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 scan **DATE** 9/22/2020

1. If there is future development on this project, the water and wastewater demands should be incorporated into a master plan document.

2. Use City of Scottsdale design flows, if none are available then relate the wastewater flows to the COS water demand. Explain what and how you are determining the flows used.

3. Provide and industrial sampling manhole per DSPM 7-1.406 and Standard Detail 2460. Coordinate location with COS Water Quality.

WOOD PATEL

PRELIMINARY WASTEWATER COLLECTION SYSTEM BASIS OF DESIGN REPORT FOR SEC HAYDEN-LOOP 101 PROJECT

September 10, 2020
WP# 205133

Registered Professional Engineer (Civil)
CERTIFICATE NO.
33359
JOHN M.
BULKA
Date Signed 09/10/20
ARIZONA, U.S.A.
EXPIRES 03-31-23

28-DR-2020
9/11/2020

WOOD PATEL

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Jeffrey R. Minch, PE, CFM
Robert D. Gofonia, PE, RLS
Nicholas E. Brown, PE

September 10, 2020

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillon@scottsdaleaz.gov

Re: **SEC Hayden-Loop 101 Project**
Preliminary Wastewater Collection System Basis of Design Report
WP# 205133

Dear Mr. Dillon:

The proposed SEC Hayden-Loop 101 project (Site) is a 74.44-acre site, located in the northwest quarter of Section 36, Township 4 North, Range 4 East of the Gila and Salt River Meridian. More specifically, the Site is located at the northeast corner of Hayden Road and Mayo Boulevard. Refer to the Vicinity Map at the back of this report for project location. Proposed improvements for the Site include a realignment of the existing Mayo Boulevard, one (1) proposed mixed-used structure and associated parking, landscape, hardscape and utilities. The proposed structure is comprised of two (2) buildings separated by a fire wall. Building 1 is a proposed 5-story building with approximately 216,225 square-feet of office and 33,310 square-feet of industrial space. Building 2 is a proposed 114,535 square-foot single story industrial building.

Wastewater flows from the proposed building will discharge to a proposed 8-inch onsite sewer line. The proposed 8-inch onsite sewer line will connect to a proposed 8-inch offsite/public sewer line (south collection system) in Mayo Boulevard along the south side of the site. The proposed 8-inch offsite/public sewer line will connect to an existing 8-inch stub at the intersection of Hayden Road and Mayo Boulevard which outfalls to an existing manhole in Hayden Road. The proposed 8-inch onsite and offsite/public sewer lines are intended to also serve a portion of future development on the Site. Additionally, a proposed 8-inch offsite/public sewer line (north collection system) will be constructed in the realigned Mayo Boulevard and is intended to also serve future development on Site. This proposed 8-inch offsite/public sewer line will outfall to the existing 12-inch sewer line in Hayden Road. The north sewer collection system has been omitted from the attached capacity calculations and will be analyzed as part of the Master Planning for the Site. Refer to the attached Wastewater Exhibit for a depiction of the existing and proposed wastewater infrastructure for the Site.

The design criteria used to estimate wastewater flows and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL) understanding of the published *City of Scottsdale Design Standards and Policies Manual*, 2018 and City of *Phoenix Design Standards Manual for Water and Wastewater Systems*, 2017. The following is a summary of the primary design criteria utilized:

- Average Day Wastewater Demand, Office: ..... 0.4 gpd / sq. ft
- Average Day Wastewater Demand, Industrial (Phoenix): .....50 gpd / 1,000 sq. ft
- Peak Factor, Office: 3
- Peak Factor, Industrial: .....$1+14/(4+P^{1/2})$
- Minimum Mean Full Flow Velocity: .....2.50 fps
- Minimum Peak Full Flow Velocity:..... 10.0 fps
- Minimum Peak Flow d/D Ratio (12" dia. or less sewers): ..... d/D = 0.65

Abbreviations: gpd = gallons per day; fps = feet per second; P=population/1,000

Based on the above design criteria, the projected average day flow for the proposed Site is calculated to be 93,883 gallons per day (gpd), or 65 gallons per minute (gpm). The peak flow is projected to be 292,681 gpd, or 203 gpm. 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 has been calculated to have an additional peak flow capacity of 134,502 gpd to serve future development.

Thank you for your review of the Preliminary Wastewater Collection System Basis of Design Report provided for the SEC Hayden-Loop 101 Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John Bulka, PE
Project Manager

EXPIRES 03-31-23

se
Y:\WP\Reports\Commercial\205133 Hayden Loop Preliminary Wastewater BOD.docx

CALCULATIONS AND MODELING RESULTS

WOOD PATEL

TABLE 1
WASTEWATER DESIGN CRITERIA

Project	SEC Hayden-Loop 101 Project
Location	Scottsdale AZ
Project Number	205133
Project Engineer	John Bulka, P.E.
References	City of Scottsdale Design Standards and Policy Manual (2018)
	Arizona Administrative Code, Title 18, Chapter 9
	City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

RESIDENTIAL WASTEWATER DEMANDS

LAND USE	AVERAGE DAILY DEMAND (ADD)		POPULATION[1]
	VALUE	UNITS	
Single Family Residential	250	gpd/DU	2.5 Persons per DU
Multi-Family Residential	220	gpd/DU	2.2 Persons per DU

NON-RESIDENTIAL WASTEWATER DEMANDS

LAND USE	AVERAGE DAILY DEMAND (ADD)		POPULATION[1]	Peaking Factor (PF)
	VALUE	UNITS		
Commercial/Retail	0.5	gpd/sf	0.005 Persons per sf	3
Office	0.4	gpd/sf	0.004 Persons per sf	3
Resturant	1.2	gpd/sf	0.012 Persons per sf	6
High Density Condominium	140	gpd/unit	1.4 Persons per unit	4.5
Resort Hotel	380	gpd/room	3.8 Persons per room	4.5
School: without cafeteria	30	gpd/student	0.3 Persons per Student	6
School: with cafeteria	50	gpd/student	0.5 Persons per Student	6
Cultural	0.1	gpd/sf	0.001 Persons per sf	3
Clubhouse for Subdivision Golf Course	200	gpd/DU	2 Persons per patron x2 patrons per du per day	4.5
Fitness Center/ Spa/ Health Club	0.8	gpd/sf	0.008 Persons per sf	3.5
Industrial	50	gpd/1,000 sf	0.5 Persons per 1,000 sf	See Below

HYDRAULIC MODELING CRITERIA

DESCRIPTION		VALUE
INDUSTRIAL PEAK FLOW[3]		
	Peak Flow = Peaking Factor (PF) x ADD	$[1+14/(4+P^{1/2})]$ x ADD
	(PF is based on upstream population, P = Population/1,000)	
HYDRAULICS		
	Minimum Pipe Diameter (in)	8
	Manning's "n" value	8
	Maximum d/D ratio at peak flow (D ≤ 12")	0.013
	Maximum d/D ratio at peak flow (D > 12")	0.65

PIPE SIZE	MEAN VELOCITY[2]		DESIGN SLOPE[2]	
(in)	Minimum (ft/sec)	Maximum (ft/sec)	Minimum (%)	Maximum (%)
8	2.5	10.0	0.520	6.980
10	2.5	10.0	0.390	5.121
12	2.5	10.0	0.310	3.919

Notes
1. Based on Arizona Administrative Code, Title 18, Chapter 9 value of 100 gallons per capita per day.
2. Per City of Scottsdale Design Standards and Policy Manual (2018)
3. Per City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

WOOD PATEL

TABLE 2
WASTEWATER MODEL

Project SEC Hayden-Loop 101 Project
Location Scottsdale AZ
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards and Policy Manual (2018)
Arizona Administrative Code, Title 18, Chapter 9
City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

		LAND USE																
FROM NODE	**TO NODE**	**Single Family Residential (DU)**	**Multi-Family Residential (DU)**	**Commercial/Retail (sf)**	**Office (sf)**	**Resturant (sf)**	**High Density Condominium (unit)**	**Resort Hotel (room)**	**School: without cafeteria (student)**	**School: with cafeteria (student)**	**Cultural (sf)**	**Clubhouse for Subdivision Golf Course (DU)**	**Industrial (1,000 sf)**	**SEWER NODE ADD (gpd)**	**TOTAL ADD (gpd)**	**TOTAL ADD (gpm)**	**WEIGHTED PEAKING FACTOR[1]**	**PEAK FLOW (gpd)**	**PEAK FLOW (gpm)**
Outfall 1 North																			
MH-1	MH-2				216,225								147.85	93,883	93,883	65	3.1	292,681	203
MH-2	MH-3													0	93,883	65	3.1	292,681	203
MH-3	MH-4													0	93,883	65	3.1	292,681	203
MH-4	MH-5													0	93,883	65	3.1	292,681	203
MH-5	MH-7													0	93,883	65	3.1	292,681	203
MH-6	MH-7													--	--	--	--	--	--
MH-7	MH-8													0	93,883	65	3.1	292,681	203
MH-8	MH-9													0	93,883	65	3.1	292,681	203
MH-9	MH-10													0	93,883	65	3.1	292,681	203
MH-10	MH-13													0	93,883	65	3.1	292,681	203
MH-11	MH-12													--	--	--	--	--	--
MH-12	MH-13													--	--	--	--	--	--
MH-13	MH-14													0	93,883	65	3.1	292,681	203
MH-14	EX MH-1													0	93,883	65	3.1	292,681	203
Total Outfall 1		**0**	**0**	**0**	**216,225**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**147.85**	**93,883**	**93,883**	65	**3.1**	**292,681**	**203**

Note:
1. Weighted peaking factor based upon City of Scottsdale Design Standards and Policy Manual (2018) & City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017) peaking factors for various land uses. The peaking factors are weighted in relation to total Average Day Demand for each use.

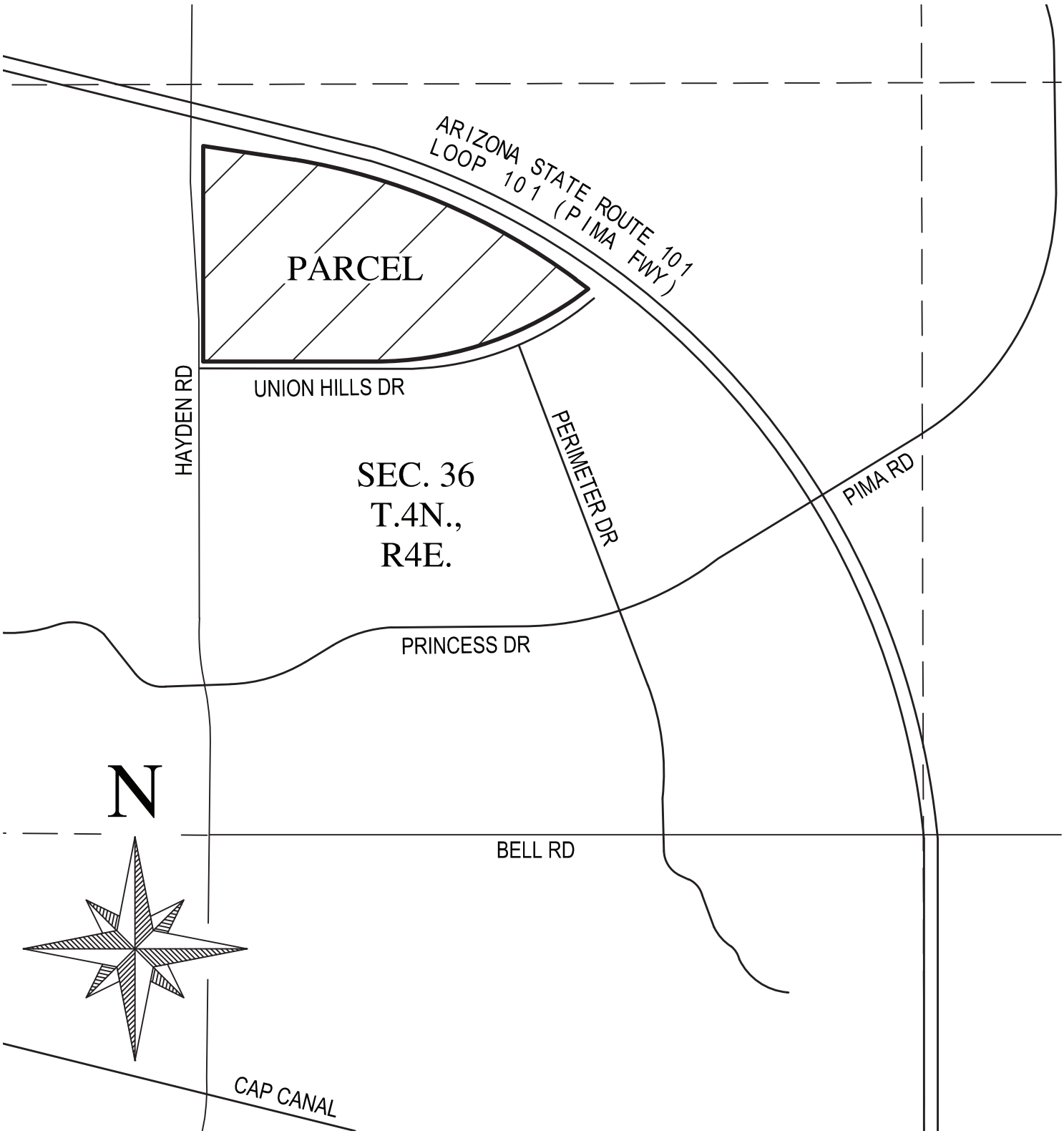
WOOD PATEL

TABLE 3
CALCULATED PIPE CAPACITIES

Project SEC Hayden-Loop 101 Project
Location Scottsdale AZ
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards and Policy Manual (2018)
ADEQ Bulletin No. 11
City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

						PEAK FLOW RESULTS					
FROM NODE	**TO NODE**	**PIPE SIZE**	**MODELED PIPE SLOPE**	**PIPE CAPACITY (0.65 FULL)**		**PEAK FLOW**		**d/D**	**Peak Flow Velocity**	**SURPLUS CAPACITY**	**PERCENT OF CAPACITY**
		(in)	**(ft/ft)**	**(gpd)**	**(gpm)**	**(gpd)**	**(gpm)**		**(ft/sec)**	**(gpd)**	**(%)**
Outfall 1 North											
MH-1	MH-2	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-2	MH-3	8	0.0090	561,997	390	292,681	203	0.44	3.10	269,316	52.1%
MH-3	MH-4	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-4	MH-5	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-5	MH-7	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-6	MH-7	8	0.0070	495,635	344	--	--	--	--	--	--
MH-7	MH-8	8	0.0080	529,856	368	292,681	203	0.45	2.97	237,175	55.2%
MH-8	MH-9	8	0.0052	427,183	297	292,681	203	0.51	2.53	134,502	68.5%
MH-9	MH-10	8	0.0080	529,856	368	292,681	203	0.45	2.97	237,175	55.2%
MH-10	MH-13	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-11	MH-12	8	0.0110	621,311	431	--	--	--	--	--	--
MH-12	MH-13	8	0.0110	621,311	431	--	--	--	--	--	--
MH-13	MH-14	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-14	EX MH-1	8	0.0100	592,397	411	292,681	203	0.42	3.22	299,716	49.4%

VICINITY MAP



WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

VICINITY MAP

DATE	9/01/2020	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	BJ	CHECK	NEB
		DRAWN	ACH		

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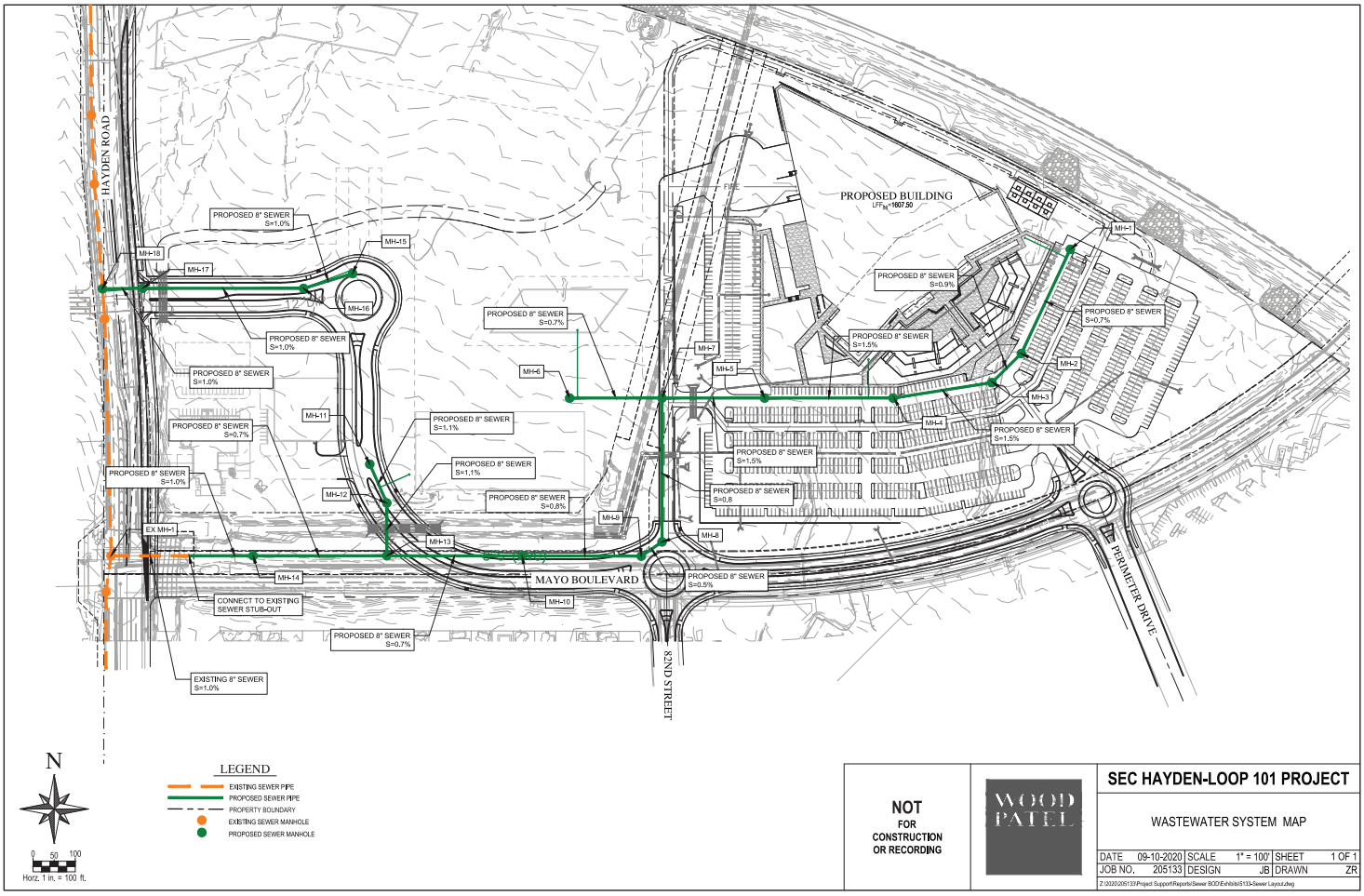
28-DR-2020
9/11/2020

WASTEWATER EXHIBIT



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

WASTEWATER SYSTEM MAP

DATE	09-10-2020	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	JB	DRAWN	ZR

Z:\2020\205133\Project Support\Reports\Sewer BOD\Exhibits\S133-Sewer Layout.dwg

CITY OF SCOTTSDALE

Abbreviated Water and Sewer Needs

WOOD PATEL

PRELIMINARY WASTEWATER COLLECTION SYSTEM
BASIS OF DESIGN REPORT
FOR
SEC HAYDEN-LOOP 101 PROJECT

September 10, 2020
WP# 205133

WOOD PATEL

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September 10, 2020

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
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Scottsdale, Arizona 85258

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Re: **SEC Hayden-Loop 101 Project**
Preliminary Wastewater Collection System Basis of Design Report
WP# 205133

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Wastewater flows from the proposed building will discharge to a proposed 8-inch onsite sewer line. The proposed 8-inch onsite sewer line will connect to a proposed 8-inch offsite/public sewer line (south collection system) in Mayo Boulevard along the south side of the site. The proposed 8-inch offsite/public sewer line will connect to an existing 8-inch stub at the intersection of Hayden Road and Mayo Boulevard which outfalls to an existing manhole in Hayden Road. The proposed 8-inch onsite and offsite/public sewer lines are intended to also serve a portion of future development on the Site. Additionally, a proposed 8-inch offsite/public sewer line (north collection system) will be constructed in the realigned Mayo Boulevard and is intended to also serve future development on Site. This proposed 8-inch offsite/public sewer line will outfall to the existing 12-inch sewer line in Hayden Road. The north sewer collection system has been omitted from the attached capacity calculations and will be analyzed as part of the Master Planning for the Site. Refer to the attached Wastewater Exhibit for a depiction of the existing and proposed wastewater infrastructure for the Site.

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- Peak Factor, Industrial: .....$1+14/(4+P^{1/2})$
- Minimum Mean Full Flow Velocity: .....2.50 fps
- Minimum Peak Full Flow Velocity:..... 10.0 fps
- Minimum Peak Flow d/D Ratio (12" dia. or less sewers): ..... d/D = 0.65

Abbreviations: gpd = gallons per day; fps = feet per second; P=population/1,000

Based on the above design criteria, the projected average day flow for the proposed Site is calculated to be 93,883 gallons per day (gpd), or 65 gallons per minute (gpm). The peak flow is projected to be 292,681 gpd, or 203 gpm. The proposed sewer slopes, projected flow velocities, and pipe flow capacities are summarized on the attached spreadsheets.

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Thank you for your review of the Preliminary Wastewater Collection System Basis of Design Report provided for the SEC Hayden-Loop 101 Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John Bulka, PE
Project Manager

EXPIRES 03-31-23

se
Y:\WP\Reports\Commercial\205133 Hayden Loop Preliminary Wastewater BOD.docx

CALCULATIONS AND MODELING RESULTS

WOOD PATEL

TABLE 1
WASTEWATER DESIGN CRITERIA

Project	SEC Hayden-Loop 101 Project
Location	Scottsdale AZ
Project Number	205133
Project Engineer	John Bulka, P.E.
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RESIDENTIAL WASTEWATER DEMANDS

LAND USE	AVERAGE DAILY DEMAND (ADD)		POPULATION[1]
	VALUE	UNITS	
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Multi-Family Residential	220	gpd/DU	2.2 Persons per DU

NON-RESIDENTIAL WASTEWATER DEMANDS

LAND USE	AVERAGE DAILY DEMAND (ADD)		POPULATION[1]	Peaking Factor (PF)
	VALUE	UNITS		
Commercial/Retail	0.5	gpd/sf	0.005 Persons per sf	3
Office	0.4	gpd/sf	0.004 Persons per sf	3
Resturant	1.2	gpd/sf	0.012 Persons per sf	6
High Density Condominium	140	gpd/unit	1.4 Persons per unit	4.5
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School: without cafeteria	30	gpd/student	0.3 Persons per Student	6
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Clubhouse for Subdivision Golf Course	200	gpd/DU	2 Persons per patron x2 patrons per du per day	4.5
Fitness Center/ Spa/ Health Club	0.8	gpd/sf	0.008 Persons per sf	3.5
Industrial	50	gpd/1,000 sf	0.5 Persons per 1,000 sf	See Below

HYDRAULIC MODELING CRITERIA

DESCRIPTION		VALUE
INDUSTRIAL PEAK FLOW[3]		
	Peak Flow = Peaking Factor (PF) x ADD	$[1+14/(4+P^{1/2})]$ x ADD
	(PF is based on upstream population, P = Population/1,000)	
HYDRAULICS		
	Minimum Pipe Diameter (in)	8
	Manning's "n" value	8
	Maximum d/D ratio at peak flow (D ≤ 12")	0.013
	Maximum d/D ratio at peak flow (D > 12")	0.65

PIPE SIZE	MEAN VELOCITY[2]		DESIGN SLOPE[2]	
(in)	Minimum (ft/sec)	Maximum (ft/sec)	Minimum (%)	Maximum (%)
8	2.5	10.0	0.520	6.980
10	2.5	10.0	0.390	5.121
12	2.5	10.0	0.310	3.919

Notes
1. Based on Arizona Administrative Code, Title 18, Chapter 9 value of 100 gallons per capita per day.
2. Per City of Scottsdale Design Standards and Policy Manual (2018)
3. Per City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

WOOD PATEL

TABLE 2
WASTEWATER MODEL

Project SEC Hayden-Loop 101 Project
Location Scottsdale AZ
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards and Policy Manual (2018)
Arizona Administrative Code, Title 18, Chapter 9
City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

		LAND USE																
FROM NODE	**TO NODE**	**Single Family Residential (DU)**	**Multi-Family Residential (DU)**	**Commercial/Retail (sf)**	**Office (sf)**	**Resturant (sf)**	**High Density Condominium (unit)**	**Resort Hotel (room)**	**School: without cafeteria (student)**	**School: with cafeteria (student)**	**Cultural (sf)**	**Clubhouse for Subdivision Golf Course (DU)**	**Industrial (1,000 sf)**	**SEWER NODE ADD (gpd)**	**TOTAL ADD (gpd)**	**TOTAL ADD (gpm)**	**WEIGHTED PEAKING FACTOR[1]**	**PEAK FLOW (gpd)**	**PEAK FLOW (gpm)**
Outfall 1 North																			
MH-1	MH-2				216,225								147.85	93,883	93,883	65	3.1	292,681	203
MH-2	MH-3													0	93,883	65	3.1	292,681	203
MH-3	MH-4													0	93,883	65	3.1	292,681	203
MH-4	MH-5													0	93,883	65	3.1	292,681	203
MH-5	MH-7													0	93,883	65	3.1	292,681	203
MH-6	MH-7													--	--	--	--	--	--
MH-7	MH-8													0	93,883	65	3.1	292,681	203
MH-8	MH-9													0	93,883	65	3.1	292,681	203
MH-9	MH-10													0	93,883	65	3.1	292,681	203
MH-10	MH-13													0	93,883	65	3.1	292,681	203
MH-11	MH-12													--	--	--	--	--	--
MH-12	MH-13													--	--	--	--	--	--
MH-13	MH-14													0	93,883	65	3.1	292,681	203
MH-14	EX MH-1													0	93,883	65	3.1	292,681	203
Total Outfall 1		**0**	**0**	**0**	**216,225**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**147.85**	**93,883**	**93,883**	65	**3.1**	**292,681**	**203**

Note:
1. Weighted peaking factor based upon City of Scottsdale Design Standards and Policy Manual (2018) & City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017) peaking factors for various land uses. The peaking factors are weighted in relation to total Average Day Demand for each use.

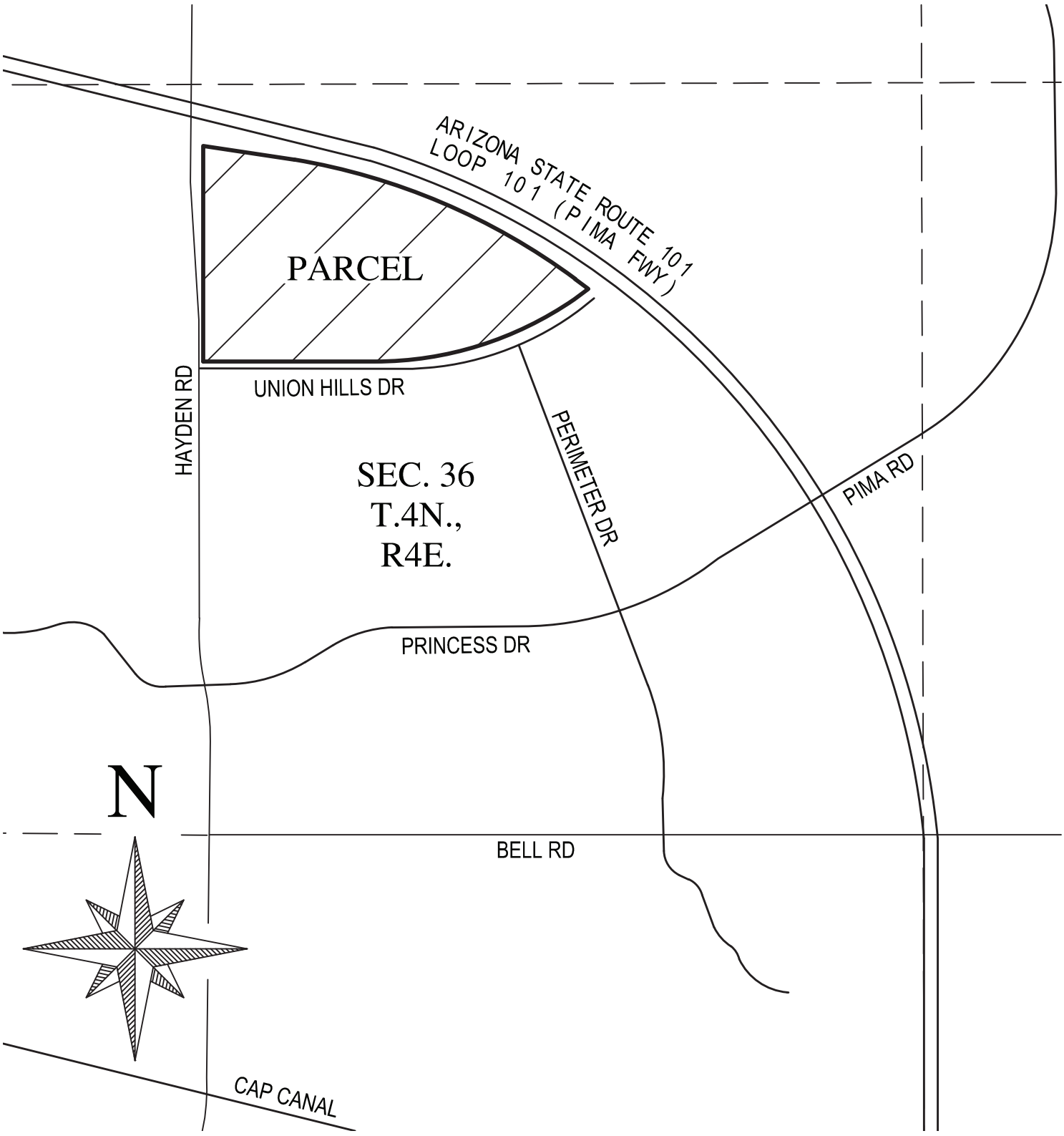
WOOD PATEL

TABLE 3
CALCULATED PIPE CAPACITIES

Project SEC Hayden-Loop 101 Project
Location Scottsdale AZ
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards and Policy Manual (2018)
ADEQ Bulletin No. 11
City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017)

						PEAK FLOW RESULTS					
FROM NODE	**TO NODE**	**PIPE SIZE**	**MODELED PIPE SLOPE**	**PIPE CAPACITY (0.65 FULL)**		**PEAK FLOW**		**d/D**	**Peak Flow Velocity**	**SURPLUS CAPACITY**	**PERCENT OF CAPACITY**
		(in)	**(ft/ft)**	**(gpd)**	**(gpm)**	**(gpd)**	**(gpm)**		**(ft/sec)**	**(gpd)**	**(%)**
Outfall 1 North											
MH-1	MH-2	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-2	MH-3	8	0.0090	561,997	390	292,681	203	0.44	3.10	269,316	52.1%
MH-3	MH-4	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-4	MH-5	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-5	MH-7	8	0.0150	725,535	504	292,681	203	0.38	3.74	432,854	40.3%
MH-6	MH-7	8	0.0070	495,635	344	--	--	--	--	--	--
MH-7	MH-8	8	0.0080	529,856	368	292,681	203	0.45	2.97	237,175	55.2%
MH-8	MH-9	8	0.0052	427,183	297	292,681	203	0.51	2.53	134,502	68.5%
MH-9	MH-10	8	0.0080	529,856	368	292,681	203	0.45	2.97	237,175	55.2%
MH-10	MH-13	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-11	MH-12	8	0.0110	621,311	431	--	--	--	--	--	--
MH-12	MH-13	8	0.0110	621,311	431	--	--	--	--	--	--
MH-13	MH-14	8	0.0070	495,635	344	292,681	203	0.47	2.82	202,954	59.1%
MH-14	EX MH-1	8	0.0100	592,397	411	292,681	203	0.42	3.22	299,716	49.4%

VICINITY MAP



WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

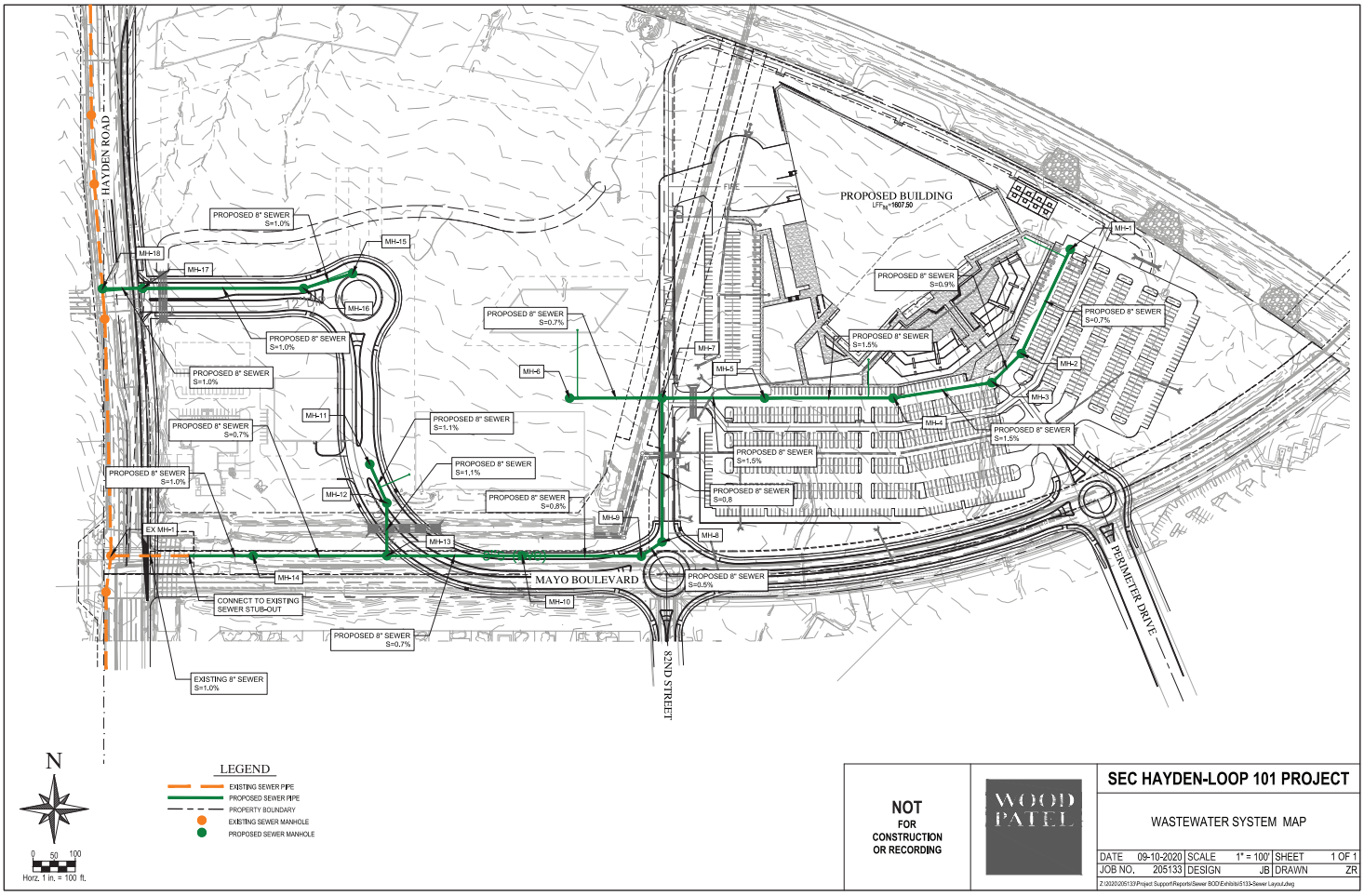
VICINITY MAP

DATE	9/01/2020	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	BJ	CHECK	NEB
		DRAWN	ACH		

Z:\2020\205133\Project Support\Reports\Sewer BOD\Exhibits\5133-Vicinity Map.dwg

28-DR-2020
9/11/2020

WASTEWATER EXHIBIT



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

WASTEWATER SYSTEM MAP

DATE	09-10-2020	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	JB	DRAWN	ZR

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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 scan **DATE** 9/22/2020

09/22/2020

WOOD PATEL

1. Use Scottsdale Industrial water demand criteria 1.44 GPM/Acre with FAR of 0.25 unless you have a better FAR for the development.

2. Fire flow of 3,625 GPM is excessive. Contact Doug Wilson, COS Plans Examiner, to determine correct fire flow requirement.

3. It is not reasonable to require multiple fire hydrants on opposite sides of the building to meet the required fire flow. A reduced fire flow should meet modeling criteria with two or three hydrants.

PRELIMINARY WATER DISTRIBUTION SYSTEM BASIS OF DESIGN REPORT FOR SEC HAYDEN-LOOP 101 PROJECT

September 10, 2020
WP# 205133

28-DR-2020
9/11/2020

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September 10, 2020

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillon@scottsdaleaz.gov

Re: **SEC Hayden-Loop 101 Project**
Preliminary Water Distribution System Basis of Design Report
WP# 205133

Dear Mr. Dillon:

The proposed SEC Hayden-Loop 101 project (Site) is a 74.44-acre site, located in the northwest quarter of Section 36, Township 4 North, Range 4 East of the Gila and Salt River Meridian. More specifically, the Site is located at the northeast corner of Hayden Road and Mayo Boulevard. Refer to the Vicinity Map at the back of this report for project location. Proposed improvements for the Site include a realignment of the existing Mayo Boulevard, one (1) proposed mixed-used structure and associated parking, landscape, hardscape and utilities. The proposed structure is comprised of two (2) buildings separated by a fire wall. Building 1 is a proposed 5-story building with approximately 216,225 square-feet of office and 33,310 square-feet of industrial space. Building 2 is a proposed 114,535 square-foot single story industrial building.

Existing water infrastructure adjacent to the Site includes a public 16-inch waterline within Hayden Road and a public 12-inch waterline within Mayo Boulevard. Two (2) existing water stubs extend from the 12-inch waterline to the Site. 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) understanding of the published *City of Scottsdale Design Standards and Policies Manual*, 2018, *City of Phoenix Design Standards Manual for Water and Wastewater Systems*, 2017 and *International Fire Code,* 2015. The following is a summary of the primary design criteria utilized:

- Average Day Water Demand, Office: ..... 8.34×10^{-4} gpm/ sq. ft*
- Average Day Water Demand, Industrial (Phoenix): ..... 9.03×10^{-2} gpm/ 1,000 sq. ft
- Maximum Day Demand: ..... 2.0 x ADD
- Peak Hour Demand: ..... 3.5 x ADD
- Fire Flow Demand: ..... 3,625 gpm (7,250 gpm * 50% reduction)
- 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
*Includes both inside and outside use per Figure 6-1.2, COS Design Standards & Policies Manual

Proposed water infrastructure includes two (2) separate 12-inch waterline loops. The first proposed 12-inch loop will be located at the southwest corner of the Site within the realigned Mayo Boulevard and is intended to serve future Site improvements. The loop will connect to the existing waterlines in Hayden Road and Mayo Boulevard. Water demands for the proposed office and warehouse buildings will be served by the second proposed 12-inch waterline loop that ties into the existing 12-inch waterline within Mayo Boulevard at two (2) locations. Domestic water services will be provided by a 4-inch domestic meter. Fire protection for the project will be provided by a combination of a fire service for building fire sprinklers, a proposed remote fire department connection, and 15 proposed fire hydrants that have been located to meet City of Scottsdale coverage requirements.

The average day water demand for the Site is projected to be approximately 192.9 gallons per minute (gpm). Maximum day demands and peak hour demands are projected to be 385.8 gpm and 675.2 gpm, respectively (refer to the attached calculations).

WaterCAD V10i, by Haestad Methods, was utilized to analyze the existing water distribution system and proposed improvements. Results from a fire hydrant flow test, conducted on March 12, 2020, by Arizona Flow Testing LLC, were utilized to simulate the City of Scottsdale water supply for the project (refer to attached modeling results).

The hydraulic modeling results indicate the proposed system is capable of delivering peak hour demands, totaling 675.2 gpm, to the proposed Site, with pressures ranging from 64 to 75 pounds per square inch (psi).

The *Fire Flow + Max Day* results from the model indicate that while using the reduced flow test results, per City of Scottsdale requirements, the residual pressure in the system does not reach the required 30 psi at the TEE of the operating hydrant, when applying the entire required fire flow at a single hydrant. However, when splitting the flow evenly between six (6) of the nine (9) fire hydrants adjacent to the building, the minimum residual pressure at the TEE of an operating hydrant reached the required 30 psi. When using the raw flow test results and applying the entire fire flow to a single hydrant, the residual pressure at the TEE of the operating hydrant was 39 psi. It is believed that the system is adequate in serving the fire flow requirements for the Site. 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 SEC Hayden-Loop 101 Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John Bulka, PE
Project Manager

EXPIRES 03-31-23

se
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CALCULATIONS AND HYDRAULIC MODELING RESULTS

WOOD PATEL

TABLE 1
WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

Project SEC Hayden-Loop 101 Project
Location Scottsdale Arizona
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards & Policies Manual (2018)

RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
< 2 dwelling DU/ac	0.69	gpm/unit	Note 1
2-2.9 dwelling DU/ac	0.66	gpm/unit	Note 1
3-7.9 dwelling DU/ac	0.36	gpm/unit	Note 1
8-11.9 dwelling DU/ac	0.33	gpm/unit	Note 1
12-22 2 dwelling DU/ac	0.33	gpm/unit	Note 1
High Density Condominium (condo)	0.27	gpm/unit	Note 1
Resort Hotel (includes site amenities)	0.63	gpm/unit	Note 1

NON-RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Restaurant	0.00181	gpm/sf	Note 1
Commercial/Retail	0.00111	gpm/sf	Note 1
Commercial High Rise	0.000834	gpm/sf	Note 1
Office	0.000834	gpm/sf	Note 1
Institutional	1.88	gpm/acre	Note 1
Industrial	0.0903	gpm/1,000 sf	Note 5
Research and Development	1.79	gpm/acre	Note 1

LANDSCAPE WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Natural Area Open Space	0.00	gpm/acre	Note 1
Developed Open Space - Parks	2.49	gpm/acre	Note 1
Developed Open Space - Golf Course	5.96	gpm/acre	Note 1

HYDRAULIC MODELING CRITERIA				
	DESCRIPTION	**VALUE**	**UNITS**	**NOTES**
MAX DAY FLOW				
	Max Day Flow = Peaking Factor (PF) x ADD	3.5 x ADD	gpm	Note 1
PEAK HOUR FLOW				
	Peak Hour Flow = Peaking Factor (PF) x ADD	4 x ADD	gpm	Note 1
MODELED FIRE HYDRANT FLOW (MINIMUM)				
☐	Residential, 0 - 3,600 sf fire-flow calculation area	1,000	gpm	Note 3
☐	Residential, 3,601 - 4,800 sf fire-flow calculation area	1,750	gpm	Note 4
☐	Residential, 4,801 - 6,200 sf fire-flow calculation area	2,000	gpm	Note 4
☐	Residential, 6,201 - 7,700 sf fire-flow calculation area	2,250	gpm	Note 4
☐	Residential, 7,701 - 9,400 sf fire-flow calculation area	2,500	gpm	Note 4
☐	Residential, 9,401 - 11,300 sf fire-flow calculation area	2,750	gpm	Note 4
☐	Multi-Family Residential	-	gpm	Note 2
☑	Commercial	3,625	gpm	Note 2
HYDRAULICS				
	Residual Pressure Range, Peak Hour	50-150	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Hydrant TEE)	30	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Domestic Service)	15	psi	Note 1
	Minimum Pipe Diameter, Looped System	6	in	Note 1
	Hazen-Williams C-value	130	-	Note 1

Notes:
1. Per City of Scottsdale Design Standards & Policies Manual (2018)
2. Per 2015 International Fire Code as adopted by the City of Scottsdale. Utilizes construction type IIB, 114,535 sf area (Building 2), 50% reduction applied.
3. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 1-hour fire duration
4. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 2-hour fire duration
5. Per City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017) modified to City of Scotttsdale standards.

28-DR-2020
9/11/2020

WOOD PATEL

TABLE 2
WATER DEMAND DESIGN FLOWS

Project SEC Hayden-Loop 101 Project
Location Scottsdale Arizona
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards & Policies Manual (2018)

HYDRAULIC MODEL NODE	ELEVATION (ft)	PRESSURE ZONE	Building	LAND USE	APPLICABLE UNIT	NUMBER OF UNITS	GPM/APPLICABLE UNIT[1]	AVERAGE DAILY DEMAND		MAX DAY DEMAND		PEAK HOUR DEMAND		Fire Flow
								(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)
J-46	1,601.9	4	1	Office	gpm/sf	216,225	0.00083	179.5	192.8	359.0	385.6	628.3	674.9	3,625.0
				Industrial	gpm/1,000 sf	33.31	0.0903	3.0		6.0		10.5		
			2	Industrial	gpm/1,000 sf	114.54	0.0903	10.3		20.6		36.1		
Total								**192.8**		**385.6**		**674.9**		

Notes
1. GPM values are based on a 12-hour active water used period per 24-hour day per the City of Scottsdale Design Standards and Policy Manual.

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Static

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,757.30
EX FH-2 (TEST)	1,590.98	0	72	1,757.30
EX FH-3 (FLOW A)	1,586.00	0	74	1,757.30
EX J-10	1,595.30	0	70	1,757.30
EX J-20	1,595.10	0	70	1,757.30
EX J-30	1,592.18	0	71	1,757.30
EX J-50	1,586.00	0	74	1,757.30
EX J-70	1,584.45	0	75	1,757.30
EX J-80	1,581.95	0	76	1,757.30
EX J-90	1,583.61	0	75	1,757.30
EX J-100	1,584.83	0	75	1,757.30
EX J-110	1,591.24	0	72	1,757.30
FH-12	1,584.48	0	75	1,757.30

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Residual

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	2,314	39	1,684.68
EX FH-2 (TEST)	1,590.98	0	43	1,690.31
EX FH-3 (FLOW A)	1,586.00	1,595	44	1,686.61
EX J-10	1,595.30	0	39	1,684.91
EX J-20	1,595.10	0	39	1,686.24
EX J-30	1,592.18	0	42	1,688.86
EX J-50	1,586.00	0	44	1,686.66
EX J-70	1,584.45	0	44	1,686.61
EX J-80	1,581.95	0	45	1,686.61
EX J-90	1,583.61	0	45	1,686.61
EX J-100	1,584.83	0	44	1,686.61
EX J-110	1,591.24	0	41	1,686.61
FH-12	1,584.48	0	44	1,686.61

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Max

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	3,172	14	1,627.08
EX FH-2 (TEST)	1,590.98	0	20	1,637.18
EX FH-3 (FLOW A)	1,586.00	2,187	19	1,630.54
EX J-10	1,595.30	0	14	1,627.49
EX J-20	1,595.10	0	15	1,629.88
EX J-30	1,592.18	0	18	1,634.59
EX J-50	1,586.00	0	19	1,630.62
EX J-70	1,584.45	0	20	1,630.54
EX J-80	1,581.95	0	21	1,630.54
EX J-90	1,583.61	0	20	1,630.54
EX J-100	1,584.83	0	20	1,630.54
EX J-110	1,591.24	0	17	1,630.54
FH-12	1,584.48	0	20	1,630.54

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Average Day Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,757.03
EX FH-2 (TEST)	1,590.98	0	72	1,757.04
EX FH-3 (FLOW A)	1,586.00	0	74	1,757.03
EX J-10	1,595.30	0	70	1,757.03
EX J-20	1,595.10	0	70	1,757.03
EX J-30	1,592.18	0	71	1,757.04
EX J-50	1,586.00	0	74	1,757.03
EX J-70	1,584.45	0	75	1,757.03
EX J-80	1,581.95	0	76	1,757.03
EX J-90	1,583.61	0	75	1,757.03
EX J-100	1,584.83	0	75	1,757.03
EX J-110	1,591.24	0	72	1,757.03
FH-1	1,596.50	0	69	1,757.02
FH-2	1,601.60	0	67	1,757.01
FH-3	1,602.00	0	67	1,757.00
FH-4	1,605.00	0	66	1,757.00
FH-5	1,605.50	0	66	1,757.00
FH-6	1,604.50	0	66	1,757.01
FH-7	1,599.70	0	68	1,757.01
FH-8	1,594.00	0	71	1,757.02
FH-9	1,586.50	0	74	1,757.02
FH-10	1,594.53	0	70	1,757.01
FH-11	1,592.38	0	71	1,757.02
FH-12	1,584.48	0	75	1,757.03
FH-13	1,588.09	0	73	1,757.03
FH-14	1,591.62	0	72	1,757.03
FH-15	1,589.30	0	73	1,757.03
J-10	1,596.00	0	70	1,757.02
J-20	1,596.50	0	69	1,757.02
J-30	1,601.60	0	67	1,757.01
J-46	1,601.90	193	67	1,757.00
J-60	1,605.30	0	66	1,757.00
J-100	1,605.50	0	66	1,757.01
J-110	1,605.00	0	66	1,757.01
J-120	1,600.64	0	68	1,757.01
J-150	1,593.00	0	71	1,757.02
J-170	1,588.19	0	73	1,757.03
J-220	1,584.87	0	74	1,757.03
J-230	1,586.00	0	74	1,757.03

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Average Day Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	108	0.31
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	108	0.31
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	108	0.31
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-85	0.24
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-108	0.31
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-108	0.31
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-108	0.31
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-108	0.31
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-146	0.41
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-146	0.41
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	47	0.13
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	47	0.13
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-47	0.13
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-47	0.13
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-47	0.13
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	47	0.13
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	47	0.13
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	47	0.13
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	47	0.13
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	47	0.13
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	47	0.13
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	85	0.24
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	85	0.24
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	85	0.24
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-38	0.11
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-38	0.11
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-38	0.11
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	193	0.03
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	193	0.03

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Max Day Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,756.31
EX FH-2 (TEST)	1,590.98	0	72	1,756.38
EX FH-3 (FLOW A)	1,586.00	0	74	1,756.32
EX J-10	1,595.30	0	70	1,756.31
EX J-20	1,595.10	0	70	1,756.33
EX J-30	1,592.18	0	71	1,756.36
EX J-50	1,586.00	0	74	1,756.32
EX J-70	1,584.45	0	74	1,756.32
EX J-80	1,581.95	0	75	1,756.32
EX J-90	1,583.61	0	75	1,756.32
EX J-100	1,584.83	0	74	1,756.32
EX J-110	1,591.24	0	71	1,756.32
FH-1	1,596.50	0	69	1,756.28
FH-2	1,601.60	0	67	1,756.25
FH-3	1,602.00	0	67	1,756.21
FH-4	1,605.00	0	65	1,756.22
FH-5	1,605.50	0	65	1,756.23
FH-6	1,604.50	0	66	1,756.24
FH-7	1,599.70	0	68	1,756.26
FH-8	1,594.00	0	70	1,756.27
FH-9	1,586.50	0	73	1,756.31
FH-10	1,594.53	0	70	1,756.27
FH-11	1,592.38	0	71	1,756.27
FH-12	1,584.48	0	74	1,756.32
FH-13	1,588.09	0	73	1,756.32
FH-14	1,591.62	0	71	1,756.32
FH-15	1,589.30	0	72	1,756.32
J-10	1,596.00	0	69	1,756.30
J-20	1,596.50	0	69	1,756.28
J-30	1,601.60	0	67	1,756.26
J-46	1,601.90	386	67	1,756.21
J-60	1,605.30	0	65	1,756.21
J-100	1,605.50	0	65	1,756.25
J-110	1,605.00	0	65	1,756.25
J-120	1,600.64	0	67	1,756.25
J-150	1,593.00	0	71	1,756.28
J-170	1,588.19	0	73	1,756.32
J-220	1,584.87	0	74	1,756.32
J-230	1,586.00	0	74	1,756.32

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Max Day Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	216	0.61
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	216	0.61
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	216	0.61
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-170	0.48
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-216	0.61
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-216	0.61
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-216	0.61
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-216	0.61
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-292	0.83
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-292	0.83
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	94	0.27
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	94	0.27
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-94	0.27
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-94	0.27
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-94	0.27
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	94	0.27
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	94	0.27
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	94	0.27
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	94	0.27
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	94	0.27
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	94	0.27
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	170	0.48
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	170	0.48
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	170	0.48
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-76	0.22
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-76	0.22
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-76	0.22
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	386	0.07
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	386	0.07

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	69	1,754.52
EX FH-2 (TEST)	1,590.98	0	71	1,754.70
EX FH-3 (FLOW A)	1,586.00	0	73	1,754.54
EX J-10	1,595.30	0	69	1,754.52
EX J-20	1,595.10	0	69	1,754.56
EX J-30	1,592.18	0	70	1,754.65
EX J-50	1,586.00	0	73	1,754.54
EX J-70	1,584.45	0	74	1,754.54
EX J-80	1,581.95	0	75	1,754.54
EX J-90	1,583.61	0	74	1,754.54
EX J-100	1,584.83	0	73	1,754.54
EX J-110	1,591.24	0	71	1,754.54
FH-1	1,596.50	0	68	1,754.43
FH-2	1,601.60	0	66	1,754.35
FH-3	1,602.00	0	66	1,754.23
FH-4	1,605.00	0	65	1,754.26
FH-5	1,605.50	0	64	1,754.29
FH-6	1,604.50	0	65	1,754.32
FH-7	1,599.70	0	67	1,754.37
FH-8	1,594.00	0	69	1,754.41
FH-9	1,586.50	0	73	1,754.50
FH-10	1,594.53	0	69	1,754.39
FH-11	1,592.38	0	70	1,754.40
FH-12	1,584.48	0	74	1,754.54
FH-13	1,588.09	0	72	1,754.54
FH-14	1,591.62	0	70	1,754.54
FH-15	1,589.30	0	71	1,754.54
J-10	1,596.00	0	69	1,754.49
J-20	1,596.50	0	68	1,754.42
J-30	1,601.60	0	66	1,754.36
J-46	1,601.90	675	66	1,754.22
J-60	1,605.30	0	64	1,754.24
J-100	1,605.50	0	64	1,754.33
J-110	1,605.00	0	65	1,754.34
J-120	1,600.64	0	67	1,754.34
J-150	1,593.00	0	70	1,754.42
J-170	1,588.19	0	72	1,754.53
J-220	1,584.87	0	73	1,754.54
J-230	1,586.00	0	73	1,754.54

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	377	1.07
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	377	1.07
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	377	1.07
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-298	0.84
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-377	1.07
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-377	1.07
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-377	1.07
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-377	1.07
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-510	1.45
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-510	1.45
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	165	0.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	165	0.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-165	0.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-165	0.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-165	0.47
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	165	0.47
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	165	0.47
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	165	0.47
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	165	0.47
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	165	0.47
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	165	0.47
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	298	0.84
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	298	0.84
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	298	0.84
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-133	0.38
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-133	0.38
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-133	0.38
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	675	0.12
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	675	0.12

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	38	1,682.30
EX FH-2 (TEST)	1,590.98	0	42	1,687.05
EX FH-3 (FLOW A)	1,586.00	0	42	1,682.21
EX J-10	1,595.30	0	38	1,682.30
EX J-20	1,595.10	0	38	1,683.47
EX J-30	1,592.18	0	40	1,685.78
EX J-50	1,586.00	0	42	1,682.21
EX J-70	1,584.45	0	42	1,682.21
EX J-80	1,581.95	0	43	1,682.21
EX J-90	1,583.61	0	43	1,682.21
EX J-100	1,584.83	0	42	1,682.21
EX J-110	1,591.24	0	39	1,682.21
FH-1	1,596.50	0	36	1,680.09
FH-2	1,601.60	0	33	1,678.22
FH-3	1,602.00	0	31	1,674.68
FH-4	1,605.00	0	29	1,671.62
FH-5	1,605.50	3,625	27	1,669.03
FH-6	1,604.50	0	29	1,671.08
FH-7	1,599.70	0	33	1,675.44
FH-8	1,594.00	0	36	1,678.13
FH-9	1,586.50	0	41	1,680.95
FH-10	1,594.53	0	36	1,678.47
FH-11	1,592.38	0	37	1,678.50
FH-12	1,584.48	0	42	1,682.21
FH-13	1,588.09	0	41	1,682.21
FH-14	1,591.62	0	39	1,682.21
FH-15	1,589.30	0	40	1,682.21
J-10	1,596.00	0	37	1,681.74
J-20	1,596.50	0	36	1,679.92
J-30	1,601.60	0	33	1,678.44
J-46	1,601.90	386	32	1,676.02
J-60	1,605.30	0	30	1,673.78
J-100	1,605.50	0	29	1,672.35
J-110	1,605.00	0	29	1,672.90
J-120	1,600.64	0	31	1,673.24
J-150	1,593.00	0	37	1,678.51
J-170	1,588.19	0	40	1,681.78
J-220	1,584.87	0	42	1,682.21
J-230	1,586.00	0	42	1,682.21

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,156	6.12
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,156	6.12
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,156	6.12
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,854	5.26
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,156	6.12
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,156	6.12
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,156	6.12
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,156	6.12
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-2,315	6.57
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-2,315	6.57
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,929	5.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-1,929	5.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	1,929	5.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	1,929	5.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-1,696	4.81
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	1,696	4.81
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	1,696	4.81
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	1,696	4.81
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	1,696	4.81
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,696	4.81
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	1,696	4.81
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,854	5.26
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,854	5.26
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,854	5.26
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-159	0.45
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-159	0.45
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-159	0.45
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day (Six Hydrants)

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	38	1,682.35
EX FH-2 (TEST)	1,590.98	0	42	1,687.05
EX FH-3 (FLOW A)	1,586.00	0	42	1,682.17
EX J-10	1,595.30	0	38	1,682.35
EX J-20	1,595.10	0	38	1,683.50
EX J-30	1,592.18	0	40	1,685.79
EX J-50	1,586.00	0	42	1,682.17
EX J-70	1,584.45	0	42	1,682.17
EX J-80	1,581.95	0	43	1,682.17
EX J-90	1,583.61	0	43	1,682.17
EX J-100	1,584.83	0	42	1,682.17
EX J-110	1,591.24	0	39	1,682.17
FH-1	1,596.50	0	36	1,680.15
FH-2	1,601.60	0	33	1,678.35
FH-3	1,602.00	604	32	1,675.76
FH-4	1,605.00	604	30	1,674.88
FH-5	1,605.50	604	30	1,674.75
FH-6	1,604.50	604	30	1,674.79
FH-7	1,599.70	604	33	1,675.94
FH-8	1,594.00	604	36	1,677.90
FH-9	1,586.50	0	41	1,680.89
FH-10	1,594.53	0	36	1,678.47
FH-11	1,592.38	0	37	1,678.44
FH-12	1,584.48	0	42	1,682.17
FH-13	1,588.09	0	41	1,682.17
FH-14	1,591.62	0	39	1,682.17
FH-15	1,589.30	0	40	1,682.17
J-10	1,596.00	0	37	1,681.79
J-20	1,596.50	0	36	1,679.98
J-30	1,601.60	0	33	1,678.51
J-46	1,601.90	386	32	1,676.71
J-60	1,605.30	0	30	1,675.51
J-100	1,605.50	0	30	1,675.13
J-110	1,605.00	0	30	1,675.27
J-120	1,600.64	0	32	1,675.36
J-150	1,593.00	0	37	1,678.43
J-170	1,588.19	0	40	1,681.73
J-220	1,584.87	0	42	1,682.17
J-230	1,586.00	0	42	1,682.17

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day (Six Hydrants)

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,147	6.09
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,147	6.09
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,147	6.09
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,864	5.29
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,147	6.09
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,147	6.09
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,147	6.09
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,147	6.09
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-1,978	5.61
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-1,978	5.61
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,592	4.52
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-988	2.80
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	988	2.80
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	384	1.09
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-220	0.62
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	824	2.34
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	824	2.34
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	824	2.34
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	824	2.34
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,429	4.05
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	2,033	5.77
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,864	5.29
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,864	5.29
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,864	5.29
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	168	0.48
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	168	0.48
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	168	0.48
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day (Raw Flow Test Results)

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	50	1,710.02
EX FH-2 (TEST)	1,590.98	0	54	1,714.76
EX FH-3 (FLOW A)	1,586.00	0	54	1,709.93
EX J-10	1,595.30	0	50	1,710.02
EX J-20	1,595.10	0	50	1,711.19
EX J-30	1,592.18	0	52	1,713.49
EX J-50	1,586.00	0	54	1,709.93
EX J-70	1,584.45	0	54	1,709.93
EX J-80	1,581.95	0	55	1,709.93
EX J-90	1,583.61	0	55	1,709.93
EX J-100	1,584.83	0	54	1,709.93
EX J-110	1,591.24	0	51	1,709.93
FH-1	1,596.50	0	48	1,707.80
FH-2	1,601.60	0	45	1,705.94
FH-3	1,602.00	0	43	1,702.40
FH-4	1,605.00	0	41	1,699.34
FH-5	1,605.50	3,625	39	1,696.75
FH-6	1,604.50	0	41	1,698.80
FH-7	1,599.70	0	45	1,703.16
FH-8	1,594.00	0	48	1,705.85
FH-9	1,586.50	0	53	1,708.66
FH-10	1,594.53	0	48	1,706.19
FH-11	1,592.38	0	49	1,706.21
FH-12	1,584.48	0	54	1,709.93
FH-13	1,588.09	0	53	1,709.93
FH-14	1,591.62	0	51	1,709.93
FH-15	1,589.30	0	52	1,709.93
J-10	1,596.00	0	49	1,709.46
J-20	1,596.50	0	48	1,707.64
J-30	1,601.60	0	45	1,706.15
J-46	1,601.90	386	44	1,703.74
J-60	1,605.30	0	42	1,701.50
J-100	1,605.50	0	41	1,700.07
J-110	1,605.00	0	41	1,700.62
J-120	1,600.64	0	43	1,700.95
J-150	1,593.00	0	49	1,706.23
J-170	1,588.19	0	52	1,709.50
J-220	1,584.87	0	54	1,709.93
J-230	1,586.00	0	54	1,709.93

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day (Raw Flow Test Results)

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,156	6.12
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,156	6.12
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,156	6.12
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,854	5.26
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,156	6.12
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,156	6.12
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,156	6.12
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,156	6.12
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-2,315	6.57
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-2,315	6.57
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,929	5.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-1,929	5.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	1,929	5.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	1,929	5.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-1,696	4.81
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	1,696	4.81
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	1,696	4.81
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	1,696	4.81
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	1,696	4.81
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,696	4.81
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	1,696	4.81
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,854	5.26
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,854	5.26
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,854	5.26
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-159	0.45
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-159	0.45
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-159	0.45
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

FIRE HYDRANT FLOW TEST

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Hayden/ Union Hills
Project Address:	Union Hills & 82nd Street, Scottsdale, Arizona, 85255
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	20095
Flow Test Permit No.:	C61530
Date and time flow test conducted:	March 12, 2020 at 8:30 AM
Data is current and reliable until:	September 12, 2020
Conducted by:	F. Vaughan & T. Atherton – Az. Flow Testing, LLC (480-250-8154)
Coordinated by:	Jared Berry – City of Scottsdale-Inspector (602-541-4942)

Raw Test Data

Static Pressure: **84.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **55.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **18.0 PSI Hyd A**
29.0 PSI Hyd B
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Hose Monster (B)
(Measured in inches) One 4 inch Pollard Diffuser (A)

Coefficient of Diffuser: 0.7875/(B) and 0.9/(A)

Flowing GPM: **3,909 GPM**
(Measured in gallons per minute)
1,595 GPM + 2,314 GPM = 3,909 GPM

GPM @ 20 PSI: **5,994 GPM**

Data with 12 PSI Safety Factor

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

Residual Pressure: **43.0 PSI**
(Measured in pounds per square inch)

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

Distance between hydrants: See Below

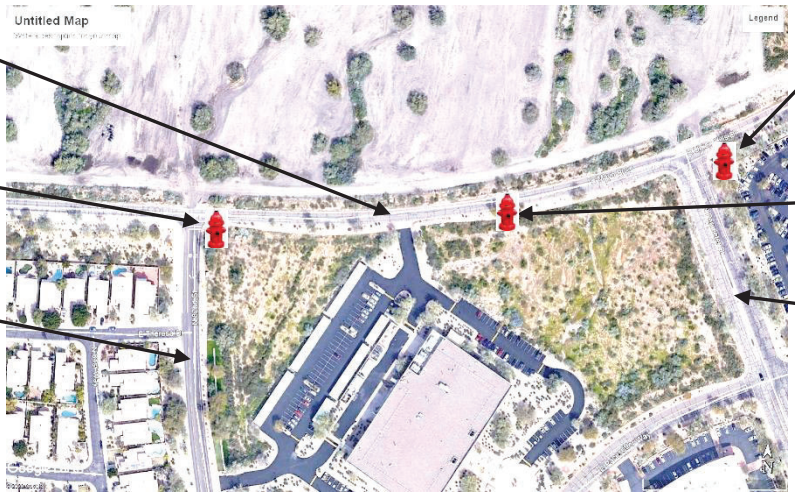
Main size: Not Provided

Flowing GPM: **3,909 GPM**

GPM @ 20 PSI**:** **5,359 GPM**

Flow Test Location

North



East Mayo Blvd.

Flow Fire Hydrant A (630 Feet from Pressure Hydrant)

North 82nd Street

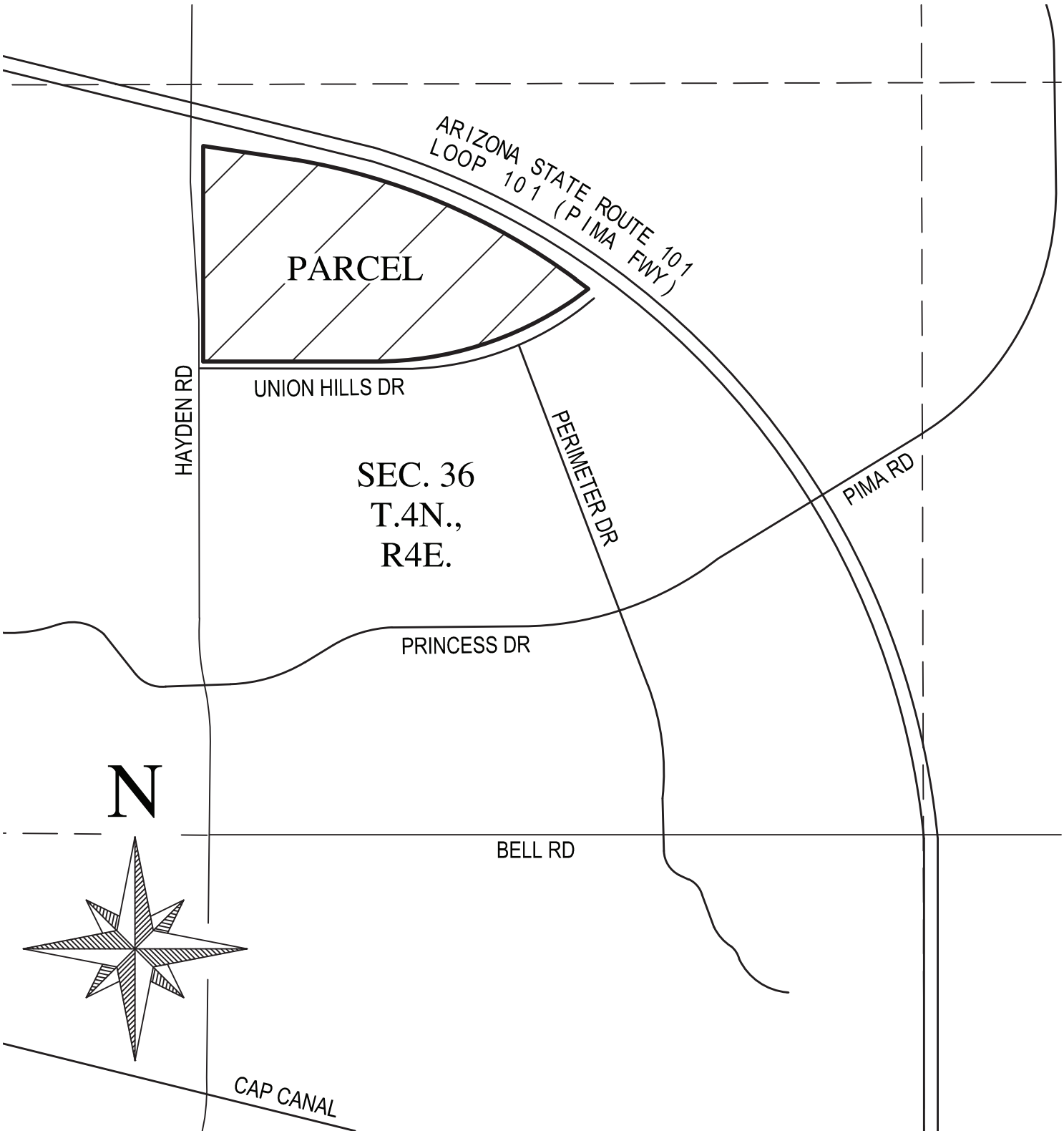
Flow Fire Hydrant B (450 Feet from Pressure Hydrant)

Pressure Fire Hydrant

North Perimeter Drive

Project Site
Union Hills & 82nd Street

VICINITY MAP



WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

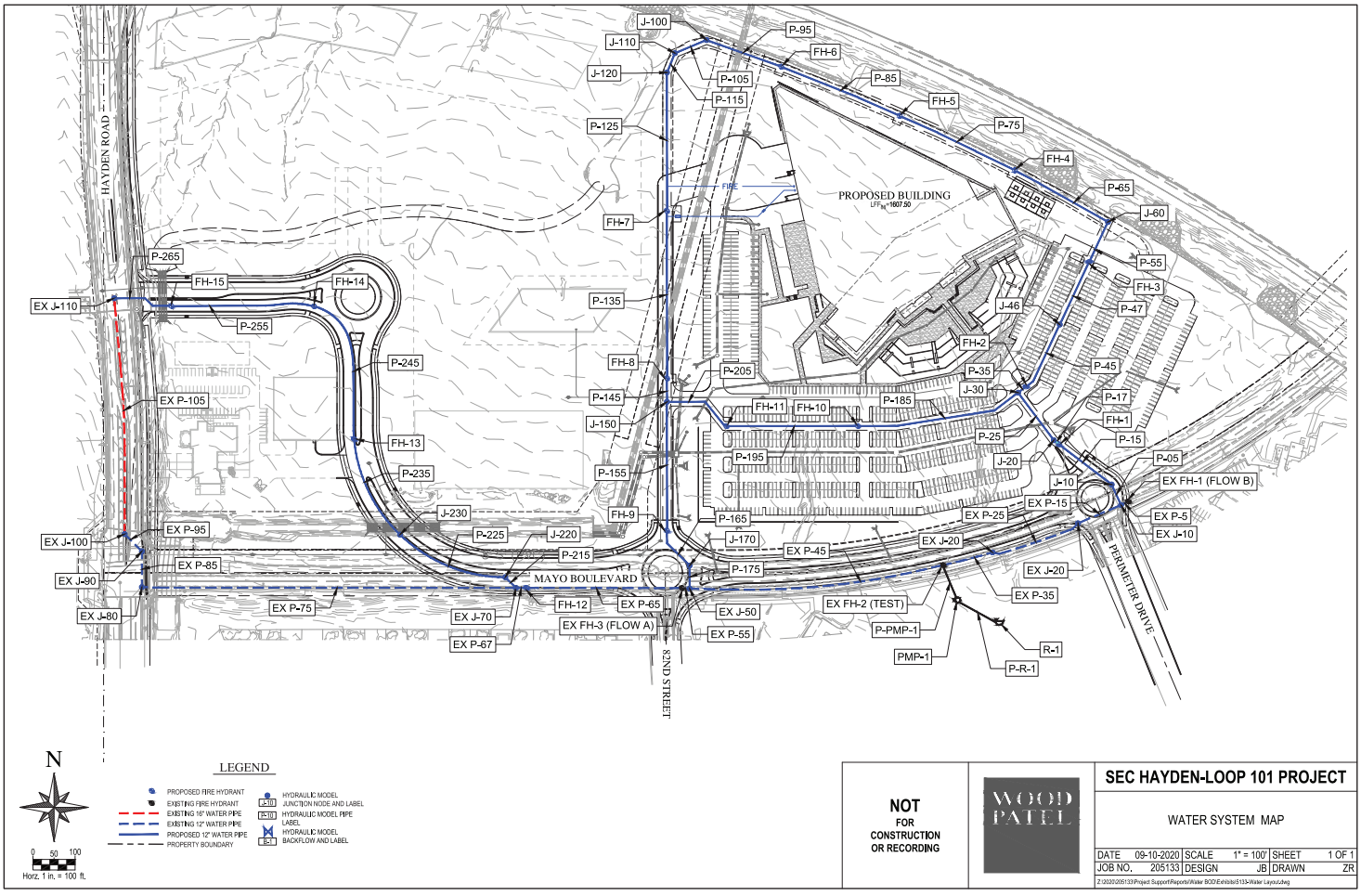
VICINITY MAP

DATE	9/01/2020	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	BJ	CHECK	NEB
		DRAWN	ACH		

Z:\2020\205133\Project Support\Reports\Water BOD\Exhibits\5133-Vicinity Map.dwg

28-DR-2020
9/11/2020

WATER EXHIBIT



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

WATER SYSTEM MAP

DATE	09-10-2020	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	JB	DRAWN	ZR

Z:\2020\205133\Project Support\Reports\Water BOD\Exhibits\5133-Water Layout.dwg

28-DR-2020
9/11/2020

WOOD PATEL

PRELIMINARY WATER DISTRIBUTION SYSTEM
BASIS OF DESIGN REPORT
FOR
SEC HAYDEN-LOOP 101 PROJECT

September 10, 2020
WP# 205133

WOOD PATEL

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September 10, 2020

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillon@scottsdaleaz.gov

Re: **SEC Hayden-Loop 101 Project**
Preliminary Water Distribution System Basis of Design Report
WP# 205133

Dear Mr. Dillon:

The proposed SEC Hayden-Loop 101 project (Site) is a 74.44-acre site, located in the northwest quarter of Section 36, Township 4 North, Range 4 East of the Gila and Salt River Meridian. More specifically, the Site is located at the northeast corner of Hayden Road and Mayo Boulevard. Refer to the Vicinity Map at the back of this report for project location. Proposed improvements for the Site include a realignment of the existing Mayo Boulevard, one (1) proposed mixed-used structure and associated parking, landscape, hardscape and utilities. The proposed structure is comprised of two (2) buildings separated by a fire wall. Building 1 is a proposed 5-story building with approximately 216,225 square-feet of office and 33,310 square-feet of industrial space. Building 2 is a proposed 114,535 square-foot single story industrial building.

Existing water infrastructure adjacent to the Site includes a public 16-inch waterline within Hayden Road and a public 12-inch waterline within Mayo Boulevard. Two (2) existing water stubs extend from the 12-inch waterline to the Site. 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) understanding of the published *City of Scottsdale Design Standards and Policies Manual*, 2018, *City of Phoenix Design Standards Manual for Water and Wastewater Systems*, 2017 and *International Fire Code,* 2015. The following is a summary of the primary design criteria utilized:

- Average Day Water Demand, Office: ..... 8.34×10^{-4} gpm/ sq. ft*
- Average Day Water Demand, Industrial (Phoenix): ..... 9.03×10^{-2} gpm/ 1,000 sq. ft
- Maximum Day Demand: ..... 2.0 x ADD
- Peak Hour Demand: ..... 3.5 x ADD
- Fire Flow Demand: ..... 3,625 gpm (7,250 gpm * 50% reduction)
- 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
*Includes both inside and outside use per Figure 6-1.2, COS Design Standards & Policies Manual

Proposed water infrastructure includes two (2) separate 12-inch waterline loops. The first proposed 12-inch loop will be located at the southwest corner of the Site within the realigned Mayo Boulevard and is intended to serve future Site improvements. The loop will connect to the existing waterlines in Hayden Road and Mayo Boulevard. Water demands for the proposed office and warehouse buildings will be served by the second proposed 12-inch waterline loop that ties into the existing 12-inch waterline within Mayo Boulevard at two (2) locations. Domestic water services will be provided by a 4-inch domestic meter. Fire protection for the project will be provided by a combination of a fire service for building fire sprinklers, a proposed remote fire department connection, and 15 proposed fire hydrants that have been located to meet City of Scottsdale coverage requirements.

The average day water demand for the Site is projected to be approximately 192.9 gallons per minute (gpm). Maximum day demands and peak hour demands are projected to be 385.8 gpm and 675.2 gpm, respectively (refer to the attached calculations).

WaterCAD V10i, by Haestad Methods, was utilized to analyze the existing water distribution system and proposed improvements. Results from a fire hydrant flow test, conducted on March 12, 2020, by Arizona Flow Testing LLC, were utilized to simulate the City of Scottsdale water supply for the project (refer to attached modeling results).

The hydraulic modeling results indicate the proposed system is capable of delivering peak hour demands, totaling 675.2 gpm, to the proposed Site, with pressures ranging from 64 to 75 pounds per square inch (psi).

The *Fire Flow + Max Day* results from the model indicate that while using the reduced flow test results, per City of Scottsdale requirements, the residual pressure in the system does not reach the required 30 psi at the TEE of the operating hydrant, when applying the entire required fire flow at a single hydrant. However, when splitting the flow evenly between six (6) of the nine (9) fire hydrants adjacent to the building, the minimum residual pressure at the TEE of an operating hydrant reached the required 30 psi. When using the raw flow test results and applying the entire fire flow to a single hydrant, the residual pressure at the TEE of the operating hydrant was 39 psi. It is believed that the system is adequate in serving the fire flow requirements for the Site. 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 SEC Hayden-Loop 101 Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John Bulka, PE
Project Manager

EXPIRES 03-31-23

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CALCULATIONS AND HYDRAULIC MODELING RESULTS

WOOD PATEL

TABLE 1
WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

Project SEC Hayden-Loop 101 Project
Location Scottsdale Arizona
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards & Policies Manual (2018)

RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
< 2 dwelling DU/ac	0.69	gpm/unit	Note 1
2-2.9 dwelling DU/ac	0.66	gpm/unit	Note 1
3-7.9 dwelling DU/ac	0.36	gpm/unit	Note 1
8-11.9 dwelling DU/ac	0.33	gpm/unit	Note 1
12-22 2 dwelling DU/ac	0.33	gpm/unit	Note 1
High Density Condominium (condo)	0.27	gpm/unit	Note 1
Resort Hotel (includes site amenities)	0.63	gpm/unit	Note 1

NON-RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Restaurant	0.00181	gpm/sf	Note 1
Commercial/Retail	0.00111	gpm/sf	Note 1
Commercial High Rise	0.000834	gpm/sf	Note 1
Office	0.000834	gpm/sf	Note 1
Institutional	1.88	gpm/acre	Note 1
Industrial	0.0903	gpm/1,000 sf	Note 5
Research and Development	1.79	gpm/acre	Note 1

LANDSCAPE WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Natural Area Open Space	0.00	gpm/acre	Note 1
Developed Open Space - Parks	2.49	gpm/acre	Note 1
Developed Open Space - Golf Course	5.96	gpm/acre	Note 1

HYDRAULIC MODELING CRITERIA				
	DESCRIPTION	**VALUE**	**UNITS**	**NOTES**
MAX DAY FLOW				
	Max Day Flow = Peaking Factor (PF) x ADD	3.5 x ADD	gpm	Note 1
PEAK HOUR FLOW				
	Peak Hour Flow = Peaking Factor (PF) x ADD	4 x ADD	gpm	Note 1
MODELED FIRE HYDRANT FLOW (MINIMUM)				
☐	Residential, 0 - 3,600 sf fire-flow calculation area	1,000	gpm	Note 3
☐	Residential, 3,601 - 4,800 sf fire-flow calculation area	1,750	gpm	Note 4
☐	Residential, 4,801 - 6,200 sf fire-flow calculation area	2,000	gpm	Note 4
☐	Residential, 6,201 - 7,700 sf fire-flow calculation area	2,250	gpm	Note 4
☐	Residential, 7,701 - 9,400 sf fire-flow calculation area	2,500	gpm	Note 4
☐	Residential, 9,401 - 11,300 sf fire-flow calculation area	2,750	gpm	Note 4
☐	Multi-Family Residential	-	gpm	Note 2
☑	Commercial	3,625	gpm	Note 2
HYDRAULICS				
	Residual Pressure Range, Peak Hour	50-150	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Hydrant TEE)	30	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Domestic Service)	15	psi	Note 1
	Minimum Pipe Diameter, Looped System	6	in	Note 1
	Hazen-Williams C-value	130	-	Note 1

Notes:
1. Per City of Scottsdale Design Standards & Policies Manual (2018)
2. Per 2015 International Fire Code as adopted by the City of Scottsdale. Utilizes construction type IIB, 114,535 sf area (Building 2), 50% reduction applied.
3. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 1-hour fire duration
4. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 2-hour fire duration
5. Per City of Phoenix Design Standards Manual for Water and Wastewater Systems (2017) modified to City of Scotttsdale standards.

28-DR-2020
9/11/2020

WOOD PATEL

TABLE 2
WATER DEMAND DESIGN FLOWS

Project SEC Hayden-Loop 101 Project
Location Scottsdale Arizona
Project Number 205133
Project Engineer John Bulka, P.E.
References City of Scottsdale Design Standards & Policies Manual (2018)

HYDRAULIC MODEL NODE	ELEVATION (ft)	PRESSURE ZONE	Building	LAND USE	APPLICABLE UNIT	NUMBER OF UNITS	GPM/APPLICABLE UNIT[1]	AVERAGE DAILY DEMAND		MAX DAY DEMAND		PEAK HOUR DEMAND		Fire Flow
								(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)
J-46	1,601.9	4	1	Office	gpm/sf	216,225	0.00083	179.5	192.8	359.0	385.6	628.3	674.9	3,625.0
				Industrial	gpm/1,000 sf	33.31	0.0903	3.0		6.0		10.5		
			2	Industrial	gpm/1,000 sf	114.54	0.0903	10.3		20.6		36.1		
Total								**192.8**		**385.6**		**674.9**		

Notes
1. GPM values are based on a 12-hour active water used period per 24-hour day per the City of Scottsdale Design Standards and Policy Manual.

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Static

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,757.30
EX FH-2 (TEST)	1,590.98	0	72	1,757.30
EX FH-3 (FLOW A)	1,586.00	0	74	1,757.30
EX J-10	1,595.30	0	70	1,757.30
EX J-20	1,595.10	0	70	1,757.30
EX J-30	1,592.18	0	71	1,757.30
EX J-50	1,586.00	0	74	1,757.30
EX J-70	1,584.45	0	75	1,757.30
EX J-80	1,581.95	0	76	1,757.30
EX J-90	1,583.61	0	75	1,757.30
EX J-100	1,584.83	0	75	1,757.30
EX J-110	1,591.24	0	72	1,757.30
FH-12	1,584.48	0	75	1,757.30

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Residual

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	2,314	39	1,684.68
EX FH-2 (TEST)	1,590.98	0	43	1,690.31
EX FH-3 (FLOW A)	1,586.00	1,595	44	1,686.61
EX J-10	1,595.30	0	39	1,684.91
EX J-20	1,595.10	0	39	1,686.24
EX J-30	1,592.18	0	42	1,688.86
EX J-50	1,586.00	0	44	1,686.66
EX J-70	1,584.45	0	44	1,686.61
EX J-80	1,581.95	0	45	1,686.61
EX J-90	1,583.61	0	45	1,686.61
EX J-100	1,584.83	0	44	1,686.61
EX J-110	1,591.24	0	41	1,686.61
FH-12	1,584.48	0	44	1,686.61

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Calibration Max

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	3,172	14	1,627.08
EX FH-2 (TEST)	1,590.98	0	20	1,637.18
EX FH-3 (FLOW A)	1,586.00	2,187	19	1,630.54
EX J-10	1,595.30	0	14	1,627.49
EX J-20	1,595.10	0	15	1,629.88
EX J-30	1,592.18	0	18	1,634.59
EX J-50	1,586.00	0	19	1,630.62
EX J-70	1,584.45	0	20	1,630.54
EX J-80	1,581.95	0	21	1,630.54
EX J-90	1,583.61	0	20	1,630.54
EX J-100	1,584.83	0	20	1,630.54
EX J-110	1,591.24	0	17	1,630.54
FH-12	1,584.48	0	20	1,630.54

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Average Day Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,757.03
EX FH-2 (TEST)	1,590.98	0	72	1,757.04
EX FH-3 (FLOW A)	1,586.00	0	74	1,757.03
EX J-10	1,595.30	0	70	1,757.03
EX J-20	1,595.10	0	70	1,757.03
EX J-30	1,592.18	0	71	1,757.04
EX J-50	1,586.00	0	74	1,757.03
EX J-70	1,584.45	0	75	1,757.03
EX J-80	1,581.95	0	76	1,757.03
EX J-90	1,583.61	0	75	1,757.03
EX J-100	1,584.83	0	75	1,757.03
EX J-110	1,591.24	0	72	1,757.03
FH-1	1,596.50	0	69	1,757.02
FH-2	1,601.60	0	67	1,757.01
FH-3	1,602.00	0	67	1,757.00
FH-4	1,605.00	0	66	1,757.00
FH-5	1,605.50	0	66	1,757.00
FH-6	1,604.50	0	66	1,757.01
FH-7	1,599.70	0	68	1,757.01
FH-8	1,594.00	0	71	1,757.02
FH-9	1,586.50	0	74	1,757.02
FH-10	1,594.53	0	70	1,757.01
FH-11	1,592.38	0	71	1,757.02
FH-12	1,584.48	0	75	1,757.03
FH-13	1,588.09	0	73	1,757.03
FH-14	1,591.62	0	72	1,757.03
FH-15	1,589.30	0	73	1,757.03
J-10	1,596.00	0	70	1,757.02
J-20	1,596.50	0	69	1,757.02
J-30	1,601.60	0	67	1,757.01
J-46	1,601.90	193	67	1,757.00
J-60	1,605.30	0	66	1,757.00
J-100	1,605.50	0	66	1,757.01
J-110	1,605.00	0	66	1,757.01
J-120	1,600.64	0	68	1,757.01
J-150	1,593.00	0	71	1,757.02
J-170	1,588.19	0	73	1,757.03
J-220	1,584.87	0	74	1,757.03
J-230	1,586.00	0	74	1,757.03

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Average Day Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	108	0.31
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	108	0.31
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	108	0.31
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-85	0.24
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-108	0.31
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-108	0.31
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-108	0.31
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-108	0.31
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-146	0.41
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-146	0.41
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	47	0.13
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	47	0.13
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-47	0.13
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-47	0.13
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-47	0.13
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	47	0.13
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	47	0.13
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	47	0.13
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	47	0.13
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	47	0.13
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	47	0.13
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	85	0.24
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	85	0.24
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	85	0.24
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-38	0.11
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-38	0.11
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-38	0.11
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	193	0.03
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	193	0.03

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Max Day Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	70	1,756.31
EX FH-2 (TEST)	1,590.98	0	72	1,756.38
EX FH-3 (FLOW A)	1,586.00	0	74	1,756.32
EX J-10	1,595.30	0	70	1,756.31
EX J-20	1,595.10	0	70	1,756.33
EX J-30	1,592.18	0	71	1,756.36
EX J-50	1,586.00	0	74	1,756.32
EX J-70	1,584.45	0	74	1,756.32
EX J-80	1,581.95	0	75	1,756.32
EX J-90	1,583.61	0	75	1,756.32
EX J-100	1,584.83	0	74	1,756.32
EX J-110	1,591.24	0	71	1,756.32
FH-1	1,596.50	0	69	1,756.28
FH-2	1,601.60	0	67	1,756.25
FH-3	1,602.00	0	67	1,756.21
FH-4	1,605.00	0	65	1,756.22
FH-5	1,605.50	0	65	1,756.23
FH-6	1,604.50	0	66	1,756.24
FH-7	1,599.70	0	68	1,756.26
FH-8	1,594.00	0	70	1,756.27
FH-9	1,586.50	0	73	1,756.31
FH-10	1,594.53	0	70	1,756.27
FH-11	1,592.38	0	71	1,756.27
FH-12	1,584.48	0	74	1,756.32
FH-13	1,588.09	0	73	1,756.32
FH-14	1,591.62	0	71	1,756.32
FH-15	1,589.30	0	72	1,756.32
J-10	1,596.00	0	69	1,756.30
J-20	1,596.50	0	69	1,756.28
J-30	1,601.60	0	67	1,756.26
J-46	1,601.90	386	67	1,756.21
J-60	1,605.30	0	65	1,756.21
J-100	1,605.50	0	65	1,756.25
J-110	1,605.00	0	65	1,756.25
J-120	1,600.64	0	67	1,756.25
J-150	1,593.00	0	71	1,756.28
J-170	1,588.19	0	73	1,756.32
J-220	1,584.87	0	74	1,756.32
J-230	1,586.00	0	74	1,756.32

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Max Day Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	216	0.61
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	216	0.61
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	216	0.61
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-170	0.48
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-216	0.61
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-216	0.61
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-216	0.61
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-216	0.61
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-292	0.83
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-292	0.83
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	94	0.27
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	94	0.27
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-94	0.27
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-94	0.27
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-94	0.27
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	94	0.27
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	94	0.27
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	94	0.27
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	94	0.27
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	94	0.27
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	94	0.27
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	170	0.48
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	170	0.48
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	170	0.48
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-76	0.22
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-76	0.22
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-76	0.22
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	386	0.07
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	386	0.07

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	69	1,754.52
EX FH-2 (TEST)	1,590.98	0	71	1,754.70
EX FH-3 (FLOW A)	1,586.00	0	73	1,754.54
EX J-10	1,595.30	0	69	1,754.52
EX J-20	1,595.10	0	69	1,754.56
EX J-30	1,592.18	0	70	1,754.65
EX J-50	1,586.00	0	73	1,754.54
EX J-70	1,584.45	0	74	1,754.54
EX J-80	1,581.95	0	75	1,754.54
EX J-90	1,583.61	0	74	1,754.54
EX J-100	1,584.83	0	73	1,754.54
EX J-110	1,591.24	0	71	1,754.54
FH-1	1,596.50	0	68	1,754.43
FH-2	1,601.60	0	66	1,754.35
FH-3	1,602.00	0	66	1,754.23
FH-4	1,605.00	0	65	1,754.26
FH-5	1,605.50	0	64	1,754.29
FH-6	1,604.50	0	65	1,754.32
FH-7	1,599.70	0	67	1,754.37
FH-8	1,594.00	0	69	1,754.41
FH-9	1,586.50	0	73	1,754.50
FH-10	1,594.53	0	69	1,754.39
FH-11	1,592.38	0	70	1,754.40
FH-12	1,584.48	0	74	1,754.54
FH-13	1,588.09	0	72	1,754.54
FH-14	1,591.62	0	70	1,754.54
FH-15	1,589.30	0	71	1,754.54
J-10	1,596.00	0	69	1,754.49
J-20	1,596.50	0	68	1,754.42
J-30	1,601.60	0	66	1,754.36
J-46	1,601.90	675	66	1,754.22
J-60	1,605.30	0	64	1,754.24
J-100	1,605.50	0	64	1,754.33
J-110	1,605.00	0	65	1,754.34
J-120	1,600.64	0	67	1,754.34
J-150	1,593.00	0	70	1,754.42
J-170	1,588.19	0	72	1,754.53
J-220	1,584.87	0	73	1,754.54
J-230	1,586.00	0	73	1,754.54

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	377	1.07
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	377	1.07
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	377	1.07
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-298	0.84
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-377	1.07
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-377	1.07
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-377	1.07
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-377	1.07
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-510	1.45
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-510	1.45
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	165	0.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	165	0.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	-165	0.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	-165	0.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-165	0.47
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	165	0.47
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	165	0.47
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	165	0.47
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	165	0.47
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	165	0.47
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	165	0.47
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	298	0.84
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	298	0.84
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	298	0.84
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-133	0.38
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-133	0.38
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-133	0.38
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	675	0.12
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	675	0.12

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	38	1,682.30
EX FH-2 (TEST)	1,590.98	0	42	1,687.05
EX FH-3 (FLOW A)	1,586.00	0	42	1,682.21
EX J-10	1,595.30	0	38	1,682.30
EX J-20	1,595.10	0	38	1,683.47
EX J-30	1,592.18	0	40	1,685.78
EX J-50	1,586.00	0	42	1,682.21
EX J-70	1,584.45	0	42	1,682.21
EX J-80	1,581.95	0	43	1,682.21
EX J-90	1,583.61	0	43	1,682.21
EX J-100	1,584.83	0	42	1,682.21
EX J-110	1,591.24	0	39	1,682.21
FH-1	1,596.50	0	36	1,680.09
FH-2	1,601.60	0	33	1,678.22
FH-3	1,602.00	0	31	1,674.68
FH-4	1,605.00	0	29	1,671.62
FH-5	1,605.50	3,625	27	1,669.03
FH-6	1,604.50	0	29	1,671.08
FH-7	1,599.70	0	33	1,675.44
FH-8	1,594.00	0	36	1,678.13
FH-9	1,586.50	0	41	1,680.95
FH-10	1,594.53	0	36	1,678.47
FH-11	1,592.38	0	37	1,678.50
FH-12	1,584.48	0	42	1,682.21
FH-13	1,588.09	0	41	1,682.21
FH-14	1,591.62	0	39	1,682.21
FH-15	1,589.30	0	40	1,682.21
J-10	1,596.00	0	37	1,681.74
J-20	1,596.50	0	36	1,679.92
J-30	1,601.60	0	33	1,678.44
J-46	1,601.90	386	32	1,676.02
J-60	1,605.30	0	30	1,673.78
J-100	1,605.50	0	29	1,672.35
J-110	1,605.00	0	29	1,672.90
J-120	1,600.64	0	31	1,673.24
J-150	1,593.00	0	37	1,678.51
J-170	1,588.19	0	40	1,681.78
J-220	1,584.87	0	42	1,682.21
J-230	1,586.00	0	42	1,682.21

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,156	6.12
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,156	6.12
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,156	6.12
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,854	5.26
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,156	6.12
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,156	6.12
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,156	6.12
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,156	6.12
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-2,315	6.57
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-2,315	6.57
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,929	5.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-1,929	5.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	1,929	5.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	1,929	5.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-1,696	4.81
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	1,696	4.81
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	1,696	4.81
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	1,696	4.81
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	1,696	4.81
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,696	4.81
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	1,696	4.81
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,854	5.26
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,854	5.26
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,854	5.26
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-159	0.45
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-159	0.45
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-159	0.45
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day (Six Hydrants)

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	38	1,682.35
EX FH-2 (TEST)	1,590.98	0	42	1,687.05
EX FH-3 (FLOW A)	1,586.00	0	42	1,682.17
EX J-10	1,595.30	0	38	1,682.35
EX J-20	1,595.10	0	38	1,683.50
EX J-30	1,592.18	0	40	1,685.79
EX J-50	1,586.00	0	42	1,682.17
EX J-70	1,584.45	0	42	1,682.17
EX J-80	1,581.95	0	43	1,682.17
EX J-90	1,583.61	0	43	1,682.17
EX J-100	1,584.83	0	42	1,682.17
EX J-110	1,591.24	0	39	1,682.17
FH-1	1,596.50	0	36	1,680.15
FH-2	1,601.60	0	33	1,678.35
FH-3	1,602.00	604	32	1,675.76
FH-4	1,605.00	604	30	1,674.88
FH-5	1,605.50	604	30	1,674.75
FH-6	1,604.50	604	30	1,674.79
FH-7	1,599.70	604	33	1,675.94
FH-8	1,594.00	604	36	1,677.90
FH-9	1,586.50	0	41	1,680.89
FH-10	1,594.53	0	36	1,678.47
FH-11	1,592.38	0	37	1,678.44
FH-12	1,584.48	0	42	1,682.17
FH-13	1,588.09	0	41	1,682.17
FH-14	1,591.62	0	39	1,682.17
FH-15	1,589.30	0	40	1,682.17
J-10	1,596.00	0	37	1,681.79
J-20	1,596.50	0	36	1,679.98
J-30	1,601.60	0	33	1,678.51
J-46	1,601.90	386	32	1,676.71
J-60	1,605.30	0	30	1,675.51
J-100	1,605.50	0	30	1,675.13
J-110	1,605.00	0	30	1,675.27
J-120	1,600.64	0	32	1,675.36
J-150	1,593.00	0	37	1,678.43
J-170	1,588.19	0	40	1,681.73
J-220	1,584.87	0	42	1,682.17
J-230	1,586.00	0	42	1,682.17

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day (Six Hydrants)

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,147	6.09
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,147	6.09
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,147	6.09
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,864	5.29
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,147	6.09
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,147	6.09
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,147	6.09
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,147	6.09
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-1,978	5.61
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-1,978	5.61
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,592	4.52
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-988	2.80
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	988	2.80
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	384	1.09
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-220	0.62
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	824	2.34
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	824	2.34
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	824	2.34
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	824	2.34
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,429	4.05
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	2,033	5.77
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,864	5.29
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,864	5.29
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,864	5.29
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	168	0.48
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	168	0.48
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	168	0.48
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

SEC Hayden-Loop 101 Project

FlexTable: Junction Table

Active Scenario: Fire Flow + Max Day (Raw Flow Test Results)

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EX FH-1 (FLOW B)	1,595.30	0	50	1,710.02
EX FH-2 (TEST)	1,590.98	0	54	1,714.76
EX FH-3 (FLOW A)	1,586.00	0	54	1,709.93
EX J-10	1,595.30	0	50	1,710.02
EX J-20	1,595.10	0	50	1,711.19
EX J-30	1,592.18	0	52	1,713.49
EX J-50	1,586.00	0	54	1,709.93
EX J-70	1,584.45	0	54	1,709.93
EX J-80	1,581.95	0	55	1,709.93
EX J-90	1,583.61	0	55	1,709.93
EX J-100	1,584.83	0	54	1,709.93
EX J-110	1,591.24	0	51	1,709.93
FH-1	1,596.50	0	48	1,707.80
FH-2	1,601.60	0	45	1,705.94
FH-3	1,602.00	0	43	1,702.40
FH-4	1,605.00	0	41	1,699.34
FH-5	1,605.50	3,625	39	1,696.75
FH-6	1,604.50	0	41	1,698.80
FH-7	1,599.70	0	45	1,703.16
FH-8	1,594.00	0	48	1,705.85
FH-9	1,586.50	0	53	1,708.66
FH-10	1,594.53	0	48	1,706.19
FH-11	1,592.38	0	49	1,706.21
FH-12	1,584.48	0	54	1,709.93
FH-13	1,588.09	0	53	1,709.93
FH-14	1,591.62	0	51	1,709.93
FH-15	1,589.30	0	52	1,709.93
J-10	1,596.00	0	49	1,709.46
J-20	1,596.50	0	48	1,707.64
J-30	1,601.60	0	45	1,706.15
J-46	1,601.90	386	44	1,703.74
J-60	1,605.30	0	42	1,701.50
J-100	1,605.50	0	41	1,700.07
J-110	1,605.00	0	41	1,700.62
J-120	1,600.64	0	43	1,700.95
J-150	1,593.00	0	49	1,706.23
J-170	1,588.19	0	52	1,709.50
J-220	1,584.87	0	54	1,709.93
J-230	1,586.00	0	54	1,709.93

SEC Hayden-Loop 101 Project

FlexTable: Pipe Table

Active Scenario: Fire Flow + Max Day (Raw Flow Test Results)

Label	Start Node	Stop Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
EX P-05	EX J-10	EX FH-1 (FLOW B)	19	12.0	Ductile Iron	130.0	0	0.00
EX P-15	EX J-20	EX J-10	111	12.0	Ductile Iron	130.0	2,156	6.12
EX P-25	EX J-30	EX J-20	219	12.0	Ductile Iron	130.0	2,156	6.12
EX P-35	EX FH-2 (TEST)	EX J-30	121	12.0	Ductile Iron	130.0	2,156	6.12
EX P-45	EX J-50	EX FH-2 (TEST)	607	12.0	Ductile Iron	130.0	-1,854	5.26
EX P-55	EX FH-3 (FLOW A)	EX J-50	7	12.0	Ductile Iron	130.0	0	0.00
EX P-65	FH-12	EX FH-3 (FLOW A)	397	12.0	Ductile Iron	130.0	0	0.00
EX P-67	EX J-70	FH-12	8	12.0	Ductile Iron	130.0	0	0.00
EX P-75	EX J-80	EX J-70	889	12.0	Ductile Iron	130.0	0	0.00
EX P-85	EX J-90	EX J-80	85	12.0	Ductile Iron	130.0	0	0.00
EX P-95	EX J-100	EX J-90	58	12.0	Ductile Iron	130.0	0	0.00
EX P-105	EX J-110	EX J-100	561	16.0	Ductile Iron	130.0	0	0.00
P-05	J-10	EX J-10	53	12.0	Ductile Iron	130.0	-2,156	6.12
P-15	FH-1	J-10	158	12.0	Ductile Iron	130.0	-2,156	6.12
P-17	J-20	FH-1	15	12.0	Ductile Iron	130.0	-2,156	6.12
P-25	J-30	J-20	141	12.0	Ductile Iron	130.0	-2,156	6.12
P-35	FH-2	J-30	18	12.0	Ductile Iron	130.0	-2,315	6.57
P-45	J-46	FH-2	183	12.0	Ductile Iron	130.0	-2,315	6.57
P-47	FH-3	J-46	157	12.0	Ductile Iron	130.0	-1,929	5.47
P-55	J-60	FH-3	105	12.0	Ductile Iron	130.0	-1,929	5.47
P-65	J-60	FH-4	253	12.0	Ductile Iron	130.0	1,929	5.47
P-75	FH-4	FH-5	303	12.0	Ductile Iron	130.0	1,929	5.47
P-85	FH-5	FH-6	305	12.0	Ductile Iron	130.0	-1,696	4.81
P-95	J-100	FH-6	188	12.0	Ductile Iron	130.0	1,696	4.81
P-105	J-110	J-100	81	12.0	Ductile Iron	130.0	1,696	4.81
P-115	J-120	J-110	50	12.0	Ductile Iron	130.0	1,696	4.81
P-125	FH-7	J-120	327	12.0	Ductile Iron	130.0	1,696	4.81
P-135	FH-8	FH-7	400	12.0	Ductile Iron	130.0	1,696	4.81
P-145	J-150	FH-8	56	12.0	Ductile Iron	130.0	1,696	4.81
P-155	FH-9	J-150	306	12.0	Ductile Iron	130.0	1,854	5.26
P-165	J-170	FH-9	105	12.0	Ductile Iron	130.0	1,854	5.26
P-175	EX J-50	J-170	54	12.0	Ductile Iron	130.0	1,854	5.26
P-185	J-30	FH-10	398	12.0	Ductile Iron	130.0	-159	0.45
P-195	FH-10	FH-11	312	12.0	Ductile Iron	130.0	-159	0.45
P-205	FH-11	J-150	169	12.0	Ductile Iron	130.0	-159	0.45
P-215	J-220	EX J-70	36	12.0	Ductile Iron	130.0	0	0.00
P-225	J-230	J-220	277	12.0	Ductile Iron	130.0	0	0.00
P-235	FH-13	J-230	257	12.0	Ductile Iron	130.0	0	0.00
P-245	FH-14	FH-13	363	12.0	Ductile Iron	130.0	0	0.00
P-255	FH-15	FH-14	362	12.0	Ductile Iron	130.0	0	0.00
P-265	EX J-110	FH-15	116	12.0	Ductile Iron	130.0	0	0.00
P-PMP-1	PMP-1	EX FH-2 (TEST)	1	48.0	Ductile Iron	130.0	4,011	0.71
P-R-1	R-1	PMP-1	1	48.0	Ductile Iron	130.0	4,011	0.71

FIRE HYDRANT FLOW TEST

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Hayden/ Union Hills
Project Address:	Union Hills & 82nd Street, Scottsdale, Arizona, 85255
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	20095
Flow Test Permit No.:	C61530
Date and time flow test conducted:	March 12, 2020 at 8:30 AM
Data is current and reliable until:	September 12, 2020
Conducted by:	F. Vaughan & T. Atherton – Az. Flow Testing, LLC (480-250-8154)
Coordinated by:	Jared Berry – City of Scottsdale-Inspector (602-541-4942)

Raw Test Data

Static Pressure: **84.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **55.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **18.0 PSI Hyd A**
29.0 PSI Hyd B
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Hose Monster (B)
(Measured in inches) One 4 inch Pollard Diffuser (A)

Coefficient of Diffuser: 0.7875/(B) and 0.9/(A)

Flowing GPM: **3,909 GPM**
(Measured in gallons per minute)
1,595 GPM + 2,314 GPM = 3,909 GPM

GPM @ 20 PSI: **5,994 GPM**

Data with 12 PSI Safety Factor

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

Residual Pressure: **43.0 PSI**
(Measured in pounds per square inch)

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

Distance between hydrants: See Below

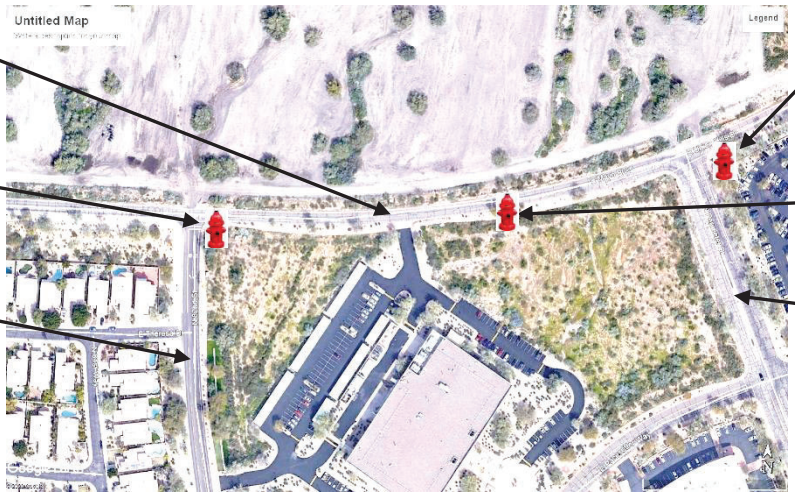
Main size: Not Provided

Flowing GPM: **3,909 GPM**

GPM @ 20 PSI**:** **5,359 GPM**

Flow Test Location

North



East Mayo Blvd.

Flow Fire Hydrant A (630 Feet from Pressure Hydrant)

North 82nd Street

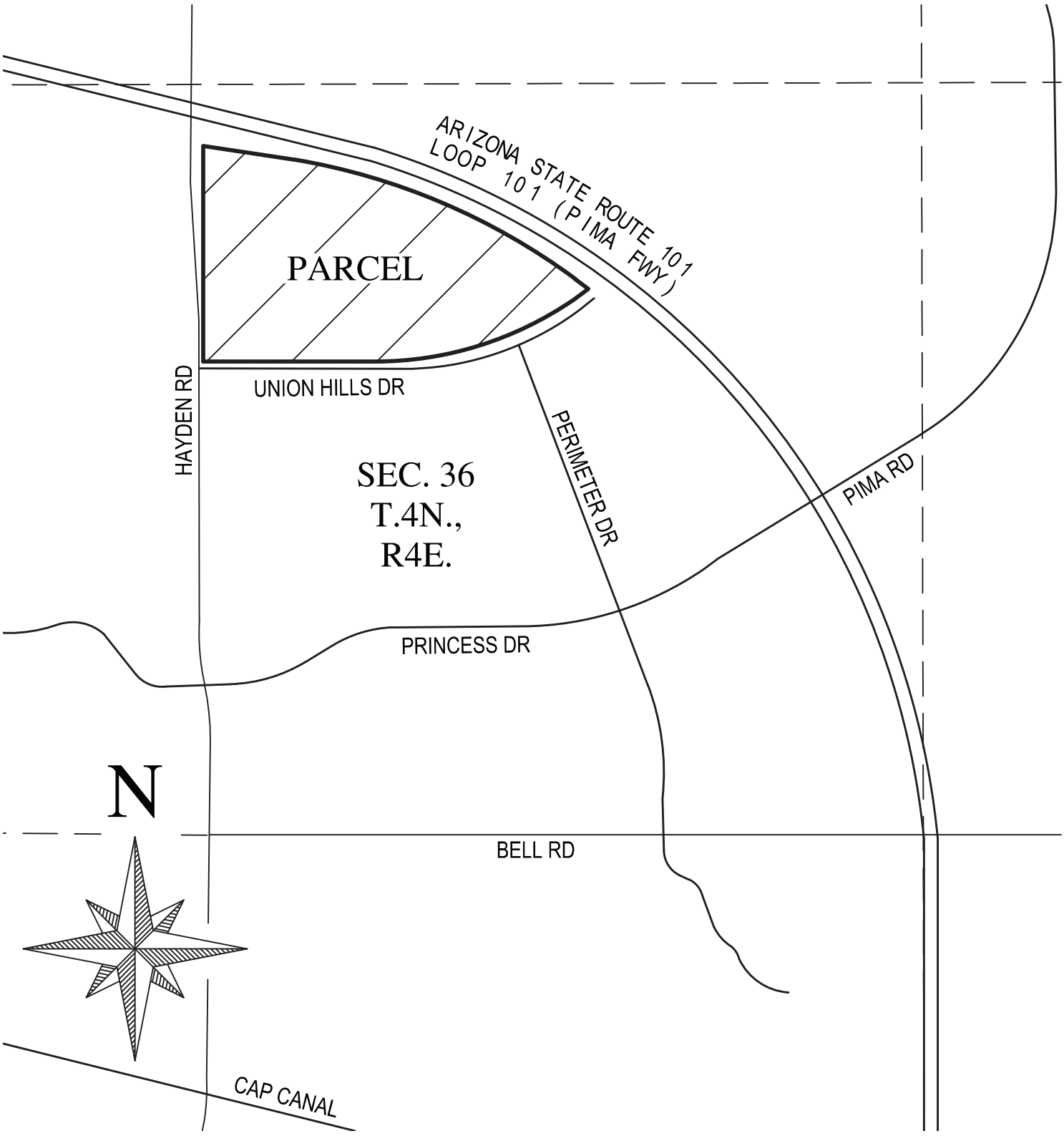
Flow Fire Hydrant B (450 Feet from Pressure Hydrant)

Pressure Fire Hydrant

North Perimeter Drive

Project Site
Union Hills & 82nd Street

VICINITY MAP



WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

VICINITY MAP

DATE	9/01/2020	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	BJ	CHECK	NEB
		DRAWN	ACH		

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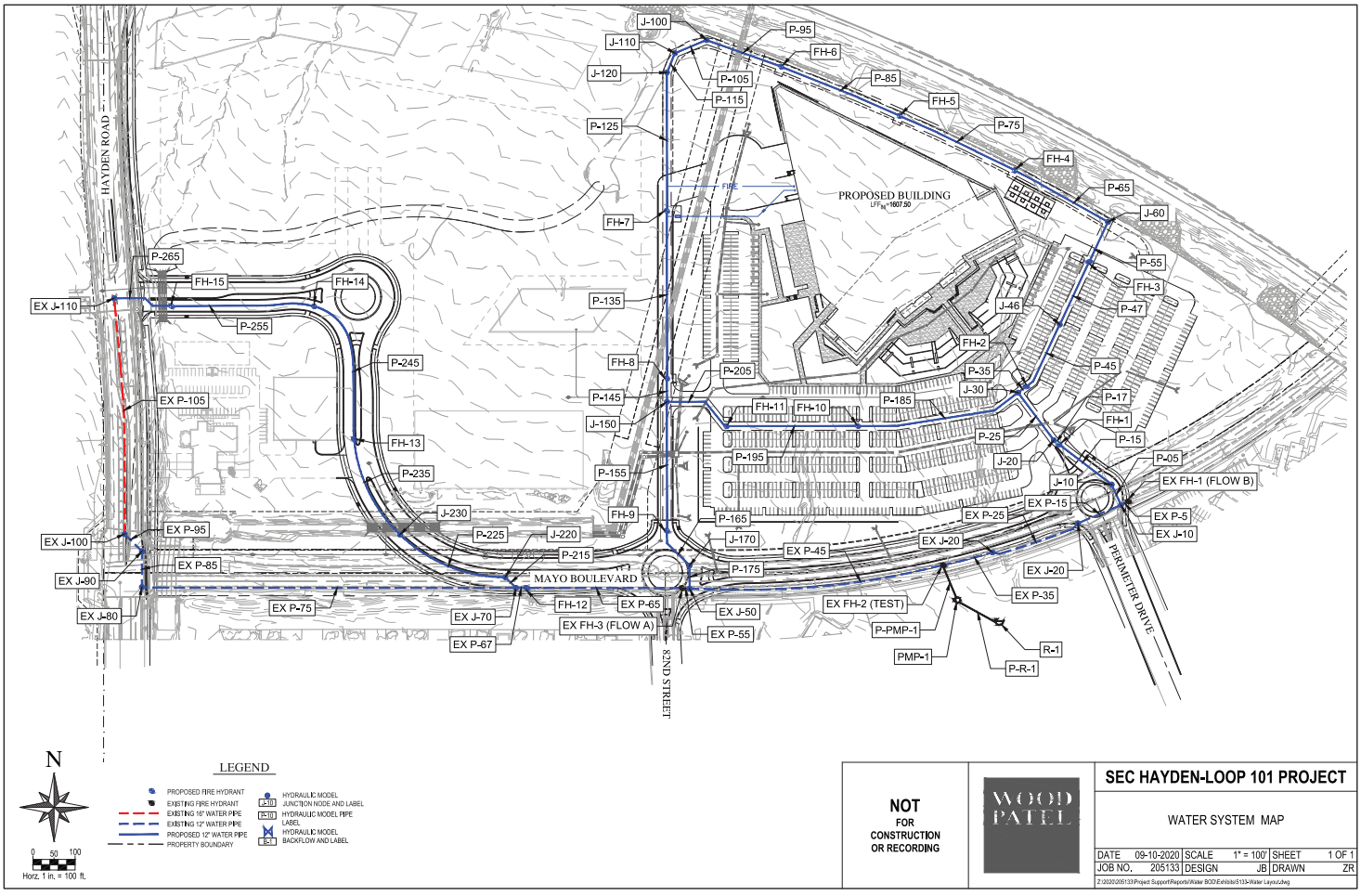
28-DR-2020
9/11/2020

WATER EXHIBIT



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

SEC HAYDEN-LOOP 101 PROJECT

WATER SYSTEM MAP

DATE	09-10-2020	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133	DESIGN	JB	DRAWN	ZR

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28-DR-2020
9/11/2020