



**MONTGOMERY**  
ENGINEERING & MANAGEMENT, L.L.C.

# **PRELIMINARY DRAINAGE REPORT**

**CAMELBACK LANDS 7**

**5307 N. INVERGORDON ROAD  
PARADISE VALLEY, ARIZONA**

**MAY 23, 2019  
REVISION 2**

**Benchmark: Brass cap in hand hold at the intersection of  
Invergordon Road and Jackrabbit Road  
Elevation 1375.831 (NAVD '88) GDAC #24555-1**



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## 2.0 INTRODUCTION

This report was prepared to determine drainage paths and high-water elevations based on the 100-year rainfall for Camelback Lands 7, a replat of Camelback Lands Lot 81, splitting the current lot into two lots. The current address is 5307 N. Invergordon Road, Paradise Valley, Arizona located in a residential area zoned R-43. See Appendix A for vicinity map.

The parent lot is 2.24 acres in size with proposed lots of 1.12 acres each. The existing residence, guest house and tennis court will be demolished. The proposed lots are for residential development at a future date by others with this report addressing methods to maintain the runoff entrance and exit locations at historic locations. Camelback Lands was platted in 1945 with no drainage easements on the plat.

Historically, runoff from Camelback Mountain did not appear to have any significant flows onto the lot based on Maricopa County aerial photographs from 1949. No contour maps from that time period were found. A 1961 aerial photograph shows Sage Drive developed west of Invergordon Road and current contours show significant runoff from Sage Drive entering Invergordon Road with a large flow over-topping the curb and sidewalk and entering the west side of lot 81. Since we have no knowledge of what took place between 1945 and 1961, this replat will treat runoff from Sage Drive entering the west side of lot 81 as a historical condition for this inlet location. The only drainage exit point on this site is at the southeast corner of the lot. The north and east side have existing walls with no drain openings. The lot need to be designed for current conditions. See Appendix E for prints of historical photographs. To mitigate the offsite runoff, a drainage channel is proposed to route runoff to the southwest corner where current runoff exits lot 81.

## 3.0 FEMA FLOODPLAIN CLASSIFICATION

This site is located in FEMA flood zone 'X' per flood map 04013C, panel 1765L, dated 10-16-2013. See Appendix B for a FIRM map showing the floodplain classification.

## 4.0 PURPOSE

This Drainage Report has been prepared to meet Paradise Valley requirements in accordance with the Paradise Valley Storm Drainage Manual plus noted portions of the Maricopa County Drainage Policies and Standards, Drainage Design Manuals for Maricopa County, (MCDDM) Volume 1 – Hydrology and Volume 2 – Hydraulics. This report will determine the 100-year runoff for sizing culverts retention and drainage easement locations.

The following pages show calculations for the 100-year runoff, a proposed drainage channel and high-water elevations. Retention for future custom home development will be provided at the time of permitting for the residence and is not part of this report. No retention is required for this lot split.

## 5.0 OFF-SITE DRAINAGE DESCRIPTION

Offsite runoff is divided into two Watershed Basins (WB) as shown on the watershed exhibit in Appendix I. WB 'A' begins at a ridge on Camelback Mountain and flows easterly to the subject lot. Terrain consists of steep mountain grades to developed residential land. WB 'B' begins in a residential area below the steep mountain terrain that drains easterly to the subject lot. Terrain is developed residential land with desert landscape.

WB 'A' drains 46 acres having a 100-year runoff of 213 cfs and 'B' drains 10 acres having a 100-year runoff of 35 cfs. WB 'A' splits at Invergordon Road with a street capacity of 26 cfs flowing full, leaving 187 cfs overtopping the east curb onto lot 81. WB 'B' drains to an existing pipe-arch culvert under Invergordon Road to an outlet began just south of lot 81 to a rock-lined channel.

## 6.0 ON-SITE DRAINAGE DESCRIPTION

The existing lot is fenced at the north and west side with the only outlet available at the southeast corner. Runoff of 187 cfs from WB 'A' that overtops the curb along Invergordon Road currently sheet flows onto lot 81 near the south end of an existing tennis court. The land generally slopes down from Invergordon Road to the southeast corner of the lot. Since this runoff path does not appear in the 1949 aerial photograph and the lot was previously developed and graded, there is no large drainage channel for the flow across this lot. There are two minor drainage swells that flow to the southeast corner of the lot.

South of lot 81, on lots 79 and 80 of Camelback Lands, there is an existing trash rack at a 45-degree angle to the south boundary that is an inlet to a gap between two fences with two existing 6.67' wide by 1.33' high drain openings directing runoff onto said lot 79 to the east. This inlet also accepts runoff from WB that flows along the north side of lot 80 in a rock-lined channel with an existing fence along the south side of the channel. Runoff will pond at the outlet openings that are undersized. Appendix D, outlet orifice calculations, show runoff will pond to elevation 1374.31 with runoff flowing at 12.5 fps at the existing outlet openings. The downstream property has a visible drainage channel that based on visual observation only and no calculations, appears to be undersized for current 100-year flows calculated. The openings are not on the subject property and not within the scope of this report. A drainage easement will be added where the runoff flows across lot 81.

Since runoff from WB 'A' will sheet flow onto lot 81 and spread across most of the lot due to no well-defined drainage paths, it is proposed to provide a drainage channel with the replat to establish the drainage path with a proposed drainage easement. The construction of the channel may be phased to a future date subject to an assurance agreement. The proposed channel will be wide at the western end and to funnel runoff to a trapezoid channel with 4:1 side slopes a berm 8' wide on either side to contain the runoff. Gabions are proposed where a bank is not possible.

## 7.0 SPECIAL CONDITIONS

The existing lot was previously developed with no well-defined washes on-site and no 404 washes. Stormwater Pollution Prevention Plan with NOI and dust control permits are required. Phasing of the drainage channel is proposed with an assurance to be provided.

## 8.0 HYDROLOGY METHODS

Runoff was calculated using the rational Method and the Maricopa County Drainage program for the Retention Method with watershed areas determined using Maricopa County Aerial Contour Maps, see Appendix C for Rational calculations and Appendix I for a watershed exhibit. WB 'A' runoff is 213 cfs and WB 'B' is 35 cfs for the 100-year event. Post vs. pre-runoff will not increase from this project due to no development.

## 9.0 HYDRAULICS METHODS

Studio Express computer program using the manning's equation was used to calculate the high-water elevations at section locations shown on the Paving, Grading and Drainage plan (see Appendix J) with Studio Express Calculations in Appendix D.

## 10.0 STORMWATER RETENTION

Retention is not required for this split with no development other than drainage improvements. Future development will need to provide required retention due to impervious surfaces.

## 11.0 FINISH FLOOR ELEVATION REQUIREMENTS

Finish Floor elevations are not a part of this report. Plans for the custom homes will be required to provide finish floor protection a minimum of 1 foot above the high-water elevation and highest adjacent grade, whichever is highest plus all regulations in affect at that time.

## 12.0 SEDIMENTATION AND EROSION HAZARDS

The proposed channel will be lined with rip-rap.

## 13.0 CONCLUSIONS AND RECOMMENDATIONS

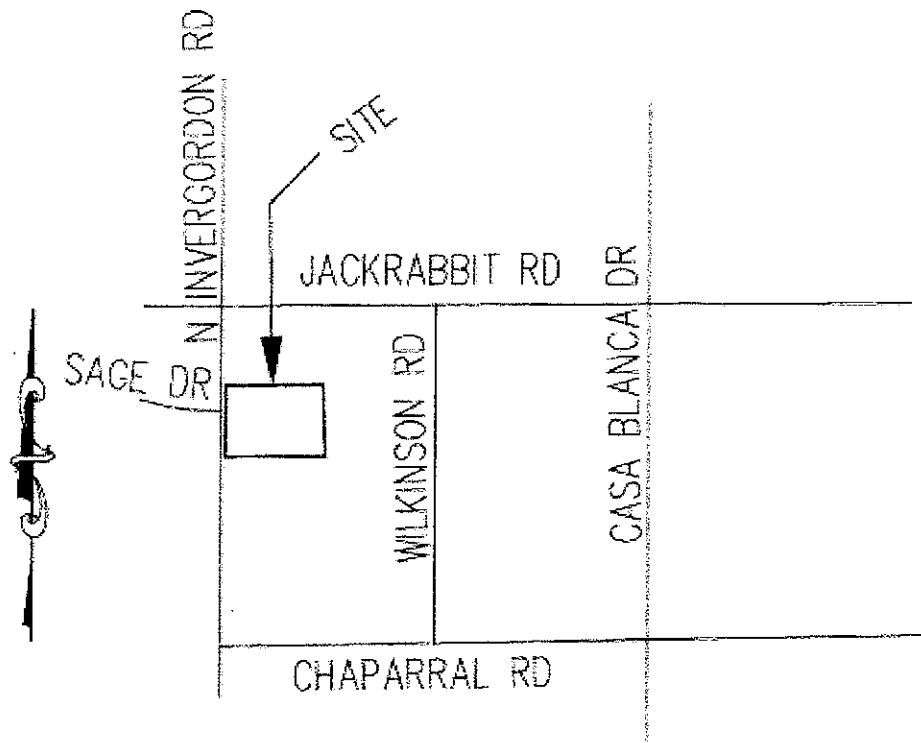
In summary, runoff from Sage Drive overtopping the east Invergordon Road curb onto this site will be routed to the southeast corner via an open drainage channel with a drainage easement at areas inundated during the 100-year event. Runoff in the channel south of lot 81 that over-tops onto lot 81 will have a drainage easement for inundated areas from over-topping and outlet ponding onto lot 81. This design is for current flows with no improvements to areas off-site which are private property. The current channel south of lot 81 and outlet at the northwest corner of the adjacent lot 79 are under- sized for current design flows and are not within the scope of work for this report and project.

## APPENDIX A



# EXHIBIT A

## Location of the Two Lots



## VICINITY MAP

NO SCALE

## APPENDIX B

# National Flood Hazard Layer FIRMette



Index Date: NOV. 9, 2015

## Legend

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

**SPECIAL FLOOD HAZARD AREAS**

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

0.2% Annual Chance Flood Hazard. Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X

Future Conditions 1% Annual Chance Flood Hazard Zone X  
Area with Reduced Flood Risk due to Levee. See Notes. Zone X  
Area with Flood Risk due to Levee Zone D

## OTHER AREAS OF FLOOD HAZARD

Area of Minimal Flood Hazard Zone X  
Effective LOMRs

## OTHER AREAS

## GENERAL STRUCTURES

Channel, Culvert, or Storm Sewer  
Levee, Dike, or Floodwall

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

## OTHER FEATURES

Digital Data Available  
No Digital Data Available  
Unmapped

## MAP PANELS



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2018 at 1:29:36 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



USGS The National Map, Orthoimagery, Data refreshed October 2017



## APPENDIX C

Flood Control District of Maricopa County  
Drainage Design Management System  
SUB BASINS

Project Reference: CAMELBACK LANDS LOT

Page 1

10/24/2018

ID	Sub Basin Data						Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01												
A	46.0	4,590	2,492.00	1,378.00	1,281.5	0.030	Q (cfs) C  CA (ac) Volume (ac-ft) Tc (min) i (in/hr)	89.4 0.65 29.90 1,6439 10 2.99	107.6 0.65 29.90 1,9786 10 3.60	144.4 0.71 32.66 2,6553 10 4.42	185.8 0.80 36.80 3,4166 10 5.05	212.4 0.81 37.26 3,9057 10 5.70
B	10.0	1,730	1,474.00	1,376.00	299.1	0.034	Q (cfs) C  CA (ac) Volume (ac-ft) Tc (min) i (in/hr)	14.4 0.48 4.80 0.2648 10 2.99	17.3 0.48 4.80 0.3181 10 3.60	23.4 0.53 5.30 0.4303 10 4.42	29.3 0.58 5.80 0.5388 10 5.05	34.2 0.60 6.00 0.6289 10 5.70

Flood Control District of Maricopa County  
Drainage Design Management System  
LAND USE

Page 1

10/24/2018

Project Reference: CAMELBACK LANDS LOT

Sub Basin	Land Use Code	Area (acres)	Area (%)	Kb	Runoff Coefficient C					Description	
					2 Year	5 Year	10 Year	25 Year	50 Year		100 Year
Major Basin ID: 01											
A	130	24.00	52.2	0.030	0.80*	0.80*	0.80*	0.88*	0.95*	0.95*	Large Lot Residential - Single Family (1 du per acre to 2 du
	130	22.00	47.8	0.030	0.48	0.48	0.48	0.53	0.63*	0.65*	Large Lot Residential - Single Family (1 du per acre to 2 du
			46.000	100.0							
B	130	10.00	100.0	0.034	0.48	0.48	0.48	0.53	0.58	0.60	Large Lot Residential - Single Family (1 du per acre to 2 du
		10.000	100.0								

Flood Control District of Maricopa County  
 Drainage Design Management System  
 RAINFALL DATA  
 Project Reference: CAMELBACK LANDS LOT

Page 1

10/24/2018

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.241	0.328	0.394	0.484	0.553	0.624
	NOAA14	10 MIN	0.367	0.499	0.600	0.737	0.842	0.950
	NOAA14	15 MIN	0.455	0.619	0.743	0.913	1.044	1.177
	NOAA14	30 MIN	0.612	0.833	1.001	1.230	1.406	1.585
	NOAA14	1 HOUR	0.758	1.031	1.239	1.522	1.740	1.962
	NOAA14	2 HOUR	0.872	1.166	1.391	1.698	1.933	2.177
	NOAA14	3 HOUR	0.944	1.239	1.473	1.802	2.063	2.336
	NOAA14	6 HOUR	1.122	1.439	1.690	2.034	2.303	2.583
	NOAA14	12 HOUR	1.250	1.585	1.847	2.201	2.471	2.751
	NOAA14	24 HOUR	1.499	1.943	2.295	2.782	3.166	3.568

## APPENDIX D



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

10-30-2018

## SEC A

## Channel 1

### USER-DEFINED

Total Depth = 0.97 ft  
Invert Elevation = 1378.23 ft  
Channel Slope = 0.580 %  
Manning's n = Composite

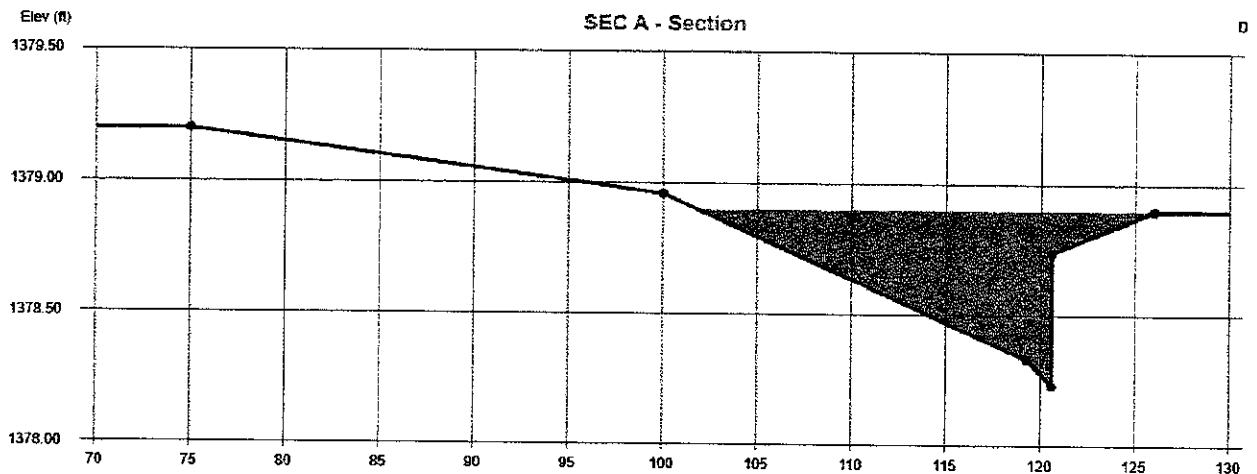
### DISCHARGE

Method = Known Depth  
known Depth = 0.67 ft

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
13.46	0.67	6.22	2.17	24.69	0.021	0.61	1378.90	1378.97	0.24	24.16

13.46 x 2 sides = 26 cfs in street flowing south  
213 cfs - 26 cfs = 187 cfs over the curb



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

10-30-2018

## SEC B

## Channel 2

### USER-DEFINED

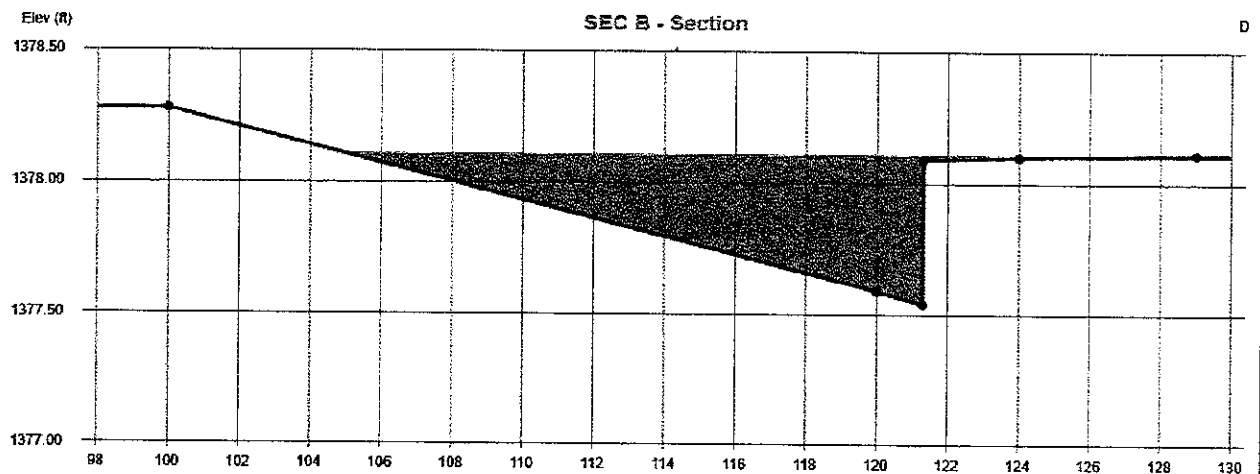
Total Depth = 0.74 ft  
Invert Elevation = 1377.54 ft  
Channel Slope = 0.600 %  
Manning's n = Composite

### DISCHARGE

Method = Known Depth  
known Depth = 0.57 ft

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
9.67	0.57	4.69	2.06	24.63	0.018	0.50	1378.11	1378.18	0.21	24.07



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

## SEC C

## Channel 6

### USER-DEFINED

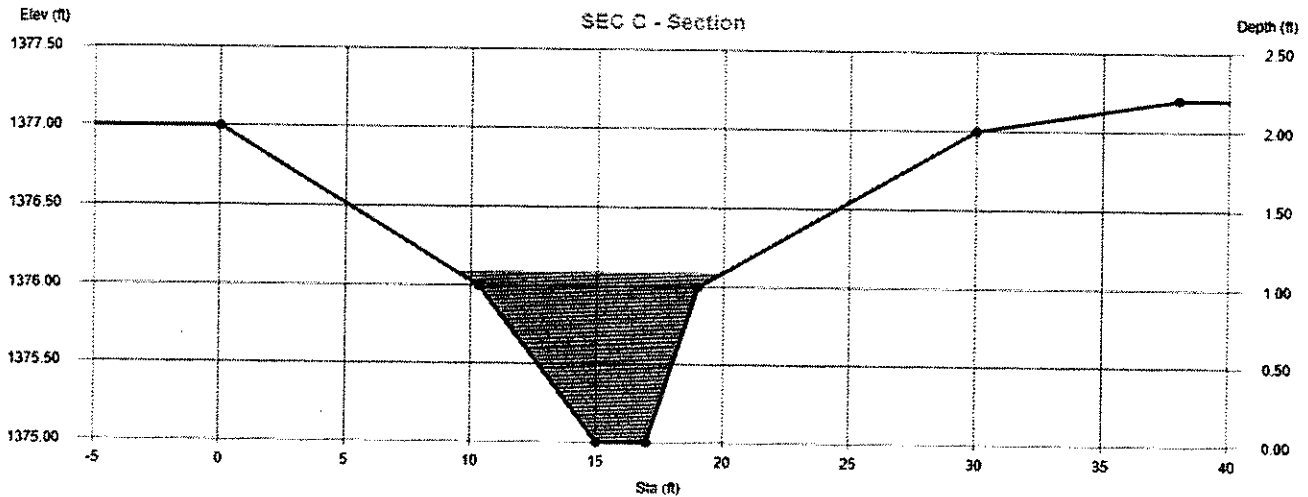
Total Depth = 2.20 ft  
Invert Elevation = 1375.00 ft  
Channel Slope = 5.000 %  
Manning's n = Composite

### DISCHARGE

Method = Known Q  
Known Q = 35.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
35.00	1.09	6.22	5.63	10.97	0.040	1.25	1376.09	1376.58	3.40	10.62



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

## SEC D

## Channel 7

### USER-DEFINED

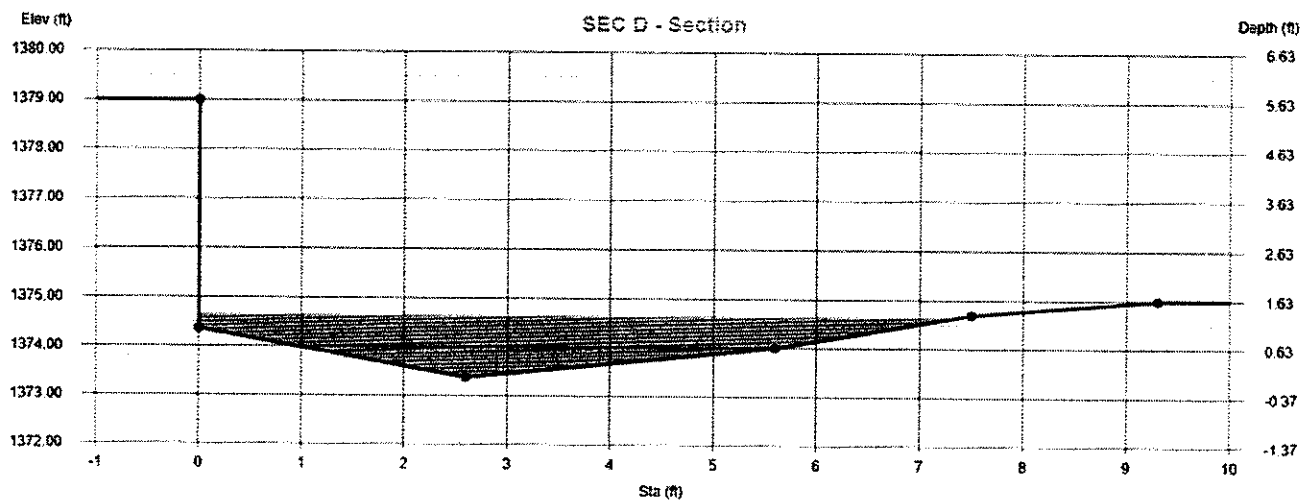
Total Depth = 5.63 ft  
Invert Elevation = 1373.37 ft  
Channel Slope = 5.000 %  
Manning's n = Composite

### DISCHARGE

Method = Known Q  
Known Q = 35.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
35.00	1.27	5.44	6.44	7.98	0.039	1.45	1374.64	1375.29	3.96	7.34



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

## SEC E

## Channel 8

### USER-DEFINED

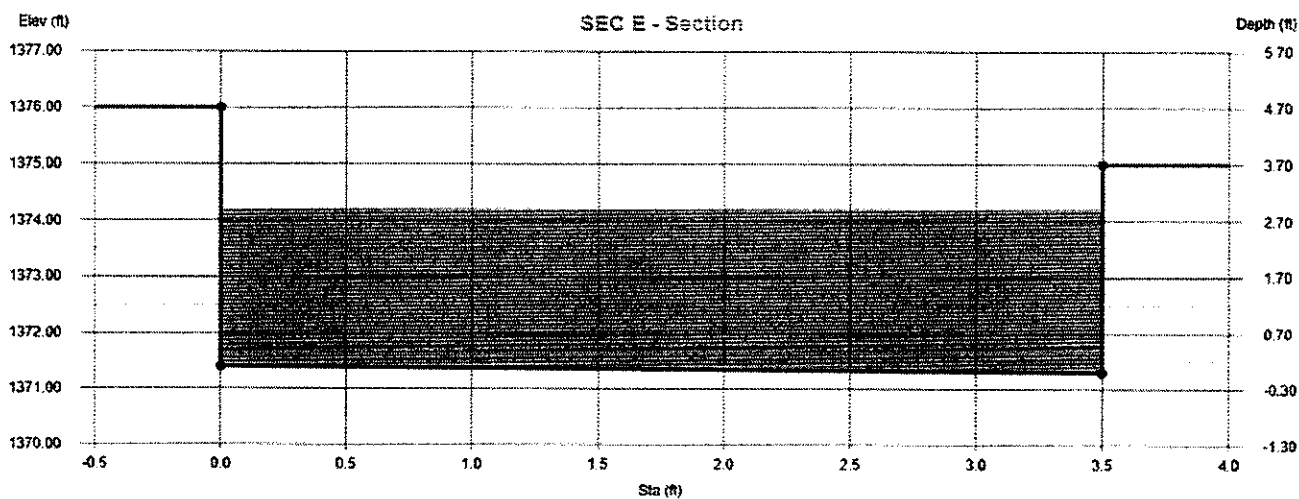
Total Depth = 4.70 ft  
Invert Elevation = 1371.30 ft  
Channel Slope = 0.800 %  
Manning's n = Composite

### DISCHARGE

Method = Known Q  
Known Q = 35.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
35.00	2.90	9.98	3.51	9.20	0.040	1.51	1374.20	1374.39	1.45	3.50



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

sc f

## Channel 9

### USER-DEFINED

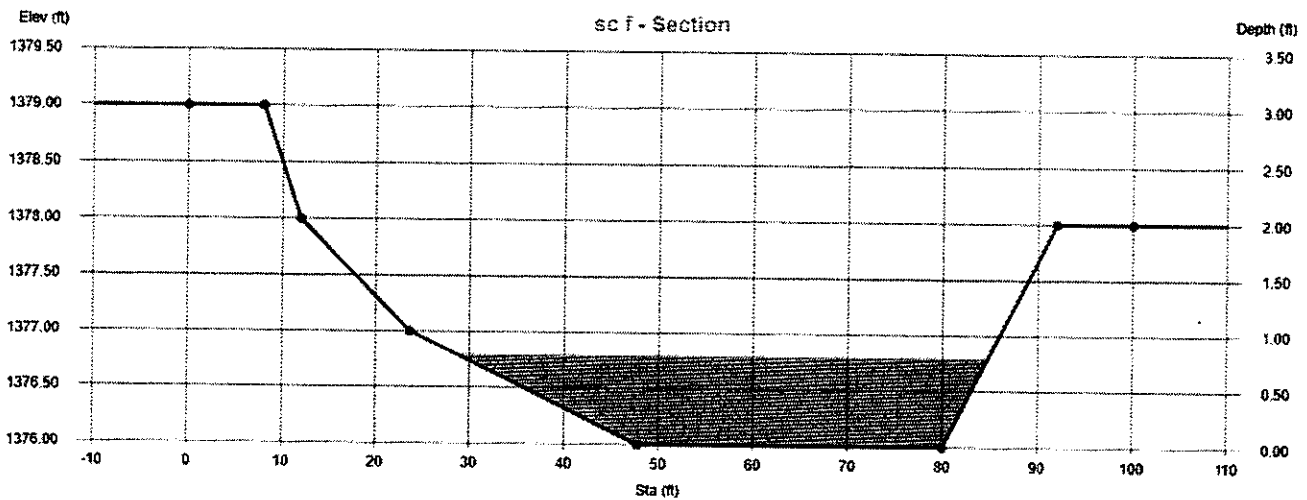
Total Depth = 3.00 ft  
Invert Elevation = 1376.00 ft  
Channel Slope = 5.000 %  
Manning's n = Composite

### DISCHARGE

Method = Known Q  
Known Q = 187.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
187.00	0.79	34.86	5.36	56.14	0.045	0.88	1376.79	1377.24	2.46	56.06



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

## 187 CFS CHANNEL SEC 'G'

## Channel 3

### TRAPEZOIDAL

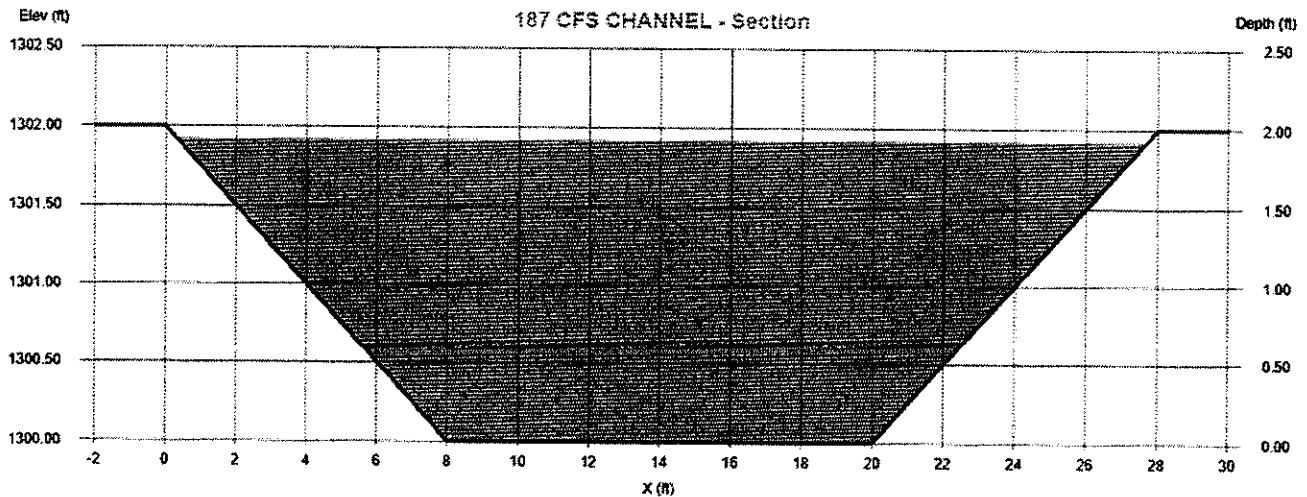
Bottom Width = 12.00 ft  
Side Slope Left, z:1 = 4.00  
Side Slope Right, z:1 = 4.00  
Total Depth = 2.00 ft  
Invert Elevation = 1300.00 ft  
Channel Slope = 1.500 %  
Manning's n = 0.045

### DISCHARGE

Method = Known Q  
Known Q = 187.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)		(ft)	(ft)	(ft)	(lb/sqft)	(ft)
187.00	1.92	37.79	4.95	27.83	0.045	1.63	1301.92	1302.30	1.80	27.36



# Channel Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

02-19-2019

## SEC H

## Channel 10

### USER-DEFINED

Total Depth = 3.50 ft  
Invert Elevation = 1371.00 ft  
Channel Slope = 2.000 %  
Manning's n = Composite

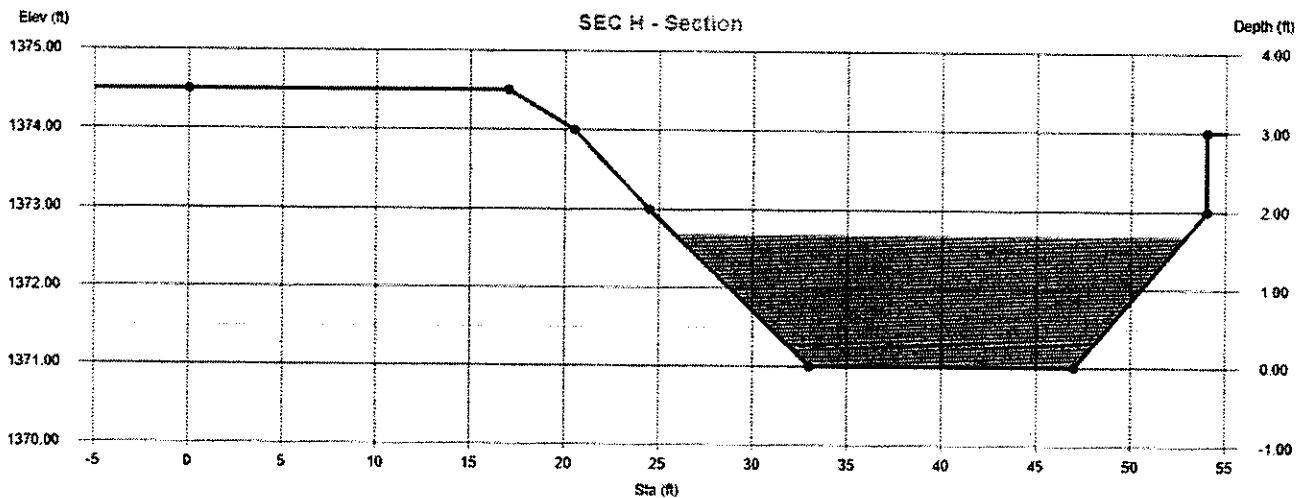
### DISCHARGE

Method = Known Q  
Known Q = 187.00 cfs

### CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	Composite	(ft)	(ft)	(ft)	(lb/sqft)	(ft)
187.00	1.68	34.46	5.43	27.45	0.045	1.53	1372.68	1373.14	2.10	27.02

+ 0.2' super-elev.  
1372.88





# Orifice Report

Project filename: CAMELBACK LANDS LOT 81.stx

Studio Express by Hydrology Studio v 1.0.0.2

12-13-2018

## OUTLET ORIFICE TWO EXIST. FENCE OPENINGS

### Orifice 1

#### RECTANGULAR ORIFICE

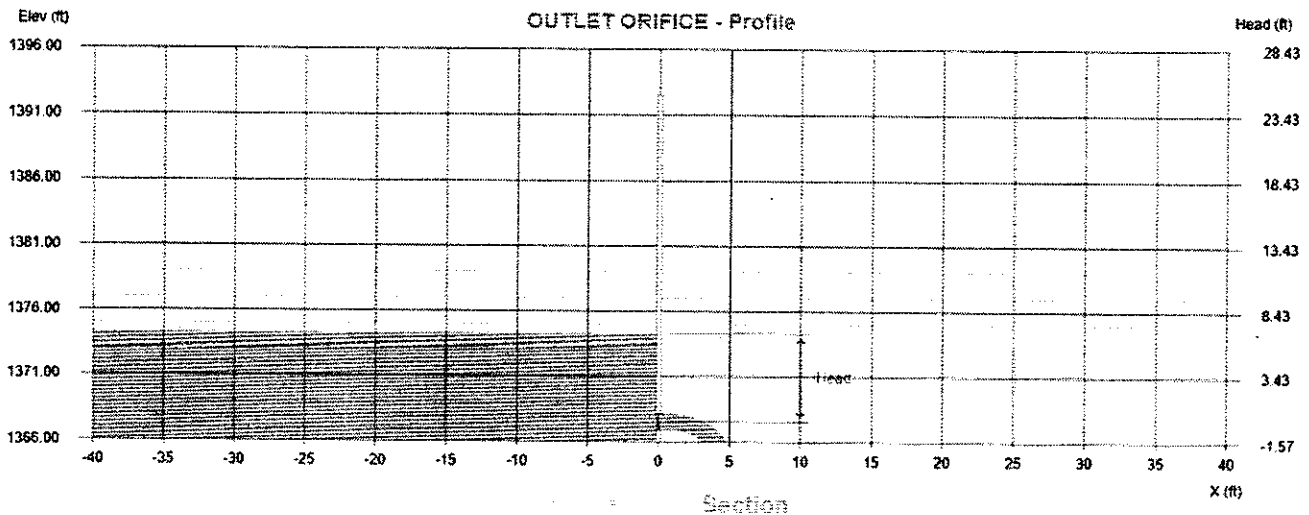
Orifice Rise = 16.00 in  
Orifice Span = 160.00 in  
Centroid Elevation = 1367.57 ft  
Maximum Headwater = 25.00 ft  
Orifice Coefficient,  $C_o = 0.60$

#### DISCHARGE

Method = Known Q  
Known Q = 222.00 cfs

#### CALCULATION SAMPLE

Flow	Head	Area	Velocity	Vel Head	WS Elev				
(cfs)	(ft)	(sqft)	(ft/s)	(ft)	(ft)				
222.000	6.734	17.778	12.488	2.424	1374.304				



## SUPERELEVATION AT CURVE IN OPEN CHANNEL

REFERENCE MARICOPA CO DRAINAGE DESIGN MANUAL HYDRAULICS

$$Y = 0.5 * V * V * T / (32.2 * R_c)$$

Y = SUPERELEVATION INCREASE IN FEET

V = AVERAGE VELOCITY

R<sub>c</sub> = RADIUS AT CENTER OF WASH

T = WIDTH OF FLOW AT TOP

LOCATION	V	T	R <sub>c</sub>	SUPERELEVATION
CURVE 50'R	5	27.4	50	0.2
SEC H CURVE	5.43	27.1	50	0.2

CAMELBACK LANDS LOT 81

FREEBOARD PER MARICOPA COUNTY HYDRAULICS DRAINAGE DESIGN MANUAL

$FB = 0.25(Y=V*V/2*G)$       FORMULA 6-25

Y = DEPTH

V = VELOCITY

g = 32.2 FT/SEC/SEC

DEPTH	VELOCITY	FB
1.68	5.5	0.53743

## APPENDIX E

E Jackrabbi Run

E Jackrabbi Run

E Sage Dr

T2N  
R4E

16

N INVERGORDON RD

S 17E

15

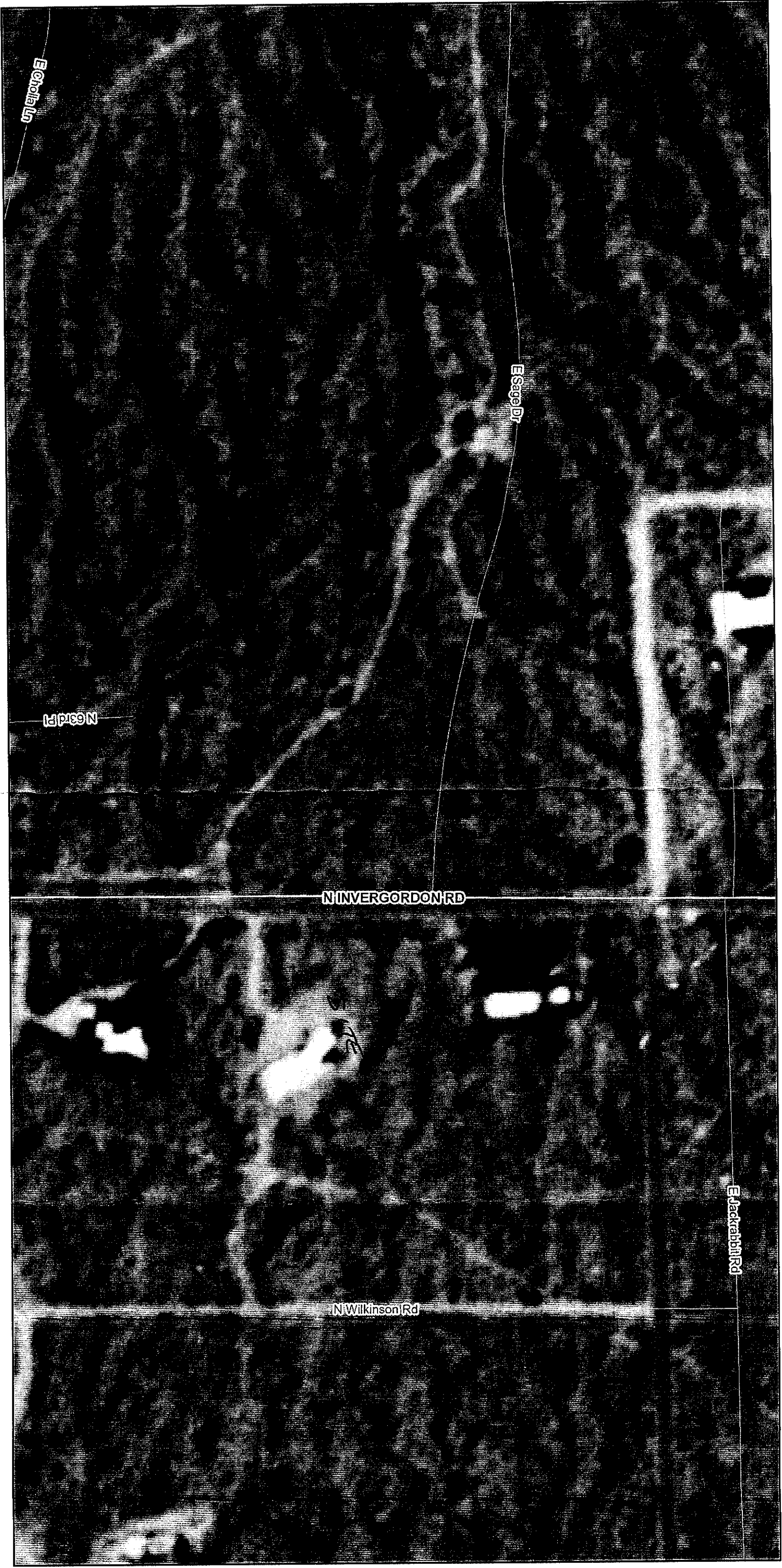
N Wilkinson Rd

N 63rd F

Date of Photography - February 17th, 1949



Historical Aerial Photography



9/18/2018 7:51:51 AM

Maricopa County

Highway

Interstate\State\US\Other Highway

Ramp

Arterial

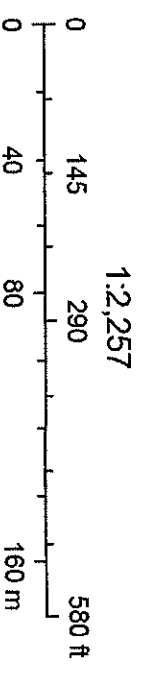
Local

Image

High : 240

Low : 8

1953 MARICOPA COUNTY AERIAL



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

# Historical Aerial Photography



9/18/2018 7:53:27 AM

Maricopa County

Highway

Interstate\State\US\Other Highway

Ramp

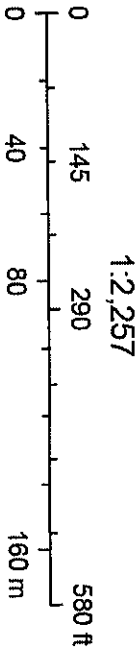
Arterial

Image

High : 255

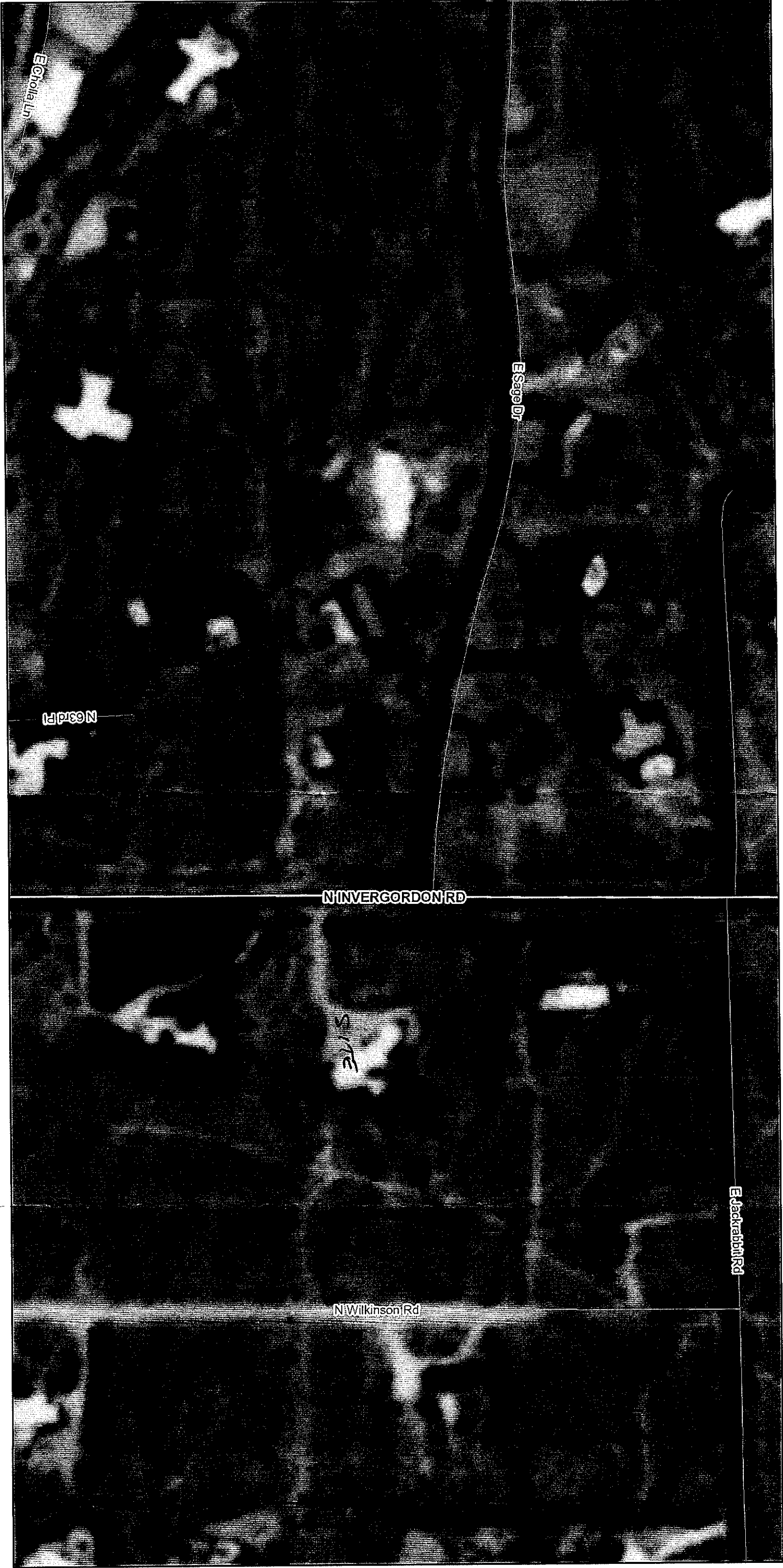
Low : 0

## 1959 MARICOPA COUNTY AERIAL



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

# Historical Aerial Photography



9/18/2018 7:54:49 AM

Maricopa County

Highway

Interstate\State\US\Other Highway

Ramp

Arterial

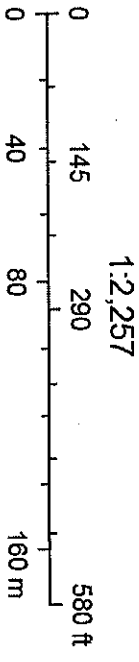
Local

Image

High : 255

Low : 0

## 1961 MARICOPA COUNTY AERIAL



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



Historical Aerial Photography



9/18/2018 7:56:43 AM

Maricopa County

Highway

Interstate\State\US\Other Highway

Ramp

Arterial

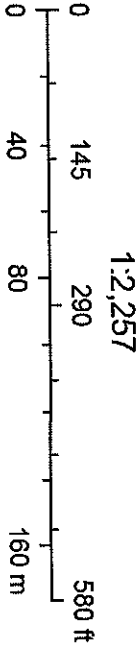
Local

Image

High : 255

Low : 0

1969 MARICOPA COUNTY AERIAL



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

## APPENDIX F

Riprap will be provided to mitigate erosion and sized for the 100-year event.

## APPENDIX G

No retention required for this phase.

## APPENDIX H

# 1-B: WARNING AND DISCLAIMER OF LIABILITY



## WARNING AND DISCLAIMER OF LIABILITY

The Town's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the Town is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

### WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the Town, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

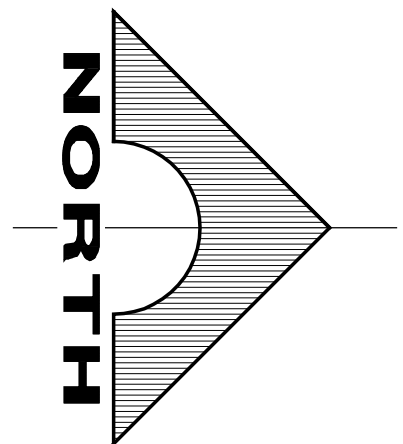
I have read and understand the above.

Plan Check #

Owner

Date





GRAPHIC SCALE  
160 0 80 160 320 640

( IN FEET )  
1 inch = 160 ft.



WATERSHED EXHIBIT  
CAMELBACK LANDS LOT 81  
5307 N. INVERGORDON ROAD, P.V.