CITY OF SCOTTSDALE

Abbreviated Water and Sewer Needs

SEWER BASIS OF DESIGN

Proposed Whataburger
7134 E Thomas Road
Scottsdale, AZ 85251

FINAL Basis of Design Report

☐ **APPROVED**

☑ **APPROVED AS NOTED**

☐ **REVISE AND RESUBMIT**

CITY OF SCOTTSDALE

SCOTTSDALE WATER

9379 E San Salvador Dr.
Scottsdale, AZ 85258

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

BY ldillon **DATE** 4/21/2020

Address comments below on submitted plans:
1) MAG 440-3 sewer service line requires cleanout to be in ROW.
2) 4X 90 degree bends shown on service line. Replace each 90 degree elbow on service lines with 2X45 degreee bends followed by cleanout.
3) No location or demolition shown of existing sewer service line. Existing line needs to be removed and permanently plugged at property line.

Prepared for:

Whataburger
300 Concord Plaza Drive
San Antonio, Texas 78216

Prepared by:

Kimley-Horn and Associates, Inc.
1001 West Southern Avenue
Mesa, Arizona 85210

291394000
March 2020

Final Sewer Basis of Design

WHATABURGER SCOTTSDALE

MARCH 2020

Prepared By:

Kimley»Horn

4-DR-2020
3/31/2020

Contents

Tables

Appendices

INTRODUCTION

INTENT

The purpose of this sewer report is to support the sanitary sewer system for the proposed Whataburger restaurant development located in the northeast corner of Thomas Road to and 71st Street in Scottsdale, Arizona. This report presents the basis of design criteria that will be used for the engineering design of the proposed development utilizing current sewer design standards and guidelines set forth by the City of Scottsdale, Arizona.

PROJECT DESCRIPTION

Whataburger Scottsdale is located within Section 27 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bound to the south by Thomas Road and to the west by 71st Street. Existing commercial developments surround the site. See **Appendix A: Site Location Map**

Whataburger Scottsdale is a proposed 1.41-acre commercial development. The existing zoning of the project is C-3.

DISTRIBUTION SYSTEM DESCRIPTION

EXISTING COLLECTION SYSTEM

The site is surrounded by existing commercial development. Per the City of Scottsdale Quarter Section Map 15-44 there is an existing 8-inch VCP sewer line in Thomas Road directly south of the site, and an 8-inch PVC sewer line in 71st Street west of the site.

PROPOSED COLLECTION SYSTEM

The proposed Whataburger gravity sewer system will connect via a new wye connection tap to the existing 8-inch PVC main in 71st Street on the west side of the site. The proposed on-site collection system will consist of approximately 226-feet of 6-inch gravity sewer line that will collect and convey wastewater flows generated by the site. Refer to **Appendix B** for the Proposed Sewer System Layout Exhibit.

BASIS OF DESIGN

DESIGN METHODOLOGY

Average Day Demand design flows are calculated based on design criteria detailed within the City of Scottsdale Design Standards and Polices Manual (DS&PM). Per DS&PM Chapter 7, a design flow of 1.2 gallons per day per SF of restaurant shall be used. The DS&PM also requires a peaking factor of 6.0. Water System Analysis. See **Table 1** below for a summary of sewer demands.

Table 1 Sewer Demands

Land Use	Demand	Building SF	Average Day Demand (gpd)	Peaking Factor	Peak Flow (gpd)	Peak Flow (gpm)
Restaurant	1.2 gpd per SF	3,583 SF	4,300	6	25,800	17.92

Per the DS&PM proposed sewer lines were designed to achieve a full flow velocity of between 2.5 and 10 feet per second and maintain a maximum d/D ration 0.65 when calculated with a Manning's "n" value of 0.013. To satisfy these requirements the proposed private 6-inch sewer lateral will be designed with a minimum slope of 0.0188 ft/ft 1.88%). See **Appendix C** for pipe slope calculations.

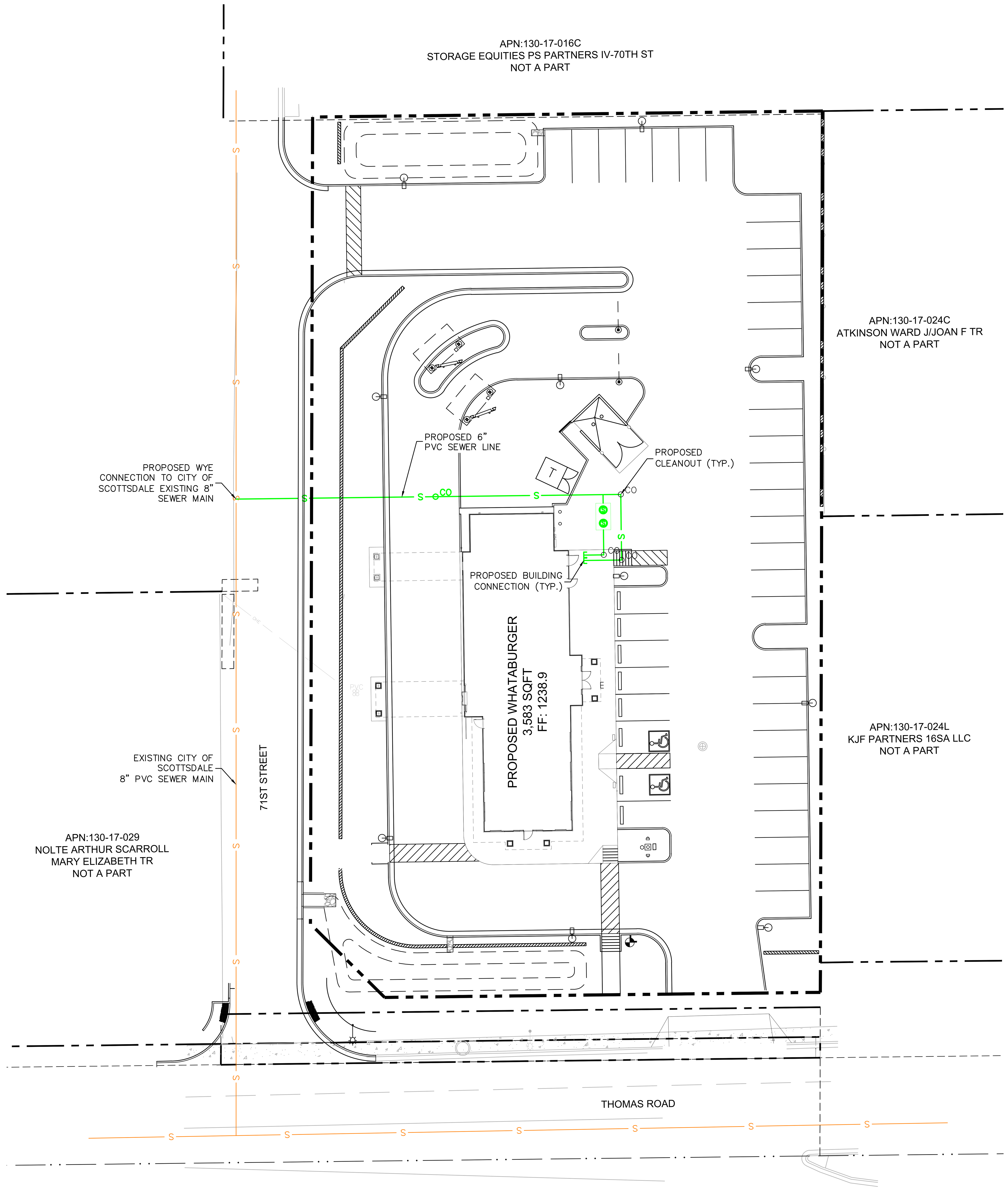
WASTEWATER SYSTEM ANAYLSIS AND RESULTS

To determine the capacity of the proposed wastewater collection system, the peak design flow was analyzed within the minimum design pipe slope. At the minimum design slope of 0.0188 ft/ft a 6-inch line has the capacity to convey approximately 497,000 gallons per day. A 6-inch line at the design slope can convey the proposed peak design flow of 25,800 gallons per day at a normal depth of 0.9' or a d/D ratio of 0.15, at a velocity of 2.06 ft/s. **See Appendix C – Flowmaster Calculations** for pipe capacity calculations.

Appendix A – Site Location Map

Appendix B – Proposed Sewer System Layout

REV	DESCRIPTION	BY	DATE	APPR



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EXISTING SEWER LINE
- PROPOSED SEWER CLEANOUT
- PROPOSED SEWER LINE

Refer to notes on more detailed utility plan provided separately but appended here.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

Kimley»Horn © 2020
1001 W Southern Ave, Suite 131
Mesa, Arizona 85210 (480) 207-2666

WHATABURGER

WHATABURGER RESTAURANT
SEWER LAYOUT EXHIBIT
7134 E THOMAS ROAD
SCOTTSDALE, AZ 85251

PROJECT No. 291394000
SCALE (H): 1"=20'
SCALE (V): NONE
DRAWN BY: MEN/PAR
DESIGN BY: PAR/HDR
CHECK BY: HDR
DATE: 3/27/20

Registered Professional Engineer (Civil)
CERTIFICATE NO. 47693
HEATHER ROBERTS
ARIZONA, U.S.A.
Exp. Date 03/31/20

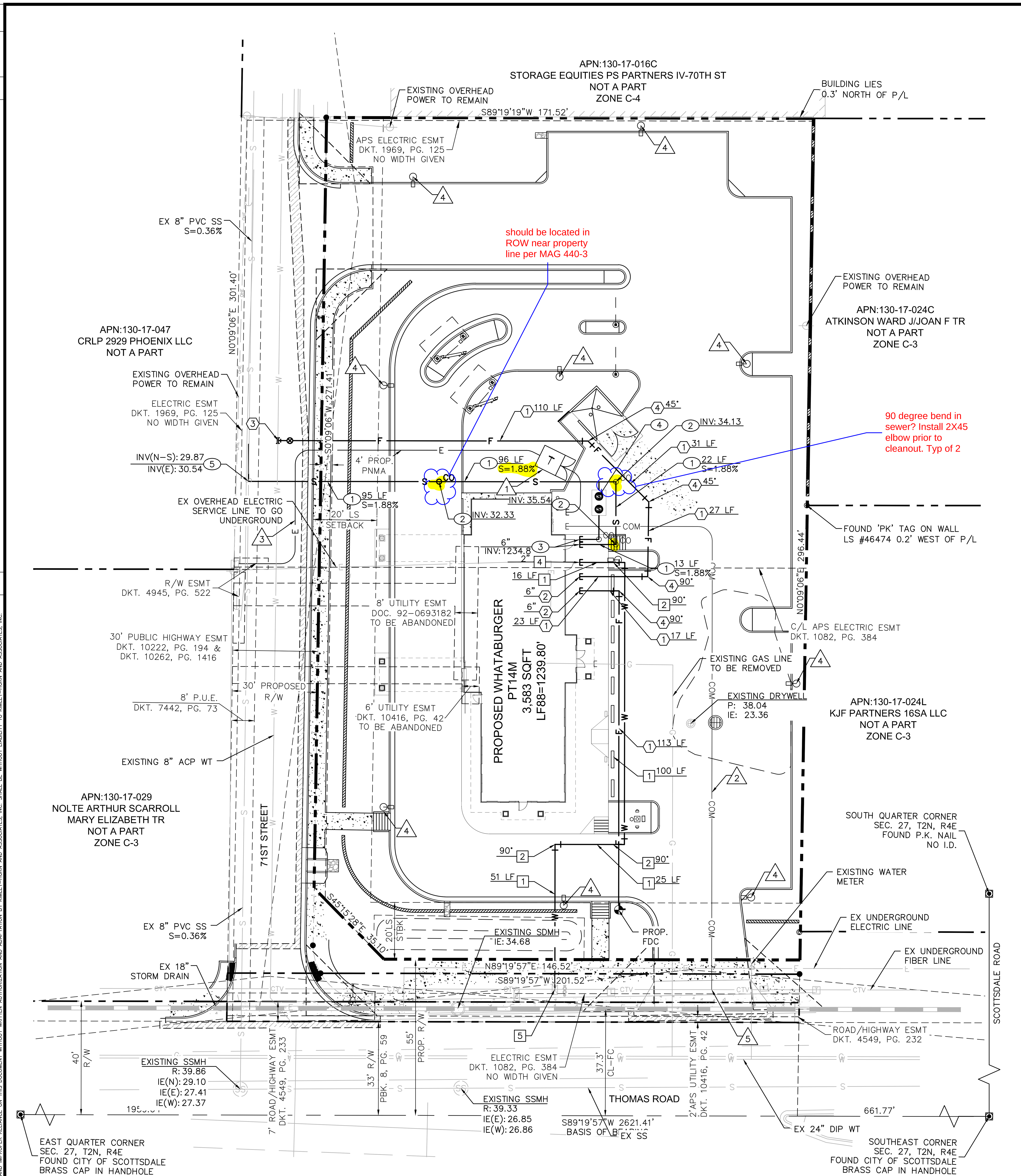
Sewer Layout.dwg

01 OF 01 SHEETS

4-DR-2020
3/31/2020

Sheet added by LDillon, submitted at same time as this report as separate case file as 4_DR_2020_V2_Utility Plan.pdf

REV	DESCRIPTION	BY	DATE	APPR



LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- STREET CENTERLINE
- EASEMENT LINE
- EXISTING SANITARY SEWER MAIN
- EXISTING PUBLIC WATER MAIN
- EXISTING GAS LINE
- EXISTING COMMUNICATION LINE
- EXISTING ELECTRIC LINE
- EXISTING STORM DRAIN
- PROPOSED DOMESTIC WATER MAIN
- PROPOSED SEWER MAIN
- PROPOSED FIRE LINE
- PROPOSED ELECTRIC LINE
- PROPOSED COMMUNICATION LINE
- PROPOSED FIRE DEPARTMENT CONNECTION
- EXISTING DRYWELL
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED GREASE TRAP

DOMESTIC WATER NOTES

1. INSTALL 2" SCH 40 PVC DOMESTIC WATER SERVICE, LENGTH PER PLAN.
2. INSTALL BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.
4. BUILDING DOMESTIC WATER CONNECTION, REF MEP PLANS FOR CONTINUATION.
5. CONNECT TO EXISTING METERED SERVICE.

FIRELINE NOTES

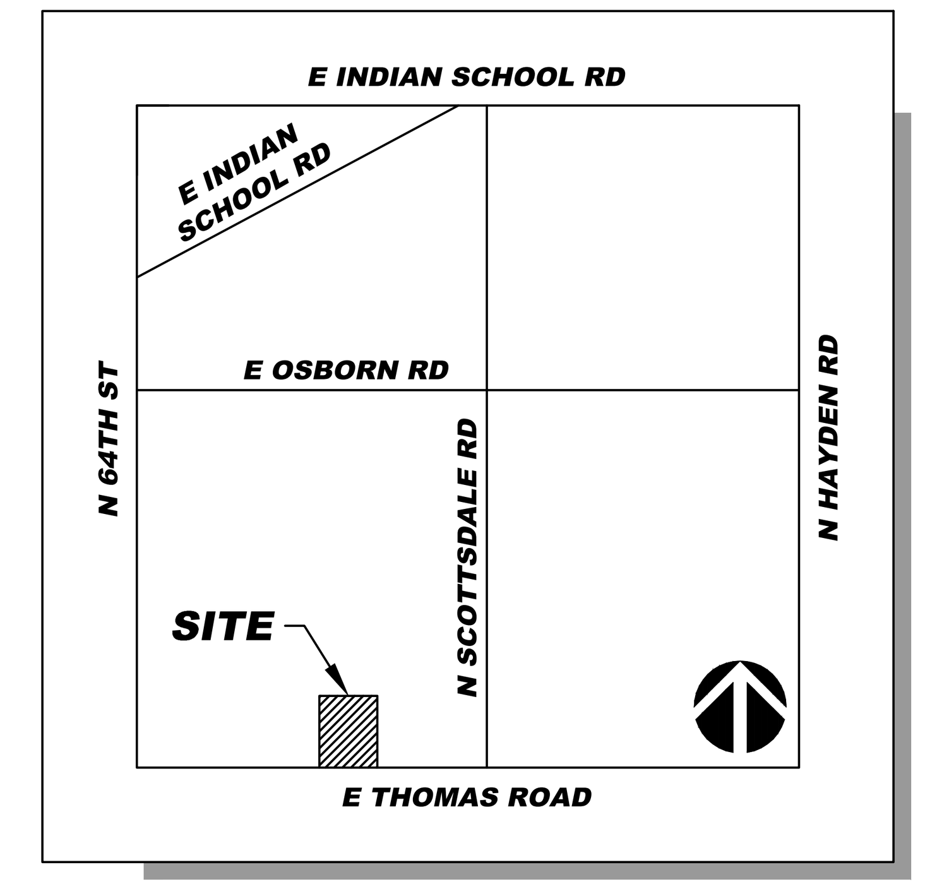
1. INSTALL 6" CLASS 350 DIP WATER MAIN POLYWRAPPED WITH TRACER WIRE, LENGTH PER PLAN, MINIMUM 3' COVER. BEDDING AND BACKFILL PER COS STD DET 2201.
2. BUILDING FIRELINE CONNECTION. INSTALL FIRELINE RISER AND BACKFLOW PREVENTOR PER COS STD DET 2369 IN FIRE RISER ROOM. REF FIRE SPRINKLER PLANS FOR CONTINUATION.
3. INSTALL 8" X 6" TS&V
4. INSTALL BEND WITH RESTRAINED JOINTS PER MAG STD DET 303, ANGLE PER PLAN.

SEWER NOTES

1. INSTALL 6" SDR 35 PVC PRIVATE SEWER MAIN, LENGTH AND SLOPE PER PLAN. ✓
2. INSTALL SEWER CLEANOUT PER MAG STD DET 441, INVERT PER PLAN.
3. CONNECT TO BUILDING SEWER AT TWO-WAY CLEANOUT, INVERT PER PLAN. REF MEP PLANS FOR CONTINUATION.
4. PROPOSED 1500 GALLON GREASE INTERCEPTOR
5. 6" SEWER SERVICE LATERAL PER MAG 440-3 ✓

DRY UTILITY CONSTRUCTION NOTES

1. PROPOSED TRANSFORMER LOCATION, REF APS PLANS FOR TRANSFORMER DETAILS.
2. INSTALL CENTURYLINK TELECOM ROUTING. CONTRACTOR SHALL JOINT TRENCH WITH APS WHERE FEASIBLE AND PROVIDE CONDUIT (2-4"), BEDDING, SHADING, AND BACKFILL. REFER TO CENTURYLINK PLANS FOR CONSTRUCTION INFORMATION.
3. INSTALL APS POWER ROUTING. REFER TO APS PLANS FOR CONSTRUCTION INFORMATION.
4. PROPOSED SITE LIGHT
5. CONNECT TO EXISTING



VICINITY MAP
MARICOPA COUNTY
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

Kimley»Horn
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1001 W Southern Ave, Suite 131
Mesa, Arizona 85210 (480) 207-2666

WHATABURGER

WHATABURGER RESTAURANT
UTILITY PLAN
7134 E THOMAS ROAD
SCOTTSDALE, AZ 85251

PROJECT No. 291394000
SCALE (H): 1"=20'
SCALE (V): ---
DRAWN BY: MEN/PAR
DESIGN BY: PAR/HDR
CHECK BY: HDR
DATE: 03/09/2020

Registered Professional Engineer
CERTIFICATE NO. 47693
HEATHER ROBERTS
Date Signed 03/30/20
ARIZONA, U.S.A.
Exp. Date 03/31/20

94000UT.dwg
C07
07 OF 10 SHEETS

Appendix C – Flowmaster Calculations

Worksheet for 6-inch Capacity

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0188	ft/ft
Normal Depth	6.0	in
Diameter	6.0	in
Discharge	497,217	gal/day

Results		
Discharge	497,217	gal/day
Normal Depth	6.0	in
Flow Area	0.2	ft²
Wetted Perimeter	1.6	ft
Hydraulic Radius	1.5	in
Top Width	0.00	ft
Critical Depth	5.3	in
Percent Full	100.0	%
Critical Slope	0.0170	ft/ft
Velocity	3.92	ft/s
Velocity Head	0.24	ft
Specific Energy	0.74	ft
Froude Number	(N/A)	
Maximum Discharge	534,859	gal/day
Discharge Full	497,217	gal/day
Slope Full	0.0188	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	6.0	in
Critical Depth	5.3	in
Channel Slope	0.0188	ft/ft
Critical Slope	0.0170	ft/ft

Worksheet for 6-inch Design

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0188	ft/ft
Diameter	6.0	in
Discharge	25,800	gal/day

Results		
Normal Depth	0.9	in
Flow Area	0.0	ft²
Wetted Perimeter	0.4	ft
Hydraulic Radius	0.6	in
Top Width	0.36	ft
Critical Depth	1.2	in
Percent Full	15.5	%
Critical Slope	0.0073	ft/ft
Velocity	2.06	ft/s
Velocity Head	0.07	ft
Specific Energy	0.14	ft
Froude Number	1.574	
Maximum Discharge	534,859	gal/day
Discharge Full	497,217	gal/day
Slope Full	0.0001	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	15.5	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.9	in
Critical Depth	1.2	in
Channel Slope	0.0188	ft/ft
Critical Slope	0.0073	ft/ft