PRELIMINARY DRAINAGE REPORT

FOR

Springhill Suites – 68th and Camelback Rd.

APN# 173-36-008B

6808 E. Camelback Rd. Scottsdale, AZ 85251 Submittal - September 16, 2019

Prepared for:

Kuber Development 1550 S. 52nd Street

Tempe, Arizona 85281

APPROVED

10/10/2019

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September 16, 2019



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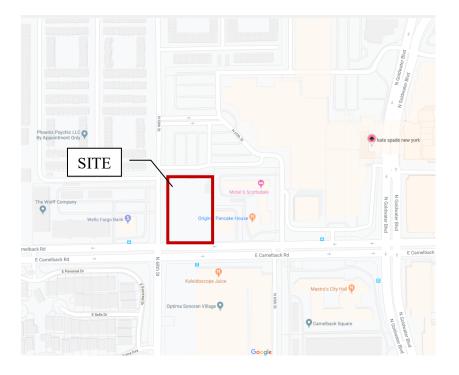
INTRODUCTION

The purpose of this report is to indicate the methods used and to provide discussion of the proposed stormwater drainage for a new 4 story hotel at the NEC of Camelback Rd and 68th Street in the City of Scottsdale (the Site). The Site is currently a vacant lot proposed to be developed as a Hotel. The proposed improvements include construction of a parking lot, open space areas, a new building, driveways, pedestrian access ramps, sidewalks, and stormwater drainage structures. This report will indicate how the storm water generated on the subject property is addressed and how it complies with the City of Scottsdale drainage requirements.

SITE DESCRIPTION

The project site is located at the northeast corner of N 68rd Street and Camelback Road in Scottsdale, Arizona. The site is bounded by existing commercial parking to the north, N 68th Street to the west, Camelback Road to the south, and existing commercial developments to the east. The total property area is approximately 2.0 acres (86,664 sq. ft.). Refer to Vicinity Map (Figure 1) below for a general graphical representation of the Site location.

Figure 1



EXISITNG DRAINAGE

The Site is currently vacant and generally slopes to the southwest. The change in grade over the entire site is approximately 3.5'. Based on field observation and available topographic data no existing drainage structures are found onsite. Based upon topographic survey information the site currently sheet flows to the public right of way and discharges to both Camelback Rd and N. 68th Street.

FEMA FLOOD ZONE / FIRM MAP

This is to certify that the above subject property lies within shaded zone 'x' as designated on the FIRM flood insurance rate map, map number 04013c1770l, dated October 16, 2013. Shaded zone 'x' is designated as being areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood as determined by the federal emergency management agency under that circumstance.

PROPOSED DRAINAGE PLAN

The Site currently discharges to Camelback Road and to 68th Street. To mitigate the drainage flows we propose to retain the 100-yr, 2-hr post development runoff volumes within an underground storage system on-site.

The drainage concept proposes to capture the 100-yr, 2-hr post development runoff volumes in an 8ft dia. underground CMP pipe, referred to in this report as UG Pipe. The entire site will discharge via curb opening and catch basins to the underground Pipe, the underground retention consists of 308 LF, 8ft dia. CMP pipe with a provided retention volume of 15,482 CF. Discharges to these facilities will be routed in 18" HDPE storm drain pipe and bleed off in two drywells in approximately 21.5 hours.

Building Finished Floor elevation shall be set a minimum of one foot above low top of curb of adjacent site outfall.



DATA ANALYSIS METHODS

The computations included in this report are based on the procedure described in the City of Scottsdale Design Standards and Policies Manual and the design standards and methodologies developed by the Flood Control District of Maricopa County. The 100yr 2 hr storm event was used to calculate the retention volume required across the site.

Table 1-Retention Volume Requirements

Area [ft²]	С	Precipitation* [in]	Retention Volume Required [ft ³]
86,664	0.90	2.17	14,105

^{*100-}yr, 2 hr precipitation = 2.17" Per NOAA14

Table 2- Retention Volume Provided

Retention	Pipe Dia [ft]	Pipe area [ft ²]	Length [ft]	Volume [ft ³]
UG pipe	8	50.27	308	15,482

Table 3- Drawdown Time

Retention Basin ID	Volume Pro [ft ³]	perc rate[cfs]	# of drywells	drawdown time [hrs]
UG pipe	15,482	0.1	2	21.5

WARNING AND DISCLAIMER OF LIABILITY

Refer to **Appendix 4** for a copy of the Warning & Disclaimer of Liability form.

CONCLUSION

This project has been designed to conform to the City of Scottsdale storm drainage design requirements. Proposed drainage improvements will include an underground retention system sized to retain the onsite volume for the 100 yr 2 hr storm event. Proposed stormdrain inlets and storm drain pipes have been adequately sized to convey the expected peak flows to the underground storage system which will drain the retained volume within 36 hours via drywell. Excess flows generated onsite will overflow to Camelback Road. No adverse impacts to the offsite downstream properties are anticipated as a result of the proposed improvements.



REFERENCES

City of Scottsdale, Design Standards & Policies Manual, January 2010.

Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, Volume 1. August 15, 2013.

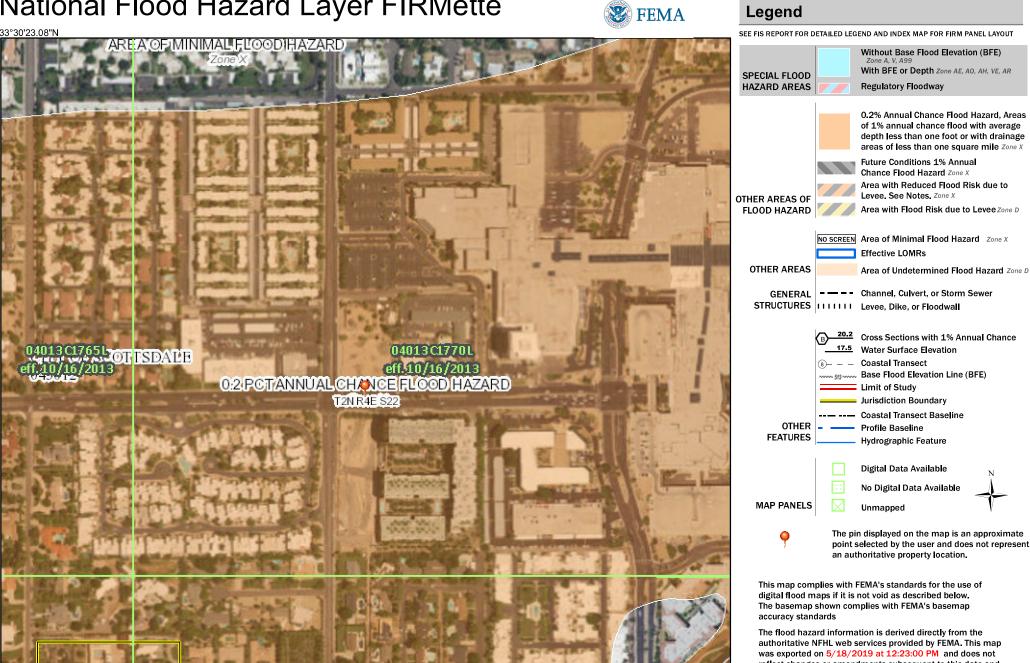
Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, Volume 2. August 15, 2013.



Appendix 1: Figures

National Flood Hazard Layer FIRMette





04013C2235L

Feet

2.000

250

500

1.000

1.500

1:6,000

The National Map: Orthoimagery. Data refreshed April, 2019.

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 NO SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D - - - Channel, Culvert, or Storm Sewer STRUCTURES | LILLI Levee, Dike, or Floodwall 20.2 Cross Sections with 1% Annual Chance 17.5 Water Surface Elevation **Coastal Transect** Base Flood Elevation Line (BFE) Jurisdiction Boundary — --- Coastal Transect Baseline Profile Baseline Hydrographic Feature Digital Data Available No Digital Data Available

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

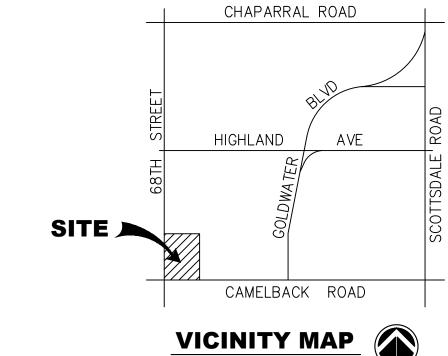
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/18/2019 at 12:23:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded 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.

68TH ST & CAMELBACK ROAD

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 22, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

PRELIMINARY GRADING AND DRAINAGE PLAN





LEGAL DESCRIPTION

PARCEL NO. 1:

LOT 7, ARCADIA VISTA UNIT 4, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, ARIZONA, IN BOOK 21 OF MAPS, PAGE 38;

EXCEPT THE EAST 355.00 FEET; AND EXCEPT THE NORTH 250.00 FEET; AND

EXCEPT THAT PORTION CONVEYED IN WARRANTY DEED RECORDED IN RECORDING NO. 93-0011829.

PARCEL NO. 2:

LOT 8, ARCADIA VISTA UNIT 4, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, ARIZONA, IN BOOK 21 OF MAPS, PAGE 38:

EXCEPT THE EAST 355.00 FEET; AND EXCEPT THAT PORTION CONVEYED IN WARRANTY DEED RECORDED IN DOCKET

3732, PAGE 46; AND EXCEPT THAT PORTION CONVEYED IN WARRANTY DEED RECORDED IN RECORDING NO. 93-0011829.

NOT A PART OWNER: DILLARDS PROPERTIES INC DEED#11-150442, MCR SUBJECT PROPERTY APN# 173-36-008B STREI GAS CAMELBACK ROAD **INDEX MAP**

LEGEND

	PROPERTY BOUNDARY	S	SLOPE
	SAWCUT LINE/LIMITS OF GRADING	FT	FOOT
	CENTER LINE	TC	TOP OF CURB ELEVATION
1581 — —	EXISTING MINOR CONTOUR	GB	GRADE BREAK
	EXISTING MAJOR CONTOUR	SW	SIDEWALK
		Р	PAVEMENT
1581 ———	PROPOSED MINOR CONTOUR	С	CONCRETE
1580 ———	PROPOSED MAJOR CONTOUR	- → -	GRADE BREAK
W	PROPOSED WATER LINE SERVICE	1.0%	FLOW ARROW
c	CONCEPTUAL GAS LINE	P=1425.00	PROPOSED SPOT ELEVATION
6"S—	PROPOSED SANITARY SEWER LINE	∕−(P=1424.25)	EXISTING SPOT ELEVATION

SHEET NO.

ARCHITECT

SHEET INDEX

SHEET TITLE

PRELIMINARY G&D COVER SHEET

PRELIMINARY GRADING & DRAINAGE PLAN

KULTNA LLC 1550 N 52ND STREET TEMPE, AZ 85 480-966-0955 EMAIL: SHANEKUBER@GMAIL.COM

CIVIL ENGINEER

IMEG CORP 1600 N. DESERT DRIVE, SUITE 230 TEMPE, AZ 85281 PHONE: 480-378-3925 CONTACT: MIKE JACKSON

SITE DATA

A.P.N: 173-36-008B AREA: 86,664 S.F. OR 2.06 AC. ADDRESS: NE CORNER 68TH ST. & CAMELBACK ROAD SCOTTSDALE, ARIZONA 85251

BASIS OF BEARING

THE BASIS OF BEARING USED FOR THIS SURVEY IS THE SOUTH LINE OF THE NORTHEAST QUARTER OF SECTION 22, TOWNSHIP 2 NORTH, RANGE 4 EAST, AS SHOWN ON THE SUBDIVISION PLAT OF "ARCADIA VISTA UNIT 4" FILED IN BOOK 21, PAGE 48, MARICOPA COUNTY RECORDS.

SAID BEARING = SOUTH 88° 57' 00" WEST

PROJECT BENCHMARK

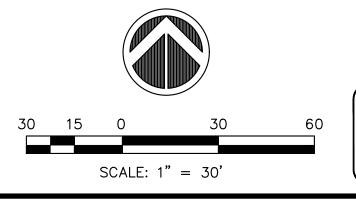
THE BENCHMARK USED FOR THIS SURVEY IS THE EAST 1/4 CORNER OF SECTION 21, UNIQUE POINT ID 3158, BEING MARKED BY A 3" AZ HIGHWAY DPT BRASS CAP IN HANDHOLE, 0.75' DOWN, HAVING AN ELEVATION OF 1,305.137 FEET, MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION (NAVD88).

SITE BENCHMARK

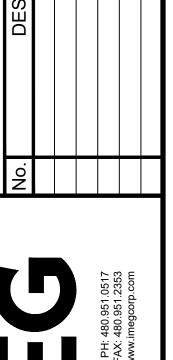
THE BRASS CAP IN HANDHOLE BEING THE CENTER OF SECTION 22, TOWNSHIP 2 NORTH, RANGE 4 EAST, LOCATED IN THE CENTERLINE INTERSECTION OF 68TH STREET & CAMELBACK ROAD. SAID ELEVATION = 1288.75 (N.A.V.D.88)

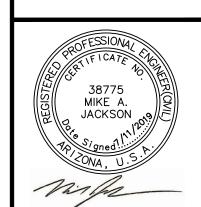
FLOOD PLAIN CERTIFICATION

THIS IS TO CERTIFY THAT THE ABOVE SUBJECT PROPERTY LIES WITHIN SHADED ZONE 'X' AS DESIGNATED ON THE FIRM FLOOD INSURANCE RATE MAP, MAP NUMBER 04013C1770L, DATED OCTOBER 16, 2013. SHADED ZONE 'X' IS DESIGNATED AS BEING AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD AS DETERMINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY UNDER THAT CIRCUMSTANCE.









ROAD CAMELBACK 68TH

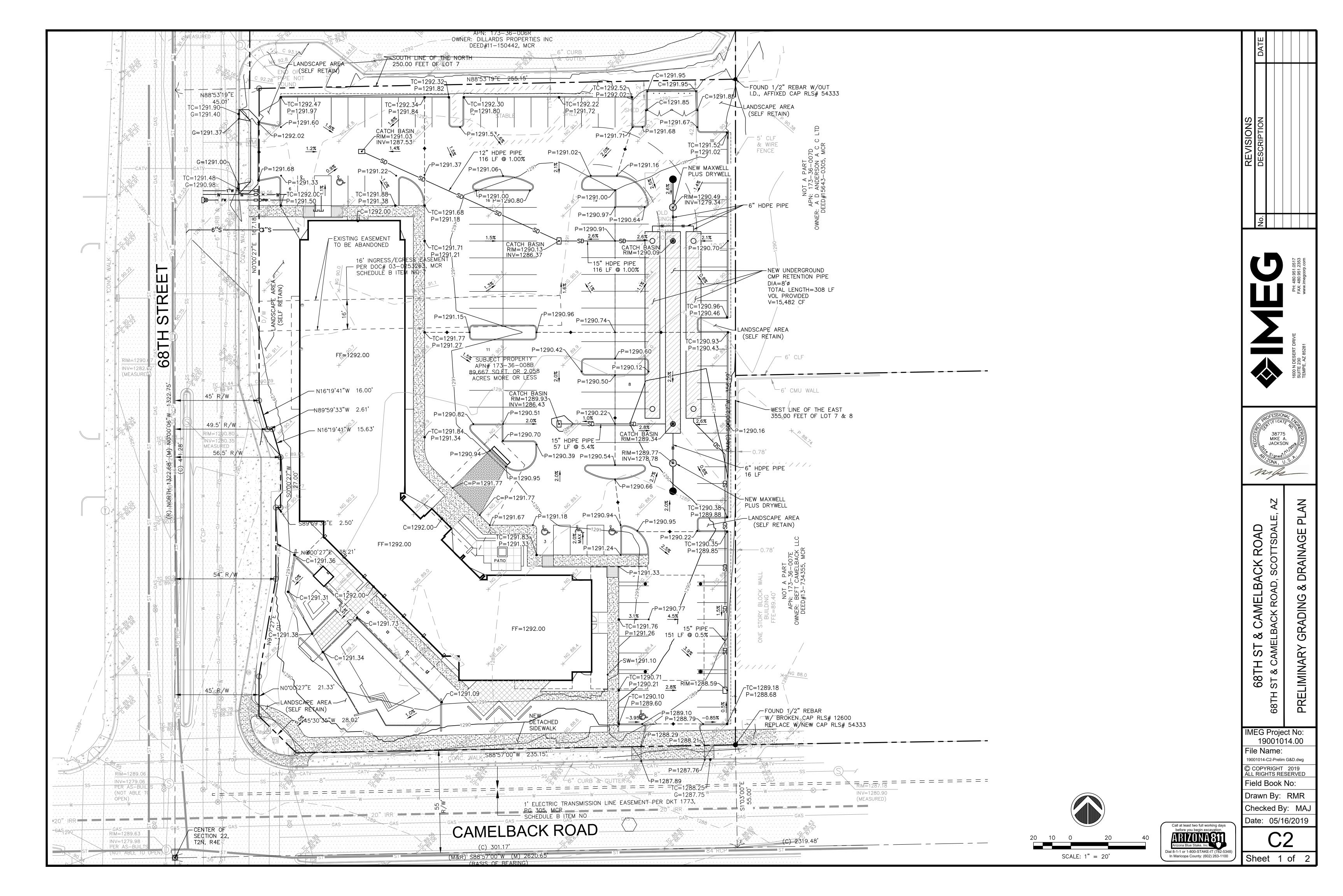
IMEG Project No: 19001014.00 File Name:

19001014-C1-Prelim Cover.dwg ALL RIGHTS RESERVED

Field Book No:

Drawn By: RMR Checked By: MAJ Date: 05/16/2019

Sheet 1 of



Appendix 2: NOAA 14 Precipitation Values



NOAA Atlas 14, Volume 1, Version 5 Location name: Scottsdale, Arizona, USA* Latitude: 33.5027°, Longitude: -111.9341° Elevation: 1289.33 ft**

* source: ESRI Maps ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS	PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹									
Duration	Average recurrence interval (years)									
Duration	1	2	5	10	25	50	100	200	500	1000
5-min	0.184 (0.154-0.224)	0.240 (0.203-0.292)	0.327 (0.273-0.396)	0.393 (0.326-0.474)	0.482 (0.394-0.579)	0.552 (0.445-0.659)	0.622 (0.493-0.742)	0.694 (0.540-0.826)	0.790 (0.599-0.943)	0.864 (0.642-1.03)
10-min	0.280 (0.235-0.340)	0.366 (0.308-0.445)	0.497 (0.416-0.603)	0.598 (0.497-0.722)	0.734 (0.600-0.882)	0.839 (0.677-1.00)	0.946 (0.749-1.13)	1.06 (0.822-1.26)	1.20 (0.912-1.43)	1.32 (0.977-1.57)
15-min	0.347 (0.291-0.422)	0.453 (0.382-0.552)	0.616 (0.515-0.747)	0.741 (0.615-0.894)	0.910 (0.744-1.09)	1.04 (0.839-1.24)	1.17 (0.929-1.40)	1.31 (1.02-1.56)	1.49 (1.13-1.78)	1.63 (1.21-1.95)
30-min	0.466 (0.391-0.568)	0.610 (0.514-0.743)	0.829 (0.693-1.01)	0.998 (0.829-1.21)	1.23 (1.00-1.47)	1.40 (1.13-1.68)	1.58 (1.25-1.88)	1.76 (1.37-2.10)	2.01 (1.52-2.39)	2.19 (1.63-2.62)
60-min	0.577 (0.484-0.703)	0.755 (0.636-0.920)	1.03 (0.858-1.25)	1.24 (1.03-1.49)	1.52 (1.24-1.82)	1.73 (1.40-2.07)	1.96 (1.55-2.33)	2.18 (1.70-2.60)	2.48 (1.88-2.96)	2.72 (2.02-3.25)
2-hr	0.670 (0.571-0.799)	0.867 (0.739-1.04)	1.16 (0.985-1.38)	1.38 (1.16-1.65)	1.69 (1.40-2.00)	1.93 (1.58-2.27)	2.17 (1.75-2.55)	2.41 (1.91-2.84)	2.74 (2.12-3.23)	3.00 (2.27-3.55)
3-hr	0.729 (0.618-0.878)	0.935 (0.797-1.13)	1.23 (1.04-1.48)	1.46 (1.23-1.75)	1.79 (1.48-2.13)	2.05 (1.67-2.43)	2.32 (1.86-2.75)	2.60 (2.05-3.08)	2.99 (2.29-3.55)	3.31 (2.46-3.93)
6-hr	0.878 (0.760-1.03)	1.11 (0.966-1.31)	1.43 (1.23-1.67)	1.68 (1.44-1.96)	2.02 (1.71-2.34)	2.29 (1.90-2.65)	2.57 (2.10-2.97)	2.85 (2.29-3.30)	3.24 (2.54-3.76)	3.55 (2.71-4.13)
12-hr	0.982 (0.859-1.14)	1.24 (1.08-1.44)	1.57 (1.37-1.82)	1.83 (1.58-2.12)	2.19 (1.87-2.52)	2.45 (2.07-2.82)	2.73 (2.28-3.15)	3.01 (2.47-3.47)	3.39 (2.72-3.93)	3.68 (2.90-4.30)
24-hr	1.17 (1.05-1.33)	1.49 (1.33-1.69)	1.94 (1.72-2.19)	2.29 (2.02-2.58)	2.77 (2.44-3.13)	3.16 (2.75-3.55)	3.56 (3.08-4.00)	3.97 (3.42-4.47)	4.54 (3.86-5.12)	5.00 (4.21-5.64)
2-day	1.27 (1.13-1.44)	1.62 (1.45-1.83)	2.13 (1.89-2.40)	2.54 (2.25-2.86)	3.10 (2.74-3.50)	3.56 (3.12-4.00)	4.04 (3.51-4.55)	4.53 (3.91-5.11)	5.23 (4.46-5.91)	5.79 (4.89-6.56)
3-day	1.34 (1.19-1.52)	1.72 (1.53-1.94)	2.26 (2.01-2.55)	2.70 (2.39-3.04)	3.32 (2.92-3.73)	3.81 (3.33-4.29)	4.34 (3.76-4.88)	4.89 (4.21-5.51)	5.67 (4.82-6.39)	6.30 (5.30-7.12)
4-day	1.42 (1.26-1.60)	1.81 (1.61-2.05)	2.39 (2.12-2.70)	2.86 (2.52-3.22)	3.53 (3.09-3.97)	4.07 (3.54-4.57)	4.64 (4.01-5.22)	5.25 (4.50-5.91)	6.11 (5.18-6.87)	6.81 (5.71-7.68)
7-day	1.58 (1.40-1.79)	2.01 (1.79-2.28)	2.66 (2.36-3.01)	3.19 (2.81-3.60)	3.93 (3.44-4.43)	4.52 (3.94-5.09)	5.16 (4.46-5.81)	5.84 (5.01-6.58)	6.79 (5.75-7.66)	7.56 (6.34-8.55)
10-day	1.71 (1.52-1.94)	2.19 (1.95-2.48)	2.89 (2.56-3.26)	3.46 (3.05-3.89)	4.25 (3.73-4.77)	4.89 (4.26-5.48)	5.56 (4.82-6.24)	6.27 (5.39-7.04)	7.26 (6.17-8.16)	8.07 (6.78-9.07)
20-day	2.10 (1.88-2.36)	2.71 (2.41-3.04)	3.58 (3.18-4.01)	4.23 (3.75-4.74)	5.12 (4.52-5.72)	5.80 (5.10-6.48)	6.49 (5.68-7.26)	7.20 (6.27-8.06)	8.15 (7.03-9.15)	8.88 (7.60-9.98)
30-day	2.46 (2.18-2.76)	3.16 (2.81-3.55)	4.17 (3.70-4.67)	4.93 (4.37-5.52)	5.96 (5.25-6.67)	6.76 (5.92-7.54)	7.57 (6.61-8.45)	8.39 (7.29-9.37)	9.50 (8.19-10.6)	10.4 (8.86-11.6)
45-day	2.84 (2.54-3.19)	3.67 (3.27-4.11)	4.83 (4.31-5.41)	5.69 (5.06-6.37)	6.83 (6.05-7.64)	7.69 (6.79-8.60)	8.55 (7.52-9.58)	9.42 (8.25-10.6)	10.6 (9.18-11.9)	11.4 (9.88-12.9)
60-day	3.15 (2.82-3.52)	4.07 (3.64-4.54)	5.35 (4.78-5.97)	6.28 (5.60-7.01)	7.50 (6.67-8.36)	8.40 (7.44-9.37)	9.30 (8.21-10.4)	10.2 (8.95-11.4)	11.3 (9.91-12.7)	12.2 (10.6-13.7)

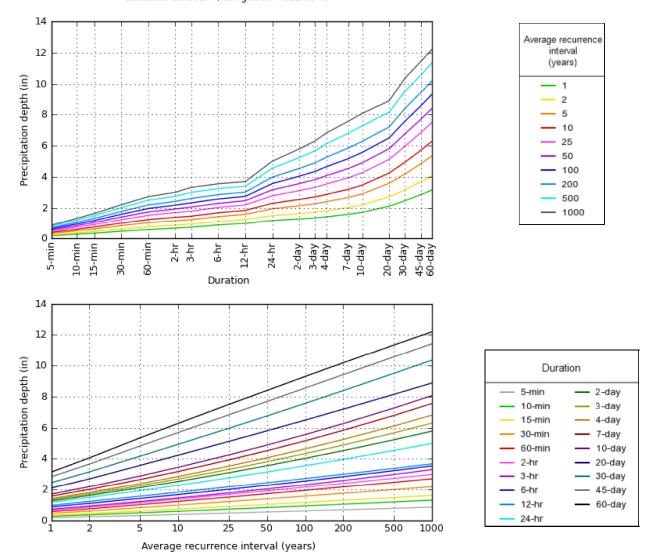
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

PF graphical

PDS-based depth-duration-frequency (DDF) curves Latitude: 33.5027°, Longitude: -111.9341°

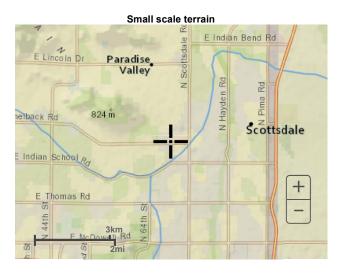


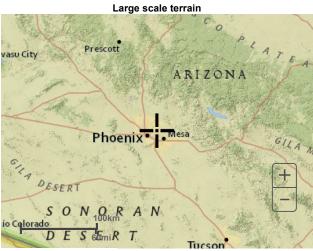
NOAA Atlas 14, Volume 1, Version 5

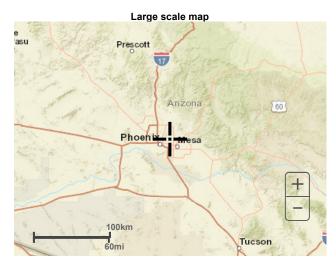
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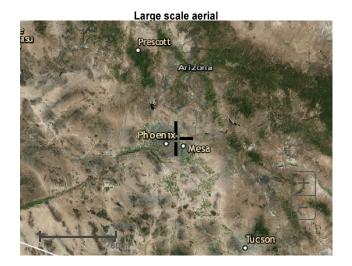
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Maps & aerials









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US Department of Commerce

National Oceanic and Atmospheric Administration

National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910

Questions?: HDSC.Questions@noaa.gov

<u>Disclaimer</u>

Appendix 3: Warning and Disclaimer of Liability





Appendix 4-1C

WARNING & DISCLAIMER OF LIABILITY

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to "minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall" (Scottsdale Revised Code §37-16).

As defined in S.R.C. §37-17, a flood plain or "Special flood hazard area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board." It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22

"The degree of flood protection provided by the requirements in this article 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 manmade or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder."

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and und and explained this		m an agent for	an owner I have made the owner aware of
Plan Check No.	Owner or Agent	Date	