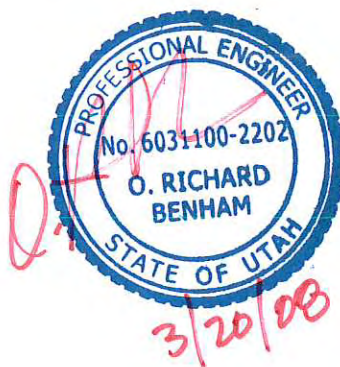


KEVIN TOLTON LOT OLYMPUS HILLS SUBDIVISION

SALT LAKE COUNTY, UTAH

Hydrologic Analysis Report

MARCH 20, 2008



Prepared For:
John Hill
County Hydrologist
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Prepared By:
Jack Johnson Company
1777 Sun Peak Drive
Park City, Utah 84098



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- 10-Yr and 100-Yr Rational Method Calculations
- Worksheet for Ephemeral Stream Cross Sections



Lot/Project Description

The lot is primarily made up of woodland areas with two ephemeral streams bisecting the lot on the north east and the south west. The site slopes consistently towards the west at an average incline of less than 30%. The majority of the lot is covered by scrub oak, mountain maple, and a few scattered pine trees. The soils appear to be rocky and well drained, typical of the surrounding foothills area.

Hydrologic Analysis

The purpose of this analysis is to provide Salt Lake County Urban Hydrology with the requested hydrologic information as discussed in the Pre-Application Meeting. This study is intended to evaluate the proposed building area and the effects it has on natural drainages, downstream drainage or flooding problems, and any drainage issues with future or existing developments. The following is included in this report:

- Channel geometry of the ephemeral streams as evidenced by surveying, identifying the top of bank and any overflow areas.
- Potential drainage flows calculated using the 100-yr frequency storm event.

Included in Appendix A are exhibits depicting the two drainage areas and ephemeral streams with corresponding cross sections that could potentially impact the proposed buildable area. The calculations for the 100-yr frequency storm event show that the depth of flow in ephemeral stream A is about 1 foot deep with a top width flow of less than 6 feet (see Appendix B). The approximate slope used to calculate ephemeral stream A is 30%. In an effort to be conservative this appears to be less than the actual slope of the drainage path, which means the calculated width is greater than what will actually be experienced during a 100-yr frequency storm event. The "Proposed Site Exhibit" in Appendix A shows a 6' wide hatching to illustrate the high water mark for the 100-yr frequency storm event. Ephemeral stream B is found to have no impact on the proposed building location. The natural drainage of ephemeral stream B becomes none channelized on the east side of the lot. This causes the runoff that isn't infiltrated into the rocky soil to sheet flow down to the cul-de-sac.

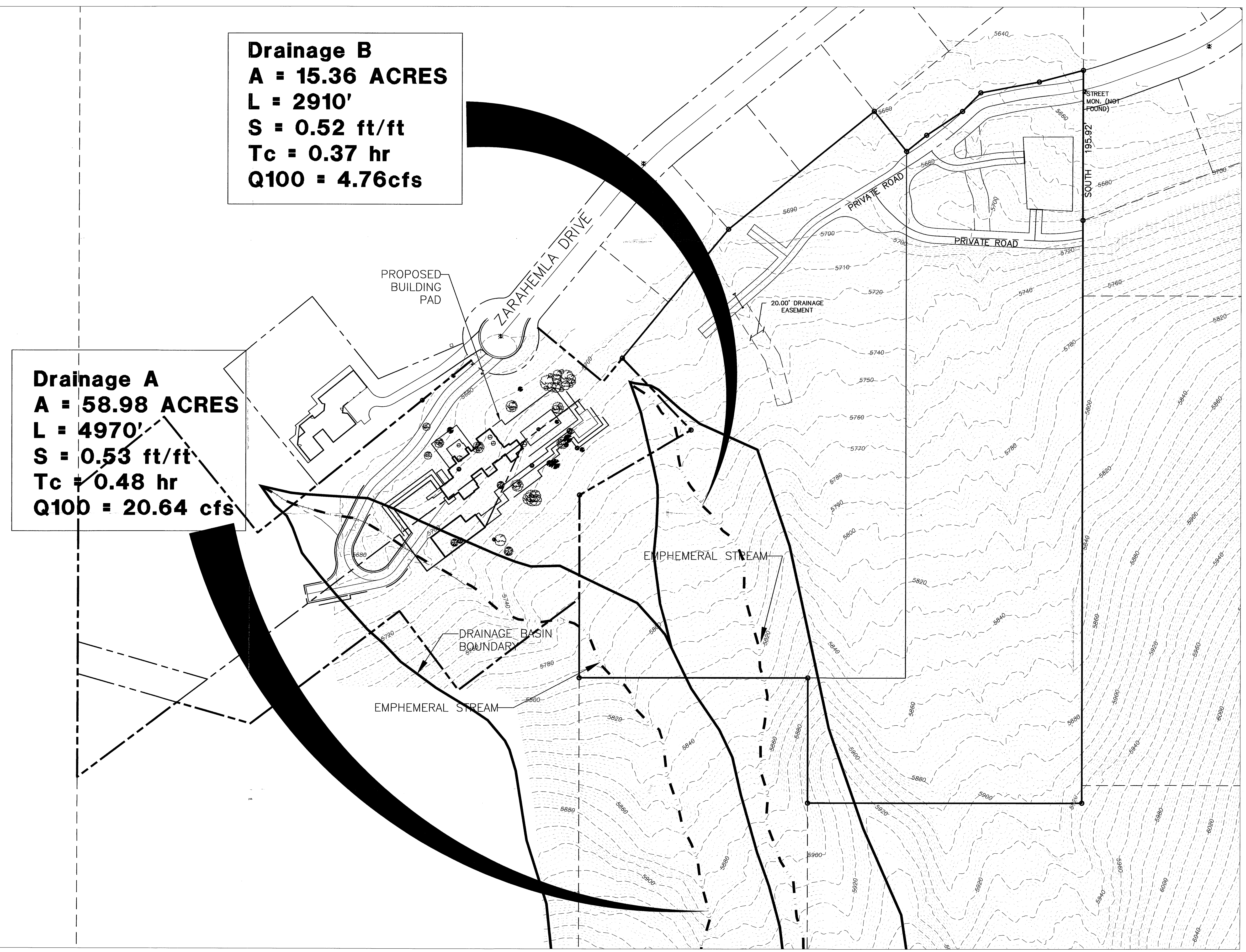
Conclusion

It is our conclusion that the proposed buildable area as shown in the "Proposed Site Exhibit" will not create any negative impacts on the existing drainages or impact any downstream drainage causing flooding problems. In addition, by adhering to proper erosion control practices there shall be no disturbances to the ephemeral streams during any construction activities. The proposed ephemeral stream crossings are to be constructed from bottomless culverts, which will not disrupt these natural drainage paths. By implementing proper grading, landscaping and other approved BMPs, any increase in runoff shall be treated on site before entering any ephemeral stream channels. It is the Jack Johnson Company's intent to maintain the natural surroundings of this area wherever possible and to provide a site plan that meets the design standards of the Foothills and Canyons Overlay Zone as detailed in the Salt Lake County Development Code.



Drainage B
A = 15.36 ACRES
L = 2910'
S = 0.52 ft/ft
Tc = 0.37 hr
Q100 = 4.76cfs

Drainage A
A = 58.98 ACRES
L = 4970'
S = 0.53 ft/ft
Tc = 0.48 hr
Q100 = 20.64 cfs



North arrow pointing up with the letter 'N'.

Graphic scale bar showing 0, 30, 60, 120, and 180 feet.

1"=60'

NOTE: 11X17 PRINTS ARE 2X THE PRINTED SCALE

NOTICE TO CONTRACTORS

IT SHALL BE THE RESPONSIBILITY OF CONTRACTOR TO CONTACT 'BLUE STAKES' UTILITY LOCATION CENTER AT 1-800-662-4111, AT LEAST TWO WORKING DAYS PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION ACTIVITIES.

JACK JOHNSON COMPANY

Designing World Destinations

In-Person - 1777 Sun Peak Drive - Park City - Utah 84098
Telephone - 435.645.9000 - Facsimile - 435.649.1620
www.jackjohnson.com

DATE:	MARCH 20, 2007
DESIGNED BY:	SPW/JEW
DRAWN BY:	JEW
REVIEWED BY:	O. RICHARD BENHAM
PROJECT:	0706.0107.00
ISSUE:	FCOZ SUBMITTAL

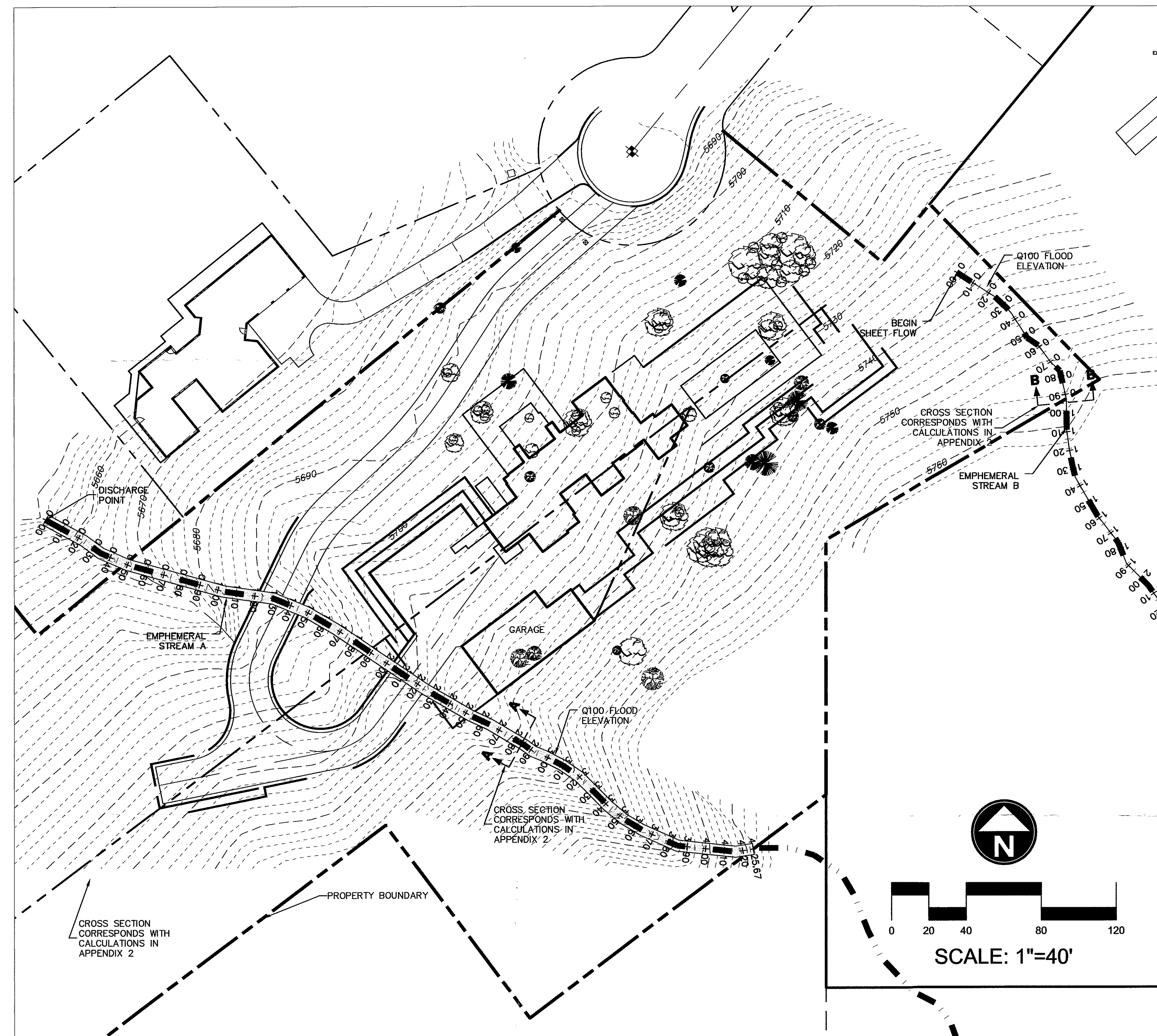
REVISIONS

TOLTON RESIDENCE
OLYMPUS COVE

HYDROLOGY STUDY

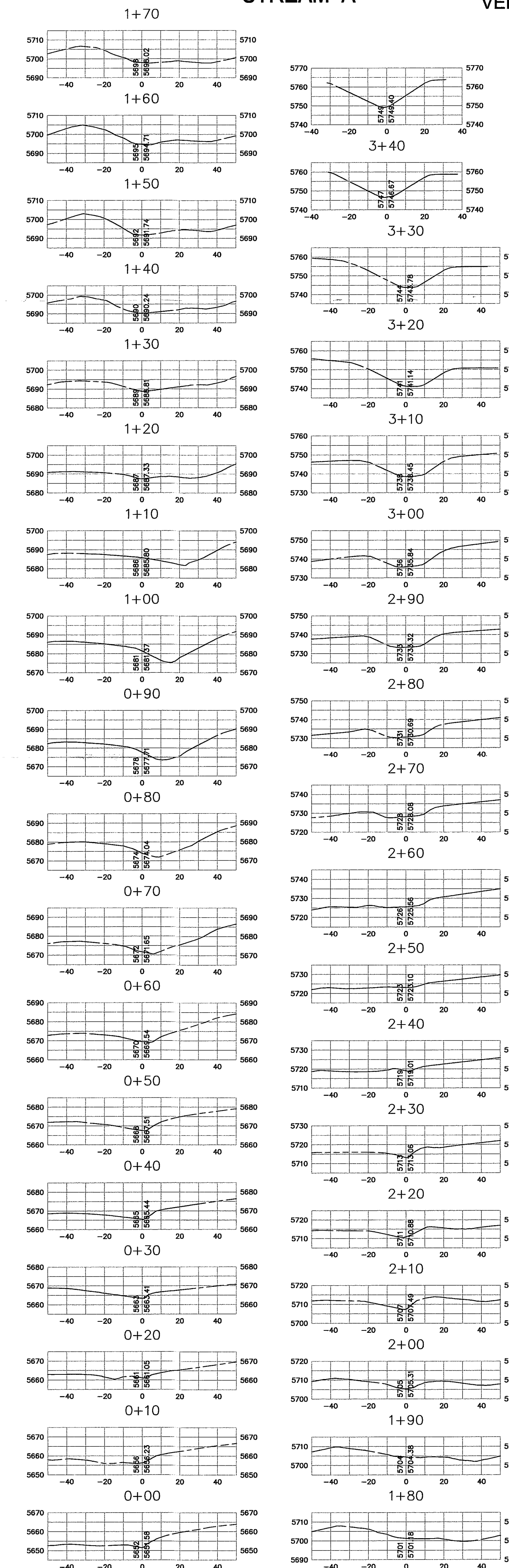
DRAINAGE AREA EXHIBIT

1 OF 3

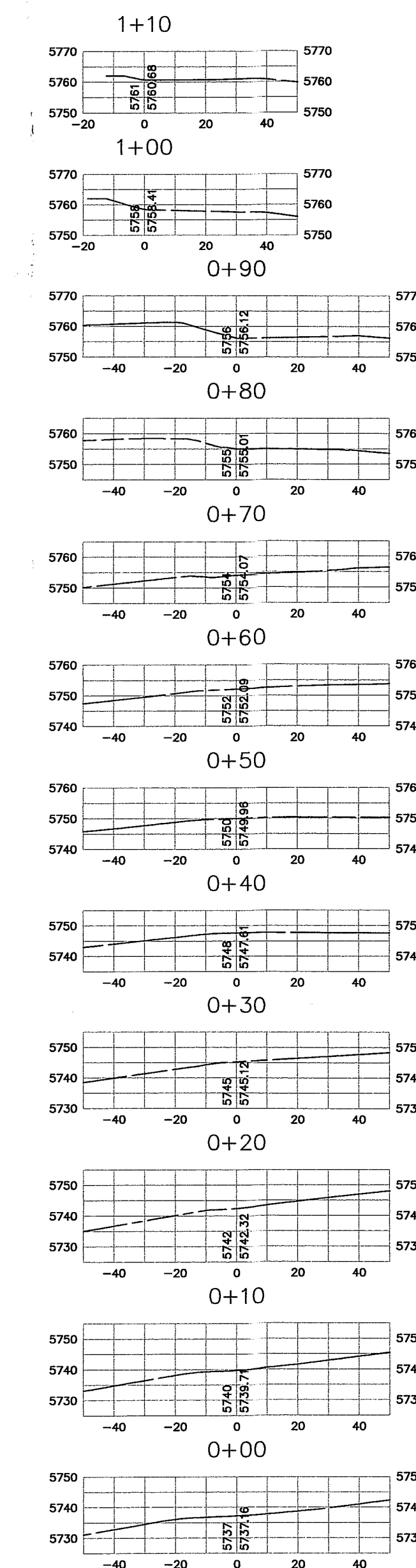


EPHEMERAL STREAM A

HORIZONTAL SCALE:
1"=40'
VERTICAL SCALE:
1"=40'



EPHEMERAL STREAM B



OLYMPUS HILLS TOLTON LOT - EPHEMERAL STREAM CROSS SECTIONS

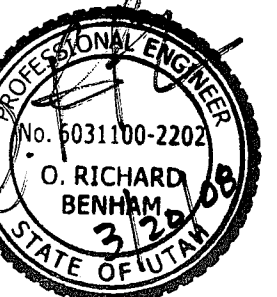
CALL BEFORE YOU DIG.
IT'S FREE &
IT'S THE LAW.
1-800-662-4111
208-2100
140 EAST 1300 SOUTH
SALT LAKE CITY, UT 84115



JACK JOHNSON COMPANY

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Telephone - 435.645.9000 - Facsimile - 435.649.1620
www.jackjohnson.com

DATE: MARCH 20, 2008
DESIGNED BY: JEAN
DRAWN BY: JEAN
REVIEWED BY: O. RICHARD
PROJECT: 706.0107.00
ISSUE: FCOZ SUBMITTAL



REVISIONS

TOLTON
RESIDENCE
OLYMPUS HILLS

EPHEMERAL
STREAM
CROSS SECTIONS

2 OF 3

path: K:\VBA Tolton\Engineering\04_Engineering\Hydrology\
file name: TOLTON EPHEMERAL STREAM CROSS SECTIONS.dwg | job date: March 19, 2008 | plotted by: jackie

**Olympus Cove
Salt Lake City, Utah
Runoff Calculations
11-08-07**

10-yr Rational Method Calculations - DRAINAGE AREA #A

C= 0.25 dimensionless, weighted Rational Method runoff coefficient
 I= 0.69 inches/hour
 A= 58.98 acres
 Q_{PEAK}= 10.17 cfs, peak developed runoff

 L= 4968 ft, overland flow length, longest path to discharge point
 S= 53.00 %, average slope along L

 T_C= 28.71 minutes, per FAA overland flow method

Desc	Acres	C
Pavement	0.000	0.95
Roofs	0.000	0.85
Graded	0.000	0.45
Woodland	58.980	0.25
Total	58.980	0.25

Time (min)	Ave Intensity (in/hr)
15	0.53
28.71	0.69
30	0.71

<< NOAA 14 Precipitation
 << Linear Interpolation
 << NOAA 14 Precipitation

100-yr, Rational Method Calculations - DRAINAGE AREA #A

C= 0.25 dimensionless, weighted Rational Method runoff coefficient
 I= 1.40 inches/hour
 A= 58.98 acres
 Q_{PEAK}= 20.64 cfs, peak developed runoff

 L= 4968 ft, overland flow length, longest path to discharge point
 S= 53.00 %, average slope along L

 T_C= 28.71 minutes, per FAA overland flow method

Desc	Acres	C
Pavement	0.000	0.95
Roofs	0.000	0.85
Graded	0.000	0.45
Woodland	58.980	0.25
Total	58.980	0.25

Time (min)	Ave Intensity (in/hr)
15	1.06
28.71	1.40
30	1.43

<< NOAA 14 Precipitation
 << Linear Interpolation
 << NOAA 14 Precipitation



**Olympus Cove
Salt Lake City, Utah
Runoff Calculations
11-08-07**

10-yr, Rational Method Calculations - DRAINAGE AREA #B

C= 0.25 dimensionless, weighted Rational Method runoff coefficient
 I= 0.62 inches/hour
 A= 15.77 acres
 Q_{PEAK}= 2.44 cfs, peak developed runoff

L= 3040 ft, overland flow length, longest path to discharge point
 S= 52.00 %, average slope along L

T_C= 22.60 minutes, per FAA overland flow method

Desc	Acres	C
Pavement	0.000	0.95
Roofs	0.000	0.85
Graded	0.000	0.45
Woodland	15.770	0.25
Total	15.770	0.25

Time (min)	Ave Intensity (in/hr)
15	0.53
22.60	0.62
30	0.71

<< NOAA 14 Precipitation
 << Linear Interpolation
 << NOAA 14 Precipitation

100-yr, Rational Method Calculations - DRAINAGE AREA#B

C= 0.25 dimensionless, weighted Rational Method runoff coefficient
 I= 1.24 inches/hour
 A= 15.36 acres
 Q_{PEAK}= 4.76 cfs, peak developed runoff

L= 2910 ft, overland flow length, longest path to discharge point
 S= 52.00 %, average slope along L

T_C= 22.11 minutes, per FAA overland flow method

Desc	Acres	C
Pavement	0.000	0.95
Roofs	0.000	0.85
Graded	0.000	0.45
Woodland	15.360	0.25
Total	15.360	0.25

Time (min)	Ave Intensity (in/hr)
15	1.06
22.11	1.24
30	1.43

<< NOAA 14 Precipitation
 << Linear Interpolation
 << NOAA 14 Precipitation



Project Description

Manning Formula

Normal Depth

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.63
0+10	3.33
0+20	2.87
0+30	2.54
0+40	2.92
0+50	1.49
0+60	6.99
0+70	9.62
0+80	11.29
0+90	12.87
1+00	13.88

Roughness Coefficient

(0+00, 2.63)	(0+10, 3.33)	0.035
(0+10, 3.33)	(0+20, 2.87)	0.035
(0+20, 2.87)	(0+30, 2.54)	0.035
(0+30, 2.54)	(0+40, 2.92)	0.035
(0+40, 2.92)	(0+50, 1.49)	0.035
(0+50, 1.49)	(0+60, 6.99)	0.045
(0+60, 6.99)	(0+70, 9.62)	0.035
(0+70, 9.62)	(0+80, 11.29)	0.035
(0+80, 11.29)	(0+90, 12.87)	0.035
(0+90, 12.87)	(1+00, 13.88)	0.035

Worksheet for Irregular Section A-A

Results

Normal Depth		0.68	ft
Elevation Range	1.49 to 13.88	ft	
Flow Area		1.99	ft ²
Wetted Perimeter		6.07	ft
Top Width		5.85	ft
Normal Depth		0.68	ft
Critical Depth		1.14	ft
Critical Slope		0.02912	ft/ft
Velocity		10.28	ft/s
Velocity Head		1.64	ft
Specific Energy		2.32	ft
Froude Number		3.11	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.68	ft
Critical Depth	1.14	ft
Channel Slope	0.30000	ft/ft
Critical Slope	0.02912	ft/ft

Cross Section for Irregular Section A-A

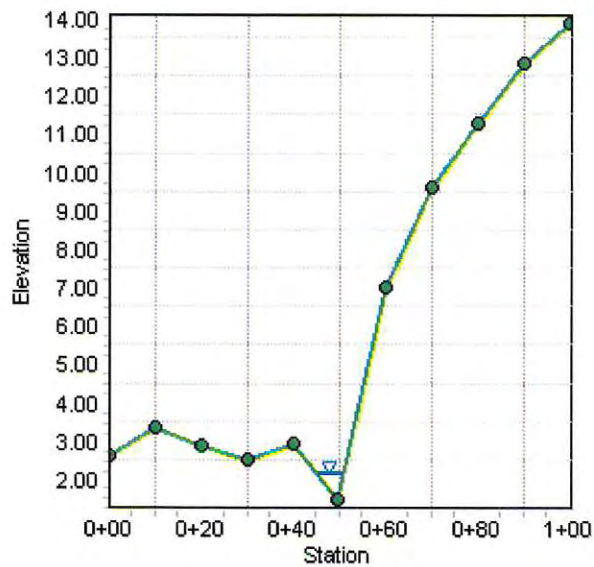
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.30000	ft/ft
Normal Depth	0.68	ft
Discharge	20.44	ft ³ /s

Cross Section Image



Worksheet for Irregular Section B-B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.22000	ft/ft
Discharge	4.76	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	1.19
0+10	1.92
0+20	1.67
0+30	1.45
0+40	1.24
0+50	1.12
0+60	3.81
0+70	6.23
0+80	6.05
0+90	5.68
1+00	5.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.19)	(0+20, 1.67)	0.035
(0+20, 1.67)	(0+30, 1.45)	0.035
(0+30, 1.45)	(0+40, 1.24)	0.035
(0+40, 1.24)	(0+50, 1.12)	0.040
(0+50, 1.12)	(0+60, 3.81)	0.040
(0+60, 3.81)	(0+70, 6.23)	0.040
(0+70, 6.23)	(0+80, 6.05)	0.035
(0+80, 6.05)	(0+90, 5.68)	0.035
(0+90, 5.68)	(1+00, 5.31)	0.035

Worksheet for Irregular Section B-B

Results

Normal Depth		0.17	ft
Elevation Range	1.12 to 6.23 ft		
Flow Area		1.32	ft ²
Wetted Perimeter		14.67	ft
Top Width		14.54	ft
Normal Depth		0.17	ft
Critical Depth		0.24	ft
Critical Slope		0.04410	ft/ft
Velocity		3.62	ft/s
Velocity Head		0.20	ft
Specific Energy		0.38	ft
Froude Number		2.12	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.24	ft
Channel Slope	0.22000	ft/ft
Critical Slope	0.04410	ft/ft

Cross Section for Irregular Section B-B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.22000	ft/ft
Normal Depth	0.17	ft
Discharge	4.76	ft ³ /s

Cross Section Image

