Appendix I

Preliminary Drainage Study Report

PRELIMINARY DRAINAGE STUDY REPORT

for

County Project No. _____

Alder Avenue Industrial

APN: 0252-131-03, -04, -36, -41, -43

SITE LOCATED AT
10336, 10360 and 10380 Alder Avenue
(West side of Alder Avenue about 600 feet North of Slover Avenue)
Community of Bloomington
County of San Bernardino
State of California

County of San Bernardino
BUILDING AND SAFETY

PRELIMINARY APPROVAL

THE APPROVAL OF THIS REPORT SHALL NOT BE CONSTRUED TO BE A PERMIT FOR ANY DEVELOPMENT OR SITE IMPROVEMENT.

By _____

Date 09/03/2019

This report has Preliminary Approval. Prior to Final Approval the report, all outstanding comments/ requirements shall be met.

Prepared for:

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Prepared by:

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REGISTERED PROFESSIONAL ENGINEER
BRADLEY C. KNEPP
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CIVIL
STATE OF CALIFORNIA

May 21, 2019

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Attachments

JURISDICTION AND SCOPE OF DRAINAGE REPORT

Stormwater impacts associated with the Alder Avenue Industrial Building project are within the jurisdiction of the County of San Bernardino. The County requires hydrologic analyses be performed according to methodologies and criteria prescribed by the San Bernardino County Flood Control District (SBCFCD).

The scope of this report includes potential storm water impacts associated with the proposed project site to existing private and public storm drain facilities, quantification of the proposed 100-year peak flows generated from the site and verifies any existing storm drain facilities and the proposed building are not impacted adversely. The scope of the final drainage report (not this report) will include 10-year Rational Method Hydrology calculations discharging to the street, street flow and onsite flow hydraulic calculations.

PROJECT DESCRIPTION

Existing Conditions

The existing 8.96-acre property is located on the west side of Alder Avenue about 600 feet north of Slover Avenue in the community of Bloomington, in the County of San Bernardino, California. The property is bounded to the north by a Southern Pacific Railroad easement, to the west by a railroad yard, to the south by a steel facility and several single-family homes and to the east by Alder Avenue and industrial property east of Alder Avenue. Please refer to the Existing Hydrology Map, attached.

The existing property was developed as a pickling and brining facility and the largest steel frame building near the west end of the property is currently used for produce processing. There are numerous small structures and brine tanks throughout the property. There is also a single-story single-family home in the northeast corner of the property. With the exception of some area around the single-family home, the site is fully paved with asphalt concrete pavement (some weathered at top surface, and Portland cement concrete pavement surrounding many of the brine tanks. These existing site structures and surfaces will be demolished for the proposed project. The existing property is 96.6% impervious.

Due to lack of availability of records indicative of permitted land uses on the project property, the County requires the land be assumed undeveloped for the existing condition. The site was analyzed for the existing condition assuming 0% impervious undeveloped land using the County's Rational Method with a resultant 100-year peak flow of 19.1 cubic feet per second (cfs). The time of concentration from the Rational Method was used to determine the lag time in the County's Unit Hydrograph Method, which yielded a peak 100-year flow rate of 17.6 cfs. Existing cover was assumed to be annual grasses, poor cover, and with Hydrologic Soil Group A applicable over all analyzed areas, per NRCS report (attached), a Curve Number of 67 was selected per Figure C-3 (1 of 2) of the San Bernardino County Hydrology Manual (page C-6, attached).

The property receives offsite run-on flows from the southern portion of the Southern Pacific Railroad easement. The southern 27± feet of this easement is asphalt concrete along the north property line adjoining the railroad easement. Approximately one half of the railroad easement drains to the south to the property line, thence, eastward and finally southward in Alder Avenue. This condition remains essentially the same in both the existing and proposed conditions, though in the existing condition, some railroad drainage enters the project site via its north property line and then subsequently enters Alder Avenue from the property. For analysis purposes, also included on

the Existing Drainage Map's hydrologic assumptions (notes), this run-on was ignored as far as the existing onsite peak flow rate is concerned (since it will be diverted east along the north property line in the proposed condition).

The existing condition of the west half of Alder Avenue is unimproved roadway with an asphalt concrete pavement edge and adjoining earthen flowline, beginning at the south end of the existing site running from north to south and discharging into Slover Avenue. The existing western half of Alder Avenue is 100% impervious asphalt concrete pavement along the whole of the eastern property frontage. In the proposed condition, the proposed public way will expand 14' westward for inclusion of a proposed curb-adjacent sidewalk and landscaped parkway, increasing the public way area, and likewise increasing public way perviousness.

Proposed Conditions, Hydrology and 100-Year Detention Analysis

The project proposes a 172,780 square foot 21-dock industrial distribution building, associated truck and employee parking areas and a stormwater quality infiltration system consisting of a surface basin designed to accommodate both water quality (NPDES) infiltration and County 100-year flood mitigation impacts due to re-development of the onsite property. As noted above, although the proposed condition results in less runoff from the site in proposed (post-redeveloped) condition due to increased perviousness, the existing condition is assumed to be 100% pervious and undeveloped; therefore detention is required to mitigate the 100-year peak flow rate down to existing (assumed predeveloped) conditions.

The County's Rational Method was used to calculate the 100-year peak flow from the proposed site, 29.3 cfs, and the Rational Method time of concentration was used to determine the lag time for the County's Unit Hydrograph Method in order to generate a 5-minute-increment 100-year 24-hour runoff hydrograph for the purpose of detention routing and outlet analysis with the goal of reducing peak flows from the site down to existing (predeveloped) levels. The Unit Hydrograph peak 100-year flow is 24.7 cfs in the proposed condition. The Unit Hydrograph peak 100-year flow is 17.6 cfs in the assumed existing condition; this is also the target design discharge for the proposed condition. *With the purpose of keeping in mind actual physical conditions (respecting actual hydrologic conditions), please note the actual existing physical condition of the existing site is 96.6% imperviousness, and now has an actual 100-yr peak existing flow rate in excess of the proposed (post-redeveloped) Unit Hydrograph peak flow of 24.7 cfs since the actual proposed redeveloped imperviousness is only 83.0%. The post-redeveloped condition, without any reduction of discharge flows, would reduce actual existing flows from the site in all storm events.)* Results of Modified Puls routing and discharge outlet hydraulics analyses, under County-required assumed existing conditions, are summarized in the stage-storage-discharge table below:

	Stage	Storage (cf)	Discharge (cfs)
Basin Floor Elevation	**1085.00**	**0**	**0**
Surface Outlet Weir Elevation	**1088.50**	**32,948**	**0**
Q_{100} Water Surface Elevation	**1089.40**	**44,733**	**17.6**
Top of Basin	**1089.50**	**46,132**	**23.6**

The site must discharge into the street (Alder Avenue) as there are no improved storm drain facilities in this area of the County. The 100-year outlet discharge target of 17.6 cfs is met with an onsite 18-foot wide, 1-foot high concrete compound weir with the bottom 6 inches (88.50 to 89.00)

consisting of ten (10) equally spaced 60° V-notch weirs across the 18-foot opening and the upper 6 inches (89.00 to 89.50) consisting of a simple rectangular weir (open/clear above the V-notches). This compound weir limits 100-yr basin discharge flows to 17.6 cfs while keeping the 100-year water surface elevation below the basin top of 1089.50. Weir flows then pass through several under-sidewalk drains in the public way which will utilize County under-sidewalk/parkway drain standards to provide discharge of all onsite flows into Alder Avenue at the gutter flow line. The under-sidewalk drain will be designed in final design as part of onsite storm drain plans (onsite) and Alder Avenue half-street improvement plans (public way).

The 100-year volume is mitigated as well. The existing Unit Hydrograph (assuming predeveloped conditions) yields a 100-year 24-hour volume of 4.70 ac-ft, while the proposed (unmitigated) yields a volume of 5.08 ac-ft, a difference of 0.38 ac-ft. The mitigated 100-year 24-hour hydrograph yields a 24-hour volume of 4.17 ac-ft, or approximately 0.53 ac-ft less than the existing (assuming predeveloped) condition (4.70 ac-ft). All hydrographs referenced in the above discussion are attached. Although the surface basin is designed to infiltrate a full basin into the ground in less than 48 hours (per NPDES requirements), no infiltration was assumed for the above detention routing and volume calculations.

All stormwater not infiltrated into native soils onsite, per the project WQMP, discharges into Alder Avenue and Slover Avenue and thence eastward in Slover Avenue (as there are no improved storm drain facilities in the immediate area).

The 100-year peak flow, calculated with County-approved Modified Rational Method software, indicates peak 100-year flow from the studied area (railroad, site, and public way) is 24.6 cfs (assuming site property 0% impervious), 36.6 cfs in the proposed (redeveloped) condition. The proposed County Rational Method peak flow (36.6 cfs) is not mitigated by detention analysis. An estimated mitigation of 8.4 cfs (estimated per ratio of County Rational Method numbers compared to County Unit Hydrograph numbers) would result in a County Rational Method mitigated 100-year discharge of approximately 28.2 cfs (from the whole studied area) into the earthen gutter south of the site. The actual physical conditions of the existing site presently would produce a peak 100-year discharge slightly greater than 36.6 cfs.

CONCLUSION

The redevelopment of this property yields a 100-year flow rate less than the existing (assumed predeveloped) condition and a 100-year discharge volume 0.53 ac-ft less than assumed existing. Peak flow rate and volume are both reduced to lower than assumed existing levels due to onsite detention mitigation. As such, there are no anticipated adverse impacts to existing or proposed structures or existing public facilities associated with development of this site.

ATTACHMENTS

SAN BERNARDINO COUNTY HYDROLOGY

- 100-YEAR RATIONAL METHOD CALCULATIONS
- 100-YEAR UNIT HYDROGRAPH CALCULATIONS
- NRCS SOILS REPORT WITH HYDROLOGIC SOIL GROUP A

100-YEAR 24-HOUR DETENTION CALCULATIONS

- DETENTION SUMMARY
- ROUTING TABLE
- 100-YEAR 24-HOUR MITIGATED SITE DISCHARGE HYDROGRAPH
- STAGE STORAGE CALCULATIONS USED FOR DETENTION CALCULATIONS

EXISTING AND PROPOSED HYDROLOGY MAPS

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              San Bernardino County Rational Hydrology Program
             (Hydrology Manual Date - August 1986)
 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
     Rational Hydrology Study        Date: 12/10/18
--------------------------------------------------------------------------
74432
Lake Creek Industrial - Alder Avenue Industrial
Rational Method Hydrology
100-Year 1-Hour Event - Predeveloped Conditions
--------------------------------------------------------------------------
Program License Serial Number 6241
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.340 (In.)
Slope used for rainfall intensity curve b =  0.6000
Soil antecedent moisture condition (AMC) = 3
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.290(In/Hr)
Initial subarea data:
Initial area flow distance =   940.000(Ft.)
Top (of initial area) elevation =  1100.500(Ft.)
Bottom (of initial area) elevation =  1087.600(Ft.)
Difference in elevation =    12.900(Ft.)
Slope =    0.01372  s(%)=       1.37
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   19.139 min.
Rainfall intensity =      2.660(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.802
Subarea runoff =     19.110(CFS)
Total initial stream area =        8.960(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.290(In/Hr)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       98.000 to Point/Station        2.000
**** SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
RESIDENTIAL(5 - 7 dwl/acre)
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
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Site, assumed undeveloped

Railroad

Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.5000 Max loss rate(Fm)= 0.393(In/Hr)
Time of concentration = 19.14 min.
Rainfall intensity = 2.660(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.795
Subarea runoff = 4.326(CFS) for 2.120(Ac.)
Total runoff = 23.436(CFS)
Effective area this stream = 11.08(Ac.)
Total Study Area (Main Stream No. 1) = 11.08(Ac.)
Area averaged Fm value = 0.310(In/Hr)
++
Process from Point/Station 99.000 to Point/Station 2.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Time of concentration = 19.14 min.
Rainfall intensity = 2.660(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.799
Subarea runoff = 1.138(CFS) for 0.490(Ac.)
Total runoff = 24.574(CFS)
Effective area this stream = 11.57(Ac.)
Total Study Area (Main Stream No. 1) = 11.57(Ac.)
Area averaged Fm value = 0.300(In/Hr)
End of computations, Total Study Area = 11.57 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.
Area averaged pervious area fraction(Ap) = 0.870
Area averaged SCS curve number = 59.1

Alder public way

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          San Bernardino County Rational Hydrology Program

               (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2005 Version 7.1
     Rational Hydrology Study        Date: 05/20/19
--------------------------------------------------------------------------
74432
Alder Avenue Industrial Bldg
Rational Method Analysis
100-year 1-hour - Proposed Condition
--------------------------------------------------------------------------


Program License Serial Number 6241

--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.340 (In.)
Slope used for rainfall intensity curve b =  0.6000
Soil antecedent moisture condition (AMC) = 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   159.000(Ft.)
Top (of initial area) elevation =  1127.000(Ft.)
Bottom (of initial area) elevation =  1126.200(Ft.)
Difference in elevation =     0.800(Ft.)
Slope =    0.00503  s(%)=       0.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.654 min.
Rainfall intensity =      5.013(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =      1.688(CFS)
Total initial stream area =        0.380(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)
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Initial area A


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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
--------------------------------------------------------------------------
Upstream point/station elevation =  1090.800(Ft.)
Downstream point/station elevation =  1089.800(Ft.)
Pipe length  =   200.00(Ft.)   Manning's N = 0.011
No. of pipes = 1  Required pipe flow  =     1.688(CFS)
Given pipe size =      8.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.337(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.792(Ft.)
 Minor friction loss =      0.545(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.84(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =     7.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     7.34 min.
Rainfall intensity =      4.726(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.885
Subarea runoff =      2.369(CFS) for    0.590(Ac.)
Total runoff =      4.057(CFS)
Effective area this stream =        0.97(Ac.)
Total Study Area (Main Stream No. 1) =        0.97(Ac.)
Area averaged Fm value =    0.079(In/Hr)
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area B

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
--------------------------------------------------------------------------
Upstream point/station elevation =  1089.800(Ft.)
Downstream point/station elevation =  1088.300(Ft.)
Pipe length  =   299.00(Ft.)   Manning's N = 0.011
No. of pipes = 1  Required pipe flow  =     4.057(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.896(Ft.)  at the headworks or inlet of the pipe(s)
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 Pipe friction loss =      2.775(Ft.)
 Minor friction loss =      0.621(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.17(Ft/s)
Travel time through pipe =    0.96 min.
Time of concentration (TC) =     8.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000                    area C
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =     8.31 min.
Rainfall intensity =      4.388(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.884
Subarea runoff =      5.485(CFS) for    1.490(Ac.)
Total runoff =      9.542(CFS)
Effective area this stream =        2.46(Ac.)
Total Study Area (Main Stream No. 1) =        2.46(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1088.300(Ft.)
Downstream point/station elevation =  1085.500(Ft.)
Pipe length  =   568.00(Ft.)   Manning's N = 0.011
No. of pipes = 1  Required pipe flow  =     9.542(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.233(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.354(Ft.)
 Minor friction loss =      0.679(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.40(Ft/s)
Travel time through pipe =    1.75 min.
Time of concentration (TC) =    10.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
PARK subarea
Decimal fraction soil group A = 1.000
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1085.00 per plan


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Decimal fraction soil group B = 0.000                    area D
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.8500     Max loss rate(Fm)=     0.667(In/Hr)
Time of concentration =    10.06 min.
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total a
rational method)(Q=KCIA) is C = 0.850
Subarea runoff =      1.136(CFS) for    0.750(Ac.)
Total runoff =     10.677(CFS)
Effective area this stream =        3.21(Ac.)
Total Study Area (Main Stream No. 1) =        3.21(Ac.)
Area averaged Fm value =    0.216(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000                    area E
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =    10.06 min.
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.870
Subarea runoff =     17.251(CFS) for    5.000(Ac.)
Total runoff =     27.928(CFS)
Effective area this stream =        8.21(Ac.)
Total Study Area (Main Stream No. 1) =        8.21(Ac.)
Area averaged Fm value =    0.132(In/Hr)


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Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000                    area F
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =    10.06 min.
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

Identify nodes on plan

For areas E and F, provide analysis detailing the proposed storm drain (i.e. pipeflow).

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rational method)(Q=KCIA) is C = 0.870
Subarea runoff =      1.277(CFS) for    0.370(Ac.)
Total runoff =     29.204(CFS)
Effective area this stream =        8.58(Ac.)
Total Study Area (Main Stream No. 1) =        8.58(Ac.)
Area averaged Fm value =    0.130(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =    10.06 min.
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.871
Subarea runoff =      2.967(CFS) for    0.860(Ac.)
Total runoff =     32.172(CFS)
Effective area this stream =        9.44(Ac.)
Total Study Area (Main Stream No. 1) =        9.44(Ac.)
Area averaged Fm value =    0.125(In/Hr)
End of computations, Total Study Area =            9.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.160
Area averaged SCS curve number =  32.0
```

area ALDER

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0

          Study date  12/06/18

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------------------------------------------------------------------------------

San Bernardino County Synthetic Unit Hydrology Method
          Manual date - August 1986


Program License Serial Number 6241

------------------------------------------------------------------------
74432
Lake Creek Industrial - Alder Avenue Industrial
Unit Hydrograph Hydrology
100-year 24-hour Event - Predeveloped Conditions
------------------------------------------------------------------------

     Storm Event Year = 100

     Antecedent Moisture Condition = 3

 English (in-lb) Input Units Used

 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



Area averaged rainfall intensity isohyetal data:
     Sub-Area        Duration        Isohyetal
     (Ac.)            (hours)         (In)
Rainfall data for year 100
          8.96           1           1.34
------------------------------------------------------------------------
Rainfall data for year 100
          8.96           6           3.51
------------------------------------------------------------------------
Rainfall data for year 100
          8.96          24           8.10
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** Area-averaged max loss rate, Fm ********
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SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap      Fm
No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction     (In/Hr)  (dec.)   (In/Hr)
 67.0      84.6          8.96      1.000     0.290    1.000    0.290

Area-averaged adjusted loss rate Fm (In/Hr) =  0.290

********* Area-Averaged low loss rate fraction, Yb **********

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC3)           Yield Fr
     8.96   1.000         67.0      84.6       1.82     0.773

Area-averaged catchment yield fraction, Y =  0.773
Area-averaged low loss fraction, Yb =  0.227
User entry of time of concentration  =   0.319 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =       8.96(Ac.)
Catchment Lag time =   0.255 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 32.6541
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.290(In/Hr)
Average low loss rate fraction (Yb) = 0.227 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall =  0.496(In)
Computed peak 30-minute rainfall =  1.016(In)
Specified peak 1-hour rainfall =  1.340(In)
Computed peak 3-hour rainfall =  2.418(In)
Specified peak 6-hour rainfall =  3.510(In)
Specified peak 24-hour rainfall =  8.100(In)


Rainfall depth area reduction factors:
Using a total area of       8.96(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000     Adjusted rainfall =  0.496(In)
30-minute factor = 1.000    Adjusted rainfall =  1.015(In)
1-hour factor = 1.000       Adjusted rainfall =  1.339(In)
3-hour factor = 1.000       Adjusted rainfall =  2.418(In)
6-hour factor = 1.000       Adjusted rainfall =  3.510(In)
24-hour factor = 1.000      Adjusted rainfall =  8.100(In)
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Interval          'S' Graph          Unit Hydrograph
Number            Mean values             ((CFS))
------------------------------------------------------------------------
          (K =       108.36 (CFS))

  1               3.256                   3.528
  2              15.662                  13.443
  3              36.806                  22.912
  4              57.034                  21.919
  5              68.437                  12.355
```

6	74.932	7.039
7	79.459	4.905
8	82.967	3.802
9	85.838	3.110
10	88.106	2.458
11	90.051	2.108
12	91.623	1.703
13	92.949	1.437
14	94.005	1.144
15	95.005	1.083
16	95.922	0.995
17	96.652	0.790
18	97.286	0.687
19	97.848	0.609
20	98.314	0.505
21	98.694	0.412
22	99.021	0.354
23	99.347	0.354
24	99.674	0.354
25	100.000	0.354

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4957	0.4957
2	0.6541	0.1584
3	0.7693	0.1152
4	0.8631	0.0938
5	0.9437	0.0806
6	1.0151	0.0714
7	1.0797	0.0646
8	1.1389	0.0592
9	1.1938	0.0549
10	1.2452	0.0514
11	1.2936	0.0484
12	1.3394	0.0458
13	1.3984	0.0589
14	1.4552	0.0569
15	1.5102	0.0550
16	1.5635	0.0533
17	1.6154	0.0518
18	1.6658	0.0504
19	1.7149	0.0491
20	1.7629	0.0480
21	1.8098	0.0469
22	1.8556	0.0458
23	1.9005	0.0449
24	1.9445	0.0440
25	1.9876	0.0432
26	2.0300	0.0424
27	2.0716	0.0416
28	2.1126	0.0409
29	2.1528	0.0402
30	2.1924	0.0396
31	2.2314	0.0390
32	2.2698	0.0384

33	2.3077	0.0379
34	2.3450	0.0373
35	2.3819	0.0368
36	2.4183	0.0364
37	2.4541	0.0359
38	2.4896	0.0354
39	2.5246	0.0350
40	2.5591	0.0346
41	2.5933	0.0342
42	2.6271	0.0338
43	2.6606	0.0334
44	2.6937	0.0331
45	2.7264	0.0327
46	2.7588	0.0324
47	2.7909	0.0321
48	2.8226	0.0318
49	2.8541	0.0315
50	2.8852	0.0312
51	2.9161	0.0309
52	2.9467	0.0306
53	2.9770	0.0303
54	3.0071	0.0301
55	3.0369	0.0298
56	3.0664	0.0296
57	3.0957	0.0293
58	3.1248	0.0291
59	3.1537	0.0288
60	3.1823	0.0286
61	3.2107	0.0284
62	3.2389	0.0282
63	3.2668	0.0280
64	3.2946	0.0278
65	3.3222	0.0276
66	3.3495	0.0274
67	3.3767	0.0272
68	3.4037	0.0270
69	3.4305	0.0268
70	3.4572	0.0266
71	3.4836	0.0265
72	3.5099	0.0263
73	3.5392	0.0293
74	3.5684	0.0292
75	3.5974	0.0290
76	3.6263	0.0289
77	3.6550	0.0287
78	3.6835	0.0286
79	3.7120	0.0284
80	3.7402	0.0283
81	3.7684	0.0281
82	3.7964	0.0280
83	3.8242	0.0279
84	3.8519	0.0277
85	3.8795	0.0276
86	3.9070	0.0275
87	3.9344	0.0273

88	3.9616	0.0272
89	3.9887	0.0271
90	4.0156	0.0270
91	4.0425	0.0269
92	4.0692	0.0267
93	4.0959	0.0266
94	4.1224	0.0265
95	4.1488	0.0264
96	4.1751	0.0263
97	4.2012	0.0262
98	4.2273	0.0261
99	4.2533	0.0260
100	4.2791	0.0259
101	4.3049	0.0258
102	4.3306	0.0257
103	4.3561	0.0256
104	4.3816	0.0255
105	4.4070	0.0254
106	4.4322	0.0253
107	4.4574	0.0252
108	4.4825	0.0251
109	4.5075	0.0250
110	4.5324	0.0249
111	4.5572	0.0248
112	4.5819	0.0247
113	4.6066	0.0246
114	4.6311	0.0245
115	4.6556	0.0245
116	4.6799	0.0244
117	4.7042	0.0243
118	4.7285	0.0242
119	4.7526	0.0241
120	4.7766	0.0241
121	4.8006	0.0240
122	4.8245	0.0239
123	4.8483	0.0238
124	4.8721	0.0237
125	4.8957	0.0237
126	4.9193	0.0236
127	4.9428	0.0235
128	4.9663	0.0234
129	4.9896	0.0234
130	5.0129	0.0233
131	5.0362	0.0232
132	5.0593	0.0232
133	5.0824	0.0231
134	5.1054	0.0230
135	5.1284	0.0229
136	5.1513	0.0229
137	5.1741	0.0228
138	5.1968	0.0227
139	5.2195	0.0227
140	5.2421	0.0226
141	5.2647	0.0226
142	5.2872	0.0225

143	5.3096	0.0224
144	5.3320	0.0224
145	5.3543	0.0223
146	5.3765	0.0222
147	5.3987	0.0222
148	5.4208	0.0221
149	5.4429	0.0221
150	5.4649	0.0220
151	5.4868	0.0219
152	5.5087	0.0219
153	5.5306	0.0218
154	5.5524	0.0218
155	5.5741	0.0217
156	5.5957	0.0217
157	5.6173	0.0216
158	5.6389	0.0216
159	5.6604	0.0215
160	5.6819	0.0214
161	5.7033	0.0214
162	5.7246	0.0213
163	5.7459	0.0213
164	5.7671	0.0212
165	5.7883	0.0212
166	5.8094	0.0211
167	5.8305	0.0211
168	5.8516	0.0210
169	5.8726	0.0210
170	5.8935	0.0209
171	5.9144	0.0209
172	5.9352	0.0208
173	5.9560	0.0208
174	5.9768	0.0207
175	5.9975	0.0207
176	6.0181	0.0207
177	6.0387	0.0206
178	6.0593	0.0206
179	6.0798	0.0205
180	6.1002	0.0205
181	6.1207	0.0204
182	6.1410	0.0204
183	6.1614	0.0203
184	6.1817	0.0203
185	6.2019	0.0202
186	6.2221	0.0202
187	6.2423	0.0202
188	6.2624	0.0201
189	6.2825	0.0201
190	6.3025	0.0200
191	6.3225	0.0200
192	6.3424	0.0199
193	6.3623	0.0199
194	6.3822	0.0199
195	6.4020	0.0198
196	6.4218	0.0198
197	6.4416	0.0197

198	6.4613	0.0197
199	6.4809	0.0197
200	6.5005	0.0196
201	6.5201	0.0196
202	6.5397	0.0195
203	6.5592	0.0195
204	6.5787	0.0195
205	6.5981	0.0194
206	6.6175	0.0194
207	6.6369	0.0194
208	6.6562	0.0193
209	6.6755	0.0193
210	6.6947	0.0192
211	6.7139	0.0192
212	6.7331	0.0192
213	6.7522	0.0191
214	6.7714	0.0191
215	6.7904	0.0191
216	6.8095	0.0190
217	6.8285	0.0190
218	6.8474	0.0190
219	6.8664	0.0189
220	6.8852	0.0189
221	6.9041	0.0189
222	6.9229	0.0188
223	6.9417	0.0188
224	6.9605	0.0188
225	6.9792	0.0187
226	6.9979	0.0187
227	7.0166	0.0187
228	7.0352	0.0186
229	7.0538	0.0186
230	7.0724	0.0186
231	7.0909	0.0185
232	7.1094	0.0185
233	7.1279	0.0185
234	7.1463	0.0184
235	7.1647	0.0184
236	7.1831	0.0184
237	7.2014	0.0183
238	7.2198	0.0183
239	7.2380	0.0183
240	7.2563	0.0183
241	7.2745	0.0182
242	7.2927	0.0182
243	7.3109	0.0182
244	7.3290	0.0181
245	7.3471	0.0181
246	7.3652	0.0181
247	7.3832	0.0180
248	7.4013	0.0180
249	7.4192	0.0180
250	7.4372	0.0180
251	7.4551	0.0179
252	7.4730	0.0179

253	7.4909	0.0179
254	7.5088	0.0178
255	7.5266	0.0178
256	7.5444	0.0178
257	7.5621	0.0178
258	7.5799	0.0177
259	7.5976	0.0177
260	7.6153	0.0177
261	7.6329	0.0177
262	7.6505	0.0176
263	7.6681	0.0176
264	7.6857	0.0176
265	7.7033	0.0175
266	7.7208	0.0175
267	7.7383	0.0175
268	7.7558	0.0175
269	7.7732	0.0174
270	7.7906	0.0174
271	7.8080	0.0174
272	7.8254	0.0174
273	7.8427	0.0173
274	7.8600	0.0173
275	7.8773	0.0173
276	7.8946	0.0173
277	7.9118	0.0172
278	7.9291	0.0172
279	7.9463	0.0172
280	7.9634	0.0172
281	7.9806	0.0171
282	7.9977	0.0171
283	8.0148	0.0171
284	8.0319	0.0171
285	8.0489	0.0170
286	8.0659	0.0170
287	8.0829	0.0170
288	8.0999	0.0170

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0170	0.0039	0.0131
2	0.0170	0.0039	0.0131
3	0.0170	0.0039	0.0132
4	0.0171	0.0039	0.0132
5	0.0171	0.0039	0.0132
6	0.0171	0.0039	0.0133
7	0.0172	0.0039	0.0133
8	0.0172	0.0039	0.0133
9	0.0173	0.0039	0.0133
10	0.0173	0.0039	0.0134
11	0.0173	0.0039	0.0134
12	0.0174	0.0039	0.0134
13	0.0174	0.0040	0.0135
14	0.0174	0.0040	0.0135

15	0.0175	0.0040	0.0135
16	0.0175	0.0040	0.0135
17	0.0176	0.0040	0.0136
18	0.0176	0.0040	0.0136
19	0.0177	0.0040	0.0136
20	0.0177	0.0040	0.0137
21	0.0177	0.0040	0.0137
22	0.0178	0.0040	0.0137
23	0.0178	0.0040	0.0138
24	0.0178	0.0040	0.0138
25	0.0179	0.0041	0.0138
26	0.0179	0.0041	0.0139
27	0.0180	0.0041	0.0139
28	0.0180	0.0041	0.0139
29	0.0181	0.0041	0.0140
30	0.0181	0.0041	0.0140
31	0.0182	0.0041	0.0140
32	0.0182	0.0041	0.0141
33	0.0183	0.0041	0.0141
34	0.0183	0.0041	0.0141
35	0.0183	0.0042	0.0142
36	0.0184	0.0042	0.0142
37	0.0184	0.0042	0.0143
38	0.0185	0.0042	0.0143
39	0.0185	0.0042	0.0143
40	0.0186	0.0042	0.0144
41	0.0186	0.0042	0.0144
42	0.0187	0.0042	0.0144
43	0.0187	0.0042	0.0145
44	0.0188	0.0043	0.0145
45	0.0188	0.0043	0.0146
46	0.0189	0.0043	0.0146
47	0.0189	0.0043	0.0146
48	0.0190	0.0043	0.0147
49	0.0190	0.0043	0.0147
50	0.0191	0.0043	0.0147
51	0.0191	0.0043	0.0148
52	0.0192	0.0044	0.0148
53	0.0192	0.0044	0.0149
54	0.0193	0.0044	0.0149
55	0.0194	0.0044	0.0150
56	0.0194	0.0044	0.0150
57	0.0195	0.0044	0.0151
58	0.0195	0.0044	0.0151
59	0.0196	0.0044	0.0151
60	0.0196	0.0045	0.0152
61	0.0197	0.0045	0.0152
62	0.0197	0.0045	0.0153
63	0.0198	0.0045	0.0153
64	0.0199	0.0045	0.0154
65	0.0199	0.0045	0.0154
66	0.0200	0.0045	0.0155
67	0.0201	0.0046	0.0155
68	0.0201	0.0046	0.0156
69	0.0202	0.0046	0.0156

70	0.0202	0.0046	0.0157
71	0.0203	0.0046	0.0157
72	0.0204	0.0046	0.0158
73	0.0205	0.0046	0.0158
74	0.0205	0.0047	0.0159
75	0.0206	0.0047	0.0159
76	0.0207	0.0047	0.0160
77	0.0207	0.0047	0.0160
78	0.0208	0.0047	0.0161
79	0.0209	0.0047	0.0161
80	0.0209	0.0048	0.0162
81	0.0210	0.0048	0.0163
82	0.0211	0.0048	0.0163
83	0.0212	0.0048	0.0164
84	0.0212	0.0048	0.0164
85	0.0213	0.0048	0.0165
86	0.0214	0.0049	0.0165
87	0.0215	0.0049	0.0166
88	0.0216	0.0049	0.0167
89	0.0217	0.0049	0.0168
90	0.0217	0.0049	0.0168
91	0.0218	0.0050	0.0169
92	0.0219	0.0050	0.0169
93	0.0220	0.0050	0.0170
94	0.0221	0.0050	0.0171
95	0.0222	0.0050	0.0172
96	0.0222	0.0050	0.0172
97	0.0224	0.0051	0.0173
98	0.0224	0.0051	0.0173
99	0.0226	0.0051	0.0174
100	0.0226	0.0051	0.0175
101	0.0227	0.0052	0.0176
102	0.0228	0.0052	0.0176
103	0.0229	0.0052	0.0177
104	0.0230	0.0052	0.0178
105	0.0232	0.0053	0.0179
106	0.0232	0.0053	0.0180
107	0.0234	0.0053	0.0181
108	0.0234	0.0053	0.0181
109	0.0236	0.0054	0.0182
110	0.0237	0.0054	0.0183
111	0.0238	0.0054	0.0184
112	0.0239	0.0054	0.0185
113	0.0241	0.0055	0.0186
114	0.0241	0.0055	0.0187
115	0.0243	0.0055	0.0188
116	0.0244	0.0055	0.0188
117	0.0245	0.0056	0.0190
118	0.0246	0.0056	0.0190
119	0.0248	0.0056	0.0192
120	0.0249	0.0056	0.0193
121	0.0251	0.0057	0.0194
122	0.0252	0.0057	0.0195
123	0.0254	0.0058	0.0196
124	0.0255	0.0058	0.0197

125	0.0257	0.0058	0.0198
126	0.0258	0.0058	0.0199
127	0.0260	0.0059	0.0201
128	0.0261	0.0059	0.0202
129	0.0263	0.0060	0.0203
130	0.0264	0.0060	0.0204
131	0.0266	0.0060	0.0206
132	0.0267	0.0061	0.0207
133	0.0270	0.0061	0.0209
134	0.0271	0.0061	0.0209
135	0.0273	0.0062	0.0211
136	0.0275	0.0062	0.0212
137	0.0277	0.0063	0.0214
138	0.0279	0.0063	0.0215
139	0.0281	0.0064	0.0218
140	0.0283	0.0064	0.0219
141	0.0286	0.0065	0.0221
142	0.0287	0.0065	0.0222
143	0.0290	0.0066	0.0224
144	0.0292	0.0066	0.0226
145	0.0263	0.0060	0.0203
146	0.0265	0.0060	0.0205
147	0.0268	0.0061	0.0207
148	0.0270	0.0061	0.0209
149	0.0274	0.0062	0.0212
150	0.0276	0.0063	0.0213
151	0.0280	0.0063	0.0216
152	0.0282	0.0064	0.0218
153	0.0286	0.0065	0.0221
154	0.0288	0.0065	0.0223
155	0.0293	0.0066	0.0227
156	0.0296	0.0067	0.0228
157	0.0301	0.0068	0.0232
158	0.0303	0.0069	0.0234
159	0.0309	0.0070	0.0239
160	0.0312	0.0071	0.0241
161	0.0318	0.0072	0.0246
162	0.0321	0.0073	0.0248
163	0.0327	0.0074	0.0253
164	0.0331	0.0075	0.0256
165	0.0338	0.0077	0.0261
166	0.0342	0.0078	0.0264
167	0.0350	0.0079	0.0271
168	0.0354	0.0080	0.0274
169	0.0364	0.0082	0.0281
170	0.0368	0.0084	0.0285
171	0.0379	0.0086	0.0293
172	0.0384	0.0087	0.0297
173	0.0396	0.0090	0.0306
174	0.0402	0.0091	0.0311
175	0.0416	0.0094	0.0322
176	0.0424	0.0096	0.0328
177	0.0440	0.0100	0.0340
178	0.0449	0.0102	0.0347
179	0.0469	0.0106	0.0362

180	0.0480	0.0109	0.0371
181	0.0504	0.0114	0.0390
182	0.0518	0.0118	0.0401
183	0.0550	0.0125	0.0425
184	0.0569	0.0129	0.0440
185	0.0458	0.0104	0.0354
186	0.0484	0.0110	0.0374
187	0.0549	0.0125	0.0425
188	0.0592	0.0134	0.0458
189	0.0714	0.0162	0.0552
190	0.0806	0.0183	0.0623
191	0.1152	0.0242	0.0910
192	0.1584	0.0242	0.1342
193	0.4957	0.0242	0.4716
194	0.0938	0.0213	0.0725
195	0.0646	0.0146	0.0499
196	0.0514	0.0117	0.0397
197	0.0589	0.0134	0.0455
198	0.0533	0.0121	0.0412
199	0.0491	0.0111	0.0380
200	0.0458	0.0104	0.0354
201	0.0432	0.0098	0.0334
202	0.0409	0.0093	0.0316
203	0.0390	0.0088	0.0302
204	0.0373	0.0085	0.0289
205	0.0359	0.0081	0.0277
206	0.0346	0.0078	0.0267
207	0.0334	0.0076	0.0259
208	0.0324	0.0074	0.0250
209	0.0315	0.0071	0.0243
210	0.0306	0.0069	0.0237
211	0.0298	0.0068	0.0230
212	0.0291	0.0066	0.0225
213	0.0284	0.0064	0.0220
214	0.0278	0.0063	0.0215
215	0.0272	0.0062	0.0210
216	0.0266	0.0060	0.0206
217	0.0293	0.0067	0.0227
218	0.0289	0.0065	0.0223
219	0.0284	0.0064	0.0220
220	0.0280	0.0064	0.0216
221	0.0276	0.0063	0.0213
222	0.0272	0.0062	0.0210
223	0.0269	0.0061	0.0208
224	0.0265	0.0060	0.0205
225	0.0262	0.0059	0.0202
226	0.0259	0.0059	0.0200
227	0.0256	0.0058	0.0198
228	0.0253	0.0057	0.0195
229	0.0250	0.0057	0.0193
230	0.0247	0.0056	0.0191
231	0.0245	0.0055	0.0189
232	0.0242	0.0055	0.0187
233	0.0240	0.0054	0.0185
234	0.0237	0.0054	0.0184

235	0.0235	0.0053	0.0182
236	0.0233	0.0053	0.0180
237	0.0231	0.0052	0.0178
238	0.0229	0.0052	0.0177
239	0.0227	0.0051	0.0175
240	0.0225	0.0051	0.0174
241	0.0223	0.0051	0.0172
242	0.0221	0.0050	0.0171
243	0.0219	0.0050	0.0170
244	0.0218	0.0049	0.0168
245	0.0216	0.0049	0.0167
246	0.0214	0.0049	0.0166
247	0.0213	0.0048	0.0165
248	0.0211	0.0048	0.0163
249	0.0210	0.0048	0.0162
250	0.0208	0.0047	0.0161
251	0.0207	0.0047	0.0160
252	0.0206	0.0047	0.0159
253	0.0204	0.0046	0.0158
254	0.0203	0.0046	0.0157
255	0.0202	0.0046	0.0156
256	0.0200	0.0045	0.0155
257	0.0199	0.0045	0.0154
258	0.0198	0.0045	0.0153
259	0.0197	0.0045	0.0152
260	0.0195	0.0044	0.0151
261	0.0194	0.0044	0.0150
262	0.0193	0.0044	0.0149
263	0.0192	0.0044	0.0149
264	0.0191	0.0043	0.0148
265	0.0190	0.0043	0.0147
266	0.0189	0.0043	0.0146
267	0.0188	0.0043	0.0145
268	0.0187	0.0042	0.0145
269	0.0186	0.0042	0.0144
270	0.0185	0.0042	0.0143
271	0.0184	0.0042	0.0142
272	0.0183	0.0042	0.0142
273	0.0182	0.0041	0.0141
274	0.0181	0.0041	0.0140
275	0.0180	0.0041	0.0140
276	0.0180	0.0041	0.0139
277	0.0179	0.0041	0.0138
278	0.0178	0.0040	0.0138
279	0.0177	0.0040	0.0137
280	0.0176	0.0040	0.0136
281	0.0175	0.0040	0.0136
282	0.0175	0.0040	0.0135
283	0.0174	0.0039	0.0134
284	0.0173	0.0039	0.0134
285	0.0172	0.0039	0.0133
286	0.0172	0.0039	0.0133
287	0.0171	0.0039	0.0132
288	0.0170	0.0039	0.0132

Total soil rain loss = 1.74(In)
Total effective rainfall = 6.36(In)
Peak flow rate in flood hydrograph = 17.61(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 5.0 10.0 15.0 20.0
0+ 5	0.0003	0.05	Q
0+10	0.0019	0.22	Q
0+15	0.0055	0.52	VQ
0+20	0.0111	0.81	VQ
0+25	0.0178	0.98	VQ
0+30	0.0252	1.07	V Q
0+35	0.0330	1.14	V Q
0+40	0.0412	1.19	V Q
0+45	0.0497	1.23	V Q
0+50	0.0584	1.27	V Q
0+55	0.0674	1.30	V Q
1+ 0	0.0765	1.32	V Q
1+ 5	0.0857	1.35	V Q
1+10	0.0951	1.36	V Q
1+15	0.1046	1.38	V Q
1+20	0.1142	1.40	V Q
1+25	0.1239	1.41	|VQ
1+30	0.1337	1.42	|VQ
1+35	0.1436	1.43	|VQ
1+40	0.1535	1.44	|VQ
1+45	0.1635	1.45	|VQ
1+50	0.1736	1.46	|VQ
1+55	0.1837	1.47	|VQ
2+ 0	0.1939	1.48	|VQ
2+ 5	0.2041	1.48	|VQ
2+10	0.2143	1.49	|VQ
2+15	0.2246	1.49	|VQ
2+20	0.2349	1.49	|VQ
2+25	0.2452	1.50	| Q
2+30	0.2555	1.50	| VQ
2+35	0.2659	1.50	| VQ
2+40	0.2763	1.51	| VQ
2+45	0.2867	1.51	| VQ
2+50	0.2971	1.52	| VQ
2+55	0.3076	1.52	| VQ
3+ 0	0.3181	1.52	| VQ
3+ 5	0.3286	1.53	| VQ
3+10	0.3391	1.53	| VQ
3+15	0.3497	1.53	| VQ
3+20	0.3603	1.54	| Q
3+25	0.3709	1.54	| Q

3+30	0.3815	1.55	Q				
3+35	0.3922	1.55	Q				
3+40	0.4029	1.55	Q				
3+45	0.4137	1.56	Q				
3+50	0.4244	1.56	Q				
3+55	0.4352	1.57	Q				
4+ 0	0.4460	1.57	Q				
4+ 5	0.4569	1.57	Q				
4+10	0.4677	1.58	Q				
4+15	0.4786	1.58	QV				
4+20	0.4896	1.59	QV				
4+25	0.5005	1.59	QV				
4+30	0.5115	1.60	QV				
4+35	0.5225	1.60	QV				
4+40	0.5336	1.60	QV				
4+45	0.5447	1.61	QV				
4+50	0.5558	1.61	QV				
4+55	0.5669	1.62	QV				
5+ 0	0.5781	1.62	QV				
5+ 5	0.5893	1.63	QV				
5+10	0.6006	1.63	Q V				
5+15	0.6119	1.64	Q V				
5+20	0.6232	1.64	Q V				
5+25	0.6345	1.65	Q V				
5+30	0.6459	1.65	Q V				
5+35	0.6573	1.66	Q V				
5+40	0.6688	1.66	Q V				
5+45	0.6802	1.67	Q V				
5+50	0.6918	1.67	Q V				
5+55	0.7033	1.68	Q V				
6+ 0	0.7149	1.68	Q V				
6+ 5	0.7265	1.69	Q V				
6+10	0.7382	1.69	Q V				
6+15	0.7499	1.70	Q V				
6+20	0.7617	1.71	Q V				
6+25	0.7734	1.71	Q V				
6+30	0.7853	1.72	Q V				
6+35	0.7971	1.72	Q V				
6+40	0.8090	1.73	Q V				
6+45	0.8210	1.73	Q V				
6+50	0.8330	1.74	Q V				
6+55	0.8450	1.75	Q V				
7+ 0	0.8570	1.75	Q V				
7+ 5	0.8691	1.76	Q V				
7+10	0.8813	1.76	Q V				
7+15	0.8935	1.77	Q V				
7+20	0.9057	1.78	Q V				
7+25	0.9180	1.78	Q V				
7+30	0.9303	1.79	Q V				
7+35	0.9427	1.80	Q V				
7+40	0.9551	1.80	Q V				
7+45	0.9676	1.81	Q V				
7+50	0.9801	1.82	Q V				
7+55	0.9927	1.82	Q V				
8+ 0	1.0053	1.83	Q V				

8+ 5	1.0180	1.84	Q V				
8+10	1.0307	1.85	Q V				
8+15	1.0435	1.85	Q V				
8+20	1.0563	1.86	Q V				
8+25	1.0691	1.87	Q V				
8+30	1.0821	1.88	Q V				
8+35	1.0950	1.88	Q V				
8+40	1.1081	1.89	Q V				
8+45	1.1212	1.90	Q V				
8+50	1.1343	1.91	Q V				
8+55	1.1475	1.92	Q V				
9+ 0	1.1608	1.93	Q V				
9+ 5	1.1741	1.93	Q V				
9+10	1.1875	1.94	Q V				
9+15	1.2009	1.95	Q V				
9+20	1.2144	1.96	Q V				
9+25	1.2280	1.97	Q V				
9+30	1.2416	1.98	Q V				
9+35	1.2553	1.99	Q V				
9+40	1.2691	2.00	Q V				
9+45	1.2829	2.01	Q V				
9+50	1.2968	2.02	Q V				
9+55	1.3108	2.03	Q V				
10+ 0	1.3249	2.04	Q V				
10+ 5	1.3390	2.05	Q V				
10+10	1.3532	2.06	Q V				
10+15	1.3674	2.07	Q V				
10+20	1.3818	2.08	Q V				
10+25	1.3962	2.09	Q V				
10+30	1.4107	2.11	Q V				
10+35	1.4253	2.12	Q V				
10+40	1.4400	2.13	Q V				
10+45	1.4547	2.14	Q V				
10+50	1.4696	2.15	Q V				
10+55	1.4845	2.17	Q V				
11+ 0	1.4995	2.18	Q V				
11+ 5	1.5146	2.19	Q V				
11+10	1.5298	2.21	Q V				
11+15	1.5451	2.22	Q V				
11+20	1.5605	2.24	Q V				
11+25	1.5760	2.25	Q V				
11+30	1.5917	2.27	Q V				
11+35	1.6074	2.28	Q V				
11+40	1.6232	2.30	Q V				
11+45	1.6391	2.31	Q V				
11+50	1.6552	2.33	Q V				
11+55	1.6713	2.35	Q V				
12+ 0	1.6876	2.36	Q V				
12+ 5	1.7040	2.37	Q V				
12+10	1.7202	2.36	Q V				
12+15	1.7362	2.32	Q V				
12+20	1.7520	2.29	Q V				
12+25	1.7676	2.28	Q V				
12+30	1.7833	2.28	Q V				
12+35	1.7991	2.29	Q V				

12+40	1.8150	2.30		Q		V	
12+45	1.8310	2.32		Q		V	
12+50	1.8471	2.34		Q		V	
12+55	1.8633	2.36		Q		V	
13+ 0	1.8797	2.38		Q		V	
13+ 5	1.8962	2.40		Q		V	
13+10	1.9130	2.43		Q		V	
13+15	1.9299	2.45		Q		V	
13+20	1.9470	2.48		Q		V	
13+25	1.9643	2.51		Q		V	
13+30	1.9818	2.54		Q		V	
13+35	1.9995	2.58		Q		V	
13+40	2.0175	2.61		Q		V	
13+45	2.0358	2.65		Q		V	
13+50	2.0543	2.69		Q		V	
13+55	2.0730	2.73		Q		V	
14+ 0	2.0921	2.77		Q		V	
14+ 5	2.1115	2.81		Q		V	
14+10	2.1312	2.86		Q		V	
14+15	2.1513	2.91		Q		V	
14+20	2.1717	2.97		Q		V	
14+25	2.1926	3.03		Q		V	
14+30	2.2138	3.09		Q		V	
14+35	2.2356	3.15		Q		V	
14+40	2.2578	3.22		Q		V	
14+45	2.2805	3.30		Q		V	
14+50	2.3038	3.38		Q		V	
14+55	2.3276	3.47		Q		V	
15+ 0	2.3522	3.56		Q		V	
15+ 5	2.3775	3.67		Q		V	
15+10	2.4035	3.79		Q		V	
15+15	2.4305	3.92		Q		V	
15+20	2.4585	4.06		Q		V	
15+25	2.4873	4.18		Q		V	
15+30	2.5163	4.21		Q		V	
15+35	2.5449	4.16		Q		V	
15+40	2.5736	4.16		Q		V	
15+45	2.6034	4.34		Q		V	
15+50	2.6357	4.68		Q		V	
15+55	2.6716	5.23		Q		V	
16+ 0	2.7144	6.21		Q		V	
16+ 5	2.7761	8.96		Q		V	
16+10	2.8718	13.90				V Q	
16+15	2.9931	17.61				V	Q
16+20	3.1058	16.35				V	Q
16+25	3.1861	11.66				Q V	
16+30	3.2468	8.82		Q		V	
16+35	3.2987	7.54		Q		V	
16+40	3.3456	6.80		Q		V	
16+45	3.3884	6.21		Q		V	
16+50	3.4273	5.66		Q		V	
16+55	3.4634	5.25		Q		V	
17+ 0	3.4968	4.85		Q		V	
17+ 5	3.5280	4.53		Q		V	
17+10	3.5571	4.23		Q		V	

17+15	3.5850	4.04		Q		V	
17+20	3.6115	3.85		Q		V	
17+25	3.6364	3.62		Q		V	
17+30	3.6602	3.46		Q		V	
17+35	3.6830	3.31		Q		V	
17+40	3.7047	3.16		Q		V	
17+45	3.7256	3.02		Q		V	
17+50	3.7456	2.91		Q		V	
17+55	3.7651	2.83		Q		V	
18+ 0	3.7840	2.74		Q		V	
18+ 5	3.8022	2.65		Q		V	
18+10	3.8193	2.47		Q		V	
18+15	3.8362	2.46		Q		V	
18+20	3.8532	2.46		Q		V	
18+25	3.8700	2.45		Q		V	
18+30	3.8867	2.42		Q		V	
18+35	3.9031	2.38		Q		V	
18+40	3.9193	2.35		Q		V	
18+45	3.9353	2.32		Q		V	
18+50	3.9511	2.29		Q		V	
18+55	3.9666	2.26		Q		V	
19+ 0	3.9820	2.24		Q		V	
19+ 5	3.9972	2.21		Q		V	
19+10	4.0123	2.18		Q		V	
19+15	4.0271	2.16		Q		V	
19+20	4.0418	2.13		Q		V	
19+25	4.0564	2.11		Q		V	
19+30	4.0707	2.09		Q		V	
19+35	4.0850	2.07		Q		V	
19+40	4.0991	2.05		Q		V	
19+45	4.1130	2.03		Q		V	
19+50	4.1268	2.01		Q		V	
19+55	4.1405	1.99		Q		V	
20+ 0	4.1541	1.97		Q		V	
20+ 5	4.1675	1.95		Q		V	
20+10	4.1808	1.93		Q		V	
20+15	4.1940	1.92		Q		V	
20+20	4.2071	1.90		Q		V	
20+25	4.2201	1.88		Q		V	
20+30	4.2330	1.87		Q		V	
20+35	4.2457	1.85		Q		V	
20+40	4.2584	1.84		Q		V	
20+45	4.2709	1.82		Q		V	
20+50	4.2834	1.81		Q		V	
20+55	4.2958	1.80		Q		V	
21+ 0	4.3080	1.78		Q		V	
21+ 5	4.3202	1.77		Q		V	
21+10	4.3323	1.76		Q		V	
21+15	4.3443	1.74		Q		V	
21+20	4.3563	1.73		Q		V	
21+25	4.3681	1.72		Q		V	
21+30	4.3799	1.71		Q		V	
21+35	4.3916	1.70		Q		V	
21+40	4.4032	1.69		Q		V	
21+45	4.4147	1.68		Q		V	

21+50	4.4262	1.67	Q			V
21+55	4.4376	1.66	Q			V
22+ 0	4.4490	1.65	Q			V
22+ 5	4.4602	1.64	Q			V
22+10	4.4714	1.63	Q			V
22+15	4.4826	1.62	Q			V
22+20	4.4936	1.61	Q			V
22+25	4.5046	1.60	Q			V
22+30	4.5156	1.59	Q			V
22+35	4.5265	1.58	Q			V
22+40	4.5373	1.57	Q			V
22+45	4.5481	1.56	Q			V
22+50	4.5588	1.56	Q			V
22+55	4.5695	1.55	Q			V
23+ 0	4.5801	1.54	Q			V
23+ 5	4.5906	1.53	Q			V
23+10	4.6012	1.53	Q			V
23+15	4.6116	1.52	Q			V
23+20	4.6220	1.51	Q			V
23+25	4.6324	1.50	Q			V
23+30	4.6427	1.50	Q			V
23+35	4.6529	1.49	Q			V
23+40	4.6631	1.48	Q			V
23+45	4.6733	1.48	Q			V
23+50	4.6834	1.47	Q			V
23+55	4.6935	1.46	Q			V
24+ 0	4.7035	1.46	Q			V

```
     U n i t   H y d r o g r a p h   A n a l y s i s

     Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
          Study date  12/05/18

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
--------------------------------------------------------------------------------
San Bernardino County Synthetic Unit Hydrology Method
          Manual date - August 1986
Program License Serial Number 6241

------------------------------------------------------------------------
74432
Lake Creek Industrial - Alder Avenue Industrial
Unit Hydrograph Hydrology
100-year 24-hour Event - Proposed Conditions
------------------------------------------------------------------------

     Storm Event Year = 100

     Antecedent Moisture Condition = 3

 English (in-lb) Input Units Used

 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



Area averaged rainfall intensity isohyetal data:
     Sub-Area        Duration        Isohyetal
     (Ac.)            (hours)         (In)
Rainfall data for year 100
          8.60            1           1.34
------------------------------------------------------------------------
Rainfall data for year 100
          8.60            6           3.51
------------------------------------------------------------------------
Rainfall data for year 100
          8.60           24           8.10
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

******** Area-averaged max loss rate, Fm ********


SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap       Fm
No.(AMCII) NO.(AMC 3)    (Ac.)    Fraction     (In/Hr)   (dec.)   (In/Hr)
 32.0       52.0          1.47      0.171     0.785     1.000    0.785
 98.0       99.6          7.13      0.829     0.008     1.000    0.008

Area-averaged adjusted loss rate Fm (In/Hr) =  0.141
```



```
********* Area-Averaged low loss rate fraction, Yb **********

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC3)          Yield Fr
     1.47   0.171         32.0      52.0       9.23     0.312

     7.13   0.829         98.0      99.6       0.04     0.994

Area-averaged catchment yield fraction, Y =  0.878
Area-averaged low loss fraction, Yb =  0.122
User entry of time of concentration  =   0.168 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =       8.60(Ac.)
Catchment Lag time =   0.134 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 62.0040
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.141(In/Hr)
Average low loss rate fraction (Yb) = 0.122 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall =  0.496(In)
Computed peak 30-minute rainfall =  1.016(In)
Specified peak 1-hour rainfall =  1.340(In)
Computed peak 3-hour rainfall =  2.418(In)
Specified peak 6-hour rainfall =  3.510(In)
Specified peak 24-hour rainfall =  8.100(In)


Rainfall depth area reduction factors:
Using a total area of       8.60(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000     Adjusted rainfall =  0.496(In)
30-minute factor = 1.000    Adjusted rainfall =  1.015(In)
1-hour factor = 1.000       Adjusted rainfall =  1.339(In)
3-hour factor = 1.000       Adjusted rainfall =  2.418(In)
6-hour factor = 1.000       Adjusted rainfall =  3.510(In)
24-hour factor = 1.000      Adjusted rainfall =  8.100(In)
------------------------------------------------------------------------

              U n i t  H y d r o g r a p h
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Interval          'S' Graph          Unit Hydrograph
Number            Mean values             ((CFS))
------------------------------------------------------------------------
          (K =       104.02 (CFS))

  1                 8.676                   9.025
  2                44.021                  36.766
  3                69.934                  26.954
  4                79.912                  10.379
  5                85.885                   6.213
  6                89.899                   4.175
  7                92.721                   2.936
  8                94.747                   2.107
```

9	96.392	1.711
10	97.590	1.246
11	98.481	0.928
12	99.130	0.675
13	100.000	0.338

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.4957	0.4957
2	0.6541	0.1584
3	0.7693	0.1152
4	0.8631	0.0938
5	0.9437	0.0806
6	1.0151	0.0714
7	1.0797	0.0646
8	1.1389	0.0592
9	1.1939	0.0549
10	1.2453	0.0514
11	1.2936	0.0484
12	1.3395	0.0458
13	1.3984	0.0589
14	1.4552	0.0569
15	1.5102	0.0550
16	1.5636	0.0533
17	1.6154	0.0518
18	1.6658	0.0504
19	1.7149	0.0491
20	1.7629	0.0480
21	1.8098	0.0469
22	1.8556	0.0458
23	1.9005	0.0449
24	1.9445	0.0440
25	1.9877	0.0432
26	2.0300	0.0424
27	2.0716	0.0416
28	2.1126	0.0409
29	2.1528	0.0402
30	2.1924	0.0396
31	2.2314	0.0390
32	2.2698	0.0384
33	2.3077	0.0379
34	2.3451	0.0373
35	2.3819	0.0368
36	2.4183	0.0364
37	2.4541	0.0359
38	2.4896	0.0354
39	2.5246	0.0350
40	2.5591	0.0346
41	2.5933	0.0342
42	2.6271	0.0338
43	2.6606	0.0334
44	2.6937	0.0331
45	2.7264	0.0327
46	2.7588	0.0324
47	2.7909	0.0321

48	2.8226	0.0318
49	2.8541	0.0315
50	2.8852	0.0312
51	2.9161	0.0309
52	2.9467	0.0306
53	2.9770	0.0303
54	3.0071	0.0301
55	3.0369	0.0298
56	3.0664	0.0296
57	3.0957	0.0293
58	3.1248	0.0291
59	3.1537	0.0288
60	3.1823	0.0286
61	3.2107	0.0284
62	3.2389	0.0282
63	3.2668	0.0280
64	3.2946	0.0278
65	3.3222	0.0276
66	3.3495	0.0274
67	3.3767	0.0272
68	3.4037	0.0270
69	3.4305	0.0268
70	3.4572	0.0266
71	3.4836	0.0265
72	3.5099	0.0263
73	3.5392	0.0293
74	3.5684	0.0292
75	3.5974	0.0290
76	3.6263	0.0289
77	3.6550	0.0287
78	3.6835	0.0286
79	3.7120	0.0284
80	3.7402	0.0283
81	3.7684	0.0281
82	3.7964	0.0280
83	3.8242	0.0279
84	3.8519	0.0277
85	3.8795	0.0276
86	3.9070	0.0275
87	3.9344	0.0273
88	3.9616	0.0272
89	3.9887	0.0271
90	4.0156	0.0270
91	4.0425	0.0269
92	4.0692	0.0267
93	4.0959	0.0266
94	4.1224	0.0265
95	4.1488	0.0264
96	4.1751	0.0263
97	4.2012	0.0262
98	4.2273	0.0261
99	4.2533	0.0260
100	4.2792	0.0259
101	4.3049	0.0258
102	4.3306	0.0257

103	4.3561	0.0256
104	4.3816	0.0255
105	4.4070	0.0254
106	4.4322	0.0253
107	4.4574	0.0252
108	4.4825	0.0251
109	4.5075	0.0250
110	4.5324	0.0249
111	4.5572	0.0248
112	4.5819	0.0247
113	4.6066	0.0246
114	4.6311	0.0245
115	4.6556	0.0245
116	4.6800	0.0244
117	4.7042	0.0243
118	4.7285	0.0242
119	4.7526	0.0241
120	4.7766	0.0241
121	4.8006	0.0240
122	4.8245	0.0239
123	4.8483	0.0238
124	4.8721	0.0237
125	4.8957	0.0237
126	4.9193	0.0236
127	4.9428	0.0235
128	4.9663	0.0234
129	4.9896	0.0234
130	5.0129	0.0233
131	5.0362	0.0232
132	5.0593	0.0232
133	5.0824	0.0231
134	5.1054	0.0230
135	5.1284	0.0229
136	5.1513	0.0229
137	5.1741	0.0228
138	5.1968	0.0227
139	5.2195	0.0227
140	5.2421	0.0226
141	5.2647	0.0226
142	5.2872	0.0225
143	5.3096	0.0224
144	5.3320	0.0224
145	5.3543	0.0223
146	5.3765	0.0222
147	5.3987	0.0222
148	5.4208	0.0221
149	5.4429	0.0221
150	5.4649	0.0220
151	5.4869	0.0219
152	5.5087	0.0219
153	5.5306	0.0218
154	5.5524	0.0218
155	5.5741	0.0217
156	5.5957	0.0217
157	5.6174	0.0216

158	5.6389	0.0216
159	5.6604	0.0215
160	5.6819	0.0214
161	5.7033	0.0214
162	5.7246	0.0213
163	5.7459	0.0213
164	5.7671	0.0212
165	5.7883	0.0212
166	5.8095	0.0211
167	5.8305	0.0211
168	5.8516	0.0210
169	5.8726	0.0210
170	5.8935	0.0209
171	5.9144	0.0209
172	5.9352	0.0208
173	5.9560	0.0208
174	5.9768	0.0207
175	5.9975	0.0207
176	6.0181	0.0207
177	6.0387	0.0206
178	6.0593	0.0206
179	6.0798	0.0205
180	6.1002	0.0205
181	6.1207	0.0204
182	6.1410	0.0204
183	6.1614	0.0203
184	6.1817	0.0203
185	6.2019	0.0202
186	6.2221	0.0202
187	6.2423	0.0202
188	6.2624	0.0201
189	6.2825	0.0201
190	6.3025	0.0200
191	6.3225	0.0200
192	6.3424	0.0199
193	6.3623	0.0199
194	6.3822	0.0199
195	6.4020	0.0198
196	6.4218	0.0198
197	6.4416	0.0197
198	6.4613	0.0197
199	6.4809	0.0197
200	6.5006	0.0196
201	6.5201	0.0196
202	6.5397	0.0195
203	6.5592	0.0195
204	6.5787	0.0195
205	6.5981	0.0194
206	6.6175	0.0194
207	6.6369	0.0194
208	6.6562	0.0193
209	6.6755	0.0193
210	6.6947	0.0192
211	6.7139	0.0192
212	6.7331	0.0192

213	6.7523	0.0191
214	6.7714	0.0191
215	6.7904	0.0191
216	6.8095	0.0190
217	6.8285	0.0190
218	6.8474	0.0190
219	6.8664	0.0189
220	6.8853	0.0189
221	6.9041	0.0189
222	6.9229	0.0188
223	6.9417	0.0188
224	6.9605	0.0188
225	6.9792	0.0187
226	6.9979	0.0187
227	7.0166	0.0187
228	7.0352	0.0186
229	7.0538	0.0186
230	7.0724	0.0186
231	7.0909	0.0185
232	7.1094	0.0185
233	7.1279	0.0185
234	7.1463	0.0184
235	7.1647	0.0184
236	7.1831	0.0184
237	7.2014	0.0183
238	7.2198	0.0183
239	7.2380	0.0183
240	7.2563	0.0183
241	7.2745	0.0182
242	7.2927	0.0182
243	7.3109	0.0182
244	7.3290	0.0181
245	7.3471	0.0181
246	7.3652	0.0181
247	7.3832	0.0180
248	7.4013	0.0180
249	7.4192	0.0180
250	7.4372	0.0180
251	7.4551	0.0179
252	7.4730	0.0179
253	7.4909	0.0179
254	7.5088	0.0178
255	7.5266	0.0178
256	7.5444	0.0178
257	7.5621	0.0178
258	7.5799	0.0177
259	7.5976	0.0177
260	7.6153	0.0177
261	7.6329	0.0177
262	7.6505	0.0176
263	7.6682	0.0176
264	7.6857	0.0176
265	7.7033	0.0175
266	7.7208	0.0175
267	7.7383	0.0175

268	7.7558	0.0175
269	7.7732	0.0174
270	7.7906	0.0174
271	7.8080	0.0174
272	7.8254	0.0174
273	7.8427	0.0173
274	7.8600	0.0173
275	7.8773	0.0173
276	7.8946	0.0173
277	7.9118	0.0172
278	7.9291	0.0172
279	7.9463	0.0172
280	7.9634	0.0172
281	7.9806	0.0171
282	7.9977	0.0171
283	8.0148	0.0171
284	8.0319	0.0171
285	8.0489	0.0170
286	8.0659	0.0170
287	8.0829	0.0170
288	8.0999	0.0170

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0170	0.0021	0.0149
2	0.0170	0.0021	0.0149
3	0.0170	0.0021	0.0150
4	0.0171	0.0021	0.0150
5	0.0171	0.0021	0.0150
6	0.0171	0.0021	0.0150
7	0.0172	0.0021	0.0151
8	0.0172	0.0021	0.0151
9	0.0173	0.0021	0.0152
10	0.0173	0.0021	0.0152
11	0.0173	0.0021	0.0152
12	0.0174	0.0021	0.0152
13	0.0174	0.0021	0.0153
14	0.0174	0.0021	0.0153
15	0.0175	0.0021	0.0154
16	0.0175	0.0021	0.0154
17	0.0176	0.0022	0.0154
18	0.0176	0.0022	0.0154
19	0.0177	0.0022	0.0155
20	0.0177	0.0022	0.0155
21	0.0177	0.0022	0.0156
22	0.0178	0.0022	0.0156
23	0.0178	0.0022	0.0156
24	0.0178	0.0022	0.0157
25	0.0179	0.0022	0.0157
26	0.0179	0.0022	0.0157
27	0.0180	0.0022	0.0158
28	0.0180	0.0022	0.0158
29	0.0181	0.0022	0.0159

30	0.0181	0.0022	0.0159
31	0.0182	0.0022	0.0159
32	0.0182	0.0022	0.0160
33	0.0183	0.0022	0.0160
34	0.0183	0.0022	0.0160
35	0.0183	0.0022	0.0161
36	0.0184	0.0022	0.0161
37	0.0184	0.0023	0.0162
38	0.0185	0.0023	0.0162
39	0.0185	0.0023	0.0163
40	0.0186	0.0023	0.0163
41	0.0186	0.0023	0.0164
42	0.0187	0.0023	0.0164
43	0.0187	0.0023	0.0164
44	0.0188	0.0023	0.0165
45	0.0188	0.0023	0.0165
46	0.0189	0.0023	0.0166
47	0.0189	0.0023	0.0166
48	0.0190	0.0023	0.0166
49	0.0190	0.0023	0.0167
50	0.0191	0.0023	0.0167
51	0.0191	0.0023	0.0168
52	0.0192	0.0023	0.0168
53	0.0192	0.0024	0.0169
54	0.0193	0.0024	0.0169
55	0.0194	0.0024	0.0170
56	0.0194	0.0024	0.0170
57	0.0195	0.0024	0.0171
58	0.0195	0.0024	0.0171
59	0.0196	0.0024	0.0172
60	0.0196	0.0024	0.0172
61	0.0197	0.0024	0.0173
62	0.0197	0.0024	0.0173
63	0.0198	0.0024	0.0174
64	0.0199	0.0024	0.0174
65	0.0199	0.0024	0.0175
66	0.0200	0.0024	0.0175
67	0.0201	0.0025	0.0176
68	0.0201	0.0025	0.0177
69	0.0202	0.0025	0.0177
70	0.0202	0.0025	0.0178
71	0.0203	0.0025	0.0178
72	0.0204	0.0025	0.0179
73	0.0205	0.0025	0.0180
74	0.0205	0.0025	0.0180
75	0.0206	0.0025	0.0181
76	0.0207	0.0025	0.0181
77	0.0207	0.0025	0.0182
78	0.0208	0.0025	0.0182
79	0.0209	0.0026	0.0183
80	0.0209	0.0026	0.0184
81	0.0210	0.0026	0.0185
82	0.0211	0.0026	0.0185
83	0.0212	0.0026	0.0186
84	0.0212	0.0026	0.0186

85	0.0213	0.0026	0.0187
86	0.0214	0.0026	0.0188
87	0.0215	0.0026	0.0189
88	0.0216	0.0026	0.0189
89	0.0217	0.0027	0.0190
90	0.0217	0.0027	0.0191
91	0.0218	0.0027	0.0192
92	0.0219	0.0027	0.0192
93	0.0220	0.0027	0.0193
94	0.0221	0.0027	0.0194
95	0.0222	0.0027	0.0195
96	0.0222	0.0027	0.0195
97	0.0224	0.0027	0.0196
98	0.0224	0.0027	0.0197
99	0.0226	0.0028	0.0198
100	0.0226	0.0028	0.0199
101	0.0227	0.0028	0.0200
102	0.0228	0.0028	0.0200
103	0.0229	0.0028	0.0201
104	0.0230	0.0028	0.0202
105	0.0232	0.0028	0.0203
106	0.0232	0.0028	0.0204
107	0.0234	0.0029	0.0205
108	0.0234	0.0029	0.0206
109	0.0236	0.0029	0.0207
110	0.0237	0.0029	0.0208
111	0.0238	0.0029	0.0209
112	0.0239	0.0029	0.0210
113	0.0241	0.0029	0.0211
114	0.0241	0.0030	0.0212
115	0.0243	0.0030	0.0213
116	0.0244	0.0030	0.0214
117	0.0245	0.0030	0.0215
118	0.0246	0.0030	0.0216
119	0.0248	0.0030	0.0218
120	0.0249	0.0030	0.0219
121	0.0251	0.0031	0.0220
122	0.0252	0.0031	0.0221
123	0.0254	0.0031	0.0223
124	0.0255	0.0031	0.0223
125	0.0257	0.0031	0.0225
126	0.0258	0.0032	0.0226
127	0.0260	0.0032	0.0228
128	0.0261	0.0032	0.0229
129	0.0263	0.0032	0.0231
130	0.0264	0.0032	0.0232
131	0.0266	0.0033	0.0234
132	0.0267	0.0033	0.0235
133	0.0270	0.0033	0.0237
134	0.0271	0.0033	0.0238
135	0.0273	0.0033	0.0240
136	0.0275	0.0034	0.0241
137	0.0277	0.0034	0.0243
138	0.0279	0.0034	0.0245
139	0.0281	0.0034	0.0247

140	0.0283	0.0035	0.0248
141	0.0286	0.0035	0.0251
142	0.0287	0.0035	0.0252
143	0.0290	0.0036	0.0255
144	0.0292	0.0036	0.0256
145	0.0263	0.0032	0.0231
146	0.0265	0.0032	0.0232
147	0.0268	0.0033	0.0235
148	0.0270	0.0033	0.0237
149	0.0274	0.0033	0.0240
150	0.0276	0.0034	0.0242
151	0.0280	0.0034	0.0246
152	0.0282	0.0034	0.0247
153	0.0286	0.0035	0.0251
154	0.0288	0.0035	0.0253
155	0.0293	0.0036	0.0257
156	0.0296	0.0036	0.0259
157	0.0301	0.0037	0.0264
158	0.0303	0.0037	0.0266
159	0.0309	0.0038	0.0271
160	0.0312	0.0038	0.0273
161	0.0318	0.0039	0.0279
162	0.0321	0.0039	0.0281
163	0.0327	0.0040	0.0287
164	0.0331	0.0040	0.0290
165	0.0338	0.0041	0.0297
166	0.0342	0.0042	0.0300
167	0.0350	0.0043	0.0307
168	0.0354	0.0043	0.0311
169	0.0364	0.0044	0.0319
170	0.0368	0.0045	0.0323
171	0.0379	0.0046	0.0332
172	0.0384	0.0047	0.0337
173	0.0396	0.0048	0.0348
174	0.0402	0.0049	0.0353
175	0.0416	0.0051	0.0365
176	0.0424	0.0052	0.0372
177	0.0440	0.0054	0.0386
178	0.0449	0.0055	0.0394
179	0.0469	0.0057	0.0411
180	0.0480	0.0059	0.0421
181	0.0504	0.0062	0.0443
182	0.0518	0.0063	0.0455
183	0.0550	0.0067	0.0483
184	0.0569	0.0070	0.0499
185	0.0458	0.0056	0.0402
186	0.0484	0.0059	0.0425
187	0.0549	0.0067	0.0482
188	0.0592	0.0072	0.0520
189	0.0714	0.0087	0.0627
190	0.0806	0.0099	0.0707
191	0.1152	0.0117	0.1035
192	0.1584	0.0117	0.1467
193	0.4957	0.0117	0.4840
194	0.0938	0.0115	0.0823

195	0.0646	0.0079	0.0567
196	0.0514	0.0063	0.0451
197	0.0589	0.0072	0.0517
198	0.0533	0.0065	0.0468
199	0.0491	0.0060	0.0431
200	0.0458	0.0056	0.0402
201	0.0432	0.0053	0.0379
202	0.0409	0.0050	0.0359
203	0.0390	0.0048	0.0342
204	0.0373	0.0046	0.0328
205	0.0359	0.0044	0.0315
206	0.0346	0.0042	0.0304
207	0.0334	0.0041	0.0293
208	0.0324	0.0040	0.0284
209	0.0315	0.0038	0.0276
210	0.0306	0.0037	0.0268
211	0.0298	0.0036	0.0262
212	0.0291	0.0036	0.0255
213	0.0284	0.0035	0.0249
214	0.0278	0.0034	0.0244
215	0.0272	0.0033	0.0239
216	0.0266	0.0033	0.0234
217	0.0293	0.0036	0.0257
218	0.0289	0.0035	0.0253
219	0.0284	0.0035	0.0249
220	0.0280	0.0034	0.0246
221	0.0276	0.0034	0.0242
222	0.0272	0.0033	0.0239
223	0.0269	0.0033	0.0236
224	0.0265	0.0032	0.0233
225	0.0262	0.0032	0.0230
226	0.0259	0.0032	0.0227
227	0.0256	0.0031	0.0224
228	0.0253	0.0031	0.0222
229	0.0250	0.0031	0.0219
230	0.0247	0.0030	0.0217
231	0.0245	0.0030	0.0215
232	0.0242	0.0030	0.0213
233	0.0240	0.0029	0.0210
234	0.0237	0.0029	0.0208
235	0.0235	0.0029	0.0206
236	0.0233	0.0029	0.0204
237	0.0231	0.0028	0.0203
238	0.0229	0.0028	0.0201
239	0.0227	0.0028	0.0199
240	0.0225	0.0028	0.0197
241	0.0223	0.0027	0.0196
242	0.0221	0.0027	0.0194
243	0.0219	0.0027	0.0193
244	0.0218	0.0027	0.0191
245	0.0216	0.0026	0.0190
246	0.0214	0.0026	0.0188
247	0.0213	0.0026	0.0187
248	0.0211	0.0026	0.0186
249	0.0210	0.0026	0.0184

250	0.0208	0.0026	0.0183
251	0.0207	0.0025	0.0182
252	0.0206	0.0025	0.0180
253	0.0204	0.0025	0.0179
254	0.0203	0.0025	0.0178
255	0.0202	0.0025	0.0177
256	0.0200	0.0025	0.0176
257	0.0199	0.0024	0.0175
258	0.0198	0.0024	0.0174
259	0.0197	0.0024	0.0173
260	0.0195	0.0024	0.0172
261	0.0194	0.0024	0.0171
262	0.0193	0.0024	0.0170
263	0.0192	0.0024	0.0169
264	0.0191	0.0023	0.0168
265	0.0190	0.0023	0.0167
266	0.0189	0.0023	0.0166
267	0.0188	0.0023	0.0165
268	0.0187	0.0023	0.0164
269	0.0186	0.0023	0.0163
270	0.0185	0.0023	0.0162
271	0.0184	0.0023	0.0162
272	0.0183	0.0022	0.0161
273	0.0182	0.0022	0.0160
274	0.0181	0.0022	0.0159
275	0.0180	0.0022	0.0158
276	0.0180	0.0022	0.0158
277	0.0179	0.0022	0.0157
278	0.0178	0.0022	0.0156
279	0.0177	0.0022	0.0155
280	0.0176	0.0022	0.0155
281	0.0175	0.0021	0.0154
282	0.0175	0.0021	0.0153
283	0.0174	0.0021	0.0153
284	0.0173	0.0021	0.0152
285	0.0172	0.0021	0.0151
286	0.0172	0.0021	0.0151
287	0.0171	0.0021	0.0150
288	0.0170	0.0021	0.0149

Total soil rain loss = 0.93(In)
Total effective rainfall = 7.17(In)
Peak flow rate in flood hydrograph = 24.74(CFS)

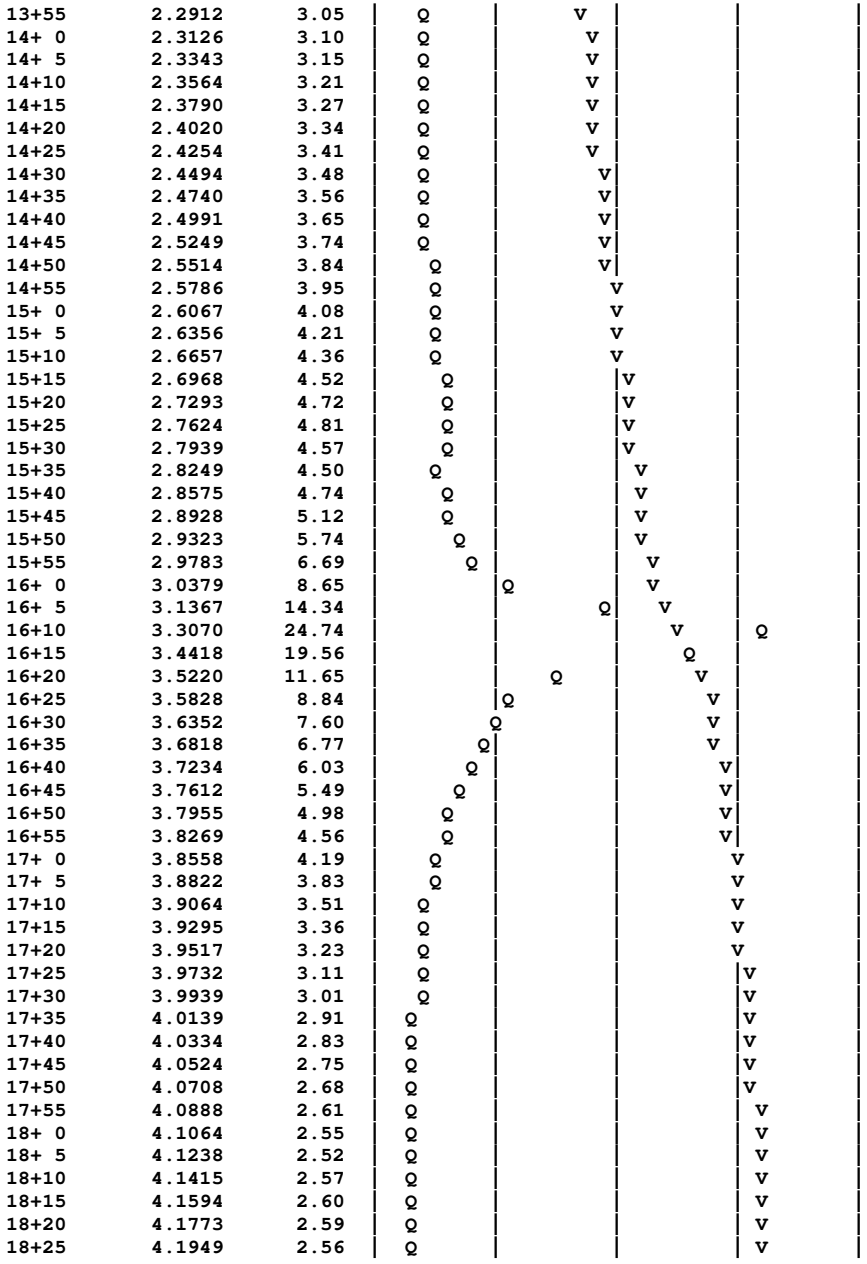
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0009	0.13	Q				
0+10	0.0056	0.68	Q				
0+15	0.0131	1.09	VQ				
0+20	0.0217	1.24	VQ				
0+25	0.0309	1.34	VQ				
0+30	0.0405	1.40	VQ				
0+35	0.0505	1.45	VQ				
0+40	0.0607	1.48	VQ				
0+45	0.0711	1.51	V Q				
0+50	0.0817	1.53	V Q				
0+55	0.0924	1.55	V Q				
1+ 0	0.1031	1.56	V Q				
1+ 5	0.1140	1.57	V Q				
1+10	0.1248	1.58	V Q				
1+15	0.1357	1.58	VQ				
1+20	0.1466	1.58	VQ				
1+25	0.1575	1.59	VQ				
1+30	0.1685	1.59	VQ				
1+35	0.1795	1.59	VQ				
1+40	0.1905	1.60	VQ				
1+45	0.2015	1.60	VQ				
1+50	0.2126	1.60	VQ				
1+55	0.2236	1.61	VQ				
2+ 0	0.2347	1.61	VQ				
2+ 5	0.2459	1.62	VQ				
2+10	0.2570	1.62	Q				
2+15	0.2682	1.62	Q				
2+20	0.2794	1.63	Q				
2+25	0.2906	1.63	Q				
2+30	0.3019	1.64	Q				
2+35	0.3132	1.64	Q				
2+40	0.3245	1.64	Q				
2+45	0.3358	1.65	Q				
2+50	0.3472	1.65	Q				
2+55	0.3586	1.66	Q				
3+ 0	0.3700	1.66	Q				
3+ 5	0.3815	1.66	Q				
3+10	0.3930	1.67	QV				
3+15	0.4045	1.67	QV				
3+20	0.4160	1.68	QV				
3+25	0.4276	1.68	QV				
3+30	0.4392	1.68	QV				
3+35	0.4509	1.69	QV				
3+40	0.4625	1.69	QV				
3+45	0.4742	1.70	QV				
3+50	0.4859	1.70	QV				
3+55	0.4977	1.71	QV				
4+ 0	0.5095	1.71	QV				
4+ 5	0.5213	1.72	Q V				
4+10	0.5332	1.72	Q V				
4+15	0.5450	1.73	Q V				
4+20	0.5570	1.73	Q V				
4+25	0.5689	1.74	Q V				
4+30	0.5809	1.74	Q V				
4+35	0.5929	1.75	Q V				
4+40	0.6050	1.75	Q V				

4+45	0.6171	1.76	Q V				
4+50	0.6292	1.76	Q V				
4+55	0.6413	1.77	Q V				
5+ 0	0.6535	1.77	Q V				
5+ 5	0.6658	1.78	Q V				
5+10	0.6780	1.78	Q V				
5+15	0.6903	1.79	Q V				
5+20	0.7027	1.79	Q V				
5+25	0.7150	1.80	Q V				
5+30	0.7275	1.80	Q V				
5+35	0.7399	1.81	Q V				
5+40	0.7524	1.81	Q V				
5+45	0.7649	1.82	Q V				
5+50	0.7775	1.83	Q V				
5+55	0.7901	1.83	Q V				
6+ 0	0.8028	1.84	Q V				
6+ 5	0.8155	1.84	Q V				
6+10	0.8282	1.85	Q V				
6+15	0.8410	1.85	Q V				
6+20	0.8538	1.86	Q V				
6+25	0.8666	1.87	Q V				
6+30	0.8795	1.87	Q V				
6+35	0.8925	1.88	Q V				
6+40	0.9055	1.89	Q V				
6+45	0.9185	1.89	Q V				
6+50	0.9316	1.90	Q V				
6+55	0.9447	1.91	Q V				
7+ 0	0.9579	1.91	Q V				
7+ 5	0.9711	1.92	Q V				
7+10	0.9844	1.93	Q V				
7+15	0.9977	1.93	Q V				
7+20	1.0111	1.94	Q V				
7+25	1.0245	1.95	Q V				
7+30	1.0380	1.96	Q V				
7+35	1.0515	1.96	Q V				
7+40	1.0651	1.97	Q V				
7+45	1.0787	1.98	Q V				
7+50	1.0924	1.99	Q V				
7+55	1.1061	1.99	Q V				
8+ 0	1.1199	2.00	Q V				
8+ 5	1.1338	2.01	Q V				
8+10	1.1477	2.02	Q V				
8+15	1.1616	2.03	Q V				
8+20	1.1756	2.04	Q V				
8+25	1.1897	2.04	Q V				
8+30	1.2038	2.05	Q V				
8+35	1.2180	2.06	Q V				
8+40	1.2323	2.07	Q V				
8+45	1.2466	2.08	Q V				
8+50	1.2610	2.09	Q V				
8+55	1.2754	2.10	Q V				
9+ 0	1.2899	2.11	Q V				
9+ 5	1.3045	2.12	Q V				
9+10	1.3192	2.13	Q V				
9+15	1.3339	2.14	Q V				

9+20	1.3487	2.15	Q V				
9+25	1.3635	2.16	Q V				
9+30	1.3785	2.17	Q V				
9+35	1.3935	2.18	Q V				
9+40	1.4085	2.19	Q V				
9+45	1.4237	2.20	Q V				
9+50	1.4389	2.21	Q V				
9+55	1.4542	2.22	Q V				
10+ 0	1.4696	2.23	Q V				
10+ 5	1.4851	2.25	Q V				
10+10	1.5006	2.26	Q V				
10+15	1.5163	2.27	Q V				
10+20	1.5320	2.28	Q V				
10+25	1.5478	2.30	Q V				
10+30	1.5637	2.31	Q V				
10+35	1.5797	2.32	Q V				
10+40	1.5958	2.34	Q V				
10+45	1.6120	2.35	Q V				
10+50	1.6283	2.37	Q V				
10+55	1.6447	2.38	Q V				
11+ 0	1.6612	2.39	Q V				
11+ 5	1.6778	2.41	Q V				
11+10	1.6945	2.43	Q V				
11+15	1.7113	2.44	Q V				
11+20	1.7282	2.46	Q V				
11+25	1.7453	2.47	Q V				
11+30	1.7624	2.49	Q V				
11+35	1.7797	2.51	Q V				
11+40	1.7971	2.53	Q V				
11+45	1.8146	2.55	Q V				
11+50	1.8323	2.56	Q V				
11+55	1.8501	2.58	Q V				
12+ 0	1.8680	2.60	Q V				
12+ 5	1.8859	2.60	Q V				
12+10	1.9032	2.52	Q V				
12+15	1.9202	2.46	Q V				
12+20	1.9371	2.46	Q V				
12+25	1.9541	2.46	Q V				
12+30	1.9711	2.48	Q V				
12+35	1.9883	2.49	Q V				
12+40	2.0056	2.51	Q V				
12+45	2.0231	2.54	Q V				
12+50	2.0407	2.56	Q V				
12+55	2.0585	2.59	Q V				
13+ 0	2.0766	2.62	Q V				
13+ 5	2.0948	2.65	Q V				
13+10	2.1132	2.68	Q V				
13+15	2.1319	2.71	Q V				
13+20	2.1509	2.75	Q V				
13+25	2.1700	2.79	Q V				
13+30	2.1895	2.83	Q V				
13+35	2.2092	2.86	Q V				
13+40	2.2292	2.91	Q V				
13+45	2.2496	2.95	Q V				
13+50	2.2702	3.00	Q V				

13+55	2.2912	3.05	
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14+25	2.4254	3.41	
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15+ 0	2.6067	4.08	
15+ 5	2.6356	4.21	
15+10	2.6657	4.36	
15+15	2.6968	4.52	
15+20	2.7293	4.72	
15+25	2.7624	4.81	
15+30	2.7939	4.57	
15+35	2.8249	4.50	
15+40	2.8575	4.74	
15+45	2.8928	5.12	
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16+ 0	3.0379	8.65	
16+ 5	3.1367	14.34	
16+10	3.3070	24.74	
16+15	3.4418	19.56	
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16+25	3.5828	8.84	
16+30	3.6352	7.60	
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16+40	3.7234	6.03	
16+45	3.7612	5.49	
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17+ 0	3.8558	4.19	
17+ 5	3.8822	3.83	
17+10	3.9064	3.51	
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17+25	3.9732	3.11	
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17+35	4.0139	2.91	
17+40	4.0334	2.83	
17+45	4.0524	2.75	
17+50	4.0708	2.68	
17+55	4.0888	2.61	
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18+ 5	4.1238	2.52	
18+10	4.1415	2.57	
18+15	4.1594	2.60	
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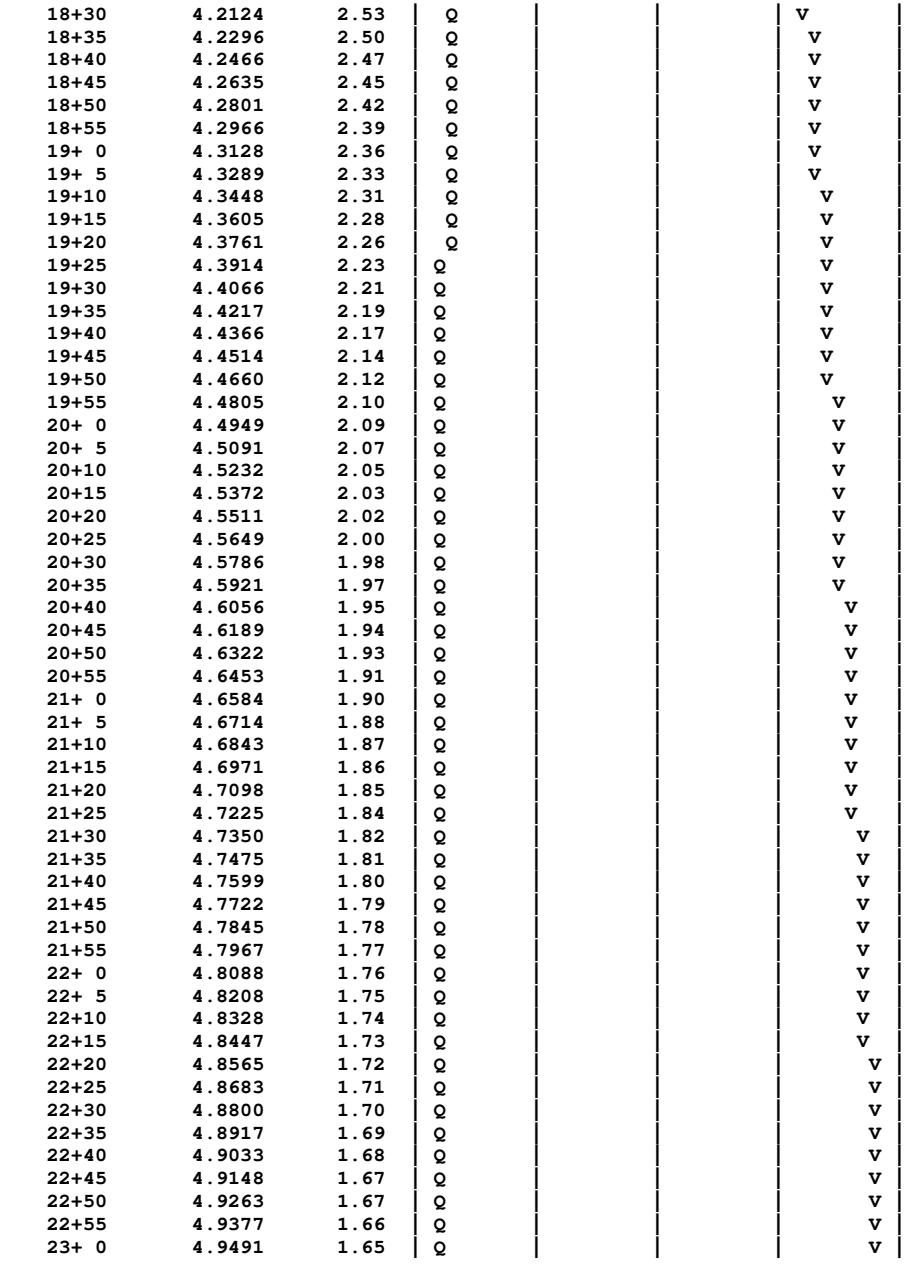
18+30	4.2124	2.53	
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19+ 0	4.3128	2.36	
19+ 5	4.3289	2.33	
19+10	4.3448	2.31	
19+15	4.3605	2.28	
19+20	4.3761	2.26	
19+25	4.3914	2.23	
19+30	4.4066	2.21	
19+35	4.4217	2.19	
19+40	4.4366	2.17	
19+45	4.4514	2.14	
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20+10	4.5232	2.05	
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20+20	4.5511	2.02	
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20+40	4.6056	1.95	
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21+15	4.6971	1.86	
21+20	4.7098	1.85	
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21+55	4.7967	1.77	
22+ 0	4.8088	1.76	
22+ 5	4.8208	1.75	
22+10	4.8328	1.74	
22+15	4.8447	1.73	
22+20	4.8565	1.72	
22+25	4.8683	1.71	
22+30	4.8800	1.70	
22+35	4.8917	1.69	
22+40	4.9033	1.68	
22+45	4.9148	1.67	
22+50	4.9263	1.67	
22+55	4.9377	1.66	
23+ 0	4.9491	1.65	

23+ 5	4.9604	1.64	Q			V
23+10	4.9716	1.63	Q			V
23+15	4.9828	1.63	Q			V
23+20	4.9940	1.62	Q			V
23+25	5.0051	1.61	Q			V
23+30	5.0161	1.60	Q			V
23+35	5.0271	1.60	Q			V
23+40	5.0381	1.59	Q			V
23+45	5.0490	1.58	Q			V
23+50	5.0598	1.58	Q			V
23+55	5.0706	1.57	Q			V
24+ 0	5.0814	1.56	Q			V

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Figure C-3 (1 of 2)

United States Department of Agriculture

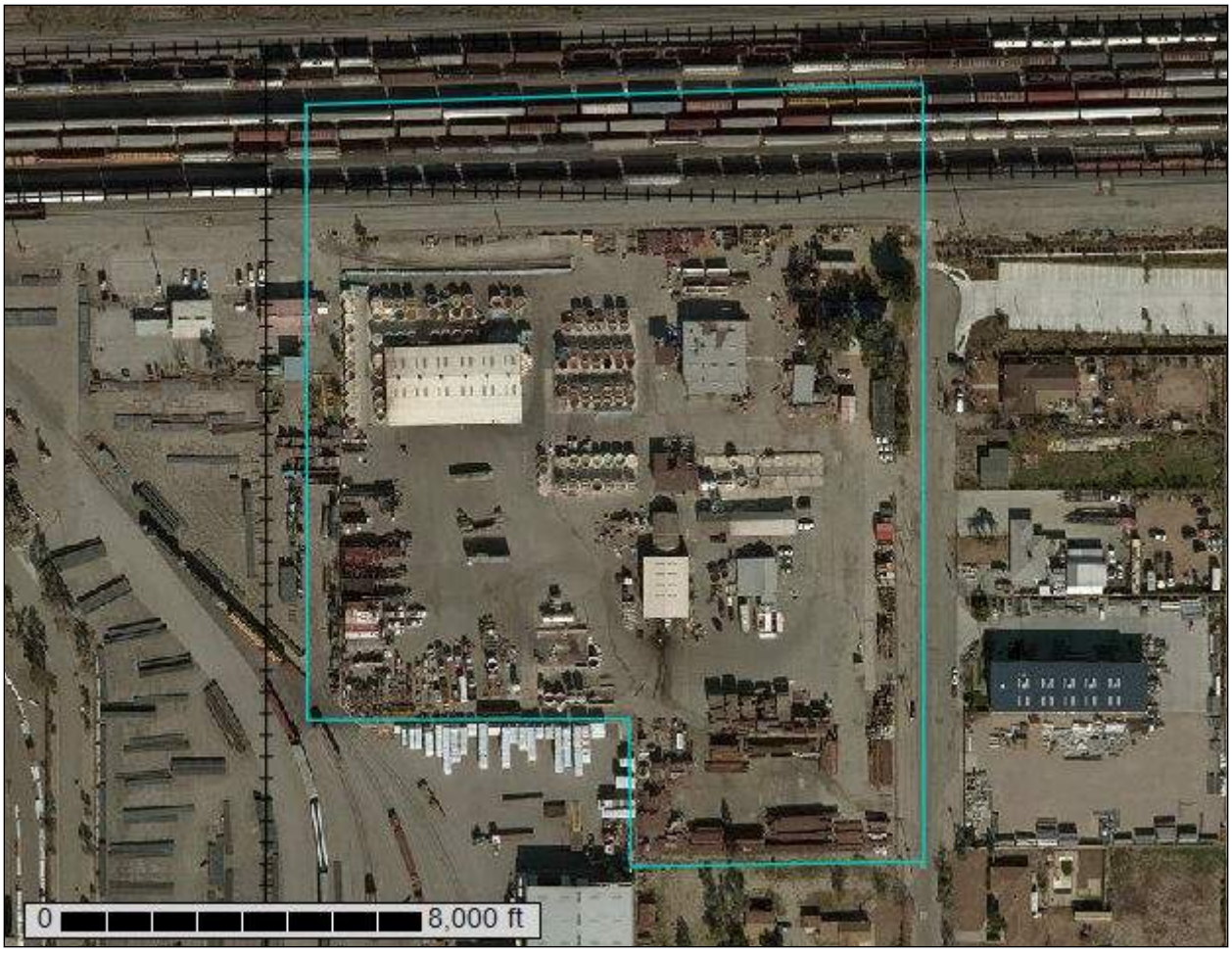
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for San Bernardino County Southwestern Part, California

Alder Avenue Industrial Bldg



June 4, 2018

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

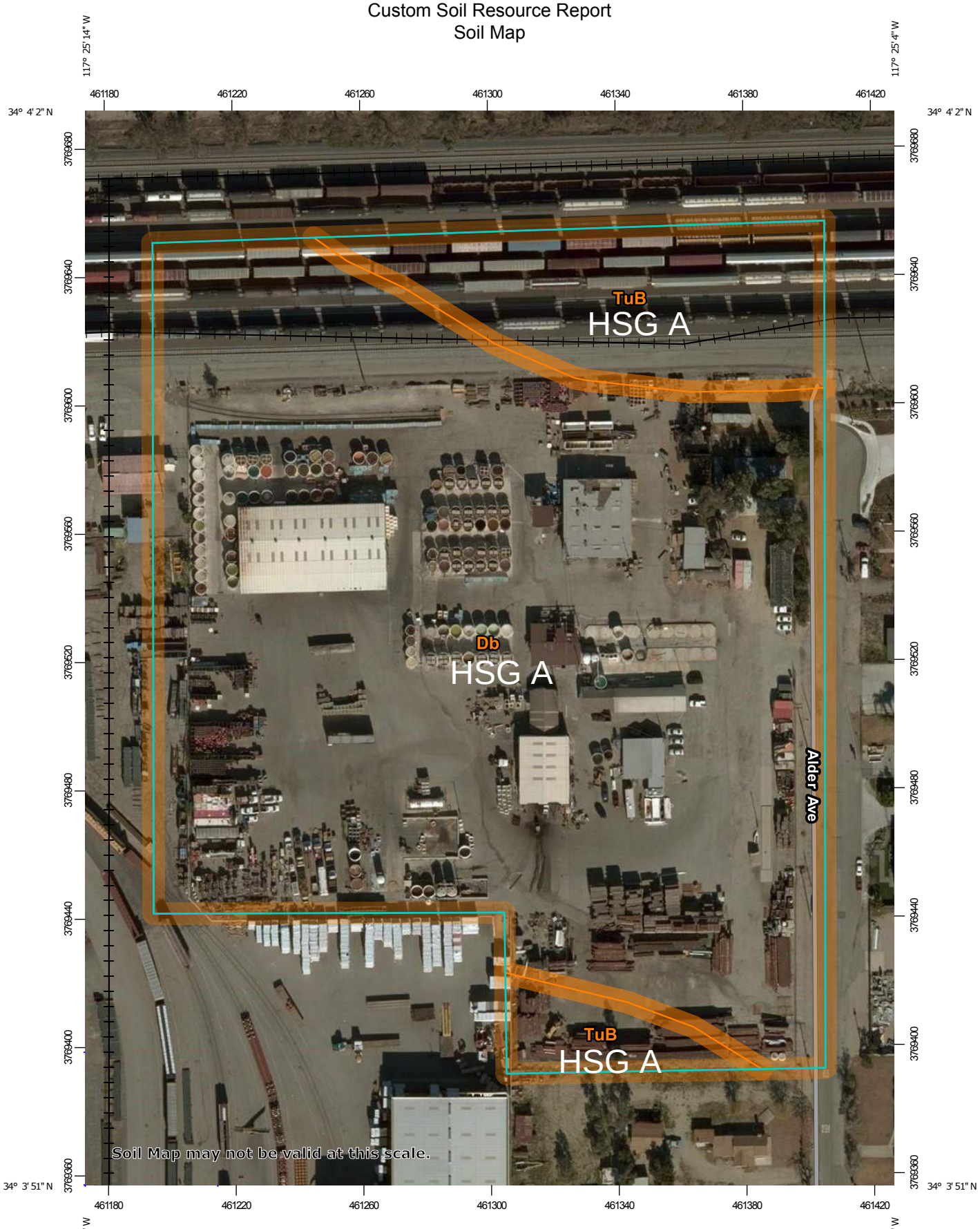
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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



Map Scale: 1:1,630 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 9, Sep 11, 2017

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

Date(s) aerial images were photographed: Jan 5, 2015—Jan 18, 2015

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

MAP LEGEND

MAP INFORMATION

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Db	Delhi fine sand	10.4	84.9%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	1.9	15.1%
Totals for Area of Interest		**12.3**	**100.0%**

Map Unit Descriptions

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

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

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

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

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

San Bernardino County Southwestern Part, California

Db—Delhi fine sand

Map Unit Setting

National map unit symbol: hcjq
Elevation: 30 to 1,400 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 225 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Delhi

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from granite

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Tujunga, loamy sand
Percent of map unit: 5 percent
Hydric soil rating: No

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

TuB—Tujunga loamy sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2sx6y
Elevation: 650 to 3,110 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 62 to 65 degrees F
Frost-free period: 325 to 365 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Tujunga, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga, Loamy Sand

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

Typical profile
A - 0 to 6 inches: loamy sand
C1 - 6 to 18 inches: loamy sand
C2 - 18 to 60 inches: loamy sand

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Tujunga, gravelly loamy sand
Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hanford, sandy loam
Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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Alder Industrial Detention Summary

Trib. Areas	(ac)
Onsite	8.96

5/21/2019

(assumes same area as existing site)

Stage-Storage-Discharge Summary	Basin Water Stage (elev)	Basin Storage (cf)	Outlet Structure Discharge (cfs)
Floor of Basin	85.00	0	0.0
Weir Discharge	88.50	32,948	0.0
Q_{100} WSEL	89.40	44,733	17.6
Max Allowable WSEL	89.00	39,317	2.6

Mitigation Summary				
Storm Frequency	Storm Duration	Target Qexist (cfs)	Unmitigated Basin Qin (cfs)	Mitigated Basin Qout (cfs)
100-year	24-hour	17.6	24.7	17.6

Outlet Structure Summary	
18 ft wide Compound Weir	Elevation
Bottom: 6" High (10 Count) V-Notch Weirs	88.50 to 89.00
Top: 6" Open top (rectangular) Weir	89.00 to 89.50

Alder Industrial
5/21/2019

Routing Table

Discharge Weir Elevation: 88.50

dT= 5

Depth (ft)	Stage (elev)	Area (sf)	Storage (cf)	2S/dT (cfs)	2S/dT+O (cfs)	Outlet Structure Outflow (cfs)	Outlet Structures V-Notch (cfs)	Outlet Structures Rectang (cfs)
0.00	85.00	6691.8	0	0.0	0.0	0.0		
0.10	85.10	6838.3	677	4.5	4.5	0.0		
0.20	85.20	6985.7	1368	9.1	9.1	0.0		
0.30	85.30	7133.9	2074	13.8	13.8	0.0		
0.40	85.40	7282.9	2795	18.6	18.6	0.0		
0.50	85.50	7432.7	3530	23.5	23.5	0.0		
0.60	85.60	7583.2	4281	28.5	28.5	0.0		
0.70	85.70	7734.6	5047	33.6	33.6	0.0		
0.80	85.80	7886.8	5828	38.9	38.9	0.0		
0.90	85.90	8039.8	6624	44.2	44.2	0.0		
1.00	86.00	8193.6	7436	49.6	49.6	0.0		
1.10	86.10	8348.2	8263	55.1	55.1	0.0		
1.20	86.20	8503.6	9106	60.7	60.7	0.0		
1.30	86.30	8659.8	9964	66.4	66.4	0.0		
1.40	86.40	8816.8	10838	72.3	72.3	0.0		
1.50	86.50	8974.6	11727	78.2	78.2	0.0		
1.60	86.60	9133.2	12633	84.2	84.2	0.0		
1.70	86.70	9292.6	13554	90.4	90.4	0.0		
1.80	86.80	9452.9	14491	96.6	96.6	0.0		
1.90	86.90	9613.9	15445	103.0	103.0	0.0		
2.00	87.00	9775.7	16414	109.4	109.4	0.0		
2.10	87.10	9938.3	17400	116.0	116.0	0.0		
2.20	87.20	10101.7	18402	122.7	122.7	0.0		
2.30	87.30	10266.0	19420	129.5	129.5	0.0		
2.40	87.40	10431.0	20455	136.4	136.4	0.0		
2.50	87.50	10596.8	21506	143.4	143.4	0.0		
2.60	87.60	10763.4	22574	150.5	150.5	0.0		
2.70	87.70	10930.9	23659	157.7	157.7	0.0		
2.80	87.80	11099.1	24761	165.1	165.1	0.0		
2.90	87.90	11268.2	25879	172.5	172.5	0.0		
3.00	88.00	11438.0	27014	180.1	180.1	0.0		
3.10	88.10	11608.6	28167	187.8	187.8	0.0		
3.20	88.20	11780.1	29336	195.6	195.6	0.0		
3.30	88.30	11952.3	30523	203.5	203.5	0.0		
3.40	88.40	12125.4	31727	211.5	211.5	0.0		
3.50	88.50	12299.2	32948	219.7	219.7	0.0	0.00	
3.60	88.60	12473.9	34186	227.9	228.0	0.0	0.05	
3.70	88.70	12649.3	35443	236.3	236.6	0.3	0.27	
3.80	88.80	12825.6	36716	244.8	245.5	0.7	0.72	
3.90	88.90	13002.7	38008	253.4	254.9	1.5	1.48	
4.00	89.00	13180.5	39317	262.1	264.7	2.6	2.57	0.00
4.10	89.10	13359.2	40644	271.0	275.4	4.5	2.60	1.88
4.20	89.20	13538.7	41989	279.9	287.8	7.9	2.60	5.31
4.30	89.30	13718.9	43352	289.0	301.4	12.4	2.60	9.76
4.40	89.40	13900.0	44733	298.2	315.8	17.6	2.60	15.0
4.50	89.50	14081.9	46132	307.5	331.1	23.6	2.60	21.0

Outlet Structures - Hydraulics

V-Notch Weir

0.57667	Ce (func of Θ)
0.00370	k (func of Θ)
60	Θ, degrees
6	H max, in.
10	count/qty

DEPTH	WEIR Q
0.0	0.00
0.1	0.05
0.2	0.27
0.3	0.72
0.4	1.48
0.5	2.57

Rectangular Weir

3.3	Cd (Weir)
Width	18.000 ft

DEPTH	WEIR Q
0.0	0.00
0.1	1.88
0.2	5.31
0.3	9.76
0.4	15.0
0.5	21.0

Alder Industrial

DETENTION BASIN ROUTING

100-yr 24-hr Storm Event Hydrograph

17.6	Event Existing Qout Target, cfs
24.7	Event Max Basin Inflow, cfs
17.6	Event Max Basin Outflow, cfs
89.40	Event Max WSEL
4.17	Event 24-hr Volume Out, ac-ft

5 Minute Interval

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
1	0.08	0.130	0.00	0.00	0.00	0.00	85.00
2	0.17	0.680	0.81	0.81	0.00	0.00	85.00
3	0.25	1.090	2.58	2.58	0.00	0.00	85.00
4	0.33	1.240	4.91	4.91	0.00	0.00	85.10
5	0.42	1.340	7.49	7.49	0.00	0.00	85.10
6	0.50	1.400	10.23	10.23	0.00	0.00	85.20
7	0.58	1.450	13.08	13.08	0.00	0.00	85.20
8	0.67	1.480	16.01	16.01	0.00	0.00	85.30
9	0.75	1.510	19.00	19.00	0.00	0.00	85.40
10	0.83	1.530	22.04	22.04	0.00	0.00	85.40
11	0.92	1.550	25.12	25.12	0.00	0.00	85.50
12	1.00	1.560	28.23	28.23	0.00	0.00	85.50
13	1.08	1.570	31.36	31.36	0.00	0.00	85.60
14	1.17	1.580	34.51	34.51	0.00	0.00	85.70
15	1.25	1.580	37.67	37.67	0.00	0.00	85.70
16	1.33	1.580	40.83	40.83	0.00	0.00	85.80
17	1.42	1.590	44.00	44.00	0.00	0.00	85.80
18	1.50	1.590	47.18	47.18	0.00	0.00	85.90
19	1.58	1.590	50.36	50.36	0.00	0.00	86.00
20	1.67	1.600	53.55	53.55	0.00	0.00	86.00
21	1.75	1.600	56.75	56.75	0.00	0.00	86.10
22	1.83	1.600	59.95	59.95	0.00	0.00	86.10
23	1.92	1.610	63.16	63.16	0.00	0.00	86.20
24	2.00	1.610	66.38	66.38	0.00	0.00	86.20
25	2.08	1.620	69.61	69.61	0.00	0.00	86.30
26	2.17	1.620	72.85	72.85	0.00	0.00	86.40
27	2.25	1.620	76.09	76.09	0.00	0.00	86.40
28	2.33	1.630	79.34	79.34	0.00	0.00	86.50
29	2.42	1.630	82.60	82.60	0.00	0.00	86.50
30	2.50	1.640	85.87	85.87	0.00	0.00	86.60
31	2.58	1.640	89.15	89.15	0.00	0.00	86.60
32	2.67	1.640	92.43	92.43	0.00	0.00	86.70
33	2.75	1.650	95.72	95.72	0.00	0.00	86.70
34	2.83	1.650	99.02	99.02	0.00	0.00	86.80
35	2.92	1.660	102.33	102.33	0.00	0.00	86.80
36	3.00	1.660	105.65	105.65	0.00	0.00	86.90
37	3.08	1.660	108.97	108.97	0.00	0.00	86.90
38	3.17	1.670	112.30	112.30	0.00	0.00	87.00
39	3.25	1.670	115.64	115.64	0.00	0.00	87.00
40	3.33	1.680	118.99	118.99	0.00	0.00	87.10
41	3.42	1.680	122.35	122.35	0.00	0.00	87.10
42	3.50	1.680	125.71	125.71	0.00	0.00	87.20
43	3.58	1.690	129.08	129.08	0.00	0.00	87.20
44	3.67	1.690	132.46	132.46	0.00	0.00	87.30
45	3.75	1.700	135.85	135.85	0.00	0.00	87.30
46	3.83	1.700	139.25	139.25	0.00	0.00	87.40

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
47	3.92	1.710	142.66	142.66	0.00	0.00	87.40
48	4.00	1.710	146.08	146.08	0.00	0.00	87.50
49	4.08	1.720	149.51	149.51	0.00	0.00	87.50
50	4.17	1.720	152.95	152.95	0.00	0.00	87.60
51	4.25	1.730	156.40	156.40	0.00	0.00	87.60
52	4.33	1.730	159.86	159.86	0.00	0.00	87.70
53	4.42	1.740	163.33	163.33	0.00	0.00	87.70
54	4.50	1.740	166.81	166.81	0.00	0.00	87.80
55	4.58	1.750	170.30	170.30	0.00	0.00	87.80
56	4.67	1.750	173.80	173.80	0.00	0.00	87.90
57	4.75	1.760	177.31	177.31	0.00	0.00	87.90
58	4.83	1.760	180.83	180.83	0.00	0.00	88.00
59	4.92	1.770	184.36	184.36	0.00	0.00	88.00
60	5.00	1.770	187.90	187.90	0.00	0.00	88.10
61	5.08	1.780	191.45	191.45	0.00	0.00	88.10
62	5.17	1.780	195.01	195.01	0.00	0.00	88.10
63	5.25	1.790	198.58	198.58	0.00	0.00	88.20
64	5.33	1.790	202.16	202.16	0.00	0.00	88.20
65	5.42	1.800	205.75	205.75	0.00	0.00	88.30
66	5.50	1.800	209.35	209.35	0.00	0.00	88.30
67	5.58	1.810	212.96	212.96	0.00	0.00	88.40
68	5.67	1.810	216.58	216.58	0.00	0.00	88.40
69	5.75	1.820	220.21	220.21	0.00	0.00	88.50
70	5.83	1.830	223.86	223.86	0.00	0.00	88.50
71	5.92	1.830	227.52	227.52	0.00	0.00	88.50
72	6.00	1.840	231.19	231.09	0.05	0.00	88.60
73	6.08	1.840	234.77	234.67	0.05	0.00	88.60
74	6.17	1.850	238.36	237.83	0.27	0.00	88.70
75	6.25	1.850	241.53	241.00	0.27	0.00	88.70
76	6.33	1.860	244.71	244.17	0.27	0.01	88.70
77	6.42	1.870	247.90	246.45	0.72	0.01	88.80
78	6.50	1.870	250.19	248.74	0.72	0.01	88.80
79	6.58	1.880	252.49	251.05	0.72	0.02	88.80
80	6.67	1.890	254.82	253.37	0.72	0.02	88.80
81	6.75	1.890	257.15	254.20	1.48	0.03	88.90
82	6.83	1.900	257.99	255.04	1.48	0.04	88.90
83	6.92	1.910	258.85	255.89	1.48	0.05	88.90
84	7.00	1.910	259.71	256.76	1.48	0.06	88.90
85	7.08	1.920	260.59	257.64	1.48	0.07	88.90
86	7.17	1.930	261.49	258.54	1.48	0.08	88.90
87	7.25	1.930	262.40	259.45	1.48	0.09	88.90
88	7.33	1.940	263.32	260.37	1.48	0.10	88.90
89	7.42	1.950	264.26	261.31	1.48	0.11	88.90
90	7.50	1.960	265.22	260.09	2.57	0.13	89.00
91	7.58	1.960	264.01	261.05	1.48	0.14	88.90
92	7.67	1.970	264.98	259.85	2.57	0.15	89.00
93	7.75	1.980	263.80	260.85	1.48	0.17	88.90
94	7.83	1.990	264.82	259.69	2.57	0.18	89.00
95	7.92	1.990	263.67	260.72	1.48	0.20	88.90
96	8.00	2.000	264.71	259.58	2.57	0.21	89.00
97	8.08	2.010	263.59	260.64	1.48	0.22	88.90
98	8.17	2.020	264.67	261.72	1.48	0.23	88.90
99	8.25	2.030	265.77	260.63	2.57	0.25	89.00
100	8.33	2.040	264.70	259.57	2.57	0.27	89.00
101	8.42	2.040	263.65	260.70	1.48	0.28	88.90

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
102	8.50	2.050	264.79	259.66	2.57	0.29	89.00
103	8.58	2.060	263.77	260.82	1.48	0.31	88.90
104	8.67	2.070	264.95	259.82	2.57	0.32	89.00
105	8.75	2.080	263.97	261.02	1.48	0.34	88.90
106	8.83	2.090	265.19	260.05	2.57	0.35	89.00
107	8.92	2.100	264.24	261.29	1.48	0.36	88.90
108	9.00	2.110	265.50	260.37	2.57	0.38	89.00
109	9.08	2.120	264.60	261.65	1.48	0.39	88.90
110	9.17	2.130	265.90	260.77	2.57	0.40	89.00
111	9.25	2.140	265.04	259.91	2.57	0.42	89.00
112	9.33	2.150	264.20	261.25	1.48	0.44	88.90
113	9.42	2.160	265.56	260.42	2.57	0.45	89.00
114	9.50	2.170	264.75	259.62	2.57	0.47	89.00
115	9.58	2.180	263.97	261.02	1.48	0.48	88.90
116	9.67	2.190	265.39	260.26	2.57	0.50	89.00
117	9.75	2.200	264.65	261.70	1.48	0.51	88.90
118	9.83	2.210	266.11	260.98	2.57	0.52	89.00
119	9.92	2.220	265.41	260.27	2.57	0.54	89.00
120	10.00	2.230	264.72	259.59	2.57	0.56	89.00
121	10.08	2.250	264.07	261.12	1.48	0.57	88.90
122	10.17	2.260	265.63	260.50	2.57	0.59	89.00
123	10.25	2.270	265.03	259.90	2.57	0.60	89.00
124	10.33	2.280	264.45	261.50	1.48	0.62	88.90
125	10.42	2.300	266.08	260.95	2.57	0.63	89.00
126	10.50	2.310	265.56	260.42	2.57	0.65	89.00
127	10.58	2.320	265.05	259.92	2.57	0.67	89.00
128	10.67	2.340	264.58	261.63	1.48	0.68	88.90
129	10.75	2.350	266.32	261.19	2.57	0.70	89.00
130	10.83	2.370	265.91	260.78	2.57	0.71	89.00
131	10.92	2.380	265.53	260.40	2.57	0.73	89.00
132	11.00	2.390	265.17	260.03	2.57	0.75	89.00
133	11.08	2.410	264.83	259.70	2.57	0.77	89.00
134	11.17	2.430	264.54	261.59	1.48	0.78	88.90
135	11.25	2.440	266.46	261.33	2.57	0.79	89.00
136	11.33	2.460	266.23	261.10	2.57	0.81	89.00
137	11.42	2.470	266.03	260.90	2.57	0.83	89.00
138	11.50	2.490	265.86	260.72	2.57	0.85	89.00
139	11.58	2.510	265.72	260.59	2.57	0.86	89.00
140	11.67	2.530	265.63	260.50	2.57	0.88	89.00
141	11.75	2.550	265.58	260.45	2.57	0.90	89.00
142	11.83	2.560	265.56	260.43	2.57	0.92	89.00
143	11.92	2.580	265.57	260.44	2.57	0.94	89.00
144	12.00	2.600	265.62	260.48	2.57	0.95	89.00
145	12.08	2.600	265.68	260.55	2.57	0.97	89.00
146	12.17	2.520	265.67	260.54	2.57	0.99	89.00
147	12.25	2.460	265.52	260.39	2.57	1.01	89.00
148	12.33	2.460	265.31	260.18	2.57	1.02	89.00
149	12.42	2.460	265.10	259.97	2.57	1.04	89.00
150	12.50	2.480	264.91	259.77	2.57	1.06	89.00
151	12.58	2.490	264.74	259.61	2.57	1.08	89.00
152	12.67	2.510	264.61	261.66	1.48	1.09	88.90
153	12.75	2.540	266.71	261.58	2.57	1.10	89.00
154	12.83	2.560	266.68	261.55	2.57	1.12	89.00
155	12.92	2.590	266.70	261.57	2.57	1.14	89.00
156	13.00	2.620	266.78	261.64	2.57	1.16	89.00

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
157	13.08	2.650	266.91	261.78	2.57	1.18	89.00
158	13.17	2.680	267.11	261.98	2.57	1.19	89.00
159	13.25	2.710	267.37	262.24	2.57	1.21	89.00
160	13.33	2.750	267.70	262.57	2.57	1.23	89.00
161	13.42	2.790	268.11	262.98	2.57	1.25	89.00
162	13.50	2.830	268.60	263.46	2.57	1.26	89.00
163	13.58	2.860	269.15	264.02	2.57	1.28	89.00
164	13.67	2.910	269.79	264.66	2.57	1.30	89.00
165	13.75	2.950	270.52	265.39	2.57	1.32	89.00
166	13.83	3.000	271.34	266.21	2.57	1.33	89.00
167	13.92	3.050	272.26	267.13	2.57	1.35	89.00
168	14.00	3.100	273.28	268.14	2.57	1.37	89.00
169	14.08	3.150	274.39	269.26	2.57	1.39	89.00
170	14.17	3.210	275.62	266.67	4.48	1.41	89.10
171	14.25	3.270	273.15	268.01	2.57	1.44	89.00
172	14.33	3.340	274.62	269.49	2.57	1.45	89.00
173	14.42	3.410	276.24	267.28	4.48	1.48	89.10
174	14.50	3.480	274.17	269.04	2.57	1.50	89.00
175	14.58	3.560	276.08	267.13	4.48	1.53	89.10
176	14.67	3.650	274.34	269.20	2.57	1.55	89.00
177	14.75	3.740	276.59	267.64	4.48	1.57	89.10
178	14.83	3.840	275.22	270.09	2.57	1.60	89.00
179	14.92	3.950	277.88	268.92	4.48	1.62	89.10
180	15.00	4.080	276.95	267.99	4.48	1.65	89.10
181	15.08	4.210	276.28	267.33	4.48	1.68	89.10
182	15.17	4.360	275.90	266.94	4.48	1.72	89.10
183	15.25	4.520	275.82	266.86	4.48	1.75	89.10
184	15.33	4.720	276.10	267.15	4.48	1.78	89.10
185	15.42	4.810	276.68	267.72	4.48	1.81	89.10
186	15.50	4.570	277.10	268.14	4.48	1.84	89.10
187	15.58	4.500	277.21	268.26	4.48	1.87	89.10
188	15.67	4.740	277.50	268.54	4.48	1.90	89.10
189	15.75	5.120	278.40	269.44	4.48	1.93	89.10
190	15.83	5.740	280.30	271.34	4.48	1.96	89.10
191	15.92	6.690	283.77	274.82	4.48	1.99	89.10
192	16.00	8.650	290.16	274.33	7.91	2.04	89.20
193	16.08	14.340	297.32	281.50	7.91	2.09	89.20
194	16.17	24.740	320.58	285.32	17.63	2.18	89.40
195	16.25	19.560	329.62	294.37	17.63	2.30	89.40
196	16.33	11.650	325.58	290.32	17.63	2.42	89.40
197	16.42	8.840	310.81	286.09	12.36	2.52	89.30
198	16.50	7.600	302.53	277.81	12.36	2.61	89.30
199	16.58	6.770	292.18	276.36	7.91	2.68	89.20
200	16.67	6.030	289.16	273.33	7.91	2.73	89.20
201	16.75	5.490	284.85	275.89	4.48	2.78	89.10
202	16.83	4.980	286.36	277.41	4.48	2.81	89.10
203	16.92	4.560	286.95	277.99	4.48	2.84	89.10
204	17.00	4.190	286.74	277.78	4.48	2.87	89.10
205	17.08	3.830	285.80	276.85	4.48	2.90	89.10
206	17.17	3.510	284.19	275.23	4.48	2.93	89.10
207	17.25	3.360	282.10	273.14	4.48	2.96	89.10
208	17.33	3.230	279.73	270.78	4.48	2.99	89.10
209	17.42	3.110	277.12	268.16	4.48	3.02	89.10
210	17.50	3.010	274.28	269.15	2.57	3.05	89.00
211	17.58	2.910	275.07	269.94	2.57	3.07	89.00

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
212	17.67	2.830	275.68	266.72	4.48	3.09	89.10
213	17.75	2.750	272.30	267.17	2.57	3.11	89.00
214	17.83	2.680	272.60	267.47	2.57	3.13	89.00
215	17.92	2.610	272.76	267.62	2.57	3.15	89.00
216	18.00	2.550	272.78	267.65	2.57	3.17	89.00
217	18.08	2.520	272.72	267.59	2.57	3.18	89.00
218	18.17	2.570	272.68	267.55	2.57	3.20	89.00
219	18.25	2.600	272.72	267.59	2.57	3.22	89.00
220	18.33	2.590	272.78	267.65	2.57	3.24	89.00
221	18.42	2.560	272.80	267.66	2.57	3.26	89.00
222	18.50	2.530	272.75	267.62	2.57	3.27	89.00
223	18.58	2.500	272.65	267.52	2.57	3.29	89.00
224	18.67	2.470	272.49	267.36	2.57	3.31	89.00
225	18.75	2.450	272.28	267.15	2.57	3.33	89.00
226	18.83	2.420	272.02	266.88	2.57	3.34	89.00
227	18.92	2.390	271.69	266.56	2.57	3.36	89.00
228	19.00	2.360	271.31	266.18	2.57	3.38	89.00
229	19.08	2.330	270.87	265.74	2.57	3.40	89.00
230	19.17	2.310	270.38	265.25	2.57	3.41	89.00
231	19.25	2.280	269.84	264.71	2.57	3.43	89.00
232	19.33	2.260	269.25	264.11	2.57	3.45	89.00
233	19.42	2.230	268.60	263.47	2.57	3.47	89.00
234	19.50	2.210	267.91	262.78	2.57	3.48	89.00
235	19.58	2.190	267.18	262.05	2.57	3.50	89.00
236	19.67	2.170	266.41	261.28	2.57	3.52	89.00
237	19.75	2.140	265.59	260.46	2.57	3.54	89.00
238	19.83	2.120	264.72	259.58	2.57	3.56	89.00
239	19.92	2.100	263.80	260.85	1.48	3.57	88.90
240	20.00	2.090	265.04	259.91	2.57	3.58	89.00
241	20.08	2.070	264.07	261.12	1.48	3.60	88.90
242	20.17	2.050	265.24	260.11	2.57	3.61	89.00
243	20.25	2.030	264.19	261.24	1.48	3.63	88.90
244	20.33	2.020	265.29	260.16	2.57	3.64	89.00
245	20.42	2.000	264.18	261.22	1.48	3.65	88.90
246	20.50	1.980	265.20	260.07	2.57	3.67	89.00
247	20.58	1.970	264.02	261.07	1.48	3.68	88.90
248	20.67	1.950	264.99	259.86	2.57	3.69	89.00
249	20.75	1.940	263.75	260.80	1.48	3.71	88.90
250	20.83	1.930	264.67	261.72	1.48	3.72	88.90
251	20.92	1.910	265.56	260.43	2.57	3.73	89.00
252	21.00	1.900	264.24	261.29	1.48	3.75	88.90
253	21.08	1.880	265.07	259.93	2.57	3.76	89.00
254	21.17	1.870	263.68	260.73	1.48	3.77	88.90
255	21.25	1.860	264.46	261.51	1.48	3.78	88.90
256	21.33	1.850	265.22	260.09	2.57	3.80	89.00
257	21.42	1.840	263.78	260.83	1.48	3.81	88.90
258	21.50	1.820	264.49	261.54	1.48	3.82	88.90
259	21.58	1.810	265.17	260.04	2.57	3.84	89.00
260	21.67	1.800	263.65	260.69	1.48	3.85	88.90
261	21.75	1.790	264.28	261.33	1.48	3.86	88.90
262	21.83	1.780	264.90	259.77	2.57	3.87	89.00
263	21.92	1.770	263.32	260.37	1.48	3.89	88.90
264	22.00	1.760	263.90	260.95	1.48	3.90	88.90
265	22.08	1.750	264.46	261.51	1.48	3.91	88.90
266	22.17	1.740	265.00	259.87	2.57	3.92	89.00

Interval	Time (hrs)	Basin Inflow (cfs)	2S/dT+O (cfs)	2S/dT-O (cfs)	Basin Outflow (cfs)	Cumul. Vol. Out (ac-ft)	Basin WSEL (elev)
267	22.25	1.730	263.34	260.39	1.48	3.94	88.90
268	22.33	1.720	263.84	260.89	1.48	3.95	88.90
269	22.42	1.710	264.32	261.36	1.48	3.96	88.90
270	22.50	1.700	264.77	259.64	2.57	3.97	89.00
271	22.58	1.690	263.03	260.08	1.48	3.98	88.90
272	22.67	1.680	263.45	260.50	1.48	4.00	88.90
273	22.75	1.670	263.85	260.90	1.48	4.01	88.90
274	22.83	1.670	264.24	261.29	1.48	4.02	88.90
275	22.92	1.660	264.62	261.67	1.48	4.03	88.90
276	23.00	1.650	264.98	259.85	2.57	4.04	89.00
277	23.08	1.640	263.14	260.18	1.48	4.05	88.90
278	23.17	1.630	263.45	260.50	1.48	4.06	88.90
279	23.25	1.630	263.76	260.81	1.48	4.07	88.90
280	23.33	1.620	264.06	261.11	1.48	4.08	88.90
281	23.42	1.610	264.34	261.39	1.48	4.09	88.90
282	23.50	1.600	264.60	261.65	1.48	4.10	88.90
283	23.58	1.600	264.85	259.72	2.57	4.12	89.00
284	23.67	1.590	262.91	259.96	1.48	4.13	88.90
285	23.75	1.580	263.13	260.18	1.48	4.14	88.90
286	23.83	1.580	263.34	260.38	1.48	4.15	88.90
287	23.92	1.570	263.53	260.58	1.48	4.16	88.90
288	24.00	1.560	263.71	260.76	1.48	4.17	88.90

Surface Basin 85.00(Bottom) to 88.50(Weir)
74432 Alder Ave
Basin Stage Storage Table

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Increment Volume Avg. End (cu. ft)	Cumulativ Volume Avg. End (cu. ft)
85.00	6,691.76	N/A	N/A	0.00
85.10	6,838.33	0.10	676.50	676.50
85.20	6,985.71	0.10	691.20	1367.71
85.30	7,133.89	0.10	705.98	2073.69
85.40	7,282.87	0.10	720.84	2794.53
85.50	7,432.66	0.10	735.78	3530.30
85.60	7,583.24	0.10	750.79	4281.10
85.70	7,734.63	0.10	765.89	5046.99
85.80	7,886.82	0.10	781.07	5828.06
85.90	8,039.81	0.10	796.33	6624.39
86.00	8,193.61	0.10	811.67	7436.07
86.10	8,348.21	0.10	827.09	8263.16
86.20	8,503.61	0.10	842.59	9105.75
86.30	8,659.81	0.10	858.17	9963.92
86.40	8,816.81	0.10	873.83	10837.75
86.50	8,974.62	0.10	889.57	11727.32
86.60	9,133.23	0.10	905.39	12632.71
86.70	9,292.64	0.10	921.29	13554.01
86.80	9,452.85	0.10	937.27	14491.28
86.90	9,613.87	0.10	953.34	15444.62
87.00	9,775.69	0.10	969.48	16414.10
87.10	9,938.31	0.10	985.70	17399.80
87.20	10,101.73	0.10	1002.00	18401.80
87.30	10,265.96	0.10	1018.38	19420.18
87.40	10,430.98	0.10	1034.85	20455.03
87.50	10,596.81	0.10	1051.39	21506.42
87.60	10,763.44	0.10	1068.01	22574.43
87.70	10,930.88	0.10	1084.72	23659.15
87.80	11,099.11	0.10	1101.50	24760.65
87.90	11,268.15	0.10	1118.36	25879.01
88.00	11,437.99	0.10	1135.31	27014.32
88.10	11,608.64	0.10	1152.33	28166.65
88.20	11,780.08	0.10	1169.44	29336.09
88.30	11,952.33	0.10	1186.62	30522.71
88.40	12,125.38	0.10	1203.89	31726.59
88.50	12,299.23	0.10	1221.23	32947.82
88.60	12,473.88	0.10	1238.66	34186.48
88.70	12,649.34	0.10	1256.16	35442.64
88.80	12,825.60	0.10	1273.75	36716.39
88.90	13,002.66	0.10	1291.41	38007.80
89.00	13,180.52	0.10	1309.16	39316.96
89.10	13,359.19	0.10	1326.99	40643.94
89.20	13,538.66	0.10	1344.89	41988.84
89.30	13,718.93	0.10	1362.88	43351.72
89.40	13,900.00	0.10	1380.95	44732.66
89.50	14,081.88	0.10	1399.09	46131.76

RR CENTER LINE

SOUTHERN PACIFIC RAILROAD AREA
2.12 ACRES
33% IMPERVIOUS
4.3 cfs Q_{100}

EXISTING DESIGN INTENTION APPEARS TO DIVERT RAILROAD FLOWS EASTWARD INTO ALDER, BUT FAILS NEAR THIS LOCATION. SEE ASSUMPTIONS, BELOW.

INITIAL NODE 1 (1100.5) EG

0.84 ACRES

L=281'

EXISTING PROPERTY
ASSUMED UNDEVELOPED FOR HYDROLOGIC ANALYSES
8.96 ACRES
Rational Method:
19.1 cfs Q_{100}
Tc 19.1 min.
Unit Hydrograph Method:
17.6 cfs Q_{100}

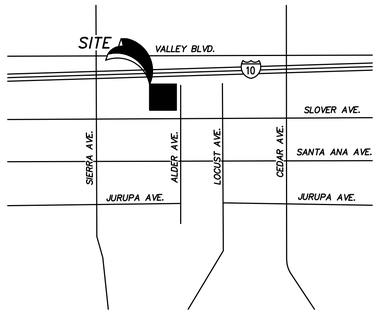
WEST HALF ALDER AVE
0.49 ACRES
100% IMPERVIOUS
1.1 cfs Q_{100}

ALDER AVENUE

CENTER LINE

NODE 2 (1087.6) EG

24.6 cfs Q100 . STUDY AREA DISCHARGE



VICINITY MAP

OWNER

SRPF B/10336 ALDER, LLC
2001 ROSS AVE, SUITE 400
DALLAS, TX
APPLICANT CONTACT:
MICHAEL JOHNSON
(786) 200-9681

APN

0252-131-03, -04, -36, -41, -43

LEGEND

DRAINAGE AREA BOUNDARY

SURFACE DRAINAGE DIRECTION

HYDROLOGIC ASSUMPTIONS FOR EXISTING DRAINAGE MAP:

1. DUE TO LACK OF LAND USE RECORDS, COUNTY REQUIRES EXISTING PROPERTY BE ASSUMED TO BE 100% PERVIOUS/PRE-DEVELOPED CONDITION. AS SUCH, EVEN THOUGH THE EXISTING SITE IS ACTUALLY 96% IMPERVIOUS, THE SITE IS ASSUMED 100% PERVIOUS/PRE-DEVELOPED.
2. NO RUN-ON FROM THE RAILROAD IS ASSUMED. THIS IS A CONSERVATIVE ASSUMPTION BECAUSE THE EXISTING SITE IS THE BASIS FOR THE 100-YEAR DETENTION TARGET, THUS THE TARGET IS LOWER, REQUIRING MORE DETENTION THAN IF ACTUAL EXISTING CONDITIONS AT THE PROJECT/RAILROAD LINE WERE ASSUMED. EXISTING GRADING INDICATES THE EXISTING PL CONDITION WAS INTENDED TO DIVERT ALL RAILROAD FLOW INTO ALDER AVENUE BUT SOME OF THE ORIGINAL GRADING NOW FAILS AT THE EASTERN END OF THE PL, THE PROPOSED CONDITION WILL DIVERT ALL RUN-ON FROM THE RAILROAD INTO ALDER AVENUE VIA A CONCRETE CHANNEL SOUTH OF THE PL AND NORTH OF THE NORTH CURB OF THE NORTH ACCESS DRIVE.
3. THE EXISTING HYDROLOGIC ANALYSIS OF THE EXISTING WEST HALF OF ALDER AVENUE IS BASED ON THE ACTUAL 100% IMPERVIOUS BUILT EXISTING CONDITION (AND PROPOSED CONDITIONS WILL ADD PERVIOUS AREA).
4. IT IS ASSUMED REASONABLE PER COUNTY HYDROLOGY THAT THE TIME OF CONCENTRATION FROM THE RATIONAL METHOD MAY BE USED TO DETERMINE THE LAG TIME IN THE UNIT HYDROGRAPH METHOD.

SCALE: 1" = 40'

GRAPHIC SCALE
40' 0 40' 80' 120'

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

ALDER AVENUE INDUSTRIAL BUILDING

EXISTING DRAINAGE MAP

5/20/2019

SHEET 1 OF 1

SOUTHERN PACIFIC
RAILROAD AREA
2.12 ACRES
33% IMPERVIOUS
4.3 cfs Q_{100}

NODE 102
L=159'
1126.2 ROOF
1095.5 TG
1090.8 INV
1.7 cfs Q100

PROPOSED 8" STORM DRAIN

NODE 103
L=200'
1094.5 TG
1089.8 INV
4.1 cfs Q100

PROPOSED 12" STORM DRAIN

NODE 104
L=299'
1088.3 INV
9.5 cfs Q100

A
0.38
1.7

B
0.59
2.4

C
1.49
5.5

INITIAL
NODE 101
1127.0 ROOF

ALDER AVENUE
INDUSTRIAL BLDG
8.60 ACRES
Rational Method
29.3 cfs Q_{100}
Tc 10.1 min.
Unit Hydrograph Method
24.7 cfs Q_{100}

Detail land cover (landscaping). Calculations identify Subarea D as park (CN 85 with a_p=0.85).

PROPOSED 18" STORM DRAIN

ALDER
0.86
3.0

E
5.00
16.0

D
0.75
1.1

Nodes 104 and 105?

PROPOSED ONSITE SEEPAGE PITS, SEPTIC TANK, AND SEWER

17.3 cfs Q100

Hydrology calculations do not include pipeflow.

F
0.37
1.3

PROPOSED 18" STORM DRAIN

INLET
2.6 cfs Q100

Node?

18.6 cfs Q100

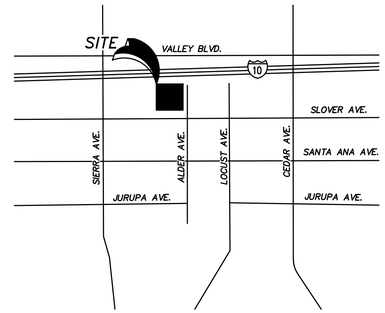
1085.00 BOTTOM OF BASIN
1088.50 DISCHARGE WEIR
1089.50 TOP OF BASIN

NODE 105
L=568'
1085.00 INV
10.7 cfs Q100

ONSITE DISCHARGE TO GUTTER VIA UNDER-SIDEWALK DRAIN

36.6 cfs Q100
STUDY AREA
DISCHARGE

ALDER AVENUE



VICINITY MAP

OWNER

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2001 ROSS AVE, SUITE 400
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APPLICANT CONTACT:
MICHAEL JOHNSON
(786) 200-9681

APN

0252-131-03, 0252-131-04,
0252-131-36, 0252-131-41,
0252-131-43

LEGEND

- PROJECT BOUNDARY
- DRAINAGE AREA BOUNDARY
- DRAINAGE SUB-AREA BOUNDARY
- DIRECTION OF SURFACE FLOW
- (R/W) EXISTING RIGHT-OF-WAY
- R/W PROPOSED RIGHT-OF-WAY

K
8.31
13.6

K — DRAINAGE AREA REFERENCE
8.31 — ACREAGE IN ACRES
13.6 — Q_{100} IN CFS

SCALE: 1" = 40'

HYDROLOGIC ASSUMPTIONS FOR PROPOSED DRAINAGE MAP:

1. NO RUN-ON FROM THE RAILROAD IS ASSUMED DUE TO PLANNED SMALL CONCRETE CHANNEL SOUTH OF THE NORTH PL AND NORTH OF THE NORTH ACCESS DRIVE NORTH CURB.
2. DUE TO 14' DEDICATION OF LAND TO ALDER AVENUE, THE PROPOSED SITE IS SMALLER THAN EXISTING; WEST HALF OF ALDER AVENUE AT PROJECT FRONTAGE WILL BE RECONSTRUCTED TO PROPOSED ROW.
3. IT IS ASSUMED REASONABLE PER COUNTY HYDROLOGY THAT THE TIME OF CONCENTRATION FROM THE RATIONAL METHOD BE USED TO DETERMINE THE LAG TIME IN THE UNIT HYDROGRAPH METHOD.

GRAPHIC SCALE
40' 0 40' 80' 120'

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ALDER AVENUE INDUSTRIAL BUILDING

PROPOSED DRAINAGE MAP

5/20/2019

SHEET 1 OF 1

I:\74432 ALDER AVE INDUSTRIAL\DWG\Z-74432-ZDM.DWG 5/22/2019 11:52:43 AM