALT AND YELLOW ON ON CONCRETE, UNLESS STATED OTHERWISE.

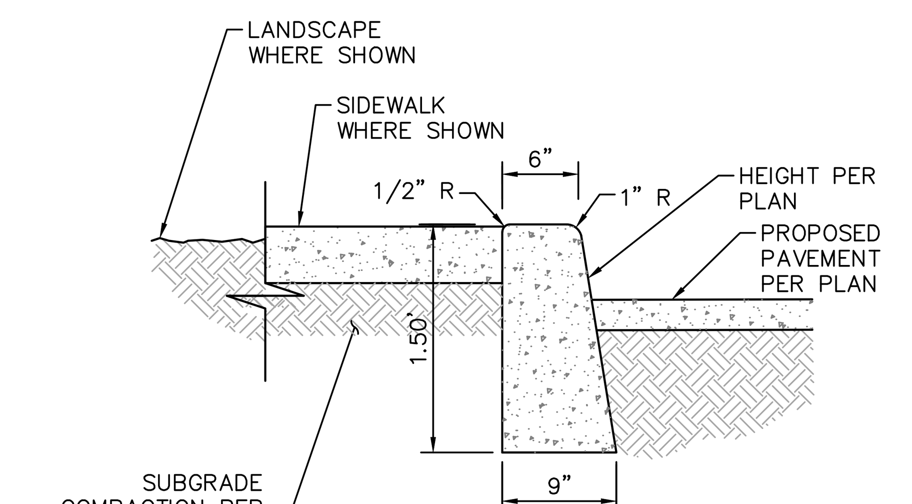
TYPICAL PAVEMENT MARKINGS (10)

N.T.S.



STANDARD 90° PARKING STALL STRIPING (7)

N.T.S.



NOTES:

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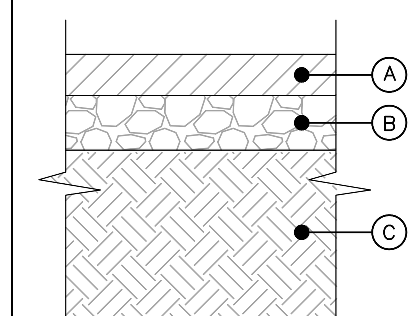
CONCRETE CURB (4)

N.T.S.



NOTES:

1. CONTRACTOR SHALL CONFIRM THESE PAVEMENT SECTIONS WITH THE GEOTECHNICAL REPORT BY UNIVERSAL ENGINEERING SCIENCES, NOVEMBER 04, 2021.
2. MATCH EXISTING PAVEMENT SECTION IF MORE STRINGENT THAN SECTION PER THIS DETAIL.
3. CONTRACTOR TO PROVIDE R-VALUE OF COMPACTED SUBGRADE TO ENGINEER PRIOR TO PAVEMENT OPERATIONS, IN ORDER TO MAKE ANY NECESSARY ADJUSTMENTS TO THE PAVEMENT SECTION.
4. ALL TREAD SURFACES SHALL BE SLIP-RESISTANT.
5. REFER TO ARCHITECTURAL PLANS FOR COLOR, TEXTURE, PATTERN AND FINISH.
6. SEE DETAIL 2 FOR THICKENED EDGE DETAIL AT ALL EDGE CONDITIONS.

(A) C2-PG64-10 HOT MIX ASPHALTIC PAVEMENT, 3,500 PSI HEAVY DUTY PORTLAND CEMENT CONCRETE OR 2,500 PSI STANDARD DUTY TYPE 1 PORTLAND CEMENT CONCRETE.

(B) AGGREGATE BASE COMPACTED TO 95% MAXIMUM DRY DENSITY BASED ON ASTM D1557-07 TEST METHOD OR CLASS 2 AGGREGATE BASE COMPACTED TO 95% OF THE MATERIAL'S ASTM D-1557 MAXIMUM DRY DENSITY.

(C) SUBGRADE SCARIFIED AND RECOMPACTED TO 95% MAXIMUM DRY DENSITY BASED ON ASTM D1557-07 TEST METHOD

	HEAVY DUTY ASPHALT CONCRETE PAVEMENT	STANDARD DUTY CONCRETE PAVEMENT	HEAVY DUTY CONCRETE PAVEMENT
(A)	0'-4"	0'-4"	0'-6"
(B)	0'-8"	0'-4"	0'-10"
(C)	1'-0"	1'-0"	1'-0"

PAVEMENT SECTIONS (1)

N.T.S.

Underground Service Alert
of Southern California
CALL: TOLL FREE 1-800-422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTICE TO CONTRACTOR

PURSUANT TO ASSEMBLY BILL 3019 NO EXCAVATION PERMIT IS VALID UNLESS THE CONTRACTOR CONTACTS AND OBTAINS AN INQUIRY I.D. NUMBER FROM "UNDERGROUND SERVICE ALERT" (1-800-422-4133) AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING EXCAVATION.

PROJECT NO. YY-NNNN: PROJECT TITLE PROJECT LIMITS

FILE NO.:

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APPROVED	INSTALLED

REFERENCES

BENCHMARK NO.: 3C-26-06 ELEV.: 173.744' NAVD88

THE ON-SITE BENCHMARK IS BASED ON NAVD 1988 DATUM, AND IS A SET MAG NAIL AND SHINER AT THE NORTHEAST CORNER OF PARCEL 2. ELEVATION = 193.65 FEET.

THE BASIS OF BEARING IS THE CENTERLINE OF SANTA CLARA AVENUE PER TRACT MAP NO. 14568, BOOK 695, PAGE 47, COUNTY OF ORANGE, A BEARING OF N89°59'50"E.

CONSTRUCTION COMPLETED:

ENGINEERS SEAL: REGISTERED PROFESSIONAL ENGINEER, HANNAH M. LUEVANO, NO. 90371, CIVIL, STATE OF CALIFORNIA — NOT FOR CONSTRUCTION

PREPARED UNDER THE SUPERVISION OF: HANNAH LUEVANO — SENIOR CIVIL ENGINEER RCE NO.: 90371 — DESIGNED: HS DRAWN: MH CHECKED: HS — DATE 6/29/2023

REVIEWED FOR CONSTRUCTABILITY AND RECOMMENDED FOR CONSTRUCTION: JASON GABRIEL — PRINCIPAL CIVIL ENGINEER RCE NO.: 62968 — XX/YYYY

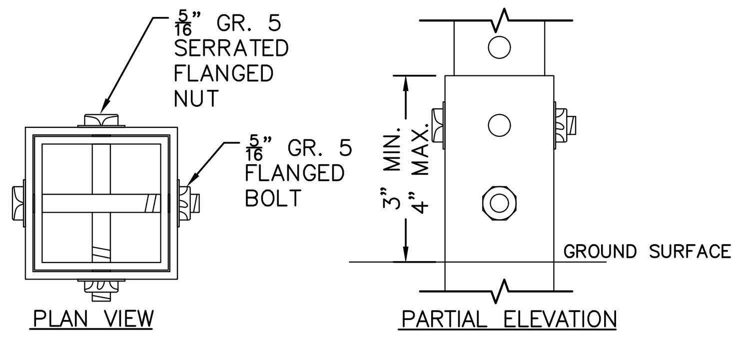
PROPOSED DRIVE-THRU RESTAURANT

2109 E SANTA CLARA AVENUE
SANTA ANA, CA 92705

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

CONSTRUCTION DETAILS

SHEET NO. C8.0



SQUARE TUBE BREAK AWAY POST

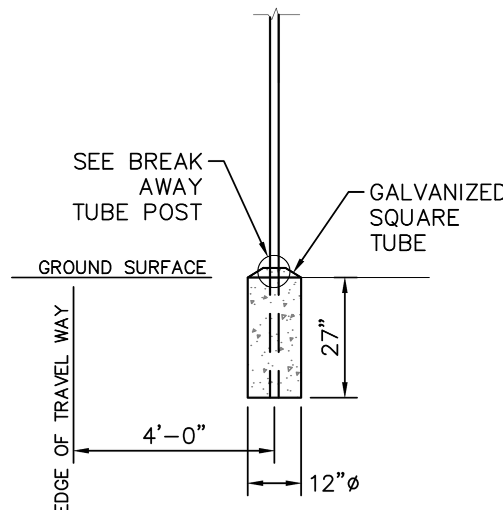
NOTES:

1. GALVANIZED SQUARE TUBE

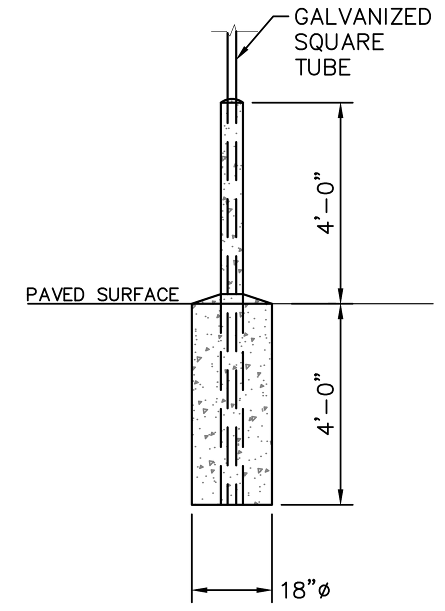
POST TUBES – 2"x2"x3/16" 14ga
POST TUBE SHALL MEET ASTM A1011 GRADE 50.
POST TUBE GALVANIZED AS PER ASTM A653 GRADE 90.

ANCHOR TUBE – 2-1/4"x2-1/4"x3/16" 14ga
HEAVY DUTY ANCHOR TUBE SHALL MEET ASTM A500 GRADE B.
STRUCTURAL TUBE AND STEEL SHALL BE HOT DIP GALVANIZED PER ASTM A123.

THE UPPER SIGN POST SHALL TELESCOPE INSIDE THE ANCHOR TUBE A MINIMUM OF 12". THE ANCHOR TUBE SHALL BE A MINIMUM 27" DEEP WITH 3" MIN. 4" MAX. EXPOSED ABOVE FINISH GRADE.

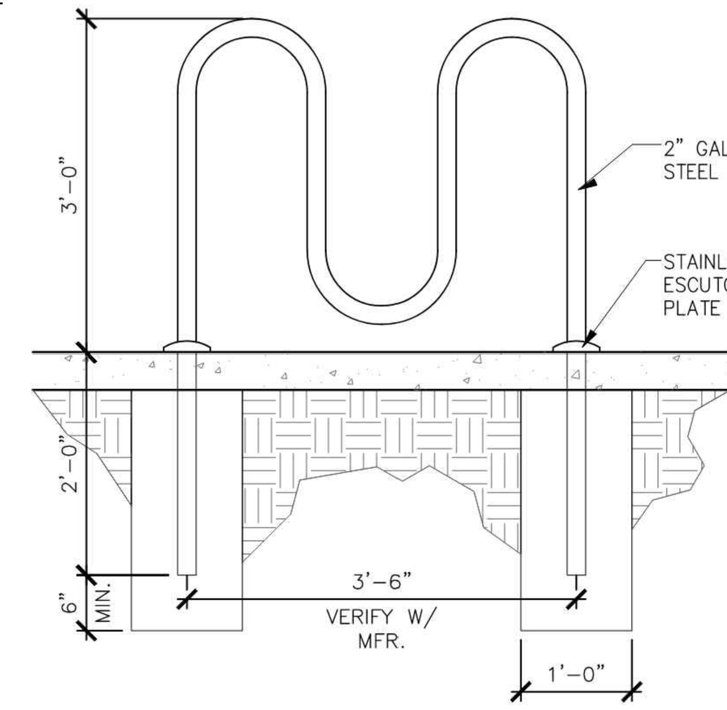


SINGLE POST

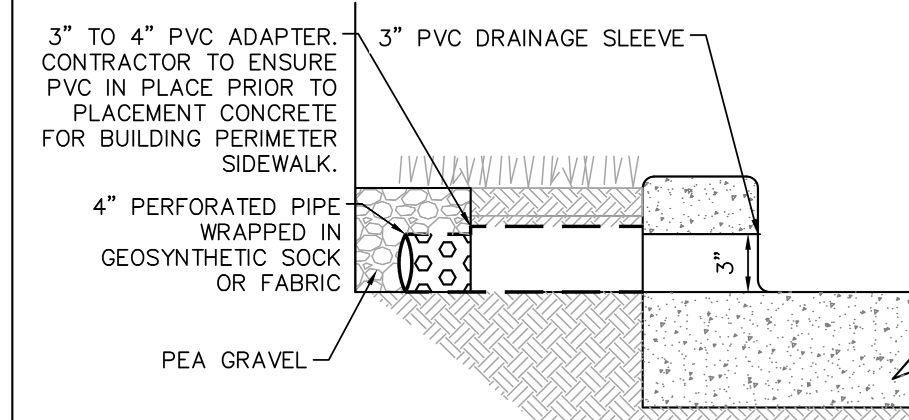


SINGLE POST WITH BOLLARD

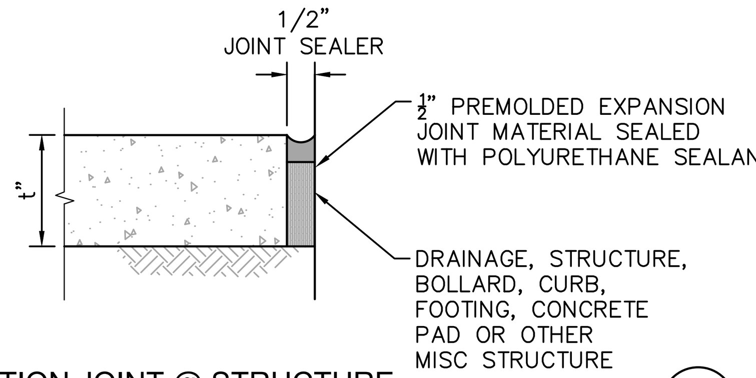
SIGN BASE DETAIL (11)
N.T.S.



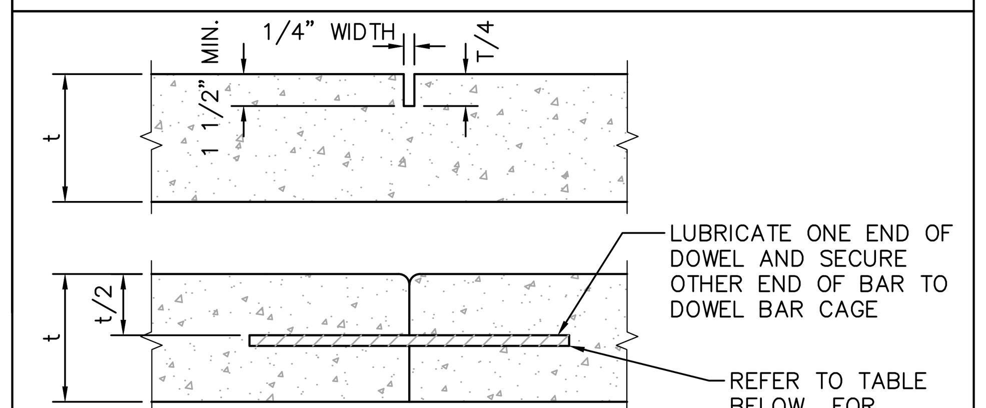
SHORT TERM BIKE RACK (7)
N.T.S.



DRAINAGE SLEEVE DETAIL (6)

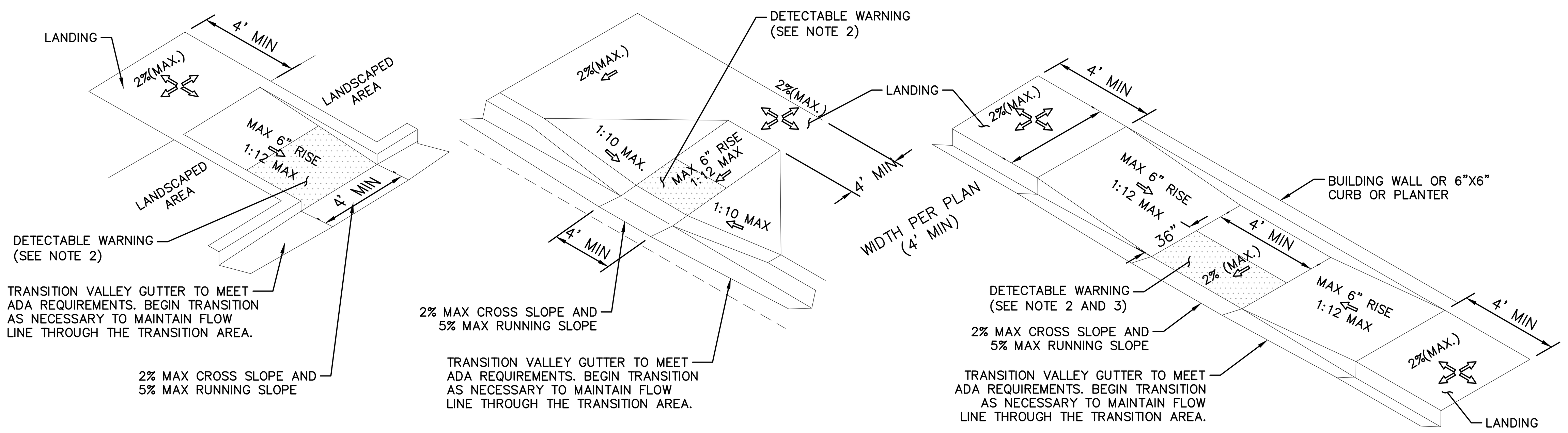


ISOLATION JOINT @ STRUCTURE (4)
N.T.S.



T	DOWEL DIAMETER	DOWEL EMBEDMENT	TOTAL DOWEL LENGTH
in. (mm)	in. (mm)	in. (mm)	in. (mm)
4.0 (102)	1/2 (13)	5 (125)	14 (360)
6.0 (150)	3/4 (20)	5 (125)	14 (360)
6.5 (165)	7/8 (22)	5 (125)	14 (360)
7.0 (180)	1 (25)	6 (150)	16 (400)
7.5 (190)	1–1/8 (28)	7 (180)	16 (400)
≥ 8.0 (200)	1–1/4 (32)	8 (200)	17 (430)

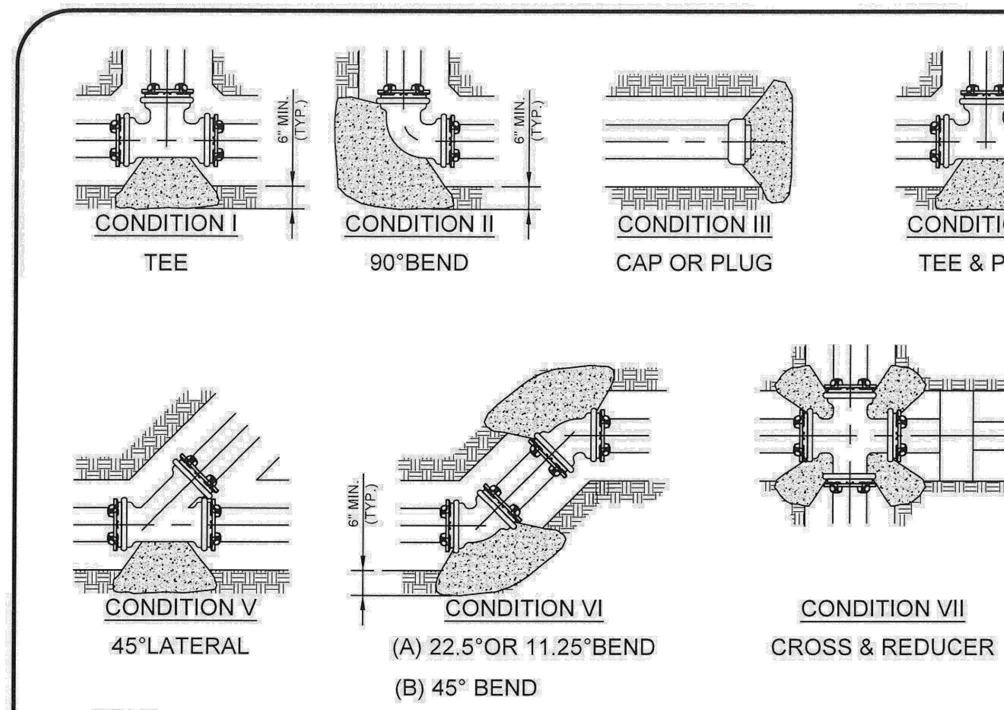
CONSTRUCTION AND CONTROL JOINT (3)
N.T.S.



NOTES:

1. ALL ACCESSIBLE COMPONENTS CONSTRUCTED AS PART OF THESE PLANS SHALL COMPLY WITH THE LOCAL, STATE, AND FEDERAL REGULATIONS WHICHEVER ARE MORE STRINGENT.
2. CURB RAMPS SHALL HAVE A DETECTABLE WARNING EXTENDING THE FULL WIDTH OF THE CURB RAMP AND 3' DEEP. GROOVED SURFACES ON OUTDOOR CURB RAMPS ARE NOT PERMITTED. VERIFY LOCAL REQUIREMENTS WITH THE BUILDING DEPARTMENT. REFER TO TRUNCATED DOMES DETAIL AND REQUIREMENTS IN THE CALIFORNIA BUILDING CODE.
3. PARALLEL CURB RAMPS SHALL HAVE A DETECTABLE WARNING EXTENDING 36" DEEP ALONG THE FLUSH TRANSITION BETWEEN STREET AND SIDEWALK. REFER TO TRUNCATED DOMES DETAIL.
4. PUBLIC SIDEWALK CURB RAMPS CONSTRUCTED WITHIN A PUBLIC RIGHT– OF –WAY, IN ABSENCE OF LOCAL ROADWAY GUIDELINES, SHALL MEET OR EXCEED LOCAL REGULATIONS.
5. CURB RAMP SURFACES (FLARES AND RAMP) SHALL HAVE A DIFFERENT TEXTURE FROM THE SURROUNDING PAVEMENT.
6. CURB RAMPS SHALL BE CONCRETE WITH STRENGTH OF 2500 PSI.
7. INSTALL 1/4" EXPANSION JOINT FILLER MATERIAL BETWEEN A NEW CURB RAMP AND THE EXISTING SIDEWALKS.
8. WATER PONDING WITHIN THE CURB RAMP LIMITS IS NOT ALLOWED.
9. NO GRADE BREAK IS ALLOWED ALONG THE RAMP SURFACE.
10. CROSS SLOPE OF THE CURB RAMP SURFACE SHALL BE LESS THAN 2%.
11. TRANSITION CHANGE IN ELEVATION IS NOT TO EXCEED 1/2" WITHIN AN ACCESSIBLE ROUTE.
12. DIAGONAL CURB RAMP SIDE SLOPE VARIES UNIFORMLY FROM A MAXIMUM OF UP TO 10% AT CURB TO CONFORM WITH LONGITUDINAL SIDEWALK SLOPE ADJACENT TO TOP OF THE RAMP.

ACCESSIBLE RAMP DETAILS (10)
N.T.S.



NOTES:

1. PIPE FITTINGS SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE. SEE SPECIFICATIONS.
2. THRUST BLOCK BEARING FACES SHALL BE POURED AGAINST UNDISTURBED SOIL, OR APPROVED COMPACTED BACKFILL. BEARING FACES SHALL BE A MINIMUM OF 6-INCHES PAST THE TRENCH WALL.
3. THRUST BLOCKS SHALL BE CLASS 560-C-3250 CONCRETE, UNLESS OTHERWISE SPECIFIED.
4. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
5. FOR THRUST RESTRAINT ON PIPES LARGER THAN 12-INCHES IN DIAMETER, SPECIAL REVIEW AND APPROVAL IS REQUIRED FROM THE WATER RESOURCES DIVISION.

- THRUST BLOCK BEARING AREA -

PIPE SIZE (IN INCHES)	CONDITIONS I.	II.	III.	IV.	V.	(A) VI.	(B)	VII.	
4	3.2	4.5	3.2	2 @ 3.2	3.2	1.2	2.4	4 @ 4.5	AREA IN SQ. FT.
6	7.1	10	7.1	2 @ 7.1	7.1	2.8	5.4	4 @ 10.0	
8	12.6	17.8	12.6	2 @ 12.6	12.6	4.9	9.6	4 @ 17.8	
10	19.6	27.7	19.6	2 @ 19.6	19.6	7.7	15.0	4 @ 27.7	
12	28.2	39.9	28.2	2 @ 28.2	28.2	11.0	21.6	4 @ 39.9	

BASED ON 100 P.S.I. PRESSURE AND ALLOWABLE BEARING PRESSURE OF 1000 P.S.F.
TEST PRESSURE OF 200 PSI.

APPROVED: DATE: 11/24/2020

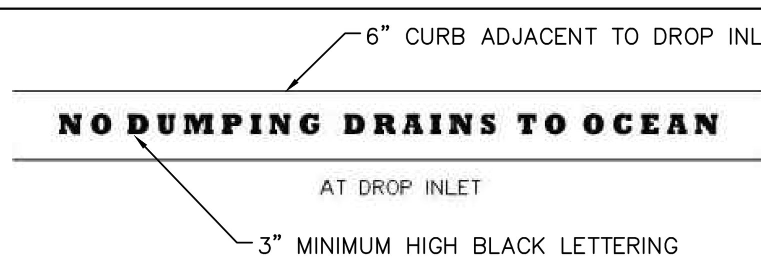
CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
5/2/07	J.B.	UPDATED
8/12/09	R.R.	ADDED 11 1/4° BEND
6/4/13	J.A.	UPDATED INFORMATION
11/2020	R.R.	UPDATED

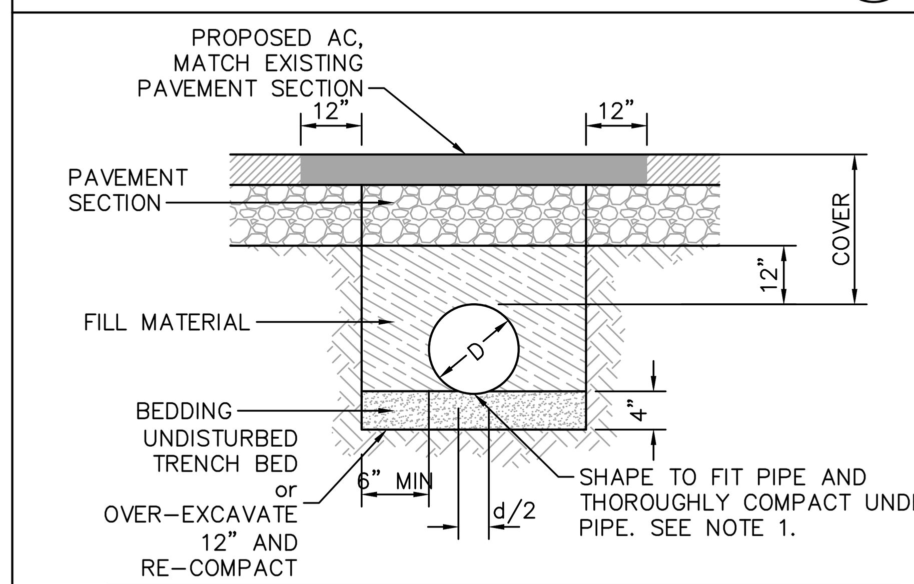
THRUST BLOCK INSTALLATION

STD. PLAN NUMBER 1412

THRUST AND ANCHOR BLOCK DETAILS (5)
N.T.S.

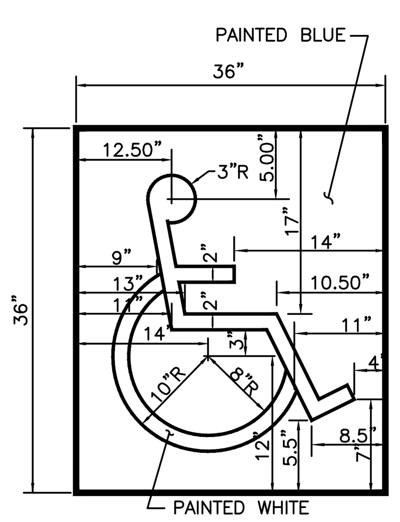


STENCIL DETAIL (2)
N.T.S.

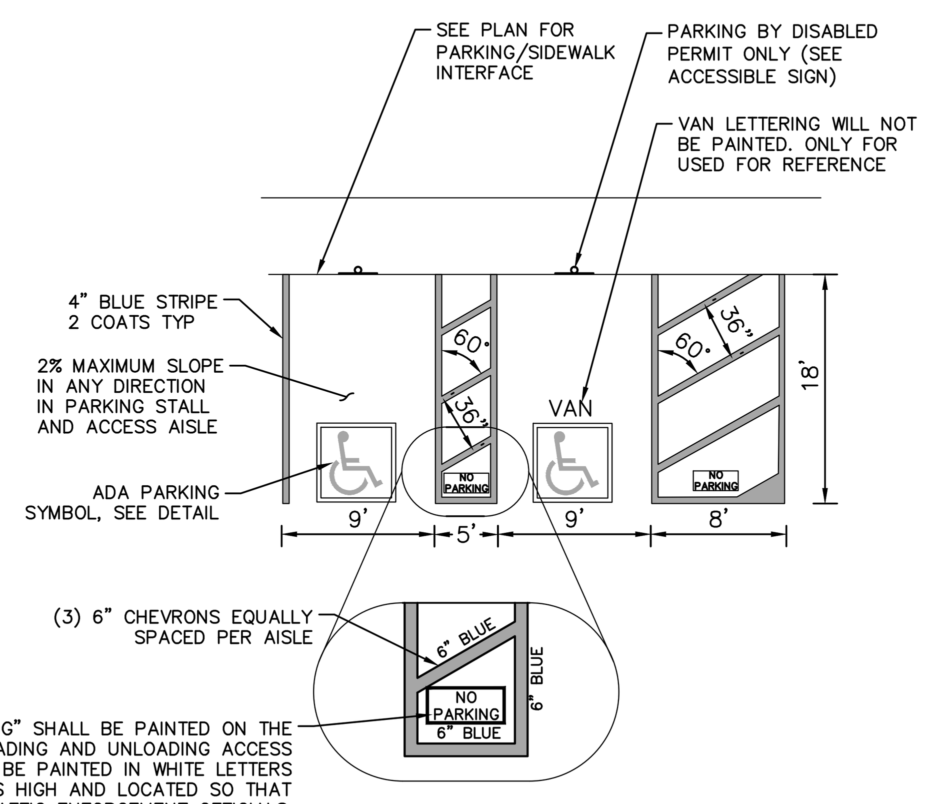


NOTES	
BEDDING:	CLEAN COARSE SAND
FILL MATERIAL:	NATIVE MATERIAL – MAXIMUM SIZE NOT TO EXCEED 1 1/2"
COVER:	36" MINIMUM, OR MINIMUM OF AGENCY HAVING JURISDICTION
NOTE 1:	EXCAVATE FOR BELLS OR HUBS SO FULL LOAD IS CARRIED BY PIPE BARRELS.
NOTE 2:	REFER TO SECTION ______ IN GEOTECHNICAL REPORT FOR BEDDING RECOMMENDATIONS

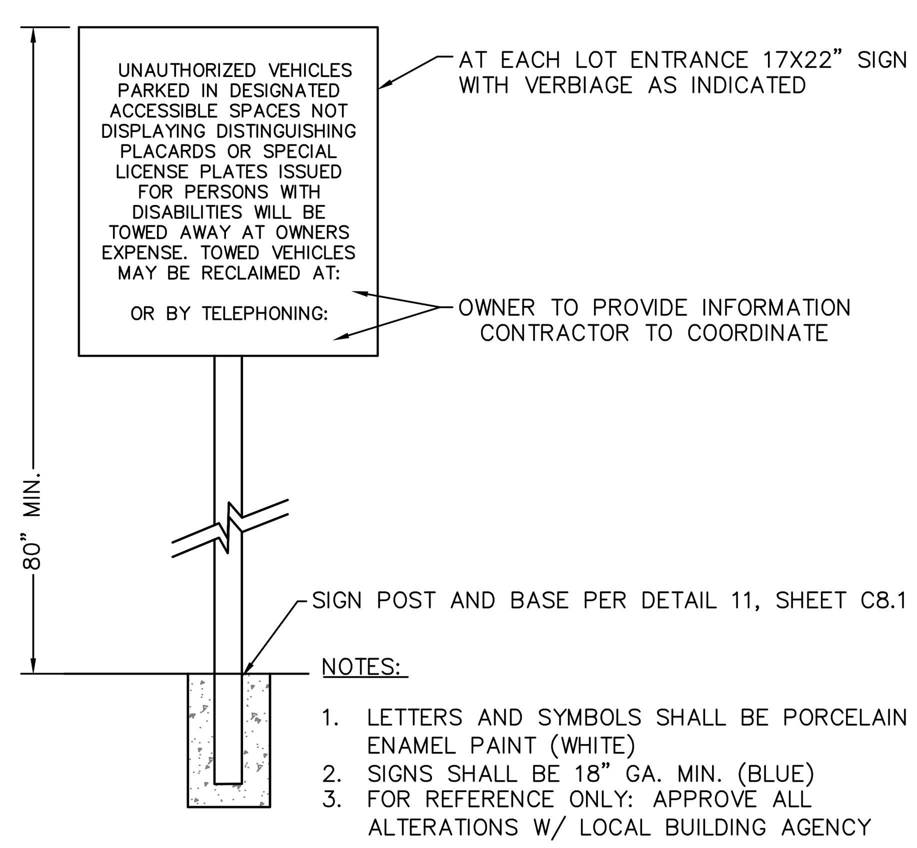
FLEXIBLE PIPE BEDDING AND TRENCH DETAIL (1)
N.T.S.



ADA LOGO STRIPING DETAIL
LOCATED AT EDGE OF PARKING SPACE (PER CBC SECTION 1129B.4)



ACCESSIBLE PARKING STALL STRIPING (9)
N.T.S.



NOTES:

1. LETTERS AND SYMBOLS SHALL BE PORCELAIN ENAMEL PAINT (WHITE)
2. SIGNS SHALL BE 18" GA. MIN. (BLUE)
3. FOR REFERENCE ONLY: APPROVE ALL ALTERATIONS W/ LOCAL BUILDING AGENCY

PARKING SIGN (8)
N.T.S.

Underground Service Alert of Southern California
CALL: TOLL FREE 1-800-422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTICE TO CONTRACTOR

PURSUANT TO ASSEMBLY BILL 3019 NO EXCAVATION PERMIT IS VALID UNLESS THE CONTRACTOR CONTACTS AND OBTAINS AN INQUIRY I.D. NUMBER FROM "UNDER-GROUND SERVICE ALERT" (1–800–422–4133) AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING EXCAVATION.

FILE NO.:

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APPROVED	INSTALLED

REFERENCES

BENCHMARK NO.: 3C–26–06 ELEV.: 173.744' NAVD88
THE ON–SITE BENCHMARK IS BASED ON NAVD 1988 DATUM, AND IS A SET MAG NAIL AND SHINER AT THE NORTHEAST CORNER OF PARCEL 2. ELEVATION = 193.65 FEET.
THE BASIS OF BEARING IS THE CENTERLINE OF SANTA CLARA AVENUE PER TRACT MAP NO. 14568, BOOK 695, PAGE 47, COUNTY OF ORANGE, A BEARING OF N89°59'50"E.
CONSTRUCTION COMPLETED:

ENGINEERS SEAL
REGISTERED PROFESSIONAL ENGINEER HANNAH M L NO. 90371 CIVIL STATE OF CALIFORNIA
NOT FOR CONSTRUCTION

PREPARED UNDER THE SUPERVISION OF: HANNAH LUEVANO
SENIOR CIVIL ENGINEER RCE NO.: 90371
DESIGNED: HS DRAWN: MH CHECKED: HS
DATE 6/29/2023

REVIEWED FOR CONSTRUCTABILITY AND RECOMMENDED FOR CONSTRUCTION: JASON GABRIEL
PRINCIPAL CIVIL ENGINEER RCE NO.: 62968
XX/YYYY

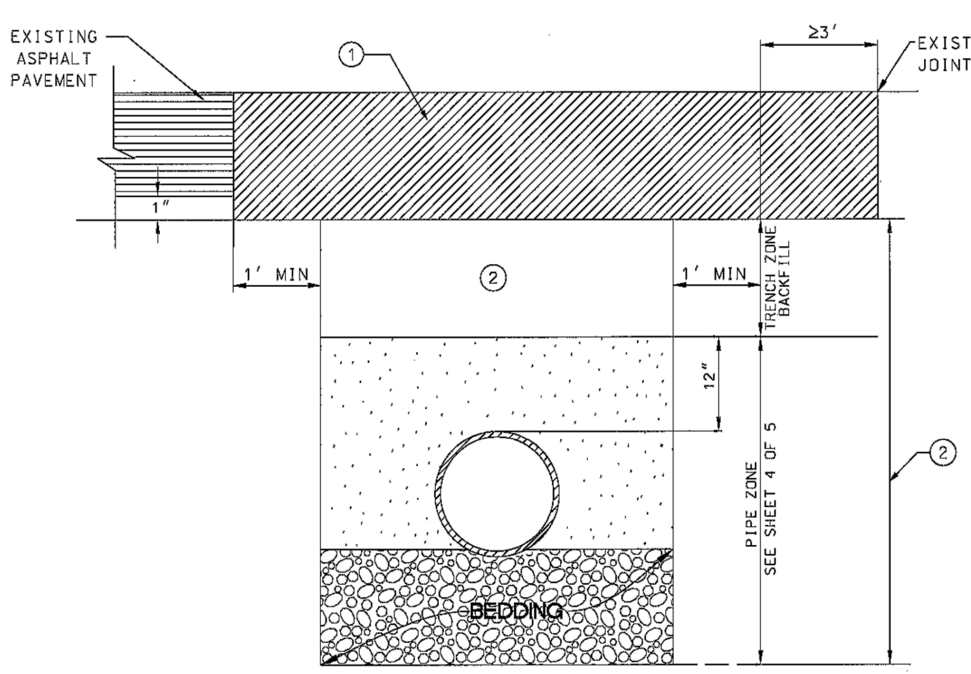
PROPOSED DRIVE-THRU RESTAURANT
2109 E SANTA CLARA AVENUE
SANTA ANA, CA 92705

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

CONSTRUCTION DETAILS

SHEET NO. C8.1

PROJECT NO. YY-NNNN: PROJECT TITLE PROJECT LIMITS



CONSTRUCTION NOTES

(1) LIMIT OF TRENCH. IF THE LIMIT OF TRENCH IS WITHIN 3' FROM A JOINT, REPLACE THE ENTIRE SEGMENT FROM THE LIMIT OF TRENCH TO THE JOINT. SPECIFIC LIMITS OF RECONSTRUCTION TO BE DETERMINED BY THE CITY ENGINEER.

MATCH EXISTING PAVEMENT SECTION (CONVENTIONAL OR RUBBERIZED ASPHALT) AS DIRECTED BY THE CITY ENGINEER AND AS FOLLOWS:

STREET TYPE	AC MINIMUM PAVEMENT THICKNESS
LOCAL	6"
INDUSTRIAL	10"
COLLECTOR	12"
ARTERIAL	AS DIRECTED BY CITY ENGINEER

(2) SEE STANDARD PLAN SHEET 4 FOR MATERIALS AND REQUIREMENTS.

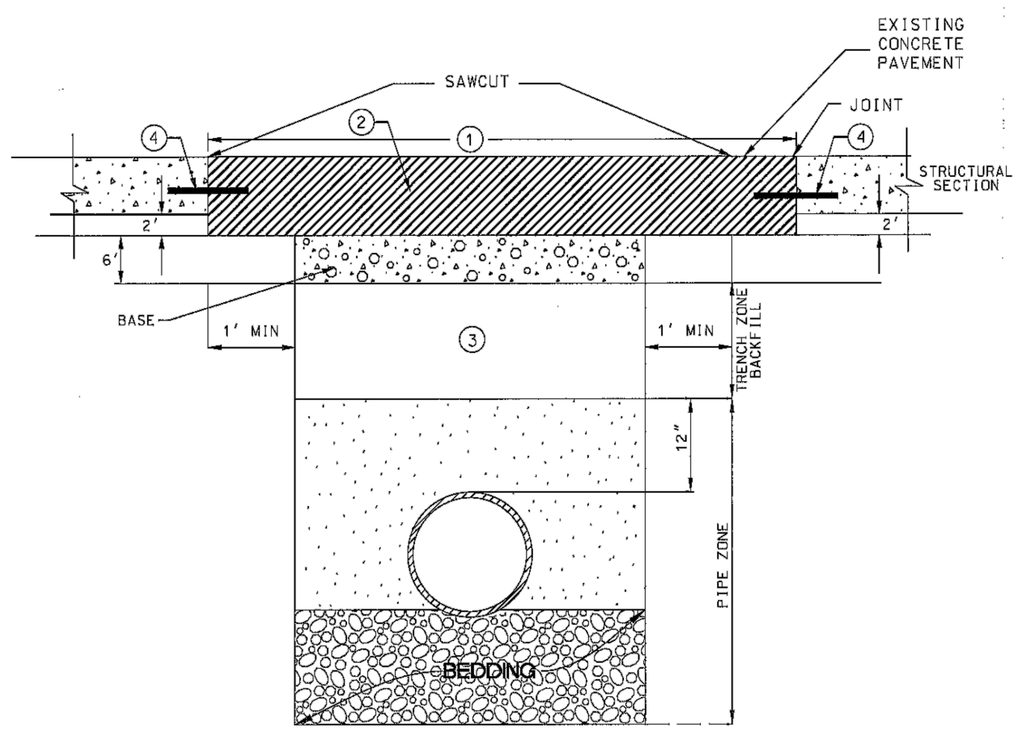
(3) SEE STANDARD PLAN 1151 FOR LIMITS OF PAVEMENT REPAIR FOR STREETS UNDER MORATORIUM AS DESCRIBED IN SAMC 33-54.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
12/14/00		REVISED STANDARD PLAN NUMBER

UTILITY TRENCH DETAIL
ASPHALT PAVEMENT
TRENCH PAVEMENT REQUIREMENTS
STD. PLAN NUMBER 1150
SHEET 1 OF 5



CONSTRUCTION NOTES

(1) REMOVE AND REPLACE THE EXISTING STRUCTURAL SECTION TO A MINIMUM WIDTH OF 1' BEYOND LIMIT OF TRENCH ON EACH SIDE OR TO NEAREST JOINT, WHICHEVER IS GREATER. SPECIFIC LIMITS OF PAVEMENT RECONSTRUCTION TO BE DETERMINED BY THE CITY ENGINEER.

(2) REPLACEMENT CONCRETE THICKNESS SHALL BE A MINIMUM OF 2" GREATER THAN EXISTING CONCRETE SECTION AND SHALL HAVE A MINIMUM THICKNESS OF 8" PCC OVER 6" AGGREGATE BASE.

(3) SEE SHEET 4 OF 5 FOR MATERIALS AND REQUIREMENTS.

(4) DOWELS FOR CONTACT JOINTS SHALL BE #4 BARS, 18" LONG AND SPACED @ 24" ON CENTER.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
12/16/96	SA	ADDITIONAL NOTE #5
06/01/00	SA	REVISED NOTES AND DETAIL
12/14/00		REVISED STANDARD PLAN NUMBER

UTILITY TRENCH DETAIL
PCC PAVEMENT
TRENCH PAVEMENT REQUIREMENTS
STD. PLAN NUMBER 1150
SHEET 2 OF 5

GENERAL NOTES

A. CONTRACTOR SHALL USE A VACUUM TO ABSORB SEDIMENTS DURING SAWCUTTING OPERATION AND DISPOSE OFFSITE.

B. CONTRACTOR SHALL REMOVE ANY GEOTEXTILE MATERIALS (INCLUDING CEMENT TREATED BASE) AND DISPOSE OFFSITE.

C. WHEN ALLOWED PLACEMENT OF SLURRY BACKFILL, THE CONTRACTOR SHALL NOT BASE PAVE FOR A MINIMUM OF 24 HOURS. BASE PAVING SHALL BE DONE 1" BELOW FINISHED GRADE USING TYPE III-B3-AR-4000 ASPHALT AND THE EDGES SHALL BE RAMPED TO EXISTING USING COLD MIX AT (1:12) SLOPE. FINAL PAVING SHALL BE DONE IMMEDIATELY AFTER THE BASE PAVING USING TYPE III-C3-AR-4000 ASPHALT.

D. PCC (PORTLAND CEMENT CONCRETE) USED FOR STREET PAVEMENT SHALL BE MINIMUM CLASS 560-A-3250.

E. REFER TO THE CITY'S MUNICIPAL CODE FOR THE EXCAVATION RESTRICTIONS UNDER PAVEMENT MORATORIUM.

F. TEMPORARY PAVING:

i. ALL TRENCHES SHALL BE BACKFILLED AND HAVE TEMPORARY PAVEMENT CONSTRUCTED OR COVERED WITH STEEL RECESSED TRAFFIC PLATES AT THE END OF EACH WORKING DAY.

IN THE EVENT STEEL PLATES CANNOT BE RECESSED, THE MINIMUM ASPHALT TAPER (COLD MIX) SHALL BE (12:1) RATIO, AS DETERMINED BY THE CITY ENGINEER.

ii. WITHIN FOUR CONSECUTIVE CALENDAR DAYS FOLLOWING INSTALLATION OF THE CONDUIT, OR AFTER COMPACTION IS APPROVED BY THE CITY ENGINEER, WHICHEVER COMES FIRST STEEL TRAFFIC PLATES SHALL BE REMOVED AND THREE INCHES OF TEMPORARY PAVEMENT SHALL BE CONSTRUCTED FLUSH WITH EXISTING PAVEMENT.

iii. CROSS STREETS ARE TO BE PAVED WITH TEMPORARY PAVEMENT ON THE SAME DAY OF EXCAVATION. TEMPORARY PAVEMENT SHALL BE MAINTAINED SO THAT A SMOOTH TRAVERSABLE SURFACE IS AVAILABLE AT ALL TIMES FOR VEHICULAR TRAFFIC AND SHALL BE FREE FROM RUTS, DEPRESSIONS, HOLES AND LOOSE GRAVELS.

iv. TEMPORARY PAVING SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR BEFORE THE PERMANENT RESURFACING IS PLACED.

G. PERMANENT PAVING:

i. PERMANENT PAVEMENT RESTORATION SHALL BE COMPLETED IMMEDIATELY AFTER THE TRENCH IS BACKFILLED, AND COMPACTION HAS BEEN APPROVED BY THE CITY ENGINEER.

ii. TACK COAT IS REQUIRED FOR ALL AC PAVEMENT TRENCHING OPERATIONS.

ii. DENSITY AND SMOOTHENESS SHALL BE DONE PER THE "GREENBOOK" SECTION 302-5.6.2.

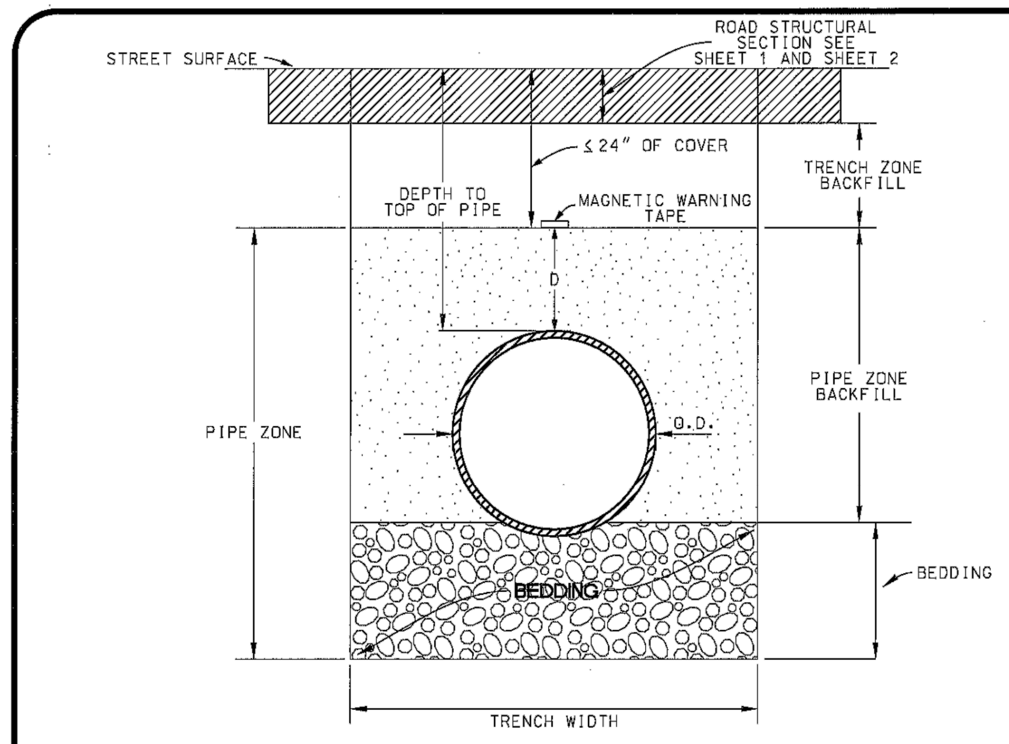
H. USE OF ROCKWHEEL IS NOT PERMITTED ON PCC PAVEMENT AND ON TRENCHES GREATER THAN 10" UNLESS WIHT PRIOR APPROVAL BY THE CITY ENGINEER.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
12/14/00		REVISED STANDARD PLAN NUMBER

UTILITY TRENCH DETAIL
ASPHALT CONCRETE PAVEMENT
TRENCH PAVEMENT REQUIREMENTS
STD. PLAN NUMBER 1150
SHEET 3 OF 5



UTILITY	BEDDING MATERIAL / THICKNESS	D	PIPE ZONE BACKFILL	TRENCH ZONE BACKFILL	TRENCH WIDTH	DEPTH TO TOP OF PIPE
WATER	IMPORTED MATERIAL SAND EQUIVALENT≥30 / 6"	12"	SAND EQUIVALENT ≥30	SAND EQUIVALENT ≥30	MIN. 24" O.D.+ 20"	36" MIN.
SEWER	1/2" CRUSHED ROCK / 6"	12"	1/2" CRUSHED ROCK		MIN. 24" O.D.+ 12"	36" MIN.
STORM DRAIN	1/2" CRUSHED ROCK / D/4, MIN. 6"	VARIES	IMPORTED MATERIAL SAND EQUIVALENT ≥30		O.D.+ 16"	30" MIN. LOCAL 36" MIN. ARTERIAL
OTHER	VARIES / VARIES	VARIES	SAND EQUIVALENT ≥30 OR ENGINEERED SECTION		VARIES	30" MIN. LOCAL 36" MIN. ARTERIAL

NOTE: ANY DEVIATION FROM THESE REQUIREMENTS NEED PRIOR APPROVAL FROM CITY ENGINEER. COMPACTION OF 90% MUST BE MET FOR ALL MATERIALS IN THE TABLE.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
12/14/00		REVISED STANDARD PLAN NUMBER

UTILITY TRENCH DETAIL
TRENCH MATERIALS
AND BACKFILL REQUIREMENTS
STD. PLAN NUMBER 1150
SHEET 4 OF 5

GENERAL NOTES:

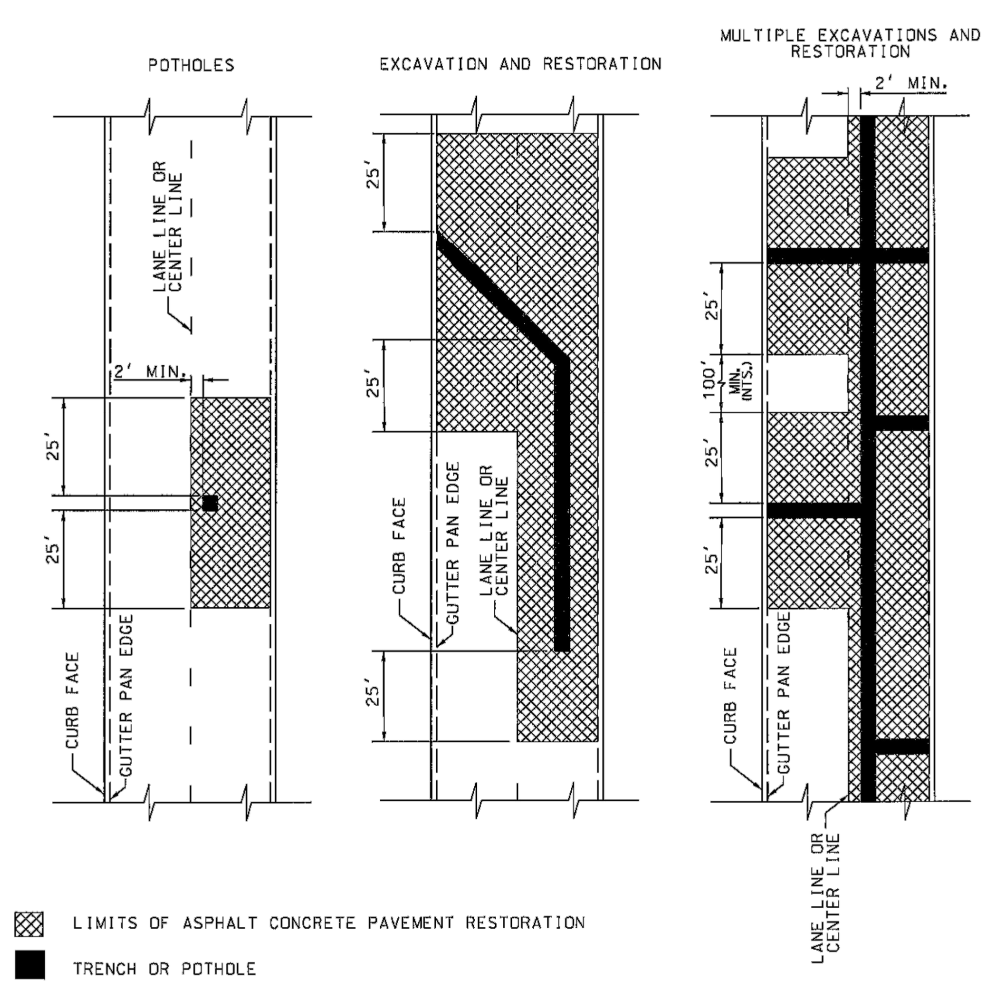
1. IF TRENCH WALLS SLOUGH SO AS TO REMOVE FIRM SUPPORT TO ADJACENT PAVEMENT, SUCH PAVEMENT SHALL BE REMOVED BACK TO WHERE UNDISTURBED IS AVAILABLE. THE REMOVAL OF PAVEMENT UNDER SUCH CONDITIONS SHALL BE FOR A MINIMUM DISTANCE OF 10 FEET ALONG THE TRENCH, AND THE WIDTH OF REMOVAL SHALL BE CONSTANT AND EQUAL TO THE GREATEST DIMENSION REQUIRED FOR REMOVAL TO FIRM SUPPORT.
2. PAVEMENT REPLACEMENT SHALL BE DONE ACCORDING TO CITY OF SANTA ANA STANDARD PLAN NUMBERS 1150 SHEET 1, 2 AND 1151.
3. COMPACT THE SAND BEDDING USING THE JETTING METHODS PER THE "GREENBOOK".
4. INSTALL DETECTABLE UTILITY MARKING TAPE - (COLOR CODED PER DIG ALERT SUGGESTED MARKING GUIDELINES.)
5. ALL TRENCHING AND CONSTRUCTION OPERATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE STATE'S DEPARTMENT OF INDUSTRIAL RELATIONS.
6. UTILITY PIPE SHALL BE INSTALLED IN THE CENTER OF THE TRENCH.
7. ALL TRENCH ZONE BACKFILL MUST CONFORM TO SECTION 200 OF THE "GREENBOOK" AND SHALL BE PLACED ACCORDING TO SECTION 306-1.3. IN ADDITION, WHEN NATIVE BACKFILL MATERIAL IS ALLOWED, THE CONTRACTOR SHALL TEST THE MATERIAL TO SHOW THAT THE MATERIAL IS SUITABLE FOR BACKFILL. SUITABLE NATIVE BACKFILL MATERIAL MAY ONLY BE USED WITH PRIOR APPROVAL FROM THE CITY ENGINEER. THE MATERIAL IS NOT SUITABLE IF SAND EQUIVALENT IS LESS THAN 30 OR IF THE MOISTURE CONTENT EXEEDS THE OPTIMUM.
8. USE 1/2 SACK SAND/CEMENT SLURRY BACKFILL FOR TRENCHES LESS THAN 10" WIDE. SLURRY IS ALLOWED IN CITY OWNED UTILITIES WITH PRIOR APPROVAL BY THE CITY ENGINEER.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
12/14/00		REVISED STANDARD PLAN NUMBER

UTILITY TRENCH DETAIL
TRENCH MATERIALS
AND BACKFILL REQUIREMENTS
STD. PLAN NUMBER 1150
SHEET 5 OF 5



LIMITS OF ASPHALT CONCRETE PAVEMENT RESTORATION
TRENCH OR POTHOLE

GENERAL NOTES:

A. ASPHALT CONCRETE RESTORATION FOR STREETS UNDER MORATORIUM AS DESCRIBED IN SAMC 33-54 IS AS SHOWN.

APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE	REVISION

RESTORATION FOR
MORATORIUM STREETS
STD. PLAN NUMBER 1151
SHEET 1 OF 2

GENERAL NOTES CONTINUED:

B. RESTORATION SHALL CONSIST OF GRINDING AND OVERLAYING TO A MINIMUM DEPTH OF 2" OF ASPHALT CONCRETE IN ADDITION TO RESTORATION REQUIRED BY CITY STANDARD 1150.

C. GAPS OF LESS THAN 100' BETWEEN GRIND AND OVERLAY EDGES SHALL BE INCLUDED IN THE RESTORATION.

D. POTHOLES USING A 10" DIAMETER OR LESS ROUND VACUUM CORE MAY NOT REQUIRE A GRIND AND OVERLAY, AT THE DISCRETION OF THE CITY ENGINEER'S FIELD REPRESENTATIVE.

E. IF THE EDGE OF TRENCH IS WITHIN 2' OF A LANE LINE, THE GRIND AND OVERLAY SHALL EXTEND TO COVER THE ENTIRE NEIGHBORING LANE.

F. RESTORATION FOR ANGLED TRENCHES ARE TO BE SQUARED OFF AS SHOWN ON PAGE 1.

G. IN LIEU OF GRIND AND OVERLAY, ASPHALT BEYOND THE LIMITS OF THE RESTORATION REQUIRED BY CITY STANDARD 1150 MAY BE REPLACED AT FULL DEPTH.

H. IN PORTLAND CEMENT CONCRETE PAVED STREETS, THE RESTORATION LIMITS ARE DETERMINED USING CITY STANDARD 1150.

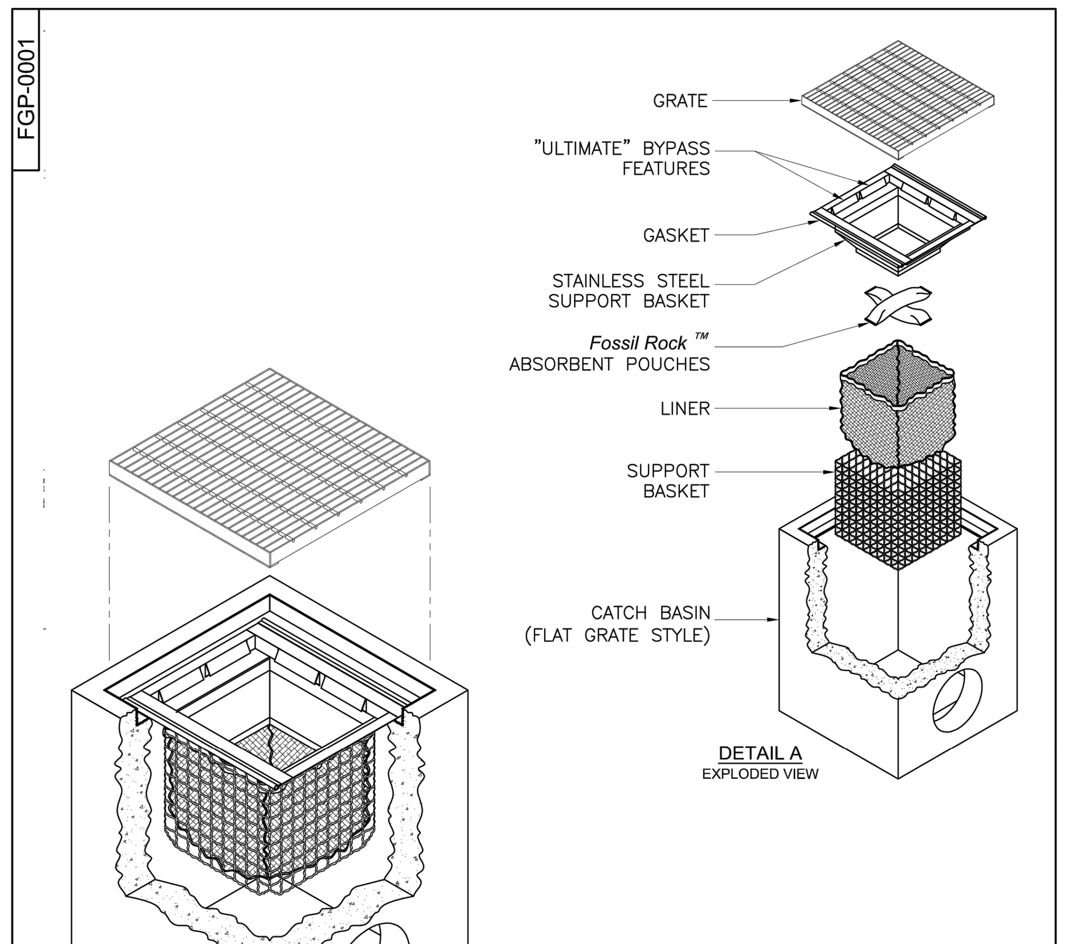
APPROVED: DATE: 3/22/16
CITY ENGINEER

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE	REVISION

RESTORATION FOR
MORATORIUM STREETS
STD. PLAN NUMBER 1151
SHEET 2 OF 2

FGP-0001



FloGard® FILTER
-INSTALLED INTO CATCH BASIN-

NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock* ™, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

U.S. PATENT # 6,00,023 & 6,877,029

FloGard®
Catch Basin Insert Filter
Grated Inlet Style
Inlet Filtration

Oldcastle® Stormwater Solutions
7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO.	REV	ECO	DATE	
FGP-0001	G	ECO-0142 JPR 7/13/16	JPR 11/3/06	SHEET 1 OF 2

24" X 24" DRAIN INLET (1)
N.T.S.

Underground Service Alert
of Southern California
CALL: TOLL FREE 1-800-422-4133
TWO WORKING DAYS BEFORE YOU DIG

NOTICE TO CONTRACTOR

PURSUANT TO ASSEMBLY BILL 3019 NO EXCAVATION PERMIT IS VALID UNLESS THE CONTRACTOR CONTACTS AND OBTAINS AN INQUIRY I.D. NUMBER FROM "UNDERGROUND SERVICE ALERT" (1-800-422-4133) AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING EXCAVATION.

FILE NO.:

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APPROVED	INSTALLED

REFERENCES

BENCHMARK NO.: 3C-26-06 ELEV.: 173.744' NAVD88
THE ON-SITE BENCHMARK IS BASED ON NAVD 1988 DATUM, AND IS A SET MAG NAIL AND SHINER AT THE NORTHEAST CORNER OF PARCEL 2. ELEVATION = 193.65 FEET.
THE BASIS OF BEARING IS THE CENTERLINE OF SANTA CLARA AVENUE PER TRACT MAP NO. 14568, BOOK 695, PAGE 47, COUNTY OF ORANGE, A BEARING OF N89°59'50"E.
CONSTRUCTION COMPLETED:

ENGINEERS SEAL
REGISTERED PROFESSIONAL ENGINEER · HANNAH M L... · NO. 90371 · CIVIL · STATE OF CALIFORNIA
NOT FOR CONSTRUCTION

PREPARED UNDER THE SUPERVISION OF: HANNAH LUEVANO
SENIOR CIVIL ENGINEER RCE NO.: 90371
DESIGNED: HS DRAWN: MH CHECKED: HS
DATE 6/29/2023

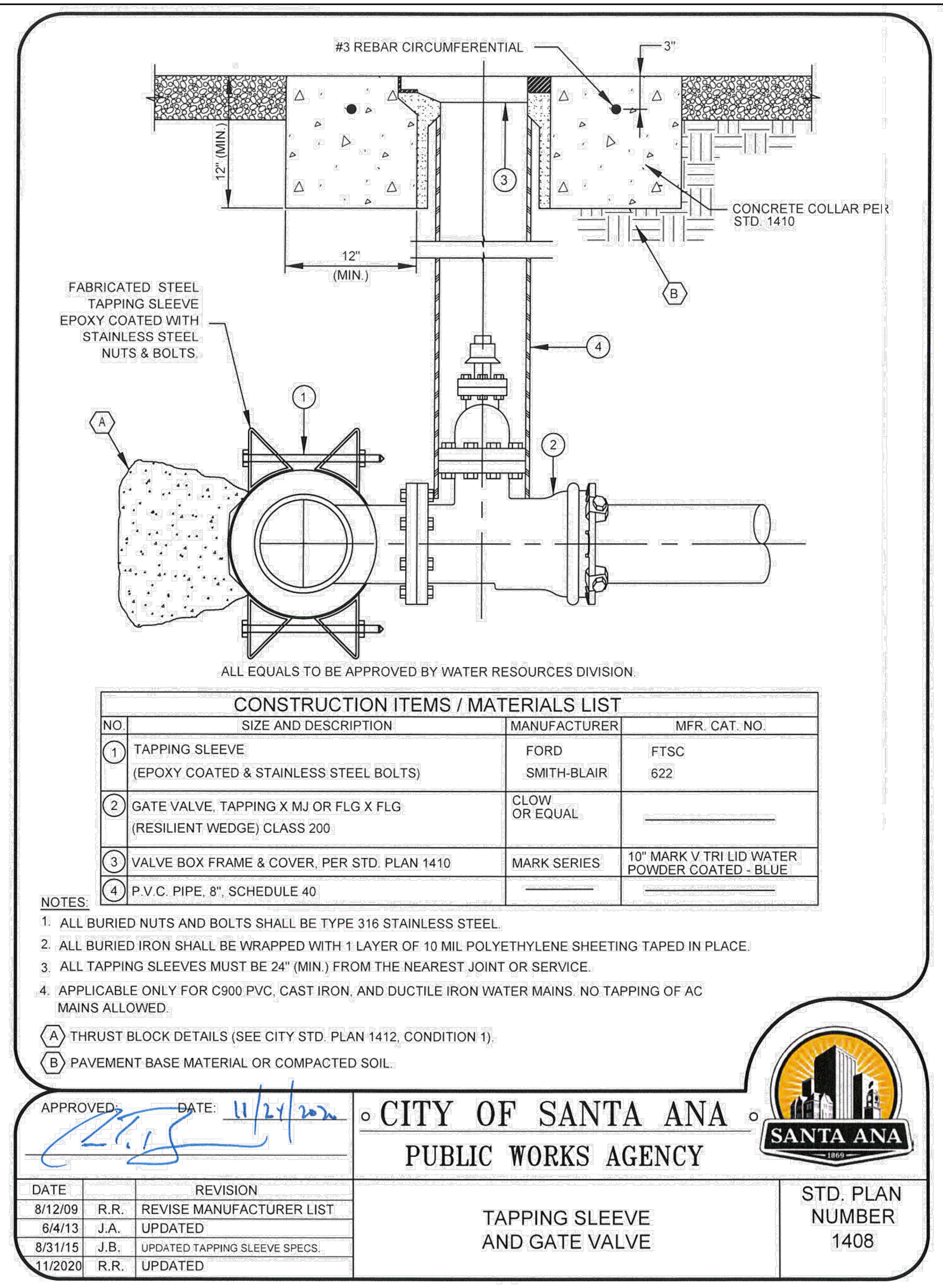
REVIEWED FOR CONSTRUCTABILITY AND RECOMMENDED FOR CONSTRUCTION: JASON GABRIEL
PRINCIPAL CIVIL ENGINEER RCE NO.: 62968
XX/YYYY

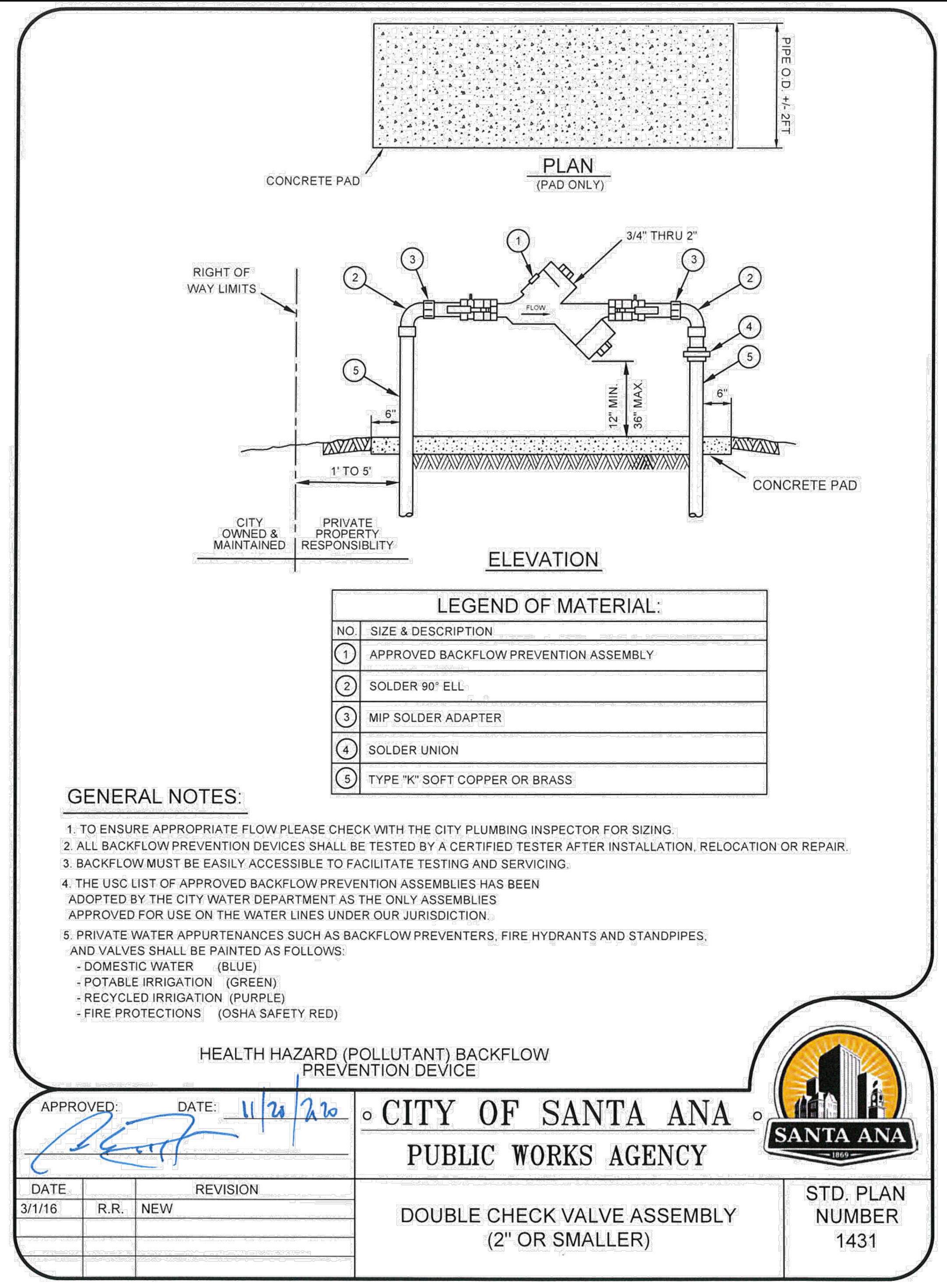
PROPOSED DRIVE-THRU RESTAURANT
2109 E SANTA CLARA AVENUE
SANTA ANA, CA 92705

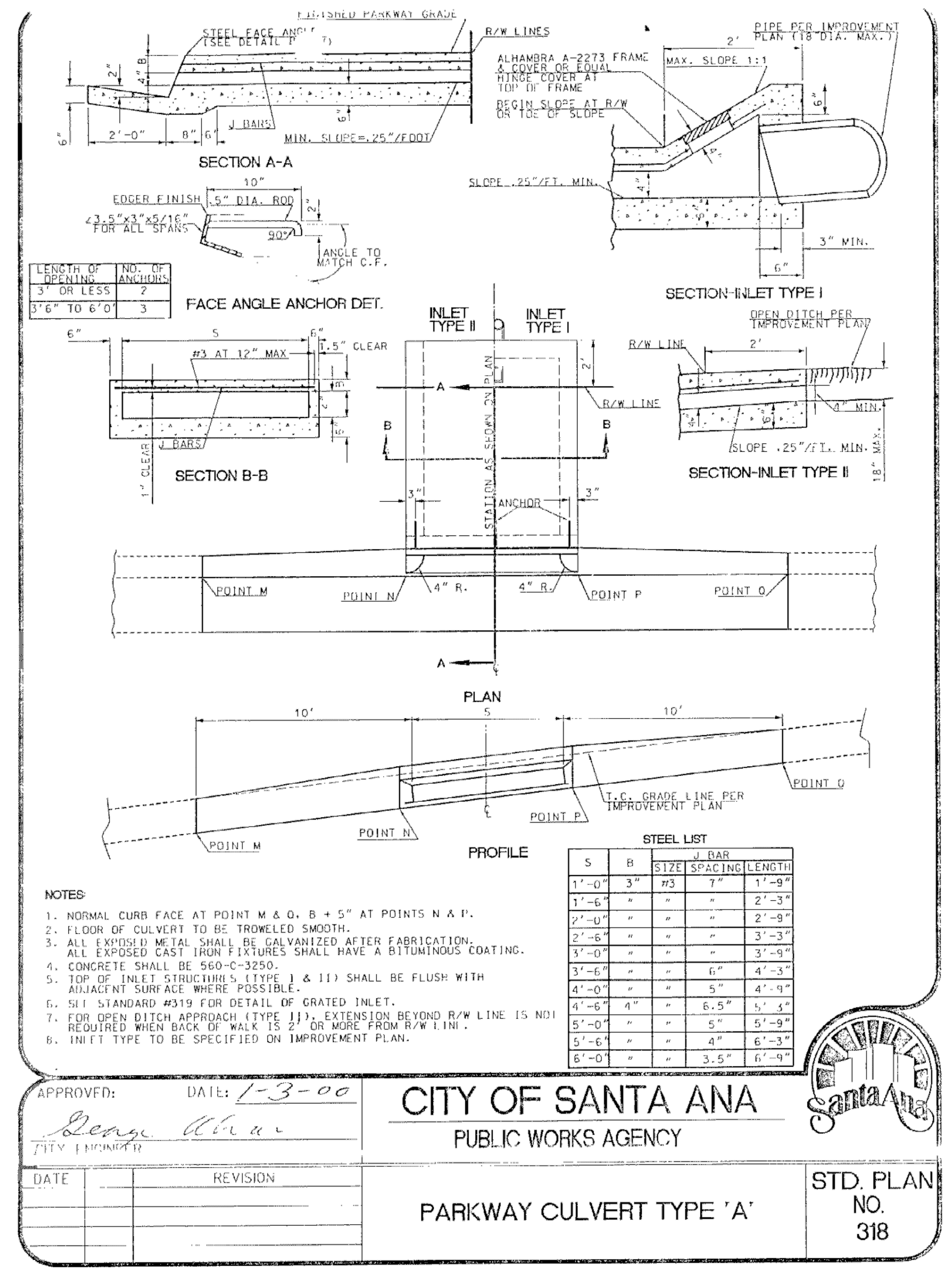
PUBLIC WORKS AGENCY
CITY OF SANTA ANA

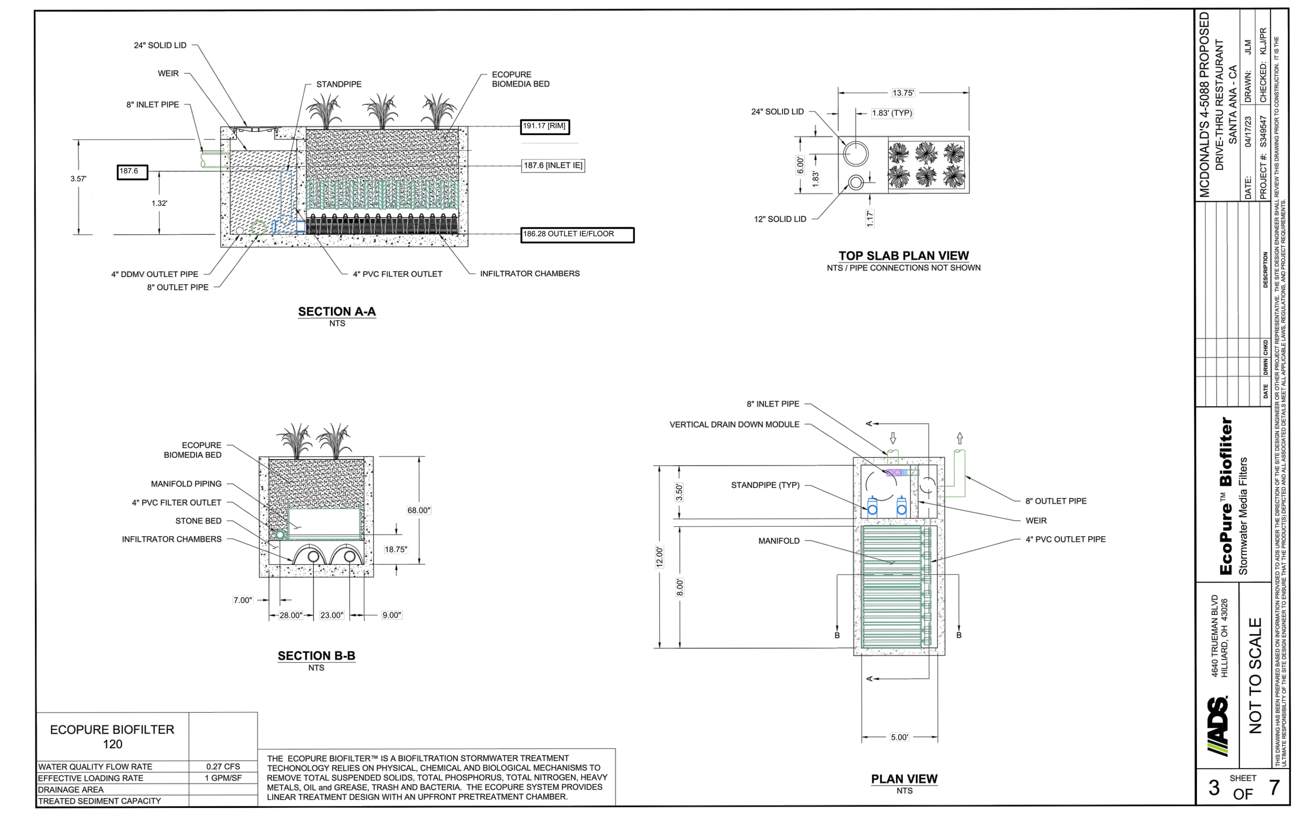
CONSTRUCTION DETAILS
SHEET NO. C8.2

PROJECT NO. YY-NNNN: PROJECT TITLE PROJECT LIMITS





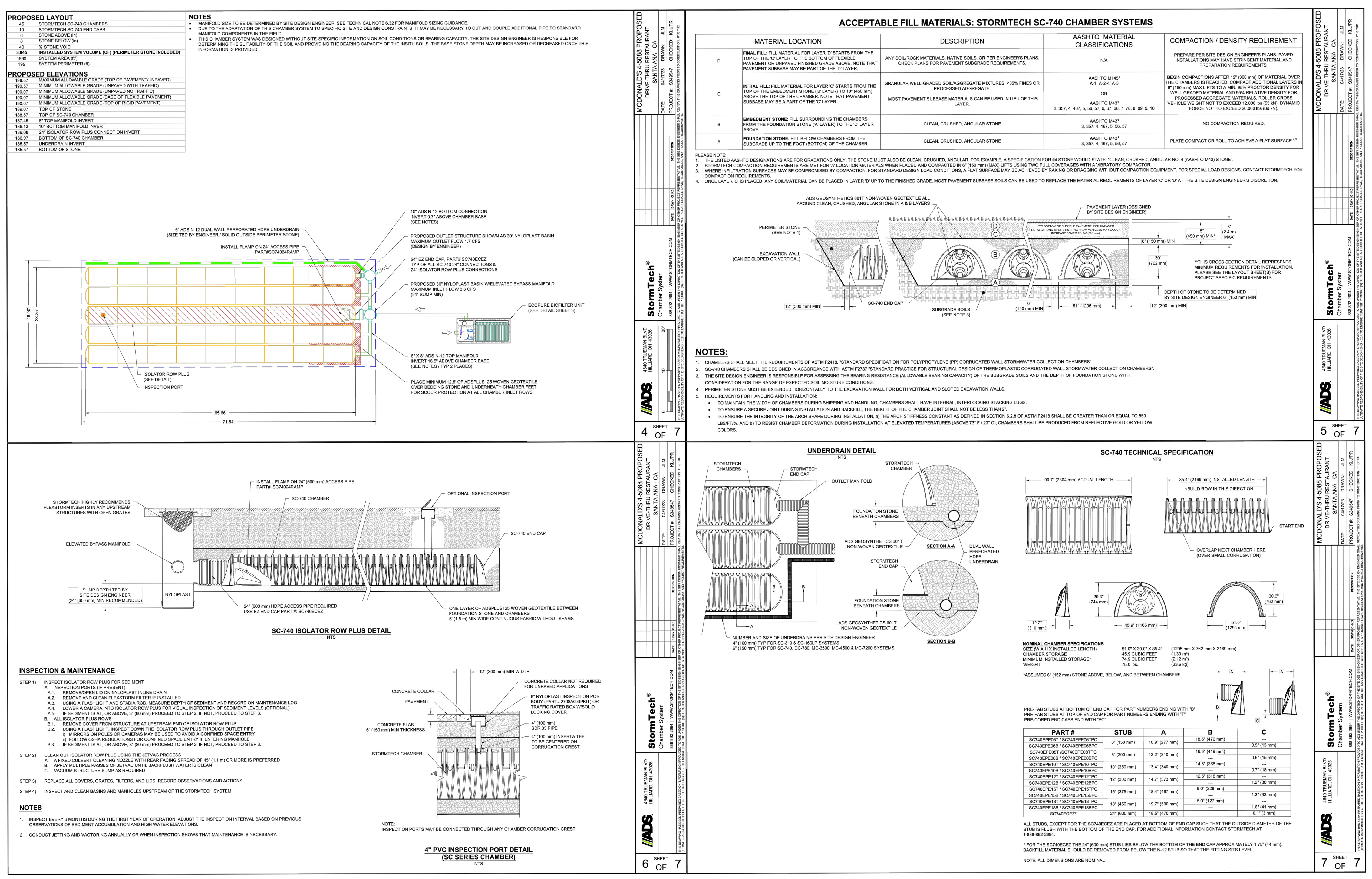




ADS ECOPURE BIOFILTER MODULAR WETLAND SYSTEM

N.T.S.

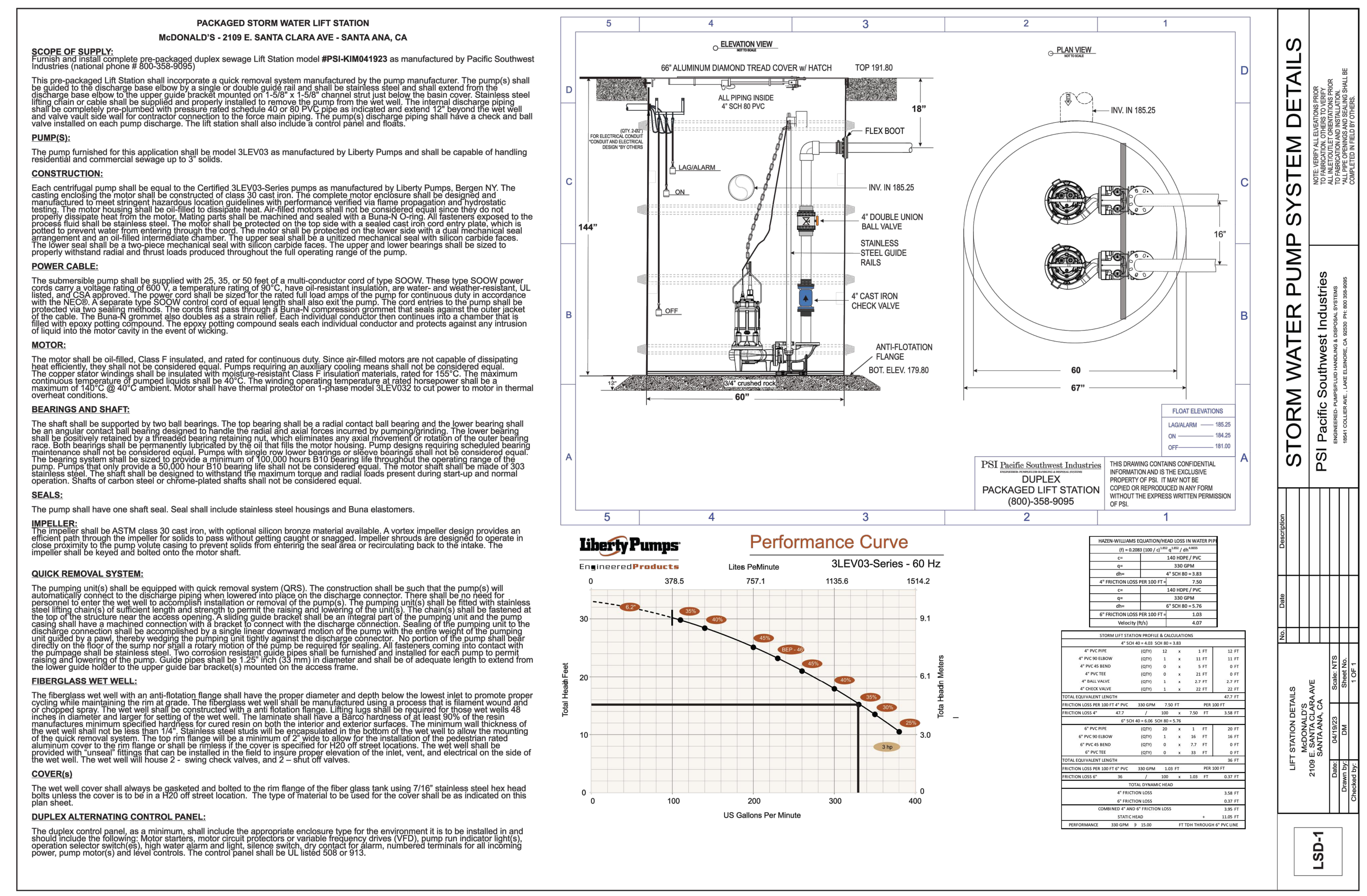
3



UNDERGROUND ADS STORMTECH DETENTION SYSTEM

N.T.S.

1



PSI SINGLE STAGE SUMP PUMP

N.T.S.

2

Underground Service Alert
of Southern California

CALL: TOLL FREE 1-800-422-4133

TWO WORKING DAYS BEFORE YOU DIG

NOTICE TO CONTRACTOR

PURSUANT TO ASSEMBLY BILL 3019 NO EXCAVATION PERMIT IS VALID UNLESS THE CONTRACTOR CONTACTS AND OBTAINS AN INQUIRY I.D. NUMBER FROM "UNDERGROUND SERVICE ALERT" (1-800-422-4133) AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING EXCAVATION.

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ENGINEERS SEAL

REGISTERED PROFESSIONAL ENGINEER HANNAH M L NO. 90371 CIVIL STATE OF CALIFORNIA — NOT FOR CONSTRUCTION

PREPARED UNDER THE SUPERVISION OF: HANNAH LUEVANO — SENIOR CIVIL ENGINEER RCE NO.: 90371 — DESIGNED: HS DRAWN: MH CHECKED: HS — DATE 6/29/2023

REVIEWED FOR CONSTRUCTABILITY AND RECOMMENDED FOR CONSTRUCTION: JASON GABRIEL — PRINCIPAL CIVIL ENGINEER RCE NO.: 62968 — XX/YYYY

PROPOSED DRIVE-THRU RESTAURANT

2109 E SANTA CLARA AVENUE
SANTA ANA, CA 92705

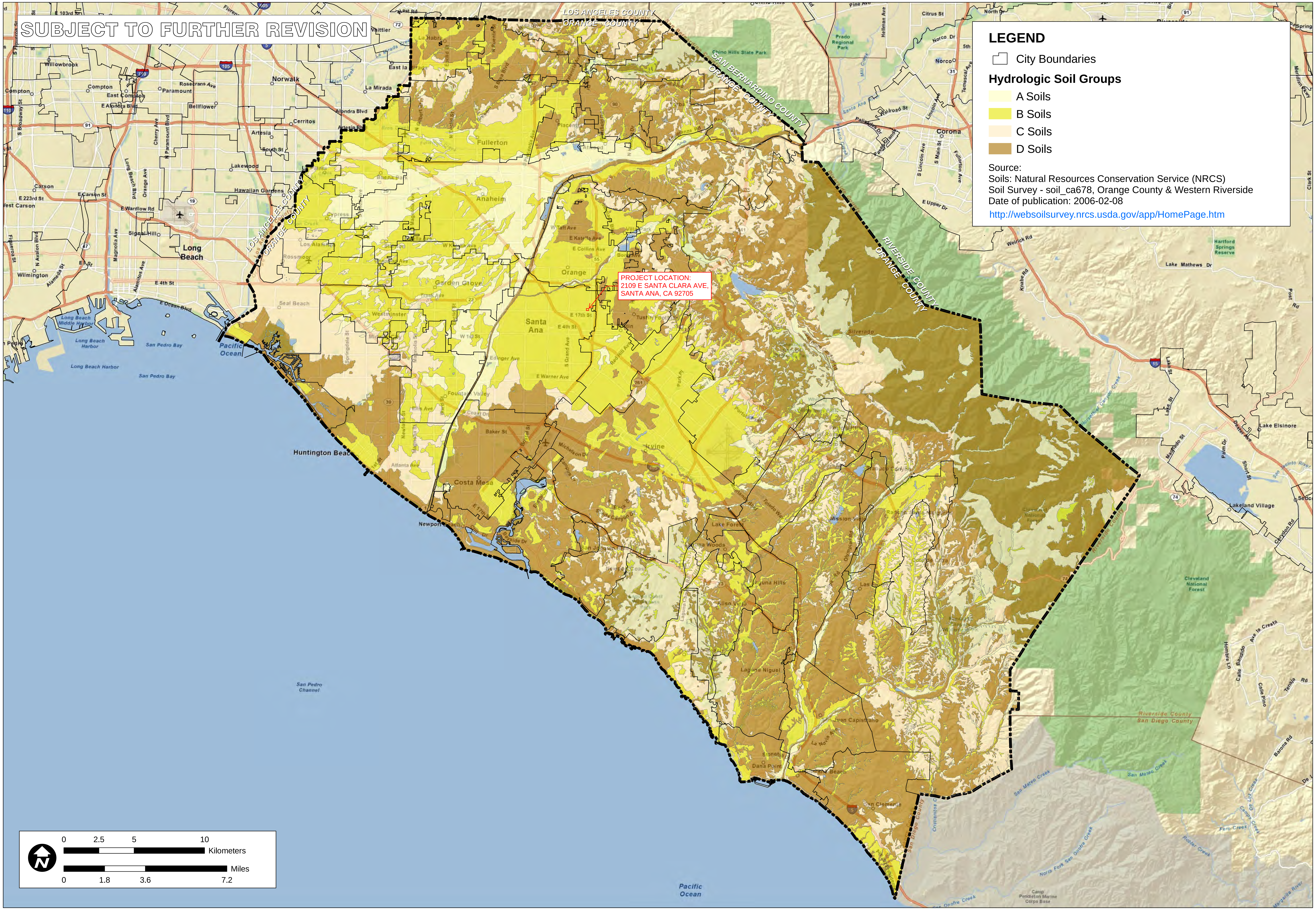
PUBLIC WORKS AGENCY
CITY OF SANTA ANA

CONSTRUCTION DETAILS

SHEET NO. C8.3

PROJECT NO. YY-NNNN: PROJECT TITLE PROJECT LIMITS

Attachment D
County Soils and Rainfall Maps



TITLE

NRCS HYDROLOGIC SOILS GROUPS

JOB

ORANGE COUNTY INFILTRATION STUDY

ORANGE CO. CA

SCALE 1" = 1.8 miles

DESIGNED TH

DRAWING TH

CHECKED BMP

DATE 02/09/11

JOB NO. 9526-E

PACE Advanced Water Engineering

FIGURE

XVI-2a

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-2a_HydroSoils_20110215.mxd

United States Department of Agriculture

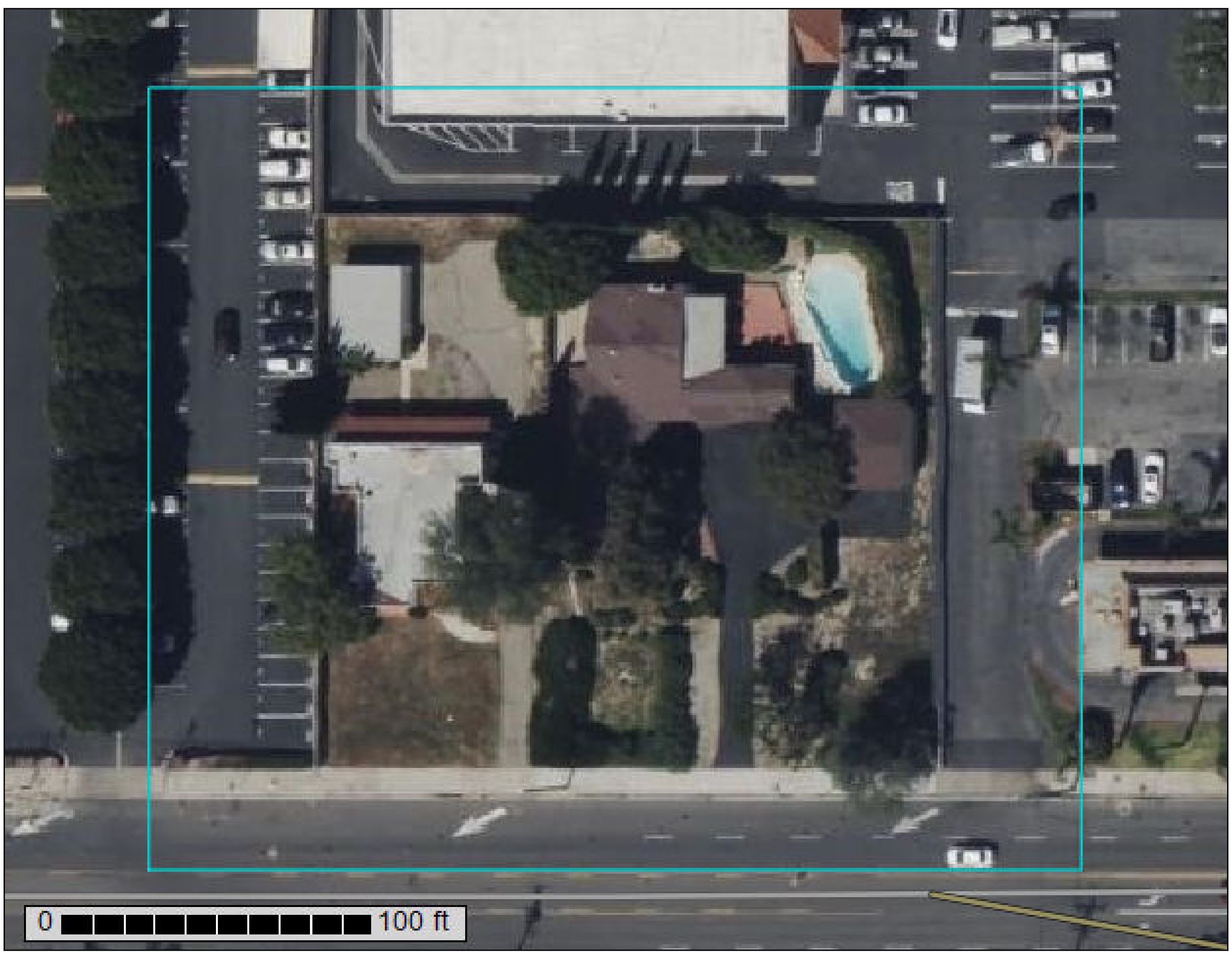
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Orange County and Part of Riverside County, California



October 4, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


117° 50' 15" W
117° 50' 9" W
33° 46' 4" N
33° 46' 1" N
422440
422450
422460
422470
422480
422490
422500
422510
422520
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3736700
3736690
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166
Soil Map may not be valid at this scale.
N
Map Scale: 1:650 if printed on A landscape (11" x 8.5") sheet.
Meters
0 5 10 20 30
Feet
0 30 60 120 180
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 16, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
166	Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	1.7	100.0%
Totals for Area of Interest		**1.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County and Part of Riverside County, California

166—Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tyyv
Elevation: 20 to 1,920 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 62 to 66 degrees F
Frost-free period: 320 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mocho and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mocho

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: loam
A - 10 to 16 inches: loam
Bk1 - 16 to 34 inches: loam
Bk2 - 34 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Sorrento

Percent of map unit: 6 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Bolsa, silt loam, drained

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Anacapa

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hueneme

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mocho, 2 to 9 percent slopes

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chino, drained

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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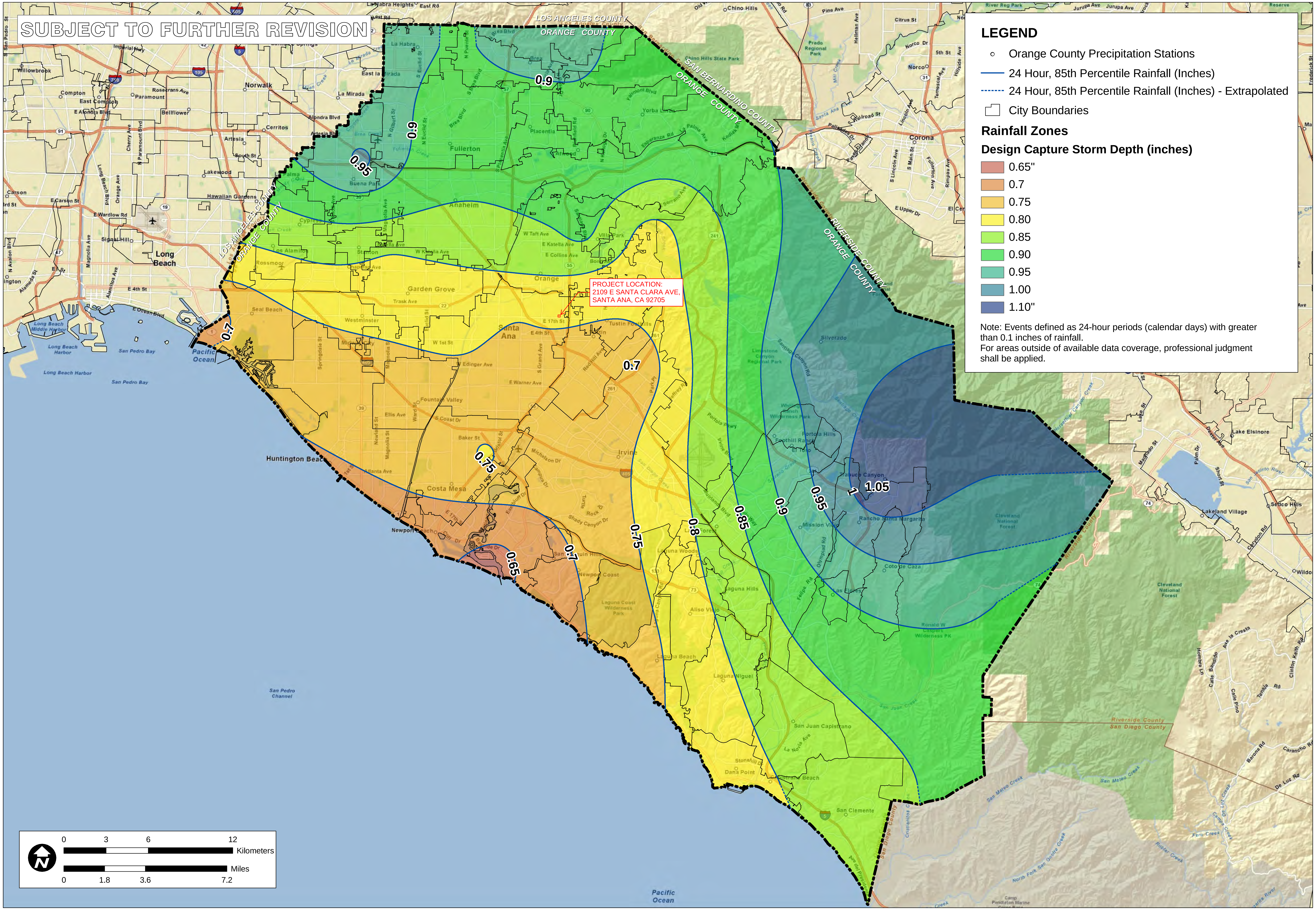

TITLE
RAINFALL ZONES

ORANGE COUNTY TECHNICAL GUIDANCE DOCUMENT

JOB
ORANGE CO. CA

SCALE 1" = 1.8 miles
DESIGNED TH
DRAWING TH
CHECKED BMP
DATE 04/22/10
JOB NO. 9526-E

PACE Advanced Water Engineering

FIGURE
XVI-1

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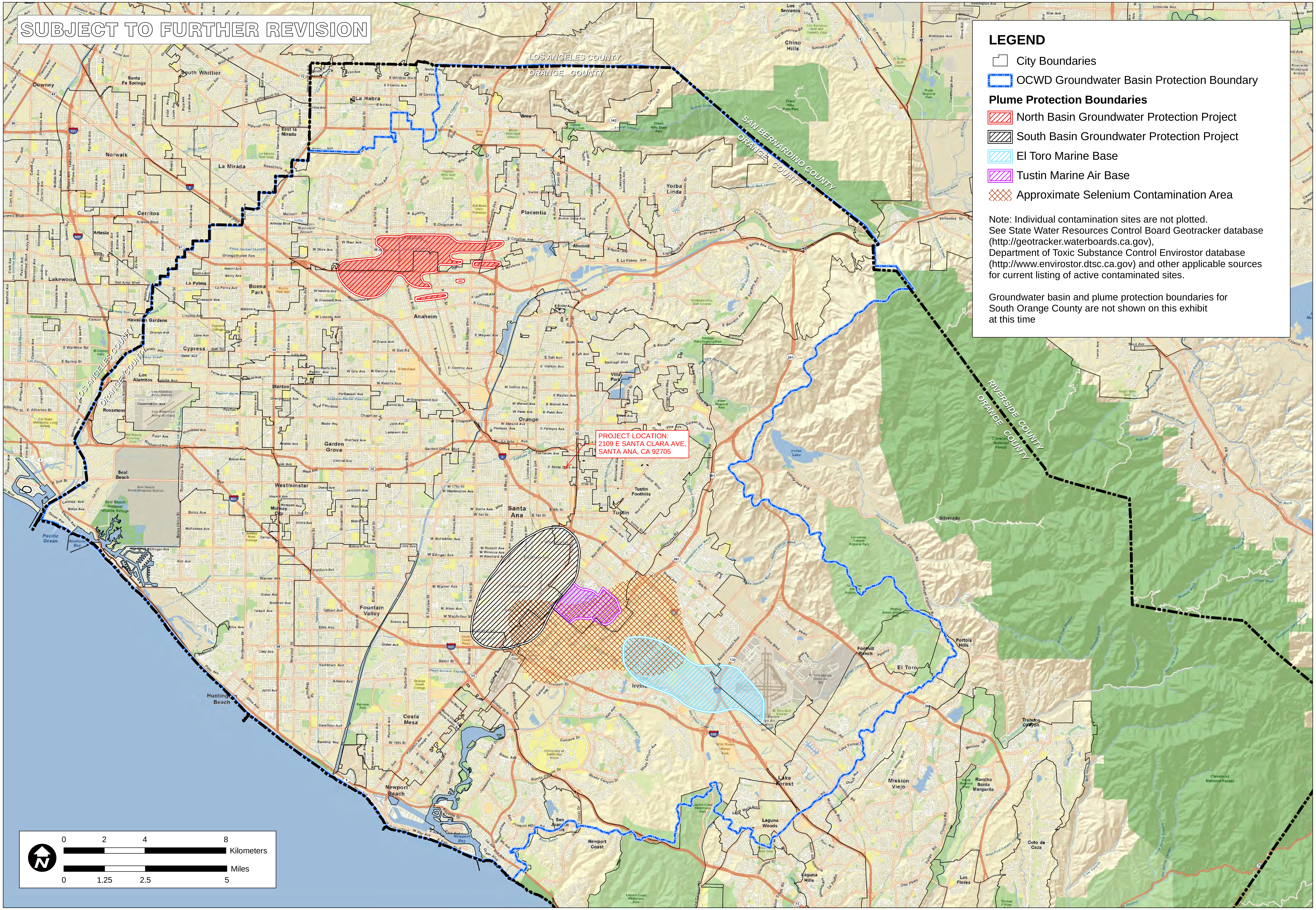
Attachment E
Groundwater Feasibility



TITLE
NORTH ORANGE COUNTY GROUNDWATER PROTECTION AREAS

JOB
ORANGE COUNTY INFILTRATION STUDY
ORANGE CO.
CA

SCALE	1" = 1.25 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE
XVI-2f

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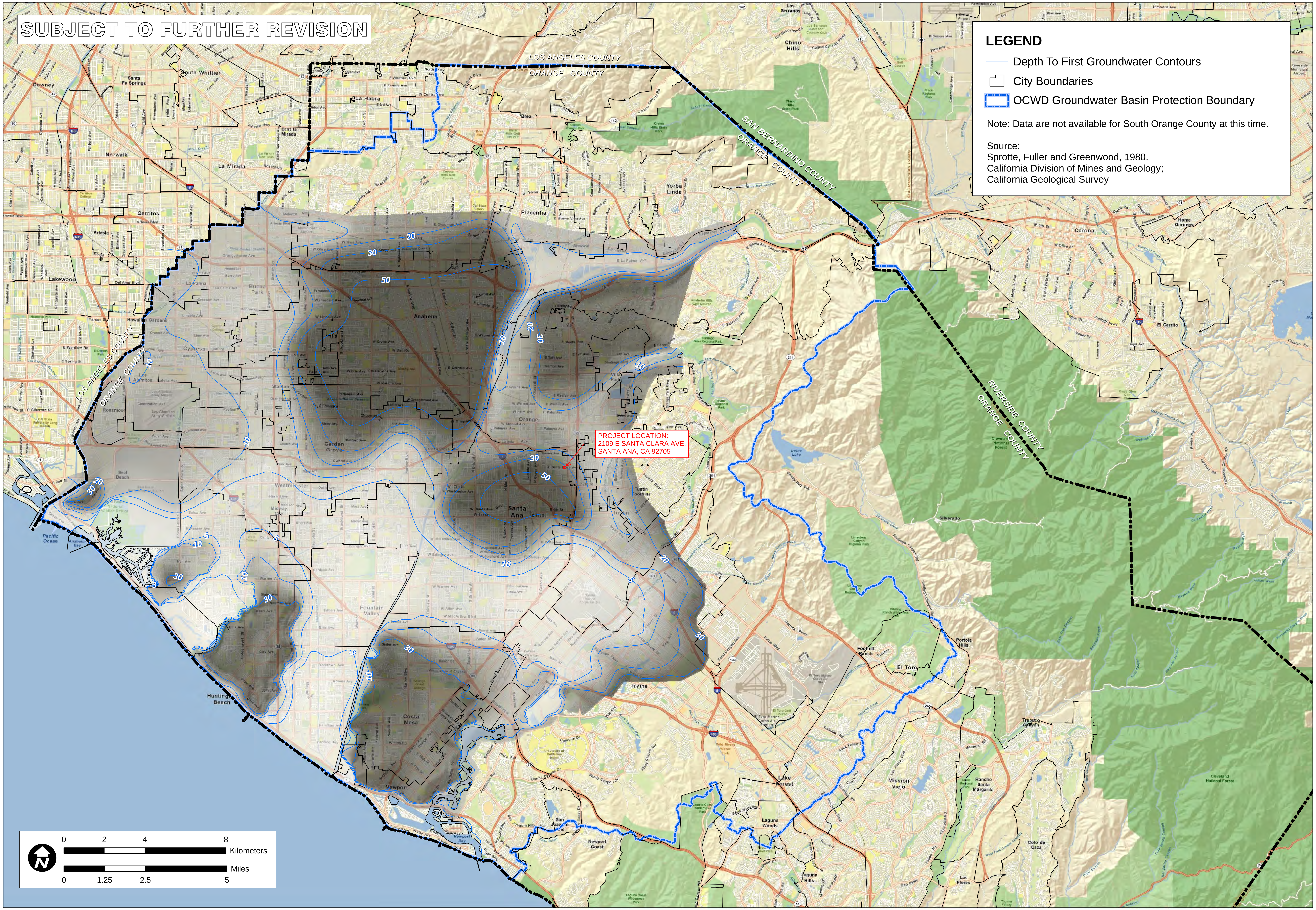

TITLE

NORTH ORANGE COUNTY MAPPED DEPTH TO FIRST GROUNDWATER

JOB

ORANGE COUNTY INFILTRATION STUDY

ORANGE CO. CA

SCALE	1" = 1.25 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE Advanced Water Engineering

FIGURE

XVI-2d

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Worksheet I: Summary of Groundwater-related Feasibility Criteria

1	Is project large or small? (as defined by Table VIII.2) circle one	Large	Small (circled)	
2	What is the tributary area to the BMP?	A	0.72	acres
3	What type of BMP is proposed?	Biotreatment System		
4	What is the infiltrating surface area of the proposed BMP?	A_{BMP}	240	sq-ft
5	What land use activities are present in the tributary area (list all) Commercial restaurant with drive through			
6	What land use-based risk category is applicable?	L (circled)	M	H
7	If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all): Full trash capture system will be implemented to satisfy State Board requirements			
8	What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section VIII.2 (circle one)	5 ft	10 ft (circled)	
9	Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater: The project site mounded seasonally high ground water level is approximately 30 feet and the infiltration BMP depth is 5 feet which equates to a 25 foot separation. According to Section VIII.2, "if the mounded seasonally high ground water level is greater than 15 feet, the depth of groundwater does not constrain infiltration". Therefore, the minimum separation of a 5 foot deep BMP and a 15 foot groundwater level is 10 feet.			
10	What is separation from the infiltrating surface to seasonally high groundwater?	SHGWT	25	ft
11	What is separation from the infiltrating surface to mounded seasonally high groundwater?	Mounded SHGWT		ft
12	Describe assumptions and methods used for mounding analysis: N/A			
13	Is the site within a plume protection boundary (See Figure	Y	N (circled)	N/A

Worksheet I: Summary of Groundwater-related Feasibility Criteria

	VIII.2)?	
14	Is the site within a selenium source area or other natural plume area (See Figure VIII.2)?	Y (N) N/A
15	Is the site within 250 feet of a contaminated site?	Y (N) N/A
16	If site-specific study has been prepared, provide citation and briefly summarize relevant findings: N/A	
17	Is the site within 100 feet of a water supply well, spring, septic system?	Y (N) N/A
18	Is infiltration feasible on the site relative to groundwater-related criteria?	Y (N)
Provide rationale for feasibility determination: N/A		

Note: if a single criterion or group of criteria would render infiltration infeasible, it is not necessary to evaluate every question in this worksheet.

Attachment F
Geotechnical Report

UNIVERSAL
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Geotechnical Engineering Report

Proposed McDonalds Restaurant
2109 E Santa Clara Avenue
Santa Ana, California 92705

Prepared for:
McDonald's USA
18565 Jamboree Road, Ste. 850
Irvine, CA 92612

November 4, 2021

Project No.: 4230.2100035.0000

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Geotechnical Engineering
Construction Materials Testing & Inspection
Building Code Compliance
Occupational Health & Safety
Environmental
Building Envelope

November 4, 2021
Project No. 4230.2100035.0000

Ms. Christine Cho
McDonalds USA
18565 Jamboree Road, Ste. 850
Irvine, CA 92612

Subject: Geotechnical Engineering Report
Proposed McDonald's Restaurant
2109 E Santa Clara Avenue,
Santa Ana, California 92705

Dear Ms. Cho:

In accordance with your request and authorization, we are presenting the results of our geotechnical investigation for the proposed project located at 2109 E Santa Clara Avenue in the city of Santa Ana, California 92705. The purpose of this investigation has been to evaluate the subsurface conditions at the site and to provide geotechnical engineering recommendations for the proposed construction.

Based on our findings, the proposed project is geotechnically feasible, provided that the recommendations in this report are incorporated into the design and are implemented during construction of the project. This report was prepared in accordance with the requirements of the 2019 California Building Code.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES

Nadim Sunna, MS, PE, GE 3172
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
NADIM T SUNNA
Type text here
GE 3172
GEOTECHNICAL
STATE OF CALIFORNIA

Alexia Mackey
Staff Scientist

Distribution: one PDF document via email to Addressee

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1. INTRODUCTION

This report presents the results of our geotechnical engineering evaluation performed for the proposed single story at-grade McDonald's restaurant and parking lot at 2109 E Santa Clara Avenue, Santa Ana, California (Figure 1, Site Location Map). The purpose of this study has been to evaluate the subsurface conditions at the site and to provide geotechnical recommendations related to the design and construction of the proposed structures.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The project site is located at 2109 E Santa Clara Avenue in the City of Santa Ana, California as shown on Figure 1. At the time of exploration, the subject site was a residential plot with two houses and two detached garages. It is our understanding that the proposed project consists of the development of a single story at-grade McDonald's restaurant and parking lot. The approximate site coordinates are latitude 33.76749°N and longitude 117.83683°W and is located at approximately 188 feet above Mean Sea Level (MSL).

3. SCOPE OF WORK

To prepare this report, we have performed the following tasks:

3.1. Literature Review

We reviewed readily available background data including in-house geologic maps, topographic maps, and aerial photographs relevant to the subject site in preparation of this report. The list of documents reviewed is presented in the "References" section of this report.

3.2. Engineering Analyses and Report Preparation

We compiled and analyzed the data collected from our site reconnaissance, subsurface evaluation, and laboratory testing, and prepared this report to present our conclusions and recommendations, including:

- Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials
- Evaluation of site-specific seismic design parameters in accordance with 2019 California Building Code
- Evaluation of current and historic high groundwater conditions at the site and potential impact on the existing structures and site development
- Evaluation of project feasibility and suitability of on-site soils for foundation support
- Evaluation of foundation design parameters including soil bearing capacity, lateral resistance, friction coefficient, and seismic considerations
- Evaluation of the potential for the on-site materials to corrode buried concrete and metals

3.3. Field Exploration

The field exploration consisted of excavating five (5) 8-inch-diameter exploratory borings at various locations within the subject site on October 8, 2021. The borings were advanced to depths ranging from 5 to 21.5 feet below the existing grade. The drilling operation was performed using a hollow-stem auger drill rig. The borings were backfilled with the soil cuttings at the end of field exploration.

The approximate locations of the borings are shown on Figure 2 – Site Plan and Boring Location Map. Detailed exploration information of soil borings is presented in Appendix A.

3.4. Geotechnical Laboratory Testing

Laboratory tests were performed on selected samples obtained from the borings in order to aid in the soil classification and to evaluate the engineering properties of the foundation soils. Laboratory tests included in-situ moisture and density, #200 sieve wash, sieve analysis, Atterberg limits, direct shear tests, Expansion Index, consolidation, corrosion testing, and R-values. The detailed laboratory test results are presented in Appendix B.

4. SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1. Regional Geologic Setting

According to the preliminary geologic map of the Santa Ana Quadrangle (Morton, 2003), the project site is underlain by undifferentiated young alluvial deposit (map symbol: Qyf) that typically consists of unconsolidated to slightly consolidated, undissected to slightly dissected boulders, cobbles, gravels, sands, and silt deposits issued from a confined valley or canyon.

4.2. Subsurface Earth Materials

Earth materials encountered during our subsurface investigation consists of fill overlaying the young alluvial fan deposits (Qyf). In general, the soil consists of light brown to brown, dry to damp, medium dense to very dense, clayey and silty sands.

4.3. Groundwater

Groundwater was not encountered during our subsurface investigation to a maximum depth of 21.5 feet below the existing grade. Based on our review of nearby well data (Well337646N1178432W002), the highest groundwater level is reportedly situated at a depth of approximately 214 feet below the ground surface, which was recorded on March 12th, 2021. Historic high groundwater is 30 feet below the ground surface. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time as a consequence of seasonal and meteorological fluctuations, or of activities by humans at this and nearby sites. Based on our findings, we note that the potential for groundwater to impact the proposed improvements is considered low.

5. GEOLOGIC HAZARDS AND FINDINGS

5.1. Surface Fault Rupture

The subject site is not located within a State of California Alquist-Priolo Earthquake Fault Zone (formerly known as a Special Studies Zone) (CGS, 2018). No active faults are known to underlie or project towards the site. It is our opinion that the likelihood of fault rupture occurring at the site during the design life of the proposed improvements is low.

5.2. Liquefaction and Seismic Settlement Potential

Liquefaction occurs when the pore pressures generated within a soil mass approach the effective overburden pressure. Liquefaction of soils may be caused by cyclic loading such as that imposed by ground shaking during earthquakes. The increase in pore pressure results in a loss of strength, and the soil then can undergo both horizontal and vertical movements, depending on the site conditions. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity. Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion.

The current standard of practice, as outlined in the “Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California” and “Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California” requires liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

A review of the State of California Seismic Hazard Zone Map for the Orange Quadrangle indicates the site is not located within an area identified as having a potential for liquefaction. Additionally, based on the lack of shallow ground water, and uniform soil stratum, the potential for liquefaction to impact the proposed improvements is considered low.

5.3. Landslides

Based on our review of the referenced geologic maps, literature, topographic maps, aerial photographs, and our subsurface evaluation, no landslides or related features underlie or are adjacent to the subject site. Due to the relatively level and limited gradient changes of the site and surrounding areas, the potential for landslides at the project site is considered low to negligible.

5.4. Flooding

The Federal Emergency Management Agency (FEMA) has prepared flood insurance rate maps (FIRMs) for use in administering the National Flood Insurance Program. Based on our review of the FEMA (2008) flood map, the site is outside the 0.2% annual chance (500-year) floodplain.

5.5. Tsunamis and Seiches

Tsunamis are waves generated by massive landslides near or under sea water. The site is not located on any State of California – County of Orange Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is considered to be negligible because the site is located approximately 19 kilometers (12.0 miles) inland from the Pacific Ocean shore, at an elevation exceeding the maximum height of potential tsunami inundation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. The potential for the site to be adversely impacted by earthquake-induced seiches is considered to be low due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

6. GEOTECHNICAL ENGINEERING FINDINGS

6.1. Rippability

Based on our subsurface exploration of the site, the near-surface materials should be generally excavatable with heavy-duty earthwork equipment in good working condition.

6.2. Caving Potential

In general, the near surface sandy soils have a low to moderate potential for caving. We recommend that the geotechnical engineer should be notified immediately if severe caving conditions are encountered during excavations to provide further mitigation recommendations.

6.3. Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content the onsite fill consists of sandy silt within the soils encountered near the ground surface. Generally, this material exhibits “very low” expansion potential.

6.4. Corrosive Soils

The potential for the on-site materials to corrode buried steel and concrete improvements was evaluated. Laboratory testing was performed on representative soil samples to evaluate pH, minimum resistivity, and soluble chloride and sulfate contents. General recommendations to address the corrosion potential of the on-site soils are provided below. Imported fill materials, if used, should be tested to evaluate whether their corrosion potential is more severe than those assumed.

6.4.1. Sulfate Exposure

Laboratory tests indicate that the potential of sulfate attack on concrete in contact with the on-site soils is “negligible” or “S0” exposure in accordance with ACI 318, Table 19.3.1.1. Therefore, restriction on the type of cement, water to cement ratio, and compressive strength is not required from a geotechnical standpoint. Ferrous Metals

The results of the laboratory chemical tests performed on a sample of soil collected within the site indicate that the on-site soils are moderately corrosive to ferrous metals. Consequently, metal structures which will be in direct contact with the soil (i.e., underground metal conduits, pipelines, metal sign posts, etc.) and/or in close proximity to the soil (wrought iron fencing, etc.) may be subject to corrosion. The use of special coatings or cathodic protection around buried metal structures has been shown to be beneficial in reducing corrosion potential. Additional provisions will be required to address high chloride contents of the soil per the 2019 CBC to protect the concrete reinforcement. The laboratory testing program performed for this project does not address the potential for corrosion to copper piping. In this regard, a corrosion engineer should be consulted to perform more detailed testing and develop appropriate mitigation measures (if necessary).

6.5. Infiltration Testing

Two (2) preliminary percolation tests were performed on October 9, 2021, to evaluate the potential of infiltrating stormwater into the site soils and determine a preliminary design infiltration rate for initial design of the planned BMPs. The borings are shown on the attached Figure 2 – Site Plan and Boring Location Map, were excavated to depth of 5 feet below the existing grade. The infiltration test data was utilized to determine the preliminary design infiltration rates as provided in Table A below.

Table A: Preliminary Design Infiltration Rates Summary

Boring No.	Depth Below Existing Grade (feet)	Observed Infiltration Rates (inches/hour)
P-1	5	0.22
P-2	5	0.18

Based on our preliminary infiltration testing, we note that infiltration of stormwater into the site soils is deemed not feasible. Therefore, alternate means of storing and disposing of stormwater should be evaluated by the project civil engineer. Our percolation testing data is presented within Appendix C, Infiltration Test Result.

7. GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS

7.1. General Conclusion

Based on the results of our field exploration and engineering analyses, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided that the recommendations in this report are incorporated into the design plans and are implemented during construction.

The following is a summary of the geotechnical considerations for this project:

- Groundwater was not encountered during subsurface investigation, and it is not expected to impact the proposed development.

- Infiltration of stormwater into the site soils is deemed not feasible based on our preliminary testing.

- The site is not subject to liquefaction and associated liquefaction settlement due to the lack of shallow groundwater and uniform soil stratum.
- The potential for landslide, flooding, tsunami and seiches to impact the proposed improvement is considered low.
- The site is not located within an AP Zone, however, it is subject to intense ground shaking during a seismic event.
- The onsite near-surface soils are expected to exhibit a very low expansion potential.
- The onsite near-surface soils are considered to have negligible exposure to sulfate, however, are moderately corrosive to ferrous metals.
- We recommend that new foundations be embedded into engineered fill material.

Our geotechnical engineering analyses performed for this report were based on the earth materials encountered during the subsurface exploration for the site. If the design substantially changes, then our geotechnical engineering recommendations would be subject to revision based on our evaluation of the changes. The following sections present our conclusions and recommendations pertaining to the engineering design for this project.

7.2. Site Preparation and Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. UES should be contacted for questions regarding the recommendations or guidelines presented herein.

7.2.1. General Grading Recommendations

Site preparation should begin with the removal of utility lines, asphalt, concrete, vegetation, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside edges of the proposed excavation and fill areas. We recommend that unsuitable materials such as organic matter or oversized material be selectively removed and disposed offsite. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed at a legal dump site away from the project area.

7.2.2. Remedial Grading

Based on our field exploration and engineering analysis, we recommend that the new building foundations be supported on 2 feet of engineered fill material. On this basis, we recommend that the building pad be excavated to 2 feet below the bottom of the footings. The excavation should extend laterally a minimum of 2 feet from the edge of the new footings.

Pavement and/or sidewalk areas should be over-excavated to a depth of at least 12 inches below the bottom of the pavement section (i.e., aggregate base) whichever is lower. Deeper removals may be required in areas where soft, saturated, or unsuitable materials are encountered.

For trash enclosure and site walls foundations, we recommend that the foundations be supported on competent engineered fill.

The extent and depths of removal should be evaluated by soil engineer in the field based on the materials exposed. Additional removals may be recommended if loose or soft soils are exposed during grading.

7.2.3. Materials for Fill

On-site soils are suitable to be reused for compaction effort. However, the underlying alluvium with an organic content of less than 3 percent by volume (or 1 percent by weight) are suitable for use as fill. Soil material to be used as fill should not contain contaminated materials, rocks, or lumps over 4 inches in largest dimension, and not more than 40 percent larger than ¾ inch. Utility trench backfill material should not contain rocks or lumps over 3 inches in largest dimension. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or may be disposed offsite.

Any imported fill material should consist of granular soil having a “very low” expansion potential (that is, expansion index of 20 or less). Import material should also have low corrosion potential (that is, chloride content less than 500 parts per million [ppm], soluble sulfate content of less than 0.1 percent, and pH of 5.5 or higher). Materials to be used as fill should be evaluated by UES prior to importing or filling.

7.2.4. Compacted Fill

Prior to placement of compacted fill, the contractor should request an evaluation of the exposed excavation bottom by UES. Unless otherwise recommended, the exposed ground surface should then be scarified to a depth of approximately 6 inches and watered or dried, as needed, to achieve generally consistent moisture contents of 2 percent above optimum moisture content. The scarified materials should then be compacted to 90 percent relative compaction in accordance with the latest version of ASTM Test Method D1557.

Compacted fill should be placed in horizontal lifts of approximately 6 to 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve 2 percent above optimum moisture condition, mixed, and then compacted by mechanical methods, using sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other appropriate compacting rollers, to a relative compaction of 90 percent as evaluated by ASTM D1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved. Within pavement areas, the upper 12-inches of subgrade soil should be compacted to 95 percent relative compaction evaluated by ASTM D1557.

7.2.5. Temporary Excavations

Temporary excavations for the demolition, earthwork, footings, and utility trenches are expected to be up to 4 feet in height. Due to relatively loose condition of shallow onsite soils, temporary, unsurcharged excavation sides should be sloped no steeper than an inclination of 1H:1V (horizontal: vertical). Where sloped excavations are created, the tops of the slopes should be barricaded so that vehicles and storage loads do not encroach within 10 feet of the top of the excavated slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes. UES should be advised of such heavy vehicle loadings so that specific setback requirements can be established. If the temporary construction slopes are to be maintained during the rainy season, berms are recommended to be graded along the tops of the slopes in order to prevent runoff water from entering the excavation and eroding the slope faces.

UES should observe the excavations so that any necessary modifications based on variations in the encountered soil conditions can be made. All applicable safety requirements and regulations, including CalOSHA requirements, should be met.

7.3. Seismic Design Parameters

Our recommendations for seismic design parameters have been developed in accordance with 2019 CBC and ASCE 7-16 (ASCE, 2016) standards. The applicable site class is D based on the results of our field investigation. Table B: 2019 California Building Code Design Parameters presents the seismic design parameters for the site in accordance with 2019 CBC.

Table B: 2019 California Building Code Design Parameters

Design Parameters	Value
Site Class	D
Mapped Spectral Acceleration Parameter at Period of 0.2-Second, S_s	1.324 g
Mapped Spectral Acceleration Parameter at Period 1-Second, S_1	0.472 g
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.83
Adjusted MCE_R Spectral Response Acceleration Parameter at Short Period, S_{MS}	1.324 g
1-Second Period Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{M1}	0.864
Short Period Design Spectral Response Acceleration Parameter, S_{DS}	0.883
1-Second Period Design Spectral Response Acceleration Parameter, S_{D1}	0.576
Peak Ground Acceleration, PGA_M	0.609g
Seismic Design Category	D

Notes: Since the Site Class is designated as D and the S1 value is greater than or equal to 0.2, the 2019 CBC requires either a site-specific seismic hazard analysis per Section 21.2 of ASCE 7-16 or the application of Exception 2 of Section 11.4.8 of ASCE 7-16. The project structural engineer should apply all requirements of Section 11.4.8 of ASCE 7-16.

7.4. Foundation Recommendations

A shallow foundation system may be used for support of the proposed building, provided that all the footings are placed on engineered fill prepared as described in the "Remedial Grading" section of this report.

Our geotechnical foundation design parameters are presented in Table C: Geotechnical Design Parameters for Foundation, below.

Table C: Geotechnical Design Parameters for Foundation

Design Parameters	Values
Bearing Material	• Engineering Fill • See Remedial Grading section of this report.
Minimum Footing Dimensions	• At least 12 inches in width and at least 18 inches in depth.
Allowable Bearing Pressure	• An allowable bearing capacity of 2,500 psf may be used for the design of foundations found on engineered fill. • For miscellaneous and lightly-loaded auxiliary foundations such as trash enclosures, an allowable bearing pressure of 1,800 pounds per square foot (psf) may be used. • For light pole foundations that are embedded a minimum of 4 feet below the finish grade, an allowable bearing capacity of 3,000 psf may be used. • The allowable bearing values may be increased by one-third for transient loads from wind or earthquake.
Estimated Static Settlement	• Less than 1 inches total settlement with differential settlement estimated to be less than 0.5 inch over a span 30 feet.
Allowable Coefficient of Friction Below Footings	0.35
Unfactored Lateral Passive Resistance	250 pcf (equivalent fluid pressure) Maximum allowable of 2,500 psf

As mentioned above, the structural building loads are not provided to us at this time and since the settlement criteria may control the design, the allowable bearing pressure for the proposed foundation may be revisited for the final design, once loading data becomes available.

7.5. Concrete Slab-On-Grade

At minimum the building slab-on-grade should be at least 5 inches in thickness and should be reinforcement with a minimum of No. 4 bars spaced at 18 inches on-center. Final design of the slab should be provided by the project structural engineer.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder should comply with ASTM E 1745 Class A requirements. At minimum, the vapor retarder should consists of 15 mil Stegowrap or equivalent.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. Sand above the vapor retarder is outside of UES purview and should be in accordance with the structural engineer's recommendation.

UES does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore, it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure. Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection for concrete slabs-on-grade.

The recommendations presented above are intended to reduce the potential for cracking of slabs; however, even with the incorporation of the recommendations presented herein, slabs may still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics.

7.6. Flexible Pavement Design

Our pavement structural design is in accordance with Chapter 600 of the Caltrans Highway Design Manual, which is based on a relationship between the gravel equivalent (GE) of the pavement structural materials, the traffic index (TI), and the R-value of the underlying subgrade soil.

Based on an R-value test result of 17 and an assumed TI's of 4, 5.5 and 7, we have determined the minimum structural sections as provided within Table C below. The assumed R-value should be verified during rough grading by UES prior to placement of the aggregate base.

Table D – Recommended Minimum HMA and Base Section Thicknesses

Location	Parking Stalls	Drive Aisle	Firelane / Truck Driveway
Traffic Index	**4.0**	**5.5**	**7.0**
HMA Thickness (in)	4.0	4.0	6.0
Aggregate Base Thickness (in)	4.0	8.0	10.0

Prior to construction of the pavement sections provided above, the subgrade for the proposed pavement should be moisture conditioned to a depth of 12 inches and compacted to achieve 95 percent. The aggregate base section should then be placed, moisture conditioned to near optimum moisture content and compacted to achieve 95 percent relative compaction. The HMA section should be in accordance with the City of Santa Ana requirements and should be compacted to 95 percent relative compaction.

A representative of UES should be onsite to observe and test the subgrade, base and HMA sections.

7.7. Drainage Control

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be always maintained. All site drainage, with the exception of any required to disposed of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices.

The proposed structure should be provided with roof drainage. Discharge from downspouts, roof drains and scuppers should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

8. DESIGN REVIEW AND CONSTRUCTION MONITORING

Geotechnical review of plans and specifications is of paramount importance in engineering practice. The poor performance of many structures has been attributed to inadequate geotechnical review of construction documents. Additionally, observation of excavations will be important to the performance of the proposed development. The following sections present our recommendations relative to the review of construction documents and the monitoring of construction activities.

8.1. Plans and Specifications

The design plans and specifications should be reviewed by UES prior to bidding and construction, as the geotechnical recommendations may need to be reevaluated in the light of the actual design configuration and loads. This review is necessary to evaluate whether the recommendations contained in this report and future reports have been properly incorporated into the project plans and specifications. Based on the work already performed, this office is best qualified to provide such review.

8.2. Construction Monitoring

Site preparation, removal of unsuitable soils, assessment of imported fill materials, fill placement, foundation installation, and other site grading operations should be observed and tested. The substrata exposed during the construction may differ from that encountered in the test excavations. Continuous observation by a representative of UES during construction allows for evaluation of the soil conditions as they are encountered and allows the opportunity to recommend appropriate revisions where necessary.

The project engineer should be notified prior to exposure of subgrades. It is critically important that the engineer be provided with an opportunity to observe all exposed subgrades prior to burial or covering.

9. LIMITATIONS

The recommendations and opinions expressed in this report are based on information obtained from our field exploration for the site. In the event that any of our recommendations conflict with recommendations provided by other design professionals, we should be contacted to aid in resolving the discrepancy.

Due to the limited nature of our field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation and laboratory testing can be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during excavation operations, for example, the presence of unsuitable soil, and that additional effort may be required to mitigate them.

Site conditions, including groundwater elevation, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which UES has no control.

UES's recommendations for this site are, to a high degree, dependent upon appropriate quality control of foundation construction. Accordingly, the recommendations are made contingent upon the opportunity for UES to observe foundation excavations for the proposed construction. If parties other than UES are engaged to provide such services, such parties must be notified that they will be required to assume complete responsibility as the geotechnical engineer of record and the engineering geologist of record for the geotechnical phase of the project by concurring with the recommendations in this report and/or by providing alternative recommendations.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. UES should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report has been prepared for the exclusive use by the client and its agents for specific application to the proposed design and construction of the project described herein. Any party other than the client who wishes to use this report for an adjacent or nearby project, shall notify UES of such intended use. Land use, site conditions, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of this report and the nature of the project, UES may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or any other party will release UES from any liability resulting from the use of this report by any unauthorized party.

UES has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either expressed or implied, is made as to the conclusions and recommendations contained in this report.

10. SELECTED REFERENCES

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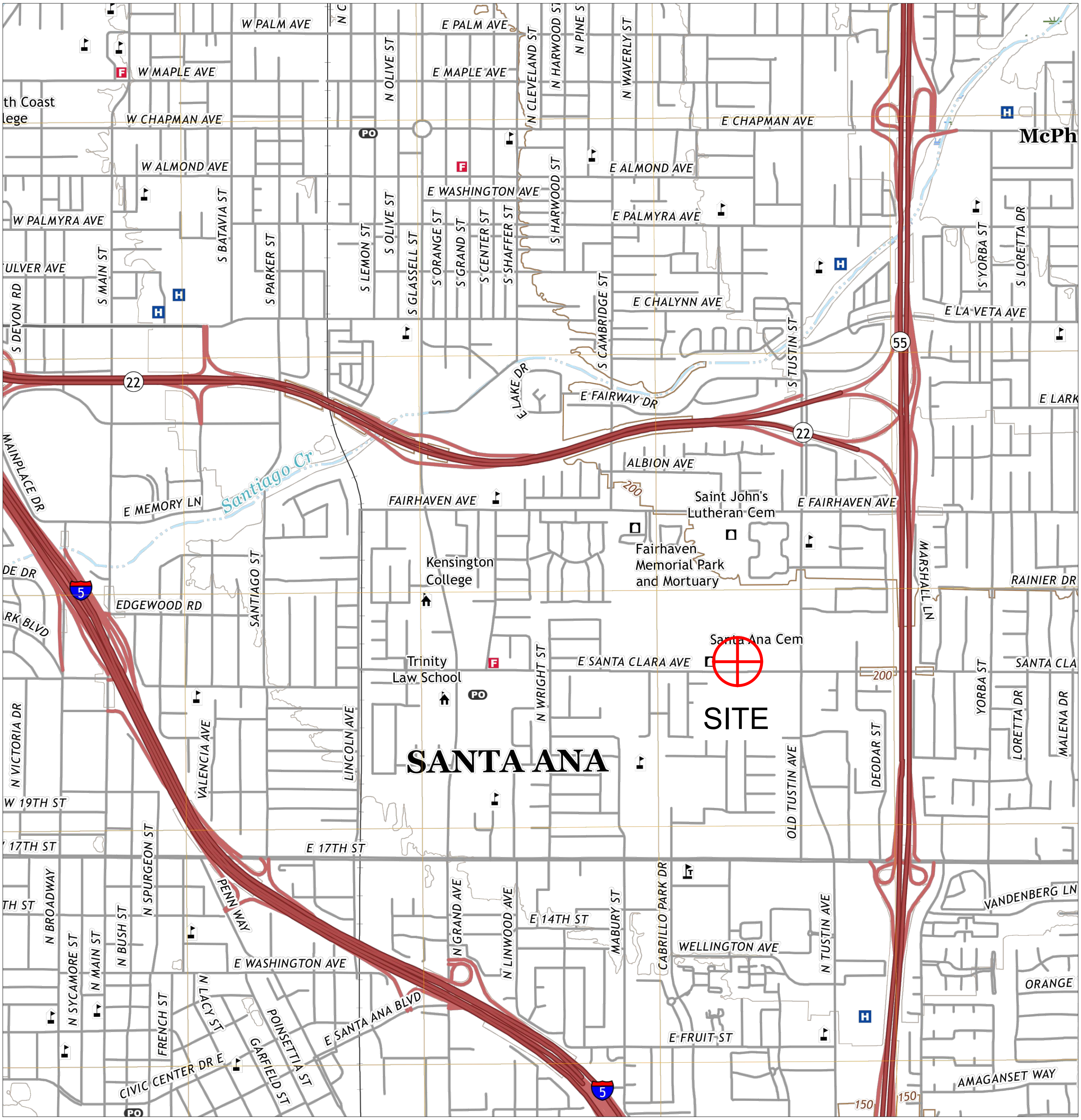
FIGURES



APPROXIMATE SITE LOCATION

N

SCALE IN FEET

0 1000' 2000'

REFERENCE: USGS "Orange 7.5-Minute Quadrangle" (2018)

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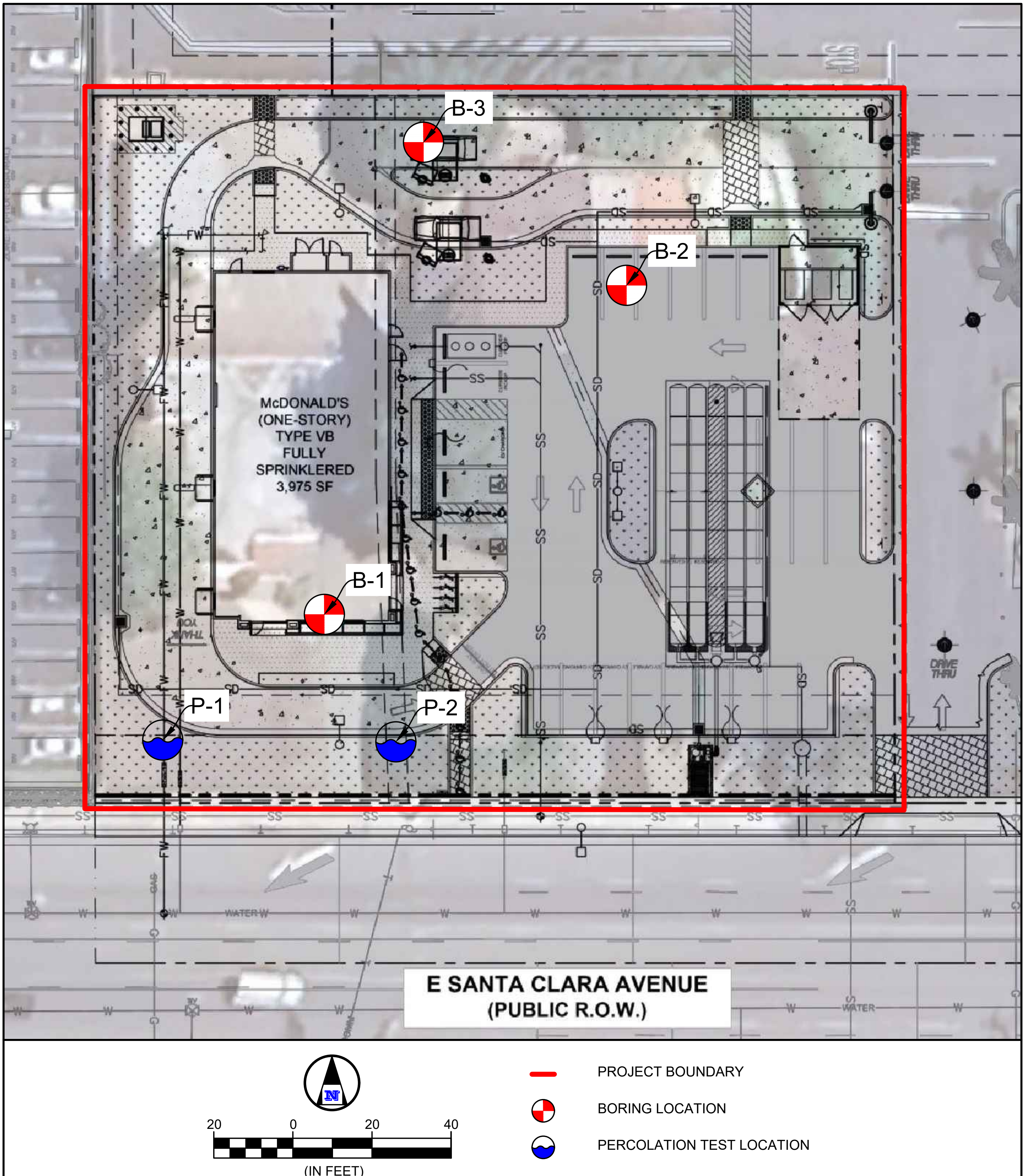
SITE VICINITY LOCATION MAP

McDonald's
2109 E Santa Clara Ave
Santa Ana, California

PROJECT NO.	REPORT DATE	FIGURE 1
4230.2100035.0000	October 2021	



UES	Exploration Map Santa Ana McDonalds 2109 Santa Clara Avenue Orange County, California	Date: 08-21-2023 Job No: 4230.2100035.0000 **Figure 2**

APPENDIX A
Field Exploration and Boring Logs

Appendix A
Field Exploration and Boring Logs

General

The subsurface exploration program for the proposed project consisted of logging five 8-inch diameter exploratory borings conducted at the site on October 8, 2021. The borings were advanced to a maximum depth of 21.5 feet below the existing grade. The drilling operation was performed using a limited access track-mounted CME-75 hollow-stem-auger drill rig.

Drilling and Sampling

The Boring Logs are presented in the following pages. The log also shows the boring number and drilling date. The borings were logged by a geologist using the Unified Soil Classification System. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual. Drive and bulk samples of representative earth materials were obtained from the borings.

Disturbed samples were obtained using a Standard Penetration Sampler (SPT). This sampler consists of a 2-inch O.D., 1.4-inch I.D. split barrel shaft that is advanced into the soil at the bottom of the drilled hole a total of 18 inches. The number of blows required to drive the sampler the final 12 inches is presented on the boring logs. Soil samples obtained by the SPT were retained in plastic bags.

A California modified sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 3-inch outside diameter (O.D.), 2.4-inch inside diameter (I.D.) split barrel shaft that was driven a total of 12-inches into the soil at the bottom of the boring by a safety hammer weighing 140 pounds at a drop height of approximately 30 inches. The soil was retained in brass rings for laboratory testing. Additional soil from each drive remaining in the cutting shoe was usually discarded after visually classifying the soil. The number of blows required to drive the sampler the final 12 inches is presented on the boring logs.

Upon completion of the borings, the boreholes were backfilled with soil from the cuttings.

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Universal Engineering Sciences
16 Technology Dr., Ste 139
Irvine, CA 92618
Telephone: 949-989-6940

BORING NUMBER B-1

CLIENT McDonald's USA
PROJECT NAME McDonalds Santa Ana Subsurface Investigations
PROJECT NUMBER 4230.2100035.0000
PROJECT LOCATION Santa Ana, CA
DATE STARTED 10/8/21 **COMPLETED** 10/8/21
GROUND ELEVATION 192 ft MSL **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Choice Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY GD **CHECKED BY** NS
AT END OF DRILLING ---
NOTES Backfilled with native clippings. No groundwater encountered.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	FINES CONTENT (%)
0		(SC) CLAYEY SAND trace gravel, light brown, dry to damp, medium dense, fine grained										
			GB	100								
			MC	100	11-16-16 (32)	1.0	111	4	25	14	11	
5		some gravel	SPT	100	5-5-6 (11)							35
		(SC) CLAYEY SAND WITH GRAVEL, dark yellow brown, dry, medium dense, fine grained	MC	100	11-12-15 (27)	1.5	113	5				44
10			SPT	100	9-6-7 (13)							
		no recovery	MC	0	50							
15		(SM) SILTY SAND WITH GRAVEL, light brown, dry, very dense. One big chunk of bedrock.	SPT	100	5-20-30 (50)							17
		no recovery	MC	0	33-25-35 (60)							
20		no recovery	SPT	0	50							

Bottom of borehole at 21.5 feet.

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BORING NUMBER B-2

CLIENT McDonald's USA
PROJECT NAME McDonalds Santa Ana Subsurface Investigations
PROJECT NUMBER 4230.2100035.0000
PROJECT LOCATION Santa Ana, CA
DATE STARTED 10/8/21 **COMPLETED** 10/8/21
GROUND ELEVATION 192 ft MSL **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Choice Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY GD **CHECKED BY** NS
AT END OF DRILLING ---
NOTES Backfilled with native clippings. No groundwater encountered.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(SC) CLAYEY SAND, light brown, dry to damp, stiff, fine grained										
			GB	100								
			MC	100	7-10-12 (22)	0.5	103	5				
5		trace gravel, medium dense	SPT	100	5-4-5 (9)							
			MC	100	7-17-19 (36)	1.0	114	4				
10			SPT	100	5-8-8 (16)							

Bottom of borehole at 11.5 feet.