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Litchfield Park • Arizona

85340



**PRELIMINARY DRAINAGE REPORT
FOR
TY JENKINS HANGAR
16061 N. 81ST STREET
SCOTTSDALE, ARIZONA 85260**

PREPARED FOR:

**Larson Associates Architects
3807 N. 24th Street Suite 100
Phoenix, Arizona 85016**

**Job Number 24-013
September 30, 2024**

at your service



INTRODUCTION

This Preliminary Drainage Statement addresses the drainage conditions for the Ty Jenkins Hangar project located at 16061 N 81st Street, Scottsdale, Arizona. The property is located within the southwest quarter of Section 1, Township 3 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona. The parcel for the Ty Jenkins Hangar is designated as Lot 34 of the North Scottsdale Airpark Unit 1 subdivision which is on the west side of the Scottsdale Airport runway.

The purpose of this preliminary drainage statement is to document that stormwater runoff has been considered in the planning of a project and that the public and its property will be protected from damage by runoff and flooding from the 100-year flood event. This applies to all properties adjacent to, or potentially impacted by, this development in addition to the property to be developed.

The project was designed in accordance with the 2018 City of Scottsdale Design Standards and Policy Manual.

EXISTING CONDITIONS

The parcel for the Ty Jenkins Hangar is designated as Lot 34 of the North Scottsdale Airpark Unit 1 subdivision recorded in Book 327 of Maps, Page 12 at the Maricopa County Recorder's Office.

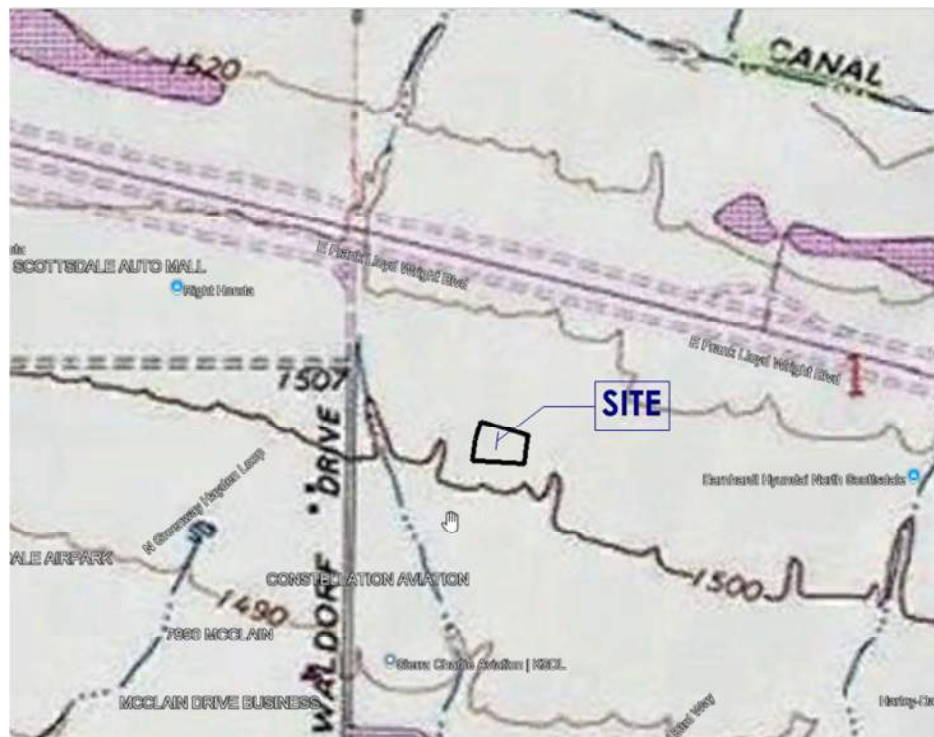
Based on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map Number 04013C1320L dated October 16th, 2013, this site is located in flood zone "dotted X". FEMA defines flood zone "dotted X" as, *"Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot, or drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood."*

The land in the Scottsdale Airpark area drains generally to the southwest. The properties in the North Scottsdale Airpark are required to provide stormwater retention with overflow into either the adjacent street or the adjacent taxiway. The Ty Jenkins Hangar lot is vacant and drains into the adjacent taxiway to the east.

See vicinity map below:



The general topography of the area slopes from northeast to southwest. As this area developed over time, the offsite runoff that historically affected this property was retained by prior commercial developments, and/or diverted by public streets. In addition, the Central Arizona Project canal is located approximately 820 feet northeast of the site. The canal effectively acts as a levee from the historic runoff generated from the McDowell Mountains. See USGS quadrangle map below:



Based on all of this information, it is a safe assertion that this project is not adversely affected from offsite stormwater runoff.

PROPOSED DRAINAGE PLAN

The Ty Jenkins Hangar lot will be designed to retain the runoff from the 100-year, 2-hour storm. The retention will be provided in an underground stormwater storage tank, constructed of 14 gage aluminized corrugated steel pipe with 5" x 1" corrugations. The stormwater storage tank will be installed under the parking drive area. The stored water will be disposed of by a drywell. In the event of a storm greater than the 100 year, 2 hour storm the excess water will overflow into 81st Street.

Based on the net area of the lot (52,527 square feet) and given the precipitation depth for the 100-year, 2-hour storm event (2.24"), the city will require the project to retain 8,432 cubic feet of stormwater. Since the project will include fueling operations for aircraft, to be in compliance with ADEQ's General Permit 2.04 for fuel facilities, the required storage volume is equal to 110% of the calculated storage amount plus the volume from the largest anticipated spill. ADEQ leaves the spill volume up to the discretion of the owner. For this project, the largest anticipated fuel spill was set at 3000 gallons (401 cubic feet). Given the above, this project will need to retain 9,676 cubic feet of stormwater volume.

Based on the proposed grading plan, the required storage volume will be provided underground in 10-foot diameter pipes. Using 125 linear feet of the pipe will provide 9,817 cubic feet of storage.

A new Envibro-type drywell system will be used to drain the retained stormwater volume. The drywell will be located under the new aircraft apron. The drywell will be a Torrent Resources Envibro-Max system. Per the manufacturer, the unit is capable of processing up to 100 gallons per minute (0.22-cfs). Based on this processing rate, the drainage system can drain in 12.3 hours.

The site outfall location is at the southwest corner of the lot into 81st Street. The outfall elevation is 1506.4. Given that the finished floor of the new office building is at 1508.73, this places it 2.3 -feet above the outfall elevation adequately protecting it from flooding.

Based on the above information, the proposed grading plan is in conformance with the city's stormwater requirements, and the building is adequately protected from the runoff given the 100-year storm event. See the Appendix for the supporting calculations, and exhibits.

APPENDIX

FEMA MAP

DWL RQDD PRRG-EPUGDHU)BWWH



HQ

Q)6\$7 /\$4(8)5\$5\$7

6\$52
\$5\$5

- LWHRW %DH)PRRGPHDWLRQ %Q
- LWK%RU#BWK -RQ\$5\$9\$
- \$HODMRL)PRRG

26\$52
2\$5

- \$QDD &QPH)PRRG-EPUG \$H/DV
- R DQDD PRQH)PRRGZWKDHUHDH
- G-BWKOHWWKDQHQHRRW RU ZWKGDULQ
- DJHD/R OHW/WKQHQHVWUHEOHQ;
- XWUH&QLWLRQ/\$QDD
- &QPH)PRRG-EPUG -RQ;
- \$JHDZWK\$G-HG)PRRG\$NGHWR
- HHH GHHRMHV -RQ;
- \$JHDZWK)PRRG\$NGHWRHHH -RQ;

26\$5

- \$JHRIQLBD)PRRG-EPUG -RQ;
- (HFWLYH
- \$JHRIQGHWUEQG)PRRG-EPUG -RQ;
- &QDD &OYUW RU BVRUPHEU
- ||||| HHH'LN RU)PRRGDO

26
\$5

- \$JRW#FWLRQ/ZWK\$QDD &QPH
- DAHU BUIPHOHYDWLRQ
- &DWD TUDQHFW
- %DH)PRRGPHDWLRQLQH %Q
- LEW R BVG
- XULGLFWLRQ%RQDU
- &DWD TUDQHFW %DHLQH
- \$JRLQH%DHLQH
- \$JRUDSLFW)DWXUH

\$5\$6

- LJLWDD DWD\$DLODEOH
- RJLWDD DWD\$DLODEOH
- \$QSSG



7KHSQQLVSDHGRQWKHBSLV/DQDSSURLEBWH
SLQV VHOHFWHGBWKHXHU DQGGRH/QRW UHBUH
DQDWKULWDLWYHSURSHUWOFDMLRQ

7KLVBSFBLHVZWK\$VWWDQDUG/IRU WKHXHR
GLJWDD IORGBS/LILW LVQRW YRLGDV/GHFWLHGGBORZ
7KHEDBSVVRQFBLHVZWK\$VVDHBS
DPRU WWDQDUG/

7KHIORGKQUGLQRUBMLRQLVGHULYHGLUHFWO/IURWKH
DWKULWDLWYHJZEYUHLHV/SURLGHGB 7KLVBS
ZVHBUWHGRQ DV, 3 DQGGRH/QRW
UHOHW PRQH/RU DQDQWV VEHXQV VRWLVGDWHDQG
WLR 7KHJ DQGHIFWL YHLQRUBMLRQBPRQHUR
BHHVSHUWHGGBQZGDWRHU WLR

7KLVBSLHLVYRLGLI WKHQRU RUHR WKHIFORZQBS
DQDQWVGRQRW DSSDU, EDHBSLBUH IORGJQHDEOV
OHQGS VADHEDU BSRUHWLRQGDWH FRQLWLGQMLLHV
)SSQD QEHU DQGHIFWL YHGDWH DSLBHVIRU
XQSSG DQGXQGUQLJGDH/DQDQW BHHXGIRU
UHDMLRU/SURMHV

CALCULATIONS

Required Stormwater Storage Volume

$$V_r = [(P/12) * A * C] * 1.10 + LAFS$$

V_r = Volume Required, Cubic Feet

P = Precipitation Amount, Inches

A = Net Area of Property, Square Feet

C = Runoff Coefficient, 86%

$LAFS$ = Largest Anticipated Fuel Spill (3,000 Gallons)

$$\begin{aligned} V_r &= [(2.24\text{in}/12\text{in}/\text{ft})(52527\text{sf})(0.86)] * 1.1 + 401 \\ &= 9,676 \text{ CF} \end{aligned}$$

Provided Stormwater Storage Volume

Retention is provided in an underground storage tank.

$$V_{\text{prov}} = (A)(L)$$

A = Cross Sectional Area of Tank, SF

L = Length of Tank, FT

$$\begin{aligned} V_{\text{prov}} &= (78.5 \text{ SF})(125 \text{ FT}) \\ &= 9,817 \text{ CF} \end{aligned}$$

Disposal of Stored Stormwater

N = Number of drywells needed.

$$N = V / (R * 3600\text{sec}/\text{hr} * 36\text{hr})$$

V = Retention Basin Design Volume in cubic feet.

R = Perc rate for drywells in cubic feet per second.

$$\begin{aligned} N &= 9817 \text{ CF} / (0.22 \text{ CFSs} * 3600\text{sec}/\text{hr} * 36\text{hr}) \\ &= 0.34 \end{aligned}$$

Use one drywell

Ty Jenkins Hangar

Rational Method Runoff Calculations

Design Storm: 100-year, 5-minute

Location	C	TC (min)	i (in/hr)	A (acres)	Q (cfs)	Volume (cf)
CB1	0.95	5	7.5	0.072862	0.52	156
CB2	0.95	5	7.5	0.028722	0.20	61
CB3A*	0.95	5	7.5	0.178358	1.27	381
CB4	0.95	5	7.5	0.118219	0.84	253
CB5	0.95	5	7.5	0.268405	1.91	574
CB6	0.95	5	7.5	0.072319	0.52	155
CB7	0.95	5	7.5	0.272218	1.94	582

* CB3A functions as a junction box only, grate elevation is above the basin overflow

Q = CiA
Q = Peak runoff, cubic feet per second.
C = Coefficient of runoff.
i = intensity of rainfall, Inches per hour.
A = Area contributing to runoff, acres.
V = Runoff Volume, Cubic Feet,
= $TC \times 60 \times CiA$

Ty Jenkins Hangar Valley Gutter

Location	"n" Factor	Street Slope	Cross Slope	Depth of flow	Spread	Flow Area	Wetted Perimeter	Velocity (1)	Q (2)
CB6	0.015	0.00500	0.0150	0.10	6.67	0.67	13.33	0.95	0.63

$$(1) V = (1.486/n) * (a/p)^{.667} * (s^{.5})$$

$$(2) Q = (1.486/n) * (a^{1.667} / p^{.667}) * (s^{.5})$$

Worksheet for P1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.011 ft/ft
Diameter	12.0 in
Discharge	0.52 cfs
Results	
Normal Depth	2.8 in
Flow Area	0.1 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.7 in
Top Width	0.84 ft
Critical Depth	3.6 in
Percent Full	23.2 %
Critical Slope	0.004 ft/ft
Velocity	3.76 ft/s
Velocity Head	0.22 ft
Specific Energy	0.45 ft
Froude Number	1.638
Maximum Discharge	4.72 cfs
Discharge Full	4.39 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	23.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.8 in
Critical Depth	3.6 in
Channel Slope	0.011 ft/ft
Critical Slope	0.004 ft/ft

P2

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Diameter	12.0 in
Discharge	0.72 cfs
Results	
Normal Depth	3.9 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.2 ft
Hydraulic Radius	2.2 in
Top Width	0.94 ft
Critical Depth	4.2 in
Percent Full	32.4 %
Critical Slope	0.004 ft/ft
Velocity	3.27 ft/s
Velocity Head	0.17 ft
Specific Energy	0.49 ft
Froude Number	1.190
Maximum Discharge	3.42 cfs
Discharge Full	3.18 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	32.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.9 in
Critical Depth	4.2 in
Channel Slope	0.006 ft/ft
Critical Slope	0.004 ft/ft

P3

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.005 ft/ft
Diameter	12.0 in
Discharge	1.99 cfs
Results	
Normal Depth	7.3 in
Flow Area	0.5 ft ²
Wetted Perimeter	1.8 ft
Hydraulic Radius	3.4 in
Top Width	0.98 ft
Critical Depth	7.2 in
Percent Full	61.1 %
Critical Slope	0.005 ft/ft
Velocity	3.96 ft/s
Velocity Head	0.24 ft
Specific Energy	0.85 ft
Froude Number	0.972
Maximum Discharge	3.10 cfs
Discharge Full	2.88 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	34.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.3 in
Critical Depth	7.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

P4

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.011 ft/ft
Diameter	12.0 in
Discharge	1.99 cfs
Results	
Normal Depth	5.7 in
Flow Area	0.4 ft ²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.9 in
Top Width	1.00 ft
Critical Depth	7.2 in
Percent Full	47.5 %
Critical Slope	0.005 ft/ft
Velocity	5.42 ft/s
Velocity Head	0.46 ft
Specific Energy	0.93 ft
Froude Number	1.574
Maximum Discharge	4.68 cfs
Discharge Full	4.35 cfs
Slope Full	0.002 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	47.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.7 in
Critical Depth	7.2 in
Channel Slope	0.011 ft/ft
Critical Slope	0.005 ft/ft

P5

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.010 ft/ft
Diameter	12.0 in
Discharge	2.83 cfs
Results	
Normal Depth	7.1 in
Flow Area	0.5 ft ²
Wetted Perimeter	1.8 ft
Hydraulic Radius	3.3 in
Top Width	0.98 ft
Critical Depth	8.7 in
Percent Full	59.3 %
Critical Slope	0.006 ft/ft
Velocity	5.83 ft/s
Velocity Head	0.53 ft
Specific Energy	1.12 ft
Froude Number	1.463
Maximum Discharge	4.61 cfs
Discharge Full	4.29 cfs
Slope Full	0.005 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	59.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.1 in
Critical Depth	8.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

P6

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.015 ft/ft
Diameter	12.0 in
Discharge	2.23 cfs
Results	
Normal Depth	5.5 in
Flow Area	0.4 ft ²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.8 in
Top Width	1.00 ft
Critical Depth	7.7 in
Percent Full	45.9 %
Critical Slope	0.005 ft/ft
Velocity	6.34 ft/s
Velocity Head	0.62 ft
Specific Energy	1.08 ft
Froude Number	1.882
Maximum Discharge	5.56 cfs
Discharge Full	5.17 cfs
Slope Full	0.003 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	45.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.5 in
Critical Depth	7.7 in
Channel Slope	0.015 ft/ft
Critical Slope	0.005 ft/ft

P7

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.006 ft/ft
Diameter	12.0 in
Discharge	2.56 cfs
Results	
Normal Depth	8.0 in
Flow Area	0.6 ft ²
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.5 in
Top Width	0.94 ft
Critical Depth	8.2 in
Percent Full	66.5 %
Critical Slope	0.006 ft/ft
Velocity	4.61 ft/s
Velocity Head	0.33 ft
Specific Energy	1.00 ft
Froude Number	1.061
Maximum Discharge	3.53 cfs
Discharge Full	3.28 cfs
Slope Full	0.004 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	66.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.0 in
Critical Depth	8.2 in
Channel Slope	0.006 ft/ft
Critical Slope	0.006 ft/ft

P8

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.011
Channel Slope	0.010 ft/ft
Diameter	15.0 in
Discharge	4.47 cfs
Results	
Normal Depth	8.2 in
Flow Area	0.7 ft ²
Wetted Perimeter	2.1 ft
Hydraulic Radius	4.0 in
Top Width	1.24 ft
Critical Depth	10.3 in
Percent Full	55.0 %
Critical Slope	0.005 ft/ft
Velocity	6.47 ft/s
Velocity Head	0.65 ft
Specific Energy	1.34 ft
Froude Number	1.529
Maximum Discharge	8.21 cfs
Discharge Full	7.63 cfs
Slope Full	0.003 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.2 in
Critical Depth	10.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

Grate Inlet On Grade -CB1

Project Description	
Solve For	Efficiency
Input Data	
Discharge	0.52 cfs
Slope	0.000 ft/ft
Gutter Width	6.10 ft
Gutter Cross Slope	0.001 ft/ft
Road Cross Slope	0.001 ft/ft
Roughness Coefficient	0.013
Grate Width	2.00 ft
Grate Length	3.4 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	99.68 %
Intercepted Flow	0.52 cfs
Bypass Flow	0.00 cfs
Spread	452.5 ft
Depth	5.4 in
Flow Area	102.4 ft ²
Gutter Depression	0.0 in
Total Depression	0.0 in
Velocity	0.01 ft/s
Splash Over Velocity	7.49 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.997
Grate Flow Ratio	0.012
Active Grate Length	1.7 ft

Ditch Inlet In Sag -CB2

Project Description	
Solve For	Spread
Input Data	
Discharge	0.20 cfs
Left Side Slope	5.000 H:V
Right Side Slope	4.000 H:V
Bottom Width	2.00 ft
Grate Width	2.00 ft
Grate Length	3.4 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	2.3 ft
Depth	0.5 in
Wetted Perimeter	2.4 ft
Top Width	2.35 ft
Open Grate Area	3.1 ft ²
Active Grate Weir Length	8.8 ft

Ditch Inlet In Sag -CB3

Project Description	
Solve For	Spread
Input Data	
Discharge	1.27 cfs
Left Side Slope	5.000 H:V
Right Side Slope	4.000 H:V
Bottom Width	2.00 ft
Grate Width	2.00 ft
Grate Length	6.8 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	2.8 ft
Depth	1.1 in
Wetted Perimeter	2.8 ft
Top Width	2.81 ft
Open Grate Area	6.1 ft ²
Active Grate Weir Length	15.6 ft

Ditch Inlet In Sag -CB4

Project Description	
Solve For	Spread
Input Data	
Discharge	0.84 cfs
Left Side Slope	85.700 H:V
Right Side Slope	51.600 H:V
Bottom Width	2.50 ft
Grate Width	2.50 ft
Grate Length	2.5 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	17.8 ft
Depth	1.3 in
Wetted Perimeter	17.8 ft
Top Width	17.84 ft
Open Grate Area	2.8 ft ²
Active Grate Weir Length	7.5 ft

Ditch Inlet In Sag -CB5

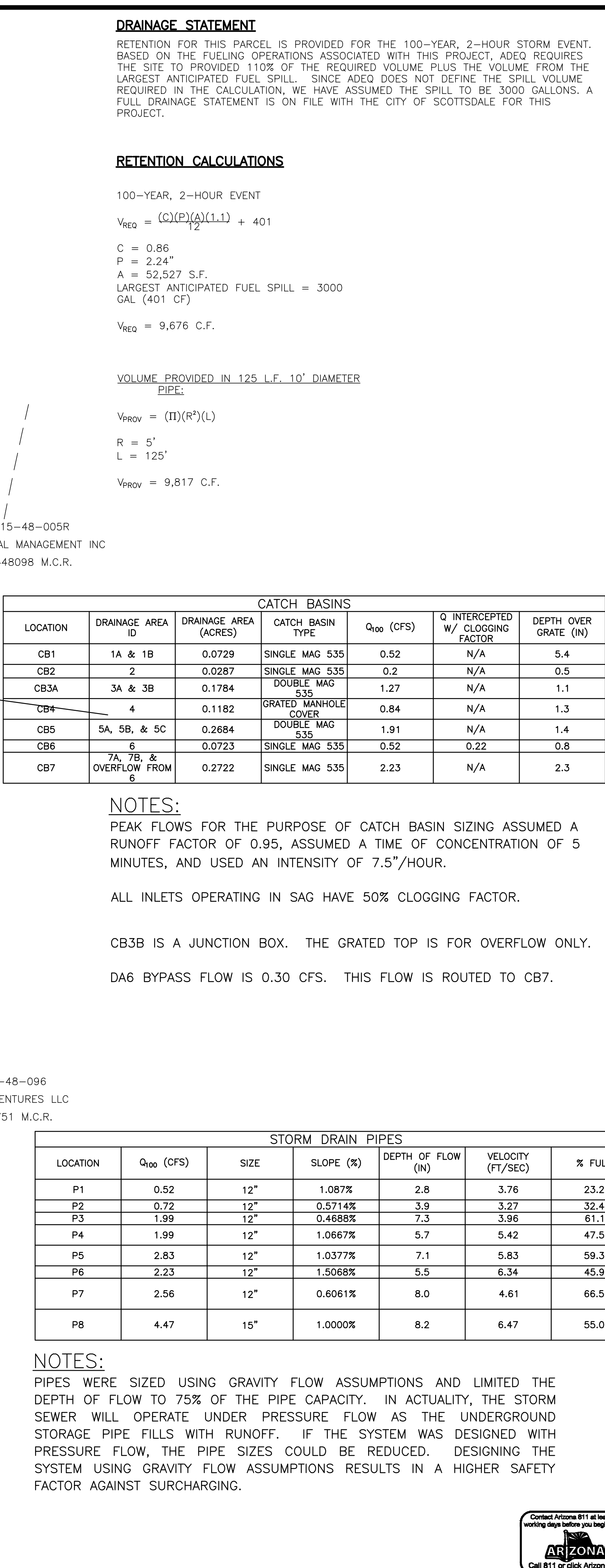
Project Description	
Solve For	Spread
Input Data	
Discharge	1.91 cfs
Left Side Slope	50.270 H:V
Right Side Slope	26.220 H:V
Bottom Width	2.00 ft
Grate Width	2.00 ft
Grate Length	6.8 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	11.1 ft
Depth	1.4 in
Wetted Perimeter	11.1 ft
Top Width	11.07 ft
Open Grate Area	6.1 ft ²
Active Grate Weir Length	15.6 ft

Ditch Inlet On Grade - CB6

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.011
Slope	0.005 ft/ft
Left Side Slope	69.900 H:V
Right Side Slope	86.670 H:V
Bottom Width	2.00 ft
Discharge	0.52 cfs
Grate Width	2.00 ft
Grate Length	3.4 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	41.87 %
Intercepted Flow	0.22 cfs
Bypass Flow	0.30 cfs
Flow Area	0.5 ft ²
Wetted Perimeter	12.2 ft
Top Width	12.21 ft
Velocity	1.12 ft/s
Splash Over Velocity	7.48 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.191
Grate Flow Ratio	0.282
Active Grate Length	1.7 ft
Critical Depth	0.8 in
Critical Slope	0.005 ft/ft
Froude Number	1.016
Flow Type	Supercritical
Specific Energy	0.08 ft
Velocity Head	0.02 ft
Depth	0.8 in

Ditch Inlet In Sag -CB7

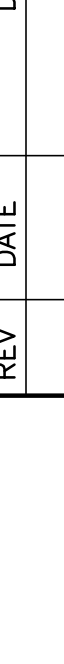
Project Description	
Solve For	Spread
Input Data	
Discharge	2.23 cfs
Left Side Slope	50.000 H:V
Right Side Slope	94.700 H:V
Bottom Width	2.00 ft
Grate Width	2.00 ft
Grate Length	3.4 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	29.8 ft
Depth	2.3 in
Wetted Perimeter	29.8 ft
Top Width	29.81 ft
Open Grate Area	3.1 ft ²
Active Grate Weir Length	8.8 ft



CATCH BASINS						
LOCATION	DRAINAGE AREA ID	DRAINAGE AREA (ACRES)	CATCH BASIN TYPE	Q ₁₀₀ (CFS)	Q INTERCEPTED W/ CLOGGING FACTOR	DEPTH OVER GRATE (IN)
CB1	1A & 1B	0.0729	SINGLE MAG 535	0.52	N/A	5.4
CB2	2	0.0287	SINGLE MAG 535	0.2	N/A	0.5
CB3A	3A & 3B	0.1784	DOUBLE MAG 535	1.27	N/A	1.1
CB4	4	0.1182	GRADED MANHOLE COVER	0.84	N/A	1.3
CB5	5A, 5B, & 5C	0.2684	DOUBLE MAG 535	1.91	N/A	1.4
CB6	6	0.0723	SINGLE MAG 535	0.52	0.22	0.8
CB7	7A, 7B, & OVERFLOW FROM 6	0.2722	SINGLE MAG 535	2.23	N/A	2.3

STORM DRAIN PIPES						
LOCATION	Q ₁₀₀ (CFS)	SIZE	SLOPE (%)	DEPTH OF FLOW (IN)	VELOCITY (FT/SEC)	% FULL
P1	0.52	12"	1.087%	2.8	3.76	23.2
P2	0.72	12"	0.5714%	3.9	3.27	32.4
P3	1.99	12"	0.4688%	7.3	3.96	61.1
P4	1.99	12"	1.0667%	5.7	5.42	47.5
P5	2.83	12"	1.0377%	7.1	5.83	59.3
P6	2.23	12"	1.5068%	5.5	6.34	45.9
P7	2.56	12"	0.6061%	8.0	4.61	66.5
P8	4.47	15"	1.0000%	8.2	6.47	55.0

Plot Date/Time: 9/28/2024 1:53 PM Layout Name: DE
Full File Path: T:\draft_users\cod01-drafting\24-013 Ty Jenkins Hangar\24-013.dwg

1	SHEET	24-013	SCALE:	1:20	JOB NO.:	24-013	TITLE	DESIGN REVIEW - CIVIL PLAN DRAINAGE EXHIBIT	SITE ADDRESS	16061 N. 81ST STREET, SCOTTSDALE, AZ	DRAWN BY	RR	DESIGNED BY	KZ	REVIEWED BY	KZ	DATE	OCT 2024	PROJECT	TY JENKINS HANGAR	LOCATION	SCOTTSDALE, ARIZONA 85260	All information contained in this document is the property of Zell Company, L.L.C. and may not be used or reproduced for any other purpose without the expressed written consent of Zell Company, L.L.C. Dimensions shown on this drawing are for reference only. Do not scale this drawing.	Professional Engineer No. 24449 KENNETH W. ZELL ARIZONA, U.S.A. Expires 12/31/2025		PO Box 2191 Litchfield Park, Arizona 85340 Phone: 623-947-72300	REV	DATE	DESCRIPTION	BY

DRAINAGE EXHIBIT