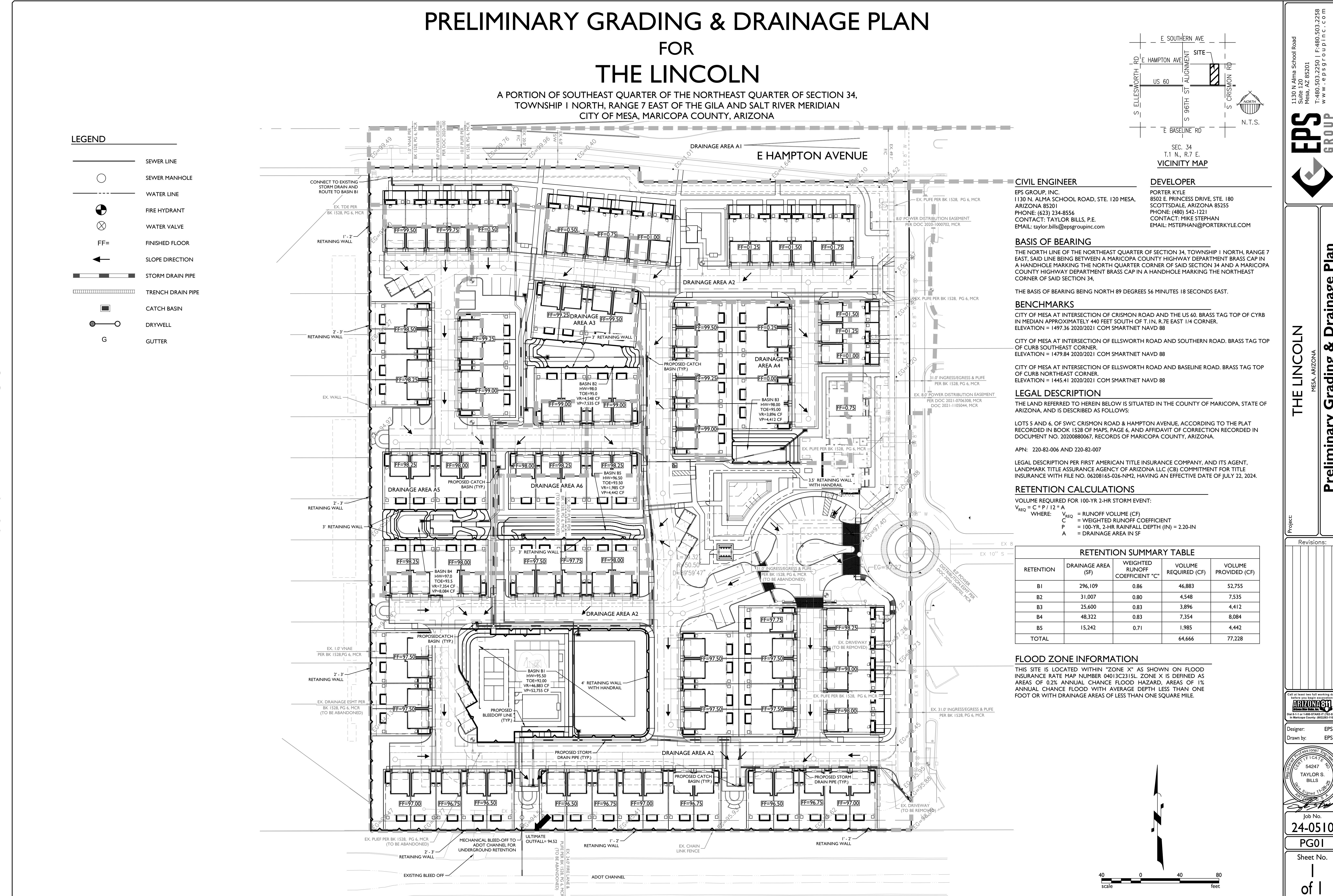


24-0510 - THE LINCOLN





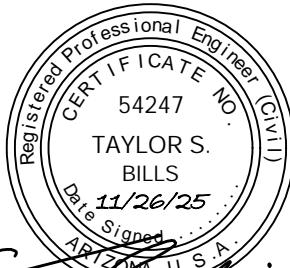
Preliminary Drainage Report

For

The Lincoln
Mesa, Arizona

Owner/Developer

Porter-Kyle
8502 E. Princess Drive, Suite 180
Scottsdale, AZ 85255
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Project No. 24-0510

Date: November 2025

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Appendix A

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Appendix B

Retention Calculations

1.0 Introduction

The Lincoln (the Project) is a proposed 370,785 square feet townhome (8.51 ac) site with 102 units located approximately 370 feet west of the E Hampton Ave and S Crisman Rd intersection. The Project can be further located in the Northeast quarter of Section 34, Township 1 North, Range 7 East of the Gila and Salt River Meridian, Maricopa County, Arizona, Assessor Parcel Numbers (APN) 220-82-007 and 220-82-006. See **Figure 1**.

The Project is an infill development bound by Hampton Ave to the north, an existing commercial development to the east, an ADOT drainage channel to the south, and an existing single-family subdivision to the west.

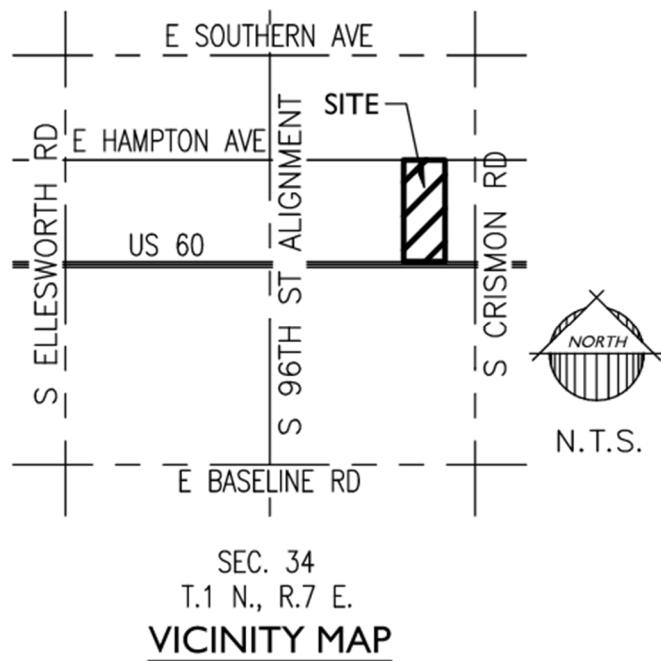


Figure 1 - Vicinity Map

1.1 Project Description

The Project consists of 102 attached garage townhome style units and a clubhouse, landscape, on-site parking, and associated amenities.

2.0 Project Background

2.1 National Flood Insurance Program

This site is located within FEMA Flood Zone X as shown on FEMA Flood Insurance Rate Map 04013C2315L dated October 16, 2013. See **Figure 2**.

Flood Zone X is defined as:

Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than one (1) foot or with drainage areas less than one (1) square mile; and areas protected by levees from 1% annual chance flood.

National Flood Hazard Layer FIRMette

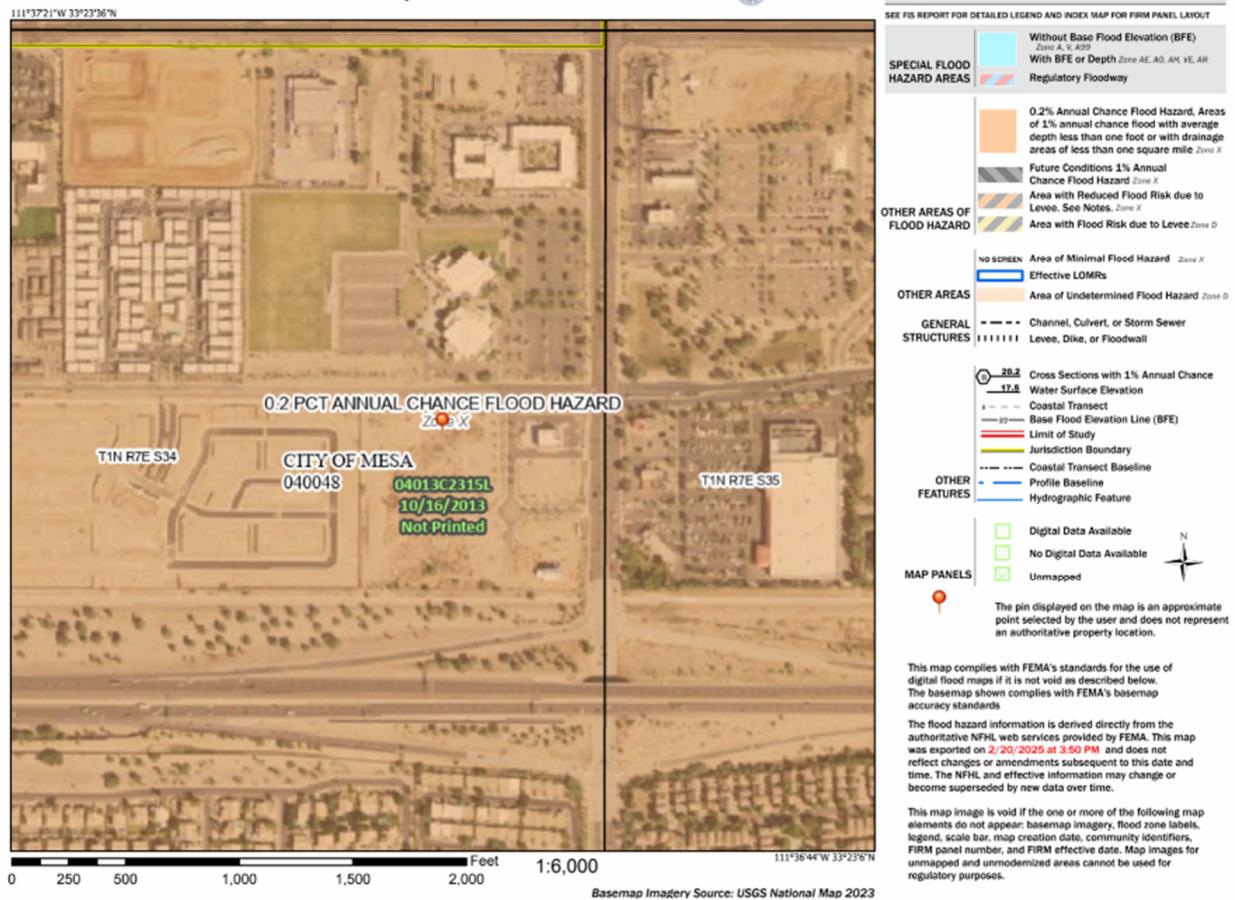


Figure 2 - FIRMette

3.0 Existing Onsite Conditions

The natural grade for this area slopes from northeast to southwest at approximately 1.0 percent. The site is currently undeveloped land with a temporary retention basin along the frontage on E Hampton Ave and the southeast corner of the site.

4.0 Offsite Retention

Offsite drainage generated within the half-street of E Hampton Ave will be collected by an existing catch basin at the northwest corner of the site and routed to onsite retention basins meeting the capacity requirements of the design storm event per City of Mesa design guidelines.

5.0 Onsite Retention

Onsite drainage will be captured and retained onsite up to the 100-year 2-hour storm event according to all City of Mesa standards and guidelines. Finished grades have been designed for runoff to drain away from buildings, to catch basins, and then to above ground retention basins. Three (3) of the retention basins (Basins B2, B3, & B5) are 3' maximum depth with 4:1 side slopes or retaining walls along the perimeter. The two retention basins (Basin B1 & B4) with amenities in them are 3.5' deep with the amenities located 1.5' above basin bottom. These basins have 4:1 side slopes or retaining walls along the perimeter. Finished floor elevations are designed to be a minimum of 14 inches above the ultimate site outfall or 12 inches above the lowest adjacent gutter elevation, whichever is higher.

See **Appendix A** for an illustration of the basin names and area designations, and **Appendix B** for retention calculations.

6.0 Retention Percolation

Storm water disposal will be by bleed-off to the existing bleed-off pipe at the southern boundary of the site which outfalls to the ADOT channel. All storm water is to be disposed of within 24 to 36 hours.

7.0 Methodology and Criteria

The following section provides an overview of the rational method and time of concentration used during final design.

7.1 Rational Method

The Rational Method will be used to calculate storm drain peak flows at critical locations in the development. As outlined in the Maricopa County Drainage Manual Volume 2, the Rational Method was applied. The storm drain peak flows were calculated as follows:

$$Q_p = CIA_d$$

where:

C = Composite runoff coefficient (Calculations shown in **Appendix B**.)

I = Intensity corresponding to T_c

A_d = Area in acres

7.2 Time of Concentration

Inlet time estimated, system time established based on summation of travel time in system and initial time of concentration based upon the following equation:

$$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

where:

T_c = Time of concentration (hrs): minimum of 5 minutes

L = Length of the longest flow path (miles)

K_b = Watershed resistance coefficient – (See Maricopa County Drainage Manual, Hydrology)

S = Watercourse slope (ft/mi)

i = Rainfall intensity (in/hr)

7.3 Manning's Equation

The street capacities will be calculated using Manning's equation:

$$Q = \frac{1.486AR^{2/3}S^{0.5}}{n}$$

where:

S = Street longitudinal slope (ft/ft)

A = Flow Area (sq. ft)

R = Hydraulic Radius (ft)

n = Manning's roughness coefficient = (0.015)

7.4 Catch Basin Design

The inlet capacity of an in-sump curb opening is determined by using the following formula:

$$Q_i = C_w(L + 1.8W)d^{1.5}$$

where:

C_w = Weir coefficient (2.3)

L = Length of Curb Opening (ft)

W = Width of grate or depressed gutter (ft)

d = Curb depth at curb opening (ft)

The inlet capacity of an in-sump grated inlet is determined by using the following equation:

$$Q_i = C_w P d^{1.5}$$

where:

C_w = Weir coefficient (3.0)

P = Perimeter of grate, disregarding bars and sides against curb (ft)

d = Curb depth at curb opening (ft)

7.5 Storm Drains

The following equations was used to analyze storm drain hydraulics:

$$HGL_{End} = HGL_{Begin} + L_f + L_m$$

where:

L_m = Minor Losses

$L_f = S_f \times \text{Pipe length}$

$$S_f = \text{Friction Slope} = K \frac{V^2 I}{2gR^{1.33}}$$

where:

K = Loss coefficient (0.00492)

V = Velocity assuming flowing full

g = Gravity constant (32.2 $\frac{ft}{s^2}$)

R = Hydraulic radius (ft)

7.6 Onsite Retention Requirements

The following section outlines the design requirements governing the design of onsite retention basins as outlined in the City of Mesa Engineering & Design Standards Section 806.

7.6.1 Required Retention Volume

$$V_{required} = \frac{CDA}{12}$$

where:

C = Runoff Coefficient

D = Depth of Precipitation (2.20 inches per City of Mesa Design Standards)

A = Area (acres)

7.7 Ultimate Outfall and Finished Floor

The Project has an ultimate outfall located near the southwest corner of the site at an elevation of 1494.52. Building finished floors have been designed to be a minimum of 14 inches above the ultimate outfall or 12 inches above the lowest adjacent gutter elevation, whichever is higher.

8.0 Conclusions

This report concluded that:

- The Project has been designed in accordance with the Flood Control District of Maricopa County standards and City of Mesa Engineering Department Engineering & Design Standards 2023.
- The Project does not create adverse impacts on any downstream property.
- The Ultimate Outfall is near the southwest corner of the site, at an elevation of 1494.52.
- Retention basins distributed throughout the site will provide the retention needed for the Project.
- The half-street of E Hampton Ave will be collected by an existing inlet and routed to onsite retention basin.

9.0 References

City of Mesa. (2023). Engineering & Design Standards Manual. Mesa, Arizona, United States.

Flood Control District of Maricopa County. (2018). 2018 Drainage Design Manual for Maricopa County, AZ Volume 1: Hydrology. Maricopa County, Arizona, USA.

Flood Control District of Maricopa County. (2018). 2018 Drainage Design Manual for Maricopa County, AZ Volume 2: Hydraulics. Maricopa County, AZ, USA.

Appendix A

Figures

National Flood Hazard Layer FIRMette



Legend

111°37'21"W 33°23'36"N

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

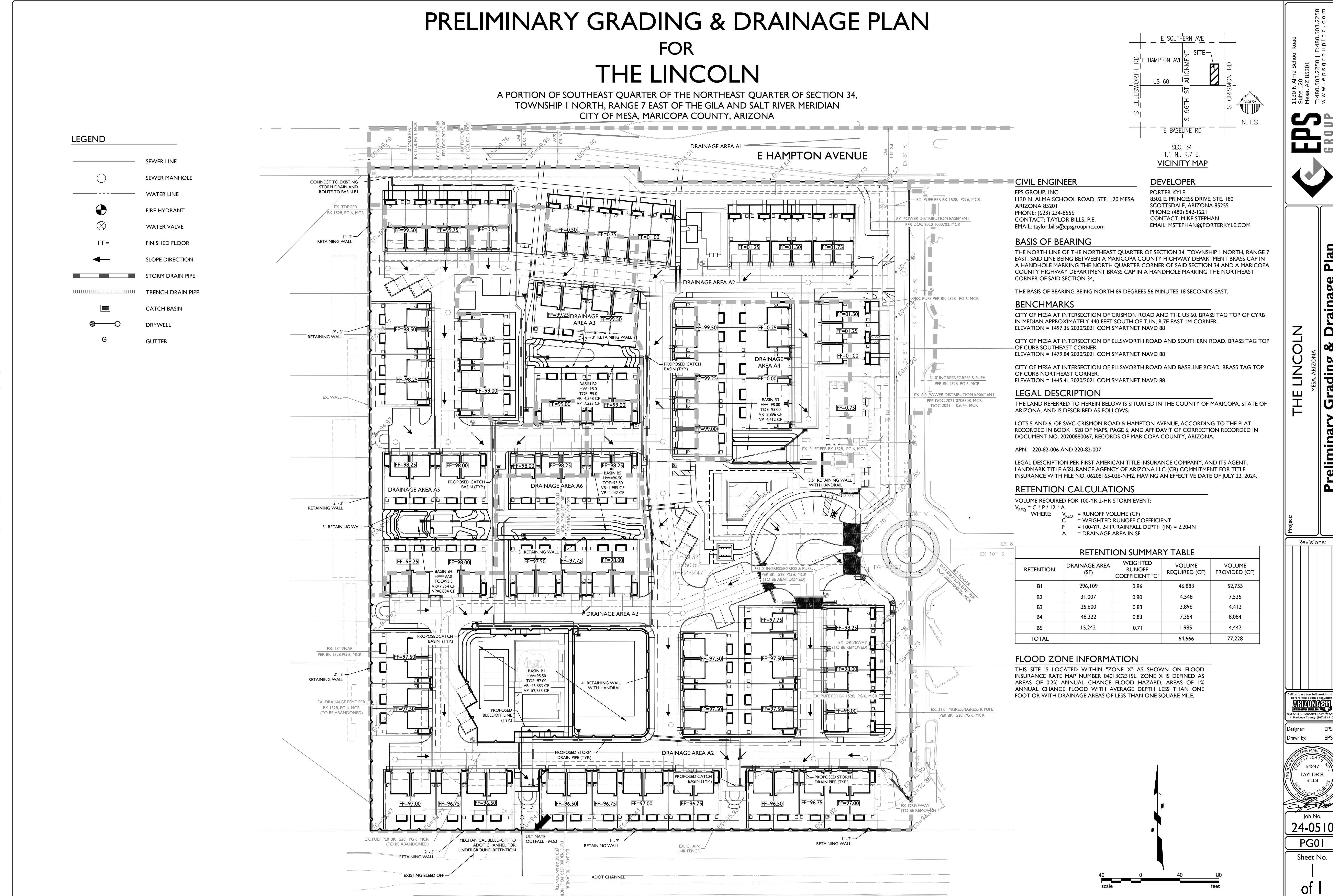
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **2/20/2025 at 3:50 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRMS effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

111°36'44"W 33°23'6"N
Basemap Imagery Source: USGS National Map 2023

111°37'21"W 33°23'36"N
Basemap Imagery Source: USGS National Map 2023

24-0510 - THE LINCOLN



Appendix B

Retention Calculations

Weighted Runoff Coefficient by Area

Project: The Lincoln

Prepared By: Antonio Andrade

Date: 11/26/2025

Sub Basin Area: A1 (Offsites)

Area Description	C	Area
Roofs and Concrete	0.95	40,251
Desert Landscaping	0.50	0
Total Area	40,251	
Weighted C	0.95	

Sub Basin Area: A2

Area Description	C	Area
Roofs and Concrete	0.95	199,001
Desert Landscaping	0.50	56,857
Total Area	255,858	
Weighted C	0.85	

Sub Basin Area: A3

Area Description	C	Area
Roofs and Concrete	0.95	20,485
Desert Landscaping	0.50	10,522
Total Area	31,007	
Weighted C	0.80	

Sub Basin Area: A4

Area Description	C	Area
Roofs and Concrete	0.95	18,615
Desert Landscaping	0.50	6,985
Total Area	25,600	
Weighted C	0.83	

Sub Basin Area: A5

Area Description	C	Area
Roofs and Concrete	0.95	34,957
Desert Landscaping	0.50	13,365
Total Area	48,322	
Weighted C	0.83	

Sub Basin Area: A6

Area Description	C	Area
Roofs and Concrete	0.95	7,216
Desert Landscaping	0.50	8,026
Total Area	15,242	
Weighted C	0.71	

Retention Calculations

Project: The Lincoln

Storm Event: 100-yr, 2-hr

Prepared by: Antonio Andrade

11/26/25

$$V = C * A * P / 12$$

Where:

V = Runoff Volume

C = Runoff Coefficient

A = Drainage Area

P = 2.20 in

Surface Retention Basin Volume Provided

Basin ID	Elevation	Area (ft ²)	Incremental Volume (ft ³)	Volume Provided, V _p (ft ³)
----------	-----------	-------------------------	---------------------------------------	--

B1	92	7,855		
	92.5	8,587	4,111	
	93.5	9,150	8,869	
	93.5	19,434	-	
	94.5	19,877	19,656	
	95.5	20,361	20,119	52,755

B2	95	2,127		
	96	2,376	2,252	
	97	2,635	2,506	
	98	2,917	2,777	7,535

B3	95	983		
	96	1,290	1,137	
	97	1,629	1,460	
	98	1,999	1,815	4,412

B4	93.5	751		
	94	1,329	520	
	95	2,048	1,689	
	95	2,510	-	
	96	2,953	2,732	
	97	3,332	3,143	8,084

B5	93.5	578		
	94.5	1,092	836	
	95.5	1,784	1,439	
	96.5	2,549	2,167	4,442

Total Surface Retention 77,228

Retention Calculations

Project: The Lincoln

Storm Event: 100-yr, 2-hr

Prepared by: Antonio Andrade

11/26/25

Volume Required and Summary

<i>Basin ID</i>	<i>Sub-Basin ID</i>	<i>Sub Basin Area Description</i>	<i>Area</i>	<i>C</i>	<i>Volume Required, V_R (ft³)</i>	<i>Volume Provided, V_p (ft³)</i>
B1	A1 (Offsite) A2	Offsite	40,251	0.95	7,011	
		Onsite	255,858	0.85	39,872	
		Total	296,109	0.86	46,883	52,755
B2	A3	Onsite	31,007	0.80	4,548	
		Total	31,007		4,548	7,535
B3	A4	Onsite	25,600	0.83	3,896	
		Total	25,600		3,896	4,412
B4	A5	A5	48,322	0.83	7,354	
		Total	48,322		7,354	8,084
B5	A6	Onsite	15,242	0.71	1,985	
		Total	15,242		1,985	4,442



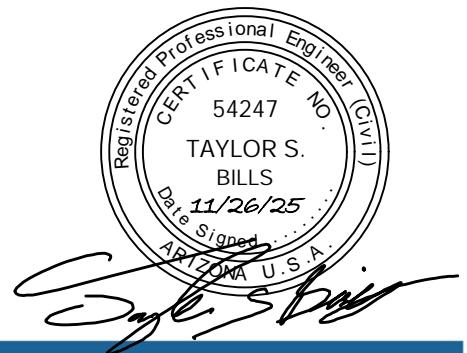
Preliminary Sewer Report

For

The Lincoln
Mesa, Arizona

Owner/Developer

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Phone: 480.542.1221
Contact: Mike Stephan
Email: mstephan@porterkyle.com



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Appendix A

Preliminary Utility Plan

Appendix B

Sewer Demand Calculations

1.0 Introduction

The Lincoln (the Project) is a proposed 370,785 square feet townhome (8.51 ac) site with 102 units located approximately 370 feet west of the E Hampton Ave and S Crisman Rd intersection. The Project can be further located in the Northeast quarter of Section 34, Township 1 North, Range 7 East of the Gila and Salt River Meridian, Maricopa County, Arizona, Assessor Parcel Numbers (APN) 220-82-007 and 220-82-006. See **Figure 1**.

The Project is an infill development bound by Hampton Ave to the north, an existing commercial development to the east, an ADOT drainage channel to the south, and an existing single-family subdivision to the west.

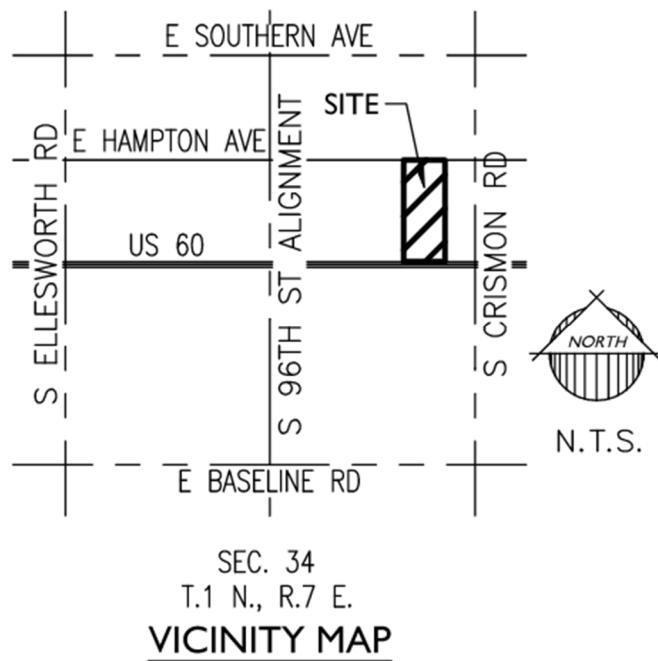


Figure 1 - Vicinity Map

1.1 Project Description

The Project consists of 102 attached garage townhome style units and a clubhouse, landscape, on-site parking, and associated amenities.

2.0 Existing Conditions

There is an existing 10-inch public PVC sewer that is extended to the project site from the shared east-west access drive with the existing development to the east and existing 8-inch public sewer within the existing north-south access drive on the east side of the project site that is owned and maintained by the City of Mesa.

3.0 Sewer Design

The calculations of sewer flow and pipe sizing in this report are based on system design criteria in the City of Mesa Engineering & Design Standards dated 2023, as well as Title 18, Chapter 9 of the Arizona Administrative Code, and regionally accepted design standards.

On-site wastewater flow for the Project will be conveyed via 4-inch services to each of the units. We will connect to the existing 10-inch stub into the site and route a new public 8-inch main through out the site to collect wastewater from the development and outfall to the existing 10-inch public main within shared east-west access to the east of the project site.

All on-site lines were sized taking into consideration prospective flows for the project, minimum pipe sizes, and slopes. See **Appendix A** for the sewer design layout.

The average daily sewer demand used was estimated as outlined in the City of Mesa Engineering & Design Standards. A peaking factor of 3.0 was applied to all flows less than 1.0 MGD per Table 4.3. Refer to **Appendix B** for demand calculations.

The design criteria for this project follow:

- Average use per Table 4.1 and 4.2 (City of Mesa, 2023)
- Peaking Factor = 3.0 per Table 4.3 (City of Mesa, 2023)

3.1 Calculations

Sewer demand for the Project is based on the following criteria:

$$\text{Average Daily Flow} = \text{Average Unit Daily Flow} * \# \text{ of Units}$$

$$\text{Peak Hour Discharge} = \text{Average Daily Flow} * \text{Peaking Factor}$$

Capacity (Q) is calculated by the following equation:

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Where:

$$n = 0.013$$

A= Cross Sectional Area R = Hydraulic Radius

S = Slope

See **Appendix B** for the Average Daily and Peak Hour sewer demand calculations.

4.0 Conclusions

- City of Mesa Engineering & Design Standards, dated 2023, as well as Title 18, Chapter 9 of the Arizona Administrative Code and regionally accepted design standards have been met.
- All on-site sewer lines are gravity-fed and are designed to have a full flow velocity of 2.5 ft/s minimum and 9 ft/s maximum.
- The development proposes to route a new public main throughout the site that will outfall to the existing 10-inch PVC sewer main within shared east-west access to the east of the project site.
- Total peak demand for the project is 54,669 gallons per day (0.085 cfs).

5.0 References

City of Mesa. (2023, October). Engineering & Design Standards. Mesa, AZ, USA.

International Code Council. (2017, August 31). International Building Code 2018.

State of Arizona. (2022). Arizona Administrative Code. Arizona, USA.

Appendix A

Preliminary Utility Plan

Appendix B

Sewer Demand Calculations

The Lincoln
24-0510
Municipality Mesa, AZ
Location SWC of Hampton Ave and Crismon Rd

Wastewater Demand per Building

Building ID	Land Use	# of Units sf	unit	Unit Demand gpd/unit	Avg Daily Flow - AD gpd	gpm	Peak Flow (ADx3) gpd	gpm
Townhomes	Residential	102	ea	160.0	16,320	11.33	48,960	34.00
Clubhouse	Commercial/Retail	3,806	sf	0.5	1,903	1.32	5,709	3.96
Total					18,223	12.65	54,669	37.96

Summary

Wastewater Demands

Peak Flow 37.96 gpm
 0.08 cfs

Note: Wastewater Demand is per COM EDS Section 411, Table 4.2, peaking factors per Table 4.3

proposed Sewer 8" @ 0.33%

8" Capacity at d/D of 0.67 = 0.55 cfs = 352,643 gpd = 244.89 gpm

Existing Sewer 10" @ 0.25%

10" Capacity at d/D of 0.67 = 0.86 cfs = 556,513 gpd = 386.47 gpm