

May 8, 2020

Smoke Tree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Wastewater Capacity Study

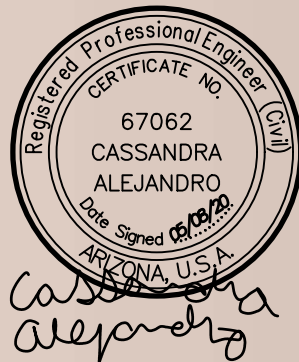
Prepared for:

Gentree LLC

3620 East Campbell Avenue
Suite B

Phoenix, AZ 85018

Contact: Sam Robinson



Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street

Phoenix, AZ 85014

Contact: Cassandra Alejandro, P.E.

602.285.4763

Job # 1.01.0315301



WASTEWATER CAPACITY STUDY

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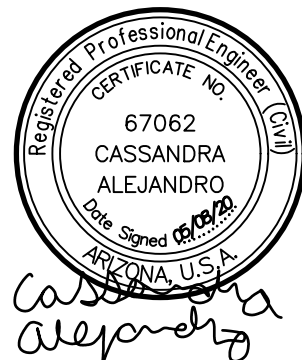
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1.0 INTRODUCTION

1.1 General Description

Smoke Tree Resort is a proposed redevelopment of an existing resort complex on approximately 5 acres of existing special use permit resort land located in the Town of Paradise Valley, Arizona. A total of 122 new rental rooms are proposed. Room counts have not been approved by the Town of Paradise Valley's Town Council. Room counts may be revised. The site will also include a Restaurant, Market, and Coffee Shop with square footages estimated and may be revised at 3,200; 4,000; and 1,800 respectively.

This report addresses sewer capacity requirements for the proposed development. The sewer system will outfall to the City of Scottsdale Sewer System. The system's design will adhere to the *City of Scottsdale Design Standards and Policies Manual, January 2018* and the *International Plumbing Code*.

1.2 Project Location

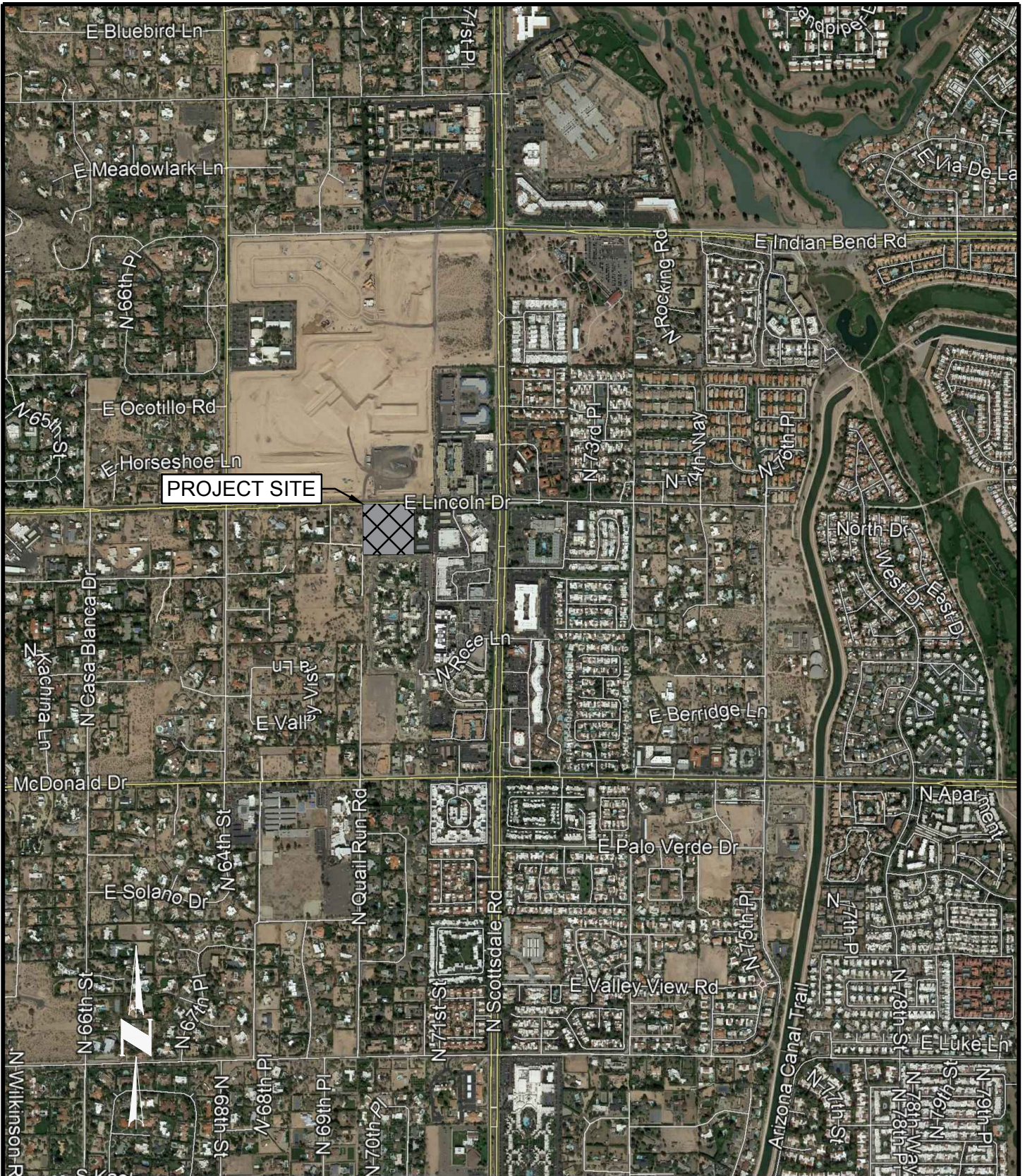
Smoke Tree Resort is located in Section 10 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. The development is bordered by East Lincoln Drive to the north and Quail Run Road to the west. See Figure 1, 2, 3, and 4.

1.3 Topographic Conditions

Smoke Tree Resort ranges in elevation from approximately 1,318 feet above mean sea level (MSL) on the southwest corner of the property to approximately 1,313 feet MSL on the northeast corner of the property. Overall, the property generally slopes to the north northeast toward Lincoln Drive.

1.4 Existing Sewer Capacity

The Town of Paradise Valley has two wastewater providers, the City of Phoenix and the Town of Paradise Valley. The Town of Paradise Valley's wastewater system is operated, maintained, and treated by the City of Scottsdale through an intergovernmental agreement. Appendix A contains the City of Scottsdale "Will-Serve" letter. Smoke Tree Resort will be served by the City of Scottsdale per the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)*. Appendix B includes applicable Pages from the *Town of Paradise Valley Wastewater Master Plan (Arcadis, May 2015)* depicting the direction of flow into the City of Scottsdale's wastewater system. Appendix C includes City of Scottsdale Wastewater Quarter Section Maps depicting the location and flow direction of the existing gravity sewer network servicing the Smoke Tree Resort.



NOT TO SCALE
 1.01.0315301
 4550 North 12th Street
 Phoenix, Arizona 85014
 Phone 602-264-6831
<http://www.cvlci.com>

VICINITY MAP

SMOKE TREE RESORT

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 CONSULTANTS
 CELEBRATING 60 YEARS

FIGURE 1



PROGRAM:

- A. Pedestrian entry
- B. Resort Reception Entry Plaza and Valet
- C. Resort Reception and Lobby
- D. Pavilion
- E. Event Lawn
- F. Shade Trellis
- G. Restaurant
- H. Market
- I. Coffee Shop
- J. Outdoor Patio
- K. Resort Pool
- L. Pool Lounge
- M. Entry Lounge
- N. Resort Suites (guest rooms)
- O. Meeting Room
- P. Luxury Suites (guest rooms)
- Q. Signage
- R. Surface Parking
- S. Quail Run Road Access Point
- T. Garbage Bins
- U. Delivery Location
- V. Employee Break Area
- W. Back of House
- AB. Sight Visibility Triangle - 33' x 33'
- AC. APS Utility Box

RESORT UNITS - 122 KEYS

Main Hotel		
1st Level	=	42 keys
2nd Level	=	45 keys
3rd Level	=	15 keys
		<u>102 keys</u>
Luxury Suites (guest rooms)		
4 villas with 3 keys	=	12 keys
2 villas with 4 keys	=	8 keys
		<u>20 keys</u>
Total Keys	=	122 keys



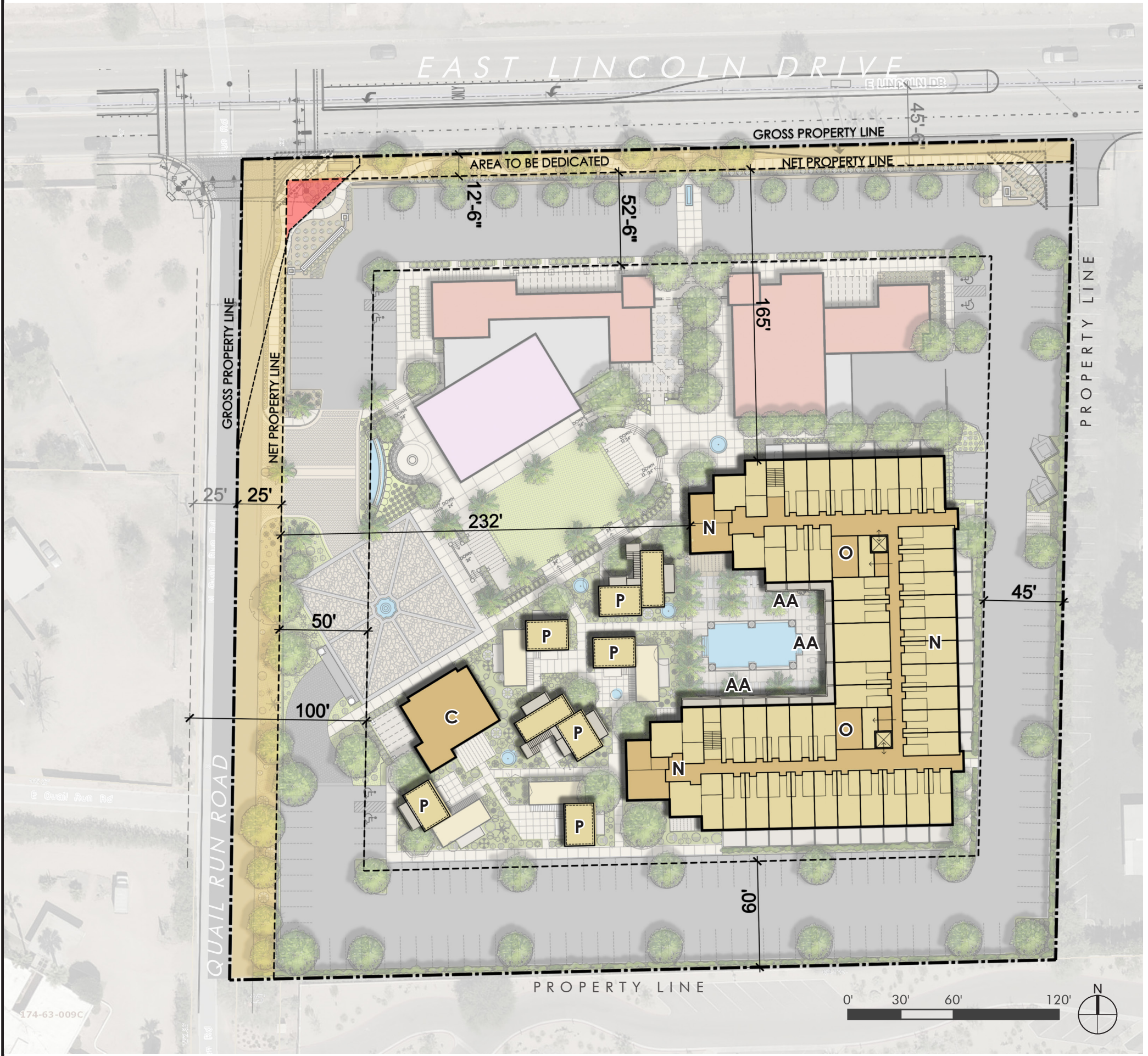
PROPOSED SITE PLAN - GROUND LEVEL

the smoke tree resort

7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A8

SEP 6, 2019
11 x 17 format
REVISED
MAY 5, 2020




PROGRAM:


- C. Resort Reception and Lobby
- N. Resort Suites (guest rooms)
- O. Meeting Room
- P. Luxury Suites (guest rooms)
- AA. Balconies

PHX
ARCHITECTURE

GREY|PICKETT
BEUS
GILBERT


CREATIVE DESIGNS
IN LIGHTING


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PROPOSED SITE PLAN - SECOND LEVEL

the **smoke** *tree* **resort**
7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A9

SEP 6, 2019
11 x 17 format
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MAY 5, 2020



PROGRAM:

- N. Resort Suites (guest rooms)
- O. Meeting Room
- X. Lounge
- AA. Balconies

PHX
ARCHITECTURE

GREY|PICKETT
BEUS
GILBERT


CREATIVE DESIGNS
IN LIGHTING


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PROPOSED SITE PLAN - THIRD LEVEL

the **smoke** *tree* **resort**

7101 E LINCOLN DR, PARADISE VALLEY, AZ 85253
SPECIAL USE PERMIT | MAJOR AMENDMENT APPLICATION

A10
SEP 6, 2019
11 x 17 format
REVISED
MAY 5, 2020

2.0 WASTEWATER SYSTEM DESIGN CRITERIA

The following criteria was be used in developing the sewer capacity study.

2.1 Design Criteria

This sewer study is based on criteria from the *City of Scottsdale Design Standards & Policies Manual, January 2018* and *Integrated Wastewater Master Plan, March 2008*. Design flow criteria are presented in Table 1 and hydraulic design criteria are presented in Table 2.

Table 1 - Design Flow Criteria

Description	Unit	Average Day Flow (gpd/unit)	Peak Day Flow (gpm/pool)	Peak Day Flow (gpd/unit)	Peaking Factor
Resort Hotel Room ¹	Room	380	-	1,710	4.5
Pool Backwash ²	Pool	N/A	60	-	-
Commercial/Retail	Square Foot	0.5	-	-	3.0
Restaurant	Square Foot	1.2	-	-	6.0

¹Includes site amenities

²Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

Table 2 – Hydraulic Design Criteria

Description	Criteria
Minimum Sewer Diameter	8-inch
Minimum Full Pipe Velocity	2.5 fps
Minimum Slope	
8-inch Sewer	0.0052 ft/ft
Manning's "n"	0.013
Maximum Pipe Velocity	10 fps
d/D (≤ 12-inch) at Peak Flow	0.65
d/D (> 12-inch) at Peak Flow	0.70
Manhole Spacing (8 to 15-inch)	500 ft
Minimum Drop Across Manhole	0.1 ft
Change in Sewer Diameter	Top invert of upstream pipe ≥ top invert of downstream
Minimum Depth of Cover	4 ft

2.2 Design Calculations

Table 3 contains the wastewater flow generation calculations for flows for the Smoke Tree Resort.

Table 3 – Wastewater Flow Generation

Land Use	Description	Unit	No. of Units	Average Day Unit Flow (gpd/unit)	Average Flow (gpd)	PF	Peak Flow (gpm/pool)	Peak Flow (gpd)
Room	Resort Hotel ¹	Room	122	380	46,360	4.5	N/A	208,620
Pool	Backwash Rate ²	Pool	1	N/A	N/A	N/A	60	86,400
Restaurant	Restaurant	Sq. Ft.	3,200	1.2	3,840	6.0	N/A	23,040
Market	Commercial/Retail	Sq. Ft.	4,000	0.5	2,000	3.0	N/A	6,000
Coffee Shop	Commercial/Retail	Sq. Ft.	1,800	0.5	900	3.0	N/A	2,700
Total					53,100			326,760

¹Includes site amenities.

²Assumes backwash rate of 60 gpm/small pool for a 10 minute duration.

As shown, the peak flow calculations include peak flows calculated per the City of Scottsdale design criteria.

3.0 EXISTING AND PROPOSED INFRASTRUCTURE

3.1 Existing Sewer Lines

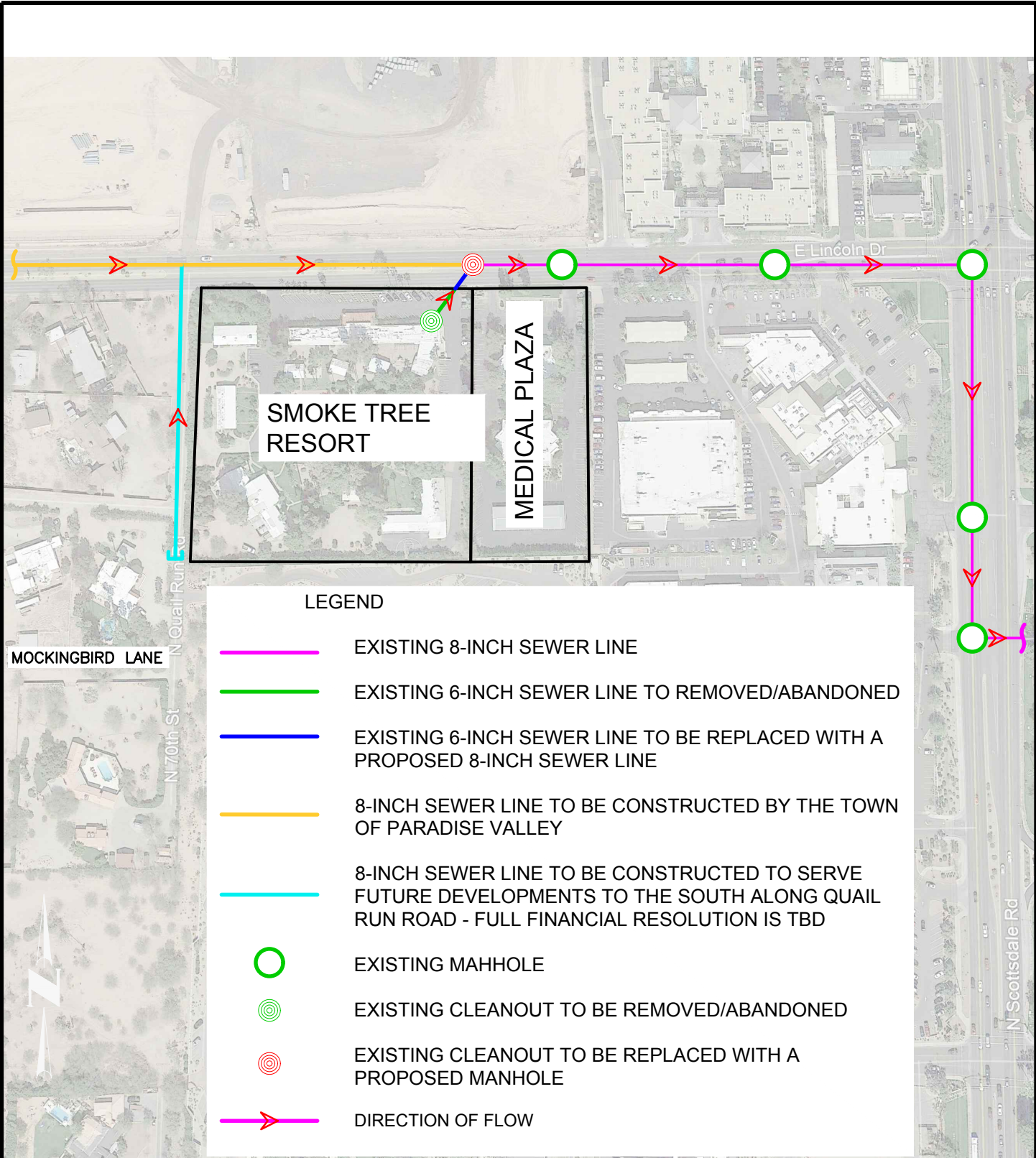
An existing 8-inch gravity sewer is adjacent to the site in Lincoln Drive and accepts flows from the existing 6-inch VCP gravity sewer serving the Smoke Tree Resort. Wastewater flows east within the existing 8-inch sewer line in Lincoln Drive to North Scottsdale Road. From here the wastewater flows south along North Scottsdale Road to McDonald Drive flowing east. (See Figure 3 and Appendix C for direction of flow.) Flow is ultimately treated at the 91st Avenue Regional Wastewater Treatment Plant in west Phoenix, which is owned and operated by the Sub-Regional Operating Group (SROG).

3.2 Proposed Infrastructure

The existing 6-inch VCP gravity sewer serving the Smoke Tree Resort will be replaced by 21.02-feet of 8-inch gravity sewer as designed by T.Y. Lin at a slope of 0.0052 ft/ft per the Town of Paradise Valley Arizona Roadway and Utility Improvements – Lincoln Drive Project No. 2016-14. Smoke Tree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.

The on-site collection system will consist of sewer service lines and is designed to convey wastewater from the south to the north where it will connect to the 8-inch gravity sewer service designed by T.Y. Lin and flow into the existing 8-inch gravity sewer line in Lincoln Drive. Wastewater will flow east within the existing 8-inch sewer line in Lincoln Drive to North Scottsdale Road. From here the wastewater flows south along North Scottsdale Road eventually to McDonald Drive flowing east. All sewer lines will be located in major streets or in easements dedicated for that use. Project No. 2016-14 is going to stub out an 8-inch gravity sewer line in Quail Run Road which will not be utilized by the development of the Smoke Tree Resort. This 8-inch stub will be extended to the south end of the proposed Quail Run Road improvements adjacent to the Smoke Tree development for use by future development to the south. Full financial resolution for the extension of the 8-inch gravity sewer along Quail Run Road adjacent to the Smoke Tree Resort is yet to be determined.

A sewer capacity analysis was completed to design the wastewater line for Smoke Tree Resort. The analysis may be seen in Appendix D. The sewer mains will be sized according to the anticipated cumulative flows as the lines are routed to the existing 8-inch gravity sewer within Lincoln Drive. The pipe size and minimum and maximum slope required will be determined based on the criteria established in Section 2.1. Manholes within the development are assumed to have 6 feet of depth to verify cover depth and allow for slope design.



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WASTEWATER SYSTEM LAYOUT

SMOKE TREE RESORT

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FIGURE 3

4.0 SUMMARY

This wastewater system analysis presents the collection system design criteria and proposed wastewater infrastructure for the Smoke Tree Resort. This wastewater system will be owned by the Town of Paradise Valley and operated by the City of Scottsdale. The sewer infrastructure conforms to the City of Scottsdale's minimum standards and is consistent with the City's current *Design Standards and Policies Manual, January 2018*.

The results of this analysis are summarized as follows:

- The proposed collection system is designed to meet the *City of Scottsdale Design Standards and Policies Manual, January 2018*.
- The proposed collection system will discharge to the 8-inch gravity sewer service designed by T.Y. Lin connecting the Smoke Tree Resort to the existing 8-inch gravity sewer line in Lincoln Drive.
- Smoke Tree Resort will reimburse the Town of Paradise Valley for the replacement off the 6-inch VCP gravity sewer with the 8-inch gravity sewer and manhole as part of the Lincoln Road Improvement Project No. 2016-14.
- Full financial resolution for the extension of the 8-inch gravity sewer along Quail Run Road adjacent to the Smoke Tree Resort is yet to be determined.
- Minimum and maximum pipe velocities were met for all proposed sewer lines.
- The average daily flow for Smoke Tree Resort is estimated at 53,100 gpd.
- The peak flow for Smoke Tree Resort including pool backwash is estimated at 326,760 gpd.
- Wastewater demands include site amenities within the Resort Hotel Room demand of 380 gpd for average daily flow and 1,710 gpd for peak flow. The Restaurant, Market, and Coffee Shop have been added as individual land uses beyond site amenities as requested by the City of Scottsdale.

The Town has noted that the Developer shall extend 8" sewer stub out on N. Quail Run Rd. to be installed with Town's Lincoln Rd. Improvement project to the end of the Developer's N. Quail Run Rd. improvements. Developer may seek sewer reimbursement agreement. Installation with N. Quail Run Rd. construction will avoid future pavement cuts and disruption to the resort and residents. The sewer reimbursement agreement may be initiated by the developer following the requirements of Chapter 15 of the Town Code. The Developer shall provide the Town with any easements and access required to install the 8" sewer lateral as part of the Lincoln Drive improvement project. The Developer shall reimburse the Town for all costs associated with design and construction of the 8" sewer lateral and required manhole. This may be included in a Development Agreement.

APPENDIX A

City of Scottsdale “Will-Serve” Letter



Water Resources

9379 E. San Salvador
Scottsdale, AZ 85258

PHONE 480-312-5685
FAX 480-312-5615
www.ScottsdaleAZ.gov

February 11, 2020

Maricopa County Environmental Services Department
1001 North Central Avenue, Suite 150
Phoenix, AZ 85004

**Re: Sanitary Sewer Connection
Smoke Tree Resort
Town of Paradise Valley**

Gentlemen:

This letter is provided to satisfy those submittal requirements under General Aquifer Protection Permit 4.01 for extension of a sanitary sewer collection system as indicated below:

The City of Scottsdale's sanitary sewer collection system has sufficient capacity to accept the flows generated from this project and convey those flows into the City of Scottsdale's sewer collection system.

The City of Scottsdale's sanitary sewer collection system which discharges to the Princess metering station has sufficient capacity to accept the residual waste stream resulting from the treatment of flows generated from this project. Downstream of the Princess metering station, these residual flows enter into the Sub-regional Operating Group (SROG) Salt River Outfall (SRO) trunk line.

The City of Scottsdale has established operational requirements and maintenance procedures to assure efficient conveyance of sanitary sewer flows throughout its collection system.

If you have any questions regarding this information, please contact our office at 480-312-5685.

Sincerely,

A handwritten signature in blue ink that reads "Phil Sacks".

Richard Sacks, P.E.
Scottsdale Water

FINAL Basis of Design Report

- APPROVED**
- APPROVED AS NOTED**
- REVISE AND RESUBMIT**



January 20, 2020

Smoke Tree Resort

7101 East Lincoln Drive
Paradise Valley, Arizona 85253

Wastewater Capacity Study

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance. For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks

DATE 1/29/2020

Prepared for:

Gentree LLC

3620 East Campbell Avenue
Suite B
Phoenix, AZ 85018
Contact: Sam Robinson



Cassandra Alejandro

Prepared by:

Coe & Van Loo Consultants, Inc.

4550 N. 12th Street
Phoenix, AZ 85014
Contact: Cassandra Alejandro, P.E.
602.285.4763

Job # 1.01.0315301



WASTEWATER CAPACITY STUDY

APPENDIX B

***Applicable Pages from the Town of Paradise
Valley Wastewater Master Plan (Arcadis, May
2015)***



FINAL REPORT

WASTEWATER MASTER PLAN

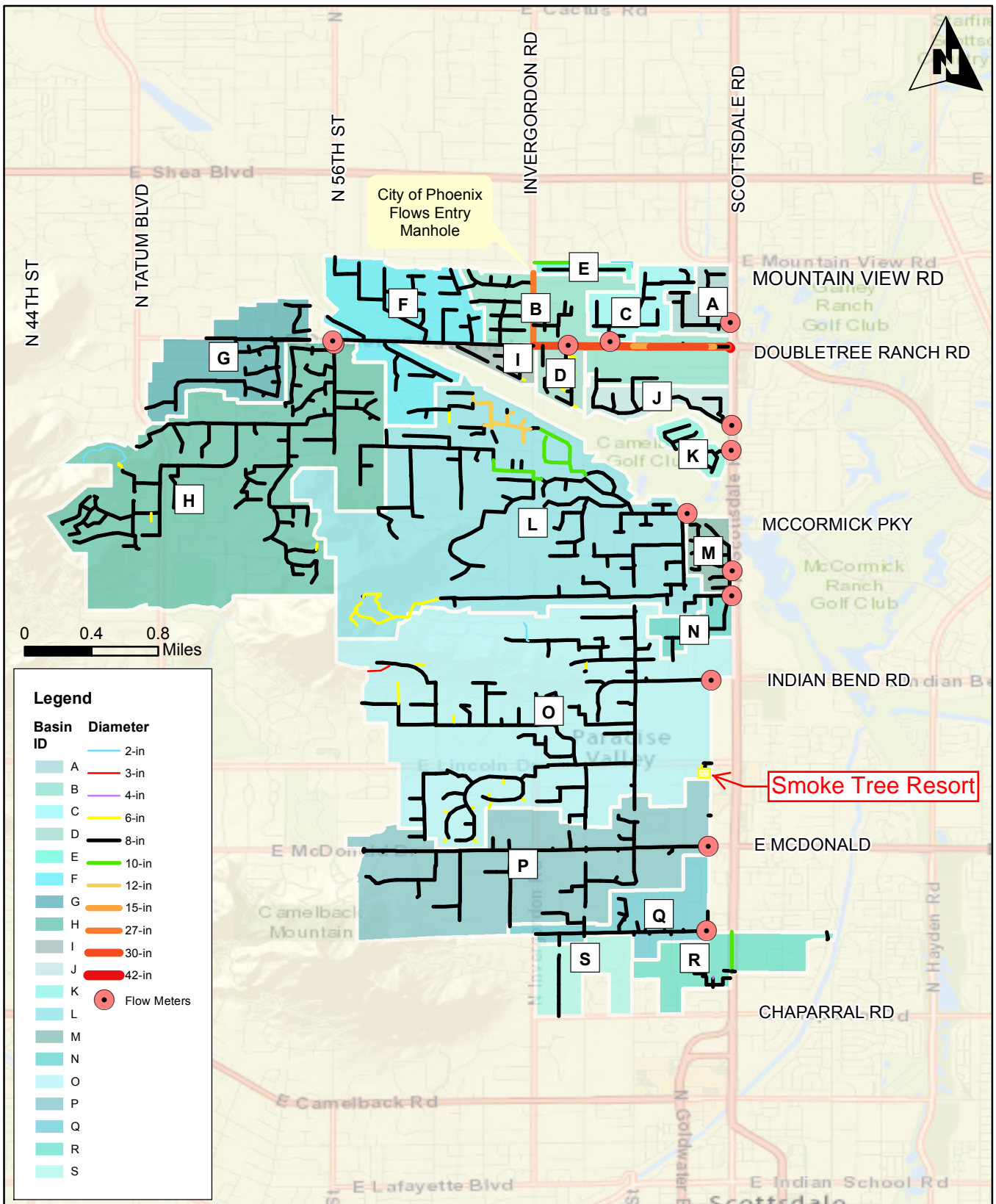
MAY 2015

Welcome
Town of
Paradise Valley

Timothy Francis



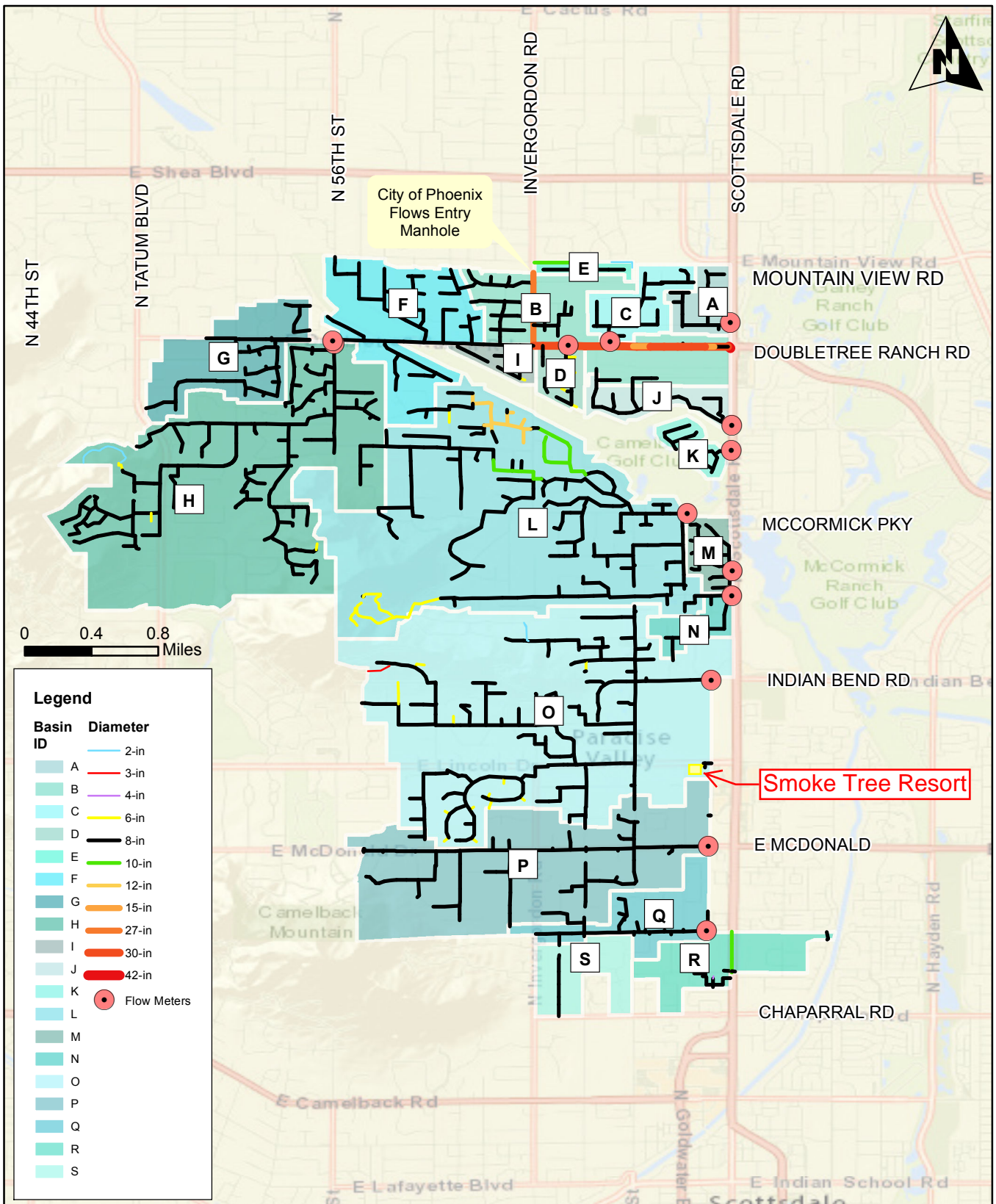
Expires 12/31/17



TOWN OF PARADISE VALLEY, ARIZONA
 WASTEWATER MASTER PLAN
 Existing Collection System



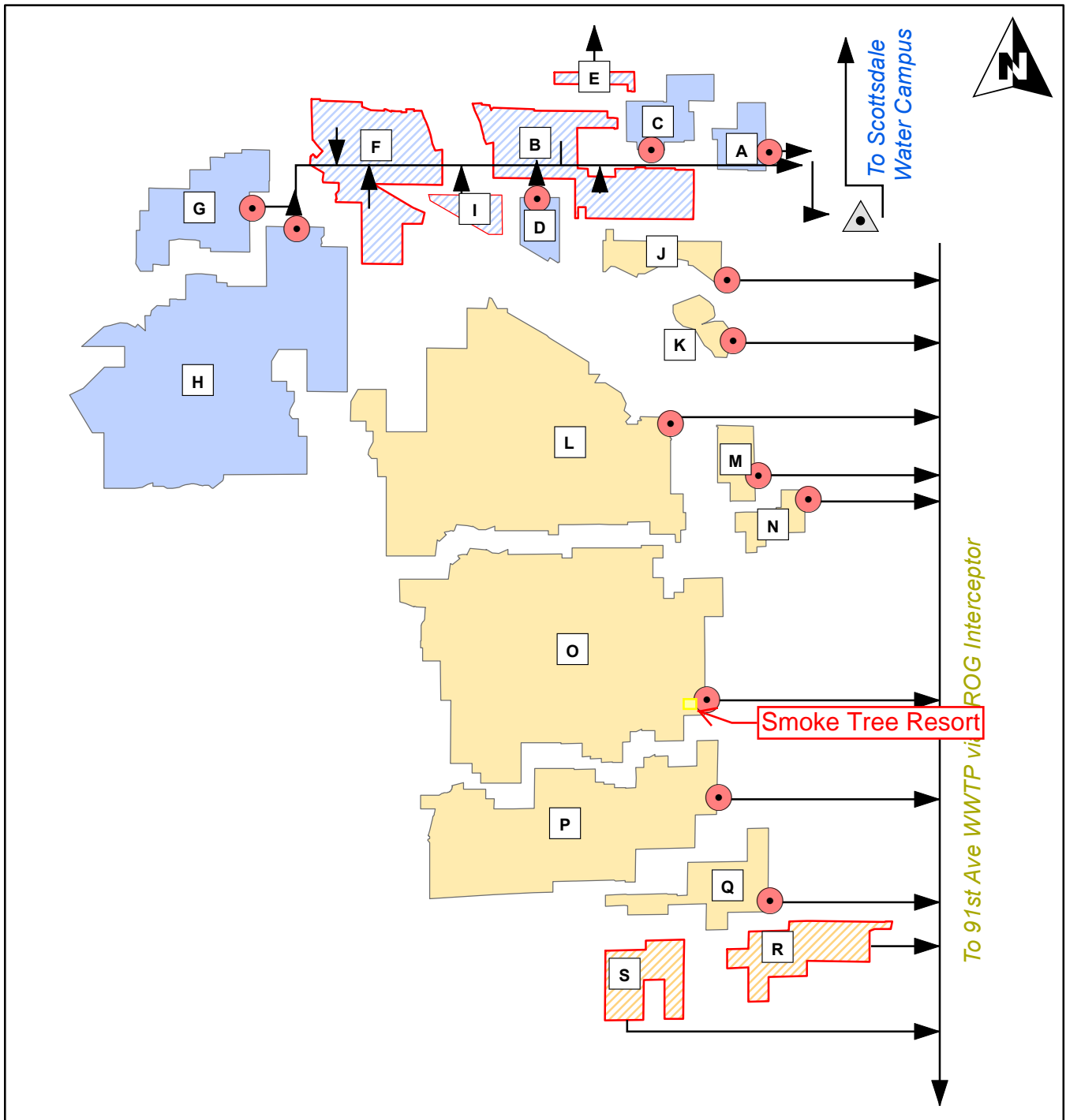
May 2015
 FIGURE 3-1







TOWN OF PARADISE VALLEY, ARIZONA
 WASTEWATER MASTER PLAN
 Existing Collection System



May 2015
 FIGURE 3-1



Legend

-  Scottsdale Lift Station
-  Flow Meters
-  Schematic Basin Connectivity
-  Flows to Scottsdale Water Campus, Metered
-  Flow to Scottsdale Water Campus, Unmetered
-  Flows to 91st Ave WWTTP via SROG Interceptor, Metered
-  Flows to 91st Ave WWTTP via SROG Interceptor, Unmetered



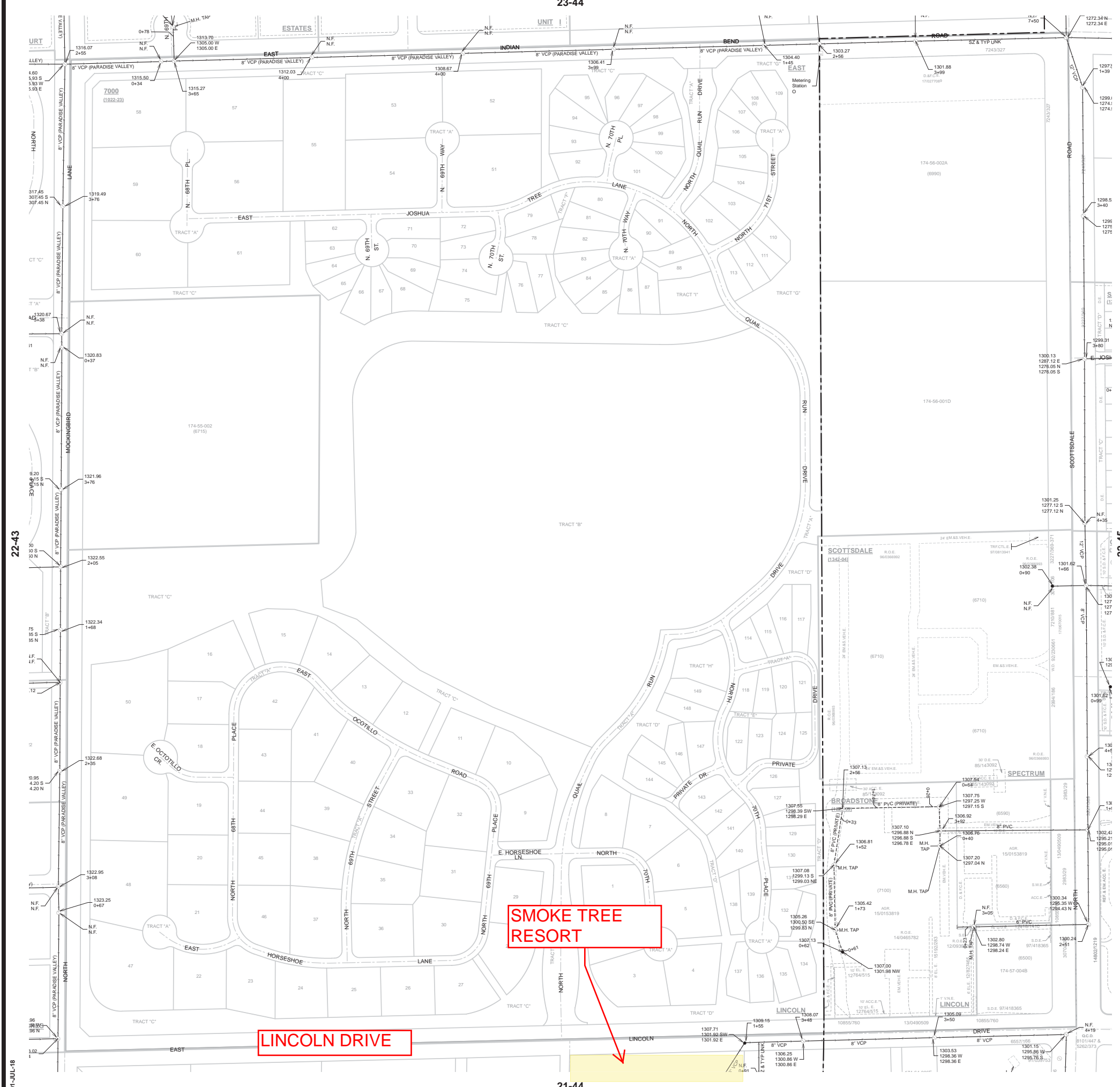
TOWN OF PARADISE VALLEY, ARIZONA
WASTEWATER MASTER PLAN
Schematic of Existing Basin Connectivity



May 2015
 FIGURE 3-2

APPENDIX C

Sewer Quarter Section Maps

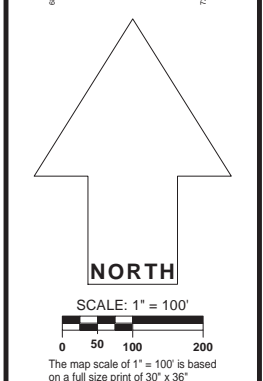
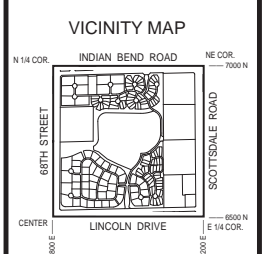


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 THE CITY OF SCOTTSDALE
 01-JUL-18

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 • THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

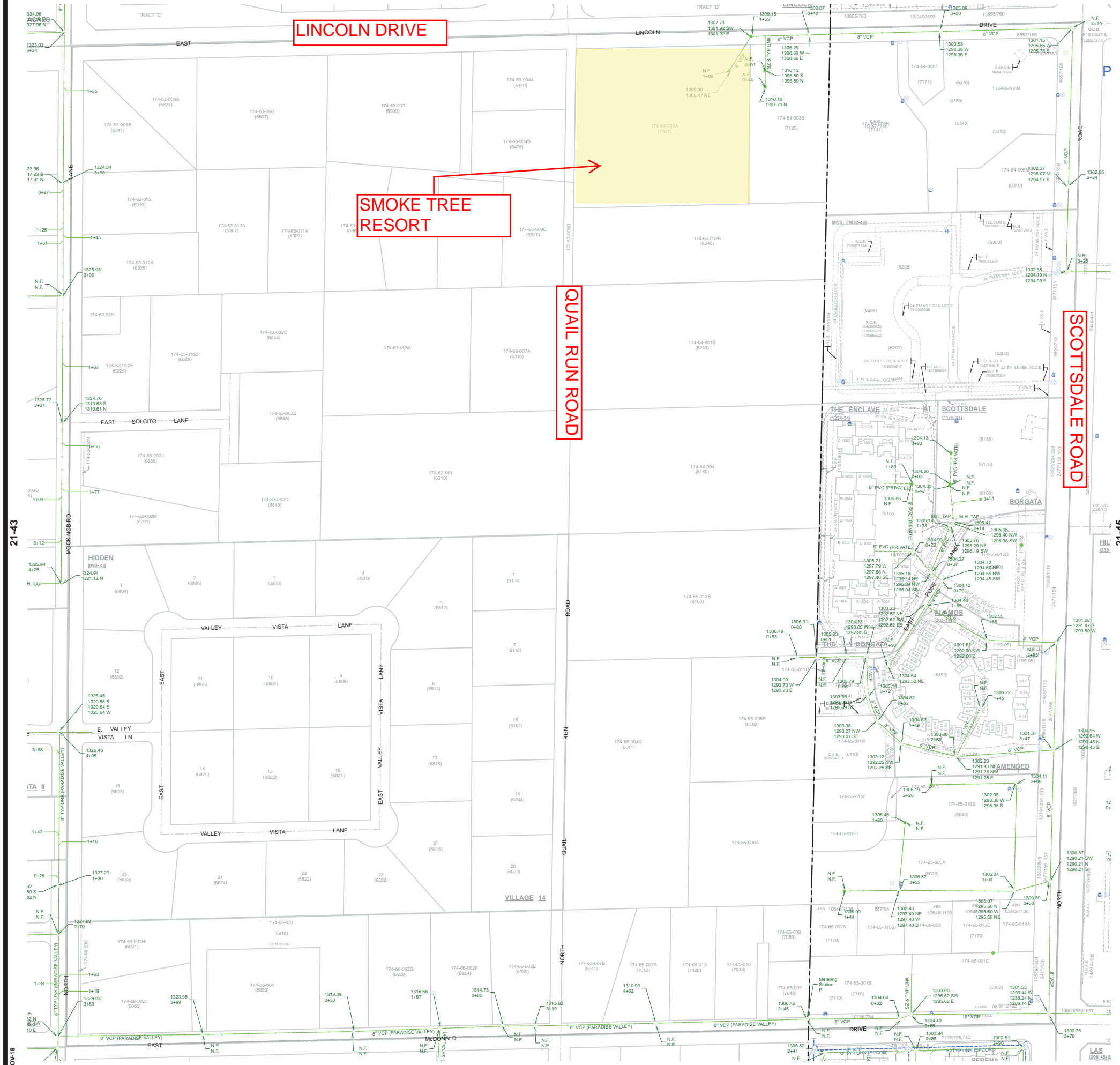
LEGEND:

Cleanout	●
Lift Station	⊠
Manhole	⊙
Non-GPS Point	○
Plug	⌋
Sewer Service Point	⊞
Sewer Tap Point	⊞
Sewer Valve	⊗
Treatment Plant	⊞
Sewer Main - Gravity	—
Sewer Main - Force	—
Sewer Main - Private	—



SEWER
 QUARTER SECTION MAP
22-44
 NE 1/4 SEC. 10 T2N R4E

CITY OF SCOTTSDALE
 SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
 3629 North Drinkwater Boulevard
 Scottsdale, Arizona 85251

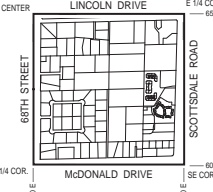


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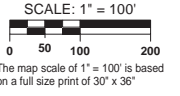
LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP



NORTH



WATER & SEWER
 QUARTER SECTION MAP
21-44
 SE 1/4 SEC. 10 T2N R4E

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 THE CITY OF SCOTTSDALE
 25-NOV-18

CITY OF SCOTTSDALE
 SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
 3629 North Drinkwater Boulevard
 Scottsdale, Arizona 85251

APPENDIX D

Sewer Analysis Results

Table B-1: Smoke Tree Resort System Calculations

Upstream MH	Downstream MH	DU or Units	Average Day Unit Factor (gpcpd)	Average Daily Flow (gpd)	Cumulative Average Daily Flow	Peak Factor	Sewer Lines Peak Flow (gpd)	Upstream Peak Flow (gpd)	Peak Flow (gpd)	Total Estimated Peak Flow (gpd)	Estimated Ground Elevation (feet)	Estimated Length (feet)	Line Diameter (inches)	Sewer Line Slope (ft/ft)	Estimated Upstream MH Depth (feet)	Estimated Upstream Invert Elevation (feet)	Drop Through Manhole/Meeting Crowns (feet)	Estimated Downstream Invert Elevation (feet)	Sewer Line Capacity (gpd)	% Full (Q/Qf)	Velocity Flowing Full (fps)	Actual Peak Velocity (fps)	d/D
stub	MH 7	122	380.00	53,100	53,100	4.50	326,760	0	326,760	326,760.00	1309.14	21	8	0.0052	6.14	1302.33	0.10	1302.22	563,106	58%	2.5	2.59	0.55
	Pool Backwash	1	60 gpm/pool	Peak Day Demand		86,400																	
	Restaurant	3200	1.2 gpd/sq ft			6																	
	Market	4000	0.5 gpd/sq ft			3																	
	Coffee Shop	1800	0.5 gpd/sq ft			3																	

Existing invert information from T.Y. Lin Plans for the Town of Paradise Valley Arizona Roadway and Utility Improvements Lincoln Drive Project No. 2016-14

Average Day Unit Factor includes all site amenities