



May 17, 2018

To: Mr. Paul Mood, PE
Town Engineer
Town of Paradise Valley
6401 E Lincoln Drive
Paradise Valley, AZ 85253

Re: **Cuculic Residence**
5204 E San Juan Ave
Paradise Valley, AZ 85253
LDG Project #1711162

DRAINAGE MEMORANDUM

Dear Mr. Mood:

In accordance with the Town of Paradise Valley Hillside Ordinance, we have prepared this drainage memorandum and preliminary grading and drainage plans, related to the construction of Cuculic Residence. The goal of this memorandum is to describe the existing and proposed drainage conditions and to identify the potential improvements to mitigate the drainage impact to the subject and the neighboring properties downstream.

The site is located at 5204 E San Juan Ave, Paradise Valley, AZ 85253 and it is also being Lot 32 of Stone Canyon, a subdivision, recorded in Book 62, Page 41, MCR). The lot is situated within a residential subdivision, at the northerly hills of Camelback Mountain and it is zoned R-43 Hillside. The 1.08-acre property is currently developed and it has a single-family residence (2,367 s.f.), constructed in 1956.

Site is located in FEMA Flood Zone "X" according to Flood Insurance Rate Map (FIRM) #: 04013C, Panel 1765 of 4425, Suffix L, dated October 16th, 2013, as published by FEMA. The FIRM Panel defines Zone "X" as follows: "Areas determined to be outside the 0.2% annual chance floodplain".

The proposed architectural plans call for a new single-family residence (4,498 s.f.) to be constructed within the currently disturbed building envelope. There are two washes, east and west of the residence, which run in northerly direction and leave the property at 52nd Place's right-of way. There is an existing 18" CMP culvert constructed under 52nd Place, just north of the driveway entry. There is also an 18" pipe at the ultimate outfall of the site that conveys flows under 52nd Place to the north. Based on the estimated peak discharges, overtopping of both pipes most likely will occur during a major storm event.

The mountainous terrain slopes southerly with an average slope of 23%. The lot is covered with large boulders, rock outcroppings and native desert vegetation. Field surveys and site inspections were conducted in 2017 to collect important information regarding the existing topographic characteristics, existing drainage conditions, to verify and confirm the extent of the tributary areas, local disturbances to the historic flows, and location and condition of the existing storm drainage structures. A topographic map was developed with a one-foot contour interval for the site and the adjacent street. Invert elevations of the existing culverts were picked up to facilitate the hydraulic calculations. The

elevation contours and survey spot elevations were tied to the GDACS monuments and are based on the Town of Paradise Valley vertical datum (NAVD 88).

Aerial and topographic maps were collected from the Maricopa County GIS and USGS web sites to facilitate further and clearly delineate the limits of each drainage tributary area contributing runoff to the subject project and to define the conveyance corridors. Maricopa County, FCDMC, City of Phoenix and USGS maps, aerial photography and surveyed topographic map for the sites were reviewed and used to establish the tributary areas within the watershed basin.

Computations were performed to estimate the 100-year design peak discharges from the sub-basins that contribute offsite flows to the project. Computer program DDMS provided by the Flood Control District of Maricopa County was utilized to generate the hydrology model and to estimate the 100-year peak discharges. Since the total drainage area of the watershed is less than 160 acres, the Rational Method has been used in accordance with the Flood Control District of Maricopa County (FCDMC) Drainage Design Manual Volume I – Hydrology. FCDMC Drainage Design Management System software was utilized for calculating the Rational Method parameters and the peak discharges of each contributing area. Precipitation data was derived from the NOAA Atlas 14, Volume 1, Version 4.

Three sub-basins were delineated for the watershed contributing runoff to the subject property. The overall area of the watershed is 10.79 ac. The peak discharges from each basin were depicted on the drainage map. Proposed grading and drainage plan is based on the architectural site plan. The finish floor elevation of the residence was set at 1553.50, which is 2' higher than the elevation of the existing house. This would help with the slope of the new driveway and with the construction of swales behind the new retaining wall on the south side of the home. The intent of the swales is to capture any sheet flows coming from south and to redirect them to the west and east washes. Check dams and rock outlet structures were proposed to dissipate the water energy and mitigate the erosion. Culverts under the driveway are proposed to convey the flows to the north following the historic drainage path. New on-site drainage system and a dry well are designed to capture the on-site generated runoff. The proposed on-site storm water retention will reduce the impact to downstream properties. Existing rock berm along the north edge of San Juan Ave. as well as on-site walking paths were called out for removal.

Please refer to the enclosed exhibits for more details in support of this drainage narrative.

A Drainage Easement and Maintenance Agreement for Drainage Easement Area will be required for this project. Required maintenance of the proposed drainage structures within the pipes, swales, check dams, inlets, scuppers will be owner's responsibility.

In conclusion, the proposed preliminary design has the potential to collect, convey and discharge off-site and on-site generated runoff safely and effectively. The proposed improvements reduce the drainage impact to the neighboring lots downstream and will not result in alteration and increase of the existing and historic drainage patterns or magnitudes.

Respectfully Submitted,



Nick Prodanov, PE, PMP
Principal
Land Development Group, LLC

Enclosures

- Drainage Map
- Hydrology Calculations
- Preliminary Grading and Drainage Plan

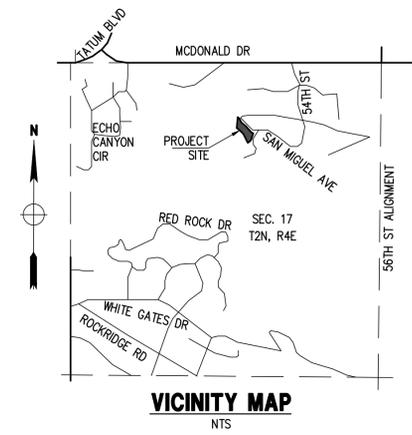
DRAINAGE MAP

CUCULIC RESIDENCE

5204 E SAN JUAN AVE., PARADISE VALLEY, AZ 85253

LOT 32 - STONE CANYON

A SUBDIVISION PLAT RECORDED IN BOOK 62 OF MAPS, PAGE 41, MCR.,
 LOCATED IN A PORTION OF THE SW 1/4 OF THE NW 1/4 OF THE NE 1/4 OF SECTION 17, T.2N, R.4E
 OF THE GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA



OWNER
 MARY JO. & LAWRENCE M. CUCULIC
 5204 E SAN JUAN AVE.
 PARADISE VALLEY, AZ 85253

SITE DATA
 APN: 172-47-032
 ADDRESS: 5204 E SAN JUAN AVE.,
 PARADISE VALLEY, AZ 85253
 ZONING: R-43
 LOT AREA: 47,205 S.F. (1.084 AC.)
 CONSTRUCTION YEAR: 1956
 Q.S. 20-40
 AREA UNDER ROOF: XXX S.F.

LEGAL DESCRIPTION
 LOT 32, OF STONE CANYON, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, ARIZONA, RECORDED BOOK 62 OF MAPS, PAGE 41;
 EXCEPT ALL COAL AND MINERALS AS RESERVED IN THE PATENT OF SAID LAND.

BENCHMARK
 BRASS CAP FLUSH AT THE INTERSECTION OF 56TH STREET AND MCDONALD DRIVE, HAVING AN ELEVATION OF 1417.52, (NAVD 88) DATUM, GDACS# 24544-1.

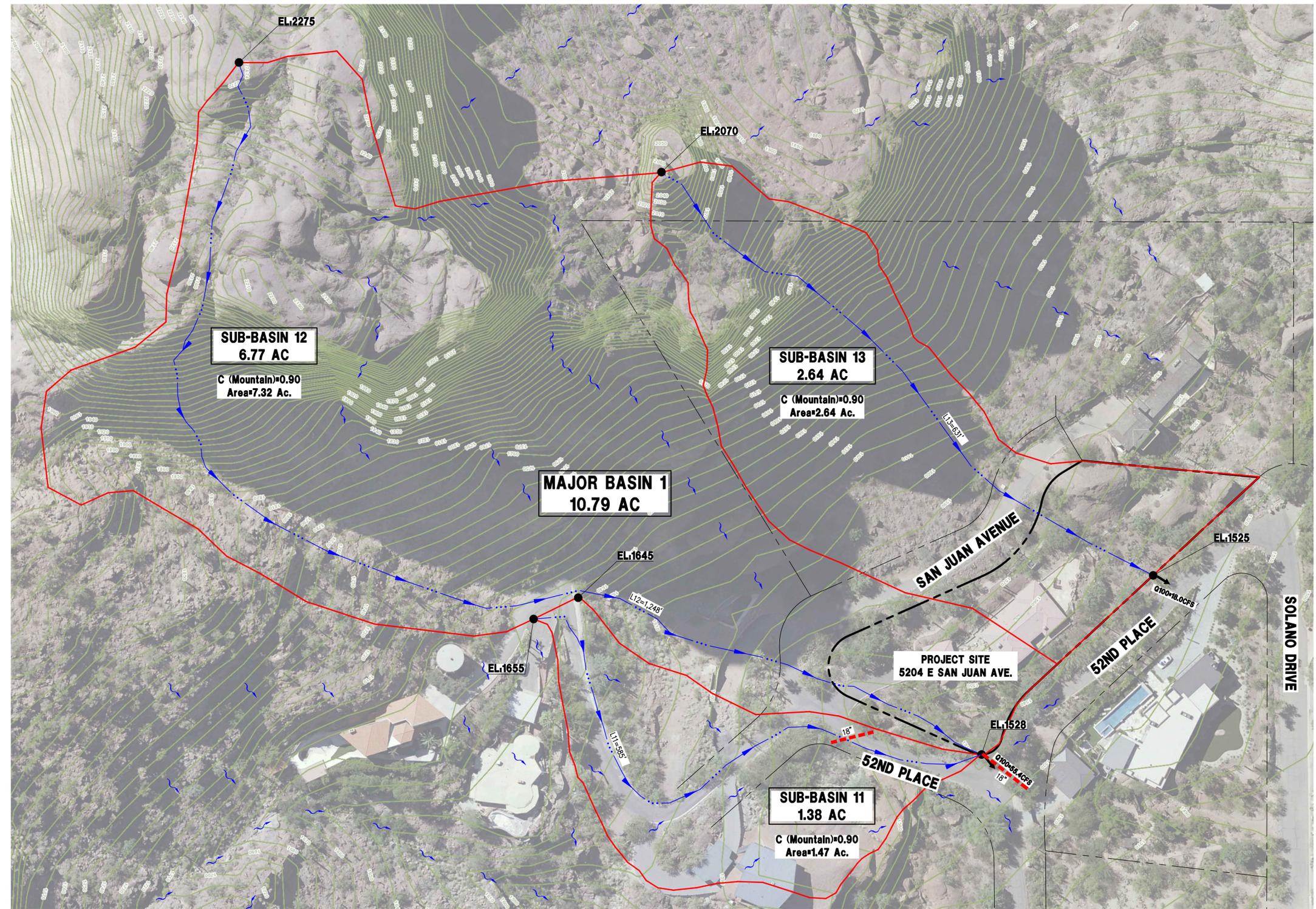
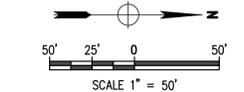
BASIS OF BEARINGS
 THE FOUND SOUTH LINE OF LOT 21, THE BEARING OF WHICH IS S89°53'20"E.

FLOOD INSURANCE RATE MAP (FIRM) DATA

COMMUNITY #	PANEL #	SUFFIX	BASED FLOOD ELEVATION
040049	1765 OF 4425	L	N/A
MAP #	PANEL DATE	ZONE	X*
04013C	10/16/2013	X*	

*AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

- LEGEND**
- DRAINAGE FLOW
 - SPOT ELEVATION
 - TRIBUTARY AREA BOUNDARY
 - FLOW LINE
 - PIPE/CULVERT



DRAINAGE MAP
LOT 32 - STONE CANYON
5204 E SAN JUAN AVE.,
PARADISE VALLEY,
AZ 85253

DATE: 05/17/18
 DESIGNED BY: NP
 DRAWN BY: ZA
 CHECKED BY: JJ
 SCALE: 1"=50'
 JOB: 171182
 VERSION: 1.1
 PLOT DATE: 05/17/18

REVISIONS:
 DATE:
 THIS DRAWING IS AN INSTRUMENT OF SERVICE AND AS SUCH SHALL REMAIN PROPERTY OF LAND DEVELOPMENT GROUP, LLC. UNLESS OTHERWISE SPECIFIED IN WRITING. NO PART OF THIS DRAWING SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF LAND DEVELOPMENT GROUP, LLC.

P. 602.889.1984 | F. 602.445.9482
 8808 N CENTRAL AVE., SUITE 288
 PHOENIX, AZ 85020
 PHOENIXLANDGEN.COM

LAND DEVELOPMENT GROUP

REGISTERED PROFESSIONAL ENGINEER
 41005
 NICKOLA J. PRODANOV
 State of Arizona
 ARIZONA U.S.A.
 Expires 08/31/2019

DM-1
 1 OF 1

Town of Paradise Valley
Drainage Design Management System
MAJOR BASINS
Project Reference: 1711162

Major Basin	Area (acres)	Description
01	10.79	Major Basin 01

Town of Paradise Valley
 Drainage Design Management System
RAINFALL DATA
 Project Reference: 1711162

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.244	0.332	0.399	0.490	0.559	0.630
	NOAA14	10 MIN	0.372	0.505	0.607	0.745	0.851	0.958
	NOAA14	15 MIN	0.461	0.626	0.753	0.924	1.055	1.188
	NOAA14	30 MIN	0.621	0.844	1.014	1.243	1.420	1.600
	NOAA14	1 HOUR	0.768	1.044	1.255	1.539	1.758	1.980
	NOAA14	2 HOUR	0.879	1.178	1.404	1.714	1.951	2.196
	NOAA14	3 HOUR	0.950	1.249	1.485	1.815	2.078	2.353
	NOAA14	6 HOUR	1.131	1.451	1.703	2.050	2.322	2.605
	NOAA14	12 HOUR	1.270	1.610	1.876	2.236	2.512	2.796
	NOAA14	24 HOUR	1.533	1.989	2.348	2.848	3.243	3.655

Town of Paradise Valley
 Drainage Design Management System
LAND USE
 Project Reference: 1711162

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											
11	MOUNT	1.38	100.0	0.196	0.70	0.70	0.70	0.77	0.84	0.90*	Mountain Terrain (Slopes > 10%)
		1.380	100.0								
12	MOUNT	6.77	100.0	0.175	0.70	0.70	0.70	0.77	0.84	0.90*	Mountain Terrain (Slopes > 10%)
		6.770	100.0								
13	MOUNT	2.64	100.0	0.187	0.70	0.70	0.70	0.77	0.84	0.90*	Mountain Terrain (Slopes > 10%)
		2.640	100.0								

* Non default value

Town of Paradise Valley
 Drainage Design Management System
SUB BASINS
 Project Reference: 1711162

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													
11	1.4	585	1,655.00	1,528.00	1,146.3	0.196	Q (cfs)	2.5	3.5	4.4	6.0	7.7	9.4
							C	0.70	0.70	0.70	0.77	0.84	0.90
							CA (ac)	0.97	0.97	0.97	1.06	1.16	1.24
							Volume (ac-ft)	0.0349	0.0425	0.0494	0.0618	0.0750	0.0864
							Tc (min)	8	7	6	6	5	5
							i (in/hr)	2.54	3.65	4.51	5.69	6.60	7.56
12	6.8	1,248	2,275.00	1,528.00	3,160.4	0.175	Q (cfs)	12.0	17.2	21.4	29.6	37.6	46.0
							C	0.70	0.70	0.70	0.77	0.84	0.90
							CA (ac)	4.74	4.74	4.74	5.21	5.69	6.09
							Volume (ac-ft)	0.1699	0.2119	0.2400	0.3048	0.3664	0.4229
							Tc (min)	8	7	6	6	5	5
							i (in/hr)	2.53	3.63	4.51	5.69	6.60	7.56
13	2.6	631	2,070.00	1,525.00	4,560.4	0.187	Q (cfs)	5.4	7.4	8.9	11.9	14.9	18.0
							C	0.70	0.70	0.70	0.77	0.84	0.90
							CA (ac)	1.85	1.85	1.85	2.03	2.22	2.38
							Volume (ac-ft)	0.0496	0.0680	0.0818	0.1094	0.1370	0.1655
							Tc (min)	5	5	5	5	5	5
							i (in/hr)	2.93	3.98	4.79	5.88	6.71	7.56

* Non default value

Town of Paradise Valley
Drainage Design Management System
RATIONAL METHOD NETWORK
Project Reference: 1711162

	Type	Model ID	Sort	Comments
Major Basin: 01	Sub Basin	11	2	
	Sub Basin	12	4	
	Combine	12	6	

Town of Paradise Valley
 Drainage Design Management System
RATIONAL METHOD FLOW SUMMARY - ALL
 Project Reference: 1711162

Page 1

5/17/2018

Type ID	Conveyance			Combine	Return Period (Years)						
	Length (ft)	Velocity (ft/sec)	Tpipe (min)		2	5	10	25	50	100	
Major Basin ID: 01											
Sub Basin	-	-	-	-	Q (cfs)	-	-	-	-	-	9.4
11					CA (ac)	0.97	0.97	0.97	1.06	1.16	1.24
					Tc (min)	7.6	6.6	6.1	5.6	5.3	5.0
					i (in/hr)	2.54	3.65	4.51	5.69	6.60	7.56
Sub Basin	-	-	-	-	Q (cfs)	-	-	-	-	-	46.0
12					CA (ac)	4.74	4.74	4.74	5.21	5.69	6.09
					Tc (min)	7.7	6.7	6.1	5.6	5.3	5.0
					i (in/hr)	2.53	3.63	4.51	5.69	6.60	7.56
Combine	-	-	-	2	Q (cfs)	-	-	-	-	-	55.4
12					CA (ac)	-	-	-	-	-	7.33
					Tc (min)	-	-	-	-	-	-
					i (in/hr)	-	-	-	-	-	-

* First Pipe

LOT 21 - STONE CANYON
BOOK 62, PAGE 41, MCR
APN 172-47-021
5228 E SOLANO DR
PARADISE VALLEY, AZ 85253
ZONING: R-43 (HILLSIDE)

FOUND REBAR W/
CAP RLS#42137

FOUND REBAR
NO I.D.

588°53'17"E 213.00'
(BASIS OF BEARINGS)

SOLANO DRIVE

52ND PLACE

SAN MIGUEL AVENUE

52ND PLACE

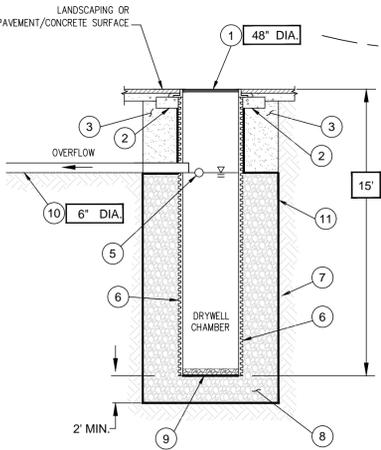
SAN JUAN AVENUE

BUILDING PAD SLOPE
VERTICAL CHANGE IN ELEVATION=19.00'
HORIZONTAL LENGTH=84.00'
SLOPE=23%
% ALLOWABLE LAND
DISTURBANCE ALLOWED=15.16%

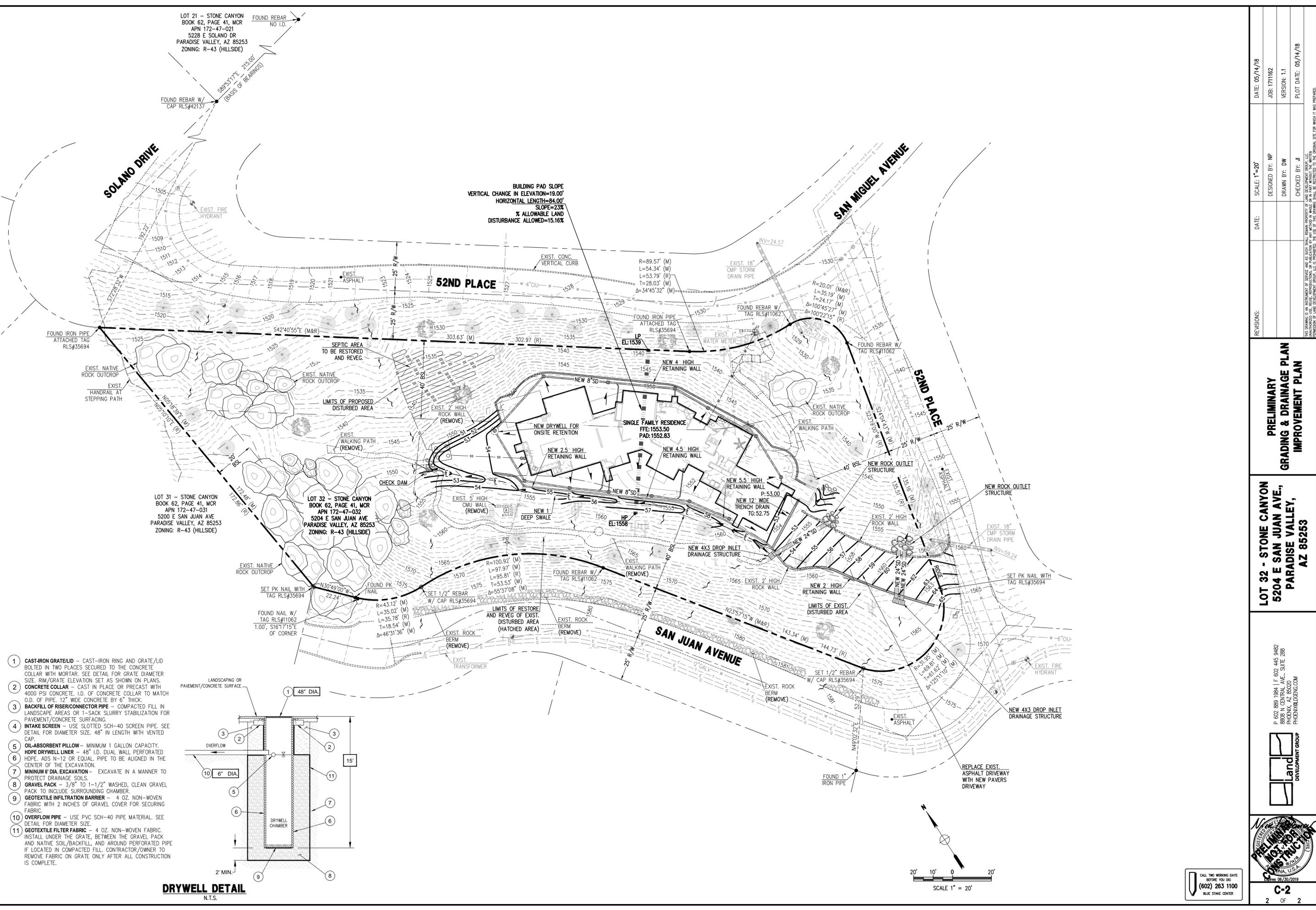
LOT 31 - STONE CANYON
BOOK 62, PAGE 41, MCR
APN 172-47-031
5200 E SAN JUAN AVE
PARADISE VALLEY, AZ 85253
ZONING: R-43 (HILLSIDE)

LOT 32 - STONE CANYON
BOOK 62, PAGE 41, MCR
APN 172-47-032
5204 E SAN JUAN AVE
PARADISE VALLEY, AZ 85253
ZONING: R-43 (HILLSIDE)

- 1 CAST-IRON GRATE/LID - CAST-IRON RING AND GRATE/LID BOLTED IN TWO PLACES SECURED TO THE CONCRETE COLLAR WITH MORTAR. SEE DETAIL FOR GRATE DIAMETER SIZE, RIM/GRATE ELEVATION SET AS SHOWN ON PLANS.
- 2 CONCRETE COLLAR - CAST IN PLACE OR PRECAST WITH 4000 PSI CONCRETE. I.D. OF CONCRETE COLLAR TO MATCH O.D. OF PIPE. 12" WIDE CONCRETE BY 6" THICK.
- 3 BACKFILL OF RISER/CONNECTOR PIPE - COMPACTED FILL IN LANDSCAPE AREAS OR 1-SACK SLURRY STABILIZATION FOR PAVEMENT/CONCRETE SURFACING.
- 4 INTAKE SCREEN - USE SLOTTED SCH-40 SCREEN PIPE. SEE DETAIL FOR DIAMETER SIZE. 48" IN LENGTH WITH VENTED CAP.
- 5 OIL-ABSORBENT PILLLOW - MINIMUM 1 GALLON CAPACITY.
- 6 HDPE DRYWELL LINER - 48" I.D. DUAL WALL PERFORATED HDPE. ADS N-12 OR EQUAL PIPE TO BE ALIGNED IN THE CENTER OF THE EXCAVATION.
- 7 MINIMUM 6" DIA. EXCAVATION - EXCAVATE IN A MANNER TO PROTECT DRAINAGE SOILS.
- 8 GRAVEL PACK - 3/8" TO 1-1/2" WASHED, CLEAN GRAVEL PACK TO INCLUDE SURROUNDING CHAMBER.
- 9 GEOTEXTILE INFILTRATION BARRIER - 4 OZ. NON-WOVEN FABRIC WITH 2 INCHES OF GRAVEL COVER FOR SECURING FABRIC.
- 10 OVERFLOW PIPE - USE PVC SCH-40 PIPE MATERIAL. SEE DETAIL FOR DIAMETER SIZE.
- 11 GEOTEXTILE FILTER FABRIC - 4 OZ. NON-WOVEN FABRIC. INSTALL UNDER THE GRATE, BETWEEN THE GRAVEL PACK AND NATIVE SOIL/BACKFILL, AND AROUND PERFORATED PIPE IF LOCATED IN COMPACTED FILL. CONTRACTOR/OWNER TO REMOVE FABRIC ON GRATE ONLY AFTER ALL CONSTRUCTION IS COMPLETE.



DRYWELL DETAIL
N.T.S.



DATE:	05/14/18
DESIGNED BY:	NP
DRAWN BY:	DW
CHECKED BY:	JJ
DATE:	05/14/18
SCALE:	1"=20'
REVISIONS:	

**PRELIMINARY
GRADING & DRAINAGE PLAN
IMPROVEMENT PLAN**

**LOT 32 - STONE CANYON
5204 E SAN JUAN AVE.,
PARADISE VALLEY,
AZ 85253**

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PHOENIX LANDSCAPE GROUP

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BLUE STAKE CENTER

C-2
2 OF 2