CITY OF SCOTTSDALE

Water and Wastewater Study
Combined

PRELIMINARY Basis of Design Report

☑ ACCEPTED

☐ ACCEPTED AS NOTED

☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

03/11/2021

BY rsacks **DATE** 3/11/2021

WOOD PATEL

PRELIMINARY WATER DISTRIBUTION SYSTEM
BASIS OF DESIGN REPORT
FOR
RAINTREE DRIVE RESIDENTIAL

March 5, 2021
WP# 195063

EXPIRES 6-30-21

1-DR-2020
3/9/2021

WOOD PATEL

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March 5, 2021

Mr. Levi Dillion, PE
Senior Water Resources Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillion@scottsdaleaz.gov

Re: **Raintree Drive Residential**
Preliminary Water Distribution System Basis of Design Report
WP# 195063

Mr. Dillion:

This Preliminary Water Distribution System Basis of Design Report is prepared for Trammell Crow and submitted to the City of Scottsdale. The Raintree Drive Residential Building (Site) is a 3.12-acre site, located at the southeast corner of North Northsight Boulevard and East Raintree Drive. More specifically, the Site is located at the southwest quarter of Section 12, Township 3 North, Range 4 East of the Gila and Salt River Meridian. Refer to the *Vicinity Map* at the back of this report for project location. The Site is a proposed 5-story, 190-room residential building with 5.5-story parking garage with associated paving, utility, hardscape, and landscape improvements.

The Site is surrounded by public waterline infrastructure which forms a looped waterline system around the Site. There is one (1) 12-inch C900 water main in Northsight Boulevard, (1) 20-inch SCP and one (1) 12-inch ACP water main in Raintree Drive, and one (1) 10-inch C900 water main in 87th Street. There is one (1) 8-inch DIP public waterline in the existing Raintree Private Drive. The Raintree Drive Residential site proposes two (2) new connections to the public 8-inch water main in the Raintree Private Drive to service domestic and fire demands. Refer to the attached *Water Exhibit* for a depiction of the existing water infrastructure surrounding the Site.

The design criteria used to estimate potable water demands and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL's) understanding of the requirements listed in the *City of Scottsdale Design Standards and Policies Manual*, 2018. The following is a summary of the primary design criteria utilized:

- Average Day Water Demand, High Density Condominium:.....0.27 gpm/unit*
- Fire Flow Requirements: .....min 1,500 gpm**
- Maximum Day Demand:.....2.0 x ADD
- Peak Hour Demand:.....3.5 x ADD
- Minimum Residual Pressure, Peak Hour: .....50 psi
- Minimum Residual Pressure, Maximum Day + Fire Flow: .....30 psi
- Maximum System Pressure:.....120 psi
- Maximum Pipe Head Loss, Maximum Day Demand: .....8 ft / 1000 ft
- Maximum Pipe Head Loss, Peak Hour Demand: 10 ft / 1000 ft
- Minimum Pipe Diameter, Public Water Line..... 8 inches

Abbreviations: gpd = gallons per day; sf = square feet; ADD = average day demand; psi = pounds per square inch

1-DR-2020
3/9/2021

*Includes both inside and outside use per Figure 6-1.2, *COS Design Standards & Policies Manual*
**Fire flow is based on 10% reduction to account for flow measurement inaccuracy (Refer to attached *Calculations* in the appendices)

Potable water service for the proposed Site will be provided by one (1) 3-inch domestic turbo water service, equipped with a 3-inch backflow prevention device and meter, connecting to the existing 8-inch waterline on the south side of the Site. A 1-inch irrigation service, equipped with a 1-inch backflow prevention device and meter, will be relocated and utilized in the northeast corner. Refer to the attached *Water Exhibit* for a depiction of the proposed water infrastructure.

Fire protection for the proposed building will be provided though one (1) 8-inch fire sprinkler service, connecting to the 8-inch public waterline on the south side of the Site. In addition, there are several existing fire hydrants within the Site vicinity. One (1) fire hydrant will be relocated. Refer to the attached *Water Exhibit* for proposed fire hydrant and fire sprinkler service locations.

The design criteria used to estimate water demands and evaluate system hydraulics are based on WOODPATEL's understanding of locally accepted design criteria, and the requirements listed in the City of Scottsdale Standards.

The average-day water demand for the Site is projected to be approximately 73,872 gallons per day (gpd), or 51 gallons per minute (gpm). The projected max day demand is 103 gpm. The projected peak demand is 180 gpm (Refer to the attached *Calculation and Hydraulic Modeling Results*). The plumbing engineer will review internal building design to confirm whether a pump is required to maintain the minimum 50 psi at the highest finished floor.

WaterCAD Version 8i, by Haestad Methods, was utilized to analyze the existing water distribution system and proposed improvements. The hydraulic model was calibrated using data provided from a fire hydrant flow test, performed by the Arizona Flow Testing, LLC., on November 8, 2019 (Refer to attached *Fire Hydrant Flow Test*).

The hydraulic modeling results indicate the proposed system is capable of delivering peak demands of approximately 180 gpm to the Site, with pressures ranging from 72 -74 psi. Fire-flow results during Max Day demand indicate the required fire flows (1,500 gpm) are available within the proposed development at all existing and proposed fire hydrants, with system residual pressures at or above 30 psi, with the minimum fire flow at 2,704 gpm. It is important to add, a 75-percent reduction was applied to the fire flow requirements, due to proposed sprinkler system. Hydraulic-modeling results, calculations, and exhibits involved in the water system analysis are attached.

Thank you for your review of the Water Distribution System Basis of Design Report provided for the Raintree Drive Residential. Feel free to contact me if you have any questions.

Wood, Patel & Associates, Inc.

John "Gordy" Ritchie, PE
Project Manager

EXPIRES 6-30-21

Attachments:
Calculations and Hydraulic Modeling Results
Vicinity Map
Water System Exhibit
Fire Flow Test Results

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CALCULATIONS AND HYDRAULIC MODELING RESULTS

WOOD PATEL

TABLE 1
WATER DEMAND DESIGN FLOWS

Project	Raintree Drive Residential
Location	Scottsdale AZ
Project Number	15063
Project Engineer	John "Gordy" Ritchie
References	City of Scottsdale Design Standards and Policies Manual

LAND USE AND DWELLING UNIT BREAKDOWN BY JUNCTION

HYDRAULIC MODEL NODE	ELEVATION (ft)	LAND USE	DWELLING UNITS	DEMAND VALUE	UNITS	AVERAGE DAILY DEMAND			MAX DAY FLOW			PEAK FLOW		
						(gpm)	(gpd)	Total (gpm)	(gpm)	(gpd)	Total (gpm)	(gpm)	(gpd)	Total (gpm)
J-DOM	1,462.00	High Density Condominium	190	0.27	gpm/Unit	51.30	73,872.00	51.30	102.60	147,744.00	102.60	179.55	258,552.00	179.55
Total			**190**			**51**	**73,872**	**51**	**103**	**147,744**	**103**	**180**	**258,552**	**180**

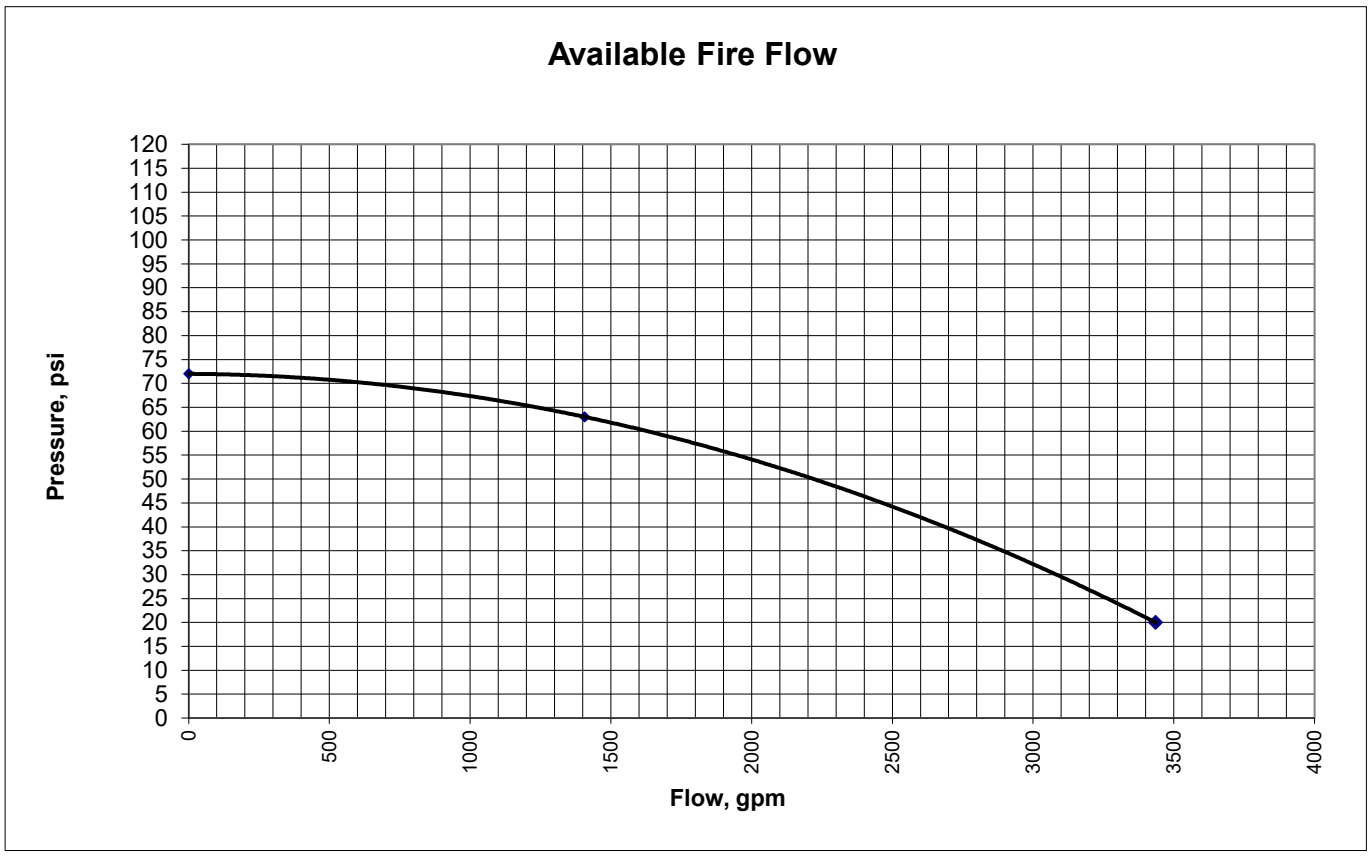
WOOD PATEL

EXISTING WATER SYSTEM PRESSURES

Project	Raintree Drive Residential
Location	Scottsdale AZ
Project Number	15063
Project Engineer	John "Gordy" Ritchie

Flow Test Location
Date of Flow Test

Pressure Hydrant		**Flow Hydrant**	
Static Pressure (psi)	72.0		
Residual Pressure (psi)	63.0	Flow (gpm)	1407
Calculated Flow at 20 psi	3435 gpm	Calculated Flow at	20 psi



Discharge (gpm)	Pressure (psi)	Head (ft)
0	72	166.2
1407	63	145.5
3435	20	46.2

Notes
1. Values provided from a flow test by Arizona Fire Flow Testing LLC.

1-DR-2020
3/9/2021

FlexTable: Pipe Table

Active Scenario: Calibration - Static

Label	Diameter (in)	Material	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	Ductile Iron	FH-TEST	J-DOM	130.0	0	0.00
P-2	8.0	Ductile Iron	J-DOM	FH-FIRE	130.0	0	0.00
P-4	8.0	Ductile Iron	J-FLOW	J-1	130.0	0	0.00
P-5	12.0	PVC	J-1	J-2	150.0	0	0.00
P-6	12.0	Asbestos Cement	J-2	FH-TEST	140.0	0	0.00
P-PMP	48.0	Ductile Iron	PMP-1	FH-TEST	130.0	0	0.00
P-RES	48.0	Ductile Iron	RES-1	PMP-1	130.0	0	0.00

FlexTable: Junction Table

Active Scenario: Calibration - Static

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
FH-FIRE	1,458.50	0	1,629.20	74
FH-TEST	1,463.00	0	1,629.20	72
J-1	1,460.00	0	1,629.20	73
J-2	1,460.00	0	1,629.20	73
J-DOM	1,462.00	0	1,629.20	72
J-FLOW	1,459.00	0	1,629.20	74

FlexTable: Pipe Table

Active Scenario: Calibration - Flow

Label	Diameter (in)	Material	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	Ductile Iron	FH-TEST	J-DOM	130.0	0	0.00
P-2	8.0	Ductile Iron	J-DOM	FH-FIRE	130.0	0	0.00
P-4	8.0	Ductile Iron	J-FLOW	J-1	130.0	-1,407	8.98
P-5	12.0	PVC	J-1	J-2	150.0	-1,407	3.99
P-6	12.0	Asbestos Cement	J-2	FH-TEST	140.0	-1,407	3.99
P-PMP	48.0	Ductile Iron	PMP-1	FH-TEST	130.0	1,407	0.25
P-RES	48.0	Ductile Iron	RES-1	PMP-1	130.0	1,407	0.25

FlexTable: Junction Table

Active Scenario: Calibration - Flow

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
FH-FIRE	1,458.50	0	1,608.50	65
FH-TEST	1,463.00	0	1,608.50	63
J-1	1,460.00	0	1,602.96	62
J-2	1,460.00	0	1,605.39	63
J-DOM	1,462.00	0	1,608.50	63
J-FLOW	1,459.00	1,407	1,572.11	49

FlexTable: Pipe Table

Active Scenario: Calibration - Max

Label	Diameter (in)	Material	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	Ductile Iron	FH-TEST	J-DOM	130.0	0	0.00
P-2	8.0	Ductile Iron	J-DOM	FH-FIRE	130.0	0	0.00
P-4	8.0	Ductile Iron	J-FLOW	J-1	130.0	-3,435	21.92
P-5	12.0	PVC	J-1	J-2	150.0	-3,435	9.74
P-6	12.0	Asbestos Cement	J-2	FH-TEST	140.0	-3,435	9.74
P-PMP	48.0	Ductile Iron	PMP-1	FH-TEST	130.0	3,435	0.61
P-RES	48.0	Ductile Iron	RES-1	PMP-1	130.0	3,435	0.61

FlexTable: Junction Table

Active Scenario: Calibration - Max

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
FH-FIRE	1,458.50	0	1,509.20	22
FH-TEST	1,463.00	0	1,509.20	20
J-1	1,460.00	0	1,480.28	9
J-2	1,460.00	0	1,492.94	14
J-DOM	1,462.00	0	1,509.20	20
J-FLOW	1,459.00	3,435	1,319.15	-61

FlexTable: Pipe Table

Active Scenario: Average Day Demand

Label	Diameter (in)	Material	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	Ductile Iron	FH-TEST	J-DOM	130.0	33	0.21
P-2	8.0	Ductile Iron	J-DOM	FH-FIRE	130.0	-19	0.12
P-3	8.0	Ductile Iron	FH-FIRE	J-FLOW	130.0	-19	0.12
P-4	8.0	Ductile Iron	J-FLOW	J-1	130.0	-19	0.12
P-5	12.0	PVC	J-1	J-2	150.0	-19	0.05
P-6	12.0	Asbestos Cement	J-2	FH-TEST	140.0	-19	0.05
P-PMP	48.0	Ductile Iron	PMP-1	FH-TEST	130.0	51	0.01
P-RES	48.0	Ductile Iron	RES-1	PMP-1	130.0	51	0.01

FlexTable: Junction Table

Active Scenario: Average Day Demand

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
FH-FIRE	1,458.50	0	1,629.16	74
FH-TEST	1,463.00	0	1,629.17	72
J-1	1,460.00	0	1,629.17	73
J-2	1,460.00	0	1,629.17	73
J-DOM	1,462.00	51	1,629.16	72
J-FLOW	1,459.00	0	1,629.16	74

FlexTable: Pipe Table

Active Scenario: Peak Hour

Label	Diameter (in)	Material	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1	8.0	Ductile Iron	FH-TEST	J-DOM	130.0	114	0.73
P-2	8.0	Ductile Iron	J-DOM	FH-FIRE	130.0	-65	0.42
P-3	8.0	Ductile Iron	FH-FIRE	J-FLOW	130.0	-65	0.42
P-4	8.0	Ductile Iron	J-FLOW	J-1	130.0	-65	0.42
P-5	12.0	PVC	J-1	J-2	150.0	-65	0.19
P-6	12.0	Asbestos Cement	J-2	FH-TEST	140.0	-65	0.19
P-PMP	48.0	Ductile Iron	PMP-1	FH-TEST	130.0	180	0.03
P-RES	48.0	Ductile Iron	RES-1	PMP-1	130.0	180	0.03

FlexTable: Junction Table

Active Scenario: Peak Hour

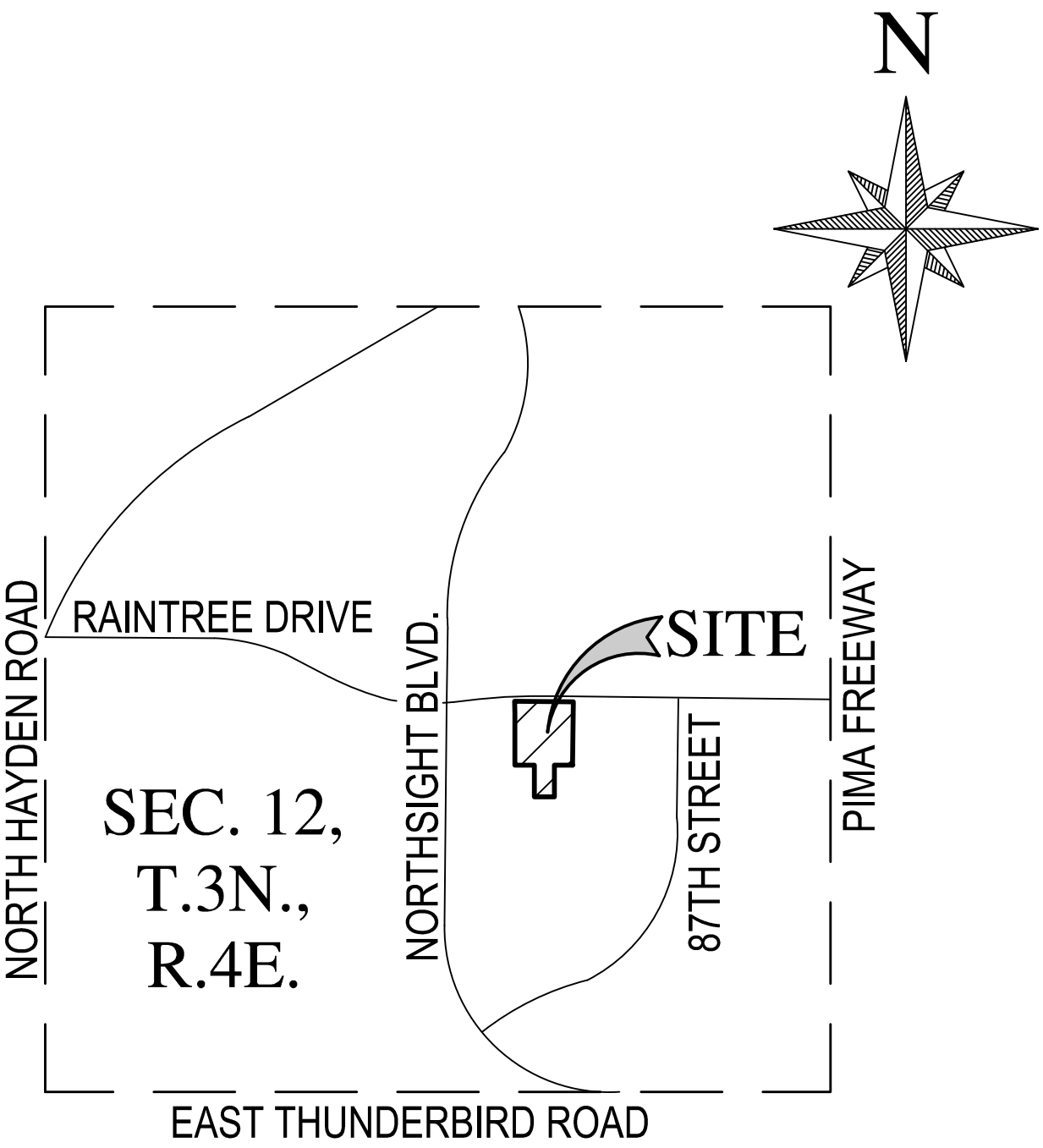
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
FH-FIRE	1,458.50	0	1,628.72	74
FH-TEST	1,463.00	0	1,628.84	72
J-1	1,460.00	0	1,628.82	73
J-2	1,460.00	0	1,628.83	73
J-DOM	1,462.00	180	1,628.72	72
J-FLOW	1,459.00	0	1,628.72	73

Fire Flow Node FlexTable: Fire Flow Report

Active Scenario: Fire Flow + Max Day

Label	Elevation (ft)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Hydraulic Grade (ft)
FH-FIRE	1,458.50	1,500	2,662	30	31	1,629.04
FH-TEST	1,463.00	1,500	2,978	30	30	1,629.08
J-1	1,460.00	1,500	2,826	30	30	1,629.07
J-2	1,460.00	1,500	2,893	30	30	1,629.08
J-DOM	1,462.00	1,603	2,763	30	30	1,629.04
J-FLOW	1,459.00	1,500	2,664	30	31	1,629.04

VICINITY MAP



NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD PATEL

RAINTREE DRIVE RESIDENITIAL

VICINITY MAP

DATE	03-05-2021	SCALE	N/A	SHEET	01 OF 01
JOB NO.	195063	DESIGN	JGR	CHECK	JGR
		DRAWN	AF	RFI #	N/A

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1-DR-2020
3/9/2021

WATER SYSTEM EXHIBIT

PIPE DIAMETER EXISTING

8-INCHES

12-INCHES

N

0 80 160

Horz. 1 in. = 80 ft.

J-2

P-6

RES-1

PMP-1

P-PMP

P-RES

FH-TEST

RAINTREE DRIVE

EX. FH

EX. FH

RELOCATE LANDSCAPE METER AND BACKFLOW

REMOTE FDC

PROPOSED RAINTREE RESIDENTIAL BUILDING

FIRE SERVICE

RELOCATE FH TO LANDSCAPE

J-FIRE

3" METER & VAULT

P-2

PRIVATE DRIVE

PRIVATE DRIVE

NORTHSIGHT BOULEVARD

P-5

FH-FLOW

P-3

J-DOM

P-4

J-1

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

RAINTREE DRIVE RESIDENITIAL

WATER EXHIBIT

DATE	12-04-19	SCALE	1" = 80'	SHEET	01 OF 01
JOB NO.	195063	DESIGN	JGR	DRAWN	AF

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1-DR-2020
3/9/2021

FIRE FLOW TEST RESULTS

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Raintree Phase 3 Residential Building
Project Address:	87th Street and Raintree Drive, Scottsdale, Arizona 85260
Arizona Flow Testing Project No.:	19414
Client Project No.:	Not Provided
Flow Test Permit No.:	C60265
Date and time flow test conducted:	November 8, 2019 at 8:00 AM
Data is current and reliable until:	May 8, 2020
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Jared Berry – City of Scottsdale-Inspector (602-541-4942)

Raw Test Data

Static Pressure: **82.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **73.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **14.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: 4- Inch Hose Monster
(Measured in inches)

Coefficient of Diffuser: .7875

Flowing GPM: **1,407 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **3,989 GPM**

Data with 10 PSI Safety Factor

Static Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **63.0 PSI**
(Measured in pounds per square inch)

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Distance between hydrants: Approx. 330 Feet

Main size: Not Provided

Flowing GPM: **1,407 GPM**

GPM @ 20 PSI: **3,627 GPM**

Flow Test Location
+

North

Pressure Fire Hydrant

Project Site
87th Street and Raintree Drive

Flow Fire Hydrant

East Raintree Drive

North 87th Street

Private Drive

1-DR-2020
3/9/2021

WOOD PATEL

PRELIMINARY WASTEWATER COLLECTION SYSTEM
BASIS OF DESIGN REPORT
FOR
RAINTREE DRIVE RESIDENTIAL

March 5, 2021
WP# 195063

PRELIMINARY Basis of Design Report

- ☐ **ACCEPTED**
- ☑ **ACCEPTED AS NOTED**
- ☐ **REVISE AND RESUBMIT**

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY rsacks **DATE** 3/11/2021

03/11/2021

Registered Professional Engineer (Civil)
CERTIFICATE NO.
59956
JOHN
G. RITCHIE
Date Signed 03/05/2021
ARIZONA, U.S.A.

EXPIRES 6-30-21

Note that sewer east of MH #4 is not connected to this MH. That sewer flows east.

1-DR-2020
3/9/2021

WOOD PATEL

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March 5, 2021

Mr. Levi Dillion, PE
Senior Water Resources Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

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ldillion@scottsdaleaz.gov

Re: **Raintree Drive Residential**
Preliminary Wastewater Collection System Basis of Design Report
WP# 195063

Mr. Dillion:

This Preliminary Wastewater Collection System Basis of Design Report is prepared for Trammell Crow Company and submitted to the City of Scottsdale in support of the application for a minor General Plan Amendment and rezoning of the property located in the southeast quadrant of Raintree Drive and north Northsight Boulevard.

Phase I consists of the existing office building and improvements on the west side of the property. Phase II consists of an approved office building, parking garage and related improvements to be constructed on the east side of the property.

The proposed Raintree Drive Residential Building (Site) is a 3.12-acre site, located at the southeast corner of north Northsight Boulevard and east Raintree Drive. More specifically, the Site is located at the southwest quarter of Section 12, Township 3 North, Range 4 East of the Gila and Salt River Meridian. Refer to the *Vicinity Map* at the back of this report for project location. The Site is a proposed 5-story, 190-room residential building with 5.5- story parking garage with associated paving, utility, hardscape, and landscape improvements. A pool will be constructed within a courtyard area within the general building footprint. Backwash for the pool will be accounted for within the building plumbing design.

Wastewater flowing from the proposed Site will discharge to an existing 8-inch stub into the 8-inch sewer line located in the Site's private drive, as well as a proposed 6-inch sewer stub that also discharges into the same 8-inch sewer line in the Site's private drive. The 8-inch sewer line then discharges into the existing public 8-inch VCP sewer line in Raintree Drive. Refer to the attached *Wastewater Exhibit* for a depiction of the existing sewer infrastructure surrounding the Site.

The design criteria used to estimate wastewater flows and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL's) understanding of the requirements listed in the *City of Scottsdale Design Standards and Policies Manual,* 2018. The following is a summary of the primary design criteria utilized:

- Average Day Wastewater flows, High Density Condominium: .....140 gpd/unit
- Peaking Factor, High Density Condominium: 4.5
- Minimum Mean Full Flow Velocity:.....2.50 fps
- Minimum Peak Full Flow Velocity:..... 10.0 fps
- Minimum Peak Flow d/D Ratio (12-inch diameter or less sewers):.....d/D = 0.65
- Minimum Peak Full Flow Velocity:.....10.0 fps
- Minimum Peak Flow d/D Ratio (12-inch diameter or less sewers): .....d/D = 0.65

Abbreviations: gpd = gallons per day; fps = feet per second

Based on the above design criteria, the projected average day flow for the proposed project is approximately 26,600 gallons per day (gpd). The peak flow is projected to be 119,700 gpd. The proposed sewer slopes, projected flow velocities, and pipe flow capacities are summarized on the attached spreadsheets.

It is assumed the infiltration and inflow from wet weather has been accounted for in the published design flow rates for the development and the maximum d/D. Therefore, those flows have not been added into the calculations. The proposed sanitary sewer collection system is designed to have adequate capacity to serve the proposed development, including backwash from the pool to be confirmed by the plumbing engineer.

Thank you for your review of the Preliminary Wastewater Collection System Basis of Design Report provided for the Raintree Drive Residential. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

EXPIRES 6-30-21

John "Gordy" Ritchie, PE
Project Manager

Attachments: Wastewater Design Flows & Flowmaster Results
Vicinity Map
Wastewater Exhibit

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1-DR-2020
3/9/2021

WASTEWATER DESIGN FLOWS & FLOWMASTER RESULTS

TABLE 1
WASTEWATER MODEL, FULL BUILD-OUT CONDITION

Project	Raintree Drive Residential
Location	Scottsdale AZ
Project Number	15063
Project Engineer	John "Gordy" Ritchie
References	City of Scottsdale Design Standards and Policies Manual
	Arizona Administrative Code, Title 18, Chapter 9

FROM NODE	TO NODE	Multi-Family Residential (DU)	Commerical (Office)	DEMAND VALUE (gpd/DU)	SEWER NODE ADD (gpd)	TOTAL ADD (gpd)	POPULATION	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (gpm)
Outfall 1 Priavte Drive										
Office	Private Drive	0	175,000	0.4	70,000	70,000	0.0	4.5	315,000	219
Residential	Private Drive	190	0	140	26,600	26,600	266.0	4.5	119,700	83
Total Outfall 1		**190**			**26,600**	**96,600**	266.0	4.5	**434,700**	**302**
Total Outfall 1		**190**			**26,600**	**96,600**	266.0	4.5	**434,700**	**302**
Total Proposed Flow		**190**			**26,600**	**96,600**	**266**	**4.5**	**434,700**	**302**

8-Inch at Peak Flow

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.08000	ft/ft
Diameter	8.00	in
Discharge	119700.00	gal/day

Results

Normal Depth	1.27	in
Flow Area	0.04	ft²
Wetted Perimeter	0.55	ft
Hydraulic Radius	0.78	in
Top Width	0.49	ft
Critical Depth	0.20	ft
Percent Full	15.8	%
Critical Slope	0.00641	ft/ft
Velocity	5.23	ft/s
Velocity Head	0.42	ft
Specific Energy	0.53	ft
Froude Number	3.41	
Maximum Discharge	3.68	ft³/s
Discharge Full	3.42	ft³/s
Slope Full	0.00023	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

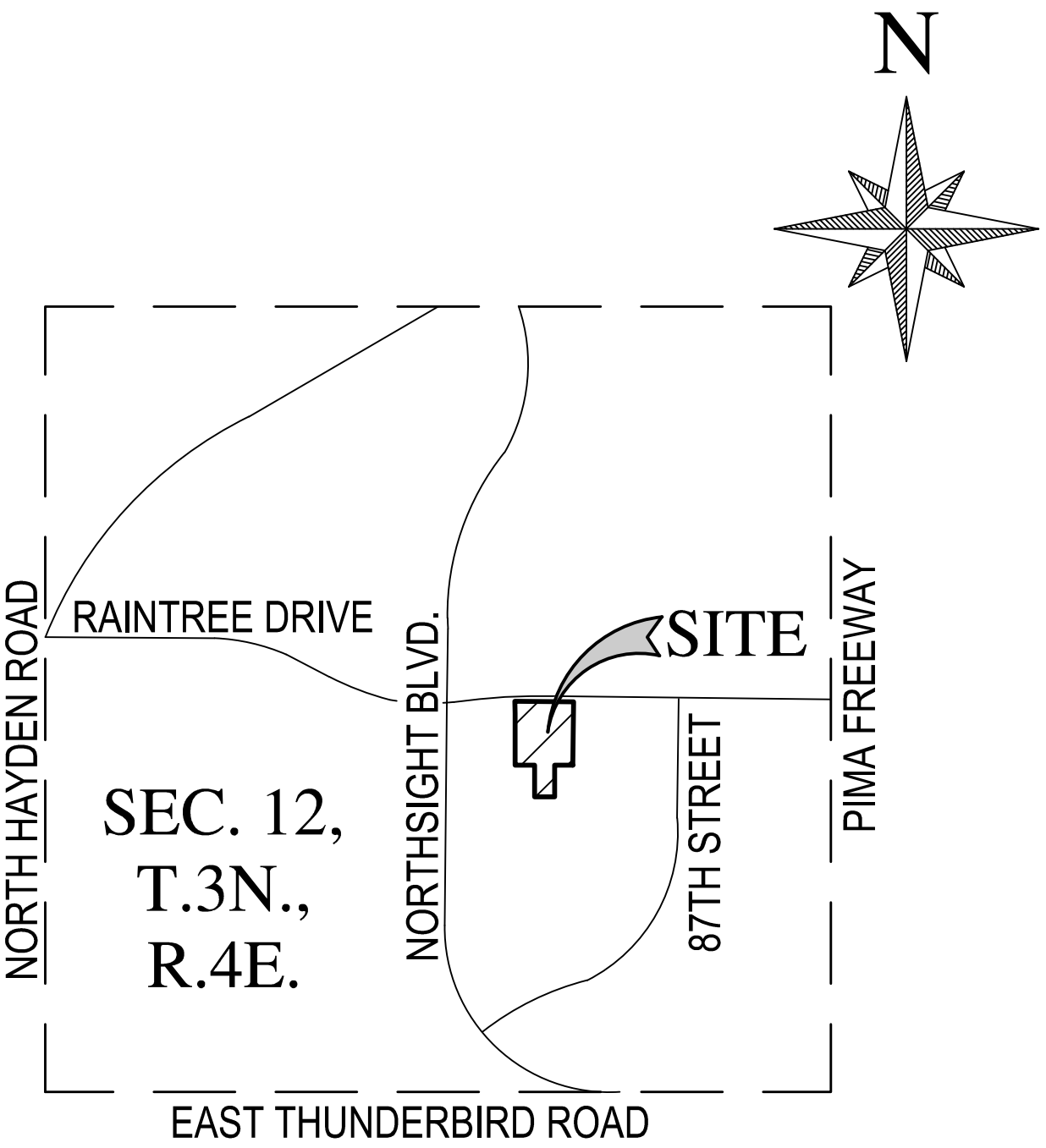
Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	15.81	%
Downstream Velocity	Infinity	ft/s

8-Inch at Peak Flow

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.27	in
Critical Depth	0.20	ft
Channel Slope	0.08000	ft/ft
Critical Slope	0.00641	ft/ft

VICINITY MAP



NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD PATEL

RAINTREE DRIVE RESIDENITIAL

VICINITY MAP

DATE	03-05-2021	SCALE	N/A	SHEET	01 OF 01
JOB NO.	195063	DESIGN	JGR	CHECK	JGR
		DRAWN	AF	RFI #	N/A

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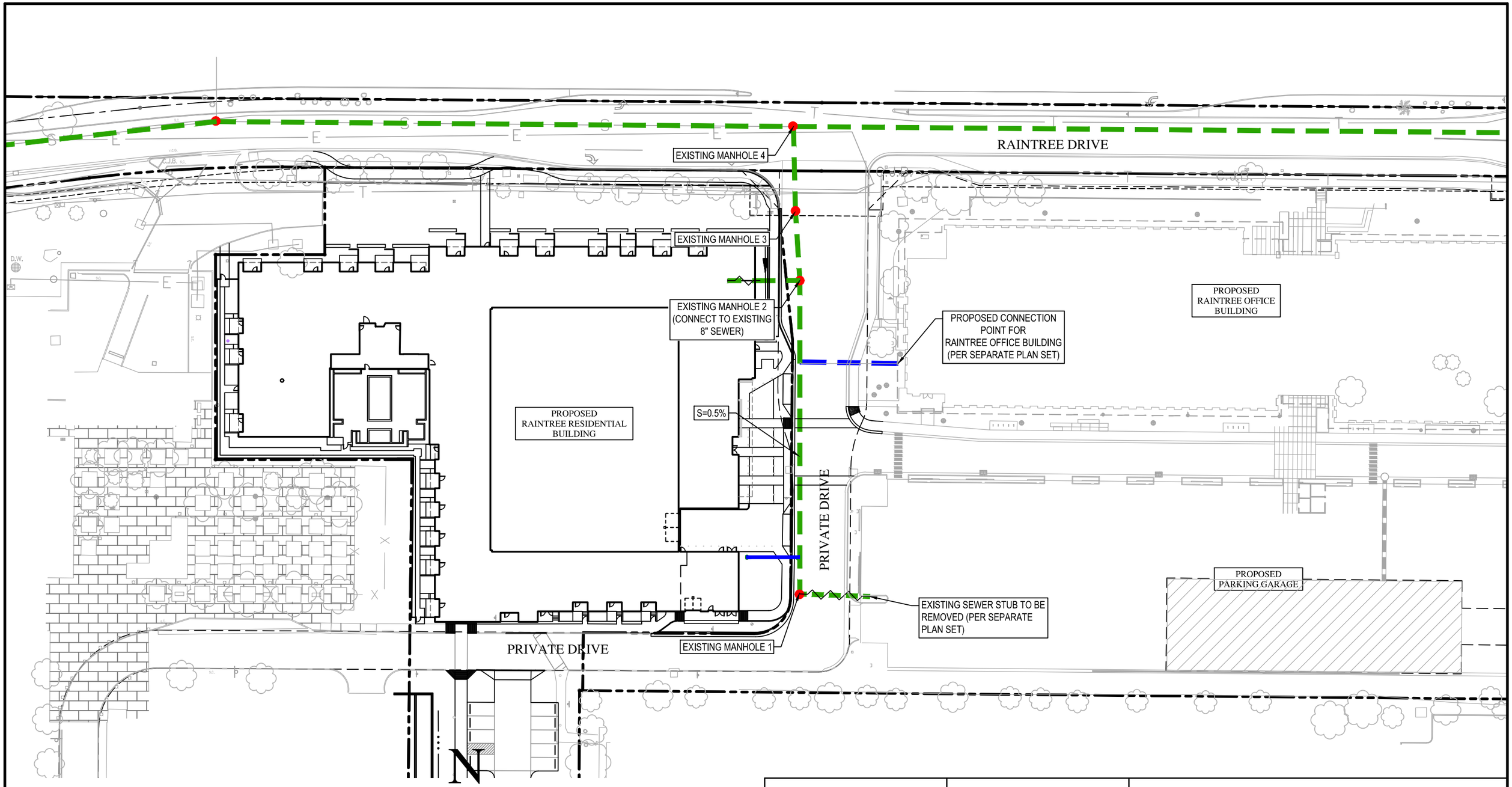
1-DR-2020
3/9/2021

WASTEWATER EXHIBIT



PIPE DIAMETER	EXISTING	PLANNED
6-INCHES		
8-INCHES		
12-INCHES		
MANHOLE		
CLEANOUT		

0 60 120

Horz. 1 in. = 60 ft.

NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD PATEL

RAINTREE DRIVE RESIDENITIAL

WASTEWATER EXHIBIT

DATE	03-05-2021	SCALE	1" = 60'	SHEET	01 OF 01
JOB NO.	195063	DESIGN	JGR	CHECK	TB
		DRAWN	AF	RFI #	N/A

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1-DR-2020
3/9/2021