September 25, 2025

County of San Bernardino
Planning Division
15900 Smoke Tree St. Suite 131
Hesperia, CA 92345

Subject: Tentative Tract Map No. 20781 Preliminary Drainage Report

TTM# 20781 is located in the City of Victorville, County of San Bernardino, California, on the Southwest corner of Green Tree Blvd. and 6th Street. TTM 20781 is a 20 acre (Gross) vacant land site and is proposed to be developed as a residential subdivision with 70 single family residential lots (3.5 dwelling units/ac). The natural terrain of the parcel flows in Northeasterly direction at a slope of approximately 2.0%.

Offsite tributary areas from the South, Southwest, West and East Area were quantified and the flows were quantified for 100-yr storm event (Refer to the attached Offsite Area Exhibit).

The following are the offsite areas, and the flows from 100-yr storm event drain through the site:

Area-1: From offsite area south and southwest: 16.5 acres, Q100: 33.3 cfs drain into proposed CB-1 (Sump Basin) in Talpa Street
Area-2: From offsite area to the west: 3.0 acres, Q100: 6.00 cfs drain to proposed V-gutter.

Area-3: From commercial lot to the east: 10.0 acres, Q100: 17.6 cfs drain into proposed CB-2 (Sump Basin) in 6th Street

Existing 2-36”CMP culvert: Q100: 168.0 cfs into the drainage structure onsite from offsite area to the west.

Total offsite flows drain into the site: 224.9 cfs

Onsite flow from 20.0 acre site: 39.0 cfs

Onsite flows from area to the east and west will be conveyed to the proposed two stage infiltration basin via the onsite storm drain system for water quality volume infiltration. Once the basin reaches its capacity and in a larger storm event the flow will drain out via 24” riser grate & outlet pipe into the proposed 36” RCP onsite which is carrying offsite flows from south and east (From CB-1, CB-2). Onsite and Offsite flows (from south, east & west) flows drain into the proposed drainage structure to the east of the basin and finally drain into the existing RCB culvert via proposed 48”RCP.

Offsite area from south, southwest (AREA-1) will be drain into the proposed sump catch basin (CB-1) (future catch basin) per tract no. 14132. The flow will then convey to the north via the 24” RCP into the proposed drainage structure to the east of the basin.

Offsite area from east, (AREA-3) will be drain into the proposed sump catch basin (CB-2). The flow will then convey to the northwest via the 24” RCP into the proposed drainage structure east of the basin.

Two existing 36”CMP culverts drain under Arrowhead Drive to the west of our site, and surface flow to the southwest corner of the site. We quantify the flow to the CMPs full capacity. Offsite flow from these two CMP culverts will be drain into a proposed drainage structure to the west of the two stage infiltration basin and drain into the proposed drainage structure to the east of basin via proposed 2-36” RCP.

A small offsite area (AREA-2) from west will sheet flow into the proposed V-gutter along the westerly property line and will drain into the proposed drainage structure at the northwest corner.

The combine offsite and onsite flow (estimated to be 263.9 cfs) will be drained out from the proposed drainage structure (east of the basin) into the existing two RCB Drain (3’H x 5’W) via proposed two 48” RCP which are to be joined with the existing RCBs. The flow will finally drain into the existing City storm drain system (Concrete trapezoid channel) across Green Tree Blvd. where the flow will follow the exiting drainage pattern (See Existing Site Map).

According to the Victorville Master Plan of Drainage, the proposed site is tributary to Line A-03 (See attached Comprehensive Storm Drain Plan Line A-03). Line A-03 confluences with the Oro Grande Wash and has a 100-year peak flow rate of 780-cfs with 550 acres contributing to this flow. The city does not entirely adhere to the master plan of drainage, much of the flow as supposed to come from the south, which tract 14132 has intercepted. The tract has already been rough graded and is currently under construction.

Ultimately, the runoff produced from the site, and the runoff from offsite tributary to the site, flows to the Mojave River. A Hydrology Exhibit accompanies this discussion to further illustrate the offsite tributary area and direction of flow.

If you have any questions, please feel free to contact me.

Sincerely,

Robert K. Allard

Robert K. Allard, P.E.
Principal
Allard Engineering
(909) 356-1815


EX. SD
EX. TRAPEZOIDAL CHANNEL (LINE A-03-01)
6th Ave & Green Tree Blvd
EX. CB
2-EX. RCB (3'H x5'W) CULVERT
SITE (~20 AC)
34.49803, -117.30917
Yates Rd
Green Tree Blvd
Oakmont Dr
Deauville Dr
Riviera Dr
Johnston Rd
Trinidad Dr
Victoria Dr
Greenbriar Dr
Greenwood Pl
Arrowhead Dr
Arroyo Dr
La Vila Dr
Rocca Ct
Warwick St
6th Ave
Talpa St
Elkins St
Maxwell Ct
Earl Way
Adams St
7th Ave
3rd Ave
Google Earth
© 2021 Google
1000 ft
N

OFFSITE AREA HYDROLOGY EXHIBIT

TALPA STREET

N.A.P.
APN 3090-031-

A.P.
APN 3090-031-07

N.A.P.
APN 3090-031-03

N.A.P.
APN 3090-011-01

YATES ROAD

GREEN TREE BOULEVARD

6TH AVENUE

FLOW FROM OFFSITE AREA-2: 6 CFS DRAIN TO 3'W V-GUTTER

3'W V-GUTTER

SITE BOUNDARY

FLOW VIA V-GUTTER: 6.0 CFS (FROM AREA-2)

TWO-STAGE INFILTRATION BASIN
BOTTOM BASIN-2
BOTTOM AREA= 6,204 SF
WATER DEPTH: 3.67, FB: 1.0'
BASIN CAPACITY: 31,867 CF

DRAINAGE STRUCTURE

FLOW FROM OFFSITE AREA VIA EX. 2-36" CMP CULVERT : 168.0 CFS

TWO-STAGE INFILTRATION BASIN
TOP BASIN-1
BOTTOM AREA= 8,171 SF
WATER DEPTH: 1.67, FB: 1.0'
BASIN CAPACITY: 6,046 CF

FLOW FROM OFFSITE AREA VIA EXISTING 2-36" CMP CULVERT, V-GUTTER Q100: 174.0 2-36" RCP

FLOW FROM OFFSITE AREA-1: 33.3 CFS 24" RCP

CONC. CHANNEL 5'Bx1'H, 5:1 SIDES)

PARKWAY DRAIN (14'Wx5"H)

EMMERGENCY SPILLWAY (5'Bx1'H, 5:1 SIDES) DRAIN TO STREET PARKWAY

CONC. SWALE 17.5'Wx7"H

GROUTED RIPRAP

24" RISER GRATE&OUTLET

2-48" RCP

EX. RCB DRAIN TO CONC. TRAP CHANNEL

EX. CONC. TRAP CHANNEL (LINE A-03-01)

HP: 2940.5

24" RCP ONSITE

2940.5 FS
Q_{100} = 12.2 CFS
1

2938.0 FS
Q_{100} = 39.0 CFS
2

DRAINAIGE TRANSITION STRUCTURE TOTAL FLOW: Q100= 207.1 CFS

FLOW FROM OFFSITE AREA-4: 17.6 CFS 24" RCP

FLOW FROM OFFSITE AREA-1: 33.3 CFS DRAIN TO CB-1 (SUMP BASIN, 6'W)

CB-1

CB-2

FLOW FROM OFFSITE AREA-3: 17.6 CFS DRAIN TO CB-2 (SUMP BASIN 5'W)

2963.5 FS
Q_{100} = 00.0 CFS
0

3.5 DU/AC | 5.3 | 954

3.5 DU/AC | 4.2 | 520

3.5 DU/AC | 10.5 | 520

TRACT NO. 8195
M.B. 106/51-53

2-(3'Wx5'W) Ex. RCB

LOT "A"

LOT "B"

LOT "C"

LOT "D"

LOT "E"

LOT "F"

LOT "G"

LOT "H"

LOT "I"

LOT "J"

LOT "K"

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LOT "M"

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LOT "P"

LOT "Q"

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LOT "V"

LOT "W"

LOT "X"

LOT "Y"

LOT "Z"

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LOT "AB"

LOT "AC"

LOT "AD"

LOT "AE"

LOT "AF"

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LOT "AH"

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LOT "AK"

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LOT "VP"

LOT "VQ"

LOT "VR"

LOT "VS"

LOT "VT"

LOT "VU"

LOT "VV"

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LOT "VX"

LOT "VY"

LOT "VZ"

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LOT "XU"

LOT "XV"

LOT "XW"

LOT "XX"

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LOT "XZ"

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LOT "YC"

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LOT "YE"

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LOT "ZO"

LOT "ZP"

LOT "ZQ"

LOT "ZR"

LOT "ZS"

LOT "ZT"

LOT "ZU"

LOT "ZV"

LOT "ZW"

LOT "ZX"

LOT "ZY"

LOT "ZZ"

I-15 FREEWAY

YATES ROAD

ARROWHEAD AVENUE

GREEN TREE BLVD

6TH AVENUE

PROJECT LOCATION

N

VICINITY MAP
NOT TO SCALE

INF. BASIN LATITUDE & LONGITUDE
34.41546° N, -117.39006° W

NODE — 0 — 2940 FS, Q_{100} = 20.0 CFS

ELEVATION

100 YEAR DEVELOPED STORM FLOW RATE

DEVELOPED CONDITION

DWELLING UNIT 39/AC, & COMMERCIAL

DWELLING UNIT PER AC RESIDENTIAL

FLOW PATH LENGTH

DRAINAGE SUB-AREA — 3.5 DU/AC | 4.2 | 520

SITE LATITUDE & LONGITUDE
34.41465° N, -117.39258° W

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 INCH = 60 FT.

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CITY OF VICTORVILLE, CALIFORNIA

ONSITE DRAINAGE EXHIBIT
TTM# 20781

Filename: I:\Grand Pacific Communities - 339\Green Tree Blvd\DWG's\ENTITLEMENT\EXHIBITS\DRAINAGE EXHIBIT 9-24-25.dw

RATIONAL METHOD HYDROLOGY ANALYSIS
ONSITE, 100-YR STORM EVENT

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************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1400

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* GREEN TREE TRACT*
* PEAK FLOW-100YR STORM EVENT                                           *
* DEVELOPED CONDITION                                                   *
 ************************************************************************

  FILE NAME: VIC.DAT
  TIME/DATE OF STUDY: 20:59 06/02/2025
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      1.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   954.00
  ELEVATION DATA: UPSTREAM(FEET) =   2963.50  DOWNSTREAM(FEET) =   2940.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.498
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.815
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        5.30      0.42     0.600    76   13.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA RUNOFF(CFS) =     12.22
  TOTAL AREA(ACRES) =      5.30   PEAK FLOW RATE(CFS) =     12.22

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2940.50  DOWNSTREAM ELEVATION(FEET) = 2938.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   3.85   Tc(MIN.) =   17.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.421
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.20      0.42     0.600    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    8.19
  EFFECTIVE AREA(ACRES) =      9.50    AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        9.5        PEAK FLOW RATE(CFS) =      18.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  2.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      2.00 =    1474.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.421
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.50      0.42     0.600    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.42
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   20.48
  EFFECTIVE AREA(ACRES) =     20.00   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       20.0       PEAK FLOW RATE(CFS) =      39.01
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       20.0  TC(MIN.) =     17.35
  EFFECTIVE AREA(ACRES) =     20.00  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.42  AREA-AVERAGED Ap = 0.600
  PEAK FLOW RATE(CFS)   =      39.01
```

```
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY ANALYSIS
OFFSITE AREA (AREA-1, AREA-2, AREA-3)


FLOW FROM EXISTING 2-36" CMP CULVERT : 168.0 CFS
3.0 AC
6.0 CFS
(2 CFS/AC)
DRAIN TO EX SWALE
AREA-2
AREA FROM WEST (3.0 AC)
1.0 AC
COMM
DRAIN TO NODE 2
FS 2969.0
Q100: 33.3 cfs
[2]
5.5 AC
COMM
L=630'
NODE 1 TO 2
AREA-1
AREA FROM SOUTH & SOUTHWEST & NORTH (16.5 AC)
10.0 AC
4-5 DU/AC
L=916'
FS 2977.0
Q100: 22.2 cfs
[1]
HP 2985.0
[0]
FS 2965.0
Q100: 17.6 cfs
[11]
5.0 AC
COMM
ADDED TO NODE
AREA-3
AREA FROM EAST (10 AC)
5.0 AC
BARREN
L=725'
NODE 10 TO 11
FS 2967.0
Q100: 0.0 cfs
[10]
Wimbleton Dr
Green Tree Blvd
Joe's Liquor
Warwick St
Elkins St
Greyrock St
Oak Ct
Ottawa St
Mesa Largo St
Cypress Ave
Arrowhead Dr
La Villa Dr
Arroyo Dr
Sixth Ave
Dean Ave
Nathan's Bluetooth Speakers
Google Earth
OFFSITE AREA HYDROLOGY EXHIBIT

```
************************************************************************
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                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* OFFSITE AREA 1                                                        *
* PEAK FLOW CALC                                                        *
* 100-YR STORM                                                          *
 ************************************************************************

  FILE NAME: OFFSITE1.DAT
  TIME/DATE OF STUDY: 15:41 06/03/2025
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  36.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      1.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   916.00
  ELEVATION DATA: UPSTREAM(FEET) =   2985.00  DOWNSTREAM(FEET) =   2977.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       C       10.00      0.27     0.500    86   15.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
```

```
  SUBAREA RUNOFF(CFS) =     22.22
  TOTAL AREA(ACRES) =     10.00   PEAK FLOW RATE(CFS) =     22.22

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2977.00  DOWNSTREAM(FEET) =   2969.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   630.00   CHANNEL SLOPE =  0.0127
  CHANNEL FLOW THRU SUBAREA(CFS) =      22.22
  FLOW VELOCITY(FEET/SEC) =   3.47 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =   18.39
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      2.00 =    1546.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.338
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        5.50      0.27      0.100    86
  COMMERCIAL                C        1.00      0.27      0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     6.50      SUBAREA RUNOFF(CFS) =   13.52
  EFFECTIVE AREA(ACRES) =     16.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.27  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       16.5       PEAK FLOW RATE(CFS) =      33.34
```

```
************************************************************************
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                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* OFFSITE AREA-3 FROM EAST                                                *
* 100-YR STORM                                                            *
*                                                                         *
 *************************************************************************

  FILE NAME: OFFSITE2.DAT
  TIME/DATE OF STUDY: 15:38 06/03/2025
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   725.00
  ELEVATION DATA: UPSTREAM(FEET) =   2967.00  DOWNSTREAM(FEET) =   2965.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   23.777
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.004
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   C        5.00      0.06     1.000    98   23.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.06
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
  SUBAREA RUNOFF(CFS) =      8.74
  TOTAL AREA(ACRES) =      5.00   PEAK FLOW RATE(CFS) =      8.74

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.004
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        5.00      0.27     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.27
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    8.90
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.08  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      17.63
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.0  TC(MIN.) =     23.78
  EFFECTIVE AREA(ACRES) =     10.00  AREA-AVERAGED Fm(INCH/HR)=  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.08  AREA-AVERAGED Ap = 0.550
  PEAK FLOW RATE(CFS)   =      17.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDRAULIC CALCULATION

```
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------------------------------------------------------------------------
  TIME/DATE OF STUDY: 14:14 09/26/2025
========================================================================
 Problem Descriptions:
  SUMP CB-1 SIZING
  CB-1 SUMP
************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
------------------------------------------------------------------------

    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =   33.30
    BASIN OPENING(FEET) =  0.42
    DEPTH OF WATER(FEET) =  2.00

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =      11.22

========================================================================
```

```
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--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 10:27 06/02/2025
==========================================================================
 Problem Descriptions:
  SUMP BASIN FOR EAST AREA ONSITE
  CB-2 SUMP
**************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
--------------------------------------------------------------------------

    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =   17.60
    BASIN OPENING(FEET) =  0.45
    DEPTH OF WATER(FEET) =  2.50

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =       4.86

==========================================================================
```

```
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```

2-36" CMP
CAPACITY: 168.0 CFS

```
--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 08:47 05/29/2025
==========================================================================
 Problem Descriptions:
  36" CMP Full Flow Capacity Calc


**************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   3.000
    FLOWDEPTH(FEET) =   2.700
    PIPE SLOPE(FEET/FEET) =  0.0100
    MANNINGS FRICTION FACTOR = 0.011000
    >>>>> NORMAL DEPTH FLOW(CFS) =     84.01
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      2.70
    FLOW AREA(SQUARE FEET) =      6.70
    FLOW TOP-WIDTH(FEET) =     1.800
    FLOW PRESSURE + MOMENTUM(POUNDS) =         2574.24
    FLOW VELOCITY(FEET/SEC.) =          12.538
    FLOW VELOCITY HEAD(FEET) =           2.441
    HYDRAULIC DEPTH(FEET) =      3.72
    FROUDE NUMBER =     1.145
    SPECIFIC ENERGY(FEET) =            5.14
==========================================================================
```

```
**************************************************************************
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                          Analysis prepared by:

                  +-------------------------+
                  | V-GUTTER TO THE         |
                  | WEST PROPERTY LINE      |
                  +-------------------------+
--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 22:52 05/29/2025
==========================================================================
 Problem Descriptions:
  V-gutter sizing


**************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =   1.50
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    1.00
            Z2(HORIZONTAL/VERTICAL) =    1.00
    BASEWIDTH(FEET) =     0.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.005000
    MANNINGS FRICTION FACTOR = 0.0150
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    >>>>> NORMAL DEPTH FLOW(CFS) =     10.33
    FLOW TOP-WIDTH(FEET) =         3.00
    FLOW AREA(SQUARE FEET) =           2.25
    HYDRAULIC DEPTH(FEET) =     0.75
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     4.59
    UNIFORM FROUDE NUMBER =    0.934
    PRESSURE + MOMENTUM(POUNDS) =          162.05
    AVERAGED VELOCITY HEAD(FEET) =      0.327
    SPECIFIC ENERGY(FEET) =      1.827
==========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         2.92
    CRITICAL FLOW AREA(SQUARE FEET) =           2.13
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.73
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     4.84
    CRITICAL DEPTH(FEET) =     1.46
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          161.68
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.364
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      1.824
==========================================================================
```

```
************************************************************************
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------------------------------------------------------------------------
  TIME/DATE OF STUDY: 17:04 06/04/2025
========================================================================
 Problem Descriptions:
  24" SD CAPACITY CALC


************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   2.000
    FLOWDEPTH(FEET) =   1.900
    PIPE SLOPE(FEET/FEET) =  0.0100
    MANNINGS FRICTION FACTOR = 0.013000
    >>>>> NORMAL DEPTH FLOW(CFS) =     24.31
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      1.90
    FLOW AREA(SQUARE FEET) =      3.08
    FLOW TOP-WIDTH(FEET) =     0.872
    FLOW PRESSURE + MOMENTUM(POUNDS) =          548.32
    FLOW VELOCITY(FEET/SEC.) =           7.885
    FLOW VELOCITY HEAD(FEET) =           0.965
    HYDRAULIC DEPTH(FEET) =      3.54
    FROUDE NUMBER =     0.739
    SPECIFIC ENERGY(FEET) =            2.87
========================================================================
```

```
************************************************************************
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                           Analysis prepared by:



------------------------------------------------------------------------
  TIME/DATE OF STUDY: 16:49 05/20/2025
========================================================================
 Problem Descriptions:
  36" RCP capacity calc


************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   3.000
    PIPE SLOPE(FEET/FEET) =  0.0100
    PIPEFLOW(CFS) =        54.10
    MANNINGS FRICTION FACTOR = 0.015000
========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    CRITICAL DEPTH(FEET) =      2.39
    CRITICAL FLOW AREA(SQUARE FEET) =     6.034
    CRITICAL FLOW TOP-WIDTH(FEET) =   2.417
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         1348.42
    CRITICAL FLOW VELOCITY(FEET/SEC.) =     8.966
    CRITICAL FLOW VELOCITY HEAD(FEET) =            1.25
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      2.50
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =            3.64
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      2.30
    FLOW AREA(SQUARE FEET) =      5.82
    FLOW TOP-WIDTH(FEET) =     2.535
    FLOW PRESSURE + MOMENTUM(POUNDS) =         1351.15
    FLOW VELOCITY(FEET/SEC.) =           9.294
    FLOW VELOCITY HEAD(FEET) =           1.341
    HYDRAULIC DEPTH(FEET) =      2.30
    FROUDE NUMBER =     1.081
    SPECIFIC ENERGY(FEET) =            3.64
========================================================================
```

```
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                           Analysis prepared by:



------------------------------------------------------------------------
  TIME/DATE OF STUDY: 16:49 05/20/2025
========================================================================
 Problem Descriptions:
  36" RCP capacity calc


************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   3.000
    PIPE SLOPE(FEET/FEET) =  0.0100
    PIPEFLOW(CFS) =        54.10
    MANNINGS FRICTION FACTOR = 0.015000
========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    CRITICAL DEPTH(FEET) =      2.39
    CRITICAL FLOW AREA(SQUARE FEET) =     6.034
    CRITICAL FLOW TOP-WIDTH(FEET) =   2.417
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         1348.42
    CRITICAL FLOW VELOCITY(FEET/SEC.) =     8.966
    CRITICAL FLOW VELOCITY HEAD(FEET) =            1.25
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      2.50
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =            3.64
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      2.30
    FLOW AREA(SQUARE FEET) =      5.82
    FLOW TOP-WIDTH(FEET) =     2.535
    FLOW PRESSURE + MOMENTUM(POUNDS) =         1351.15
    FLOW VELOCITY(FEET/SEC.) =           9.294
    FLOW VELOCITY HEAD(FEET) =           1.341
    HYDRAULIC DEPTH(FEET) =      2.30
    FROUDE NUMBER =     1.081
    SPECIFIC ENERGY(FEET) =            3.64
========================================================================
```

```
************************************************************************
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                          Analysis prepared by:



------------------------------------------------------------------------
  TIME/DATE OF STUDY: 13:45 09/26/2025
========================================================================
 Problem Descriptions:
  48" RCP with S=0.01 capacity calc


************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
------------------------------------------------------------------------
    PIPE DIAMETER(FEET) =   4.000
    FLOWDEPTH(FEET) =   3.600
    PIPE SLOPE(FEET/FEET) =  0.0100
    MANNINGS FRICTION FACTOR = 0.015000
    >>>>> NORMAL DEPTH FLOW(CFS) =    132.68
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =      3.60
    FLOW AREA(SQUARE FEET) =     11.91
    FLOW TOP-WIDTH(FEET) =     2.400
    FLOW PRESSURE + MOMENTUM(POUNDS) =         4127.35
    FLOW VELOCITY(FEET/SEC.) =          11.138
    FLOW VELOCITY HEAD(FEET) =           1.926
    HYDRAULIC DEPTH(FEET) =      4.96
    FROUDE NUMBER =     0.881
    SPECIFIC ENERGY(FEET) =            5.53
========================================================================
```

```
*****************************************************************************
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                           Analysis prepared by:

                          V-GUTTER TO THE
                          WEST PROPERTY LINE

-----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 11:49 09/25/2025
=============================================================================
 Problem Descriptions:
  Street Flow capacity (R/W)


*****************************************************************************
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
    CONSTANT STREET GRADE(FEET/FEET) = 0.010000
    CONSTANT STREET FLOW(CFS) =   20.00
    AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
    CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) =   30.00
    DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   20.00
    INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
    OUTSIDE  STREET CROSSFALL(DECIMAL) = 0.020000
    CONSTANT SYMMETRICAL CURB HEIGHT(FEET) =   0.50
    CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) =   1.50
    CONSTANT SYMMETRICAL GUTTER-LIP(FEET) =  0.03125
    CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) =  0.12500
    FLOW ASSUMED TO FILL STREET EVENLY ON BOTH SIDES
=============================================================================
    STREET FLOW MODEL RESULTS:
-----------------------------------------------------------------------------
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   17.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY =    1.45
=============================================================================
```

```
*****************************************************************************
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                          Analysis prepared by:




-----------------------------------------------------------------------------
  TIME/DATE OF STUDY: 10:49 09/29/2025
=============================================================================
 Problem Descriptions:
 CONC CHANNEL FOR ONSITE FLOW DRAIN
 INTO THE PARKWAY DRAIN

*****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
    NORMAL DEPTH(FEET) =   0.58
    CHANNEL Z1(HORIZONTAL/VERTICAL) =   15.00
            Z2(HORIZONTAL/VERTICAL) =   15.00
    BASEWIDTH(FEET) =     0.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.020000
    MANNINGS FRICTION FACTOR = 0.0150
=============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH FLOW(CFS) =     30.93
    FLOW TOP-WIDTH(FEET) =        17.40
    FLOW AREA(SQUARE FEET) =            5.05
    HYDRAULIC DEPTH(FEET) =     0.29
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     6.13
    UNIFORM FROUDE NUMBER =    2.006
    PRESSURE + MOMENTUM(POUNDS) =          428.22
    AVERAGED VELOCITY HEAD(FEET) =      0.583
    SPECIFIC ENERGY(FEET) =      1.163
=============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =        23.00
    CRITICAL FLOW AREA(SQUARE FEET) =           8.81
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.38
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     3.51
    CRITICAL DEPTH(FEET) =     0.77
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          350.84
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.191
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      0.958
=============================================================================
```

```
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                           Analysis prepared by:



------------------------------------------------------------------------
  TIME/DATE OF STUDY: 12:22 09/25/2025
========================================================================
 Problem Descriptions:
  REVERSE PARKWAY DRAIN SIZING


************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    0.00
            Z2(HORIZONTAL/VERTICAL) =    0.00
    BASEWIDTH(FEET) =    14.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.050000
    UNIFORM FLOW(CFS) =       39.00
    MANNINGS FRICTION FACTOR = 0.0150
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =   0.29
    FLOW TOP-WIDTH(FEET) =        14.00
    FLOW AREA(SQUARE FEET) =           4.09
    HYDRAULIC DEPTH(FEET) =     0.29
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     9.55
    UNIFORM FROUDE NUMBER =    3.114
    PRESSURE + MOMENTUM(POUNDS) =          758.65
    AVERAGED VELOCITY HEAD(FEET) =      1.415
    SPECIFIC ENERGY(FEET) =      1.707
========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =        14.00
    CRITICAL FLOW AREA(SQUARE FEET) =           8.73
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.62
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     4.47
    CRITICAL DEPTH(FEET) =     0.62
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          507.48
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.310
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      0.933
========================================================================
```

```
**************************************************************************
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                          Analysis prepared by:



--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 10:44 09/29/2025
==========================================================================
 Problem Descriptions:
  CONC CHANNEL SIZING

  ONSITE FLOW TO BASIN
**************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
--------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    5.00
            Z2(HORIZONTAL/VERTICAL) =    5.00
    BASEWIDTH(FEET) =     5.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.010000
    UNIFORM FLOW(CFS) =       39.00
    MANNINGS FRICTION FACTOR = 0.0150
==========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =   0.72
    FLOW TOP-WIDTH(FEET) =        12.23
    FLOW AREA(SQUARE FEET) =           6.23
    HYDRAULIC DEPTH(FEET) =     0.51
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     6.26
    UNIFORM FROUDE NUMBER =    1.547
    PRESSURE + MOMENTUM(POUNDS) =          594.13
    AVERAGED VELOCITY HEAD(FEET) =      0.609
    SPECIFIC ENERGY(FEET) =      1.332
==========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
--------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =        14.14
    CRITICAL FLOW AREA(SQUARE FEET) =           8.75
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.62
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     4.46
    CRITICAL DEPTH(FEET) =     0.91
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          546.71
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.308
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      1.223
==========================================================================
```

```
************************************************************************
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                          Analysis prepared by:

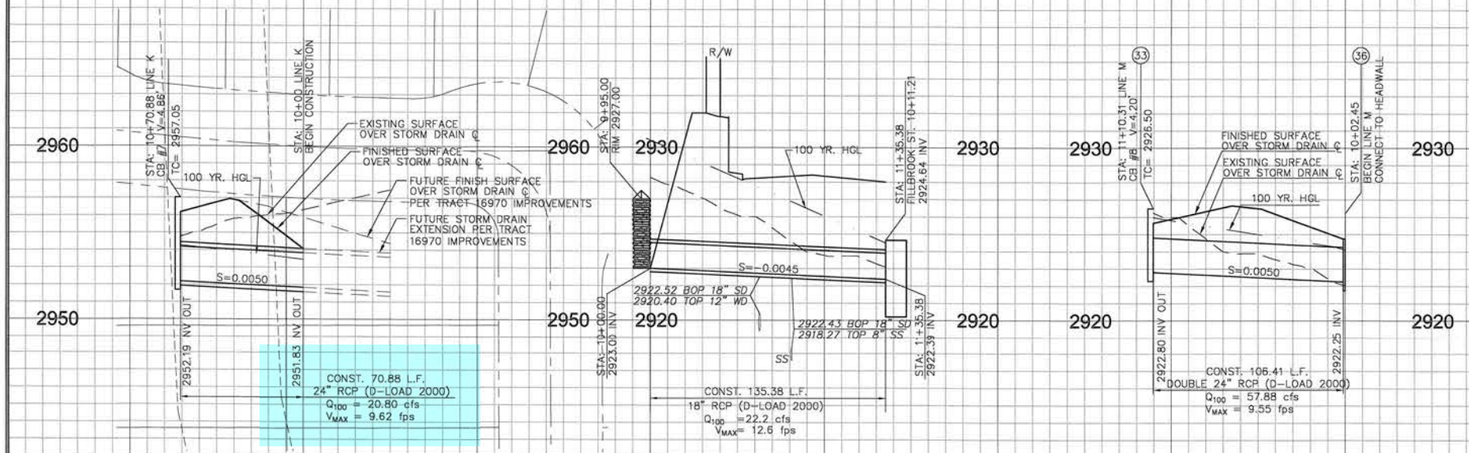


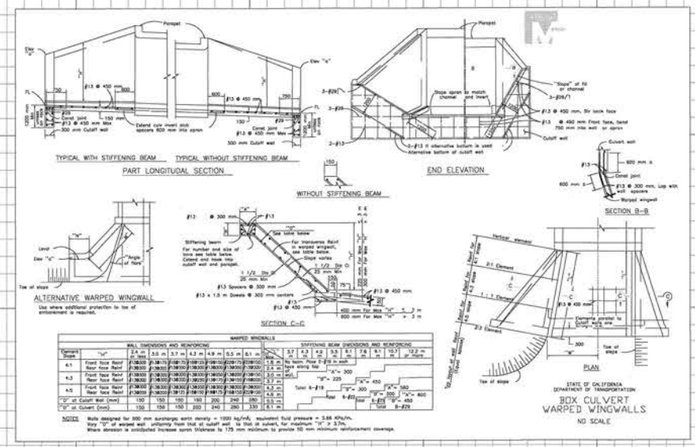
------------------------------------------------------------------------
  TIME/DATE OF STUDY: 08:21 09/25/2025
========================================================================
 Problem Descriptions:
  Emmergency spillway Sizing


************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =    5.00
            Z2(HORIZONTAL/VERTICAL) =    5.00
    BASEWIDTH(FEET) =     5.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.020000
    UNIFORM FLOW(CFS) =       52.70
    MANNINGS FRICTION FACTOR = 0.0150
========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =   0.71
    FLOW TOP-WIDTH(FEET) =        12.08
    FLOW AREA(SQUARE FEET) =            6.04
    HYDRAULIC DEPTH(FEET) =     0.50
    FLOW AVERAGE VELOCITY(FEET/SEC.) =     8.72
    UNIFORM FROUDE NUMBER =    2.173
    PRESSURE + MOMENTUM(POUNDS) =         1005.77
    AVERAGED VELOCITY HEAD(FEET) =      1.181
    SPECIFIC ENERGY(FEET) =      1.889
========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =        15.69
    CRITICAL FLOW AREA(SQUARE FEET) =          11.06
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.71
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =     4.76
    CRITICAL DEPTH(FEET) =     1.07
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          792.00
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =      0.352
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =      1.422
========================================================================
```

1.35*Q100= 52.7 cfs
Q100= 39.0 cfs

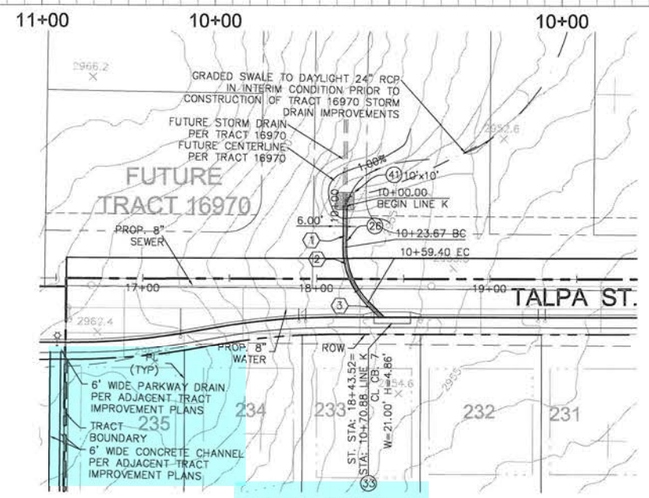
REFERENCE MATERIALS / PLANS

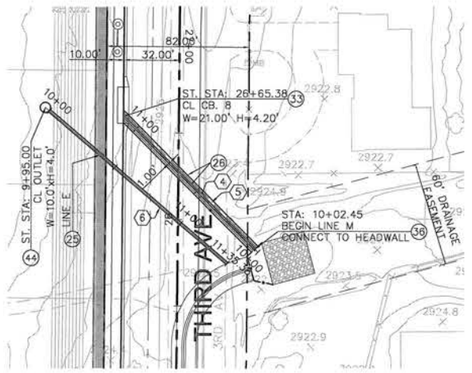




2004 Std PLAN D86A

SCALE:
HORIZ. 1"=40'
VERT. 1"=4'

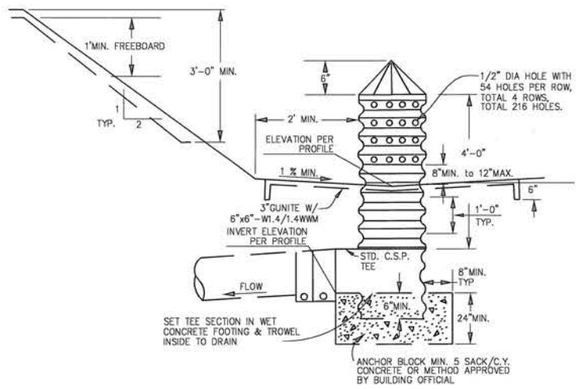




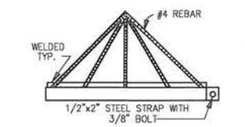
CONSTRUCTION NOTES

(25) CONSTRUCT 18" RCP (CLASS IV) D-LOAD PER PLAN
(26) CONSTRUCT 24" RCP (CLASS IV) D-LOAD PER PLAN
(31) CONSTRUCT MANHOLE PER APWA STD. DWG. NO. 320-1
(33) CONSTRUCT CATCH BASIN PER VVWD STD. DWG. NO. D-02, W=21', V PER PROFILE.
(36) CONSTRUCT HEADWALL STRUCTURE PER CALTRANS STD D86A
(41) CONSTRUCT 1/4 TON RIPRAP 30" DEEP SIZE PER PLAN
(44) DRAIN PIPE & RISER PER DETAIL, THIS SHEET.

CURVE / LINE DATA			
	DELTA/BRG.	R	L
(1)	N00°33'13"W	–	23.67'
(2)	45°29'16"	45.00'	35.73'
(3)	N46°02'29"W	–	11.48'
(4)	N45°32'59"W	–	106.31'
(5)	N45°32'59"W	–	109.39'
(6)	N50°17'44"W	–	138.38'



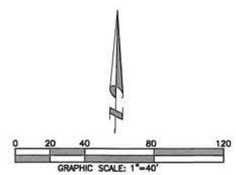
(44) DRAIN PIPE & RISER
NO SCALE
ORANGE COUNTY ENVIRONMENTAL MANAGEMENT AGENCY
MODIFIED STD. PLAN 1327 – DESILTING BASIN



GRATE ASSEMBLY DETAIL

1. THE MINIMUM PIPE RISER SHALL BE A 30" CORRUGATED STEEL PIPE (CSP), 14 GA., OR AN ALTERNATE APPROVED BY THE BUILDING OFFICIAL. RISER TO HAVE A CROSS-SECTIONAL AREA AT LEAST 1.5 TIMES THE CROSS- SECTIONAL AREA OF THE HORIZONTAL DRAIN PIPE.

2. THE MINIMUM DRAIN PIPE SHALL BE A 12" CSP, 14 GA., OR AN ALTERNATE APPROVED BY THE BUILDING OFFICIAL.



DIAL BEFORE YOU DIG 1-800-227-2600
DIGALERT
PLAY IT SAFE. DIAL BEFORE YOU DIG!
AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATING

REV	DATE	BY	DESCRIPTION	APPR

APPROVED
CITY OF VICTORVILLE
JOHN A. McGLADE, CITY ENGINEER — EXPIRES: 03-31-07
4-19-07 DATE
R.C.E. 40935

BENCHMARK
// V-102, NORTHWEST CORNER OF ARROWHEAD DR. & PETITE ST. @ APPROX. 3/4 DELTA; 1.7' BACK FROM CURB FACE ELEVATION = 2954.932'

LEGAL DESCRIPTION
A PORTION OF THE NORTH HALF OF THE SE 1/4 OF THE NW 1/4, SECTION 29, T5N, R4W, S.B.M.

BASIS OF BEARING
BEARINGS HEREON ARE BASED ON CALCULATED VALUES BETWEEN SAN BERNARDINO COUNTY SURVEYOR G.P.S. STATIONS 21300 (N/W COR. SEC. 28) AND 21308 (N/E COR. SEC. 28) ZONE 5, NAD '83 WHICH WERE UTILIZED AS HORIZONTAL CONTROL FOR THIS MAP. SAID CALCULATED VALUES PRODUCE A BEARING OF NORTH 00° 33' 00" WEST ON THE CENTERLINE MONUMENTS ALONG THIRD AVENUE AS SHOWN HEREON.

STATION:	NORTHING	EASTING
21300	2,005,001.873	6,768,817.836
21308	2,005,096.365	6,774,069.702

REGISTERED PROFESSIONAL ENGINEER JOSEPH E. DIETZ NO. 67032 EXP. 9-30-08 CIVIL STATE OF CALIFORNIA

TETRA TECH INC.
4120 E. JURUPA AVE., SUITE 206, ONTARIO, CA 91761
TEL (909) 390-8000 FAX (909) 390-8020

THESE PLANS WERE PREPARED UNDER MY SUPERVISION:
JOSEPH E. DIETZ R.C.E. 67032 EXP. DATE 9-30-08 — 3.16.07 DATE

STORM DRAIN IMPROVEMENT PLANS
TRACT 14132
OFFSITE STORM DRAIN
CITY OF VICTORVILLE, CALIFORNIA

JOB NO.	SHEET	OF
P09213-0002	4	5

SCALE	DATE	DRAWN BY	DESIGNED BY	FILE NO.
1" = 40'	03/16/07	VN	RFS	SD-PH1-04

P:\P09213\00002\Cadd\SD_PH1_04_PP.dwg 3/16/2007 10:32:13 AM PDT

NOTICE TO CONTRACTORS

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL PERMITS REQUIRED BY THE CITY OF VICTORVILLE IN ORDER TO DO THE WORK SHOWN ON THESE PLANS.
2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PROTECT SURVEYING MONUMENTS IN PLACE AND THE CONTRACTOR SHALL BE EMPIRICALLY RESPONSIBLE FOR RESETTING DAMAGED OR DESTROYED MONUMENTS.
3. WHEN ROUGH GRADING HAS BEEN ACCOMPLISHED, SOIL TESTS SHALL BE TAKEN PER THE STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS OF THE CITY OF VICTORVILLE.
4. ALL CONTRACTORS SHALL BE LICENSED IN ACCORDANCE WITH THE LAWS OF THIS STATE, AND ANY CONTRACTOR NOT SO LICENSED SHALL BE SUBJECT TO THE PENALTIES IMPOSED BY SUCH LAWS. CONTRACTOR SHALL POSSES THE APPROPRIATE LICENSE PRIOR TO AWARD OF CONTRACT.
5. AC ASPHALT CONCRETE IS TO BE PLACED DIRECTLY ON SUBSURFACE OF ROAD OR DRAINAGE FACILITIES. A SOIL STERILANT REGISTERED BY THE EPA FOR USE UNDER A.C. OR P.C.C. SEALS BE UNIFORMLY APPLIED AT THE MANUFACTURERS RECOMMENDED RATE FOR THE FULL PAVEMENT WIDTH FROM TO FACING.
6. ALL LABORATORY CUTS IN CITY MAINTAINED ROADWAYS SHALL BE TESTED TO VERIFY COMPACTION TO 90% RELATIVE COMPACTION (R.C.) AT VARYING DEPTHS TO WITHIN 0.5' SHALL BE PROVIDED TO 95%.
7. PRECEDING TRENCHING REMOVAL OF EXISTING PAVEMENT, PIPE OR CURB AND/OR GUTTER, THE CONTRACTOR SHALL DILIGENTLY PURSUE THIS PORTION OF WORK TO COMPLETION.
8. THE CONTRACTOR SHALL KEEP THE STREETS CLEAN UNTIL ACCEPTED BY THE CITY OF VICTORVILLE.
9. THE EXECUTION OF ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE PLANS, THE CITY OF VICTORVILLE DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS DATED APRIL 1976 AND CALTRANS STD. SPECS. & STD. DRGS. DATED JULY, 1992.
10. CONTRACTOR SHALL NOTIFY THE CITY OF VICTORVILLE, BUREAU OF ENGINEERING, INSPECTION SECTION (619) 955-5085, 48 HOURS PRIOR TO COMMENCING CONSTRUCTION AND AT LEAST 24 HOURS PRIOR TO ALL INSPECTIONS.
11. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES 48 HOURS PRIOR TO CONSTRUCTION OF THE IMPROVEMENTS SHOWN ON THESE PLANS.

A) SOUTHERN CALIFORNIA EDISON COMPANY
15305 HESPERIA RD. VICTORVILLE, CA 92392
TELEPHONE: (619) 951-5018

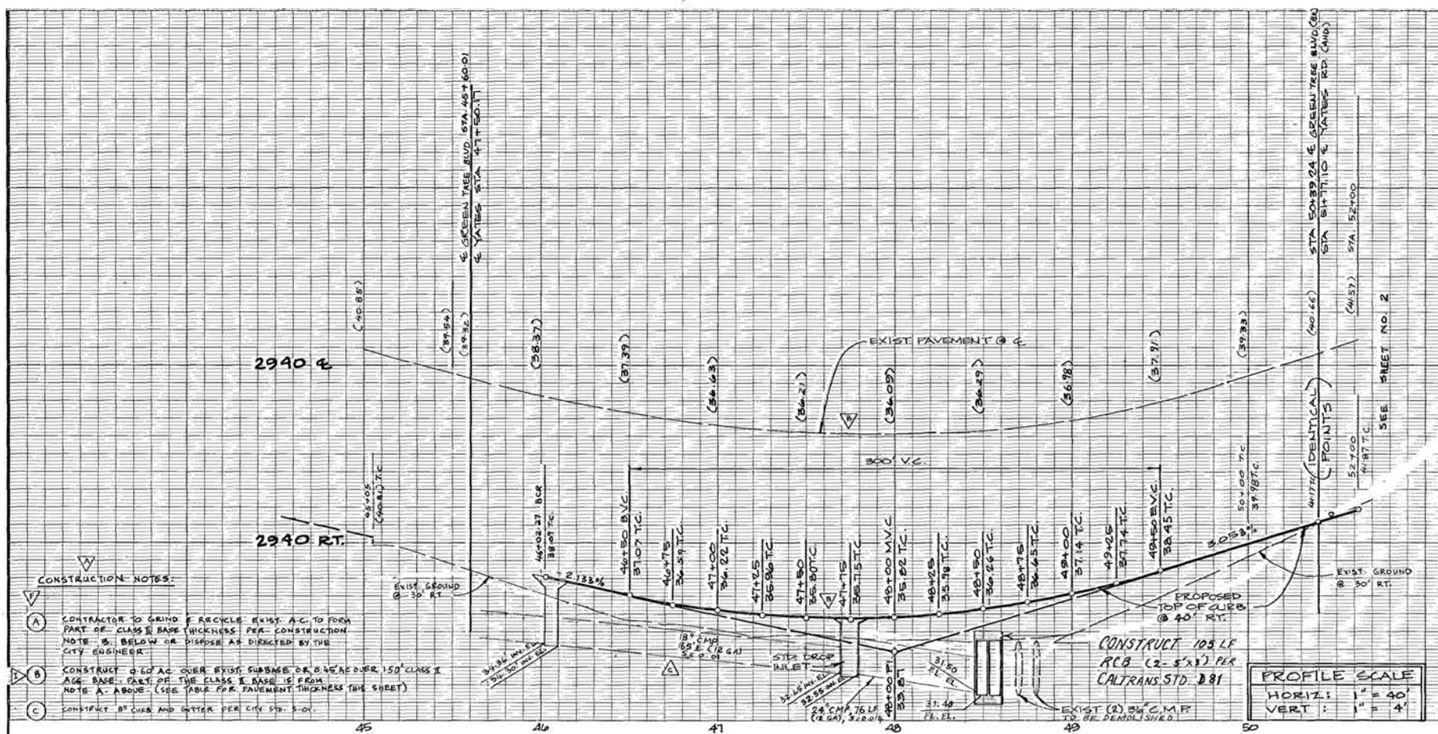
B) SOUTHWEST GAS CORPORATION
13671 MARIPOSA RD. VICTORVILLE, CA 92392
TELEPHONE: (619) 996-4688

C) CONTINENTAL TELEPHONE OF CALIFORNIA
16568 LA PAZ, VICTORVILLE, CA 92392
TELEPHONE: (619) 245-2455

D) VICTOR VALLEY COUNTY WATER DISTRICT
15075 7th, VICTORVILLE, CA
TELEPHONE: (619) 245-6426

E) GENERAL TELEPHONE
12940 BUSINESS CENTER DRIVE
VICTORVILLE, CA 92392
TELEPHONE: (619) 241-7848

12. ANY REVISIONS MADE TO APPROVED PLANS SHALL BE SUBJECT TO APPROVAL BY THE CITY ENGINEER.
13. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA (TELEPHONE: 1-800-422-4133) 48 HOURS PRIOR TO STARTING ANY EXCAVATION WORK FOR THE IMPROVEMENTS SHOWN ON THESE PLANS.
14. WITHIN 72 HOURS AFTER SURFACING IS PLACED, ALL MANHOLES AND VALVE BOX FRAMES AND COVERS SHALL BE ADJUSTED BY THE DEVELOPER TO FINISH GRADE. EXCEPT THAT THOSE IN THE GAS DEPARTMENT AREAS SHALL BE ADJUSTED BY THE DEPARTMENTS CREW. IN CASE OF WATER DEPARTMENT, THE ADJUSTMENT SHALL BE MADE BY THE DEVELOPER IN ASSOCIATION WITH THE DEPARTMENT.
15. STREET WORK SHALL BE PERFORMED BY A CITY AND STATE LICENSED CONTRACTOR UNDER A PERMIT OBTAINED FROM THE CITY HALL OF THE CITY OF VICTORVILLE.
16. ACCESS TO ADJACENT OCCUPANT SHALL BE MAINTAINED EXCEPT WHEN PRECLUDED BY NECESSARY CONSTRUCTION FOR REASONABLE PERIODS OF TIME AS APPROVED BY THE CITY ENGINEER.
17. THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUALLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE CITY HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

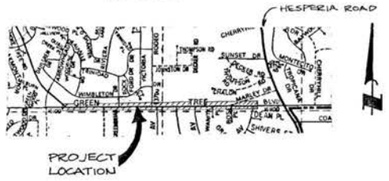


CONSTRUCTION NOTES:

- (A) CONTRACTOR TO GRIND & RECYCLE EXIST. A.C. TO FORM PART OF CLASS II BASE THICKNESS PER CONSTRUCTION NOTE "B" BELOW OR DISPOSE AS DIRECTED BY THE CITY ENGINEER.
- (B) CONSTRUCT 0.60 AC OVER EXIST. SUBBASE OR 0.45 AC OVER 1.50 CLASS II AGG. BASE. PART OF THE CLASS II BASE IS FROM NOTE A ABOVE. (SEE TABLE FOR PAVEMENT THICKNESS THIS SHEET)
- (C) CONSTRUCT 8" CURB AND GUTTER PER CITY STD. S-01
- (D) CONSTRUCT HANDICAPPED RAMP PER CITY STD. S-11
- (E) CONSTRUCT CROSS GUTTER AND SPANDREL PER CITY STD. S-05.
- (F) CONSTRUCT DROP INLET PER CITY STD. D-02.
- (G) CONSTRUCT 6" CURB AND GUTTER PER CITY STD. S-01.
- (H) CONSTRUCT RESIDENTIAL / COMMERCIAL DRIVEWAY PER CITY STD. S-02 / S-03.
- (I) CONSTRUCT SEWER LINE AND DETAILS PER VSD STD. S-3, S-4 AND S-5.
- (J) EXISTING A.C. PAVEMENT TO REMAIN
- (K) CONSTRUCT DELINEATORS TYPE F1
- (L) CONSTRUCT DROP INLET PER CITY STD. D-02 AND MODIFICATIONS PER THIS PLAN. (DETAILS ON SHT. 5 OF 6)
- (M) CONSTRUCT 0.45' AC OVER 2.0' CLASS II AGG. BASE (SEE TABLE FOR PAVEMENT THICKNESS THIS SHEET)

PROFILE SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'

VICINITY MAP
NO SCALE



NOTE:
THE STATIONING ON THIS SHEET IS ALONG THE ℄ OF GREENTREE BLVD. AND ENDS ON STA. 50+89.24 AND WILL CONTINUE EAST ALONG THE EASTERLY PROLONGATION OF THE ℄ OF YATES ROAD. THEREFORE;
50+89.24 = 51+77.10

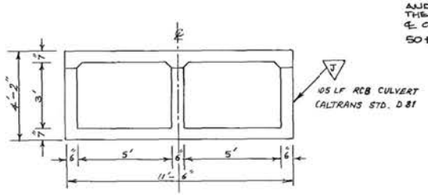
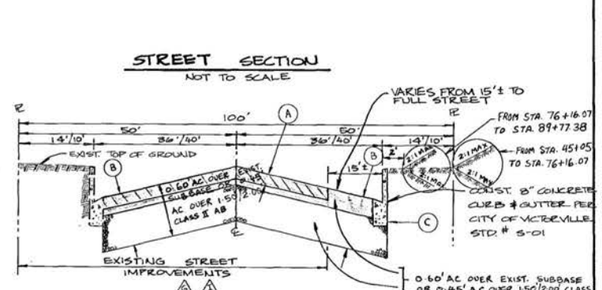


TABLE FOR PAVEMENT THICKNESS

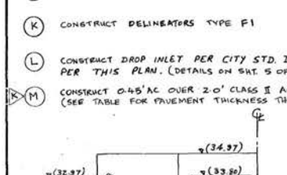
FROM STATION	TO STATION	PAVEMENT THICKNESS
45+05.00	50+89.24 (51+77.10)	0.60' AC OVER EX. SUBBASE
51+77.10 (50+89.24)	58+00.00	0.60' AC OVER EX. SUBBASE
58+00.00	67+50.00	0.45' AC OVER 1.50' CLASS II BASE
67+50.00	78+00.00	0.60' AC OVER EX. SUBBASE
78+00.00	84+00.00	0.45' AC OVER 1.50' CLASS II BASE
84+00.00	91+00.00	0.45' AC OVER 2.00 CLASS II BASE
91+00.00	92+50.00	0.45' AC OVER 1.50' CLASS II BASE
0+46.00 (3rd AVE)	6+50.00 (3rd AVE)	0.60' AC OVER EX. SUBBASE

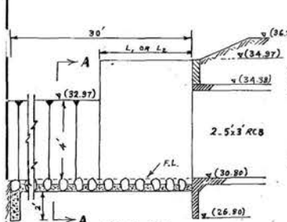
(A) (A)

STREET SECTION
NOT TO SCALE



(A) (A)





NOTE: USE REINFORCEMENT BARS FOR 6' HIGH WINGWALL.

REGISTERED PROFESSIONAL ENGINEER
EDMUNDO SOTO AGUIRRE
No. 28436
Expires
CIVIL
STATE OF CALIFORNIA

Edmundo S. Aguirre
EDMUNDO S. AGUIRRE R.C.E. 28436 EXP. 3/31/90

JUAN L. MIJARES R.C.E. 18018 EXP. 6/30/89

Kenyon & Associates, Inc.
ENGINEERING • SOILS • SURVEYING
12138 INDUSTRIAL BLVD. SUITE 240 VICTORVILLE, CA. 92392 619-241-6146
401 E. BUENA VISTA ST. BARSTOW, CA. 92311 619-256-0394

LEGEND:

(40.00)	INDICATES EXIST. ELEVATION
40.00	INDICATES PROPOSED ELEVATION
T.P.	INDICATES TOP OF PAVEMENT
T.C.	INDICATES TOP OF CURB
F.L.	INDICATES FLOW LINE
℄	INDICATES CENTERLINE
CONC.	INDICATES CONCRETE
A.C.	INDICATES A.C. PAVEMENT
T.L.	INDICATES TOP OF LIP
✦ L.T.	PROPOSED OR RELOCATED STREET LIGHT

(A) "AS BUILT"

NO	REVISIONS	BY	DATE
(A)	AS BUILT	KK	7/1/96
(D)	CURB RETURN AMENDED	KK	6/8/92
(E)	PAVEMENT WIDEN TO 40'	KK	6/8/92
(F)	CONST. NOTES A & B AMENDED.	KK	6/8/92
(G)	TYPICAL SECTION AMENDED	KK	6/8/92
(H)	STREET LIGHT RELOCATED	KK	7/8/92
(I)	TYPICAL SECTION AND CONST. NOTE 'B' AMENDED	KK	7/8/92
(J)	DEMOLISH CMP AND CONST. RCB, HEADWALL AND APRON	KK	7/8/92

NO	REVISIONS	BY	DATE
(A)	CONSTRUCTION NOTES AND NOTICE TO CONTRACTORS ADDED	KK	12/4/91
(B)	PROFILE & EXIST. SUBDIV. CORRECTED	KK	12/4/91
(C)	DROP INLET & PIPE ADDED & V-GUTTER REMOVED	KK	12/4/91

FIELD BOOK NO (S)

BENCH MARK: NO. 41
LOCATED ON THE NORTH WEST CORNER OF GREENTREE BLVD. AND RODEO DRIVE.
ELEV.: 2949.34'

CITY OF VICTORVILLE

STREET IMPROVEMENT PLAN

GREEN TREE BLVD.

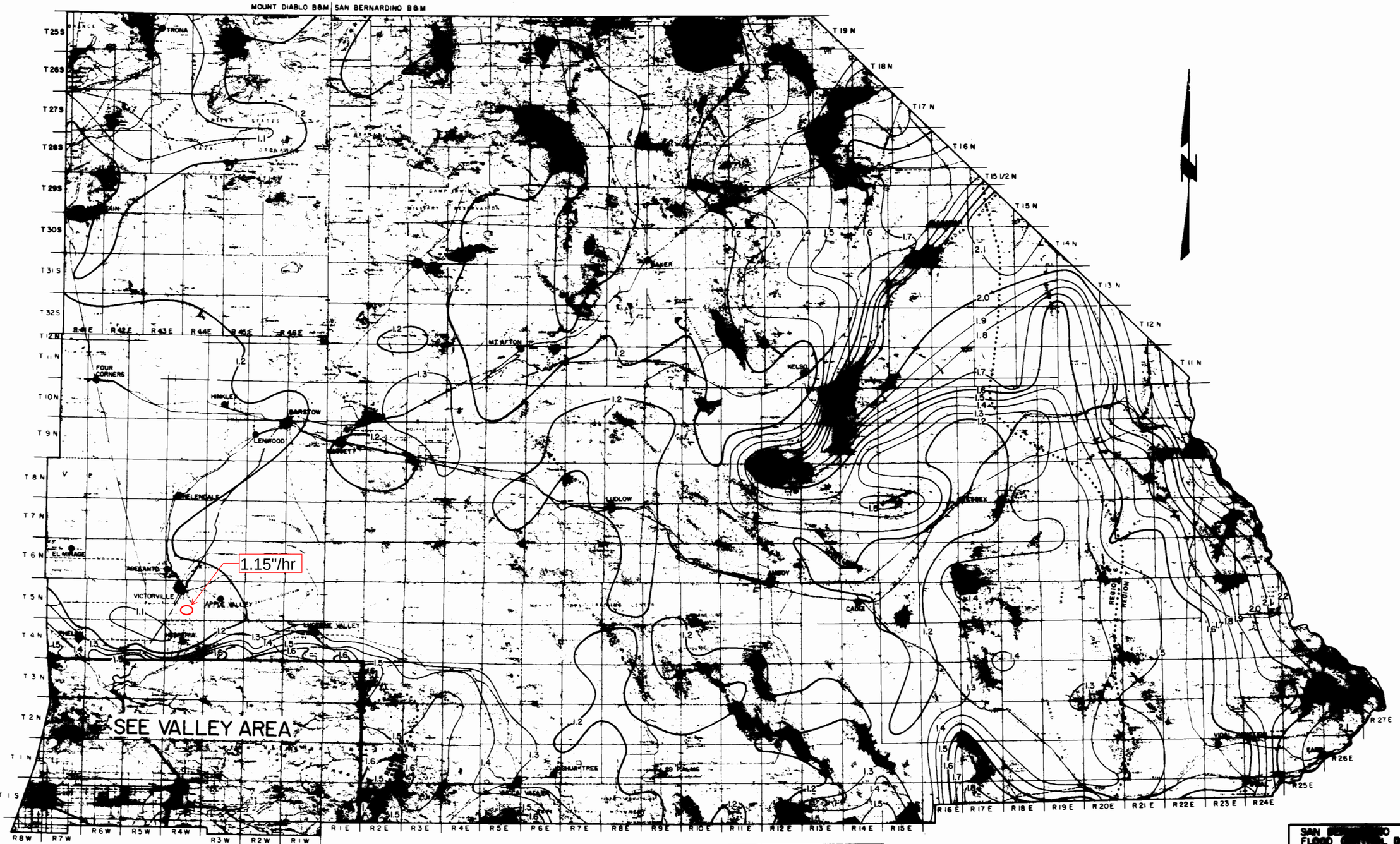
YATES ROAD TO DEAN AVENUE
STA. 45+05 TO STA. 50+89.24 AND STA. 51+77.10 TO STA. 52+00

DESIGN BY E.S.A.
DR BY M.J.M.
CHK'D BY J.L.M.
DATE

SHEET NO. 1 OF 6
DRAWING NO. P-422
PROJECT NO. STP LN 5380 (001)

APPROVED BY CITY ENGINEER
CITY ENGINEER Edmundo S. Aguirre DATE 7/12/96 R.C.E. 28436 EXPIRES 3/31/98

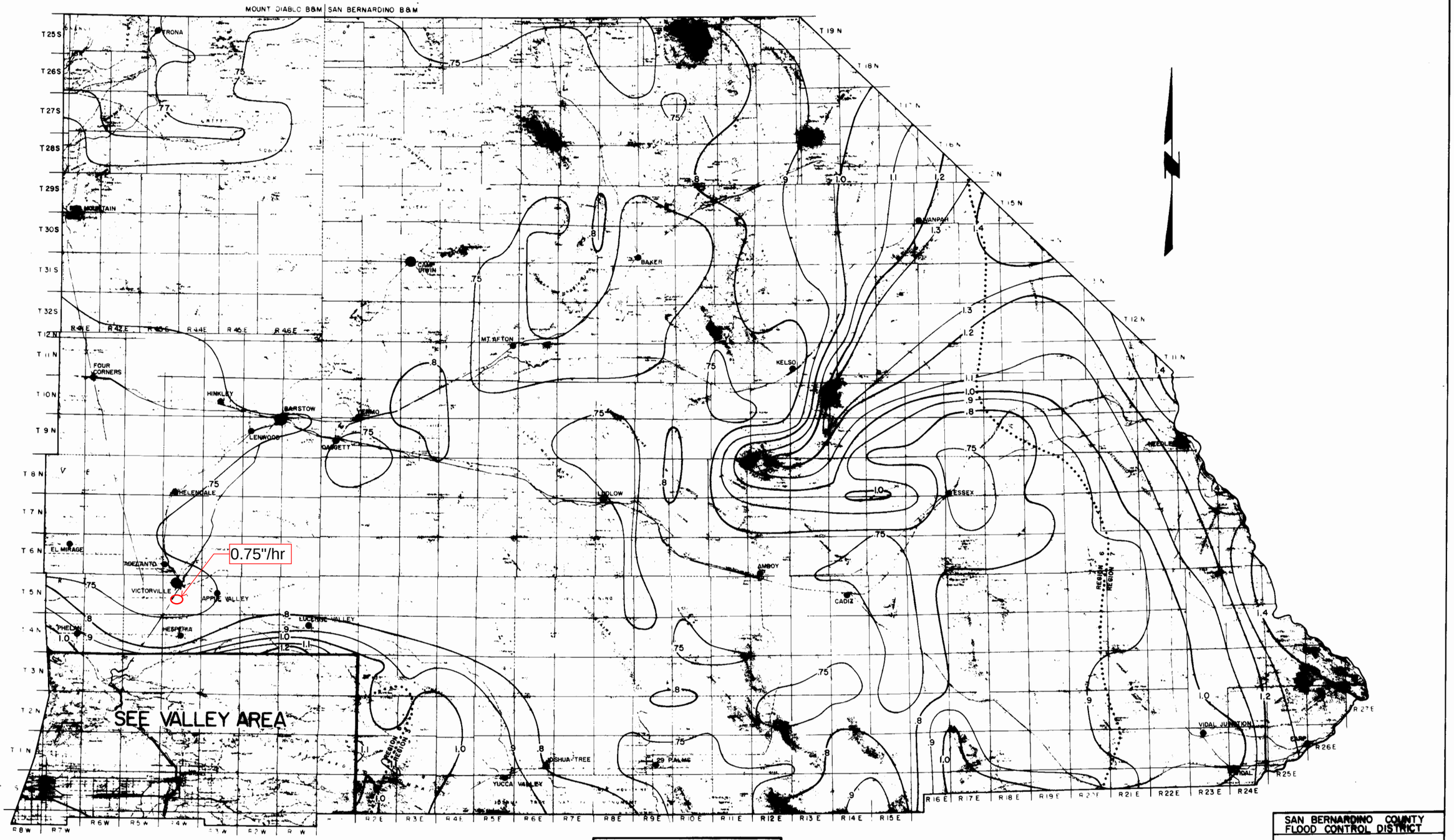

2-36" UNDER ARROWHEAD DRIVE DRAIN TO THE SOUTHWEST CORNER OF THE SITE



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

FIGURE B-10



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:

3.5 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS

Y_{10} - 10 YEAR 1 HOUR

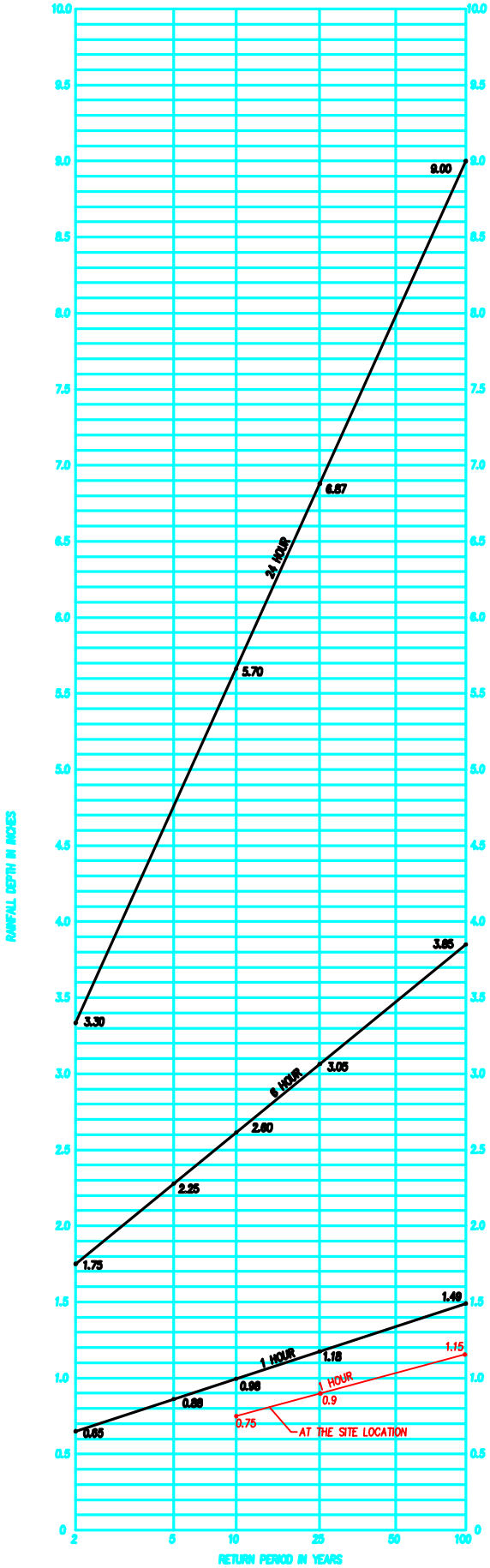
BASED ON U.S.D.C, N.O.A.A. ATLAS 2, 1973

APPROVED BY

FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 6MI.	WRD-1	9 of 12

FIGURE B-9



NOTE:
1. FOR INTERMEDIATE RETURN PERIODS PLOT 10-YEARS AND 100-YEAR ONE HOUR VALUES FROM MAPS, THEN CONNECT POINTS AND READ VALUE FOR DESIRED RETURN PERIOD. FOR EXAMPLE GIVEN 10-YEAR ONE HOUR=0.95" AND 100-YEAR ONE HOUR=1.60", 25-YEAR ONE HOUR=1.18."

REFERENCE: NOAA ATLAS 2, VOLUME 9-CAL_1973

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES

GEOTECHNICAL EVALUTION AND INFILTRATION TESTING REPORT

SOILS SOUTHWEST, INC.
SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

Report of Geotechnical Evaluations and Soil Infiltration Testing for WQMP-BMP Stormwater Disposal System

Proposed 70-lot Single Family Tract 20781
SWC Green Tree Boulevard and 6th Avenue
Victorville, California
APN(S):3090-011-02,3090-031-06,-11&-12

Project No. 25032-F/BMP
August 20,2025

Prepared for:

Grand Pacific Communities, Corp
c/o Mr. Mike McDaniel: Construction Manager
100 N. Barranca Avenue, Suite 950
West Covina, California 91791

soilssouthwest@aol.com
Established 1984

SOILS SOUTHWEST, INC.
SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

August 20,2025 Project No. 25032-F/BMP

Grand Pacific Communities, Corp
100 N. Barranca Avenue, Suite 950
West Covina, California 91791

Attention: Mr. Mike McDaniel: Construction Manager

Subject: Report of (i) Geotechnical Evaluations &
(ii) Soil Infiltration Testing for WQMP-BMP Stormwater Disposal System
Proposed 70-lot Single Family Tract 20781
SWC Green Tree Boulevard and 6th Avenue
Victorville, California
APN(S):3090-011-02,3090-031-06,-11&-12

Reference: Tentative Tract Map 20781:Preliminary Grading Plan Prepared by Allard Engineering dated January 19,2025

Gentlemen,

Presented herewith is the Report of (i) Geotechnical Evaluations and (ii) Soil Infiltration Testing for WQMP-BMP Stormwater Disposal Design for the site of the proposed 70-lot single-family tract to be constructed on the undeveloped parcel located on southwest corner of Green Tree Boulevard and 6th Avenue , City of Victorville, California. In absence of detailed precise grading plans, the recommendations included should be considered as "preliminary. Most of the findings related in this report are professional opinions. Revised and/or updated recommendations may be warranted following grading/development plan review when supplied.

No development details are available for review. However, based on the conceptual project development plan supplied, it is understood that the subject development will primarily include a single-family tract development comprised of seventy (70) detached lots consisting of assumed 1 and/or 2-story single-family dwellings. Conventional construction of wood frame and stucco with concrete slabs-on-grade is expected. Supplemental installation of on-site WQMP-BMP stormwater disposal basin proposed along the north side of the planned "E" Street. Conventional site preparations and grading should be anticipated with the proposed development. Supplemental improvements are expected to include on-site paving/ parking driveways and off-site street and storm drain improvements among others. For estimation purposes, load bearing structural loadings of 40 kips and 4 klf are assumed for isolated and conventional wall footings, respectively.

Based on the geotechnical explorations completed at this time, it is our opinion that, in general, the site soils encountered primarily consist of upper dry potentially compressible and slightly hydro-collapsible fine to medium coarse silty sands with traces of caliche, pebbles, rock fragments and occasional small ½" rocks, overlying variegating layers of dry to damp potentially compressible and slightly to moderately hydro-collapsible poorly graded fine to medium coarse gravely sands with white calcium deposits, gravely fine to coarse sands, silty fine to medium coarse sands, and fine well-graded sands with silts, pebbles and rock fragments to the maximum 31 feet depth explored. No free groundwater was encountered. Descriptions of the soils encountered are provided in the attached Log of Borings (B-1 to B-12).

Based on review of the available USGS (California Geologic Survey) publication, it is understood that the site is not situated within an A-P Special Studies Zone where a known seismic fault passes through the site or its adjacent. No shallow depth groundwater was encountered within the maximum 31 feet depth explored and none such is anticipated considering other projects completed in the area over the previous years. Available California State Water Resource website showing records were limited to 1957 recording of historical groundwater table in excess of 100 feet below existing grade surface. No current groundwater table data is available for review from this website and two other agencies.

Based review of available data, site reconnaissance, and Special Publication 117A, published by the State of California Division of Mines and Geology, it is our opinion that the site should be considered non-susceptible to soils liquefaction in event of a strong motion earthquake thereby requiring no special geotechnical design recommendations other than those as described herein.

Based on review of the FEMA National Flood Hazard Layer FIRMette map, it is our understanding that the subject area is delineated as Zone X, Area of Minimal Flood Hazard as shown in the attached Appendix C

The findings, opinions, and recommendations included should be considered "preliminary" and subject to revision following detailed development plan review.

It is our opinion that from a geotechnical viewpoint, the site should be considered suitable for the proposed development provided that the recommendations included are considered in design and construction.

It is suggested that, when prepared, the site topographic and plans should be available for review to verify applicability of certain assumptions as used in the preparation of this report. Revised and/or updated recommendations may be warranted following detailed development plans review.

We offer no other warranty, express or implied.

Respectfully submitted,
Soils Southwest, Inc.

Malay Gupta, RCE 31708

REGISTERED PROFESSIONAL ENGINEER
MALAY K. GUPTA
No 31708
Exp. 12-31-26
CIVIL
STATE OF CALIFORNIA

John Flippin, Project Coordinator

1.0 Introduction

This report presents the results of (i) Geotechnical Evaluations and (ii) Soil Infiltration Testing for WQMP-BMP stormwater disposal design proposed 70-lot single-family tract to be constructed on the undeveloped parcel located on southwest corner of Green Tree Boulevard and 6th Avenue , City of Victorville, California. In absence of detailed precise grading plans, the recommendations included should be considered as "preliminary. Most of the findings related in this report are professional opinions. Revised and/or updated recommendations may be warranted following grading/development plans review when supplied. The WQMP-BMP stormwater disposal design is included in Section 6 of this report.

1.1 Proposed Development

No precise project development details are available for review. Based on the preliminary project information supplied, it is understood that the subject development will primarily include a single-family tract development comprised of seventy (70) lots consisting of 1 and/or 2-story single-family dwellings. Conventional construction of wood frame and stucco with concrete slabs-on-grade is expected. Supplemental installation of on-site WQMP-BMP retention drainage basin is proposed for the north side of the planned "E" Street. Conventional site preparations and grading including cuts and fills should be anticipated with the proposed development. Supplemental improvements are expected to include on-site paving/ parking driveways and off-site street and storm drain improvements among others. For estimation purposes, load bearing structural loadings of 40 kips and 4 klf for isolated and conventional wall footings are assumed in preparing this report.

The purpose of the (i) Geotechnical evaluations is to determine the nature and engineering properties of the near grade and subsurface soils, and to provide recommendations for foundation design, concrete slab-on-grade, paving, site preparations and grading, and inspection during construction. Being beyond scope of work, no site-specific Phase I Environment Assessment Evaluations or site-specific geologic studies are included and none such should be warranted.

The recommendations contained reflect our best estimate of the soils' conditions as encountered as described. It is not to be considered as a warranty of the soils for other areas or for the depths beyond the explorations completed at this time.

The recommendations supplied should be considered valid and applicable when the following conditions are observed:

i. Pre-grade meeting with the contractor, public agency, and the soils engineer,
ii. Excavated bottom inspections and verifications of excavated bottoms prior to engineered fill soils placement,
iii. Continuous observations and testing during site preparation and mass grading,
iv. Observation and inspection of footing trenches prior to steel and concrete placement,
v. Plumbing trenches backfill placement prior to concrete slabs-on-grade placement,
vi. On and off-site utility trenches backfill observations testing and verifications, and
vii. Consultations as required during construction or upon your request.

In absence of precise grading plan, the geotechnical recommendations supplied should be considered "preliminary". Supplemental recommendations may be warranted following development details review.

1.2 Site Description

Within the City of Victorville, the hilly rectangular shaped parcel of about 18 acres (NET) is bounded by Green Tree Boulevard on the north, by Talpa Street (under construction) on the south, by 6th Avenue on the east and by the vacant undeveloped and mixed us properties on the west. Overall vertical relief within the parcel is currently unknown but is estimated to be about 30 feet with overall sheet-flow from incidental rainfall appears to flow toward the north along with onsite variegating flow patterns considering its hilly multi-sloping terrain, in nature. Apart from scattered debris and debris stockpiles, seasonal weeds, and occasional desert brush and other vegetation, presence of no other significant features is noted.

2.0 Scope of Services

For geotechnical evaluations our Scope of Services include, in general, the following:

o **Field Explorations**

Twelve (12) exploratory test borings (B-1 to B-12) explored using an 8-inch diameter hollow-stem auger drilling rig advanced to maximum 31 feet depth below the current grade surface.

Prior to test explorations an underground utility clearance was established with Underground Service Alert (USA) of Southern California to avoid possible subsurface lifeline obstruction and rupture. Following necessary soil sampling and in-situ testing, the test excavations were backfilled with local soils using minimum compaction effort. Collected samples were subsequently transferred to our laboratory for necessary geotechnical testing. Approximate test excavation locations are shown on the attached Plate 1.

During excavations, the soils encountered were continuously logged and bulk and undisturbed samples were procured. Collected samples were subsequently transferred to our laboratory for necessary geotechnical testing. Description of the soils encountered is shown on the attached Test Exploration Logs in Appendix A.

o **Laboratory Testing**

Representative bulk and undisturbed site soils were tested in laboratory to aid in the soils classification and to evaluate relevant engineering properties pertaining to the project requirements. The laboratory tests completed include the following:

- In-situ moisture contents and dry density (ASTM Standard D2216),
- Maximum Dry Density and Optimum Moisture Content (ASTM Standard D1557),
- Direct Shear (ASTM Standard D3080),
- Soil consolidation (ASTM Standard D2435),
- Soils Gradation evaluations (ASTM D422*), and*
- Soils Sand Equivalent, SE (ASTM D 2419)

No soils chemical analysis is currently included. Post-grading soil chemical analyses are suggested including pH, sulfate, chloride, and resistivity will be performed prior to actual construction and concrete pour.

Description of the test results and test procedures used are provided in Appendix B of this report.

o Based on the test explorations, soil sampling, laboratory testing, and engineering analyses completed at this time, our preliminary recommendations for design of foundations, slab-on-grade, paving and parking, site preparations and grading, and monitoring during construction are described.

o Preparation of this report for initial use by the project design professionals. The recommendations herein should be considered as "preliminary" and subject to revision and upgrading following review of the final grading and development plans, when supplied.

3.0 Existing Site Conditions

3.1 Subsurface Conditions

The soils encountered, primarily consists of upper dry potentially compressible and slightly hydro-collapsible fine to medium coarse silty sands with traces of caliche, pebbles, rock fragments and occasional small ½" rocks, overlying variegating layers of dry to damp potentially compressible and slightly to moderately hydro-collapsible poorly graded fine to medium coarse gravely sands white calcium deposits, gravely fine to coarse sands, silty fine to medium coarse sands, and fine well-graded sands with silts with pebbles, rock fragments to the maximum 31 feet depth explored. No free groundwater or bedrock was encountered. Based on review of the USDA Natural Resources Conservation Service: Web Soil Survey for the subject area, it is our understanding that the soil classification for the subject area is generally identified as 107-Bryman Loamy Fine Sand, 5 to 9 percent slops with the upper 9 inches consisting of loamy fine sands overlying sandy clay loams between 9 inches and 39 inches below the existing grade surface followed by loamy sands from 39 inches to 60 inches below existing grade. The northwest portion of the planned development is identified as 106-Bryman Loma Fine Sand, 2 to 5 percent slopes with similar soil characteristics up to 60 inches recorded below grade. Descriptions of the soils encountered are provided in the attached Logs of Borings (B-1 to B-12).

Based on the information published by the Department of Conservation, State of California, it is understood that the site is not situated within an A-P Special Study Zone. No shallow depth groundwater was encountered within the maximum 31 feet depth explored and none such is anticipated considering other projects completed in the area over the previous years. Considering past projects completed in the area where no shallow groundwater was encountered within the 31 feet explored, and considering the moderate to high SPT blow counts (>30) as recorded at depths, based on the Special Publication 117A, published by the State of California Division of Mines and Geology, it is our opinion that the site should be considered non-susceptible to soils liquefaction in event of a strong motion earthquake.

The upper compressible and potentially hydro-collapsible soils existing as described are considered relatively dry, non-homogeneous and compressible in nature, and thus should be considered inadequate for directly supporting structural loadings without excessive differential settlements to load bearing footings and concrete slab-on-grade. It is our opinion, however, that for structural support, when the upper 5 feet of the compressible soils are graded in form of subexcavations and their replacement as engineered fills compacted to minimum 95%, the structural pads thus constructed should be considered adequate for the planned development with tolerable settlements.

The subexcavation depth described should be considered approximate. Additional subexcavations may be warranted within isolated areas underlain by old fills, buried debris, abandoned utilities and others. The recommendations for structural pad preparations are described in Section 1.1 of this report.

Laboratory shear tests conducted on undisturbed samples and on the upper bulk soils remolded to 95% exhibit moderate shear strengths under increased moisture conditions. Results of the laboratory shear tests are provided in Plate B-1 of this report.

Consolidation tests conducted on the upper undisturbed samples procured indicate moderate potentials for compressibility under structural loadings. The results of soils consolidation tests are shown on Plate B-2.

Silty sandy in nature, the site soils are considered non-critically expansive in characteristics, thereby requiring no special geotechnical reinforcements other than those as described in this report.

3.2 Excavatibility

It is our opinion that the site preparations and grading required for the project may be accomplished by using conventional heavy-duty construction equipment. No blasting or jackhammering should be warranted.

3.3 Subsurface Variations

Based on the results of subsurface explorations and local experience from similar projects completed as of this date, it is our opinion that variations in subsoils continuity and depths of subsoils deposit may be expected. Due to the nature and depositional characteristics of the soils underlying as described it is our opinion that care should be exercised in interpolating and/or extrapolating of the subsurface conditions existing in between and beyond the test explorations described. Although not encountered, presence of underlying old, buried utilities may be expected during grading and construction.

3.4 Groundwater

No shallow depth groundwater was encountered within the maximum 31 feet depth explored and none such is anticipated considering other projects completed in the area over the previous years. Recorded groundwater data is limited and no current measured readings are available for review.

GROUNDWATER TABLE	
Reporting Agency	California Department of Water Resources Marcelo Montagna 2008 Maps http://wdl.water.ca.gov/waterdatalibrary/
Well Number	05N/04W-28D001S
Well Monitoring Agency	USGS
Well Location: Township/Range/Section	T05N-R04W-Section 28
Well Elevation:	2962.81
Current Depth to Water (Measured in feet)	156.53
Current Date Water was Measured	March 1,1957
Depth to Water (Measured in feet) (Shallowest)	156.53
Date Water was Measured (Shallowest)	March 1,1957

3.5 Soil Corrosivity Analyses

No soils chemical analysis is currently included. It is suggested that following mass grading completions, soils corrosivity potential evaluations should be made to determine, at a minimum, concentrations of pH, sulfate, chloride, and resistivity, if warranted. Further corrective recommendations should be provided by Corrosion Engineer.

3.6 Faulting and Seismicity

3.6.1 Direct or Primary Seismic Hazards

Surface ground ruptures are associated with presence of nearby active fault and ground shaking representing primary or direct seismic hazards to structures. There are no known active or potentially active faults that pass through or towards the subject site, and the site is not situated within an A-P Special Studies Zone.

According to the current CBC, the site is considered within Seismic Zone 4. As a result, it is likely that during life expectancy of the structures built moderate to severe ground shaking may have potential for adverse effects on the site.

3.6.2 Induced or Secondary Seismic Hazards

In addition to ground shaking, effects of seismic activity may include potentials for soil liquefaction, differential settlements, ground lurching, landslides, lateral spreading, and earthquake induced flooding. Potential effects of such are described below.

3.6.2.1 Surface Fault Rupture

The site is not situated within an A-P Special Studies Zone. Based on review of existing geologic information, no major fault is noted to cross through or extends towards the site. The potential for surface rupture resulting from nearby fault movement is not known for certainty but is considered "low" considering the site distance to the nearby known earthquake fault.

3.6.2.2 Flooding

Flooding hazards include tsunamis (seismic sea waves), Seiches, and failure of manmade reservoirs, tanks, and aqueducts. The potential for these hazards is considered "remote" considering the inland site location and absence of nearby known bodies of water. Based on review of the FEMA National Flood Hazard Layer FIRMette map, it is our understanding that the subject area is delineated as Zone X, Area of Minimal Flood Hazard as shown in the attached Appendix C.

3.6.2.3 Land Sliding

Seismically induced landslides and other slope failures are common occurrences during or soon after an earthquake. Considering that the site and its adjacent being relatively flat, excluding the existing onsite variegating rolling hill terrain, it is our opinion that potential for seismically induced landslide should be considered as "remote".

3.6.2.4 Lateral Spreading

Seismically induced lateral spreading involves lateral movement of existing soils due to ground shaking. Lateral spreading is demonstrated by near vertical cracks with predominantly horizontal movement of the soil mass involved. The topography of the site being near level, it is our opinion that the potential for seismically induced lateral spreading should be considered as "remote".

3.6.2.5 Settlement and Subsidence

Based on subsequent laboratory analyses conducted on undisturbed samples procured at this time, it is our opinion that the near surface soils existing at their present state should be considered relatively compressible, potentially hydro-collapsible and susceptible to subsidence.

3.6.2.6 Liquefaction

Liquefaction is caused by build-up of excess hydrostatic pressure in saturated non-cohesive soils due to cyclic stress generated by ground shaking during an earthquake. The significant factors on which soil liquefaction potential depends include, among others, the soil type, soil relative density, intensity of earthquake, duration of ground-shaking, and depth of groundwater.

In absence of groundwater within 50 feet below grade and high SPT blows counts as encountered based on the Special Publication 117A published by the US Division of Mines and Geology it is our opinion that the site should be considered non-susceptible to seismically induced potential for soils liquefaction.

3.7 Seismic Design Parameters

The design spectrum was developed based on the 2022 CBC. Site Coordinates of 34.499126°N, -117.309273°W were used to establish the seismic parameters presented below.

3.7.1 Seismic Design Coefficients

The site is situated at approximately 8.87 miles from the North Frontal (West) Fault capable of generating an earthquake magnitude, M of 7.2 and Peak Horizontal Ground Acceleration, PGA of 0.500g at 10% probability of exceedance in 50-year return period.

For foundation and structural design use of the following seismic parameters are suggested as based on the current 2022 CBC:

Recommended values are based upon the online review of ASCE 7-22 Hazard Tool coefficient parameters. The following presents the seismic design parameters evaluated based on the available publications published by California Geological Survey (CGS), 2022 CBC, and ASCE Standard 7-16.

The following presents the seismic design parameters evaluated based on the currently published California Geological Survey and 2022 CBC.

The recommended seismic design parameters are based upon the USGS ASCE 7-Hazard Reports Parameters and supplemental seismic parameters are provided in Appendix C of this report. For foundation and structural design, the following presents the seismic design parameters as based on the available publications as currently published by the California Geological Survey and 2022 CBC.

TABLE 3.7A.1 Seismic Source Type

Based on California Geological Survey-Probabilistic Seismic Hazard Assessment Peak Horizontal Ground Acceleration (PGA) having a 10% probability of exceedance in a 50-year-period is described as below:

Seismic Source Type / Appendix C	
Nearest Maximum Fault Magnitude	M>\=7.2
Peak Horizontal Ground Acceleration (PGA)	0.500g

TABLE 3.7.2 Seismic Design Parameters

CBC Chapter 16	2022 ASCE 7-16 Standard Seismic Design Parameters	Recommended Values
1613A.5.2	Site Class	D
1613.5.1	The mapped spectral accelerations at short period	S_s
1613.5.1	The mapped spectral accelerations at 1.0-second period	S_1
1613A5.3(1)	Seismic Coefficient, S_s	1.193 g
1613A5.3(2)	Seismic Coefficient, S_1	0.461 g
1613A5.3(1)	Site Class D / Seismic Coefficient, F_a	1.023 g
1613A5.3(2)	Site Class D / Seismic Coefficient, F_v	NA
16A-37 Equation	Spectral Response Accelerations, $S_{Ms} = F_a S_s$	1.220 g
16A-38 Equation	Spectral Response Accelerations, $S_{M1} = F_v S_1$	NA
16A-39 Equation	Design Spectral Response Accelerations, $S_{Ds} = 2/3 \times S_{Ms}$	0.813 g
16A-40 Equation	Design Spectral Response Accelerations, $S_{D1} = 2/3 \times S_{Ms}$	NA

In design, vertical acceleration may be assumed to about 1/3 to 2/3 of the estimated horizontal ground accelerations described.

It should be noted that lateral force requirement in design by structural engineer should be intended to resist total structural collapse during an earthquake. During the lifetime use of the structure built, it is our opinion that some structural damage may be anticipated requiring some structural repairs. Adequate structural design and implementation of such in construction should be strictly observed.

4.0 Geotechnical Recommendations

4.1 General Recommendations

Based on field explorations, laboratory testing, and subsequent engineering analyses, the following conclusions and recommendations are presented for the site under study:

(I) From a geotechnical viewpoint, the site is considered grossly stable for the proposed development, provided the recommendations supplied herein are incorporated in design and construction. Foundation design shall reflect considerations of the seismically induced PGA as described.

(II) Because of the poorly graded potentially hydro-collapsible and compressible sandy soils existing as encountered, it is our opinion that for structural support the load bearing soils shall be reworked in the form of subexcavations followed by scarification, moisturization, and their replacement as engineered fills compacted to minimum 95%. In the event that new fill soils are required over the current grade surface, such shall be placed on the original grades when prepared as described.

(III) The subexcavation depths during mass grading as described in the following section shall be considered as "minimum". During grading, localized deeper subexcavations may be required within areas underlain by buried debris, utilities, localized fills or soft soils, and others. It will be the responsibility of the grading contractor to inform the project soils engineer of the presence of such prior to further site preparations and grading.

(IV) In order to minimize potential for differential settlements, it is recommended that structural footings shall be established exclusively into engineered fills of local soils compacted to the minimum as recommended in this report. Construction of footings and slabs straddling over cut and fill transition shall be avoided.

(V) Structural design consideration shall include probability for "moderate to high peak ground acceleration" from relatively active nearby earthquake faults. Implementing the seismic design parameters and procedures as outlined in the current CBC and as described earlier, however, may minimize the adverse effects for the proposed structures.

(VI) Although no groundwater was encountered, provisions shall be maintained during construction to divert incidental rainfall away from the constructed structural pads.

(VII) It is our opinion that, if site preparations and grading are performed as recommended and as per the generally accepted construction practices and current CBC, the proposed development will not adversely affect the stability of the site or its adjacent.

4.1.1 Recommendations for Site Preparations and Grading for Structural Support

In absence of precise grading plan review, the planned structural pad grades are assumed at/or near the existing grade surface. For adequate structural support, it is our opinion that moderate site preparations and grading should be included in the form of subexcavations of the near grade dry and compressible soils and their replacement as engineered fills compacted to the minimum 95% as described.

In general, subexcavations should be as follows:

(i) minimum 5 feet below the current grade surface as described or
(ii) to the depth as required to expose the underlying moist and dense natural subgrades or
(iii) to the depth required to maintain a 24-inch-thick compacted fill mat blanket below foundation bottoms, whichever is greater.

The site preparations and grading described should encompass, at a minimum, the proposed structural footprint areas and minimum 5 feet beyond the most extended structural popout footing, or as suggested by the geotechnical engineer during grading. No cut and fill transition conditions should be allowed.

Within areas requiring fill soils, if any, such may be placed following sufficient subexcavations to expose the underlying dense subgrades as approved by the project soils engineer. During grading, the engineered fills placed should be compacted to near Optimum Moisture and with minimum 95 percent compaction of soils' Maximum Dry Density as determined by the ASTM D1557 test method.

The subexcavation depths described should be considered as "preliminary". Localized additional subexcavations may be required within areas underlain by undocumented old fills, buried utilities and abandoned sewer and/or buried septic systems. It is recommended that the excavated subgrades should be verified and approved by the soils engineer prior to structural fill soil placement. Supplemental recommendations may be warranted following detailed development plans review.

The subexcavation depths described should be considered as "approximate". Actual subexcavation depths should be determined by the soils engineer during grading.

For reference, supplemental general mass grading recommendations are included Section 5 of this report.

4.1.2 Structural Fill Material Requirements

(i) Non-expansive in nature, the on-site soils free of organic, debris, and rocks larger than 6-inch in diameter, should be considered suitable for reuse as structural backfills.

(ii) Following mass grading completion, representative site soils sampled from graded fills expected in contact with footings and utilities should be laboratory tested to verify presence of sulfate, pH, chloride, and resistivity. Based on the chemical test results, supplemental design recommendations will be supplied prior to concrete pour. Such chemical testing will be programmed when requested by the addressee.

4.1.3 Cut/Fill Transition Pad Preparations (if applicable)

Use of cut/fill transitions should be avoided to minimize potential for differential settlements to footings and concrete slabs-on-grade. Within cut/fill transition areas, if it becomes essential, it is suggested that following necessary cuts, the entire structural pad should be prepared so as to establish an uniform bearing compacted fill mat prepared in conformance to the general guidelines as described below.

Pad Preparation Guidelines for Cut/Fill Transition Areas

Fill Depth Required for Finish Grade (within low-lying areas)	**Overexcavation Depth below Finish Grade (within cut areas)**
Up to 5 feet	Equal Depth
5 to 10 feet	5 feet
Greater than 10 feet	One-half the maximum thickness of fills placed on the "fill" portion (20 feet maximum)

Cut portions should be overexcavated beyond the structural perimeter lines for a horizontal distance equal to the depth of overexcavation or to a minimum distance of 5 feet, whichever is greater. Actual subexcavation depths should be determined by the soils engineer during grading.

4.2 Structural Foundation Design Parameters

For structural support, it is assumed that for load bearing support conventional continuous wall foundations and isolated round/square footings will be used established into the engineered graded fills placed during site preparations and grading as described. Static structural loadings of 50 kips and 5 klf are assumed for isolated columns and continuous wall footings, respectively.

In absence of detailed development plan review, it is understood that a one or two-story conventional wood frame and stucco construction will be used with concrete slabs-on-grade. In general, it is suggested that use of load bearing continuous wall and/or isolated spread footings will be used underlain by at least 24-inch-thick engineered fill mat of local soils compacted as described.

Under static loading conditions, with a Factor of Safety, FS = 3.0, an allowable soil vertical bearing capacity of 2500 psf may be considered in design. The soil bearing capacity described may be increased by 200 psf for each additional footing depth to a total not exceeding 3000 psf. If normal code requirements are applied, the above capacities may further be increased by an additional 1/3 for short duration of loading which includes the effect of wind and seismic forces.

From a geotechnical viewpoint, 12-inch-wide x 18-inch-deep foundation dimensions for one-story and 18 inch wide x 24-inch deep foundation dimensions for two-story dwellings may be considered for the planned three-story construction. Actual foundation dimensions, including foundation thickness against punching shear etc., should be determined by the project structural engineer based on the static loading and seismic PGA described earlier.

The footing depths described should be measured vertically from the lowest adjacent outside grade and not from the finished pad grade or from finished floor surface. Footing depths and dimensions shall be verified by the soils engineer prior to footing-forming, rebar, and concrete placement. It will be the contractor's responsibility to arrange such verification by the soils engineer.

From a geotechnical viewpoint under static loading conditions, use of minimum reinforcements consisting of 2-#4 rebar placed near the top and 2-#4 rebar near bottom footings, are recommended. Additional reinforcements, if specified by the project structural engineer, should be incorporated in construction.

Based on the laboratory determined soils consolidation characteristics, settlements to properly designed and constructed foundations supported exclusively into engineered fills of site soils or its equivalent or better, and carrying maximum assumed structural loadings are expected to be within "tolerable" limits.

Under static loading conditions, over a 40-foot-span the estimated total and differential settlements should be about 1 and 1/2-inch, respectively, provided the foundations being supported by engineered fills of local soils compacted as described. Most of the elastic deformations, however, are expected to occur during construction.

4.3 Concrete Slabs-on-Grade

The prepared subgrades described to receive footings should be adequate for concrete slab-on-grade placement. For estimation purposes, use of 4.5-inch-thick (net) concrete slab-on-grade is suggested reinforced with #3 rebar at 18-inches o/c. Actual slab-on-grade thickness, however, should be designed by the project structural engineer based upon structural loadings, the seismic design parameters, and the Peak Horizontal Ground Acceleration (PHGA) described. Concrete slab-on-grade positive contact with footings is suggested as designed by the project structural engineer. Flatworks, including sidewalks, should not be placed bearing directly on the surface soils currently existing without first processing the surface (e.g. removing organic debris, moisturizing, and compacting to the minimum of 90%) if not within the already graded building envelope.

Within moisture sensitive areas, concrete slabs should be underlain by 2-inch of compacted clean sand, followed by 10-mil-thick vapor barrier, such as commercially available StegoWrap, Visqueen or other approved covering, overlying an additional 2-inch-thick layer of sands. Sands used should have a Sand Equivalent, SE, of 30 or greater.

Subgrades to receive concrete foundations and slabs-on-grade should be "'dampened" as would be expected in any such concrete placement. Use of low-slump concrete is recommended. In addition, it is recommended that utility trenches underlying concrete slabs and driveways should be thoroughly backfilled with gravelly sandy soils mechanically compacted to minimum percent compaction as required as described. Concrete construction joint requirements should be supplied by the project structural engineer.

Finished slab subgrade verifications, including buried utility trenches backfills etc. should be verified by the soils engineer immediately prior to vapor barrier placement. No water jetting should be allowed in an effort to compact utility trenches backfills.

For driveways, it is our opinion that concrete slabs should be 5½ -inch-thick (net) with thickened edges, placed over local sandy soils compacted to at least 95%. Driveway slab reinforcing and construction and expansion joints etc. should be incorporated as recommended by the project structural engineer.

No concrete should be placed during extreme weather conditions, such as during high outside temperature and/or during high Santa Ana wind conditions. Use of excess water on finished grade is not recommended to prevent post-placement concrete "warping".

4.3.1 Concrete Curing

In order to minimize potential for excessive concrete shrinkage or cracking, concrete slabs shall be adequately "cured" by using water or by using commercially available chemical curing agents.

4.4 Resistance to Lateral Loads

Resistance to foundation lateral displacement can be achieved by friction acting at the base of foundation and by passive earth pressures. A coefficient friction of 0.3 may be assumed with normal dead load forces for footings established on engineered fills primarily consisting of silty. Within areas of silty sands with pebbles and rock fragments, a coefficient of 0.45 may be considered in design.

An allowable passive lateral earth resistance of 250 psf per foot of depth may be assumed for the sides of foundations poured against compacted fills. The maximum lateral passive earth pressure is recommended not to exceed 2500 pounds.

For design, active lateral pressures from local soils when used as backfills may be estimated from the following equivalent fluid density:

CONDITIONS	EQUIVALENT FLUID DENITY (pcf)	
	Level Backfill	2:1 Backfill Sloping Upwards
Active	35	55
At Rest	60	73
Seismic	75% of active earth pressures	75% of active earth pressures

4.5 Swimming Pool (if planned)

For adequate structural support, it is recommended that swimming pool shell should be established exclusively on underlying competent natural subgrades, or entirely into compacted engineered fills of local soils or its equivalent, or better. No cut-fill transition subgrade conditions should be allowed.

For swimming pool shell design, the following criteria may be considered:

1. Swimming pool full, with no passive resistance,
2. Swimming pool empty, with lateral active pressures from surrounding soils, and
3. Swimming pool full, with supported soil surroundings.

With soil vertical bearing capacity of 1800 psf, for design, lateral active pressures, and passive resistance in the form of "equivalent fluid density" from horizontal backfill, may be considered from the lateral active and passive resistance described. Supplemental recommendations on such will be supplied upon request.

4.6 Shrinkage and Subsidence

It is our opinion that during grading the upper soils may be subjected to a volume change. Assuming a 90% relative compaction for structural fills and assuming an overexcavation and recompaction depth as described, such volume change due to shrinkage may be on the order of 10% to 12%. Further volume change may be expected due to supplemental shrinkage during preparation of subgrade soils. For estimation purpose, such may be approximated to about 2-inch when conventional construction equipment is used.

4.7 Construction Consideration

4.7.1 Unsupported Excavation

Some exclusive pockets of gravelly sandy site soils encountered are considered highly susceptible to caving. Temporary excavations up to 4 feet in depth may be made without rigorous lateral supports. Excavated surface should be "'wetted" during construction in order to minimize potential surface soil raveling. No surcharge loading should be allowed within an imaginary 1:1 line drawn upward from toe of temporary excavations.

4.7.2 Supported Excavations

If vertical excavations exceeding 4 feet in depth become warranted, such should be achieved using shoring to support sidewalls.

4.8 Structural Pavement Thickness

Alternative I - Rigid Concrete Paving

Rigid paving, if selected, should be of at least 5inch-thick (net) reinforced with #4 rebar at 20 inches o/c placed directly over the local engineered soils compacted to minimum 95%.

Actual paving thickness and reinforcement requirements, however, should be supplied by the project structural engineer using soils' Subgrade Reaction, k_{cf}, of 250.

Rigid concrete driveways should have thickened edges to prevent potential for lateral sliding under auto and truck traffic loading.

Alternative II - Asphalt Paving

Flexible asphalt paving, if selected, based on the estimated Traffic Indices (TIs) as described below and an estimate soils' R-value of 47, the following flexible (a.c.) pavement sections are provided for estimation purposes:

Service Vehicle	Estimated Traffic Index, TIs	Pavement Type	Paving Thickness, inches
Auto/ Light-duty Truck Traffic	6 9	a.c. over Class II base or CMB	8.0 over 10.0 11.0 over 13.0

Within paving areas, subgrade soils should be subexcavated to minimum 24 inches, moisture conditioned to near Optimum Moisture Content, followed by the excavated soils replacement as engineered fills compacted to at least 90% of the relative soils' Maximum Dry Density as determined by ASTM D1557 method. Class II base or CMB used to receive asphalt concrete should be placed directly over the prepared subgrades and compacted to minimum 95%. Use of deeper paving edges are recommended to minimize potential for edge movement and paving distress.

The pavement evaluations are based on estimated Traffic Indices (TIs) as shown and on the soils' R-value as described. It is recommended that following mass grading completion, representative site soils should be laboratory tested to determine soils' R-value and to provide updated paving thickness.

4.9 Soil Caving

Considering dry silt and sand mix and slightly silty sands in nature, the site soils are considered "low" susceptible to caving. Temporary excavations in excess of 5 feet should be made at a slope 2 to 1 (h:v) or flatter and as per the construction guidelines provided by Cal-Osha.

4.10 Retaining Wall (if planned)

It is unknown if any retaining structure will be associated with development proposed. It is our opinion that retaining foundations should be designed based on a soils vertical bearing capacity of 1800 psf, along with the lateral active pressures as described below:

Slope of Retained Material (h:v)	Equivalent Fluid Density, pcf	
	Clean Sand	Local Soil
level	30	35
2:1	42	55

Walls adjacent to traffic areas should be designed to resist a uniform lateral pressure of 100 psf, which is a result of an assumed 300 psf surcharge behind the walls due to normal traffic. If the traffic is kept back 10 feet from the wall, the traffic surcharge may be neglected.

The design parameters described. do not include any hydrostatic pressure build-up. Consequently, installation of "'French-drain" behind retaining walls is recommended to minimize water pressure build-up behind retaining walls. Use of impervious material is preferred within upper the 18 inches of the backfills placed.

Backfills behind retaining wall should be compacted to a minimum 90% of the soils' Maximum Dry Density as determined by the ASTM D15571 test method. Flooding and/or jetting behind wall should not be permitted.

4.11 Utility Trenches Backfill

Utility trenches backfills within structural pad areas and beyond should be placed in accordance with the following recommendations:

- Trenches backfills consisting of flexible pipes should be placed in 6 to 8-inch thin lifts mechanically compacted to 90% or better of the laboratory maximum dry density for the soils used. Jetting is not recommended within utility trench backfill. Within streets, upper 2 feet of the trench backfill should be compacted to 95% or better.

- Exterior trenches along a foundation or a toe of a slope and extending below a 1:1 imaginary line projected from the outside bottom edge of the footing or toe of the slope should be compacted to 90% of the Maximum Dry Density for the soils used during backfill. Excavations should conform to the requirements of Cal-Osha.

4.12 Pre-Construction Meeting

It is recommended that no clearing of the site or any grading operation be performed without the presence of a representative of this office. An on-site pre-grading meeting should be arranged between the soils engineer and the grading contractor prior to any construction.

4.13 Seasonal Limitations

No fill shall be placed, spread or rolled during unfavorable weather conditions. Where the work is interrupted by heavy rains, fill operations shall not be resumed until moisture conditions are considered favorable by the soils engineer.

4.14 Planters

In order to minimize potential differential settlement to foundations, use of planters requiring heavy irrigation *should be restricted from being used adjacent to structural footings.* In event such becomes unavoidable, planter boxes with sealed bottoms, should be considered.

4.15 Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Pad drainage should be directed towards streets and to other approved areas away from foundations. Slope areas should be planted with draught resistant vegetation. Over watering landscape areas could adversely affect the proposed site development during its lifetime use.

4.16 Observations and Testing During Construction

Recommendations provided assume that structural footings and slabs-on-grade be established exclusively into compacted engineered fills. Excavated footings should be inspected, verified, and certified by the soils engineer prior to steel and concrete placement to ensure their sufficient embedment and proper bearing as recommended. Structural backfills discussed should be placed under direct observations and testing by Soils Southwest, Inc. Excess soils generated from footing excavations should be removed from pad areas and such should not be allowed on subgrades underlying concrete slab.

In general, geotechnical inspections should include, in minimum, the following:

- Subexcavation depth during grading,
- Fill compaction testing,
- Retaining wall backfill compaction,
- Excavated foundation depth,
- Paving subgrade verification, and
- Utility trenches backfill compaction.

4.17 Project Details Review

No precise grading or development plans are prepared and none such is available for review. Prior to actual mass grading, grading and foundation plans should be available to ensure applicability of the assumptions made in preparing this report. If during construction, conditions are observed different from those as presented, revised and/or supplemental recommendations will be required.

4.18 Final Compaction Report

A final report of field compaction control testing should be prepared following the completion of grading and a post-grading compaction report. The report should include a summary of the observations and testing performed, laboratory test results, and the results and locations of field moisture and density tests performed during grading.

5.0 Earth Work/General Grading Recommendations

Site preparations and grading should involve over-excavation and replacement of local soils as structural fill compacted to the minimum relative compactions as described earlier.

Structural Backfill:

Local soils free of debris, large rocks and organic should be considered suitable for reuse as backfill. Loose soils, formwork and debris should be removed prior to backfilling retaining walls. On-site sand backfill should be placed and compacted in accordance with the recommended specifications provided below. Where space limitations do not allow conventional backfilling operations, special backfill materials and procedures may be required. Pea gravel or other select backfill can be used in limited space areas. Recommendations for placement and densification of pea gravel or other special backfill can be provided during construction.

Site Drainage:

Adequate positive drainage should be provided away from the structure to prevent water from ponding and to reduce percolation of water into backfill. A desirable slope for surface drainage is 2% in landscape areas and 1% in paved areas. Planters and landscaped areas adjacent to building perimeter should be designed to minimize water filtration into subsoils. Considerations should be given to the use of closed planter bottoms, concrete slabs, and perimeter subdrains where applicable.

Utility Trenches:

Buried utility conduits should be bedded and backfilled around the conduit in accordance with the project specifications. Where conduit underlies concrete slab-on-grade and pavement, the remaining trench backfill above the pipes should be placed and compacted in accordance with the following grading specifications.

General Grading Recommendations:

Recommended general specifications for surface preparation to receive fill and compaction for structural and utility trench backfill and others are presented below.

1. Areas to be graded, backfilled or paved, shall be grubbed, stripped and cleaned of all buried and undetected debris, structures, concrete, vegetation and other deleterious materials prior to grading.

2. Where compacted fill is to provide vertical support for foundations, all loose, soft, and other incompetent soils should be removed to full depth as approved by the soils engineer, or at least up to the depth as previously described in this report. The areas of such removal should extend at least 5 feet beyond the perimeter of exterior foundation limit or to the extent as approved by the soils engineer during grading.

3. The fills to support foundations and slab-on-grade should be compacted to minimum 90% of the soil's Maximum Dry Density at near Optimum Moisture Conditions. To minimize potential differential settlements to foundations and slabs straddling over cut and fill transition, cut portions following cut, should be further over-excavated and such be replaced as engineered fill compacted to minimum percentage compaction requirements described.

4. Utility trenches within building pad areas and beyond should be backfilled with granular material and such should be mechanically compacted as described earlier.

5. Compaction for structural fills shall be determined relative to the Maximum Dry Density as determined by ASTM D1557 compaction methods. In-situ field density should be determined by the ASTM D1556 (Sand Cone standard method) or by other approved procedures.

6. Imported soils, if required, shall be clean, granular, and non-expansive in nature and as approved by the project soils engineer.

7. During grading, fill soils shall be placed in thin layers, thickness such should not exceed 6 to 8 inches.

8. No rocks over 6 to 8 inches in diameter shall be permitted to use as grading material without prior approval of the soils engineer.

9. No jetting and/or water tampering be considered for backfill compaction for utility trenches without prior approval of the soils engineer. For such backfill, hand tampering with fill layers of 8 to 12 inches in thickness is recommended.

10. The presence of any utility trenches at depth, cesspools or abandoned septic tanks existing within building pad areas and beyond, should be excavated and removed or such should be backfilled with gravel, slurry or by other material as approved by the soils engineer.

11. Imported fill soils, if required, should be equivalent to site soils or better. Such should be approved by the soils engineer prior to their use.

12. Grading required for pavement, sidewalks, or other facilities to be used by general public, should be constructed under direct observation of the soils engineer or as required by the local public agencies.

13. A site meeting should be held between the grading contractor and the soils engineer prior to actual construction. Two days advance notice will be required for such meeting.

6.0 WQMP-BMP Infiltration Rate Using Porchet Method for Stormwater Disposal Design

Presented herewith are the preliminary results of soils' infiltration testing performed for the planned stormwater disposal system proposed for the project. The test results should be considered "tentative" given the potential for changes to site finish grades or changes in soil conditions as exposed during site preparations and grading.

Five (5) infiltration tests were performed at the depths and locations as suggested by the project design engineer. The tests were performed using the standardized "falling-head" test converted using the Porchet method. Test locations are shown on the attached Plate 1 and the test data is provided in the attached Appendix D.

The soils encountered within the proposed infiltration system areas consist, in general, of dry fine to medium coarse sands with some silts, pebbles, and rock fragments to the maximum depths of 3.5,1.5, and 2.5 feet explored and proposed underground infiltration retention basin system bottom as described (P-1 to P-5). Additional geotechnical boring to maximum depth of 31 feet did not expose the presence of shallow depth groundwater or layers considered impermeable to water. Descriptions of the soils encountered are provided in the attached Log of Borings.

Method of infiltration rates as per the guidelines in accordance with Table 1, Infiltration Basin Option 2 of Appendix A of the Riverside County-Low Impact Development (LID) BMP Design Handbook as well as per the Appendices Section VII.3.8.2, Appendix VII: Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations of the San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook.

Based on the field infiltration testing completed, it is our opinion that for the infiltration system design proposed at about 1.5 to 3.5 feet below existing grade as suggested by the project civil engineer, the observed soils' infiltration rates are 3.43 inches/hour, 3.83 inches/hour, 2.30 inches/hour, 6.97 inches/hour, and 5.02 inches/hour for test locations P-1 to P-5, respectively.

For design, it is suggested that use of an appropriate factor of safety as determined by the design engineer should be considered to the observed rate to account for long-term saturation, inconsistencies in subsoil conditions, potential for silting, and lack of maintenance. The observed soils' percolation rates are provided in Section 6.3 of this report.

6.1 METHODOLOGY AND TEST PROCEDURES

EQUIPMENT SET-UP (POST EXCAVATION) PROCEDURES:

Following test boring completion, each of the test holes were fitted with perforated PVC pipes. For testing, each test hole was initially filled using water supplied by water jugs.

Prior to actual testing, to determine test intervals, as per the Section 2.3 for deep percolation testing of the referenced handbook guideline, two consecutive readings were performed to determine if 6 or more inches of water seeped in 25 minutes. Since 6 inches or more of water seeped away in less than 25 minutes for all test locations P-1 to P-5, subsequent percolation testing was performed at 10-minute time intervals for at least minimum one hour or until the rates were uniform. Testing included water placement at about 18 inches, surface, and 6 inches below existing grade surface (inlet depth of approximately 24 inches above infiltration system bottom).

The final 10-minute recorded percolation test rates were converted into an Infiltration Rate (I_t) for inches per hour using the "Porchet Method" equation as described in the Reference 2, Riverside County Low Impact Development BMP Design Handbook, as well as per the Appendices Section VII.3.8.2, Appendix VII: Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations on the San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook.

6.2 INFILTRATION TEST RESULTS

Based on the soils infiltration testing completed at the test locations and at the test depth as described, the observed soils' percolation rates are 3.43 inches/hour, 3.83 inches/hour, 2.30 inches/hour, 6.97 inches/hour, and 5.02 inches/hour for test locations P-1 to P-5, respectively.

Calculations to convert the percolation test rate to infiltration test rates in accordance with Section 2.3 of the County Handbook are presented in Table I and II below. For design, it is suggested that an appropriate Factor of Safety as selected by the design engineer should be considered to the observed field percolation rate described.

6.3 SUMMARY & CONVERSION CALCULATIONS

For WQMP-BMP design, based on the soils infiltration testing completed and, on the calculations as described, the following infiltration rates may be considered. Actual field test data are attached.

TABLE I
Observed Infiltration Rate for Design

Test Location (8-1-25)	Test Depth Below Grade, feet	Porchet Method Observed Rate, inch/hour
P-1	3.5	3.43
P-2	1.5	3.83
P-3	1.5	2.30
P-4	1.5	6.97
P-5	2.5	5.02

TABLE II
Conversion Table (Porchet Method)

Test No.	Depth Test Hole, inches	Time Interval, minutes	Initial Depth, inches	Final Depth, inches	Initial Water Height, inches	Final Water Height, inches	Change in Height/ Time	Average Head Height/Time
	Dt	ΔT	D_O	D_f	$H_o=D_t-D_o$	$H_f=D_t-D_f$	$\Delta H= H_f-H_O$	$H_{avg} = (H_o+H_f)/2$
P-1	42	10	18	24.5	24	17.5	6.5	20.75
P-2	18	10	0	5.5	18	12.5	5.5	15.25
P-3	18	10	0	3.5	18	14.5	3.5	16.25
P-4	18	10	0	9.0	18	9.0	9.0	13.50
P-5	30	10	6	15.0	24	15.0	9.0	19.50

	Infiltration Rate (It)=ΔH60r/Δt(r+2Havg)		
	A	B	C
Test No.	ΔH60r	Δt(r+2Havg)	A/B=inch/hour
P-1	1560	455	3.43
P-2	1320	345	3.83
P-3	840	365	2.30
P-4	2160	310	6.97
P-5	2160	430	5.02

Use of a safety factor of approximately 1.5 or as determined by the project design engineer may be considered to account for long-term saturation, inconsistencies in subsoil conditions, and potential for silting of percolating soils.

The infiltration rates described is based on the in-situ testing completed at the locations as suggested by the project design engineer. In the event that the final chamber location and depth vary considerably from those described herein, supplemental soils infiltration testing may be warranted.

It should be noted that over prolonged use and lack of maintenance the detention/infiltration basins or deep chambers constructed based on the suggested design rate may experience much lower infiltration rate due to the accumulation of silts, fines, soils, and others. Regular maintenance of the chambers in the form of removal of debris, oil, and fines are strongly recommended. A maintenance record of such is suggested for future use.

Suggested Requirements for Standard Stormwater BMP Installation

The invert of stormwater infiltration should be set at least 10 feet above the groundwater elevation and should not be placed on steep slopes to create conditions for slopes instability.

When adequately installed, it is our opinion that the Stormwater infiltration systems installed should not increase the potentials for static or seismic settlement of structures.

Stormwater infiltration installed should not place an increased surcharge on structures or foundations on or its adjacent. The pore water pressure should not increase the soils retained by retaining structures.

The invert of stormwater infiltration should be set back at least 15 feet and outside a 1:1 plan drawn up from the bottom of adjacent foundations.

Stormwater infiltration should not be located near utility lines where the introduction of stormwater could cause damage to utilities or settlement of trench backfill.

Stormwater infiltration systems should not be allowed within 100 feet of any potable groundwater production well.

Once installed, regular maintenance of the detention systems is recommended.

7.0 Closure

The opinions and conclusions presented are based upon the findings and observations as made during subsurface test excavations and subsequent laboratory testing and engineering evaluations as currently used in the Geotechnical industry. The recommendations supplied should be considered "preliminary" since they are based on soil samples only. If during construction, the subsoil conditions appear different from those as disclosed during field investigation this office should be notified to consider any possible need for modification by the geotechnical recommendations as provided in this report.

Recommendations provided are based on the assumptions that structural footings strictly be established exclusively into compacted fill. No footings and/or slabs should be allowed straddling over cut/fill transition interface.

Site grading observations and testing must be performed by a representative of this office. Further, it is recommended that excavated footings should be verified and approved by soils engineer prior to steel and concrete placement to ensure that foundations are founded into satisfactory soils and excavations are free of loose and disturbed materials.

A pre-grading meeting in between grading contractor and soils engineer is recommended prior to construction preferably at the site, to discuss the grading procedures to be implemented and other requirements described in this report to be fulfilled.

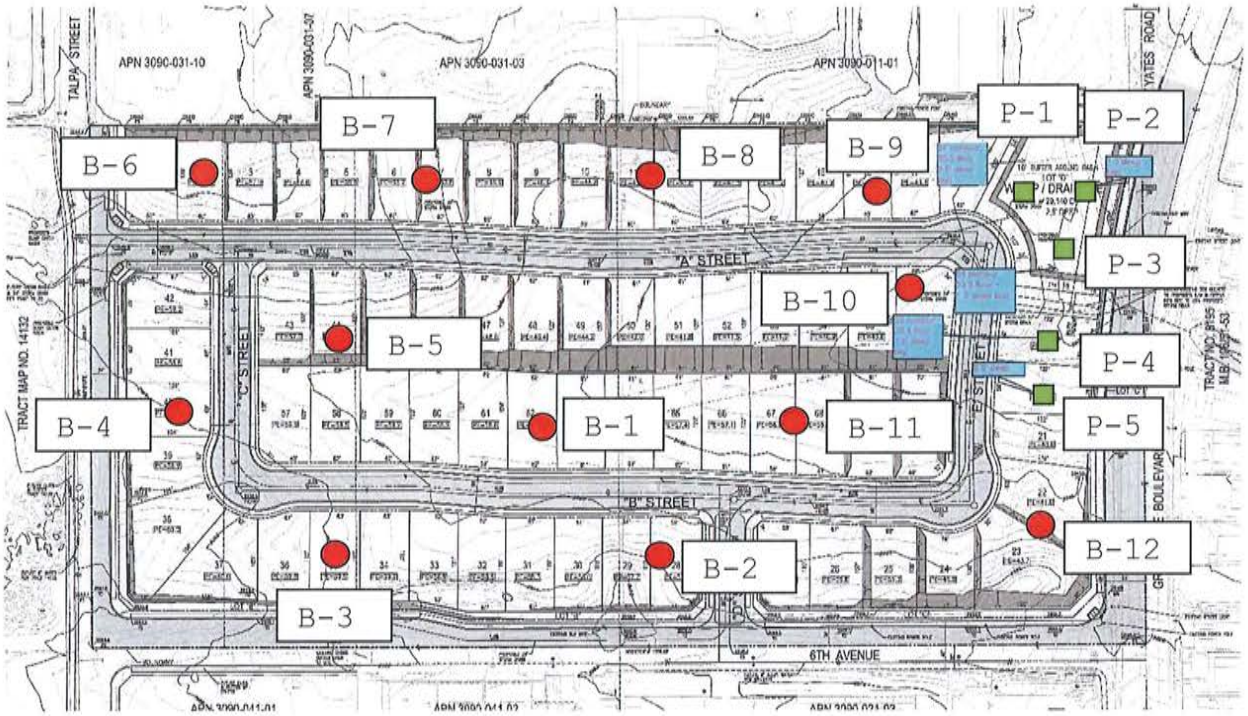
This report has been prepared exclusively for the use of the addressee for the project referenced in the context. It shall not be transferred or be used by other parties without a written consent by Soils Southwest, Inc.

Should the project be delayed beyond one year after the date of this report, the recommendations presented shall be reviewed to consider any possible change in site conditions.

The recommendations presented are on the assumption that the necessary geotechnical observations and testing during construction will be performed by a representative of this office. The field observations are considered a continuation of the geotechnical investigation performed.

If another firm is retained for geotechnical observations and testing, our professional liability and responsibility shall be limited to the extent that Soils Southwest, Inc. would not be the geotechnical engineer of record. Use of the geotechnical recommendations by others will relieve Soils Southwest, Inc. of any liability that may arise during the lifetime use of the structure constructed.

PLOT PLAN AND TEST LOCATIONS
Proposed 70-lot Single Family Tract 20781
SWC Green Tree Boulevard and 6th Avenue
Victorville, California
APN(S):3090-011-02,3090-031-06,-11&-12
NTS



Legend:
- B-1 Approximate Location of Test Borings for Geotechnical Study
- BMP-1 Approximate Location of Test Boring for BMP Soils' Infiltration

Plate 1

8.0 APPENDIX A

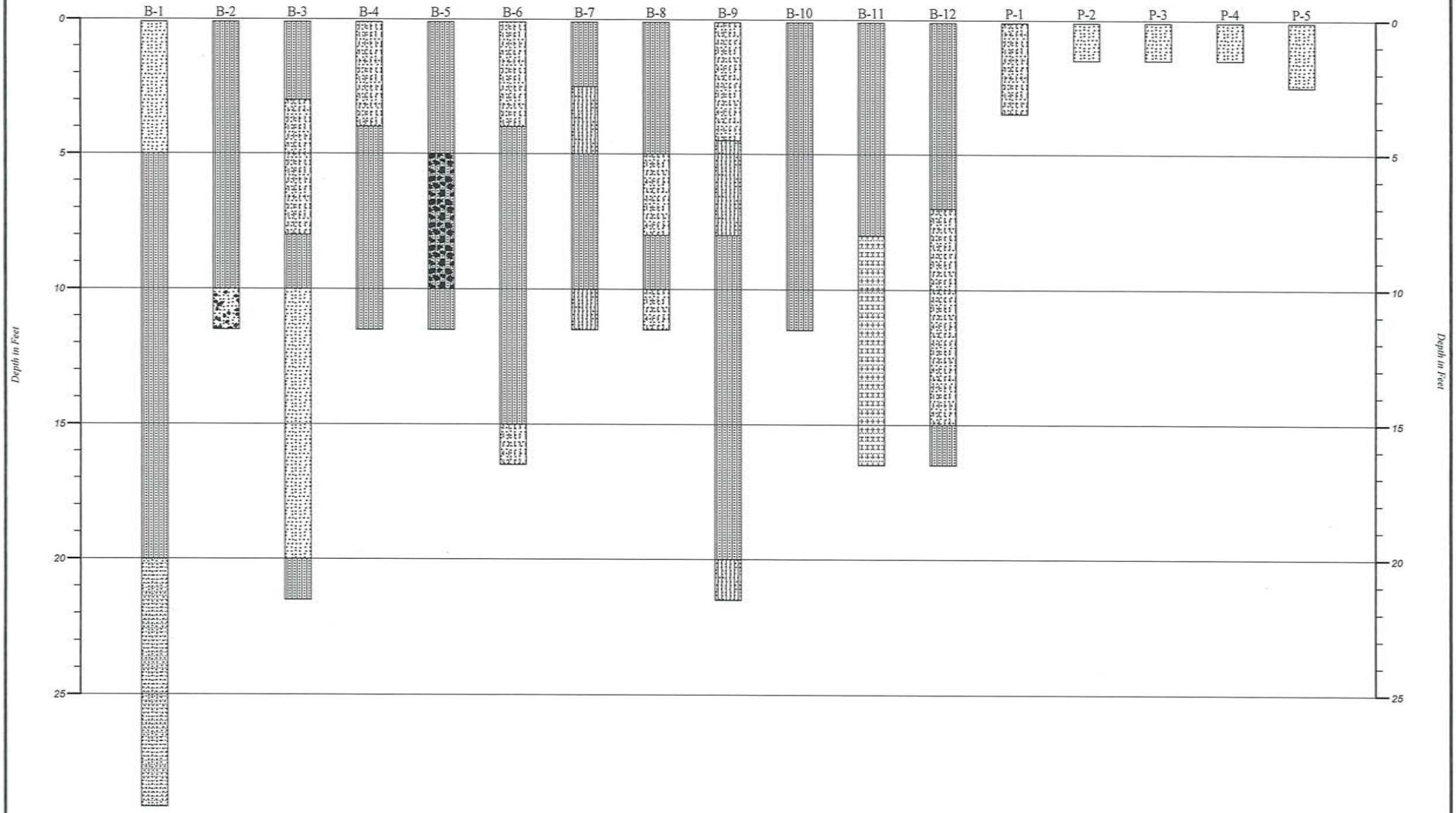
Field Explorations

Geotechnical evaluations included 12 exploratory test borings (B-1 to B-12) using a hollow-stem auger drilling rig advanced to maximum 31 feet below existing grade surface, along with 5 test pits (P-1 to P-5) to a maximum depth of 3.5 feet below existing grade surface. Approximate test exploration locations are shown on the attached Plate 1.

Soils encountered during explorations were logged and such were classified by visual observations in accordance with the generally accepted classification system. The field descriptions were modified, where appropriate, to reflect laboratory test results. The bulk and undisturbed soil samples procured were sent to our laboratory for geotechnical analyses as described in the attached Test Boring Logs.

Logs of test explorations are presented in the following summary sheets that include the description of the soils and/or fill materials encountered.

LOG OF TEST EXPLORATIONS



Plan View

Strata symbols

- Poorly graded sand
- Silty sand
- Interlayered well/poorly graded sand
- Poorly graded gravel and sand
- Poorly graded sand with silt
- Silty sand and gravel
- Poorly graded silty fine sand
- Well graded sand with silt

SOILS SOUTHWEST, INC.

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=5'		8/18/2025

Grand Pacific Communities

PROJECT NO. 25032-F/BMP

FIGURE NUMBER

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP			surface weeds and gravels
								SAND - yellow, silty, fine to medium coarse pebbles, rock fragments, dry
								- (Max Dry Density = 130 pcf @ 9.0%)
13								- semi-cemented sands, dry
							5	- SPT blow counts (6" intervals)= 5,6,7
		4.3	120.6	92.8	SM			- color change to peach tan, silty, fine to medium coarse, pebbles, rock fragments, 1/2" rocks, dry
							10	
57								- color change to light yellow gray, silty cemented, fine to medium coarse, pebbles, rock fragments, some white caliche, very dense, dry
								- SPT blow counts (6" intervals)= 26,26,31
							15	
							20	
29					SW-SP			- fine with scattered rock 1/2"-1",dense,dry
								- SPT blow counts (6" intervals)= 11,13,16
							25	
							30	
78					SM			- color change to light gray-brown with streaks of white, cemented, caliche, fine silty, very dense, dry
								- SPT blow counts (6" intervals) = 16,31,47
								- End of test boring @ 31.5 ft.

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Planned 70-Lot Single Family Tract Green Tree Blvd. & 6th Ave. Victorville, California	**Plate #**

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
								- no bedrock - no groundwater
							40	
							45	
							50	
							55	
							60	
							65	
							70	

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LOG OF BORING B-2

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			scattered surface weeds
								SAND - tan, silty, fine to medium coarse, pebbles, rock fragments, dry
		3.6	121.5	93.4				- color change to light brown, silty, fine to medium coarse semi-cemented with traces of white caliche, pebbles, rock fragments, and 1/4" rock, dense, dry
							5	
10								- color change to tan, gravely, silty, fine to medium coarse, pebbles, rock fragments scattered rocks, loose to low density,dry
								- SPT blow counts(6" intervals)=7,5,5
							10	
20					GP-SP			- color change to yellow, gravely, medium coarse to coarse, rock fragments, medium dense, dry
								- SPT blow counts (6"intervals) = 5,8,12
								- End of test boring @ 11.5 ft.
							15	- no bedrock
								- no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
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LOG OF BORING B-3

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			scattered surface weeds
								SAND - light yellow gray, silty, fine,dry
								- with presence of white caliche material
					SP-SM			- slightly silty, fine to medium coarse, pebbles, rock fragments, dry
							5	
18								- SPT blow counts (6" intervals)= 6,8,10
		1.1	118.9	91.4	SM			- color change to grayish peach tan, silty, fine to medium, pebbles, rocks 1/4", very dry
							10	
23					SP			- color change to light whitish yellow gray gravely, fine to coarse, pebbles, rock fragments, rock
								- SPT blow counts (6" intervals)= 8,11,12
							15	
								- scattered rock 1"-2"
							20	
41					SM			- color change to grayish light yellow to tan brown, silty, scattered pebbels, dry
								- SPT blow counts (6" intervals) = 12,18,23
								- End of test boring @ 21.5 ft.
								- no bedrock
								- no groundwater
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

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LOG OF BORING B-4

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			scattered surface weeds SAND - reddish brown to yellow, slightly silty, fine to medium coarse, pebbles occasional rock fragments, dry
64					SM		5	- color change to light gray yellow, silty fine to medium coarse, pebbles, scattered rock fragments, dry - SPT blow counts (6" intervals)=13,31,33
		8.7	99.0	76.2				- color change to yellow, silty, fine, dry
41							10	- dense - SPT blow counts (6"intervals)= 11,18,23
								- End of test boring @ 11.5 ft. - no bedrock - no groundwater
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

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LOG OF BORING B-5

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			surface weeds, scattered organic and other debris
								SAND - tan brown, silty, fine to medium coarse, pebbles, dry
							5	- color change to light yellow gray, silty fine
37					GM-SM			- color change to grayish tan, slightly silty, gravely, fine to coarse, pebbles, rock fragments, dry
								- SPT blow counts (6" intervals)=9,18,19
							10	
24					SM			- color change to light yellow,silty, fine to medium coarse, pebbles, rock fragments dry
								- SPT blow counts (6" intervals)= 9,11,13
								- End of test boring @ 11.5 ft.
								- no bedrock
							15	- no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

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LOG OF BORING B-6

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			scattered weeds and brush
								SAND - orangish tan brown, slightly silty, fine to medium coarse, pebbles, rock fragments, low to medium denese, dry
		1.3	104.0	80.0	SM		5	- color change to pinkish sand, silty, fine to medium coarse with pebbles, rock fragments, medium dense
75								- color change to yellow tan, silty,cemented with some white caliche, very dense, dry
								- SPT blow counts (6" intervals)= 29,33,42
							10	
47								- color change to white to light yellow, silty, fine, trace caliche, dense, dry
								- SPT blow counts (6" intervals)=12,19,28
							15	
38					SP-SM			- color change to yellowish gray to tan brown, slightly silty, fine, with traces of white caliche and scattered pebbles,dry
								- SPT blow counts (6" intervals) = 4,17,21
								- End of test boring @ 16.5 ft.
							20	- no bedrock
								- no groundwater
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

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LOG OF BORING B-7

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			surface weeds
								SAND - yellow tan, silty, fine to medium coarse, pebbles, rock fragments,dry
					SM-ML			- color change to whitish light yellow, some caliche, fine, silty, cemented,
19							5	pebbles, rock fragments, dry
		8.9	101.7	78.2	SM			- SPT blow counts (6" intervals) = 4,7,12
								- color change to light brown, silty, fine medium coarse, medium dense, damp
							10	
65					SM-ML			- color change to light yellowish gray, with traces of white caliche, fine,silty pebbles, dry to orangeish tan, silty, fine, occasional pebbles, very dense,dry
								- SPT blow counts (6" intervals)= 19,30,35
							15	- End of test boring @ 11.5 ft.
								- no bedrock
								- no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

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LOG OF BORING B-8

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			scattered weeds and debris
								SAND - light yellow gray, silty, fine to medium coarse, pebbles,rock fragments dry
							5	- color change to whitish yellow, cemented silty, some caliche, very dense, dry
					SP-SM			- color change to white, caliche with cemented slightly silty, fine, dry
		3.9	119.5	91.9	SM			- color change to light yellow,slightly silty, caliche, pebbles, rock fragments, dry
47					SP-SM		10	- color change to light brown, silty, fine to medium, pebbles, rock fragments, dense, dry
								- color change to light yellow tan to white slightly silty, fine to medium coarse, pebbles, rock fragments, dense, dry
							15	- End of test boring @ 11.5 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
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LOG OF BORING B-9

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			surface desert weeds SAND - grayish yellow tan, slightly silty, fine to medium coarse, pebbles, rock fragments, dry
							5	
57					SM-ML			- color change to white light yellow tan, silty, trace caliche, fine, pebbles, scattered rock fragments, dry - very dense - SPT blow counts (6" intervals) = 15,25,32
44					SM			- color change to light yellow, silty, fine to medium, pebbles, dense, dry - SPT blow counts (6" intervals) = 10,23,21
							10	
							15	
							20	
46					SM-ML			- color change to grayish tan, silty, fine traces of caliche, occasional pebbles,dry - SPT blow counts (6" intervals) = 11,23,23
								- End of test boring @ 21.5 ft. - no bedrock - no groundwater
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Planned 70-Lot Single Family Tract Green Tree Blvd. & 6th Ave. Victorville, California	**Plate #**

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
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Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-10

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			weeds
								SAND - grayish yellow tan, silty, fine to medium coarse, pebbles,rock fragments dry
		4.7	118.3	86.9				- color change to light brown, silty, fine to medium coarse, pebbles, rock fragments, medium dense to dense, dry
30							5	- color change to white transition to light yellow, silty, caliche, fine, scattered pebbles and rock fragments, dry
								- SPT blow counts (6" intervals) = 10,11,19
36							10	- silty fine with white flecks, dense, dry
								- SPT blow counts (6" intervals) = 12,16,20
								- End of test boring @ 11.5 ft.
								- no bedrock
								- no groundwater
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
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LOG OF BORING B-11

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			surface weeds, scattered organic debris
								SAND - light yellow to white, silty, trace caliche, fine to medium coarse, pebbles, dry
35								- color change to light brown with white caliche, fine, dry
							5	- SPT blow counts (6" intervals)=13,16,19
								- color change to white light yellow, silty fine
34					SW-SM			- color change to light gray yellow tan, well-graded sand with some silts, and traces of white caliche, scattered pebbles dry
							10	- SPT blow counts (6" intervals) = 10,15,19
							15	
45								- color change to yellow brown with traces of clay to light yellow fine well graded sand to light gray brown, slightly silty fine, dense, dry
								- SPT blow counts (6" intervals) = 12,20,25
							20	- End of test boring @ 16.5 ft. - no bedrock - no groundwater
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-12

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			surface weeds, scattered organic debris
								SAND - light yellowish gray-brown, silty, fine to medium coarse, pebbles
36					SP			- color change to whitish light yellow with trace caliche
		6.3	124.6	95.9			5	- color change to orangish gray tan, semi-cemented, traces of caliche, fine to medium, pebbles, dry
								- SPT blow counts (6" intervals)= 8,16,20
					SP-SM			- color change to orangish yellow, silty, fine to medium coarse, pebbles, rock fragments, very dense, dry
							10	- color change to orangish grayish yellow, slightly silty, cemented, fine to medium pebbles, dry
							15	
41					SM			- color change to grayish tan brown,silty cemented, fine, dry
								- SPT blow counts (6" intervals)= 11,17,24
								- End of test boring @ 16.5 ft.
								- no bedrock
								- no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-1

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			weeds, scattered organic debris
								SAND - grayish tan brown, slightly silty, fine to medium coarse, pebbles, rock fragments, dry
							5	- End of infiltration test boring @ 3.5 ft. - no bedrock - no groundwater - 3" perforated socked PVC pipe installed with gravel at bottom
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Planned 70-Lot Single Family Tract Green Tree Blvd. & 6th Ave. Victorville, California	**Plate #**

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-2

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP			weeds
								SAND - grayish tan brown, traces of silt, fine to medium coarse, pebbles, rock fragments, dry
								- End of infiltration test boring @ 1.5 ft.
								- no bedrock
							5	- no groundwater
								- 3" perforated socked PVC pipe installed with gravel at bottom
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-3

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP			weeds
								SAND - light yellow gray, traces of silt, fine to medium coarse, pebbles, rock fragments, dry
								- End of infiltration test boring @ 1.5 ft.
								- no bedrock
								- no groundwater
								- 3" perforated socked PVC pipe installed with gravel at bottom
							5	
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-4

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP			weeds
								SAND - light yellow gray, traces of silt, fine to medium coarse, pebbles, rock fragments, dry
								- End of infiltration test boring @ 1.5 ft.
								- no bedrock
								- no groundwater
								- 3" perforated socked PVC pipe installed with gravel at bottom
							5	
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-5

Project: Grand Pacific Communities		**Job No.:** 25032-F/BMP
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** July 29,2025

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP			weeds
								SAND - light yellow gray, traces of silt, fine to medium coarse, pebbles, rock fragments, dry
								- End of infiltration test boring @ 2.5 ft.
								- no bedrock
								- no groundwater
								- 3" perforated socked PVC pipe installed with gravel at bottom
							5	
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Planned 70-Lot Single Family Tract
Green Tree Blvd. & 6th Ave.
Victorville, California

Plate #

Bulk/Grab sample Standard penetration test California sampler

KEY TO SYMBOLS

Symbol Description

Strata symbols


Poorly graded sand


Silty sand


Interlayered well/poorly graded sand


Poorly graded gravel and sand


Poorly graded sand with silt


Silty sand and gravel


Poorly graded silty fine sand


Well graded sand with silt

Soil Samplers


Bulk/Grab sample


Standard penetration test


California sampler

Notes:

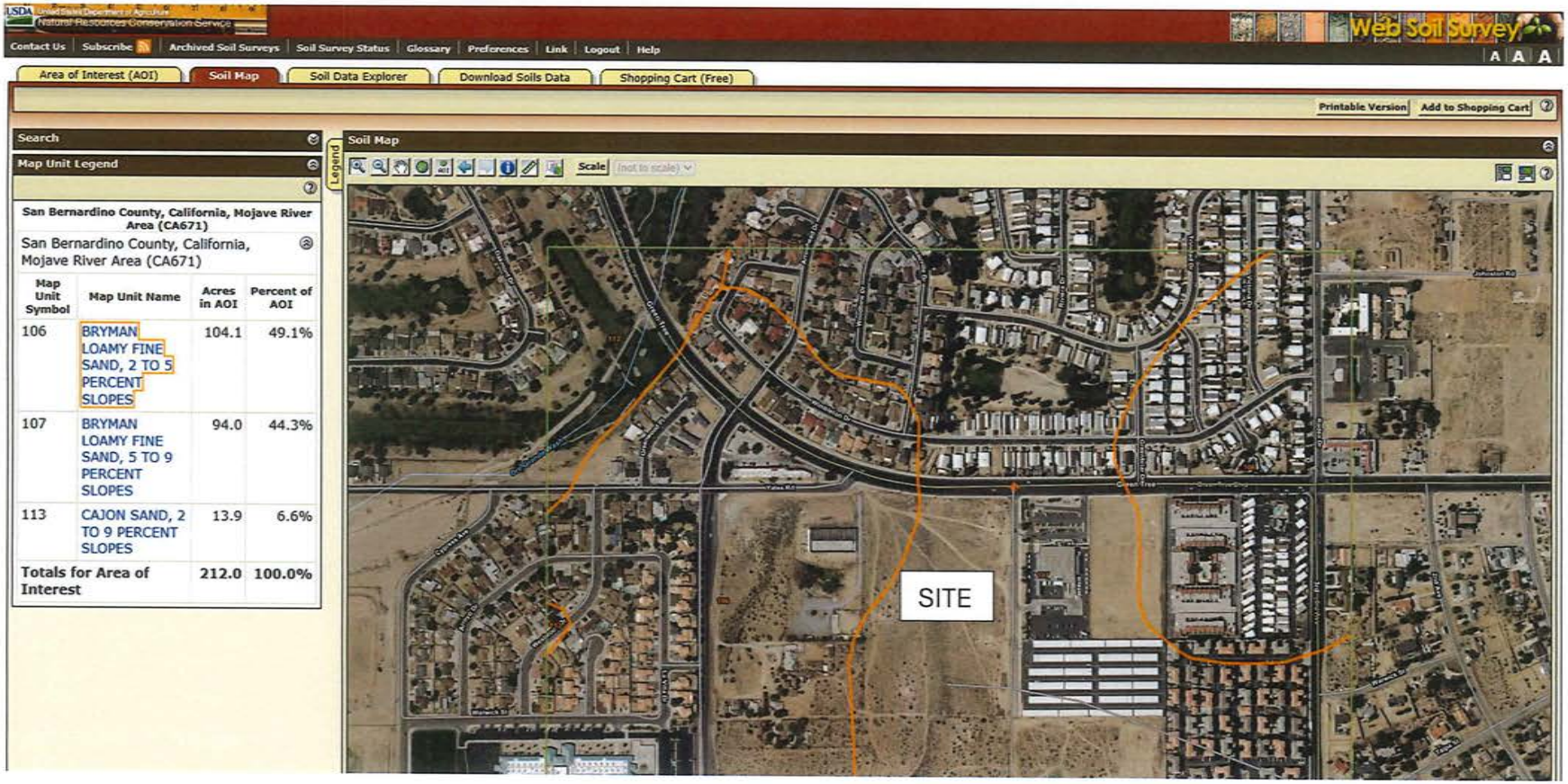
1. Exploratory borings were drilled on July 29,2025 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.



San Bernardino County, California, Mojave River Area (CA671)

San Bernardino County, California, Mojave River Area (CA671)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
106	BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	104.1	49.1%
107	BRYMAN LOAMY FINE SAND, 5 TO 9 PERCENT SLOPES	94.0	44.3%
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	13.9	6.6%
Totals for Area of Interest		**212.0**	**100.0%**

San Bernardino County, California, Mojave River Area

106—BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrb
Elevation: 3,000 to 3,400 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bryman and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bryman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 43 inches: sandy clay loam
H3 - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon, loamy surface
Percent of map unit: 5 percent
Hydric soil rating: No

Helendale
Percent of map unit: 5 percent
Hydric soil rating: No

Mohave variant
Percent of map unit: 5 percent
Hydric soil rating: No

Bryman, gravelly surface
Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 16, Aug 30, 2024

Hydrologic Soil Group: C
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon, loamy surface
Percent of map unit: 5 percent
Hydric soil rating: No

Helendale
Percent of map unit: 5 percent
Hydric soil rating: No

Mohave variant
Percent of map unit: 5 percent
Hydric soil rating: No

Bryman, gravelly surface
Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 16, Aug 30, 2024

San Bernardino County, California, Mojave River Area

107—BRYMAN LOAMY FINE SAND, 5 TO 9 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrc
Elevation: 3,000 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Bryman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 39 inches: sandy clay loam
H3 - 39 to 60 inches: loamy sand

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C

Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon
Percent of map unit: 5 percent
Hydric soil rating: No

Helendale
Percent of map unit: 5 percent
Hydric soil rating: No

Bryman, sloping
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 16, Aug 30, 2024

Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon
Percent of map unit: 5 percent
Hydric soil rating: No

Helendale
Percent of map unit: 5 percent
Hydric soil rating: No

Bryman, sloping
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 16, Aug 30, 2024

9.0 APPENDIX B

Laboratory Test Programs

Laboratory tests were conducted on representative soils for the purpose of classification and for the determination of the physical properties and engineering characteristics. The number and selection of the types of testing for a given study are based on the geotechnical conditions of the site. A summary of the various laboratory tests performed for the project is presented below.

Moisture Content and Dry Density (ASTM D2216-80):

Data obtained from these tests performed on undisturbed samples are used to aid in geotechnical soil classification and correlation of the soils and to provide qualitative information regarding in-situ soil strengths.

Direct Shear (ASTM D3080):

Data obtained from this test performed at increased and field moisture conditions on relatively undisturbed and remolded soil sample is used to evaluate soil shear strengths. Samples contained in brass sampler rings placed directly on test apparatus are sheared at a constant strain rate of 0.002 inch per minute under saturated conditions and under varying loads appropriate to represent anticipated structural loadings. Shearing deformations are recorded to failure. Peak and/or residual shear strengths are obtained from the measured shearing load versus deflection curve. Test results, plotted in graphical form, are presented on Plate B-1 of this section.

Soil Consolidation (ASTM D2835):

Drive-tube samples are tested at their field moisture contents and at increased moisture conditions since the soils may become saturated during lifetime use of the planned structure.

Data obtained from this test performed on relatively undisturbed and/or remolded samples, were used to evaluate the consolidation characteristics of foundation soils under anticipated foundation loadings. Preparation for this test involved trimming the sample, placing it in 1-inch-high brass ring, and loading it into the test apparatus which contained porous stones to accommodate drainage during testing. Normal axial loads are applied at a load increment ratio, successive loads being generally twice the preceding.

Soil samples are usually under light normal load conditions to accommodate seating of the apparatus. Samples were tested at the field moisture conditions at a predetermined normal load. Potentially moisture sensitive soil typically demonstrated significant volume change with the introduction of free water. The results of the consolidation tests are presented in graphical forms on Plate B-2 of this section.

Potential Expansion, EI (ASTM Standard D4829):

Sandy, silty, and gravely in nature, the soils are considered 'very low' in expansion characteristic with an Expansion Index, EI, less than 20. Supplemental soil expansion testing may be warranted following mass grading completion.

Sieve Analysis (ASTM D 422):

Soils gradation analyses are performed on procured bulk samples at various testing for depths to determine the classification of existing soil conditions.

Laboratory Test Results

Table I. Maximum Dry Density - Optimum Moisture Content (ASTM D1557)

Boring No. & Sample Depth, ft	Max. Dry Density, pcf	Optimum Moisture Content, %
B-1 @ 0-5 SAND- yellowish tan to peach tan brown, silty, fine to medium coarse, pebbles, rock fragments, occasional ½" rock, dry	130	9.0

Table II. In-Situ Moisture-Density Determinations (ASTM D2216)

Test Boring No.	Sample Depth, ft	Dry Density, pcf	Moisture Content, %
1	5.0	120.6	4.3
2	3.0	121.5	3.6
3	8.0	118.9	1.1
4	7.0	99.0	8.7
6	4.0	104.0	1.3
7	5.0	101.7	8.9
8	8.0	119.5	3.9
10	3.0	118.3	4.7
12	5.0	124.6	6.3

Table III. Consolidation (D2435)

Sample #	Depth, ft	Consolidation prior to saturation, % @ 2 kips	Hydro Collapse, % @ 2 kips	Total Consolidation, % @ 8 kips (saturated)
B-1 (remolded)	0-5	0.6	0.0	1.4
B-1 (undisturbed)	5	0.6	2.5 (moderate)	5.7
B-2 (undisturbed)	3	1.3	0.9 (slight)	5.2
B-8 (undisturbed)	8	0.5	0.7 (slight)	5.7

Table IV: Direct Shear (ASTM D3080)

Test Trench or Boring & Sample Depth, ft	Test Condition	Cohesion, pdf	Friction, degrees
B-1 @ 0-5	Remolded to 90%	325	41
B-10 @ 3	Undisturbed	375	46
B-7 @ 5	Undisturbed	75	50
B-3 @ 8.0	Undisturbed	225	43

Table V: Sand Equivalent, SE (ASTM D2419)

Sample Location @ depth, ft	Sand Equivalent , SE.
PV-1 @ 0-3	37.5
PV-2 @ 0-4	11.10
PV-3 @ 0-3	9.62
PV-4 @0-3	35.71
PV-5 @ 0-2.5	47.66

Table VI: Sieve Analysis (ASTM D 422)
PV-3 @ 0-3 feet (Bulk)

Grain Size	% Retained
Gravels	2
Sand-Medium to Coarse	28
Fines	44
Silts	26

Table VII: Soils' Density Correlation to SPT Blow Counts

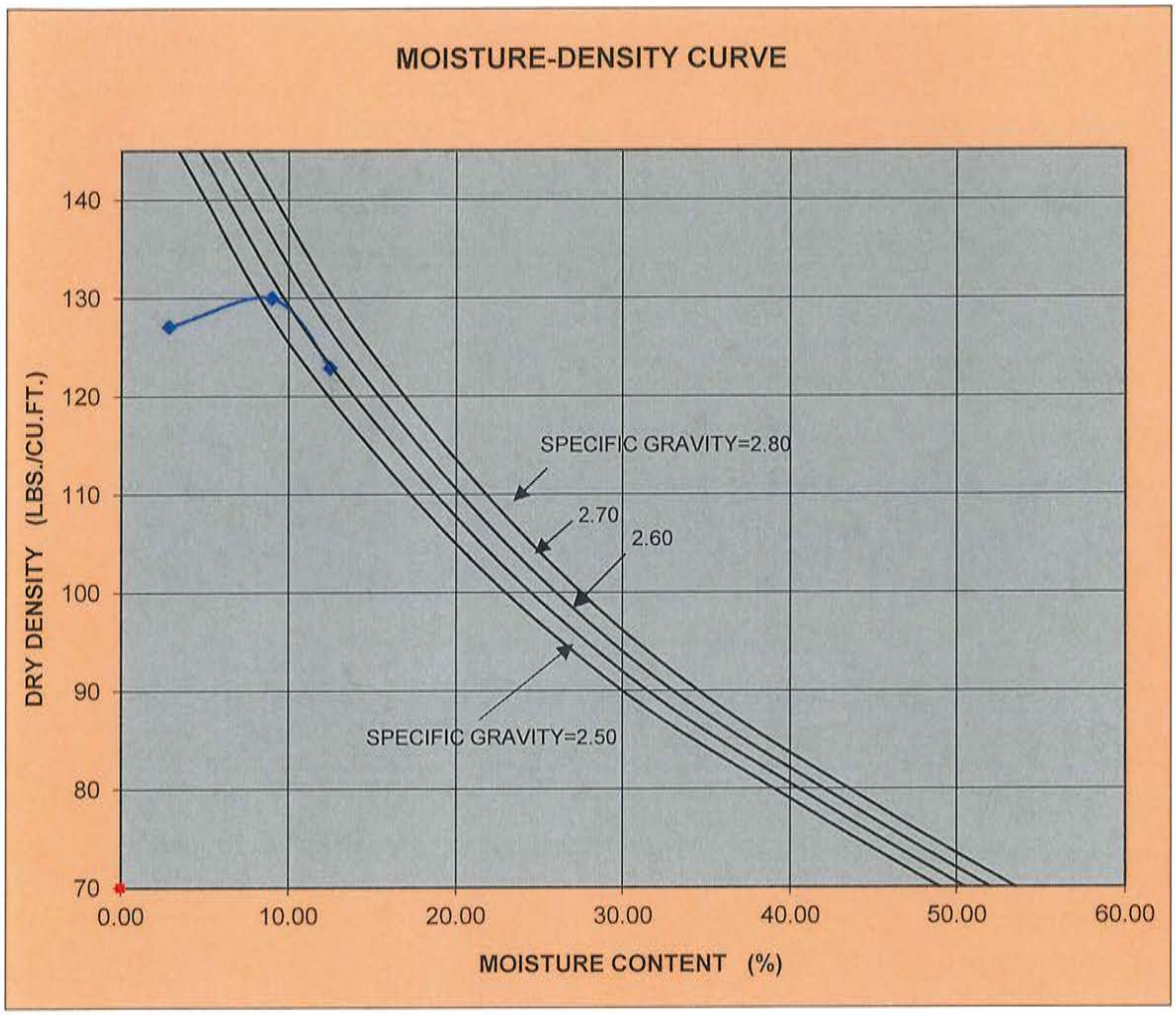
Density/Consistency		1" Soil Tube -- Blows Per Foot			Standard Penetration Blows Per Foot
Granular	Cohesive	Sand and Gravel	Silt	Clay	
Very Loose	Very Soft	0-50	0-50	0-60	0-5
Loose	Soft	50-100	50-180	60-250	5-10
Slightly Compact	Stiff	100-350	180-1000	250-1000	10-20
Compact	Very Stiff	350-525	1000-2000	1000-4000	20-35
Dense	Hard	525-1500	2000-5000	4000-5000	35-70
Very Dense	Very Hard	1500+	5000+	5000+	70+

Table VIII: Soil Density Based on Relative Compaction

% Compaction	Compactness
< 75	Loose
75-83	Medium Dense
83-90	Dense
>90	Very Dense

MODIFIED PROCTOR COMPACTION TEST (ASTM STD. 1557)

MOISTURE % (g)	2.86	9.00	12.50	12.50
DRY DENSITY (pcf)	127.1	130	122.9	122.9



CURVE	SOIL DESCRIPTION	OPT MOIST. CONTENT(%)	MAX DRY DENSITY (P.C.F.)
B-1 0-5	Grand Pacific Communities Green Tree Boulevard & 6th Avenue Victorville, California	9	130
SOIL DESCRIPTION: SAND- yellowish tan to peach tan brown, silty, fine to medium coarse pebbles, rock fragments, occasional 1/2" rock, dry			PROJECT NO. 25032-F PLATE: A-1

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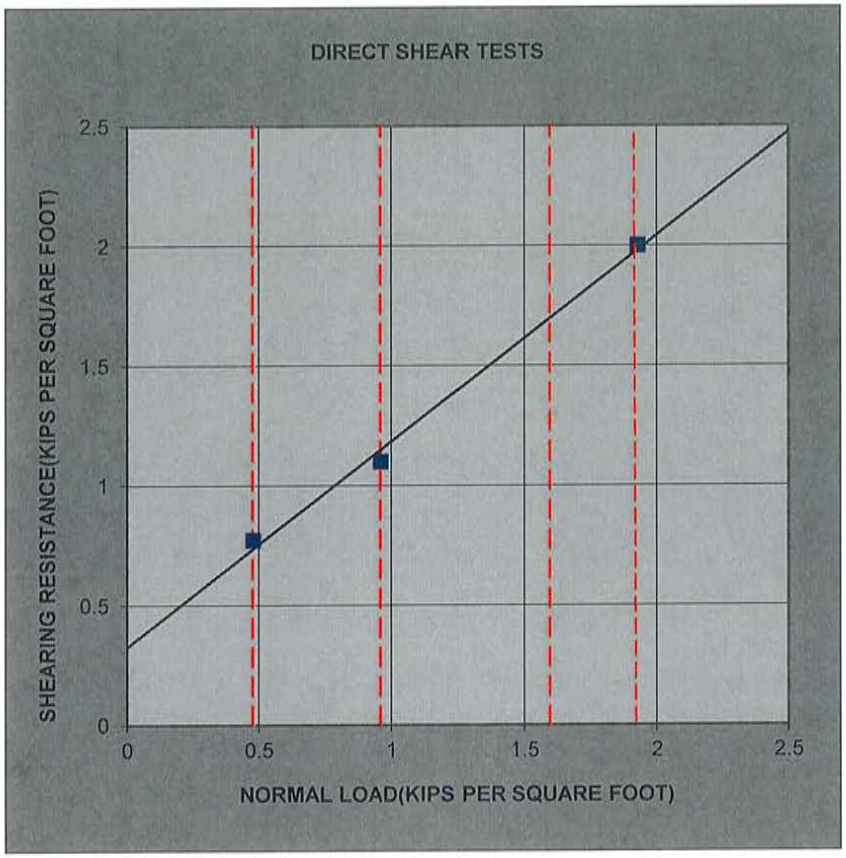
Consulting Foundation Engineers



SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-1	0 to 5	Remolded to 90%	325.12	40.67

Proposed 70-Lot Single Family Home Tract Development
SWC Green Tree Blvd. & 6th Ave.
Victorville, California

PROJECT NO.	25032-F
PLATE	B-1

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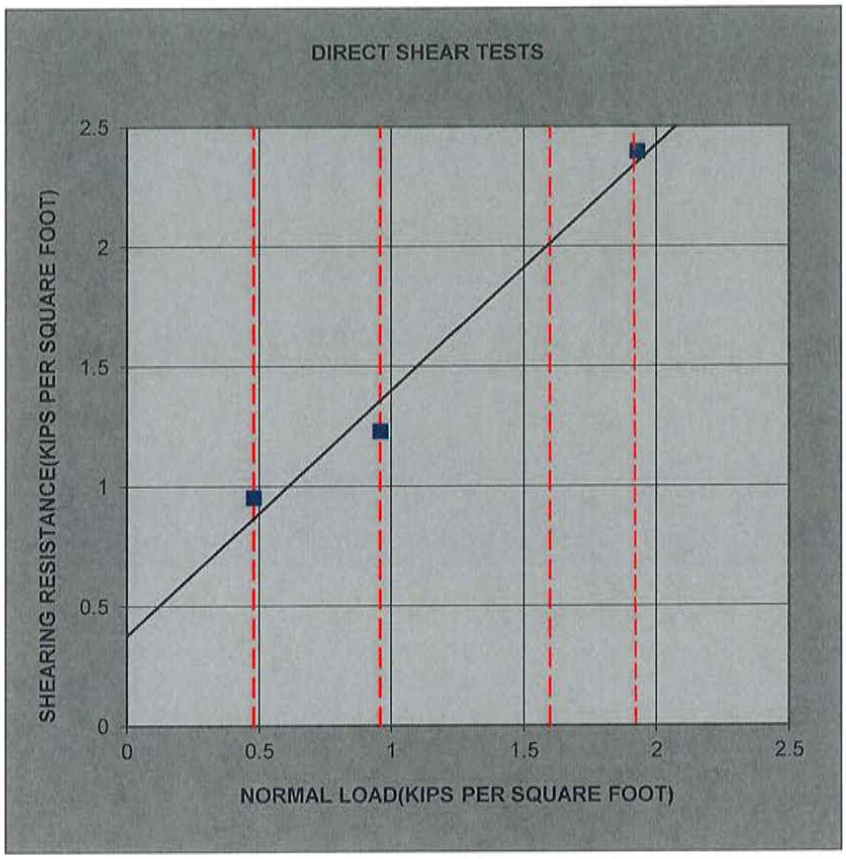

SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-10	3.0	Undisturbed	375.18	45.69

Proposed 70-Lot Single Family Home Tract Development
SWC Green Tree Blvd. & 6th Ave.
Victorville, California

PROJECT NO.	25032-F
PLATE	B-1-1

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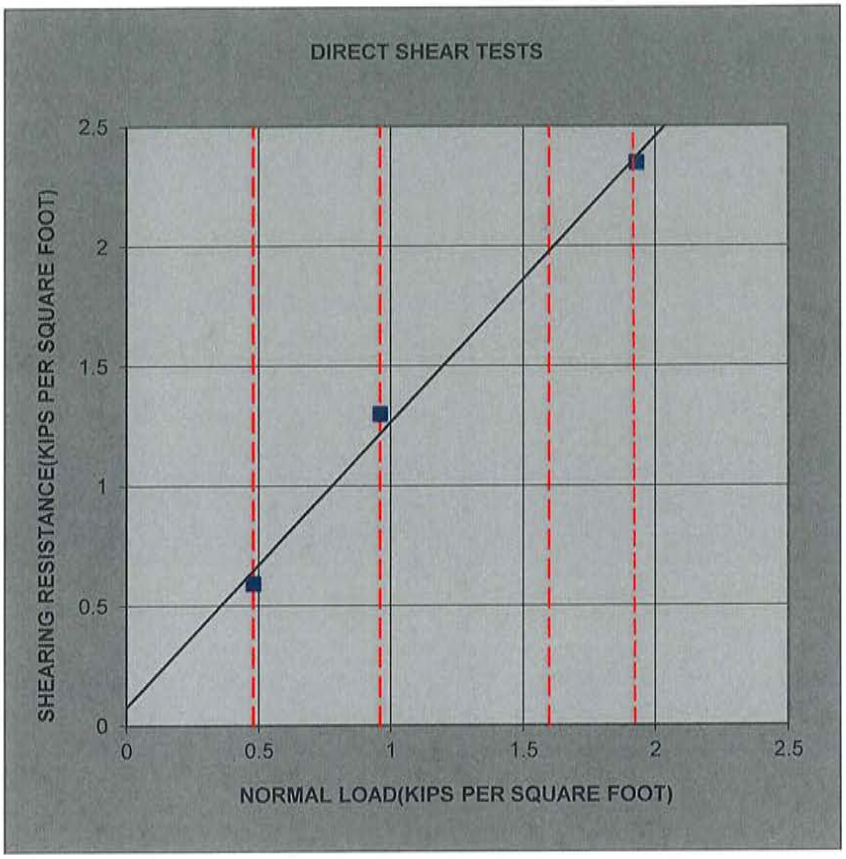

SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-7	5.0	Undisturbed	75.04	49.98

Proposed 70-Lot Single Family Home Tract Development
SWC Green Tree Blvd. & 6th Ave.
Victorville, California

PROJECT NO.	25032-F
PLATE	B-1-2

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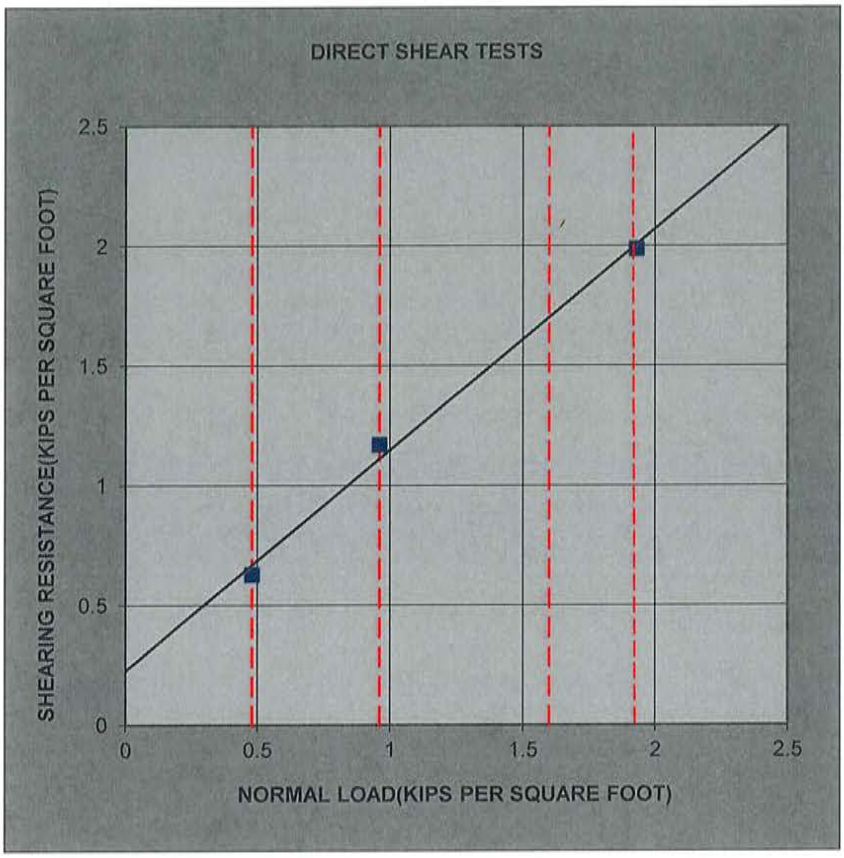

SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-3	8.0	Undisturbed	225.12	42.69

Proposed 70-Lot Single Family Home Tract Development SWC Green Tree Blvd. & 6th Ave. Victorville, California	PROJECT NO.	25032-F
	PLATE	B-1-3

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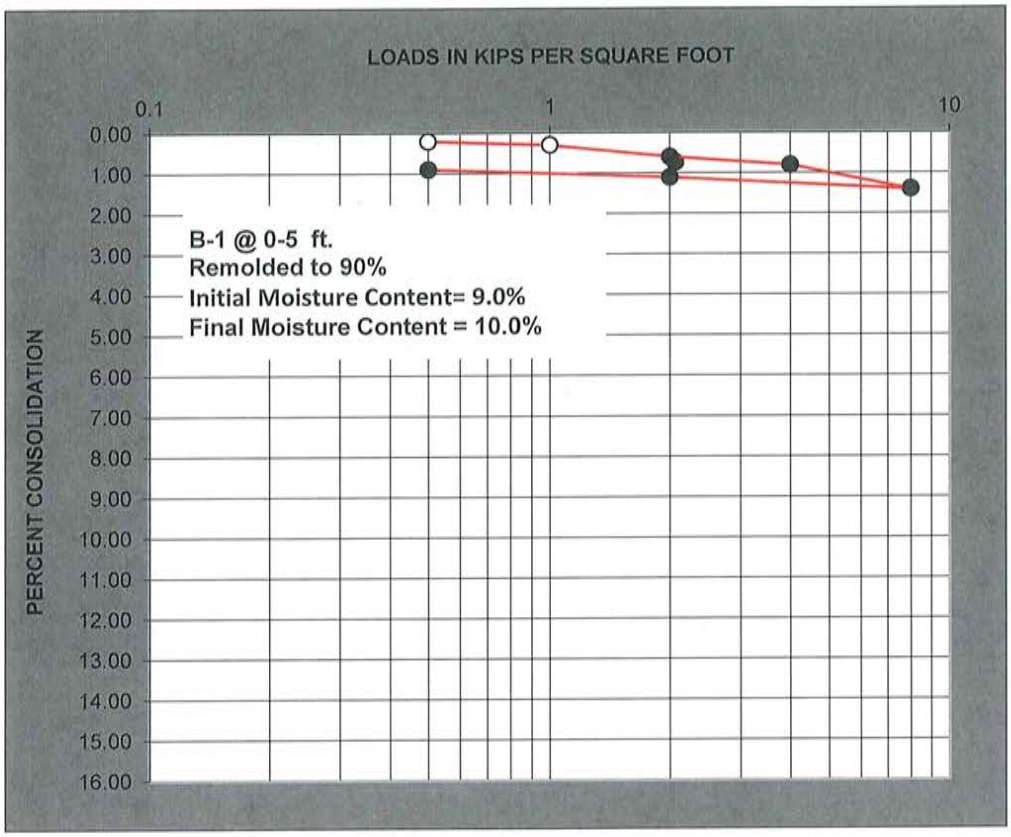
Consulting Foundation Engineers

CONSOLIDATION TESTS

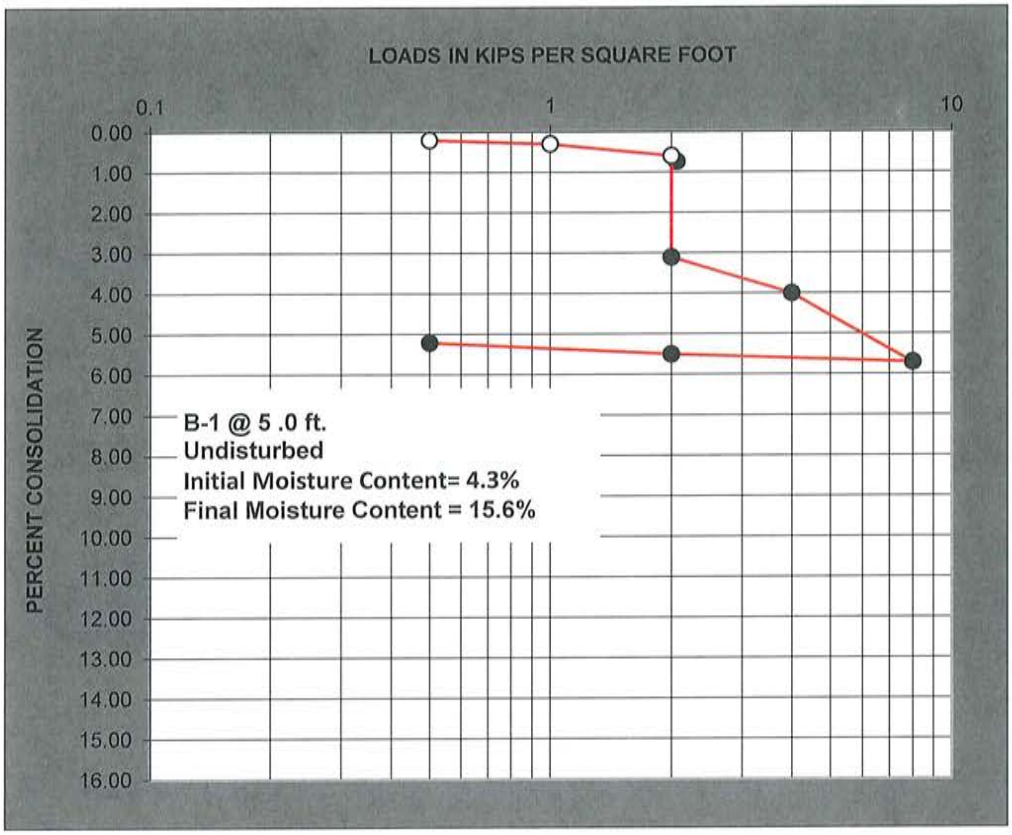


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed 70-Lot Single-Family Residential Tract SWC Green Tree Blvd. & 6th Ave., Victorville, California		
	PROJECT NO.	25032-F	PLATE	B-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

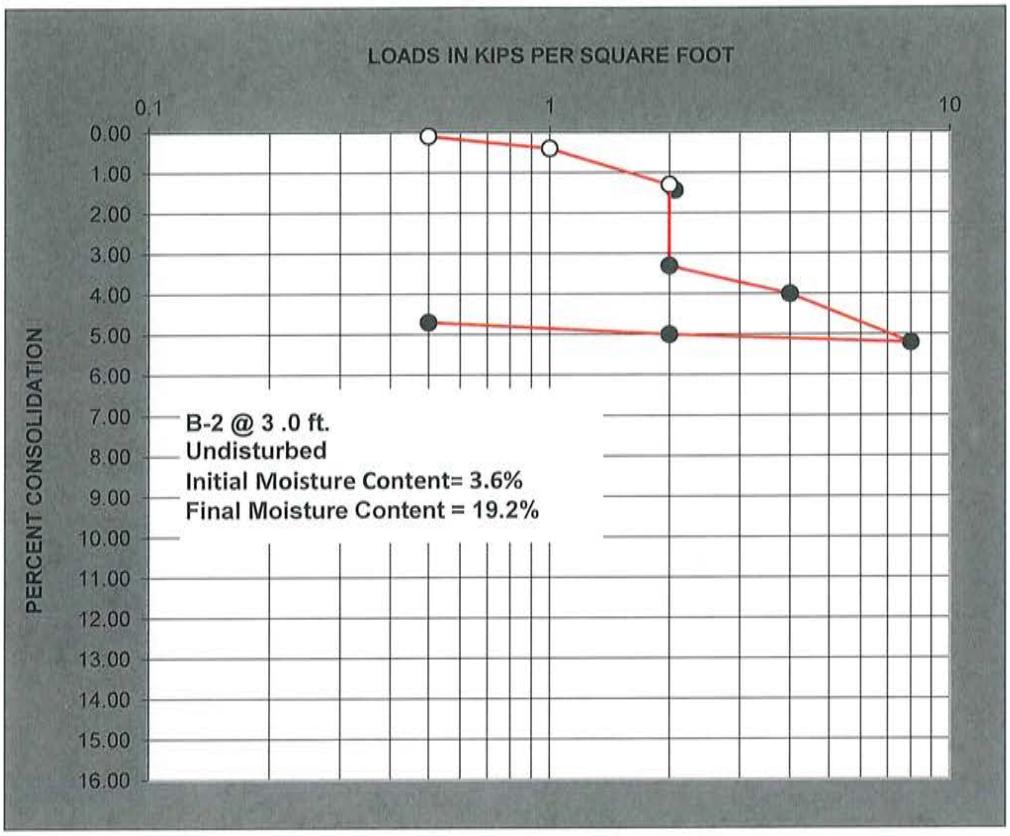


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed 70-Lot Single-Family Residential Tract SWC Green Tree Blvd. & 6th Ave., Victorville, California		
	PROJECT NO.	25032-F	PLATE	B-2-1

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

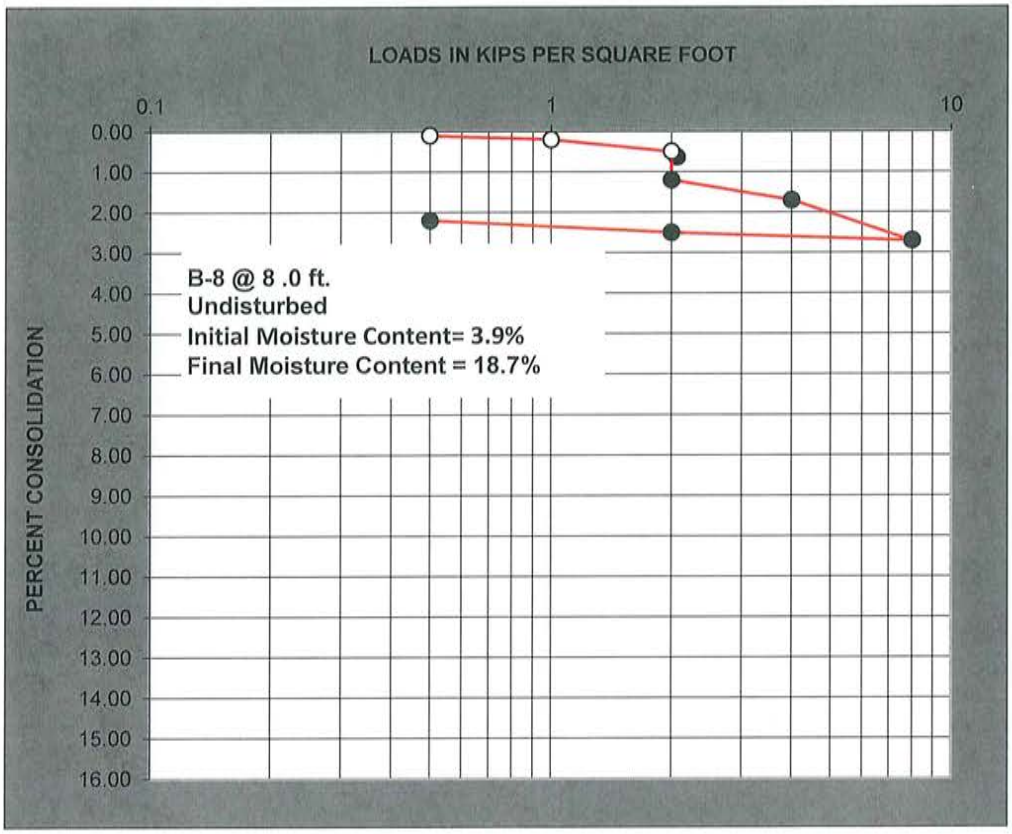


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed 70-Lot Single-Family Residential Tract SWC Green Tree Blvd. & 6th Ave., Victorville, California		
	PROJECT NO.	25032-F	PLATE	B-2-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

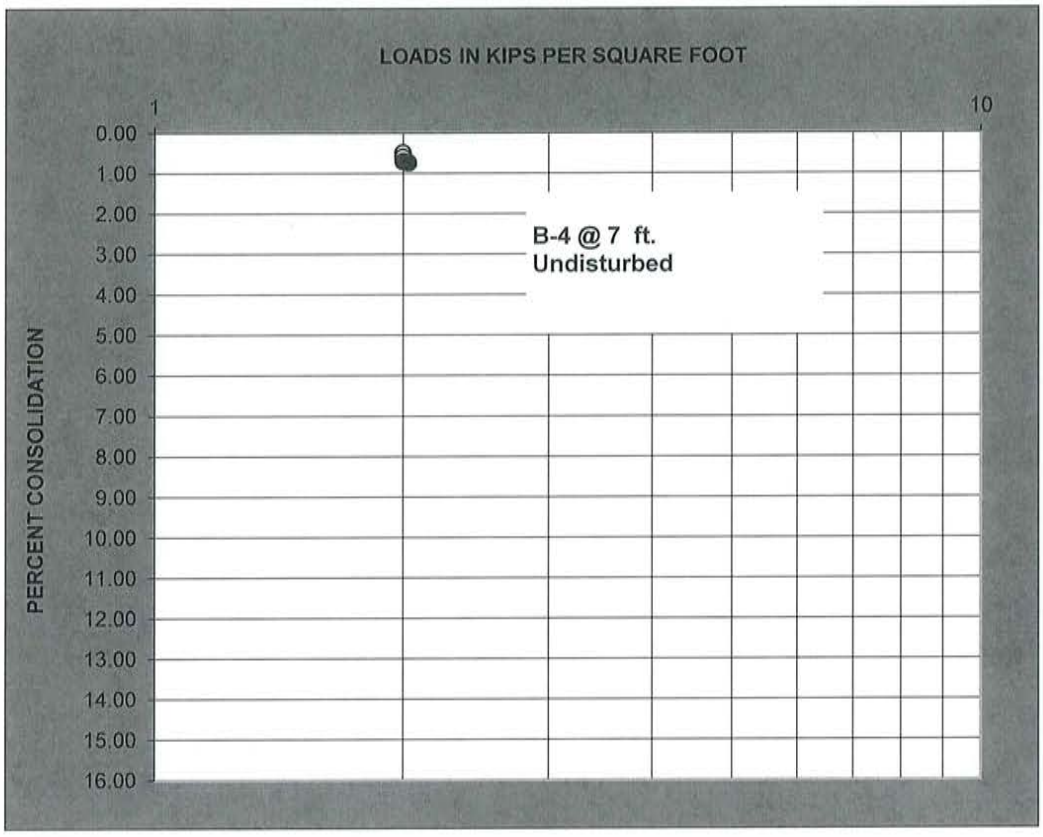


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed 70-Lot Single-Family Residential Tract SWC Green Tree Blvd. & 6th Ave., Victorville, California		
	PROJECT NO.	25032-F	PLATE	B-2-3

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

COLLAPSE POTENTIAL TEST (ASTM-D5333-96)



- **WATER PERMITTED TO CONTACT SAMPLE**

READING	COLLAPSE POTENTIAL %	SEVERITY
0.7	0.1-2	Slight

COLLAPSE POTENTIAL %	SEVERITY
0	No Problem
0.1-2	Slight
2.1-6	Moderate
6.1-10	Moderately-Severe
>10	Severe

PROJECT	Proposed 70-Lot Single-Family Residential Tract SWC Green Tree Blvd. & 6th Ave., Victorvilled, CA		
PROJECT NO.	25032-F	PLATE	B-3

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

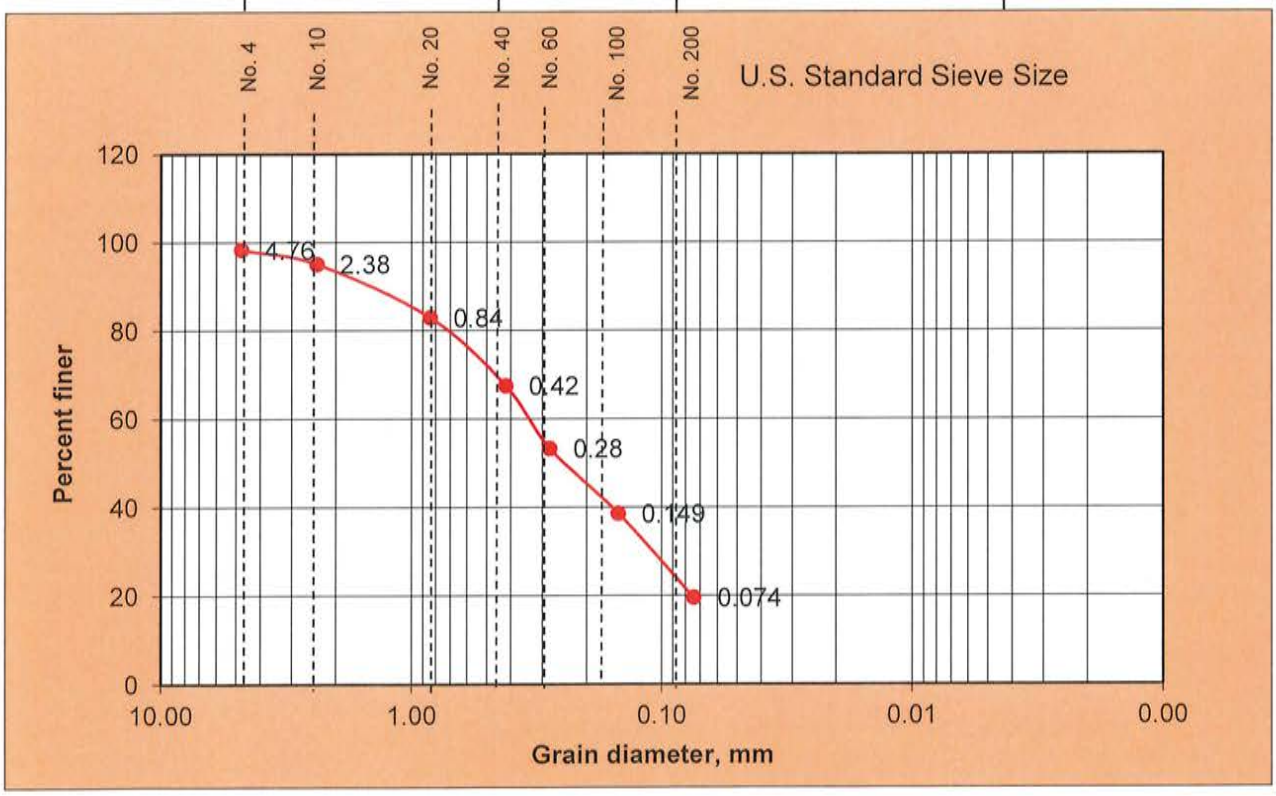
GRAIN SIZE DISTRIBUTION ASTM D422

Project: Grand Pacific Communities Tract **Job #** 25032-F/BMP
Location: SWC Green Tree & 6th Ave. Victorvilled **Boring No:** PV-3 @ 0-3' **Sample No:** 1
Description of Soil: SM
Date of Sample: 7/29/2025
Tested By: JG **Date of Testing:** 8/8/2025

Sieve No.	Sieve Openings in mm	Percent Finer
4	4.76	98.36
10	2.38	95.16
20	0.84	82.98
40	0.42	67.58
60	0.28	53.34
100	0.149	38.62
200	0.074	19.58

Grain Size	% Retained
Gravel	2
Med. to Crs	28
Fines	44
Silts	26
Insitu M.C. %	7.8

Gravel	Sand			
	Coarse to Medium	Fine	Silt	Clay



Visual Soil Description : SAND- fine silty with widely scattered pebbles, damp

Soil Classification: SM

System: USC

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

SAND EQUIVALENT TEST

Test Date: August 7,2025

Project No.: 25032-F

Job Name: Grand Pacific Communities: 70-Lot SF Tract
SWC Green Tree Blvd. & 6th Ave., Victorville

Sample Location: B-2 PV-1@ 0-3 ft. (east side)

Sample by: JF Tested by: JG

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	11:06	11:11	11:16	
TIME SOAK (10 min.)	11:16	11:21	11:26	
TIME AT LEVEL 15ML	11:18	11:23	11:28	
TIME of READING (20-min)	11:38	11:43	11:48	
FINE, ML	6.2	6.0	6.2	
COARSE, ML	2.2	2.3	2.4	
SE = 100x (coarse/fine)	35.48	38.33	38.7	
SE Average	37.5			

SAND EQUIVALENT TEST

Test Date: August 7,2025

Project No.: 25032-F

Job Name: Grand Pacific Communities: 70-Lot SF Tract
SWC Green Tree Blvd. & 6th Ave., Victorville

Sample Location: B-4 PV-2@ 0-4 ft. (south side)

Sample by: JF Tested by: JG

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	1:07	1:12	1:17	
TIME SOAK (10 min.)	1:17	1:22	1:27	
TIME AT LEVEL 15ML	1:19	1:24	1:29	
TIME of READING (20-min)	1:39	1:44	1:49	
FINE, ML	5.7	5.7	5.7	
COARSE, ML	0.6	0.9	0.4	
SE = 100x (coarse/fine)	10:52	15.79	7.01	
SE Average	11.10			

SOILS SOUTHWEST, INC.
CONSULTING FOUNDATION
ENGINEERS

SAND EQUIVALENT TEST

Test Date: August 8,2025

Project No.: 25032-F

Job Name: Grand Pacific Communities: 70-Lot SF Tract
SWC Green Tree Blvd. & 6th Ave., Victorville

Sample Location: B-7 PV-3@ 0-3 ft. (southwest side)

Sample by: JF Tested by: JG

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	8:47	8:52	8:57	
TIME SOAK (10 min.)	8:57	9:02	9:07	
TIME AT LEVEL 15ML	8:59	9:04	9:09	
TIME of READING (20-min)	9:19	9:24	9:29	
FINE, ML	5.9	5.7	6.0	
COARSE, ML	0.6	0.4	0.7	
SE = 100x (coarse/fine)	10.17	7.02	11.67	
SE Average	9.62			

SOILS SOUTHWEST, INC.
CONSULTING FOUNDATION
ENGINEERS

SAND EQUIVALENT TEST

Test Date: August 8,2025

Project No.: 25032-F

Job Name: Grand Pacific Communities: 70-Lot SF Tract
SWC Green Tree Blvd. & 6th Ave., Victorville

Sample Location: B-10 PV-4@ 0-3 ft. (north side-interior)

Sample by: JF Tested by: JG

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	10:03	10:08	10:13	
TIME SOAK (10 min.)	10:13	10:18	10:23	
TIME AT LEVEL 15ML	10:15	10:20	10:25	
TIME of READING (20-min)	10:35	10:40	10:45	
FINE, ML	5.6	5.6	5.6	
COARSE, ML	2.1	2.0	1.9	
SE = 100x (coarse/fine)	37.5	35.71	33.93	
SE Average	35.71			

SOILS SOUTHWEST, INC.
CONSULTING FOUNDATION
ENGINEERS

SAND EQUIVALENT TEST

Test Date: August 8,2025

Project No.: 25032-F

Job Name: Grand Pacific Communities: 70-Lot SF Tract
SWC Green Tree Blvd. & 6th Ave., Victorville

Sample Location: P-5/ PV-5@ 0-2.5 ft. (north side-Green Tree side)

Sample by: JF Tested by: JG

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	11:05	11:10	11:15	
TIME SOAK (10 min.)	11:15	11:20	11:25	
TIME AT LEVEL 15ML	11:17	11:22	11:27	
TIME of READING (20-min)	11:37	11:42	11:47	
FINE, ML	5.7	5.7	5.8	
COARSE, ML	2.6	2.7	2.9	
SE = 100x (coarse/fine)	45.61	47.37	50.0	
SE Average	47.66			

APPENDIX C

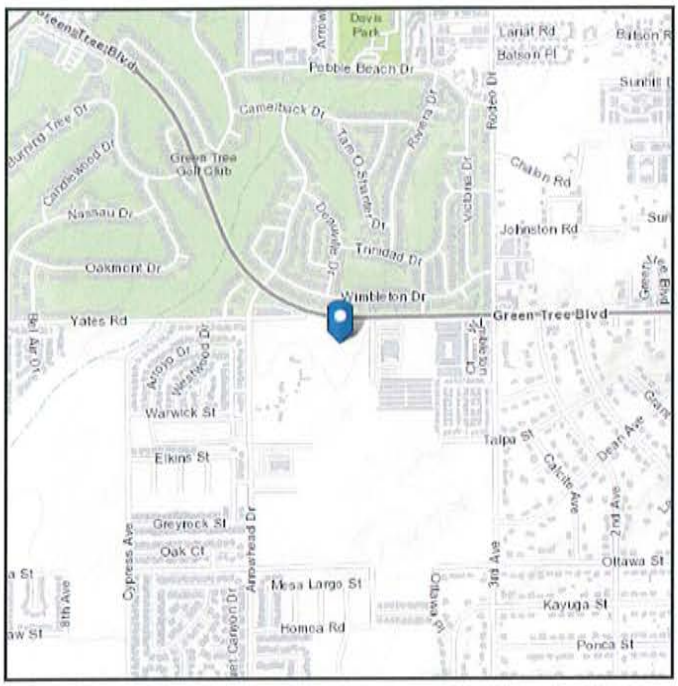
Seismic Design Parameters
Seismic Maps
&
FEMA: National Flood Hazard Layer FIRMette

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 34.499126
Longitude: -117.309273
Elevation: 2941.8912211976026 ft (NAVD 88)



ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.193	S_{D1} :	N/A
S_1 :	0.461	T_L :	12
F_a :	1.023	PGA :	0.5
F_v :	N/A	PGA_M :	0.55
S_{MS} :	1.22	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.813	C_v :	1.339

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Mon Jul 21 2025

Date Source: USGS Seismic Design Maps

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
8.87	North Frontal (West)	CA	1	49	S	reverse	0	16	50
13.26	Helendale -So Lockhart	CA	0.6	90	V	strike slip	0	13	114
14.28	Cleghorn	CA	3	90	V	strike slip	0	16	25

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Fault Name	State
North Frontal (West)	**California**

GEOMETRY	
Dip (degrees)	49
Dip direction	S
Sense of slip	reverse
Rupture top (km)	0
Rupture bottom (km)	16
Rake (degrees)	90
Length (km)	50

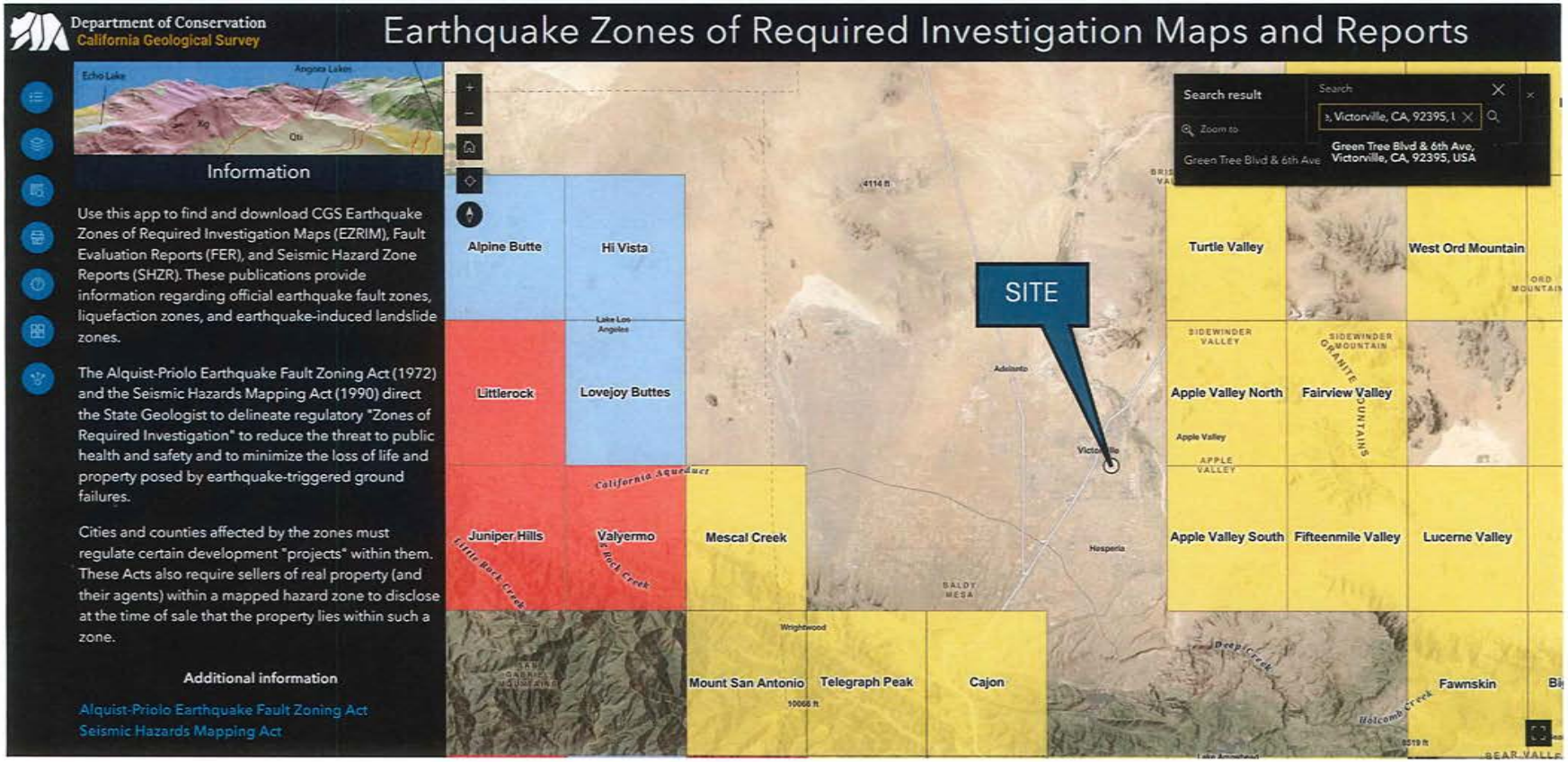
MODEL VALUES		
Slip Rate	1	
Probability of activity	1	
	ELLSWORTH	HANKS
Minimum magnitude	6.5	6.5
Maximum magnitude	7.20	7.10
b-value	0.8	0.8

Fault Model	Deformation Model	Char Rate[1]	GR-a-value[1]	Weight
Stitched	2.1	3.98e-04 / 5.62e-04	1.737 / 1.845	0.50
UnStitched	2.1	3.98e-04 / 5.62e-04	1.737 / 1.845	0.50
Stitched	2.4	3.98e-04 / 5.62e-04	1.737 / 1.845	0.50
UnStitched	2.4	3.98e-04 / 5.62e-04	1.737 / 1.845	0.50

[1] 1st Value is based on Ellsworth relation and 2nd value is based on Hanks and Bakun relation

Comments

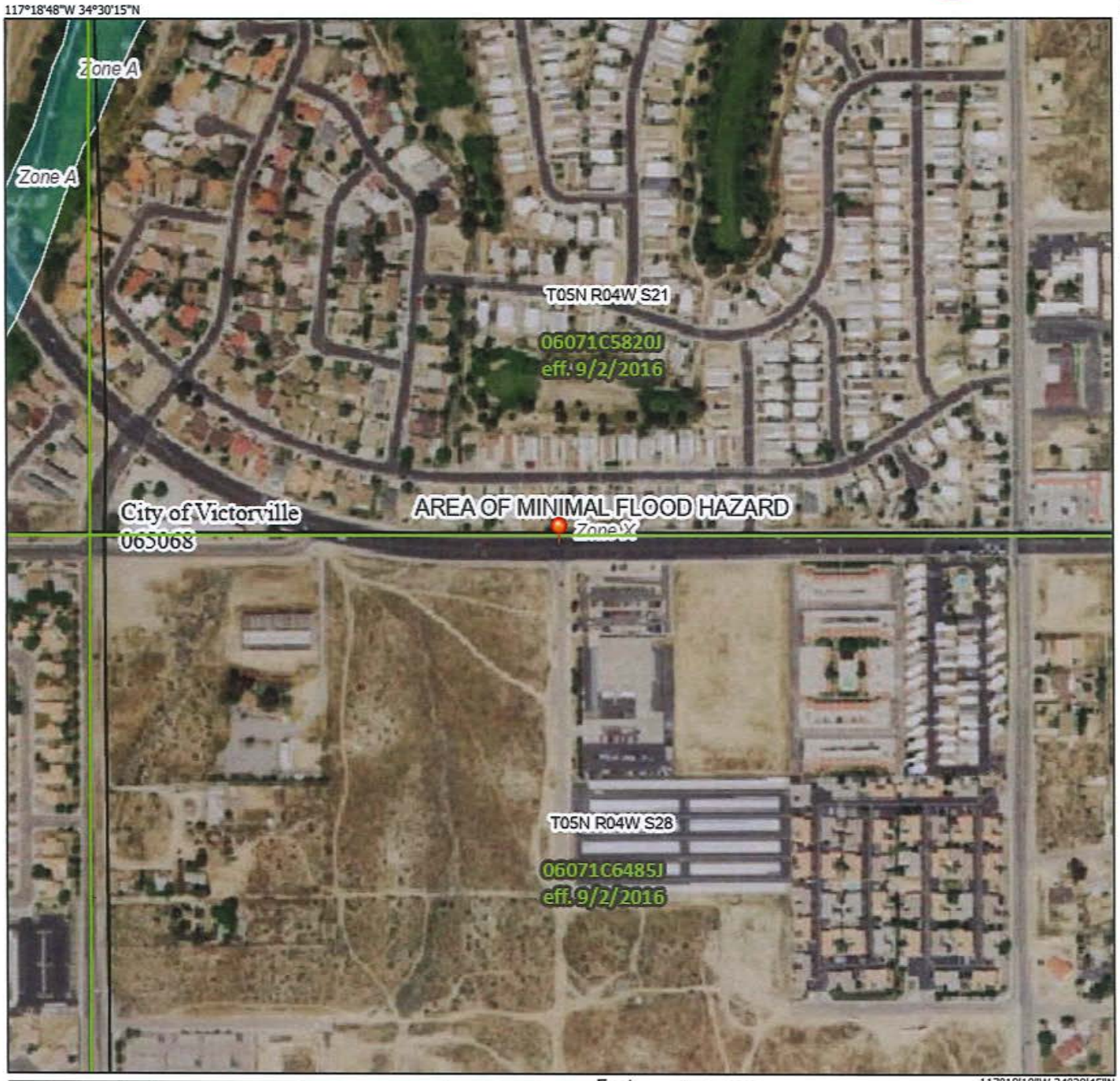
Reported slip rate of 1.2 mm/yr for Sky High Ranch fault, a RLSS segment of fault zone (Meisling, 1984). Other reported slip rates range between 0.1 and 1.3 mm/yr.



Based on review of the above California Department of Conservation: California Geological Society: Earthquake Zones of Required Investigation Maps and Reports, it is our opinion that the project site is outside a zone of recorded seismically hazard faults or other seismically induced activity.

National Flood Hazard Layer FIRMette

FEMA



Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/21/2025 at 6:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX D

Field Infiltration Test Data
Porchet Method Calculation Summary
San Bernardino County Form 4.3-3

Conversion Table (Porchet Method)
Grand Pacific Communities
Green Tree Boulevard & 6th Avenue, Victorville
Project No. 25032-BMP

Test N no.	Test Hole Depth (inches) D_T	Time Interval Δ_T	Initial Depth (inches) D_O (in)	Final Depth (inches) D_f (in)	Initial Water Height (inches) $H_O=D_T-D_O$	Final Water Height (inches) $H_f = D_T-D_f$	Change Height/Time $\Delta H/\Delta D= H_O-H_f$	Average Head Height/Time Havg = $(H_O+H_f)/2$
P-1	42	10	18	24.5	24	17.5	6.5	20.75
P-2	18	10	0	5.5	18	12.5	5.5	15.25
P-3	18	10	0	3.5	18	14.5	3.5	16.25
P-4	18	10	0	9	18	9	9	13.5
P-5	30	10	6	15	24	15	9	19.5

	Observed Infiltration Rate (It) = ΔH60r/Δt (r+2Havg)		
	A	B	C
	ΔH60r	Δt (r+2H_{avg})	A/B= inch/hr
P-1	1560	455	**3.43**
P-2	1320	345	**3.83**
P-3	840	365	**2.30**
P-4	2160	310	**6.97**
P-5	2160	430	**5.02**

Legend

Δ H/ΔD = Observed Field Rate

H_O = inches of water filled from bottom

D_O = initial height of water (inches) from bottom

D_f = final heigh of water (inches) from bottom

Columns A-B-C : Porchet Conversion Calculations

Column C: Observed Rate following Porchet Conversion

D_t = depth of test hole bottom (inches)

Percolation Test Data Sheet

Project: GRAND PACIFIC COMMUNITIES				Project No. 25032-BMP
Test Hole No:	P-1		Tested By: JG	Date: 8-1-25
Depth of Test Hole, D_T	42	3.5ft	USCS Soil Classification	
Test Hole Dimensions (inches)				Length / Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=		

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 Inches??? (Y/N)
1	8:49	9:14	25	18	41	23	Y
2	9:17	9:42	25	18	37.5	19.5	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	9:43	9:53	10	18	26	8	0.8
2	9:54	10:04	10	18	25.5	7.5	1.33
3	10:07	10:17	10	18	25	7	1.42
4	10:17	10:27	10	18	25	7	1.42
5	10:28	10:38	10	18	24.5	6.5	1.53
6	10:38	10:48	10	18	24.5	6.5	1.53
7	10:49	10:59	10	18	24.5	6.5	1.53
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							

Comments

Percolation Test Data Sheet

Project: GRAND PACIFIC COMMUNITIES			Project No. 25032-BMP
Test Hole No:	P-2	Tested By: JG	Date: 8-1-25
Depth of Test Hole, D_T	18	USCS Soil Classification	

Test Hole Dimensions (inches)			Length	Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=		

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	8:51	9:16	25	0	18	18	Y
2	9:18	9:43	25	0	18	18	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	9:45	9:55	10	0	8	8	0.8
2	9:55	10:05	10	0	7.5	7.5	1.33
3	10:11	10:21	10	0	7	7	1.42
4	10:22	10:32	10	0	6.5	6.5	1.53
5	10:32	10:42	10	0	6	6	1.66
6	10:42	10:52	10	0	5.5	5.5	1.81
7	10:53	11:03	10	0	5.5	5.5	1.81
8	11:03	11:13	10	0	5.5	5.5	1.81
9							
10							
11							
12							
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14							
15							
16							
17							
18							

Comments

Percolation Test Data Sheet

Project: GRAND PACIFIC COMMUNITIES			Project No. 25032-BMP	
Test Hole No:	P-3	Tested By: JG	Date: 8-1-25	
Depth of Test Hole, D_T	18"	USCS Soil Classification		
Test Hole Dimensions (inches)			Length	Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=		

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	8:53	9:18	25	0	17	17	Y
2	9:20	9:45	25	0	12	12	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	9:48	9:58	10	0	5	5	2
2	9:58	10:08	10	0	5	5	2
3	10:13	10:23	10	0	4.5	4.5	2.22
4	10:23	10:33	10	0	4.5	4.5	2.22
5	10:34	10:44	10	0	4	4	2.5
6	10:44	10:54	10	0	3.5	3.5	2.85
7	10:55	11:05	10	0	3.5	3.5	2.85
8	11:05	11:15	10	0	3.5	3.5	2.85
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							

Comments

Percolation Test Data Sheet

Project: GRAND PACIFIC COMMUNITIES			Project No. 25032-BMP
Test Hole No:	P-4	Tested By: JG	Date: 8-1-25
Depth of Test Hole, D_T	18	USCS Soil Classification	
Test Hole Dimensions (inches)			Length / Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=	

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	11:19	11:44	25	0	18	18	Y
2	11:45	12:10	25	0	18	18	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	12:16	12:26	10	0	10.5	10.5	0.95
2	12:26	12:36	10	0	10	10	1
3	12:36	12:46	10	0	9.5	9.5	1.05
4	12:46	12:56	10	0	9.5	9.5	1.05
5	12:56	13:06	10	0	9	9	1.11
6	13:06	13:16	10	0	9	9	1.11
7	13:16	13:26	10	0	9	9	1.11
8							
9							
10							
11							
12							
13							
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Comments

Percolation Test Data Sheet

Project: GRAND PACIFIC COMMUNITIES			Project No. 25052-BMP	
Test Hole No:	P-5	Tested By: JG	Date: 8-1-25	
Depth of Test Hole, D_T	30	USCS Soil Classification		
Test Hole Dimensions (inches)			Length	Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=		

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 Inches??? (Y/N)
1	08:41	9:06	25	6	21	3	Y
2	09:08	9:33	25	6	20	4	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	09:34	9:44	10	6	16	10	1
2	09:45	9:55	10	6	16	10	1
3	09:56	10:06	10	6	15.5	9.5	1.05
4	10:08	10:18	10	6	15.5	9.5	1.05
5	10:20	10:30	10	6	15	9	1.11
6	10:31	10:41	10	6	15	9	1.11
7	10:42	10:52	10	6	15	9	1.11
8	10:54	11:04	10	6	15	9	1.11
9							
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Comments

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item19*			
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 **Infiltration rate of underlying soils (in/hr)** *See Section 5.4.2 and Appendix C of the TGD for WQMP for minimum requirements for assessment methods*	3.43	3.83	2.30
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*			
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*			
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*			
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*			
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity			
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*			
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*			
16 Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*			

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item19*			
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix C of the TGD for WQMP for minimum requirements for assessment methods*	6.97	5.02	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*			
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*			
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*			
8 Infiltrating surface area, *SA_{BMP}* (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*			
9 Amended soil depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity			
11 Gravel depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*			
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*			
16 Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*			

APPENDIX E-Reference Source

American Concrete Institute, 2011, Building Code Requirements for Structural Concrete (ACI 31811) and Commentary (ACI 318R-11).
American Society of Civil Engineers, 2010, Minimum Design Loads for Buildings and Other Structures: ASCE Standard ASCE/SEI 7-10, 608 pp.
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https://asce7hazardtool.online/
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ASTM Standard in ACI 301&318, SP-71 (95), American Concrete Institute, Farmington Hills.
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California Building Standards Commission (CBSC), 2016, "2016 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2".
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http://wdl.water.ca.gov/waterdatalibrary/index.cfm
San Bernardino & Los Angeles Geologic Map of the Shadow Mountains & Victorville 15 minute Quadrangles 2008
USDA Web Soil Survey
Web Soil Survey - Home
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http://www.geosystemsoftware.com
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Latitude and Longitude Source: https://getlatlong.net/
Morton, D.M., and Miller, F.K., 2006, "Detailed Description of Map Units, version 1.0", U.S. Geologic Survey
San Bernardino County Land Use Plan, GENERAL PLAN, Geologic Hazard Overlays, EHFH C Victorville/ San Bernardino, Sheet FH20, Prepared by San Bernardino County and USGS.
'Soil and Geology Procedures for Foundation Design', ARMY tms 5-818-1, Airforce AFM Chap.7 88-3
United States Geological Survey, 1981, Guasti Quadrangle: 7.5 Minute Series (Topographic), scale 1:24,000.
2008 National Seismic Hazard Maps - Source Parameters
https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm

PROFESSIONAL LIMITATIONS

Geotechnical investigation is completed using the degree of care and skill ordinarily exercised, under similar circumstances by other reputable soils engineers practicing in these general or similar localities. We offer no other warranty, expressed or implied, made to the conclusions and professional opinions included in this report.

The investigations are based on soil samples only, consequently the recommendations provided shall be considered 'preliminary'. The samples taken and used for testing and the observations made are believed representative of site conditions; however, soil and geologic conditions can vary significantly between boring. As in most major projects, conditions revealed by excavations may vary with preliminary findings. If this occurs, the changed conditions must be evaluated and the opinions and the suggestions should be adjusted .

The report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineers. For reference, the suggestions and recommendations opined should be incorporated into structural plans. The necessary steps should be to see that such recommendations are observed field.

The findings of this report are valid as of this present date. However, changes in the conditions of a property can occur with the passage of time, whether they due to natural process or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur from legislation or broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by change outside of our control. Therefore, this report is subject to review and should be updated after a period of one year.

RECOMMENDED SERVICES

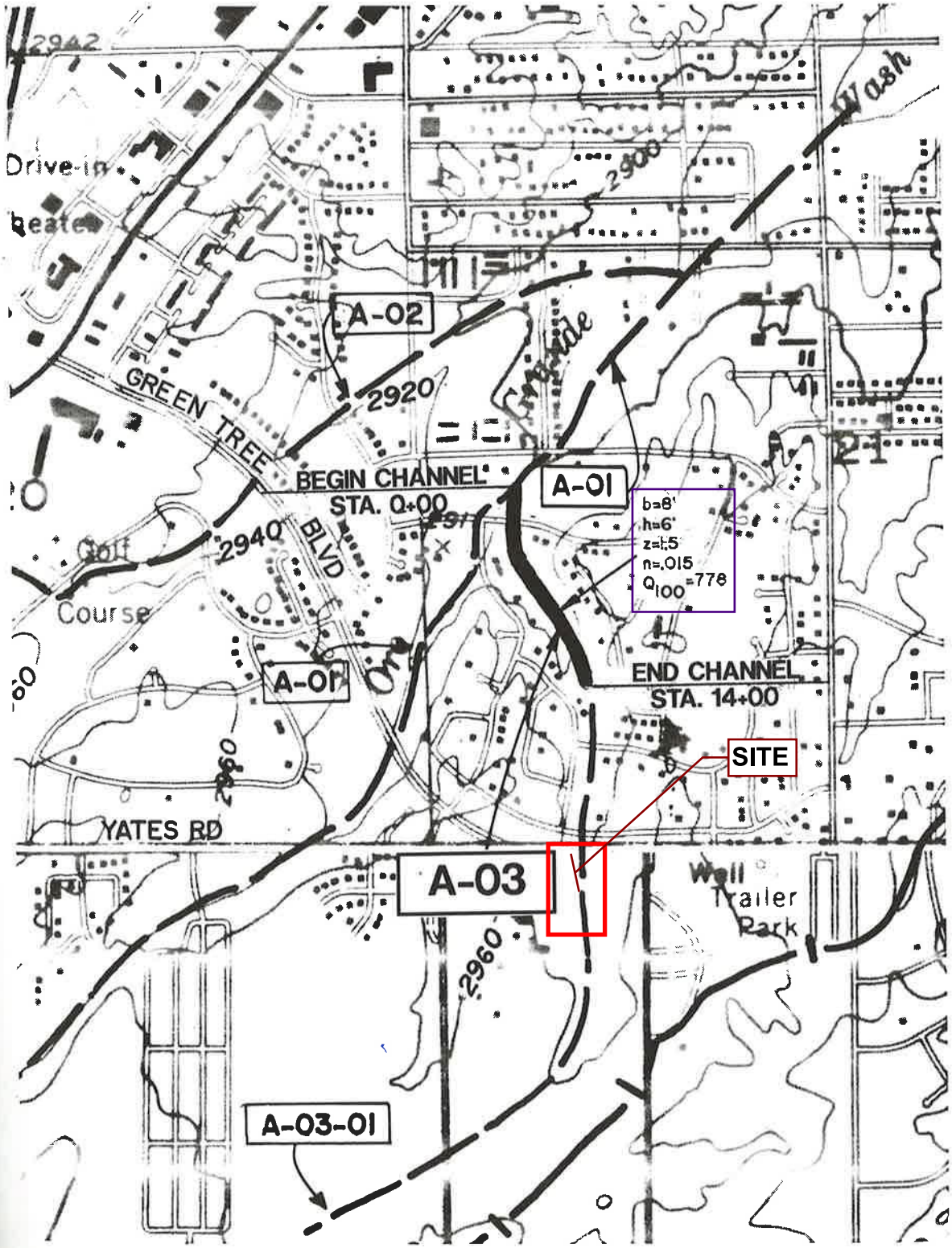
The review of grading plans and specifications, field observations and testing by a geotechnical representative of this office is integral part of the conclusions and recommendations made in this report. If Soils Southwest, Inc. (SSW) is not retained for these services, the Client agrees to assume SSW's responsibility for any potential claims that may arise during and after construction or during the lifetime use of the structure and its appurtenant.

The recommendations supplied should be considered valid and applicable, provided the following conditions, in minimum, are met:

i. Pre-grade meeting with the contractor, public agency, and the soils engineer,
ii. Excavated bottom inspections and verification s by soils engineer prior to backfill placement,
iii. Continuous observations and testing during site preparation and structural fill soils placement,
iv. Observation and inspection of footing trenching prior to steel and concrete placement,
v. Subgrade verifications including plumbing trench backfills prior to concrete slab-on-grade placement,
vi. On and off-site utility trench backfill testing and verifications,
vii. Precise-grading plan review, and
viii. Consultations as required during construction or upon request.

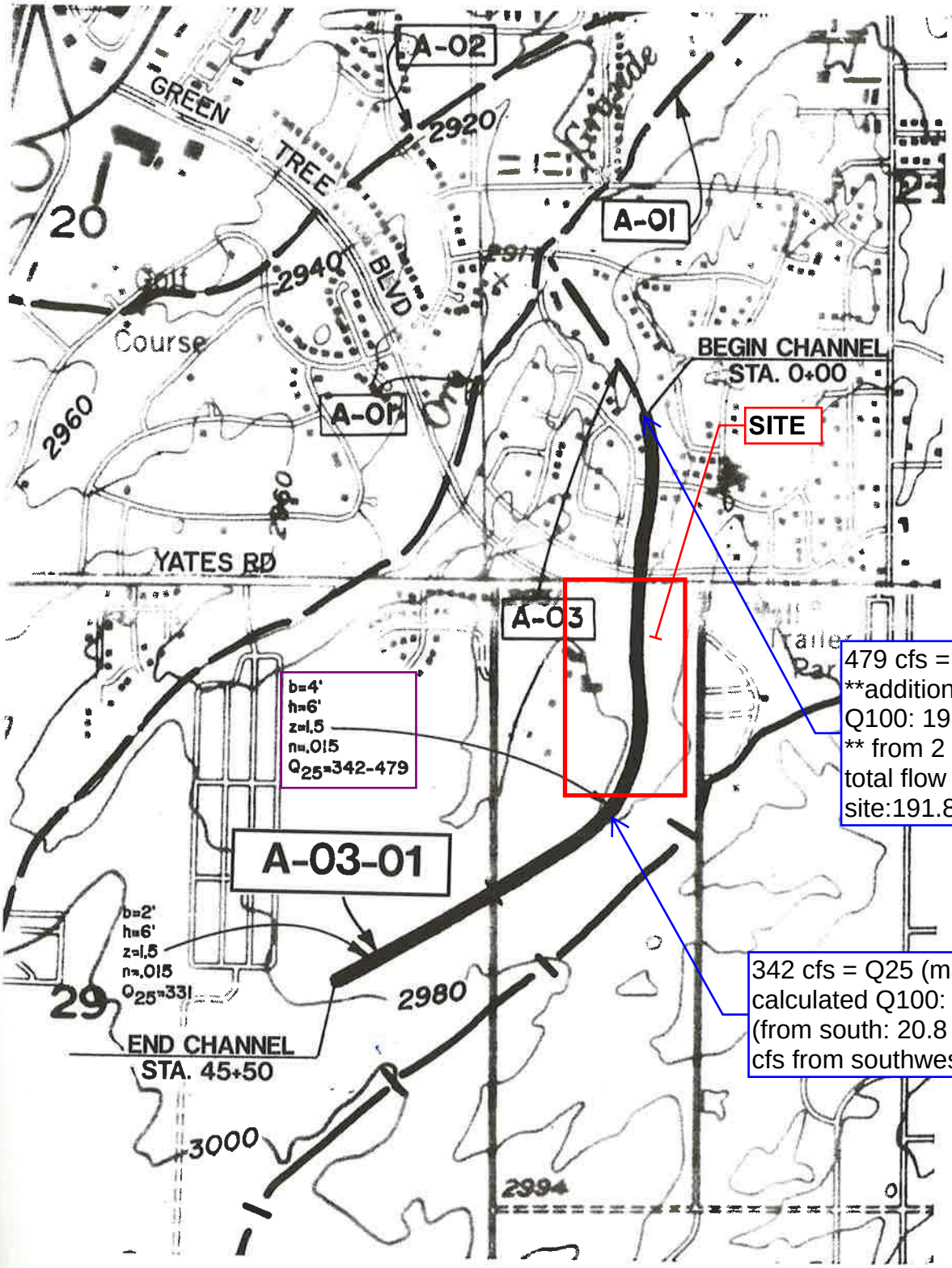
In the event that the above conditions are not fulfilled, Soils Southwest, Inc. will assume no responsibility for any structural distresses during the lifetime use of the development planned.

VICTORVILLE MASTER PLAN OF DRAINAGE



LEGEND	PROPOSED FACILITY	FLOODPLAIN
	FACILITY SHOWN ELSEWHERE	FLOODWAY
	WATERSHED BOUNDARY	DETENTION BASIN

VICTORVILLE MASTER PLAN OF DRAINAGE	COMPREHENSIVE STORM DRAIN PLAN LINE A-03 SHEET 1 OF 1	SCALE 1"=1000' WILLIAMSON & SCHMID



LEGEND

PROPOSED FACILITY
FACILITY SHOWN ELSEWHERE
WATERSHED BOUNDARY
FLOODPLAIN
FLOODWAY
DETENTION BASIN

VICTORVILLE MASTER PLAN OF DRAINAGE

COMPREHENSIVE STORM DRAIN PLAN
LINE A-03-01
SHEET 1 OF 1

SCALE 1"=1000'

WILLIAMSON SCHMID

A-02 continues to follow the SBCFCD right-of-way through the golf course to Interstate 15. There is a small existing earthen channel which is proposed to be concrete lined and there is also an existing culvert under the freeway which appears to have sufficient capacity.

Upstream of Interstate 15, A-02 parallels the freeway in a trapezoidal section to Dos Palmas Road. This channel has a side slope of 1:1 (horizontal:vertical) due to its close proximity to the freeway where right-of-way is limited. At the upstream end of A-02 is secondary facility A-02-01 which also parallels the freeway upstream to Luna Road. At this point the facility continues as an RCP in Luna Road.

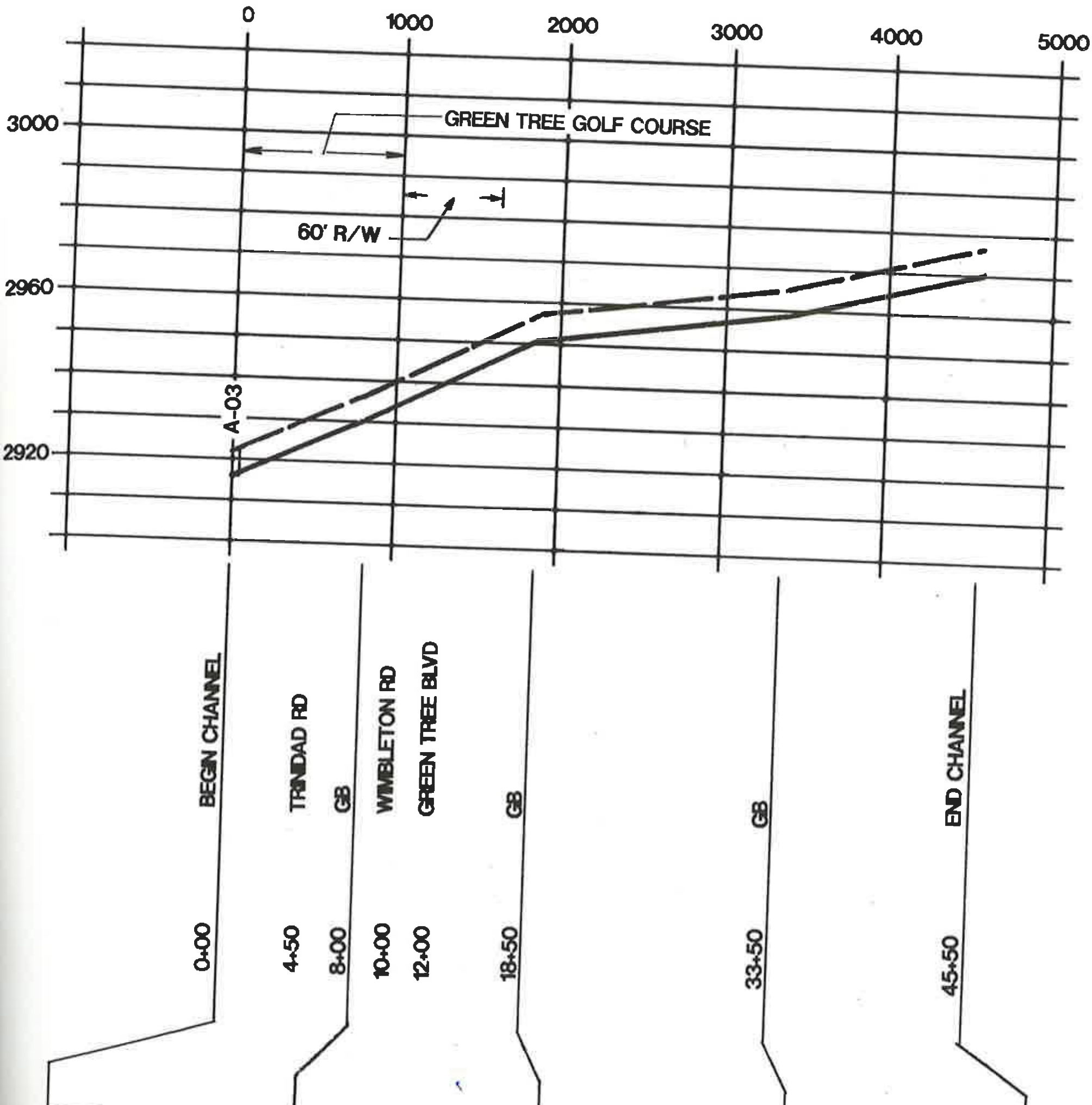
A-03 and Tributaries

A-03 drains a largely undeveloped area east of the Oro Grande Wash and south of Green Tree Boulevard. At its confluence with the Oro Grande Wash, A-03 has a 100-year peak flow rate of 780 cfs with 550 acres contributing to this flow. A-03 continues southeast adjacent to one of the fairways of the Green Tree Golf Course. The proposed channel is a concrete lined trapezoidal section. Upstream of A-03 is secondary facility A-03-01 which continues through the golf course, then crosses Green Tree Boulevard into the undeveloped area. It is again recommended that all facilities in parks and golf courses remain in their natural condition.

A-04 (East Oro Grande Wash) and Tributaries

The East Oro Grande Wash drains the eastern portion of the watershed from its confluence with the Oro Grande Wash to the Cajon Summit. At its confluence with the Oro Grande Wash the East Oro Grande has a net peak flow rate of 2620 cfs, reduced due to an upstream basin, with 4960 acres contributing.

From its confluence with the Oro Grande Wash, A-04 heads south in an ill-defined natural drainage course. From the A-01 confluence to the California Aqueduct, the East Oro Grande Wash alignment is "snaked" through existing development which has encroached into the wash's historic flow path. The



LENGTH				
	800	1050	1500	1200
SLOPE	.018	.020	.005	.012
FLOW	Q_{25}=479	Q_{25}=351	Q_{25}342	Q_{25}=331
SIZE	b=4', h=6', z=1.5			b=2', h=6', z=1.5
TYPE	CONCRETE TRAPEZOIDAL CHANNEL			

LEGEND

LEVEE

NATURAL GROUND

PROPOSED FLOWLINE

VICTORVILLE
MASTER PLAN
OF DRAINAGE

COMPREHENSIVE STORM DRAIN PLAN
LINE A-03-01
SHEET 1 OF 1

SCALE
H: 1"=1000'
V: 1"=40'

WILLIAMSON SCHMID