

HYDROLOGY & HYDRAULICS REPORT

for

Best 4 Less - Jurupa
Xxxx Jurupa Avenue
Riverside, CA 92504

Prepared for:

Galaxy Oil Company
303 North Placentia Ave., Suite 200
Fullerton, CA 92831
(714) 687-1450

Prepared by:



22672 Lambert Street, Suite 606
Lake Forest, CA 92630
Phone: (949) 753-0600



November 2024

TABLE OF CONTENTS

<u>Section</u>	<u>Page Number</u>
1. Introduction.....	3
2. Project Description.....	3
3. Existing & Proposed Site Summary.....	4
4. Project Site Hydrology Methodology.....	5
5. Post Development Calculation Summary.....	5
6. Pipe Sizing.....	5
7. Conclusion.....	6

Appendices:

Appendix A – *Proposed Condition Exhibit*

Appendix B – *Hydrology Calculations*

Appendix C – *Drainage Structures Sizing Output Files*

Appendix D – *Soils Information and Reference Drawings*

1. Introduction

The purpose of this study is to establish the sufficiency of the proposed drainage facilities, in relation to design flows, for the proposed 0.98-acre fueling station development at the southeast corner of Jurupa Avenue and Dales Street, in the City of Riverside, California.

2. Project Description

The 0.98-acre project site resides in the City of Riverside, at the southeast corner of Jurupa Avenue and Dales Street. The intent of the project is to clear and grub the existing site and develop a fueling station, complete with paved drive aisles, sidewalks, and landscaping.

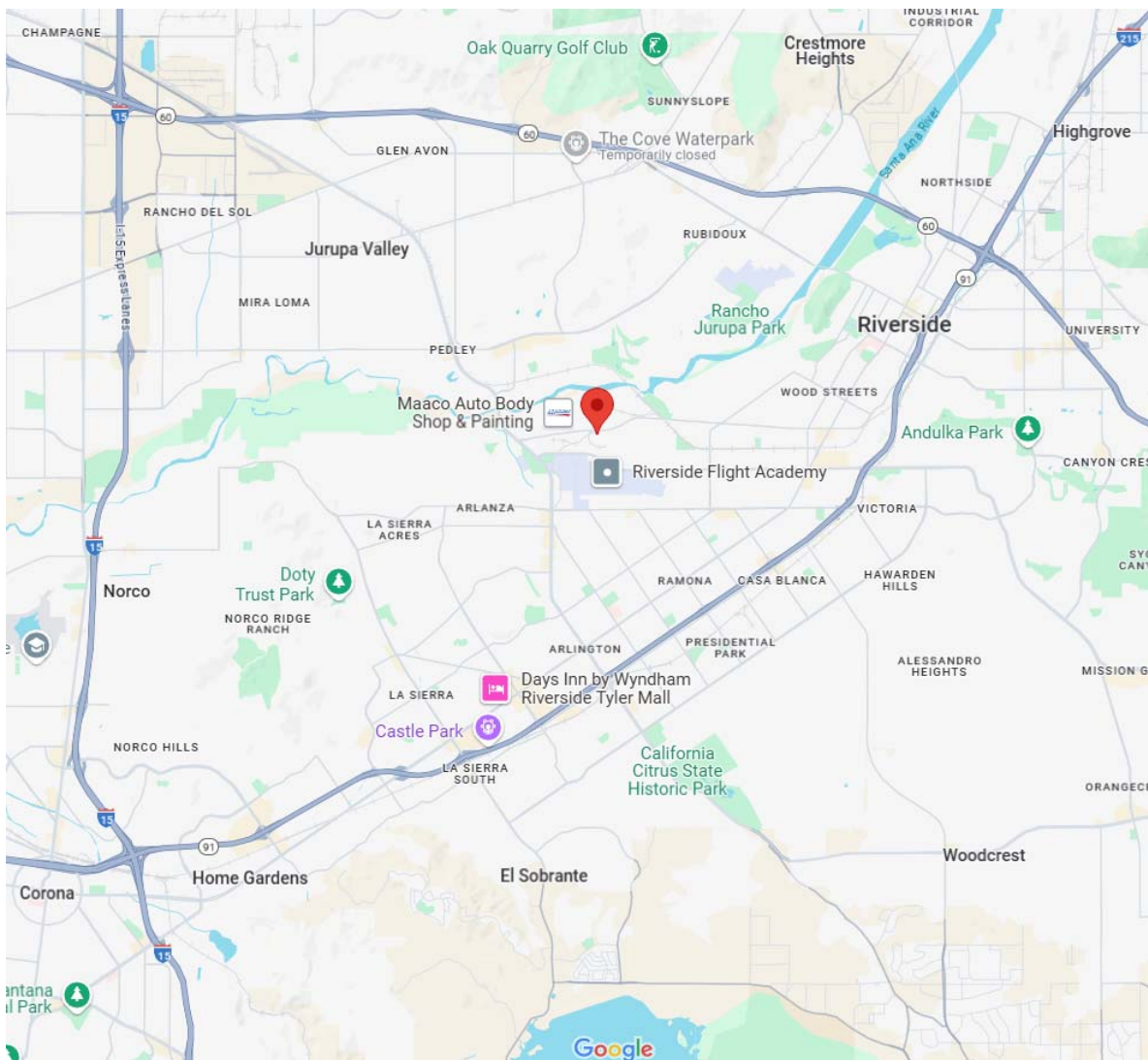


Figure 1: Vicinity map

3. Existing & Proposed Site Summary

The existing site is undeveloped, consisting of gravel and natural vegetation ground cover. The site slopes from its high point at the southeast corner of the site, to the low point at the northwest corner. The site is moderately sloped at around 5%. Runoff is allowed to flow into the adjacent street untreated and flows westerly in Jurupa Avenue until it is collected in a curb inlet catch basin along the southerly curb and gutter. Storm water then flows in surface and below-grade storm drain infrastructures and ultimately reaches the Pacific Ocean.

The project will clear and grub the existing vegetation over the entire site, and construct a new fueling station, with concrete paved drive aisles, concrete sidewalks, a trash enclosure, and landscaping. Approximately 23% of the proposed project site will be pervious surfaces, in the form of landscaping. In general, the proposed project will convey storm water in the northwesterly direction, via sheet flow concentrated within the onsite concrete gutters, and in a below grade storm drain pipe system. Runoff will be discharged into the proposed proprietary biofiltration device. Overflow will bypass the biofiltration unit, through the internal overflow system within the proprietary BMP, and convey storm water to a bubbler structure at the northwest corner of the property. From the bubbler water will flow through an under sidewalk parkway drain and into the curb and gutter of Jurupa Avenue. No offsite flows will make their way onsite.



Figure 2: Existing site conditions – satellite view

4. Project Site Hydrology Methodology

The drainage system was designed to meet or exceed the requirements of the City of Riverside to establish onsite storm drain facility sizing. Flow rates were calculated via the CIVILCADD/CIVILDESIGN Engineering Software Riverside County Rational Method Hydrology Program, with the 10, 25 and 100-year rainfall events selected as the design storms. The calculation outputs can be found in Appendix B, and are further summarized in the table in Section 5. Soil types 'B' and 'C' were used in the Analysis. See the Soil Map and Soil Descriptions in Appendix D of this report.

5. Post Development Calculation Summary:

Site Condition	DMA	Area (acres)	Q 10-year (cfs)	Q 25-year (cfs)	Q 100-year (cfs)
Proposed	A	0.36	0.871	1.022	1.250
	B	0.03	0.071	0.084	0.104
	C	0.06	0.145	0.170	0.208
	D	0.06	0.145	0.170	0.208
	E	0.36	0.871	1.022	1.250
	Total	0.87	2.103	2.468	3.020

Table 1: Rational Method Hydrology Outputs

It can be seen on the HCOC Applicability Map in Appendix D that the project is located in an area that is designated as not applicable. Therefore, no hydrologic conditions of concern are present.

6. Pipe Sizing:

This section, along with the channel sizing software outputs in Appendix C of this report, demonstrate that the proposed onsite piping is adequately sized to convey the 25-year storm event.

Hydraflow Express Extension channel reports are included in Appendix C of this report. For each individual drainage management area (DMA), said channel reports demonstrate that the 25-year storm event flowrates can be conveyed in the outlet pipe as sized and sloped in the construction drawings. DMA delineations can be found on the Proposed Condition Exhibit in Appendix B.

As flows combine with flows from other drainage areas, the combined flowrates must be evaluated to determine an appropriate pipe size based on proposed pipe slopes. Descriptions of flowrate combinations are below. Channel Reports – Pipe Sizing can be found in Appendix C of this report.

DMA-B + DMA-C = 0.254 cfs

Per channel report, a 6" pipe at 1.0% will convey the required flows

DMA-A + DMA-B + DMA-C = 1.276 cfs

Per channel report, an 8" pipe at 1.0% will convey the required flows

DMA-A + DMA-B + DMA-C + DMA-D = 1.446 cfs

Per channel report, an 8" pipe at 1.0% will convey the required flows

DMA-A + DMA-B + DMA-C + DMA-D + DMA-E = 2.468 cfs

Per channel report, a 12" pipe at 1.0% will convey the required flows

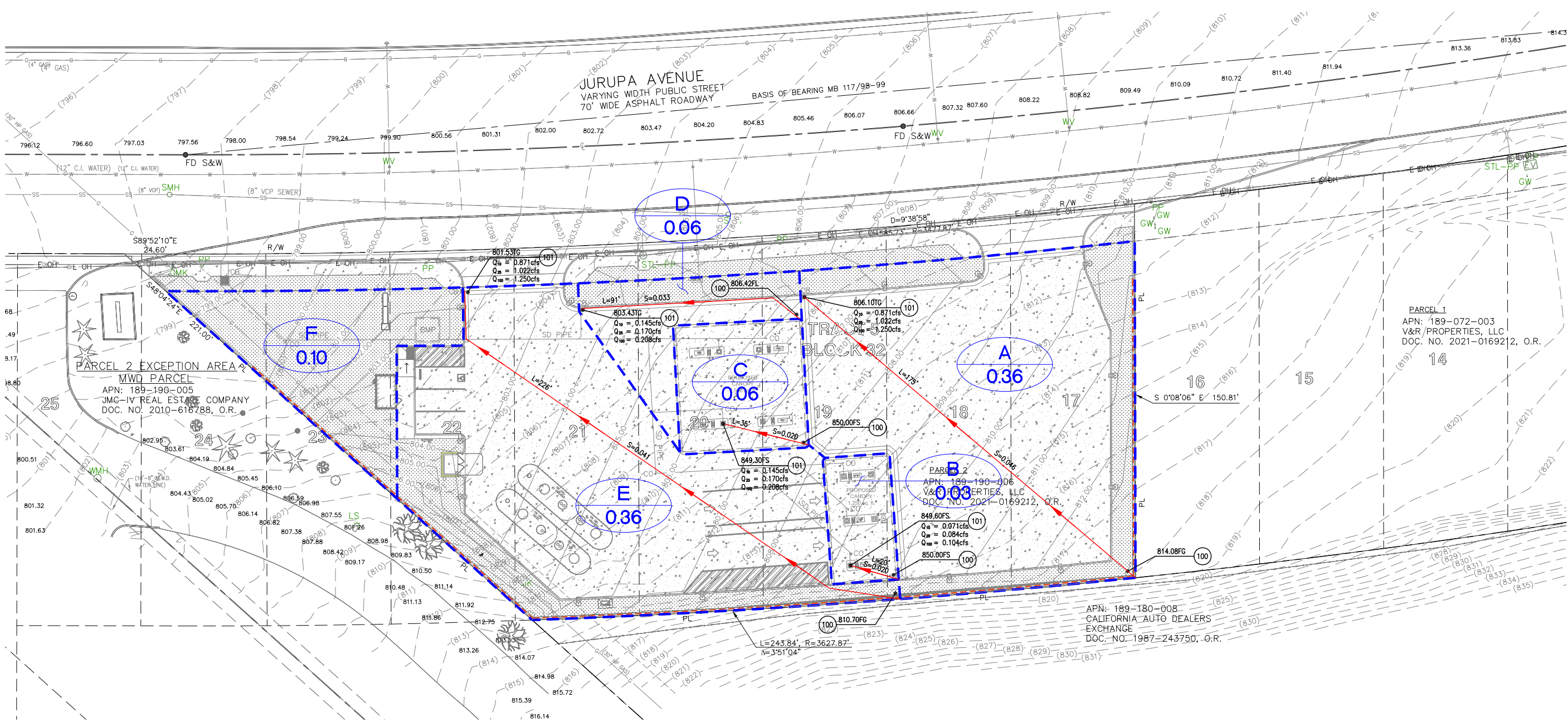
As demonstrated above and shown in the channel sizing software outputs in Appendix C of this report, the proposed onsite piping is adequately sized to convey the 25-year storm event.

7. Conclusion

It has been shown above and in Appendix C of this report that the site storm drain facilities have been adequately sized to handle the runoff from rain events of at least a 25-year frequency. Additionally, the site is located in an area that is exempt from a hydraulic condition of concern evaluation. Therefore, drainage goals and requirements, set by the City of Riverside, have been met or exceeded by this design.

Appendix A

Proposed Condition Exhibit



PROJECT AREA: 42,779 s.f. / 0.98 ACRES

LEGEND:

→ - Direction of Drainage

XX
X.XX
DRAINAGE AREA IDENTIFICATION
DRAINAGE AREA ACREAGE

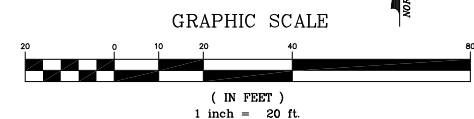
□ - Drainage Management Area Limits

LAND COVERS:

• - Landscaping
• - Concrete

AREAS:

DMA Designation	Total Area (sf)	Pervious Area (sf / %)	Impervious Area (sf / %)
A	15,871	2,613 16.5%	13,258 83.5%
B	1,376	0 0%	1,376 100%
C	2,702	0 0%	2,702 100%
D	2,512	847 33.7%	1,665 66.3%
E	15,775	2,327 14.8%	13,448 85.2%
F	4,431	4,310 97.3%	121 2.7%



DRAWN BY:
DATE:
SCALE:
PLOT:
REF:
FILE: 032-000

NOTICE
The drawings and all information therein are the property of the drafter and shall not be used for any other project without the written consent of the drafter. The drawing and any copies thereof shall be returned to the owner upon demand.

PREPARED FOR:
NA CIVIL INC.
CIVIL ENGINEERING - SURVEYING
LANDSCAPE ARCHITECTURE
14075 JENSEN DRIVE
FULLERTON, CA 92630
949.753.0000

10/01/24
DATE

10/01/24
DATE

NO. <<<<<<

PROPOSED CONDITION
BEST 4 LESS - JURUPA
XXXX JURUPA AVENUE
RIVERSIDE, CA 92504

DRAWING NUMBER
HYD-1

Appendix B

Hydrology Calculations

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area A: Proposed 10-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.700(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 175.000(Ft.)
Top (of initial area) elevation = 814.080(Ft.)
Bottom (of initial area) elevation = 806.100(Ft.)
Difference in elevation = 7.980(Ft.)
Slope = 0.04560 s(percent)= 4.56
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 2.746(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.871(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area A: Proposed 25-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 25.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 25.0
Calculated rainfall intensity data:
1 hour intensity = 0.819(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 175.000(Ft.)
Top (of initial area) elevation = 814.080(Ft.)
Bottom (of initial area) elevation = 806.100(Ft.)
Difference in elevation = 7.980(Ft.)
Slope = 0.04560 s(percent)= 4.56
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.214(In/Hr) for a 25.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.022(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area A: Proposed 100-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.000(In/Hr)
Slope of intensity duration curve = 0.5500
+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 175.000(Ft.)
Top (of initial area) elevation = 814.080(Ft.)
Bottom (of initial area) elevation = 806.100(Ft.)
Difference in elevation = 7.980(Ft.)
Slope = 0.04560 s(percent)= 4.56
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.922(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.250(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area B: Proposed 10-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 1
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.700(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 20.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.600(Ft.)
Difference in elevation = 0.400(Ft.)
Slope = 0.02000 s(percent)= 2.00
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 2.746(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 44.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.071(CFS)
Total initial stream area = 0.030(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.03 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area B: Proposed 25-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 25.00 Antecedent Moisture Condition = 1
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 25.0
Calculated rainfall intensity data:
1 hour intensity = 0.819(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 20.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.600(Ft.)
Difference in elevation = 0.400(Ft.)
Slope = 0.02000 s(percent)= 2.00
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.214(In/Hr) for a 25.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 44.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.084(CFS)
Total initial stream area = 0.030(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.03 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area B: Proposed 100-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.000(In/Hr)
Slope of intensity duration curve = 0.5500
+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 20.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.600(Ft.)
Difference in elevation = 0.400(Ft.)
Slope = 0.02000 s(percent)= 2.00
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.922(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.104(CFS)
Total initial stream area = 0.030(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.03 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area C: Proposed 10-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.700(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 20.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.600(Ft.)
Difference in elevation = 0.400(Ft.)
Slope = 0.02000 s(percent)= 2.00
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 2.746(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.145(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area C: Proposed 25-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 25.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 25.0
Calculated rainfall intensity data:
1 hour intensity = 0.819(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 36.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.300(Ft.)
Difference in elevation = 0.700(Ft.)
Slope = 0.01944 s(percent)= 1.94
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.214(In/Hr) for a 25.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.170(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area C: Proposed 100-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.000(In/Hr)
Slope of intensity duration curve = 0.5500
+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 36.000(Ft.)
Top (of initial area) elevation = 850.000(Ft.)
Bottom (of initial area) elevation = 849.300(Ft.)
Difference in elevation = 0.700(Ft.)
Slope = 0.01944 s(percent)= 1.94
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.922(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.208(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area D: Proposed 10-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.700(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 91.000(Ft.)
Top (of initial area) elevation = 806.420(Ft.)
Bottom (of initial area) elevation = 803.430(Ft.)
Difference in elevation = 2.990(Ft.)
Slope = 0.03286 s(percent)= 3.29
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 2.746(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.145(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area D: Proposed 25-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 25.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 25.0
Calculated rainfall intensity data:
1 hour intensity = 0.819(In/Hr)
Slope of intensity duration curve = 0.5500

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 91.000(Ft.)
Top (of initial area) elevation = 806.420(Ft.)
Bottom (of initial area) elevation = 803.430(Ft.)
Difference in elevation = 2.990(Ft.)
Slope = 0.03286 s(percent)= 3.29
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.214(In/Hr) for a 25.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.170(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area D: Proposed 100-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.000(In/Hr)
Slope of intensity duration curve = 0.5500

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 91.000(Ft.)
Top (of initial area) elevation = 806.420(Ft.)
Bottom (of initial area) elevation = 803.430(Ft.)
Difference in elevation = 2.990(Ft.)
Slope = 0.03286 s(percent)= 3.29
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.922(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.208(CFS)
Total initial stream area = 0.060(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.06 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area e: Proposed 10-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.700(In/Hr)
Slope of intensity duration curve = 0.5500

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 226.000(Ft.)
Top (of initial area) elevation = 810.700(Ft.)
Bottom (of initial area) elevation = 801.530(Ft.)
Difference in elevation = 9.170(Ft.)
Slope = 0.04058 s(percent)= 4.06
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 2.746(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.871(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

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

English (in-lb) Units used in input data file

Program License Serial Number 6113

Area E: Proposed 25-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 25.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)

For the [Riverside] area used.

10 year storm 10 minute intensity = 1.880(In/Hr)

10 year storm 60 minute intensity = 0.700(In/Hr)

100 year storm 10 minute intensity = 2.680(In/Hr)

100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 25.0

Calculated rainfall intensity data:

1 hour intensity = 0.819(In/Hr)

Slope of intensity duration curve = 0.5500

+++++

Process from Point/Station 100.000 to Point/Station 101.000

**** INITIAL AREA EVALUATION ****

Initial area flow distance = 226.000(Ft.)

Top (of initial area) elevation = 810.700(Ft.)

Bottom (of initial area) elevation = 801.530(Ft.)

Difference in elevation = 9.170(Ft.)

Slope = 0.04058 s(percent)= 4.06

$TC = k(0.300)^*[(length^3)/(elevation\ change)]^{0.2}$

Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.

Initial area time of concentration = 5.000 min.

Rainfall intensity = 3.214(In/Hr) for a 25.0 year storm

COMMERCIAL subarea type

Runoff Coefficient = 0.883

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.380

Decimal fraction soil group C = 0.620

Decimal fraction soil group D = 0.000

RI index for soil(AMC 2) = 64.06

Pervious area fraction = 0.100; Impervious fraction = 0.900

Initial subarea runoff = 1.022(CFS)

Total initial stream area = 0.360(Ac.)

Pervious area fraction = 0.100

End of computations, total study area = 0.36 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100

Area averaged RI index number = 64.1

***** Hydrology Study Control Information *****
English (in-lb) Units used in input data file

Program License Serial Number 6113

Area E: Proposed 100-year

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2
Standard intensity-duration curves data (Plate D-4.1)
For the [Riverside] area used.
10 year storm 10 minute intensity = 1.880(In/Hr)
10 year storm 60 minute intensity = 0.700(In/Hr)
100 year storm 10 minute intensity = 2.680(In/Hr)
100 year storm 60 minute intensity = 1.000(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.000(In/Hr)
Slope of intensity duration curve = 0.5500
+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 226.000(Ft.)
Top (of initial area) elevation = 810.700(Ft.)
Bottom (of initial area) elevation = 801.530(Ft.)
Difference in elevation = 9.170(Ft.)
Slope = 0.04058 s(percent)= 4.06
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 3.922(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.380
Decimal fraction soil group C = 0.620
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.06
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.250(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 64.1

Appendix C

Drainage Structure Sizing Output Files

Channel Report

Area A

Circular

Diameter (ft) = 0.50

Invert Elev (ft) = 100.00

Slope (%) = 2.50

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 1.02

Highlighted

Depth (ft) = 0.40

Q (cfs) = 1.020

Area (sqft) = 0.17

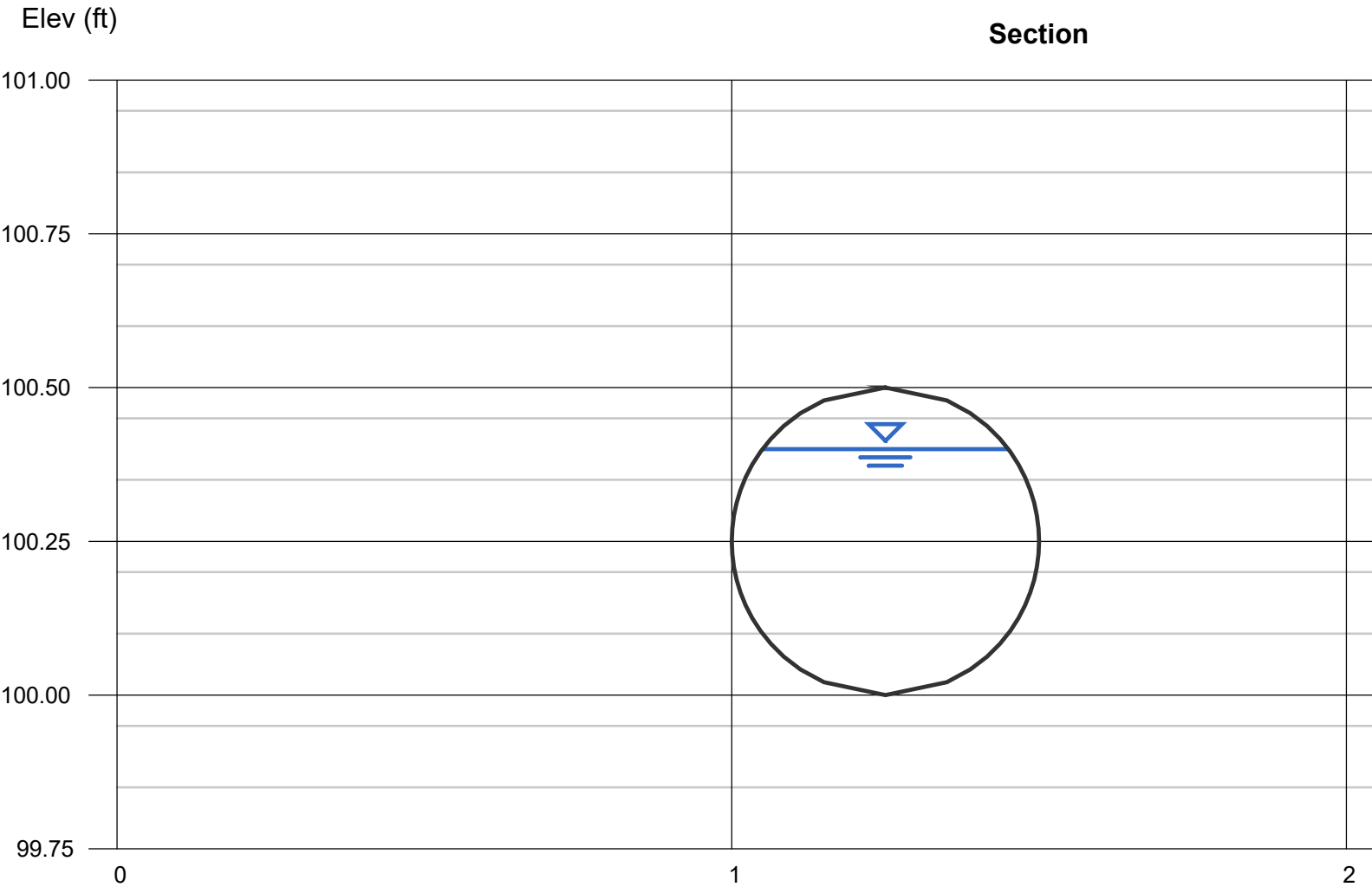
Velocity (ft/s) = 6.06

Wetted Perim (ft) = 1.11

Crit Depth, Yc (ft) = 0.48

Top Width (ft) = 0.40

EGL (ft) = 0.97



Channel Report

Area B

Circular

Diameter (ft) = 0.33

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.08

Highlighted

Depth (ft) = 0.14

Q (cfs) = 0.080

Area (sqft) = 0.03

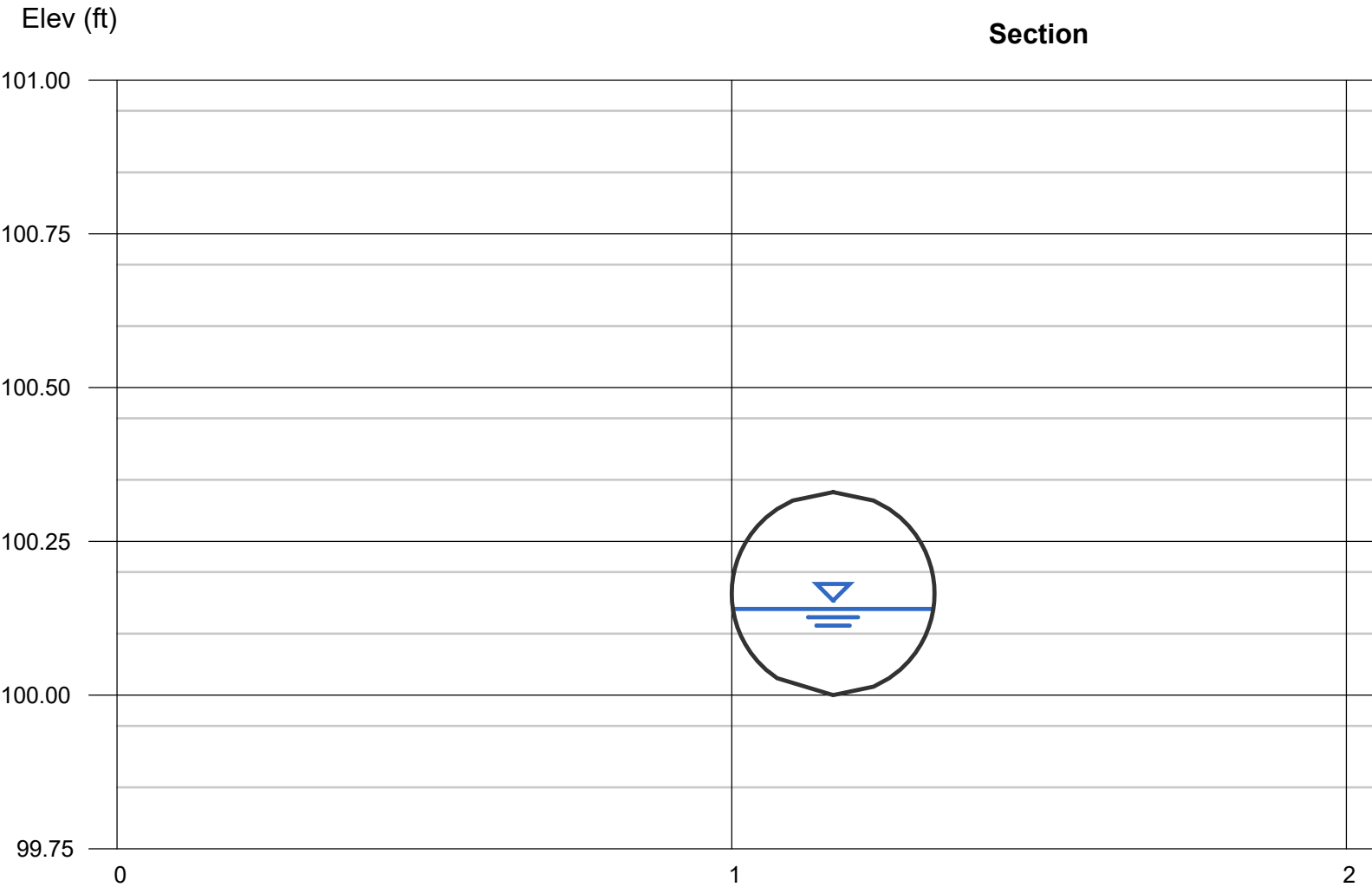
Velocity (ft/s) = 2.31

Wetted Perim (ft) = 0.47

Crit Depth, Yc (ft) = 0.16

Top Width (ft) = 0.33

EGL (ft) = 0.22



Channel Report

Area C

Circular

Diameter (ft) = 0.33

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.17

Highlighted

Depth (ft) = 0.22

Q (cfs) = 0.170

Area (sqft) = 0.06

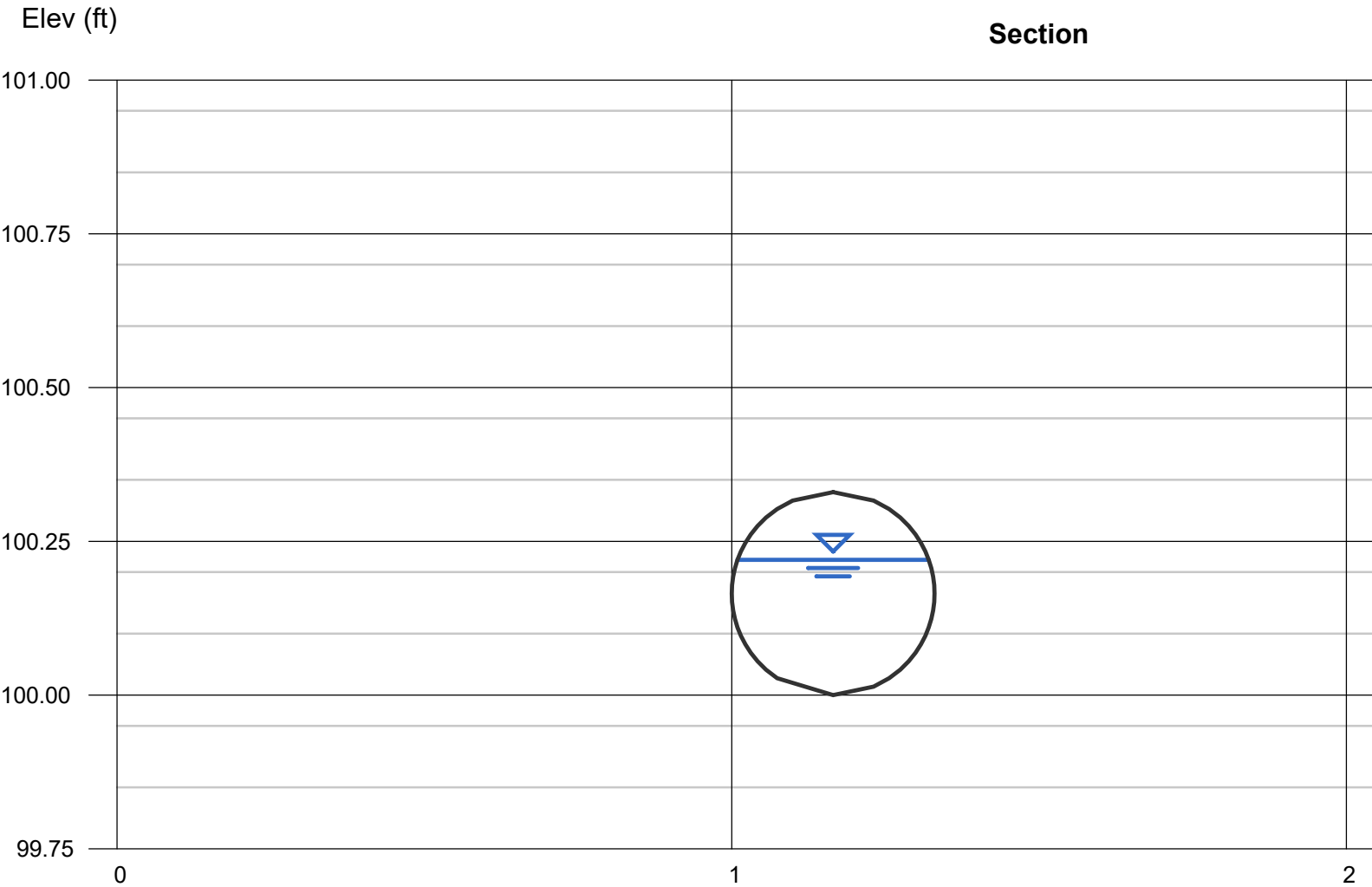
Velocity (ft/s) = 2.80

Wetted Perim (ft) = 0.63

Crit Depth, Yc (ft) = 0.24

Top Width (ft) = 0.31

EGL (ft) = 0.34



Channel Report

Area D

Circular

Diameter (ft) = 0.33

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.17

Highlighted

Depth (ft) = 0.22

Q (cfs) = 0.170

Area (sqft) = 0.06

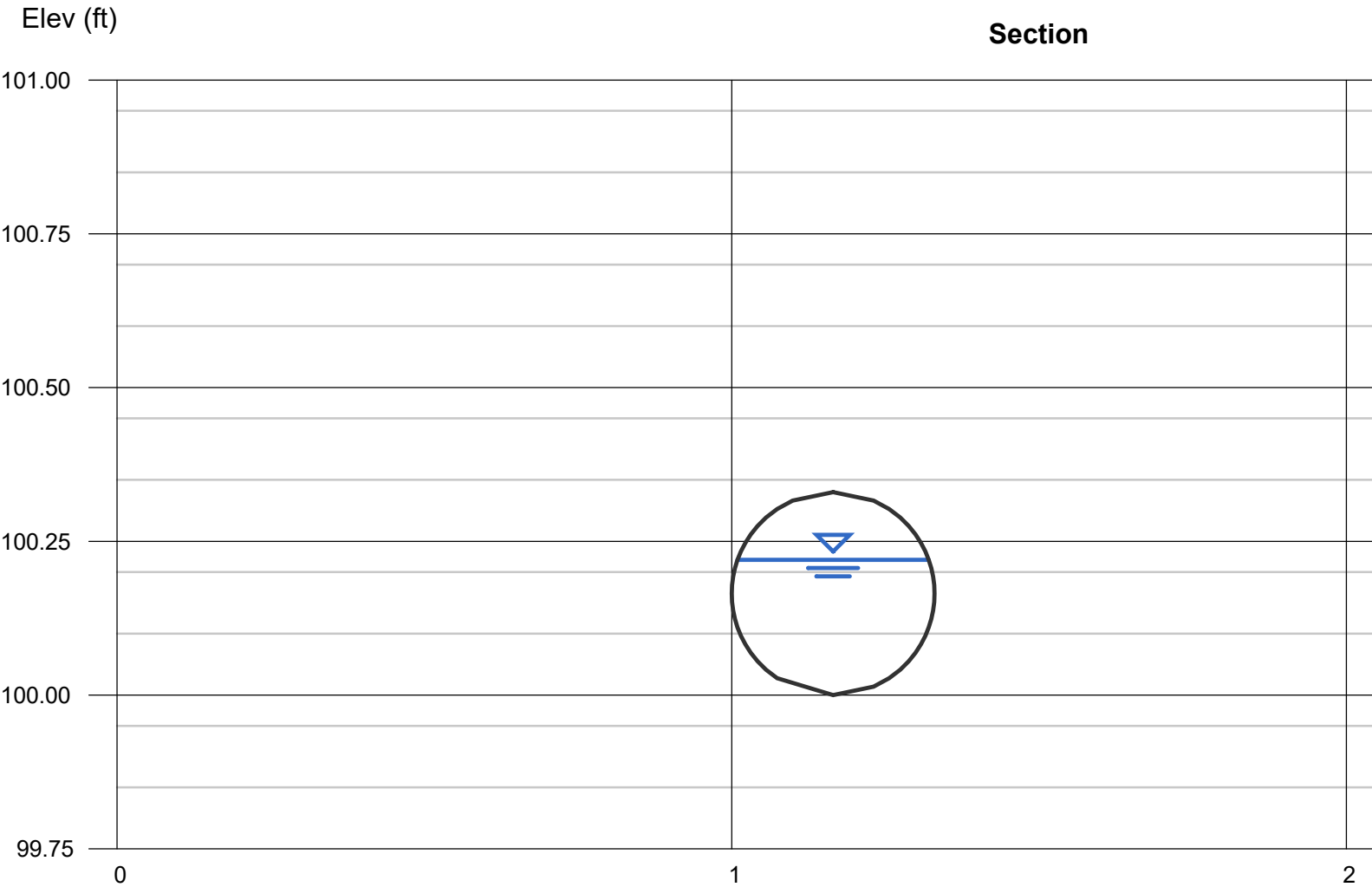
Velocity (ft/s) = 2.80

Wetted Perim (ft) = 0.63

Crit Depth, Yc (ft) = 0.24

Top Width (ft) = 0.31

EGL (ft) = 0.34



Channel Report

Area E

Circular

Diameter (ft) = 0.50

Invert Elev (ft) = 100.00

Slope (%) = 2.50

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 1.02

Highlighted

Depth (ft) = 0.40

Q (cfs) = 1.020

Area (sqft) = 0.17

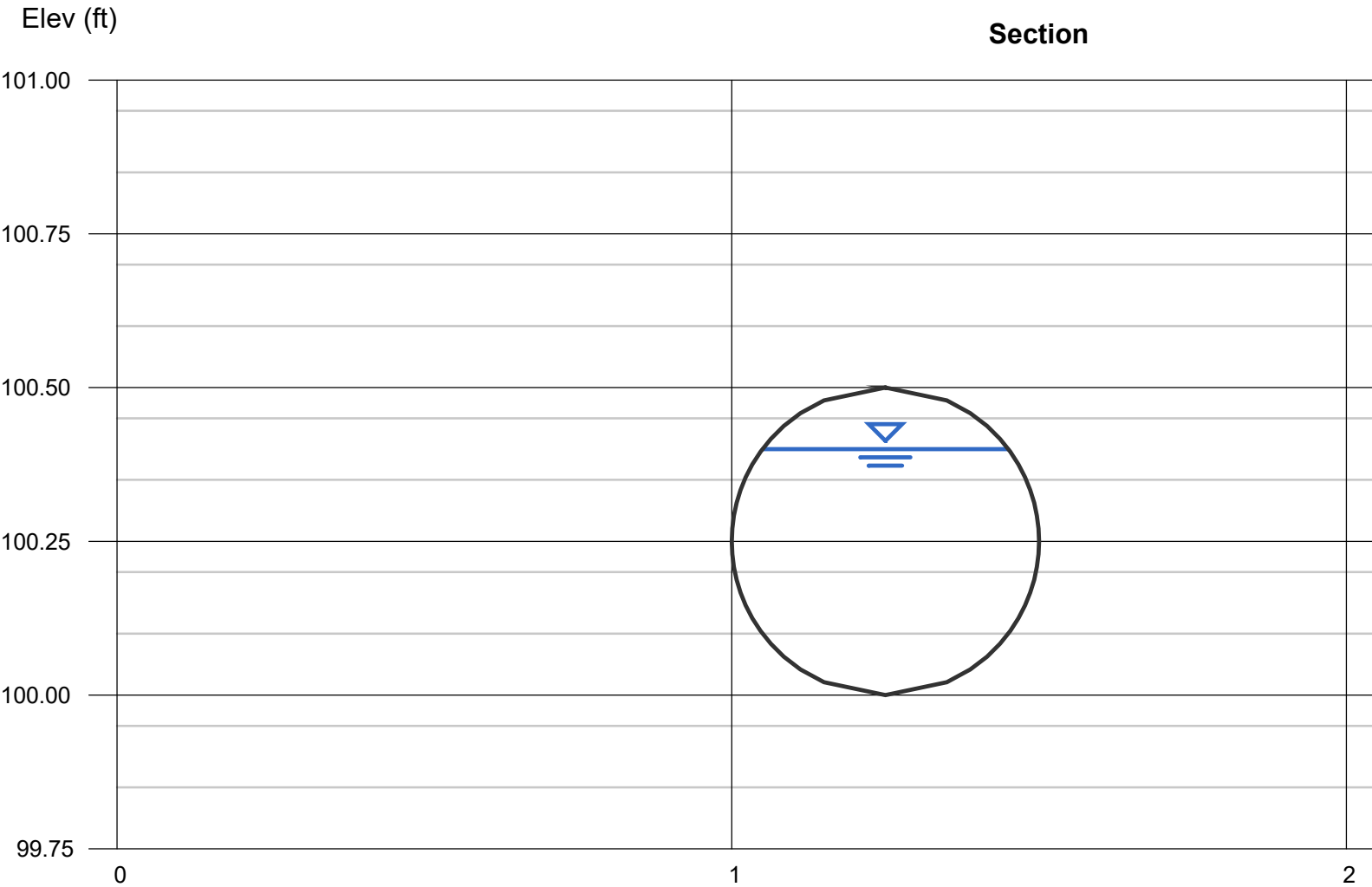
Velocity (ft/s) = 6.06

Wetted Perim (ft) = 1.11

Crit Depth, Yc (ft) = 0.48

Top Width (ft) = 0.40

EGL (ft) = 0.97



Channel Report

Area B + C

Circular

Diameter (ft) = 0.50

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 0.25

Highlighted

Depth (ft) = 0.22

Q (cfs) = 0.250

Area (sqft) = 0.08

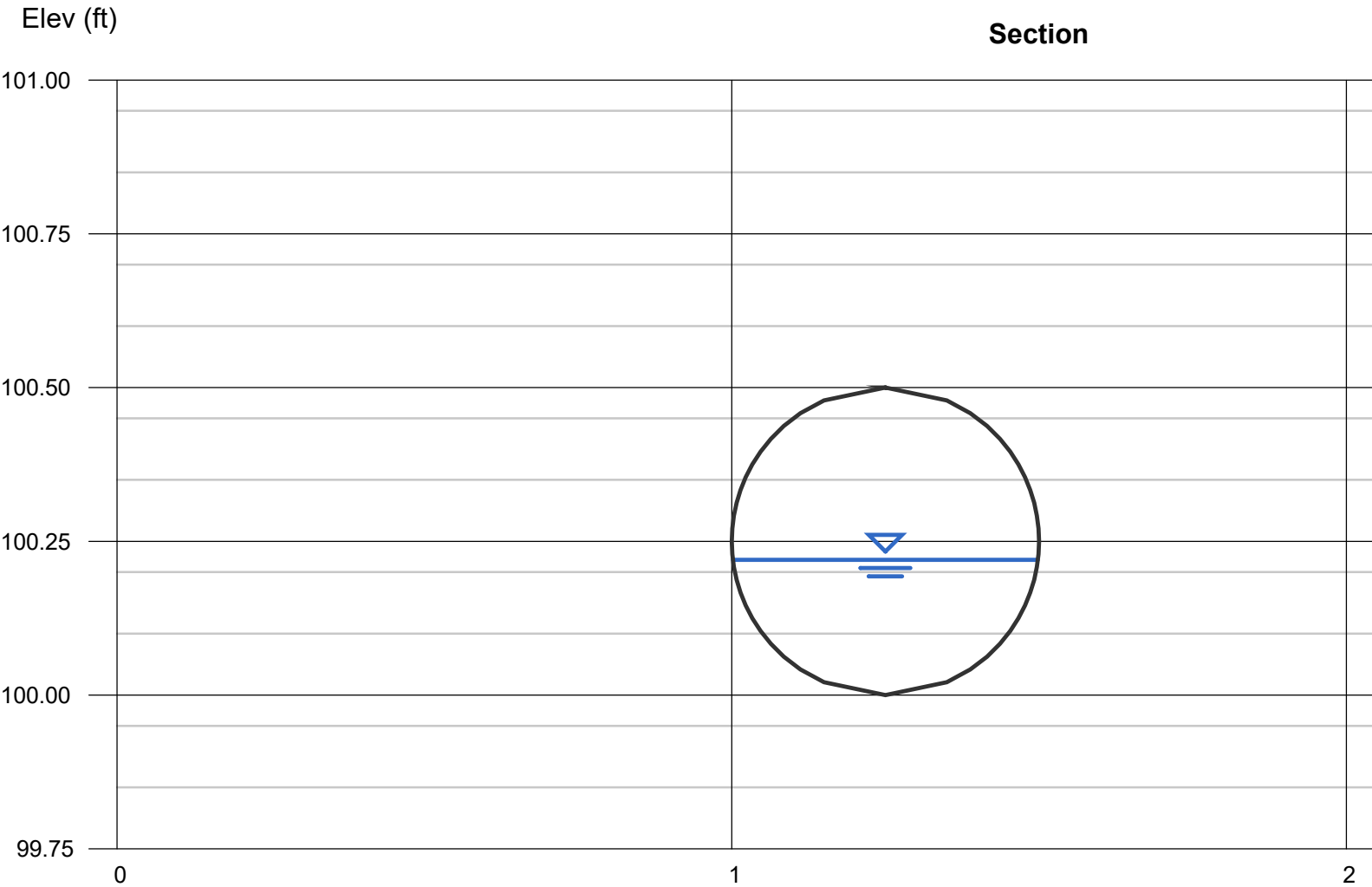
Velocity (ft/s) = 2.98

Wetted Perim (ft) = 0.73

Crit Depth, Yc (ft) = 0.26

Top Width (ft) = 0.50

EGL (ft) = 0.36



Channel Report

Area A + B + C

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 1.28

Highlighted

Depth (ft) = 0.49

Q (cfs) = 1.280

Area (sqft) = 0.28

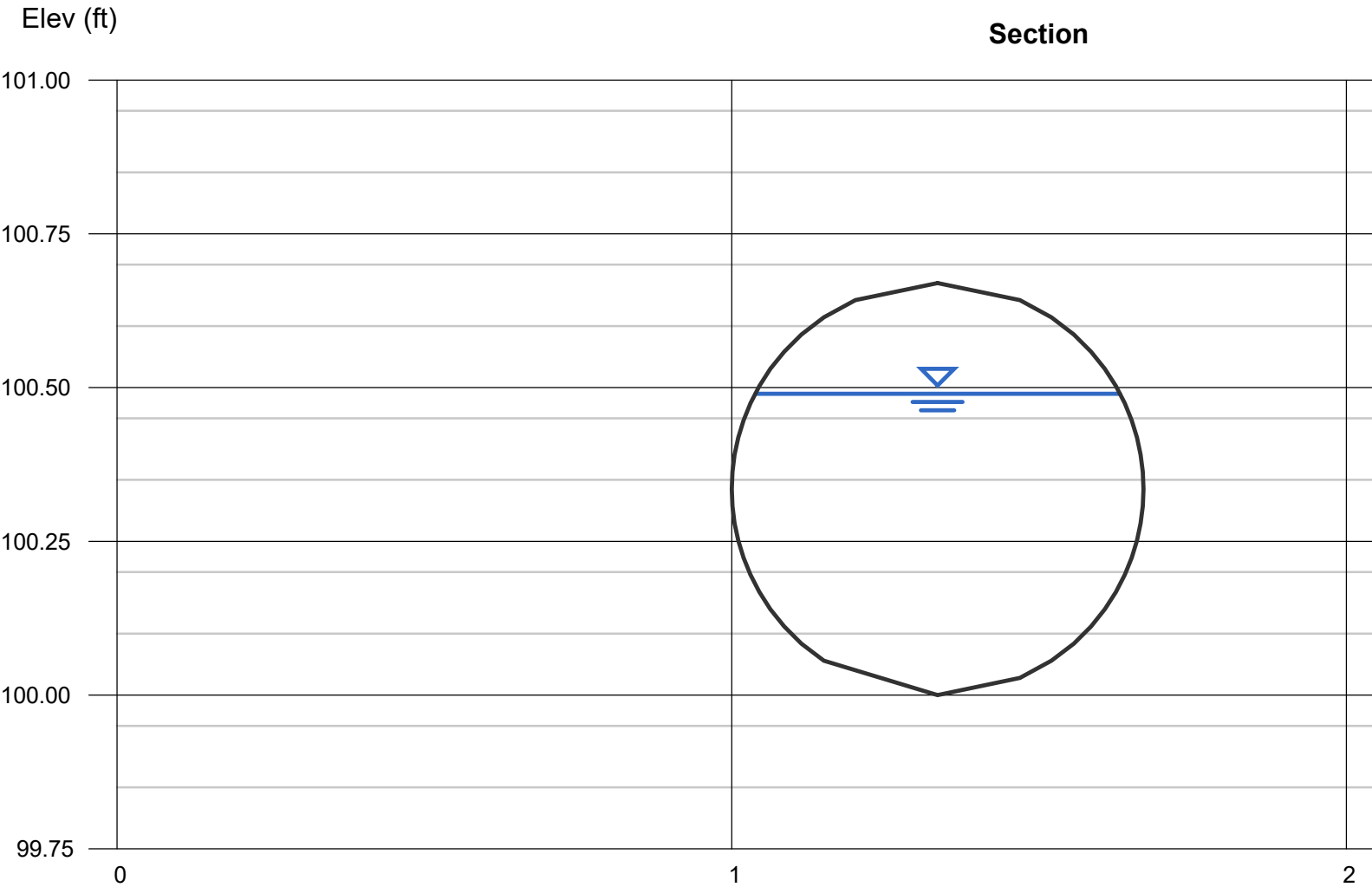
Velocity (ft/s) = 4.62

Wetted Perim (ft) = 1.38

Crit Depth, Yc (ft) = 0.54

Top Width (ft) = 0.59

EGL (ft) = 0.82



Channel Report

Area A + B + C + D

Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 1.45

Highlighted

Depth (ft) = 0.55

Q (cfs) = 1.446

Area (sqft) = 0.31

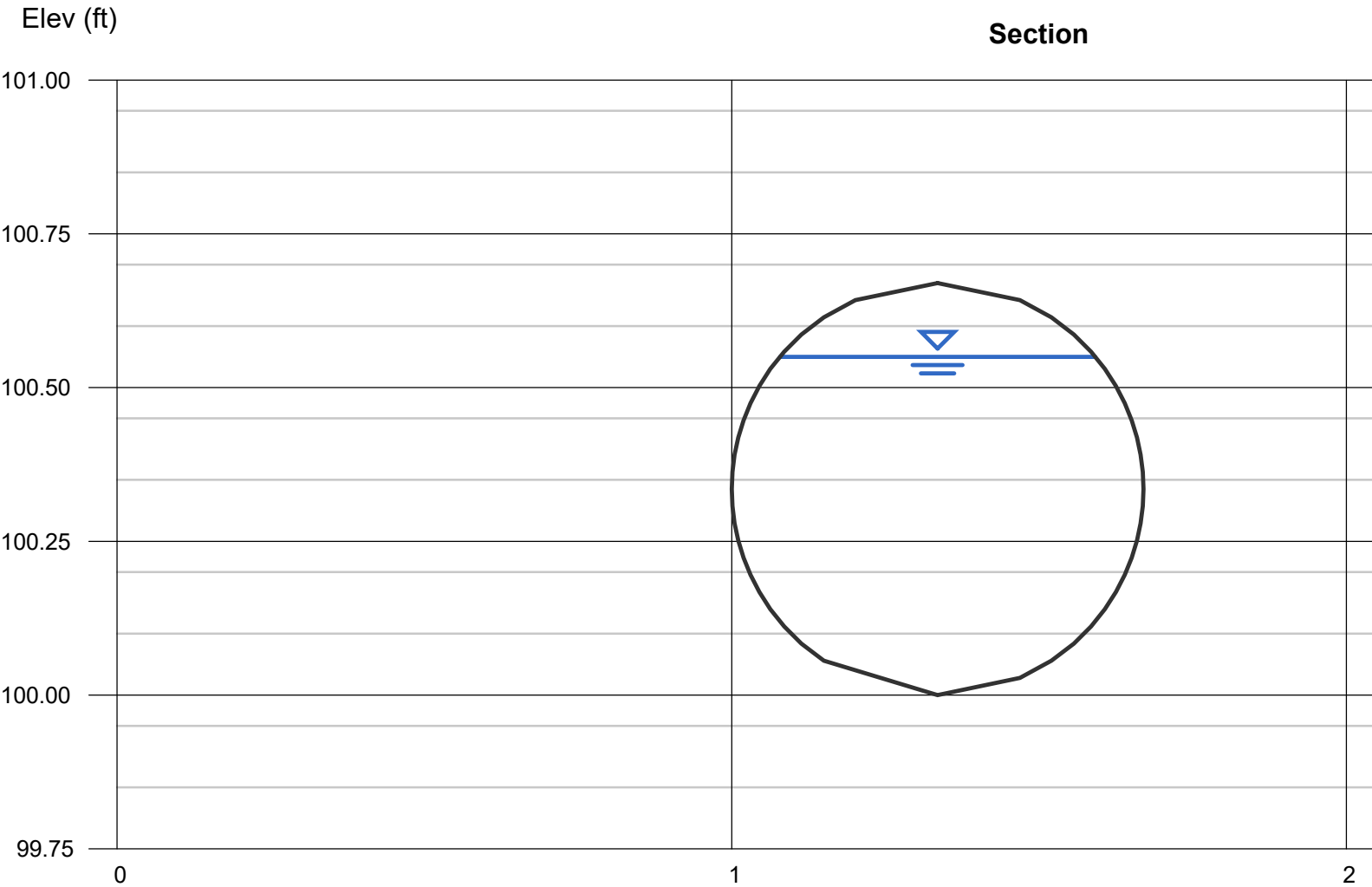
Velocity (ft/s) = 4.66

Wetted Perim (ft) = 1.52

Crit Depth, Yc (ft) = 0.57

Top Width (ft) = 0.51

EGL (ft) = 0.89



Channel Report

Area A + B + C + D + E

Circular

Diameter (ft) = 1.00

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.011

Calculations

Compute by: Known Q

Known Q (cfs) = 2.47

Highlighted

Depth (ft) = 0.55

Q (cfs) = 2.470

Area (sqft) = 0.44

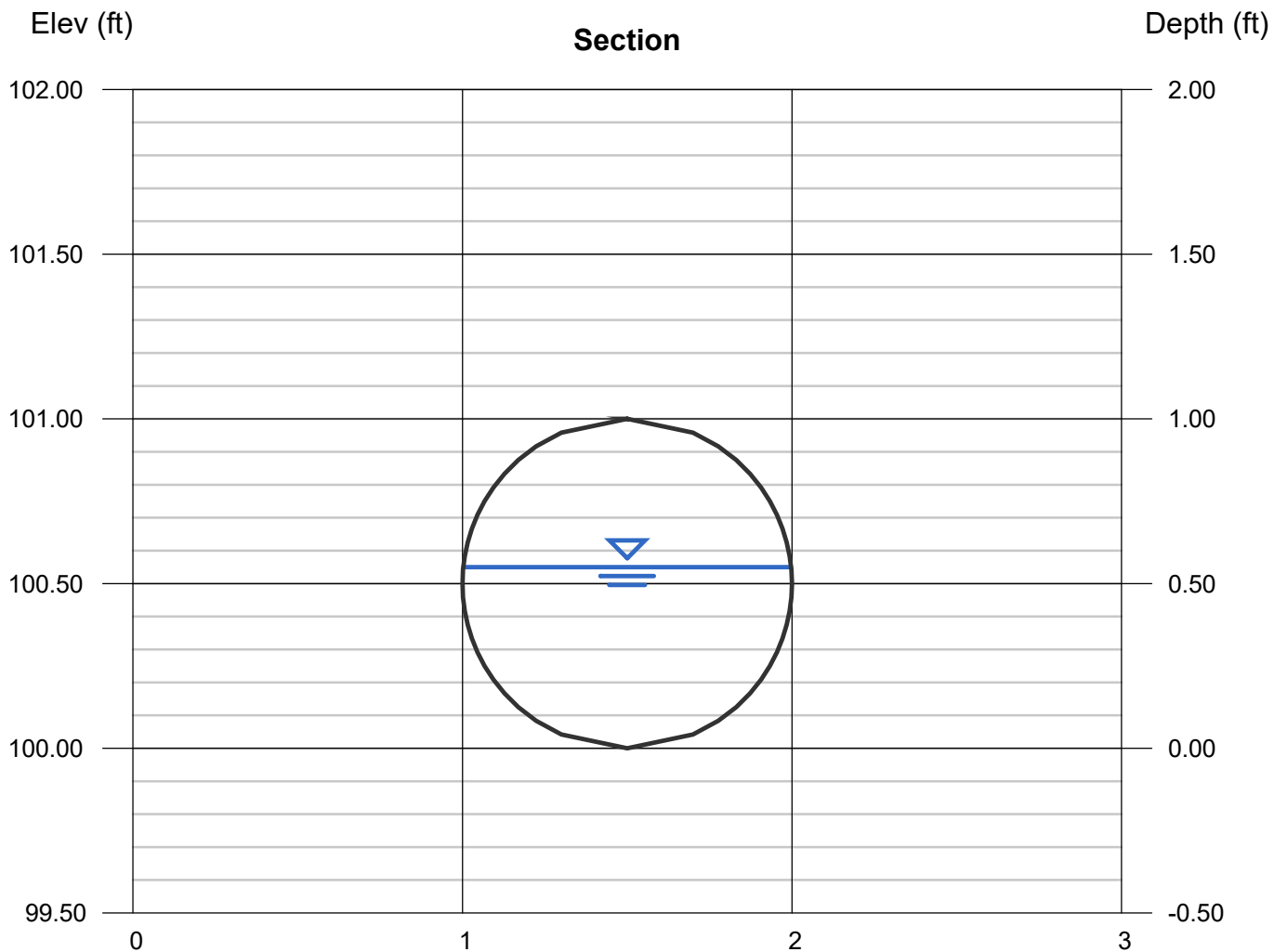
Velocity (ft/s) = 5.56

Wetted Perim (ft) = 1.67

Crit Depth, Yc (ft) = 0.68

Top Width (ft) = 0.99

EGL (ft) = 1.03



Appendix D

Soils Information and Reference Drawings

Soil Map—Western Riverside Area, California



USDA
Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

11/14/2024
Page 1 of 3

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 1:15,800.

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: Western Riverside Area, California

Survey Area Data: Version 17, Aug 30, 2024

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

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

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background 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
BhC	Buchenau loam, slightly saline-alkali, 2 to 8 percent slopes	0.4	38.2%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	0.6	61.8%
Totals for Area of Interest		0.9	100.0%

Western Riverside Area, California

BhC—Buchenau loam, slightly saline-alkali, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hcr1
Elevation: 500 to 1,500 feet
Mean annual precipitation: 13 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Buchenau

Setting

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

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 52 inches: loam
H3 - 52 to 61 inches: cemented

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 40 to 60 inches to duripan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low
(0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e



Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

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

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

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

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

Western Riverside Area, California

FaD2—Fallbrook sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: htcp
Elevation: 300 to 2,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Fallbrook

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from granodiorite and/or
residuum weathered from tonalite

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 24 inches: sandy clay loam
H3 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low
to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Vista

Percent of map unit: 3 percent
Hydric soil rating: No

Bonsall

Percent of map unit: 3 percent
Hydric soil rating: No

Monserate

Percent of map unit: 3 percent
Hydric soil rating: No

Buren

Percent of map unit: 3 percent
Hydric soil rating: No

Cieneba

Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 17, Aug 30, 2024

