Drainage Reports

Abbreveated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

Water Basis of Design
Prepared: November 2017

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 scan DATE 3/12/2018

Asteria Estates

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March, 2018.

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1.0 INTRODUCTION

1.1 Project Description

The purpose of this water report is to support the proposed Asteria Highlands residential development. Asteria Highlands is adjacent to the StoryRock Master Planned Community (formerly named Cavalliere Ranch), a development consisting of 462-acres of single family residential construction. A Conceptual Water Master Plan was approved October 2014 with the project Zoning Case (13-ZN-2014) and amended October 2016.

Asteria Highlands is a proposed 40-acre single family residential subdivision consisting of 33 single family residential units. Asteria Highlands is proposed to be zoned R1-70 ESL (4 lots) and R1-35 ESL (27 lots).

1.2 Project Location

Asteria Highlands is located within Section 11 of Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bound to the north by Alameda Road alignment, and the east by 128th Street, to the South by undivided land, and to the West by existing Sereno Canyon single family residential subdivision (COS#2703-07-1). See **Figure 1: Vicinity Map.**

1.3 Scope of Water Plan

This report presents the basis of design criteria that will be used for the engineering design of the proposed Asteria Highlands development. This report will establish the final water system demands for the project and the water system infrastructure required to serve the development. Finally, the report will show the development of this site is in conformance with the approved regional Conceptual Water Master Plan.

All design criteria that is presented in this report will conform to the City of Scottsdale Design Standards & Polices Manual (DS&PM).

Figure 1: Vicinity Map

2.0 EXISTING SITE CONDITIONS AND WATER SYSTEMS

2.1 Site Conditions

The project is undeveloped natural desert. Based on a review of City Quarter Section maps; no city water infrastructure exists on-site. Many washes and rock features of varying sizes characterize the site. The on-site washes vary in size and depth, but generally flow from the southwest to the northeast or east through the site. Multiple ridgelines run though the site, in the general direction of southwest to northeast. Elevations across the Asteria Highlands site range from approximately 2775' in the southwest to 2695' in the northeast.

2.2 Adjacent Water Systems

Directly to the west of the project is the development of Sereno Canyon. A majority of the project infrastructure has been constructed, though none of the lots have been developed. An existing zone 13 booster pump station (PS 145) is located at Alameda Road and the 122th Street alignment, near the west edge of Sereno Canyon. The booster pump station is proposed to serve the area. PS 145 is comprised of three 500 gpm pumps and a 1,750 gpm fire flow booster pump, connected to a 12,000-gallon tank. One of the pumps is required to be kept as a redundant pump. Additionally, there is space for a 4th domestic pump. All liens associated with the Sereno Canyon improvements of the booster pump station for 13 of the 31 lots have been resolved with the Tiara Estates final plat.

A 12-inch zone 13 waterline exists in the Alameda Road Alignment in Sereno Canyon Phase III "Tract B", with a stub at the Asteria Highlands western boundary.

2.3 Existing Pressure Zones

Based on site elevations City of Scottsdale DS&PM, the Asteria Highlands site falls entirely within City of Scottsdale pressure zone 13. Sereno Canyon to the west primarily operates in the same pressure zone 13. There is a planned pressure reducing valve (PRV) on the 12-inch line in 128th Street just North of the project, which reduces the line to pressure zone 12.

2.4 Phasing and Existing Development

The Asteria Highlands project is planned to run concurrently with the construction of 128th Street improvements by StoryRock. Asteria Highlands is not dependent on the 12-inch waterline and PRV located North of the Alameda Road alignment in 128th Street that is being constructed by StoryRock. Asteria Highlands will be served from the existing zone 13 water line in the Alameda Road alignment at the Northwest corner of the project. The 12-inch zone 13 water line will be extended east in the Alameda Road alignment to 128th street with this project. An additional 12-inch zone 13 waterline will be constructed with Phase 4 of Sereno Canyon that will ultimately loop the zone 13 water system for the two developments and future phases of StoryRock. Asteria Highlands will

be serviced from the single 12-inch waterline located in the Alameda Road Alignment until the Sereno Canyon Phase 4 connection is developed.

3.0 Proposed Water System

3.1 General Discussion

The proposed water system for Asteria Highlands consists of a 12-inch waterline within 128th Street along the projects frontage, a 12-inch waterline being extended along the northern boundary (Alameda Road alignment) to 128th Street and 8-inch water lines internal to the development.

3.2 Proposed Distribution System

The proposed on-site distribution system will consist of 8-inch and 12-inch Class 350 DIP water lines that will provide potable water and fire protection. Asteria Highlands will operate entirely in pressure zone 13. Water mains onsite will reside in a minimum of a 20' wide tract and/or easement under either a paved or decomposed granite surface that will meet fire department emergency access requirements.

The off-site waterline needed to serve Asteria Highlands is currently stubbed to the northwest corner of the site in the Alameda Road Alignment and will be extended to 128th street with this project. An additional 12-inch zone 13 waterline will be extended through Sereno Canyon Phase 4 by future development of StoryRock and/or Sereno Canyon ultimately looping the zone 13 water system. Asteria Highlands will be serviced from the single 12-inch waterline located in the Alameda Road Alignment until the Sereno Canyon Phase 4 connection is developed.

See **Figure 2: Water System Layout** for proposed waterline locations.

Figure 2: Water System Layout

4.0 METHODOLOGY AND CALCULATIONS

4.1 General Discussion

The proposed water distribution system for Asteria Highlands has been designed to provide the calculated domestic and fire flow demands for the project, while maintaining required operating pressures. The design criterion conforms to the approved Conceptual Water Master Plan and is based on requirements described within the City of Scottsdale Design Standards and Policies Manual (DS&PM).

4.2 Water Demands, Fire Flows, Pressures

The proposed water distribution system for the project was modeled with the StoryRock Master Water Report. This model assumed more Dwelling units than is currently proposed with the Asteria Highlands development.

The model consisted of 4 design scenarios: Average Day, Max Day, Peak Hour, and Max Day plus Fire Flow. Average Day Demands are based on Figure 6.1-2 in the DS&PM, with peaking factors per section 6-1.404. A fire flow of 1,000 gpm per section 6-1.501 of the DS&PM was used. See **Table 1** below for a summary of water demands. According to Section 6-1.407 of the DSPM, distribution systems shall be designed with a minimum residual pressure of 50 psi and a maximum static pressure of 120 psi. For fire flow scenarios, a minimum design pressure of 30 psi is required.

Table 1: Water Demands

	Land Use	Dwelling Units (du)	Average Daily Demand (gpd/du)	Average Daily Flow (gpd)	ADF (gpm)	Max Day Flow (gpd)	MDF (gpm)	Peak Hour Flow (gpd)	PHF (gpm)
Proposed Asteria Highlands Site	<2 du/ac	31	485.6	15,054	10	30,107	21	52,689	37
StoryRock Master Water Plan	<2 du/ac	40	485.6	19,424	13	38,848	27	67,987	47

4.3 Results

Based on the results of the hydraulic modeling from the StoryRock Master Water Plan, the proposed water distribution system can provide the required domestic and fire flow water demands to the project while maintaining required operating pressures. The 8-inch distribution system with a 12-inch line located in 128th street provides adequate flow for both domestic and fire flow scenarios. The proposed hydrant elevations for the site range from 2711 to 2752, all of which fall entirely into pressure zone 13. This ensures

that all proposed pads and hydrants will have all the required flows and pressures. See **Table 2** below for a summary of the StoryRock Master Water Plan model results and the corresponding effects on the proposed Asteria Highlands development.

Table 2: Water Results

	Analysis Point	Elevation	Average Daily Pressure (psi)	Max Day Pressure (psi)	Peak Hour Pressure (psi)	Max Day + Fire Pressure (psi)
StoryRock Master Water Plan	J-5	2,694	116.3	115.9	114.1	55.6
Proposed Asteria Highlands	Highest Hydrant	2,752	91.2	90.8	89.0	30.5
Proposed Asteria Highlands	Low Pad	2,716	106.8	106.4	104.6	46.1

See **Appendix A** for complete results of the StoryRock Master Plan hydraulic models.

The proposed hydrant locations and elevations were considered to show the proposed development will still have adequate pressures after elevation head loss. Due to the decreased demand from the StoryRock Master Water Plan model to the proposed site, this is a conservative approximation of the actual pressures in the Asteria Highlands development.

Appendix A – StoryRock Master Water Plan