P.C.C.E. INC.

CIVIL ENGINEERING AND DESIGN

Drainage Study for 23401 Civic Center Way

WHOLE FOODS AT THE PARK

Prepared by:

P.C.C.E. INC
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C63480

April 6, 2011

P.C.C.E. INC.
CIVIL ENGINEERING AND DESIGN

Project Introduction

The proposed project site is located on 23401 Civic Center Way in the City Malibu. The surrounding area is mostly developed hillside terrain with single family residences interspersed throughout the area. All roof drainage will be outfitted with downspout filters prior to being discharged to a 1'x1' splash pad where flows will drain to proposed bioswales within the parking lots. From the bioswales, the drainage enters catch basins outfitted with an Abtech filter system. From this point the flows enter the proposed drain system shown on Sheet 2 of the grading plans prepared for this project. For further stormwater treatment, a RESI-EPIC stormwater solution is proposed which will utilize clean washed sand to further treat to site runoff. The proposed project is not required to provide onsite detention as discussions with City staff indicated that drainage studies conducted for Legacy Park revealed that the subject project was considered as a fully developed site and detention for this developed site is provided by the Legacy Park project.

The purpose of the included hydrology report is to review the capacity for the proposed onsite drainage lines for planning submittal and review. The site was divided into 6 contributory areas. A summary of the hydrology and hydraulic calculations performed for the site are summarized below.

Hydrologic and Hydraulic Calculations

On-Site Hydrology

Hydrology analysis for the subject site was performed in accordance with standards set forth in the County of Los Angeles Hydrology Manual. The drainage area was determined with the use of flown topography and was confirmed with the use of a field survey. Analysis was performed for the 50 year event. The isohyte for this area is 7.0. The soil type is 029. Below is a summary of the anticipated Q(50 YEAR) and the hydraulic calculations performed.

SUBAREA	*DRAINAGE AREA(ACRES)*	*Q100(PEAK FLOW RATE)*
AREA 1A	0.87 ACRES	3.27 CFS
AREA 2A	1.12 ACRES	4.21 CFS
AREA 3A	0.62 ACRES	2.33 CFS
AREA 4A	1.34 ACRES	4.04 CFS
AREA 5A	1.57 ACRES	4.48 CFS
AREA 6A	0.21 ACRES	0.79 CFS

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On-Site Hydraulic Calculations

AREA(Q100)	*PIPE SIZE*	*DEPTH*	*FULLFLOW RATE*
AREA 1A (3.27 cfs)	12 INCH	8.64 INCH	3.77 CFS
AREA 2A (2.11 cfs) (2*2.11 cfs)	8 INCH	6.41 INCH	2.17 CFS
AREA 3A (2.33 cfs)	8 INCH	6.27 INCH	2.45 CFS
AREA 4A (4.04 cfs)	15 INCH	12 INCH	5.50 CFS
AREA 5A (4.48 cfs)	15 INCH	8.75 INCH	6.96 CFS
AREA 6A (0.79 cfs)	6 INCH	3.56 INCH	1.20 CFS
TOTAL(19.1 cfs)	24 INCH-RCP	18.56 INCH	20.23 CFS

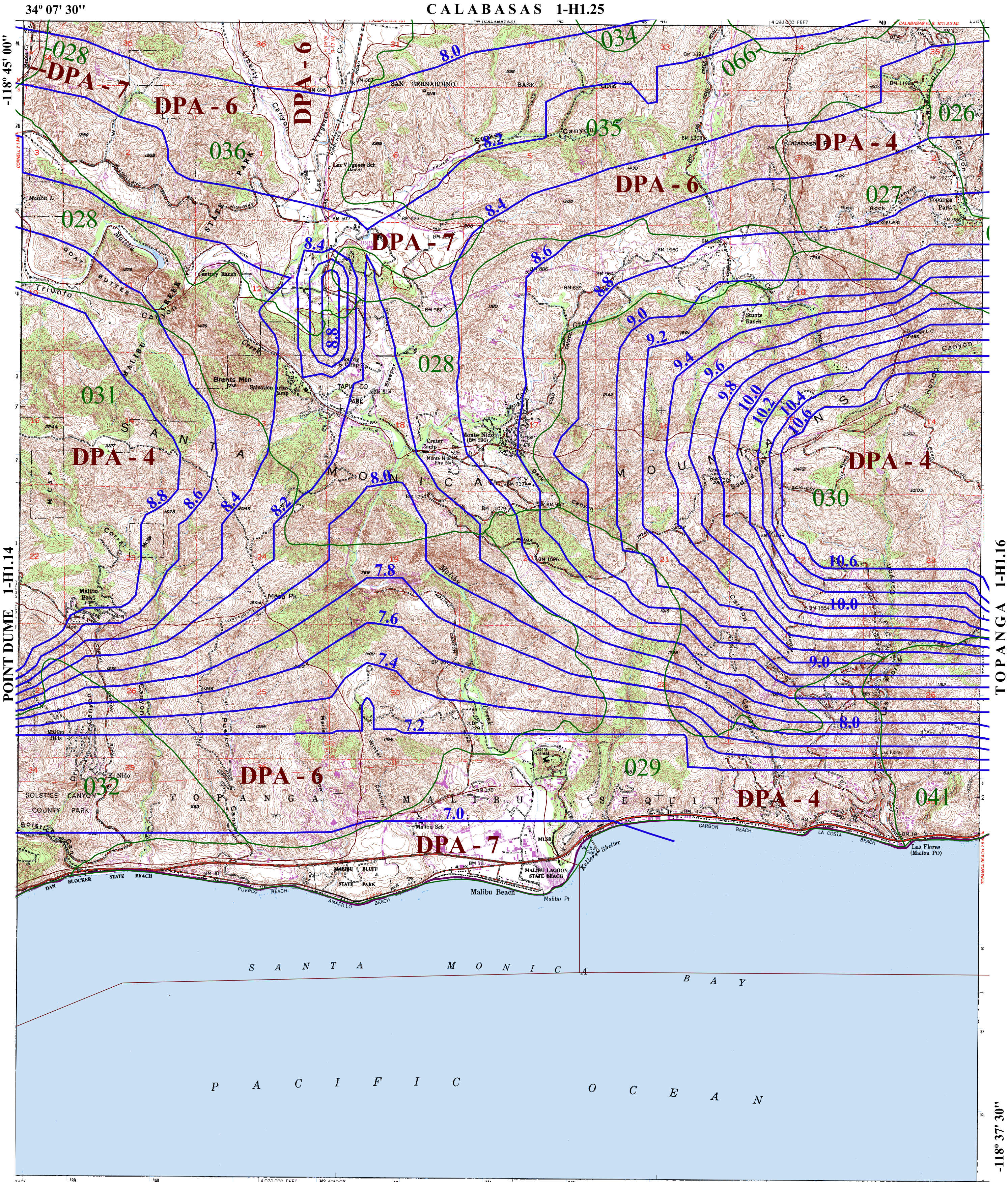
WSPG calculations were also performed for the subject site to verify hydraulic grade lines and storm drain capacity for a 50 year storm event. The calculations are included in this report.

Conclusion

Hydraulic calculations performed for the proposed onsite drainage system for the project located at 23401 Civic Center Way revealed that the proposed storm drain system for this project for the various subareas is more than adequate to handle the anticipated flows during a proposed 50 year storm event.

EXHIBITS


Malibu Creek State Park
Malibu Canyon Rd
Rindge Mesa Rd
Carbon Canyon Rd
Palm Canyon Ln
State Park Land
Fines Rd
Cross Creek Rd
Serra Rd
Serra Rd
Sweetwater Mesa Rd
Carbon Mesa Rd
Huntsinger Cir
Baxter Dr
President Dr
Pepperdine University-Malibu
Malibu Country Dr
Seaver Dr
Harbor Vista Dr
Coast View Dr
Malibu
Beckledge Ter
Pacific Coast Hwy
1
Banowsky Blvd
Civic Center Wy
23401 Civic Center Way
Pacific Coast Hwy
1
Winter Mesa
Malibu Colony Rd
Surfrider Beach State Park
Malibu Bluffs State Recreation Area
Malibu Bluffs Park
Malibu Rd
Malibu Lagoon State Beach
Pacific Ocean
0.5 km
1500 ft
© 2009 Rand McNally © 2009 NAVTEQ



1 0 1 2 Miles

016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

MALIBU BEACH
50-YEAR 24-HOUR ISOHYET

1-H1.15

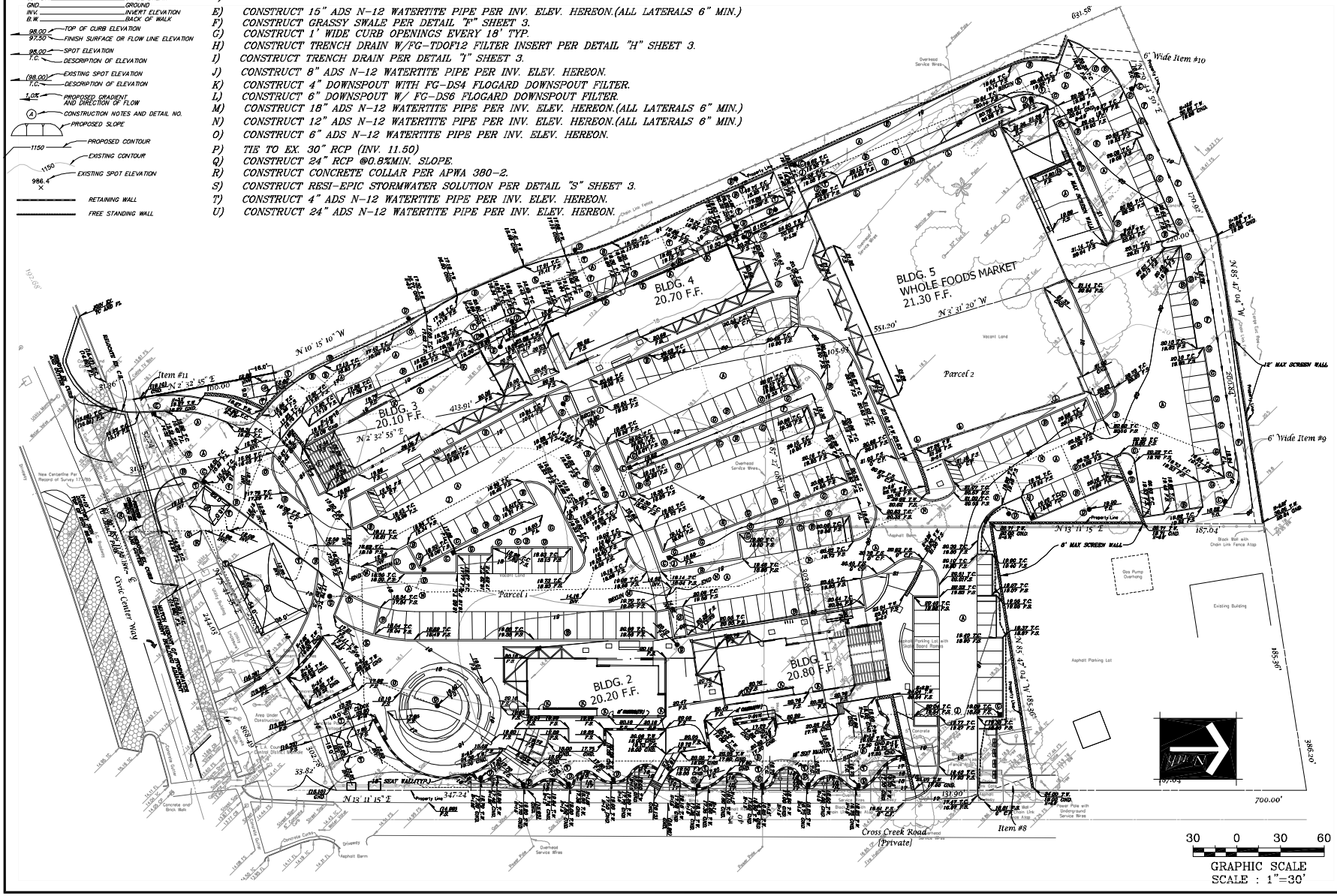
LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

CONSTRUCTION NOTES

A) CONSTRUCT DRIVEWAY PER DETAIL "A" SHEET 3..
B) CONSTRUCT 6" CURB PER APWA 120-1 A1-150(6)
C) CONSTRUCT 18"X18" BROOKS CATCH BASIN W/ ABTECH DI 1414H INSERT PER DETAIL "C" SHEET 3.
D) CONSTRUCT AREA DRAIN PER DETAIL "D" SHEET 3.
E) CONSTRUCT 15" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.(ALL LATERALS 6" MIN.)
F) CONSTRUCT GRASSY SWALE PER DETAIL "F" SHEET 3.
G) CONSTRUCT 1' WIDE CURB OPENINGS EVERY 18' TYP.
H) CONSTRUCT TRENCH DRAIN W/FG-TDOF12 FILTER INSERT PER DETAIL "H" SHEET 3.
I) CONSTRUCT TRENCH DRAIN PER DETAIL "I" SHEET 3.
J) CONSTRUCT 8" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.
K) CONSTRUCT 4" DOWNSPOUT WITH FG-DS4 FLOGARD DOWNSPOUT FILTER.
L) CONSTRUCT 6" DOWNSPOUT W/ FG-DS6 FLOGARD DOWNSPOUT FILTER.
M) CONSTRUCT 18" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.(ALL LATERALS 6" MIN.)
N) CONSTRUCT 12" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.(ALL LATERALS 6" MIN.)
O) CONSTRUCT 6" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.
P) TIE TO EX. 30" RCP (INV. 11.50)
Q) CONSTRUCT 24" RCP @0.8%MIN. SLOPE.
R) CONSTRUCT CONCRETE COLLAR PER APWA 380-2.
S) CONSTRUCT RESI-EPIC STORMWATER SOLUTION PER DETAIL "S" SHEET 3.
T) CONSTRUCT 4" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.
U) CONSTRUCT 24" ADS N-12 WATERTITE PIPE PER INV. ELEV. HEREON.

Legend:

- F.G. — FINISHED GRADE
- F.L. — FLOW LINE
- F.S. — FINISHED SURFACE
- T.C. — TOP OF CURB
- T.W. — TOP OF WALL
- H.P. — HIGH POINT
- T.G. — TOP OF GRATE
- TYP. — TYPICAL
- GD.-BK. — GRADE BREAK
- GND — GROUND
- INV. — INVERT ELEVATION
- B.W. — BACK OF WALK
- 98.00 / 97.50 — TOP OF CURB ELEVATION / FINISH SURFACE OR FLOW LINE ELEVATION
- 95.00 T.C. — SPOT ELEVATION / DESCRIPTION OF ELEVATION
- (98.00) T.C. — EXISTING SPOT ELEVATION / DESCRIPTION OF ELEVATION
- 1.0% — PROPOSED GRADIENT AND DIRECTION OF FLOW
- (A) — CONSTRUCTION NOTES AND DETAIL NO.
- PROPOSED SLOPE
- 1150 — PROPOSED CONTOUR
- 1150 — EXISTING CONTOUR
- 986.4 — EXISTING SPOT ELEVATION
- RETAINING WALL
- FREE STANDING WALL



PLAN REVISION DESCRIPTIONS

PREPARED BY OR UNDER THE DIRECTION OF:

STEPHEN R SMITH P.E. 63480

DATE:

Precise Grading Plan
for
23401 Civic Center Way

Prepared for
MALIBU WF, LLC
MALIBU CA

DESCRIPTION:	BY
DESIGNED:	S.S
DRAWN:	S.S
CHECKED:	S.S
SUPERVISED:	S.S
PROJ. ENGINEER:	S.S
DRAWING SCALE:	1"=30'
DWEI JOB NUMBER:	6000-251

SHEET NO.

2

OF 3 SHEETS

PLOT DATE:4-6-11PLANNING REVISION

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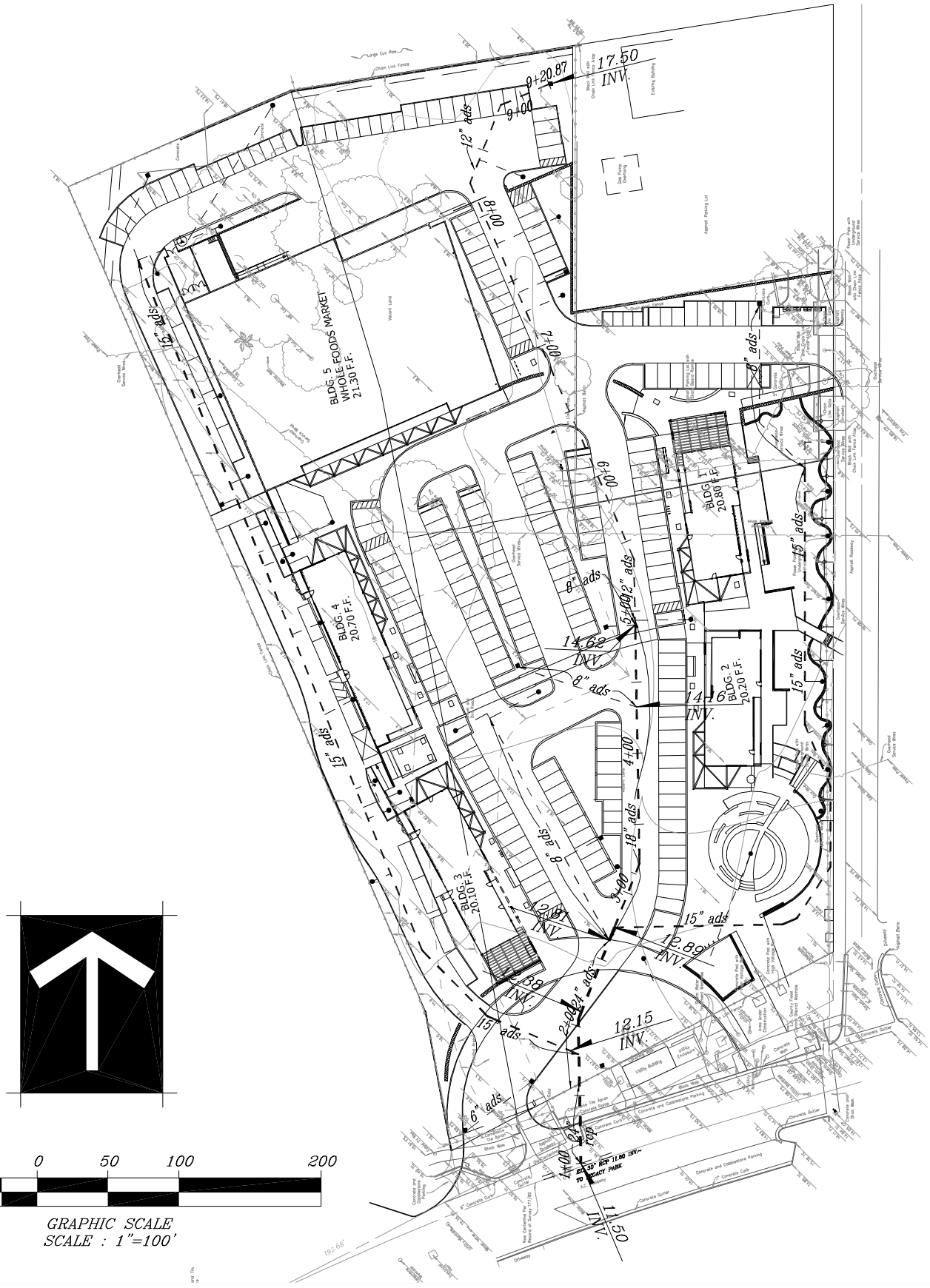
SUBAREA 1A=0.87 ACRES(Q50=3.27 CFS)
SUBAREA 2A=1.12 ACRES(Q50=4.21 CFS)
SUBAREA 3A=0.62 ACRES(Q50=2.33 CFS)
SUBAREA 4A=1.34 ACRES(Q50=4.04 CFS)
SUBAREA 5A=1.57 ACRES(Q50=4.48 CFS)
SUBAREA 6A=0.21 ACRES(Q50=0.79 CFS)

PROJECT No: 23401 CIVIC CENTER WAY(ONSITE HYDROLOGY MAP)



100 50 0 50 100 200

GRAPHIC SCALE
SCALE : 1"=100'

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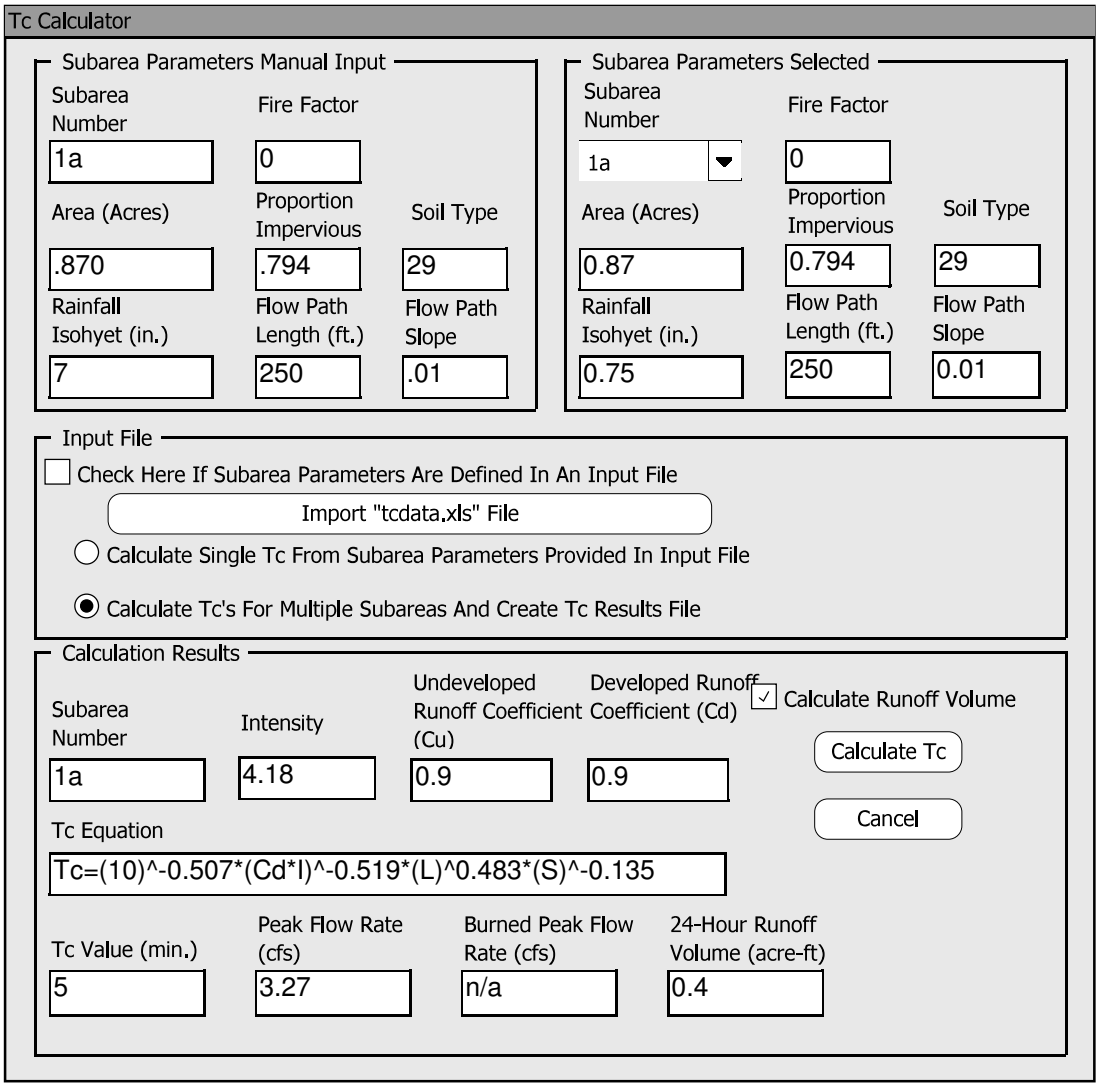
PROJECT No: 23401 CIVIC CENTER WAY(STORM DRAIN EXHIBIT)

HYDROLOGY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1a
Fire Factor
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Area (Acres)
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Proportion Impervious
.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
250
Flow Path Slope
.01
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
0.87
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
0.75
Flow Path Length (ft.)
250
Flow Path Slope
0.01
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Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
1a
Intensity
4.18
Undeveloped Runoff Coefficient (Cu)
0.9
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
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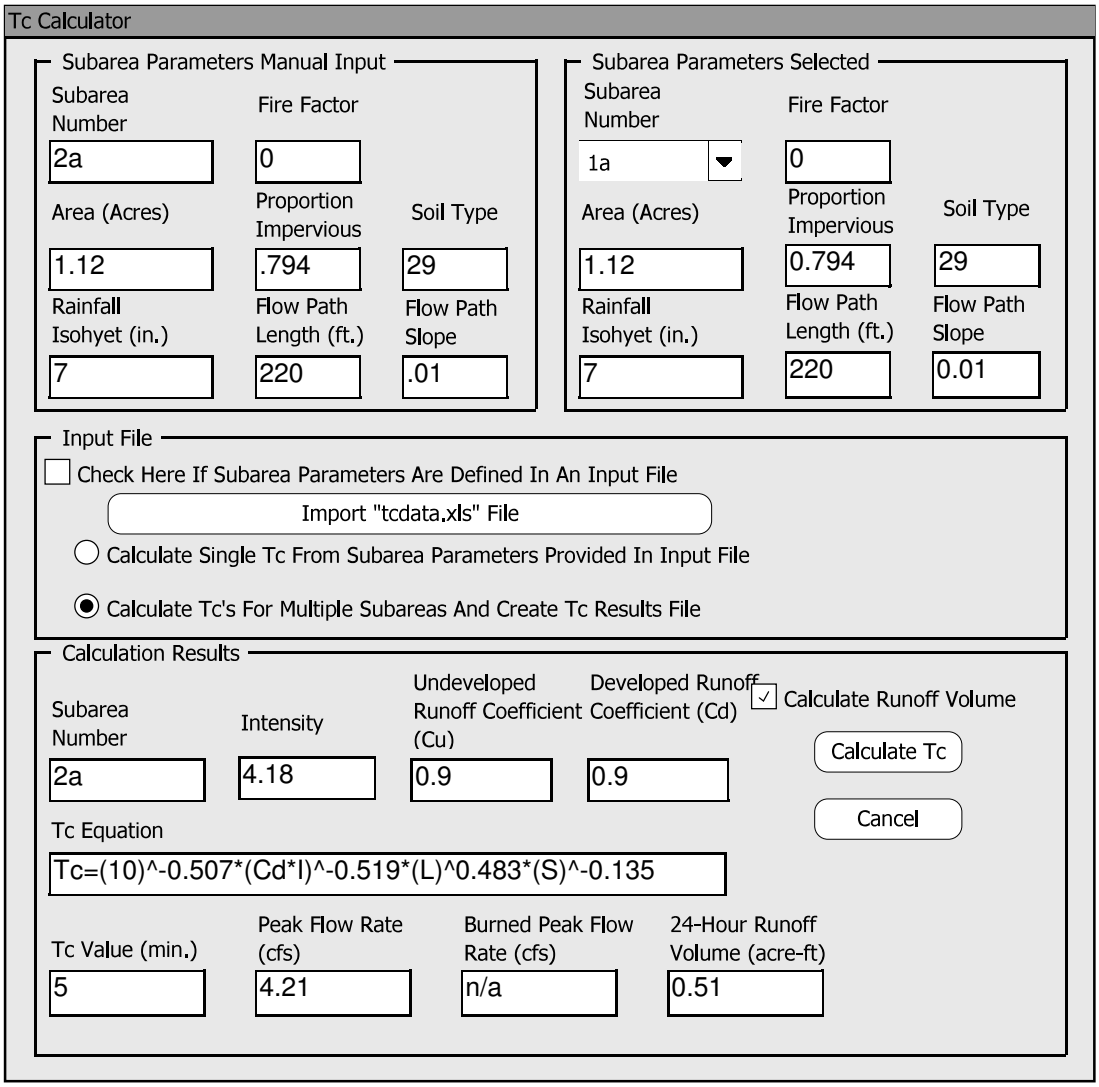
Peak Flow Rate (cfs)
3.27
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.4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2a
Fire Factor
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Area (Acres)
1.12
Proportion Impervious
.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
220
Flow Path Slope
.01
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
1.12
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
220
Flow Path Slope
0.01
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Calculate Tc's For Multiple Subareas And Create Tc Results File
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Subarea Number
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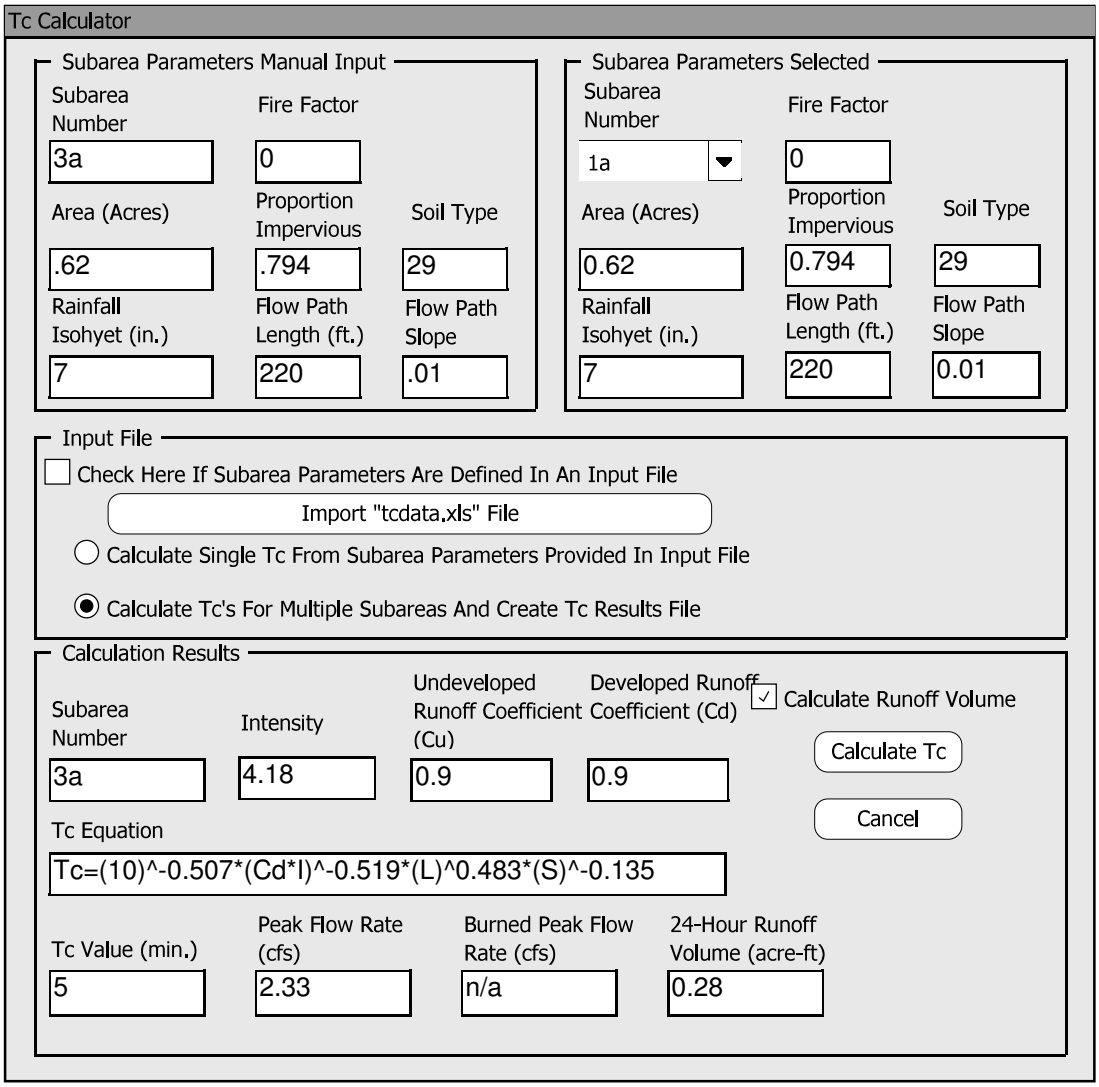
Intensity
4.18
Undeveloped Runoff Coefficient (Cu)
0.9
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
4.21
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.51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Subarea Parameters Manual Input
Subarea Number
3a
Fire Factor
0
Area (Acres)
.62
Proportion Impervious
.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
220
Flow Path Slope
.01
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
0.62
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
220
Flow Path Slope
0.01
Input File
Check Here If Subarea Parameters Are Defined In An Input File
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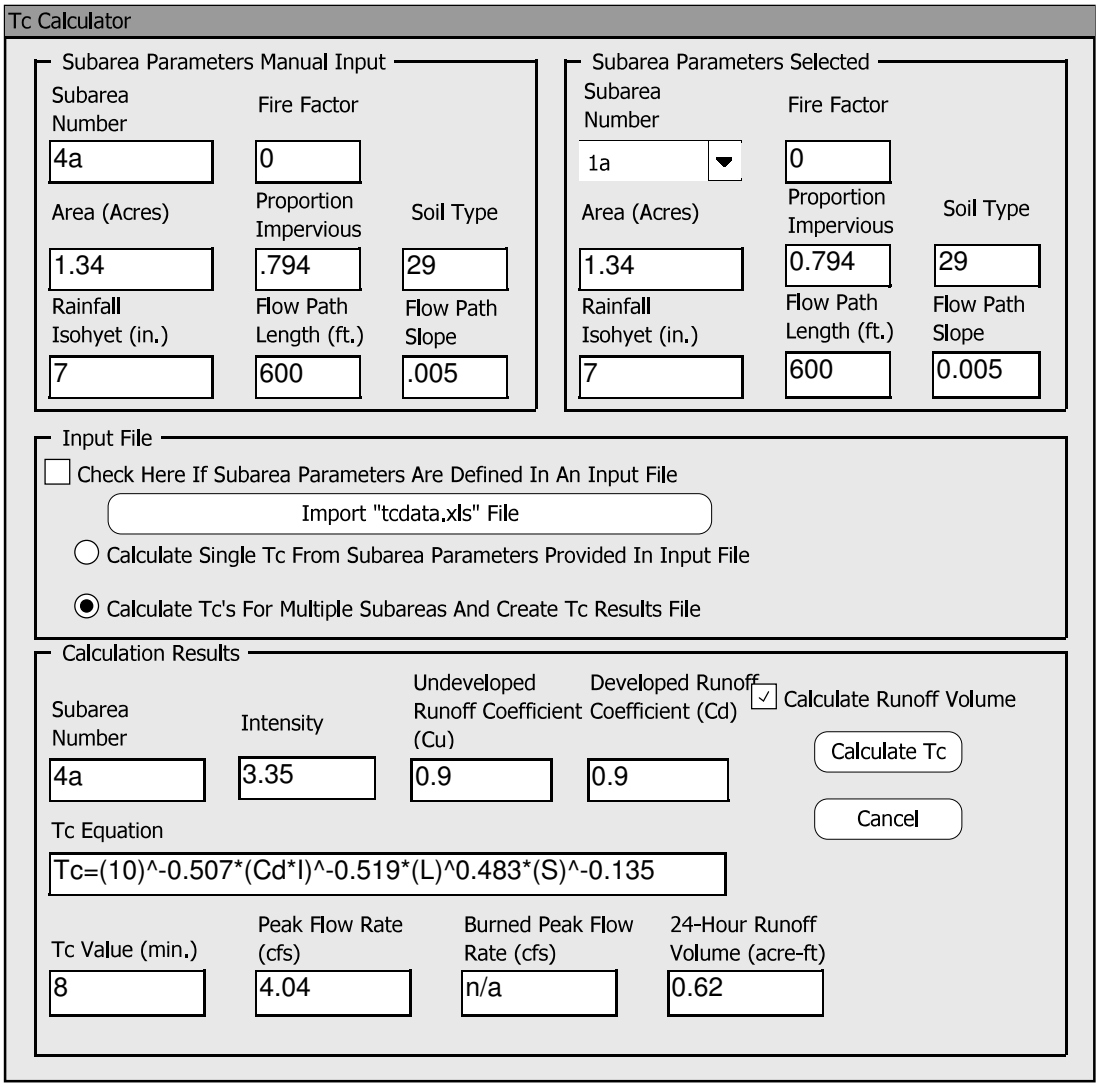
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
3a
Intensity
4.18
Undeveloped Runoff Coefficient (Cu)
0.9
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
2.33
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.28


Tc Calculator
Subarea Parameters Manual Input
Subarea Number
4a
Fire Factor
0
Area (Acres)
1.34
Proportion Impervious
.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
600
Flow Path Slope
.005
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
1.34
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
600
Flow Path Slope
0.005
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Subarea Number
4a
Intensity
3.35
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0.9
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
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Tc Value (min.)
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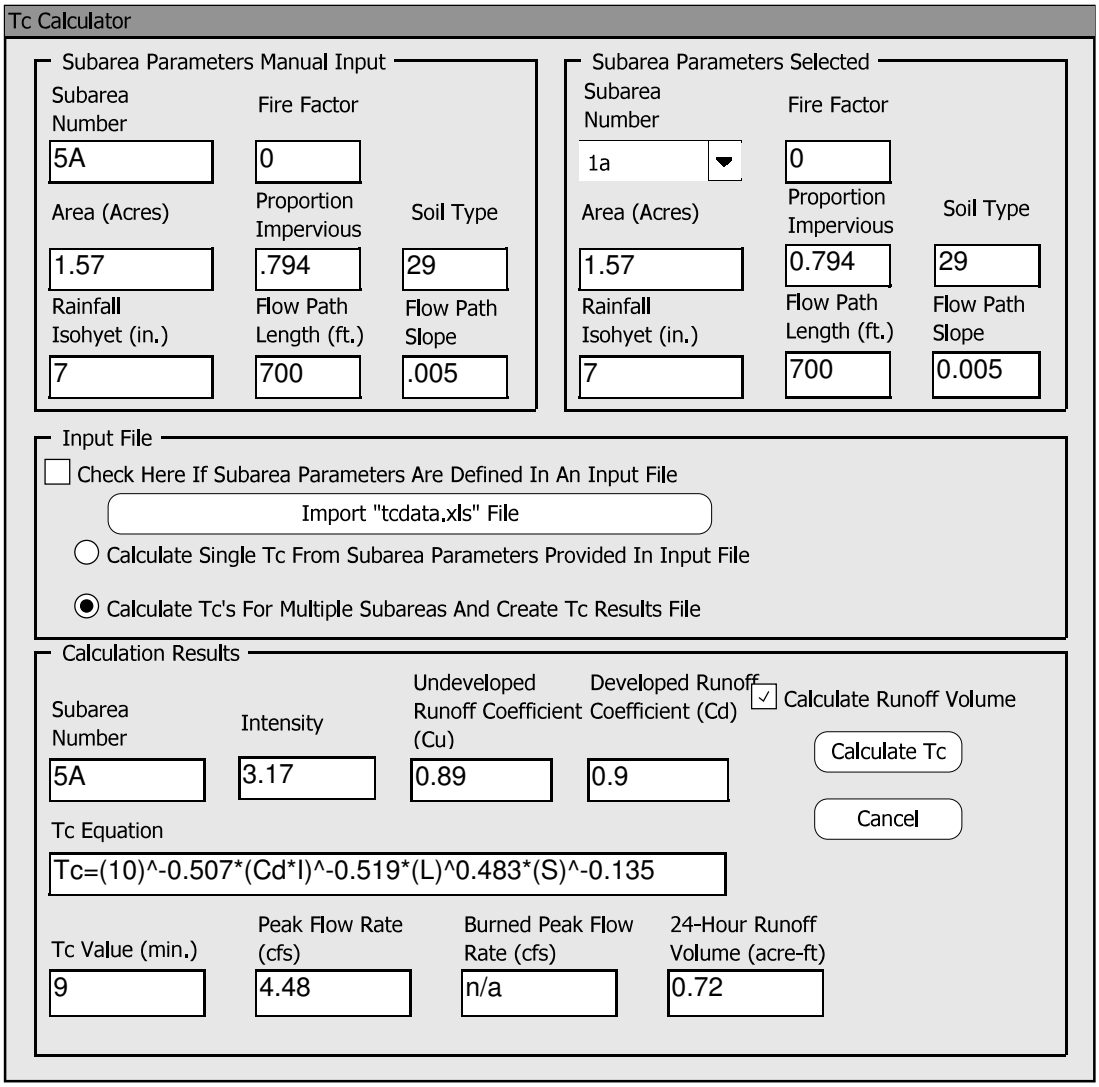
4.04
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.62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Subarea Parameters Manual Input
Subarea Number
5A
Fire Factor
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Area (Acres)
1.57
Proportion Impervious
.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
700
Flow Path Slope
.005
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
1.57
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
700
Flow Path Slope
0.005
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Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
5A
Intensity
3.17
Undeveloped Runoff Coefficient (Cu)
0.89
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
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Tc Value (min.)
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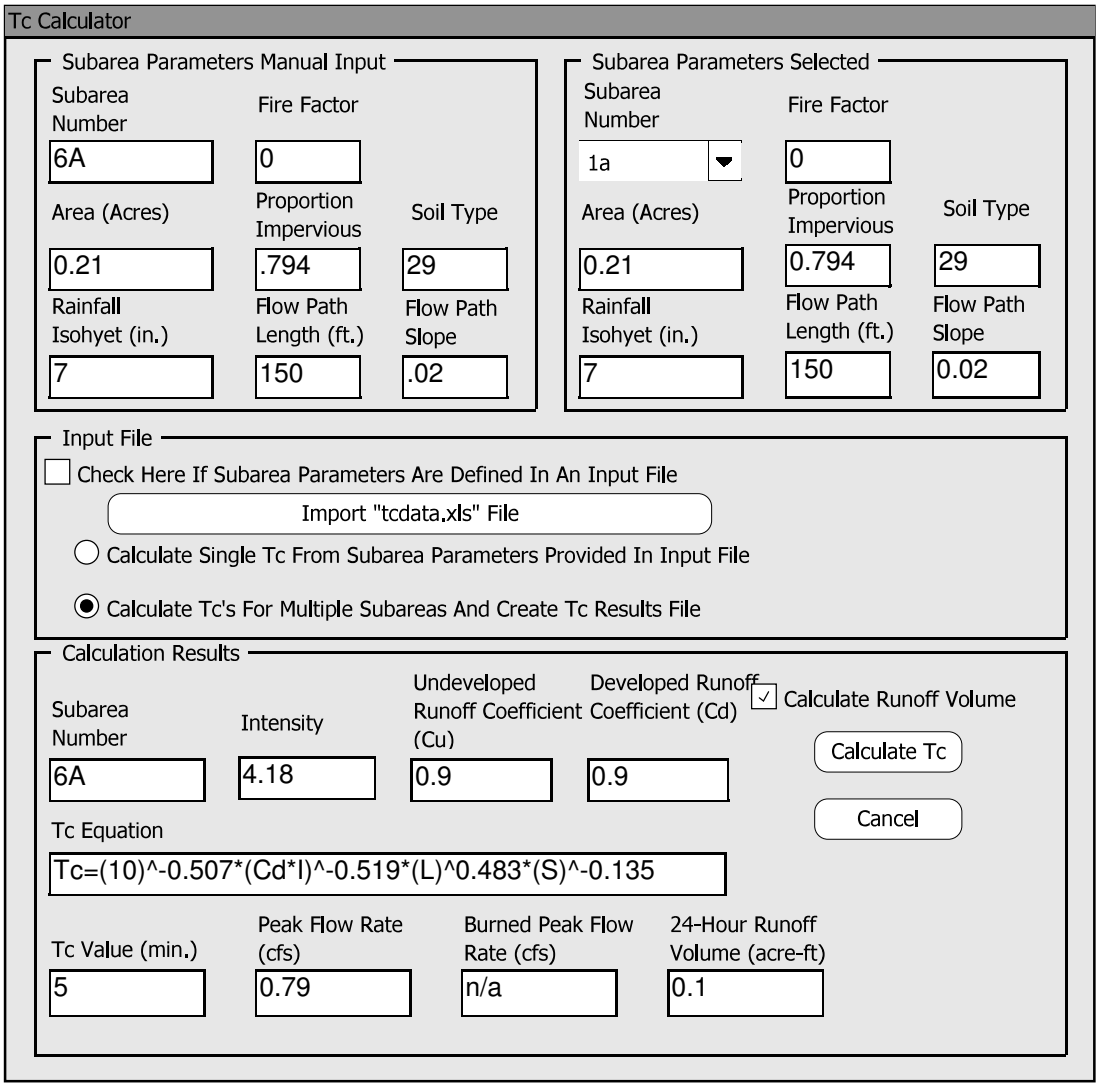
Peak Flow Rate (cfs)
4.48
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.72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Subarea Parameters Manual Input
Subarea Number
6A
Fire Factor
0
Area (Acres)
0.21
Proportion Impervious
.794
Soil Type
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Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
150
Flow Path Slope
.02
Subarea Parameters Selected
Subarea Number
1a
Fire Factor
0
Area (Acres)
0.21
Proportion Impervious
0.794
Soil Type
29
Rainfall Isohyet (in.)
7
Flow Path Length (ft.)
150
Flow Path Slope
0.02
Input File
Check Here If Subarea Parameters Are Defined In An Input File
Import "tcdata.xls" File
Calculate Single Tc From Subarea Parameters Provided In Input File
Calculate Tc's For Multiple Subareas And Create Tc Results File
Calculation Results
Subarea Number
6A
Intensity
4.18
Undeveloped Runoff Coefficient (Cu)
0.9
Developed Runoff Coefficient (Cd)
0.9
Calculate Runoff Volume
Calculate Tc
Cancel
Tc Equation
Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135
Tc Value (min.)
5
Peak Flow Rate (cfs)
0.79
Burned Peak Flow Rate (cfs)
n/a
24-Hour Runoff Volume (acre-ft)
0.1

HYDRAUICS

Manning Pipe Calculator(SUBAREA 1A)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	1.0000 ft
Flowrate	3.2700 cfs
Slope	0.0080 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.7202 ft
Area	0.7854 ft2
Wetted Area	0.6056 ft2
Wetted Perimeter	2.0268 ft
Perimeter	3.1416 ft
Velocity	5.4000 fps
Hydraulic Radius	0.2988 ft
Percent Full	72.0196 %
Full flow Flowrate	3.7661 cfs
Full flow velocity	4.7951 fps

Critical Information

Critical depth	0.8000 ft
Critical slope	0.0056 ft/ft
Critical velocity	4.7208 fps
Critical area	0.6927 ft2
Critical perimeter	2.1708 ft
Critical hydraulic radius	0.3191 ft
Critical top width	1.0000 ft
Specific energy	1.1685 ft
Minimum energy	1.2000 ft
Froude number	1.2381
Flow condition	Supercritical

Manning Pipe Calculator (SUBAREA 2A-2 INLETS)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	0.6700 ft
Flowrate	2.1100 cfs
Slope	0.0224 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.5341 ft
Area	0.3526 ft2
Wetted Area	0.3014 ft2
Wetted Perimeter	1.4790 ft
Perimeter	2.1049 ft
Velocity	7.0013 fps
Hydraulic Radius	0.2038 ft
Percent Full	79.7232 %
Full flow Flowrate	2.1660 cfs
Full flow velocity	6.1437 fps

Manning Pipe Calculator(SUBREA 3A)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	0.6700 ft
Flowrate	2.3300 cfs
Slope	0.0286 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.5223 ft
Area	0.3526 ft2
Wetted Area	0.2949 ft2
Wetted Perimeter	1.4500 ft
Perimeter	2.1049 ft
Velocity	7.9010 fps
Hydraulic Radius	0.2034 ft
Percent Full	77.9584 %
Full flow Flowrate	2.4475 cfs
Full flow velocity	6.9420 fps

Manning Pipe Calculator (SUBAREA 4A)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	1.2500 ft
Flowrate	4.0400 cfs
Slope	0.0052 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.7956 ft
Area	1.2272 ft2
Wetted Area	0.8242 ft2
Wetted Perimeter	2.3091 ft
Perimeter	3.9270 ft
Velocity	4.9017 fps
Hydraulic Radius	0.3569 ft
Percent Full	63.6504 %
Full flow Flowrate	5.5052 cfs
Full flow velocity	4.4860 fps

Critical Information

Critical depth	0.8214 ft
Critical slope	0.0047 ft/ft
Critical velocity	4.7025 fps
Critical area	0.8591 ft2
Critical perimeter	2.3563 ft
Critical hydraulic radius	0.3646 ft
Critical top width	1.2500 ft
Specific energy	1.1671 ft
Minimum energy	1.2321 ft
Froude number	1.0674
Flow condition	Supercritical

Manning Pipe Calculator (SUBAREA AREA 5A INLET)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	1.2500 ft
Flowrate	4.4800 cfs
Slope	0.0083 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.7298 ft
Area	1.2272 ft2
Wetted Area	0.7440 ft2
Wetted Perimeter	2.1742 ft
Perimeter	3.9270 ft
Velocity	6.0213 fps
Hydraulic Radius	0.3422 ft
Percent Full	58.3869 %
Full flow Flowrate	6.9552 cfs
Full flow velocity	5.6676 fps

Critical Information

Critical depth	0.8705 ft
Critical slope	0.0048 ft/ft
Critical velocity	4.8673 fps
Critical area	0.9204 ft2
Critical perimeter	2.4544 ft
Critical hydraulic radius	0.3750 ft
Critical top width	1.2500 ft
Specific energy	1.2930 ft
Minimum energy	1.3057 ft
Froude number	1.3769
Flow condition	Supercritical

Manning Pipe Calculator (SUBAREA 6A-INLET)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	0.5000 ft
Flowrate	0.7900 cfs
Slope	0.0325 ft/ft
Manning's n	0.0110

Computed Results:

Depth	0.2968 ft
Area	0.1963 ft2
Wetted Area	0.1214 ft2
Wetted Perimeter	0.8795 ft
Perimeter	1.5708 ft
Velocity	6.5056 fps
Hydraulic Radius	0.1381 ft
Percent Full	59.3582 %
Full flow Flowrate	1.1955 cfs
Full flow velocity	6.0885 fps

Critical Information

Critical depth	0.4802 ft
Critical slope	0.0079 ft/ft
Critical velocity	3.7044 fps
Critical area	0.2133 ft2
Critical perimeter	1.2457 ft
Critical hydraulic radius	0.1712 ft
Critical top width	0.5000 ft
Specific energy	0.9549 ft
Minimum energy	0.7203 ft
Froude number	2.3296
Flow condition	Supercritical

Manning Pipe Calculator(24" CONCRETE PIPE)

Given Input Data:

Shape	Circular
Solving for	Depth of Flow
Diameter	2.0000 ft
Flowrate	19.1000 cfs
Slope	0.0080 ft/ft
Manning's n	0.0130

Computed Results:

Depth	1.5469 ft
Area	3.1416 ft2
Wetted Area	2.6073 ft2
Wetted Perimeter	4.2989 ft
Perimeter	6.2832 ft
Velocity	7.3256 fps
Hydraulic Radius	0.6065 ft
Percent Full	77.3442 %
Full flow Flowrate	20.2341 cfs
Full flow velocity	6.4407 fps

Critical Information

Critical depth	1.6299 ft
Critical slope	0.0063 ft/ft
Critical velocity	6.7479 fps
Critical area	2.8305 ft2
Critical perimeter	4.4013 ft
Critical hydraulic radius	0.6431 ft
Critical top width	2.0000 ft
Specific energy	2.3583 ft
Minimum energy	2.4448 ft
Froude number	1.1572
Flow condition	Supercritical

W.S.P.G.

DATE: 4/ 6/2011
TIME: 10:14

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4			2.00														
CD	2	4			1.50														
CD	3	4			0.50														
CD	4	4			0.67														
CD	5	4			1.00														
CD	6	4			1.25														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

23401 CIVIC CENTER WAY

HEADING LINE NO 2 IS -

50 YEAR STORM EVENT

HEADING LINE NO 3 IS -

PREPARED BY PCCE INC.

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	100.00	11.50	1	0.00

ELEMENT NO 2 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	170.20	12.06	1	3	0	0.014	0.8	0.0	12.20	0.00	90.00	0.00

ELEMENT NO 3 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	181.42	12.15	1	6	0	0.014	4.5	0.0	12.30	0.00	45.00	0.00

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	188.86	12.21	1	0.011	0.00	0.00	45.00	0

ELEMENT NO 5 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	264.33	12.81	1	4	0	0.014	2.3	0.0	13.00	0.00	45.00	0.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
266.33 12.83 1 0.011
0.00 0.00 0.00 0

ELEMENT NO 7 IS A JUNCTION * * * * * *
*
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3
INVERT-4 PHI 3 PHI 4
274.07 12.89 1 6 0 0.011 4.0 0.0 12.95
0.00 45.00 0.00
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 8 IS A REACH * * *
U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
322.49 13.28 2 0.011
0.00 0.00 45.00 0

ELEMENT NO 9 IS A JUNCTION * * * * * *
*
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3
INVERT-4 PHI 3 PHI 4
432.55 14.16 2 4 0 0.014 2.1 0.0 14.50
0.00 45.00 0.00

ELEMENT NO 10 IS A REACH * * *
U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
442.55 14.24 2 0.011
0.00 0.00 0.00 0

ELEMENT NO 11 IS A JUNCTION * * * * * *
*
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3
INVERT-4 PHI 3 PHI 4
490.21 14.62 2 4 0 0.014 2.1 0.0 15.00
0.00 45.00 0.00
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 12 IS A REACH * * *
U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
536.46 14.93 5 0.011
0.00 0.00 45.00 0

ELEMENT NO 13 IS A REACH * * *
U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
824.92 16.86 5 0.011
0.00 0.00 45.00 0

ELEMENT NO 14 IS A REACH * * *
U/S DATA STATION INVERT SECT N
RADIUS ANGLE ANG PT MAN H
883.82 17.25 5 0.011
0.00 0.00 45.00 0

ELEMENT NO 15 IS A SYSTEM HEADWORKS * *
U/S DATA STATION INVERT SECT W S ELEV
920.87 17.50 5 0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS,
W.S.ELEV = INV + DC
LICENSEE: P.C.C.E. INC. F0515P
PAGE 1

WATER SURFACE PROFILE LISTING

23401 CIVIC CENTER WAY

50 YEAR STORM EVENT

PREPARED BY PCCE INC.

WHO OUT

STATION ID NO.	INVERT ELEV / PIER	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	DIA / NORM DEPTH
L/ELEM	SO / ZR					SF AVE	HF			
100.00	11.50	1.572	13.072	19.1	7.21	0.807	13.879	0.00	1.572	
2.00	0.00 0.00	0 0.00								
JUNCT STR	0.00798					.007766	0.55			
	0.00									
170.20	12.06	1.860	13.920	18.3	6.01	0.561	14.481	0.00	1.541	
2.00	0.00 0.00	0 0.00								
JUNCT STR	0.00802					.005441	0.06			
	0.00									
181.42	12.15	2.209	14.359	13.8	4.39	0.300	14.659	0.00	1.338	
2.00	0.00 0.00	0 0.00								
7.44	0.00806					.002664	0.02			1.090
	0.00									
188.86	12.21	2.214	14.424	13.8	4.39	0.300	14.724	0.00	1.338	
2.00	0.00 0.00	0 0.00								
JUNCT STR	0.00795					.003490	0.26			
	0.00									
264.33	12.81	1.952	14.762	11.5	3.68	0.211	14.973	0.00	1.217	
2.00	0.00 0.00	0 0.00								
2.00	0.01000					.001633	0.00			0.914
	0.00									
266.33	12.83	1.934	14.764	11.5	3.70	0.212	14.976	0.00	1.217	
2.00	0.00 0.00	0 0.00								
JUNCT STR	0.00775					.001205	0.01			
	0.00									
274.07	12.89	2.036	14.926	7.5	4.24	0.280	15.206	0.00	1.061	
1.50	0.00 0.00	0 0.00								
48.42	0.00805					.003650	0.18			0.900
	0.00									
322.49	13.28	1.864	15.144	7.5	4.24	0.280	15.424	0.00	1.061	
1.50	0.00 0.00	0 0.00								
JUNCT STR	0.00800					.004488	0.49			
	0.00									
432.55	14.16	1.592	15.752	5.4	3.06	0.145	15.897	0.00	0.896	
1.50	0.00 0.00	0 0.00								
10.00	0.00800					.001892	0.02			0.740
	0.00									
442.55	14.24	1.531	15.771	5.4	3.06	0.145	15.916	0.00	0.896	
1.50	0.00 0.00	0 0.00								
JUNCT STR	0.00797					.002042	0.10			
	0.00									
490.21	14.62	1.333	15.953	3.3	4.20	0.274	16.227	0.00	0.778	
1.00	0.00 0.00	0 0.00								
46.25	0.00670					.006142	0.28			0.780
	0.00									

WHO OUT

23401 CIVIC CENTER WAY

50 YEAR STORM EVENT

PREPARED BY PCCE INC.

STATION ID NO.	INVERT ELEV / PIER	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	DIA / HGT / BASE / ZL / NO / AVBPR / L/ELEM / SO / ZR / NORM DEPTH
536.46	14.93	1.348	16.278	3.3	4.20	0.274	16.552	0.00	0.778	1.00 0.00 0.00 0 0.00
288.46	0.00669					.006142	1.77			0.780 0.00
824.92	16.86	1.230	18.090	3.3	4.20	0.274	18.364	0.00	0.778	1.00 0.00 0.00 0 0.00
58.90	0.00662					.006142	0.36			0.800 0.00
883.82	17.25	1.243	18.493	3.3	4.20	0.274	18.767	0.00	0.778	1.00 0.00 0.00 0 0.00